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About This Installation Guide

This guide describes the PTP 820C installation procedures and provides additional information concerning system parts and frequency bands.

This guide contains the following chapters:
- Chapter 1 : Before You Start
- Chapter 2 : Product Hardware Description
- Chapter 3 : Cable Installation and Grounding
- Chapter 4 : PoE Injector Installation and Connection
- Chapter 5 : Generic Installation Procedures
- Chapter 6 : Installation Procedures per Configuration Type
- Chapter 7 : Acceptance and Commissioning Procedures

Contacting Cambium Networks

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Purpose

Cambium Networks Point-To-Point (PTP) documents are intended to instruct and assist personnel in the operation, installation and maintenance of the Cambium PTP equipment and ancillary devices. It is recommended that all personnel engaged in such activities be properly trained.

Cambium Networks disclaims all liability whatsoever, implied or express, for any risk of damage, loss or reduction in system performance arising directly or indirectly out of the failure of the customer, or anyone acting on the customer’s behalf, to abide by the instructions, system parameters, or recommendations made in this document.

Cross references

References to external publications are shown in italics. Other cross references, emphasized in blue text in electronic versions, are active links to the references.

This document is divided into numbered chapters that are divided into sections. Sections are not numbered, but are individually named at the top of each page, and are listed in the table of contents.

Feedback

We appreciate feedback from the users of our documents. This includes feedback on the structure, content, accuracy, or completeness of our documents. Send feedback to support@cambiumnetworks.com.
Problems and warranty

Reporting problems

If any problems are encountered when installing or operating this equipment, follow this procedure to investigate and report:

1. Search this document and the software release notes of supported releases.
2. Visit the support website.
3. Ask for assistance from the Cambium Networks product supplier.
4. Gather information from affected units, such as any available diagnostic downloads.
5. Escalate the problem by emailing or telephoning support.

Repair and service

If unit failure is suspected, obtain details of the Return Material Authorization (RMA) process from the support website.

Hardware warranty

Cambium Networks’ standard hardware warranty is for one (1) year from date of shipment from Cambium Networks or a Cambium distributor. Cambium Networks warrants that hardware will conform to the relevant published specifications and will be free from material defects in material and workmanship under normal use and service. Cambium Networks shall within this time, at its own option, either repair or replace the defective product within thirty (30) days of receipt of the defective product. Repaired or replaced product will be subject to the original warranty period but not less than thirty (30) days.

To register PTP products or activate warranties, visit the support website. For warranty assistance, contact the reseller or distributor.

Caution

Using non-Cambium Networks parts for repair could damage the equipment or void warranty. Contact Cambium Networks for service and repair instructions.

Portions of Cambium Networks equipment may be damaged from exposure to electrostatic discharge. Use precautions to prevent damage.
Cambium Networks systems and equipment provide security parameters that can be configured by the operator based on their particular operating environment. Cambium recommends setting and using these parameters following industry recognized security practices. Security aspects to be considered are protecting the confidentiality, integrity, and availability of information and assets. Assets include the ability to communicate, information about the nature of the communications, and information about the parties involved.

In certain instances Cambium Networks makes specific recommendations regarding security practices, however the implementation of these recommendations and final responsibility for the security of the system lies with the operator of the system.
Warnings, cautions, and notes

The following describes how warnings and cautions are used in this document and in all documents of the Cambium Networks document set.

Warnings

Warnings precede instructions that contain potentially hazardous situations. Warnings are used to alert the reader to possible hazards that could cause loss of life or physical injury. A warning has the following format:

⚠️ Warning
Warning text and consequence for not following the instructions in the warning.

Cautions

Cautions precede instructions and are used when there is a possibility of damage to systems, software, or individual items of equipment within a system. However, this damage presents no danger to personnel. A caution has the following format:

⚠️ Caution
Caution text and consequence for not following the instructions in the caution.

Notes

A note means that there is a possibility of an undesirable situation or provides additional information to help the reader understand a topic or concept. A note has the following format:

🔍 Note
Note text.
Caring for the environment

The following information describes national or regional requirements for the disposal of Cambium Networks supplied equipment and for the approved disposal of surplus packaging.

In EU countries

The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to these directives when using Cambium Networks equipment in EU countries.

Disposal of Cambium Networks equipment

Do not dispose of Cambium Networks equipment in landfill sites. For disposal instructions, refer to http://www.cambiumnetworks.com/support/weee-compliance

Disposal of surplus packaging

Do not dispose of surplus packaging in landfill sites. In the EU, it is the individual recipient’s responsibility to ensure that packaging materials are collected and recycled according to the requirements of EU environmental law.

In non-EU countries

In non-EU countries, dispose of Cambium Networks equipment and all surplus packaging in accordance with national and regional regulations.
Chapter 1: Before You Start

Cambium Networks PTP 820C represents a new generation of radio technology, capable of high bit rates and longer reach and suitable for diverse deployment scenarios.

PTP 820C is a MultiCore system that utilizes parallel radio signal processing in a compact, all-outdoor device combining radio, baseband, and Carrier Ethernet functionality to offer a future proof solution for PTP connectivity applications.

PTP 820C supports cutting edge capacity-boosting techniques, such as LoS MIMO, QPSK to 2048 QAM, and Header De-Duplication, to offer a high capacity solution for every network topology and every site configuration.

This chapter includes:

- Important Notes
- Safety Precautions & Declared Material
- Pre-installation Instructions
- PTP 820 Assured Platform
Important Notes

- For the warranty to be honored, install the unit in accordance with the instructions in this manual.
- Any changes or modifications of equipment not expressly approved by the manufacturer could void the user’s authority to operate the equipment and the warranty for such equipment.
- PTP 820C is intended for installation in a restricted access location.
- PTP 820C must be installed and permanently connected to protective earth by qualified service personnel in accordance with applicable national electrical codes.
Safety Precautions & Declared Material

General Equipment Precautions

**Caution**
To avoid malfunctioning or personnel injuries, equipment or accessories/kits/plug-in unit installation, requires qualified and trained personnel. Changes or modifications not expressly approved by Cambium Networks could void the user's authority to operate the equipment.

**Caution**
Where special cables, shields, adapters and grounding kits are supplied or described in this manual, these items must be used, to comply with the FCC regulations.

**Caution**
Use of controls, adjustments, or performing procedures other than those specified herein, may result in hazardous radiation exposure.

**Caution**
When working with a PTP 820C, note the following risk of electric shock and energy hazard:
Disconnecting one power supply disconnects only one power supply module. To isolate the unit completely, disconnect all power supplies.

**Caution**
Machine noise information order - 3. GPSGV, the highest sound pressure level amounts to 70 dB (A) or less, in accordance with ISO EN 7779.

**Anti Static**
Static electricity may cause body harm, as well as harm to electronic components inside the device. Anyone responsible for the installation or maintenance of the PTP 820C must use an ESD Wrist Strap. ESD protection measures must be observed when touching the unit. To prevent damage, before touching components inside the device, all electrostatic must be discharged from both personnel and tools.

**Caution**
In Norway and Sweden:
Equipment connected to the protective earthing of the building installation through the mains connection or through other equipment with a connection to protective earthing – and to a cable distribution system using coaxial cable, may in some circumstances create a fire hazard. Connection to a cable distribution system has therefore to be provided through a device providing electrical isolation below a certain frequency range (galvanic isolator, see EN 60728-11).

Utstyr som er koplet til beskyttelsesjord via nettplugg og/eller via annet jordtilkoplet utstyr – og er tilkoplet et kabel-TV nett, kan forårsake brannfare. For å unngå dette skal det ved tilkoping av utstyret til kabel-TV nettet installeres en galvanisk isolator mellom utstyret og kabel-TV nettet.

Utrustning som är kopplad till skyddsjord via jordat vägguttag och/eller via annan utrustning och samtidigt är kopplad till kabel-TV nät kan i vissa fall medföra risk för brand. För att undvika detta skall vid anslutning av utrustningen till kabel-TV nät galvanisk isolator finnas mellan utrustningen och kabel-TV nätet.

---

**Caution**

**Précautions générales relatives à l’équipement**

**Caution**

L’utilisation de commandes ou de réglages ou l’exécution de procédures autres que celles spécifiées dans les présentes peut engendrer une exposition dangereuse aux rayonnements.

**Caution**

L’usage de PTP 820C s’accompagne du risque suivant d’électrocution et de danger électrique : le débranchement d’une alimentation électrique ne déconnecte qu’un module d’alimentation électrique. Pour isoler complètement l’unité, il faut débrancher toutes les alimentations électriques.

**Caution**

Bruit de machine d’ordre - 3. GPSGV, le plus haut niveau de pression sonore s’élève à 70 dB (A) au maximum, dans le respect de la norme ISO EN 7779.
Allgemeine Vorsichtsmaßnahmen für die Anlage

**Caution**
Wenn andere Steuerelemente verwendet, Einstellungen vorgenommen oder Verfahren durchgeführt werden als die hier angegebenen, kann dies gefährliche Strahlung verursachen.

**Caution**
Beachten Sie beim Arbeiten mit PTP 820C das folgende Stromschlag- und Gefahrenrisiko: Durch Abtrennen einer Stromquelle wird nur ein.

**Caution**
Stromversorgungsmodul abgetrennt. Um die Einheit vollständig zu isolieren, trennen Sie alle Stromversorgungen ab.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß EN ISO 7779.
Pre-installation Instructions

Packing

The equipment must be packed and sealed in moisture absorbing bags.

Transportation and Storage

The equipment cases are prepared for shipment by air, truck, railway and sea, suitable for handling by forklift trucks and slings. The cargo must be kept dry during transportation, in accordance with ETS 300 019-1-2, Class 2.3. For sea-transport, deck-side shipment is not permitted. Carrier-owned cargo containers must be used.

It is recommended that the equipment be transported to the installation site in its original packing case.

If intermediate storage is required, the packed equipment must be stored in a dry and cool environment, and out of direct sunlight, in accordance with ETS 300 019-1-1, Class 1.2.

Unpacking

The equipment is packed in sealed plastic bags and moisture absorbing bags are inserted. Any separate sensitive product, i.e. printed boards, are packed in anti-static handling bags. The equipment is further packed in special designed cases.

Marking is done according to standard practice unless otherwise specified by customers. The following details should be marked:

- Customers address
- Contract No
- Site name (if known)
- Case No

Inspection

Check the packing lists and ensure that correct parts numbers quantities of goods have arrived. Inspect for any damage on the cases and equipment. Report any damage or discrepancy to Cambium Networks support by e-mailing to support@cambiumnetworks.com.
PTP 820 Assured Platform

PTP 820 Assured platform enhances network reliability and security, ensuring that mission-critical networks maintain availability, and protecting the confidentiality and integrity of their users’ data.

The PTP 820 Assured platform is compliant with FIPS 140-2, including:

- Compliance with FIPS 140-2 specifications for cryptography module.
- FIPS 140-2 Level 2 physical security.
- AES-256 encryption (FIPS 197) over radio links.

The PTP 820 Assured platform also provides:

- Secured communication and protocols for management interface.
- Centralized user authentication management via RADIUS.
- Advanced identity management and password policy enforcement.
- Security events log.
- Secure product architecture and development.

The following products are included in the PTP 820 Assured platform:

- PTP 820C Assured
- PTP 820S Assured
- PTP 820G Assured

**Note**

PTP 820 Assured is supported with certain versions of the release. To determine whether a specific release version supports PTP 820 Assured, check the Release Notes for the current system release.
Chapter 2: Product Hardware Description

This chapter describes the hardware components of the PTP 820C product. This chapter consists of the following sections:

- PTP 820C Hardware Overview
- MultiCore Mediation Devices (MCMD)
- PoE Injector
- System Components
- Adaptors and Installation Kits
- Antenna Connection
- Power Specs
PTP 820C Hardware Overview

PTP 820C features an all-outdoor MultiCore architecture consisting of a single unit directly mounted on the antenna.

**Figure 1** PTP 820C Rear View (Left) and Front View (Right)

![PTP 820C Rear View (Left) and Front View (Right)](image)

**Figure 2** Cable Gland Construction

![Cable Gland Construction](image)
PTP 820C Interfaces

Figure 3  PTP 820C Interfaces

- Data Port 1 for GbE traffic:
  - Electric: 10/100/1000Base-T. Supports PoE.
  - Optical: 1000Base-SX (or X-LX-ZX/XD)
- Data Port 2 for GbE traffic:
  - Electric: 10/100/1000Base-T
  - Optical: 1000Base-SX (or X-LX-ZX/XD)
- Data Port 3 - Reserved for MIMO Use Only
- Power interface (-48VDC)
- Management Port: 10/100Base-T
- 2 RF Interfaces: Standard interface per frequency band
- RSL interface: BNC connector
- Source sharing: TNC connector
- Grounding screw
MultiCore Mediation Devices (MCMD)

The MultiCore Mediation Devices (MCMD) are designed to offer a simple and compact solution for a direct mount installation of the dual-carrier PTP 820C on a standard RFU-C antenna.

PTP 820C is equipped with two antenna ports, which mandates the use of the following MCMDs for direct mount connections. The specific MCMDs depend on the configuration.

The following table describes some of the available MCMDs. For a full list of components, see System Components on page 2-8.

---

**Note**

MCMDs are not grounded. To add grounding, the MCMD can be connected to the PTP 820C using a Grounding Jumper.

---

<table>
<thead>
<tr>
<th>MCMD type</th>
<th>Functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Splitter</td>
<td>Combines the two carriers using the same polarization</td>
</tr>
<tr>
<td>OMT</td>
<td>Combines the two carriers on alternate polarizations (H,V)</td>
</tr>
</tbody>
</table>

---

**Table 1  MCMD type**

---

**Figure 4  Splitter**

---

![Splitter Image]
Figure 5  OMT
PoE Injector

The PoE injector is an outdoor unit which can be mounted on a wall, pole, or indoor rack. Each PoE Injector kit includes the following items:

- PoE injector
- 2 DC power connectors

**Figure 6  PoE Injector**

The PoE Injector model available:

- **N000082L022A PTP 820 PoE Injector all outdoor, redundant DC input, +24VDC support** – Includes two DC power ports with power input ranges of $\pm(18-60)V$ each.

**PoE Injector Interfaces**

- Power-Over-Ethernet (PoE) Port
- GbE Data Port supporting 10/100/1000Base-T
- DC Power Port 1 $\pm(18-60)V$ or $\pm(40-60)V$
- DC Power Port 2 $\pm(18-60)V$
- Grounding screw
Figure 7 PoE Injector Ports
System Components

The following figures show the main components used in the PTP 820C installation procedures.

**Note**
The availability of the installation components follows the PTP 820C frequency rollout as stated in the published roadmap. The presence of a specific component in this manual does not indicate that it is available for ordering. Please consult with your respective pre-sales engineer for specific component availability.

**Figure 8** System Components

<table>
<thead>
<tr>
<th>PTP 820C</th>
<th>Dual Core Coupler/Splitter</th>
<th>DC OMT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="PTP 820C" /></td>
<td><img src="image2" alt="Dual Core Coupler/Splitter" /></td>
<td><img src="image3" alt="DC OMT" /></td>
</tr>
<tr>
<td>DC Splitter</td>
<td>Adaptor for 6 GHz - 13 GHz</td>
<td>PoE Injector</td>
</tr>
<tr>
<td><img src="image4" alt="DC Splitter" /></td>
<td><img src="image5" alt="Adaptor for 6 GHz - 13 GHz" /></td>
<td><img src="image6" alt="PoE Injector" /></td>
</tr>
<tr>
<td>Dual Core Mediation Device</td>
<td>Remote Pole Mount</td>
<td>Remote Dual Pole Mount</td>
</tr>
<tr>
<td><img src="image7" alt="Dual Core Mediation Device" /></td>
<td><img src="image8" alt="Remote Pole Mount" /></td>
<td><img src="image9" alt="Remote Dual Pole Mount" /></td>
</tr>
</tbody>
</table>
## Adaptors and Installation Kits

### Table 2  Adaptors and Installation kits for 6 to 18 GHz

<table>
<thead>
<tr>
<th>Description</th>
<th>6 GHz</th>
<th>7-8 GHz</th>
<th>10-11 GHz</th>
<th>13 GHz</th>
<th>15 GHz</th>
<th>18 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>N060082L135A</td>
<td>N070082L292A</td>
<td>N110082L080A</td>
<td>N130082L054A</td>
<td>N150082L076A</td>
<td>N180082L042A</td>
</tr>
<tr>
<td>PTP 820C DUAL SPLITTER KIT</td>
<td>N060082L136A</td>
<td>N070082L293A</td>
<td>N110082L081A</td>
<td>N130082L055A</td>
<td>N150082L077A</td>
<td>N180082L043A</td>
</tr>
<tr>
<td>PTP 820C SPLITTER KIT</td>
<td>N060082L138A</td>
<td>N070082L295A</td>
<td>N110082L083A</td>
<td>N130082L057A</td>
<td>N150082L079A</td>
<td>N180082L045A</td>
</tr>
<tr>
<td>PTP 820C OMT KIT</td>
<td>N060082L137A</td>
<td>N070082L294A</td>
<td>N110082L082A</td>
<td>N130082L056A</td>
<td>N150082L078A</td>
<td>N180082L044A</td>
</tr>
<tr>
<td>PTP 820C DUAL CORE MD KIT</td>
<td>N060082L134A</td>
<td>N070082L291A</td>
<td>N110082L079A</td>
<td>N130082L053A</td>
<td>N150082L075A</td>
<td>N180082L041A</td>
</tr>
</tbody>
</table>

### Table 3  Adaptors and Installation kits for 23 to 38 GHz

<table>
<thead>
<tr>
<th>Description</th>
<th>23 GHz</th>
<th>26 GHz</th>
<th>28-31 GHz</th>
<th>32 GHz</th>
<th>38 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>N230082L032A</td>
<td>N260082L026A</td>
<td>N280082L035A</td>
<td>N320082L019A</td>
<td>N380082L043A</td>
</tr>
<tr>
<td>PTP 820C DUAL SPLITTER KIT</td>
<td>N230082L033A</td>
<td>N260082L027A</td>
<td>N280082L036A</td>
<td>N320082L020A</td>
<td>N380082L044A</td>
</tr>
<tr>
<td>PTP 820C SPLITTER KIT</td>
<td>N230082L035A</td>
<td>N260082L029A</td>
<td>N280082L038A</td>
<td>N320082L022A</td>
<td>N380082L046A</td>
</tr>
<tr>
<td>PTP 820C OMT KIT</td>
<td>N230082L034A</td>
<td>N260082L028A</td>
<td>N280082L037A</td>
<td>N320082L021A</td>
<td>N380082L045A</td>
</tr>
<tr>
<td>PTP 820C DUAL CORE MD KIT</td>
<td>N230082L031A</td>
<td>N260082L025A</td>
<td>N280082L034A</td>
<td>N320082L018A</td>
<td>N380082L042A</td>
</tr>
</tbody>
</table>
### Table 4 Remote Mount – 6 to 15 GHz

<table>
<thead>
<tr>
<th>Remote Mount</th>
<th>6 GHz</th>
<th>7 GHz - 8GHz</th>
<th>10 GHz - 11GHz</th>
<th>13 GHz</th>
<th>15 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFU-C REMOTE MOUNT KIT</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
</tr>
<tr>
<td>PTP 820C DC REMOTE MOUNT KIT</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
</tr>
<tr>
<td>RFU-C WG Kit</td>
<td>N060082L156A</td>
<td>N070082L004A</td>
<td>N110082L105A</td>
<td>N130082L070A</td>
<td>N150082L092A</td>
</tr>
<tr>
<td>RFU-C REMOTE MOUNT ADAPTOR KIT</td>
<td>N060082L003A</td>
<td>N070082L002A</td>
<td>N110082L002A</td>
<td>N130082L002A</td>
<td></td>
</tr>
<tr>
<td>REMOTE MOUNT ADAPTOR KIT</td>
<td>N060082L002A</td>
<td>N060082L001A</td>
<td>N060082L001A</td>
<td>N060082L001A</td>
<td></td>
</tr>
</tbody>
</table>

### Table 5 Remote Mount – 18 to 38 GHz

<table>
<thead>
<tr>
<th>Remote Mount</th>
<th>18 GHz</th>
<th>23 GHz</th>
<th>26 GHz</th>
<th>28 GHz</th>
<th>32 GHz</th>
<th>38 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFU-C REMOTE MOUNT KIT</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
<td>N000082L121A</td>
</tr>
<tr>
<td>PTP 820C DC REMOTE MOUNT KIT</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
<td>N000082L120A</td>
</tr>
<tr>
<td>RFU-C WG KIT</td>
<td>N180082L058A</td>
<td>N180082L058A</td>
<td>N180082L058A</td>
<td>N280082L048A</td>
<td>N280082L048A</td>
<td>N280082L048A</td>
</tr>
</tbody>
</table>
## Antenna Circ Adaptors

**Table 6** Antenna circ. Adaptors for 6 to 18GHz

<table>
<thead>
<tr>
<th>Antenna Circ. Adapters for OMT</th>
<th>6 GHz</th>
<th>7 GHz - 8GHz</th>
<th>10 GHz - 11GHz</th>
<th>13 GHz</th>
<th>15 GHz</th>
<th>18 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>CommScope</td>
<td>N060082L147A</td>
<td>N070082L303A</td>
<td>N110082L092A</td>
<td>N130082L060A</td>
<td>N150082L082A</td>
<td>N180082L048A</td>
</tr>
<tr>
<td>Radio Waves</td>
<td>N060082L154A</td>
<td>N070082L310A</td>
<td>N110082L103A</td>
<td>N130082L068A</td>
<td>N150082L090A</td>
<td>N180082L056A</td>
</tr>
<tr>
<td>CNT</td>
<td>N060082L155A</td>
<td>N070082L311A</td>
<td>N110082L104A</td>
<td>N130082L069A</td>
<td>N150082L091A</td>
<td>N180082L057A</td>
</tr>
</tbody>
</table>

**Table 7** Antenna circ. Adaptors for 23 to 38 GHz

<table>
<thead>
<tr>
<th>Antenna Circ. Adapters for OMT</th>
<th>23 GHz</th>
<th>24 GHz</th>
<th>26 GHz</th>
<th>28 GHz</th>
<th>32 GHz</th>
<th>38 GHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>CommScope</td>
<td>N230082L039A</td>
<td>-</td>
<td>N260082L032A</td>
<td>N280082L042A</td>
<td>N320082L025A</td>
<td>N380082L049A</td>
</tr>
<tr>
<td>Radio Waves</td>
<td>N230082L046A</td>
<td>-</td>
<td>N260082L038A</td>
<td>N280082L046A</td>
<td>NA</td>
<td>N380082L054A</td>
</tr>
<tr>
<td>CNT</td>
<td>N230082L047A</td>
<td>N260082L039A</td>
<td>N260082L039A</td>
<td>N280082L047A</td>
<td>N320082L030A</td>
<td>N380082L055A</td>
</tr>
</tbody>
</table>

## PoE Injector

**Table 8** PoE Injector

<table>
<thead>
<tr>
<th>Marketing Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L022A</td>
<td>PoE Injector all outdoor, redundant DC input, +24VDC support</td>
</tr>
<tr>
<td>N000082L020A</td>
<td>PoE Injector 19” Rack Mount Kit</td>
</tr>
<tr>
<td>N000082L021A</td>
<td>PoE Injector 23” rack mount KIT</td>
</tr>
</tbody>
</table>
Antenna Connection

PTP 820C can be mounted directly for all frequencies (6 GHz - 38 GHz) using the following antenna types (for integrated antennas, specific antennas part numbers are required):

- CommScope: VHLP series
- Radiowaves: HP series
- Cambium Networks: CNT series

For remote mount installations, the following Flexible Waveguide flanges should be used (millimetric). The same antenna type (integrated) as indicated above can be used (recommended). Other antenna types using the flanges listed in the table below may also be used.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6(L/U) GHz 5.8-7.1 GHz</td>
<td>31.8</td>
<td>WR137</td>
<td>UDR70</td>
<td>PDR70</td>
<td>PDR70</td>
<td>UDR70</td>
</tr>
<tr>
<td>7/8 GHz 7.1-8.5 GHz</td>
<td>26</td>
<td>WR112</td>
<td>UBR84</td>
<td>PBR84</td>
<td>PBR84</td>
<td>UBR84</td>
</tr>
<tr>
<td>10/11 GHz 10.0-11.7 GHz</td>
<td>18</td>
<td>WR90</td>
<td>UBR100</td>
<td>PBR100</td>
<td>PBR100</td>
<td>UBR100</td>
</tr>
<tr>
<td>13 GHz 12.7-13.3 GHz</td>
<td>15</td>
<td>WR75</td>
<td>UBR120</td>
<td>PBR120</td>
<td>PBR120</td>
<td>UBR120</td>
</tr>
<tr>
<td>15 GHz 14.5-15.4 GHz</td>
<td>13.5</td>
<td>WR62</td>
<td>UBR140</td>
<td>PBR140</td>
<td>PBR140</td>
<td>UBR140</td>
</tr>
<tr>
<td>18 GHz 17.7-19.7 GHz</td>
<td>10.5</td>
<td>WR42</td>
<td>UBR220</td>
<td>PBR220</td>
<td>PBR220</td>
<td>UBR220</td>
</tr>
<tr>
<td>23 GHz 21.2-23.6 GHz</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26 GHz 24.5-26.6 GHz</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28-31 GHz 27.3-29.5 GHz</td>
<td>7</td>
<td>WR28</td>
<td>UBR320</td>
<td>PBR320</td>
<td>PBR320</td>
<td>UBR320</td>
</tr>
<tr>
<td>32 GHz 31.8-33.4 GHz</td>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 GHz 37.0-40.0 GHz</td>
<td>5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If a different antenna type (CPR flange) is used, a flange adaptor is required. Please contact your Cambium Networks representative for details.
Note
Appropriate lubricant or grease can be applied to the screws that connect the PTP 820C to the antenna interface.
Power Specs

Electrical Requirements

- 48V DC Nominal
- Maximum current rating 1.5 A
- Maximum Cable length 300 meter
- Maximum cable size for PoE cable is 24 AWG, with maximum current up to 2A from the power source.

Important Notes

- The unit must only be installed by service personnel.
- The unit must have a permanent connection to protective grounding.
- Data port 2, Data port 3, the Management port and the TNC connector do not provide protection from over-voltages on telecommunication networks for host equipment users.
- The RSL interface connector is intended for technician use only.
- Disconnect device (circuit breaker) in the building installation:
  - Should be readily accessible and incorporated external to the equipment.
  - The maximum rating of the overcurrent protection shall be up to 6 Amp.

Environmental Specifications

Operating: ETSI EN 300 019-1-4 Class 4.1
Temperature range for continuous operating temperature with high reliability:
-33°C (-27°F) to +55°C (131°F)
Temperature range for exceptional temperatures; tested successfully with limited margins:
-45°C (-49°F) to +60°C (140°F)
Humidity: 5%RH to 100%RH
IEC529 IP66
Storage: ETSI EN 300 019-1-1 Class 1.2
Transportation: ETSI EN 300 019-1-2 Class 2.3
Chapter 3: Cable Installation and Grounding

This chapter describes the installation procedure of the PTP 820C product. This chapter consists of the following sections:

- Minimum and Maximum Cable Diameter
- Cable Grounding
- Surge Protection
- Available Cable Options
- Securing the Cables
- Special Instructions for use of Glands
- Connecting an Optical Fiber Cable and SFP
- Connecting a DC Power Cable
- Connecting the Ethernet Cable
- Management Connection for 4x4 MIMO and 1+1/2+2 HSB Configurations
Minimum and Maximum Cable Diameter

To fit the gland, the outer cable diameter should be between 6-10 mm. This applies to all glands on both the PTP 820C unit and the PoE Injector.

To fit the grounding clamp, the outer diameter of CAT5E Ethernet cable must be between 6-7.1mm.
Cable Grounding

Cables must be grounded as follows:

- For Fiber cables (see Connecting an Optical Fiber Cable and SFP on page3-21), no grounding is required.
- For DC power cables (see Connecting a DC power cable on page 3-25), no grounding is required.
- For Ethernet cables (see Connecting the Ethernet Cable on page3-28), the shielded Ethernet cable (SF/UTP construction must be grounded to the antenna tower at the top (next to the PTP 820 unit). The entry to the indoor cabinet and every 50m, using the kit N000082L017A.

Figure 9  Grounding cable

<table>
<thead>
<tr>
<th>Table 10 Cable Grounding Kit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part Number</strong></td>
</tr>
<tr>
<td>N000082L017A</td>
</tr>
</tbody>
</table>
To connect the grounding kit:

1. Strip the cable jacket.

2. Place the cable in the middle of the grounding bracket.

3. Close the grounding bracket around the cable.

4. Tighten the two screws to secure the grounding bracket around the cable.
5. Install the grounding lug on the grounding bar, or directly to the tower.

6. Tighten the grounding lug.
Grounding the PTP 820C Unit.

**Required Tools**

- Metric offset wrench key wrench #3
- Metric wrench 10mm

**Procedure**

1. On the front of each PTP 820C unit, loosen the nut, plain washer and serrated washer from the GND stud, using the metric offset hexagon key and the wrench.

2. Place the cable lug (supplied with the PTP 820C grounding kit) in place on the screw.

3. Secure the cable lug.

4. The second side of the GND cable should be connected to the main ground bar or terminal ground bar of the site.

5. Perform a resistance test between the 2 lugs of the GND cable. Verify that the result is 0-2 ohms

---

**Note**

The unit’s grounding screw terminal must be connected to protective earth in a building installation always in accordance with applicable national code and regulations by a service person.
A 2-pole circuit breaker, a branch circuit protector, suitably certified in accordance with applicable national code and regulations, rated maximum 20A, must be installed for full power disconnection in a building installation.

Any outdoor antenna cable shield must always be connected to protective earth in a building installation.
Grounding for MultiCore Mediation Devices

MultiCore Mediation Devices (MCMDs) are not grounded. To add grounding, connect MCMD to the PTP 820C using a Grounding Jumper. To connect the Grounding Jumper:

1. When the user secures the MCMD to the antenna, connect one end of the Grounding Jumper to the lower left screw that connects the MCMD to the antenna.

2. When the user performs the PTP 820C grounding procedure described in Grounding Procedure, connect the other end of the Grounding Jumper to the PTP 820C grounding screw, along with the PTP 820C grounding cable. The order in which you place the two cables is not important.

Power Source

The power cable must be plugged into the unit before turning on the external power.

When selecting a power source, the following must be considered:

DC power can be from -40 VDC to -60 VDC.

**Note**

Availability of UPS (Uninterrupted Power Source), battery backup and emergency power generator is recommended.
The power supply must have grounding points on the AC and DC sides.

**Caution**

The user power supply GND must be connected to the positive pole in the PTP 820C power supply. Any other connection may cause damage to the system.

**Note**

For the warranty to be honored, you must install the PTP 820C in accordance with the above instructions.
Surge Protection

PTP 820C includes built-in surge protection for its Ethernet and power interfaces. PTP 820C’s surge protection implementation complies with the standards set forth in the Surge Protection requirements section of the PTP 820C Technical Description, provided the Ethernet cables were prepared according to the instructions in (Preparing the Ethernet Cable and Plug-in Field on page 3-28)

In areas where severe lighting conditions are likely to occur, it is strongly recommended to add additional protection by placing lightning protectors on all electrical Ethernet cables, near the connection points with the PTP 820C unit.
Available Cable Options

Fiber Optic Cables

Table 11  Fiber Optic cables part numbers

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L139A</td>
<td>PTP 820 Optical cable, SM, 30m</td>
</tr>
<tr>
<td>N000082L140A</td>
<td>PTP 820 Optical cable, SM, 50m</td>
</tr>
<tr>
<td>N000082L141A</td>
<td>PTP 820 Optical cable, SM, 80m</td>
</tr>
<tr>
<td>N000082L142A</td>
<td>PTP 820 Optical cable, SM, 100m</td>
</tr>
<tr>
<td>N000082L143A</td>
<td>PTP 820 Optical cable, SM, 150m</td>
</tr>
<tr>
<td>N000082L146A</td>
<td>PTP 820 Fiber 1+1 Splitter, SM</td>
</tr>
<tr>
<td>N000082L147A</td>
<td>PTP 820 Fiber Adapter</td>
</tr>
</tbody>
</table>

DC Cable and Connector

Table 12  DC Cable and Connector part numbers

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L018A</td>
<td>PTP 820 Outdoor_DC_cbl_2x12AWG_drum</td>
</tr>
<tr>
<td>N000082L019A</td>
<td>PTP 820 Outdoor_DC_cbl_2x18AWG_drum</td>
</tr>
<tr>
<td>N000082L065A</td>
<td>PTP 820 DC Connector</td>
</tr>
</tbody>
</table>
Cables for MIMO Connections

Table 13  Cables for MIMO connections part numbers

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L060A</td>
<td>PTP 820C MIMO or Prot management cable 10m</td>
</tr>
<tr>
<td>N000082L061A</td>
<td>PTP 820C MIMO or Prot management cable 1m</td>
</tr>
<tr>
<td>N000082L062A</td>
<td>PTP 820C MIMO or Prot management ODU spltr</td>
</tr>
<tr>
<td>N000082L063A</td>
<td>PTP 820C Data Sharing Kit 10m</td>
</tr>
<tr>
<td>N000082L064A</td>
<td>PTP 820C Source Sharing 10m</td>
</tr>
<tr>
<td>N000082L136A</td>
<td>PTP 820C/S MIMO or Prot management cable 20m</td>
</tr>
<tr>
<td>N000082L137A</td>
<td>PTP 820C, Source Sharing 20M</td>
</tr>
<tr>
<td>N000082L138A</td>
<td>PTP 820C, Cable, SFP, 4x4 MIMO_DATA_SHARING_KIT_20M</td>
</tr>
</tbody>
</table>

Ethernet Cable and Specifications

Table 14  Ethernet cable part numbers

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L016A</td>
<td>PTP 820 CAT5E Outdoor 100m drum</td>
</tr>
</tbody>
</table>

This cable is suitable for:
- Fast Ethernet
- Gigabit Ethernet
- PoE

The following figure shows the cable design. The numbers in the figure refer to the items listed beneath the figure.
Figure 10 Ethernet cable design

- [1] Conductor
- [2] Insulation
- [4] Tinned copper braid

Table 15 Ethernet cable color code

<table>
<thead>
<tr>
<th>Pair</th>
<th>Wire A</th>
<th>Wire B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WHITE-blue</td>
<td>BLUE</td>
</tr>
<tr>
<td>2</td>
<td>WHITE-orange</td>
<td>ORANGE</td>
</tr>
<tr>
<td>3</td>
<td>WHITE-green</td>
<td>GREEN</td>
</tr>
<tr>
<td>4</td>
<td>WHITE-brown</td>
<td>BROWN</td>
</tr>
</tbody>
</table>

Outdoor Ethernet Cable Specifications

Table 16 Outdoor Ethernet cable specifications – Electrical requirements.

<table>
<thead>
<tr>
<th>Electrical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Type</td>
</tr>
<tr>
<td>Wire gauge</td>
</tr>
</tbody>
</table>

phn-3962 004v000
Page 3-13
### Electrical Requirements

<table>
<thead>
<tr>
<th>Stranding</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating</td>
<td>70V</td>
</tr>
<tr>
<td>Shielding</td>
<td>Tinned copper Braid (Coverage: &gt;80%) = Aluminum Foil</td>
</tr>
</tbody>
</table>

#### Pinout

<table>
<thead>
<tr>
<th>RJ45,P1</th>
<th>RJ45,P2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WHITE/GREEN</td>
</tr>
<tr>
<td>2</td>
<td>GREEN</td>
</tr>
<tr>
<td>3</td>
<td>WHITE/ORANGE</td>
</tr>
<tr>
<td>6</td>
<td>ORANGE</td>
</tr>
<tr>
<td>4</td>
<td>BLUE</td>
</tr>
<tr>
<td>5</td>
<td>WHITE/BLUE</td>
</tr>
<tr>
<td>7</td>
<td>WHITE/BROWN</td>
</tr>
<tr>
<td>8</td>
<td>BROWN</td>
</tr>
</tbody>
</table>

#### Mechanical/ Environmental Requirements

<table>
<thead>
<tr>
<th>Jacket</th>
<th>UV resistant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outer diameter</td>
<td>7.1mm (in order to be compatible with the grounding clamp, CAT5E gnd kit)</td>
</tr>
<tr>
<td>Operating and Storage temperature range</td>
<td>-40°C - 85°C</td>
</tr>
<tr>
<td>Flammability rating</td>
<td>According to UL-1581 VW1, IEC 60332-1</td>
</tr>
<tr>
<td>RoHS</td>
<td>According to Directive/2002/95/EC</td>
</tr>
</tbody>
</table>

### Outdoor DC Cable Specifications

#### Table 17 Outdoor DC cable specifications – Electrical Requirements

<table>
<thead>
<tr>
<th>Electrical Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cable type</strong></td>
</tr>
<tr>
<td><strong>Wire gauge</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Stranding</strong></td>
</tr>
</tbody>
</table>

phn-3962 004v000
Page 3-14
### Electrical Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating</td>
<td>600V</td>
</tr>
<tr>
<td>Spark test</td>
<td>4KV</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>2KV AC min</td>
</tr>
</tbody>
</table>

### Mechanical/Environmental Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacket</td>
<td>UV resistant</td>
</tr>
<tr>
<td>Outer diameter</td>
<td>7-10 mm</td>
</tr>
<tr>
<td>Operating and Storage</td>
<td>-40°C - 85°C</td>
</tr>
<tr>
<td>temperature range</td>
<td></td>
</tr>
<tr>
<td>Flammability rating</td>
<td>According to UL-1581 VW1, IEC 60332-1</td>
</tr>
<tr>
<td>RoHS</td>
<td>According to Directive/2002/95/EC</td>
</tr>
</tbody>
</table>
Securing the Cables

All cables must be secured at every meter on-site using either a T-Rups kit or cable clamps. When using the T-Rups kit, take special care to apply the proper amount of force in order to avoid damage to the cable. This is especially important for optical (SFP) cables.
Special Instructions for use of Glands

**Note**
Each PTP 820C unit is supplied with two glands. If additional glands are required, they must be ordered separately, in kits of five glands each.

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L014A</td>
<td>PTP 820 Glands_x5_KIT</td>
</tr>
</tbody>
</table>

In order to remove the plastic plugs from the unit, you can use the flange of supplied glands to disconnect them. See figures below:

**Figure 11** Glands
**General Installation Procedure**

This procedure applies to all cable types, and explains how to install the cables using long glands. The gland is supplied pre-assembled.
1 Before inserting a cable, you must disassemble the gland cap and gland rubber from the gland body.

2 Slide the gland cap into the cable.

3 Slide the gland rubber into the cable.
4 Slide the cable into the body of the gland. If a gland cap is being used (see Step 5), make sure to leave enough space for the gland cap to fit into the gland without disturbing the cable.

5 Optionally, after securing the cable into the body of the gland, close the other side of the gland with an M28 gland cap. The gland cap protects the cable and connector from damage when elevating the cable and gland to the radio unit.

6 The M28 gland cap has a hook on top. After attaching the gland cap to the gland, connect a rope to the hook and use this to lift the gland and cable up to the radio unit. Before securing the gland into the radio unit, remove the gland cap.
7 If an M28 gland cap is used to close the gland when raising the gland and cable to the radio unit, remove the gland cap from the gland at this point by unscrewing the cap.

8 Connect the cable to the port.

9 Screw the gland into the radio unit until there is full contact between the gland and the radio unit.

---

**Note**

Before tightening the gland, make sure the gland is aligned with the taped hole in the unit. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.

Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately, and thread out the gland. Verify that the gland thread is not damaged and tighten the gland again.

---

10 Insert the main part of the gland into the thread in the radio body and tighten until there is full contact and the gasket is fully contained between the gland and the radio and cannot be seen. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately, and thread out the gland. Verify that the gland thread is not damaged and tighten the gland again.

---

**Caution**

Ensure that the gland rubber is properly located and not damaged during the tightening of the gland cap.
11 Tighten the rear portion of the gland onto the main part of the gland and make sure that the main part of the gland does not have an additional swivel after the rear portion is secured.

**Note**
If the main portion of the gland is rotated while the rear portion is seizing the cable, this may ruin the cable connector.

12 Secure the cable to the lip of the gland using a tie wrap.
Connecting an Optical Fiber Cable and SFP

To connect an optical fiber cable and the SFP transceiver:

1. Use a pre-assembled cable.

2. Split the connector into two separate LC Connectors (one for each fiber).

3. Remove the gland cap and rubber from the gland body.

4. Slide the gland cap into the cable.

5. Slide the rubber into the cable.

6. Insert the fibers with the connector one by one into the cable gland.
Secure the cable to the lip of the gland using a tie wrap.

**Note**
If you are raising the cable to a radio unit on a tower, this step is crucial to prevent the cable from slipping from the gland, which could damage the connector.

Connect the fibers to the SFP transceiver. Listen for the “click” to ensure that they are fully inserted.

Remove the tie wrap securing the cable to the gland.

**Note**
A new tie wrap must be used to secure the cable to the gland at the end of the procedure, as described in Step 13.

Connect the connector into the PTP 820C plug connector.
11 Tighten the gland to the radio unit until there is full contact between the gland and the radio unit.

12 Tighten the gland cap.

---

**Note**

Before tightening the gland, make sure the gland is aligned with the taped hole in the unit.

Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately, thread out the gland, and verify that the gland threads are not damaged. Then, tighten the gland again.

---

**Caution**

If the gland thread is damaged, do not use it.
13 Secure the cable to the gland using a tie wrap.
Connecting a DC Power Cable

To connect a DC power cable:

1. Strip off 45 mm from the cable jacket.

2. Expose 10 mm at the edge of each of the two wires.

3. Insert the power cable into the gland.

4. Insert the power cable wires into the power connector.

5. Match “+” to the 0V wire and “−” to the -48V wire.
6  Tighten the two top screws.

7  Plug the power cable with connector into the PTP 820C power connector.

8  Tighten the two front screws.

9  Screw the gland into the radio unit
Note
Before tightening the gland, make sure the gland is even with the cover. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately and verify that the gland is not being inserted at an angle. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.

10 Tighten the gland cap.
11 Secure the cable to the gland with a tie wrap.
Connecting the Ethernet Cable

**Note**
To ensure proper grounding and connectivity, it is recommended to use pre-assembled Ethernet cables.

Preparing the Ethernet Cable and Plug-in Field

**Note**
To ensure proper grounding, the RJ-45 plug must be shielded, with a crimping tail.

<table>
<thead>
<tr>
<th>Table 19 Materials for preparing Ethernet Data Cables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marketing P/N</strong></td>
</tr>
<tr>
<td>N000082L016A</td>
</tr>
<tr>
<td>N000082L014A</td>
</tr>
<tr>
<td>N000082L017A</td>
</tr>
<tr>
<td>N000082L073A</td>
</tr>
</tbody>
</table>
To prepare the Ethernet cable and plug-in field:

1. Prepare the gland and insert the cable, as described in General Installation Procedure.
2. Strip off approximately 45 mm of the outer insulation jacket from the CAT5E cable.
3. Do not strip off the end of the cablesheild, but rather, twist the shield to form a braid.

4. Roll back the foil shield insulation and wrap the drain wire around the foil. Do not remove any insulation from the conductors.

5. Align the colored wires.

---

**Note**

Cord colors must be matched to the same pins on both ends of the cable.
6  Trim all wires to the same length. About 12 mm on the left must be exposed from the inner sheath.

7  Separate the wires and place the twisted shield between the separated wires.

8  Insert the wires into the RJ45 plug. Verify that each wire is fully inserted into the front of the RJ45 plug and in the correct order according to the pinouts shown in Outdoor Ethernet Cable Specifications. The sheath of the Ethernet cable must extend into the plug by about 13 mm and held in place by the crimp.

9  Extend the cable jacket with the shield into the connector about 5 mm for strain relief and shielding connection.
10 Wrap the twisted braid firmly around the cable jacket and let the crimping tail of the RJ45 plug envelop it.

![Twisted Braid Enveloped by Crimping Tail](image)

**Note**
To ensure proper grounding, it is essential that the twisted braid be firmly connected to the RJ45 plug.

11 Crimp the RJ45 plug with the crimp tool. Make sure the twisted shield is crimped firmly to the RJ45 plug.

12 Verify that the wires ended up the correct order and that the wires extend to the front of the RJ45 plug and make good contact with the metal contacts in the RJ45 plug.

13 Push back the CAT5E plug cover on the connector plug.

**Note**
It is recommended that the newly prepared cable be tested with a Cable Analyzer such as the FLUKE DTX-1800 (or the equivalent), to make sure the cable complies with ANSI/TIA/EIA-568-B-2. Make sure to verify both connectivity and grounding continuity at both ends of the cable.
Preparing the Ethernet Cable Already Assembled

To prepare the Ethernet cable already assembled:

1. Release the gland cap and the gland rubber slightly.

2. Insert the CAT5E cable into the gland cap and into the rubber gland.

3. Insert the CAT5E cable into the gland body.
Connection of Ethernet Cable to PTP 820C

To connect the Ethernet cable to the PTP 820C:

1. Remove the relevant cap from the PTP 820C radio. You can use the side of the gland to unscrew the cap.

2. Connect the CAT5E cable to the PTP 820C.

3. Screw the gland into the radio unit.

**Note**
Before tightening the gland, make sure the gland is even with the cover. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately and verify that the gland is not being inserted at an angle. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.
4  Tighten the gland cap.

5  Secure the cable to the gland using a tie wrap.
Management Connection for 4x4 MIMO and 1+1/2+2 HSB Configurations

In 4x4 MIMO and all HSB protection configurations, two Y-splitter cables and a special signaling cable must be used to connect the management ports (MGT/PROT) of the two PTP 820C units and provide management access to each unit.

The MIMO/Protection signaling cables are available pre-assembled from Cambium Networks in various lengths, but users can also prepare them in the field.

The following sections explain how to prepare and connect these cables.

Preparing a MIMO/Protection Signaling Cable

The MIMO/Protection signaling cables require the following pinouts.

MIMO/Protection Signaling Cable Pinouts

Before tightening the gland, make sure the gland is even with the cover. Tighten the gland gently and make sure there is no resistance. If there is resistance, stop immediately and verify that the gland is not being inserted at an angle. Tightening the gland at an angle can ruin the thread on the gland and prevent proper sealing of the interface.
Connecting the MIMO/Protection Splitters and Protection Signaling Cable

Each splitter has three ports:

- **System plug ("Sys")** – The system plug should be connected to the PTP 820C’s management port.
- **Management port ("Mng")** – A standard CAT5E cable should be connected to the splitter’s management port in order to utilize out-of-band (external) management.

---

**Note**

Even for systems that use in-band management, initial configuration of a 4x4 MIMO and any HSB protection configuration must be performed manually using out-of-band management.

---

- **MIMO/Protection signaling port ("MIMO/Prot")** – A MIMO/Protection signaling cross cable, as described above, should be connected between this port and the other “MIMO/Prot” port of the second splitter on the mate PTP 820C unit.
- **The following figure demonstrates a 4x4 MIMO configuration in which both PTP 820C units are connected to an external management station and to each other, using two splitters.**
Figure 13 4x4 MIMO or HSB Protection Configuration with External Management
Chapter 4: PoE Injector Installation and Connection

This chapter describes the PoE Injector installation and connection procedure of the PTP 820C product. This chapter consists of the following sections:

- PoE Injector Cable Connection
- PoE Injector Grounding
- PoE Injector 19" Rack Installation
- PoE Injector ETSI Rack Installation
PoE Injector Cable Connection

The PoE Injector cables are connected similar to the PTP 820C.

- To connect the Ethernet (CAT5E) cable to the PoE or Data port, see *Connection of Ethernet Cable to PTP 820C* on page 3-35.
- To connect the DC power cable to the power port or dual feed port, see *Connecting a DC Power Cable* on page 3-27.
- The total length of the cable between the PTP 820C port and the Switch/Router the device is connected to must not exceed 100m/328ft. This length includes the connection between the PTP 820C and the PoE Injector (X1 + X2 ≤ 100m/328ft in the figure below).

**Note**
The length of the cable connecting the customer equipment to the PoE injector should not be longer than 10m (according to ANSI/TIA-568 standard).

**Figure 14** PoE Injector cable connection

**Note**
For the warranty to be honored, the connection must be through the glands only. Do not open the PoE injector box cover.
PoE Injector Grounding

To ground the PoE Injector:

1. On the right side of each PoE Injector, loosen the screw, plain washer, and serrated washer.
2. Place the cable lug (supplied with the PoE injector kit) between the plain and serrated washer.
3. Tighten the screw.
4. Perform a resistance test between the 2 lugs of the GND cable. Verify that the result is 0-2 ohms.
PoE Injector 19” Rack Installation

List of Items

Table 20  Required items for PoE Injector 19” rack installation

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PoE Injector</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PoE Injector 19” Rack Mount Kit</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Philips Screwdriver
**Procedure**

To mount the PoE Injector on a rack:

1. Mount the PoE Injector to a 19” rack using a 19” rack adaptor.
2. Mount the PoE Injector on the 19” adaptor through the wall mounting holes, using M6 screws and washers.
2 Mount the 19" rack adaptor to a 19" rack using four M6 screws and cage nuts.
PoE Injector ETSI Rack Installation

List of Items

Table 21 Required items for PoE Injector ETSI rack installation

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PoE Injector</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PoE Injector ETSI Rack Mount Kit</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Philips Screwdriver

Procedure

To mount the PoE Injector to an ETSI rack:

1. Mount the PoE Injector to an ETSI rack using a 19” rack adaptor and ETSI adapting ears.
2. Connect the ETSI adapting ears to a 19” rack adaptor using four M6 screws.
3. Mount the PoE Injector on the adaptor through the wall mounting holes using M6 screws and washers.

4. Mount the 19” rack adaptor with the ETSI ears on the ETSI rack using four M6 screws and cage nuts.

---

**Note**
For this type of installation, a 2RU space is required.
Chapter 5: Generic Installation Procedures

This chapter describes generic installation procedures of PTP 820C product. This chapter consists of the following sections:

- General Notes Concerning All Installation Procedures
- Torque Requirements
- PTP 820C DC Pole Mount Procedure
- Remote Mount Installation for Single Polarization with an Remote Mount kit
General Notes Concerning All Installation Procedures

Since the PTP 820C architecture is of a Dual Core nature, each dual core configuration can be considered as single core configuration hardware ready for its dual core counterpart. Therefore, you must follow the same procedure for 2+0 SP installation, if you want to install a 1+0 SP HW ready for 2+0 SP.

One of the major benefits of the PTP 820C and the dual core architecture is that upgrading can be done remotely by uploading the correct software license.

Before starting an installation, use a leveler to make sure that the poles are 100% vertical. You need to check both sides of each pole at 90 degrees separation. This is a critical step in any link but most important when installing MIMO or XPIC

---

**Note**

Do not remove the transparent pressure windows located on the antenna interfaces.

---

**Figure 13** Transparent Pressure Windows.
Torque Requirements

When tightening the captive screws, use 20 Nm torque for radio-antenna, radio-mediation device, and mediation device-antenna connections. In order to avoid misalignment, screws should be tightened progressively.

When fastening a waveguide to the radio or mediation device, use the following torque, according to frequency and screw type:

- 6 GHz: M5/#10-32: 3.5 Nm
- 7/8-15 GHz: M4/#8-32: 2.5 Nm
- 18-42 GHz: M3/#4-40: 1Nm
PTP 820C DC Pole Mount Procedure

Note
The pole diameter range for pole mount installations is 8.89 cm – 11.43 cm (3.5 inches – 4.5 inches).

List of Items

Table 22 DC Pole Mount part numbers

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N000082L120A</td>
<td>PTP 820C DC Remote Mount Kit</td>
</tr>
<tr>
<td>N060082L002A</td>
<td>PTP 820C 6 GHz Remote Mount adaptor - UDR70</td>
</tr>
<tr>
<td>N070082L001A</td>
<td>PTP 820C 7-8 GHz Remote Mount adaptor - UBR84</td>
</tr>
<tr>
<td>N110082L001A</td>
<td>PTP 820C 10-11 GHz Remote Mount adaptor - UBR100</td>
</tr>
<tr>
<td>N130082L001A</td>
<td>PTP 820C 13 GHz Remote Mount adaptor - UBR120</td>
</tr>
</tbody>
</table>

Required Tools

Metric offset wrench key wrench set

Installation Procedure

To install the PTP 820C pole mount:
1 Mount and tighten the PTP 820C DC pole mount to a pole with a diameter of 114 mm using the four washers and screws supplied with the PTP 820C DC pole mount kit.

6-13 GHz Installation Procedure

1 Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.
Remote Mount Installation for Single Polarization with an Remote Mount kit

List of Items

Table 23  Required items for Remote mount Installation single polarization

<table>
<thead>
<tr>
<th>Marketing P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>N060082L003A</td>
<td>PTP 820 RFU-C ADPT 6 GHz Remote Mount Adaptor - UDR70</td>
</tr>
<tr>
<td>N070082L002A</td>
<td>PTP 820 RFU-C ADPT 7_8 GHz Remote Mount Adaptor - UBR84</td>
</tr>
<tr>
<td>N110082L002A</td>
<td>PTP 820 RFU-C ADPT 10_11 GHz Remote Mount Adaptor - UBR100</td>
</tr>
<tr>
<td>N130082L002A</td>
<td>PTP 820 RFU-C ADPT 13GHz Remote Mount Adaptor - UBR120</td>
</tr>
<tr>
<td>N000082L121A</td>
<td>P 820 RFU-C Pole Mount kit</td>
</tr>
<tr>
<td>N060082L138A</td>
<td>PTP 820C Splitter Kit 6 GHz</td>
</tr>
<tr>
<td>N070082L295A</td>
<td>PTP 820C Splitter Kit 7-8 GHz</td>
</tr>
<tr>
<td>N110082L083A</td>
<td>PTP 820C Splitter Kit 10-11 GHz</td>
</tr>
<tr>
<td>N130082L057A</td>
<td>PTP 820C Splitter Kit 13 GHz</td>
</tr>
<tr>
<td>N150082L079A</td>
<td>PTP 820C Splitter Kit 15 GHz</td>
</tr>
<tr>
<td>N180082L045A</td>
<td>PTP 820C Splitter Kit 18 GHz</td>
</tr>
<tr>
<td>N230082L035A</td>
<td>PTP 820C Splitter Kit 23 GHz</td>
</tr>
<tr>
<td>N260082L029A</td>
<td>PTP 820C Splitter Kit 26 GHz</td>
</tr>
<tr>
<td>N280082L038A</td>
<td>PTP 820C Splitter Kit 28 GHz</td>
</tr>
<tr>
<td>N320082L022A</td>
<td>PTP 820C Splitter Kit 32 GHz</td>
</tr>
<tr>
<td>N380082L046A</td>
<td>PTP 820C Splitter Kit 38 GHz</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key wrench set
- Phillips #1, #2 screwdriver
Chapter 5: Generic Installation Procedures

Remote Mount Installation for Single Polarization with an Remote Mount kit

6-13 GHz Installation Procedure

1. Mount and tighten the RFU-C Adaptor plate (supplied in RFU-C Adaptation kit to RFU-C Adaptor Remote Mount Kit) to the RFU-C Remote Pole Mount using the four flat screws supplied with the RFU-C Adaptation kit to RFU-C Adaptor Remote Mount Kit.
2. Mount and tighten the PTP 820C Splitter to the RFU-C Remote Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.

3. Mount and tighten the PTP 820C radio to the PTP 820C Splitter using the four captive screws and washers that are assembled to the PTP 820C radio. Pay attention that the O-rings are mounted on the PTP 820C Splitter kit.
4 Connect the Flexible Waveguide and Sealing Gasket supplied with the RFU-C Adaptor Remote Mount Kit to the RFU-C Adaptor plate. Tighten the four screws supplied with the RFU-C Adaptor Remote Mount Kit.
15-38 GHz Installation Procedure

1. Loosen the two screws, and remove the twist plate from the PTP 820C Splitter.

2. Mount and tighten the PTP 820C Splitter to the RFU-C Remote Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.
3 Mount and tighten the PTP 820C radio to the PTP 820C Splitter using the four captive screws and washers that are assembled to the PTP 820C radio. Make sure the O-rings are mounted on the PTP 820C Splitter kit.

4 Connect the Flexible Waveguide and Sealing O-ring supplied with the RFU-C Adaptor Remote Mount Kit to the PTP 820-C Splitter kit. Tighten the four screws supplied with the RFU-C Adaptation kit to the RFU-C Adaptor Remote Mount Kit.
Management Connection for MIMO and Protection Configurations

In MIMO and all HSB protection configurations, a special signaling cable must be used to connect the management ports (MGT/PROT) of the two PTP 820C units.

When Out-of-Band management is used, a splitter must be used to connect the management ports to local management and to each other.

The MIMO/Protection signaling cables are available pre-assembled from Cambium Networks in various lengths (see Cables for MIMO Connections on page 3-12), but you can also prepare them in the field.

The following sections explain how to prepare and connect these cables.

Preparing a MIMO/Protection Signaling Cable

To prepare your own MIMO/Protection signaling cables, follow the instructions in Preparing the Ethernet Cable and Plug-in Field on page 3-30. You must use the following pinouts:

![MIMO/Protection cable pinout diagram]

Connecting a MIMO/Protection Signaling Cable

This option must be used when you plan to manage the system using in-band management.

The MIMO/Protection signaling cable must be connected between the management ports of two PTP 820C units operating in either MIMO or HSB protection mode. The physical cable connection...
is the same as connecting a CAT5E cable to a system data or management port. For details, see Connecting the Ethernet Cable on page 3-30.

**Connecting a MIMO/Protection Splitter**

This option must be used when you plan to manage the system using out-of-band (external) management rather than in-band management.

The splitter has three ports, as shown in the following figure.

**Figure 15** MIMO/Protection signaling cable 2

- **System plug ("Sys")** – The system plug must be connected to the PTP 820C’s management port.
- **Management port ("Mng")** – A standard CAT5E cable must be connected to the splitter’s management port in order to utilize out-of-band (external) management.
- **MIMO/Protection signaling port ("MIMO/Prot")** – A standard CAT5E cable or a MIMO/Protection signaling cable must be connected between this port and the other “MIMO/Prot” port of the second splitter on the mate PTP 820C unit.

The following figures demonstrate a 4x4 MIMO configuration in which both PTP 820C units are connected to an external management station and to each other, using two splitters.
Figure 16  MIMO/Protection signaling cable 3
Chapter 6: Installation Procedures per Configuration Type

This chapter describes the installation procedures per configuration type of the PTP 820C product.

This chapter consists of the following sections:

- MultiCore 2+0 Dual Polarization Direct Mount
- MultiCore 2+0 Dual Polarization Remote Mount
- MultiCore 2+0 Single Polarization Direct Mount
- MultiCore 2+0 Single Polarization Remote Mount
- MultiCore 2+2 HSB Double Polarization Direct Mount
- MultiCore 2+2 HSB Double Polarization Remote Mount
- MultiCore 2+2 HSB Single Polarization Direct Mount
- MultiCore 2+2 HSB Single Polarization Remote Mount
- 2 x MultiCore 2+0 Dual Polarization Direct Mount
- 2 x MultiCore 2+0 Dual Polarization Remote Mount
- 2 x MultiCore 2+0 Single Polarization Direct Mount
- 2x2 LoS MIMO Direct Mount
- 2x2 LoS MIMO Remote Mount
- 4x4 LoS MIMO Direct Mount
- 4+0 Dual Polarization, 2+2HSB Single/Dual Polarization Direct Mount
- 4+0 Dual Polarization, 2+2HSB Dual Polarization Remote Mount
- 2+2 HSB Single Polarization Remote Mount
- 1+1 HSB-SD
- AFR 1+0 Hub Site
MultiCore 2+0 Dual Polarization Direct Mount

Figure 16 MultiCore 2+0 Dual Polarization Direct Mount

---

**Note**

This procedure can also be used for MultiCore 1+0 DP HW ready for MultiCore 2+0 DP configuration.

---

### List of Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>1</td>
<td>Per Antenna Vendor</td>
</tr>
</tbody>
</table>

---

### Required Tools

- Metric offset hexagon key set
- Metric wrench key set
Insertion Loss

Table 25 Insertion loss for MultiCore 2+0 Dual Polarization Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>OMT</td>
<td>Each PTP 820C antenna port to Mediation device antenna port</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Procedure

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring and install the circular transition instead.)
2. Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

3. Connect the PTP 820C radio to the OMT Kit using the four M8 captive screws and washers supplied and tighten the screws.
Chapter 6: Installation Procedures per Configuration Type

MultiCore 2+0 Dual Polarization Remote Mount

This procedure is for use with Interface antennas, up to six feet. For standard interface antennas (six feet and larger), no OMT and no Circ./Circ. Adaptor are used, and the flexible waveguides are connected directly to the antenna flanges. For instructions how to connect the waveguides to the antenna flanges, refer to the antenna vendor's documentation.

**Note**
This procedure can also be used for MultiCore 1+0 DP HW ready for MultiCore 2+0 DP configurations.

![Figure 17 MultiCore 2+0 Dual Polarization Remote Mount](image)

**List of Items**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT kit</td>
<td>1</td>
<td>Not used for standard interface antennas (six feet and larger).</td>
</tr>
<tr>
<td>3</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PTP 820C DC POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTP 820C DC REMOTE MOUNT ADAPTOR KIT</td>
<td>1</td>
<td>From 6-13GHz</td>
</tr>
<tr>
<td></td>
<td>Circ./Circ. Adaptor</td>
<td>1</td>
<td>Per Antenna Vendor. Not used for standard interface antennas (six feet and larger).</td>
</tr>
</tbody>
</table>
Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver
- Insertion Loss

Insertion Loss

Table 27 Insertion loss for MultiCore 2+0 Dual Polarization Remote Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>OMT and two WGs</td>
<td>Each PTP 820C</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>antenna port to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mediation device</td>
<td></td>
</tr>
<tr>
<td></td>
<td>antenna port</td>
<td></td>
</tr>
</tbody>
</table>

Common Installation

1 Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)
2  Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

3  Mount and tighten the O-ring and the Flexible WG to PTP 820C OMT ports using the four screws supplied with the Flexible WG kit.
6-13 GHz

1. Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C to the PTP 820C Pole Mount using the four captive screws and washers that are supplied with the PTP 820C. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten both Flexible WGs with their O-ring to the PTP 820C Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.

**15-38 GHz**

1 Mount and tighten the PTP 820C to the PTP 820C DC Pole Mount using the four screws assembled on the PTP 820C.
2 Mount and tighten the O-ring and the Flexible WG to PTP 820C radio ports using the four screws supplied with the Flexible WG kit.
Chapter 6: Installation Procedures per Configuration Type

MultiCore 2+0 Single Polarization Direct Mount

Figures 18 MultiCore 2+0 Single Polarization Direct Mount

---

**Note**

This procedure can also be used for MultiCore 1+0 SP HW ready for MultiCore 2+0 SP configurations.

---

**List of Items**

**Table 28 Required item for MultiCore 2+0 Single Polarization Direct Mount**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C Splitter KIT</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Required Tools**

- Metric offset hexagon key set
- Phillips #1 and #2 screwdriver

**Insertion Loss**

**Table 29 Insertion loss for MultiCore 2+0 Single Polarization Direct Mount**

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path / Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Splitter</td>
<td>Radio to antenna port</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Procedure

1 Adjust the twist on the Splitter Kit. Perform one of the following steps, according to the required polarization (horizontal or vertical).

For horizontal polarization, locate the holes above and below the letter “H” on the pins and fasten the two screws.

For vertical polarization, locate the holes above and below the letter “V” on the pins and fasten the two screws.

2 Mount and tighten the PTP 820C Splitter Kit on the antenna using the four M8 screws and washers.

3 Mount and tighten the PTP 820C to the PTP 820C Splitter Kit using the four M8 captive screws and washers supplied.
MultiCore 2+0 Single Polarization Remote Mount

Note
This procedure can also be used for MultiCore 1+0 SP HW ready for MultiCore 2+0 SP configurations.

Figure 18 MultiCore 2+0 Single Polarization Remote Mount

List of Items

Table 30 Required item for MultiCore 2+0 Single Polarization Remote Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>RFU-C ADAPTOR REMOTE MOUNT KIT</td>
<td>1</td>
<td>From 6-13 GHz</td>
</tr>
<tr>
<td>3</td>
<td>RFU-C POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PTP 820C SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FLEXIBLE WG KIT</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key wrench set
- Phillips #1, #2 screwdriver
- Metric wrench key set
## Insertion Loss

**Table 31 Insertion loss for MultiCore 2+0 Single Polarization Remote Mount**

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Splitter and one WG Radio to antenna port</td>
<td></td>
<td>4.0</td>
</tr>
</tbody>
</table>
6-13 GHz

1. Mount and tighten the RFU-C Remote Mount Adaptor plate (supplied in RFU-C Adaptor Remote Mount kit) to the RFU-C Pole Mount using the four flat screws supplied with the RFU-C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Splitter to the RFU-C Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.
3 Mount and tighten the PTP 820C to the PTP 820C Splitter using the four captive screws and washers that are assembled to the PTP 820C radio. Pay attention that the O-rings are mounted on the PTP 820C Splitter kit.

4 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the RFU-C Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Kit.
15-38 GHz

1. Loosen the two screws and remove the twist plate from the PTP 820C Splitter.

2. Mount and tighten the PTP 820C Splitter to the RFU-C Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.
3 Mount and tighten the PTP 820C to the PTP 820C Splitter using the four captive screws and washers that are assembled to the PTP 820C. Pay attention that the O-rings are mounted on the PTP 820C Splitter kit.

4 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the PTP 820C Splitter kit. Tighten the four screws supplied with the Flexible Waveguide kit.
MultiCore 2+2 HSB Double Polarization Direct Mount

Figure 19 MultiCore 2+2 HSB Double Polarization Direct Mount

Note
This procedure can also be used for 2 x MultiCore 1+1 HSB DP HW ready for MultiCore 2+2 HSB DP configurations.

List of Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>1</td>
<td>Per Antenna Vendor</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
Insertion Loss

Table 33 Insertion loss for MultiCore 2+2 HSB Double Polarization Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6-8 GHz</td>
<td>11 GHz</td>
</tr>
<tr>
<td>Splitter and one WG</td>
<td>Main Paths</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Secondary Paths</td>
<td>6.2</td>
</tr>
</tbody>
</table>

Procedure

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

2. Connect the PTP 820C OMT Kit to the antenna and secure it with four screws. Verify existence of the O-ring.
3 Connect the PTP 820C Dual Coupler Kit to the OMT Kit using four M8 screws and washers, and tighten the screws.

4 Mount and tighten the PTP 820C radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers. Pay attention that the O-rings are correctly mounted on the radio ports of the PTP 820C Dual Coupler.
5. Connect the MIMO signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable. *(See preparing a MIMO/protection signaling cable on page 3-35)*
Chapter 6: Installation Procedures per Configuration Type

MultiCore 2+2 HSB Double Polarization Remote Mount

**Note**
This procedure can also be used for 2 x MultiCore 1+1 HSB DP HW ready for MultiCore 2+2 HSB DP configurations.

**Figure 20** MultiCore 2+2 HSB Double Polarization Remote Mount

CCDP - Protected

**List of Items**

**Table 34** Required items for MultiCore 2+2 HSB Double Polarization Remote Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PTP 820C DC POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PTP 820C DC REMOTE MOUNT ADAPTOR KIT</td>
<td>1</td>
<td>From 6-13GHz</td>
</tr>
<tr>
<td>7</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>1</td>
<td>Per Antenna Vendor.</td>
</tr>
</tbody>
</table>

**Required Tools**

- Metric offset hexagon key set
- Metric wrench key set
• Phillips #1, #2 screwdriver

### Insertion Loss

**Table 35** Insertion loss for MultiCore 2+2 HSB Double Polarization Remote Mount

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Coupler, OMT and two WGs</td>
<td>Main Paths</td>
<td>2.1</td>
<td>2.1</td>
<td>2.8</td>
<td>3.1</td>
<td>3.4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary Paths</td>
<td>6.7</td>
<td>6.7</td>
<td>7.4</td>
<td>7.5</td>
<td>7.8</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

### Common Installation

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)
2 Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.

3 Mount and tighten the O-ring and the Flexible WG to PTP 820C OMT ports using the four screws supplied with the Flexible WG kit.
4 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to Preparing a MIMO/Protection signaling cable on page 3-35.
6-13 GHz

1. Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Pole Mount using the four screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820C radio. Pay attention that the O-rings are correctly assembled on the radio port of the PTP 820C Dual coupler.

4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the PTP 820C Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.
**15-38 GHz**

1. Mount and tighten the PTP 820C Dual Coupler to PTP 820C DC Pole Mount using the four screws and washers supplied with PTP 820C Dual Coupler kit.

2. Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820c radio. Pay attention that the O-rings are correctly assembled on the radio port of the PTP 820C Dual coupler.
3 Mount the O-ring and the Flexible WG to PTP 820C Dual Coupler ports using the four screws supplied with the Flexible WG kit.
MultiCore 2+2 HSB Single Polarization Direct Mount

Note
This procedure can also be used for 2 x MultiCore 1+1 HSB SP HW ready for MultiCore 2+2 HSB SP configurations.

List of Items

Table 36 Required items for MultiCore 2+2 HSB Single Polarization Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DUAL COUPLER KIT</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1 screwdriver

Insertion Loss

Table 37 Insertion loss for MultiCore 2+2 HSB Single Polarization Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Main Paths</td>
<td></td>
<td>4.9</td>
</tr>
</tbody>
</table>
### Mediation Devices

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Double Coupler and Splitter</td>
<td>Secondary Paths</td>
<td>9.5</td>
<td>9.5</td>
<td>9.5</td>
<td>9.7</td>
<td>9.7</td>
<td>10</td>
</tr>
</tbody>
</table>
Procedure

1. Adjust the twist on the Splitter Kit. Perform one of the following steps, according to the required polarization (horizontal or vertical).

   For horizontal polarization, locate the holes above and below the letter “H” on the pins and fasten the two screws.

   For vertical polarization, locate the holes above and below the letter “V” on the pins and fasten the two screws.

2. Mount the Splitter Kit on the antenna using four M8 screws and washers and tighten the screws.
3 Connect the PTP 820C Dual Coupler Kit to the PTP 820C Splitter Kit using four M8 screws and washers and tighten the screws.

4 Connect the PTP 820C radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers and tighten the screws.
5 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, see Preparing a MIMO/Protection signaling cable on page 3-35.
Chapter 6: Installation Procedures per Configuration Type

MultiCore 2+2 HSB Single Polarization Remote Mount

**Note**
This procedure can also be used for 2 x MultiCore 1+1 HSB SP HW ready for 2+2 HSB SP configuration.

**Figure 22** MultiCore 2+2 HSB Single Polarization Remote Mount

---

**List of Items**

**Table 38** Required items for MultiCore 2+2 HSB Single Polarization Remote Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>RFU-C POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>RFU-C REMOTE MOUNT ADAPTOR</td>
<td>1</td>
<td>From 6-13 GHz.</td>
</tr>
</tbody>
</table>

**Required Tools**

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver
## Insertion Loss

**Table 39** Insertion loss for MultiCore 2+2 HSB Single Polarization Remote Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Splitter and one WG</td>
<td>Main Paths</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Secondary Paths</td>
<td>10</td>
</tr>
</tbody>
</table>

### 6-13 GHz

1. Mount and tighten the RFU-C Remote Mount Adaptor plate (supplied in RFU-C Adaptor Remote Mount kit) to the RFU-C Pole Mount using the four flat screws supplied with the RFU-C Adaptor Remote Mount kit.
2 Mount and tighten the PTP 820C Splitter to the RFU-C Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.

3 Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Splitter using the four captive screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Splitter.
4 Mount and tighten the PTP 820C Radio to the PTP 820C Dual Coupler using the four screws and washers that are assembled to the PTP 820C Radio. Pay attention that the O-rings are mounted on the PTP 820C Dual Coupler.

5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the RFU-C Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide Kit.
6 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to preparing a MIMO protection signalling cable on page 3-35.
15-38 GHz

1. Loosen the two screws, and remove the twist plate from the PTP 820C Splitter.

2. Mount and tighten the PTP 820C Splitter to the RFU-C Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.
3 Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Splitter using the four captive screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Splitter.

4 Mount and tighten the PTP 820C Radio to the PTP 820C Dual Coupler using the four screws and washers that are assembled to the PTP 820C radio. Pay attention that the O-rings are mounted on the PTP 820C Dual Coupler.
5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide Kit to the PTP 820C Dual Coupler antenna port. Tighten the four screws supplied with the Flexible Waveguide kit.

6 Connect the protection signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, refer to *Preparing a MIMO/Protection signaling cable on page 3-35*
2 x MultiCore 2+0 Dual Polarization Direct Mount

Figure 23  2 x MultiCore 2+0 Dual Polarization Direct Mount

Note
This procedure can also be used for MultiCore 2+0 DP HW ready for 2 x MultiCore 2+0 DP configurations.

List of Items

Table 40  Required items for 2 x MultiCore 2+0 Dual Polarization Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER or SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>1</td>
<td>Per Antenna Vendor</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
Insertion Loss

Table 41 Insertion loss for 2 x MultiCore 2+0 Dual Polarization Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Double Splitter and OMT</td>
<td>Radio to antenna port</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Procedure

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

2. Connect the PTP 820C OMT Kit to the antenna and secure it with four screws. Verify existence of the O-ring.
3 Connect the PTP 820C Dual Coupler Kit to the OMT Kit using four M8 screws and washers, and tighten the screws.

4 Mount and tighten the PTP 820C DC radio unit to both sides of the PTP 820C Dual Coupler using the supplied captive screws and washers. Pay attention that the O-rings are correctly mounted on the radio ports of the PTP 820C Dual Coupler.
2 x MultiCore 2+0 Dual Polarization Remote Mount

Note
This procedure can also be used for 2 x MultiCore 1+0 DP HW ready for 2 x MultiCore 2+0 DP configurations.

Figure 24 2 x MultiCore 2+0 Dual Polarization Remote Mount

List of Items

Table 42 Required items for MultiCore 2+0 HSB Dual Polarization Remote Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER OR DUAL SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PTP 820C DC POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PTP 820C DC REMOTE MOUNT ADAPTOR KIT</td>
<td>1</td>
<td>From 6-13GHz</td>
</tr>
<tr>
<td>7</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>1</td>
<td>Per Antenna Vendor</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver
## Insertion Loss

**Table 43** Insertion loss for MultiCore 2+0 Dual Polarization Remote Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Double Splitter, OMT and two WGs</td>
<td>Radio to antenna port</td>
<td>4.3</td>
</tr>
</tbody>
</table>

## Common Installation Procedure

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

2. Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.
Mount and tighten the O-ring and the Flexible WG to PTP 820C OMT ports using the four screws supplied with the Flexible WG kit.
6-13 GHz

1. Mount and tighten the PTP 820-C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Pole Mount using the four screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820C radio. Make sure that the O-rings are correctly assembled on the radio port of the PTP 820C Dual Coupler.

4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the PTP 820C Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.
15-38 GHz

1. Mount and tighten the PTP 820C Dual Coupler to PTP 820C DC Pole Mount using the four screws and washers supplied with PTP 820C Dual Coupler kit.

2. Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820C radio. Pay attention that the O-rings are correctly assembled on the radio port of the PTP 820C Dual Coupler.
3 Mount the O-ring and the Flexible WG to PTP 820C Dual Coupler ports using the four screws supplied with the Flexible WG kit.
2 x MultiCore 2+0 Single Polarization Direct Mount

Figure 25 2 x MultiCore 2+0 Single Polarization Direct Mount

Note
This procedure can also be used for 2 x MultiCore 1+0 SP HW ready for 2 x MultiCore 2+0 SP configurations.

List of Items

Table 44 Required items for 2 x MultiCore 2+0 Single Polarization Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C Splitter Kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C Dual Splitter Kit</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1 screwdriver

Insertion Loss

Table 45 Insertion loss for 2 x MultiCore 2+0 Single Polarization Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Double Splitter</td>
<td>Radio to antenna port</td>
<td>7</td>
</tr>
<tr>
<td>and splitter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Procedure

1. Adjust the twist on the PTP 820C Splitter Kit. Perform one of the procedures below according to the required polarization:
   
   Horizontal polarization, locate the holes above and below the letter “H” on the pins and fasten the two screws.
   
   Vertical polarization, locate the holes above and below the letter “V” on the pins and fasten the two screws.

2. Mount the Splitter Kit on the antenna using four M8 screws and washers and tighten the screws.
3 Connect the PTP 820C Dual Coupler Kit to the PTP 820C Splitter Kit using four M8 screws and washers and tighten the screws.

4 Connect the PTP 820C radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers and tighten the screws.
2x2 LoS MIMO Direct Mount

Figure 26 2x2 LoS MIMO Direct Mount

Note
This procedure can also be used for 1+0 SD configurations.

List of Items

Table 46 Required items for 2x2 LoS MIMO Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C Radio</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C Dual Core Kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Flexible WG Kit</td>
<td>1</td>
<td>Optional</td>
</tr>
<tr>
<td>4</td>
<td>Coax to WG Kit</td>
<td>1</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Phillips #1 and #2 screwdriver

Insertion Loss

Table 47 Insertion loss for 2x2 LoS MIMO Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Dual Core Mediation Device and WG</td>
<td>Radio to antenna (upper path)</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>WG port to second antenna</td>
<td>Frequency band and WG length (antenna separation)</td>
</tr>
</tbody>
</table>
Procedure

1  Adjust the twist on the dual core kit according to the required polarization.

Note  
Ensure the polarization mounting direction of the twist to the dual core is according to the antenna polarization.

For horizontal polarization, locate the holes above and below the letter “H” on the pins and fasten the two screws.

For vertical polarization, locate the holes above and below the letter “V” on the pins and fasten the two screws.

2  If not required, remove the plate assembled to the bended part of the dual core kit.
3  Mount and tighten the PTP 820C dual core kit on the antenna using the four M8 screws and washers.

**Note**
Verify that the O-ring is properly mounted between the antenna transition and the dual core.

4  Connect the PTP 820C radio to the PTP 820C dual core kit using four M8 screws and washers and tighten the screws.

**Note**
Verify that the O-rings are properly mounted between the dual core and the radio.
5 You can switch the orientation of the dual core flange connection by removing screws and rotating the bended part. Place back O-ring and tighten back screws.

**Note**
Verify that the O-rings are properly mounted between the dual core and the Coax to WG flange.

6 Connect the flexible waveguide to the PTP 820C dual core kit using O-ring, screws and washers supplied with flexible waveguide kit and tighten the screws.

**Note**
Verify that the O-rings are properly mounted between the dual core and the flexible waveguide flange.
7 You can also connect the dual core flange to coax to WG adapter supplied separately. Place O-ring and tighten screws and washers supplied with Coax to WG adapter kit.

---

**Note**
Verify that the O-rings are properly mounted between the dual core and the Coax to WG flange.
2x2 LoS MIMO Remote Mount

Note
This procedure can also be used for 1+0 SD configurations.

Figure 27 2x2 LoS MIMO Remote Mount

List of Items

Table 48 Required items for 2x2 LoS MIMO Remote Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C REMOTE MOUNT ADAPTOR KIT</td>
<td>1</td>
<td>From 6-13GHz</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Insertion Loss

Table 49 Insertion loss for 2x2 LoS MIMO Remote Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>WGs</td>
<td>PTP 820C antenna port to antenna port</td>
<td>Frequency band and WG length (antenna separation) dependent</td>
</tr>
</tbody>
</table>
6-13 GHz

1. Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Radio to the PTP 820C Pole Mount using the four captive screws and washers that are supplied with the PTP 820C Radio. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten both Flexible WGs with their O-ring to the PTP 820C Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.
15-38 GHz

1. Mount and tighten the PTP 820C radio to the PTP 820C DC Pole Mount using the four screws assembled on the PTP 820C radio.

2. Mount and tighten the O-ring and the Flexible WG to PTP 820C radio ports using the four screws supplied with the Flexible WG kit.
3 Mount and tighten the O-ring and flexible WG to both antenna ports using the four screws supplied with the flexible WG kit.
4x4 LoS MIMO Direct Mount

Figure 28 4x4 LoS MIMO Direct Mount

List of Items

Table 50 Required items for 4x4 LoS MIMO Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>MIMO DATA CABLE</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>SOURCE SHARING CABLE</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CAT5E MIMO SIGNALING CABLE</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CIRC./CIRC. ADAPTOR</td>
<td>2</td>
<td>Per Antenna Vendor</td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set
## Insertion Loss

Table 51 Insertion loss for 4x4 LoS MIMO Direct Mount

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>OMT for each PTP 820C</td>
<td>Each PTP 820C antenna port to Mediation device antenna port</td>
<td>0.3</td>
</tr>
</tbody>
</table>
**Procedure**

1. For instructions on installation of the PTP 820C OMT and radios, see *MultiCore 2+0 Dual Polarization Direct Mount* on page 6-2.

2. Connect the source sharing cable between both EXT REF PTP 820C radio connectors.
3 Connect the MIMO data sharing cable between both ETH3/EXT PTP 820C radio connectors.

4 Connect the MIMO signaling cable between the management ports of both units. For additional instructions on preparing and connecting this cable, see Preparing a MIMO/Protection signaling cable on page 3-35.
4+0 Dual Polarization, 2+2 HSB Single/Dual Polarization Direct Mount

List of Items

Table 52 Required items for 4+0 Dual Polarization, 2+2 HSB Single/Dual Polarization Direct Mount

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C Dual Coupler/Splitter/Circulator</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C OMT/Splitter Kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C Radios</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

 Procedure

1. Once the OMT/Splitter is mounted to the antenna, connect the PTP 820C Dual Coupler/Splitter kit to the OMT kit using four M8 screws and washers, and tighten the screws.

Caution

Verify that the O-ring is properly mounted between the OMT/Splitter ports and the Dual Coupler/Splitter.
2 Connect the PTP 820C DC radios using the four M8 captive screws and washers supplied, and tighten the screws.

---

**Caution**

Verify that the O-rings are properly mounted between the Dual Coupler/Splitter ports and the radio.
4+0 Dual Polarization, 2+2HSB Dual Polarization
Remote Mount

List of Items

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C OMT Kit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Flexible Waveguide Kit</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C Dual Coupler/Splitter</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Common Installation

1. Connect the OMT kit to the antenna and secure it with four screws.

Caution

Verify that the O-ring is properly mounted between the antenna transition and the OMT.
6-13GHz

1. Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Pole Mount using the four screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820C radio. Make sure that the O-rings are correctly assembled on the radio port of the PTP 820C dual coupler.

4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the PTP 820C Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.
15-38 GHz

1. Mount and tighten the PTP 820C Dual Coupler to the PTP 820C DC Pole Mount using the four screws and washers supplied with the PTP 820C Dual Coupler kit.

2. Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on the PTP 820C unit. Make sure that the O-rings are correctly assembled on the radio port of the PTP 820C Dual Coupler.
3. Mount the O-ring and the Flexible Waveguides to the PTP 820C Dual Coupler ports using the four screws supplied with the Flexible Waveguide kits.

4. Mount and tighten the O-ring and the Flexible Waveguides to the PTP 820C OMT ports using the four screws supplied with the Flexible Waveguide kits.

**Caution**
Verify that the O-rings are correctly mounted between the OMT ports and each Flexible Waveguide.
2+2 HSB Single Polarization Remote Mount

**Note**
This procedure can also be used for 1+1 HSB SP HW ready for 2+2 HSB SP configurations.

**Figure 29** 2+2 HSB Single Polarization Remote Mount

**List of Items**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C SPLITTER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PTP 820C DUAL COUPLER KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>RFU-C POLE MOUNT KIT</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Required Tools**

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver
6-13GHz

1. Mount and tighten the RFU-C Remote Mount Adaptor plate (supplied in the RFU-C Adaptor Remote Mount kit) to the RFU-C Pole Mount using the four flat screws supplied with the RFU-C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C Splitter to the RFU-C Pole Mount using the four captive screws and washers that are assembled to the PTP 820C Splitter kit.
3 Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Splitter using the four captive screws and washers that are supplied with the PTP 820C Dual Coupler kit. Make sure that the O-rings are mounted on the PTP 820C Splitter.

4 Mount and tighten the PTP 820C unit to the PTP 820C Dual Coupler using the four screws and washers that are assembled to the PTP 820C unit. Make sure that the O-rings are mounted on the PTP 820C Dual Coupler.
5 Connect the Flexible Waveguide and Sealing Gasket supplied with the Flexible Waveguide kit to the RFU-C Adaptor plate. Tighten the four screws supplied with the Flexible Waveguide kit.
1+1 HSB-SD

List of Items

Table 55 Required items for 1+1 HSB-SD

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Flexible Waveguide Kit</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PTP 820C Dual Coupler/Splitter</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

6-13GHz

1 Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2 Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Pole Mount using the four screws and washers that are supplied with the PTP 820C Dual Coupler kit. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on PTP 820C radio. Make sure that the O-rings are correctly assembled on the radio port of the PTP 820C dual coupler.

4 Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the PTP 820C Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.
15-42GHz

1. Mount and tighten the PTP 820C Dual Coupler to the PTP 820C Pole Mount using the four screws and washers supplied with the PTP 820C Dual Coupler kit.

2. Mount and tighten the PTP 820C radios on each side of the PTP 820C Dual Coupler using the screws assembled on the PTP 820C unit. Make sure that the O-rings are correctly assembled on the radio port of the PTP 820C Dual Coupler.
3 Mount the O-ring and the Flexible Waveguides to the PTP 820C Dual Coupler ports using the four screws supplied with the Flexible Waveguide kits.

4 Mount and tighten the O-ring and the Flexible Waveguides to the antenna ports on the primary and diversity antennas using the four screws supplied with the Flexible Waveguide kits.

**Note**
Verify that the O-rings are correctly mounted between the OMT ports and each Flexible Waveguide.
AFR 1+0 Hub Site

In an AFR 1+0 configuration, a Multicore PTP 820C unit is deployed at the hub site and two PTP 820C or PTP 820S units are deployed in two tail sites.

The hub site utilizes a single PTP 820C unit with two radio carriers. Each carrier is in a link, via its own directional antenna, with a tail site that consists of a PTP 820C or PTP 820S unit.

**Note**
The links should be located so as to ensure that the two radio paths do not cross. The tail site unit is installed as a simple 1+0 configuration.

The hub site unit is installed as a remote mount configuration in which two flexible waveguides are used to connect the two Remote Mount Adaptor ports to an antenna. This chapter describes a hub site installation.

For standard interface antennas (six feet and larger), no OMT and no Circ./Circ. Adaptor are used, and the flexible waveguides are connected directly to the antenna flanges. For instructions how to connect the waveguides to the antenna flanges, refer to the antenna vendor's documentation.

### List of Items

**Table 56 Required items 1+0 Hub Site**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PTP 820C RADIO</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FLEXIBLE WG KIT</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PTP 820C DC POLE MOUNT KIT</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PTP 820C DC REMOTE MOUNT ADAPTOR KIT</td>
<td>1</td>
<td>From 6-13GHz</td>
</tr>
<tr>
<td>6</td>
<td>Circ./Circ. Adaptor</td>
<td>1</td>
<td>Per Antenna Vendor. Not used for standard interface antennas (six feet and larger).</td>
</tr>
</tbody>
</table>

### Required Tools

- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver
## Insertion Loss

### Table 57 Insertion Loss for AFR 1+0 Hub Site

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flex WG (1m)</td>
<td>Each PTP 820C port to antenna port</td>
<td>0.4</td>
<td>0.5</td>
<td>1.0</td>
<td>1.8</td>
<td>2.7</td>
<td>3.3</td>
</tr>
</tbody>
</table>
Common Installation

1. Prior to the installation, follow the antenna manufacturer’s instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)

2. Mount and tighten the Flexible WG to the antenna port using the four screws supplied with the Flexible WG kit.
6-13 GHz

1. Mount and tighten the PTP 820C Remote Mount Adaptor plate (supplied in PTP 820C Adaptor Remote Mount kit) to the PTP 820C Pole Mount using the four flat screws supplied with the PTP 820C Adaptor Remote Mount kit.

2. Mount and tighten the PTP 820C to the PTP 820C Pole Mount using the four captive screws and washers that are supplied with the PTP 820C. Pay attention that the O-rings are mounted on the PTP 820C Remote Mount Adaptor.
3 Mount and tighten both Flexible WGs with their O-ring to the PTP 820C Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.
15-38 GHz

1. Mount and tighten the PTP 820C to the PTP 820C DC Pole Mount using the four screws assembled on the PTP 820C.

2. Mount and tighten the O-ring and the Flexible WG to PTP 820C radio ports using the four screws supplied with the Flexible WG kit.

The following figure shows the complete installation.

---

**Note**

This figure shows an installation with horizontal polarization. Vertical polarization can also be used. The same polarization must be used for both links.
## Chapter 7: Mediation Device Losses

### Table 58 Mediation device losses

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Flex WG</td>
<td>3ft / 1.2m</td>
<td>0.5</td>
</tr>
<tr>
<td>Dual Core Mediation Device</td>
<td>Radio to antenna</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(upper path)</td>
<td></td>
</tr>
<tr>
<td>OMT</td>
<td>Radio to antenna</td>
<td>0.3</td>
</tr>
<tr>
<td></td>
<td>ports (V or H)</td>
<td></td>
</tr>
<tr>
<td>Splitter</td>
<td>Radio to antenna</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>port</td>
<td></td>
</tr>
<tr>
<td>Double Coupler</td>
<td>Main Paths</td>
<td>1.4</td>
</tr>
</tbody>
</table>
## Mediation Devices

<table>
<thead>
<tr>
<th>Mediation Devices</th>
<th>Signal Path/Remarks</th>
<th>Insertion Loss [dB]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-8 GHz</td>
</tr>
<tr>
<td>Secondary Paths</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Double Splitter</td>
<td>Radio to antenna port</td>
<td>3.5</td>
</tr>
</tbody>
</table>
This chapter provides Cambium Networks’ recommended Acceptance and Commissioning Procedure for PTP 820. Acceptance and commissioning should be performed after initial setup is complete.

The purpose of this procedure is to verify correct installation and operation of the installed link and the interoperability with customer end equipment.

Cambium Networks’ Acceptance and Commissioning procedure includes the following stages:

- Site Acceptance Procedure
- Commissioning of Radio Link

The Site Acceptance Procedure is a checklist that summarizes the installation requirements of the site at which the products were installed.

The commissioning tests cover the required configuration information that should be recorded, and the tests that should be performed on the radio link.
Site Acceptance Procedure

The purpose of the following procedures is to verify that all installation requirements were noted and checked. Following this procedure will ensure proper, long-lasting, and safe operation of the product.

The checklist below summarizes the installation requirements of the site.

<table>
<thead>
<tr>
<th>SITE ACCEPTANCE CHECKLIST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. SITE INFORMATION</strong></td>
</tr>
<tr>
<td>Customer:</td>
</tr>
<tr>
<td>Radio model:</td>
</tr>
<tr>
<td>Site name:</td>
</tr>
<tr>
<td>Site code:</td>
</tr>
<tr>
<td>Radio link code:</td>
</tr>
<tr>
<td>Site address:</td>
</tr>
<tr>
<td><strong>2. ANTENNA MOUNTING</strong></td>
</tr>
<tr>
<td>Antenna mount type:</td>
</tr>
<tr>
<td>Mount is of sufficient height to clear local obstructions OK</td>
</tr>
<tr>
<td>Mount is safely positioned to not cause a safety hazard OK</td>
</tr>
<tr>
<td>Mount is secure and perpendicular OK</td>
</tr>
<tr>
<td>Mount is grounded as per site specifications OK</td>
</tr>
<tr>
<td>All steelwork is Galvanized or Stainless Steel as appropriate OK</td>
</tr>
<tr>
<td><strong>3. ANTENNA</strong></td>
</tr>
<tr>
<td>Antenna type (model and size): OK</td>
</tr>
<tr>
<td>Antenna is securely fixed to mount OK</td>
</tr>
<tr>
<td>Antenna is grounded as per site specifications OK</td>
</tr>
<tr>
<td>Antenna sway braces are installed correctly (where applicable) OK</td>
</tr>
<tr>
<td>Antenna Radome is securely fitted (where applicable) OK</td>
</tr>
<tr>
<td>Water drain plugs are fitted and removed, as appropriate OK</td>
</tr>
</tbody>
</table>
### Antenna sealing O-Ring is properly fitted and not damaged

- **OK**

### Antenna/Launch unit polarization is as per link requirements

- **OK**

---

#### SITE ACCEPTANCE CHECKLIST (continued)

<table>
<thead>
<tr>
<th>4. OUTDOOR UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of ODU mount:</td>
</tr>
<tr>
<td>ODU is securely mounted to the antenna or pole</td>
</tr>
<tr>
<td>ODU is grounded as per installation instructions</td>
</tr>
<tr>
<td>ODU’s polarization is as per link requirements</td>
</tr>
<tr>
<td>ODU is installed properly and has no physical damage</td>
</tr>
</tbody>
</table>

**For Remote-Mount Only:**

| Remote mount kit is securely mounted to the pole | OK |
| Flexible waveguide has no physical damage and connectors are sealed | OK |
| All flexible waveguide bolts are secured using washers and lock-washers, as appropriate | OK |
| Flexible waveguide is secured to the pole | OK |

#### 6. CAT5/Fiber Optic CABLE

<table>
<thead>
<tr>
<th>Overall cable length:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable type:</td>
<td></td>
</tr>
<tr>
<td>CAT5 connectors assembled properly on the cable</td>
<td>OK</td>
</tr>
<tr>
<td>Cable connected securely to ODU and IDU</td>
<td>OK</td>
</tr>
<tr>
<td>Cable connector is covered by gland and secure by cable tie at the ODU</td>
<td>OK</td>
</tr>
<tr>
<td>At the ODU, cable has a service/drip loop to prevent moisture from entering the connector</td>
<td>OK</td>
</tr>
<tr>
<td>Cable is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)</td>
<td>OK</td>
</tr>
<tr>
<td>Cable has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications</td>
<td>OK</td>
</tr>
<tr>
<td>Grounding is as per site specifications</td>
<td>OK</td>
</tr>
<tr>
<td>Cable point-of-entry to building/shelter is weather-proof</td>
<td>OK</td>
</tr>
<tr>
<td>Cable ends are properly labeled</td>
<td>OK</td>
</tr>
</tbody>
</table>
### SITE ACCEPTANCE CHECKLIST (continued)

#### 7. FLEXIBLE WAVEGUIDE

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall flexible WG length:</td>
<td></td>
</tr>
<tr>
<td>Flexible WG type:</td>
<td></td>
</tr>
<tr>
<td>Flexible WG is connected securely to ODU and Antenna</td>
<td>OK</td>
</tr>
<tr>
<td>Flexible WG connector is weather-proofed (sealed) at the ODU</td>
<td>OK</td>
</tr>
<tr>
<td>At the ODU, the flexible WG has a service/drip loop to prevent moisture from entering the connector</td>
<td>OK</td>
</tr>
<tr>
<td>Flexible WG is secured using suitable restraints to fixed points at regular intervals (0.5 m recommended)</td>
<td>OK</td>
</tr>
<tr>
<td>Flexible WG has no sharp bends, kinks, or crushed areas. All bends are per manufacturer specifications</td>
<td>OK</td>
</tr>
<tr>
<td>Flexible WG point-of-entry to building/shelter is weather-proof</td>
<td>OK</td>
</tr>
<tr>
<td>Flexible WG ends are properly labeled</td>
<td>OK</td>
</tr>
</tbody>
</table>

#### 8. DC POWER SUPPLY - Two Inputs

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured DC voltage input to the IDU:</td>
<td>(-40.5 to -60 VDC)</td>
</tr>
<tr>
<td>Power-Supply maximum current:</td>
<td></td>
</tr>
<tr>
<td>Power-Supply is properly grounded</td>
<td>OK</td>
</tr>
<tr>
<td>DC power backup type:</td>
<td></td>
</tr>
<tr>
<td>IDU DC connector is secure and the DC input leads are correctly terminated (no bare wires are visible)</td>
<td>OK</td>
</tr>
<tr>
<td>IDU DC connector (+) and (GND) leads are shorted and GND is grounded</td>
<td>OK</td>
</tr>
</tbody>
</table>

#### 9. RACK INSTALLATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack is mounted to the shelter floor with four screws</td>
<td>OK</td>
</tr>
<tr>
<td>Rack is mounted to the shelter wall with two screws</td>
<td>OK</td>
</tr>
</tbody>
</table>
### SITE ACCEPTANCE CHECKLIST (continued)

#### 10. REMARKS/NOTES

<table>
<thead>
<tr>
<th>Remarks/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### 11. GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Site accepted by:</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Title:</td>
</tr>
<tr>
<td></td>
<td>Company:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
<tr>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site approved by:</th>
<th>Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Title:</td>
</tr>
<tr>
<td></td>
<td>Company:</td>
</tr>
<tr>
<td></td>
<td>Signature:</td>
</tr>
<tr>
<td></td>
<td>Date:</td>
</tr>
</tbody>
</table>
The following notes provide important additional information about the Site Acceptance Checklist.

1. **Antenna Mounting**
   - Mounting pole is of sufficient height to clear local obstructions, such as parapets, window cleaning gantries, and lift housings.
   - Mounting Pole is of sufficient height, and is safely positioned, so as not to cause a safety hazard. No person should be able to walk in front of, or look directly into the path of the microwave radio beam. Where possible, the pole should be away from the edge of the building.
   - Mounting pole is secure and perpendicular. A pole that is not perpendicular may cause problems during antenna alignment.
   - Mounting pole is grounded as per site specifications. All operators and site owners have specific requirements regarding the grounding of installations. As a minimum, typical requirements are such that any metal structure must be connected to the existing lightning protection ground of the building. Where it extends beyond the 45-degree cone of protection of existing lightning conductors, additional lightning protectors should be installed.
   - All steelwork is Galvanized or Stainless Steel, as appropriate to prevent corrosion.

2. **Antenna**
   - Antenna is grounded as per site specifications. See the third point in the Antenna Mounting section above.
   - Antenna sway braces are fitted and installed correctly, where applicable. Typically, for an antenna of 1.2 m or larger, an extra sway brace is fitted to the mounting frame of the antenna. This sway brace should not be mounted to the same pole as the antenna, but should be installed directly back to the tower or an alternative point.
   - Antenna Water Drain Plugs are fitted and removed, where appropriate. Some antennas have moisture drain plugs installed at various points around the antenna. The purpose of these plugs is to allow any moisture that forms on the inside of the antenna or radome to drip out and prevent a pool within the antenna. Only the plugs at the bottom of the antenna, after installation, should be removed. All other plugs should be left in position.

3. **ODU (Outdoor Unit)**
   - The ODU is grounded as per installation instructions. See the third point in the Antenna Mounting section above.
   - The ODU polarization is as per link requirements and matches the polarization of the antenna.
   - The main traffic connections are correctly terminated and crimped as per cable and connector manufacturer instructions. All fiber optic patch leads should be routed carefully and efficiently, using conduits to prevent damage to the cables.
   - All other user terminations are secure and correctly terminated.
   - All labeling is complete as per site requirements. Labeling is specific to each customer. At a site with only one installation, labeling may be unnecessary. However, at sites with multiple installations, correct and adequate labeling is essential for future maintenance operations.

Typical labeling requirements include:
• Antenna labels - for link identity and bearing
• ODU labels - for link identity, frequency, and polarization
• Cat5/Fiber cable labels - for link identity, close to the ODU, switch, and either end of any joint
• Switch labels - for link identity
Radio Link Commissioning Procedure

Scope

This section describes the recommended commissioning tests for PTP 820 radio link in a 1+0 configuration.

The purpose of the commissioning tests is to verify correct and proper operation of the product.

Commissioning Test

The following tests should be performed on each installed link.

Link Verification

- Received Signal Level (RSL) is up to +/- 4 dB from the expected (calculated) level at both ends of the link.\(^1\)
- Radio Bit Error Rate (BER) is 10E-11 or lower.
- If working with ATPC, ATPC is operating as expected (RSL = reference level).

Ethernet Line Interfaces Test

- Connect Ethernet Packet Analyzer to the GbE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Cambium's specifications for the chosen MRMC).
- Connect Ethernet Packet Analyzer to the FE port. Use physical loop at remote end (or connect second analyzer). Run Packet Loss test for at least one hour (load rate as per Cambium's specifications for the chosen MRMC).

Interoperability Verification

- Connect customer end equipment to the line interfaces, and verify correct operation.
- Further interoperability tests should be performed in accordance with the specific requirements of the connected end equipment.

\(^{1}\) The voltage at the BNC port is 1.XX where XX is the RSL level. For example: 1.59V means an RSL of -59 dBm. Note that the voltage measured at the BNC port is not accurate and should be used only as an aid).
Management Verification

- Launch the HTTP management and verify that you can manage the link and that you are able to perform changes to the link configuration (frequency channel, Tx power, system name, time & date, etc.)
- Verify that correct parameters are reported when performing the above.
- Verify that there are no active alarms on the link.
- If the management station is located at a remote site (Network Operation Center), verify that the management station can manage the link and receive traps.
PTP 820 Commissioning Log

The Commissioning Log is an integral part of the commissioning procedure and should be filled in for each installed link.

The Commissioning Log gathers all relevant information regarding the installed link and contains a checklist of all recommended commissioning tests.

Maintaining the Commissioning Log is important for tracking your installations, and to provide essential data for Cambium Networks.

Upon completing the Commissioning Log, send the log to Cambium Networks’ support center at https://support.cambiumnetworks.com.

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PTP 820 LINK COMMISSIONING LOG

<table>
<thead>
<tr>
<th>1. GENERAL INFORMATION</th>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio model:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configuration:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio link code:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 1 name &amp; add:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 2 name &amp; add:</td>
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</table>

<table>
<thead>
<tr>
<th>2. ODU/RFU</th>
<th>Site 1</th>
<th>Site 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODU model:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODU p/n:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODU s/n:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ODU SW:</td>
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</tr>
<tr>
<td>Tx frequency (MHz):</td>
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</tr>
<tr>
<td>Rx frequency (MHz):</td>
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<tr>
<td>Link ID:</td>
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<tr>
<td>Tx power (dBm):</td>
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<tr>
<td>ATPC on/off:</td>
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<tr>
<td>ATPC ref level:</td>
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<tr>
<td>ODU Polarization:</td>
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<table>
<thead>
<tr>
<th>3. ANTENNA AND ODU MOUNT</th>
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</thead>
<tbody>
<tr>
<td>Antenna vendor and model:</td>
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<tr>
<td>Antenna size:</td>
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<td>Mounting type:</td>
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### 4. LINK PARAMETERS

<table>
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<tr>
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<tr>
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<td>Rain zone:</td>
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<tr>
<td>Expected RSL (dBm):</td>
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<td>Expected Diversity RSL (dBm):</td>
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<tr>
<td>RSL Main (dBm):</td>
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<tr>
<td>RSL Diversity (dBm):</td>
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<tr>
<td>Deviation from exp?:</td>
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<td>RSL ≤4 dB?:</td>
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### 5. COMMISSIONING TESTS

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<tbody>
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<tr>
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<tr>
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<tr>
<td>FE test:</td>
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### 6. MANAGEMENT CONFIGURATION

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### 7. REMARKS/NOTES


### 8. INSTALLATION INFORMATION

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<tr>
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<td></td>
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Installed by:  
Commissioned by: