AirGuard WiMesh 3e-523 Series

Models: 3e–523A, 3e-523S, 3e-523E-900, and 3e-523M (OEM Module)

User's Guide

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October 2015 29000169-005 Revision C1

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Table of Contents

1. Introduction

This manual covers the installation and operation of the Ultra Electronics, 3eTI AirGuard WiMesh Series model numbers: 3e–523 family of products. These rugged secure data points have been designed and tested for use in harsh demanding environments were durability is a key requirement. The 3e-523 product family consists of the 3e-523A, 3e-523S, 3e-523M and the 3e-523E-900 (hereinafter referred to as the 3e-523, unless otherwise specified).

The 3e-523 includes FIPS-140-2 certified AES/3DES cryptographic modules for wireless encryption and HTTPS/TLS, for secure web communication.

The cryptographic modules provide the following encryption capabilities.

- AES (128/192/256 bit)
- AES-CCM (128 bit)

1.1 Basic Features

The AirGuard WiMesh 3e-523 family of products is made up of four different products each designed to meet specific user needs and requirements. This section provides a general overview of interfaces and specific capabilities of each product. A more detailed description of the different products can be found in the product specific chapters found later in this manual.

The WiMesh End Point 3e-523A provides the following interfaces:

- One RJ-45 10 / 100 Mbps WAN Ethernet port for remote management and for interfacing to a wired network.
- Two 802.11a/b/g antenna ports.
- One DB-15 RS-232/422/485 & power connector.
- Device Reset button, provides ability to reset device to either user programmed configuration or factory default.
- Device grounding connector.

The 3e-523A provides the following LED indicator lights:

- FIPS LED
- WLAN LED

The WiMesh PAC-Link 3e-523S portable adaptive com-link provides the following interfaces:

- One RJ-45 10 / 100 Mbps WAN Ethernet port for remote management and for interfacing to a wired network.
- One DB-9 RS-232 serial port for configuration or interfacing to a sensor.
- One 802.11a/b/g antenna port.
- One external power switch.

The 3e-523S provides the following LED indicator lights:

- FIPS LED

- WLAN LED

The WiMesh 3e-523E-900 unit provides the following interfaces:

- One RJ-45 10 / 100 Mbps WAN Ethernet cable entry port for remote management and for interfacing to a wired network.
- One 900 MHz N-type female jack antenna connector.
- One power entry port.
- Device grounding connector.

The WiMesh End Point OEM Module 3e-523M provides the following interface:

- One RJ-45 10 / 100 Mbps WAN Ethernet port for remote management and for interfacing to a wired network.
- Two 802.11a/b/g antenna ports.
- One 16 pin RS-232/422/485 & Power connector.
- One 14 pin connector which brings out LED and Advanced Feature Signals.

1.2 Wireless Basics

Wireless networking uses electromagnetic radio frequency waves to transmit and receive data. Communication occurs by establishing radio links between the wireless access point and devices configured to be part of the WLAN.

The 3e-523 incorporates 802.11 Wi-Fi standards, and FIPS 140-2 compliant security for wireless communication.

802.11a - The IEEE 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. Depending on radio design and RF channel issues 802.11a devices can operation at rates between the 54 Mbps maximum and 6 Mbps. 802.11a uses an Orthogonal Frequency Division Multiplexing (OFDM) encoding scheme rather than Frequency-Hopping Spread Spectrum (FHSS) or Direct-Sequence Spread Spectrum (DSSS).

802.11b - The IEEE 802.11b compliant devices provide 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps depending on signal strength) in the 2.4 GHz band. 802.11b devices operate using Direct-Sequence Spread Spectrum (DSSS) modulation techniques. Note that for the 3e-523E-900 this is the only mode used, and controls to change this are not available in the configuration software.

802.11g - The IEEE 802.11g standard is an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 2.4 GHz band. Depending on radio design and RF channel issues 802.11g devices can operation at rates between the 54 Mbps maximum and 6 Mbps. Like the 802.11a standard

802.11g uses an Orthogonal Frequency Division Multiplexing (OFDM) encoding scheme for data transmission.

Because 802.11g is backwards-compatible with 802.11b, it is a popular component in LAN construction. 802.11g broadens 802.11b's data rates to 54 Mbps within the 2.4 GHz band providing higher data transmission rates.

802.11b/g Mixed - 802.11b/g combines 802.11b and 802.11g data rates to offer a broader range of operation.

1.2.1 Bridging / Mesh Operation

The 3e-523 functions as a bridge. There are a number of bridging configurations supported, including the following popular configurations:

- Point-to-point bridging of 2 Ethernet Links.
- Point-to-multipoint bridging (mesh) of several Ethernet links.
- Repeater mode (wireless client to wireless bridge).

1.2.2 Access Point Operation

The 3e-523 functions as an access point. In this mode of operation the 3e-523 provides wireless networking to multiple client devices while providing connectivity into a local area network (LAN).

1.2.3 Client Operation

The 3e-523 can functions as a wireless client. In this mode of operation the 3e-523 acts as a wireless endpoint providing a communication link into a wireless Local Area Network (LAN) network.

1.2.4 Data Encryption and Security

The 3e-523 includes advanced wireless security features. Bridging encryption can be established between the 3e-523 using AES-ECB or AES-CCM encryption (approved by the National Institute of Standards and Technology (NIST) for U.S. Government and DoD agencies). There is also the option of no security, but some level of security is recommended.

AES - The Advanced Encryption Standard (AES) was selected by National Institute of Standards and Technology (NIST) in October 2000 as an upgrade from the previous DES standard. AES uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information. It has the ability to use even larger 192-bit and 256-bit keys, if desired.

802.11i and WPA2 employ AES CCM, which is a combination of AES Counter (CTR) mode per packet data encryption, combined with AES Cipher Block Chaining

Message Authentication Code (CBC-MAC) per packet data integrity / authentication of the entire packet including the MAC header. AES CCMP has been deemed to surpass the RC4 stream cipher, upon which the older WEP and WPA security protocols are based. 3eTI was the first company to take its AES algorithm through the NIST CCM algorithm certification process, thereby ensuring that 3eTI's AES CCMP is standards-based, non-proprietary, and ready for wide WPA2 interoperability usage.

Operation Authentication - Authentication mechanisms are used to authenticate an operator accessing the device and to verify that the operator is authorized to assume the requested role and perform services within that role.

Access to the management screens for the 3e-523 requires knowledge of the assigned operator ID and Password. The Factory defaults are:

- ID: CryptoOfficer
- Password: CryptoFIPS

The Crypto Officer initially installs and configures the 3e-523 after which the password should be changed from the default password. The ID and Password are case sensitive.

1.3 Device Management and Administration

After initial setup, maintenance of the system and programming of security functions should be performed by personnel trained in the procedure using the embedded web-based management screens.

The next chapter covers the basic procedure for configuration of 3e-523 devices. Table 1 provides a listing of the page organization of the 3e-523 data points.

1.4 Product Family Navigation Options

The next chapter covers the basic procedure for setting up the hardware. Table 1 provides an overview of the web GUI screens and menu structure for used to manage and administer 3e-523 devices

Table 1 - 3e–523 Data Point Navigation Options

System Configuration
General
Operating Mode
System Deployment
WAN
Serial Port
WLAN QoS/WMM
Wireless AP & Bridge
Radio
Bridge Mode
Bridge Encryption
Bridge MAC Filtering
AP Encryption
Wireless VLAN
AP MAC Filtering
Rogue AP Detection
AP Advanced
Services Settings
SNMP Agent
Serial Communication
Remote Administration
Admin User Management
List All Users
Add New User
User Login Policy

Monitoring/Reports
System Status
Bridging Status
Bridging Site Map
Wireless Clients
Adjacent AP List
Logs
System Log
Web Access Log
Auditing
Audit Log
Report Query
Configuration
System Administration
Email Notification Conf
Radio Tx Off Control
System Upgrade
Factory Default
Remote Logging
Reboot
On Demand Self-Test
Periodic Self Test
Utilities
Help

2. Device Configuration

2.1 Preliminary Configuration Steps

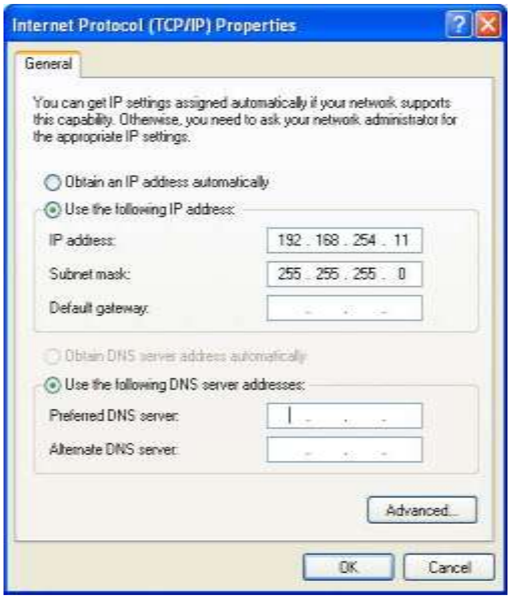
For the initial configuration, the 3e–523 network administrator may need the following information:

- IP address – a list of IP addresses available on the organization's LAN that are available to be used for assignment to the 3e–523.
- Subnet Mask for the LAN.
- Default IP address of the 3e–523 (192.168.254.254)
- Local maintenance port IP address (192.168.15.1)
- DNS IP address.
- The MAC addresses of wireless card that will be used to access the 3e–523 network of Access Points (if manual bridging mode is used, or if MAC address filtering is to be enabled).
- The appropriate encryption key for Static AES or AEC_CCM, if state-of-the art key management will be used. Alternately, the appropriate WEP key.
- Default CW IP address

Initial Setup using the LAN Ethernet Port - Plug one end of an RJ-45 Ethernet cable to the LAN RJ-45 Ethernet port of the 3e–523 and the other end to an Ethernet port on your laptop. In order to connect properly to the 3e–523 on the LAN port, the TCP/IP parameters on your laptop must be set to a static IP address. Go to your network connection settings and modify your LAN connection TCP/IP properties.

Set the IP address and subnet mask. The IP address can be in the range of 192.168.254.xxx, where xxx can be from 2 to 253 (see Figure 1).

Figure 1 - Internet Protocol Properties



You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 254 . 11

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: . . .

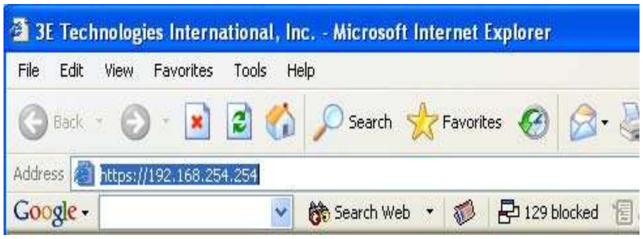
Alternate DNS server: . . .

Now you can open a browser and connect to the 3e–523 to begin configuring the unit.

Login - On your computer, pull up a browser window and put the default URL for the3e–523 Local LAN in the address line (Figure 2).

https://192.168.254.254

Figure 2 - Login

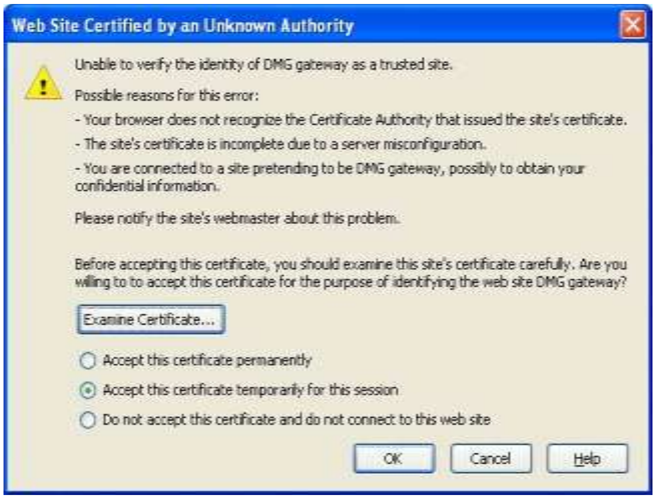


3E Technologies International, Inc. - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back
Search
Favorites
Google
Search Web
129 blocked

Address https://192.168.254.254

A warning window appears stating that it is unable to verify the identity of DMG gateway as a trusted site. Select "Accept this certificate temporarily for this session" and click Ok (Figure 3).

Figure 3 - Web site certification



Web Site Certified by an Unknown Authority

Unable to verify the identity of DMG gateway as a trusted site.

Possible reasons for this error:

- Your browser does not recognize the Certificate Authority that issued the site's certificate.
- The site's certificate is incomplete due to a server misconfiguration.
- You are connected to a site pretending to be DMG gateway, possibly to obtain your confidential information.

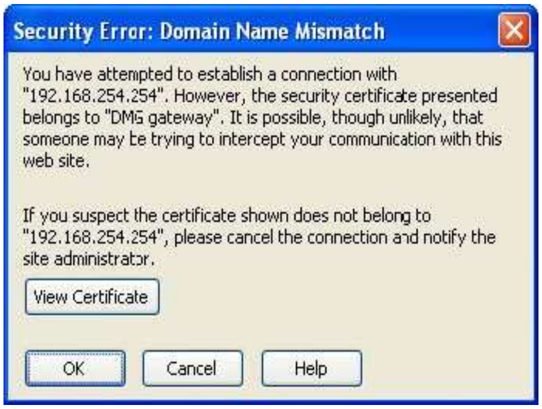
Please notify the site's webmaster about this problem.

Before accepting this certificate, you should examine this site's certificate carefully. Are you willing to to accept this certificate for the purpose of identifying the web site DMG gateway?

○ Accept this certificate permanently
● Accept this certificate temporarily for this session
○ Do not accept this certificate and do not connect to this web site

Another security window pops open. Click Ok to continue (Figure 4).

Figure 4 - Security window



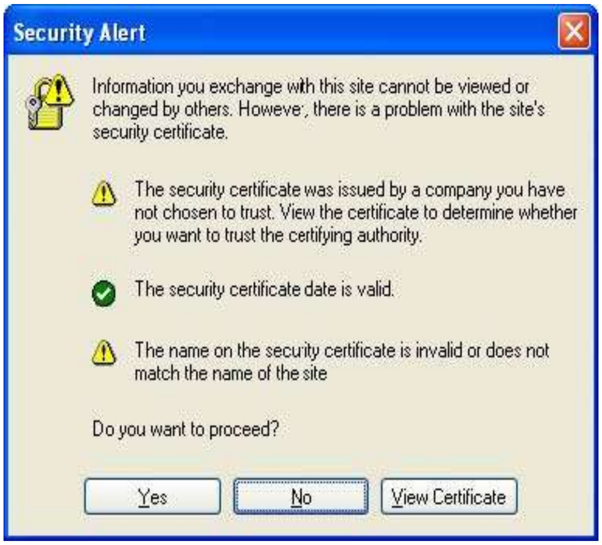
Security Error: Domain Name Mismatch

You have attempted to establish a connection with "192.168.254.254". However, the security certificate presented belongs to "DMG gateway". It is possible, though unlikely, that someone may be trying to intercept your communication with this web site.

If you suspect the certificate shown does not belong to "192.168.254.254", please cancel the connection and notify the site administrator.

A standard security alert window (Figure 5) appears. Click Yes to continue.

Figure 5 - Security alert window



Security Alert

Information you exchange with this site cannot be viewed or changed by others. However, there is a problem with the site's security certificate.

The security certificate was issued by a company you have not chosen to trust. View the certificate to determine whether you want to trust the certifying authority.

The security certificate date is valid.

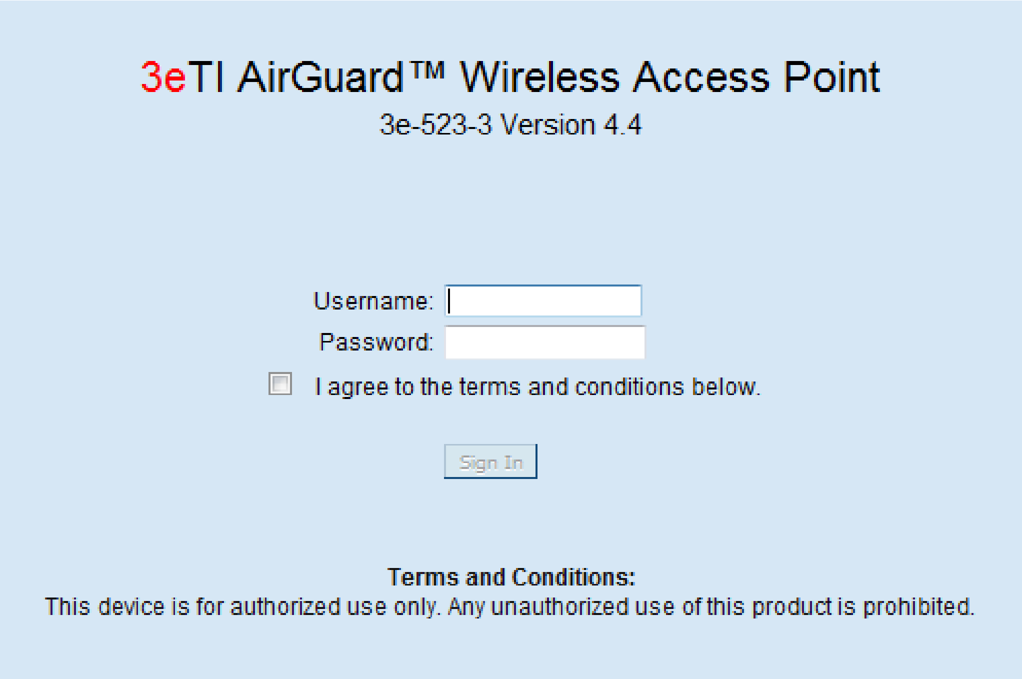
The name on the security certificate is invalid or does not match the name of the site

Do you want to proceed?

The Device Login window appears (Figure6).

You will be asked for your User Name and Password. The default is "CryptoOfficer" with the password "CryptoFIPS" to give full access for setup configuration. (This user name and password is case-sensitive.)

Figure6–Login



3eTI AirGuard™ Wireless Access Point

3e-523-3 Version 4.4

Username:

Password:

□ I agree to the terms and conditions below.

Terms and Conditions:

This device is for authorized use only. Any unauthorized use of this product is prohibited.

NOTE: If your login session is in-active for more than 10 minutes, then you will have to re-authenticate your identity. If after three times you fail to re-authenticate then your account will be locked. The exception is if you are the last active CryptoOfficer on the system, then your account will not be locked. The Admin User Management - List All Users screen displays account status. If an account is locked, it will show a status of "Locked" and a reason of "bad passwd". Other accounts show status as "Active" and reason "Normal".

The CryptoOfficer is the only role that can unlock an account once it has been locked. Go to the **Admin User Management - List All Users** screen and click the unlock button at the end of the user entry.

Data Point Configuration and Operating Modes - To begin configuration of the 3e-523 Data Points you first must select the mode of operation. 3e-523 devices can operate in one of four different modes. Valid operating modes are provided in the following list below:

- Standalone Access Point operation.
- Standalone Bridge operation.
- Mixed Access Point and Bridge operation.
- Client only operation.

The following subsections how to configure and operate 3e-523 Data Points.

2.2 System Configuration

There are six options under **System Configuration**:

- General
- Operating Mode
- System Deployment
- WAN
- Serial Port
- WLAN QoS/WMM

Each screen is described in detail in the following subsections.

2.2.1 General

Upon access the 3e-523 web GUI, you will immediately be directed to the **System Configuration - General** screen(

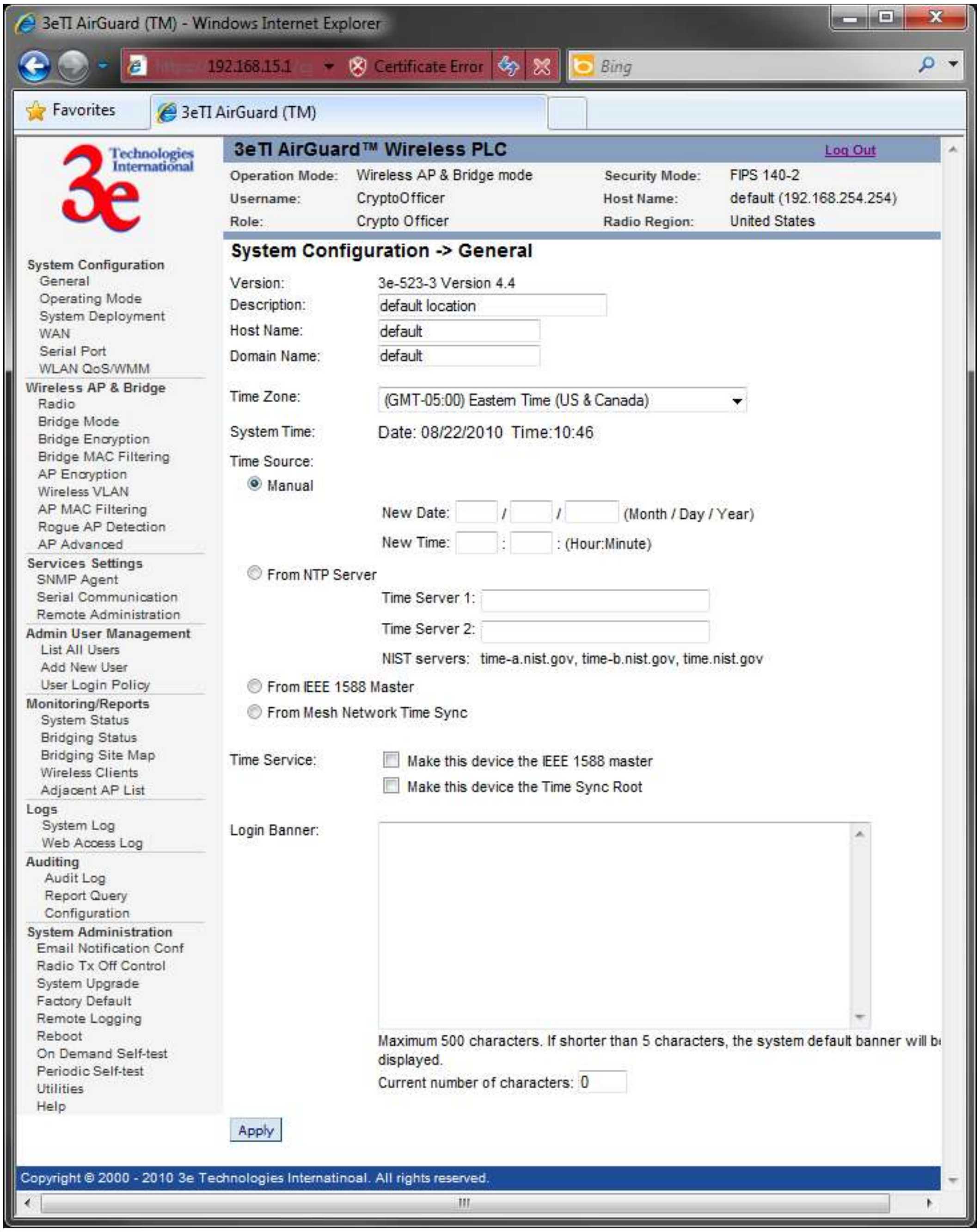
Figure 7).

This screen lists the firmware version number for your unit and allows you to set the Host Name and Domain Name as well as establish system date and time. (Host and Domain Names are both set at the factory for "default" but can optionally be assigned a unique name for each.) To set the date and time, you can do it manually or set it based on the NTP server.

NOTE: The CryptoOfficer is the only user who can set the date and time. The system date must be set to a date after 01/01/2005.

In the Description field you can enter a description of the physical location of the unit. This is useful when deploying units to remote locations. When you are satisfied with your changes, click **Apply**.

Figure 7 - System Configuration – General



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> General

Version: 3e-523-3 Version 4.4
Description: default location
Host Name: default
Domain Name: default

Time Zone: (GMT-05:00) Eastern Time (US & Canada)

System Time: Date: 08/22/2010 Time:10:46

Time Source:
● Manual
New Date: / / (Month / Day / Year)
New Time: : (Hour:Minute)
○ From NTP Server
Time Server 1:
Time Server 2:
NIST servers: time-a.nist.gov, time-b.nist.gov, time.nist.gov
○ From IEEE 1588 Master
○ From Mesh Network Time Sync

Time Service: □ Make this device the IEEE 1588 master
□ Make this device the Time Sync Root

Login Banner:

Maximum 500 characters. If shorter than 5 characters, the system default banner will b
displayed.
Current number of characters: 0

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Next go next to the System Configuration - Operating Mode page.

2.2.2 Operating Mode

This screen (Figure 8) allows you to set the operating mode to one of the following:

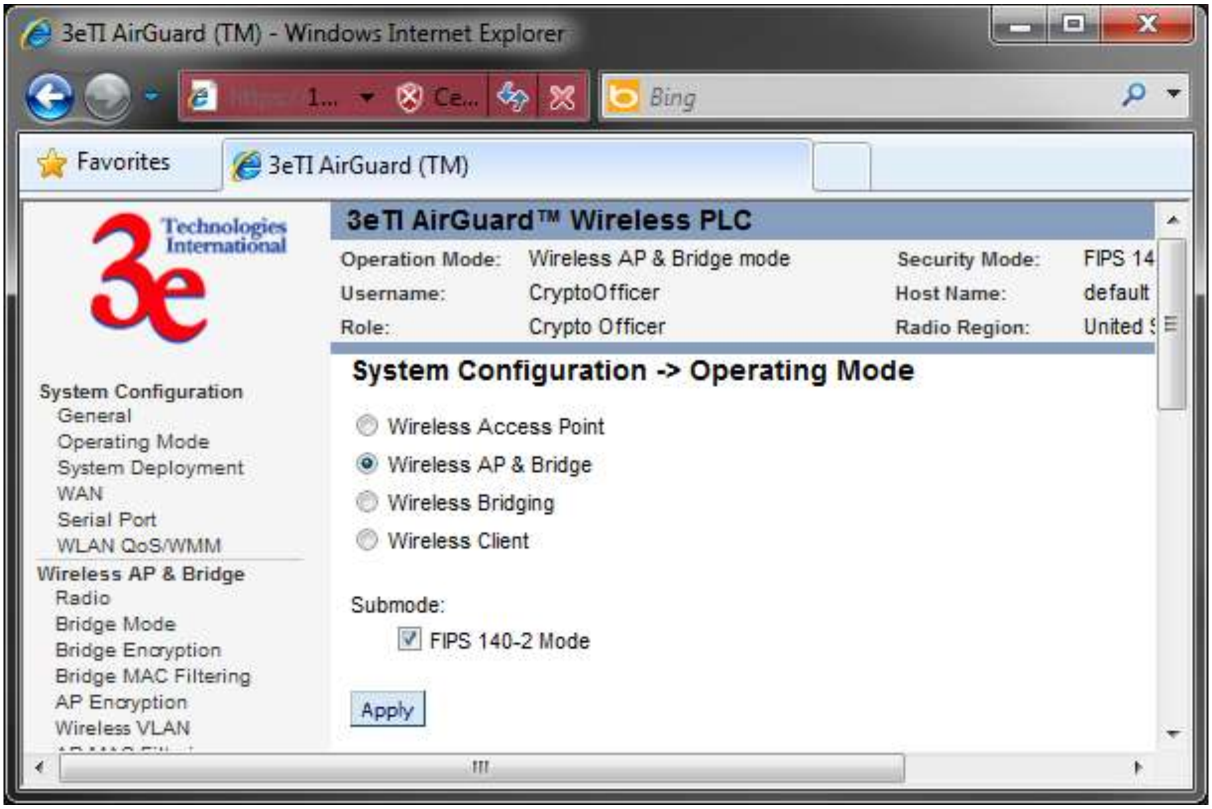
- Wireless Access Point
- Wireless Access Point & Bridge
- Wireless Bridge

- Wireless Client

You only need to visit this page if you will be changing modes, or if you want to change your sub mode

Note that if you change modes your configuration will be preserved. If you switch between FIPS 140-2 sub mode and non-FIPS, all previously entered information will be reset to factory settings for the selected wireless mode.

Figure 8 - System Configuration - Operating Mode



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 14
Username:	CryptoOfficer	Host Name:	default
Role:	Crypto Officer	Radio Region:	United !

System Configuration -> Operating Mode

○ Wireless Access Point
● Wireless AP & Bridge
○ Wireless Bridging
○ Wireless Client

Submode:
☑ FIPS 140-2 Mode

Apply

Sub mode

There are two options under Sub mode:

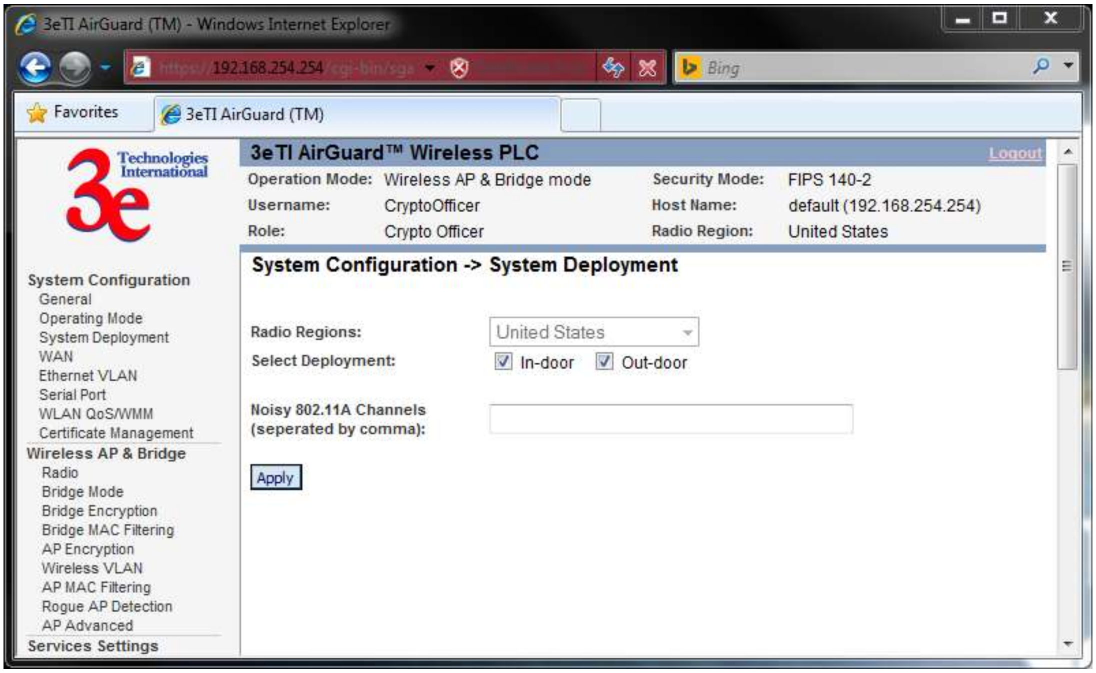
- FIPS 140-2 Mode
- Use IPv6 Mode

To use the 3e–523 in FIPS 140-2 mode, or in IPv6 mode, check the box and click **Apply**.

2.2.3 System Deployment

The unit is programmed at the factory with the customer's country code. The country code (region) is read-only. The channel list and transmit power varies from region to region based on each country's regional regulations (see Figure 9).

Figure 9 - System Configuration - System Deployment



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode

Security Mode: FIPS 140-2

Username: CryptoOfficer

Host Name: default (192.168.254.254)

Role: Crypto Officer

Radio Region: United States

System Configuration -> System Deployment

Radio Regions: United States

Select Deployment: ☑ In-door ☑ Out-door

Noisy 802.11A Channels (seperated by comma):

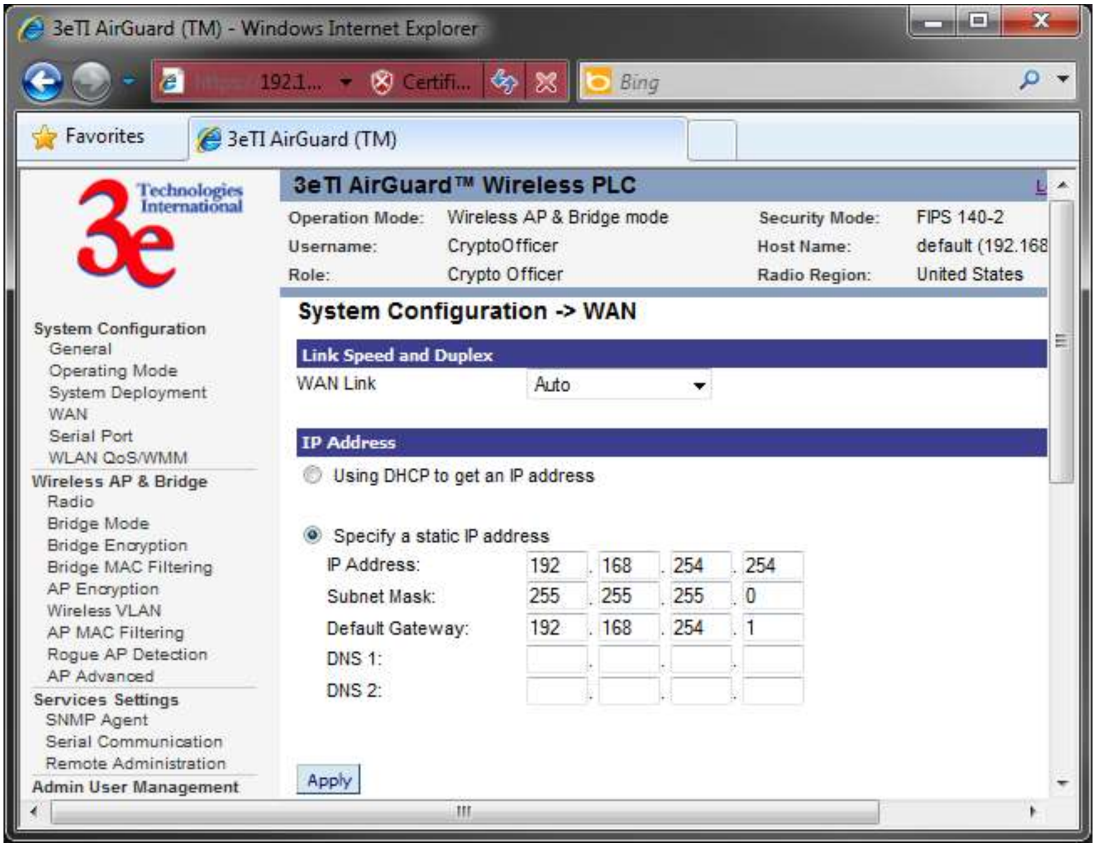
2.2.4 WAN

Click the entry on the left hand navigation panel for **System Configuration - WAN**. This directs you to the **System Configuration - WAN** screen (Figure 10).

If not using DHCP to get an IP address, input the static IP information that the access point requires in order to be managed from the wired LAN. This will be the IP address, Subnet Mask, Default Gateway, and, where needed, DNS 1 and 2.

Click **Apply** to accept changes.

Figure 10 - System Configuration - WAN



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168
Radio Region: United States

System Configuration -> WAN

Link Speed and Duplex

WAN Link: Auto

IP Address

○ Using DHCP to get an IP address

● Specify a static IP address

IP Address: 192 . 168 . 254 . 254
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway: 192 . 168 . 254 . 1
DNS 1: . . .
DNS 2: . . .

NOTE: After changing the network address you will no longer be able to access the above configuration page with the default IP address. You will have to change the browser URL to reflect the new IP address and log in again.

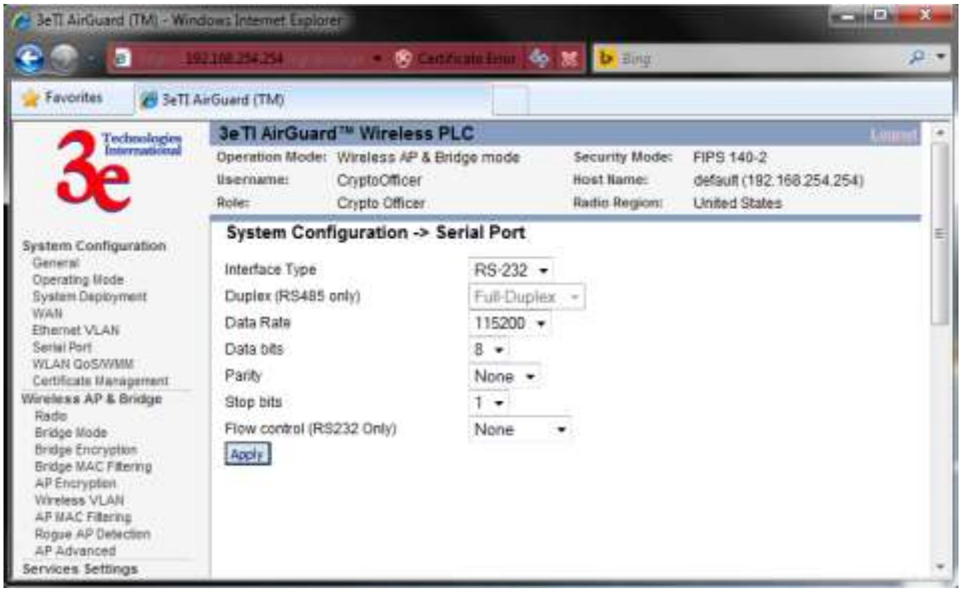
NOTE: If DHCP is selected, a new IP address would be given to the 3e–523 unit after clicking Apply. To log into to unit and keep setting it up, the new IP address needs to be obtained from your Network Administrator. Another way to obtain the new IP address is to set up "Remote Logging" before setting up WAN using DHCP.

2.2.5 Serial Port

Click the entry on the left hand navigation panel for **System Configuration - Serial Port** (Figure 11). The serial settings control the type and format of the serial data to be transmitted and received.

NOTE: You must also configure the settings under **Services Settings - Serial Communication** (Table 2) in order for the system to work.

Figure 11 - System Configuration - Serial Port



Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.254.254)
Radio Region: United States

System Configuration -> Serial Port

Interface Type	RS-232
Duplex (RS485 only)	Full-Duplex
Data Rate	115200
Data bits	8
Parity	None
Stop bits	1
Flow control (RS232 Only)	None

Table 2. Service Settings

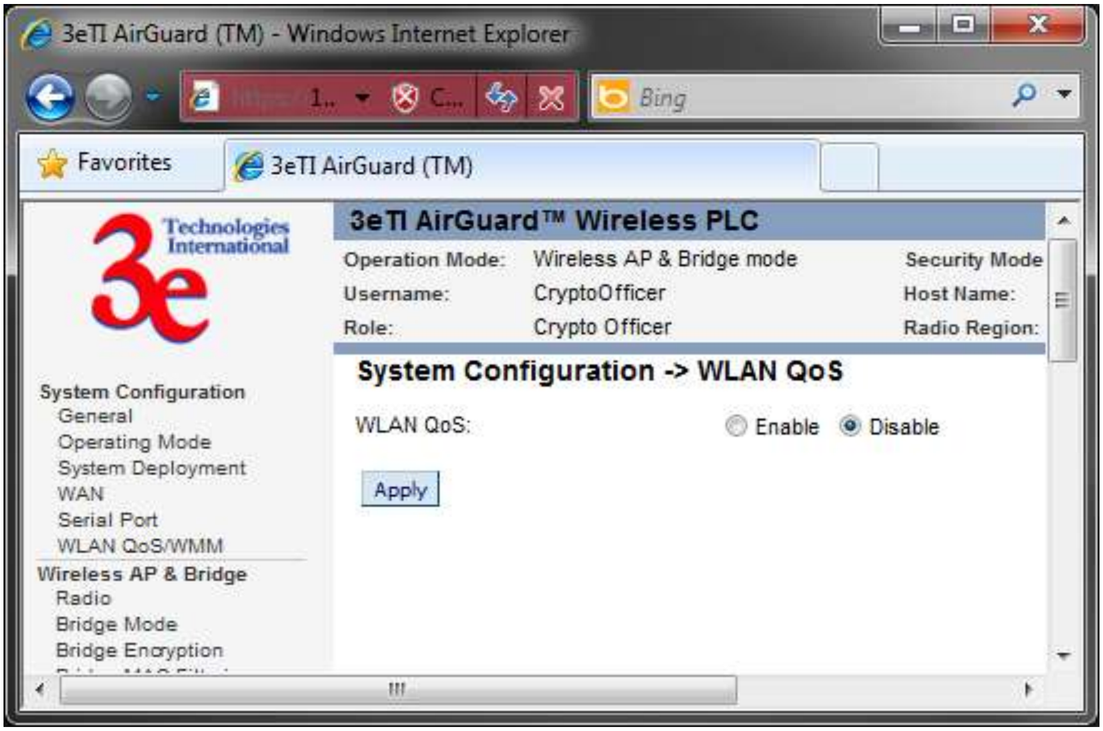
Serial Settings		
Interface Type	RS-232 RS-422 RS-485	Select the interface type for the serial I/O port
Duplex (RS485 only)	Full-Duplex Half-Duplex	For use with RS-485 interface. In full duplex mode data is transmitted and received simultaneously. In half duplex mode data is transmitted or received but not at the same time.
Data Rate (bits per second)	115200 57600 38400 19200 9600 4800 2400 1200	Select the data rate required.
Data bits	8 7 6 5	Select the number of data bits to be transmitted or received.
Parity	None Odd Even	Select parity to be used.
Stop bits	1 2	Select number of stop bits to be used.

Serial Settings		
Flow control (RS232 only)	None Hardware	For use with RS-232 interface. When hardware flow control is selected, RTS and CTS are used.

2.2.6 WLAN QoS/WMM

The unit has a Quality of Service (QoS) / Wireless Multi-Media (WMM) capability (Figure 12). The QoS/WMM feature default is set to disable.

Figure 12 - System Configuration - WLAN QoS



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode
Host Name:
Radio Region:

System Configuration -> WLAN QoS

WLAN QoS: ○ Enable ● Disable

If QoS is enabled, all traffic passing through the unit will be prioritized into four queues (low, normal, medium, high). The traffic can be prioritized by MAC/IP/TCP/UDP/port, etc. The 802.1d BPDU is honored the highest priority without further configuration.

If a traffic pattern matches more than one rule in the policies configured, the highest priority among these rules is used. If a traffic pattern does not match any of the configured policies, then the priority is set to normal.

There are four policy types to choose from:

• Application	This is a layer 4 (transportation layer) policy.
• IP address	This is a layer 3 (network layer) policy.
• MAC address	This is a layer 2 (link layer) policy.
• Ethernet protocol	This is a layer 2 (link layer) policy.

Click on the New QoS Policy tab to configure your QoS policies.

Create a policy name

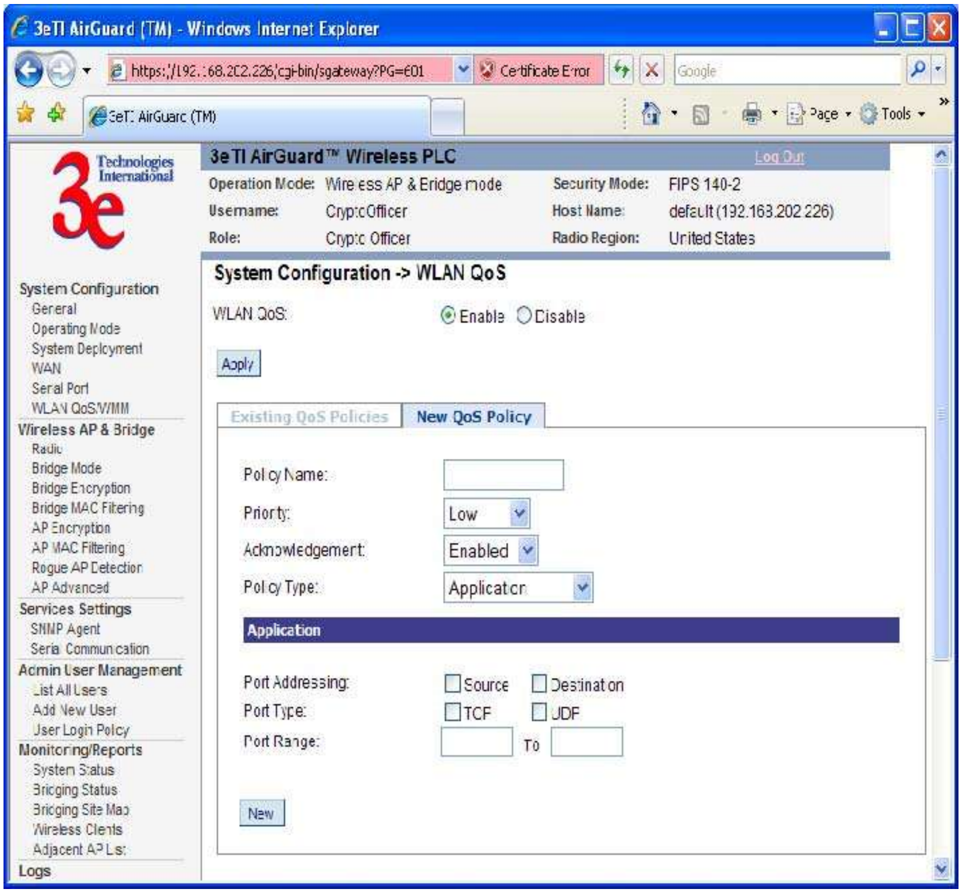
Select your priority level from the drop-down list

Either enable or disable weather your want an 802.11 acknowledgement. For sensitive data packet loss, (e.g., file transfer), "Enable" is recommended. For less sensitive, non-critical, packet loss (e.g., video), "Disable" is recommended

Select a policy type from the drop-down list and configure the policy fields

The following screens (Figure 13, Figure 14, Figure 15, Figure 16, and Figure 17) show policy set ups based on type.

Figure 13 - Application Policy Type



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.163.202.226)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> WLAN QoS

WLAN QoS: ● Enable ○ Disable

Policy Name:

Priority: Low

Acknowledgement: Enabled

Policy Type: Application

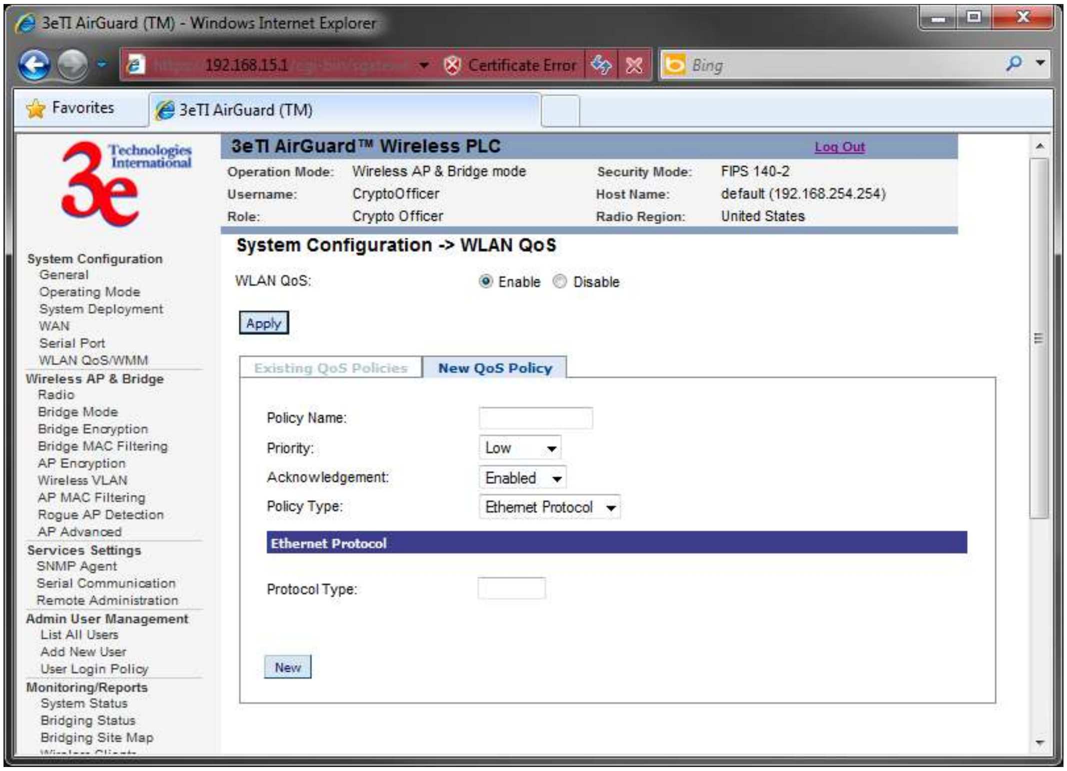
Application

Port Addressing: □ Source □ Destination

Port Type: □ TCP □ UDP

Port Range: To

Figure 14 - Ethernet Protocol Policy Type



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> WLAN QoS

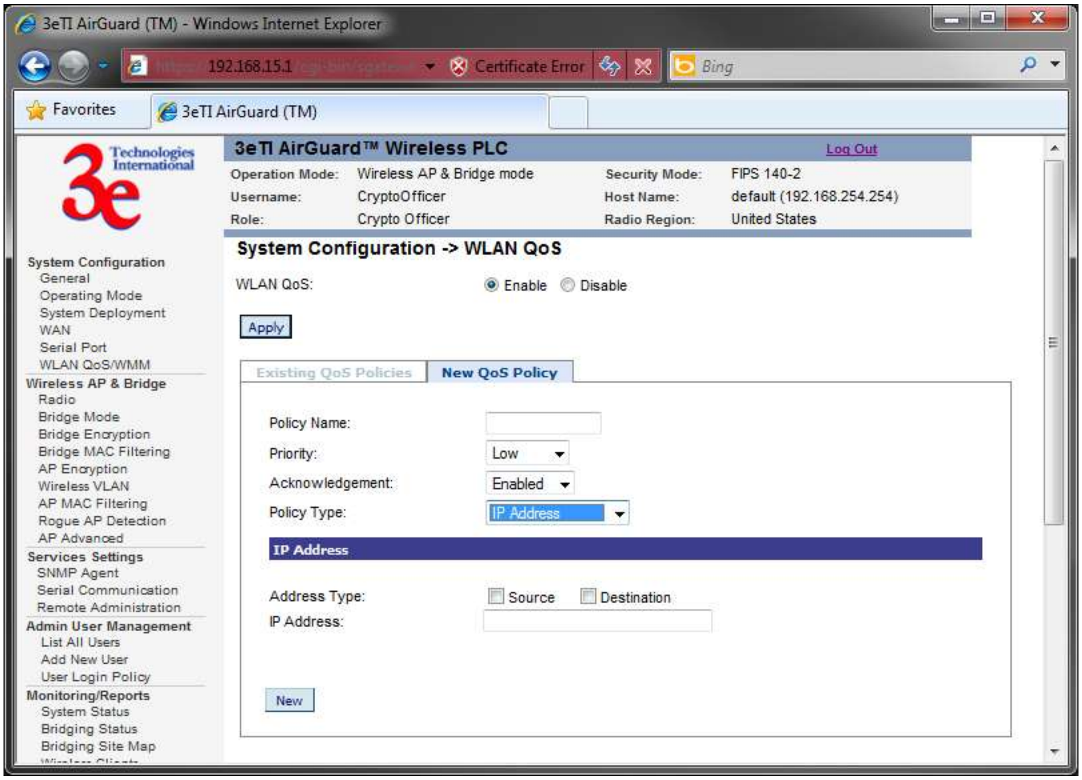
WLAN QoS: ● Enable ○ Disable

Policy Name:
Priority: Low
Acknowledgement: Enabled
Policy Type: Ethernet Protocol

Ethernet Protocol

Protocol Type:

Figure 15 - IP Address Policy Type



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> WLAN QoS

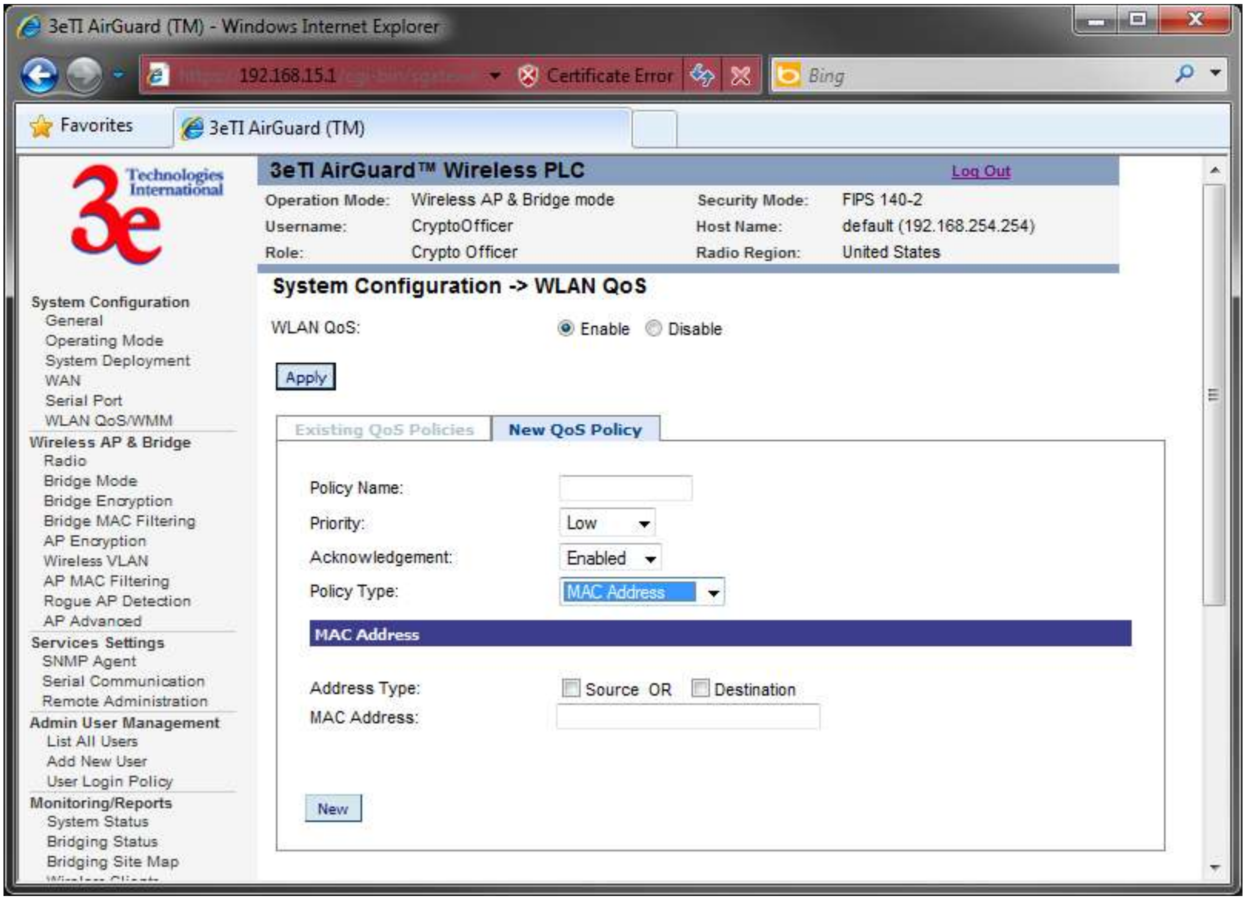
WLAN QoS: ● Enable ○ Disable

Policy Name:
Priority: Low
Acknowledgement: Enabled
Policy Type: IP Address

IP Address

Address Type: □ Source □ Destination
IP Address:

Figure 16 - MAC Address Policy Type



Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> WLAN QoS

WLAN QoS: ● Enable ○ Disable

Policy Name:

Priority: Low

Acknowledgement: Enabled

Policy Type: MAC Address

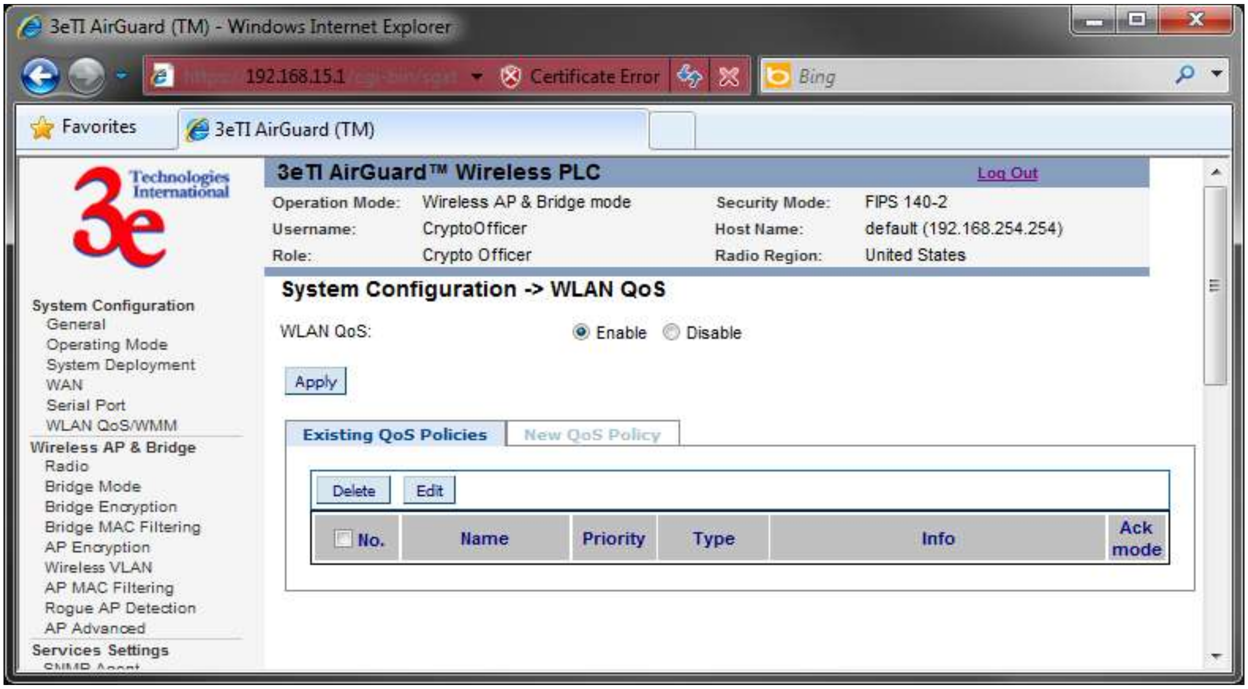
MAC Address

Address Type: □ Source OR □ Destination

MAC Address:

To view any existing QoS policies, click on the "Existing QoS Policies" tab.

Figure 17 - Existing QoS Policies



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> WLAN QoS

WLAN QoS: ● Enable ○ Disable

□ No.	Name	Priority	Type	Info	Ack mode

2.3 Wireless AP and Bridge Mode

The following subsections describe the screens used when configuring the access point and bridge.

The following screens are available in Wireless AP & Bridge mode:

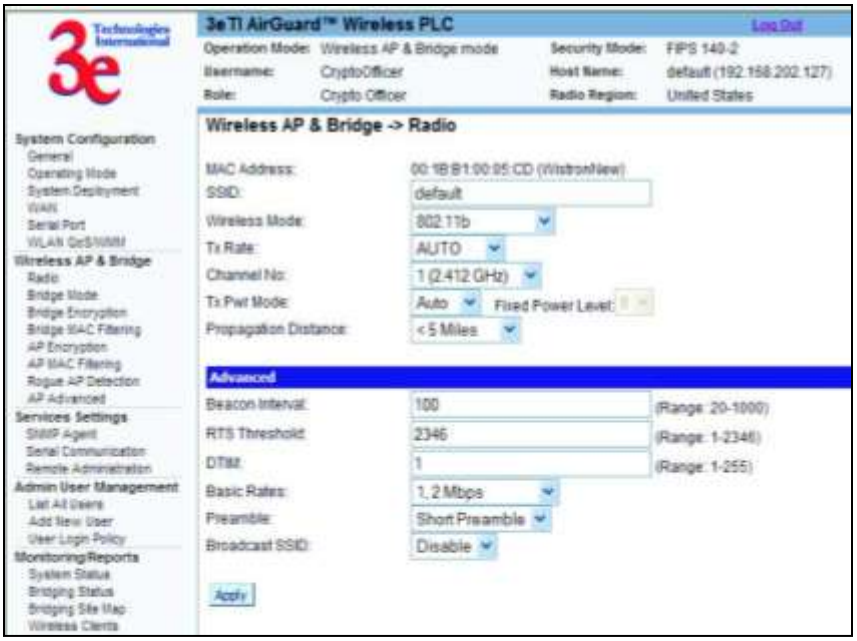
- Radio
- Bridge Mode
- Bridge Encryption
- Bridge MAC Filtering
- AP Encryption
- AP MAC Filtering
- Rogue AP Detection
- AP Advanced
- VLAN

All other screens are the same as those described in the Client Mode section.

2.3.1 Radio Configuration for 3e-523A, 3e-523S and 3e-523M

The **Wireless AP & Bridge - Radio** screen (Figure 18) contains wireless bridging information including the channel number, Tx rate, Tx power, spanning tree protocol (802.1d) enable/disable, and remote device's BSSID. This page is important in setting up your access point and bridging configurations. Table 3 below lists the various radio settings.

Figure 18 - Wireless AP & Bridge — Radio



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

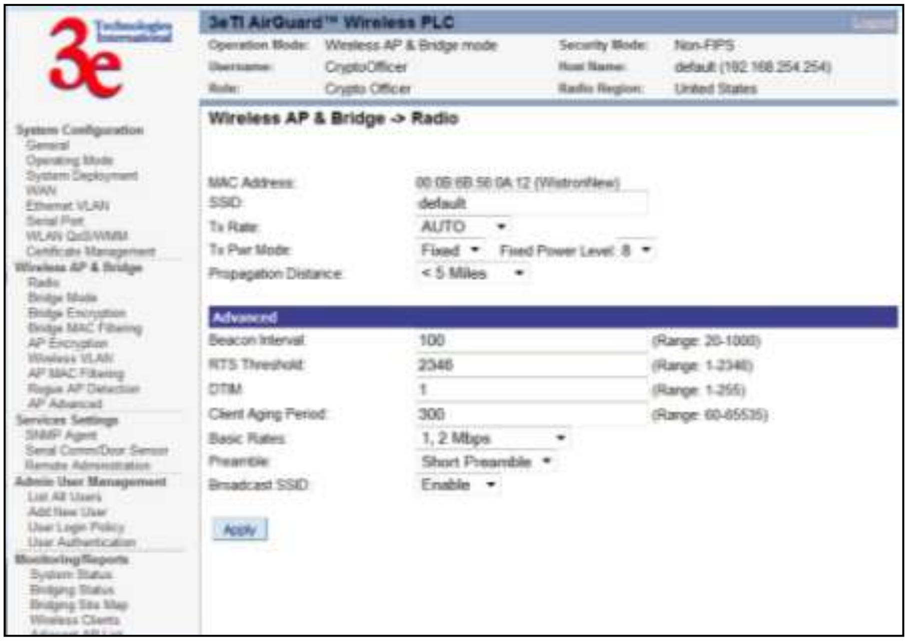
Wireless AP & Bridge -> Radio

MAC Address:	00:1B:B1:00:05:CD (WistronNew)	
SSID:	default	
Wireless Mode:	802.11b	
Tx Rate:	AUTO	
Channel No:	1 (2.412 GHz)	
Tx Pwr Mode:	Auto	Fixed Power Level:
Propagation Distance:	< 5 Miles	
Beacon Interval:	100	(Range: 20-1000)
RTS Threshold:	2346	(Range: 1-2346)
DTIM:	1	(Range: 1-255)
Basic Rates:	1, 2 Mbps	
Preamble:	Short Preamble	
Broadcast SSID:	Disable	

2.3.2 Radio Configuration for 3e-523E-900

The **Wireless AP and Bridge - Radio** screen (shown in Figure 19, below) for the Model 3e-523E-900 contains wireless bridging information including Tx rate, Tx power mode and level, as well as advanced configuration options such as Beacon Interval and RTS Threshold. This page is important in setting up your access point and bridging configurations. Table 3 below lists the various radio settings.

Figure 19 – 3e-523E-900 AP and Bridge -- Radio



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	Non-FIPS
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

Wireless AP & Bridge -> Radio

MAC Address:	00:0B:6B:56:0A:12 (WistronNew)	
SSID:	default	
Tx Rate:	AUTO	
Tx Pwr Mode:	Fixed	Fixed Power Level: 8
Propagation Distance:	< 5 Miles	
Beacon Interval:	100	(Range: 20-1000)
RTS Threshold:	2346	(Range: 1-2346)
DTIM:	1	(Range: 1-255)
Client Aging Period:	300	(Range: 60-65535)
Basic Rates:	1, 2 Mbps	
Preamble:	Short Preamble	
Broadcast SSID:	Enable	

Table 3 - Radio Settings

Radio Settings		
Wireless Mode (option is not available on the 3e-523E-900.)	802.11b/g Mixed 802.11a 802.11a Turbo	Sets the wireless mode for the wireless bridge. Note: If the device is enabled with 4.9GHz sub-band, you will have two more options: • 4.9G Federal • 4.9G Public Safety
Tx Rate	802.11b/g Mixed	
	AUTO, 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54 Mbps (only some of these are available for the 3e-523E-900)	When set to *AUTO*, the card attempts to select the optimal rate for the channel. If a fixed rate is used, the card will only transmit at that rate.
	802.11a	
	AUTO, 6, 9, 12, 18, 24, 36, 48, 54 Mbps	When set to *AUTO*, the card attempts to select the optimal rate for the channel. If a fixed rate is used, the card will only transmit at that rate.
	802.11a Turbo	
	AUTO	The card attempts to select the optimal rate for the channel.
Channel Number (dependent on the radio country code configured; option is not available on the 3e-523E-900.)	802.11b/g Mixed	
	1 (2.412 GHz) 2 (2.417 GHz) 3 (2.422 GHz) 4 (2.427 GHz) 5 (2.432 GHz) 6 (2.437 GHz) 7 (2.442 GHz) 8 (2.447 GHz) 9 (2.452 GHz) 10 (2.457 GHz) 11 (2.462 GHz)	Sets the channel frequency for the wireless bridge.
	802.11a	
	52 (5.26 GHz) 56 (5.28 GHz) 60 (5.30 GHz) 64 (5.32 GHz) 149 (5.745 GHz) 153 (5.765 GHz) 157 (5.785 GHz) 161 (5.805 GHz) 165 (5.825 GHz)	Sets the channel frequency for the wireless bridge.

Radio Settings		
	802.11a Turbo	
	50 (5.25 GHz) 58 (5.29 GHz) 152 (5.76 GHz) 160 (5.80 GHz)	Sets the channel frequency for the wireless bridge.
Tx Pwr Mode	OFF FIXED, AUTO	The Tx Pwr Mode defaults to AUTO, giving the largest range of radio transmission available under ambient conditions. The wireless bridge's broadcast range can be limited by setting the Tx Pwr Mode to Fixed and choosing from 1-8 for Fixed Pwr Level. If you want to prevent any radio frequency transmission from the wireless bridge, set the Tx Pwr Mode to *OFF*. This will not turn off RF transmissions from any associated wireless devices, but they will not be able to communicate with the wireless bridge when the Tx Pwr Mode is off.
Fixed Pwr Level	1, 2, 3, 4, 5, 6, 7, 8 (3e-523E-900 transmit power options which start at 4.)	Select a range when Tx Pwr Mode is set to *FIXED*. Level 1 is the shortest distance, and Level 8 is the longest.
Propagation Distance	< 5 Miles 5-10 Miles 11-15 Miles 16-20 Miles 21-25 Miles 26-30 Miles > 30 Miles (not changeable for the 3e-523E-900.)	Set the distance based on the space between this bridge and furthest bridge that is connected to it.
RTS Threshold	Range 1-2346	The number of bytes used for the RTS/CTS handshake boundary. When a packet size is greater than the RTS threshold, the RTS/CTS handshaking is performed.
Beacon Interval	20-1000	The time interval in milliseconds in which the 802.11 Beacon is transmitted by the bridge.
BSSID	Enter hexadecimal numbers	Add the MAC address of the remote bridge. The remote bridge's MAC address will appear at the bottom of the screen.
Note		You can enter a note that defines the location of the remote bridge.

2.3.3 Bridge Mode

The **Wireless Bridge - General** screen (Figure 20) contains wireless bridging information. This page is important in setting up your bridge configuration.

Table 4 lists the various auto bridging setting options. Wireless bridging supports two modes of operation:

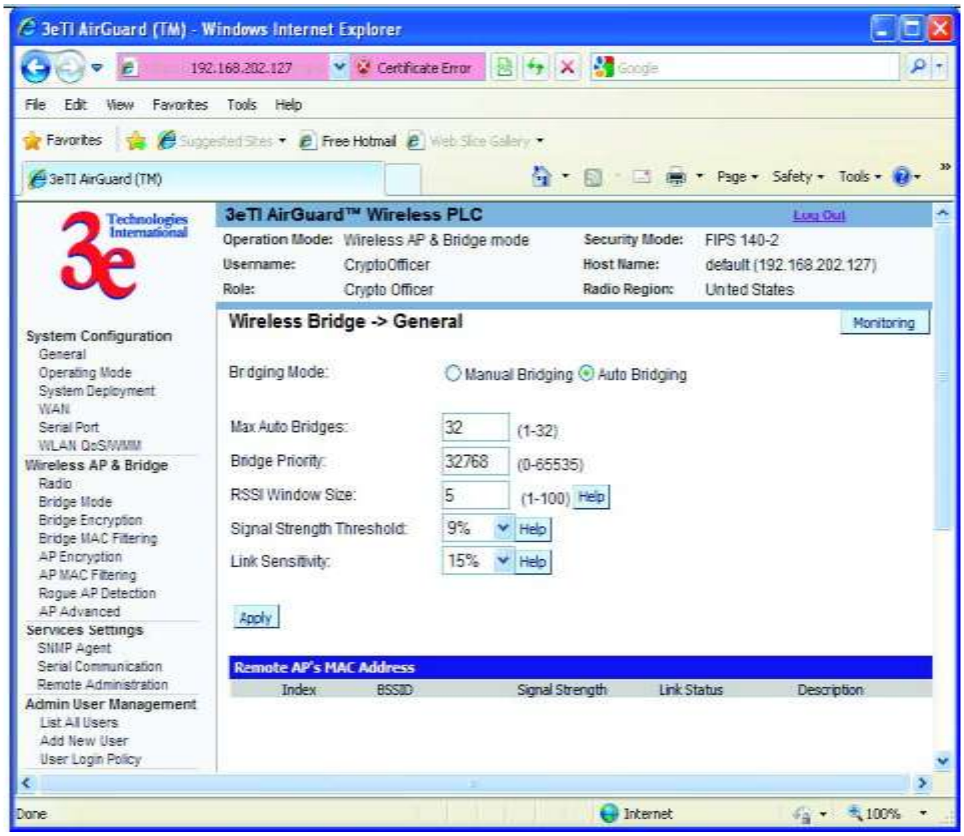
- Manual wireless bridging
- Auto-forming wireless bridging (AWB) - with a maximum number of allowable bridges (the default is 32)

Auto-forming Wireless Bridging - When the wireless bridge is in auto-forming mode, the wireless bridge sniffs for beacons from other wireless bridges and identifies devices that match a policy such as SSID and channel.

Instead of simply adding the devices with the same SSID/channel to the network, a three-way association handshake is performed in order to control network access.

To make a unit the root (leaf) STP node, set the bridge priority lower than any other node in the network.

Figure 20 - Wireless Bridge — General



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

Wireless Bridge -> General

Bridging Mode: ○ Manual Bridging ● Auto Bridging

Max Auto Bridges: 32 (1-32)

Bridge Priority: 32768 (0-65535)

RSSI Window Size: 5 (1-100)

Signal Strength Threshold: 9%

Link Sensitivity: 15%

Remote AP's MAC Address

Index	BSSID	Signal Strength	Link Status	Description

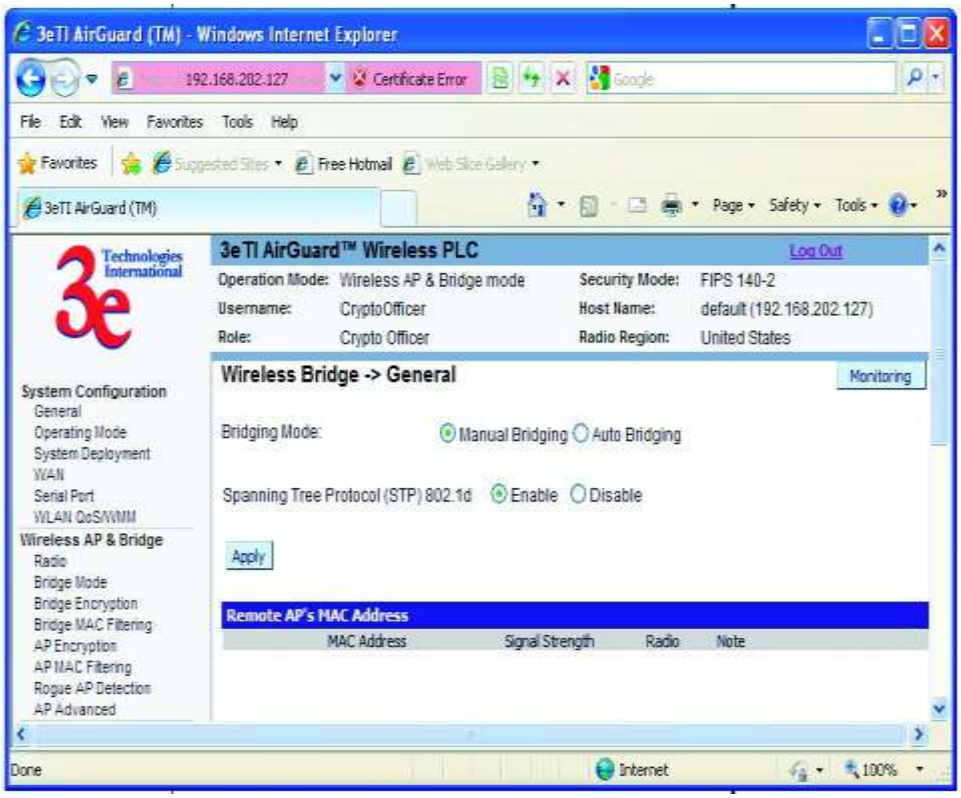
Table 4 - Auto Bridging General Settings Options

Auto Bridging General Settings Options		
Bridging Mode	Auto Bridging	auto bridging selected
SSID	numbers or letters	Can be any set of letters and numbers assigned by the network administrator. This nomenclature has to be set on the wireless bridge and each wireless device in order for them to communicate.
Max Auto Bridges	1-32	Maximum number of auto bridges allowed.
Bridge Priority	1-65535	Determines the root (leaf) STP node. The lowest bridge priority in the network will become the STP root.
RSSI Window Size	1-100	RF signal fluctuates over time and the fluctuation varies in different operating environments. This parameter serves to smooth RSSI. The RSSI that applications use will be an average of last window-size RSSI samples. The sampling rate depends on the beacon interval of the neighbor mesh node. This helps stabilize the network. For fixed location deployment, higher values are suggested for both window size and beacon interval. Lower value is recommended while adjusting antenna or distributing mobile mesh devices.
Signal Strength Threshold	75% 60% 51% 45% 39% 27% 21% 15% 9% None	On creating a bridge link, if the signal strength is less than this threshold, the link will not be created. After a link is created, it will not be destroyed even after the signal goes below this threshold. This helps to stabilize the network.

Auto Bridging General Settings Options		
Link Sensitivity	75% 60% 51% 45% 39% 27% 21% 15% 9% None	After a link is created, signal strength is mapped to RSTP path cost. Because RF signal fluctuates, path cost needs to be adjusted accordingly. However, adjusting path cost too frequently will cause network instability. This field serves as a threshold to adjust path cost. Path cost is adjusted if signal strength increases/decreases by this value since the last adjustment. If the value is set to none, every link acts like 100% signal and there will be no path cost adjustment later on. It is strongly recommended that the same value is set on all other nodes in the same network.
Broadcast SSID	Disable/Enable	When disabled, the AP hides the SSID in outgoing beacon frames and stations cannot obtain the SSID through passive scanning. Also, when it is disabled, the bridge doesn’t send probe responses to probe requests with unspecified SSIDs.
Signal Strength MAC		The signal strength of this wireless bridge will be indicated on the Signal Strength LED located on the front of the case.
Remote AP's MAC Address	Read Only	Displays the BSSID of remote bridges that were added on the Wireless Bridge - Radio screen.

Manual Bridging - When the wireless bridge is in manual bridging mode (Figure 21), you can manually select a signal strength LED MAC and enable or disable spanning tree protocol. You can also delete remote AP's MAC addresses. Table 5 lists the various manual bridging settings.

Figure 21 - Wireless Bridge - Manual Bridging



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Wireless Bridge -> General

Bridging Mode: ● Manual Bridging ○ Auto Bridging

Spanning Tree Protocol (STP) 802.1d ● Enable ○ Disable

Remote AP's MAC Address

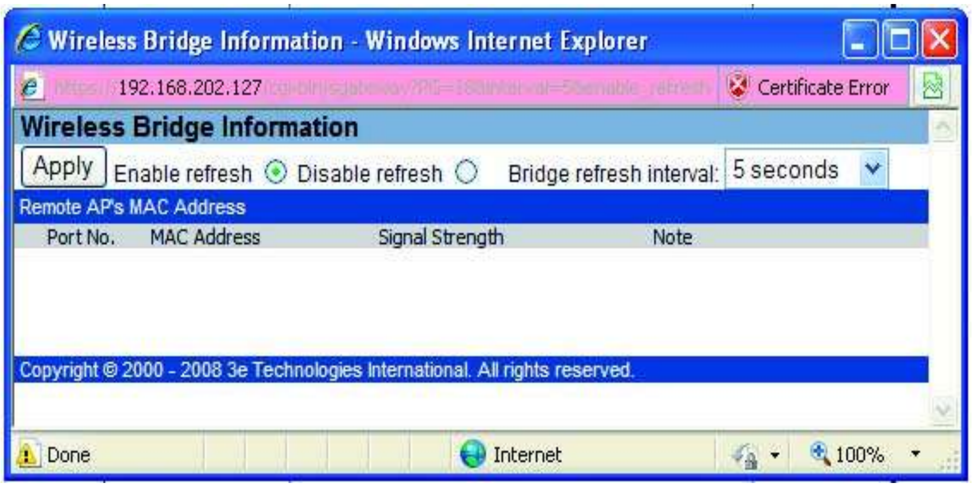
MAC Address	Signal Strength	Radio	Note

Table 5 - Manual Bridging General Settings Options

Manual Bridging General Settings Options		
Bridging Mode	Manual Bridging	manual bridging selected
Signal Strength LED MAC	Not Assigned	Allows you to set the number of the remote AP which will be listed at the bottom of the screen once the system is operational This wireless bridge becomes the guiding port that is displayed in the WLAN LED on the front of the 523–3 and 3e-523-F1 as a signal.
Spanning Tree Protocol (STP)	Enable/Disable	Enable STP if there is any possibility that a bridging loop could occur. If you are certain that there is no possibility that a bridging loop will occur, then disable STP. The bridge will be more efficient (faster) without it. If you are not sure, the safest solution is to enable STP.
Remote AP's MAC Address	Read Only	Displays the BSSID of remote bridges that were added on the Wireless Bridge - Radio screen.

Monitoring - In the upper right-hand corner of the **Wireless Bridge - General** screen there is a button called Monitoring (Figure 22). If you click on this button, a pop-up window will appear (WDS Information). If you select Enable refresh, you can set the bridge refresh interval from 5 seconds to 30 minutes. Refreshing the screen allows you to see the effect of aiming the antenna to improve signal strength.

Figure 22 - Wireless Bridge - Monitoring



Wireless Bridge Information

Apply | Enable refresh ● Disable refresh ○ | Bridge refresh interval: 5 seconds

Remote AP's MAC Address

Port No.	MAC Address	Signal Strength	Note

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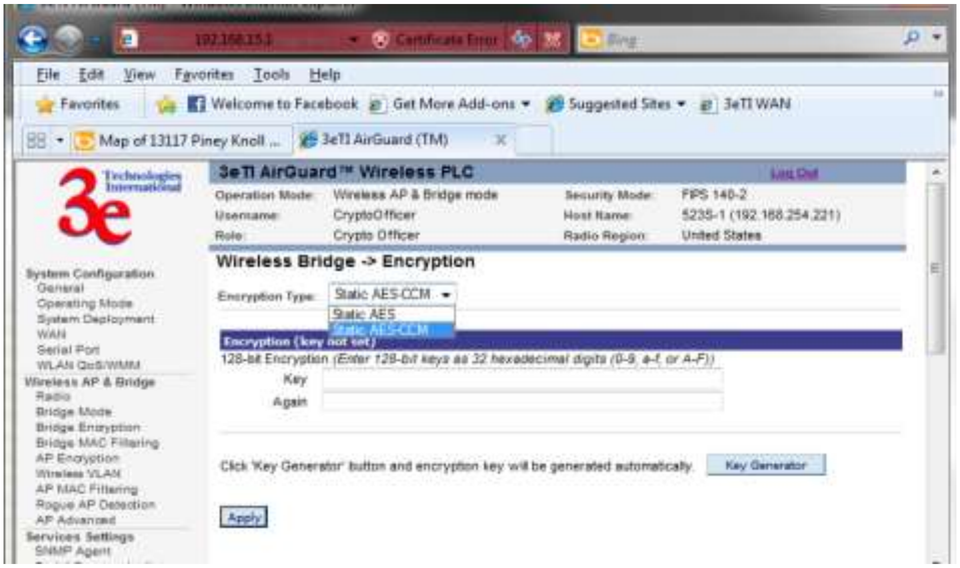
2.3.4 Bridge Encryption

The **Wireless Bridge - Encryption** screen (Figure 23) is used to configure static encryption keys for the wireless bridge. This is an important page to set up to ensure that your bridge is working correctly. The encryption key that you use on this screen must be the same for any bridge connected to your bridging network in order for communication to occur. On this screen you can select Static AES (128-bit, 192-bit, or 256-bit) or AES-CCM (128-bit)

Figure 23 - . Wireless Bridge – AES-CCM Encryption



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	5235-1 (192.168.254.221)
Role:	Crypto Officer	Radio Region:	United States

Wireless Bridge -> Encryption

Encryption Type: Static AES-CCM

Encryption (key not set)

128-bit Encryption *(Enter 128-bit keys as 32 hexadecimal digits (0-9, a-f, or A-F))*

Key

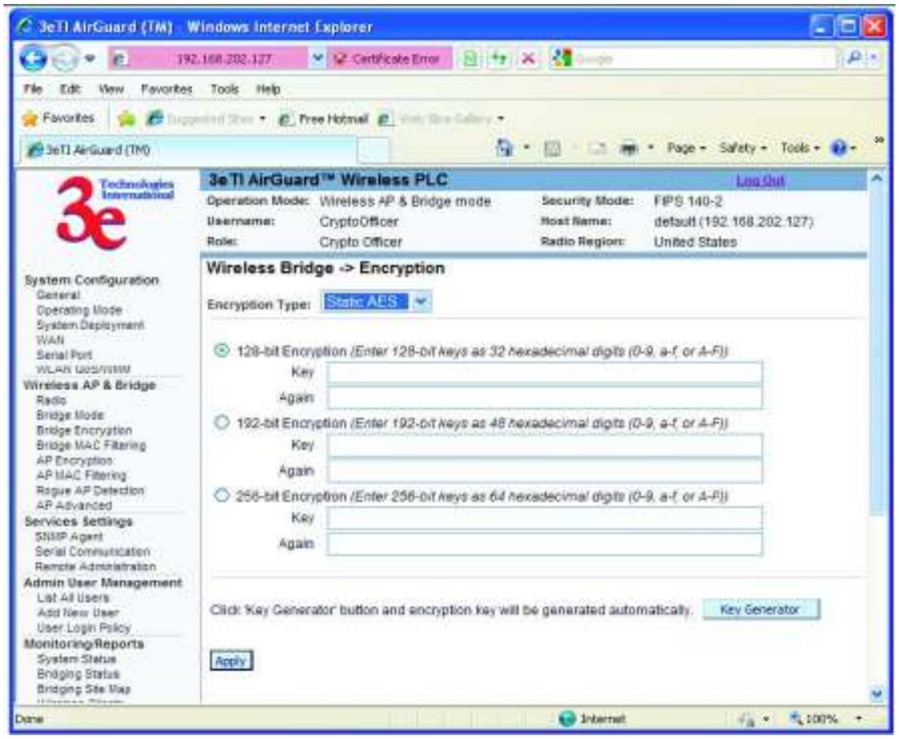
Again

Click 'Key Generator' button and encryption key will be generated automatically.

Static AES Key - The Advanced Encryption Standard (AES) was selected by National Institute of Standards and Technology (NIST) in October 2000 as an upgrade from the previous DES standard. AES uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information. With the ability to use even larger 192-bit and 256-bit keys, if desired, it offers higher security against brute-force attack than the old 56-bit DES keys (Figure 24).

The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.

Figure 24 - Wireless Bridge - Static AES



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

Wireless Bridge -> Encryption

Encryption Type: Static AES

● 128-bit Encryption *(Enter 128-bit keys as 32 hexadecimal digits (0-9, a-f, or A-F))*
Key
Again

○ 192-bit Encryption *(Enter 192-bit keys as 48 hexadecimal digits (0-9, a-f, or A-F))*
Key
Again

○ 256-bit Encryption *(Enter 256-bit keys as 64 hexadecimal digits (0-9, a-f, or A-F))*
Key
Again

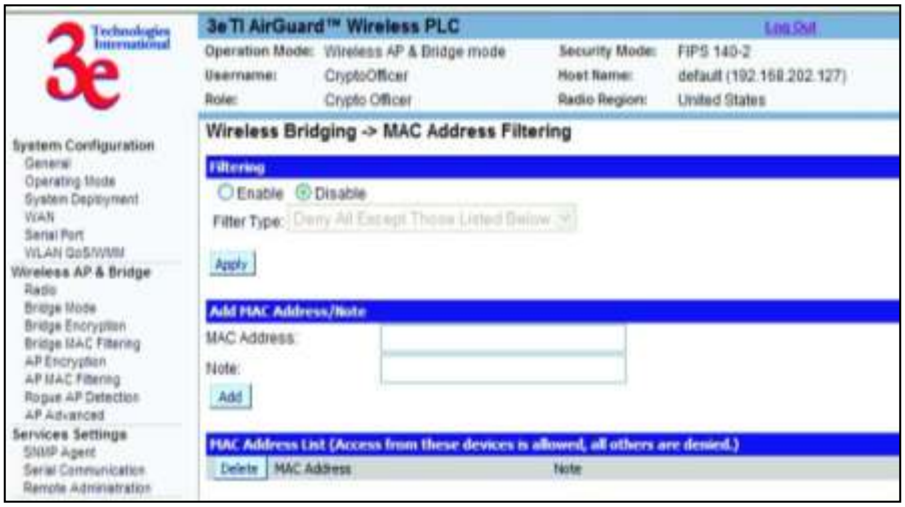
Click 'Key Generator' button and encryption key will be generated automatically.

2.3.5 MAC Address Filtering

The **WirelessBridge - MAC Address Filtering** screen (Figure 25)is used to set up MAC address filtering for the 3e–523 device. This option is only available in Auto Bridge Mode.

The factory default for MAC Address filtering is **Disabled**. If you enable MAC Address filtering, you should also set the toggle for **Filter Type**.

Figure 25 - Wireless Bridge - MAC Address Filtering



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Wireless Bridging -> MAC Address Filtering

Filtering

○ Enable ● Disable

Filter Type: Deny All Except Those Listed Below

Add MAC Address/Note

MAC Address:

Note:

MAC Address List (Access from these devices is allowed, all others are denied.)

Delete	MAC Address	Note

This works as follows:

- If **Filtering** is enabled and **Filter Type** is **Deny All Except Those Listed Below**, only those devices equipped with the authorized MAC addresses will be able to communicate with the 3e–523. In this case, input the MAC addresses of all the remote bridging units that will be authorized to access this 3e–523. The MAC address is engraved or written on the PC (PCMCIA) Card.
- If **Filtering** is enabled and **Filter Type** is **Allow All Except Those Listed Below**, those devices with a MAC address which has been entered in the MAC Address listing will NOT be able to communicate with the 3e–523. In this case, navigate to the report: **Wireless Clients** and copy the MAC address of any Wireless Client that you want to exclude from communication with the 3e–523 and input those MAC Addresses to the MAC Address list.

2.3.6 AP Encryption

The **Access Point - Encryption** screen displays a default factory setting of no encryption, but for security reasons it will not communicate to any clients unless the encryption is set by the CryptoOfficer. There are different encryption options for the AP in FIPS Mode and in non-FIPS Mode. Table 6 below shows the differences.

Table 6 - Encryption Options

Encryption Options	
In FIPS 140-2 Mode	**In non-FIPS AP Mode**
FIPS Static AES	Static WEP
FIPS 802.11i	802.11i

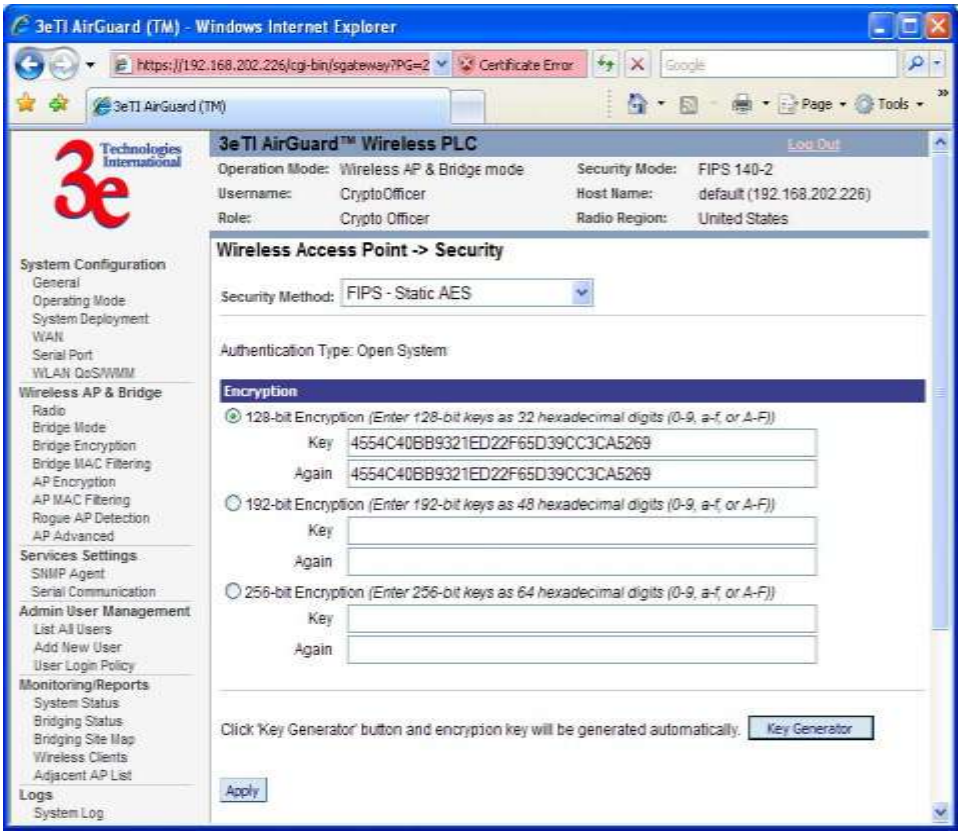
In the following explanations, the FIPS Mode security options are discussed first.

Static AES Key - The Advanced Encryption Standard (AES) was selected by National Institute of Standards and Technology (NIST) in October 2000 as an upgrade from the previous DES standard. AES uses a 128-bit block cipher algorithm and encryption technique for protecting computerized information.

With the ability to use even larger 192-bit and 256-bit keys, if desired, it offers higher security against brute-force attack than the old 56-bit DES keys. See Figure 26.

The Key Generator button automatically generates a randomized key of the appropriate length. This key is initially shown in plain text so the user has the opportunity to copy the key. Once the key is applied, the key is no longer displayed in plain text.

Figure 26 - Static AES



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.226)
Radio Region: United States

Wireless Access Point -> Security

Security Method: FIPS - Static AES

Authentication Type: Open System

Encryption

● 128-bit Encryption *(Enter 128-bit keys as 32 hexadecimal digits (0-9, a-f, or A-F))*
Key 4554C40BB9321ED22F65D39CC3CA5269
Again 4554C40BB9321ED22F65D39CC3CA5269

○ 192-bit Encryption *(Enter 192-bit keys as 48 hexadecimal digits (0-9, a-f, or A-F))*
Key
Again

○ 256-bit Encryption *(Enter 256-bit keys as 64 hexadecimal digits (0-9, a-f, or A-F))*
Key
Again

Click 'Key Generator' button and encryption key will be generated automatically.

802.11i - If you wish to use 802.11i on the 3e–523, enable either Pre-shared Key Settings or 802.1x Settings (Figure 27)

If you are a SOHO user, selecting pre-shared key means that you don’t have the expense of installing a Radius Server. Simply input up to 63 character / numeric / hexadecimals in the Passphrase field.

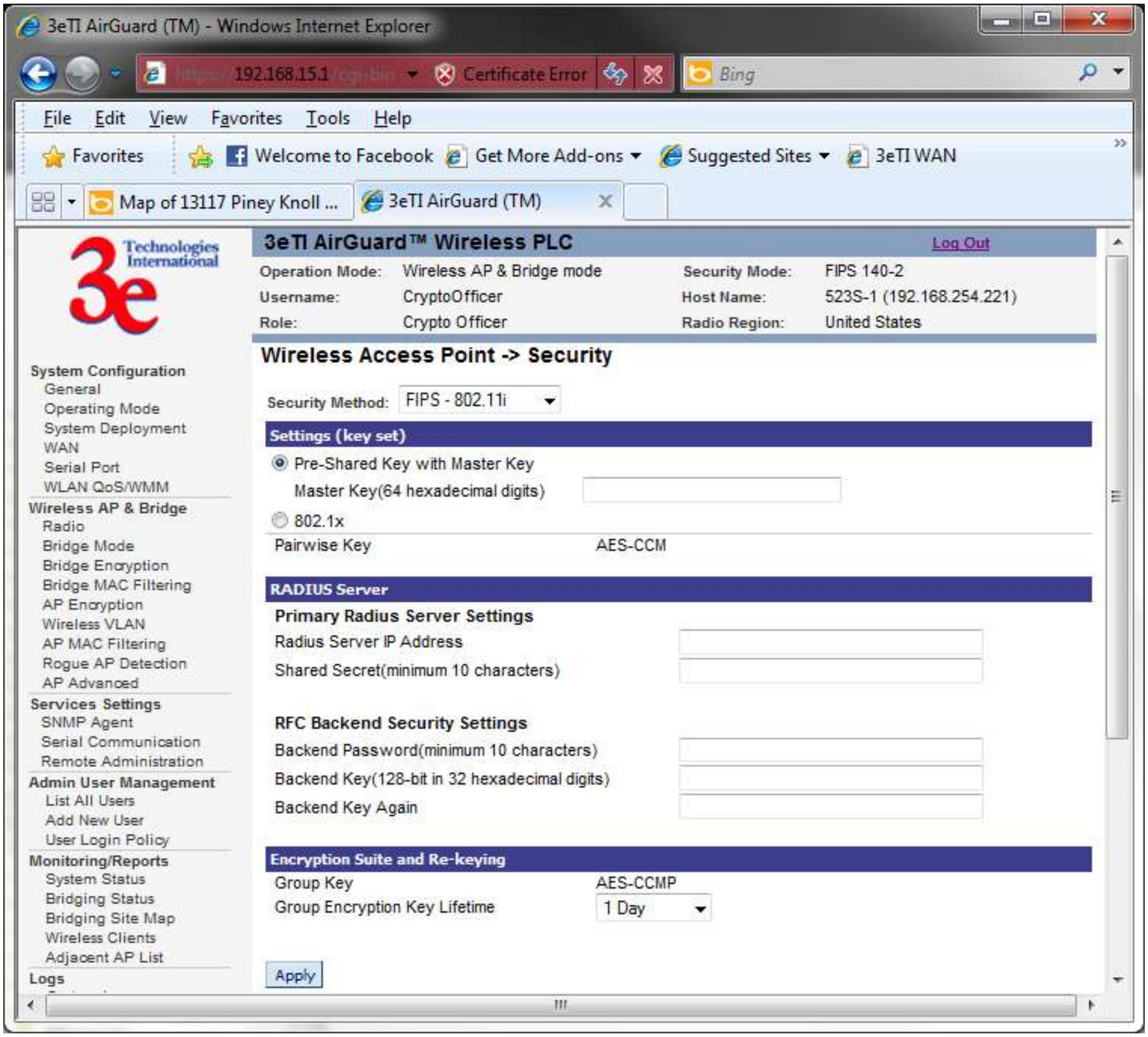
Enable pre-authentication to allow a client to authenticate in advance with the AP before the client is associated with it. Allowing the AP to pre-authenticate a client decreases the transition time when a client roams between APs.

As an alternative, for business applications who have installed Radius Servers, select 802.1x and input the Primary Radius Server and RFC Backend security settings. Use of Radius Server for key management and authentication requires that you have installed a separate certification system and each client must have been issued an authentication certificate.

Re-keying time is the frequency in which new encryption keys are generated and distributed to the client. The more frequent re-keying, the better the security. For highest security, select the lowest re-keying interval.

Once you have selected the options you will use, click **Apply**.

Figure 27 – FIPS 802.11i



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: 523S-1 (192.168.254.221)
Role: Crypto Officer
Radio Region: United States

Wireless Access Point -> Security

Security Method: FIPS - 802.11i

Settings (key set)

● Pre-Shared Key with Master Key
Master Key(64 hexadecimal digits)
○ 802.1x
Pairwise Key AES-CCM

RADIUS Server

Primary Radius Server Settings
Radius Server IP Address
Shared Secret(minimum 10 characters)

RFC Backend Security Settings
Backend Password(minimum 10 characters)
Backend Key(128-bit in 32 hexadecimal digits)
Backend Key Again

Encryption Suite and Re-keying

Group Key AES-CCMP
Group Encryption Key Lifetime 1 Day

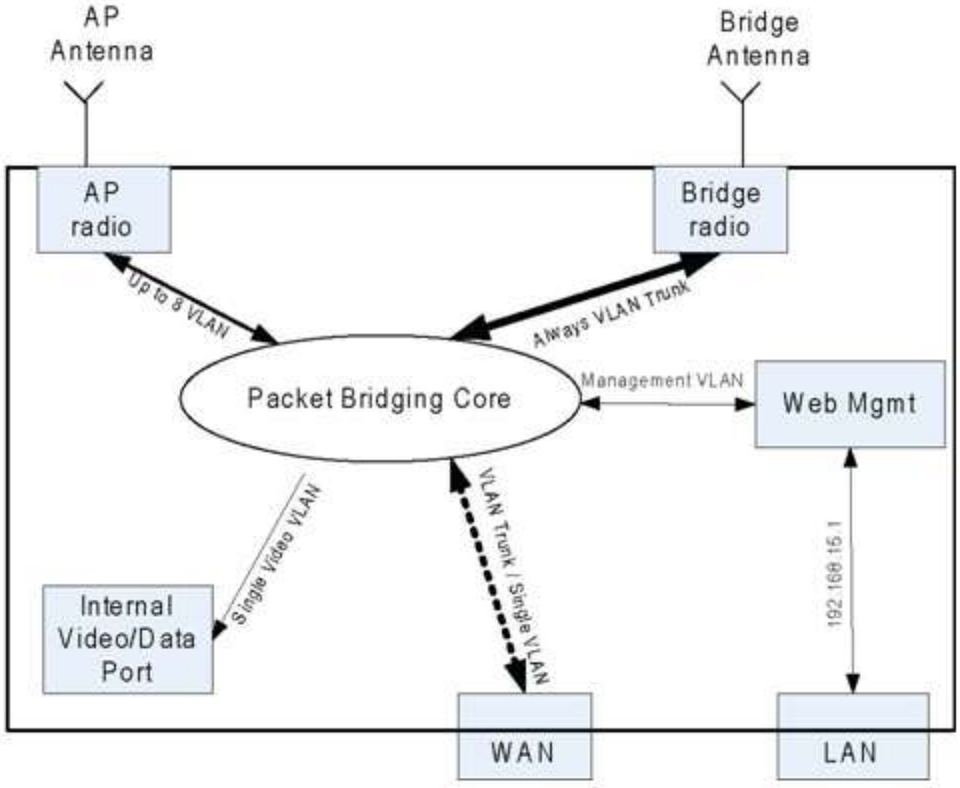
Apply

2.3.7 Wireless VLAN

Logical Internal Interfaces - In order to use the VLAN features of the 3e-523 series products correctly and flexibly, it’s recommended that user understand the logical internals. The following provides an overview of VLAN operation on the 3e-523 devices

Figure 28 below shows the logical internal interfaces of the “Packet Bridging Core” which bridges packets between the logical and physical interfaces (WAN, AP, Bridge, and Management VLAN) of the 3e-523.

Figure 28 - Packet Bridging Logical Internals



Note: The 3e-523 contains one radio and one Ethernet port. The radio operates in client mode, AP mode, Bridge mode, or AP & Bridge modes. Note that client mode does not offer VLAN capability and VLAN operation cannot be configured when operating in Client mode.

AP Virtual Interface - The AP virtual interface is available in AP mode or AP & Bridge simultaneous mode. It can be configured to provide a maximum of 8 VLAN mappings. Each VLAN is mapped to one SSID. Packets in the air between AP radio and wireless clients contain no VLAN tag.

Packets from a wireless client associated with a given SSID are VLAN tagged by the AP radio, according to the configuration mapping between SSID and VLAN. The tagging happens before packets enter the “Packet Bridging Core.”

VLAN tags, in packets received from the WAN interface and to be transmitted to wireless clients associated with the AP radio, are removed before the packets are transmitted to the clients.

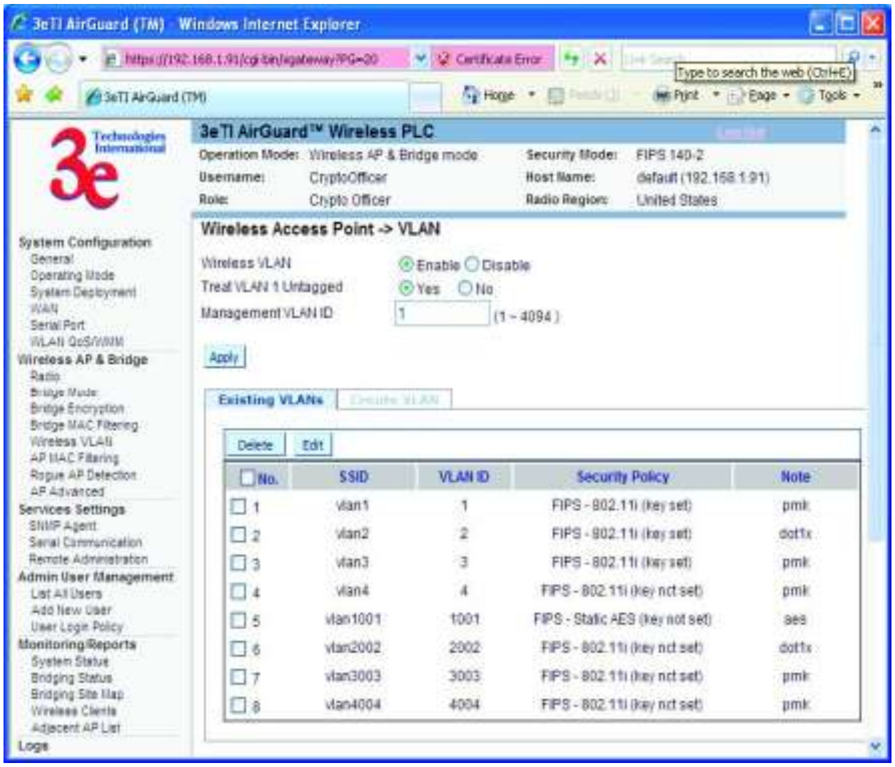
Bridge Virtual Interface - The bridge virtual interface is available in Bridge or AP & Bridge mode. The bridge virtual interface always acts as VLAN trunk. Packets in and out from bridge radio are sent unmodified. So there’s no VLAN related configuration for the bridge virtual interface.

WAN Virtual Interface - Since the 3e-523 has one Ethernet port, both the WAN and LAN logical interfaces map to the Ethernet physical interface. IP/ARP packets with a fixed target IP address of 192.168.15.1 are always redirected to LAN virtual interface. All other packets go to WAN virtual interface.

The WAN virtual interface always acts as VLAN trunk. Packets in and out from bridge radio are sent unmodified. So there’s no VLAN related configuration for WAN virtual interface.

Web Management - Web management traffic from non-local port is on management VLAN. Packets originated from web management server are tagged with management VLAN before they reach “Packet Bridging Core”. Only packets with management VLAN tag can be forwarded by “Packet Bridging Core” to web management server and the VLAN tags are removed before they reach web management server.

Figure 29 - VLAN Configuration GUI Overview



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.1.91)
Role: Crypto Officer
Radio Region: United States

Wireless Access Point -> VLAN

Wireless VLAN ● Enable ○ Disable
Treat VLAN 1 Untagged ● Yes ○ No
Management VLAN ID 1 (1 ~ 4094)

Apply

Existing VLANs | Create VLAN

Delete | Edit

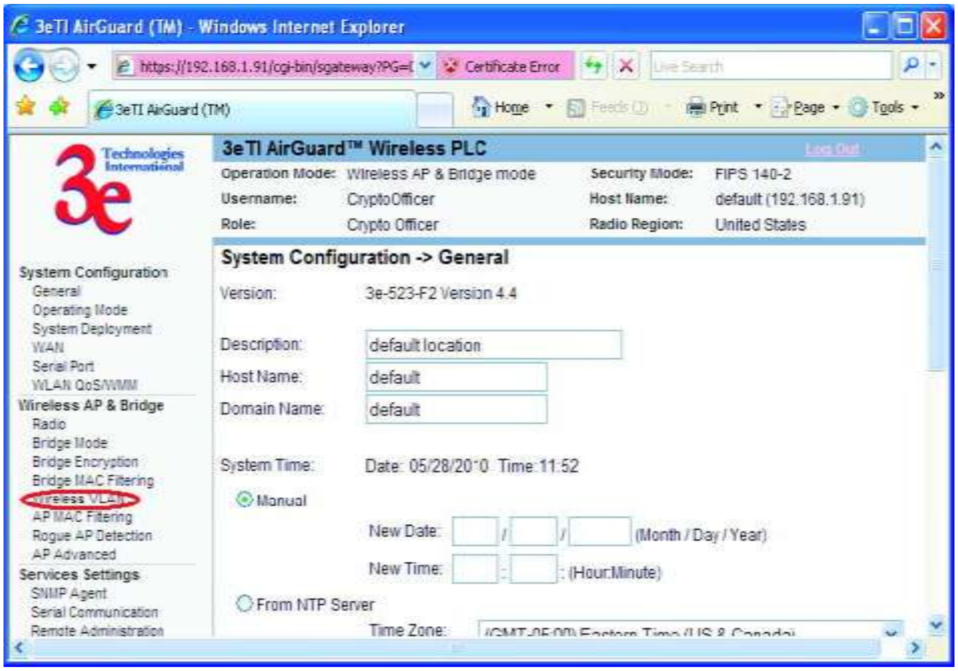
□ No.	SSID	VLAN ID	Security Policy	Note
□ 1	vlan1	1	FIPS - 802.11i (key set)	pmk
□ 2	vlan2	2	FIPS - 802.11i (key set)	dot1x
□ 3	vlan3	3	FIPS - 802.11i (key set)	pmk
□ 4	vlan4	4	FIPS - 802.11i (key not set)	pmk
□ 5	vlan1001	1001	FIPS - Static AES (key not set)	aes
□ 6	vlan2002	2002	FIPS - 802.11i (key not set)	dot1x
□ 7	vlan3003	3003	FIPS - 802.11i (key not set)	pmk
□ 8	vlan4004	4004	FIPS - 802.11i (key not set)	pmk

Figure 29 above shows the web GUI configuration for 2 out of 4 interfaces listed in 1 “Logical Internal.” The “bridge virtual interface” and “WAN virtual interfaces” always work in VLAN trunk mode, therefore, there’s no VLAN related configuration for these two interfaces.

The bottom half part shows the SSID to VLAN mappings as well as the security policies assigned to each VLAN.

VLAN Configuration Detail - To enable the VLAN feature, click Wireless VLAN link on left menu (Figure 30, and Figure 31 below).

Figure 30 - Left Menu



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.1.91)
Role:	Crypto Officer	Radio Region:	United States

System Configuration -> General

Version: 3e-523-F2 Version 4.4

Description: default location

Host Name: default

Domain Name: default

System Time: Date: 05/28/2010 Time: 11:52

● Manual

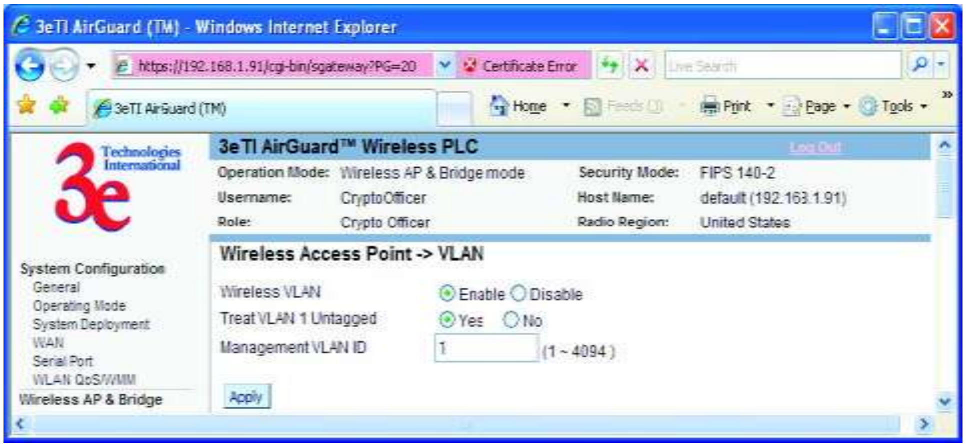
New Date: / / (Month / Day / Year)

New Time: : (Hour:Minute)

○ From NTP Server

Time Zone: (GMT-05:00) Eastern Time (US & Canada)

Figure 31 - VLAN Enable Page



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.1.91)
Role:	Crypto Officer	Radio Region:	United States

Wireless Access Point -> VLAN

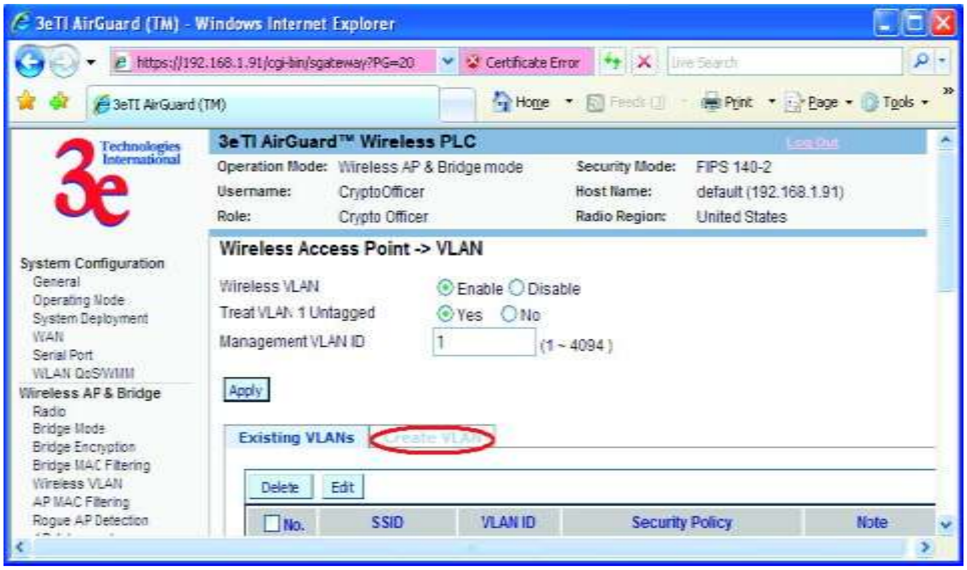
Wireless VLAN ● Enable ○ Disable

Treat VLAN 1 Untagged ● Yes ○ No

Management VLAN ID 1 (1 ~ 4094)

To create a SSID to VLAN mapping on an AP virtual interface, click **Create VLAN** tab on the **Wireless VLAN** page after enabling the Wireless VLAN option (Figure 32 and Figure 33).

Figure 32 - Create Wireless VLAN Tab


3eTI AirGuard™ Wireless PLC

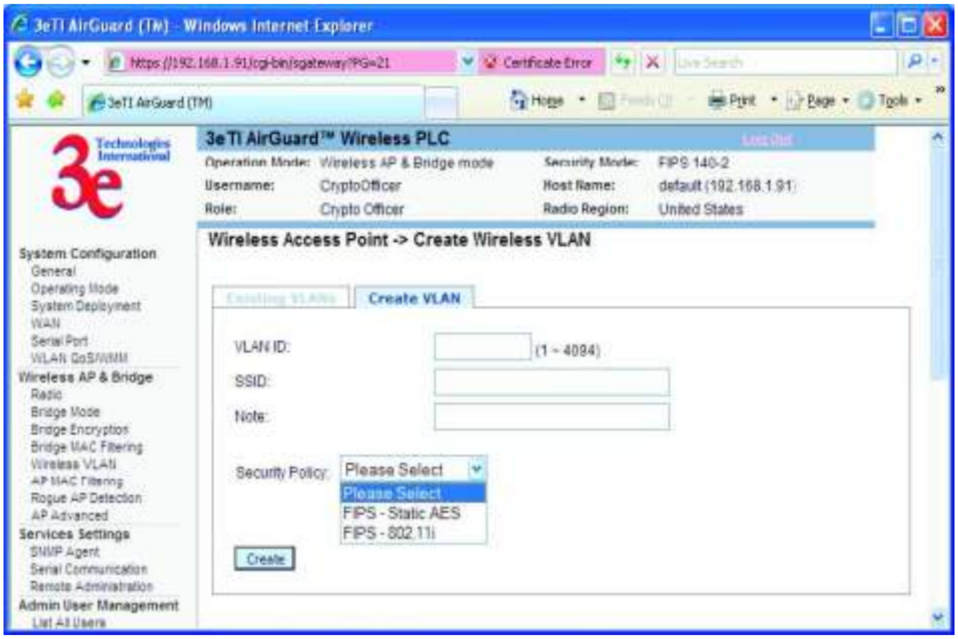
Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.1.91)
Role: Crypto Officer
Radio Region: United States

Wireless Access Point -> VLAN

Wireless VLAN ● Enable ○ Disable
Treat VLAN 1 Untagged ● Yes ○ No
Management VLAN ID 1 (1 ~ 4094)

No.	SSID	VLAN ID	Security Policy	Note

Figure 33 - Create Wireless VLAN Page


3eTI AirGuard™ Wireless PLC

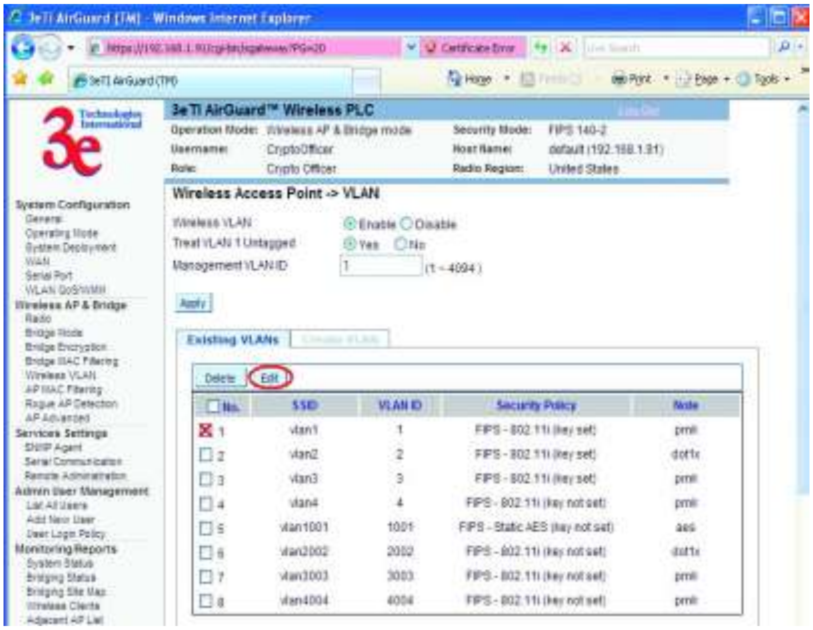
Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.1.91)
Role: Crypto Officer
Radio Region: United States

Wireless Access Point -> Create Wireless VLAN

VLAN ID: (1 ~ 4094)
SSID:
Note:
Security Policy: Please Select

To edit an existing VLAN, select the target VLAN and then click the Edit button (Figure 34 and Figure 35)

Figure 34 - Edit VLAN step 1



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.1.91)
Role:	Crypto Officer	Radio Region:	United States

Wireless Access Point -> VLAN

Wireless VLAN ● Enable ○ Disable

Treat VLAN 1 Untagged ● Yes ○ No

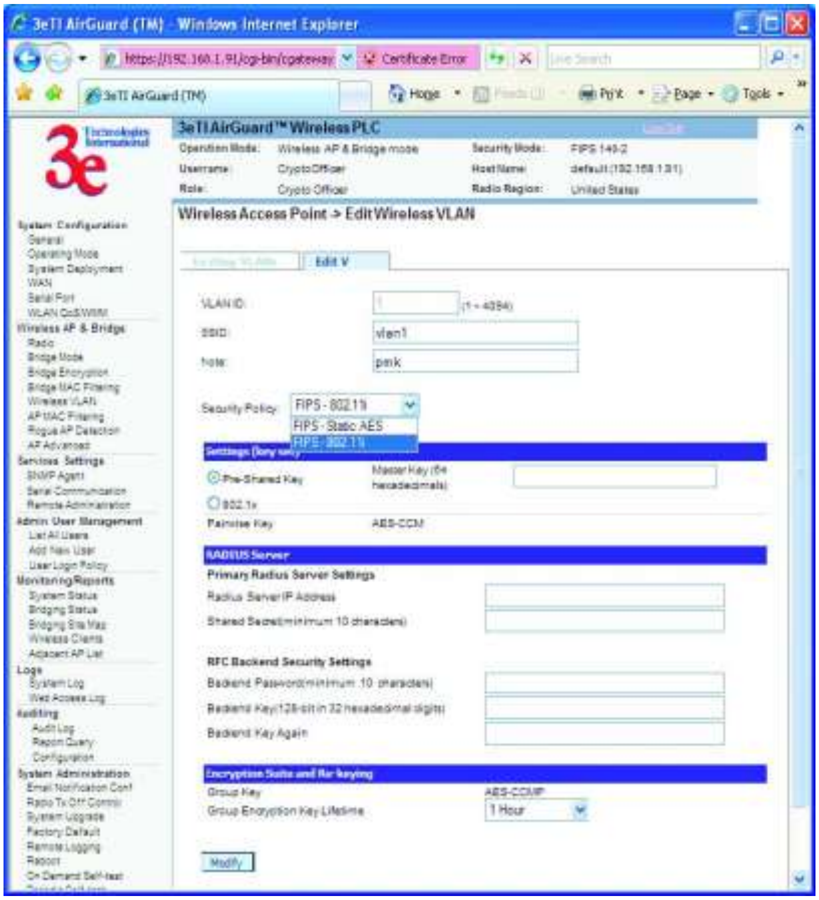
Management VLAN ID 1 (1 ~ 4094)

Apply

Existing VLANs

□ No.	SSID	VLAN ID	Security Policy	Note
☒ 1	vlan1	1	FIPS - 802.11i (key set)	pmk
□ 2	vlan2	2	FIPS - 802.11i (key set)	dot1x
□ 3	vlan3	3	FIPS - 802.11i (key set)	pmk
□ 4	vlan4	4	FIPS - 802.11i (key not set)	pmk
□ 5	vlan1001	1001	FIPS - Static AES (key not set)	aes
□ 6	vlan2002	2002	FIPS - 802.11i (key not set)	dot1x
□ 7	vlan3003	3003	FIPS - 802.11i (key not set)	pmk
□ 8	vlan4004	4004	FIPS - 802.11i (key not set)	pmk

Figure 35 - Edit VLAN step 2



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.1.91)
Role:	Crypto Officer	Radio Region:	United States

Wireless Access Point -> Edit Wireless VLAN

VLAN ID: 1 (1 ~ 4094)

SSID: vlan1

Note: pmk

Security Policy: FIPS - 802.11i (FIPS - Static AES / FIPS - 802.11i)

● Pre-Shared Key — Master Key (64 hexadecimals)

○ 802.1x

Pairwise Key: AES-CCM

Primary Radius Server Settings

Radius Server IP Address

Shared Secret(minimum 10 characters)

RFC Backend Security Settings

Backend Password(minimum 10 characters)

Backend Key(128-bit in 32 hexadecimal digits)

Backend Key Again

Group Key: AES-CCMP

Group Encryption Key Lifetime: 1 Hour

NOTES & TIPS

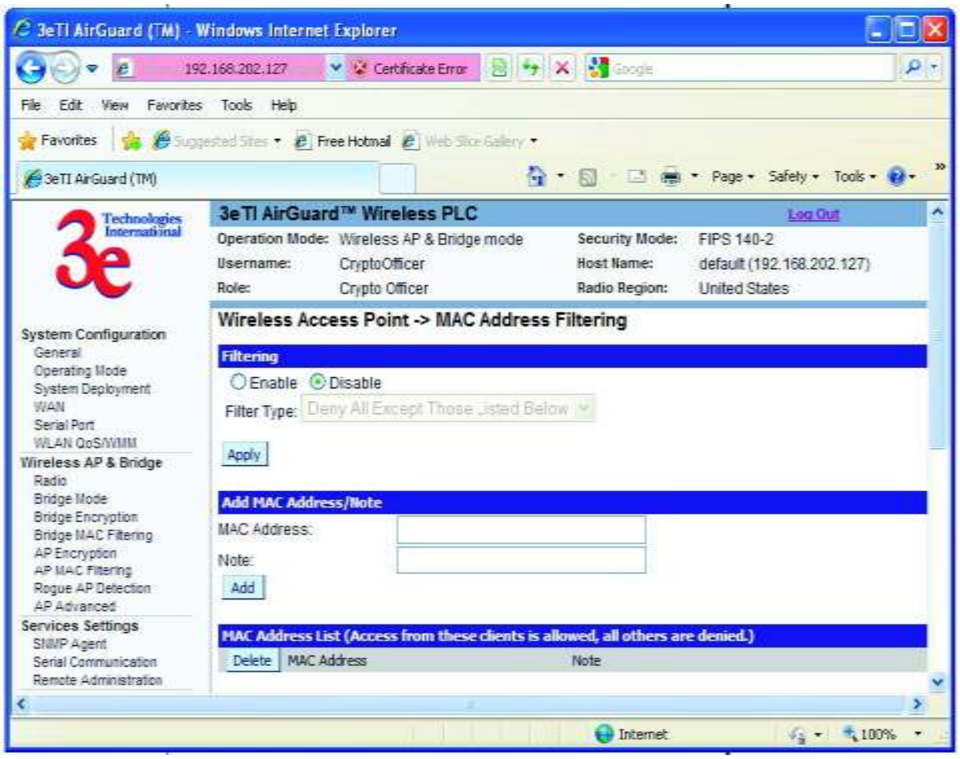
1. Most (not all) switch vendors treat VLAN 1 as an untagged VLAN. 3eTI devices make the VLAN 1 tag rule a user option. By default, 3eTI treats VLAN 1 as an untagged VLAN. It is recommended that users keep the same default setting for all devices in the same physical network.
2. "Treat VLAN 1 Untagged" setting is a device-wide option. The rule applies to all interfaces that are configured to be on VLAN 1.   For example, if this option is enabled, management traffic from this device Also, wireless client traffic on VLAN 1 won't have tag.
3. It's always recommended to manage the device through the LAN virtual interface (192.168.15.1) when local access is available for the device. The LAN virtual interface is helpful especially when:
   - A device IP address is unknown.
   - The device has not obtained an IP address from a DHCP server.
   - The Management VLAN is tagged.

2.3.8 AP MAC Filtering

The **Wireless Access Point - MAC Filtering** screen (

Figure 36) is used to set up MAC address filtering for 3e–523 devices. The factory default for MAC Address filtering is **Disabled**. If you enable MAC Address filtering, you should also set the toggle for **Filter Type**.

Figure 36 - Wireless Access Point - MAC Filtering



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

Wireless Access Point -> MAC Address Filtering

Filtering

○ Enable ● Disable

Filter Type: Deny All Except Those Listed Below

Apply

Add MAC Address/Note

MAC Address:

Note:

Add

MAC Address List (Access from these clients is allowed, all others are denied.)

Delete	MAC Address	Note

MAC Filtering works as follows:

- If **Filtering** is enabled and **Filter Type** is **Deny All Except Those Listed Below**, only those devices equipped with the authorized MAC addresses will be able to communicate with the access point. In this case, input the MAC addresses of all the PC cards that will be authorized to access this access point.
- If **Filtering** is enabled and **Filter Type** is **Allow All Except Those Listed Below**, those devices with a MAC address which has been entered in the MAC Address listing will NOT be able to communicate with the access point. In this case, navigate to the report: **Wireless Clients** and copy the MAC address of any Wireless Client that you want to exclude from communication with the access point and input those MAC Addresses to the MAC Address list.

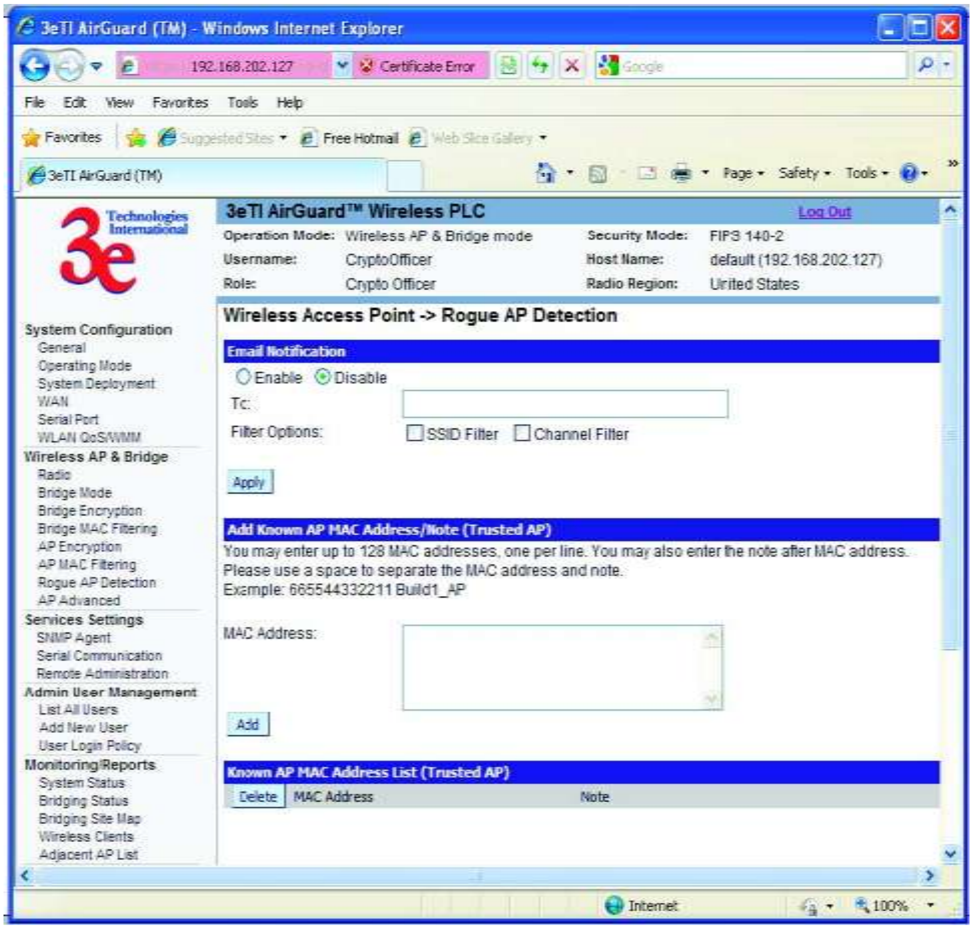
2.3.9 Rogue AP Detection

The **Wireless Access Point - Rogue AP Detection** screen (Figuer 37) allows the network administrator to set up rogue AP detection. Enable rogue AP detection and enter the MAC Address of each AP in the network that you want the AP being configured to accept as a trusted AP. (You may add up to 20 APs.) Enter an email address for notification of any rogue or non-trusted APs. (The MAC Address for the 3e–523 is located on the **System Configuration - General** screen. You can also select the following filter options.

- **SSID Filter**: Check the SSID option to only send rogue APs that match the AP's SSID or wireless bridge's SSID.
- **Channel Filter**: Check the channel filter option to only send rogue APs that match the AP's channel or the wireless bridge's channel.
- If both options are checked, only APs that match both the SSID and channel are sent.

The Adjacent AP list, under Monitoring/Reports on the navigation menu, will detail any marauding APs.

Figure 37 - Wireless Access Point - Rogue AP Detection



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Wireless Access Point -> Rogue AP Detection

Email Notification

○ Enable ● Disable

To:

Filter Options: □ SSID Filter □ Channel Filter

Add Known AP MAC Address/Note (Trusted AP)

You may enter up to 128 MAC addresses, one per line. You may also enter the note after MAC address. Please use a space to separate the MAC address and note.
Example: 665544332211 Build1_AP

MAC Address:

Known AP MAC Address List (Trusted AP)

Delete	MAC Address	Note

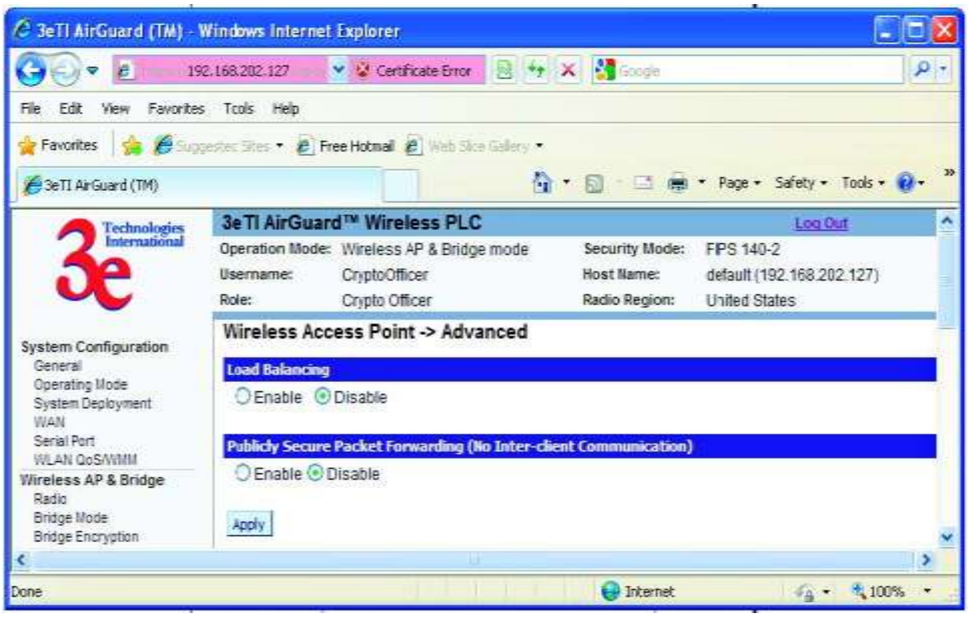
2.3.10 AP Advanced

The **Wireless Access Point - Advanced** screen (Fifure 38) allows you to enable or disable load balancing and to control Publicly Secure Packet Forwarding, which provides client isolation at the Layer 2 level.

Load balancing is enabled by default. The load balancing feature balances the wireless clients between APs. If two APs with similar settings are in a conference room, depending on the location of the APs, all wireless clients could potentially associate with the same AP, leaving the other AP unused. Load balancing attempts to evenly distribute the wireless clients on both APs.

Publicly Secure Packet Forwarding is disabled by default. Enabling this feature prevents wireless clients that associate with the same AP from communicating with each other.

Figure 38 - Wireless Access Point - Advanced



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Wireless Access Point -> Advanced

Load Balancing

○ Enable ● Disable

Publicly Secure Packet Forwarding (No Inter-client Communication)

○ Enable ● Disable

Once you have made any changes, click **Apply** to save.

2.4 Service Settings

There are two options under **Service Settings**:

- SNMP Agent
- Serial Communication

Each screen is described in detail in the following subsections.

2.4.1 SNMP Agent

The **Service Settings - SNMP Agent** screen (Figure 39) allows you to set up an SNMP Agent. The agent is a software module that collects and stores management information for use in a network management system. 3e–523 devices have an integrated SNMP agent software module that translates the device’s management information into a common form for interpretation by the SNMP Manager, which usually resides on a network administrator’s computer.

Information is transported via SNMPv1 (Simple Network Management Protocol) or SNMPv2c, along with the associated Management Information Base (MIB), though trap-directed notifications.

The idea behind trap-directed notification is as follows: if a manager is responsible for a large number of devices, and each device has a large number of objects, it is impractical for him to poll or request information from every object on every device. The solution is for each agent on the managed device to notify the manager without solicitation. It does this by sending a message known as a trap when an appropriate event occurs.

After receiving the event, the manager displays it and may choose to take an action based on the event. For instance, the manager can poll the agent directly, or poll other associated device agents to get a better understanding of the event.

Trap-directed notification can result in substantial savings of network and agent resources by eliminating the need for frivolous SNMP requests. However, it is not possible to totally eliminate SNMP polling. SNMP requests are required for discovery and topology changes. In addition, a managed device agent can not send a trap, if the device has had a catastrophic outage.

SNMPv1 traps are defined in RFC 1157, with the following fields:

- **Enterprise** Identifies the type of managed object generating the trap.
- **Agent address** Provides the address of the managed object generating the trap.
- **Generic trap type** Indicates one of a number of generic trap types.
- **Specific trap code** Indicates one of a number of specific trap codes.
- **Time stamp** Provides the amount of time that has elapsed between the last network reinitialization and generation of the trap.
- **Variable bindings** The data field of trap containing PDU. Each variable binding associates a particular MIB object instance with its current value.

Standard generic traps are: coldStart, warmStart, linkDown, linkUp, authenticationFailure, egpNeighborLoss.

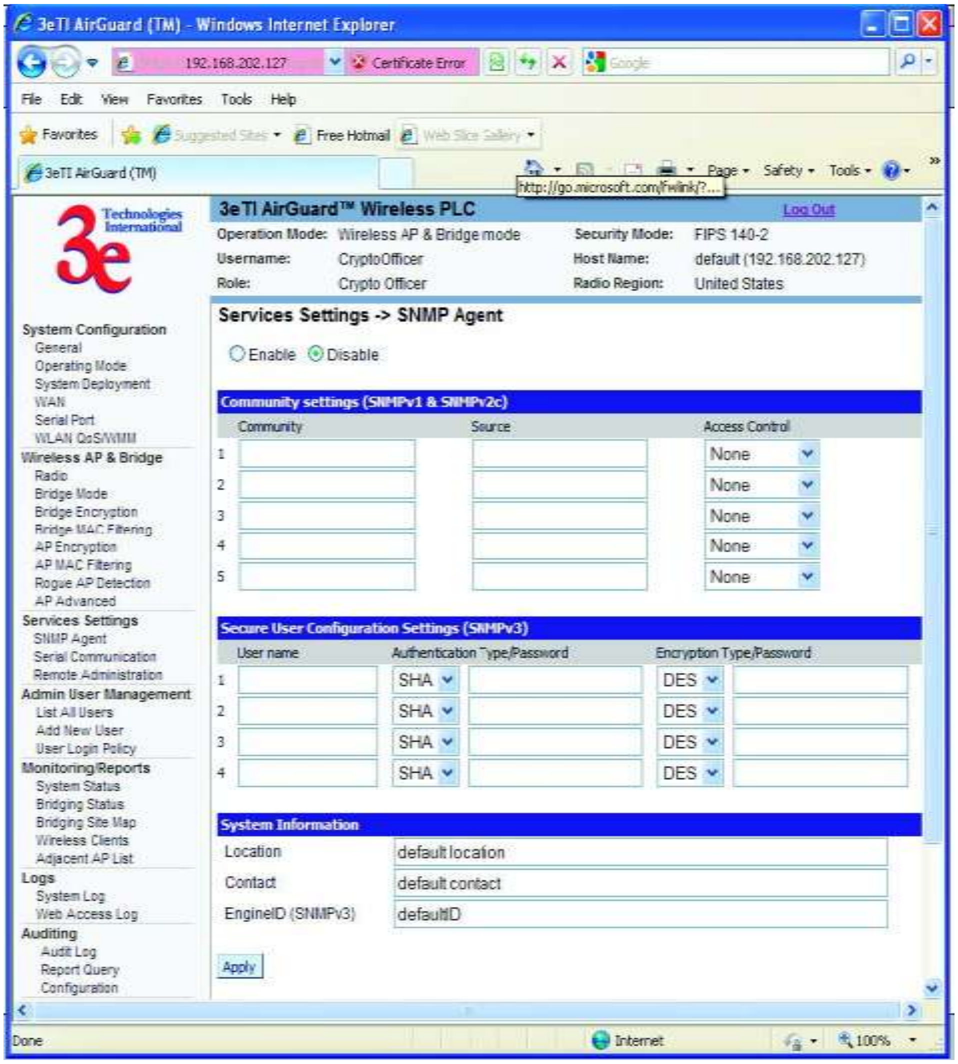
In the current release, 3eTI has implemented warmStart, link-Down, linkUp, and authenticationFailure 5 generic traps and transports those traps using SNMPx2, V2c Trap PDU format.

For generic SNMPv1 traps, 3eTI also redefined some generic traps (see the 3eti-trap-mibs document) by adding some bound variables.

For example, when a trap is received for a warmStart, the receiving system will be able to see one variable associated with this trap. The received variableName field will shows the 3eTI enterprise oid. The varibleValue field will indicate a warmStart reason.

Additionally, a device does not send a trap to a network management system unless it is configured to do so.

Figure 39 - Service Settings - SNMP Agent



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Services Settings -> SNMP Agent

○ Enable ● Disable

Community settings (SNMPv1 & SNMPv2c)

	Community	Source	Access Control
1			None
2			None
3			None
4			None
5			None

Secure User Configuration Settings (SNMPv3)

	User name	Authentication Type/Password		Encryption Type/Password	
1		SHA		DES	
2		SHA		DES	
3		SHA		DES	
4		SHA		DES	

System Information

Location	default location
Contact	default contact
EngineID (SNMPv3)	defaultID

The SNMP configuration consists of several fields, which are explained below:

- **Community** The Community field for Get (Read Only), Set (Read & Write), and Trap is simply the SNMP terminology for "password" for those functions.
- **Source** The IP address or name where the information is obtained.
- **Access Control** Defines the level of management interaction permitted.

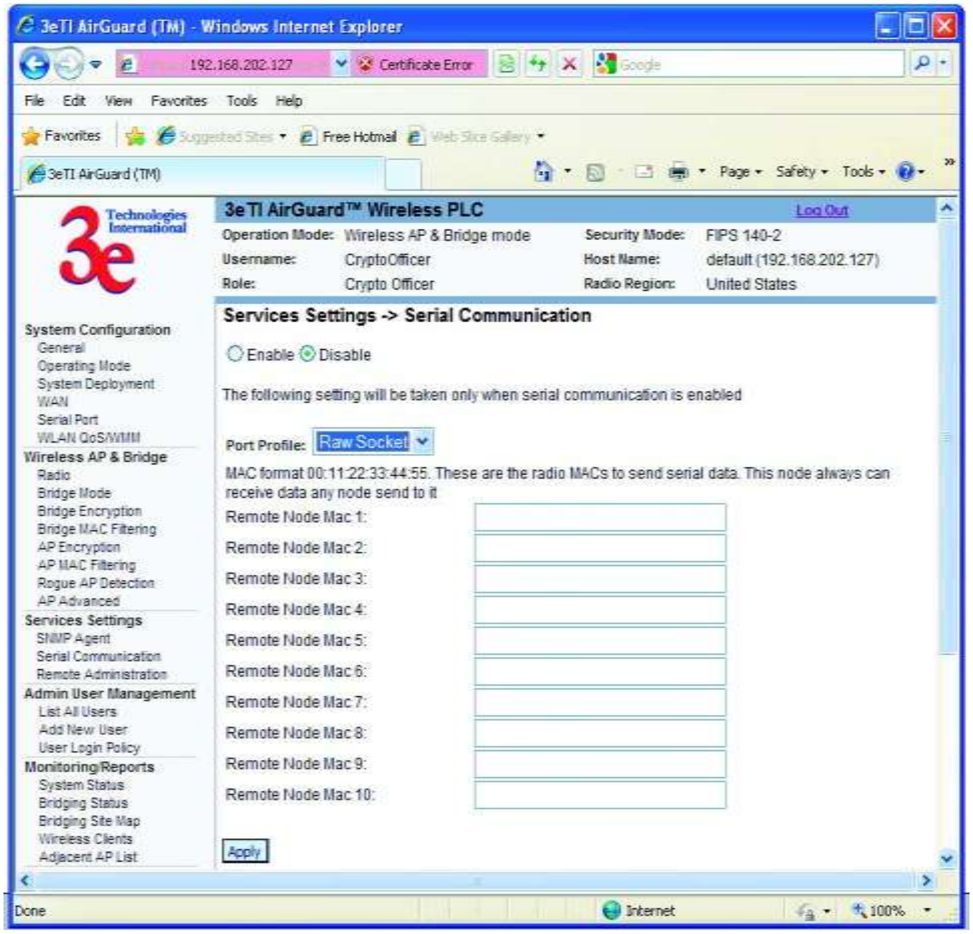
If using SNMPv3, enter a username (minimum of eight characters), authentication type with key and data encryption type with a key. If operating in FIPS mode, only SHA and AES are supported. This configuration information will also need to be entered in your MIB manager setup.

2.4.2 Serial Communication

The **Serial Communication Settings** section (Figure 40) displays the current serial port mode of operation. One of two serial port profiles can be selected.

Raw Socket - This allows serial devices connected to two 3e–523 devices to communicate across the network. It is bidirectional, multiple uni-casting and peer-to-peer communications.

Figure 40 - Service Settings - Serial Communication



3e TI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Services Settings -> Serial Communication

○ Enable ● Disable

The following setting will be taken only when serial communication is enabled

Port Profile: Raw Socket

MAC format 00:11:22:33:44:55. These are the radio MACs to send serial data. This node always can receive data any node send to it

Remote Node Mac 1:

Remote Node Mac 2:

Remote Node Mac 3:

Remote Node Mac 4:

Remote Node Mac 5:

Remote Node Mac 6:

Remote Node Mac 7:

Remote Node Mac 8:

Remote Node Mac 9:

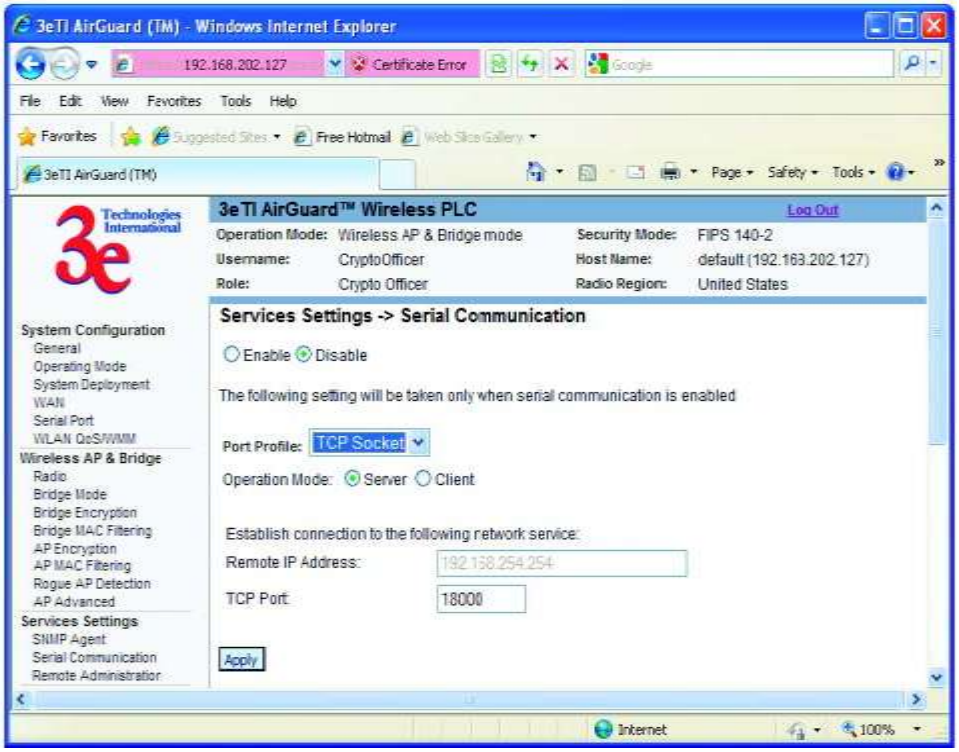
Remote Node Mac 10:

TCP Socket - It is direct IP Mode using TCP. When using TCP sockets your serial server can be configured as a TCP server or TCP client (Figure 41).

If the 3e–523 device is configured as a TCP server, other network devices can initiate a TCP connection with the serial device connected to the serial port. Network devices initiating connections must be configured with the IP address of the device and the TCP port number associated with its serial port.

If the 3e–523 device is configured as a TCP client it will automatically establish a bi-directional TCP connection between the serial device and a server or other networked device.

Figure 41 - Service Settings - TCP Socket



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Services Settings -> Serial Communication

○ Enable ● Disable

The following setting will be taken only when serial communication is enabled

Port Profile: TCP Socket

Operation Mode: ● Server ○ Client

Establish connection to the following network service:

Remote IP Address: 192.168.254.254

TCP Port: 18000

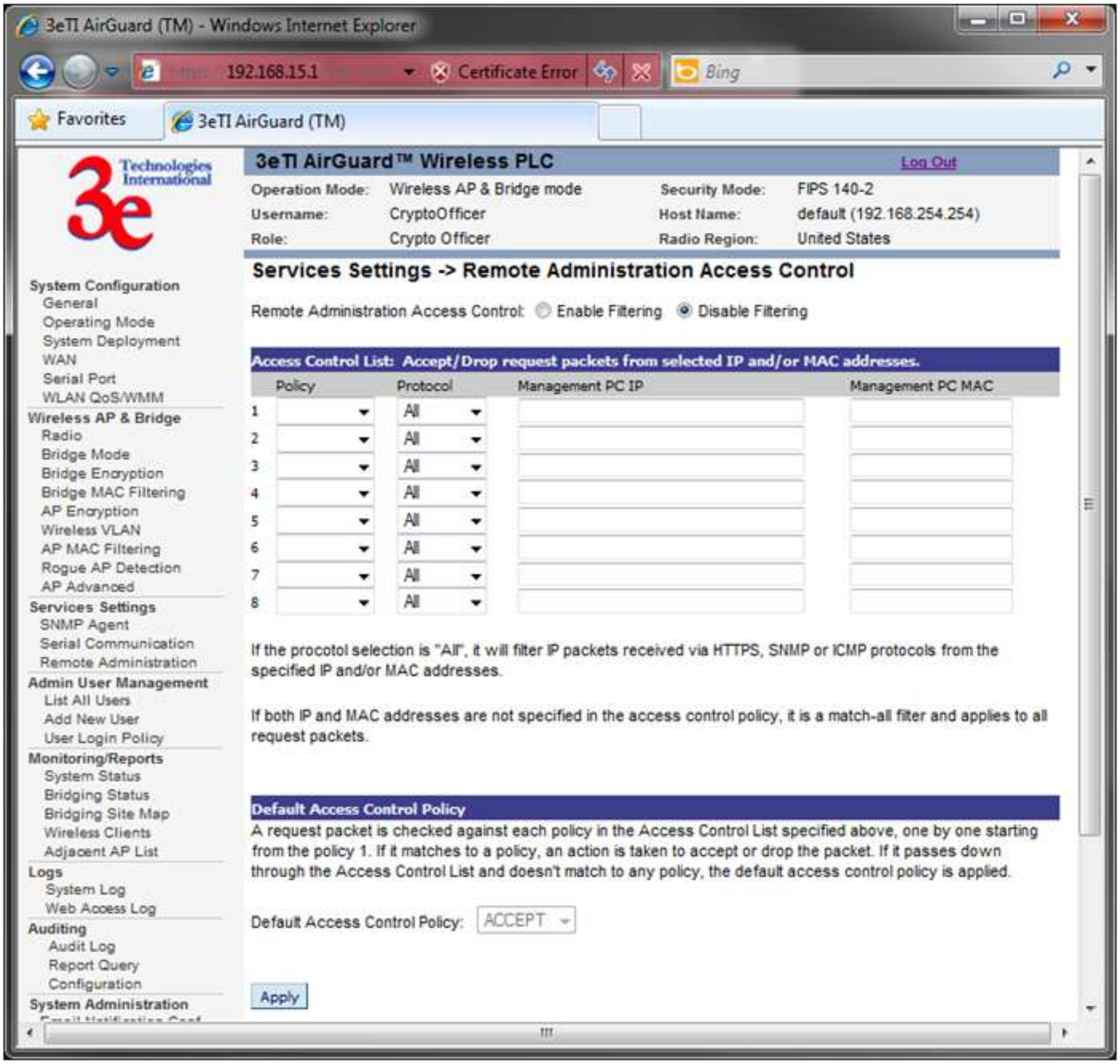
Apply

2.4.3 Remote Administration

The **Service Settings – Remote Administration** screen (Figure 42) allows you to set up access control policies for remote administration via HTTPs, SNMP and ICMP protocols. In the factory default configuration, Remote Administration Access Control option is disabled and hence remote administration is allowed for any source IP address and MAC address.

When the Remote Administration Access Control option is enabled, the device validates the source IP and/or MAC addresses of administrative queries and control requests to insure that the message request is from an approved node. This enables secure remote administration from selected IP and/or MAC addresses.

Figure 42 - Service Settings – Remote Administration Access Control



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

Services Settings -> Remote Administration Access Control

Remote Administration Access Control: ○ Enable Filtering ● Disable Filtering

Access Control List: Accept/Drop request packets from selected IP and/or MAC addresses.

	Policy	Protocol	Management PC IP	Management PC MAC
1		All		
2		All		
3		All		
4		All		
5		All		
6		All		
7		All		
8		All		

If the procotol selection is "All", it will filter IP packets received via HTTPS, SNMP or ICMP protocols from the specified IP and/or MAC addresses.

If both IP and MAC addresses are not specified in the access control policy, it is a match-all filter and applies to all request packets.

Default Access Control Policy

A request packet is checked against each policy in the Access Control List specified above, one by one starting from the policy 1. If it matches to a policy, an action is taken to accept or drop the packet. If it passes down through the Access Control List and doesn't match to any policy, the default access control policy is applied.

Default Access Control Policy: ACCEPT

2.5 Admin User Management

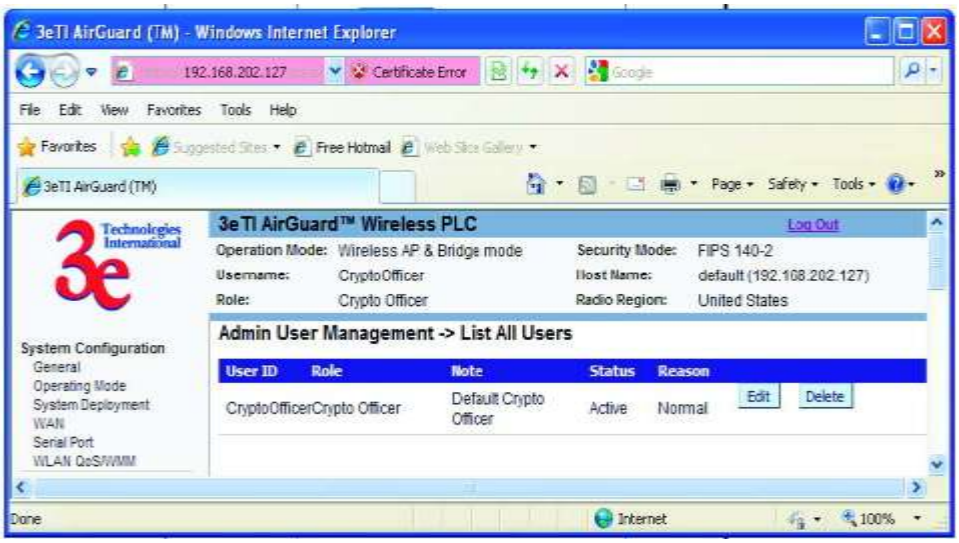
There are three options under Admin User Management:

- List All Users
    - Edit User
- Add New Users
- User Login Policy Each screen is described in detail in the following subsections.

2.5.1 List All Users

The **Admin User Management - List All** Users screen (Figure 43) lists the Crypto Officer and administrator accounts configured for the unit. You can edit or delete users from this screen.

Figure 43 - Admin User Management - List All Users



3eTI AirGuard™ Wireless PLC

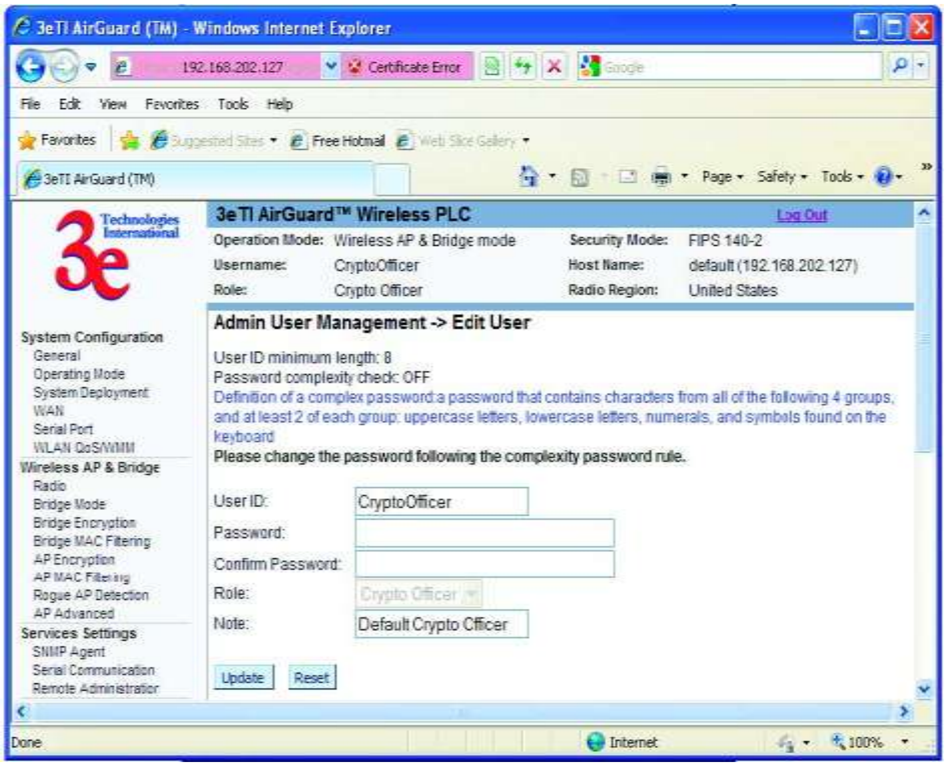
Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Admin User Management -> List All Users

User ID	Role	Note	Status	Reason		
CryptoOfficer	Crypto Officer	Default Crypto Officer	Active	Normal	Edit	Delete

If you click on Edit, the **Admin User Management - Edit User** screen (Figure 44) appears. On this screen you can edit the user ID, password, role, and note fields.

Figure 44 - Admin User Management - Edit User



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Admin User Management -> Edit User

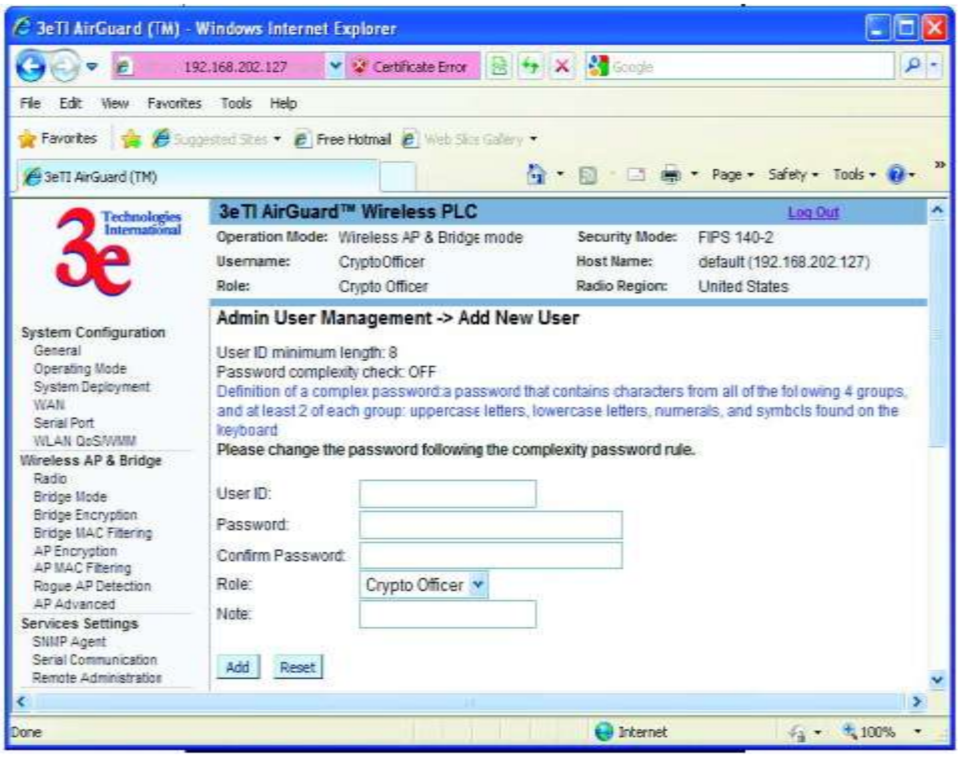
User ID minimum length: 8
Password complexity check: OFF
Definition of a complex password:a password that contains characters from all of the following 4 groups, and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard
Please change the password following the complexity password rule.

User ID:	CryptoOfficer
Password:	
Confirm Password:	
Role:	Crypto Officer
Note:	Default Crypto Officer

2.5.2 Add New User

The **Admin User Management - Add New User** screen (Figure 45) allows you to add new Administrators and CryptoOfficers, assigning and confirming the password.

Figure 45 - Admin User Management - Add New User



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Admin User Management -> Add New User

User ID minimum length: 8
Password complexity check: OFF
Definition of a complex password:a password that contains characters from all of the fol owing 4 groups, and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbcls found on the keyboard
Please change the password following the complexity password rule.

User ID:
Password:
Confirm Password:
Role: Crypto Officer
Note:

The screen as shown in Figure 46 below, will appear in FIPS 140-2 mode. The **Password complexity check** and the **Minimal Password length** are established on the **Admin User Management - User Login Policy** screen.

2.5.3 User Login Policy

The **Admin User Management - User Login Policy** screen (Figure 46) allows you to enable a **Password Complexity Check**. The "User Login Policy" applies to both admin users and end-users. If an admin account or an end-user account is locked for whatever reason, only a CryptoOfficer role user can unlock the account from the LAN port.

The definition of a complex password is a password that contains characters from all of the following 4 groups and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard. The **minimum password length** is eight (8) characters and the maximum length is 30.

The **maximum password age** is configurable from 30 to 90 days. The default is 90 days. If you do not change your password after the maximum password age expires, you will not have access to the unit. However, you have until 150 days of the password age to change the password. You will be prompted to change your password from 90-150 days. After 150 days, the account will be locked and the CryptoOfficer will have to unlock it for you. The only exception to this rule is if you are the last active CryptoOfficer user.

You can also set the **password uniqueness depth**. This means a former password cannot be reused. The depth is configurable from 3 to 10. For example, if the password uniqueness depth is set to 3, then the last 3 passwords cannot be reused when changing your password.

The maximum bad password attempts can be set from 3 to 10 attempts. A user account will be locked after the number of attempts has been exceeded.

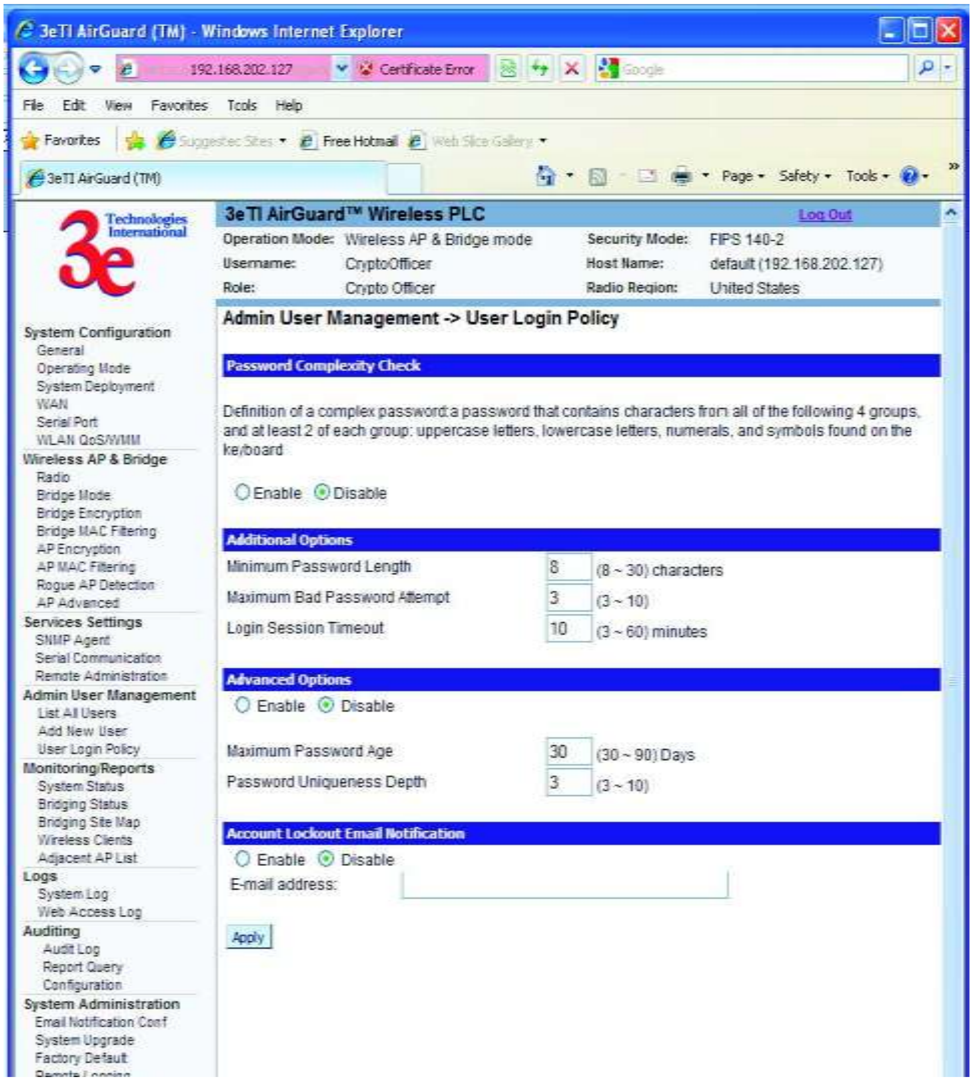
The login session timeout range is from 3 to 60 minutes. If the admin user session is inactive for more than the timeout amount then the session automatically terminates.

The default for the account lockout email notification is set to disable. If enabled, the system will send an email to the email address listed to inform that person that a user has been locked out of the system. To configure the email notification go to the **System Administration - Email Notification Configuration** screen.

Click **Apply** to save your selection.

Note: When password rule is set to be stricter, all users will be required to change their passwords. This is true for users whose passwords already meet the new password rules. The reason for this is that all passwords are saved in a one-way hash format. The unit does not know the plaintext format of any passwords.

Figure 46 - Admin User Management - User Login Policy



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Admin User Management -> User Login Policy

Password Complexity Check

Definition of a complex password: a password that contains characters from all of the following 4 groups, and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard

○ Enable ● Disable

Additional Options

Minimum Password Length	8	(8 ~ 30) characters
Maximum Bad Password Attempt	3	(3 ~ 10)
Login Session Timeout	10	(3 ~ 60) minutes

Advanced Options

○ Enable ● Disable

Maximum Password Age	30	(30 ~ 90) Days
Password Uniqueness Depth	3	(3 ~ 10)

Account Lockout Email Notification

○ Enable ● Disable

E-mail address:

Apply

2.6 Monitoring/Reports

This section gives you a variety of lists and status reports. Most of these are self-explanatory.

There are up to five options under **Monitoring/Reports**, depending on the operating mode:

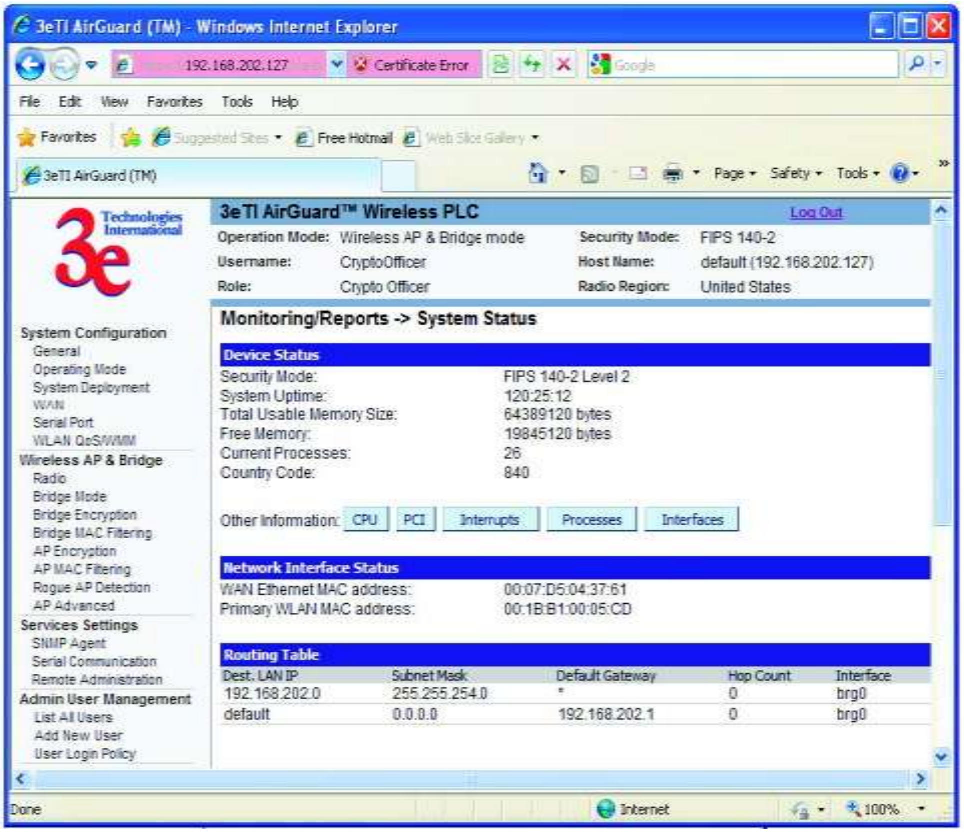
- System Status
- Bridging Status
- Bridging Site Map
- Wireless Clients
- Adjacent AP List

Each screen is described in detail in the following subsections.

2.6.1 System Status

The **Monitoring/Report - System Status** screen (Figure 47) displays the status of the 3e–523 device, the network interface, and the routing table.

Figure 47 - Monitoring/Report — System Status



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Monitoring/Reports -> System Status

Device Status

Security Mode:	FIPS 140-2 Level 2
System Uptime:	120:25:12
Total Usable Memory Size:	64389120 bytes
Free Memory:	19845120 bytes
Current Processes:	26
Country Code:	840

Other Information:

Network Interface Status

WAN Ethernet MAC address:	00:07:D5:04:37:61
Primary WLAN MAC address:	00:1B:B1:00:05:CD

Routing Table

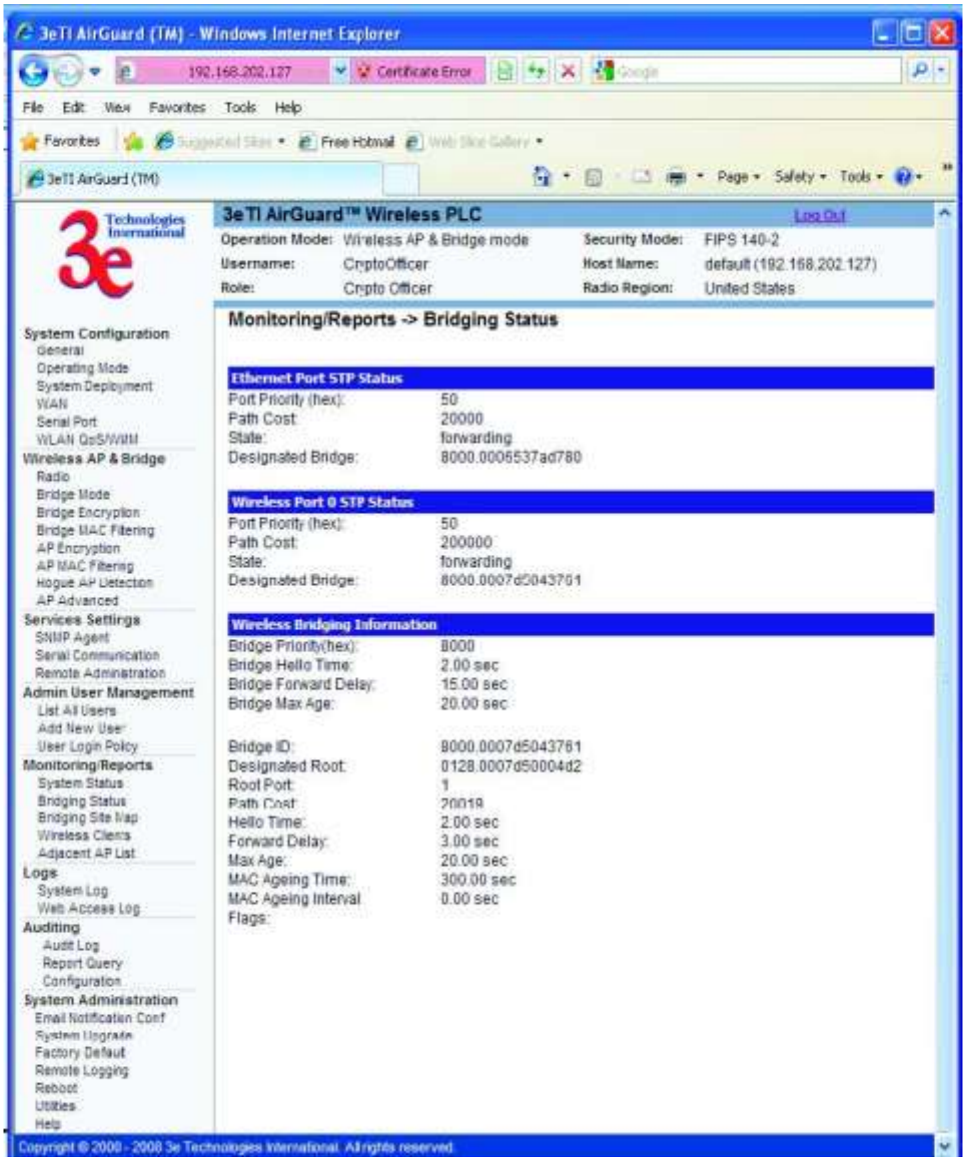
Dest. LAN IP	Subnet Mask	Default Gateway	Hop Count	Interface
192.168.202.0	255.255.254.0	*	0	brg0
default	0.0.0.0	192.168.202.1	0	brg0

There are some pop-up informational menus that give detailed information about **CPU, PCI, Interrupts, Process,** and **Interfaces**.

2.6.2 Bridging Status

The **Monitoring/Report - Bridging Status** screen (Figure 48) displays the Ethernet Port STP status, Wireless Port STP status, and Wireless Bridging information.

Figure 48 - Monitoring/Report — Bridging Status



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Monitoring/Reports -> Bridging Status

Ethernet Port STP Status

Port Priority (hex):	50
Path Cost:	20000
State:	forwarding
Designated Bridge:	8000.0005537ad780

Wireless Port 0 STP Status

Port Priority (hex):	50
Path Cost:	200000
State:	forwarding
Designated Bridge:	8000.0007d5043761

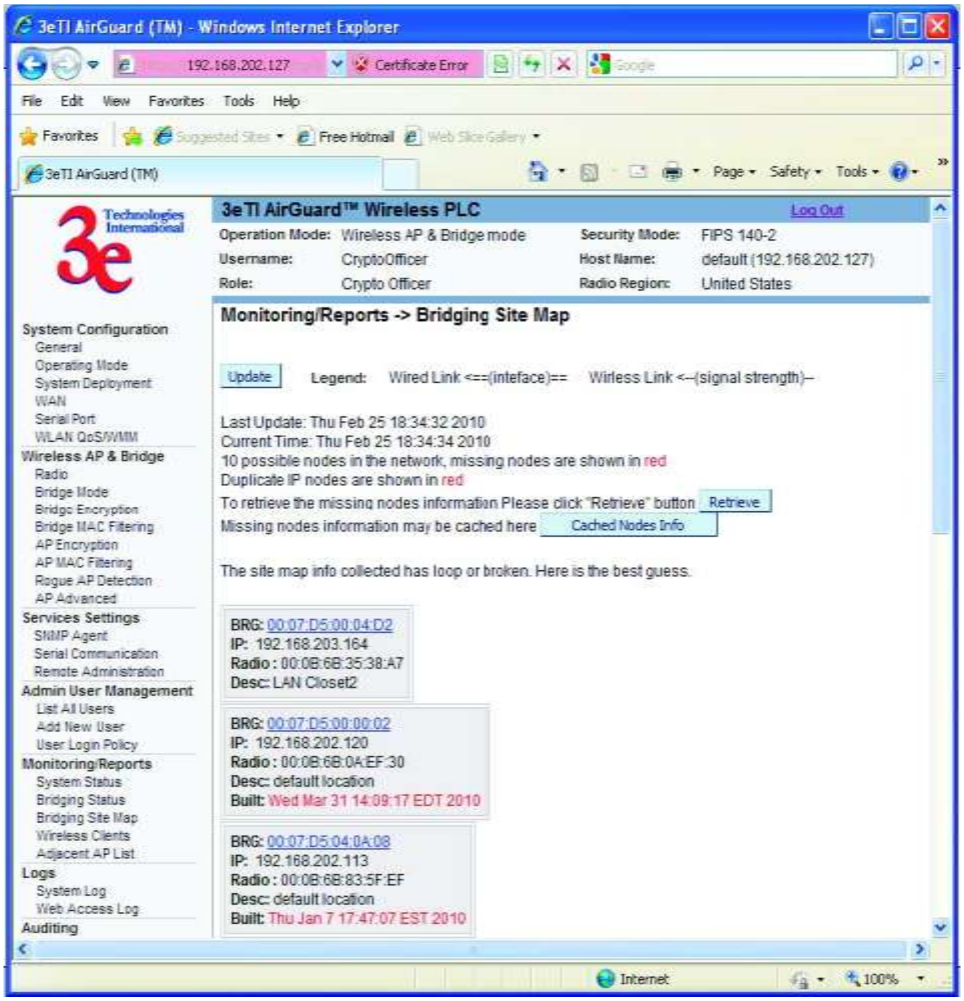
Wireless Bridging Information

Bridge Priority(hex):	8000
Bridge Hello Time:	2.00 sec
Bridge Forward Delay:	15.00 sec
Bridge Max Age:	20.00 sec
Bridge ID:	8000.0007d5043761
Designated Root:	0128.0007d50004d2
Root Port:	1
Path Cost:	20019
Hello Time:	2.00 sec
Forward Delay:	3.00 sec
Max Age:	20.00 sec
MAC Ageing Time:	300.00 sec
MAC Ageing Interval:	0.00 sec
Flags:	

2.6.3 Bridge Site Map

The Bridge Site Map (Figure 49) shows the spanning tree network topology of both wired and wireless nodes connected to the network. The root STP node is always on top and the nodes of the hierarchy are displayed below it. Wired links are double dotted lines and wireless links are single dotted lines. This map does not update dynamically. You must press the Update button to refresh the map.

Figure 49 - Monitoring/Report — Bridge Site Map



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Monitoring/Reports -> Bridging Site Map

Legend: Wired Link <==(inteface)== Wirless Link <--(signal strength)--

Last Update: Thu Feb 25 18:34:32 2010
Current Time: Thu Feb 25 18:34:34 2010
10 possible nodes in the network, missing nodes are shown in red
Duplicate IP nodes are shown in red
To retrieve the missing nodes information Please click "Retrieve" button
Missing nodes information may be cached here

The site map info collected has loop or broken. Here is the best guess.

BRG: 00:07:D5:00:04:D2
IP: 192.168.203.164
Radio : 00:0B:6B:35:38:A7
Desc: LAN Closet2

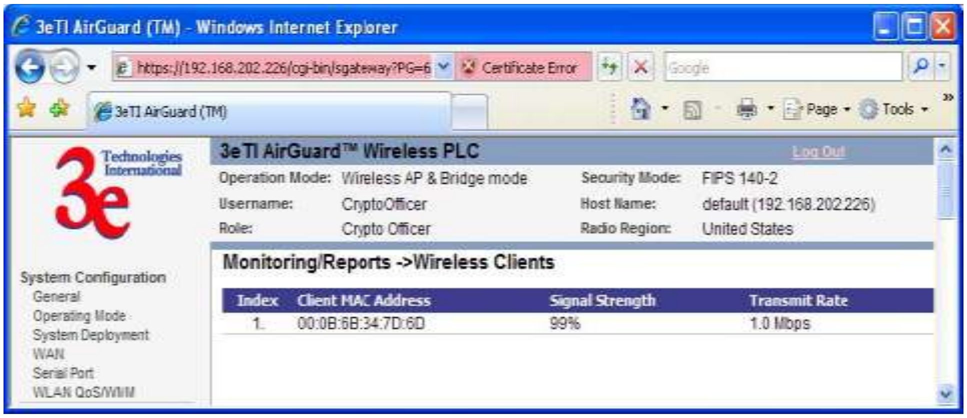
BRG: 00:07:D5:00:00:02
IP: 192.168.202.120
Radio : 00:0B:6B:0A:EF:30
Desc: default location
Built: Wed Mar 31 14:09:17 EDT 2010

BRG: 00:07:D5:04:0A:08
IP: 192.168.202.113
Radio : 00:0B:6B:83:5F:EF
Desc: default location
Built: Thu Jan 7 17:47:07 EST 2010

2.6.4 Wireless Clients

The **Monitoring/Report - Wireless Clients** screen (Figure 50) displays the MAC Address of all wireless clients and their signal strength and transmit rate. The screen shown here emulates the FIPS 140-2 setup and contains a column for EMCON response. This column is not displayed if the AP is in non-FIPS mode. The EMCON feature only works with 3e-010F Crypto Client in FIPs mode.

Figure 50 - Monitoring/Report — Wireless Clients



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.226)
Role:	Crypto Officer	Radio Region:	United States

Monitoring/Reports ->Wireless Clients

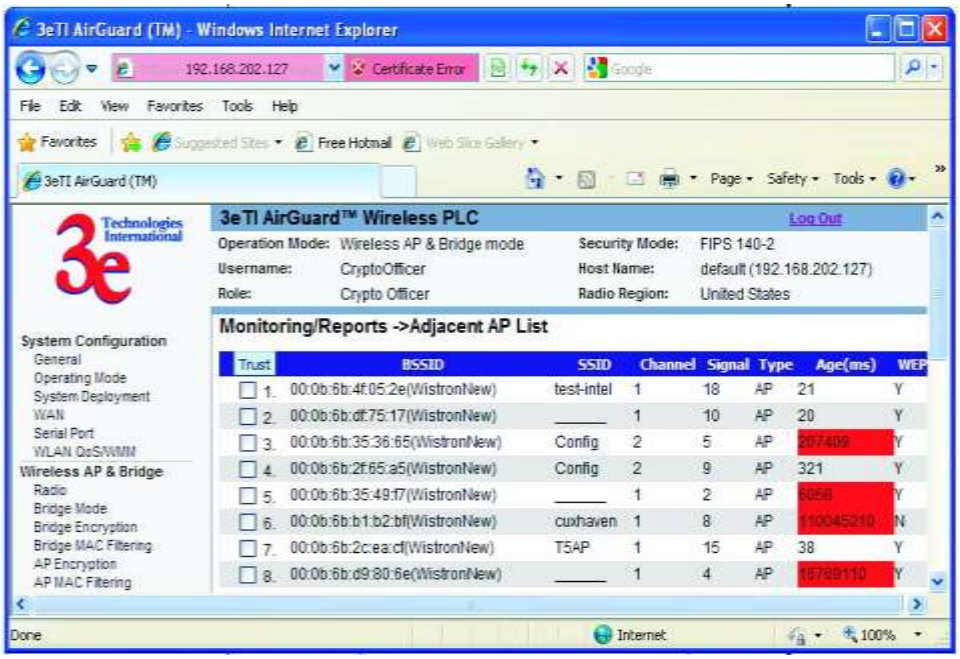
Index	Client MAC Address	Signal Strength	Transmit Rate
1.	00:0B:6B:34:7D:6D	99%	1.0 Mbps

2.6.5 Adjacent AP List

The **Monitoring/Report - Adjacent AP List** screen (Figure 51) shows all the APs on the network. If you select the checkbox next to any AP shown, the AP will thereafter be accepted by the unit as a trusted AP.

These APs are detected by the AP's wireless card and the wireless bridge's wireless card. The list of APs are only within the band that can be seen from a particular channel. For example, if the AP is on channel 1, it will display APs on channels 1-3.

Figure 51 - Monitoring/Report — Adjacent AP List



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Monitoring/Reports ->Adjacent AP List

Trust	BSSID	SSID	Channel	Signal	Type	Age(ms)	WEP
□ 1.	00:0b:6b:4f:05:2e(WistronNew)	test-intel	1	18	AP	21	Y
□ 2.	00:0b:6b:df:75:17(WistronNew)	______	1	10	AP	20	Y
□ 3.	00:0b:6b:35:36:65(WistronNew)	Config	2	5	AP	207409	Y
□ 4.	00:0b:6b:2f:65:a5(WistronNew)	Config	2	9	AP	321	Y
□ 5.	00:0b:6b:35:49:f7(WistronNew)	______	1	2	AP	6058	Y
□ 6.	00:0b:6b:b1:b2:bf(WistronNew)	cuxhaven	1	8	AP	110045210	N
□ 7.	00:0b:6b:2c:ea:cf(WistronNew)	T5AP	1	15	AP	38	Y
□ 8.	00:0b:6b:d9:80:6e(WistronNew)	______	1	4	AP	15789110	Y

2.7 Logs

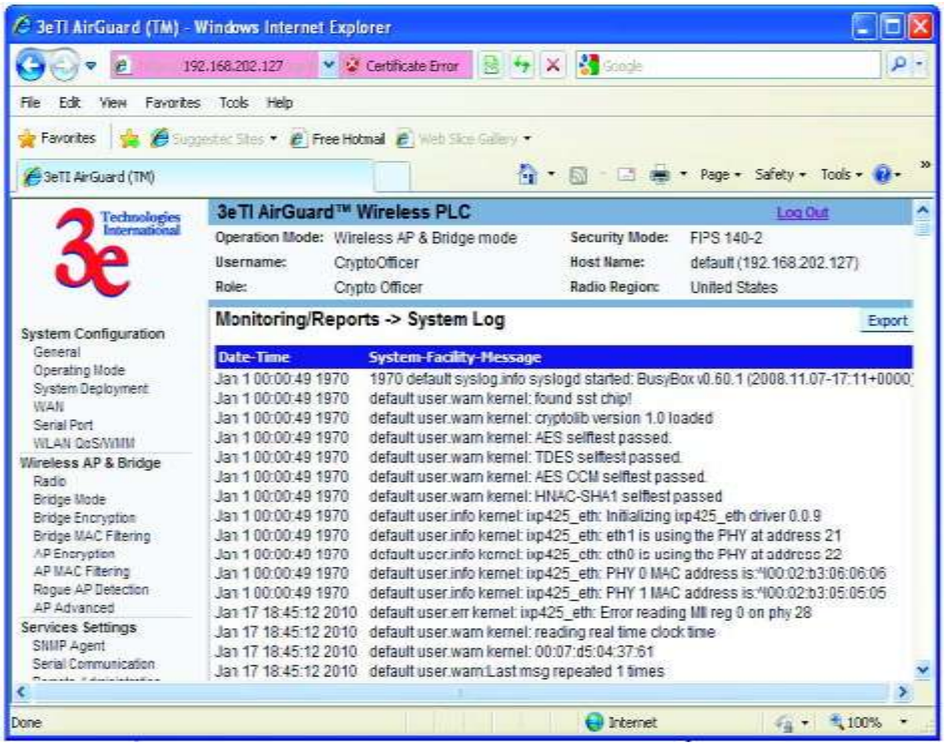
There are two logs available for viewing and exporting.

2.7.1 System Log

The **Logs - System Log** screen (Figure 52) displays system facility messages with date and time stamp. These are messages documenting functions performed internal to the system, based on the system’s functionality. Generally, the Administrator would only use this information if trained as or working with a field engineer or as information provided to technical support.

The System log continues to accumulate listings. If you wish you can export the log and save it as a file on your PC. Click on **Export**.

Figure 52 - Logs — System Log



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

Monitoring/Reports -> System Log

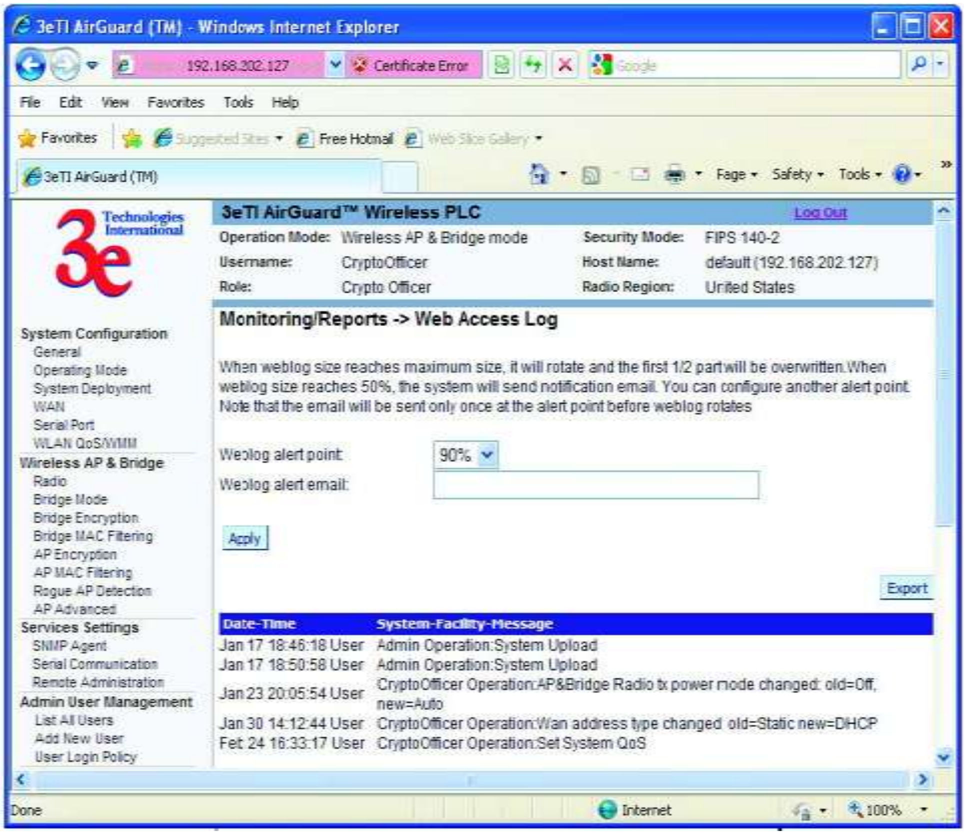
```
Date-Time            System-Facility-Message
Jan 1 00:00:49 1970  1970 default syslog.info syslogd started: BusyBox v0.60.1 (2008.11.07-17:11+0000
Jan 1 00:00:49 1970  default user.warn kernel: found sst chip!
Jan 1 00:00:49 1970  default user.warn kernel: cryptolib version 1.0 loaded
Jan 1 00:00:49 1970  default user.warn kernel: AES selftest passed.
Jan 1 00:00:49 1970  default user.warn kernel: TDES selftest passed.
Jan 1 00:00:49 1970  default user.warn kernel: AES CCM selftest passed.
Jan 1 00:00:49 1970  default user.warn kernel: HMAC-SHA1 selftest passed
Jan 1 00:00:49 1970  default user.info kernel: ixp425_eth: Initializing ixp425_eth driver 0.0.9
Jan 1 00:00:49 1970  default user.info kernel: ixp425_eth: eth1 is using the PHY at address 21
Jan 1 00:00:49 1970  default user.info kernel: ixp425_eth: eth0 is using the PHY at address 22
Jan 1 00:00:49 1970  default user.info kernel: ixp425_eth: PHY 0 MAC address is:'/00:02:b3:06:06:06
Jan 1 00:00:49 1970  default user.info kernel: ixp425_eth: PHY 1 MAC address is:'/00:02:b3:05:05:05
Jan 17 18:45:12 2010 default user.err kernel: ixp425_eth: Error reading MII reg 0 on phy 28
Jan 17 18:45:12 2010 default user.warn kernel: reading real time clock time
Jan 17 18:45:12 2010 default user.warn kernel: 00:07:d5:04:37:61
Jan 17 18:45:12 2010 default user.warn:Last msg repeated 1 times
```

2.7.2 Web Access Log

The **Web Access Log** (Figure 53) displays system facility messages with date and time stamp for any actions involving web access. For example, this log records when you set encryption mode, change operating mode, etc., using the web browser. It establishes a running record regarding what actions were performed and by whom.

The Web access log will continue to accumulate listings. You can set an alert point. You will be notified by email when the alerts reach a certain threshold. If you wish you can export the log and save it as a file on your PC. Click on **Export**.

Figure 53 - Web Access Log



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Monitoring/Reports -> Web Access Log

When weblog size reaches maximum size, it will rotate and the first 1/2 part will be overwritten.When weblog size reaches 50%, the system will send notification email. You can configure another alert point. Note that the email will be sent only once at the alert point before weblog rotates

Weblog alert point: 90%

Weblog alert email:

```
Date-Time             System-Facility-Message
Jan 17 18:46:18 User  Admin Operation:System Upload
Jan 17 18:50:58 User  Admin Operation:System Upload
Jan 23 20:05:54 User  CryptoOfficer Operation:AP&Bridge Radio tx power mode changed: old=Off,
                      new=Auto
Jan 30 14:12:44 User  CryptoOfficer Operation:Wan address type changed old=Static new=DHCP
Feb 24 16:33:17 User  CryptoOfficer Operation:Set System QoS
```

2.8 Auditing

The unit collects audit data and provides an interface for authorized administrators to review generated audit records. It generates records for two separate classes of events: authentication/access to the system, and actions taken directly on the system. All audit records include the date/ time of the event, the identity associated with the event (such as the service, computer or user), the success/failure of the event and a definition of the event (by code or explanation).

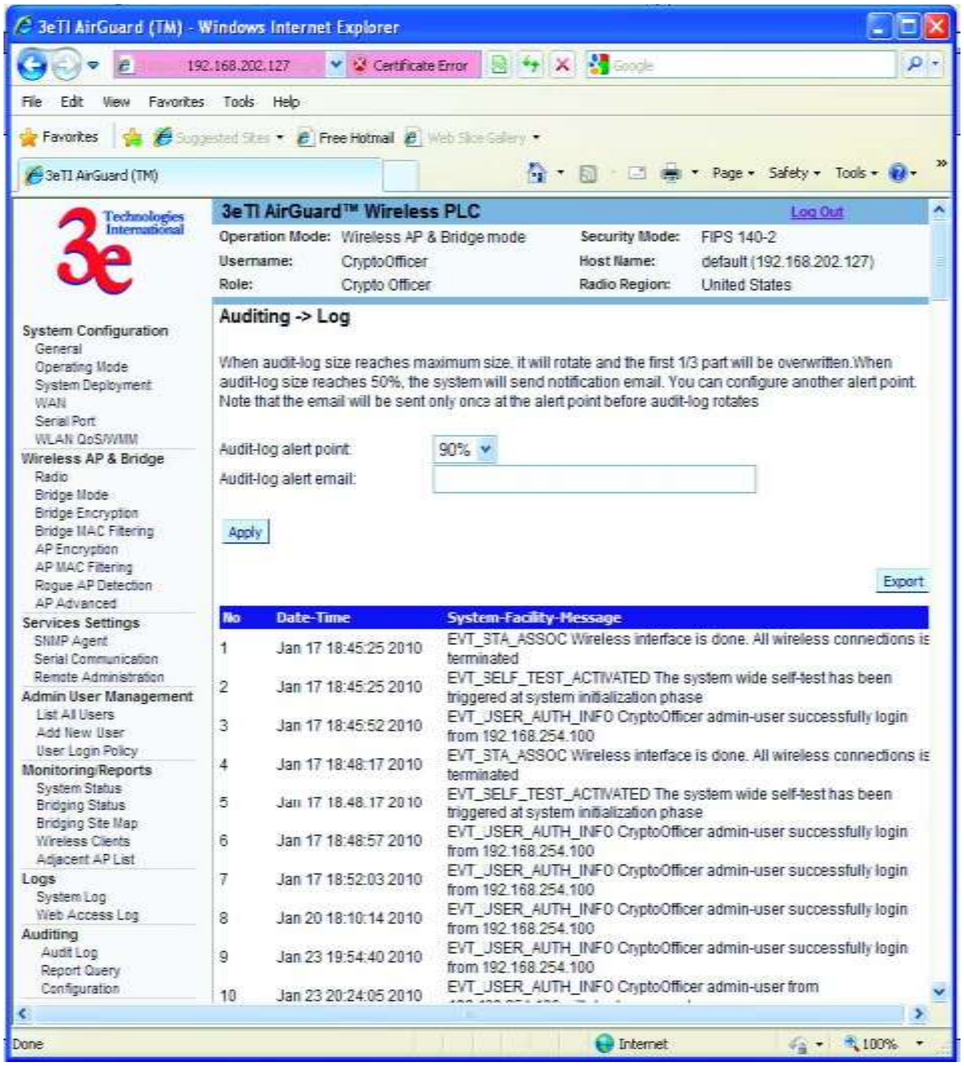
Every start and stop of the audit service is noted in the audit record. For audit events resulting from actions of identified users, the unit associates each auditable event with the identity of the user that caused the event. The unit includes or excludes auditable events from the set of audited events based on object identity, user identity, subject identity, host identity, and event type.

The Auditing screens contain auditing functions for the system. The screens and functions are detailed in the following subsections.

2.8.1 Audit Log

The **Auditing—Audit Log** screen (Figure 54) provides a listing of all the audit records.

Figure 54 - Auditing — Audit Log



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Auditing -> Log

When audit-log size reaches maximum size, it will rotate and the first 1/3 part will be overwritten.When audit-log size reaches 50%, the system will send notification email. You can configure another alert point. Note that the email will be sent only once at the alert point before audit-log rotates

Audit-log alert point: 90%

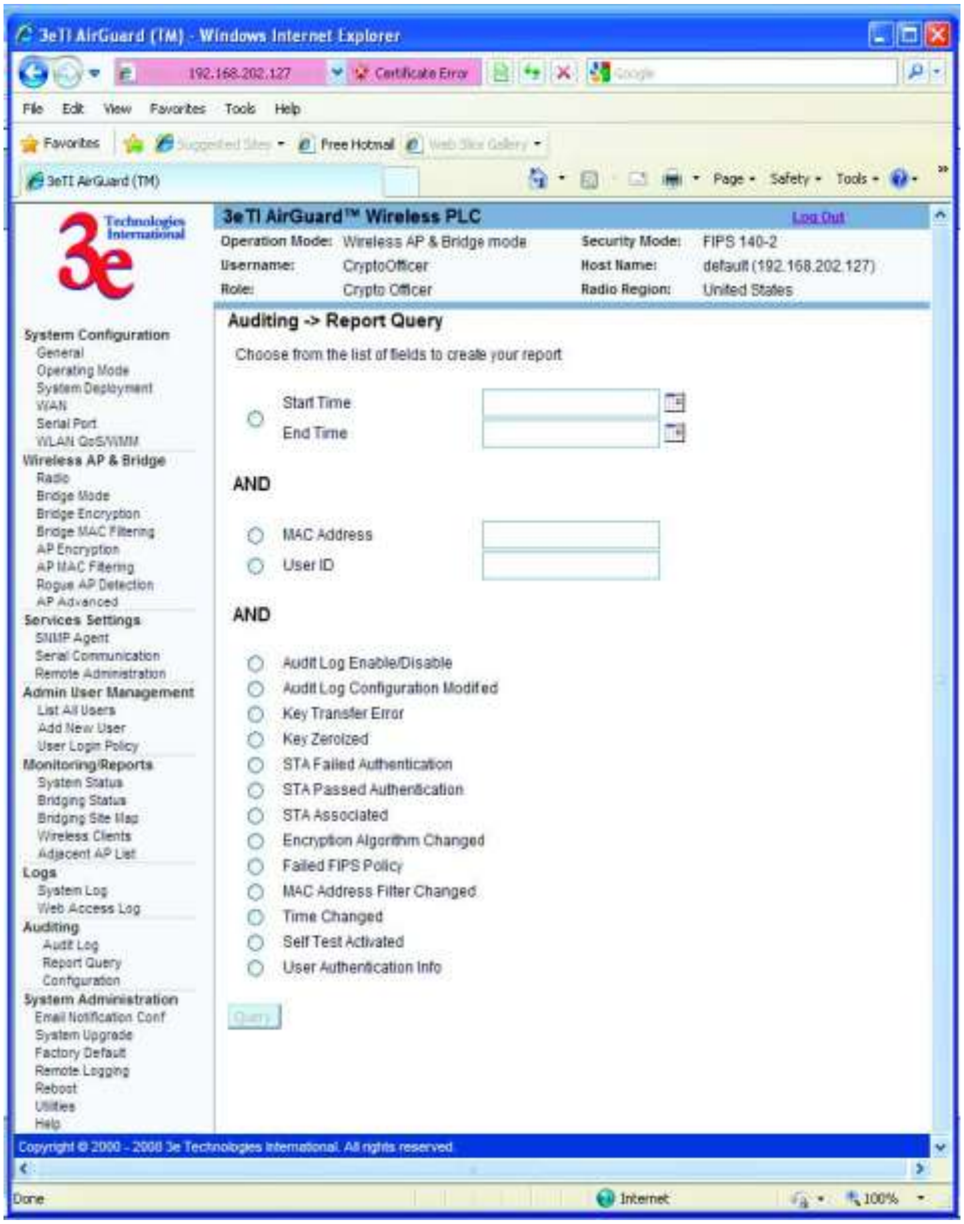
Audit-log alert email:

No	Date-Time	System-Facility-Message
1	Jan 17 18:45:25 2010	EVT_STA_ASSOC Wireless interface is done. All wireless connections is terminated
2	Jan 17 18:45:25 2010	EVT_SELF_TEST_ACTIVATED The system wide self-test has been triggered at system initialization phase
3	Jan 17 18:45:52 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user successfully login from 192.168.254.100
4	Jan 17 18:48:17 2010	EVT_STA_ASSOC Wireless interface is done. All wireless connections is terminated
5	Jan 17 18:48:17 2010	EVT_SELF_TEST_ACTIVATED The system wide self-test has been triggered at system initialization phase
6	Jan 17 18:48:57 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user successfully login from 192.168.254.100
7	Jan 17 18:52:03 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user successfully login from 192.168.254.100
8	Jan 20 18:10:14 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user successfully login from 192.168.254.100
9	Jan 23 19:54:40 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user successfully login from 192.168.254.100
10	Jan 23 20:24:05 2010	EVT_USER_AUTH_INFO CryptoOfficer admin-user from

2.8.2 Report Query

The **Auditing—Report Query** screen (Figure 55) allows you to query on report based on start time, end time, MAC address, or unique record IDs.

Figure 55 - Auditing — Report Query



3e TI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

Auditing -> Report Query

Choose from the list of fields to create your report

○ Start Time
End Time

AND

○ MAC Address
○ User ID

AND

○ Audit Log Enable/Disable
○ Audit Log Configuration Modifed
○ Key Transfer Error
○ Key Zeroized
○ STA Failed Authentication
○ STA Passed Authentication
○ STA Associated
○ Encryption Algorithm Changed
○ Failed FIPS Policy
○ MAC Address Filter Changed
○ Time Changed
○ Self Test Activated
○ User Authentication Info

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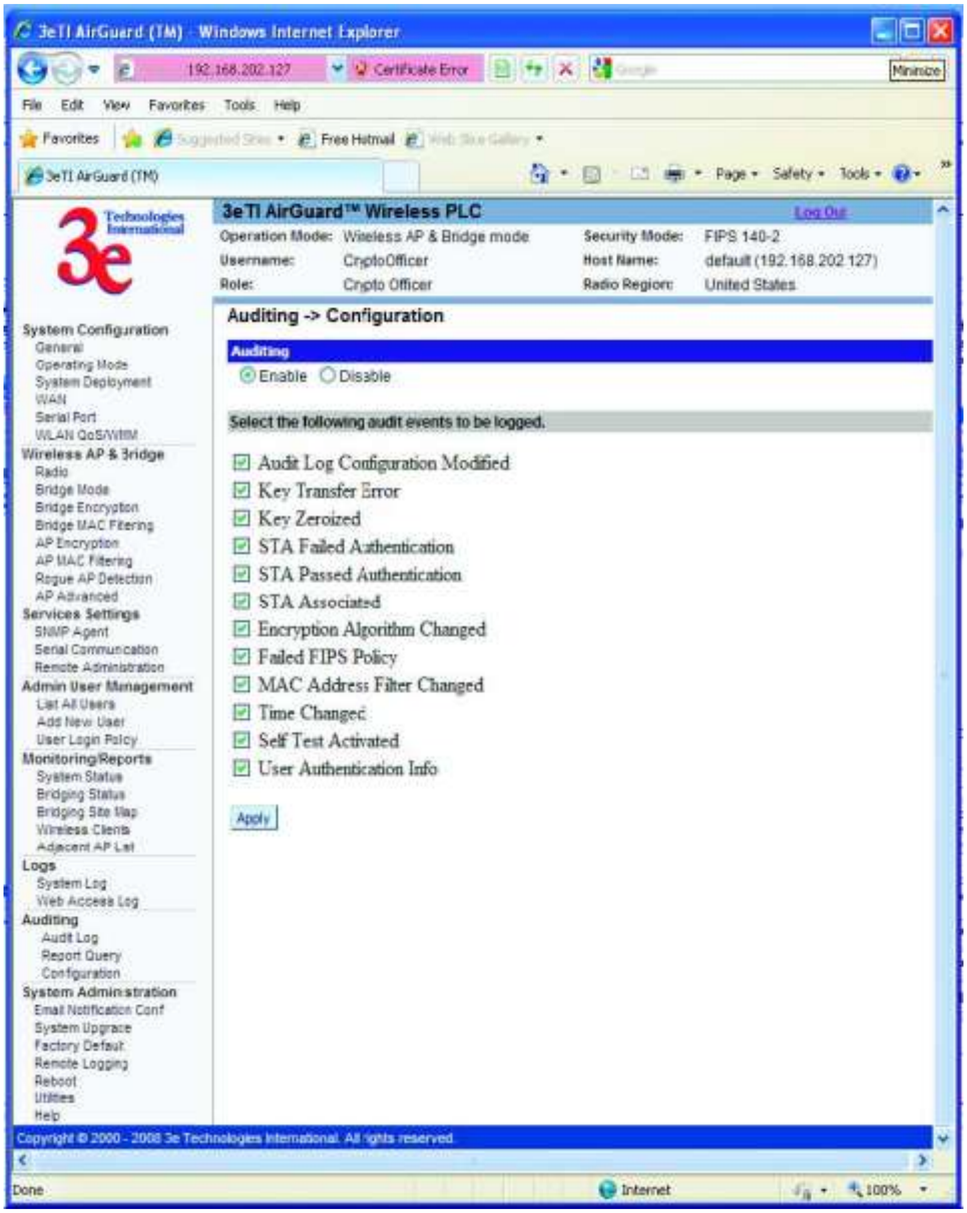
2.8.3 Configuration

The **Auditing—Configuration** screen is used to configure the auditing settings. You can enable and disable the auditing function on this screen. You can select which audit event types you wish to log.Figure 56 below shows the screen and Table 7 lists event types and descriptions.

Figure 56 - Auditing — Configuration



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Auditing -> Configuration

Auditing

● Enable ○ Disable

Select the following audit events to be logged.

- ☑ Audit Log Configuration Modified
- ☑ Key Transfer Error
- ☑ Key Zeroized
- ☑ STA Failed Authentication
- ☑ STA Passed Authentication
- ☑ STA Associated
- ☑ Encryption Algorithm Changed
- ☑ Failed FIPS Policy
- ☑ MAC Address Filter Changed
- ☑ Time Changed
- ☑ Self Test Activated
- ☑ User Authentication Info

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Table 7 - Auditing — Configuration Event Type and Description

Event Type	Description
Audit Log Configuration Modified	Any modification to the audit log configuration (enable/disable, recorded event types, etc) will trigger the creation of an audit record.
Key Transfer Error	Any error detected during the dynamic key exchange, either to the station or the authentication server.

Key Zeroized	The keys are zeroized including: 1. Transitioning from static key to DKE (and vice versa) 2. Transitioning to bypass mode Individual log messages appear from the application and driver since keys are held in both locations.
STA Failed Authentication	A station's authentication request is dropped because it doesn't match the MAC address filter.
STA Associated	A station successfully associates to the AP.
Encryption Algorithm Changed	The encryption algorithm is changed, including bypass mode.
Failed FIPS Policy	All HMAC/AES decrypt errors that can be detected.
MAC Filter Changed	The MAC address filter is changed including adding/deleting, enable/disable, and changing filter type.
Time Changed	Whenever the time is changed via the GUI or at bootup if the time is within two minutes of 11/30/1999, 0hr, 0min.
Self Test Activated	The self-test function is run.

2.9 System Administration

There are six options under **System Administration**:

- Email Notification Configuration
- System Upgrade
- Firmware Upgrade
- Local Configuration Upgrade
- Remote Configuration Upgrade
- Factory Default
- Remote Logging
- Reboot
- Utilities

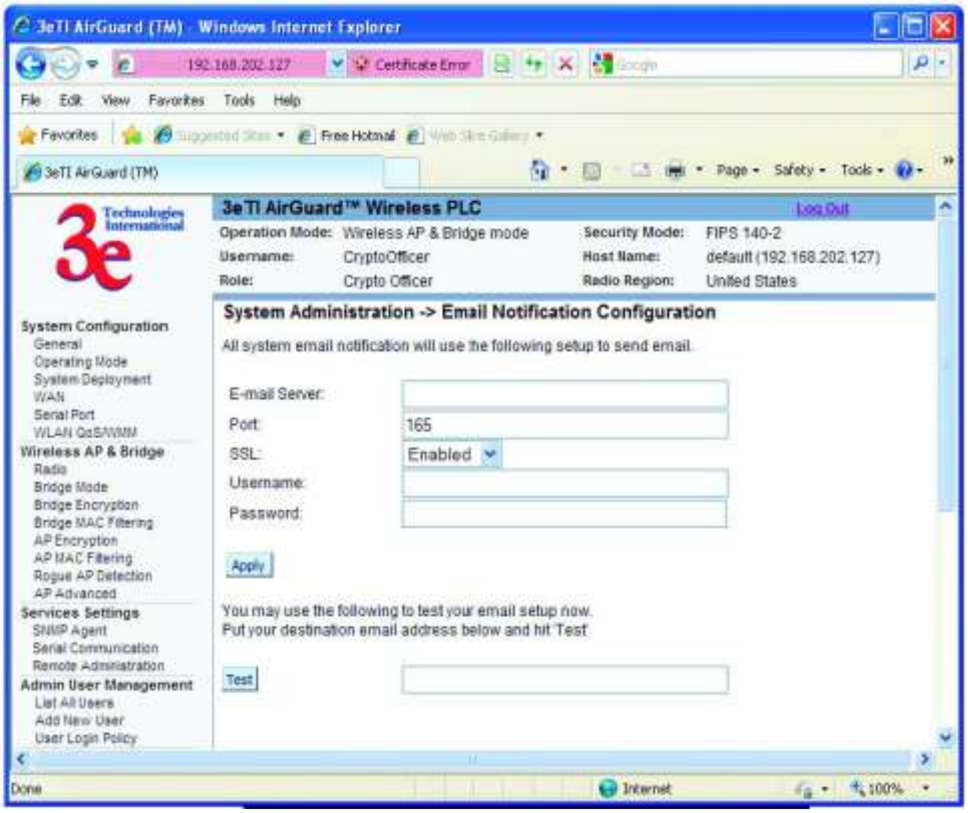
Each screen is described in detail in the following subsections.

2.9.1 E-mail Notification Configuration

All system notification emails need to be set up using the **System Administration - Email Notification Configuration** screen (Figure 57). Your email server must support SMTP protocol. If you email server does not require authentication to send email then leave the username/password fields blank. If your email server does not support SSL (Secure Socket Layer) then disable SSL on the 3e–523. You may also test your email setup using the test feature on this screen.

NOTE: Check your connection to the mail server. Emails sent from the 3e–523 may be queued for a short period if the connection fails temporarily, but it will give up if the connection continues to fail.

Figure 57 - System Administration — Email Notification Configuration



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

System Administration -> Email Notification Configuration

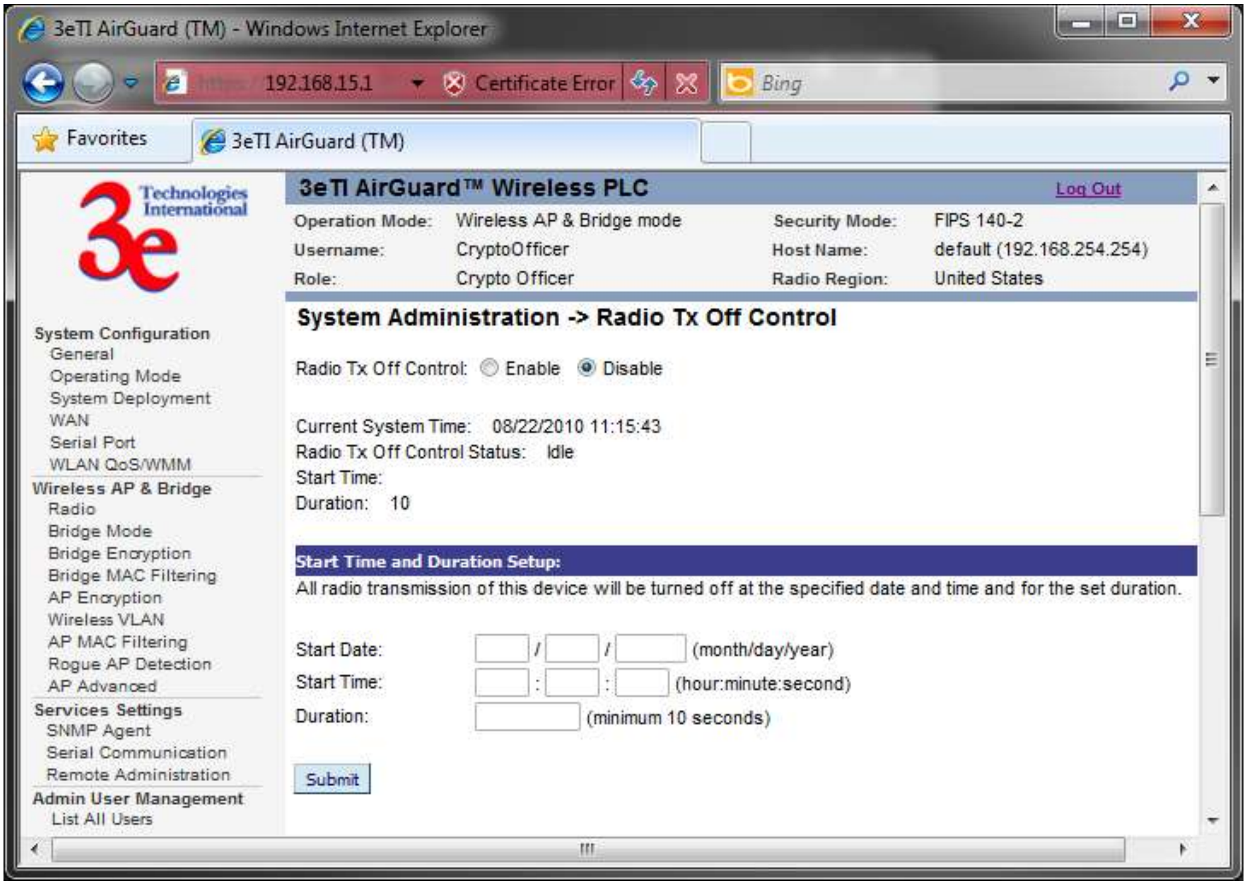
All system email notification will use the following setup to send email.

E-mail Server:
Port: 165
SSL: Enabled
Username:
Password:

You may use the following to test your email setup now.
Put your destination email address below and hit 'Test'.

2.9.2 Radio Tx Off Control

Figure 58 - System Administration — Radio Tx Off Control



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

System Administration -> Radio Tx Off Control

Radio Tx Off Control: ○ Enable ● Disable

Current System Time: 08/22/2010 11:15:43
Radio Tx Off Control Status: Idle
Start Time:
Duration: 10

Start Time and Duration Setup:

All radio transmission of this device will be turned off at the specified date and time and for the set duration.

Start Date: ____ / ____ / ____ (month/day/year)
Start Time: ____ : ____ : ____ (hour:minute:second)
Duration: ____ (minimum 10 seconds)

2.9.3 System Upgrade

The System **Administration - System Upgrade** screen (Figure 59) gives you the ability to upload updates to the 3e–523 device's firmware as they become available. When a new upgrade file becomes available, you can do a firmware upgrade from the **Firmware Upgrade** window.

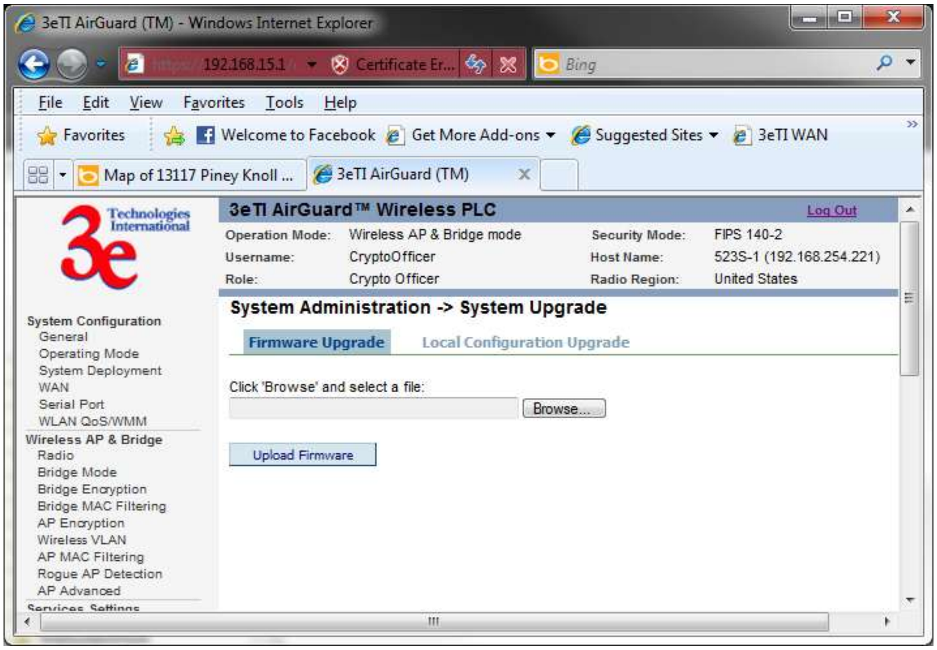
There is also a configuration file transfer option which allows the system configuration file from one AP to be transferred to another AP, in order to minimize the administration of the APs. Only configuration parameters that can be shared between APs are downloaded in the configuration file. WAN IP address and hostname are not transferred in the configuration file.

Only the Crypto Officer role can access this function.

Firmware Upgrade - On the **System Administration - System** Upgrade screen (Figure 59), the Firmware Upgrade tab is the default view.

Click browse and select the firmware file to be uploaded. Click on the Upload Firmware button.

Figure 59 - System Administration — Firmware Upgrade



Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: 523S-1 (192.168.254.221)
Role: Crypto Officer
Radio Region: United States

System Administration -> System Upgrade

Click 'Browse' and select a file:

Local Configuration Upgrade - On the **System Administration - System Upgrade** screen (

Figure 60Figure 60), click on the Local Configuration Upgrade tab to upload and download configuration files to other 3e–523 devices connected to the network.

To upload a configuration file, select the file using the browse button and enter the passphrase for that file. The passphrase protects the file from unauthorized users. It prevents unauthorized users from applying the system configuration file to an unauthorized device to gain access to the network. Before downloading the system configuration file to a local computer, the user must enter a passphrase to protect the file. Before the system configuration file can be uploaded onto another 3e–523 device, the passphrase must be entered on the remote 3e–523 device.

Notes:

1. When downloading configuration files, keys are NOT downloaded.
2. When uploading configuration file to a device, if the device currently is configured to the same security options as those in the uploaded file, the keys are reused. Otherwise, the keys are zeroized and marked “**key not set**” from web GUI.

   e.g. Current device has 802.11i-PMK option on AP security. The configured to be uploaded will use 802.11i-PMK for AP security. Existing 256bit PMK is reused. Otherwise, AP security is marked “key not set”.
3. In VLAN scenario, VLAN ID (NOT the SSID) is the index to find matching security option.

   E.g. Current device has 3 VLAN configured as follows.

   a. VLAN ID = 1, SSID=area-1, security=802.11i pmk
   b. VLAN ID = 2, SSID=area-2, security=802.11i-dot1x
   c. VLAN ID = 3, SSID=area-3, security=static AES

   The configuration file to be uploaded has 4 VLAN configured as follows.

   a. VLAN ID = 1, SSID=test-1, security=802.11i pmk

b. VLAN ID = 2, SSID=area-1, security=802.11i-dot1x

c. VLAN ID = 3, SSID=area-2, security=802.11i pmk

d. VLAN ID = 4, SSID=area-3, security=static AES

The device will have 4 VLANs configured as follows

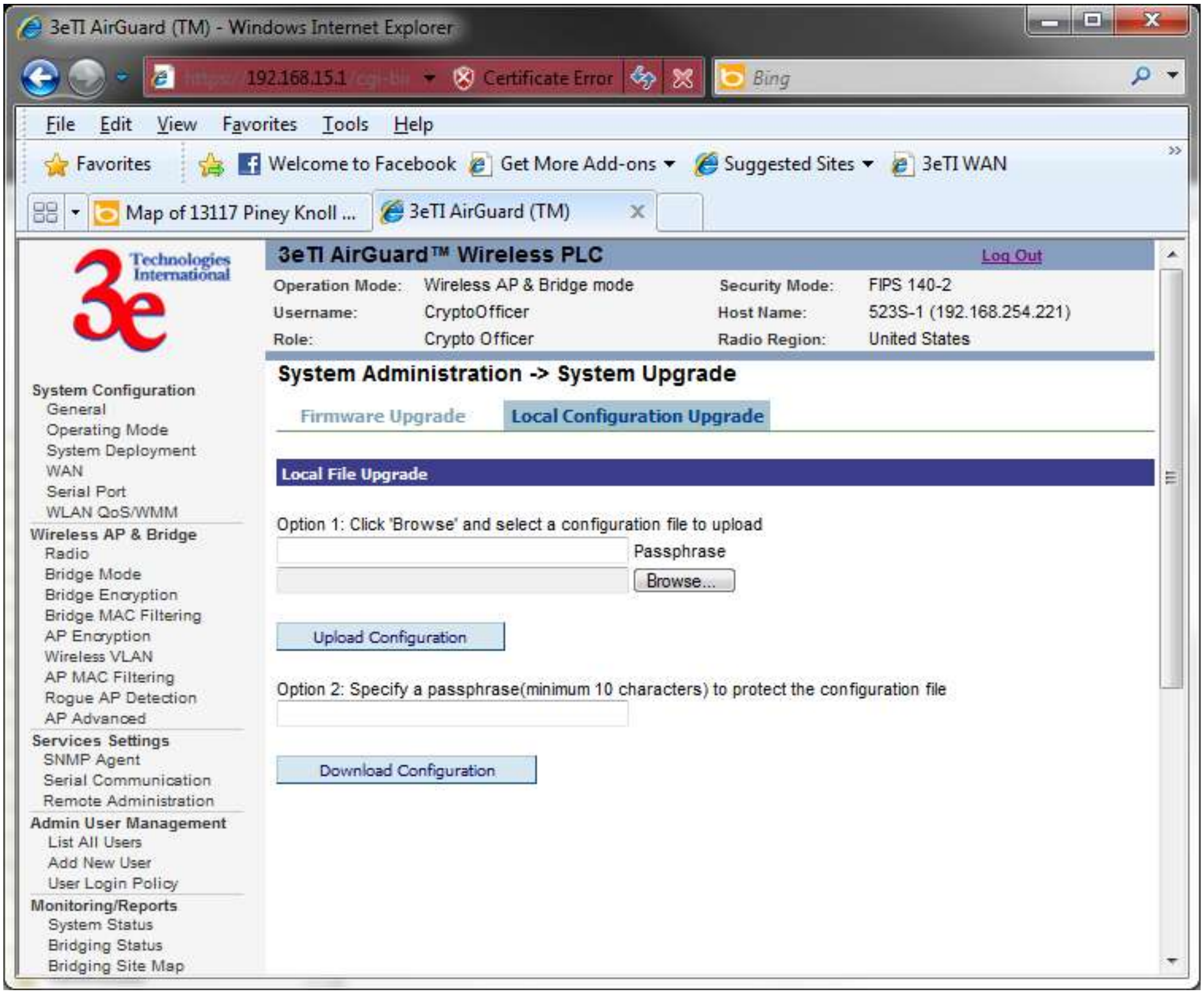
a. VLAN ID = 1, SSID=test-1, security=802.11i pmk (key set)

b. VLAN ID = 2, SSID=area-1, security=802.11i-dot1x (key set)

c. VLAN ID = 3, SSID=area-2, security=802.11i pmk (key not set)

d. VLAN ID = 4, SSID=area-3, security=static AES (key not set)

Figure 60 -System Administration — Local Configuration Upgrade



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	523S-1 (192.168.254.221)
Role:	Crypto Officer	Radio Region:	United States

System Administration -> System Upgrade

Local File Upgrade

Option 1: Click 'Browse' and select a configuration file to upload

Passphrase

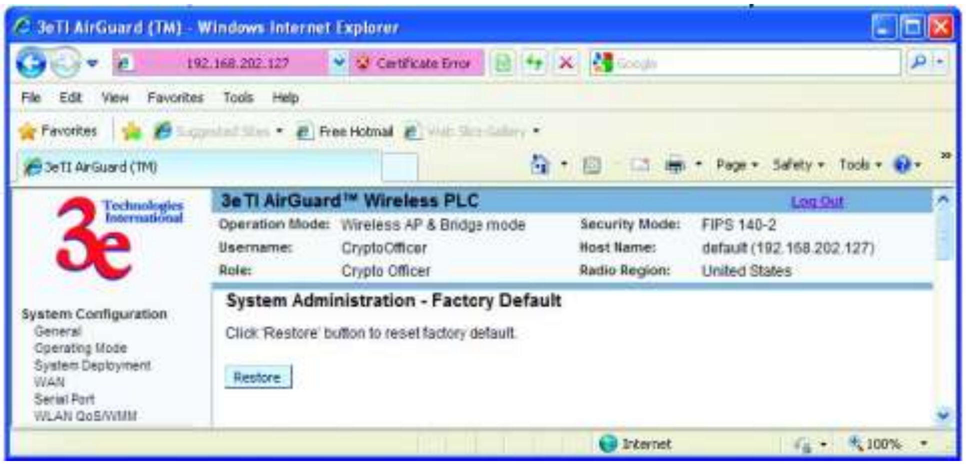
Option 2: Specify a passphrase(minimum 10 characters) to protect the configuration file

2.9.4 Factory Default

The **System Administration - Factory Default** screen (Figure 61) is used to reset the 3e–523 to its factory settings.

The "Restore" button is a fallback troubleshooting function that should only be used to reset to original settings. Only the Crypto Officer role has access to the Restore button.

Figure 61 - System Administration - Factory Default



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

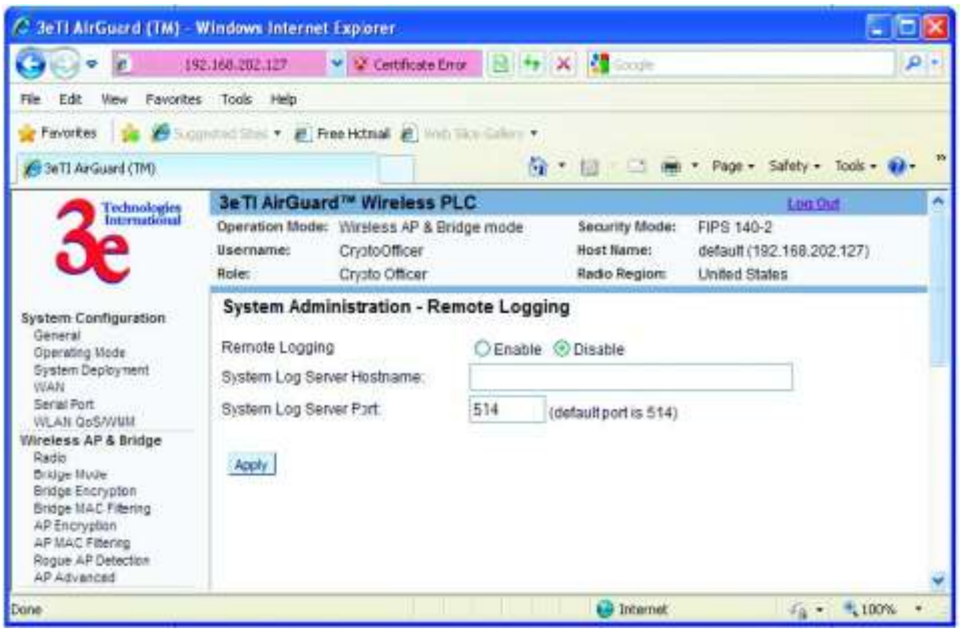
System Administration - Factory Default

Click 'Restore' button to reset factory default.

2.9.5 Remote Logging

The **System Administration —Remote Logging** screen (Figure 62) allows you to forward the syslog data from each machine to a central remote logging server. In the 3e–523, this function uses the syslogd daemon. If you enable Remote Logging, input a System Log Server IP Address and System Log Server Port. Click **Apply** to accept these values.

Figure 62 - System Administration - Remote Logging



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.202.127)
Role:	Crypto Officer	Radio Region:	United States

System Administration - Remote Logging

Remote Logging ○ Enable ● Disable

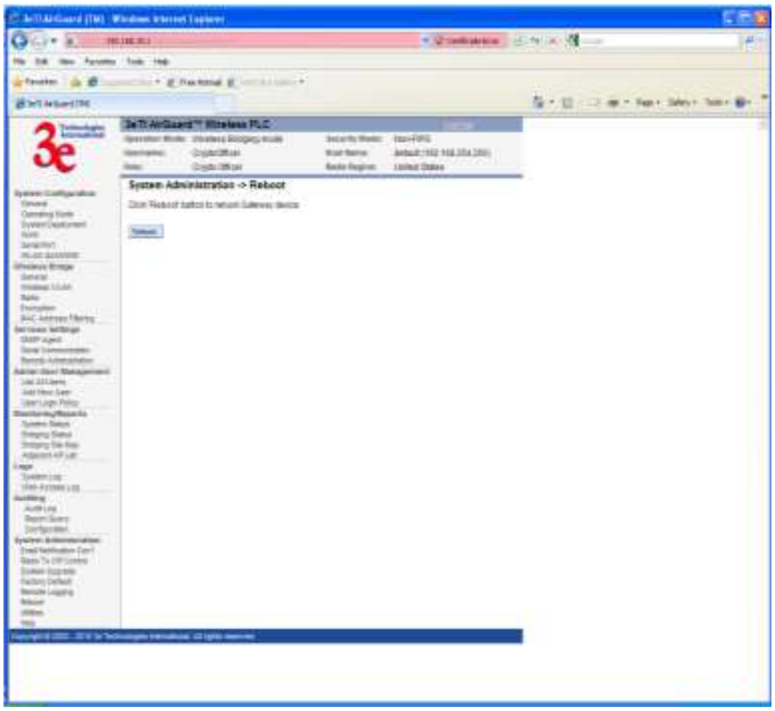
System Log Server Hostname:

System Log Server Port: 514 (default port is 514)

2.9.6 Reboot

The **System Administration - Reboot** screen (Figure 63) allows you to reboot the 3e–523 without changing any preset functionality. Both Crypto Officer and Administrator functions have access to this function.

Figure 63 - System Administration - Reboot



3eTI AirGuard™ Wireless PLC

System Administration -> Reboot

Click Reboot button to reboot Gateway device

2.9.7 On Demand Self-test

Self-tests are run to verify the correctness of cryptographic related functions. Two cryptographic libraries support these tests:

OpenSSL crypto library – free software from the OpenSSL project. This library is used by user space applications.

Kernel crypto library – This library is used by kernel space applications. It can be supported by hardware (if available) or software. All 3e525A-3 platforms will support the hardware kernel library.

The following tests are available using the OpenSSL library:

- Advanced Encryption Standard (ECB mode)
- Triple DES
- Secure Hash Algorithm 1
- Random Number Generator
- Hashed Message Authentication Code
- RSA Algorithm
- Firmware Integrity Check
- Bootloader Integrity Check

The following tests are available using the kernel libraries:

- Advanced Encryption Standard (ECB mode)
- Advanced Encryption Standard (CCM mode)
- Secure Hash Algorithm 1
- Hashed Message Authentication Code
- Key Error Detection – checks for corruption of keys stored in flash

The following tests do not rely on crypto libraries:

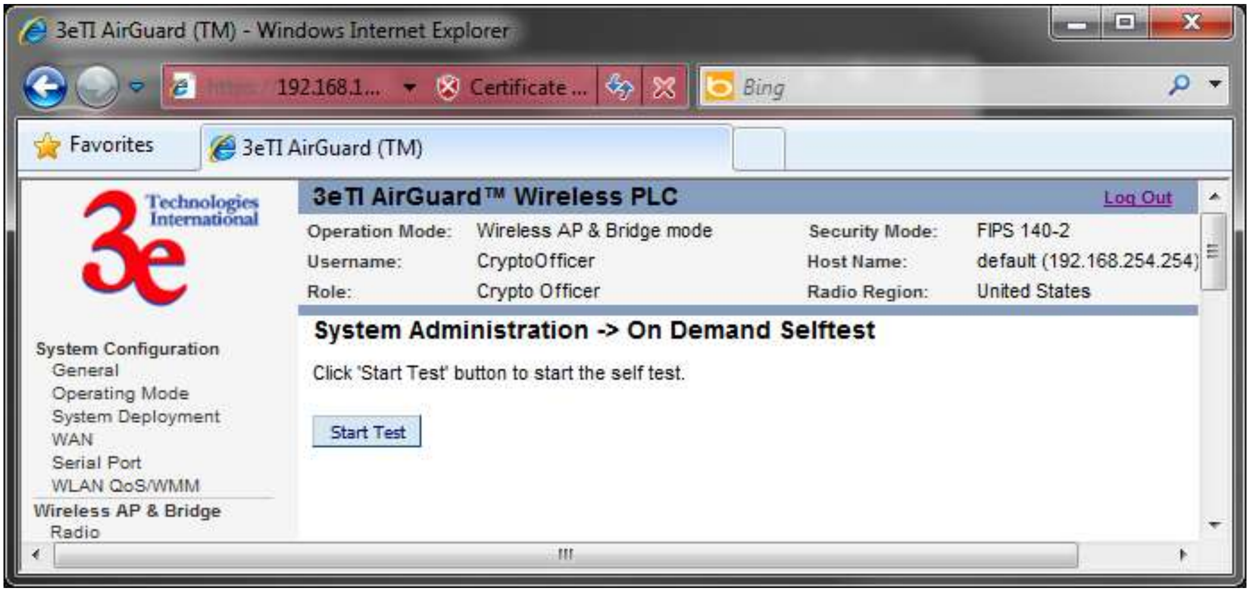
- Key Error Detection – checks for corruption of keys stored in flash

Test results are written to the system log. Test failures are also written to the console. The platform should not pass secure data while self tests are executing so network interfaces are disabled during self tests. The platform is halted if any self test fails.

These tests are run during power up, on demand or periodically. All of the above tests are executed automatically when the platform is powered up. Links to initiate on-demand or periodic selftests are available on the platform's web page under "System Administration" if the user is logged in as a crypto officer.

On-demand Self-test - Selecting the "On Demand Self-test" link (Figure 64) and clicking on "Start Test" executes each self-test except the firmware and bootloader integrity checks. A web page will be displayed indicating if the tests passed or failed.

Figure 64 - System Administration – On Demand Self-test



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

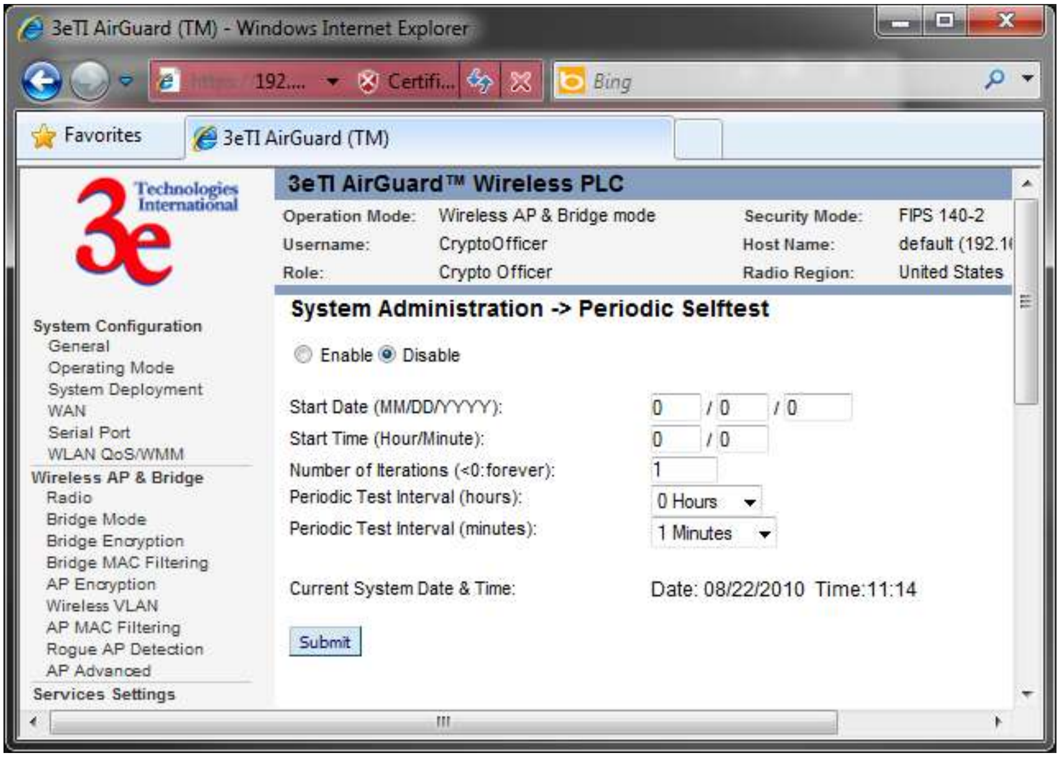
System Administration -> On Demand Selftest

Click 'Start Test' button to start the self test.

2.9.8 Periodic Self-test

Selecting the "Periodic Self-test" link (Figure 65 allows the user to enable/disable periodic tests. A test iteration executes each selftest except the firmware and bootloader integrity checks. The "Periodic Test Interval" is the time between test iterations.

Figure 65 - System Administration – Periodic Self-test



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.1
Role:	Crypto Officer	Radio Region:	United States

System Administration -> Periodic Selftest

○ Enable ● Disable

Start Date (MM/DD/YYYY): 0 / 0 / 0
Start Time (Hour/Minute): 0 / 0
Number of Iterations (<0:forever): 1
Periodic Test Interval (hours): 0 Hours
Periodic Test Interval (minutes): 1 Minutes

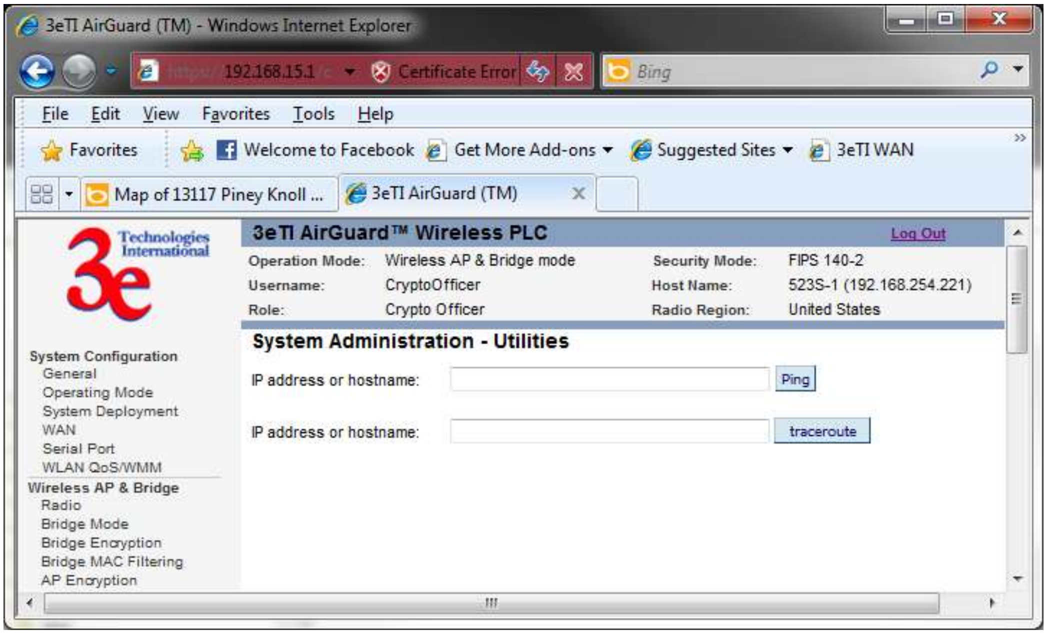
Current System Date & Time: Date: 08/22/2010 Time:11:14

Submit

2.9.9 Utilities

The **System Administration - Utilities** screen (Figure 66) gives you ready access to two useful utilities: Ping and Traceroute. Simply enter the IP Address or hostname you wish to ping or traceroute and click either the Ping or Traceroute button, as appropriate.

Figure 66 - System Administration - Utilities



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	523S-1 (192.168.254.221)
Role:	Crypto Officer	Radio Region:	United States

System Administration - Utilities

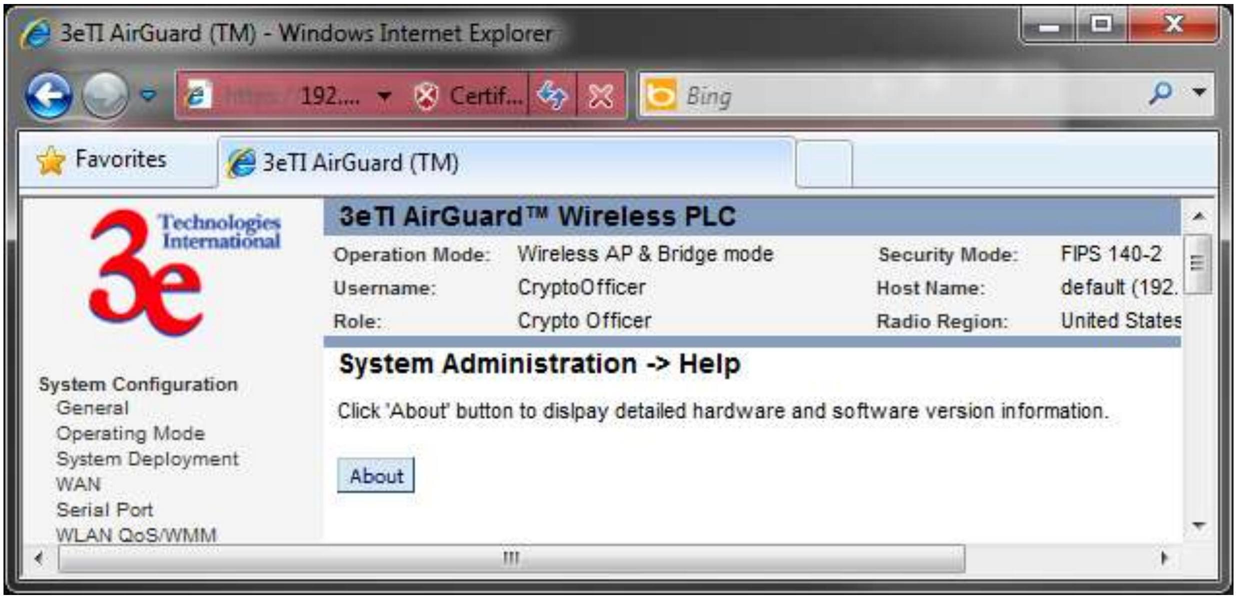
IP address or hostname:

IP address or hostname:

2.9.10 Help

The **System Administration - Help** screen (Figure 67) displays detailed hardware and software version information.

Figure 67 - System Administration - Help



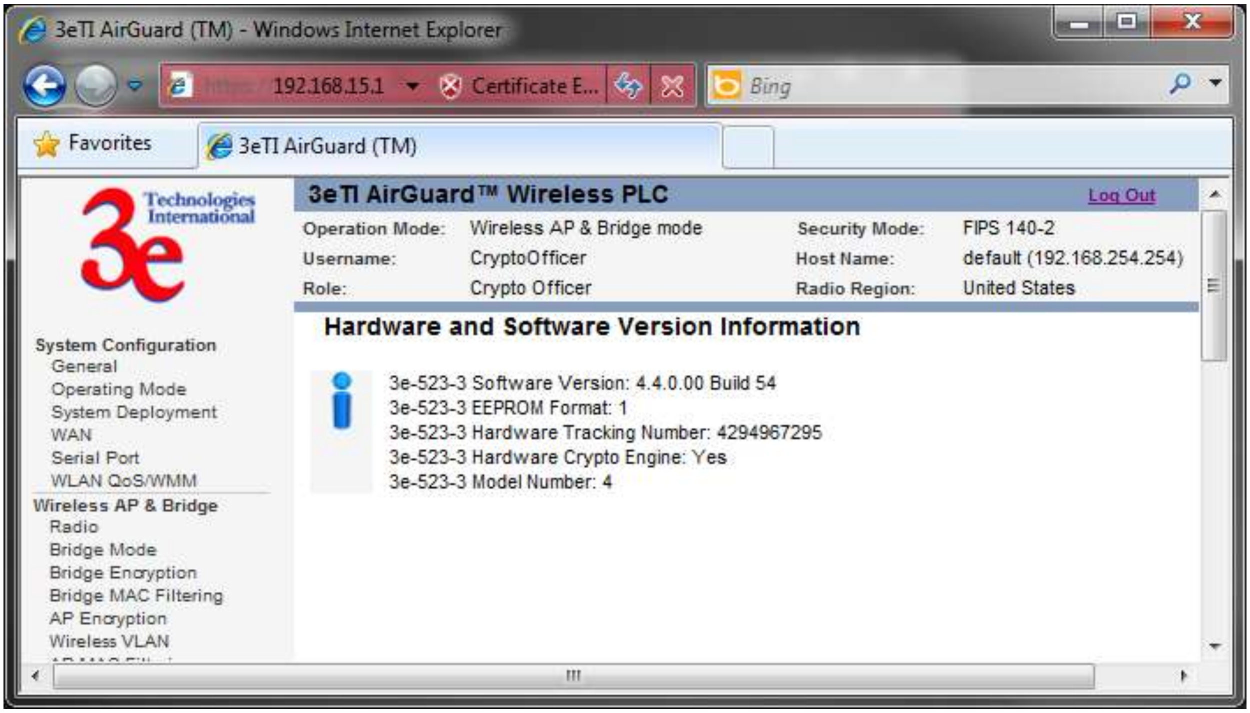
3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.
Role:	Crypto Officer	Radio Region:	United States

System Administration -> Help

Click 'About' button to dislpay detailed hardware and software version information.

Figure 68 - System Administration – Help ResultsA



3eTI AirGuard™ Wireless PLC

Operation Mode:	Wireless AP & Bridge mode	Security Mode:	FIPS 140-2
Username:	CryptoOfficer	Host Name:	default (192.168.254.254)
Role:	Crypto Officer	Radio Region:	United States

Hardware and Software Version Information

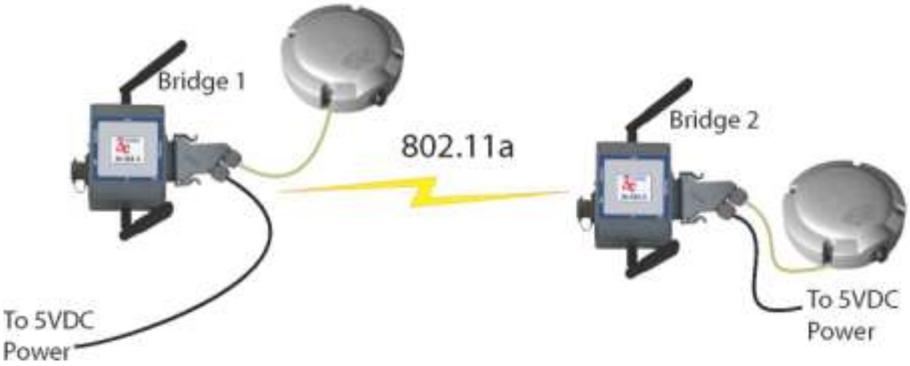
3e-523-3 Software Version: 4.4.0.00 Build 54
3e-523-3 EEPROM Format: 1
3e-523-3 Hardware Tracking Number: 4294967295
3e-523-3 Hardware Crypto Engine: Yes
3e-523-3 Model Number: 4

2.10 Operational Configurations

Setting Up Bridging Type Point-to-Point Bridge Configuration

A point-to-point link (Figure 69) is a direct connection between two, and only two, locations or nodes.

Figure 69 - Point-to-Point Link



For the two bridges that are to be linked to communicate properly, they must be set up with compatible commands in the setup screens.

- For instance, the bridges must have the same channel number. Because there is a separate WLAN card for bridging, there can be a separate WLAN on the AP WLAN card with no loss efficiency, as long as you set the channel numbers so there's no conflict or noise with the channel assigned to the bridge. Spanning Tree Protocol may be set to Enable, if there is any possibility of a bridging loop, or to Disable (which is more efficient) if there's no possibility of a bridging loop. Each bridge must contain the other's BSSID. (The BSSID of each is equivalent to the MAC address contained on the **Wireless AP & Bridge — Radio** setup page. Enter only hexadecimal numbers, no colons. Data entry is not case sensitive.) Finally, the wireless bridging encryption must be set to the appropriate type and key length and must be identical on each bridge.
- Table 8 and Table 9 below lists sample settings for manual bridging and auto bridging modes.

Table 8 - Point-to-Point Bridging Setup Guide — Manual Mode

Direction	**Bridge 1**	**Bridge 2**
Wireless Bridge — Bridging Mode (Manual Bridging Mode)		
Bridging Mode	Manual bridging selected	Manual bridging selected
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol (STP)	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Must be the same as Bridge 2	Must be the same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
Beacon Interval	1000	1000
BSSID	Add Bridge 2 MAC	Add Bridge 1 MAC
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be the same key as Bridge 2.	Select appropriate key type/length and value. Must be the same key as Bridge 1.

Table 9 - Point-to-Point Bridging Setup Guide — Auto Mode

Direction	**Bridge 1**	**Bridge 2**
Wireless Bridge — Bridging Mode (Auto Bridging Mode)		
Bridging Mode	Auto bridging selected	Auto bridging selected
SSID	Must be the same as Bridge 2	Must be the same as Bridge 1
Max Auto Bridges	32 (range 1-32)	32 (range 1-32)
Bridge Priority	32768 (range 1-65535)	32768 (range 1-65535)
RSSI Window Size	5	5
Signal Strength Threshold	9%	9%
Link Sensitivity	15%	15%

Broadcast SSID	Disable	Disable
Signal Strength MAC	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No	Must be the same as Bridge 2	Must be the same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
Beacon Interval	1000	1000
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be same as Bridge 2.	Select appropriate key type/length and value. Must be same as Bridge 1.

The following sequence walks you through the setup of bridge 1. Bridge 2 would duplicate this procedure, with the BSSID of bridge 2 being the MAC address of bridge 1 and vice versa.

Navigate to the Wireless Bridge — Radio screen (Figure 70).

In the first section you will see the MAC Address of the bridging card. This is used as the BSSID on other 3e–523–3s that will be communicating with this one.

Select the **Wireless Mode** to be used for bridging. Set the **Tx Rate** to a fixed transmit rate or select AUTO if you want the card to attempt to select the optimal rate for the channel If the Tx rate is set to a fixed rate, then the card will only transmit at that rate.

Next select the **Channel Number**. The **Channel Number** must be set to the same frequency in order for each bridge to communicate. **TX Pwr Mode** can be left on **Auto** unless the power needs to be regulated.

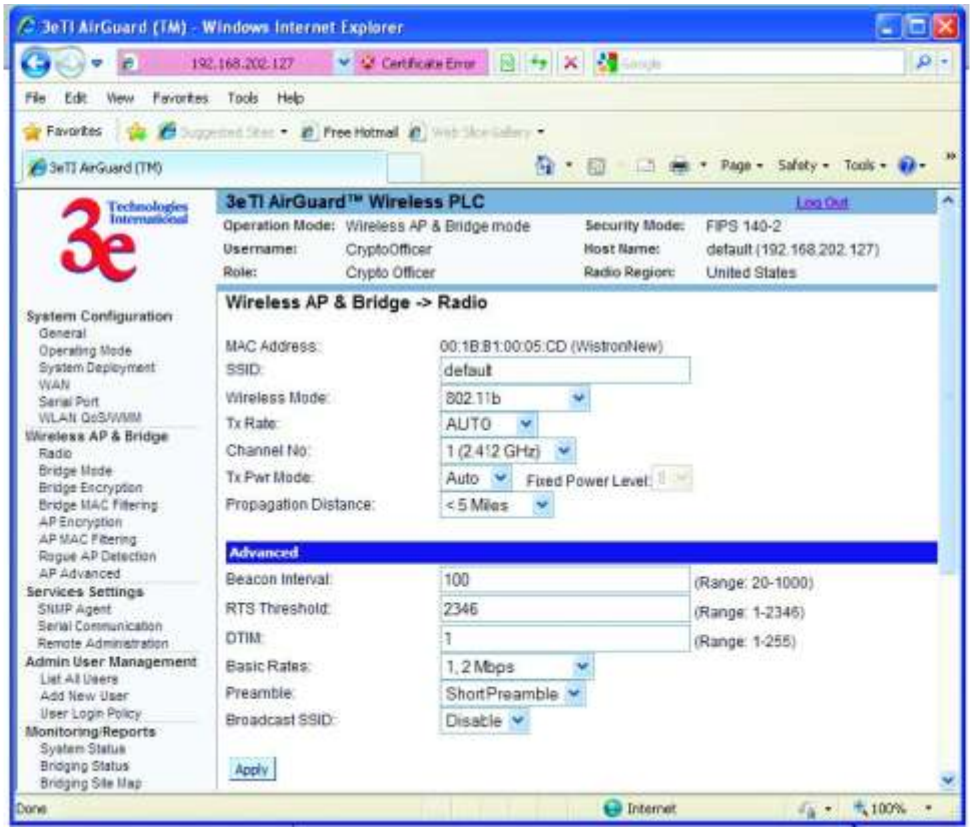
Select the **Propagation Distance** which is based on the distance between a bridge and the furthest bridge that is connected to it.

Set the **RTS Threshold** which is the number of bytes used for the RTS/CTS handshake boundary. When a packet size is greater than the RTS threshold, the RTS/CTS handshaking is performed.

Click Apply to accept your changes but stay on this screen.

Add the **BSSID** of the remote bridge. The BSSID corresponds to that bridge's MAC address. In entering the BSSID, enter only hexadecimal numbers, no colons. Data entry is not case sensitive. You may also enter a note that defines the location of the remote bridge. Then click **Add** to accept. The remote bridge's BSSID will now appear at the bottom of the **Wireless Bridge - Bridging Mode** screen.

Figure 70 - Wireless Bridge - Radio



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Wireless AP & Bridge -> Radio

MAC Address: 00:1B:B1:00:05:CD (WistronNew)
SSID: default
Wireless Mode: 802.11b
Tx Rate: AUTO
Channel No: 1 (2.412 GHz)
Tx Pwr Mode: Auto Fixed Power Level: 1
Propagation Distance: < 5 Miles

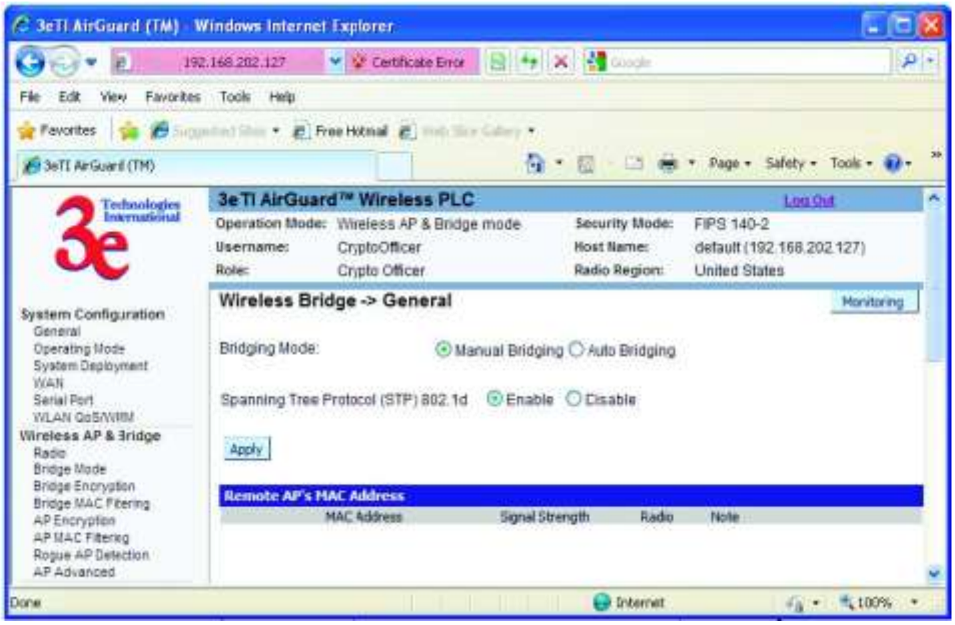
Advanced

Beacon Interval: 100 (Range: 20-1000)
RTS Threshold: 2346 (Range: 1-2346)
DTIM: 1 (Range: 1-255)
Basic Rates: 1, 2 Mbps
Preamble: ShortPreamble
Broadcast SSID: Disable

Next go to the **Wireless Bridge - Bridging Mode** screen (Figure 71). Select either manual or auto bridging. If you choose **Manual Bridging** then you will have to set **Spanning Tree Protocol** to **Enable** unless you are sure that there is no chance of a loop. You can also assign a **Signal Strength LED MAC**. **Signal strength LED MAC** allows you to set the number of one of the Remote APs which will be listed at the bottom of the screen once the system is operational as the guiding port that you wish to have display in the WLANSS LED on the front of the 3e–523–3 as a signal. If you don’t wish to display any connection signal, simply leave this set at Not Assigned. From this screen you can also choose to delete a remote AP's MAC address.

Click Apply to accept your changes.

Figure 71 - Wireless Bridge - Bridging Mode



3e TI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.127)
Role: Crypto Officer
Radio Region: United States

Wireless Bridge -> General

Bridging Mode: ● Manual Bridging ○ Auto Bridging

Spanning Tree Protocol (STP) 802.1d ● Enable ○ Disable

Apply

Remote AP's MAC Address

MAC Address	Signal Strength	Radio	Note

If you choose **Auto Bridging** mode (Figure 72), then you will need to enter the following information:

Enter the **SSID**. This can be any set of letters and numbers assigned by the network administrator. This nomenclature has to be set on the wireless bridge and each wireless device in order for them to communicate.

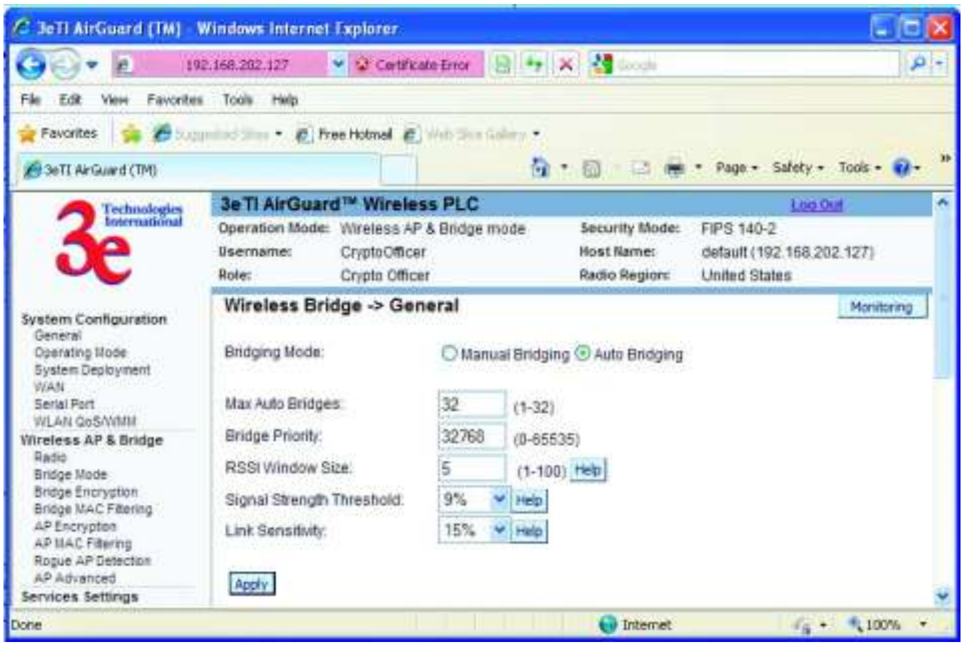
Enter a number from 1 to 32 for the **Max Auto Bridges**. Next enter the **Bridge Priority** (range from 1-65535). This determines the root (leaf) STP node. The lowest bridge priority in the network will become the STP root.

Select the Signal Strength Threshold.

Either enable or disable the **Broadcast SSID**. When disabled, the bridge hides the SSID in outgoing beacon frames and stations cannot obtain the SSID through passive scanning. Also, when it is disabled, the bridge doesn’t send probe responses to probe requests with unspecified SSIDs.

Finally enter the **Signal Strength MAC**. The signal strength of this wireless bridge will be indicated on the Signal Strength LED located on the front of the case.

Figure 72 - Wireless Bridge - Auto Bridging Mode



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: default (192.168.202.127)
Radio Region: United States

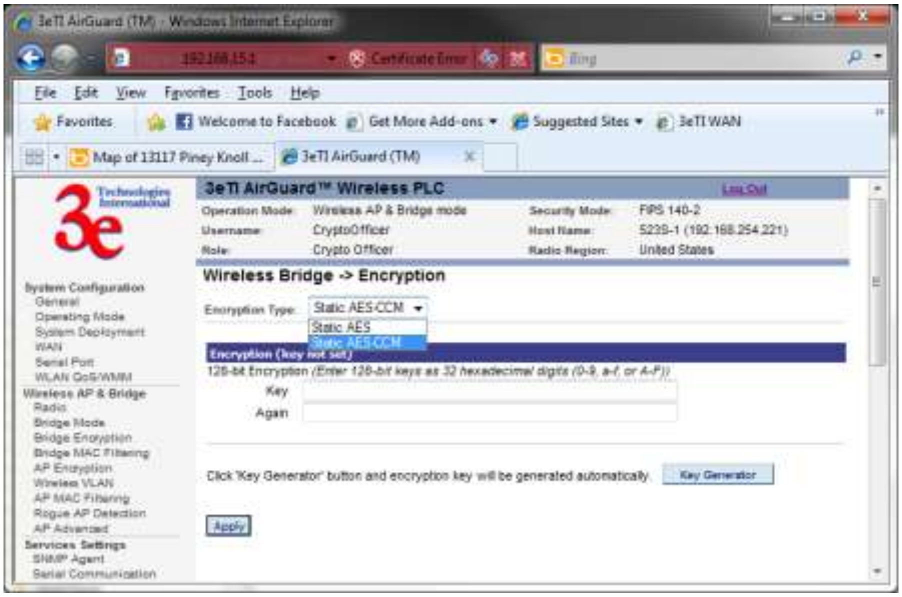
Wireless Bridge -> General

Bridging Mode: ○ Manual Bridging ● Auto Bridging

Max Auto Bridges: 32 (1-32)
Bridge Priority: 32768 (0-65535)
RSSI Window Size: 5 (1-100)
Signal Strength Threshold: 9%
Link Sensitivity: 15%

Next, navigate to the **Wireless Bridge — Encryption** screen (Figure 73). Select the appropriate key type and length and the key value. The encryption key value and type for Bridge 1 must be the same as for Bridge 2. For wireless bridging, only AES and 3DES are available for encryption.

Figure 73 - Wireless Bridge - Encryption



3eTI AirGuard™ Wireless PLC

Operation Mode: Wireless AP & Bridge mode
Username: CryptoOfficer
Role: Crypto Officer
Security Mode: FIPS 140-2
Host Name: 5239-1 (192.168.254.221)
Radio Region: United States

Wireless Bridge -> Encryption

Encryption Type: Static AES-CCM

Encryption (key not set)

128-bit Encryption *(Enter 128-bit keys as 32 hexadecimal digits (0-9, a-f, or A-F))*

Key

Again

Click 'Key Generator' button and encryption key will be generated automatically.

Configure the second of your two point-to-point bridges following the instructions given for Bridge 1 above.

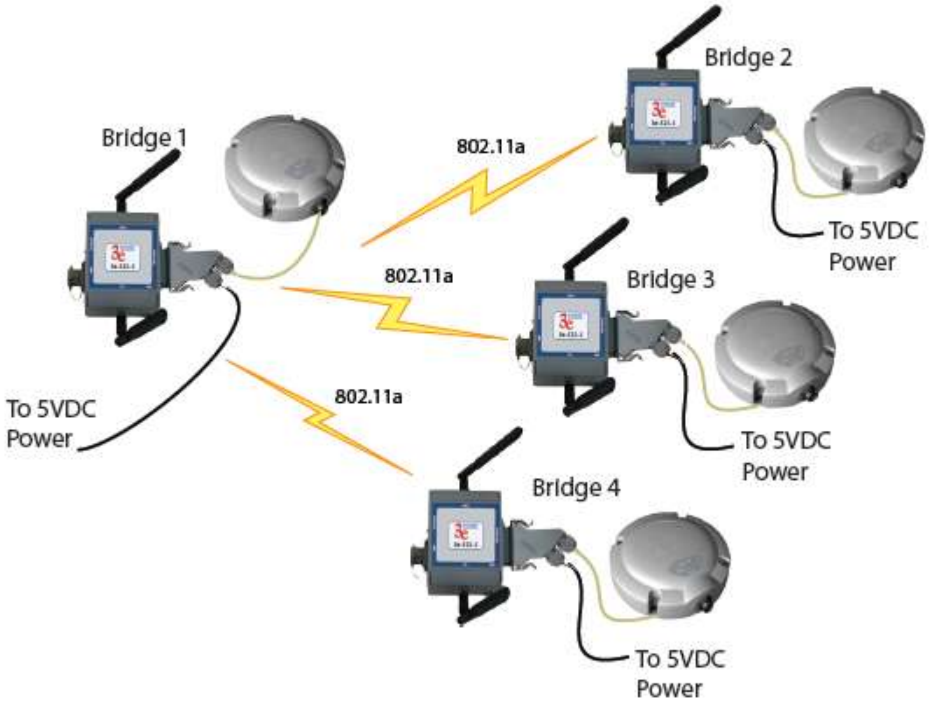
Point-to-Multipoint Bridge Configuration

A point-to-multipoint configuration (Figure 74) allows you to set up three or more 3e–523 units in bridging mode and accomplish bridging between 3 or more locations wirelessly.

For the three bridges that are to be linked to communicate properly, they have to be set up with compatible commands in their setup screens.

For instance, all bridges must have the same channel number. Spanning Tree Protocol will usually be set to Enable. If configured as in the diagram following, Bridge 1 must contain all of the others' BSSIDs, while Bridge 2 ~ n must only contain Bridge 1's BSSID. (The BSSID of each is equivalent to the MAC address found on the **Wireless Bridge - Radio** page. Enter only hexadecimal numbers. Data entry is not case sensitive.) Finally, the wireless bridging encryption of each must be set to the appropriate type and key length and must be the same on all.

Figure 74 - Point-to-Multipoint Bridge Configuration



Follow the steps of the procedure outlined in the point-to-point bridge section. Table 10 and Table 11 below describe the basic attributes.

Table 10 - Point-to-Multipoint Bridging Setup Guide - Manual Mode

Direction	Bridge 1	Bridge 2 ~ n
Wireless Bridge — Radio		
Wireless Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Same as Bridge 2~n	Same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles

RTS Threshold	2346	2346
Beacon Interval	1000	1000
BSSID	Add Bridge 2~n MAC	Add Bridge 1 MAC
Wireless Bridge — Bridging Mode (Manual Bridging Mode)		
Bridging Mode	Manual bridging selected	Manual bridging selected
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be the same key as Bridge 2~n.	Select appropriate key type/length and value. Must be the same key as Bridge 1.

Table 11 - Point-to-Multipoint Bridging Setup Guide — Auto Mode

Direction	Bridge 1	Bridge 2
Wireless Bridge — Radio		
Wirelss Mode	802.11a	802.11a
Tx Rate	AUTO	AUTO
Channel No.	Same as Bridge 2~n	Same as Bridge 1
Tx Power Mode	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346
Beacon Interval	1000	1000
BSSID	Add Bridge 2~n MAC	Add Bridge 1 MAC
Wireless Bridge — Bridging Mode (Auto Bridging Mode)		
Bridging Mode	Manual bridging selected	Auto bridging selected
SSID	Must be the same as Bridge 2~n	Must be the same as Bridge 2
Max Auto Bridges	32 (range 1-32)	32 (range 1-32)
Bridge Priority	32768 (range 1-65535)	32768 (range 1-65535)
RSSI Window Size	5	5
Signal Strength Threshold	9%	9%
Link Sensitivity	15%	15%
Signal Strength MAC	Enter from list at the bottom of the screen	Enter from list at the bottom of the screen
Wireless Bridge — Encryption		
Bridging encryption options	Select appropriate key type/length and value. Must be same as Bridge 2.	Select appropriate key type/length and value. Must be same as Bridge 1.

The above recommended setup requires only Bridge 1 to be set in point-to-multipoint mode. It is possible to set all bridges in point-tomultipoint mode, in which case , each bridge would have to contain the BSSID for each of the other bridges and Spanning Tree Protocol must be Enabled.

Repeater Bridge Configuration

A repeater setup can be used to extend the wireless signal from one bridge connected to an Ethernet LAN wirelessly so that another bridge can control a wireless LAN at a distance (Figure 75). Table 12 describes the basic attributes.

Figure 75 - Repeater Bridge Configuration

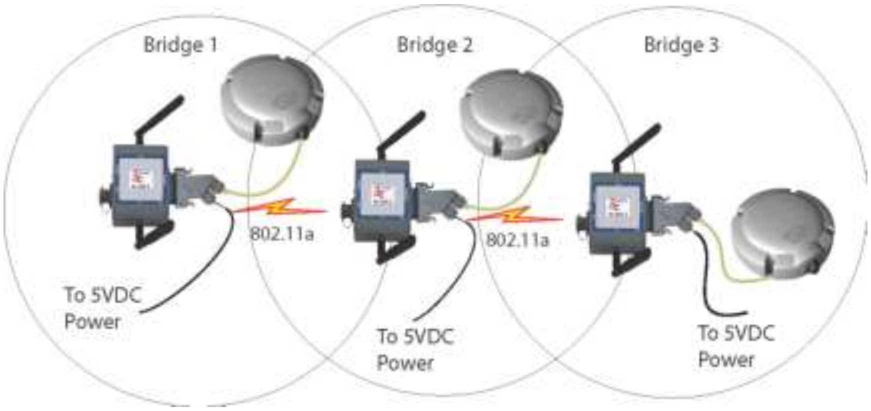


Table 12 - Repeater Bridging Setup Guide — Manual Mode

Direction	Bridge 1	Bridge 2	Bridge 3
Wireless Bridge — Radio			
Wireless Mode	802.11a	802.11a	802.11a
Tx Rate	AUTO	AUTO	AUTO
Channel No.	Same as Bridge 2	Same as Bridge 1	Same as Bridge 1
Tx Power Mode	Auto	Auto	Auto
Propagation Distance	< 5 Miles	< 5 Miles	< 5 Miles
RTS Threshold	2346	2346	2346
Beacon Interval	1000	1000	1000
BSSID	Add Bridge 2's MAC	Add Bridge 1's and Bridge 3's MAC	Add Bridge 2's MAC
Wireless Bridge — Bridging Mode (Manual Bridging Mode)			
Bridging Mode	Manual	Manual	Manual
Signal Strength LED MAC	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)	Not Assigned (select from drop-down list)
Spanning Tree Protocol	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)	Enable (or Disable if no bridging loop possible)
Wireless Bridge — Encryption			
Wireless Configuration – Bridging Encryption	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges	Select appropriate key type/length and enter key value. Must be the same as that on the other two Bridges

3. WiMesh End Points 3e-523A and 3e-523E-900 Hardware Installation

3.1 3e-523A Hardware Installation

Preparation for Use

This section deals with installation of the 3e–523A unit. The unit requires physical mounting and installation on the site, following a prescribed placement design to ensure optimum operation.

The package includes the following items:

- The Device
- Documentation as PDF files (on CD-ROM)
- Registration and Warranty cards

The device has the following available accessories:

- Outdoor Accessory Kit (3e-523-OAK)
- Indoor Accessory Kit (3e-523-IAK)
- DIN Rail Accessory Kit (3e-523-DINR-IN)

The device can be mounted outdoors on a high post to achieve the best bridge result. If mounted outdoors, the outdoor accessory kit must be used to prevent lightning damage.

⚠ **IMPORTANT NOTE**:

To comply with FCC RF exposure compliance requirements, the antennas used with the 3e-523A must be installed with a minimum separation distance of 21.5 cm from all persons, and must not be co-located or operated in conjunction with any other antenna or transmitter. Installation should be accomplished using the authorized cables and/or connectors provided with the device or available from the manufacturer/distributor for use with this device. Changes or modifications not expressly approved by the manufacturer or party responsible for this FCC compliance could void the user’s authority to operate the equipment.

Installation Instructions

This manual deals only and specifically with a single device as a unit. The purpose of this chapter is to describe the device and its identifiable parts so that the user is sufficiently familiar to interact with the physical unit. Preliminary setup information provided below is intended for information and instruction of the wireless LAN system administration personnel.

It is intended that the user not open the unit. Any maintenance required is limited to the external enclosure surface, cable connections, and to the management software (as described in Chapter 2) only.

Minimum System and Component Requirements

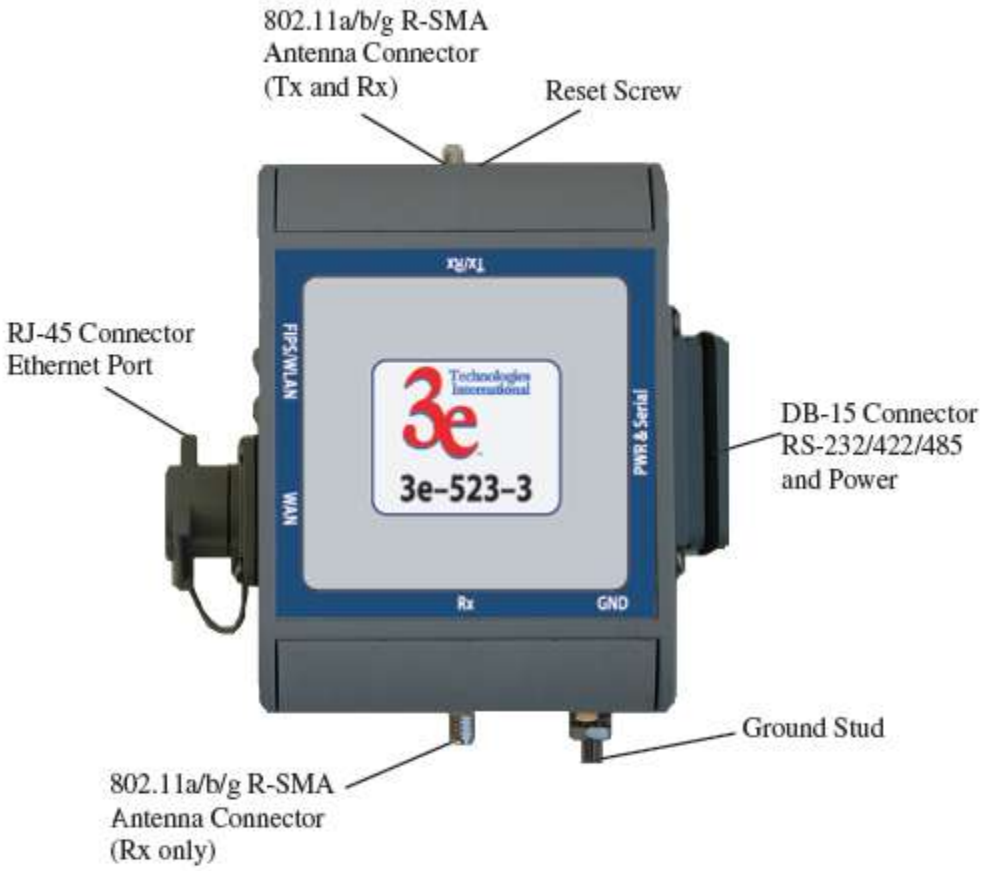
To complete the configuration, you should have at least the following components:

- PCs with one of the following operating systems installed: Windows NT 4.0, Windows 2000 or Windows XP
- Access to at least one laptop or PC with an Ethernet card and cable that can be used to complete the initial configuration of the unit.
- A Web browser program (such as Microsoft Internet Explorer 6.0 or later, or Netscape 6.3 or later) installed on the PC or laptop you will be using to configure the Access Point.
- TCP/IP Protocol (usually comes installed on any Windows PC.)

3.1.1 Connectors and Cabling

Figure 76 shows the external connectors on the device

Figure 76 - device external connectors



The RJ-45 Ethernet port is a standard 10/100 Ethernet connection. The DB-15 connector is a serial RS232/422/485 I/O port that is also the power interface. The power source should be +5V DC @ 3 amps. The top antenna is an 802.11 a/b/g antenna providing transmit (TX) and receive (RX) functions. The bottom antenna is an 802.11 a/b/g antenna providing the receive diversity functions.

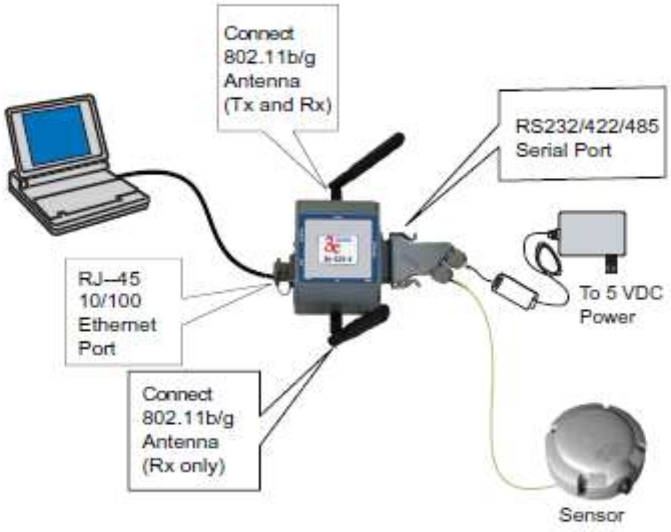
The pin out information for the DB-15 connector is listed in Table 13

Table 13 - DB-15 Pin Out Information

Pin	Name
1	COM 0 TX
2	COM 0 NCTS
3	Signal GND
4	RS-485 TX–
5	RS-485 RX–
6	Power RTN
7	Power RTN
8	Power RTN
9	COM 0 RX
10	COM 0 NRTS
11	RS-485 TX+
12	RS-485 RX+
13	Power RTN
14	+5 VDC
15	+5 VDC

Figure 77 below illustrates the setup.

Figure 77 - Setup



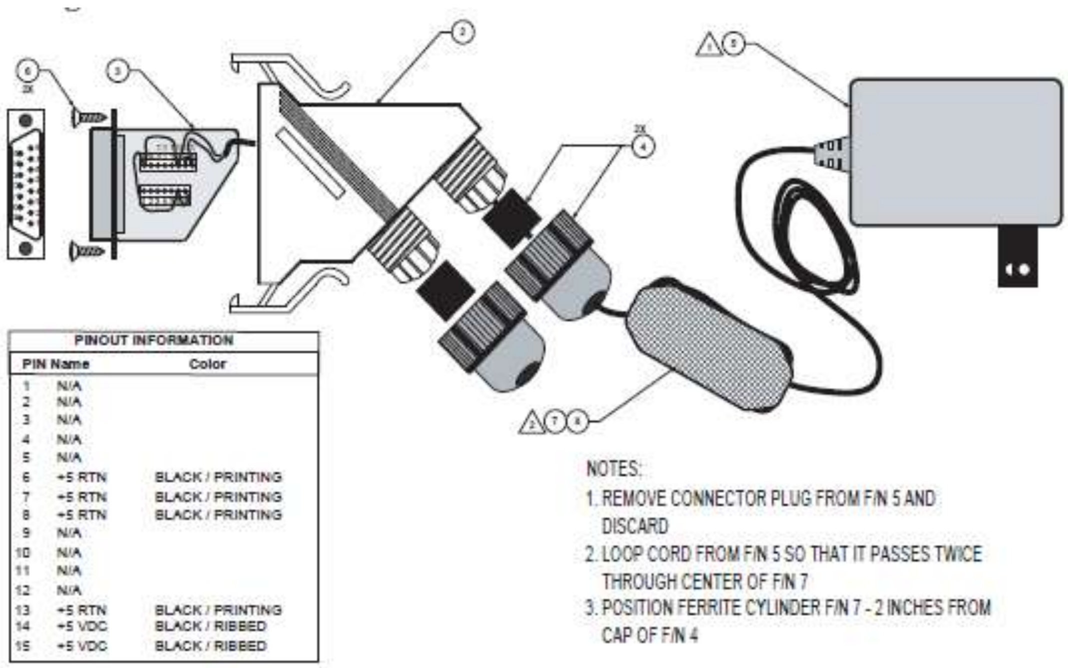
3.1.2 Indoor Accessory Kit Installation

The indoor accessory kit (3e-523-IAK) contains the following items:

- Qty 2 - R-SMA antennas
- DB-15 connector housing with power supply

Assemble the DB-15 connector for power and serial data signals. It is intended that the conductors intended for +5 VDC Power and Serial Data be routed through the compression nuts and sleeve inserts before entering the larger connector housing. Refer to Figure 78 below which illustrates the connector housing assembly. The example shown shows the wiring for +5 VDC Power.

Figure 78 - Connector housing assembly



PINOUT INFORMATION		
PIN	Name	Color
1	N/A	
2	N/A	
3	N/A	
4	N/A	
5	N/A	
6	+5 RTN	BLACK / PRINTING
7	+5 RTN	BLACK / PRINTING
8	+5 RTN	BLACK / PRINTING
9	N/A	
10	N/A	
11	N/A	
12	N/A	
13	+5 RTN	BLACK / PRINTING
14	+5 VDC	BLACK / RIBBED
15	+5 VDC	BLACK / RIBBED

NOTES:

1. REMOVE CONNECTOR PLUG FROM F/N 5 AND DISCARD
2. LOOP CORD FROM F/N 5 SO THAT IT PASSES TWICE THROUGH CENTER OF F/N 7
3. POSITION FERRITE CYLINDER F/N 7 - 2 INCHES FROM CAP OF F/N 4

3.1.3 Outdoor Accessory Kit Installation

If any portion of this system (enclosure, antennas, cables etc.) is mounted outdoors, it is strongly recommended that the Outdoor Accessory Kit (523-OAK) for this product be used. This kit contains lightning arrestors and ground cables designed for this product.

If the system is mounted outdoors where CE Mark certification is required, use of the Outdoor Accessory Kit (or equivalent) is MANDATORY. Failure to install this protection will void the warranty.

The Outdoor Accessory Kit (3e-523-OAK) contains the following items:

- Mounting Plate
- Pole Mounting Rear Plate
- Qty 2 - Outdoor omni-directional antennas
- Qty 2 - Right angle R-SMA to bulkhead N cable assemblies
- Qty 2 – Lightning Arrestors
- Qty 2 - Ground wires
- Qty 4 - 1/4-inch bolts
- Qty 4 - 1/4–20 Nut and washer

- Qty 4 - Hex socket cap screws
- Hex key wrench tool
- DB-15 connector housing with associated parts
- Large connector housing
- DB-15 screw housing insert
- Qty 2 - Rubber sleeves
- Qty 2 - Compression nuts
- Qty 2 - Flat head #4 self tapping screws
- Ferrite cylinder

NOTE: You (the user) are required to ensure that the connection to a proper earth ground is made by properly certified and authorized personnel and must conform to all applicable codes and regulations. The materials required to connect to a proper ground are defined by local conditions and must be procured locally to ensure the correct safety environment is achieved. The cable used to connect to a proper ground must be AWG 10 or heavier. This cable should be kept as short as possible.

⚠ ! WARNING !

Do not attempt to install any outdoor equipment during hazardous conditions such as a thunderstorm, where lightning could strike the equipment or installer. Failure to follow this warning could result in injury or death.

1. Install two Bulkhead N Cable Assemblies to the Mounting Plate.
2. Install unit on the Mounting Plate using the 4 hex socket cap screws. Orient the unit so that the larger rectangular bulkhead connector is facing away from the N connectors. Tighten with included hex key wrench tool.
3. Attach the one ground wire to each Lightning Arrestor. Note that one wire is longer than the other. Each lightning arrestor has a ring terminal attached, remove and discard this item.
4. Attach both Lightning Arrestors to the N Connectors on the Mounting Plate. Mount the Lightning Arrestor with the longer ground wire on the right side.
5. Route the ground wires to the ground stud on the unit. Secure with 10-32 Nut. Note that a wire must be routed from this point to a suitable earth ground.

   Assemble DB-15 Connector for power and serial data signals. It is intended that the conductors intended for +5 VDC Power and Serial Data be routed through the compression nuts and sleeve inserts before entering the larger connector housing. Refer to Figure 78 below to illustrate connector housing assembly. The example shown shows the wiring for +5 VDC Power. See for pin information for the entire connector.

6. Figure 78To reduce unintentional radio frequency interference (RFI), the +5 volt DC power provided to the device should be conditioned by passing the wires through the supplied ferrite cylinder (see Figure 79). Refer to the drawing below for guidance on how to pass the wires through the ferrite cylinder before terminating into the supplied DB-15 connector housing. The ferrite cylinder should be placed approximately two inches from the cap of the connector housing.
7. The Outdoor Accessory Kit can be mounted on a pole using the Pole Mounting Rear Plate.

Figure 78 - Connector housing assembly

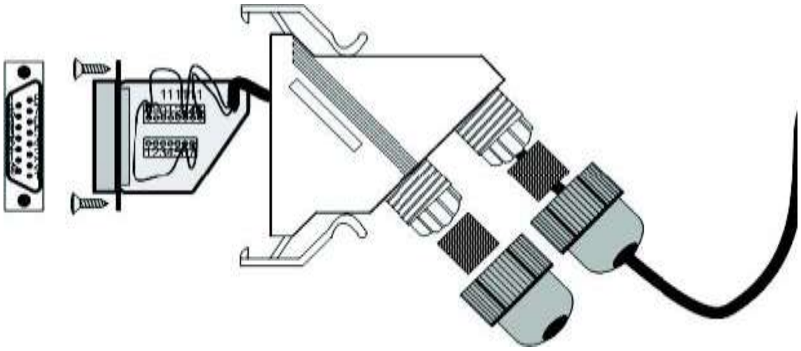


Figure 79 - Power conditioning

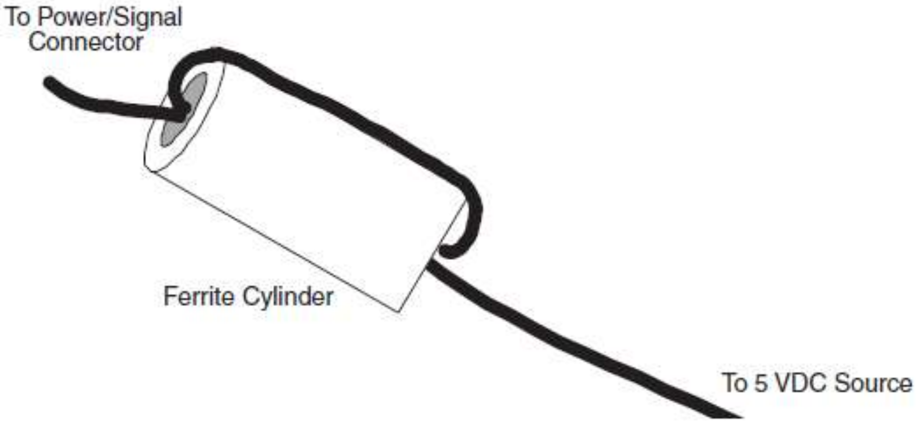
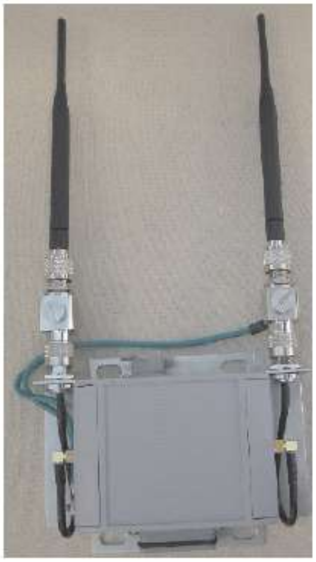
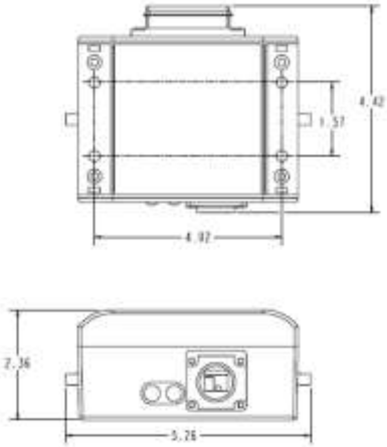


Figure 80 - Outdoor accessory kit mounting



Next is information on the physical dimensions (Figure 81) of the 3e–523–3 unit.

Figure 81 - 3e-523 dimensions



3.1.4 The Indicator Lights

The side panel of the 3e–523–3 contains two indicator lights (Light Emitting Diodes or LEDs) that help describe the state of various networking and connection operations (see Figure 82).

Figure 82 - 3e-523 indicator lights

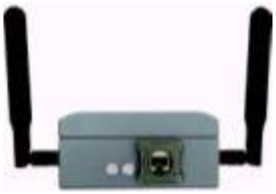


Table 14 - Indicator Lights

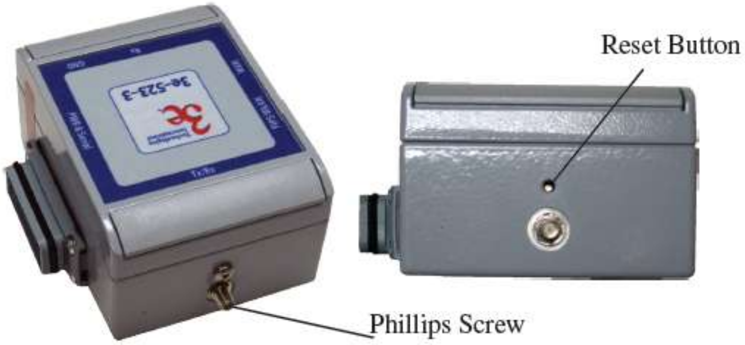
LED	Description
FIPS LED (further from the RJ-45 connector)	The Red LED indicates whether or not the 3e–523–3 is in FIPS mode. When this LED is lit, the system is in FIPS mode. When not lit, the system is in non-FIPS mode.
WLAN LED (next to the RJ-45 connector)	The amber LED is the uplink signal strength, for the bridge or client radio link. When a strong signal is being received from the remote bridge radio (bridging mode) or the access point (when in client mode), then the LED will be on steady. As the received signal becomes weaker, the LED may blink fast for a moderate signal, blink slowly for a weak signal, or be dark when no connection is made. When the operating mode of the device is set for access point only mode, this LED is not used.

3.1.5 Reset Button

The reset button is located behind the Phillips (cross-tip) screw on the top side of the unit (Figure 83). Remove the screw to access the reset button. To reset the unit, use a small screw driver and perform the following:

1. Push in and hold the reset button for five seconds. Holding the button for more than five (5) seconds but less than 10 does a reset. Removing power, or going through the web interface are usually a better ways to reset, when possible. If you hold the button too long, you could factory default the unit by mistake, and wipe out your configuration.
2. If you continue to hold the button, after 20 seconds the unit will be reset to the factory default.
3. Make sure you reinstall the screw with gasket after using the reset button to keep water out of the unit.

Figure 83 - Reset button



3.2 3e-523E-900 Hardware Installation

This section deals with installation of the 3e-523E-900 unit. The unit requires physical mounting and installation on the site, following a specific placement design ensuring optimum operation.

FCC Regulations require that the 3e-523E-900 product be professionally installed by an installer certified by the National Association of Radio and Telecommunications Engineers or equivalent institution.

The package includes the following items:

- The Device.
- Documentation as PDF files (housed on a CD-ROM).
- Registration and Warranty cards.

Minimum System and Component Requirements

To complete the configuration, you must have the following minimal components:

- PCs with one of the following operating systems installed: Windows NT 4.0, Windows 2000 or Windows XP.
- Access to at least one laptop or PC with an Ethernet card, and cable that can be used to complete the initial configuration of the unit.
- A Web browser program (such as Microsoft Internet Explorer 6.0 or later, or Netscape 6.3 or later) installed on the PC or laptop you will be using to configure the Access Point.

3.2.1 Specifications

ELECTRICAL SPECIFICATIONS:

Operating Voltage:	110/220VAC, 50/60Hz
Power Requirements:	5.5 Watts (> 0°C) 15 Watts (< 0°C, internal heaters operating)
External Interfaces:	Ethernet, 10/100, standard RJ-45 interface N-type female jack antenna connector
Radio Transmission :	902-928 MHz band

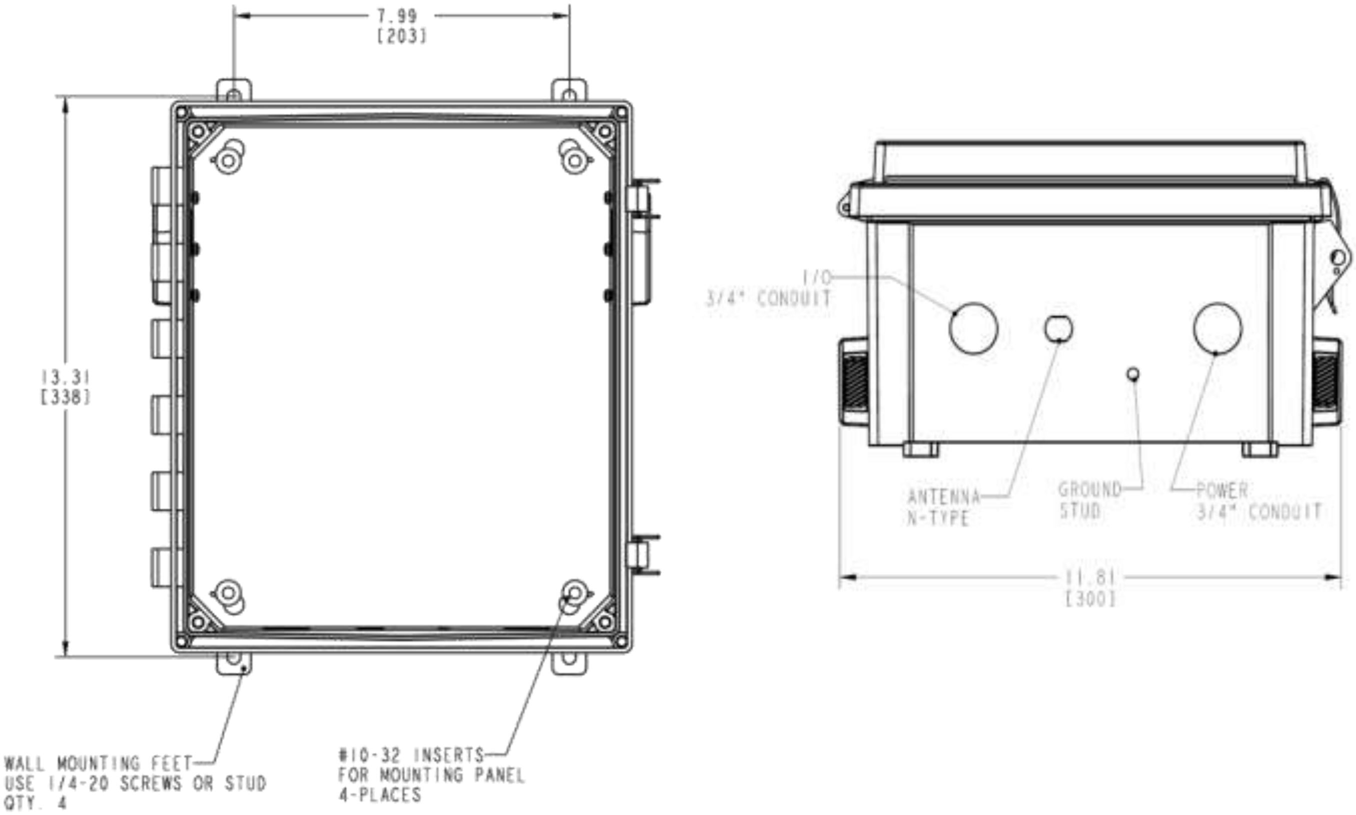
ENVIRONMENTAL SPECIFICATIONS:

Operating Temperature:	-30 to +50°C External Ambient (-22 to +122 °F)
Storage Temperature:	-40 to +70°C (-40 to +158 °F)
Relative Humidity:	90%, non-condensing

MECHANICAL / MOUNTING SPECIFICATIONS:

Enclosure:	Polycarbonate, polyurethane gasket, stainless steel hardware
Weight :	8.8 lbs
Features:	Pad-lockable, outdoor deployment (weatherproof)
Dimensions:	12.08” W x 13.57” H x 6.95” D

3.2.2 Mounting Pattern



3.2.3 Installation Requirements

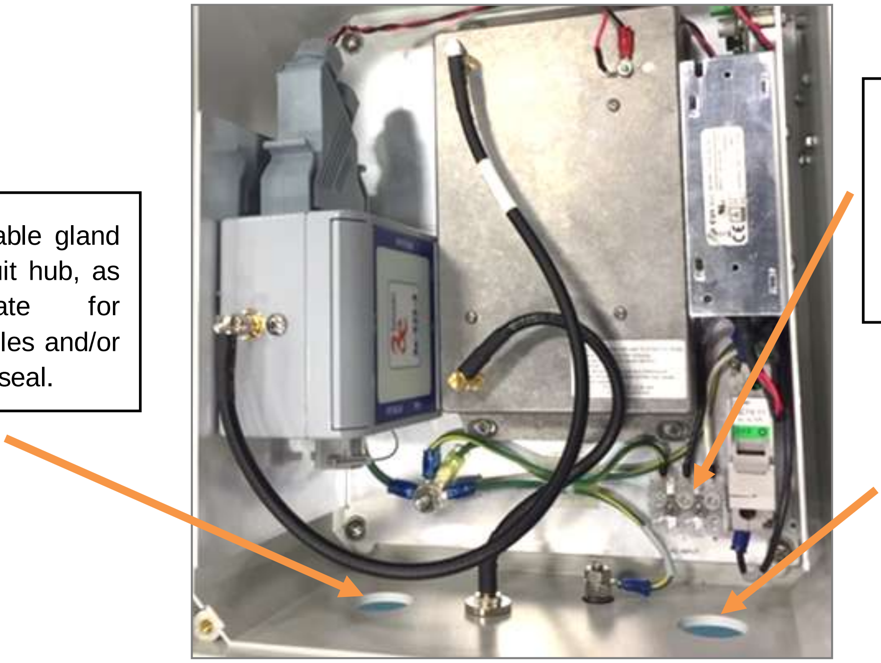
! WARNING !

Do not attempt to install any outdoor equipment during hazardous conditions such as a thunderstorm, where lightning could strike the equipment or installer. Failure to follow this warning could result in injury or death.

Mounting feet (and screws) are supplied with the unit, attached inside of the cover. Installer must attach these to the enclosure prior to mounting.

Drill holes per mounting pattern drawing and fasten with ¼” screws or bolts (provided by the installer), as appropriate for the installation.

AC power cabling and cable gland (or conduit and hub) are to be provided by the installer as appropriate. Two cutouts provided, one for signal wire, one for power wiring, each at 1.109” diameter. Both holes must have appropriate cable glands or conduit hubs added for weatherproof installation.



Install cable gland or conduit hub, as appropriate for data cables and/or weather seal.

Install AC wiring per label. Ground to “G”, Line (black) to “L”, Neutral (white) to “N” terminals.

Secure wires with gland/hub.

Install power cable gland or conduit hub, as appropriate.

External grounding wire is not provided with the unit. Protection for the user and unit require a minimum 10AWG safety ground be attached to the threaded stud at the bottom of the unit to a secure earth bonded surface. The length of this grounding wire should be kept to a minimum, 3eTI recommends less than 3 feet.

NOTE: You (the user) are required to ensure that the connection to a proper earth ground is made by properly certified and authorized personnel and must conform to all applicable codes and regulations. The materials required to connect to a proper ground are defined by local conditions and must be procured locally to ensure the correct safety environment is achieved.

The cable used to connect to a proper ground must be AWG 10 or heavier. This cable should be kept as short as possible.

3.2.4 RF Connections

NOTE: This radio transmitter IC: 6780A-523E900 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device**.**

- L-Com HGV906U, 6-dBi gain, Omni-Directional antenna
- L-Com HG906YE, 6-dBi gain, Yagi antenna

RF cabling, lightning arrester, and antenna are not provided with the unit.

- The installer should provide a suitable lightning arrestor that can attach directly to the N-male RF port at the bottom of the unit. Ground the lightning arrestor to the same earth bonded ground attachment as used for the unit.
- The installer should provide a suitable antenna to meet the RF coverage needs per application.
- LMR-400 cabling is recommended for longer than 10 feet of external RF cabling. Ensure this cable is routed and tied down to avoid undue mechanical stress on the lightning arrestor attached to the unit.

3.2.5 RF Safety Information

FCC: To comply with FCC RF exposure compliance requirements, the antennas used with the 3e-523E-900 product must be installed with a minimum separation distance of 21.5 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. Installation should be accomplished using the authorized cables and / or connectors provided with the device or available from the manufacturer / distributor for use with this device. Changes or modifications not expressly approved by the manufacturer or party responsible for this FCC compliance could void the user's authority to operate the equipment.

Industry Canada: To comply with Industry Canada RF Exposure requirements, the antennas used with the 3e-523E-900 product must be installed with a minimum separation distance of 32 cm from all persons.

NOTE: This equipment has been tested and found to comply with part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance to the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

4. WiMesh PAC-Link (3e-523S) Hardware Overview

The 3e–523S, also called the Portable Adaptive Com-Link (PAC-Link), is an extremely portable, battery operated IP router used in mobile operations. The 3e–523S is intended to provide mobile IP connectivity for personnel on the move when the RF signal strength cannot be maintained to the base operations center. When the RF signal is disrupted, a 3e–523S can be used as a repeater which when situated in a suitable location, will provide suitable RF signal strength between the personnel and the base operations center.

Multiple 3e–523S units can provide secure communications between personnel and the base operations center when large structures are penetrated or around the perimeter of large objects by simply tying the 3e–523S units to railings or other convenient tie points as the progress of personnel takes them beyond the signal range of the last 3e–523S–1 that was deployed. In this way, connectivity can be maintained between personnel and the base operations center.

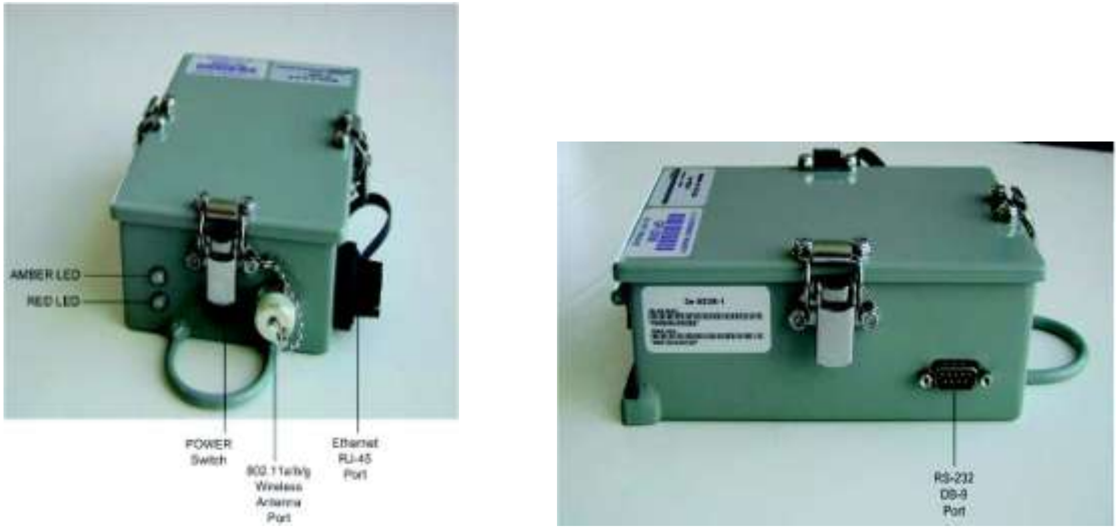
Inside the 3e–523S is the FIPS 140-2 Validated 3e–523M multifunction wireless data module. Also included is a rechargeable lithium-ion battery with a battery charge of approximately eight hours. The 3e–523S supports three different operating modes:

- Wireless Access Point (WAP)
- Wireless Client (STA)
- Wireless Bridge (WDS)

The 3e–523S can be configured for FIPS or non-FIPS sub-mode. In addition, the 3e–523S supports 802.11i and Wi-Fi Protected Access 2 (WPA2), WPA and different EAP types, Temporal Key Integrity Protocol (TKIP) for WPA encryption and Advanced Encryption Standard (AES) for WPA2 encryption. With support of 802.11a/b/g standards, the 3e–523S delivers up to 22 Mbps of sustained data rate in 5 GHz and 2.4 GHz bands.

Figure 84 below shows the Antenna and Ethernet sides of the 3e523S device.

Figure 84 - 3e-523S Device (Antenna side) on left and 3e-523S Device (RS-232 side) on right.



5. WiMesh End Point OEM Module (3e-523M)

The 3e–523M is a secure multi-function wireless OEM Module which can be integrated into another product.

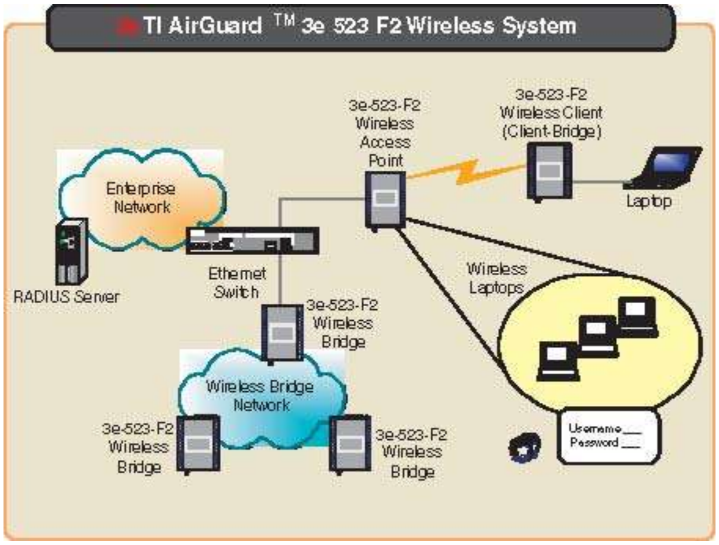
The 3e–523M supports four different operating modes:

- Wireless Access Point (WAP)
- Wireless AP and Bridge simultaneous mode
- Wireless Client (STA)
- Wireless Bridge (WDS)

The 3e–523M also can be configured for FIPS or non-FIPS sub mode. In addition, the 3e–523M supports 802.11i and Wi-Fi Protected Access 2 (WPA2), WPA and different EAP types. Temporal Key Integrity Protocol (TKIP) for WPA encryption and Advanced Encryption Standard (AES) for WPA2 encryption.

With support of 802.11b/g/a standards, the 3e–523M delivers up to 54Mbps of data rate in 5GHz and 2.4 GHz bands. Figure 85 below illustrates a wireless system using the 3e–523M in all three modes.

Figure 85 - 3e-523M wireless system


TI AirGuard TM 3e 523 F2 Wireless System
3e-523-F2 Wireless Access Point
3e-523-F2 Wireless Client (Client-Bridge)
Laptop
Enterprise Network
RADIUS Server
Ethernet Switch
Wireless Laptops
3e-523-F2 Wireless Bridge
Wireless Bridge Network
3e-523-F2 Wireless Bridge
3e-523-F2 Wireless Bridge
Username___
Password ___

Wireless Access Point Mode

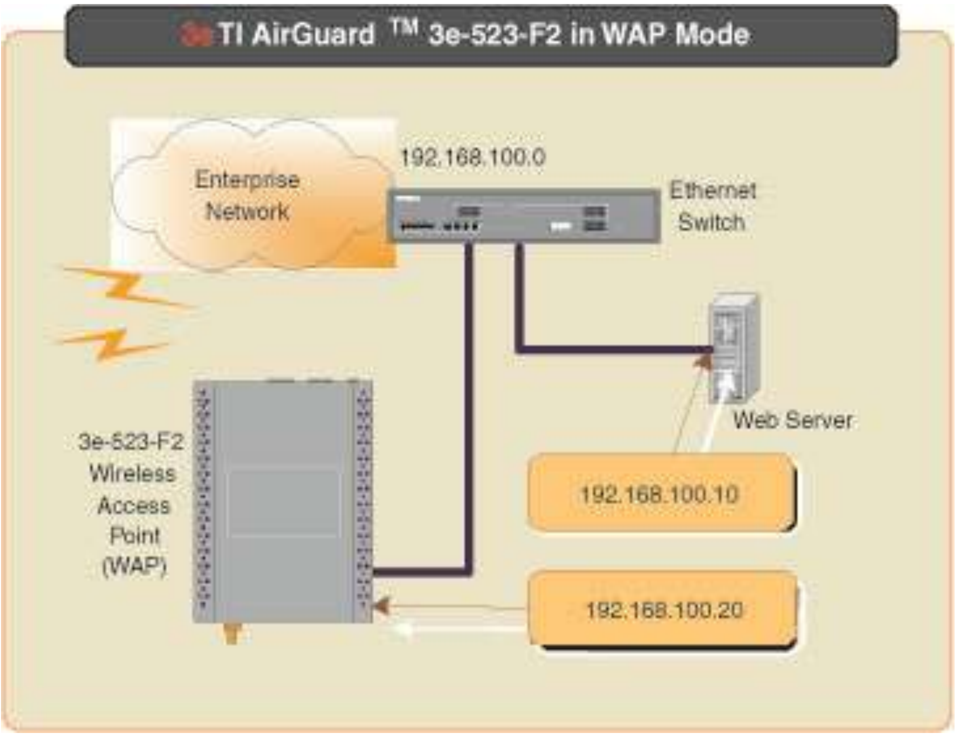
In the wireless access point mode, you can use the 3e–523M to connect wireless communication devices together to create a wireless network. The 3e–523M is usually connected to a wired network and can relay data between devices on each side. Many 3e–523Ms can be connected together to create a larger network that allows roaming (

Figure 86).

In Wireless Access Point (WAP) mode the WAN interface has to connect to a backbone Ethernet switch in order to operate normally. It bridges the backbone Ethernet network and wireless interface.

Figure 86 below shows how to setup the Ethernet cable and IP addressing.

Figure 86 - 3e-523M wireless access point mode



There are numerous security methods provided in this mode. In non-FIPS mode: WEP, WPA (TKIP and AES-CCM) and WPA2 (TKIP and AES-CCM) are available. The 3e–523M also supports EAP-MD5, EAP-TTLS, EAP-TLS, PEAP, EAP-SIM protocols. In FIPS mode: static 128-, 192- and 256-bit AES, static 3DES and FIPS 802.11i are available.

WPA is a subset of 802.11i that satisfies some of the requirements of the full 802.11i standard. Some of the significant features of WPA are:

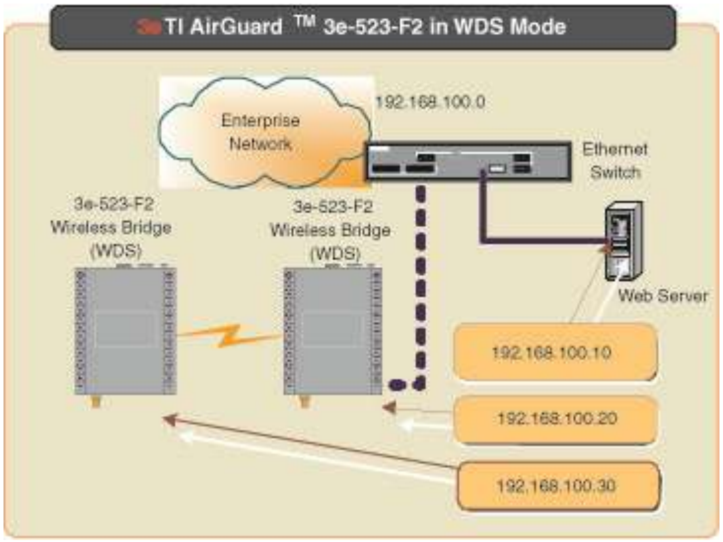
1. It supports two authenticated key management protocols in infrastructure mode using 802.1X with pre-shared key and with EAP authentication. The IBSS approach described uses no authenticated key management protocol but uses a pre-shared key directly as the encryption/integrity key.
2. APs and stations use IEEE 802.11 open authentication when they use WPA.
3. APs must advertise what they support (Cipher suite, authentication modes). Stations must request the cipher suites and authenticated key management protocol they want. A propriety information element in the Beacon and probe response messages is used to carry this information. The station uses the same information element in association request message.
4. Authentication and Association are required.
5. TKIP encryption with the Michael integrity check is required.

Wireless Bridging Mode

In Wireless Bridging (WDS) mode the WAN interface may or may not need to connect to a backbone Ethernet switch. It depends on needs of infrastructure network. However, wireless bridging extends the network from an existing wired network easily without altering the network topology.

Figure 87 below shows how to setup the Ethernet cable and IP addressing.

Figure 87 - 3e-523-F2 wireless bridging mode


3eTI AirGuard ™ 3e-523-F2 in WDS Mode
Enterprise Network
192.168.100.0
Ethernet Switch
3e-523-F2 Wireless Bridge (WDS)
3e-523-F2 Wireless Bridge (WDS)
Web Server
192.168.100.10
192.168.100.20
192.168.100.30

This type of infrastructure is decentralized. As each node needs only transmit as far as the next node. Nodes act as repeaters to transmit data from nearby nodes to peers that are too far away to reach, resulting in a network that can span large distances.

The 3e–523M in bridging mode provides point-to-point or point-to-multipoint network topology.

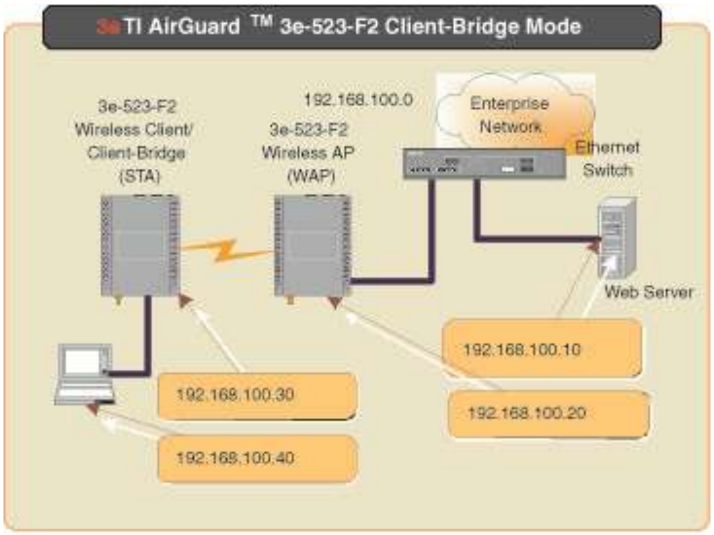
In bridging mode, the 3e–523M can be configured for FIPS or non-FIPS mode.

In non-FIPS mode the 3e–523M supports AES-CCM for security. In FIPS mode, the 3e–523M supports Static 128-, 192- and 256-bit AES and static 3DES.

Wireless Client Mode

In Wireless Client/Client-Bridge mode, the WAN interface is NOT design for a backbone network connection. It is the interface for computer connected to it. The following diagram shows how to setup the Ethernet cable and IP addressing (Figure 88).

Figure 88 - Wireless client mode



The 3e–523M can operate as a client device that communicates with a wireless access point. It supports 802.11a/b/g bands.

In client mode, the 3e–523M can be configured for FIPS or non-FIPS mode.

In non-FIPS mode the 3e–523M supports AES-CCM for security. In FIPS mode, the 3e–523M supports Static 128-, 192- and 256-bit AES and static 3DES.

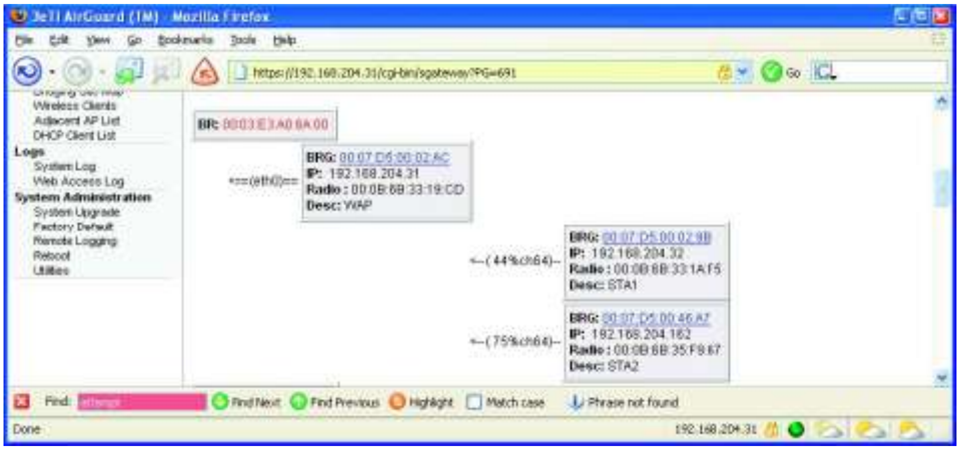
Network Topology Map Enhancement

The 3e–523M contains an embedded network topology map (89 111) which can help you to envision the bridged network. The initial implementation provides the following tree structure where each indented entry is a child to the entry above it. The entry at the top of the tree is the STP root. The receive signal strength is indicated by the % on each link.

The map shows the network layer 2 topology. APs that are part of another network are not displayed in the map. This map only reports all 3eTI devices (client-bridge, AP, bridge) and part of 3rd party switches running STP. 3eTI strongly recommends that you configure your 3rd party switch as root and make it the uplink for the 3eTI device cloud to the backbone network.

This implementation is base-on the current design.

Figure 89 - Network topology map



BR: 00:03:E3:A0:8A:00

<==(eth0)==

BRG: 00:07:D5:00:02:AC
IP: 192.168.204.31
Radio : 00:0B:6B:33:19:CD
Desc: WAP

<--(44%ch64)--

BRG: 00:07:D5:00:02:9B
IP: 192.168.204.32
Radio : 00:0B:6B:33:1A:F5
Desc: STA1

<--(75%ch64)--

BRG: 00:07:D5:00:46:A7
IP: 192.168.204.162
Radio : 00:0B:6B:35:F8:67
Desc: STA2

Hardware Installation

The 3e-523M has multiple wired interfaces and functions available via the exposed connectors (Figure 90). These interface features on connector P1 consist of a Serial RS-232/422/485 IO port that also contains the power interface. Connector P2 contains the Reset Function, LED Indicators as well as advanced features to be activated in future revisions. There is a standard 10/100 RJ-45 Ethernet port. The wireless interface consists of one 802.11 a/b/g dual antenna wireless interface for diversity. It uses standard 50-ohm SMA connectors.

The Reset Function is activated by shorting P2 - pin 1 to GND found at P2 – pin 7 or 8.

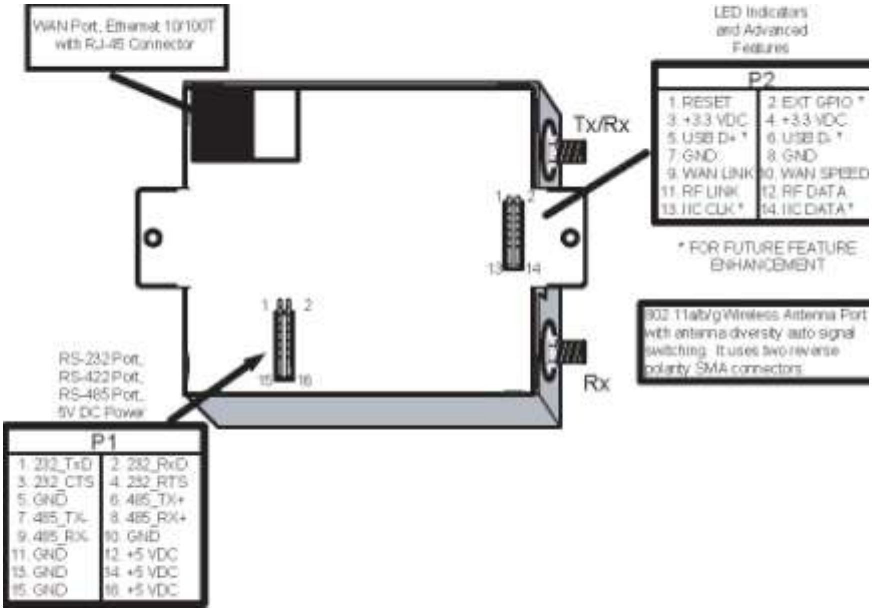
- Short for 5 seconds and release – simple reset, you can also power cycle the module
- Short for 11 seconds and release – resets all to factory defaults. This can be used when there's no GUI access to the module.

The 3.3 VDC pins shown on P2 – pins 3 and 4 are only to be used as a current source to illuminate any external LED indicators the user wishes to connect. DO NOT ATTEMPT TO SOURCE 3.3 VDC TO THE 3e523M THROUGH P2. This will void the warranty, damage the unit and may create a safety hazard.

The LED Indicator signals are capable of sinking approximately 9 mA using the supplied +3.3 VDC from pins 3 and 4 of P2. Refer to the following Figure 91 to view the connection for these signals. Each LED Indicator signal from the 3e-523M processor contains a 287 ohm current limiting resistor, so no additional resistor is typically required.

Power requirements: +5VDC +-5% 3 Amps

Figure 90 - Hardware Installation



The 3e-523M unit can be used for either RS232 communications or for RS485/422 communications, but the two functions are mutually exclusive as they share a common UART. The pinout information for the P1 serial port is shown in Table 15 below.

NOTE: For a rugged environment, the user should consider adding RTV to enforce the connectors.

Table 15 - P1 Pin Out Information

Pin Number	Serial Port Functionality
1	RS232 TxD
2	RS232 RxD
3	RS232 CTS
4	RS232 RTS
5	GND
6	RS485 TX+
7	RS485 TX
8	RS485 RX+
9	RS485 RX
10	GND
11	GND
12	+5VDC
13	GND
14	+5VDC
15	GND
16	+5VDC

When the 3e-523M unit is run in full RS485 duplex mode each 485 signal pair is connected separately and when the interface is run in half duplex mode the Tx+/Rx+ and Tx-/Rx- wires are connected together.

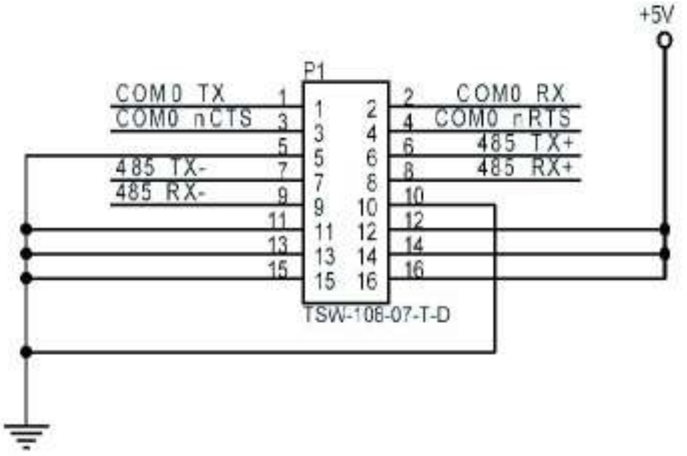
The P2 serial port is used for LED indicators and advanced features. See Table 16

Table 16 - P2 Pin Out Information

Pin Number	Serial Port Functionality
1	RESET
2	EXT GPIO
3	+3.3 VDC
4	+3.3 VDC
5	USV D+
6	USB D
7	GND
8	GND
9	WAN LINK
10	WAN SPEED
11	RF LINK
12	RF DATA
13	IIC CLK
14	IIC DATA

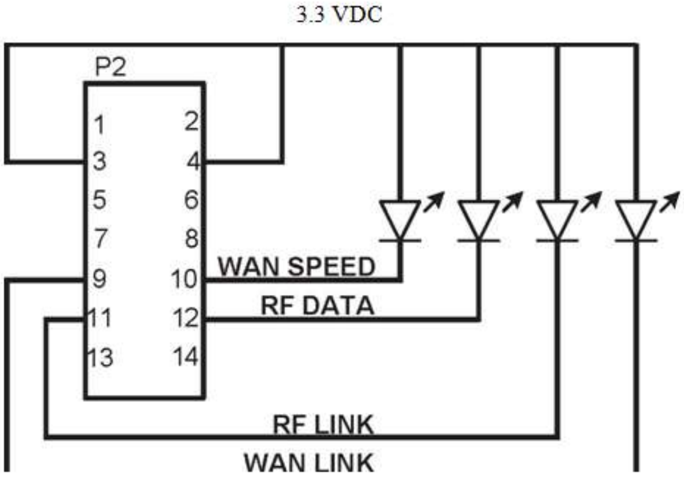
Pin Definition and schematics of the P1 serial port and power, 16 pin, double row, 100 mil header is illustrated in Figure 91 below.

Figure 91 - P1 Pin setup



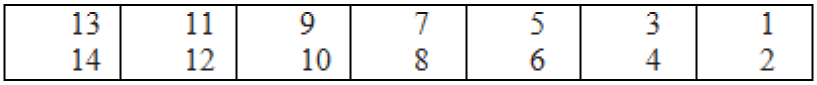
Pin Definition and schematics of the P2 serial port and LED, 14 pin, double row, 100 mil header (Figure 92).

Figure 92 - P2 Pin setup



Top view of P2 connector, the Pin 1 is closer to the Tx/Rx antenna connector (Figure 93). Table 17 and Table 18 below lists the mating connectors. Figure 93

Figure 93. Top View of P2 Connector



13	11	9	7	5	3	1
14	12	10	8	6	4	2

Table 17 - Mating Connector

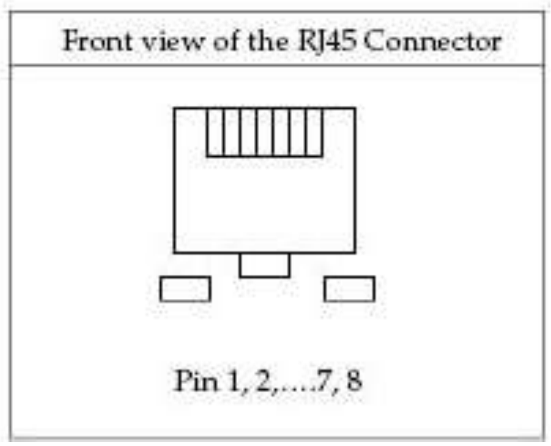
Digi-Key Part Number	WM2524-ND
Manufacturer Part Number	022-55-2141
Description	CONN RECEPT HOUSING 14POS .100 inch

Table 18 - Mating Connector Contact Pin

Digi-Key Part Number	WM2511-ND
Manufacturer Part Number	16-02-0096
Description	CONN SOCKET CRIMP 24-30AWG TIN

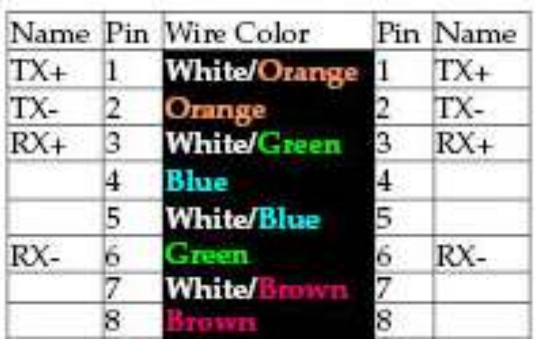
Pin Definition (Figure 94) and color code (Figure 95) for RJ45 of Ethernet port.

Figure 94 - Front view of RJ45 connector



RJ45 connector signal names and color code per IEEE 802.3 spec. Figure 95 illustrates the mechanical drawing of 3e-523-F2.

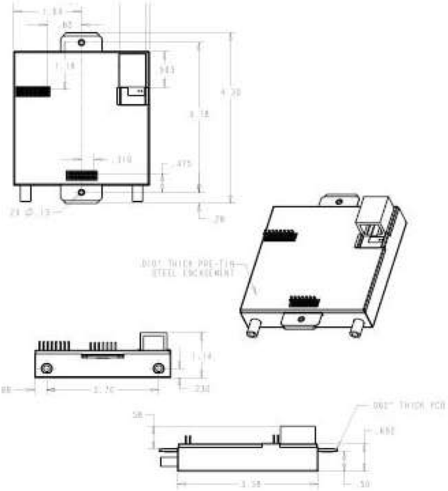
Figure 95 - RJ45 connector signal names and color code



Name	Pin	Wire Color	Pin	Name
TX+	1	White/Orange	1	TX+
TX-	2	Orange	2	TX-
RX+	3	White/Green	3	RX+
	4	Blue	4	
	5	White/Blue	5	
RX-	6	Green	6	RX-
	7	White/Brown	7	
	8	Brown	8	

5.1.1 Mechanical Drawings

Figure 96 - Mechanical drawing of 3e-523-F2



6. Technical Support

Manufacturer’s Statement

3e–523 is provided with a standard warranty. It is not desired or expected that the user open the device. If a malfunction is experienced and all external causes are eliminated, the user should contact 3eTI for instructions on how to resolve the issue

If you are experiencing trouble with this unit, the point of contact is:

e-mail:	support@3eti.com
Phone:	1-800-449-3384 (Monday - Friday)
or visit our website at	www.ultra-3eti.com

Radio Frequency Interference Requirements

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission’s Rules and Regulations. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

Installation should be accomplished using the authorized cables and/or connectors provided with the device or available from the manufacturer/distributor for use with this device. Changes or modifications not expressly approved by the manufacturer or party responsible for this FCC compliance could void the user’s authority to operate the equipment.

Appendix A: Glossary

3DES - Also referred to as Triple DES, a mode of the DES encryption algorithm that encrypts data three times.

802.11 - 802.11 refers to a family of specifications developed by the IEEE for wireless LAN technology. 802.11 specifies an over-the-air interface between a wireless client and a base station or between two wireless clients. The IEEE accepted the specification in 1997.

Access Point - An access point is a gateway set up to allow a group of LAN users access to another group or a main group. The access point doesn’t use the DHCP server function and therefore accepts IP address assignment from the controlling network.

AES - Short for Advanced Encryption Standard, a symmetric 128-bit block data encryption technique developed by Belgian cryptographers Joan Daemen and Vincent Rijmen. The U.S government adopted the algorithm as its encryption technique in October 2000, replacing the DES encryption it used. AES works at multiple network layers simultaneously.

Bridge - A device that connects two local-area networks (LANs), or two segments of the same LAN that use the same protocol, such as Ethernet or Token-Ring.

DHCP - Short for Dynamic Host Configuration Protocol, DHCP is a protocol for assigning dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address every time it connects to the network. In some systems, the device’s IP address can even change while it is still connected. DHCP also supports a mix of static and dynamic IP addresses. Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address. Many ISPs use dynamic IP addressing for dial-up users.

NMS (Network Management Station) - Includes such management software as HP Openview and IBM Netview.

PC Card - A computer device packaged in a small card about the size of a credit card and conforming to the PCMCIA standard.

PDA (Personal Digital Assistant) - A handheld device.

SNMP (Simple Network Management Protocol) - A Network ID unique to a network. Only clients and access points that share the same SSID are able to communicate with each other. This string is case-sensitive. Wireless LANs offer several security options, but increasing the security also means increasing the time spent managing the system. Encryption is the key. The biggest threat is from intruders coming into the LAN. You set a seven-digit alphanumeric security code, called an SSID, in each wireless device and they thereafter operate as a group.

WLAN (Wireless Local Area Network) - A type of local-area network that uses high-frequency radio waves rather than wires to communicate between nodes.

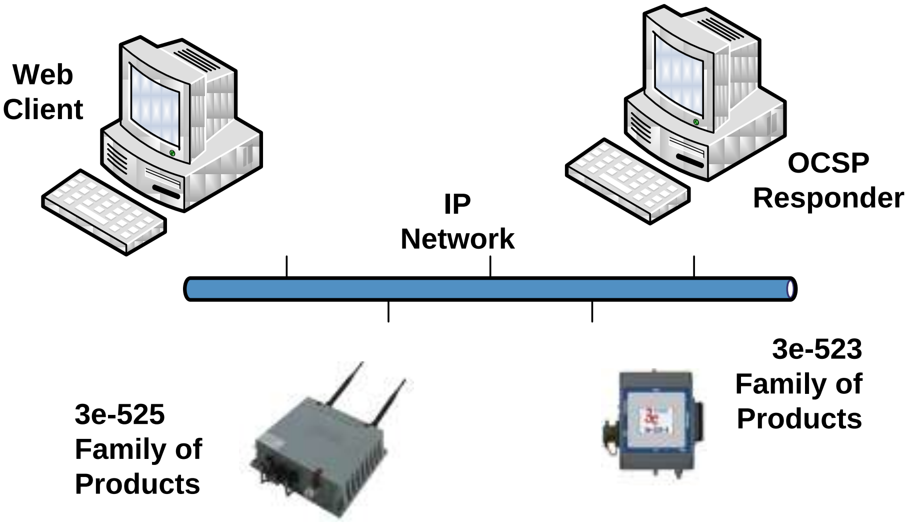
Appendix B: Two-Factor Authentication Overview and Configuration

B.1 Overview and Operation

Two-factor authentication is the method of using two independent methods to increase the assurance that a user has been authorized to access a secure device. 3eTI devices have the ability to provide increased authentication assurance by providing for a user requiring 3eTI device access to be authenticated first via a centralized validation authority and user login / password access for a particular device. The 3eTI Data Points support Public Key Certificates issues and managed by a Certificate Authority. By networking 3eTI devices into a Public Key Infrastructure, a 3eTI Data Point can use the capabilities of the PKI network by requiring a user to first validate authentication capabilities using a Common Access Card (CAC) card and the PKI network when using a computer to gain access to the 3eTI Data Point. Once permission is granted through the PKI network a user then uses their login ID and password to gain access to the 3eTI device.

Since the exact method of implementing and managing a PKI network may vary based on organization the following section provides details on how a 3eTI Data Point may be configured for two-factor authentication based on internal 3eTI configuration and testing of this feature. The following defines how to configure and use a Public Key Infrastructure (PKI) to manage and configure a 3e-523 Data Point. See Figure 97 for a block level overview of a PKI network.

Figure 97 – Two-Factor Authentication PKI Network Overview



When enabled, a user with a valid Common Access Card (CAC) is authenticated through an existing PKI network to gain an access to a 3eTI Data Points web management interface. The 3eTI Data Point uses the Online Certificate Status Protocol (OCSP) to send requests to an OCSP Responder in the PKI network. Based on the information returned from the OCSP Responder, the Data Point determines if the users has permission to access the web management GUI of the device. Based on the current permission setting of the requestor, the OCSP responder will return receive one of three possible statuses in response to a request to check CAC certificates validity. The status in the response the Data Point can be unknown, revoked, or good.

If the OCSP Responder does not have access to a valid Certificate Revocation List (CRL) for the Certificate Authority (CA) owning the requesting CAC certificate then the status returned will be unknown. The unknown certificate status is treated by the AP as if the client certificate was invalid. If the responder has access to a valid CRL for the CA owning the certificate then the status depends upon whether or not the certificate is listed in the CRL as revoked. If revoked then the status returned is revoked, otherwise the status will be good. If the response returned is invalid or revoked the Data Point will not allow the requestor to login to the web management interface. If the response is good the Data Point provides the Login and password interface to the requestor.

PKI Network Components

The following components are required to implement and operate a PKI network providing Two-Factor authentication of 3eTI Data Points, see Figure 97 **–** for the components that make up a PKI network.

Web Client

A computer running a valid Web client / browser (Internet Explorer 6 or later) that is able to communicate to the Data Point thought either its LAN or WAN port. The web client PC must be running Windows XP SP3 or later and be equipped with smart card slot. The computer must have software installed that can read and process CAC card information. Also, the requestor must have a valid Common Access Card (CAC) (DoD CA-23) that will return a status of good from the OCSP Responder. Software such as ActivIdentity ActivClient (6.2 or later) will meet system requirements.

OCSP Responder

The OCSP Responder provides remote access to Certificate Revocation List (CRL) databases via the OCSP protocol. The responder is meant to aggregate and help manage large databases and control how a CRL is stored and managed within the network. Software such as Tumbleweed Validation Authority (4.9) running on Windows Server 2003 R2 platform is recommended. DoD CA-23 certificate and any corresponding CRL can be loaded to the OCSP Responder from a local file. Current DoD certificates and CRLs can be obtained from https://crl.chamb.disa.mil/. See Table 19 for the network component operational requirements.

Table 19 - PKI Network Component Requirements

System Element	Operational Requirements
Web Client	• Internet Explorer 6.0 or later, running on Windows XP SP3 or later. • PC with smart card slot and ActivIdentity ActivClient (or similar) 6.2 or later software installed. • DoD issued Common Access Card (CAC).
OCSP Responder	Windows Server 2003 R2 Tumbleweed Valicert Validation Authority 4.9 or later
3eTI Data Points	Software Release 4.4 or later, valid for both 3e-523 and 3e-525 series of products

B.2 Configuration of 3eTI Data Points for Two-Factor Authentication

Configuring OCSP operation on 3eTI Data Points

By default, OCSP is disabled. The following steps show how to enable and configure OCSP on 3eTI devices.

- Login onto the device and navigate to the User Login Policy web page, as shown in Figure 98.

In order to start using OCSP, the CA certificate (DoD CA-23 certificate) that will used to issue / sign the CAC certificates must be uploaded to the AP.

IMPORTANT NOTE: The CA certificate file must be in PEM format. DoD certificates downloaded from the DoD PKI Management web site (https://crl.chamb.disa.mil/) are typically received in the X.509 format (*.cer), if this is true the file will need to be converted to PEM format first. This can be accomplished using the **OpenSSL utility** that comes pre-installed on most Linux distributions or can be uploaded from the internet:

The command for converting from X.509 format to PEM format is

```
OpenSSL x509 -inform der -in DODCA_23.cer -out DODCA_23.pem
```

- Click the **Load New Certificate** link on the User Login Policy web page. This will take you to the "Update OCSP Certificate" web page shown in Figure 98
- Click on the **Browse** button and navigate to the CA certificate file using the Choose File to Upload screen, select the file and click the **Open** button, see Figure 99.
- After the CA file in PEM format is selected, click the **Upload Cert** button, on the web page. A warning pop up window will be displayed, see Figure 100.

IMPORTANT: Read the warning message carefully. If the CA certificate file is not correct and does not match the certificate on the CAC card and/or is not the same as what is installed on OCSP Responder the connection to web management interface of the 3eTI device may not be possible.

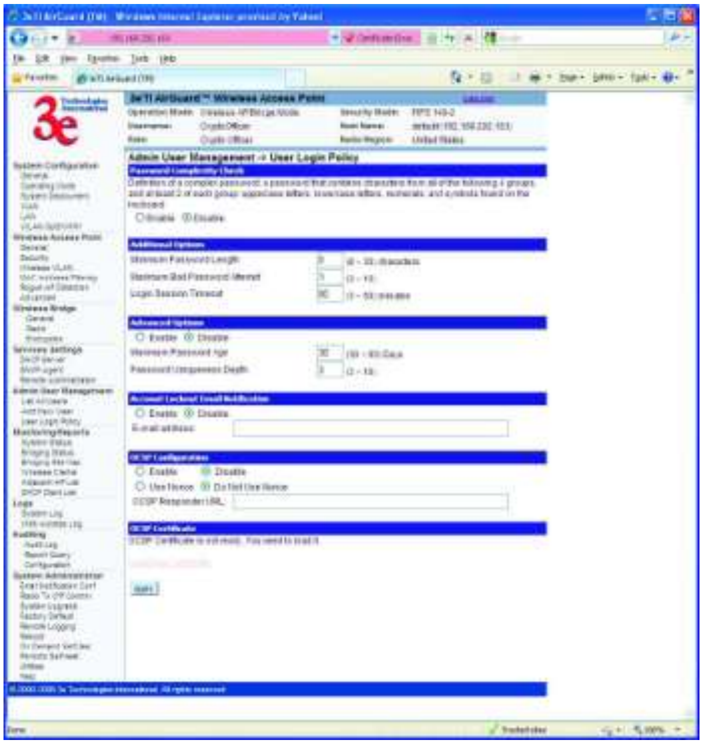
WARNING: If the web client/AP/OCSP Responder are configured incorrectly, or there is no network connection to the Validation Authority software / OCSP Responder, the web client will not be able to access the device web GUI. If this occurs setting the 3eTI Data Point to its factory default configuration will disable OCSP, allowing a user to connect to device web GUI using factory default settings.

- Click the **OK** button of the pop up window. If the upload is successful the message page shown in Figure 101 will be displayed.

– Click **Back** button. This will take you back to the User Login Policy web page, Figure 98

. The User Login Policy page will show information related to the uploaded CA under the OCSP Certificate banner on the page.

Figure 98 - User Login Policy Page



3eTI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode | Security Mode: FIPS 140-2

Username: CryptoOfficer | Host Name: default (192.168.230.151)

Role: Crypto Officer | Radio Region: United States

Admin User Management -> User Login Policy

Password Complexity Check

Definition of a complex password: a password that contains characters from all of the following 4 groups, and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard

○ Enable ● Disable

Additional Options

Minimum Password Length: 8 (8 - 32) characters

Maximum Bad Password Attempt: 5 (3 - 10)

Login Session Timeout: 30 (1 - 60) minutes

Advanced Options

○ Enable ● Disable

Maximum Password Age: 30 (30 - 60) Days

Password Uniqueness Depth: 3 (3 - 10)

Account Lockout Email Notification

○ Enable ● Disable

E-mail address:

OCSP Configuration

○ Enable ● Disable

○ Use Nonce ● Do Not Use Nonce

OCSP Responder URL:

OCSP Certificate

OCSP Certificate is not exist. You need to load it.

Apply

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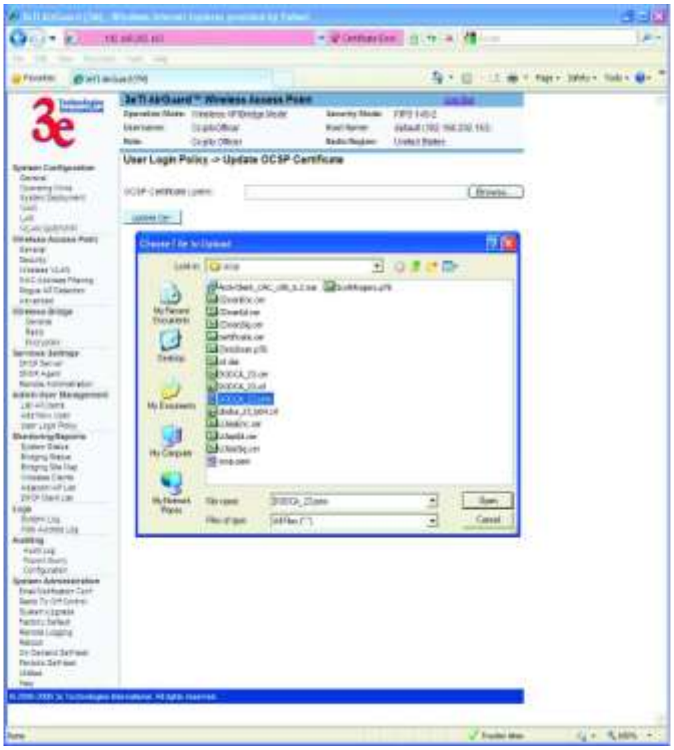
Figure 99 - Loading OCSP Certificate File



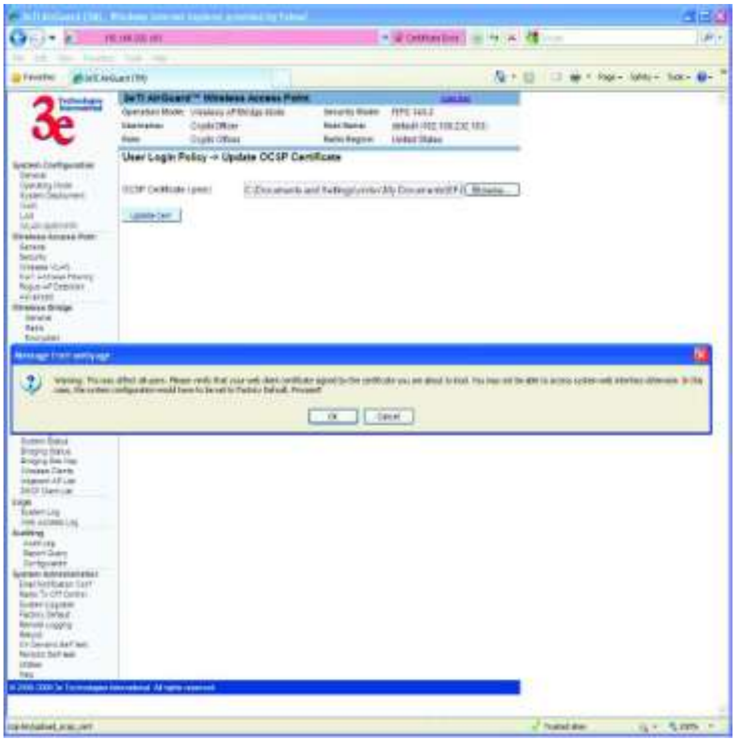
3eTI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode   Security Mode: FIPS 140-2
Username: CryptoOfficer   Host Name: default (192.168.232.163)
Role: Crypto Officer   Radio Region: United States

User Login Policy -> Update OCSP Certificate

OCSP Certificate (.pem):

Figure 100 - OCSP Certificate File Warning



3eTI AirGuard™ Wireless Access Point

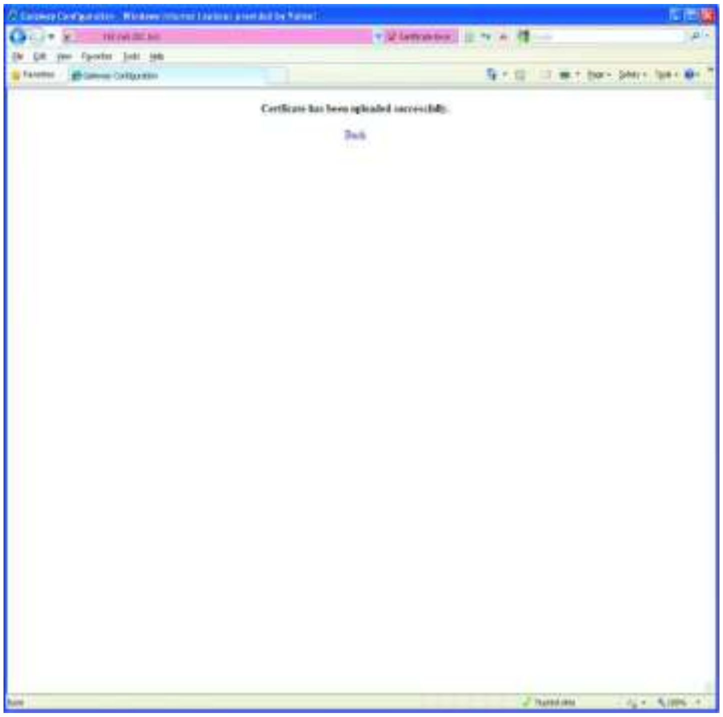
User Login Policy -> Update OCSP Certificate

OCSP Certificate (.pem): C:\Documents and Settings\...\My Documents\...

Message from webpage

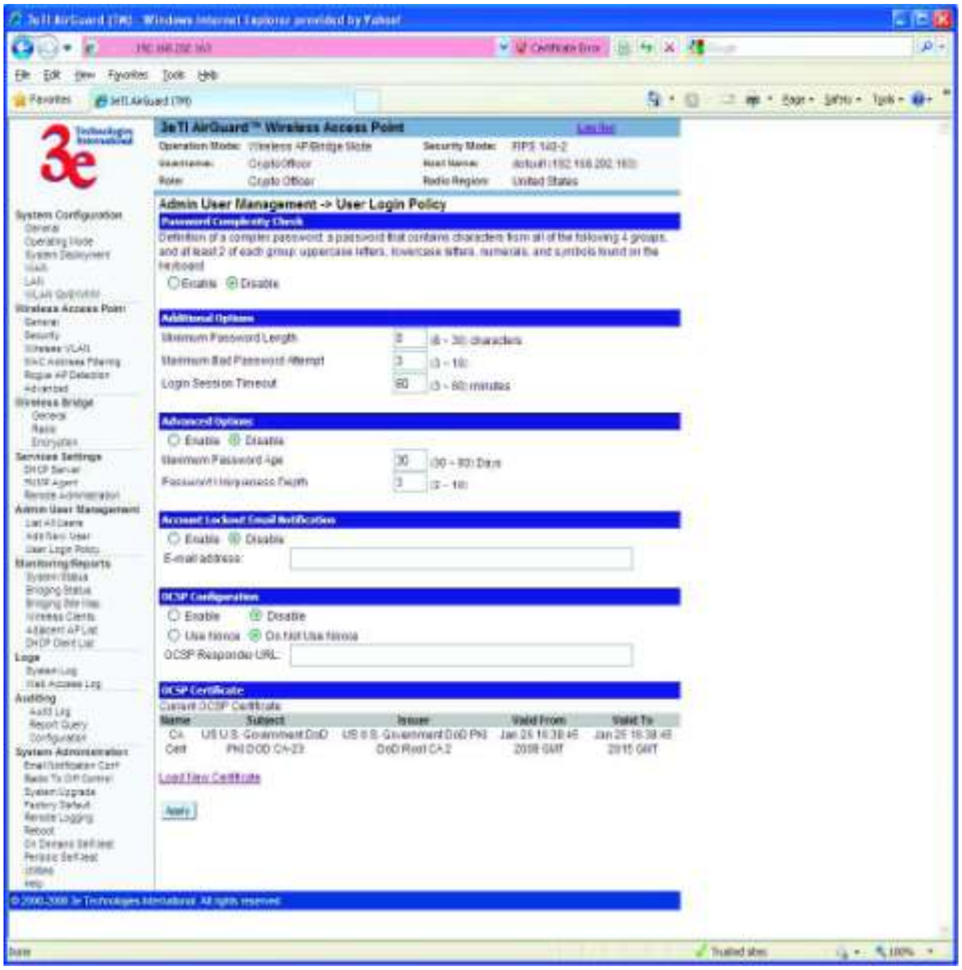
Warning: You can affect all users. Please verify that your web client certificate signed by the certificate you are about to load. You may not be able to access system web interface otherwise. In this case, the system configuration would have to be set to Factory Default. Proceed?

Figure 101 - OCSP Certificate File Upload Success Message Page



Certificate has been uploaded successfully.

Figure 102 - User Login Policy with Upload Certificate Information



3eTI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Slave   Security Mode: FIPS 140-2
Username: CryptoOfficer   Host Name: default (192.168.202.163)
Role: Crypto Officer   Radio Region: United States

Admin User Management -> User Login Policy

Password Complexity Check

Definition of a complex password: a password that contains characters from all of the following 4 groups, and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard

○ Enable ● Disable

Additional Options

Minimum Password Length 8 (8 - 30 characters)
Maximum Bad Password Attempt 3 (3 - 10)
Login Session Timeout 60 (3 - 60 minutes)

Advanced Options

○ Enable ● Disable

Maximum Password Age 30 (30 - 90) Days
Password Uniqueness Depth 3 (2 - 10)

Account Lockout Email Notification

○ Enable ● Disable

E-mail address:

OCSP Configuration

○ Enable ● Disable
○ Use Nonce ● Do Not Use Nonce

OCSP Responder URL:

OCSP Certificate

Current OCSP Certificate

Name	Subject	Issuer	Valid From	Valid To
CA Cert	US U.S. Government DoD PKI DOD CA-23	US U.S. Government DoD PKI DoD Root CA 2	Jan 25 16:38:45 2008 GMT	Jan 25 16:38:45 2015 GMT

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Next OCSP communication to the OCSP Responder must be established. In order to enable OCSP, the OCSP Responder URL must be entered into the Data point. This is entered in the input box under theOCSP Configuration label, see Figure 102.   OCSP supports two schemes, "http:" and "https:" The host name may be either an IP address or domain name. The latter can only be used if DNS is able to resolve the host name to IP address. Optionally, the port number can be specified separated from the host name by colon.

Examples of the valid OCSP Responder URLs are:

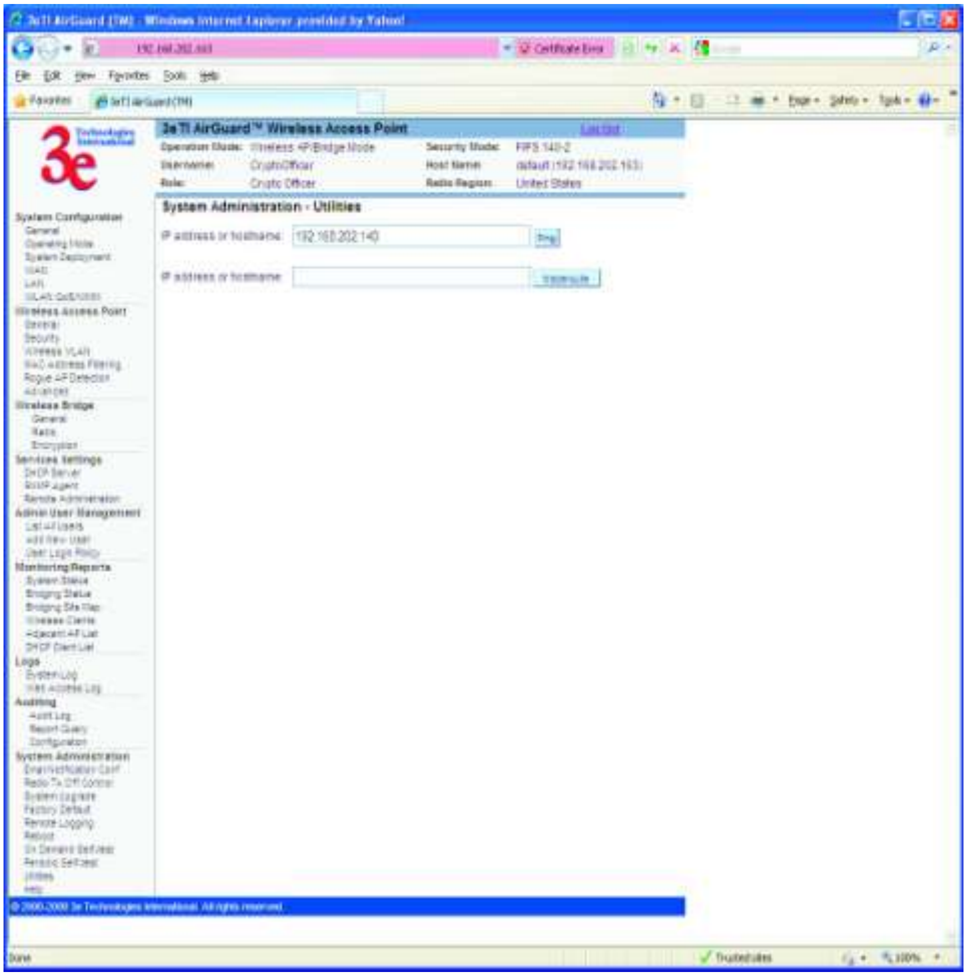
- http://192.168.202.140
- https://192.168.202.140
- https://192.168.202.140:443
- http://3ETI-ENGR
- https://3ETI-ENGR:443

- **IMPORTANT**: Before enabling the 3eTI Data Point for OCSP communication, it is recommended the communication with the OCSP Responder by verified. This can be done by a ping of the OCSP Responder from the 3eTI Data Point, see **Figure 103**. The ping capability can be found on the Utilities web page of the device. The IP address or host name of the OCSP Responder URL must be entered in the IP address or hostname text box, for example, 192.168.202.140 or 3ETI-ENGR.
- Click the **Ping** button next to the text box.

If communication between the device and OCSP Respond can be established a ping success screen as shown in Figure 104 will be displayed.

WARNING: If the ping is not successful do not proceed until networking issues preventing successful communication can be resolved.

Figure 103 – 3eTI Data Point Utilities Web Page



3eTI AirGuard (TM) - Windows Internet Explorer provided by Yahoo!

3eTI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.163)
Role: Crypto Officer
Radio Region: United States

System Administration - Utilities

IP address or hostname: 192.168.202.140 Ping

IP address or hostname: Traceroute

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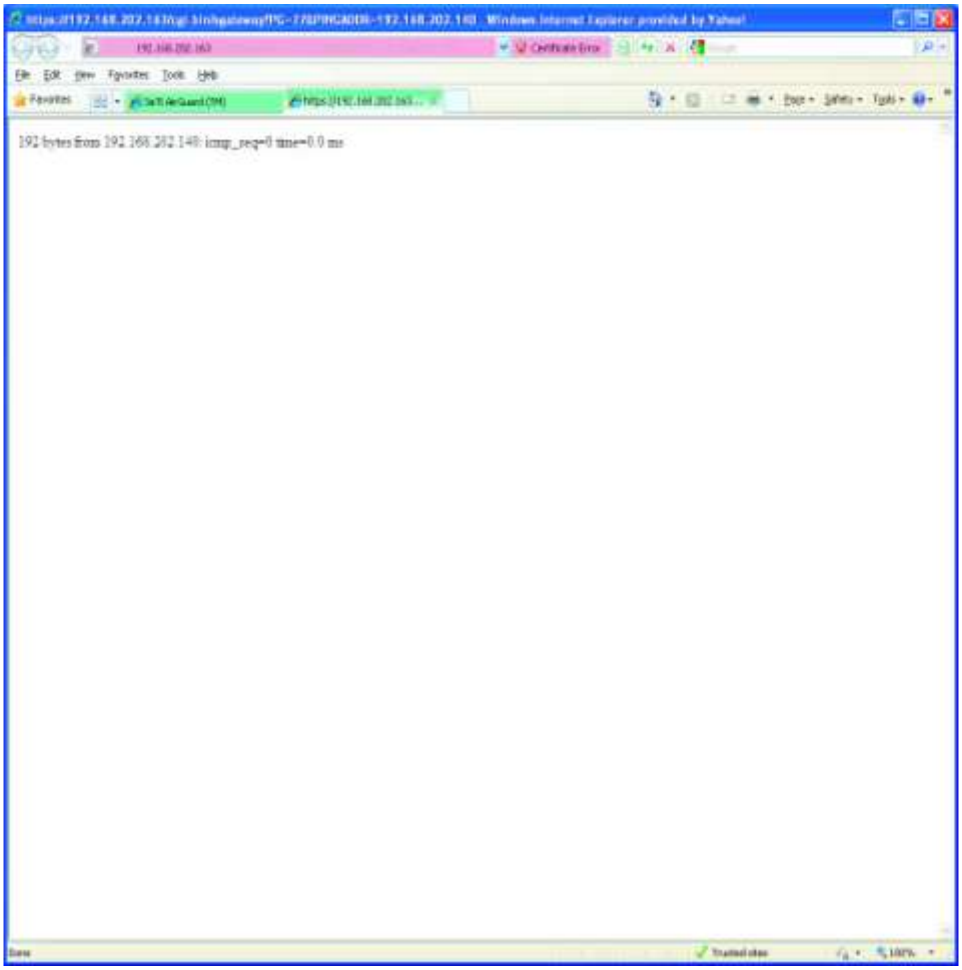
Figure 104 – Ping Success Response

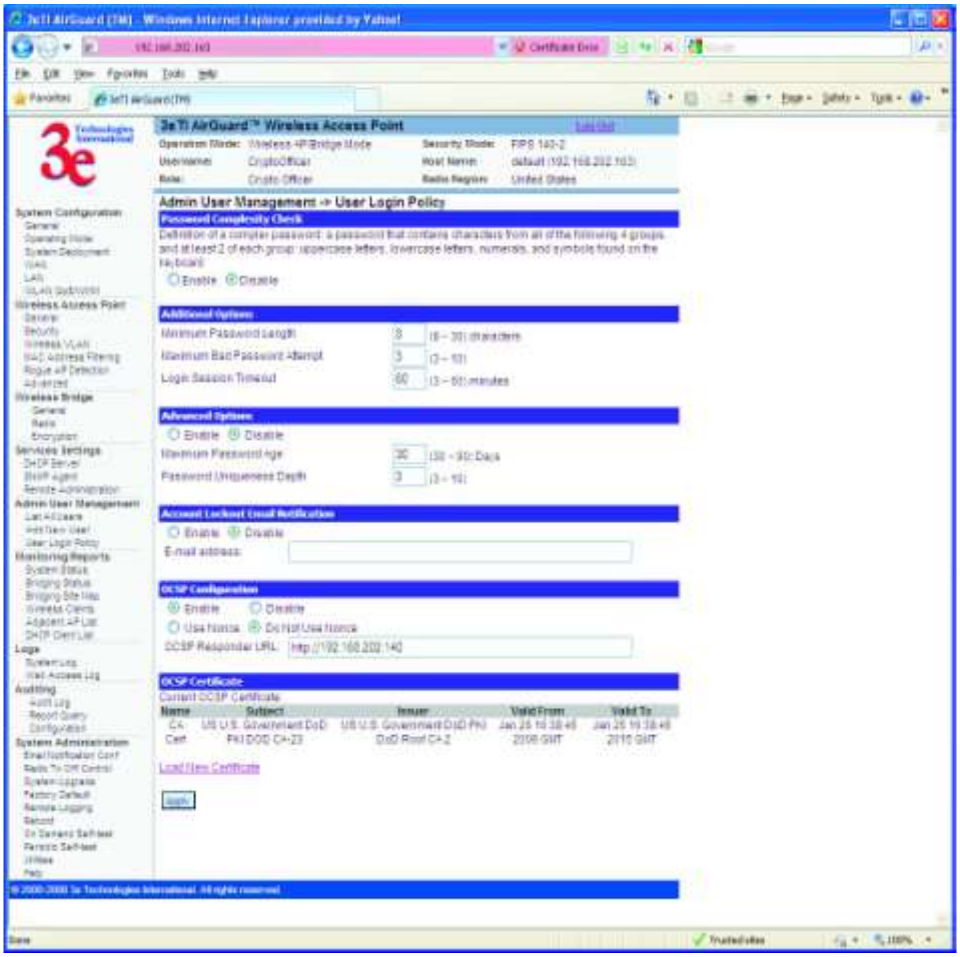


```
192 bytes from 192.168.202.140: icmp_req=0 time=0.0 ms
```

- Once connectivity to the OCSP Responder has been verified, navigate back to User Login Policy web page and enter OCSP Responder URL into the OCSP URL Responder text box, as shown in Figure 105. Click the **Enable** radio button.

NOTE: The Use Nonce setting is optional. It should be left at **Do Not Use Nonce** for most installations.

Figure 105 – OCSP Responder Enable



3eTI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode
Security Mode: FIPS 140-2
Username: CryptoOfficer
Host Name: default (192.168.202.163)
Role: Crypto Officer
Radio Region: United States

Admin User Management -> User Login Policy

Password Complexity Check

Definition of a complex password: a password that contains characters from all of the following 4 groups and at least 2 of each group: uppercase letters, lowercase letters, numerals, and symbols found on the keyboard.

○ Enable ● Disable

Additional Options

Minimum Password Length	8	(8 – 30) characters
Maximum Bad Password Attempt	3	(3 – 10)
Login Session Timeout	60	(3 – 60) minutes

Advanced Options

○ Enable ● Disable

Maximum Password Age	30	(30 – 90) Days
Password Uniqueness Depth	3	(3 – 10)

Account Lockout Email Notification

○ Enable ● Disable

E-mail address:

OCSP Configuration

● Enable ○ Disable

○ Use Nonce ● Do Not Use Nonce

OCSP Responder URL: http://192.168.202.140

OCSP Certificate

Current OCSP Certificate

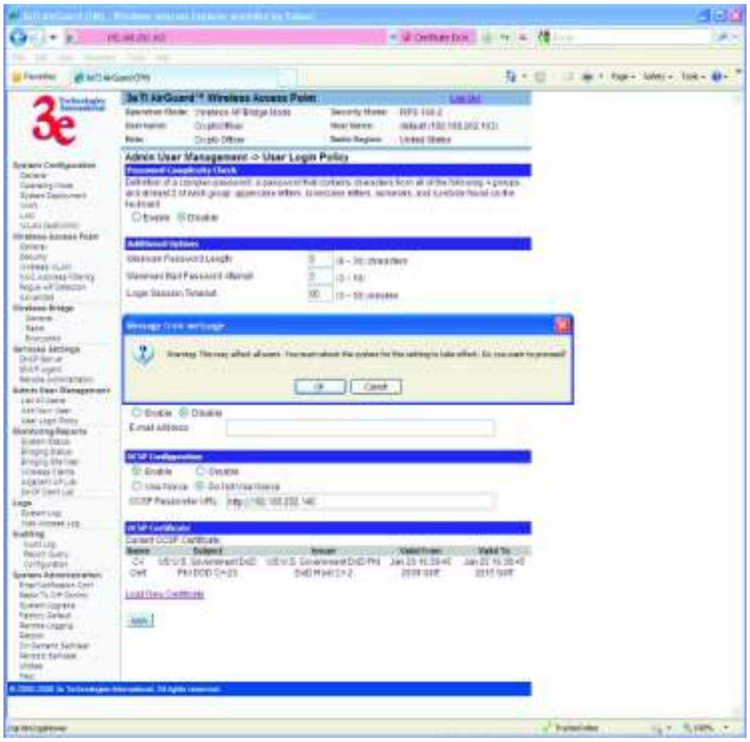
Name	Subject	Issuer	Valid From	Valid To
CA Cert	US U.S. Government DoD PKI DOD CA-23	US U.S. Government DoD PKI DoD Root CA 2	Jan 25 19:38:45 2008 GMT	Jan 25 19:38:45 2010 GMT

- After setting the OCSP Configuration parameters, click the **Apply** button at the bottom of the screen. The a reboot required warning message will be displayed, see Figure 106.

WARNING: If the web client/AP/OCSP Responder are configured incorrectly, or there is no network connection to the Validation Authority software / OCSP Responder, the web client will not be able to access the device web GUI. If this occurs setting the 3eTI Data Point to its factory default configuration will disable OCSP, allowing a user to connect to device web GUI using factory default settings.

- If all enter information is correct click the **OK** button and navigate to the Reboot web page, click the **Reboot** button. The following warning message will appear, see Figure 107.
- Click the **OK** button. The screen shown in Figure 108 will appear.

Figure 106 – OCSP Enabled Warning



3eTI AirGuard™ Wireless Access Point

Admin User Management -> User Login Policy

Password Complexity Check

○ Enable ● Disable

Additional Options

Minimum Password Length	8	(8 – 30) characters
Maximum Bad Password Attempt	3	(3 – 10)
Login Session Timeout	60	(3 – 60) minutes

Message from webpage

Warning: This may affect all users. You must reboot the system for this setting to take effect. Do you want to proceed?

OK | Cancel

○ Enable ● Disable

E-mail address

OCSP Configuration

● Enable ○ Disable

○ Use Nonce ● Do Not Use Nonce

OCSP Responder URL: http://192.168.232.140

OCSP Certificate

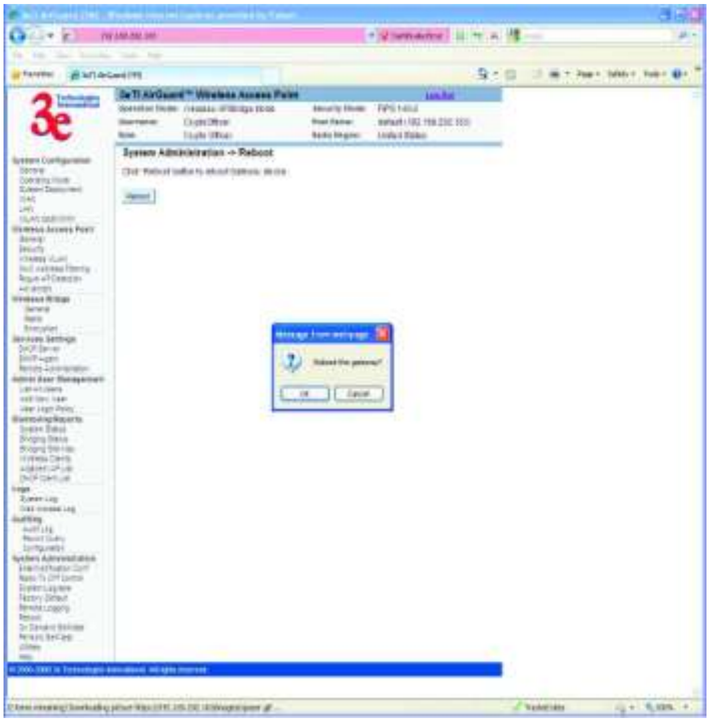
Current OCSP Certificate

Name	Subject	Issuer	Valid From	Valid To
CA Cert	US/U.S. Government/DoD PKI/DOD CA-23	US/U.S. Government/DoD PKI DoD Root CA 2	Jan 23 [illegible] 2009 GMT	Jan 22 [illegible] 2015 GMT

Load New Certificate

Apply

Figure 107 – Reboot Warning



3eTI AirGuard™ Wireless Access Point

System Administration -> Reboot

Click "Reboot" button to reboot [illegible] device.

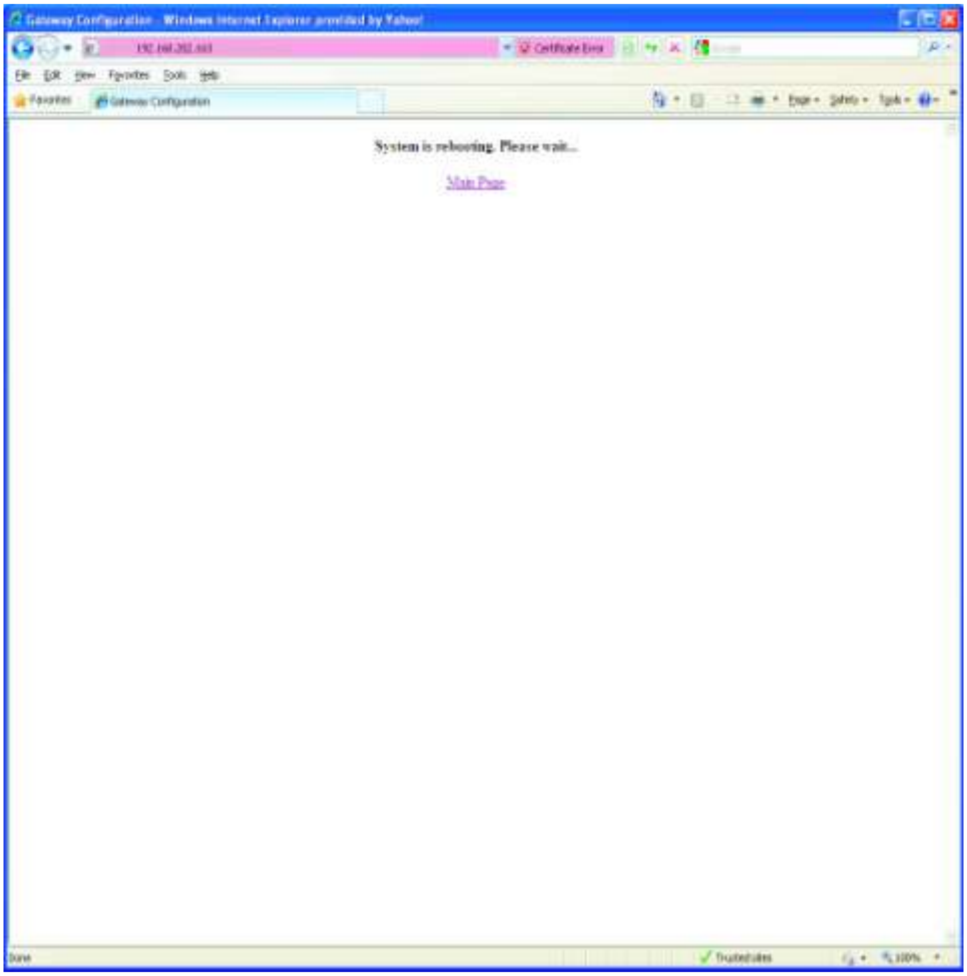
Reboot

Message from webpage

Reboot the gateway?

OK | Cancel

Figure 108 – Reboot Success


Gateway Configuration - Windows Internet Explorer provided by Yahoo!
Certificate Error
File Edit View Favorites Tools Help
Favorites
Gateway Configuration
Page Safety Tools
Done
Trusted sites
100%

System is rebooting. Please wait...

Main Page

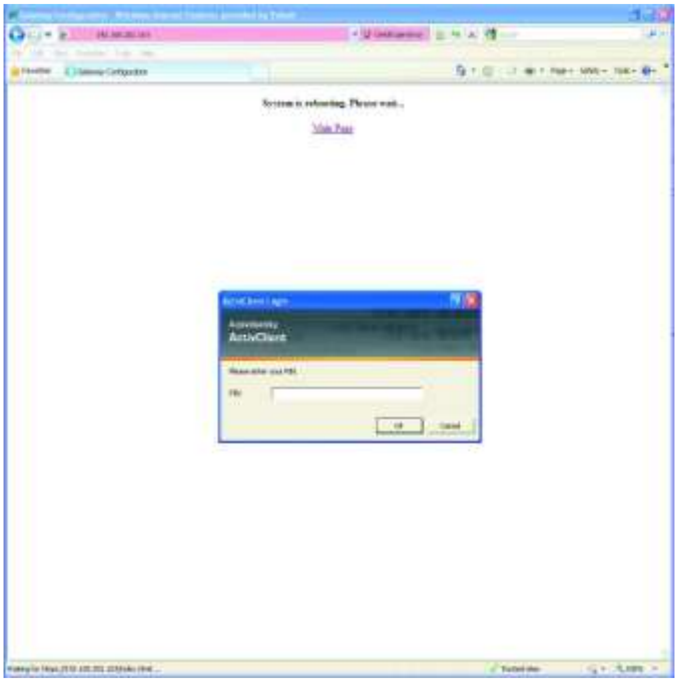
- Once the device has completed it reboot sequence, click on the **Main Page** link, as shown in Figure 108.

Depending on certificate caching options, caching history, and software being used to read and validate the CAC card, prompt(s) for validating the CAC will appear, these may be similar to those shown in as shown in Figure 109 .

The Internet Explorer prompt for selecting the certificate to use for the connection will appear, as shown in Figure 110.

- Click on the certificate to use for accessing the device and click the **OK** button. A following warning message about the web server certificate will appear, see Figure 111.
- Click on the **Continue to this website (not recommended)** link. If a screen prompting you to add the web-site to the exceptions list appears, add the IP address to the exceptions list. If the IP address of this AP was previously added to the exceptions list, the following screen will appear as in Figure 112

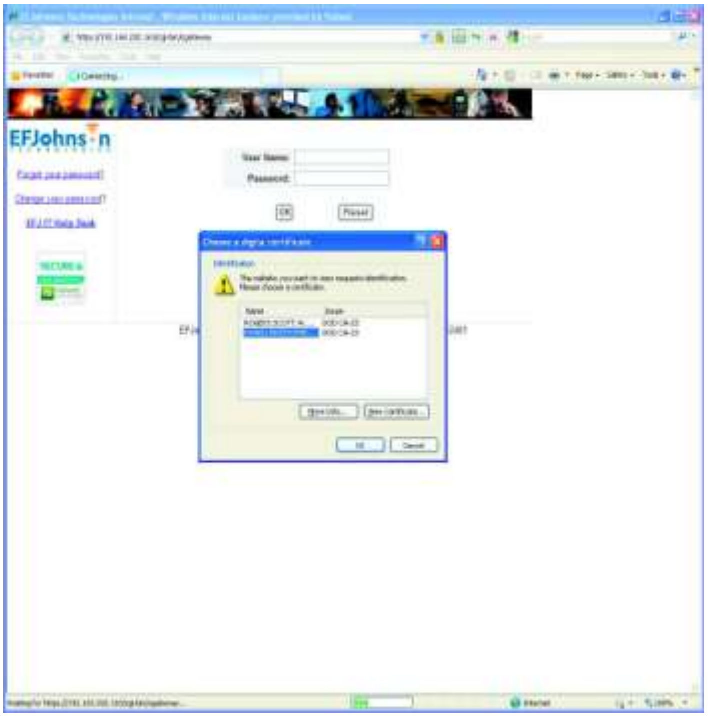
Figure 109 - ActivClient Password Prompt



System is rebooting. Please wait...

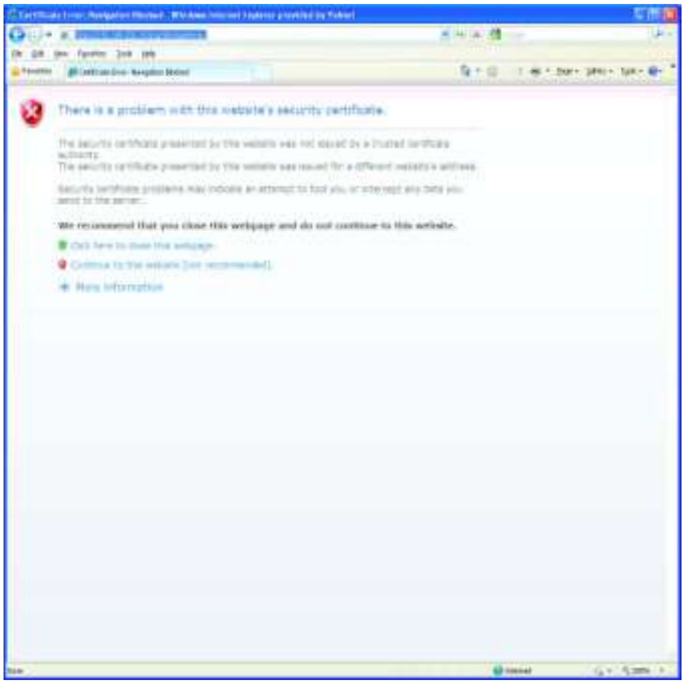
Main Page

Figure 110 - Internet Explorer Certificate Prompt



The website you want to view requests identification. Please choose a certificate.

Figure 111 - Internet Explorer Website Certificate Warning



There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

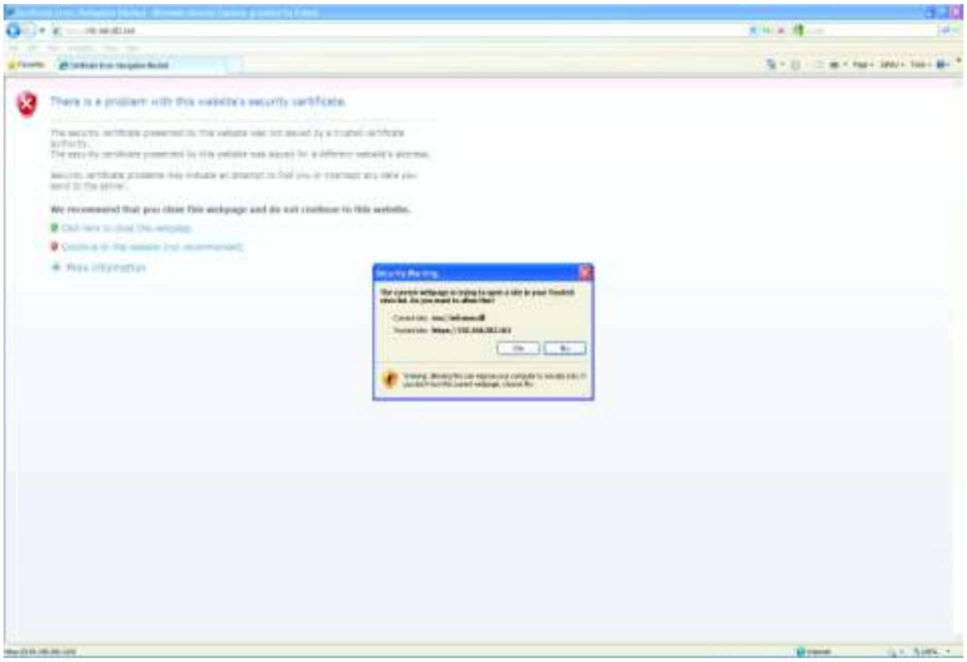
Click here to close this webpage.

Continue to this website (not recommended).

More information

- Click on **Yes** button. The certificate list to use with this website will appear as shown in Figure 113.
- Highlight the correct ID certificate and click the **OK** button. The login screen of the AP will appear as in Figure 114.

Figure 112 - Internet Explorer Website Warning



There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

Click here to close this webpage.

Continue to this website (not recommended).

More information

Security Warning

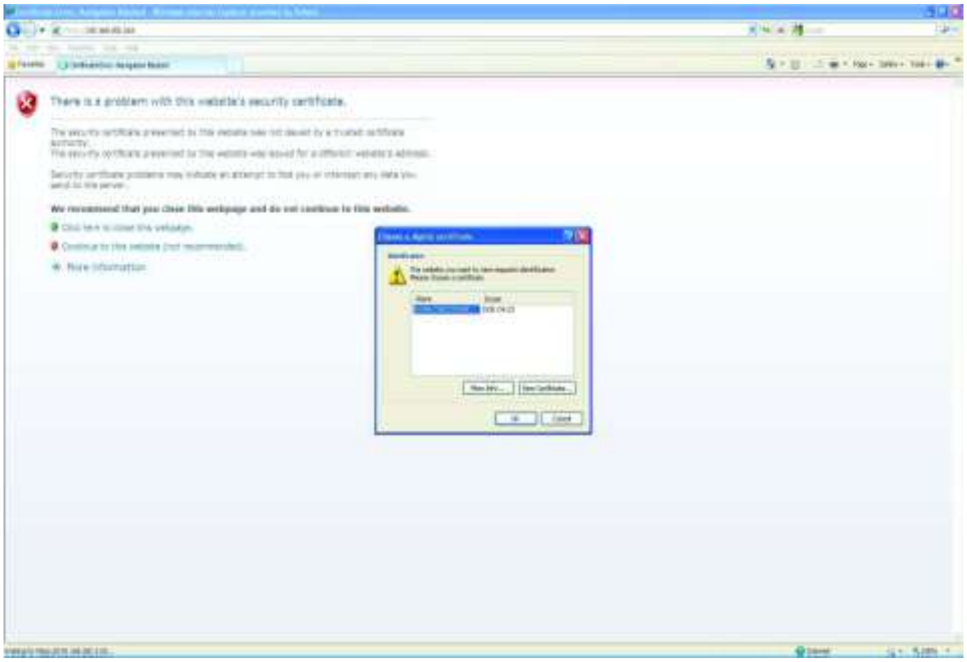
The current webpage is trying to open a site in your Trusted sites list. Do you want to allow this?

Current site: [illegible]

Trusted site: **https://[illegible]**

Warning: allowing this can expose your computer to security risks. If you don't trust the current webpage, choose No.

Figure 113 - Internet Explorer Client Certificate List



There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

We recommend that you close this webpage and do not continue to this website.

- Click here to close this webpage.
- Continue to this website (not recommended).
- More information

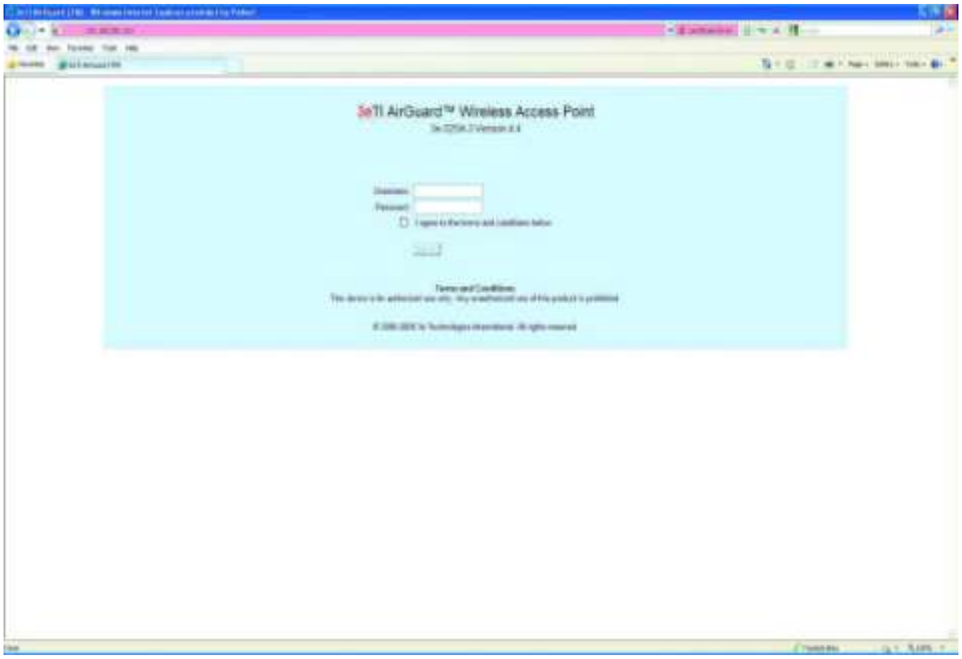
Choose a digital certificate

Identification

The website you want to view requests identification. Please choose a certificate.

Name	Issuer
[illegible]	[illegible]

Figure 114 - Internet Explorer Data Point Login Screen



3eTI AirGuard™ Wireless Access Point

3e-525A-3 Version 4.4

Username:

Password:

□ I agree to the terms and conditions below

Terms and Conditions

This device is for authorized use only. Any unauthorized use of this product is prohibited.

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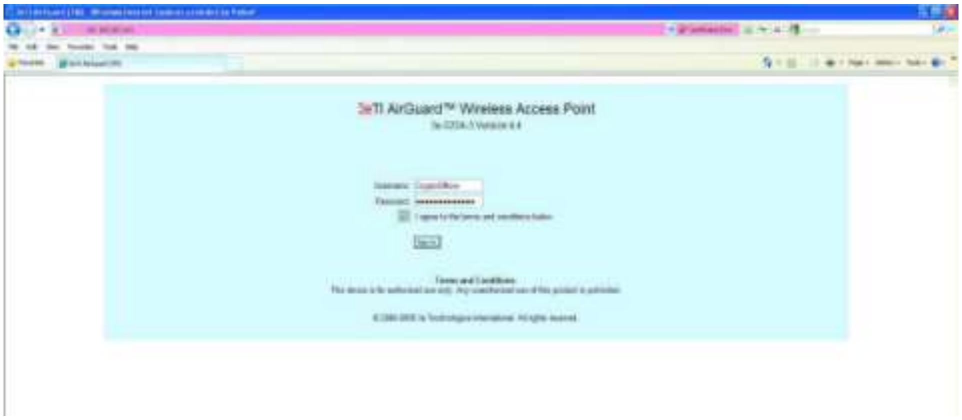
- Type the user name and password in the corresponding boxes. Click on the checkbox to accept the Terms and Conditions, and click the **Sign In** button (Figure 115).

Figure 115 - Internet Explorer Data Point Login Credentials



3eTI AirGuard™ Wireless Access Point

3e-525A-3 Version 4.4

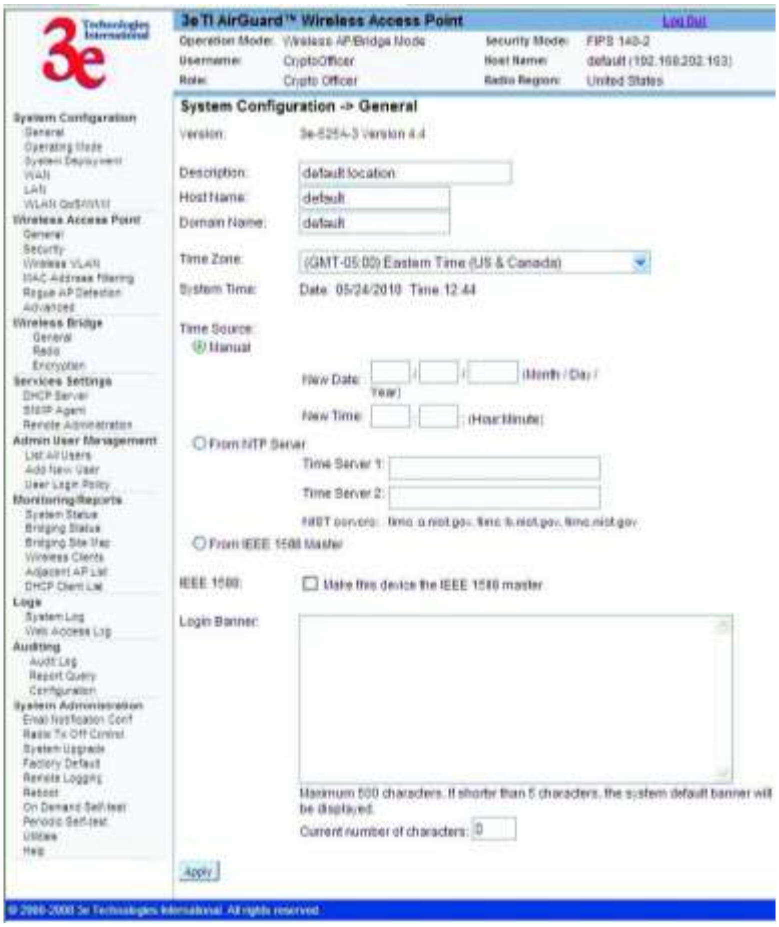
Username: CryptoOfficer

Password: ••••••••••••••

Terms and Conditions

If correct login credentials were specified, the General configuration web page of the AP will appear, as shown in Figure 116. If this screen appears the CAC certificate have been verified by the 3eTI device and the OCSP responder. You now have access to the web GUI and can configure and manage the device.

Figure 116 - Internet Explorer Data Point General Configuration Web Page



3e TI AirGuard™ Wireless Access Point

Operation Mode: Wireless AP/Bridge Mode

Security Mode: FIPS 140-2

Username: CryptoOfficer

Host Name: default (192.168.202.193)

Role: Crypto Officer

Radio Region: United States

System Configuration -> General

Version: 3e-525A-3 Version 4.4

Description: default location

Host Name: default

Domain Name: default

Time Zone: (GMT-05:00) Eastern Time (US & Canada)

System Time: Date 05/24/2010 Time 12:44

Time Source:

● Manual

New Date: / / (Month / Day / Year)

New Time: : (Hour:Minute)

○ From NTP Server

Time Server 1:

Time Server 2:

NIST servers: time-a.nist.gov, time-b.nist.gov, time.nist.gov

○ From IEEE 1588 Master

IEEE 1588: □ Make this device the IEEE 1588 master

Login Banner:

Maximum 500 characters. If shorter than 5 characters, the system default banner will be displayed.

Current number of characters: 0

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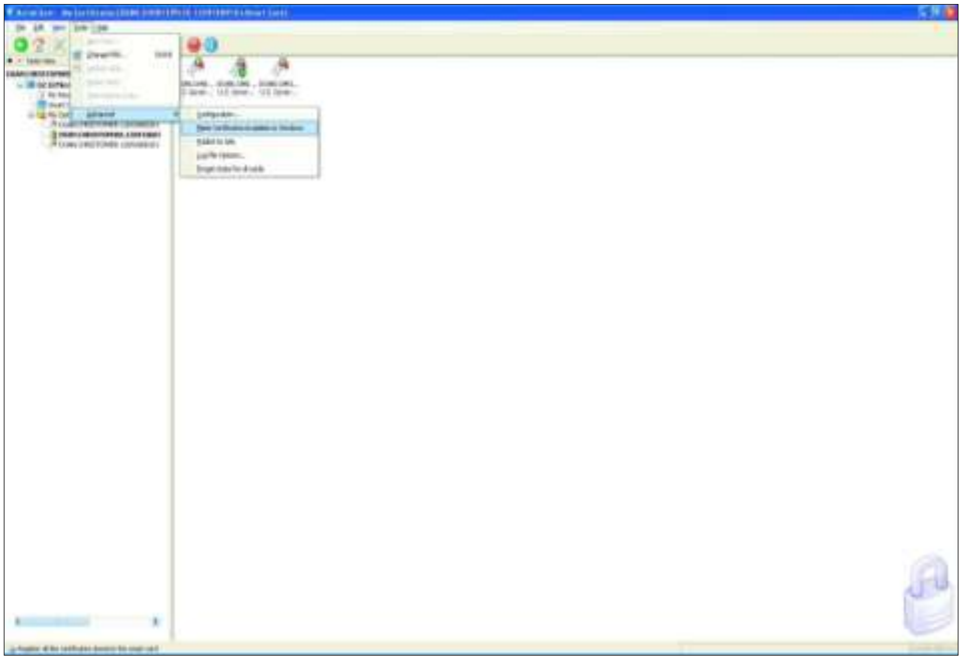
B.3 Optional 3rd party Device Configuration Overview

3eTI has tested and validated the above capabilities using ActivIdentity ActivClient and Tumbleweed Valicert Validation Authority software providing an end to end validation capability. It is recognized that other OCSP based software may provide the same capabilities. This section is intended to provide an overview of configuring the above software for use within a PKI network. More detail on how to use and configure the software can be found in the respective user manuals for each product.

Configuration Procedure Web Client Configuration

- Install the ActiveIdentity ActiveClient software as specified by the vendor
- Obtain a valid CAC card (3eTI has validated this feature using a DoD CA-23 issued CAC).
- Insert the CAC card into the smart card slot of the PC.
- Once the ActivClient software recognizes the CAC, double click on ActivClient icon in the System Tray to open the software window, shown in and navigate to **Tools -> Advanced -> Make Certificates Available to Windows**, as shown in Figure 117

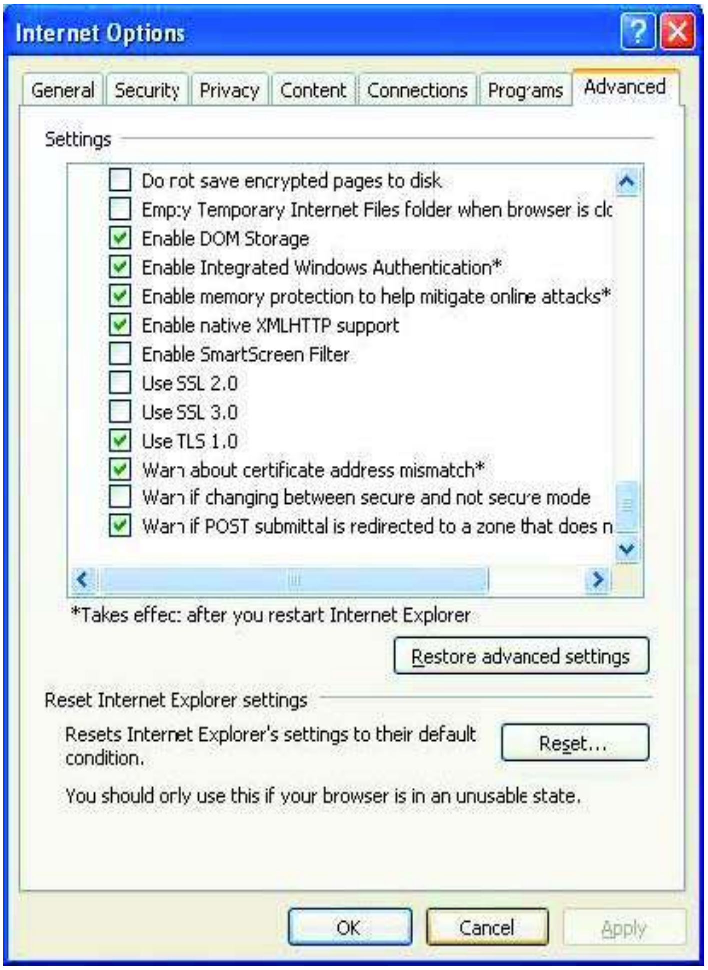
Figure 117 - ActivClient Certificate Export



- Open Internet Explorer. Click on menu item **Tools -> Internet Options**. Click on Advanced tab and scroll down to SSL/TLS options. Make sure that Use SSL 2.0 and Use SSL 3.0 options are unchecked and Use TLS 1.0 option is checked, as shown in Figure 118.

The software is ready to be used, please refer to the appropriate software configuration documentation to insure proper setup and operation.

Figure 118 - Internet Explorer Security Options



Settings

- ☐ Do not save encrypted pages to disk
- ☐ Empty Temporary Internet Files folder when browser is clc
- ☑ Enable DOM Storage
- ☑ Enable Integrated Windows Authentication*
- ☑ Enable memory protection to help mitigate online attacks*
- ☑ Enable native XMLHTTP support
- ☐ Enable SmartScreen Filter
- ☐ Use SSL 2.0
- ☐ Use SSL 3.0
- ☑ Use TLS 1.0
- ☑ Warn about certificate address mismatch*
- ☐ Warn if changing between secure and not secure mode
- ☑ Warn if POST submittal is redirected to a zone that does n

*Takes effect after you restart Internet Explorer

Reset Internet Explorer settings

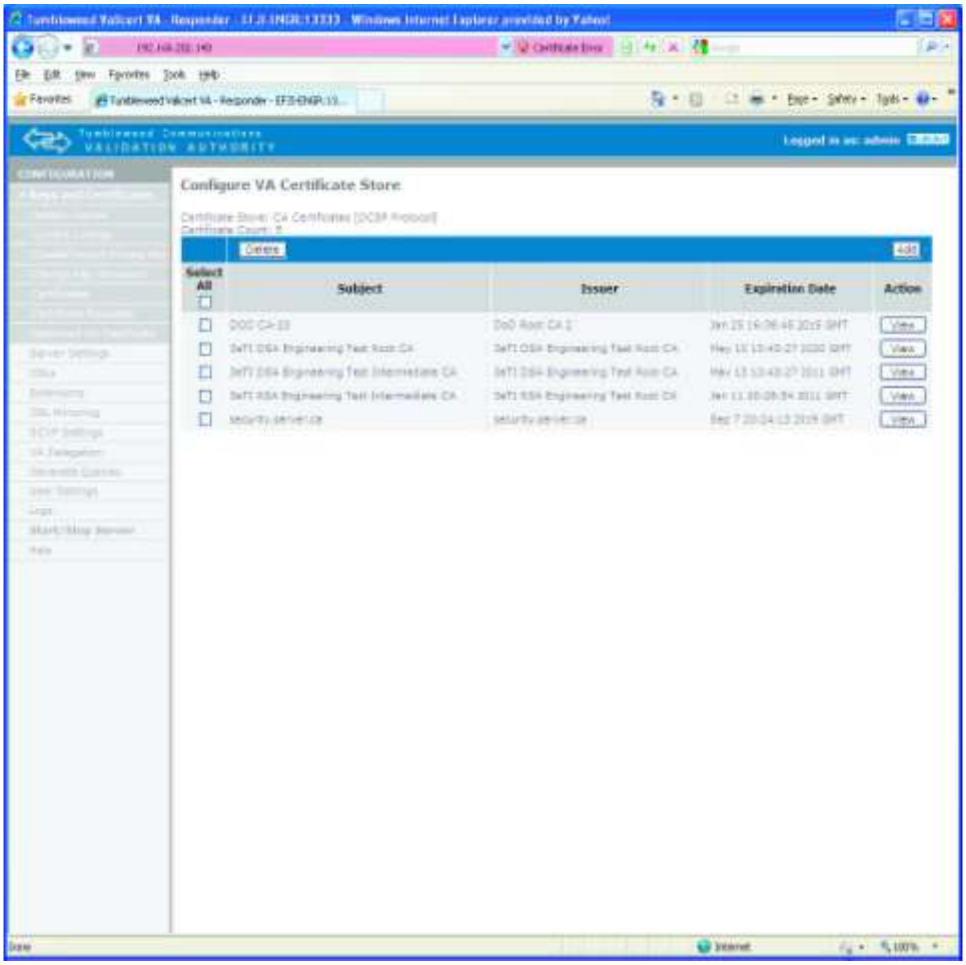
Resets Internet Explorer's settings to their default condition.

You should only use this if your browser is in an unusable state.

OCSP Responder Configuration

- Install the Tumbleweed Valicert Validation Authority software as specified by the vendor
- Appropriate certificate and corresponding CRL available as described in previous sections (3eTI has tested the configuration using DoD CA-23 issued CAC)
- Open web GUI to the OCSP Responder and navigate to the **CONFIGURATION -> Keys and Certificates -> Certificates** page**.** Verify that the certificate (CAC issuer certificate) is installed. This is the same certificate that will be installed on the 3eTI Data Point.
- If the certificate is not installed, click the **Add** button and load the certificate from the local file. This is shown in the Figure 119.

Figure 119 - OCSP Responder Certificates



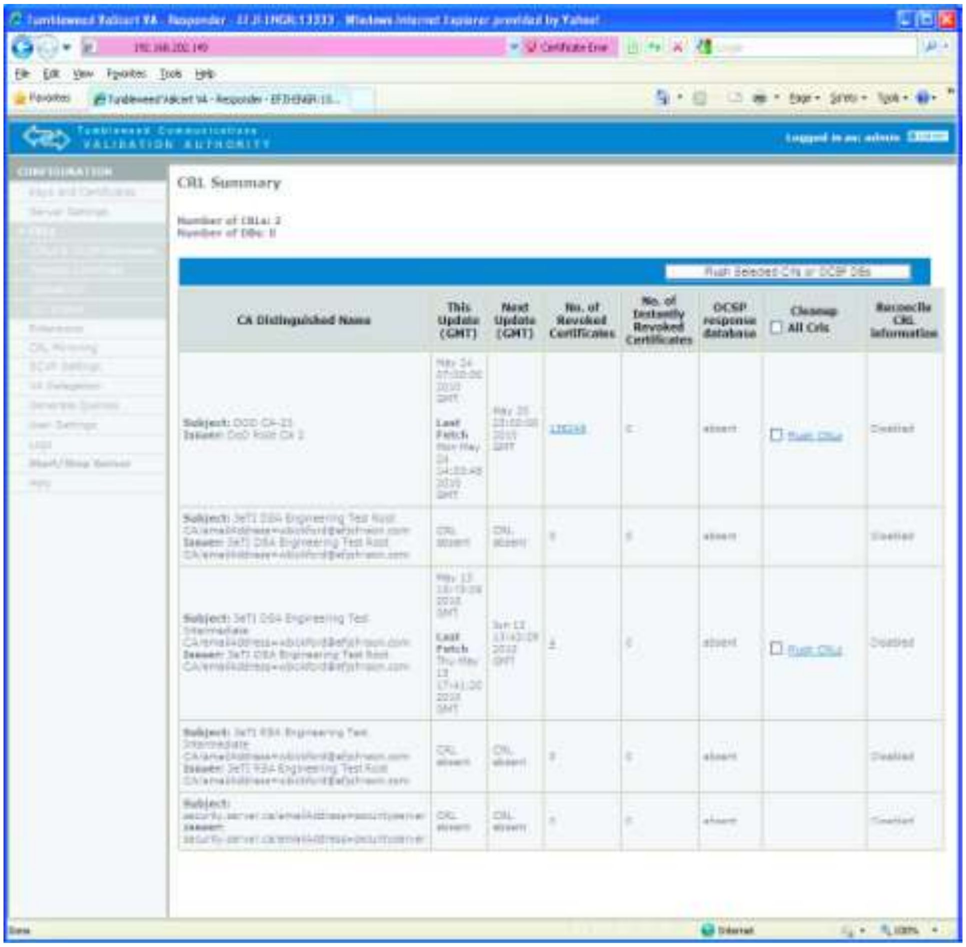
Configure VA Certificate Store

Certificate Store: CA Certificates [OCSP Protocol]
Certificate Count: 5

Select All □	Subject	Issuer	Expiration Date	Action
□	DOD CA-33	DoD Root CA 2	Jan 25 16:36:46 2015 GMT	View
□	3eTI DSA Engineering Test Root CA	3eTI DSA Engineering Test Root CA	May 13 13:40:27 2020 GMT	View
□	3eTI DSA Engineering Test Intermediate CA	3eTI DSA Engineering Test Root CA	May 13 13:40:27 2011 GMT	View
□	3eTI RSA Engineering Test Intermediate CA	3eTI RSA Engineering Test Root CA	Jan 11 20:28:34 2011 GMT	View
□	security.server.ca	security.server.ca	Sep 7 20:24:13 2019 GMT	View

- Navigate to the **CONFIGURATION -> CRLs -> Upload Crl** screen and upload the correct certificate from the local file.
- Navigate to **CONFIGURATION -> CRLs** and OCSP Databases and verify that the certificate is listed as shown in Figure 120.

Figure 120 - OCSP Responder CRLs



CRL Summary

Number of CRLs: 2
Number of DBs: 0

Flush Selected CRLs or OCSP DBs

CA Distinguished Name	This Update (GMT)	Next Update (GMT)	No. of Revoked Certificates	No. of Instantly Revoked Certificates	OCSP response database	Cleanup □ All Crls	Reconcile CRL Information
Subject: DOD CA-21 **Issuer:** DoD Root CA 2	May 24 07:00:00 2010 GMT **Last Fetch** Mon May 24 14:23:48 2010 GMT	May 25 23:00:00 2010 GMT	126249	0	absent	□ Flush CRLs	Disabled
Subject: 3eTI DSA Engineering Test Root CA/emailAddress=[illegible] **Issuer:** 3eTI DSA Engineering Test Root CA/emailAddress=[illegible]	CRL absent	CRL absent	0	0	absent		Disabled
Subject: 3eTI DSA Engineering Test Intermediate CA/emailAddress=[illegible] **Issuer:** 3eTI DSA Engineering Test Root CA/emailAddress=[illegible]	May 13 18:19:28 2010 GMT **Last Fetch** Thu May 13 17:41:20 2010 GMT	Jun 12 13:42:28 2010 GMT	4	0	absent	□ Flush CRLs	Disabled
Subject: 3eTI RSA Engineering Test Intermediate CA/emailAddress=[illegible] **Issuer:** 3eTI RSA Engineering Test Root CA/emailAddress=[illegible]	CRL absent	CRL absent	0	0	absent		Disabled
Subject: security.server.ca/emailAddress=securityserver **Issuer:** security.server.ca/emailAddress=securityserver	CRL absent	CRL absent	0	0	absent		Disabled

Appendix C: Common Criteria Supplement

If the 3e-525A-3 product family is to be operated in a Common Criteria certified environment, the product MUST be inspected upon arrival from 3e Technologies International. If the any of the red tamper-evident tapes indicate that the product or its CDROM sleeve have been opened, the user is not to use the product prior to contacting 3eTechnologies International:

Ultra Electronics, 3eTI
9713 Key West Avenue
Suite 500
Rockville, Maryland 20850 USA

Telephone:	1-800-449-3384
FAX:	1-301-670-6989

Once the product is in the user's possession, it is the responsibility of the user to use and maintain the product and its CDROM in a safe and secure manner as defined within this document. If the user finds any issues of the product and deems that is security related, the user shall contact 3eTI at the address above.

In order to operate the 3e-525A-3 product in a Common Criteria certified environment, the following MUST be carried out.

1. On the System Configuration Operating Mode GUI screen:
   - [FIPS 140-2 Mode] MUST be selected
2. The Administrator's session timeout must be set to a minimum of 10 minutes.

To operate in the Common Criteria environment, the Crypto-Officer and Administrators must enforce the following password policy. That is, all passwords required in the use of the 3e-525A-3 product must:

- have a minimum length of 8 characters,
- contain at least two uppercase characters (A, B, C, …) and two
- lowercase characters (a, b, c, …),
- contain at least two numeric characters (1, 2, 3, …),
- contain at least two special characters,
- have a 30 day expiration date,
- not be a common word, a word in any existing password dictionaries, or a word easily guessed (such as "password").

To operate in the Common Criteria environment, all Crypto-Officers and Administrators responsible for the 3e-525A-3 product must be non-hostile and appropriately trained, and must follow all of the guidance information contained in this document.

To operate in the Common Criteria environment, the 3e-525A-3 product (plus associated clients and the 3e-030-2 as appropriate) shall be installed with appropriate physical security, commensurate with the value of the products and the data contained within.

CryptoOfficer and Administrator have different privileges in managing the device, the table below shows the user-accessible functions and privilege all security parameters under the control of the user, indicating secure values as appropriate each type of security-relevant event relative to the user-accessible functions that need to be performed.

Categories	**Features**	Operators								Parameters	Audit Events
		Crypto Officer				Administrator					
		Show[1]	**Set**[2]	**Add**[3]	**Delete**[4]	**Show**[5]	**Set**[6]	**Add**[7]	**Delete**[8]		
System Configuration											
- Operating Mode	AP / Bridging Mode – FIPS	X	X			X	X			FIPS/Non-FIPS mode	None
	AP / Bridging Mode – Non-FIPS		X			X	X				
Wireless Access Point											
- Security	AES (128-/192-256-bit)	X	X							AES 128 key: 32 hex digits AES 192 key: 48 hex digits AES 256: 64 hex digits	EVT_KEY_GENERATED EVT_KEY_ZEROIZED EVT_ENCRYPT_ALG_CHANGED EVT_STA_ASSOC EVT_SELF_TEST_ACTIVATED
	FIPS 802.11i	X	X							Pre-Shared	EVT_KEY_GENERATED EVT_KEY_ZEROIZED

[1] *The operator can view this setting*

[2] *The operator can change this setting*

[3] *The operator can add a required input. For example: Adding an entry to the MAC address filtering table*

[4] *The operator can delete a particular entry. For example: Deleting an entry from the MAC address filtering table*

[5] *The operator can view this setting*

[6] *The operator can change this setting*

[7] *The operator can add a required input. For example: Adding an entry to the MAC address filtering table*

[8] *The operator can delete a particular entry. For example: Deleting an entry from the MAC address filtering table*

Categories	Features	Operators								Parameters	Audit Events
		Crypto Officer				Administrator					
		Show[1]	Set[2]	Add[3]	Delete[4]	Show[5]	Set[6]	Add[7]	Delete[8]		
										key: 64 hex digits Radius Server IP: valid IPV4 address Shared secret: 10 to 95 characters Backend password: 10 to 95 characters Backend key: 10 to 95 characters	EVT_ENCRYPT_ALG_CHANGED EVT_STA_ASSOC EVT_SELF_TEST_ACTIVATED
Wireless Bridge											
• Encryption	AES (128-/192-256-bit)	X	X							AES 128 key: 32 hex digits AES 192 key: 48 hex digits AES 256: 64 hex digits	EVT_KEY_GENERATED EVT_KEY_ZEROIZED EVT_ENCRYPT_ALG_CHANGED EVT_STA_ASSOC EVT_SELF_TEST_ACTIVATED
	AES_CCMP	X	X		X					32 hex digits	EVT_KEY_GENERATED EVT_KEY_ZEROIZED EVT_ENCRYPT_ALG_CHANGED EVT_STA_ASSOC

Categories	Features	Operators								Parameters	Audit Events
		Crypto Officer				Administrator					
		Show[1]	**Set**[2]	**Add**[3]	**Delete**[4]	**Show**[5]	**Set**[6]	**Add**[7]	**Delete**[8]		
											EVT_SELF_TEST_ACTIVATED
Service Settings											
• SNMP agent	Enable/ Disable Community settings Secure User Configuration System Information	X X X X	X X X X			X X X X	X X X X			None	None
User Management											
• List All Users		X		X	X	X				None	None
• Add New User			X							None	EVT_USER_AUTH_INFO
• User Password Policy	Enable/Disable Policy setting	X X	X X							passwd complexity enable/disable min passwd length: 8 to 30 characters max bad passwd entries 3 to 10 session timeout 3 to 60 minutes max passwd age 30 to 90 days uniqueness	EVT_USER_AUTH_INFO

Categories	**Features**	Operators								Parameters	Audit Events
		Crypto Officer				Administrator					
		Show[1]	**Set**[2]	**Add**[3]	**Delete**[4]	**Show**[5]	**Set**[6]	**Add**[7]	**Delete**[8]		
										depth 3 to 10 characters OSCP enable/disable	
Monitoring / Reports											
• System Log	Date/Time/Message	X			X	X			X	None	None
• Web Access Log		X			X	X			X	None	None
Auditing											
• Log		X				X				None	None
• Report Query		X				X				None	None
• Configuration	Enable/Disable Selectable items	X X	X X							None	EVT_AUDIT_CFG_MOD
System Administration											
• System Upgrade	Firmware Upgrade Local Configuration Upgrade Remote Configuration Upgrade	X X X	X X X							None	None
• Self Tests	Perform Cryptographic algorithm KAT, key error detection test, software integrity check	X	X							None	EVT_SELF_TEST_ACTIVATED
• Factory Defaults		X								None	None
• Remote Logging	Enable/Disable	X	X			X	X			None	EVT_AUDIT_LOG_STATE_CHAN

Categories	**Features**	Operators								Parameters	Audit Events
		Crypto Officer				Administrator					
		Show[1]	**Set**[2]	**Add**[3]	**Delete**[4]	**Show**[5]	**Set**[6]	**Add**[7]	**Delete**[8]		
	Settings	X	X			X	X				GED
• Reboot		X	X			X				None	None