Enterasys® Wireless

Convergence Software

User Guide

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enterasys®

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About This Guide

This guide describes how to install, configure, and manage the Enterasys Wireless Convergence Software system. This guide is also available as an online help system.

To Access the Online Help System:

1. In the Enterasys Wireless Assistant Top Menu bar, click **Help**.
2. The online help system is launched.

Intended Audience

This guide is a reference for system administrators who install and manage the Enterasys Wireless system.

Any administrator performing tasks described in this guide must have an account with administrative privileges.

How to Use This Guide

This preface provides an overview of this guide and a brief summary of each chapter, defines the conventions used in this document; and instructs how to obtain technical support from Enterasys Networks. To locate information about various subjects in this guide, refer to the following table.

For...	Refer to...
An overview of the product, its features and functionality.	Chapter 1, Overview of the Enterasys Wireless Convergence Software Solution
Information about how to perform the installation, first time setup and configuration of the Enterasys Wireless Controller, as well as configuring the data ports and defining routing.	Chapter 2, Configuring the Enterasys Wireless Controller
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An overview of topologies and provides detailed information about how to configure them.	Chapter 4, Configuring Topologies
An overview of policies and provides detailed information about how to configure them.	Chapter 5, Configuring Policies
An overview of WLAN services and provides detailed information about how to configure them.	Chapter 6, Configuring WLAN Services
An overview of Virtual Network Services (VNS), provides detailed instructions in how to configure a VNS, either using the Wizards or by manually creating the component parts of a VNS.	Chapter 7, Configuring a VNS

For...	Refer to...
Information about configuring Classes of Service (CoS) which are a configuration entity containing QoS Marking (802.1p and ToS/DSCP), Inbound/Outbound Rate Limiting and Transmit Queue Assignments.	Chapter 8, Configuring Classes of Service
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Information on how to set up the mobility domain that provides mobility for a wireless device user when the user roams from one Wireless AP to another in the mobility domain.	Chapter 12, Configuring Mobility
Information on how to use the Enterasys Wireless Convergence Software features with third-party wireless access points.	Chapter 13, Working with Third-party APs
Information on the security tool that scans for, detects, and reports on rogue APs.	Chapter 14, Working with the Mitigator
Information on the various reports and displays available in the Enterasys Wireless Convergence Software system.	Chapter 15, Working with Reports and Displays
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The default GuestPortal ticket page source code.	Appendix C, Default GuestPortal Source Code

Formatting Conventions

The Enterasys Wireless Convergence Software documentation uses the following formatting conventions to make it easier to find information and follow procedures:

- **Bold** text is used to identify components of the management interface, such as menu items and section of pages, as well as the names of buttons and text boxes.

  For example: Click **Logout**.

- `Monospace` font is used in code examples and to indicate text that you type.

  For example: Type `https://<hwc-address>[:mgmt-port]`
- The following notes are used to draw your attention to additional information:

Note: Notes identify useful information, such as reminders, tips, or other ways to perform a task.

Caution: Cautionary notes identify essential information, which if ignored can adversely affect the operation of your equipment or software.

Warning: Warning notes identify essential information, which if ignored can lead to personal injury or harm.

Additional Documentation

To access related information, see the *Enterasys Wireless Convergence Software User Guide*. Enterasys Wireless Controller documentation is available at:

https://extranet.enterasys.com/downloadswww.siemens.com/automation/service&support

Getting Help

For additional support related to the product or this document, contact Enterasys Networks using one of the following methods:

World Wide Web	www.enterasys.com/support
Phone	1-800-872-8440 (toll-free in U.S. and Canada) or 1-978-684-1000 To find the Enterasys Networks Support toll-free number in your country: www.enterasys.com/support
Internet mail	support@enterasys.com To expedite your message, type Enterasys Wireless in the subject line
To send comments concerning this document to the Technical Publications Department: techpubs@www.enterasys.com Please include the document part number in your email message.	

Before contacting Enterasys Networks for technical support, have the following information ready:

- Your Enterasys Networks service contract number
- A description of the failure
- A description of any action(s) already taken to resolve the problem (for example, changing mode switches or rebooting the unit)
- The serial and revision numbers of all involved Enterasys Networks products in the network
- A description of your network environment (such as layout, cable type, other relevant environmental information)
- Network load and frame size at the time of trouble (if known)

- The device history (for example, whether you have returned the device before, or whether this is a recurring problem)
- Any previous Return Material Authorization (RMA) numbers

Safety Information

Dangers

- Replace the power cable immediately if it shows any sign of damage.
- Replace any damaged safety equipment (covers, labels and protective cables) immediately.
- Use only original accessories or components approved for the system. Failure to observe these instructions may damage the equipment or even violate safety and EMC regulations.
- Only authorized Enterasys service personnel are permitted to service the system.

Warnings

- This device must not be connected to a LAN segment with outdoor wiring.
- Ensure that all cables are run correctly to avoid strain.
- Replace the power supply adapter immediately if it shows any sign of damage.
- Disconnect all power before working near power supplies unless otherwise instructed by a maintenance procedure.
- Exercise caution when servicing hot swappable Enterasys Wireless Controller components: power supplies or fans. Rotating fans can cause serious personal injury.
- This unit may have more than one power supply cord. To avoid electrical shock, disconnect all power supply cords before servicing. In the case of unit failure of one of the power supply modules, the module can be replaced without interruption of power to the Enterasys Wireless Controller. However, this procedure must be carried out with caution. Wear gloves to avoid contact with the module, which will be extremely hot.
- There is a risk of explosion if a lithium battery is not correctly replaced. The lithium battery must be replaced only by an identical battery or one recommended by the manufacturer.
- Always dispose of lithium batteries properly.
- Do not attempt to lift objects that you think are too heavy for you.

Cautions

- Check the nominal voltage set for the equipment (operating instructions and type plate). High voltages capable of causing shock are used in this equipment. Exercise caution when measuring high voltages and when servicing cards, panels, and boards while the system is powered on.
- Only use tools and equipment that are in perfect condition. Do not use equipment with visible damage.
- To protect electrostatic sensitive devices (ESD), wear a wristband before carrying out any work on hardware.
- Lay cables so as to prevent any risk of them being damaged or causing accidents, such as tripping.

Sicherheitshinweise

Gefahrenhinweise

- Sollte das Netzkabel Anzeichen von Beschädigungen aufweisen, tauschen Sie es sofort aus.
- Tauschen Sie beschädigte Sicherheitsausrüstungen (Abdeckungen, Typenschilder und Schutzkabel) sofort aus.
- Verwenden Sie ausschließlich Originalzubehör oder systemspezifisch zugelassene Komponenten. Die Nichtbeachtung dieser Hinweise kann zur Beschädigung der Ausrüstung oder zur Verletzung von Sicherheits- und EMV-Vorschriften führen.
- Das System darf nur von autorisiertem Enterasys-Servicepersonal gewartet werden.

Warnhinweise

- Dieses Gerät darf nicht über Außenverdrahtung an ein LAN-Segment angeschlossen werden.
- Stellen Sie sicher, dass alle Kabel korrekt geführt werden, um Zugbelastung zu vermeiden.
- Sollte das Netzteil Anzeichen von Beschädigung aufweisen, tauschen Sie es sofort aus.
- Trennen Sie alle Stromverbindungen, bevor Sie Arbeiten im Bereich der Stromversorgung vornehmen, sofern dies nicht für eine Wartungsprozedur anders verlangt wird.
- Gehen Sie vorsichtig vor, wenn Sie an Hotswap-fähigen Wireless Controller-Komponenten (Stromversorgungen oder Lüftern) Servicearbeiten durchführen. Rotierende Lüfter können ernsthafte Verletzungen verursachen.
- Dieses Gerät ist möglicherweise über mehr als ein Netzkabel angeschlossen. Um die Gefahr eines elektrischen Schlages zu vermeiden, sollten Sie vor Durchführung von Servicearbeiten alle Netzkabel trennen. Falls eines der Stromversorgungsmodule ausfällt, kann es ausgetauscht werden, ohne die Stromversorgung zum Wireless Controller zu unterbrechen. Bei dieser Prozedur ist jedoch mit Vorsicht vorzugehen. Das Modul kann extrem heiß sein. Tragen Sie Handschuhe, um Verbrennungen zu vermeiden.
- Bei unsachgemäßem Austausch der Lithium-Batterie besteht Explosionsgefahr. Die Lithium-Batterie darf nur durch identische oder vom Händler empfohlene Typen ersetzt werden.
- Achten Sie bei Lithium-Batterien auf die ordnungsgemäße Entsorgung.
- Versuchen Sie niemals, ohne Hilfe schwere Gegenstände zu heben.

Vorsichtshinweise

- Überprüfen Sie die für die Ausrüstung festgelegte Nennspannung (Bedienungsanleitung und Typenschild). Diese Ausrüstung arbeitet mit Hochspannung, die mit der Gefahr eines elektrischen Schlages verbunden ist. Gehen Sie mit großer Vorsicht vor, wenn Sie bei eingeschaltetem System Hochspannungen messen oder Karten, Schalttafeln und Baugruppen warten.
- Verwenden Sie nur Werkzeuge und Ausrüstung in einwandfreiem Zustand. Verwenden Sie keine Ausrüstung mit sichtbaren Beschädigungen.
- Tragen Sie bei Arbeiten an Hardwarekomponenten ein Armband, um elektrostatisch gefährdete Bauelemente (EGB) vor Beschädigungen zu schützen.
- Verlegen Sie Leitungen so, dass sie keine Unfallquelle (Stolpergefahr) bilden und nicht beschädigt werden.

Consignes De Sécurité

Dangers

- Si le cordon de raccordement au secteur est endommagé, remplacez-le immédiatement.
- Remplacez sans délai les équipements de sécurité endommagés (caches, étiquettes et conducteurs de protection).
- Utilisez uniquement les accessoires d'origine ou les modules agréés spécifiques au système. Dans le cas contraire, vous risquez d'endommager l'installation ou d'enfreindre les consignes en matière de sécurité et de compatibilité électromagnétique.
- Seul le personnel de service Enterasys est autorisé à maintenir/réparer le système.

Avertissements

- Cet appareil ne doit pas être connecté à un segment de LAN à l'aide d'un câblage extérieur.
- Vérifiez que tous les câbles fonctionnent correctement pour éviter une contrainte excessive.
- Si l'adaptateur d'alimentation présente des dommages, remplacez-le immédiatement.
- Coupez toujours l'alimentation avant de travailler sur les alimentations électriques, sauf si la procédure de maintenance mentionne le contraire.
- Prenez toutes les précautions nécessaires lors de l'entretien/réparations des modules du Wireless Controller pouvant être branchés à chaud : alimentations électriques ou ventilateurs.Les ventilateurs rotatifs peuvent provoquer des blessures graves.
- Cette unité peut avoir plusieurs cordons d'alimentation.Pour éviter tout choc électrique, débranchez tous les cordons d'alimentation avant de procéder à la maintenance.En cas de panne d'un des modules d'alimentation, le module défectueux peut être changé sans éteindre le Wireless Controller. Toutefois, ce remplacement doit être effectué avec précautions. Portez des gants pour éviter de toucher le module qui peut être très chaud.
- Le remplacement non conforme de la batterie au lithium peut provoquer une explosion. Remplacez la batterie au lithium par un modèle identique ou par un modèle recommandé par le revendeur.
- Sa mise au rebut doit être conforme aux prescriptions en vigueur.
- N'essayez jamais de soulever des objets qui risquent d'être trop lourds pour vous.

Précautions

- Contrôlez la tension nominale paramétrée sur l'installation (voir le mode d'emploi et la plaque signalétique). Des tensions élevées pouvant entraîner des chocs électriques sont utilisées dans cet équipement. Lorsque le système est sous tension, prenez toutes les précautions nécessaires lors de la mesure des hautes tensions et de l'entretien/réparation des cartes, des panneaux, des plaques.
- N'utilisez que des appareils et des outils en parfait état. Ne mettez jamais en service des appareils présentant des dommages visibles.
- Pour protéger les dispositifs sensibles à l'électricité statique, portez un bracelet antistatique lors du travail sur le matériel.
- Acheminez les câbles de manière à ce qu'ils ne puissent pas être endommagés et qu'ils ne constituent pas une source de danger (par exemple, en provoquant la chute de personnes).

1

Overview of the Enterasys Wireless Convergence Software Solution

This chapter describes Enterasys Wireless Convergence Software concepts, including:

Introduction

The next generation of Enterasys wireless networking devices provides a truly scalable WLAN solution. Enterasys Wireless APs are fit access points controlled through a sophisticated network device, the Enterasys Wireless Controller. This solution provides the security and manageability required by enterprises and service providers.

The Enterasys Wireless system is a highly scalable Wireless Local Area Network (WLAN) solution. Based on a third generation WLAN topology, the Enterasys Wireless system makes wireless practical for service providers as well as medium and large-scale enterprises.

The Enterasys Wireless system provides a secure, highly scalable, cost-effective solution based on the IEEE 802.11 standard. The system is intended for enterprise networks operating on multiple floors in more than one building, and is ideal for public environments, such as airports and convention centers that require multiple access points.

This chapter provides an overview of the fundamental principles of the Enterasys Wireless system.

The Enterasys Wireless System

The Enterasys Wireless Controller is a network device designed to integrate with an existing wired Local Area Network (LAN). The rack-mountable Enterasys Wireless Controller provides centralized management, network access, and routing to wireless devices that use Wireless APs to access the network. It can also be configured to handle data traffic from third-party access points.

The Enterasys Wireless Controller provides the following functionality:

- Controls and configures Wireless APs, providing centralized management
- Authenticates wireless devices that contact a Wireless AP

- Assigns each wireless device to a VNS when it connects
- Routes traffic from wireless devices, using VNS, to the wired network
- Applies filtering policies to the wireless device session
- Provides session logging and accounting capability

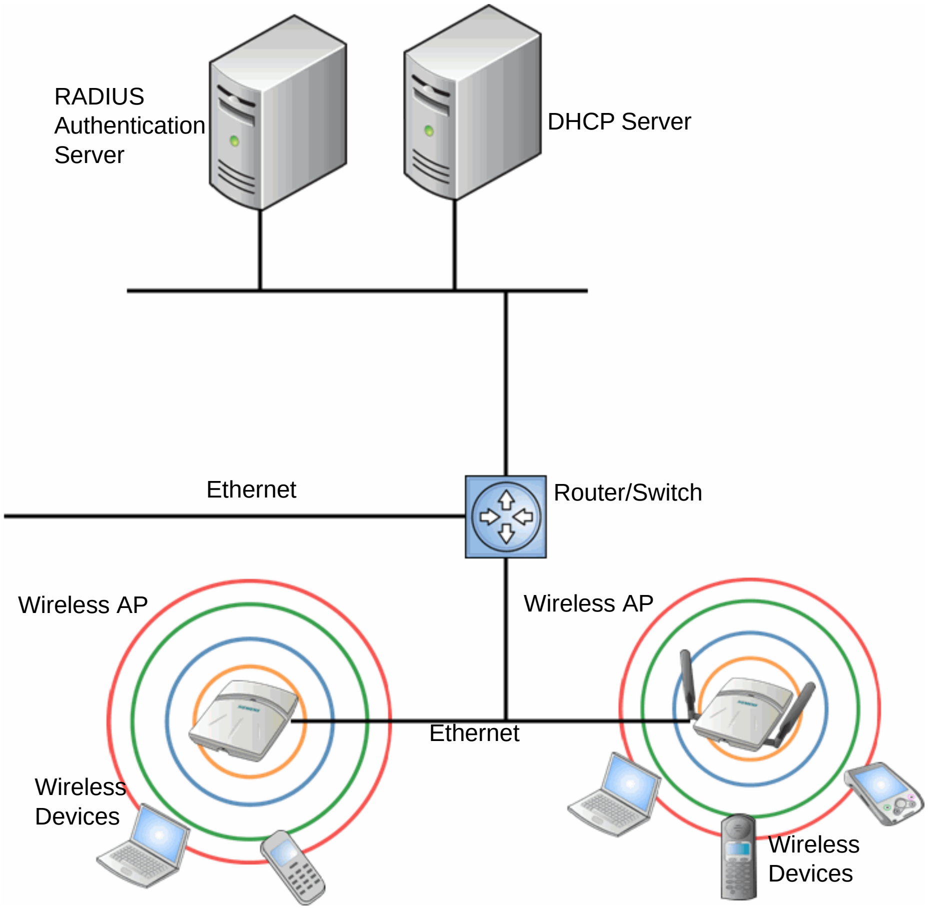
Conventional Wireless LANs

Wireless communication between multiple computers requires that each computer be equipped with a receiver/transmitter—a WLAN Network Interface Card (NIC)—capable of exchanging digital information over a common radio frequency. This is called an ad hoc network configuration. An ad hoc network configuration allows wireless devices to communicate together. This setup is defined as an independent basic service set (IBSS).

An alternative to the ad hoc configuration is the use of an access point. This may be a dedicated hardware bridge or a computer running special software. Computers and other wireless devices communicate with each other through this access point. The 802.11 standard defines access point communications as devices that allow wireless devices to communicate with a distribution system. This setup is defined as a basic service set (BSS) or infrastructure network.

To allow the wireless devices to communicate with computers on a wired network, the access points must be connected to the wired network providing access to the networked computers. This topology is called bridging. With bridging, security and management scalability is often a concern.

Figure 1-1 Standard Wireless Network Solution Example



The wireless devices and the wired networks communicate with each other using standard networking protocols and addressing schemes. Most commonly, Internet Protocol (IP) addressing is used.

Elements of the Enterasys Wireless Convergence Software Solution

The Enterasys Wireless Convergence Software solution consists of two devices:

- Enterasys Wireless Controller
- Wireless APs

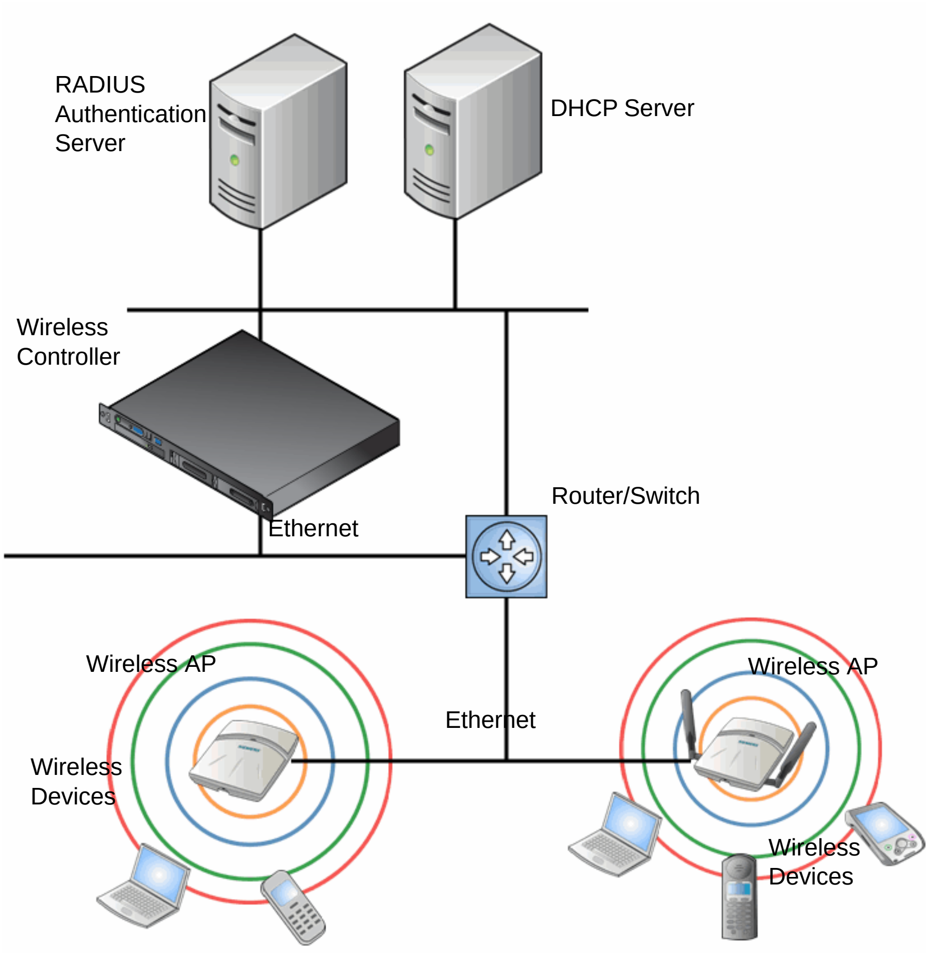
This architecture allows a single Enterasys Wireless Controller to control many Wireless APs, making the administration and management of large networks much easier.

There can be several Enterasys Wireless Controllers in the network, each with a set of registered Wireless APs. The Enterasys Wireless Controllers can also act as backups to each other, providing stable network availability.

In addition to the Enterasys Wireless Controllers and Wireless APs, the solution requires three other components, all of which are standard for enterprise and service provider networks:

- **RADIUS Server** (Remote Access Dial-In User Service) or other authentication server
- **DHCP Server** (Dynamic Host Configuration Protocol). If you do not have a DHCP Server on your network, you can enable the local DHCP Server on the Enterasys Wireless Controller. The local DHCP Server is useful as a general purpose DHCP Server for small subnets. For more information, see Step 11 of “Setting Up the Data Ports” on page 2-16.
- **SLP** (Service Location Protocol)

Figure 1-2 Enterasys Wireless Controller Solution



As illustrated in Figure 1-2, the Enterasys Wireless Controller appears to the existing network as if it were an access point, but in fact one Enterasys Wireless Controller controls many Wireless APs. The Enterasys Wireless Controller has built-in capabilities to recognize and manage the Wireless APs. The Enterasys Wireless Controller:

- Activates the Wireless APs
- Enables Wireless APs to receive wireless traffic from wireless devices
- Processes the data traffic from the Wireless APs
- Forwards or routes the processed data traffic out to the network
- Authenticates requests and applies access policies

Simplifying the Wireless APs makes them cost-effective, easy to manage, and easy to deploy. Putting control on an intelligent centralized Enterasys Wireless Controller enables:

- Centralized configuration, management, reporting, and maintenance
- High security
- Flexibility to suit enterprise
- Scalable and resilient deployments with a few Enterasys Wireless Controllers controlling hundreds of Wireless APs

The Enterasys Wireless system:

- **Scales up to Enterprise capacity —** Enterasys Wireless Controllers are scalable:
  - C5110 — Up to 525 APs
  - C4110 — Up to 250 APs
  - C20 — Up to 32 APs
  - C25 — Up to 48 APs
  - V2110 — Up to 120 APs

  In turn, each Wireless AP can handle up to 254 wireless devices, with each radio supporting a maximum of 127. With additional Enterasys Wireless Controllers, the number of wireless devices the solution can support can reach into the thousands.

- **Integrates with existing network —** A Enterasys Wireless Controller can be added to an existing enterprise network as a new network device, greatly enhancing its capability without interfering with existing functionality. Integration of the Enterasys Wireless Controllers and Wireless APs does not require any re-configuration of the existing infrastructure (for example, VLANs).
- **Integrates with the** Enterasys **NetSight Suite of products**. For more information, see "Enterasys NetSight Suite Integration" on page 1-6.

  Plug-in applications include:
  - Automated Security Manager
  - Inventory Manager
  - NAC Manager
  - Policy Control Console
  - Policy Manager
- **Offers centralized management and control —** An administrator accesses the Enterasys Wireless Controller in its centralized location to monitor and administer the entire wireless network. From the Enterasys Wireless Controller the administrator can recognize, configure, and manage the Wireless APs and distribute new software releases.
- **Provides easy deployment of** Wireless AP**s —** The initial configuration of the Wireless APs on the centralized Enterasys Wireless Controller can be done with an automatic "discovery" technique.
- **Provides security via user authentication —** Uses existing authentication (AAA) servers to authenticate and authorize users.
- **Provides security via filters and privileges —** Uses virtual networking techniques to create separate virtual networks with defined authentication and billing services, access policies, and privileges.
- **Supports seamless mobility and roaming —** Supports seamless roaming of a wireless device from one Wireless AP to another on the same Enterasys Wireless Controller or on a different Enterasys Wireless Controller.
- **Integrates third-party access points —** Uses a combination of network routing and authentication techniques.
- **Prevents rogue devices —** Unauthorized access points are detected and identified as either harmless or dangerous rogue APs.
- **Provides accounting services —** Logs wireless user sessions, user group activity, and other activity reporting, enabling the generation of consolidated billing records.

- **Offers troubleshooting capability —** Logs system and session activity and provides reports to aid in troubleshooting analysis.
- **Offers dynamic RF management —** Automatically selects channels and adjusts Radio Frequency (RF) signal propagation and power levels without user intervention.

Enterasys NetSight Suite Integration

The Enterasys Wireless Convergence Software solution now integrates with the Enterasys NetSight Suite of products. The Enterasys NetSight Suite of products provides a collection of tools to help you manage networks. Its client/server architecture lets you manage your network from a single workstation or, for networks of greater complexity, from one or more client workstations. It is designed to facilitate specific network management tasks while sharing data and providing common controls and a consistent user interface. For more information, see http://www.enterasys.com/products/visibility-control/index.aspx

The NetSight Suite is a family of products comprised of NetSight Console and a suite of plug-in applications, including:

- **Automated Security Manager** — Automated Security Manager is a unique threat response solution that translates security intelligence into security enforcement. It provides sophisticated identification and management of threats and vulnerabilities. For information on how the Enterasys Wireless Convergence Software solution integrates with the Automated Security Manager application, see the Enterasys Wireless Convergence Software *Maintenance Guide*.
- **Inventory Manager** — Inventory Manager is a tool for efficiently documenting and updating the details of the ever-changing network. For information on how the Enterasys Wireless Convergence Software solution integrates with the Automated Security Manager application, see the Enterasys Wireless Convergence Software *Maintenance Guide*.
- **NAC Manager** — NAC Manager is a leading-edge NAC solution to ensure only the right users have access to the right information from the right place at the right time. The Enterasys NAC solution performs multi-user, multi-method authentication, vulnerability assessment and assisted remediation. For information on how the Enterasys Wireless Convergence Software solution integrates with the Enterasys NAC solution, see "NAC integration with Enterasys Wireless WLAN" on page 1-12.
- **Policy Manager** — Policy Manager recognizes the Enterasys Wireless Controller suite as policy capable devices that accept partial configuration from Policy Manager. Currently this integration is partial in the sense that NetSight is unable to create WLAN services directly; The WLAN services need to be directly provisioned on the controller and are represented to Policy Manager as logical ports. The Enterasys Wireless Controller allows Policy Manager to:
  - Attach Topologies (assign VLAN to port) to the Enterasys Wireless Controller physical ports (Console).
  - Attach policy to the logical ports (WLAN Service/SSID),
  - Assign a Default Role/Policy to a WLAN Service, thus creating the VNS.
  - Perform authentication operations which can then reference defined policies for station-specific policy enforcement.

  This can be seen as a three step process:

  a. Deploy the controller and perform local configuration

     - The Enterasys Wireless Controller ships with a default SSID, attached by default to all AP radios, when enabled.

- Use the basic installation wizard to complete the Enterasys Wireless Controller configuration.

b. Use Policy Manager to:

- Push the VLAN list to the Enterasys Wireless Controller (Topologies)
- Attach VLANs to Enterasys Wireless Controller physical ports (Console - Complete Topology definition)
- Push RADIUS server configuration to the Enterasys Wireless Controller
- Push policy definitions to the Enterasys Wireless Controller
- Attach the default policy to create a VNS

c. Fine tune controller settings. For example, configuring filtering at APs and Enterasys Wireless Controller for a bridged at controller or routed topologies and associated VNSs.

Note: Complete information about integration with Policy Manager is outside the scope of this document.

Enterasys Wireless Convergence Software and Your Network

This section is a summary of the components of the Enterasys Wireless Convergence Software solution on your enterprise network. The following are described in detail in this guide, unless otherwise stated:

- Enterasys Wireless Controller — A rack-mountable network device that provides centralized control over all access points and manages the network assignment of wireless device clients associating through access points.
- Wireless AP — A wireless LAN fit access point that communicates with a Enterasys Wireless Controller.
- **RADIUS Server** (Remote Access Dial-In User Service) (RFC2865), or other authentication server — An authentication server that assigns and manages ID and Password protection throughout the network. Used for authentication of the wireless users in either 802.1x or Captive Portal security modes. The RADIUS Server system can be set up for certain standard attributes, such as filter ID, and for the Vendor Specific Attributes (VSAs). In addition, RADIUS Disconnect (RFC3576) which permits dynamic adjustment of user policy (user disconnect) is supported.
- **DHCP Server** (Dynamic Host Configuration Protocol) (RFC2131) — A server that assigns dynamically IP addresses, gateways, and subnet masks. IP address assignment for clients can be done by the DHCP server internal to the Enterasys Wireless Controller, or by existing servers using DHCP relay. It is also used by the Wireless APs to discover the location of the Enterasys Wireless Controller during the initial registration process using Options 43, 60, and Option 78. Options 43 and 60 specify the vendor class identifier (VCI) and vendor specific information. Option 78 specifies the location of one or more SLP Directory Agents. For SLP, DHCP should have Option 78 enabled.
- **Service Location Protocol (SLP)** (SLP RFC2608) — Client applications are User Agents and services that are advertised by a Service Agent. In larger installations, a Directory Agent collects information from Service Agents and creates a central repository. The Enterasys solution relies on registering "Enterasys" as an SLP Service Agent.
- **Domain Name Server (DNS) —** A server used as an alternate mechanism (if present on the enterprise network) for the automatic discovery process. Enterasys Wireless Controller, Access Points and Convergence Software relies on the DNS for Layer 3 deployments and for

static configuration of Wireless APs. The controller can be registered in DNS, to provide DNS assisted AP discovery. In addition, DNS can also be used for resolving RADIUS server hostnames.

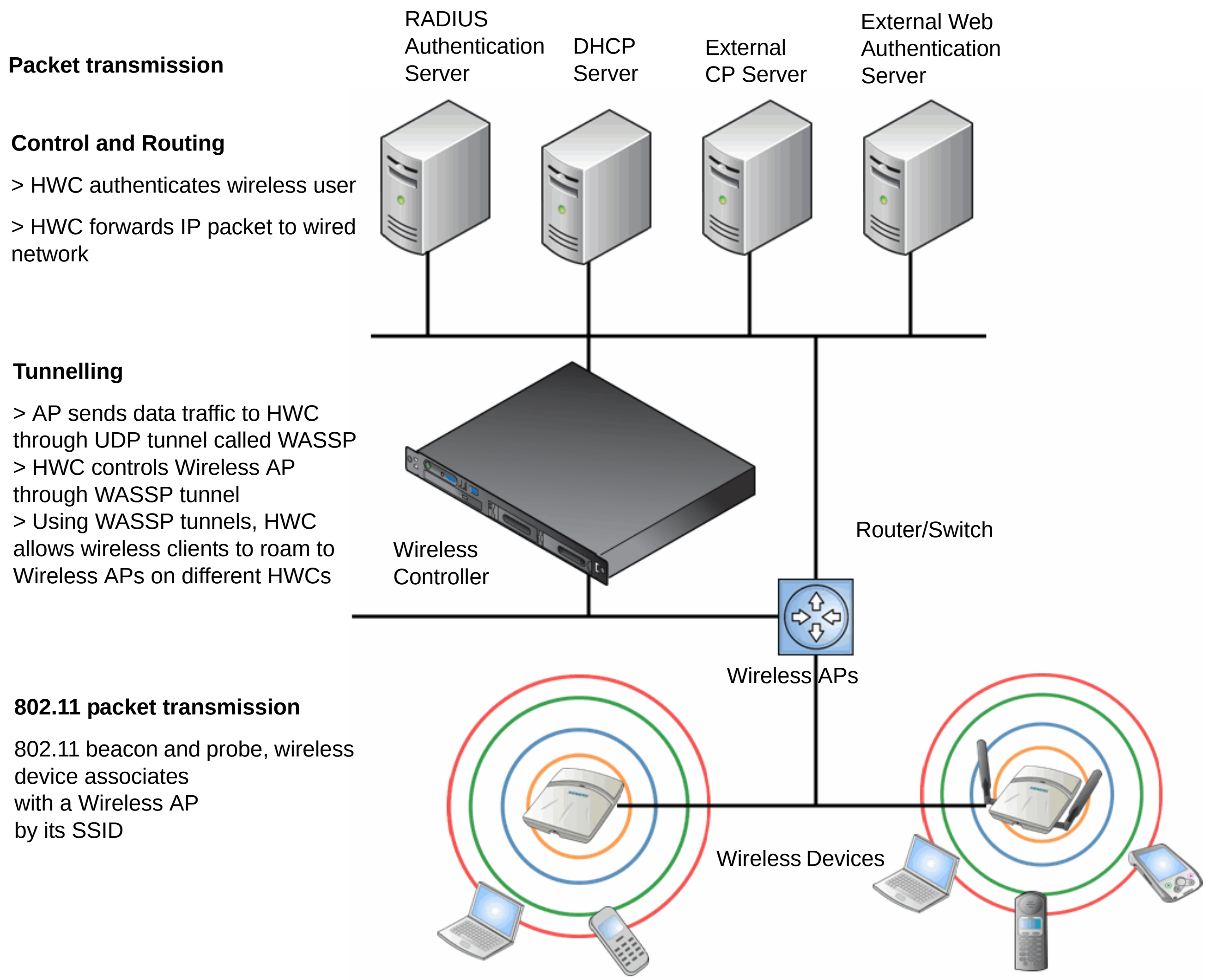
- **Web Authentication Server —** A server that can be used for external Captive Portal and external authentication. The Enterasys Wireless Controller has an internal Captive portal presentation page, which allows Web authentication (Web redirection) to take place without the need for an external Captive Portal server.
- **RADIUS Accounting Server** (Remote Access Dial-In User Service) (RFC2866) — A server that is required if RADIUS Accounting is enabled.
- **Simple Network Management Protocol** (SNMP) — A Manager Server that is required if forwarding SNMP messages is enabled.
- **Network infrastructure** — The Ethernet switches and routers must be configured to allow routing between the various services noted above. Routing must also be enabled between multiple Enterasys Wireless Controllers for the following features to operate successfully:
  - Availability
  - Mobility
  - Mitigator for detection of rogue access points

  Some features also require the definition of static routes.
- **Web Browser —** A browser provides access to the Enterasys Wireless Controller Management user interface to configure the Enterasys Wireless Convergence Software.
- **SSH Enabled Device —** A device that supports Secure Shell (SSH) is used for remote (IP) shell access to the system.
- **Zone Integrity** — The Zone integrity server enhances network security by ensuring clients accessing your network are compliant with your security policies before gaining access. Zone Integrity Release 5 is supported**.**

Network Traffic Flow

Figure 1-3 illustrates a simple configuration with a single Enterasys Wireless Controller and two Wireless APs, each supporting a wireless device. A RADIUS server on the network provides authentication, and a DHCP server is used by the Wireless APs to discover the location of the Enterasys Wireless Controller during the initial registration process. Network inter-connectivity is provided by the infrastructure routing and switching devices.

Figure 1-3 Traffic Flow Diagram


Packet transmission
RADIUS Authentication Server
DHCP Server
External CP Server
External Web Authentication Server
Control and Routing
> HWC authenticates wireless user
> HWC forwards IP packet to wired network
Tunnelling
> AP sends data traffic to HWC through UDP tunnel called WASSP
> HWC controls Wireless AP through WASSP tunnel
> Using WASSP tunnels, HWC allows wireless clients to roam to Wireless APs on different HWCs
Wireless Controller
Router/Switch
Wireless APs
802.11 packet transmission
802.11 beacon and probe, wireless device associates with a Wireless AP by its SSID
Wireless Devices

Each wireless device sends IP packets in the 802.11 standard to the Wireless AP. The Wireless AP uses a UDP (User Datagram Protocol) based tunnelling protocol. In tunneled mode of operation, it encapsulates the packets and forwards them to the Enterasys Wireless Controller. The Enterasys Wireless Controller decapsulates the packets and routes these to destinations on the network. In a typical configuration, access points can be configured to locally bridge traffic (to a configured VLAN) directly at their network point of attachment.

The Enterasys Wireless Controller functions like a standard L3 router or L2 switch. It is configured to route the network traffic associated with wireless connected users. The Enterasys Wireless Controller can also be configured to simply forward traffic to a default or static route if dynamic routing is not preferred or available.

Network Security

The Enterasys Wireless Convergence Software system provides features and functionality to control network access. These are based on standard wireless network security practices.

Current wireless network security methods provide protection. These methods include:

- Shared Key authentication that relies on Wired Equivalent Privacy (WEP) keys

- Open System that relies on Service Set Identifiers (SSIDs)
- 802.1x that is compliant with Wi-Fi Protected Access (WPA)
- Captive Portal based on Secure Sockets Layer (SSL) protocol

The Enterasys Wireless Convergence Software system provides the centralized mechanism by which the corresponding security parameters are configured for a group of users.

- Wired Equivalent Privacy (WEP) is a security protocol for wireless local area networks defined in the 802.11b standard
- Wi-Fi Protected Access version 1 (WPA1™) with Temporal Key Integrity Protocol (TKIP)
- Wi-Fi Protected Access version 2 (WPA2™) with Advanced Encryption Standard (AES) and Counter Mode with Cipher Block Chaining Message Authentication Code (CCMP)

Authentication

The Enterasys Wireless Controller relies on a RADIUS server, or authentication server, on the enterprise network to provide the authentication information (whether the user is to be allowed or denied access to the network). A RADIUS client is implemented to interact with infrastructure RADIUS servers.

The Enterasys Wireless Controller provides authentication using:

- Captive Portal — a browser-based mechanism that forces users to a Web page
- RADIUS (using IEEE 802.1x)

The 802.1x mechanism is a standard for authentication developed within the 802.11 standard. This mechanism is implemented at the wireless port, blocking all data traffic between the wireless device and the network until authentication is complete. Authentication by 802.1x standard uses Extensible Authentication Protocol (EAP) for the message exchange between the Enterasys Wireless Controller and the RADIUS server.

When 802.1x is used for authentication, the Enterasys Wireless Controller provides the capability to dynamically assign per-wireless-device WEP keys (called per session WEP keys in 802.11). In the case of WPA, the Enterasys Wireless Controller is not involved in key assignment. Instead, the controller is involved in the information exchange between RADIUS server and the user's wireless device to negotiate the appropriate set of keys. With WPA2 the material exchange produces a Pairwise Master Key which is used by the AP and the user to derive their temporal keys. (The keys change over time.)

The Enterasys Wireless Convergence Software solution provide a RADIUS redundancy feature that enables you to define a failover RADIUS server in the event that the active RADIUS server becomes unresponsive.

Privacy

Privacy is a mechanism that protects data over wireless and wired networks, usually by encryption techniques.

Enterasys Wireless Convergence Software supports the Wired Equivalent Privacy (WEP) standard common to conventional access points.

It also provides Wi-Fi Protected Access version 1 (WPA v.1) encryption, based on Pairwise Master Key (PMK) and Temporal Key Integrity Protocol (TKIP). The most secure encryption mechanism is WPA version 2, using Advanced Encryption Standard (AES).

Virtual Network Services

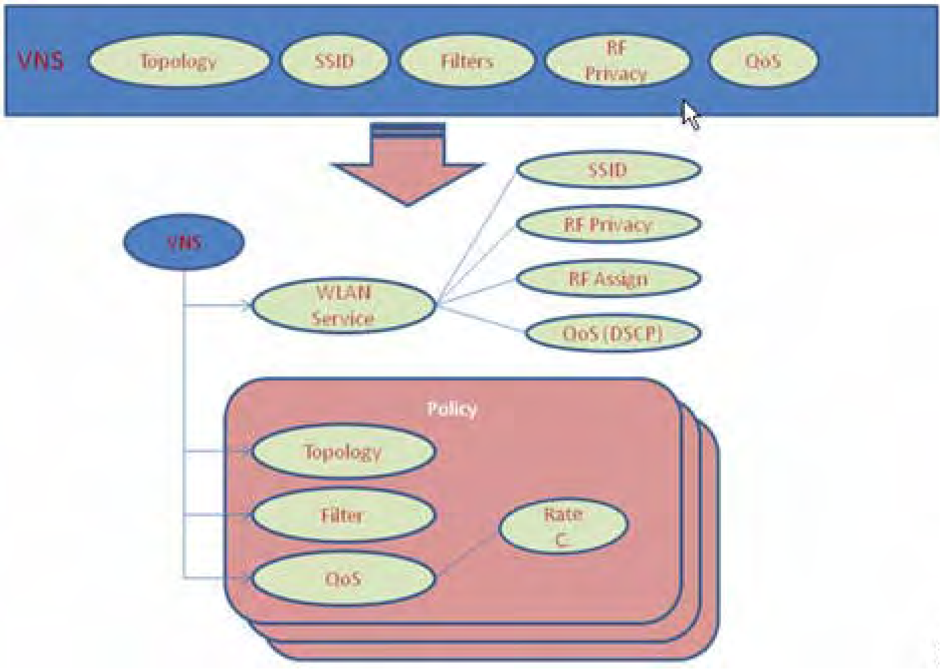
Virtual Network Services (VNS) provide a versatile method of mapping wireless networks to the topology of an existing wired network.

In releases prior to V7.0, a VNS was a collection of operational entities. Starting with Release V7.0, a VNS becomes the binding of reusable components:

- **WLAN Service** components that define the radio attributes, privacy and authentication settings, and QoS attributes of the VNS
- **Policy** components that define the topology (typically a VLAN), filter rules, and Class of Service applied to the traffic of a station.

Figure 1-4 illustrates the transition of the concept of a VNS to a binding of reusable components.

Figure 1-4 VNS as a Binding of Reusable Components



WLAN Service components and Policy components can be configured separately and associated with a VNS when the VNS is created or modified. Alternatively, they can be configured during the process of creating a VNS.

Additionally, Policies can be created using the Enterasys NetSight Policy Manager or NetSight Wireless Manager and pushed to the Enterasys Wireless Controller. Policy assignment ensures that the correct topology and traffic behavior are applied to a user regardless of WLAN service used or VNS assignment.

When VNS components are set up on the Enterasys Wireless Controller, among other things, a range of IP addresses is set aside for the Enterasys Wireless Controller's DHCP server to assign to wireless devices.

If the OSPF routing protocol is enabled, the Enterasys Wireless Controller advertises the routed topologies as reachable segments to the wired network infrastructure. The controller routes traffic between the wireless devices and the wired network.

The Enterasys Wireless Controller also supports VLAN-bridged assignment for VNSs. This allows the controller to directly bridge the set of wireless devices associated with a WLAN service directly to a specified core VLAN.

Each Enterasys Wireless Controller model can support a specified number of active VNSs, as listed below:

- C5110 — Up to 128 VNSs
- C4110 — Up to 64 VNSs
- C20 — Up to 8 VNSs
- C25 — Up to 16 VNSs
- V2110 — Up to 48 VNSs

The Wireless AP radios can be assigned to each of the configured WLAN services and, therefore, VNSs in a system. Each Wireless AP can be the subject of 16 service assignments — 8 assignments per radio — which corresponds to the number of SSIDs it can support. Once a radio has all 8 slots assigned, it is no longer eligible for further assignment.

NAC integration with Enterasys Wireless WLAN

Enterasys Wireless WLAN supports integration with a NAC (Network Admission Control) Gateway. The NAC Gateway can provide your network with authentication, registration, assessment, remediation, and access control for mobile users.

NAC Gateway integration with Enterasys Wireless WLAN supports SSID VNSs when used in conjunction with MAC-based external captive portal authentication.

Figure 1-5 and Table 1-1 depict the topology and workflow relationship between Enterasys Wireless WLAN that is configured for external captive portal and a NAC Gateway. With this configuration, the NAC Gateway acts like a RADIUS proxy server. An alternative is to configure the NAC Gateway to perform MAC-based authentication itself, using its own database of MAC addresses and permissions. For more information, see “Creating a NAC VNS Using the VNS Wizard” on page 7-19.

Figure 1-5 WLAN and NAC Integration with External Captive Portal Authentication

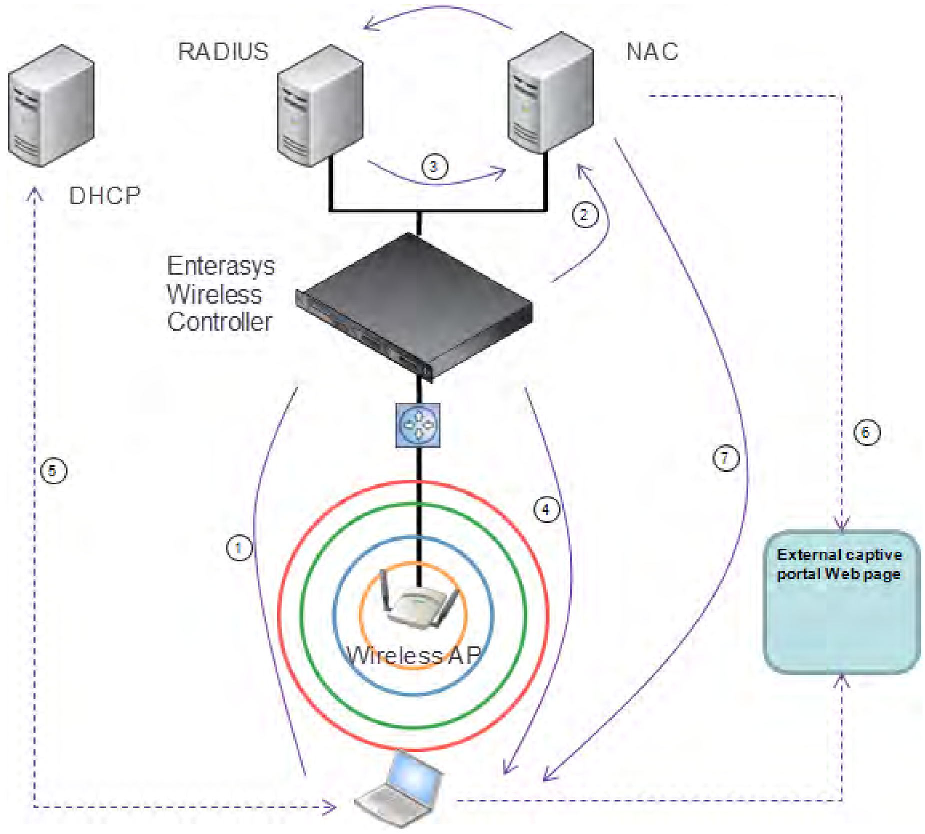

RADIUS
NAC
DHCP
3
2
Enterasys Wireless Controller
6
7
5
4
1
External captive portal Web page
Wireless AP

Table 1-1 WLAN and NAC Integration Steps

Step	Description
1	The client laptop connects to the Wireless AP. The Wireless AP determines that authentication is required, and sends an association request to the Enterasys Wireless Controller.
2	The Enterasys Wireless Controller forwards to the NAC Gateway an access-request message for the client laptop, which is identified by its MAC address. The NAC Gateway forwards the access-request to the RADIUS server. The NAC Gateway acts like a RADIUS proxy server.
3	The RADIUS server evaluates the access-request and sends an Access-Accept message back to the NAC. The NAC receives the access-accept packet. Using its local database, the NAC determines the correct policy to apply to this client laptop and updates the access-accept packet with the policy assignment. The updated Access-Accept message is forwarded to the Enterasys Wireless Controller and Wireless AP.
4	The Enterasys Wireless Controller and Wireless AP apply policy against the client laptop accordingly. The Enterasys Wireless Controller assigns a set of filters to the client laptop’s session and the Wireless AP allows the client laptop access to the network.
5	The client laptop interacts with a DHCP server to obtain an IP address.

Table 1-1 WLAN and NAC Integration Steps (continued)

Step	Description
6	Eventually the client laptop uses its Web browser to access a Website. • The Enterasys Wireless Controller determines that the target Website is blocked and that the client laptop still requires authentication. • The Enterasys Wireless Controller sends an HTTP redirect to the client laptop's browser. The redirect sends the browser to the Web server on the NAC Gateway. • The NAC displays an appropriate Web page in the client laptop's browser. The contents of the page depend on the current policy assignment (enterprise, remediation, assessing, quarantine, or unregistered) for the MAC address.
7	When the NAC determines that the client laptop is ready for a different policy assignment, it sends a 'disconnect message' (RFC 3576) to the Enterasys Wireless Controller. When the Enterasys Wireless Controller receives the 'disconnect message' sent by the NAC, the Enterasys Wireless Controller terminates the session for the client laptop. The Enterasys Wireless Controller forwards the command to terminate the client laptop's session to the Wireless AP, which disconnects the client laptop.

VNS Components

The distinct constituent high-level configurable umbrella elements of a VNS are:

- Topology
- Policy
- Classes of Service
- WLAN Service

Topology

Topologies represent the networks with which the Enterasys Wireless Controller and its APs interact. The main configurable attributes of a topology are:

- Name - a string of alphanumeric characters designated by the administrator.
- VLAN ID - the VLAN identifier as specified in the IEEE 802.1Q definition.
- VLAN tagging options.
- Port of presence for the topology on the Enterasys Wireless Controller. (This attribute is not required for Routed and Bridged at AP topologies.)
- Interface. This attribute is the IP (L3) address assigned to the Enterasys Wireless Controller on the network described by the topology. (Optional.)
- Type. This attribute describes how traffic is forwarded on the topology. Options are:
  - "Physical" - the topology is the native topology of a data plane and it represents the actual Ethernet ports
  - "Management" - the native topology of the Enterasys Wireless Controller management port
  - "Routed" - the controller is the routing gateway for the routed topology.
  - "Bridged at Controller" - the user traffic is bridged (in the L2 sense) between wireless clients and the core network infrastructure.

  - "Bridged at AP" - the user traffic is bridged locally at the AP without being redirected to the Enterasys Wireless Controller.

- Exception Filters. Specifies which traffic has access to the Enterasys Wireless Controller from the wireless clients or the infrastructure network.
- Certificates.
- Multicast filters. Defines the multicast groups that are allowed on a specific topology segment.

Policy

A Policy is a collection of attributes and rules that determine actions taken user traffic accesses the wired network through the WLAN service (associated to the WLAN Service's SSID). Depending upon its type, a VNS can have between one and three Authorization Policies associated with it:

1. Default non-authorized policy — This is a mandatory policy that covers all traffic from stations that have not authenticated. At the administrator's discretion the default non-authorized policy can be applied to the traffic of authenticated stations as well.
2. Default authorized policy — This is a mandatory policy that applies to the traffic of authenticated stations for which no other policy was explicitly specified. It can be the same as the default non-authorized policy.
3. Third party AP policy — This policy applies to the list of MAC addresses corresponding to the wired interfaces of third party APs specifically defined by the administrator to be providing the RF access as an AP WLAN Service. This policy is only relevant when applied to third party AP WLAN Services.

Classes of Service

In general, Class of Service (CoS) refers to a set of attributes that define the importance of a frame while it is forwarded through the network relative to other packets, and to the maximum throughput per time unit that a station or port assigned to a specific policy is permitted. The CoS defines actions to be taken when rate limits are exceeded.

All incoming packets may follow these steps to determine a CoS:

- Classification - identifies the first matching rule that defines a CoS.
- Marking - modifies the L2 802.1p and/or L3 ToS based on CoS definition.
- Rate limiting (drop) is set.

The system limit for the number of CoS profiles on a controller is identical to the number of policies. For example, the maximum number of CoS profiles on a C5110 is 512.

WLAN Services

A WLAN Service represents all the RF, authentication and QoS attributes of a wireless access service offered by the Enterasys Wireless Controller and its APs. A WLAN Service can be one of the following types:

- Standard — A conventional service. Only APs running Enterasys Wireless software can be part of this WLAN Service. This type of service can be used as a Bridged at Controller, Bridged at AP, or Routed Topology. This type of service provides access for mobile stations. Policies can be associated with this type of WLAN service to create a VNS.
- Third Party AP — A Wireless Service offered by third party APs. This type of service provides access for mobile stations. Policies can be assigned to this type of WLAN service to create a VNS.

- Dynamic Mesh and WDS (Static Mesh)— This is to configure a group of APs organized into a hierarchy for purposes of providing a Wireless Distribution Service. This type of service is in essence a wireless trunking service rather than a service that provides access for stations. As such, this service cannot have policies attached to it.
- Remote — A service that resides on the edge (foreign) Enterasys Wireless Controller. Pairing a remote service with a remoteable service on the designated home Enterasys Wireless Controller allows you to provision centralized WLAN Services in the mobility domain. This is known as centralized mobility.

As of Release V7.0, the components of a WLAN Service map to the corresponding components of a VNS in previous releases. The exception is that WLAN Services are not classified as SSID-based or AAA-based, as was the case in previous releases. Instead, the administrator makes an explicit choice of the type of authentication to use on the WLAN Service. If his choice of authentication option conflicts with any of his other authentication or privacy choices, the WLAN Service cannot be enabled.

Routing

Routing can be used on the Enterasys Wireless Controller to support the VNS definitions. Through the user interface you can configure routing on the Enterasys Wireless Controller to use one of the following routing techniques:

- **Static routes** — Use static routes to set the default route of a Enterasys Wireless Controller so that legitimate wireless device traffic can be forwarded to the default gateway.
- **Open Shortest Path First** (OSPF, version 2) (RFC2328) — Use OSPF to allow the Enterasys Wireless Controller to participate in dynamic route selection. OSPF is a protocol designed for medium and large IP networks with the ability to segment routes into different areas by routing information summarization and propagation. Static Route definition and OSPF dynamic learning can be combined, and the precedence of a static route definition over dynamic rules can be configured by selecting or clearing the **Override dynamic routes** option checkbox.
- **Next-hop routing** — Use next-hop routing to specify a unique gateway to which traffic on a VNS is forwarded. Defining a next-hop for a VNS forces all the traffic in the VNS to be forwarded to the indicated network device, bypassing any routing definitions of the controller's route table.

Mobility and Roaming

In typical simple configurations, APs are set up as bridges that bridge wireless traffic to the local subnet. In bridging configurations, the user obtains an IP address from the same subnet as the AP, assuming no VLAN trunking functionality. If the user roams between APs on the same subnet, it is able to keep using the same IP address. However, if the user roams to another AP outside of that subnet, its IP address is no longer valid. The user's client device must recognize that the IP address it has is no longer valid and re-negotiate a new one on the new subnet. This mechanism does not mandate any action on the user. The recovery procedure is entirely client device dependent. Some clients automatically attempt to obtain a new address on roam (which affects roaming latency), while others will hold on to their IP address. This loss of IP address continuity seriously affects the client's experience in the network, because in some cases it can take minutes for a new address to be negotiated.

The Enterasys Wireless Convergence Software solution centralizes the user's network point of presence, therefore abstracting and decoupling the user's IP address assignment from that of the APs location subnet. That means that the user is able to roam across any AP without losing its own IP address, regardless of the subnet on which the serving APs are deployed.

In addition, a Enterasys Wireless Controller can learn about other Enterasys Wireless Controllers on the network and then exchange client session information. This enables a wireless device user to roam seamlessly between different Wireless APs on different Enterasys Wireless Controllers.

Network Availability

The Enterasys Wireless Convergence Software solution provides availability against Wireless AP outages, Enterasys Wireless Controller outages, and even network outages. The Enterasys Wireless Controller in a VLAN bridged topology can potentially allow the user to retain the IP address in a failover scenario, if the VNS/VLAN is common to both controllers. For example, availability is provided by defining a paired controller configuration by which each peer can act as the backup controller for the other's APs. APs in one controller are allowed to fail over and register with the alternate controller.

If an Enterasys Wireless Controller fails, all of its associated Wireless APs can automatically switch over to another Enterasys Wireless Controller that has been defined as the secondary or backup Enterasys Wireless Controller. If the AP reboots, the original Enterasys Wireless Controller is restored. The original Enterasys Wireless Controller is restored if it is active. However, active APs will continue to be connected to the failover controller until the administrator releases them back to the original home controller.

Quality of Service (QoS)

Enterasys Wireless Convergence Software solution provides advanced Quality of Service (QoS) management to provide better network traffic flow. Such techniques include:

- **WMM (Wi-Fi Multimedia)** — WMM is enabled per WLAN service. The Enterasys Wireless Controller provides centralized management of the AP features. For devices with WMM enabled, the standard provides multimedia enhancements for audio, video, and voice applications. WMM shortens the time between transmitting packets for higher priority traffic. WMM is part of the 802.11e standard for QoS. In the context of the Enterasys Wireless Solution, the ToS/DSCP field is used for classification and proper class of service mapping, output queue selection, and priority tagging.
- **IP ToS (Type of Service)** or **DSCP (Diffserv Codepoint)** — The **ToS/DSCP** field in the IP header of a frame indicates the priority and class of service for each frame. The IP TOS and/or DSCP is maintained and transported within CTP (CAPWAP Tunneling Protocol) by copying the user IP QoS information to the CTP header—this is referred to as Adaptive QoS.
- **Rate Control** — Rate Control for user traffic can also be considered as an aspect of QoS. As part of Policy definition, the user can specify (default) policy that includes Ingress and Egress rate control. Ingress rate control applies to traffic generated by wireless clients and Egress rate control applies to traffic targeting specific wireless clients. The bit-rates can be configured as part of globally available profiles which can be used by any particular configuration. A global default is also defined.

Quality of Service (QoS) management is also provided by:

- Assigning high priority to a WLAN service
- Adaptive QoS (automatic and all time feature)
- Support for legacy devices that use SpectraLink Voice Protocol (SVP) for prioritizing voice traffic (configurable)

Enterasys Wireless Controller Product Family

The Enterasys Wireless Controller is available in the following product families:

Table 1-2 Enterasys Wireless Controller Product Families

Enterasys Wireless Controller Model Number	Specifications
C5110	• Three data ports supporting up to 525 Wireless APs – 2 fiber optic SR (10Gbps) – 1 Ethernet port GigE • One management port (Ethernet) GigE • One console port (DB9 serial) • Four USB ports — two on each front and back panel (only one port active at a time) • Redundant dual power supply unit
C4110	• Four GigE ports supporting up to 250 Wireless APs • One management port (Ethernet) GigE • One console port (DB9 serial) • Four USB ports (only one active at a time) • Redundant dual power supply unit
C20	• Two GigE ports supporting up to 32 Wireless APs • One management port GigE • One console port (USB control) • One USB port • Power supply standard (R)
C25	• Two GigE ports supporting up to 48 Wireless APs • One management port GigE • One console port (DB9 serial) • One USB port
V2110	• Two GigE ports supporting up to 120 Wireless APs • One management port GigE • One console port (DB9 serial) • Four USB ports (only one active at a time)

2

Configuring the Enterasys Wireless Controller

This chapter describes the steps involved in the initial configuration and setup, of the Enterasys Wireless Controller, including:

System Configuration Overview

The following section provides a high-level overview of the steps involved in the initial configuration of your system:

1. Before you begin the configuration process, research the type of WLAN deployment that is required. For example, topology and VLAN IDs, SSIDs, security requirements, and filter policies.

2. Prepare the network servers. Ensure that the external servers, such as DHCP and RADIUS servers (if applicable) are available and appropriately configured.

3. Install the Enterasys Wireless Controller. For more information, see the documentation for your Enterasys Wireless Controller.

4. Perform the first time setup of the Enterasys Wireless Controller on the physical network, which includes configuring the IP addresses of the interfaces on the Enterasys Wireless Controller.

   – Create a new physical topology and provide the IP address to be the relevant subnet point of attachment to the existing network.

   – To manage the Enterasys Wireless Controller through the interface configured above, select the **Mgmt** checkbox on the **Interfaces** tab.

   – Configure the data port interfaces to be on separate VLANs, matching the VLANs configured in Step 3 above. Ensure also that the tagged vs. untagged state is consistent with the switch port configuration.

- Configure the time zone. Because changing the time zone requires restarting the Enterasys Wireless Controller, Enterasys recommends that you configure the time zone during the initial installation and configuration of the Enterasys Wireless Controller to avoid network interruptions. For more information, see “Configuring Network Time” on page 2-48.
- Apply an activation key file. If an activation key is not applied, the Enterasys Wireless Controller functions with some features enabled in demonstration mode. Not all features are enabled in demonstration mode. For example, mobility is not enabled and cannot be used.

Caution: Whenever the licensed region changes on the Enterasys Wireless Controller, all Wireless APs are changed to **Auto Channel Select** to prevent possible infractions to local RF regulatory requirements. If this occurs, all manually configured radio channel settings will be lost.

Installing the new license key before upgrading will prevent the Enterasys Wireless Controller from changing the licensed region, and in addition, manually configured channel settings will be maintained. For more information, see the Enterasys Wireless *Convergence Software Maintenance Guide*.

5. Configure the Enterasys Wireless Controller for remote access:
   - Set up an administration station (laptop) on subnet 192.168.10.0/24. By default, the Enterasys Wireless Controller's Management interface is configured with the static IP address 192.168.10.1.
   - Configure the Enterasys Wireless Controller’s management interface.
   - Configure the data interfaces.
   - Set up the Enterasys Wireless Controller on the network by configuring the physical data ports.
   - Configure the routing table.
   - Configure static routes or OSPF parameters, if appropriate to the network.

   For more information, see “Configuring the Enterasys Wireless Controller for the First Time” on page 2-12.
6. Configure the traffic topologies your network must support. Topologies represent the Controller’s points of network attachment, and therefore VLANs and port assignments need to be coordinated with the corresponding network switch ports. For more information, see “Configuring a Basic Topology” on page 4-2.
7. Configure policies. Policies are typically bound to topologies. Policy application assigns user traffic to the corresponding network point.
   - Policies define user access rights (filtering or ACL)
   - Polices reference user's rate control profile.

   For more information, see “Configuring Policies” on page 5-1.
8. Configure WLAN services.
   - Define SSID and privacy settings for the wireless link.
   - Select the set of APs/Radios on which the service is present.
   - Configure the method of credential authentication for wireless users (None, Internal CP, External CP, GuestPortal, 802.1x[EAP])

   For more information, see “Configuring WLAN Services” on page 6-1.
9. Create the VNSs.

A VNS binds a WLAN Service to a Policy that will be used for default assignment upon a user's network attachment.

You can create topologies, policies, and WLAN services first, before configuring a VNS, or you can select one of the wizards (such as the VNS wizard), or you can simply select to create new VNS.

The VNS page then allows for in-place creation and definition of any dependency it may require, such as:

- Creating a new WLAN Service
- Creating a new policy
- Creating a new class of service (within a policy)
- Creating a new topology (within a policy)
- Creating new rate controls, and other Class of Service parameters

The default shipping configuration does not ship any pre-configured WLAN Services, VNSs, or Policies.

10. Install, register, and assign APs to the VNS.

    - Confirm the latest firmware version is loaded. For more information, see "Performing Wireless AP Software Maintenance" on page 3-121.
    - Deploy Wireless APs to their corresponding network locations.
    - If applicable, configure a default AP template for common radio assignment, whereby APs automatically receive complete configuration. For typical deployments where all APs are to have the same configuration, this feature will expedite deployment, as an AP will automatically receive full configuration (including VNS-related assignments) upon initial registration with the Enterasys Wireless Controller. If applicable, modify the properties or settings of the Wireless APs. For more information, see Chapter 3, **Configuring the Wireless AP**.
    - Connect the Wireless APs to the Enterasys Wireless Controller.
    - Once the Wireless APs are powered on, they automatically begin the Discovery process of the Enterasys Wireless Controller, based on factors that include:
        - Their Registration mode (on the Wireless AP **Registration** screen)
        - The enterprise network services that will support the discovery process

Logging on to the Enterasys Wireless Controller

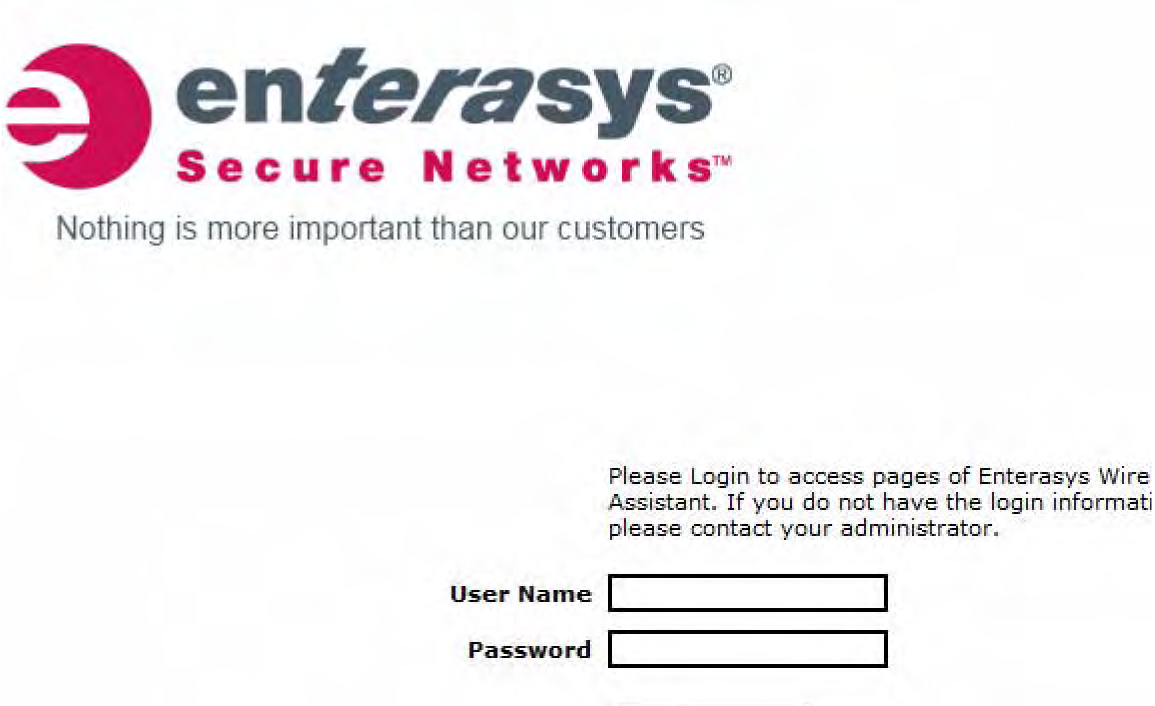
1. Launch your Web browser (Internet Explorer version 6.0 or higher, or FireFox).

   See the V8.01 release notes for the supported Web browsers.

2. In the browser address bar, type the following, using the IP address of your controller:

   `https://192.168.10.1:5825`

   This launches the Wireless Assistant. The login screen is displayed.



Please Login to access pages of Enterasys Wire
Assistant. If you do not have the login informati
please contact your administrator.

User Name

Password

3. In the **User Name** box, type your user name.
4. In the **Password** box, type your password.

Note: The Enterasys Wireless Controller default user name is admin. The default password is `abc123`.

5. Click **Login**. The Wireless Assistant Home Screen is displayed.

Wireless Assistant Home Screen

The Wireless Assistant Home Screen provides real-time status information on the current state of the wireless network. Information is grouped under multiple functional areas (Network Status, Admin sessions, and so on) and provides a graphical representation of active AP information (such as the number of wired packets, stations, and total APs).

The top menu bar displays across each page within the Wireless Assistant. Using the top menu bar, you can access Wireless Controllers, Wireless APs, VNS Configurations, the Mitigator and online help. Figure 2-1 shows the Wireless Assistant top menu bar.

Figure 2-1 Wireless Assistant Top Menu Bar

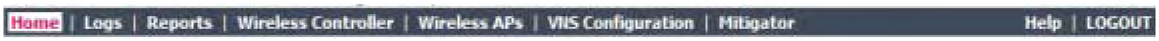
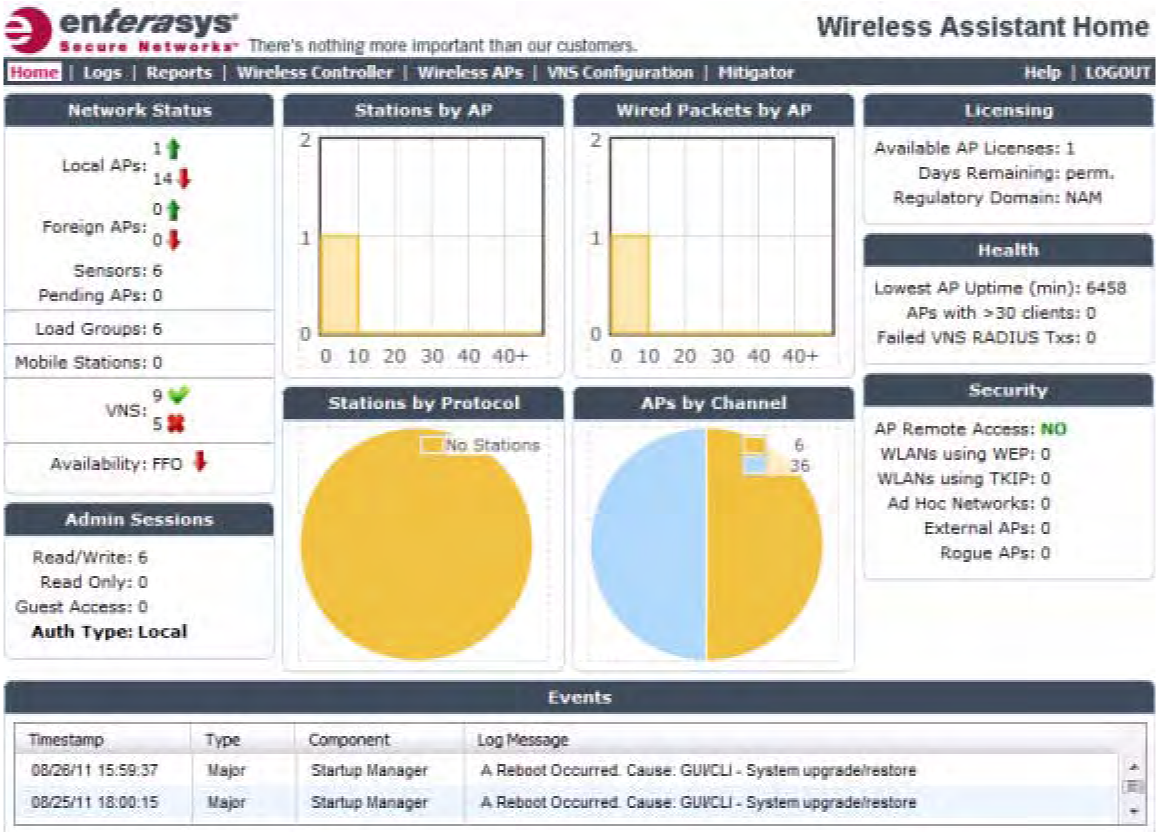

Home | Logs | Reports | Wireless Controller | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT

Figure 2-2 shows the Wireless Assistant Home Screen. Table 2-1, describes the home screen headings and descriptions with links to support information within the online help.

Figure 2-2 Wireless Assistant Home Screen



Network Status

Local APs: 1 ↑ 14 ↓

Foreign APs: 0 ↑ 0 ↓

Sensors: 6

Pending APs: 0

Load Groups: 6

Mobile Stations: 0

VNS: 9 ✓ 5 ✗

Availability: FFO ↓

Admin Sessions

Read/Write: 6

Read Only: 0

Guest Access: 0

Auth Type: Local

Licensing

Available AP Licenses: 1

Days Remaining: perm.

Regulatory Domain: NAM

Health

Lowest AP Uptime (min): 6458

APs with >30 clients: 0

Failed VNS RADIUS Txs: 0

Security

AP Remote Access: NO

WLANs using WEP: 0

WLANs using TKIP: 0

Ad Hoc Networks: 0

External APs: 0

Rogue APs: 0

Events

Timestamp	Type	Component	Log Message
08/26/11 15:59:37	Major	Startup Manager	A Reboot Occurred. Cause: GUI/CLI - System upgrade/restore
08/25/11 18:00:15	Major	Startup Manager	A Reboot Occurred. Cause: GUI/CLI - System upgrade/restore

Table 2-1 Wireless Assistant Home Screen Headings

Home Screen Heading	Description
Network Status	Includes real-time totals for the following components: • Local APs - total number of active or inactive local APs. Click the number displayed to open a separate dialog that lists the AP name, serial number, and IP address. • Foreign APs - total number of active or inactive foreign APs. Click the number displayed to open a separate dialog that lists the AP name, serial number, and IP address. • Sensors - total number of active sensors. Click the number displayed to open a separate dialog that lists the sensor name, serial number, and IP address. • Pending APs - total APs pending verification. Click the number displayed to open a separate dialog that lists the AP name, serial number, and IP address. • Load Groups - total active load groups. Click **Load Groups** to display the Active Wireless Load Groups report. • Mobile Stations - total number of active mobile stations. Click **Mobile Stations** to display the All Active Client report. Within the report, Mobility Tunnels lists the total number of mobility clients. If mobility is not enabled on the controller, then information on Mobility Tunnels will not appear. • VNS - total defined VNSs (enabled and disabled). Click **VNS** to display the total number of enabled and disabled VNS assignments, respectively, configured on the system. • Availability - status of most recent session. Click **Availability** to display the state of availability link (up or down) with indication if fast failover is enabled. If Availability is not enabled on the controller, then information about Availability will not appear.
Admin Sessions	Displays information on the total number of recent administrative activities including: • Read/Write sessions - total number of currently active GUI and CLI (either SSH or serial console ones) Read/Write sessions. • Read-only sessions - total number of currently active GUI and CLI (either SSH or serial console ones) Read only sessions. • Guest Access sessions - total number of currently active GuestPortal Manager sessions that can only be achieved through the GUI. • Auth Type - lists the presently configured login mode. Click each heading to access the Wireless Controller > Login Management screen. For more information, see Configuring the Login Authentication Mode.
Stations by AP	Displays a graphical representation of the total number of active stations and the number of APs. Click the **Stations by AP** heading to access the Active Clients by Wireless AP Report. For more information, see Viewing Statistics for Wireless APs.
Stations by Protocol	Displays a graphical representation of the total number of active stations grouped by protocol. Click the **Stations by Protocol** heading to access the All Active Clients Report. For more information, see Viewing Statistics for Wireless APs.
Wired Packets by AP	Displays a graphical representation of packet statistics including the total number of packets sent and received, the total packets discarded, and the total number of unicast, multicast, and broadcast packets. Click the **Wired Packets by AP** heading to access the Wired Ethernet Statistics by Wireless Report. For more information, see Viewing Statistics for Wireless APs.

Table 2-1 Wireless Assistant Home Screen Headings (continued)

Home Screen Heading	Description
APs by Channel	Displays a graphical representation of the total number of active APs grouped by channel. Click the **APs by Channel** heading to access the Active Wireless APs Report. For more information, see Viewing Statistics for Wireless APs.
Licensing	Displays licensing information including: • Available AP Licenses - total number of available licenses. • Days Remaining - number of days remaining on this license key. • Regulatory Domain - Domain information for this license period. Click the **Licensing** heading to access the Wireless Controller > Software Maintenance screen. For more information, see Installing the License Keys.
Health	Displays network health statistics including: • Local AP Uptime (min) • APs with > 30 clients • Failed VNS RADIUS Txs Click each heading to access the Active Wireless APs Report. For more information, see Viewing Statistics for Wireless APs.
Security	Displays totals for the following security related statistics: • AP remote access - click to access the Wireless APs > AP Registration page • WLANs using WEP • WLANs using TKIP • Ad Hoc Networks - click to access the Mitigator > Rogue Detection page • External APs - click to access the Mitigator > Rogue Detection page • Rogue APs - click to access the Mitigator > Rogue Detection page For more information, see Defining Properties for the Discovery Process, and Working with Mitigator Scan Results.
Events	Displays major events that impact network performance and efficiency. Each event listed includes a timestamp of the event, the type or classification of the event, which component is impacted by the event, and a log message providing specific information for the event. Click the **Events** heading to access the Logs > Logs & Traces page. For more information, see Available Reports and Displays.

Working with the Basic Installation Wizard

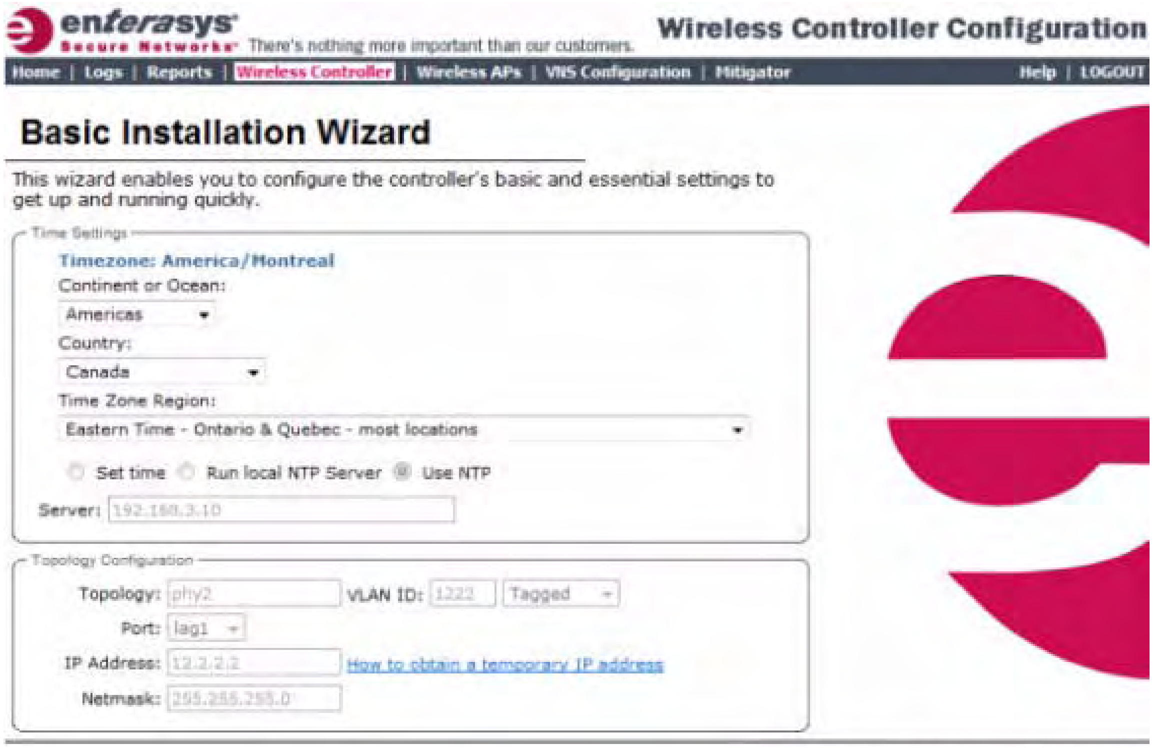
The Enterasys Wireless Convergence Software system provides a basic installation wizard that can help administrators configure the minimum Enterasys Wireless Controller settings that are necessary to deploy a functioning Enterasys Wireless solution on a network.

Administrators can use the basic installation wizard to quickly configure the Enterasys Wireless Controller for deployment, and then once the installation is complete, continue to revise the Enterasys Wireless Controller configuration accordingly.

The basic installation wizard is automatically launched when an administrator logs on to the Enterasys Wireless Controller for the first time, including when the system has been reset to the factory default settings. In addition, the basic installation wizard can also be launched at any time from the left pane of the Enterasys Wireless Controller Configuration screen.

To Configure the Enterasys Wireless Controller with the Basic Installation Wizard:

1. Log on to the Enterasys Wireless Controller. For more information, see "Logging on to the Enterasys Wireless Controller" on page 2-4.
2. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
3. In the left pane, click **Installation Wizard**. The **Basic Installation Wizard** screen is displayed.


enterasys Secure Networks
There's nothing more important than our customers.
Wireless Controller Configuration
Home | Logs | Reports | Wireless Controller | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT

Basic Installation Wizard

This wizard enables you to configure the controller's basic and essential settings to get up and running quickly.

Time Settings

Timezone: America/Montreal

Continent or Ocean: Americas

Country: Canada

Time Zone Region: Eastern Time - Ontario & Quebec - most locations

○ Set time ○ Run local NTP Server ● Use NTP

Server: 192.168.3.10

Topology Configuration

Topology: phy2 VLAN ID: 1222 Tagged

Port: lag1

IP Address: 12.2.2.2 How to obtain a temporary IP address

Netmask: 255.255.255.0

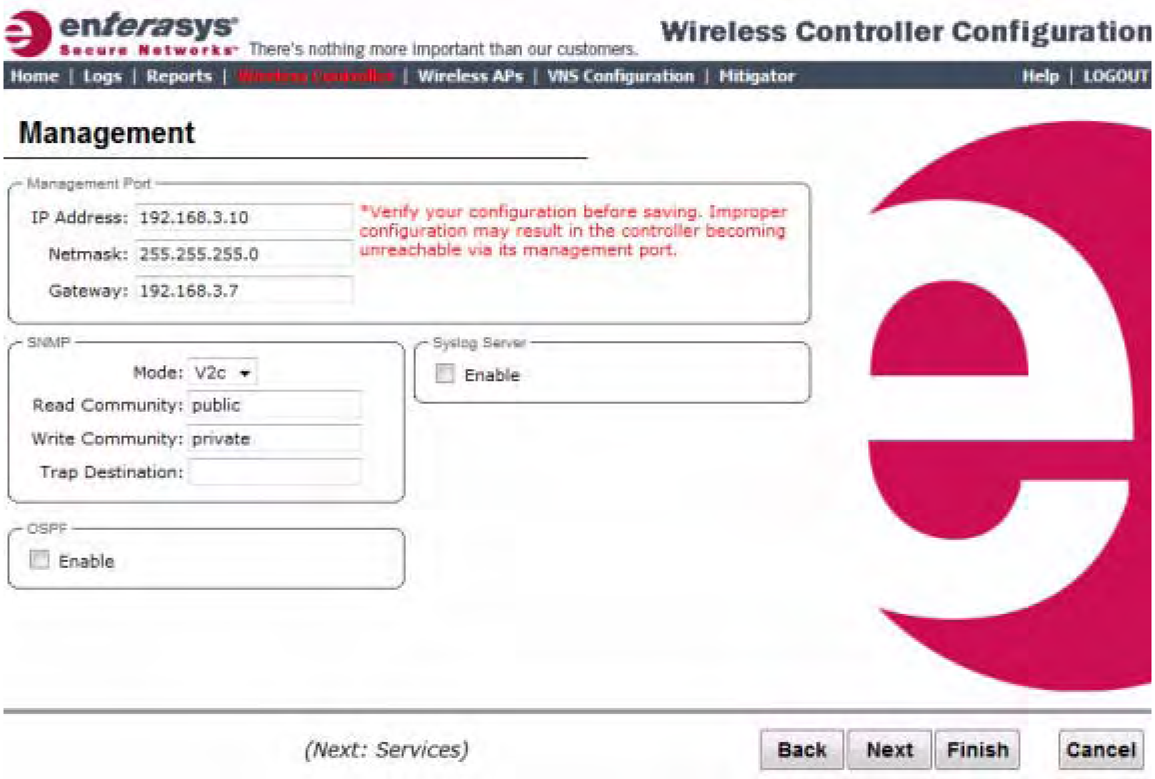
4. In the **Time Settings** section, configure the Enterasys Wireless Controller timezone:
   - **Continent or Ocean** — Click the appropriate large-scale geographic grouping for the time zone.
   - **Country** — Click the appropriate country for the time zone. The contents of the drop-down list change, based on the selection in the **Continent or Ocean** drop-down list.
   - **Time Zone Region** — Click the appropriate time zone region for the selected country.
5. To configure the Enterasys Wireless Controller's time, do one of the following:
   - To manually set the Enterasys Wireless Controller time, use the **Year**, **Month**, **Day**, **HR**, and **Min**. drop-down lists to specify the time.
   - To use the Enterasys Wireless Controller as the NTP time server, select the **Run local NTP Server** option.
   - To use NTP to set the Enterasys Wireless Controller time, select the **Use NTP** option, and then type the IP address of an NTP time server that is accessible on the enterprise network.

   The Network Time Protocol is a protocol for synchronizing the clocks of computer systems over packet-switched data networks.
6. In the **Topology Configuration** section, click the physical interface of the Enterasys Wireless Controller you want to assign as a data port. The system assigns default **IP Address** and

Netmask values for the data port. If applicable, type a different IP address and netmask for the selected physical interface.

For information on how to obtain a temporary IP address from the network, click **How to obtain a temporary IP address**.

7. Click **Next**. The **Management** screen is displayed.


enterasys
Secure Networks
There's nothing more important than our customers.
Wireless Controller Configuration
Home | Logs | Reports | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT
Management
Management Port
SNMP
Syslog Server
OSPF
(Next: Services)
Back
Next
Finish
Cancel

IP Address: 192.168.3.10

Netmask: 255.255.255.0

Gateway: 192.168.3.7

*Verify your configuration before saving. Improper configuration may result in the controller becoming unreachable via its management port.

Mode: V2c

Read Community: public

Write Community: private

Trap Destination:

□ Enable

□ Enable

8. In the **Management Port** section, confirm the port configuration values that were defined when the Enterasys Wireless Controller was physically deployed on the network. If applicable, edit these values:
   - **IP Address** — Displays the IP address for the Enterasys Wireless Controller's management port. Revise this as appropriate for the enterprise network.
   - **Netmask** — Displays the appropriate subnet mask for the IP address to separate the network portion from the host portion of the address.
   - **Gateway** — Displays the default gateway of the network.

9. In the **SNMP** section, click **V2c** or **V3** in the **Mode** drop-down list to enable SNMP, if applicable. Only one mode can be supported on the controller at a time.

   If you selected **V2c**, do the following:
   - **Read Community** — Type the password that is used for read-only SNMP communication.
   - **Write Community** — Type the password that is used for write SNMP communication.
   - **Trap Destination** — Type the IP address of the server used as the network manager that will receive SNMP messages.

10. In the **OSPF** section, select the **Enable** checkbox to enable OSPF, if applicable. Use OSPF to allow the Enterasys Wireless Controller to participate in dynamic route selection. OSPF is a

protocol designed for medium and large IP networks with the ability to segment routes into different areas by routing information summarization and propagation.

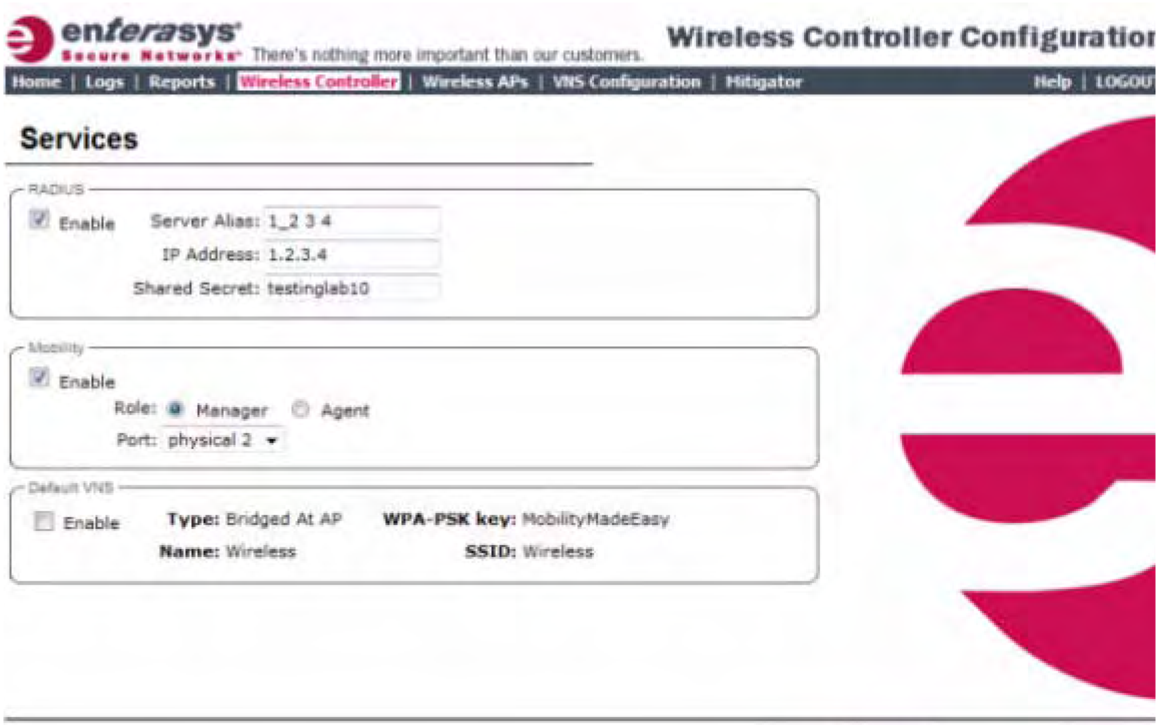
Do the following:

- **Port** — Click the physical interface of the Enterasys Wireless Controller you want to assign as a router port.
- **Area ID** — Type the desired area. Area 0.0.0.0 is the main area in OSPF.

11. In the **Syslog Server** section, select the **Enable** checkbox to enable the syslog protocol for the Enterasys Wireless Controller, if applicable. Syslog is a protocol used for the transmission of event notification messages across networks.

    In the **IP Address** box, type the IP address of the syslog server.

12. Click **Next**. The **Services** screen is displayed.


enterasys
Secure Networks
There's nothing more important than our customers.
Wireless Controller Configuratior
Home | Logs | Reports | Wireless Controller | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT

Services

RADIUS

☑ Enable Server Alias: 1_2 3 4
IP Address: 1.2.3.4
Shared Secret: testinglab10

Mobility

☑ Enable
Role: ● Manager ○ Agent
Port: physical 2

Default VNS

□ Enable Type: Bridged At AP WPA-PSK key: MobilityMadeEasy
Name: Wireless SSID: Wireless

13. In the **RADIUS** section, select the **Enable** checkbox to enable RADIUS login authentication, if applicable. RADIUS login authentication uses a RADIUS server to authenticate user login attempts. RADIUS is a client/server authentication and authorization access protocol used by a network access server (NAS) to authenticate users attempting to connect to a network device.

    Do the following:

    - **Server Alias** — Type a name that you want to assign to the RADIUS server. You can type a name or IP address of the server.
    - **Hostname/IP** — Type the RADIUS server's hostname or IP address.
    - **Shared Secret** — Type the password that will be used to validate the connection between the Enterasys Wireless Controller and the RADIUS server.

14. In the **Mobility** section, select the **Enable** checkbox to enable the Enterasys Wireless Controller mobility feature, if applicable. Mobility allows a wireless device user to roam seamlessly between different Wireless APs on the same or different Enterasys Wireless Controllers.

A dialog is displayed informing you that NTP is required for the mobility feature and prompting you to confirm you want to enable mobility.

Note: If the Enterasys Wireless Controller is configured as a mobility agent, it will act as an NTP client and use the mobility manager as the NTP server. If the Enterasys Wireless Controller is configured as a mobility manager, the Enterasys Wireless Controller's local NTP will be enabled for the mobility domain.

Click **OK** to continue, and then do the following:

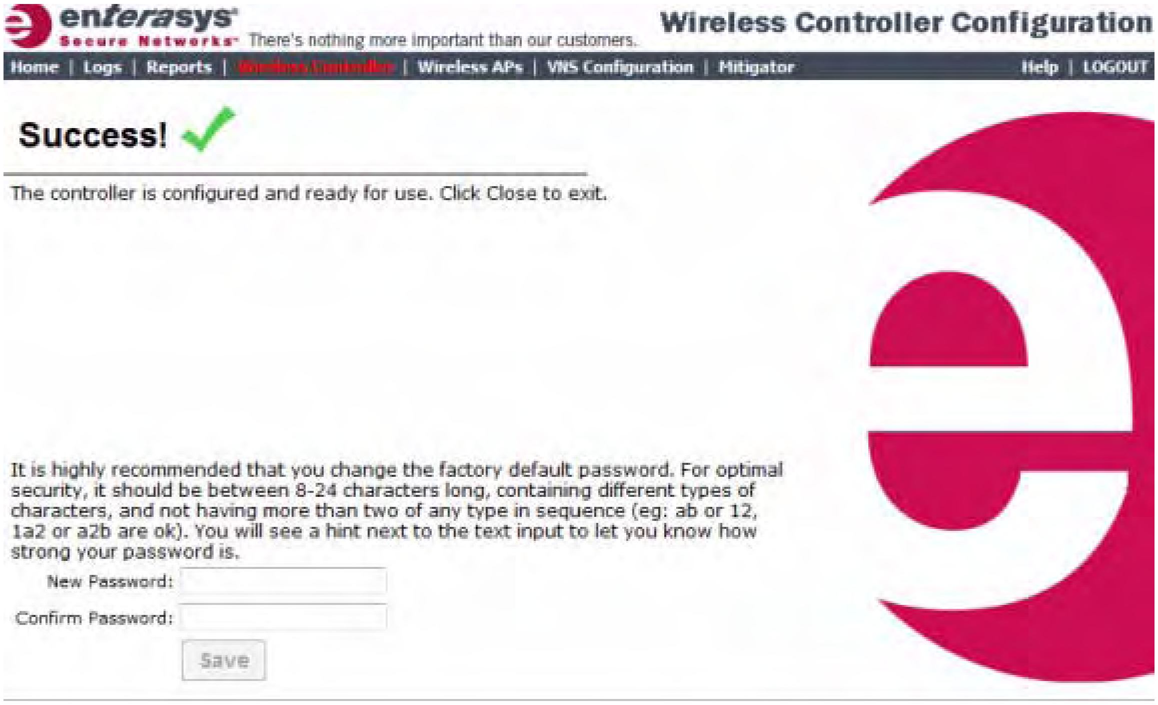
Role — Select the role for the Enterasys Wireless Controller, **Manager** or **Agent**. One Enterasys Wireless Controller on the network is designated as the mobility manager and all other Enterasys Wireless Controllers are designated as mobility agents.

Port — Click the interface on the Enterasys Wireless Controller to be used for communication between mobility manager and mobility agent. Ensure that the selected interface is routable on the network. For more information, see Chapter 12, **Configuring Mobility**.

Manager IP — Type the IP address of the mobility manager port if the Enterasys Wireless Controller is configured as the mobility agent.

15. In the **Default VNS** section, select the **Enable** checkbox to enable a default VNS for the Enterasys Wireless Controller. The default VNS parameters are displayed. Refer to "Virtual Network Services" on page 1-11 for more information about the default VNS.
16. Click **Finish**. The **Success** screen is displayed. Enterasys recommends that you change the factory default administrator password. Do the following:
    - **New Password** — Type a new administrator password.
    - **Confirm Password** — Type the new administrator password again.
17. Click **Save**. Your new password is saved.
18. Click **OK**, and then click **Close**. The Enterasys Wireless Assistant home screen is displayed.

Note: The Enterasys Wireless Controller reboots after you click **Save** if the time zone is changed during the Basic Install Wizard. If the IP address of the management port is changed during the configuration with the Basic Install Wizard, the Enterasys Wireless Assistant session is terminated and you will need to log back in with the new IP address.


enterasys
Secure Networks
There's nothing more important than our customers.
Wireless Controller Configuration
Home | Logs | Reports | Wireless Controller | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT
Save

Success!

The controller is configured and ready for use. Click Close to exit.

It is highly recommended that you change the factory default password. For optimal security, it should be between 8-24 characters long, containing different types of characters, and not having more than two of any type in sequence (eg: ab or 12, 1a2 or a2b are ok). You will see a hint next to the text input to let you know how strong your password is.

New Password:

Confirm Password:

Configuring the Enterasys Wireless Controller for the First Time

As soon as the Enterasys Wireless Controller is deployed, you should perform a series of configuration tasks. These tasks include:

- Changing the Administrator Password
- Applying Product License Keys
- Setting Up the Data Ports
- Setting Up Internal VLAN ID and Multicast Support
- Setting Up Static Routes
- Setting Up OSPF Routing
- Configuring Filtering at the Interface Level
- Protecting the Controller's Interfaces and Internal Captive Portal Page
- Configuring the Login Authentication Mode
- Configuring SNMP
- Configuring Network Time
- Configuring DNS Servers for Resolving Host Names of NTP and RADIUS Servers

Although the basic installation wizard has already configured some aspects of the Enterasys Wireless Controller deployment, you can continue to revise the Enterasys Wireless Controller configuration according to your network needs.

Changing the Administrator Password

Enterasys recommends that you change your default administrator password once your system is deployed. The Enterasys Wireless Controller default password is `abc123`. When the Enterasys Wireless Controller is installed and you elect to change the default password, the new password must be a minimum of eight characters.

The minimum eight character password length is not applied to existing passwords. For example, if a six character password is already being used and an upgrade of the software is performed, the software does not require the password to be changed to a minimum of eight characters. However, once the upgrade is completed and a new account is created, or the password of an existing account is changed, the new password length minimum will be enforced.

To Change the Administrator Password:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Login Management**.
3. In the Full Administrator table, click the administrator user name.
4. In the **Password** box, type the new administrator password.
5. In the **Confirm Password** box, type the new administrator password again.
6. Click **Change Password**.

Note: The Enterasys Wireless Controller provides you with local login authentication mode, the RADIUS-based login authentication mode, and combinations of the two authentication modes. The local login authentication is enabled by default. For more information, see "Configuring the Login Authentication Mode" on page 2-35.

Applying Product License Keys

The Enterasys Wireless Controller's license system works on simple software-based key strings. A key string consists of a series of numbers and/or letters. Using these key strings, you can license the software, and enhance the capacity of the Enterasys Wireless Controller to manage additional Wireless APs.

The key strings can be classified into the following variants:

- **Activation Key** — Activates the software. This key is further classified into two sub-variants:
  - **Temporary Activation Key** — Activates the software for a trial period of 90 days.
  - **Permanent Activation Key** — Activates the software for an infinite period.
- **Option Key** — Activates the optional feature:
  - **Capacity Enhancement Key** — Enhances the capacity of the Enterasys Wireless Controller to manage additional Wireless APs. You may have to add multiple capacity enhancement keys to reach the Enterasys Wireless Controller's limit. Depending on the Enterasys Wireless Controller model, a capacity enhancement key adds the following Wireless APs:
    - C5110 — Adds 25 Wireless APs
    - C4110 — Adds 25 Wireless APs
    - C20 — Adds 16 Wireless APs
    - C25 — Adds 16 Wireless APs

- V2110 — Adds 16 Wireless APs

Note: If you connect additional Wireless APs to a Enterasys Wireless Controller that has a permanent activation key without installing a capacity enhancement key, a grace period of seven days will start. You must install the correct key during the grace period. If you do not install the key, the Enterasys Wireless Controller will start generating event logs every 15 minutes, indicating that the key is required. In addition, you will not be able to edit the Virtual Network Services (VNS) parameters.

The Enterasys Wireless Controller can be in the following licensing modes:

- **Unlicensed** — When the Enterasys Wireless Controller is not licensed, it operates in 'demo mode.' In 'demo mode,' the Enterasys Wireless Controller allows you to operate as many Wireless APs as you want, subject to the maximum limit of the platform type. In demo mode, you can use only the b/g radio, with channels 6, 11, and auto. 11n support and Mobility are disabled in demo mode.
- **Licensed with a temporary activation key** — A temporary activation key comes with a regulatory domain. With the temporary activation key, you can select a country from the domain and operate the Wireless APs on any channel permitted by the country. A temporary activation key allows you to use all software features. You can operate as many Wireless APs as you want, subject to the maximum limit of the platform type.

  A temporary activation key is valid for 90 days. Once the 90 days are up, the temporary key expires. You must get a permanent activation key and install it on the Enterasys Wireless Controller. If you do not install a permanent activation key, the Enterasys Wireless Controller will start generating event logs every 15 minutes, indicating that an appropriate license is required for the current software version. In addition, you will not be able to edit the Virtual Network Services (VNS) parameters.
- **Licensed with permanent activation key** — A permanent activation key is valid for an infinite period. In addition, unlike the temporary activation key, the permanent activation key allows you to operate a stipulated number of the Wireless APs, depending upon the platform type. If you want to connect additional Wireless APs, you have to install a capacity enhancement key. You may even have to install multiple capacity enhancement keys to reach the Enterasys Wireless Controller's limit.

  The following table lists the platform type and the corresponding number of the Wireless APs allowed by the permanent activation key.

Table 2-2 Platform Type / Wireless APs Allowed by Permanent Activation Key

Platform	Wireless APs permitted by permanent activation key	Platform's optimum limit	Number of capacity enhancement keys to reach the optimum limit
C20	16	32	1
C25	16	48	2
C4110	50	250	8
C5110	150	525	15
V2110	8	120	7

If the Enterasys Wireless Controller detects multiple license violations, such as capacity enhancement, a grace period counter will start from the moment the first violation occurred. The Enterasys Wireless Controller will generate event logs for every violation. The only way to leave the grace period is to clear all outstanding license violations.

The Enterasys Wireless Controller can be in an unlicensed state for an infinite period. However, if you install a temporary activation key, the unlicensed state is terminated. After the validity of a temporary activation key and the related grace period expire, the Enterasys Wireless Controller will generate event logs every 15 minutes, indicating that an appropriate license is required for the current software version. In addition, you will not be able to edit the Virtual Network Services (VNS) parameters.

Installing the License Keys

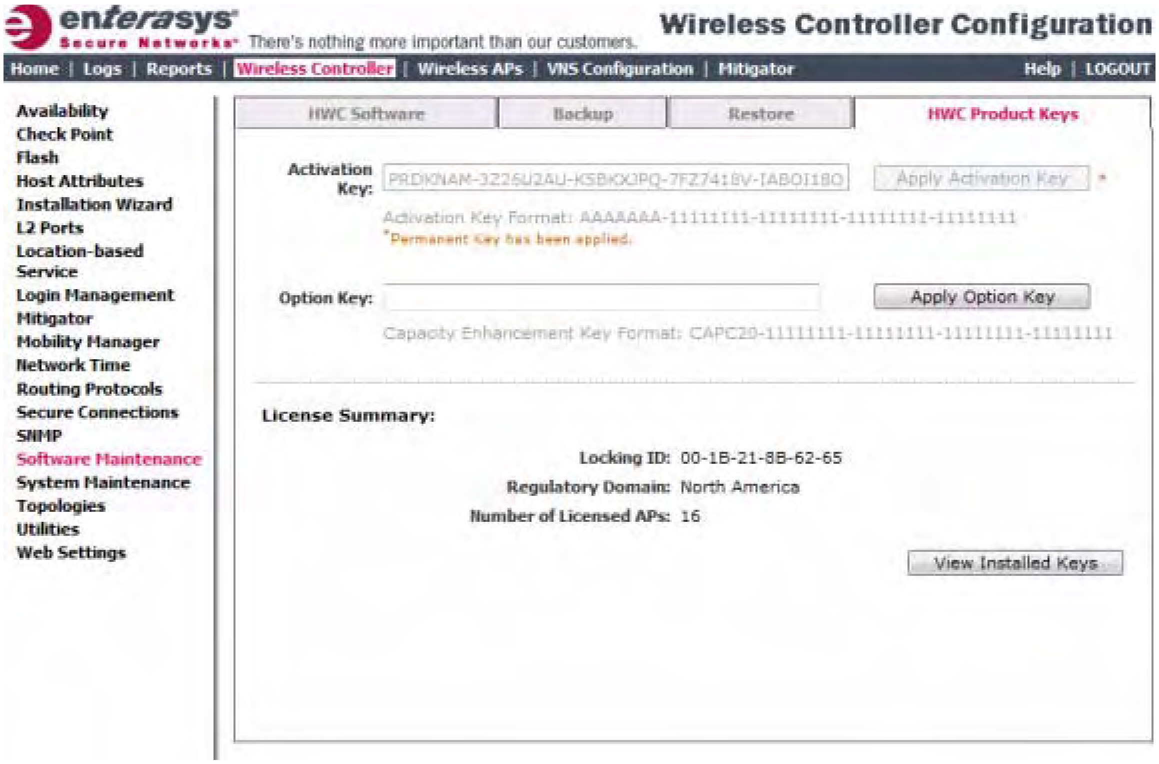
This section describes how to install the license key on the Enterasys Wireless Controller. It does not explain how to generate the license key. For information on how to generate the license key, see the Enterasys Wireless *License Certificate*, which is sent to you via traditional mail.

You have to type the license keys on the Enterasys Wireless Assistant GUI.

To Install the License Keys:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Software Maintenance**.
3. Click the **HWC Product Keys** tab.

   The bottom pane displays the license summary.



Activation Key: PRDKNAM-3226U2AU-K5BKXJPQ-7FZ7418V-IABOI18O *

Activation Key Format: AAAAAAA-1111111-1111111-1111111-1111111

*Permanent Key has been applied.

Option Key:

Capacity Enhancement Key Format: CAPC20-1111111-1111111-1111111-1111111

License Summary:

Locking ID: 00-1B-21-8B-62-65

Regulatory Domain: North America

Number of Licensed APs: 16

4. If you are installing a temporary or permanent activation license key, type the key in the **Activation Key** box, and then click the **Apply Activation Key** button.
5. If you are installing a capacity enhancement, type the key in the **Option Key** box, and then click the **Apply Option Key** button.
6. To view installed keys, click **View Installed Keys**.

Setting Up the Data Ports

A new Enterasys Wireless Controller is shipped from the factory with all its data ports set up. Support of management traffic is disabled on all data ports. By default, data interface states are enabled. A disabled interface does not allow data to flow (receive/transmit).

Physical ports are represented by the L2 (Ethernet) Ports. The L2 port can be accessed from **L2 Ports** tabs under Enterasys Wireless Controller Configuration. The L2 Ports cannot be removed from the system but their operational status can be changed. Refer to Viewing and Changing the L2 Ports Information.

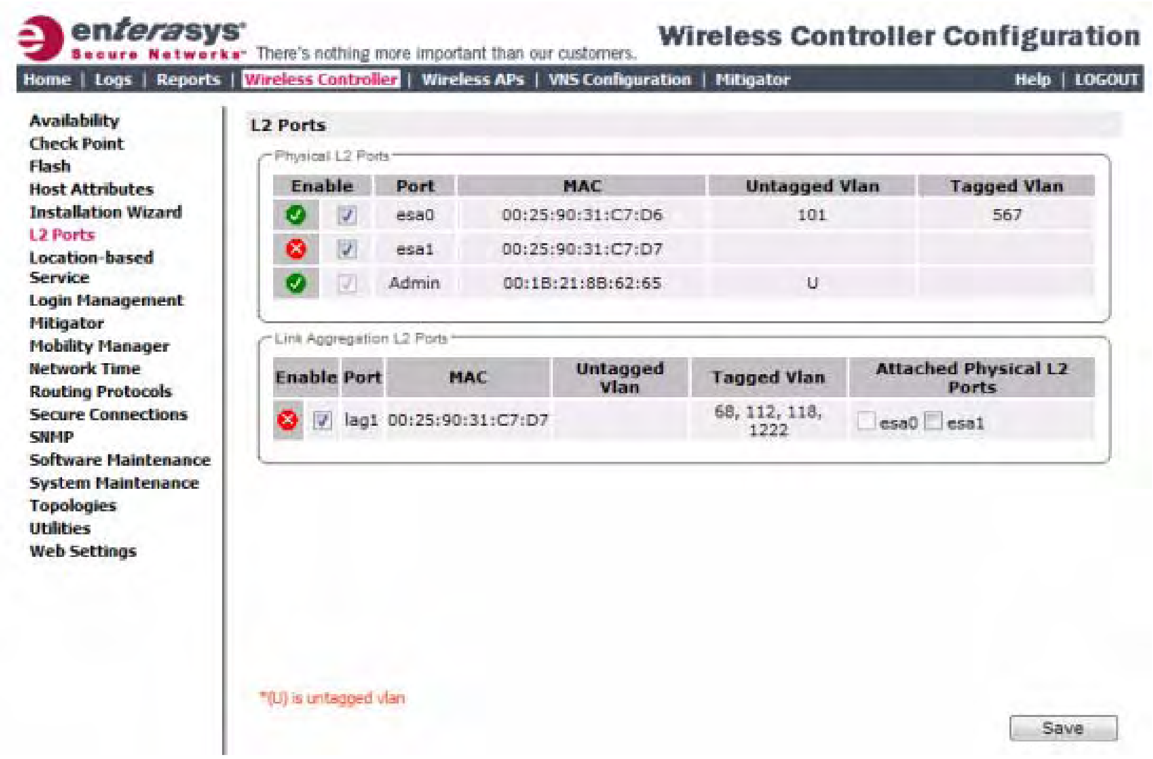
Link Aggregation ports are represented by the L2 (peer-to-peer) LAG Ports. The L2 port and Topology information can be accessed from **L2 Ports** and **Topology** tabs under Enterasys Wireless Controller Configuration. The LAG L2 Ports cannot be removed from the system but their operational status can be changed. Refer to Viewing and Changing the L2 Ports Information.

Note: You can redefine a data port to function as a **Third-Party AP Port**. Refer to Viewing and Changing the Physical Topologies for more information.

Viewing and Changing the L2 Ports Information

To View and Change the L2 Port Information:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **L2 Ports**. The **L2 Ports** tab is displayed.



L2 Ports

Physical L2 Ports

Enable		Port	MAC	Untagged Vlan	Tagged Vlan
✓	☑	esa0	00:25:90:31:C7:D6	101	567
✗	☑	esa1	00:25:90:31:C7:D7		
✓	☑	Admin	00:1B:21:8B:62:65	U	

Link Aggregation L2 Ports

Enable		Port	MAC	Untagged Vlan	Tagged Vlan	Attached Physical L2 Ports
✗	☑	lag1	00:25:90:31:C7:D7		68, 112, 118, 1222	□ esa0 □ esa1

*(U) is untagged vlan

The **L2 Ports** tab presents the Physical (that is, Ethernet) and Link Aggregation LAG (peer to peer) data ports that exist on the Enterasys Wireless Controller. These ports cannot be deleted and new ones cannot be created.

LAG ports are statically configured by adding/removing physical ports from the LAG. Physical port belong to at most one LAG at one time. L2 port attached to a LAG port does not have any properties and could not be attached to any topology. The L2 ports attached to LAG ports can be enabled or disabled. Optional, if changes occur to the port physical parameters (speed, half or full duplex), a warning will be displayed to indicate that the L2 port does not meet LAG conditions.

Considerations for attaching/detaching regular L2 ports to LAG ports:

- Regular L2 port should not have any bridged and physical topologies associated with the port.
- Regular L2 port should not be disabled.
- L2 ports can be detached from LAG ports regardless of any topologies attached to the LAG port.
- If the L2 port is the last remaining in LAG, a warning will be issued. If last port of the LAG has been detached, the LAG should be in operational DOWN state.
- After detaching the L2 port, it could be attached to any bridged or physical topology or points via a routing table to the port any routed topology.

Assigning any bridged or physical topology without specifying an L2 port is not supported. However, you can move any bridged and physical topology to either a physical or LAG L2 port.

Physical:

- C5110 — Three data ports, displayed as **esa0**, **esa1**, and **esa2**.
- C4110 — Four data ports, displayed as **Port1**, **Port2**, **Port3**, and **Port4**.
- C20 — Two data ports, displayed as **esa0** and **esa1**.
- C25 — Two data ports, displayed as **esa0** and **esa1**.
- V2110 — Two data ports, displayed as **esa0 and esa1**.

Link Aggregation:

- C5110 — One data port, displayed as **lag1**
- C4110 — One data port, displayed as **lag1.**
- C20 — One data port, displayed **lag1.**
- C25 — One data port, displayed as **lag1**.

Also an “Admin” port is created by default. This represents a physical port, separate from the other data ports, being used for management connectivity.

Parameters displayed for the L2 Ports are:

- Operational status, represented graphically with a green checkmark (UP) or red X (DOWN). This is the only configurable parameter.
- Port name, as described above.
- MAC address, as per Ethernet standard.
- Untagged VLAN, displays the associated untagged VLAN ID. This ID is unique among topologies.
- Tagged VLAN, displays the associated tagged VLAN ID.

– Attached Physical L2 Ports (Link Aggregation L2 Ports only) select the physical L2 ports associated with the link aggregation L2 Ports.

Note: Refer to Viewing and Changing the Physical Topologies for more information about L2 port topologies.

3. If desired, change the operational status by clicking the Enable checkbox.

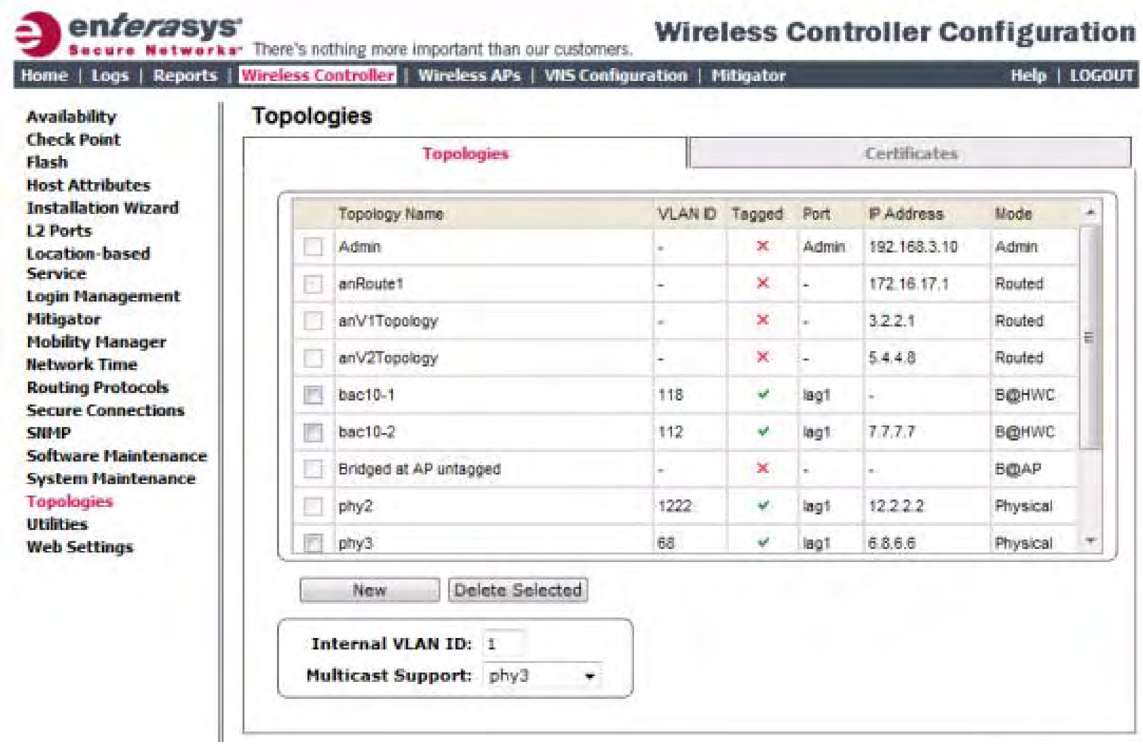
   You can change the operational state for each port. By default, data interface states are enabled. If they are not enabled, you can enable them individually. A disabled interface does not allow data to flow (receive/transmit).

Viewing and Changing the Physical Topologies

To View and Change the L2 Port Topologies:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Topologies**. The **Topologies** tab is displayed.

   An associated topology entry is created by default for each L2 Port with the same name.

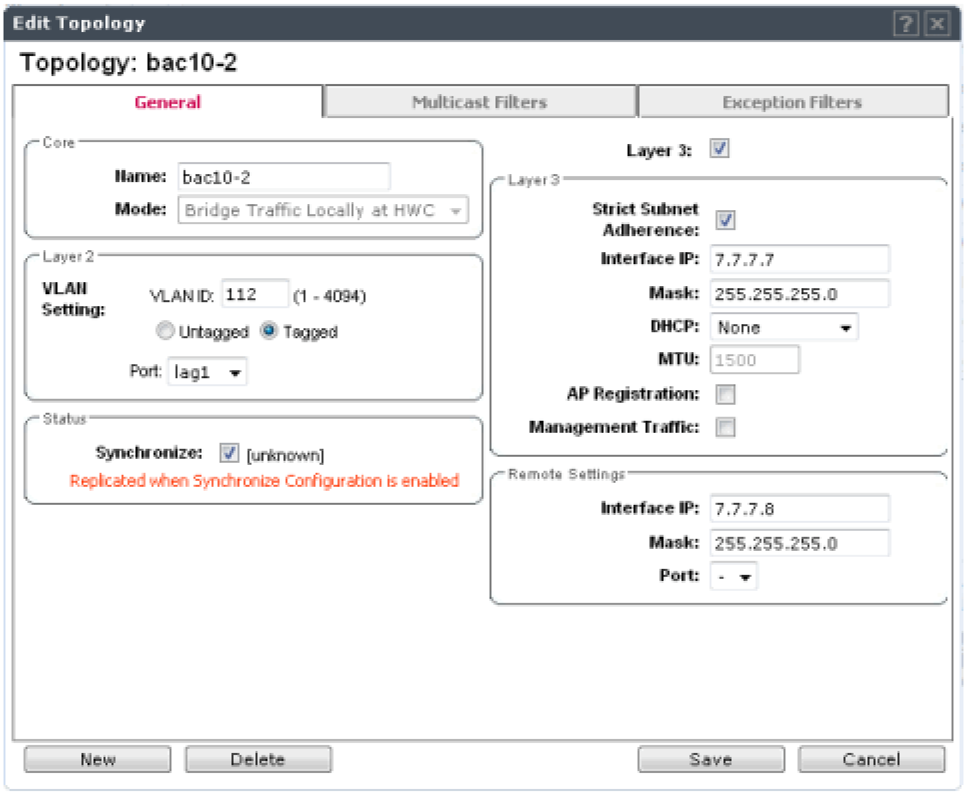


	Topology Name	VLAN ID	Tagged	Port	IP Address	Mode
□	Admin	-	✗	Admin	192.168.3.10	Admin
□	anRoute1	-	✗	-	172.16.17.1	Routed
□	anV1Topology	-	✗	-	3.2.2.1	Routed
□	anV2Topology	-	✗	-	5.4.4.8	Routed
□	bac10-1	118	✓	lag1	-	B@HWC
□	bac10-2	112	✓	lag1	7.7.7.7	B@HWC
□	Bridged at AP untagged	-	✗	-	-	B@AP
□	phy2	1222	✓	lag1	12.2.2.2	Physical
□	phy3	68	✓	lag1	6.8.6.6	Physical

Internal VLAN ID: 1

Multicast Support: phy3

3. To change any of the associated parameters, click on the topology entry to be modified. An “Edit Topology” pop up window appears.



Topology: bac10-2

Core
Name: bac10-2
Mode: Bridge Traffic Locally at HWC

Layer 2
VLAN Setting: VLAN ID: 112 (1 - 4094)
○ Untagged ● Tagged
Port: lag1

Status
Synchronize: ☑ [unknown]
Replicated when Synchronize Configuration is enabled

Layer 3: ☑

Layer 3
Strict Subnet Adherence: ☑
Interface IP: 7.7.7.7
Mask: 255.255.255.0
DHCP: None
MTU: 1500
AP Registration: □
Management Traffic: □

Remote Settings
Interface IP: 7.7.7.8
Mask: 255.255.255.0
Port: -

For the data ports predefined in the system, **Name** and **Mode** are not configurable.

4. Optionally, configure one of the physical topologies for Third Party AP connectivity by clicking the **3rd Party AP Topology** checkbox.

   You must configure a topology to which you will be connecting third-party APs by checking this box. Only one topology can be configured for third-party APs.

   Third-party APs must be deployed within a segregated network for which the Enterasys Wireless Controller becomes the single point of access (i.e., routing gateway). When you define a third-party AP topology, the interface segregates the third-party AP from the remaining network.

5. To configure an interface for VLAN assignment, configure the **VLAN Setting**s in the **Layer 2** box.

   When you configure a Enterasys Wireless Controller port to be a member of a VLAN, you must ensure that the VLAN configuration (VLAN ID, tagged or untagged attribute, and Port ID) is matched with the correct configuration on the network switch.

6. To replicate topology settings, click **Synchronize** in the **Status** box.

7. If the desired IP configuration is different from the one displayed, change the **Interface IP** and **Mask** accordingly in the **Layer 3** box.

   For this type of data interface, the Layer 3 check box is selected automatically. This allows for IP Interface and subnet configuration together with other networking services.

8. The **MTU** value specifies the Maximum Transmission Unit or maximum packet size for this topology. The fixed value is 1500 bytes for physical topologies.

   If you are using OSPF, be sure that the MTU of all the interfaces in the OSPF link match.

Note: If the routed connection to an AP traverses a link that imposes a lower MTU than the default 1500 bytes, the Enterasys Wireless Controller and AP participate in automatic MTU discovery and adjust their settings accordingly.At the Enterasys Wireless Controller, MTU adjustments are tracked on a per AP basis. If the Enterasys Wireless software cannot discover the MTU size, it enforces the static MTU size.

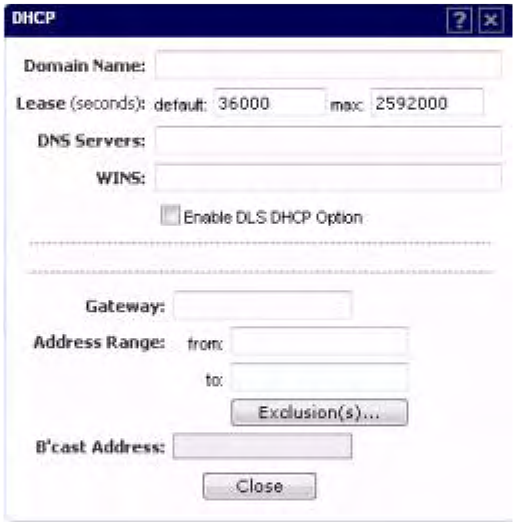
9. To enable AP registration through this interface, select the **AP Registration** checkbox.

   Wireless APs use this port for discovery and registration. Other controllers can use this port to enable inter-controller device mobility if this port is configured to use SLP or the Enterasys Wireless Controller is running as a manager and SLP is the discovery protocol used by the agents.

10. To enable management traffic, select the **Management Traffic** checkbox. Enabling management provides access to SNMP (v2, V3, get), SSH, and HTTPs management interfaces.

Note: This option does not override the built-in protection filters on the port.
The built-in protection filters for the port, which are restrictive in the types of packets that are allowed to reach the management plane, are extended with a set of definitions that allow for access to system management services through that interface (SSH, SNMP, HTTPS:5825).

11. To enable the local DHCP Server on the Enterasys Wireless Controller, in the **DHCP** box, select **Local Server**. Then, click on the **Configure** button to open the DHCP configuration pop up window.



DHCP

Domain Name:

Lease (seconds): default: 36000 max: 2592000

DNS Servers:

WINS:

☐ Enable DLS DHCP Option

Gateway:

Address Range: from:

to:

B'cast Address:

Note: The local DHCP Server is useful as a general-purpose DHCP Server for small subnets.

a. In the **Domain Name** box, type the name of the domain that you want the Wireless APs to use for DNS Server's discovery.

b. In the **Lease (seconds) default** box, type the time period for which the IP address will be allocated to the Wireless APs (or any other device requesting it).

c. In the **Lease (seconds) max** box, type the maximum time period in seconds for which the IP address will be allocated to the Wireless APs.

d. In the **DNS Servers** box, type the DNS Server's IP address if you have a DNS Server.

e. In the **WINS** box, type the WINS Server's IP address if you have a WINS Server.

Note: You can type multiple entries in the **DNS Servers** and **WINS** boxes. Each entry must be separate by a comma. These two fields are not mandatory to enable the local DHCP feature.

f. In the **Gateway** box, type the IP address of the default gateway.

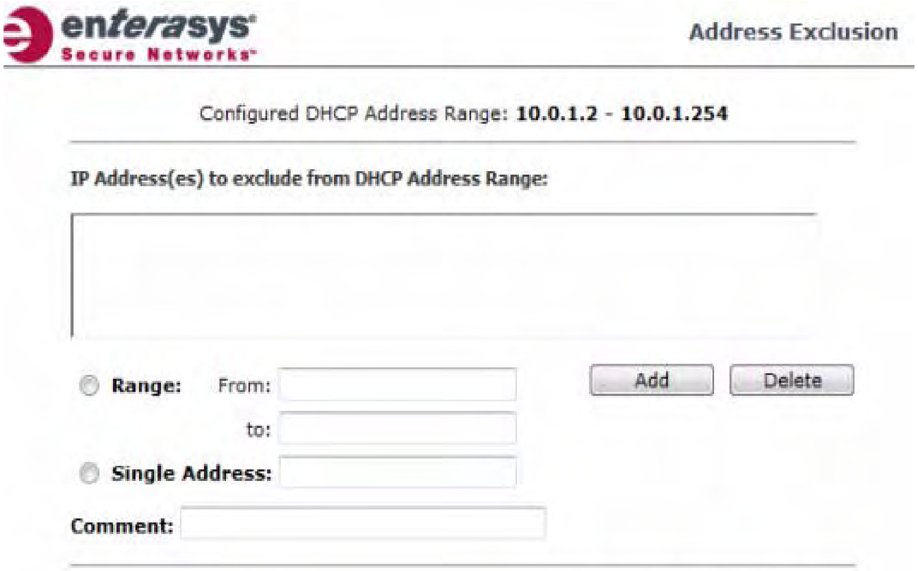
Note: Since the Enterasys Wireless Controller is not allowed to be the gateway for the segment, including Wireless APs, you cannot use the Interface IP address as the gateway address for physical and Bridged at Controller topology. For routed topology, the controller IP address must be the gateway.

g. Configure the address range from which the local DHCP Server will allocate IP addresses to the Wireless APs.

- In the **Address Range: from** box, type the starting IP address of the IP address range.
- In the **Address Range: to** box, type the ending IP address of the IP address range.

h. Click the **Exclusion(s)** button to exclude IP addresses from allocation by the DHCP Server. The **DHCP Address Exclusion** window opens.

The Enterasys Wireless Controller automatically adds the IP addresses of the Interfaces (Ports), and the default gateway to the exclusion list. You cannot remove these IP addresses from the exclusion list.


enterasys Secure Networks
Address Exclusion
IP Address(es) to exclude from DHCP Address Range:
○ Range: From:
to:
○ Single Address:
Comment:
Add
Delete

Configured DHCP Address Range: **10.0.1.2 - 10.0.1.254**

- Select the **Range** radio button. In the **From** box, type the starting IP address of the IP address range that you want to exclude from the DHCP allocation.
- In the **To** box, type the ending IP address of the IP address range that you want to exclude from the DHCP allocation.
- To exclude a single address, select the **Single Address** radio button and type the IP address in the adjacent box.
- In the **Comment** box, type any relevant comment. For example, you can type the reason for which a certain IP address is excluded from the DHCP allocation.
- Click on **Add**. The excluded IP addresses are displayed in the **IP Address(es) to exclude from DHCP Address Range** box.
- To delete a IP Address from the exclusion list, select it in the **IP Address(es) to exclude from DHCP Range** box, and then click **Delete**.

- To save your changes, click **OK**.

i. Click **Close** to close the DHCP configuration window.

Note: The **Broadcast (B'cast) Address** field is view only. This field is computed from the mask and the IP addresses.

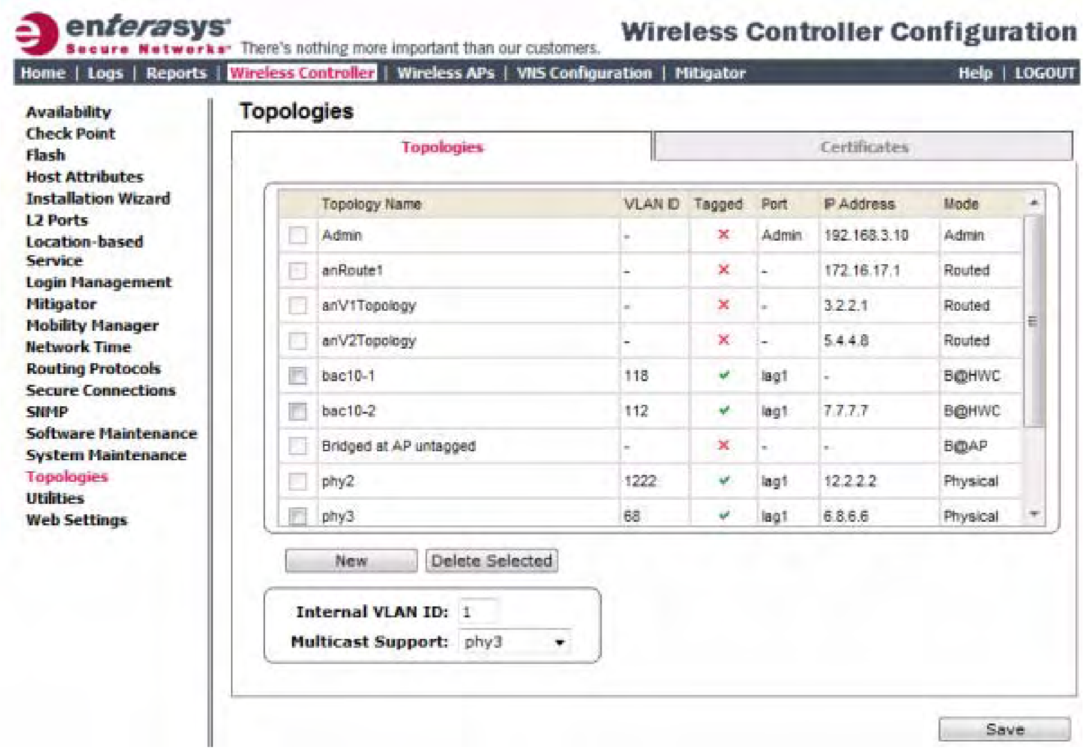
12. You are returned to the L2 port topology edit window.

Setting Up Internal VLAN ID and Multicast Support

You can configure the Internal VLAN ID, and enable multicast support. The internal VLAN used only internally and is not visible on the external traffic. The physical topology used for multicast is represented by a physical topology to/from which the multicast traffic is forwarded in conjunction with the virtual routed topologies (and VNSs) configured on the controller. Please note that no multicast routing is available at this time.

To configure the Internal VLAN ID and enable multicast support:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Topologies**. The **Topologies** tab is displayed.
3. Click the **Interfaces** tab.



	Topology Name	VLAN ID	Tagged	Port	IP Address	Mode
□	Admin	-	✗	Admin	192.168.3.10	Admin
□	anRoute1	-	✗	-	172.16.17.1	Routed
□	anV1Topology	-	✗	-	3.2.2.1	Routed
□	anV2Topology	-	✗	-	5.4.4.8	Routed
□	bac10-1	118	✓	lag1	-	B@HWC
□	bac10-2	112	✓	lag1	7.7.7.7	B@HWC
□	Bridged at AP untagged	-	✗	-	-	B@AP
□	phy2	1222	✓	lag1	12.2.2.2	Physical
□	phy3	68	✓	lag1	6.8.6.6	Physical

Internal VLAN ID: 1

Multicast Support: phy3

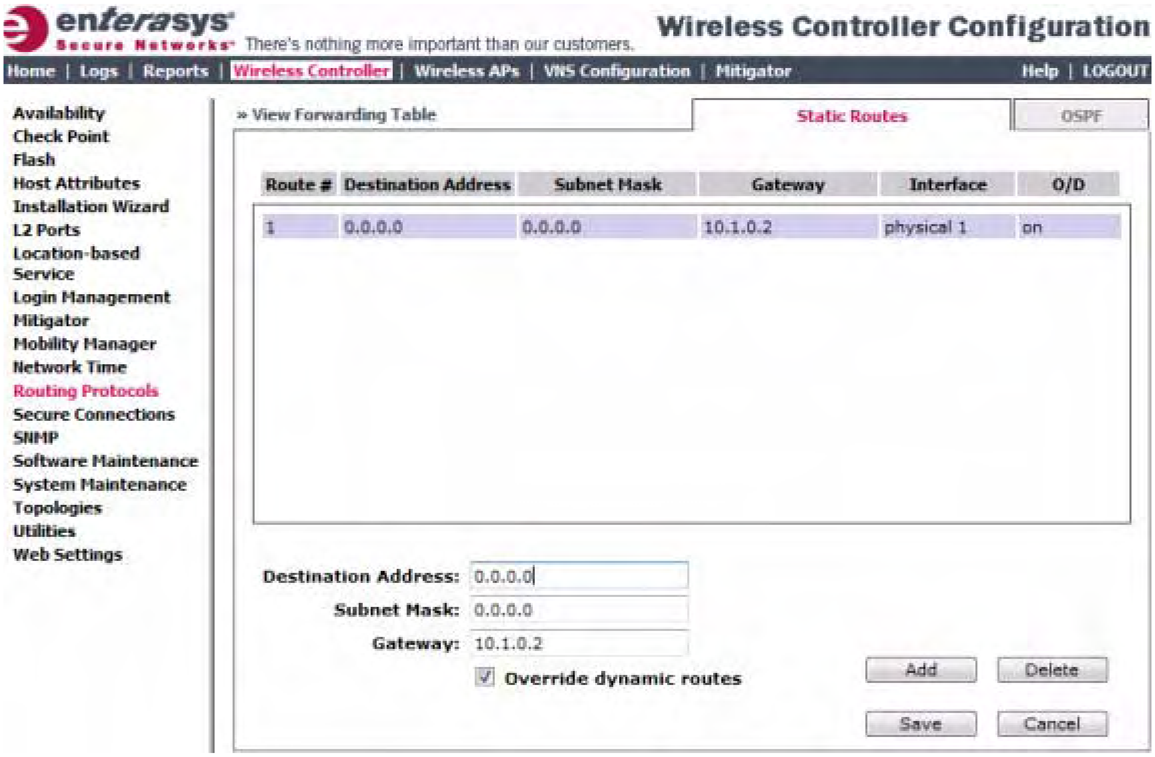
4. In the **Internal VLAN ID** box, type the internal VLAN ID.
5. From the **Multicast Support** drop-down list, select the desired physical topology.
6. To save your changes, click **Save**.

Setting Up Static Routes

When setting up a Enterasys Wireless Controller routing protocol, you must define a default route to your enterprise network, either with a static route or by using the OSPF protocol. A default route enables the Enterasys Wireless Controller to forward packets to destinations that do not match a more specific route definition.

To Set a Static Route on the Enterasys Wireless Controller:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Routing Protocols**. The **Static Routes** tab is displayed.



Route #	Destination Address	Subnet Mask	Gateway	Interface	O/D
1	0.0.0.0	0.0.0.0	10.1.0.2	physical 1	on

Destination Address: 0.0.0.0

Subnet Mask: 0.0.0.0

Gateway: 10.1.0.2

☑ Override dynamic routes

3. To add a new route, in the **Destination Address** box type the destination IP address of a packet.

   To define a default static route for any unknown address not in the routing table, type **0.0.0.0**.
4. In the **Subnet Mask** box, type the appropriate subnet mask to separate the network portion from the host portion of the IP address (typically 255.255.255.0). To define the default static route for any unknown address, type 0.0.0.0.
5. In the **Gateway** box, type the IP address of the adjacent router port or gateway on the same subnet as the Enterasys Wireless Controller to which to forward these packets. This is the IP address of the next hop between the Enterasys Wireless Controller and the packet's ultimate destination.
6. Click **Add**. The new route is added to the list of routes.
7. Select the **Override dynamic routes** checkbox to give priority over the OSPF learned routes, including the default route, which the Enterasys Wireless Controller uses for routing. This option is enabled by default.

   To remove this priority for static routes, so that routing is controlled dynamically at all times, clear the **Override dynamic routes** checkbox.

Note: If you enable dynamic routing (OSPF), the dynamic routes will normally have priority for outgoing routing. For internal routing on the Enterasys Wireless Controller, the static routes normally have priority.

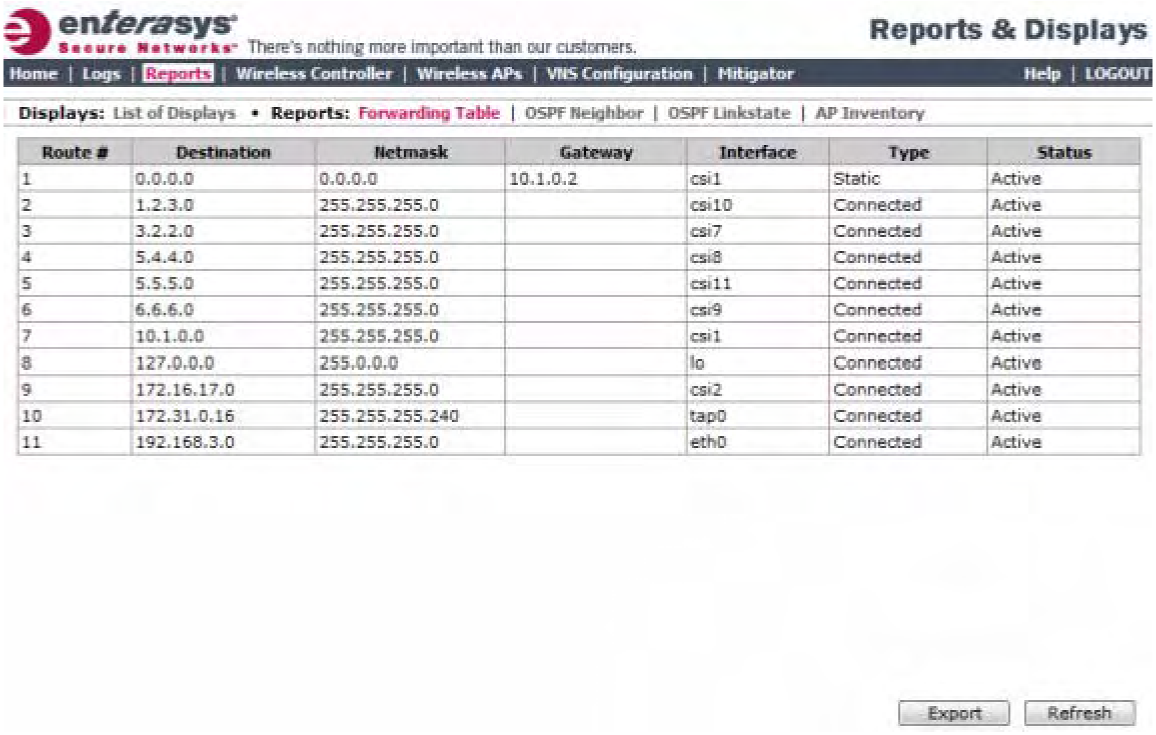
8. To save your changes, click **Save**.

Viewing the Forwarding Table

You can view the defined routes, whether static or OSPF, and their current status in the forwarding table.

To View the Forwarding Table on the Enterasys Wireless Controller:

1. From the **Routing Protocols Static Routes** tab, click **View Forwarding Table.** The Forwarding Table is displayed.
2. Alternatively, from the top menu, click **Reports**. The **Reports & Displays** screen is displayed. Then, click **Forwarding Table**. The **Forwarding Table** is displayed.


enterasys
Secure Networks
There's nothing more important than our customers.
Reports & Displays
Home | Logs | Reports | Wireless Controller | Wireless APs | VNS Configuration | Mitigator
Help | LOGOUT
Displays: List of Displays • Reports: Forwarding Table | OSPF Neighbor | OSPF Linkstate | AP Inventory
Export
Refresh

Route #	Destination	Netmask	Gateway	Interface	Type	Status
1	0.0.0.0	0.0.0.0	10.1.0.2	csi1	Static	Active
2	1.2.3.0	255.255.255.0		csi10	Connected	Active
3	3.2.2.0	255.255.255.0		csi7	Connected	Active
4	5.4.4.0	255.255.255.0		csi8	Connected	Active
5	5.5.5.0	255.255.255.0		csi11	Connected	Active
6	6.6.6.0	255.255.255.0		csi9	Connected	Active
7	10.1.0.0	255.255.255.0		csi1	Connected	Active
8	127.0.0.0	255.0.0.0		lo	Connected	Active
9	172.16.17.0	255.255.255.0		csi2	Connected	Active
10	172.31.0.16	255.255.255.240		tap0	Connected	Active
11	192.168.3.0	255.255.255.0		eth0	Connected	Active

This report displays all defined routes, whether static or OSPF, and their current status.

3. To update the display, click **Refresh**.

Setting Up OSPF Routing

To enable OSPF (OSPF RFC2328) routing, you must:

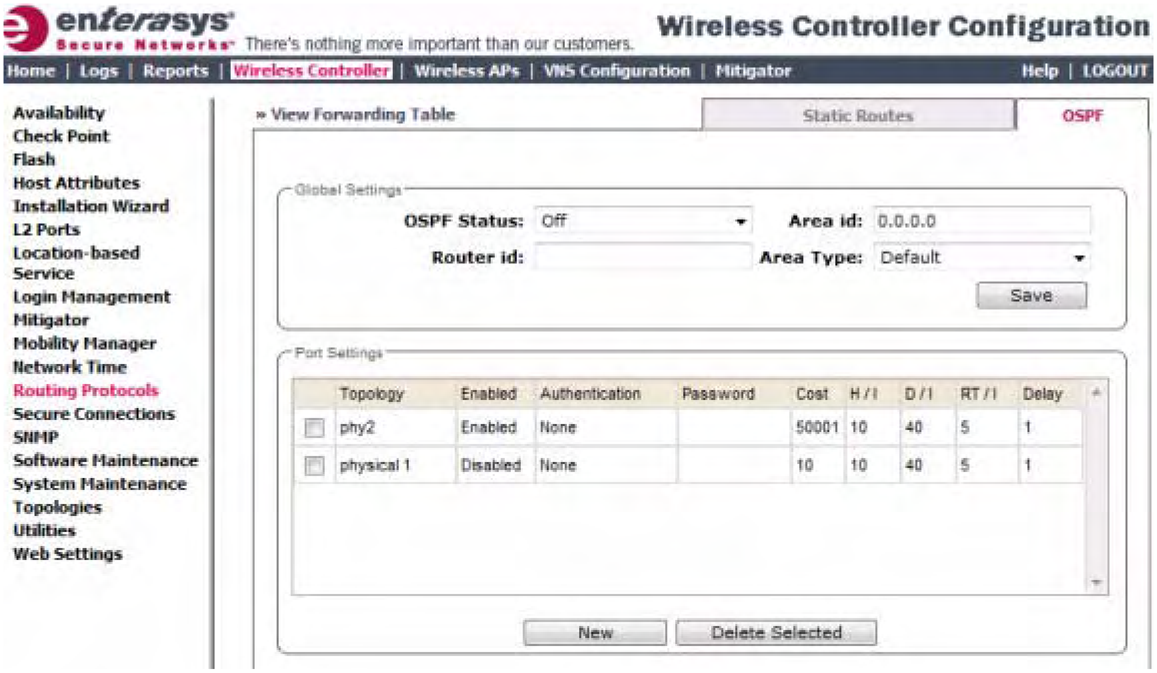
- Specify at least one topology on which OSPF is enabled on the Port Settings option of the OSPF tab. This is the interface on which you can establish OSPF adjacency.
- Enable OSPF globally on the Enterasys Wireless Controller.
- Define the global OSPF parameters.

Ensure that the OSPF parameters defined here for the Enterasys Wireless Controller are consistent with the adjacent routers in the OSPF area. This consistency includes the following:

- If the peer router has different timer settings, the protocol timer settings in the Enterasys Wireless Controller must be changed to match to achieve OSPF adjacency.
- The MTU of the ports on either end of an OSPF link must match. The MTU for ports on the Enterasys Wireless Controller is fixed at 1500. This matches the default MTU in standard routers.

To Set OSPF Routing Global Settings on the Enterasys Wireless Controller:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Routing Protocols**. The **Static Routes** tab is displayed by default.
3. Click the **OSPF** tab.



OSPF Status: Off

Router id:

Area id: 0.0.0.0

Area Type: Default

	Topology	Enabled	Authentication	Password	Cost	H / I	D / I	RT / I	Delay
□	phy2	Enabled	None		50001	10	40	5	1
□	physical 1	Disabled	None		10	10	40	5	1

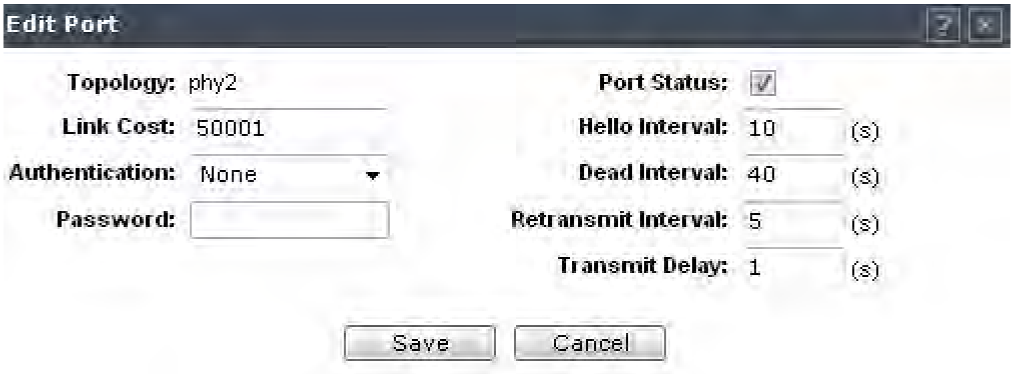
4. From the **OSPF Status** drop-down list, click **On** to enable OSPF.

   In the **Router ID** box, type the IP address of the Enterasys Wireless Controller. This ID must be unique across the OSPF area. If left blank, the OSPF daemon automatically picks a router ID from one of the Enterasys Wireless Controller’s interface IP addresses.
5. In the **Area ID** box, type the area. 0.0.0.0 is the main area in OSPF.
6. In the **Area Type** drop-down list, click one of the following:
   - **Default** — The default acts as the backbone area (also known as area zero). It forms the core of an OSPF network. All other areas are connected to it, and inter-area routing happens via a router connected to the backbone area.
   - **Stub** — The stub area does not receive external routes. External routes are defined as routes which were distributed in OSPF via another routing protocol. Therefore, stub areas typically rely on a default route to send traffic routes outside the present domain.
   - **Not-so-stubby** — The not-so-stubby area is a type of stub area that can import autonomous system (AS) external routes and send them to the default/backbone area, but cannot receive AS external routes from the backbone or other areas.

7. To save your changes, click **Save**.

To Set OSPF Routing Port Settings on the Enterasys Wireless Controller:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Routing Protocols**.
3. Click the **OSPF** tab.
4. Select a port to configure by clicking on the desired port in the Port Settings table. The Edit Port dialog displays.



Topology: phy2
Link Cost: 50001
Authentication: None
Password:
Port Status: ☑
Hello Interval: 10 (s)
Dead Interval: 40 (s)
Retransmit Interval: 5 (s)
Transmit Delay: 1 (s)

5. In the **Link Cost** box, type the OSPF standard value for your network for this port. This is the cost of sending a data packet on the interface. The lower the cost, the more likely the interface is to be used to forward data traffic.

Note: If more than one port is enabled for OSPF, it is important to prevent the Enterasys Wireless Controller from serving as a router for other network traffic (other than the traffic from wireless device users on routed topologies controlled by the Enterasys Wireless Controller). For more information, see "Filtering Rules" on page 5-3.

6. In the **Authentication** drop-down list, click the authentication type for OSPF on your network: **None** or **Password**. The default setting is **None**.
7. If **Password** is selected as the authentication type, in the **Password** box, type the password.

   If **None** is selected as the Authentication type, leave this box empty. This password must match on either end of the OSPF connection.
8. Type the following:
   - **Hello-Interval —** Specifies the time in seconds (displays OSPF default).The default setting is **10** seconds.
   - **Dead-Interval —** Specifies the time in seconds (displays OSPF default). The default setting is **40** seconds.
   - **Retransmit-Interval —** Specifies the time in seconds (displays OSPF default). The default setting is **5** seconds.
   - **Transmit Delay—** Specifies the time in seconds (displays OSPF default). The default setting is **1** second.
9. To save your changes, click **Save**.

To Confirm That Ports Are Set for OSPF:

1. To confirm that the ports are set up for OSPF, and that advertised routes from the upstream router are recognized, click **View Forwarding Table**. The **Forwarding Table** is displayed.

The following additional reports display OSPF information when the protocol is in operation:

– **OSPF Neighbor** — Displays the current neighbors for OSPF (routers that have interfaces to a common network)

– **OSPF Linkstate** — Displays the Link State Advertisements (LSAs) received by the currently running OSPF process. The LSAs describe the local state of a router or network, including the state of the router's interfaces and adjacencies.

2. To update the display, click **Refresh**.

Configuring Filtering at the Interface Level

The Enterasys Wireless solution has a number of built-in filters that protect the system from unauthorized traffic. These filters are specific only to the Enterasys Wireless Controller. These filters are applied at the network interface level and are automatically invoked. By default, these filters provide stringent-level rules to allow only access to the system's externally visible services. In addition to these built-in filters, the administrator can define specific exception filters at the interface-level to customize network access. These filters depend on Topology Modes and the configuration of an L3 interface for the topology.

For Bridged at Controller topologies, exception filters are defined only if L3 (IP) interfaces are specified. For Physical, Routed, and 3rd Party AP topologies, exception filtering is always configured since they all have an L3 interface presence.

Built-in Interface-based Exception Filters

On the Enterasys Wireless Controller, various interface-based exception filters are built in and invoked automatically. These filters protect the Enterasys Wireless Controller from unauthorized access to system management functions and services via the interfaces. Access to system management functions is granted if the administrator selects the **allow management** traffic option in a specific topology.

Allow management traffic is possible on the topologies that have L3 IP interface definitions. For example, if management traffic is allowed on a physical topology (esa0), only users connected through ESA0 will be able to get access to the system. Users connecting on any other topology, such as Routed or Bridged Locally at Controller, will no longer be able to target ESA0 to gain management access to the system. To allow access for users connected on such a topology, the given topology configuration itself must have **allow management** traffic enabled and users will only be able to target the topology interface specifically.

On the Enterasys Wireless Controller's L3 interfaces (associated with either physical, Routed, or Bridged Locally at Controller topologies), the built-in exception filter prohibits invoking SSH, HTTPS, or SNMP. However, such traffic is allowed, by default, on the management port.

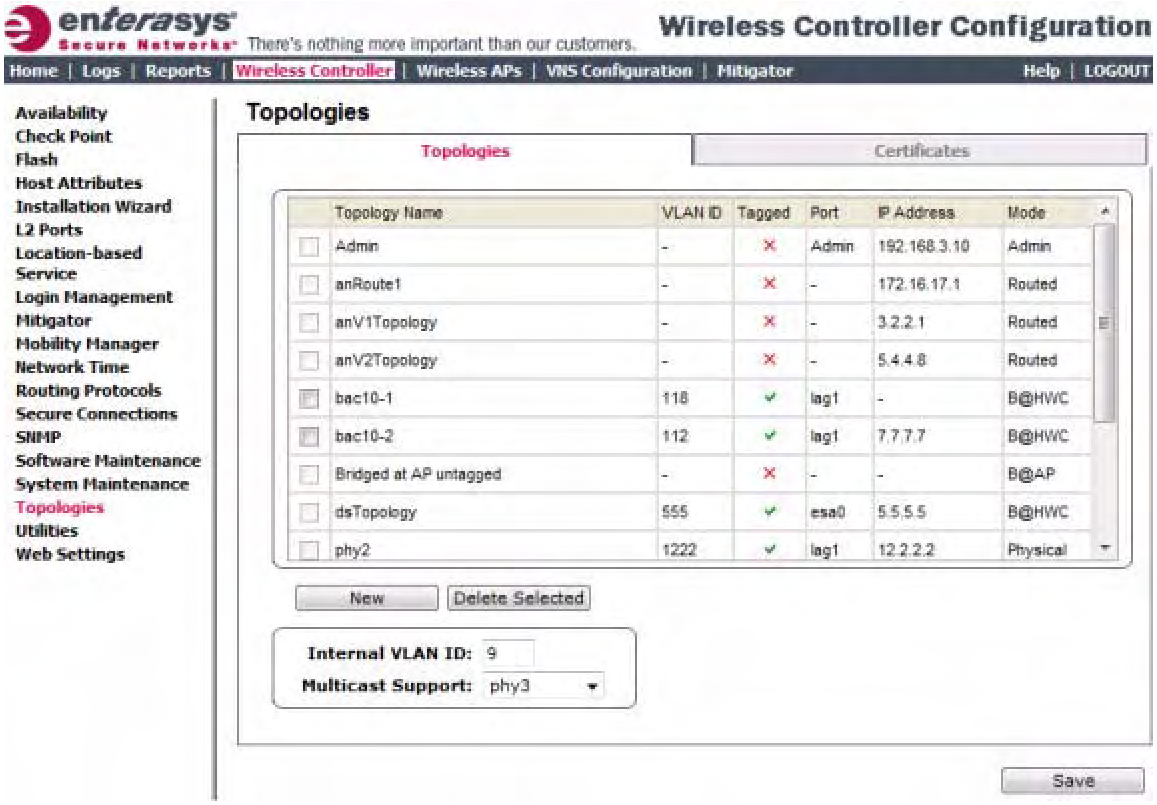
If management traffic is explicitly enabled for any interface, access is implicitly extended to that interface through any of the other interfaces (VNS). Only traffic specifically allowed by the interface's exception filter is allowed to reach the Enterasys Wireless Controller itself. All other traffic is dropped. Exception filters are dynamically configured and regenerated whenever the system's interface topology changes (for example, a change of IP address for any interface).

Enabling management traffic on an interface adds additional rules to the exception filter, which opens up the well-known IP(TCP/UDP) ports, corresponding to the HTTPS, SSH, and SNMP applications.

The interface-based built-in exception filtering rules, in the case of traffic from wireless users, are applicable to traffic targeted directly for the topology L3 interface. For example, a filter specified by a Policy may be generic enough to allow traffic access to the Enterasys Wireless Controller's management (for example, Allow All [*.*.*.*]). Exception filter rules are evaluated after the user's assigned filter policy, as such, it is possible that the policy allows the access to management functions that the exception filter denies. These packets are dropped.

To Enable SSH, HTTPS, or SNMP Access Through a Physical Data Interface:

1. From the top menu, click **Wireless Controller.** The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Topologies**. The **Topologies** tab is displayed.



	Topology Name	VLAN ID	Tagged	Port	IP Address	Mode
□	Admin	-	✗	Admin	192.168.3.10	Admin
□	anRoute1	-	✗	-	172.16.17.1	Routed
□	anV1Topology	-	✗	-	3.2.2.1	Routed
□	anV2Topology	-	✗	-	5.4.4.8	Routed
□	bac10-1	118	✓	lag1	-	B@HWC
□	bac10-2	112	✓	lag1	7.7.7.7	B@HWC
□	Bridged at AP untagged	-	✗	-	-	B@AP
□	dsTopology	555	✓	esa0	5.5.5.5	B@HWC
□	phy2	1222	✓	lag1	12.2.2.2	Physical

Internal VLAN ID: 9

Multicast Support: phy3

3. On the **Topologies** tab, click the appropriate data port topology. The Edit Topology window displays.
4. Select the **Management Traffic** checkbox if the topology has specified an L3 IP interface presence.
5. To save your changes, click **Save**.

Working with Administrator-defined Interface-based Exception Filters

You can add specific filtering rules at the interface level in addition to the built-in rules. Such rules give you the capability of restricting access to a port, for specific reasons, such as a Denial of Service (DoS) attack.

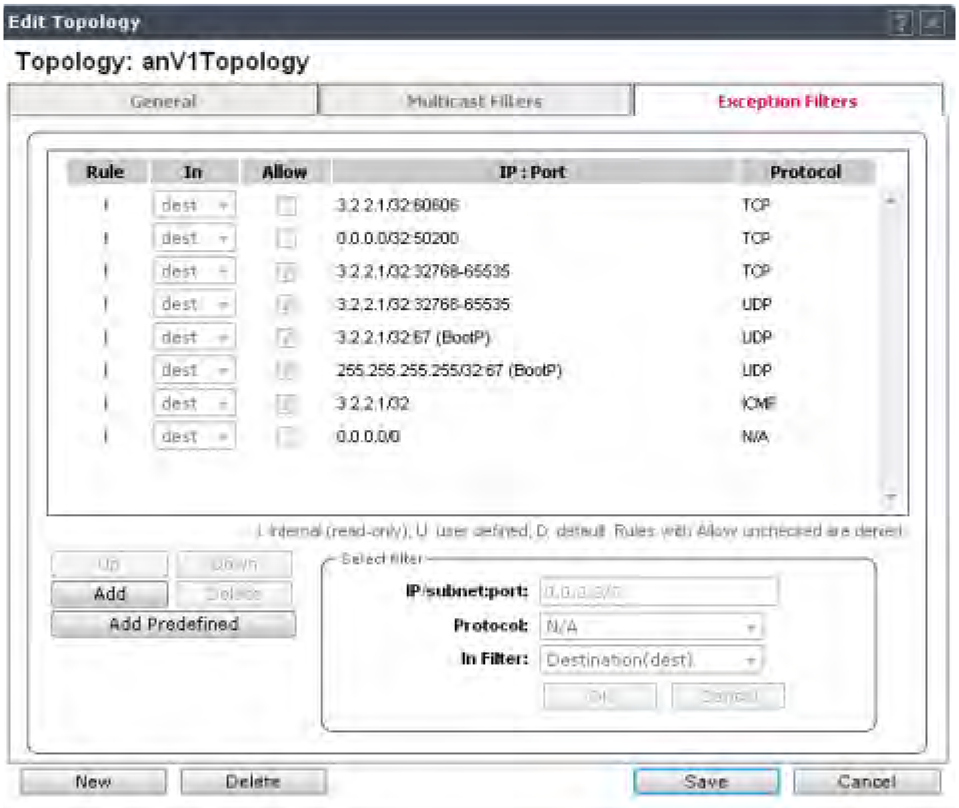
The filtering rules are set up in the same manner as filtering rules defined for a Policy — specify an IP address, select a protocol if applicable, and then either allow or deny traffic to that address. For more information, see “Filtering Rules” on page 5-3.

The rules defined for port exception filters are prepended to the normal set of restrictive exception filters and have precedence over the system's normal protection enforcement (that is, they are evaluated first).

Warning: If defined improperly, user exception rules may seriously compromise the system's normal security enforcement rules. They may also disrupt the system's normal operation and even prevent system functionality altogether. It is advised to only augment the exception-filtering mechanism if absolutely necessary.

To Define Interface Exception Filters:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Topologies**. The **Topologies** screen is displayed.
3. Select a topology to be configured. The Edit Topology window is displayed.
4. If the topology has an L3 interface defined, an Exception Filters tab is available. Select this tab. The Exception Filter rules are displayed.



Topology: anV1Topology

Rule	In	Allow	IP : Port	Protocol
I	dest	□	3.2.2.1/32:60606	TCP
I	dest	□	0.0.0.0/32:50200	TCP
I	dest	☑	3.2.2.1/32:32768-65535	TCP
I	dest	☑	3.2.2.1/32:32768-65535	UDP
I	dest	☑	3.2.2.1/32:67 (BootP)	UDP
I	dest	☑	255.255.255.255/32:67 (BootP)	UDP
I	dest	☑	3.2.2.1/32	ICMP
I	dest	□	0.0.0.0/0	N/A

I: Internal (read-only), U: user defined, D: default. Rules with Allow unchecked are denied.

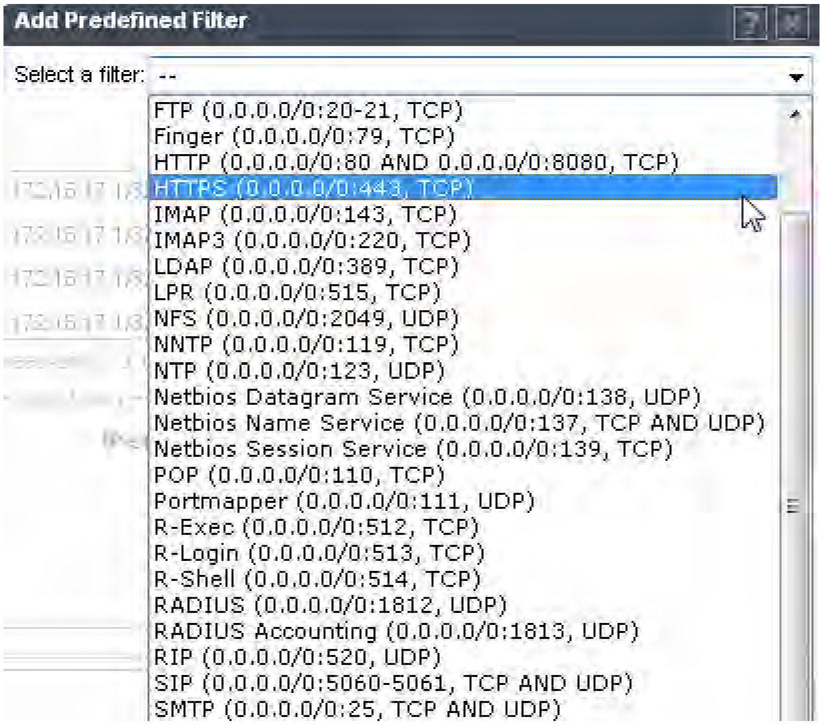
IP/subnet:port: 0.0.0.0/0

Protocol: N/A

In Filter: Destination(dest)

5. Add rules by either:

   – Clicking the **Add Predefined** button, selecting a filter from the drop down list, and clicking **Add**.



Add Predefined Filter

Select a filter: --

FTP (0.0.0.0/0:20-21, TCP)
Finger (0.0.0.0/0:79, TCP)
HTTP (0.0.0.0/0:80 AND 0.0.0.0/0:8080, TCP)
HTTPS (0.0.0.0/0:443, TCP)
IMAP (0.0.0.0/0:143, TCP)
IMAP3 (0.0.0.0/0:220, TCP)
LDAP (0.0.0.0/0:389, TCP)
LPR (0.0.0.0/0:515, TCP)
NFS (0.0.0.0/0:2049, UDP)
NNTP (0.0.0.0/0:119, TCP)
NTP (0.0.0.0/0:123, UDP)
Netbios Datagram Service (0.0.0.0/0:138, UDP)
Netbios Name Service (0.0.0.0/0:137, TCP AND UDP)
Netbios Session Service (0.0.0.0/0:139, TCP)
POP (0.0.0.0/0:110, TCP)
Portmapper (0.0.0.0/0:111, UDP)
R-Exec (0.0.0.0/0:512, TCP)
R-Login (0.0.0.0/0:513, TCP)
R-Shell (0.0.0.0/0:514, TCP)
RADIUS (0.0.0.0/0:1812, UDP)
RADIUS Accounting (0.0.0.0/0:1813, UDP)
RIP (0.0.0.0/0:520, UDP)
SIP (0.0.0.0/0:5060-5061, TCP AND UDP)
SMTP (0.0.0.0/0:25, TCP AND UDP)

   – Clicking the Add button, filling in the following fields, then clicking **OK**:

     (1) In the **IP / subnet:port** box, type the destination IP address. You can also specify an IP range, a port designation, or a port range on that IP address.

     (2) In the **Protocol** drop-down list, click the protocol you want to specify for the filter. This list may include **UDP**, **TCP**, **GRE**, **IPsec-ESP**, **IPsec-AH**, **ICMP**. The default is N/A.

6. The new filter is displayed in the upper section of the screen.
7. Click the new filter entry.
8. To allow traffic, select the **Allow** checkbox.
9. To adjust the order of the filtering rules, click **Up** or **Down** to position the rule. The filtering rules are executed in the order defined here.
10. To save your changes, click **Save**.

Protecting the Controller’s Interfaces and Internal Captive Portal Page

By default, the Enterasys Wireless Controller is shipped with a self-signed certificate used to perform the following tasks:

- Protect all interfaces that provide administrative access to the Enterasys Wireless Controller
- Protect the internal Captive Portal page

This certificate is associated with topologies that have a configured L3 (IP) interface.

If you continue to use the default certificate to secure the Enterasys Wireless Controller and internal Captive Portal page, your Web browser will likely produce security warnings regarding the security risks of trusting self-signed certificates. To avoid the certificate-related Web browser security warnings, you can install customized certificates on the Enterasys Wireless Controller.

Note: To avoid the certificate-related Web browser security warnings when accessing the Enterasys Wireless Assistant, you must also import the customized certificates into your Web browser application.

Before Installing a Certificate

Before you create and install a certificate:

1. Select a certificate format to install. The Enterasys Wireless Controller supports several types of certificates, as shown in Table 2-3.

Table 2-3 Supported Certificate and CA Formats

Certificate Format	Description
PKCS#12	The PKCS#12 certificate (.pfx) file contains both a certificate and the corresponding private key. The Enterasys Wireless Controller will accept the PKCS#12 file as long as the format of the private key and certificate are valid.
PEM/DER	The PEM/DER certificate (.crt) file requires a separate PEM/DER private key (.key) file. The Enterasys Wireless Controller uses OpenSSL PKCS12 command to convert the .crt and .key files into a single .pfx PKCS#12 certificate file. The Enterasys Wireless Controller will accept the PEM/DER file as long as the format of the private key and certificate are valid.
PEM-formatted CA public certificate file	If you choose to install this optional certificate, you must do so when specifying the PCKCS#12 or PEM/DER certificates.

Note: When generating the PKCS#12 certificate file or PEM/DER certificate and key files, you must ensure that the interface identified in the certificate corresponds to the Enterasys Wireless Controller's interface for which the certificate is being installed.

2. Understand how the controller monitors the expiration date of installed certificates.

   The Enterasys Wireless Controller generates an entry in the events information log as the certificate expiry date approaches, based on the following schedule: 15, 8, 4, 2, and 1 day prior to expiration. The log messages cease when the certificate expires. For more information, see the Enterasys Wireless Convergence Software *Maintenance Guide.*

3. Understand how the controller manages certificates during upgrades and migrations.

   Installed certificates will be backed up and restored with the Enterasys Wireless Controller configuration data. Installed certificates will also be migrated during an upgrade and during a migration.

Installing a Certificate for a Enterasys Wireless Controller Interface

You can install a certificate from the Certificates tab available on the Topologies page.

To Install a Certificate for a Enterasys Wireless Controller Data Interface:

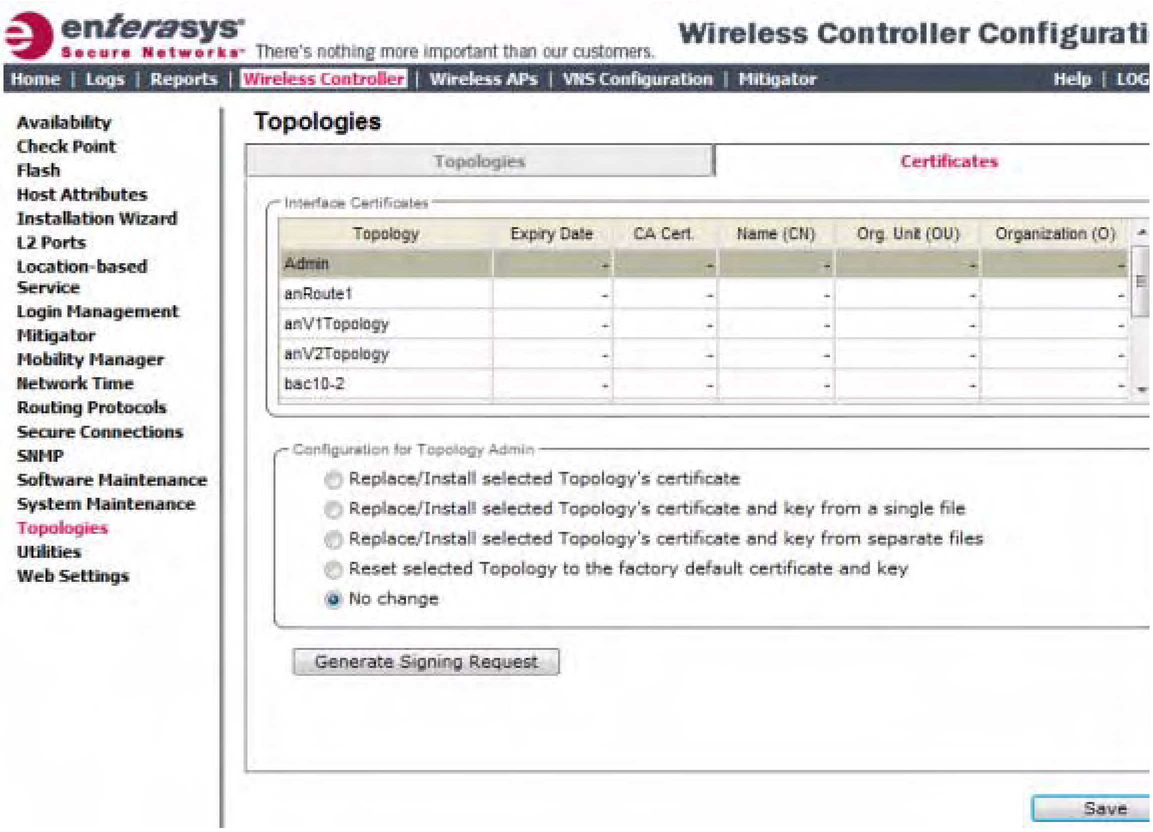
1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Topologies**. The **Topologies** tab is displayed.
3. Click the **Certificates** tab.

4. In the **Interface Certificates** table, click to select the topology (which has an L3 interface) for which you want to install a certificate.

   The Configuration for Topologies section and the Generate Signing Request button become available. Use the field and button descriptions in Table 2-4 to create and install certificates.

Note: The interface identified in the certificate must correspond to the Enterasys Wireless Controller's interface for which the certificate is being installed.

The **Configuration for Topologies** section displays.



Topology	Expiry Date	CA Cert.	Name (CN)	Org. Unit (OU)	Organization (O)
Admin	-	-	-	-	-
anRoute1	-	-	-	-	-
anV1Topology	-	-	-	-	-
anV2Topology	-	-	-	-	-
bac10-2	-	-	-	-	-

○ Replace/Install selected Topology's certificate
○ Replace/Install selected Topology's certificate and key from a single file
○ Replace/Install selected Topology's certificate and key from separate files
○ Reset selected Topology to the factory default certificate and key
● No change

Table 2-4 Topologies Page: Certificates Tab Fields and Buttons

Field/Button	Description
Interface Certificates	
Topology	Topology name
Expiry Date	Date when the certificate expires
CA Cert.	Identifies whether or not a CA certificate has been installed on the topology.
Name (CN)	The IP address of DNS address associated with the topology that the certificate applies to.
Org Unit (OU)	Name of the organization’s unit.
Organization	Name of the organization
Configuration for Topology	
Replace/Install selected Topology’s certificate	To replace the existing port’s certificate and key using this option, do the following: 1. From the click the Generate Signing Request button to create the certificate and key. 2. Download the key and CSR when prompted. 3. Use a 3rd party certificate service to sign the CSR and create a certificate and a Certificate Authority (CA) file. 4. Save the certificate on your computer. 5. Return to the Certificates tab on the Enterasys Wireless Assistant UI. 6. Select the topology for which you created the certificate and select **Replace/Install selected Topologies certificate.** 7. Click **Browse** next to the **Signed certificate to install** box. 8. Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **Certificate file to install** box. 9. (Optional) Click **Browse** next to the **Optional:Enter PEM-encoded CA public certificates file** box. The **Choose file** dialog is displayed. 10.(Optional) Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **Optional:Enter PEM-encoded CA public certificates file** box. **Note:** If you choose to install a CA public certificate, you must install it when you install the PEM/DER certificate and key.

Table 2-4 Topologies Page: Certificates Tab Fields and Buttons (continued)

Field/Button	Description
Replace/Install selected Topology's certificate and key from a single file	To replace the existing port's certificate and key using this option, do the following: 1. Click **Browse** next to the **PKCS #12 file to install** box. The **Choose file** dialog is displayed. 2. Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **PKCS #12 file to install** box. 3. In the **Private key password** box, type the password for the key file. The key file is password protected. 4. (Optional) Click **Browse** next to the **Optional:Enter PEM-encoded CA public certificates file** box. The **Choose file** dialog is displayed. 5. (Optional) Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **Optional:Enter PEM-encoded CA public certificates file** box. **Note:** If you choose to install a CA public certificate, you must install it when you install the PEM/DER certificate and key.
Replace/Install selected Topology's certificate and key from separate files	To replace the existing port's certificate and key using this option, do the following: 1. Click **Browse** next to the **PKCS #12 file to install** box. The **Choose file** dialog is displayed. 2. Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **PKCS #12 file to install** box. 3. Click **Browse** next to the **Private key file to install** box. The **Choose file** dialog is displayed. 4. Navigate to the key file you want to install for this port, and then click **Open**. The key file name is displayed in the **Private key file to install** box 5. In the **Private key password** box, type the password for the key file. The key file is password protected. 6. (Optional) Click **Browse** next to the **Optional:Enter PEM-encoded CA public certificates file** box. The **Choose file** dialog is displayed. 7. (Optional) Navigate to the certificate file you want to install for this port, and then click **Open**. The certificate file name is displayed in the **Optional:Enter PEM-encoded CA public certificates file** box. **Note:** If you choose to install a CA public certificate, you must install it when you install the PEM/DER certificate and key.
Reset selected Topology to the factory default certificate and key	Select to assign the factory default certificate and key to the interface.
No change	The default setting.
Generate Signing Request	To generate a CSR for the controller, click **Generate Signing Request**. The **Generate Certificate Signing Request** window displays (Figure 2-3)
Save	Click to save the changes to this Topology.

Note: To avoid the certificate-related Web browser security warnings when accessing the Enterasys Wireless Assistant, you must also import the customized certificates into your Web browser application.

Figure 2-3 Generate Certificate Signing Request Window

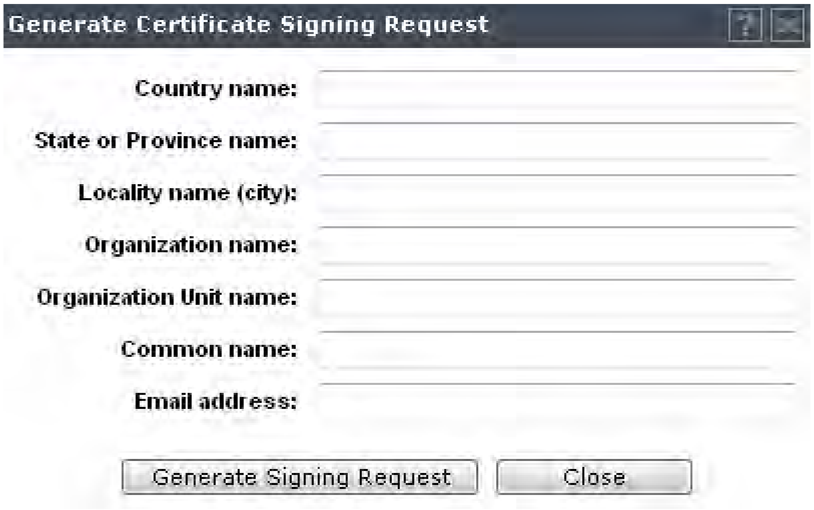


Table 2-5 Generate Certificate Signing Request Page - Fields and Buttons

Field/Button	Description
Country name	The two-letter ISO abbreviation of the name of the country
State or Province name	The name of the State/Province
Locality name (city)	The name of the city.
Organization name	The name of the organization
Organizational Unit name	The name of the unit within the organization.
Common Name	Set the common name to be one of the following: the IP address of the interface that the CSR applies to. a DNS address associated with the IP address of the interface that the CSR applies to.
Email address	The email address of the organization
Generate Signing Request	Click to generate a signing request. A certificate request file is generated (.csr file extension). The name of the file is the IP address of the topology you created the CSR for. The **File Download** dialog is displayed.

Configuring the Login Authentication Mode

You can configure the following login authentication modes to authenticate administrator login attempts:

- Local authentication — The Enterasys Wireless Controller uses locally configured login credentials and passwords. See “Configuring the Local Login Authentication Mode and Adding New Users” on page 2-36.
- RADIUS authentication — The Enterasys Wireless Controller uses login credentials and passwords configured on a RADIUS server. See “Configuring the RADIUS Login Authentication Mode” on page 2-38.

- Local authentication first, then RADIUS authentication — The Enterasys Wireless Controller first uses locally configured login credentials and passwords. If this login fails, the Enterasys Wireless Controller attempts to validate login credentials and passwords configured on a RADIUS server. See "Configuring the Local, RADIUS Login Authentication Mode" on page 2-42.
- RADIUS authentication first, then local authentication — The Enterasys Wireless Controller first uses login credentials and passwords configured on a RADIUS server. If this login fails, the Enterasys Wireless Controller attempts to validate login credentials and passwords configured locally. See "Configuring the RADIUS, Local Login Authentication Mode" on page 2-44.

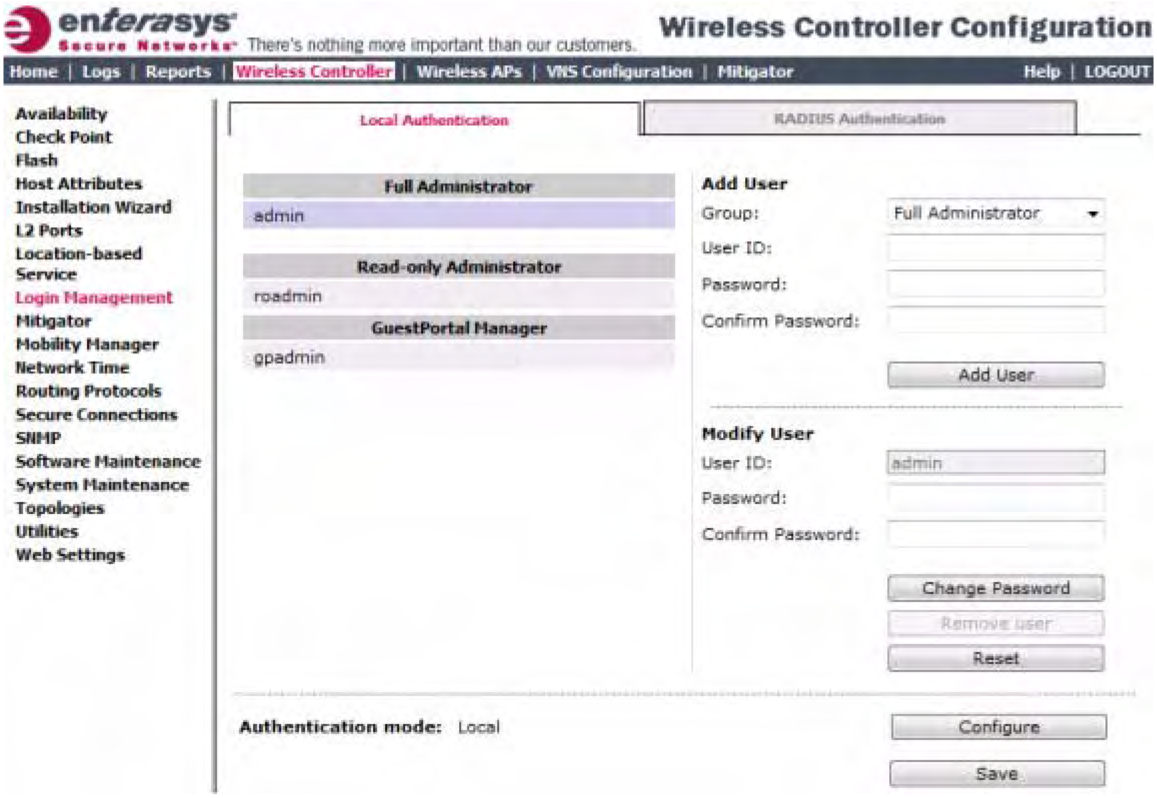
Note: The Enterasys Wireless Convergence Software enables you to recover the Enterasys Wireless Controller via the **Rescue** mode if you have lost its login password. For more information, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

Configuring the Local Login Authentication Mode and Adding New Users

Local login authentication mode is enabled by default. If the login authentication was previously set to another authentication mode, you can change it to the local authentication. You can also add new users and assign them to a login group — as full administrators, read-only administrators, or as a GuestPortal managers. For more information, see "Defining Enterasys Wireless Assistant Administrators and Login Groups" on page 16-5.

To configure the local login authentication mode:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Login Management**. The **Login Management** screen is displayed.



Full Administrator
admin

Read-only Administrator
roadmin

GuestPortal Manager
gpadmin

Group: Full Administrator

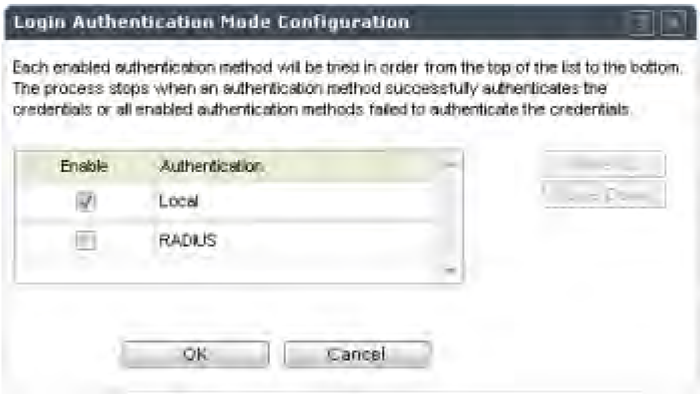
User ID:

User ID: admin

Authentication mode: Local

3. In the **Authentication mode** section, click **Configure**.

The **Login Authentication Mode Configuration** window is displayed.



Login Authentication Mode Configuration

Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	Local
□	RADIUS

4. Select the **Local** checkbox.

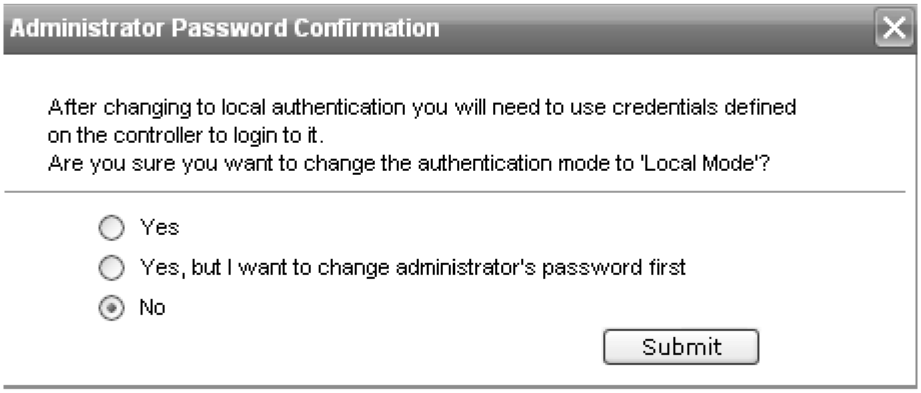
   If the **RADIUS** checkbox is selected, deselect it.

5. Click **OK**.
6. In the **Add User** section, select one of the following from the **Group** drop-down list:
   - **Full Administrator** — Grants the administrator’s access rights to the administrator.
   - **Read-only Administrator** — Grants read-only access right to the administrator.
   - **GuestPortal Manager** — Grants the user GuestPortal manager rights.
7. In the **User ID** box, type the user’s ID.
8. In the **Password** box, type the user’s password.

Note: The password must be 8 to 24 characters long.

9. In the **Confirm Password** box, re-type the password.
10. To add the user, click **Add User**. The new user is added.
11. Click **Save**.

    The **Administrator Password Confirmation** window is displayed.



Administrator Password Confirmation

After changing to local authentication you will need to use credentials defined on the controller to login to it.
Are you sure you want to change the authentication mode to 'Local Mode'?

○ Yes
○ Yes, but I want to change administrator's password first
● No

12. Select the appropriate option.
    - **Yes** — Change authentication mode to local. Use the administrator password currently defined on the controller.

- **Yes, but I want to change administrator's password first** — Change authentication mode to local and change the administrator password currently defined on the controller.
- **No** — Do not change the authentication mode to local.

13. Click **Submit**.
14. If you chose **Yes, but I want to change administrator's password first**, you are prompted to change the administrator's password.

Configuring the RADIUS Login Authentication Mode

The local login authentication mode is enabled by default. You can change the local login authentication mode to RADIUS-based authentication.

Note: Before you change the default local login authentication to RADIUS-based authentication, you must configure the RADIUS Server on the **Global Settings** screen. For more information, see "VNS Global Settings" on page 7-3.

RADIUS is a client/server authentication and authorization access protocol used by a network access server (NAS) to authenticate users attempting to connect to a network device. The NAS functions as a client, passing user information to one or more RADIUS servers. The NAS permits or denies network access to a user based on the response it receives from one or more RADIUS servers. RADIUS uses User Datagram Protocol (UDP) for sending the packets between the RADIUS client and server.

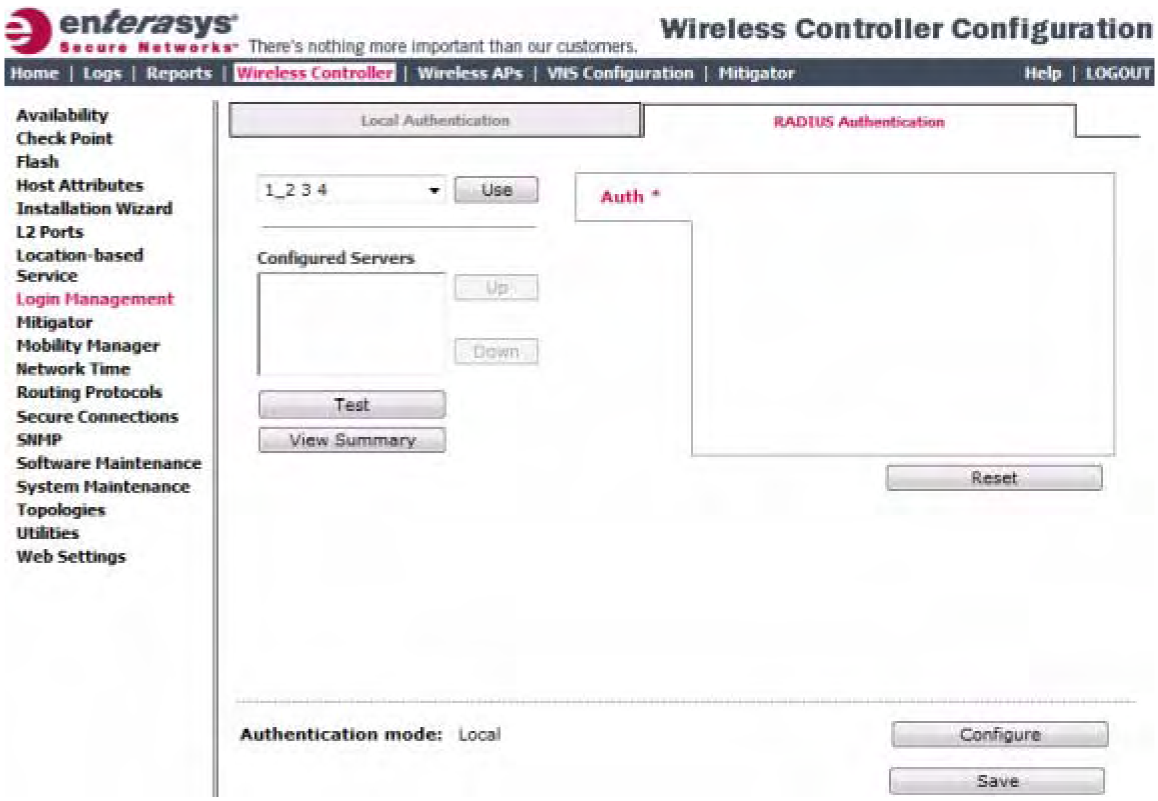
You can configure a RADIUS key on the client and server. If you configure a key on the client, it must be the same as the one configured on the RADIUS servers. The RADIUS clients and servers use the key to encrypt all RADIUS packets transmitted. If you do not configure a RADIUS key, packets are not encrypted. The key itself is never transmitted over the network.

Note: Before you configure the system to use RADIUS-based login authentication, you must configure the Service-Type RADIUS attribute on the RADIUS server.

To configure the RADIUS login authentication mode:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Login Management**. The **Login Management** screen is displayed.

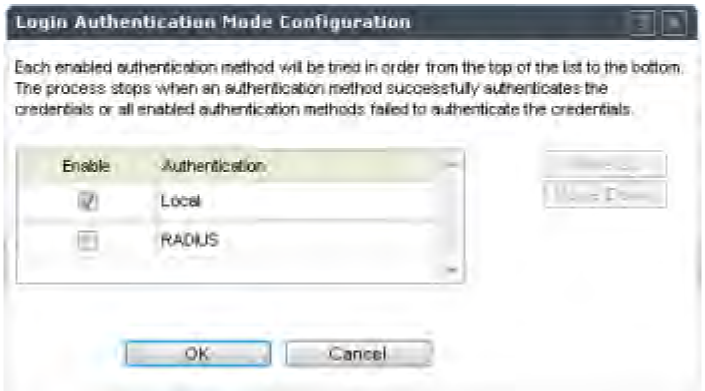
3. Click the **RADIUS Authentication** tab.



Authentication mode: Local

4. In the **Authentication mode** section, click **Configure**.

The **Login Authentication Mode Configuration** window is displayed.



Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	Local
☐	RADIUS

5. Select the **RADIUS** checkbox.

If the **Local** checkbox is selected, deselect it.

6. Click **OK**.

7. From the drop-down list, located next to the **Use** button, select the RADIUS Server that you want to use for the RADIUS login authentication, and then click **Use**. The RADIUS Server's name is displayed in the **Configured Servers** box, and in the **Auth** section, and the following default values of the RADIUS Server are displayed.

Note: The RADIUS Servers displayed in the list located against the **Use** button are defined on **Global Settings** screen. For more information, see "VNS Global Settings" on page 7-3.

The following values can be edited:

- **NAS IP address** — The IP address of Network Access Server (NAS).
- **NAS Identifier** — The Network Access Server (NAS) identifier. The NAS identifier is a RADIUS attribute that identifies the server responsible for passing information to designated RADIUS servers, and then acting on the response returned.
- **Auth Type** — The authentication protocol type (PAP, CHAP, MS-CHAP, or MS-CHAP2).
- **Set as Primary Server** — Specifies the primary RADIUS server when there are multiple RADIUS servers.

8. To add additional RADIUS servers, repeat Step 7.

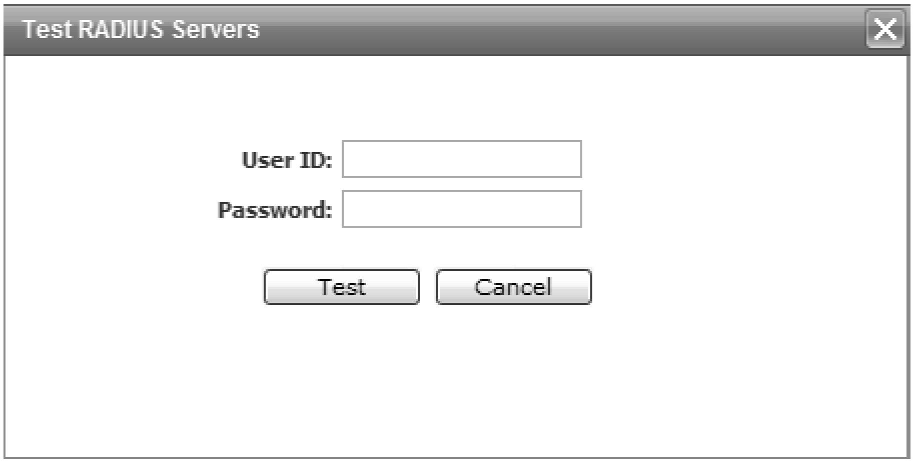
Note: You can add up to three RADIUS servers to the list of login authentication servers. When you add two or more RADIUS servers to the list, you must designate one of them as the Primary server. The Enterasys Wireless Controller first attempts to connect to the Primary server. If the Primary Server is not available, it tries to connect to the second and third server according to their order in the **Configured Servers** box. You can change the order of RADIUS servers in the **Configured Servers** box by clicking on the **Up** and **Down** buttons.

9. Click **Test** to test connectivity to the RADIUS server.

Note: You can also test the connectivity to the RADIUS server after you save the configuration.

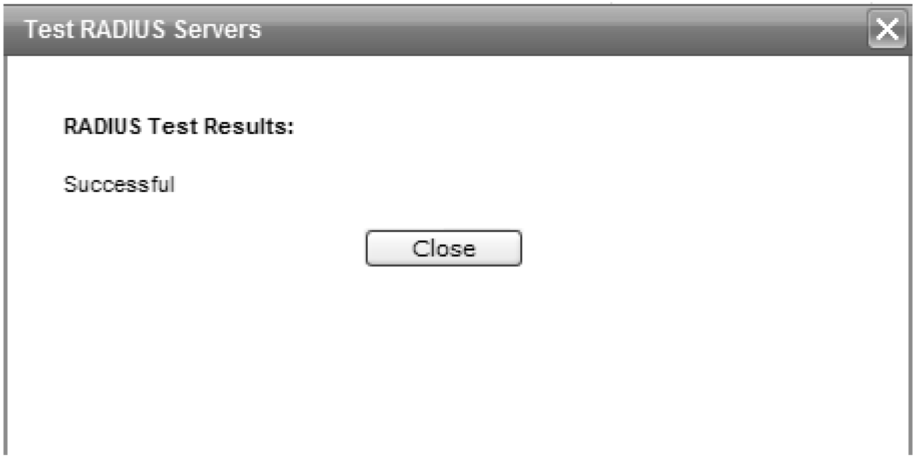
If you do not test the RADIUS server connectivity, and you have made an error in configuring the RADIUS-based login authentication mode, you will be locked out of the Enterasys Wireless Controller when you switch the login mode to the RADIUS login authentication mode. If you are locked out, access Rescue mode via the console port to reset the authentication method to local.

The following window is displayed.



10. In the **User ID** and the **Password** boxes, type the user's ID and the password, which were configured on the RADIUS Server, and then click **Test**. The RADIUS connectivity result is displayed.

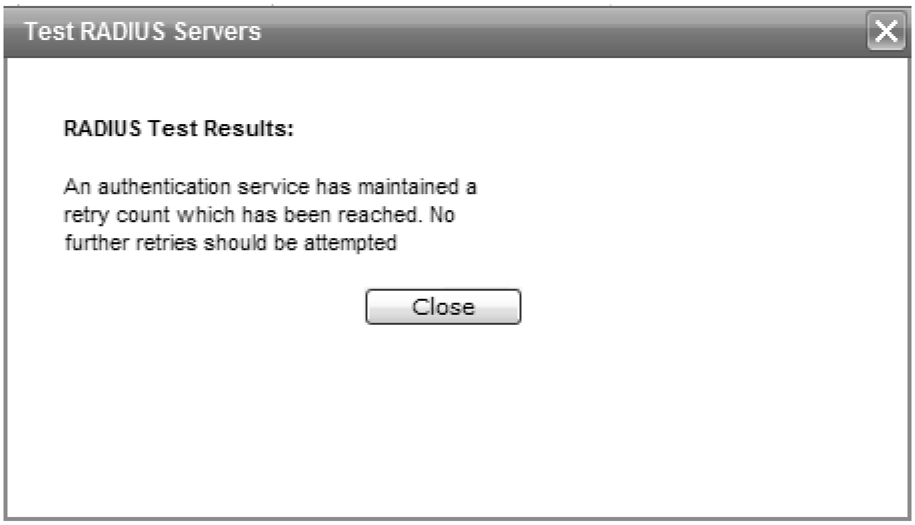
Note: To learn how to configure the User ID and the Password on the RADIUS server, refer to your RADIUS server's user guide.



RADIUS Test Results:

Successful

If the test is not successful, the following message will be displayed:

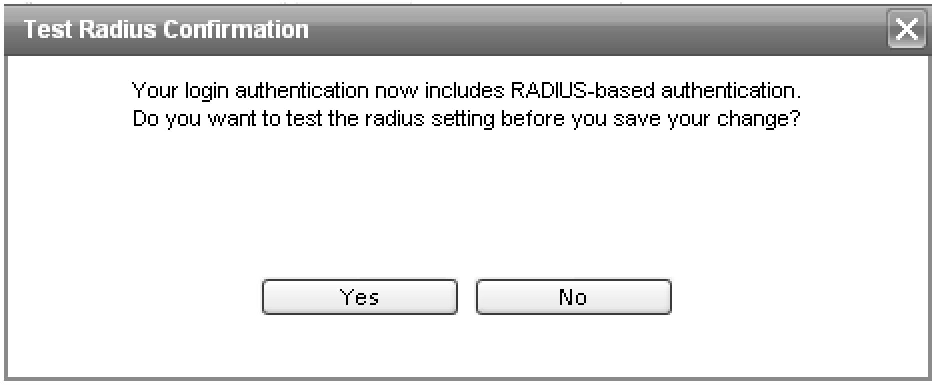


RADIUS Test Results:

An authentication service has maintained a retry count which has been reached. No further retries should be attempted

11. If the RADIUS connectivity test displays "Successful" result, click **Save** on the **RADIUS Authentication** screen to save your configuration.

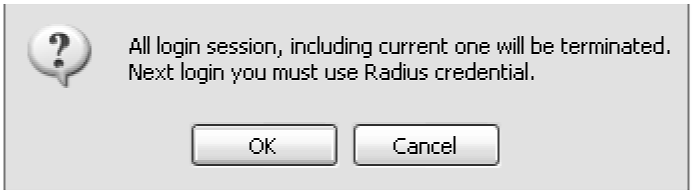
    The following window is displayed:



Your login authentication now includes RADIUS-based authentication.
Do you want to test the radius setting before you save your change?

12. If you tested the RADIUS server connectivity earlier in this procedure (Step 9 and Step 10), click **No**. If you click **Yes**, you will be asked to enter the RADIUS server user ID and password. See Step 10 for more information.

    The following message is displayed:



All login session, including current one will be terminated.
Next login you must use Radius credential.

13. To change the authentication mode to RADIUS authentication, click **OK**.

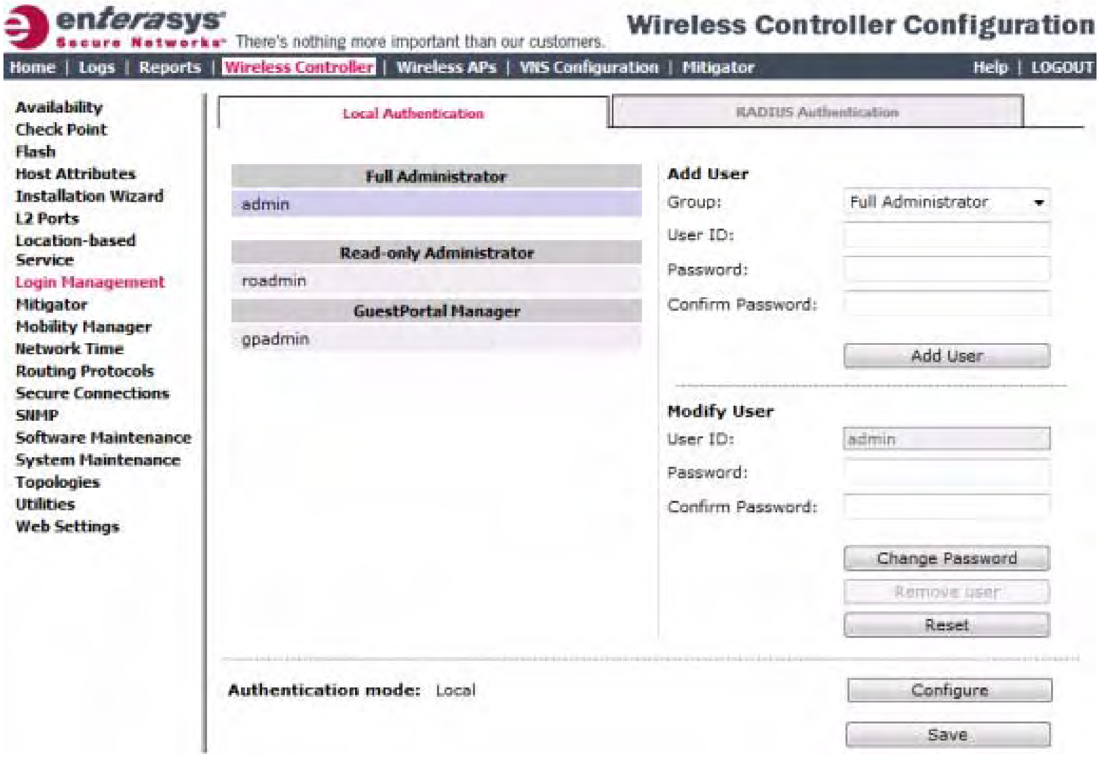
    You will be logged out of the Enterasys Wireless Controller immediately. You must use the RADIUS login user name and password to log on the Enterasys Wireless Controller.

    To cancel the authentication mode changes, click **Cancel**.

Configuring the Local, RADIUS Login Authentication Mode

To configure the Local, RADIUS login authentication mode:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Login Management**. The **Login Management** screen is displayed.



Full Administrator
admin

Read-only Administrator
roadmin

GuestPortal Manager
gpadmin

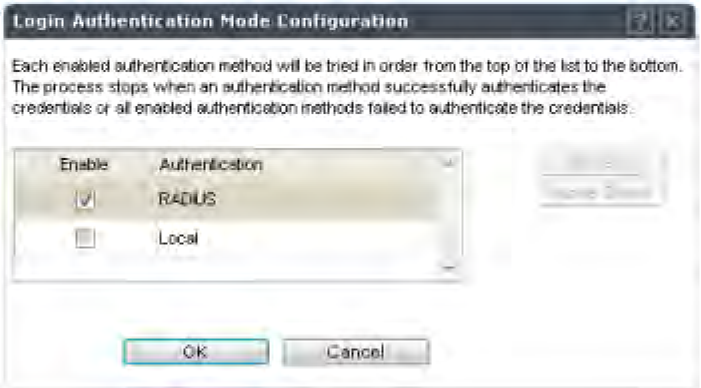
Group: Full Administrator
User ID:
Password:
Confirm Password:

User ID: admin
Password:
Confirm Password:

Authentication mode: Local

3. In the **Authentication mode** section, click **Configure**.

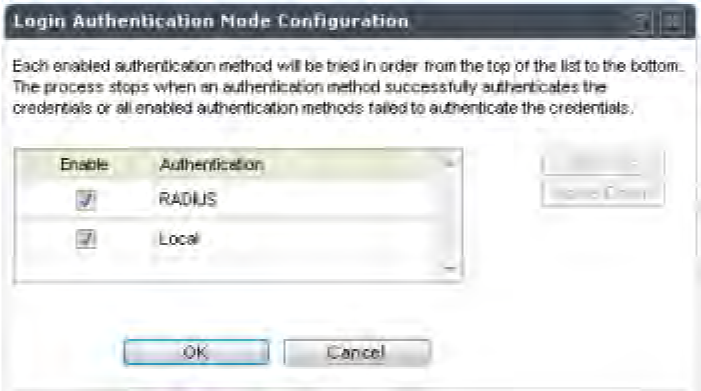
The **Login Authentication Mode Configuration** window is displayed.



Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	RADIUS
□	Local

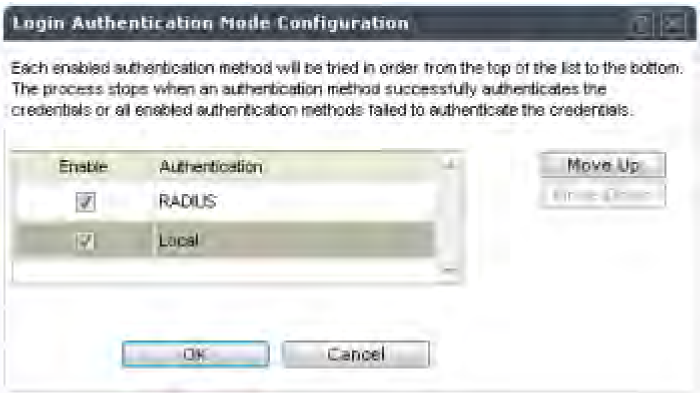
4. Select the **Local** and **RADIUS** checkbox.



Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	RADIUS
☑	Local

5. If necessary, select **Local** and use the **Move Up** button to move **Local** to the top of the list.



Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	RADIUS
☑	Local

6. Click **OK**.
7. On the **Login Management** screen, click **Save**.

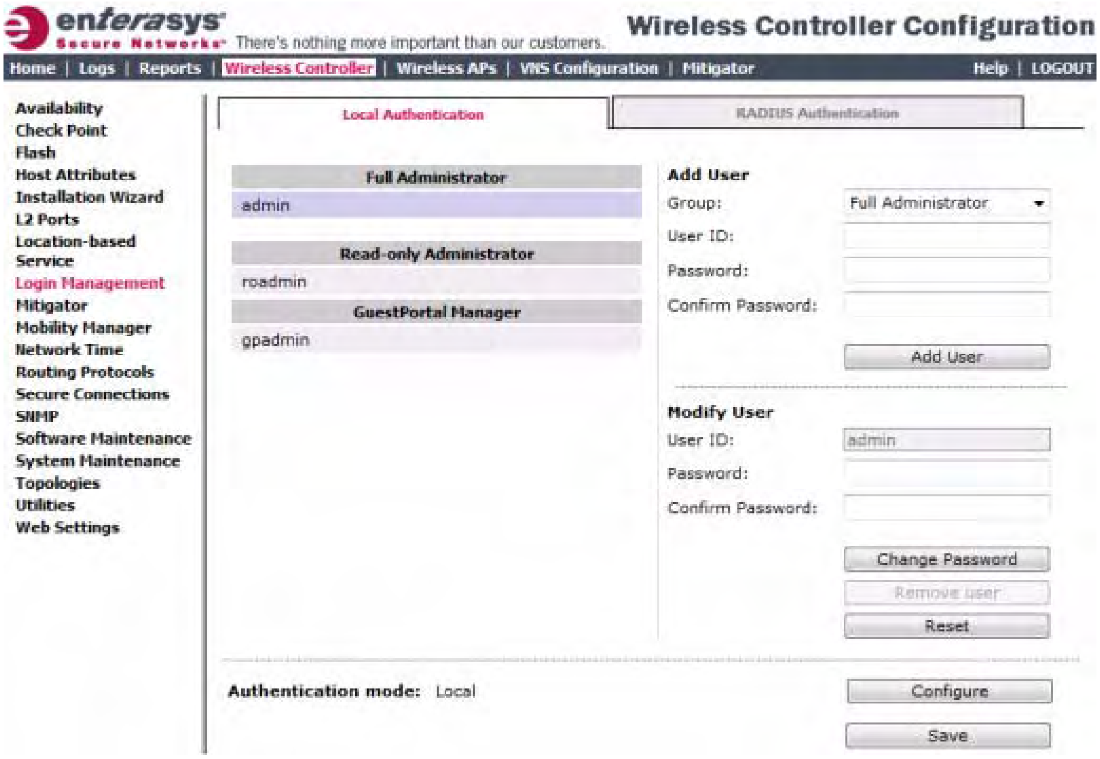
For information on setting local login authentication settings, see "Configuring the Local Login Authentication Mode and Adding New Users" on page 2-36.

For information on setting RADIUS login authentication settings, see "Configuring the RADIUS Login Authentication Mode" on page 2-38.

Configuring the RADIUS, Local Login Authentication Mode

To configure the RADIUS, Local login authentication mode:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Login Management**. The **Login Management** screen is displayed.



Full Administrator
admin

Read-only Administrator
roadmin

GuestPortal Manager
gpadmin

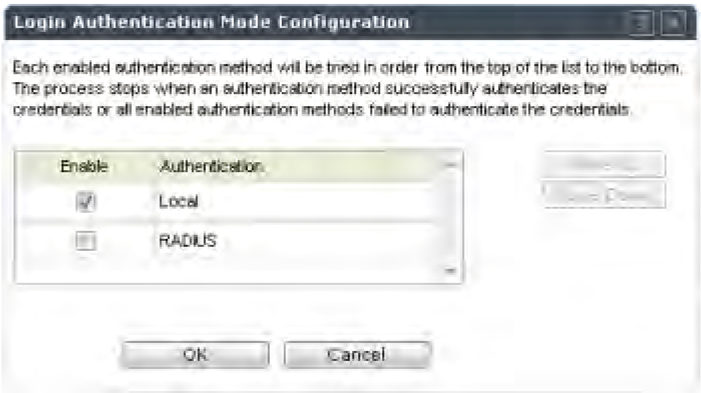
Group: Full Administrator

User ID: admin

Authentication mode: Local

3. In the **Authentication mode** section, click **Configure**.

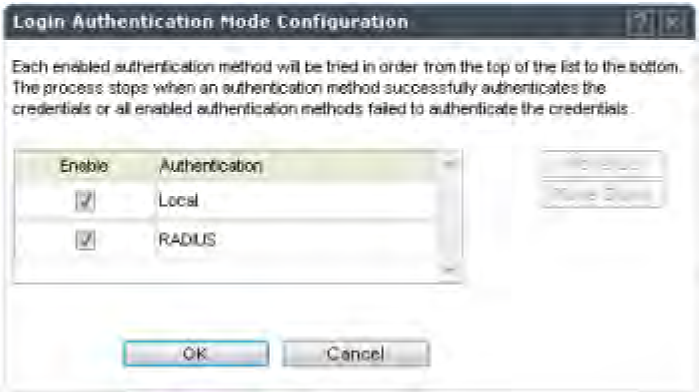
   The **Login Authentication Mode Configuration** window is displayed.



Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	Local
☐	RADIUS

4. Select the **Local** and **RADIUS** checkbox.

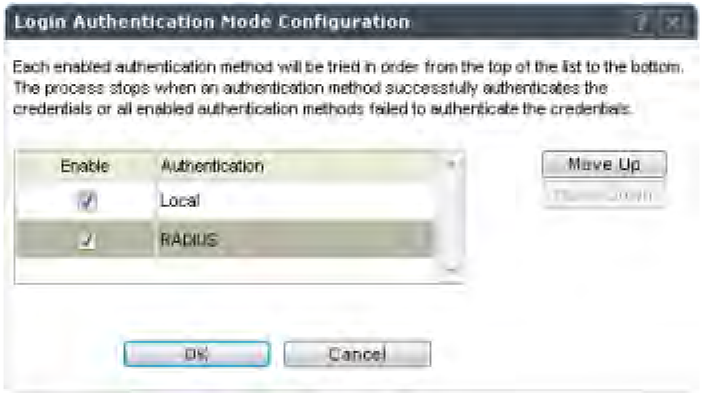


Login Authentication Mode Configuration

Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	Local
☑	RADIUS

5. If necessary, select **RADIUS** and use the **Move Up** button to move **RADIUS** to the top of the list.



Login Authentication Mode Configuration

Each enabled authentication method will be tried in order from the top of the list to the bottom. The process stops when an authentication method successfully authenticates the credentials or all enabled authentication methods failed to authenticate the credentials.

Enable	Authentication
☑	Local
☑	RADIUS

6. Click **OK**.

7. On the **Login Management** screen, click **Save**.

For information on setting RADIUS login authentication settings, see “Configuring the RADIUS Login Authentication Mode” on page 2-38.

For information on setting local login authentication settings, see “Configuring the Local Login Authentication Mode and Adding New Users” on page 2-36.

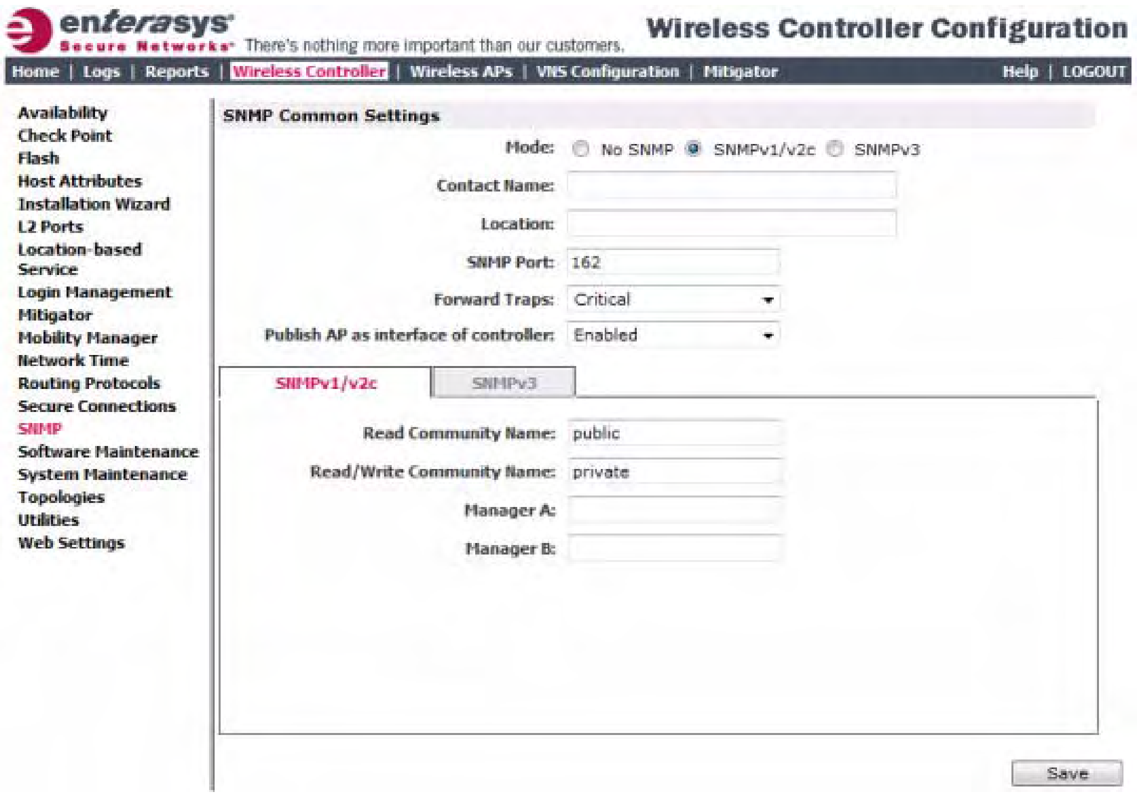
Configuring SNMP

The Enterasys Wireless Controller supports the Simple Network Management Protocol (SNMP) for retrieving statistics and configuration information. If you enable SNMP on the Enterasys Wireless Controller, you can choose either SNMPv3 or SNMPv1/v2 mode. If you configure the Enterasys Wireless Controller to use SNMPv3, then any request other than SNMPv3 request is rejected. The same is true if you configure the Enterasys Wireless Controller to use SNMPv1/v2.

To Configure SNMP:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.

2. In the left pane, click **SNMP**. The **SNMP** screen is displayed.



SNMP Common Settings

Mode: ○ No SNMP ● SNMPv1/v2c ○ SNMPv3

Contact Name:

Location:

SNMP Port: 162

Forward Traps: Critical

Publish AP as interface of controller: Enabled

SNMPv1/v2c | SNMPv3

Read Community Name: public

Read/Write Community Name: private

Manager A:

Manager B:

3. In the SNMP Common Settings section, configure the following:
   - **Mode** — Select **SNMPv1/v2c** or **SNMPv3** to enable SNMP.
   - **Contact Name** — The name of the SNMP administrator.
   - **Location** — The physical location of the Enterasys Wireless Controller running the SNMP agent.
   - **SNMP Port** — The destination port for the SNMP traps. Possible ports are 0–65555.
   - **Forward Traps** — The lowest severity level of SNMP trap that you want to forward.
   - **Publish AP as interface of controller** — Enable or disable SNMP publishing of the access point as an interface to the Enterasys Wireless Controller.
4. Continue with the appropriate procedure for configuring SNMPv1/v2c-specific or SNMPv3-specific parameters.
   - Configuring SNMPv1/v2c-specific Parameters
   - Configuring SNMPv3-specific Parameters

Configuring SNMPv1/v2c-specific Parameters

1. Configure the following parameters on the **SNMPv1/v2c** tab:
   - **Read Community Name** — The password that is used for read-only SNMP communication.
   - **Read/Write Community Name** — The password that is used for write SNMP communication.

   - **Manager A** — The IP address of the server used as the primary network manager that will receive SNMP messages.
   - **Manager B** — The IP address of the server used as the secondary network manager that will receive SNMP messages.
2. Click **Save**.

Configuring SNMPv3-specific Parameters

1. Configure the parameters following on the **SNMPv3** tab:
   - **Context String** — A description of the SNMP context.
   - **Engine ID** — The SNMPv3 engine ID for the Enterasys Wireless Controller running the SNMP agent. The engine ID must be from 5 to 32 characters long.
   - **RFC3411 Compliant** — The engine ID will be formatted as defined by SnmpEngineID textual convention (that is, the engine ID will be prepended with SNMP agents' private enterprise number assigned by IANA as a formatted HEX text string).
2. Click **Add User Account**. The **Add SNMPv3 User Account** window displays.
3. Configure the following parameters:
   - **User** — Enter the name of the user account.
   - **Security Level** — Select the security level for this user account. Choices are: authPriv, authNoPriv, noAuthnoPriv.
   - **Auth Protocol** — If you have selected a security level of authPriv or authNoPriv, select the authentication protocol. Choices are: MD5, SHA, None.
   - **Auth Password** — If you have selected a security level of authPriv or authNoPriv, enter an authentication password.
   - **Privacy Protocol** — If you have selected the security level of authPriv, select the privacy protocol. Choices are: DES, None
   - **Privacy Password** — If you have selected the security level of authPriv, enter a privacy password.
   - **Engine ID** — If desired, enter an engine ID. The ID can be between 5 and 32 bytes long, with no spaces, control characters, or tabs.
   - **Trap Destination** — If desired, enter the IP address of a trap destination.
4. Click **OK**. The **Add SNMPv3 User Account** window closes.
5. Repeat steps 2 through 4 to add additional users.
6. In the **Trap 1** and **Trap 2** sections, configure the following parameters:
   - **Destination IP** — The IP address of the machine monitoring SNMPv3 traps
   - **User Name** — The SNMPv3 user to configure for use with SNMPv3 traps
7. Click **Save**.

Editing an SNMPv3 User

To Edit an SNMPv3 User:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **SNMP**. The **SNMP** screen is displayed.

3. Click the **SNMPv3** tab.
4. Select an SNMP user.
5. Click **Edit Selected User**. The **Edit SNMPv3 User Account** window displays.
6. Edit the user configuration as desired.
7. Click **OK**. The **Edit SNMPv3 User Account** window closes.
8. Click **Save**.

Deleting an SNMPv3 User

To Delete an SNMPv3 User:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **SNMP**. The **SNMP** screen is displayed.
3. Click the **SNMPv3** tab.
4. Select an SNMP user.
5. Click **Delete Selected User**. You are prompted to confirm that you want to delete the selected user.
6. Click **OK**.

Configuring Network Time

You should synchronize the clocks of the Enterasys Wireless Controller and the Wireless APs to ensure that the logs and reports reflect accurate time stamps. For more information, see Chapter 15, **Working with Reports and Displays**.

The normal operation of the Enterasys Wireless Controller will not be affected if you do not synchronize the clock. The clock synchronization is necessary to ensure that the logs display accurate time stamps. In addition, clock synchronization of network elements is a prerequisite for the following configuration:

- Mobility Manager
- Session Availability

Network Time Synchronization

Network time is synchronized in one of two ways:

- Using the system’s time — The system’s time is the Enterasys Wireless Controller’s time.
- Using Network Time Protocol (NTP) — The Network Time Protocol is a protocol for synchronizing the clocks of computer systems over packet-switched data networks.

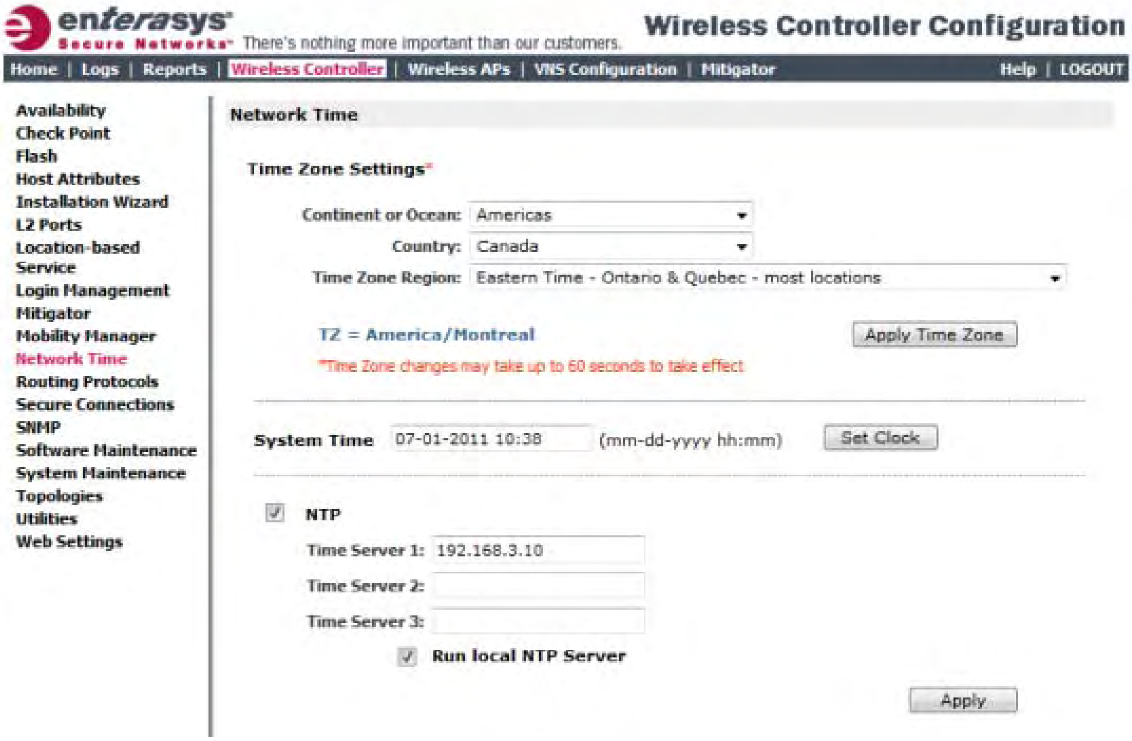
The Enterasys Wireless Controller automatically adjusts for any time change due to Daylight Savings time.

Configuring the Network Time Using the System’s Time

To Configure the Network Time, Using the System’s Time:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.

2. In the left pane, click **Network Time**. The **Network Time** screen is displayed.



Time Zone Settings*

Continent or Ocean: Americas

Country: Canada

Time Zone Region: Eastern Time - Ontario & Quebec - most locations

TZ = America/Montreal

*Time Zone changes may take up to 60 seconds to take effect

System Time 07-01-2011 10:38 (mm-dd-yyyy hh:mm)

☑ NTP

Time Server 1: 192.168.3.10

Time Server 2:

Time Server 3:

☑ Run local NTP Server

3. From the **Continent or Ocean** drop-down list, click the appropriate large-scale geographic grouping for the time zone.

4. From the **Country** drop-down list, click the appropriate country for the time zone. The contents of the drop-down list change, based on the selection in the **Continent or Ocean** drop-down list.

5. From the **Time Zone Region** drop-down list, click the appropriate time zone region for the selected country.

6. Click **Apply Time Zone**.

7. In the **System Time** box, type the system time.

8. Click **Set Clock**.

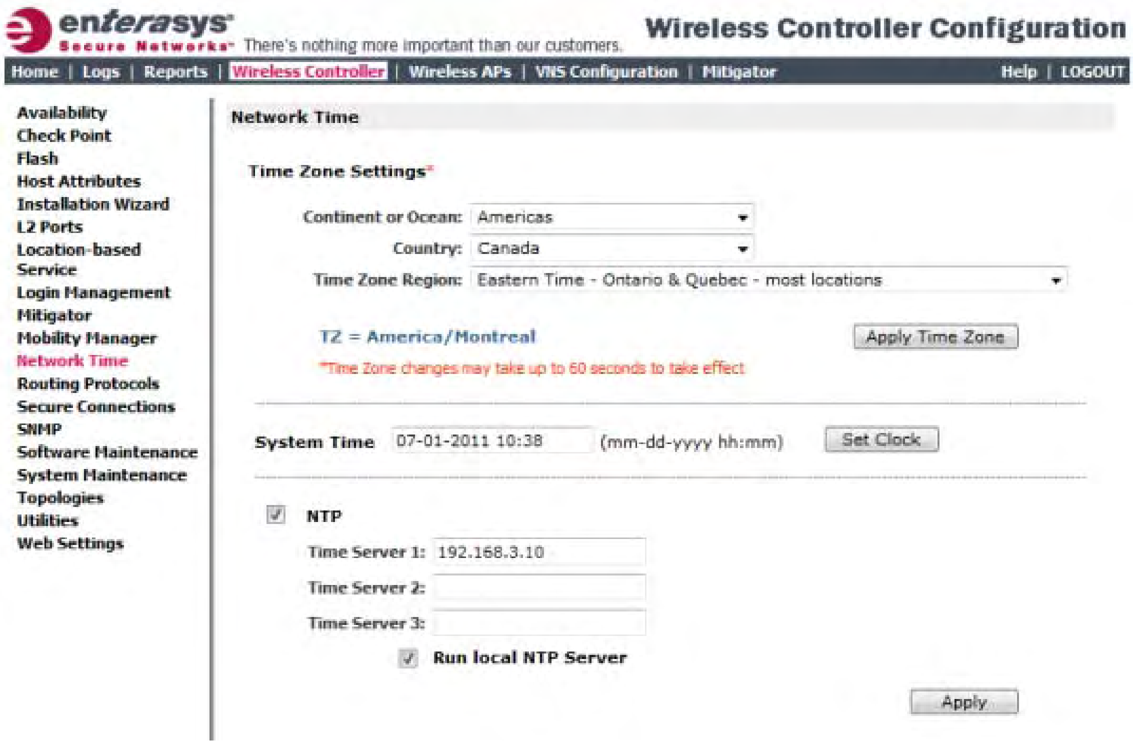
9. The WLAN network time is synchronized in accordance with the Enterasys Wireless Controller's time.

Configuring the Network Time Using an NTP Server

To configure the network time using an NTP server:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.

2. In the left pane, click **Network Time**. The **Network Time** screen is displayed.



Network Time

Time Zone Settings*

Continent or Ocean: Americas

Country: Canada

Time Zone Region: Eastern Time - Ontario & Quebec - most locations

TZ = America/Montreal

*Time Zone changes may take up to 60 seconds to take effect

System Time 07-01-2011 10:38 (mm-dd-yyyy hh:mm)

☑ NTP

Time Server 1: 192.168.3.10

Time Server 2:

Time Server 3:

☑ Run local NTP Server

3. From the **Continent or Ocean** drop-down list, click the appropriate large-scale geographic grouping for the time zone.

4. From the **Country** drop-down list, click the appropriate country for the time zone. The contents of the drop-down list change, based on the selection in the **Continent or Ocean** drop-down list.

5. From the **Time Zone Region** drop-down list, click the appropriate time zone region for the selected country.

6. Click **Apply Time Zone**.

7. In the **System Time** box, type the system time.

8. Select the **Use NTP** checkbox.

Note: If you want to use the Enterasys Wireless Controller as the NTP Server, select the **Run local NTP Server** checkbox, and then skip to Step 11.

9. In the **Time Server 1** text box, type the IP address or FQDN (Full Qualified Domain Name) of an NTP time server that is accessible on the enterprise network.

10. Repeat for **Time Server2** and **Time Server3** text boxes.

    If the system is not able to connect to the **Time Server 1**, it will attempt to connect to the additional servers that have been specified in **Time Server 2** and **Time Server 3** text boxes.

11. Click **Apply**.

12. The WLAN network time is synchronized in accordance with the specified time server.

Configuring Secure Connections

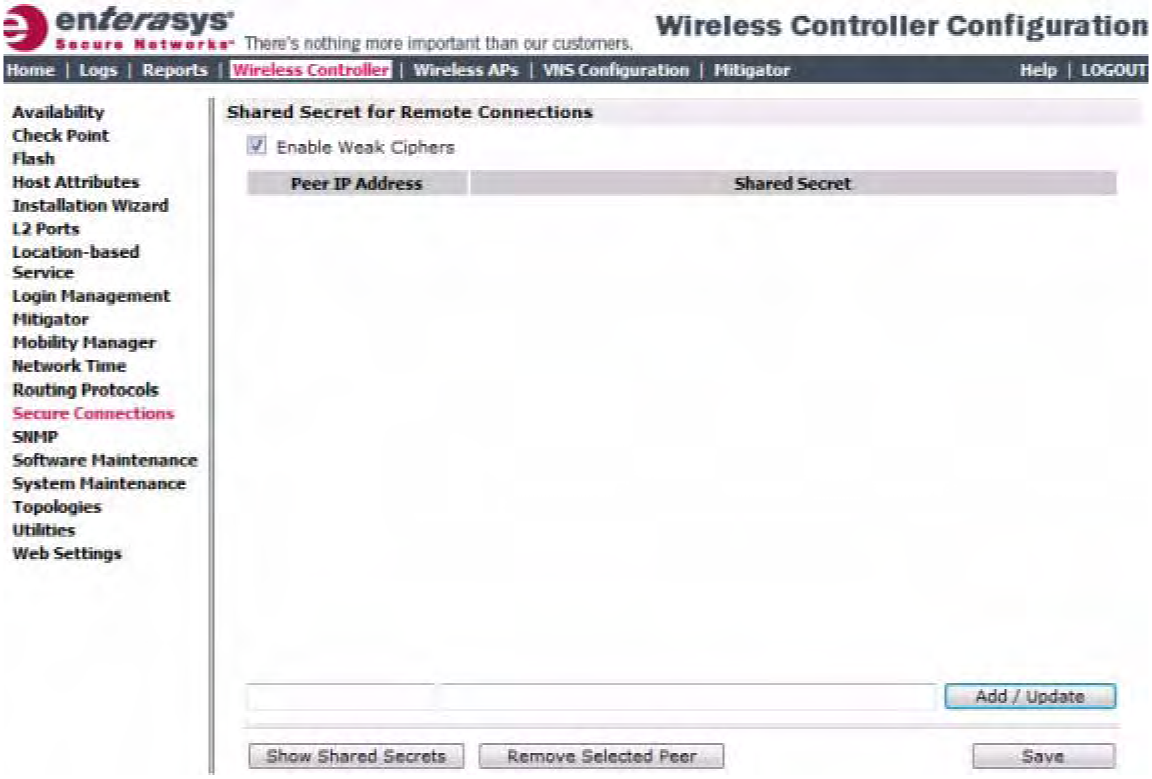
The controllers communicate amongst themselves using a secure protocol. Among other things, this protocol is used to share between controllers the data required for high availability. They also use this protocol to communicate with NMS Wireless Manager. The protocol requires the use of a shared secret for mutual authentication of the end points.

By default the controllers and NMS Wireless Manager use a well known factory default shared secret. This makes it easy to get up and running but is not as secure as some sites require.

The controllers and NMS Wireless Manager allow the administrator to change the shared secret used by the secure protocol. In fact the controllers and Wireless Manager can use a different shared secret for each individual end point to which they connect with the protocol.

To configure the shared secret for a connection on the controller:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Secure Connections**. The **Secure Connections** screen is displayed.



Shared Secret for Remote Connections

☑ Enable Weak Ciphers

Peer IP Address	Shared Secret

3. Enter the Server IP address of the other end of the secure protocol tunnel and the shared secret to use.
4. Click **Add/Update**.
5. Click **Save.**

Note: Configure the same shared secret onto the devices at each end of the connection. Otherwise, the two controllers or controller and NMS Wireless Manager will not be able to communicate.

Configuring DNS Servers for Resolving Host Names of NTP and RADIUS Servers

Since the **Global Settings** screen (**top menu** > **VNS Configuration** > **Global Settings**) allows you to set up NTP and RADIUS servers by defining their host names, you have to configure your DNS servers to resolve the host names of NTP and RADIUS servers to the corresponding IP addresses.

Note: For more information on RADIUS server configuration, see "Defining RADIUS Servers and MAC Address Format" on page 7-4.

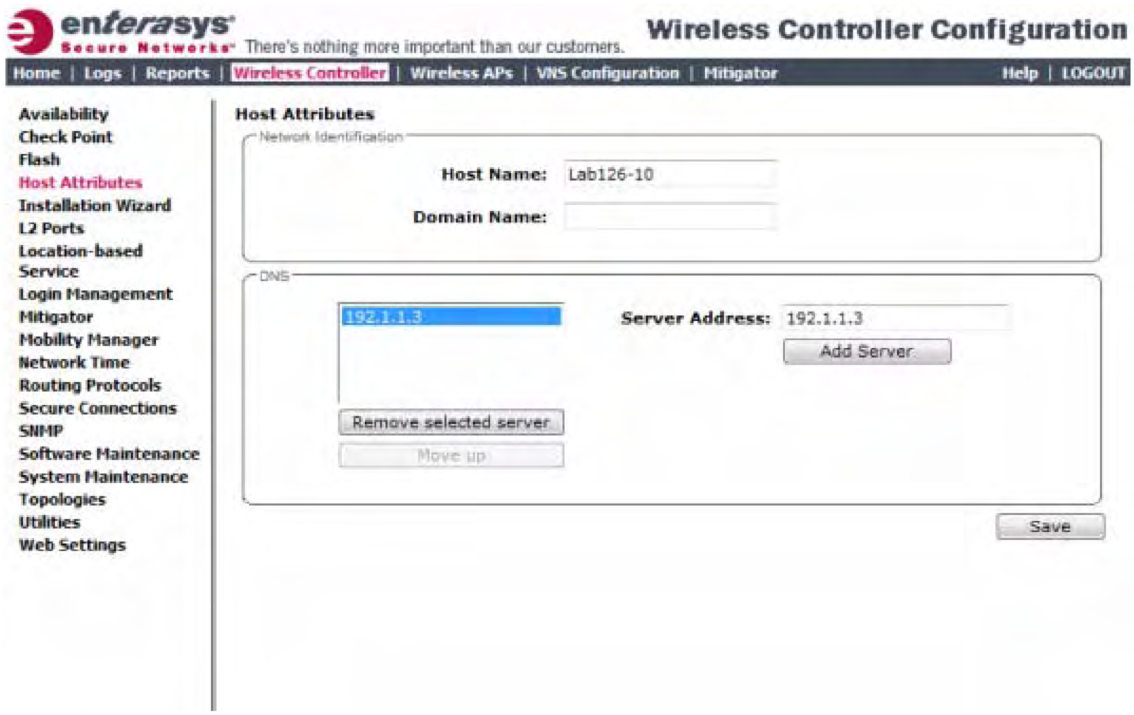
You can configure up to three DNS servers to resolve NTP and RADIUS server host names to their corresponding IP addresses.

The Enterasys Wireless Controller sends the host name query to the first DNS server in the stack of three configured DNS servers. The DNS server resolves the queried domain name to an IP address and sends the result back to the Enterasys Wireless Controller.

If for some reason, the first DNS server in the stack of configured DNS servers is not reachable, the Enterasys Wireless Controller sends the host name query to the second DNS server in the stack. If the second DNS server is also not reachable, the query is sent to the third DNS server in the stack.

To configure DNS servers for resolving host names of NTP and RADIUS servers:

1. From the top menu, click **Wireless Controller**. The **Wireless Controller Configuration** screen is displayed.
2. In the left pane, click **Host Attributes**. The **Host Attributes** screen is displayed.



Host Name: Lab126-10

Domain Name:

Server Address: 192.1.1.3

3. In the DNS box, type the DNS server's IP address in the **Server Address** field and then click **Add Server**. The new server is displayed in the DNS servers' list.

Note: You can configure up to three DNS servers.

4. To save your changes, click **Save**.

Using an AeroScout/Ekahau Location-Based Solution

You can deploy your Enterasys Wireless Controller and Wireless APs as part of an AeroScout or Ekahau location-based solution.

On the Enterasys Wireless Controller, you configure the AeroScout/Ekahau server IP address and enable the location-based service. The AeroScout/Ekahau server is aware only of the Enterasys Wireless Controller IP address and is notified of the operational APs by the Controller.

On the APs that you want to participate in the location-based service, you enable the location-based service.

Note: Participating Wireless APs must use the 2.4 GHz band.

Once you have enabled the location-based service on the Enterasys Wireless Controller and the participating Wireless APs, at least one of the participating Wireless APs will receive reports from an AeroScout/Ekahau Wi-Fi RFID tag in the 2.4GHZ band. The tag reports are collected by the AP and forwarded to the AeroScout/Ekahau server by encapsulating the tag reports in a WASSP tunnel and routing them as IP packets through the Enterasys Wireless Controller.

Note: Tag reports are marked with UP=CS5, and DSCP = 0xA0. On the Enterasys Wireless Controller, tag reports are marked with UP=CS5 to the core (if 802.1p exists).

An AP's tag report collection status is reported in the Wireless AP Inventory report. For more information, see "Viewing Reports" on page 15-14.

If availability is enabled, tag report transmission pauses on failed over APs until they are configured and notified by the AeroScout/Ekahau server.

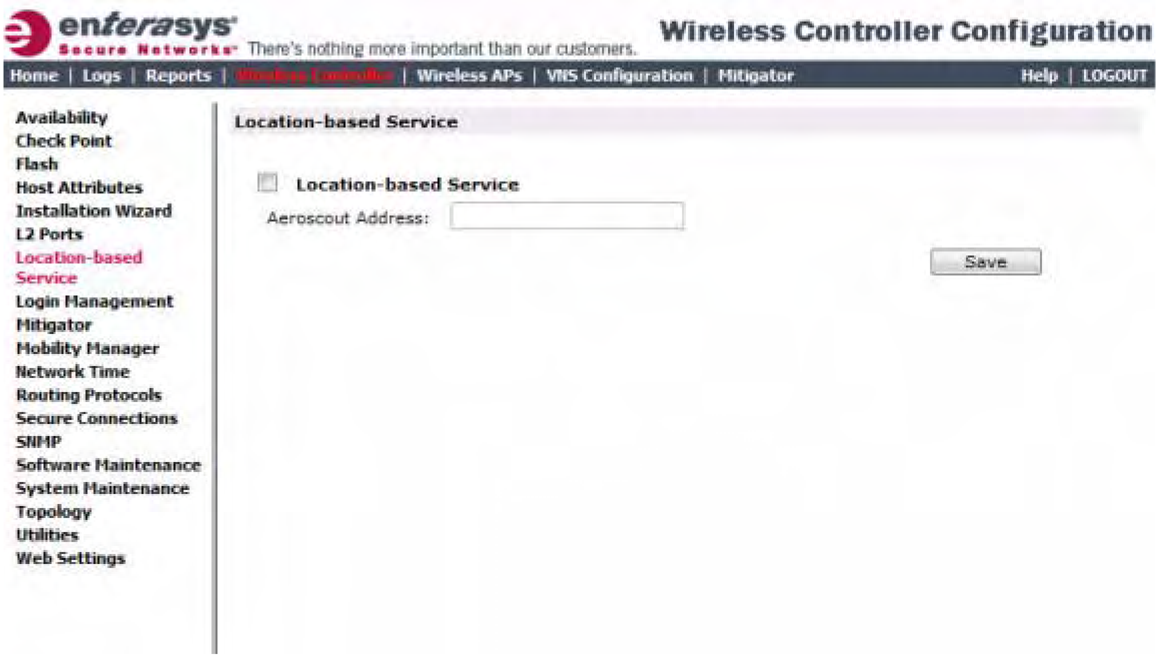
When AeroScout/Ekahau support is disabled on the Enterasys Wireless Controller, the Enterasys Wireless Controller does not communicate with the AeroScout/Ekahau server and the APs do not perform any AeroScout/Ekahau-related functionality.

Ensure that your AeroScout/Ekahau tags are configured to transmit on all non-overlapping channels (1, 6 and 11) and also on channels above 11 for countries where channels above 11 are allowed. Refer to AeroScout/Ekahau documentation for proper deployment of the AeroScout/Ekahau location-based solution.

To Configure a Enterasys Wireless Controller for Use with an AeroScout/Ekahau Solution:

1. From the top menu, click **Wireless Controller.** The **Wireless Controller Configuration** screen is displayed.

2. In the left pane, click **Location-based Service**. The **Location-based Service** screen is displayed.

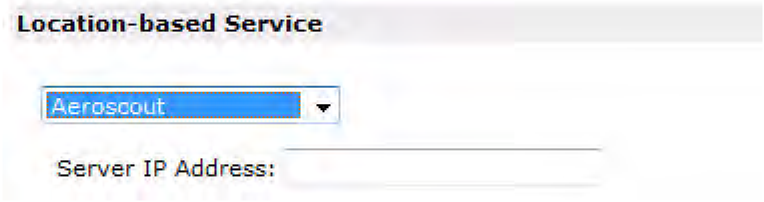


□ Location-based Service

Aeroscout Address:

3. From the **Location-based Service** drop-down list, click the desired location-based service for the Enterasys Wireless Controller.

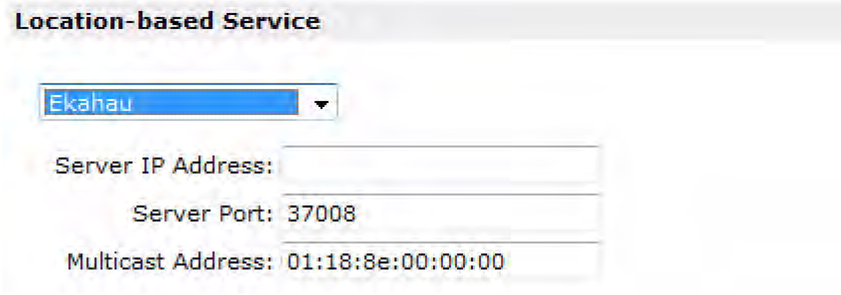
4. If Aeroscout is selected, enter the Server IP Address of the AeroScout server in the **Aeroscout Address** field.



Aeroscout

Server IP Address:

5. If Ekahau is selected, enter the Server IP Address, Server Port, and Multicast Address of the Ekahau server on the **Ekahau Address** field.



Ekahau

Server IP Address:

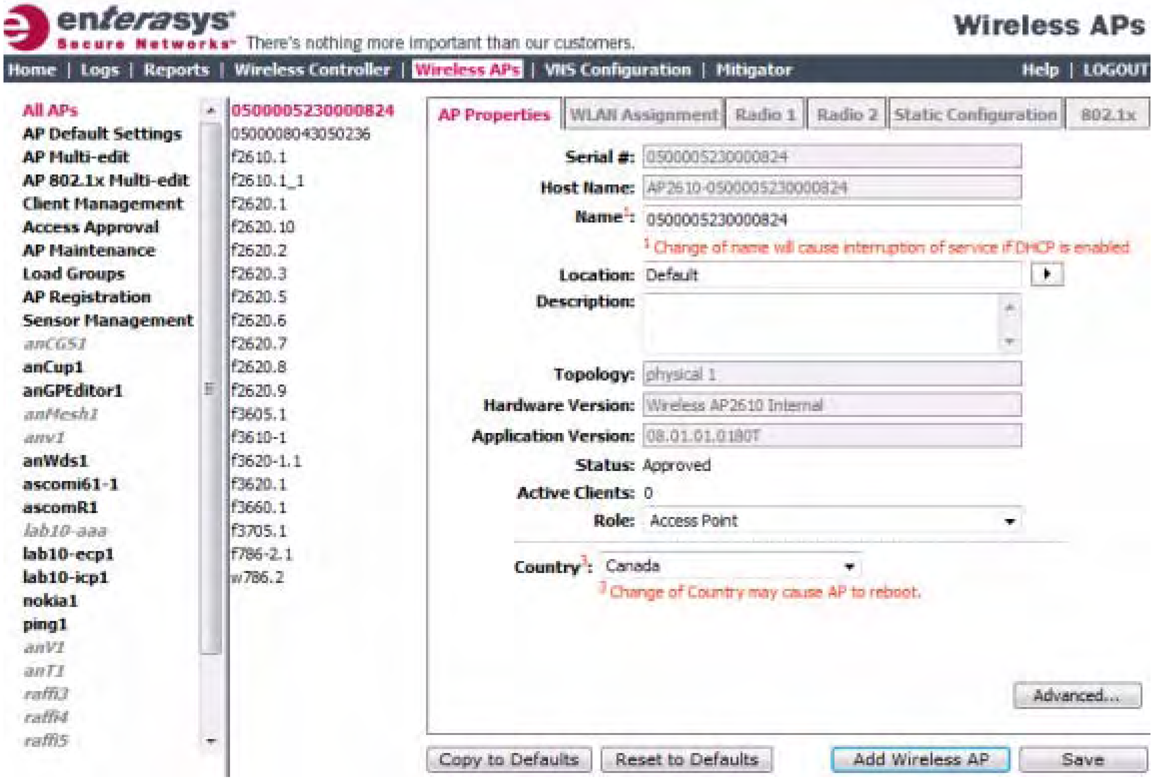
Server Port: 37008

Multicast Address: 01:18:8e:00:00:00

6. Click **Save**.

You must now assign Wireless APs to participate in the location-based service.

7. From the top menu, click **Wireless APs**. The **All APs** screen is displayed.



Serial #: 0500005230000824

Host Name: AP2610-0500005230000824

Name[1]: 0500005230000824

[1] Change of name will cause interruption of service if DHCP is enabled

Location: Default

Description:

Topology: physical 1

Hardware Version: Wireless AP2610 Internal

Application Version: 08.01.01.0180T

Status: Approved

Active Clients: 0

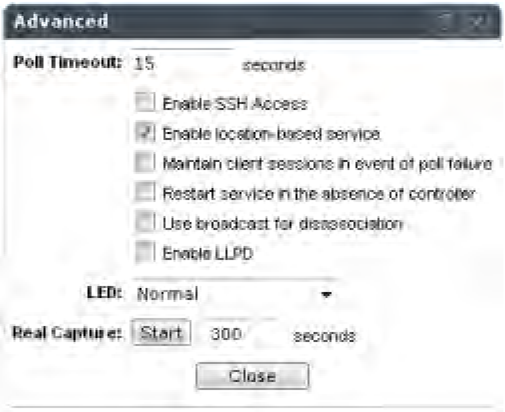
Role: Access Point

Country[3]: Canada

[3] Change of Country may cause AP to reboot.

8. Select an AP.

9. Click **Advanced**. The **Advanced** window displays.



Poll Timeout: 15 seconds

□ Enable SSH Access

☑ Enable location-based service

□ Maintain client sessions in event of poll failure

□ Restart service in the absence of controller

□ Use broadcast for disassociation

□ Enable LLPD

LED: Normal

Real Capture: 300 seconds

10. Select the **Enable location-based service** field.

11. Click **Close**. The **Advanced** window closes.

12. Repeats steps 7 through 10 for each additional AP that you want to participate in the location-based service.

13. Click **Save**.

Note: You can also enable location-based service on APs through the **Location-based service** field on the **AP Multi-edit** screen and the **Advanced** window of the **AP Default Settings** screen.

Additional Ongoing Operations of the System

Ongoing operations of the Enterasys Wireless Convergence Software system can include the following:

- Enterasys Wireless Controller System Maintenance
- Wireless AP Maintenance
- Client Disassociate
- Logs and Traces
- Reports and Displays

For more information, see Chapter 16, **Performing System Administration** or the Enterasys Wireless Convergence Software *Maintenance Guide.*

3

Configuring the Wireless AP

This chapter describes the Wireless Access Point (AP) and the Enterasys Wireless Convergence Software solution, including:

Wireless AP Overview

The Wireless AP uses the 802.11 wireless standards (802.11a/b/g/n) for network communications and bridges network traffic to an Ethernet LAN. The Wireless AP runs proprietary software that allows it to communicate only with the Enterasys Wireless Controller.

The Wireless AP physically connects to a LAN infrastructure and establishes an IP connection to the Enterasys Wireless Controller, which manages the Wireless AP configuration through the Enterasys Wireless Assistant. The Enterasys Wireless Controller also provides centralized management (verification and upgrade) of the Wireless AP firmware image.

A UDP-based protocol enables communication between the Wireless AP and the Enterasys Wireless Controller. The UDP-based protocol encapsulates IP traffic from the Wireless AP and directs it to the Enterasys Wireless Controller. The Enterasys Wireless Controller decapsulates the packets and routes them to the appropriate destinations, while managing sessions and applying policies.

Deploying a Wireless AP with External Antennas

Some Wireless AP models support external antennas. The external antennas are individually certified and determine the available channel list and the maximum transmitting power for the country in which the Wireless AP is deployed. For a list of the external antennas that can be used with each antenna model and how to install them, refer to the *Enterasys Wireless External Antenna Site Preparation and Installation Guide.*

The following Wireless AP models support external antennas:

- **AP2620** — an Enterasys Standard Wireless AP model.
- **AP2660** — an Enterasys Wireless Outdoor AP model.
- **AP3620** — an Enterasys Wireless 802.11n AP model.
- **AP3640** — an Enterasys Wireless Standalone AP model.
- **AP3660** — an Enterasys Wireless 802.11n Outdoor AP model.
- **W78xC**— an Enterasys Wireless 802.11n Outdoor AP model.

Configure the Wireless AP to indicate which external antenna is connected at each antenna port.

Note: An individual Enterasys Wireless AP cannot support an indoor mounted antenna and an outdoor mounted antenna simultaneously. The AP4102/4102C, however, can support both indoor and outdoor antennas simultaneously.

Deploying a Wireless AP with external antennas is part of the Wireless AP configuration process. For more information, see "Configuring Wireless AP Settings" on page 3-29.

Enterasys Standard Wireless AP

The Enterasys Standard Wireless AP is available in the following models:

Table 3-1 Enterasys Standard Wireless AP Models

AP Model	Description
AP2610	Internal antenna, internal dual (multimode) diversity antennas
AP2620	External antenna (dual external antennas), RP-SMA connectors
AP2605	Two external, non-detachable antennas
AP4012/4102C	Integrated and external antenna

Each model has two radios — Radio 1 and Radio 2. Figure 3-1 shows a block diagram of the Enterasys StandardWireless AP equipped with external antennas.

Enterasys Standard Wireless AP Radios

Note: The following access point radio discussion does not apply to the AP4102/4102C access points. For more information on the AP4102/4102C access points, see "AP4102/4102C Access Points" on page 3-4.

The Enterasys StandardWireless AP is equipped with two radios — Radio 1 and Radio 2.

- **Radio 1** supports the 5 GHz radio, with radio mode **a.**
- **Radio 2** supports the 2.4 GHz radio, with radio modes **b**, **g**, and **b/g.**

Radio 1 and **Radio 2** are connected to both external antennas — EA1 and EA2.

The following is a block diagram of the Enterasys StandardWireless AP equipped with external antennas.

Figure 3-1 Enterasys Standard Wireless APs Baseband

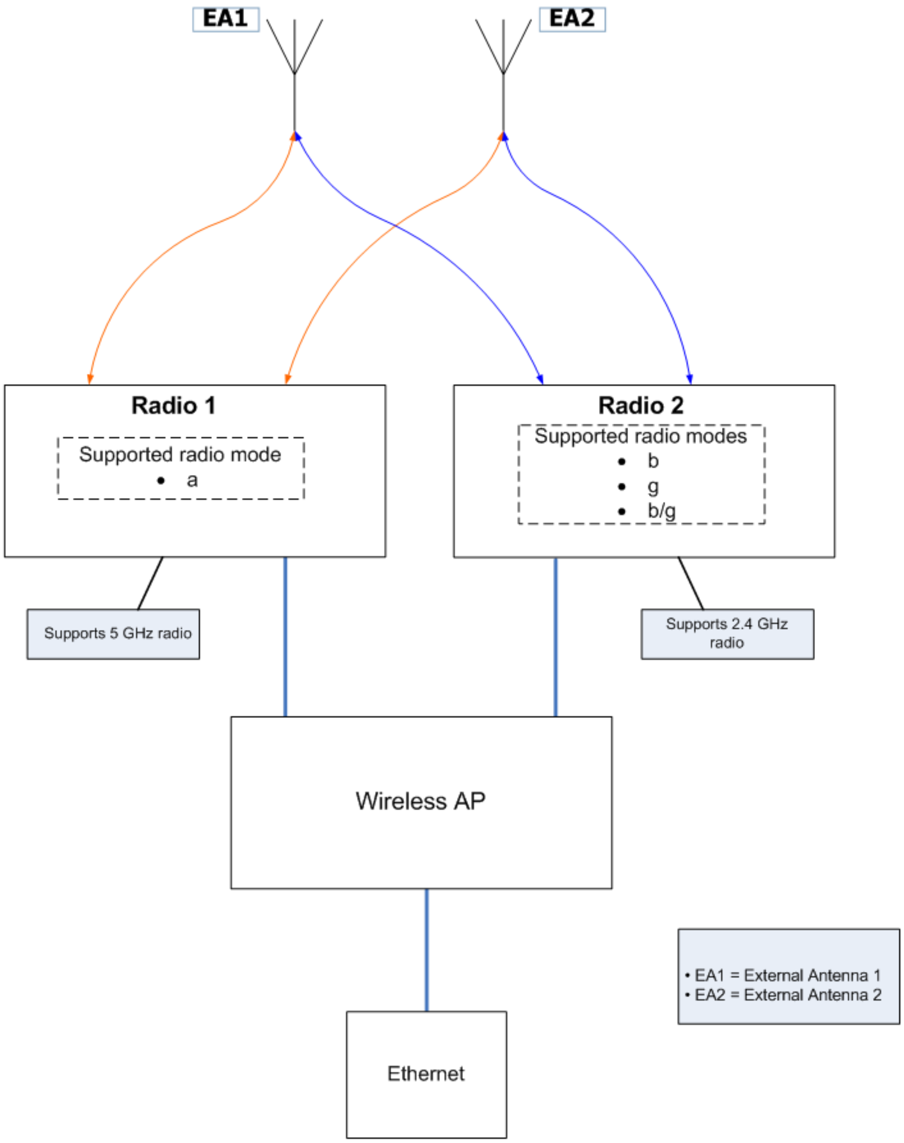


Figure 3-1 illustrates the following:

- The Enterasys StandardWireless AP has two radios — **Radio 1** and **Radio 2**.
- **Radio 1** supports the 5 GHz radio, with radio mode **a.**
- **Radio 2** supports the 2.4 GHz radio, with radio modes **b**, **g**, and **b/g.**
- **Radio 1** and **Radio 2** are connected to both external antennas — EA1 and EA2.

5 GHz radio supporting the 802.11a standard — The 802.11a standard is an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 5-GHz band. The 802.11a standard uses an orthogonal frequency division multiplexing encoding scheme, rather than Frequency-Hopping Spread Spectrum (FHSS) or Direct-Sequence Spread Spectrum (DSSS).

2.4 GHz radio supporting the 802.11b/g standards — The 802.11g standard applies to wireless LANs and specifies a transmission rate of 54 Mbps. The 802.11b (High Rate) standard is an extension to 802.11 that specifies a transmission rate of 11 Mbps. Since 802.11g uses the same communication frequency range as 802.11b (2.4 GHz), 802.11g devices can co-exist with 802.11b devices on the same network.

The radios are enabled or disabled through the Enterasys Wireless Controller. Both radios can be enabled to offer service simultaneously. For more information, see "Modifying Wireless AP 2610/ 2620 Radio Properties" on page 3-52.

The Unlicensed National Information Infrastructure (U-NII) bands all lie within the 5-GHz band, designed for short-range, high-speed, wireless networking communication.

The Wireless AP supports the full range of 802.11a:

- 5.15 to 5.25 GHz — U-NII Low Band
- 5.25 to 5.35 GHz — U-NII Middle Band
- 5.47 to 5.725 GHz — UNII 2+
- 5.725 to 5.825 GHz — U-NII High Band

AP4102/4102C Access Points

The AP4102 and AP4102C access points are Enterasys manufactured access points that run Enterasys WLAN software. The AP4102/4102C access point has 2 integrated dual-band antennas. Diversity, which is the use of two antennas to increase the odds that a better radio stream is received on either of the antennas, is supported only with integrated antennas.

The available external antennas for the AP4102/4102C access point are listed in Table 3-2.

Table 3-2 Available Antennas for the AP4102/4102C

Left Antennas	Right Antennas
RBT4K - AG - IA, 2 dBi	RBT4K - AG - IA, 4 dBi
RBTES - BG - M08M, 8dBi	RBTES - AH - M10M, 110 dBi
RBTES - BG - P18M, 18 dBi	RBTES - AH - P23M, 23 dBi
RBTES - BG - S1490M, 14 dBi	RBTES - AM - M10M, 10 dBi
	RBTES - AW - S1590M, 15 dBi 90 Deg
	RBTES - AW - S1590M, 16 dBi 60 Deg

The antenna selection automatically restricts channels and respective power settings according to certifications.

Enterasys Wireless Outdoor APs

The Enterasys Wireless Outdoor AP enables you to extend your Wireless LAN beyond the confines of indoor locations. The Enterasys Wireless Outdoor AP is resistant to harsh outdoor conditions and extreme temperatures. Using the advanced wireless distribution feature of the Enterasys Wireless LAN, the Enterasys Wireless Outdoor AP can extend your Wireless LAN to outdoor locations without Ethernet cabling. A mounting bracket is available to enable quick and easy mounting of the Enterasys Wireless Outdoor APs to walls, rails, and poles.

The Enterasys Wireless Outdoor AP supports 802.11a, 802.11g, 802.11n (AP3660 only), and full backward compatibility with legacy 802.11b devices.

The Enterasys Wireless Outdoor AP is available in three models:

- **AP2650** — Internal antenna, internal dual (multimode) diversity antennas
- **AP2660** — External antenna (dual external antennas), RP-SMA connectors
- **AP3660** — External antenna (dual external antennas), RP-SMA connectors

Note: Any Outdoor AP model number in the **Hardware Version** box on the **AP Properties** tab that ends with -1 is an Outdoor AP that contains the new radio card. For example, the Enterasys Wireless AP2650-1 Internal.

Enterasys Wireless 802.11n AP

The Enterasys Wireless 802.11n AP delivers total data rates of up to 300Mbps, depending on its configuration. The improved throughput of 300 Mbps is spread over a number of simultaneous users so that the Wireless 802.11n AP provides 300mobile users with an experience similar to that of a wired 100 Mbps Ethernet connection — the standard for desktop connectivity.

To configure the Enterasys Wireless 802.11n AP to achieve this high link rate, see "Achieving High Throughput with the Wireless 802.11n AP" on page 3-50.

Note: The Wireless 802.11n AP is backward-compatible with existing 802.11a/b/g networks.

MIMO

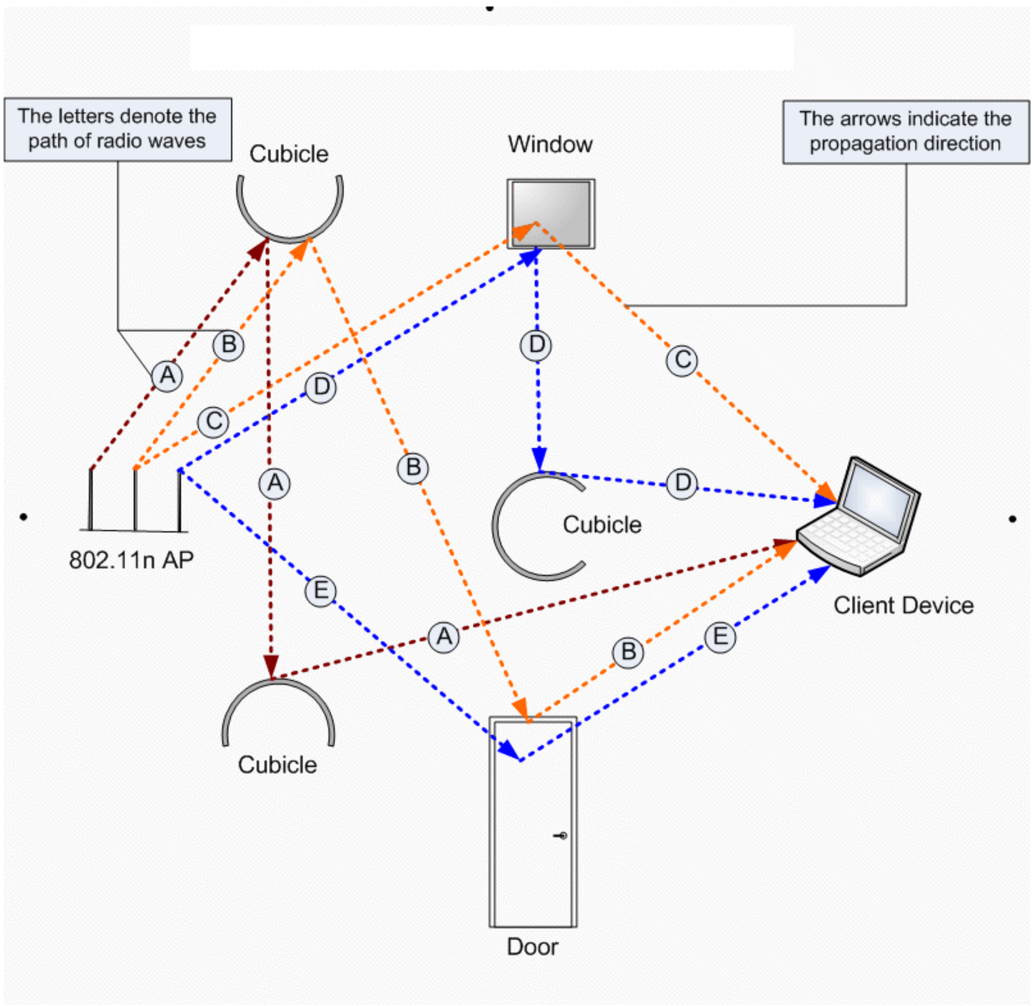
The mainstay of 802.11 AP is MIMO (multiple input, multiple output) — a technology that uses advanced signal processing with multiple antennas to improve the throughput. MIMO takes advantage of multipath propagation to decrease packet retries to improve the fidelity of the wireless network.

The 802.11n AP's MIMO radio sends out one or two radio signals through its three antennas. Each of these signals is called a spatial stream. Because the location of the antennas on the 802.11n AP is spaced out, each spatial stream follows a slightly different path to the client device. Furthermore, the two spatial streams get multiplied into several streams as they bounce off the obstructions in the vicinity. This phenomenon is called multipath. Since these streams are bounced from different surfaces, they follow different paths to the client device. The client device, which is also 802.11n compliant, also has multiple antennas. Each of the antennas independently decodes the arriving signal. Then each antenna's decoded signal is combined with the decoded signals from the other antennas. The software algorithm uses the redundancy to extract one or two spatial streams and enhances the streams' signal to noise ratio.

The client device too sends out one or two spatial streams through its multiple antennas. These spatial streams get multiplied into several steams as they bounce off the obstructions in the vicinity en route to the 802.11n AP. The 802.11n AP's MIMO receiver receives these multiple streams with three antennas. Each of the three antennas independently decodes the arriving signal. Then each antennas's decoded signal is combined with the decoded signals from the other antennas. The 802.11n AP's MIMO receiver again uses the redundancy to extract one or two spatial streams and enhances the streams' signal to noise ratio.

By using the multiple streams, MIMO doubles the throughput.

Figure 3-2 MIMO in Enterasys Wireless 802.11n AP


The letters denote the path of radio waves
Cubicle
Window
The arrows indicate the propagation direction
B
A
D
C
D
C
A
B
D
802.11n AP
Cubicle
Client Device
E
A
B
E
Cubicle
Door

Note: MIMO should not be confused with the **Diversity** feature. While **Diversity** is the use of two antennas to increase the odds that a better radio stream is received on either of the antennas, MIMO antennas radiate and receive multi-streams of the same packet to achieve the increased throughput.
The **Diversity** feature is meant to offset the liability of RF corruption, arising out of multipath, whereas MIMO converts the liability of multipath to its advantage.

Because the 802.11n AP operates with multiple antennas, it is capable of picking up even the weakest signals from the client devices.

Channel Bonding

In addition to MIMO technology, the 802.11n AP makes a number of additional changes to the radio to increase the effective throughput of the Wireless LAN. The radios of regular Enterasys Wireless APs use radio channels that are 20 MHz wide. This means that the channels must be spaced at 20 MHz to avoid interference. The radios of 802.11n AP can use two channels at the same time to create a 40 MHz wide channel. By using the two 20 MHz channels in this manner, the 802.11n AP achieves more than double the throughput. The 40-MHz channels in 802.11n are two adjacent 20-MHz channels, bonded together. This technique of using two channels at the same time is called channel bonding.

Shortened Guard Interval

The purpose of the guard interval is to introduce immunity to propagation delays, echoes and reflections of symbols in orthogonal frequency division multiplexing (OFDM) — a method by which information is transmitted via a radio signal in Wireless APs.

In OFDM, the beginning of each symbol is preceded by a guard interval. As long as the echoes fall within this interval, they will not affect the safe decoding of the actual data, as data are only interpreted outside the guard interval. Longer guard periods reduce the channel efficiency. The 802.11n AP provides reduced guard periods, thereby increasing the throughput.

MAC Enhancements

The 802.11n AP also has an improved MAC layer protocol that reduces overhead (in the MAC layer protocol) and contention losses. This results in increased throughput.

Models

The Wireless 802.11n AP is available in the following models:

- **Model AP3605** — Three internal antennas
- **Model AP3610** — Three internal antennas
- **Model AP3620** — Three external antennas
- **Model AP3630** — Three internal antennas
- **Model AP3640** — Three external antennas
- **Model AP3660** — Six external antennas

Environment

With the exception of the AP3660, Wireless 802.11n APs cannot be deployed in an outdoor environment.

Enterasys Wireless 802.11n AP's Radios

The Enterasys Wireless 802.11n AP is equipped with two radios — Radio 1 and Radio 2. The following is a block diagram of the Enterasys Wireless 802.11n AP equipped with external antennas.

Figure 3-3 Enterasys Wireless 802.11n AP's Baseband

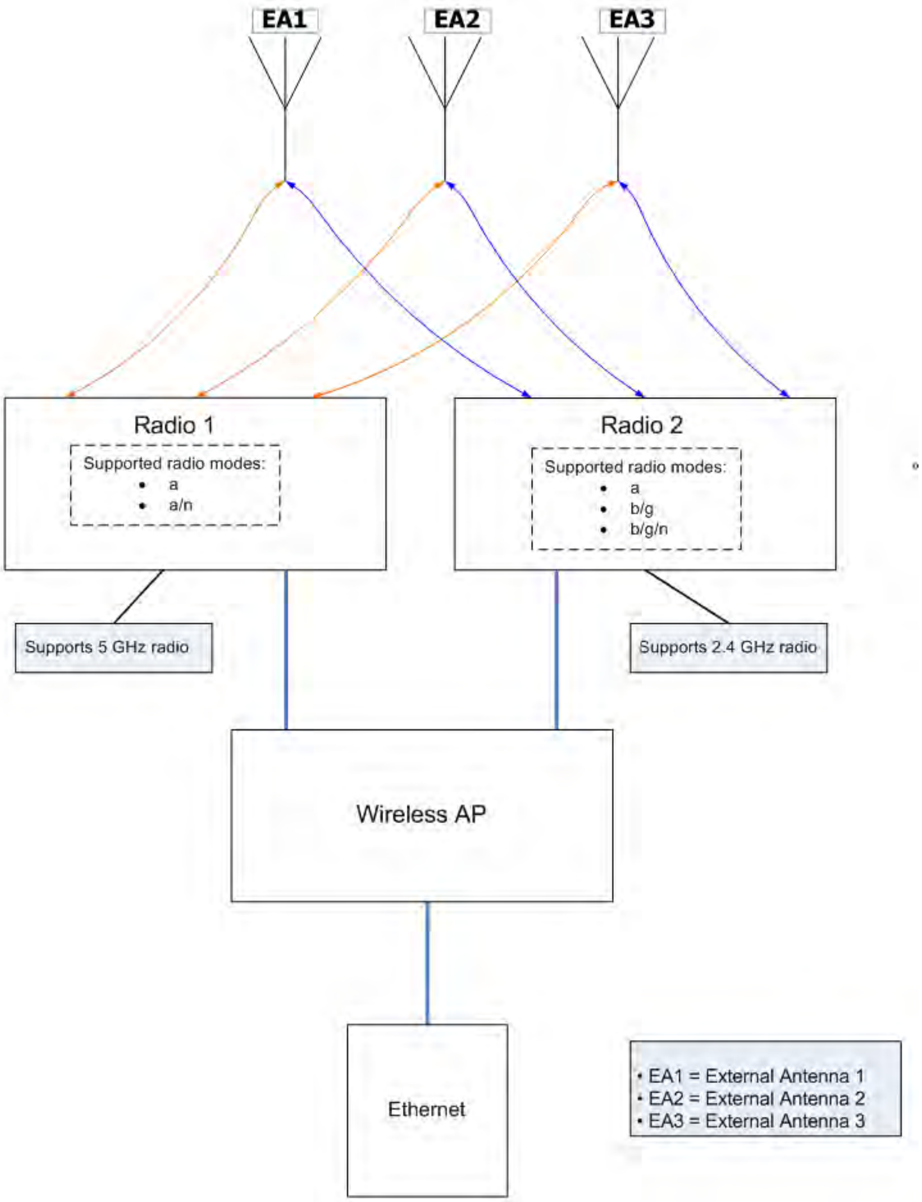


Figure 3-3 illustrates the following:

- The Enterasys Wireless 802.11n AP has two radios — **Radio 1** and **Radio 2**.
- **Radio 1** supports the 5 GHz radio, with radio modes **a**, **a/n,** and **n-strict**.
- **Radio 2** supports the 2.4 GHz radio, with radio modes **b**, **g**, **b/g**, **b/n**, **b/g/n,** and **n-strict**.
- **Radio 1** and **Radio 2** are connected to all three antennas — EA1, EA2, and EA3

5 GHz radio supporting the 802.11a/n standard — When in legacy 802.11a mode, the AP36xx supports data rates up to 54Mbps, identical to the AP26xx. The modulation used is OFDM. In 802.11n mode there are two supported channel bandwidths, 20MHz and 40MHz. The 802.11n AP supports up to 300Mbps in 40MHz channels and 130Mbps in 20MHz channels. The modulation used is MIMO-OFDM with one or two spatial streams.

2.4 GHz radio supporting the 802.11b/g/n standard — When in legacy 802.11b/g mode, the AP36xx APs support data rates up to 54Mbps, identical to the AP26xx APs. The modulation used is OFDM for 11g and CCK for 11b. In 802.11n mode there are two supported channel bandwidths, 20MHz and 40MHz. The AP36xx APs support up to 300Mbps in 40MHz channels and 130Mbps in 20MHz channels. The modulation used is MIMO-OFDM with one or two spatial streams.

The radios are enabled or disabled through the Enterasys Wireless Assistant. For more information, see "Modifying Wireless 802.11n AP 3605/3610/3620/3660/W78xC Radio Properties" on page 3-38.

The Unlicensed National Information Infrastructure (U-NII) bands all lie within the 5-GHz band, designed for short-range, high-speed, wireless networking communication.

The 802.11n AP supports the full range of frequencies available in the 5GHz band:

- 5150 to 5250 MHz - U-NII Low band
- 5250 to 5350 MHz - U-NII Middle Band
- 5470 to 5700 MHz - U-NII Worldwide
- 5725 to 5825 MHz - U-NII High Band

Note: The Wireless 802.11n AP can achieve link rates of up to 300Mbps. To achieve this level of high link rates, specific items need to be configured through the Enterasys Wireless Controller. For more information, see "Achieving High Throughput with the Wireless 802.11n AP" on page 3-50.

Wireless AP International Licensing

The Wireless AP must be configured to operate on the appropriate radio band in accordance with the regulations of the country in which it is being used. For more information, see Appendix B.

To configure the appropriate radio band according to the country of operation, use the Enterasys Wireless Controller. For more information, see "Configuring Wireless AP Settings" on page 3-29.

Wireless AP Default IP Address and First-time Configuration

The Wireless APs are shipped from the factory with a default IP address — 192.168.1.20. The default IP address simplifies the first-time IP address configuration process for Wireless APs. If the Wireless AP fails in its discovery process, it returns to its default IP address. This Wireless AP behavior ensures that only one Wireless AP at a time can use the default IP address on a subnet. For more information, see "Discovery and Registration Overview" on page 3-10.

The Wireless APs can acquire their IP addresses by one of two methods:

- **DHCP assignment** — When the Wireless AP is powered on, it attempts to reach the DHCP server on the network to acquire the IP address. If the Wireless AP is successful in reaching the DHCP server, the DHCP server assigns an IP address to the Wireless AP.
  - If the DHCP assignment is not successful in the first 60 seconds, the Wireless AP returns to its default IP address.
  - The Wireless AP waits for 30 seconds in default IP address mode before again attempting to acquire an IP address from the DHCP server.
  - The process repeats itself until the DHCP assignment is successful, or until an administrator assigns the Wireless AP an IP address, using static configuration.

Note: DHCP assignment is the default method for the Wireless AP configuration. DHCP assignment is part of the discovery process. For more information, see "Discovery and Registration Overview" on page 3-10.

- **Static configuration** — You can assign a static IP address to the Wireless AP, using the static configuration option. For more information, see the following section.

Note: You can establish a telnet or SSH session with the Wireless AP during the time window of 30 seconds when the Wireless AP returns to its default IP address mode. If a static IP address is assigned during this period, you must reboot the Wireless AP for the configuration to take effect. For more information, see "Assigning a Static IP Address to the Wireless AP" on page 3-10.

Assigning a Static IP Address to the Wireless AP

Depending upon the network condition, you can assign a static IP address to the Wireless AP using the Enterasys Wireless Assistant (Controller's GUI). Refer to "Setting Up the Wireless AP Using Static Configuration" on page 3-61 for more information.

Discovery and Registration Overview

When the Wireless AP is powered on, it automatically begins a discovery process to determine its own IP address and the IP address of the Enterasys Wireless Controller. When the discovery process is successful, the Wireless AP registers with the Enterasys Wireless Controller.

Warning: Only use power supplies that are recommended by Enterasys. For example, for the Wireless 802.11n AP use WS-PS361020-MR (AP3610/AP3620 AC Power Supply-Multi-Region).

Wireless AP Discovery

Wireless APs discover the IP address of a Enterasys Wireless Controller using a sequence of mechanisms that allow for the possible services available on the enterprise network. The discovery process is successful when the Wireless AP successfully locates a Enterasys Wireless Controller to which it can register.

Ensure that the appropriate services on your enterprise network are prepared to support the discovery process. The following steps summarize the discovery process:

1. Use the IP address of the Enterasys Wireless Controller to which the AP last connected successfully

   Once a Wireless AP has successfully registered with a Enterasys Wireless Controller, it recalls that controller's IP address, and uses that address on subsequent reboots. The Wireless AP bypasses discovery and goes straight to registration.

   If this discovery method fails, it cycles through the remaining steps.

2. Use the predefined static IP addresses for the Enterasys Wireless Controllers on the network (if configured).

   You can specify a list of static IP addresses of the Enterasys Wireless Controllers on your network. On the **Static Configuration** tab, add the addresses to the **Wireless Controller Search List**.

Caution: Wireless APs configured with a static Wireless Controller Search List can only connect to Enterasys Wireless Controllers in the list. Improperly configured Wireless APs cannot connect to a non-existent Enterasys Wireless Controller address, and therefore cannot receive a corrected configuration.

3. Use Dynamic Host Configuration Protocol (DHCP) Option 60 to query the DHCP server for available Enterasys Wireless Controllers. The DHCP server will respond to the Wireless AP with Option 43, which will list the available Enterasys Wireless Controllers.

   For the DHCP server to respond to a Wireless AP’s Option 60 request, you must configure the DHCP server with the vendor class identifier (VCI) for each Wireless AP. You must also configure the DHCP server with the IP addresses of the Enterasys Wireless Controllers. For more information, refer to Enterasys Wireless Convergence Software *Getting Started Guide*.

4. Use a Domain Name Server (DNS) lookup for the host name Controller.domain-name.

   The Wireless AP tries the DNS server if it is configured in parallel with SLP unicast and SLP multicast.

   If you use this method for discovery, place an A record in the DNS server for Controller.<domain-name>. The <domain-name> is optional, but if used, ensure it is listed with the DHCP server.

5. Use a multicast SLP request to find SLP SAs

   The Wireless AP sends a multicast SLP request, looking for any SLP Service Agents providing the Enterasys service.

   The Wireless AP will try SLP multicast in parallel with other discovery methods.

6. Use DHCP Option 78 to locate a Service Location Protocol (SLP) Directory Agent (DA), followed by a unicast SLP request to the Directory Agent.

   To use the DHCP and unicast SLP discovery method, you must ensure that the DHCP server on your network supports Option 78 (DHCP for SLP RFC2610). The Wireless APs use this method to discover the Enterasys Wireless Controller.

   This solution takes advantage of two services that are present on most networks:

   – **DHCP** — The standard is a means of providing IP addresses dynamically to devices on a network.

   – **SLP —** A means of allowing client applications to discover network services without knowing their location beforehand. Devices advertise their services using a Service Agent (SA). In larger installations, a Directory Agent (DA) collects information from SAs and creates a central repository (SLP RFC2608).

   The Enterasys Wireless Controller contains an SLP SA that, when started, queries the DHCP server for Option 78 and if found, registers itself with the DA as service type Enterasys. The Enterasys Wireless Controller contains a DA (SLPD).

   The Wireless AP queries DHCP servers for Option 78 to locate any DAs. The Wireless APs’ SLP User Agent then queries the DAs for a list of Enterasys SAs.

   Option 78 must be set for the subnets connected to the ports of the Enterasys Wireless Controller and the subnets connected to the Wireless APs. These subnets must contain an identical list of DA IP addresses.

Registration After Discovery

Any of the discovery steps 2 through 6 can inform the Wireless AP of a list of multiple IP addresses to which the Wireless AP may attempt to connect. Once the Wireless AP has discovered these addresses, it sends out connection requests to each of them. These requests are sent simultaneously. The Wireless AP will attempt to register only with the first which responds to its request.

When the Wireless AP obtains the IP address of the Enterasys Wireless Controller, it connects and registers, sending its serial number identifier to the Enterasys Wireless Controller, and receiving from the Enterasys Wireless Controller a port IP address and binding key.

Once the Wireless AP is registered with a Enterasys Wireless Controller, you must configure the Wireless AP. After the Wireless AP is registered and configured, you can assign it to one or more Virtual Network Services (VNS) to handle wireless traffic.

Default Wireless AP Configuration

Default Wireless AP configuration acts as a configuration template that can be automatically assigned to new registering Wireless APs. The default Wireless AP configuration allows you to specify common sets of radio configuration parameters and VNS assignments for Wireless APs. For more information, see "Configuring the Default Wireless AP Settings" on page 3-76.

Understanding the Wireless AP LED Status

When you power on and boot the Wireless AP, you can follow its progress through the registration process by observing the LED sequence as described in the following sections:

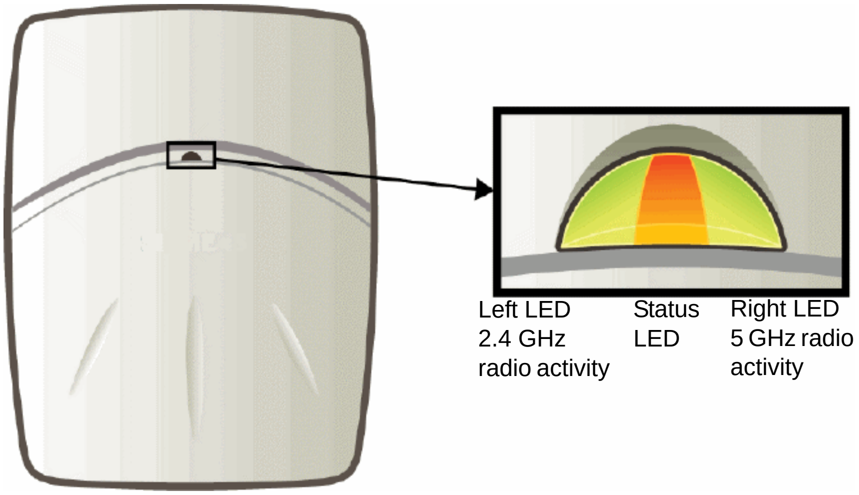
- Enterasys Wireless AP LED Status
- Enterasys Wireless Outdoor AP3660 LED Indicators
- Enterasys Wireless Outdoor AP2660 LED Status
- Enterasys Wireless 802.11n AP LED Status
- AP4102 and AP2605 LED Status

After you power on and boot the Wireless AP for the first time, you can configure LED behavior as described in Configuring Wireless AP LED Behavior.

Enterasys Wireless AP LED Status

The following figure depicts the location of the three LEDs on the Enterasys Wireless AP.

Figure 3-4 Enterasys Wireless AP LEDs



Warning: Never disconnect a Wireless AP from its power supply during a firmware upgrade. Disconnecting a Wireless AP from its power supply during a firmware upgrade may cause firmware corruption rendering the AP unusable.

LED Color Codes

The AP LEDs indicate “normal-operation”, “warning/special”, or “failed” state of the Wireless AP in the following color codes:

- Green — Indicates the normal-operation state.
- Orange/Amber — Indicates the warning, or special state such as WDS.
- Red — Indicates the error state.
- Blinking — Indicates that the state, such as initialization, or discovery is in progress.
- Steady — Indicates that the state is stable/completed. For example, initialization finished, or discovery completed.

Center LED

The Center LED indicates the general status of the Wireless AP:

Table 3-3 Center LED and Wireless AP’s Status

Center LED	Enterasys Wireless AP’s status
Blinking Green	Initialization and discovery in progress via Ethernet link
Blinking Orange/Amber	Initialization and discovery in progress via WDS link
Blinking Red	Error during initialization/discovery process
Solid Red	Irrecoverable error
Solid Green	Discovery finished via Ethernet link
Solid Orange/Amber	Discovery finished via WDS link

Left LED

The Left LED indicates the high-level state of the Wireless AP during the initialization and discovery process:

Table 3-4 Left LED and Wireless AP’s High-level State

Left LED	Enterasys Wireless AP’s high-level state
Off	Initialization
Blinking Green	Network Discovery
Solid Green	Connecting with the Enterasys Wireless Controller

Left and Right LEDs

The Right LED indicates the detailed state during the initialization and discovery processes:

Table 3-5 Left and Right LEDs and Wireless AP’s Detailed State

Left LED	Right LED	Enterasys Wireless AP’s detailed state
Off	Off	Initialization: Power-on self-test (POST)
	Blinking Green	Initialization: Random delay
	Solid Green	Initialization: Vulnerable period

Table 3-5 Left and Right LEDs and Wireless AP’s Detailed State (continued)

Left LED	Right LED	Enterasys Wireless AP’s detailed state
Blinking Green	Off	Network Discovery: 802.1x authentication
	Blinking Green	Network Discovery: Attempting to obtain IP address via DHCP
	Solid Green	Network Discovery: Discovered Enterasys Wireless Controller
Solid Green	Off	Connecting to Enterasys Wireless Controller: Attempting to register with the Enterasys Wireless Controller
	Blinking Green	Connecting to Enterasys Wireless Controller: Upgrading to higher version
	Solid Green	Connecting to Enterasys Wireless Controller: Configuring itself

Composite View of the Three LEDs

The Center, Left and the Right LEDs work in conjunction to indicate the general, high-level state and the detailed state respectively.

Table 3-6 provides a composite view of the three LED lights of the Wireless AP’s state:

Table 3-6 Composite View of Three LED Lights

Left LED	Right LED	Center LED	Enterasys Wireless AP’s Detailed state
Off	Off	Blinking Green	Initialization: Power-on self-test (POST)
	Blinking Green	Blinking Green	Initialization: Random delay
		Blinking Red	Initialization: Neither Ethernet nor WDS link
	Solid Green	Blinking Green	Initialization: Vulnerable period
		Blinking Red	Reset to factory defaults
		Blinking Orange	WDS scanning
Blinking Green	Off	Blinking Green/ Orange	Network discovery: 802.1x authentication
		Blinking Red	Failed 802.1x authentication
	Blinking Green	Blinking Green/ Orange	Network discovery: DHCP
		Blinking Red	Default IP address
	Solid Green	Blinking Green/ Orange	Network discovery: HWC discovery / connect
		Blinking Red	Discovery failed

Table 3-6 Composite View of Three LED Lights (continued)

Left LED	Right LED	Center LED	Enterasys Wireless AP's Detailed state
Solid Green	Off	Blinking Green/ Orange	Connecting with Enterasys Wireless Controller: Registration
		Blinking Red	Registration failed
	Blinking Green	Blinking Green/ Orange	Connecting with Enterasys Wireless Controller: Image upgrade
		Solid Green/ Orange	AP operating normally: Forced image upgrade
		Blinking Red	Image upgrade failed
	Solid Green	Blinking Green/ Orange	Connecting with Enterasys Wireless Controller: Configuration
		Blinking Red	Configuration failed

Note: The Left and Right LEDs turn on after the Center LED. This allows you to distinguish easily between the Center LED and the Left/Right LEDs.

Note: If the Center LED begins blinking RED, it indicates that the Wireless AP's state has failed.

Note: Random delays do not occur during normal reboot. A random delay only occurs after a vulnerable period power-down.

The Wireless AP can be reset to its factory default settings. For more information, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

LEDs Indicating WDS Strength for AP2610 and AP2620

The AP indicates the WDS signal strength as a bar graph. To avoid confusion with startup LED behavior, the patterns go from right to left and an LED is always blinking at least twice as fast as the LEDs in normal mode.

Table 3-7 illustrates the behavior of the three LED lights of the Wireless AP's WDS strength.

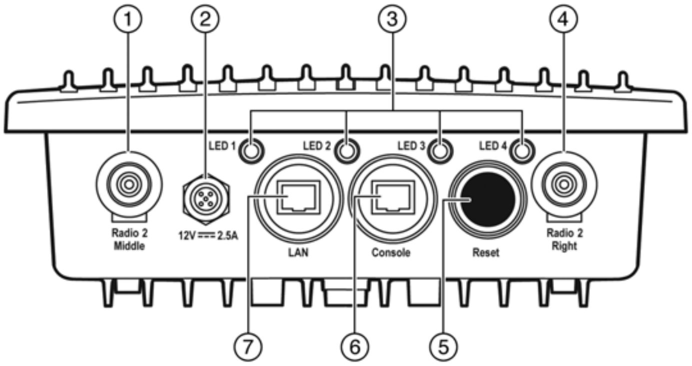
Table 3-7 AP2610 and AP2620 LEDs Indicating Signal Strength

RSS (dBm)	Left LED	Middle LED	Right LED
RSS ≤ -84	Off	Off	Blinking green
-84 < RSS ≤ -77	Off	Off	Fast Blinking green
-77 < RSS ≤ -70	Off	Blinking green	Solid green
-70 < RSS ≤ -63	Blinking green	Solid green	Solid green
RSS < -63	Fast Blinking green	Solid green	Solid green

Enterasys Wireless Outdoor AP3660 LED Indicators

The AP3660 provides four LED indicators (see Figure 3-5). The LEDs provide status information (see Table 3-8 on page 3-16) on the current state of the AP3660.

Figure 3-5 AP3660 Bottom View



1	Radio 2 - Middle Antenna	**5**	Reset Switch
2	12V DC Connector	**6**	Console Port (RJ45)
3	Status LEDs	**7**	LAN Port (RJ45)
4	Radio 2 - Right Antenna		

Note: The AP3660 provides six external antenna ports. The network administrator determines which antenna port will be used based on the external antenna selected. The AP3660 can also be configured to select the antenna that provides the best possible data transmission (diversity).

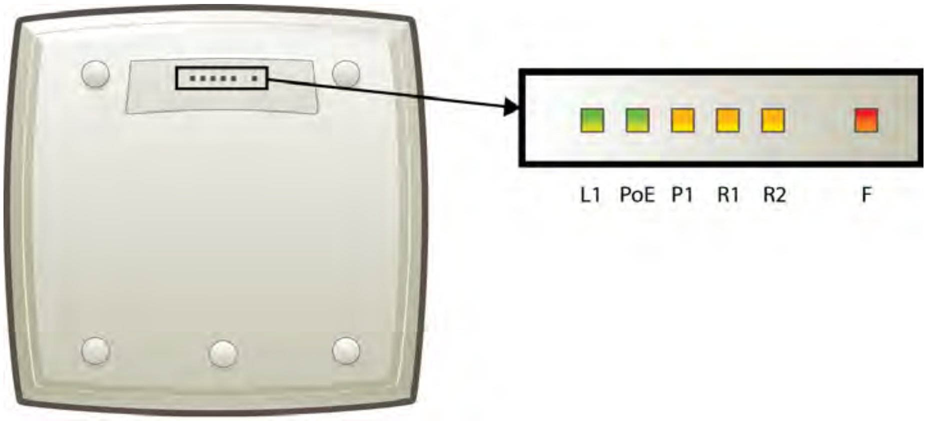
Table 3-8 AP3660 LED Status Indicators

LED	Status	Description
1 (Power)	On Green	Indicates the AP3660 is working normally.
	Flashing Green	Indicates: • running a self test • loading software program
	On Red	Indicates a CPU or system failure.
2 (Ethernet Link)	On Blue	Indicates a valid 1Gbps Ethernet link.
	On Green	Indicates a valid 100Mbps Ethernet link.
	On Red	Indicates a valid 10Mbps Ethernet link.
3 (Wireless Link)	On Green	Indicates Radio 1 (5GHz) is enabled.
	Flashing Green	Indicates the AP3660 is transmitting or receiving data.
4 (Wireless Link)	On Green	Indicates Radio 2 (2.4GHz) is enabled.
	Flashing Green	Indicates the AP3660 is transmitting or receiving data.

Enterasys Wireless Outdoor AP2660 LED Status

The following figure depicts the location of the LEDs on the Enterasys Wireless Outdoor AP.

Figure 3-6 Enterasys Wireless Outdoor AP LEDs



The R1, R2 and F LEDs work in conjunction to indicate the general, high-level and detailed state respectively. The remaining LEDs indicate link status.

Table 3-9 provides a composite view of the R1, R2 and F LEDs:

Table 3-9 Enterasys Wireless Outdoor AP LED Status

R1 LED	R2 LED	F LED	Enterasys Wireless Outdoor AP's detailed status
Off	Off	Blinking Red	Initialization: Power-on-self test (POST)
	Blinking Green	Blinking Red	Initialization: Random delay
	Solid Green	Blinking Red	Initialization: Vulnerable Period
		Solid Red	Reset to factory defaults
	Solid Green	Blinking Red	WDS scanning
Blinking Green/ Yellow	Off	Blinking Red	Network discovery: 802.1x authentication
		Solid Red	Failed 802.1x authentication
	Blinking Green/ Yellow	Blinking Red	Network discovery: DHCP
		Solid Red	Default IP address
	Solid Green/ Yellow	Blinking Red	Network discovery: HWC discovery/connect
		Solid Red	Discovery failed

Table 3-9 Enterasys Wireless Outdoor AP LED Status (continued)

R1 LED	R2 LED	F LED	Enterasys Wireless Outdoor AP's detailed status
Solid Green	Off	Blinking Red	Connecting with HWC: Registration
		Solid Red	Registration failed
	Blinking Green/ Yellow	Blinking Red	Connecting with HWC: Image upgrade
		Solid Red	Image upgrade failed
	Solid Green/ Yellow	Blinking Red	Connecting with HWC: Configuration
		Solid Red	Configuration failed
	Blinking Green/ Yellow	Off	AP operating and running normally: Forced image upgrade
		Solid Red	Image upgrade failed

Note: After discovery is finished, the Left and Right LEDs will be Green for Ethernet uplink, and Yellow for WDS uplink.

Note: If a fatal AP error occurs, the Status LED will be solid Red.

LEDS Indicating WDS Strength for AP2650 and AP2660

The AP indicates the WDS signal strength as a bar graph. To avoid confusion with startup LED behavior, the patterns go from right to left and an LED is always blinking at least twice as fast as the LEDs in normal mode.

Table 3-10 illustrates the behavior of the LED in WDS Signal Strength for AP models AP2650 and AP2660.

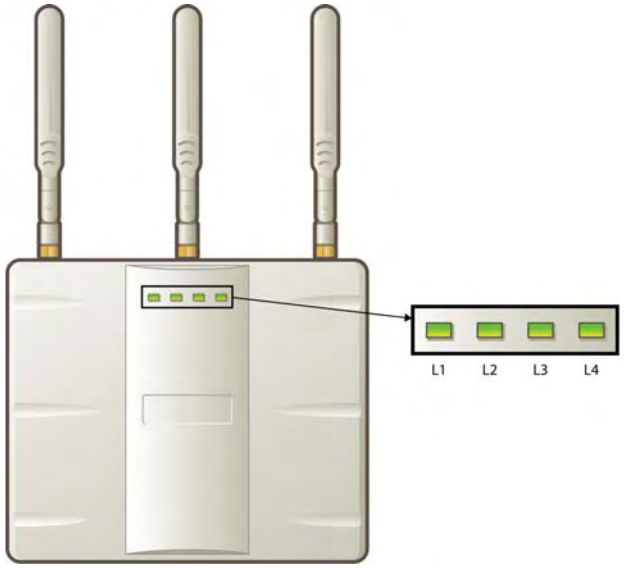
Table 3-10 AP2650 and AP2660 LEDs Indicating Signal Strength

RSS (dBm)	LED					
	L1	**PoE**	**P1**	**R1**	**R2**	**F**
RSS ≤ -84	Off	Off	Off	Off	Off	Blinking green
-84 < RSS ≤ -77	Off	Off	Off	Off	Off	Fast Blinking green
-77 < RSS ≤ -70	Off	Off	Off	Off	Blinking green	Solid green
-70 < RSS ≤ -63	Off	Off	Off	Blinking green	Solid green	Solid green
-63 < RSS ≤ -56	Off	Off	Blinking green	Solid green	Solid green	Solid green
-56 < RSS ≤ -49	Off	Blinking green	Solid green	Solid green	Solid green	Solid green
-49 < RSS ≤ -42	Blinking green	Solid green	Solid green	Solid green	Solid green	Solid green
RSS < -42	Fast Blinking green	Solid green	Solid green	Solid green	Solid green	Solid green

Enterasys Wireless 802.11n AP LED Status

Figure 3-7 depicts the location of the LEDs on the Enterasys Wireless 802.11n.

Figure 3-7 Enterasys Wireless 802.11n AP LEDs



LEDs L1, L3, and L4 work in conjunction to indicate the general, high-level, and detailed state respectively. LED L2 indicates the status of the Ethernet port.

After initialization and discovery is completed and the 802.11n AP is connected to the Enterasys Wireless Controller, LEDs L3 and L4 indicate the state of the corresponding radio — L3 for Radio 5 GHz, and L4 for Radio 2.4 GHz.

LEDs Color Codes

The 802.11n AP LEDs indicate "normal-operation", "warning/special", or "failed" state of the Wireless AP in the following color codes:

Table 3-11 LED Color Codes

LED Color/State	Description
Green	Normal operational state.
Orange/amber	Warning or special state, such as WDS.
Blinking	AP state, such as initialization or discovery, is in progress.
Red	Error state
Steady color	AP state is stable; process is completed. For example, initialization is finished or discovery completed.

LED L1

LED L1 indicates the general state of the 802.11n AP:

Table 3-12 LED L1 and Wireless AP's Status

L1	Enterasys Wireless 802.11n AP's general state
Blink Green	Initialization and discovery in progress via Ethernet

Table 3-12 LED L1 and Wireless AP's Status (continued)

L1	Enterasys Wireless 802.11n AP's general state
Blink Amber	Initialization and discovery in progress via WDS
Blink Red	Error during initialization and discovery
Solid Green	Discovery finished via Ethernet
Solid Amber	Discovery finished via WDS

LEDs L3 and L4

LEDs L3 and L4 indicate the detailed state of the Wireless AP. LEDs L1, L3, and L4 work in conjunction to indicate the general and detailed state of the 802.11n AP.

Table 3-13 provides a composite view of the three LEDs and the corresponding state of the 802.11n AP:

Table 3-13 LEDs L3, L4 and L1, and Wireless 802.11n AP's Detailed State

L3	L4	L1	Enterasys Wireless 802.11n AP's detailed state
Off	Off	Blink Green	Initialization: Power-on self test (POST)
	Blink Green	Blink Green	
		Blink Red	
	Solid Green	Blink Green	
		Blink Red	
		Blink Amber	
Blink Green	Off	Blink Green / Orange	Network discovery: 802.1x authentication
		Blink Red	Failed 802.1x authentication
	Blink Green	Blink Green / Amber	Network discovery: DHCP
		Blink Red	Default IP address
	Solid Green	Blink Green / Amber	Network discovery: HWC discovery / connect
		Blink Red	Discovery failed
Solid Green	Off	Blink Green / Amber	Connecting to HWC: Registration
		Blink Red	Registration failed
	Blink Green	Blink Green Amber	Connecting to HWC: Image upgrade
		Solid Green / Amber	AP operating normally: Forced image upgrade
		Blink Red	Image upgrade failed
	Solid Green	Blink Green / Amber	Connecting to HWC: Configuration
		Blink Red	Configuration failed

After initialization and discovery is completed and the 802.11n AP is connected to the Enterasys Wireless Controller, the LEDs L3 and L4 indicate the state of the corresponding radio — L3 for Radio 5 GHz, and L4 for Radio 2.4 GHz.

Figure 3-14 provides a view of the LEDs L3 and L4 and the corresponding radio state after the discovery is completed.

Table 3-14 LEDs L3 and L4, and Corresponding Radio State

L3/L4	Radio status
Off	Radio off
Solid Blue	Radio in HT mode
Solid Green	Radio in legacy mode

LED L2

The LED L2 indicates the status of the Ethernet port:

Table 3-15 LED L2 and Ethernet Port's Status

L2	Ethernet port's status
Off	No Ethernet connection: WDS is enabled
Solid Blue	1 Gb Ethernet connection
Solid Green	100 Mb Ethernet connection
Solid Amber	10 Mb Ethernet connection

Note: A 10 Mb Ethernet connection is considered a warning state since it is not sufficient to sustain a single radio in the legacy 11g or 11a modes.

LEDS Indicating WDS Strength for AP3610 and AP3620

The AP indicates the WDS signal strength as a bar graph. To avoid confusion with startup LED behavior, the patterns go from right to left and an LED is always blinking at least twice as fast as the LEDs in normal mode.

Table 3-16 illustrates the behavior of the LED behavior in WDS Signal Strength mode for AP models AP3610 and AP3620.

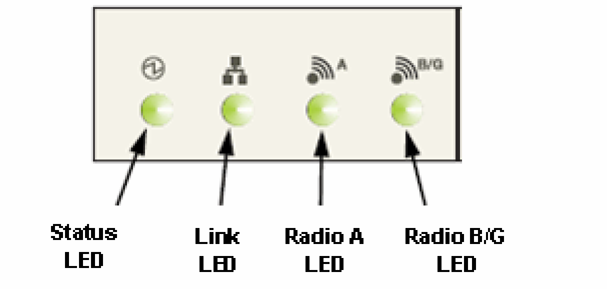
Table 3-16 AP3610 and AP3620 LEDs Indicating Signal Strength

	LED			
RSS (dBm)	L1	L2	L3	L4
RSS ≤ -84	Off	Off	Off	Blinking green
-84 < RSS ≤ -77	Off	Off	Off	Fast Blinking green
-77 < RSS ≤ -70	Off	Off	Blinking green	Solid green
-70 < RSS ≤ -63	Off	Blinking green	Solid green	Solid green
-63 < RSS ≤ -56	Blinking green	Solid green	Solid green	Solid green
RSS < -56	Fast Blinking green	Solid green	Solid green	Solid green

Note: The LEDs on the AP3605 do not indicate WDS signal strength.

AP4102 and AP2605 LED Status

The following figure shows the LEDs on the AP4102 and AP2605 Access Points.



Status LED

The Status LED indicates the general status of the access point.

Table 3-17 AP4102 and AP2605 Status Indicators

Status LED	AP Status
Blink green	Initialization and discovery in progress via Ethernet or WDS link
Blink amber	Error during initialization and discovery
Solid green	Discovery finished via Ethernet or WDS link

Radio B/G LED

The Radio B/G LED will show the general high-level state during initialization and discovery for the access point.

Table 3-18 AP4102 and AP2605 Initialization and Discovery Indicators

Radio B/G LED	AP High-Level State
Off	Initialization
Blink green	Network discovery
Solid green	Connecting with Enterasys Wireless Controller

Composite View of LEDs

The following table summarizes all LEDs during the initialization and discovery.

These states will be shown together with a status LED blinking green or orange. If the status LED is blinking green, the state will be the one executed by the AP in that moment. If the status LED is blinking orange, the state will be the one that the AP failed.

The status and radio LEDs will blink with 1/3 pulse width, but the radio LEDs will turn on after the status LED. This solution also allows the user to distinguish easily between the status LED and the radio LEDs.

Table 3-19 AP4102 and AP2605 Composite View of LEDs

Radio B/G LED	Radio A LED	Status LED	AP Detailed State
Off	Off	Blink green	Initialization: Power-on self test (POST)
	Blink green	Blink green	Initialization: Random delay
		Blink orange	Initialization: No Ethernet nor WDS link
	Solid green	Blink green	Initialization: Vulnerable period
		Blink orange	Reset to factory defaults
	Solid green	Blink green	WDS scanning
Blink green	Off	Blink green	Network discovery: 802.1x authentication
		Blink orange	Failed 802.1x authentication
	Blink green	Blink green	Network discovery: DHCP
		Blink orange	Default IP address
	Solid green	Blink green	Network discovery: HWC discovery / connect
		Blink orange	Discovery failed
Solid Green	Off	Blink green	Connecting with HWC: Registration
		Blink orange	Registration failed
	Blink green	Blink green	Connecting with HWC: Image upgrade
		Blink orange	Image upgrade failed
	Solid green	Blink green	Connecting with HWC: Configuration
		Blink orange	Configuration failed
	Blink green	Solid green	AP up and running: Forced image upgrade
		Blink orange	Image upgrade failed

LEDs Indicating WDS Strength for AP4102 and AP2605

The AP indicates the WDS signal strength as a bar graph. To avoid confusion with startup LED behavior, the patterns go from right to left and an LED is always blinking at least twice as fast as the LEDs in normal mode.

Table 3-20 illustrates the LED behavior in WDS Signal Strength mode for AP models AP4102 and AP2605.

Table 3-20 AP4102 and AP2605 LEDs Indicating Signal Strength

RSS (dBm)	LED			
	Status	Link	Radio A	Radio B/G
RSS ≤ -84	Off	Eth state	Off	Blinking green
-84 < RSS ≤ -77	Off	Eth state	Off	Fast Blinking green
-77 < RSS ≤ -70	Off	Eth state	Blinking green	Solid green
-70 < RSS ≤ -63	Blinking green	Eth state	Solid green	Solid green

Table 3-20 AP4102 and AP2605 LEDs Indicating Signal Strength (continued)

RSS (dBm)	LED			
	Status	**Link**	**Radio A**	**Radio B/G**
RSS < -63	Fast Blinking green	Eth state	Solid green	Solid green

Configuring Wireless AP LED Behavior

You can configure the behavior of the LEDs so that they provide the following information:

Table 3-21 LED Operational Modes

LED Mode	Information Displayed
Off	Displays fault patterns only. LEDs do not light when the AP is fault free and the discovery is complete.
Normal	Identifies the AP status during the registration process during power on and boot process.
Identify	All LEDs blink simultaneously approximately two to four times every second.
WDS Signal Strength	Indicates the WDS signal strength as a bar graph. See Table 3-7, Table 3-10, Table 3-16, and Table 3-20 for a description of LED behavior. This setting helps to align external antennas in WDS deployments by correlating the WDS link RSS with the LED pattern. Use this setting only if the AP operates in WDS mode by being a member of a WDS VNS.

You can configure the AP LED mode when you configure:

- An individual Wireless AP.
- Multiple Wireless APs simultaneously.
- Default Wireless AP behavior.

Note: You can configure all four AP LED modes if you configure an individual Wireless AP or multiple Wireless APs simultaneously. If you configure the default Wireless AP behavior, the only LED modes available are Off and Normal.

To Configure the AP LED Operational Mode When Configuring an Individual Wireless AP:

1. From the top menu, click **Wireless APs**. The Wireless AP screen displays.
2. In the left-hand pane, click **All APs**. The **AP Configuration** page displays with the **AP Properties** tab exposed.
3. In the second column from the left, select the appropriate AP.
4. On the **AP Properties** tab, click the **Advanced** button. The **Advanced** window displays.
5. In the **LED** field, click the arrow and select an LED operational mode. See Table 3-21 for a description of each option.

To Set the AP LED Operational Mode When Using the AP Mulit-edit Feature:

1. From the top menu, click **Wireless APs**. The Wireless AP window displays.
2. In the left-hand pane, click **AP Multi-edit**. The **AP Multi-edit** window displays.

3. In the **Wireless AP** section, select one or more Wireless APs. The **AP Configuration** screen displays.
4. In the **AP Configuration** section, locate the LED field. Click the arrow and select an LED operational mode. See Table 3-21 for a description of each option.

To Set the AP LED Operational Mode When Configuring Default AP Behavior:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Default Settings**. The **AP Default Settings** page displays with the **Common Configuration** tab exposed.
3. Click the AP tab that corresponds to the type of AP that you want to configure. The **AP Properties** and **Radio** settings become available.
4. Click the **Advanced** button. The **Advanced** window displays.
5. In the **LED** field, click the arrow and select an LED operational mode. See Table 3-21 for a description of each option.

Configuring the Wireless APs for the First Time

Before the Wireless AP is configured for the first time, you must first confirm that the following has already occurred:

- The Enterasys Wireless Controller has been set up. For more information, see Chapter 2, **Configuring the Enterasys Wireless Controller**.
- The Enterasys Wireless Controller has been configured. For more information, see Chapter 2, **Configuring the Enterasys Wireless Controller**.
- The Wireless APs have been installed.

If you are installing the Enterasys Wireless AP, see the Enterasys Wireless *AP Installation Instructions*.

- – If you are installing the Enterasys Wireless 802.11n AP, see the Enterasys Wireless 802.11n AP *Installation Instructions*.
- – If you are installing the Enterasys Wireless Outdoor AP, see the Enterasys Wireless *Outdoor AP Installation Instructions* and the Enterasys Wireless *Outdoor AP Installation Guide*.

Once the installations are completed, you can then continue with the Wireless AP initial configuration. The Wireless AP initial configuration involves two steps:

1. Define parameters for the discovery process. For more information, see “Defining Properties for the Discovery Process” on page 3-26.
2. Connect the Wireless AP to a power source to initiate the discovery and registration process. For more information, see “Connecting and Initiating the Wireless AP Discovery and Registration Process” on page 3-28.

Adding a Wireless AP Manually Option

An alternative to the automatic discovery and registration process of the Wireless AP is to manually add and register a Wireless AP to the Enterasys Wireless Controller. For more information, see “Adding and Registering a Wireless AP Manually” on page 3-28.

Defining Properties for the Discovery Process

Before a Wireless AP is configured, you must define the following properties for the discovery process:

- Security Mode
- Discovery Timers

The discovery process is the process by which the Wireless APs determine the IP address of the Enterasys Wireless Controller.

Security Mode

Security mode defines how the Enterasys Wireless Controller behaves when registering new, unknown devices. During the registration process, the Enterasys Wireless Controller’s approval of the Wireless AP’s serial number depends on the security mode that has been set:

- **Allow all Wireless APs to connect**
  - If the Enterasys Wireless Controller does not recognize the registering serial number, a new registration record is automatically created for the AP (if within MDL license limit). The AP receives a default configuration. The default configuration can be the default template assignment.
  - If the Enterasys Wireless Controller recognizes the serial number, it indicates that the registering device is pre-registered with the controller. The controller uses the existing registration record to authenticate the AP and the existing configuration record to configure the AP.
- **Allow only approved Wireless APs to connect (this is also known as secure mode)**
  - If Enterasys Wireless Controller does not recognize the AP, the AP's registration record is created in pending state (if within MDL limits). The administrator is required to manually approve a pending AP for it to provide active service. The pending AP receives minimum configuration, which only allows it to maintain an active link with the controller for future state change. The AP's radios are not configured or enabled. Pending APs are not eligible for configuration operations (VNS Assignment, default template, Radio parameters) until approved.
  - If the Enterasys Wireless Controller recognizes the serial number, the controller uses the existing registration record to authenticate the AP. Following successful authentication, the AP is configured according to its stored configuration record.

Note: During the initial setup of the network, Enterasys recommends that you select the **Allow all** Wireless AP**s to connect** option. This option is the most efficient way to get a large number of Wireless APs registered with the Enterasys Wireless Controller.

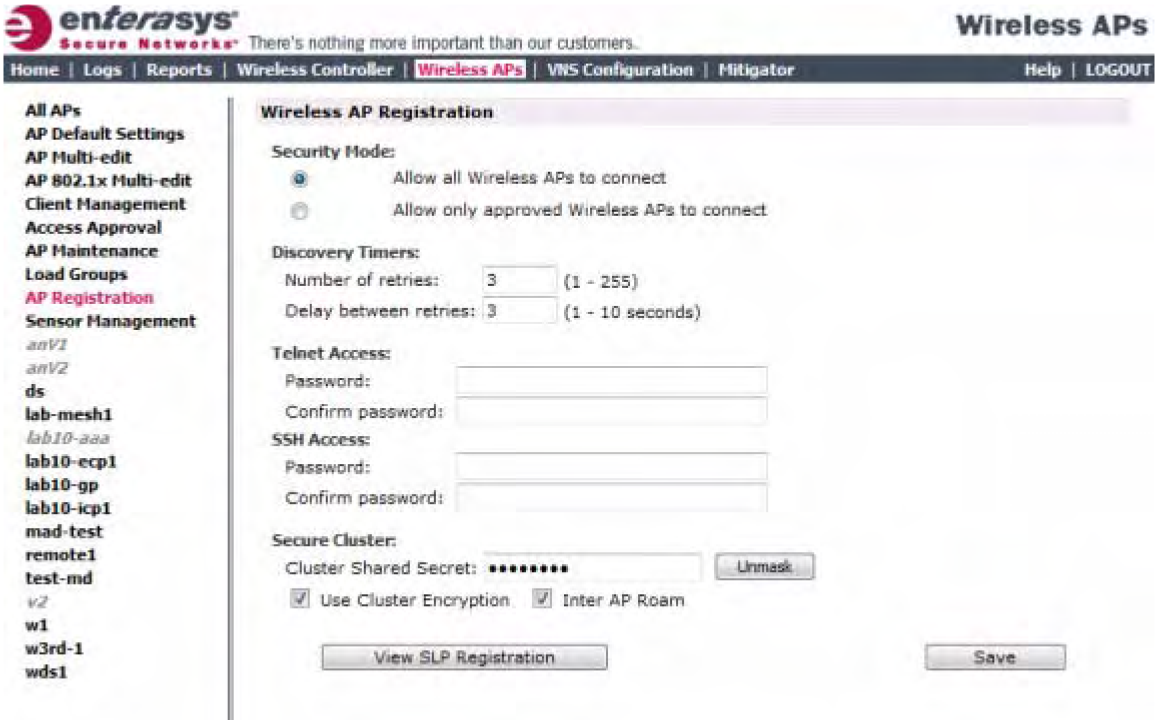
Once the initial setup is complete, Enterasys recommends that you reset the security mode to the **Allow only approved** Wireless AP**s to connect** option. This option ensures that no unapproved Wireless APs are allowed to connect. For more information, see “Configuring Wireless AP Settings” on page 3-29.

Discovery Timers

The discovery timer parameters dictate the number of retry attempts and the time delay between each attempt.

To Define the Discovery Process Parameters:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Registration**. The **Wireless AP Registration** screen is displayed.



Wireless AP Registration

Security Mode:

● Allow all Wireless APs to connect

○ Allow only approved Wireless APs to connect

Discovery Timers:

Number of retries: 3 (1 - 255)

Delay between retries: 3 (1 - 10 seconds)

Telnet Access:

Password:

Confirm password:

SSH Access:

Password:

Confirm password:

Secure Cluster:

Cluster Shared Secret: ••••••••

☑ Use Cluster Encryption ☑ Inter AP Roam

3. In the **Security Mode** section, select one of the following:
   - **Allow all** Wireless AP**s to connect**
   - **Allow only approved Wireless APs to connect**

   The **Allow all** Wireless AP**s to connect** option is selected by default. For more information, see "Security Mode" on page 3-26.
4. In the **Discovery Timers** section, type the discovery timer values in the following boxes:
   - **Number of retries**
   - **Delay between retries**

   The number of retries is limited to 255 for the discovery. The default number of retries is 3, and the default delay between retries is 3 seconds.
5. To save your changes, click **Save**.

Once the discovery parameters are defined, you can connect the Wireless AP to a power source.

Connecting and Initiating the Wireless AP Discovery and Registration Process

When a Wireless AP is powered on, it automatically begins the discovery and registration process with the Enterasys Wireless Controller.

Table 3-22 lists the ways in which Wireless APs can be connected and powered.

Table 3-22 Connecting and Powering a Wireless AP

Wireless AP	Method of Connecting and Powering
Enterasys Wireless AP	• Power over Ethernet (802.3af): – PoE enabled switch port – PoE Injector • Power by AC adaptor
Enterasys Wireless Outdoor AP	• Power over Ethernet (802.3af) – PoE enabled switch port – PoE Injector • Power by 48VDC (Direct Current) • 110-230 VAC (Alternating Current) For more information, see the Enterasys Wireless *Outdoor Access Point Installation Guide.*
Enterasys Wireless 802.11n AP	• Power over Ethernet (802.3af) – PoE enabled switch port – PoE Injector **Note:** Use a 1 GB PoE injector to ensure optimum performance of the Enterasys Wireless 802.11n AP. • Power by AC adaptor

Adding and Registering a Wireless AP Manually

You can manually add and register a Wireless AP to the controller instead of using the automatic discovery and registration. When you manually add and register an AP, the system applies the default settings to the AP. After the system registers the AP, you can go in and edit its configuration settings. For more information, see Configuring Wireless AP Settings.

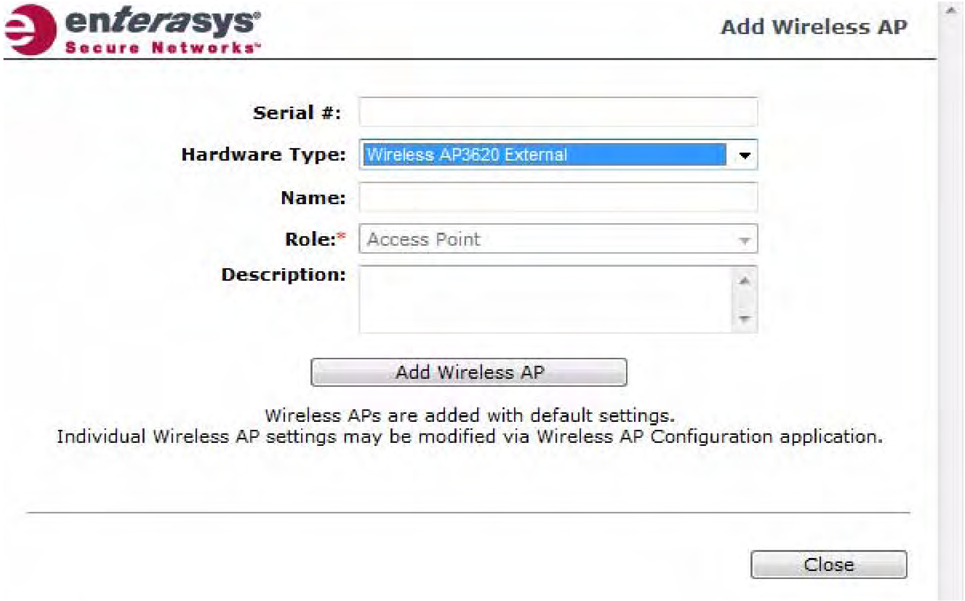
To add and register a Wireless AP manually:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.

   Regardless of the tab you click on, the Add Wireless Button displays at the bottom of the page.

2. Click the **Add Wireless AP** button.

The **Add Wireless AP** screen displays.



Hardware Type: Wireless AP3620 External

Role: Access Point

Wireless APs are added with default settings.
Individual Wireless AP settings may be modified via Wireless AP Configuration application.

Table 3-23 Add Wireless AP window

Field	Description
Serial #	Type the Wireless AP's unique identifier.
Hardware Type	Select the hardware model of this AP from the drop-down menu
Name	Type a unique name for the Wireless AP that identifies the access point. The default value is the Wireless AP's serial number.
Role	Select the role for this AP: access point or sensor. If the hardware type you select only supports the access point role, the items in the drop-down list may be view-only. Not all Wireless AP hardware types support the sensor role. .
Description	Enter a description of this AP.
Add Wireless AP	Click to add the Wireless AP with default settings. You can later modify these settings. When a Wireless AP is added manually, it is added to the controller database only and does not get assigned.
Close	Click to close this window.

Configuring Wireless AP Settings

Wireless APs are added with default settings, which you can adjust and configure according to your network requirements. In addition, you can modify the properties and the settings for each radio on the Wireless AP.

You can also locate and select Wireless APs in specific registration states to modify their settings. For example, this feature is useful when approving pending Wireless APs when there are a large number of other Wireless APs that are already registered. On the **Access Approval** screen, click **Pending** to select all pending Wireless APs, then click **Approve** to approve all selected Wireless APs.

Configuring Wireless AP settings can include the following processes:

- Modifying a Wireless AP's Status
- Configuring a Wireless AP's Properties
- Configuring Wireless AP Radio Properties
- Setting Up the Wireless AP Using Static Configuration
- Setting Up 802.1x Authentication for a Wireless AP

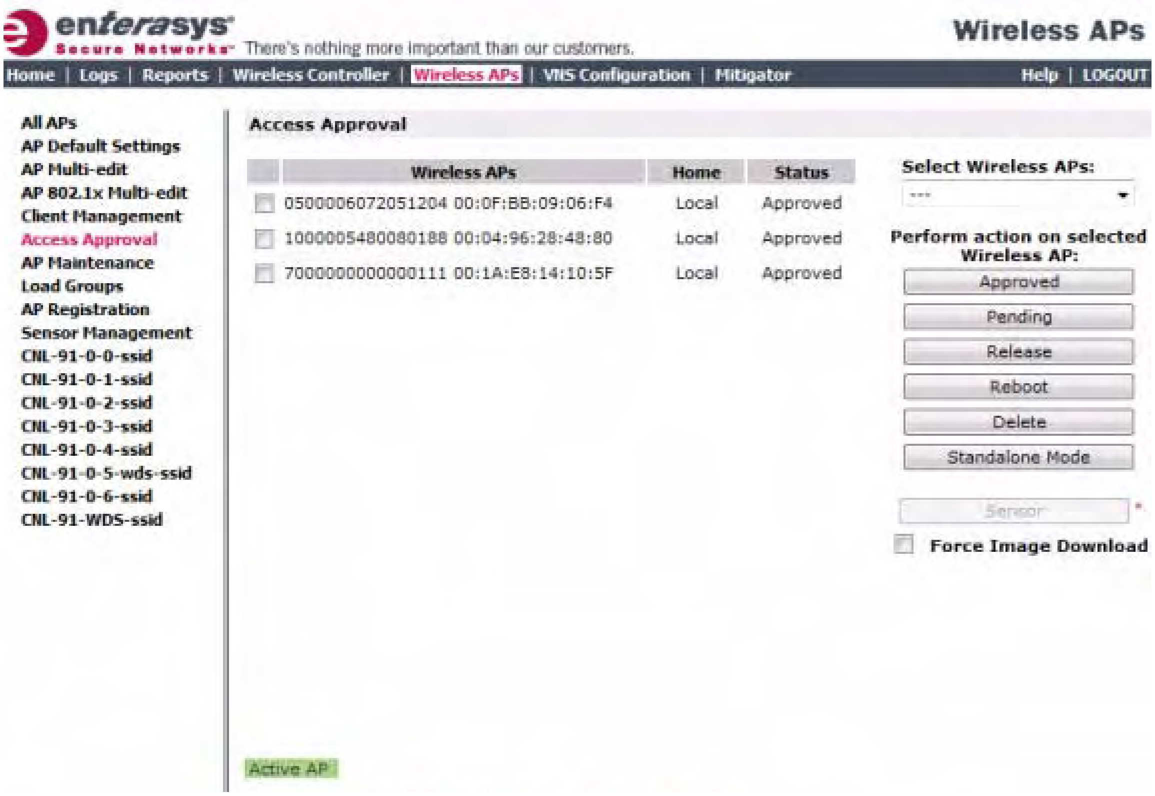
When configuring Wireless APs, you can choose to configure individual Wireless APs or simultaneously configure a group of Wireless APs. For more information, see "Configuring Multiple Wireless APs Simultaneously" on page 3-108.

Modifying a Wireless AP's Status

If during the discovery process, the Enterasys Wireless Controller security mode was **Allow only approved Wireless APs to connect**, then the status of the Wireless AP is Pending. You must modify the security mode to **Allow all Wireless APs to connect**. For more information, see "Security Mode" on page 3-26.

To Modify a Wireless AP's Registration Status:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **Access Approval**. The **Access Approval** screen is displayed, along with the registered Wireless APs and their status.



Access Approval

	Wireless APs	Home	Status
□	0500006072051204 00:0F:BB:09:06:F4	Local	Approved
□	1000005480080188 00:04:96:28:48:80	Local	Approved
□	7000000000000111 00:1A:E8:14:10:5F	Local	Approved

3. To select the Wireless APs for status change, do one of the following:
   - – For a specific Wireless AP, select the corresponding checkbox.
   - – For Wireless APs by category, click one of the **Select** Wireless AP**s** options.

To clear your Wireless AP selections, click **Deselect All**.

4. Click the appropriate **Perform action on selected** Wireless AP**s** option:
   - **Approved** — Change a Wireless AP's status to **Approved** — a Wireless AP's status changes from **Pending** to **Approved** if the **AP Registration** screen was configured to register only approved Wireless APs.
   - **Pending** — AP is removed from the Active list, and is forced into discovery.
   - **Release** — Release foreign Wireless APs after recovery from a failover. Releasing an AP corresponds to the Availability functionality. For more information, see Chapter 11, **Availability and Session Availability**.
   - **Reboot** — Reboot the AP without using Telnet or SSH to access it.
   - **Delete** — Releases the Wireless AP from the Enterasys Wireless Controller and deletes the Wireless AP’s entry in the Enterasys Wireless Controller's management database.
   - **Standalone Mode** — The 802.11n AP running V7.31 or later converts from fit mode to standalone mode. For more information, see “Converting the Wireless AP to Standalone Mode” on page 3-1180.

Configuring a Wireless AP’s Properties

Once a Wireless AP has successfully registered, you can then continue to configure its properties. Configuring Wireless AP properties includes working with the following Wireless AP tabs:

- **AP properties**
- **VNS Assignment**
- **Radio 1**
- **Radio 2**
- **Static Configuration**
- **802.1x**

AP Properties Tab Configuration

Use the **AP Properties** tab to view and configure basic Wireless AP properties. Some of the Wireless AP properties can be viewed and configured via the **Advanced** dialog. The following Wireless AP properties on this tab are read-only:

- **Serial #** — Displays a unique identifier that is assigned during the manufacturing process.
- **Host Name** — This value, which is based on AP **Name**, cannot be directly edited. This value depicts the AP Host-Name value. If the AP **Name** value does begin with a number, for example when it is the AP's serial number, the AP's model is prepended to the value. This value is used for tracking purposes on the DHCP server.
- **Port** — Displays the Ethernet port of the Enterasys Wireless Controller to which the Wireless AP is connected.
- **Hardware Version** — Displays the current version of the Wireless AP hardware.
- **Application Version** — Displays the current version of the Wireless AP software.
- **Status**:
  - **Approved** — Indicates that the Wireless AP has received its binding key from the Enterasys Wireless Controller after the discovery process.

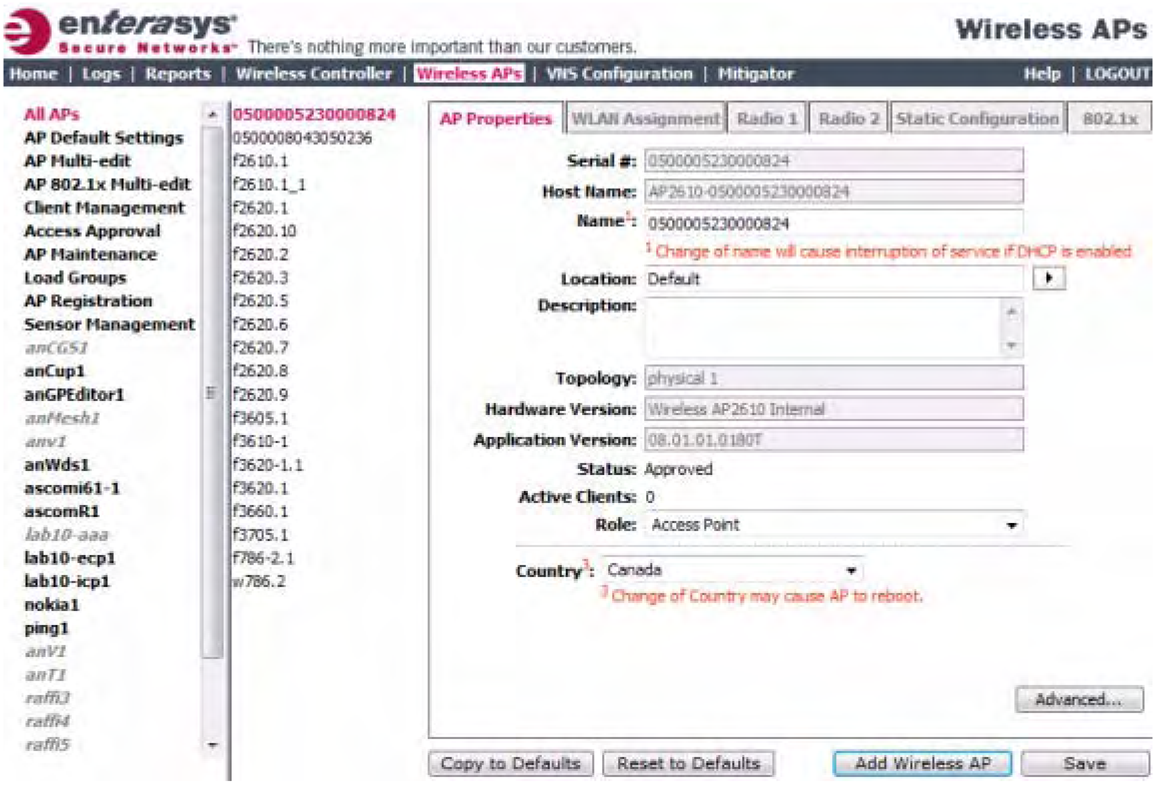
- – If no status is shown, that indicates that the Wireless AP has not yet successfully been approved for access with the secure Enterasys Wireless Controller.

  You can modify the status of a Wireless AP on the **Access Approval** screen. For more information, see "Modifying a Wireless AP's Status" on page 3-30.

- **Active Clients** — Displays the number of wireless devices currently associated with the Wireless AP.

To Modify a Wireless AP's Properties

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP whose properties you want to modify. The **AP Properties** tab displays Wireless AP information.



Serial #: 0500005230000824

Host Name: AP2610-0500005230000824

Name[1]: 0500005230000824

[1] Change of name will cause interruption of service if DHCP is enabled

Location: Default

Description:

Topology: physical 1

Hardware Version: Wireless AP2610 Internal

Application Version: 08.01.01.0180T

Status: Approved

Active Clients: 0

Role: Access Point

Country[1]: Canada

[1] Change of Country may cause AP to reboot.

3. Modify the Wireless AP's information:
   - – **Name** — Type a unique name for the Wireless AP that identifies the access point. The default value is the Wireless AP's serial number.
   - – **Location** — The location of the Wireless AP.
   - – **Description** — Type comments for the Wireless AP.
   - – **AP Environment** — Click the Wireless AP's environment — **Indoor** or **Outdoor**.

Note: The **AP Environment** drop-down is displayed on the **AP Properties** tab only if the selected Wireless AP is the Enterasys Outdoor Wireless AP.
The Enterasys Outdoor Wireless AP can be deployed in both indoor and outdoor environments.

   - – **Country** — Click the country of operation. This option is only available with some licenses.

Note: The antenna you select determines the available channel list and the maximum transmitting power for the country in which the Wireless AP is deployed.

Until you select a real antenna type, the external antenna types are set as follows:

– **No Antenna** — This antenna setting is in place for new external antenna APs added to a new installation or for new external antenna APs added to an existing installation. The radio is off, even if a VNS is configured on the AP/radio.

– **Default** — This antenna setting is in place for existing installations upgraded from pre-V7.21 installations. As long as this setting is in place, you cannot change the **Max Tx Power** setting.

After you select a real antenna, you can set the antenna type back to **No Antenna,** but you cannot set the antenna type back to **Default**.

4. To modify Wireless AP advanced settings, click **Advanced**. The **Advanced** dialog is displayed.

– **Poll Timeout** — Type the timeout value, in seconds, for the Wireless AP to re-establish the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times the **Detect link failure** value on the **AP Properties** screen. For more information, see "Session Availability" on page 11-9.

– **Telnet Access/SSH Access** — Click to enable or disable telnet or access to the Wireless AP.

Note: The name of this field depends on type of Wireless AP that you have selected.

– **Location-based-service** — Enable or disable the AeroScout or Ekahau location-based service for the Wireless AP.

– **Maintain client session in event of poll failure** — Select this option (if using a bridged at AP VNS) if the Wireless AP should remain active if a link loss with the controller occurs.This option is enabled by default.

– **Restart service in the absence of controller** — Select this option (if using a bridged at AP VNS) to ensure the Wireless AP's radios continue providing service if the Wireless AP's connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.

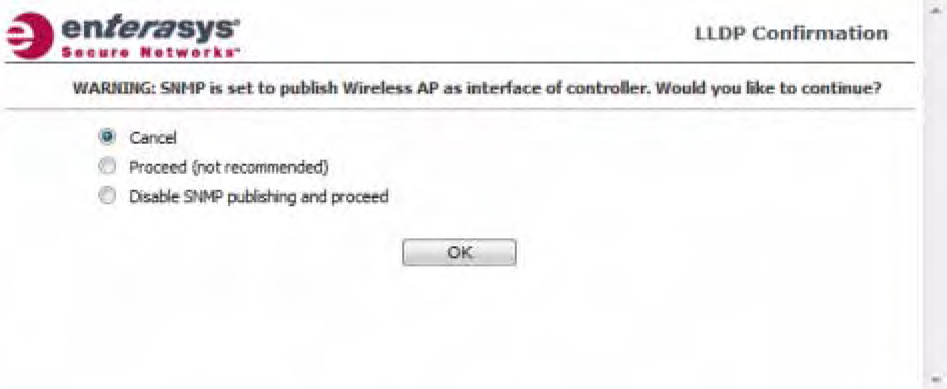
– **Use broadcast for disassociation** — Select this option if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the Wireless AP under the following conditions:

- If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).
- If a BSSID is deactivated or removed on the Wireless AP.

This option is disabled by default.

– **LLDP** — Click to enable or disable the Wireless AP from broadcasting LLDP information. This option is disabled by default.

If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel
○ Proceed (not recommended)
○ Disable SNMP publishing and proceed

– Select one of the following:

  - **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.
  - **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

  For more information on enabling SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

– **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

– **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.

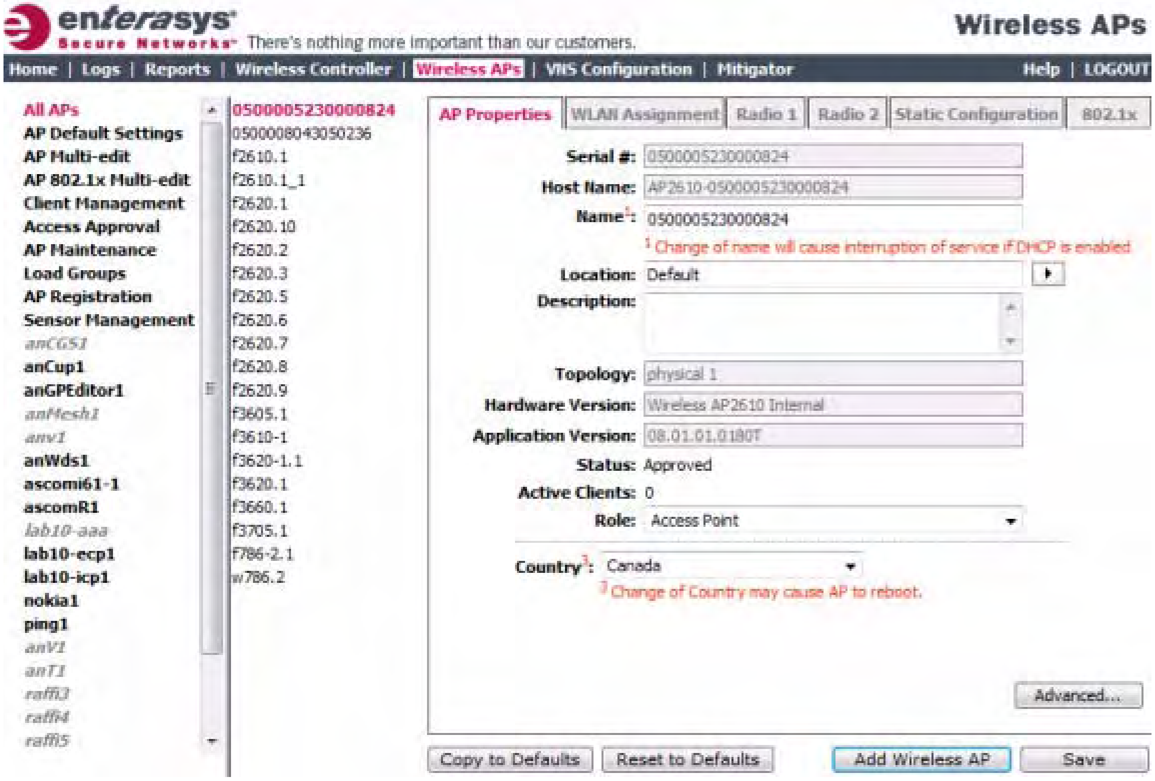
– **Real Capture** — Click **Start** to start real capture server on the AP. This feature can be enabled for each AP individually. Statistics are captured using an external connection to a Windows WireShark client. In Wireshark, by selecting the remote APs' IP address and null authentication, the wired and enabled wireless interfaces are listed as available for capture. Default capture server timeout is set to 300 seconds and the maximum configurable timeout is 1 hour. Capture statistics are found on the Active Wireless APs report (see Viewing Statistics for Wireless APs).

5. Click **Close**. The **Advanced** dialog is closed.
6. To save your changes, click **Save**.

To Modify a Wireless AP's Properties as a Sensor:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.

2. In the Wireless AP list, click the Wireless AP whose properties you want to modify. The **AP Properties** tab displays Wireless AP information.



Serial #: 0500005230000824
Host Name: AP2610-0500005230000824
Name[1]: 0500005230000824
[1] Change of name will cause interruption of service if DHCP is enabled
Location: Default
Description:
Topology: physical 1
Hardware Version: Wireless AP2610 Internal
Application Version: 08.01.01.0180T
Status: Approved
Active Clients: 0
Role: Access Point
Country[1]: Canada
[1] Change of Country may cause AP to reboot.

3. Modify the Wireless AP's information:
   - **Name** — Type a unique name for the Wireless AP that identifies the AP. The default value is the Wireless AP's serial number.
   - **Host Name** — This value, which is be based on AP **Name**, cannot be directly edited. This value depicts the AP Host-Name value. If the AP **Name** value does begin with a number, for example when it is the AP's serial number, the AP's model is prepended to the value. This value is used for tracking purposes on the DHCP server.
   - **Location** — The location of the Wireless AP.
   - **Description** — Type comments for the Wireless AP.
   - **Role** — Click the role for the AP, either **Access Point** or **Sensor**. Once the AP is configured as a **Sensor**, the AP no longer performs RF services and is no longer managed by the Enterasys Wireless Controller. For more information, see "Configuring an AP as a Sensor" on page 3-119.

4. To save your changes, click **Save**.

Assigning Wireless AP Radios to a VNS

There are three methods of assigning Wireless AP radios to a VNS:

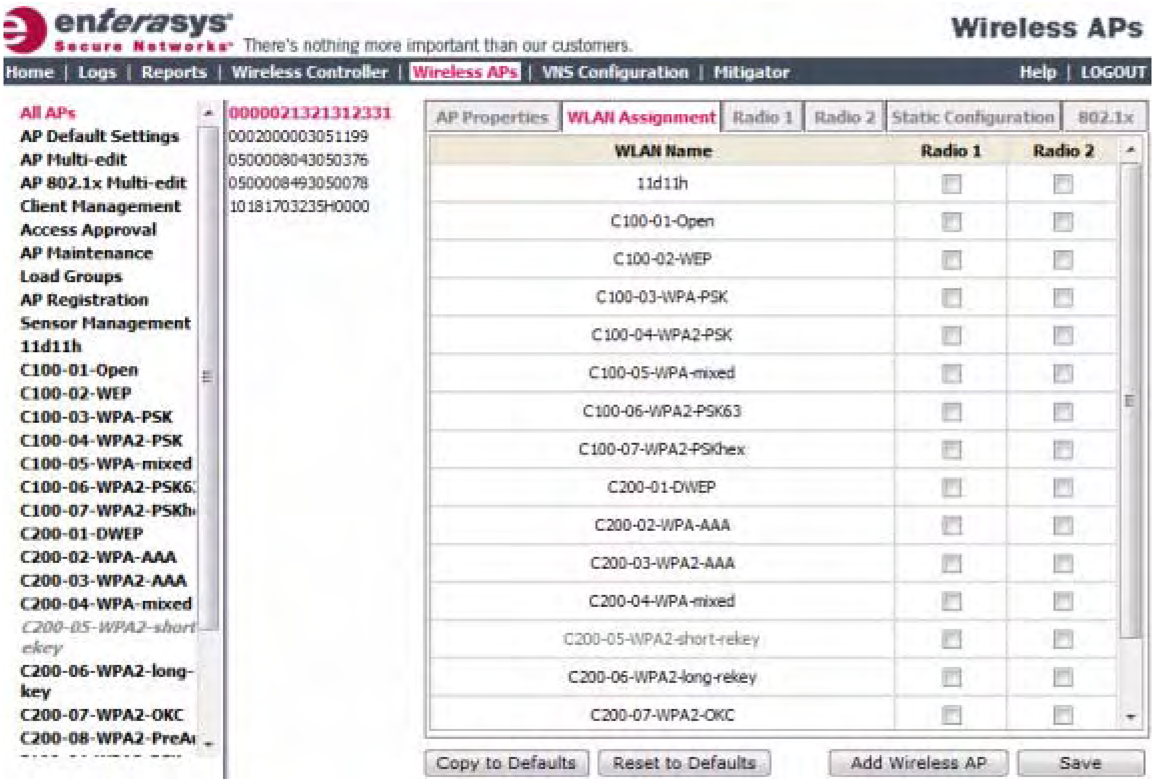
- **VNS configuration** — When a VNS is configured, you can assign Wireless AP radios to the VNS through its associated WLAN Service. For more information, see "Configuring WLAN Services" on page 6-1.

Note: To configure foreign Wireless AP radios to a VNS, use the VNS configuration method. Foreign Wireless APs are only listed and available for VNS assignment from the **WLAN Services** tab. For more information, see Chapter 7, **Configuring a VNS**.

- **AP Multi-edit** — When you configure multiple Wireless APs simultaneously, you can use the AP Multi-edit feature. For more information, see “Configuring Multiple Wireless APs Simultaneously” on page 3-108.
- Wireless AP **configuration** — When you configure an individual Wireless AP, you can assign its radios to a specific WLAN Service.

To Assign Wireless AP Radios When Configuring an Individual Wireless AP:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. Click the appropriate Wireless AP in the list. The **AP Properties** tab is displayed.
3. Click the **WLAN Assignment** tab.



WLAN Name	Radio 1	Radio 2
11d11h	□	□
C100-01-Open	□	□
C100-02-WEP	□	□
C100-03-WPA-PSK	□	□
C100-04-WPA2-PSK	□	□
C100-05-WPA-mixed	□	□
C100-06-WPA2-PSK63	□	□
C100-07-WPA2-PSKhex	□	□
C200-01-DWEP	□	□
C200-02-WPA-AAA	□	□
C200-03-WPA2-AAA	□	□
C200-04-WPA-mixed	□	□
C200-05-WPA2-short-rekey	□	□
C200-06-WPA2-long-rekey	□	□
C200-07-WPA2-OKC	□	□

4. In the **Radio 1** and **Radio 2** columns, select the Wireless AP radios that you want to assign for each WLAN Service.
5. To save your changes, click **Save**.

Configuring Wireless AP Radio Properties

Modifying Wireless AP radio properties can vary significantly depending on the model of the Wireless AP your are configuring:

- For specific information on modifying a Wireless 802.11n AP, see “Modifying Wireless 802.11n AP 3605/3610/3620/3660/W78xC Radio Properties” on page 3-38.
- For specific information on modifying a Wireless AP 2610/2620 or Enterasys Wireless Outdoor AP, see “Modifying Wireless AP 2610/2620 Radio Properties” on page 3-52.

Dynamic Radio Management (DRM)

When you modify a Wireless AP's radio properties, the Dynamic Radio Management (DRM) functionality of the Enterasys Wireless Controller can be used to help establish the optimum radio configuration for your Wireless APs. DRM is enabled by default. The Enterasys Wireless Controller's DRM:

- Adjusts transmit power levels to balance coverage between Wireless APs assigned to the same RF domain and operating on the same channel.
- Scans and coordinates with other Wireless APs to select an optimal operating channel.

The DRM feature consists of three functions:

- **Auto Channel Selection (ACS)** — ACS provides an easy way to optimize channel arrangement based on the current situation in the field. ACS provides an optimal solution only if it is triggered on all Wireless APs in a deployment. Triggering ACS on a single Wireless AP or on a subset of Wireless APs provides a useful but suboptimal solution. Also, ACS only relies on the information observed at the time it is triggered. Once a Wireless AP has selected a channel, it will remain operating on that channel until the user changes the channel or triggers ACS.

  ACS can be triggered by one of the following events:

  – A new Wireless AP registers with the Enterasys Wireless Controller and the **AP Default Settings** channel is **Auto**.

  – A user selects **Auto** from the **Request New Channel** drop-down list on the Wireless AP's radio configuration tabs.

  – A user selects **Auto** from the **Channel** drop-down list on the **AP Multi-edit** screen.

  – If Dynamic Channel Selection (DCS) is enabled in active mode and a DCS threshold is exceeded.

  – A Wireless AP detects radar on its current operating channel and it employs ACS to select a new channel.

  – **Channel Plan** — If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference. Select from the following options:

    Depending on the radio used, when defining a channel plan you can either create your customized channel plan by selecting individual channels or you can select a default 3 or 4 channel plan.

    You can use the channel plan to avoid transmission overlap on 40MHz channels of the Wireless 802.11n APs. To avoid channel overlap between Wireless 802.11n APs that operate on 40MHz channels, configure the channel plan for the 5 GHz radio band to use every other channel available.

    If using half of the available channels is not an option for your environment, do not configure a channel plan. Instead, allow ACS to select from all available channels. This alternate solution may contribute to increased congestion on the extension channels.

Note: ACS in the 2.4GHz radio band with 40MHz channels is not recommended due to severe co-channel interference.

- **Dynamic Channel Selection (DCS)** — DCS allows a Wireless AP to monitor traffic and noise levels on the channel on which the Wireless AP is currently operating. DCS can operate in two modes:
  - **Monitor** — When DCS is enabled in monitor mode and traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. The DCS monitor alarm is used for evaluating the RF environment of your deployed Wireless APs.
  - **Active** — When DCS is enabled in active mode and traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS will be employed to select an alternate channel for the Wireless AP to operate on. DCS will not trigger channel changes on neighboring Wireless APs.

Note: If DCS is enabled, DCS statistics can be viewed in the **Wireless Statistics by Wireless APs** display. For more information, see Chapter 15, **Working with Reports and Displays**.

- **Auto Tx Power Control (ATPC)** — ATPC guarantees your LAN a stable RF environment by automatically adapting transmission power signals according to the coverage provided by the Wireless APs. ATPC can be either enabled or disabled.

  When you disable ATPC, you are given the option of automatically adjusting the Max Tx Power setting to match the Current Tx Power Level. In the case of AP Multi-edit, if you reply yes, then each individual Wireless AP's Max Tx Power setting will be adjusted to correspond with its Current Tx Power Level in the database.

Modifying Wireless 802.11n AP 3605/3610/3620/3660/W78xC Radio Properties

The Wireless 802.11n AP 3605/3610/3620/3660/W78xC are 802.11n-compliant access points. The following section describes how to modify a Wireless 802.11n AP.

For information on how to modify a Wireless AP 2610/2620 or the Enterasys Wireless Outdoor AP, see “Modifying Wireless AP 2610/2620 Radio Properties” on page 3-52.

Channel Bonding

Channel bonding improves the effective throughput of the wireless LAN. In contrast to the Wireless AP 26xx which uses radio channel spacings that are only 20MHz wide, the Wireless 802.11n AP can use two channels at the same time to create a 40MHz wide channel. To achieve a 40MHz channel width, the Wireless 802.11n AP employs channel bonding — two 20MHz channels at the same time.

The 40MHz channel width is achieved by bonding the primary channel (20MHz) with an extension channel that is either 20MHz above (bonding up) or 20MHz below (bonding down) of the primary channel.

Depending on the **Radio**, channel bonding can be predefined:

- **Radio 1** — Bonding pairs are predefined.
- **Radio 2** — Channels can bond up or down as long as the band edge is not exceeded, but some channels have predefined bonding directions.

Channel bonding is enabled by selecting the **Channel Width** on the **Radio** tabs. When selecting **Channel Width**, the following options are available:

- **20MHz** — Channel bonding is not enabled:
  - 802.11n clients use the primary channel (20MHz)

  - Non-802.11n clients, as well as beacons and multicasts, use the 802.11a/b/g radio protocols.

- **40MHz** — Channel bonding is enabled:
  - 802.11n clients that support the 40MHz frequency can use 40MHz, 20MHz, or the 802.11a/b/g radio protocols.
  - 802.11n clients that do not support the 40MHz frequency can use 20MHz or the 802.11a/b/g radio protocols.
  - Non-802.11n clients, beacons, and multicasts use the 802.11a/b/g radio protocols.
  - If the primary channel allows for both bonding types (up and down), you can select the channel bonding type from the **Channel Bonding** drop-down list.
  - If the primary channel allows for only one of the bonding types (up or down), that channel bond type is displayed in the **Channel Bonding** drop-down list.
- **Auto** — Channel bonding is automatically enabled or disabled, switching between 20MHz and 40MHz, depending on how busy the extension channel is. If the extension channel is busy above a prescribed threshold percentage, which is defined in the **40MHz Channel Busy Threshold** box, channel bonding is disabled.

Channel Selection — Primary and Extension

The primary channel of the Wireless 802.11n AP is selected from the **Request New Channel** drop-down list. If **auto** is selected, the ACS feature selects the primary channel. Depending on the primary channel that is selected, channel bonding may be allowed: up or down.

Guard Interval

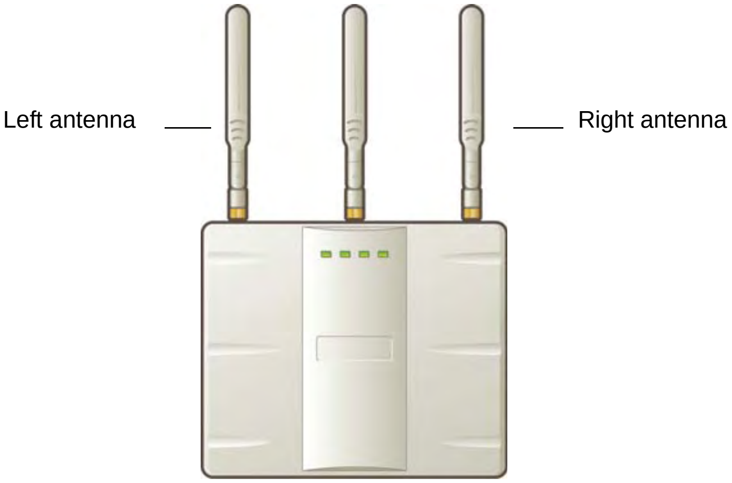
The guard intervals ensure that individual transmissions do not interfere with one another. The Wireless 802.11n AP provides a shorter guard interval that increases the channel throughput. When a 40MHz channel is used, you can select the guard interval to improve the channel efficiency. The guard interval is selected from the **Guard Interval** drop-down list. Longer guard periods reduce the channel efficiency.

Aggregate MSDU and MPDU

The Wireless 802.11n AP provides aggregate Mac Service Data Unit (MSDU) and aggregate Mac Protocol Data Unit (MPDU) functionality, which combines multiple frames together into one larger frame for a single delivery. This aggregation reduces the overhead of the transmission and results in increased throughput. The aggregate methods are enabled and defined selected from the **Aggregate MSDUs** and **Aggregate MPDUs** drop-down lists.

Antenna Selection

The Wireless 802.11n AP has three antennas: left, middle, and right. The illustration below identifies the left and right antennas for the AP3620.



The Wireless 802.11n AP is configured, by default, to transmit on all three antennas. Depending on your deployment requirements, you can configure the Wireless 802.11n AP to transmit on specific antennas. You can configure the Wireless 802.11n AP to transmit on specific antennas for both radios, including all the available modes:

- **Radio 1** — a, a/n modes
- **Radio 2** — b, b/g, b/g/n modes

When you configure the Wireless 802.11n AP to use specific antennas, the following occurs:

- Transmission power is recalculated — The **Current Tx Power Level** value for the radio is automatically adjusted to reflect the recent antenna configuration. It takes approximately 30 seconds for the change to the **Current Tx Power Level** value to be reflected in the Enterasys Wireless Assistant.
- Radio is reset — The radio is reset causing client connections on this radio to be lost.

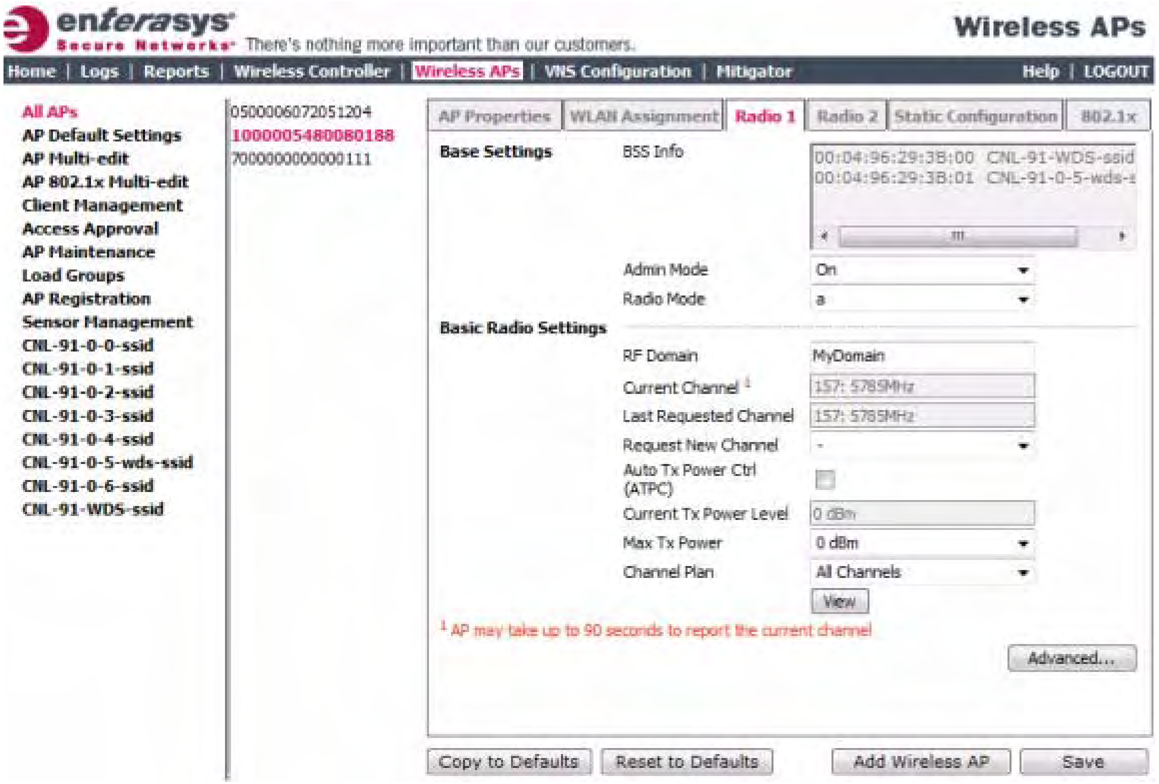
To Modify Wireless 802.11n AP Radio Properties:

1. From the top menu, click **Wireless APs**. The Enterasys Wireless AP screen is displayed.
2. Click the appropriate Wireless 802.11n AP in the list. The **AP Properties** tab is displayed.
3. Click the **Radio** tab you want to modify.

   Each **Radio** tab displays the radio settings for each radio on the Wireless AP. If the **Radio** has been assigned to a WLAN Service, the WLAN Service names and MAC addresses are displayed in the **Base Settings** section. The Wireless AP radios can be assigned to each of the configured WLAN Services in a system. Each radio can support eight WLAN assignments, corresponding to the number of SSIDs it can support. Once a radio has all 8 slots assigned, it is no longer eligible for further assignment.

   The **BSS Info** section is view-only. After WLAN Service configuration, the **Basic Service Set (BSS)** section displays the MAC address on the Wireless AP for each WLAN Service as well as the SSIDs of the WLAN Services to which this radio has been assigned.

4. If applicable, click the **Radio 1** tab.



enterasys Secure Networks There's nothing more important than our customers.

Wireless APs

Base Settings

BSS Info: 00:04:96:29:3B:00 CNL-91-WDS-ssid; 00:04:96:29:3B:01 CNL-91-0-5-wds-s

Admin Mode: On

Radio Mode: a

Basic Radio Settings

RF Domain: MyDomain

Current Channel [1]: 157: 5785MHz

Last Requested Channel: 157: 5785MHz

Request New Channel: -

Auto Tx Power Ctrl (ATPC): □

Current Tx Power Level: 0 dBm

Max Tx Power: 0 dBm

Channel Plan: All Channels

[1] AP may take up to 90 seconds to report the current channel

5. In the **Base Settings** section, do the following:

   – **Admin Mode** — Select On to enable the radio; select Off to disable the radio.

   – **Radio Mode** — Click one of the following radio options:

      - **a** — Click to enable the **802.11a** mode of **Radio 1** without 802.11n capability.

      - **a/n** — Click to enable the **802.11a** mode of **Radio 1** with 802.11n capability.

      - **n-strict** — Click to enable the **802.11a** mode of **Radio 1** with 802.11n strict capability

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration. The Wireless AP hardware version dictates the available radio modes.

   – **Channel Width** — Click the channel width for the radio:

      - **20MHz** — Click to allow 802.11n clients to use the primary channel (20MHz) and non-802.11n clients, as well as beacons and multicasts, to use the 802.11b/g radio protocols.

      - **40MHz** — Click to allow 802.11n clients that support the 40MHz frequency to use 40MHz, 20MHz, or the 802.11b/g radio protocols. 802.11n clients that do not support the 40MHz frequency can use 20MHz or the 802.11b/g radio protocols and non-802.11n clients, beacons, and multicasts use the 802.11b/g radio protocols.

      - **Auto** — Click to automatically switch between 20MHz and 40MHz channel widths, depending on how busy the extension channel is.

6. In the **Basic Radio Settings** section, do the following:

   - **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
   - **Request New Channel** — Click the wireless channel you want the Wireless 802.11n AP to use to communicate with wireless devices.

     Click **Auto** to request the ACS to search for a new channel for the Wireless AP, using a channel selection algorithm. This forces the Wireless AP to go through the auto-channel selection process again.

     Note: ACS in the 2.4GHz radio band with 40MHz channels is not recommended due to severe co-channel interference.

     Depending on the regulatory domain (based on country), some channels may be restricted. The default value is based on North America. For more information, see Appendix B.
   - **Auto Tx Power Ctrl (ATPC)** — Select to enable ATPC. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.

     Note: If you disable ATPC, you can still choose to maintain using the current Tx power setting ATPC had established. If you elect to maintain using the ATPC power setting, the displayed **Current Tx Power Level** value becomes the new **Max Tx Power** value for the Wireless AP.
   - **Channel Bonding** — Click the bonding method, **Up** or **Down**. The primary channel (20MHz) is bonded with an extension channel that is either 20MHz above (bonding up) or 20MHz below (bonding down) of the primary channel. Note that the available choices for **Channel Bonding** in the drop-down list may depend on the channel first selected in **Request New Channel**.
   - **Guard Interval** — Click a guard interval, **Long** or **Short**, when a 40MHz channel is used. Enterasys recommends that you use a short guard interval in small rooms (for example, a small office space) and a long guard interval in large rooms (for example, a conference hall).
   - **Max Tx Power** — Click the maximum Tx power level to which the range of transmit power can be adjusted: **0** to **24 dBm**. Enterasys recommends that you select **24 dBm** to use the entire range of potential Tx power.

     Note: In reality, the lowest achievable power level is 5 dBm for the Wireless 802.11n AP 3610 and 2 dBm for the Wireless 802.11n AP 3620. If you assign a lower value, it will automatically default to the lowest achievable level.
   - **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted. Enterasys recommends that you select the lowest value available to use the entire range of potential Tx power.

     Note: The **Minimum Tx Power** level is subject to the regulatory compliance requirement for the selected country.
   - **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you to use **0 dB** during your initial configuration. If you have an RF plan

that recommended Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.

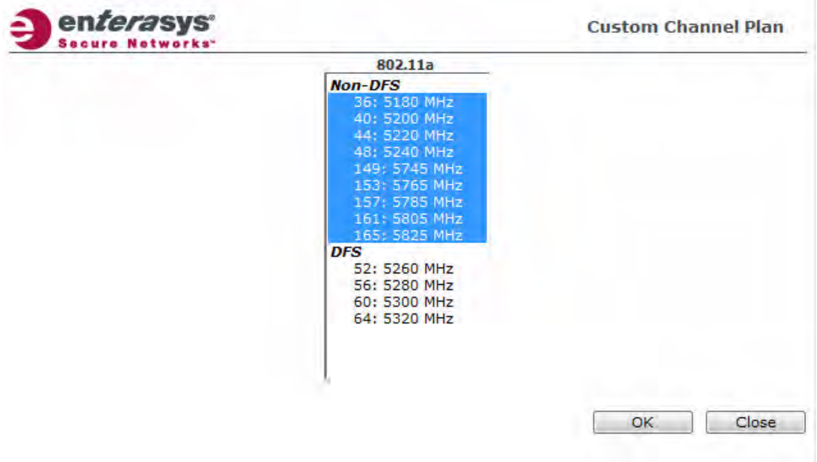
Note: The following fields are view only.
• **Current Channel** — The actual channel the ACS has assigned to the Wireless AP radio. The **Current Channel** value and the **Last Requested Channel** value may be different because the ACS automatically assigns the best available channel to the Wireless AP, ensuring that a Wireless AP's radio is always operating on the best available channel.

• **Last Requested Channel** — The last wireless channel that you had selected to communicate with the wireless devices.

• **Current Tx Power Level** — The actual Tx power level used by the Wireless AP radio.

– **Channel Plan —** If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference. Click one of the following:

  - **All channels —** ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
  - **All Non-DFS Channels —** ACS scans all non-DFS channels for an operating channel. This selection is always available, but if there are no DFS Channels available, the list is the same as the All Channels list.
  - **Custom —** To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.



– **Antenna Selection —** Click the antenna, or antenna combination, you want to configure on this radio.

Note: When you configure the Wireless 802.11n AP to use specific antennas, the transmission power is recalculated; the **Current Tx Power Level** value for the radio is automatically adjusted to reflect the recent antenna configuration. It takes approximately 30 seconds for the change to the **Current Tx Power Level** value to be reflected in the Enterasys Wireless Assistant. Also, the radio is reset which may cause client connections on this radio to be lost.

7. To modify **Radio 1** advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
8. In the **Advanced** dialog **Radio Settings** section, do the following:
   - **DTIM Period** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
   - **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
   - **RTS/CTS Threshold** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
   - **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the Wireless AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.
   - **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
   - **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

     Do not change the default setting for the radio that provides service to 802.11 clients only.
   - **Dynamic Channel Selection** — To enable Dynamic Channel Selection, click one of the following:
     - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
     - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
   - **DCS Noise Threshold** — Type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
   - **DCS Channel Occupancy Threshold** — Type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
   - **DCS Update Period** — Type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.

- **Protection Mode —** Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
- **Protection Type —** Click a protection type, **CTS Only** or **RTS- CTS**, when a 40MHz channel is used. This protects high throughput transmissions on extension channels from interference from non-11n APs and clients.
- **Min. Basic Rate —** Click a minimum basic rate, **6Mbps**, **12Mbps**, or **24Mbps**.

9. In the **Advanced** dialog **11n Settings** section, do the following:
   - **Protection Mode —** Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
   - **Protection Type —** Click a protection type, **CTS Only** or **RTS- CTS**, when a 40MHz channel is used. This protects high throughput transmissions on extension channels from interference from non-11n APs and clients.
   - **40MHz Channel Busy Threshold —** Type the extension channel threshold percentage, which if exceeded, will disable transmissions on the extension channel (40MHz).
   - **Aggregate MSDUs —** Click an aggregate MSDU mode: **Enabled** or **Disabled**. Aggregate MSDU increases the maximum frame transmission size.
   - **Aggregate MPDUs —** Click an aggregate MPDU mode: **Enabled** or **Disabled**. Aggregate MPDU provides a significant improvement in throughput.
   - **Aggregate MPDU Max Length —** Type the maximum length of the aggregate MPDU. The value range is 1024-65535 bytes.
   - **Agg. MPDU Max # of Sub-frames —** Type the maximum number of sub-frames of the aggregate MPDU. The value range is 2-64.
   - **ADDBA Support —** Click an ADDBA support mode: **Enabled** or **Disabled**. ADDBA, or block acknowledgement, provides acknowledgement of a group of frames instead of a single frame. **ADDBA Support** must be enabled if **Aggregate APDU** is enable.
   - **LDPC —** Click an LDPC mode: **Enabled** or **Disabled**. LDPC increases the reliability of the transmission resulting in a 2dB increased performance compared to traditional 11n coding.
   - **STBC —** Click an STBC mode: **Enabled** or **Disabled**. STBC is a simple open loop transmit diversity scheme. When enabled, STBC configuration is 2x1 (one spatial stream split into two space-time streams). TXBF will override STBC if both are enabled for single stream rates.
   - **TXBF —** Click an TXBF mode: **Enabled** or **Disabled**. Tx Beam Forming focuses transmission beams directly at the intended receiver while reducing the overall interference generated by the transmitter.
10. Click **Close**. The **Advanced** dialog is closed.
11. Click **Save** to save your changes.
12. If applicable, click the **Radio 2** tab.
13. In the **Base Settings** section, do the following:
    - **Admin Mode —** Select On to enable the radio; select Off to disable the radio.
    - **Radio Mode —** Click one of the following radio options:
      - **b —** Click to enable the 802.11b-only mode of **Radio 2**. If selected, the AP will use only 11b (CCK) rates with all associated clients.

    - **g** — Click to enable the 802.11g-only mode of **Radio 2**.
    - **b/g** — Click to enable both the 802.11g mode and the 802.11b mode of **Radio 2**. If selected, the AP will use 11b (CCK) and 11g-specific (OFDM) rates with all of the associated clients. The AP will not transmit or receive 11n rates.
    - **g/n** — Click to enable both the 802.11g mode and the 802.11nb mode of **Radio 2**. If selected, the AP will use 11n and 11g-specific (OFDM) rates with all of the associated clients. The AP will not transmit or receive 11b rates.
    - **b/g/n** — Click to enable b/g/n modes of **Radio 2**. If selected, the AP will use all available 11b, 11g, and 11n rates.
    - **n-strict** — Click to enable the 802.11n-strict mode of **Radio 2**. If selected, the AP can be configured to use 11n-strict rates with all of the associated clients. The AP will not transmit or receive 11b or 11g rates.

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

  - **Channel Width** — Click the channel width for the radio:
    - **20MHz** — Click to allow 802.11n clients to use the primary channel (20MHz) and non-802.11n clients, beacons, and multicasts to use the 802.11b/g radio protocols.
    - **40MHz** — Click to allow 802.11n clients that support the 40MHz frequency to use 40MHz, 20MHz, or the 802.11b/g radio protocols. 802.11n clients that do not support the 40MHz frequency can use 20MHz or the 802.11b/g radio protocols and non-802.11n clients, beacons, and multicasts use the 802.11b/g radio protocols.
    - **Auto** — Click to automatically switch between 20MHz and 40MHz channel widths, depending on how busy the extension channel is.

14. In the **Basic Radio Settings** section, do the following:
    - **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
    - **Request New Channel** — Click the wireless channel you want the Wireless 802.11n AP to use to communicate with wireless devices.

      Click **Auto** to request the ACS to search for a new channel for the Wireless 802.11n AP, using a channel selection algorithm. This forces the Wireless 802.11n AP to go through the auto-channel selection process again.

Note: ACS in the 2.4GHz radio band with 40MHz channels is not recommended due to severe co-channel interference.

      Depending on the regulatory domain (based on country), some channels may be restricted. For more information, see Appendix B.

    - **Auto Tx Power Ctrl (ATPC)** — Select to enable ATPC. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.

Note: If you disable ATPC, you can still choose to maintain using the current Tx power setting ATPC had established. If you elect to maintain using the ATPC power setting, the displayed **Current Tx Power Level** value becomes the new **Max Tx Power** value for the Wireless AP.

– **Channel Bonding** — Click the bonding method, **Up** or **Down**. The primary channel (20MHz) is bonded with an extension channel that is either 20MHz above (bonding up) or 20MHz below (bonding down) of the primary channel. Note that the available choices for **Channel Bonding** in the drop-down list may depend on the channel first selected in **Request New Channel**.

– **Guard Interval** — Click a guard interval, **Long** or **Short**, when a 40MHz channel is used. Enterasys recommends that you use a short guard interval in small rooms (for example, a small office space) and a long guard interval in large rooms (for example, a conference hall).

– **Max Tx Power** — Click the maximum Tx power level to which the range of transmit power can be adjusted: **0** to **23 dBm**. Enterasys recommends that you select **23 dBm** to use the entire range of potential Tx power.

Note: The lowest **Max Tx Power** level that can be assigned is **5 dBm** for the Wireless 802.11n AP 3610 and **4 dBm** for the Wireless 802.11n AP 3620; a lower **Max Tx Power** level assignment will automatically default to the lowest allowed levels.

– **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted. Enterasys recommends that you select the lowest value available to use the entire range of potential Tx power.

Note: The **Minimum Tx Power** level is subject to the regulatory compliance requirement for the selected country.

– **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dB** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.

Note: The following fields are view only.
• **Current Channel** — The actual channel the ACS has assigned to the Wireless AP radio. The **Current Channel** value and the **Last Requested Channel** value may be different because the ACS automatically assigns the best available channel to the Wireless AP, ensuring that a Wireless AP's radio is always operating on the best available channel.

• **Last Requested Channel** — The last wireless channel that you had selected to communicate with the wireless devices.

• **Current Tx Power Level** — The actual Tx power level assigned to the Wireless AP radio.

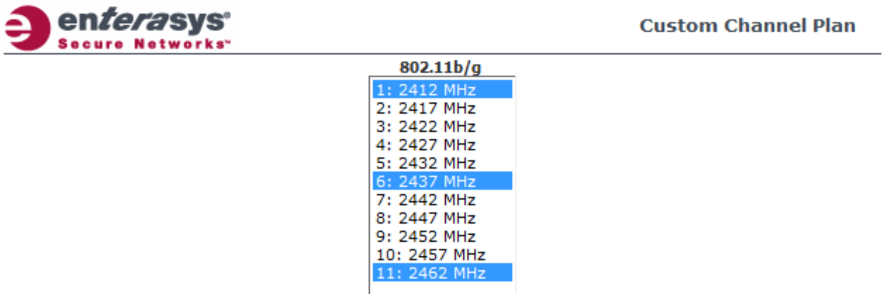
– **Channel Plan** — If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference. Click one of the following:

  - **3 Channel Plan** — ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in most other parts of the world.

  - **4 Channel Plan** — ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in most other parts of the world.

  - **Auto** — ACS will scan the default channel plan channels: **1**, **6**, and **11** in North America, and **1**, **5**, **9**, and **13** in most other parts of the world.

- **Custom** — If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.



802.11b/g

1: 2412 MHz
2: 2417 MHz
3: 2422 MHz
4: 2427 MHz
5: 2432 MHz
6: 2437 MHz
7: 2442 MHz
8: 2447 MHz
9: 2452 MHz
10: 2457 MHz
11: 2462 MHz

- **Antenna Selection** — Click the antenna, or antenna combination, you want to configure on this radio.

Note: When you configure the Wireless 802.11n AP to use specific antennas, the transmission power is recalculated; the **Current Tx Power Level** value for the radio is automatically adjusted to reflect the recent antenna configuration. It takes approximately 30 seconds for the change to the **Current Tx Power Level** value to be reflected in the Enterasys Wireless Assistant. Also, the radio is reset which may cause client connections on this radio to be lost.

15. To modify **Radio 2** advanced settings, click **Advanced**. The **Advanced** dialog is displayed.

16. In the **Advanced** dialog **Base Settings** section, do the following:

- **DTIM Period** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. Use a small number to minimize broadcast and multicast delay. The default value is **5**.

- **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.

- **RTS/CTS Threshold** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.

- **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the Wireless AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.

- **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.

- **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

- **Min Basic Rate** — Click the minimum data rate that must be supported by all stations in a BSS: **6**, **12**, or **24** Mbps. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.

  Do not change the default setting for the radio that provides service to 802.11 clients only.

17. In the **Advanced** dialog **Basic Radio Settings** section, do the following:
    - **Dynamic Channel Selection** — To enable Dynamic Channel Selection, click one of the following:
      - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
      - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
      - **DCS Noise Threshold** — Type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
      - **DCS Channel Occupancy Threshold** — Type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
      - **DCS Update Period** — Type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
18. In the **Advanced** dialog **11b Settings** section, do the following:
    - **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short** or **Long**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this Wireless 802.11n AP. Click **Long** if compatibility with pre-11b clients is required.
19. In the **Advanced** dialog **11g Settings** section, do the following:
    - **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
    - **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
    - **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

Note: The overall throughput is reduced when **Protection Mode** is enabled due to the additional overhead caused by the RTS/CTS. The overhead is minimized by setting **Protection Type** to **CTS Only** and **Protection Rate** to **11 Mbps.** The overhead causes the overall throughput to be sometimes lower than if just 11b mode is used. If there are many 11b clients, Enterasys recommends that you disable 11g support (11g clients are backward compatible with 11b APs). An alternate approach, although potentially a more expensive method, is to dedicate all APs on a channel for 11b (for example, disable 11g on these APs) and disable 11b on all other APs. The difficulty with this method is that the number of APs must be increased to ensure coverage separately for 11b and 11g clients.

20. In the **Advanced** dialog **11n Settings** section, do the following:

    – **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.

    – **Protection Type** — Click a protection type, **CTS Only** or **RTS- CTS**, when a 40MHz channel is used. This protects high throughput transmissions on extension channels from interference from non-11n APs and clients.

    – **40MHz Prot. Channel Offset** — Select a 20MHz channel offset if the deployment is using channels that are 20MHz apart (for example, using channels **1**, **5**, **9**, and **13**) or a 25MHz channel offset if the deployment is using channels that are 25MHz apart (for example, using channels **1**, **6**, and **11**).

    – **40MHz Channel Busy Threshold** — Type the extension channel threshold percentage, which if exceeded, will disable transmissions on the extension channel (40MHz).

    – **Aggregate MSDUs** — Click an aggregate MSDU mode: **Enabled** or **Disabled**. Aggregate MSDU increases the maximum frame transmission size.

    – **Aggregate MPDUs** — Click an aggregate MPDU mode: **Enabled** or **Disabled**. Aggregate MPDU provides a significant improvement in throughput.

    – **Aggregate MPDU Max Length** — Type the maximum length of the aggregate MPDU. The value range is 1024-65535 bytes.

    – **Agg. MPDU Max # of Sub-frames** — Type the maximum number of sub-frames of the aggregate MPDU. The value range is 2-64.

    – **ADDBA Support** — Click an ADDBA support mode: **Enabled** or **Disabled**. ADDBA, or block acknowledgement, provides acknowledgement of a group of frames instead of a single frame. **ADDBA Support** must be enabled if **Aggregate MPDU** is enabled.

    – **LDPC** — Click an LDPC mode: **Enabled** or **Disabled**. LDPC increases the reliability of the transmission resulting in a 2dB increased performance compared to traditional 11n coding.

    – **STBC** — Click an STBC mode: **Enabled** or **Disabled**. STBC is a simple open loop transmit diversity scheme. When enabled, STBC configuration is 2x1 (one spatial stream split into two space-time streams). TXBF will override STBC if both are enabled for single stream rates.

    – **TXBF** — Click an TXBF mode: **Enabled** or **Disabled**. Tx Beam Forming focuses transmission beams directly at the intended receiver while reducing the overall interference generated by the transmitter.

21. Click **Close**. The **Advanced** dialog is closed.

22. To save your changes, click **Save**.

Achieving High Throughput with the Wireless 802.11n AP

To achieve link rates of up to 300Mbps with the Wireless 802.11n AP, configure your system as described in the following section.

Note: Maximum throughput cannot be achieved if both 802.11n and legacy client devices are to be supported.

Note: Some client devices will choose a 2.4GHz radio even when a 5GHz high-speed radio network is available; you may need to force those client devices to use only 5GHz if you have configured high throughput only on the 5GHz radio.

To Achieve High Throughput with the Wireless 802.11n AP:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless 802.11n AP you want to configure.
3. Click the **Radio 2** tab, and then do the following:
   - In the **Radio Mode** drop-down list, click **b/g/n**.
   - In the **Channel Width** drop-down list, click **40MHz**.

   Note: Some client devices do not support 40MHz in b/g/n mode. To accommodate these clients, you must enable **a/n** mode on the **Radio 1** tab. Otherwise, the client device will connect at only 130Mbps.

   - In the **Guard Interval** drop-down list, click **Short**.
   - In the **11g Settings** section, click **None** in the **Protection Mode** drop-down list.

   Note: Do not disable 802.11g protection mode if you have 802.11b or 802.11g client devices using this Wireless AP; instead, configure only **Radio 1** for high throughput unless it is acceptable to achieve less than maximum 802.11n throughput on **Radio 2**.

   - If only 802.11n devices are present, you must disable 11n protection and 40Mz protection:
     - **Protection Mode** — Click **None**.
     - **Protection Type** — Click **CTS only** or **RTS CTS**.

   Note: Do not disable 802.11n protection mode if you have 802.11b or 802.11g client devices using this Wireless AP; instead, configure only **Radio 1** for high throughput unless it is acceptable to achieve less than maximum 802.11n throughput on **Radio 2**.

   - **Aggregate MSDUs** — Click **Enabled**.
   - **Aggregate MPDU** — Click **Enabled**.
   - **Aggregate MPDU Max Length** — Click **65535**
   - **Agg. MPDU Max # of Sub-frames** — Type **64**.
   - **ADDBA Support** — Click **Enabled**.
4. Click the **Radio 1** tab, and then do the following:
   - In the **Admin Mode** drop-down list, click the **On** option.
   - In the **Radio Mode** drop-down list, click the **a/n** option.
   - In the **Channel Width** drop-down list, click **40MHz**.
   - In the **Guard Interval** drop-down list, click **Short**.
   - If only 802.11n devices are present, you must disable 11n protection and 40Mz protection:
     - **Protection Mode** — Click **None**.
     - **Protection Type** — Click **CTS only** or **RTS CTS**.
   - **Aggregate MSDUs** — Click **Enabled**.
   - **Aggregate MPDU** — Click **Enabled**.
   - **Aggregate MPDU Max Length** — Click **Enabled**.
   - **Agg. MPDU Max # of Sub-frames** — Type **64**.
   - **ADDBA Support** — Click **Enabled**.

5. From the top menu, click **VNS Configuration**. The **Virtual Network Configuration** screen is displayed.
6. In the left pane **Virtual Networks** list, click the VNS you want to configure. The **Topology** tab is displayed.
7. Click the **Privacy** tab. Some client devices will not use 802.11n mode if they are using WEP or TKIP for security. Therefore, do one of the following:
   - Select **None**.
   - Select **WPA-PSK**, and then clear the **WPA v.1** option:
     - Select **WPA v.2**.
     - In the **Encryption** drop-down list, click **AES only**.

Note: To achieve the strongest encryption protection for your VNS, Enterasys recommends that you use WPA v.2.

8. Click the **QoS Policy** tab.
9. In the **Wireless QoS** section, select the **WMM** option. Some 802.11n client devices will remain at 54Mbps unless WMM is enabled.

Modifying Wireless AP 2610/2620 Radio Properties

The following section describes how to modify a Wireless AP 2610/2620 and the Enterasys Wireless Outdoor AP. For information on how to modify a Wireless 802.11n AP 3605/3610/3620/3660/W78xC, see "Modifying Wireless 802.11n AP 3605/3610/3620/3660/W78xC Radio Properties" on page 3-38.

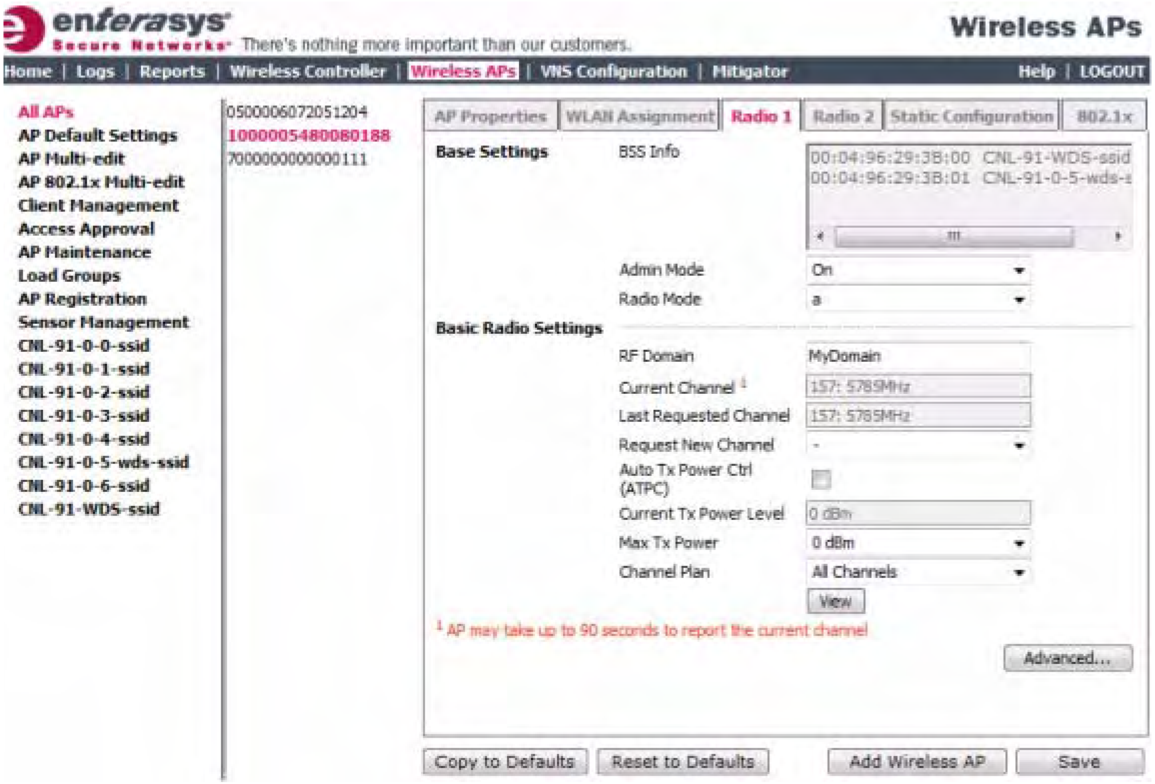
To Modify the Wireless AP's Radio Properties:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. Click the appropriate Wireless AP in the list. The **AP Properties** tab is displayed.
3. Click the **Radio** tab you want to modify.

   Each **Radio** tab displays the radio settings for each radio on the Wireless AP. If the radio has been assigned to a WLAN Service, the WLAN Service names and MAC addresses are displayed in the **Base Settings** section. The Wireless AP radios can be assigned to each of the configured WLAN Services in a system. Each radio can be the subject of 8 WLAN Service assignments (corresponding to the number of SSIDs it can support). Once a radio has all 8 slots assigned, it is no longer eligible for further assignment.

   The **BSS Info** section is view only. After WLAN Service configuration, the **Basic Service Set (BSS)** section displays the MAC address on the Wireless AP for each WLAN Service and the SSIDs of the WLAN Services to which this radio has been assigned.

4. If applicable, click the **Radio 1** tab.



Base Settings

BSS Info: 00:04:96:29:3B:00 CNL-91-WDS-ssid; 00:04:96:29:3B:01 CNL-91-0-5-wds-s

Admin Mode: On

Radio Mode: a

Basic Radio Settings

RF Domain: MyDomain

Current Channel [1]: 157: 5785MHz

Last Requested Channel: 157: 5785MHz

Request New Channel: -

Auto Tx Power Ctrl (ATPC): □

Current Tx Power Level: 0 dBm

Max Tx Power: 0 dBm

Channel Plan: All Channels

[1] AP may take up to 90 seconds to report the current channel

5. In the **Base Settings** section, do the following:

– **Admin Mode** — Select On to enable the radio; select Off to disable the radio.

– **Radio Mode** — Click **a** to enable 802.11a mode of **Radio 1**.

Note: The Wireless AP hardware version dictates the available radio modes.

6. In the **Basic Radio Settings** section, do the following:

– **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.

– **Request New Channel** — Click the wireless channel you want the Wireless AP to use to communicate with wireless devices.

Click **Auto** to request the ACS to search for a new channel for the Wireless AP, using a channel selection algorithm. This forces the Wireless AP to go through the auto-channel selection process again.

Depending on the regulatory domain (based on country), some channels may be restricted. The default value is based on North America. For more information, see Appendix B.

– **Auto Tx Power Ctrl (ATPC)** — Select to enable ATPC. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.

Note: If you disable ATPC, you can elect to maintain using the current Tx power setting ATPC had established. If you elect to maintain using the ATPC power setting, the displayed **Current Tx Power Level** value becomes the new **Max Tx Power** value for the Wireless AP.

– **Max Tx Power** — Click the maximum Tx power level to which the range of transmit power can be adjusted: **0** to **23 dBm**. Enterasys recommends that you select **23 dBm** to use the entire range of potential Tx power.

– **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted. Enterasys recommends that you select the lowest value available to use the entire range of potential Tx power.

Note: The **Minimum Tx Power** level is subject to the regulatory compliance requirement for the selected country.

– **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dB** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.

Note: The following fields are view only.
• **Current Channel** — The actual channel the ACS has assigned to the Wireless AP radio. The **Current Channel** value and the **Last Requested Channel** value may be different because the ACS automatically assigns the best available channel to the Wireless AP, ensuring that a Wireless AP's radio is always operating on the best available channel.

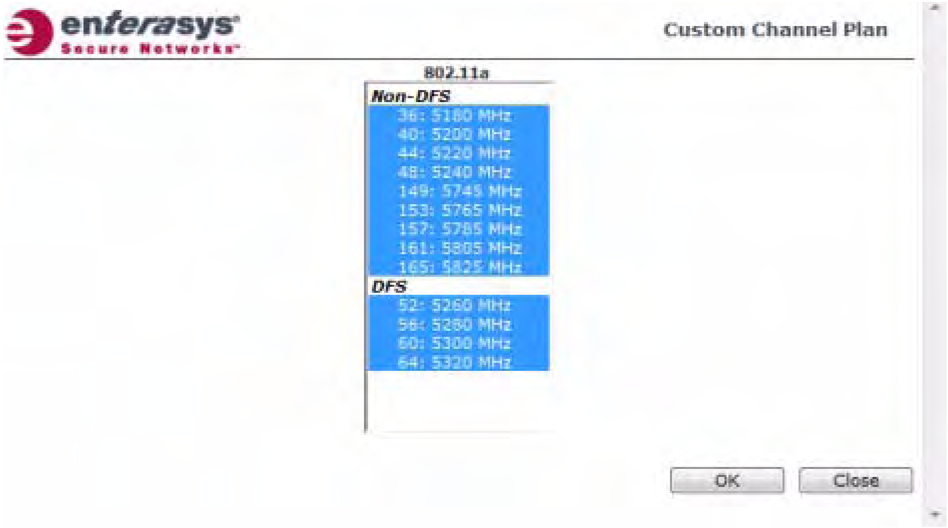
• **Last Requested Channel** — The last wireless channel that you had selected for the Wireless AP to communicate with the wireless devices.

• **Current Tx Power Level** — The actual Tx power level assigned to the Wireless AP radio.

– **Channel Plan** — If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference. Click one of the following:

  - **All channels** — ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
  - **All Non-DFS Channels** — ACS scans all non-DFS channels for an operating channel. This selection is always available, but if there are no DFS Channels available, the list is the same as the All Channels list.
  - **Custom** — To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key.

To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.



7. To modify **Radio 1** advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
8. In the **Advanced** dialog **Base Settings** section, do the following:
   - **DTIM Period** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
   - **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
   - **RTS/CTS Threshold** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
   - **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the Wireless AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.
   - **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
   - **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

     Do not change the default setting for the radio that provides service to 802.11 clients only.

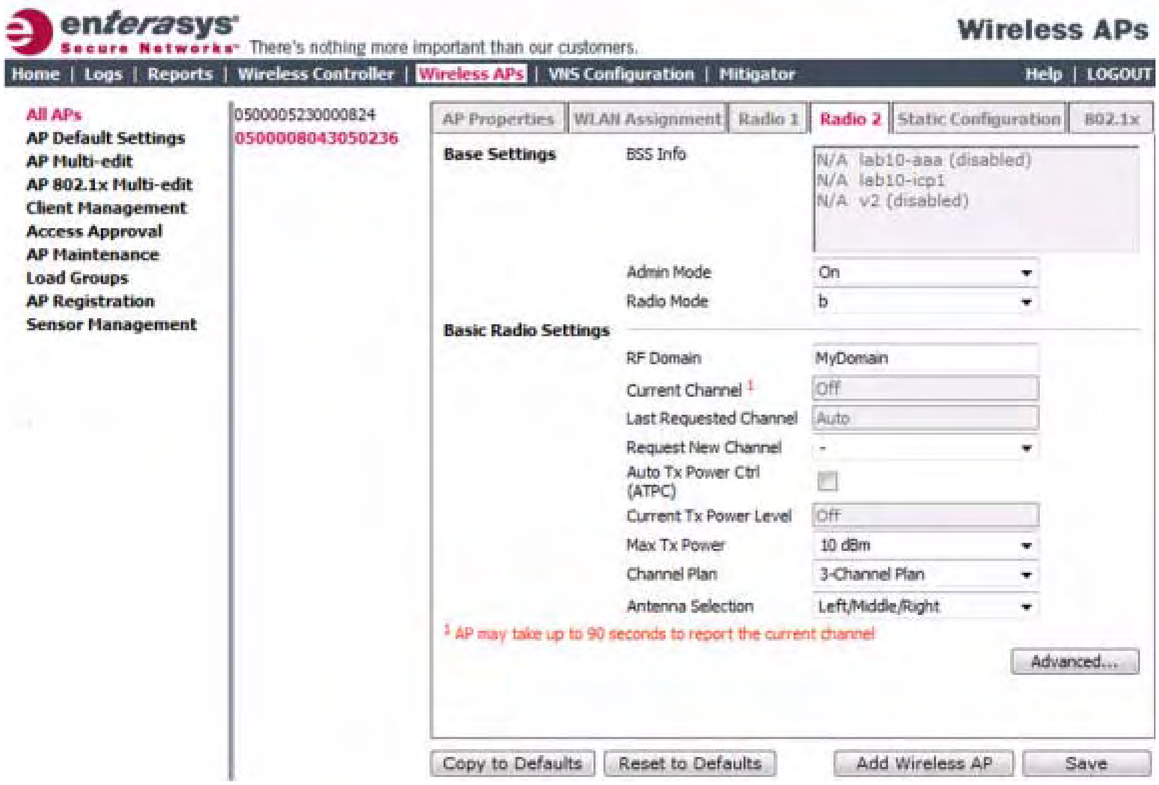
- **Min Basic Rate** — Click the minimum data rate that must be supported by all stations in a BSS: **6**, **12**, or **24** Mbps. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.
- **Max Basic Rate** — Click the maximum data rate that must be supported by all stations in a BSS: **6**, **12**, or **24** Mbps. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.
- **Max Operational Rate** — Click the maximum data rate that clients can operate at while associated with the Wireless AP: **24**, **36**, **48**, or **54** Mbps. If necessary, the **Max Operational Rate** choices adjust automatically to be higher or equal to the **Max Basic Rate**.

9. In the **Advanced** dialog **Basic Radio Settings** section, do the following:

   - **Dynamic Channel Selection** — To enable Dynamic Channel Selection, click one of the following:
     - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
     - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
     - **DCS Noise Threshold** — Type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
     - **DCS Channel Occupancy Threshold** — Type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
     - **DCS Update Period** — Type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
   - **Rx Diversity** — Click **Best** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity antennas. The default and recommended selection is **Best**. If only one antennae is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Best** if two identical antennas are not used.
   - **Tx Diversity** — Click **Alternate** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity antennas. The default selection is **Alternate** that maximizes performance for most clients. However, some clients may behave oddly with Tx Diversity set to **Alternate**. Under those circumstances, Enterasys recommends that you use either **Left** or **Right** for Tx Diversity. If only one antennae is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Alternate** if two identical antennas are not used.
   - **Total # of Retries for Background BK** — Click the number of retries for the Background transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
   - **Total # of Retries for Best Effort BE** — Click the number of retries for the Best Effort transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
   - **Total # of Retries for Video VI** — Click the number of retries for the Video transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

- **Total # of Retries for Voice VO** — Click the number of retries for the Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
- **Total # of Retries for Turbo Voice TVO** — Click the number of retries for the Turbo Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

10. Click **Close**. The **Advanced** dialog is closed.
11. If applicable, click the **Radio 2** tab.



0500005230000824
0500008043050236

Base Settings

BSS Info: N/A lab10-aaa (disabled)
N/A lab10-icp1
N/A v2 (disabled)

Admin Mode: On

Radio Mode: b

Basic Radio Settings

RF Domain: MyDomain

Current Channel [1]: Off

Last Requested Channel: Auto

Request New Channel: -

Auto Tx Power Ctrl (ATPC): □

Current Tx Power Level: Off

Max Tx Power: 10 dBm

Channel Plan: 3-Channel Plan

Antenna Selection: Left/Middle/Right

[1] AP may take up to 90 seconds to report the current channel

12. In the **Base Settings** section, do the following:
    - **Admin Mode** — Select On to enable the radio; select Off to disable the radio.
    - **Radio Mode** — Click one of the following radio options:
        - **b** — Click to enable the 802.11b-only mode of **Radio 2**. If selected, the AP will use only 11b (CCK) rates with all associated clients.
        - **g** — Click to select the 802.11g-only mode of **Radio 2**. If selected, the AP will not accept associations from 11b clients, but it will still use all CCK and OFDM 11g rates with its associated clients. To disable CCK rates, use the **Min/Max Basic Rate** and **Max Operation Rate** controls to select OFDM-only rates.
        - **b/g** — Click to enable both the 802.11g mode and the 802.11b mode of **Radio 2**. If selected, the AP will use 11b (CCK) and 11g-specific (OFDM) rates with all of the associated clients. The AP will not transmit or receive 11n rates.

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

13. In the **Basic Radio Settings** section, do the following:

   – **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.

   – **Request New Channel** — Click the wireless channel you want the Wireless AP to use to communicate with wireless devices.

   Click **Auto** to request the ACS to search for a new channel for the Wireless AP, using a channel selection algorithm. This forces the Wireless AP to go through the auto-channel selection process again.

   Depending on the regulatory domain (based on country), some channels may be restricted. The default value is based on North America. For more information, see Appendix B.

   – **Auto Tx Power Ctrl (ATPC)** — Select to enable ATPC. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.

Note: If you disable ATPC, you can elect to maintain using the current Tx power setting ATPC had established. If you elect to maintain using the ATPC power setting, the displayed **Current Tx Power Level** value becomes the new **Max Tx Power** value for the Wireless AP.

   – **Max Tx Power** — Click the maximum Tx power level to which the range of transmit power can be adjusted: **8** to **18 dBm**. Enterasys recommends that you select **18 dBm** to use the entire range of potential Tx power.

   – **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted. Enterasys recommends that you select the lowest value available to use the entire range of potential Tx power.

Note: The **Minimum Tx Power** level is subject to the regulatory compliance requirement for the selected country.

   – **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dB** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.

Note: The following fields are view only.
• **Current Channel** — The ACS has assigned to the Wireless AP radio. The **Current Channel** value and the **Last Requested Channel** value may be different because the ACS automatically assigns the best available channel to the Wireless AP, ensuring that a Wireless AP's radio is always operating on the best available channel.

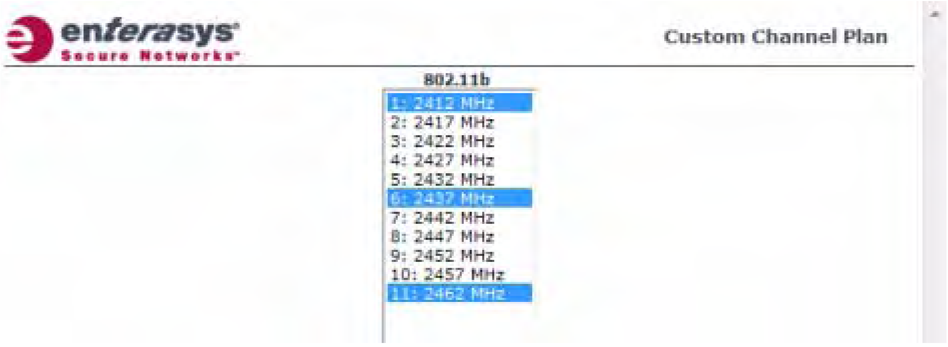
• **Last Requested Channel** — The last wireless channel that you had selected for the Wireless AP to communicate with the wireless devices.

• **Current Tx Power Level** — The actual Tx power level assigned to the Wireless AP radio.

   – **Channel Plan** — If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an

ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference. Click one of the following:

- **3 Channel Plan** — ACS will scan the following channels: **1**, **6**, and **11** in the US, and **1**, **7**, and **13** in Europe.
- **4 Channel Plan** — ACS will scan the following channels: **1**, **4**, **7**, and **11** in the US, and **1**, **5**, **9**, and **13** in Europe.
- **Auto** — ACS will scan the default channel plan channels: **1**, **6**, and **11** in the US, and **1**, **5**, **9**, and **13** in Europe.
- **Custom** — If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.



14. To modify **Radio 2** advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
15. In the **Advanced** dialog **Base Settings** section, do the following:
    - **DTIM Period** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
    - **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
    - **RTS/CTS Threshold** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
    - **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the Wireless AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.
    - **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
    - **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000

meters so that the software increases the timeout value proportionally with the distance between APs.

- **Min Basic Rate** — Click the minimum data rate that must be supported by all stations in a BSS: **1**, **2**, **5.5**, or **11** Mbps. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.
- **Max Basic Rate** — Click the maximum data rate that must be supported by all stations in a BSS: **1**, **2**, **5.5**, or **11** Mbps. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.
- **Max Operational Rate** — Click the maximum data rate that clients can operate at while associated with the Wireless AP: **11**, **12**, **18**, **24**, **36**, **48**, or **54** Mbps. If necessary, the **Max Operational Rate** choices adjust automatically to be higher or equal to the **Max Basic Rate**.

  Do not change the default setting for the radio that provides service to 802.11 clients only.

16. In the **Advanced** dialog **Basic Radio Settings** section, do the following:
    - **Dynamic Channel Selection** — To enable Dynamic Channel Selection, click one of the following:
      - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
      - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
      - **DCS Noise Threshold** — Type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
      - **DCS Channel Occupancy Threshold** — Type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
      - **DCS Update Period** — Type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
    - **Rx Diversity** — Click **Best** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity antennas. The default and recommended selection is **Best**. If only one antennae is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Best** if two identical antennas are not used.
    - **Tx Diversity** — Click **Alternate** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity antennas. The default selection is **Alternate** that maximizes performance for most clients. However, some clients may behave oddly with Tx Diversity set to **Alternate**. Under those circumstances, Enterasys recommends that you use either **Left** or **Right** for Tx Diversity. If only one antennae is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Alternate** if two identical antennas are not used.
    - **Total # of Retries for Background BK** — Click the number of retries for the Background transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

- **Total # of Retries for Best Effort BE** — Click the number of retries for the Best Effort transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
- **Total # of Retries for Video VI** — Click the number of retries for the Video transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
- **Total # of Retries for Voice VO** — Click the number of retries for the Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
- **Total # of Retries for Turbo Voice TVO** — Click the number of retries for the Turbo Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

17. In the **Advanced** dialog **11b Settings** section, select the **Preamble**. Click a preamble type for 11b-specific (CCK) rates: **Short** or **Long**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.
18. In the **Advanced** dialog **11g Settings** section, do the following:
    - **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
    - **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
    - **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

Note: The overall throughput is reduced when **Protection Mode** is enabled, due to the additional overhead caused by the RTS/CTS. The overhead is minimized by setting **Protection Type** to **CTS Only** and **Protection Rate** to **11** Mbps. The overhead causes the overall throughput to be sometimes lower than if just 11b mode is used. If there are many 11b clients, Enterasys recommends that you disable 11g support (11g clients are backward compatible with 11b APs).

An alternate approach, although a more expensive method, is to dedicate all APs on a channel for 11b (for example, disable 11g on these APs) and disable 11b on all other APs. The difficulty with this method is that the number of APs must be increased to ensure coverage separately for 11b and 11g clients.

19. Click **Close**. The **Advanced** dialog is closed.
20. To save your changes, click **Save.**

Setting Up the Wireless AP Using Static Configuration

The Wireless AP static configuration feature provides the Enterasys Wireless Convergence Software solution with the capability for a network with either a central office or a branch office model. The static configuration settings assist in the setup of branch office support. These settings are not dependent of branch topology, but instead can be employed at any time if required. In the branch office model, Wireless APs are installed in remote sites, while the Enterasys Wireless Controller is in a central office. The Wireless APs must be able to interact in both the local site network and the central network. To achieve this model, a static configuration is used.

Note: If a Wireless AP with a statically configured IP address (without a statically configured Wireless Controller Search List) cannot register with the Enterasys Wireless Controller within the specified number of retries, the Wireless AP will use SLP, DNS, and SLP multicast as a backup mechanism.

To Set Up a Wireless AP Using Static Configuration:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. Click the appropriate Wireless AP in the list.
3. Click the **Static Configuration** tab. The Static Configuration page displays.
4. Configure the settings on the Static Configuration page. You must:

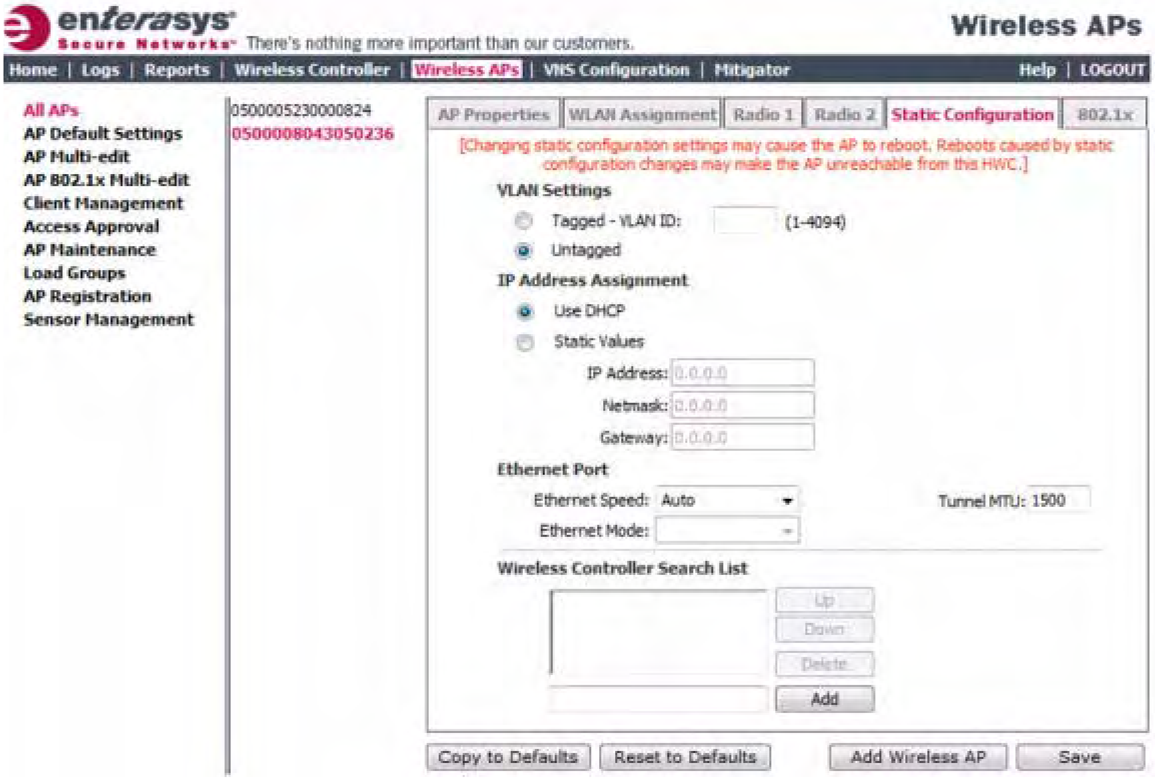
- Select a VLAN setting for the Wireless AP

Caution: Caution should be exercised when using this feature. For more information, see "Configuring VLAN Tags for Wireless APs" on page 3-65.

If the Wireless AP VLAN is not configured properly (wrong tag), connecting to the Wireless AP may not be possible. To recover from this situation, you will need to reset the Wireless AP to its factory default settings. For more information, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- Select a method of IP address assignment for the Wireless AP.

Note: For the initial configuration of a Wireless AP to use a static IP address assignment, the following is recommended:
• Allow the Wireless AP to first obtain an IP address using DHCP. By default, Wireless APs are configured to use the DHCP IP address configuration method.
• Allow the Wireless AP to connect to the Enterasys Wireless Controller using the DHCP assigned IP address.
• After the Wireless AP has successfully registered to the Enterasys Wireless Controller, use the **Static Configuration** tab to configure a static IP address for the Wireless AP, and then save the configuration.
• Once the static IP address has been configured on the Wireless AP, the Wireless AP can then be moved to its target location, if applicable. (A branch office scenario is an example of a setup that may require static IP assignment.)



[Changing static configuration settings may cause the AP to reboot. Reboots caused by static configuration changes may make the AP unreachable from this HWC.]

VLAN Settings

○ Tagged - VLAN ID: (1-4094)

● Untagged

IP Address Assignment

● Use DHCP

○ Static Values

IP Address: 0.0.0.0

Netmask: 0.0.0.0

Gateway: 0.0.0.0

Ethernet Port

Ethernet Speed: Auto

Ethernet Mode:

Tunnel MTU: 1500

Wireless Controller Search List

Table 3-24 Static Configuration

Field/Button	Description
VLAN Settings	
Tagged	Select if you want to assign this AP to a specific VLAN and type the value in the box.
Untagged	Select if you want this AP to be untagged. This option is selected by default.
VLAN ID	Enter a VLAN ID. Valid values are 1 to 4094
IP Address Assignment	
Use DHCP	Select to enable Dynamic Host Configuration Protocol (DHCP). This option is enabled by default.
Static Values	Select to specify the IP address of the Wireless AP.
IP Address	Type the IP address of the AP.
Netmask	Type the appropriate subnet mask to separate the network portion from the host portion of the address.
Gateway	Type the default gateway of the network.
Ethernet Port	
Ethernet Speed	If the Wireless AP has an Ethernet port, select values in the **Ethernet Speed** and **Ethernet Mode** drop down lists.
Ethernet Mode	If the Wireless AP has an Ethernet port, select values in the **Ethernet Speed** and **Ethernet Mode** drop down lists.

Table 3-24 Static Configuration (continued)

Field/Button	Description
Tunnel MTU	Enter a static MTU value, from 600 to 1500, in the **Tunnel MTU** box. If the Enterasys wireless software cannot discover the MTU size, it enforces the static MTU size. Set the MTU size to allow the source to reduce the packet size and avoid the need to fragment data packets in the tunnel.
Wireless Controller Search List	
Up	Select a controller and click the Up button to modify the order of the controllers. When an AP searches for a controller to register with, it begins with the first controller in the list.
Down	Select a controller and click the Up button to modify the order of the controllers. When an AP searches for a controller to register with, it begins with the first controller in the list.
Delete	Click to remove the controller from the list so that it can no longer control the wireless AP.
Add	In the Add box, type the IP address of the Enterasys Wireless Controller that will control this Wireless AP then click the Add button to add the IP address is added to the list. Repeat this process to add the IP addresses of up to three controllers. This feature allows the Wireless AP to bypass the discovery process. If the **Wireless Controller Search List** box is not populated, the Wireless AP will use SLP unicast/multicast, DNS, or DHCP vendor option 43 to discover a Enterasys Wireless Controller. For the initial Wireless AP deployment, it is necessary to use one of the described options in “Discovery and Registration Overview” on page 3-10.
Additional Buttons	
Copy to Defaults	To make this Wireless AP’s configuration be the system’s default AP settings, click **Copy to Defaults**. A pop-up dialog asking you to confirm the configuration change is displayed.To confirm resetting the system’s default Wireless AP settings, click **OK.**
Reset to Defaults	If you have a Wireless AP that is already configured with its own settings, but would like the Wireless AP to be reset to use the system’s default AP settings, use the **Reset to Defaults** feature
Add Wireless AP	Click to manually add and register a Wireless AP to the Enterasys Wireless Controller
Save	Click to save your changes.

Configuring Telnet/SSH Access

Telnet is used for accessing legacy (non-11n) Access Points. SSH is used for accessing Next-Generation (11n) Access Points.

Note: The new telnet/SSH access password that you set up over the controller’s user interface overrides the default access password. The process for setting up the new password is described below.

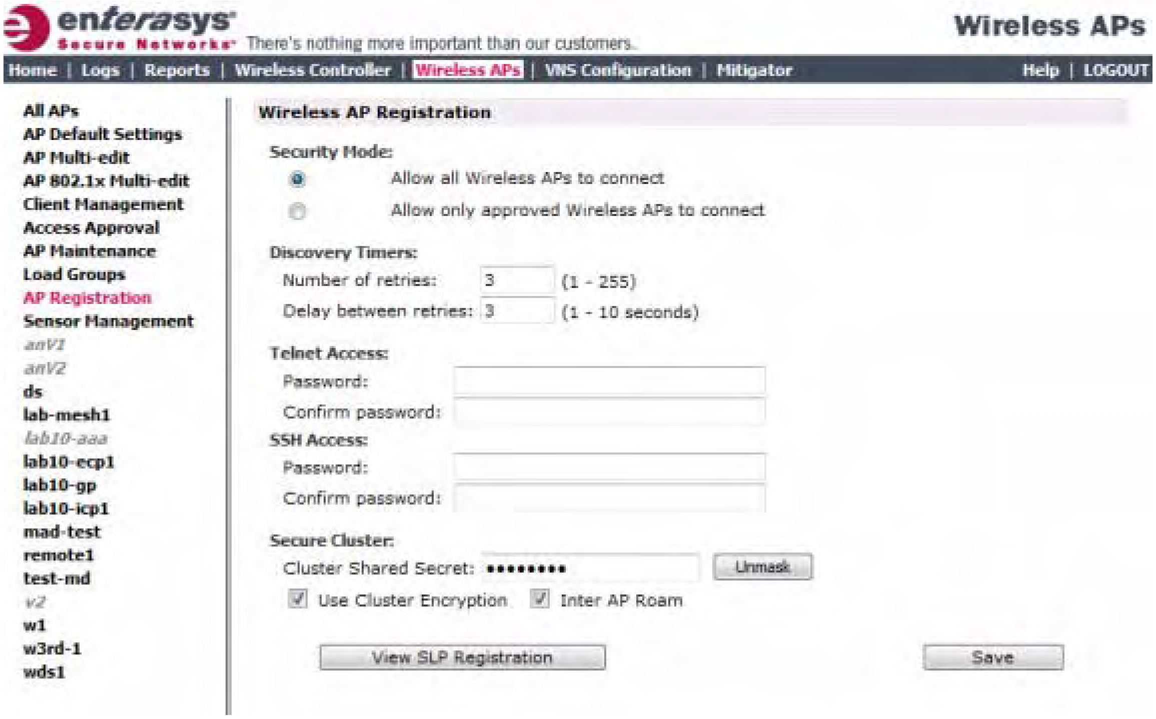
To enable or disable telnet or SSH access:

1. From the top menu, click **Wireless APs**. The **Wireless APs** screen is displayed.
2. In the Wireless AP list, click the Wireless AP for which you want to enable or disable telnet.
3. Click **Advanced**. The Advanced dialog is displayed.

4. In the **Telnet Access/SSH Access** drop-down list, click one of the following:
   - **Enable** — Enables telnet/SSH access
   - **Disable** — Disables telnet/SSH access
5. To save your changes, click **Save**.

To set up a new telnet/SSH access password:

1. From the top menu, click **Wireless APs**. The **Wireless APs** screen is displayed.
2. In the left pane, click **AP Registration**. The **Wireless AP Registration** screen is displayed.



Wireless AP Registration

Security Mode:

● Allow all Wireless APs to connect

○ Allow only approved Wireless APs to connect

Discovery Timers:

Number of retries: 3 (1 - 255)

Delay between retries: 3 (1 - 10 seconds)

Telnet Access:

Password:

Confirm password:

SSH Access:

Password:

Confirm password:

Secure Cluster:

Cluster Shared Secret: ••••••••

☑ Use Cluster Encryption ☑ Inter AP Roam

Note: The **SSH Access** section on the **AP Registration** screen is applicable to the 11n Wireless APs. The **Telnet Access** section is applicable to the Standard Wireless AP or the Enterasys Wireless Outdoor AP.

3. If you are setting up a new telnet access password for either the Wireless AP or Wireless Outdoor AP, type the new password in the **Password** box under the **Telnet Access** section. If you are setting up a new SSH access password for the Wireless 802.11n AP, type the new password in the **Password** box under the **SSH Access** section.
4. In the **Confirm Password** box, re-type the password.
5. To save your changes, click **Save**.

Configuring VLAN Tags for Wireless APs

Caution: You must exercise caution while configuring a VLAN ID tag. If a VLAN tag is not configured properly, the connectivity between the Enterasys Wireless Controller and the Wireless AP will be lost.

To configure the VLAN tag for the Wireless AP, you must connect the Wireless AP to a point on the central office network that does not require VLAN tagging. If the VLAN tagging is configured correctly and you are still on the central office network, the Wireless AP will lose connection with the Enterasys Wireless Controller after it is rebooted (the Wireless AP reboots when the configuration settings are saved).

If the Wireless AP does not lose its connection with the Enterasys Wireless Controller after the reboot, the VLAN ID has not been configured correctly. After the VLAN is configured correctly, you can move the Wireless AP to the target location.

To Configure Wireless APs with a VLAN Tag:

1. Connect the Wireless AP in the central office to the Enterasys Wireless Controller port (or to a network point) that does not require VLAN tagging.
2. From the top menu, click **Wireless APs**. The **Wireless APs** screen is displayed.
3. Click the **Static Configuration** tab.
4. In the **VLAN Settings** section, select **Tagged - VLAN ID**.
5. In the **Tagged - VLAN ID** text box, type the VLAN ID on which the Wireless AP will operate.
6. To save your changes, click **Save**. The Wireless AP reboots and loses connection with the Enterasys Wireless Controller.
7. Log out from the Enterasys Wireless Controller.
8. Disconnect the Wireless AP from the central office network and move it to the target location.
9. Power up the Wireless AP. The Wireless AP connects to the Enterasys Wireless Controller.

   If the Wireless AP does not connect to the Enterasys Wireless Controller, the Wireless AP was not configured properly. To recover from this situation, you must reset the Wireless AP to its factory default settings, and reconfigure the static IP address. For more information, see the Enterasys Wireless Convergence Software *User Guide*.

Setting Up 802.1x Authentication for a Wireless AP

802.1x is an authentication standard for wired and wireless LANs. The 802.1x standard can be used to authenticate access points to the LAN to which they are connected. 802.1x support provides security for network deployments where access points are placed in public spaces.

To successfully set up 802.1x authentication of a Wireless AP, the Wireless AP must be configured for 802.1x authentication before the Wireless AP is connected to a 802.1x enabled switch port.

⚠ **Caution:** If the switch port to which the Wireless AP is connected is not 802.1x enabled, the 802.1x authentication will not take effect.

802.1x authentication credentials can be updated at any time, whether or not the Wireless AP is connected with an active session. If the Wireless AP is connected, the new credentials are sent immediately. If the Wireless AP is not connected, the new credentials are delivered the next time the Wireless AP connects to the Enterasys Wireless Controller.

There are two main aspects to the 802.1x feature:

- Credential management — The Enterasys Wireless Controller and the Wireless AP are responsible for the requesting, creating, deleting, or invalidating the credentials used in the authentication process.
- Authentication — The Wireless AP is responsible for the actual execution of the EAP-TLS or PEAP protocol.

802.1x authentication can be configured on a per-AP basis. For example, 802.1x authentication can be applied to specific Wireless APs individually or with a multi-edit function.

The 802.1x authentication supports two authentication methods:

- PEAP (Protected Extensible Authentication Protocol)
  - Is the recommended 802.1x authentication method
  - Requires minimal configuration effort and provides equal authentication protection to EAP-TLS
  - Uses user ID and passwords for authentication of access points
- EAP-TLS
  - Requires more configuration effort
  - Requires the use of a third-party Certificate Authentication application
  - Uses certificates for authentication of access points
  - Enterasys Wireless Controller can operate in either proxy mode or pass through mode.
    - Proxy mode — The Enterasys Wireless Controller generates the public and private key pair used in the certificate.
    - Pass through mode — The certificate and private key is created by the third-party Certificate Authentication application.

Note: Although a Wireless AP can support using both PEAP and EAP-TLS credentials simultaneously, it is not recommended to do so. Instead, Enterasys recommends that you use only one type of authentication and that you install the credentials for only that type of authentication on the Wireless AP.

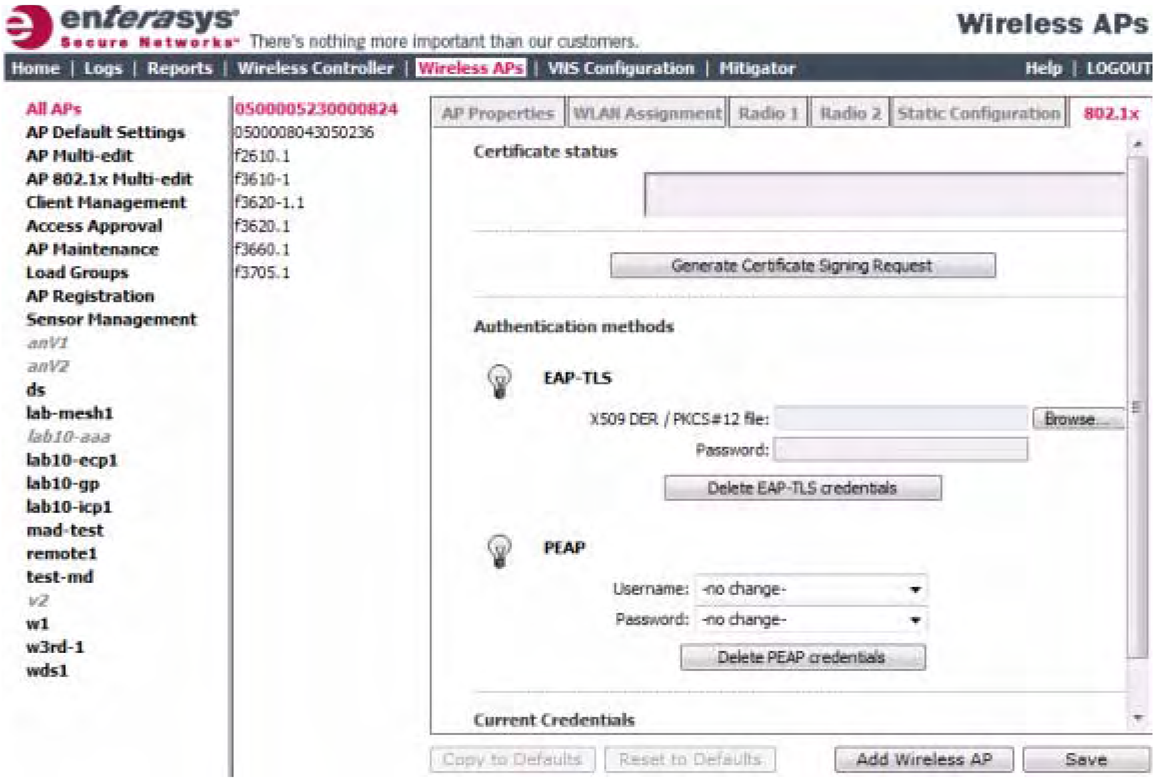
Configuring 802.1x PEAP Authentication

PEAP authentication uses user ID and passwords for authentication. To successfully configure 802.1x authentication of a Wireless AP, the Wireless AP must first be configured for 802.1x authentication before the Wireless AP is deployed on a 802.1x enabled switch port.

To Configure 802.1x PEAP Authentication:

1. From the top menu, click **Wireless APs**. The Enterasys Wireless AP screen displays.
2. In the Wireless AP list, click the Wireless AP for which you want to configure 802.1x PEAP authentication.

3. Click the **802.1x** tab.



4. In the **Username** drop-down list, click the value you want to assign as the user name credential:
   - **Name** — The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
   - **Serial** — The serial number of the Wireless AP. This setting cannot be edited.
   - **MAC** — The MAC address of the Wireless AP. The setting cannot be edited.
   - **Other** — Click to specify a custom value. A text box is displayed. In the text box, type the value you want to assign as the user name credential.
5. In the **Password** drop-down list, click the value you want to assign as the password credential:
   - **Name** — The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
   - **Serial** — The serial number of the Wireless AP. The setting cannot be edited.
   - **MAC** — The MAC address of the Wireless AP. The setting cannot be edited.
   - **Other** — Click to specify a custom value. A text box is displayed. In the text box, type the value you want to assign as the password credential.
6. To save your changes, click **Save.**

   The 802.1x PEAP authentication configuration is assigned to the Wireless AP. The Wireless AP can now be deployed to a 802.1x enabled switch port.

Configuring 802.1x EAP-TLS Authentication

EAP-TLS authentication uses certificates for authentication. A third-party Certificate Authentication application is required to configure EAP-TLS authentication. Certificates can be overwritten with new ones at any time.

With EAP-TLS authentication, the Enterasys Wireless Controller can operate in the following modes:

- Proxy Mode
- Pass Through Mode

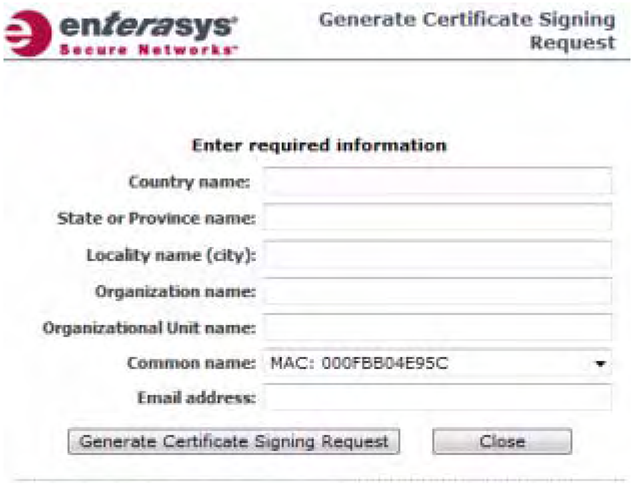
Note: When a Wireless AP configured with 802.1x EAP-TLS authentication is connected to a Enterasys Wireless Controller, the Wireless AP begins submitting logs to the Enterasys Wireless Controller thirty days before the certificate expires to provide administrators with a warning of the impending expiry date.

Proxy Mode

In proxy mode, Enterasys Wireless Controller generates the public and private key pair used in the certificate. You can specify the criteria used to create the Certificate Request. The Certificate Request that is generated by the Enterasys Wireless Controller is then used by the third-party Certificate Authentication application to create the certificate used for authentication of the Wireless AP. To successfully configure 802.1x authentication of a Wireless AP, the Wireless AP must first be configured for 802.1x authentication before the Wireless AP is deployed on a 802.1x enabled switch port.

To Configure 802.1x EAP-TLS Authentication in Proxy Mode:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP for which you want to configure 802.1x EAP-TLS authentication.
3. Click the **802.1x** tab.
4. Click **Generate Certificate Signing Request**. The **Generate Certificate Signing Request** window is displayed.


enterasys
Secure Networks
Generate Certificate Signing Request
Enter required information

Country name:
State or Province name:
Locality name (city):
Organization name:
Organizational Unit name:
Common name: MAC: 000FBB04E95C
Email address:

Generate Certificate Signing Request
Close

5. Type the criteria to be used to create the certificate request. All fields are required:
   - **Country name** — The two-letter ISO abbreviation of the name of the country
   - **State or Province name** — The name of the State/Province

- **Locality name (city)** — The name of the city
- **Organization name** — The name of the organization
- **Organizational Unit name** — The name of the unit within the organization
- **Common name** — Click the value you want to assign as the common name of the Wireless AP:
  - **Name** — The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
  - **Serial** — The serial number of the Wireless AP. The setting cannot be edited.
  - **MAC** — The MAC address of the Wireless AP. The setting cannot be edited.
  - **Other** — Click to specify a custom value. A text box is displayed. In the text box, type the value you want to assign as the common name of the Wireless AP.
- **Email address** — The email address of the organization

6. Click **Generate Certificate Signing Request**. A certificate request file is generated (.csr file extension). The name of the file is the Wireless AP serial number. The **File Download** dialog is displayed.
7. Click **Save**. The **Save as** window is displayed.
8. Navigate to the location on your computer that you want to save the generated certificate request file, and then click **Save**.
9. In the third-party Certificate Authentication application, use the content of the generated certificate request file to generate the certificate file (.cer file extension).
10. On the **802.1x** tab, click **Browse**. The **Choose file** window is displayed.
11. Navigate to the location of the certificate file, and click **Open**. The name of the certificate file is displayed in the **X509 DER / PKCS#12 file** box.
12. To save your changes, click **Save.**

    The 802.1x EAP-TLS (certificate and private key) authentication in proxy mode is assigned to the Wireless AP. The Wireless AP can now be deployed to a 802.1x enabled switch port.

Pass Through Mode

In pass through mode, the certificate and private key are created by the third-party Certificate Authentication application. To successfully configure 802.1x authentication of a Wireless AP, the Wireless AP must first be configured for 802.1x authentication before the Wireless AP is deployed on a 802.1x enabled switch port.

Before you configure 802.1x using EAP-TLS authentication in pass through mode, you must first create a certificate using the third-party Certificate Authentication application and save the certificate file in PKCS #12 file format (.pfx file extension) on your system.

To Configure 802.1x EAP-TLS Authentication in Pass Through Mode:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP for which you want to configure 802.1x EAP-TLS authentication.
3. Click the **802.1x** tab.
4. Click **Browse**. The **Choose file** window is displayed.
5. Navigate to the location of the certificate file (.pfx) and click **Open**. The name of the certificate file is displayed in the **X509 DER / PKCS#12 file** box.

6. In the **Password** box, type the password that was used to protect the private key.

Note: The password that was used to protect the private key must be a maximum of 31 characters long.

7. To save your changes, click **Save.**

   The 802.1x EAP-TLS authentication in pass through mode is assigned to the Wireless AP. The Wireless AP can now be deployed to a 802.1x enabled switch port.

Viewing 802.1x Credentials

When 802.1x authentication is configured on a Wireless AP, the light bulb icon on the **802.1x** tab for the configured Wireless AP is lit to indicate which 802.1x authentication method is used. A Wireless AP can be configured to use both EAP-TLS and PEAP authentication methods. For example, when both EAP-TLS and PEAP authentication methods are configured for the Wireless AP, both light bulb icons on the **802.1x** tab are lit.

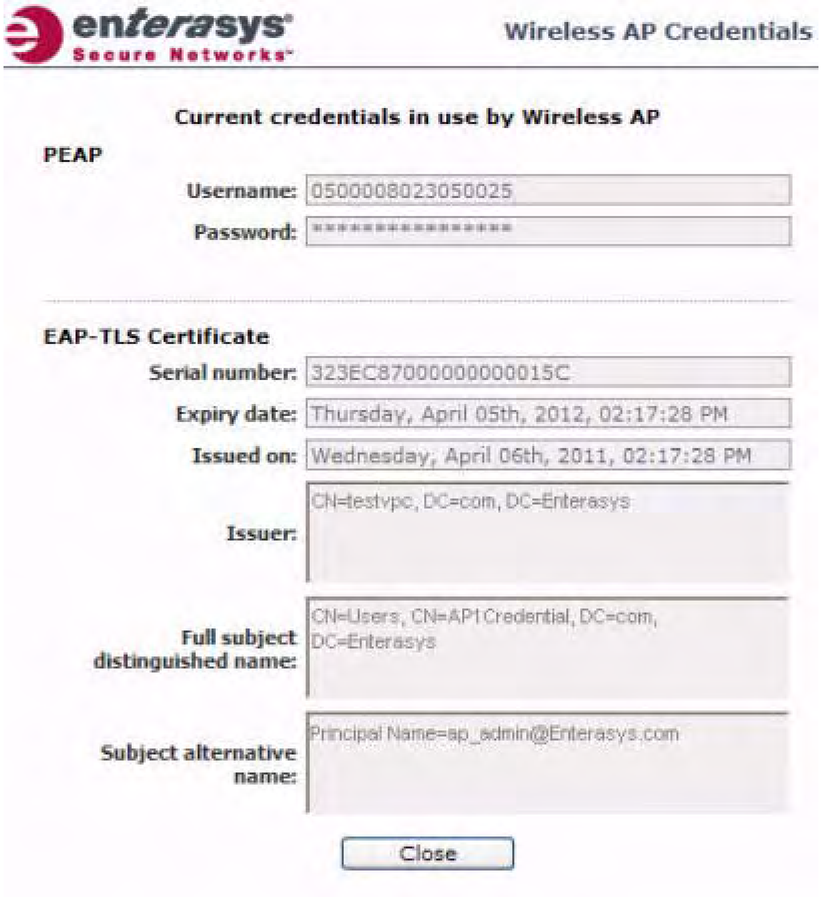
Note: You can only view the 802.1x credentials of Wireless APs that have an active session with the Enterasys Wireless Controller. If you attempt to view the credentials of a Wireless AP that does not have an active session, the Wireless AP Credentials window displays the following message:

Unable to query Wireless AP: not connected.

To View Current 802.1x Credentials:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP for which you want to view its current 802.1x credentials.
3. Select the 802.1x tab.

4. In the **Current Credentials** section, click **Get Certificate details**. The **Wireless AP Credentials** window is displayed.



Current credentials in use by Wireless AP

PEAP

Username: 0500008023050025

Password: ****************

EAP-TLS Certificate

Serial number: 323EC87000000000015C

Expiry date: Thursday, April 05th, 2012, 02:17:28 PM

Issued on: Wednesday, April 06th, 2011, 02:17:28 PM

Issuer: CN=testvpc, DC=com, DC=Enterasys

Full subject distinguished name: CN=Users, CN=AP1Credential, DC=com, DC=Enterasys

Subject alternative name: Principal Name=ap_admin@Enterasys.com

Deleting 802.1x Credentials

Caution: Exercise caution when deleting 802.1x credentials. For example, deleting 802.1x credentials may prevent the Wireless AP from being authenticated or cause it to lose its connection with the Enterasys Wireless Controller.

To Delete Current 802.1x Credentials:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP for which you want to delete its current 802.1x credentials.
3. Do the following:
   - To delete EAP-TLS credentials, click **Delete EAP-TLS** credentials.
   - To delete PEAP credentials, click **Delete PEAP** credentials.

   The credentials are deleted and the Wireless AP settings are updated.

Note: If you attempt to delete the 802.1x credentials of a Wireless AP that currently does not have an active session with the Enterasys Wireless Controller, the credentials are only deleted after the Wireless AP connects with the Enterasys Wireless Controller.

Setting Up 802.1x Authentication for Wireless APs Using Multi-edit

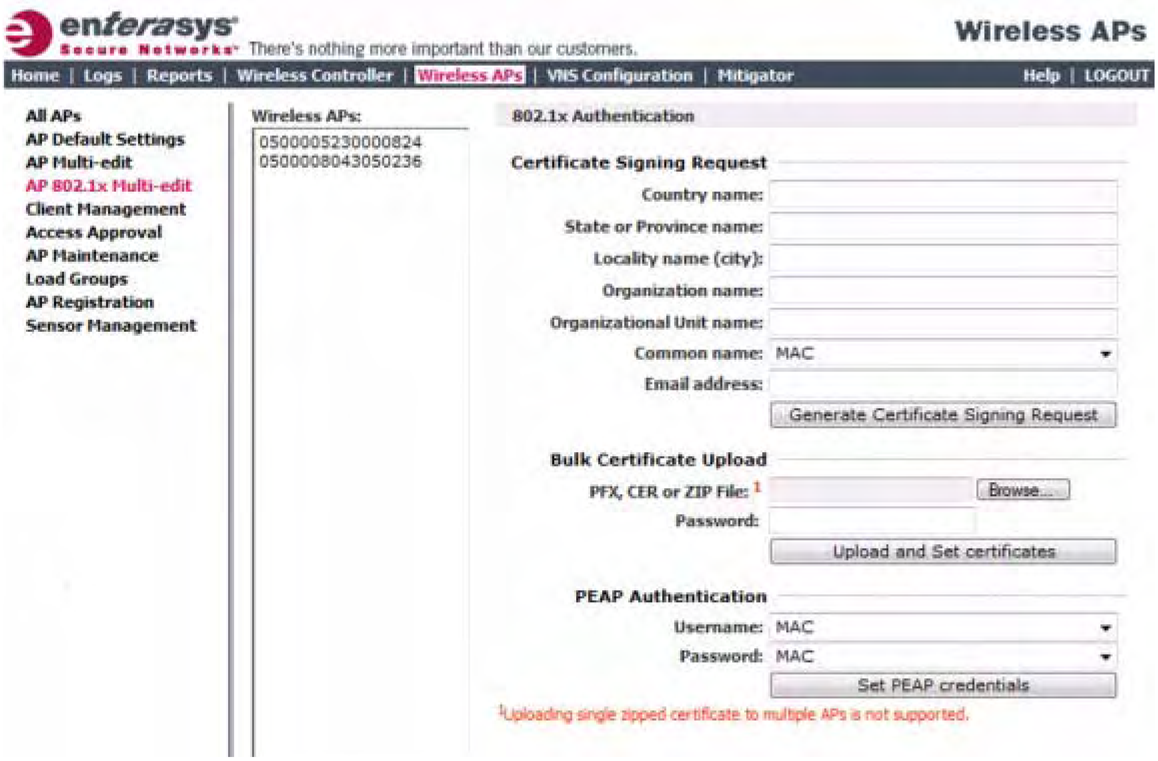
In addition to configuring Wireless APs individually, you can also configure 802.1x authentication for multiple Wireless APs simultaneously by using the AP 802.1x Multi-edit feature.

When you use the AP 802.1x Multi-edit feature, you can choose to:

- Assign EAP-TLS authentication based on generated certificates to multiple Wireless APs by uploading a .pfx, .cer, or .zip file.
- Assign PEAP credentials to multiple Wireless APs based on a user name and password that you define

To Configure 802.1x EAP-TLS Authentication in Proxy Mode Using Multi-edit:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP 802.1x Multi-edit**.



Wireless APs:
0500005230000824
0500008043050236

802.1x Authentication

Certificate Signing Request

Country name:
State or Province name:
Locality name (city):
Organization name:
Organizational Unit name:
Common name: MAC
Email address:

Bulk Certificate Upload

PFX, CER or ZIP File: [1]
Password:

PEAP Authentication

Username: MAC
Password: MAC

[1]Uploading single zipped certificate to multiple APs is not supported.

3. In the Wireless APs list, click one or more Wireless APs to configure. To select multiple Wireless APs, click the Wireless APs from the list while pressing the CTRL key.
4. In the **Certificate Signing Request** section, type the following:
   - **Country name** — The two-letter ISO abbreviation of the name of the country
   - **State or Province name** — The name of the State/Province
   - **Locality name (city)** — The name of the city
   - **Organization name** — The name of the organization
   - **Organizational Unit name** — The name of the unit within the organization

- **Common name** — Click the value you want to assign as the common name of the Wireless AP:
  - **Name** — The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
  - **Serial** — The serial number of the Wireless AP. The Wireless AP serial number cannot be edited.
  - **MAC** — The MAC address of the Wireless AP. The Wireless AP MAC address cannot be edited.
- **Email address** — The email address of the organization

5. Click **Generate Certificates**. The **AP 802.1x Multi-edit progress** window is displayed, which provides the status of the configuration process. Once complete, the **File Download** dialog is displayed.
6. Click **Save**. The **Save as** window is displayed.
7. Navigate to the location on your computer that you want to save the generated **certificate_requests.tar** file, and then click **Save**.

   The **certificate_requests.tar** file contains a certificate request (.csr) file for each Wireless AP.
8. Do one of the following:
   - For each certificate request, generate a certificate using the third-party Certificate Authentication application. This method will produce a certificate for each Wireless AP. Once complete, zip all the certificates files (.cer) into one .zip file.
   - Use one of the certificate requests and generate one certificate using the Certificate Authentication application. This method will produce one certificate that can be applied to all Wireless APs.
9. In the **Bulk Certificate Upload** section, click **Browse**. The **Choose file** window is displayed.
10. Navigate to the location of the file (.zip or .cer), and then click **Open**. The name of the file is displayed in the **PFX, CER or ZIP Archive** box.
11. Click **Upload and Set certificates**. Once complete, the **Settings updated** message is displayed in the footer of the Enterasys Wireless Assistant.

    The 802.1x EAP-TLS authentication configuration is assigned to the Wireless APs. The Wireless APs can now be deployed to 802.1x enabled switch ports.

Configuring 802.1x EAP-TLS Authentication in Pass Through Mode Using Multi-edit:

When you configure 802.1x EAP-TLS authentication in pass through mode using Multi-edit, do one of the following:

- Generate a certificate for each Wireless AP using the third-party Certificate Authentication application. When generating the certificates:
  - Use the Common name value (either Name, Serial, or MAC) of the Wireless AP to name each generated certificate.
  - Use a common password for each generated certificate.
  - All .pfx files created by the third-party Certificate Authentication application must be zipped into one file.
- Generate one certificate, using the third-party Certificate Authentication application, to be applied to all Wireless APs. When generating the certificate, use the Common name value (either Name, Serial, or MAC) of the Wireless AP to name the generated certificate.

To Configure 802.1x EAP-TLS Authentication in Pass Through Mode Using Multi-edit:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP 802.1x Multi-edit**.
3. In the Wireless AP**s** list, click one or more Wireless APs to configure. To select multiple Wireless APs, click the Wireless APs from the list while pressing the CTRL key.
4. In the **Bulk Certificate Upload** section, click **Browse**. The **Choose file** window is displayed.
5. Navigate to the location of the file (.zip or .pfx), and then click **Open**. The name of the file is displayed in the **PFX, CER or ZIP Archive** box.
6. In the **Password** box, type the password used during the certificates generation process.
7. Click **Upload and Set certificates**. Once complete, the **Settings updated** message is displayed in the footer of the Enterasys Wireless Assistant.

   The 802.1x EAP-TLS authentication configuration is assigned to the Wireless APs. The Wireless APs can now be deployed to 802.1x enabled switch ports.

To Configure 802.1x PEAP Authentication Using Multi-edit:

1. From the top menu, click Wireless AP **Configuration**. The Wireless AP screen is displayed.
2. In the left pane, click **AP 802.1x Multi-edit**.
3. In the **Wireless APs** list, click one or more APs to edit. To select multiple APs, click the APs from the list while pressing the CTRL key.
4. In the **PEAP Authentication** section, do the following:
   - In the **Username** drop-down list, click the value you want to assign as the user name credential:
     - **Name —** The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
     - **Serial —** The serial number of the Wireless AP. The Wireless AP serial number cannot be edited.
     - **MAC —** The MAC address of the Wireless AP. The Wireless AP MAC address cannot be edited.
   - In the **Password** drop-down list, click the value you want to assign as the password credential:
     - **Name —** The name of the Wireless AP, which is assigned on the **AP Properties** tab. The Wireless AP name can be edited.
     - **Serial —** The serial number of the Wireless AP. The Wireless AP serial number cannot be edited.
     - **MAC —** The MAC address of the Wireless AP. The Wireless AP MAC address cannot be edited.
5. Click **Set PEAP credentials**. The **AP 802.1x Multi-edit progress** window is displayed, which provides the status of the configuration process. Once complete, the **Settings updated** message is displayed in the footer of the Enterasys Wireless Assistant.

   The 802.1x PEAP authentication configuration is assigned to the Wireless APs. The Wireless APs can now be deployed to 802.1x enabled switch ports.

Configuring the Default Wireless AP Settings

Wireless APs are added with default settings. You can modify the system's Wireless AP default settings, and then use these default settings to configure newly added Wireless APs. In addition, you can base the system's Wireless AP default settings on an existing Wireless AP configuration or you can have configured Wireless APs inherit the properties of the default Wireless AP configuration when they register with the system.

The process of configuring the default Wireless AP settings is divided into up to six tabs:

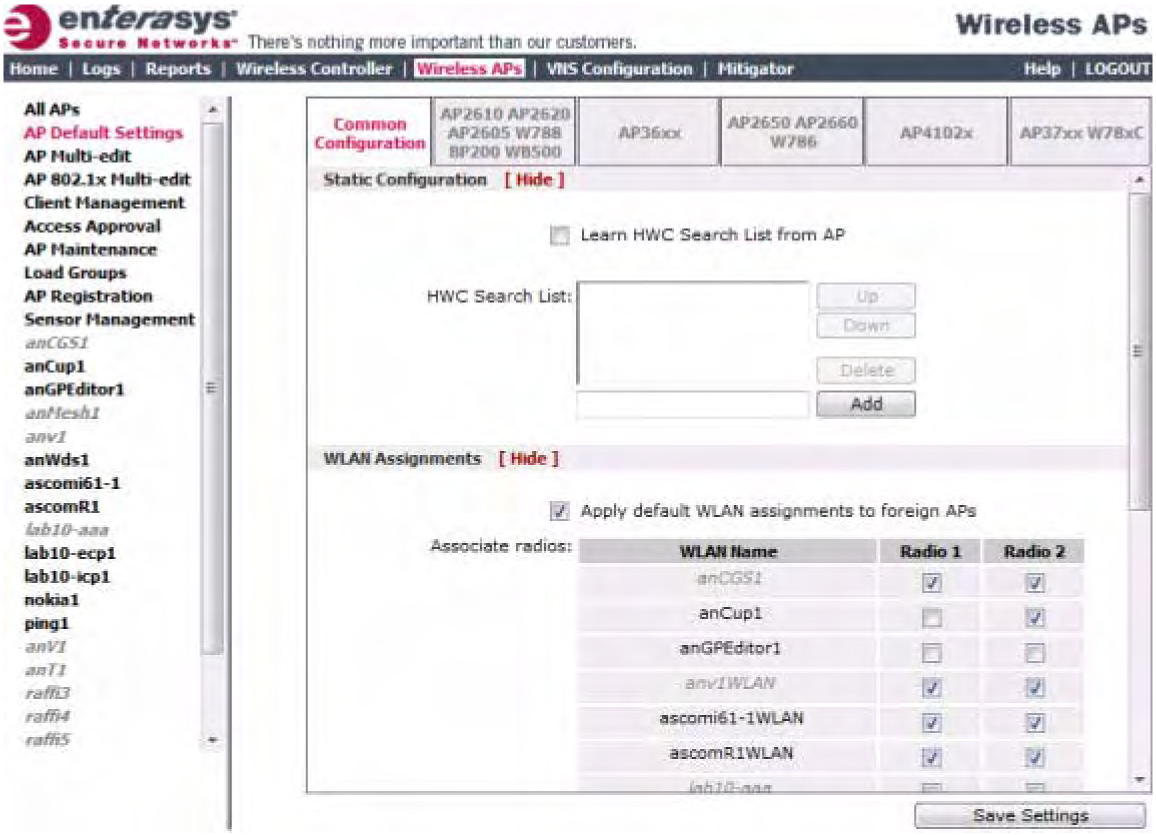
- **Common Configuration** — Configure common configuration, such as WLAN assignments and static configuration options for all Wireless APs. See "Configure Common Configuration Default AP Settings" on page 3-76.
- **AP2610 AP2620 AP2605 W788 BP200 WB500** — Configure the default settings for the standard Wireless APs, and the W788, BP200, and WB500 access points. See "Configure AP2610/20, AP2605, W788, BP200, and WB500 Default AP Settings" on page 3-77.
- **AP36xx** — Configure the default settings for the Wireless 802.11n APs. See "Configure AP36xx Default AP Settings" on page 3-83.
- **AP2650 AP2660 W786** — Configure the default settings for the Enterasys Wireless Outdoor APs and the W786 access points. See "Configure AP2650/60, W786 Default AP Settings" on page 3-89.
- **AP4102x** — Configure the default settings for the AP4102 and the AP4102C access points. See "Configure AP4102x Default AP Settings**" on page 3-95**.
- **AP37xx W78xC**— Configure the default settings for the Wireless 802.11n APs. See "Configure AP37xx, W78xC Default AP Settings" on page 3-101.

Configure Common Configuration Default AP Settings

To Configure Common Configuration Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.

2. In the left pane, click **AP Default Settings**. The **Common Configuration** tab is displayed.



□ Learn HWC Search List from AP

HWC Search List:

☑ Apply default WLAN assignments to foreign APs

Associate radios:

WLAN Name	Radio 1	Radio 2
anCGS1	☑	☑
anCup1	□	☑
anGPEditor1	□	□
anv1WLAN	☑	☑
ascomi61-1WLAN	☑	☑
ascomR1WLAN	☑	☑
lab10-aaa		

3. In the **Static Configuration** section, do one of the following:

   – To allow each Wireless AP to provide its own HWC Search List, select the **Learn HWC Search List from AP** checkbox.

   – To specify a common HWC Search List for all Wireless APs, clear the **Learn HWC Search List from AP** checkbox.

   The Wireless AP is successful when it finds a Enterasys Wireless Controller that will allow it to register.

   This feature allows the Wireless AP to bypass the discovery process. If the **Wireless Controller Search List** box is not populated, the Wireless AP will use SLP unicast/multicast, DNS, or DHCP vendor option 43 to discover a Enterasys Wireless Controller.

   The DHCP function for wireless clients must be provided locally by a local DHCP server, unless each wireless client has a static IP address.

   For the initial Wireless AP deployment, it is necessary to use one of the described options in "Discovery and Registration Overview" on page 3-10.

4. In the **WLAN Assignments** section, assign the **Radios** for each VNS in the list by selecting or clearing the option boxes.

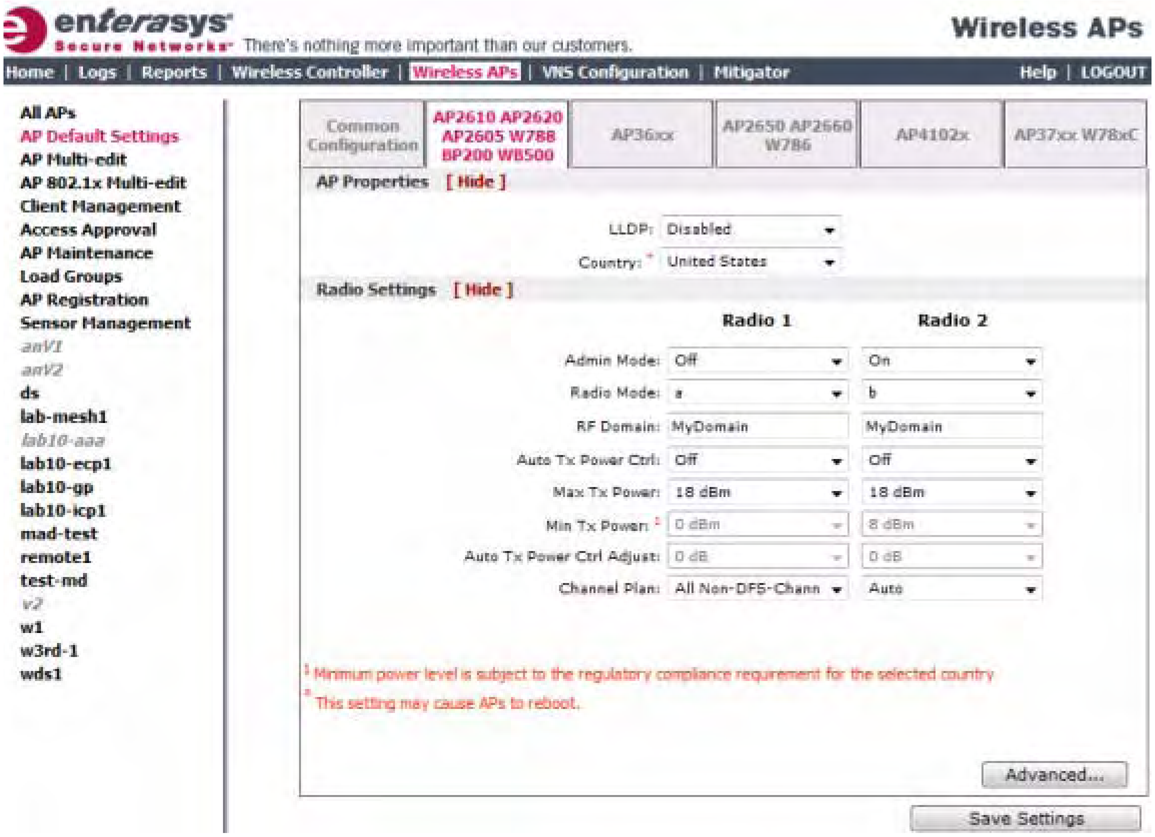
5. To save your changes, click **Save Settings**.

Configure AP2610/20, AP2605, W788, BP200, and WB500 Default AP Settings

To Configure AP2610/20, AP2605, W788, BP200, and WB500 Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.

2. In the left pane, click **AP Default Settings**. The **Common Configuration** tab is displayed.
3. Click the **AP2610 AP2620 AP2605 W788 BP200 WB500** tab.



AP Properties [Hide]

LLDP: Disabled

Country: * United States

Radio Settings [Hide]

	Radio 1	Radio 2
Admin Mode:	Off	On
Radio Mode:	a	b
RF Domain:	MyDomain	MyDomain
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	18 dBm
Min Tx Power: [1]	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Chann	Auto

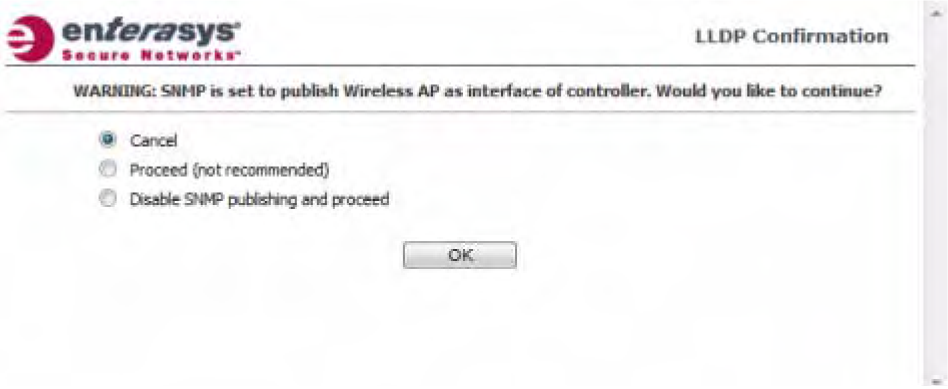
[1] Minimum power level is subject to the regulatory compliance requirement for the selected country

* This setting may cause APs to reboot.

4. In the **AP Properties** section, do the following:

– **LLDP — Click to Enable** or **Disable** the Wireless AP from broadcasting LLDP information. This option is disabled by default.

If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel
○ Proceed (not recommended)
○ Disable SNMP publishing and proceed

– Select one of the following:

- **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.
- **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

For more information on using SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

- **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.
- **Country** — Click the country of operation. This option is only available with certain licenses.

5. In the **Radio Settings** section, do the following for each radio:

   - **Admin mode** — Select On to enable this radio; Select Off to disable this radio.
   - **Radio mode** — Click the radio mode you want to enable:
     - **Radio 1 — a**.
     - **Radio 2 — b**, **g**, or **b/g**.

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

- **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
- **Auto Tx Power Ctrl** — Click to either enable or disable ATPC from the **Auto Tx Power Ctrl** drop-down list. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.
- **Max Tx Power** — Click the appropriate Tx power level from the **Max TX Power** drop-down list. The values in the **Max TX Power** drop-down are in dBm.
- **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted: **0** to **23** (b/g or b/g/n) or **24** (a or a/n) dBm. Enterasys recommends that you use **0 dBm** if you do not want to limit the potential Tx power level range that can be used.
- **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that use **0 dBm** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.
- **Channel Plan** — If ACS is enabled you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an

ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference.

For **Radio 1**, click one of the following:

- **All channels** — ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
- **All Non-DFS Channels** — ACS scans all non-DFS channels for an operating channel. This selection is available when there is at least one DFS channel supported for the selected country.
- **Custom** — To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.

For **Radio 2**, click one of the following:

- **3 Channel Plan** — ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in the rest of the world.
- **4 Channel Plan** — ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **Auto** — ACS will scan the default channel plan channels: **1**, **6**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **Custom** — If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.

6. To modify default access point advanced settings, click **Advanced**. The **Advanced** dialog is displayed.

7. In the **Advanced** dialog **AP Properties** section, do the following:

   - **Poll Timeout** — Type the timeout value, in seconds. The Wireless AP uses this value to trigger re-establishing the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times of **Detect link failure** value on **AP Properties** screen. For more information, see "Session Availability" on page 11-9.

   - **Remote Access** — Click to **Enable** or **Disable** telnet access to the Wireless AP.
   - **location-based service** — Click to **Enable** or **Disable** location-based service on this Wireless AP. location-based service allows you to use this Wireless AP with an AeroScout or Ekahau solution.
   - **Maintain client session in event of poll failure** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) if the AP should remain active if a link loss with the controller occurs.This option is enabled by default.
   - **Restart service in the absence of controller** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) to ensure the Wireless AP continues providing service if the Wireless AP's connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.

- **Use broadcast for disassociation** — Click to **Enable** or **Disable** if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the AP under the following conditions:

  - If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).
  - If a BSSID is deactivated or removed on the Wireless AP.

  This option is disabled by default.

8. In the **Advanced** dialog **Radio Settings** section, do the following:

   - **DTIM** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
   - **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
   - **RTS/CTS** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
   - **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented.
   - **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
   - **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

     Do not change the default setting for the radio that provides service to 802.11 clients only.
   - **Dynamic Channel Selection** — Click one of the following:
     - **Off** — Disables DCS.
     - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
     - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
     - **DCS Noise Threshold** — If DCS is enabled, type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.

- **DCS Channel Occupancy Threshold** — If DCS is enabled, type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
- **DCS Update Period** — If DCS is enabled, type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.

- **Rx Diversity** — Click **Best** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default and recommended selection is **Best**. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Best** if two identical antennas are not used.
- **Tx Diversity** — Click **Alternate** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default selection is **Alternate** that maximizes performance for most clients. However, some clients may behave oddly with Tx Diversity set to **Alternate**. Under those circumstances, Enterasys recommends that you use either **Left** or **Right** for Tx Diversity. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Alternate** if two identical antennas are not used.
- **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short**, **Long**, or **Auto**. The recommended value is **Auto**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.
- **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
- **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
- **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

9. In the **Advanced** dialog **Enhanced Rate Control** section, do the following:
    - **Min Basic Rate** — For each radio, click the minimum data rate that must be supported by all stations in a BSS: **1**, **2**, **5.5**, or **11** Mbps for 11b and 11b+11g modes. Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11g-only mode. Click **6**, **12**, or **24** Mbps for 11a mode. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.
    - **Max Basic Rate** — For each radio, click the maximum data rate that must be supported by all stations in a BSS: **1**, **2**, **5.5**, or **11** Mbps for 11b and 11b+11g modes. Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11g-only mode. Click **6**, **12**, or **24** Mbps for 11a mode. If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.
    - **Max Operational Rate** — For each radio, click the maximum data rate that clients can operate at while associated with the AP: **1**, **2**, **5.5**, or **11** Mbps for 11b-only mode. Click **1**, **2**, **5.5**, **6**, **9**, **11**, **12**, **18**, **24**, **36**, **28**, or **54** Mbps for 11b+11g or 11g-only modes. Click **6**, **9**, **12**, **18**, **24**, **36**, **48**, or **54** Mbps for 11a mode. If necessary, the **Max Operational Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.

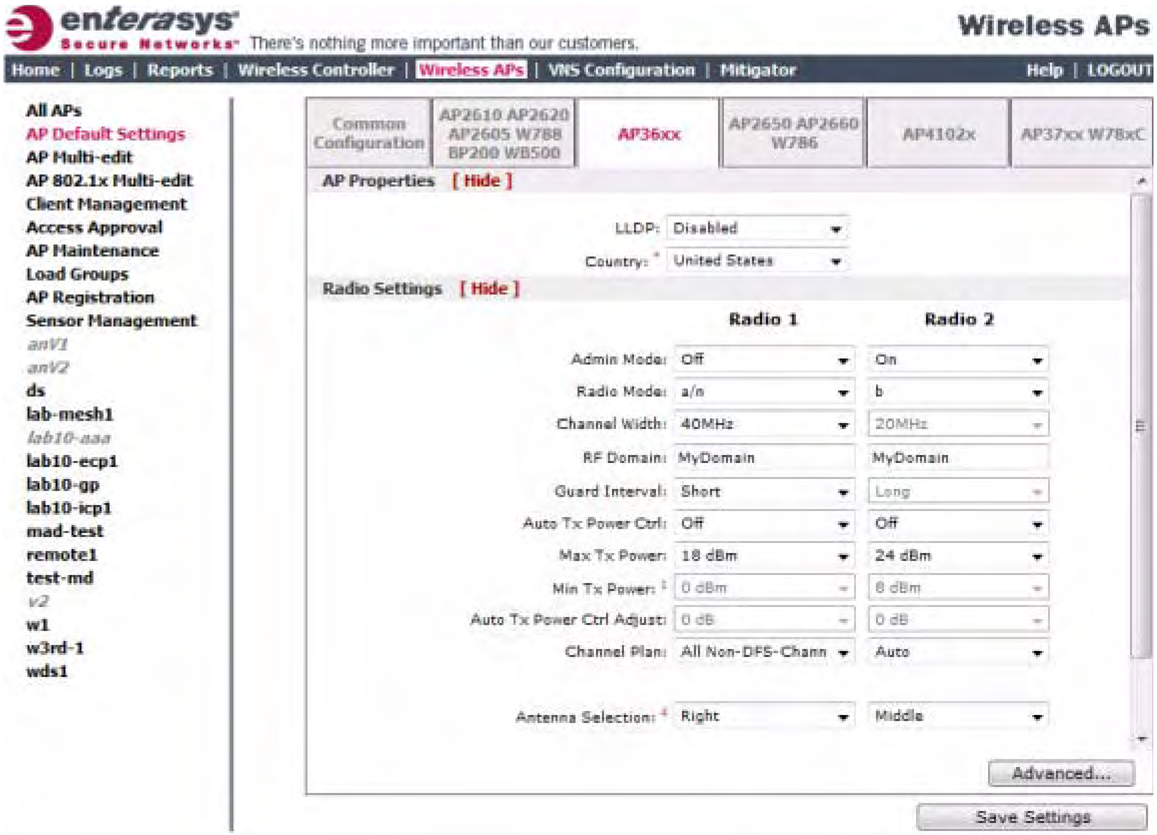
10. In the **Advanced** dialog **No of Retries** section, do the following:
    - **Background BK** — For each radio, click the number of retries for the Background transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Best Effort BE** — For each radio, click the number of retries for the Best Effort transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Video VI** — For each radio, click the number of retries for the Video transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Voice VO** — For each radio, click the number of retries for the Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Turbo Voice TVO** — For each radio, click the number of retries for the Turbo Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
11. Click **Close**. The **Advanced** dialog is closed.
12. To save your changes, click **Save Settings**.

Configure AP36xx Default AP Settings

To Configure AP36xx Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Default Settings**. The **Common Configuration** tab is displayed.

3. Click the **AP36xx** tab.



AP Properties [Hide]

LLDP: Disabled

Country: * United States

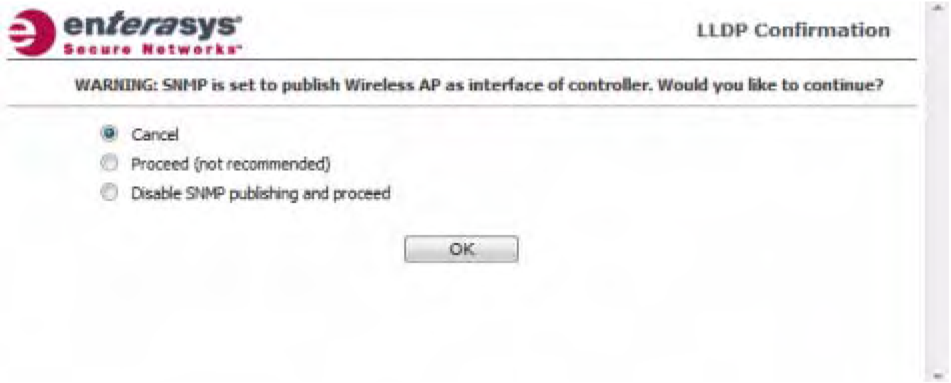
Radio Settings [Hide]

	Radio 1	Radio 2
Admin Mode:	Off	On
Radio Mode:	a/n	b
Channel Width:	40MHz	20MHz
RF Domain:	MyDomain	MyDomain
Guard Interval:	Short	Long
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	24 dBm
Min Tx Power: ¹	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Chann	Auto
Antenna Selection: ⁴	Right	Middle

4. In the **AP Properties** section, do the following:

– **LLDP** — Click to enable or disable the Wireless AP from broadcasting LLDP information. This option is disabled by default.

If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel
○ Proceed (not recommended)
○ Disable SNMP publishing and proceed

– Select one of the following:

- **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.

- **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

For more information on enabling SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

- **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.
- **Country** — Click the country of operation. This option is only available with some licenses.

5. In the **Radio Settings** section, do the following for each radio:

- **Admin Mode** — For radios 1 and 2, Select **Off** to disable the radio or select **On** to enable the radio:
- **Radio mode** — Click the radio mode you want to enable:
  - **Radio 1** — **a**, **a/n,** or **n-strict**.
  - **Radio 2** — **b**, **b/g**, **g, g/n, b/g/n**, or **n-strict.**

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

- **Channel Width** — Click the channel width for the radio:
  - **20MHz** — Click to allow 802.11n clients to use the primary channel (20MHz) and non-802.11n clients, beacons, and multicasts to use the 802.11b/g radio protocols.
  - **40MHz** — Click to allow 802.11n clients that support the 40MHz frequency to use 40MHz, 20MHz, or the 802.11b/g radio protocols. 802.11n clients that do not support the 40MHz frequency can use 20MHz or the 802.11b/g radio protocols and non-802.11n clients, beacons, and multicasts use the 802.11b/g radio protocols.
  - **Auto** — Click to automatically switch between 20MHz and 40MHz channel widths, depending on how busy the extension channel is.
- **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
- **Guard Interval** — Click a guard interval, **Long** or **Short**, when a 40MHz channel is used. Enterasys recommends that you use a short guard interval in small rooms (for example, a small office space) and a long guard interval in large rooms (for example, a conference hall).
- **Auto Tx Power Ctrl** — Click to enable or disable ATPC from the **Auto Tx Power Ctrl** drop-down list. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.

- **Max Tx Power —** Click the appropriate Tx power level from the **Max TX Power** drop-down list. The values in the **Max TX Power** drop-down are in dBm.
- **Min Tx Power —** If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted: **0** to **23** (b/g or b/g/n) or **24** (a or a/n) dBm. Enterasys recommends that you select **0 dBm** to use the entire range of potential Tx power.
- **Auto Tx Power Ctrl Adjust —** If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dBm** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.
- **Channel Plan —** If ACS is enabled, you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference.

  For **Radio 1**, click one of the following:

  - **All channels —** ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
  - **All Non-DFS Channels —** ACS scans all non-DFS channels for an operating channel. This selection is available when there is at least one DFS channel supported for the selected country.
  - **Custom —** To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.

  For **Radio 2**, click one of the following:

  - **3 Channel Plan —** ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in the rest of the world.
  - **4 Channel Plan —** ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
  - **Auto —** ACS will scan the default channel plan channels: **1**, **6**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
  - **Custom —** If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.
- **Antenna Selection —** Click the antenna, or antenna combination, you want to configure on this radio.

  When you configure the Wireless 802.11n AP to use specific antennas, the transmission power is recalculated; the **Current Tx Power Level** value for the radio is automatically adjusted to reflect the recent antenna configuration. It takes approximately 30 seconds for the change to the **Current Tx Power Level** value to be reflected in the Enterasys Wireless Assistant. Also, the radio is reset causing client connections on this radio to be lost.

Note: Antenna Selection is not applicable to the AP3605.

6. To modify default access point advanced settings, click **Advanced**. The **Advanced** dialog is displayed.

7. In the **Advanced** dialog **AP Properties** section, do the following:

   – **Poll Timeout** — Type the timeout value, in seconds. The Wireless AP uses this value to trigger re-establishing the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times of **Detect link failure** value on **AP Properties** screen. For more information, see "Session Availability" on page 11-9.

   – **Remote Access** — Click to **Enable** or **Disable** telnet or SSH access to the Wireless AP.

   – **Location-based service** — Click to **Enable** or **Disable** location-based service on this Wireless AP. Location-based service allows you to use this Wireless AP with an AeroScout solution.

   – **Maintain client session in event of poll failure** — Select this option (if using a bridged at AP VNS) if the AP should remain active if a link loss with the controller occurs.This option is enabled by default.

   – **Restart service in the absence of controller** — Select this option (if using a bridged at AP VNS) to ensure the Wireless AP's radios continue providing service if the Wireless AP's connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.

   – **Use broadcast for disassociation** — Select if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the AP under the following conditions:

     - If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).

     - If a BSSID is deactivated or removed on the Wireless AP.

     This option is disabled by default.

8. In the **Advanced** dialog **Radio Settings** section, do the following:

   – **DTIM** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.

   – **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.

   – **RTS/CTS** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.

   – **Frag. Threshold** — For each radio, type the fragment size threshold, in bytes, above which the packets will be fragmented by the AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.

- **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
- **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

  Do not change the default setting for the radio that provides service to 802.11 clients only.
- **Dynamic Channel Selection** — To enable Dynamic Channel Selection, click one of the following:
  - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
  - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
- **DCS Noise Threshold** — Type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
- **DCS Channel Occupancy Threshold** — Type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
- **DCS Update Period** — Type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
- **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short**, **Long**, or **Auto**. The recommended value is **Auto**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.
- **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
- **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
- **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

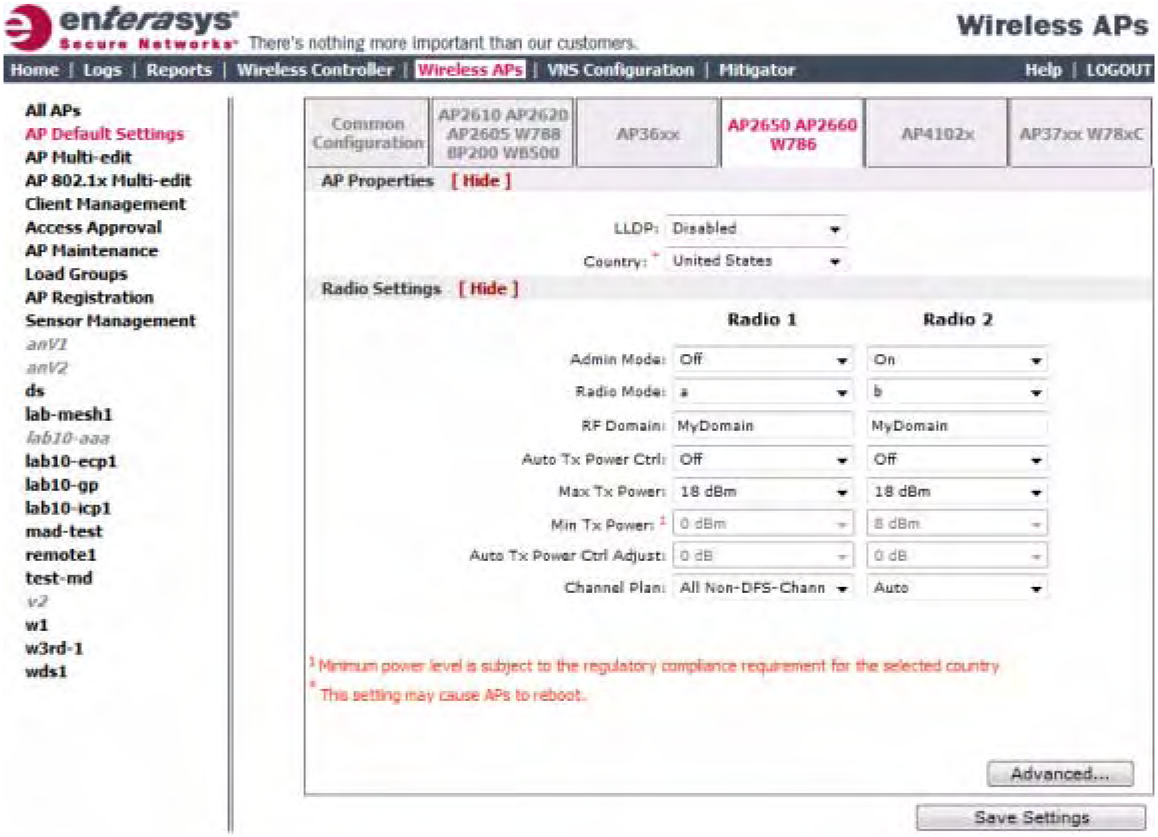
9. In the **Advanced** dialog **11n Settings** section, do the following:
   - **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
   - **Protection Type** — Click a protection type, **CTS Only** or **RTS- CTS**, when a 40MHz channel is used. This protects high throughput transmissions on extension channels from interference from non-11n APs and clients.
   - **40MHz Prot. Channel Offset —** Select a 20MHz channel offset if the deployment is using channels that are 20MHz apart (for example, using channels **1**, **5**, **9**, and **13**) or a 25MHz channel offset if the deployment is using channels that are 25MHz apart (for example, using channels **1**, **6**, and **11**).
   - **40MHz Channel Busy Threshold —** Type the extension channel threshold percentage, which if exceeded, will disable transmissions on the extension channel (40MHz).
   - **Aggregate MSDUs** — Click an aggregate MSDU mode: **Enabled** or **Disabled**. Aggregate MSDU increases the maximum frame transmission size.
   - **Aggregate MPDUs** — Click an aggregate MPDU mode: **Enabled** or **Disabled**. Aggregate MPDU provides a significant improvement in throughput.
   - **Aggregate MPDU Max Length** — Type the maximum length of the aggregate MPDU. The value range is 1024-65535 bytes.
   - **Agg. MPDU Max # of Sub-frames** — Type the maximum number of sub-frames of the aggregate MPDU. The value range is 2-64.
   - **ADDBA Support** — Click an ADDBA support mode: **Enabled** or **Disabled**. ADDBA, or block acknowledgement, provides acknowledgement of a group of frames instead of a single frame. **ADDBA Support** must be enabled if **Aggregate MPDU** is enable.
10. Click **Close**. The **Advanced** dialog is closed.
11. To save your changes, click **Save Settings**.

Configure AP2650/60, W786 Default AP Settings

To Configure AP2650/60, W786 Default Access Point Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Default Settings**. The **Common Configuratio**n tab is displayed.

3. Click the **AP2650 AP2660 W786** tab.



AP Properties

LLDP: Disabled

Country: * United States

Radio Settings

	Radio 1	Radio 2
Admin Mode:	Off	On
Radio Mode:	a	b
RF Domain:	MyDomain	MyDomain
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	18 dBm
Min Tx Power: [1]	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Chann	Auto

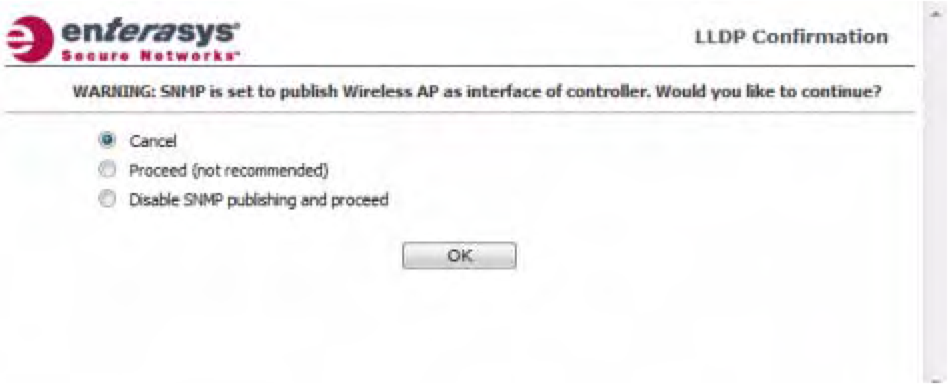
[1] Minimum power level is subject to the regulatory compliance requirement for the selected country

* This setting may cause APs to reboot.

4. In the **AP Properties** section, do the following:

   – **LLDP** — Click to **Enable** or **Disable** the Wireless AP from broadcasting LLDP information. This option is disabled by default.

     If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel

○ Proceed (not recommended)

○ Disable SNMP publishing and proceed

   – Select one of the following:

     - **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.

     - **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

For more information on enabling SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

- **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.

5. **Country** — Click the country of operation. This option is only available with some licenses.
6. In the **Radio Settings** section, do the following for each radio:

- **Admin Mode** — For Radios 1 and 2, Select **Off** to disable the radio or select **On** to enable the radio:
- **Radio mode** — Click the radio mode you want to enable:
  - **Radio 1 — b**, **g**, **b/g**, or **a**.
  - **Radio 2 — b**, **g**, **b/g**, or **a**.

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

- **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
- **Auto Tx Power Ctrl** — Click to either enable or disable ATPC from the **Auto Tx Power Ctrl** drop-down list. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.
- **Max Tx Power** — Click the appropriate Tx power level from the **Max TX Power** drop-down list. The values in the **Max TX Power** drop-down are in dBm.
- **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted: **0** to **23** (b/g or b/g/n) or **24** (a or a/n) dBm. Enterasys recommends that you select **0 dBm** to use the entire range of potential Tx power.
- **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dBm** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.
- **Channel Plan** — If ACS is enabled you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an

ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference.

If you have set the radio to 802.11a, click one of the following:

- **All channels** — ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
- **All Non-DFS Channels** — ACS scans all non-DFS channels for an operating channel. This selection is available when there is at least one DFS channel supported for the selected country.
- **Custom** — To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.

If you have set the radio to 802.11b, g, or b/g, click one of the following:

- **3 Channel Plan** — ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in the rest of the world.
- **4 Channel Plan** — ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **Auto** — ACS will scan the default channel plan channels: **1**, **6**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **Custom** — If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.

7. To modify default access point advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
8. In the **Advanced** dialog **AP Properties** section, do the following:
   - **Poll Timeout** — Type the timeout value, in seconds. The Wireless AP uses this value to trigger re-establishing the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times of **Detect link failure** value on **AP Properties** screen. For more information, see “Session Availability” on page 11-9.

   - **Remote Access** — Click to **Enable** or **Disable** telnet or SSH access to the Wireless AP.
   - **Location-based service** — Click to **Enable** or **Disable** location-based service on this Wireless AP. Location-based service allows you to use this Wireless AP with an AeroScout solution.
   - **Maintain client session in event of poll failure** — Select this option (if using a bridged at AP VNS) if the AP should remain active if a link loss with the controller occurs.This option is enabled by default.
   - **Restart service in the absence of controller** — Select this option (if using a bridged at AP VNS) to ensure the Wireless AP’s radios continue providing service if the Wireless AP’s connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.

- **Use broadcast for disassociation** — Select if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the AP under the following conditions:
  - If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).
  - If a BSSID is deactivated or removed on the Wireless AP.

  This option is disabled by default.

9. In the **Advanced** dialog **Radio Settings** section, do the following:

- **DTIM** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
- **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
- **RTS/CTS** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
- **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.
- **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.
- **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

  Do not change the default setting for the radio that provides service to 802.11 clients only.
- **Dynamic Channel Selection** — Click one of the following:
  - **Off** — Disables DCS.
  - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
  - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
  - **DCS Noise Threshold** — If DCS is enabled, type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.

    - **DCS Channel Occupancy Threshold** — If DCS is enabled, type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
    - **DCS Update Period** — If DCS is enabled, type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
- **Rx Diversity** — Click **Best** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default and recommended selection is **Best**. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Best** if two identical antennas are not used.
- **Tx Diversity** — Click **Alternate** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default selection is **Alternate** that maximizes performance for most clients. However, some clients may behave oddly with Tx Diversity set to **Alternate**. Under those circumstances, Enterasys recommends that you use either **Left** or **Right** for Tx Diversity. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Alternate** if two identical antennas are not used.
- **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short**, **Long**, or **Auto**. The recommended value is **Auto**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.
- **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
- **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
- **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

10. In the **Advanced** dialog **Enhanced Rate Control** section, do the following:
    - **Min Basic Rate** — For each radio, click the minimum data rate that must be supported by all stations in a BSS:
        - Click **1**, **2**, **5.5**, 6or **11** Mbps for 11b-only mode.
        - Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11b+11g mode.
        - Click **6**, **12**, or **24** Mbps for 11a and 11g modes.

      If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.
    - **Max Basic Rate** — For each radio, click the maximum data rate that must be supported by all stations in a BSS:
        - Click **1**, **2**, **5.5**, or **11** Mbps for 11b-only mode.
        - Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11b+11g mode.
        - Click **6**, **12**, or **24** Mbps for 11a and 11g modes.

If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.

– **Max Operational Rate** — For each radio, click the maximum data rate that clients can operate at while associated with the AP:

  - Click **1**, **2**, **5.5**, or **11** Mbps for 11b-only mode.
  - Click **1**, **2**, **5.5**, **6**, **9**, **11**, **12**, **18**, **24**, **36**, **28**, or **54** Mbps for 11b+11g modes.
  - Click **6**, **9**, **12**, **18**, **24**, **36**, **48**, or **54** Mbps for 11a and 11g modes.

  If necessary, the **Max Operational Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.

11. In the **Advanced** dialog **No of Retries** section, do the following:

– **Background BK** — For each radio, click the number of retries for the Background transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

– **Best Effort BE** — For each radio, click the number of retries for the Best Effort transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

– **Video VI** — For each radio, click the number of retries for the Video transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

– **Voice VO** — For each radio, click the number of retries for the Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

– **Turbo Voice TVO** — For each radio, click the number of retries for the Turbo Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.

12. Click **Close**. The **Advanced** dialog is closed.

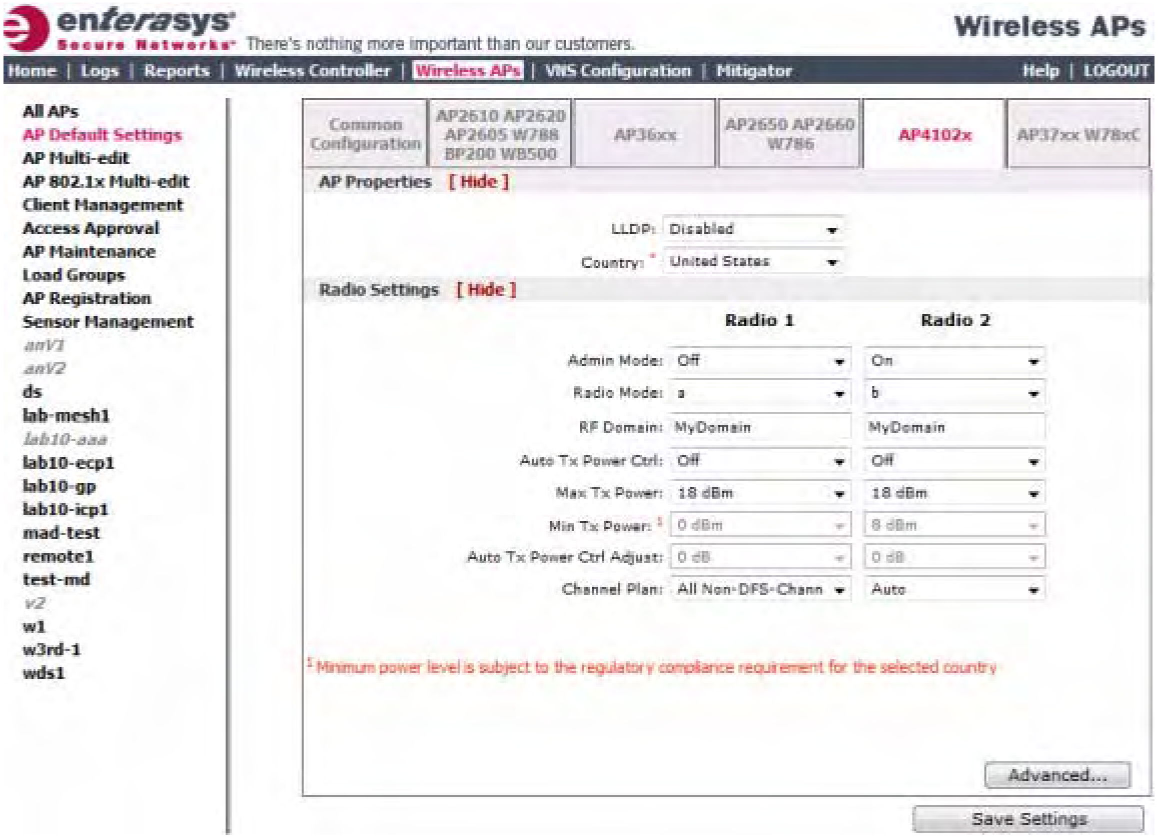
13. To save your changes, click **Save Settings**.

Configure AP4102x Default AP Settings

To Configure AP4102x Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Default Settings**. The **Common Configuration** tab is displayed.

3. Click the **AP4102x** tab.



AP Properties [Hide]

LLDP: Disabled

Country: * United States

Radio Settings [Hide]

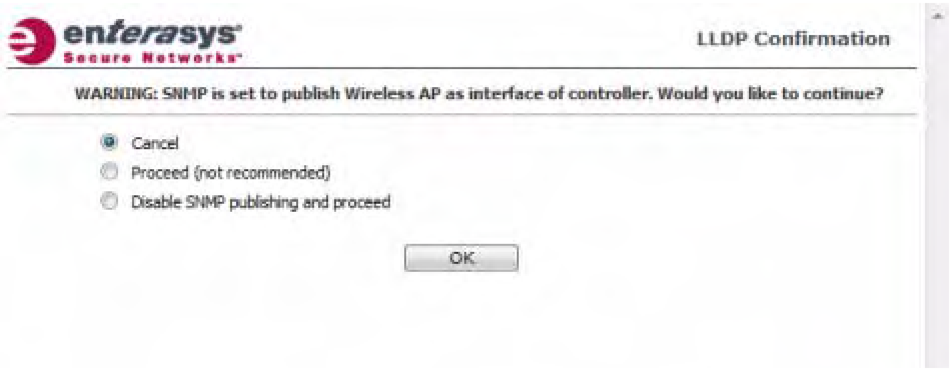
	Radio 1	Radio 2
Admin Mode:	Off	On
Radio Mode:	a	b
RF Domain:	MyDomain	MyDomain
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	18 dBm
Min Tx Power: [1]	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Chann	Auto

[1] Minimum power level is subject to the regulatory compliance requirement for the selected country

4. In the **AP Properties** section, do the following:

   – **LLDP** — Click to **Enable** or **Disable** the Wireless AP from broadcasting LLDP information. This option is disabled by default.

     If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel
○ Proceed (not recommended)
○ Disable SNMP publishing and proceed

   – Select one of the following:

     - **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.
     - **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

     For more information on enabling SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

- **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.
- **Country** — Click the country of operation. This option is only available with some licenses.

5. In the **Radio Settings** section, do the following for each radio:
   - **Admin Mode** — For radios 1 and 2, Select **Off** to disable the radio or select **On** to enable the radio:
   - **Radio mode** — Click the radio mode you want to enable:
     - **Radio 1** — **a**.
     - **Radio 2** — **b**, **g**, or **b/g**.

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

- **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
- **Auto Tx Power Ctrl** — Click to either enable or disable ATPC from the **Auto Tx Power Ctrl** drop-down list. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.
- **Max Tx Power** — Click the appropriate Tx power level from the **Max TX Power** drop-down list. The values in the **Max TX Power** drop-down are in dBm.
- **Min Tx Power** — If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted: **0** to **23** (a) or **24** (b, g, or b/g) dBm. Enterasys recommends that you select **0 dBm** to use the entire range of potential Tx power.
- **Auto Tx Power Ctrl Adjust** — If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dBm** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.
- **Channel Plan** — If ACS is enabled you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference.

For **Radio 1**, click one of the following:

- **All channels** — ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
- **All Non-DFS Channels** — ACS scans all non-DFS channels for an operating channel. This selection is available when there is at least one DFS channel supported for the selected country.
- **Custom** — To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.

For **Radio 2**, click one of the following:

- **3 Channel Plan** — ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in the rest of the world.
- **4 Channel Plan** — ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **Auto** — ACS will scan the default channel plan channels: **1**, **6**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
- **‘Custom** — If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.

6. To modify default access point advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
7. In the **Advanced** dialog **AP Properties** section, do the following:

– **Poll Timeout** — Type the timeout value, in seconds. The Wireless AP uses this value to trigger re-establishing the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times of **Detect link failure** value on **AP Properties** screen. For more information, see “Session Availability” on page 11-9.

– **Remote Access** — Click to **Enable** or **Disable** telnet or SSH access to the Wireless AP.

– **Location-based service** — Click to **Enable** or **Disable** location-based service on this Wireless AP. Location-based service allows you to use this Wireless AP with an AeroScout solution.

– **Maintain client session in event of poll failure** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) if the AP should remain active if a link loss with the controller occurs.This option is enabled by default.

– **Restart service in the absence of controller** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) to ensure the Wireless APs’ radios continue providing service if the Wireless AP’s connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.

– **Use broadcast for disassociation** — Click to **Enable** or **Disable** if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the AP under the following conditions:

- If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).
- If a BSSID is deactivated or removed on the Wireless AP.

This option is disabled by default.

8. In the **Advanced** dialog **Radio Settings** section, do the following:

– **DTIM** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.

– **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.

– **RTS/CTS** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.

– **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.

– **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.

– **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

Do not change the default setting for the radio that provides service to 802.11 clients only.

– **Dynamic Channel Selection** — Click one of the following:

- **Off** — Disables DCS.
- **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
- **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.
- **DCS Noise Threshold** — If DCS is enabled, type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.

    - **DCS Channel Occupancy Threshold** — If DCS is enabled, type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.
    - **DCS Update Period** — If DCS is enabled, type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.
  - **Rx Diversity** — Click **Best** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default and recommended selection is **Best**. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Best** if two identical antennas are not used.
  - **Tx Diversity** — Click **Alternate** for the best signal from both antennas, or **Left** or **Right** to choose either of the two diversity receiving antennas. The default selection is **Alternate** that maximizes performance for most clients. However, some clients may behave oddly with Tx Diversity set to **Alternate**. Under those circumstances, Enterasys recommends that you use either **Left** or **Right** for Tx Diversity. If only one antenna is connected, use the corresponding **Left** or **Right** diversity setting. Do not use **Alternate** if two identical antennas are not used.
  - **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short**, **Long**, or **Auto**. The recommended value is **Auto**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.
  - **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
  - **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.
  - **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

9. In the **Advanced** dialog **Enhanced Rate Control** section, do the following:
   - **Min Basic Rate** — For each radio, click the minimum data rate that must be supported by all stations in a BSS:
     - Click **1**, **2**, **5.5**, 6or **11** Mbps for 11b-only mode.
     - Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11b+11g mode.
     - Click **6**, **12**, or **24** Mbps for 11a and 11g modes.

     If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.
   - **Max Basic Rate** — For each radio, click the maximum data rate that must be supported by all stations in a BSS:
     - Click **1**, **2**, **5.5**, or **11** Mbps for 11b-only mode.
     - Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11b+11g mode.
     - Click **6**, **12**, or **24** Mbps for 11a and 11g modes.

If necessary, the **Max Basic Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**. If both **Min Basic Rate** and **Max Basic Rate** are set to an 11g-specific (OFDM) rate, (for example, **6**, **12**, or **24** Mbps) all basic rates will be 11g-specific.

- **Max Operational Rate** — For each radio, click the maximum data rate that clients can operate at while associated with the AP:
  - Click **1**, **2**, **5.5**, or **11** Mbps for 11b-only mode.
  - Click **1**, **2**, **5.5**, **6**, **9**, **11**, **12**, **18**, **24**, **36**, **28**, or **54** Mbps for 11b+11g modes.
  - Click **6**, **9**, **12**, **18**, **24**, **36**, **48**, or **54** Mbps for 11a and 11g modes.

  If necessary, the **Max Operational Rate** choices adjust automatically to be higher or equal to the **Min Basic Rate**.

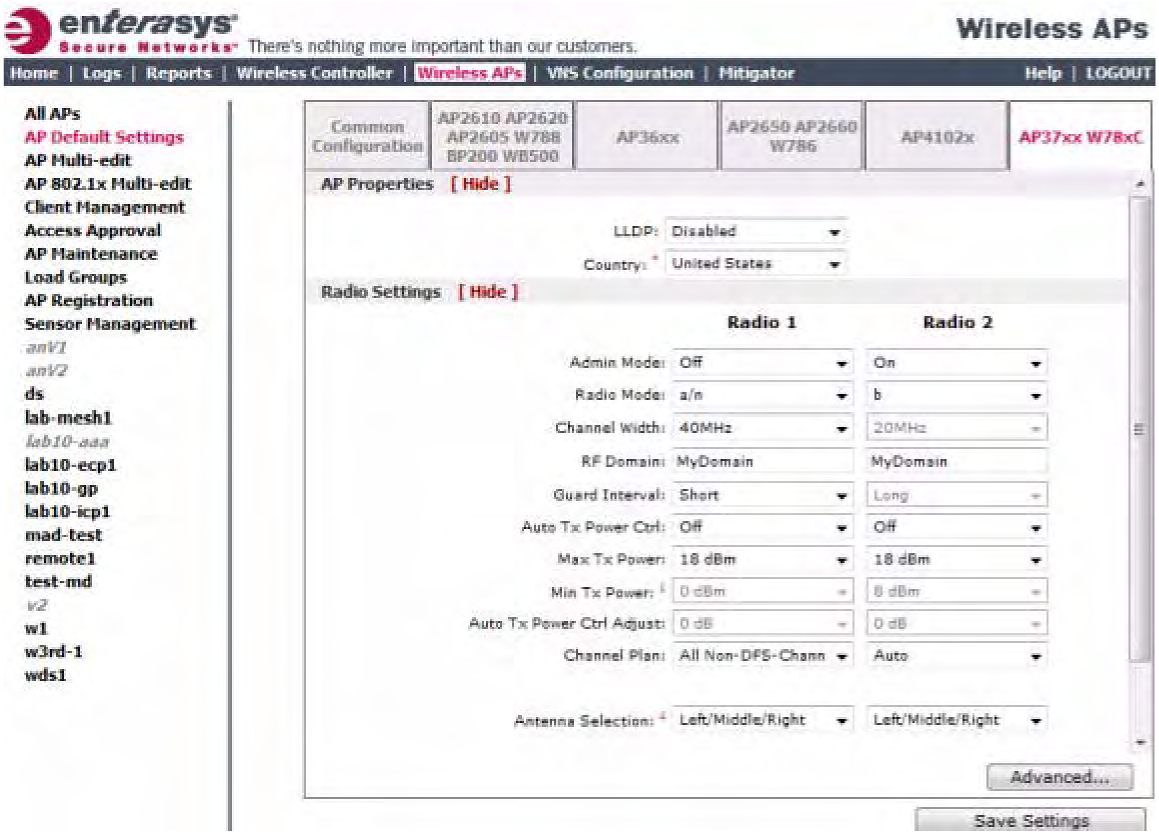
10. In the **Advanced** dialog **No of Retries** section, do the following:
    - **Background BK** — For each radio, click the number of retries for the Background transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Best Effort BE** — For each radio, click the number of retries for the Best Effort transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Video VI** — For each radio, click the number of retries for the Video transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Voice VO** — For each radio, click the number of retries for the Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
    - **Turbo Voice TVO** — For each radio, click the number of retries for the Turbo Voice transmission queue. The default value is **adaptive (multi-rate)**. The recommended setting is **adaptive (multi-rate)**.
11. Click **Close**. The **Advanced** dialog is closed.
12. To save your changes, click **Save Settings**.

Configure AP37xx, W78xC Default AP Settings

To Configure AP37xx, W78xC Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Default Settings**. The **Common Configuration** tab is displayed.

3. Click the **AP37xx W78xC** tab.



AP Properties [Hide]

LLDP: Disabled

Country: * United States

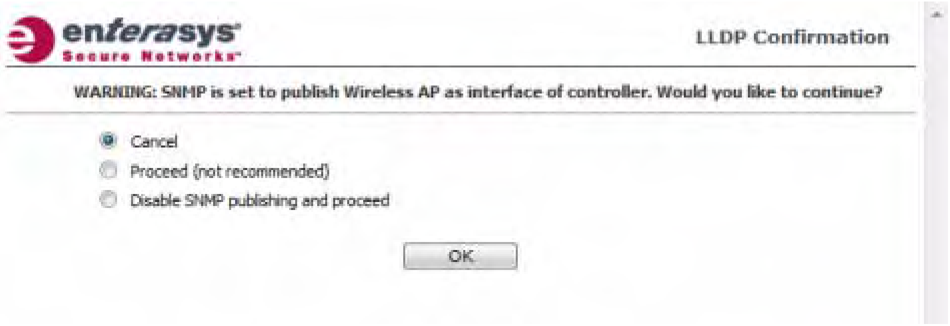
Radio Settings [Hide]

	Radio 1	Radio 2
Admin Mode:	Off	On
Radio Mode:	a/n	b
Channel Width:	40MHz	20MHz
RF Domain:	MyDomain	MyDomain
Guard Interval:	Short	Long
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	18 dBm
Min Tx Power:	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Chann	Auto
Antenna Selection: *	Left/Middle/Right	Left/Middle/Right

4. In the **AP Properties** section, do the following:

   – **LLDP** — Click to **Enable** or **Disable** the Wireless AP from broadcasting LLDP information. This option is disabled by default.

   If SNMP is enabled on the Enterasys Wireless Controller and you enable LLDP, the **LLDP Confirmation** dialog is displayed.



WARNING: SNMP is set to publish Wireless AP as interface of controller. Would you like to continue?

● Cancel
○ Proceed (not recommended)
○ Disable SNMP publishing and proceed

   – Select one of the following:

      - **Proceed (not recommended)** — Select this option to enable LLDP and keep SNMP running, and then click **OK**.

      - **Disable SNMP publishing, and proceed** — Select this option to enable LLDP and disable SNMP, and then click **OK**.

   For more information on enabling SNMP, see the Enterasys Wireless Convergence Software *Maintenance Guide*.

- **Announcement Interval** — If LLDP is enabled, type how often the Wireless AP advertises its information by sending a new LLDP packet. This value is measured in seconds.

  If there are no changes to the Wireless AP configuration that impact the LLDP information, the Wireless AP sends a new LLDP packet according to this schedule.

Note: The **Time to Live** value cannot be directly edited. The **Time to Live** value is calculated as four times the **Announcement Interval** value.

- **Announcement Delay** — If LLDP is enabled, type the announcement delay. This value is measured in seconds. If a change to the Wireless AP configuration occurs which impacts the LLDP information, the Wireless AP sends an updated LLDP packet. The announcement delay is the length of time that delays the new packet delivery. The announcement delay helps minimize LLDP packet traffic.
- **Country** — Click the country of operation. This option is only available with some licenses.

5. In the **Radio Settings** section, do the following for each radio:
   - **Admin Mode** — For radios 1 and 2, Select **Off** to disable the radio or select **On** to enable the radio:
   - **Radio mode** — Click the radio mode you want to enable:
     - **Radio 1 — a**, **a/n,** or **n-strict**.
     - **Radio 2 — b**, **b/g**, **g, g/n, b/g/n**, or **n-strict.**

Note: Depending on the radio modes you select, some of the radio settings may not be available for configuration.

- **Channel Width** — Click the channel width for the radio:
  - **20MHz** — Click to allow 802.11n clients to use the primary channel (20MHz) and non-802.11n clients, beacons, and multicasts to use the 802.11b/g radio protocols.
  - **40MHz** — Click to allow 802.11n clients that support the 40MHz frequency to use 40MHz, 20MHz, or the 802.11b/g radio protocols. 802.11n clients that do not support the 40MHz frequency can use 20MHz or the 802.11b/g radio protocols and non-802.11n clients, beacons, and multicasts use the 802.11b/g radio protocols.
  - **Auto** — Click to automatically switch between 20MHz and 40MHz channel widths, depending on how busy the extension channel is.
- **RF Domain** — Type a string that uniquely identifies a group of APs that cooperate in managing RF channels and transmission power levels. The maximum length of the string is 16 characters. The RF Domain is used to identify a group of Wireless APs.
- **Guard Interval** — Click a guard interval, **Long** or **Short**, when a 40MHz channel is used. Enterasys recommends that you use a short guard interval in small rooms (for example, a small office space) and a long guard interval in large rooms (for example, a conference hall).
- **Auto Tx Power Ctrl** — Click to either enable or disable ATPC from the **Auto Tx Power Ctrl** drop-down list. ATPC automatically adapts transmission power signals according to the coverage provided by the Wireless APs. After a period of time, the system will stabilize itself based on the RF coverage of your Wireless APs.
- **Max Tx Power** — Click the appropriate Tx power level from the **Max TX Power** drop-down list. The values in the **Max TX Power** drop-down are in dBm.

- **Min Tx Power —** If ATPC is enabled, click the minimum Tx power level to which the range of transmit power can be adjusted: **0** to **23** (b/g or b/g/n) or **24** (a or a/n) dBm. Enterasys recommends that you select **0 dBm** to use the entire range of potential Tx power.
- **Auto Tx Power Ctrl Adjust —** If ATPC is enabled, click the Tx power level that can be used to adjust the ATPC power levels that the system has assigned. Enterasys recommends that you use **0 dBm** during your initial configuration. If you have an RF plan that recommends Tx power levels for each Wireless AP, compare the actual Tx power levels your system has assigned against the recommended values your RF plan has provided. Use the **Auto Tx Power Ctrl Adjust** value to achieve the recommended values.
- **Channel Plan —** If ACS is enabled you can define a channel plan for the Wireless AP. Defining a channel plan allows you to limit which channels are available for use during an ACS scan. For example, you may want to avoid using specific channels because of low power, regulatory domain, or radar interference.
- **Antenna Selection —** Click the antenna, or antenna combination, you want to configure on this radio.

  For **Radio 1**, click one of the following:

  - **All channels —** ACS scans all channels for an operating channel and returns both DFS and non-DFS channels, if available.
  - **All Non-DFS Channels —** ACS scans all non-DFS channels for an operating channel. This selection is available when there is at least one DFS channel supported for the selected country.
  - **Custom —** To configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Custom Channel Plan** dialog displays. By default, all channels participate in the channel plan. Click the individual channels you want to include in the channel plan. To select contiguous channels, use the Shift key. To select multiple, non-contiguous channels in the list, use the CTRL key. Click **OK** to save the configuration.

  For **Radio 2**, click one of the following:

  - **3 Channel Plan —** ACS will scan the following channels: **1**, **6**, and **11** in North America, and **1**, **7**, and **13** in the rest of the world.
  - **4 Channel Plan —** ACS will scan the following channels: **1**, **4**, **7**, and **11** in North America, and **1**, **5**, **9**, and **13** in the rest of the world.
  - **Auto —** ACS will scan the default channel plan channels: **1**, **6**, and **11** in the North America, and **1**, **5**, **9**, and **13** in the rest of the world.
  - **Custom —** If you want to configure individual channels from which the ACS will select an operating channel, click **Configure**. The **Add Channels** dialog is displayed. Click the individual channels you want to add to the channel plan while pressing the CTRL key, and then click **OK**.

6. To modify default access point advanced settings, click **Advanced**. The **Advanced** dialog is displayed.
7. In the **Advanced** dialog **AP Properties** section, do the following:
   - **Poll Timeout —** Type the timeout value, in seconds. The Wireless AP uses this value to trigger re-establishing the link with the Enterasys Wireless Controller if it (Wireless AP) does not get an answer to its polling. The default value is 10 seconds.

Note: If you are configuring session availability, the **Poll Timeout** value should be 1.5 to 2 times of **Detect link failure** value on **AP Properties** screen. For more information, see “Session Availability” on page 11-9.

- **Remote Access** — Click to **Enable** or **Disable** telnet or SSH access to the Wireless AP.
- **Location-based service** — Click to **Enable** or **Disable** location-based service on this Wireless AP. Location-based service allows you to use this Wireless AP with an AeroScout solution.
- **Maintain client session in event of poll failure** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) if the AP should remain active if a link loss with the controller occurs.This option is enabled by default.
- **Restart service in the absence of controller** — Click to **Enable** or **Disable** (if using a bridged at AP VNS) to ensure the Wireless APs’ radios continue providing service if the Wireless AP’s connection to the Enterasys Wireless Controller is lost. If this option is enabled, it allows the Wireless AP to start a bridged at AP VNS even in the absence of a Enterasys Wireless Controller.
- **Use broadcast for disassociation** — Click to **Enable** or **Disable** if you want the Wireless AP to use broadcast disassociation when disconnecting all clients, instead of disassociating each client one by one. This will affect the behavior of the AP under the following conditions:
  - If the Wireless AP is preparing to reboot or to enter one of the special modes (DRM initial channel selection).
  - If a BSSID is deactivated or removed on the Wireless AP.

  This option is disabled by default.
- **Real Capture** — Click **Start** to start real capture server on the AP. This feature can be enabled for each AP individually. Statistics are captured using an external connection to a Windows WireShark client. In Wireshark, by selecting the remote APs’ IP address and null authentication, the wired and enabled wireless interfaces are listed as available for capture. Default capture server timeout is set to 300 seconds and the maximum configurable timeout is 1 hour. Capture statistics are found on the Active Wireless APs report (see Viewing Statistics for Wireless APs).

8. In the **Advanced** dialog **Radio Settings** section, do the following:
   - **DTIM** — Type the desired DTIM (Delivery Traffic Indication Message) period — the number of beacon intervals between two DTIM beacons. To ensure the best client power savings, use a large number. For example, 5. Use a small number to minimize broadcast and multicast delay. The default value is **5**.
   - **Beacon Period** — Type the desired time, in milliseconds, between beacon transmissions. The default value is **100** milliseconds.
   - **RTS/CTS** — Type the packet size threshold, in bytes, above which the packet will be preceded by an RTS/CTS (Request to Send/Clear to Send) handshake. The default value is **2346**, which means all packets are sent without RTS/CTS. Reduce this value only if necessary.
   - **Frag. Threshold** — Type the fragment size threshold, in bytes, above which the packets will be fragmented by the AP prior to transmission. The default value is **2346**, which means all packets are sent unfragmented. Reduce this value only if necessary.
   - **Max % of non-unicast traffic per Beacon period** — Enter the maximum percentage of time that the AP will transmit non-unicast packets (broadcast and multicast traffic) for each configured Beacon Period. For each non-unicast packet transmitted, the system calculates the airtime used by each packet and drops all packets that exceed the

configured maximum percentage. By restricting non-unicast traffic, you limit the impact of broadcasts and multicasts on overall system performance.

– **Maximum Distance** — Enter a value from 100 to 15,000 meters that identifies the maximum link distance between APs that participate in a WDS. This value ensures that the acknowledgement of communication between APs does not exceed the timeout value predefined by the 802.11 standard. The default value is 100 meters. If the link distance between APs is greater than 100 meters, configure the maximum distance up to 15,000 meters so that the software increases the timeout value proportionally with the distance between APs.

  Do not change the default setting for the radio that provides service to 802.11 clients only.

– **Dynamic Channel Selection** — Click one of the following:

  - **Off** — Disables DCS.
  - **Monitor Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated.
  - **Active Mode** — If traffic or noise levels exceed the configured DCS thresholds, an alarm is triggered and an information log is generated. In addition, the Wireless AP will cease operating on the current channel and ACS is employed to automatically select an alternate channel for the Wireless AP to operate on.

– **DCS Noise Threshold** — If DCS is enabled, type the noise interference level, measured in dBm, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.

– **DCS Channel Occupancy Threshold** — If DCS is enabled, type the channel utilization level, measured as a percentage, after which ACS will scan for a new operating channel for the Wireless AP if the threshold is exceeded.

– **DCS Update Period** — If DCS is enabled, type the time, measured in minutes that determines the period during which the Wireless AP averages the **DCS Noise Threshold** and **DCS Channel Occupancy Threshold** measurements. If either one of these thresholds is exceeded, then the Wireless AP will trigger **ACS**.

– **Preamble** — Click a preamble type for 11b-specific (CCK) rates: **Short**, **Long**, or **Auto**. The recommended value is **Auto**. Click **Short** if you are sure that there is no pre-11b AP or a client in the vicinity of this AP. Click **Long** if compatibility with pre-11b clients is required.

– **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.

– **Protection Rate** — Click a protection rate: **1**, **2**, **5.5**, or **11** Mbps. The default and recommended setting is **11**. Only reduce the rate if there are many 11b clients in the environment or if the deployment has areas with poor coverage. For example, rates lower than **11** Mbps are required to ensure coverage.

– **Protection Type** — Click a protection type: **CTS Only** or **RTS CTS**. The default and recommended setting is **CTS Only**. Click **RTS CTS** only if an 11b AP that operates on the same channel is detected in the neighborhood, or if there are many 11b-only clients in the environment.

– **Min Basic Rate** — For each radio, click the minimum data rate that must be supported by all stations in a BSS: **1**, **2**, **5.5**, or **11** Mbps for 11b and 11b+11g modes. Click **1**, **2**, **5.5**, **6**, **11**, **12**, or **24** Mbps for 11g-only mode. Click **6**, **12**, or **24** Mbps for 11a mode.

9. In the **Advanced** dialog **11n Settings** section, do the following:
   - **Protection Mode** — Click a protection mode: **None**, **Auto**, or **Always**. The default and recommended setting is **Auto**. Click **None** if 11b APs and clients are not expected. Click **Always** if you expect many 11b-only clients.
   - **Protection Type** — Click a protection type, **CTS Only** or **RTS- CTS**, when a 40MHz channel is used. This protects high throughput transmissions on extension channels from interference from non-11n APs and clients.
   - **40MHz Prot. Channel Offset** — Select a 20MHz channel offset if the deployment is using channels that are 20MHz apart (for example, using channels **1**, **5**, **9**, and **13**) or a 25MHz channel offset if the deployment is using channels that are 25MHz apart (for example, using channels **1**, **6**, and **11**).
   - **40MHz Channel Busy Threshold** — Type the extension channel threshold percentage, which if exceeded, will disable transmissions on the extension channel (40MHz).
   - **Aggregate MSDUs** — Click an aggregate MSDU mode: **Enabled** or **Disabled**. Aggregate MSDU increases the maximum frame transmission size.
   - **Aggregate MPDUs** — Click an aggregate MPDU mode: **Enabled** or **Disabled**. Aggregate MPDU provides a significant improvement in throughput.
   - **Aggregate MPDU Max Length** — Type the maximum length of the aggregate MPDU. The value range is 1024-65535 bytes.
   - **Agg. MPDU Max # of Sub-frames** — Type the maximum number of sub-frames of the aggregate MPDU. The value range is 2-64.
   - **ADDBA Support** — Click an ADDBA support mode: **Enabled** or **Disabled**. ADDBA, or block acknowledgement, provides acknowledgement of a group of frames instead of a single frame. **ADDBA Support** must be enabled if **Aggregate MPDU** is enabled.
   - **LDPC** — Click an LDPC mode: **Enabled** or **Disabled**. LDPC increases the reliability of the transmission resulting in a 2dB increased performance compared to traditional 11n coding.
   - **STBC** — Click an STBC mode: **Enabled** or **Disabled**. STBC is a simple open loop transmit diversity scheme. When enabled, STBC configuration is 2x1 (one spatial stream split into two space-time streams). TXBF will override STBC if both are enabled for single stream rates.
   - **TXBF** — Click an TXBF mode: **Enabled** or **Disabled**. Tx Beam Forming focuses transmission beams directly at the intended receiver while reducing the overall interference generated by the transmitter.
10. Click **Close**. The **Advanced** dialog is closed.
11. To save your changes, click **Save Settings**.

Modifying a Wireless AP's Properties Based on a Default AP Configuration

If you have a Wireless AP that is already configured with its own settings, but would like the Wireless AP to be reset to use the system's default AP settings, use the **Reset to Defaults** feature on the **AP Properties** tab.

To Configure a Wireless AP with the System's Default AP Settings:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.

2. In the Wireless AP list, click the Wireless AP whose properties you want to modify. The **AP Properties** tab displays Wireless AP information.
3. To have the Wireless AP inherit the system’s default AP settings, click **Reset to Defaults**. A pop-up dialog asking you to confirm the configuration change is displayed.
4. To confirm resetting the Wireless AP to the default settings, click **OK**.

Caution: If you reset an AP to defaults, its Search List will be deleted, regardless of the settings in Common Configuration.

Modifying the Wireless AP’s Default Setting Using the Copy to Defaults Feature

You can modify the system’s default AP settings by using the **Copy to Defaults** feature on the **AP Properties** tab. This feature allows the properties of an already configured Wireless AP to become the system’s default Wireless AP settings.

To Modify the System’s Default AP Settings Based on an Already Configured AP:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the Wireless AP list, click the Wireless AP whose properties you want to become the system’s default AP settings. The **AP Properties** tab is displayed.
3. If applicable, modify the Wireless AP’s properties. For more information, see “Configuring a Wireless AP’s Properties” on page 3-31.
4. To make this Wireless AP’s configuration be the system’s default AP settings, click **Copy to Defaults**. A pop-up dialog asking you to confirm the configuration change is displayed.
5. To confirm resetting the system’s default Wireless AP settings, click **OK**.

Configuring Multiple Wireless APs Simultaneously

In addition to configuring Wireless APs individually, you can also configure multiple Wireless APs simultaneously by using the **AP Multi-edit** function. Configuring Wireless APs simultaneously is similar to modifying the system’s default AP settings or individual Wireless APs.

When selecting which Wireless APs to configure simultaneously, you can use the following criteria:

- Select the Wireless APs by hardware type
- Select the Wireless APs individually

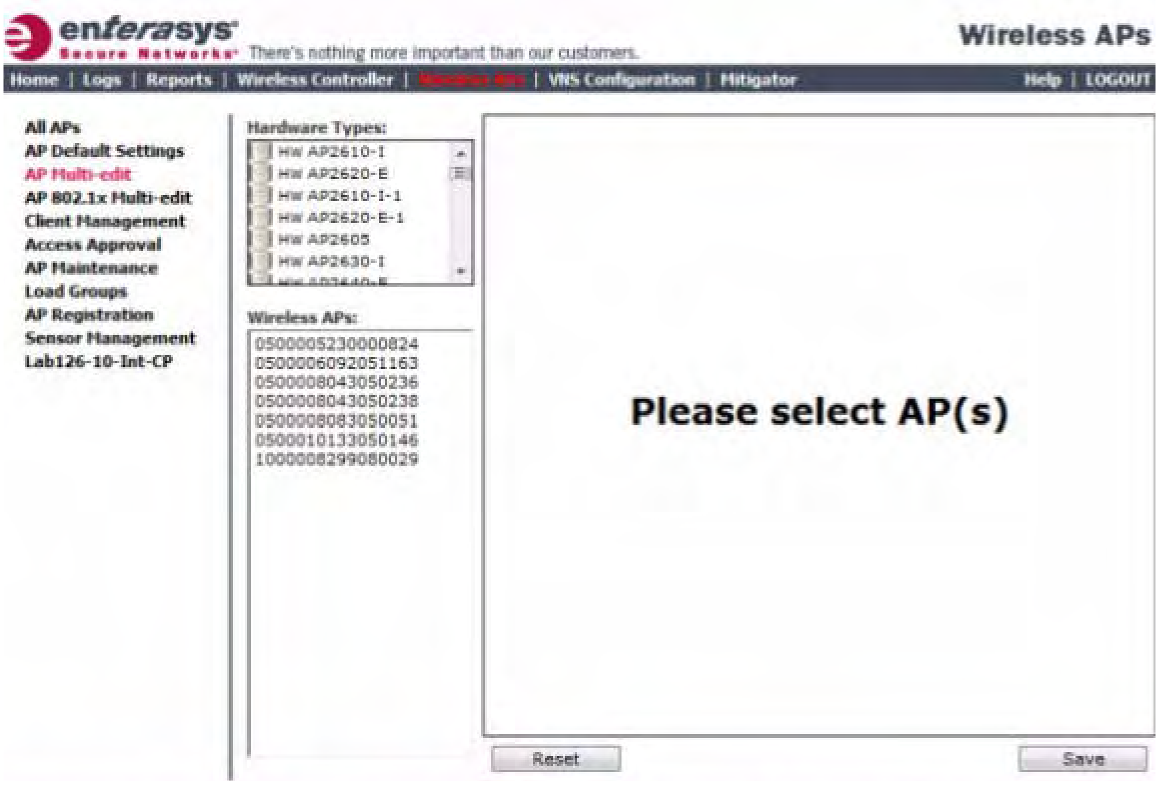
You can select multiple hardware types and individual Wireless APs by pressing the Ctrl key and selecting the hardware types and specific Wireless APs.

When you configure multiple Wireless APs using the **AP Multi-edit** screen, it is important to note that for some Wireless AP settings to be available for configuration, other Wireless AP settings must be enabled or configured first.

Note: Only settings and options supported by all of the currently selected hardware types are available for configuring.

To Configure Wireless APs Simultaneously:

1. From the top menu, click **Wireless APs**. The Wireless AP screen is displayed.
2. In the left pane, click **AP Multi-edit**.



Hardware Types:

- HW AP2610-I
- HW AP2620-E
- HW AP2610-I-1
- HW AP2620-E-1
- HW AP2605
- HW AP2630-I
- HW AP2640-E

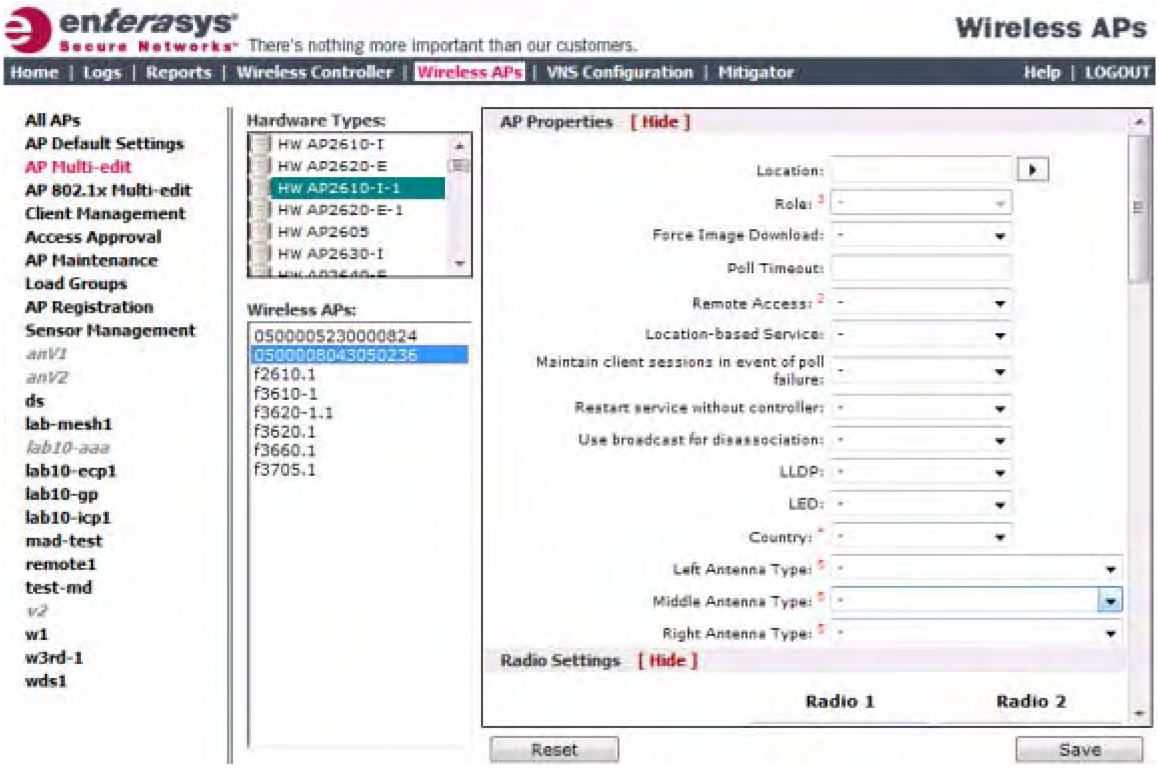
Wireless APs:

0500005230000824
0500006092051163
0500008043050236
0500008043050238
0500008083050051
0500010133050146
1000008299080029

Please select AP(s)

3. Do one of the following:
   - In the **Hardware Types** list, click one or more Wireless AP hardware types.

– In the **Wireless APs** list, click one or more Wireless APs to edit. To click multiple Wireless APs, click the APs from the list while pressing the CTRL key. The AP profile page displays.



Note: When using the **Multi-edit** function, any box or option that is not explicitly modified will not be changed by the update.

The Wireless APs shown in the Wireless APs list can be from any version of the software. Only attributes that are common between software versions will be available. Attempting to set an attribute that does not apply for an AP will not abort the multi-edit operation.

Field/Button	Description
Hardware Types	The Wireless AP hardware model.
Wireless APs	The name assigned to the Wireless AP.
AP Properties	For more information, see “Configuring a Wireless AP’s Properties” on page 3-31.
Radio Settings	For more information, see “Configuring Wireless AP Radio Properties” on page 3-36.
Static Configuration	
HWC Search List	Click one of the following: • **Clear search list** — Click to clear previously assigned Enterasys Wireless Controllers that were configured to control this Wireless AP. • **Re-configure search list** — Click to assign Enterasys Wireless Controllers to control this Wireless AP. This causes the Add box to become available.

Field/Button	Description
Add box	Enter the IP address of the Enterasys Wireless Controller that will control this Wireless AP. This box is available only if you selected **Re-configure search list** when configuring the search list. Click the Add button to add the IP address to the list. Repeat to add additional Enterasys Wireless Controllers. The maximum is three Enterasys Wireless Controllers. Click **Up** and **Down** to modify the order of the Enterasys Wireless Controllers. The Wireless AP is successful when it finds a Enterasys Wireless Controller that will allow it to register. This feature allows the Wireless AP to bypass the discovery process. If the **HWC Search List** is not populated, the Wireless AP will use SLP unicast/multicast, DNS, or DHCP vendor option 43 to discover a Enterasys Wireless Controller. For the initial Wireless AP deployment, it is necessary to use one of the described options in “Discovery and Registration Overview” on page 3-10.
Tunnel MTU	Enter a static MTU value, from 600 to 1500. If the Enterasys wireless software cannot discover the MTU size, it enforces the static MTU size. Set the MTU size to allow the source to reduce the packet size and avoid the need to fragment data packets in the tunnel.
WLAN Assignments	
WLAN Assignments	From the drop-down list, click one of the following: • **Clear WLAN list** — Click to clear previously assigned WLAN services of the Wireless APs. • **Re-configure WLAN list** — Click to assign WLAN services to the Wireless APs. In the **Radio 1** and **Radio 2** columns, select the Wireless AP radios that you want to assign for each WLAN service.
Save	Click to save your changes.

Configuring Co-located APs in Load Balance Groups

You can configure APs that are co-located in an open area, such as a classroom, a conference hall, or an entrance lobby, to act as a load balance group. Load balancing distributes clients across the co-located APs that are members of the load balance group. The co-located APs should provide the same SSID, have Line-of-Sight (LoS) between each other, and be deployed on multiple channels with overlapping coverage.

You must assign an AP’s radio to the load balance group for the client distribution to occur. Load balancing occurs only among the assigned AP radios of the load balance group. Each radio can be assigned only to one load balance group. Multiple radios on the same AP do not have to be in the same load balance group. The radios that you assign to the load balance group must be on APs that are controlled by the same Enterasys Wireless Controller.

The load balance group uses one or more WLAN services for all APs assigned to the load balance group. You can configure two types of load balance groups:

You can configure two types of load groups:

- Client Balancing load group – preforms load balancing based on the number of clients across all APs in the group and only for the WLANs assigned to the load group. This is different from load control in the Radio Preference group— load control APs make decisions in isolation from each other.
- Radio Preference load group – performs band preference steering and load control. Band preference steering is a mechanism to move 11a-capable clients to the 11a radio on the AP, relieving congestion on the 11g radio. No balancing is done between the 11a and 11g radios. Load control is disabled by default. A radio load group executes band preference steering and/or load control across the radios on each AP in the group. Each AP balances in isolation from the other APs, but all APs in the load group have the same configuration related to the band preference and load control.

Client balancing on the Enterasys Wireless Controller is AP-centric and requires no input from the client. The AP radios in the client balance group share information with secure (AES) SIAPP (Siemens Inter-AP Protocol) messaging using multicast on the wired network. All APs in a client balance group must be in the same SIAPP cluster to ensure that each AP can reach all other APs in the client balance group over the wired subnet. If the APs in a client balance group are not in same SIAPP cluster, client balancing will happen independently within the subgroups defined by SIAPP clusters.

The benefits of configuring your co-located APs that are controlled by the same Enterasys Wireless Controller as a client balance group are the following:

- Resource sharing of the balanced AP
- Efficient use of the deployed 2.4 and 5 GHz channels
- Reduce client interference by distributing clients on different channels
- Scalable 802.11 deployment: if more clients need to be served in the area, additional APs can be deployed on a new channel

You can assign a maximum of 32 APs to a client balance group. Table 3-25 lists the maximum number of load balance groups for each Enterasys Wireless Controller.

Table 3-25 Maximum Number of Load Balance Groups

Enterasys Wireless Controller	Number of load balance groups
C20	8
C4110	32
C5100	64
C25	8
V2110	32

Currently, the following Wireless AP models support load balance groups:

- AP3605
- AP3610
- AP3620
- AP3630 (in fit mode only)
- AP3640 (in fit mode only)
- AP3660