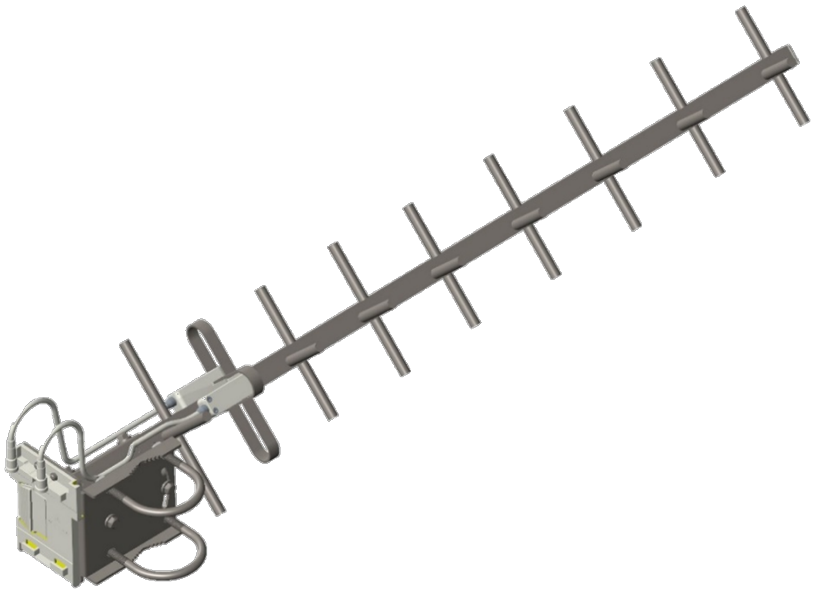
# PMP 450 Series 900 MHz SM

## Attaching the SM 900 MHz directional antenna to the pole

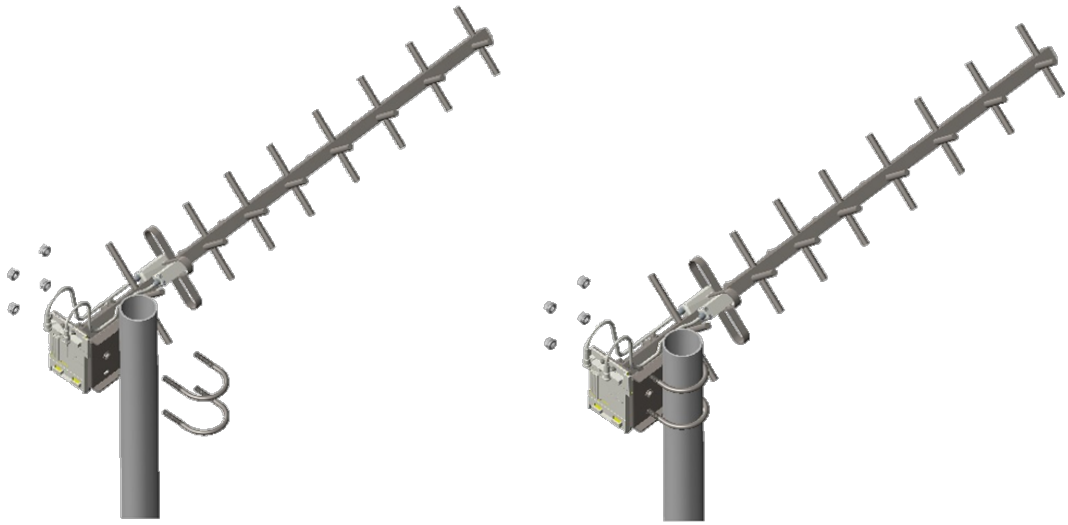
1 Unbox the directional yagi antenna.

**Figure 81** PMP 450i 900 MHz SM external directional antenna



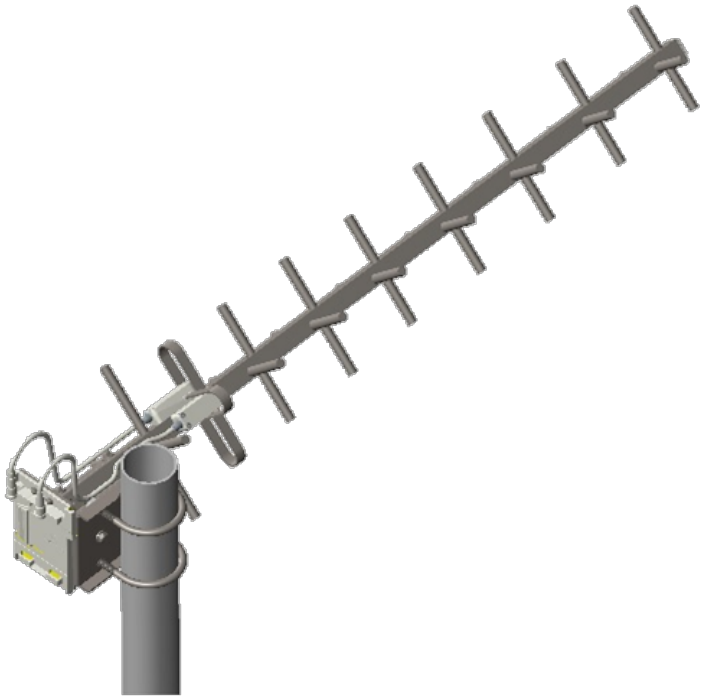
2 Attach the directional atenna to the pole and insert the two U clamps into the mounting bracket of the antenna

**Figure 82** Attach the antenna to the pole



3 Tighten all nuts to approximately 6 to 7 Nm or less to avoid deforming the pole.

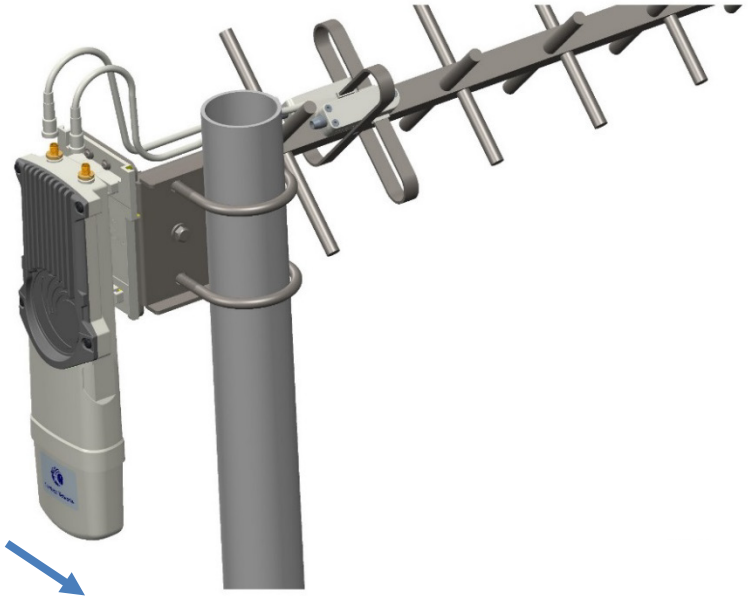
**Figure 83** Fixing the nuts



## Radio mounting to the antenna

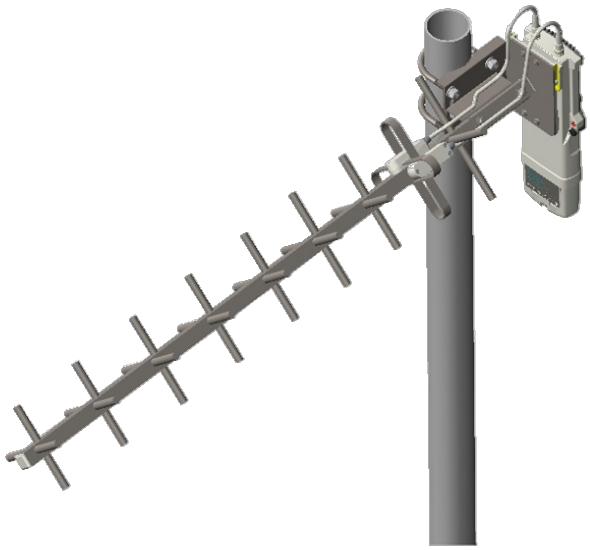
1 Align the radio to E bracket and slide towards right to lock on the antenna as shown in figure.

**Figure 84** Fixing the radio to the antenna




2 Connect the port A of SM to vertical and port B of SM to horizontal polarization interfaces of the antenna with RF cable.

**Figure 85** Connecting RF cable to the radio



# Directional Yagi antenna alignment

The directional Yagi antenna horizontal and vertical alignment procedure is shown below. The Yagi antenna can be aligned for +15 to -15 degree.

**Figure 86** Yagi antenn alignment - horizentaly

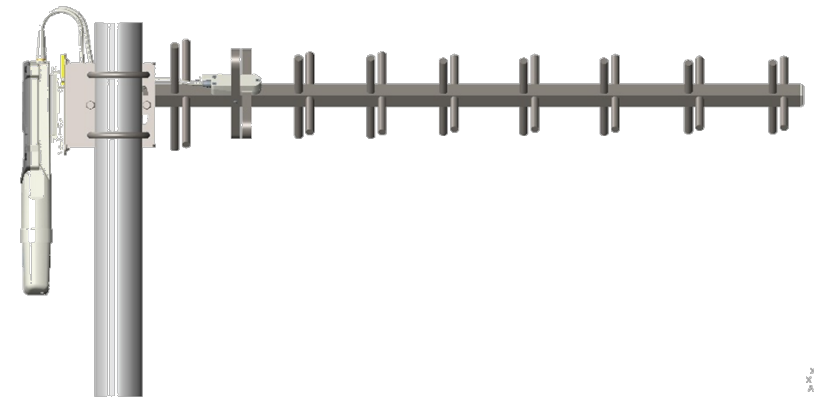


**Figure 87** Yagi antenna alignment - upward tilt

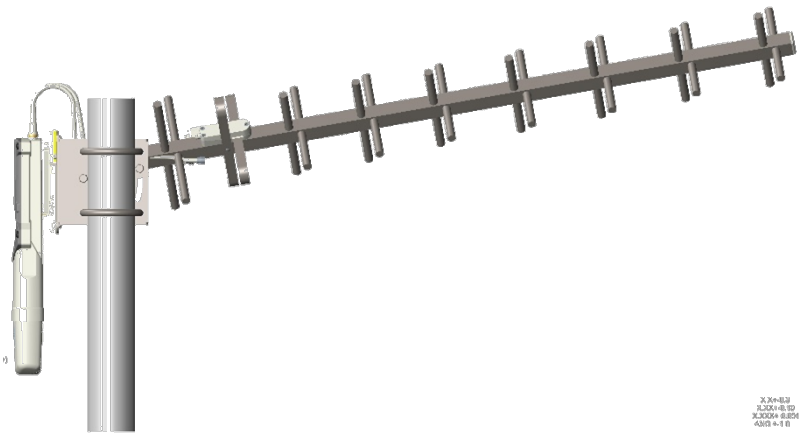
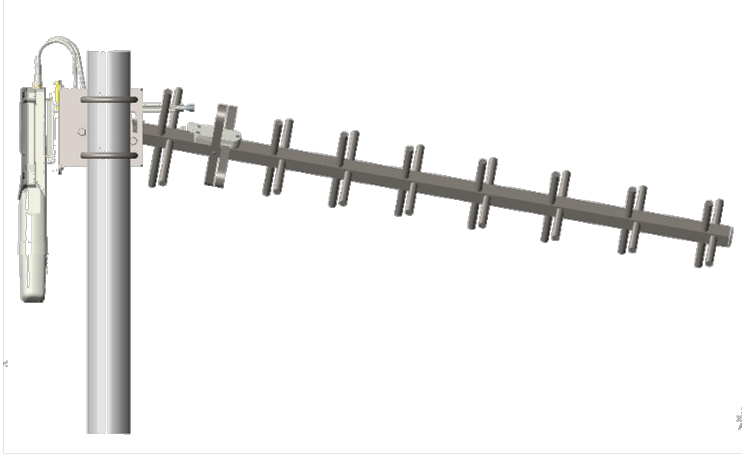


**Figure 88** Yagi antenna alignment - downward tilt



# Installing an integrated ODU

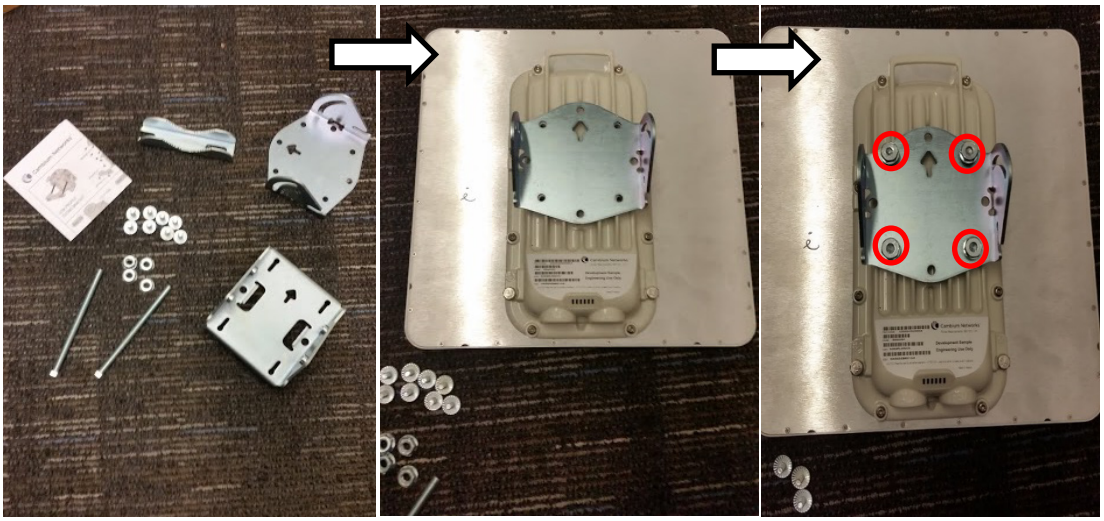
**Caution**

Do not reverse the bracket clamp, as this arrangement may lead to failure of the assembly. Do not over-tighten the bolts as this may lead to failure of the assembly.

To mount and connect an integrated ODU, proceed as follows:

1 Fix the mounting plate to the back of the ODU using the four M6 bolts, and spring and plain washers provided. Tighten the bolts to a torque setting of 5.0 Nm (3.7 lb ft).

**Figure 89** Fixing the mounting plate to the back of the ODU



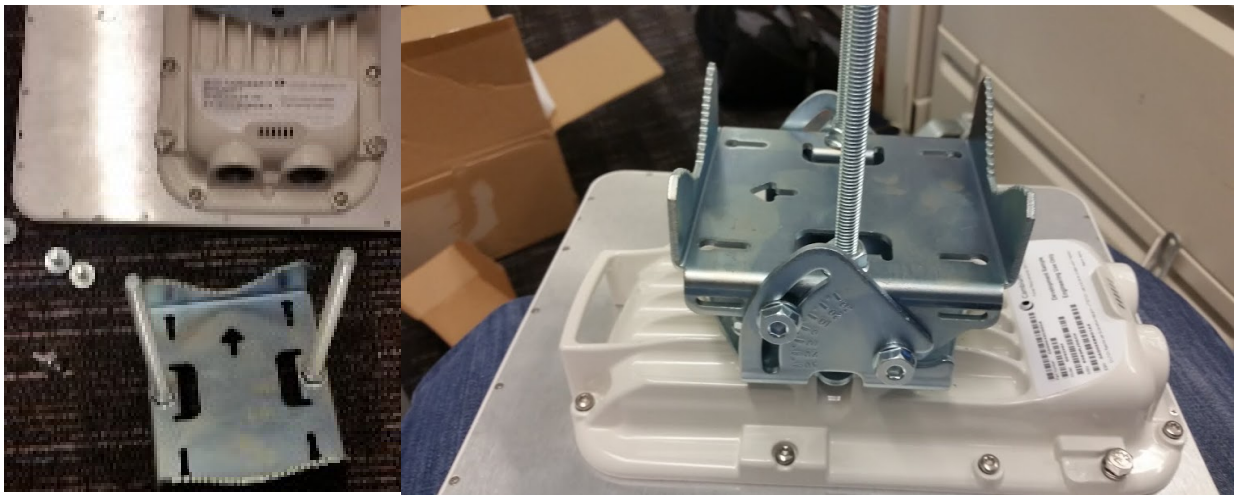
2 Attach the bracket body to the mounting plate using the M8 bolt, spring and plain washers.

3 Hoist the ODU to the mounting position.

4 Attach the bracket body to the pole using the bracket clamp, M8 bolts, and spring and plain washers.

5 If the ODU is mounted outdoors, weatherproof the N type connectors (when antenna alignment is complete) using PVC tape and self-amalgamating rubber tape.

**Figure 90** Attaching the bracket body



# Connecting Cat5e Ethernet cable

## Connecting an RJ45 and gland to a unit

Perform this task to connect the Ethernet cable to an AP.

To connect the Ethernet cable with a gland to an AP unit, proceed as follows:

1 Insert the RJ45 cable through the gland components

2 Insert the RJ45 plug into the socket in the unit, making sure that the locking tab snaps home.

3 Support the drop cable and gently hand screw the gland body into the unit until the bushing seal is flush to the unit body.

**Note**

Do not fit the back shell prior to securing the gland body.

4 Once the gland is fully hand screwed into the unit, tighten it one full rotation only with a 1 1/8 inch spanner wrench.

5 When the gland body has been fitted, tighten the gland back shell.

**Caution**

Do not over-tighten the gland back shell, as the internal seal and structure or RJ45 port may be damaged.

**Figure 91** Ethernet cable gland for PMP/PTP 450 Series

**Figure 92** Ethernet cable gland for PMP/PTP 450i Series

# Disconnecting an RJ45 and gland from a unit

Perform this task to disconnect the Ethernet cable and watertight gland from ODU.

To disconnect the Ethernet cable and gland from a unit, proceed as follows:

1. Hold Ethernet cable and remove the gland back shell
2. Use a small flathead screwdriver (0.2”/5mm wide or greater) to gently release the black plastic watertight bushing from the compression fins, being careful not to damage the bushing.
3. Unscrew the gland body from the AP, making sure that the Ethernet cable is not rotating while disengaging the gland body from the AP housing
4. Use a small screwdriver to depress the RJ45 locking clip
5. Unplug the RJ45 cable
6. Remove the gland from the cable, if necessary

# Installing ODU

## Installing an PMP 450 platform AP

To install a PMP 450 platform Series AP, perform the following steps.

**Procedure 5** Installing an AP

1. Begin with the AP in the powered-down state.
2. Choose the best mounting location for your particular application. Modules need not be mounted next to each other. They can be distributed throughout a given site. However, the 60° offset must be maintained. Mounting can be done with stainless steel hose clamps or another equivalent fastener.

   See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna to PMP 450i Series, PMP 450 Series, PMP 450i Series 900 MHz AP and PMP 450 Series 900 MHz SM

   See Installing an integrated ODU on page 6-49
3. Align the AP as follows:
   a. Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone.
   b. Use a local map, compass, and/or GPS device as needed to determine the direction that one or more APs require to each cover the intended 60° sector.
   c. Apply the appropriate degree of downward tilt.
   d. Ensure that the nearest and furthest SMs that must register to this AP are within the beam coverage area.
4. Using stainless steel hose clamps or equivalent fasteners, lock the AP in the proper direction and downward tilt.
5. Attach the cables to the AP (See Powering the AP/SM/BH for test configuration on Page 5-15)
6. Perform waterproof the cables (See section Attaching and weatherproofing an N type connector on page 6-66).

# Installing a PMP 450 platform SM

Installing a PMP 450 platform Series SM consists of two procedures:

- Physically installing the SM on a residence or other location and performing a coarse alignment using the alignment tool or alignment tone.
- Verifying the AP to SM link and finalizing alignment using review of power level, link tests, and review of registration and session counts.

**Procedure 6** Installing an SM

1 Choose the best mounting location for the SM based on section ODU and external antenna location on page 3-10.

2 Use stainless steel hose clamps or equivalent fasteners to lock the SM into position.

See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna

See Installing an integrated ODU on page 6-49

3 Remove the base cover of the SM.

4 Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector, and connect the cable to the SM.

5 Wrap a drip loop in the cable.

6 For Connectorized Models, Install the external antenna according to the manufacturer's instructions.

7 For Connectorized Models, connect the SM's N-type antenna connectors to the external antenna, ensuring that the polarity matches between the SM cable labeling and the antenna port labels.

| Connectorized SM Antenna Cable Label | Antenna Connection |
|---|---|
| A | Vertical |
| B | Horizontal |

8 For Connectorized Models, weatherproof the N-type antenna connectors following section Attaching and weatherproofing an N type connector on page 6-66.

9 Wrap an AWG 10 (or 6mm$^2$) copper wire around the Ground post of the SM

10 Securely connect the copper wire to the grounding system (Protective Earth) according to applicable regulations.

11 Install an surge suppressor as describe in section Mount the Surge Suppressor on page 6-9

12 Connect the power supply to a power source.

13 Connect the Ethernet output from the power supply to the Ethernet port of your laptop.

14 Launch your web browser. In the URL address bar, enter **169.254.1.1**. then press Enter.

15 If the browser in laptop fails to access the interface of the SM, follow the procedure Radio recovery mode – Radio Recovery Console / Default Mode (fka Default Plug) on page 1-20

16 Log in as admin on the ODU. Configure a password for the admin account and log off.

17 Log back into the SM as admin or root, using the password that you configured.

18 For coarse alignment of the SM, use the Alignment Tool located at **Tools**, **Alignment Tool**.

Optionally, connect a headset to the AUX/SYNC port the SM and listen to the alignment tone, which indicates greater SM receive signal power by pitch. By adjusting the SM's position until the highest frequency pitch is obtained operators and installers can be confident that the SM is properly positioned. For information on device GUI tools available for alignment, see sections Using the Alignment Tool, Using the Link Capacity Test tool, and Using AP Evaluation tool below.

19 When the highest power achieved, lock the SM mounting bracket in place.

20 Log off of the SM web interface.

21 Disconnect the Ethernet cable from your laptop.

22 Replace the base cover of the SM.

23 Connect the Ethernet cable to the computer that the subscriber will be using.

# Installing a PTP 450 platform BHM

To install a PTP 450 platform Series BHM, perform the following steps.

**Procedure 7** Installing a BHM

1 Access the General tab of the Configuration page in the BHM

2 Choose the best mounting location for your particular application.

3 Align the BHM as follows:

a. Move the module to where the link will be unobstructed by the radio horizon and no objects penetrate the Fresnel zone.

b. Use a local map, compass, and/or GPS device as needed to determine the direction to the BHS.

c. Apply the appropriate degree of downward or upward tilt.

d. Ensure that the BHS is within the beam coverage area.

4 Using stainless steel hose clamps or equivalent fasteners, lock the BHM into position.

See Installing external antennas to a connectorized ODU on page 6-21 for connecting external antenna

5 If this BHM will not be connected to a CMM, optionally connect a utility cable to a GPS timing source and then to the SYNC port of the BHM.

6 Either connect the BHM's Aux to the CMM or connect the DC power converter to the BHM and then to an AC power source.

RESULT: When power is applied to a module or the unit is reset on the web-based interface, the module requires approximately 25 seconds to boot. During this interval, self-tests and other diagnostics are being performed.

7 Access **Configuration > General** page of the BHM for Synchronization configuration.

8 If a CMM4 is connected, set the **Sync Input** parameter to the AutoSync or Autosync + Free Run selection.

# Installing a PTP 450 platform BHS

To install a PTP 450 platform Series BHS, perform the following steps.

**Procedure 8** Installing a BHS

1 Choose the best mounting location for the BHS.

2 Terminate the UV outside grade Category 5 Ethernet cable with an RJ-45 connector, and connect the cable to the BHS. (See Powering the AP/SM/BH for test configuration on Page 5-15)

3 Use stainless steel hose clamps or equivalent fasteners to lock the BHS into position.

4 Install an surge suppressor as describe in section Mount the Surge Suppressor on page 6-9

5 For coarse alignment of the BHS, use the Audible Alignment Tone feature as follows:

a. At the BHS, connect the RJ-45 connector of the Alignment Tool Headset to the Aux port via alignment tone adapter as shown in Figure 138 on page 8-20.

b. Listen to the alignment tone for pitch, which indicates greater signal power (RSSI/dBm) by higher pitch.

Adjust the module slightly until you hear the highest pitch and highest volume

6 When you have achieved the best signal (highest pitch, loudest volume), lock the BHS in place with the mounting hardware

## Configuring the Link

See Configuring remote access on page 7-181.

## Monitoring the Link

See Monitoring the Link on page 7-182.

# Installing the AC Power Injector

**Caution**

As the PSU is not waterproof, locate it away from sources of moisture, either in the equipment building or in a ventilated moisture-proof enclosure. Do not locate the PSU in a position where it may exceed its temperature rating.

**Caution**

Do not plug any device other than a PMP/PTP 450i ODU into the ODU port of the PSU. Other devices may be damaged due to the non-standard techniques employed to inject DC power into the Ethernet connection between the PSU and the ODU.

Do not plug any device other than a Cambium PMP/PTP 450 platform PSU into the PSU port of the ODU. Plugging any other device into the PSU port of the ODU may damage the ODU and device.

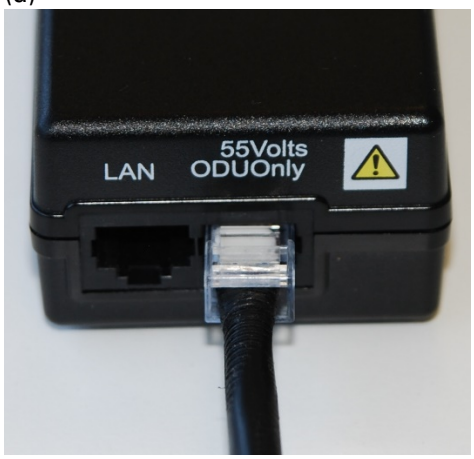
## Installing the AC Power Injector

Follow this procedure to install the AC Power Injector:

1 Form a drip loop on the PSU end of the LPU to PSU drop cable. The drip loop ensures that any moisture that runs down the cable cannot enter the PSU.

2 (a) Place the AC Power Injector on a horizontal surface. Plug the LPU to PSU drop cable into the PSU port labeled ODU. (b) When the system is ready for network connection, connect the network Cat5e cable to the LAN port of the PSU:

(a)




(b)

# Installing CMM4

**Note**

For instructions on CMM3 (CMMmicro) or CMM4 installation, including the outdoor temperature range in which it is acceptable to install the unit, tools required, mounting and cabling instructions, and connectivity verification, please see the *PMP Synchronization Solutions User Guide* located on the Cambium website.

The Cluster Management Module 4 (CMM4) provides power, sync, and network connectivity for up to eight APs, backhauls, and Ethernet terrestrial feeds in a variety of configurations. The CMM4 provides

- Sync over Power over Ethernet and integrated surge suppression on the controller board for up to 8 APs or BHs. Both a custom 30 VDC power scheme and a custom 56 VDC power scheme are available. Neither is the same as the later IEEE Standard 802.3af, and neither is compatible with it.
- Managed switching using a hardened EtherWAN switch (1090CKHH models). The CMM4 ships with a 14-port EtherWAN switch and is also available without a switch. The CMM4 originally shipped with a 9-port EtherWAN switch.
- Surge suppression on the controller board for the incoming 30V DC and 56V DC power lines and GPS coax cable.
- Auto-negotiation on the Ethernet ports. Ports will auto-negotiate to match inputs that are either 100Base-T or 10Base-T, and either full duplex or half duplex, when the connected device is set to auto-negotiate. Alternatively, these parameters are settable.
- An always-on NTP (Network Time Protocol) server that can provide date and time to any radio that can reach the CMM's management IP address.
- CNUT can be used to upgrade the CMM-4 software.

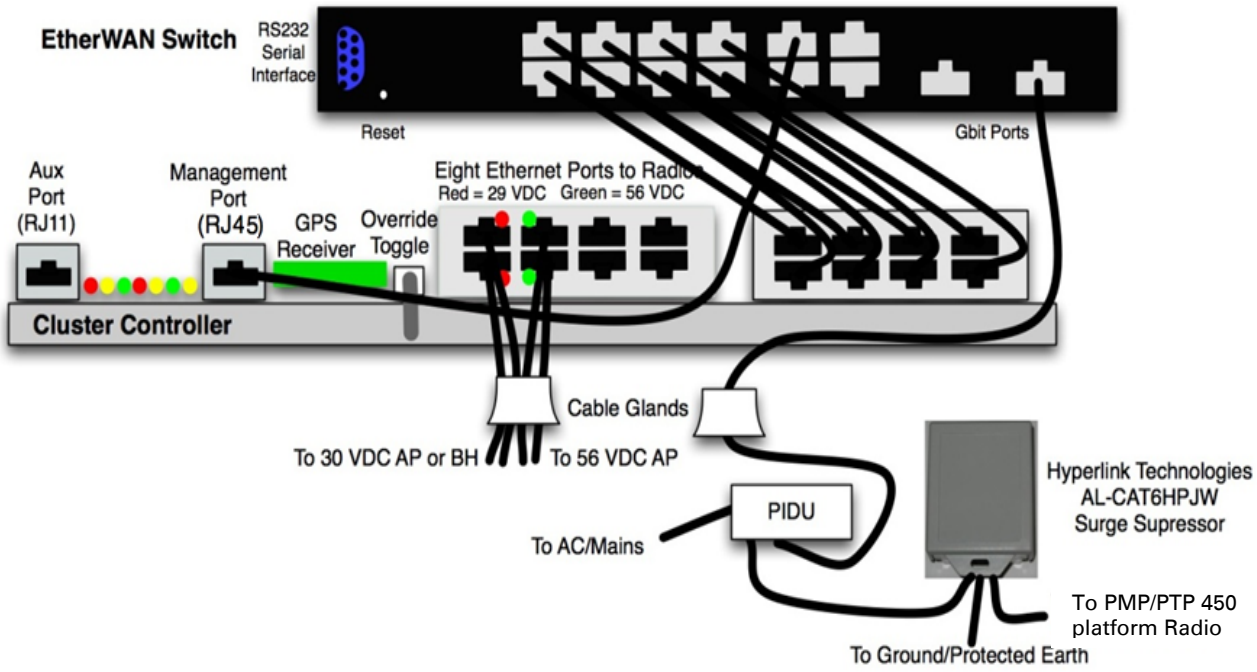
PMP/PTP 450 platform can use the CMM4's EtherWan switch for their network connectivity.

**Note**

The 56V of a CMM4 needs to go through the adapter cable (part number N000045L001A) as shown in Figure 21 on page 2-39.

The CMM4 56V power adapter cable can be prepared by swapping pins 5 and 7. See CMM4 56V power adapter cable pinout on page 2-39 for power adapter cable pinout.

**Figure 93** CMM4 cabled to support PMP/PTP 450 platform

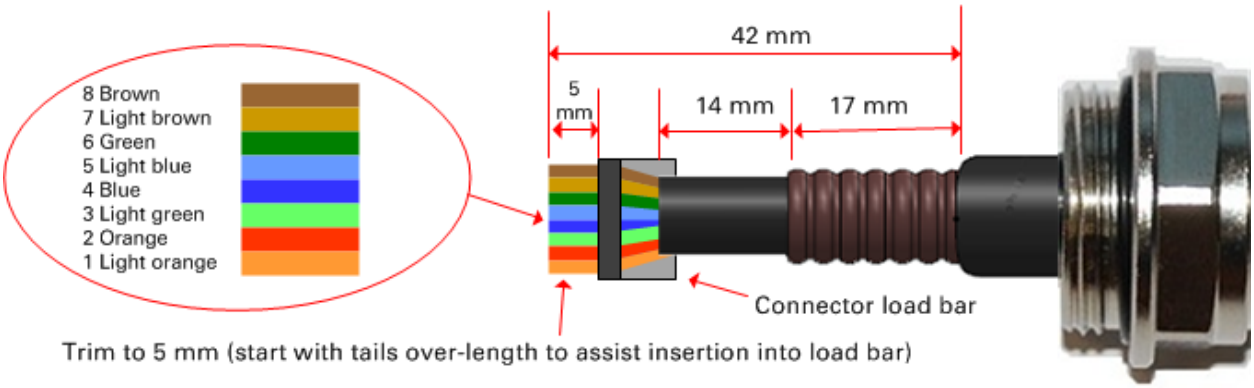


# Supplemental installation information

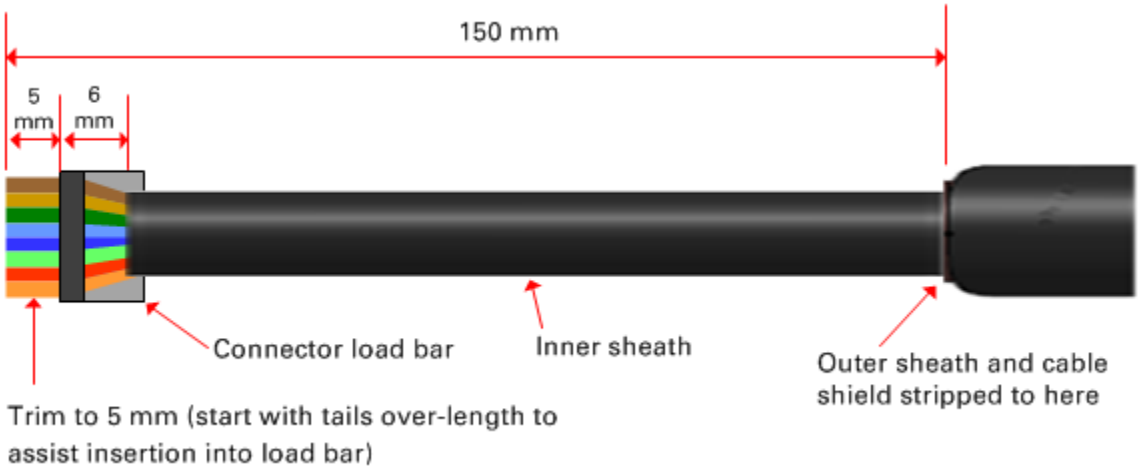
This section contains detailed installation procedures that are not included in the above topics, such as how to strip cables, create grounding points and weatherproof connectors.

## Stripping drop cable

When preparing drop cable for connection to the PMP/PTP 450 platform ODU or LPU, use the following measurements:




When preparing drop cable for connection to the PMP/PTP 450 platform PSU (without a cable gland), use the following measurements:

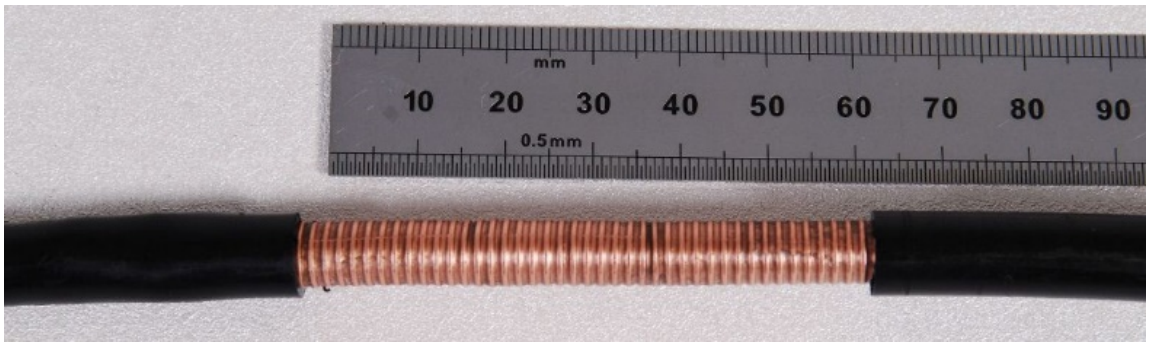


# Creating a drop cable grounding point

Use this procedure to connect the screen of the main drop cable to the metal of the supporting structure using the cable grounding kit (Cambium part number 01010419001).

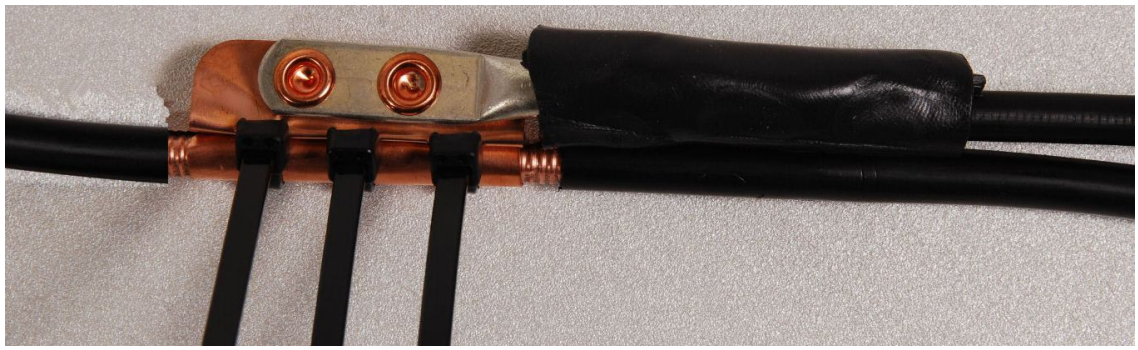
To identify suitable grounding points, refer to Drop cable grounding points on page 3-13.

1 Remove 60 mm (2.5 inches) of the drop cable outer sheath.




2 Cut 38mm (1.5 inches) of rubber tape (self-amalgamating) and fit to the ground cable lug. Wrap the tape completely around the lug and cable.

3 Fold the ground wire strap around the drop cable screen and fit cable ties.



4 Tighten the cable ties with pliers. Cut the surplus from the cable ties.

5 Cut a 38mm (1.5 inches) section of self-amalgamating tape and wrap it completely around the joint between the drop and ground cables.

6 Use the remainder of the self-amalgamating tape to wrap the complete assembly. Press the tape edges together so that there are no gaps.

7 Wrap a layer of PVC tape from bottom to top, starting from 25 mm (1 inch) below and finishing 25 mm (1 inch) above the edge of the self-amalgamating tape, overlapping at half width.

8 Repeat with a further four layers of PVC tape, always overlapping at half width. Wrap the layers in alternate directions (top to bottom, then bottom to top). The edges of each layer should be 25mm (1 inch) above (A) and 25 mm (1 inch) below (B) the previous layer.


9 Prepare the metal grounding point of the supporting structure to provide a good electrical contact with the grounding cable clamp. Remove paint, grease or dirt, if present. Apply anti-oxidant compound liberally between the two metals.

10 Clamp the bottom lug of the grounding cable to the supporting structure using site approved methods. Use a two-hole lug secured with fasteners in both holes. This provides better protection than a single-hole lug.

# Attaching and weatherproofing an N type connector

The following procedure should be used to weatherproof the N type connectors fitted to the connectorized ODU (AP/SM/BH) and antenna. This procedure must be followed to ensure that there is no moisture ingress at the radio ports. Failure to properly seal N-type antenna connectors can result in poor link performance or complete loss of radio communication.

**Note**

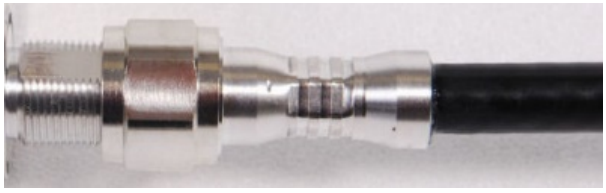
Cambium recommends to assemble the antenna, attach the ODU and cabling, and to seal the RF connections before installing the unit at the deployment site.

**Note**

N type connectors should be tightened using a torque wrench, set to 15 lb in or 1.7 Nm. If a torque wrench is not available, N type connectors may be finger tightened.

Use this procedure to weatherproof the N type connectors fitted to the connectorized ODU and external antenna (if recommended by the antenna manufacturer).

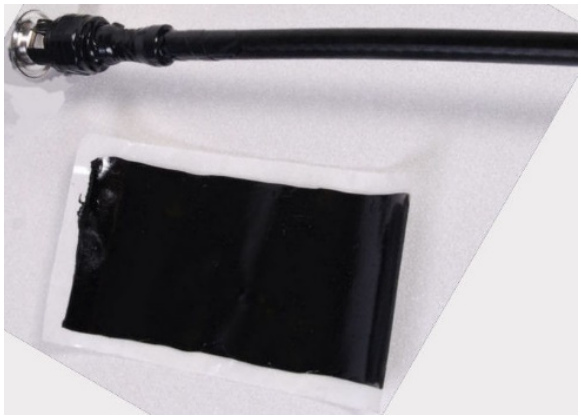
1 Ensure the connection is tight. A torque wrench should be used if available:



2 Wrap the connection with a layer of 19 mm (0.75 inch) PVC tape, starting 25 mm (1 inch) below the connector body. Overlap the tape to half-width and extend the wrapping to the body of the LPU. Avoid making creases or wrinkles:

3 Smooth the tape edges:

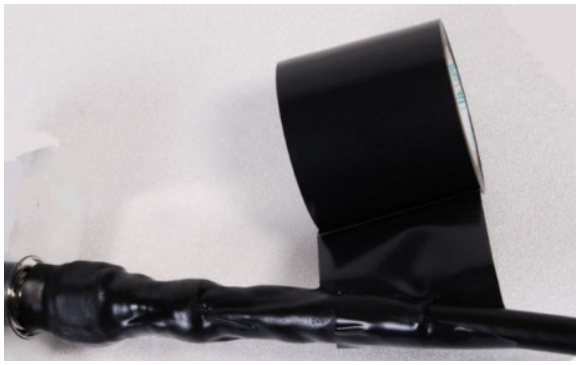
4 Cut a 125mm (5 inches) length of rubber tape (self-amalgamating):



5 Expand the width of the tape by stretching it so that it will wrap completely around the connector and cable:

6 Press the tape edges together so that there are no gaps. The tape should extend 25 mm (1 inch) beyond the PVC tape:

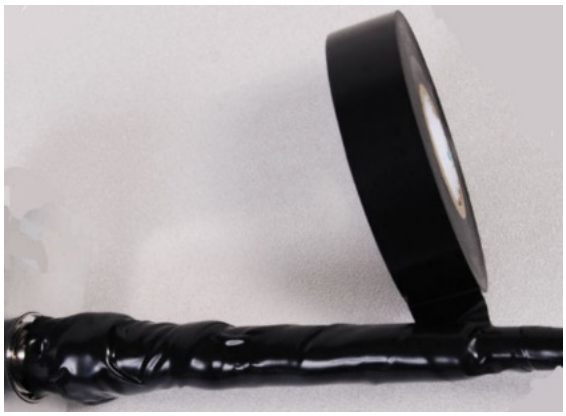
7 Wrap a layer of 50 mm (2 inch) PVC tape from bottom to top, starting from 25 mm (1 inch) below the edge of the self-amalgamating tape, overlapping at half width.



8 Repeat with a further four layers of 19 mm (0.75 inch) PVC tape, always overlapping at half width. Wrap the layers in alternate directions:

- Second layer: top to bottom.
- Third layer: bottom to top.
- Fourth layer: top to bottom.
- Fifth layer: bottom to top.

The bottom edge of each layer should be 25 mm (1 inch) below the previous layer.



9 Check the completed weatherproof connection:

**Note**

A video of this procedure can be found at:

https://www.youtube.com/watch?v=a-twPfCVq4A

# Chapter 7: Configuration

This chapter describes how to use the web interface to configure the PMP/PTP 450 platform link. This chapter contains the following topics:

# Preparing for configuration

This section describes the checks to be performed before proceeding with unit configuration and antenna alignment.

## Safety precautions

All national and local safety standards must be followed while configuring the units and aligning the antennas.

Warning

Ensure that personnel are not exposed to unsafe levels of RF energy. The units start to radiate RF energy as soon as they are powered up. Respect the safety standards defined in Compliance with safety standards on page 4-22, in particular the minimum separation distances.

Observe the following guidelines:

- Never work in front of the antenna when the ODU is powered.
- Always power down the PSU before connecting or disconnecting the drop cable from the PSU, ODU or LPU.

## Regulatory compliance

All applicable radio regulations must be followed while configuring the units and aligning the antennas. For more information, refer to Compliance with radio regulations on page 4-28.

**Caution**

If the system designer has provided a list of channels to be barred for TDWR radar avoidance, the affected channels must be barred before the units are allowed to radiate on site, otherwise the regulations will be infringed.

**Attention**

Si le concepteur du système a fourni une liste de canaux à interdire pour éviter les radars TDWR, les cannaux concernées doivent être interdits avant que les unités sont autorisées à émettre sur le site, sinon la réglementation peut être enfreinte.

# Connecting to the unit

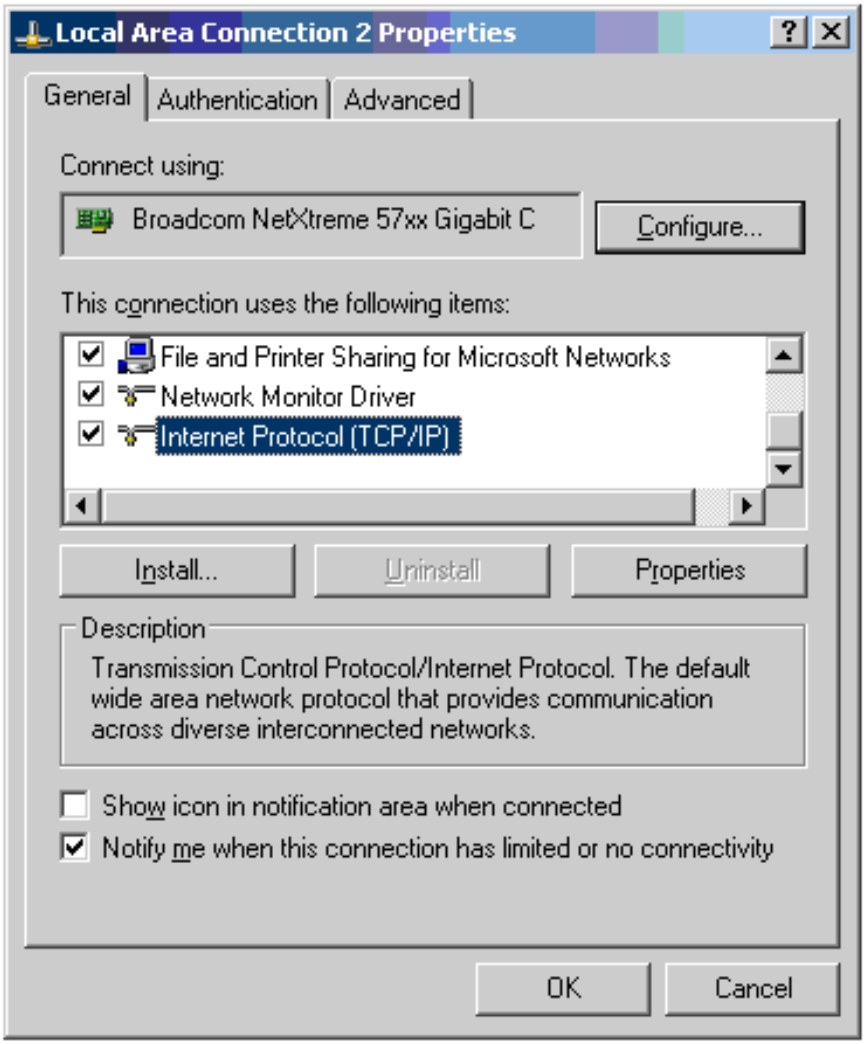
This section describes how to connect the unit to a management PC and power it up.

## Configuring the management PC

Use this procedure to configure the local management PC to communicate with the PMP/PTP 450 platform.

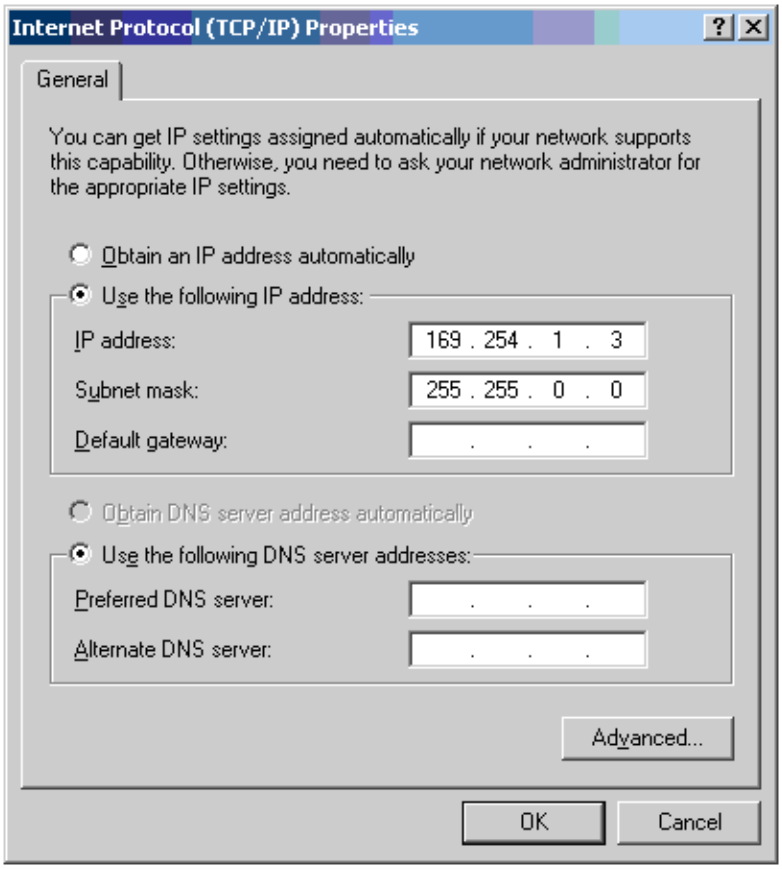
**Procedure 9** Configuring the management PC

1. Select **Properties** for the Ethernet port. In Windows 7 this is found in **Control Panel > Network and Internet > Network Connections > Local Area Connection**.
2. Select **Internet Protocol (TCP/IP)**:



3 Click **Properties**.

4 Enter an IP address that is valid for the 169.254.X.X network, avoiding 169.254.0.0 and 169.254.1.1. A good example is 169.254.1.3:




5 Enter a subnet mask of 255.255.0.0. Leave the default gateway blank.

# Connecting to the PC and powering up

Use this procedure to connect a management PC and power up the PMP/PTP 450 platform.

**Procedure 10** Connecting to the PC and powering up

1 Check that the ODU and PSU are correctly connected.

2 Connect the PC Ethernet port to the LAN port of the PSU using a standard (not crossed) Ethernet cable.

3 Apply mains or battery power to the PSU. The green Power LED should illuminate continuously.

4 After about several seconds, check that the orange Ethernet LED starts with 10 slow flashes.

5 Check that the Ethernet LED then illuminates continuously.

# Using the web interface

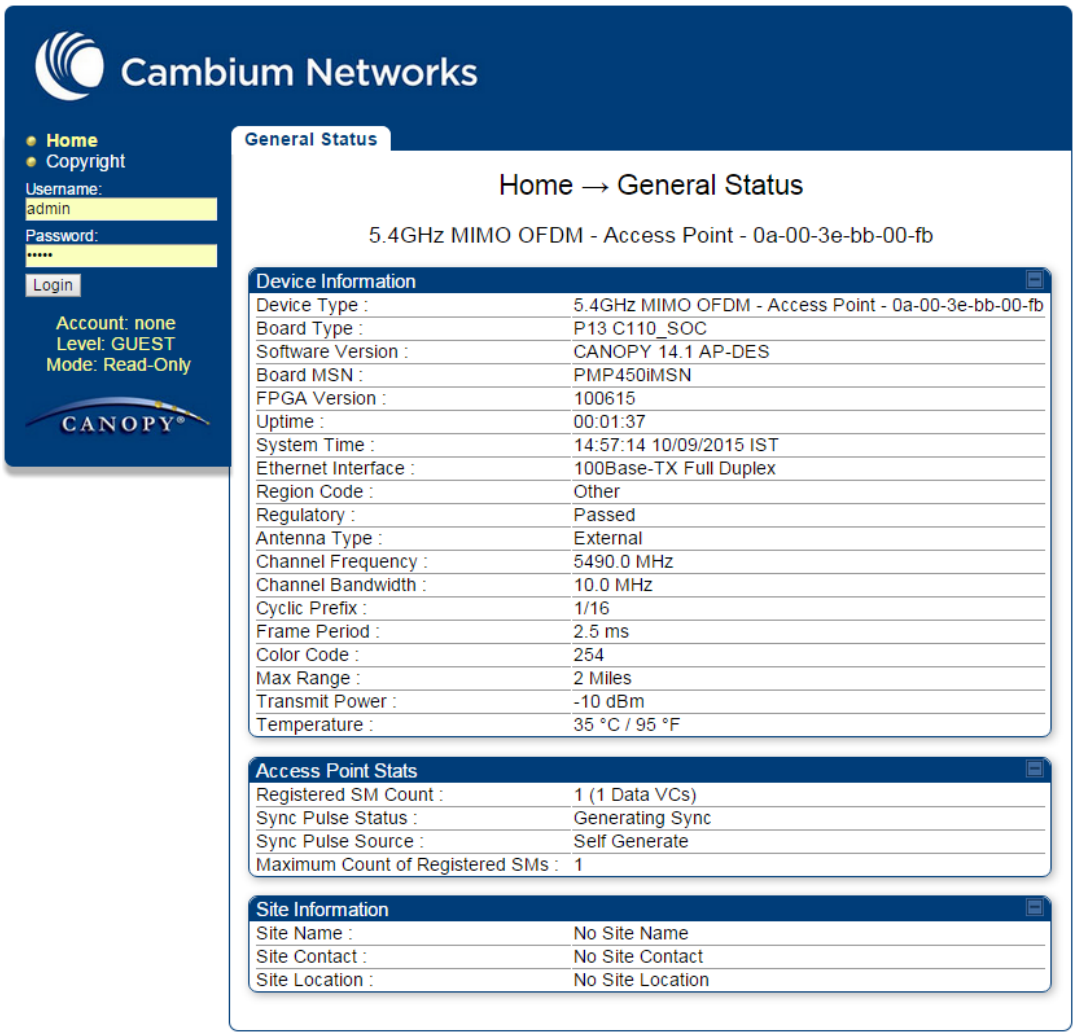
This section describes how to log into the PMP/PTP 450 platform web interface and use its menus.

## Logging into the web interface

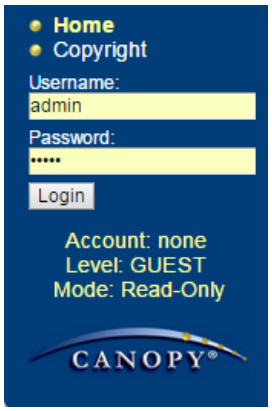
Use this procedure to log into the web interface as a system administrator.

**Procedure 11** Logging into the web interface

1. Start the web browser from the management PC.
2. Type the IP address of the unit into the address bar. The factory default IP address is **169.254.1.1**. Press ENTER. The web interface menu and System Summary page are displayed:

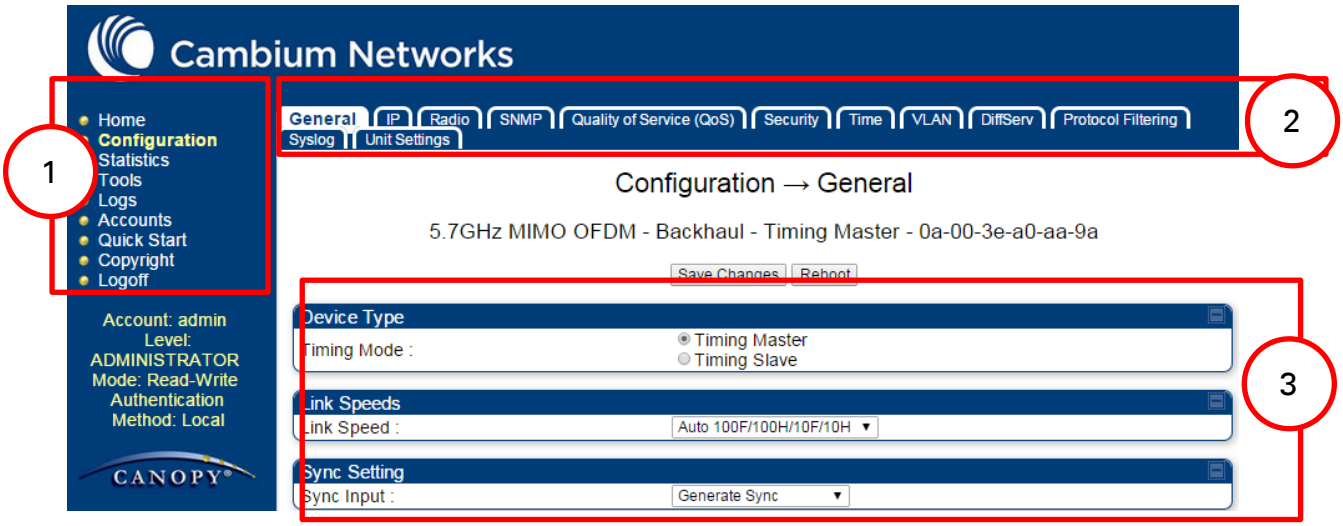


3 On left hand side of home page, the login information is displayed:




4 Enter Username (factory default username is *admin*) and Password (factory default password is *admin*) and click **Login**.

# Web GUI




| Field Name | Description |
|---|---|
| Main Manu | Click an option in side navigation bar (area marked as “1”). Multiple options in sub-navigation bars appear |
| Menu Option | Click top sub-navigation bar to choose one configuration page (area marked as “2”) |
| Parameter | To configure the parameters (e.g. area marked as “3”) |
| Save Changes | Press "Save Changes" to confirm and save the changes |
| Reboot | To reboot the ODU |

# Using the menu options

Use the menu navigation bar in the left panel to navigate to each web page. Some of the menu options are only displayed for specific system configurations. Use Table 72 to locate information about using each web page.

**Table 72** Menu options and web pages

| Main menu | Menu options | Applicable module | Description |
|---|---|---|---|
| Home | | | |
| | General Status | All | Viewing General Status on page 9-2 |
| | Session Status | AP, BHM | Viewing Session Status on page 9-15 |
| | Event Log | All | Interpreting messages in the Event Log on page 9-20 |
| | Network Interface | AP, BHM | Viewing the Network Interface on page 9-23 |
| | Layer 2 Neighbors | All | Viewing the Layer 2 Neighbors on page 9-24 |
| Configuration | | | |
| | General | All | General configuration on page 7-71 |
| | IP | All | Configuring IP and Ethernet interfaces on page 7-26 |
| | Radio | All | PMP/PTP 450i – Configurating radio on page 7-124 |
| | SNMP | All | Setting up SNMP agent on page 7-168 |
| | Qaulity of Service (QoS) | All | Configuring quality of service on page 7-185 |
| | Security | All | Configuring security on page 7-97 |
| | Time | AP, BHM | Setting up time and date<br>Time page of PMP/PTP 450 platform AP/BHM on page 7-93 |

| Main menu | Menu options | Applicable module | Description |
|---|---|---|---|
| | VLAN | All | VLAN Remarking and Priority bits configuration – AP/SM on page 7-46<br>VLAN configuration for PTP on page 7-56 |
| | DiffServ | All | IPv4 and IPv6 Prioritization on page 7-63 |
| | Protocol Filtering | All | Filtering protocols and ports on page 7-64 |
| | Syslog | All | Configuring syslog on page 7-175 |
| | Unit Setting | All | Configuring Unit Settings page on page 7-89 |
| Statistics | | | |
| | Scheduler | All | Viewing the Scheduler statistics on page 9-25 |
| | Registration Failures | AP, BHM | Viewing list of Registration Failures statistics on page 9-27 |
| | Bridge Control Block | All | Interpreting Bridge Control Block statistics on page 9-50 |
| | Bridging Table | All | Interpreting Bridging Table statistics on page 9-28 |
| | Ethernet | All | Interpreting Ethernet statistics on page 9-30 |
| | Radio | All | Interpreting RF Control Block statistics on page 9-33 |
| | VLAN | All | Interpreting VLAN statistics on page 9-34 |
| | Data VC | All | Interpreting Data VC statistics on page 9-36 |
| | Throughput | AP, BHM | Interpreting Throughput statistics on page 9-38 |
| | Filter | SM | Interpreting Filter statistics on page 9-43 |
| | ARP | SM | Viewing ARP statistics on page 9-44 |

| Main menu | Menu options | Applicable module | Description |
|---|---|---|---|
| | Overload | All | Interpreting Overload statistics on page 9-41 |
| | Syslog Statistics | All | Interpreting syslog statistics on page 9-55 |
| | Translation Table | SM | Interpreting Translation Table statistics on page 9-29 |
| | DHCP Relay | SM | Interpreting DHCP Relay statistics on page 9-42 |
| | NAT Stats | SM | Viewing NAT statistics on page 9-45 |
| | NAT DHCP | SM | Viewing NAT DHCP Statistics on page 9-47 |
| | Pass Through Statistics | AP | Interpreting Pass Through Statistics on page 9-52 |
| | Sync Status | AP | Interpreting Sync Status statistics on page 9-48 |
| | PPPoE | SM | Interpreting PPPoE Statistics for Customer Activities on page 9-49 |
| | SNMPv3 Statistics | All | Interpreting SNMPv3 Statistics on page 9-53 |
| | Frame Utilization | | Interpreting SNMPv3 Statistics on page 9-53 |
| Tools | | | |
| | Link Capacity Test | All | Using the Link Capacity Test tool on page 8-21 |
| | Spectrum Analyzer | All | Spectrum Analyzer tool on page 8-3 |
| | Remote Spectrum Analyzer | All | Remote Spectrum Analyzer tool on page 8-12 |
| | AP/BHM Evaluation | SM, BHS | Using AP Evaluation tool on page 8-24<br>Using BHM Evaluation tool on page 8-28 |
| | Subscriber Configuration | AP | Using the Subscriber Configuration tool on page 8-36 |
| | OFDM Frame Calculator | AP, BHM | Using the OFDM Frame Calculator tool on page 8-32 |

| Main menu | Menu options | Applicable module | Description |
|---|---|---|---|
| | BER results | SM | Using BER Results tool on page 8-40 |
| | Alignment Tool | SM, BHS | Using the Alignment Tool on page 8-15 |
| | Link Status | AP | Using the Link Status tool on page 8-37 |
| | Sessions | AP | Using the Sessions tool on page 8-41 |
| Logs | | | |
| Accounts | | | |
| | Change User Setting | | Changing a User Setting on page 7-99 |
| | Add user | | Adding a User for Access to a module on page 7-98 |
| | Delete User | | Deleting a User from Access to a module on page 7-99 |
| | User | | Users account on page 7-100 |
| Quick Start | | | |
| | Quick Start | AP, BHM | Quick link setup on page 7-12 |
| | Region Settings | AP, BHM | Quick link setup on page 7-12 |
| | Radio Carrier Frequency | AP, BHM | Quick link setup on page 7-12 |
| | Synchronization | AP, BHM | Quick link setup on page 7-12 |
| | LAN IP Address | AP, BHM | Quick link setup on page 7-12 |
| | Review and Save Configuration | AP, BHM | Quick link setup on page 7-12 |
| PDA | | | |
| | Quick Status | SM | The PDA web-page includes 320 x 240 pixel formatted displays of information important to installation and alignment for installers using legacy PDA devices. All device web pages are compatible with touch devices such as smart phones and |
| | Spectrum Results (PDA) | SM | |
| | Information | SM | |
| | BHM Evaluation | SM | |

| Main menu | Menu options | Applicable module | Description |
|---|---|---|---|
| | AIM | SM | tablets. |
| Copyright | | | |
| | Copyright Notices | All | The Copyright web-page displays pertinent device copyright information. |
| Logoff | | All | |

# Quick link setup

This section describes how to use the Quick Start Wizard to complete the essential system configuration tasks that must be performed on a PTP/PMP configuration.

**Note**

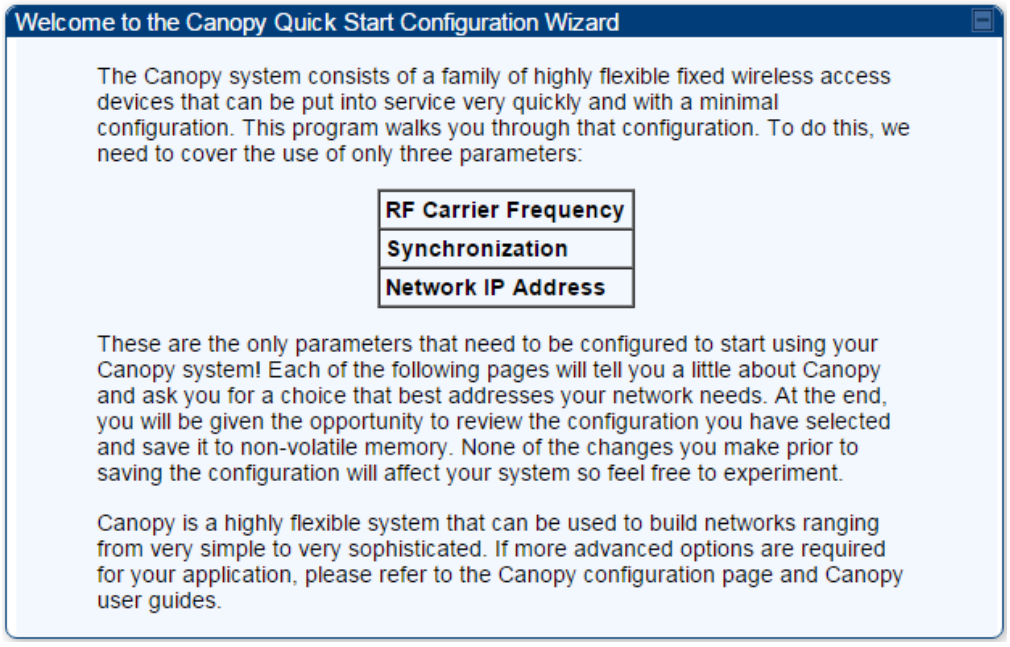
If the IP address of the AP or BHM is not known, See Radio recovery mode – Radio Recovery Console / Default Mode (fka Default Plug) on page 1-20.

## Initiating Quick Start Wizard

| Applicable products | PMP : ☑ AP | PTP: ☑ BHM |
|---|---|---|

To start with Quick Start Wizard: after logging into the web management interface click the **Quick Start** button on the left side of main menu bar. The AP/BHM responds by opening the Quick Start page.

**Figure 94** Disarm Installation page (top and bottom of page shown)




Quick Start is a wizard that helps you to perform a basic configuration that places an AP/BHM into service. Only the following parameters must be configured:

- Region Code
- RF Carrier Frequency
- Synchronization
- LAN (Network) IP Address

In each Quick Start page, you can

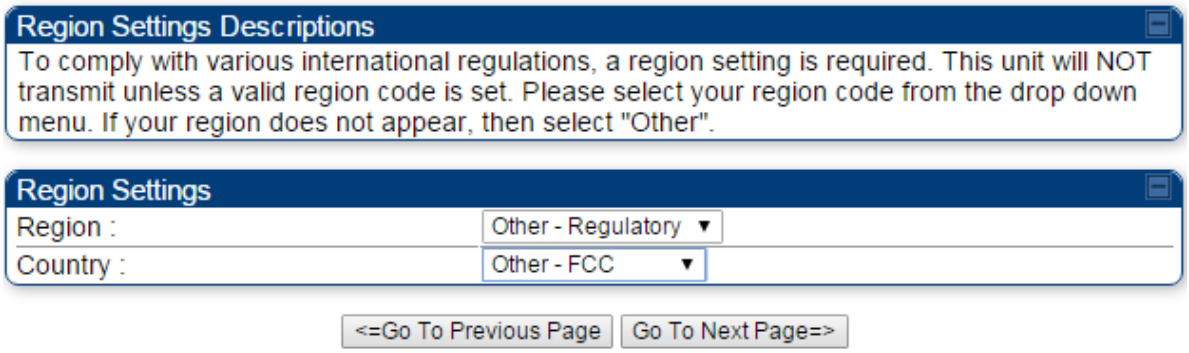
- specify the settings to satisfy the requirements of the network.
- review the configuration selected.
- save the configuration to non-volatile memory.

**Procedure 12** Quick start wizard

1 At the bottom of the Quick Start tab, click the **Go To Next Page** button.

2 From the pull-down menu, select the region in which the AP will operate.

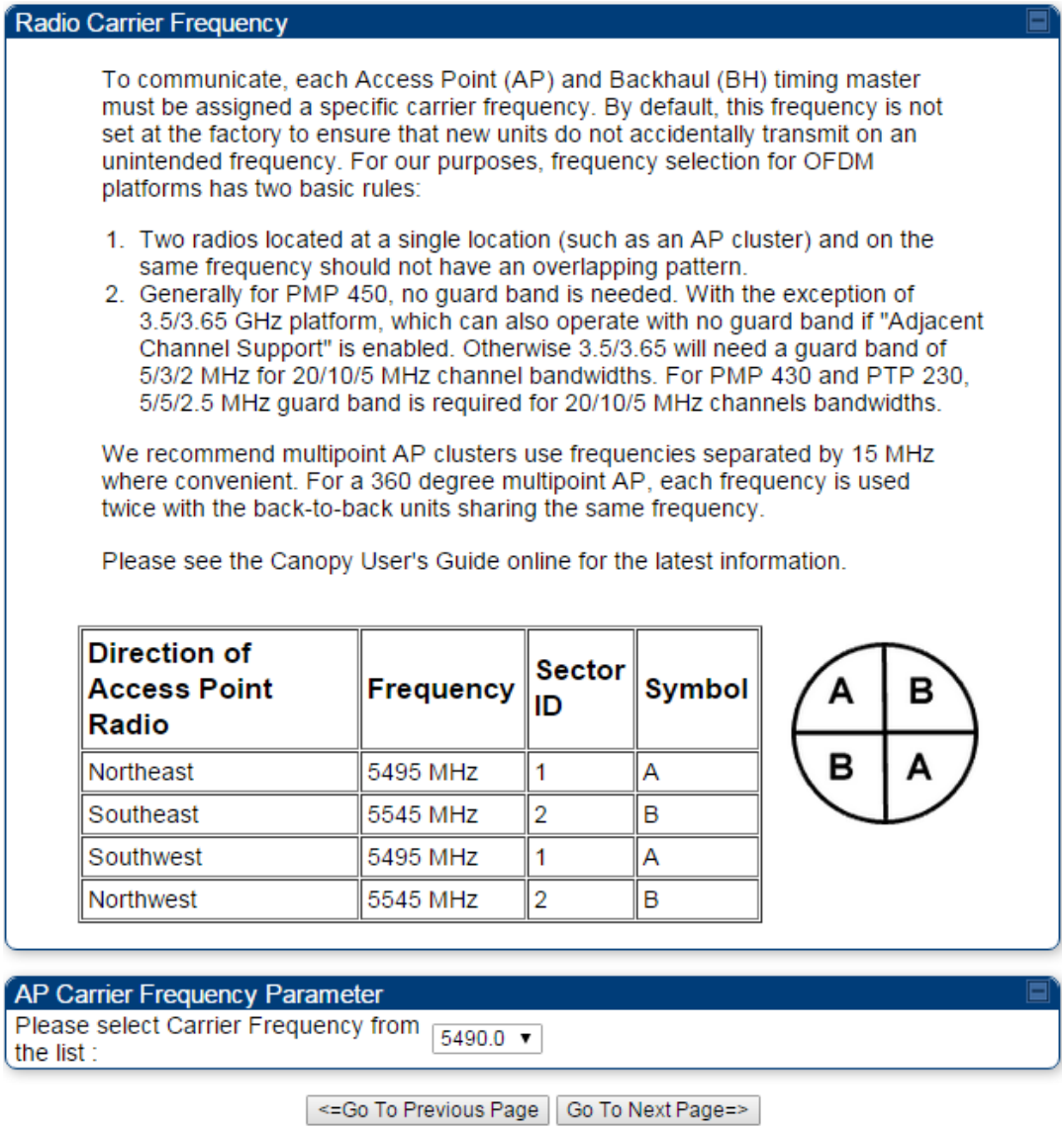
**Figure 95** Regional Settings tab of AP/BHM




3 Click the **Go To Next Page** button.

4 From the pull-down menu, select a frequency for the test.

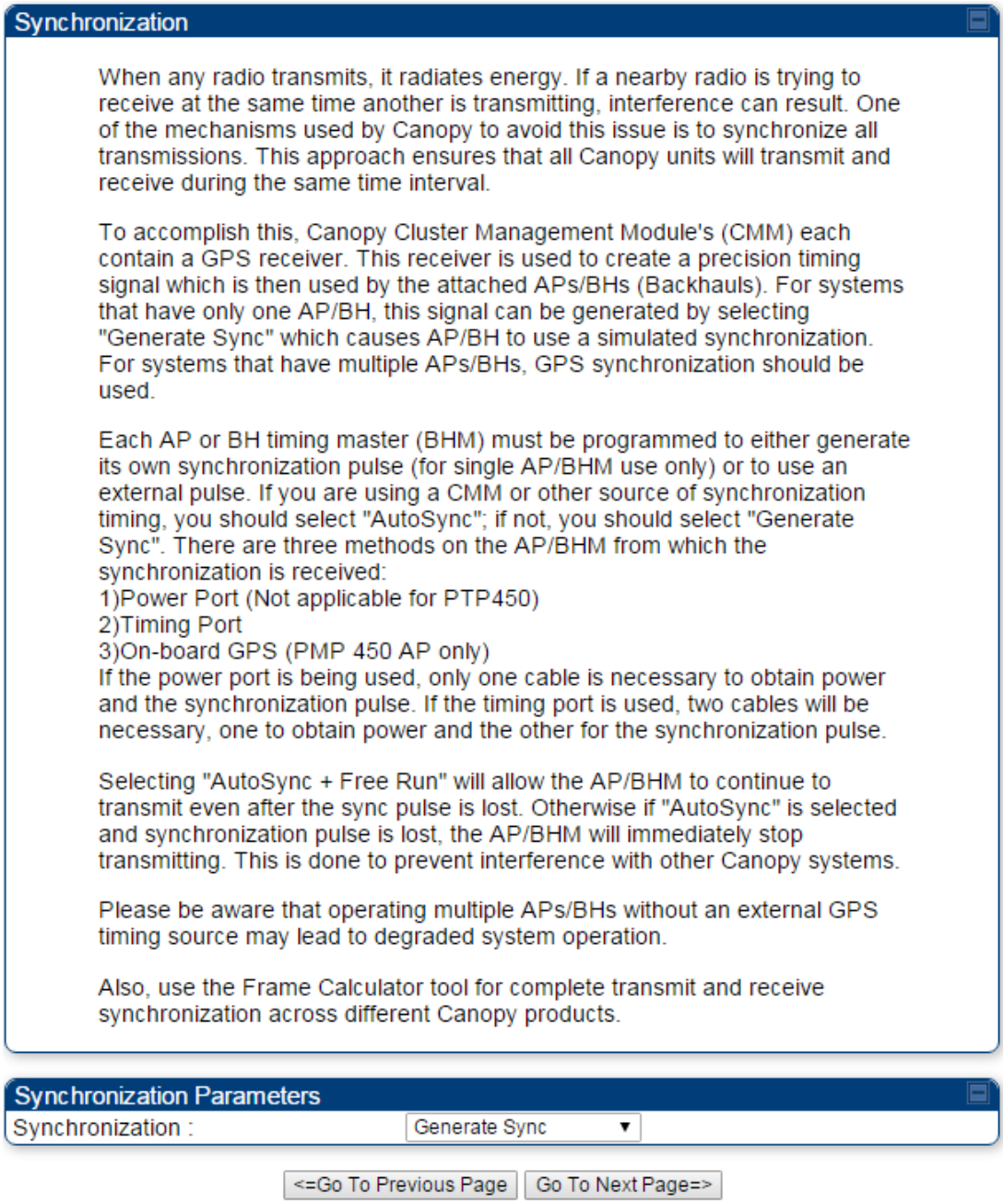
**Figure 96** Radio Carrier Frequency tab of AP/BHM




5 Click the **Go To Next Page** button.

6 At the bottom of this tab, select **Generate Sync Signal**.

**Figure 97** Synchronization tab of AP/BHM

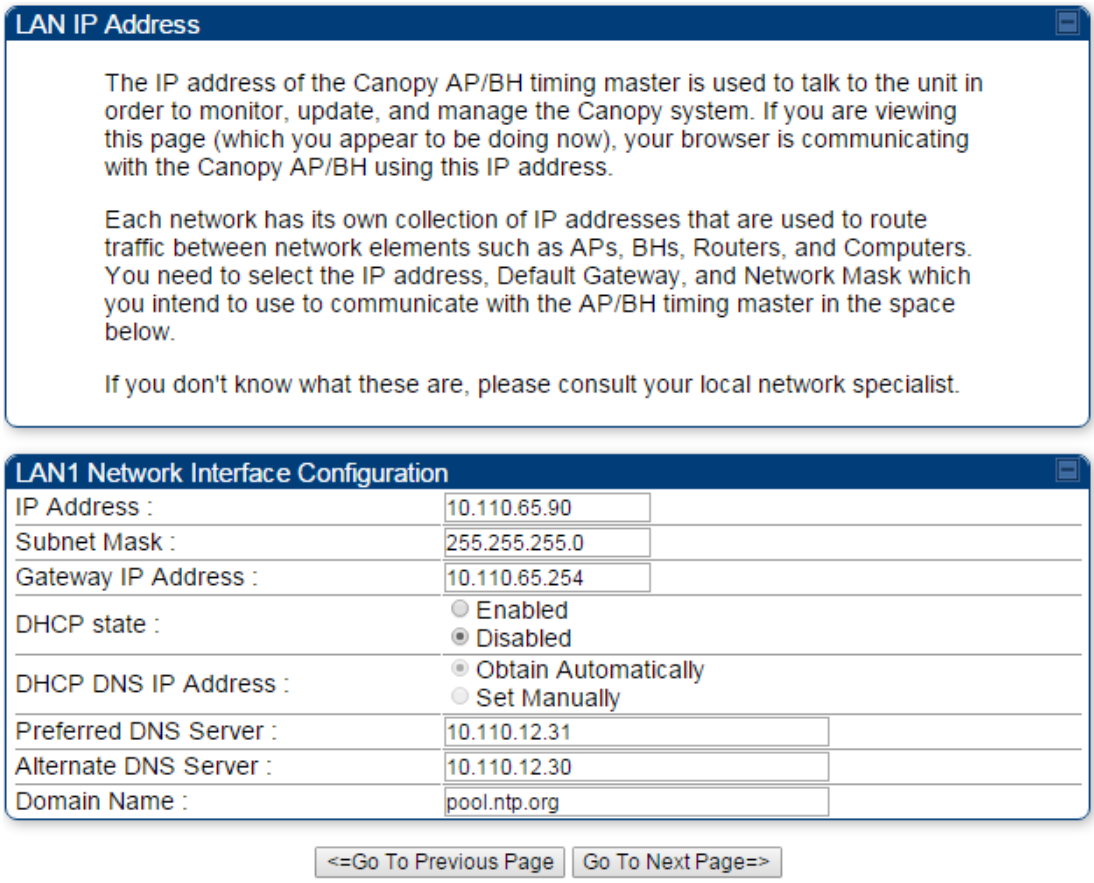



7 Click the **Go To Next Page** button.

8 At the bottom of the IP address configuration tab, either

- specify an **IP Address**, a **Subnet Mask**, and a **Gateway IP Address** for management of the AP and leave the **DHCP state** set to **Disabled**.
- set the **DHCP state** to **Enabled** to have the IP address, subnet mask, and gateway IP address automatically configured by a domain name server (DNS).

**Figure 98** LAN IP Address tab of the AP/BHM



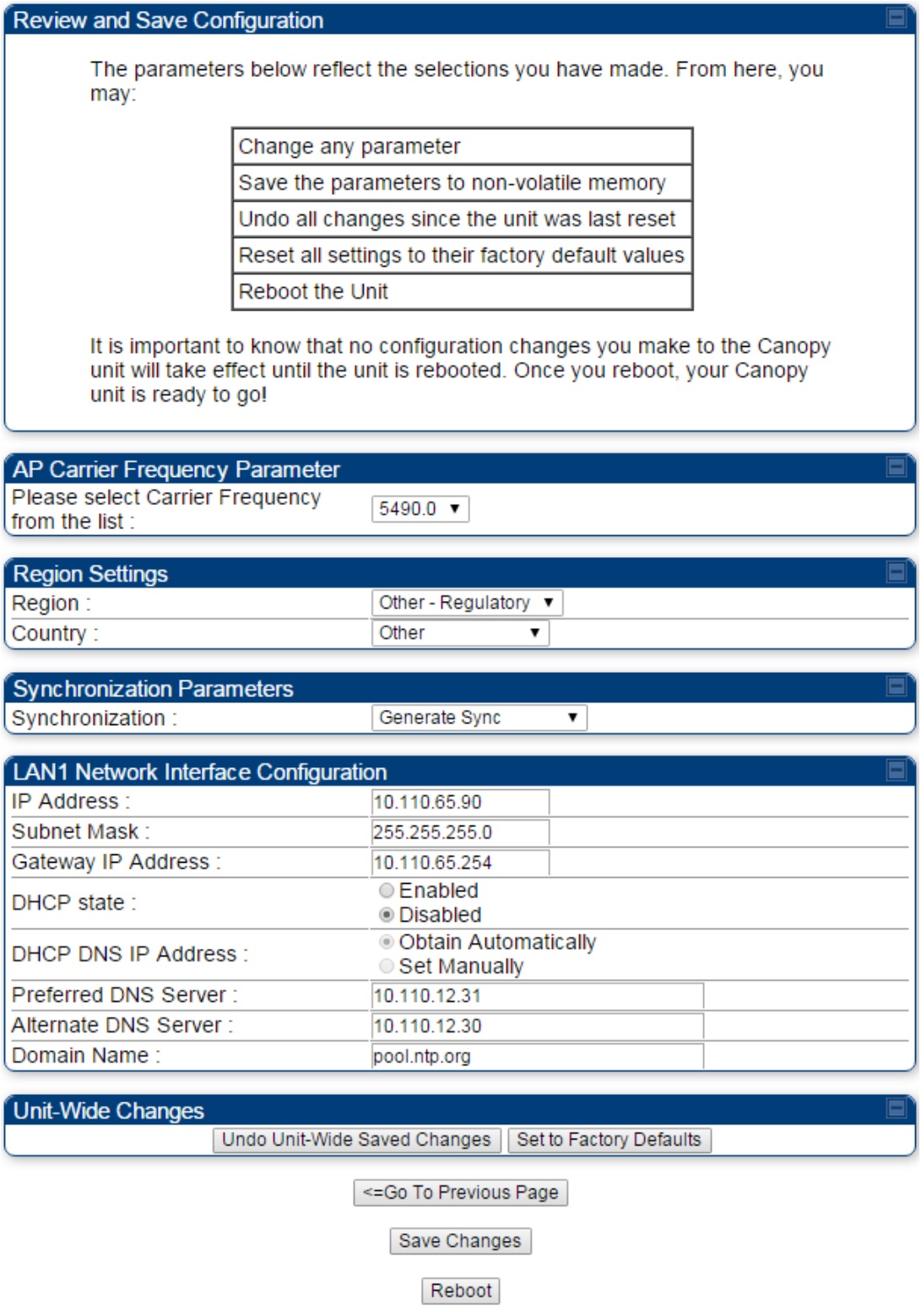

**Note**

Cambium encourages you to experiment with the interface. Unless you save a configuration and reboot the AP after you save the configuration, none of the changes are affected.

9 Click the **Go To Next Page =>** button.

10 Ensure that the initial parameters for the AP are set as you intended.

**Figure 99** Review and Save Configuration tab of the AP/BHM



11 Click the **Save Changes** button.

12 Click the **Reboot** button.
***RESULT:*** The AP responds with the message **Reboot Has Been Initiated...**

13 Wait until the indicator LEDs are not red.

14 Trigger your browser to refresh the page until the AP redisplays the General Status tab.

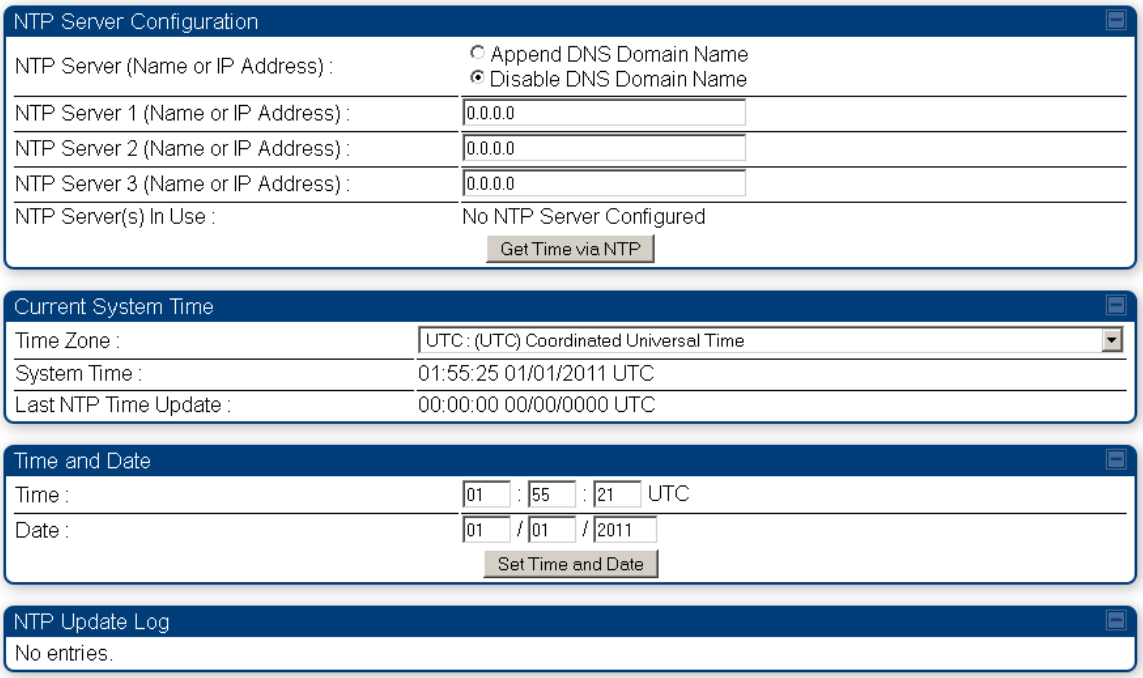
15 Wait until the red indicator LEDs are not lit.

# Configuring time settings

| | | | | | |
|---|---|---|---|---|---|
| Applicable products | PMP : | ☑ | AP | PTP: | ☑ BHM |

To proceed with the test setup, click the **Configuration** link on the left side of the General Status page. When the AP responds by opening the Configuration page to the General page, click the Time tab.

**Figure 100** Time tab of the AP/BHM



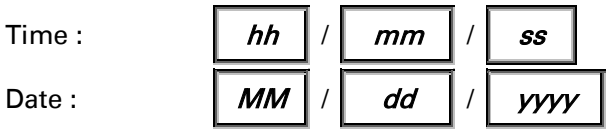

To have each log in the AP/BHM correlated to a meaningful time and date, either a reliable network element must pass time and date to the AP/BHM or you must set the time and date whenever a power cycle of the AP/BHM has occurred. A network element passes time and date in any of the following scenarios:

- A connected CMM4 passes time and date (GPS time and date, if received).
- A separate NTP server is addressable from the AP/BHM.

If the AP/BHM should obtain time and date from a CMM4, or a separate NTP server, enter the IP address of the CMM4 or NTP server on this tab. To force the AP/BHM to obtain time and date before the first (or next) 15-minute interval query of the NTP server, click **Get Time through NTP**.

If you enter a time and date, the format for entry is

**Figure 101** Time and date entry formats




where

***hh*** represents the two-digit hour in the range 00 to 24
***mm*** represents the two-digit minute
***ss*** represents the two-digit second
***MM*** represents the two-digit month
***dd*** represents the two-digit day
***yyyy*** represents the four-digit year

Proceed with the time setup as follows.

**Procedure 13** Entering AP/BHM time setup information

1. Enter the appropriate information in the format shown above.
2. Then click the **Set Time and Date** button.

**Note**

The time displayed at the top of this page is static unless your browser is set to automatically refresh

# Powering the SM/BHS for test

**Procedure 14** Powering the SM/BHS for test

1. In one hand, securely hold the top (larger shell) of the SM/BHS. With the other hand, depress the lever in the back of the base cover (smaller shell). Remove the base cover.
2. Plug one end of a CAT 5 Ethernet cable into the SM PSU port
3. Plug the other end of the Ethernet cable into the jack in the pig tail that hangs from the power supply
4. Roughly aim the SM/BHS toward the AP/BHM

5 Plug the power supply into an electrical outlet

Warning

From this point until you remove power from the AP/BHM, stay at least as far from the AP/BHM as the minimum separation distance specified in Calculated distances and power compliance margins.

6 Repeat the foregoing steps for each SM/BHS that you wish to include in the test.

# Viewing the Session Status of the AP/BHM to determine test registration

Once the SMs/BHS under test are powered on, return to the computing device to determine if the SM/BHS units have registered to the AP/BHM.

**Note**

In order for accurate power level readings to be displayed, traffic must be present on the radio link.

The Session Status tab provides information about each SM/BHS that has registered to the AP/BHM. This information is useful for managing and troubleshooting a system. All information that you have entered in the **Site Name** field of the SM/BHS displays in the Session Status tab of the linked AP/BHM.

The Session Status tab also includes the current active values on each SM( or BHS) (LUID) for MIR, and VLAN, as well as the source of these values (representing the SM/BHS itself, Authentication Server, or the AP/BHM and cap, if any—for example, APCAP as shown above).. As an SM/BHS registers to the AP/BHM, the configuration source that this page displays for the associated LUID may change. After registration, however, the displayed source is stable and can be trusted.

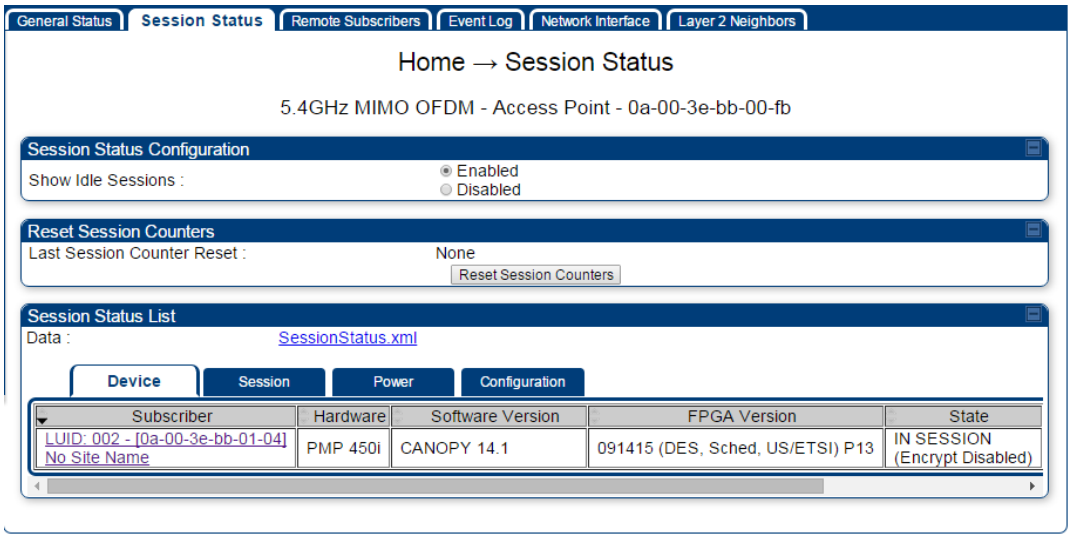
Idle subscribers may be included or removed from the session status display by enabling or disabling, respectively, the **Show Idle Sessions** parameter. Enabling or disabling this parameter only affects the GUI display of subscribers, not the registration status.

The SessionStatus.xml hyperlink allows user to export session status page from web management interface of AP/BHM. The session status page will be exported in xml file.

**Procedure 15** Viewing the AP Session Status page

1 On the AP web management GUI, navigate to **Home**, **Session Status**:

**Figure 102** Session Status tab of AP



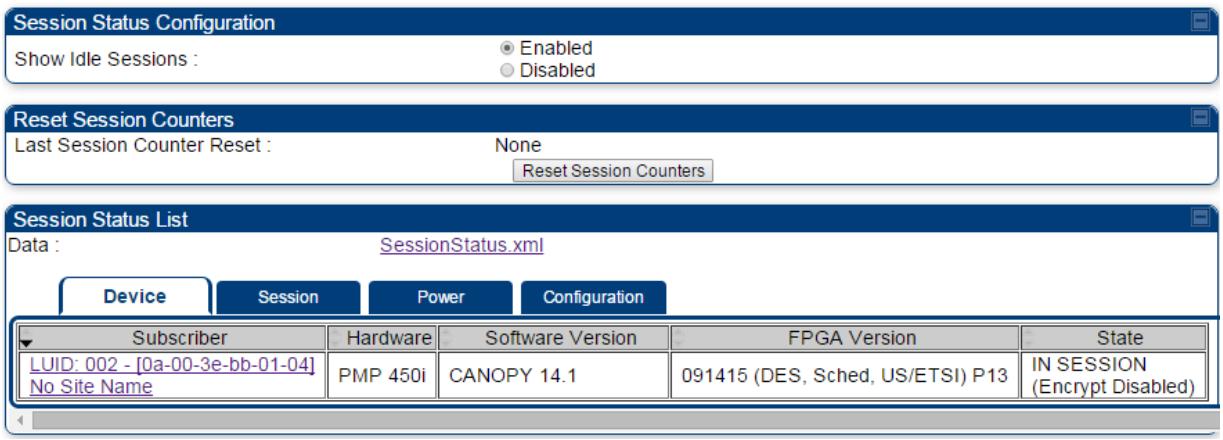

**Note**

Session status page for BHM is same as AP.

2 Verify that for each SM (or BHS) MAC address (printed on the SM/BHS housing) the AP/BHM has established a registered session by verifying the "State" status of each entry.

The Session Status page of the AP/BHM is explained in Table 73.

**Table 73** Session Status Attributes – AP



| Attribute | Meaning |
|---|---|
| LUID | This field displays the LUID (logical unit Identifier) of the SM/BHS. As each SM/BHS registers to the AP/BHM, the system assigns a LUID of 2 or a higher unique number to the SM/BHS. If an SM/BHS loses registration with the AP/BHM and then regains registration, the SM/BHS will retain the same LUID.<br>  **Note**<br>The LUID associated is lost when a power cycle of the AP/BHM occurs.<br>Both the LUID and the MAC are hot links to open the interface to the SM/BHS. In some instances, depending on network activity and network design, this route to the interface yields a blank web page. If this occurs, refresh your browser view. |
| MAC | This field displays the MAC address (or electronic serial number) of the SM/BHS. Both the LUID and the MAC are hot links to open the interface to the SM. In some instances, depending on network activity and network design, this route to the interface yields a blank web page. If this occurs, refresh your browser view. |
| State | This field displays the current status of the SM/BHS as either<br>• **IN SESSION** to indicate that the SM/BHS is currently registered to the AP/BHM.<br>• **IDLE** to indicate that the SM/BHS was registered to the AP/BHM at one time, but now is not.<br>This field also indicates whether the encryption scheme in the module is enabled. |
| Site Name | This field indicates the name of the SM/BHS. You can assign or change this name on the Configuration web page of the SM/BHS. This information is also set into the *sysName* SNMP MIB-II object and can be polled by an SNMP management server. |
| Software Version | This field displays the software release that operates on the SM/BHS, the release date and time of the software. |
| FPGA Version | This field displays the version of FPGA that runs on the SM/BHS. |
| Session Timeout | This field displays the timeout in seconds for management sessions via HTTP, ftp access to the SM/BHS. 0 indicates that no limit is imposed. |
| AirDelay | This field displays the distance of the SM from the AP/BHM. To derive the distance in meters, multiply the displayed number by 0.3048. At close distances, the value in this field is unreliable. |
| Session Count | This field displays how many times the AP/BHM has granted registration to the SM/BHS. Typically, this is the sum of Reg Count and Re-Reg |

| | |
|---|---|
| | Count. However, the result of internal calculation may display here as a value that slightly differs from the sum. |
| Reg Count | When a SM/BHS makes a registration request, the AP/BHM checks its local database to see whether it considers the SM/BHS to be already registered. If the AP/BHM concludes that the SM/BHS is not currently in session, then the request increments the value of this field. |
| Re-Reg Count | When an SM/BHS makes a registration request, the AP/BHM checks its local database to see whether it considers the SM/BHS to be already registered. If the AP/BHM concludes that the SM/BHS is not, then the request increments the value of this field.<br>Typically, a **Re-Reg Count** is the case where the SM/BHS attempts to register for having lost communication with the AP/BHM and the AP/BHM has not yet observed the link to the SM/BHS as being out of session. Then the AP/BHM again grants the registration to the SM/BHS and increments the re-registration count.<br>If the number of sessions is significantly greater than the number for other SMs/BHS, then this may indicate a link problem (check mounting, alignment, receive power levels) or an interference problem (conduct a spectrum scan). |
| Session Uptime | Once an SM/BHS successfully registers to an AP/BHM, this timer is started. If a session drops or is interrupted, this timer is reactivated once re-registration is complete. |
| Power Level | This field indicates the AP's/BHM's combined receive power level for the listed SM/BHS. |
| Signal Strength Ratio | This field displays the ratio of the Vertical path received signal power to the Horizontal path received signal power. This ratio can be useful for determining multipathing conditions (high vertical to horizontal ratio). |
| Signal to Noise Ratio | This field lists the current signal-to-noise level, an indication of the separation of the received power level vs. noise floor. |
| Sustained Uplink Data Rate | This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified rate at which each SM/BHS registered to this AP/BHM is replenished with credits for transmission. The configuration source of the value is indicated in parentheses.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Uplink Burst Allocation | This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified maximum amount of data that each SM/BHS is allowed to transmit before being recharged at the **Sustained Uplink Data Rate** with credits to transmit more. The configuration source of the value is indicated in |

| | |
|---|---|
| | parentheses.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Sustained Downlink Data Rate | This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the specified the rate at which the AP/BHM should be replenished with credits (tokens) for transmission to each of the SMs/BHS's in its sector. The configuration source of the value is indicated in parentheses.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Downlink Burst Allocation | This field displays the value that is currently in effect for the SM/BHS, with the source of that value in parentheses. This is the maximum amount of data to allow the AP/BHM to transmit to any registered SM/BHS before the AP/BHM is replenished with transmission credits at the **Sustained Downlink Data Rate**. The configuration source of the value is indicated in parentheses.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Max Burst Uplink Rate | The data rate at which an SM/BHS is allowed to burst (until burst allocation limit is reached) before being recharged at the **Sustained Uplink Data Rate** with credits to transit more. When set to 0 (default), the burst rate is unlimited.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Max Burst Downlink Rate | The data rate at which an SM/BHS is allowed to burst (until burst allocation limit is reached) before being recharged at the **Sustained Downlink Data Rate** with credits to transit more. When set to 0 (default), the burst rate is unlimited.<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Low Priority Uplink CIR | This field indicates the minimum rate at which low priority traffic is sent over the uplink (unless CIR is oversubscribed or RF link quality is degraded).<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Low Priority Downlink CIR | This field indicates the minimum rate at which low priority traffic is sent over the downlink (unless CIR is oversubscribed or RF link quality is degraded).<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| High Uplink CIR | This field indicates the minimum rate at which high priority traffic is sent |

| | |
|---|---|
| | over the uplink (unless CIR is oversubscribed or RF link quality is degraded).<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| High Downlink CIR | This field indicates the minimum rate at which high priority traffic is sent over the downlink (unless CIR is oversubscribed or RF link quality is degraded).<br>The AP/BHM will display one of denotations for configuration source. See Table 74 on page 7-25. |
| Rate | This field displays whether the high-priority channel is enabled in the SM and the status of rate adapt. For example, if “8X/4X” is listed, the radio is capable of operating at 8X but is currently operating at 4X, due to RF conditions.<br>This field also states whether it is MIMO-A or MIMO-B radio e.g. “8X/8X MIMO-B” indicates MIMO-B and “8X/4X MIMO-A” indicates MIMO-A. |

**Table 74** Session Status > Configuration CIR configuration denotations

| Attribute | Meaning |
|---|---|
| (SM) | QoS/VLAN parameters are derived from the SM’s/BHS’s settings |
| (APCAP) | QoS/VLAN parameters are derived from the AP’s settings, including any keyed capping (for radios capped at 4 Mbps, 10 Mbps, or 20 Mbps) |
| (D) | QoS/VLAN parameters are retrieved from the device, due to failed retrieval from the AAA or WM server. |
| (AAA) | QoS/VLAN parameters are retrieved from the RADIUS server |
| (BAM) | QoS/VLAN parameters are retrieved from a WM BAM server |

# Configuring IP and Ethernet interfaces

This task consists of the following sections:

# Configuring the IP interface

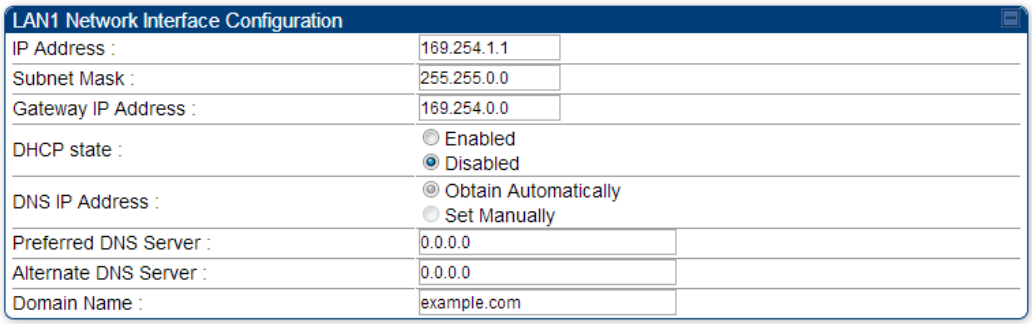
The IP interface allows users to connect to the PMP/PTP 450 platform web interface, either from a locally connected computer or from a management network.

| Applicable products | PMP : ☑ AP ☑ SM | PTP: ☑ BHM ☑ BMS |
|---|---|---|

To configure the IP interface, follow these instructions:

**Procedure 16** Configuring the AP/BHM IP interface

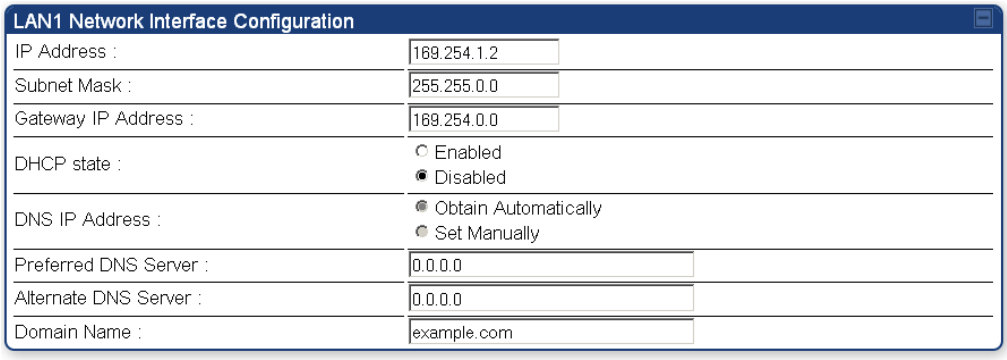
1 Select menu option **Configuration** > **IP**. The LAN configuration page is displayed:




2 Update IP Address, Subnet Mask and Gateway IP Address to meet network requirements (as specified by the network administrator).

3 Review the other IP interface attributes and update them, if necessary (see Table 75 IP interface attributes).

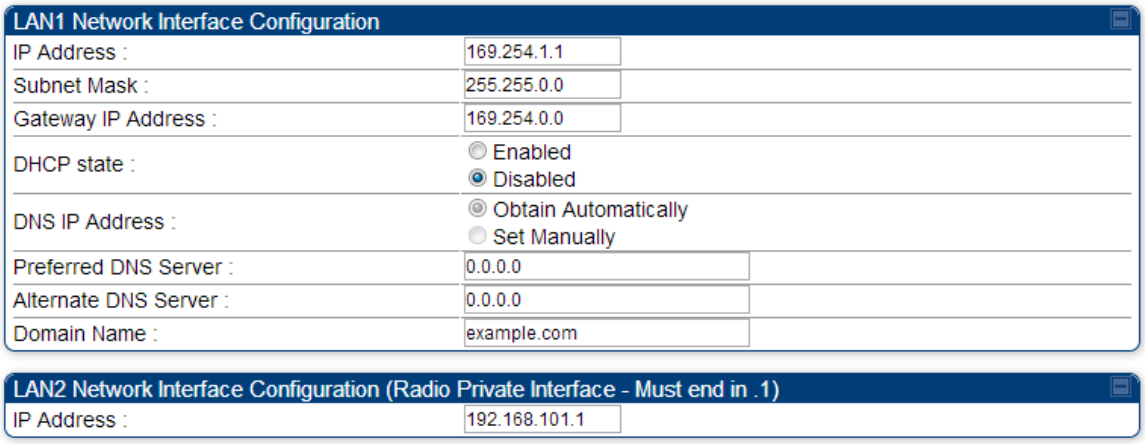
4 Click **Save**. "Reboot Required" message is displayed:




5 Click **Reboot**.

The IP page of AP/SM/BHM/BHS is explained in Table 75.

**Table 75** IP interface attributes




| Attribute | Meaning |
|---|---|
| IP Address | Internet Protocol (IP) address. This address is used by family of Internet protocols to uniquely identify this unit on a network. |
| Subnet Mask | Defines the address range of the connected IP network. |
| | The IP address of a computer on the current network that acts as a gateway. A gateway acts as an entrance and exit to packets from and to other networks. |
| DHCP state | If **Enabled** is selected, the DHCP server automatically assigns the IP configuration (IP address, subnet mask, and gateway IP address) and the values of those individual parameters (above) are not used. The setting of this DHCP state parameter is also viewable (read only), in the Network Interface tab of the Home page. |
| DNS IP Address | Canopy devices allow for configuration of a preferred and alternate DNS server IP address either automatically or manually. Devices must set DNS server IP address manually when DHCP is disabled for the management interface of the device. DNS servers may be configured automatically from the DHCP response when DHCP is enabled for the management interface of the device. Optionally devices may be configured to set the DNS server IP address manually when DHCP is enabled for the management interface. The default DNS IP addresses are 0.0.0.0 when configured manually. |
| Preferred DNS Server | The first address used for DNS resolution. |
| Alternate DNS Server | If the Preferred DNS server cannot be reached, the Alternate DNS Server is used. |
| Domain Name | The operator's management domain name may be configured for DNS. The domain name configuration can be used for configuration of the servers in the operator's network. The default domain name is |

| | |
|---|---|
| | example.com, and is only used if configured as such. |
| LAN2 Network Interface Configuration (Radio Private Interface) – IP Address | It is recommended not to change this parameter from the default AP/BHM private IP address of 192.168.101.1. A /24 CIDR subnet is used to communicate with each of the SMs/BHS that are registered. The AP/BHM uses a combination of the private IP and the LUID (logical unit ID) of the SM/BHS.<br>It is only displayed for AP and BHM.<br>**Table 76** SM/BHS private IP and LUID |

| SM/BHS | LUID | Private IP |
|---|---|---|
| First SM/BHS registered | 2 | 192.168.101.2 |
| Second SM/BHS registered | 3 | 192.168.101.3 |

# NAT, DHCP Server, DHCP Client and DMZ

| | | |
|---|---|---|
| **Applicable products** | **PMP :** | ☑ SM |

The system provides NAT (Network Address Translation) for SMs in the following combinations of NAT and DHCP (Dynamic Host Configuration Protocol):

- NAT Disabled
- NAT with DHCP Client (**DHCP** selected as the **Connection Type** of the WAN interface) and DHCP Server
- NAT with DHCP Client(**DHCP** selected as the **Connection Type** of the WAN interface)
- NAT with DHCP Server
- NAT without DHCP

## NAT

NAT isolates devices connected to the Ethernet or wired side of a SM from being seen directly from the wireless side of the SM. With NAT enabled, the SM has an IP address for transport traffic (separate from its address for management), terminates transport traffic and allows you to assign a range of IP addresses to devices that are connected to the Ethernet or wired side of the SM.

In the Cambium system, NAT supports many protocols, including HTTP, ICMP (Internet Control Message Protocols), and FTP (File Transfer Protocol). For virtual private network (VPN) implementation, L2TP over IPSec (Level 2 Tunneling Protocol over IP Security) and PPTP (Point to Point Tunneling Protocol) are supported.

**Note**

When NAT is enabled, a reduction in throughput is introduced in the system (due to processing overhead).

## DHCP

DHCP enables a device to be assigned a new IP address and TCP/IP parameters, including a default gateway, whenever the device reboots. Thus DHCP reduces configuration time, conserves IP addresses, and allows modules to be moved to a different network within the Cambium system.

In conjunction with the NAT features, each SM provides the following:

- A DHCP server that assigns IP addresses to computers connected to the SM by Ethernet protocol.
- A DHCP client that receives an IP address for the SM from a network DHCP server.

## DMZ

In conjunction with the NAT features, a DMZ (Demilitarized Zone) allows the allotment of one IP address behind the SM for a device to logically exist outside the firewall and receive network traffic. The first three octets of this IP address must be identical to the first three octets of the NAT private IP address.

- A DHCP server that assigns IP addresses to computers connected to the SM by Ethernet protocol.
- A DHCP client that receives an IP address for the SM from a network DHCP server.

## NAT Disabled

The NAT Disabled implementation is illustrated in Figure 103.