Given below is the table which explains Protocol Filter parameters and the method to configure the configurable parameter(s):

Parameter	Description
Filtering Control	This parameter is used to apply filters on the device's interface. The filtering can be applied on any of the following interfaces: • **Ethernet**: Packets are examined at the Ethernet interface. • **Wireless**: Packets are examined at the Wireless interface. • **All Interfaces**: Packets are examined at both Ethernet and Wireless interface. By default, the Filtering Control is set to **Disable**, meaning which Protocol Filters are disabled on all the interfaces. *: In addition to enabling **Filtering Control**, the **Global Filter Flag** should also be enabled to apply filters.*
Filtering Type	This parameter specifies the action to be performed on the data packets whose protocol type is not defined in the protocol filter table (this table contains a list of default protocols supported by the device and the protocols defined by the user), or whose Entry Status is in Disable state. The available filtering types are: • **Block**: The protocols with entry status Disable or the protocols which do not exist in the protocol filtering table are blocked. • **Passthru**: The protocols with entry status Disable or the protocols which do not exist in the protocol filtering table are allowed through the configured interface.

After configuring the required parameters, click **OK** and then **COMMIT**.

5.10.1.1 Protocol Filter Table

The Protocol Filter table displays a list of default protocols supported by the device and the protocols created by the user. By default, the system generates 19 protocols entries. Each of the Protocol contains the following information:

Parameter	Description
Protocol Name	Represents the Protocol name. The system throws an error when you try to edit the name of a default protocol.
Protocol Number	Represents the Protocol number. The value is of 4 digit hexadecimal format. The system throws an error when you try to edit the Protocol number of a default protocol.
Filter Status	The supported filter status are, • **Passthru**: When the 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 configured interface. • **Block**: When the filter status is set to **Block** and entry status is Enable, all packets whose protocol matches with the given protocol number are dropped on the configured interface. By default, the status is set to Block.

Entry Status	Set the entry status as either Enable, Disable or Delete. • **Enable**: Enables filter status on a protocol. • **Disable**: Disables filter status on a protocol. • **Delete**: Deletes a protocol entry from the Protocol Filter Table.
: System-defined default protocols cannot be deleted.	

5.10.1.2 Add User-defined Protocols to the Filter Table

To add user-defined protocols to the Protocol Filter Table, click **Add** in the **Protocol Filter** screen. The **Protocol Filter Add Row** screen appears.

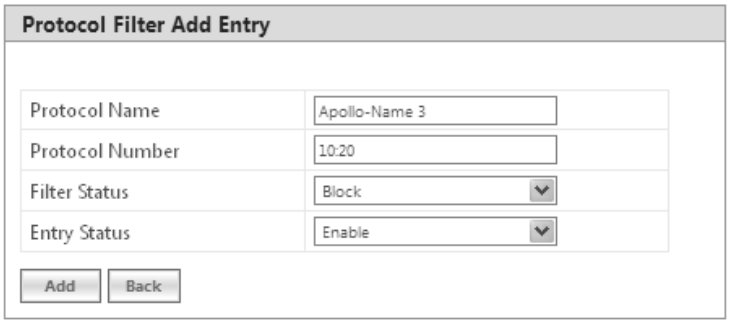


Figure 5-95 Add User-defined Protocols

Enter details for all the required parameters and click **Add**.

: The maximum number of Protocol Filters that can be added to the table are 64, out of which 19 are default entries.

5.10.2 Static MAC Address Filter

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

Each MAC Address or Mask is comprised of 12 hexadecimal digits (0-9, 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 will look for when examining packets. The device uses Boolean logic to perform an "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 will examine 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 will only look for the specific MAC address (in this case, 00:20:A6:12:54:C3).

You can configure the Static MAC Address Filter parameters depending on the following scenarios:

- 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 Address 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 address and Wireless Mask (leave the Wired MAC Address and Wired Mask set to all zeros).
- To prevent traffic between a specific wired MAC address and a specific wireless MAC address, configure all four parameters. Configure the wired and wireless MAC address and set the wired and wireless mask to all Fs.
- To prevent all traffic from a specific wired Group MAC address from being forwarded to the wireless network, configure only the Wired MAC Address and Wired Mask (leave the Wireless MAC Address and Wireless Mask set to all zeros).
- To prevent all traffic from a specific wireless Group MAC address from being forwarded to the wired network, configure only the Wireless MAC address and Wireless Mask (leave the Wired MAC Address and Wired Mask set to all zeros).
- To prevent traffic between a specific wired Group MAC address and a specific wireless Group MAC address, configure all four parameters. Configure the wired and wireless MAC address and set the wired and wireless mask to all Fs.

Static MAC Filter Examples

Consider a network that contains a wired PC and three wireless PCs. The MAC addresses for each PCs are as follows:

- **MAC Address of the wired PC:** 00:40:F4:1C:DB:6A
- **MAC Address of the wireless PC1:** 00:02:2D:51:94:E4
- **MAC Address of the wireless PC2:** 00:02:2D:51:32:12
- **MAC Address of the wireless PC3:** 00:20:A6:12:4E:38

5.10.2.0.1 Prevent two specific PCs from communicating

Configure the following settings to prevent the wired PC and wireless PC1 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 PC and wireless PC1 is blocked. wireless PC2 and PC3 can still communicate with the wired PC.

5.10.2.0.2 Prevent multiple Wireless PCs from communicating with a single wired PC

Configure the following settings to prevent wireless PC1 and PC2 from communicating with the wired PC:

- **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 PC1 and wireless PC2 share the same prefix (00:02:2D), traffic between the wired Server and wireless PC1 and PC2 is blocked. Wireless PC3 can still communicate with the wired PC since it has a different prefix (00:20:A6).

5.10.2.0.3 Prevent all wireless PCs from communicating with a single wired PC

Configure the following settings to prevent wired PC from communicating with all three wireless PCs:

- **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 device blocks all traffic between the wired PC and all wireless PCs.

5.10.2.0.4 Prevent a wireless PC from communicating with the wired network

Configure the following settings to prevent wireless PC3 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 device blocks all traffic between wireless PC3 and the Ethernet network.

5.10.2.1 Static MAC Address Filter Configuration

To configure Static MAC Filter parameters, navigate to **ADVANCED CONFIGURATION > Filtering > Static MAC Address Filter**. The **Static MAC Address Filter** screen appears:

Figure 5-96 Static MAC Address Filter

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

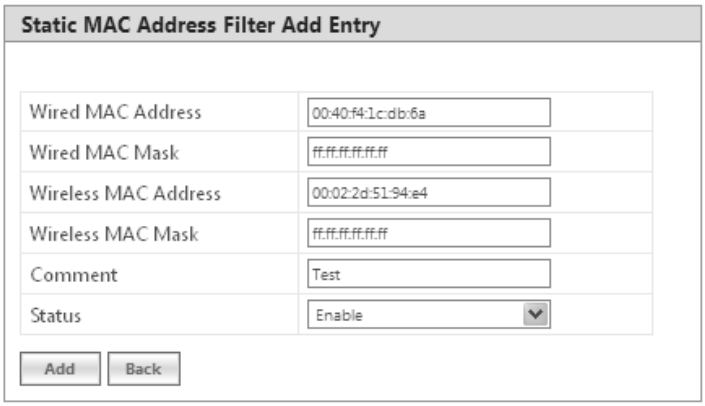


Figure 5-97 Static MAC Address Filter Add Entry

Given below is the table which explains Static MAC Address Filter parameters and the method to configure the configurable parameter(s):

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

Click **Add** and then **COMMIT**.

:

- *You can configure a maximum of 200 MAC address filters.*
- *The Wired MAC address and the Wireless MAC address should be a unicast MAC address.*
- *The MAC Address or Mask includes 12 hexadecimal digits (each hexadecimal equals to 4 bits containing 0 or 1) which is equivalent to 48 bit identifier.*

5.10.3 Advanced Filtering

With Advanced Filtering, you can filter pre-defined IP Protocol traffic on the network.

By default, 5 IP protocols are pre-defined and based on the configuration they can be blocked or allowed to enter the network.

To apply filters on the IP protocols, navigate to **ADVANCED CONFIGURATION > Filtering > Advanced Filtering**. The **Advanced Filtering** screen appears:

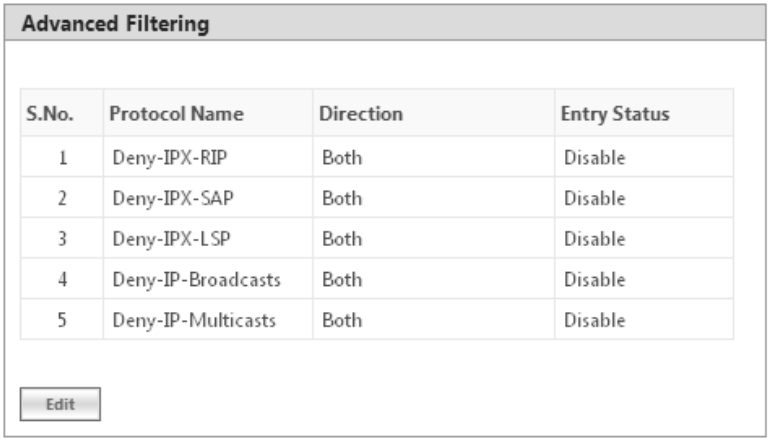


Figure 5-98 Advanced Filtering

The Advanced Filtering table contains a list of 5 pre-defined protocols on which Advanced Filtering is applied. The following table explains the Filtering table parameters:

Parameter	Description
Protocol Name	Represents the protocol name. By default, Advanced Filtering is supported on the following 5 default protocols: • Deny IPX RIP • Deny IPX SAP • Deny IPX LSP • Deny IP Broadcasts • Deny IP Multicasts
Direction	Represents the direction of an IP Protocol traffic that needs to be filtered. The directions that can be filtered are, • Ethernet to wireless • Wireless to ethernet • Both
Entry Status	The filters are applied on the IP protocol only when Entry Status is enabled.

:

- *The Advanced Filtering table contains a maximum of 5 pre-defined IP protocols.*
- *User-defined IP protocols cannot be added to the Advanced Filtering table.*

5.10.3.1 Edit Advanced Filtering Table Entries

To edit Advanced Filtering table protocols, click **Edit** in the **Advanced Filtering** screen. The **Advanced Filtering - Edit Entries** screen appears.

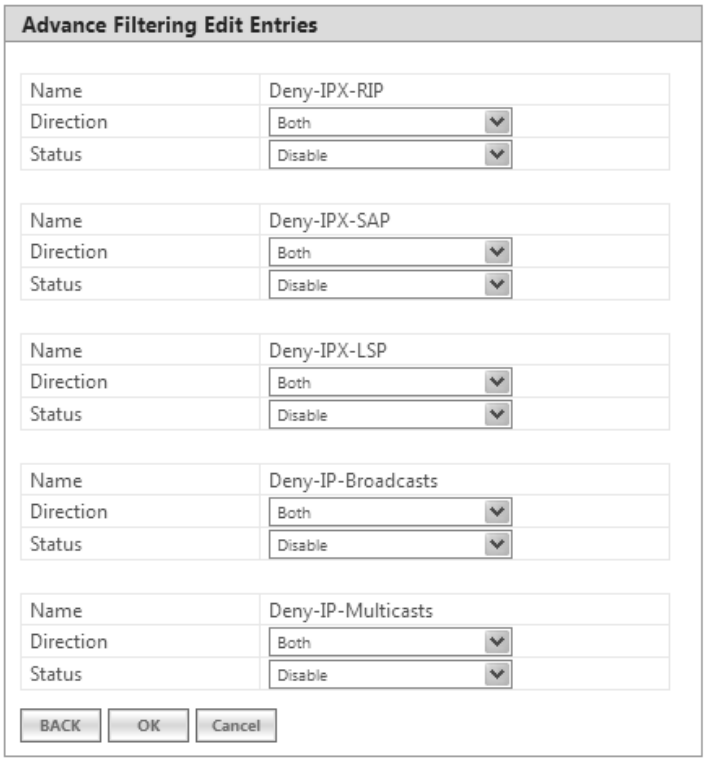


Figure 5-99 Advance Filtering- Edit Entries

Modify the IP protocol traffic direction that needs to be filtered, and the filtering status for the desired IP Protocol.

Next click **OK** and then **COMMIT**.

5.10.4 TCP/UDP Port Filter

TCP/UDP Port Filtering allows you to enable or disable Transmission Control Protocol (TCP) ports and User Datagram Port (UDP) ports on network devices. A user specifies a Protocol Name, Port Number, Port Type (TCP, UDP, or TCP/UDP), and filtering interfaces (Only Wireless, Only Ethernet or Both) in order to block access to services such as Telnet and FTP, and traffic such as NETBIOS and HTTP.

To apply filters on TCP/UDP Port, navigate to **ADVANCED CONFIGURATION > Filtering > TCP/UDP Port Filter**. The **TCP/UDP Port Filter** screen appears.

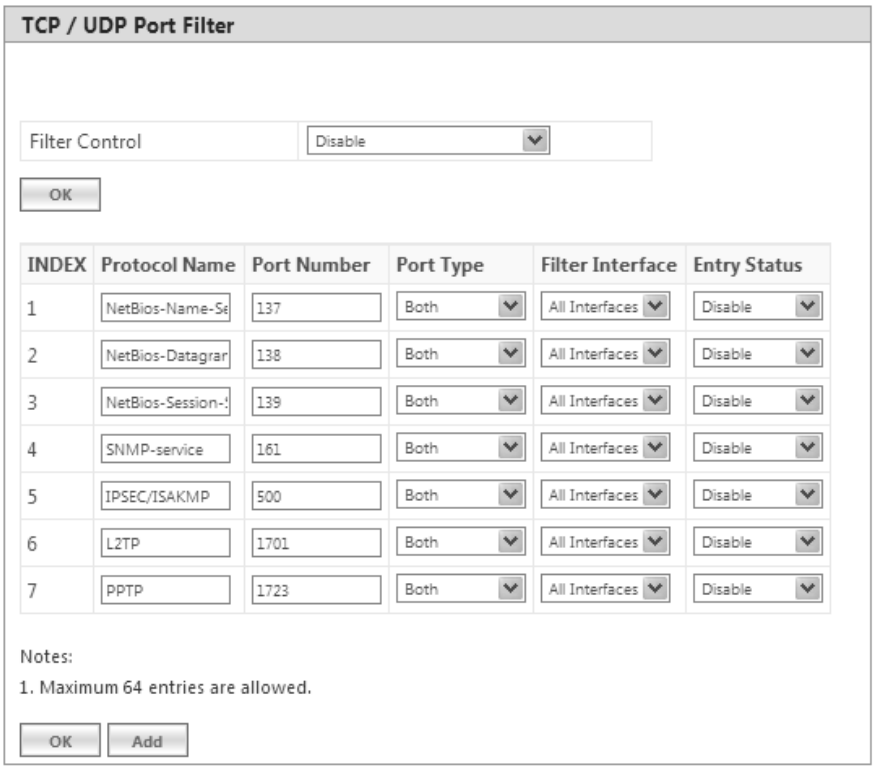


Figure 5-100 TCP/UDP Port Filter

The **Filter Control** parameters determines if filter has to be applied or not on a TCP/UDP Port. By default, it is disabled. To apply filters, select **Enable** and click **OK**.

5.10.4.1 TCP/UDP Port Filter Table

The TCP/UDP Port Filter table displays a list of default TCP/UDP ports and user-defined ports which can be enabled or disabled as desired. By default, the device support 7 default TCP/UDP port filter entries.

Parameter	Description
Protocol Name	Represents the name of the service/protocol. Please note that the system throws an error when an attempt is made to edit the default service/protocol name.
Port Number	Represents the destination port number. Please note that the system throws an error when an attempt is made to edit the port number.
Port Type	Represents the port type (TCP, UDP, Both).
Filter Interface	Represents the interface on which the filter is applied. The supported interfaces are, • Only Ethernet • Only Wireless • All Interfaces

Parameter	Description
Entry Status	Set the entry status as either Enable, Disable or Delete. • **Enable**: Filter is applied and filters the packet based on the Port number and port type. • **Disable**: No filter is applied. • **Delete**: Allows to delete only user-defined TCP/UDP port filter entry. When you attempt to delete default entries, the device throws an error.

If you have configured any user-defined protocols then click **OK** and then **COMMIT**.

For example, a device with the following configuration would discard frames received on its Ethernet interface with a UDP destination port number of 137, effectively blocking NETBIOS Name Service packets. Please note that even the Filtering Control should be enabled to apply the filter.

Protocol Name	Port Number	Port Type	Filter Interface	Entry Status (Enable/Disable)
NETBIOS Name Service	137	UDP	Ethernet	Enable

5.10.4.2 Adding User-defined TCP/UDP Port Filter Entries

To add user-defined TCP/UDP port filter entries to the table, click **Add** in the **TCP / UDP Port Filter** screen. The **TCP/UDP Port Filter Add Row** screen appears:

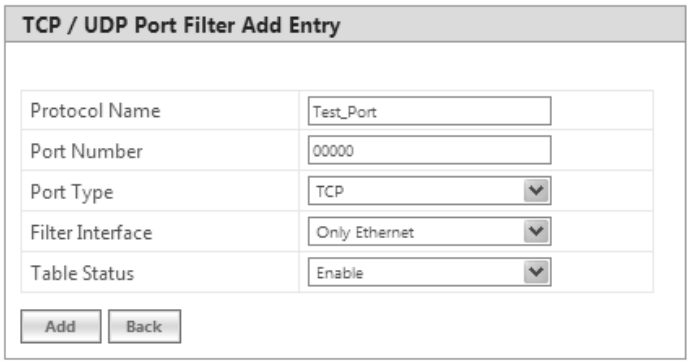


Figure 5-101 Add User-defined TCP/UDP Protocols

Provide details for all the parameters and click **Add.**

To apply the configured parameters, click **COMMIT**.

:

- *The TCP/UDP filtering operation is allowed only when the **Global Flag** and **Filter Control** options are enabled.*
- *You can add a maximum of 64 TCP/UDP Port Filter entries to the table, out of which 7 are default entries.*

5.10.5 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 or 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, navigate to **ADVANCED CONFIGURATION > Filtering > Storm Threshold Filter**. The **Storm Threshold Filter** screen appears. This screen 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.

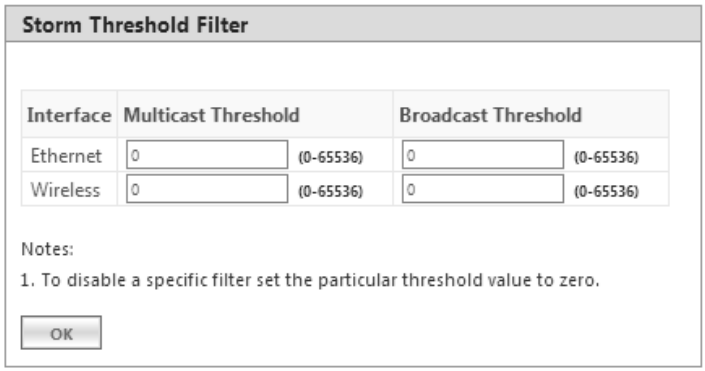


Figure 5-102 Storm Threshold Filter

Given below is the table which explains Storm Threshold Filter parameters and the method to configure the configurable parameter(s):

Parameter	Description
Interface	Allows to configure the type of interface on which filtering has to be applied. The Storm Threshold filter can be used to filter the traffic on two types of interfaces: Ethernet or Wireless. By default, Storm Threshold filtering is disabled on both Ethernet and Wireless interfaces**.**
Multicast Threshold	Allows 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	Allows 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.

After configuring the required parameters, click **OK** and then **COMMIT**.

5.10.6 WORP Intra Cell Blocking

: Intra Cell Blocking is applicable only to a BSU in Bridge Mode only.

The WORP Intra Cell Blocking feature restricts traffic between SUs which are registered to the same BSU. The two potential reasons to isolate traffic among the SUs are:

- To provide better security by isolating the traffic from one SU to another in a public space.
- To block unwanted traffic between SUs to prevent this traffic from using bandwidth.

The user can form groups of SUs at the BSU which define the filtering criteria. All data to/from SUs belonging to the same group are bridged. If an SU does not belong to any group, the BSU discards the data.

The user can also configure a Security Gateway to block traffic between SUs connected to different BSUs. All packets destined for SUs not connected to the same BSU are forwarded to the Security Gateway MAC address (configured under Security Gateway).

The following rules apply to Intra Cell Blocking Groups:

- an SU can be assigned to more than one group.
- an SU that has not been assigned to any group cannot communicate to any other SU connected to the same or different BSU.

5.10.6.0.1 Example of Intra-Cell Blocking Groups

Assume that four Intra Cell Blocking Groups have been configured on a BSU. SUs 1 through 10 are registered to the BSU.

Group1	Group2	Group3	Group4
SU1	SU2	SU6	SU8
SU4	SU3	SU1	SU9
SU5	SU8	SU7	SU10

In this example, SU1 belongs to two groups, Group 1 and Group 3. Therefore, packets from SU1 destined to SU4, SU5, SU6 and SU7 are not blocked. However, SU9 belongs to group 4 only and packets from SU9 are blocked unless sent to SU8 or SU 10.

To configuring Intra-Cell Blocking parameters, navigate to **ADVANCED CONFIGURATION > Filtering**> **WORP Intra Cell Blocking**. The following screen appears:

Figure 5-103 Intra Cell Blocking

This screen is classified into two categories: **Intra Cell Blocking** and **Security Gateway**. Given below are the configuration details.

Parameter	Description
Intra Cell Blocking	
Status	By default, Intra Cell Blocking is disabled on a BSU. Select **Enable** to enable the feature and then Click **OK** and then **COMMIT**.
Security Gateway	
Status	By default, Security Gateway is disabled on a BSU. Select **Enable** to enable the feature.
MAC Address	Represents the MAC address of the security gateway. This gateway routes the packets transmitted by the SU to the different BSUs to which it belongs.
After configuring the required parameters, click **OK** and then **COMMIT**.	

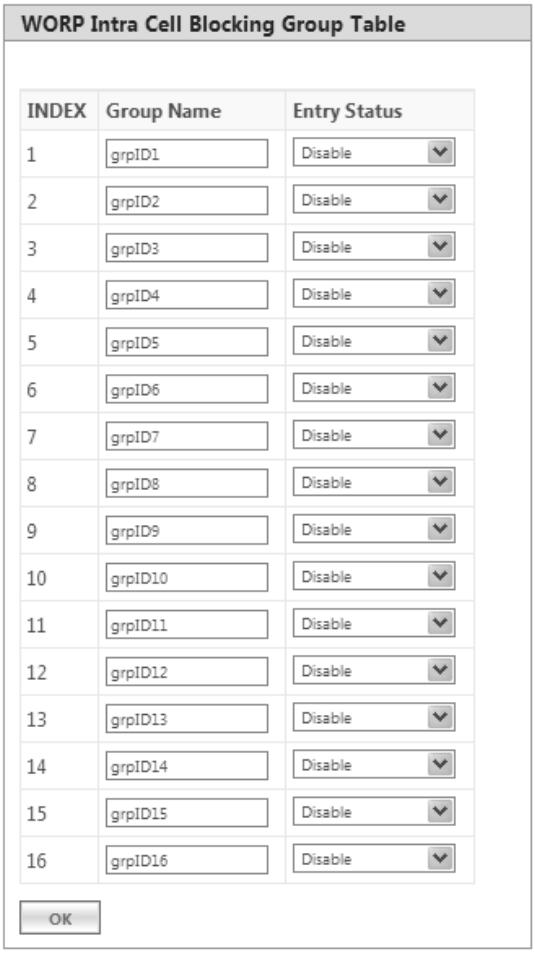
*: Intra Cell Blocking is configurable only in Bridge mode. When you change the device from **Bridge** to **Routing** mode or vice-versa, Intra-Cell Blocking stops or starts working only after device reboot.*

5.10.6.1 WORP Intra Cell Blocking Group Table

The user can form groups of SUs at the BSU which define the filtering criteria. All data to/from SUs belonging to the same group are bridged. If an SU does not belong to any group, the BSU discards the data.

By default, a BSU supports 16 groups and each group can contain a maximum of 240 SUs. Please note that a single SU can be a member of all the existing groups.

To view and configure the Intra Cell Blocking Group table, navigate to **ADVANCED CONFIGURATION** > **Filtering**> **WORP Intra Cell Blocking** > **Group Table**. The **WORP Intra Cell Blocking Group Table** screen appears:



WORP Intra Cell Blocking Group Table

INDEX	Group Name	Entry Status
1	grpID1	Disable
2	grpID2	Disable
3	grpID3	Disable
4	grpID4	Disable
5	grpID5	Disable
6	grpID6	Disable
7	grpID7	Disable
8	grpID8	Disable
9	grpID9	Disable
10	grpID10	Disable
11	grpID11	Disable
12	grpID12	Disable
13	grpID13	Disable
14	grpID14	Disable
15	grpID15	Disable
16	grpID16	Disable

OK

Figure 5-104 WORP Intra Cell Blocking Group Table

This table displays the list of groups. If the Entry Status for a group is set to **Enable** then BSU discards all the packets coming from SUs which are not members of that group. If set to Disable, then allows all the packets coming from SUs which are not the members of that group. If you have changed the Entry Status of a group, then click **OK** and then **COMMIT**.

5.10.6.2 WORP Intra Cell Blocking MAC Table

The WORP Intra Cell Blocking MAC table allows to add SU's MAC address and assign them to the groups. You can add a maximum of 250 SUs to the table.

To add SU to the table, navigate to **ADVANCED CONFIGURATION** > **Filtering** > **WORP Intra Cell Blocking** > **MAC Table**. The **WORP Intra Cell Blocking MAC Table** screen appears:

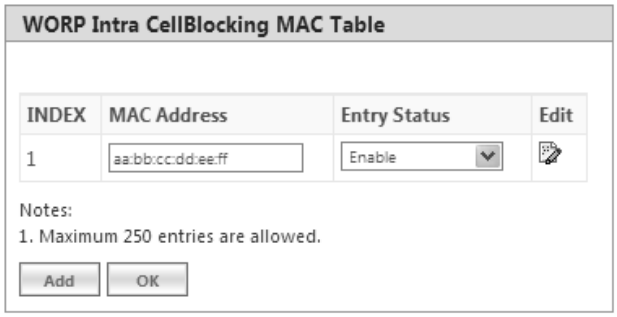


Figure 5-105 WORP Intra Cell Blocking MAC Table

5.10.6.2.1 To add MAC addresses, click **Add**. The following screen appears.

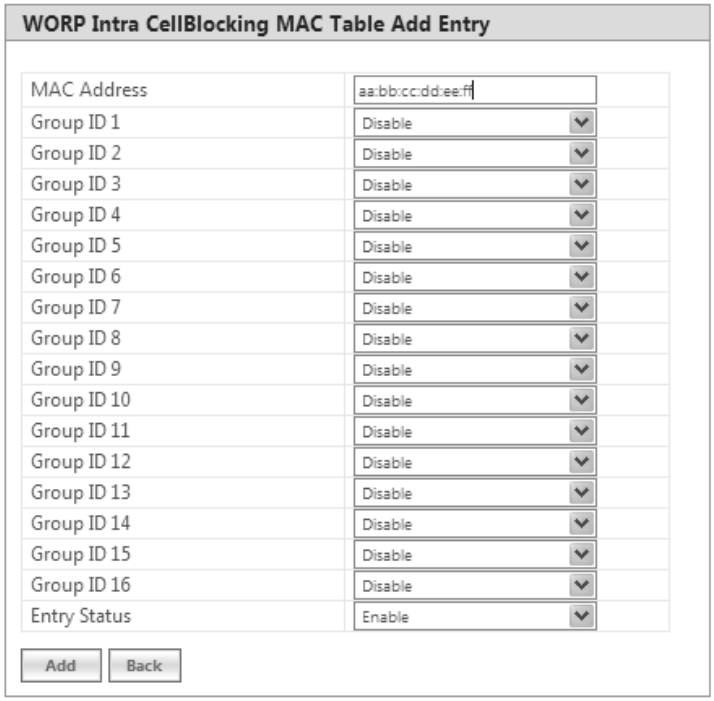


Figure 5-106 WORP Intra Cell Blocking MAC Table Add Entry

Given below is the table which explains the WORP Intra Cell Blocking MAC Table entries and the method to configure the configurable parameter(s):

Parameter	Description
MAC Address	Represents the MAC address of the SU.
Group ID's 1 to 16	By default, a Group ID is disabled meaning which the SU is not a part of that group. To make it a part of that group, select **Enable**.
Entry Status	If SU is part of a group and its Entry Status is enabled then it can communicate with all the SUs belonging to that group. If Entry Status is disabled, then the communication is blocked.

After adding the MAC address, click **Add**.

To edit the existing MAC addresses, click **Edit** icon in the **WORP Intra Cell Blocking MAC Table** screen. Modify the parameters as desired in the **WORP Intra Cell Blocking MAC Table Add Row** screen and click **OK** and then **COMMIT**.

In the **WORP Intra Cell Blocking MAC Table**, you can change the Entry Status as either Enable/Disable/Delete. Once the status is changed, click **OK** and then **COMMIT**.

5.11 DHCP

Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to assign an IP address to the DHCP client from a defined range of IP addresses configured for a given network. Allocating IP addresses from a central location simplifies the process of configuring IP addresses to individual DHCP clients, and also avoids IP conflicts.

5.11.1 DHCP Pool

DHCP Pool is a pool of defined IP addresses which enables a DHCP Server to dynamically pick IP address from the pool and assign it to the DHCP client.

To configure a range of IP addresses in the DHCP Pool, navigate to **ADVANCED CONFIGURATION > DHCP > DHCP Server > Pool**. The **DHCP Pool** screen appears:

Figure 5-107 DHCP Pool

Each pool entry comprises the following tabulated information:

Parameter	Description
Interface	Specifies the interface type, that is, Bridge or Routing (Ethernet and Wireless).
Start IP Address and End IP Address	Specifies the start and end IP address of the addresses to be added to the pool.
Delete	Allows you to delete a pool entry.

: You can add a maximum of five pool entries to the table. A pool entry can be deleted but cannot be edited.

5.11.1.1 Adding a New Pool Entry

To add a new entry to the DHCP Pool, click **Add** on the **DHCP Pool** screen. The following **DHCP Pool Table Add Row** screen appears:

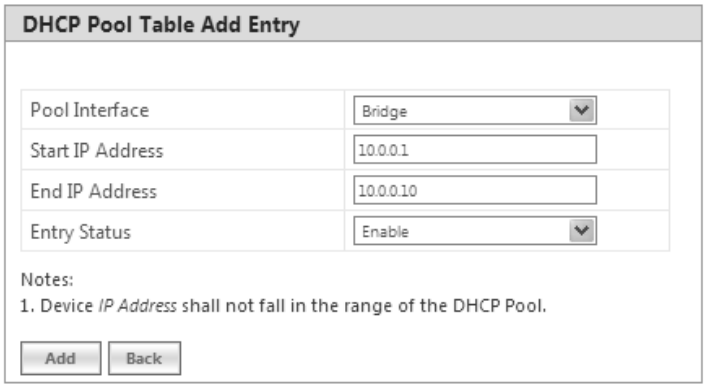


Figure 5-108 DHCP Pool Table Add Entry

Enter the pool details and click **Add**. The entry will be updated in the DHCP pool table.

To apply the configured changes, click **COMMIT**.

5.11.2 DHCP Server

If DHCP Server is enabled, it picks automatically the IP addresses from the specific interface address pool and assigns them to the respective DHCP clients.

DHCP Server feature is applicable to both **Bridge** and **Routing** Mode. In Routing mode, DHCP Server can be configured for each interface (Ethernet and Wireless) 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.

To configure the DHCP server parameters, navigate to **ADVANCED CONFIGURATION** > **DHCP > DHCP Server > Interface**. The **DHCP Server** screen appears:

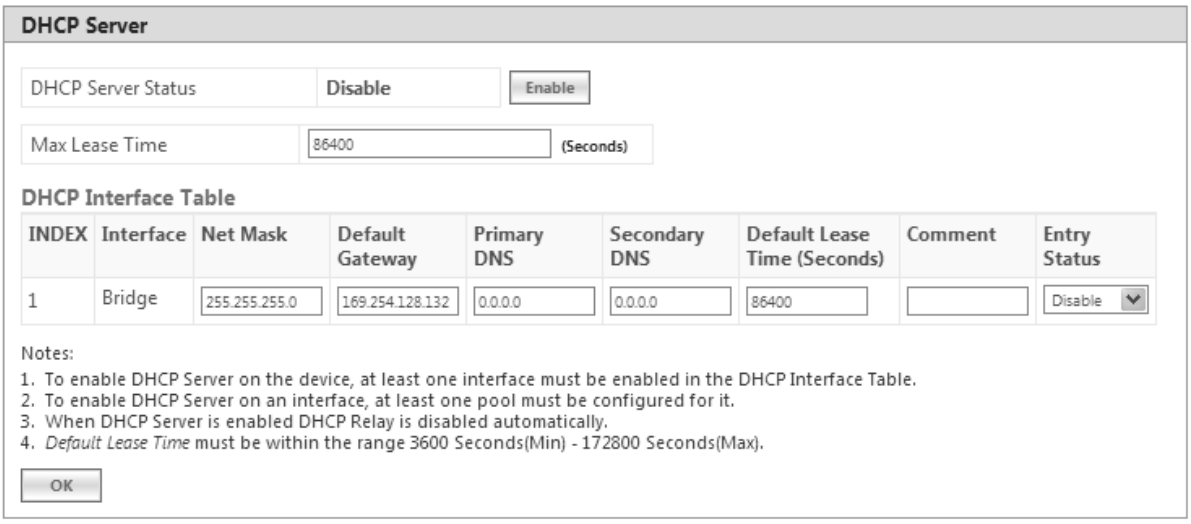


Figure 5-109 DHCP Server (Bridge Mode)

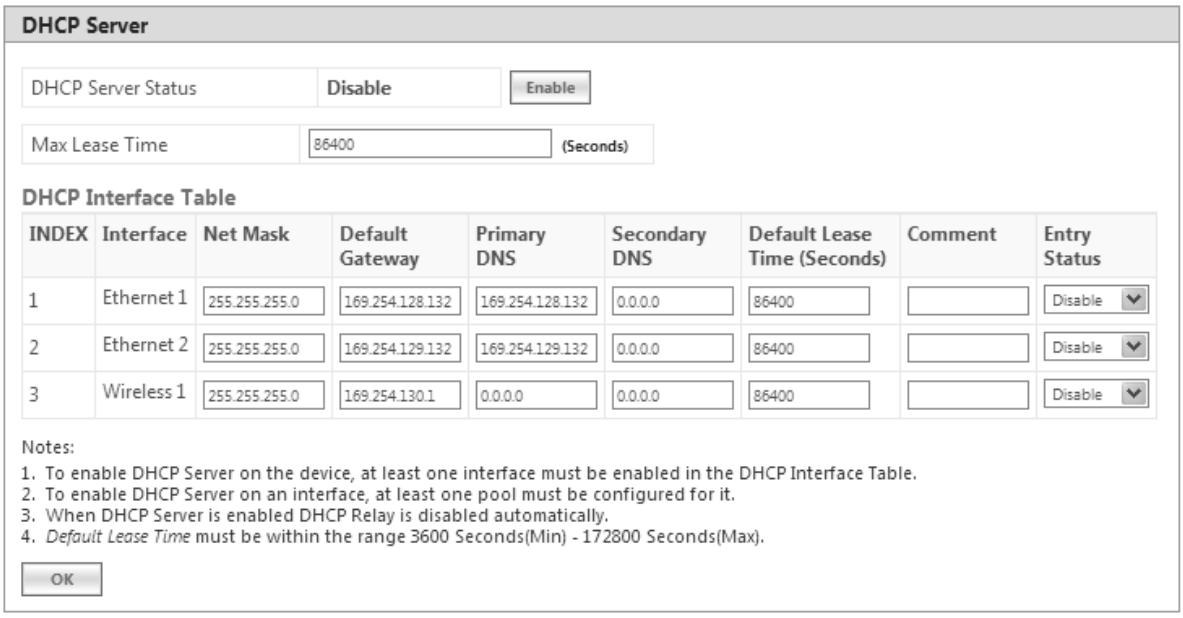


Figure 5-110 DHCP Server (Routing Mode)

Given below is the table which explains DHCP Server parameters and the method to configure the configurable parameter(s):

Parameter	Description
DHCP Server Status	By default, DHCP Server is disabled on a device. To enable DHCP Server, select **Enable**. A DHCP Server can be enabled only when the following two conditions are satisfied: 1. Before enabling, atleast one interface should be enabled on which the DHCP Server has to run. 2. The DHCP pool table should have atleast one pool configured for that interface.
Max Lease Time	Specifies the maximum lease time for which the DHCP client can use the IP address provided by the DHCP Server. The value ranges from 3600 - 172800 seconds.
DHCP Interface Table	
Interface Type	Specifies the interface for which the DHCP Server functionality shall be configured. That is Bridge or Ethernet/Wireless in case of Routing mode.
Net Mask	Specifies the subnet mask to be sent to the DHCP 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 DHCP client along with the 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 DHCP client.
Secondary DNS	Specifies the secondary DNS IP address to be sent to the DHCP client.

Parameter	Description
Default Lease Time	DHCP Server uses this option to specify the lease time it is willing to offer to the DHCP client over that interface. Once the lease time expires, the DHCP Server allocates a new IP address to the device. The **Default Lease Time** should be less than or equal to the configured **Max Lease Time**.
Comment	Specifies a note for the device administrator.
Entry Status	Used to **Enable** or **Disable** the DHCP Server functionality over the interface.

After configuring the required parameters, click **OK** and then **COMMIT**.

5.11.3 DHCP Relay (Routing Mode only)

The DHCP relay agent relays DHCP messages between the DHCP Clients and the configured DHCP Servers on different IP networks. You can configure a maximum of five DHCP Servers. There must be at least one DHCP Server configured in order to relay DHCP request.

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

To view and configure DHCP Relay Server parameters, navigate to **ADVANCED CONFIGURATION > DHCP > DHCP Relay > Relay Server**. The **DHCP Relay** screen appears:

Figure 5-111 DHCP Relay

By default, DHCP Relay is disabled on the device. To enable it, atleast one DHCP Server IP address should be configured.

To add a DHCP Server to the Relay Server Table, click **Add** in the **DHCP Relay** screen. The **DHCP Relay Server Add Row** screen appears:

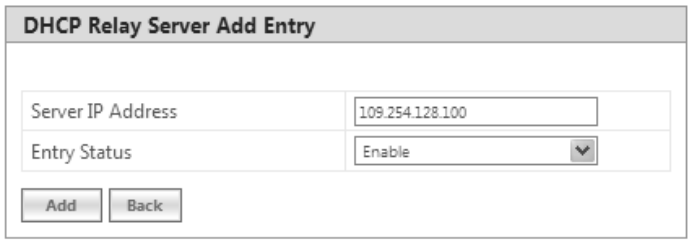


Figure 5-112 DHCP Relay Server Add Entry

Enter the DHCP Server IP Address and then click **Add**.

After configuring the required parameters, click **OK** and then **COMMIT**.

: DHCP server is disabled automatically if DHCP Relay agent is enabled and vice-verse.

5.12 IGMP Snooping

> ***: IGMP Snooping is applicable only in Bridge Mode.***

Proxim's Tsunami® devices support Internet Group Management Protocol (IGMP) Snooping feature. With IGMP Snooping enabled on the device, multicast traffic is only forwarded to ports that are members of the specific multicast group. By forwarding the traffic only to the destined ports, reduces unnecessary load on devices to process packets.

Explained below is the IGMP Snooping process with the help of a diagram:

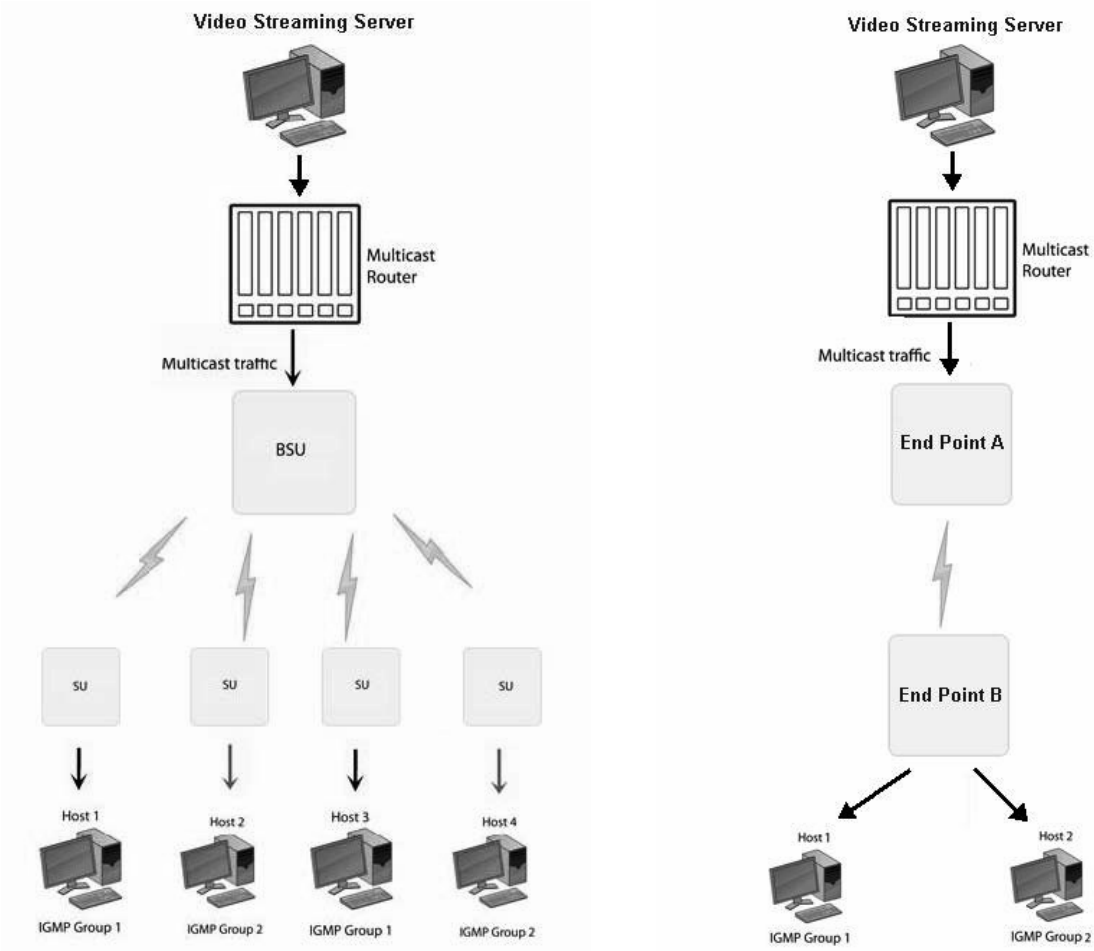


Figure 5-113 IGMP Snooping Process

The router forwards the IP multicast data to the BSU/End Point A.

Lets say, with IGMP Snooping not enabled on the BSU/End Point A, the multicast data is transmitted over the wireless medium irrespective of whether the multicast group address is a member of the multicast group table maintained in each BSU/End Point A. With IGMP Snooping enabled, the BSU/End Point A transmits the data only when the multicast group address is a member of the multicast group table, else drops the packet. The SU/End Point B will receive the multicast data.

Similarly, with IGMP Snooping not enabled on the SU/End Point B, the multicast data is transmitted irrespective of whether the multicast group address is a member of the multicast group table maintained in each SU/End Point B. With IGMP Snooping enabled, the SU/End Point B transmits the data to the host only when the multicast group address is a member of the multicast group table, else drops the packet.

IGMP Snooping is of 2 kinds:

- **Active**: Active IGMP Snooping listens to IGMP traffic and filters IGMP packets to reduce load on the multicast router.
- **Passive**: Passive IGMP Snooping simply listens to IGMP traffic and does not filter or interfere with IGMP.

:

- *Tsunami® devices supports only passive IGMP Snooping.*
- *IGMP versions v1,v2 and v3 are supported.*
- *The device can add a maximum of 64 Multicast groups in the Snooping table.*

To configure IGMP Snooping parameters, navigate to **ADVANCED CONFIGURATION > IGMP Snooping**. The following **IGMP Snooping** screen appears:

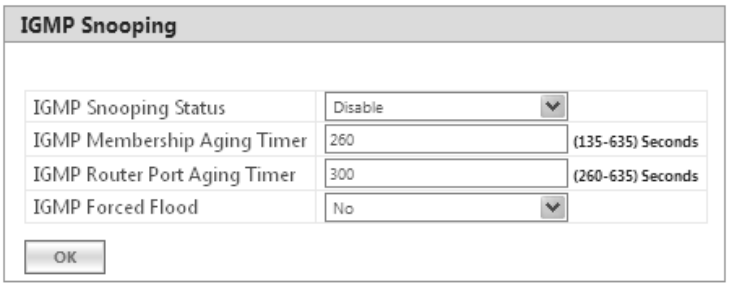


Figure 5-114 IGMP Snooping

Given below is the table which explains IGMP Snooping parameters and the method to configure the configurable parameter(s):

Parameter	Description
IGMP Snooping Status	By default, IGMP Snooping Status is disabled on the device, meaning which, the device transmits IP multicast traffic to all the ports. To forward the traffic only to the members of the specific multicast group, enable IGMP Snooping Status.
IGMP Membership Aging Timer	Represents the time after which the IGMP multicast group age-outs or elapses. It ranges from 135 to 635 seconds. The default Aging Timer is **260 seconds**.
IGMP Router Port Aging Timer	Represents the time after which the IGMP Router port age-outs or elapses. It ranges from 260 to 635 seconds. The default Aging Timer is **300 seconds**.
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.**

After configuring the required parameters, click **OK** and then **COMMIT**.

Management

6

This chapter provides information on how to manage the device by using Web interface. It contains information on the following:

- System
- File Management
- Services
- Simple Network Time Protocol (SNTP)
- Access Control
- Reset to Factory
- Convert QB to MP

: Recommended characters for the name field are A-Z a-z 0-9 - _ = : . @ $ & and space.

6.1 System

6.1.1 System Information

The **System Information** tab enables you to view and configure system specific information such as System Name, System Description, Contact Details of the person managing the device, and so on.

To view and configure system specific Information, navigate to **MANAGEMENT** > **System** > **Information**. The **System Information** screen appears:

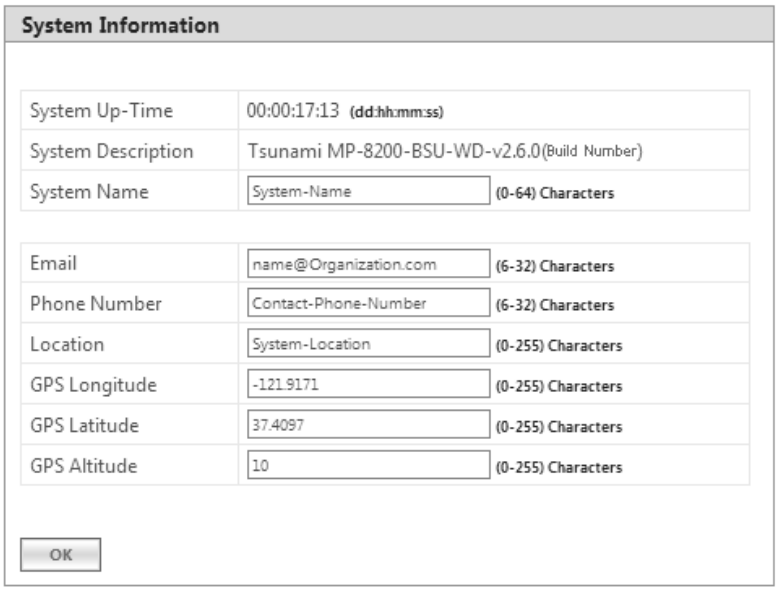


Figure 6-1 System Information

Given below is the table which explains System parameters and the method to configure the configurable parameter(s):

Parameter	Description
System Up-Time	This is a read-only parameter. It represents the operational time of the device since its last reboot.
System Description	This is a read-only parameter. It provides system description such as system name, firmware version and the latest firmware build supported. For example: MP-8100-BSU-WD-v2.X.Y(Build No.)
System Name	Represents the name assigned to the device. You can enter a system name of maximum 64 characters and should be unique across all devices in WORP network.
Email	Represents the email address of the person administering the device. You can enter an email address of minimum 6 and maximum 32 characters.
Phone Number	Represents the phone number of the person administering the device. You can enter a phone number of minimum 6 and maximum 32 characters.
Location	Represents the location where the device is installed. You can enter the location name of minimum 0 and maximum 255 characters.
GPS Longitude	Represents the longitude at which the device is installed. You can enter a longitude value of minimum 0 and maximum 255 characters.
GPS Latitude	Represents the latitude at which the device is installed. You can enter a latitude value of minimum 0 and maximum 255 characters.
GPS Altitude	Represents the altitude at which the device is installed. You can enter a altitude value of minimum 0 and maximum 255 characters.

After configuring the required parameters, click **OK** and then **COMMIT.**

6.1.2 Inventory Management

The **Inventory Management** tab provides inventory information about the device.

To view inventory information, navigate to **MANAGEMENT** > **System** > **Inventory Management**. The **System Inventory Management Table** appears.

System Inventory Management Table

INDEX	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	512240	Application Software Image	2103	1	2	6	0
3	12PI45010024	Hardware Inventory	2001	1	1	4	0
4	-NA-	BSP-Bootloader	2107	1	1	4	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
8	-NA-	Daughter Card	2011	1	1	7	8

Refresh

Figure 6-2 An Example - Inventory Management

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

Click **Refresh**, to view the updated system inventory management information.

6.1.3 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 of the device 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 set on the device, click **MANAGEMENT** > **System** > **Licensed Features**. The **Licensed Features** screen appears.

Licensed Features

```
Product Description                      = Tsunami MP-8200-BSU-WD
Number of Radios                         = 1
Number of Ethernet Interfaces            = 2
Radio 1 Allowed Frequency Band           = 4.9 GHz, 5 GHz
Maximum Output Bandwidth                 = 300 Mbps
Maximum Input Bandwidth                  = 300 Mbps
Maximum Aggregate Bandwidth              = 600 Mbps
Product Family                           = Tsunami MP
Product Class                            = Outdoor
Allowed Operations Modes of Radio 1      = BSU, SU
Maximum SUs Allowed                      = 250
Mac Address of the Device is             = 00:20:A6:12:89:34
```

Figure 6-3 Licensed Features

Given below is the table which explains each of the parameters:

Parameter	Description
Product Description	Description about the device.
Number of Radios	The number of radios the device supports.
Number of Ethernet Interfaces	The number of Ethernet interfaces supported by the device.
Radio 1 Allowed Frequency Band	The operational frequency band supported by the device radio.
Maximum Output Bandwidth	The maximum output bandwidth limit of the device. It is represented in mbps.
Maximum Input Bandwidth	The maximum input bandwidth limit of the device. It is represented in mbps. : *The Input and Output Bandwidth features are referred with respect to the wireless interface. Input bandwidth refers to the data received on the wireless interface and output bandwidth refers to the data sent out of the wireless interface.*
Maximum Aggregate Bandwidth	The maximum cumulative bandwidth of the device, which is the sum of configured output and input bandwidths.
Product Family	Represents the product family of the device.
Product Class	Represents the product class of the device, which is either indoor or outdoor.
Allowed Operational Modes of Radio1	Represents the operational mode of the device, that is, BSU/SU/End Point A/End Point B.
Maximum SUs Allowed	The maximum number of SUs that a BSU supports.
MAC address of the Device is	The MAC address of the device.

6.1.3.1 License Upgrade Procedure

In order to get additional bandwidth, **Upgrade the License** by following the procedure given below:

- Retrieve the license information (**License Info** file with **.lic** extension) from the device. For more details, refer Retrieve From Device section.
- To purchase a license upgrade, please contact your Proxim Sales Representative; to generate a unique license file for your device, please refer to the Technical Note available on Proxim support site: https://my.proxim.com/article/3003
- Upgrade the bandwidth using the license file(**.bin** extension) generated in the above step. For more details, refer Upgrade License section.

6.2 File Management

The **File Management** tab enables you to upgrade the firmware and configuration files onto the device, and retrieve configuration and log files from the device through Hypertext Transfer Protocol (HTTP) and Trivial File Transfer Protocol (TFTP).

6.2.1 TFTP Server

A Trivial File Transfer Protocol (TFTP) server lets you transfer files across a network. By using TFTP, you can retrieve files from the device for backup or copying, and you can upgrade the firmware or the configuration files onto the device. You can download the SolarWinds TFTP server application from http://my.proxim.com. You can also download the latest TFTP software from SolarWinds Web site at http://www.solarwinds.net.

While using TFTP server, ensure the following:

- The upload or download directory is correctly set (the default directory is **C:\TFTP-Root**).
- The required firmware file is present in the directory.
- The TFTP server is running during file upload and download. You can check the connectivity between the device and the TFTP server by pinging the device from the Personal Computer that hosts the TFTP server. The ping program should show replies from the device.
- The TFTP server should be configured to transmit and receive files (on the Security tab under **File > Configure**), with no automatic shutdown or time-out (on the **Auto-Close** tab).

: The instructions listed above are based on the assumption that you are using the SolarWinds TFTP server; otherwise the configuration may vary.

6.2.2 Text Based Configuration (TBC) File Management

Text Based Configuration (TBC) file is a simple text file that holds device template configurations. The device 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 onto the device. It differs mainly from 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 the live CLI session.

6.2.2.1 Generating TBC File

The TBC file is generated through CLI by executing **generate** command.

While generating the TBC file from CLI, there is an option to generate it with or without all Management and 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 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
- Any user-added or edited configurations on current live CLI session

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 6-4 TBC File in xml Format

6.2.2.2 Editing the TBC File

The 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 onto the device.

6.2.2.3 Loading the TBC file

The TBC file can be loaded onto the device by using either SNMP, Web Interface or CLI. You can either use **TFTP** or **HTTP** to load the TBC file.

By using Web Interface, you can load the TBC file by navigating to **MANAGEMENT > File Management > Upgrade Configuration**. To load the TBC file, it should be generated or downloaded onto the device. While loading the TBC file onto the device, any file name is accepted. Once loaded, the TBC file name is renamed to **PXM-TBC.xml**.

If the TBC file does not contain 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.

: 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 (that is, 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.

:

- *Remove any unmodified parameters from the TBC file, before loading it.*
- *If you get any timeout errors while loading TBC file from SNMP interface, increase the time-out value to more than 30 seconds in the MIB Browser.*

6.2.3 Upgrade Firmware

You can update the device with the latest firmware either through HTTP or TFTP.

:

- *Make sure the firmware being loaded is compatible to the device being upgraded.*
- *In a point-to-multipoint network, it is recommended to upgrade the base station first and then the subscriber(s).*
- *In a point-to-point network, it is recommended to upgrade the End Point A first and then the End Point B.*

6.2.3.1 Upgrade Firmware via HTTP

To upgrade the firmware via HTTP, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Upgrade Firmware** > **HTTP**.

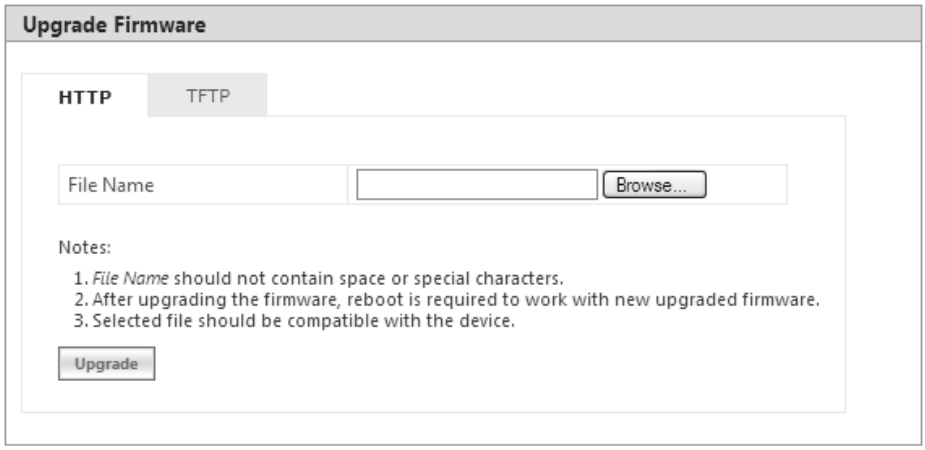


Figure 6-5 Upgrade Firmware - HTTP

2. In the HTTP screen, click **Browse** to select the latest firmware file from the desired location. Ensure that the file name does not contain any space or special characters.
3. Click **Upgrade**.

6.2.3.2 Upgrade Firmware via TFTP

To upgrade the firmware via TFTP Server, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Upgrade Firmware** > **TFTP**.

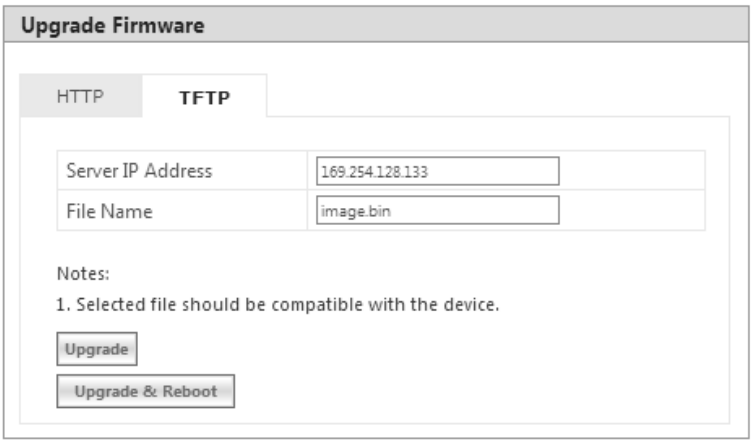


Figure 6-6 Upgrade Firmware - TFTP

2. Based on the IP mode configure either IPv4 or IPv6 address as TFTP Server address.
3. Enter the name of the latest firmware file (including the file extension) that has to be loaded onto the device in the **File Name** box.
4. To upgrade the device with new firmware click **Upgrade** and then reboot the device, or click **Upgrade & Reboot**.

:

- *After upgrading the device with the new firmware, reboot the device; Otherwise the device will continue to run with the old firmware.*
- *It is recommended not to navigate away from the upgrade screen, while the upgrade is in progress.*

6.2.4 Upgrade Configuration

You can upgrade the device with the latest configuration files either through HTTP or TFTP.

: Make sure the configuration file being loaded into the device is compatible. That is, the configuration file being loaded should have been retrieved from a device of the same SKU.

6.2.4.1 Upgrade Configuration via HTTP

To upgrade the configuration files by using HTTP, do the following:

1. Navigate to **MANAGEMENT > File Management > Upgrade Configuration > HTTP.**

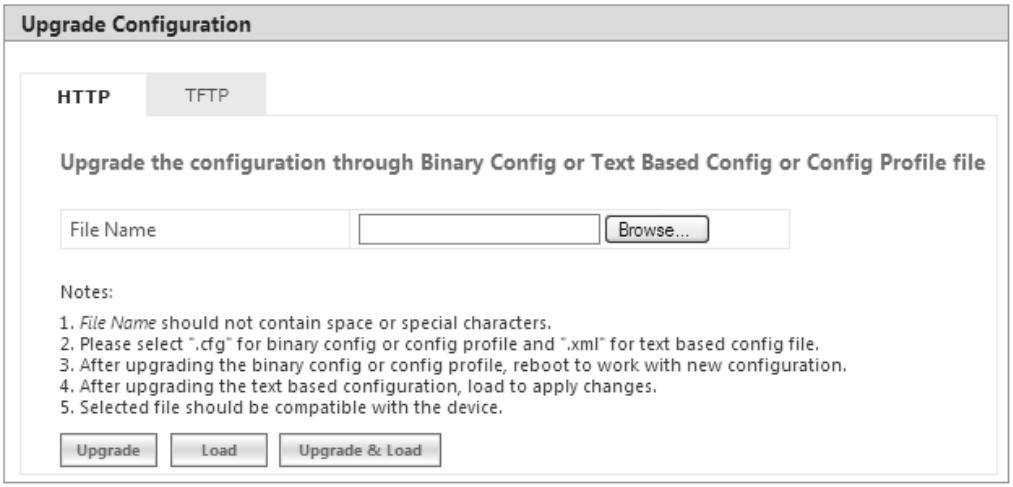


Figure 6-7 Upgrade Configuration - HTTP

2. In the HTTP screen, click **Browse** to locate the configuration file. Select a Binary Configuration file or a Config Profile file, or a **PXM-TBC.xml** for Text Based Configuration file. Make sure that the file name does not contain any space or special characters.
3. If you are upgrading the device with Binary Configuration file then click **Upgrade** and then reboot the device.
4. If you are upgrading the device with Config Profile file then click **Upgrade** and then reboot the device. On upgrade, the device shall come up with the loaded profile. If the configuration profile is not compatible, then on reboot, the device will rollback to its old configuration.
5. If you are upgrading the device with Text Based Configuration file then click **Upgrade** to upgrade the device with the config file and then click **Load** for loading the config file onto the device. Alternatively, you can perform both upgrade and load operation in one single step, by clicking **Upgrade & Load**.

6.2.4.2 Upgrade Configuration via TFTP

To upgrade the configuration files by using TFTP Server, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Update Configuration > TFTP**.

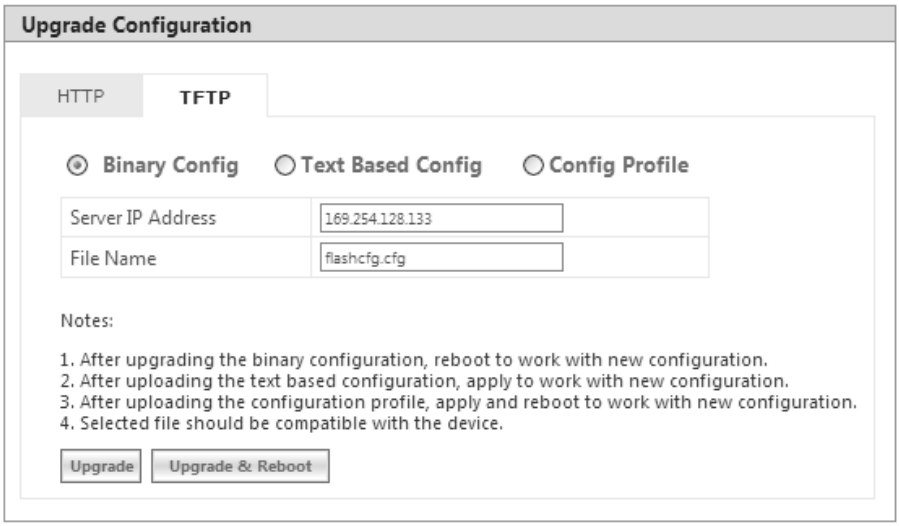


Figure 6-8 Upgrade Binary Configuration via TFTP

2. You can update the device with three types of configuration files: Binary, Text Based and Config Profile. To update the device with Binary Configuration file, select **Binary Config**.
   - Based on the IP mode configure either IPv4 or IPv6 address as TFTP Server address.
   - Enter the name of the Binary file (including the file extension) that has to be downloaded onto the device in the **File Name** box.
3. To update the device with Text Based Configuration files, select **Text Based Config**.
   - Based on the IP mode configure either IPv4 or IPv6 address as TFTP Server address.
   - Enter the name of the Text Based file (including the file extension) that has to be downloaded onto the device in the **File Name** box.

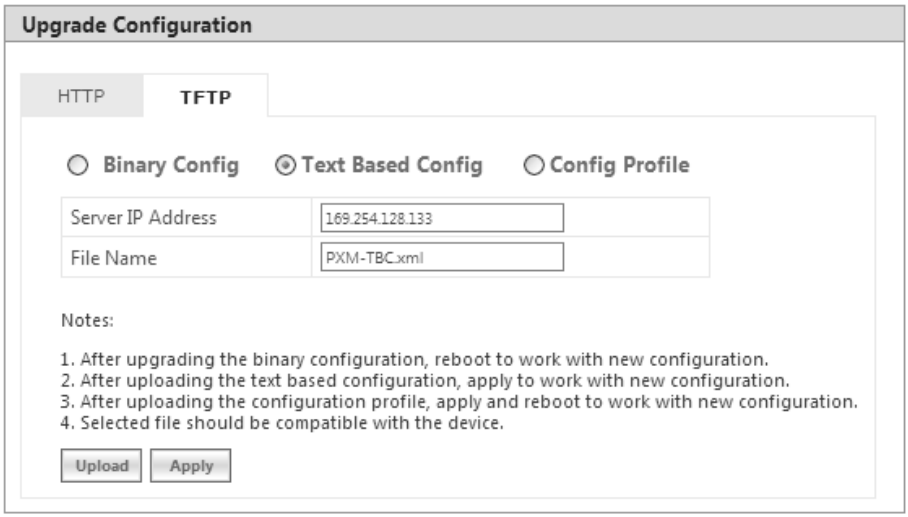


Figure 6-9 Upgrade Text Based Configuration via TFTP

4. To update the device with Configuration Profile files, select **Config Profile**.
   - Based on the IP mode, configure either IPv4 or IPv6 address as TFTP Server address.
   - Enter the name of the Config Profile file (including the file extension) that has to be downloaded onto the device in the **File Name** box.

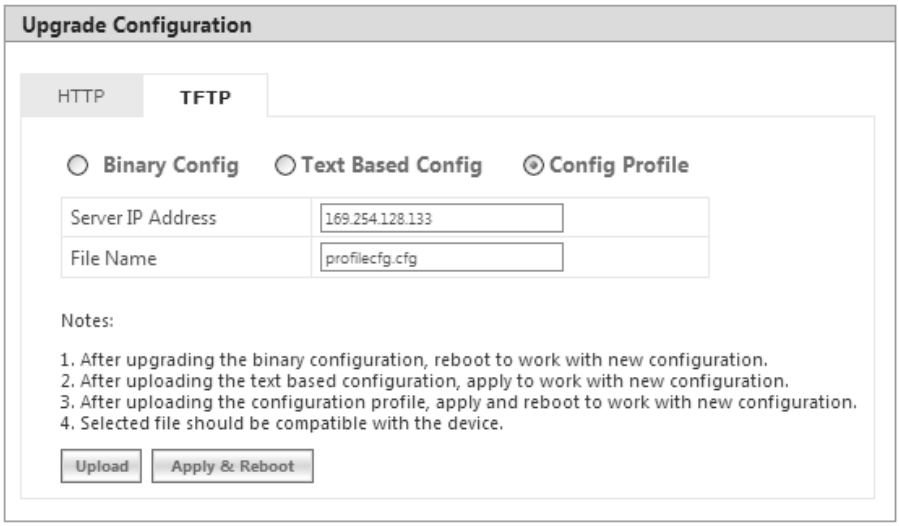


Figure 6-10 Upgrade Configuration Profile via TFTP

5. If you are upgrading the device with Binary Configuration file then click **Upgrade** and then reboot the device, or click **Upgrade & Reboot**.
6. If you are upgrading the device with Text Based Configuration file, click **Upload** and then click **Apply**.
7. If you are upgrading the device with Config profile file then click **Upload** and then reboot the device, or click **Apply & Reboot**.

: It is recommended not to navigate away from the upgrade screen, while the upgrade is in progress.

6.2.5 Upgrade License

You can upgrade the license file on the device either through HTTP or TFTP. Refer License Upgrade Procedure section for more details.

6.2.5.1 Upgrade License via HTTP

To upgrade the license using HTTP, do the following:

1. Navigate to **MANAGEMENT > File Management > Upgrade License > HTTP.**

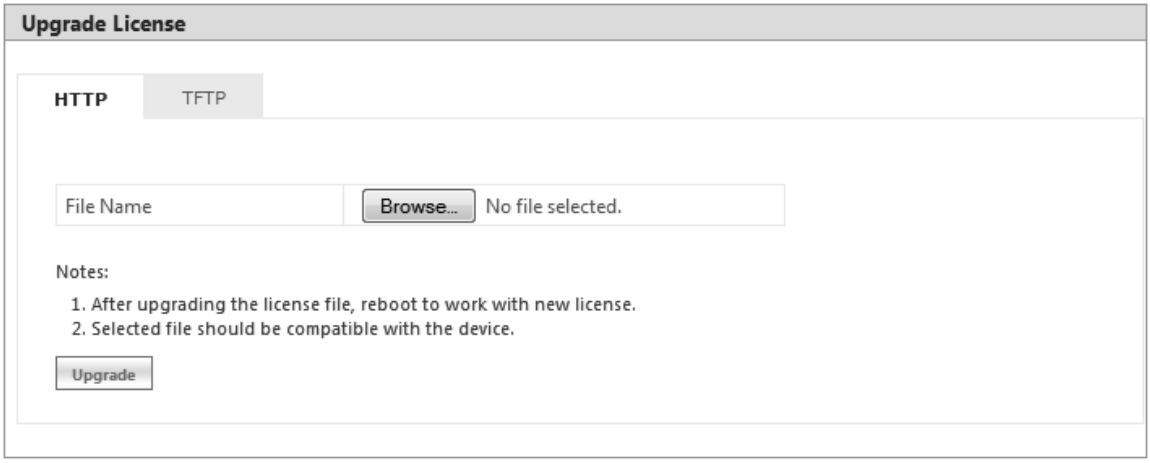


Figure 6-11 Upgrade License via HTTP

2. In the HTTP screen, click **Browse** to locate the license upgrade(**.bin**) file to be loaded on the device.
3. Click **Upgrade** button to upgrade the license on the device and then reboot the device.

6.2.5.2 Upgrade License via TFTP

To upgrade the license file using TFTP Server, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Update License > TFTP**.

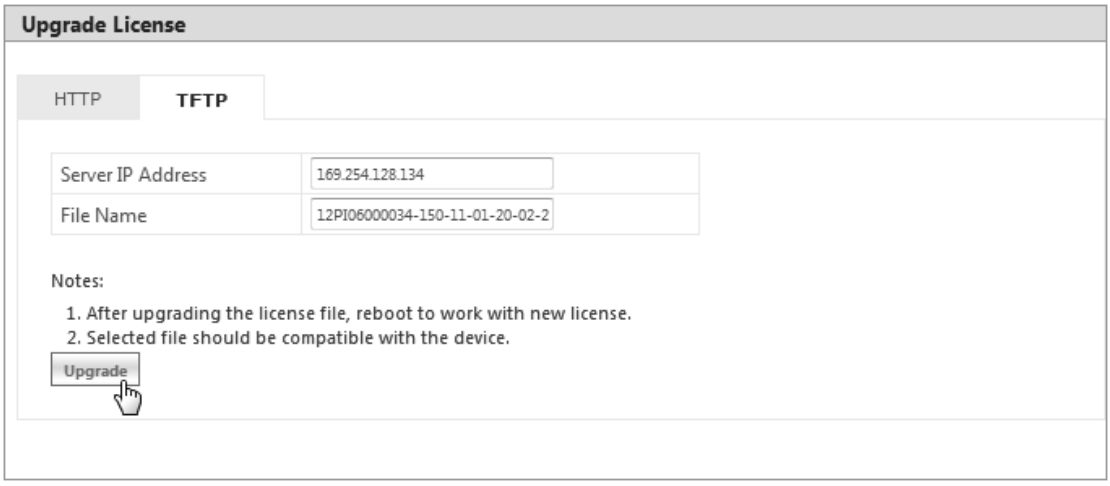


Figure 6-12 Upgrade License via TFTP

2. Based on the IP mode, configure either IPv4 or IPv6 address as TFTP Server address.
3. Enter the name of the file (including the file extension) that has to be loaded on the device, in the **File Name** box.
4. Click **Upgrade** button to upgrade the license on the device and then reboot the device.

- *Upgrade license can be done through CLI/Web Interface/SNMP.*
- *It is applicable only to MP-820-BSU-100, MP-820-SUA-50$^+$, MP-825-SUR-50$^+$, and QB-825-LNK-50$^+$ devices.*

6.2.6 Retrieve From Device

The **Retrieve From Device** tab allows you to retrieve logs, config files, and license info from the device either through HTTP or TFTP.

6.2.6.1 Retrieve from Device via HTTP

To retrieve files from the device by using HTTP, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Retrieve from Device > HTTP**.

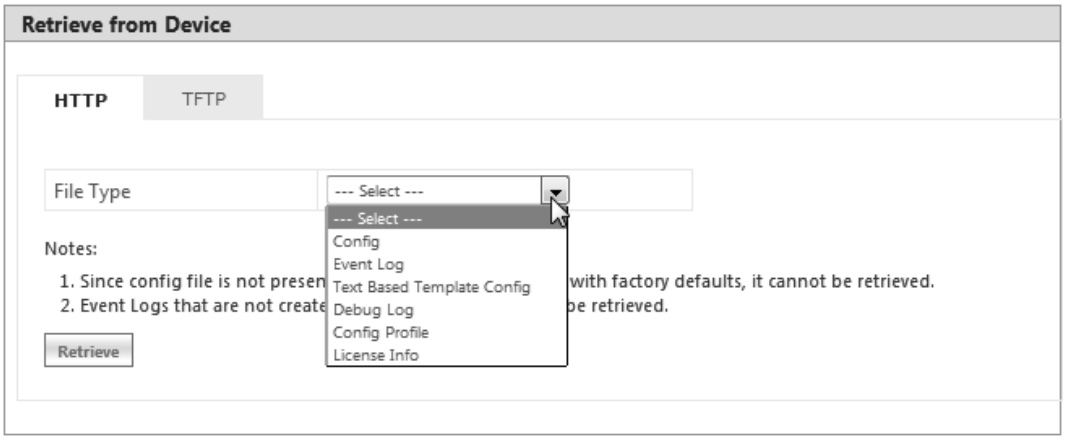


Figure 6-13 Retrieve Files via HTTP

2. Select the type of file that you want to retrieve from the device from the **File Type** drop down box. The files may vary depending on your device. The **File Types** are:
   a. Config
   b. Event Log
   c. Temperature Log
   d. Text Based Template Config
   e. Debug Log
   f. Config Profile
   g. License Info

   The Config Profile is used for replicating the configuration of a master device on to other similar devices by excluding the unique parameters like System information, IP configuration, Ethernet configuration, Wireless configuration based on the selection. By default, System Information and IP Configuration parameters are excluded. On selecting config profile type the following screen appears:

Figure 6-14 Retrieve Config Profile File via HTTP

After excluding the unique parameters, click **Create Profile** for creating the profile and then click **Retrieve**. When the retrieved configuration profile file is loaded on target devices, the target devices will come up with configuration of the master device except the excluded parameters. The excluded parameters are retained as configured on the target device.

: *Config Profile is applicable only to the compatible devices.*

3. Click **Retrieve.** Based on the selected file, the following **Download** screen appears.

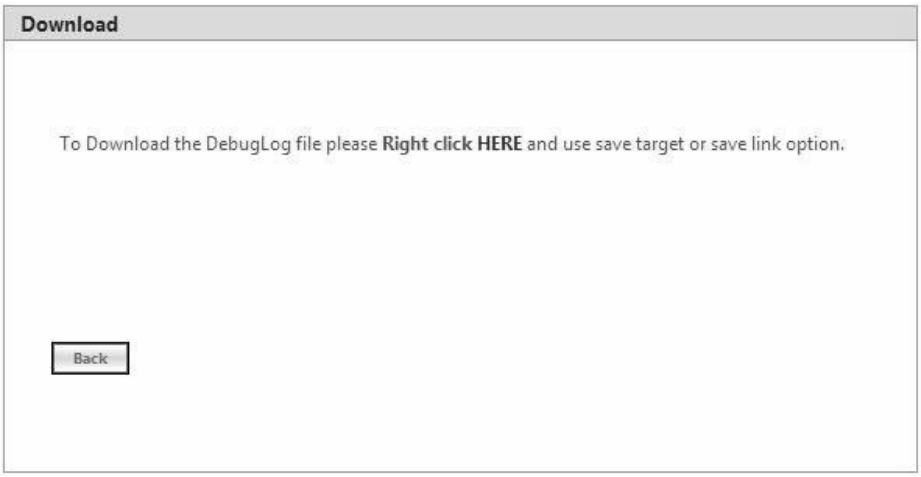


Figure 6-15 Download Screen

4. Right-click the **Download** link and select **Save Target As** or **Save Link As** to save the file to the desired location.

6.2.6.2 TFTP Retrieve

To retrieve files from the device by using TFTP, do the following:

1. Navigate to **MANAGEMENT** > **File Management** > **Retrieve from Device > TFTP**.

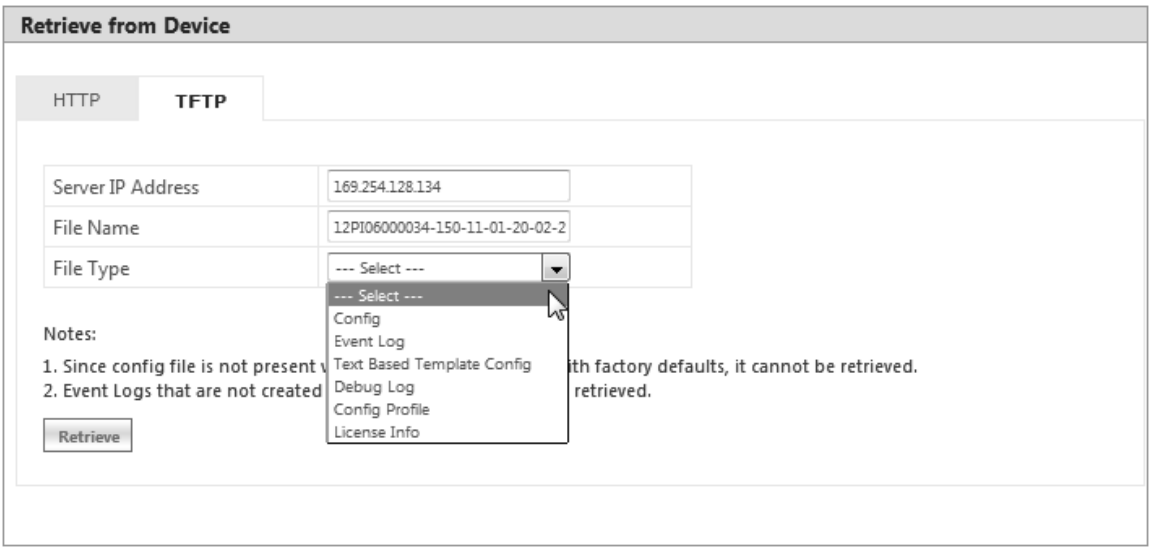


Figure 6-16 Retrieve Files via TFTP

2. Based on the IP mode, configure either IPv4 or IPv6 address as TFTP Server address.
3. Enter the name of the file (including the file extension) that has to be retrieved from the device, in the **File Name** box.
4. Select the file type that you want to retrieve from the device, from the **File Type** drop down box. The file types are:
   a. Config
   b. Event Log
   c. Temperature Log
   d. Text Based Template Config
   e. Debug Log
   f. Config Profile
   g. License Info

   The Config Profile is used for replicating the configuration of a master device on to other similar devices by excluding the unique parameters like System information, IP configuration, Ethernet configuration, Wireless configuration based on the selection. By default, System Information and IP Configuration parameters are excluded. On selecting config profile type the following screen appears:

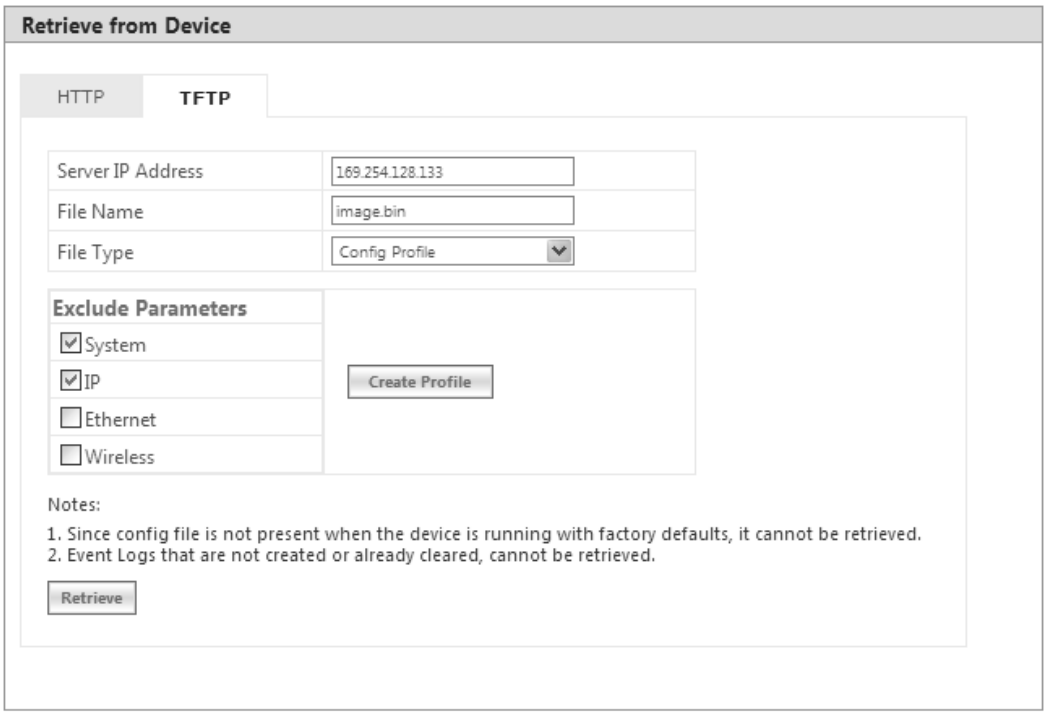


Figure 6-17 Retrieve Config Profile File via TFTP

After excluding the unique parameters, click **Create Profile** for creating the profile and then click **Retrieve**. When the retrieved configuration profile file is loaded on the target devices, the target devices will come up with configuration of the master device except the excluded parameters. The excluded parameters are retained as configured on the target device.

5. Click **Retrieve.** The retrieved file can be found in the TFTP Server folder.

- *Config Profile is applicable only to the compatible devices.*
- *When the device is running with default factory settings, there is no Binary Configuration file present and hence it cannot be retrieved.*
- *Similarly, the Text Based Template Configuration file does not exist if it is not generated from the CLI.*
- *You can retrieve Event Logs only when they are generated by the device.*
- *Retrieval of license info file (CLI/Web Interface/SNMP) is supported only by MP-820-BSU-100, MP-820-SUA-50$^+$, MP-825-SUR-50$^+$, and QB-825-LNK-50$^+$ devices.*
- *For more information on license upgrade, refer* License Upgrade Procedure *and* Upgrade License *sections.*

6.3 Services

The **Services** tab lets you configure the HTTP/HTTPS, Telnet/SSH and SNMP interface parameters.

6.3.1 HTTP/HTTPS

To configure HTTP/HTTPS interface parameters, navigate to **MANAGEMENT** > **Services > HTTP / HTTPS**.

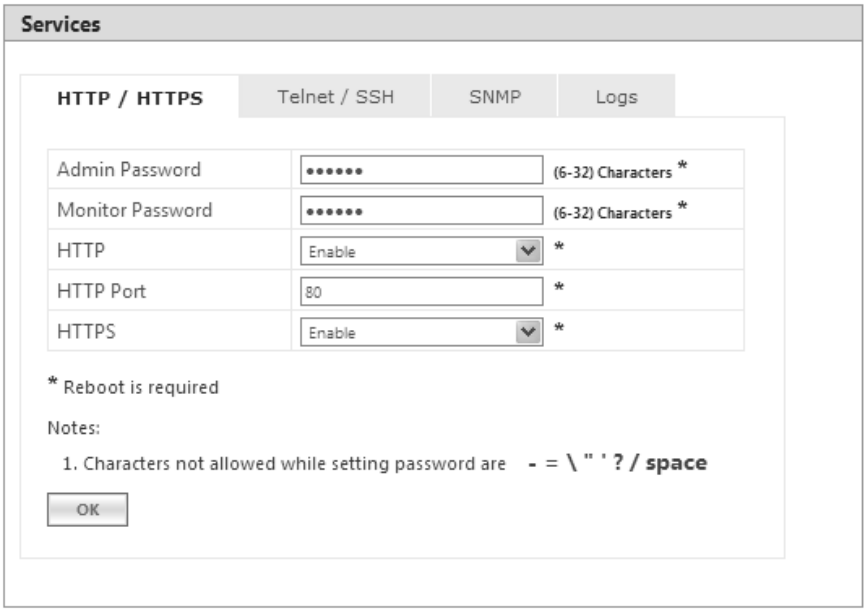


Figure 6-18 HTTP/HTTPS

Given below is the table which explains HTTP/HTTPS parameters and the method to configure the configurable parameter(s).

Parameter	Description
Admin Password	By default, the Administrator password to access HTTP/HTTPS interface is **public**. For security reasons, it is recommended to change the default password. The password should be alphanumeric with minimum of 6 and maximum of 32 characters. *: The following special characters are not allowed in the password:* ***- = \ " ' ? / space***
Monitor Password	The Administrator user has the privilege to change the Monitor user password. By default, the Monitor user password to access HTTP/HTTPS interface is **public**. For security reasons it is recommended to change the default password. The password should be alphanumeric with minimum of 6 and maximum of 32 characters. *: The following special characters are not allowed in the password:* **- = \ " ' ? / space**
HTTP	By default, a user can manage the device through Web Interface. To prevent access to the device through Web Interface, select **Disable**.
HTTP Port	Represents the HTTP port to manage the device through Web Interface. By default, the HTTP port is **80**.

Parameter	Description
HTTPS	By default, a user can manage the device through Web Interface over secure socket Layer (HTTPS). To prevent access to the device through HTTPS, select **Disable**. : The password configuration for HTTPS is same as configured for HTTP.

After configuring the required parameters, click **OK**, **COMMIT** and then **REBOOT.**

6.3.2 Telnet/SSH

To configure Telnet/SSH interface parameters, navigate to **MANAGEMENT** > **Services > Telnet / SSH.**

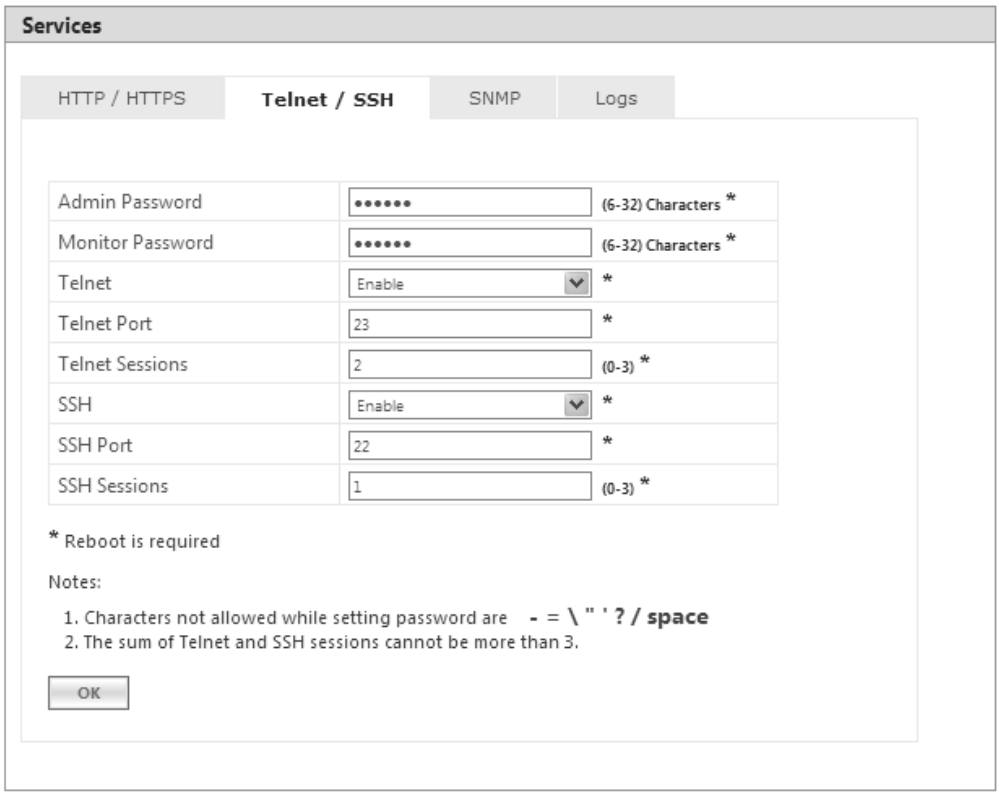


Figure 6-19 Telnet/SSH

Given below is the table which explains Telnet/SSH parameters and the method to configure the configurable parameter(s):

Parameter	Description
Admin Password	By default, the Administrator password to access Telnet/SSH interface is **public**. For security reasons, it is recommended to change the default password. The password should be alphanumeric with minimum of 6 and maximum of 32 characters. *: The following special characters are not allowed in the password:* ***- = \ " ' ? / space***
Monitor Password	The Administrator user has the privilege to change the Monitor user password. By default, the Monitor user password to access Telnet/SSH interface is **public**. For security reasons it is recommended to change the default password. The password should be alphanumeric with minimum of 6 and maximum of 32 characters. *: The following special characters are not allowed in the password:* **- = \ " ' ? / space**
Telnet	By default, a user can manage the device through Telnet. To prevent access to the device through Telnet, select **Disable**.
Telnet Port	Represents the port to manage the device using Telnet. By default, the Telnet port is **23**.
Telnet Sessions	The number of Telnet sessions which controls the number of active Telnet connections. A user is restricted to configure a maximum of 3 Telnet sessions. By default, the number of Telnet sessions allowed is **2**.
SSH	By default, a user can manage the device through SSH. To prevent access to the device through SSH, select **Disable**.
SSH Port	Represents the port to manage the device using Secure Shell. By default, the Secure Shell port is **22**.
SSH Sessions	Represents the number of SSH sessions which controls the number of active SSH connections. A user is restricted to configure a maximum of 3 SSH sessions. By default, the number of SSH sessions allowed is **1**. *: The 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 0 or 1.*

After configuring the required parameters, click **OK**, **COMMIT** and then **REBOOT.**

6.3.3 SNMP

To configure SNMP interface parameters, navigate to **MANAGEMENT** > **Services > SNMP.**

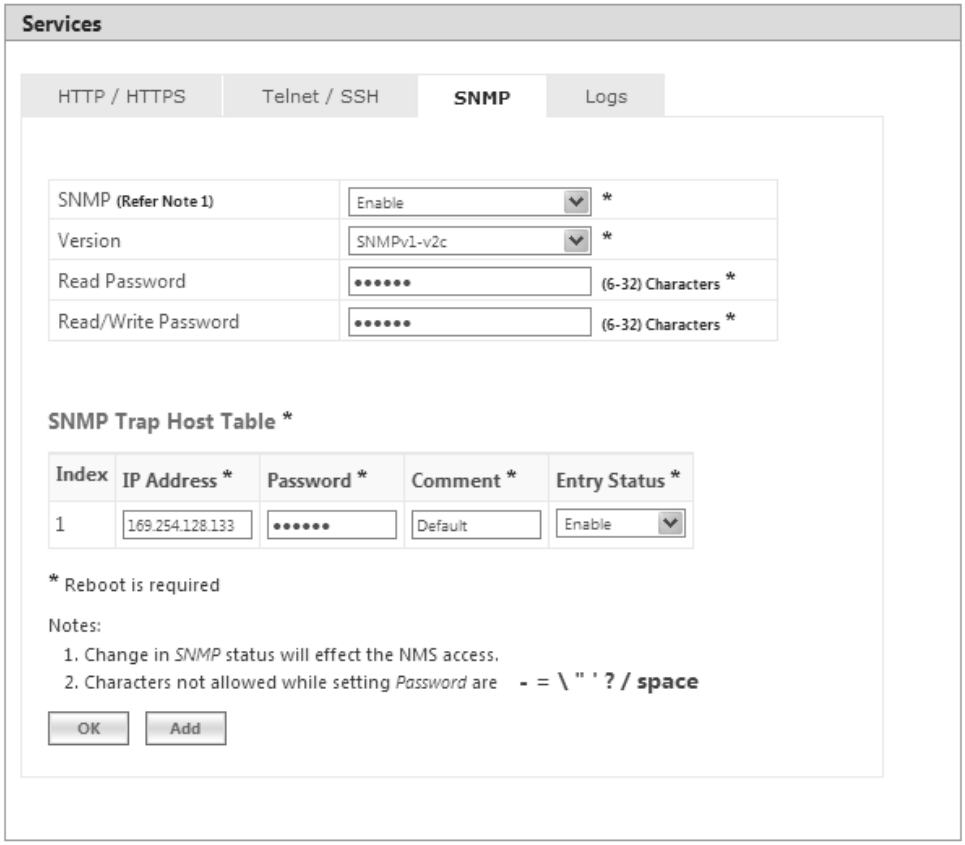


Figure 6-20 SNMPv1-v2c

Figure 6-21 SNMPv3

Given below is the table which explains SNMP parameters and the method to configure the configurable parameter(s):

Parameter	Description
SNMP	By default, the user has the access to manage the device through SNMP Interface. To prevent access to the device through SNMP, select **Disable**. : *Any change in the SNMP status will affect the Network Management System access.*
Version	Allows you to configure the SNMP version. The supported SNMP versions are v1-v2c and v3. By default, the SNMP version is **v1-v2c**.
SNMP v1-v2c Specific Parameters	
Read Password	Represents the read only community string 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 in the NMS or MIB browser. The default password is "public". The password should be of minimum 6 and maximum 32 characters.

Parameter	Description
	: The following special characters are not allowed in the password: **- = \ " ' ? / space**
Read/Write Password	Represents the read-write community string 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 in the NMS or MIB browser. The default password is "public". The password should be of minimum 6 and maximum 32 characters. *: The following special characters are not allowed in the password:* **- = \ " ' ? / space**
SNMP v3 Specific Parameters	
Security level	The supported security levels for the device are **AuthNoPriv** and **AuthPriv**. Select **AuthNoPriv** for Extensible Authentication or **AuthPriv** for both Authentication and Privacy (Encryption).
Priv Protocol	Applicable only when the Security Level is set to **AuthPriv**. Represents the type of privacy (or encryption) protocol. Select the encryption standard as either AES-128 (Advanced Encryption Standard) or DES (Data Encryption Standard). The default Priv Protocol is AES-128. *: The following special characters are not allowed in the password:* **- = \ " ' ? / space**
Priv Password	Applicable only when the Security Level is set to **AuthPriv**. Represents the pass key for the selected Privacy protocol. The default password is **public123**. The password should be of minimum 8 and maximum 32 characters. *: The following special characters are not allowed in the password:* **- = \ " ' ? / space**
Auth Protocol	Represents the type of Authentication protocol. Select the encryption standard as either **SHA** (Secure Hash Algorithm) or **MD5** (Message-Digest algorithm). The default Auth Protocol is **SHA**.
Auth Password	Represents the pass key for the selected Authentication protocol. The default password is **public123**. The password should be of minimum 8 and maximum 32 characters.

After configuring the required parameters, click **OK**, **COMMIT** and then **REBOOT.**

6.3.3.1 SNMP Trap Host Table

The SNMP Trap Host table allows you to add a maximum of 5 Trap server's IP address to which the SNMP traps will be delivered. By default, the SNMP traps are delivered to 169.254.128.133.

: The default SNMP Trap Host Table entry cannot be deleted.

To add entries to the Trap Host Table, click **Add** in the **Services** screen. The **SNMP Trap Host Table Add Row** screen appears:

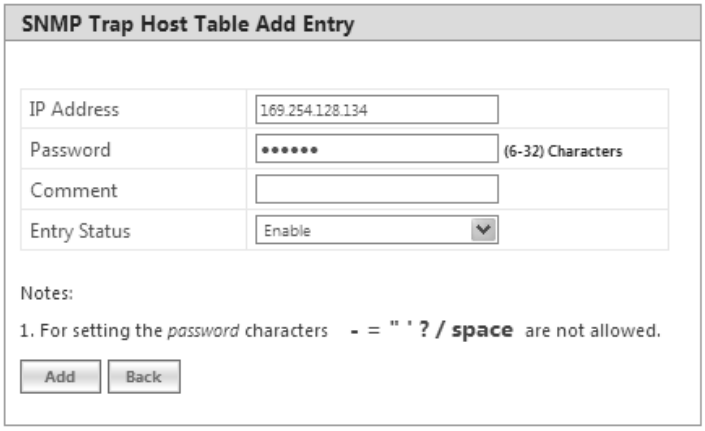


Figure 6-22 Add Entries to SNMP Host Table

Configure the following parameters:

- **IP Address**: Based on the IP mode, enter the IPv4 or IPv6 address of the Trap server to which SNMP traps will be delivered.

  : IPv6 address should be the global IP address and not the link local IP address.

- **Password**: Type the password to authenticate the Trap Server. The following special characters are not allowed in the password: **- = \ " ' ? / *space***

  : Applicable only to SNMP v1-v2c.

- **Comment**: Type comments, if any.
- **Entry Status**: Select the entry status as either Enable or Disable. If enabled, the device will send SNMP traps to the authenticated Trap Server.
- After configuring the required parameters, click **Add** and then **COMMIT**.

6.3.3.2 Edit SNMP Trap Host Table

Edit the desired SNMP Trap Host Table entries and click **OK**, **COMMIT** and then **REBOOT**.

6.3.4 Logs

The device supports two types of log mechanisms:

1. **Event Log**: Based on the configured event log priority, all the log messages are logged and used for any analysis. This log messages remain until they are cleared by the user.
2. **Syslog**: They are similar to Event logs except that they are cleared on device reboot.

To configure Event log and Syslog priority, navigate to **MANAGEMENT** > **Services** > **Logs**. The following screen appears:

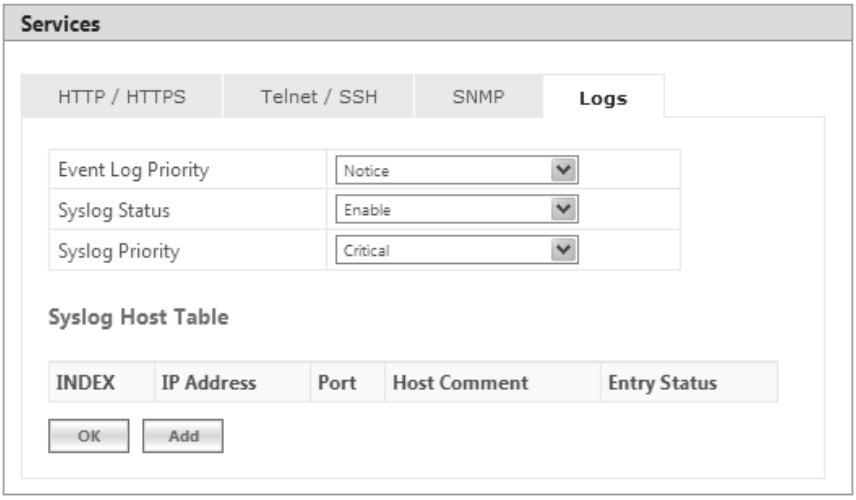


Figure 6-23 Logs

- **Event Log Priority**: By default, the priority is set to Notice. You can configure the event log priority as one of the following:
  - Emergency
  - Alert
  - Critical
  - Error
  - Warning
  - Notice
  - Info
  - Debug

  Please note that the priorities are listed in the order of their severity, where **Emergency** takes the highest severity and **Debug** the lowest. When the log priority is configured as high, all the logs with low priority are also logged. For example, if **Event Log Priority** is set to **Notice**, then the device will log all logs with priorities Notice, Warning, Error, Critical, Alert and Emergency.
- **Syslog Status**: By default, **Syslog Status** is enabled and default priority is **Critical**. If desired, you can choose to disable.
- **Syslog Priority**: Configuration is same as Event Log Priority.
- After configuring the required parameters, click **OK** and then **COMMIT**.

6.3.4.1 Configure a Remote Syslog host

Configure a syslog host (server) in order to forward syslog messages to it.

: You can configure only one syslog host.

Follow the following steps to configure a remote syslog host:

1. Click **Add** in the **Syslog Host Table** screen. The **Syslog Host Table Add Row** screen appears:

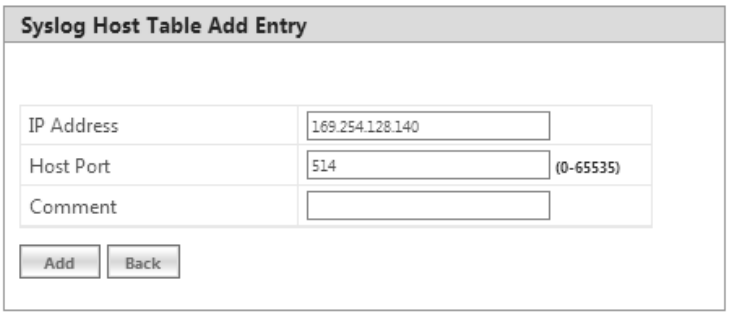


Figure 6-24 Syslog Host Table Add Row

2. **IP Address**: Based on the IP mode, enter IPv4 or IPv6 address of the Syslog host.

   : IPv6 address should be the global IP address and not the link local IP address.

3. **Host Port**: Represents the port on which the Syslog host listens to the log messages sent by the device. The default port is 514.

   : The user must configure the correct port number on which the Syslog host is running. Choice of port number must be in line with the standards for port number assignments defined by Internet Assigned Numbers Authority (IANA).

4. **Comments**: Types comments, if any.
5. Click **Add**. The syslog host is added to the **Syslog Host Table**.

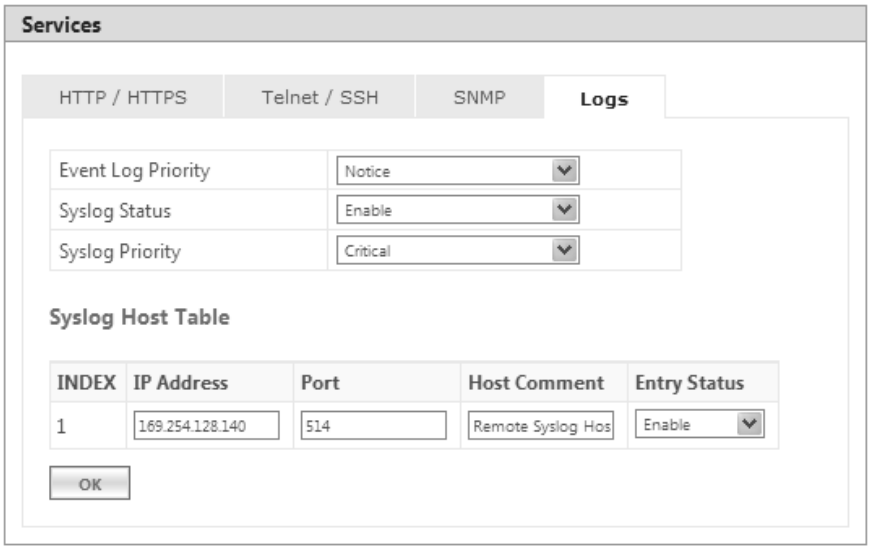


Figure 6-25 Syslog Host Configured

For some reason, if the configured syslog host parameters are changed then you can edit it directly in the **Syslog Host Table** entry. You can change the following parameters:

- **IP Address**
- **Port**
- **Host Comments**
- **Entry Status:**
  - **Enable**: By default, the configured Syslog host is enabled on the device.
  - **Disable**: To disable an entry in the Syslog Host Table, click **Disable**.
  - **Delete**: To delete the configured Syslog host, click **Delete**.

After doing the necessary changes, click **OK** followed by **COMMIT**.

6.4 Simple Network Time Protocol (SNTP)

Proxim's point-to-multipoint and point-to-point devices are furnished with Simple Network Time Protocol (SNTP) Client software that enables to synchronize device's time with the network time servers.

The SNTP Client when enabled on the device(s), sends an NTP (Network Time Protocol) request to the configured time servers. Upon receiving the NTP response, it decodes the response and sets the received date and time on the device after adjusting the time zone and day light saving.

In case, the time servers are not available, then users also have the option to manually set the date and time on the device.

To synchronize device's time with time servers or manually set the time, navigate to **MANAGEMENT > SNTP**. The **SNTP** screen appears:

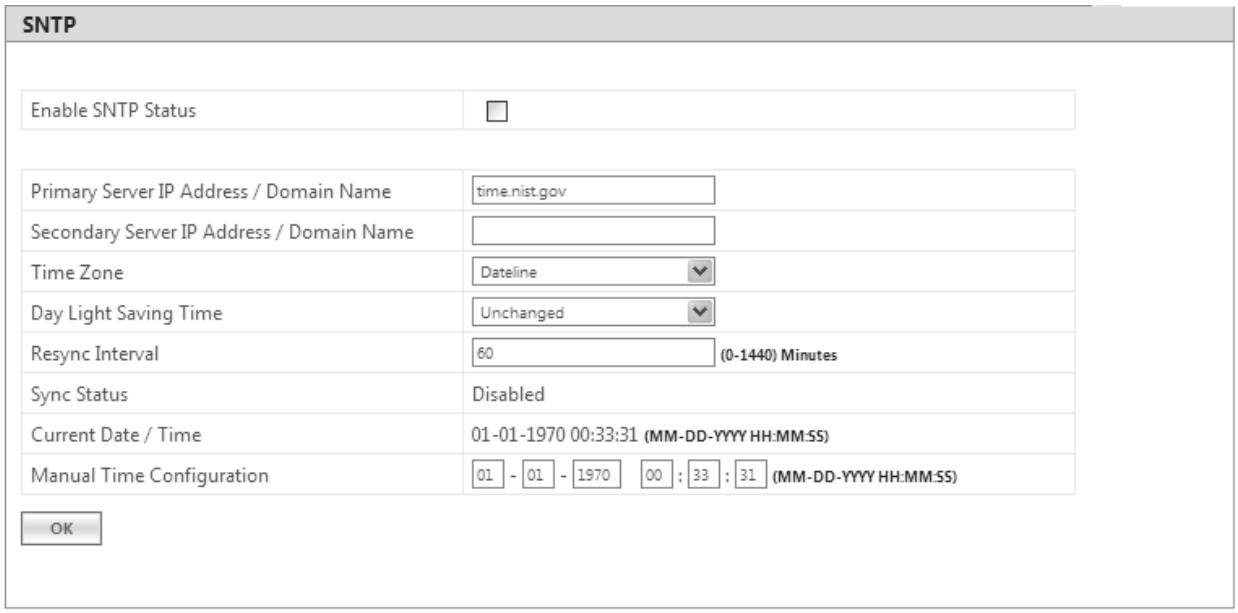


Figure 6-26 Time Synchronization

Given below is the table which explains SNTP parameters and the method to configure the configurable parameter(s):

Parameter	Description
Enable SNTP Status	Select this parameter to enable SNTP Client on the device. If enabled, the SNTP Client tries to synchronize the device's time with the configured time servers. By default, the SNTP status is disabled.
Primary Server IP Address/Domain Name	Enter the host name, or the IP address based on IP modes (**IPv4 only** or **IPv4 and IPv6**) of the primary SNTP time server. The SNTP Client tries to synchronize device's time with the configured primary server time. : • *If host name is configured, instead of IP address then make sure that DNS server IP is configured on the device.* • *IPv6 address should be the global IP address and not the link local IP address.*
Secondary Server IP Address/Domain Name	Enter the host name, or the IP address based on IP modes (**IPv4 only** or **IPv4 and IPv6**) of the secondary SNTP time server. If the primary server is not reachable, then SNTP client tries to synchronize device's time with the secondary server time. : • *If the SNTP client is not able to sychronize the time with both the servers (primary and secondary), then it tries to synchronize again after every one minute.* • *IPv6 address should be the global IP address and not the link local IP address.*

Parameter	Description
Time Zone	Configure the time zone from the available list. This configured time zone is considered before setting the time, received from the time servers, on the device.
Day Light Saving Time	Configure the Day Light Saving time from the available list. This configured Day Light Saving time is considered before setting the time, received from the time servers, on the device.
ReSync Interval	Set ReSync time interval ranging from **0 to 1440** minutes. Once the time is synchronized, the SNTP Client tries to resynchronize with the time servers after every set time interval. By default, the ReSync interval is set to **60** minutes.
Sync Status	Specifies the SNTP Client sync status when it tries to ReSync again with the time servers. The status is as follows: • **Disabled**: The SNTP client will not synchronize the time with the time servers and displays the status as Disabled. • **Synchronizing**: The SNTP client is in the process of synchronzing time with the time servers. • **Synchronized**: The SNTP client has synchronized time with the time servers.
Current Date/Time	Displays the current date and time. If SNTP is enabled, it displays the time the device received from the SNTP server. If SNTP is not enabled, then it displays the time manually set by the user.
Manual Time Configuration	If SNTP Client is disabled on the device or the time servers are not available on the network, then the user can manually set the time. Enter the time manually in the format: MM-DD-YYYY HH:MM:SS. : • *Manual time configuration is not retained across reboots. After every reboot the user has to set the time again.* • *Over a period of time, with manual time configuration, the device may lag behind the actual time. So, it is recommended to periodically check and adjust the time.*

To save the configured parameters, click **OK** and then **COMMIT**.

6.5 Access Control

The **Access Control** tab enables you to control the device management access through specified host(s). You can specify a maximum of five hosts to control device management access.

To configure management access control parameters, navigate to **MANAGEMENT > Access Control**. The **Management Access Control** screen appears:

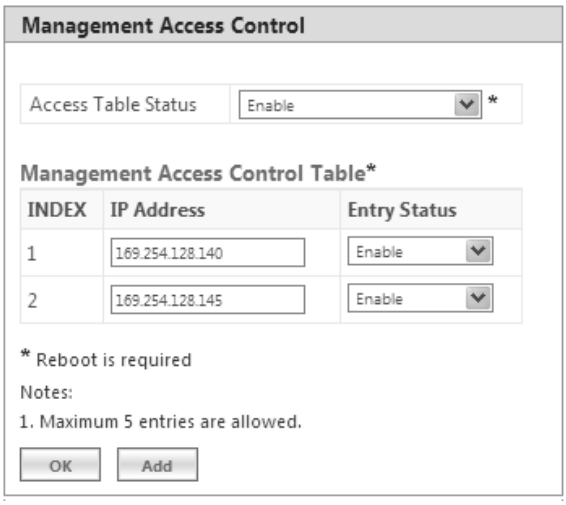


Figure 6-27 Management Access Control

By default, the Management Access Control feature is disabled on the device. To enable, select **Enable** from the **Access Table Status** box and click **OK**. Reboot the device, for the changes to take effect.

: Only when the Access Table Status is enabled, you can add host(s) to the Management Access Control Table.

6.5.0.1 Add Host(s) to Management Access Control Table

To add a host to the Management Access Control Table, do the following:

1. Click **Add** in the **Management Access Control** screen. The **Management Access Table Add Row** screen appears:

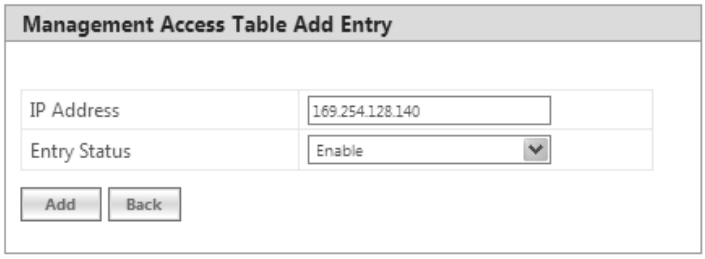


Figure 6-28 Management Access Table Add Row

2. **IP Address**: Based on the IP mode, configure either IPv4 or IPv6 address of the host that controls the device management access.
3. **Entry Status**: By default, the entry status is enabled meaning which the specified host can control the device management access. Edit the status to **Disable**, if you do not want the host to control the device management access.
4. Click **Add**.

: If MAC ACL is enabled, configure at least one entry in the Management Access Table with the IP address (of the PC or the management station), in order to manage the device.

6.5.0.2 Edit Management Access Control Table Entries

Edit the desired host entries and click **OK, COMMIT** and then **REBOOT**.

6.6 Reset to Factory

The **Reset to Factory** tab allows you to reset the device to its factory default state. When this operation is performed, the device will reboot automatically and comes up with default configurations.

To reset the device to its factory defaults, navigate to **MANAGEMENT** > **Reset To Factory**. The Factory Reset screen appears:

Figure 6-29 Reset to Factory Defaults

Click **OK**, if you wish to proceed with factory reset, else click **Cancel**.

6.7 Convert QB to MP

The **Convert QB to MP** tab lets you convert a QB to SU so that the converted device can connect to a BSU and operate as a SU.

This feature is applicable only to,

- QB-8100-EPA which converts to a MP-8100-SUA
- QB-8150-EPR which converts to a MP-8150-SUR
- QB-8150-EPR-100 which converts to a MP-8150-SUR-100
- QB-8200-EPA which converts to a MP-8200-SUA
- QB-8250-EPR which converts to a MP-8250-SUR
- QB-8151-EPR which converts to a SU
- QB-825-EPR-50 which converts to a MP-825-CPE-50
- QB-825-EPR-50^{+} which converts to a MP-825-SUR-50^{+}

You can convert a QB to SU mode by using two methods:

- **Method 1**: Web Interface
- **Method 2**: Load an SU config file (retrieved from another SU) onto the QB device and then reboot.

: Even after conversion from QB to MP, the device description still shows as QB.

To convert a QB to SU using Web Interface, do the following:

1. Navigate to **MANAGEMENT** > **Convert QB to MP**. The **Convert QB to MP** screen appears:

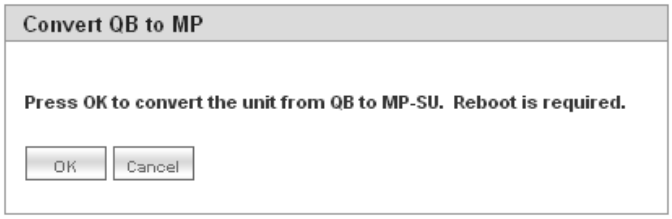


Figure 6-30 Convert QB to MP

2. Click **OK**.
3. Reboot the device for the changes to take effect.

:

- *A QB after converting to SU will function in SU mode only. It will accept only MP firmware for upgrade.*
- *The version of the firmware being upgraded to should be 2.4.0 or later. If earlier version of the firmware is loaded, the device will reset to factory default upon initialization and operate in QB mode.*
- *When upgrading a converted device from Bootloader, it must be done using a QB image, as the device is licensed as QB.*
- *The conversion of the device from QB to SU requires a reboot.*
- *In case of Method 1 (Web Interface) conversion, QB mode configuration will be deleted.*
- *Reset to factory defaults, always results in the device initializing in QB mode.*

Monitor

7

This chapter contains information on how to monitor the device by using Web interface. It contains information on the following:

- System
- Interface Statistics
- WORP Statistics
- Active VLAN
- Bridge
- Network Layer
- RADIUS (BSU or End Point A only)
- IGMP
- DHCP
- Logs
- Tools
- SNMP v3 Statistics

7.1 System

The **System** tab enables to view system specific information such as **LED/RSSI Display**.

: 'RSSI LED' feature is applicable only to 82x devices.

To view **LED/RSSI Display**, navigate to **MONITOR > System**. The **LED/RSSI Display** screen appears:

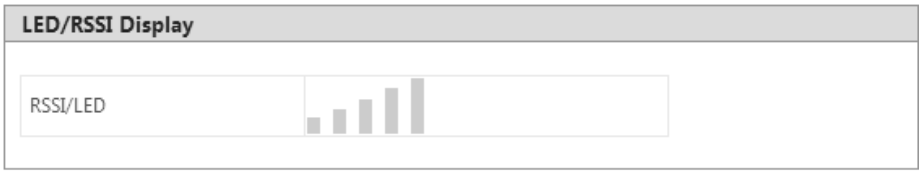


Figure 7-1 LED/RSSI Display

When the link is established, Received Signal Strength Indicator (RSSI) LEDs on the scaling mask glow. Scaling mask LEDs indicate the received signal strength of the link. The more LEDs on the scaling mask glow, better is the signal.

To select the **LED Display Status**, navigate to **Advanced Configuration > System.** By default, **RSSI Display** mode is enabled, if required the user can select the Disable (LEDs Off) mode. In **Disable (LEDs Off)** mode, all the 5 LEDs will be off.

– The LED behavior in **RSSI Display mode** is given below:
  - By default all the 5 LEDs will blink for an interval of 1 second to indicate the device is UP.
  - For a BSU, in order to monitor the SU link statistics, the user should first configure the wireless MAC address of the SU. If the configured SU is registered with the BSU, then the LEDs will glow based on the RSSI value else all the 5 LEDs will blink.

- For a SU, if the SU is registered with the BSU, then the LEDs will glow based on the RSSI value else all the 5 LEDs will blink.
- For a CPE, if the CPE is registered with the BSU, then the LEDs will glow based on the RSSI value else all the 5 LEDs will blink.
- For QB, if EndPointA is registered with EndPointB, then the LEDs will glow based on the RSSI value of each EndPoint. else all the 5 LEDs will blink.

7.2 Interface Statistics

Interface Statistics allows you to monitor the status and performance of the Ethernet and Wireless interfaces of the device.

7.2.1 Ethernet Statistics

To view the Ethernet interface statistics, click **MONITOR > Interface Statistics**. The **Interface Statistics** screen appears:

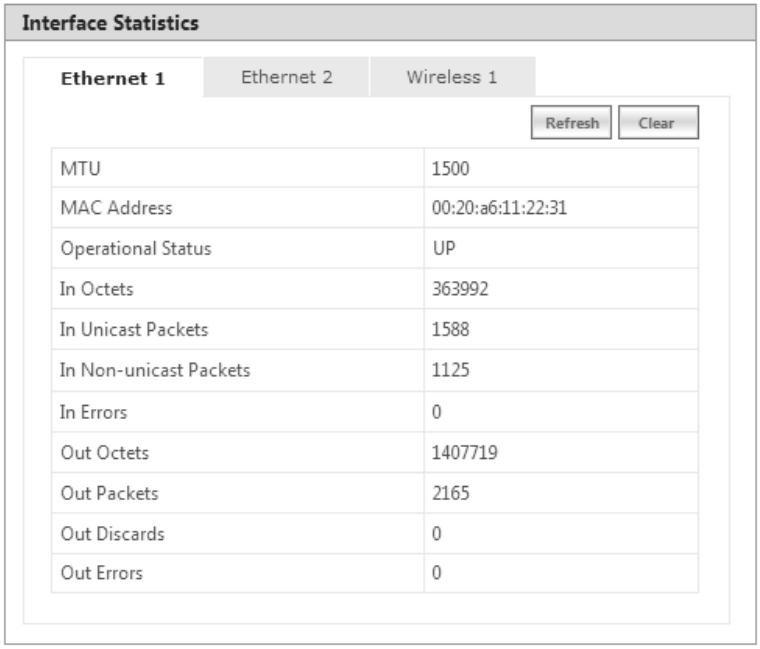


Figure 7-2 Ethernet Interface Statistics

To view Ethernet statistics, click **Ethernet 1** or **Ethernet 2** depending on the Ethernet interfaces supported by your device.

Given below is the table which explains the parameters displayed in the Ethernet Statistics screen:

Parameter	Description
MTU	Specifies the largest size of the data packet received or sent on the Ethernet interface. The MTU size varies from 1500 to 1514 depending on the MTU configuration (See System).
MAC Address	Specifies the MAC address at the Ethernet protocol layer.
Operational Status	Specifies the current operational state of the Ethernet interface.
In Octets	Specifies the total number of octets received on the Ethernet interface.

Parameter	Description
In Unicast Packets	Specifies the number of subnetwork- unicast packets delivered to the higher level protocol.
In Non-unicast Packets	Specifies the number of non-unicast subnetwork packets delivered to the higher level protocol.
In Errors	Specifies the number of inbound packets that contained errors and are restricted from being delivered.
Out Octets	Specifies the total number of octets transmitted out from the Ethernet interface.
Out Packets	Specifies the total number of packets requested by the higher level protocol and then, transmitted.
Out Discards	Specifies 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	Specifies the number of outbound packets that are not transmitted because of errors.

To view the updated Ethernet statistics, click **Refresh**.

To delete the Ethernet statistics, click **Clear**.

7.2.2 Wireless Statistics

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

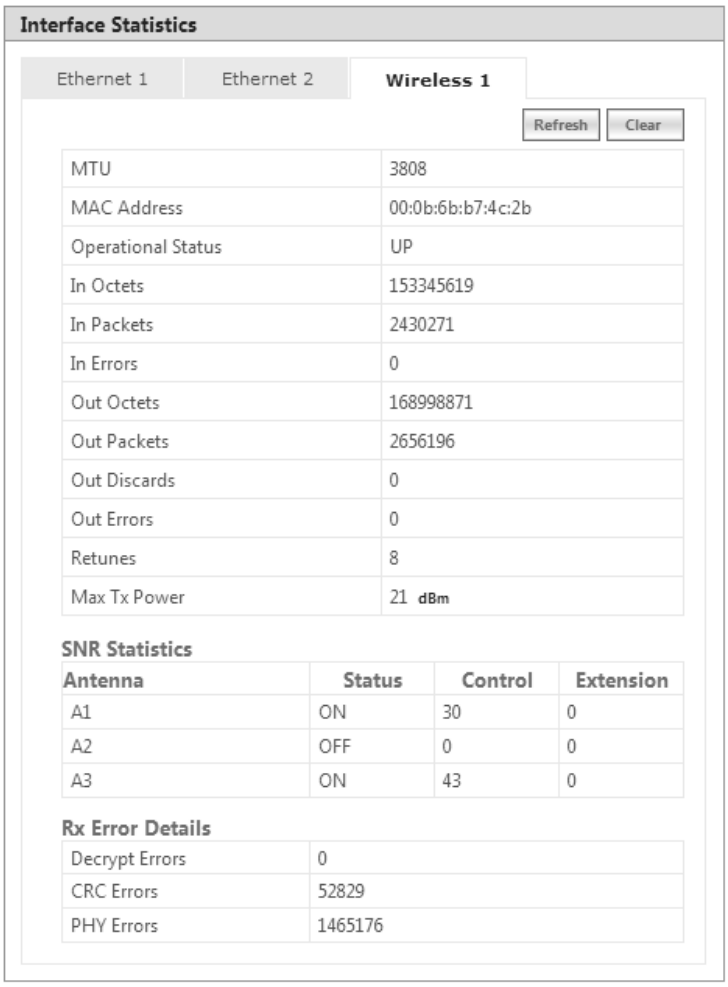


Figure 7-3 Wireless Interface Statistics

Given below is the table which explains the parameters displayed in the Wireless statistics screen:

Parameter	Description
MTU	Specifies the largest size of the data packet received or sent on the wireless interface. The MTU size can range from **350 to 3808** bytes for High throughput modes and **350 to 2304** bytes for legacy mode. The default and maximum value of the WORP MTU is **3808** bytes for higher throughput and **2304** bytes for legacy mode.
MAC Address	Specifies the MAC address at the wireless protocol layer.
Operational Status	Specifies the current operational state of the wireless interface.
In Octets	Specifies the total number of octets received on the wireless interface.
In Packets	Specifies the number of packets delivered to the higher level protocol.

Parameter	Description
In Errors	Specifies the number of inbound packets that contained errors and are restricted from being delivered.
Out Octets	Specifies the total number of octets transmitted out from the wireless interface.
Out Packets	Specifies the total number of packets requested by the higher level protocol and then, transmitted.
Out Discards	Specifies 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	Specifies the number of outbound packets that are not transmitted because of errors.
Retunes	Specifies the number of times the radio is re-tuned for better performance of the device.
Max Tx Power	Indicates the maximum power that the radio can radiate.
SNR Statistics SNR Statistics represents the signal strength with regard to the noise at the antenna ports.	
Antenna	Specifies the antenna ports available for the product. Please note that the antenna ports vary depending on the product.
Status	Specifies the configuration status of the antenna ports. **ON** indicates that antenna port is enabled and **OFF** indicates that antenna port is disabled.
Control	Specifies the SNR value of the packet received at the selected channel frequency.
Extension	This parameter is applicable only to the 40 MHz modes, that is, 40 PLUS and 40 Minus. It specifies the SNR value of the packet received on the extension channel (20MHz).
Rx Error Details	
Decrypt Errors	This parameter is applicable only if 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.
PHY Errors	Specifies the total Rx PHY Errors. It generally indicates the interference in the wireless medium.

To view the updated Wireless statistics, click **Refresh**.

To delete the Wireless statistics, click **Clear**.

7.2.3 PPPoE Statistics

: Applicable only to an SU in Routing mode.

To view PPPoE interface statistics, navigate to **MONITOR** > **Interface Statistics > PPPoE > PPP Interface Stats**.

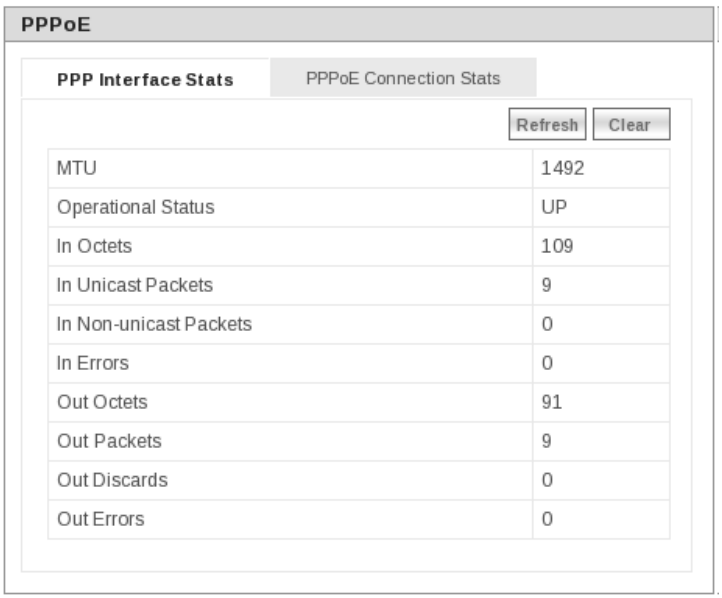


Figure 7-4 PPPoE Interface Statistics

The PPPoE interface parameters are same as the Ethernet interface parameters. Please note that if a link is not established between a PPPoE client and server, then the device displays the following message.

Figure 7-5 PPPoE Server - No Link Established

To view the updated PPPoE interface statistics, click **Refresh**. Please note that for every 4 seconds, the interface statistics gets refreshed.

To view the PPPoE connection status such as the number of attempts made to start a session between PPPoE client and server, and the number of attempts failed to establish a connection, click **PPPoE Connection Stats**.

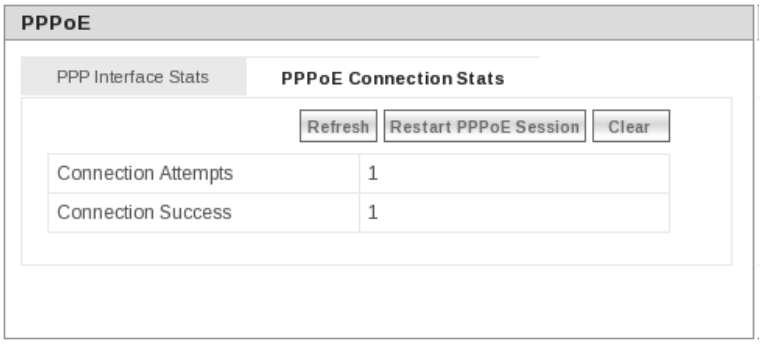


Figure 7-6 PPPoE Connection Statistics

To view updated connection statistics, click **Refresh**.

To restart the session between the PPPoE client and server, click **Restart PPPoE Session**. On successfully re-establishing a session, the IP address of the wireless interface will be assigned again by the PPPoE server, if Address Type is set to PPPoE-ipcp.

To clear the existing connection statistics, click **Clear**.

7.2.4 IP Tunnels

: Applicable only in Routing Mode.

To view IP Tunnels interface statistics, click **MONITOR** > **Interface Statistics > IP Tunnels**. The following **IP Tunnel Interface Statistics** screen appears:

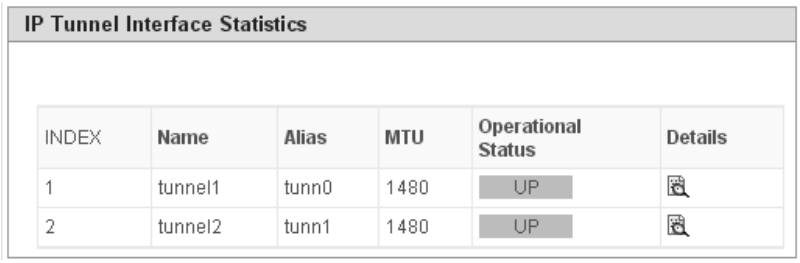
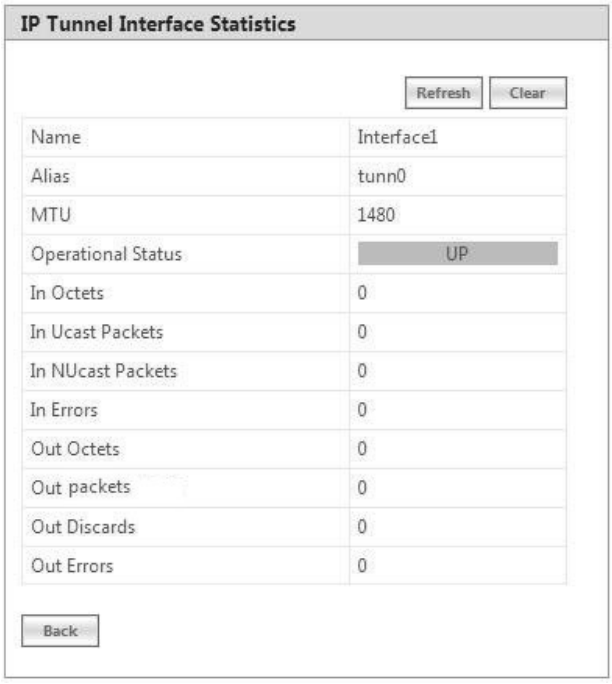


Figure 7-7 IP Tunnels Interface Statistics

Given below is an explanation to each of these parameters:

Parameter	Description
Name	Specifies the tunnel interface name.
Alias	Specifies the supplementary tunnel interface name.
Maximum Transmission Unit (MTU)	Specifies the largest size packet or frame that can be sent over the tunnel interface. The MTU of the tunnel interface is derived from the underlying interface: **For IP-IP tunnel interface**: MTU = Underlying interface MTU – 20 bytes (IP header) **For IP-GRE interface**: MTU = Underlying interface MTU – 24 bytes (IP header + gre protocol)
Operational Status	The Operational Status indicates only the tunnel interface status. The status can be either UP or DOWN. *: For the tunnel to function correctly both ends should be configured correctly.*

Parameter	Description
Details	Provides a more detailed statistics about the tunnel interface. To view the detailed statistics, click  .  IP Tunnel Interface Statistics Refresh Clear Name: Interface1 Alias: tunn0 MTU: 1480 Operational Status: UP In Octets: 0 In Ucast Packets: 0 In NUcast Packets: 0 In Errors: 0 Out Octets: 0 Out packets: 0 Out Discards: 0 Out Errors: 0 Back **Figure 7-8 Detailed IP Tunnels Interface Statistics** The detailed tunnel interface parameters are similar to the Ethernet Interface Statistics. Please refer to Ethernet Statistics.

7.3 WORP Statistics

7.3.1 General Statistics

WORP General Statistics provides general statistics about the WORP.

To view General Statistics, navigate to **MONITOR > WORP Statistics > Interface 1 > General Statistics**. The following **WORP General Statistics** screen appears.

WORP General Statistics

Interface Type	SU
WORP Protocol Version	11

Refresh Clear

WORP Data Messages

Poll Data	7
Poll No Data	9124934
Reply Data	2222
Reply More Data	0
Reply No Data	9123208
Poll No Replies	0

Data Transmission Statistics

Send Success	1245
Send Retries	126
Send Failures	183
Receive Success	7
Receive Retries	0
Receive Failures	0

Registration details

Remote Partners	1
Announcements	124128
Request For Service	2
Registration Requests	3
Registration Rejects	0
Authentication Requests	3
Authentication Confirms	3
Registration Attempts	1
Registration Incompletes	0
Registration Timeouts	0
Registration Last Reason	None

Figure 7-9 WORP General Statistics (SU/End Point A/End Point B)

WORP General Statistics

Basic Advanced

Interface Type	BSU
WORP Protocol Version	11

Refresh Clear

WORP Data Messages

Poll Data	2052
Poll No Data	4993575
Reply Data	1986
Reply More Data	0
Reply No Data	4679404
Poll No Replies	314060

Data Transmission Statistics

Send Success	1690
Send Retries	152
Send Failures	9
Receive Success	1986
Receive Retries	0
Receive Failures	4

Registration details

Remote Partners	1
Announcements	48352
Request For Service	2
Registration Requests	3
Registration Rejects	0
Authentication Requests	3
Authentication Confirms	3
Registration Attempts	1
Registration Incompletes	0
Registration Timeouts	0
Registration Last Reason	None

Figure 7-10 WORP General Statistics (BSU)

7.3.1.1 Basic Statistics

Given below is an explanation to the basic parameters:

Parameter	Description
Interface Type	Specifies the type of radio interface.
WORP Protocol Version	Specifies the version of the WORP Protocol used. This information is useful to the customer support team for debugging purpose only.
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 or received.
Poll No Data	Refers to the number of polls with no data messages sent or received.
Reply Data	Refers to the number of poll replies with data messages sent or received.
Reply More Data	Refers to the number of poll replies with more data messages sent or received.
Reply No Data	Refers to the number of poll replies with no data messages sent or received.
Poll No Replies	Refers to the number of times the poll messages are sent by a BSU/End Point A and received no reply from SU/End Point B. This parameter is applicable only to a BSU.
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 are not acknowledged by the peer even after the specified number of retransmissions.
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 SU/End Point A/End Point B, the number of remote partners is always zero or one.
Announcements	Refers to the number of Announcement messages sent or received on WORP interface.
Request For Service	Refers to the number of requests for service messages sent or received.
Registration Requests	Refers to the number of registration request messages sent or received on WORP interface.
Registration Rejects	Refers to the number of registration reject messages sent or received on WORP interface.
Authentication Requests	Refers to the number of authentication request messages sent or received on WORP interface.

Parameter	Description
Authentication Confirms	Refers to the number of authentication confirm messages sent or received 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 are not yet completed.
Registration Timeouts	Refers to the number of times the registration procedure timed out.
Registration Last Reason	Refers to the reason for the last registration getting aborted or failed.

: For better results, the Send Failure or Send Retrieve must be low in comparison to Send Success. The same applies for Receive Retries or Receive Failure.

Click Clear to delete existing general statistics. Click **Refresh** to view updated WORP general statistics.

7.3.1.2 Advanced Statistics

Advanced statistics is applicable only to the BSU. The **Advanced Statistics** screen displays the wireless transmission values used by the BSU to send announcement and broadcast messages.

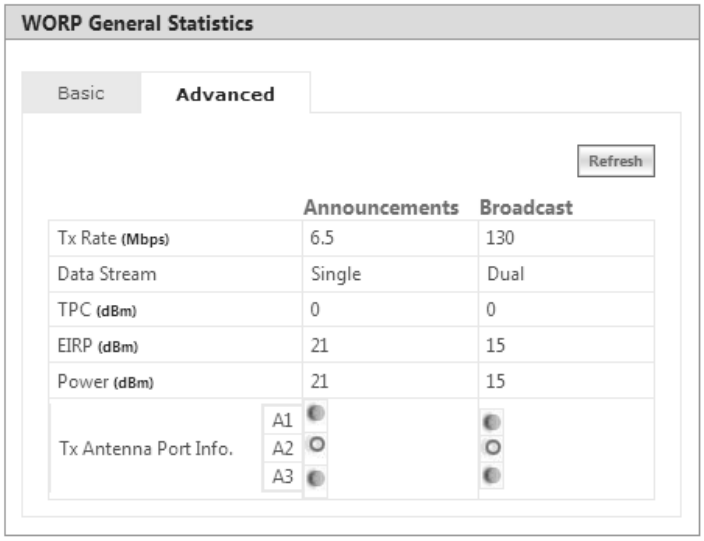


Figure 7-11 WORP Advanced Statistics

Given below is an explanation to the advanced parameters:

Parameter	Description
Tx Rate	Displays the Data Transmission Rate used by the BSU.
Data Stream	Displays the Data Streams used by the BSU.

Parameter	Description
TPC	Displays the TPC value currently applied by the device to adjust the transmit power radiated by the radio.
EIRP	Displays the current EIRP that a radio antenna radiates (after applying the TPC).
Power	Displays the current transmit power radiated by the radio (after applying the TPC).
Tx Antenna Ports	Indicates the status of the antenna ports at the BSU end.

Click **Refresh** to view updated WORP advanced statistics.

7.3.2 Link Statistics

7.3.2.1 SU / End Point B Link Statistics

: SU Link Statistics is applicable only to a BSU, and End Point B Link Statistics is applicable only to a End Point A device.

SU Link statistics provides information about the SUs connected to a BSU. Similarly, End Point B Link Statistics provides information about an End Point B currently connected to an End Point A device.

To view link statistics, navigate to **MONITOR > WORP Statistics > Interface 1 > SU Link Statistics**.

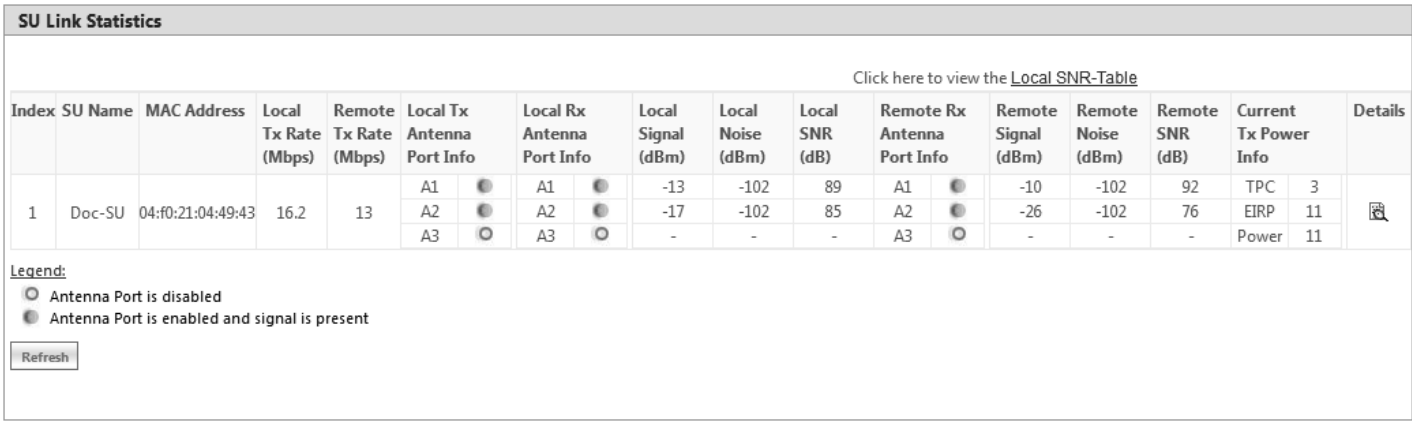
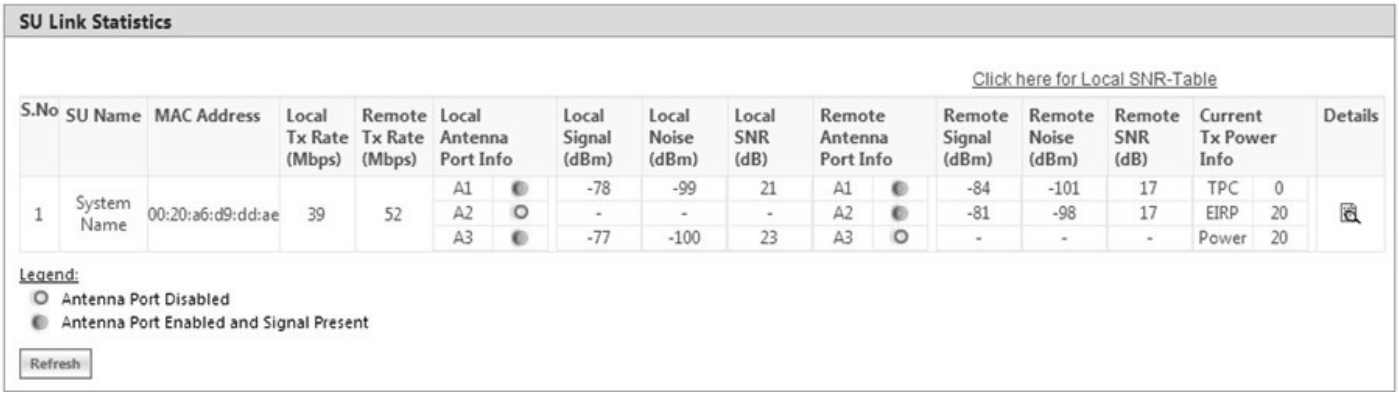


Figure 7-12 An Example - SU Link Statistics (For 82x Devices)



SU Link Statistics

Click here for Local SNR-Table

S.No	SU Name	MAC Address	Local Tx Rate (Mbps)	Remote Tx Rate (Mbps)	Local Antenna Port Info		Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Remote Antenna Port Info		Remote Signal (dBm)	Remote Noise (dBm)	Remote SNR (dB)	Current Tx Power Info		Details
1	System Name	00:20:a6:d9:dd:ae	39	52	A1	◐	-78	-99	21	A1	◐	-84	-101	17	TPC	0	
					A2	○	-	-	-	A2	◐	-81	-98	17	EIRP	20	
					A3	◐	-77	-100	23	A3	○	-	-	-	Power	20	

Legend:
○ Antenna Port Disabled
◐ Antenna Port Enabled and Signal Present

Refresh

Figure 7-13 An Example - SU Link Statistics (For All Devices)

Given below is an explanation to each of these parameters:

Parameter	Description
SU Name/ End Point B Name	Represents the name of the SU/End Point B connected to a BSU/End Point A respectively.
MAC Address	Represents the MAC address of the SU/End Point B connected to a BSU/End Point A respectively.
Local Tx Rate (Mbps)	Represents the data transmission rate at the local (current device) end.
Remote Tx Rate (Mbps)	Represents the data transmission rate at the remote (peer) end.
Local Antenna Port Info	Indicates the status of the antenna ports at the local end. The following symbols indicate the status of the antenna ports. ○ Indicates the antenna port is disabled. ◐ Indicates the antenna port is enabled and signal is present.
Local Tx Antenna Port Info	Indicates the status of the antenna ports at the transmitting end. The following symbols indicate the status of the antenna ports. ○ Indicates the antenna port is disabled. ◐ Indicates the antenna port is enabled and signal is present.
Local Rx Antenna Port Info	Indicates the status of the antenna ports at the receiving end. The following symbols indicate the status of the antenna ports. ○ Indicates the antenna port is disabled. ◐ Indicates the antenna port is enabled and signal is present.

Parameter	Description
Local Signal (dBm)	Represents the signal level with which the device at the local end receives frames from the device at the remote end, through wireless medium.
Local Noise (dBm)	Represents the noise measured at the local end antenna ports.
Local SNR (dB)	Represents the SNR measured by the receiver at the local end and is based on the Local Signal and Local Noise.
Remote Rx Antenna Port Info	Indicates the status of the remote end antenna ports. The antenna ports status is same as explained in Local Antenna Port Info.
Remote Signal (dBm)	Represents the signal level with which the device at the remote end receives frames, through wireless medium.
Remote Noise (dBm)	Represents the noise measured at the remote end antenna ports.
Remote SNR (dB)	Represents the SNR measured by the receiver at the remote end and is based on the Remote Signal and Remote Noise.
Current Tx Power (dBm)	• **TPC**: Displays the TPC value currently applied by the device to adjust the transmit power radiated by the radio antenna. : *For a given data rate, if the configured TPC value is greater than the maximum transmit power supported by the radio then maximum transmit power supported by radio value is applied.* • **EIRP**: Displays the current EIRP that a radio antenna radiates (after applying the TPC). • **Power**: Displays the current transmit power radiated by the radio (after applying the TPC).

Click **Refresh** to view updated link statistics.

To view detailed SU/End Point B Link statistics, click **Details** icon in the **SU/End Point B Link Statistics** screen. The following screen appears depending on your device:

SU WORP Detailed Statistics

Disconnect | Refresh | Back

SU Name	System Name	Send Failures	0
MAC Address	00:20:a6:d9:dd:ae	Receive Success	176
WORP Protocol Version	11	Receive Retries	0
Bridge Port	3	Receive Failures	0
WORP Port	0	Poll No Replies	100407
Request For Service	8917	Operational Mode	High Throughput
Poll Data	693726	Channel Bandwidth	20 MHz
Poll No Data	693720	Local Guard Interval	Full GI-800nSec
Reply Data	593466	Remote Guard Interval	Full GI-800nSec
Reply No Data	593290	Link Profile Name	Default
Send Success	7	QoS Class Index	1
Send Retries	0	DCS ReTx Percent	-1

Remote SNR Information

MCS Index	Modulation	Number of Streams	Data Rate (Mbps)	Minimum Required SNR (dB)	Maximum Optimal SNR (dB)
MCS 0	BPSK(1/2)	Single	6.5	7	85
MCS 1	QPSK(1/2)	Single	13	9	84
MCS 2	QPSK(3/4)	Single	19.5	10	84
MCS 3	16QAM(1/2)	Single	26	14	82
MCS 4	16QAM(3/4)	Single	39	17	82
MCS 5	64QAM(2/3)	Single	52	22	80
MCS 6	64QAM(3/4)	Single	58.5	25	78
MCS 7	64QAM(5/6)	Single	65	27	77
MCS 8	BPSK(1/2)	Double	13	8	84
MCS 9	QPSK(1/2)	Double	26	11	84
MCS 10	QPSK(3/4)	Double	39	13	82
MCS 11	16QAM(1/2)	Double	52	16	82
MCS 12	16QAM(3/4)	Double	78	20	81
MCS 13	64QAM(2/3)	Double	104	26	64
MCS 14	64QAM(3/4)	Double	117	28	62
MCS 15	64QAM(5/6)	Double	130	30	61

Figure 7-14 An Example - SU Detailed Statistics

The detailed page displays Remote SNR information, that is, the Minimum Required SNR and the Maximum Optimal SNR value for a given data rate or modulation, to achieve optimal throughput.

To disconnect an SU/End Point B from BSU/End Point A respectively, click **Disconnect**.

To view updated detailed statistics, click **Refresh**.

To view local SNR table, click **Click here for Local SNR-Table** on the upper-right of **SU/End Point B Link Statistics** screen (Refer An Example - SU Link Statistics (For 82x Devices)). The following screen appears depending on your device:

Local SNR Information

Wireless 1

INDEX	MCS Index	Modulation	Number of Streams	Data Rate (Mbps)	Minimum Required SNR (dB)		Maximum Optimal SNR (dB)	
					Default	Configured	Default	Configured
1	MCS0	BPSK(1/2)	Single	6.5	7	7	50	50
2	MCS1	QPSK(1/2)	Single	13.0	11	11	50	50
3	MCS2	QPSK(3/4)	Single	19.5	13	13	50	50
4	MCS3	16QAM(1/2)	Single	26.0	16	16	50	50
5	MCS4	16QAM(3/4)	Single	39.0	20	20	50	50
6	MCS5	64QAM(2/3)	Single	52.0	24	24	50	50
7	MCS6	64QAM(3/4)	Single	58.5	26	26	50	50
8	MCS7	64QAM(5/6)	Single	65.0	29	29	50	50
9	MCS8	BPSK(1/2)	Dual	13.0	9	9	50	50
10	MCS9	QPSK(1/2)	Dual	26.0	12	12	50	50
11	MCS10	QPSK(3/4)	Dual	39.0	15	15	50	50
12	MCS11	16QAM(1/2)	Dual	52.0	18	18	50	50
13	MCS12	16QAM(3/4)	Dual	78.0	21	21	50	50
14	MCS13	64QAM(2/3)	Dual	104.0	26	26	50	50
15	MCS14	64QAM(3/4)	Dual	117.0	29	29	50	50
16	MCS15	64QAM(5/6)	Dual	130.0	30	30	50	50

Notes:

1. *Minimum Required SNR* values are used by remote device when *DDRS* is enabled.
2. *Maximum Optimal SNR* values are used by remote device when *ATPC* is enabled.

Close

Figure 7-15 An Example - Local SNR Information

These configured values are used by ATPC and DDRS to derive TPC and data rate for optimal throughput.

7.3.2.2 BSU/End Point A Link Statistics

: BSU Link Statistics is applicable only to an SU, and End Point A Link Statistics is applicable only to an End Point B device.

BSU Link statistics provides information about the BSU to which SUs are connected. Similarly, End Point A Link Statistics provides information about an End Point A currently linked to an End Point B device.

BSU Link Statistics

Click here to view the Local SNR-Table

BSU Name	MAC Address	Local Tx Rate (Mbps)	Remote Tx Rate (Mbps)	Local Tx Antenna Port Info		Local Rx Antenna Port Info		Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Remote Rx Antenna Port Info		Remote Signal (dBm)	Remote Noise (dBm)	Remote SNR (dB)	Current Tx Power Info		Details
System-BSU	04:f0:21:04:49:40	6.5	14.6	A1	◐	A1	◐	-10	-102	92	A1	◐	-14	-102	88	TPC	11	
				A2	◐	A2	◐	-14	-102	88	A2	◐	-15	-102	87	EIRP	26	
				A3	○	A3	○	-	-	-	A3	○	-	-	-	Power	11	

Legend:
○ Antenna Port is disabled
◐ Antenna Port is enabled and signal is present

Refresh

Figure 7-16 An Example - BSU Link Statistics (For 82x Devices)

BSU Link Statistics

Click here for Local SNR-Table

BSU Name	MAC Address	Local Tx Rate (Mbps)	Remote Tx Rate (Mbps)	Local Antenna Port Info		Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Remote Antenna Port Info		Remote Signal (dBm)	Remote Noise (dBm)	Remote SNR (dB)	Current Tx Power Info		Details
System Name	00:0b:6b:b7:1b:39	52	39	A1	◐	-81	-100	19	A1	◐	-78	-99	21	TPC	0	
				A2	◐	-79	-99	20	A2	○	-	-	-	EIRP	21	
				A3	○	-	-	-	A3	◐	-75	-100	25	Power	21	

Legend:
○ Antenna Port Disabled
◐ Antenna Port Enabled and Signal Present

Refresh

Figure 7-17 An Example - BSU Link Statistics (For All Devices)

To access the **Radio Link Test Tool**, navigate to **MONITOR > WORP Statistics > Interface 1 > SU/BSU Link Statistics > Details**. Click . The **SU/BSU WORP Detailed Statistics** screen appears. In this screen, click the **Radio Link Test** button. For detailed description of this tool, refer Radio Link Test Tool.

7.3.3 QoS Statistics (BSU or End Point A Only)

: This parameter is applicable only to BSU or End Point A radio modes.

To view QoS Statistics, navigate to **MONITOR > WORP Statistics > Interface 1 > QoS Statistics.** The following **QoS Summary** screen appears.

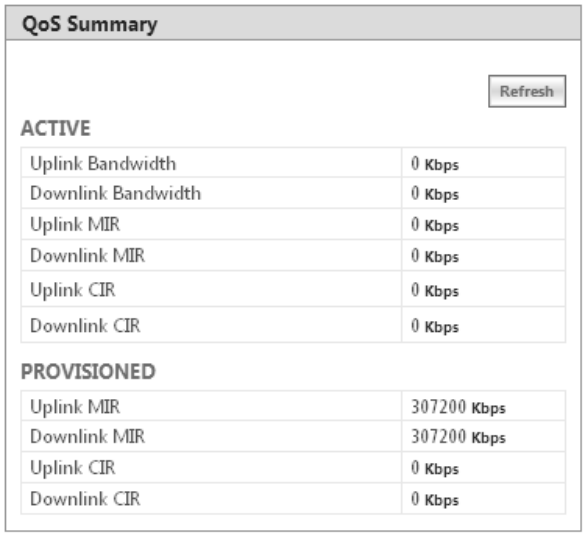


Figure 7-18 QoS Summary

This screen shows the total, minimum and maximum bandwidth allocated per BSU/End Point A, and the minimum and maximum bandwidth allocated for each SU/End Point B registered with the BSU/End Point A respectively.

7.4 Active VLAN

: Active VLAN is applicable only to a device in SU (Bridge) mode.

The Active VLAN page enables you to identify the VLAN Configuration mode applied on a device in SU mode.

To view active VLAN applied on the device in SU mode, navigate to **MONITOR** > **Active VLAN**. The **Active VLAN** page appears:

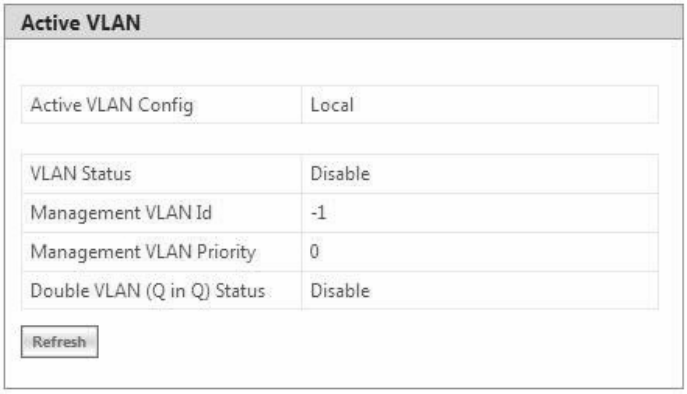


Figure 7-19 Active VLAN

The **Active VLAN Config** parameter helps you to identify the current VLAN configuration applied on the device in SU mode.

- **Local**: VLAN configuration is done locally from the device.
- **Remote**: VLAN configuration is done through RADIUS Server.

This page also displays the VLAN parameters and their values that are configured either locally or remotely.

To view active VLAN Ethernet Configuration, navigate to **MONITOR** > **Active VLAN > Ethernet**. The **Active VLAN Ethernet Configuration** page appears:

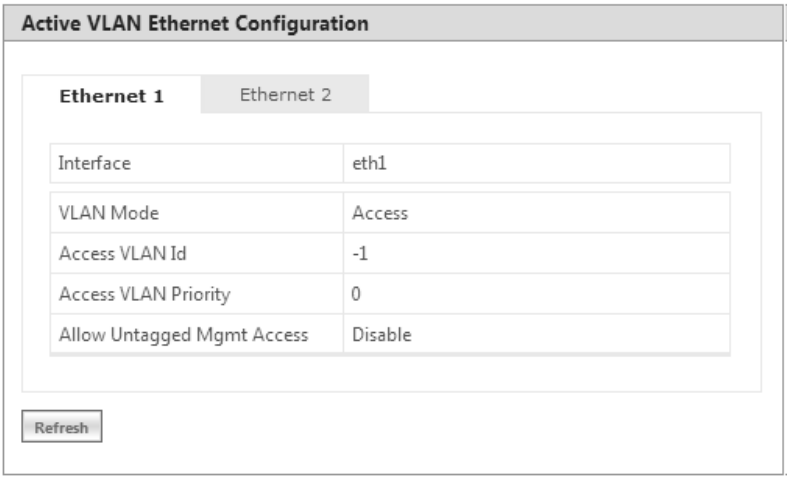


Figure 7-20 Active VLAN Ethernet Configuration

This page displays the VLAN Ethernet parameters and their values that are configured either locally or remotely.

: Please note that the number of Ethernets vary depending on the device.

7.5 Bridge

7.5.1 Bridge Statistics

The Bridge Statistics allows you to monitor the statistics of the Bridge.

To view the **Bridge Statistics**, navigate to **MONITOR > Bridge > Bridge Statistics**. The following **Bridge Statistics** screen appears:

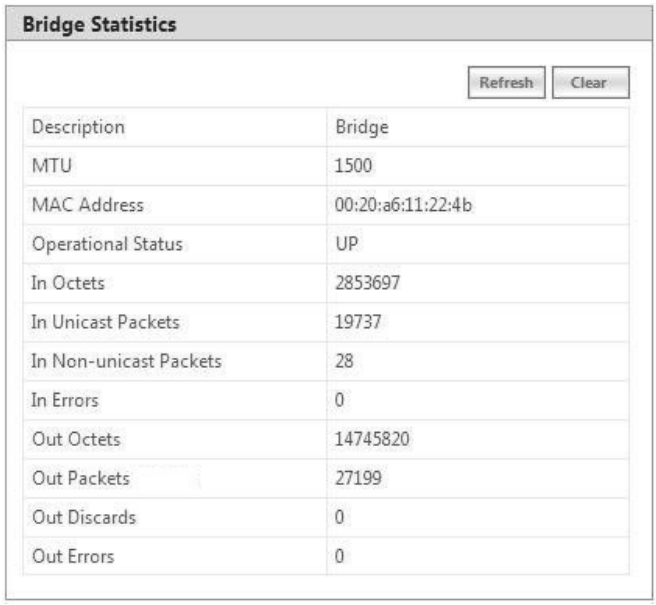


Figure 7-21 Bridge Statistics

The following table lists the parameters and their description:

Parameter	Description
Description	This parameter provides a description about the bridge.
MTU	Represents the largest size of the data packet sent on the bridge.
MAC Address	Represents the MAC address at the bridge protocol layer.
Operational Status	Represents the current operational status of the bridge: **UP** (ready to pass packets) or **DOWN** (not ready to pass packets).
In Octets	Represents the total number of octets received on the bridge interface, including the framing characters.
In Unicast Packets	Represents the number of unicast subnetwork packets delivered to the higher level protocol.
In Non-unicast Packets	Represents the number of non-unicast subnetwork packets delivered to the higher level protocol.
In Errors	Represents the number of inbound packets with errors and that are restricted from being delivered.
Out Octets	Represents the total number of octets transmitted out of the bridge, including the framing characters.
Out Packets	Represents the total number of packets requested by higher-level protocols to be transmitted out of the bridge interface to a sub-network address, including those that were discarded or not sent.
Out Discards	Represents the number of error-free outbound packets which are discarded to prevent them from being transmitted. One possible reason for discarding such a packet could be to free up buffer space.

Parameter	Description
Out Errors	Represents the number of outbound packets that could not be transmitted because of errors.

To view updated Bridge statistics, click **Refresh**.

To clear the Bridge statistics, click **Clear**.

7.5.2 Learn Table

Learn Table allows you to view all the MAC addresses that the device has learnt on all of its interfaces.

To view Learn Table statistics, navigate to **MONITOR > Bridge > Learn Table**. The **Learn Table** screen appears.

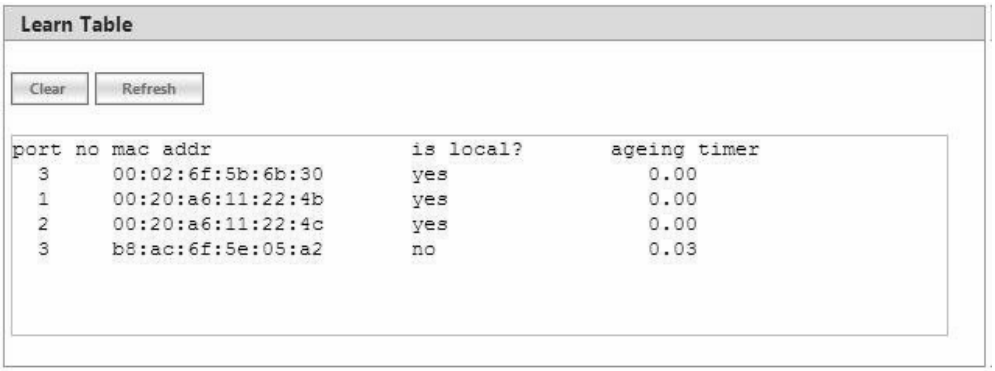


Figure 7-22 Learn Table

The Learn Table displays the MAC address of the learnt device, the bridge port number, aging timer for each device learnt on an interface, and the local (DUT's local interfaces)/remote (learned entries through bridging) status of the learnt device.

To view updated learn table statistics, click **Refresh**.

To clear learn table statistics, click **Clear**.

7.6 Network Layer

7.6.1 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, navigate to **MONITOR > Network Layer > Routing Table**. The **Routing Table** screen appears:

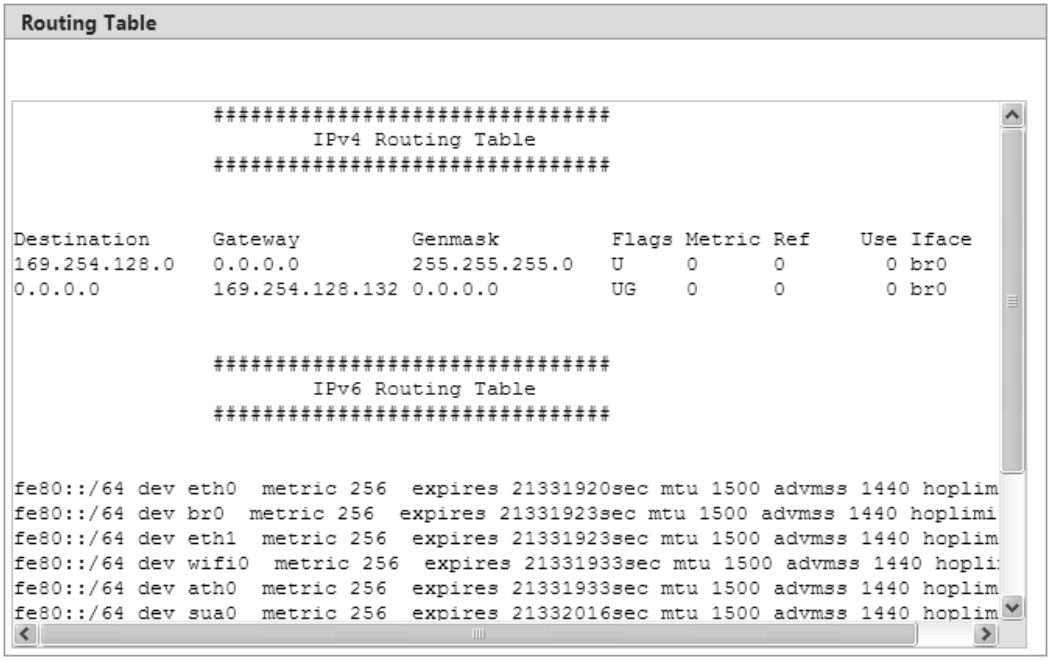


Figure 7-23 Routing Table

7.6.2 IP ARP

Address Resolution Protocol (ARP) is a protocol for mapping an Internet Protocol address (IP address) to a physical address on the network. The IP ARP table is used to maintain a correlation between each IP address and its corresponding MAC address. ARP provides the protocol rules for making this correlation and providing address conversion in both directions.

To view IP Address Resolution Protocol (ARP) statistics, navigate to **MONITOR > Network Layer > IP ARP**. The **IP ARP Table** screen appears.

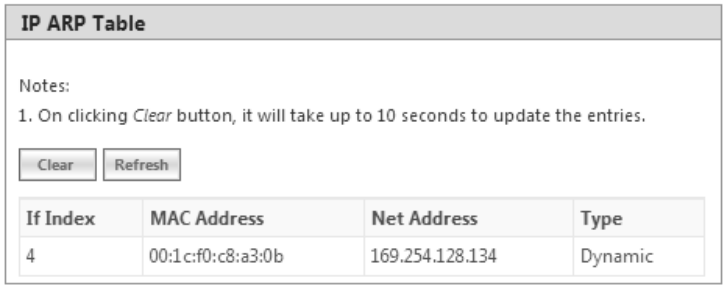


Figure 7-24 IP ARP Table

The **IP ARP Table** contains the following information:

- **Index:** Represents the interface type.
- **MAC Address:** Represents the MAC address of a node on the network.
- **Net Address**: This parameter represents the corresponding IP address of a node on the network.
- **Type**: This parameter represents the type of mapping, that is, Dynamic or Static.

To view updated IP ARP entries, click **Refresh**.

To clear the IP ARP entries, click **Clear**.

7.6.3 ICMP Statistics

The ICMP Statistics attributes enable you to monitor the message traffic that is received and transmitted by the device.

To view ICMP statistics, navigate to **MONITOR > Network Layer > ICMP Statistics**. The **ICMP Statistics** screen appears.

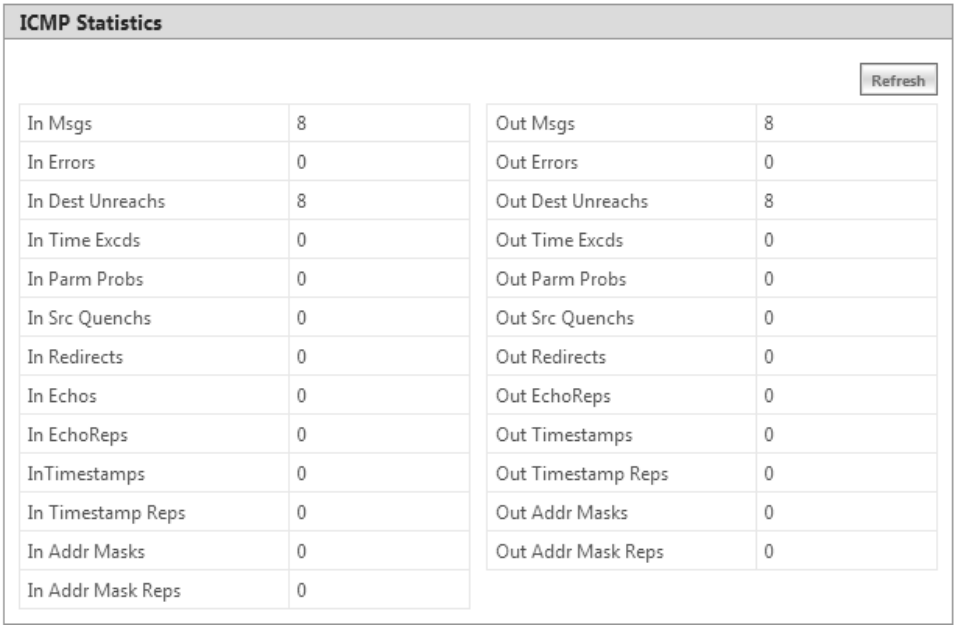


Figure 7-25 ICMP Statistics

The following table lists the ICMP Statistics parameters and their description:

Parameter	Description
In Msgs or Out Msgs	Represents the number of ICMP messages that are received/transmitted by the device.
In Errors or Out Errors	Represents the number of ICMP messages that are received/transmitted by the device but determined as having ICMP-specific errors such as Bad ICMP checksums, bad length and so on.
In Dest Unreachs or Out Dest Unreachs	Represents the number of ICMP destination unreachable messages that are received/transmitted by the device.
In Time Excds or Out Time Excds	Represents the number of ICMP time exceeded messages that are received/transmitted by the device.
In Parm Probs or Out Parm Probs	Represents the number of ICMP parameter problem messages that are received/transmitted by the device.
In Srec Quenchs or Out Srec Quenchs	Represents the number of ICMP source quench messages that are received/transmitted by the device.
In Redirects or Out Redirects	Represents the rate at which the ICMP redirect messages are received/transmitted by the device.
In Echos	Represents the rate at which the ICMP echo messages are received.
In EchoReps or Out EchoReps	Represents the rate at which the ICMP echo reply messages are received/transmitted by the device.

Parameter	Description
In Timestamps or Out Timestamps	Represents the rate at which the ICMP timestamp (request) messages are received/transmitted by the device.
In Timestamps Reps or Out Timestamps Reps	Represents the rate at which the ICMP timestamp reply messages are received/transmitted by the device.
In Addr Masks or Out Addr Masks	Represents the number of ICMP address mask request messages that are received/transmitted by the device.
In Addr Mask Reps or Out Addr Mask Reps	Represents the number of ICMP address mask reply messages that are received/transmitted by the device.

To view updated ICMP Statistics, click **Refresh**.

7.6.4 IP Address Table

The **IP Address Table** shows all IP addresses of the device. The IP Address Table screen contains IP addresses of the interface. To view table, navigate to **MONITOR > Network Layer > IP Address Table**. The **IP Address Table** screen appears.

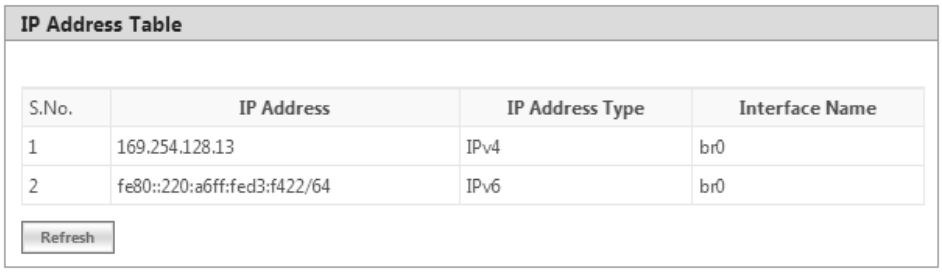


Figure 7-26 IP Address Table

7.6.5 DNS Addresses

It shows DNS Addresses currently active on the device. To view DNS addresses, navigate to **MONITOR > Network Layer > DNS Addresses**. The **DNS Addresses** screen appears.

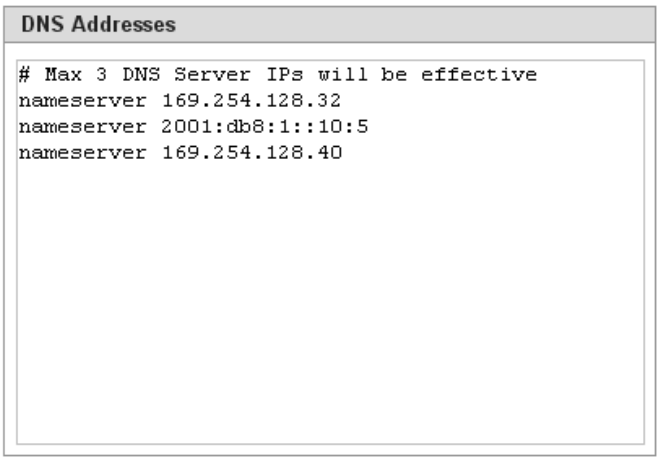


Figure 7-27 DNS Addresses

7.6.6 Neighbour Table

: This parameter is applicable only in **IPv4 and IPv6** mode, not in **IPv4 only** mode.

The Neighbour Table contains a list of neighbouring routers and information about them. To view Neighbour Table, navigate to **MONITOR > Network Layer > Neighbour Table**. The **Neighbour table** screen appears.

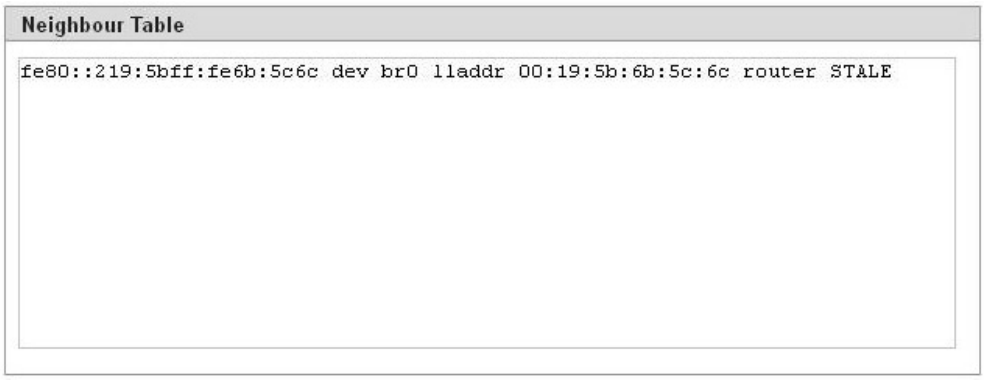


Figure 7-28 Neighbour Table

7.6.7 RIP Database

: *Applicable only in routing mode.*

The **RIP Database** screen contains routes (Routing Information Protocol updates) learnt from other routers.

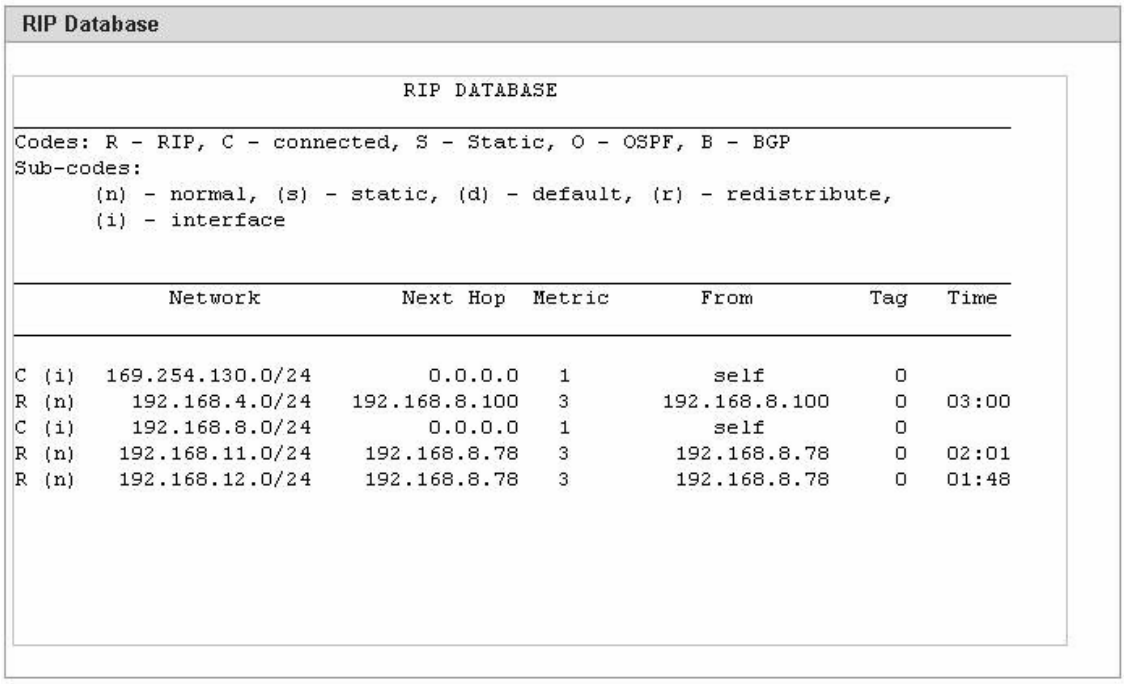


Figure 7-29 RIP Database

7.7 RADIUS (BSU or End Point A only)

: RADIUS is applicable only to a BSU or an End Point A device.

7.7.1 Authentication Statistics

Authentication Statistics provides information on RADIUS Authentication for both the primary and backup servers for each RADIUS server profile.

To view Authentication statistics, navigate to **MONITOR > RADIUS > Authentication Statistics**. The **RADIUS Client Authentication Statistics** screen appears:

RADIUS Client Authentication Statistics

INDEX	Round Trip Time	Reqs	Retrans	Accepts	Rejects	Resp	Mal Resp	Bad Auths	Timeouts	Unknown Types	Pkts Dropped
1	100	1	0	0	1	1	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0

Refresh

Figure 7-30 Radius Client Authentication Statistics

The following table lists the Authentication Statistics parameters and their description:

Parameter	Description
Round Trip Time	Represents the round trip time for messages exchanged between RADIUS client and authentication server since the client startup.
Reqs	Represents the number of RADIUS access request messages transmitted from the RADIUS client to the authentication server since client startup.
RTMS	This parameter represents the number of times the RADIUS access requests are being transmitted to the server from the device since the client startup.
Accepts	Represents the number of RADIUS access accept messages received by the device since client startup.
Rejects	Represents the number of RADIUS access reject messages received by the device since client startup.
Resp	Represents the number of RADIUS response packets received by the device since client startup.
Mal Resp	Represents the number of malformed RADIUS access response messages received by the device since client startup.
Bad Auths	Represents the number of malformed RADIUS access response messages containing invalid authenticators received by the device since client startup.
Time Outs	Represents the total number of timeouts for RADIUS access request messages since client startup.

Parameter	Description
UnKnown Types	This parameter specifies the number of messages with unknown RADIUS message code since client startup.
Packets Dropped	Represents the number of RADIUS packets dropped by the device.

To view updated RADIUS Client Authentication statistics, click **Refresh**.

7.8 IGMP

: Applicable in Bridge mode only.

To view IGMP statistics, navigate to **MONITOR > IGMP > IGMP Snooping Stats**. The **Ethernet or Wireless Multicast List** screen appears:

Figure 7-31 Ethernet1 Multicast List

7.8.1 Ethernet or Wireless Multicast List

The Multicast List table contains the IGMP Multicast IP and Multicast MAC address details for the Ethernet or Wireless interfaces. The following table lists the parameters and their description.

Parameter	Description
Group IP	Represents the IP address of the multicast group for Ethernet or Wireless interface learned by IGMP snooping.
MAC Address	Represents the MAC address of the multicast group for Ethernet or Wireless interface learned by IGMP snooping.
Time Elapsed	Represents the time elapsed since the multicast entry has been created for the Ethernet or Wireless interface.

To view updated IGMP statistics, click **Refresh**.

7.8.2 Router Port List

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

To view Router Port List, navigate to **MONITOR > IGMP > Router Port List**. The **Router Port List** screen appears:

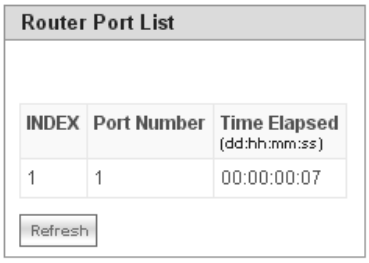


Figure 7-32 Router Port List

The following table lists the parameters and their description.

Parameter	Description
Port Number	Represents the port number on which multicast router is attached (on which IGMP Query has been received).
Time Elapsed	Represents the time elapsed since the port is marked as the router port.

To view updated Router Port list, click **Refresh**.

7.9 DHCP

DHCP Leases file stores the DHCP client database 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, navigate to **MONITOR > DHCP > Leases**.

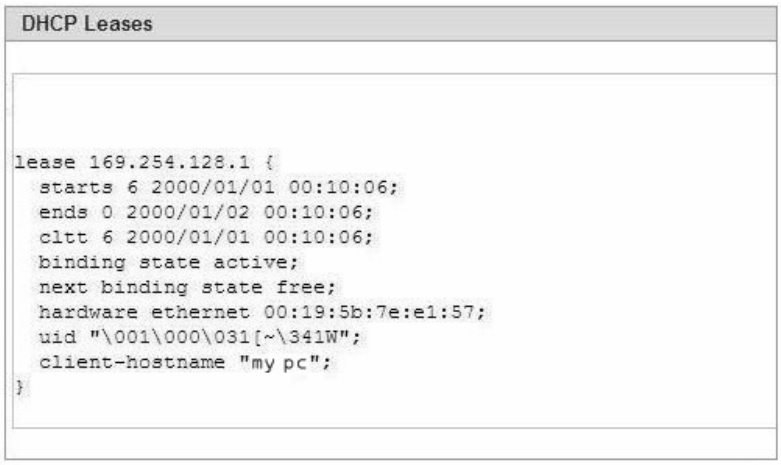


Figure 7-33 DHCP Leases

7.10 Logs

7.10.1 Event Log

Event Log file 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 log priority is set under **MANAGEMENT** > **Services** > **Logs**), the event details are logged and can be used for any future reference or troubleshooting.

7.10.1.1 View Event Log

To view the event log messages, navigate to **MONITOR > Logs > Event Log**. The following **Event Log** screen appears:

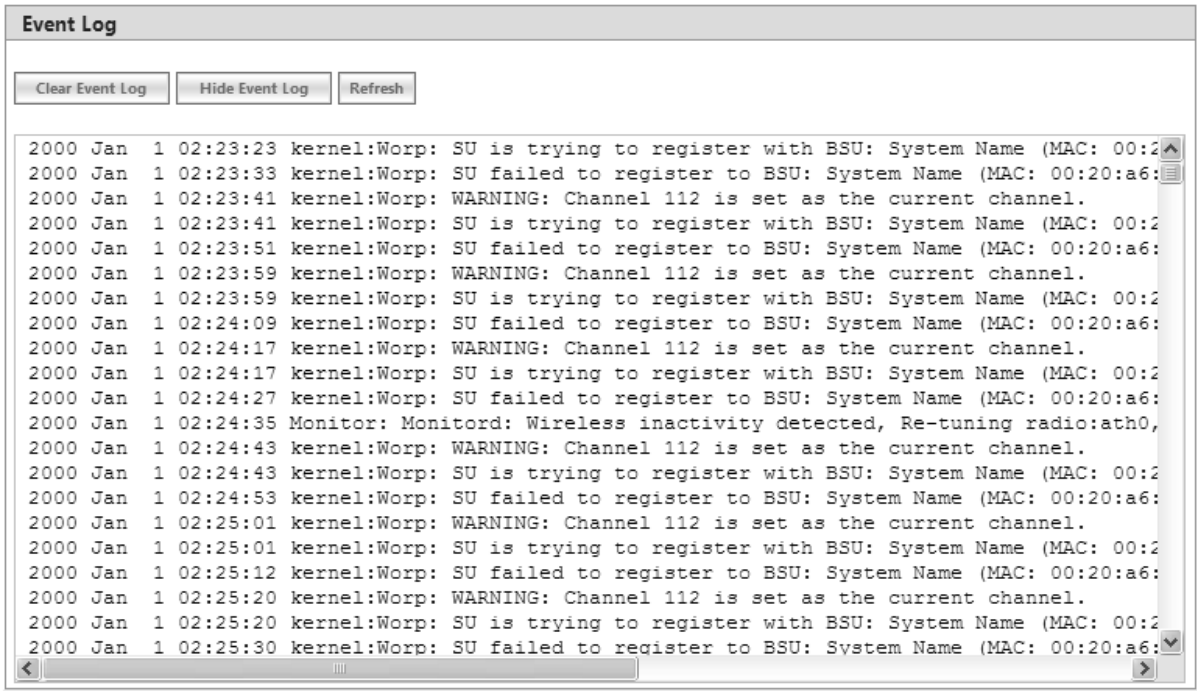


Figure 7-34 Event Log Messages

To retrieve the event log file from the device, see Retrieve From Device.

The maximum size of the event log file is 65 KB. If the file size exceeds 65 KB, then all the log messages are moved to a backup file and only the recent 100 lines are displayed in the log file. When the size of the log file exceeds again then it overwrites the backup file.

Backup files can be retrieved by using 'retrieve' CLI command. For more details, see **Tsunami 800 and 8000 Series Reference guide** available at http://my.proxim.com.

: Log messages can be stored in the log file approximately up to 6 days with logging interval of 5 minutes.

7.10.1.2 Hide Event Log

To hide the event log messages, click **Hide Event Log**.

7.10.1.3 Clear Event Log

To clear the event log messages, click **Clear Event Log**. The messages are cleared and moved to the backup file leaving the event log file empty. An event is generated on clearing the event log messages.

: The current and the backed up event logs are stored in the flash memory and can be retrieved even after device reboot.

7.10.2 Debug Log

Debug Log helps you to debug issues related to important features of the device. Currently, this feature supports only DDRS and DFS. This feature helps the engineering team to get valuable information from the field to analyze the issues and provide faster solution. This feature should be used only in consultation with the Proxim Customer Support team. Once logging is enabled, the Debug Log file can be retrieved via HTTP or TFTP.

To enable Debug Log, navigate to **MONITOR > Logs > Debug Log**. The **Debug Log** screen appears:

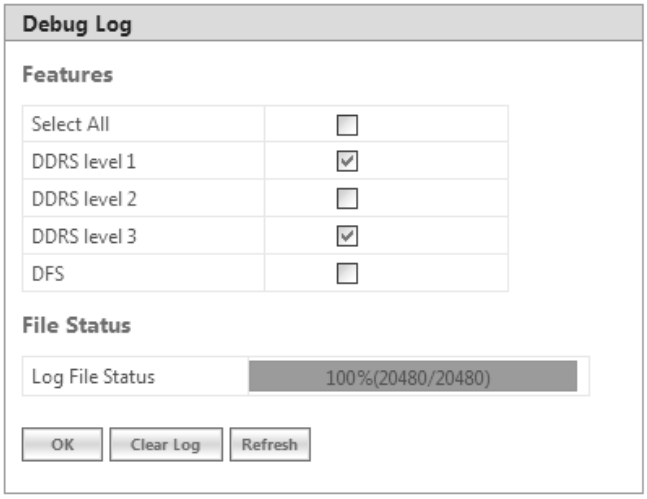


Figure 7-35 Debug Log

Features: Select the appropriate features to be logged. The available features are Select All, DDRS Level 1, DDRS Level 2, DDRS Level 3 and DFS.

File Status: This parameter displays the current size of the Debug Log file.

After selecting the **DDRS level**, click **OK**.

To delete the **Debug Log**, click **Clear Log**.

To get the updated status of the **Debug Log** File, Click **Refresh.**

7.10.3 Temperature Log

: Temperature Log is not applicable to MP-8150-CPE, MP-8160-CPE, MP-825-CPE-50, MP-820-BSU-100, MP-820-SUA-50$^+$, MP-825-SUR-50$^+$, QB-825-EPR/LNK-50, QB-825-EPR/LNK-50$^+$ *and QB-8150-LNK-12/50 devices.*

Temperature Log feature is used to log the internal temperature of the device for the configured temperature logging interval (By default, it is 5 minutes). It also generates a trap and an event message when the internal temperature of the device

reaches or exceeds the configured threshold range. The device issues a warning trap when the temperature is 5° Celsius less than the configured threshold range.

To access this feature, navigate to **MONITOR > Logs > Temperature Log**. The following **Temperature** screen appears:

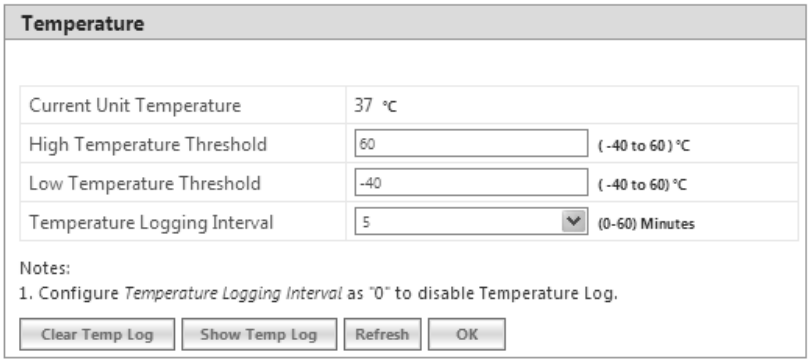


Figure 7-36 Temperature Log

- **Current Unit Temperature**: Displays the current internal temperature of the device in Celsius.
- **High and Low Temperature Threshold**:
  - Configure the high temperature threshold ranging from -40ºC to 60ºC. By default, it is set to 60ºC.
  - Configure the low temperature threshold ranging from -40ºC to 60ºC. By default, it is set to -40ºC.
  - When the current internal temperature of the device reaches or exceeds this threshold range, then a trap and event message is generated for every one hour (as long as it stays in the same state). If the temperature of the device further changes, then the device will immediately generates another trap and an event message.
  - For example, lets say the configured threshold range is -30(low) to 40 (high). If the device temperature reaches 50 then a trap and event message is generated for every one hour till it remains at 50. So, when the temperature increases to 51 then it will immediately generate another trap and an event message.
- **Temperature Logging Interval**: A logging interval from 1 to 60 minutes with 5 minute increment can be selected. For example, if you configure logging interval as 10 minutes then the device temperature is logged for every 10 minutes.

: If the logging interval is configured '0', then the temperature log feature will be disabled.

- After configuring the parameters, click **OK** followed by **COMMIT**.

7.10.3.1 View Temperature Log

To view the temperature Log, click **Show Temp Log**.

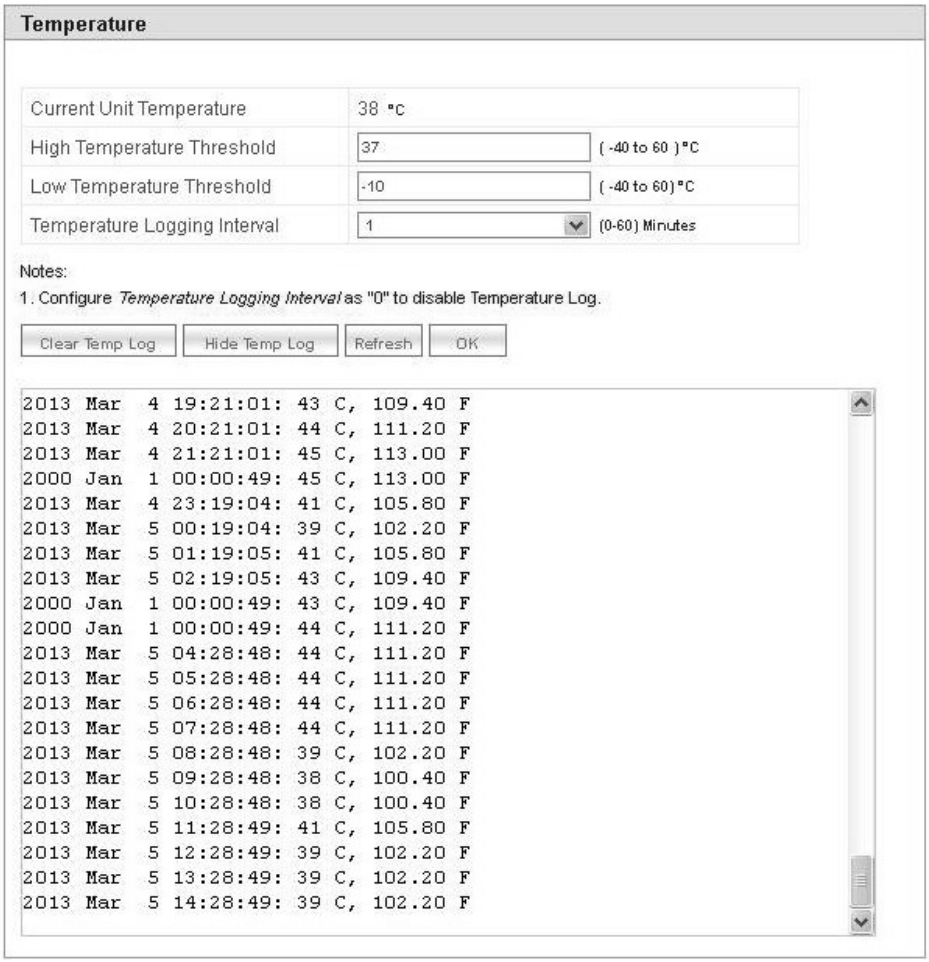


Figure 7-37 View Temperature Log

To retrieve the temperature log file from the device, see Retrieve From Device.

The maximum size of the temperature log file is 65 KB. If the file size exceeds 65 KB, then all the log messages are moved to a backup file and only the recent 100 lines are displayed in the log file. When the size of the log file exceeds again then it overwrites the backup file.

Backup files can be retrieved by using 'retrieve' CLI command. For more details, see **Tsunami 800 and 8000 Series Reference guide** available at http://my.proxim.com.

: Log messages can be stored in the log file approximately up to 6 days with logging interval of 5 minutes.

7.10.3.2 Hide Temperature Log

To hide the temperature log messages, click **Hide Temp Log**.

7.10.3.3 Clear Temperature Log

To clear the temperature log messages, click **Clear Temp Log**. The messages are cleared and moved to the backup file leaving the temperature log file empty. An event is generated on clearing the temperature log messages.

: The current and the backed up temperature logs are stored in the flash memory and can be retrieved even after device reboot.

7.11 Tools

7.11.1 Wireless Site Survey

: Applicable only to a device in SU or End Point B mode.

Wireless Site Survey is done by the SU or End Point B only. This feature scans all the available channels according to the current Channel Bandwidth, and collects information about all BSUs or Endpoint A configured with the same network name as SUs or End Point B.

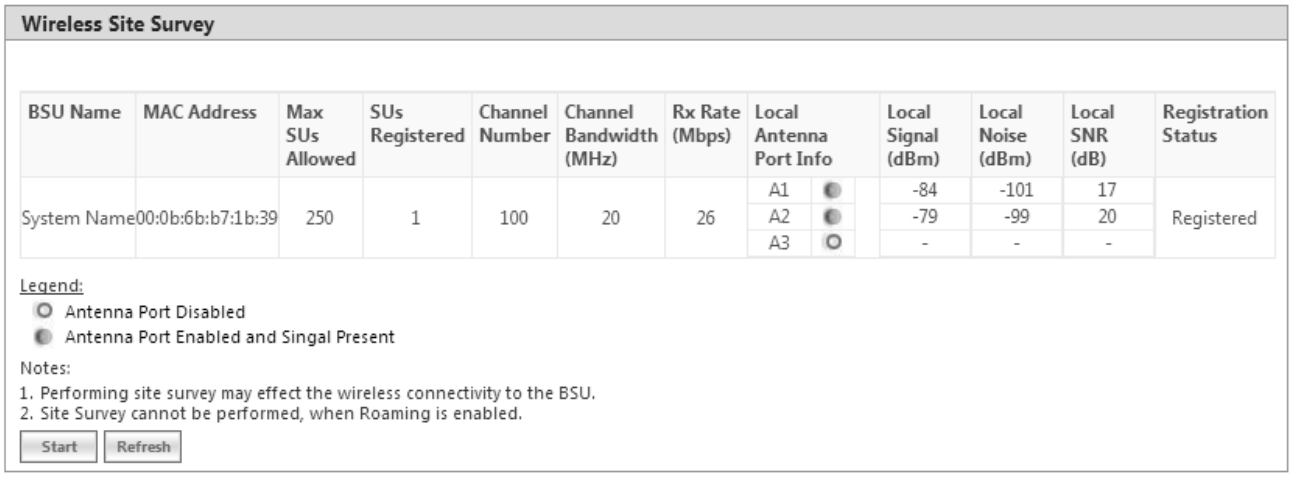


Figure 7-38 Wireless Site Survey - SU Mode

To initialize the survey process, click **Start**. This process list the details of all the available BSUs or End Point A. To stop the site survey process, click Stop.

During the scan process, click **Refresh** to view the latest discovered BSU/End Point A.

: Site Survey cannot be performed, when Roaming is enabled.

7.11.2 Scan Tool

With Scan Tool, you can scan all the Proxim devices available on the network.

To scan the devices, navigate to **MONITOR** > **Tools** > **Scan Tool**. The **Scan Tool** screen appears. In the Scan Tool screen, select **Scan Mode** as **IPv4.** Click **Scan** to scan and refresh the devices on the network. The scanned devices are displayed as shown below:

ScanTool

Scan Mode IPv4

Index	Name	Description	MAC Address	IP Address	Subnet Mask	Default Gateway	IP Type	Uptime
1	Doc-SU	Tsunami QB-825-EPR-50-WD v2.6.2(612110) SN-SN000000000001121212 BL-V1.0.3	00:20:a6:08:98:67	169.254.128.133	255.255.255.0	169.254.128.132	Static	00:03:31:22
2	System-BSU	Tsunami MP-820-BSU-100-WD v2.6.2(612110) SN-12PI06000034 BL-V1.0.4	00:20:a6:ef:11:1f	169.254.128.132	255.255.255.0	169.254.128.132	Static	00:03:31:22

Scan

Figure 7-39 An Example - Scanned Devices (IPv4)

In the Scan Tool screen, select **Scan Mode** as **IPv6** to scan the **82x devices** with IPv6 mode. Click **Scan** to scan and refresh the devices on the network. The scanned 82x devices are displayed as shown below:

ScanTool

Scan Mode IPv6

Index	Name	Description	MAC Address	Inet Address	Inet Default Gateway	IP Type	Uptime
1	Doc-SU	Tsunami QB-825-EPR-50-WD v2.6.2(612110) SN-SN000000000001121212 BL-V1.0.3	00:20:a6:08:98:67	2001:db8:1::128:133/64	2001:db8:1::128:132	Static	00:00:27:45
2	System-BSU	Tsunami MP-820-BSU-100-WD v2.6.2(612110) SN-12PI06000034 BL-V1.0.4	00:20:a6:ef:11:1f	2001:db8:1::128:132/64	2001:db8:1::128:133	Static	00:00:36:06

Scan

Figure 7-40 An Example - Scanned Devices (IPv6)

: ScanTool IPv6 support is applicable only for the 82x devices with IPv6 mode.

7.11.3 sFlow®

Proxim's point-to-multipoint and point-to-point devices support sFlow® technology, developed by InMon Corporation. The sFlow® technology provides the ability to measure network traffic on all interfaces simultaneously by collecting, storing, and analyzing traffic data.

Depicted below is the sFlow architecture that consists of a sFlow Agent and a sFlow Receiver.

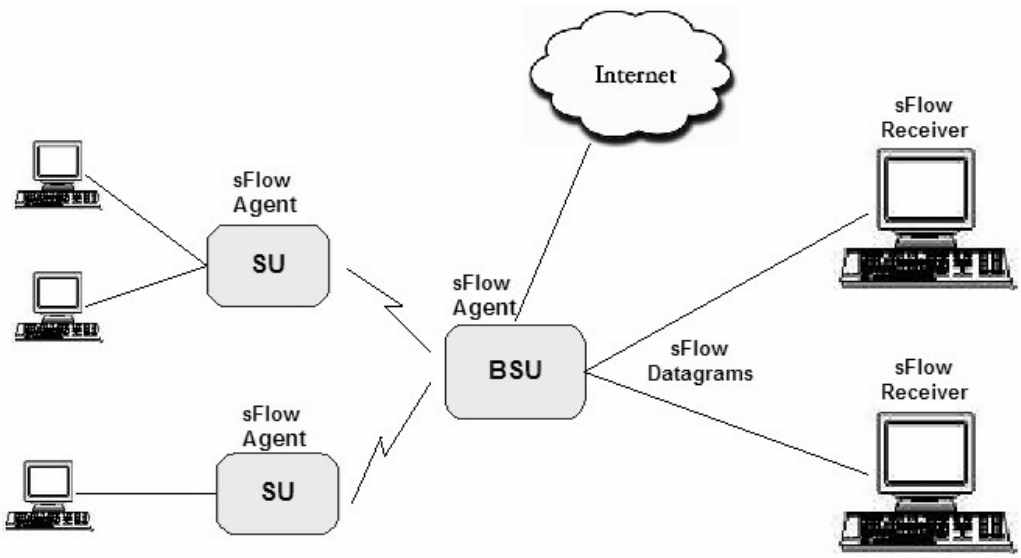


Figure 7-41 sFlow Architecture - An Example with a BSU and SUs

The **sFlow Agent**, which is running on devices, captures traffic information received on all the Ethernet interfaces, and sends sampled packets to the **sFlow Receiver** for analysis.

The sampling mechanism used to sample data are as follows:

- **Packet Flow Sampling**: In this sampling, the data packets received on the Ethernet interface of the device are sampled based on a counter. With each packet received, the counter is decremented. When the counter reaches zero, the packet is packaged and sent to the sFlow Receiver for analysis. These packets are referred to as Packet Flow Samples.
- **Counter Polling Sampling**: In this sampling, the sFlow Agent sends counters periodically to the sFlow Receiver based on the set polling interval. If polling interval is set to 5 seconds then the sFlow Agent sends counters to sFlow Receiver every 5 seconds. These packets are referred to as Counter Polling Samples.

The Packet Flow Samples and Counter Polling Samples are collectively sent to the sFlow Receiver as sFlow Datagrams. It is possible to enable either or both types of sampling.

sFlow Sampling effects the system performance and hence care must be taken in configuring the sFlow parameters.

To configure sFlow, navigate to **MONITOR** > **Tools** > **sFlow**. The following **sFlow®** screen appears:

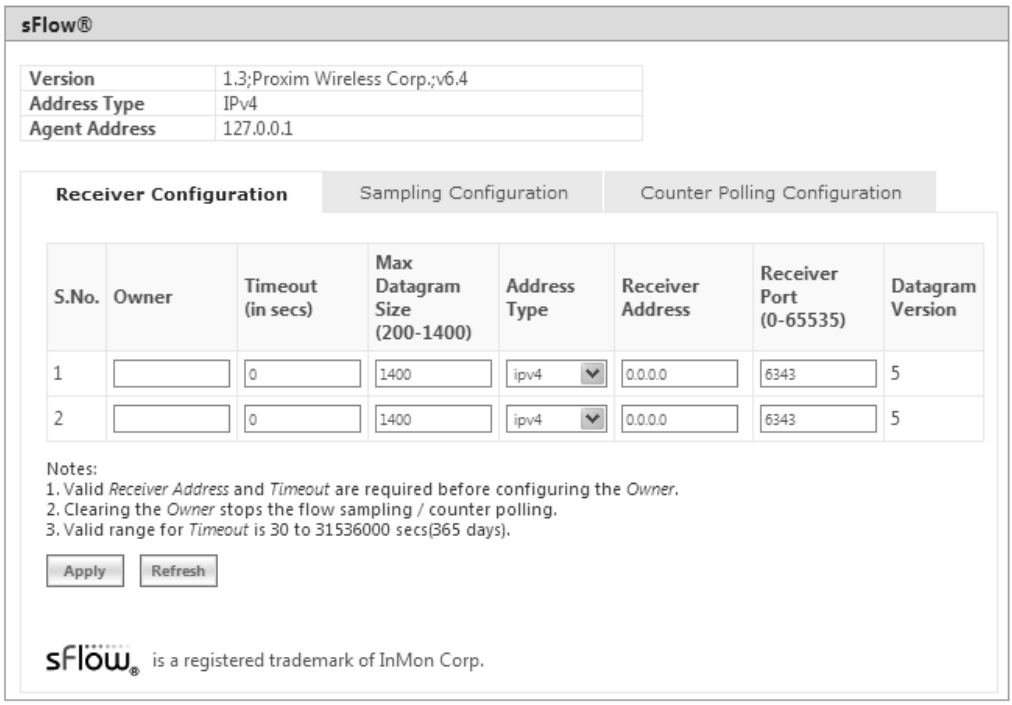


Figure 7-42 sFLOW

This screen displays the following information about the sFlow Agent:

- **Version**: The version displayed is **1.3;Proxim Wireless Corp.; v6.4**. The version comprises the following information:
  1. **sFlow MIB Version**: Indicates the agent's MIB version. The MIB specifies how the agent extracts and bundles sampled data, and the sFlow receiver must support the agent's MIB. The sFlow MIB version is 1.3. so the sFlow Receiver's version must also be at least 1.3.
  2. **Organization**: Specifies the organization implementing sFlow Agent functionality on the device, that is, **Proxim Wireless Corp.**
  3. **Revision**: Specifies the sFlow Agent version, that is, **v6.4**.
- **Address Type**: Specifies the protocol version for IP addresses.
- **Agent Address**: Specifies the sFlow Agent's IP address.

7.11.3.1 sFlow Receiver Configuration

The Receiver Configuration page allows you to configure sFlow Receiver(s), which receives samples from all agents on the network, combines and analyzes the samples to produce a report of network activity.

To configure sFlow Receiver, navigate to **MONITOR** > **Tools** > **sFlow** and select **Receiver Configuration** tab.

Given below is the table which explains sFlow parameters and the method to configure the configurable parameter(s):

Parameter	Description
S.No.	Represents the Receiver index number. Please note that the number of indexes depends on the Ethernet interfaces your device supports.
Owner	Enter a string, which uniquely identifies the sFlow Receiver.

Parameter	Description
Time Out	Enter a value ranging from 30 to 31536000 seconds (365 days) in the **Time Out** box. The sFlow Agent sends sampled packets to the specified sFlow Receiver till it reaches zero. At zero, all the Receiver parameters are set to default values.
Max Datagram Size	Enter the maximum size of a sFlow datagram (in bytes), which the Receiver can receive, in the **Max Datagram Size** box. By default, the maximum datagram size is set to 1400 bytes. It can range from 200 to 1400 bytes.
Address Type	The address type supported by sFlow Receiver is ipv4, which is by default selected. *: Only IPv4 is currently supported.*
Receiver Address	Enter the sFlow Receiver's IP address in the **Receiver Address** box.
Receiver Port	By default, the sFlow Receiver listens to the sFlow datagrams on 6343 port. To change the port, enter a valid port ranging from 0 to 65535 in the **Receiver Port** box.
Datagram Version	The sFlow datagram version used is 5.

Click **Apply**, to save the sFlow Receiver configuration parameters.

Once the Receiver configurations are done, either Packet Flow sampling or Counter Polling Sampling or both can be started.

:

- *Enabling sampling effects the system performance and hence care should be taken in setting the right values for Timeout and Max Datagram Size.*
- *When the Owner string is cleared, the Flow Sampling and Counter Polling stops.*

7.11.3.2 Sampling Configuration

To configure and start packet flow sampling, do the following:

1. Navigate to **MONITOR** > **Tools** > **sFlow** and select **Sampling Configuration** tab.

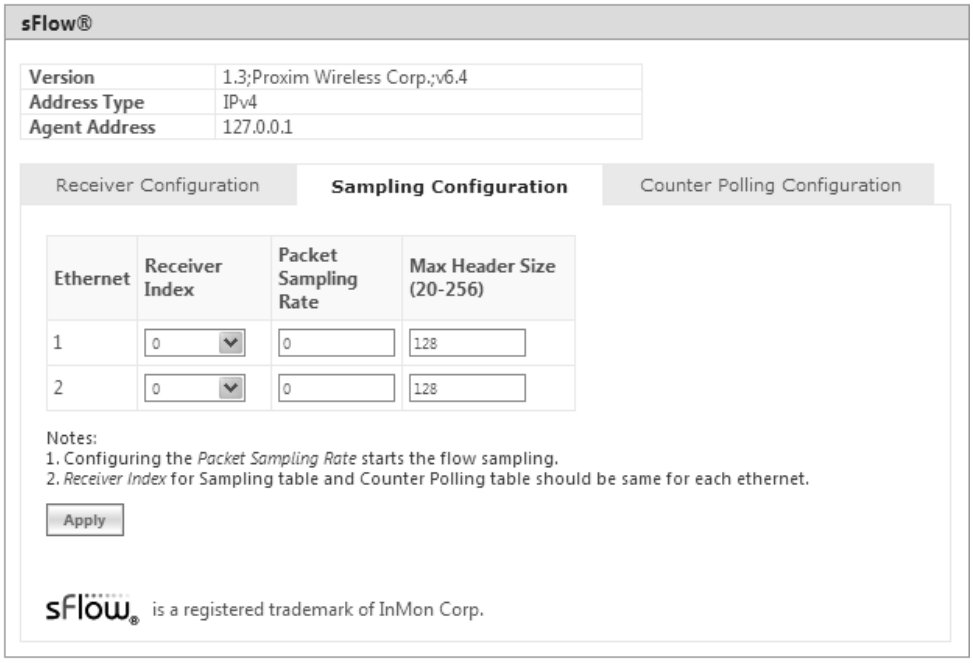


Figure 7-43 sFlow Sampling Configuration

2. From the **Receiver Index** drop-down box, select the receiver index number associated with the sFlow Receiver to which the sFlow Agent should send the sFlow Datagrams.

   : If device has two Ethernet interfaces, then configure different Receiver indexes for each of the interface.

3. Type a value in the **Packet Sampling Rate** box. This value determines the number of packets the sFlow Agent samples from the total number of packets passing through the Ethernet interface of the device.
4. Type a value in the **Maximum Header Size** box, to set the amount of data (in bytes) to be included in the sFlow datagram. The sFlow Agent samples the specified number of bytes. For example, if you set the Maximum Header Size to 100, the sFlow Agent places the first 100 bytes of every sampled frame in the datagram. The value should match the size of the frame and packet header so that the entire header is forwarded. The default size is 128 bytes. The header size can range from 20 to 256 bytes.
5. Next, click **Apply** to start packet flow sampling. Once it starts, the **Time Out** parameter (see sFlow Receiver Configuration) keeps decrementing till it reaches a zero value. On reaching zero, the corresponding Receiver and Sampling values are set to default values.

:

- *Enabling sFlow packet sampling effects the system performance, and hence care must be taken when choosing the right value for Packet Sampling Rate and Maximum Header Size.*
- *Receiver Index for packet Sampling table and Counter Polling table should be same for each Ethernet interface.*

7.11.3.3 Counter Polling Configuration

To configure and start Counter Polling sampling, do the following:

1. Navigate to **MONITOR** > **Tools** > **sFlow** and select **Counter Polling Configuration** tab.

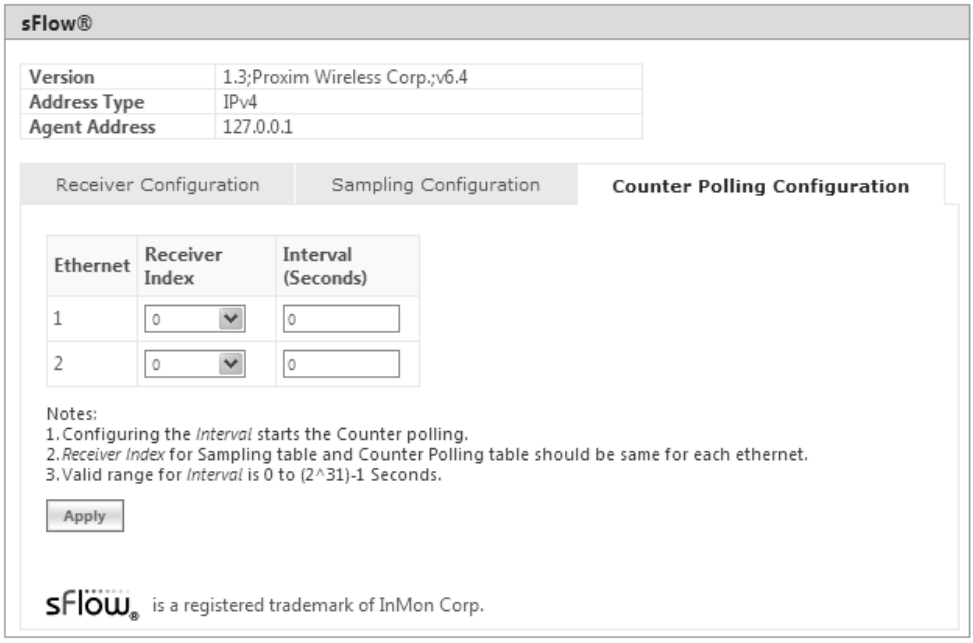


Figure 7-44 Counter Polling Configuration

2. From the **Receiver Index** drop-down box, choose the receiver index number associated with the sFlow Receiver to which the sFlow Agent sends the counters.

   : If Packet Flow Sampling is already configured and running, then you should configure the Receiver index same as configured in the Packet Flow Sampling for each Ethernet interface.

3. Set the polling interval by typing a value in the **Interval** box. Lets say, the polling interval is set to 30 seconds. So for every 30 seconds, the counters are collected and send to the sFlow Receiver. The valid range for polling interval is 0 to 2^{31} - 1 seconds.
4. Next, click **Apply** to start Counter Polling Sampling. Once it starts, the **Time Out** parameter (see sFlow Receiver Configuration) keeps decrementing till it reaches a zero value. On reaching zero, the corresponding Receiver and Counter Polling values are set to default values.

- *Enabling sFlow counter sampling effects the system performance, and hence care must be taken when choosing the right value sampling interval.*
- *Receiver Index for packet Sampling table and Counter Polling table should be same for each Ethernet interface.*
- *If a sampling starts and there is already another sampling running then we consider the time out value of the current/already running sampling.*

7.11.4 Console Commands

The **Console Commands** feature helps Proxim's Technical Support team to debug field issues.

7.11.5 Spectrum Analyzer

: Spectrum Analyzer is not applicable to MP-8150-CPE and QB-8150-LNK-12/50 devices.

Spectrum Analyzer helps to analyze a spectrum for interference, and select a relatively low interference channel. This tool is not a replacement for the commercial Spectrum Analyzers as this is only intended to help with channel selection and diagnose performance issues.

: Only an administrator user can use Spectrum Analyzer to scan the spectrum. However, the Monitor user can view the last scanned results.

To scan all the channels in the configured frequency domain, do the following:

1. Navigate to **MONITOR > Tools > Spectrum Analyzer**. The following **Spectrum Analyzer** screen appears:

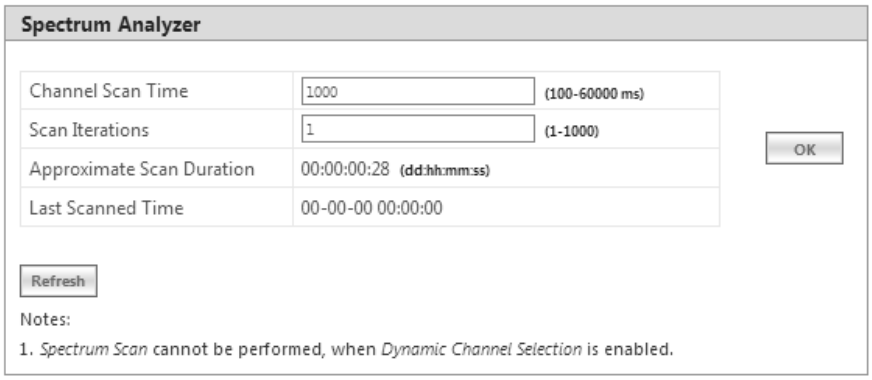


Figure 7-45 An Example - Spectrum Analyzer

2. **Channel Scan Time**: Enter the time (ranging from 100 to 60000 milliseconds) to scan each channel. By default, the scan time is set to 1000 milliseconds.
3. **Scan Iterations**: Enter a number (ranging from 1 to 1000) which represents the number of times the scan iterates. By default, the scan iteration is set to 1.
4. After configuring the **Channel Scan Time** and **Scan Iterations**, click **OK**. Upon clicking **OK**, the **Approximate Scan Duration** parameter displays the total time (dd:hh:mm:ss) required to complete the scan.
5. **Last Scanned Time**: Represents the time at which the last spectrum scan was done.
6. Next click **Start**, to start the scan. Click **Stop** to stop the scan or wait for completion of the scan.

:

- *Spectrum Analyzer scan cannot be performed when* Dynamic Channel Selection (DCS) *is enabled.*
- *The total duration of scan depends on the number of channels available, channel scan time and scan iterations.*
- *To reduce scan duration, configure the appropriate frequency filter lower and upper edges.*
- *While scanning, Spectrum Analyzer does not consider channel offset.*
- *The frequencies are scanned by 5MHz slice starting from the lower edge of the frequency filter, and displays the results captured at that particular instance.*
- *Spectrum Analyzer detects only 802.11 modulated signals.*

- *When working in a high interference network, ensure to run the spectrum analyzer with multiple iterations (increase the Scan Time) to get accurate results.*

:

- ***When the Spectrum Analyzer starts, the wireless link, if established, is terminated and re-established after the scan is completed.***
- ***As the wireless link is down during spectrum analysis, the remote device cannot be accessed. Hence, if Spectrum Analyzer is started on a remote device, the results will not be available until spectrum scan is completed and wireless link gets re-established.***

7. The scanned results are displayed in the form of a graph as follows:

:

- *A minor variation in Spectrum Analyzer results can be expected due to the following reasons:*
  - *Satellite Density Configuration*
  - *A variation in the radio properties between various device models.*

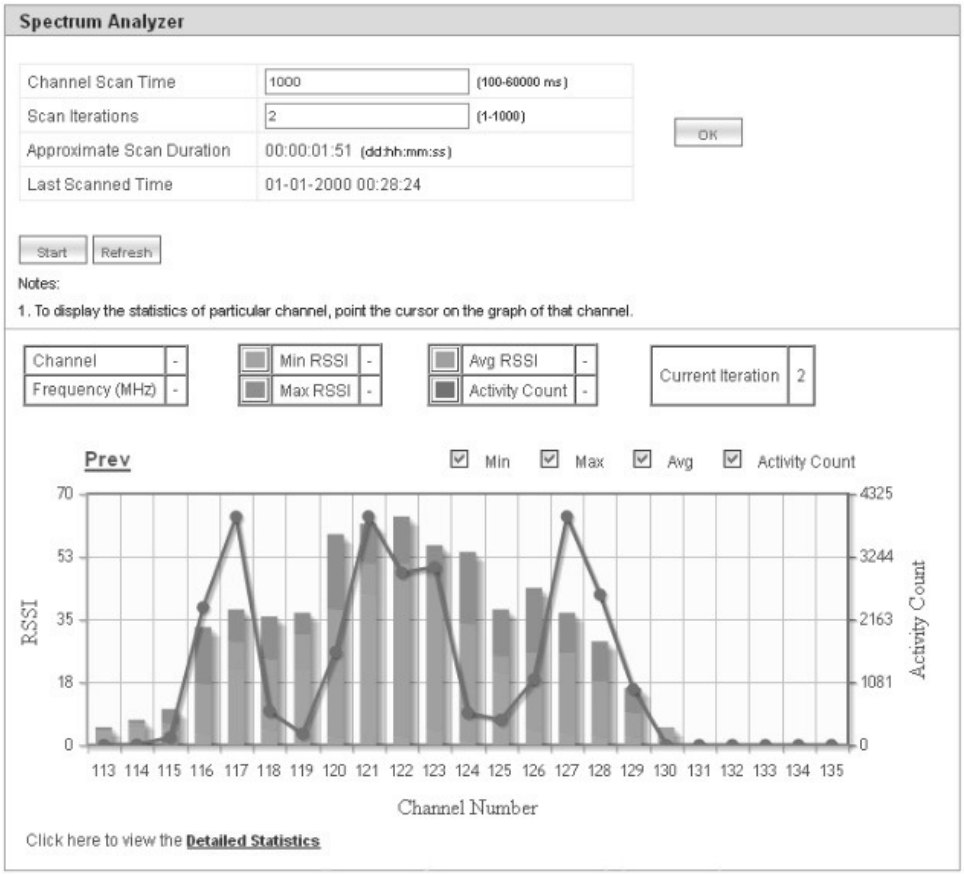


Figure 7-46 An Example - Scanned Results

Graph Results Interpretation

Consider a network with a device operating on channel 122 with 20 MHz channel bandwidth. In the same vicinity, when we run the Spectrum Analyzer on a Tsunami radio it will display the results as shown in Figure 7-46. From the results, we see interfering signals on channels 115 to 129. It also shows strong interfering signal on channels 120 to124 indicating the presence of a device operating on channel 122, and moderate interfering signals on channels 115-119 and 125-129 (which are side band signals from the same interference source).

We recommend to avoid using these channels while installing Tsunami products, otherwise radio will report huge PHY and CRC errors. However, to make these channels usable and to ignore the low interference signals, we recommend configuring Satellite Density on the devices.

By default, for each channel, the graph represents the following statistics:

Parameter	Description	Legend
Maximum RSSI	Represents the maximum RSSI of all the signals received during the scan on a given channel.	
Minimum RSSI	Represents the minimum RSSI of all the signals received during the scan on a given channel.	
Average RSSI	Represents the average RSSI of all the signals received during the scan on a given channel.	
Activity Count	Represents the total wireless activities (including OFDM Signal and Errors) during the scan on a given channel.	

Please note that the **Current Iteration** parameter helps to learn the current scan iteration. For example, if **Scan Iteration** is configured as 2, and currently only one scan cycle is complete then Current Iteration parameter displays 1.

To view the statistics of a particular channel, point the cursor to that channel on the graph. The statistics is displayed as shown below:

Figure 7-47 Channel Statistics

It is also possible to view only the selected statistics on the graph. For example, to view only Minimum and Maximum RSSI on the graph, uncheck the box against **Activity Count** and **Avg** on the top of the graph.

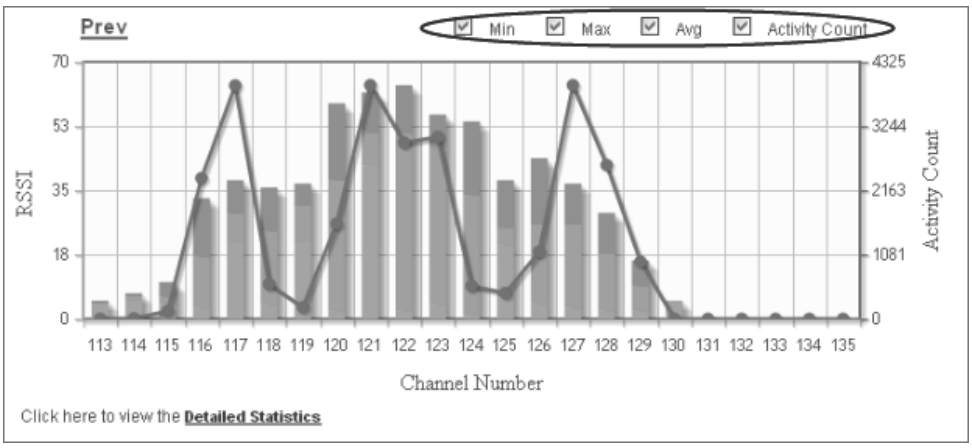


Figure 7-48 An Example - Selective Graph Statistics

At a time, the graph represents the statistics of a maximum of 32 channels. To view the graph(s) of the remaining channels, click **Next** (available on the upper right corner of the graph). Click **Previous** to view the statistics of the previous channels.

To view the tabular format of the graph statistics, click **Detailed Statistics** on the bottom left of the graph. The detailed statistics is displayed as follows:

Spectrum Analyzer Table

Refresh

INDEX	Channel Number	Channel Frequency (MHz)	Max RSSI	Min RSSI	Avg RSSI	Activity Count
1	99	5495	22	20	21	50
2	100	5500	22	19	20	48
3	101	5505	21	17	19	46
4	102	5510	11	3	6	52
5	103	5515	0	0	0	0
6	104	5520	0	0	0	0
7	105	5525	0	0	0	0
8	106	5530	0	0	0	0
9	107	5535	0	0	0	0
10	108	5540	0	0	0	0
11	109	5545	0	0	0	0
12	110	5550	0	0	0	0
13	111	5555	0	0	0	0
14	112	5560	0	0	0	0
15	113	5565	0	0	0	0
16	114	5570	6	2	3	19
17	115	5575	6	4	5	6
18	116	5580	6	3	4	4
19	117	5585	8	4	6	63
20	131	5655	16	5	14	163
21	132	5660	14	10	11	159
22	133	5665	9	6	6	9

Figure 7-49 An Example - Detailed Statistics

: Spectrum Analyzer configuration parameters and results are not persistent across reboots.

7.11.6 Radio Link Test Tool

In general, whenever the network has some performance issue, it is required to identify whether the issue is due to the wireless link or due to other network parameters. The Radio Link Test (RLT) tool helps to measure and diagnose any performance issues in the wireless link. At MAC level, this tool internally generates the traffic between the two radios, monitors the traffic, and generates a test report.The test report will help in analyzing the wireless link performance and other related issues such as interference, lower throughput, and wireless errors. Especially for the static link establishment, this is very helpful to check the link between the two radios when installing for the first time or if any performance issues are noticed after the installation. If the link between the radios is of expected quality, then there is no issue with the wireless link. In case, if there is any issue due to wireless parameters, the link may need some tuning in configuration such as channel, Data Rate, Tx power or distance between radios. In spite of all the testing and tuning, if the performance still fails to improve, then it may be due to installation related issues such as antenna alignment or the physical path. In the worst case, it may be a hardware related issue.

- *This is not a replacement for other wireless performance measuring tools and should be used in conjunction with other tools like Iperf or any other commercial tools.*
- *It is recommended to use this tool with caution on live networks as it will be generating internal traffic which may impact the network performance.*
- *Radio Link test is an experimental feature and will be improved in future releases.*
- *It is applicable only to 82x devices.*
- *This tool can be accessed through web interface, console commands, and CLI.*
- *Both ends of a link cannot simultaneously run this test.*

7.11.6.1 Configuration Options

The configuration options for the Radio Link Test tool are tabulated below:

Parameter	Description
Test Duration	Time duration for which the Radio Link Test is performed (Default: 60 seconds)
Traffic Direction	Direction of the traffic (Downlink/Uplink /Bi-directional)
Traffic Rate	Amount of traffic to be generated (K bps)
Periodic Report Interval	Time interval in which the report is presented to the user interface (seconds)
Packet Size	Generate packet size (Default value: 1500 bytes)
MAC Address	Wireless MAC address of the device running in server mode
Verbose Mode	Detailed statistics information
Help	List of possible options (Usage)
Version	Display tool version information

To access this tool through web interface, navigate to **MONITOR > WORP Statistics > Interface 1 > BSU/SU Link Statistics > Details.** Click as shown in An Example - SU Link Statistics.

SU Link Statistics

Click here to view the Local SNR-Table

Index	SU Name	MAC Address	Local Tx Rate (Mbps)	Remote Tx Rate (Mbps)	Local Tx Antenna Port Info		Local Rx Antenna Port Info		Local Signal (dBm)	Local Noise (dBm)	Local SNR (dB)	Remote Rx Antenna Port Info		Remote Signal (dBm)	Remote Noise (dBm)	Remote SNR (dB)	Current Tx Power Info		Details
1	Doc-SU	04:f0:21:04:49:43	16.2	13	A1	◐	A1	◐	-13	-102	89	A1	◐	-10	-102	92	TPC	3	
					A2	◐	A2	◐	-17	-102	85	A2	◐	-26	-102	76	EIRP	11	
					A3	○	A3	○	-	-	-	A3	○	-	-	-	Power	11	

Legend:
- ○ Antenna Port is disabled
- ◐ Antenna Port is enabled and signal is present

Refresh

Figure 7-50 An Example - SU Link Statistics

The following **BSU/SU WORP Detailed Statistics** screen appears.

BSU WORP Detailed Statistics

Radio Link Test | Disconnect | Refresh | Back

Click the **Radio Link Test** Button. The following **Radio Link Test** screen appears.

Radio Link Test

Traffic
- Uplink
- Downlink
- Bidirection
- ☑ Verbose

START

Local	Remote
System-BSU	Doc-SU
04:f0:21:04:49:40	04:f0:21:04:49:43

Notes:
1. Test runs for 60 seconds.
2. Select verbose mode for detailed statistics.

Figure 7-51 Radio Link Test Tool

In the Radio Link Test screen, you can select the required type of traffic from the given options namely **Uplink**, **Downlink**, and **Bidirection**. By selecting **Verbose** along with any one of the traffic options, you can get a detailed test report for the traffic selected. In the above screen, for example, select **Bidirection** and **Verbose**. Next, click the **START** button.

Figure 7-52 An Example - Radio Link Test (Bidirectional Traffic with Verbose mode)

The test runs for 60 seconds and displays the Radio Link Test Report as shown below.

```
==============================================================
  RADIO LINK TEST REPORT
==============================================================
  CONFIGURATION
  Peer MAC            : 04:f0:21:04:49:43
  Test Direction      : Bi-directional
  Test Duration       : 60 seconds
  Ethernet MTU Size   : 1500 Bytes
  Downlink Rate       : UNLIMITED
  Uplink Rate         : UNLIMITED
  -------------------------------------------------------------
  RESULT SUMMARY
  TEST STATUS         : COMPLETED
  UDP THROUGHPUT      : 13951 Kbps

  DOWNLINK STATS      [ local <-- remote ]
  Packets Transfered  : 35231
  Bytes Transfered    : 52846500
  Average Throughput  : 6914 Kbps

  UPLINK STATS        [ local --> remote ]
  Packets Transfered  : 35856
  Bytes Transfered    : 53784000
  Average Throughput  : 7037 Kbps

  INTERFACE STATS       LOCAL             REMOTE
  WORP STATS
  Data Rate(Kbps)     : 16200             16200
  Send Success        : 14156             14068
  Send Retries        : 45                49
  Send Failures       : 325               161
  WIRELESS STATS
  Phy Errors          : 126               39
  CRC Errors          : 41                52
  Medium Busy         : 0                 0
  MIMO STATS          : SIG  NOI  SNR     SIG  NOI  SNR
  A1:                   -29 -102   73     -30 -102   72
  A2:                   -18 -102   84     -18 -102   84
  A3:                     0    0    0       0    0    0
==============================================================
```

Figure 7-53 An Example - Test Report (Bidirectional Traffic with Verbose mode)

7.11.6.2 Statistics Options

The test report can be analyzed by using the statistics options tabulated below:

Parameter	Description
Traffic Statistics	
Tx Packets	Total packets transmitted from the moment user initiated the test.
Rx Packets	Total packets received from the moment user initiated the test.
Lost Packets	Packets lost due to any reason.
Duplicated Packets	Number of packets received in duplicate for the already received packets.
Tx Rate	The rate at which the packets are sent.
Rx Rate	The rate at which the packets are received.
Wireless Statistics	
Phy Errors	Total number of error packets received from the moment user initiated the test . The possible reasons: • It indicates the interference in the wireless medium • Low signal level
CRC Errors	Number of packets received with invalid CRC. The possible reasons: • It indicates the interference in the wireless medium • Low signal level
Medium Busy	Number of times the radio detected busy medium while trying to transmit the frame. This could be due to interference on that specific channel.
WORP Statistics	
Send success	Refers to the number of data messages sent and acknowledged by the peer successfully.
Send failure	Refers to the number of data messages that are not acknowledged by the peer even after the specified number of retransmissions.
Send retires	Refers to the number of data messages that are re-transmitted and acknowledged by the peer successfully.
Receive success	Refers to the number of data messages received and acknowledged successfully.
Receive failures	Refers to the number of successfully received re-transmitted data messages.
Receive retires	Refers to the number of data messages that were not received successfully.

Parameter	Description
Signal Statistics	
Signal	Signal measured at the radio port
Noise	Noise detected at the radio port
SNR	Signal to Noise Ratio (dB)

Using the **rlt** command options tabulated below, you run the radio link test tool through **Web Console**.

Options	Description
-t	Test duration (Default: 60 seconds)
-i	Periodic report display interval (Default: 0 - disabled)
-s	Packet size (Default: 1500 bytes)
-o	Ignore timeout during test (Default: do not ignore)
Traffic Direction	
-d	Downlink throughput test with specified traffic rate in K bps (Default: Unlimited)
-u	Uplink throughput test with specified traffic rate in K bps (Default: Unlimited)
No option	Default: Bi-Directional test with unlimited rate
Miscellaneous	
-h, --help	Tool usage
-v, --version	Tool version number
-V	Verbose mode (Enables detailed statistics display)

The “-i” option to display the test report at regular intervals works only with the “-V” verbose option for all traffic directions.

To access this tool through **Web Console**, navigate to **MONITOR > Tools** > **Console Commands**. In the **Web Console** screen do the following:

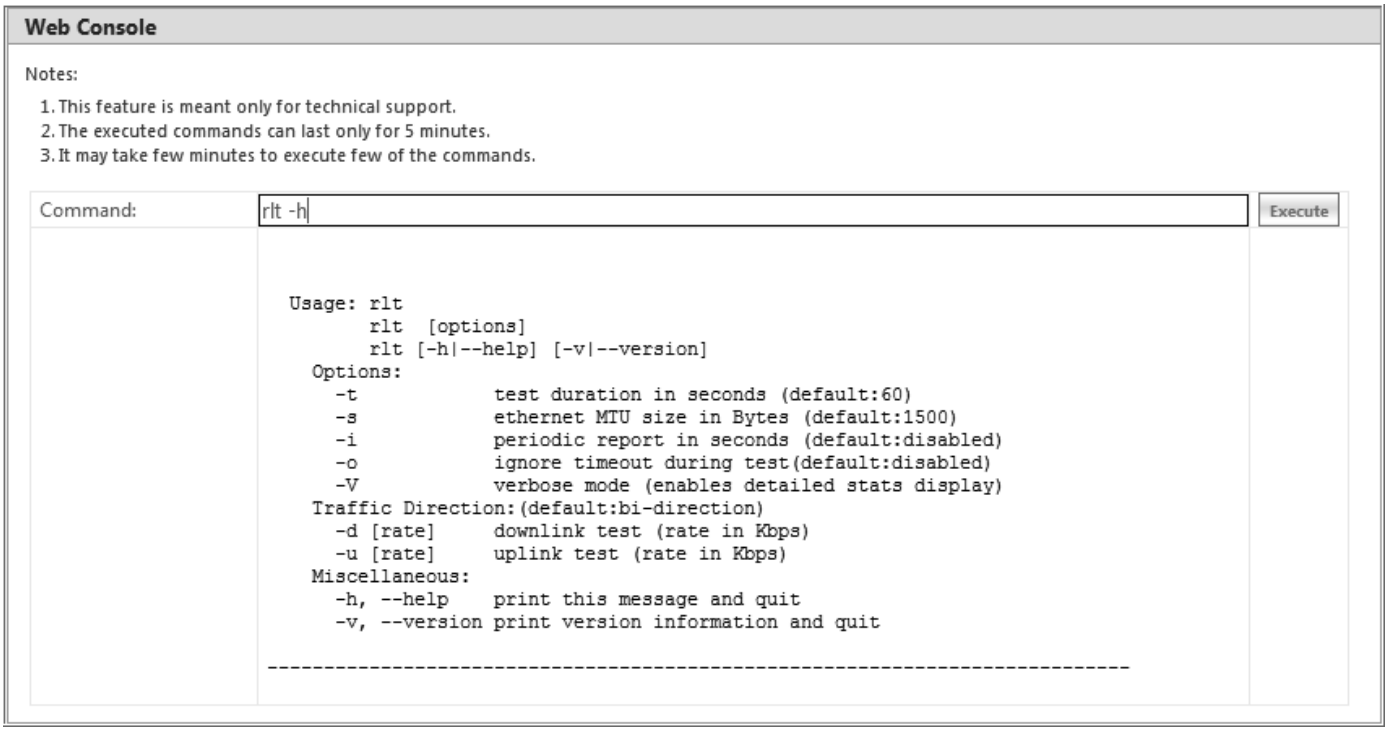


Figure 7-54 An Example - Radio Link Test Through Web Console

- **Command**: Type the required **rlt** command. Click the **Execute** button.
- The command execution is displayed in the Web Console screen.

To run the Radio Link Test tool through Command Line Interface (CLI), refer the *Tsunami® 800 and 8000 Series Reference Guide.*

7.12 SNMP v3 Statistics

SNMP v3 statistics can be viewed only when SNMPv3 feature is enabled on the device. See SNMP.

To view the **SNMPv3 Statistics**, navigate to **MONITOR > SNMPV3 Statistics**. The following **SNMP v3 Statistics** screen appears:

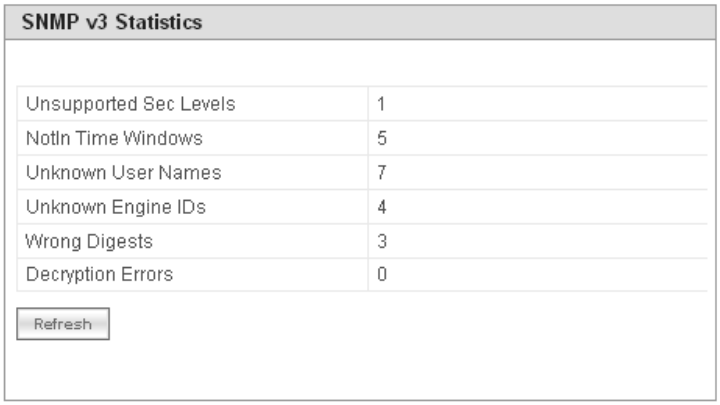


Figure 7-55 SNMP v3 Statistics

The following table lists the SNMP v3 parameters and their description:

Parameter	Description
Unsupported Sec Levels	This parameter specifies the total number of packets dropped by the SNMP engine because they requested a security level that was unknown to the SNMP engine or otherwise unavailable.
Not In Time Windows	This parameter specifies the total number of packets dropped by the SNMP engine because they appeared outside the authoritative SNMP engine's window.
Unknown User Names	This parameter specifies the total number of packets dropped by the SNMP engine because they correspond to a user that is unknown to an SNMP engine.
Unknown Engine IDs	This parameter specifies the total number of packets dropped by the SNMP engine because they correspond to an SNMP Engine ID that is unknown to an SNMP engine.
Wrong Digests	This parameter specifies the total number of packets dropped by the SNMP engine because they do not contain the expected digest value.
Decryption Errors	This parameter specifies the total number of packets dropped by the SNMP engine because they could not be decrypted.

Troubleshooting

8

This chapter helps you to address the problems that might arise while using our device. If the procedures discussed in this chapter does not provide a solution, or the solution does not solve your problem, check our support site at http://my.proxim.com which stores all resolved problems in its solution database. Alternatively, you can post a question on the support site, to a technical person who will reply to your email.

Before you start troubleshooting, check the details in the product documentation available on the support site. For details about RADIUS, TFTP, Terminal and Telnet programs, and Web Browsers, refer to their appropriate documentation.

In some cases, rebooting the device solves the problem. If nothing else helps, refer to Recovery Procedures.

This chapter provides information on the following:

- PoE Injector
- Connectivity Issues
- Surge or Lightning Issues (For Connectorized devices)
- Setup and Configuration Issues
- Application Specific Troubleshooting
- Wireless Link Issues
- Wired (Ethernet) Interface Validation
- Wireless Interface Validation
- Recovery Procedures
- Spectrum Analyzer
- Miscellaneous

8.1 PoE Injector

Problem	Solution
The Device Does Not Work	• Make sure that you are using a standard UTP – Category 5e/6 cable in case of MP-8100-BSU, MP-8100-SUA, MP-8150-SUR, MP-8150-SUR-100, MP-8160-BSU, MP-8160-BS9, MP-8160-SUA, QB-8100-EPA/LNK, QB-8150-EPR/LNK, QB-8150-LNK-100, QB-8151-EPR/LNK, MP-8200-BSU, MP-8250-BS9, MP-8250-BS1, MP-8200-SUA, MP-820-BSU-100, MP-820-SUA-50+, MP-825-SUR-50+, QB-825-EPR/LNK-50+, and QB-8200-LNK devices – Category 5/5e cable in case of MP-8150-CPE, MP-8160-CPE-A100, MP-825-CPE-50, QB-825-EPR/LNK-50, and QB-8150-LNK-12/50 • Try a different port on the same PoE Injector hub (remember to move the input port accordingly) – if it works then there is a problem in the previous RJ45 port or a bad RJ45 port connection. • Try to connect the device to a different PoE Injector hub. • Try using a different Ethernet cable – if it works, there is probably a fault in the cable or its connection. • Check the power plug and hub. • If the Ethernet link goes down, check the cable, cable type, switch and hub.
There is No Data Link	• Verify that the indicator on the device port is "ON." • Verify that the Ethernet cable from PoE Injector hub to the Ethernet port of the device is properly connected. • Make sure that you are using a standard UTP – Category 5e/6 cable in case of MP-8100-BSU, MP-8100-SUA, MP-8150-SUR, MP-8150-SUR-100, MP-8160-BSU, MP-8160-BS9, MP-8160-SUA, QB-8100-EPA/LNK, QB-8150-EPR/LNK, QB-8150-LNK-100, QB-8151-EPR/LNK, MP-8200-BSU, MP-8250-BS9, MP-8250-BS1, MP-8200-SUA, MP-820-BSU-100, MP-820-SUA-50+, MP-825-SUR-50+, QB-825-EPR/LNK-50+, and QB-8200-LNK devices – Category 5/5e cable in case of MP-8150-CPE, MP-8160-CPE-A100, MP-825-CPE-50, QB-825-EPR/LNK-50, and QB-8150-LNK-12/50 • The length of the cable from the Ethernet port of the device to the PoE should be less than 100 meters (approximately 325 feet). • Try to connect a different device to the same port on the PoE Injector hub – if it works and a link is established then there is probably a fault in the data link of the device. • Try to re-connect the cable to a different output port (remember to move the input port accordingly) – if it works then there is a fault probably in the output or input port of the PoE Injector hub or a bad RJ45 connection.
Overload Indications	• Connect the device to a PoE Injector. • Ensure that there is no short over on any of the connected cables. • Move the device into a different output port (remember to move the input port accordingly) - if it works then there is a fault probably in the previous RJ45 port or bad RJ45 port connection.

8.2 Connectivity Issues

Connectivity issues include any problem that prevents from powering or connecting to the device.

Problem	Solution
Does Not Boot - No LED Activity	• Make sure the power source is ON. • Make sure all the cables to the device are connected properly.
Ethernet Link Does Not Work	Check the Ethernet LED • **Solid Green**: The Ethernet link is up. • **Blinking Green**: The Ethernet link is down.
Serial Link Does Not Work	• Double-check the physical network connections. • Make sure your PC terminal program (such as HyperTerminal) is active and configured to the following values: – Com Port: (COM1, COM2 and so on 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**) *: Not applicable to MP-825-CPE-50, and MP-8160-CPE-A100 as it does not support serial interface.*
Cannot Access the Web Interface	• Open a command prompt window and type the Ping command along with the IP address of the device. For example, **ping 10.0.0.1**. If the device does not respond, check if you have the correct IP address. If the device responds then it means the Ethernet connection is working properly. • Ensure that you are using Microsoft Internet Explorer 7.0 (or later) or Mozilla Firefox 3.0 (or later). • Ensure that you are not using a proxy server for the network connection with your Web browser. • Ensure that you have not exceeded the maximum number of Web Interfaces or CLI sessions. • Double-check the physical network connections. Use a well-known device to ensure the network connection is functioning properly. • Troubleshoot the network infrastructure (check switches, routers, and so on). *: At any point of time, if the device is unable to connect to your network, reset the device by unplugging and plugging the cables from the PoE.*

8.3 Surge or Lightning Issues (For Connectorized devices)

Problem	Solution
Surge or Lighting Problem	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 Arrestor. • Unscrew the N-Type connector at the top and visually inspect the Surge Arrestor for electrical burns. If any, replace it.

8.4 Setup and Configuration Issues

Problem	Solution
Device Reboots Continuously	One of the reason for the device to reboot continuously is that the radio card is not properly placed in the mini-PCI slot. When you power on the device and you do not see the "**WIRELESS NETWORK1 PASSED**" in the POST message in the Serial Console, please contact Proxim's support site at http://my.proxim.com.
Lost Telnet or SNMP Password	Perform Operational Mode procedure. This procedure resets system and network parameters, but does not affect the image of the device. The default HTTP, Telnet, and SNMP username is **admin** and password is **public**.
Device Responds Slowly	If the device takes a long time to respond, it could mean that: • No DHCP server is available. • The IP address of the device is already in use. Verify that the IP address is assigned only to the device you are using. Do this by switching off the device 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 device uses a static IP address, switching to DHCP mode could solve this problem. • The network traffic is more.
Incorrect Device IP Address	• The default IP address assignment mode is Static and the default IP address of the device is 169.254.128.132. • If the IP address assignment mode is set to Dynamic, then the DHCP Server will assign an IP address automatically to the device. If the DHCP server is not available on your network, then the fall back IP address (169.254.128.132) of the device is used. • Use ScanTool, to find the current IP address of the device. Once you have the current IP address, use Web Interface or CLI Interface to change the device IP settings, if necessary. • If you are using static IP address assignment, and cannot access the device over Ethernet, refer to Initializing the IP Address using CLI. • Perform Operational Mode procedure. This will reset the device to static mode.

Problem	Solution
HTTP Interface or Telnet Does Not Work	• Make sure you are using a compatible browser: – Microsoft Internet Explorer 7.0 or later – Mozilla Firefox 3.0 or later : • *When working with Internet Explorer 9 in Windows 2008 Server, navigate to **Internet Options -> Security -> Internet -> Custom Level -> Scripting -> Active Scripting** to enable active scripting.* • *When working with Internet Explorer 10 and facing web page issues, click the **Broken Page** icon available on the right side of address bar.* • Make sure you have the correct IP address of the device. Enter the device IP address in the address bar of the browser, for example **http://169.254.128.132**. • When the **Enter Network Password** window appears, enter the User Name and and Password. The default HTTP username is **admin** and password is **public**. • Use CLI, to check the IP Access Table which can restrict access to Telnet and HTTP.
Telnet CLI Does Not Work	• Make sure you have the correct IP address. Enter the device IP address in the Telnet connection dialog, from a DOS prompt: **C:\> telnet <Device IP Address>** • Use HTTP, to check the IP Access Table which can restrict access to Telnet and HTTP. • Enable Telnet in Vista or Windows 7 as it is by default disabled.
TFTP Server Does Not Work	• The TFTP server is not properly configured and 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
Changes in Web Interface Do Not Take Effect	1. Restart your Web browser. 2. Log on to the device again and make changes. 3. Reboot the device. 4. Click **COMMIT** for the changes to take effect. 5. Wait until the device reboots before accessing the device again.

8.5 Application Specific Troubleshooting

Problem	Solution
RADIUS Authentication Server Services unavailable	If RADIUS Authentication is enabled on the device, then make sure that your network's RADIUS servers are operational. Otherwise, clients will not be able to log on to the device. There are several reasons for the authentication server's services to be unavailable. To make it available, • Make sure you have the proper RADIUS authentication server information setup configured on 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.
TFTP Server	If a TFTP server is not configured and running, you will not be able to download and upload images and configuration files to or from the device. Remember that the TFTP server need not be local, as 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 image file 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).

8.6 Wireless Link Issues

Given below are the possible reasons for a wireless link not getting established and the relevant observations.

Reason(s)	Observation
Mismatch in network name	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented in BSU/End Point A and SU/End Point B. • The WORP counters are not affected. • The remote device is not listed in the Site Survey.
Incorrect or invalid configured BSU/End Point A name	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented in SU/End Point B. • The WORP counters are not affected. • The remote device is not listed in the Site Survey.
Mismatch in network secret	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented in BSU/End Point A and SU/End Point B. • The WORP counters are incremented (Req for Serv, Reg Req, Auth Req, Reg Attempts, Reg LastReason: Incorrect Parameter) on both ends.
Encryption set to **No Encryption** in BSU/End Point A and **AES Encryption** in SU/End Point B	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented in BSU/End Point A; No decrypt errors are observed in SU/End Point B. • In SU/End Point B, the WORP counters (Announcements, Req for Serv, Reg Attempts, Reg incomplete, Reg timeout, Reg Last Reason: Timeout) are incremented. In BSU/End Point A, no WORP counters are incremented except announcements. • The remote device is not listed in the Site Survey.
Encryption set to **AES Encryption** in BSU/End Point A and **No Encryption** in SU/End Point B	• The Wireless Statistics counters and WORP counters are not incremented in SU/End Point B. • The remote device is not listed in the Site Survey.
Encryption set to **AES Encryption** in both BSU/End Point A and SU/End Point B. A mismatch in Encryption key	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented only in SU/End Point B. • The remote device is not listed in the Site Survey.
BSU exceeds the maximum SU limit	• The Wireless Interface Statistics (In Octets, In Non-Unicast Packets) are incremented in SU/End Point B but fails to authenticate. • The WORP counters (Announcements, Req for Serv, Reg Attempts, Reg Incompletes, Reg Timeouts, Reg Last Reason: Timeout) are incremented in SU/End Point B. • The remote device is listed in the Site Survey.

<table>
<tr><th>Reason(s)</th><th>Observation</th></tr>
<tr><td>With multiple link profiles, the wireless network performance is getting affected.</td><td>
The overall performance of the wireless network gets affected when using multiple link profiles and atleast one of the subscriber is operating with a lower data rate.

For example, consider a wireless network with a BSU and 5 SU profiles. Each SU is transmitting data at a data rate as tabulated below. As SU1 is operating at a lower data rate (6.5 Mbps), the entire performance of the network gets affected.
<table>
<tr><th>SU Profile(s)</th><th>Data Rate</th><th>Throughput</th></tr>
<tr><td>SU1</td><td>6.5 Mbps</td><td rowspan="5">Aggregated throughput can be a maximum of 13 Mbps</td></tr>
<tr><td>SU2</td><td>39 Mbps</td></tr>
<tr><td>SU3</td><td>78 Mbps</td></tr>
<tr><td>SU4</td><td>130 Mbps</td></tr>
<tr><td>SU5</td><td>78 Mbps</td></tr>
</table>
In order to optimize the network performance, apply QoS.

Given below is an example on how the network performance can be improved by applying QoS. QoS is applied for SU1 with the following configuration:
• PIR based on the ToS value 96
• SFC with MIR/CIR= 1Mbps; Priority = 3; Latency/Jitter=10ms

Subscribers SU2...SU5 use the default QoS configuration.
<table>
<tr><th>Profiles</th><th>Data Rate</th><th>Throughput</th></tr>
<tr><td>SU1</td><td>6.5 Mbps</td><td rowspan="5">With QoS applied for SU1, expected throughput is 26 Mbps</td></tr>
<tr><td>SU2</td><td>39 Mbps</td></tr>
<tr><td>SU3</td><td>78 Mbps</td></tr>
<tr><td>SU4</td><td>130 Mbps</td></tr>
<tr><td>SU5</td><td>78 Mbps</td></tr>
</table>
 : Given above is just an example and values might vary from case-to-case.
</td></tr>
</table>

Reason(s)	Observation
Interference issues due to wider beam width of the antenna	• **MP-825-CPE-50, MP-825-SUR-50+, QB-825-EPR/LNK-50, and QB-825-EPR/LNK-50+ uses a wider beam width antenna (up to 38 °) with a gain of 15dBi. Due to its wider beam width, it may pick up more interfering signals and may report large number of errors compared to other Tsunami products. Wireless interference may also lead to:** – SNR value fluctuations between the Antenna (A1/A2) ports – DDRS operation at lower data rates – Higher number of PHY errors which may result in false RADAR detection in DFS bands • **To overcome these issues, use a spectrum analyzer and switch to a noise-free channel.**

8.7 Wired (Ethernet) Interface Validation

Problem	Solution
Wired (Ethernet) Interface Validation	Run iperf commands • Use iperf commands with –w option as 202k. The throughput is expected to be equal in both directions and should be comparable from laptop to laptop or desktop to desktop performance If the above throughput value is not in the expected range, • Check speed and duplex settings between the device and Personal Computer or switch or router connected • Make sure the connection established is of same speed and full duplex is as expected (10 or 100 or 1000) • With auto negotiation, if you notice this issue, then try manually setting the speed and duplex • Update the Ethernet driver in the Personal Computer to the latest one

8.8 Wireless Interface Validation

Problem	Solution
Wireless Interface Validation	**Run iperf commands** (You can run Embedded iperf commands only through Telnet.) • iperf –s –w 202k (command for iperf server) • Iperf –c ipaddress –w 202k –t time Period –I <intermediateResultInterval> –P <4 or 6> (command to run iperf client) – Ipaddress -> of the SU/End Point B or BSU/End Point A device where the iperf server is running – P -> No of pairs (Streams) • Use –d option to run bidirectional throughput • Use –r option to run unidirectional throughput one after another without changing the server and SU ends If the expected throughput is not achieved, then check the following: • **Antenna Alignment** – Note whether the antenna ports are balanced – SNR/RSSI provided for Local and Remote in the BSU/SU Link Statistics page or by using "aad" command – Signal difference of <=5 dBm is considered as balanced and recommended – If the chains are not balanced, then look at the alignment and connectors of RF cables, used between antenna and device – If in RMA (Returned from Customer), check the RF cable to radio port connectivity – Avoid nearby metal surfaces, if you are using Omni antenna • **Data Streams** – Select "Single" stream instead of "Dual" stream mode – DDRS - with single stream data rate or with Auto mode Dual stream data rates can be used only when the signal in both antenna ports is balanced. • **Antenna Port Selection** – For devices with 3x3 MIMO radio, make sure you are either enabling all antenna ports for 3x3 MIMO or using A1 and A3 antenna ports for 2x2 MIMO mode – For devices with 2x2 MIMO radio, use A1 and A2 antenna ports – For using single stream, it is mandatory to select antenna port A1 – Enabling all antenna port will not cause any issue even if it is not in use. • **Bad Channel** – Check for CRC errors, PHY errors, WORP Retries and WORP Failures in Monitor Interface Statistics page. If this count increments steadily (Refreshing the web page is required) then • Either change the channel and check for a better channel • Use Wi-Spy or similar tool and check the environment for better channel

Problem	Solution
Wireless Interface Validation	• **Data Rate Issues** – Ensure same data rates are selected if you are using fixed data rate between BSU/SU and End Point A/End Point B to have predictable throughput and link – Alternatively, use DDRS with Auto mode enabled • **Performance and Stability Issues** – Check the distance between two co-locating devices. The distance between two co-locating devices should be minimum 3 meters, in order to achieve good throughput and maintain link stability. The operating adjacent channel should maintain 5MHz spacing if managed by a single administrator. – When DDRS is disabled, check the Minimum Required SNR for the current data rate by navigating to **MONITOR** --> **WORP Statistics** --> **Interface 1** --> **Link Statistics Page** --> **Click here for Local SNR-Table**. If the current SNR is not meeting the minimum required SNR criteria for the current data rate, then accordingly reduce the data rate. – If SNR is more than the maximum optimal SNR limit (**MONITOR** --> **WORP Statistics** --> **Interface 1** --> **Link Statistics Page** --> **Click here for Local SNR-Table**) then it causes radio receiver saturation thus impacting the performance of the link. To overcome this situation, set the TPC appropriately or enable ATPC to adjust the signal level automatically. Also, enabling DDRS can help in choosing right data rate automatically. – To measure and diagnose any performance issues in the wireless link, use the **Radio Link Test Tool**. To use this tool, navigate to **MONITOR** --> **WORP Statistics** --> **Interface 1** --> **Link Statistics Page** --> **Details** -->**Click** icon. For detailed description of this tool, refer Radio Link Test Tool

8.9 Recovery Procedures

Recovery Procedure is used to restore the device to its factory default operating state. Depending on the device state, the recovery procedures can be classified under two modes:

1. **Operational Mode**: Device is up and in running state.
2. **Bootloader Mode**: Device operating image is deleted.

8.9.1 Operational Mode

<table>
<tr><th>S.No</th><th>Scenario</th><th>Recovery Procedure</th></tr>
<tr><td>1</td><td>Restore the device to its factory default configuration while accessing it through web interface</td><td>In the web interface, navigate to MANAGEMENT > Reset to Factory. The Factory Reset screen appears:
 

In the screen, click OK. The device now reboots and comes with:
• IP Address: 169.254.128.132
• Username: admin
• Password: public</td></tr>
<tr><td>2</td><td>The device is not accessible for reasons such as user has forgotten the web interface login password, Management VLAN Id is changed, wrong VLAN configuration.</td><td>Press and hold the Reload button (use a pin or the end of a paper clip) on the POE injector for a time frame as mentioned in the following table:
<table>
<tr><th>Device</th><th>Timings</th></tr>
<tr><td>MP-8100-BSU; MP-8100-SUA
MP-8150-SUR; MP-8150-SUR-100
MP-8160-BSU; MP-8160-BS9
MP-8160-SUA; MP-8200-BSU
MP-8250-BS9; MP-8250-BS1
MP-8200-SUA; MP-8250-SUR
MP-825-CPE-50; MP-825-SUR-50+;
MP-820-BSU-100; MP-820-SUA-50+
QB-825-EPR/LNK-50+;
QB-825-EPR/LNK-50;
QB-8100-EPA/LNK; QB-8150-EPR/LNK
QB-8150-LNK-100; QB-8151-EPR/LNK
QB-8200-EPA / LNK; QB-8250-EPR / LNK</td><td>5 to 6 seconds</td></tr>
<tr><td>MP-8150-CPE; MP-8160-CPE-A100;
QB-8150-LNK-12; QB-8150-LNK-50</td><td>15 seconds</td></tr>
</table>
:
• To use this procedure, use a PoE injector with Reload functionality.
• The device operating image will get deleted, if you press the button for more than the above mentioned time.
• The timings mentioned above are valid from the time the device is powered UP (that is during POST).
The device now reboots and comes with: IP Address: 169.254.128.132; Username: admin; and Password: public</td></tr>
</table>

8.9.2 Bootloader Mode

S.No	Scenario	Recovery Procedure
1	a) The device operating image is corrupted for reasons such as power interruption while upgrading *(For 82x devices)*.	• After powering-up the device, press and hold the Reload button on the PoE injector (use a pin or the end of a paper clip) for first 15 seconds and then release the button between 15-30 seconds. By doing so, the operating image will get deleted. *:* • *No reload via Ethernet cross cable.* • *It is not applicable to MP-825-CPE-50 and QB-825-EPR/LNK-50 devices.* After deleting the operating image, refer Using the ScanTool and Using the Bootloader CLI sections to load the firmware onto the device.
	b) The device operating image is corrupted for reasons such as power interruption while upgrading *(For all devices)*.	Do one of the following: • While powering the device, press and hold the Reload button on the PoE injector (*use a pin or the end of a paper clip)* for 15 seconds. By doing so, the operating image will get deleted. • Use a 4-pair (Gigabit) cross over Ethernet cable between the PoE and the device. By doing so, the reload functionality gets activated and forcibly deletes the operating image. • If you are having serial access to the device during POST, press **SHIFT+u** to enter into forced user mode of the bootloader. From the Bootloader prompt, enter the command **firmware_delete**. After deleting the operating image, refer Using the ScanTool and Using the Bootloader CLI sections to load the firmware onto the device.
2	The device is not accessible for reasons such as user has forgotten the web interface login password, Management VLAN Id is changed, and wrong VLAN configuration. And, you do not have a reload capable PoE but Serial access is possible	If you are having serial access to the device during POST, press **SHIFT+u** to enter into forced user mode of the bootloader. From the Bootloader prompt, enter the command **config_delete**. Next, issue the command **reboot**. The device now reboots and comes with: **IP Address**: **169.254.128.132**; **Username**: **admin**; and **Password**: **public**

8.9.3 Load a New Image

Follow one of the procedures below to load a new image to the device:

- Using the ScanTool
- Using the Bootloader CLI

: A new image cannot be downloaded using Bootloader CLI onto MP-825-CPE-50, MP-8160-CPE-A100 and QB-825-EPR-50 as it does not provide a serial interface.

8.9.3.1 Using the ScanTool

To download the firmware image to the device, 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 automatically detects the device that does not have a valid software image. The **TFTP Server** and **Image File Name** parameters are enabled in the ScanTool's ***Change*** screen so that you can download a new image to the device. (These fields are disabled, if ScanTool detects a software image on the device). See Initialization.

Preparing to Download the Device Image

Before starting the download process, you need to know the device IP Address, Subnet Mask, the TFTP Server IP Address, and the Image file name. Make sure the TFTP server is running and properly configured to point to the folder containing the image to be downloaded.

Download Procedure

Follow these steps to download a software image to the device by using ScanTool:

1. Download the latest software from http://my.proxim.com, and copy it to the default directory of the TFTP server.
2. Launch Proxim's ScanTool.
3. Highlight the entry for the device that you want to update and click **Change**.
4. Set **IP Address Type** to **Static**.

   : You need to assign static IP information temporarily to the device since its DHCP client functionality is not available when no image is installed on the device.

5. Now enter the IP address, Subnet mask, Default-gateway, Server - IP address and the image filename.
6. Click OK. The device will reboot and the download starts automatically.
7. Click OK when prompted to return to the Scan List screen after the device has been updated successfully.
8. Click Cancel to close the ScanTool.

After the download process is completed, the device will reboot and initialize. After successful initialization, the device is ready to be configured.

8.9.3.2 Using the Bootloader CLI

To download the new device image, 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 an Ethernet cable.

You must also connect the device to a computer with a standard serial cable and use a terminal client. From the terminal, enter the CLI commands to set the IP address of the device and to download the device image.

Preparing to Download the device image

Before starting, you need to know the device IP Address, Subnet Mask, the TFTP Server IP Address, and the device image file name. Make sure the TFTP server is running and configured to point to the default directory containing the image to be downloaded.

Download Procedure

1. Download the latest software from http://my.proxim.com, and copy it to the default directory of the TFTP server.
2. Connect the device serial port to your computer's serial port.
3. Open your terminal emulator program and set the following connection properties:
   - **Com Port:** COM1, COM2 and so on, depending on your computer
   - **Baud Rate:** 115200
   - **Data Bits:** 8
   - **Stop Bits:** 1
   - **Flow Control:** None
   - **Parity:** None
4. Under **File > Properties > Settings > ASCII Setup**, enable the **Send line ends with line feeds** option.

   Terminal Emulator program sends a line return at the end of each line of code.

   The terminal display shows Power On Self Tests (POST) activity. After approximately 30 seconds, a message indicates: **Starting ScanTool interface, press any key to enter CLI 5".** After this message appears, press any key. Now the bootloader prompt appears as below:

   ```
   Bootloader=>
   ```
5. Enter the following commands:

   ```
   Bootloader=> show (to view configuration parameters and values)
   Bootloader=> set ipaddr <Access Point IP Address>
   Bootloader=> set serverip <TFTP Server IP Address>
   Bootloader=> set filename <Device 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 169.254.128.133
   Bootloader=> set filename image_proxim.sei
   Bootloader=> set gatewayip 169.254.128.133
   Bootloader=> set netmask 255.255.255.0
   Bootloader=> set ipaddrtype static
   Bootloader=> show
   Bootloader=> reboot
   ```

   The device will reboot and then download the image file. When the download process is complete, configure the device.

8.9.4 Setting IP Address using Serial Port

If the ScanTool fails to scan the device and users knows the login credentials then you can set the IP address for the device using serial port.

8.9.4.1 Hardware and Software Requirements

- Standard serial (RS-232) cable
- ASCII Terminal software

8.9.4.2 Attach the Serial Port Cable

1. Connect one end of the serial cable to the device and the other end to a serial port on your computer.
2. Power on the computer and the device.

8.9.4.3 Initializing the IP Address using CLI

After connecting the cable to the serial port, you can use the CLI to communicate with the device. CLI supports the most-generic terminal emulation programs. In addition, many web sites offer shareware or commercial terminal programs that you can download. Once the IP address has been assigned, you can use the HTTP interface or the Telnet to complete the configuration.

Follow these steps to assign an IP address to the device:

1. Open your terminal emulation program and set the following connection properties:
   - **Com Port**: COM1, COM2, and so on depending on your computer
   - **Baud Rate**: 115200
   - **Data Bits**: 8
   - **Stop Bits**: 1
   - **Flow Control**: None
   - **Parity**: None

   The terminal display shows Power On Self Tests (POST) activity, and then displays the software version. It prompts you to enter the CLI username and password. The commands to enter the username and password are as follows:

```
##################################################|
# +-++-++-++-++-++-+
# |p||r||o||x||i||m|
# +-++-++-++-++-++-+
# Version: 1.0.0 B208100
# Architecture: MIPS 7660
# Creation: 10-Aug-2009 (IST) 08:16:14 PM
##################################################|
Username: admin
Password:
```

   This process may take up to 90 seconds.

2. Enter the CLI Username and password. By default username is **admin** and password is **public**. The terminal displays a welcome message and then the CLI Prompt. Enter ‘show ip’ as shown below:

```
System Name> show ip

The following Ethernet IP information is displayed:

// Ethernet IP CONFIGURATION //
INDEX 1
IP Address: 10.0.0.1
Mask: 255.255.255.0
Address Type: static

// IP Gateway Configuration //
Gateway IP Address: 169.254.128.1
```

3. Change the IP address and other network values using the following CLI commands (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
```

4. After the device reboots, verify the new IP address by reconnecting to the CLI. Alternatively, you can ping the device from a network computer to confirm that the new IP address has taken effect.

   When a proper IP address is set, use HTTP interface or Telnet to configure the rest of the operating parameters of the device.

8.10 Spectrum Analyzer

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°, one can check the direction of the interference. 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.

8.10.1 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:

- Change the channel to a frequency that has no or least interference.
- Try changing the antenna polarization.
- 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.
- Adjusting the antenna angle/height can help to reduce the interference.

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.

8.10.2 Conclusion

A spectrum analyzer can be a great help to identify whether interference might be causing link problems on the device. 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.

- Base Announces should increase continuously.
- Registration Requests and Authentication Requests should be divisible by 3. WORP 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.

8.11 Miscellaneous

8.11.1 Unable to Retrieve Event Logs through HTTPS

If using Internet Explorer 7 and are not able to retrieve event logs through HTTPS, do the following:

1. Open Internet Explorer
2. Navigate to **Tool** > **Internet Options** > **Advanced**
3. Go to **Security** and uncheck/unselect **Do not save encrypted pages to disk**

Alternatively, use Mozilla Firefox 3.5 or later.

Feature Applicability

A

Given below are the feature(s) applicable to the respective point-to-point devices:

Feature Name	Bridge Mode	Routing Mode	QB-8150-EPR/LNK QB-8150-LNK-100 QB-8151-EPR/LNK QB-8200-EPA/LNK QB-8250-EPR/LNK		QB-8150-LNK-12/50		QB-825-EPR/LNK-50 QB-825-EPR/LNK-50*		Comments
			End Point A	End Point B	End Point A	End Point B	End Point A	End Point B	
Maximum MTU Size	Yes	Yes	No	No	Yes	Yes	Yes	Yes	
Advanced Ethernet Properties	Yes	Yes	Yes	Yes	No	No	No	No	
Sleep Mode	Yes	Yes	No	No	No	No	No	No	
Channel Offset	Yes	Yes	No	No	Yes	Yes	Yes	Yes	
Legacy Mode	Yes	Yes	No	No	No	No	No	No	
ATPC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DFS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Manual Blacklist	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DDRS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Wireless Security (Legacy Mode) None WEP TKIP AES-CCM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Wireless Security (11n Mode) None AES-CCM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
RADIUS Security	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes - only when configured in End Point A mode.
MAC ACL	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes - only when configured in End Point A mode.
QoS	Yes	Yes	Yes	No	Yes	No	Yes	No	QoS is configurable only on End Point A but applied to both End Point A and End Point B.
VLAN - Transparent and Trunk Mode	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
VLAN - Access Mode	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
VLAN - QinQ	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
VLAN over RADIUS	Yes	No	No	No	No	No	No	No	
QoS over RADIUS	Yes	Yes	No	No	No	No	No	No	
Filtering	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
WORP Intra Cell Blocking	Yes	No	No	No	No	No	No	No	
DHCP Server	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DHCP Relay	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
IGMP Snooping	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
Static Route Table	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
NAT	No	Yes	No	Yes	No	Yes	No	Yes	
RIP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
PPPoE client	No	Yes	No	No	No	No	Yes	No	
IP in IP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
SNMPv1-v2c and v3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
SNTP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Management Access Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
QB-EP to SU	Yes	Yes	Yes	Yes	No	No	Yes	Yes	
Sflow	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Wireless Site Survey	Yes	Yes	No	Yes	No	Yes	No	Yes	
STP/LACP Passthru	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	
Spectrum Analyzer	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Roaming	No	No	No	No	No	No	No	No	
DNS Proxy	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Dynamic Channel Selection	Yes	Yes	No	No	No	No	No	No	
IPv6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Secondary BSU	No	No	No	No	No	No	No	No	
Link Profiles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Supports only the default link profile
Radio Link Test Tool	Yes	Yes	No	No	No	No	Yes	Yes	"Yes" only for 82x devices
Scan Tool	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	IPv6 mode is applicable only in 82x devices

Given below are the feature(s) applicable to the respective point-to-multipoint devices:

Feature Name	Bridge Mode	Routing Mode	MP-8100-BSU MP-8200-BSU MP-820-BSU-100	MP-8160-BSU MP-8160-BS9	MP-8100-SUA MP-8150-SUR MP-8150-SUR-100 MP-8200-SUA MP-8250-SUR MP-820-SUA-50* MP-825-SUR-50+	MP-8160-SUA	MP-8150-CPE	MP-825-CPE-50	MP-8160-CPE	Comments
Maximum MTU Size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Advanced Ethernet Properties	Yes	Yes	No	No	No	No	No	No	No	
Sleep Mode	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes - only when configured in BSU mode.
Channel Offset	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	
Legacy Mode	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	
ATPC	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DFS	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	
Manual Blacklist	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DDRS	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Wireless Security (Legacy Mode) None WEP TKIP AES-CCM	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	8160 products do not support legacy mode
Wireless Security (11n Mode) None AES-CCM	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
RADIUS Security	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes - only when configured in BSU mode.
MAC ACL	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes - only when configured in BSU mode.
QoS	Yes	Yes	Yes	Yes	No	No	No	No	No	QoS is configurable only on BSU but applied to both BSU and SU
VLAN - Transparent and Trunk Mode	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
VLAN - Access Mode	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	
VLAN - QinQ	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	
VLAN over RADIUS	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	VLAN configuration for SUs can be configured in the RADIUS server.
QoS over RADIUS	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	QoS class for each SU can be configured in the RADIUS server.
Filtering	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
WORP Intra Cell Blocking	Yes	No	Yes	Yes	No	No	No	No	No	Yes - only when configured in BSU mode.
DHCP Server	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DHCP Relay	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
IGMP Snooping	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Static Route Table	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
NAT	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	
RIP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
PPPoE client	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes	
IP in IP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
SNMPv1-v2c and v3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
SNTP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Management Access Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
QB-EP to SU	Yes	Yes	No	No	No	No	No	No	No	
Sflow	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Wireless Site Survey	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	
STP/LACP Passthru	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Spectrum Analyzer	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	
Roaming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
DNS Proxy	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Dynamic Channel Selection	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Link Profiles	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
IPv6	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Secondary BSU	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Radio Link Test Tool	Yes	Yes	Yes	No	Yes	No	No	Yes	No	"Yes" only for 82x devices
Scan Tool	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	IPv6 mode is applicable only in 82x devices

Parameters Requiring Reboot

B

Given below are the parameters that require the device to reboot.

Parameter(s)	Web Page(s)	Applicable Device Mode*
System Configuration		
Radio Mode	BASIC CONFIGURATION ADVANCED CONFIGURATION -> System	All
Frequency Domain	BASIC CONFIGURATION ADVANCED CONFIGURATION -> System	All
Network Mode	ADVANCED CONFIGURATION -> System	All
Maximum MTU	ADVANCED CONFIGURATION -> System	All
Frequency Filter Lower Edge	ADVANCED CONFIGURATION -> System	All
Frequency Filter Upper Edge	ADVANCED CONFIGURATION -> System	All
IP Configuration (Bridge Mode)		
Ethernet	BASIC CONFIGURATION ADVANCED CONFIGURATION -> Network -> IP Configuration	All
Default Gateway IP Address		All
DNS		All
IP Configuration (Routing Mode)		
Ethernet	BASIC CONFIGURATION ADVANCED CONFIGURATION -> Network -> IP Configuration	All
Wireless		All
Wireless (With PPPoE)		SU Mode
Default Gateway IP Address		All
DNS (Primary and Secondary Address)		All
NAT		
Status	ADVANCED CONFIGURATION -> Network -> NAT	SU Mode / End Mode B mode
Dynamic Start Port	ADVANCED CONFIGURATION -> Network -> NAT	SU Mode / End Mode B mode
Dynamic End Port	ADVANCED CONFIGURATION -> Network -> NAT	SU Mode / End Mode B mode
PPPoE		
Status	ADVANCED CONFIGURATION -> Network -> PPPoE Client	SU Mode
Ethernet Interface Properties		
Admin Status	ADVANCED CONFIGURATION -> Network -> Ethernet	All

Parameter(s)	Web Page(s)	Applicable Device Mode*
Wireless Properties		
Channel Bandwidth	BASIC CONFIGURATION ADVANCED CONFIGURATION -> Wireless -> Interface1 -> Properties	All
Channel Offset	ADVANCED CONFIGURATION -> Wireless -> Properties	Applicable only to, • MP-820-BSU-100 • MP-820-SUA-50+ • MP-825-SUR-50+ • MP-825-CPE-50 • MP-8150-CPE • MP-8160-BSU • MP-8160-BS9 • MP-8160-SUA • MP-8160-CPE-A100 • QB-825-EPR/LNK-50 • QB-825-EPR/LNK-50+ • QB-8150-LNK-12/50
Auto Channel Selection	BASIC CONFIGURATION ADVANCED CONFIGURATION -> Wireless -> Interface1 -> Properties	Applicable only to BSU.
Legacy Mode	BASIC CONFIGURATION ADVANCED CONFIGURATION -> Wireless -> Interface1 -> Properties	Applicable only to, • MP-820-BSU-100 • MP-820-SUA-50+ • MP-825-SUR-50+ • MP-825-CPE-50 • MP-8100-BSU • MP-8100-SUA • MP-8150-SUR • MP-8150-CPE • MP-8150-SUR-100 • MP-8200-BSU • MP-8200-SUA • MP-8250-BS9 • MP-8250-BS1 • MP-8250-SUR
Frequency Extension	ADVANCED CONFIGURATION -> Wireless -> Interface1 -> Properties -> MIMO Properties -> MIMO	All
Upgrade Firmware and Configuration		
Upgrade Firmware	MANAGEMENT -> File Management -> Upgrade Firmware	All

Parameter(s)	Web Page(s)	Applicable Device Mode*
Upgrade Configuration	MANAGEMENT -> File Management -> Upgrade Configuration	All
HTTP / HTTPS		
Admin Password	MANAGEMENT -> Services -> HTTP / HTTPS	All
Monitor Password		All
HTTP		All
HTTP Port		All
HTTPS		All

Parameter(s)	Web Page(s)	Applicable Device Mode*
SNMP (If SNMP v1-v2c is enabled)		
SNMP	MANAGEMENT -> Services -> SNMP	All
Version		All
Read Password		All
Read / Write Password		All
SNMP Trap Host Table		All
SNMP (If SNMP v3 is enabled)		
SNMP	MANAGEMENT -> Services -> SNMP	All
Version		All
Security Level		All
Priv Protocol		All
Priv Password		All
Auth Protocol		All
Auth Password		All
SNMP Trap Host Table		All
Telnet / SSH		

Parameter(s)	Web Page(s)	Applicable Device Mode*
Admin Password	MANAGEMENT -> Services -> Telnet / SSH	All
Monitor Password		All
Telnet		All
Telnet Port		All
Telnet Sessions		All
SSH		All
SSH Port		All
SSH Sessions		All
Management Access Control		
Access Table Status	MANAGEMENT -> Access Control	All
Management Access Control Table		All
Reset to Factory	MANAGEMENT -> Reset to Factory	All
Convert QB to MP	MANAGEMENT -> Convert QB to MP	Applicable only to • QB-825-EPR/LNK-50 • QB-825-EPR/LNK-50+ • QB-8100-EPA/LNK • QB-8150-EPR/LNK • QB-8150-LNK-100 • QB-8151-EPR/LNK • QB-8200-LNK

* **BSU**: Refers to a Base Station
SU Mode: Refers to both SU and CPE
End Point A Mode: Refers to a device in End Point A mode
End Point B Mode: Refers to a device in End Point B mode

Frequency Domains and Channels

C

Introduction

The Tsunami® point-to-point and point-to-multipoint products are available in two SKUs: United States (US) and rest of the World (WD) markets. Depending on the SKU, the device is hard programmed at factory per the 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 regulatory rules and frequency bands. The frequency domains can be easily configured using the Web Interface as it is a drop down list with all the available domains. The following table lists all the Tsunami® 800 and 8000 Series products with the applicable frequency domains and their corresponding ENUM values, SKUs supported and licensed frequency bands.

US Frequency Domains

Point to Multipoint Devices							
Product(s)				MP-8100-BSU MP-8100-SUA	MP-8150-SUR MP-8150-SUR-100	MP-8150-CPE	MP-8200-BSU / SUA MP-8250-BS9 / BS1 MP-8250-SUR	MP-820-BSU-100 MP-820-SUA-50+ MP-825-CPE-50 MP-825-SUR-50+
Licensed Bands (in GHz)				2.4, 4.9, 5.0	5.0	5.0	4.9, 5.0	5.0
Frequency Domains	United States 5 GHz - US*	ENUM Values	1				✓	✓
	United States 5.8 GHz - US*		2	✓	✓	✓	✓	✓
	United States 2.4 GHz - US*		3	✓				
	US2 (5.3 and 5.8GHz) - US*		22	✓	✓	✓		✓
	United States 4.9 GHz		28				✓	

Point to Point Devices								
Product(s)				QB-8100-EPA/LNK	QB-8150-EPR QB-8150-LNK QB-8150-LNK-100 QB-8151-EPR/LNK	QB-8150-LNK-12# QB-8150-LNK-50	QB-8200-EPA/LNK QB-8250-EPR/LNK	QB-825-EPR/LNK-50 QB-825-EPR/LNK-50+
				US	US	US	US	US
Licensed Bands (in GHz)				2.4, 5.0	5.0	5.0	4.9, 5.0	5.0
Frequency Domains	United States 5 GHz - US*	ENUM Values	1				✓	✓
	United States 5.8GHz - US*		2	✓	✓	✓	✓	✓
	United States 2.4 GHz - US*		3	✓				
	US2 (5.3 and 5.8GHz) - US*		22	✓	✓			✓
	United States 4.9 GHz		28				✓	

* Applicable to US SKU only
# US SKU is not applicable to QB-8150-LNK-12

World Frequency Domains

Point to Multipoint Devices								
Product(s)			MP-8100-BSU MP-8100-SUA	MP-8150-SUR MP-8150-SUR-100	MP-8150-CPE	MP-8160-BSU MP-8160-BS9 MP-8160-SUA MP-8160-CPE	MP-8200-BSU / SUA MP-8250-BS9 / BS1 MP-8250-SUR MP-820-BSU-100 MP-820-SUA-50+	MP-825-SUR-50+ MP-825-CPE-50
			WD	WD	WD	WD	WD	WD
Licensed Bands (in GHz)			2.4, 4.9, 5.0	4.9, 5.0	5.0	6.4	4.9, 5.0	5.0
Frequency Domains	World 5 GHz	ENUM Values 4	✓	✓	✓		✓	✓
	World 4.9 GHz	5	✓	✓			✓	
	World 2.4 GHz	6	✓					
	World 2.3 GHz	7	✓					
	World 2.5 GHz	8	✓					
	Canada 5 GHz	9	✓	✓	✓		✓	✓
	WD Europe 5.8 GHz	10	✓	✓	✓		✓	✓
	WD Europe 5.4 GHz	11	✓	✓	✓		✓	✓
	WD-Europe 2.4 GHz	12	✓					
	Russia 5 GHz	13	✓	✓	✓		✓	✓
	Taiwan 5 GHz	14	✓	✓	✓		✓	✓
	WD United States 5 GHz	15	✓	✓	✓		✓	✓
	Canada 5.8 GHz	16	✓	✓	✓		✓	✓
	World 6.4 GHz	17				✓		
	WD UK 5.8 GHz	20	✓	✓	✓		✓	✓
	World 5.9 GHz	21	✓	✓	✓		✓	✓
	India 5.8 GHz	23	✓	✓	✓		✓	✓
	Brazil 5.4 GHz	24	✓	✓	✓		✓	✓
	Brazil 5.8 GHz	25	✓	✓	✓		✓	✓
	Australia 5.4 GHz	26	✓	✓	✓		✓	✓
	Australia 5.8 GHz	27	✓	✓	✓		✓	✓
	WD United States 4.9 GHz	29					✓	
	Canada 4.9 GHz	30					✓	
	WD Japan 4.9 GHz	31					✓	
	Legacy 5GHz	32	✓	✓	✓		✓	✓
	WD Japan 5.6 GHz	33					✓	✓
	WD United States 5.8	34					✓	✓
	World 5.8 GHz	40	✓	✓			✓	✓
	Indonesia 5.7 GHz	41	✓	✓			✓	✓

Point to Point Devices								
Product(s)				QB-8100-EPA/LNK	QB-8150-EPR QB-8150-LNK QB-8150-LNK-100 QB-8151-EPR/LNK	QB-8150-LNK-12# QB-8150-LNK-50	QB-8200-EPA/LNK QB-8250-EPR/LNK	QB-825-EPR/LNK-50 QB-825-EPR/LNK-50+
				WD	WD	WD	WD	WD
Licensed Bands (in GHz)				2.4, 4.9, 5.0	4.9, 5.0	5.0	4.9, 5.0	5.0
Frequency Domains	World 5 GHz	ENUM Values	4	✓	✓	✓	✓	✓
	World 4.9 GHz		5	✓	✓		✓	
	World 2.4 GHz		6	✓				
	World 2.3 GHz		7	✓				
	World 2.5 GHz		8	✓				
	Canada 5 GHz		9	✓	✓	✓	✓	✓
	WD-Europe 5.8 GHz		10	✓	✓	✓	✓	✓
	WD-Europe 5.4 GHz		11	✓	✓	✓	✓	✓
	WD-Europe 2.4 GHz		12	✓				
	Russia 5 GHz		13	✓	✓	✓	✓	✓
	Taiwan 5 GHz		14	✓	✓	✓	✓	✓
	WD United States 5 GHz		15	✓	✓	✓	✓	✓
	Canada 5.8 GHz		16	✓	✓	✓	✓	✓
	World 6.4 GHz		17					
	World UK 5.8 GHz		20	✓	✓	✓	✓	✓
	World 5.9 GHz		21	✓	✓	✓	✓	✓
	India 5.8 GHz		23	✓	✓	✓	✓	✓
	Brazil 5.4 GHz		24	✓	✓	✓	✓	✓
	Brazil 5.8 GHz		25	✓	✓	✓	✓	✓
	Australia 5.4 GHz		26	✓	✓	✓	✓	✓
	Australia 5.8 GHz		27	✓	✓	✓	✓	✓
	WD United States 4.9 GHz		29				✓	
	Canada 4.9 GHz		30				✓	
	WD Japan 4.9 GHz		31				✓	
	Legacy 5 GHz		32	✓	✓	✓	✓	✓
	WD Japan 5.6 GHz		33				✓	✓
	WD United States 5.8 GHz		34				✓	✓
	World 5.8 GHz		40	✓	✓		✓	✓
	Indonesia 5.7 GHz		41	✓	✓		✓	✓

Europe and Japan Frequency Domains

Point to Multipoint Devices								
Product(s)				MP-8100-BSU MP-8100-SUA	MP-8150-SUR MP-8150-SUR-100	MP-8200-BSU / SUA MP-8250-BS9 / BS1 MP-8250-SUR		MP-820-BSU-100 MP-820-SUA-50+	MP-825-SUR-50+ MP-825-CPE-50
				EU	EU	EU	JP	EU	EU
Licensed Bands (in GHz)				2.4, 4.9, 5.0	4.9, 5.0	4.9, 5.0	4.9, 5.0	4.9, 5.0	5.0
Frequency Domains	Japan 2.4 GHz	ENUM Values	18						
	Japan 4.9 GHz		19				✓		
	UK 5.8 GHz		35	✓	✓	✓		✓	✓
	Europe 5.8 GHz		36	✓	✓	✓		✓	✓
	Europe 5.4 GHz		37	✓	✓	✓		✓	✓
	Europe 2.4 GHz		38	✓					
	Japan 5.6 GHz		39				✓		

Point to Point Devices								
Product(s)				QB-8100-EPA/LNK	QB-8150-EPR QB-8150-LNK QB-8150-LNK-100 QB-8151-EPR/LNK	QB-8200-EPA/LNK QB-8250-EPR/LNK		QB-825-EPR/LNK-50 QB-825-EPR/LNK-50+
				EU	EU	JP	EU	EU
Licensed Bands (in GHz)				2.4, 4.9, 5.0	4.9, 5.0	4.9, 5.0	4.9, 5.0	5.0
Frequency Domains	Japan 2.4 GHz	ENUM Values	18					
	Japan 4.9 GHz		19			✓		
	UK 5.8 GHz		35	✓	✓		✓	✓
	Europe 5.8 GHz		36	✓	✓		✓	✓
	Europe 5.4 GHz		37	✓	✓		✓	✓
	Europe 2.4 GHz		38	✓				
	Japan 5.6 GHz		39			✓		

When the device is configured by using CLI or SNMP, care has to be taken to set the domains by using a predefined ENUM value.

Example: The CLI commands to set WORLD 5 GHz as frequency domain are as follows:

```
T8000-C1:65:7E(config)# system-configure
T8000-C1:65:7E(config-sysconfig)# network-mode bridge
Changes in Network mode requires Reboot.
T8000-C1:65:7E(config-sysconfig)# frequency-domain ?
Possible completions:

<Use 'show supported-frequency-domains' to get supported frequency domains
list>
Frequency Domain Configuration
T8000-C1:65:7E(config-sysconfig)# frequency-domain 4
Changes in Frequency Domain requires Reboot.
T8000-C1:65:7E(config-sysconfig)#exit
T8000-C1:65:7E(config)#exit
```

: All DFS countries support only 20 and 40 MHz channel bandwidths.

2.4 GHz Channels

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
US SKU						
United States 2.4 GHz	2412 ~ 2462	1 (2412), 2 (2417)... 10 (2457), 11 (2462).	1 (2412), 2 (2417)... 10 (2457), 11 (2462).	1 (2412), 2 (2417)... 10 (2457), 11 (2462).	1 (2412), 2 (2417)... 6 (2437), 7 (2442).	5 (2432), 6 (2437)... 10 (2457), 11 (2462).
World SKU						
World 2.3 GHz	2277 ~ 2397	100 (2277), 101 (2282)... 123 (2392), 124 (2397).	100 (2277), 101 (2282)... 122 (2387), 123 (2392).	101 (2282), 102 (2287)... 121(2382), 122 (2387).	101 (2282), 102 (2287)... 117 (2362), 118 (2367).	105 (2302), 106(2307)... 121(2382), 122 (2387).
World 2.4 GHz	2412 ~ 2472	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 8 (2447), 9 (2452).	5 (2432), 6 (2437)... 12 (2467), 13 (2472).
World 2.5 GHz	2477 ~ 2507	200(2477), 201(2482)... 205 (2502), 206(2507).	200(2477), 201(2482)... 205 (2502), 206(2507).	201(2482), 202 (2487)... 204(2497), 205 (2502).	-	-
WD-Europe 2.4 GHz	2412 ~ 2472	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 8 (2447), 9 (2452).	5 (2432), 6 (2437)... 12 (2467), 13 (2472).
EU SKU						
Europe 2.4 GHz	2412 ~ 2472	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 12 (2467), 13 (2472).	1 (2412), 2 (2417)... 8 (2447), 9 (2452).	5 (2432), 6 (2437)... 12 (2467), 13 (2472).

4.9 and 5 GHz Channels

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
US SKU						
United States 5 GHz	5260 ~ 5320 (DFS) 5500 ~ 5580 (DFS) 5660 ~ 5700 (DFS) 5745 ~ 5825 (non-DFS)	-	-	52(5260), 53(5265)... 63(5315), 64(5320). 100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700). 149(5745), 150(5750)... 164(5820), 165(5825).	52(5260), 53(5265)... 59(5295), 60(5300). 100(5500), 101(5505)... 111(5555), 112(5560). 133(5665), 134(5670)... 135(5675), 136(5680). 149(5745), 150(5750)... 160(5800), 161(5805).	56(5280), 57(5285)... 63(5315), 64(5320). 104(5520), 105(5525)... 115(5575), 116(5580). 136(5680), 137(5685)... 139(5695), 140(5700). 153(5765), 154(5770)... 164(5820), 165(5825).
United States 5.8 GHz	5740 ~ 5830 (Non-DFS)	148(5740), 149(5745)... 165(5825), 166(5830).	149(5745), 150(5750)... 164(5820), 165(5825).	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 (DFS) 5745 ~ 5825 (Non-DFS)	-	-	52(5260), 53(5265)... 63(5315), 64(5320). 149(5745), 150(5750)... 164(5820), 165(5825).	52(5260), 53(5265)... 59(5295), 60(5300). 149(5745), 150(5750)... 160(5800), 161(5805).	56(5280), 57(5285)... 63(5315), 64(5320). 153(5765), 154(5770)... 164(5820), 165(5825).
United States 4.9 GHz	4942 ~ 4987 (Non-DFS)	5(4942.5), 15(4947.5)... 85(4982.5), 95(4987.5).	10(4945), 20(4950)... 80(4980), 90(4985).	20(4950), 30(4955)... 70(4975), 80(4980).	-	-
Japan SKU						
Japan 4.9	4912 ~ 4980 (Non-DFS)	182(4912.5), 183(4917.5)... 188(4942.5), 189(4947.5).	183(4915), 184(4920)... 188(4940), 189(4945).	184(4920), 188(4940)... 192(4960), 196(4980).	184(4920), 185(4925), 191(4955)... 192(4960).	188(4940), 189(4945), 195(4975)... 196(4980).

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
Japan 5.6	5500 ~ 5700 (DFS)	-	-	100(5500) 104(5520) 108(5540) 112(5560) 116(5580) 120(5600) 124(5620) 128(5640) 132(5660) 136(5680) 140(5700)	100(5500) 108(5540) 116(5580) 124(5620) 136(5680)	104(5520) 112(5560) 120(5600) 128(5640) 140(5700)
World SKU						
WD United States 5 GHz	5255 ~ 5325 (DFS) 5495 ~ 5585 (DFS) 5655 ~ 5705 (DFS) 5740 ~ 5830 (non-DFS)	-	-	52(5260), 53(5265)... 63(5315), 64(5320). 100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700). 149(5745), 150(5750)... 164(5820), 165(5825)	52(5260), 53(5265)... 59(5295), 60(5300). 100(5500), 101(5505)... 111(5555), 112(5560). 133(5665), 134(5670), 135(5675), 136(5680). 149(5745), 150(5750)... 160(5800), 161(5805).	56(5280), 57(5285)... 63(5315), 64(5320). 104(5520), 105(5525)... 115(5575), 116(5580). 136(5680), 137(5685)... 139(5695), 140(5700). 153(5765), 154(5770)... 164(5820), 165(5825).
World 5 GHz	5155 ~ 6075 (Non-DFS) *Please note that 8200 & 82x SKUs support upto 5920 MHz frequency.*	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	4905 ~ 4995 (Non-DFS)	181(4905), 182(4910)… 187(4935), 188(4940). 10(4945), 20(4950)… 100(4990), 110(4995).	181(4905), 182(4910)… 187(4935), 188(4940). 10(4945), 20(4950)… 100(4990), 110(4995).	182(4910), 183(4915)… 187(4935), 188(4940). 10(4945), 20(4950)… 90(4985), 100(4990).	182(4910), 183(4915)… 187(4935), 188(4940). 10(4945), 20(4950)… 50(4965), 60(4970).	186(4930), 187(4935), 188(4940), 10(4945), 20(4950)… 90(4985), 100(4990).

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
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)
Canada 5 GHz	5255 ~ 5325 (DFS) 5495 ~ 5585 (DFS) 5655 ~ 5705 (DFS)	-	-	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)... 59(5295), 60(5300). 100(5500), 101(5505)... 111(5555), 112(5560). 132(5660), 133(5665)... 135(5675), 136(5680).	56(5280), 57(5285)... 63(5315), 64(5320). 104(5520), 105(5525)... 115(5575), 116(5580). 136(5680), 137(5685)... 139(5695), 140(5700).
WD-Europe 5.4 GHz	5495 ~ 5585 (DFS) 5655 ~ 5705 (DFS)	-	-	100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).	100(5500), 101(5505)... 111(5555), 112(5560). 132(5660), 133(5665)... 135(5675), 136(5680).	104(5520), 105(5525)... 115(5575), 116(5580). 136(5680), 137(5685)... 139(5695), 140(5700).
WD-Europe 5.8 GHz	5735 ~ 5870 (DFS)	-	-	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) *Please note that 8200 & 82x SKUs support upto 5920 MHz frequency.*	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).
Taiwan 5 GHz	5495 ~ 5705 (DFS) 5740 ~ 5810 (Non-DFS)	-	-	100(5500), 101(5505)... 139(5695), 140(5700). 149(5745), 150(5750)... 160(5800), 161(5805).	100(5500), 101(5505)... 135(5675), 136(5680). 149(5745), 150(5750)... 156(5780), 157(5785).	104(5520), 105(5525)... 139(5695), 140(5700). 153(5765), 154(5770)... 160(5800), 161(5805).

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		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).
WD U.K 5.8 GHz	5730 ~ 5790 (DFS) 5820 ~ 5845 (DFS)	-	-	147(5735), 148(5740)... 156(5780), 157(5785). 167(5835).	147(5735), 148(5740)... 152(5760), 153(5765).	151(5755), 152(5760)... 156(5780), 157(5785).
Australia 5.4 GHz	5475 ~ 5595 (DFS) 5655 ~ 5720 (DFS)	-	-	96(5480), 97(5485)… 117(5585), 118(5590). 132(5660), 133(5665)… 142(5710), 143(5715).	96(5480), 97(5485)… 113(5565), 114(5570). 132(5660), 133(5665)… 138(5690), 139(5695).	100(5500), 101(5505)… 117(5585), 118(5590). 136(5680), 137(5685)… 142(5710), 143(5715).
Australia 5.8 GHz	5730 ~ 5845 (Non-DFS)	146(5730), 147(5735)… 168(5840), 169(5845).	146(5730), 147(5735)... 148(5740), 169(5845).	147(5735), 148(5740)… 167(5835), 168(5840).	147(5735), 148(5740)... 163(5815), 164(5820).	151(5755), 152(5760)… 167(5835), 168(5840).
Brazil 5.4 GHz	5475 ~ 5720 (DFS)	-	-	96(5480), 97(5485)… 142(5710), 143(5715).	96(5480), 97(5485)… 138(5690), 139(5695).	100(5500), 101(5505)… 142(5710), 143(5715).
Brazil 5.8 GHz	5730 ~ 5845 (Non-DFS)	146(5730), 147(5735)... 168(5840), 169(5845).	146(5730), 147(5735)... 168(5840), 169(5845).	147(5735), 148(5740)... 167(5835), 168(5840).	147(5735), 148(5740)... 163(5815), 164(5820).	151(5755), 152(5760)... 167(5835), 168(5840).
Canada 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).

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
Legacy 5GHz	5150 ~ 6080 (Non-DFS) *Please note that 8200 & 82x SKUs support upto 5920 MHz frequency.*	30(5150), 31(5155)... 215(6075), 216(6080).	30(5150), 32(5160)... 214(6070), 216(6080).	30(5150), 34(5170)... 210(6050), 216(6070).	-	-
WD Japan 4.9	4912 ~ 4980 (Non-DFS) *Please note that 8100 SKUs does not support this frequency.*	182(4912.5), 183(4917.5)... 188(4942.5), 189(4947.5).	183(4915), 184(4920)... 188(4940), 189(4945).	184(4920), 188(4940), 192(4960), 196(4980).	184(4920) 192(4960)	188(4940) 196(4980)
WD-Japan 5.6	5500 ~ 5700 (DFS)	-	-	100(5500) 104(5520) 108(5540) 112(5560) 116(5580) 120(5600) 124(5620) 128(5640) 132(5660) 136(5680) 140(5700)	100(5500) 108(5540) 116(5580) 124(5620) 136(5680)	104(5520) 112(5560) 120(5600) 128(5640) 140(5700)
WD United States 4.9 GHz	4942 ~ 4987 (Non-DFS)	5(4942.5), 15(4947.5)... 85(4982.5), 95(4987.5),	10(4945), 20(4950)... 80(4980), 90(4985).	20(4950), 30(4955)... 70(4975), 80(4980).	-	-
WD United States 5.8 GHz	5740 ~ 5830 (Non-DFS)	148(5740), 149(5745)... 165(5825), 166(5830).	149(5745), 150(5750)... 164(5820), 165(5825).	149(5745), 150(5750)... 164(5820), 165(5825).	149(5745), 150(5750)... 160(5800), 161(5805).	153(5765), 154(5770)... 164(5820), 165(5825).
World 5.8 GHz	5720 ~ 5855 (Non-DFS)	144(5720), 145(5725)... 170(5850), 171(5855).	144(5720), 145(5725)... 170(5850), 171(5855).	145(5725), 146(5730)... 169(5845), 170(5850).	145(5725), 146(5730)... 165(5825), 166(5830).	149(5745), 150(5750)... 169(5845), 170(5850).
Indonesia 5.7 GHz	5730 ~ 5820 (Non-DFS)	146(5730), 147(5735)... 163(5815), 164(5820).	146(5730), 147(5735)... 163(5815), 164(5820).	147(5735), 148(5740)... 162(5810), 163(5815).	147(5735), 148(5740)... 158(5790), 159(5795).	151(5755), 152(5760)... 162(5810), 163(5815).

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency in GHz)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
EU SKU						
U.K 5.8 GHz	5730 ~ 5790 (DFS) 5820 ~ 5845 (DFS)	-	-	147(5735), 148(5740)... 156(5780), 157(5785). 167(5835)	147(5735), 148(5740)... 152(5760), 153(5765).	151(5755), 152(5760)... 156(5780), 157(5785).
Europe 5.8 GHz	5735 ~ 5870 (DFS)	-	-	149(5745), 150(5750)... 172(5860), 173(5865).	149(5745), 150(5750)… 168(5840), 169(5845).	153(5765), 154(5770)... 172(5860), 173(5865).
Europe 5.4 GHz	5495 ~ 5585 (DFS) 5655 ~ 5705 (DFS)	-	-	100(5500), 101(5505)... 115(5575), 116(5580). 132(5660), 133(5665)... 139(5695), 140(5700).	100(5500), 101(5505)... 111(5555), 112(5560). 132(5660), 133(5665)... 135(5675), 136(5680).	104(5520), 105(5525)... 115(5575), 116(5580). 136(5680), 137(5685)... 139(5695), 140(5700).

6.4 GHz Channels

Frequency Domain	Frequency Band (Start Frequency ~ End Frequency in MHz)	Allowed Channels (Center Frequency)				
		5 MHz	10 MHz	20 MHz	40 PLUS MHz	40 MINUS MHz
World 6.4 GHz	5905 ~ 6420	181 (5905), 182 (5910)... 283 (6415), 284 (6420).	181 (5905), 182 (5910)... 283 (6415), 284 (6420).	182 (5910), 183 (5915)... 282 (6410), 283 (6415).	182 (5910), 183 (5915)... 278 (6390), 279 (6395).	186 (5930) 187 (5935)... 282 (6410), 283 (6415).

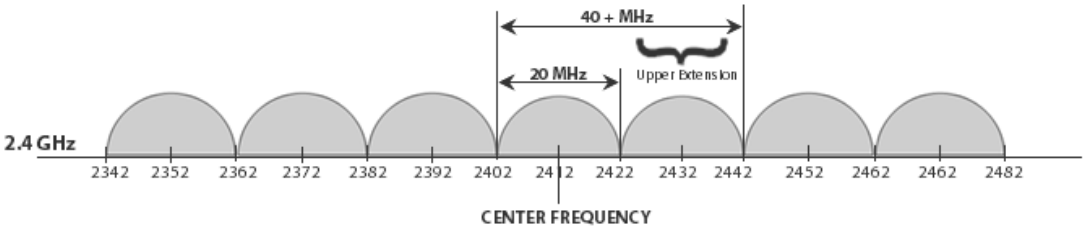
: The center frequency listed in the above tables are based on channel offset set to '0'. If channel offset is set to any value other than '0' then the center frequency will be shifted accordingly. You can set the channel offset ranging from -2 to +2 MHz in MP-8150-CPE, MP-8160-BSU, MP-8160-SUA, MP-8160-CPE-A100, MP-825-CPE-50, MP-820-BSU-100, MP-820-SUA-50+, MP-825-SUR-50+, QB-8150-EPR/LNK-12/50, QB-825-EPR/LNK-50, and QB-825-EPR/LNK-50+.

Details for 40MHz Bandwidth

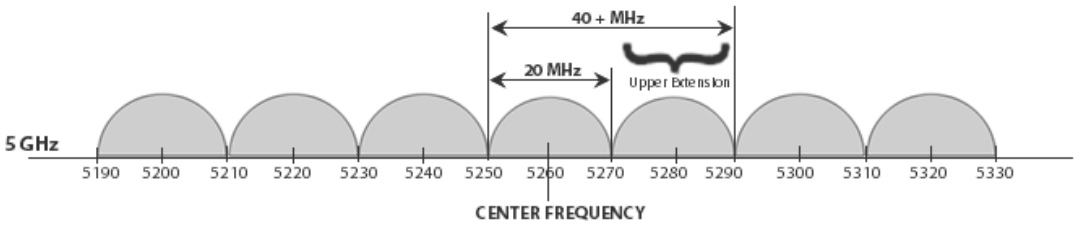
While choosing 40MHz bandwidth, you can select 40 PLUS (Upper Extension) or 40 MINUS (Lower Extension). 40 PLUS means the center frequency calculation is done for 20MHz and add another 20MHz to the top edge of 20MHz. 40 MINUS means the center frequency calculation is done for 20MHz and add another 20MHz to the bottom edge of 20MHz.

For 40 PLUS

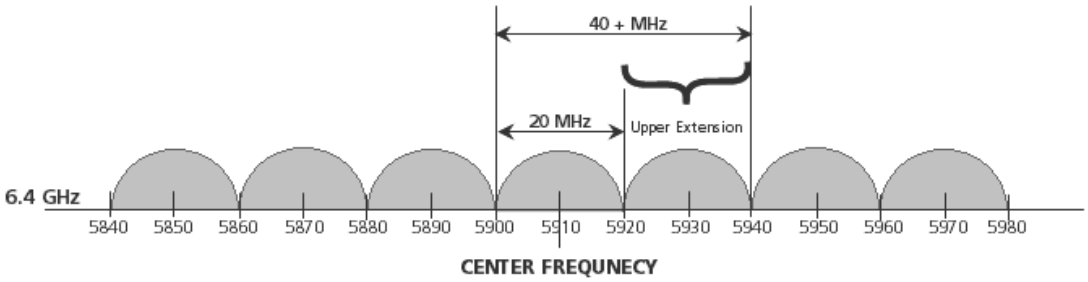
- 2.4GHz ->
  - Channel 1 = 2412 MHz
  - Bandwidth starts from 2403 MHz and ends at 2442 MHz



- 5GHz ->
  - Channel 52 = 5260 MHz
  - Bandwidth starts from 5251 MHz and ends at 5290 MHz

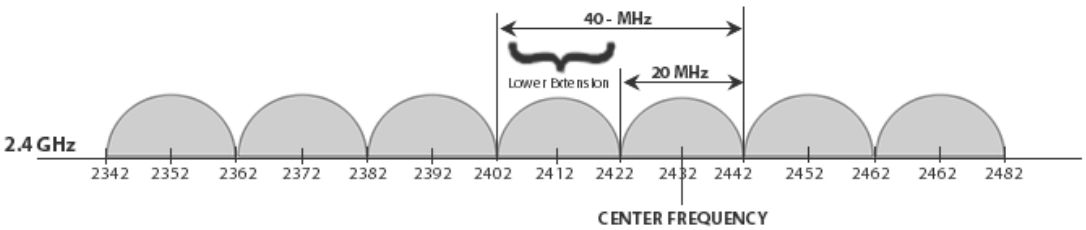


- 6.4GHz ->
  - Channel 181 = 5910 MHz
  - Bandwidth starts from 5901 MHz and ends at 5940 MHz

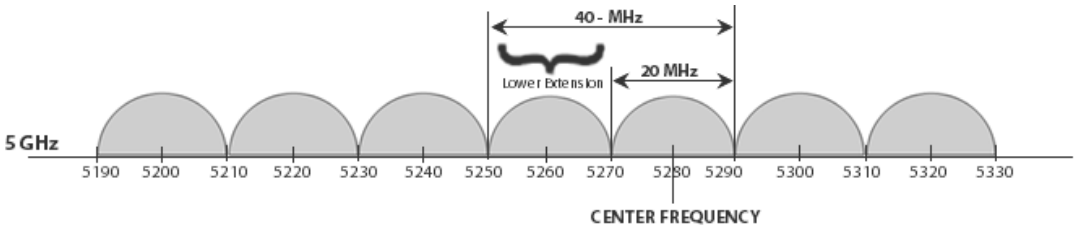


For 40 MINUS

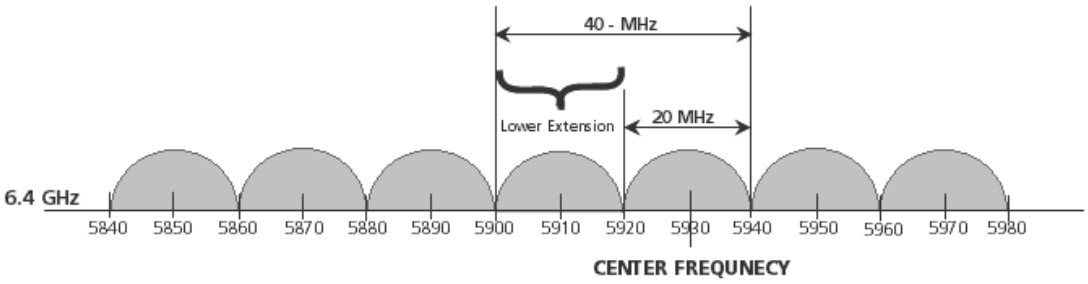
- 2.4GHz ->
  - Channel 5 = 2432 MHz
  - Bandwidth starts from 2403 MHz and ends at 2442 MHz



- 5GHz ->
  - Channel 56 = 5280 MHz
  - Bandwidth starts from 5251 MHz and ends at 5290 MHz



- 6.4GHz ->
  - Channel 186 = 5930 MHz
  - Bandwidth starts from 5901 MHz and ends at 5940 MHz


40 - MHz
Lower Extension
20 MHz
6.4 GHz
5840
5850
5860
5870
5880
5890
5900
5910
5920
5930
5940
5950
5960
5970
5980
CENTER FREQUNECY

LACP - Device Management

D

Tsunami Quickbridge® devices that are part of the LACP link cannot be managed through the switches, so it is recommended to use the second Ethernet port for management.

:

- *When using second Ethernet port for management, ensure to disable Auto Shutdown for Ethernet2. See* Auto Shutdown*).*
- ***STP/LACP Frames** should be set to passthru. See* Filtering (Bridge Only)

: The second Ethernet port is POE out; it should be connected via a passive POE (Without the AC power plugged-in) or Gigabit 48 VDC Injector (GIG-POE-INJ-48VDC-T) (without 48 VDC power plugged-in). Directly connecting the Ethernet port2 of the device to the PC Ethernet NIC may damage the PC NIC port or Ethernet port on the switch.

In this chapter, we have chosen the following two examples to explain the device management in the LACP link, by using the second Ethernet port.

Example1

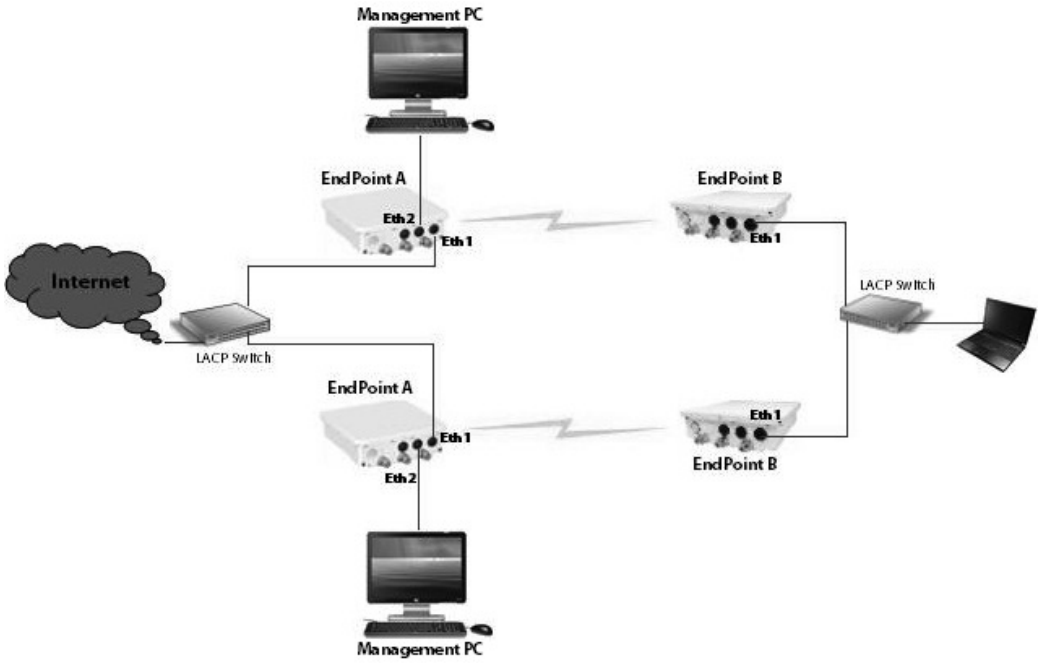


Figure D-1 Device Management with No VLAN

In this example, we have considered a network with two QuickBridge links each supporting LACP mode. In this setup, VLAN is not configured on both LACP switches and devices.

The Ethernet1 of all the devices is connected to the LACP port and is used for data transfer.

To manage the devices, use a dedicated management Personal Computer per QuickBridge link. Use Ethernet2 port of the device to connect the Personal Computer.

: In Fail Over Mode (if one of the link goes down), the remote device of a particular link cannot be managed.

Example2

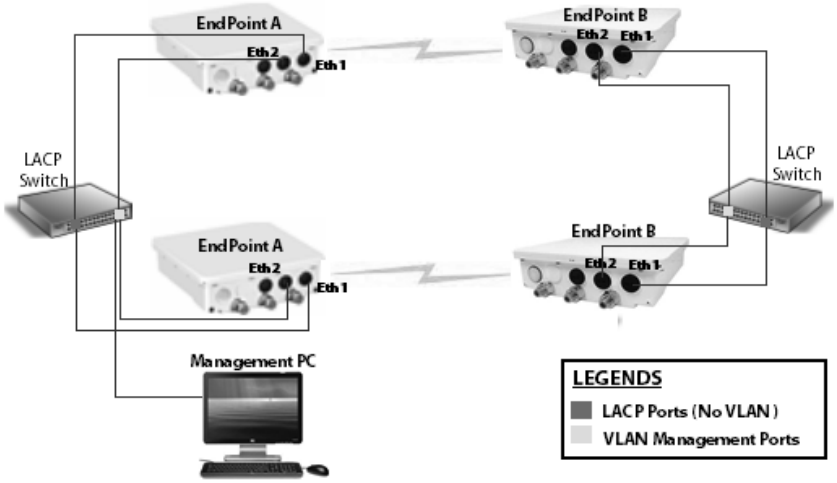


Figure D-2 Device Management with VLAN

In this example, we have considered a network with two QuickBridge links each supporting LACP mode. In this setup, Ethernet 1 of all the devices is connected to the LACP port, with no VLAN. The Ethernet 2 of all the devices is connected to the tagged VLAN management port with Spanning Tree enabled.

To manage all the devices in the QuickBridge network, use one dedicated management Personal Computer connected to the untagged VLAN port of the switch.

To manage the devices, configure same management VLAN Id on all the devices. The Ethernet 1 should be configured in transparent VLAN mode to allow data transfer. The Ethernet2 can be configured either in transparent mode or trunk mode to allow management traffic to the devices.

With Spanning Tree enabled on the LACP Switches, you will be able to manage all the QuickBridge devices, even if one of the wireless link goes down.

For VLAN configuration, refer VLAN (Bridge Mode Only).

QinQ

E

The Subscribers and End Point devices support QinQ VLAN feature that enables service providers to use a single VLAN ID to support multiple customer VLANs by encapsulating the 802.1Q VLAN tag within another 802.1Q frame. The benefits with QinQ are as follows:

- Increases the VLAN space in a provider network or enterprise backbone
- Reduce the number of VLANs that a provider needs to support within the provider network for the same number of customers
- Enables customers to plan their own VLAN IDs, without running into conflicts with service provider VLAN IDs
- Provides a simple Layer 2 VPN solution for small-sized MAN (Metropolitan Area Networks) or Intranet
- Provides customer traffic isolation at Layer 2 within a service provider network

Consider a BSU and SU network, with QinQ (**Double VLAN (Q in Q) Status**) enabled on the SU.

- **Subscriber**:
  - Based on the Ethernet VLAN configuration on the Subscriber, the data packets are tagged as follows:
    - **Access Mode**: SU double tags the packet with Access VLAN ID as inner tag and Service VLAN ID as outer tag.

      : When Double VLAN is enabled on the device, the Access VLAN ID should not be set to -1.

    - **Trunk Mode**: SU expects a tagged packet (inner tag) and tags the packet with Service VLAN ID as outer tag.

      : When Double VLAN is enabled on the device, the Port VLAN ID should not be set to -1.

    - **Transparent Mode**: When QinQ is enabled, SU cannot be configured in the Transparent mode.
  - In case of downlink traffic, SU always expects double tagged packet from the wireless side. If the outer VLAN tag matches with Service VLAN ID then SU will untag the packet and forward to Ethernet. Based on Ethernet VLAN configuration, the data packets are handled accordingly. When the outer VLAN tag does not match the Service VLAN ID, the packet is dropped.
  - Different outer VLAN IDs can be configured for different SUs, but those VLAN IDs should also be configured on the BSU Ethernet.

- **Base Station**:
  - BSU always considers the first VLAN tag available in the packet; in case of double tagged packet it is the outer VLAN ID.
    - **Trunk Mode**: The outer tag of the packet arriving at the Ethernet side should match with the VLAN ID configured in the trunk table.
    - **Transparent Mode**: When configured in transparent mode, ensure the data packet is double tagged.

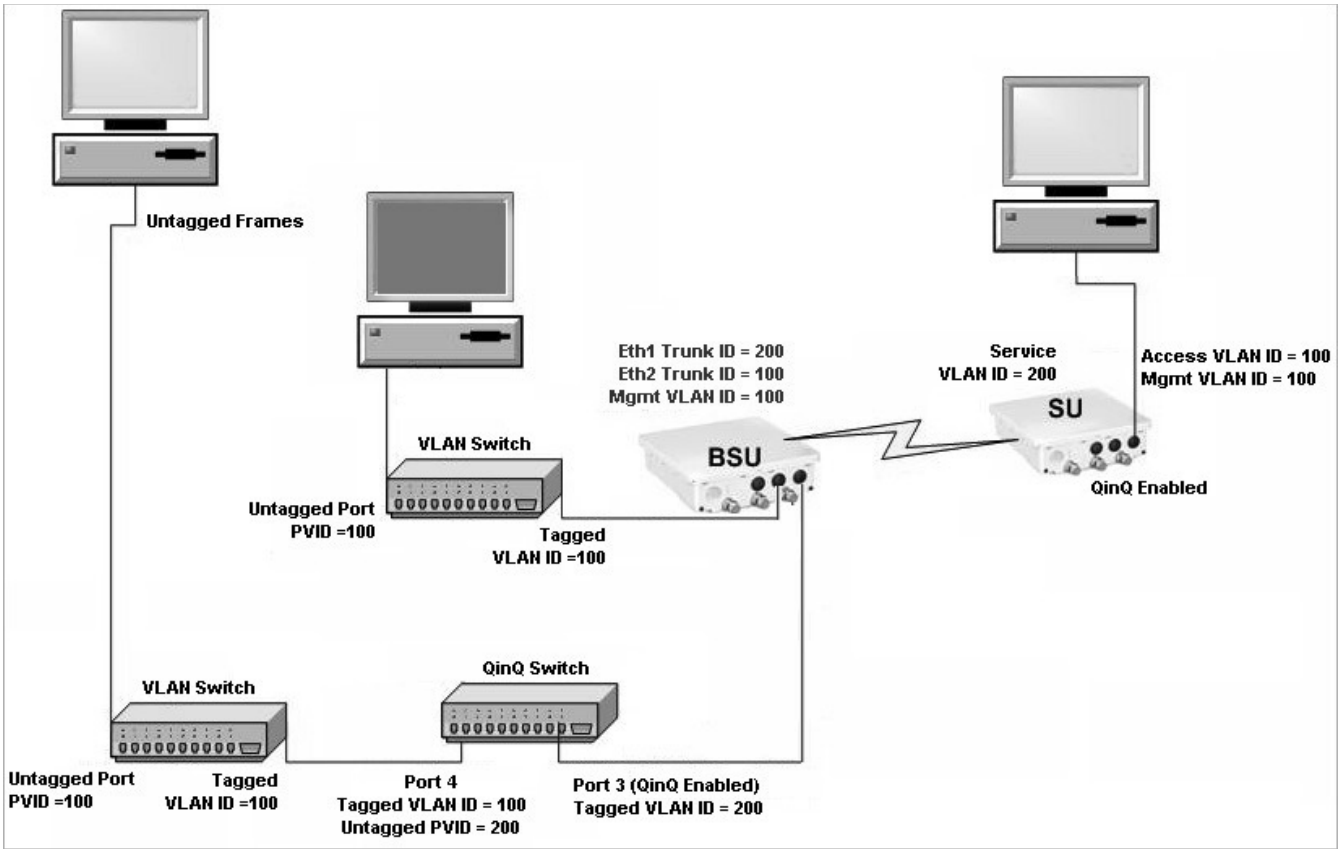
- **Device Management**
  - From the BSU Ethernet side, the BSU/SU can be managed with a single VLAN tagged packet that matches the Management VLAN ID.
  - From the SU Ethernet side, only SU can be managed with a single VLAN tagged packet that matches the Management VLAN ID; BSU cannot be managed from the SU Ethernet side.

:

- *In a QuickBridge link, Q-in-Q should be enabled either on an End Point A or an End Point B.*
- *The user configurable TPID is only used in the Service Provider VLAN tag. The Inner or customer VLAN tag should always have TPID as 0x8100.*

An Example:

The following diagram is the pictorial representation of how traffic flows in a QinQ enabled network.



The Computer behind SU can be used to manage the SU.

To manage BSU, connect another Computer to BSU Ethernet port through a VLAN switch with PVID as 100.

BSU Redundancy

F

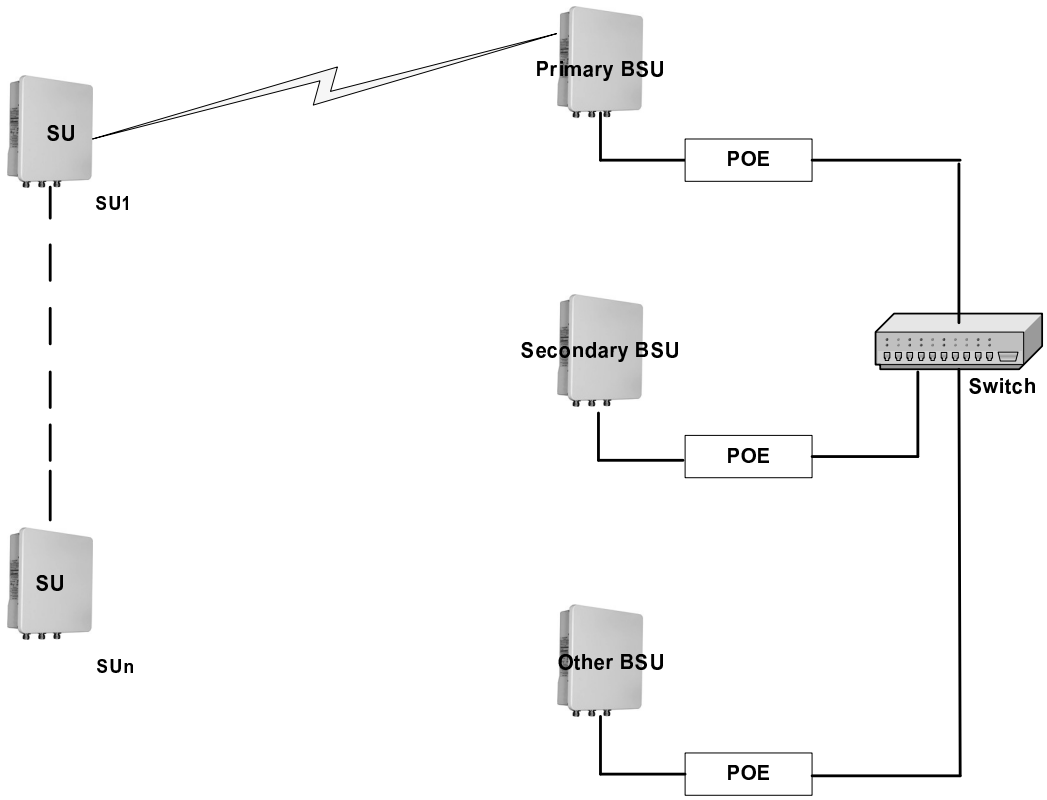
The BSU Redundancy feature can help in reducing the network outage in case of the Primary BSU failure. This feature enables the SU to keep track of the Primary and the Secondary BSU availability through a proprietary protocol. This allows the SU to switch between the Primary and the Secondary BSU depending on the link status. If both the Primary and the Secondary BSU are not available, the SU attempts to find any other BSU within its network.

Configuration Guidelines

This feature is activated only on a SU. By default, it is disabled.

- Use a non-empty string to enable this feature and an empty string to disable this feature.
- When this feature is enabled, it is mandatory to configure both the Primary and the Secondary BSU name on the SU.
- The Primary and the Secondary BSU names should be unique.
- It is expected that the Primary and the Secondary BSUs are connected to the same L2 Broadcast domain and are configured with the same "Network Name" as the SU.

Example



The Primary and the Secondary BSUs are in the same L2 Broadcast domain.

Figure F-1 An Example - BSU Redundancy Feature

Log Samples for BSU Redundancy

SU - During Boot Up

- Channel 160 is set as the current channel.
- SU is trying to register with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26).
- SU received QoS Class: Unlimited Best Effort (indx: 1).
- SU registered with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26) on channel 160(0x14004A0) (SNR: A1:46 A2:0 A3:40[dB]) at WORP port[0].
- Link Profile Index: 1.
- Wireless: WORP Link Established with **Primary BSU: BSU1**
- Wireless: **SU discovered Secondary BSU:BSU2 on channel:60**
- After getting connected to the Primary BSU, the SU should discover the secondary BSU.

Primary BSU Down - Connected to Secondary BSU

- **SU unregistered from BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26)**.
- Channel 60 is set as the current channel.
- **SU is trying to register with BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff)**.
- SU received QoS Class: Unlimited Best Effort (indx: 1).
- SU registered with BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff) on channel 60(0x78043C) (SNR: A1:51 A2:0 A3:49[dB]) at WORP port[0].
- kernel:Worp: Link Profile Index: 1.
- Wireless: WORP Link Established with Secondary BSU: BSU2

Connected to Other BSU

- 01:52:25 kernel:Worp: WARNING: Channel 100 is set as the current channel.
- 01:52:25 kernel:Worp: SU is trying to register with BSU: BSU3 (MAC: 00:20:a6:d3:ed:e5).
- 01:52:25 kernel:Worp: SU received QoS Class: Unlimited Best Effort (index: 1).
- 01:52:25 kernel:Worp: SU registered with BSU: BSU3 (MAC: 00:20:a6:d3:ed:e5) on channel 100(0xC80464) (SNR: A1:58 A2:0 A3:54[dB]) at WORP port[0].
- 01:52:25 kernel:Worp: Link Profile Index: 1.
- 01:52:25: Wireless: WORP Link Established with Other BSU: BSU3
- 01:54:35: Wireless: **SU discovered Secondary BSU:BSU2 on channel:60**
- 01:54:35: Wireless: **SU discovered Primary BSU:BSU1 on channel:160**
- SU should discover both the Primary and the Secondary BSU, and connect to the Primary BSU after the switch time interval.

BSU Switch Time Interval - 15 Minutes

- 1Wireless: WORP Link Established with Secondary BSU: BSU2
- **00:08:34:** Wireless: SU discovered Primary BSU:BSU1 on channel:160
- 00:23:34 kernel:Worp: SU unregistered from BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff).
- 00:23:34 kernel:Worp: WARNING: Channel 0 is set as the current channel.
- 00:23:35 kernel:Worp: SU is trying to register with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26).
- 00:23:35 kernel:Worp: SU received QoS Class: Unlimited Best Effort (indx: 1).

- 00:23:35 kernel:Worp: SU registered with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26) on channel 160(0x14004A0) (SNR: A1:43 A2:0 A3:36[dB]) at WORP port[0].
- 00:23:35 kernel:Worp: Link Profile Index: 1.
- **00:23:35: Wireless: WORP Link Established with Primary BSU: BSU1**
- 00:24:34: Wireless: SU discovered Secondary BSU:BSU2 on channel:60

Connect to Primary BSU

- 01:59:25: Wireless: **WORP Link Established with Other BSU: BSU3**
- 02:02:25 kernel:Worp: SU unregistered from BSU: BSU3 (MAC: 00:20:a6:d3:ed:e5)..
- 02:02:25: Wireless: **SU discovered Secondary BSU:BSU2 on channel:60**
- 02:02:25: Wireless: **SU discovered Primary BSU:BSU1 on channel:160**
- 02:02:25 kernel:Worp: SU is trying to register with BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff).
- 02:02:25 kernel:Worp: SU received QoS Class: Unlimited Best Effort (indx: 1).
- 02:02:25 kernel:Worp: SU registered with BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff) on channel 60(0x78043C) (SNR: A1:37 A2:0 A3:35[dB]) at WORP port[0].
- 02:02:25: Wireless: WORP Link Established with Secondary BSU: BSU2
- 02:04:25 kernel:Worp: SU unregistered from BSU: BSU2 (MAC: 00:0b:6b:b7:4b:ff).
- 02:04:25 kernel:Worp: SU is trying to register with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26).
- 02:04:25 kernel:Worp: **SU registered with BSU: BSU1** (MAC: 00:0b:6b:b7:4c:26) on channel 160(0x14004A0) (SNR: A1:46 A2:0 A3:42[dB]) at WORP port[0].
- 02:05:25: Wireless: SU discovered Secondary BSU:BSU2 on channel:60
- 02:04:25: Wireless: WORP Link Established with Primary BSU: BSU1

No Response Message

- 03:32:25 kernel:Worp: WARNING: Channel 0 is set as the current channel.
- 03:32:25 kernel:Worp: SU is trying to register with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26).
- 03:32:25 kernel:Worp: SU received QoS Class: Unlimited Best Effort (indx: 1).
- 03:32:25 kernel:Worp: SU registered with BSU: BSU1 (MAC: 00:0b:6b:b7:4c:26) on channel 160(0x14004A0) (SNR: A1:45 A2:0 A3:42[dB]) at WORP port[0].
- 03:32:25 kernel:Worp: Link Profile Index: 1.
- 03:32:25: Wireless: WORP Link Established with Primary BSU: BSU1
- 03:33:25: Wireless: **SU discovered Secondary BSU:BSU2 on channel:60**
- 03:40:43: Wireless: Secondary BSU: BSU2 not Available

Bootloader CLI and ScanTool

G

Bootloader CLI

The Bootloader CLI is a minimal subset of the normal CLI that is used to perform initial configuration of the device. The Bootloader CLI is available when the device 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 Bootloader CLI provides the ability to configure the initial setup parameters; and depending on this configuration, a software file is downloaded to the device during startup.

The Bootloader 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 Bootloader 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 Bootloader fails to load the firmware from flash, it tries to get the firmware from the network. While trying to get firmware from the network, the device should be powered on using Ethernet 1 interface of the device. The default configuration of the Bootloader 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 parameter value.

To Load the Firmware by using Dynamic IP Parameters

1. Set the ipaddrtype to dynamic
2. Run the BOOTP and TFTP Servers followed by device reboot

When the device reboots, the device gets the IP Address and Boot filename from the BOOTP server. You need not change any of the default Bootloader 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 followed by device reboot.

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 as "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 Bootloader 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 Bootloader mode.

For example:

MP-8100-BSU-WD	- Description of the device
vX.Y.Z	- Firmware Version
SN-11Pl15010031	- Serial Number
BL-v1.3.1	- Bootloader version

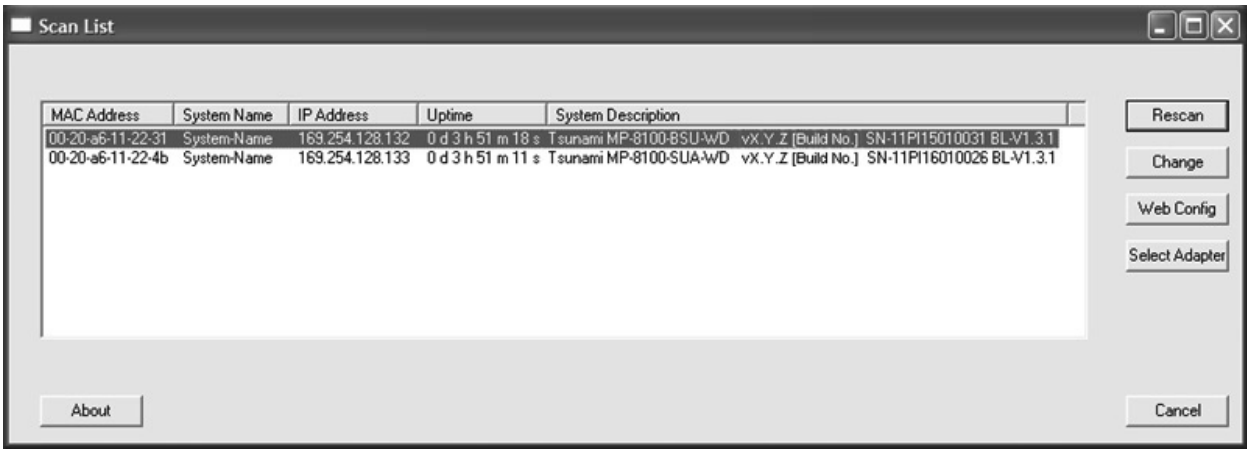


Figure G-1 Scan Tool View of a Device in Bootloader Mode (An Example)

SNR Information

H

Given below are the SNR values for the following devices:

- MP-8100-BSU
- MP-8100-SUA
- MP-8150-SUR
- MP-8150-SUR-100
- QB-8100-EPA/LNK
- QB-8150-EPR/LNK
- QB-8150-LNK-100
- QB-8151-EPR/LNK

MCS Index	Modulation	No of Streams	2.4 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	10	86	3.3	10	86	6.5	12	86	13.5	15	26	80
MCS1	QPSK 1/2	Single	3.3	15	86	6.5	16	86	13	21	86	27	30	26	80
MCS2	QPSK 3/4	Single	4.9	21	84	9.7	21	84	19.5	21	84	40.5	45	26	79
MCS3	16 QAM 1/2	Single	6.5	23	82	13	23	82	26	23	82	54	60	30	77
MCS4	16 QAM 3/4	Single	9.7	26	80	19.5	26	80	39	25	80	81	90	33	77
MCS5	64 QAM 2/3	Single	13	29	79	26	29	79	52	27	78	108	120	37	76
MCS6	64 QAM 3/4	Single	14.6	30	79	29.3	31	78	58.5	30	77	121.5	135	40	75
MCS7	64 QAM 5/6	Single	16.2	32	78	32.5	32	78	65	32	77	135	150	42	75
MCS8	BPSK 1/2	Dual	3.3	12	86	6.5	14	86	13	14	86	27	30	16	80
MCS9	QPSK 1/2	Dual	6.5	20	84	13	21	84	26	21	84	54	60	26	80
MCS10	QPSK 3/4	Dual	9.7	22	82	19.5	23	82	39	22	82	81	90	28	79
MCS11	16 QAM 1/2	Dual	13	23	80	26	23	80	52	24	80	108	120	32	77
MCS12	16 QAM 3/4	Dual	19.5	27	80	39	27	80	78	30	78	162	180	35	77
MCS13	64 QAM 2/3	Dual	26	30	79	52	30	79	104	34	78	216	240	37	76
MCS14	64 QAM 3/4	Dual	29.3	36	78	58.5	35	77	117	37	77	243	270	43	75
MCS15	64 QAM 5/6	Dual	32.5	39	78	65	38	77	130	39	76	270	300	45	75

MCS Index	Modulation	No of Streams	5 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	6	86	3.3	7	86	6.5	6	86	13.5	15	9	80
MCS1	QPSK 1/2	Single	3.3	8	86	6.5	8	86	13	9	86	27	30	11	80
MCS2	QPSK 3/4	Single	4.9	10	84	9.7	13	84	19.5	11	84	40.5	45	15	79
MCS3	16 QAM 1/2	Single	6.5	14	82	13	16	82	26	14	82	54	60	16	77
MCS4	16 QAM 3/4	Single	9.7	17	80	19.5	20	80	39	18	80	81	90	20	77
MCS5	64 QAM 2/3	Single	13	22	79	26	24	79	52	22	78	108	120	24	76
MCS6	64 QAM 3/4	Single	14.6	25	79	29.3	26	78	58.5	25	77	121.5	135	27	75
MCS7	64 QAM 5/6	Single	16.2	28	78	32.5	29	78	65	28	77	135	150	30	75
MCS8	BPSK 1/2	Dual	3.3	8	86	6.5	9	86	13	9	86	27	30	9	80
MCS9	QPSK 1/2	Dual	6.5	12	84	13	12	84	26	12	84	54	60	13	80
MCS10	QPSK 3/4	Dual	9.7	14	82	19.5	15	82	39	14	82	81	90	17	79
MCS11	16 QAM 1/2	Dual	13	16	80	26	16	80	52	16	80	108	120	22	77
MCS12	16 QAM 3/4	Dual	19.5	20	80	39	21	80	78	20	78	162	180	25	77
MCS13	64 QAM 2/3	Dual	26	25	79	52	26	79	104	26	78	216	240	27	76
MCS14	64 QAM 3/4	Dual	29.3	29	78	58.5	29	77	117	29	77	243	270	30	75
MCS15	64 QAM 5/6	Dual	32.5	30	78	65	30	77	130	30	76	270	300	33	75

Given below are the SNR values for the following device(s) in legacy mode:

- MP-8100-BSU
- MP-8100-SUA
- MP-8150-SUR
- MP-8150-SUR-100

Modulation	2.4 GHz									5 GHz					
	5 MHz			10 MHz			20 MHz			5 MHz		10 MHz		20 MHz	
	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Min SNR	Max SNR	Min SNR	Max SNR	Min SNR	Max SNR
BPSK 1/2	1.5	10	84	3	10	84	6	13	84	8	84	8	84	7	81
BPSK 3/4	2.25	10	84	4.5	11	84	9	13	84	9	84	9	84	8	81
QPSK 1/2	3	12	84	6	11	84	12	15	84	10	82	10	82	9	81
QPSK 3/4	4.5	14	84	9	13	84	18	15	84	12	82	11	82	12	81
16QAM 1/2	6	17	82	12	17	80	24	22	80	16	82	16	82	15	80
16QAM 3/4	9	20	82	18	23	78	36	25	73	18	82	18	80	18	80

Modulation	2.4 GHz									5 GHz					
	5 MHz			10 MHz			20 MHz			5 MHz		10 MHz		20 MHz	
	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Min SNR	Max SNR	Min SNR	Max SNR	Min SNR	Max SNR
64QAM 2/3	12	27	81	24	29	76	48	28	73	24	80	24	80	24	78
64QAM 3/4	13.5	29	80	27	30	74	54	29	72	27	80	27	80	27	76

Given below are the SNR values for the following devices:

- MP-8150-CPE
- QB-8150-LNK-12/50

MCS Index	Modulation	No of Streams	5 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	8	82	3.3	8	82	6.5	8	82	13.5	15	8	82
MCS1	QPSK 1/2	Single	3.3	8	82	6.5	9	82	13	9	82	27	30	9	82
MCS2	QPSK 3/4	Single	4.9	10	82	9.7	11	82	19.5	11	82	40.5	45	11	80
MCS3	16 QAM 1/2	Single	6.5	13	82	13	15	82	26	17	82	54	60	16	80
MCS4	16 QAM 3/4	Single	9.7	16	82	19.5	19	82	39	19	82	81	90	18	80
MCS5	64 QAM 2/3	Single	13	20	81	26	22	81	52	23	81	108	120	23	79
MCS6	64 QAM 3/4	Single	14.6	22	80	29.3	24	80	58.5	25	80	121.5	135	24	79
MCS7	64 QAM 5/6	Single	16.2	24	80	32.5	26	80	65	26	80	135	150	26	79
MCS8	BPSK 1/2	Dual	3.3	9	82	6.5	8	82	13	9	82	27	30	9	82
MCS9	QPSK 1/2	Dual	6.5	10	82	13	10	82	26	12	82	54	60	11	80
MCS10	QPSK 3/4	Dual	9.7	12	82	19.5	12	82	39	13	82	81	90	13	80
MCS11	16 QAM 1/2	Dual	13	16	82	26	16	82	52	18	82	108	120	15	78
MCS12	16 QAM 3/4	Dual	19.5	19	80	39	20	82	78	19	82	162	180	20	68
MCS13	64 QAM 2/3	Dual	26	24	80	52	24	80	104	24	80	216	240	24	60
MCS14	64 QAM 3/4	Dual	29.3	29	80	58.5	30	78	117	27	78	243	270	29	58
MCS15	64 QAM 5/6	Dual	32.5	33	80	65	33	78	130	32	78	270	300	32	56

Given below are the SNR values for the following device(s) in legacy mode:

- MP-8150-CPE
- QB-8150-LNK-12/50

Modulation	5 GHz								
	5 MHz			10 MHz			20 MHz		
	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR
BPSK 1/2	1.5	7	81	3	7	81	6	7	81
BPSK 3/4	2.25	8	81	4.5	8	81	9	8	81
QPSK 1/2	3	9	80	6	9	80	12	9	79
QPSK 3/4	4.5	12	78	9	12	78	18	12	78
16QAM 1/2	6	16	76	12	16	76	24	16	73
16QAM 3/4	9	20	72	18	20	71	36	20	71
64QAM 2/3	12	24	69	24	24	69	48	24	69
64QAM 3/4	13.5	27	68	27	27	68	54	27	66

Given below are the SNR values for the following devices:

- MP-8160-BSU
- MP-8160-BS9
- MP-8160-SUA
- MP-8160-CPE

MCS Index	Modulation	No of Streams	6.4 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	6	87	3.3	6	87	6.5	6	87	13.5	15	7	87
MCS1	QPSK 1/2	Single	3.3	8	87	6.5	8	87	13	7	87	27	30	8	86
MCS2	QPSK 3/4	Single	4.9	10	86	9.7	10	84	19.5	10	86	40.5	45	12	82
MCS3	16 QAM 1/2	Single	6.5	13	84	13	14	84	26	13	82	54	60	13	74
MCS4	16 QAM 3/4	Single	9.7	16	80	19.5	16	78	39	16	76	81	90	19	70
MCS5	64 QAM 2/3	Single	13	21	74	26	21	70	52	20	70	108	120	21	62
MCS6	64 QAM 3/4	Single	14.6	22	70	29.3	23	67	58.5	22	67	121.5	135	24	56
MCS7	64 QAM 5/6	Single	16.2	24	67	32.5	24	65	65	24	65	135	150	27	55
MCS8	BPSK 1/2	Dual	3.3	8	87	6.5	8	87	13	7	86	27	30	10	86
MCS9	QPSK 1/2	Dual	6.5	10	87	13	10	87	26	11	84	54	60	12	82

MCS Index	Modulation	No of Streams	6.4 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS10	QPSK 3/4	Dual	9.7	15	84	19.5	13	84	39	13	82	81	90	15	75
MCS11	16 QAM 1/2	Dual	13	16	80	26	17	80	52	17	78	108	120	18	74
MCS12	16 QAM 3/4	Dual	19.5	20	74	39	23	74	78	20	71	162	180	22	56
MCS13	64 QAM 2/3	Dual	26	25	70	52	24	66	104	24	65	216	240	25	55
MCS14	64 QAM 3/4	Dual	29.3	27	66	58.5	27	62	117	27	62	243	270	27	53
MCS15	64 QAM 5/6	Dual	32.5	28	64	65	29	62	130	29	62	270	300	30	52

Given below are the SNR values for the following devices:

- MP-8200-BSU / SUA
- MP-8250-BS9 / BS1
- MP-8250-SUR
- QB-8200-EPA/LNK
- QB-8250-EPR/LNK

MCS Index	Modulation	No of Streams	4.900 - 5.925 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	7	50	3.3	7	50	6.5	7	50	13.5	15	9	50
MCS1	QPSK 1/2	Single	3.3	9	50	6.5	10	50	13	11	50	27	30	10	50
MCS2	QPSK 3/4	Single	4.9	11	50	9.7	13	50	19.5	13	50	40.5	45	14	50
MCS3	16 QAM 1/2	Single	6.5	15	50	13	16	50	26	16	50	54	60	16	50
MCS4	16 QAM 3/4	Single	9.7	19	50	19.5	20	50	39	20	50	81	90	20	50
MCS5	64 QAM 2/3	Single	13	23	50	26	24	50	52	24	50	108	120	24	50
MCS6	64 QAM 3/4	Single	14.6	25	50	29.3	26	50	58.5	26	50	121.5	135	27	50
MCS7	64 QAM 5/6	Single	16.2	28	50	32.5	29	50	65	29	50	135	150	29	50
MCS8	BPSK 1/2	Dual	3.3	8	50	6.5	9	50	13	9	50	27	30	10	50
MCS9	QPSK 1/2	Dual	6.5	12	50	13	12	50	26	12	50	54	60	13	50
MCS10	QPSK 3/4	Dual	9.7	15	50	19.5	15	50	39	15	50	81	90	16	50
MCS11	16 QAM 1/2	Dual	13	18	50	26	18	50	52	18	50	108	120	20	50
MCS12	16 QAM 3/4	Dual	19.5	20	50	39	21	50	78	21	50	162	180	24	50
MCS13	64 QAM 2/3	Dual	26	25	50	52	26	50	104	26	50	216	240	27	50
MCS14	64 QAM 3/4	Dual	29.3	29	50	58.5	29	50	117	29	50	243	270	30	50

MCS Index	Modulation	No of Streams	4.900 - 5.925 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS15	64 QAM 5/6	Dual	32.5	30	50	65	30	50	130	30	50	270	300	33	50

Given below are the SNR values for the following device(s) in legacy mode:

- MP-8200-BSU / SUA
- MP-8250-BS9 / BS1
- MP-8250-SUR

Modulation	4.900 - 5.925 GHz								
	5 MHz			10 MHz			20 MHz		
	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR
BPSK 1/2	1.5	7	80	3	7	80	6	8	79
BPSK 3/4	2.25	8	80	4.5	9	79	9	9	77
QPSK 1/2	3	10	79	6	10	77	12	10	76
QPSK 3/4	4.5	12	78	9	12	76	18	12	74
16QAM 1/2	6	16	77	12	16	74	24	16	73
16QAM 3/4	9	20	76	18	20	72	36	21	72
64QAM 2/3	12	25	74	24	24	70	48	25	69
64QAM 3/4	13.5	27	73	27	27	68	54	27	68

Given below are the SNR values for the following device:

- MP-820-BSU-100
- MP-820-SUA-50+
- MP-825-SUR-50+
- MP-825-CPE-50
- QB-825-EPR/LNK-50
- QB-825-EPR/LNK-50+

MCS Index	Modulation	No of Streams	5 GHz												
			5 MHz			10 MHz			20 MHz			40 MHz			
			Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR	Data Rate		Min SNR	Max SNR
												Full	Short		
MCS0	BPSK 1/2	Single	1.6	9	50	3.3	9	50	6.5	9	50	13.5	-	9	50
MCS1	QPSK 1/2	Single	3.3	10	50	6.5	10	50	13	12	50	27	-	11	50
MCS2	QPSK 3/4	Single	4.9	13	50	9.7	13	50	19.5	13	50	40.5	-	15	50
MCS3	16 QAM 1/2	Single	6.5	17	50	13	17	50	26	16	50	54	-	16	50
MCS4	16 QAM 3/4	Single	9.7	20	50	19.5	21	50	39	22	50	81	-	24	50
MCS5	64 QAM 2/3	Single	13.0	24	50	26	25	50	52	25	50	108	-	28	50
MCS6	64 QAM 3/4	Single	14.6	26	50	29.3	27	50	58.5	27	50	121.5	-	29	50
MCS7	64 QAM 5/6	Single	16.2	30	50	32.5	29	50	65	30	50	135	-	30	50
MCS8	BPSK 1/2	Dual	3.3	10	50	6.5	10	50	13	10	50	27	-	10	50
MCS9	QPSK 1/2	Dual	6.5	13	50	13	12	50	26	12	50	54	-	13	50
MCS10	QPSK 3/4	Dual	9.7	15	50	19.5	16	50	39	15	50	81	-	17	50
MCS11	16 QAM 1/2	Dual	13.0	18	50	26	19	50	52	17	50	108	-	22	50
MCS12	16 QAM 3/4	Dual	19.5	23	50	39	23	50	78	23	50	162	-	25	50
MCS13	64 QAM 2/3	Dual	26.0	27	50	52	26	50	104	27	50	216	-	27	50
MCS14	64 QAM 3/4	Dual	29.3	29	50	58.5	29	50	117	30	50	243	-	30	50
MCS15	64 QAM 5/6	Dual	32.5	31	50	65	30	50	130	31	50	270	-	33	50

Given below are the SNR values for the following device in legacy mode:

- MP-820-BSU-100
- MP-820-SUA-50+
- MP-825-CPE-50
- MP-825-SUR-50+

Modulation	5 GHz					
	10 MHz			20 MHz		
	Data Rate	Min SNR	Max SNR	Data Rate	Min SNR	Max SNR
BPSK 1/2	3	8	50	6	8	50
BPSK 3/4	4.5	9	50	9	9	50
QPSK 1/2	6	11	50	12	12	50
QPSK 3/4	9	12	50	18	13	50
16QAM 1/2	12	16	50	24	16	50
16QAM 3/4	18	21	50	36	21	50
64QAM 2/3	24	24	50	48	25	50
64QAM 3/4	27	28	50	54	28	50

Configuration File Cross-loading across the Products

Proxim portfolio comprises different product lines and SKUs which differ in features and capabilities depending on the hardware platform and the country setting or licensing used in them. This document describes the process to successfully apply the configuration file on a device(s) and the software checks run while applying the configuration file on a device(s).

The user can apply a configuration file retrieved from a (Source) device to another compatible (Target) device. In order to successfully apply the configuration file, the following criteria should be met.

1. The Hardware Inventory Component ID should be same for both the source device and the target device.

Hardware Inventory Component ID	Products
2000	AP-800; AP-8000
2001	MP-8100-BSU; MP-8100-SUA; MP-8150-SUR MP-8150-SUR-100 MP-8160-BSU; MP-8160-SUA; MP-8160-BS9 MP-8200-BSU; MP-8200-SUA; MP-8250-BS9/SUR QB-8xxx-EPA; QB-8xxx-EPR;
2003	MP-8150-CPE
2005	Tsunami 82x Series
2006	AP-8100

NOTE:*The configuration file can be applied only to the devices of the same family.*

- *The configuration file retrieved from an 8xx series device cannot be applied to a device from 81xx series.*
- *The configuration file of a MP-8160-BSU/MP-8160-SUA device cannot be applied to an 8100/8200 series device and vice versa even though they share the same component ID.*
- *The configuration file of a MP-8150-CPE device cannot be applied to a MP-8160-CPE device and vice versa even though they share the same component ID.*

2. The Regulatory Domain should be same in both the source device and the target device.The available **Regulatory Domains** are listed below:
   - WD
   - US
   - JP
   - EU*

NOTE: *WD SKU is compatible only with the EU SKU. For example, if the configuration file retrieved from a WD SKU device is loaded on a US or JP SKU target device then the upgrade fails.*

If the above criteria are met, the configuration file can be successfully applied on the target device else an error message is thrown. Once the configuration file is loaded and the device is rebooted, the software tries to apply the new configuration file during the system boot-up process.

Sometimes, a device from a particular product series may have different a license information compared to other devices of the same series. Therefore, the start-up process validates the configuration file against the license file of the device before applying the configuration file. The configuration file is valid, if the following conditions are met:

1. The input bandwidth limit in the configuration file should be less than or equal to the input bandwidth limit in the license file.
2. The output bandwidth limit in the configuration file should be less than or equal to the output bandwidth limit in the license file.
3. The sum of the input and output bandwidth limit in the configuration file should be less than or equal to the cumulative bandwidth limit in the license file.
4. The frequency band (2.4, 4.9, and 5 G Hz) in the configuration file should match with any one of the supported frequency bands in the license file.
5. The radio operation mode (BSU/SU/AP) in the configuration file should match with any one of supported radio operating modes in the license file.
6. The number of satellites in the configuration file should be less than or equal to the number of satellites in the license file.
7. The product family (TMP/TQB/AP) value in the configuration file should match the product family value in the license file.
8. Tx/Rx antenna chain mask in the configuration file should match the Tx/Rx antenna chain mask in the license file.

NOTE: *If any one of the above conditions is not met, the configuration file will be removed by the flash control module during initialization and the device will boot-up with the last known good configuration. Before deleting the configuration file, an eventlog is generated about the violation of the license parameters. In some cases, if the last known good configuration does not exist internally, the device can reset the configuration to factory defaults and boot up.*

Abbreviations

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A	
ACL	Access Control List
ACS	Automatic Channel Selection
AES	Advanced Encryption Standard
ALG	Application Level Gateway
ARP	Address Resolution Protocol
ATPC	Adaptive Transmit Power Control
B	
BSU	Base Station Unit
C	
CCP	Compression Control Protocol
CHAP	Challenge Handshake Authentication Protocol
CLI	Command Line Interface
CIR	Committed Information Rate
CPE	Customer Premises Equipment
CRC	Cyclic Redundancy Check
D	
DDRS	Dynamic Data Rate Selection
DES	Data Encryption Standard
DFS	Dynamic Frequency Selection
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DSL	Digital Subscriber Line
E	
EIRP	Equivalent Isotropically Radiated Power
EOL	End of Life
ETSI	European Telecommunications Standards Institute
F	
FCC	Federal Communications Commission

FCS	Frame Check Sequence
G	
Gbps	Gigabit Per Second
GPL	General Public License
GRE	Generic Routing Encapsulation
H	
HTTP	HyperText Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
I	
IANA	Internet Assigned Numbers Authority (IANA)
IC	Industry Canada
ICMP	Internet Control Message Protocol
IGMP	Internet Group Management Protocol
ISP	Internet Service Provider
ITS	Intelligent Transportation System
L	
LACP	Link Aggregation Control Protocol
LAN	Local Area Network
LCP	Link Configuration Protocol
LED	Light Emitting Diode
LGPL	Lesser General Public License
M	
MAN	Metropolitan Area Networks
Mbps	Megabits Per Second
MD5	Message-Digest algorithm
MIB	Management Information Base
MIMO	Multiple-input and multiple-output
MIR	Maximum Information Rate
MP	Multipoint
MPPE	Microsoft Point-to-Point Encryption
MSCHAP v2	Microsoft Challenge-Handshake Authentication Protocol
MTU	Maximum Transmission Unit

N	
NAPT	Network Address Port Translation
NAT	Network Address Translation
NCP	Network Control Protocol
NBD	Next Business Day
NMS	Network Management System
NOP	Non Occupancy Period
P	
PAP	Password Authentication Protocol
PC	Personal Computer
PoE	Power Over Ethernet
PPPoE	Point-to-point Protocol over Ethernet
PTMP	Point-to-multipoint
PTP	Point-to-point
PVES	ProximVision ES
Q	
QB	QuickBridge
QoS	Quality of Service
R	
RADIUS	Remote Authentication Dial In User Service
RAS	Remote Access Services
RF	Radio Frequency
RIP	Routing Information Protocol
RMA	Return Material Authorization
RLT	Radio Link Test
RSSI	Received Signal Strength Indicator
S	
SHA	Secure Hash Algorithm
SKU	Stock Keeping Unit
SNMP	Simple Network Management Protocol
SNR	Signal-to-noise Ratio
SNTP	Simple Network Time Protocol
SSH	Secure Shell

SSL	Secure Socket Layer
STP	Spanning Tree Protocol
SU	Subscriber Unit
T	
TBC	Text Based Configuration
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TKIP	Temporal Key Integrity Protocol
TPC	Transmit Power Control
TPID	Tag Protocol Identifier
TTL	Time to Live
U	
UDP	User Datagram Protocol
UTP	Unshielded Twisted Pair
V	
VLAN	Virtual Local Area Network
W	
WEP	Wired Equivalent Privacy
WORP	Wireless Outdoor Router Protocol

Lightning Protection

K

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/Cat5e/Cat 6 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 arrestor (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.

Proxim Wireless offers superior lightning and surge protection for Tsunami® series products. Contact your reseller or distributor for more information.

Statement of Warranty

L

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

When Proxim determines that a returned product does not meet the warranted criteria during the warranty period, Proxim at its option, will either: (a) repair the defective product; (b) replace the defective product with a new or refurbished product that is at least equivalent to the original; or (c) refund the price paid for the defective product. Generally, products are repaired or replaced within thirty (30) business days of receipt of the product at a Proxim Logistical/Repair Center. The warranty period for repaired or replacement products is ninety (90) days or the remainder of the original warranty period, whichever is longer. These three alternatives constitute the customer's sole and exclusive remedy and Proxim's sole and exclusive liability under warranty provisions.

Limitations of Warranty

Proxim's warranties do not apply to any product (hardware or software) which has (a) been subjected to abuse, misuse, neglect, accident, or mishandling, (b) been opened, repaired, modified, or altered by anyone other than Proxim, (c) been used for or subjected to applications, environments, or physical or electrical stress or conditions other than as intended and recommended by Proxim, (d) been improperly stored, transported, installed, or used, or (e) had its serial number or other identification markings altered or removed.

Buyers can contact Proxim Wireless Customer Service Center either by telephone or via web. Support and repair of products that are out of warranty will be subject to a fee. Contact information is shown below. Additional support information can be found at Proxim Wireless's web site at http://my.proxim.com.

Contact technical support via telephone as follows:

USA and Canada Customers

- **Phone**: +1-408-383-7700; +1-866-674-6626
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

International Customers

- **Phone**: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)
- **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

General Procedures

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 warranty period. After the warranty period, Technical Support is fee based (detailed in Technical Services and Support).

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://my.proxim.com.

Create a Support Request

Submit a question or open an issue to Proxim Wireless technical support staff at the following URL: https://my.proxim.com/new_case.

Technical Services and Support

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Obtaining Technical Service and Support

If you are having trouble using the Proxim product, please read this guide 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 team:

- Product information
  - Part number and serial number of the suspected faulty device
- 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
- Registration information
  - If the product is not registered, date and location where you purchased the product

: Technical Support is free for the warranty period from the date of purchase.

Support Options

Proxim eService Web Site Support

The Proxim eService Web site is available 7x24x365 at http://my.proxim.com.

On the Proxim eService Web Site, you can access the following services:

- **Product Download Page**: Provides quick links to product firmware, software, and documentation downloads.
- **Proxim TV Links**: A link to helpful video tutorials.
- **Knowledgebase**: A solution database of all the resolved problems. You can search by product, category, keywords, or phrases.
- **Live Chat**: Chat with a support technician on-line or request to call back at a later time.
- **Create a Support Request**: Create a support request with our technical support staff who will reply to you by email.
- **Case Management**: Login to check the status of your support cases, update your personal profile, or access restricted information and features.
- **Provide Feedback**: Submit a suggestion, complaint, or other feedback about the support site and our products.

Telephone Support

Contact technical support via telephone as follows:

- **USA and Canada Customers**
  - **Phone**: +1-408-383-7700; +1-866-674-6626
  - **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)
- **International Customers**
  - **Phone**: +1-408-383-7700; 0800-916475 (France); 8-800-100-9485 (Russia)
  - **Business Hours**: 24x7 live response. Tier 3 support: 8 a.m. to 5 p.m. M-F PDT (UTC/GMT -7 hrs)

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.

All ServPak service bundles are sold as service contracts that provide coverage for specific products from 1 to 3 years. Servpak bundles are considered an upgrade to the standard product warranty and not an extension.

All Plans Include	ServPak Plus	ServPak Prime	ServPak Elite
24x7 Basic Technical Support	**Basic Advanced Replacement (Two business days/ International economy shipment service)**	**Priority Advanced Replacement (Next business day/ International priority shipment service)**	**Priority Comprehensive Advance Replacement (Next business day/ International priority shipment service)**
8x7 Advanced Technical Support		**24x7 Advanced Technical Support**	**24x7 Advanced Technical Support**
Software Maintenance		**PVES & PV NMS Support**	**PVES & PV NMS Support**
Access to Knowledge Base			**Post-Installation Optimization**
			50% discount on Onsite Technical Support and Services

Additional Information on ServPak Options

Advanced Replacement of Hardware

In the event of a hardware failure, our guaranteed turnaround time for return to factory repair is 30 days or less. Customers who purchase this service are guaranteed replacement of refurbished or new hardware to be shipped out within one or two business days, as applicable. Options are available for shipment services depending on the customer's support needs. Hardware is shipped on business days, Monday – Friday excluding Holidays, 8:00 AM – 3:30 PM Eastern Time.

Comprehensive Advanced Replacement of Hardware

In addition to ServPak Prime options, in the event of a hardware failure, Proxim will repair or replace the failed product for any reason, other than vandalism.

7x24x365 Availability

Unlimited, direct access to technical support engineers 24 hours a day, 7 days a week, 365 days a year including Holidays.

8x5 Availability

Unlimited, direct access to world-class technical support engineers 8 hours a day, 5 days a week, Monday through Friday from 8:00AM - 5:00PM Pacific Standard Time.

Basic Technical Support

Customers who purchase this service can be rest assured that their call will be answered by Proxim's Tier 1 technical support and a case opened immediately to document the problem and provide initial troubleshooting to identify the solution and resolve the incident in a timely manner.

Advanced Technical Support

In addition to Proxim's world-class Tier 1 technical support, customers will be able to have their more complex issues escalated to our world-class Tier 3 technical support engineers. Our Tier 3 engineers will review specific configurations to troubleshoot intricate issues and will also provide helpful insights regarding Proxim's products and various tips from decades of collective experience in the wireless industry.

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 feature 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.

Post-Installation Optimization

You can consult with our technical support engineers to enhance performance and efficiency of your network. Post-installation optimization services include:

- Review frequencies to select best possible channel
- Review Modulation, Channel Bandwidth, MIMO, and WORP settings to optimize throughput and link quality
- Review Satellite Density & TPC/ATPC settings
- Assistance with Bandwidth controls

- Assistance with QoS, RADIUS, and VLAN settings on Proxim equipment

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, please visit our website at http://www.proxim.com/support/servpak, call Proxim Support (For telephone numbers, see Telephone Support) or send an email to servpak@proxim.com.

Technical Support Policy

Technical Support for Current Products during Warranty Period

All Customers are entitled to free technical support for the Proxim products they purchase from Proxim's authorized resellers or distributors. Technical Support is defined as communication via the Proxim Support website (http://my.proxim.com) and/or via telephone. This technical support will be provided for free for the entire time the product is covered by a Proxim warranty. The term of Proxim's warranty is determined according to the agreement under which the product was sold and generally varies from 3 months to 2 years depending on the product. If a Customer disagrees with Proxim's determination of warranty duration, a request for review supported by a copy of all product purchase documentation may be submitted.

Technical Support for Current Products after Warranty Period

After the warranty period, technical support on products then being sold by Proxim will be based upon one of the following three options Customers can choose:

- Customers can choose to purchase one of Proxim's ServPak extended warranty and enhanced support packages for the product
- Customers can choose to purchase one-time per-incident technical support for the product for a fee
- Customers can choose to call the reseller or distributor who sold them the product for technical support

Tech Support on Discontinued Products

Technical Support on some products that Proxim has declared as EOL (End of Life) or otherwise is no longer selling is available based upon one of the following three options Customers can choose:

- For some discontinued products, Customers can choose to purchase one of Proxim's EOL ServPak support packages for the product
  - No EOL ServPak support package will be available for any product discontinued more than 5 years ago
  - No EOL ServPak support package is available for certain discontinued products
- Customers can choose to purchase one-time per-incident technical support for the product on a per hour basis at a rate of $125 an hour (4 hours minimum payable in advance by major credit card). This fee is payable in addition to any RMA fee that may be charged to subsequently repair the product.
- Customers can choose to call the reseller or distributor who sold them the product for technical support

All Proxim technical support for discontinued products, whether through an EOL ServPak package or otherwise, is provided on a "best effort" basis and is subject to the continued availability of necessary components, equipment, and other technical resources.

Note that Proxim is unable to support or warrant any equipment that has been modified, whether this modification is physical, or if third-party software codes have been loaded onto the product.