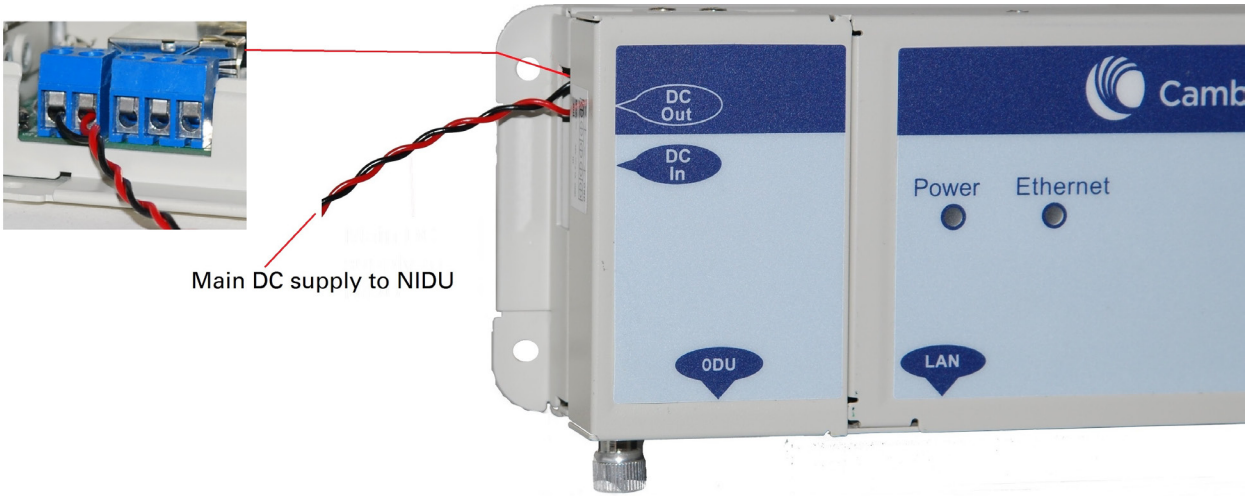
3 Connect the main DC supply cable to its power source. If this supply is from the AC+DC Enhanced Power Injector 56V, the DC Out first terminal is negative (black wire) and the second is positive (red wire):



4 Connect the backup DC supply cable to its power source.

Using the PTP 800 AC-DC Power Supply Converter

If a suitable AC mains supply is available, use the PTP 800 AC-DC Power Supply Converter (Cambium part number WB3622) to power the NIDU (Figure 127). This includes a DC power connector that plugs into both ports of the NIDU DC interface.

Figure 127 NIDU powered by the PTP 800 AC-DC Power Supply Converter

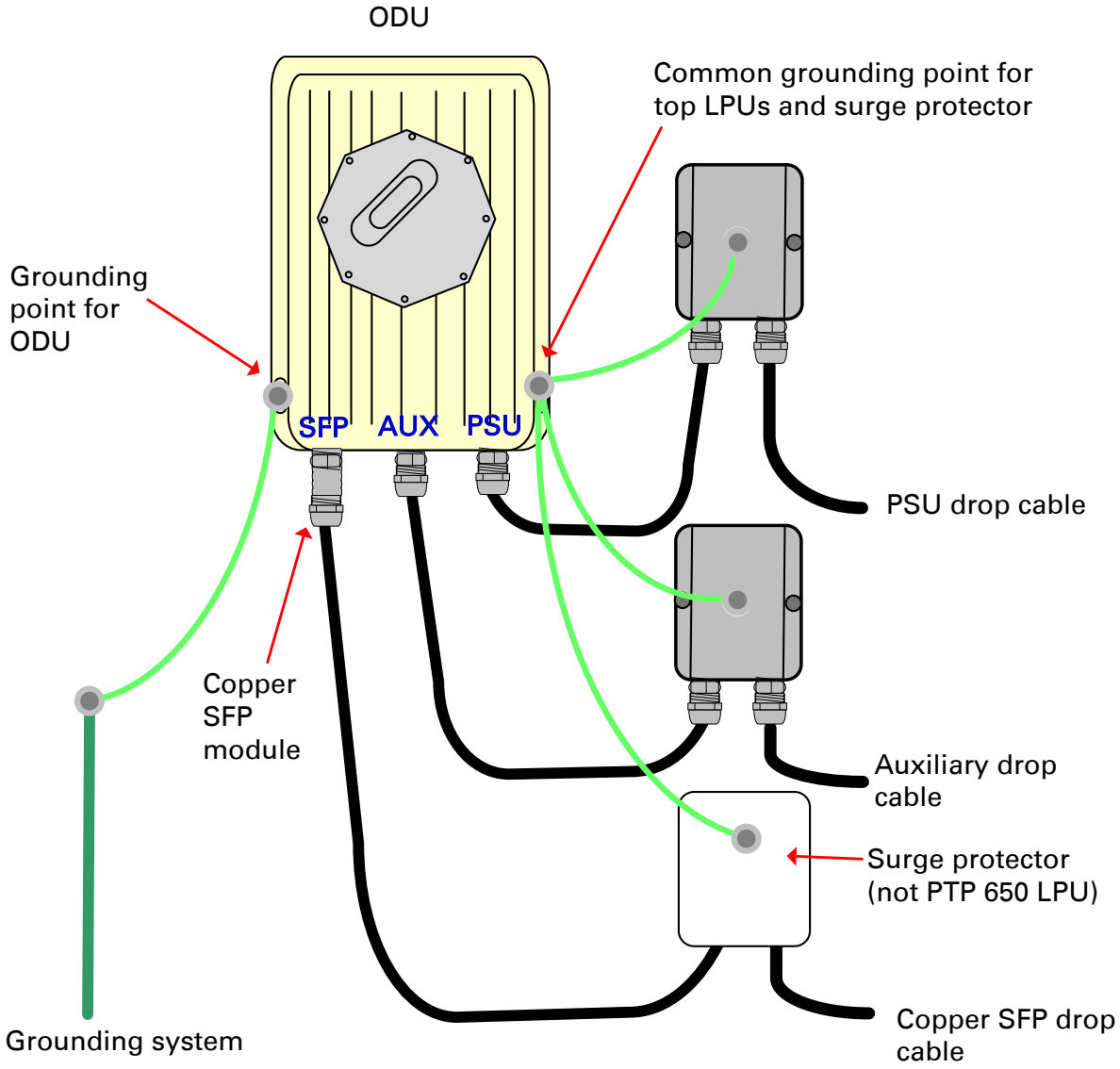
Installing an SFP Ethernet interface

In more advanced configurations, there may be an optical or copper Cat5e Ethernet interface connected to the SFP port of the ODU. Refer to Typical deployment on page 3-2 for diagrams of these configurations.

Adapt the installation procedures in this chapter as appropriate for SFP interfaces, noting the following differences from a PSU interface:

- Install an optical or copper SFP module in the ODU (SFP port) and connect the SFP optical or copper cable into this module using the long cable gland from the SFP module kit. This is described in the following procedures:
  - Fitting the long cable gland on page 5-47
  - Inserting the SFP module on page 5-48
  - Connecting the cable on page 5-50
  - Fitting the gland on page 5-51
  - Removing the cable and SFP module on page 5-53
- Optical cables do not require LPUs or ground cables.
- At the remote end of an SFP drop cable, use an appropriate termination for the connected device.
- If the connected device is outdoors, not in the equipment building or cabinet, adapt the grounding instructions as appropriate.
- PTP 670 LPUs are not suitable for installation on SFP copper Cat5e interfaces. For SFP drop cables, obtain suitable surge protectors from a specialist supplier.
- Ground the top LPUs and surge protector to the same point on the ODU (Figure 128).

Figure 128 ODU with copper Cat5e connections to all three Ethernet ports



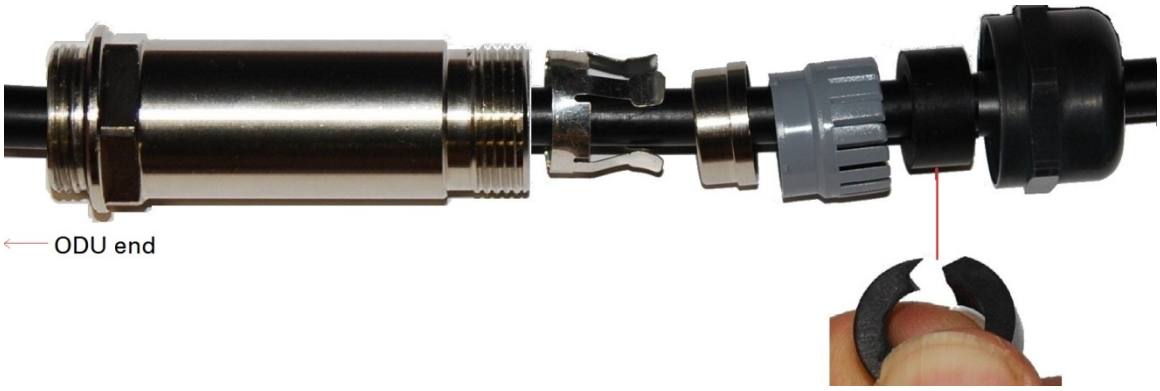
Fitting the long cable gland

Optical SFP interface: Disassemble the long cable gland and thread its components over the LC connector at the ODU end as shown below.

Copper Cat5e SFP interface: Disassemble the long cable gland and thread its components over the RJ45 connector at the ODU end as shown below.

1 Disassemble the gland:

2 Thread each part onto the cable (the rubber bung is split):



3 Assemble the spring clip and the rubber bung (the clips go inside the ring):

4 Fit the parts into the body and lightly screw on the gland nut (do not tighten it):

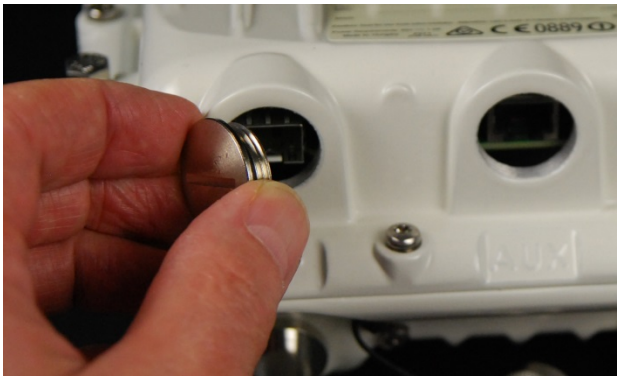
Optical

Copper

Inserting the SFP module

To insert the SFP module into the ODU, proceed as follows:

1 Remove the blanking plug from the SFP port of the ODU:



2 Insert the SFP module into the SFP receptacle with the label up:

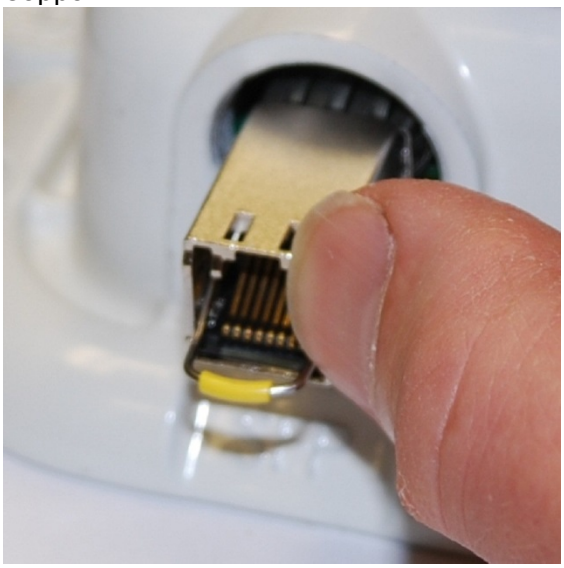
Optical

Copper

3 Push the module home until it clicks into place:

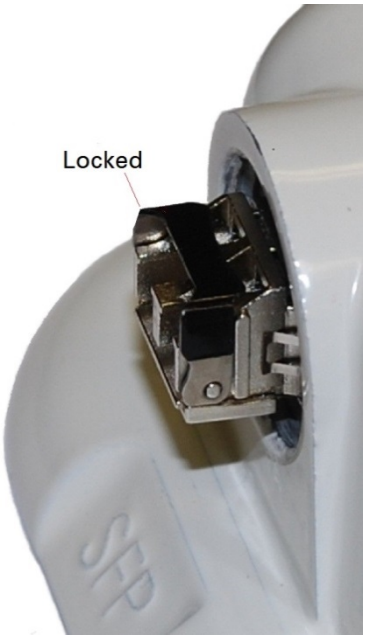
Optical

Copper

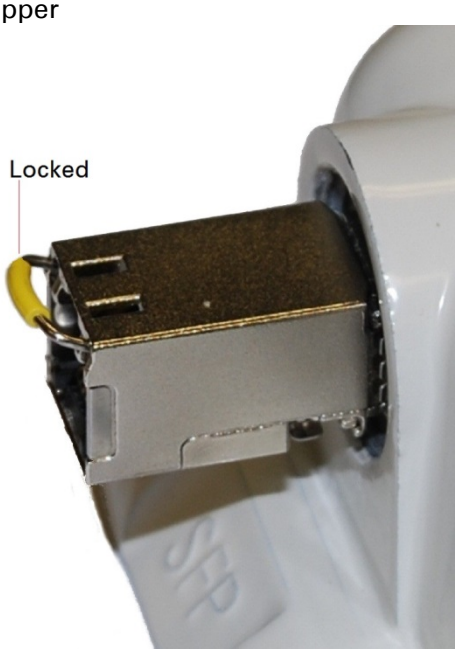


4 Rotate the latch to the locked position:

Optical



Copper



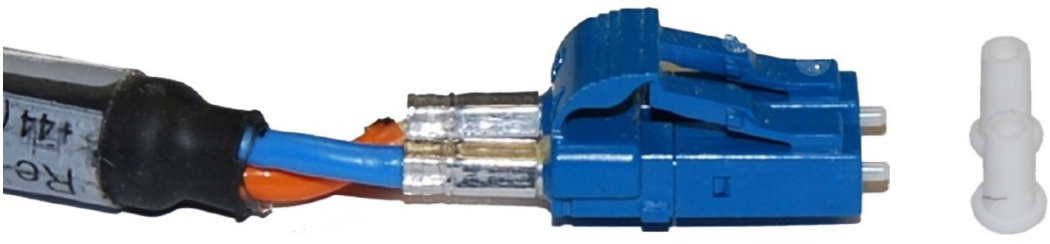
Connecting the cable

Caution

The fiber optic cable assembly is very delicate. To avoid damage, handle it with extreme care. Ensure that the fiber optic cable does not twist during assembly, especially when fitting and tightening the weatherproofing gland.

Do not insert the power over Ethernet drop cable from the PSU into the SFP module, as this will damage the module.

1 Remove the LC connector dust caps from the ODU end (optical cable only):



2 Plug the connector into the SFP module, ensuring that it snaps home:

Optical

Copper

Fitting the gland

1 Fit the gland body to the SFP port and tighten it to a torque of 5.5 Nm (4.3 lb ft)

2 Fit the gland nut and tighten until the rubber seal closes on the cable. Do not over-tighten the gland nut, as there is a risk of damage to its internal components:

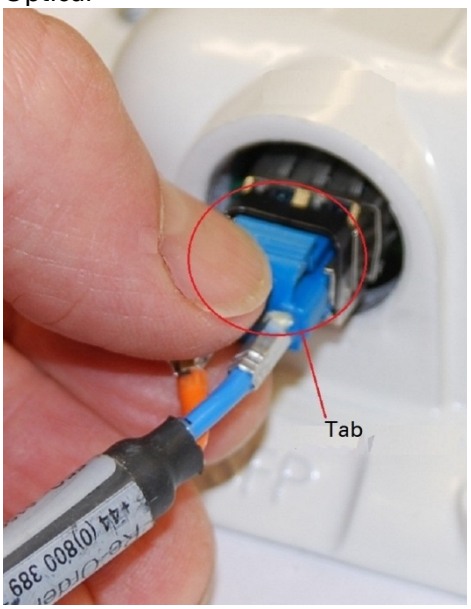

Correct
Incorrect

Removing the cable and SFP module

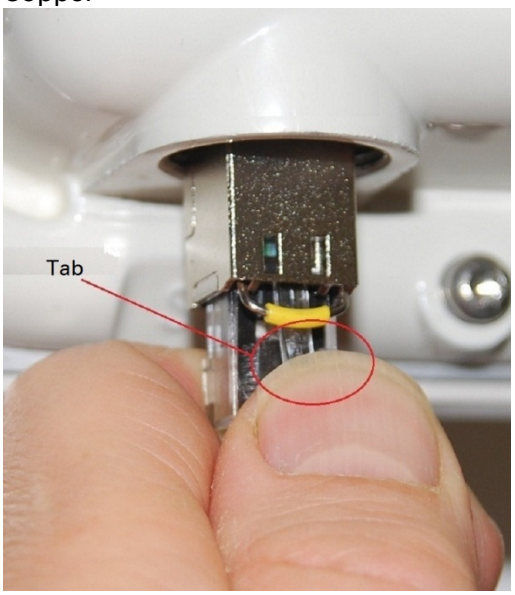
Do not attempt to remove the module without disconnecting the cable, otherwise the locking mechanism in the ODU will be damaged.

1 Remove the cable connector by pressing its release tab before pulling it out:

Optical

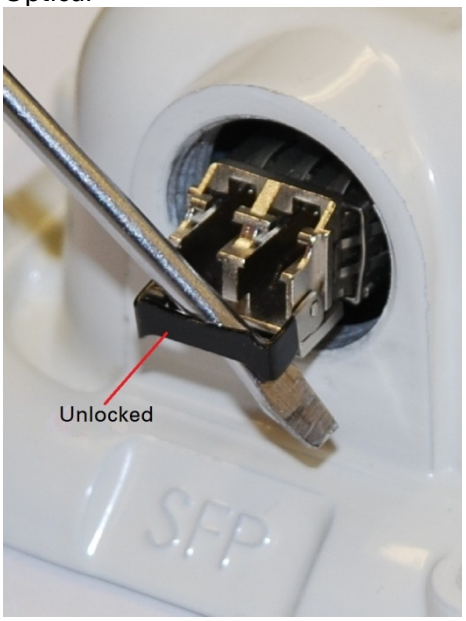


Copper

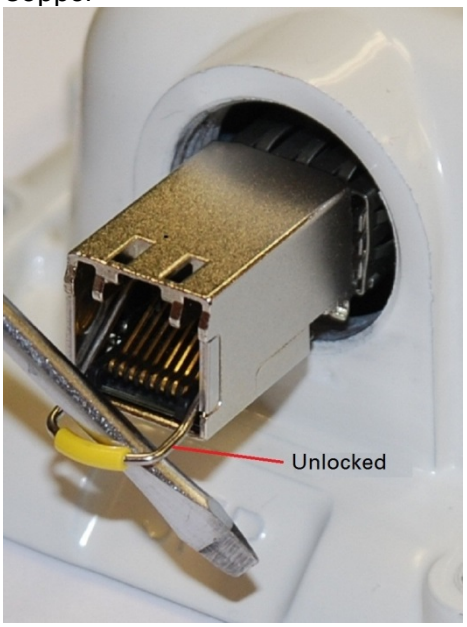


2 Rotate the latch to the unlocked position. Extract the module by using a screwdriver:

Optical



Copper



Installing an Aux Ethernet interface

In more advanced configurations, there may be a copper Cat5e Ethernet interface connected to the Aux port of the ODU. Refer to Typical deployment on page 3-2 for a diagram of this configuration.

Adapt the installation procedures in this chapter as appropriate for the Aux interface, noting the following differences:

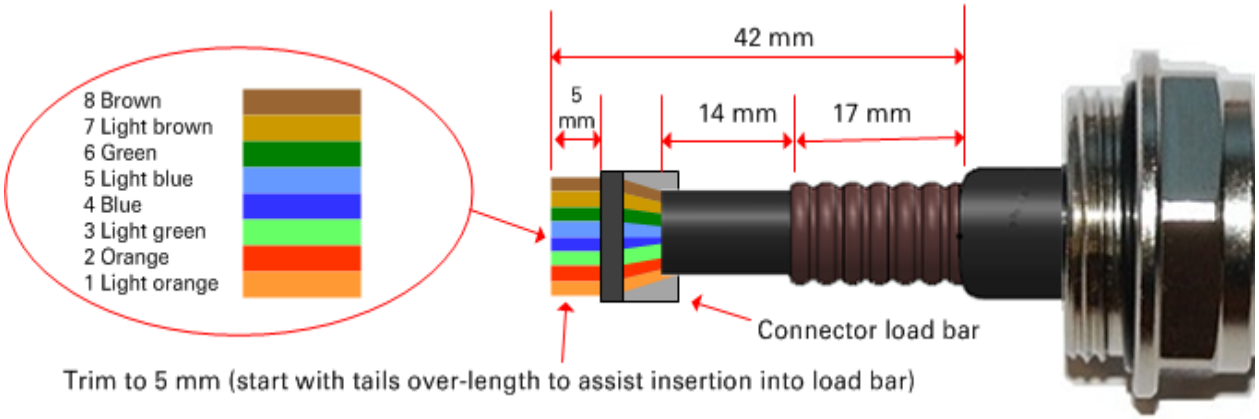
- At the remote end of the Aux drop cable, use an appropriate termination for the connected device (for example, a video camera or wireless access point).
- If the connected device is outdoors, not in the equipment building or cabinet, adapt the grounding instructions as appropriate.
- Ground the top LPUs and surge protector to the same point on the ODU (Figure 128).

Supplemental installation information

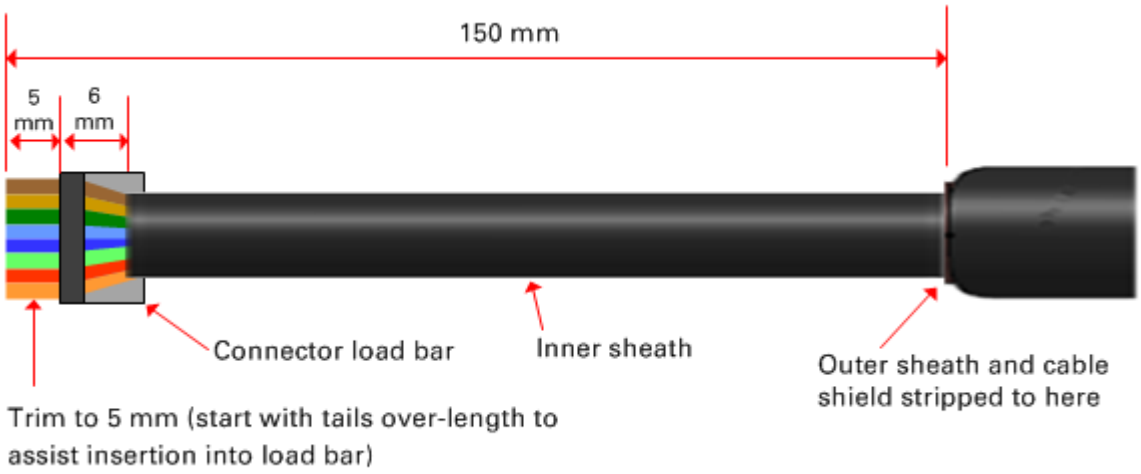
This section contains detailed installation procedures that are not included in the above topics, such as how to strip cables, create grounding points and weatherproof connectors.

Stripping drop cable

When preparing drop cable for connection to the PTP 670 ODU or LPU, use the following measurements:



When preparing drop cable for connection to the PTP 670 PSU (without a cable gland), use the following measurements:

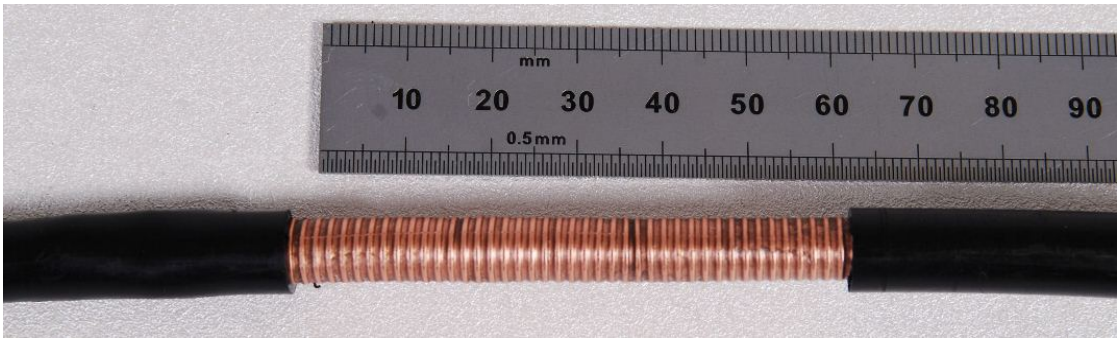


Creating a drop cable grounding point

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 3-17.

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, over lapping 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.

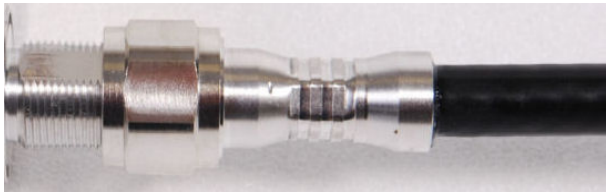
9 Prepare the metal grounding point of the supporting structure to provide a good electrical contact with the grounding cable clamp. Remove paint, grease or dirt, if present. Apply anti-oxidant compound liberally between the two metals.

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.

Weatherproofing an N type connector

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:

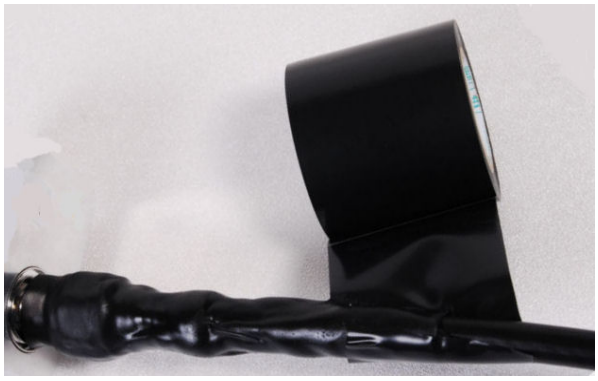
3 Smooth the tape edges:

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:

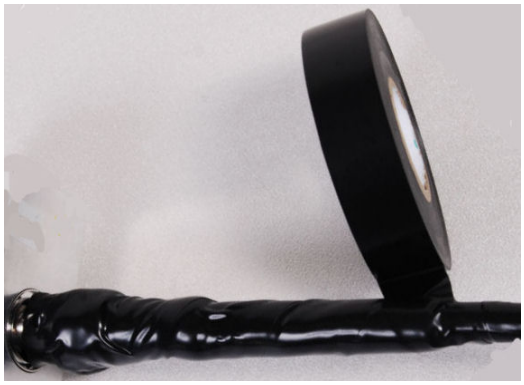
7 Wrap a layer of 50 mm (2 inch) PVC tape from bottom to top, starting from 25 mm (1 inch) below the edge of the self-amalgamating tape, overlapping at half width.



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:

Replacing PSU fuses

The AC+DC Enhanced Power Injector 56V contains two replaceable fuses. These fuses protect the positive and negative grounded DC input voltages. If an incorrect power supply (that is, not in the range 37V to 60V DC) is connected to the DC input terminals, one or both fuses may blow.

Both fuses are 3 Amp slow-blow, for example Littlefuse part number 0229003.

To replace these fuses, undo the retaining screw and hinge back the cover as indicated:

Note

No other fuses are replaceable in the AC+DC Enhanced Power Injector 56V.

Note

The AC Power Injector 56V does not contain replaceable fuses.

Chapter 6: Configuration and alignment

This chapter describes how to use the web interface to configure the PTP 670 link. It also describes how to align antennas. This chapter contains the following topics:

Preparing for configuration and alignment

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 4-20, 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 4-26.

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. To bar these channels, follow the procedure Barring channels on page 7-43.

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. Pour bloquer ces canaux, suivez la procédure Barring channels page 7-43.

Selecting configuration options

Use the installation report to determine which configuration options are required. Refer to LINKPlanner on page 3-24.

Generating license keys

To obtain License Keys for capabilities that are not factory-installed, proceed as follows:

1. Identify and purchase the required entitlement for additional capabilities by referring to ODU capability upgrades on page 2-7. The entitlement is delivered by email.
2. Obtain the MAC Address of the ODU (it is on the System Status page).
3. Follow instructions, supplied in the email, to apply the entitlement to the ODU at the Cambium Networks support web site. Generated license keys are displayed in the License Keys page

Use the Software License Key page to configure the ODU with new license keys (Software License Key page on page 6-13).

Connecting to the unit

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

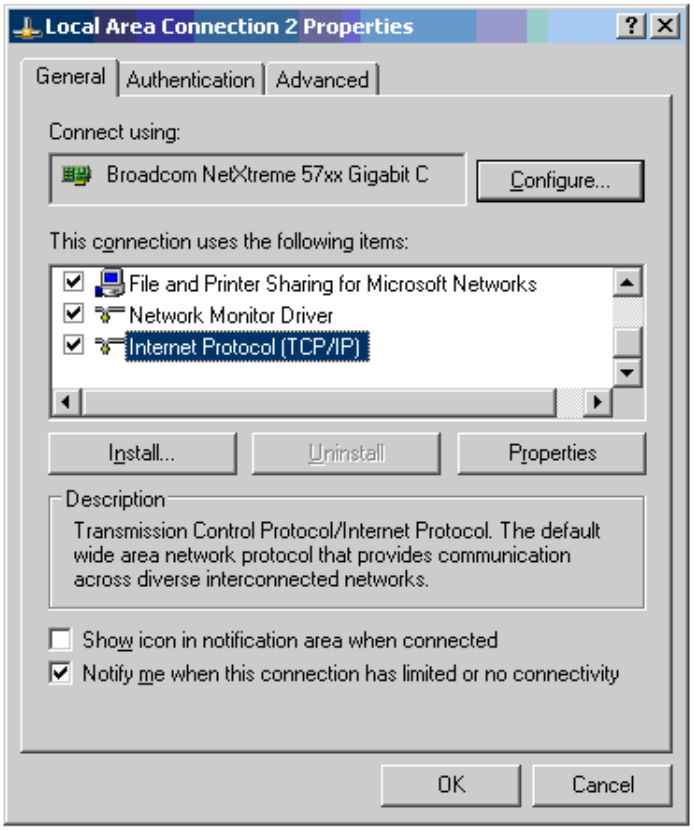
Configuring the management PC

Use this procedure to configure the local management PC to communicate with the PTP 670.

Procedure:

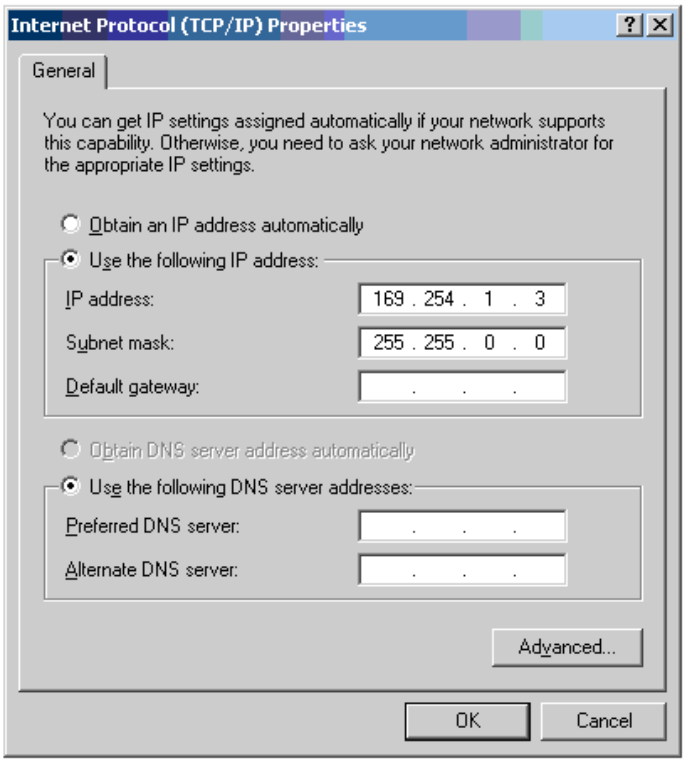
1 Select **Properties** for the Ethernet port. In Windows 7 this is found in **Control Panel > Network and Internet > Network Connections > Local Area Connection**.

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 PTP 670.

Procedure:

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 45 seconds, check that the orange Ethernet LED starts with 10 slow flashes.

5 Check that the Ethernet LED then illuminates continuously. If the Power and Ethernet LEDs do not illuminate correctly, refer to Testing link end hardware on page 8-7.

Using the web interface

This section describes how to log into the PTP 670 web interface and use its menus.

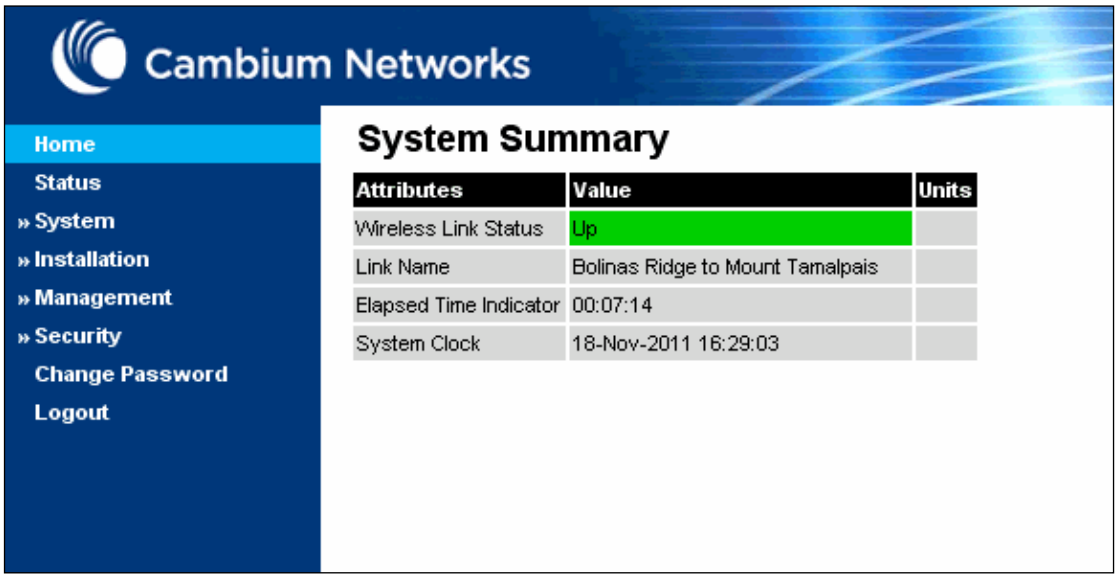
Logging into the web interface

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

Procedure:

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 the menu, click **System**. The login page is displayed with Password only (the default) or with Username and Password (if identity-based user accounts have been enabled):

4 Enter Username (if requested) and Password (the default is blank) and click **Login**.

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 152 to locate information about using each web page.

Table 152 Menu options and web pages

Main menu	Menu option	Web page information
Home		System Summary page on page 7-2
Status		System Status page on page 7-3
Alarms		Alarms on page 7-20
System		
	Configuration	System Configuration page on page 6-39
	LAN Configuration	LAN Configuration page on page 6-43
	QoS Configuration	QoS Configuration page on page 6-56
	SFP Configuration	SFP Configuration page on page 6-59
	TDM Configuration	TDM Configuration page on page 6-62
	Authorization Control	Authorization Control page on page 6-63
	Save and Restore	Save and Restore Configuration page on page 6-64
	Reset Configuration	Reset Configuration page on page 6-67
	Spectrum Expert or Spectrum Management	Spectrum Management on page 7-29
	Statistics	System Statistics page on page 7-54 Comparing actual to predicted performance on page 6-125
	Wireless Port Counters	Wireless Port Counters page on page 7-60 Test Ethernet packet errors reported by ODU on page 8-11
	Main Port Counters	Main Port Counters page on page 7-63
	Aux Port Counters	Aux Port Counters page on page 7-66
	SFP Port Counters	SFP Port Counters page on page 7-66
	SyncE Status	SyncE Status page on page 7-70
	Diagnostics Plotter	Diagnostics Plotter page on page 7-73
	CSV Download	Generate Downloadable Diagnostics page on page 7-75
	Cable Diagnostics	Cable Diagnostics on page 8-2

Main menu	Menu option	Web page information
	Software Upgrade	Software Upgrade page on page 6-68
	Reboot	Reboot Wireless Unit page on page 7-18
Installation		Installation menu on page 6-9
	Graphical Install	Graphical Install page on page 6-123
Management		
	Web	Web-Based Management page on page 6-70
	Local User Accounts	Local User Accounts page on page 6-72
	RADIUS Configuration	RADIUS Configuration page on page 6-77
	Login Information	Login Information page on page 7-18
	Web Properties	Webpage Properties page on page 6-78
	SNMP	SNMP pages (for SNMPv3) on page 6-90 SNMP pages (for SNMPv1/2c) on page 6-99
	Email	Email Configuration page on page 6-81
	Diagnostic Alarms	Diagnostic Alarms page on page 6-83
	Time	Time Configuration page on page 6-84
	Syslog	Syslog page on page 7-25
	Syslog Configuration	Syslog Configuration page on page 6-88
Security		Security menu on page 6-103
	Zeroize CSPs	Zeroize CSPs page on page 6-117
Change Password		Change Password page on page 7-19
Logout		Logging out on page 7-19

Installation menu

This section describes how to use the Installation Wizard to complete the essential system configuration tasks that must be performed on a new link.

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. To bar these channels, follow the procedure Barring channels on page 7-43.

Starting the Installation Wizard

To start the Installation Wizard: on the menu, click **Installation**. The response depends upon the state of the unit:

- If the unit is newly installed, the Software License Key page is displayed. Continue at Software License Key page on page 6-13.
- If the unit is armed for alignment, the Disarm Installation page is displayed. Continue at Disarm Installation page on page 6-10.
- If the unit is not armed, the Current Installation Summary page is displayed. Continue at Current Installation Summary page on page 6-10.

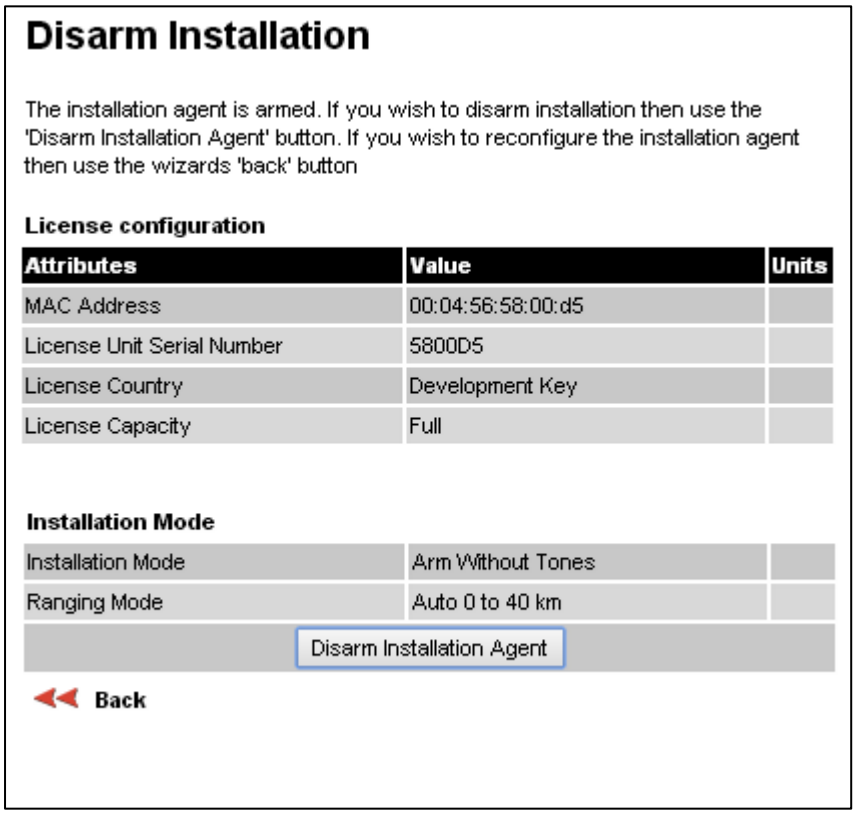
Disarm Installation page

Menu option: **Installation** (Figure 129). This page is displayed only when unit is armed.

Note

The Installation agent cannot be armed (or disarmed) when the ODU operates as a Master in the HCMP topology.

Figure 129 Disarm Installation page (top and bottom of page shown)

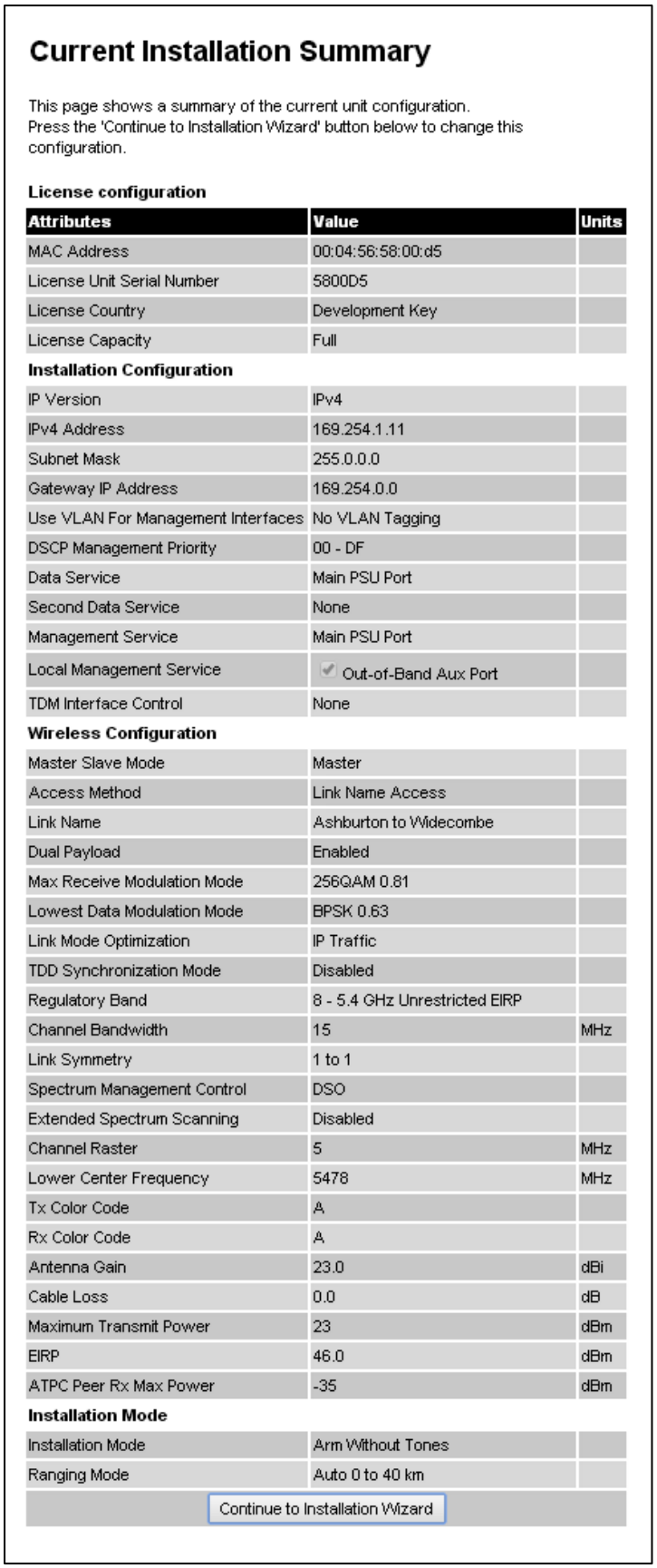


To disarm the unit, click **Disarm Installation Agent**.

Current Installation Summary page

Menu option: **Installation** (Figure 130 and Figure 131). This page is displayed only when unit is not armed.

Figure 130 Current Installation Summary page (PTP topology)



Current Installation Summary

This page shows a summary of the current unit configuration.
Press the 'Continue to Installation Wizard' button below to change this configuration.

License configuration

Attributes	Value	Units
MAC Address	00:04:56:58:00:d5	
License Unit Serial Number	5800D5	
License Country	Development Key	
License Capacity	Full	
Installation Configuration		
IP Version	IPv4	
IPv4 Address	169.254.1.11	
Subnet Mask	255.0.0.0	
Gateway IP Address	169.254.0.0	
Use VLAN For Management Interfaces	No VLAN Tagging	
DSCP Management Priority	00 - DF	
Data Service	Main PSU Port	
Second Data Service	None	
Management Service	Main PSU Port	
Local Management Service	Out-of-Band Aux Port	
TDM Interface Control	None	
Wireless Configuration		
Master Slave Mode	Master	
Access Method	Link Name Access	
Link Name	Ashburton to Widecombe	
Dual Payload	Enabled	
Max Receive Modulation Mode	256QAM 0.81	
Lowest Data Modulation Mode	BPSK 0.63	
Link Mode Optimization	IP Traffic	
TDD Synchronization Mode	Disabled	
Regulatory Band	8 - 5.4 GHz Unrestricted EIRP	
Channel Bandwidth	15	MHz
Link Symmetry	1 to 1	
Spectrum Management Control	DSO	
Extended Spectrum Scanning	Disabled	
Channel Raster	5	MHz
Lower Center Frequency	5478	MHz
Tx Color Code	A	
Rx Color Code	A	
Antenna Gain	23.0	dBi
Cable Loss	0.0	dB
Maximum Transmit Power	23	dBm
EIRP	46.0	dBm
ATPC Peer Rx Max Power	-35	dBm
Installation Mode		
Installation Mode	Arm Without Tones	
Ranging Mode	Auto 0 to 40 km	

Continue to Installation Wizard

Click **Continue to Installation Wizard**.

Figure 131 Current Installation Summary page (HCMP topology)

Current Installation Summary

This page shows a summary of the current unit configuration.
Press the 'Continue to Installation Wizard' button below to change this configuration.

License configuration

Attributes	Value	Units
MAC Address	00:04:56:58:00:58	
License Unit Serial Number	580058	
License Country	Development Key	
License Capacity	Full	
Installation Configuration		
IP Version	IPv4	
IPv4 Address	169.254.1.11	
Subnet Mask	255.255.0.0	
Gateway IP Address	169.254.0.0	
Use VLAN For Management Interfaces	No VLAN Tagging	
DSCP Management Priority	00 - DF	
Data Service	Main PSU Port + SFP Port	
Management Service	In-Band	
Local Management Service	☑ None ☑ In-Band	
Wireless Configuration		
Wireless Topology	High Capacity Multi-Point	
Master Slave Mode	Master	
Access Method	Group Access	
Group ID	0	
Dual Payload	Enabled	
Max Receive Modulation Mode	256QAM 0.81	
Lowest Data Modulation Mode	BPSK 0.63	
Link Mode Optimization	IP Traffic	
HCMP Maximum Link Range	24.0	km
Maximum Number Of Slaves	4	
HCMP Link Symmetry	1 to 1	
Downlink Ratio	50.0	%
Maximum Downlink Capacity	80.42	Mbps
Maximum Uplink Capacity	80.42	Mbps
TDD Frame Duration	5495	µs
TDD Synchronization Mode	Disabled	
Antenna Selection	Connectorized	
Connectorized Antenna Type	Directional, Integrated flat plate	
Regulatory Band	81 - 4.7 GHz	
Channel Bandwidth	20	MHz
Spectrum Management Control	Fixed Frequency	
Extended Spectrum Scanning	Disabled	
Channel Raster	5	MHz
Fixed Transmit Frequency	4410	MHz
Tx Color Code	A	
Fixed Receive Frequency	4410	MHz
Rx Color Code	A	
Antenna Gain	23.0	dBi
Cable Loss	0.0	dB
Maximum Transmit Power	27	dBm
EIRP	50.0	dBm
Atpc Hcmp Master Target Rx Power	-56	dBm
Installation Mode		
Installation Mode	Arm Without Tones	
Ranging Mode	Auto 0 to 40 km	

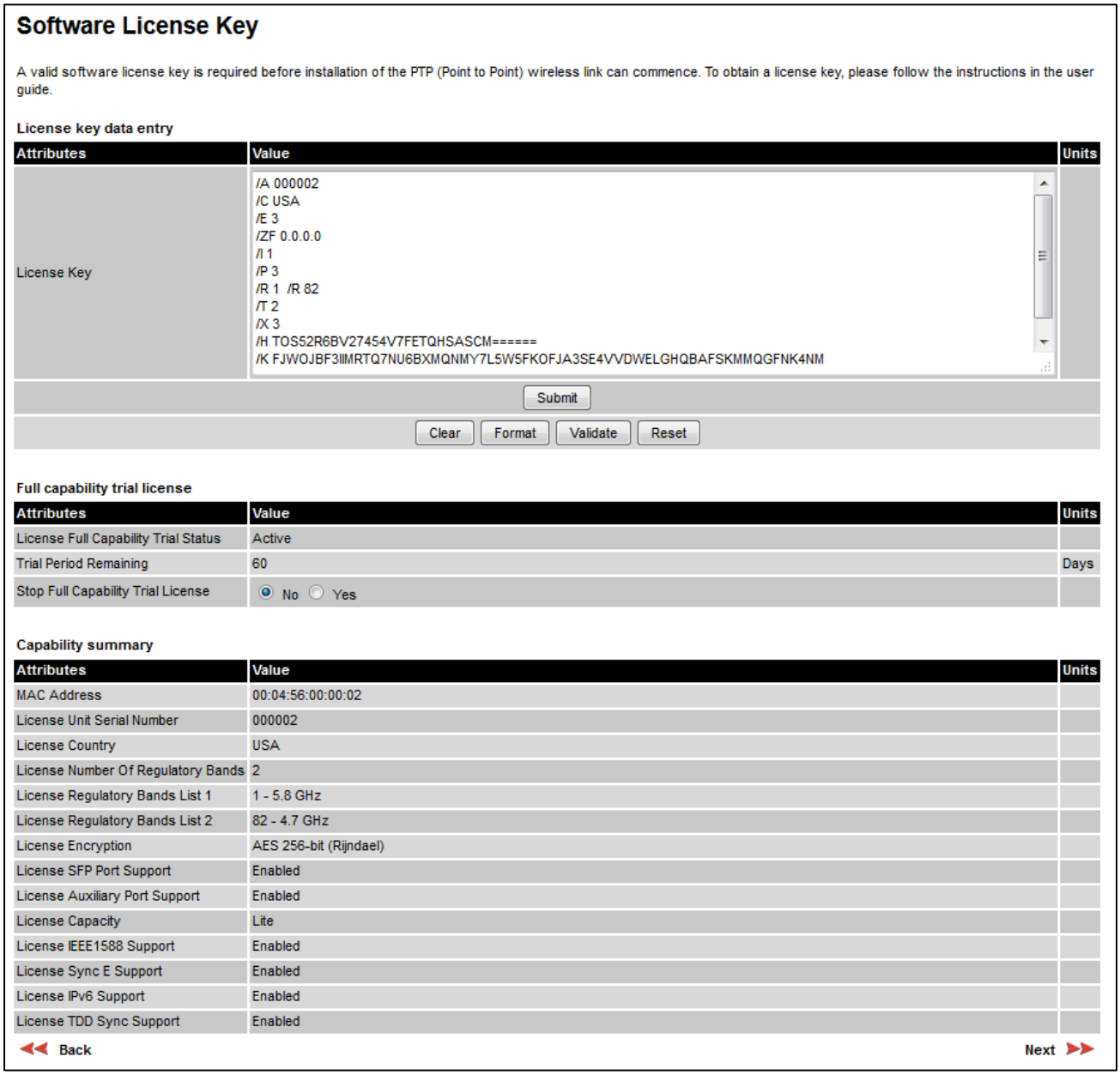
Continue to Installation Wizard

Click **Continue to Installation Wizard**.

Software License Key page

Menu option: **Installation**. Use this page to configure the unit with a new License Key and to review the capabilities of an installed License Key. The appearance of this page varies depending upon which capabilities are enabled by the entered license key. For example, Figure 132 shows the licensed capabilities for a PTP 670 in the USA market, whereas Figure 133 shows TDM support, IPv6 and other capabilities. Use the Cambium Networks License Key Generator to generate new License Keys (Generating license keys on page 6-3).

Figure 132 Software License Key page (PTP 670 USA market)



Software License Key

A valid software license key is required before installation of the PTP (Point to Point) wireless link can commence. To obtain a license key, please follow the instructions in the user guide.

License key data entry

Attributes	Value	Units
License Key	/A 000002 /C USA /E 3 /ZF 0.0.0.0 /I 1 /P 3 /R 1 /R 82 /T 2 /X 3 /H TOS52R6BV27454V7FETQHSASCM====== /K FJWOJBF3IIMRTQ7NU6BXMQNMY7L5W5FKOFJA3SE4VVDWELGHQBAFSKMMQGFNK4NM	

Submit

Clear Format Validate Reset

Full capability trial license

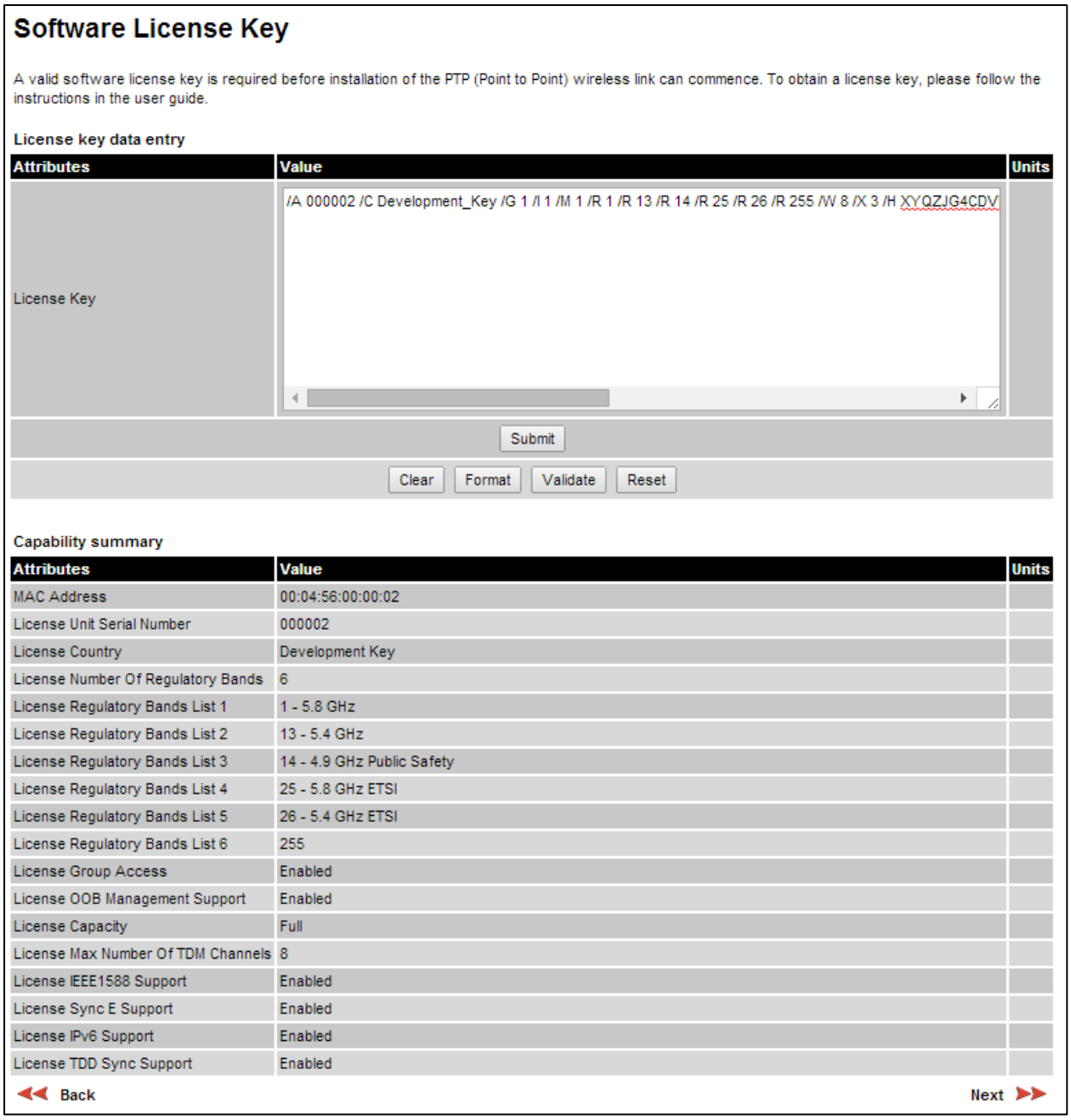
Attributes	Value	Units
License Full Capability Trial Status	Active	
Trial Period Remaining	60	Days
Stop Full Capability Trial License	(•) No ( ) Yes	

Capability summary

Attributes	Value	Units
MAC Address	00:04:56:00:00:02	
License Unit Serial Number	000002	
License Country	USA	
License Number Of Regulatory Bands	2	
License Regulatory Bands List 1	1 - 5.8 GHz	
License Regulatory Bands List 2	82 - 4.7 GHz	
License Encryption	AES 256-bit (Rijndael)	
License SFP Port Support	Enabled	
License Auxiliary Port Support	Enabled	
License Capacity	Lite	
License IEEE1588 Support	Enabled	
License Sync E Support	Enabled	
License IPv6 Support	Enabled	
License TDD Sync Support	Enabled	

◀◀ Back Next ▶▶

Figure 133 Software License Key page (TDM, IPv6 and other capabilities)



Software License Key

A valid software license key is required before installation of the PTP (Point to Point) wireless link can commence. To obtain a license key, please follow the instructions in the user guide.

License key data entry

Attributes	Value	Units
License Key	/A 000002 /C Development_Key /G 1 /I 1 /M 1 /R 1 /R 13 /R 14 /R 25 /R 26 /R 255 /W 8 /X 3 /H XYQZJG4CDV	

Submit

Clear Format Validate Reset

Capability summary

Attributes	Value	Units
MAC Address	00:04:56:00:00:02	
License Unit Serial Number	000002	
License Country	Development Key	
License Number Of Regulatory Bands	6	
License Regulatory Bands List 1	1 - 5.8 GHz	
License Regulatory Bands List 2	13 - 5.4 GHz	
License Regulatory Bands List 3	14 - 4.9 GHz Public Safety	
License Regulatory Bands List 4	25 - 5.8 GHz ETSI	
License Regulatory Bands List 5	26 - 5.4 GHz ETSI	
License Regulatory Bands List 6	255	
License Group Access	Enabled	
License OOB Management Support	Enabled	
License Capacity	Full	
License Max Number Of TDM Channels	8	
License IEEE1588 Support	Enabled	
License Sync E Support	Enabled	
License IPv6 Support	Enabled	
License TDD Sync Support	Enabled	

Back Next

Procedures:

To enter a new License Key, proceed as follows:

- To clear the existing License Key (if present), click **Clear**.
- To format the new License Key: copy it from the Cambium notification email, paste it into the License Key box and click **Format**. The page is redisplayed with the License Key formatted.
- To enter the new License Key, click **Submit**. The page is redisplayed with the Capability Summary updated.

To continue with the Installation Wizard, click **Next**.

Wireless Topology Configuration page

Menu option: **Wireless Topology**. Use this page to update Wireless Topology and Master Slave Mode.

The appearance of this page varies depending upon which capabilities have been enabled by license key. The HCMP option is only available if enabled in the license key.

Procedure:

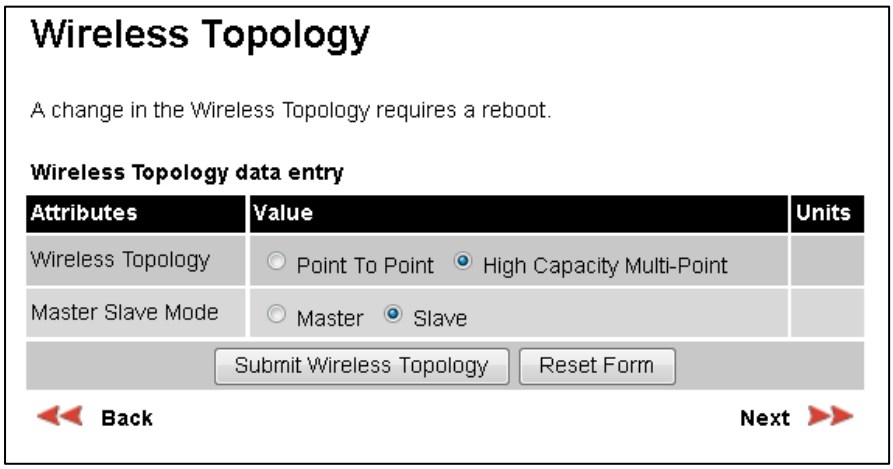
- Review and update the Wireless Topology.
- Review and update the Master Slave Mode.

If the Wireless Topology is changed from the current setting, the ODU will have to reboot. To complete the configuration of the new topology, return to the Installation Wizard when the ODU has restarted.

Note

When Wireless Topology is updated, the ODU always restarts with Master Slave Mode configured to Slave.

Figure 134 Wireless Topology page



Interface Configuration page

Menu option: **Installation**. Use this page to update the IP interface attributes.

The appearance of this page varies depending upon which capabilities have been enabled by license key. For example, Figure 135 shows the attributes that are displayed when IPv6, Aux Port, SFP Port, Second Data Service and Out-of-Band Management support are enabled, whereas Figure 137 shows the attributes that are displayed when IPv6 and TDM support are enabled.

Caution

Before configuring a VLAN for management interfaces, ensure that the VLAN is accessible, otherwise the unit will be inaccessible after the next reboot.

Note

TDM support is only available when the following are all true:

- Wireless Topology is set to PTP.
- An E1/T1 license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-13).

Note

NIDUs can be installed at both link ends without enabling TDM (set TDM Interface to **None**). LAN data will be bridged successfully, but TDM data will be ignored.

Note

Synchronous Ethernet and IEEE 1588 Transparent Clock are disabled when TDM is enabled (LAN Configuration page on page 6-43).

Note

When TDM is enabled and connected at one link end, up to two minutes may elapse before the TDM link is established (this is known as the settling period). Do not attempt to change the TDM configuration during this settling period.

Procedure:

- Review and update the IP and VLAN attributes (Table 153).
- Review and update the TDM attributes (Table 154) (if available).
- To continue with the Installation Wizard, click **Next** or **Submit Interface Configuration**.

Figure 135 Interface Configuration page (IPv6, Aux, SFP, Second Data Service and OOB support)

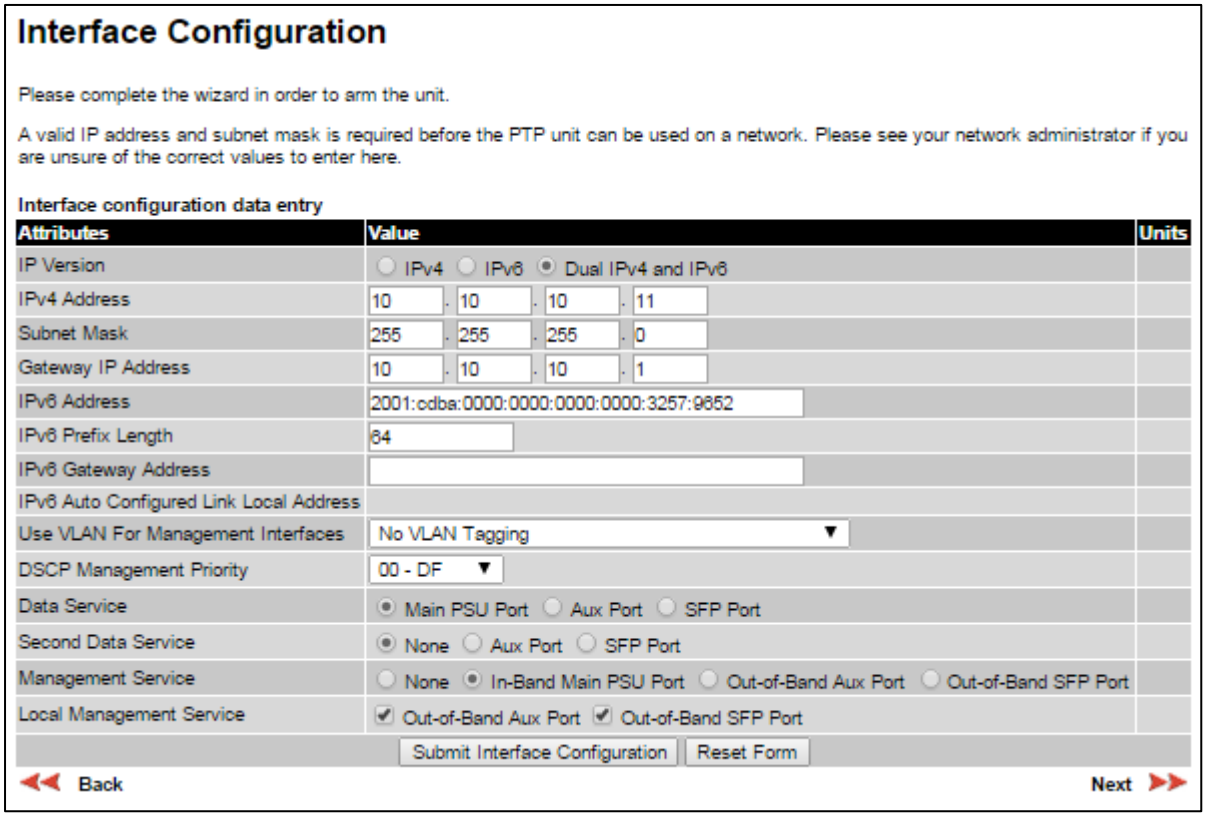


Figure 136 Interface Configuration page (HCMP wireless topology)

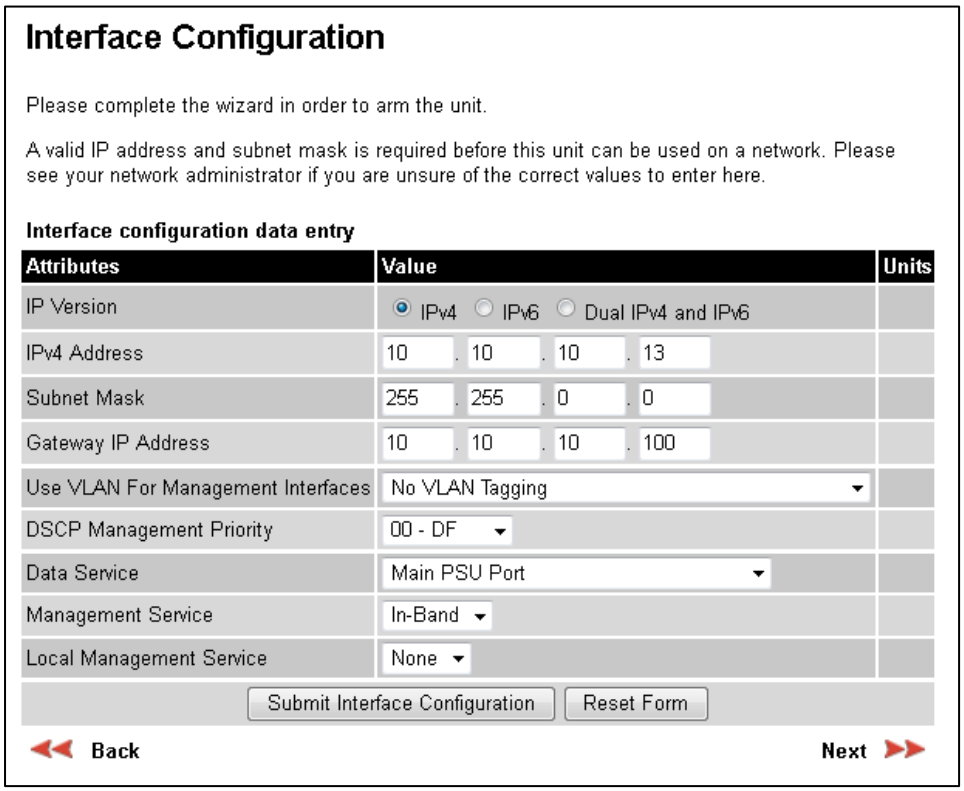
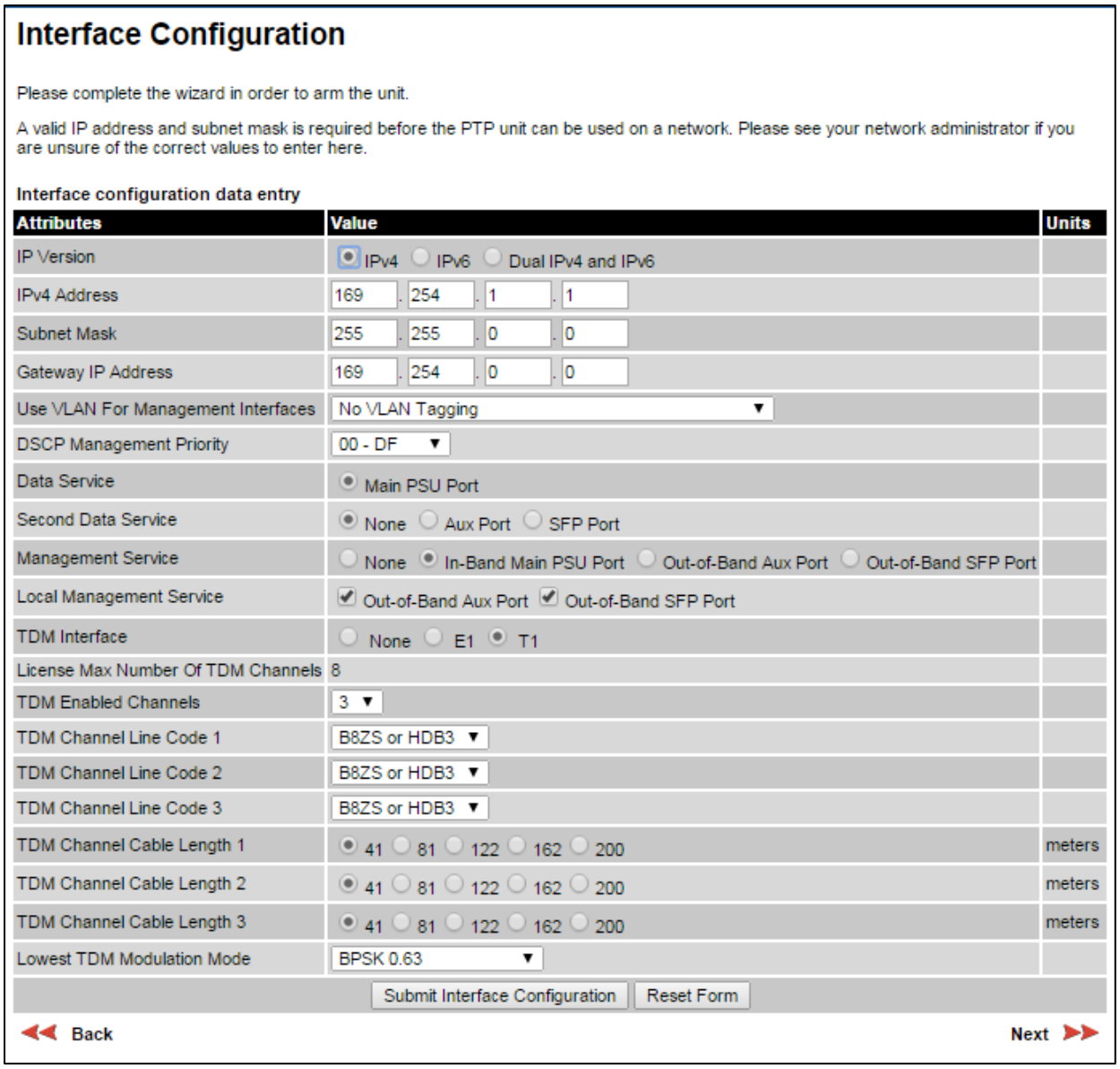


Figure 137 Interface Configuration page (TDM support)



Interface Configuration

Please complete the wizard in order to arm the unit.

A valid IP address and subnet mask is required before the PTP unit can be used on a network. Please see your network administrator if you are unsure of the correct values to enter here.

Interface configuration data entry

Attributes	Value	Units
IP Version	(•) IPv4 ( ) IPv6 ( ) Dual IPv4 and IPv6	
IPv4 Address	169 . 254 . 1 . 1	
Subnet Mask	255 . 255 . 0 . 0	
Gateway IP Address	169 . 254 . 0 . 0	
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	(•) Main PSU Port	
Second Data Service	(•) None ( ) Aux Port ( ) SFP Port	
Management Service	( ) None (•) In-Band Main PSU Port ( ) Out-of-Band Aux Port ( ) Out-of-Band SFP Port	
Local Management Service	[✓] Out-of-Band Aux Port [✓] Out-of-Band SFP Port	
TDM Interface	( ) None ( ) E1 (•) T1	
License Max Number Of TDM Channels	8	
TDM Enabled Channels	3 ▼	
TDM Channel Line Code 1	B8ZS or HDB3 ▼	
TDM Channel Line Code 2	B8ZS or HDB3 ▼	
TDM Channel Line Code 3	B8ZS or HDB3 ▼	
TDM Channel Cable Length 1	(•) 41 ( ) 81 ( ) 122 ( ) 162 ( ) 200	meters
TDM Channel Cable Length 2	(•) 41 ( ) 81 ( ) 122 ( ) 162 ( ) 200	meters
TDM Channel Cable Length 3	(•) 41 ( ) 81 ( ) 122 ( ) 162 ( ) 200	meters
Lowest TDM Modulation Mode	BPSK 0.63 ▼	

Submit Interface Configuration | Reset Form

◀◀ Back Next ▶▶

Table 153 Interface Configuration attributes

Attribute	Meaning
IP Version	The internet protocols to be supported by this ODU: **IPv4:** IPv4 protocols only. IPv4 attributes are displayed. **IPv6:** IPv6 protocols only. IPv6 attributes are displayed. **Dual IPv4 and IPv6:** Both IPv4 and IPv6 protocols. IPv4 and IPv6 attributes are displayed.
IPV4 Address	The IPv4 internet protocol address. This address is used by the family of Internet protocols to uniquely identify this unit on a network.
Subnet Mask	The address range of the connected IPv4 network.

Attribute	Meaning
Gateway IP Address	The IPv4 address of a computer on the current network that acts as an IPv4 gateway. A gateway acts as an entrance and exit to frames from and to other networks.
IPv6 Address	The IPv6 internet protocol address. This address is used by the family of Internet protocols to uniquely identify this unit on a network.
IPv6 Prefix Length	Length of the IPv6 subnet prefix (default 64 bits).
IPv6 Gateway Address	The IPv6 address of a computer on the current network that acts as an IPv6 gateway. A gateway acts as an entrance and exit to frames from and to other networks. It is usual to use the link-local address of the gateway.
IPv6 Auto Configured Link Local Address	The link-local address of the IPv6 gateway (displayed only, not updateable).
Use VLAN For Management Interfaces	VLAN tagging options for the management interfaces: **No VLAN Tagging** **IEEE 802.1Q Tagged (C-Tag, Type 8100)** **IEEE 802.1ad Tagged (S-Tag or B-Tag, Type 88a8)** Ensure that the configured VLAN is accessible, otherwise it will not be possible to access the unit following the next reboot. The PTP 670 management function is only compatible with single VLAN tagged frames. Any management frame with two or more tags will be ignored.
VLAN Management VID	Only displayed when Use VLAN for Management Interfaces is not set to **No VLAN Tagging**. The VLAN VID (range 0 to 4094) that will be included in Ethernet frames generated by the management interfaces.
VLAN Management Priority	Only displayed when Use VLAN for Management Interfaces is not set to **No VLAN Tagging**. The VLAN priority (range 0 to 7) that will be included in Ethernet frames generated by the management interfaces.
DSCP Management Priority	Differentiated Services Code Point (DSCP) value to be inserted in the IP header of all IP datagrams transmitted by the management interface.

Attribute	Meaning
Data Service	The port selection for the Data Service in the PTP wireless topology: **Main PSU Port**: The Data Service is connected to the Main PSU Port **Aux Port**: The Data Service is connected to the Aux Port **SFP Port**: The Data Service is connected to the SFP Port The Aux Port and SFP Port options are displayed if these ports are enabled in the license key. The Data Service must always be assigned to one of the three wired ports. For more help see Ethernet port allocation for PTP topology on page 3-37.
	The port allocation for the Data Service in the HCMP wireless topology: **Main PSU Port**: The Data Service is connected to the Main PSU Port **Aux Port**: The Data Service is connected to the Aux Port **SFP Port**: The Data Service is connected to the SFP Port **Main PSU Port + Aux Port**: The Data Service is connected to the Main PSU Port and the Aux Port **Main PSU Port + SFP Port**: The Data Service is connected to the Main PSU Port and the SFP Port **Aux Port + SFP Port**: The Data Service is connected to the Aux Port and the SFP Port **Main PSU Port + Aux Port + SFP Port**: The Data Service is connected to the Main PSU, Aux Port and the SFP Port The Data Service must always be assigned to at least one of the wired ports. For more help see Ethernet port allocation for HCMP topology on page 3-46.

Attribute	Meaning
Second Data Service	The port allocation for the Second Data Service in the PTP topology: **None:** The Second Data Service is disabled. **Main PSU Port**: The Second Data Service is connected to the Main PSU Port **Aux Port**: The Second Data Service is connected to the Aux Port **SFP Port**: The Second Data Service is connected to the SFP Port This attribute is only displayed when the Second Data Service support is license key enabled. The port allocated to the Data Service is not available for allocation to the Second Data Service. For more help see Ethernet port allocation for PTP topology on page 3-37.
Management Service	The port allocation for the end-to-end Management Service in the PTP topology: **None:** The Management Service is disabled. **In-Band Main PSU Port, Out-of-Band Main PSU Port:** The Management Service is connected to the Main PSU Port. **In-Band Aux Port, Out-of-Band Aux Port:** The Management Service is connected to the Aux Port. **In-Band SFP Port, Out-of-Band SFP Port:** The Management Service is connected to the SFP Port. If a port is already connected to the Data Service or the Second Data Service then the option will be displayed as In-Band... otherwise the option will be displayed as Out-of-Band... For more help see Ethernet port allocation for PTP topology on page 3-37.
	The port allocation for the end-to-end Management Service in the HCMP topology: **In-Band**: The Management Service is connected to the port or ports allocated to the Data Service. For more help see Ethernet port allocation for HCMP topology on page 3-46.
Local Management Service	For the PTP topology, any port not already selected to the Data, Second Data or Management Service is available for connection as an out-of-band port for the Local Management Service. Ports already selected to the Data, Second Data or Management services are not displayed as options. For more help see Ethernet port allocation for PTP topology on page 3-37. The Local Management Service is not available in the HCMP topology.

Configuring port allocations with TDM

When TDM is enabled, the Data Service is mapped to the Main PSU Port with no other options presented to the user. Mapping of the Second Data Service, Management Service and Local Management Service have standard options consistent with the Data Service mapping.

Table 154 Interface Configuration TDM attributes

Attribute	Meaning
TDM Interface	Only displayed when TDM is enabled by license key. The type of TDM interface that is activated. **None**: TDM is disabled. **E1**: The E1 TDM interface is activated. **T1**: The T1 TDM interface is activated.
License Max Number of TDM Channels	Only displayed when TDM Interface is set to **E1** or **T1**. The maximum number of TDM channels (E1 or T1) allowed under the installed license key.
TDM Enabled Channels	Only displayed when TDM Interface is set to **E1** or **T1**. Select the number of E1 or T1 channels that are to be enabled over the wireless bridge (1 to 8).
TDM Channel Line Code n	Only displayed when TDM Interface is set to **E1** or **T1**. Select the line code of the transceiver connected to NIDU E1/T1 channel “n” (where “n” is in the range 1 to 8).
TDM Channel Cable Length n	Only displayed when TDM Interface is set to **T1**. This control compensates for the high frequency attenuation in T1 cables. Equalization is automatic in the E1 interface. Select the nearest approximation to the length of cable connecting the transceiver to NIDU T1 channel “n” (where “n” is in the range 1 to 8).
Lowest TDM Modulation Mode	Only displayed when TDM Interface is set to **E1** or **T1**. The lowest modulation mode at which TDM data can be sent. If the link cannot sustain TDM data in this mode then the effective lowest modulation mode may differ. In conjunction with the LINKPlanner tool, this setting may be used to optimize the latency for links which operate in consistently high modulation modes. High data rate links are able to support lower latencies.

Configuring port allocations in PTP wireless topology

The Interface Configuration page controls the allocation of the Main PSU Port, Aux Port and SFP Port to the Data Service, Second Data Service, Management Service and Local Management Service.

PTP 670 supports exactly one instance of the Data Service, and this service is always mapped to one of the three wired ports. It is not possible to operate a link without any port selected to the Data Service.

PTP 670 supports zero or one instances of the optional Second Data Service. The Second Data Service can be disabled or mapped to any available port, except for the port already allocated to the Data Service.

PTP 670 supports zero or one instances of the optional Management Service. The Management Service can be used to access the management agent at the local unit. If the wireless link is established, the Management Service can also be used to access the management agent at the remote unit and other devices connected in the remote management network. The Management Service can be mapped to a port that is already used for the Data Service or Second Data Service to provide In-Band Management. Alternatively, the Management Service can be allocated to a dedicated port to provide Out-of-Band Management.

PTP 670 also supports an optional Local Management Service, providing a connection from a wired port to the local management agent. Any port not already selected is available for selection to the Local Management Service. The Local Management Service does not connect across the wireless link.

The PTP 670 must always be manageable through one of three ports. Therefore it is not possible to disable the Management Service unless at least one port is allocated to the Local Management Service.

For more details, see Ethernet port allocation for PTP topology on page 3-37.

Configuring port allocations in HCMP wireless topology

The Interface Configuration page controls the allocation of the Main PSU Port, Aux Port and SFP Port to the Data Service, Management Service and Local Management Service.

PTP 670 supports exactly one instance of the Data Service, and this service is always mapped to one or more of the three wired ports. It is not possible to operate a link without any port selected to the Data Service.

PTP 670 supports zero or one instances of the optional Management Service. The Management Service can be used to access the management agent at the local unit. If the wireless link is established, the Management Service can also be used to access the management agent at the remote unit and other devices connected in the remote management network. The Management Service can be mapped to the set of ports that are already used for the Data Service to provide In-Band Management. Alternatively, the Management Service can be allocated to one or more dedicated ports to provide Out-of-Band Management.

PTP 670 also supports an optional Local Management Service, providing a connection from a wired port to the local management agent. Any port not already selected is available for selection to the Local Management Service. The Local Management Service does not connect across the wireless link.

The PTP 670 must always be manageable through one of three ports. Therefore it is not possible to disable the Management Service unless at least one port is allocated to the Local Management Service.

For more details, see Ethernet port allocation for HCMP topology on page 3-46.

Wireless Configuration page

Menu option: **Installation** (Figure 138 and Figure 139).

This page is part of the Installation Wizard. Use it to update the wireless attributes.

Figure 138 Wireless Configuration page (PTP topology)

Wireless Configuration

Please enter the following wireless configuration parameters

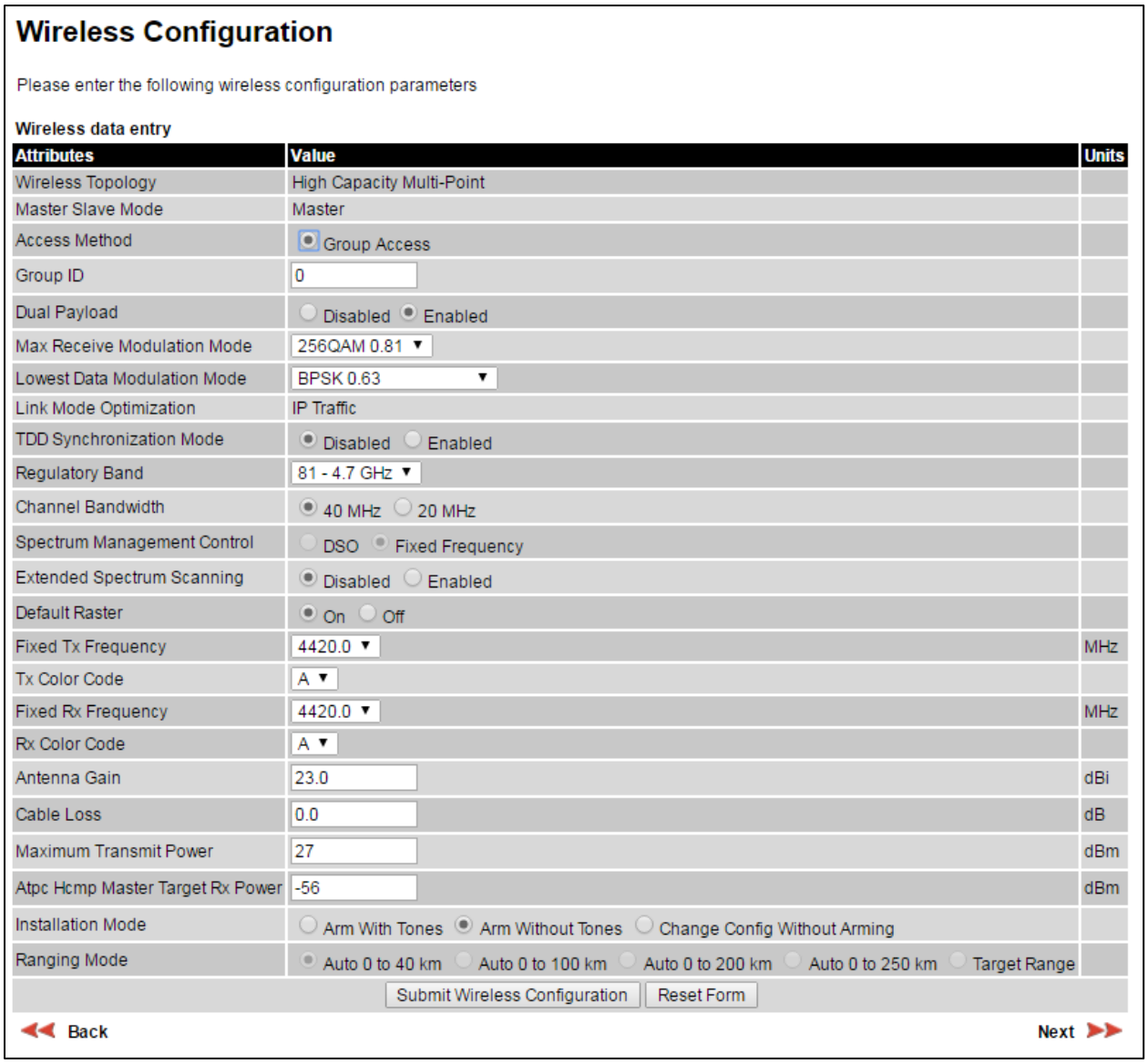
Wireless data entry

Attributes	Value	Units
Wireless Topology	Point To Point	
Master Slave Mode	○ Master ◉ Slave	
Access Method	○ Link Access ○ Link Name Access ◉ Group Access	
Group ID	123	
Dual Payload	○ Disabled ◉ Enabled	
Max Receive Modulation Mode	256QAM 0.81	
Lowest Data Modulation Mode	BPSK 0.63	
Link Mode Optimization	◉ IP Traffic ○ TDM Traffic	
TDD Synchronization Mode	○ Disabled ◉ Enabled	
Regulatory Band	95 - 4.5 GHz	
Channel Bandwidth	○ 45 MHz ○ 40 MHz ○ 30 MHz ◉ 20 MHz ○ 15 MHz ○ 10 MHz ○ 5 MHz	
Spectrum Management Control	○ DSO ◉ Fixed Frequency	
Extended Spectrum Scanning	◉ Disabled ○ Enabled	
Channel Raster	5	MHz
Default Raster	◉ On ○ Off	
Fixed Tx Frequency	4970.0	MHz
Tx Color Code	A	
Fixed Rx Frequency	4970.0	MHz
Rx Color Code	A	
Antenna Gain	23.0	dBi
Cable Loss	23.0	dB
Transmitter Channels	◉ H and V ○ H Only ○ V Only	
Maximum Transmit Power	17	dBm
EIRP	17.0	dBm
ATPC Peer Rx Max Power	-56	dBm
Installation Mode	○ Arm With Tones ◉ Arm Without Tones ○ Change Config Without Arming	
Ranging Mode	○ Auto 0 to 40 km ○ Auto 0 to 100 km ○ Auto 0 to 200 km ◉ Auto 0 to 250 km ○ Target Range	

Submit Wireless Configuration | Reset Form

◀◀ Back Next ▶▶

Figure 139 Wireless Configuration page (HCMP topology)



Wireless Configuration

Please enter the following wireless configuration parameters

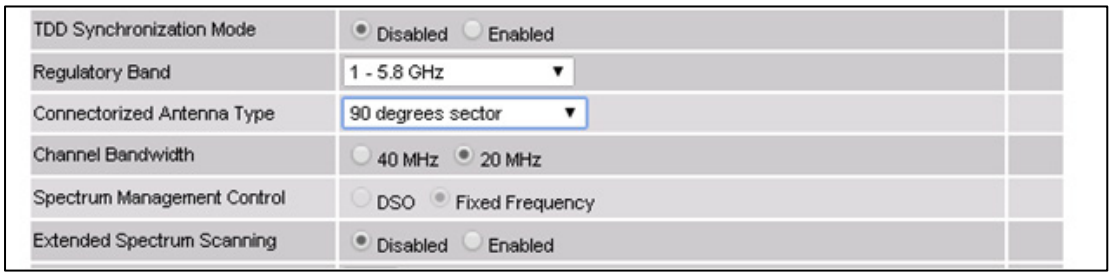
Wireless data entry

Attributes	Value	Units
Wireless Topology	High Capacity Multi-Point	
Master Slave Mode	Master	
Access Method	(•) Group Access	
Group ID	0	
Dual Payload	( ) Disabled (•) Enabled	
Max Receive Modulation Mode	256QAM 0.81 ▼	
Lowest Data Modulation Mode	BPSK 0.63 ▼	
Link Mode Optimization	IP Traffic	
TDD Synchronization Mode	(•) Disabled ( ) Enabled	
Regulatory Band	81 - 4.7 GHz ▼	
Channel Bandwidth	(•) 40 MHz ( ) 20 MHz	
Spectrum Management Control	( ) DSO (•) Fixed Frequency	
Extended Spectrum Scanning	(•) Disabled ( ) Enabled	
Default Raster	(•) On ( ) Off	
Fixed Tx Frequency	4420.0 ▼	MHz
Tx Color Code	A ▼	
Fixed Rx Frequency	4420.0 ▼	MHz
Rx Color Code	A ▼	
Antenna Gain	23.0	dBi
Cable Loss	0.0	dB
Maximum Transmit Power	27	dBm
Atpc Hcmp Master Target Rx Power	-56	dBm
Installation Mode	( ) Arm With Tones (•) Arm Without Tones ( ) Change Config Without Arming	
Ranging Mode	(•) Auto 0 to 40 km ( ) Auto 0 to 100 km ( ) Auto 0 to 200 km ( ) Auto 0 to 250 km ( ) Target Range	

Submit Wireless Configuration | Reset Form

◀◀ Back Next ▶▶

Figure 140 Wireless Configuration page (Connectorized Antenna Type, HCMP topology)



TDD Synchronization Mode	(•) Disabled ( ) Enabled	
Regulatory Band	1 - 5.8 GHz ▼	
Connectorized Antenna Type	90 degrees sector ▼	
Channel Bandwidth	( ) 40 MHz (•) 20 MHz	
Spectrum Management Control	( ) DSO (•) Fixed Frequency	
Extended Spectrum Scanning	(•) Disabled ( ) Enabled	

Procedure:

- Update the attributes (Table 155).
- To save any changes and continue with the Installation Wizard, click **Next** or click **Submit Wireless Configuration**.

Caution

The lower center frequency attribute must be configured to the same value for both the Master and Slave, otherwise the wireless link will fail to establish. The only way to recover from this situation is to modify the Lower Center Frequency attributes so that they are identical on both the master and slave units.

Note

When configuring a linked pair of units, use the Master Slave Mode to ensure that one unit is **Master** and the other is **Slave**.

Table 155 Wireless Configuration attributes

Attribute	Meaning
Master Slave Mode	**Master:** The unit controls the point-to-point link and its maintenance. On startup, the Master transmits until a link with the Slave is made. **Slave:** The unit listens for its peer and only transmits when the peer has been identified.
Access Method	ODUs must be configured in pairs before a link can be established. Access Method determines how paired ODUs will recognize each other. **Link Access:** Each ODU must be configured with Target MAC Address equal to the MAC Address of the other unit. **Link Name Access:** Both ODUs must be configured with the same Link Name. **Group Access:** Only displayed when a Group Access license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-13). Both ODUs in a PTP link, and all ODUs in an HCMP sector, must be configured with the same Group ID attributes. Group Access is the only Access Method supported in the HCMP topology.
Target MAC Address	Only displayed when Access Method is set to **Link Access**. This is the MAC Address of the peer unit that will be at the other end of the wireless link. This is used by the system to ensure the unit establishes a wireless link to the correct peer. The MAC Address can be found embedded within the serial number of the unit. The last six characters of the serial number are the last three bytes of the unit's MAC address.
Link Name	Only displayed when Access Method is set to **Link Name Access**. Link Name may consist of letters (A-Z and a-z), numbers (0-9), spaces, and the following special characters: (),-.,:<=>[]_{} Link Name must be same at both ends and different to site name.
Group Id	Only displayed when Access Method is set to **Group Access**. A link can only be established between units that have identical Group IDs.
Dual Payload	**Disabled:** The link maximizes robustness against fading and interference. **Enabled:** The link attempts to reach maximum throughput at the expense of robustness against fading and interference.

Attribute	Meaning
Max Receive Modulation Mode	The maximum mode the unit will use as its adaptive modulation. By default the Max Receive Modulation Mode is the highest mode available. For minimum error rates, set the maximum modulation mode to the minimum necessary to carry the required traffic.
Lowest Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge customer data Ethernet frames. This does not affect the bridging of management data: if out-of-band remote management is enabled, this will continue regardless of modulation mode.
Lowest Second Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge Ethernet frames in the Second Data Service. This attribute is displayed when the Second Data Service is enabled.
Link Mode Optimization	**IP Traffic:** The link is optimized for IP traffic to provide the maximum possible link capacity. **TDM Traffic:** The link is optimized for TDM traffic to provide the lowest possible latency. This is the only available setting when TDM is enabled (Interface Configuration page on page 6-16).
TDD Synchronization Mode	**Disabled:** The link does not employ TDD synchronization. **Enabled:** The link employs TDD synchronization. This is configured in the Installation Wizard; see TDD synchronization page (optional) on page 6-33. For a basic description, see TDD synchronization on page 1-26. When TDD Synchronization Mode is set to **Enabled**, the following restrictions apply: • Ranging Mode is Disabled • Target Range is Disabled In PTP topology, Link Symmetry is limited to **1 to 1**.
Regulatory Band	The regulatory band selected from the list in the license key.
Connectorized Antenna Type	Only displayed in the HCMP topology, and only when the Regulatory Band applies different limits for PTP and PMP operation. Select one of the following for an HCMP Master: • 60 degrees sector • 90 degrees sector • 120 degrees sector • Omni-directional • Other
Channel Bandwidth	Bandwidth of the transmit and receive radio channels.

Attribute	Meaning
Link Symmetry	Only displayed when Wireless Topology is set to **Point To Point** and Master Slave Mode is set to **Master**. **Adaptive**: Allows link symmetry to vary dynamically in response to offered traffic load. This is not supported in the following cases: • Where radar avoidance is mandated in the region. • Link Mode Optimization is set to **TDM Traffic**. **"5 to 1"**, **"3 to 1**, **"2 to 1"**, "**1 to 1"**, "**1 to 2"**, **"1 to 3"** or **"1 to 5"**: There is a fixed division between transmit and receive time in the TDD frame of the master ODU. The first number in the ratio represents the time allowed for the transmit direction and the second number represents the time allowed for the receive direction. The appropriate matching Link Symmetry is set at the slave ODU automatically. For example, if Link Symmetry is set to "**2 to 1"** at the master ODU, then the slave ODU will be set automatically as "**1 to 2"**. In this example, the master-slave direction has double the capacity of the slave-master direction. When TDM is enabled (Interface Configuration page on page 6-16), Link Symmetry is limited to "**1 to 1**".
Spectrum Management Control	**PTP topology** In regions that do not mandate DFS (radar detection), the options are: **DSO** **Fixed Frequency** In regions that mandate DFS (radar detection), the options are: **DFS** **DFS with DSO** This attribute is disabled if the regulatory requirement is fixed frequency only.
	PTP topology At the Master ODU, the only option is: **Fixed Frequency** At the Slave ODU, the options are: **DSO** **Fixed Frequency**
Extended Spectrum Scanning	Enables scanning of the entire frequency spectrum supported by the device (4800 MHz to 5875 MHz, or 4900 MHz to 6050 MHz). **Disabled:** The extended Spectrum Scanning is disabled. **Enabled:** The extended Spectrum Scanning is enabled.
	 **Caution** Extended Spectrum Scanning decreases DSO performance. Do not leave Extended Spectrum Scanning enabled during normal operation.

Attribute	Meaning
Lower Center Frequency	The center frequency (MHz) of the lowest channel that may be used by this link. Not displayed when Spectrum Management Control is set to **Fixed Frequency**. Use this attribute to slide the available channels up and down the band.
Default Raster	This is only displayed when Spectrum Management Control is set to **Fixed Frequency**. Limits frequency selection to the unit's default raster setting.
Fixed Tx Frequency, Fixed Rx Frequency	This is only displayed when Spectrum Management Control is set to **Fixed Frequency**. The settings must be compatible at each end of the link. Once configured, the spectrum management software will not attempt to move the wireless link to a channel with lower co-channel or adjacent channel interference. Therefore this mode of operation is only recommended for deployments where the installer has a good understanding of the prevailing interference environment.
Tx Color Code, Rx Color Code	Tx Color Code and Rx Color Code may be used to minimize interference in a dense network of synchronized PTP 670 units where some of the units are operating on the same frequency. When this type of network is designed, the Color Code values are normally specified in the link planning report. In all other cases, Cambium Networks recommend that Tx Color Code and Rx Color Code are left at the default value of **A**. The value of Tx Color Code MUST always match the value of Rx Color Code at the other end of the link.
Antenna Gain	Only displayed for a Connectorized ODU. Gain of the remote antenna.
Cable Loss	Only displayed for a Connectorized ODU. Loss in the ODU-antenna RF cable. If there is a significant difference in length of the RF cables for the two antenna ports, then the average value should be entered.
Transmitter Channels	Only displayed when the Transmitter Channels Control attribute is enabled (see Webpage Properties page on page 6-78). **H and V:** The ODU transmits on Horizontal and Vertical polarisation **H Only:** The ODU transmits on Horizontal polarisation (or at the H output of a Connectorized unit) only. **V Only:** The ODU transmits on Vertical polarisation (or at the V output of a Connectorized unit) only.  **Note** Operation using a single polarisation cannot provide polarisation diversity or polarisation multiplexing. This will reduce availability in non-line-of-sight paths, and will reduce capacity in line-of-sight or near-line-of-sight paths.

Attribute	Meaning
Maximum Transmit Power	The maximum power (dBm) at which the unit will transmit, configurable in steps of 1 dB. Its maximum value is controlled by the combination of the selected Regulatory Band, Bandwidth and (for connectorized units) Antenna Gain and Cable Loss. Set this attribute to the value specified in the installation report (LINKPlanner).  **Note** Maximum Transmit Power is the maximum combined power for the normal case where H and V channels operate together. When Transmitter Channels is set to H Only or V Only, the maximum transmitted power will be 3 dB lower than the configured Maximum Transmit Power.
ATPC Peer Rx Max Power	This attribute is only displayed if: • The unit is in PTP topology • The operating regulatory band does not require radar detection. Set this attribute to the maximum receive power the ATPC mechanism must try to achieve at the peer unit.
ATPC HCMP Master Transmit Power	This attribute is only visible if the unit is configured as an HCMP Slave. This attribute must be set to the same value as the Maximum Power Power on the HCMP Master.  **Note** The wireless link may fail to establish if the value of this attribute is not set as recommended.
ATPC HCMP Master Target Receive Power	This attribute is only visible if Wireless Topology is set to HCMP. This determines the HCMP Master receive power the ATPC mechanism on the HCMP Slave must try to reach.  **Note** Setting a high value may reduce sensitivity of the HCMP Master to low receive signal while setting it low value may prevent the HCMP Master to reach top rate mode. The default value of –56 dBm ensures that the top modulation mode can be reached whilst not degrading the performance at low receive signal level.
Installation Mode	**Arm With Tones**: Audio tones will be emitted during antenna alignment (the recommended option). **Arm Without Tones**: Audio tones will not be emitted during antenna alignment. **Change Config Without Arming**: Configuration changes will be made without arming the ODU for alignment.

Attribute	Meaning
Ranging Mode	This can only be modified if the unit is operating in the PTP topology, and Installation Mode is **Arm With Tones** or **Arm Without Tones**. **Auto..**: During alignment, the wireless units use algorithms to calculate link range. To implement automatic ranging, select a value that corresponds to the estimated maximum range of the link: **Auto 0 to 40 km** (0 to 25 miles). **Auto 0 to 100 km** (0 to 62 miles). **Auto 0 to 200 km** (0 to 125 miles). **Auto 0 to 250 km** (0 to 156 miles). **Target Range**: During alignment, the wireless units use the approximate link distance (entered in Target Range) to calculate link range. The main advantage of Target Range mode is that it reduces the time taken by the units to range. If preferred, range functions can be configured to operate in miles, as described in Webpage Properties page on page 6-78.
Target Range	Only available when Ranging Mode is set to **Target Range**. The approximate distance between the two wireless units to within ± 1 km. Enter the same value at both ends of the link.

TDD Frame page

The TDD Frame page (Figure 141) is displayed in the Installation Wizard page after the Wireless Configuration page when the ODU is operating in the HCMP topology.

Procedure:

- Update the attributes (Table 156).
- Click **Next**.

Figure 141 TDD Frame page

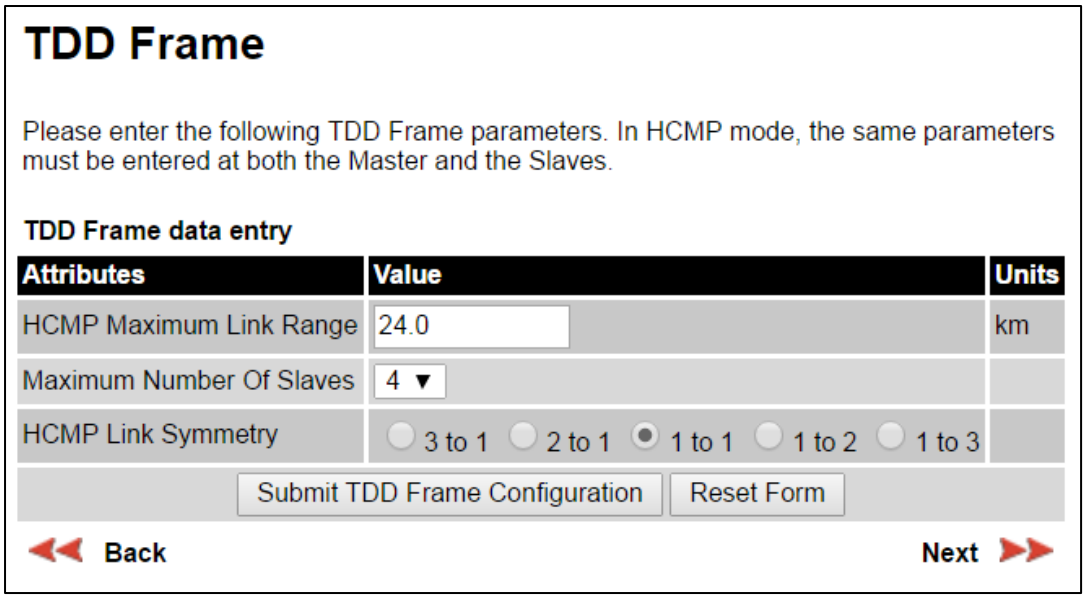


Table 156 TDD Frame attributes

Attribute	Meaning
HCMP Maximum Link range	This determines the maximum range between the HCMP Master and any of the HCMP Slave. The same value must be used on the HCMP Master and all the HCMP Slaves that connect to it. **Note** The wireless link may not establish if different values are used on the HCMP Master and the HCMP Slaves.
Maximum Number Of Slaves	This set the maximum number of HCMP Slaves that can simultaneously connect to the HCMP Master. The same value must be used on the HCMP Master and all the HCMP Slaves that connect to it. **Note** The wireless link may not establish if different values are used on the HCMP Master and the HCMP Slaves.
HCMP Link Symmetry	**"4 to 1"**, **"3 to 1**, **"2 to 1"**, "**1 to 1"**, "**1 to 2"**, **"1 to 3"** or **"1 to 4"**: The ratio of capacity between the downlink direction and the uplink direction.

TDD synchronization page (optional)

If TDD Synchronization Mode is set to **Enabled** in the Wireless Configuration page, the TDD Synchronization page (Figure 142, Figure 143, Figure 144, Figure 145, Figure 146) is the fourth Installation Wizard page.

For more information on the available options, refer to Configuration options for TDD synchronization on page 3-31.

Procedure:

- Update the attributes (Table 157 and Table 158)
- Click **Next**.

Figure 142 TDD Synchronization page, PTP-SYNC, PTP topology

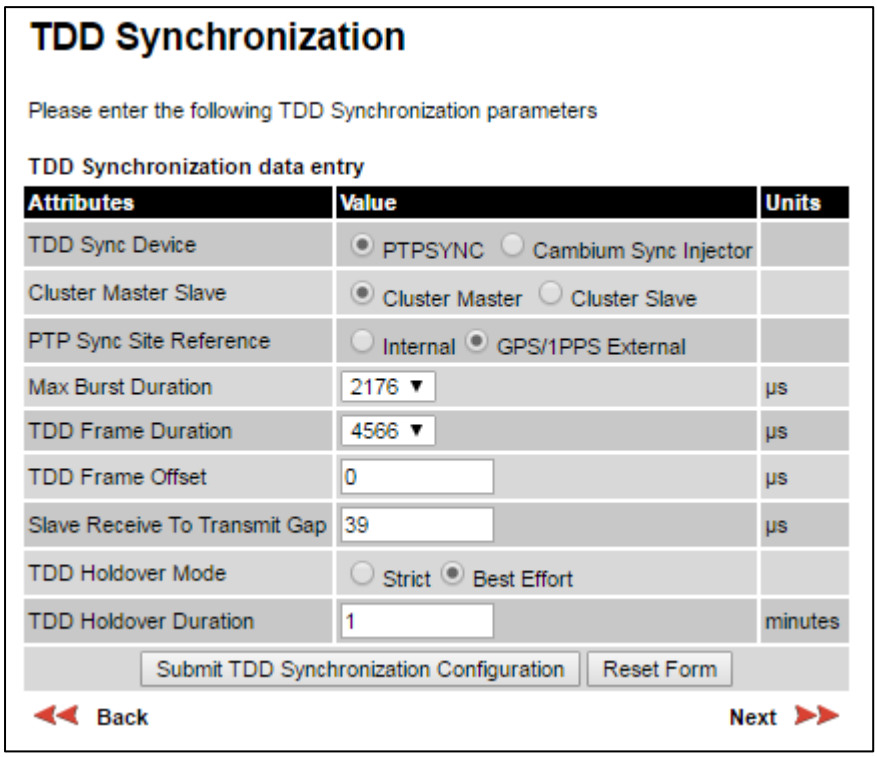
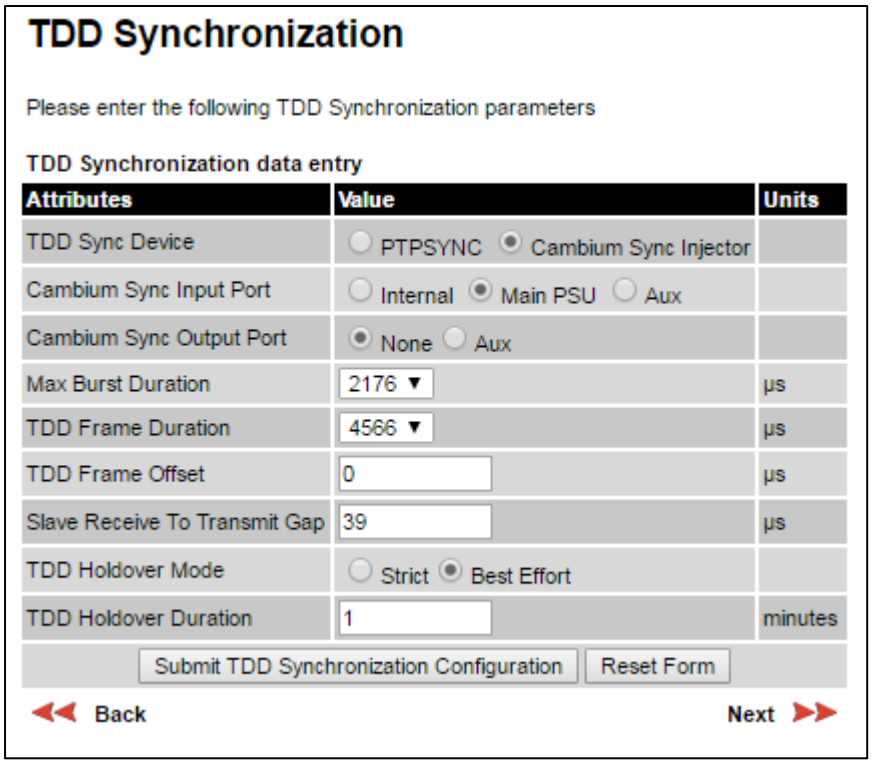


Figure 143 TDD Synchronization page, CMM5 or direct connection, PTP topology



TDD Synchronization

Please enter the following TDD Synchronization parameters

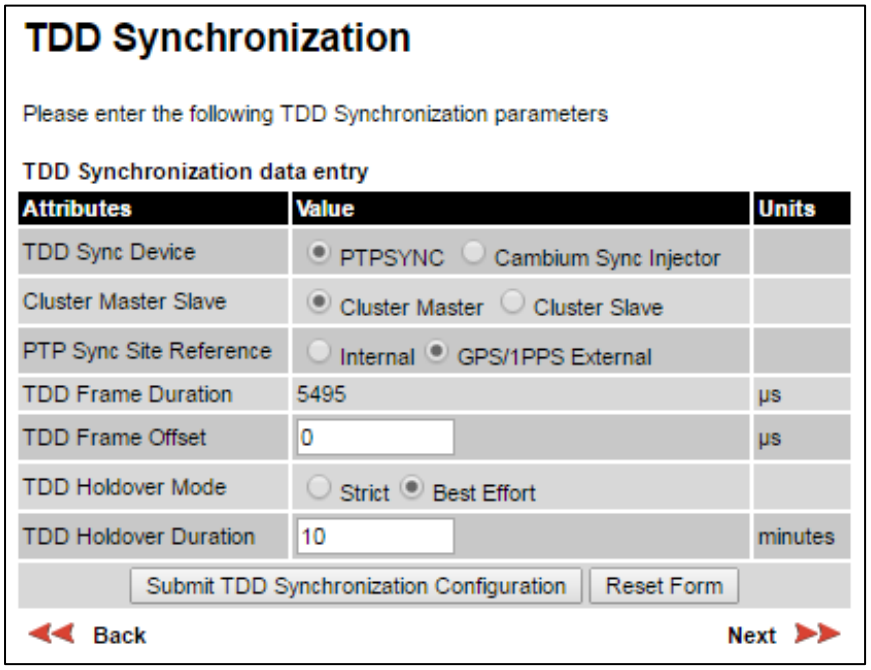
TDD Synchronization data entry

Attributes	Value	Units
TDD Sync Device	○ PTPSYNC ◉ Cambium Sync Injector	
Cambium Sync Input Port	○ Internal ◉ Main PSU ○ Aux	
Cambium Sync Output Port	◉ None ○ Aux	
Max Burst Duration	2176 ▼	µs
TDD Frame Duration	4566 ▼	µs
TDD Frame Offset	0	µs
Slave Receive To Transmit Gap	39	µs
TDD Holdover Mode	○ Strict ◉ Best Effort	
TDD Holdover Duration	1	minutes

Submit TDD Synchronization Configuration | Reset Form

◀◀ Back Next ▶▶

Figure 144 TDD Synchronization page, PTP-SYNC, HCMP topology



TDD Synchronization

Please enter the following TDD Synchronization parameters

TDD Synchronization data entry

Attributes	Value	Units
TDD Sync Device	◉ PTPSYNC ○ Cambium Sync Injector	
Cluster Master Slave	◉ Cluster Master ○ Cluster Slave	
PTP Sync Site Reference	○ Internal ◉ GPS/1PPS External	
TDD Frame Duration	5495	µs
TDD Frame Offset	0	µs
TDD Holdover Mode	○ Strict ◉ Best Effort	
TDD Holdover Duration	10	minutes

Submit TDD Synchronization Configuration | Reset Form

◀◀ Back Next ▶▶

Figure 145 TDD Synchronization page, CMM5 or direct connection, HCMP topology

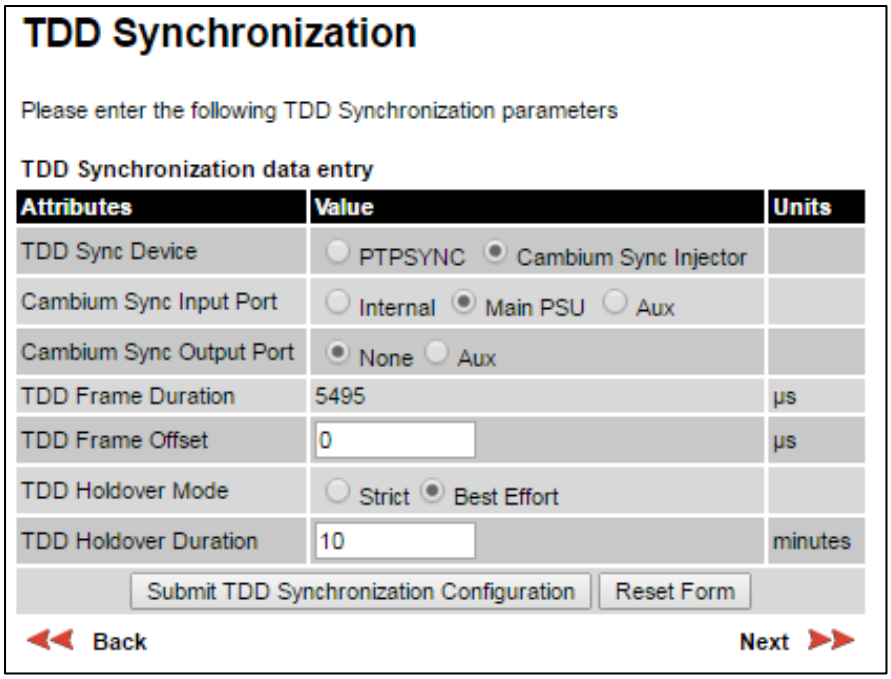
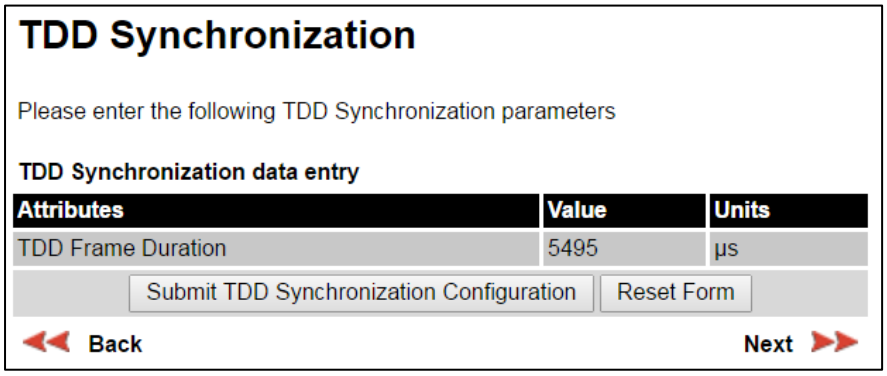


Figure 146 TDD Synchronization page, HCMP Slave



Note

For units operating in the PTP topology, obtain the data required to populate this page using the LINKPlanner.

Table 157 TDD Synchronization attributes at a TDD Master or TDD Slave ODU

Attribute	Meaning
Max Burst Duration	Only displayed in PTP topology. The maximum duration of the burst opportunity. Select a value in the range **544** to **2176** microseconds.
TDD Frame Duration	Read only in HCMP topology. Select a value in the range **1299** to **6410** microseconds.

Attribute	Meaning
Slave Receive To Transmit Gap	Only displayed in PTP topology. The duration of the gap between receive and transmit at the slave ODU.

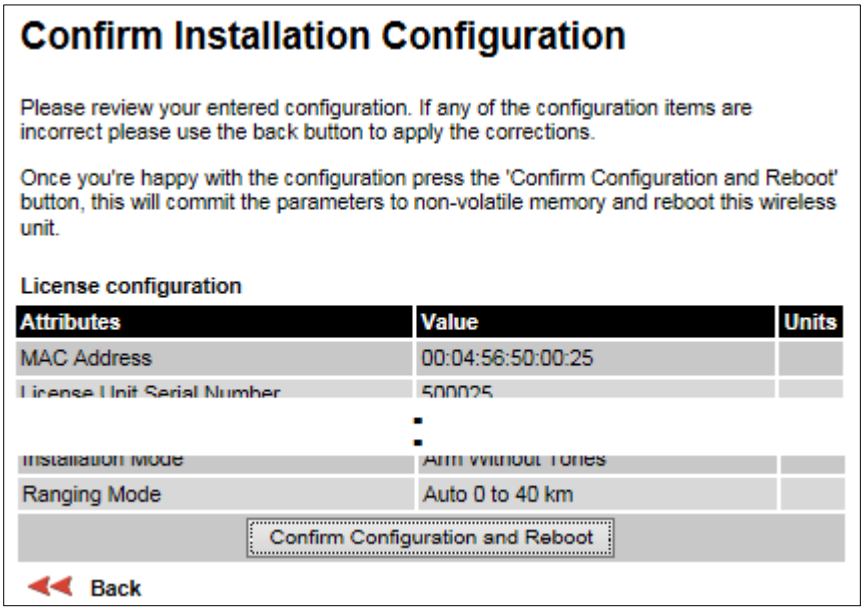
Table 158 TDD Synchronization attributes at a TDD Master ODU

Attribute	Meaning
TDD Sync Device	**PTP-SYNC**: The ODU will synchronize using the connected PTP-SYNC unit **Cambium Sync Injector**: The ODU will synchronize using CMM5, or using a direct connection to another ODU.
Cluster Master Slave	Only displayed when TDD Sync Device = **PTP SYNC** **Cluster Master**: The first ODU in the synchronization chain. **Cluster Slave**: The second or subsequent ODU in the chain.
PTP-SYNC Site Reference	Only displayed when TDD Sync Device = **PTP SYNC** **Internal**: Standalone operation with no external timing reference. **GPS/1PPS External**: An external GPS receiver will provide a 1 pps timing reference.
Cambium Sync Input Port	Only displayed when TDD Sync Device = **Cambium Sync Injector**. **Internal**: Free-running synchronization is generated internally. **Main PSU**: The ODU will synchronize to a 1PPS signal at the Main PSU port. **Aux**: The ODU will synchronize to a 1PPS signal at the Aux port.
Cambium Sync Output Port	Only displayed when TDD Sync Device = **Cambium Sync Injector**. **None**: The ODU will not output a synchronization signal. **Aux**: The ODU will output a synchronization signal at the Aux port.
TDD Frame Offset	The delay of the start of the TDD frame from the epoch of the external timing reference. This permits the design of synchronized networks in which the phase of the TDD frame is independent of the master/slave function. Enter a value in the range from zero to one microsecond less than the TDD Frame Duration.
TDD Holdover Mode	**Strict**: The unit will not transmit when synchronization is lost. **Best Effort**: The unit will synchronize when there is a reference signal, but otherwise will operate in unsynchronized mode.
TDD Holdover Duration	Specifies duration of holdover period following loss of the external timing reference for TDD synchronization. Default value **10** minutes, maximum **60** minutes.

Confirm Installation Configuration page

Menu option: **Installation** (Figure 147). Use this page to review and confirm the updated wireless configuration of the unit.

Figure 147 Confirm Installation Configuration page (top and bottom of page shown)



Procedure:

- To undo or correct any updates, click **Back**.
- To confirm the updates and arm the installation, click **Confirm Configuration and Reboot** and click **OK** to reboot the unit.
- If IP Address, Subnet Mask or Gateway IP Address have been changed: reconfigure the local management PC to use an IP address that is valid for the network. Refer to Configuring the management PC on page 6-4.
- If IP Address has been changed, use the new IP address to log into the unit.

System menu

This section describes how to configure the IP and Ethernet interfaces of the PTP 670 unit.

System Configuration page

Menu option: **System > Configuration** (Figure 148). Use this page to enable AES encryption and to review and update key wireless attributes of the unit.

Figure 148 System Configuration page

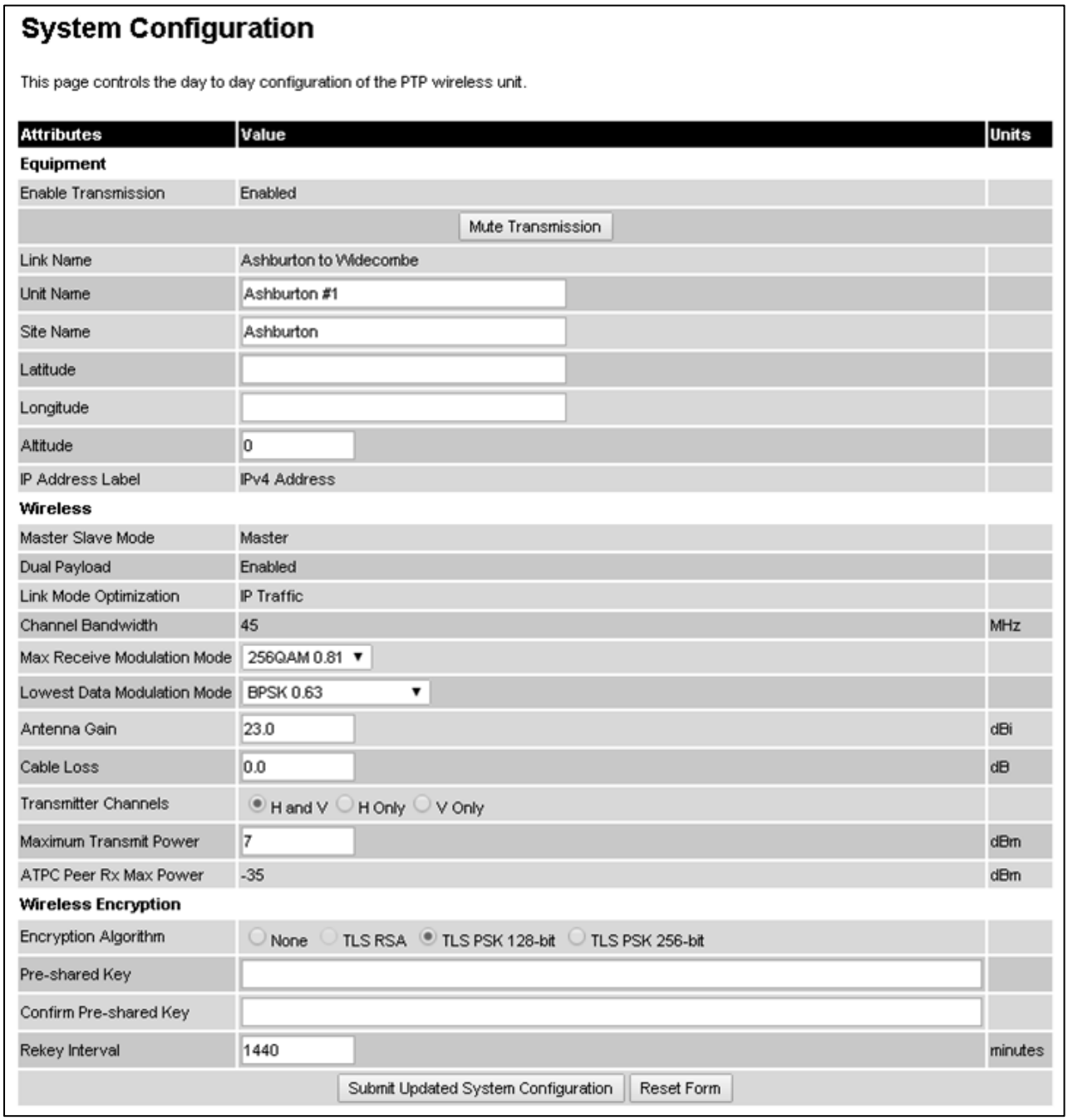
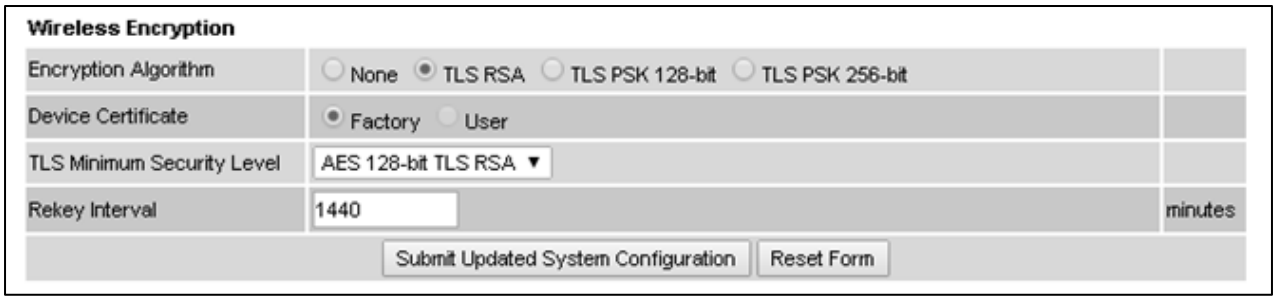


Figure 149 System Configuration page, TLS RSA Encryption Algorithm



Caution

Configuring link encryption over an operational link will necessitate a service outage. Therefore, the configuration process should be scheduled during a period of low link utilization.

Procedure:

- If AES encryption is required but the System Configuration page does not contain the Encryption Algorithm attribute, or if the Encryption Algorithm attribute provides only the None and TLS RSA attributes, then order the necessary AES capability upgrade, generate a license key and enter it on the Software License Key page (Software License Key page on page 6-13).
- Update the attributes (Table 159).
- To save changes, click **Submit Updated System Configuration**.
- If a reboot request is displayed, click **Reboot Wireless Unit** and **OK** to confirm.

Table 159 System Configuration attributes

Attribute	Meaning
Enable Transmission	Only displayed when the ODU is a Master unit and Transmitter Mute Control is enabled (see Webpage Properties page on page 6-78). Use the **Mute Transmission/Enable Transmission** control to toggle between **Muted** and **Enabled**. **Muted:** The ODU will not radiate and will not forward Ethernet frames between the wireless interface and the Ethernet ports. **Enabled**: The ODU is allowed by the user to radiate and will forward Ethernet frames between the wireless interface and the Ethernet ports.
Link Name	This is only visible if the Wireless Topology is set to PTP topology. Link Name may consist of letters (A-Z and a-z), numbers (0-9), spaces, and the following special characters: (),-.,:<=>[]_{}. If Access Method is set to Link Name Access, Link Name must be same at both ends of the link and different to site name.
Unit Name	Unit Name may consist of letters (A-Z and a-z), numbers (0-9), spaces, and the following special characters: (),-.,:<=>[]_{}. Unit name should be unique within the wireless network.

Attribute	Meaning
Site Name	User defined name for the site, with additional notes (if required).
Latitude	The latitude of the ODU, measured in decimal degrees. This attribute has no internal function.
Longitude	The longitude of the ODU, measured in decimal degrees. This attribute has no internal function.
Altitude	The altitude of the ODU, measured in meters. This attribute has no internal function.
IP Address Label	Read only. The IP Address version used to identify the unit in SMTP messages, fault logs and other system outputs. **IPv4** or **IPv6**: The unit is identified using its IPv4 or IPv6 Address. These options are only available when IP Version is set to **Dual IPv4 and IPv6** in the in the LAN Configuration page (Table 160).
Master Slave Mode	**Master:** The unit is a Master, that is, it controls the PTP link or HCMP sector. Following startup, the Master transmits continuously, except in the case of radar detection. **Slave:** The unit is a Slave, that is, it listens for its peer and only transmits when the peer has been identified. Read only.
Dual Payload	**Disabled**: The ODU will not request the remote unit to transmit dual payload modulation modes. **Enabled**: The ODU will request the remote unit to transmit single or dual payload modulation modes as determined by the wireless conditions. Read only.
Link Mode Optimization	**IP Traffic:** The link is optimized for IP traffic to provide the maximum possible link capacity. **TDM Traffic:** The link is optimized for TDM traffic to provide the lowest possible latency. Read only.
Channel Bandwidth	Bandwidth of the transmit and receive radio channels. Read only.
Max Receive Modulation Mode	The maximum mode the unit will use as its adaptive modulation. By default the Max Receive Modulation Mode is the highest mode available. For minimum error rates, set the maximum modulation mode to the minimum necessary to carry the required traffic.
Lowest Data Modulation Mode	The lowest modulation mode that must be achieved before the link is allowed to bridge customer data Ethernet frames. This does not affect the bridging of management data: if out-of-band remote management is enabled, this will continue regardless of modulation mode.

Attribute	Meaning
Antenna Gain	Only displayed for a Connectorized ODU. Gain of the external antenna.
Cable Loss	Only displayed for a Connectorized ODU. Loss in the ODU-antenna RF cable. If there is a significant difference in length of the RF cables for the two antenna ports, then the average value should be entered.
Transmitter Channels	Only displayed when the Transmitter Channels Control attribute is enabled (see Webpage Properties page on page 6-78). **H and V:** The ODU transmits on Horizontal and Vertical polarisation **H Only:** The ODU transmits on Horizontal polarisation (or at the H output of a Connectorized unit) only. **V Only:** The ODU transmits on Vertical polarisation (or at the V output of a Connectorized unit) only.  **Note** Operation using a single polarisation cannot provide polarisation diversity or polarisation multiplexing. This will reduce availability in non-line-of-sight paths, and will reduce capacity in line-of-sight or near-line-of-sight paths.
Maximum Transmit Power	The maximum power (dBm) at which the unit will transmit, configurable in steps of 1 dB. Its maximum value is controlled by the combination of the selected Regulatory Band, Bandwidth and (for connectorized units) Antenna Gain and Cable Loss. Set this attribute to the value specified in the installation report (LINKPlanner).  **Note** Maximum Transmit Power is the maximum combined power for the normal case where H and V channels operate together. When Transmitter Channels is set to H Only or V Only, the maximum transmitted power will be 3 dB lower than the configured Maximum Transmit Power.
EIRP	Only displayed when the ODU is connectorized. Effective Isotropic Radiated Power (EIRP) describes the strength of the radio signal leaving the wireless unit. Use it to verify that the link configuration (Max Transmit Power, Antenna Gain and Cable Loss) does not exceed any applicable regulatory limit. Read only.
ATPC Peer Rx Max Power	ATPC maximum receive power level at the remote ODU. In a radar avoidance area this is calculated by the software and cannot be changed. In a non-radar avoidance area this can be set manually.

Attribute	Meaning
Encryption Algorithm	Values are: **None**, **TLS RSA, TLS PSK 128-bit** or **TLS PSK 256-bit**. Use the same setting at both link ends. **TLS PSK 128-bit** and **TLS PSK 256-bit** are only displayed when an AES encryption license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-13). **TLS RSA** cannot be selected if Access Method is set to **Link Name Access**. Encryption Algorithm is not displayed if the only possible value is **None**.
Pre-shared Key	Only displayed when Encryption Algorithm is set to **TLS PSK 128-bit** or **TLS PSK 256-bit**. The key consists of 32 or 64 case-insensitive hexadecimal characters. Use the same key at both link ends.
Confirm Pre-shared Key	Only displayed when encryption algorithm **TLS PSK 128-bit** or **TLS PSK 256-bit** has been selected. Retype the Pre-shared Key.
TLS Minimum Security Level	The minum encryption key size that will be selected in TLS RSA. Values are: **None**, **AES 128-bit TLS RSA** or **AES 256-bit TLS RSA** Only displayed when Encryption Algorithm is set to TLS RSA. **AES 128-bit TLS RSA** or **AES 256-bit TLS RSA** are only available when an AES encryption license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-13). For additional information on planning TLS Minimum Security Level see TLS-RSA on page 3-58.
Rekey Interval	The interval (in minutes) between automatic update of the wireless encryption keys. Only displayed when an AES encryption and Over The Air Rekey license key has been generated (Generating license keys on page 6-3) and submitted (Software License Key page on page 6-13). Only displayed at the Master.

LAN Configuration page

Menu option: **System > Configuration > LAN Configuration**. Use this page to control how users connect to the PTP 670 web interface, either from a locally connected computer or from a management network.

The appearance of this page varies depending upon which features have been enabled by license key. For example, Figure 150 shows the attributes that are displayed when Aux Port, Second Data Service and Out-of-Band Management Service, support are enabled, whereas Figure 151 shows the attributes that are displayed when TDM support is enabled.

Caution

Before configuring a VLAN for management interfaces, ensure that the VLAN is accessible, otherwise the unit will be inaccessible after the next reboot.

Caution

Before configuring in-band management, ensure that the Master and Slave units are configured with different IP addresses, otherwise the management agent will not be able to distinguish the two units.

Caution

Auto-negotiation and forced Ethernet configuration:

- To operate an Ethernet link at a fixed speed, set Auto Negotiation to **Enabled** and limit Auto Neg Advertisement to the desired speed. If constrained auto-negotiation fails, set Auto Negotiation to **Disabled** (forced Ethernet configuration) as a last resort.
- Both ends of an Ethernet link must be configured identically, because forced and auto-negotiation are not compatible: a mixed configuration will cause a duplex mismatch, resulting in greatly reduced data capacity.
- The Auto Neg Advertisement or Forced Configuration data rates must be within the capability of the Ethernet link partner, otherwise loss of service will occur.

Note

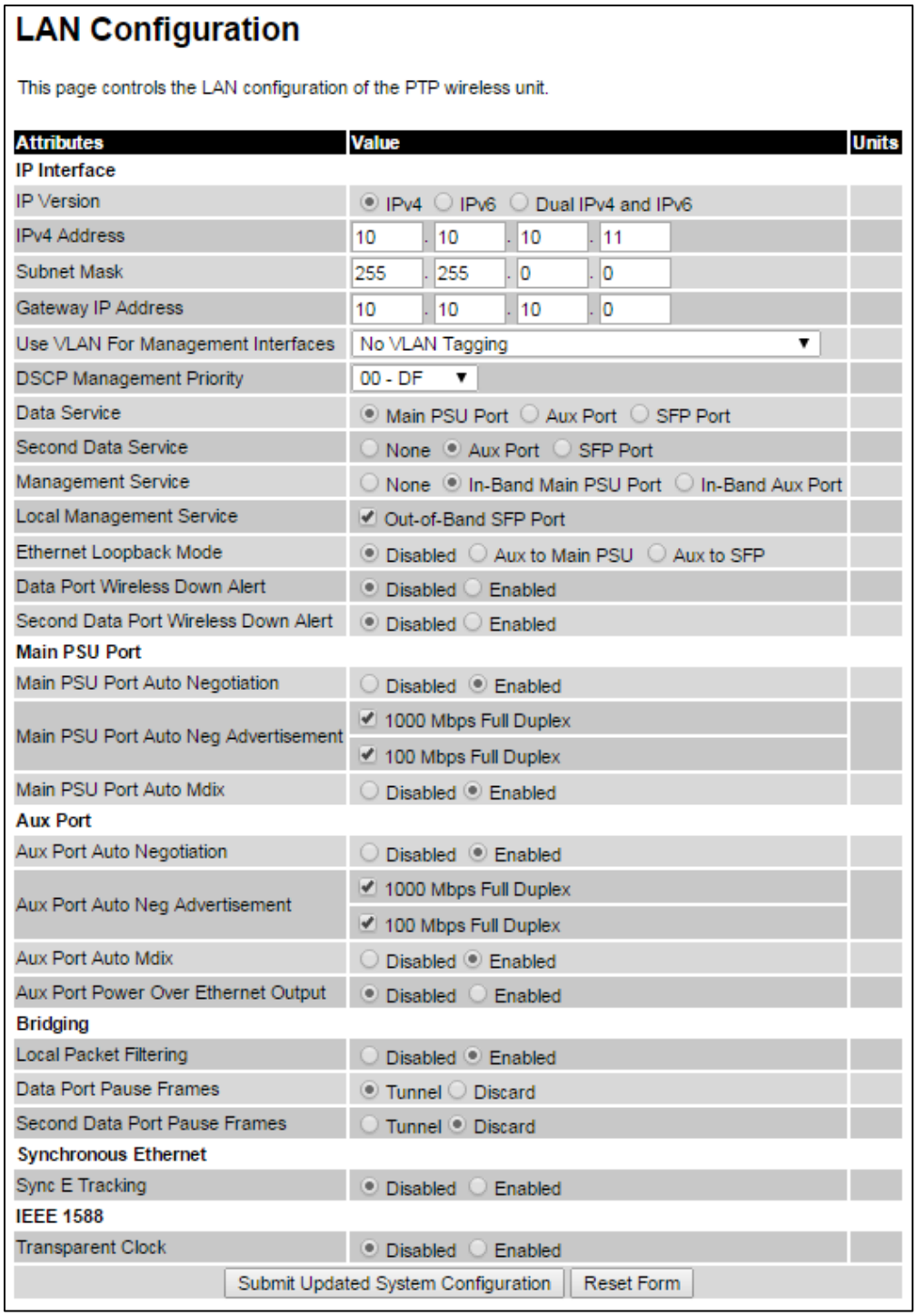
When TDM is enabled (Interface Configuration page on page 6-16), the following restrictions are automatically applied:

- Main PSU Port Auto Negotiation is set to **Enabled**.
- Main PSU Port Auto Neg Advertisement is set to **1000 Mbps Full Duplex**.
- Main PSU Port Auto MDIX is set to **Enabled**.

Note

Synchronous Ethernet and IEEE 1588 Transparent Clock are only supported in the PTP topology.

Figure 150 LAN Configuration page (PTP topology, Aux and OOB support)



LAN Configuration

This page controls the LAN configuration of the PTP wireless unit.

Attributes	Value	Units
IP Interface		
IP Version	(•) IPv4 ( ) IPv6 ( ) Dual IPv4 and IPv6	
IPv4 Address	10 . 10 . 10 . 11	
Subnet Mask	255 . 255 . 0 . 0	
Gateway IP Address	10 . 10 . 10 . 0	
Use VLAN For Management Interfaces	No VLAN Tagging ▼	
DSCP Management Priority	00 - DF ▼	
Data Service	(•) Main PSU Port ( ) Aux Port ( ) SFP Port	
Second Data Service	( ) None (•) Aux Port ( ) SFP Port	
Management Service	( ) None (•) In-Band Main PSU Port ( ) In-Band Aux Port	
Local Management Service	[✓] Out-of-Band SFP Port	
Ethernet Loopback Mode	(•) Disabled ( ) Aux to Main PSU ( ) Aux to SFP	
Data Port Wireless Down Alert	(•) Disabled ( ) Enabled	
Second Data Port Wireless Down Alert	(•) Disabled ( ) Enabled	
Main PSU Port		
Main PSU Port Auto Negotiation	( ) Disabled (•) Enabled	
Main PSU Port Auto Neg Advertisement	[✓] 1000 Mbps Full Duplex [✓] 100 Mbps Full Duplex	
Main PSU Port Auto Mdix	( ) Disabled (•) Enabled	
Aux Port		
Aux Port Auto Negotiation	( ) Disabled (•) Enabled	
Aux Port Auto Neg Advertisement	[✓] 1000 Mbps Full Duplex [✓] 100 Mbps Full Duplex	
Aux Port Auto Mdix	( ) Disabled (•) Enabled	
Aux Port Power Over Ethernet Output	(•) Disabled ( ) Enabled	
Bridging		
Local Packet Filtering	( ) Disabled (•) Enabled	
Data Port Pause Frames	(•) Tunnel ( ) Discard	
Second Data Port Pause Frames	( ) Tunnel (•) Discard	
Synchronous Ethernet		
Sync E Tracking	(•) Disabled ( ) Enabled	
IEEE 1588		
Transparent Clock	(•) Disabled ( ) Enabled	

[Submit Updated System Configuration] [Reset Form]