



Installation and Management Guide

Tsunami QB-8100 Series (100 Mbps / 5 Mbps Models) Installation and Management Guide



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Preface

About this Manual

Congratulations on your purchase of **Tsunami QuickBridge 8100**. This manual gives you a jump-start working knowledge on the **QuickBridge 8100** link that can help you build a wireless network backhaul application easily! It describes the QB-8100 device installation and its functions, the technology used, and the recommended methods for configuring and monitoring the device.

Audience

The intended audience for this manual are the Network Administrators who are installing and/or managing this device.

Prerequisites

The reader of this document should have working knowledge of Wireless Networks, Local Area Networking (LAN) concepts, network access infrastructures, and client-server applications.

Related Documents

All other documents are included in CD ROM in both printed (PDF) and online (HTML) formats.

Product Covered in this Guide

Product	Description
Tsunami QB-8150-LNK-100&5 -XX	Two Tsunami QB 8150 Links, 100 & 5 Mbps, MIMO 2x2, 16 dBi Integrated antenna

Organization of this Manual

This manual documents installing and managing of Tsunami QB series. Before installing and using the unit, Proxim recommends you to read the following chapters of this manual:

- **Chapter 1 Overview:** Provides an overview of Tsunami QB-8100 as well as wireless network topologies and combinations that can be built with the unit.
- **Chapter 2 Installation and Initialization:** Provides detailed installation instructions and explains how to access the device for configuration and maintenance.
- **Chapter 3 Basic Configuration:** Provides a high-level overview of system features, explains how to navigate the user interface, and discusses the most common settings for managing the unit.
- **Chapter 4 Advanced Configuration:** Explains the Web Interface's "Configure" options in a hierarchical manner, so you can easily find details about each item.
- **Chapter 5 System Management:** Explains the Web Interface's "Management" options in a hierarchical manner, so you can easily find details about each item to effectively manage the device.
- **Chapter 6 Monitoring the System:** Explains the Web Interface's "Monitor" options in a hierarchical manner, so you can easily find details about each item.
- **Chapter 7 Procedures:** Provides details about the various procedures involved in the operation of the QB-8100 units using the Web interface.
- **Chapter 8 Troubleshooting:** Provides instructions and solutions to solve the issues you may encounter while installing and using the QB-8100 units.

The appendixes contain supplementary information, including frequency domain tables, channel frequency, and Technical Support information.

If you are already familiar with this type of product, you can use the Quick Install Guide to install the unit.

Reference Manual

As a supplement to the Tsunami QB-8100 Series (100 Mbps/5 Mbps Models) Installation and Management Guide, the Tsunami QB-8100 Series (100 Mbps/5 Mbps Models) *Reference Manual* provides the following information:

- **Command Line Interface:** Documents the text-based configuration utility's keyboard commands and parameters.
- **MIB Browser for SNMP Interface:** Provides information and instructions on using the MIB Browser in Snmpv1-V2c and Snmpv3.
- **Event Log Error Messages:** Documents the error messages that you may see in the Event Log.
- **System Alarm Traps:** Documents the alarm traps that you can set for alarm notification.
- **Microsoft Windows IAS Radius Server Configuration:** Provides information to assist you in setting up the IAS Radius Server.
- **Glossary:** Describes terms used in the Tsunami QuickBridge 8100 documentation and in the wireless industry.

Overview

This chapter provides a description of the Tsunami QB-8100 Series (100 Mbps/5 Mbps Models), its functionalities, and features.

It covers the following topics:

- [Introduction](#)
- [Wireless Network Topology \(Point-to-Point Link\)](#)
- [Multiple-Input-Multiple-Output \(MIMO\)](#)
- [Management and Monitoring Capabilities](#)

1.1 Introduction

The Tsunami QuickBridge 8100 is a wireless point-to-point device designed to provide wireless networking solutions for enterprises and small business markets. Two pre-configured bridges enable users to easily, quickly, and economically install a wireless extension between two locations, eliminating the need for costly leased line or cable alternatives.

The product's primary components are a wireless device and a Power-over-Ethernet injector. The wireless device, which is encased in an outdoor rated weatherproof container, has an integrated antenna or external antenna connectors and can be mounted to the side of a building, on a pole, or on a tower structure.

Power and Ethernet connections must be supplied through a UV-protected CAT5 cable (not supplied) attached to a Power-over-Ethernet (PoE) injector. The PoE injector should be located either in an outdoor rated weatherproof enclosure located near the device or inside a building. The device can then be connected to a switch or hub on your network or directly to a PC.

Some of the key features of the QuickBridge 8100 series include:

- High power 2x2 MIMO radio
- Highly optimized WERP (Wireless Outdoor Routing Protocol) for outdoor applications
- Asymmetric bandwidth management
- Management through a Web Interface, a Command Line Interface (CLI), or Simple Network Management Protocol (SNMP)
- Software and configuration upgrade through HTTP/TFTP file transfer
- Outdoor placement for significantly improved range and ease of installation
- 5 GHz 2x2 MIMO integrated antenna versions for flexible deployment
- VLAN Support
- QoS based on IEEE 802.16e

1.2 Wireless Network Topology (Point-to-Point Link)

It is easy to set up a wireless point-to-point link as depicted in the following figure. Each device is set up as either an End Point A or an End Point B.



Figure 1-1 Wireless Network Topology (Point-to-Point-Link)

With a point-to-point link, you can set up a connection between two locations as an alternative to:

- Leased lines in building-to-building connections
- Wired Ethernet backbones between wireless access points in difficult-to-wire environments.

1.3 Multiple-Input-Multiple-Output (MIMO)

Multiple-Input-Multiple-Output (MIMO) is a smart antenna technology that offers tremendous performance gains for wireless devices at relatively low cost. The underlying technology of the QB-8100 radios are based on a combination of MIMO and OFDM. High performance OFDM-MIMO radio combination enhances robustness using multiple transmitters and receivers, allowing the QB-8100 units to completely take advantage of this antenna technology. In real-world environments, signals reflect from various objects to reach the receiving antenna, hence a signal follows different distances before being received. This phenomenon is called multipath propagation and causes interference and fading in non-MIMO radios. On the receiver side, having multiple receivers increases the amount of received power and also reduces multipath problems by combining the received signals for each frequency component separately. Hence, MIMO significantly improves the overall gain.

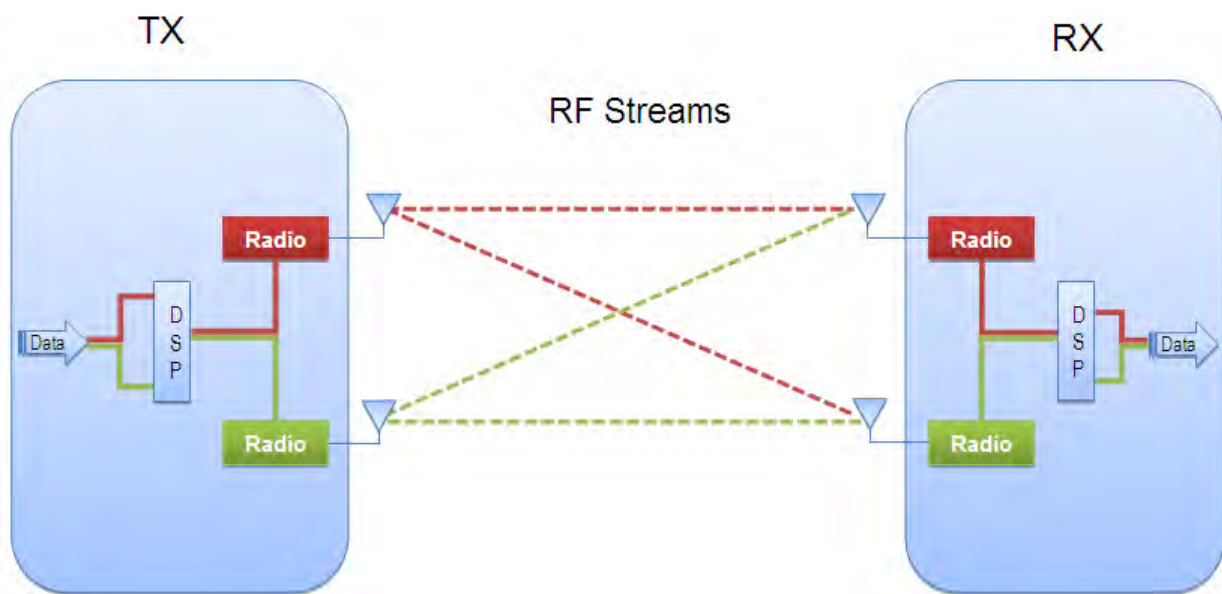


Figure 1-2 2x2 MIMO

1.4 Management and Monitoring Capabilities

The network administrators can use the following management and monitoring interfaces to configure and manage the Tsunami QB-8100 unit:

- Web Interface
- Command Line Interface
- SNMP Management

1.4.1 Web Interface

The Web interface (HTTP) provides easy access to configuration settings and network statistics from any computer on the network. You can access the Web interface over your network, over the Internet, or with an Ethernet cable connected directly to your computer's Ethernet port. See [Logging in to the Web Interface](#) for more information.

1.4.2 Command Line Interface

The Command Line Interface (CLI) is a text-based configuration utility that supports a set of keyboard commands and parameters to configure and manage the QB-8100 devices. You can enter command statements composed of CLI commands and their associated parameters. You can enter commands from the keyboard for real-time control or from scripts that automate configuration. See the *Tsunami QB-8100 Reference Manual* for more information about the Command Line Interface.

1.4.3 SNMP Management

In addition to the Web interface and the CLI, you also can use Simple Network Management Protocol (SNMP) to manage and configure the QB-8100 devices. Note that this requires an SNMP manager program (sometimes called MIB browser) or a Network Manager program using SNMP. The devices support several Management Information Base (MIB) files that describe the parameters that can be viewed and configured using SNMP:

1. PXM-SNMP.mib (Enterprise MIB)
2. RFC-1213.mib (MIB-II)
3. RFC-1215.mib (Trap MIB)
4. RFC-2790.mib (HOST-RESOURCES-MIB)
5. RFC-2571.mib (SNMP-FRAMEWORK-MIB)
6. RFC-3412.mib (SNMP-MPD-MIB)
7. RFC-3414.mib (SNMP-USER-BASED-SM-MIB)

The PXM MIB files are available on the Proxim Web site. You must compile one or more of these MIB files into your SNMP program's database before you manage your device using SNMP. See the documentation that came with your SNMP manager for instructions about how to compile MIBs.

NOTE: *When you update the software in the device, you must also update the MIBs to the same release. Because the parameters in the MIB may have changed, you will not otherwise have full control over the features in the new release.*

The enterprise MIB (PXM-SNMP.mib) defines the **Read and Read/Write** objects you can view or configure using SNMP. These objects correspond to most of the settings and statistics that are available with other management interfaces. See the enterprise MIB for more information. The MIB can be opened with any text editor, such as Microsoft Word, Notepad, and WordPad. See SNMP Parameters in the [Services: Configuring the Passwords](#) section.

IMPORTANT!

Using a serial connection, you can access the CLI of the device through a terminal emulation program, such as HyperTerminal. (See "HyperTerminal Connection Properties" in the *Tsunami QuickBridge 8100 Reference Manual*.)

For all other modes of connection, you will need the IP address of the device to use the Web Interface, SNMP, or the CLI via telnet.

CAUTION!

For Regulatory Information and latest product updates, including firmware and the MIBs, Proxim recommends visiting the Proxim Support site at <http://support.proxim.com>.

IMPORTANT!

This user guide discusses installing the device and managing it using the Web interface only. For information on managing the device via the CLI, see the *Tsunami QuickBridge 8100 Reference Manual*.

Installation and Initialization

2

This chapter describes the steps required to install and mount the QuickBridge 8100 Series units. If you are already familiar with this type of product, refer to the *Tsunami QB-8100 Quick Installation Guide* for streamlined installation procedures.

This chapter covers the following topics:

- [Hardware Overview](#)
- [Product Package](#)
- [Installation Procedure](#)
 - [Step 1: Plan for Installation](#)
 - [Step 2: Choose a Location](#)
 - [Step 3: Gather Required Tools](#)
 - [Step 4: Unpack the Product Package](#)
 - [Step 5: Assemble the Cable](#)
 - [Step 6: Mount the Unit](#)
 - [Step 7: Plug in the Cables](#)
 - [Step 8: Ground the Unit](#)
 - [Step 9: Power on the Unit](#)
 - [Step 10: View LEDs](#)
- [Initialization](#)
 - [ScanTool](#)
 - [Setting the IP Address with ScanTool](#)
- [Logging in to the Web Interface](#)
- [Factory Default Configuration](#)

2.1 Hardware Overview

The Tsunami QB-8100 Series (100 Mbps/5 Mbps Models) is a full-featured outdoor QuickBridge Endpoint that contains a high power radio unit in plastic enclosure with dual polarized, high gain performance, integrated antenna.

The unit is designed to be mounted to a pole of 1.25" - 3" diameter (not included) using the supplied pole mount bracket accessories (P/N 909-00001). An optional universal wall mounting bracket is also available from Proxim (P/N 77537); this kit is designed to mount directly to a flat surface such as a roof, wall, or under an eave.

The QB-8100 unit has an ethernet port with auto-sensing 10/100 BASE-T with configurable Tx Modes and Speeds. The unit is powered through Power-over-Ethernet via a PoE injector, and is equipped with bi-color LEDs on the ethernet connector.

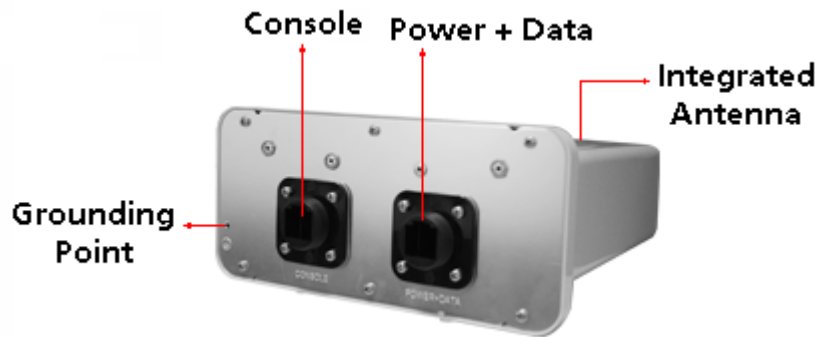


Figure 2-1 QB-8100 Hardware

2.1.1 Power-over-Ethernet

The QB-8100 unit is equipped with a Power-over-Ethernet (PoE) injector module which provides power through a PoE injector. Using PoE injector, you can provide electricity and wired connectivity to the unit over a single Category5 cable.

- The PoE injector integrated module receives 48 VDC over a standard Cat5 Ethernet cable.
- Maximum power supplied to the QB-8100 unit is 19 Watts. The units typically draw less than 13.8 Watts.
- You must have a PoE injector connected to the network to use PoE. The injector is not a repeater and does not amplify the Ethernet data signal.
- If connected to a PoE DC Injector and an AC power supply simultaneously, the radio draws power from PoE.
- The cable length between the PoE DC Injector and the radio should not exceed 100 meters (approximately 325 feet).

Recommended Cable	
Function	Power (DC) and Ethernet connection
Type	Cat5 UV-shielded and outdoor-rated
Impedance	100 ohms
Recommended cables	STP, 24 AWG, UL rated
Maximum Distance	330 feet / 100 meters
Connector type, device end	Shielded RJ45 female, weatherized using weatherproof connector
Connector type, power & Ethernet adapter end	Shielded RJ45

NOTE: The total length of cabling between the PC and the QuickBridge units cannot exceed 100 meters, which includes both the cable from the PC to the power injector and the cable from the power injector to the QuickBridge unit. Due to DC power requirements, the maximum cable length between the power injector and the QuickBridge units is 75 meters.

2.1.2 Serial Connection

The serial connection is made with an RJ11 to DB9 connector (also referred to as a “dongle”). Connect the RJ11 end to the unit and connect the serial (DB9) end to your PC to align the antenna and to enter CLI commands.

See the following figure:

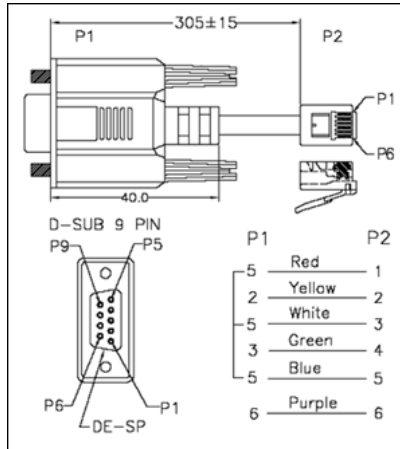


Figure 2-2 Serial Components

The connections are as follows:

D-Shell	RJ11
1	NC
2	2
3	4
4	NC
5	1 + 3 + 5
6	6
7	NC
8	NC
9	NC





2.2 Product Package

The product’s shipping boxes should be left intact and sheltered until arrival at the installation site. Carefully unpack the QuickBridge 8100 Series (100 Mbps/5 Mbps Models) shipment and check for any shipping damage or missing parts.

Each shipment includes the items listed in the following table. Verify that you have received all parts of the shipment.

NOTE: Cables are not supplied with the unit.

What’s in the Kit	Image
Units	

What's in the Kit	Image																		
Power Injector & Power Cord																			
Connector Weather Proofing Kit	 <p data-bbox="1024 474 1195 499">For Ethernet Port</p> <p data-bbox="1024 541 1195 567">For Console Port</p>																		
Grounding Kit																			
Pole Mounting Kit and Hardware	<p data-bbox="639 751 1097 781">The mounting kit includes the following:</p> <table border="0"> <thead> <tr> <th data-bbox="711 821 824 850">Quantity</th> <th data-bbox="841 821 1065 850">Component Name</th> <th data-bbox="1081 821 1159 850">Image</th> </tr> </thead> <tbody> <tr> <td data-bbox="711 898 769 928">2 ea.</td> <td data-bbox="841 898 992 928">M6-16 Screw</td> <td data-bbox="1081 898 1243 989">  </td> </tr> <tr> <td data-bbox="711 1066 769 1096">2 ea.</td> <td data-bbox="841 1066 1052 1096">M6 Spring Washer</td> <td data-bbox="1081 1052 1219 1108">  </td> </tr> <tr> <td data-bbox="711 1178 769 1207">2 ea.</td> <td data-bbox="841 1178 1032 1207">M6 Plain Washer</td> <td data-bbox="1081 1163 1203 1220">  </td> </tr> <tr> <td data-bbox="711 1297 769 1327">2 ea.</td> <td data-bbox="841 1297 976 1327">Hose Clamp</td> <td data-bbox="1081 1283 1317 1339">  </td> </tr> <tr> <td data-bbox="711 1402 769 1432">1 ea.</td> <td data-bbox="841 1402 1045 1432">Mounting Bracket</td> <td data-bbox="1081 1381 1195 1472">  </td> </tr> </tbody> </table>	Quantity	Component Name	Image	2 ea.	M6-16 Screw		2 ea.	M6 Spring Washer		2 ea.	M6 Plain Washer		2 ea.	Hose Clamp		1 ea.	Mounting Bracket	
Quantity	Component Name	Image																	
2 ea.	M6-16 Screw																		
2 ea.	M6 Spring Washer																		
2 ea.	M6 Plain Washer																		
2 ea.	Hose Clamp																		
1 ea.	Mounting Bracket																		
Quick Installation Guide																			

2.3 Installation Procedure

This section describes the procedures to install and mount the QB-8100 unit. If you are already familiar with this type of product, you can use the Quick Install Guide for streamlined installation procedures.

IMPORTANT

This device must be installed by a trained professional, value added reseller, or systems integrator who is familiar with RF planning issues and the regulatory limits.

CAUTION!

Heed all the WARNINGS. Follow all the instructions. Do not defeat the safety purpose of the grounding. Only use attachments/accessories specified by the manufacturer.

CAUTION!

There are no user-serviceable parts inside. All services must be performed by qualified personnel.

CAUTION!

For Regulatory Information and latest product updates, including firmware and the MIBs, Proxim recommends visiting the Proxim Support site at <http://support.proxim.com>

NOTE: *Equipment is to be used with, and powered by, the power injector provided with the product package or by a power injector that meets the following requirements:*

- *UL-Listed/ITE (NWGQ)*
- *Limited Power Source Output per UL/IEC 60950*
- *CE-marked*
- *Approved for Power-over-Ethernet*
- *Rated output, 48 VDC/0.40 A*

See the following steps for installation instructions:

Step 1: Plan for Installation

There are several planning factors to be considered before installing the QuickBridge 8100 unit. In addition to selecting the installation site, you should do the following:

Calculate:

- Required RSL and fade margin to achieve availability objectives
- Required path availability
- Anticipated Multi-Path Reflection Points

Determine:

- System Frequency Plan
- Required Transmission Line Types and Lengths

Plan for:

- Device's continuous power consumption needs
- Lightning protection and system grounding
- Hardware mounting
- Cable installation including egress
- Pre-testing equipment (back-to-back test procedure)

Step 2: Choose a Location

To make optimal use of the device, you must find a suitable location to install the hardware. The range of the radio device largely depends upon the position of the antenna. Proxim recommends you do a site survey, observing the following requirements, before mounting the hardware.

- The location must allow easy disconnection of power to the radio if necessary.
- Ensure free flow of air around the hardware.
- The radio device must be kept away from vibration and excessive heat.
- The installation must conform to local regulations at all times.

Step 3: Gather Required Tools

You should have the following tools available before installing the QuickBridge 8100 units:

- Phillips (cross-tip) screwdrivers
- Large blade standard screwdriver
- Spanner 10
- Wire crimpers (if using connectors that are not pre-made)
- Weatherproofing material for sealing external connectors (such as butyl tape)

NOTE: The total length of cabling between the PC and the QuickBridge units cannot exceed 100 meters, which includes both the cable from the PC to the power injector and the cable from the power injector to the QuickBridge unit. Due to DC power requirements, the maximum cable length between the power injector and the QuickBridge units is 75 meters.

Step 4: Unpack the Product Package

1. Unpack the device and accessories from the shipping box.
2. Note the Ethernet and MAC addresses of the unit as well as the serial number. These addresses may be used when configuring the unit.

NOTE: The serial number is required to obtain support from Proxim. Keep this information in a safe place.

Step 5: Assemble the Cable

To assemble the ethernet cable and weather proof the RJ45 connector,

1. Slide the lock nut (3) and sealing cap (2) over the bare end of a Cat5 ethernet cable (1) as shown in figure below:



Cat 5 cable with bare end



Lock nut and sealing cap



Lock nut and sealing cap with the Cat 5 cable

2. Terminate the Cat5 ethernet cable and crimp it with a standard RJ-45 connector (4). Tighten the sealing cap and lock the nut.



3. Insert the assembled ethernet cable into the **POWER + DATA** port of the QB-8100 unit.



Figure 2-3 Assembled Cable with the Unit

Step 6: Mount the Unit

QB-8100 Units must always be mounted with all access ports of the integrated antenna pointed straight down to achieve horizontal and vertical polarization.

To pole mount the QB-8100 unit, perform the following steps:

1. Ensure that the pole intended for installation is securely attached to a solid base.
2. Attach the mounting bracket (1) to QB-8100 unit with the provided screws and washers as shown below:



NOTE: Slide the M6-16 screw through the M6 Spring washer first and then through M6 plain washer. Misplacement of the washers may cause damage to the enclosure.



- Slide the hose clamps (2) through the mounting bracket and place the hose clamps around the pole as shown below:



- Insert the end of the hose clamps into the fastening clip and tighten the screw as shown below:



NOTE: Do not over tighten the screws at this stage, as the unit may need adjustment to obtain good signal strength.

An optional universal wall mounting kit bracket is also available from Proxim (P/N 77537); this kit is designed to mount the unit directly to a flat surface such as a roof, wall, or under an eave.

Step 7: Plug in the Cables

1. Plug one end of Cat5 Ethernet cable (5.5 mm/.217 in OD maximum; not supplied) into the Ethernet (RJ45) jack of the Ethernet interface inside the unit enclosure. Ensure that the cable connector is latched securely. You can hear a click sound when the cable connector latches into the jack, then tighten the sealing nut by hand.
2. Connect the other end of the Cat5 cable to the “**LAN+DC**” port on the power injector.

NOTE: Proxim recommends to use the supplied PoE injector.



Figure 2-4 PoE Injector

WARNING: Connect network devices only into the “**LAN**” port of the Power injector. The “**LAN+DC**” port is meant to power the QB-8100 unit.

3. To connect the QB-8100 unit directly to a PC, connect an **Ethernet cable** between the network interface card in the PC and the RJ45 “**LAN**” port on the power injector.
4. To connect the QB-8100 unit through a hub or a switch to a PC, connect an Ethernet cable between the network interface card in the PC and the hub. Connect another ethernet cable between the hub and the RJ45 “**LAN**” port on the PoE injector.

NOTE: The unit auto-detects the cable type so straight or crossover ethernet cable can be used, provided the device at the termination end has auto detection capability.

Step 8: Ground the Unit

To ensure proper grounding, use the ground point which is situated at the bottom corner of the unit and the grounding screw (M3 thread size) provided to attach a ground wire of at least 12 AWG stranded to the unit. It is important that the following ground guidelines are followed during installations:

1. Connect one end of the grounding cable to the QB 8100 unit as shown in the figure below and the other end to the closest earthing system point at the installation.
2. Cut any extra ground wire length when finished connecting it to the single point earth ground.
3. Avoid sharp bends and never loop or coil up the ground wire, always connect it straight to ground.
4. A good earth ground impedance is less than 1.0 ohm.
5. Measure ground impedance at the point where the protector ground wire is connected and not at the ground rod.
6. Connect the protector ground wire and equipment ground (both power ground and telecomm ground) to a single common ground.
7. Make sure all connections are fastened securely and are tight.
8. Never install during a storm and always follow your local safety codes.

Connect the grounding wire, which is supplied with the product package, to the grounding lug as shown below:

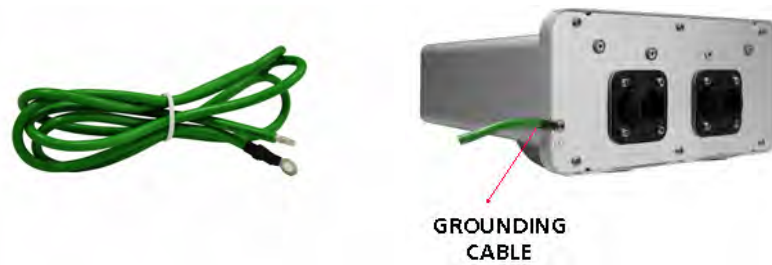


Figure 2-5 Grounding the Unit

Step 9: Power on the Unit

Plug in the power cord into a power outlet after having connected the Power Injector and the Radio device using Cat5 cable. There is no ON/OFF switch on the unit. To disconnect power, unplug the RJ45 connector from the “LAN+DC” port on the power injector.

Step 10: View LEDs

When the device is powered on, it performs startup diagnostics. When startup is complete, the LEDs show the unit's operational state. The LEDs are available at the unit's Ethernet connector inside the enclosure. You can see the LEDs through the ethernet connector. The LEDs will not be visible when the weather sealing caps are installed.



Figure 2-6 View LEDs

The following table describes the status of LEDs and the corresponding operational state of the device:

LED State	Ethernet Interface	
	Power/Ethernet LED	Wireless LED
Off	No Power	Radio is not present or failed to detect
Amber	No Application Image detected (In Bootloader CLI/Scantool mode)	Power is on and unit detects Reload signal
Blinking Green	Power is on and the Ethernet link is down	Radio is detected but wireless link has not been established yet
Solid Green	Power is on and the Ethernet link is up	Radio is detected and wireless link has been established

NOTE: All the LEDs will blink during initialization.

2.4 Initialization

Connecting to the device requires either:

- A direct connection with a serial RS-232 cable.
- A direct connection with an Ethernet cable or a network connection.

Connecting with the Ethernet cable allows you to use of the Web Interface and SNMP in addition to the CLI. Connecting with a serial connection allows you to configure and manage the device with the CLI.

Using a serial connection, you can access the device through a terminal emulation program, such as HyperTerminal. (See "HyperTerminal Connection Properties" in the *Tsunami QB-8100 Reference Manual*.)

For all other modes of connection, you will need the IP address of the device to use the Web Interface, SNMP, or the CLI. Because each network is different, an IP address suitable for your network must be assigned to the unit. You must have this IP address to configure and manage the device through its Web Interface, SNMP, or Telnet/CLI. The device can use either a **static** or **dynamic** IP address. The device obtains its IP address automatically through DHCP (dynamic IP address); or else, you must set the IP Address manually (static IP address).

2.4.1 ScanTool

ScanTool is a software utility that runs on Microsoft Windows machines and is included in the installation CD-ROM within the device package. Using ScanTool, the IP address assigned to the device can be obtained and, if required, can be changed to the IP address that is appropriate for the network. The tool automatically detects the devices installed in the network segment, regardless of IP address, and enables the configuration of each device's IP settings.

To access the HTTP interface and configure the device, the device must be assigned an IP address, which is valid on its Ethernet network. By default, the device is configured with the IP address 169.254.128.132. In case of QB, by default, the End Point A is configured as 169.254.128.132 and End Point B is configured as 169.254.128.131.

Using ScanTool, you can

- Launch the Web interface
- Scan devices which can respond to the Scantool
- Modify the assigned IP address
- Switch between the network adapters, if there are multiple network adapters in the system

NOTE: *The user may need to disable Windows Farewell for ScanTool to function or to detect the radio.*

2.4.2 Setting the IP Address with ScanTool

To initialize the scan tool

1. Power up or reset the device.
2. Run ScanTool on a computer connected to the same LAN subnet as the device, or a computer directly connected to the device with a cross-over Ethernet cable.
3. ScanTool scans the subnet and displays a list of detected devices in the Scan List.

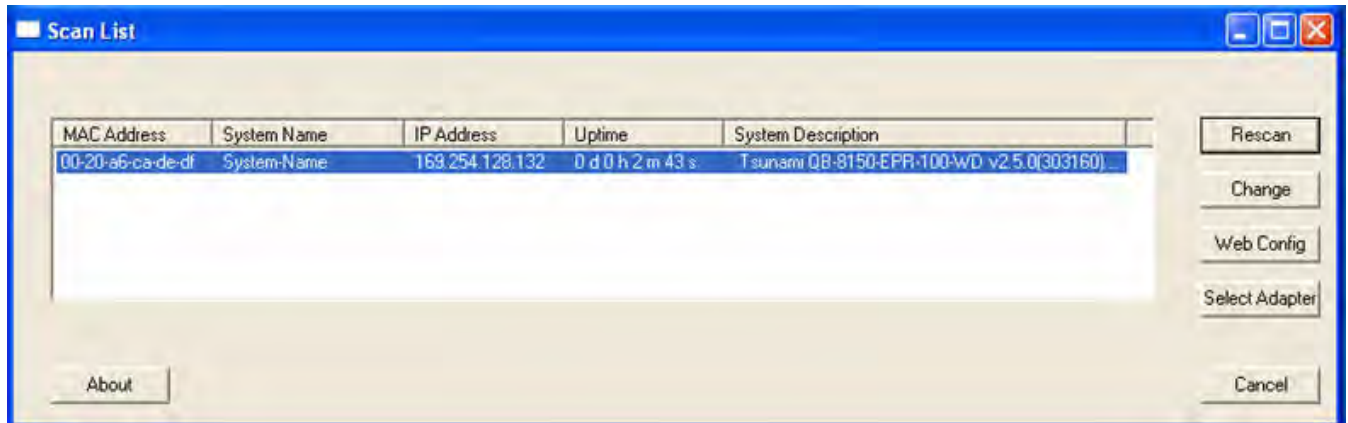


Figure 2-7 Scan List

NOTE: If your computer has more than one network adapter installed, it prompts you to select the adapter for the ScanTool before the Scan List appears. If prompted, select the ethernet adapter and click **OK**. You can change your adapter setting whenever necessary by clicking **Select Adapter** on the Scan List screen.

- If your device details do not appear in the Scan List, click **Rescan** to update the display. Note that after rebooting the device, it may take up to five minutes for the device details to appear in the Scan List. If the device details still do not appear in the list, see [Troubleshooting](#) for suggestions.

2.4.3 Modifying the IP Address

Select the device details from the scan list and click **Change**. A **Change** screen appears as shown in the following figure. The system automatically generates the **MAC address**, **System Name**, **TFTP Server IP Address** and **Image File Name** of the unit. These details can be changed only through Web Interface.

Change

MAC Address: 00-20-a6-ca-de-e0

Name: System-Name

IP Address Type: Static Dynamic

IP Address: 169.254.128.132

Subnet Mask: 255.255.255.0

Gateway IP Address: 169.254.128.132

TFTP Server IP Address: 169.254.128.133

Image File Name: imagename

Read/Write Password:

Web Configuration OK Cancel

Figure 2-8 Modifying the IP Address

2.4.3.1 Assigning the IP Address Manually

1. Select the **IP Address Type** as **Static** and then enter the appropriate **IP Address**, **Subnet Mask**, and the **Gateway IP Address** parameters.
2. Enter the SNMP Read/Write password in the **Read/Write Password** field. By default, it is **public**.
3. Click **OK** to save the details.

The device automatically reboots after clicking **OK**.

By clicking **Rescan**, verify whether the changes are applied or not. Then, click **Web Configuration** to open the web interface.

2.4.3.2 Assigning the IP Address Dynamically

NOTE: Before setting the IP Address Type as **Dynamic**, ensure there is a DHCP server in the network.

1. Select the **IP Address Type** as **Dynamic**. The **IP Address**, **Subnet Mask** and the **Gateway IP Address** fields get disabled.
2. Enter the SNMP Read/Write password in the **Read/Write Password** field. By default, it is **public**.
3. Click **OK** to save the details.

The device automatically reboots after clicking **OK**. By clicking **Rescan**, verify whether the changes are applied or not. Then, click **Web Configuration** to open the web interface.

2.5 Logging in to the Web Interface

Once the device is connected to your computer, use a web browser to configure and monitor the device. Enter `http://169.254.128.132` (the device default IP address) in the address bar.

The user is prompted to enter the username and password to access the wireless device.

The default User Name is **admin** and Password is **public**.

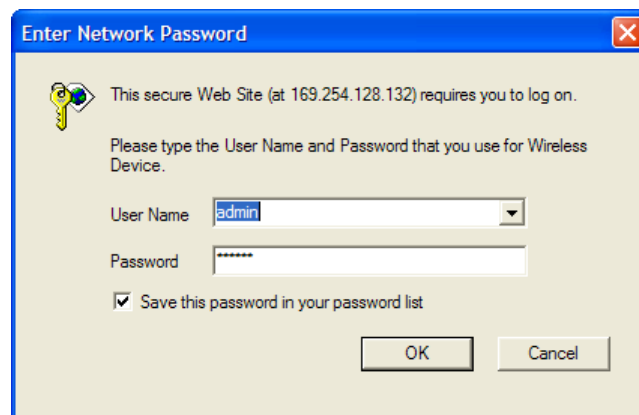


Figure 2-9 Login Page

NOTES:

- Depending on the settings made during the device initialization, the IP address may be either a dynamic IP address assigned by a network DHCP server or a static IP address which is manually configured. Refer to [ScanTool](#) for information on how to determine the device's IP address and manually configure a new IP address.
- If the connection is slow or unable to connect, use the Internet Explorer **Tools** option to ensure that you are not using a proxy server for the connection.

- If you are unable to log into the configuration pages by using default user name and password, please check with the administrator or follow [Forced Reload](#) procedures.
- For security purposes, it is recommended to change **Password** from the default “public” immediately to restrict unauthorized access to the device.
- If you enter wrong password consecutively for three times, the HTTP session will get disconnected.

2.5.1 System Summary

Upon successful login, the system summary of the device is displayed on the screen. The system summary mainly displays the general information and current state of the system, such as System Name, IP Address, Interface Status, and Event Log.

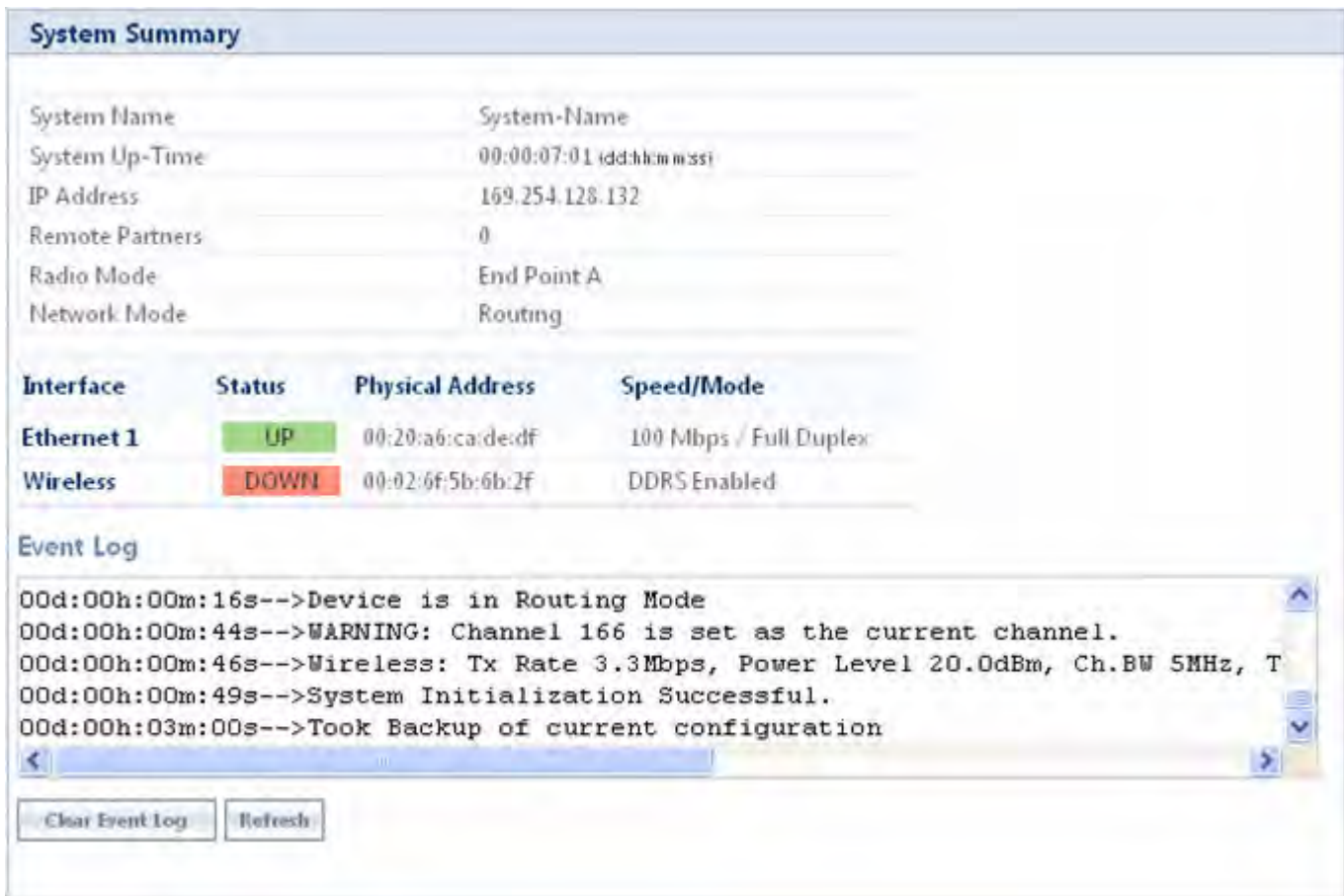
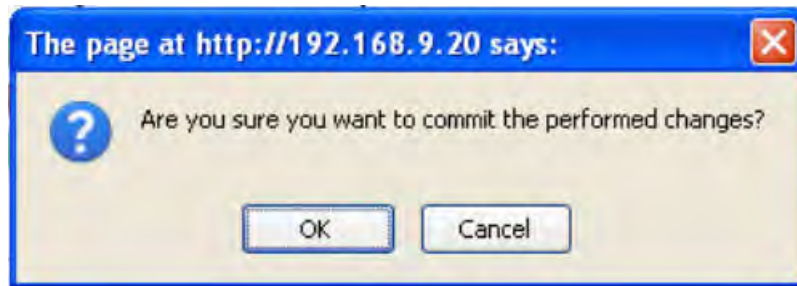


Figure 2-10 System Summary Page

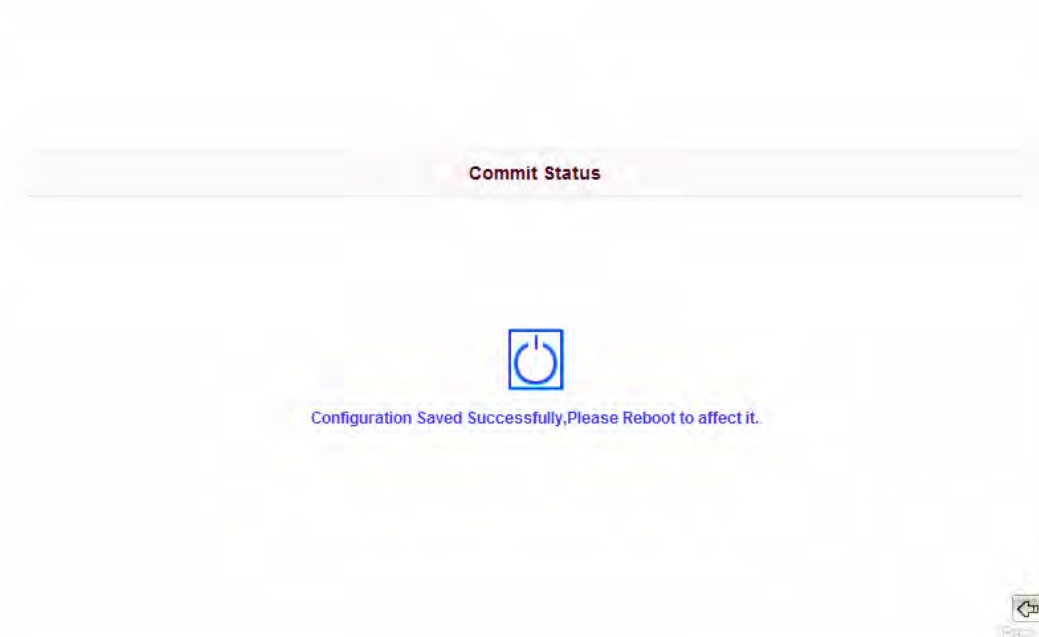
2.5.2 COMMIT Button

Commit button is used to apply the configuration changes into the unit. When changes are made to the configuration parameters of the device, the changes will not take effect, until the COMMIT button is clicked. Some parameters may require system reboot for the changes to take effect. On clicking COMMIT, the system evaluates all the configuration dependencies and displays the configuration status.

Before applying commit, the system displays a confirmation message, as shown in the following figure:



In some cases, upon successful **COMMIT** operation, a message "**Please Reboot to take effect**" appears as follows:



2.5.3 REBOOT Button

Reboot operation is required for any change in the key parameters to take effect. For example, settings such as configuring the Radio Mode, IP Address, and Network Mode need reboot to take effect.

It is recommended that the device must be rebooted immediately after modifying a rebootable parameter. System displays a confirmation window, wherein click **OK**.

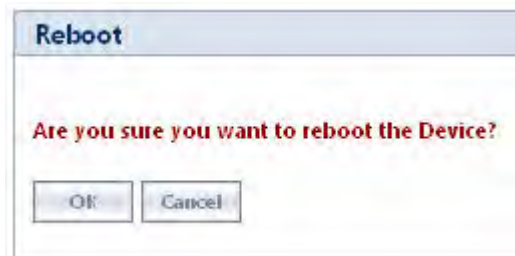


Figure 2-11 Reboot

NOTES:

- *It is always mandatory to commit the changes before **REBOOT**, otherwise the changes will not take effect.*
- *The **System Summary** can be viewed by clicking **HOME**.*
- *The Event Log can be cleared by clicking **Clear Event Log** and can be refreshed by clicking **Refresh**.*

An error message appears when a parameter is configured with inappropriate value. This error message prompts you to verify your data or warns you to correct the pathway.

2.6 Factory Default Configuration

Parameter	Default
Network Mode	Bridge
Routing	Disabled
WORP Network Name	MY_NETWORK
Password	public
IP Address Assignment Type	Static
IP Address	169.254.128.132
Subnet Mask	255.255.255.0
Registration Timeout	10
Network Secret	public
SNMP Management Interface	Enabled
Telnet Management Interface	Enabled
HTTP Management Interface	Enabled
MAC Authentication	Disabled
Radius Authentication	Disabled
Input Bandwidth Limit (in Kbps)	As per license
Output Bandwidth Limit (in Kbps)	As per license
QoS	Unlimited BE
Filtering	Disabled
DHCP Server	Disabled
DHCP Relay	Disabled
RIP	Disabled
NAT	Disabled

Basic Configuration

This chapter provides an overview of the basic configuration settings of Tsunami QB-8100 (100 Mbps/5 Mbps Models).

It covers the following topics:

- [Country and Related Settings](#)
- [Dynamic Frequency Selection \(DFS\)](#)
- [Transmit Power Control](#)
- [Pairing the End Points or setting up a QB Link](#)
- [Virtual Local Area Networks \(VLANs\)](#)
- [Quality of Service \(QoS\)](#)
- [Basic Configuration Information](#)

3.1 Country and Related Settings

The unit's **Advanced Configuration** window provides a frequency domain field that automatically provides the allowed bandwidth and frequencies for the selected country.

Units sold in the United States are pre-configured to scan and display only the outdoor frequencies permitted by the FCC. No other country can be configured. Units sold outside of the United States support the selection of a country by the professional installer using frequency domain.

NOTE: *Non-US installers should not add an antenna system until the Country is selected, the device is rebooted, and the proper power level is configured. The Transmit Power Control (TPC) feature can be used to reduce the power when required.*

The Dynamic Frequency Selection (DFS) feature is enabled automatically when you choose a country and band that require it. Refer to [Frequency Domains and Channels](#) for information on which bands need DFS.

3.2 Dynamic Frequency Selection (DFS)

The Tsunami QB-8100 supports Dynamic Frequency Selection (DFS) for FCC, IC, and ETSI regulatory domains per FCC Part 15 Rules for U-NII devices, IC RSS-210, and ETSI EN 301-893 regulations, respectively. These rules and regulations require that the devices operating in the 5 GHz band must use DFS to prevent interference with radar systems.

DFS is required for three purposes:

- 1. Radar avoidance both at startup and while operational.** To meet these requirements, the End Point A scans available frequencies at startup. If a DFS-enabled channel is busy or occupied with radar, the system will blacklist the channel for a period of 30 minutes in accordance with FCC, IC, and ETSI regulations. Once fully operational on a frequency, the End Point A actively monitors the occupied frequency. If interference is detected, the End Point A blacklists the channel, logs a message and rescans to find a new frequency that is not busy and is free of radar interference.

Radar detection is performed by both End Point A and End Point B. When an End Point B is set to a country/band in which DFS is used, it passively scans all available channels upon startup looking for a End Point A that best matches its connection criteria (such as End Point A Node System Name, Network Name, and Shared Secret). The End Point B connects to the End Point A automatically on whatever frequency the End Point A has selected. Because of this procedure, it is best to set up the End Point A and have it fully operational before installing the End Point B, although this is not required. If an End Point A rescans because of radar interference, the End Point B loses its wireless link. The End Point B waits for 30 seconds and if it finds that it could not receive the End Point A in this amount of time, it rescans the available frequencies for an available End Point A.
- 2. Guarantee the efficient use of available frequencies by all devices in a certain area.** To meet this requirement, the End Point A scans each available frequency upon startup and selects a frequency based upon the least amount of noise and interference detected. This lets multiple devices operate in the same area with limited interference.
- 3. Uniform Channel Spreading.** To meet this requirement, the End Point A randomly selects operating channel from the available channels with least interference. If the channel is occupied by radar, the device blacklists that channel and scans other available channels for the one with least interference. This implements the Uniform Channel Spreading requirement by automatically selecting the channel with least interference.

NOTE: *If the Preferred Channel is configured, the device begins by scanning that channel. This allows the installer to manually select a channel with least interference from a channel plan.*

End Point A

Dynamic Frequency Selection (DFS) is enabled automatically based on the selected frequency domain. The device selects a channel to operate as follows:

If ACS is disabled, during initialization, the device selects the Preferred Channel to be the operational channel. If ACS is enabled, during initialization, the device scans all the channels in the configured frequency domain and selects the channel with the best RSSI to be the operational channel.

Once the operating channel is selected, the device scans the channel for radar presence for a duration of Channel Wait Time. If no radar is detected, the device starts operating in that channel. If radar is detected, the channel is blacklisted for 30 minutes and a different channel is selected. To select the next operational channel, the device scans all non-blacklisted channels and selects the channel with best RSSI.

At any point of time, if Radar is detected on the current operating channel, the device blacklists that channel and scans all non-blacklisted channels and selects the channel with best RSSI.

NOTE: *Scanning is performed only on the frequencies allowed in the regulatory domain of the frequency/band selected when it is required for radar detection and avoidance.*

End Point B

When not connected to the End Point A, the End Point B scans continuously for all the channels in the configured Frequency Domain for the presence of End Point A. If suitable End Point A is found in a channel, the End Point B tries to connect to it.

NOTE: *Since the device may need to scan for radar on multiple channels, you must allow a sufficient amount of time for the units to start up. This is considerably longer than when the device is not using DFS. This is expected behavior.*

The Startup time is within four minutes if no radar is detected, but up to one minute is added for every selected channel that results in radar interference.

For detailed information on DFS, refer to [Frequency Domains and Channels](#).

3.3 Transmit Power Control

Transmit Power Control is a manual configuration selection to reduce the unit's output power. The maximum output power level for the operating frequency can be found in the event log of the unit's embedded software.

By default, the device transmits at the maximum output power that the radio can sustain for data rate and frequency selected. However, with Transmit Power Control (TPC), you can adjust the output power of the device to a lower level in order to reduce interference to neighboring devices or to use a higher gain antenna without violating the maximum radiated output power allowed for your country/band. Also, some countries that require DFS also require the transmit power to be set to a 6 dB lower value than the maximum allowed EIRP when link quality permits, as part of the DFS requirements.

NOTES:

- *When the system is set to transmit at the maximum power, professional installers must ensure that the maximum EIRP limit is not exceeded. To achieve this, they may have to add attenuation between the device and the antenna when a high gain antenna is used.*
- *You can see your unit's current output power for the selected frequency in the event log. The event log shows the selected power for all data rates, so you must look up the relevant data rate to determine the actual power level.*
- *This feature lets you only to decrease your the output power of the device; you cannot increase the output power of your device beyond the maximum the radio allows for your frequency and data rate.*

3.4 Pairing the End Points or setting up a QB Link

If a QB-8100 link product is purchased, the devices will come with a factory pre-configuration for forming a secure link out of the box. If you want to form a link manually, the following parameters have to be configured with the same values on both End Points for forming a link.

First configure one End Point as End Point A and the other End Point as End Point B. The list of parameters that must be configured for linking of End Point A and End Point B are:

- Network Name
- Network Secret
- Encryption (when used)
- Frequency Channel (when available)
- Channel Bandwidth
- Data Rate

See the description of these parameters and how to configure them in [Basic Configuration Information](#).

3.5 Virtual Local Area Networks (VLANs)

Virtual Local Area Networks (VLANs) are logical groupings of network hosts. Defined by software settings, other VLAN members or resources appear (to connected hosts) to be on the same physical segment, no matter where they are attached on the logical LAN or WAN segment. They simplify allowing traffic to flow between hosts and their frequently- used or restricted resources according to the VLAN configuration.

QB-8100 End Points are fully VLAN-ready; however, by default, VLAN support is disabled. Before enabling VLAN support, certain network settings should be configured and network resources such as VLAN-aware switches should be available, based on the type of configuration.

For details on how to configure VLAN parameters, refer to [VLAN Configuration \(Bridge Mode only\)](#).

3.6 Quality of Service (QoS)

NOTE: *Quality of Service is configured on the End Point A.*

The Quality of Service (QoS) feature is based on the 802.16 standard and defines the classes, service flows, and packet identification rules for specific types of traffic. The main priority of QoS is to guarantee a reliable and adequate transmission quality for all types of traffic under conditions of high congestion and bandwidth over-subscription.

For a complete discussion on QoS, see [Quality of Service \(QoS\) Configuration](#).

There are already several pre-defined QoS classes, SFCs and PIRs available that you may choose from which cover the most common types of traffic. If you want to configure something else, you start building the hierarchy of a QoS class by defining PIRs; you define the QoS class by associating those PIRs to relevant SFCs with priorities to each PIR within each SFC. QoS can be applied on standard 802.3 ethernet frames as well as PPPoE encapsulated frames.

3.7 Basic Configuration Information

The BASIC CONFIGURATION Page in the Web-based Configuration Interface provides a one-place access to a minimum set of configuration parameters to quickly set up a QuickBridge Point-to-Point link.

Basic Configuration

System Name	<input type="text" value="System-Name"/>	(0-64) characters
Frequency Domain	<input type="text" value="World 5 GHz"/> *	
Radio Mode	<input type="text" value="End Point A"/> *	
Channel Bandwidth	<input type="text" value="20"/> MHz *	
Auto Channel Selection	<input type="text" value="Disable"/>	
Preferred Channel	<input type="text" value="160"/> 5.8 GHZ	
Active Channel	160 (5.8 GHZ)	
Tx Rate	<input type="text" value="52Mbps"/>	
Network Name	<input type="text" value="MY_NETWORK"/>	

IP Configuration *

Interface	IP Address	Subnet Mask	Address Type
Ethernet 1	<input type="text" value="169.254.128.132"/>	<input type="text" value="255.255.255.0"/>	<input type="text" value="Static"/>

Default Gateway IP Address

IP Address

Notes: 1. Channel Bandwidth change will reset the Tx Rate to default value.
2. Change in the Radio Mode reset Wireless and WORP parameters to default values after reboot.
3 * Reboot is required

Figure 3-1: Basic Configuration

See the following table for Basic Configuration parameters and their descriptions:

Parameter	Description
System Name	This is the system name for easy identification of the End Point A or End Point B. The System Name field is limited to a length of 64 characters.

Parameter	Description
Frequency Domain	<p>It specifies the country of operation, permitted frequency bands and regulatory rules for that country/domain. Upon choosing a frequency domain, the Dynamic Frequency Selection (DFS) and Automatic Transmit Power Control (ATPC) features are enabled automatically if the selected country and band has a regulatory domain that requires it. The Frequency domain selection pre-selects and displays only the allowed frequencies for the selected country/domain.</p> <p>NOTE: Units sold only in the United States are pre-configured to scan and display the outdoor frequencies permitted by the FCC. No other country selections, channels, or frequencies can be configured. Units sold outside of the United States support the selection of a Country by the professional installer. If you change the Frequency Domain, a reboot of the unit is necessary for the upgrade to take place.</p> <p>NOTE: On World units, if World 5 GHz is selected from the Frequency Domain drop-down menu, any Channel in the 5 GHz range are displayed for manual selection.</p> <p>For a non US device, the default Frequency Domain selected is World 5GHz. For more information on frequency domains, refer to Frequency Domains and Channels.</p>
Radio Mode	<p>It specifies the mode of operation of the Unit. The device supports 2 types of modes, End Point A and End Point B, synonymous to Master/Slave and Base/Satellite. For establishing a link, configure one device as End Point A and other as End Point B.</p>
Channel Bandwidth	<p>It specifies the channel bandwidth. By default, it is set to 20 MHz. 40 MHz can be selected for higher throughputs depending on the distance and signal quality. 5 and 10 MHz can be selected for greater flexibility in spectrum selection.</p>
Auto Channel Selection	<p>Enable or disable the auto channel selection for wireless interface. If ACS is enabled on the End Point A, it scans all the channels and selects the best channel at the start up. If ACS is enabled on the End Point B, End Point B continuously scans all the channels till it connects to an End Point A.</p> <p>NOTE: ACS is enabled by default on End Point B.</p>
Preferred Channel	<p>It displays a list of available channels in the specified frequency domain. Configure this if you want to operate the device in a specific channel.</p> <p>NOTE: When DFS is active, the Device will automatically pick a new channel when RADAR interference is detected. Preferred channel is applicable only when Automatic Channel Selection is disabled.</p>

Parameter	Description
Active Channel	This will display the current active channel on which wireless interface is operating. If you have enabled the auto channel selection option or if the device moves to a different channel because of radar detection, then this field displays the current operating channel.
DDRS Status	This parameter is displayed only when DDRS feature is enabled in ADVANCED CONFIGURATION > Wireless > Interface 1 > DDRS . For more details refer to DDRS .
Tx Rate	This parameter represents the transmission data rate of the device. Desired rate can be selected from the list of available Tx rates. <i>NOTE: Configure the appropriate data rate based on the signal level.</i>
Network Name	It is the name given to a network so that an End Point A and an End Point B can mutually authenticate. End Point B can register to End Point A, only if it has the same Network Name. The Network Name can be 2 to 32 characters in length.
Ethernet IP Configuration	
By default, the QuickBridge End Point is configured to operate in Bridge Mode. The parameters in this section vary depending on the device's operating mode, i.e., Bridge or Router. Because the QuickBridge is a point-to-point system, Routing mode is not required for QuickBridge units. Configuring the unit in Routing mode is not necessary.	
IP Address Type	<ul style="list-style-type: none"> • Select Static if you want to assign a static IP address to the unit. Use this setting if you do not have a DHCP server or if you want to manually configure the IP settings. • Select Dynamic to have the device run in DHCP client mode, which gets an IP address automatically from a DHCP server over the network. <p><i>NOTE: The default Address Type is Static.</i></p> <p>When the unit is in Bridge mode, only one IP address is required. This IP address also can be changed with ScanTool (See Setting the IP Address with ScanTool).</p>
IP Address	This parameter is configurable only if the IP Address Assignment Type is set to Static. The default IP Address for End Point A is 169.254.128.132 and for End Point B is 169.254.128.131.
Subnet Mask	The mask of the subnet to which the unit is connected (the default subnet mask is 255.255.255.0). This parameter is configurable only if the IP Address Assignment Type is set to Static.
Gateway IP Address	The IP address of the default gateway. This parameter is configurable only if the IP Address Assignment Type is set to Static. The default gateway IP Address is 169.254.128.132.

Advanced Configuration

This chapter provides details about the Tsunami QB-8100 unit parameters and describes the procedures to configure them using Web-based management interface. These parameters can also be configured using the other management interfaces like SNMP and CLI.

The following topics are covered in this chapter:

- [System Configuration](#)
- [Network Configuration](#)
- [Ethernet Properties Configuration](#)
- [Wireless Configuration](#)
- [Security Configuration](#)
- [Quality of Service \(QoS\) Configuration](#)
- [VLAN Configuration \(Bridge Mode only\)](#)
- [Filtering Configuration \(Bridge Only\)](#)
- [DHCP Configuration](#)
- [Routing Features Configuration](#)

4.1 System Configuration

The System screen allows you to configure the QB-8100 device as an End Point A or an End Point B, the frequency domain, and the network mode as Bridge or Routing.

To configure the System

1. Click **ADVANCED CONFIGURATION > System**. The System screen is displayed as shown below:

Figure 4-1 System screen

2. From the **Radio Mode** drop-down menu, select either **End Point A** or **End Point B**.
3. From the **Frequency Domain** drop-down menu, select a frequency domain.
4. From the **Network Mode** drop-down menu, select either **Bridge** or **Routing**.
5. For the **Maximum MTU** field, enter the maximum MTU value.
6. Click **OK**.

The following table lists the System parameters and their descriptions:

Parameter	Description
Radio Mode	Radio mode specifies the mode of operation and QB-8100 supports two types of modes, End Point A and End Point B.
Frequency Domain	A valid frequency domain must be set before the device can be configured with any other parameters. Selecting a frequency domain makes the device compliant with the allowed frequency bands and channels for that regulatory domain.
Network Mode	The device can be configured in two network modes: Bridge Mode and Routing Mode. The default network mode is Bridge Mode. Refer to Configuring IP in Bridge or Router Mode for more information.
Active Network Mode	This is a read-only parameter which shows current operating network mode of the device. It is displayed only when the newly configured Network mode differs from the current Active Network mode.

Parameter	Description
Maximum MTU	<p>This feature provides support for Ethernet frames with more than 1,500 bytes of payload (MTU). It can be configured with any value between 68 to 2048 bytes. By default, its value is 1500.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • The “Max MTU” configured does not include Ethernet Header (14 bytes) and VLAN tag (4 bytes). • For optimal performance, same value of MTU should be configured on both End Point A and End Point B.

NOTE: Click **COMMIT** and **REBOOT** after changing any system parameter.

4.2 Network Configuration

Based on the selected mode of operation, the IP settings vary. When the device is in Bridge mode, only a single IP address is required; but for Routing mode, individual IP address are needed for each of the Ethernet and Wireless interfaces. In Bridge mode, the IP address can be statically assigned or dynamically obtained through DHCP; whereas in Routing mode, only static assignment is supported.

4.2.1 Configuring IP in Bridge or Router Mode

To view the network settings,

1. Click **ADVANCED CONFIGURATION > Network**.

If the device is configured in Bridge mode, the following screen appears:

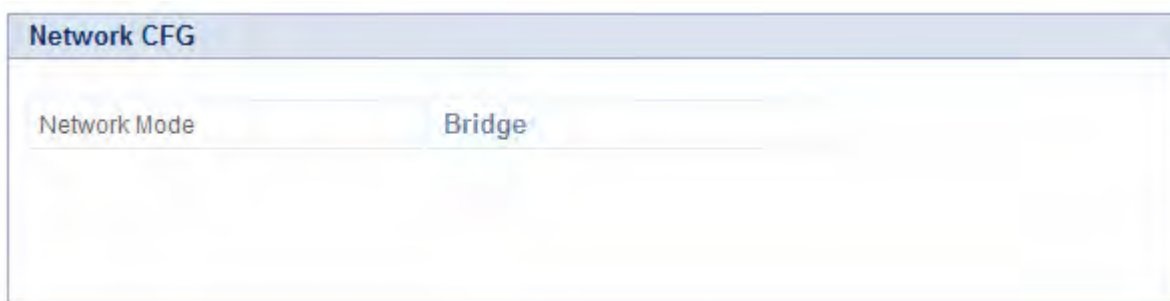


Figure 4-2 IP Configuration in Bridge Mode

If the device is configured in Router mode, the following screen appears:

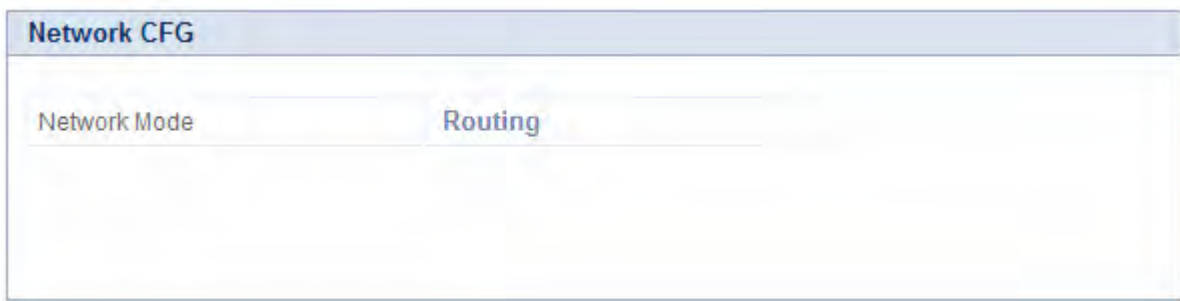


Figure 4-3 IP configuration in Router mode

To configure the Network IP properties, click **ADVANCED CONFIGURATION > Network > IP Configuration**. The following screen appears:

 A screenshot of the "IP Configuration" screen. It features a table for Ethernet settings, a section for Default Gateway IP Address, and a section for DNS settings. At the bottom, there are notes and an OK button.

S.No.	IP Address	Subnet Mask	Address Type
1	169.254.128.132	255.255.255.0	Static

Default Gateway IP Address*

IP Address: 169.254.128.132

DNS*

Primary IP Address: 0.0.0.0

Secondary IP Address: 0.0.0.0

Notes: 1.DHCP Server must be disabled before changing the network configurations like IPAddress, Subnet Mask, Address Type.
2.* Reboot is required

OK

Figure 4-4 IP Configuration

1. Enter the appropriate parameters in the IP Configuration screen. See the following table that lists and describes the parameters.
2. Click **OK**. The IP configuration takes effect only after Reboot.

Parameter	Description
Ethernet	
Address Type	This field is applicable only if the Network mode on the System screen is configured in Bridge mode. This parameter specifies whether the device network parameters are to be configured through DHCP or to be assigned statically. Select Dynamic to configure the device as a Dynamic Host Configuration Protocol (DHCP) client. If Dynamic is selected, the device obtains the IP settings from a network DHCP server automatically during the bootup. If you do not have a DHCP server or if you want to manually configure the device's IP settings, select Static for the Address Type .
IP Address	Enter the IP Address of the interface. In Bridge Mode: When the Address Type is selected as Dynamic , this field becomes read-only and displays the current IP address of the device. If the device cannot obtain an address from a DHCP server, it displays the default IP Address as 169.254.128.132 for End Point A and 169.254.128.131 for End Point B. In Routing Mode: For these interfaces, this field displays the default IP Addresses as follows: Ethernet interface: 169.254.128.132 Wireless interface: 169.254.130.132
Subnet Mask	This parameter represents the subnet mask of the interface. In Bridge Mode: When the Address Type is selected as Dynamic , this field becomes read-only and displays the current subnet mask of the device. If the device cannot obtain an address from a DHCP server, it displays the default subnet mask as 255.255.255.0.
Default Gateway IP Address	
Default Gateway IP Address	This parameter represents the gateway IP Address of the device. In Bridge Mode: When the Address Type is selected as Dynamic , this parameter becomes read-only and displays the device's current gateway IP Address that is obtained through DHCP. If the device cannot obtain an address from a DHCP server, the default gateway IP Address is 169.254.128.132. When Static IP assignment is used, subnet of the default gateway should match with the subnet of any one of the interfaces.
DNS	
Primary DNS	Specifies the IP Address of the Primary DNS Server.
Secondary DNS	Specifies the IP Address of the Secondary DNS Server.

NOTE: Click **COMMIT** and then **REBOOT** for the changes to take effect.

4.3 Ethernet Properties Configuration

In the Ethernet Interface Properties screen, you can configure the Ethernet transmission properties. The recommended settings are **Auto** for **TxMode And Speed**. The device supports a single ethernet interface **Ethernet 1**.

To configure the Ethernet Interface

1. Click **ADVANCED CONFIGURATION > Ethernet**. The Ethernet Interface Properties screen is displayed as shown below.



Figure 4-5 Wireless Ethernet Properties

2. Enter the appropriate parameters in the Ethernet Interface Properties screen. See the following table that lists the parameters and their descriptions.
3. Click **OK** and then click **COMMIT**.

Parameter	Description
MAC Address	Displays the MAC address of the Ethernet interface.
Operational Speed	Displays the current operational speed of the Ethernet interface. The speed can be 100 Mbps or 10Mbps.
Operational Tx Mode	Displays the current operational transmit mode of the Ethernet interface. There are 2 types of transmission modes: <ul style="list-style-type: none"> • Half Duplex: Allows one-way transmission at a time. Only receive or transmit operations can be performed at once. • Full Duplex: Allows two-way transmissions simultaneously.

Parameter	Description
TxMode And Speed	<p>This parameter allows the user to select the speed and mode based on the requirement for the corresponding interface.</p> <p>NOTE:</p> <ul style="list-style-type: none"> • Auto: Selects the best transmission mode available when both sides are set to Auto. • The recommended setting is Auto. • In order to allow communication, the transmitter and receiver should be configured in same transmission modes. • The maximum speed is measured as 100 megabits per second.

4.4 Wireless Configuration

The QB-8100 series of devices use a proprietary Wireless Outdoor Router Protocol (WORP). WORP offers services based on a polling algorithm, specially designed for wireless outdoor networks. WORP is designed to minimize the number of packets being sent over the air by incorporating several mechanisms, like super-packeting and piggy-back acknowledgment in order to achieve maximum throughput possible in the outdoor conditions.

A WORP-based device provides two modes of operations for establishing a wireless link, End Point A and End Point B. Based on the mode of operation at the interface, the respective parameters can be configured. The following sections describe the configurations for End Point A and End Point B.

4.4.1 Configuring WORP Properties in End Point A Mode

To set the WORP properties

1. Click **Advanced Configuration > Wireless > Interface1 > WORP**. The WORP Configuration screen appears.

WORP Configuration	
Mode	End Point A
Network Name	<input type="text" value="MY_NETWORK"/> (2-32) characters
WORP MTU	<input type="text" value="3008"/> (350-3808) Bytes
Super Framing	<input type="button" value="Enable"/> ▾
Multi Frame Bursting	<input type="button" value="Enable"/> ▾
Auto Multi Frame Bursting	<input type="button" value="Enable"/> ▾
Registration Timeout	<input type="text" value="10"/> (1-10) Seconds
Retry Count	<input type="text" value="3"/> (0-10)
Tx Rate	<input type="button" value="52"/> ▾ Mbps
Input Bandwidth Limit	<input type="text" value="102400"/> 100Mbps (64 - 102400) Kbps
Output Bandwidth Limit	<input type="text" value="102400"/> 100Mbps (64 - 102400) Kbps
Bandwidth Limit Type	<input type="button" value="Shaping"/> ▾
Security Profile Name	<input type="button" value="WORP Security"/> ▾
Radius Profile Name	<input type="button" value="Default Radius"/> ▾
MAC ACL Status	<input type="button" value="Disable"/> ▾
RADIUS MAC ACL Status	<input type="button" value="Disable"/> ▾
<p>Note: When Channel Bandwidth/Guard Interval/Data Streams are modified, Tx Rate is reset to default automatically</p>	
<input type="button" value="OK"/>	

Figure 4-6 Wireless Interface WORP

2. Enter the appropriate parameters in the WORP Configuration screen. See the following table for the descriptions of the parameters.
3. Click **OK**.

Parameter	Description
Mode	Specifies the radio mode in which the device is configured.
Network Name	It is the name given to a network so that an End Point A and an End Point B can mutually authenticate. End Point B can register to End Point A only if it has the same Network Name. The Network Name can be 1 to 32 characters in length.
WORP MTU	<p>WORP MTU (Maximum Transfer Unit) is the largest size of the data payload in wireless frame that may be transmitted. The MTU size can range from 350 to 3808 for High Throughput modes.</p> <p>The default and maximum value of the WORP MTU is 3808.</p>
Super Framing	Super Framing refers to the mechanism that enables multiple Ethernet/802.3 frames to be packed in a single WORP data frame. When the WORP MTU size is configured larger than the Ethernet frame size, then WORP constructs a super frame with size of the WORP MTU configured and pack multiple Ethernet frames. It results in reducing the number of frames transmitted over wireless medium thereby conserving wireless medium and increasing the overall throughput.
Multi Frame Bursting	<p>To achieve higher throughput, WORP protocol allows each side (End Point A or End Point B) to send multiple data frames in sequence and treats it as a single data frame. During Multi bursting sequence, the receiver will not be allowed to interrupt the sequence by sending any message. By default, this feature is Enabled.</p> <p>This parameter is configurable only on End Point A and it turns this feature on (if enabled) or off (if disabled) for both End Point A and End Point B. When Multi Frame Bursting is enabled, the number of frames transmitted for each polling cycle can be configured as part of Quality of Service (QoS) Configuration.</p>

Parameter	Description
Auto Multi Frame Bursting	<p>Select Enable or Disable from Auto Multi Frame Bursting drop-down box. By default, Auto Multi Frame Bursting is enabled.</p> <p>NOTE: <i>Auto Multi Frame Bursting is enabled only if Multi Frame Bursting is Enabled.</i></p> <p>When Auto Multi Frame Bursting is disabled, the number of packets per burst will be defined as in the QoS Service Flow class used for communication. When this feature is enabled, End Point A will monitor which of the active QoS SF Classed has the highest priority, and allow only that class to use multi-frame bursting, all the rest SF Classes to use only single frame per burst.</p>
Registration Time-out	<p>It specifies the maximum duration for the registration process to complete once End Point B starts registering with End Point A. Default time is 10 seconds.</p>
Retry Count	<p>This parameter specifies the maximum number of times a data message is retransmitted, over the wireless medium, if acknowledgement is not received. By default, this parameter is set to 3.</p>
DDRS Status	<p>This parameter is displayed only when DDRS feature is enabled in ADVANCED CONFIGURATION > Wireless > Interface 1 > DDRS. For more details refer to DDRS.</p>
Tx Rate	<p>This parameter represents the modulation rate at which the packet will be transmitted from the wireless device.</p> <p>NOTE: <i>The supported transmission rates vary based on the Channel Bandwidth, Guard Interval, and Number of Data Streams parameters.</i></p>
Input/Output Bandwidth Limit	<p>This parameter limits the data received on the wireless interface and transmitted to the wireless interface. Minimum of 64 Kbps to the maximum value specified in the License File.</p>

Parameter	Description
Bandwidth Limit Type	<p>This parameter specifies the action performed when the traffic utilization exceeds the configured input/output limits.</p> <p>Policing: When the traffic utilization reaches the configured limit, the excess traffic will be discarded.</p> <p>Shaping: When the traffic utilization reaches the configured limit, the excess traffic will be buffered and sent at the rate specified in the Output Bandwidth Limit.</p>
Security Profile Name	<p>This parameter represents the security profile currently used. The default Security Profile Name is WOP Security. The Security Profile contains the authentication and encryption methods used to secure the connection between the End Point A and End Point B. Refer to Security Configuration.</p>
Radius Profile Name	<p>This parameter represents the radius profile currently used. The radius profile contains the IP address details of the RADIUS server. Refer to Configuring the Radius Server Profile (End Point A Only).</p>
MAC ACL Status	<p>This parameter is used to enable or disable the MAC Access Control List (ACL). When enabled, the End Point A checks the ACL to allow or deny access to the End Point B.</p> <p>This option is available only in End Point A mode.</p>
Radius MAC ACL Status	<p>This parameter is used to enable authentication using RADIUS server. When enabled, the End Point A contacts the RADIUS server for authenticating the End Point B during the registration process. This option is available only in End Point A mode.</p>

NOTE: Modifying any of End Point A parameters results in temporary loss of connectivity with the End Point B.

4.4.2 Configuring WORP Properties in End Point B Mode

When the device is in End Point B mode, only End Point B-related configuration settings are displayed. Refer to [Configuring WORP Properties in End Point A Mode](#).

Parameter	Description
Mode	System Name given to the End Point A (Refer to Basic Configuration Information). If the End Point A Name is specified, it forces the End Point B to register to the End Point A with the given Network Name and System Name. If the End Point A Name is left blank, it allows the End Point B to register to any End Point A with the given Network Name.

Refer to [Configuring WORP Properties in End Point A Mode](#) for description of rest of the parameters.

To apply the configured properties to the device, click **COMMIT**.

NOTE:

- *Modifying the WORP parameters of either End Point A or End Point B may result in temporary loss of the link.*
- *When you modify WORP parameters and click **COMMIT**, it may result in brief interruption of service.*

4.4.3 Wireless Interface Properties

In the Wireless Interface Properties screen, you can configure the properties of wireless interface.

To configure the wireless interface properties

1. Click **ADVANCED CONFIGURATION > Wireless > Interface 1 > Properties**. The Wireless Interface Properties screen is displayed as shown below.

Figure 4-7 Wireless interface properties

2. Enter the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

NOTES:

- If World/Russia frequency domain is selected, establishing WORP link might take longer time because the End Point B has to scan relatively more number of channels.
- When you modify wireless parameters and click **COMMIT**, it may result in brief interruption of service.

Parameter	Descriptions
Channel Bandwidth	This parameter specifies the channel bandwidth. By default, it is set to 20 MHz. 40 MHz can be selected for higher throughputs depending on the distance and signal quality. 5 and 10 MHz can be selected for greater flexibility in spectrum selection.

Parameter	Descriptions
Auto Channel Selection (ACS)	<p>Enable or disable the Auto Channel Selection for wireless interface. If ACS is enabled on the End Point A, it scans all the channels and selects the best channel at the startup. If ACS is enabled on the End Point B, End Point B continuously scans all the channels till it connects to an End Point A.</p> <p>By default, ACS is disabled on End Point A and enabled on End Point B.</p>
Preferred Channel	<p>Select a channel from the drop-down menu if you want to operate the device in that specific channel.</p> <p>NOTE: Preferred channel cannot be configured when ACS is enabled. If DFS is active, the device will automatically pick a new channel when radar interference is detected.</p>
Active Channel	<p>This displays the current operating channel on which wireless interface is operating.</p> <p>NOTE: Active Channel can be different from Preferred Channel if radar interface is detected.</p>

Parameter	Descriptions
Satellite Density	<p>Satellite Density setting helps achieve maximum bandwidth in a wireless network. It influences the receive sensitivity of the radio interface and improves operation in environments with high noise level.</p> <p>Reducing the sensitivity of the device enables unwanted “noise” to be filtered out (it disappears under the threshold).</p> <p>You can configure the Satellite Density to be Disable, Large, Medium, Small, Mini, or Micro. By default, Satellite Density is disabled. The Medium, Small, Mini, and Micro settings are appropriate for high noise environments; whereas, Large is appropriate for a low noise environment. A long distance link may have difficulty maintaining a connection with a small density setting because the wanted signal can disappear under the threshold. Consider both noise level and distance between the peers in a link when configuring this setting. The threshold should be chosen higher than the noise level, but sufficiently below the signal level. A safe value is 10dB below the present signal strength.</p> <p>If the Signal-to-Noise Ratio (SNR) is not sufficient, you may need to set a lower data rate or use antennas with higher gain to increase the margin between wanted and unwanted signals. In a point-to-multipoint configuration, the End Point A should have a density setting suitable for End Point B, especially the ones with the lowest signal levels (longest links). Take care when configuring a remote interface; check the available signal level first, using Remote Link Test.</p> <p>See Sensitivity Threshold Values for more information on Sensitivity threshold values corresponding to various Satellite Density values.</p> <p>NOTE: <i>When the remote interface is accidentally set to small and communication is lost, it cannot be reconfigured remotely and a local action is required to bring the communication back. Therefore, the best place to experiment with the level is at the device that can be managed without going through the link. If the link is lost, the setting can be adjusted to the correct level to bring the link back.</i></p>
Cell Size	<p>This parameter specifies the cell size for the TPC setting on the wireless medium. By default, the cell size is configured to Large. You can configure the cell size as Large, Medium or Small. The TPC range is controlled by this parameter.</p>

Parameter	Descriptions
TPC	<p>With Transmit Power Control (TPC), you can adjust the output power of the device to a lower level. This is performed to reduce interference with the neighboring devices. It can be helpful when higher gain antenna is used without violating the maximum radiated output power for a country or regulatory domain. This value can be configured in 1 dB increments.</p> <p>NOTES:</p> <ul style="list-style-type: none"> • <i>This feature only lets you decrease the output power; it does not let you increase the output power beyond the maximum allowed defaults for the selected frequency and country.</i> • <i>The range of values depend on the Cell Size.</i>
Active TPC	<p>If the feature Automatic Transmit Power Control (ATPC) is enabled automatically, this field appears for <i>United States 5 GHz frequency domain only</i>.</p> <p>NOTE: <i>This field is not displayed for United States 5.8 GHz frequency domain.</i></p>
Antenna Gain	<p>The sensitivity of the radio card can be modified when detecting radar signals in accordance with ETSI, FCC, and IC Dynamic Frequency Selection (DFS) requirements. As the radar detection threshold is fixed by ETSI, the FCC, and IC and a variety of antennas with different gains may be attached to the device, you must adjust this threshold to account for higher than expected antenna gains. This can avoid false radar detection events which can result in frequent change in the Frequency channels.</p> <p>Configure the threshold for radar detection at the radio card to compensate for increased external antenna gains. The Antenna Gain value ranges from 0 to 40. The default value is 0.</p> <p>NOTE: <i>Modifying any of the wireless parameters results in temporary loss of connectivity between the End Point A and End Point B.</i></p>
Wireless Inactivity Timer	<p>Resets the wireless interface if there is no change in the Tx and Rx Packet Count in the specified interval of time. The default value is set to 0 minutes (disabled) and can be configured between 0 to 600 minutes.</p>

4.4.4 Blacklist Information

This section displays information regarding various blacklisted channels. It consists of the following parameters.

NOTE: Click **COMMIT** for the changes to take effect.

Parameter	Description
Channel Number	The channel number indicates the channel that is blacklisted.
Reason	The reason for which that particular channel is blacklisted. The most common reason for blacklisting a channel is the presence of a radar in that channel.
Time Elapsed	The time elapsed since the channel was blacklisted. When the channel is black listed due to the presence of a radar, it will be de-blacklisted after 30min.

4.4.5 Sensitivity Threshold Values

Sensitivity threshold values corresponding to various Satellite Density values are given in the table below:

Satellite Density	Receive Sensitivity Threshold	Defer Threshold
Large	-96 dbm	-62 dbm
Medium	-86 dbm	-62 dbm
Small	-78 dbm	-52 dbm
Mini	-70 dbm	-42 dbm
Micro	-62 dbm	-36 dbm

4.4.6 MIMO Properties

The MIMO Properties screen allows you to configure the Multiple-Input-Multiple-Output radio to achieve maximum performance and high throughput.

To configure MIMO properties

1. Click **ADVANCED CONFIGURATION > Wireless > Interface1 > MIMO Properties**. The MIMO Properties screen opens as shown below.

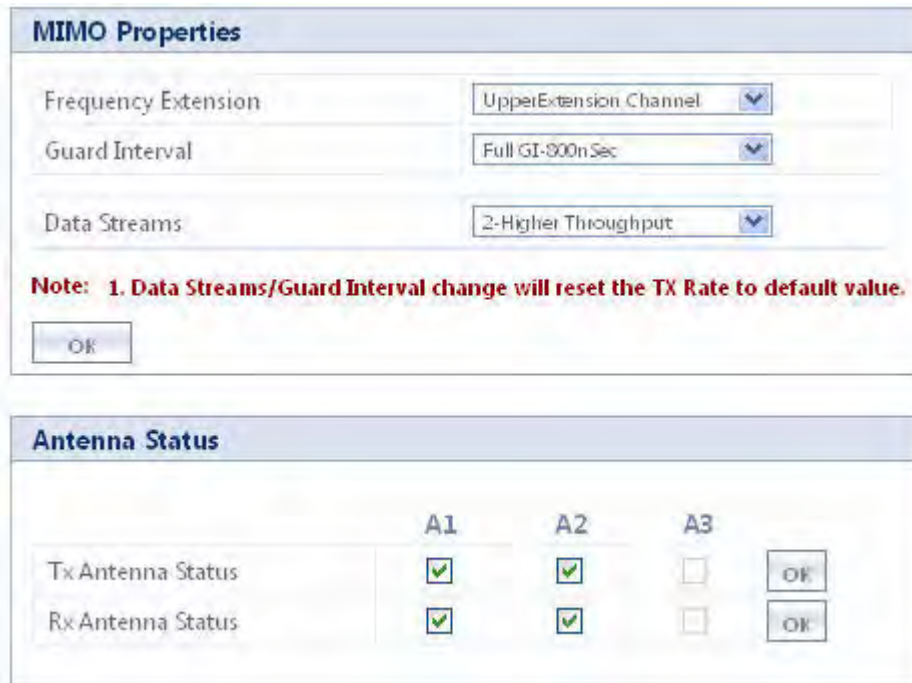


Figure 4-8 MIMO Properties

2. Enter the appropriate parameters on the MIMO Properties screen. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

NOTE: When you modify MIMO parameters and click **COMMIT**, it may result in brief interruption of service.

Parameter	Description
Frequency Extension	Configuration of this parameter is valid only if the channel bandwidth is 40 MHz. If Upper Extension Channel is selected, the radio automatically uses the current channel (20MHz) as well as next upper adjacent channel (20 MHz) for data transmission. If Lower extension channel is selected, the radio automatically uses the current channel (20MHz) as well as lower adjacent channel (20 MHz) for data transmission. For example, if channel 36 is selected in 40 + mode, the radio uses 36 as well as next upper adjacent channel 40 also for data transmission, similarly if channel 40 is used in 40- mode, the radio uses 40 as well as the next lower adjacent channel 36 for data transmission.

Parameter	Description
Guard Interval	Possible values for Guard interval are 800 nSec and 400 nSec. 400 nSec is valid only for 40 MHz channel bandwidth.
Data Streams	MIMO radio uses multiple antennas for transmitting and receiving the data. These data streams specify the number of data streams over the air transmitted or received in parallel. <ul style="list-style-type: none"> Data streams "1-Longer Range" uses a single flow of the signals on the antennas. Data streams "2-Higher Throughput" uses double flow of the signals on the antennas in parallel.
Tx Antenna Status	This parameter allows the user to specify the antenna to be used for data transmission. Selecting the respective antenna number checkbox specifies radio to use that specific antenna for data transmission.
Rx Antennas Status	This parameter allows the user to specify the antenna to be used for data reception. Selecting the respective antenna number checkbox specifies radio to use that specific antenna for data reception.

Modifying the Guard Interval, Data Streams, Tx Antenna Status and Rx Antenna Status will reset the Tx Rate to default.

4.4.7 DFS

Dynamic Frequency Selection is a mechanism to allow unlicensed devices to share spectrum with existing radar systems.

The operation of a system with DFS capability takes place in the following sequence:

1. The master device that can initiate communication selects a channel and monitors that channel for potential radar signal for a minimum listening time (channel availability check time). No transmissions can occur during this period.
2. If the radar is detected, then the system has to go and select another channel and repeat the channel availability check on the new channel (the original channel is added to a list of channels with radar).
3. Once the channel has been scanned for radar and found clean, the device starts using that channel.
4. While using the channel, the network's master device continuously monitors for potential interference from a radar source (this is referred to as in-service monitoring). If the radar is detected, then the network's master device stops transmitting in that channel. The channel is added to the list of channels with radar.
5. The master device then selects a new channel (channel that is not on the radar list).
6. A channel on the radar list can be purged once the Non Occupancy Period (NOP) has elapsed for that channel.

NOTE: For Europe 5.8 GHz channel, once End Point A / End Point B finds a clean channel (after 60 sec radar scan), it does not need to perform any 60 seconds scan again for RADAR for next 24 hours. This is not applicable when device is rebooted or that particular channel got blacklisted earlier.

4.4.7.1 DFS in End Point A Mode

Dynamic Frequency Selection (DFS) is enabled automatically based on the selected frequency domain. The device selects a channel to operate as follows:

If ACS is disabled, during initialization, the device selects the Preferred Channel to be the operational channel. If ACS is enabled, during initialization, the device scans all the channels in the configured frequency domain and selects the channel with the best RSSI to be the operational channel.

Once the operating channel is selected, the device scans the channel for radar presence for a duration of Channel Wait Time. If no radar is detected, the device starts operating in that channel. If radar is detected, the channel is blacklisted for 30 minutes and a different channel is selected. To select the next operational channel, the device scans all non-blacklisted channels and selects the channel with best RSSI.

At any point of time, if Radar is detected on the current operating channel, the device blacklists that channel and scans all non-blacklisted channels and selects the channel with best RSSI.

NOTE: Scanning is performed only on the frequencies allowed in the regulatory domain of the frequency/band selected when it is required for radar detection and avoidance.

DFS Configuration in End Point A Mode

To configure **DFS** in End Point A mode,

1. Click **ADVANCED CONFIGURATION > Wireless > Interface 1 > DFS**. The **DFS** Configuration screen appears as shown below.
2. Select the appropriate parameters. See the DFS Configuration table that lists the parameters and their descriptions.
3. Click **OK**.

The screenshot shows the 'DFS Configuration' interface. At the top, there's a title 'DFS Configuration'. Below it, there's a 'Channel Wait Time' input field containing the number '60', with a range '(0-3600) Seconds' to its right. An 'OK' button is positioned below the input field. Underneath, there's a section titled 'Blacklist Information' which contains a table with three columns: 'Channel Number', 'Reason', and 'Time Elapsed'. A 'Refresh' button is located below the table.

Figure 4-9 DFS Configuration in End Point A Mode

4.4.7.2 DFS in End Point B Mode

1. When not connected to the End Point A, the End Point B scans continuously for all the channels in the configured Frequency Domain for the presence of End Point A. If suitable End Point A is found in a channel, the End Point B tries to connect to it.

NOTE: Since the device may need to scan for radar on multiple channels, you must allow a sufficient amount of time for the units to start up. This is considerably longer than when the device is not using DFS. This is expected behavior.

The Startup time is within four minutes if no radar is detected, but up to one minute is added for every selected channel that results in radar interference.

2. After selecting the best channel from its End Point A -scan list, the End Point B scans for the radar during Channel Wait Time in that channel. The default Channel Wait Time value is 60 seconds. It starts transmitting only when the channel is found clean during this scan time.

3. During its operation, the End Point B scans for radar continuously and after detecting the radar, it sends a message to the End Point A indicating radar detection on that current channel and blacklists that channel for Non Occupancy Period (NOP). The default NOP is 30 minutes.
4. End Point B restarts scanning for the End Point A as mentioned above in Step 1.
5. End Point B never scans any blacklisted channels.
6. End Point B de-blacklists the blacklisted channel only after Non Occupancy Period.

For detailed information on DFS enabled countries, refer to [Frequency Domains and Channels](#).

End Point A's behavior on receiving RADAR event message from End Point B

As soon as End Point A receives RADAR event message from End Point B, End Point A de-registers that End Point B immediately and blacklists that channel for NOP and triggers the channel switch in case of Point-To-Point link.

In case of Point-To-MultiPoint also, End Point A shall de-register the End Point B, if it receives RADAR event message from End Point B.

DFS Configuration in End Point B Mode

To configure **DFS** in End Point B mode,

1. Click **ADVANCED CONFIGURATION > Wireless > Interface 1 > DFS**. The **DFS** Configuration screen appears as shown below:

The screenshot displays the 'DFS Configuration' window. At the top, the title is 'DFS Configuration'. Below the title, there are two main configuration areas. The first area contains a 'Channel Wait Time' input field with the value '60' and a unit indicator '(0-3600) Seconds'. Below this is a 'DFS Status' dropdown menu currently set to 'Disable'. An 'OK' button is located below these settings. The second area is titled 'Blacklist Information' and contains a table with three columns: 'Channel Number', 'Reason', and 'Time Elapsed'. Below the table is a 'Refresh' button.

Figure 4-10 DFS Configuration in End Point B Mode

The DFS Configuration table holds the DFS parameter configurations.

2. Select the appropriate parameters.
3. Click **OK**.

See the following DFS parameter configurations table that lists the parameters and their descriptions

Parameter	Description
Channel Wait Time	End Point B after selecting the best channel from its End Point A-scan list, scans for the RADAR for a period of 60 seconds in that particular channel. This Channel Wait Time ranges from 0 to 3600 sec. By default, Channel Wait Time is set to 60 sec . NOTE: End Point B starts transmitting only when the channel is found clean during the channel wait time (60 seconds scan) for RADAR.
DFS Status (End Point B only)	This parameter is displayed in End Point B only. Select the DFS Status "Enable" or "Disable" from the drop-down box provided. By default, DFS Status is Disable .

4.4.7.3 Blacklist Information

This section displays information regarding various blacklisted channels. It consists of the following parameters.

Parameter	Description
Channel Number	The channel number indicates the channel that is blacklisted.
Reason	The reason for which that particular channel is blacklisted. The most common reason for blacklisting a channel is the presence of a local radar or remote radar in that channel.
Time Elapsed	The time elapsed since the channel was blacklisted. When the channel is black listed due to the presence of a radar, it will be de-blacklisted after 30min.

NOTE: Click **COMMIT** for the changes to take effect.

4.4.8 DDRS

Dynamic Data Rate Selection (DDRS) feature allows the End Point A or End Point B to monitor the remote average signal-to-noise ratio (SNR) and the number of retransmissions between the End Point A and End Point B or vice versa. End Point A or End Point B adjusts the transmission data rate to an optimal value to provide the best possible throughput according to the current communication conditions and link quality.

End Point A or End Point B runs the DDRS Algorithm separately based on their local DDRS Status configuration. When DDRS Status is enabled on End Point A, End Point A monitors the remote SNR and number of retransmission for every registered End Point B and it can adjust different transmission rate for different End Point Bs based on their link condition. When DDRS Status is enabled on End Point B, End Point B monitors the remote SNR and number of retransmissions for End Point A and can adjust the transmission rate according to the link condition.

Note that DDRS can be enabled or disabled both on End Point A and End Point B separately.

4.4.8.1 **DDRS Configuration**

To configure **DDRS**,

1. Click **ADVANCED CONFIGURATION > Wireless > Interface 1 > DDRS**. The **DDRS** Configuration screen appears as shown below:

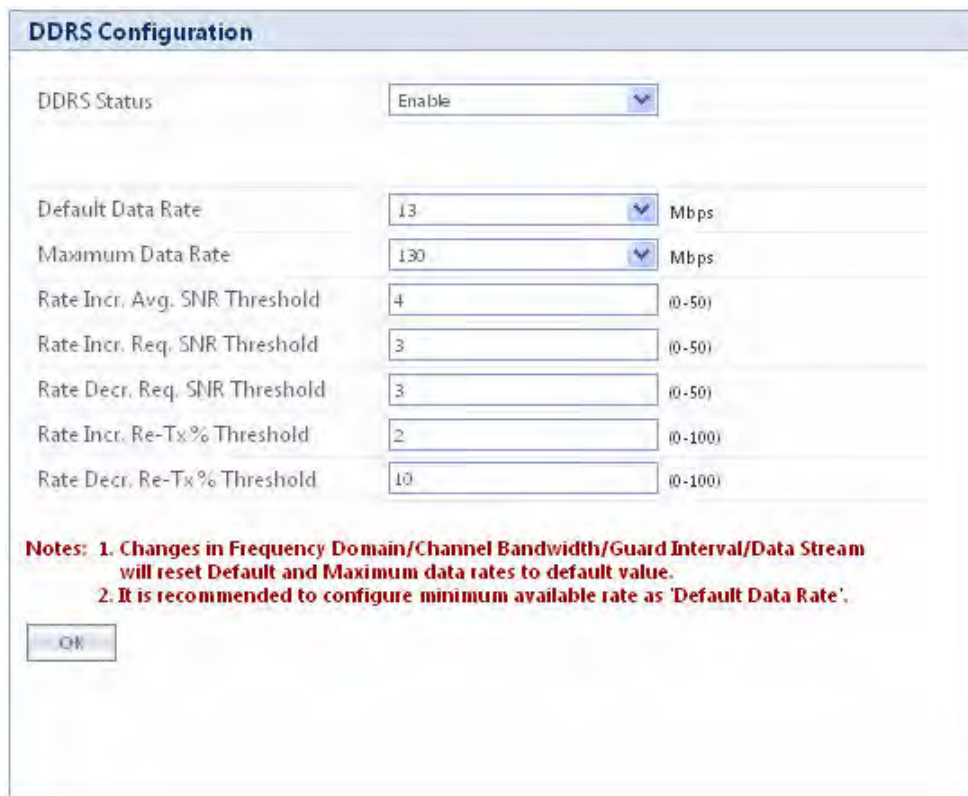


Figure 4-11 **DDRS Configuration**

The **DDRS** Configuration table holds the **DDRS** parameter configurations.

2. Select the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

Parameter	Description
DDRS Status	Select the DDRS Status Enable or Disable from the drop-down box provided to activate or deactivate DDRS feature. By default, DDRS Status is Disabled .
DDRS Default Data Rate	This parameter specifies the lowest data rate that is selected during DDRS Algorithm. By default, 13Mbps is selected. <i>NOTE: Algorithm will select the transmission rate between DDRS Default Data Rate and DDRS Max Data Rate configuration.</i>

Parameter	Description
DDRS Max Data Rate	<p>This parameter specifies the maximum data rate that is selected during DDRS Algorithm. By default, 130Mbps is selected.</p> <p>NOTE: Algorithm will select the transmission rate between DDRS Default Data Rate and DDRS Max Data Rate configuration.</p>
Rate Incr. Avg. SNR Threshold	<p>This parameter specifies a threshold value, which is added to the average remote SNR and this summation is compared with the current remote SNR. If the current remote SNR is greater than this summation, then the same rate is maintained. If the current remote SNR is smaller than or equal to this summation, then new rate is selected. By default, 4dB is configured.</p>
Rate Incr. Req. SNR Threshold	<p>This parameter specifies the threshold value, that is added to the minimum required SNR threshold of next higher data rate and this summation is compared with average remote SNR. If the average remote SNR is greater than or equal to the summation, then new data rate is selected. By default, 3dB is configured.</p> <p>NOTE: Refer to Table 4-1 and 4-2 for Minimum Required SNR for different data rates. These values are NOT user configurable.</p>
Rate Decr. Req. SNR Threshold	<p>This parameter specifies the threshold value, that is added to the minimum required SNR threshold of current data rate and this summation is compared with average remote SNR. If the average remote SNR is lower than the summation, then next lower data rate is selected. By default, 3dB is configured.</p> <p>NOTE: Refer to Table 4-1 and 4-2 for Minimum Required SNR for different data rates. These values are NOT user configurable.</p>
Rate Incr. Re-Tx% Threshold	<p>This parameter specifies the percentage of re-transmission for last 128 transmissions. If the re-transmission percentage for last 128 transmissions is greater than Rate Incr. Re-Tx% Threshold value, then the current transmission rate is maintained. By default 2% is configured.</p>
Rate Decr. Re-Tx% Threshold	<p>This parameter specifies the percentage of re-transmission for last 128 transmissions. If the re-transmission percentage for last 128 transmission is greater than Rate Decr. Re-Tx% Threshold value, then the next lower transmission rate is selected. By default 10% is configured.</p>

Table 4-1 Data Rates to Rate Index Mapping Table

Rate Index	Data Rates (Mbps)									
	5 MHz Channel Bandwidth (for Full GI-800ns)		10 MHz Channel Bandwidth (for Full GI-800ns)		20 MHz Channel Bandwidth (for Full GI-800ns)		40 MHz Channel Bandwidth			
	Longer Range	Higher Throughput	Longer Range	Higher Throughput	Longer Range	Higher Throughput	Short GI-400ns		Full GI-800ns	
							Longer Range	Higher Throughput	Longer Range	Higher Throughput
1	1.6	3.3	3.3	6.5	6.5	13	15	30	13.5	27
2	3.3	6.5	6.5	13	13	26	30	60	27	54
3	4.9	9.7	9.7	19.5	19.5	39	45	90	40.5	81
4	6.5	13	13	26	26	52	60	120	54	108
5	9.7	19.5	19.5	39	39	78	90	180	81	162
6	13	26	26	52	52	104	120	240	108	216
7	14.6	29.3	29.3	58.5	58.5	117	135	270	121.5	243
8	16.2	32.5	32.5	65	65	130	150	300	135	270

Table 4-2 DDRS Minimum Required SNR Table

Rate Index	Legacy Mode Enabled Minimum Required SNR (dB)	
	Single Stream	Dual Stream
1	7	9
2	10	13
3	13	16
4	16	19
5	20	25
6	25	28
7	28	31
8	31	34

When DDRS Status is enabled, the **DDRS Status** field is displayed and **WORP Tx Rate** is disabled in **BASIC CONFIGURATION** Screen. See [Basic Configuration Information](#) for more details. Also when enabled, the **DDRS Status** field is displayed and **WORP Tx Rate** is also disabled in **ADVANCED CONFIGURATION > Wireless > Interface 1 > WORP** screen. See [Configuring WORP Properties in End Point A Mode](#) for more information.

4.5 Security Configuration

4.5.1 Setting Up Wireless Security

In Wireless Security page, you can configure security mechanisms used to secure the communication link between End Point A and End Point B. By default, a security profile (**WORP Security**) is preconfigured with the default configuration for WORP security. However, more profiles can be created as required. Even though multiple security profiles can be created, only one security profile can be active at a time. The active security profile is configured as part of the WORP property **Security Profile Name**. For a security profile to be active, it must be enabled. Refer to [Configuring WORP Properties in End Point A Mode](#) for details.

NOTES:

- The active security profile parameters on the End Point A and End Point B should match for the connection to work as desired.
- A maximum of eight security profiles can be created.

To configure the Wireless security properties

1. Click **ADVANCED CONFIGURATION > Security > Wireless Security**. The Wireless Security Configuration screen is displayed as shown below.

S.No.	Profile Name	Entry Status	Edit
1	WORP Security	Enable	

OK Add

Figure 4-12 Wireless Security Configuration

2. Select the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

Field	Description
Profile Name	Specifies the security profile name.
Entry status	Used to enable or disable the security profile.
Edit	Click Edit to modify the Profile parameters.

NOTES:

- By default, **WORP Security** is added to the wireless security configuration.
- Default authentication mode is WORP.

4.5.1.1 Creating a New Security Profile

To create a new security profile

1. Click **ADVANCED CONFIGURATION > Security > Wireless Security**.
2. Click **Add** in the Wireless Security Configuration screen to create a new entry. The Wireless Security Add Row screen is displayed as shown below.

Figure 4-13 Creating a New Security Profile

3. Enter the appropriate parameters in the Wireless Security Add Row screen. See the following table for information on the parameters and their descriptions.
4. Click **Add**.

Field	Description
Profile Name	Enter the security profile name.
Encryption Type	Select an option from None or AES-CCM for the Encryption Type . <ol style="list-style-type: none"> 1. None - If this option is selected, no encryption will be applied to the wireless link frames. 2. AES-CCM - This option represents CCM Protocol with AES Cipher restricted to 128 bits. <ul style="list-style-type: none"> • Key 1 : Enter 16 ASCII Characters or 32 Hex Digits.
Entry status	Select Enable/Disable to enable or disable the status of the security profile.
Network Secret	Enter the WOPR Protocol Secret Key used for authenticating the End Point B with End Point A. NOTE: End Point A and End Point B must have same Network Secret.

Sample Security Profile Configuration

	End Point A	End Point B
Profile Name	NEW	NEW
Encryption Type	AES-CCM	AES-CCM
Key 1	1234567890abcdef1234567890abcdef (32 Hexadecimal digits) or publicpublic1234 (16 ASCII Characters)	1234567890abcdef1234567890abcdef (32 Hexadecimal digits) or publicpublic1234 (16 ASCII Characters)
Network Secret	public	public
Entry status	Enable	Enable
<p>NOTE:</p> <ul style="list-style-type: none"> • By using the preceding security configuration, Wireless link data follows these constraints: <ul style="list-style-type: none"> – At End Point A, frames going out from End Point A are encrypted using Key 1 and decrypted using Key 2. – At End Point B, frames going out from End Point B are encrypted using Key 2 and decrypted using Key 1. 		

4.5.1.2 Modifying a Security Profile

To edit the parameters of the existing security profiles

1. Click **ADVANCED CONFIGURATION > Security > Wireless Security**.
2. Click **Edit**. The Wireless Security Edit Row page appears.
3. Edit the parameters and click **OK**.
4. To apply the configured properties to the device, click **COMMIT**.

4.5.2 Configuring the Radius Server Profile (End Point A Only)

In large networks, you can maintain a list of MAC addresses on a centralized location using a RADIUS authentication server that grants or denies access.

A RADIUS server profile consists of a Primary and a Secondary RADIUS server that can be assigned to act as MAC Authentication servers. Configuration of Secondary Authentication Server is optional. The Radius server is referred to only when it is enabled on the **WORP Configuration** page.

To configure the Radius Server profile

1. Click **ADVANCED CONFIGURATION > Security > RADIUS**. The Radius Server Profile screen is displayed as shown below.

S.No.	Profile Name	Max Re Transmissions	Message Response Time	Re Authentication Period	Entry Status
1	Default Radius	3	3	0	Enable

Notes:

1. Max Retransmission Valid range = 0 to 3
2. Message Response Time Valid range = 3 to 9
3. Response Time < WORP Registration Timeout Value.
4. [Retransmission Count * Response Time] < Registration timeout Value.

S.No.	Server Type	IP Address	Server Port	Shared Secret	Entry Status
1	Primary Auth Server	169.254.128.133	1812	*****	Enable
2	Secondary Auth Server	169.254.128.134	1812	*****	Disable

OK

Figure 4-14 RADIUS Server Profile

2. Enter the appropriate parameters on the Radius Server Profile screen. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

Parameter	Description
Profile Name	Specifies the profile name.
Max Retransmissions	Specifies the maximum retransmissions allowed.
Message Response Time	Specifies the message response time.
Re Authentication Period	Specifies the Re Authentication Period.
Entry status	Displays the Radius profile as Enable .
Server Type	This is a read only parameter and displays the server type. Two Server Types are supported: Primary Auth Server and Secondary Auth Server .
IP Address	Enter the Server's IP address.
Server Port	Specifies the port number which is used by the unit and the Radius server to communicate. By default, RADIUS Authentication Server communicates on port 1812.
Shared Secret	Specifies the password shared by the RADIUS server and the QB-8100 device. The default password is public .
Entry Status	Select Enable/Disable to enable or disable the RADIUS server status.

Following constraints apply for Radius Profile configuration:

1. **Message Response Time** should always be less than **WORP Registration Timeout** parameter value.
2. If **Max Retransmissions** is configured as **Zero**, retransmissions do not occur.
3. The value of **Max Retransmissions** multiplied by **Message Response Time** should be less than **WORP Registration Timeout** value.
4. Max Retransmission Valid Range is 0 to 3.
5. Message Response Time Valid Range is 3 to 9.

NOTE: RADIUS authentication configuration is applicable only for End Point A.

4.5.3 Configuring the MAC ACL (End Point A Only)

You can control the access to the network using MAC Access Control List (ACL). MAC ACL is available only on End Point A. MAC Authentication is supported on the wireless interface only (not supported for the devices on the Ethernet side) and only End Point B wireless MAC addresses should be added to the list. The MAC ACL is referred to only when it is enabled on the **WORP Configuration** page.

To configure the MAC ACL

1. Click **ADVANCED CONFIGURATION > Security > MAC ACL**. The MAC Access Control screen is displayed as shown below.

S.No.	MAC Address	Comment	Entry Status
1	00:11:22:33:44:55	MAC ACL	Enable

Figure 4-15 MAC Access Control

2. Select the **Operation Type** as either **Allow** or **Deny**.

NOTE: Based on the **Operation Type**, the user can allow or deny the association of the MAC ACL profile to an End Point B.

3. Click **OK**.

To add entries to MAC Access Control table

1. Click **Add** in the **MAC Access Control** screen. The **MAC ACL Add Row** page appears.
2. Enter the **MAC Address** and **Comment**, and then select **Enable/Disable** to enable or disable **Entry Status** of the MAC Address.
3. Click **Add**.

NOTE:

- MAC Access Control authentication is available only for End Point A.
- The maximum number of MAC addresses that can be added to this table is 250.
- MAC ACL Status and Radius MAC ACL Status fields cannot be enabled simultaneously.

4.6 Quality of Service (QoS) Configuration

The Quality of Service (QoS) feature is based on the 802.16 standard and defines the classes, service flows, and packet identification rules for specific types of traffic.

4.6.1 QoS Concepts and Definitions

The software supports QoS provisioning from the End Point A only. You may define different classes of service on a End Point A that can then be assigned to the End Point B that is associated, or that may get associated, with that End Point A.

You can create, edit, and delete classes of service that are specified by the following hierarchy of parameters:

- Packet Identification Rule (PIR) – up to 64 rules, including 18 predefined rules
- Service Flow class (SFC) – up to 32 SFCs, including 8 predefined SFCs; up to 8 PIRs may be associated per SFC
- Priority for each rule within each SF class – 0 to 255, with 0 being lowest priority
- QoS class – up to 8 QoS classes, including 5 predefined classes; up to 8 SFCs may be associated per QoS class

4.6.1.1 Packet Identification Rule (PIR)

A Packet Identification Rule is a combination of parameters that specifies what type of traffic is allowed or disallowed. You can create up to 64 different PIRs, including 18 predefined PIRs. Also, you can create, edit, and delete PIRs that contain none, one, or more of the following classification fields:

- Rule Name
- IP ToS (Layer 3 QoS identification)
- 802.1p tag (layer 2 QoS identification)
- IP Protocol List containing up to 4 IP protocols
- VLAN ID
- PPPoE Encapsulation
- Ether Type (Ethernet Protocol identification)
- Up to 4 TCP/UDP Source port ranges
- Up to 4 TCP/UDP Destination port ranges
- Up to 4 pairs of Source IP address + Mask
- Up to 4 pairs of Destination IP address + Mask
- Up to 4 source MAC addresses + Mask
- Up to 4 destination MAC addresses + Mask

NOTE: IP Address, TCP/UDP Port, MAC Address need to be configured separately and associate those classification in PIR details if required.

A good example is provided by the 18 predefined PIRs. Note that these rules help identify specific traffic types:

1. All – No classification fields, all traffic matches
2. L2 Multicast
 - a. Ethernet Destination (dest = 0x010000000000, mask = 0x010000000000)
3. L2 Broadcast
 - a. Ethernet Destination (dest = 0xfffffffffff, mask = 0xfffffffffff)
4. Cisco VoIP UL
 - a. TCP/UDP Source Port Range (16,000-33,000)
 - b. IP Protocol List (17 = UDP)
5. Vonage VoIP UL

- a. TCP/UDP Source Port Range (5060-5061, 10000-20000)
- b. IP Protocol List (17 = UDP)
6. Cisco VoIP DL
 - a. TCP/UDP Destination Port Range (16,000-33,000)
 - b. IP Protocol List (17 = UDP)
7. Vonage VoIP DL
 - a. TCP/UDP Destination Port Range (5060-5061, 10000-20000)
 - b. IP Protocol List (17 = UDP)
8. TCP
 - a. IP Protocol List (6)
9. UDP
 - a. IP Protocol List (17)
10. PPPoE Control
 - a. Ether Type Rule (Ether Type = DIX-Snap, Ether Value = 0x8863)
11. PPPoE Data
 - a. Ether Type Rule (Ether Type = DIX-Snap, Ether Value = 0x8864)
12. IP
 - a. Ether Type Rule (Ether Type = DIX-Snap, Ether Value = 0x0800)
13. ARP
 - a. Ether Type Rule (Ether Type = DIX-Snap, Ether Value = 0x0806)
14. Expedited Forwarding
 - a. IP TOS/DSCP (ToS low=45(0x2D), ToS high=45(0x2D), ToS mask = 63(0x3F))
15. Streaming Video (IP/TV)
 - a. IP TOS/DSCP (ToS low=13(0x0D), ToS high=13(0x0D), ToS mask = 63(0x3F))
16. 802.1p BE
 - a. Ethernet Priority (low=0, high=0) (this is the equivalent of the User Priority value in the TCI (Tag Control Information) field of a VLAN tag)
17. 802.1p Voice
 - a. Ethernet Priority (ToS low=6, ToS high=6) (this is the equivalent of the User Priority value in the TCI (Tag Control Information) field of a VLAN tag)
18. 802.1p Video
 - a. Ethernet Priority (ToS low=5, ToS high=5) (this is the equivalent of the User Priority value in the TCI (Tag Control Information) field of a VLAN tag)

NOTE: Two different VoIP rule names have been defined for each direction of traffic, Uplink (UL) and Downlink (DL), (index numbers 4 to 7). This has been done to distinguish the proprietary nature of the Cisco VoIP implementation as opposed to the more standard Session Initiation Protocol (SIP) signaling found, for example, in the Vonage-type VoIP service.

4.6.1.2 Service Flow Class (SFC)

A Service Flow class defines a set of parameters that determines how a stream of application data that matches a certain classification profile will be handled. You can create up to 32 different SFCs, including 8 predefined SFCs. Also, you can create, edit, and delete SFCs that contain the following parameters and values:

- Service flow name
- Scheduling type – Best Effort (BE); Real-Time Polling Service (RTPS)

- Service Flow Direction – Downlink (DL: traffic from End Point A to End Point B); Uplink (UL: traffic from End Point B to End Point A)
- Maximum sustained data rate (or Maximum Information Rate, MIR) – specified in units of 1 Kbps from 8 Kbps up to the maximum rate specified in the license.
- Minimum reserved traffic rate (or Committed Information Rate, CIR) – specified in units of 1 Kbps from 0 Kbps up to the maximum rate specified in the license.
- Maximum Latency – specified in increments of 5 ms steps from a minimum of 5 ms up to a maximum of 100 ms
- Tolerable Jitter – specified in increments of 5 ms steps from a minimum of 0 ms up to the Maximum Latency (in ms)
- Traffic priority – zero (0) to seven (7), 0 being the lowest, 7 being the highest
- Maximum number of data messages in a burst – one (1) to sixteen (16), which affects the percentage of the maximum throughput of the system
- Entry Status – Enable, Disable, and Delete

NOTE: Note that traffic priority refers to the prioritization of this specific Service Flow.

The device tries to deliver the packets within the specified latency and jitter requirements, relative to the moment of receiving the packets in the unit. For delay-sensitive traffic, the jitter must be equal to or less than the latency. A packet is buffered until an interval of time equal to the difference between Latency and Jitter (Latency – Jitter) has elapsed. The device will attempt to deliver the packet within a time window starting at (Latency – Jitter) until the maximum Latency time is reached. If the SFC's scheduling type is real-time polling (RTPS), and the packet is not delivered by that time, it will be discarded. This can lead to loss of packets without reaching the maximum throughput of the wireless link. For example, when the packets arrive in bursts on the Ethernet interface and the wireless interface is momentarily maxed out, then the packets at the "end" of the burst may be timed out before they can be sent.

Users can set up their own traffic characteristics (MIR, CIR, latency, jitter, etc.) per service flow class to meet their unique requirements. A good example is provided by the 8 predefined SFCs:

1. UL-Unlimited BE
 - a. Scheduling Type = Best Effort
 - b. Service Flow Direction = Uplink
 - c. Entry Status = Enable
 - d. Maximum Sustained Data Rate = 102400 Mbps e. Traffic Priority = 0
2. DL-Unlimited BE (same as UL-Unlimited BE, except Service Flow Direction = Downlink)
3. DL-L2 Broadcast BE (same as UL-Unlimited BE, except Service Flow Direction = Downlink)
4. UL-G711 20 ms VolP RTPS
 - a. Schedule type = RTPS (Real time Polling Service)
 - b. Service Flow Direction = Uplink
 - c. Entry Status = Enable
 - d. Maximum Sustained Data Rate = 88 Kbps
 - e. Minimum Reserved Traffic Rate = 88 Kbps
 - f. Maximum Latency = 20 milliseconds g. Traffic Priority = 1
5. DL-G711 20 ms VolP rtPS (same as UL-G711 20ms VolP rtPS, except Service Flow Direction = Downlink)
6. UL-G729 20 ms VolP rtPS (same as UL-G711 20ms VolP rtPS, except Maximum Sustained Data Rate and Maximum Reserved Traffic Rate = 64 Kbps)
7. DL-G729 20 ms VolP rtPS (same as UL-G729 20ms VolP rtPS, except Service Flow Direction = Downlink)
8. DL-2Mbps Video
 - a. Schedule type = Real time Polling
 - b. Service Flow Direction = Downlink

- c. Initialization State = Active
- d. Maximum Sustained Data Rate = 2 Mbps
- e. Minimum Reserved Traffic Rate = 2 Mbps
- f. Maximum Latency = 20 milliseconds
- g. Traffic Priority = 1

Note that two different VoIP Service Flow classes for each direction of traffic have been defined (index numbers 4 to 7) which follow the ITU-T standard nomenclatures: G.711 refers to a type of audio companding and encoding that produces a 64 Kbps bitstream, suitable for all types of audio signals. G.729 is appropriate for voice and VoIP applications, but cannot transport music or fax tones reliably. This type of companding and encoding produces a bitstream between 6.4 and 11.8 Kbps (typically 8 Kbps) according to the quality of voice transport that is desired.

4.6.1.3 QoS Class

A QoS class is defined by a set of parameters that includes the PIRs and SFCs that were previously configured. You can create up to eight different QoS classes, including five predefined QoS classes. Up to eight SF classes can be associated to each QoS class, and up to eight PIRs can be associated to each SF class. For example, a QoS class called "G711 VoIP" may include the following SFCs: "UL-G711 20 ms VoIP rtPS" and "DL-G711 20 ms VoIP rtPS".

In turn, the SFC named "UL-G711 20 ms VoIP rtPS" may include the following rules: "Cisco VoIP UL" and "Vonage VoIP UL". You can create, edit, and delete QoS classes that contain the following parameters:

- QoS class name
- Service Flow (SF) class name list per QoS class (up to eight SF classes can be associated to each QoS class)
- Packet Identification Rule (PIR) list per SF class (up to eight PIRs can be associated to each SF class)
- Priority per rule which defines the order of execution of PIRs during packet identification process. The PIR priority is a number in the range 0-63, with priority 63 being executed first, and priority 0 being executed last. The PIR priority is defined within a QoS class and can be different for the same PIR in some other QoS class. If all PIRs within one QoS class have the same priority, the order of execution of PIR rules will be defined by the order of definition of SFCs, and by the order of definition of PIRs in each SFC, within that QoS class.

A good example of this hierarchy is provided by the five predefined QoS classes:

1. Unlimited Best Effort
 - a. SF class: UL-Unlimited BE
 - PIR: All; PIR Priority: 0
 - b. SF class: DL-Unlimited BE
 - PIR: All; PIR Priority: 0
2. L2 Broadcast Best Effort
 - a. SF class: DL-L2 Broadcast BE
 - PIR: L2 Broadcast; PIR Priority: 0
3. G711 VoIP
 - a. SF class: UL-G711 20 ms VoIP rtPS
 - PIR: Vonage VoIP UL; PIR Priority: 1
 - PIR: Cisco VoIP UL; PIR Priority: 1
 - b. SF class: DL-G711 20 ms VoIP rtPS
 - PIR: Vonage VoIP DL; PIR Priority: 1
 - PIR: Cisco VoIP DL; PIR Priority: 1
4. G729 VoIP
 - a. SF class: UL-G729 20 ms VoIP rtPS

- PIR: Vonage VoIP UL; PIR Priority: 1
- PIR: Cisco VoIP UL; PIR Priority: 1
- b. SF class: DL-G729 20 ms VoIP rtPS
 - PIR: Vonage VoIP DL; PIR Priority: 1
 - PIR: Cisco VoIP DL; PIR Priority: 1
- 5. 2Mbps Video
 - a. SF class: DL-2Mbps Video
 - PIR: Streaming Video (IP/TV); PIR Priority: 1

4.6.2 QoS Configuration

There are several pre-defined QoS classes, SFCs, and PIRs available that cover the most common types of traffic. If you want to configure something else, build the hierarchy of a QoS class as follows:

1. Define PIR MAC Address, IP Address and TCP/UDP Port Entries.
2. Define PIRs and specify packet clarification rules, associate MAC Address/IP Address/TCP-UDP Port Entries if required.
3. Define SFCs
4. Define QoS Class by associating PIRs with relevant SFC.
5. Assign priorities to each PIR within each SFC.

For instructions on configuring a management station (a single station used for managing an entire network), see [QoS Configuration for a Management Station](#).

QoS PIR MAC Address Configuration

1. Click **ADVANCED CONFIGURATION > QoS > PIR List > MAC Address Entries**.
2. Three predefined MAC Address entries are displayed in this page. You can configure maximum 256 entries. MAC Address and Mask combination should be unique. This MAC Address entry can be referred in the PIR Rule's Source or Destination MAC Address Classification. MAC Entry referred by any PIR rule cannot be deleted.

QoS PIR MAC Address Entries				
S.No.	MAC Address	Mask	Comment	Entry Status
1	00:00:00:00:00:00	00:00:00:00:00:00	All	Enable <input type="button" value="v"/>
2	01:00:00:00:00:00	01:00:00:00:00:00	L2 Multicast	Enable <input type="button" value="v"/>
3	ff:ff:ff:ff:ff:ff	ff:ff:ff:ff:ff:ff	L2 Broadcast	Enable <input type="button" value="v"/>

Notes:

1. Maximum 256 Entries are allowed.
2. MAC Address & Mask combination should be unique
3. MAC Address Entry referred by any PIR rule can not be deleted.

Figure 4-16 QoS PIR MAC Address Entries

3. Add a New PIR MAC Address Entry
 - a. Click **Add** to add a new entry. The following screen appears for configuring the MAC Entry Details.

Figure 4-17 QoS PIR MAC Address Add Entry

- b. Provide the MAC Address, Mask, Comment, Entry Status details and click **Add**. Comment field can be used to identify when this particular entry is referred in PIR Rule/QoS Class.

QoS PIR IP Address Configuration

1. Click **ADVANCED CONFIGURATION > QoS > PIR List > IP Address Entries**. A single predefined IP Address entry is displayed. You can configure maximum 256 entries. IP Address, Subnet Mask combination should be unique. This IP Address entry can be referred in the PIR Rule's Source or Destination IP Address Classification. IP Address Entry referred by any PIR rule cannot be deleted.

Figure 4-18 QoS PIR IP Address Entries

2. Add a New PIR IP Address Entry.
 - a. Click **Add** to add a new entry. The following screen appears for configuring the IP Address Entry Details.

Figure 4-19 QoS PIR IP Address Add Entry

- b. Provide the IP Address, Subnet Mask, Comment, Entry Status details and click **Add**. Comment field can be used by the user to identify when this particular entry is referred in PIR Rule/QoS Class.

QoS PIR TCP/UDP Port Configuration

1. Click **ADVANCED CONFIGURATION > QoS > PIR List > TCP/UDP Port Entries**. Three predefined TCP/UDP Port Entries are displayed. You can configure maximum 256 entries. Start Port, End Port combination should be unique. This TCP/UDP Port entry can be referred in the PIR Rule's Source or Destination TCP/UDP Port Classification. TCP/UDP Port Entry referred by any PIR rule can not be deleted.

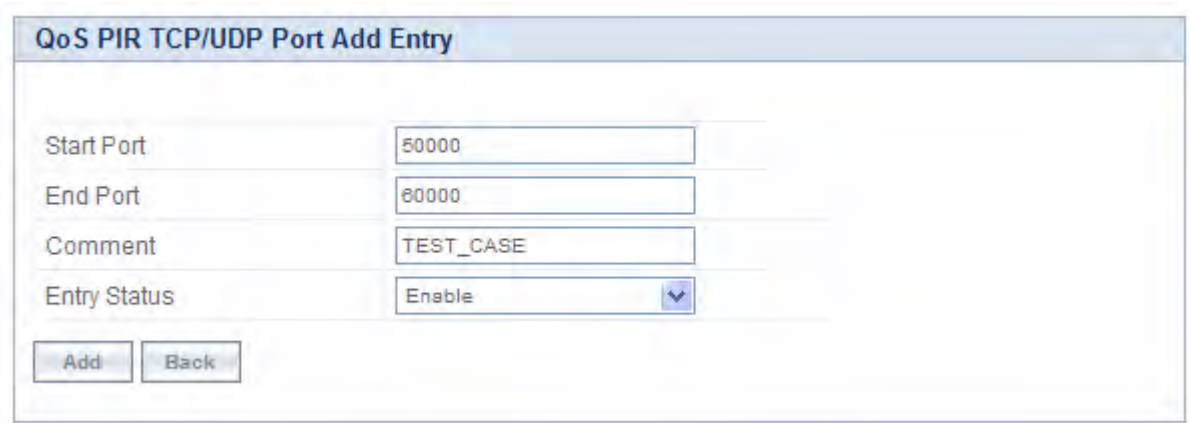
S.No.	Start Port	End Port	Comment	Entry Status
1	18000	33000	Cisco VOIP	Enable
2	5060	5061	Vonage VOIP-1	Enable
3	10000	20000	Vonage VOIP-2	Enable

Notes:

1. Maximum 256 Entries are allowed.
2. Start Port & End Port combination should be unique
3. TCP/UDP Port Entry referred by any PIR rule can not be deleted.

Figure 4-20 QoS PIR TCP/UDP Port Entries

2. Add a New PIR TCP/UDP Port Entry.
 - a. Click **Add** to add a new entry. The following screen appears for configuring the IP Address entry details.



The screenshot shows a web-based configuration form titled "QoS PIR TCP/UDP Port Add Entry". The form contains four input fields: "Start Port" with the value "50000", "End Port" with the value "80000", "Comment" with the value "TEST_CASE", and "Entry Status" with a dropdown menu set to "Enable". Below the fields are two buttons: "Add" and "Back".

Figure 4-21 QoS PIR TCP/UDP Port Add Entry

- b. Provide the Start Port, End Port, Entry Status details and click **Add**. Comment field can be used to identify when this particular entry is referred in PIR Rule/QoS Class.

4.6.2.1 QoS PIR Configuration

1. Click **ADVANCED CONFIGURATION > QoS > PIR List**. 18 predefined PIR Rules are displayed in this page. You can configure maximum 64 entries. PIR Rule Name should be unique. This PIR Rule can be referred in the QoS Class's Service Flow Details. PIR rule referred by any QoS Class cannot be deleted.

QoS PIR Entries			
S.No.	PIR Name	Entry Status	Details
1	All	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
2	L2 Multicast	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
3	L2 Broadcast	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
4	Cisco VoIP UL	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
5	Vonage VoIP UL	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
6	Cisco VoIP DL	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
7	Vonage VoIP DL	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
8	TCP	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
9	UDP	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
10	PPPoE Control	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>

Notes:

1. Maximum 64 Entries are allowed.
2. PIR Rule Name Should be Unique.
3. New PIR rule will be created without any PIR classification rules applied by default.
4. PIR Rule referred by any QoS Class can not be deleted.

Figure 4-22 QoS PIR Entries

2. Add a New PIR Rule.
 - a. Click **Add** to add a new entry. The following screen appears for configuring the New PIR Entry.

QoS PIR Add Entry	
PIR Name	<input type="text" value="TEST_CASE1"/>
Entry Status	Enable <input type="button" value="v"/>
Note: PIR Name should be unique.	
<input type="button" value="Add"/>	<input type="button" value="Back"/>

Figure 4-23 QoS PIR Add Entry

- b. Provide the PIR Name, Entry Status details and click **Add**.

PIR Rule Clarification Details

1. Click **ADVANCED CONFIGURATION > QoS > PIR List** and click **Details** for editing a particular PIR Rule.

QoS PIR Edit Entry Back

PIR Entry Details

Rule Name

Enable ToS Rule

ToS Low (0-255)

ToS High (0-255)

ToS Mask (0-255)

Enable Ether Priority Rule

Priority Low (0-7)

Priority High (0-7)

Enable VLAN Rule

VLAN Id (-1, 1 - 4094)

PPPoE Encapsulation

Enable Ether Type Rule

Ether Type

PPPoE Protocol Id

Ether Value

Notes: 1. Ether Value is not valid when PPPoE Encapsulation is enabled.
Similarly PPPoE Protocol ID is not valid when PPPoE Encapsulation is disabled.

OK

Protocol Id Entries ADD

S.No.	Protocol Id	Delete

TCP/UDP Source Port Entries ADD

S.No.	Start Port	End Port	Comment	Delete

TCP/UDP Destination Port Entries ADD

S.No.	Start Port	End Port	Comment	Delete

Source IP Address Entries ADD

S.No.	IP Address	Sub Mask	Comment	Delete

Destination IP Address Entries ADD

S.No.	IP Address	Sub Mask	Comment	Delete

Source MAC Address Entries ADD

S.No.	MAC Address	Mask	Comment	Delete

Destination MAC Address Entries ADD

S.No.	MAC Address	Mask	Comment	Delete

Figure 4-24 QoS PIR Edit Entry

Parameter	Description
Rule Name	This parameter specifies the Name of the Packet Identification Rule (PIR) and can have a length of 1-32 characters.
ToS Rule	This parameter is used to enable/disable TOS rule. Enter the values for the following to specify the ToS-related configuration: ToS Low ToS High ToS Mask
Ether Priority Rule	This parameters is used to enable or disable 802.1p priority rule. Enter the values for the following to specify 802.1p priority configuration: Priority Low Priority High
VLAN Rule	This parameters allows to enable or disable VLAN rule. Enter the VLAN ID when the VLAN rule is enabled.
PPPoE Encapsulation	This parameter is used to classify PPPoE traffic. NOTE: <ul style="list-style-type: none"> • Enabling/disabling PPPoE Configuration will automatically disable Ether Type Rule. User can configure it again by enabling Ether Type Rule. • When PPPoE Encapsulation is enabled, incoming packet will be checked again Ether value "0x8864" and look for PPPoE Protocol Id value "0x0021"(IP Protocol) by default. User can modify the PPPoE Protocol Id. All other classification rules which are specified in the PIR rule will work only if the PPPoE Protocol Id is "0021". • Ether Value is not valid when PPPoE Encapsulation is enabled.
Ether Type Rule	This parameters is used to enable/disable Ether Type rule. Enter the values for the following to specify the Ether Type rule related configuration: Ether Type PPPoE Protocol Id Ether Value NOTE: <ul style="list-style-type: none"> • PPPoE Protocol Id is not valid if PPPoE Encapsulation is disabled. • Ether Value is not valid if PPPoE Encapsulation is enabled.

Adding Protocol ID

- a. Click **Add** to add a new Protocol entry. The following screen appears.

QoS PIR Protocol Id Add Entry

Notes: 1. Maximum 4 entries are allowed
2. Valid range for Protocol Id is 1-65535

New Protocol Entry

Protocol Id

Existing Protocol Entries

S.No.	Protocol Id	Delete
1	50000	<input type="button" value="Delete"/>

Figure 4-25 QoS PIR Protocol ID

- b. Enter the details and click **Add**. For deleting an entry, click **Delete** for the corresponding entry in **PIR Details** page.

Adding TCP/UDP Source Port Numbers

- a. Click **Add** to add a new entry. The following screen appears.

QoS PIR TCP/UDP Source Port Add Entry

Note: Maximum 4 entries are allowed

New TCP/UDP Port Entry

S.No.	Start Port	End Port	Comment	Select
1	16000	33000	Cisco VOIP	<input type="radio"/>
2	5060	5061	Vonage VOIP-1	<input type="radio"/>
3	10000	20000	Vonage VOIP-2	<input type="radio"/>

Existing TCP/UDP Port Entries

S.No.	Start Port	End Port	Comment	Delete
1	16000	33000	Cisco VOIP	<input type="button" value="Delete"/>

Figure 4-26 QoS PIR TCP/UDP Source Port Add Entry

- b. All the Entries present in the PIR TCP/UDP Port Entries are displayed in the TCP/UDP Port Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing TCP/UDP Port Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

Adding TCP/UDP Destination Port Numbers

- a. Click **Add** to add a new entry. The following screen appears.

QoS PIR TCP/UDP Destination Port Add Entry

Note: Maximum 4 entries are allowed

New TCP/UDP Port Entry ADD Back

S.No.	Start Port	End Port	Comment	Select
1	16000	33000	Cisco VOIP	<input type="radio"/>
2	5060	5061	Vonage VOIP-1	<input type="radio"/>
3	10000	20000	Vonage VOIP-2	<input type="radio"/>

Existing TCP/UDP Port Entries

S.No.	Start Port	End Port	Comment	Delete
2	5060	5061	Vonage VOIP-1	Delete

Figure 4-27 QoS PIR TCP/UDP Destination Port Add Entry

- b. All the entries present in the PIR TCP/UDP Port Entries are displayed in the TCP/UDP Port Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing TCP/UDP Port Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

Adding Source IP Address

- a. Click **Add** to add a new entry. The following screen appears.

QoS PIR Source IP Address Add Entry

Note: Maximum 4 entries are allowed

New IP Address Entry ADD Back

S.No.	IP Address	Subnet Mask	Comment	Select
1	0.0.0.0	0.0.0.0	All	<input type="radio"/>

Existing IP Address Entries

S.No.	IP Address	Subnet Mask	Comment	Delete
1	0.0.0.0	0.0.0.0	All	Delete

Figure 4-28 QoS PIR Source IP Address Add Entry

- b. All the entries present in the PIR IP Address Entries are displayed in the IP Address Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing IP Address Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

Adding Destination IP Address

- a. Click **Add** to add a new entry. The following screen appears.



Figure 4-29 QoS PIR Destination IP Address Add Entry

- b. All the entries present in the PIR IP Address Entries are displayed in the IP Address Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing IP Address Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

Adding Source MAC Address

- a. Click **Add** to add a new entry. The following screen appears.

QoS PIR Source MAC Address Add Entry

Note: Maximum 4 entries are allowed

New MAC Address Entry ADD Back

S.No.	MAC Address	Mask	Comment	Select
1	00:00:00:00:00:00	00:00:00:00:00:00	All	<input type="radio"/>
2	01:00:00:00:00:00	01:00:00:00:00:00	L2 Multicast	<input type="radio"/>
3	ff:ff:ff:ff:ff:ff	ff:ff:ff:ff:ff:ff	L2 Broadcast	<input type="radio"/>

Existing MAC Address Entries

S.No.	MAC Address	Mask	Comment	Delete
2	01:00:00:00:00:00	01:00:00:00:00:00	L2 Multicast	Delete

Figure 4-30 QoS PIR Source MAC address Add Entry

- b. All the entries present in the PIR MAC Address Entries are displayed in the MAC Address Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing MAC Address Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

Adding Destination MAC Address

- a. Click **Add** to add a new entry. The following screen appears.

QoS PIR Destination MAC Address Add Entry

Note: Maximum 4 entries are allowed

New MAC Address Entry ADD Back

S.No.	MAC Address	Mask	Comment	Select
1	00:00:00:00:00:00	00:00:00:00:00:00	All	<input type="radio"/>
2	01:00:00:00:00:00	01:00:00:00:00:00	L2 Multicast	<input type="radio"/>
3	ff:ff:ff:ff:ff:ff	ff:ff:ff:ff:ff:ff	L2 Broadcast	<input type="radio"/>

Existing MAC Address Entries

S.No.	MAC Address	Mask	Comment	Delete
2	01:00:00:00:00:00	01:00:00:00:00:00	L2 Multicast	Delete

Figure 4-31 QoS PIR Destination MAC address Add Entry

- b. All the entries present in the PIR MAC Address Entries are displayed in the MAC Address Entry Table. Select the appropriate radio button and click **Add**. After adding the entry for this specific PIR, it is displayed in the Existing MAC Address Entries table. For deleting an entry, click **Delete** for the corresponding entry in the PIR Details page.

4.6.2.2 QoS Service Flow Configuration (SFC)

1. Click **ADVANCED CONFIGURATION > QoS > SFC List**. Eight predefined SFCs are displayed in this page. This table allows the user to configure maximum of 32 entries. Service Flow Name should be unique. This SFC can be referred in the QoS Class' Details. SFC referred by any QoS Class cannot be deleted.

QoS Service Flow Entries										
S.No.	Service Flow Name	Scheduler Type	Traffic Direction	MIR (Kbps)	CIR (Kbps)	Max Latency (ms)	Tolerable Jitter (ms)	Traffic Priority	Max Msgs. In Burst	Entry Status
1	UL-Unlimited BE	BE	Uplink	614400	0	5	5	0	16	Enab
2	DL-Unlimited BE	BE	Down	614400	0	5	5	0	16	Enab
3	DL-L2 Broadcast BE	BE	Down	614400	0	5	5	0	16	Enab
4	UL-G711 20ms VoIP	RTPS	Uplink	88	88	20	20	1	16	Enab
5	DL-G711 20ms VoIP	RTPS	Down	88	88	20	20	1	16	Enab
6	UL-G729 20ms VoIP	RTPS	Uplink	66	66	20	20	1	16	Enab
7	DL-G729 20ms VoIP	RTPS	Down	66	66	20	20	1	16	Enab
8	DL 2 Mbps Video	RTPS	Down	2048	2048	20	20	1	16	Enab

Notes: 1. Maximum 32 Entries are allowed.
 2. Service Flow Name should be unique
 3. Service Flow referred by any QoS Class can not be deleted.

OK Add

Figure 4-32 QoS Service Flow Entries

Adding a New Service Flow (SFC):

- a. Click **Add** to add new entry. The following screen appears for configuring the New PIR Entry.

The screenshot shows a configuration window titled "QoS Service Flow Add Entry". The fields are as follows:

- Service Flow Name: TEST_CASE1
- Scheduler Type: BE
- Traffic Direction: Downlink
- MIR: 614400 (8- 614400) Kbps
- CIR: 50000 (0- 614400) Kbps
- Max Latency: 10 (5-100) ms
- Tolerable Jitter: 10 (0-100) ms
- Traffic Priority: 5
- Max Msgs In Burst: 16 (1-16)
- Entry Status: Enable

Buttons: Add, Back

Figure 4-33 QoS Service Flow Add Entry

- Specify details for the Service Flow Name, Scheduler Type, Traffic Direction, MIR, CIR, Max Latency, Tolerable Jitter, Traffic Priority, Max Messages in Burst and Entry Status.
- Click **Add**.

Parameter	Description
Service Flow Name	Specifies the Name of the Service Flow. It can be of length 1-32 characters.
Scheduler Type	Specifies the Scheduler methods to be used. Scheduler type supports BE (Best Effort), RTPS (Real-Time Polling Service).
Traffic Direction	Specifies the Direction (Downlink or Uplink) of the traffic in which the configuration has to be matched.
MIR (Maximum Information Rate)	Specifies the maximum bandwidth allowed for this Service Flow. This value ranges from 88 to maximum value specified in the license file.
CIR (Committed Information Rate)	Specifies the reserved bandwidth allowed for this Service Flow. This value ranges from 0 to maximum value specified in the license file.
Max Latency	Specifies the Latency value. This value ranges from 5 to 100 ms.
Tolerable Jitter	Specifies the Jitter value. This value ranges from 0 to 100 ms.
Traffic Priority	Specifies the priority of the Service flow when multiple Service flows are assigned to single QoS Class. This value ranges from 0 to 7.

Parameter	Description
Max Messages in Burst	Specifies the maximum number of messages that can be sent in a burst. This value ranges from 1 to 16. NOTE: Reducing the number of messages impacts the throughput.
Entry Status	Specifies the Service Flow status.

4.6.2.3 QoS Class Configuration

1. Click **ADVANCED CONFIGURATION > QoS > Class List**. Five predefined QoS Classes are displayed in this page. You can configure maximum 8 entries. QoS Class Name should be unique. This QoS Class can be referred in the Default QoS Class or L2 Broadcast QoS Class. Any QoS Class referred cannot be deleted.

QoS Class Details

Default QoS Class:

L2 Broadcast QoS Class:

S.No.	Class Name	Entry Status	Details
1	<input type="text" value="Unlimited Best Effort"/>	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
2	<input type="text" value="L2 Broadcast Best Effort"/>	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
3	<input type="text" value="G711 VoIP"/>	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
4	<input type="text" value="G729 VoIP"/>	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
5	<input type="text" value="2 Mbps Video"/>	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>

Notes:

1. Maximum 8 QoS classes are allowed.
2. Default QoS Class will be applied on the connected which is not listed/disabled in the QoS List.
3. L2 Broadcast QoS Class should have at least one Downlink Service Flow. Uplink Service Flows which are part of this QoS Class will not be considered for QoS classification.

Figure 4-34 QoS Class Details

Parameter	Description
Default QoS Class	This parameter specifies the QoS Class profile that needs to be associated with an End Point which is not listed in the QoS End Point List but connected.

Parameter	Description
L2 Broadcast QoS Class	This parameter specifies WOPR to use this particular class for wopr broadcast facility. L2 Broadcast QoS Class is valid only for Downlink Direction. QoS Class assigned to this profile should have at least one Downlink SFC.

4. Add a New QoS Class:
 - a. Click **Add** to add new entry. The following screen appears for configuring the New Class Entry.

QoS Class Add Entry

Class Name: TEST_CASE

Service Flow Name: DL-G729 20ms VoIP rtPS

PIR Rule Name: ARP

Priority: 5

Entry Status: Enable

Note: QoS Class Name, Service Flow Name and PIR Rule Name are Mandatory.

Buttons: Add, Back

Figure 4-35 QoS Class Add Entry

- b. Specify the QoS Class Name, Service Flow Name PIR Rule Name Priority and Entry Status and click **Add**.

Parameter	Description
Class Name	Specifies the Name of the QoS Class. This name length can range from 1 to 32 characters.
Service Flow Name	Specifies the Service Flow to be associated with the QoS Class. Select one of the possible SFCs that have been previously configured in the SFC List.
PIR Rule Name	Specifies the PIR Rule need to be associated with this Service Flow. Select one of the possible PIRs that have been previously configured in the PIR List.

Parameter	Description
Priority	Specifies priority or order of execution of PIRs during packet identification process. The PIR priority is a number that can range from 0-63, with priority 63 being executed first, and priority 0 being executed last. The PIR priority is defined within a QoS class, and can be different for the same PIR in some other QoS class. If all PIRs within one QoS class have the same priority, the order of execution of PIR rules will be defined by the order of definition of SFCs, and by the order of definition of PIRs in each SFC, within that QoS class.
Entry Status	Specifies the status of the QoS Class as enable/disable.

Adding Service Flows in QoS Class

1. Click on the corresponding Details of the QoS Class for adding more Service Flows. Each QoS Class can have maximum 8 Service Flows. At least there should be one service flow per QoS Class. The following screen is displayed to configure the new SFC entry inside the QoS Class.

QoS Class Service Flow Details

Class Name: Unlimited Best Effort

S.No.	SFC Name	Entry Status	Details
1	UL-Unlimited BE	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
2	DL-Unlimited BE	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
3	DL-L2 Broadcast BE	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
4	UL-G711 20ms VoIP rTPS	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
5	DL-G711 20ms VoIP rTPS	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
6	UL-G729 20ms VoIP rTPS	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>
7	DL-G729 20ms VoIP rTPS	Enable <input type="button" value="v"/>	<input type="button" value="Details"/>

Notes: 1. Maximum 8 Service Flows are allowed.
2. QoS class should have atleast one Service Flow entry.

Figure 4-36 QoS Class Service Flow Details

2. Click **Add**. The following screen appears for association of the new SFC in this QoS Class.

The screenshot shows a web interface titled "QoS Service Flow Add Entry". It contains four input fields: "Service Flow Name" with a dropdown menu showing "UL-Unlimited BE", "PIR Rule Name" with a dropdown menu showing "Streaming Video", "Priority" with a text input field containing "7", and "Entry Status" with a dropdown menu showing "Enable". Below these fields is a red note: "Note: Same Service Flow cannot exists more than once in a QoS Class". At the bottom left, there are two buttons: "Add" and "Back".

Figure 4-37 QoS Class Service Flow Add Entry

3. Specify the Service Flow Name, PIR Rule Name, Priority and Entry Status and click **Add** to add a new entry.

Adding PIR in QoS Class

1. Click on the corresponding Details provided in the Service Flow of a particular QoS Class. Maximum 8 PIR rules can be associated per SFC of an QoS Class. At least there should be one PIR per SFC of an QoS Class. The following screen will be displayed to associate the new PIR entry inside an SFC of an QoS Class.

QoS Class PIR Details			
Class Name		Unlimited Best Effort	
Service Flow Name		UL-Unlimited BE	
S.No.	PIR Name	Priority	Entry Status
1	All	0	Enable <input type="button" value="v"/>
2	L2 Multicast	255	Enable <input type="button" value="v"/>
3	L2 Broadcast	255	Enable <input type="button" value="v"/>
4	Cisco VoIP UL	255	Enable <input type="button" value="v"/>
5	Vonage VoIP UL	255	Enable <input type="button" value="v"/>
6	Cisco VoIP DL	255	Enable <input type="button" value="v"/>
7	Vonage VoIP DL	255	Enable <input type="button" value="v"/>

Notes: 1. Maximum 8 PIRs are allowed.
2. The same PIR rule can not exists more than once in either direction of the QoS Class.

Figure 4-38 QoS Class PIR Details

- Click **Add**. The following screen appears for association of the new PIR rule in an SFC already associated in an QoS Class.

QoS Class PIR Add Entry	
PIR Rule Name	PPPoE Control <input type="button" value="v"/>
Priority	5
Entry Status	Enable <input type="button" value="v"/>

Note: Each PIR cannot exist more than once in either direction(Uplink/Downlink) per QoS Class.

Figure 4-39 QoS Class PIR Add Entry

- Specify the PIR Rule Name, Priority and Entry Status and click **Add** to add a new entry.

4.6.2.4 QoS End Point Configuration

1. Click **ADVANCED CONFIGURATION > QoS > End Point**. By default, the table does not have any entry. User can configure the Wireless MAC Address of the End Point B here and associate the QoS Class need to be used for that particular End Point.

QoS End Point B Entries				
S.No.	MAC Address	Class Name	Comment	Entry Status
1	10:20:30:40:50:60	Unlimited Best Effort	TEST_CASE1	Enable

Notes : 1. End Point B MAC Address should be unique.

Figure 4-40 QoS End Point B Entries

If no End Point is configured but any End point is associated then this End Point gets the Default QoS Class configuration. **Adding a New End Point**

1. Click **Add** to add a new entry. The following screen appears for configuring the New End Point Entry.

End Point B QoS Table Add Row	
Wireless MAC Address	<input type="text" value="10:20:30:40:50:60"/>
Class Name	<input type="text" value="Unlimited Best Effort"/> ▼
Comment	<input type="text" value="TEST_CASE1"/>
Entry Status	<input type="text" value="Enable"/> ▼
<input type="button" value="Add"/> <input type="button" value="Back"/>	

Figure 4-41 End Point B QoS Table add Row

2. Specify the Wireless Mac Address of the End Point, Class Name, Comment and Entry Status and click **Add**. Previously defined Class Name is listed in the **Class Name** drop-down menu.

4.6.3 QoS Configuration for a Management Station

As stated previously, the QoS feature enables prioritization of traffic and allocation of the available bandwidth based on that prioritization. The system is designed in such a way that higher priority traffic preempts lower priority traffic, keeping lower priority traffic on hold until higher priority traffic finishes. This mechanism ensures that the available bandwidth is always given first to the higher priority traffic; if all the bandwidth is not consumed, the remaining bandwidth is given to the lower priority traffic.

If QoS is not configured properly, the system can become difficult to access in heavily loaded networks. One of the side effects of this misconfiguration is ping time-out, which is usually interpreted as a disconnection of the pinged node. However, with the correct QoS configuration, every node in the network can be reached at any moment.

The following configuration instructions explain how to configure the system so that configuration parameters can always be changed, and ping requests and responses get higher priority in order to show the actual connectivity of the pinged node.

The configuration suggested here assumes that the whole network is managed from a single work station, called the management station. This station can be connected anywhere in the network, and can be recognized by either its IP address, or by its MAC Ethernet address if the network uses DHCP.

In this configuration, any traffic coming from or going to the management station is treated as management traffic. Therefore, the management station should be used only for configuration of the Quick Bridge nodes in the network and to check connectivity of the nodes, but it should not be used for any throughput measurements.

CAUTION: *While this QoS configuration is used, the TCP or UDP throughput should not be measured from the management station.*

Step 1: Add Packet Identification Rules

To recognize management traffic, the system needs to recognize ARP requests/responses and any traffic coming from or going to the management station.

A. Confirm the Attributes of the Existing ARP PIR

The default QoS configuration contains the PIR called "ARP," which recognizes ARP requests/responses by the protocol number 0x0806 in the Ethernet Type field of the Ethernet packet. Confirm that the ARP PIR parameters are correct, as follows:

1. Click **ADVANCED CONFIGURATION > QoS > PIR list**.
2. Click the **Details** button corresponding to the ARP PIR.
3. Confirm the following attributes:
 - Rule Name: ARP
 - Status: Enable
 - Enable Ether Type Rule: Yes (checkbox is selected)
 - Ether Type: DIX-Snap
 - Ether Value: 08:06(hex)

B. Create New PIRs to Recognize Management Traffic

To recognize the traffic coming from or going to the management station, the system must contain two additional PIRs: one with either the destination IP address or the destination MAC address equal to the management station's IP or MAC address, and another with either the source IP address or the source MAC address equal to the management station's IP or MAC address. The following examples explain PIR rules based on the IP Address of the Management Station.

1. Click **ADVANCED CONFIGURATION > QoS > PIR list > IP Address Entries**.
2. Click **Add**. The screen for adding the Management Station's IP Address appears. Enter proper IP Address, Subnet mask as 255.255.255.255, Entry status as **Enable** and then click **Add**. This adds the Management Station's IP details in the IP Address Entries of the PIR List.
3. Click **ADVANCED CONFIGURATION > QoS > PIR list**.
4. Add PIR Rule for Source IP Address.
 - a. Click **Add**. The screen for adding the New PIR Rule appears. Enter the PIR Rule Name as "Management Station SRC IP", Entry status as **Enable** and click **Add**. This adds the new PIR rule in the PIR List. By default, no classification rules are applied.
 - b. Click **ADVANCED CONFIGURATION > QoS > PIR list**. Click **Details** for "Management Station SRC IP" PIR rule. This displays all the classification rule details for this particular rule.

- c. Click **Add** that corresponds to Source IP Address Entries. This displays a screen for referring the Management Station's IP Address. New Entry Table displays all the IP Address Entries of the PIR List. Select the option button corresponding to the Management Station and then click **Add**. This adds the IP Address of the Management Station to the Existing Entries. Click **Back** and the new entry appears in the Source IP Address Entries Table.
5. Add PIR Rule for Destination IP Address.
 - a. Click **Add**. This displays a screen for adding the New PIR Rule. Enter the PIR Rule Name as "Management Station DST IP", Entry status as **Enable** and then click **Add**. This adds the new PIR rule in the PIR List. By default, no classification rules are applied.
 - b. Click **ADVANCED CONFIGURATION > QoS > PIR list**. Click **Details** corresponding to the "Management Station DST IP" PIR rule. This displays the classification rule details for this particular rule.
 - c. Click **Add** corresponding to Destination IP Address Entries. This displays a screen for referring the Management Station's IP Address. New Entry Table displays all the Entries of the IP Address Entries of the PIR List. Select the option button corresponding to the Management Station and click **Add**. This adds the IP Address of the Management Station to the Existing Entries. Click **Back** and the new entry appears in the Destination IP Address Entries Table.

Step 2: Add Service Flow Classes

To handle management traffic, the system needs two Service Flow Classes: one for uplink traffic and one for downlink traffic.

1. Configure the Downlink Service Flow.
 - a. Click **ADVANCED CONFIGURATION > QoS > SFC list**.
 - b. Click **Add**.
 - c. Enter the following parameters:
 - Service Flow Name: DL-Management
 - Scheduler Type: RtPS
 - Traffic Direction: Downlink
 - MIR: 1000
 - CIR: 1000
 - Max Latency: 20
 - Tolerable Jitter: 10
 - Priority: 7
 - Max Messages in Burst: 16
 - Entry Status: Enable
 - d. Click **Add**. The DL-Management Service Flow is added to the QoS SFC List.
2. Configure the Uplink Service Flow.
 - a. Click **ADVANCED CONFIGURATION > QoS > SFC list**.
 - b. Click **Add**.
 - c. Enter the following parameters:
 - Service Flow Name: UL-Management
 - Scheduler Type: RtPS
 - Traffic Direction: Uplink
 - MIR: 1000
 - CIR: 1000
 - Max Latency: 20
 - Tolerable Jitter: 10
 - Priority: 7

- Max Messages in Burst: 16
 - Entry Status: Enable
- d. Click **Add**. The UL-Management SF is added to the QoS SFC List.

NOTE: The input and output bandwidth limits set on the End Point A or on the End Point B are used for limiting aggregate bandwidth used by End Point B. These limits override any limit imposed by MIR in the SFC. Therefore, these limits should be set to at least 1000 kbps (MIR values in UL-Management and DL-Management SFCs).

Step 3: Configure QoS Classes

Finally, the DL-Management SFC and UL-Management SFCs created in Step 2 must be added to each QoS Class used by the Quick Bridge network. Additionally, within the QoS class, these SFC must have the three PIRs mentioned in Step 1 associated with them.

1. Add SFCs to QoS Class.
 - a. Click **ADVANCED CONFIGURATION > QoS > Class list**.
 - b. Click **Details** corresponding to the first class (Unlimited Best Effort) you wish to modify.
 - c. Under the QoS Class Service Flow, click **Add**.
 - d. Configure the following parameters, and click **Add**. This adds the New SFC & PIR relation to the QoS Class.
 - Service Flow Name: DL-Management
 - PIR Rule Name: ARP
 - PIR Priority: 63
 - Entry Status: Enable.
 - e. Again click **Add** under the QoS Class Service Flow Details.
 - f. Configure the following parameters and click **Add**. This adds the New SFC & PIR relation to the QoS Class.
 - Service Flow Name: UL-Management
 - PIR Rule Name: ARP
 - PIR Priority: 63
 - Entry Status: Enable
2. Add PIRs to SFCs within the QoS Class.
 - a. Click **ADVANCED CONFIGURATION > QoS > Class list**.
 - b. Click **Details** corresponding to the first class (Unlimited Best Effort) you wish to modify.
 - c. Under the QoS Class Service Flow Details heading, click **Details** corresponding to the DL-Management Service Flow.
 - d. Under the QoS Class PIR Details heading, click **Add**.
 - e. Add the Management Station DST IP PIR to this Service Flow by configuring the following parameters:
 - PIR Rule Name: Management Station DST IP
 - PIR Priority: 63
 - Entry Status: Enable
 - f. Click **Add**. This PIR is added to the first QoS Class (Unlimited Best Effort) Service Flow's (DL-Management) list.
 - g. Add the Management Station SRC IP PIR to this Service Flow by configuring the following parameters:
 - PIR Rule Name: Management Station SRC IP
 - PIR Priority: 63
 - Entry Status: Enable
 - h. Return to the Class List screen and repeat steps 2 - 7 for the UL-Management Service Flow in this class.

4.7 VLAN Configuration (Bridge Mode only)

Virtual Local Area Networks (VLANs) are logical groupings of network hosts. Defined by software settings, other VLAN members or resources appear (to connected hosts) to be on the same physical segment, no matter where they are attached on the logical LAN or WAN segment. They simplify traffic flow between clients and their frequently-used or restricted resources.

A device can communicate across a VLAN-capable switch that analyses VLAN tagged frames and directs traffic to the appropriate units. The purpose of this network is to provide an easy way of modifying logical groups in the dynamic environment. VLAN is supported only in **Bridge** mode.

VLANs are used to conveniently, efficiently, and easily manage your network in the following ways:

- Define groups
- Reduce broadcast and multicast traffic to unnecessary destinations
 - Improve network performance and reduce latency
- Increase security
 - Secure network restricts members to resources on their own VLAN

VLAN features can be managed via:

- The End Point's Web interface
- The Command Line Interface (see "Command Line Interface" section in the Reference Manual)
- SNMP (Log on to Proxim support site <http://support.proxim.com> for MIBs)

NOTE: The VLAN parameters can be configured on selected Interface (Ethernet 1/Ethernet 2).

4.7.1 Establishing a VLAN Connection

For enabling the VLAN support, certain network settings should be configured and certain network resources, such as VLAN aware switches should be available, depending upon the type of configuration.

VLAN support also provides the capability to specify a separate VLAN ID and priority for management frames (SNMP, ICMP, Telnet, DHCP, and TFTP).

To configure VLAN,

Click **ADVANCED CONFIGURATION > VLAN**.

VLAN	
VLAN Status	<input type="checkbox"/>
Management VLAN ID	-1 (-1, 1-4094)
Management VLAN Priority	5 (0 - 7)
<input type="button" value="OK"/>	

Figure 4-42 Configuring VLAN

VLAN parameters can be classified into two types: System-related VLAN parameters and Interface-related VLAN parameters.

1. **System-related parameters:** These parameters are applicable to the whole device. The following parameters are the System-related VLAN parameters.

- a. **VLAN Status:** Selecting the **VLAN Status** checkbox enables the VLAN Status on the device. To update all VLAN related parameters, VLAN status should be enabled.

NOTE: By default, the VLAN status is disabled.

- b. **Management VLAN ID:** This parameter is used to configure the Management VLAN ID. This option is available when Management VLAN ID is configured. The management stations must tag the management frames sent to the device with the management VLAN ID specified in the device. The device will tag all the management frames from the device with the specified management VLAN and priority.

NOTES:

- If the Management VLAN ID is -1, only untagged frames can access the device.
- Before setting the Management VLAN ID from 1 to 4094, make sure that the management platform or host is a member of the same VLAN; or else, your access to the device will be lost.

- c. **Management VLAN Priority:** This parameter is used to set IEEE 802.1p priority for the frames. The priority value ranges from 0 to 7. By default, it is set to 0 (zero).

2. **Interface-related VLAN parameters:** The device supports configuring VLAN modes for Ethernet interface. The wireless interface is always in **Transparent Mode**.

4.7.2 VLAN Modes

4.7.2.1 Transparent Mode

Transparent Mode is available for the Ethernet and Wireless interfaces for both End Point A and End Point B. It is equivalent to **NO VLAN** support and is the default mode. It is used to connect VLAN aware / unaware networks. An interface in transparent mode forwards both tagged and untagged frames.

To configure the VLAN Transparent Mode

1. Click **ADVANCED CONFIGURATION > VLAN > Ethernet**. The VLAN Ethernet Configuration window appears as shown below.



Figure 4-43 VLAN Operation in Transparent Mode

2. Enter the parameters listed in the following table.
3. Click **OK**.

Parameters	Description
Interface	Displays the name of the interface.
VLAN Mode	Select the VLAN mode as Transparent .

Click **COMMIT** for the changes to take effect. Once the transparent mode is set, both tagged and untagged frames are received on the interface.

NOTE: *Wireless Interface of the device will always be in transparent mode. There is no support provided to edit the wireless interface VLAN parameters.*

4.7.2.2 Trunk Mode

Trunk mode is configurable on both the ethernet interfaces of End Point A and End Point B. It is mainly used to connect VLAN aware networks. When an interface is in **Trunk** mode, it forwards only those tagged frames whose VLAN ID matches with a VLAN ID present in trunk table. All other frames will be dropped.



Figure 4-44 VLAN operation in Trunk Mode

To enable Trunk mode, click **ADVANCED CONFIGURATION > VLAN > Ethernet** and enter the settings as described in the following table:

Parameter	Description
Interface	Displays the name of the interface.
VLAN Mode	Select the VLAN Mode as Trunk .

Parameter	Description	
Allow Untagged Frames	Select Enable or Disable for this option.	
	Enable	If this option is selected, an interface in trunk mode forwards both tagged frames whose VLAN ID matches with one of the VLAN IDs of the trunk table and untagged frames.
	Disable	If this option is selected, an interface in trunk mode forwards only tagged frames and drops untagged frames.

Adding New Trunk Table Entries

To add new table entries

1. Click **Add** in the VLAN Ethernet Configuration screen. The **VLAN Trunk Table Add Row** page appears.

Figure 4-45 VLAN Trunk Table Add Row

2. Enter the parameters as described in the following table.
3. Click **Add**.

Field	Description
Trunk Id	Enter the value of the trunk VLAN Id.
Entry Status	Enable or disable the status of the trunk table entry.

4. Click **COMMIT** for the changes to take effect.

NOTE: Up to 256 VLAN IDs can be configured on the Ethernet interfaces of End Point A and up to 16 VLAN IDs can be configured on the Ethernet interfaces of End Point B.

4.7.2.3 Access Mode

Access mode is available only on the Ethernet interface of *End Point B*. This mode is used to connect VLAN aware networks with VLAN unaware networks. In access mode, Tagged frames with specified Access Vlan ID going out of the device through the Ethernet interface are untagged and forwarded. The untagged frames coming into the device through the Ethernet interface are tagged with specified Access Vlan ID and Access Vlan priority and forwarded.

To configure the Access Mode in the VLAN network

1. Click **ADVANCED CONFIGURATION > VLAN > Ethernet**. The VLAN Ethernet Configuration screen appears.

VLAN Ethernet Configuration

Ethernet 1

Interface: eth1

VLAN Mode: Access

Access VLAN Id: -1 (-1, 1-4094)

Access VLAN Priority: 0 (0 - 7)

OK

Figure 4-46 VLAN operation in Access Mode

2. Enter the parameters as described in the following table.

Parameter	Description
Interface	Displays the name of the interface.
VLAN Mode	Select the VLAN mode as Access .
Access VLAN Id	The Access VLAN Id values range from 1 to 4094. The default value is -1.
Access VLAN Priority	The Access VLAN priority values range from 0 to 7. The default priority is 0.

3. Click **OK**.
4. Click **COMMIT** for the changes to take effect.

4.8 Filtering Configuration (Bridge Only)

Filters are useful for preventing bridging of selected protocol traffic from one segment of a network to other segments (or subnets). This feature can be used both to increase the amount of bandwidth available on the network and to increase network security.

The Packet Filtering features help in controlling the amount of traffic exchanged between the wired and wireless networks. Filtering features are available only in bridge mode operations. Using the filtering processes, you can restrict any unauthorized packets from accessing the network.

Following are various filtering types supported by QB-8100:

- [Ethernet Protocol Filter](#)
- [Static MAC Address Filter](#)

- [Advanced Filter](#)
- [TCP/UDP Port Filter](#)
- [Storm Threshold Filter](#)

To configure the filtering mechanism

1. Click **ADVANCED CONFIGURATION > Filtering**. The Filtering screen appears.



Figure 4-47 Filtering

2. Enter the appropriate parameters in the **Filtering** screen. See the following table that lists all the parameters and their descriptions.

Parameter	Description
Global Filter Flag	This parameter is used to enable or disable complete filtering operations.
STP Frame Forward Status	By accepting the STP frames, any loops that occurs within a network can be avoided. Enable: When this option is selected, the STP frames in the system are bridged. Disable: When this option is selected, the STP frames encountered in a network are terminated at bridge.

3. Click **OK**.

NOTE:

- The filtering process is activated only when the **Global Filter Flag** is selected as **Enable**.
- Click **COMMIT** for the changes to take effect in the device.

4.8.1 Ethernet Protocol Filter

The Ethernet Protocol Filter blocks or forwards packets based on the Ethernet protocols supported on the device. The filtering takes effect only when the **Global Flag** is enabled.

The packets are forwarded or dropped depending on their **Entry status**, **Filter status** and **Filtering Type**.

To configure **Ethernet Protocol Filtering**,

1. Click **ADVANCED CONFIGURATION > Filtering > Ethernet Protocol Filtering**. The Protocol Filter screen is displayed as shown below.

Protocol Filter

Filtering Control: Disable ▼

Filtering Type: Passthru ▼

OK

S.No.	Protocol Name	Protocol Number	Filter Status	Entry Status
1	Apollo Domain	80:19	Block ▼	Disable ▼
2	Apple Talk 1 and 2	80:9b	Block ▼	Disable ▼
3	Apple Talk ARP 1 and 2	80:f3	Block ▼	Disable ▼
4	Banyan VINES	0b:ad	Block ▼	Disable ▼
5	Banyan VINES Echo	0b:af	Block ▼	Disable ▼
6	Decnet Phase IV	80:03	Block ▼	Disable ▼
7	DEC Diagnostic	80:05	Block ▼	Disable ▼
8	DEC LAT	80:04	Block ▼	Disable ▼
9	DEC MOP Dump/Load	80:01	Block ▼	Disable ▼
10	DEC MOP Rem Cons	80:02	Block ▼	Disable ▼

OK Add

Figure 4-48 Protocol Filter

2. Enter the appropriate parameters in the **Protocol Filter** screen. See the following table that lists the parameters and their descriptions.

Parameter	Description
Filtering Control	This parameter is used to configure the interface on which filtering has to be applied. By default, it is disabled. It can be configured as: <ul style="list-style-type: none"> • Ethernet: Packets are examined on the receive path of the Ethernet interface. • Wireless: Packets are examined at the Wireless interface. • All Interfaces: Packets are examined at both Ethernet and wireless interfaces. • Disable: The protocol filtering process is disabled.
Filtering Type	The Filtering Type specifies the action to be taken on the packet whose protocol/ether type is not registered in the protocol filter table or whose Entry Status is in Disable state. By default, it is set to Passthru . <p>Block: The protocols with entry status Disable or the protocols which do not exist in the protocol filtering table are blocked.</p> <p>Passthru: The protocols with entry status Disable or the protocols which do not exist in the protocol filtering table are allowed through the interface.</p>
NOTE: Click COMMIT for the changes to take effect in the device.	
Ethernet Protocol Filter Table	
Protocol Name	Specifies the name of the Ethernet Protocol.
Protocol Number	Specifies the value of the Ethernet Protocol. The value is of 4 digit Hex format.
Filter Status	This parameter allows configuring the Filter Status as either Block or Passthru . The default is Block . Selection of the Filter Status takes effect only if the Entry Status is Enabled . <p>When this filter status is set to Passthru and entry status is Enable, all packets whose protocol matches with the given protocol number are forwarded on the selected interface.</p> <p>When this filter status is set to Block and entry status is Enable, all packets whose protocol matches with the given protocol number are dropped on selected interface.</p>
Entry Status	Set the Entry Status as Enable/Disable/Delete .
NOTE: Click COMMIT for the changes to take effect in the device.	

3. A few frequently used filters are listed in the **Ethernet Protocol Filter Table**.
4. For adding new entries to the **Protocol filter Table**:
- Click **Add** to display the **Protocol Filters Add Row** page as shown in the following figure.

- b. Enter the details as described in the preceding table and click **Add**.

Figure 4-49 Protocol Filter Add Row

NOTE:

- By default, the system generates 19 entries. You can **Enable** or **Disable** the default entries, but the **Delete** option is not applicable for all the default 19 entries.
- The added entry in the table can be enabled, disabled, or deleted based on user requirement.
- Max Entries supported in **Ethernet Protocol Filter Table** are 64.

4.8.2 Static MAC Address Filter

4.8.2.1 Overview

The Static MAC Address filter optimizes the performance of a wireless and wired network. When this feature is configured, the device can block traffic between wired and wireless network based on MAC address.

The filter limits the data traffic between two specific devices (or between groups of devices based on MAC addresses and masks) through the unit's wireless interface. For example, a server on the network, which should not allow wireless clients to communicate, can be set up with a static MAC filter to block traffic between these devices. The **Static MAC Filter Table** performs bi-directional filtering.

Each MAC address or mask consists of 12 hexadecimal digits (0-9 and A-F) that correspond to a 48-bit identifier. Each hexadecimal digit represents 4 bits (0 or 1).

Taken together, a MAC address/mask pair specifies an address or a range of MAC addresses that the device looks for when examining packets. The device performs bitwise "AND" operation between the MAC address and the mask at the bit level. A mask of 00:00:00:00:00:00 corresponds to all MAC addresses, and a mask of FF:FF:FF:FF:FF:FF applies only to the specified MAC address.

For example, if the MAC address is 00:20:A6:12:54:C3 and the mask is FF:FF:FF:00:00:00, the device examines the source and destination addresses of each packet looking for any MAC address starting with 00:20:A6. If the mask is FF:FF:FF:FF:FF:FF, the device looks only for the specific MAC address (in this case, 00:20:A6:12:54:C3).

When creating a filter, the user can configure the Wired parameters only, the Wireless parameters only, or both sets of parameters.

- To prevent all traffic from a specific wired MAC address from being forwarded to the wireless network, configure only the Wired MAC address and Wired mask (leave the Wireless MAC and Wireless mask set to all zeros).
- To prevent all traffic from a specific wireless MAC address from being forwarded to the wired network, configure only the Wireless MAC and Wireless mask (leave the Wired MAC address and Wired mask set to all zeros).

- To block traffic between a specific wired MAC address and a specific wireless MAC address, configure all four parameters.

4.8.2.2 Static MAC Filter Examples

Consider a network that contains a wired server and three wireless clients. The MAC addresses for each unit are as follows:

- **Wired Server:** 00:40:F4:1C:DB:6A
- **Wireless Client 1:** 00:02:2D:51:94:E4
- **Wireless Client 2:** 00:02:2D:51:32:12
- **Wireless Client 3:** 00:20:A6:12:4E:38

Prevent Two Specific Devices from Communicating

Configure the following settings to prevent the Wired Server and Wireless Client 1 from communicating:

- **Wired MAC Address:** 00:40:F4:1C:DB:6A
- **Wired Mask:** FF:FF:FF:FF:FF:FF
- **Wireless MAC Address:** 00:02:2D:51:94:E4
- **Wireless Mask:** FF:FF:FF:FF:FF:FF

Result: Traffic between the Wired Server and Wireless Client 1 is blocked. Wireless Clients 2 and 3 still can communicate with the Wired Server.

Prevent Multiple Wireless Devices From Communicating With a Single Wired Device

Configure the following settings to prevent Wireless Clients 1 and 2 from communicating with the Wired Server:

- **Wired MAC Address:** 00:40:F4:1C:DB:6A
- **Wired Mask:** FF:FF:FF:FF:FF:FF
- **Wireless MAC Address:** 00:02:2D:51:94:E4
- **Wireless Mask:** FF:FF:FF:00:00:00

Result: When a logical "AND" is performed on the Wireless MAC Address and Wireless Mask, the result corresponds to any MAC address beginning with the 00:20:2D prefix. Since Wireless Client 1 and Wireless Client 2 share the same prefix (00:02:2D), traffic between the Wired Server and Wireless Clients 1 and 2 is blocked. Wireless Client 3 can still communicate with the Wired Server since it has a different prefix (00:20:A6).

4.8.2.3 Prevent All Wireless Devices From Communicating With a Single Wired Device

Configure the following settings to prevent Wired Server from communicating with all three Wireless Clients:

- **Wired MAC Address:** 00:40:F4:1C:DB:6A
- **Wired Mask:** FF:FF:FF:FF:FF:FF
- **Wireless MAC Address:** 00:00:00:00:00:00
- **Wireless Mask:** 00:00:00:00:00:00

Result: The unit blocks all traffic between the Wired Server and all wireless clients.

4.8.2.4 Prevent a Wireless Device from Communicating with the Wired Network

Configure the following settings to prevent Wireless Client 3 from communicating with any device on the Ethernet:

- **Wired MAC Address:** 00:00:00:00:00:00
- **Wired Mask:** 00:00:00:00:00:00
- **Wireless MAC Address:** 00:20:A6:12:4E:38

- **Wireless Mask:** FF:FF:FF:FF:FF:FF

Result: The unit blocks all traffic between Wireless Client 3 and the Ethernet network.

4.8.2.5 Static MAC Address Filter Configuration

To configuring Static MAC Filter

1. Click **ADVANCED CONFIGURATION > Filtering > Static Mac Address Filter**. The **Static MAC Address Filter** screen is displayed as shown below.

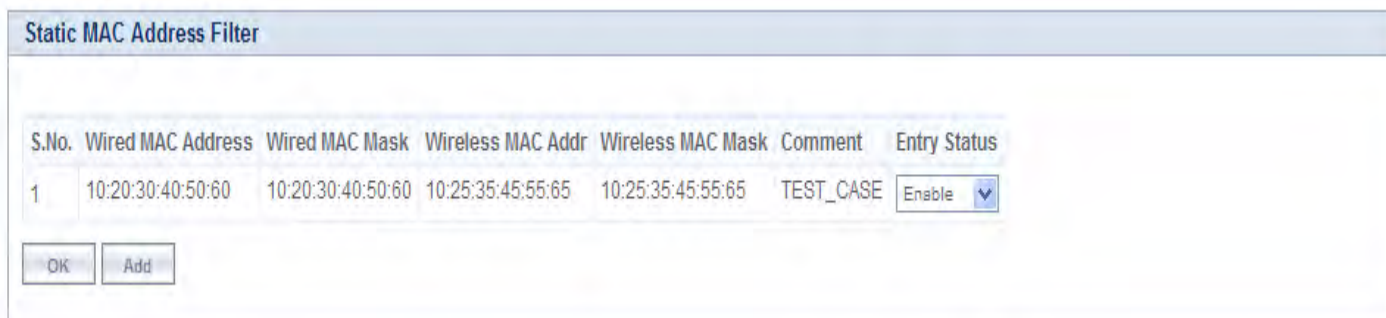


Figure 4-50 Static MAC Address Filter

2. Click **Add**. The **Static MAC Address Filter Add Row** screen appears.



Figure 4-51 Creating a new Static MAC Address Filter

3. Enter the parameters listed in the following table.

Parameter	Description
Wired MAC Address	Specifies the MAC address of the device on the wired network that is restricted from communicating with a device in the wireless network.

Parameter	Description
Wired MAC Mask	Specifies the range of MAC address to which this filter is to be applied.
Wireless MAC address	Specifies the MAC address of the device on the wireless network that is restricted from communicating with a device in the wired network.
Wireless MAC Mask	Specifies the range of MAC address to which this filter is to be applied.
Comment	Specifies the comment associated with Static MAC Filter table entry.
Status	Specifies the status of the newly created filter.

NOTE: The **Static MAC Address Filter** table supports up to 200 entries.

4. Click **Add** to add a new entry to the Static MAC Address Filter table.
5. Click **Commit** so that the filter gets applied on the network.

NOTE:

- The Wired MAC address and the Wireless MAC address should be a unicast MAC address.
- MAC Address/Mask includes 12 hexadecimal digits (each hexadecimal equals to 4 bits containing 0 or 1) which are equivalent to 48 bit identifier.

4.8.3 Advanced Filter

In Advanced Filtering, IP protocols which are frequently used or transmitted through the network are filtered.

To view the advanced filtering

1. Click **ADVANCED CONFIGURATION > Filtering > Advanced Filtering**. The Advanced Filtering screen is displayed as shown below.

Advanced Filtering			
S.No.	Protocol Name	Direction	Entry Status
1	Deny IPX RIP	Both	Disable
2	Deny IPX SAP	Both	Disable
3	Deny IPX LSP	Both	Disable
4	Deny IP Broadcasts	Both	Disable
5	Deny IP Multicasts	Both	Disable

Figure 4-52 Advanced Filtering

2. The following table describes the parameters present in the **Advanced Filtering** table.

Parameter	Description
Name	This parameter specifies the protocol name. The following filters are supported in Advanced Filtering: <ul style="list-style-type: none"> Deny IPX RIP Deny IPX SAP Deny IPX LSP Deny IP Broadcasts Deny IP Multicasts
Direction	This parameter specifies the direction of an individual entry in the Advanced Filter table. The direction can be Ethernet to Wireless, Wireless to Ethernet, or both.
Entry Status	This parameter specifies the status of the individual entry.

NOTE:

- The Advanced Filtering table contains maximum 5 entries.
- New entries cannot be added and existing entries cannot be deleted from the **Advanced Filtering** table.

4.8.3.1 Editing Table Entries

- Click **Edit** to modify the existing table details. The **Advanced Filtering - Edit Entries** page appears.

Advance Filtering - Edit Entries	
Name	Deny IPX RIP
Direction	Both
Status	Disable
Name	Deny IPX SAP
Direction	Both
Status	Disable
Name	Deny IPX LSP
Direction	Both
Status	Disable
Name	Deny IP Broadcasts
Direction	Both
Status	Disable
Name	Deny IP Multicasts
Direction	Both
Status	Disable
<input type="button" value="BACK"/> <input type="button" value="OK"/> <input type="button" value="Cancel"/>	

Figure 4-53 Advance Filtering- Edit Entries

1. After making the desired modifications, click **OK** to update the table.
2. Click **Back** to navigate to the previous page. Click **Cancel** to retain the previous entries.

NOTE: Click **COMMIT** for the changes to take effect in the device.

4.8.4 TCP/UDP Port Filter

Port-based filtering controls the user access to network services by selectively blocking TCP/UDP protocols through the device. A user can specify a Protocol Name, Port Number, Port Type (TCP, UDP, or TCP/UDP), and filtering interfaces (only Wireless, only Ethernet or all Interfaces). These parameters can be used to block access to services, such as Telnet and FTP and the traffic, such as NETBIOS and HTTP.

To configure the TCP/UDP Port filtering technique

1. Click **ADVANCED CONFIGURATION > Filtering > TCP/UDP Port Filter**. The TCP/UDP Port Filter screen is displayed as shown below. Create a new protocol by clicking **Add** or make use of the existing protocols.

S.No.	Protocol Name	Port Number	Port Type	Filter Interface	Entry Status
1	NetBios Name S	137	Both	All Interface	Disable
2	NetBios Datagra	138	Both	All Interface	Disable
3	NetBios Session	139	Both	All Interface	Disable
4	SNMP service	161	Both	All Interface	Disable
5	IPSEC/ISAKMP	500	Both	All Interface	Disable
6	L2TP	1701	Both	All Interface	Disable
7	PPTP	1723	Both	All Interface	Disable

Figure 4-54 TCP/UDP Port Filter

2. Enter the appropriate parameters. See the following table that lists the parameters and their descriptions.

Parameter	Description
Filter Control	This parameter is used to enable the TCP/UDP filter. By default, Disable is selected.
Protocol Name	This parameter specifies the TCP/UDP protocol filter name.
Port Number	This parameter specifies the TCP/UDP port number. It accepts the values within the range 0-65535.
Port Type	This parameter specifies the type of the port. The various options for the Port Type are TCP , UDP and Both . By default, Port Type is Both for the default entries and TCP for the newly added entries.
Filter Interface	This parameter is used to configure the interface type. Options for filter interface are Ethernet, Wireless, and All Interfaces.
Entry Status	This parameter indicates the status of TCP/UDP filter entry. Enable : The device filters the TCP/UDP protocols Disable : The device allows all the TCP/UDP protocols.

4.8.4.1 Adding TCP/UDP Port Table Entries

To add TCP/UDP Port Table entries

1. Click **Add** to create a new TCP/UDP port filter. The **TCP/UDP Port Filter Add Row** page is displayed as shown below.

Figure 4-55 TCP/UDP Port Filter Add Row

2. Enter the details and click **Add** to update the entry in the TCP/UDP table.

NOTE:

- The TCP/UDP filtering operation is allowed only when the **Global flag** and **Filter Control** options are selected as **Enable**
- Maximum 64 entries can be added to the table.
- Click **COMMIT** for the changes to take effect in the device.

4.8.5 Storm Threshold Filter

The Storm Threshold Filter restricts the excessive inbound multicast or broadcast traffic on layer two interfaces. This protects against broadcast storms resulting from spanning tree misconfiguration. A broadcast/multicast filtering mechanism needs to be enabled so that a large percentage of the wireless link remains available to the connected mobile terminals.

To configure Storm Threshold Filter,

1. Click **ADVANCED CONFIGURATION > Filtering > Storm Threshold Filter**. The Storm Threshold Filter screen appears as shown below:

Figure 4-56 Storm Threshold Filter

This table contains information about the threshold values per second of the multicast and broadcast packets that can be processed for the interface(s) present in the device.

2. Select the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

Parameter	Description
Interface	This parameter is used to configure the type of interface in which filtering has to be applied. The Storm Threshold filter can be used to filter the traffic on two types of interfaces such as: Ethernet or Wireless. By default, Storm Threshold filtering is disabled on both Ethernet and Wireless interfaces.
Multicast Threshold	This parameter is used to configure the threshold value of the multicast packets to be processed for the Ethernet or Wireless interface. Packets more than threshold value are dropped. If threshold value for multicast packets is set to '0', filtering is disabled. The default Multicast Threshold value is 0 per second.
Broadcast Threshold	This parameter is used to configure the threshold value of the broadcast packets to be processed for the Ethernet or Wireless interface. Packets more than threshold value are dropped. If threshold value for broadcast packets is set to '0', filtering is disabled. The default Broadcast Threshold value is 0 per second.

4.8.6 WORP Intra Cell Blocking (End Point A Only, Bridge Mode only)

Since the QB-8100 units operate in a point-to-point network mode, the Intra Cell Blocking feature has no significance for QB units. This feature is disabled by default and configuring these parameters is not necessary.

4.9 DHCP Configuration

Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to assign an IP address to a device from a defined range of IP addresses configured for a given network. It allows you to distribute IP addresses from a central point to various hosts and simplifies the process of configuring the IP addresses to individual hosts.

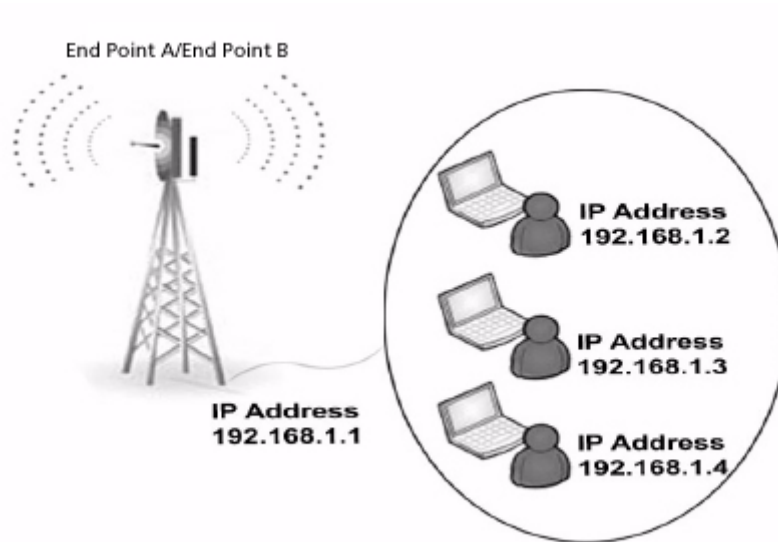


Figure 4-57 DHCP

4.9.1 DHCP server

DHCP automatically allocates network addresses and also delivers configuration parameters dynamically to the clients from the DHCP server. When DHCP server is enabled, it allows allocation of IP addresses to clients connected to the End Point A or End Point B.

The DHCP Server lets the End Point A or End Point B respond to DHCP requests with the following information:

- Host IP address
- Gateway IP address
- Subnet Mask
- Lease Time
- DNS Primary Server IP address
- DNS Secondary Server IP address

In Routing mode, DHCP Server can be configured for each interface separately. Unless the DHCP Server functionality is enabled for an interface, the DHCP Server does not respond to the DHCP requests received on that interface.

NOTE: The DHCP Server functionality is available in both **Routing** and **Bridge Modes**.

To configure the DHCP server and DHCP Interface table

1. Click **ADVANCED Configuration > DHCP > DHCP Server > Interfaces**. The **DHCP** screen appears as shown below.

DHCP Server

DHCP Server Status: Disable

Max Lease Time: (in Secs)

DHCP Interface Table

S.No.	Interface	Net Mask	Default Gateway	Primary DNS	Secondary DNS	Default Lease Time	Comment	Entry Status
1	Bridge	<input style="width: 80px;" type="text" value="255.255.255.0"/>	<input style="width: 80px;" type="text" value="189.254.128.1"/>	<input style="width: 80px;" type="text" value="0.0.0.0"/>	<input style="width: 80px;" type="text" value="0.0.0.0"/>	<input style="width: 80px;" type="text" value="86400"/>	<input style="width: 100px;" type="text"/>	<input style="width: 80px;" type="text" value="Disable"/> ▼

Notes : 1. To enable DHCP Server on the device, at least one interface must be enabled in the DHCP Interface Table.
 2. To enable DHCP Server on an interface at least one pool must be configured for it.
 3. When DHCP Server is enabled DHCP Relay is disabled automatically.
 4. Default Lease time must be with in the range 3600 Seconds(Min) - 172800 Seconds(Max).

Figure 4-58 DHCP

- Enter the appropriate parameters in the DHCP Interface Table. See the following table that lists the parameters and their descriptions.

NOTE: To enable the DHCP Server Interface, the DHCP server pool table should have at least one range configured for that interface.

Parameter	Description
Interface Type	Specifies the interface for which the DHCP Server functionality shall be configured.
Net Mask	Specifies the subnet mask to be sent to the client along with the assigned IP address. The netmask configured here should be greater than or equal to the netmask configured on the interface.
Default Gateway	Specifies the default gateway to be sent to the client along with assigned IP Address. Default Gateway is a node that serves as an accessing point to another network.
Primary DNS	Specifies the primary DNS (Domain Name Server) IP address to be sent to the client.
Secondary DNS	Specifies the secondary DNS IP address to be sent to the client.
Default Lease Time	DHCP Server uses this option to specify the lease time it is willing to offer to the client over that interface.
Comment	Specifies a note for the device administrator.
Entry Status	Used to enable or disable the DHCP server functionality over the interface.

3. To enable DHCP Server, select **Enable** for DHCP Server Status. Before enabling, in interface table there should be at least one interface enabled on which the DHCP Server has to run and the DHCP server pool table should have at least one entry configured for that interface.
4. In the **Max Lease Time** field, enter the maximum lease time.

Parameter	Description
DHCP Status	This parameter is used to enable DHCP Server or disable the DHCP functionality on the device.
Max Lease Time	Specifies the maximum lease time for which the DHCP client can have the IP address provided by the Server. The value ranges from 3600-86400 seconds.

5. Click **OK**.
6. To apply the configured properties of the device, click **COMMIT**.

NOTE: For DHCP Server to be enabled on an interface, at least one address pool must be configured for that interface.

4.9.1.1 DHCP Pool

To configure DHCP Pool

1. Click **ADVANCED CONFIGURATION > DHCP > DHCP Server > Pool**. The DHCP Pool screen appears as shown below.

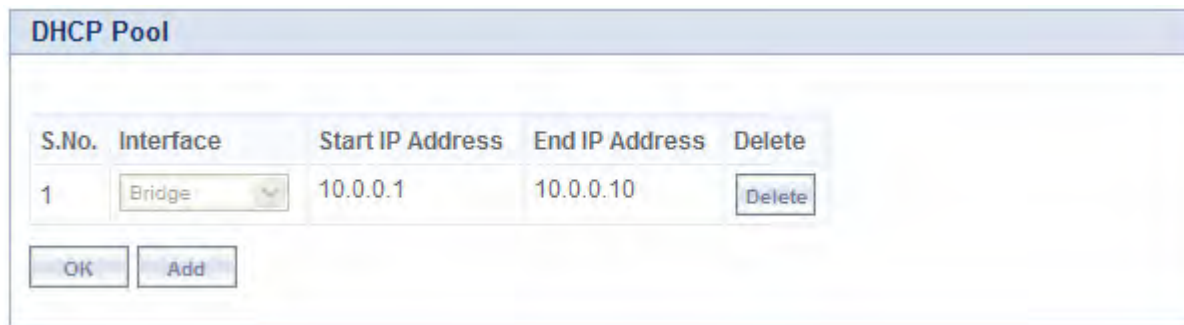


Figure 4-59 DHCP Pool

Parameter	Description
Interface	Specifies the interface to which the pool belongs.
Start IP Address/End IP Address	Specifies the start and end IP Address of the pool.
Delete	Allows the user to delete the added pool entry.

NOTE: Up to 5 entries per interface can be added in the IP Pool Table. A pool entry can be deleted but cannot be edited.

4.9.1.2 Adding a New Pool Entry

To add a new Pool entry to the DHCP server

1. Click **Add** in the DHCP Pool screen. The **DHCP Pool Table Add Row** screen is displayed as shown below.

Figure 4-60 DHCP Pool Table Add Row

2. After entering the details, click **Add**. The entry will be updated in the DHCP pool table.
3. To apply the changes, click **COMMIT**.

4.9.2 DHCP Relay (Routing Mode only)

The DHCP relay agent forwards DHCP requests to the given DHCP server. There must be at least one entry in the corresponding Server IP Address table to enable the DHCP Relay Agent. A maximum of 5 servers can be configured.

NOTE: DHCP Relay Agent parameters are configurable only in Routing mode. It cannot be enabled when NAT or DHCP Server are enabled.

To view entries in DHCP Relay Server

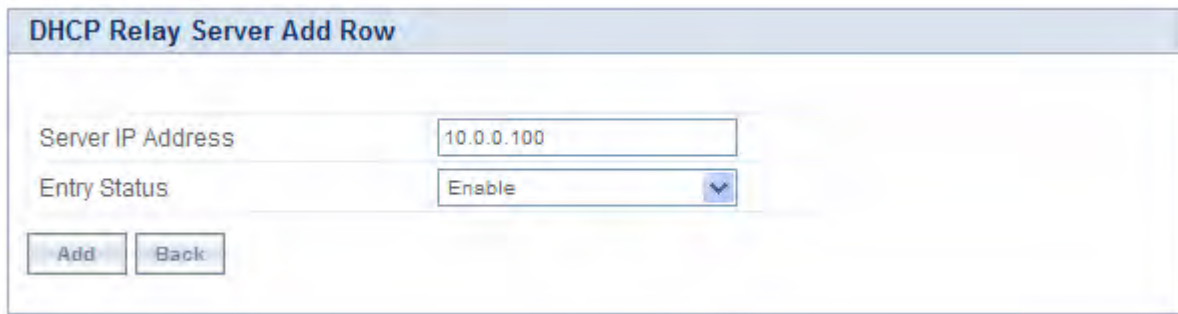
- Click **ADVANCED CONFIGURATION > DHCP > DHCP Relay > Relay Server**.

S.No.	IP Address	Delete
1	10.0.0.100	Delete

Figure 4-61 DHCP Relay

To add Relay Server Table entry

1. Click **Add** in the DHCP Relay Server screen. The DHCP Relay Server Add Row screen is displayed as shown below.



The screenshot shows a web-based configuration interface titled "DHCP Relay Server Add Row". It contains two input fields: "Server IP Address" with the value "10.0.0.100" and "Entry Status" with a dropdown menu set to "Enable". Below these fields are two buttons: "Add" and "Back".

Figure 4-62 DHCP Relay Server Add Row

2. Enter the Server IP Address and then click **Add**.
3. To enable DHCP Relay, click **Enable** for DHCP Relay Status. Before enabling, there must be at least one IP address configured in the DHCP Relay Server Table.
4. Click **OK**. To apply the changes, click **COMMIT**.

NOTE: To enable the DHCP Relay, the NAT functionality must be disabled.

4.10 IGMP Snooping (Bridge Mode only)

The **Internet Group Management Protocol (IGMP)** is a communication protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships.

Internet Group Management Protocol (IGMP) Snooping is the process of listening to IGMP network traffic. It is a feature that allows a layer 2 switch to “listen in” on the IGMP conversation between hosts and routers by processing the layer 3 IGMP packets sent in a multicast network.

4.10.0.1 Types of IGMP Snooping:

There are two types of IGMP Snooping.

Active IGMP Snooping:

Active IGMP Snooping listens to IGMP traffic and filters IGMP packets to reduce load on the multicast router. Joins and leaves heading upstream to the router are filtered so that only the minimal quantity of information is sent.

Passive IGMP Snooping:

Passive IGMP Snooping simply listens to IGMP traffic and does not filter or interfere with IGMP.

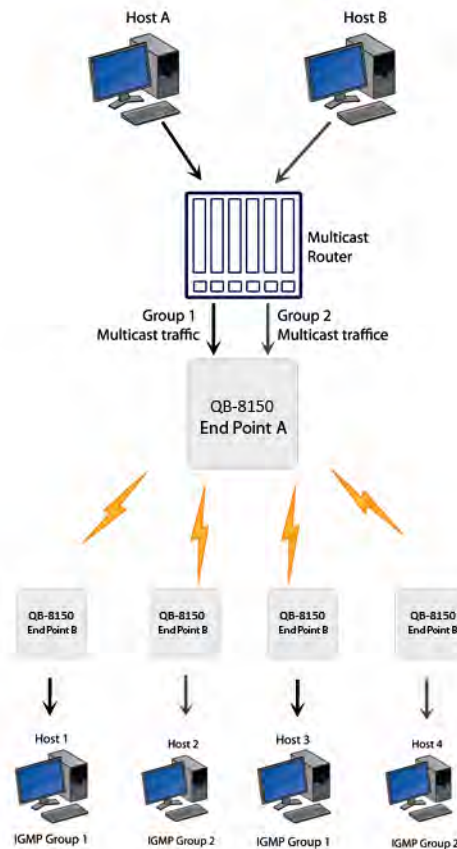


Figure 4-63 IGMP Snooping Process

NOTES:

- IGMP Snooping functionality is available both in End Point A and End Point B.
- QB 8100 supports only passive IGMP Snooping.
- IGMP versions V1, V2 and V3 are supported.
- End Point A/End Point B add maximum 64 Multicast groups in the Snooping table.

4.10.1 IGMP Snooping Configuration

To configure IGMP Snooping:

1. Click **ADVANCED Configuration > IGMP Snooping**. The IGMP snooping screen appears as shown below.

Figure 4-64 IGMP Snooping

2. Enter the appropriate parameters in the **IGMP Snooping Table**. See the following table that lists the parameters and their descriptions.
3. Click **OK**. To apply the changes, click **COMMIT**.

Parameter	Description
IGMP Snooping Status	This parameter is used to Enable/Disable the IGMP Snooping feature for the device. This feature is supported only in bridge mode. By default, IGMP Snooping Status is disabled .
IGMP Membership Aging Timer	This parameter represents the time after which the IGMP multicast group age-outs or elapses. It ranges from 135 to 635 sec. The default IGMP Membership Aging Timer is 260 sec .
IGMP Router Port Aging Timer	This parameter represents the time after which the IGMP router port age-outs or elapses. It ranges from 260 to 635 sec. The default IGMP Router Port Aging Timer is 300 sec .
IGMP Forced Flood	If you select Yes , all the Unregistered IPv4 multicast traffic (with destination address which does not match any of the groups announced in earlier IGMP Membership reports) and IGMP Membership Reports will be flooded to all the ports. By default, IGMP Forced Flood is set to No .

4.11 Routing Features Configuration

4.11.1 Static Route Table (Routing Mode Only)

The static routing table mechanism is available for End Point A and End Point B in routing mode only. It stores the route to various destinations on the network. When packets are to be routed, the routing table is referred to for the destination address.

S.No.	Destination Address	Subnet Mask	Route Next Hop	Admin Metric	Entry Status
1	10.0.0.5	255.255.255.255	169.254.130.12	5	Enable
2	10.0.0.2	255.255.255.255	169.254.130.12	5	Enable

Figure 4-65 NetIp Static Route Table

To set the static routing table

1. Click **ADVANCED CONFIGURATION > Network > Static Route Table**.
2. Enter the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **Add** to add a new entry in the table.

Parameter	Description
Static Route Status	This parameter is used to enable or disable the Static Route Status . This parameter is applicable to all static routes.
Destination Address	Specifies the destination IP address for which the static route is to be made.
Route Mask	Specifies the subnet mask of the destination IP address.
Route Next Hop	Specifies the next hop IP Address through which route is available to the destination IP address. Next hop IP should belong to at least one of the subnets connected to the device.
Metric	It is a metric that specifies the distance to the target usually counted in hops. The priority is given to this route relative to others. It can range from 0 – 16.

Parameter	Description
Entry Status	This parameter is used to configure the status of the static route. Only enabled routes are considered for routing the packets.

4.11.1.1 Adding Static Route Entries

To add Static Route entries

1. Click **Add** in the Static Route Table screen. The Static Route Table Add Row screen is displayed as shown below.

The screenshot shows a web-based configuration interface titled "Static Route Table Add Row". It contains several input fields: "Destination Address" with the value "10.0.0.2", "Subnet Mask" with "255.255.255.255", "Route Next Hop" with "189.254.130.12", "Metric" with "5", and "Entry Status" with a dropdown menu set to "Enable". At the bottom left, there are two buttons: "Add" and "Back".

Figure 4-66 Static Route Table Add Row

2. After adding the entry into the Static Route table, click **Add**.
3. Click **COMMIT** for the changes to take effect.

NOTE:

- Maximum 256 entries can be added to the static route table.
- While adding a new entry, the IP address of the Next Hop must be on the subnet of one of the device's network interfaces.

4.11.2 NAT (End Point B, Routing Mode Only)

The NAT (Network Address Translation) feature allows hosts on the Ethernet side of the End Point B to transparently access the public network through the End Point A. All the hosts in the private network can have simultaneous access to the public network.

The End Point B supports NAPT (Network Address Port Translation) where all private IP addresses are mapped to a single public IP address and does not support Basic NAT (where private IP addresses are mapped to a pool of public IP addresses).

Both **dynamic mapping** (allowing private hosts to access hosts in the public network) and **static mapping** (allowing public hosts to access hosts in the private network) are supported.

1. **Static NAT:** Static mapping is used to provide inbound access. The End Point B maps the public IP address and its transport identifiers to the private IP address (local host address) in the local network. This is used to provide inbound access to a local server for hosts in the public network. Static port mapping allows only one server of a particular type. Up to 100 entries are supported in the static port bind table.

2. **Dynamic NAT:** In dynamic mapping, the End Point B maps the private IP addresses and its transport identifiers to transport identifiers of a single Public IP address as they originate sessions to the public network. This is used only for outbound access.

NOTE:

- When NAT is enabled, the network on the wireless side of the device is considered Public and the network on the Ethernet side are considered Private.
- When NAT functionality is enabled, the DHCP Relay and RIP features are not supported. The **DHCP Relay Agent** and **RIP** must be disabled before enabling NAT.

To set the NAT parameters,

1. Click **ADVANCED CONFIGURATION > Network > NAT**. The NAT screen appears as shown below.



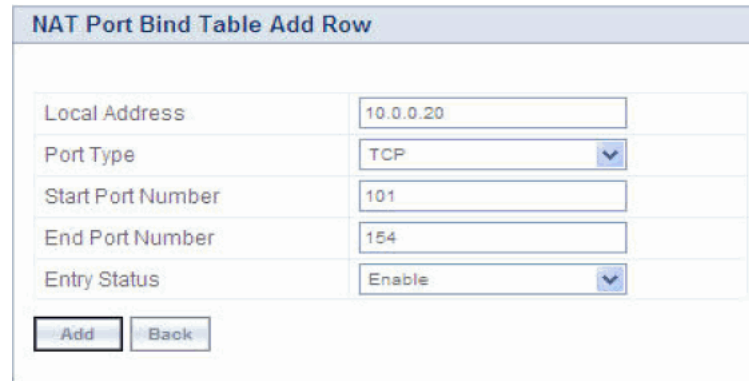
Figure 4-67 NAT

2. Enter the appropriate parameters. See the following table that lists the parameters and their descriptions.
3. Click **OK**.

Field	Description
Status	This parameter is used to enable or disable NAT feature.
Port Binding status	This parameter is used to enable or disable the Static NAT feature within different networks. It allows public hosts to access hosts in a private network. By default, it is disabled.

NOTE:

- To enable **Dynamic NAT**, set the **NAT Status** to **Enable**. To enable **Static NAT**, set the **NAT Status** to **Enable** and the **Port Binding Status** to **Enable**.
- NAT feature is available for End Point B in the routing mode only.
- Any change in the parameters requires a reboot.
- The NAT feature uses the IP address of the wireless interface as the Public IP address.



The screenshot shows a web-based configuration form titled "NAT Port Bind Table Add Row". The form contains five input fields and two buttons. The fields are: "Local Address" with the value "10.0.0.20", "Port Type" with a dropdown menu set to "TCP", "Start Port Number" with the value "101", "End Port Number" with the value "154", and "Entry Status" with a dropdown menu set to "Enable". Below the fields are two buttons: "Add" and "Back".

NAT Port Bind Table Add Row	
Local Address	10.0.0.20
Port Type	TCP
Start Port Number	101
End Port Number	154
Entry Status	Enable
<input type="button" value="Add"/> <input type="button" value="Back"/>	

Figure 4-68 NAT Port Bind Table Add Row

To add entries in the NAT static port bind table

1. Enter the Local IP Address of the host on the Ethernet (private) side of the End Point B.
2. Select the Port Type as: TCP, UDP, or Both.
3. Enter the Start Port, End Port and enable the Entry Status.
4. Click **Add**.
5. After adding the entry into the Static Port Bind Table, click **COMMIT** and then click **REBOOT** for the changes to take effect.

4.11.2.1 Supported Session Protocols

Certain applications require an Application Level Gateway (ALG) to provide the required transparency for an application running on a host in a private network to connect to its counterpart running on a host in the public network. An ALG may interact with NAT to set up state information, use NAT state information, modify application-specific payload, and perform the tasks necessary to get the application running across address realms.

No more than one server of a particular type is supported within the private network behind the End Point B. Following is the list of supported protocols with their corresponding default ALG's:

S.No.	Protocol	Support	Applications
1	H.323	H.323 ALG	Multimedia Conferencing
2	HTTP	Port Mapping for inbound connection	Web Browser
3	TFTP	Port Mapping for inbound connection	Trivial file transfer
4	Telnet	Port Mapping for inbound connection	Remote login
5	IRC	Port Mapping for inbound connection	Chat and file transfer
6	AMANDA	Port Mapping for inbound connection	Backup and archiving
7	FTP	FTP ALG	File Transfer
8	PPTP	PPTP ALG	VPN related
9	NETBIOS	Port Mapping for inbound connection	Applications on different computers can communicate within a LAN
10	SNMP	SNMP ALG	Network Management
11	DNS	Port Mapping for inbound connection	Domain Name Service

4.11.3 RIP (Routing Mode Only)

Routing Information Protocol (RIP) is a dynamic routing protocol, which can be used to automatically propagate routing table information between routers. The unit can be configured to operate in RIPv1, RIPv2, or both.

When a router receives a routing update including changes to an entry, it updates its routing table to reflect the new route. RIP maintains only the best route to a destination. Therefore, whenever new information provides a better route, the old route information is replaced.

NOTE: RIP is configurable only when the unit is in Routing Mode and Network Address Translation (**NAT**) is disabled.

To enable RIP functionality

- Enable RIP status from the drop-down menu. RIP runs on per interface basis.

To configure RIP parameters

1. Click **ADVANCED CONFIGURATION > Network > RIP**. The RIP screen is displayed as shown below.

RIP

RIP Status:

S.No.	Name	Status	Authorization Type	Authorization Key	Version Number	Direction
1	Ethernet 1	Disable	None		V2	Rx and Tx
2	Wireless 1	Disable	None		V2	Rx and Tx

Notes:

- To enable RIP, NAT must be disabled.
- Auth. Type & Key are valid for V2 version only
- If Auth. Type is "None" Auth. Key is ignored.

OK

Figure 4-69 Configuring RIP

- Enter the appropriate parameters. See the following table that lists the parameters and their descriptions.
- Click **OK**.
- Click **COMMIT** for the changes to take effect.

Parameter	Description
Name	Displays the name of the interface as Ethernet 1 or Wireless.
Status	This parameter is used to enable or disable RIP for that particular network interface.
Authorization Type	Select the appropriate authorization type. This parameter is not applicable if RIP v1 is selected as the Version number .
Authorization Key	Enter the authorization key. This parameter is not applicable if RIP v1 is selected as the Version number .
Version Number	Select RIP Version number from the Version Number list. Available options are V1 , V2 and both . The default is V2 .
Direction	Specifies whether RIP is enabled for Receive only or for both Receive and Transmit.

NOTE:

- Authorization Type** and **Authorization Key** are valid only for RIPV2 and both versions.
- The maximum metric of a RIP network is 15 hops, i.e., a maximum of 15 routers can be traversed between a source and destination network before a network is considered unreachable.
- By default, a RIP router will broadcast/multicast its complete routing table for every 30 seconds, regardless of whether anything has changed.
- RIP supports the split horizon, poison reverse and triggered update mechanisms to prevent incorrect routing updates being propagated.

System Management

This chapter provides details about the Management screen of the Web interface and describes the procedures to effectively manage the Tsunami QB-8100 device.

It covers the following topics:

- [System](#)
- [File Management](#)
- [Services: Configuring the Passwords](#)
- [SNTP](#)
- [Access Control](#)
- [Reset to Factory](#)

5.1 System

5.1.1 System Information

This section displays the basic system information. This information further helps in viewing the device details during troubleshooting. For configuring the system information, click **MANAGEMENT > System > Information**.

The screenshot shows the 'System Information' configuration page. It contains the following fields and values:

- System Up-Time:** 00:00:06.26 (dd:hh:mm:ss)
- System Description:** Tsunami QB-8150-EPR-100-WD-v2.5.0(304010)
- System Name:** System-Name (0-64) characters
- Email:** name@Organization.com (6-32) characters
- Phone Number:** Contact-Phone-Number (6-32) characters
- Location:** System-Location (0-255) characters
- GPS Longitude:** -121.8893 (0-255) characters
- GPS Latitude:** 37.3321 (0-255) characters
- GPS Altitude:** 10 (0-255) characters

At the bottom left, there is a 'OK' button.

Figure 5-1 System Information

Parameter	Description
System Up-Time	Specifies the duration of the device running time, since its last reboot.
System Description	Specifies the description of the system. It reports the device name, current firmware and build number.
System Name	Specifies the system name for easy identification of End Point A or End Point B. The System Name parameter is limited to a length of 64 characters. Use the System Name of an End Point A to configure the End Point A Name parameter on an End Point B if you want the End Point B to register only with this End Point A. If the End Point A Name is left blank on the End Point B, it can register with any End Point A that has a matching Network Name and Network Secret.
Email	Specifies the Email address of the concerned person responsible for the device.

Parameter	Description
Phone Number	Specifies the Phone number of the concerned person responsible for the device.
Location	Specifies the location of the device.
GPS Longitude, GPS Latitude and GPS Altitude	Specifies the GPS longitude, latitude and altitude at which the device is installed.

After setting the system information, click **COMMIT** for the changes to take effect in the device.

5.1.2 Identifying the Components (Inventory Management)

Inventory management provides complete component information of the device. This section describes the version history of each component.

To view the details of inventory components, click **MANAGEMENT > System > Inventory Management**.

System Inventory Management Table							
S.No.	Number	Name	Comp ID	Variant ID	Release Version	Major Version	Minor Version
1	BUILD-360	Wireless Card 1 -NIC (0x60)	2300	2	1	0	0
2	304010	Application Software Image	2110	1	2	5	0
3	10IN12010001	Hardware Inventory	2003	1	1	0	0
4	-NA-	BSP-Bootloader	2115	1	1	0	0
5	-NA-	Enterprise MIB	2200	1	2	0	0
6	-NA-	Config File	2201	1	2	0	0
7	-NA-	License File	2203	2	2	0	0

Refresh

Figure 5-2 Inventory Management

By default, the components information is auto-generated by the device. This information is standard and is used only for reference purpose.

5.1.3 Viewing Licensed Features

Licensing is considered to be the most important component of an enterprise class device which typically has a feature-based pricing model. It is also required to prevent the misuse and tampering by a wide variety of audience whose motives may be intentional or accidental.

Licensed Features are, by default, set by the company. To view the licensed features, click **MANAGEMENT > System > Licensed Features**. Refer to the parameter description given in the following table:



Figure 5-3 Licensed features

Parameter	Description
Product Description	Specifies the product description.
Number of Radios	Specifies the number of radios that the device is licensed to operate.
Number of Ethernet Interfaces	Specifies the number of Ethernet interfaces that the device is licensed to operate.
Radio 1 Allowed Frequency Band	Specifies the wireless operational frequency band supported by the device.
Maximum Output Bandwidth	Specifies the Maximum output bandwidth limit in multiples of 1Mbps (Refer to Note below).
Maximum Input Bandwidth	Specifies the Maximum output bandwidth limit in multiples of 1Mbps (Refer to Note below).
Maximum Aggregate Bandwidth	Specifies the Max cumulative bandwidth of the device which is the sum of configured output and input.
Product Family	Specifies the Product Family of the device.
Product Class	Specifies the Product Class of the device. It can be indoor or outdoor product based on this parameter.
Allowed Operational Modes of Radio1	Specifies the device operational mode as End Point A/End Point B.
MAC Address of the device is	Specifies the MAC address of the device.

NOTE: The Input and Output Bandwidth features are referred with respect to the wireless interface. That is, input bandwidth refers to the data received on the wireless interface and output bandwidth refers to the data sent out of the wireless interface.

5.2 File Management

Using this section, you can upgrade the firmware or configuration of the device and also retrieve the log/configuration files from the device. File Management can be done using TFTP (by using an external TFTP Server) using Web, CLI or SNMP. It can also be done using the HTTP using Web Interface.

5.2.1 Upgrade Firmware via HTTP

For upgrading the firmware via HTTP web interface, click **MANAGEMENT > File Management > Upgrade Firmware > HTTP**.

Figure 5-4 HTTP Upgrade Firmware

Steps to upgrade the firmware via HTTP

1. Click **Browse** and locate the firmware file.
2. Click **Update** to initiate the HTTP Update operation.

A confirmation message prompts you that a reboot of the device is required for changes to take effect. Click **OK** and then click **COMMIT** to reboot the device for changes to take effect.

NOTE:

- After upgrading new firmware, the device must be rebooted. Until a reboot occurs, the device will continue to run the firmware it was using before the upgrade started.
- If the user navigates to another page before upgradation is complete, the user may not be able to use the eventlog/syslog to confirm the status of update.

5.2.2 Upgrade Configuration via HTTP

For updating the configuration via HTTP web interface, click **MANAGEMENT > File Management > Upgrade Configuration > HTTP**.

Figure 5-5 HTTP Update-Configuration

To upgrade the configuration via HTTP

1. Click **Browse** and locate the configuration file. Select “Flashcfg.cfg” for binary configuration file and “PXM-TBC.xml” to upgrade the Text Based Configuration file. For more information on how to upgrade the Text Based configuration file refer to [Updating the device with TBC File](#).
2. Click **Update** to initiate the HTTP Update operation.
3. Click **Load** to apply the updated changes.
4. Click **Update & load** to update and load with new configurations immediately.

NOTES:

- Click **COMMIT** for the changes to take effect.
- After upgrading new configuration, the device must be rebooted.

5.2.3 Upgrade Firmware via TFTP

Using TFTP, the device can be upgraded with new firmware or configuration file. Also it can be used to retrieve the configuration or log files from the device.

To upgrade the firmware via TFTP Server, click **MANAGEMENT > File Management > Upgrade Firmware > TFTP**.

Figure 5-6 Upgrade Firmware-TFTP

To upgrade the firmware via TFTP server:

1. Enter the TFTP Server IP Address.
2. Enter the name of the firmware file to update to the device.
3. Click **Update** to initiate the new firmware updation or click **Update and Reboot** to update and reboot with new firmware immediately.

5.2.4 Upgrade Configuration via TFTP

For upgrading the configuration via TFTP Server, click **MANAGEMENT > File Management > Upgrade Configuration > TFTP**.

To upgrade the binary configuration file via TFTP server

1. Select the **Binary Config** option button.
1. Enter the TFTP Server IP Address.
2. Enter the name of the configuration file to be updated to the device.

Click **Update** to initiate the TFTP update operation or click **Update and Reboot** to update and reboot with new configuration immediately.

The screenshot shows a web interface titled "Upgrade Configuration". At the top, there are two tabs: "HTTP" and "TFTP", with "TFTP" selected. Below the tabs, there are two radio button options: "Binary Config" (which is selected) and "Text Based Config". Underneath, there are two input fields: "Server IP Address" with the value "109.254.128.133" and "File Name" with the value "flashcfg.cfg". Below the input fields, there is a red text note: "Notes : 1. After update the Binary configuration, Reboot is required to work with new upgraded configuration. 2. Please don't Navigate away from this page when the update in progress." At the bottom, there are two buttons: "Update" and "Update & Reboot".

Figure 5-7 Upgrade Binary Configuration via TFTP

To upgrade the Text Based Configuration file via TFTP server

1. Select the **Text Based Config** option button. For more information on Text Based configuration file refer to [Text Based Configuration \(TBC\) File Management](#).
2. Enter the TFTP Server IP Address.
3. Enter the name of the configuration file to be updated to the device.
 - Click **Update** to initiate the TFTP update operation. Then click **Load** to apply the updated changes. Finally click **COMMIT** for the changes to take effect.
 - Or
 - Click **Update & Load** to update and load with new configurations immediately and then Click **COMMIT** for the changes to take effect.

The screenshot shows the 'Upgrade Configuration' window with the 'TFTP' tab selected. Under 'Text Based Config', the 'Server IP Address' is set to '109.254.128.133' and the 'File Name' field is empty. Below the fields, there are two red notes: '1. After updating the Text based configuration, Please load to apply changes.' and '2. Please don't Navigate away from this page when the update in progress.' At the bottom, there are three buttons: 'Update', 'Load', and 'Update & Load'.

Figure 5-8 Upgrade Text Based Configuration via TFTP

5.2.5 Retrieve From Device

5.2.5.1 HTTP Retrieve

For retrieving a configuration file or Event log or Text based template configuration file via HTTP web interface, click **MANAGEMENT > File Management > Retrieve From Device > HTTP**.

To retrieve files from the device via HTTP

1. From the **File Type** list, select the type of file to retrieve.
 - a. **Config**: To retrieve the configuration file from the device.
 - b. **Event Log**: To retrieve the event log file from the device.
 - c. **Text Based Template Config**: To retrieve the text based template configuration file from the device. For more information on how to retrieve the Text Based configuration file refer to [Retrieving TBC File](#).
2. Click **Retrieve** to initiate the operation and retrieve the file to the local system.

The screenshot shows the 'Retrieve from Device' window with the 'HTTP' tab selected. The 'File Type' dropdown menu is open, showing options: 'Config', 'Event Log', and 'Text Based Template Config'. Below the dropdown, there are two red notes: '1. When the device is running with factory default settings, there is no binary config file present and hence the config file cannot be retrieved.' and '2. If the eventlog is not created or has been cleared, it cannot be retrieved.' At the bottom, there is a 'Retrieve' button.

Figure 5-9 HTTP Retrieve

5.2.5.2 TFTP Retrieve

This option is used to retrieve files from the device to the TFTP server. The TFTP server must be running and configured in the desired directory path to copy the retrieved file. Assign a proper name to the file which may include version or location information.

The screenshot shows a web interface titled "Retrieve from Device". It has two tabs: "HTTP" and "TFTP". Under the "TFTP" tab, there are three input fields: "Server IP Address" (1.69.254.128.133), "File Name" (PXM-TBC.xml), and "File Type" (Text Based Template Config). Below these fields is a red note: "Note: 1. When the device is running with factory default settings there is no config file present and hence the config file cannot be retrieved. 2. If the eventlog is not created or has been cleared, it cannot be retrieved." At the bottom left is a "Retrieve" button.

Figure 5-10 TFTP Retrieve

For retrieving a configuration file or Event log file or Text Based Template Configuration file via TFTP web interface, click **MANAGEMENT > File Management > Retrieve From Device > TFTP**.

To retrieve files from the device via TFTP Server

1. Enter the TFTP Server IP address.
2. Enter the name of the file to be downloaded to the device.
3. Select the type of file to upgrade from the **File Type** list:
 - a. Config: To retrieve the configuration file from the device.
 - b. Event Log: To retrieve the event log file from the device.
 - c. Text Based Template Config: To retrieve the text based template configuration file from the device. For more information on how to retrieve the Text Based configuration file refer to [Retrieving TBC File](#).
4. Click **Retrieve** to initiate the operation and retrieve the file from the TFTP Server.

NOTE: If the device is in default configuration, there will be no config file to upload. Similarly, Event Log cannot be uploaded if there is no Event Log created on the device. Also the Text Based Template Configuration file does not exist if it is not generated from the CLI.

5.3 Services: Configuring the Passwords

SNMP version, SNMP passwords, and SNMP Trap Host Table parameters can be configured to prevent unauthorized access. Each management interface can be configured with its own password. Each of the three management interfaces (HTTP/HTTPS, Telnet/SSH, and SNMP) is arranged in tabs under the **Services** link of **MANAGEMENT** tab in the Main Left Panel.

The following special characters are not allowed for setting passwords for Telnet/SSH, HTTP/HTTPS, and SNMP v2/v3: - / \ ' " = ? and blank space.

NOTE: The passwords in the Services screen are configurable.

5.3.1 HTTP/HTTPS

The screenshot shows the 'Services' configuration window. The 'HTTP / HTTPS' tab is active. The 'Password' field is masked with asterisks and has a range of (6-32) with a red asterisk. The 'HTTP' field is set to 'Enable' with a dropdown arrow and a red asterisk. The 'HTTP Port' field is set to '80' with a red asterisk. The 'HTTPS' field is set to 'Enable' with a dropdown arrow and a red asterisk. Below the fields, a red note reads: 'Notes: 1. For setting the password characters - = \ ' ' ? / space are not allowed. 2. * Reboot is required'. An 'OK' button is located at the bottom left.

Figure 5-11 HTTP/HTTPS

The parameters for HTTP/HTTPS are described in the following table.

Parameter	Description
Password	Set a new password for the interface or interfaces (Ethernet/Wireless) to manage the device through the Web interface. Enter a password between 6 and 32 characters in the Password field. The default password is " public ".
HTTP	Select Enable to allow HTTP access to the device from any host. You can also select Disable to prevent access to the device from Web interface. Similar settings are applicable for Hypertext Transfer Protocol over Secure Socket Layer or HTTPS.
HTTP Port	Specifies the port number for HTTP interface. By default, the port number is 80.

Parameter	Description
HTTPS	Similar settings as mentioned for HTTP. The password configuration for HTTPS is same as configured for HTTP.

5.3.2 Telnet/SSH

Services

HTTP / HTTPS **Telnet / SSH** SNMP SYSLOG Host Table

Password: (6-32) *

Telnet: *

Telnet Port: *

Telnet Sessions: (0-3) *

SSH: *

SSH Port: *

SSH Sessions: (0-3) *

Notes: 1. For setting the password characters `- = \ ' ' ? / space` are not allowed.
 2. The sum of Telnet and SSH sessions cannot be more than 3.
 3. * Reboot is required

Figure 5-12 Telnet/SSH

The parameters for Telnet/SSH are described in the following table.

Telnet/SSH Parameter settings	
Password	Set a new password for the interface or interfaces to manage the device through the CLI. The same password is used for serial CLI also.
Telnet	Select Enable to allow the Telnet access to the device from any host. You can also select Disable to prevent a user from accessing the device from the CLI. Similar settings are applicable for Secure Shell or SSH.
Telnet Port	Specifies the port number for Telnet interface. By default, the port number is 23.
Telnet Sessions	Specifies the number of Telnet sessions which controls the number of active Telnet connections. By default, the number of telnet sessions allowed is 2.
SSH	Select Enable to enable SSH access to the device from any host or select Disable to prevent a user from accessing the device.
SSH Port	Enter the port number for Secure Shell port for CLI interface. By default, the port number is 22.
SSH Sessions	Enter the number of SSH sessions. By default, it is 1 session. <i>NOTE: Total number of CLI sessions allowed is 3, so the sum of Telnet and SSH sessions cannot be more than 3. For example, if you configure the number of Telnet sessions as 2, then the number of SSH sessions can only be a value from 0 to 1.</i>

5.3.3 SNMP

Services

HTTP / HTTPS Telnet / SSH **SNMP** SYSLOG Host Table

SNMP: Enable (Ref Note) *

Version: SNMPv1-v2c *

Read Password: (6-32) *

Read/Write Password: (6-32) *

SNMP Trap Host Table *

S.No.	IP Address	Password	Comment	Entry Status
1	169.254.128.133	*****	Default	Enable

Notes:

1. Change in SNMP Status will effect the NMS Access
2. For setting the password characters - = \ ' ' ? / space are not allowed.
3. * Reboot is required

OK Add

Figure 5-13 SNMP

The parameters for SNMP are described in the following table.

SNMP Parameter settings	
SNMP	This parameter provides the access control for the SNMP interface. Select Enable/Disable to enable or disable the SNMP access to the device from any host. Disabling the SNMP will affect the NMS/PVES access to the device.
Version	<p>This parameter configures the SNMP version. The available versions are v1-v2 and v3. By default, the SNMP starts in version v2c.</p> <p>On selecting SNMP v1-v2c, the following parameters need to be configured. Please refer to the <i>Tsunami QB-8100 Reference Manual</i> for SNMPv1-v2c Configuration.</p>

Read Password	This parameter represents the read only community name used in SNMP Protocol. It is sent along with each SNMP GET / WALK / GETNEXT / GETBULK request to allow or deny access to the device. This password should be same as read password set at the NMS or MIB browser. The default password is "public" and range of this parameter must be between 6-32 characters.
Read/Write Password	This parameter represents the read-write community name used in SNMP Protocol. It is sent along with each SNMP GET / WALK / GETNEXT / SET request to allow or deny access to the device. This password should be same as read-write password set at the NMS or MIB browser. The default password is "public" and range of this parameter must be between 6-32 characters.

5.3.3.1 SNMPv3 Configuration

The screenshot shows the 'Services' configuration page with the 'SNMP' tab selected. The configuration includes:

- SNMP:** Enable (dropdown)
- Version:** SNMPv3 (dropdown)
- Security Level:** AuthPriv (dropdown)
- Priv Protocol:** AES-128 (dropdown)
- Priv Password:** [masked] (8-32)
- Auth Protocol:** SHA (dropdown)
- Auth Password:** [masked] (8-32)

Below the settings is the 'SNMP Trap Host Table' section with the following table:

S.No.	IP Address	Comment	Entry Status
1	169.254.128.133	Default	Enable

Notes:

1. Change in SNMP Status will effect the NMS Access
2. For setting the password characters - = \ " ' ? / space are not allowed.
3. * Reboot is required

Buttons: OK, Add

Figure 5-14 SNMPv3

On selecting SNMP V3, the following parameters need to be configured:

SNMP V3 Parameter settings	
Security level	The supported security levels for QB-8100 is AuthNoPriv and AuthPriv . Select AuthNoPriv for Extensible Authentication or AuthPriv for both Authentication and Privacy (Encryption).
Priv Protocol	This field configures the type of privacy (or encryption) protocol. This parameter is available only when the security level is AuthPriv . Select the encryption standard either AES-128 (Advanced Encryption Standard) or DES (Data Encryption Standard) from the list. The default Priv Protocol is AES-128.
Priv Password	This field configures the pass key for Privacy protocol selected. This parameter is available only when the security level is AuthPriv . The default password is public123 and range of this field must be between 8-32 characters.
Auth Protocol	This field configures the type of Authentication protocol. Select the encryption standard either SHA (Secure Hash Algorithm) or MD5 (Message-Digest algorithm) from the list. The default Auth Protocol is DES .
Auth Password	This configures the pass key for Privacy protocol selected. The default password is public123 and range of this field must be between 8-32 characters. The default user in SNMPv3 is "admin" has all read-write privileges and only one user is supported. If SNMPv3 is enabled, the v3 stats can be seen in the MONITOR > SNMPv3 stats page.

5.3.3.2 SNMP Trap Host Table

This table contains the list of IP addresses where the SNMP traps will be delivered. It supports maximum 5 rows.

Adding Entries to the Trap Host Table

To add entries to the Trap Host Table

1. Click **Add** to add Table Entries to the Trap Host Table.

The screenshot shows a web-based dialog box titled "SNMP Trap Host Table Add Row". It features three input fields: "IP Address", "Comment", and "Entry Status". The "Entry Status" field is a dropdown menu currently showing "Enable". Below the input fields are two buttons: "Add" and "Back".

Figure 5-15 SNMP Host Table Add Row

2. Enter the IP Address, Password, and Comment.

3. Select the entry status as **Enable** or **Disable** and click **Add**.

All traps will be delivered to the host port number 162. The community string/ password field is not valid if the device is configured in SNMPv3 mode.

NOTE: Changes to SNMP parameters require a Reboot to take effect.

5.3.4 System Log Host Table

System log messages are generated by the system by sending requests at various instances to the system log server. The priority with which the messages are to be logged from the configured instance can be reconfigured by selecting a desired priority from the **Log Priority** drop-down menu. These system log details are lost on system reboot. System message logging can be disabled if needed.

NOTE: When a particular priority is selected, the messages with a priority higher than the value selected will also be logged. Change of priority does not change the priority of the messages already logged but only specifies the priority of future messages to be logged.

To configure the System Log settings

1. Select a **Log Status** from the drop-down list.
2. Select a required Log Priority from the drop-down list: **Emergency, Alert, Critical, Error, Warning, Notice, Info** or **Debug**.
3. Click **OK**.

The screenshot shows the 'Services' configuration page with the 'SYSLOG Host Table' tab selected. The 'Log Status' is set to 'Enable' and 'Log Priority' is set to 'Critical'. Below these settings is a table with the following data:

S.No.	IP Address	Port	Host Comment	Entry Status
1	10.0.0.5	50000	TEST_CASE	Enable

Buttons for 'OK' and 'Add' are visible at the bottom of the configuration area.

Figure 5-16 Syslog Host Table

To add entries to the System Log Host Table

1. Click **Add** to display **SYSLOG Host Table Add Row** page.
2. Enter the parameters listed in the following table.
3. Click **Add**.

Figure 5-17 SYSLOG Host Table Add Row

Parameter	Description
IP Address	Represents the IP address of the SYSLOG server.
Port	Represents the host port number. Default port is 514. NOTE: The user must configure the correct port number on which the syslog server is running for the Host Port parameter. Choice of port number must be in line with the standards for port number assignments defined by Internet Assigned Numbers Authority (IANA) .
Host Comment	Used to provide a note for the device administrator.
Entry Status	Used to configure the status of the Syslog host entry table.

5.4 SNTP

SNTP allows a network entity to communicate with time servers in the network/Internet to retrieve and synchronize the time of day information. When this feature is enabled, the system attempts to retrieve the time of day information from the configured time servers (primary or secondary); and when successful, it updates the relevant time objects in the system.

Figure 5-18 SNTP

To configure and view parameters within the SNTP screen

1. Click **MANAGEMENT > SNTP**.
2. Select the **Enable SNTP Status** checkbox. The selected status determines which of the parameters on the SNTP page are configurable.
3. Enter the parameters listed the following table.
4. Click **OK**.
5. Click **COMMIT** for the changes to take effect.

Parameter	Description
Primary Server IP Address/Domain Name	Specifies the host name or the IP address of the primary SNTP server. Either a domain name or an IP address can be provided.
Secondary Server IP Address/Domain Name	This optional parameter specifies the host name or an IP address of the secondary SNTP server.
Time Zone	This parameter specifies the time zone set for the SNTP.
Day Light Saving Time	Specifies the number of hours adjusted for Daylight Saving Time.
Current Date/Time	Displays current date and time. If SNTP is not enabled, the current date and time are automatically generated from the local system. If SNTP is enabled, it displays the time the device has got from the SNTP server.

NOTE:

- Provide the Primary and Secondary Server details only if the SNTP status is enabled.
- For any reason, if the servers configured are not responding, the SNTP client retries every minute.

5.5 Access Control

The Management Access Control feature provides the option of controlling the management interfaces only from the specified hosts. The user needs to update the table with an IP address, which provides access to management interfaces, such as SNMP, HTTP, HTTPS, TELNET, and SSH.

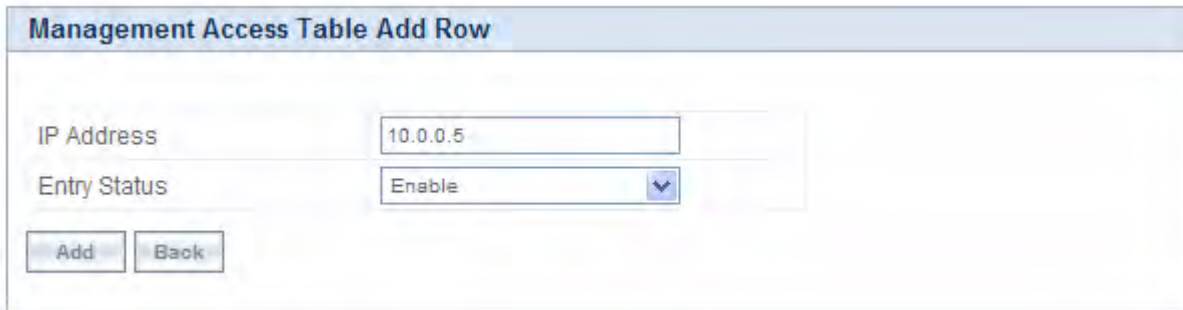
To view and configure the **Access Table Status** and **Management Access Control Table**, click **MANAGEMENT > Access Control**.

Figure 5-19 Management Access Control Table

Parameter	Description
Access Table Status	Enable or disable the Management Access Control Table status. By default, it is disabled.
IP Address	Specifies the IP Address of the machine to which the management traffic needs to be allowed.
Entry Status	Used to enable/disable a particular entry in the Management Access Table.

To add a new IP Address, follow these steps

1. Select **Enable** for the **Access Table Status**.
2. Click **Add** to display the **Management Access Table Add Row** page.



The image shows a dialog box titled "Management Access Table Add Row". It contains two input fields: "IP Address" with the value "10.0.0.5" and "Entry Status" with a dropdown menu set to "Enable". Below the fields are two buttons: "Add" and "Back".

Figure 5-20 Management Access Table Add Row

3. Enter the IP Address of the device.
4. Select **Enable** or **Disable** for the Entry status of the device.
5. Click **Add**.

Ensure that the IP address of the management PC that is used to manage the device is present in the table. Otherwise, you will not be able to manage the device. If this case occurs, try to give the PC correct IP address for management; or else, the device can be configured via the CLI over the serial port.

5.6 Reset to Factory

Click **Reset to Factory** to reset the device to its factory default state. This resets the network configuration values, including the password, IP address, and subnet mask.

- Device will reboot automatically after clicking on the **Reset To Factory Defaults**. The device comes up with default configurations after reboot.



Figure 5-21 Factory Reset

Monitoring the System

This chapter describes the procedures to monitor the Tsunami QB-8100 using the **MONITOR** screen of the Web interface. It covers the following topics:

- [Interface Statistics](#)
- [WORP Statistics](#)
- [Bridge](#)
- [Network Layer](#)
- [Radius \(End Point A only\)](#)
- [DHCP](#)
- [Logs](#)
- [Tools](#)

6.1 Interface Statistics

Interface Statistics provides detailed information about the data exchanged in both directions through the device interface. The statistical information include the type of interface, operational status, MAC address of the protocol, number of packets transmitted, signal information, number of collisions and errors occurred while transmitting the data.

The main function of interface statistics is to monitor and record the status and performance of the ethernet and the wireless interfaces.

NOTE: For every 4 seconds, statistics pages get refreshed.

6.1.1 Ethernet Statistics

Ethernet Statistics provides you a collection of statistics generated by gathering the network traffic details. Using the statistics, you can track the number of transactions occurred through this interface.

To view the Ethernet Interface Statistics, click **MONITOR > Interface Statistics** and click on either Ethernet 1 or Ethernet 2.

The screenshot shows a web interface titled 'Interface Statistics'. It has two tabs: 'Ethernet 1' (selected) and 'Wireless 1'. There are 'Refresh' and 'Clear' buttons. Below the tabs is a table of statistics for Ethernet 1:

Field	Value
Type	6
MTU	1500
Physical Address	00:20:a6:ca:de:df
Operational Status	UP
In Octets	688736
In Unicast Packets	3861
In Non-unicast Packets	0
In Errors	0
Out Octets	1938795
Out Unicast Packets	4370
Out Discards	0
Out Errors	0

Figure 6-1 Ethernet Statistics

The parameters displayed in this page are explained in the following table.

Field	Description
Type	This parameter displays the type of interface. The interface type is differentiated based on the network layers.

Field	Description
MTU	This parameter displays to the largest size of the data packet received/sent on the interface.
Physical Address	This parameter displays the MAC address at the Ethernet protocol layer.
Operational Status	This parameter displays the current operational state of the interface.
In Octets	This parameter displays the total number of the octets received on the interface.
In Unicast Packets	It displays the number of subnetwork- unicast packets delivered to the higher level protocol.
In Non-Unicast Packets	This parameter displays the number of non-unicast subnetwork packets delivered to the higher level protocol.
In Errors	This parameter displays the number of inbound packets that contained errors and restricted them from being delivered.
Out Octets	This parameter displays the total number of octets transmitted out of the interface.
Out Unicast Packets	It displays the total number of packets requested by the higher level protocol and then, transmitted to the non-unicast address.
Out Discards	This parameter displays the number of error-free outbound packets chosen to be discarded to prevent them from being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
Out Errors	It displays the number of outbound packets that could not be transmitted because of errors.

6.1.2 Wireless Statistics

Wireless Statistics screen displays the details of the wireless interface.

To view the Wireless Statistics, click **MONITOR > Interface Statistics > Wireless1**.

In addition to the parameters displayed for Ethernet interfaces, the following parameters are displayed for the wireless interface.

Parameter	Description
RSSI Statistics	RSSI stands for Received Signal Strength Indicator. For receiving strong signal, the RSSI should be high. This section displays the Receiver statistics. It indicates the power viewed across the receiver input.

Parameter	Description
Antenna	Specifies all the antenna ports available for the product. This is based on the product option. For QB-8100, it shows A1 and A2.
Status	Specifies the configuration status of the antenna ports. ON indicates that antenna port is enable for that chain. OFF means antenna port is disabled for that chain.
Control	Specifies the RSSI value of the packet received on the selected channel.
Extension	Specifies RSSI value of the packets received on the adjacent channel (20MHz). This parameter is applicable only for the 40 MHz modes, i.e., 40 Plus and 40 Minus modes.
Rx Error Details	
Decrypt Errors	This parameter is applicable if the Security is enabled. It indicates the number of received packets that failed to decrypt.
CRC Errors	Specifies the number of received packets with invalid CRC.



Figure 6-2 Wireless Statistics

6.2 WORP Statistics

6.2.1 General Statistics

WORP General Statistics screen displays the signal information, WORP data messages, Data transmission statistics, and Registration details of all the data transmitted through the interface.

To view the General Statistics, click **MONITOR > WORP Statistics > Interface 1 > General Statistics**.

WORP General Statistics			
Interface Type	End Point B	<input type="button" value="Refresh"/>	<input type="button" value="Clear"/>
Signal Information		Registration details	
Avg Local Signal	-59 dBm	Remote Partners	1
Avg Local Noise	-94 dBm	Announcements	94
Avg Remote Signal	-45 dBm	Request For Service	5
Avg Remote Noise	-94 dBm	Registration Requests	5
WORP Data Messages		Registration Rejects	0
Poll Data	73295	Authentication Requests	5
Poll No Data	73294	Authentication Confirms	5
Reply Data	73293	Registration Attempts	1
Reply More Data	0	Registration Incompletes	0
Reply No Data	73294	Registration Timeouts	0
Poll No Replies	0	Registration Last Reason	None
Data Transmission Statistics			
Send Success	2		
Send Retries	0		
Send Failures	0		
Receive Success	1		
Receive Retries	0		
Receive Failures	0		

Figure 6-3 WORP General Statistics

The parameters displayed in this page are described in the following table.

Field	Description
Interface Type	Specifies the type of radio interface.
Signal Information	Specifies the SNR details of local and remote devices. These details are measured in dBm.
Avg Local Signal	Refers to the signal level with which the End Point A received wireless frames from the End Point B.
Avg Local Noise	Refers to the noise level with which the End Point A received wireless frames from the End Point B.
Avg Remote Signal	Refers to the signal level with which the End Point B receives wireless frames from the End Point A.

Field	Description
Avg Remote Noise	Refers to the noise level with which the End Point B receives wireless frames from the End Point A.
WORP Data Messages	Specifies the sent or received data frames through wireless interface.
Poll Data	Refers to the number of polls with data messages sent (End Point A) or received (End Point B).
Poll No Data	Refers to the number of polls with no data messages sent (End Point A) or received (End Point B).
Reply Data	Refers to the number of poll replies with data messages sent (End Point B) or received (End Point A).
Reply More Data	Refers to the number of poll replies with more data messages sent (End Point B) or received (End Point A).
Reply No Data	Refers to the number of poll replies with no data messages sent (End Point B) or received (End Point A).
Poll No Replies	Refers to the number of times poll messages were sent but no reply was received. This parameter is valid only on End Point A.
Data Transmission Statistics	Specifies the number of transmissions occurred through the interface.
Send Success	Refers to the number of data messages sent and acknowledged by the peer successfully.
Send Retries	Refers to the number of data messages that are re-transmitted and acknowledged by the peer successfully.
Send Failures	Refers to the number of data messages that requires re-transmission. These frames are not acknowledged by the peer.
Receive Success	Refers to the number of data messages received and acknowledged successfully.
Receive Retries	Refers to the number of successfully received re-transmitted data messages.
Receive Failures	Refers to the number of data messages that were not received successfully.
Registration details	Specifies the status of the entire registration process.
Remote Partners	Refers to the number of remote partners. For an End Point B, this parameter is always zero or one.
Announcements	Refers to the number of Announcement messages sent (End Point A) or received (End Point B) on WORP interface.

Field	Description
Request For Service	Refers to the number of requests for service messages sent (End Point B) or received (End Point A).
Registration Requests	Refers to the number of registration request messages sent (End Point B) or received (End Point A) on WORP interface.
Registration Rejects	Refers to the number of registration reject messages sent (End Point A) or received (End Point B) on WORP interface.
Authentication Requests	Refers to the number of authentication request messages sent (End Point B) or received (End Point A) on WORP interface.
Authentication Confirms	Refers to the number of authentication confirm messages sent (End Point A) or received (End Point B) on WORP interface.
Registration Attempts	Refers to the number of times a Registration Attempt has been initiated.
Registration Incompletes	Refers to the number of registration attempts that is not completed yet.
Registration Timeouts	Refers to the number of times the registration procedure timed out.
Registration Last Reason	Refers to the reason for why the last registration was aborted or failed.

NOTE: For better results, the Send Failure/Send Retrieve must be low in comparison to Send Success. The same applies for Receive Retries/Receive Failure. Click **Refresh** to update the details in this page.

6.2.2 End Point B Link Statistics (End Point A only)

WORP End Point B Link Statistics provides the information related to the End Point B currently connected to the End Point A. This operation is available only in End Point A mode operations.

To view the Interface Statistics, click **MONITOR > WORP Statistics > Interface 1 > End Point B Link Statistics**.

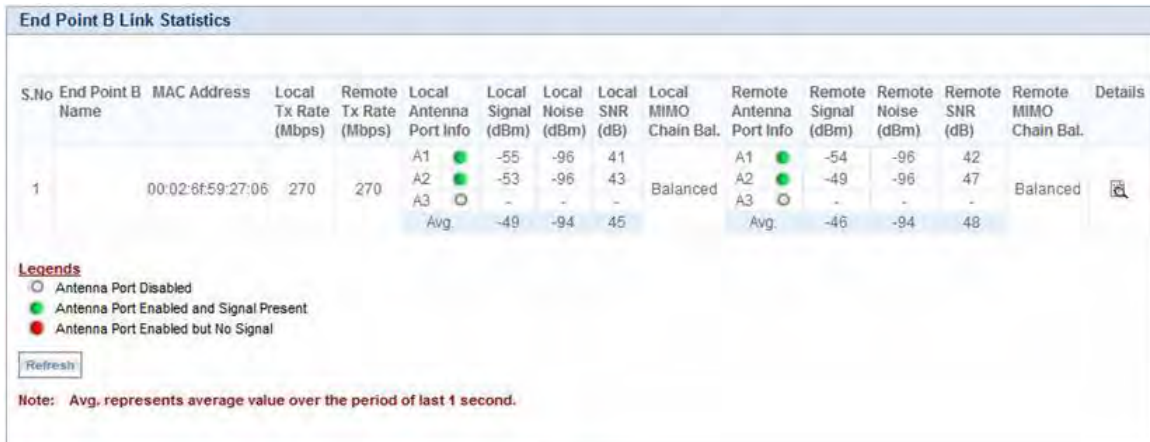


Figure 6-4 End Point B Link Statistics

Click **Refresh**, to get the updated or latest End Point B Link Statistics.

The following table lists the parameters and their descriptions:

Field	Description						
End Point B Name	System name of the End Point B connected.						
Mac Address	MAC address of the End Point B connected.						
Local Tx Rate (Mbps)	End Point A Tx Rate.						
Remote Tx Rate (Mbps)	End Point B Tx Rate.						
Local Antenna Port Info	Refers to the status of the local antenna port for the End Point B. This status is shown by three different legends: <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>This legend is displayed when the antenna port is disabled.</td> </tr> <tr> <td></td> <td>This legend is displayed when the antenna port is enabled and signal is present.</td> </tr> <tr> <td></td> <td>This legend is displayed when the antenna port is enabled and signal is not present.</td> </tr> </table>		This legend is displayed when the antenna port is disabled.		This legend is displayed when the antenna port is enabled and signal is present.		This legend is displayed when the antenna port is enabled and signal is not present.
	This legend is displayed when the antenna port is disabled.						
	This legend is displayed when the antenna port is enabled and signal is present.						
	This legend is displayed when the antenna port is enabled and signal is not present.						
Local Signal (dBm)	Refers to the signal level with which the End Point A received wireless frames from the End Point B.						
Local Noise (dBm)	Refers to the noise level with which the End Point A received wireless frames from the End Point B.						
Local SNR (dB)	Refers to the SNR measured by the receiver at the near end and is based on the Local Signal and Local Noise.						

Field	Description
Remote Antenna Port Info	Refers to the status of the remote antenna port of the End Point B. The status of the remote antenna port is shown by three different legends. For more information on the legends, refer to Local Antenna Port Info .
Remote Signal (dBm)	Signal level with which the End Point B receives wireless frames from the End Point A.
Remote Noise (dBm)	Refers to the noise level with which the End Point B receives wireless frames from the End Point A.
Remote SNR (dB)	Refers to the SNR measured by the receiver at the far end and is based on the Remote Signal and Remote Noise.
MIMO Chain Balance	Refers to the signal balance between minimum 2 Rx chains. If the signal balance between two antennas is greater than 5 dB, then, it is recommended to adjust the antennas so that MIMO Chain Balance becomes Balanced or switch to Longer Range Data Stream settings for reliable wireless link. <i>NOTE: This field is applicable only for Higher Throughput data streams.</i>

6.2.3 End Point A Link Statistics (End Point B Only)

WORP End Point A Link Statistics provides information related to End Point A currently connected to the End Point B.

End Point A Name	MAC Address	Local Tx Rate (Mbps)	Remote Tx Rate (Mbps)	Local Antenna Port Info	Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Local MIMO Chain Bal.	Remote Antenna Port Info	Remote Signal (dBm)	Remote Noise (dBm)	Remote SNR (dB)	Remote MIMO Chain Bal.
	00:02:6f:58:5c:46	270	270	A1	-56	-96	40	Balanced	A1	-55	-96	41	Balanced
				A2	-51	-96	45		A2	-51	-96	45	
				A3	-	-	-		A3	-	-	-	
				Avg.	-47	-94	49		Avg.	-48	-94	48	

Legends

- Antenna Port Disabled
- Antenna Port Enabled and Singal Present
- Antenna Port Enabled but No Signal

Refresh

Note: Avg. represents average value over the period of last 1 second.

Figure 6-5 WORP End Point A Link Statistics

Click **Refresh**, to get the updated or latest End Point A Link Statistics.

6.2.4 QoS Statistics (End Point A Only)

To view the QoS Statistics, click **MONITOR > WORP Statistics > Interface 1 > QoS Statistics**. This page displays the Provisioned and Active Bandwidth details on End Point A for the registered End Point B.

QoS Summary	
Note : This Screen displays the Provisioned, Active Bandwidth details on End Point A for the registered End Point B.	
<input type="button" value="Refresh"/>	
ACTIVE	
Uplink Bandwidth	0 Kbps
Downlink Bandwidth	0 Kbps
Uplink MIR	0 Kbps
Downlink MIR	0 Kbps
Uplink CIR	0 Kbps
Downlink CIR	0 Kbps
PROVISIONED	
Uplink MIR	0 Kbps
Downlink MIR	0 Kbps
Uplink CIR	0 Kbps
Downlink CIR	0 Kbps

Figure 6-6 QoS Summary

6.3 Bridge

6.3.1 Bridge Statistics

To view the Bridge Statistics, click **MONITOR > Bridge > Bridge Statistics**.



The screenshot shows a window titled "Bridge Statistics" with a "Refresh" and "Clear" button. Below the buttons is a table with the following data:

Parameter	Value
Description	Bridge
Type	6
MTU	1500
Physical Address	00:20:a6:98:76:54
Operational Status	UP
In Octets	380649
In Unicast Packets	299
In Non-unicast Packets	1584
In Errors	0
Out Octets	694832
Out Unicast Packets	2108
Out Discards	0
Out Errors	0

Figure 6-7 Bridge Statistics

The following table lists the parameters and their descriptions:

Parameter	Description
Description	Displays the textual string containing information about the interface.
Type	Displays the type of interface.
MTU	Displays the MTU value.
Physical Address	Displays the bridge MAC Address.
Operational Status	Displays the current state of the interface: Up (ready to pass packets) or Down (not ready to pass packets).
In Octets	Displays the total number of octets received on the interface, including the framing characters.

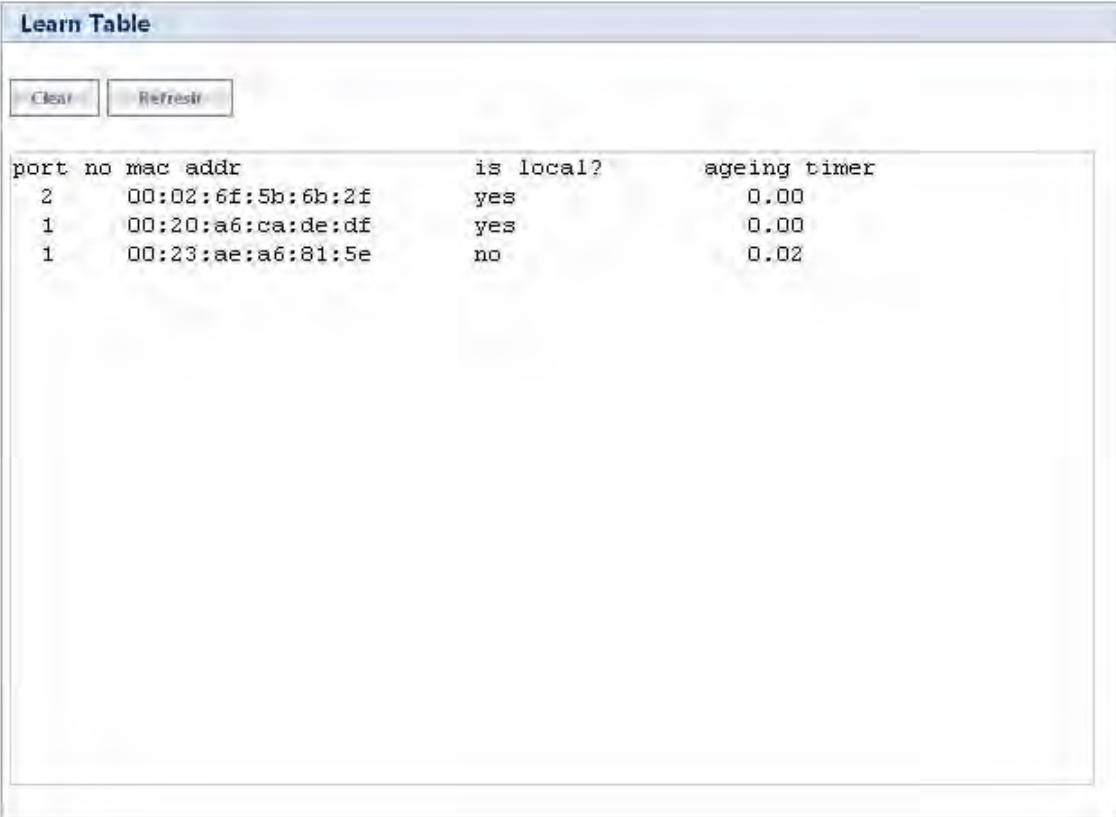
Parameter	Description
In Unicast Packets	Displays the number of subnetwork unicast packets received at the bridge interface.
In Non-unicast Packets	Displays the number of non-unicast (i.e., subnetwork-broadcast or subnetwork-multicast) packets received at the bridge interface.
In Errors	Displays the number of inbound packets that contained errors and are restricted for delivering them to a higher-layer protocol at the bridge interface.
Out Octets	Displays the total number of octets transmitted out of the interface, including the framing characters.
Out Unicast Packets	Displays the total number of packets requested by higher-level protocols to be transmitted out of the interface to a subnetwork-unicast address, including those that were discarded or not sent.
Out Discards	Displays the number of error-free outbound packets chosen to be discarded to prevent them being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
Out Errors	Displays the number of outbound packets that could not be transmitted because of errors.

6.3.2 Learn Table

Learn Table is used to view all MAC addresses the device has learnt on an interface. The Learn Table displays the information of learnt MAC addresses, the interface on which it learnt the MAC address, aging timer corresponding to the MAC add entry, and the type of interface as local interface or attached interface to the device. It reports the MAC address for each node that the device has learnt on the network and the interface on which the node was detected. There can be up to 10,000 entries in the Learn Table.

To view the **Learn Table** entries,

1. Click **MONITOR > Bridge > Learn Table**.



The screenshot shows a window titled "Learn Table" with two buttons, "Clear" and "Refresh", at the top left. Below the buttons is a table with the following data:

port no	mac addr	is local?	ageing timer
2	00:02:6f:5b:6b:2f	yes	0.00
1	00:20:a6:ca:de:df	yes	0.00
1	00:23:ae:a6:81:5e	no	0.02

Figure 6-8 Learn Table

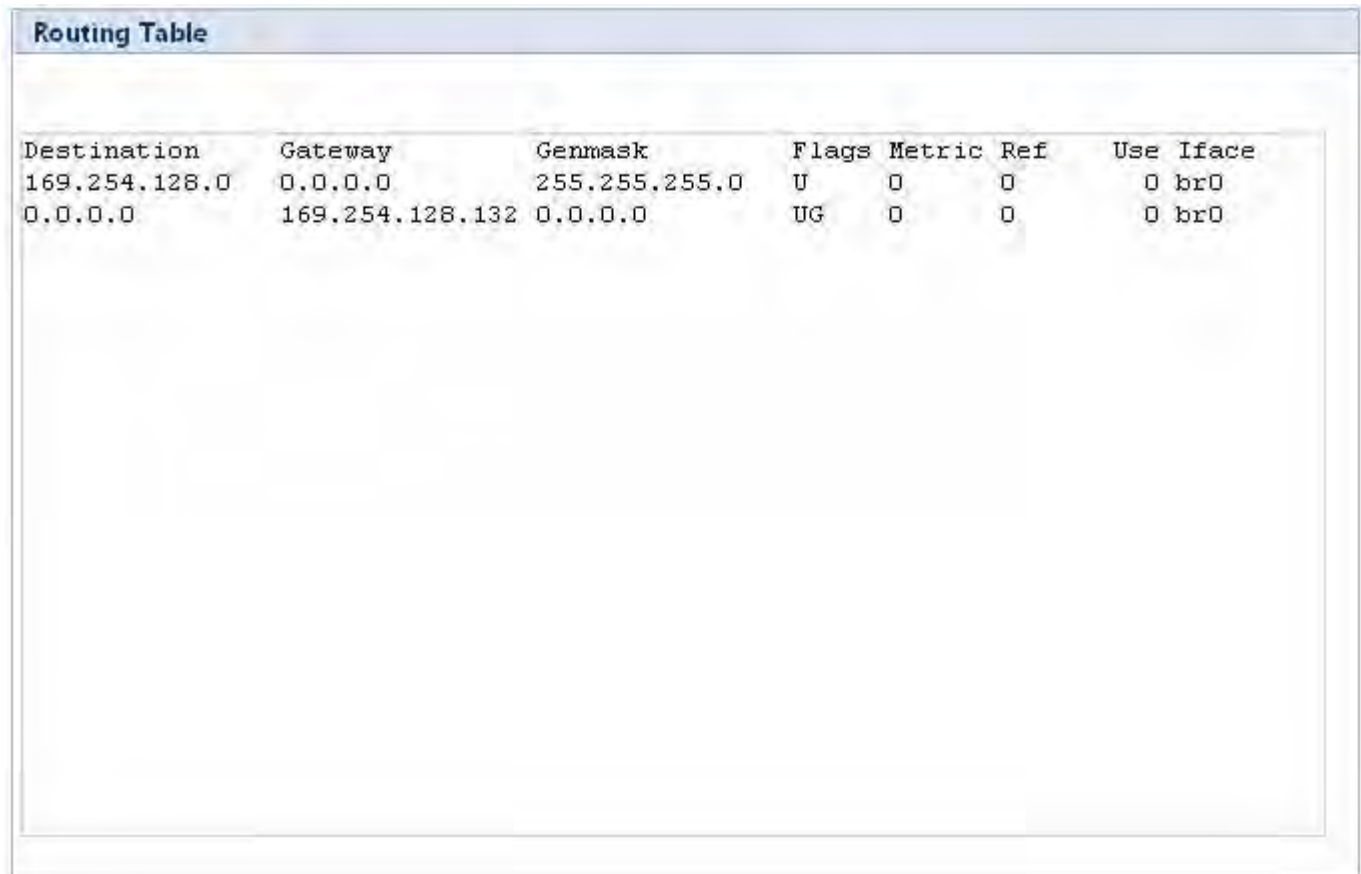
2. Click **Clear** to delete all entries of the Learn Table.
3. Click **Refresh** to get the updated or latest Learn Table.

6.4 Network Layer

6.4.1 Routing Table

Routing table displays all the active routes of the network. These can be either static or dynamic (obtained through RIP). For every route created in the network, the details of that particular link or route will get updated in this table.

To view the Routing Table, click **MONITOR > Network Layer > Routing Table**.



Destination	Gateway	Genmask	Flags	Metric	Ref	Use	Iface
169.254.128.0	0.0.0.0	255.255.255.0	U	0	0	0	br0
0.0.0.0	169.254.128.132	0.0.0.0	UG	0	0	0	br0

Figure 6-9 Routing Table

6.4.2 IP ARP

This section displays the mapping of the IP and MAC addresses of all nodes in the network. This information is based upon the Address Resolution Protocol (ARP). ARP is a L2 neighboring protocol which converts the IP address into a physical address on the Ethernet network.

To view the current ARP table

1. Click **MONITOR > Network Layer > IP ARP**.

IP ARP Table			
Note : On clicking CLEAR button, it will take upto 10 seconds to update the entries.			
<input type="button" value="Clear"/> <input type="button" value="Refresh"/>			
If Index	Physical Address	Net Address	Type
4	00:23:ae:a6:81:5e	169.254.128.134	Dynamic

Figure 6-10 IP ARP Table

2. Click **Clear** to delete all entries of the ARP Table.
3. Click **Refresh** to get the updated or latest ARP Table.

6.4.3 ICMP Statistics

This page provides the statistical information for both received and transmitted messages by the device. The ICMP Statistics attributes can be used to monitor message traffic.

To view the ICMP Statistics, click **MONITOR > Network Layer > ICMP Statistics**.

ICMP Statistics			
<input type="button" value="Refresh"/>			
In Msgs	34	Out Msgs	34
In Errors	0	Out Errors	0
In Dest Unreachs	34	Out Dest Unreachs	34
In Time Excds	0	Out Time Excds	0
In Parm Probs	0	Out Parm Probs	0
In Src Quenchs	0	Out Src Quenchs	0
In Redirects	0	Out Redirects	0
In Echos	0	Out EchoReps	0
In EchoReps	0	Out Timestamps	0
InTimestamps	0	Out Timestamp Reps	0
In Timestamp Reps	0	Out Addr Masks	0
In Addr Masks	0	Out Addr Mask Reps	0
In Addr Mask Reps	0		

Figure 6-11 ICMP Statistics

The following table lists the parameters and their descriptions:

Field	Description
In Msgs/Out Msgs	The number of ICMP messages that are received/transmitted by the device.
In Errors/Out Errors	The number of ICMP messages that the entity received/transmitted but determined as having errors.
In Dest Unreachs/ Out Dest Unreachs	The number of ICMP Destination Unreachable messages received/transmitted.
In Time Excds/Out Time Excds	The number of ICMP Time Exceeded messages received/transmitted.
In Parm Probs/Out Parm Probs	The number of ICMP Parameter Problem messages received/transmitted.
In Srec Quenchs/Out Srec Quenchs	The number of ICMP Source Quench messages received/transmitted.
In Redirects/Out Redirects	The rate of ICMP Redirect messages received/transmitted.
In Echos	The rate of ICMP Echo messages received. <i>NOTE: Out Echos parameter is not displayed in the ICMP statistics list.</i>
In EchoReps/Out EchoReps	The rate of ICMP Echo Reply messages received/transmitted.
In Timestamps/Out Timestamps	The rate of ICMP Timestamp (request) messages received/transmitted.
In Timestamps Reps/ Out Timestamps Reps	The rate of ICMP Timestamp Reply messages received/transmitted.
In Addr Masks/Out Addr Masks	The number of ICMP Address Mask Request messages received/transmitted.
In Addr Mask Reps/ Out Addr Mask Reps	The number of ICMP Address Mask Reply messages received/transmitted.

6.4.4 RIP Database

This section shows the information about the RIP database. It contains routes (Routing Information Protocol updates) learnt from other routers.

RIP Database						
RIP DATABASE						
Codes: R - RIP, C - connected, S - Static, O - OSPF, B - BGP						
Sub-codes:						
(n) - normal, (s) - static, (d) - default, (r) - redistribute,						
(i) - interface						
	Network	Next Hop	Metric	From	Tag	Time
C (i)	169.254.0.0/16	0.0.0.0	1	self	0	
R (n)	192.168.7.0/24	192.168.8.78	3	192.168.8.78	0	01:46
C (i)	192.168.8.0/24	0.0.0.0	1	self	0	
R (n)	192.168.10.0/24	192.168.8.78	3	192.168.8.78	0	02:31
R (n)	192.168.12.0/24	192.168.8.78	3	192.168.8.78	0	02:56

Figure 6-12 RIP Database

6.5 Radius (End Point A only)

This section displays the information about the radius authentication statistics.

NOTE: Radius Client Authentication Statistics are visible only on End Point A.

6.5.1 Radius Authentication Statistics

This page provides information about Radius Authentication for both the primary and backup servers for each radius server profile.

To view the **Radius Client Authentication Statistics** table, click **MONITOR > Radius > Radius client Authentication Statistics**.

S.No.	Round Trip Time	Reqs	RTMS	Accepts	Rejects	Resp	Mal Resp	Bad Auths	Timeouts	Un Known Types	Pkts Dropped
Refresh											
Notes											
S.No. : Server Index											
Reqs: Access Requests											
RTMS: Access Retransmissions											
Accepts: Access Accepts											
Rejects : Access Rejects											
Resp: Stats Responses											
Mal Resp: Malformed Responses											
Bad Auths : Bad Authenticators											
Time outs: Timeouts											
Pkts Dropped : Packets Dropped											

Figure 6-13 Radius Client Authentication Statistics

The **Radius Client Authentication Statistics** page displays the following parameters.

Field	Description
Round Trip Time	Specifies the round trip time for messages exchanged between radius client and authentication server since client startup.
Reqs	Specifies the number of Radius Access Request messages transmitted from the client to the server since client startup.
RTMS	Specifies the number of times the Radius Access Requests are being transmitted to the server from the system since the client startup.

Field	Description
Accepts	Specifies the number of Radius Access Accept messages received since client startup.
Rejects	Specifies the number of Radius Access Reject messages received since client startup.
Resp	Specifies the number of Radius response packets received by the system since client startup.
Mal Resp	Specifies the number of malformed Radius Access Response messages received since client startup.
Bad Auths	Specifies the number of malformed Radius Access response messages containing invalid authenticators received since client startup.
Time Outs	Specifies total number of timeouts for radius access request messages since client startup.

6.6 IGMP (Bridge Mode only)

Click **MONITOR > IGMP > IGMP Snooping Stats**. The Ethernet/Wireless Multicast List screen appears as shown below:

Ethernet1 Multicast List			
Ethernet1		Wireless1	
S.No.	Group IP	MAC Address	Time Elapsed (dd:hh:mm:ss)
1	225.1.1.1	01:00:5e:01:01:01	00:00:00:05
2	225.1.1.2	01:00:5e:01:01:02	00:00:00:04
3	225.1.1.3	01:00:5e:01:01:03	00:00:00:03
4	225.1.1.4	01:00:5e:01:01:04	00:00:00:02
5	225.1.1.5	01:00:5e:01:01:05	00:00:00:01
6	225.1.1.6	01:00:5e:01:01:06	00:00:00:00

Refresh

Figure 6-14 Ethernet1 Multicast List

6.6.1 Ethernet/Wireless Multicast List:

1. The Multicast List table holds the IGMP Multicast IP and Multicast MAC address details for the Ethernet/Wireless interfaces.
2. See the following table that lists the parameters and their descriptions.

Parameter	Description
Group IP	This parameter represents the IP address of Multicast group for Ethernet/Wireless interface learned by IGMP snooping.
Mac Address	This parameter represents the MAC address of Multicast group for Ethernet/Wireless interface learned by IGMP snooping.
Time Elapsed	This parameter specifies the time elapsed since the multicast entry has been created for the Ethernet/Wireless interface.

6.6.2 Router Port List

The Router Port List table shows the list of ports on which multicast routers are attached.

Click **MONITOR > IGMP > Router Port List**. The Router Port List screen appears as shown below:

S.No.	Port Number	Time Elapsed (dd:hh:mm:ss)
1	2	00:00:00:00
2	1	00:00:00:00

Refresh

Figure 6-15 Router Port List

See the following table that lists the parameters and their descriptions.

Parameter	Description
Port No	This parameter represents the port number on which multicast router is attached (on which IGMP Query has been received).
Time Elapsed	This parameter represents the time elapsed since the port is marked as the router port.

6.7 DHCP

DHCP Leases file stores the DHCP client database of the DHCP clients that the DHCP Server has served. The information stored includes the duration of the lease, for which the IP address has been assigned, the start and end dates for the lease, and the MAC address of the network interface card of the DHCP client.

To view DHCP Leases, click **MONITOR > DHCP Leases**.

```

lease 169.254.128.1 {
  starts 6 2000/01/01 00:10:06;
  ends 0 2000/01/02 00:10:06;
  cltt 6 2000/01/01 00:10:06;
  binding state active;
  next binding state free;
  hardware ethernet 00:19:5b:7e:e1:57;
  uid "\001\000\031[~\341W";
  client-hostname "my pc";
}

```

Figure 6-16 DHCP Leases

6.8 Logs

6.8.1 Event Log

The Event Log keeps track of events that occur during the operation of the device. It displays the event occurring time, event type, and the name of the error or the error message. Based on the priority, the event details are logged and can be used for any reference or troubleshooting.

To view the Event Log

1. Click **MONITOR > Logs > Event Log**. The Event Log screen appears as shown below.

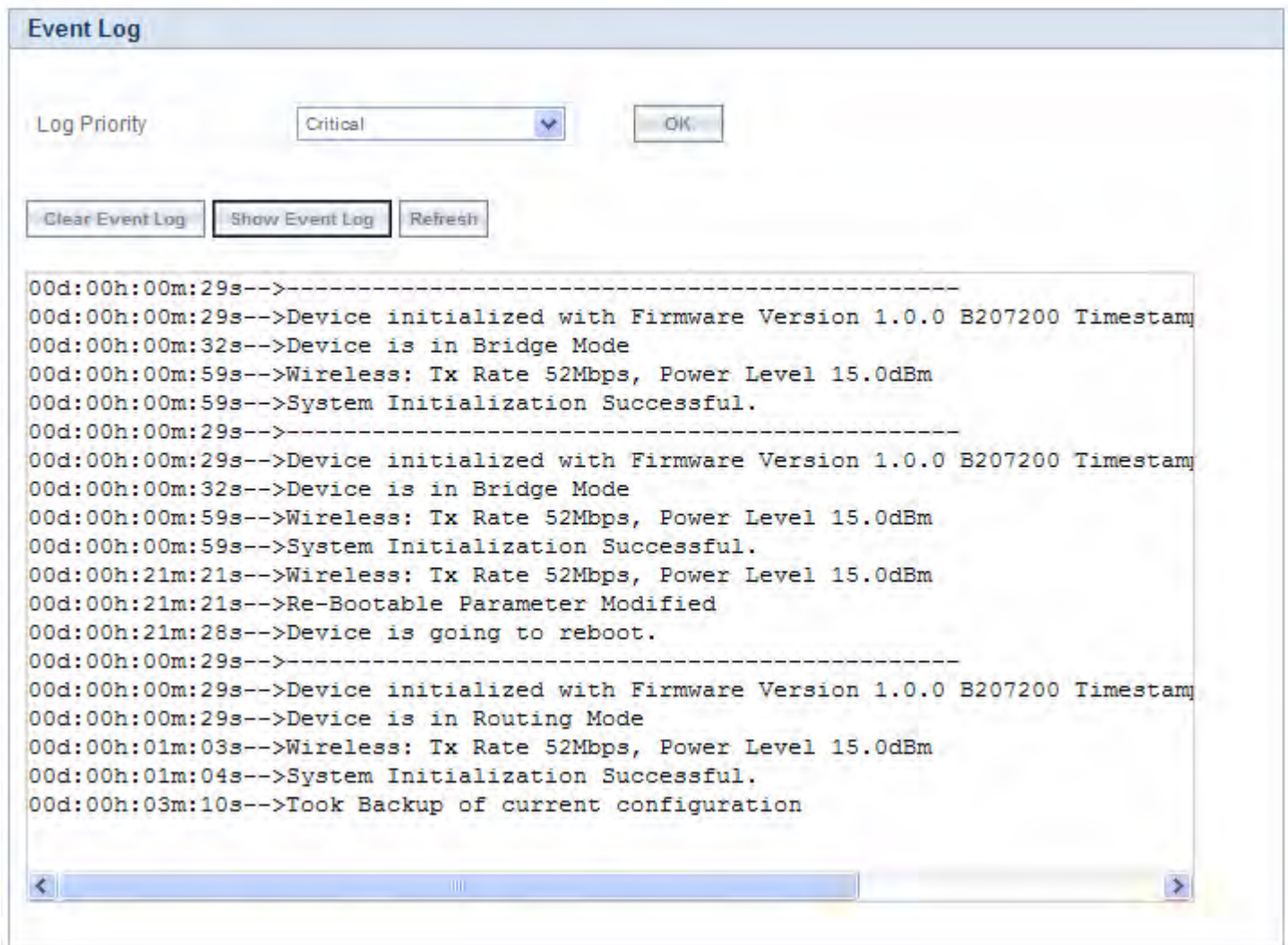


Figure 6-17 Event Log

2. Select the appropriate log priority from the Log Priority drop-down list that has the following options: **Emergency**, **Alert**, **Critical**, **Error**, **Warning**, **Notice**, **Info**, and **Debug**.

NOTE: When **Critical** is selected, the system logs only critical messages and the messages with higher priority (i.e., **Emergency** and **Alert**) will be logged from the instance the priority is selected.

3. After setting the event log priority option, click **Show Event Log** to display the event logs.

- To delete the Event Log, click **Clear Event Log**.

NOTE: The recent eventlogs are stored in the flash memory.

6.8.2 Syslog

System log messages are generated by the system by sending requests at various instances to the system log server.



Figure 6-18 System Log

- Click **Clear SysLog**, to clear the SYSLOG information.
- Click **Refresh**, to get the updated or latest SYSLOG information.

6.9 Tools

6.9.1 Link Test

WORP Link Test shows, in graphical form, Signal and Noise levels at which packets are received at local and remote unit. WORP link test feature is used to monitor the local/remote signal/noise/SNR details of the connected WORP link. During antenna alignment, this feature can be enabled to monitor the min/cur/max signal details.

NOTE: Internet Explorer 6.0 and its above versions support the link tests.

To view WORP Link Test Statistics, click **MONITOR > Tools > Link Test**.



Figure 6-19 WORP Link Test

Click **Explore Start** to explore the established WORP links. Click **Refresh** to list the details of the registered End Point B. Please note that only one End Point B gets registered to the associated End Point A. To view the details of a particular End Point B, select its **Link Test Status** as **Enable**. Clicking the **Graph** icon provides the local/remote station information. After starting the link test explore, if the user moves out of this page before stopping, exploration is automatically stopped after Link Test Idle Timeout.

When you set the **Link Test Idle Timeout** value, the exploring process automatically stops on the given timeout value if you navigate out of the web page. The default Link Test Idle Timeout is 300 seconds.

The following figure displays the graph for Local/Remote Station information, such as **Station Name** and **MAC address** of both End Point A and End Point B.

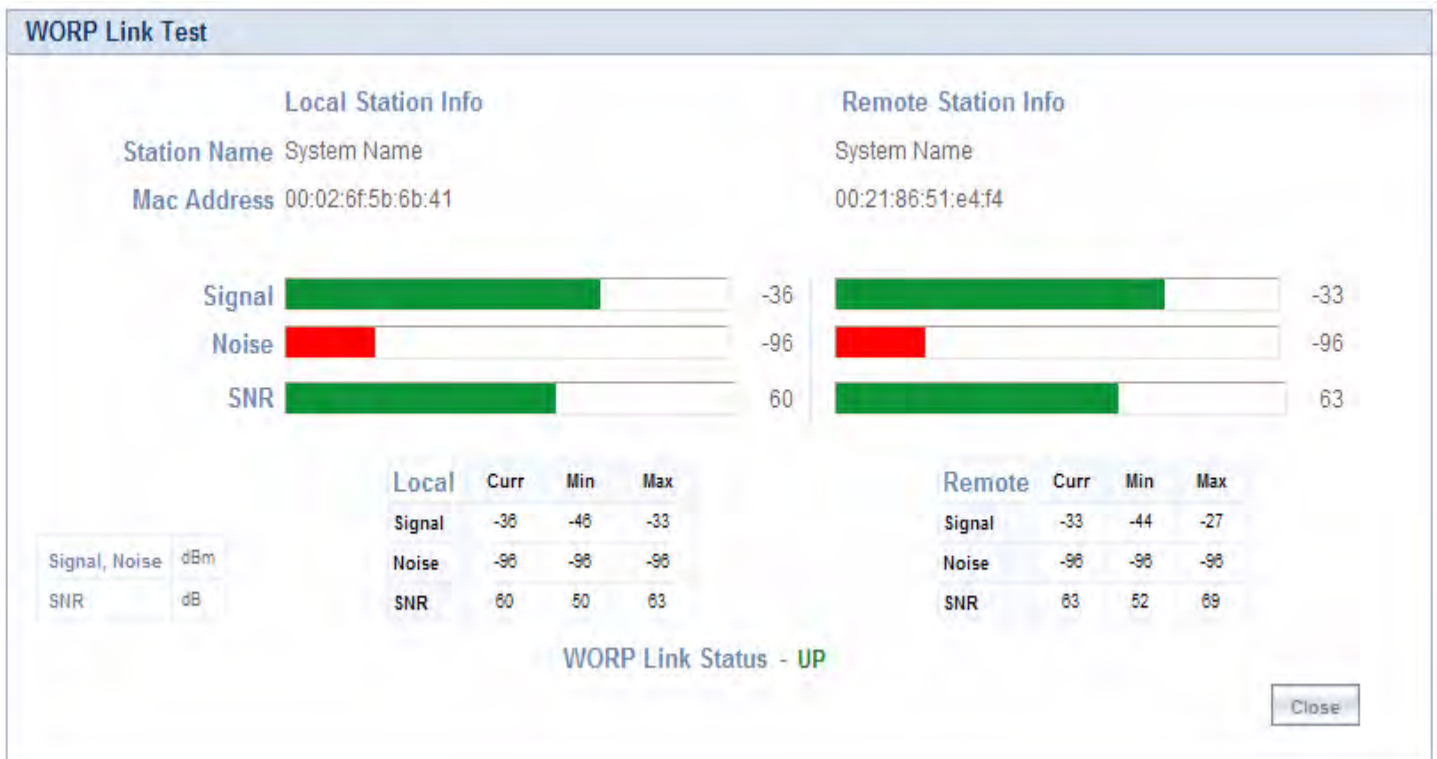


Figure 6-20 WORP Link Status Graph

To stop the link test, click **Explore Stop**.

NOTE: Link tests are performed for maximum 3 times. By default, the **Link Test Status** is disabled.

6.9.2 Wireless Site Survey (End Point B Only)

Wireless Site Survey is done by the End Point B and scans all the available channels and channel bandwidths, and collects information about all the End Point As on only those channels/bandwidths with the given Network Name. Referring to the displayed list, you can see which is the best End Point A.

Wireless Site Survey									
End Point A Name	MAC Address	Channel Number	Channel Bandwidth (MHz)	Rx Rate (Mbps)	Local Antenna Port Info	Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Registration Status
	00:02:6f:58:5c:46	133	40	270	A1 ●	-55	-96	41	Registered
					A2 ●	-49	-96	47	
					A3 ○	-	-96	-	
					Combined	-48	-96	48	

Note: Performing Site Survey may effect the Wireless Connectivity to the End Point A

Legends

- Antenna Port Disabled
- Antenna Port Enabled and Singal Present
- Antenna Port Enabled but No Signal

Figure 6-21 Wireless Site Survey Table

To initialize the survey process, click **Start** button. This process lists all the available End Point A details. If you want to stop the site survey process, click the **Stop** button.

Click **Refresh**, to get the updated or latest Wireless Site Survey Table.

NOTE: This survey process is available only for End Point B mode operation.

Procedures

This chapter provides details about the various procedures involved in the operation of the QB-8100 units through the Web, CLI, and SNMP interface.

The following topics are covered in this chapter:

- [TFTP Server Setup](#)
- [Web Interface Firmware Download](#)
- [Configuration Backup](#)
- [Configuration Restore](#)
- [Text Based Configuration \(TBC\) File Management](#)
- [Hard Reset to Factory Default](#)
- [Forced Reload](#)
- [Upgrade a New Firmware Using ScanTool in Bootloader Mode](#)
- [Download a New Firmware Using CLI from Bootloader](#)

7.1 TFTP Server Setup

A Trivial File Transfer Protocol (TFTP) server lets you transfer files across a network. You can retrieve files from the device for backup or copying, and you can upgrade the firmware or the configuration file. You can download the SolarWinds TFTP server software from the product installation CD or from <http://support.proxim.com>. You can also download the latest TFTP software from SolarWind's Web site at <http://www.solarwinds.net>. The following instructions are prepared with an assumption that you are using the SolarWinds TFTP server software; other TFTP servers may require different configurations.

NOTE: *If a TFTP server is not available in the network, you can perform similar file transfer operations using the HTTP interface.*

Ensure the following:

1. The upload or download directory is correctly set (the default directory is **C:\TFTP-Root**).
2. The required firmware file is present in the directory.
3. The TFTP server is running. The TFTP server must be running only during file upload and download. You can check the connectivity between the QB-8100 and the TFTP server by pinging the QB-8100 from the computer that hosts the TFTP server. The ping program should show replies from QB-8100.
4. The TFTP server is configured to both Transmit and Receive files (on the Security tab under **File > Configure**), with no automatic shutdown or time-out (on the **Auto-Close** tab).

7.2 Web Interface Firmware Download

In some cases, it may be necessary to upgrade the embedded software of the unit by downloading the firmware. You can download the firmware through TFTP or HTTP.

7.2.1 Through TFTP

1. Set up the TFTP server as described in TFTP Server Setup.
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Management > File Management > Upgrade Firmware > TFTP** tab.
4. Fill in the following details:
 - Server IP Address <IP address TFTP server>
 - File Name <image file name>
5. Click **Update/Update-Reboot** to start the file transfer.

The unit downloads the firmware. The TFTP server program should show download activity after a few seconds. When the download is complete, the unit is ready to start the embedded software upon reboot.

7.2.2 Through HTTP

1. Access the unit as described in [Logging in to the Web Interface](#).
2. Click **Management > File Management > Upgrade Firmware > HTTP** tab.
3. Fill in the following details:
 - File Name <firmware file name>. Using the browse button, select the firmware form the host to be uploaded.
4. Click **Update** to start the file transfer.

The unit downloads the firmware. When the download is complete, the unit is ready to start the embedded software upon reboot.

7.3 Configuration Backup

You can back up the unit's configuration by retrieving the configuration file. You can use this file to restore the configuration or to configure another similar unit (see [Configuration Restore](#)). You can update a configuration file through TFTP or HTTP.

7.3.1 Through TFTP

1. Set up the TFTP server as described in TFTP Server Setup.
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Management > File Management > Retrieve From Device > TFTP** tab.
4. Fill in the following details:
 - Server IP Address <IP address TFTP server>
 - File Name <configuration file name>
 - File Type <configuration file type>
5. Click **Retrieve** to start the file transfer.

The unit uploads the configuration file. The TFTP server program should show upload activity after a few seconds. When the upload is complete, the configuration is backed up.

7.3.2 Through HTTP

1. Access the unit as described in [Logging in to the Web Interface](#).
2. Click **Management > File Management > Retrieve From Device > HTTP** tab.
3. Fill in the following details:
 - File Type <configuration file type>
4. Click **Retrieve** to start the file transfer.

The unit uploads the configuration file. When the upload is complete, the configuration is backed up.

7.4 Configuration Restore

You can restore the configuration of the unit by downloading a configuration file. The configuration file contains the configuration information of a unit. You can download a configuration file through TFTP or HTTP.

7.4.1 Through TFTP

1. Set up the TFTP server as described in TFTP Server Setup.
2. Access the unit as described in [Logging in to the Web Interface](#).
3. Click **Management > File Management > Upgrade Configuration > TFTP** tab.
4. Fill in the following details:
 - Server IP Address <IP address TFTP server>
 - File Name <configuration file name>
5. Click **Update/Update-Reboot** to start the file transfer.

The unit downloads the configuration file. The TFTP server program should show download activity after a few seconds. In case of **Update** and **Reboot**, when the upgrade is complete and the system rebooted, the configuration is restored.

7.4.2 Through HTTP

1. Access the unit as described in [Logging in to the Web Interface](#).
2. Click **Management > File Management > Upgrade Configuration > HTTP** tab.

3. Fill in the following details:
 - File Name <configuration file name>
4. Click **Update** to start the file transfer.

A reboot is required for the new configuration to be restored into the device.

7.5 Text Based Configuration (TBC) File Management

7.5.1 Text Based Configuration File

Text Based Configuration (TBC) file is a simple text file that holds the template configurations of the device. The 8100 series of devices supports the TBC file in XML format which can be edited in any XML or text editors.

You can **generate** the TBC file from the CLI Session and manually **edit** the configurations and then **load** the edited TBC file to the device so that the edited configurations are applied on to the device. It differs mainly with the binary configuration file in terms of manual edition of configurations. The generated TBC file is a template which has only the default and modified configurations on that live CLI session.

Downloading/Uploading the TBC File:

The TBC file can be downloaded to or uploaded from the device using all three interfaces (SNMP/WEB/CLI). Either **TFTP** or **HTTP** options can be used to download or upload the TBC file.

NOTE: While downloading the TBC file, any file name is accepted and then the file is renamed to **PXM-TBC.xml**. If the mandatory XML tags are missing, the file is not downloaded to the device.

7.5.2 Generating TBC File

Text Based Configuration file is generated only when **generate** command is given from the Command Line Interface (CLI).

While generating the TBC File from CLI, there is an option to generate it with or without all Management & Security Passwords. The management passwords include CLI/WEB/SNMP passwords. The security passwords include Network-Secret/Encryption-Key(s)/RADIUS-Shared-Secret. If included, these passwords become a part of the generated TBC file and are in a readable form. If excluded, all these passwords are not a part of the generated TBC file.

The commands used for the generation of TBC file are:

```
T8000-00:00:01# generate tbc-with-pwds
```

```
T8000-00:00:01# generate tbc-without-pwds
```

The generated TBC file contains

- Default configurations with their default values.
- Any user-added or edited configurations on current live CLI session.

7.5.3 Retrieving TBC File

Using the WEB interface, you can retrieve the generated TBC file from the device either through TFTP or HTTP protocol.

7.5.3.1 Retrieving through HTTP

For retrieving a Text based template configuration file via HTTP web interface, click **MANAGEMENT > File Management > Retrieve From Device > HTTP**.

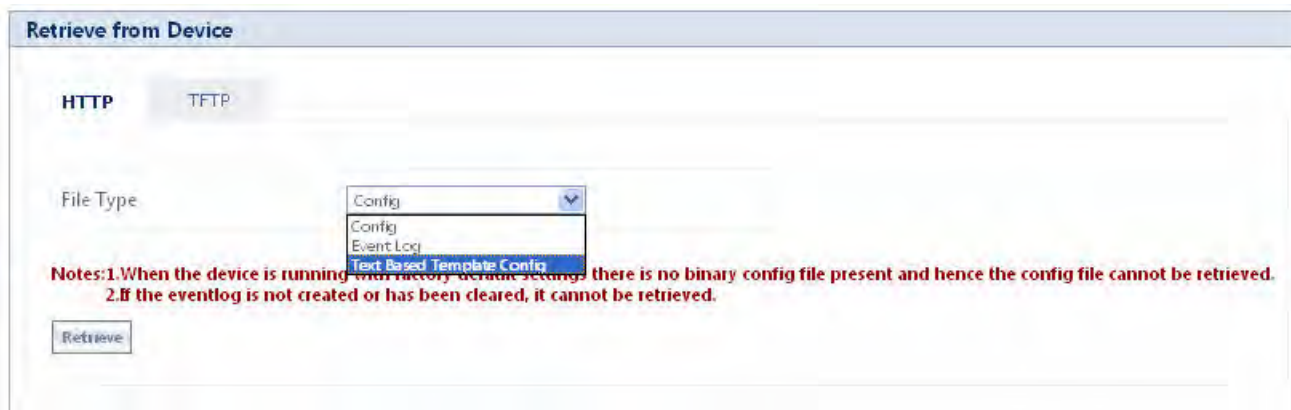


Figure 7-1 HTTP Retrieve of TBC File

1. From the **File Type** list, select **Text Based Template Config** file.
2. Click **Retrieve** to initiate the operation and retrieve the file to the local system.
3. On clicking **Retrieve**, a **Download** window appears as shown below. To download and save the file to your local system, right click on the link **HERE**, then save the file to your system.

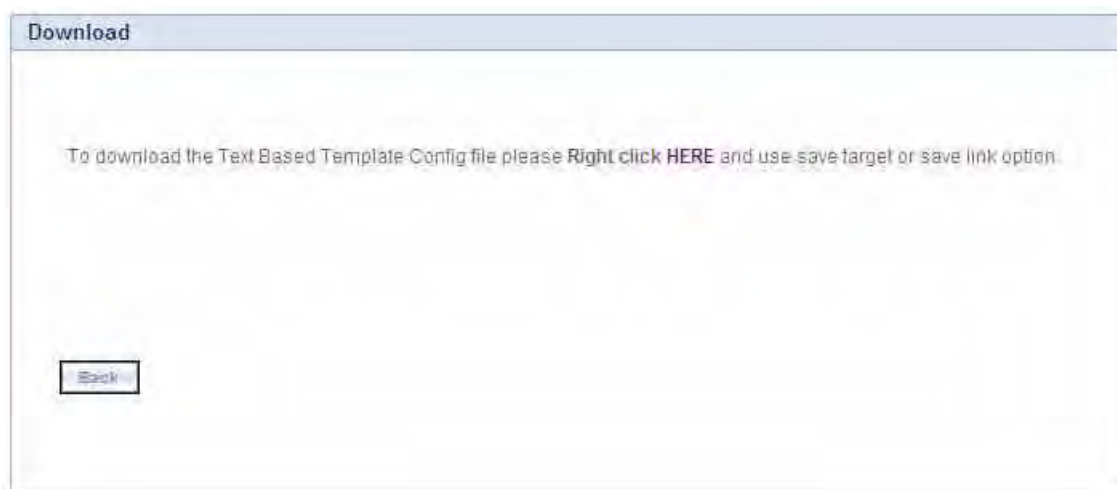
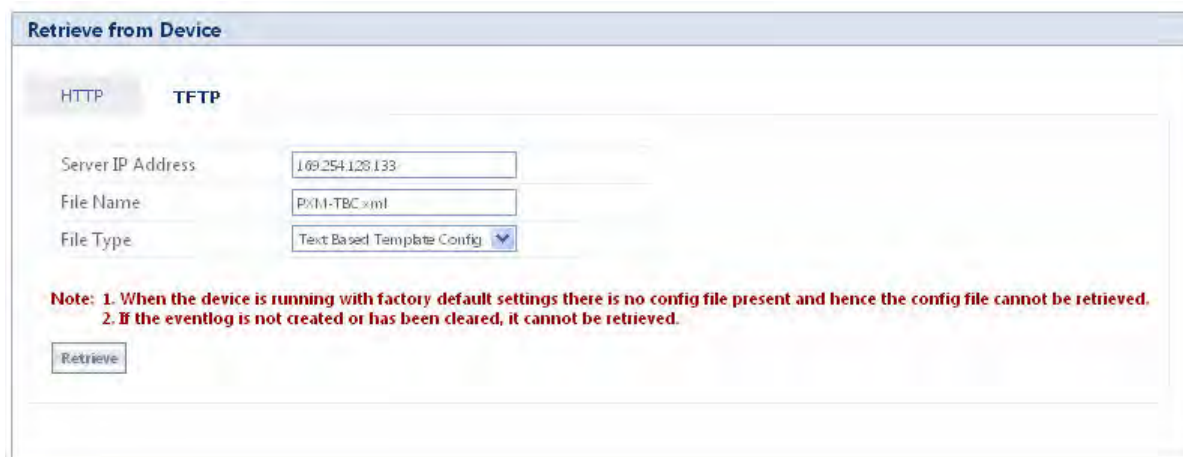


Figure 7-2 Download the TBC File

7.5.3.2 Retrieving through TFTP

For retrieving a Text Based Template Configuration file via TFTP web interface, click **MANAGEMENT > File Management > Retrieve From Device > TFTP**.



The screenshot shows a web interface titled "Retrieve from Device". It has two tabs: "HTTP" and "TFTP", with "TFTP" selected. Below the tabs are three input fields: "Server IP Address" with the value "1.69.254.128.133", "File Name" with the value "PXM-TBC.xml", and "File Type" with a dropdown menu set to "Text Based Template Config". Below these fields is a red note: "Note: 1. When the device is running with factory default settings there is no config file present and hence the config file cannot be retrieved. 2. If the eventlog is not created or has been cleared, it cannot be retrieved." At the bottom left of the form is a "Retrieve" button.

Figure 7-3 TFTP Retrieve of TBC File

1. Enter the TFTP Server IP address.
2. Enter the name of the file to be uploaded from the device.
3. Select the file type as **Text Based Template Config**.
4. To retrieve the file from the TFTP Server, Click **Retrieve**. The following window appears as shown below:



Figure 7-4 Successful retrieve of TBC

NOTE: The Text Based Template Configuration file does not exist if it is not generated from the CLI.

The generated Text Based Template Configuration file appears as shown below:

```

- <!--
  *** Proxim Corporation - Text Based Template Configuration File ***
  *** NOTE: Please remove all unmodified parameters before importing to the device. ***
  -->
- <pxm>
- <configuration>
- <management>
- <system-information>
  <email value="name@organization.com"/>
  <phone-number value="Contact-Phone-Number"/>
  <location value="System-Location"/>
  <gps-longitude value="-121.8893"/>
  <gps-latitude value="37.3321"/>
  <gps-altitude value="10"/>
  <system-name value="System-Name"/>
  <restore value="no"/>
  <factory-reset value="no"/>
</system-information>
- <tftp>
  <server-ip value="169.254.128.133"/>
  <file-name value="image.bin"/>
  <file-type value="image"/>
  <operation-type value="none"/>
</tftp>
- <access-ctrl>
  <all-access-ctrl value="enable"/>
  <http-ctrl value="enable"/>
  <https-ctrl value="enable"/>
  <snmp-ctrl value="enable"/>
  <telnet-ctrl value="enable"/>
  <ssh-ctrl value="enable"/>
</access-ctrl>
- <trap-host-table>
- <rowedit value="1">
  <ipaddress value="169.254.128.133"/>
  <password value="public"/>
  <comment value="Default"/>

```

Figure 7-5 TBC File in xml Format

7.5.4 Editing the TBC File

The Text Based Config (TBC) file can easily be opened and edited in any standard Text-Editors like Wordpad, MS-Word, Notepad++, Standard XML Editors. Proxim recommends XML Notepad 7 editor for editing the TBC file.

- You can modify any value between the double quotes(“”) in the TBC file. It is recommended not to change the text outside the double quotes (“”) or XML tags in the TBC file.
- Remove unchanged configurations from the TBC file before loading it to the device.

7.5.5 Updating the device with TBC File

You can update the device with the TBC File either through HTTP or TFTP protocol.

7.5.5.1 Updating the device with TBC File via HTTP

For updating the TBC File configuration via HTTP web interface, click **MANAGEMENT > File Management > Upgrade Configuration > HTTP**.

Upgrade Configuration

HTTP TFTP

File Name:

Notes :

1. File Name should not contain space or special characters.
2. Please select "flashcfg.cfg" for binary config file and "PXM-TBC.xml" to upgrade the Text Based Config file
3. Please do not navigate away from this page when the update is in progress.
4. After Upgrading the binary configuration, Reboot to work with new configuration. For TBC after update please load to apply changes.

Figure 7-6 Update the device with TBC File via HTTP

1. Click **Browse** and select the TBC file.
 2. Click **Update** to initiate the HTTP Update operation.
 3. Click **Load** to load the TBC file.
- Or
4. Click **Update & Load** to update and load with new configurations immediately.

NOTES:

- Click **COMMIT** for the changes to take effect.
- After upgrading new configuration, the device must be rebooted.
- To reject the changes done through **Update** or **Update & Load** options, reboot the device without clicking **COMMIT**.

7.5.5.2 Updating the device with TBC File via TFTP

For updating the device with TBC File via TFTP Server, click **MANAGEMENT > File Management > Upgrade Configuration > TFTP**.



Figure 7-7 Update the device with TBC File via TFTP

1. Select the **Text Based Config** option button.
2. Enter the TFTP Server IP Address.
3. Enter the name of the configuration file to be updated to the device.
 - Click **Update** to initiate the TFTP update operation. Then click **Load** to apply the updated changes. Finally click **COMMIT** for the changes to take effect.

Or

 - Click **Update & Load** to update and load with new configurations, the following window appears.



Figure 7-8 Message Window after successful loading of TBC File

- Click **COMMIT** for the changes to take effect.

7.5.6 Loading the TBC file

All configurations in the TBC file can be loaded to the device using all the three interfaces (SNMP/WEB/ CLI). The **Update**, **Load** and **Update & Load** tabs present in the **MANAGEMENT > File Management > Upgrade Configuration** page are used to load the TBC file using WEB. To load the TBC file, it should be generated or downloaded to the device.

If the TBC file is not with correct XML syntax, the file will be discarded with **DOM** error and no configurations will be loaded. All duplicate values entered are considered as errors while loading and syslogs will be generated accordingly. Therefore, it is recommended to delete all unchanged parameters from the TBC file during its edition. Commit is required to retain the configurations across reboots after loading the TBC file.

NOTE: Both Commit and Reboot are required to accept the modifications done in the TBC File. Only reboot is required to reject the modifications.

Loading the TBC file is allowed only once in an active device session (i.e., if TBC file is loaded, reboot is required to apply all configurations or to load another TBC file). All configurations in the TBC file are loaded to the device irrespective of their default or modified or added configurations. Loading the TBC file takes approximately 10-20 seconds depending on the number of configurations added.

NOTE: If you get any time-out errors while loading TBC file from SNMP interface, increase the time-out value to more than 30 secs in the MIB Browser.

7.6 Soft Reset to Factory Default

The unit can be reset to the factory default settings. Resetting to default settings leads to configuring the unit anew.

To reset to factory default settings using the Web Interface

1. Click **Management > Reset for Factory**.
2. Click the **Reset to Factory Default** button.

The device configuration parameter values are reset to their factory default values. If you do not have access to the unit, you can use the procedure described in Hard Reset to Factory Default as an alternative.

7.7 Hard Reset to Factory Default

If you cannot access the unit or you have lost its password, you can reset the unit to the factory default settings. Resetting to default settings leads to configuring the unit anew.

To reset to factory default settings, press and hold the RELOAD button on the side of the unit's power supply for 5 seconds. The current configuration is deleted from the unit and the unit reboots with factory defaults.

CAUTION: If you hold the RELOAD button for longer than 10 seconds, you may go into Forced Reload mode, which erases the unit's embedded software.

7.8 Forced Reload

With Forced Reload, you can erase the embedded software. Use this procedure only as a last resort if the unit does not boot and the "Reset to Factory Defaults" procedure does not help. If you perform a Forced Reload, you must download a new firmware with the Bootloader (see "Firmware Download with the Bootloader" below).

CAUTION: The following procedure erases the embedded software of the unit. This software image must be reloaded through an Ethernet connection with a TFTP server. The image filename to be downloaded can be configured with ScanTool through the Ethernet interface to make the unit functional again.

To do a forced reload

1. Disconnect and reconnect power to the unit; the unit resets and the LEDs flash.
2. Immediately press and hold the RELOAD button on the side of the unit's power supply for about 20 seconds. The software image and configuration are deleted from the unit.
3. Follow the Firmware Download with the Bootloader procedure to download an image file.

NOTE: While performing the hard reset to Factory Defaults / Forced Reload operations on the QB-8100 unit, ensure that any external device powered through the PoE injector is disconnected to avoid unwanted reload of the external device.

7.9 Upgrade a New Firmware Using ScanTool in Bootloader Mode

To download the unit's firmware, you will need an Ethernet connection to the computer on which the TFTP server resides and to a computer that is running ScanTool (this is either two separate computers connected to the same network or a single computer running both programs).

ScanTool detects if a device does not have a valid software firmware installed. In this case, the TFTP Server and Image File Name parameters are enabled in the ScanTool's Change screen so you can download a new firmware to the unit. (These fields are grayed out if ScanTool does not detect a software firmware problem.)

NOTE: *If you are unable to view the configuration parameters in ScanTool, it means that the device is not responding to your network. Hard reset the unit by unplugging and plugging the Power cable to PoE injector.*

7.9.1 Preparing to Download the Firmware

Before starting, you need to know the unit's IP address, subnet mask, the TFTP Server IP Address, and the unit's firmware name. Make sure the TFTP server is running and configured to point to the folder containing the image to be downloaded.

7.9.1.1 Download Procedure

Follow these steps to use ScanTool to download the firmware to a device with a missing firmware:

1. Download the latest software from <http://support.proxim.com>.
2. Copy the latest software updates to your TFTP server.
3. Launch ScanTool.
4. Highlight the entry for the device you want to update and click **Change**.
5. Set the IP address type as per your choice, either **Static** or **Dynamic**.
Setting IP Addrtype to static:
Set IP Address Type to Static.
 - Enter an unused IP address that is valid on your network in the IP Address field. You may need to contact your network administrator to get this address.
 - Enter the network's Subnet Mask in the field provided.
 - Enter the network's Gateway IP Address, if necessary. You may need to contact your network administrator to get this address. You should only enter the default gateway address (169.254.128.132) if the device and the TFTP server are separated by a router.
 - Enter the IP address of your TFTP server in the field provided.
 - Enter the Image File Name (including the file extension). Enter the full directory path and file name. If the file is located in the default TFTP directory, you need to enter only the file name.Setting IP Addrtype to dynamic:
 - Set IP Addrtype to Dynamic.
 - Start a tftp server and bootp server and enter all the configuration parameters (ipaddr, subnet mask etc).
6. Click OK. The device will reboot and the download will begin automatically. You should see downloading activity within the TFTP server's status screen.
7. Click OK when prompted that the device has been updated successfully to return to the Scan List screen.
8. Click Cancel to close the ScanTool.
9. When the download process is complete, configure the device as desired.

7.10 Download a New Firmware Using CLI from Bootloader

To download the unit's Image File, you will need an Ethernet connection to the computer on which the TFTP server resides. This can be any computer on the LAN or connected to the device with a cross-over Ethernet cable. You must also connect the device to a computer with a standard serial cable and use a terminal client, such as HyperTerminal. From the terminal, enter CLI Commands to set the IP address and download unit's Image.

7.10.1 Preparing to Download the Firmware

Before starting, you need to know the Unit's IP address, subnet mask, the TFTP Server IP Address, and the UNIT'S firmware name. Make sure the TFTP server is running and configured to point to the folder containing the firmware to be downloaded.

7.10.1.1 Download Procedure

1. Download the latest software from <http://support.proxim.com>.
2. Copy the latest software updates to your TFTP server's default directory.
3. Use a cross-over serial cable to connect the Unit's serial port to your computer's serial port.
4. Open your terminal emulation program (like HyperTerminal) and set the following connection properties:
 - Com Port: <COM1, COM2, etc., depending on your computer>
 - Baud rate: 115200
 - Data Bits: 8
 - Stop bits: 1
 - Flow Control: None
 - Parity: None
5. Under **File > Properties > Settings > ASCII Setup**, enable the **Send line ends with line feeds** option.
6. HyperTerminal sends a line return at the end of each line of code.
7. Power Reset the device (by resetting the power on PoE injector).
8. The terminal display shows Power On Self Tests (POST) activity. After approximately 30 seconds, a message appears indicating, "**Starting ScanTool interface, press any key to enter CLI 5**" and starts a counter for 5 seconds.
9. If the above counter expires, bootloader enters the ScanTool mode. To enter the CLI, press any key before the counter expires. Now a prompt appears as below:

```
Bootloader=>
```

10. Enter only the following statements:

```

Bootloader=> show (to view configuration parameters and values)
Bootloader=> set ipaddr <device IP Address>
Bootloader=> set serverip <TFTP Server IP Address>
Bootloader=> set filename <Device's Image File Name, including file extension>
Bootloader=> set gatewayip <Gateway IP Address>
Bootloader=> set netmask <Network Mask>
Bootloader=> set ipaddrtype static
Bootloader=> show (to confirm your new settings)
Bootloader=> reboot

```

Example:

```

Bootloader=> show
Bootloader=> set ipaddr 169.254.128.132
Bootloader=> set serverip 169.254.128
Bootloader=> set filename <imagenam>

```

```
Bootloader=> set gatewayip 169.254.128.132
Bootloader=> set netmask 255.255.255.0
Bootloader=> set ipaddrtype static
Bootloader=> show
Bootloader=> reboot
```

The device will reboot and then download the firmware. You should see the downloading activity within the TFTP server's status screen. When the download process is complete, configure the device as desired.

NOTE: *If the device is not responding to your network, hard reset the unit by unplugging and plugging the Power cable to PoE injector.*

Troubleshooting

This chapter helps you to isolate and solve problems with your QB-8100 unit. If the procedures discussed in this document does not provide a solution, or the solution does not solve your problem, check our support website at <http://support.proxim.com>.

Before you start troubleshooting, check the details in the product documentation. For details about RADIUS, TFTP, terminal and telnet programs, and Web browsers, refer to their appropriate documentation.

In some cases, rebooting the QB-8100 unit clears the problem. If nothing else helps, consider a [Soft Reset to Factory Default](#) or a [Forced Reload](#). The Forced Reload option requires you to download a new firmware to the QB-8100 unit.

The following topics are covered in this chapter:

- [PoE Injector](#)
- [Connectivity Issues](#)
- [Communication Issues](#)
- [Setup and Configuration Issues](#)

8.1 PoE Injector

8.1.1 The Unit Does Not Work

1. Verify that you are using a standard UTP Category 5 cable.
2. Try a different port on the same PoE injector hub (remember to move the input port accordingly) – if it works, there is probably a faulty port or bad RJ-45 port connection.
3. If possible, try to connect the unit to a different PoE injector hub.
4. Try using a different Ethernet cable – if it works, there is probably a faulty connection over the long cable, or a bad RJ-45 connection.
5. Check power plug and hub.
6. If the Ethernet link goes down, check the cable, cable type, switch, and hub.

8.1.2 There Is No Data Link

1. Verify that the indicator for the port is “on.”
2. Verify that the PoE injector hub is connected to the Ethernet network with a good connection.
3. Verify that the Ethernet cable is Category 5 or better and is less than 100 meters (approximately 325 feet) in length from the Ethernet source to the QB-8100 unit.
4. Try to connect a different device to the same port on the PoE injector hub – if it works and a link is established, there is probably a faulty data link in the unit.
5. Try to re-connect the cable to a different output port (remember to move the input port accordingly) – if it works, there is probably a faulty output or input port in the PoE injector hub or a bad RJ-45 connection.

8.1.3 Overload Indications

1. Verify that you are not using a cross-over cable between the PoE injector output port and the unit.
2. Verify that there is no short over any of the twisted pair cables.
3. Move the device into a different output port (remember to move the input port accordingly); if it works, there is probably a faulty port or bad RJ-45 connection.

8.2 Connectivity Issues

8.2.1 QB-8100 Does Not Boot

The QB-8100 shows no activity (the power LED is off).

1. Ensure that the power supply is properly working and correctly connected.
2. Ensure that all cables are correctly connected.
3. Check the power source.
4. If you are using an Active Ethernet splitter, ensure that the voltage is correct.
5. If you are using PoE injector, make sure you are using a Category 5, foiled, twisted pair cable to power the unit.

8.2.2 Ethernet Link Does Not Work

1. First check the Ethernet LED:
 - Solid Green: Ethernet is up.
 - Blinking Green: Ethernet is down.
2. Verify pass-through versus cross-over cable.

8.2.3 Serial Link Does Not Work

1. Make sure you are using a standard, straight-through, 9-pin serial cable.
2. Double-check the physical network connections.
3. Make sure your PC terminal program (such as HyperTerminal) is active and configured to the following values:
 - Com Port: (COM1, COM2, etc. depending on your computer);
 - Baud rate: 115200; Data bits: 8; Stop bits: 1; Flow Control: None; Parity: None;
 - Line Feeds with Carriage Returns(In HyperTerminal select: **File > Properties > Settings > ASCII Setup > Send Line Ends with Line Feeds**)

8.2.4 Cannot Use the Web Interface

1. Open a command prompt window and enter ping <ip address unit> (for example ping 10.0.0.1). If the unit does not respond, make sure that you have the correct IP address. If the unit responds, the Ethernet connection is working properly, continue with this procedure.
2. Ensure that you are using Microsoft Internet Explorer 7.0 (or later) or Firefox 3.0 (or later).
3. Ensure that you are not using a proxy server for the connection with your Web browser.
4. Ensure that you have not exceeded the maximum number of Web Interface or CLI sessions.
5. Double-check the physical network connections. Use a well-known unit to ensure the network connection is properly functioning.
6. Perform network infrastructure troubleshooting (check switches, routers, and so on).

NOTE: At any point of time, if your device is unable to connect to your network, power reset your device by unplugging and plugging PoE injector.

8.3 Communication Issues

8.3.1 Two Units Are Unable to Communicate Wirelessly

If a wireless link cannot be established after testing the two units within close distance of each other, then there can be two reasons why wireless connectivity is not possible while the QB-8100 endpoints are at their desired locations:

There may be a problem in the RF path, for example, a bad connector attachment (this is the most common problem in installations) or a bad cable (water ingress).

NOTE: *The cables can be swapped with known good ones as a temporary solution to verify cable quality.*

Another reason may be related to an interference problem caused by a high signal level from another radio. This can be checked by changing the frequency channel and then verifying whether another channel works better or by changing the polarization as a way of avoiding the interfering signal. To know in advance how much interference is present in a given environment, a Spectrum Analyzer can be attached to a (temporary) antenna for measuring the signal levels on all available channels.

NOTE: *The antennas are usually not the problem, unless mounted upside down causing the drain hole to quickly fill the radome with water.*

If a wireless link is not established after testing two units within close distance of each other, then the problem is either hardware or configuration related, such as a wrong Network name, Encryption key, Network Secret or End Point A Station Name. To eliminate these issues from being a factor, resetting the both units to factory defaults is the recommended solution.

If a wireless link is not possible after resetting the units and verifying that one unit is a End Point A with WORP End Point A interface configured and the other is an End Point B unit, then the problem is not configuration related and the only remaining reason is a possible hardware problem. Acquiring a third unit and then testing it amongst the existing units will help pinpoint the broken unit.

8.3.2 Surge and Lightning preventive maintenance

In case of any lightning or surge occurrence, check for the conditions specified below:

- Check the RF signals by referring to RSSI statistics and if the signal strength has been lowered considerably, replace the surge arrester.
- Unscrew the N-Type connector at the top and visually inspect the surge arrester for electrical burns. If any, replace the surge arrester.

8.4 Setup and Configuration Issues

The following issues relate to setup and configuration problems.

8.4.1 Lost Password

If you have lost your password, you must reset the QB-8100 device to the default settings. See [Hard Reset to Factory Default](#). The default password is **public**. If you record your password, keep it in a safe place.

8.4.2 The QB-8100 Responds Slowly

If the QB-8100 takes a long time to become available, it could mean that:

- No DHCP server is available.
- The IP address of the QB-8100 is already in use. Verify that the IP address is assigned only to the QB-8100. Do this by switching off the QB-8100 and then pinging the IP address. If there is a response to the ping, another device in the network is using the same IP address. If the QB-8100 uses a static IP address, switching to DHCP mode could remedy this problem. Also see [Setting the IP Address with ScanTool](#).
- There is too much network traffic.

8.4.3 Device Has Incorrect IP Address

1. Default IP Address Assignment mode is **Dynamic**. If you do not have a DHCP server on your network, the default IP Address is 169.254.128.132 for End Point A and 169.254.128.131 for End Point B. If you have more than one unit with default IP address connected to the network, you will not be able to communicate with them (due to an IP address conflict). In this case, assign each unit a unique static IP address via the serial cable or turn off all units but one and change the IP address using ScanTool one at a time.
2. The unit only contacts a DHCP server during boot-up. If your network's DHCP server is not available while the unit is booting, the device will use the default IP address (169.254.128.132 for End Point A and 169.254.128.131 for End Point B). Reboot the unit once your DHCP server is on-line again or use the ScanTool to find the unit's current IP address.
3. To find the unit's current IP address if using DHCP, open the IP Client Table in the DHCP Server and match the unit's IP address to its MAC address (found on the product label). Alternatively, use ScanTool to identify the unit's current IP address.
4. Once you have the current IP address, use the HTTP or CLI Interface to change the unit's IP settings, if necessary.
5. If you use static IP Address assignments and cannot access the unit over Ethernet, follow the *Initializing the IP Address using CLI* procedure. Once the IP Address is set, you can use the Ethernet Interface to complete configuration. If the device contains the default or known IP and is not accessible, then you need to check the Management VLAN configuration.
6. Configure the device to "DHCP" mode and reboot. While bootup, if there is a DHCP Server on the network, the DHCP Server will assign an IP Address to the unit.

8.4.4 HTTP Interface Does Not Work

1. Make sure you are using a compatible browser:
 - Microsoft Internet Explorer 7.0
 - Mozilla Firefox 3.0 and later.
2. Make sure you have the proper IP address. Enter your unit's IP Address in the browser address bar, similar to this example: `http://192.168.1.100`. When the Enter Network Password window appears, enter the User Name and enter the HTTP password in the Password field. The default HTTP username is **admin** and password is **public**.
3. Use the CLI over the serial port to check the IP Access Table, which may be restricting access to HTTP.

8.4.5 Telnet CLI Does Not Work

1. Make sure you have the proper IP Address. Enter your device IP address in the Telnet connection dialog, from a DOS prompt, type: C:\> telnet <Device IP Address>
2. Use the CLI over the serial port to check the IP Access Table, which may be restricting access to Telnet and HTTP.

8.4.6 TFTP Server Does Not Work

With TFTP, you can transfer files to and from the QB-8100 device. Also see [TFTP Server Setup](#). If a TFTP server is not properly configured and running, you cannot upload and download files.

The TFTP server:

- Can be situated either local or remote
- Must have a valid IP address
- Must be set for send and receive without time-out
- Must be running only during file upload and download

If the TFTP server does not upload or download files, it could mean:

- The TFTP server is not running
- The IP address of the TFTP server is invalid
- The upload or download directory is not correctly set
- The file name is not correct

8.4.7 Setting IP Address using Serial Port

Use the following procedure to set an IP address over the serial port using the CLI. The network administrator typically provides the device IP address.

8.4.7.1 Hardware and Software Requirements

- Standard cross-over serial data (RS-232) cable (not included with shipment).
- ASCII Terminal software, such as HyperTerminal.

8.4.7.2 Attaching the Serial Port Cable

1. Connect one end of the serial cable to the unit and the other end to a serial port on your computer.
2. Power on the computer and unit, if necessary.

8.4.7.3 Initializing the IP Address using CLI

After installing the serial port, you may use the CLI to communicate with the device. CLI supports most generic terminal emulation programs, such as HyperTerminal (which is included with the Windows operating systems). In addition, many web sites offer shareware or commercial terminal programs you can download. Once the IP address has been assigned, you can use the HTTP interface or the CLI over Telnet to complete the configuration.

Follow these steps to assign the QB-8100 unit an IP address:

1. Open your terminal emulation program (like HyperTerminal) and set the following connection properties:
 - Com Port: <COM1, COM2, etc., depending on your computer>
 - Baud rate: 115200
 - Data Bits: 8
 - Stop bits: 1
 - Flow Control: None

- Parity: None
- 2. Press the REBOOT button on the PoE injector of the unit.

The terminal display shows Power On Self Tests (POST) activity, displays the software version, and prompts to enter the CLI username and password similar to the example below. This process may take up to 90 seconds.

```
##### |
```

```
# Version: 2.5.0 B305010
```

```
# Architecture: PowerPC 8313
```

```
# Creation: On May 1 2010 At 15:41:28
```

```
##### |
```

```
Username: admin
```

```
Password:
```

- 3. Enter the CLI Username and password (default username is **admin** and password is **public**). The terminal displays a welcome message and then the CLI Prompt:

```
System Name>
```

- 4. Enter show configure network to find the current IP address of the device.
- 5. Change the IP address and other network values using the following CLI commands, similar to the example below (use your own IP address and subnet mask).

```
System Name> enable
```

```
System Name# configure
```

```
System Name(config)#network
```

```
System Name(config-net)# ip
```

```
System Name(config-net-ip)# ethernet-ip-table
```

```
System Name(config-net-ip-etherip)# rowedit 1 ipaddress <ipaddress>
```

```
System Name(config-net-ip-etherip)# rowedit 1 mask <subnet mask>
```

```
System Name(config-net-ip-etherip)# rowedit 1 address-type <Address Type>
```

```
System Name(config-net-ip)# default-gateway <IP Gateway>
```

```
System Name(config-net-ip-etherip)#exit
```

```
System Name(config-net-ip)#exit
```

```
System Name(config-net)#exit
```

```
System Name(config)# commit 1
```

```
System Name(config)# reboot 1
```

- 6. After the unit reboots, verify the new IP address by reconnecting to the CLI and enter a show configure network command. Alternatively, you can ping the device from a network computer to confirm that the new IP address has taken effect.
- 7. When the proper IP address is set, use the HTTP interface or CLI over Telnet to configure the rest of the unit's operating parameters.

8.4.8 RADIUS Authentication Server

If you enabled RADIUS Authentication on the unit, make sure that your network's RADIUS servers are operational. Otherwise, clients cannot log in. There are several reasons the authentication server services might be unavailable, here are two typical things to check:

- Make sure you have the proper RADIUS authentication server information setup configured in the device. Check the RADIUS Authentication Server's Shared Secret and Destination Port number (default is 1812; for RADIUS Accounting, the default is 1813).
- Make sure the RADIUS authentication server RAS setup matches the device.

8.4.9 TFTP Server

The "Trivial File Transfer Protocol" (TFTP) server allows you to transfer files across a network. You can upload the configuration files from the unit for backup or copying, and you can download configuration files or new firmware. The TFTP software is located on the installation CD. If a TFTP server is not configured and running, you will not be able to download and upload software and configuration files to/from the device. Remember that the TFTP server does not have to be local, so long as you have a valid TFTP IP address. Note that you do not need a TFTP server running unless you want to transfer files to or from the device.

After the TFTP server is installed:

- Check to see that TFTP is configured to point to the directory containing the device Image.
- Make sure you have the proper TFTP server IP Address, the proper device firmware name, and that the TFTP server is connected.
- Make sure the TFTP server is configured to both Transmit and Receive files (on the TFTP server's **Security** tab), with no automatic shutdown or time-out (on the **Auto Close** tab).

8.4.10 Recovery Procedures

The most common installation problems relate to IP addressing. For example, without the TFTP server IP Address, you will not be able to download a new device firmware to the unit. IP Address management is fundamental. We suggest you to create a chart to document and validate the IP addresses for your system. If the password is lost or forgotten, you will need to reset the unit to default values. The Soft Reset to Factory Defaults and Hard Reset to Factory Defaults procedures reset configuration settings, but do not change the current device firmware.

If the device has a corrupted firmware, follow the Forced Reload procedure to erase the current AP Image and download a new firmware.

8.4.11 Soft Reset to Factory Defaults

Use this procedure to reset the network configuration values, including the password, IP address, and subnet mask. The current unit Image is not deleted.

1. Click **Management > Reset to Factory**.
2. Click **Reset to Factory Default**. The device is reset to its factory default state.
3. The default IP address that the unit resets to is 169.254.128.132 for End Point A the device and 169.254.128.131 for End Point B. If you want to make modification to the IP address setting, use the ScanTool or CLI. See Using CLI to Manage the Access Point for CLI information.

If you do not have access to the HTTP or CLI interfaces, use the procedure described in Hard Reset to Factory Defaults.

8.4.12 Hard Reset to Factory Defaults

If you cannot access the unit or you have lost its password, you can reset the unit to the factory default settings. Resetting to default settings leads to configuring the unit anew.

To reset to factory default settings, press and hold the RELOAD button on the side of the unit's PoE injector power supply for 5 seconds. The current configuration is deleted from the unit and the unit reboots, with factory defaults.

CAUTION: *If you hold the RELOAD button for longer than 10 seconds, you may go into Forced Reload mode, which erases the unit's embedded software.*

8.4.13 Forced Reload

With Forced Reload, you bring the unit into bootloader mode by erasing the embedded software. Use this procedure only as a last resort if the unit does not boot and the procedure did not help.

CAUTION: *By completing this procedure, the embedded software in the unit will be erased. You will need to reload the software before the unit is operational.*

To do a forced reload

1. Reset the unit by resetting the power plug of PoE injector.
2. Press and hold the RELOAD button which is located on the PoE injector for about 20 seconds. The unit deletes the current firmware.
3. Unit will try to load the required firmware using the default factory configuration parameters. If this fails, then it will enter either CLI mode or ScanTool mode as per the user's choice, with a message on the serial console "Starting ScanTool interface, press any key to enter CLI 5". Follow one of the procedures below to load a new firmware to the unit:
 - Download a New Image Using ScanTool
 - Download a New Image Using the Bootloader CLI

Because the CLI option requires a physical connection to the unit's serial port, Proxim recommends the ScanTool Option.

8.4.14 VLAN Operation Issues

The correct VLAN configuration can be verified by "pinging" both wired and wireless hosts from both sides of the device and the network switch. Traffic can be "sniffed" on the wired (Ethernet), if configured. Bridge frames generated by wireless clients and viewed on one of the backbones should contain IEEE 802.1Q compliant VLAN headers or tags. The VLAN ID in the headers should correspond to one of the VLAN User IDs configured for the unit.

The correct VLAN assignment can be verified by ping:

- The unit to ensure connectivity
- The switch to ensure VLAN properties This should be checking not ping
- Hosts past the switch to confirm the switch is functional

Ultimately, traffic can be "sniffed" on the Ethernet interface using third-party packages. Most problems can be avoided by ensuring that 802.1Q compliant VLAN tags containing the proper VLAN ID have been inserted in the bridged frames. The VLAN ID in the header should correspond to the assigned VLAN.

What if network traffic is being directed to a nonexistent host?

- All sessions are disconnected, traffic is lost, and a manual override is necessary.
- Workaround: You can configure the switch to mimic the nonexistent host.

I have just configured the Management ID and now I can't manage the device.

- Check to ensure your password is correct. If your password is incorrect or all inbound packets do NOT have the correct tag, then a Forced Reload is necessary.

CAUTION: *The Forced Reload procedure disconnects all users and resets all values to factory defaults.*

8.4.15 Changes Do Not Take Effect

Changes made in the Web Interface do not take effect:

1. Restart your Web browser.
2. Log into the radio unit again and make changes.
3. Reboot the radio unit when prompted to do so.
4. Click **Commit** for the changes to take effect.

Wait until the reboot is completed before accessing the unit again.

8.4.16 Link Problems

While wireless networking emerges more and more, the number of wireless connections to networks grows every day. To successfully use the connections, technicians must be able to troubleshoot the system effectively. This section gives hints on how a point-to-point network could be analyzed in the case of "no link", a situation in which the customer thinks that the link is down because there is no traffic being passed.

The four general reasons that a wireless link may not work are related to:

- Hardware
- Configuration
- Path issues (such as distance, cable loss, obstacles)
- Environment (anything that is outside the equipment and not part of the path itself)

You have tested the equipment in the office and have verified that the hardware and configurations are sound. The path calculation has been reviewed, and the path has been double-checked for obstacles and canceling reflections. Still, the user reports that the link does not work.

Most likely, the problem reported is caused by the environment or by improper tests to verify the connection. The test method, cabling, antennas, and antenna alignment have been checked. Always do this before checking the environment.

8.4.17 General Check

Two general checks are recommended before taking any action:

- Check whether the software version on all devices is the most current version.
- Check for any reported alarm messages in the Event Log.

8.4.18 Statistics Check

Interference and other negative environment factors always have an impact on the number of correctly received frames. The Tsunami QB-8100 models give detailed information about transmission errors in the Web interface, under Monitor (Section/Window etc.).

The windows that are important for validating the health of the link are:

- Monitor / Wireless Statistics: Check CRC errors: Rising CRC errors indicate interference or low fade margin. So does Failed count. If only one of those is high, this indicates that a source of interference is significant near one end of the link.
- Monitor / Ethernet Statistics: The information is given after the wireless Ethernet frame is converted into a normal Ethernet frame. The parameters shown are part of the MIB-II.
 - Both operational and admin status should be up. An admin status of down indicates that the interface is configured to be down.
 - In Discards and Out Discards indicate overload of the buffers, likely caused by network traffic, which is too heavy.

- In Errors and Out Errors should never happen; however, it might happen if a frame's CRC was correct while the content was still invalid.
- Monitor / Wireless / WOPR (Statistics on WOPR): WOPR runs on top of normal Ethernet, which means that the WOPR frame is in fact the data field of the Ethernet frame. Send Failure or Send Retries must be low in comparison to Send Success. Low is about 1%. The same applies for Receive Success versus Receive Retries and Receive Failures. Note that the Receive Failures and Retries can be inaccurate. A frame from the remote site might have been transmitted without even being received; therefore, the count of that frame might not have been added to the statistics and the receiver simply could not know that there was a frame.
 - Remote Partners indicates how many End Point B units are connected (in case of an End Point A) or whether an End Point A is connected (in case of an End Point B).

8.4.19 Analyzing the Spectrum

The ultimate way to discover whether there is a source of interference is to use a spectrum analyzer. Usually, the antenna is connected to the analyzer when measuring. By turning the antenna 360 degrees, one can check from which direction the interference is coming. The analyzer will also display the frequencies and the level of signal is detected. Proxim recommends performing the test at various locations to find the most ideal location for the equipment.

8.4.19.1 Avoiding Interference

When a source of interference is identified and when the level and frequencies are known, the next step is to avoid the interference. Some of the following actions can be tried:

- Changing the channel to a frequency away from the interference is the first step in avoiding interference. The installer can select a DFS Preferred Channel.
- Each antenna has a polarization; try to change to a polarization different from the interference.
- A small beam antenna looks only in one particular direction. Because of the higher gain of such an antenna, lowering the output power or adding extra attenuation might be required to stay legal. This solution cannot help when the source of interference is right behind the remote site.
- Lowering the antennas can help avoid seeing interference from far away.

Move the antennas to a different location on the premises. This causes the devices to look from a different angle, causing a different pattern in the reception of the signals. Use obstructions such as buildings, when possible, to shield from the interference.

8.4.19.2 Conclusion

A spectrum analyzer can be a great help to identify whether interference might be causing link problems on Tsunami QB-8100 devices.

Before checking for interference, the link should be verified by testing in an isolated environment, to make sure that the hardware works and your configurations are correct. The path analysis, cabling and antennas should be checked as well.

Statistics in the web interface under Monitor indicates if there is a link, if the link is healthy, and a continuous test can be done using the Link Test.

- Base Announces should increase continuously.
- Registration Requests and Authentication Requests should be divisible by 3. WOPR is designed in a way that each registration sequence starts with 3 identical requests. It is not a problem if, once in a while, one of those requests is missing. Missing requests frequently is to be avoided.
- Monitor / Per Station (Information per connected remote partner): Check that the received signal level (RSL) is the same on both sides. This should be the case if output power is the same. Two different RSLs indicate a broken transmitter or receiver. A significant difference between Local Noise and Remote Noise could indicate a source of interference near the site with the highest noise. Normally, noise is about -80 dBm at 36 Mbps. This number can vary from situation to situation, of course, also in a healthy environment.

- Monitor / Link Test (Information used by Administrators for on-the-spot checking): Check the received signal level (RSL) and noise level. Compare the RSL with the values from path analysis. If the figures differ significantly from the values recorded at the Per Station window, check for environment conditions that change over time.

Frequency Domains and Channels

Introduction

The Tsunami QB-8100 is available in two SKUs one for US (US) and the other for World (WD) Markets. Depending on the SKU, the device is hard programmed at factory to that Regulatory domain. Regulatory domain controls the list of frequency domains that are available in that SKU. Further each frequency domain will define the country specific retaliatory rules and frequency bands. This is a configurable option.

The frequency domain can be easily configured using the WEB Interface as it is a drop down list with all the available domains. When using with CLI/SNMP, care has to be taken to set the domains using a predefined ENUM value. Below is the list of all available frequency domains in each SKU with their corresponding ENUM value in the braces:

For US SKU

- United States 5 GHz (1)
- United States 5.8 GHz (2)
- United States2 5.3, 5.8 GHz (22)

For World SKU

- World 5 GHz (4)
- World 5.9 GHz (21)
- World 4.9 GHz (5)
- Canada 5 GHz (9)
- Europe 5.8 GHz (10)
- Europe 5.4 GHz (11)
- Russia 5 GHz (13)
- Taiwan 5 GHz (14)
- United States 5 GHz (15)
- Canada 5.8 GHz (16)
- India 5.8 GHz (23)
- UK 5.8 GHz (20)

The following screen displays the list of frequency domains supported by the device.

```

T8000-C1:65:7E# show supported-frequency-domains

RADIO-INDEX 1

SUPPORTED FREQUENCY DOMAINS : 4,9,10,11,13,14,15,16,20,23
*****
          Frequency Domains Reference List
*****
 1  --->  United States 5GHz
 2  --->  United States 5.8GHz
 3  --->  United States 2.4GHz
 4  --->  World 5GHz
 5  --->  World 4.9GHz
 6  --->  World 2.4GHz
 7  --->  World 2.3GHz
 8  --->  World 2.5GHz
 9  --->  Canada 5GHz
10  --->  Europe 5.8GHz
11  --->  Europe 5.4GHz
12  --->  Europe 2.4GHz
13  --->  Russia 5GHz
14  --->  Taiwan 5GHz
15  --->  United States 5GHz
16  --->  Canada 5.8GHz
17  --->  World 6.4GHz
20  --->  UK 5.8GHz
21  --->  World 5.9GHz
22  --->  US2 5.3 And 5.8GHz
23  --->  India 5.8GHz
*****

```

NOTE: The supported frequency domains differ based on the License file present on the board.

5 GHz Channels/Frequencies by Country

Frequency Domain	Frequency Band (Start Center Frequency ~ End Center Frequency in MHz)	DFS	Allowed Channels (Center Frequency)				
			5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
United States 5 GHz	5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	DFS, DFS, Non-DFS	Not Supported	Not Supported	52(5260), 53(5265).... 63(5315), 64(5320). 100(5500), 101(5505).. 139(5695), 140(5700). 149(5745), 150(5750)... 164(5820), 165(5825).	52(5260), 53(5265)... 63(5315), 64(5320). 100(5500), 101(5505).... 139(5695), 140(5700). 149(5745), 150(5750)... 160(5800), 161(5805).	56(5280), 57(5285).... 63(5315), 64(5320). 100(5500), 101(5505).... 139(5695), 140(5700). 149(5745), 150(5750)... 164(5820), 165(5825).
United States 5.8 GHz	5745 ~ 5825	Non-DFS	Not Supported	Not Supported	149(5745), 150(5750)... 164(5820), 165(5825).	149(5745), 150(5750)... 160(5800), 161(5805).	153(5765), 154(5770).... 164(5820), 165(5825).
United States2(5.3, 5.8 GHz)	5260 ~ 5320 5745 ~ 5825	DFS Non-DFS	Not Supported	Not Supported	52(5260), 53(5265).... 63(5315), 64(5320). 149(5745), 150(5750)... 164(5820), 165(5825).	52(5260), 53(5265).... 63(5315), 64(5320). 149(5745), 150(5750)... 160(5800), 161(5805).	56(5280), 57(5285).... 63(5315), 64(5320). 149(5745), 150(5750)... 164(5820), 165(5825).
World 5 GHz	5155 ~ 6075	Non-DFS	31(5155), 32(5160).... 214(6070), 215(6075).	31(5155), 32(5160).... 214(6070), 215(6075).	32(5160), 33(5165).... 213(6065), 214(6070).	32(5160), 33(5165).... 209(6045), 210(6050).	36(5180), 37(5185).... 213(6065), 214(6070).
WORLD 4.9 GHz	4945 ~ 4985	Non-DFS	10 (4945), 20 (4950).... 80 (4980), 90 (4985).	10 (4945), 20 (4950).... 80 (4980), 90 (4985).	20(4950), 30(4955).... 70(4975), 80(4980).	20(4950), 30(4955), 40(4960).	60(4970), 70(4975), 80(4980).
WORLD 5.9 GHz	5880 ~ 5920	Non-DFS	176(5880), 177(5885).... 183(5915), 184(5920).	176(5880), 177(5885).... 183(5915), 184(5920).	177(5885), 178(5890)... 182(5910), 183(5915).	177(5885), 178(5890), 179(5895).	181(5905), 182(5910), 183(5915).

Frequency Domains and Channels

Frequency Domain	Frequency Band (Start Center Frequency ~ End Center Frequency in MHz)	DFS	Allowed Channels (Center Frequency)				
			5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
CANADA 5 GHz	5255 ~ 5325 5495 ~ 5585 5655 ~ 5705	DFS	51(5255), 52(5260).... 64(5320), 65(5325). 99(5495), 100(5500)... 116(5580) 117(5585). 131(5655), 132(5660).... 140(5700), 141(5705).	52(5260), 53(5265).... 63(5315), 64(5320). 100(5500), 101(5505).... 115(5575), 116(5580). 132(5660), 133(5665).... 139(5695), 140(5700).	52(5260), 53(5265).... 63(5315), 64(5320). 100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).	52(5260), 53(5265).... 63(5315), 64(5320). 100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 135(5675), 136(5680).	56(5280), 57(5285).... 63(5315), 64(5320). 100(5500), 101(5505).... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).
EUROPE 5.4 GHz	5500 ~ 5700	DFS	Not Supported	100(5500), 101(5505).... 115(5575), 116(5580). 132(5660), 133(5665).... 139(5695), 140(5700).	100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).	100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 135(5675), 136(5680).	104(5520), 105(5525)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).
EUROPE 5.8 GHz	5735 ~ 5870	DFS	Not Supported	147(5735), 148(5740)... 173(5865), 174(5870).	149(5745), 150(5750)... 172(5860), 173(5865).	149(5745), 150(5750)... 168(5840), 169(5845).	153(5765), 154(5770).... 172(5860), 173(5865).
RUSSIA 5 GHz	5155 ~ 6075	Non-DFS	31(5155), 32(5160).... 214(6070), 215(6075).	31(5155), 32(5160).... 214(6070), 215(6075).	32(5160), 33(5165).... 213(6065), 214(6070).	32(5160), 33(5165).... 219(6045), 210(6050).	36(5180), 37(5185).... 213(6065), 214(6070).
Taiwan 5 GHz	5495 ~ 5705 5740 ~ 5810	DFS	99(5495), 100(5500).... 140(5700), 141(5705). 148(5740), 149(5745).... 161(5805), 162(5810).	100(5500), 101(5505)... 139(5695), 140(5700). 149(5745), 150(5750).... 160(5800), 161(5805).	100(5500), 101(5505)... 139(5695), 140(5700). 149(5745), 150(5750)... 160(5800), 161(5805).	100(5500), 101(5505).... 139(5695), 140(5700). 149(5745), 150(5750).... 156(5780), 157(5785).	104(5520), 105(5525)... 139(5695), 140(5700). 149(5745), 150(5750)... 160(5800), 161(5805).

Frequency Domain	Frequency Band (Start Center Frequency ~ End Center Frequency in MHz)	DFS	Allowed Channels (Center Frequency)				
			5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
India 5.8 GHz	5830 ~ 5870	Non-DFS	166(5830), 167(5835)... 173(5865), 174(5870).	166(5830), 167(5835).... 173(5865), 174(5870).	167(5835), 168(5840)... 172(5860), 173(5865).	167(5835), 168(5840), 169(5845).	171(5855), 172(5860), 173(5865).
CANADA 5.8 GHz	5735 ~ 5855	Non-DFS	147(5735), 148(5740).... 170(5850), 171(5855).	147(5735), 148(5740)..... 170(5850), 171(5855).	148(5740), 149(5745)... 169(5845), 170(5850).	148(5740), 149(5745)... 165(5825), 166(5830).	152(5760), 153(5765)... 169(5845), 170(5850).
U.K 5.8 GHz	5735 ~ 5835	DFS	Not Supported	147(5735), 148(5740)..... 156(5780), 157(5785), 167(5835).	147(5735), 148(5740)... 156(5780), 157(5785), 167(5835).	147(5735), 148(5740)... 153(5765), 154(5770).	151(5755), 152(5760).... 156(5780), 157(5785), 167(5835).

NOTE: While choosing a 40MHz bandwidth, you can select 40 PLUS or 40 MINUS. 40 PLUS means the center frequency calculation is to be done for 20MHz and add another 20MHz to the top edge of 20MHz. 40 MINUS means the center frequency calculation is to be done for 20MHz and add another 20MHz to the bottom edge of 20MHz.

Details for 40MHz Bandwidth

For 40 PLUS

- 2.4GHz -> Channel 1 = 2412MHz.
- Bandwidth starts from 2403 and ends at 2442
- 5GHz -> Channel 52 = 5260
- Bandwidth starts from 5251 and ends at 5290

For 40 MINUS

- 2.4GHz -> Channel 5 = 2432MHz.
- Bandwidth starts from 2403 and ends at 2442
- 5GHz -> Channel 56 = 5280
- Bandwidth starts from 5251 and ends at 5290

Boot Loader CLI and ScanTool

Boot Loader CLI

The Boot Loader CLI is a minimal subset of the normal CLI used to perform initial configuration of the unit. The Boot Loader CLI is available when the unit's embedded software is not running.

This interface is only accessible through the serial interface, if:

- The device does not contain a software image
- An existing image is corrupted
- An automatic (default) download of image over TFTP has failed.

The Boot Loader CLI provides you with the ability to configure the initial setup parameters; and depending on this configuration, a software file is downloaded to the device during startup.

The Boot Loader CLI supports the following commands:

- **factory_reset**: Restore the factory settings
- **help**: Print Online Help
- **reboot**: Reboot the device
- **set**: Set the parameters
- **show**: Show the parameters

The Boot Loader CLI supports the following parameters (for viewing and modifying):

- **ipaddr**: IP Address
- **systemname**: System Name
- **gatewayip**: Gateway IP Address
- **serverip**: Server IP Address
- **ipaddrtype**: IP Address Type
- **netmask**: Net Mask
- **filename**: Image file name (including the file extension)

If the Boot Loader fails to load the firmware from flash, it tries to get the firmware from the network. The default configuration of the Boot Loader parameters are as follows:

Parameter	Value
ipaddr	169.254.128.132
netmask	255.255.255.0
gatewayip	169.254.128.132
systemname	systemname
serverip	169.254.128.133
filename	imagename
ipaddrtype	dynamic

To Load the Firmware from the Network

- Use the **show** command to view the parameters and their values and use the **set** command to set the values to the parameters as per the requirement.

To Get the IP Parameters Dynamically for Loading the Firmware

1. Set the ipaddrtype to dynamic.
2. Run the BOOTP and TFTP Servers along with a reboot of the unit.

When the device reboots, the device gets the IP Address and Boot filename from the BOOTP server. You need not change any of the above parameters. After BOOTP succeeds, the device initiates a TFTP request with the filename it gets from BOOTP.

To Load the Firmware by Using Static IP Parameters

1. Use the **set** command to set the IP parameters like 'ipaddr', 'serverip', 'filename' and also set the parameter 'ipaddrtype' to static.
2. Run the TFTP Server along with a reboot of the unit.

When the device reboots, the TFTP request is initiated with the value taken from the parameter "filename". This request is sent to the IP address set to the parameter "serverip". In this case, the TFTP Server should be reachable to the device.

ScanTool

If you want to access the device with Scantool, then the host running the ScanTool should also be in the same network as the device. The ScanTool broadcast requests are discarded by the routers if the device and the host running the ScanTool are in different network. This means that the ScanTool cannot discover the device.

A device in Boot Loader can be recognized by looking at the system description. If the system description does not contain any build number in braces, conclude that the device is in Boot Loader mode.

For example:

- Tsunami QB-8100 End Point is the name of the board
- WD is the Regulatory Domain
- V2.5.0 is the Firmware Version
- 303160 is the firmware build number

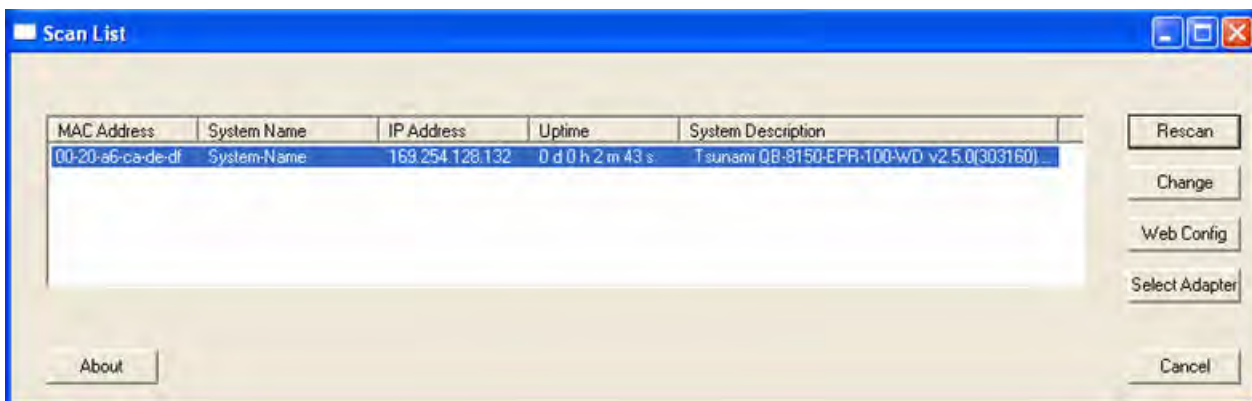


Figure B-1 Scan Tool View of a Device in Boot Loader Mode

Technical Specifications

This chapter provides information on the following topics:

- [Part Numbers](#)
- [Regulatory Approval and Frequency Domains](#)
- [Integrated Dual Polarized Panel Antenna Specifications](#)
- [Radio and Transmission Specifications](#)
- [OFDM Modulation Rates](#)
- [Wireless Protocol](#)
- [Interfaces](#)
- [Transmit Power Settings](#)
- [Receive Sensitivity](#)
- [Latency](#)
- [Management](#)
- [Power Supply](#)
- [LEDs](#)
- [Software Features](#)
- [Hardware Specifications](#)
- [Physical and Environmental Specifications](#)
- [MTBF and Warranty](#)

Part Numbers

QB-8100 Series Units

Model #	CPN #	Description
QB-8150-LNK-5-US	902-00011	Tsunami QB 8150 Link, 5 Mbps, MIMO 2x2, 16 dBi Integrated antenna – US SKU
QB-8150-LNK-5-WD	902-00013	Tsunami QB 8150 Link, 5 Mbps, MIMO 2x2, 16 dBi Integrated antenna – World SKU
QB-8150-LNK-100-US	902-00019	Tsunami QB 8150 Link, 100 Mbps, MIMO 2x2, 16 dBi Integrated antenna – US SKU
QB-8150-LNK-100-WD	902-00021	Tsunami QB 8150 Link, 100 Mbps, MIMO 2x2, 16 dBi Integrated antenna – World SKU

Accessories

CPN #	Description
77537	Universal Mounting Bracket for Wall Mounting
74962	PoE Injector with Reload function

Regulatory Approval and Frequency Domains

- **Safety Standards:** UL 60950, CAN/CSA-C22.2 No. 60950, IEC 60950, EN 60950
- **Regulatory Certifications:** FCC, IC and ETSI

5 GHz Channels/Frequencies

Region/ Country	Frequency Domain	Frequency Band (Start Center Frequency ~ End Center Frequency in MHz)	No. of Channels				
			5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
North America	United States 5 GHz	5260 ~ 5320 5500 ~ 5700 5745 ~ 5825	Not Supported	Not Supported	Up to 71	Up to 67	Up to 67
	United States 5.8 GHz	5745 ~ 5825	Not Supported	Not Supported	Up to 17	Up to 13	Up to 13
	United States ² (5.3, 5.8 GHz)	5260 ~ 5320 5745 ~ 5825	Not Supported	Not Supported	Up to 30	Up to 26	Up to 26
	Canada 5 GHz	5255 ~ 5325 5495 ~ 5585 5655 ~ 5705	Up to 45	Up to 39	Up to 39	Up to 35	Up to 35
	Canada 5.8 GHz	5735 ~ 5855	Up to 25	Up to 25	Up to 23	Up to 19	Up to 19
EU Countries	Europe 5.8 GHz	5.740 ~ 5.865			Up to 7	Up to 3	Up to 3
	Europe 5.4 GHz	5500 ~ 5700	Not Supported	Up to 26	Up to 26	Up to 22	Up to 22
	Europe 5.8 GHz	5735 ~ 5870	Not Supported	Up to 28	Up to 25	Up to 21	Up to 21
	Russia 5 GHz	5155 ~ 6075	Up to 185	Up to 185	Up to 183	Up to 179	Up to 179
APAC	Taiwan 5 GHz	5495 ~ 5810	Up to 58	Up to 54	Up to 54	Up to 50	Up to 50
	India 5.8 GHz	5830 ~ 5870	Up to 9	Up to 9	Up to 7	Up to 3	Up to 3
World	World 5 GHz	5155 ~ 6075	Up to 185	Up to 185	Up to 183	Up to 179	Up to 179
	World 4.9 GHz	4945 ~ 4985	Up to 63	Up to 63	Up to 43	Up to 3	Up to 3
	World 5.9 GHz	5880 ~ 5920	Up to 9	Up to 9	Up to 7	Up to 3	Up to 3
	United States 5 GHz	5260 ~ 5825	Not Supported	Not Supported	Up to 71	Up to 67	Up to 67
	UK 5.8 GHz	5735 ~ 5835	Not Supported	Up to 12	Up to 11	Up to 8	Up to 8

Integrated Dual Polarized Panel Antenna Specifications

Feature	Specification	
	Vertical Antenna	Horizontal Antenna
Frequency band	5.300 – 6.100 GHz	
Gain	15 - 16 dBi	15 - 16 dBi
Horizontal Half Power Beam width	17.6 – 20.3	16.5 – 18.3
Vertical Half Power Beam width	16.1 - 20.5	17.0 - 24.0
Sidelobes level	-10 dB (Max)	-8 dB (Max)
Front-to-back-ratio	23 dB (Max)	
Polarization	Linear, Vertical	Linear, Horizontal
Port to port isolation	27 dB (Min.)	
Power Handling	6 W (cw)	
VSWR	2.0:1 (Max)	
Cable	RG178, 150 mm x 2	
Connector	MMCX R/A Plug	
Standard Compliance	ETSI TS3, TS4, TS5	
Lightning Protection	DC Ground	

Radio and Transmission Specifications

Category	Specification
Modulation Method	OFDM
Radio Speeds	Upto 300 Mbps
Over-the-Air Throughput	100 Mbps

OFDM Modulation Rates

Modulation	Data Rate (Mbps)									
	5 MHz Channel Bandwidth (for Full GI-800ns)		10 MHz Channel Bandwidth (for Full GI-800ns)		20 MHz Channel Bandwidth (for Full GI-800ns)		40 MHz Channel Bandwidth			
	Single Stream	Dual Stream	Single Stream	Dual Stream	Single Stream	Dual Stream	Short GI-400ns		Full GI-800ns	
Single Stream							Dual Stream	Single Stream	Dual Stream	
64QAM 5/6	16.2	32.5	32.5	65	65	130	150	300	135	270
64QAM 3/4	14.6	29.3	29.3	58.5	58.5	117	135	270	121.5	243
64QAM 2/3	13	26	26	52	52	104	120	240	108	216
16QAM 3/4	9.7	19.5	19.5	39	39	78	90	180	81	162
16QAM 1/2	6.5	13	13	26	26	52	60	120	54	108
QPSK 3/4	4.9	9.7	9.7	19.5	19.5	39	45	90	40.5	81
QPSK 1/2	3.2	6.5	6.5	13	13	26	30	60	27	54
BPSK 1/2	1.6	3.3	3.3	6.5	6.5	13	15	30	13.5	27

Wireless Protocol

Category	Specification
Wireless Protocol	WORP (Wireless Outdoor Router Protocol)

Interfaces

Category	Specification
Wired Ethernet	One auto MDI-X RJ45 100 Mbps Ethernet Port
Serial Connector	RS 232 Serial (RJ11 to DB9)

Transmit Power Settings

- Output Power Attenuation: 0 – 23 dB, in 1 dB steps
- Output Power Values will have a tolerance of +/-1 dB
- Total EIRP must be calculated based on antenna gain

Modulation		Tx power for 5/10/20/40 MHz, 5 GHz
SINGLE (or) DUAL STREAM	64 QAM 5/6	19 dBm
	64 QAM 3/4	20 dBm
	64 QAM 2/3	21 dBm
	16 QAM 3/4	22 dBm
	16 QAM 1/2	23 dBm
	QPSK 3/4	23 dBm
	QPSK 1/2	23 dBm
	BPSK 1/2	23 dBm

Receive Sensitivity

NOTE: Rx Sensitivity values should be considered with a tolerance +/- 2 dB.

Modulation (5 MHz)		Rx Sensitivity 5 GHz	Modulation (10 MHz)		Rx Sensitivity 5 GHz	Modulation (20 MHz)		Rx Sensitivity 5 GHz	Modulation (40 MHz)		Rx Sensitivity 5 GHz				
S I N G L E	64 QAM 5/6	-78	S I N G L E	64 QAM 5/6	-77	S I N G L E	64 QAM 5/6	-76.0	S I N G L E	64 QAM 5/6	-73.0				
	64 QAM 3/4	-82		64 QAM 3/4	-81		64 QAM 3/4	-78.0		64 QAM 3/4	-75.0				
	64 QAM 2/3	-86		64 QAM 2/3	-84		64 QAM 2/3	-80.0		64 QAM 2/3	-77.0				
	16 QAM 3/4	-91		16 QAM 3/4	-89		16 QAM 3/4	-83.0		16 QAM 3/4	-81.0				
	16 QAM 1/2	-94		16 QAM 1/2	-92		16 QAM 1/2	-86.0		16 QAM 1/2	-84.0				
	QPSK 3/4	-97		QPSK 3/4	-95		QPSK 3/4	-90.0		QPSK 3/4	-87.0				
	QPSK 1/2	-99		QPSK 1/2	-96		QPSK 1/2	-92.0		QPSK 1/2	-89.0				
	BPSK 1/2	-99		BPSK 1/2	-98		BPSK 1/2	-93.0		BPSK 1/2	-89.0				
S T R E A M			S T R E A M			S T R E A M			S T R E A M						
	D U A L	64 QAM 5/6		-75	D U A L		64 QAM 5/6	-73		D U A L	64 QAM 5/6	-76.0	D U A L	64 QAM 5/6	-73.0
		64 QAM 3/4		-78			64 QAM 3/4	-75			64 QAM 3/4	-78.0		64 QAM 3/4	-75.0
		64 QAM 2/3		-80			64 QAM 2/3	-75			64 QAM 2/3	-80.0		64 QAM 2/3	-77.0
		16 QAM 3/4		-84			16 QAM 3/4	-81			16 QAM 3/4	-83.0		16 QAM 3/4	-81.0
		16 QAM 1/2		-87			16 QAM 1/2	-85			16 QAM 1/2	-86.0		16 QAM 1/2	-84.0
		QPSK 3/4		-90			QPSK 3/4	-87			QPSK 3/4	-90.0		QPSK 3/4	-87.0
		QPSK 1/2		-93			QPSK 1/2	-90			QPSK 1/2	-92.0		QPSK 1/2	-89.0
BPSK 1/2		-95	BPSK 1/2	-93		BPSK 1/2	-93.0	BPSK 1/2	-89.0						

Latency

Category	Specification
Typical at Max Latency	5 ms (as measured with test equipment under controlled lab conditions and optimum packet size).

Management

Category	Specification
Local	RS232 serial CLI (up to 115200 bps)
Remote	<ul style="list-style-type: none"> • Telnet and SSH, Web GUI (http) and SSL (https), TFTP • SNMP v1, v2c and v3 • SNMP trap and Syslog

Power Supply

Category	Specification
Input Voltage	<ul style="list-style-type: none"> • Via RJ-45 Ethernet interface supplying 48v and 0.40A on Ethernet Port • 12 V-DC through serial port (for diagnostic purpose) • Consumption 13.8 Watts typical (19 Watts max)
Power over Ethernet Injector	<ul style="list-style-type: none"> • Input : 100 – 250 V-AC (47 – 63 Hz) • Output : 48 V-DC at 0.40 A (19 Watts) • Pin-out : +48 V on pins 4/5, -48 V on pins 7/8 • Size : 3.98x2.40x1.35 inches (101.0x61.5x32.2 mm) • Weight : 5.6 ounces (160 g) • Temp : 0 to 40 °C

LEDs

Category	Specification
Types	Power Radio Activity Ethernet Activity RJ-11 detection

Software Features

Category	Specification
Key Features	<ul style="list-style-type: none"> • WOrP protocol • Transmit Power Control • Integrity Check for Software Upload • IEEE 802.16e based QoS Support; up to 8 classes of service, up to 8 service flows per class (End Point A only) • Satellite Density • Enhanced Frequency Selection • Large Frame Support • IGMP Snooping
Bridging and Routing	<ul style="list-style-type: none"> • Bridge (802.1d) • IP/ RIPv1 (RFC 1058) • IP/ RIPv2 (RFC 1388) • CIDR (RFC 1519) • ICMP (RFC 792) • IP (RFC 791) • ARP (RFC 826)
Filtering	<ul style="list-style-type: none"> • Ethernet protocol (Ethertype) • Static MAC • IP address • Broadcast protocol • Worp Intra Cell Blocking
Services	<ul style="list-style-type: none"> • DHCP Server (RFC 2131) • DHCP Client (RFC 2131) • SNTP (RFC 2030) • Bi-Directional Bandwidth Control • NAT (RFC 3022) (Configured on End Point B) • DHCP Relay (RFC 2131) (Configured on End Point B)
VLAN	<ul style="list-style-type: none"> • 802.1Q (Configured on End Point A)

Category	Specification
Security Features	<ul style="list-style-type: none"> • Critical feature support via WORP for secure long-range wireless deployments in unlicensed frequency spectrum • MD5 (embedded in WORP) authentication between End Point A and End Point B • MAC Authentication (Configured on End Point A) • Secure “over the air encryption” and AES-CCM • RADIUS MAC Access Control (Configured on End Point A)
Tools	<ul style="list-style-type: none"> • Site Survey (to be performed on End Point B) • Link Test to determine the local/remote signal/noise levels.
Management Interface	Flexible and responsive management interfaces through Web, CLI and SNMP. SNMPv3 support facilitates secure management.

Hardware Specifications

Category	Specification
Radio	5 GHz dual stream MIMO radio
Clock Speed	333 MHz
Memory	Flash: 16 MB RAM: 128 MB
Input Power	Power-over-Ethernet 48 VDC,0.40 A

Physical and Environmental Specifications

Category	Specification
Physical	
QB-8100 Dimensions (H x W x L)	7.77 x 7.56 x 3.94 inches (197.5 x 192 x 100mm)
QB-8100 Weight	1.6 lbs (.73 kg)
Environmental	
Storage Temperature	-40° to 70°C (-40° to 158° Fahrenheit)
Operating Temperature	-33° to 55°C (-40° to 131° Fahrenheit)
Humidity	Max 95% relative humidity (non-condensing)
Water and Dust Proof	IP65

MTBF and Warranty

Category	Specification
MTBF	75,000 hours
Warranty	1 year parts and labor; ServPak extended support available

Lightning Protection

Lightning protection is used to maximize the reliability of the communications equipment by safely re-directing current from a lightning strike or a power surge traveling along the Cat 5 Ethernet cabling to the ground using the shortest path possible. Designing a proper grounding system prior to installing any communications equipment is critical to minimize the possibility of equipment damage, void warranties, and cause serious injury.

The surge arrester (sometimes referred to as a lightning protector) can protect your sensitive electronic equipment from high-voltage surges caused by discharges and transients at the PoE Injector.

Proxim Wireless offers superior lightning and surge protection for Tsunami QuickBridge 8100 series products. Contact your reseller or distributor for more information.



Statement of Warranty

Warranty Coverage

Proxim Wireless Corporation warrants that its Products are manufactured solely from new parts, conform substantially to specifications, and will be free of defects in material and workmanship for a Warranty Period of 1 year from the date of purchase.

Repair or Replacement

In the event a Product fails to perform in accordance with its specification during the Warranty Period, Proxim offers return-to-factory repair or replacement, with a thirty (30) business-day turnaround from the date of receipt of the defective Product at a Proxim Wireless Corporation Repair Center. When Proxim Wireless has reasonably determined that a returned Product is defective and is still under Warranty, Proxim Wireless shall, at its option, either: (a) repair the defective Product; (b) replace the defective Product with a refurbished Product that is equivalent to the original; or (c) where repair or replacement cannot be accomplished, refund the price paid for the defective Product. The Warranty Period for repaired or replacement Products shall be ninety (90) days or the remainder of the original Warranty Period, whichever is longer. This constitutes Buyer's sole and exclusive remedy and Proxim Wireless's sole and exclusive liability under this Warranty.

Limitations of Warranty

The express warranties set forth in this Agreement will not apply to defects in a Product caused; (i) through no fault of Proxim Wireless during shipment to or from Buyer, (ii) by the use of software other than that provided with or installed in the Product, (iii) by the use or operation of the Product in an application or environment other than that intended or recommended by Proxim Wireless, (iv) by modifications, alterations, or repairs made to the Product by any party other than Proxim Wireless or Proxim Wireless's authorized repair partners, (v) by the Product being subjected to unusual physical or electrical stress, or (vii) by failure of Buyer to comply with any of the return procedures specified in this Statement of Warranty.

Buyers should return defective Products within the first 30 days to the merchant from which the Products were purchased. Buyers can contact a Proxim Wireless Customer Service Center either by telephone or via web. Calls for support for Products that are near the end of their warranty period should be made not longer than seven (7) days after expiration of warranty. Support and repair of products that are out of warranty will be subject to a repair fee. Contact information is shown below. Additional support information can be found at Proxim Wireless's web site at <http://support.proxim.com>.

USA & Canada Customers

Call Technical Support: Phone: 408-383-7700

Toll Free: 866-674-6626

Hours: 6:00 AM to 6:00 P.M. Monday - Friday, Pacific Time

APAC Customers

Call Technical Support: Phone: +91 40 23115490

Hours: 9:00 AM to 6:00 P.M. Monday - Friday, IST (UTC/GMT +5:30 hrs)

International Customers

Call Technical Support: Phone: 408-383-7700

Hours: 6:00 AM to 6:00 P.M. Monday - Friday, Pacific Time

Hours of Operation

When contacting the Customer Service for support, Buyer should be prepared to provide the Product description and serial number and a description of the problem. The serial number should be on the product.

In the event the Customer Service Center determines that the problem can be corrected with a software update, Buyer might be instructed to download the update from Proxim Wireless's web site or, if that's not possible, the update will be sent to Buyer. In the event the Customer Service Center instructs Buyer to return the Product to Proxim Wireless for repair or replacement, the Customer Service Center will provide Buyer a Return Material Authorization ("RMA") number and shipping instructions. Buyer must return the defective Product to Proxim Wireless, properly packaged to prevent damage, shipping prepaid, with the RMA number prominently displayed on the outside of the container.

Calls to the Customer Service Center for reasons other than Product failure will not be accepted unless Buyer has purchased a Proxim Wireless Service Contract or the call is made within the first thirty (30) days of the Product's invoice date. Calls that are outside of the 30-day free support time will be charged a fee of \$250.00 (US Dollars) per Support Call.

If Proxim Wireless reasonably determines that a returned Product is not defective or is not covered by the terms of this Warranty, Buyer shall be charged a service charge and return shipping charges.

Other Information

Search Knowledgebase

Proxim Wireless stores all resolved problems in a solution database at the following URL: <http://support.proxim.com>.

Ask a Question or Open an Issue

Submit a question or open an issue to Proxim Wireless technical support staff at the following URL: <http://support.proxim.com/cgi-bin/proxim.cfg/php/enduser/ask.php>.

Technical Services and Support

Obtaining Technical Service and Support

If you are having trouble using the Proxim product, please read this manual and the additional documentation provided with your product. If you require additional support to resolve your issue, please be ready to provide the following information before you contact Proxim's Technical Services:

- Product information
 - Part number of suspected faulty unit
 - Serial number of suspected faulty unit
- Trouble/error information
 - Trouble/symptom being experienced
 - Activities completed to confirm fault
 - Network information (what kind of network are you using?)
 - Circumstances that preceded or led up to the error
 - Message or alarms viewed
 - Steps taken to reproduce the problem
- ServPak information (if a Servpak customer):
 - ServPak account number

***NOTE:** Technical Support is free for the first 90 days from the date of purchase. If you would like to register your product now, visit the Proxim eService Web Site at <http://support.proxim.com> and click on New Product Registration.*

Support Options

Proxim eService Web Site Support

The Proxim eService Web site is available 7x24x365 at <http://support.proxim.com>.

On the Proxim eService Web Site, you can access the following services:

- **New Product Registration:** Register your product to gain access to technical updates, software downloads, and free technical support for the first 90 days from receipt of hardware purchase.
- **Open a Ticket or RMA:** Open a ticket or RMA
- **Search Knowledgebase:** Locate white papers, software upgrades, and technical information.
- **ServPak Support:** Learn more about Proxim's ServPak global support service options.
- **Your Stuff:** Track status of your tickets or RMAs and receive product update notifications.
- **Provide Feedback:** Submit suggestions or other types of feedback.
- **Customer Survey:** Submit an On-Line Customer Survey response.

Telephone Support

Contact technical support via telephone as follows:

USA & Canada Customers

Call Technical Support: Phone: 408-383-7700

Toll Free: 866-674-6626

Hours: 6:00 AM to 6:00 P.M. Monday - Friday, Pacific Time

APAC Customers

Call Technical Support: Phone: +91 40 23115490

Hours: 9:00 AM to 6:00 P.M. Monday - Friday, IST (UTC/GMT +5:30 hrs)

International Customers

Call Technical Support: Phone: 408-383-7700

Hours: 6:00 AM to 6:00 P.M. Monday - Friday, Pacific Time

ServPak Support

To provide even greater investment protection, Proxim Wireless offers a cost-effective support program called ServPak. ServPak is a program of enhanced service support options that can be purchased as a bundle or individually, tailored to meet your specific needs. Whether your requirement is round the clock technical support or advance replacement service, we are confident that the level of support provided in every service in our portfolio will exceed your expectations.

- **Advanced Replacement of Hardware:** Can you afford to be down in the event of a hardware failure? Our guaranteed turnaround time for return to factory repair is 30 days or less. Those customers who purchase this service are entitled to advance replacement of refurbished or new hardware guaranteed to be shipped out by the Next Business Day. Hardware is shipped Monday – Friday, 8:00 AM – 2:00 PM (PST).
- **Extended Warranty:** Extend the life of your networking investment by adding 1, 2, or 3 years to your products standard warranty. This service coverage provides unlimited repair of your Proxim hardware for the life of the service contract. The cost of an extended warranty is far less than the cost of a repair providing a sensible return on your investment.
- **7x24x365 Technical Support:** This service provides unlimited, direct access to Proxim’s world-class Tier 3 technical support engineers 24 hours a day, 7 days a week, 365 days a year including Holidays. Customers who purchase this service can rest assured that their call for technical assistance will be answered and a case opened immediately to document the problem, troubleshoot, identify the solution and resolve the incident in a timely manner or refer to an escalation manager for closure.
- **8x5 Technical Support:** This service provides unlimited, direct access to Proxim’s world-class technical support 8 hours a day, 5 days a week from 8:00 AM - 5:00 PM (PST(US)). Technical Support is available at no charge for the first 90 days from the purchase date. Beyond this period, a ServPak support agreement will be required for technical support. Self-help will be made available by accessing Proxim’s extensive eService knowledgebase.
- **Software Maintenance:** It's important to maintain and enhance security and performance of wireless equipment and Proxim makes this easy by providing a Software Maintenance program that enables customers to access new features and functionality, rich software upgrades and updates. Customers will also have full access to Proxim's vast knowledgebase of technical bulletins, white papers and troubleshooting documents.
- **Priority Queuing Phone Support:** This service provides customers with a one hour response time for technical phone support. There is no waiting in line for those urgent calls for technical support.

ServPak Service	24x7Enhanced (Bundled Serv.)	8x5 Standard (Bundled Serv.)	Extended Warranty	Advance Hardware Replacement	Software Maintenance	24x7 Technical Support
Product Coverage Duration	Renewable Contracts	Renewable Contracts	Renewable Contracts	Renewable Contracts	No	Renewable Contracts
Software Coverage Duration	Renewable Contracts	Renewable Contracts	No	No	Renewable Contracts	No
Proxim TAC Support	Yes	Yes	No	No	No	Yes
Software Updates & Upgrades	Yes	Yes	No	No	Yes	No
Registered Access to Proxim.com	Yes	Yes	Yes	Yes	Yes	Yes
Registered Access to Knowledge Tool	Yes	Yes	Yes	Yes	Yes	Yes
Advance Replacement	Yes	No	No	Yes	No	No
Depot Repair	No	Yes	Yes	No	No	No

To purchase ServPak support services, please contact your authorized Proxim distributor. To receive more information or for questions on any of the available ServPak support options, call Proxim Support at 408-383-7700 or send an email to servpak@proxim.com.

FCC Statement

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

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

FCC NOTICE: To comply with FCC part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

IMPORTANT NOTE:**FCC Radiation Exposure Statement:**

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

IMPORTANT NOTE:

This module is intended for OEM integrator only and limited to host with brand: Tsunami/ORINOCO and model list. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the FCC radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: HZB-PROXMB92 ". The FCC part 15.19 statement below has to also be available on the label: This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

IC Statement

This Class B digital apparatus complies with Canadian ICES-003.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p) is not more than that permitted for successful communication.

This device has been designed to operate with the antennas listed below, and having a maximum gain of [30] dB. Antennas not included in this list or having a gain greater than [30] dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

The device could automatically discontinue transmission in case of absence of information to transmit, or operational failure. Note that this is not intended to prohibit transmission of control or signaling information or the use of repetitive codes where required by the technology.

The device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems.

The maximum antenna gain permitted (for devices in the band 5725-5825 MHz) to comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate, as stated in section A9.2(3).

IMPORTANT NOTE:

IC Radiation Exposure Statement:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IMPORTANT NOTE:

This module is intended for OEM integrator only and limited to host with brand: Tsunami/ORiNOCO and model list. The OEM integrator is still responsible for the IC compliance requirement of the end product, which integrates this module.

20cm minimum distance has to be able to be maintained between the antenna and the users for the host this module is integrated into. Under such configuration, the IC RSS-102 radiation exposure limits set forth for a population/uncontrolled environment can be satisfied.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, the end user has to be informed to keep at least 20cm separation with the antenna while this end product is installed and operated. The end user has to be informed that the IC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. IC statement is required to be available in the users manual: This Class B digital apparatus complies with Canadian ICES-003. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX IC: 1856A-PROXMB92 " .

Model List

Product Series	Models	Description
Tsunami™ Point-to-Multipoint series	MP-8ABC-ZZZ-YYY-XX MM-8ABC-ZZZ-YYY-XX	<p>A - Represents number of radios (1, 2)</p> <p>B - Represents the operating frequency band of the first radio</p> <p>C - Represents the frequency band of the second radio</p> <p>Example:</p> <ul style="list-style-type: none"> 0 - Dual band and connectorized 2 - 2Ghz band with integrated antenna 5 - 5Ghz band with integrated antenna <p>ZZZ - Represents the type of the network unit</p> <p>Example:</p> <ul style="list-style-type: none"> CPE - Customer Premise Equipment BSU - Base Station Unit SUA - Subscriber Unit with external antenna SUR - Subscriber Unit with Integrated antenna EPR - End Point with Integrated antenna EPA - End Point with external antenna LNK - Link consisting of two End Points <p>YYY - Represents the bandwidth limit of the network unit and optionally a letter at the end representing the device configuration</p> <p>Example:</p> <ul style="list-style-type: none"> 5, 12, 25, 50, 100 - Bandwidth limits in Mbps 100i - 100Mbps indoor unit 100c - 100Mbps unit with external antenna 100a - 100Mbps unit with Integrated Antenna
	Tsunami™ QuickBridge Point to Point series	QB-8ABC-ZZZ-YYY-XX

ORiNOCO® Access Points	AP-810M-xx	Indoor AP with single radio and Mesh Capability	<p>XX - Represents the regulatory domain</p> <p>Example:</p> <ul style="list-style-type: none"> US - Compliant to FCC WD - Complaint to ETSI/CE and IC
	AP-8100M-xx	Indoor AP with dual radio and Mesh Capability	
	AP-820MR-xx	Outdoor AP with single radio and Mesh Capability	
	AP-822MR-xx	Outdoor AP with single radio and Mesh Capability, Integrated 2.4GHz Panel Antenna	
	AP-810MR-xx	Outdoor AP with single radio and Mesh Capability	
	AP-812MR-xx	Outdoor AP with single radio and Mesh Capability, Integrated 2.4GHz Sector Antenna	
	AP-8100MR-xx	Outdoor AP with dual radio and Mesh Capability	