Cambium Networks™

INSTALLATION GUIDE

RFU-D-HP

Release 13.1

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Contents

Before You Start

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.
- RFU-D-HP is intended for installation in a restricted access location.
- RFU-D-HP must be installed and permanently connected to protective earth by qualified service personnel in accordance with applicable national electrical codes.
- Site grounding is the responsibility of the operator or owner of the site. It is critical that all site components be properly grounded in accordance with the specific site requirements and applicable industry standards and best practices. Ground resistance must be no more than 5 ohms. Any higher resistance may lead to equipment malfunction and affect the product's warranty.

Safety Precautions & Declared Material

Public and Occupational Boundary Distances Under Article 3.1(a) of the RE Directive

Based on the highest nominal output power of the RFU-D-HP:

- The public exposure of compliance boundary distance is 24.6m.
- The occupational exposure of compliance boundary distance is 4.9m. This is the worst case for the highest nominal output power, using antennas up to 3 ft. For all other configurations, the compliance boundary distance is 0.

Note:

Even when the compliance boundary is a non-zero value, this only applies within the bore sight of the antenna dish. Therefore, during work within and close to the front of the antenna, make sure the transmitters are turned off. As long as the transmitters are turned off during any work on the system, the occupational exposure limit is not of concern to workers operating in or around the parabolic dish antenna.

General Equipment Precautions

Warning:

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.

Warning:

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.

Warning:

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

Warning:

When working with an RFU-D-HP, 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.

Warning:

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

Warning:

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 tilkopling 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:

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 RFU-D-HP 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.

Précautions générales relatives à l'équipement

AVERTISSEMENT :

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.

AVERTISSEMENT :

L’usage de RFU-D-HP 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.

AVERTISSEMENT :

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

WARNUNG:

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

WARNUNG:

Beachten Sie beim Arbeiten mit RFU-D-HP das folgende Stromschlag- und Gefahrenrisiko: Durch Abtrennen einer Stromquelle wird nur ein

WARNUNG:

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 should 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 should 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 a Cambium representative, by e-mail or fax.

RFU-D-HP Overview

RFU-D-HP is a MultiCore RFU that provides high power for long-haul applications. Like RFU-D, RFU-D-HP incorporates two modems, which are connected to the IDU via a single baseband interface.

RFU-D-HP offers a flexible and modular branching system that enables the combination of different bands for different carriers. For example, the same link can be used for both L6 and U6 or 7 and 8 GHz channels.

RFU-D-HP can be used with wide diplexer-based branching, enabling direct mount installation. Diplexers can be used for direct mount configurations of up to 4+0.

RFU-D-HP can also be used with channel filter-based branching, enabling configurations of up to 8+0 per polarization in remote mount and all-indoor configurations.

To maximize operational flexibility, both diplexer units and outdoor circulator units (OCUs) are provided separately for the radio units, enabling the operating frequencies of the link to be changed in the field with minimal downtime and no risk of impairing the RFU's sealing.

For all-indoor configurations, the IDU, the RFUs, and the channel filter-based branching system are ordered as a single item and delivered, pre-assembled, pre-tested, and pre-configured in a rack.

Note:

Since all-indoor configurations are pre-assembled and pre-configured, they are not covered in this Installation Guide.

RFU-D-HP Interfaces

The following figures show the RFU-D-HP TX and RX interfaces.

Figure 1: *RFU-D-HP Radio Interfaces (6-11 GHz)*

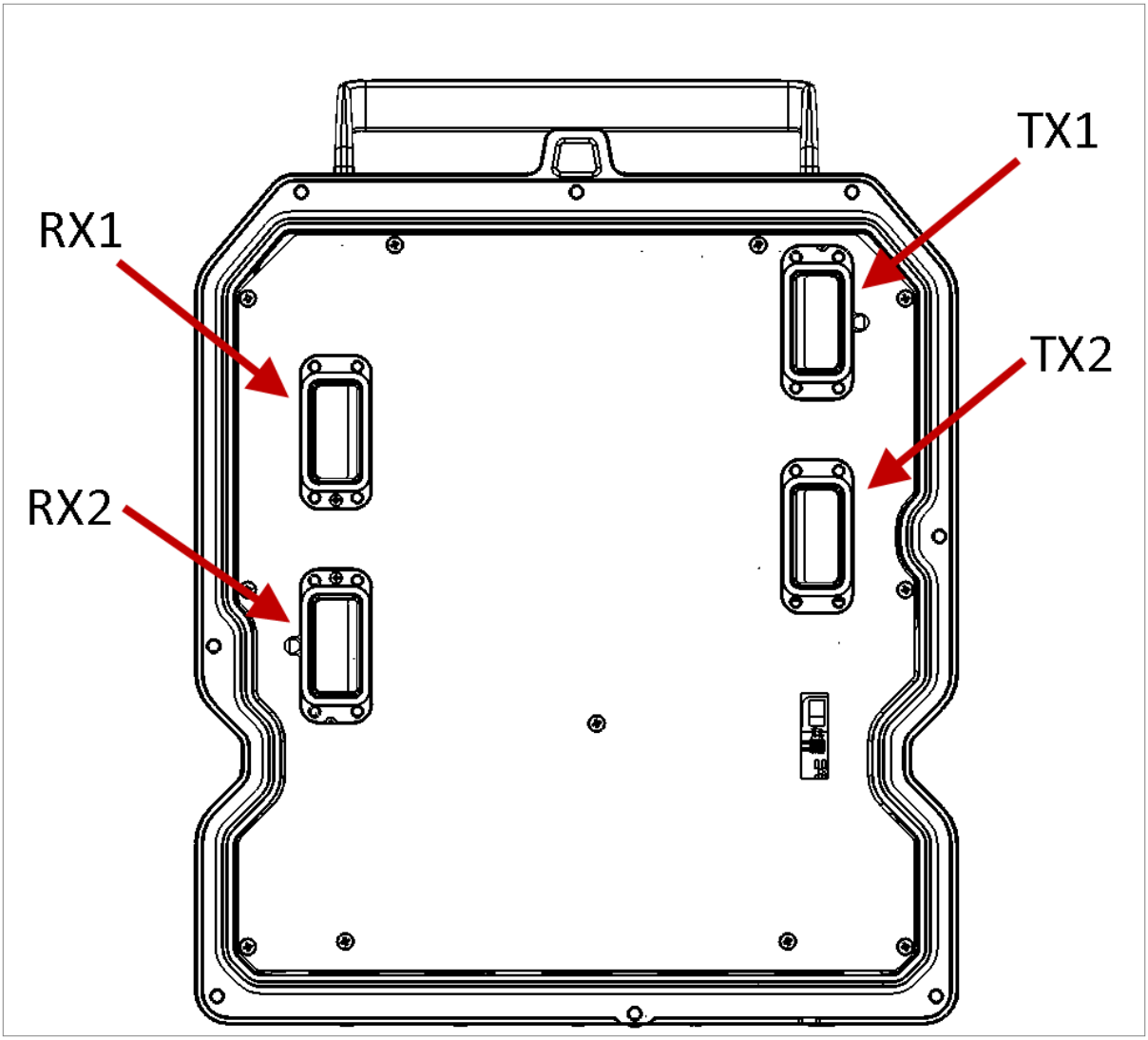


Figure 2: *RFU-D-HP Radio Interfaces (4-5 GHz)*

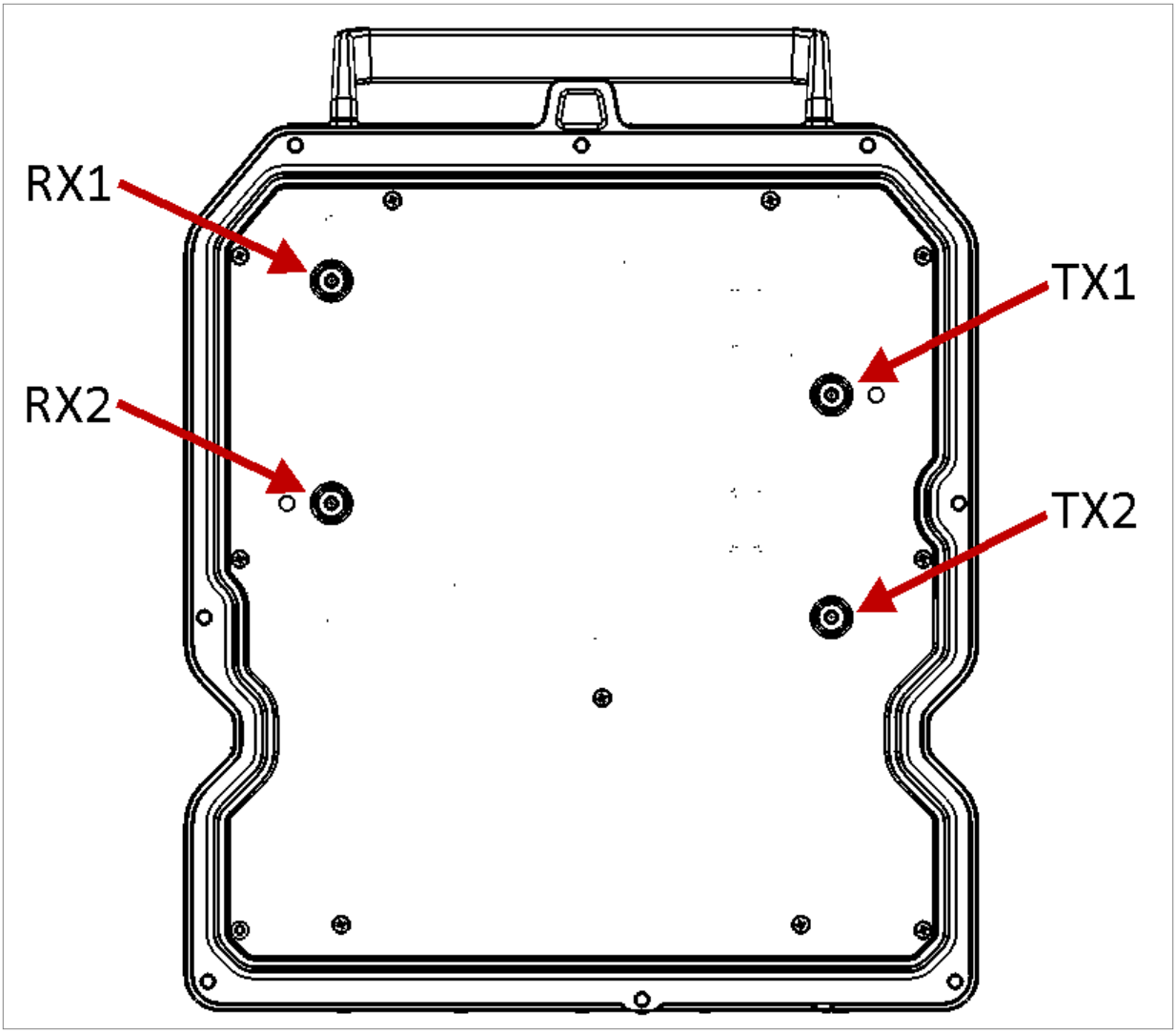


Figure 3: *RFU-D-HP Front Side Interfaces*

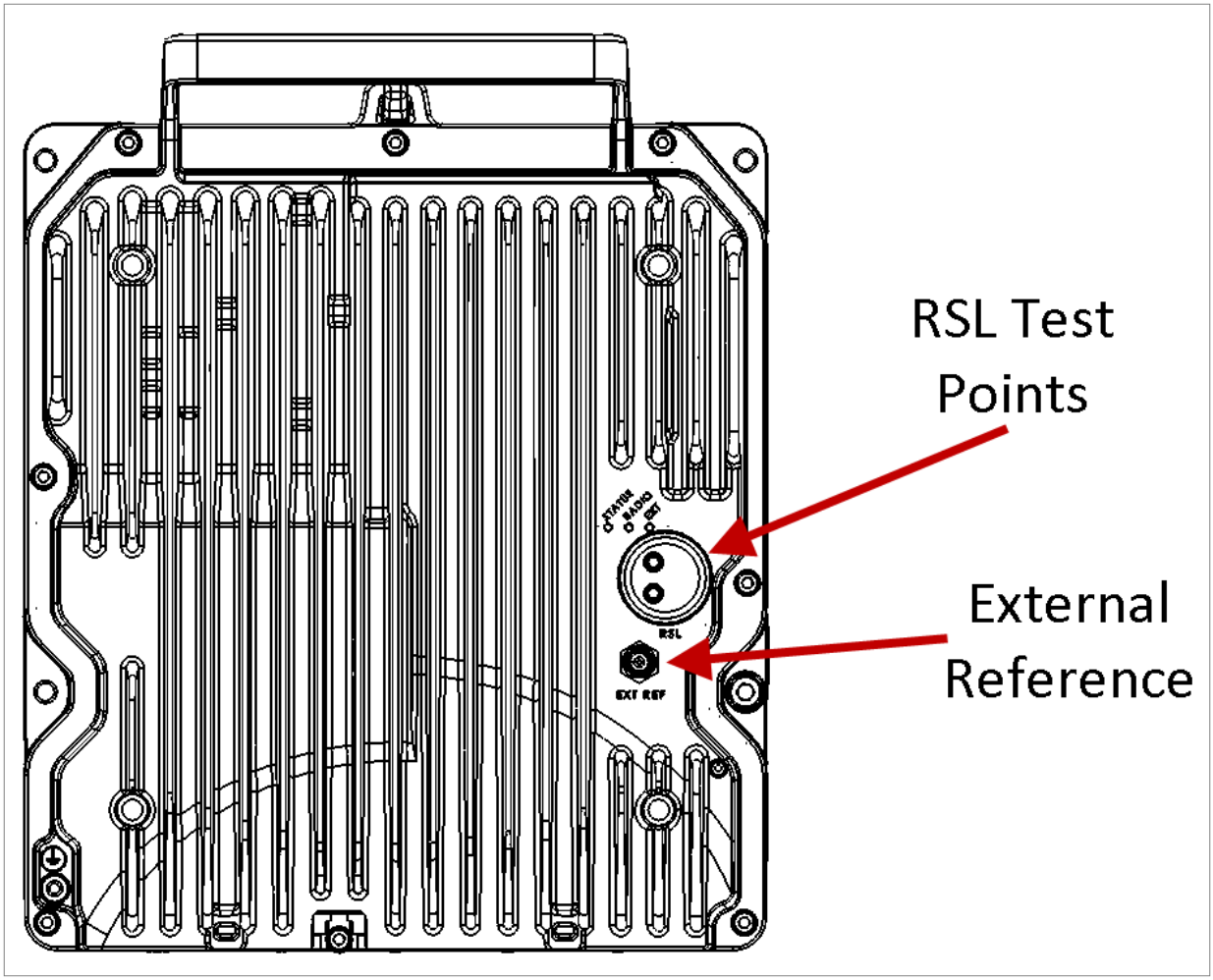
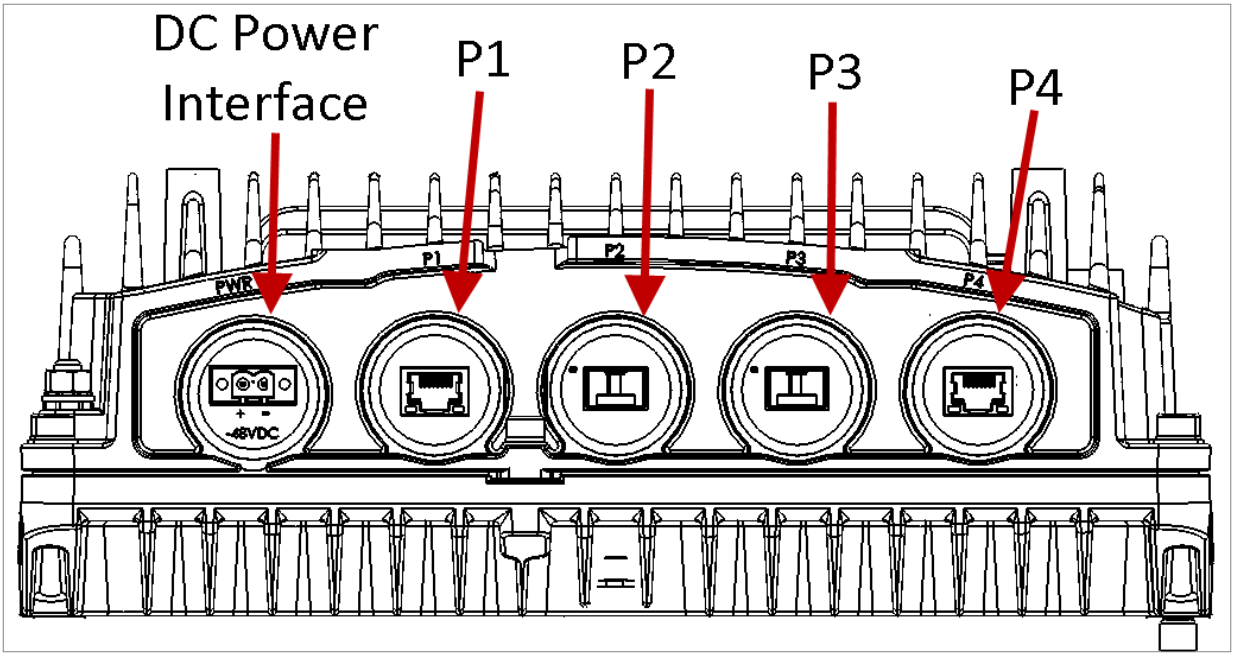
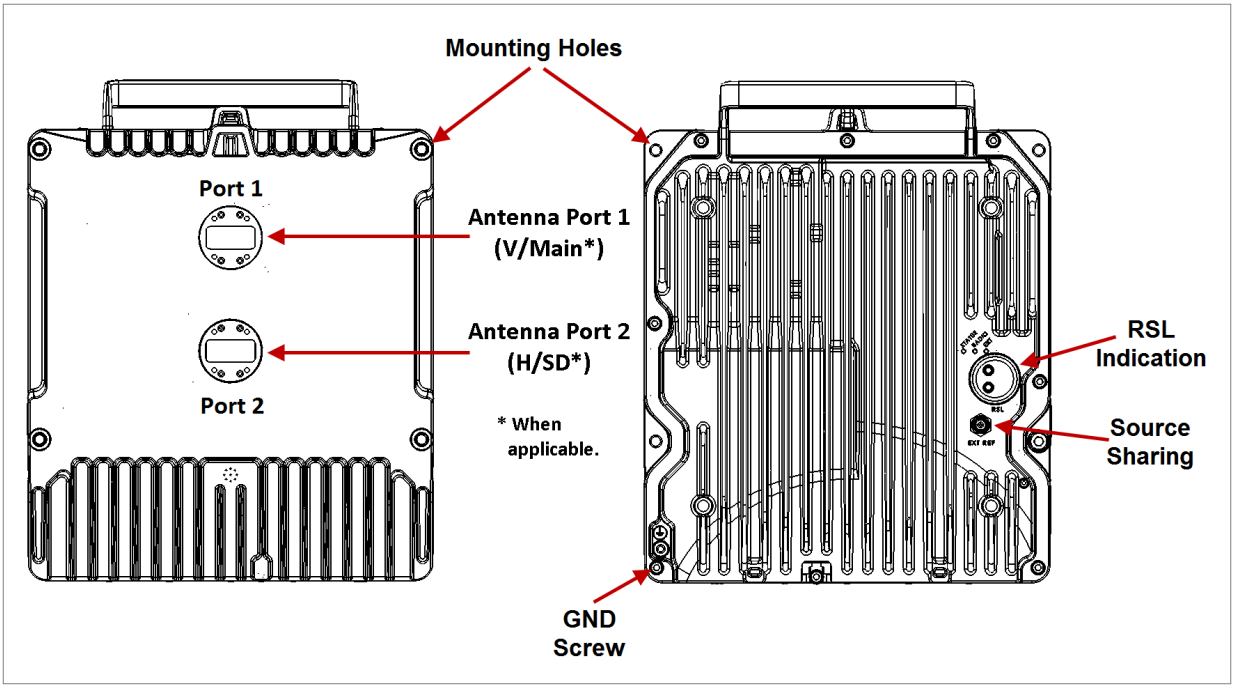


Figure 4: *RFU-D-HP Data and Power Interfaces*



- PWR: DC power interface (-48VDC)
- P1: RFU Interface (RJ-45)
- P2: RFU Interface (SFP)
- P3: Data Sharing (External Space Diversity and ASD)
- P4: Fan control and RSSI, for all-indoor configurations only.

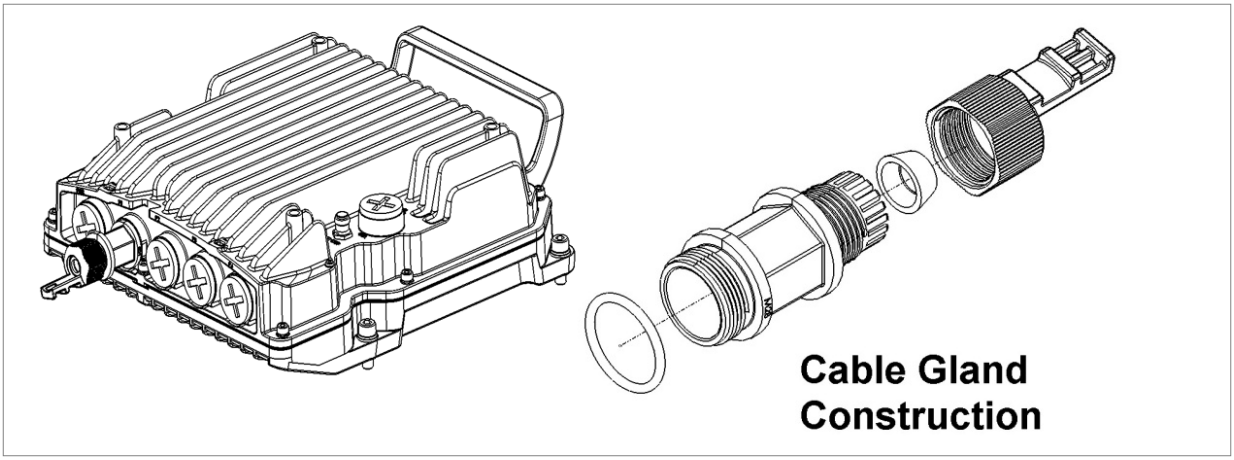
Figure 5: *RFU-D-HP Rear View (Left) and Front View (Right)*



Note:

In the RFU-D-HP diplexer, Port 1 is the upper port, located closest to the handle, and Port 2 is the lower port, located closest to the Ethernet ports.

Figure 6: *Cable Gland Construction*



Note:

The voltage at the RSL 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 RSL port is not accurate and should be used only as an aid). For instructions on determining which radio carrier is measured, refer to the User Guide for the IDU and System Release version you are using.

A 2 mm banana plug to BNC jack cable is available and can be ordered from Cambium. The marketing model is: *AGC BNC/TNC to DVM cable*. The kit also includes a BNC plug to 4 mm

banana plugs.

System Components – Diplexer-Based Branching

Note:

Refer to the product roadmap for availability of RFU-D-HP in a specific band, as well as the availability of any specific mediation device.

Presenting a specific component in this manual does not indicate that it is available for ordering. Please consult with your pre-sales engineer for specific component availability information.

Diplexer-Based Branching – Radio Components

Figure 7: *RFU-D-HP Radio Unit*

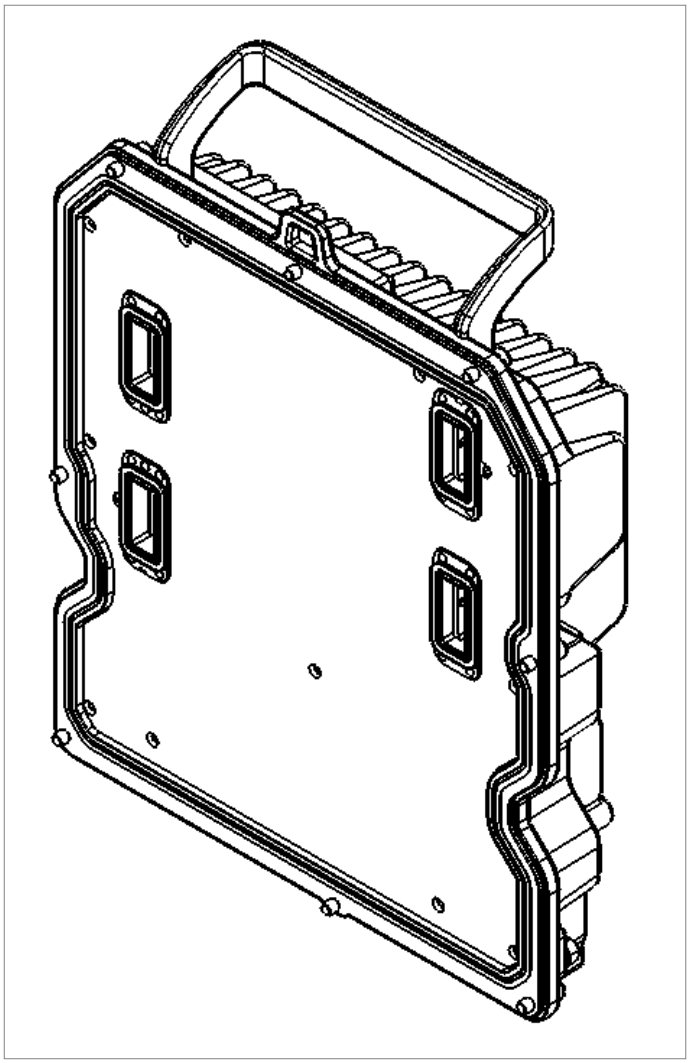
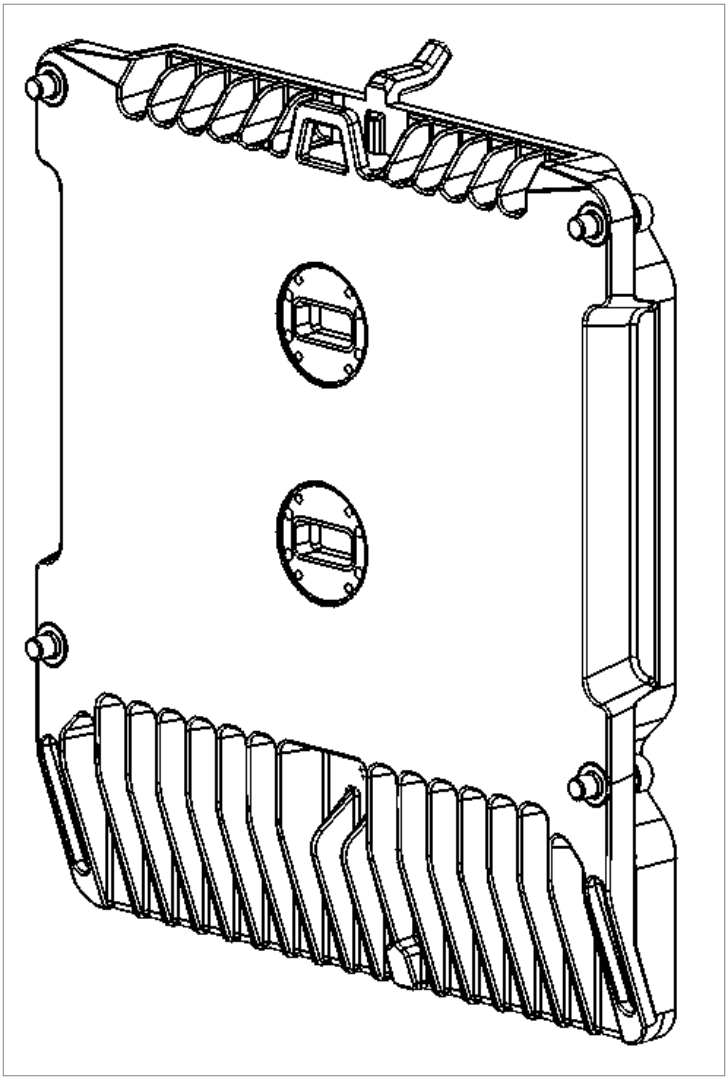


Figure 8: *RFU-D-HP Diplexer Unit*



Diplexer-Based Branching – Branching Components

Figure 9: *OMT*

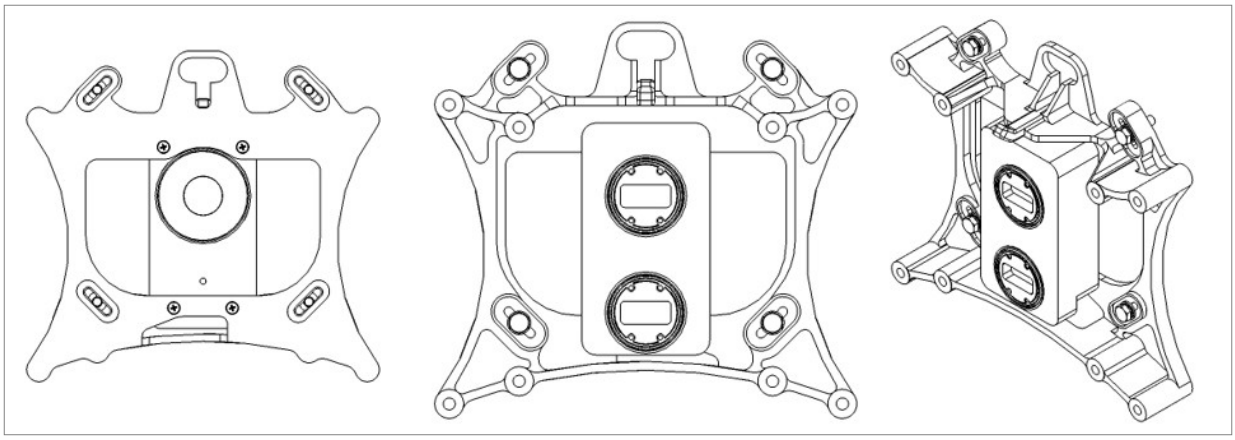


Figure 10: *Space Diversity Branching Device*

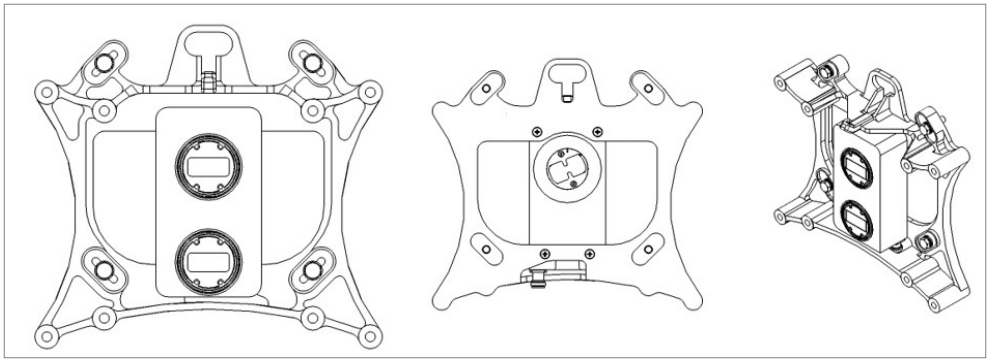


Figure 11: *Splitter*

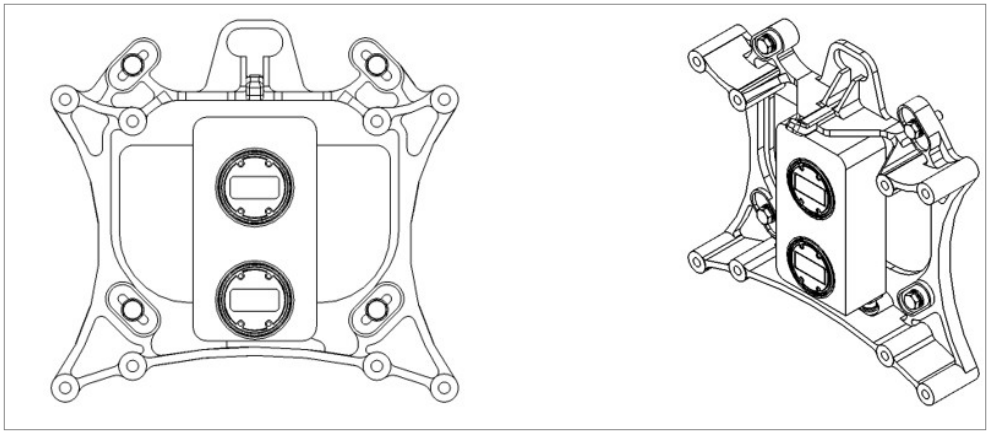
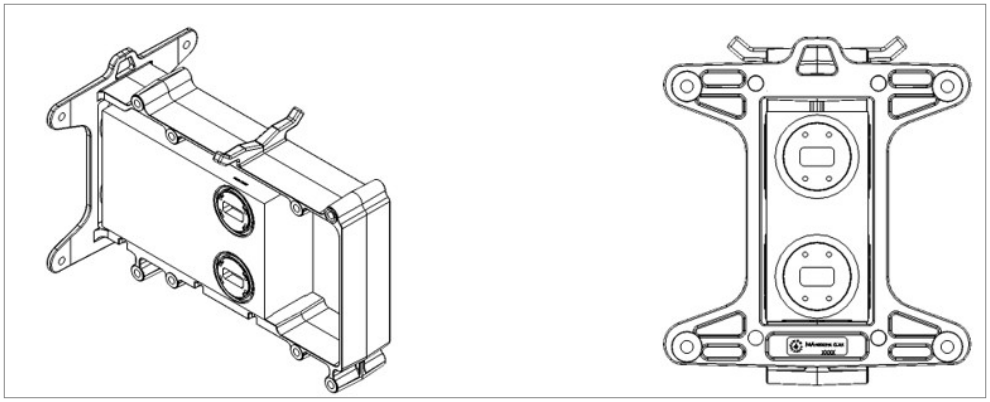


Figure 12: *Dual Coupler/Splitter/Circulator*



Diplexer-Based Branching – Accessory Components

Figure 13: *Remote Pole Mount*

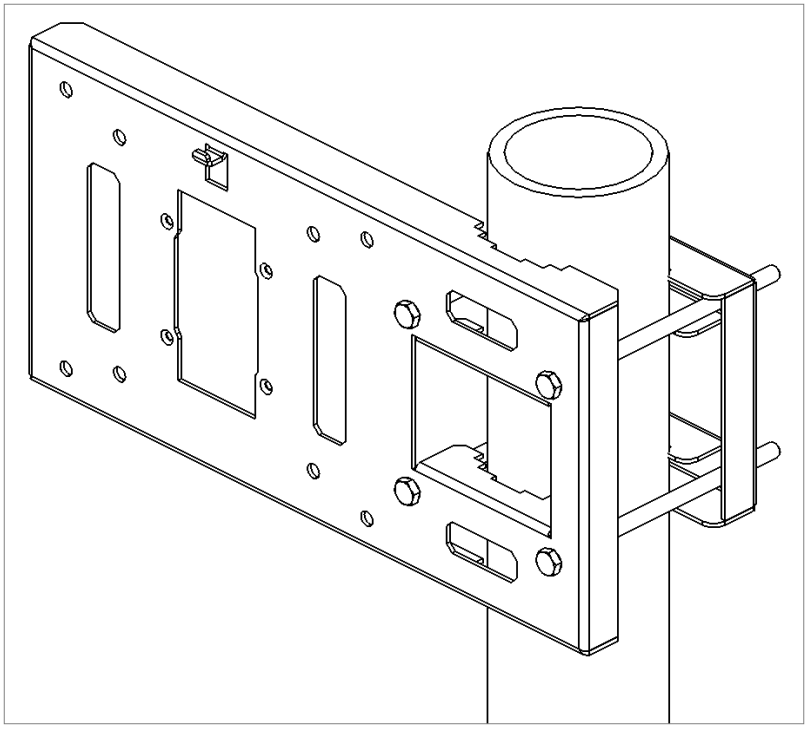


Figure 14: *Remote Pole Mount Adaptor*

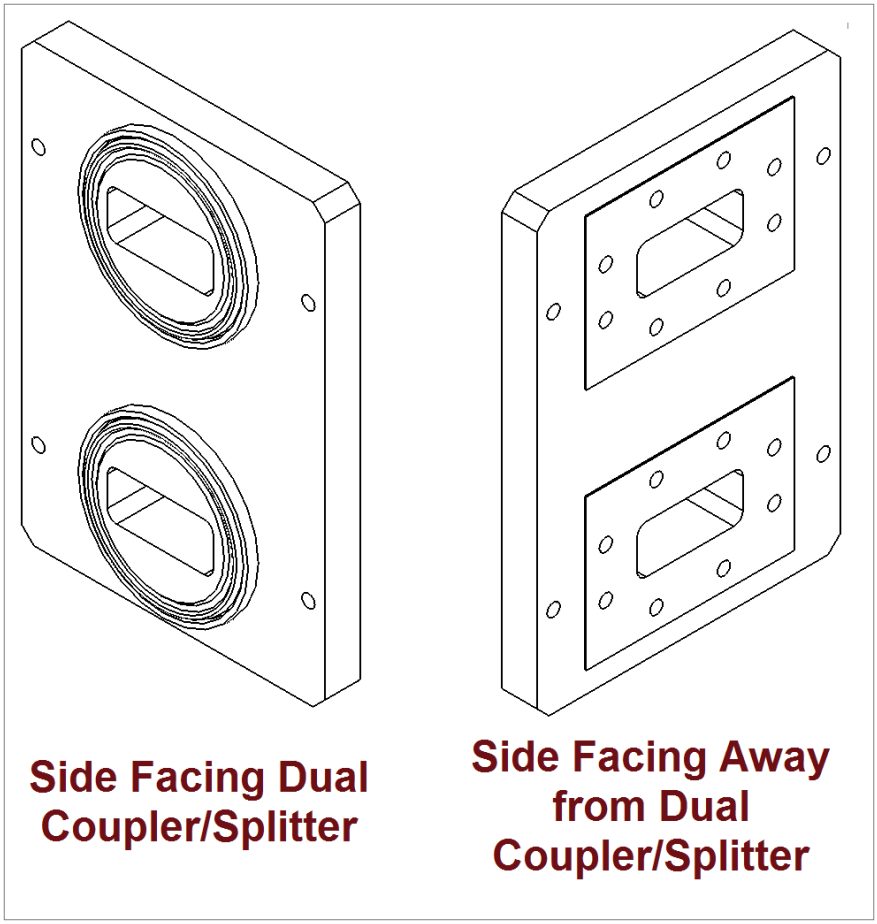
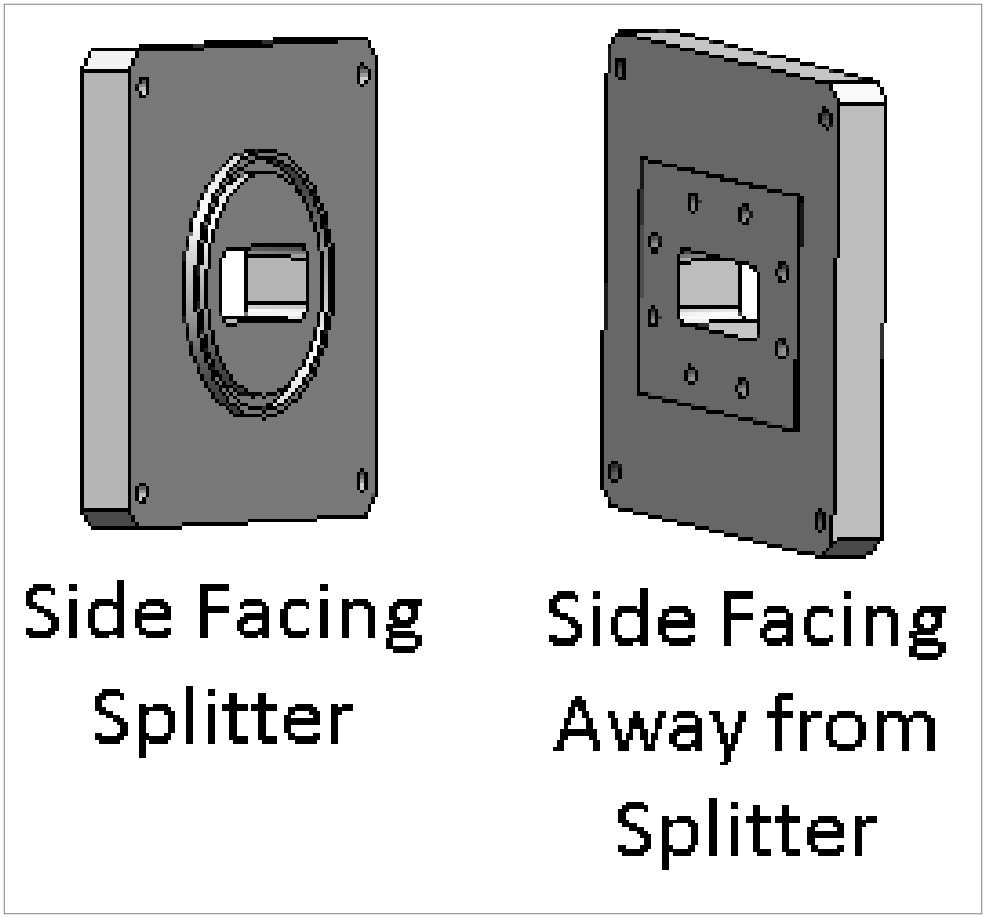


Figure 15: *Remote Pole Mount Adaptor (Single Polarization)*



System Components – Channel Filter-Based Branching

Note:

Refer to the product roadmap for availability of RFU-D-HP in a specific band, as well as the availability of any specific mediation device.

Presenting a specific component in this manual does not indicate that it is available for ordering. Please consult with your pre-sales engineer for specific component availability information.

The OCU assembly has two sets of ports: Antenna (ANT) ports and Exit (EXT) ports. When viewing the OCU from the side attached to the radio (*RFU-D-HP OCU Unit*), the EXT ports are on the left side and the ANT ports are on the right side (not shown).

Figure 16: *RFU-D-HP OCU Unit*

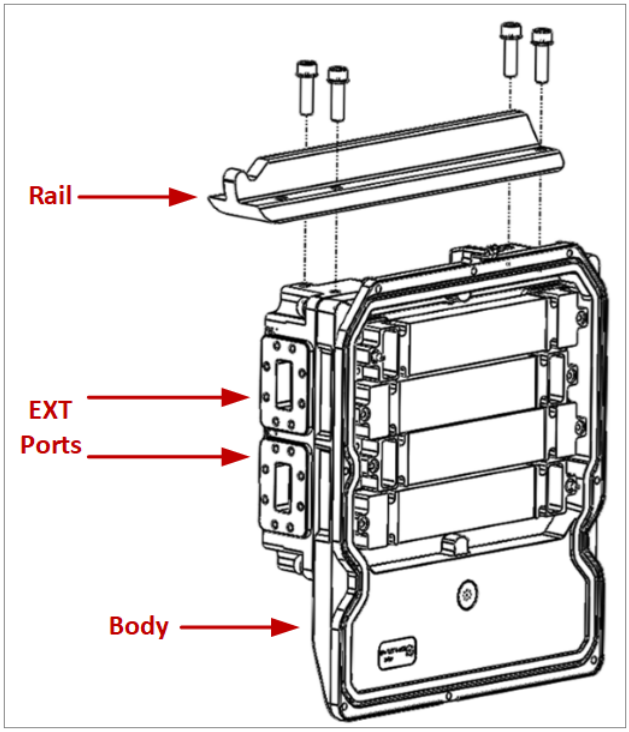


Figure 17: *RFU-D-HP Branching Pole Profile (Part of RFU-D-HP Filters Remote Mount Kit)*

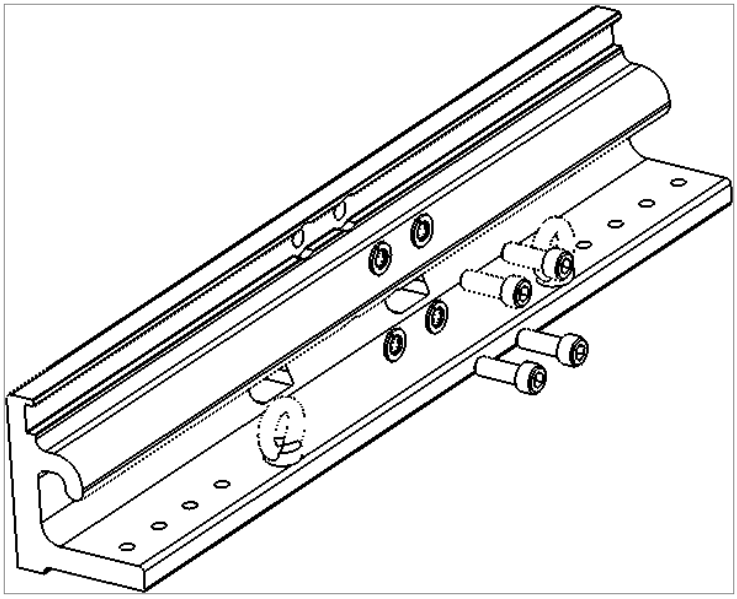


Figure 18: *RFU-D-HP OCU Unit – Exit (EXT) and Antenna (ANT) Ports)*

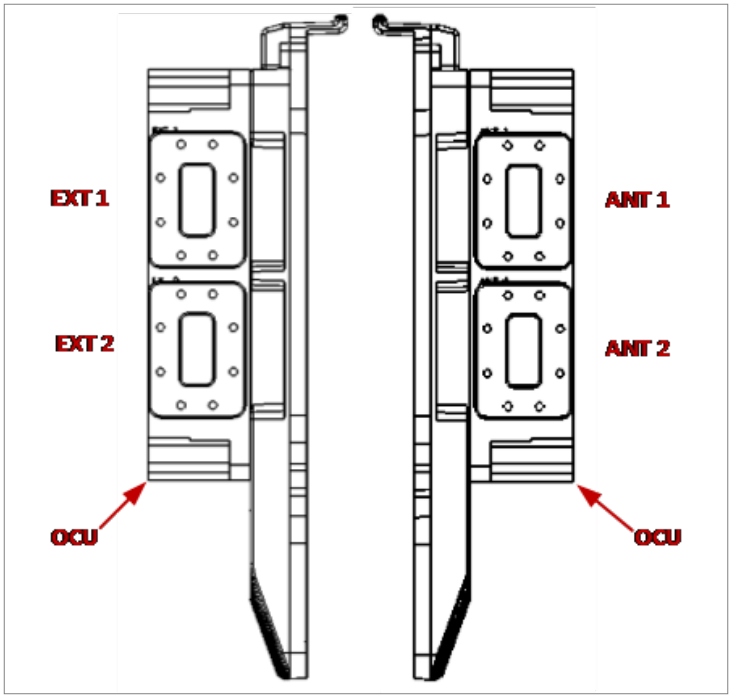


Figure 19: *Short U-Bend*

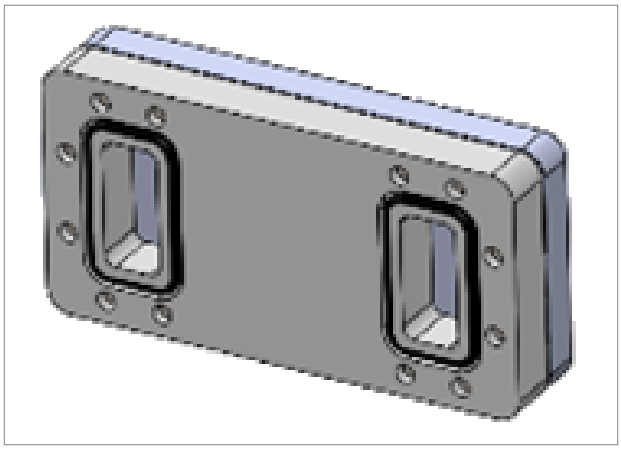


Figure 20: *Long U-Bend*

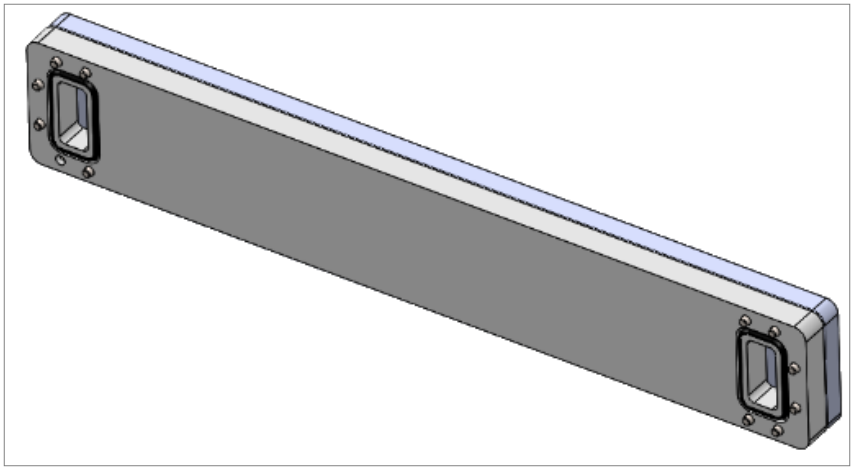


Figure 21: *Splitter/Coupler*

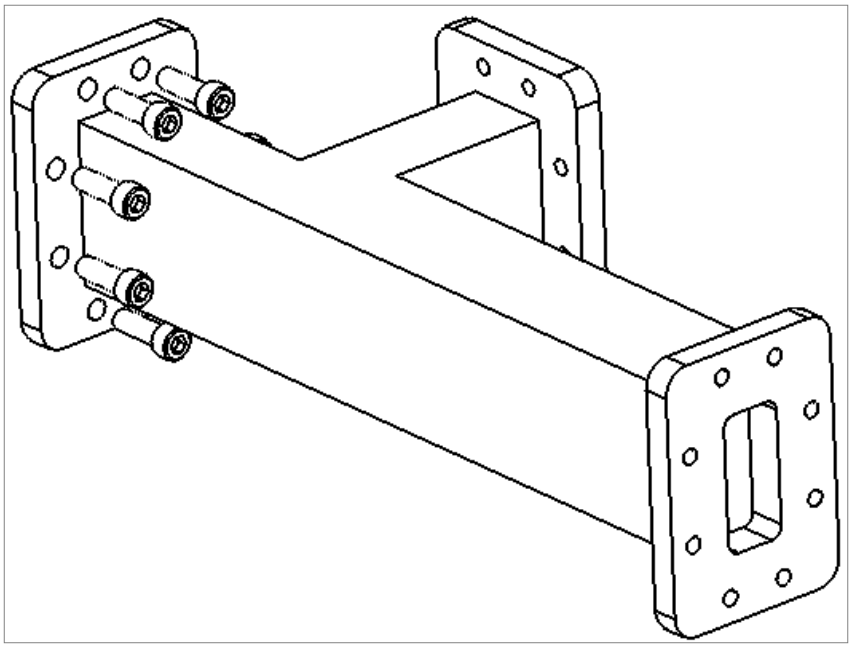
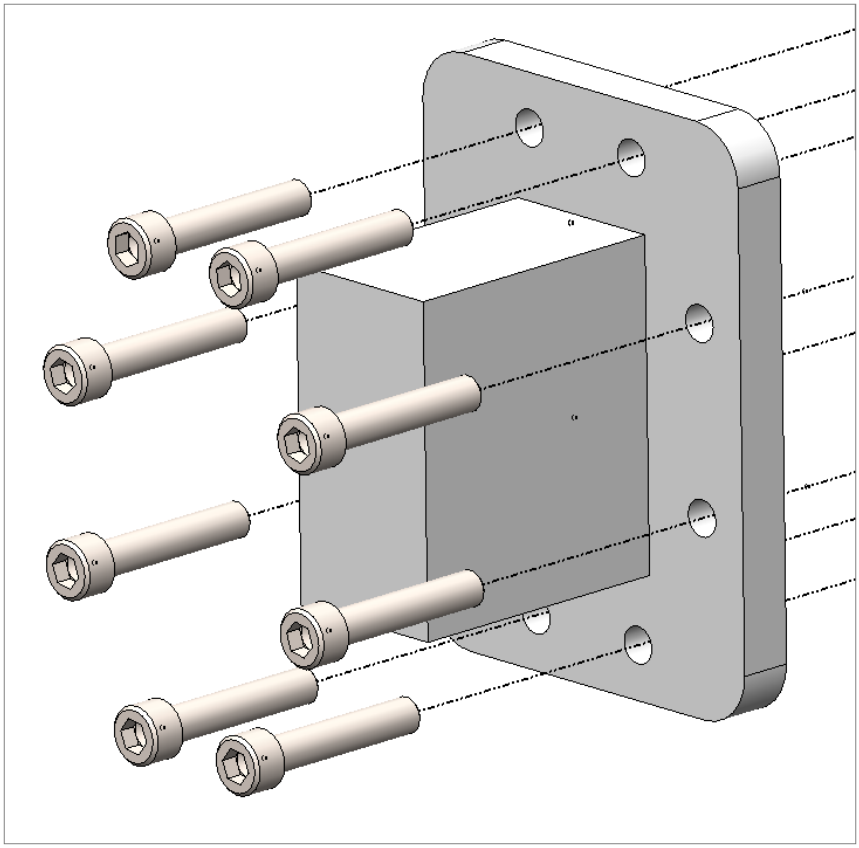


Figure 22: *Termination*



RFU-D-HP Models and Marketing Models

This section provides marketing models for radio and diplexer units, as well as mediation devices used in the various configurations described in this manual.

For a list of available Flexible Waveguides and their marketing models, refer to the latest Cambium Price List.

Note:

Refer to the product roadmap for availability of RFU-D-HP in a specific band, as well as the availability of any specific mediation device.

Presenting a specific component in this manual does not indicate that it is available for ordering. Please consult with your pre-sales engineer for specific component availability information.

Marketing Models for Radio Unit

The following table lists and describes the available RFU-D-HP models for the radio unit, which is sub-band generic.

An additional RFU-D-HP hardware option provides a single transmitter and two receivers. This option is optimized for Internal BBC Space Diversity configurations, which utilize a single transmitter and two receivers. It can also be used for any other RFU-D-HP configurations that require only one radio carrier.

The marketing models in Table 1 can be used for the single-transmitter, dual-receiver option by simply adding "-SD" to the marketing model. For example, use RFU-D-HP-06-SD for a single-transmitter RFU-D-HP for 6 GHz.

Note:

The single-transmitter, dual-receiver option can be used with Internal Space Diversity configurations.

Table 1 *RFU-D-HP Marketing Models – Radio Unit*

Marketing Model	Description
RFU-D-HP-04L	RFU-D-HP 4GHz lower band Split Mount Radio Unit
RFU-D-HP-04H	RFU-D-HP 4GHz higher band Split Mount Radio Unit
RFU-D-HP-05	RFU-D-HP 5GHz Split Mount Radio Unit
C060082R239A	RFU-D-HP, Dual TX, 06 GHz, Split, Basic Radio
RFU-D-HP-07	RFU-D-HP 7GHz Split Mount Radio Unit
C080082R175A	RFU-D-HP, Dual TX, 08 GHz, Split, Basic Radio
C110082R149A	RFU-D-HP, Dual TX, 11 GHz, Split, Basic Radio
RFU-D-HP-04L-SD	RFU-D-HP, Single TX, Dual RX, 4L GHz, Split, Basic Radio (1T2R).
RFU-D-HP-04H-SD	RFU-D-HP, Single TX, Dual RX, 4H GHz, Split, Basic Radio (1T2R)
RFU-D-HP-05-SD	RFU-D-HP, Single TX, Dual RX, 05 GHz, Split, Basic Radio (1T2R)
RFU-D-HP-06-SD	RFU-D-HP, Single TX, Dual RX, 06 GHz, Split, Basic Radio (1T2R)
RFU-D-HP-07-SD	RFU-D-HP, Single TX, Dual RX, 07 GHz, Split, Basic Radio (1T2R)
RFU-D-HP-08-SD	RFU-D-HP, Single TX, Dual RX, 08 GHz, Split, Basic Radio (1T2R)
RFU-D-HP-11-SD	RFU-D-HP, Single TX, Dual RX, 11 GHz, Split, Basic Radio (1T2R)

Marketing Models for Diplexer Unit

This section explains how to read marketing models for the RFU-D-HP diplexer. Constructing a marketing model for the purpose of equipment order should always be done using a configurator.

The marketing model syntax for the diplexer unit can be one of the following:

- DXDHff-xxxY-ccN-t
- DXDHff-xxxY-ccNdd-t
- DXDHff-xxxY-ccWdd-t

- DXDHff-xxxY-ccN-eeN-t
- DXDHff-xxxY-ccNdd-eeNgg-t
- DXDHff-xxxY-ccWdd-eeWgg-t

The placeholders in this structure are described in Table 2.

Note:

Not all fields are always necessary to define a valid marketing model. If a specific field is not applicable, it should be omitted.

Table 2 *Placeholder Definitions for Diplexer Marketing Models*

Placeholder in Marketing Model	Description	Possible Values
ff	Frequency band	04, 05, L6,U6,7,8,10,11
xxxY	TX-RX separation and block indication (Cambium internal)	xxx - TRS 3 figures in [MHz]. Y - Letter to indicate frequency block. **Example**: 266A The frequency block is a Cambium internal parameter which defines different channelization using the same TRS and frequency band.
ccNdd, eeNgg OR ccWdd, eeWgg	Channel indication or blank	{Start ch}N/W{End ch} Examples: 10N15, 01W04 (eeWgg or eeNgg are optional, for use when two different diplexers are used. For example: 1W5, 10W15) When using different diplexer types. ccNdd or ccWdd indicates the diplexer associated with Antenna Port 1 and eeNgg or eeWgg indicates the diplexer associated with Antenna Port 2.
t	TX low / TX high indication	L – TX Low H – TX high

Table 3 provides examples of specific RFU-D-HP DXU marketing models based on the syntax described above.

Table 3 *RFU-D-HP Diplexers Unit Marketing Model Example*

Marketing Model	Description
DXDH08-119A-01W03-L	RFU-D-HP Diplexers Unit, 8GHz, TRS=119MHz, two identical Diplexers Uniting channels 1 to 3, TX low
DXDHL6-252A-05N06-01N02-H	RFU-D-HP Diplexers Unit, L6GHz, 252MHz TRS, different Diplexers Uniting channels 5 to 6 on Antenna Port 1 and 1 to 2 on Antenna port 2, TX high

Note:

In case of different channel designators, the 1st set of channels designators refer to Port

Antenna 1 and the 2nd set of designators refer to Port Antenna 2.

Marketing Models for Mediation Devices in Diplexer-Based Branching

Table 4 *Marketing Models for Mediation Devices (Diplexer-Based Branching)*

Marketing Model	Description
DXDH-MD-OMT-ff	RFU-D-HP Diplexers Based Branching OMT Unit, ff GHz
DXDH-MD-SPLTR-ff	RFU-D-HP DPX Based Branching Splitter Unit,ff GHz
DXDH-MD-DUAL-CPLR-ff	RFU-D-HP Diplexers Based Branching Dual Coupler Unit, ff GHz
DXDH-MD-DUAL-SPLTR-ff	RFU-D-HP Diplexers Based Branching Dual Splitter Unit, ff GHz
DXDH-MD-DUAL-CIRC-ff	RFU-D-HP Diplexers Based Branching Dual Circulator Unit, ff GHz
DXDH-MD-SD-ff	RFU-D-HP Diplexers Based Branching Space Diversity Unit, ff GHz
N000082L166A	RFU-D-HP RM kit for Direct Mount Mediation Dev.
DXDH-RM-MOUNT-ADPT-ff	RFU-D-HP DC Adaptor Remote Mount Kit, ff GHz
DXDH-RM-MOUNT-ADPT-1P-ff	RFU-D-HP Adapter For Single Port Kit, ff GHz
DXDH-RM-MOUNT-kit-4-5	RFU-D-HP Remote Mount Kit 4-5GHz
DXDH-RM-OMT-ADPT-ff	RFU-D-HP DC OMT Adaptor, ff GHz
DXDH-MD-DUAL-CIRC-ff	RFU-D-HP DPX Based Branch. Dual Circ Unit, ff GHz
DXDH-MD-PLATE-ADAPT-ff	RFU-D-HP OMT Plate Adaptor, ff GHz
FXDH-RM-TERM-ff	RFU-D-HP PDR48 WG termination kit, ff GHz

Where

Place Holder in Marketing Model	Possible Values
ff	04, 05, 06, 7_8, 11

Table 5 *Antenna Circ. Adapters for OMT*

Note:

This adapter is not required if the antenna is equipped with a circular feeder. Such antenna will have the following marketing model structure: Am-size(ft)-freq-CIRC-mnf.

Antenna Circ. Adapters for OMT	6 GHz	7-8 GHz	10-11 GHz
CommScope	RFU-C6-OMT-INT-A	RFU-C7_8-OMT-INT-A	RFU-C10_11-OMT-INT-A

Antenna Circ. Adapters for OMT	6 GHz	7-8 GHz	10-11 GHz
Radio Waves	RFU-C6L-OMT-INT-RW /RFU-C6H-OMT-INT-RW	RFU-C7_8-OMT-INT-RW	RFU-C10_11-OMT-INT-RW
Xian Putian (Cambium branding)	RFU-C6-OMT-INT-CR	RFU-C7_8-OMT-INT-CR	RFU-C10_11-OMT-INT-CR
Xian Putian (OEM branding)	RFU-C6-OMT-INT-X	RFU-C7_8-OMT-INT-X	RFU-C10_11-OMT-INT-X

Marketing Models for OCU Unit

This section explains how to read marketing models for the RFU-D-HP OCU. Constructing a marketing model for the purpose of equipment order should always be done using a configurator.

The OCU uses the following marketing model structure:

FXDHff-xxxYZccT-mmmNZddT-t

The placeholders in this structure are described in Table 6.

Note:

Not all fields are always necessary to define a valid marketing model. If a specific field is not applicable, it should be omitted.

Table 6 *Placeholder Definitions for OCU Marketing Models*

Placeholder in Marketing Model	Description	Possible Values
ff	Frequency band	L6,U6,07,08,11
xxxY, mmmN	1st Channel Filter TRS and block indication (Cambium internal)	xxx - TRS 3 figures in [MHz]. Y - Letter to indicate frequency block. Example: 266A The frequency block is a Cambium internal parameter which defines different channelization using the same TRS and frequency band.
Z, N	Indicating the Channel Filter channel bandwidth designator	Channel Filters Channel Bandwidth Designator {A/B/C/D/E} A = 28 MHz B = 40 MHz C = 56MHz D = 80 MHz E = 112 MHz
Cc, dd	Indicating the Channel Number in the Block	

Placeholder in Marketing Model	Description	Possible Values
T	Indicating the filter type	Filter Type {N/A} N = Standard Filter A = Adjacent Channel Filter
t	TX low / TX high indication	L – TX Low H – TX high

The following are some examples of specific RFU-D-HP OCU marketing models based on the syntax specified above.

Table 7 *RFU-D-HP OCU Marketing Model Example*

Marketing Model Example	Description
FXDH6H-340FA02A-310AB04N-H	Channel Filters cover for RFU-D-HP, Upper 6 GHz with 1st Filters block TRS block 340F, 28 MHz channels number 02 Adjacent and 2nd Filters block TRS block 310A, 40 MHz channels number 04 Narrow, High

Marketing Models for Mediation Devices in Channel Filter-Based Branching

The following is a list of RFU-D-HP Channel Filter Branching units. These Branching units are used to build various RFU-D-HP configurations.

Table 8 *RFU-D-HP Branching Unit Marketing Models*

Marketing Model	Description
FXDH-RM-MOUNT-kit	RFU-D-HP OCU Mounting Kit
FXDH-RM-U-Bend-ff	RFU-D-HP Filters Cover Branching U Bend
FXDH-RM-LU-Bend-ff	RFU-D-HP FLT Cover Branch. Long U Bend
FXDH-RM-Term-ff	RFU-D-HP PDRxx/CPRyyyG WG termination kit
FXDH-RM-MD-SPLTR-ff	RFU-D-HP Filters Cover Branching Splitter MD Unit, ff GHz
FXDH-RM-MD-CPLR-ff	RFU-D-HP Filters Cover Branching Coupler MD Unit, ff GHz

In these marketing models, *ff* represents the frequency. Possible values are: 04, 05, 06, 7_8, and 11.

xx and yyy changes according to the frequency band.

Antenna Connection

RFU-D-HP can be mounted directly for 6 to 11 GHz using the following antenna types (for integrated antennas, specific antennas are required):

- Cambium Am series
- CommScope: VHLP series
- Xian Putian: WTC/WTG 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 tables below may also be used.

Table 9 *Antenna Flanges – Waveguide Flanges for Diplexer-Based Branching*

Frequency Band	Range (GHz)	Rect. WG Flange Des.	Radio Side (Remote) Flange Des.
4 GHz	3.6-4.2	WR229	UDR40
5 GHz	4.4-5.0	WR187	UDR48
6(L/U) GHz	5.8-7.1	WR137	UDR70 **Note**: There is no direct WG connection. An adaptor is required to connect the RFU to the WG.
7/8 GHz	7.1-8.5	WR112	UDR841
10/11 GHz	10.0-11.7	WR90	UDR1001

Table 10 *Antenna Flanges – Waveguide Flanges for Channel Filter-Based Branching*

Frequency Band	Range (GHz)	Rect. WG Flange Des.	Radio Side (Remote) Flange Des.
4 GHz	3.6-4.2	WR229	UDR40
5 GHz	4.4-5.0	WR187	UDR48
6(L/U) GHz	5.8-7.1	WR137	CPR137
7/8 GHz	7.1-8.5	WR112	CPR112
10/11 GHz	10.0-11.7	WR90	CPR90

If a different antenna type (CPR flange) is used, a flange adaptor is required. Please contact your Cambium representative for details.

Note:

Appropriate lubricant or grease can be applied to the screws that connect the RFU-D-HP to the antenna interface.

Power Specifications

Electrical Requirements

- Maximum Power Consumption: 130W

Important Notes!

- The unit must only be installed by service personnel.
- The unit must have a permanent connection to protective grounding.
- When using an external power source, the disconnect device (circuit breaker):
- Shall 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: -33°C (-27°F) to +55°C (131°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

Grounding the RFU-D-HP

Note:

The RFU-D-HP is internally grounded on the positive (+) side.

The grounding of the RFU-D-HP must be connected with a grounding cable to the closest main grounding point. The grounding cable must be at least 6 AWG or wider. The recommended length of the grounding cable is up to 2 meters, but in any case not more than 6 meters. The recommended resistance between the tower's main grounding point and the RFU-D-HP chassis is 2.5 mΩ or less, but in any case not more than 10 mΩ.

List of Items

Table 11 *Grounding Cable*

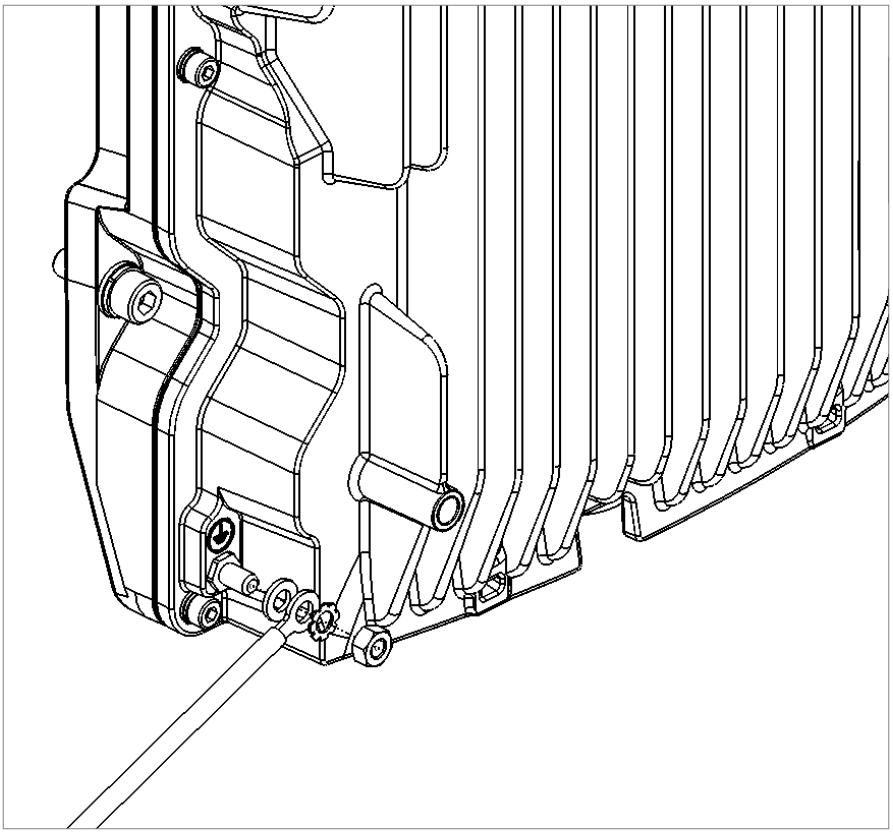
Marketing Model	Marketing Description	Quantity
N000082L116A	CABLE,1/4 INCH TO 1/4 INCH LUGS,1M,6AWG,GND	1

Required Tools

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

Procedure

1. On the front of each RFU-D-HP 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 RFU-D-HP 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 earthing screw terminal shall be permanently connected to protective earth in a building installation in accordance with applicable national code and regulations by a service person.

Any outdoor antenna cable shield shall be permanently connected to protective earth in a building installation.

Connecting the Data and Power Cables

RFU-D-HP is connected to the IDU via a standard CAT-5e or preferably CAT-6/6a cable, with RJ-45 connectors on the RFU and an RJ-45 connector on the IDU. They can also be connected to the IDU over optical fiber cables via the optical (SFP) RFU connections on the IDU.

Note:

For a description of the data and power interfaces, see Figure 4.

An external DC power cable is required to supply power to the RFU. The DC power cable is connected to the DC power interface (PWR).

CAT-5e/CAT-6 cables are connected to P1.

Optical fiber cables are connected to P2.

Table 12 *Maximum Cable Length*

Interface	Cable Type	Maximum Length	
Optical	Fiber	300m	
Electrical	CAT-5e (24 AWG)	150m	
	CAT-6a (22 AWG)	150m	
		2+0	**1+0 SD**
DC Power	DC (14 AWG)	100m	150m
	DC (12 AWG)	150m	220m
	DC (10 AWG)	230m	300m

Grounding the Cables

To fit the gland, the outer cable diameter should be between 6-10 mm.

Cables must be grounded as follows.

- For fiber cables (see Connecting an Optical Fiber Cable and SFP), no grounding is required.
- For DC power cables (see Connecting a DC Power Cable), no grounding is required.
- For CAT-5e/CAT-6 cables (see Connecting a CAT-5e/CAT-6 Data Cable), the shielded Ethernet cable (SF/UTP construction) **must** be grounded to the antenna tower at the top (next to the RFU), the entry to the indoor cabinet, and every 50m using the kit UNIV_GRD_KIT_1/2.

Figure 23: *Cable Grounding*

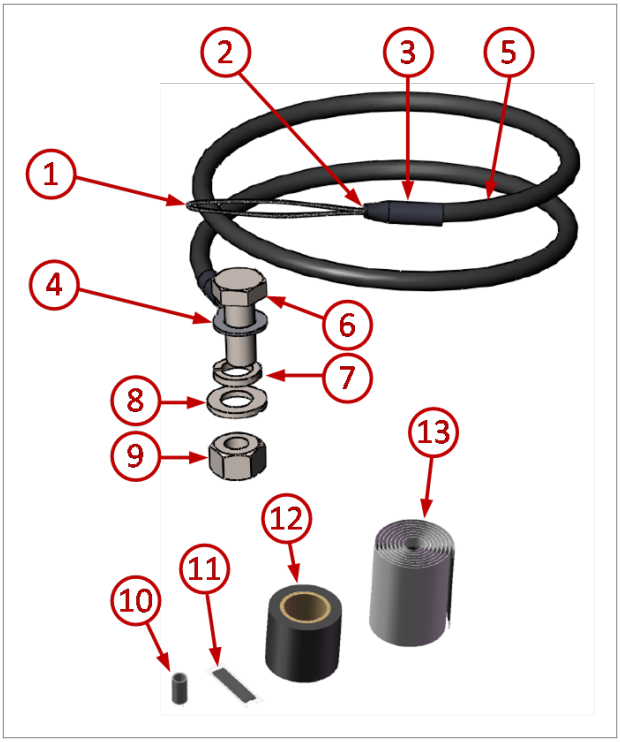
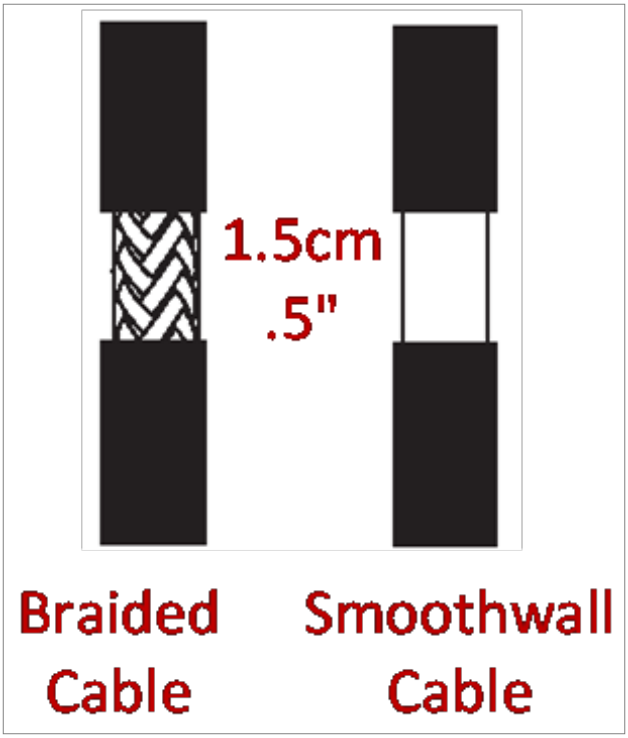


Table 13 *Cable Grounding Kit*

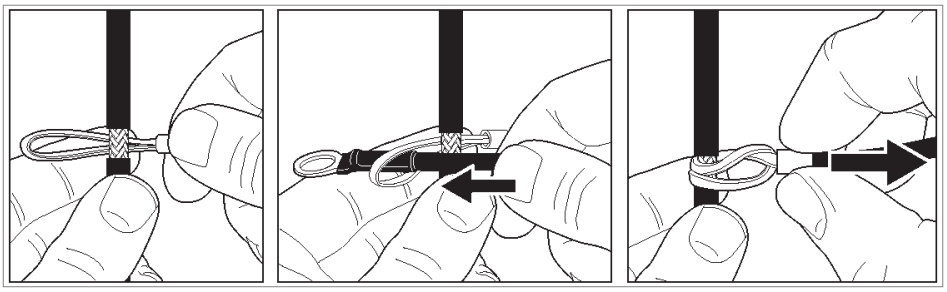
Marketing Model	Description
N000082L173A	Universal Grounding Kit up to 1/2” cable

To connect the grounding kit:

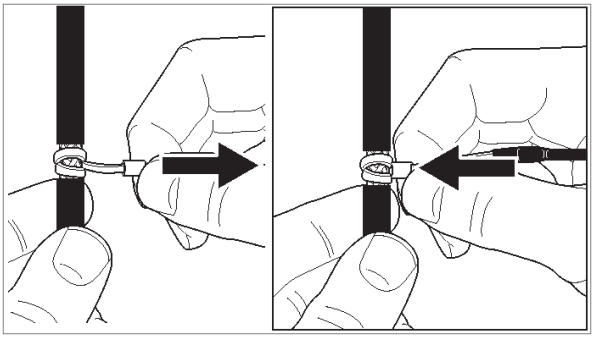
1. Strip the cable jacket about 1.5 cm (.5”).



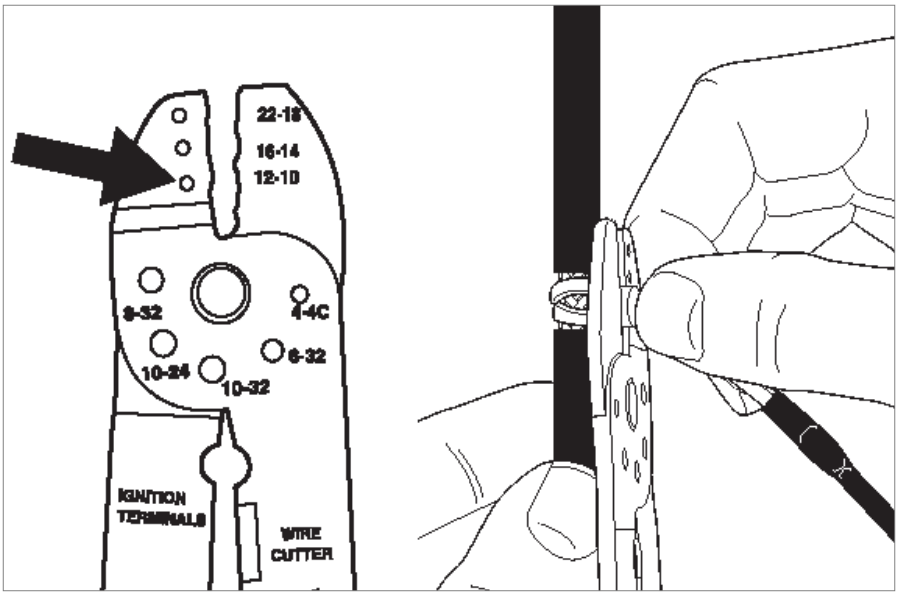
2. Loop the grounding wire’s braid belt (1) around the stripped portion of the cable, insert the rest of the grounding wire (5) through the braid belt, and tighten to form a knot, as shown in the figure below.

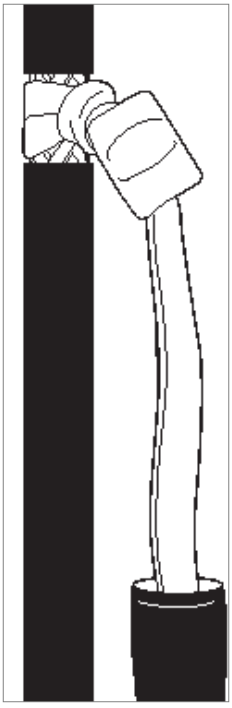


3. Grasp the terminal of the braid belt (2) and slide it flush with the knot around the cable, as shown in the figure below.

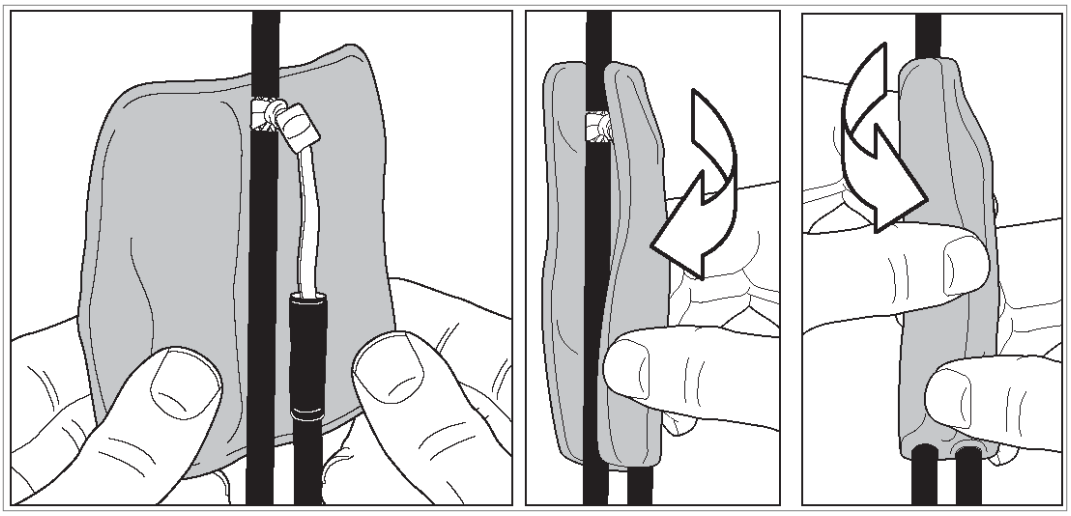


4. Crimp the knotted braid belt (1) and the bare terminal (10) together, as shown in the figures below.

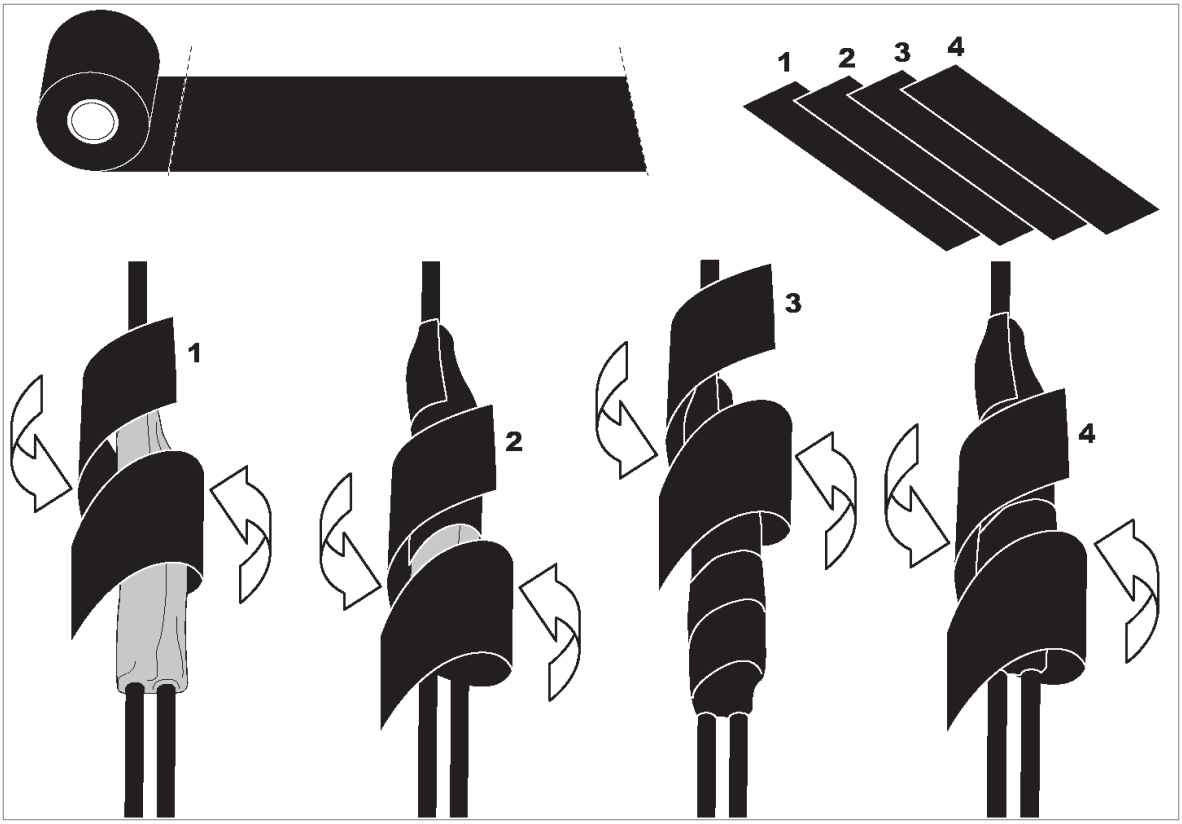


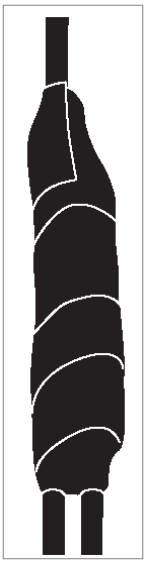


5. Wrap the butyl rubber sealing clay (13) around the cable and the grounding wire, as shown in the figures below.

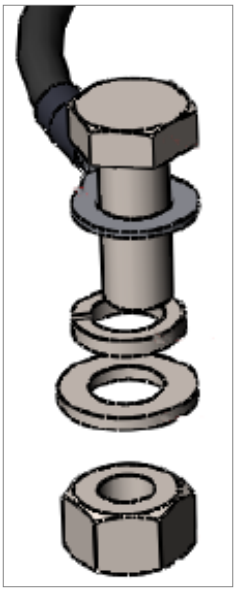


6. Cut four strips of the tape (12), approximately 20 cm (8”) each, and wrap these strips of tape around the butyl rubber sealing clay (13), as shown in the figures below.





7. Pass the hex bolt (6) through the copper lug at the end of the grounding wire (4), and secure it to the grounding bar using the flat washer (7), the spring washer (8), and the nut (9). Use conductive grease (11) on the bolt and nut to ensure proper contact.



Power Source

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

DC power can be from -40.5 to -59 VDC.

Note:

Availability of a UPS (Uninterrupted Power Source), battery backup, and emergency power generator.

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 RFU-D-HP power supply.
Any other connection may cause damage to the system!

Note:

For the warranty to be honored, you must install the RFU-D-HP in accordance with the instructions above.

Surge Protection

RFU-D-HP includes built-in surge protection for its power and RJ-45 data ports (PWR, P1, P4). RFU-D-HP's surge protection implementation for this port complies with EN61000-4-5, Class 4 , provided the cable was prepared according to the instructions in Connecting a CAT-5e/CAT-6 Data Cable .

In areas in which severe lighting conditions are likely to occur, it is strongly recommended to add additional protection by placing lightning protectors on the CAT-5e or CAT-6 cable, near the connection point with the RFU-D-HP unit.

Available Cable Options

Fiber Optic Cables - Single Mode

Table 14 *Fiber Optic Cables - Single Mode*

Marketing Model	Description
N000082L187A	CABLE,FO,DUAL LC/LC,15M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L139A	CABLE,FO,DUAL LC/LC,30M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L140A	CABLE,FO,DUAL LC/LC,50M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L141A	CABLE,FO,DUAL LC/LC,80M,SM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L142A	CABLE,FO,DUAL LC/LC,100M,SM,55mm OPEN END,M28 GLAND,ARMORED
N000082L143A	CABLE,FO,DUAL LC/LC,150M,SM,55mm OPEN END,M28 GLAND,ARMORED

Fiber Optic Cables - Multi Mode

Table 15 *Fiber Optic Cables - Multi Mode*

Marketing Model	Description
PTP 820_FO_MM_LC2LC_ ARM_7m	CABLE,FO,DUAL LC/LC,7M,MM,55mm OPEN END,M28 GLAND,ARMORED,OU

Marketing Model	Description
PTP 820_FO_MM_LC2LC_ ARM_15m	CABLE,FO,DUAL LC/LC,15M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L193A	CABLE,FO,DUAL LC/LC,20M,MM,55mm OPEN END,M28 GLAND,ARMORED
N000082L194A	CABLE,FO,DUAL LC/LC,30M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L195A	CABLE,FO,DUAL LC/LC,50M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L196A	CABLE,FO,DUAL LC/LC,80M,MM,55mm OPEN END,M28 GLAND,ARMORED,O
N000082L197A	CABLE,FO,DUAL LC/LC,100M,MM,55mm OPEN END,M28 GLAND,ARMORED
N000082L198A	CABLE,FO,DUAL LC/LC,150M,MM,55mm OPEN END,M28 GLAND,ARMORED
N000082L199A	CABLE,FO,DUAL LC/LC,200M,MM,55mm OPEN END,M28 GLAND,ARMORED

DC Cable and Connectors

Table 16 *DC Cable and Connector*

Marketing Model	Description
N000082L169A	CABLE,MATERIAL,2x14AWG,305M (1000ft),OUTDOOR (RED+BLACK)
N000082L018A	CABLE,MATERIAL,2x12AWG,305M,OUTDOOR
N000082L181A	CABLE,TB 5.00mm TO OPEN END,150m,10AWG,M28 GLAND,OUTDOOR
N000082L182A	CABLE,TB 5.00mm TO OPEN END,200m,10AWG,M28 GLAND,OUTDOOR
N000082L183A	CABLE,TB 5.00mm TO OPEN END,250m,10AWG,M28 GLAND,OUTDOOR
N000082L184A	CABLE,TB 5.00mm TO OPEN END,300m,10AWG,M28 GLAND,OUTDOOR

Note:

10 AWG cables are supplied with connectors pre-assembled.

Cables for External XPIC, External SD, and ASD Configurations

In External XPIC configurations (configurations in which XPIC is configured between two separate RFUs), External SD configurations, and the dual-RFU side of ASD configurations (including both sides of symmetrical ASD configurations), the Source Sharing cables must be connected between the EXT Ref ports of the RFUs and the Data Sharing cables must be connected between the P3 ports of the RFUs.

Table 17 *Cables for External XPIC, External SD, and ASD Configurations*

Marketing Model	Description
SOURCE_SHARING_5M	Source_Sharing_5m
N000082L064A	CABLE,TNC RA TO TNC,10M,18Ghz,3/8in,HELIAX
N000082L137A	CABLE,TNC RA TO TNC,20M,18Ghz,3/8in,HELIAX
SOURCE_SHARING_30M	Source_Sharing_30m
SOURCE_SHARING_ALL-INDOOR_2M	Source_Sharing_All-Indoor_2m
SOURCE_SHARING_ALL-INDOOR_5m	Source_Sharing_All-Indoor_5m
N000082L215A	CABLE,FO,DUAL LC-LC,1M,MM,55mm,2xM28 GLAND,ARMORED,OUTDOOR
DATA_SHARING_CBL_5m	Fiber Data sharing cable, 5m
DATA_SHRNG_KIT_5m	CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_5M
N000082L063A	PTP 820C MIMO SHARING KIT 10m
N000082L138A	PTP 820C MIMO SHARING KIT 20m
DATA_SHRNG_KIT_30m	CABLE,SFP,4x4MIMO_DATA_SHARING_KIT_30M

Cables for Internal Space Diversity Connections

The LDF4 Jumper assembly cable is used in some Internal Space Diversity configurations. In certain configurations, use of this cable is optional as a substitute for flexible waveguides.

Table 18 *Cables for Internal Space Diversity Connections*

Marketing Model	Description
LDF4-JA-15M/ LDF	LDF4-Jumper assembly 15m, N-male / N-male

Waveguide-Coax Adaptors for Internal Space Diversity Configurations

Table 19 *Waveguide-Coax Adaptors for Space Diversity Connections – Direct Mount*

Marketing Model	Frequency	Imperial/Metric	Description
ADP-WG-PDR70/NF-6H	6H GHz	Metric	WG Coax adapter PDR70/N-female. 5.925-6.425 GHz. Gray, HW kit
ADP-WG-PBR84/NF	7-8 GHz	Metric	Wave Guide to Coax Adapt 7.05-10.0 GHz, for WR112
10_11GHz_C2W_NT_Outdoor	11	Metric	ADAPTOR WG PBR100 N-TYPE,8.2-12.4GHz

Table 20 *Waveguide-Coax Adaptors for Space Diversity Connections – Remote Mount*

Marketing Model	Frequency	Imperial/Metric	Description
ADP-WG-CPR137G/NF	6 GHz	Imperial	Wave Guide to N-type WR137 KIT: CPR137G/F
ADP-WG-CPR112G/NF	7 GHz	Imperial	Wave Guide to N-type WR112 KIT: CPR112G/F
ADP-WG-CPR90G/NF	11 GHz	imperial	Wave Guide to N-type WR90 KIT: CPR90G/F

Ethernet Cable and Specifications

The Ethernet cables used with the RFU-D-HP should meet the following specifications.

Note:

It is strongly recommended to source the CAT-6 cable from Cambium.

Table 21 *Outdoor CAT-5e Cable Specifications – Electrical Requirements*

Cable type	CAT-5e SFUTP, 4 pairs, according to ANSI/TIA/EIA-568-B-2
Stranding	Solid
Conductors	Bare copper wires, 24AWG
Conductors Resistance	Maximum 94Ω/km
Impedance	100Ω
Voltage rating	700V
Shielding	Tinned copper Braid (Coverage: >=80%) + Aluminum Foil applied longitudinally

Table 22 *Outdoor Ethernet Cable – RJ-45 Connector Pinout*

Pin #	Wire Color Legend	Signal
1		TX+

Pin #	Wire Color Legend	Signal
	White/Orange	
2	 Orange	TX-
3	 White/Green	RX+
4	 Blue	TRD2+
5	 White/Blue	TRD2
6	 Green	RX-
7	 White/Brown	TRS3+
8	 Brown	TRD3-

Table 23 *Outdoor CAT-6A Cable Specifications – Electrical Requirements*

Cable type	CAT-6A SFTP, 4 pairs, according to ANSI/TIA/EIA-568-B-2
Stranding	Solid
Conductors	Annealed bare copper solid wires, 22AWG
Conductors Resistance	Maximum 55Ω/km
Impedance	100Ω
Voltage rating	700V
Shielding	Annealed Tinned Copper Braid (Coverage: >=80%) + Aluminum Foil applied longitudinally

Table 24 *Outdoor Ethernet Cable – RJ-45 Connector Pinout*

Pin #	Wire Color Legend	Signal
1	 White/Orange	TX+
2	 Orange	TX-
3		RX+

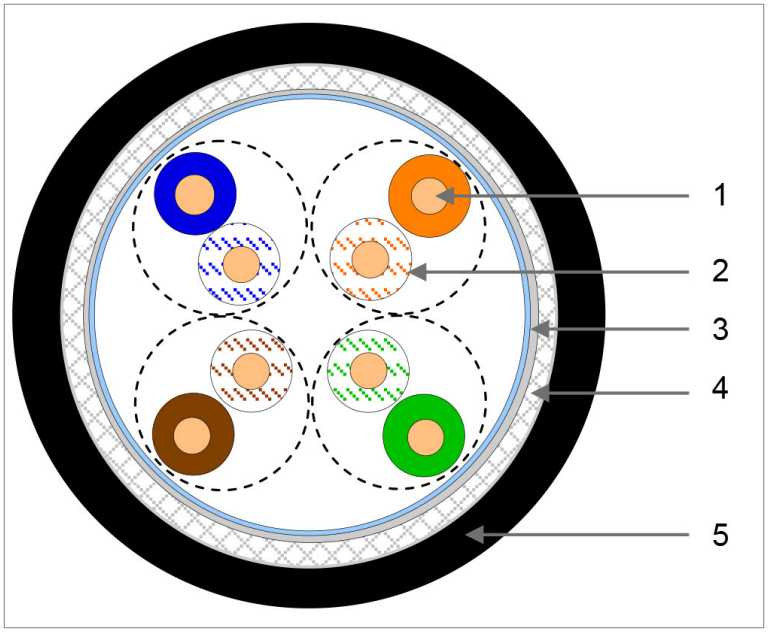
Pin #	Wire Color Legend	Signal
	White/Green	
4	Blue	TRD2+
5	White/Blue	TRD2
6	Green	RX-
7	White/Brown	TRS3+
8	Brown	TRD3-

Table 25 *Outdoor CAT-5e and CAT-6A Cables Specifications – Mechanical/ Environmental Requirements*

Jacket	UV resistant
Outer diameter	6-10 mm
Operating and storage temperature	-40^{0}C to 85^{0}C
Flammability rating	According to UL-1581 VW1, IEC 60332-1
RoHS	According to Directive/2002/95/EC

Cable Design – The numbers in the figure below refer to the items listed beneath the figure.

Figure 24: *Cable Design*



- [1] Conductor
- [2] Insulation
- [3] Screen: Alu/Pet foil. Alu outside
- [4] Tinned copper braid
- [5] Jacket

The following Ethernet cables can be ordered from Cambium. It is strongly recommended to source the CAT-6A cable from Cambium.

Table 26 *CAT-5e Cable and Specifications*

Marketing Model	Description
CAT5E_SFUTP_Outdoor_ 50m	CABLE,RJ45 TO RJ45 STR 50M,CAT-5E,ETHER,UV RES
CAT5E_SFUTP_Outdoor_ 75m	CABLE,RJ45 TO RJ45 STR 75M,CAT-5E,ETHER,UV RES
N000082L016A	CABLE,MATERIAL,CAT-5E,SFUTP,4X2X24AWG,UV RESISTANCE,100M
CAT5E_SFUTP_Outdoor_ 305m_drum	CABLE,MATERIAL,CAT-5E,SFUTP,4X2X24AWG,UV RESISTANCE,305M
CAT5E_Arm_50m	CABLE,RJ45 TO RJ45 STR,50M,CAT-5E,M28 GLAN,ARM,UV RESISTANCE
CAT5E_Arm_70m	CAT5E_Arm_75mCABLE,RJ45 TO RJ45 STR,70M,CAT-5E,M28 GLAN,ARM,UV RESISTANCE
CAT5E_Arm_305m_drum	CABLE,MATERIAL,CAT-5E,FTP,4X2X24AWG,ARMORED,UV RESIST,305M
N000082L172A	CABLE,MATERIAL,CAT-6A,SFTP,4X2X22AWG,UV RESISTANCE,305M

Outdoor DC Cable Specifications

Table 27 *Outdoor DC Cable Specifications – Mechanical/ Environmental Requirements*

Jacket	UV resistant
Outer diameter	7-10 mm
Operating and Storage temperature range	-40°C - 85°C
Flammability rating	According to UL-1581 VW1, IEC 60332-1
RoHS	According to Directive/2002/95/EC

Securing the Cables

All cables should be secured at every meter on-site using either a T-Rups kit, Marketing Model “Outdoor Ties”, 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.

The following cable clamps are available:

Table 28 *Cable Clamps*

Marketing Model	Item Description
N000082L013A	DUAL FEADER CLAMP FOR 4.0-7.0mm CABLE 6 WAY

Special Instructions for use of Glands

Note:

Each RFU-D-HP unit is supplied with two glands. If additional glands are required, they must be ordered separately, in kits of five glands each.

Table 29 *Glands Kit*

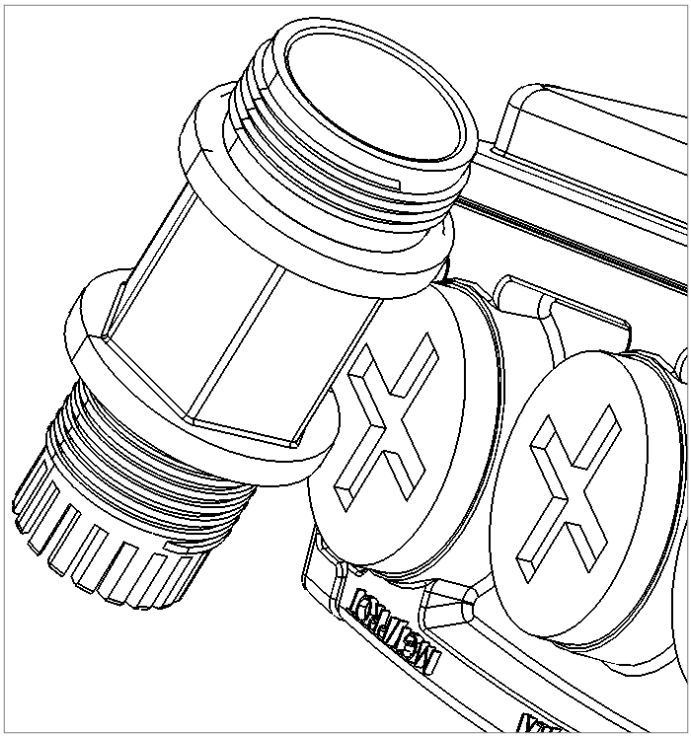
Marketing Model	Marketing Description
N000082L014A	KIT 5pcs of M28 GLAND (AA-0597-0)

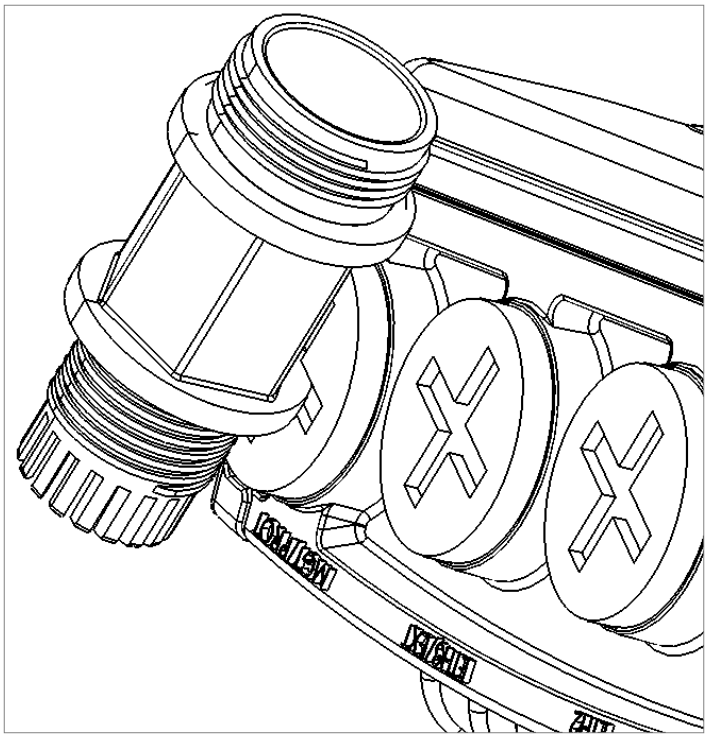
In addition, gland caps can be ordered to protect the cable and connector from damage when elevating the cable and gland to the radio unit. See Step 5. Gland caps are ordered separately, in kits of 10 caps each.

Table 30 *Gland Caps*

Marketing Model	Marketing Description
N800082L009A	KIT 10pcs of M28 Gland Cap With Hook (AA-0678-0)

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

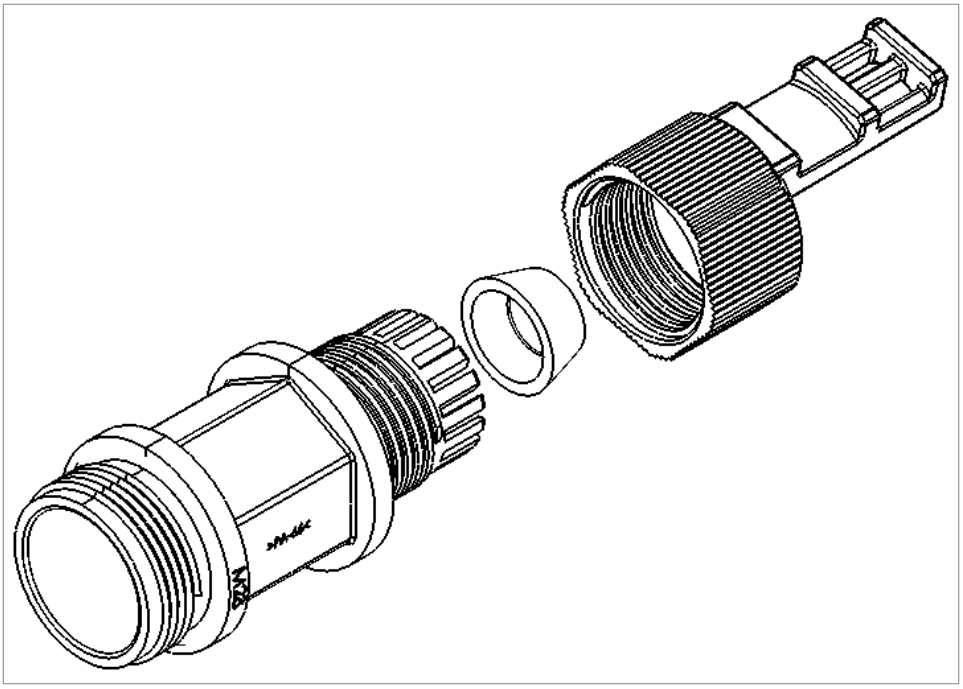




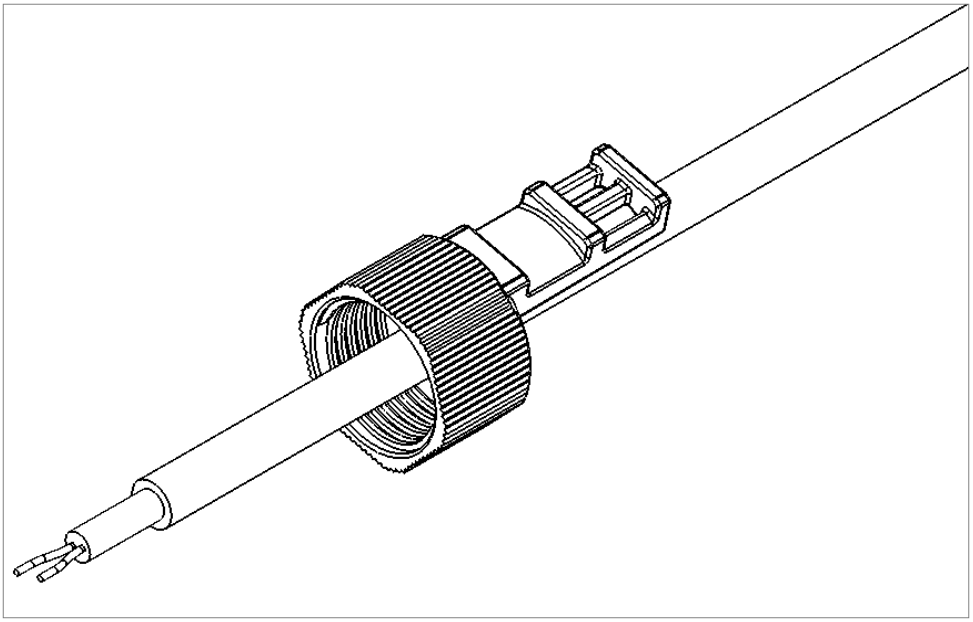
General Installation Procedure

This procedure applies to all cable types, and explains how to install the cables using long glands. The gland is supplied assembled.

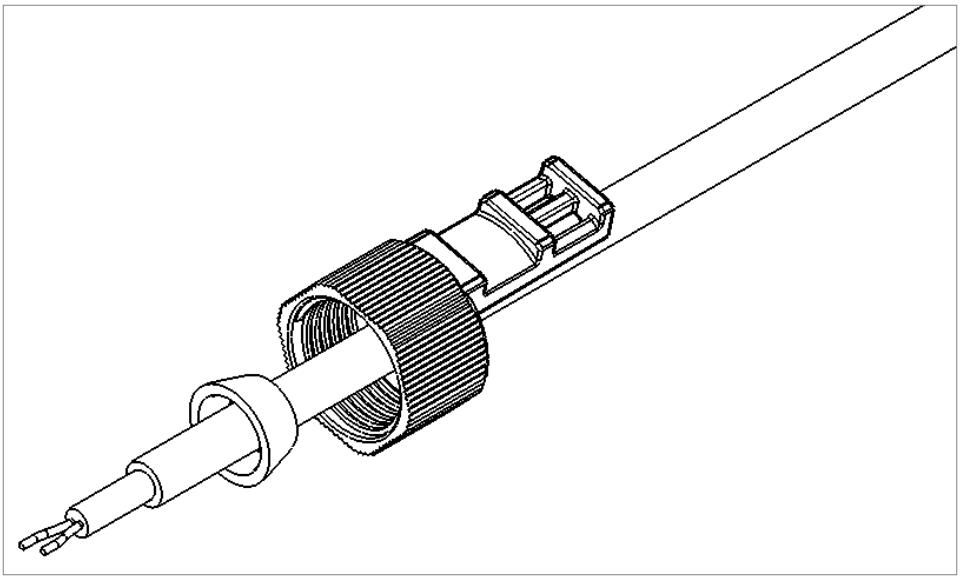
1. Before inserting a cable, you must disassemble the gland cap and gland rubber from the gland body.



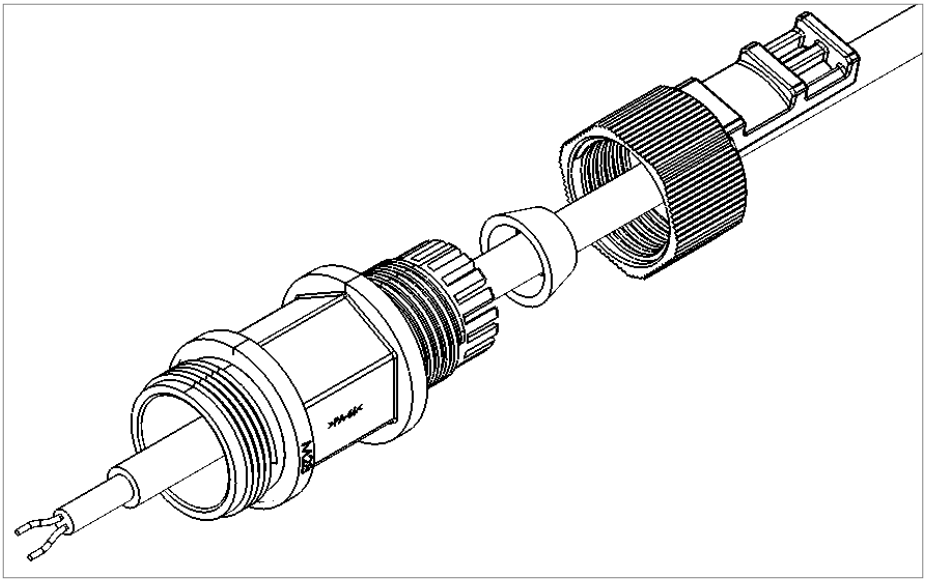
2. Slide the gland cap into the cable.



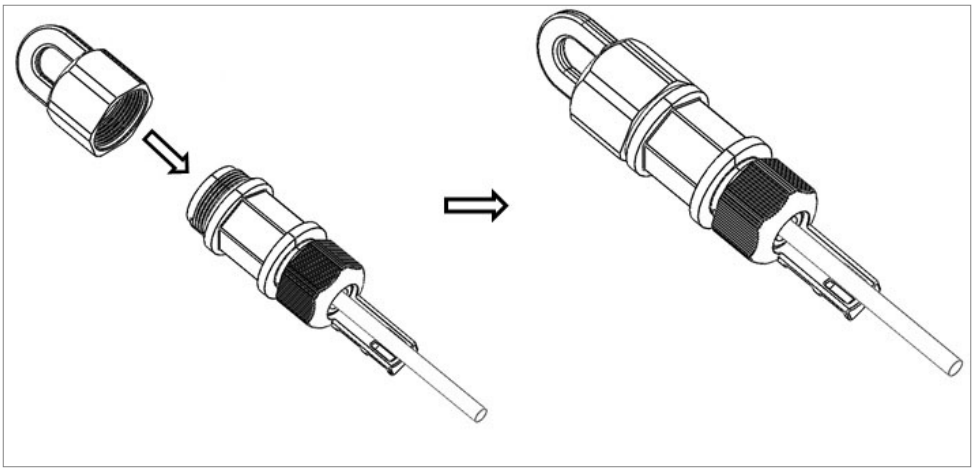
3. Slide the gland rubber into the cable.



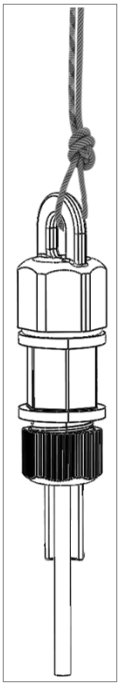
4. Slide the cable into the body of the gland. If you are using a gland cap (see Step 5) make sure to leave enough space for the gland cap to fit into the gland without disturbing the cable.



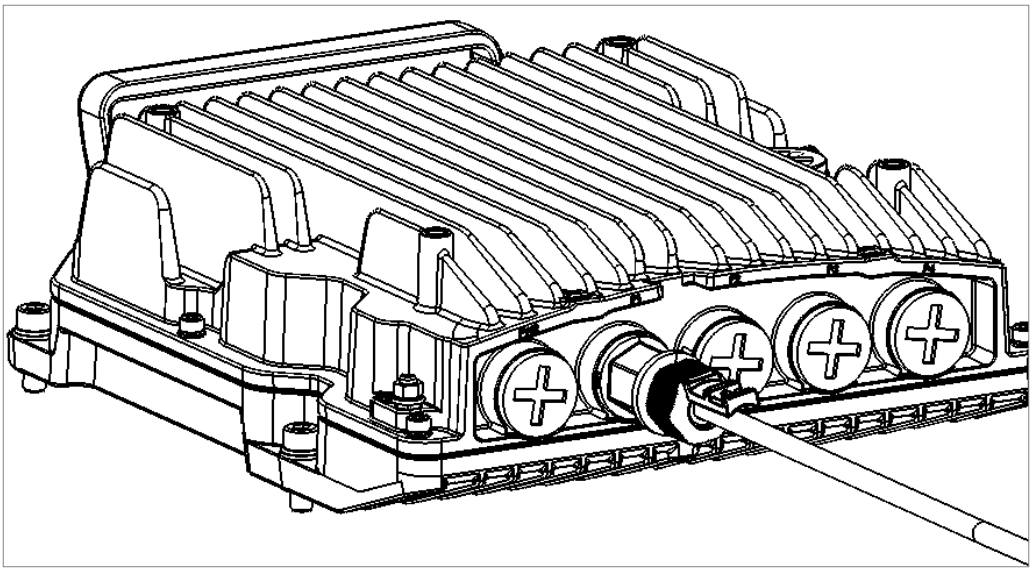
5. Optionally, after securing the cable into the body of the gland, you can close the other side of the gland with an M28 gland cap. The gland cap protects the cable and connector from damage when elevating the cable and gland to the radio unit.



6. The M28 gland cap has a hook on top. After attaching the gland cap to the gland, you can connect a rope to the hook and use this to lift the gland and cable up to the radio unit. Before screwing the gland into the radio unit, you must remove the gland cap.



7. If you used an M28 gland cap 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.



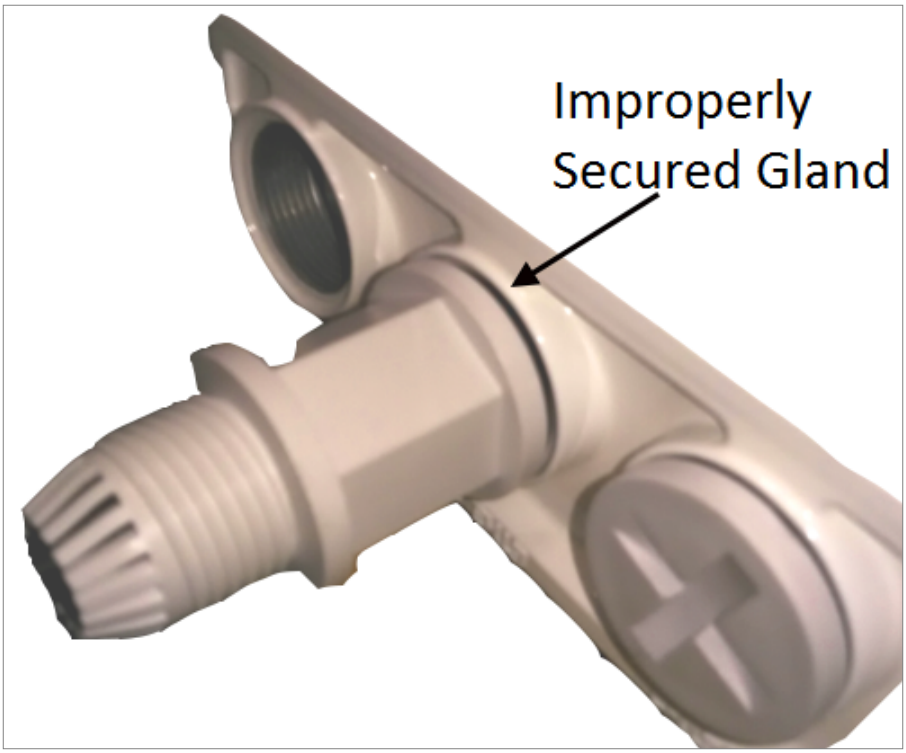
Note:

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

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.

Note:

Pay attention that the gland rubber is properly located and not damaged during the tightening of the gland cap.
If the gland thread is damaged do not use it!



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.

Figure 25: *Tightening the Front Portion of the Gland*

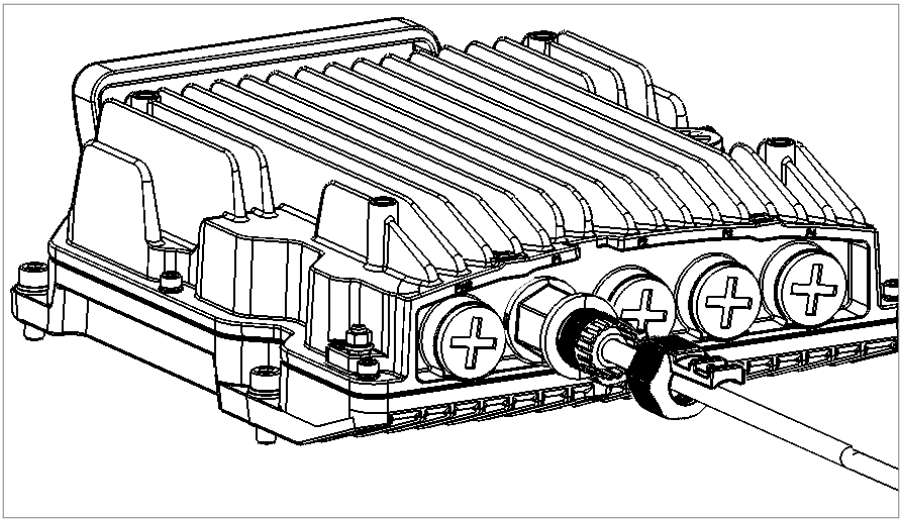
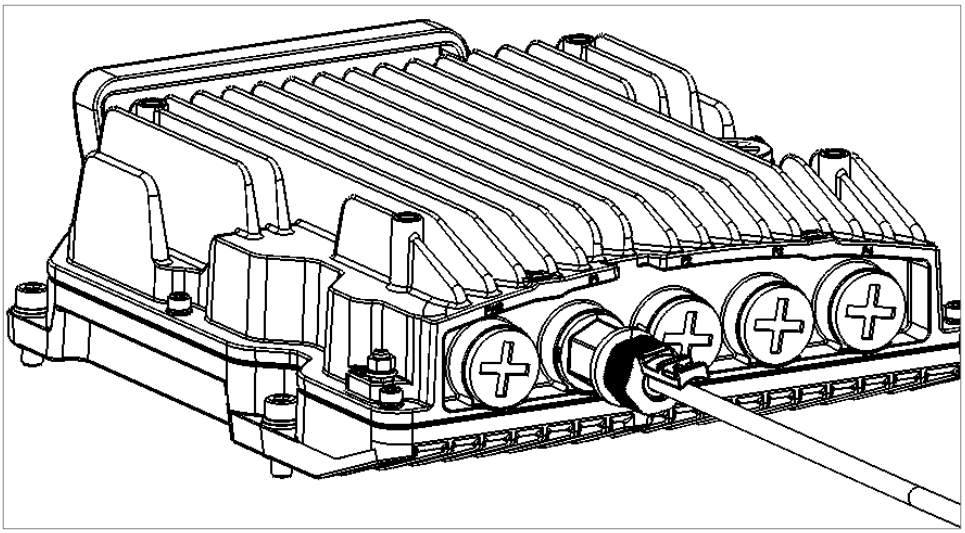
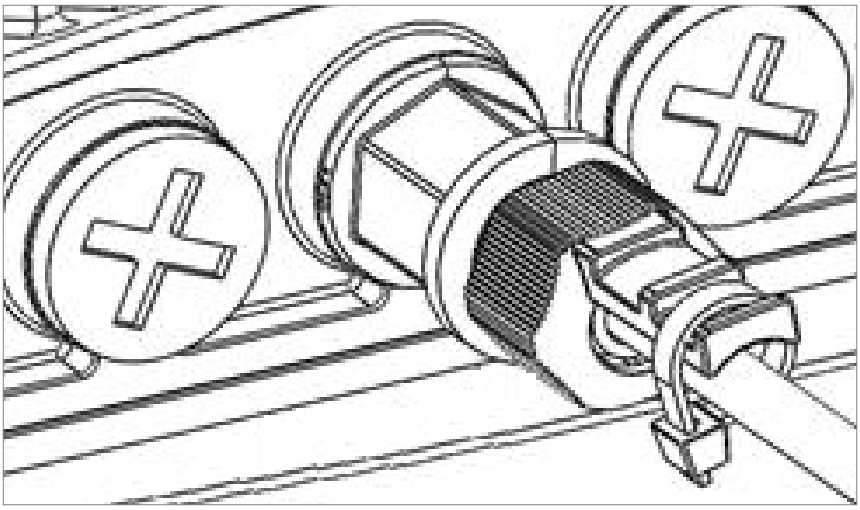


Figure 26: *Tightening the Rear Portion of the Gland*



12. Secure the cable to the lip of the gland using a tie wrap.

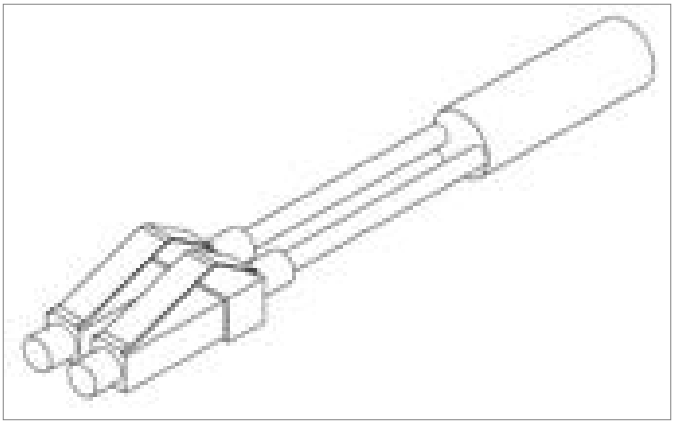


Connecting an Optical Fiber Cable and SFP

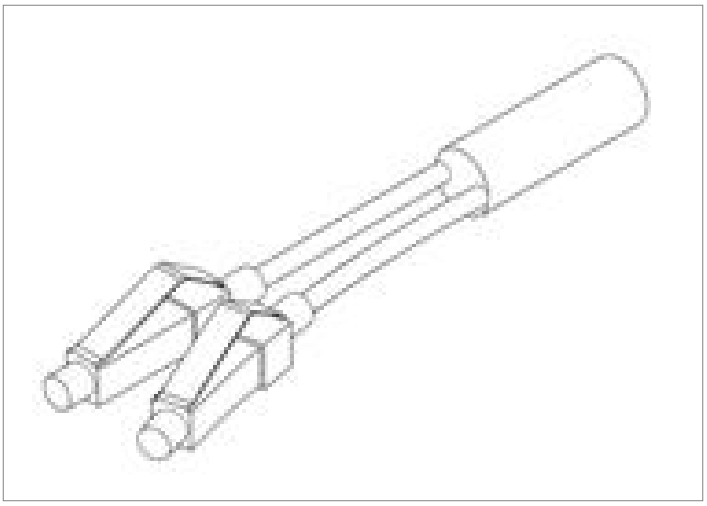
When using an optical fiber cable, the cable must be inserted in port P2. A separate DC power cable must be used to connect the RFU-D-HP to an external power source. See Connecting a DC Power Cable.

To connect an optical fiber cable and the SFP transceiver:

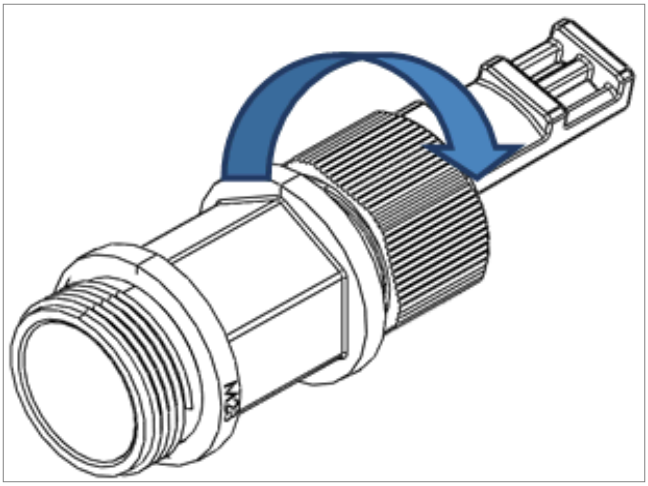
1. Use a pre-assembled cable.

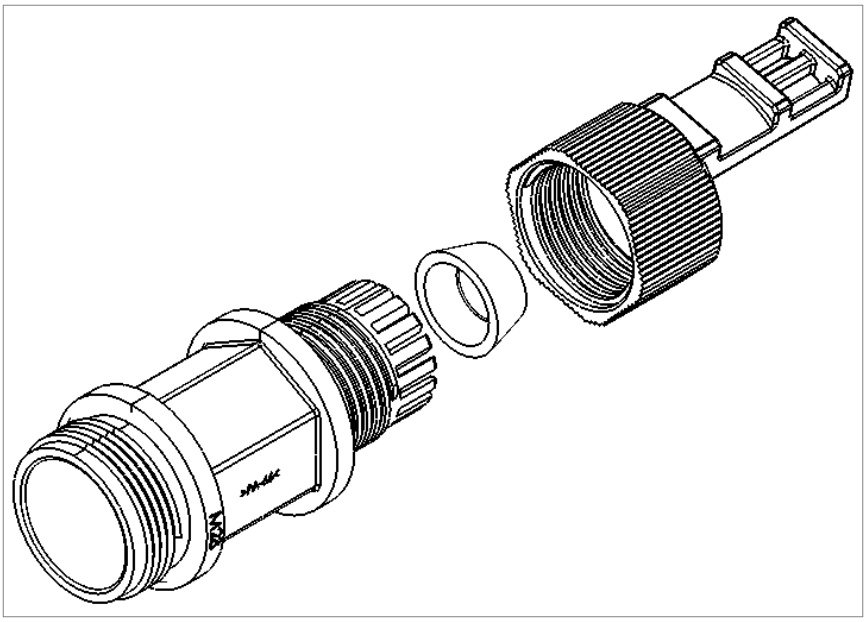


2. Split the connector into two separate LC connectors (one for each fiber).

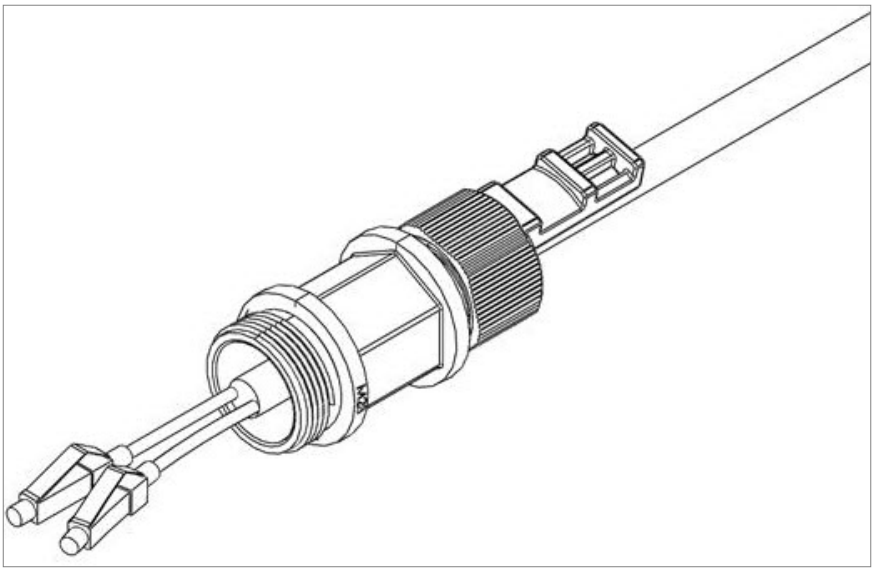


3. Remove the gland cap and rubber from the gland body.

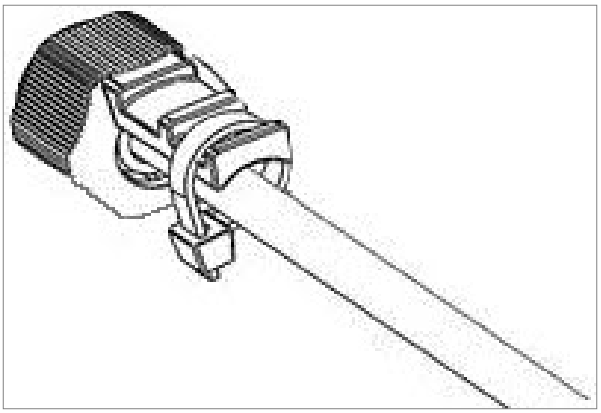




4. Slide the gland cap into the cable.
5. Slide the rubber into the cable.
6. Insert the fibers with the connectors one by one into the cable gland.



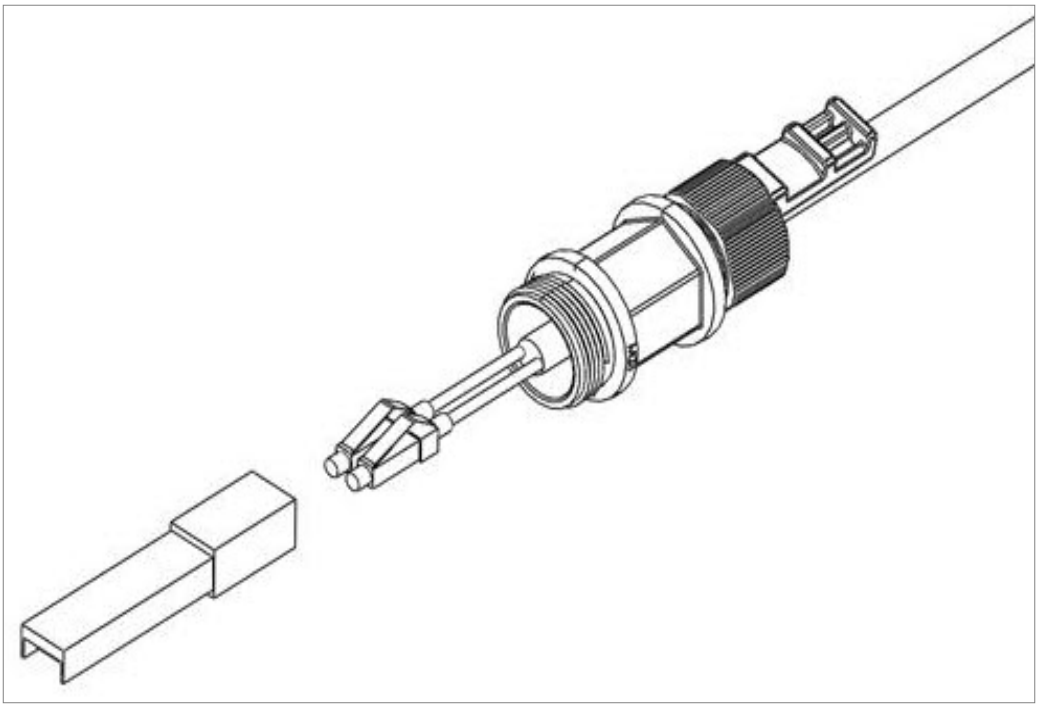
7. Secure the cable to the lip of the gland using a tie wrap.



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.

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

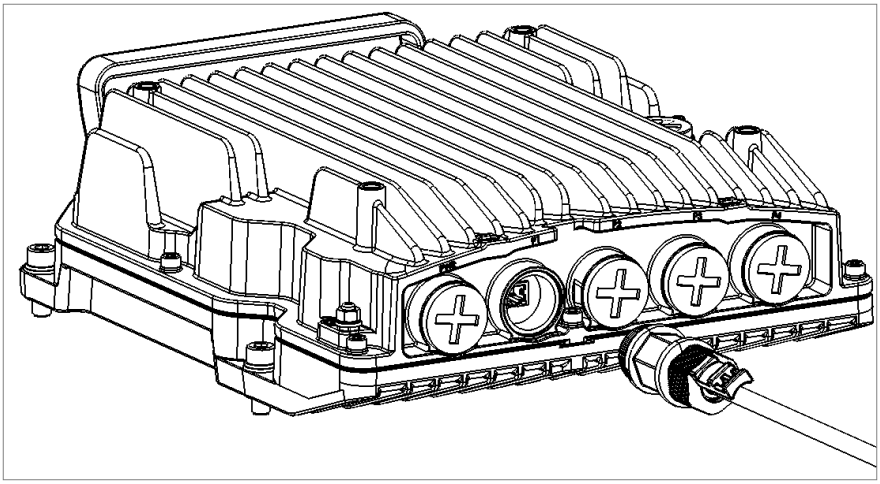


9. Remove the tie wrap securing the cable to the gland.

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.

10. Connect the connector into the RFU-D-HP 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.

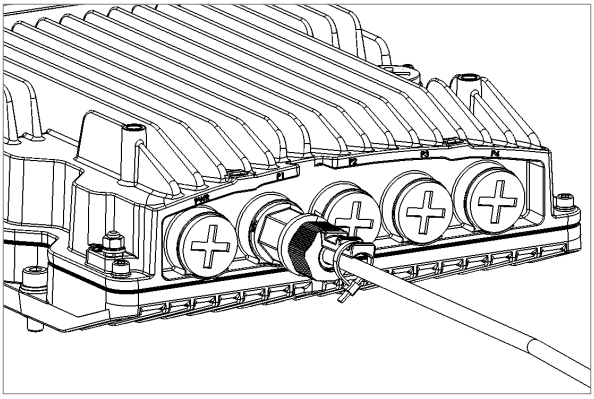
Note:

Before tightening the gland, make sure the gland is aligned with the tapped 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.

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

A DC power cable must be connected to port P1 to provide power from an external power source to the RFU.

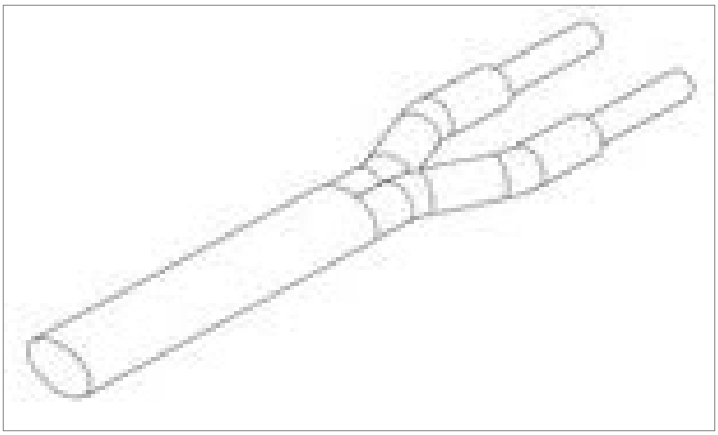
If you are assembling the cable using *OUTDOOR_DC_CBL_2X14AWG_DRUM* with *PTP 820C_DC_Conn* or *Outdoor_DC_cbl_2x12AWG_drum* with *PTP 820C_DC_Conn_12AWG*, follow the instructions in Section Assembling a DC Power Cable. Then, proceed to Section Connecting the DC Power Cable.

If you are using a power cable in which the DC connector is pre-assembled to the cable (*OD-CBL-DC-TB-OE-10AWG-xxxm*), proceed directly to Section Connecting the DC Power Cable.

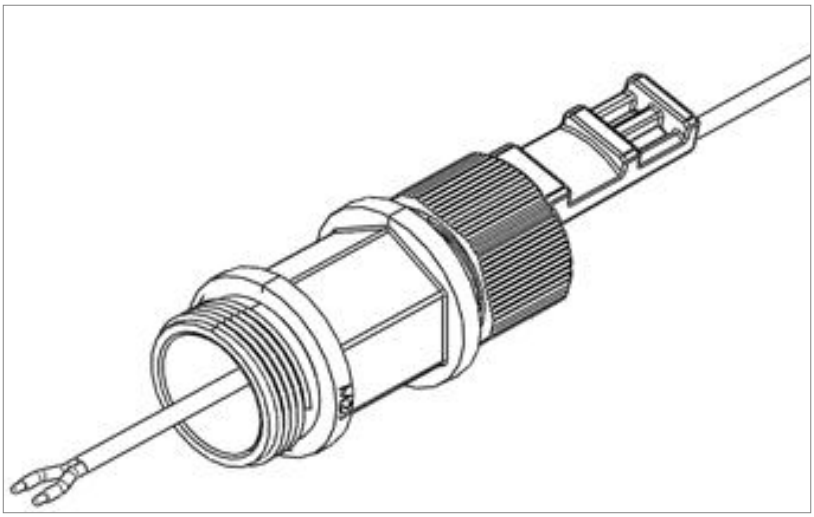
Assembling a DC Power Cable

To assemble 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.

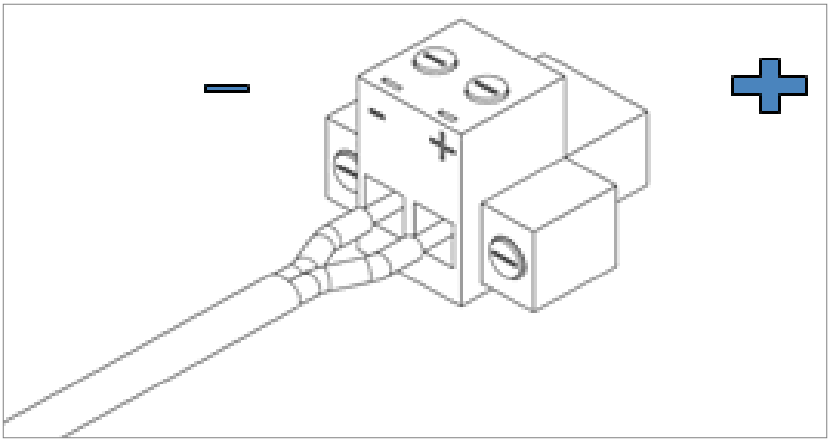


3. Insert the power cable into the gland.

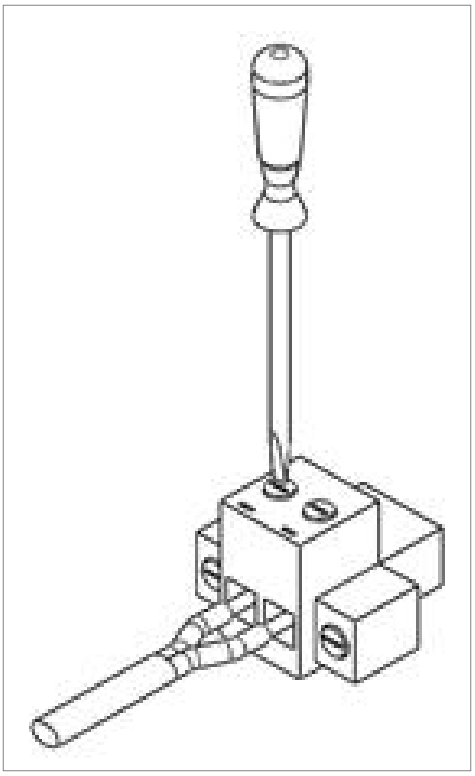


4. Insert the power cable wires into the power connector.

5. Insert the power cable wires into the power connector. Match “+” to the 0V wire and “-“ to the -48V wire.



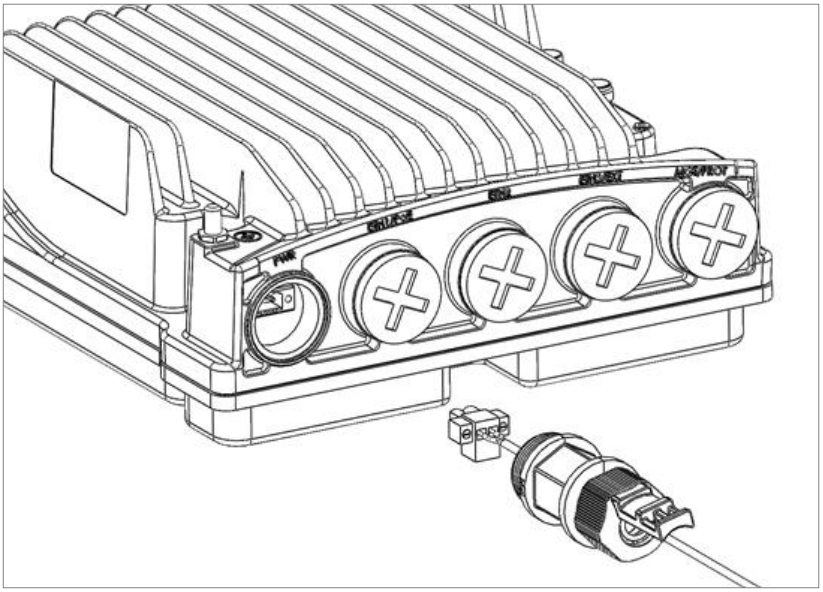
6. Tighten the two top screws.



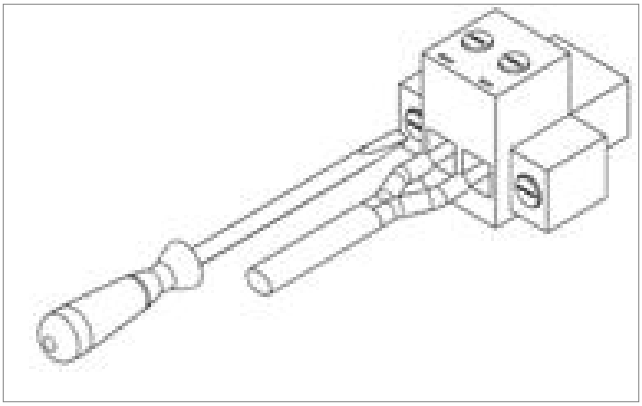
Connecting the DC Power Cable

To connect the DC power cable:

1. Plug the power cable with connector into the RFU-D-HP power connector.



2. Plug the power cable with connector into the PWR port.
3. Tighten the two front screws.

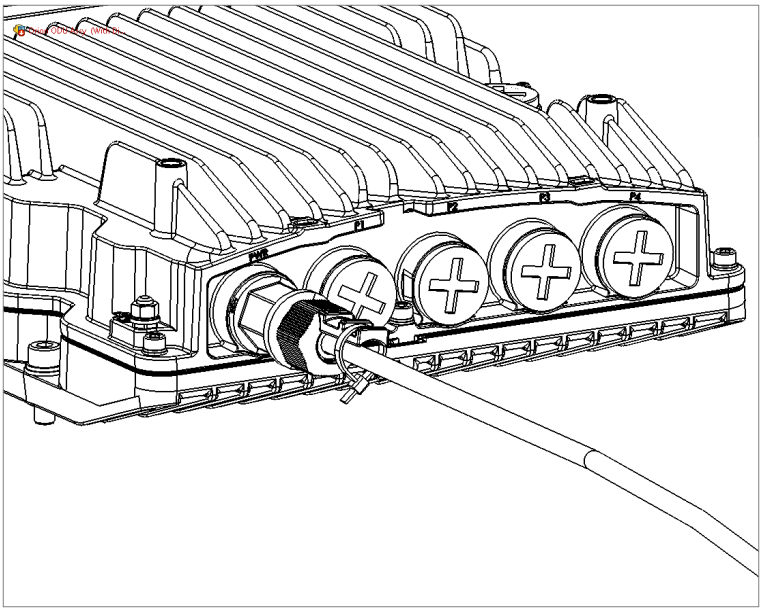


4. Screw the gland into the radio unit

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.

5. Tighten the gland cap.
6. Secure the cable to the gland with a tie wrap.



Connecting a Coaxial Power Cable

You can power the RFU-D-HP using a coaxial cable with an N-type connector. This requires a special adaptor that converts the N-type connector to a two-wire DC connector that can be used with the standard RFU-D-HP gland and power connector to connect to the RFU-D-HP's PWR port.

Table 31 *N-Type to DC Cable Adaptor*

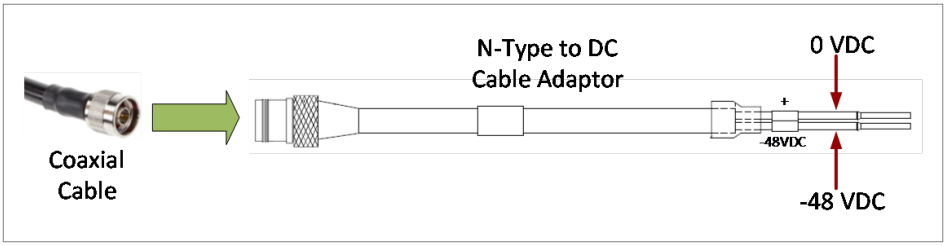
Marketing Model	Description
N-type_to_48V_DC_adaptor	DC POWER ADAPTOR N-type to DC Cable (Open End) 14AWG,30cm

Note:

The DC power connector must be ordered separately. See DC Cable and Connectors.

To connect a coaxial power cable with an N-type connector:

1. Connect the N-type end of the coaxial cable to the N-Type to DC Cable Adaptor.



2. Use shrink wrap or tape to seal the connection between the end of the coaxial cable and the adaptor. It is very important to ensure that this connection is water-tight. You can either use weatherproof shrink-wrap or butyl rubber tape with vinyl electrical tape. These options and their marketing models

are listed in Table 32.

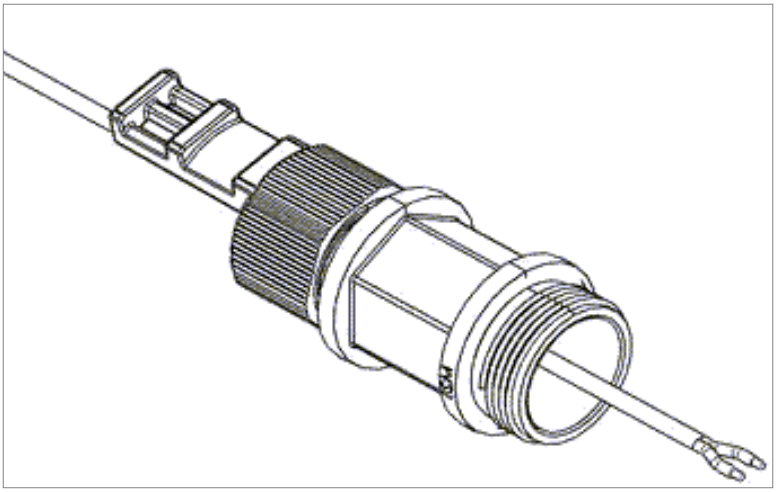
Note:

If the N-type connector is angled, you will need to use tape rather than shrink wrap to seal the connection and ensure that it is water-tight. In addition, for angled connections, make sure to secure both the cable and the adaptor such that there is no pressure on the connection.

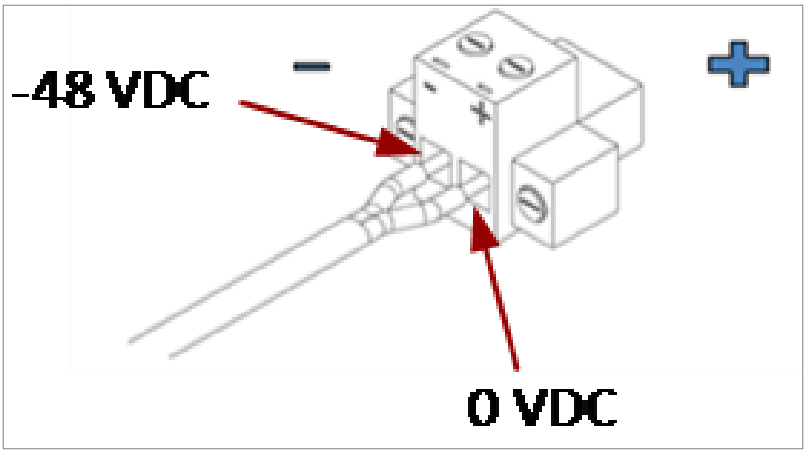
Table 32 *Materials for Watertight Connection of Coaxial Cable and Adaptor*

Marketing Model	Description
Weatherproof shrink 6mm	Cold Shrink Tubing from 24mm to 6mm, L=210mm
Butyl Rubber Tape 24 in	Butyl Rubber Tape, 24 in
Vinyl Electrical Tape Scotch	Commercial Grade Vinyl Electrical Tape.Scotch 700

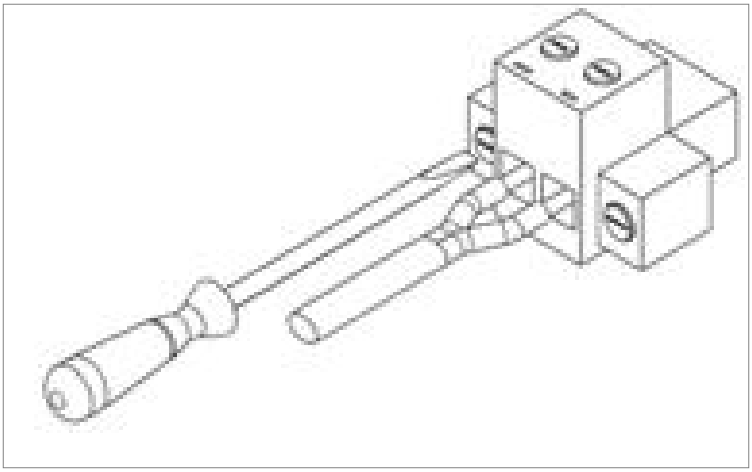
3. Insert the power cable into the gland.



4. Insert the power cable wires into the power connector. Connect the wire to marked -48 VDC to the -48 (-) side of the power adaptor. Connect the wire marked 0 VDC to the OV (+) side of the power adaptor. Tighten the screws with a flat screwdriver.



5. Plug the power cable with connector into the PWR port.
6. Tighten the two front screws.

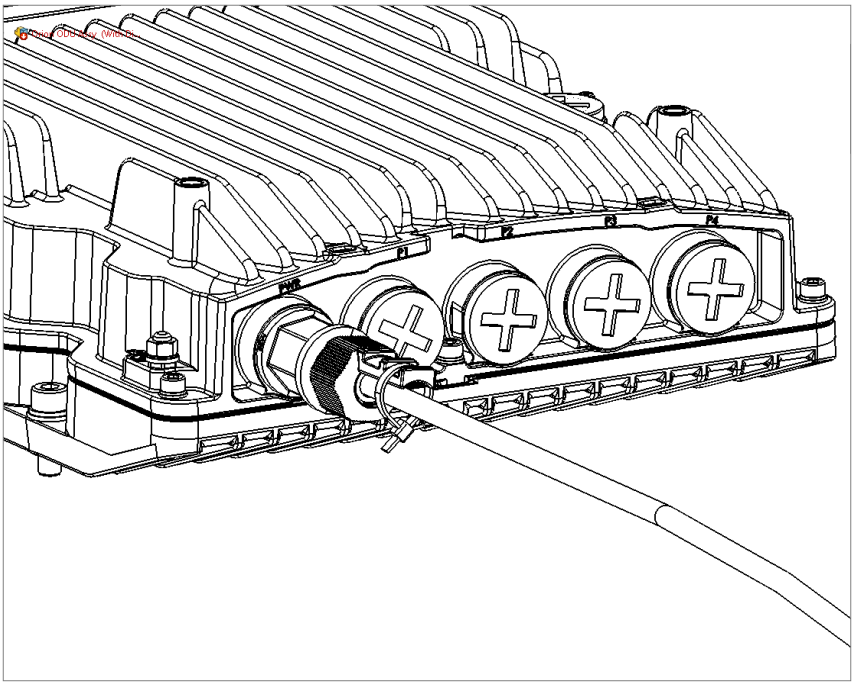


7. Screw the gland into the radio unit.

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.

8. Tighten the gland cap.
9. Secure the cable to the gland with a tie wrap.



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.

Connecting a CAT-5e/CAT-6 Data Cable

If you need to assemble the CAT-5e or CAT-6 cable, follow the instructions in section Preparing the CAT-5e or CAT-6 Cable and Plug-in Field, then proceed to section Connection of CAT-5e or CAT-6 Cable to RFU-D-HP.

If you using a pre-assembled CAT-5e or CAT-6 cable, follow the instructions in section Preparing the CAT-5e or CAT-6 Data Cable Already Assembled, then proceed to section Connection of CAT-5e or CAT-6 Cable to RFU-D-HP.

Note:

To ensure proper grounding and connectivity, it is recommended to use pre-assembled CAT-5e or CAT-6 cables.

Preparing the CAT-5e or CAT-6 Cable and Plug-in Field

Note:

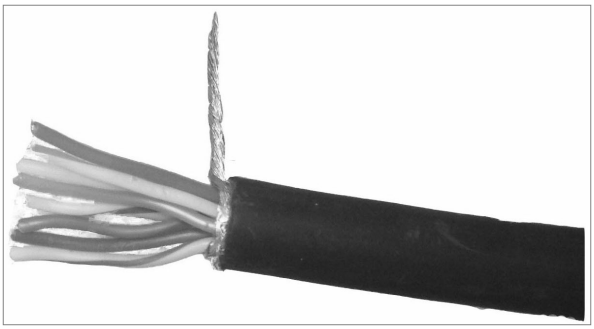
To ensure proper grounding, the RJ-45 plug must be shielded, with a crimping tail.

Table 33 *Materials for Preparing Ethernet Data Cables*

Marketing Model	Description
CAT5E_SFUTP_Outdoor_50m	CABLE,RJ45 TO RJ45 STR 50M,CAT-5E,ETHER,UV RES
CAT5E_SFUTP_Outdoor_75m	CABLE,RJ45 TO RJ45 STR 75M,CAT-5E,ETHER,UV RES
N000082L016A	PTP 820 CAT5E Outdoor 100m drum
CAT5E_SFUTP_Outdoor_305m_drum	CABLE,MATERIAL,CAT-5E,SFUTP,4X2X24AWG,UV RESISTANCE,305M
N000082L014A	PTP 820 Glands_x5_KIT
N000082L173A	Universal Grounding Kit up to 1/2” cable
N000082L073A	PTP 820 GBE_Connector_kit

To prepare the CAT-5e or CAT-6 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 CAT-5e or CAT-6 cable.
3. Do not strip off the end of the cable shield, but rather, twist the shield to form a braid.

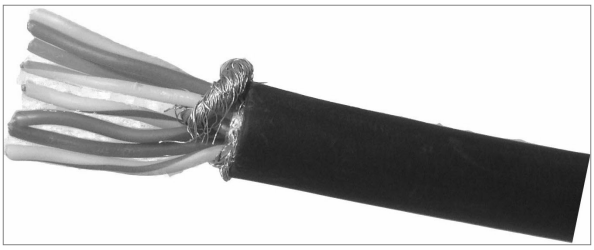


4. Roll back the foil shield insulation and wrap the drain wire around the foil. Do not remove any insulation from the conductors.
5. Align the colored wires.

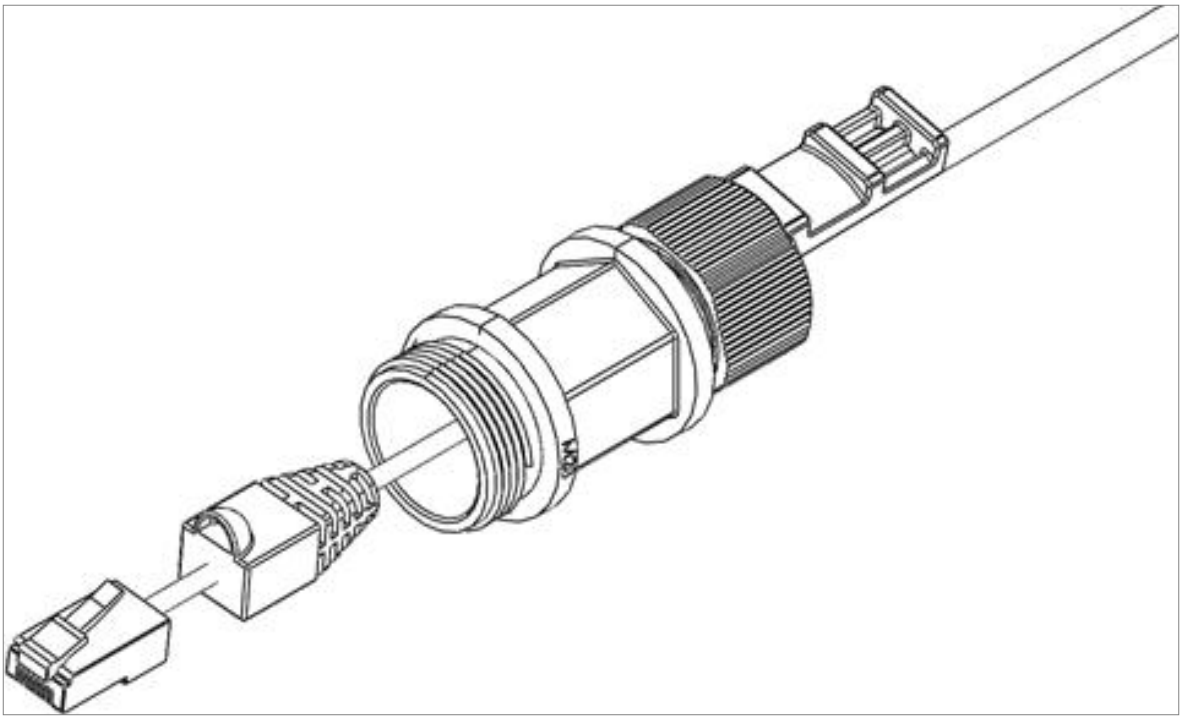
Note:

Cord colors should 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 should 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 Ethernet Cable and Specifications. The sheath of the CAT-5e or CAT-6 cable should 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.



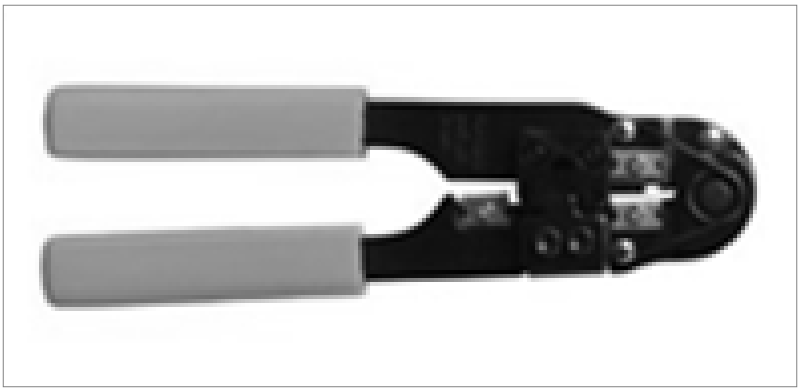
10. Wrap the twisted braid firmly around the cable jacket and let the crimping tail of the RJ45 plug envelop it.

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 CAT-5e or CAT-6 plug cover on the connector plug.

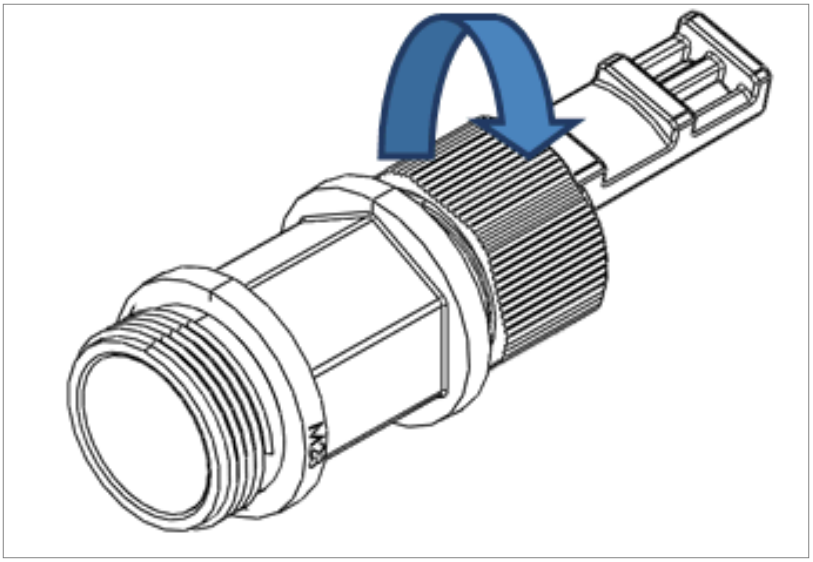
Note:

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.

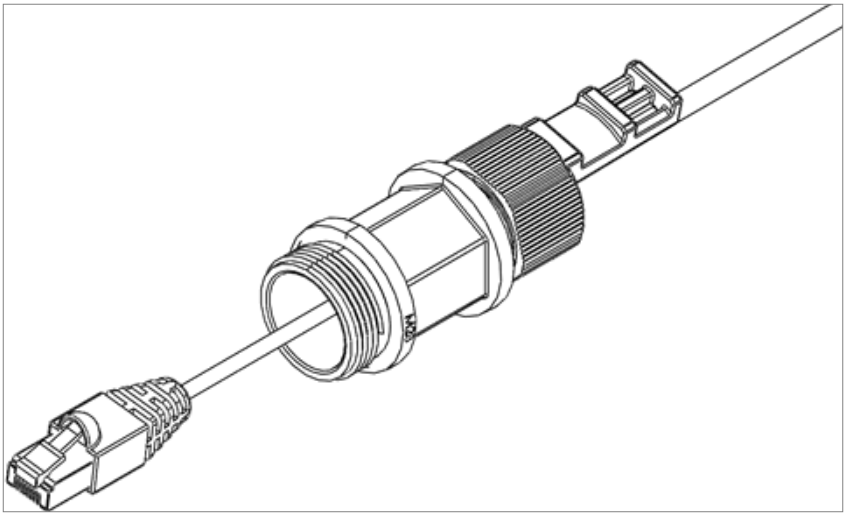
Preparing the CAT-5e or CAT-6 Data Cable Already Assembled

To prepare the CAT-5e or CAT-6 cable already assembled:

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



2. Insert the CAT-5e or CAT-6 cable into the gland cap and into the rubber gland.

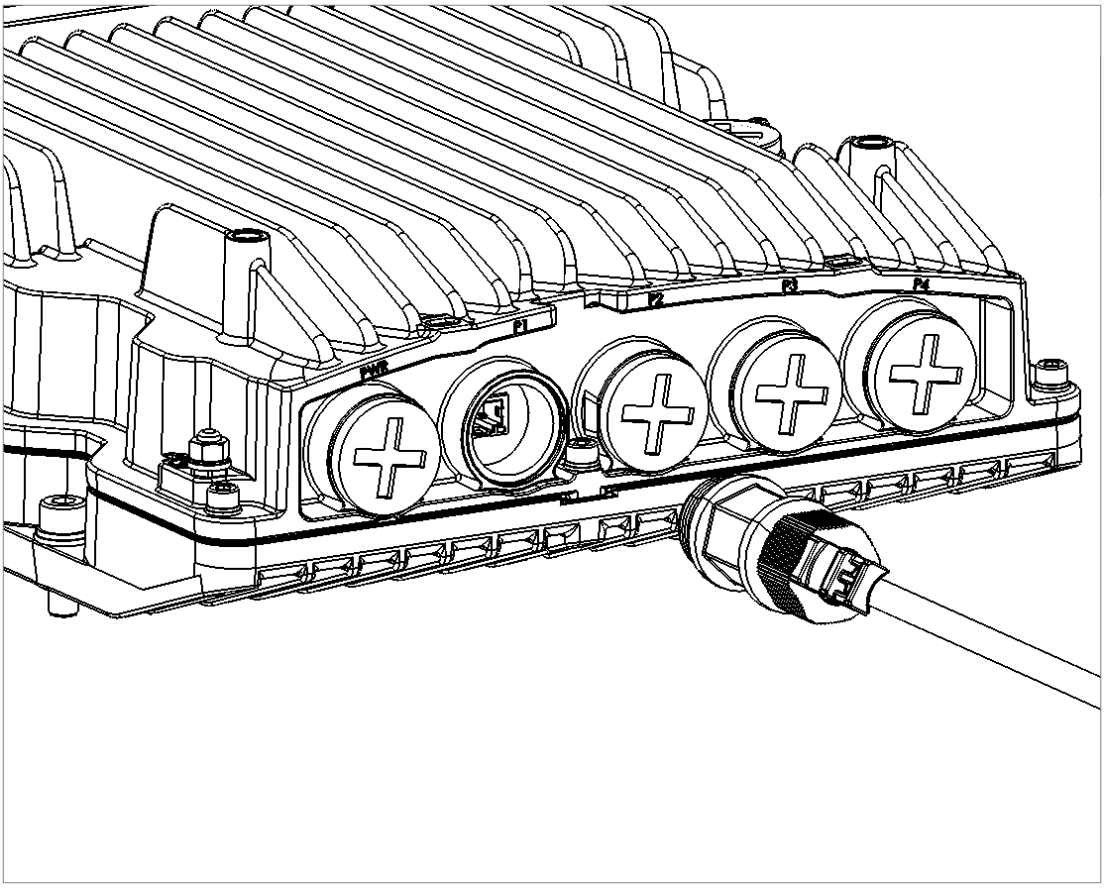


3. Insert the CAT-5e or CAT-6 cable into the gland body.

Connection of CAT-5e or CAT-6 Cable to RFU-D-HP

To connect the CAT-5e or CAT-6 cable to the RFU-D-HP:

1. Remove the relevant cap from the RFU-D-HP radio. You can use the side of the gland to unscrew the cap.
2. Connect the cable to the RFU-D-HP.



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.

Checking Electrical Ethernet Cables

Note:

When the RFU is connected to an PTP 820N or PTP 820A, this procedure cannot be used when the RFU is connected to the IDU via RFU2/Eth8 on the TCC-U front panel.

When using electrical Ethernet cables to connect the RFU with the IDU, it is strongly recommended to run a special CLI command to check that the cable is functioning properly. This command is recommended for electrical cables longer than 10m.

To run this command, you must first enter radio-unit view for the RFU you want to check. To enter radio-unit view, enter the following command in root view:

```
root> radio unit slot <slot> port <port>
```

For example, to check the cable connected to RFU interface 1 of a RIC-D in slot 5, enter the following command:

```
root> radio unit slot 5 port 1
radio-unit [5/1]>
```

Once you are in radio-unit view, enter the following command to run the cable checking operation:

```
radio-unit [x/x]>cable-bist-run
```

Note:

Running this command affects traffic and resets the RFU. If you need to run the command a second time, you must wait until the RFU comes back up. This usually takes from three to five minutes.

After running the cable-bist-run command, and once the RFU comes back up, it is recommended to run the following command (also in radio-unit view), to ensure that traffic is passing through the cable and interfaces properly:

```
radio-unit [x/x]> show counters
```

The result of the cable-bist-run command should be Pass in every row. If any Fail result occurs, the following troubleshooting steps are recommended:

1. Run the test again, after the RFU comes back up.
2. Verify that the cable is physically secure. You should be able to lightly move or shake the cable without triggering an alarm in the system.

If the test continues to produce Fail results, perform the following additional troubleshooting steps:

1. Verify that all grounding has been properly installed according to the Installation Guide for the RFU you are using, including both RFU grounding and cable grounding.
2. Verify that the cable specifications are consistent with the cable specifications listed in the Installation Guide for the RFU you are using.
3. Verify that the RJ-45 connection was installed in according with the instructions for connecting Cat5e cables described in the Installation Guide for the RFU you are using.
4. Replace the cable.

General Notes Concerning All Installation Procedures

Some of the configurations described in this manual may not be supported with every System Release version. For up-to-date information about which configurations are supported, refer to the Release Notes for the System Release version you are using.

Note that 4 and 5 GHz links are currently supported only with diplexer-based branching and remote-mount configurations.

Since the RFU-D-HP 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 should follow the 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 RFU-D-HP and its dual core architecture is that upgrading can be performed remotely by uploading the correct activation key.

When installing a 1+0 link which is hardware ready for 2+0 Dual Polarization (XPIC), make sure to plan and install the link as if it is immediately being configured as an XPIC link. This includes both link budget calculation and hardware installation.

The OMT must be carefully aligned according to the XPIC alignment procedure. Use activation key Demo Mode to activate the second radio interface for purposes of alignment. After completing alignment, install the regular activation key and configure the unit for 1+0 operation.

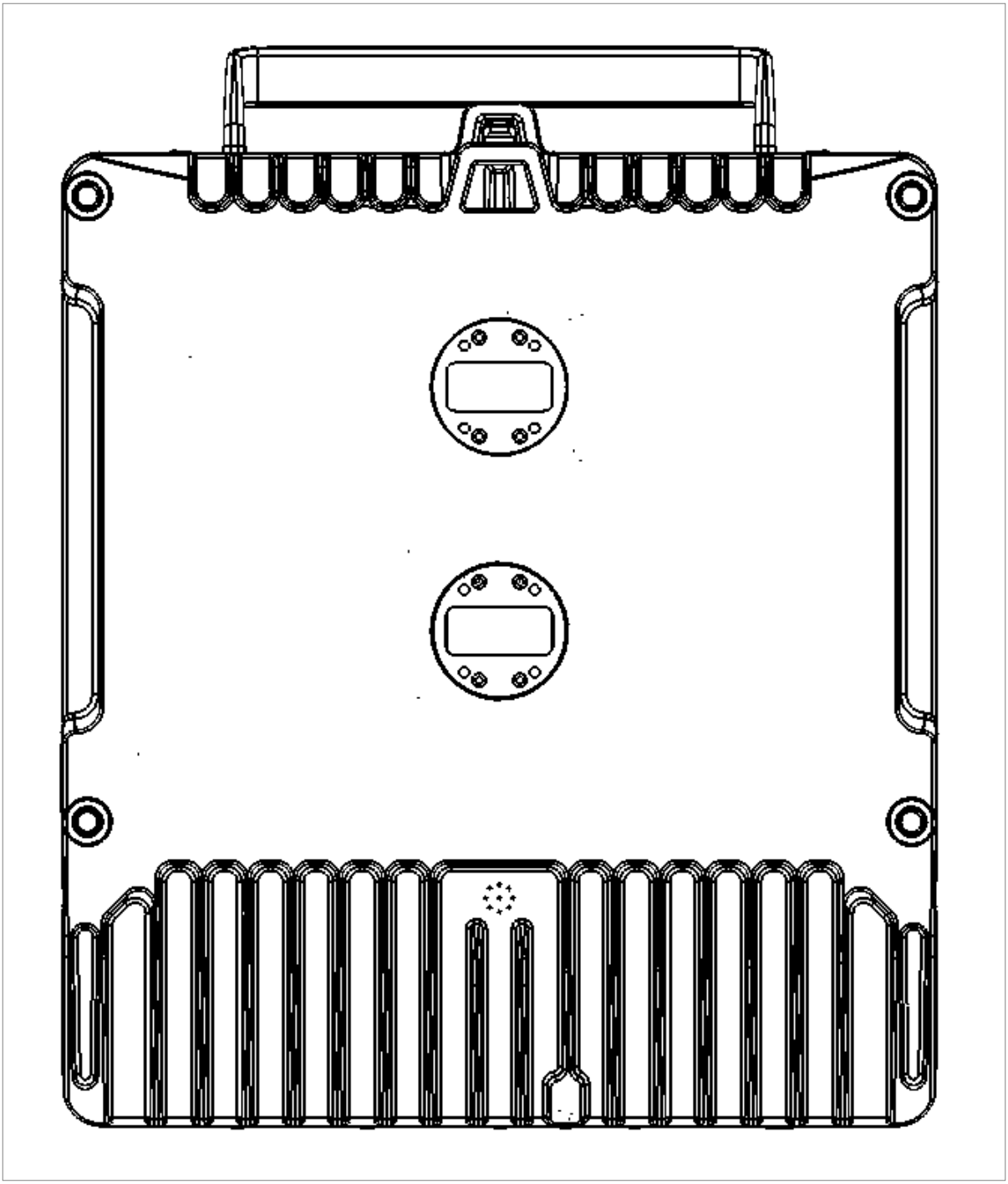
Failure to follow these steps may limit your ability to upgrade a 1+0 link to a 2+0 XPIC link at a later date from a remote location.

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 XPIC.

Note:

In addition to the plastic dust cover on the interfaces that should be removed before installation, some antennas are provided with circular transparent pressure windows that match the antenna interfaces. Please do not remove these transparent pressure windows..

Figure 27: *Transparent Pressure Windows*



Space Diversity Configurations

RFU-D-HP can be used with two basic types of BBC Space Diversity:

- External BBC Space Diversity – The Space Diversity function is performed between two RFUs, where one RFU serves in the Main role (both carriers) and the second RFU serves in the Diversity role (both carriers). This configuration requires XPIC (internal).
- Internal BBC Space Diversity – Each RFU Carrier 1 (Antenna Port 1) serves in the Main role and each RFU Carrier 2 (Antenna Port 2) serves in the Diversity role. This configuration can be used with ACCP, ACAP, CCDP, and XPIC.

Both types of Space Diversity configurations can be extended beyond 2+0 SD.

For Internal BBC Space Diversity configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters "-SD" at the end of the marketing model. See Section Marketing Models for Radio Unit .

External Space Diversity and ASD

The basic building block of each External Space Diversity configuration is a 2+0 SD configuration that consists of two RFU-D-HP units, a Master RFU and a Slave RFU. This also applies to the dual-RFU side of ASD configurations, including both sides of symmetrical ASD configurations.

- The Master RFU is connected to the Main antenna.
- The Slave RFU is connected to the Diversity antenna

Each RFU-D-HP is connected to the IDU via a separate RIC-D. This configuration may be extended to multiple pairs of RFUs. The following cables should be connected between the Main and Diversity RFUs:

- A source sharing cable between the EXT REF ports of the two RFUs.
- A data sharing cable between the P3 ports of the two RFUs.

For instructions on connecting these cables, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations

Note:

External Space Diversity and ASD configurations *must* use XPIC (internal).

Note:

With this configuration, the Main RFUs are connected to the Main antenna and the Diversity RFUs are connected to the Diversity antenna. These connections may be either direct mount, optional when using diplexer-based branching or remote mount, as shown below:

Note:

The sample configuration shown below is 4+0 Dual Polarization External Space Diversity with Internal XPIC, in a channel filters-based branching configuration.

Figure 28: *External Space Diversity – Main Units and Waveguides*

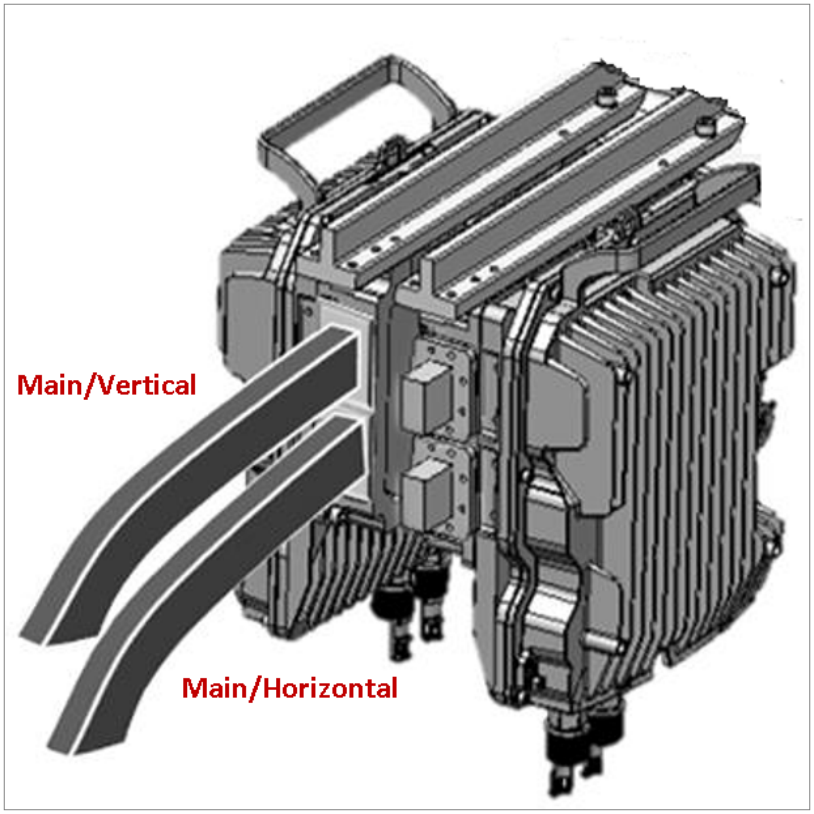
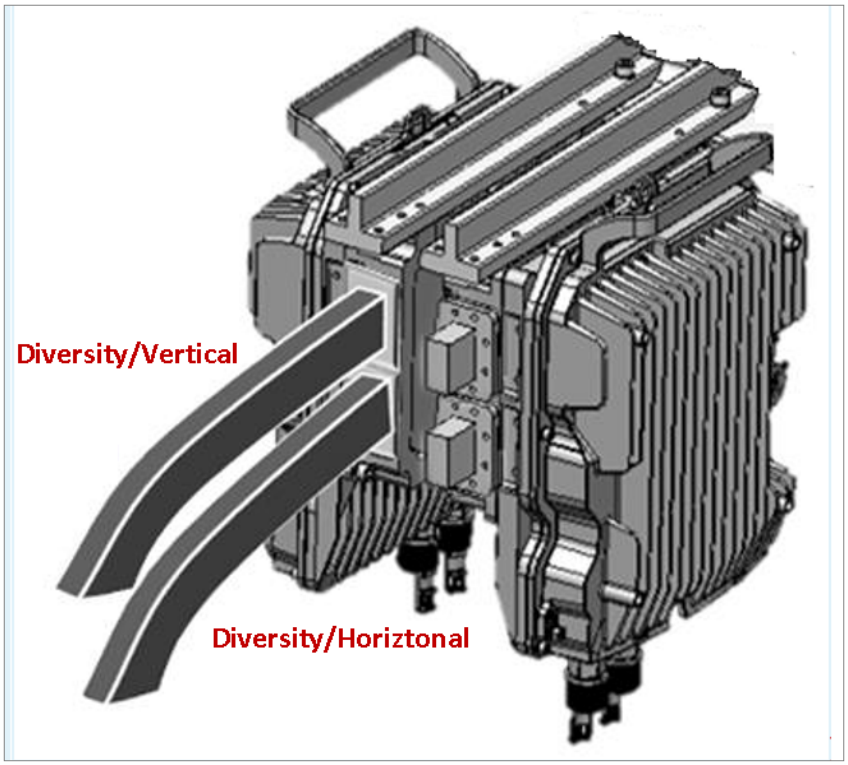


Figure 29: *External Space Diversity – Space Diversity Units and Waveguides*



Internal BBC Space Diversity

Note:

For Internal BBC Space Diversity configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

Internal BBC Space Diversity is based on a single RFU-D-HP unit in which Carrier 1 (Antenna Port 1) is the Main link and Carrier 2 (Antenna Port 2) is the Space Diversity receiver.

- Carrier 1 (Antenna Port 1) is connected to the Main antenna.
- Carrier 2 (Antenna Port 2) is connected to the Space Diversity antenna

Each RFU-D-HP is connected to the IDU via a separate RIC-D This configuration may be extended to multiple RFUs.

In case this configuration is used with XPIC, the following cables should be connected between the RFUs running on the same frequency in alternate polarizations.:

- A source sharing cable between the EXT REF ports of the two RFUs.
- A data sharing cable between the P3 ports of the two RFUs.

For instructions on connecting these cables, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

With this configuration, the Carrier 1 in each RFU is connected to the Main antenna and the Carrier 2 in each RFU is connected to the Space Diversity antenna. These connections may be either direct mount, optional when using diplexers-based branching (using the diplexer-based branching Space Diversity unit) or remote mount.

Long Antenna Waveguide Runs

When using waveguide runs of more than five meters, connecting the Tx Antenna Port of the OCU to the antenna requires installing an Adaptor Plate on the Antenna port of the OCU. For details, see Section Installing an Adaptor Plate. The Adaptor Plate is not required on Rx-only Antenna Ports.

Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations

For External XPIC, External Space Diversity, and the dual-RFU side of ASD configurations, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization.

List of Items

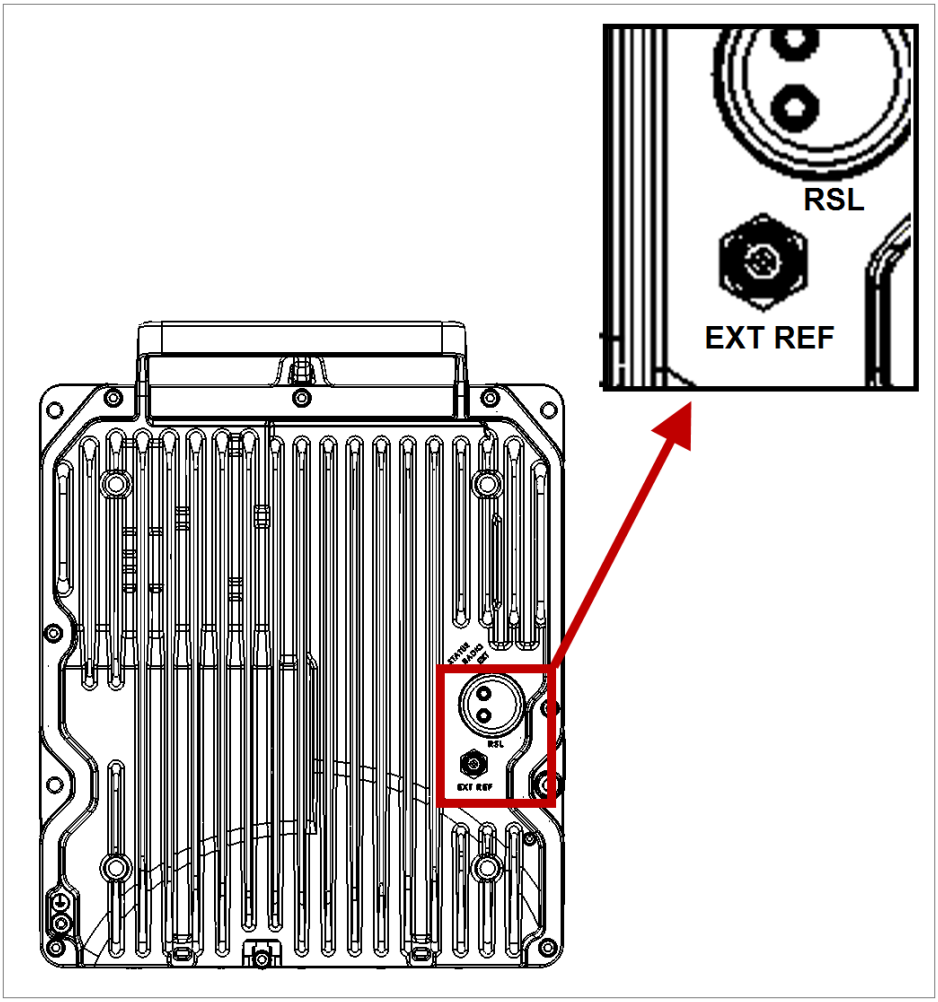
Item	Description	Quantity	Marketing Model
1	Data Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations
2	Source Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations

Required Tools

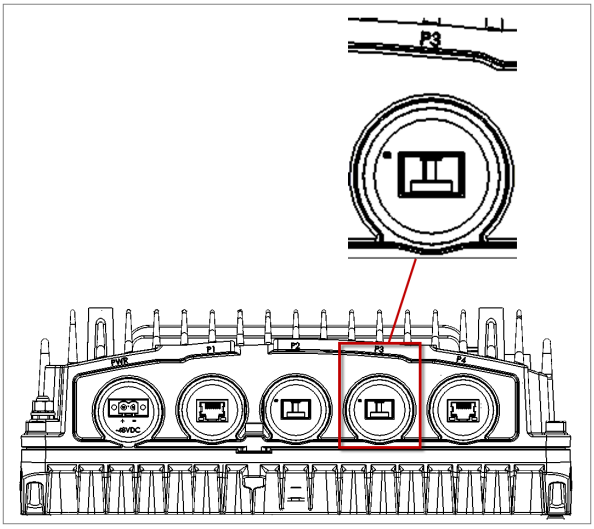
- Metric wrench key set

Procedure

1. Connect the source sharing cable between both EXT REF RFU-D-HP radio connectors. The maximum torque for connecting this cable to the radio is 5Lb.in (0.5N.m).



2. Connect the data sharing cable between both P3 RFU-D-HP ports.



Installation Instructions for Configurations with Diplexer-Based Branching

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.

For installing the diplexer unit on the radio, use 5 Nm torque.

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

- 4-5 GHz: M6: 10 Nm
- 6 GHz: M5/#10-32: 3.5 Nm
- 7/8-11 GHz: M4/#8-32: 2.5 Nm

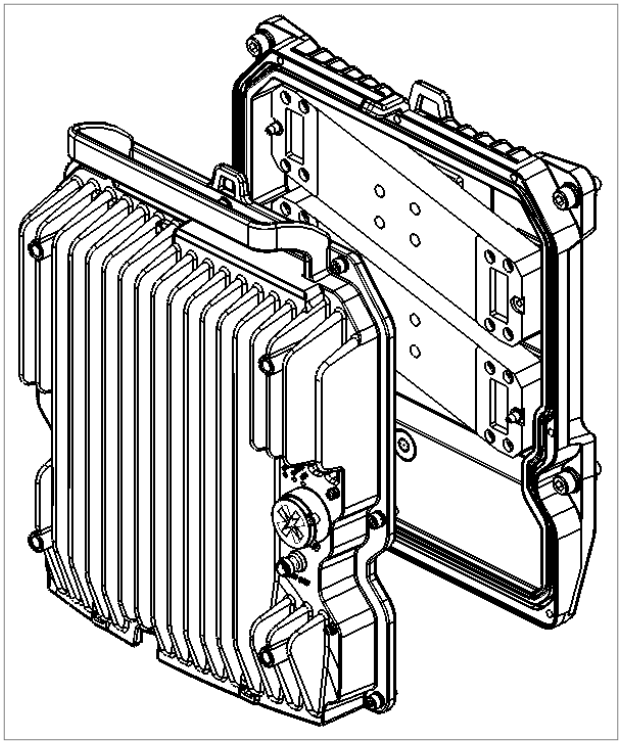
In addition, when connecting the diplexer to the radio and the radio to the mediation device, screws should be cross-tightened gradually. In other words, partially tighten one screw, then partially tighten the opposite screw. For example, if you start with the screw on the upper left, proceed to the screw on the lower right, then the upper right, then the lower left. Tighten each screw partially, then in the same order, tighten the screws further until each screw is fully tightened.

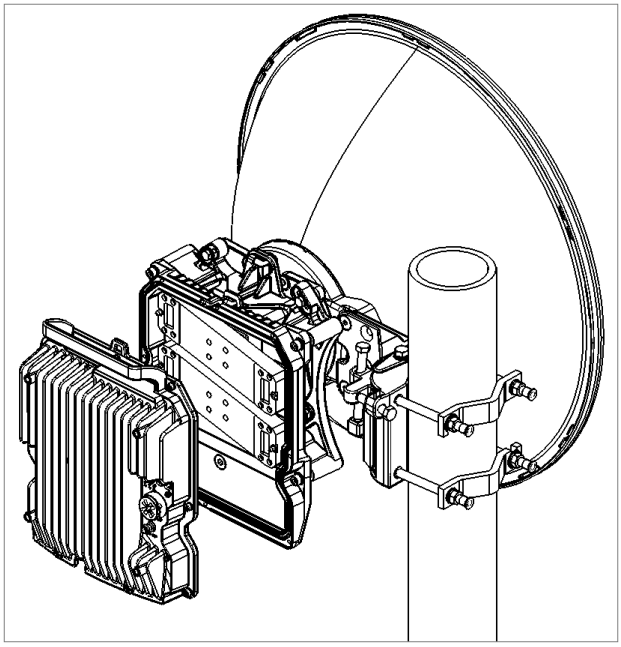
General Radio Installation

The RFU-D-HP has been designed for easy installation, with various installation options to provide maximum flexibility.

In most cases, the Diplexers unit should be attached to the antenna or mediation device first. Then, attach the radio unit to the Diplexers unit.

Figure 30: *RFU-D-HP Installation – Attaching the Diplexers Unit Before the Radio Unit*





The RFU-D-HP radio can also be assembled to the diplexers kit prior to installation, then mounted to the antenna or mediation device as a single unit. For details, see Installing the Diplexer on the Radio.

Installing the Diplexer on the Radio

For configurations that use diplexers, RFU-D-HP is delivered as two separate components: a generic radio unit and a diplexer unit. This section explains how to attach the diplexer unit to the radio unit.

Note:

Mounting of the diplexer unit to the radio unit should be performed by certified personnel in a clean, temperature and humidity-controlled environment.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP RADIO UNIT	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit

Required Tools

- Torque Wrench With Metric Hexagon Socket Key Wrench #4 (Allen Key

Procedure

1. Prior to the installation, remove the sticker which is covering the diplexer ports on the Diplexer unit and the sticker that covers the TRX ports on the radio unit.
2. Position the diplexer unit on the radio unit so that the two location pins mounted on the TRX ports of the diplexer unit Figure 31 fit into the corresponding holes in the radio unit Figure 32.
3. Attach the diplexer to the TRX using the two location pins. Make sure that the hook and the carrying handle are on the same side in both the radio unit and the diplexer unit Figure 34.

Figure 31: *Fitting the Diplexer Unit to the Radio Unit - Radio Side*

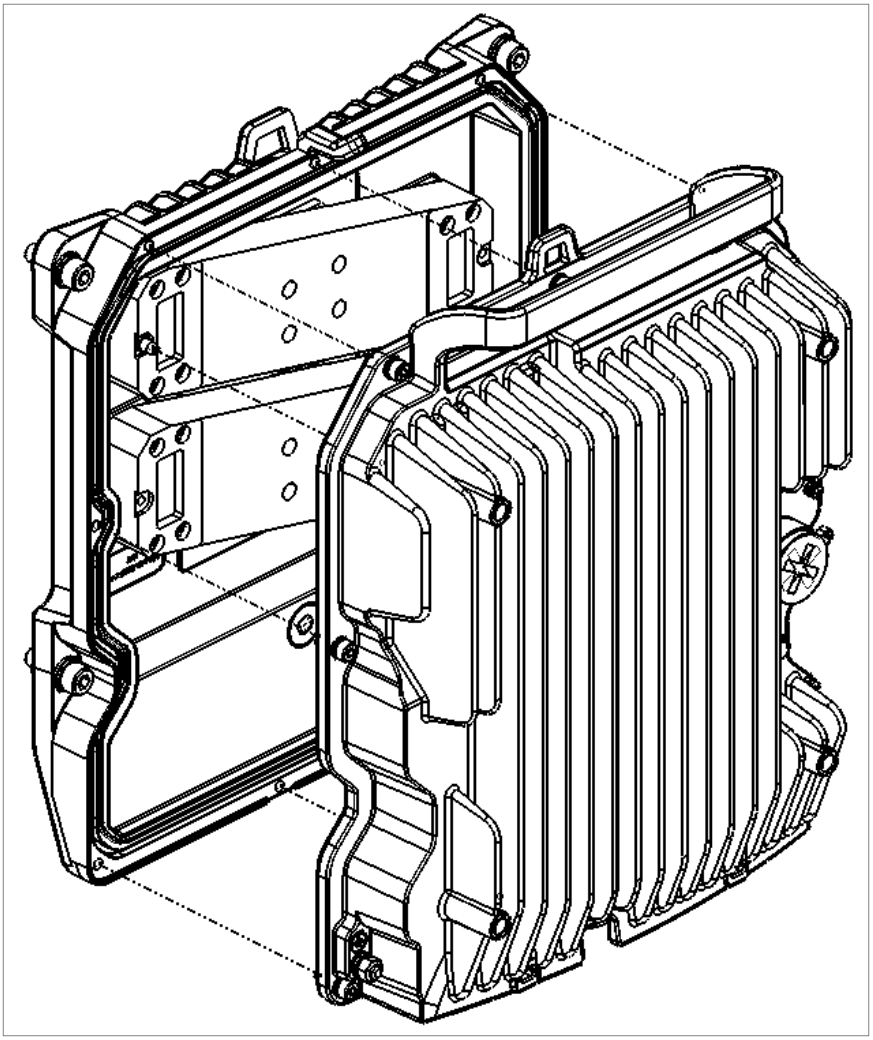


Figure 32: *Fitting the Diplexer Unit to the Radio Unit - Diplexer Unit Side*

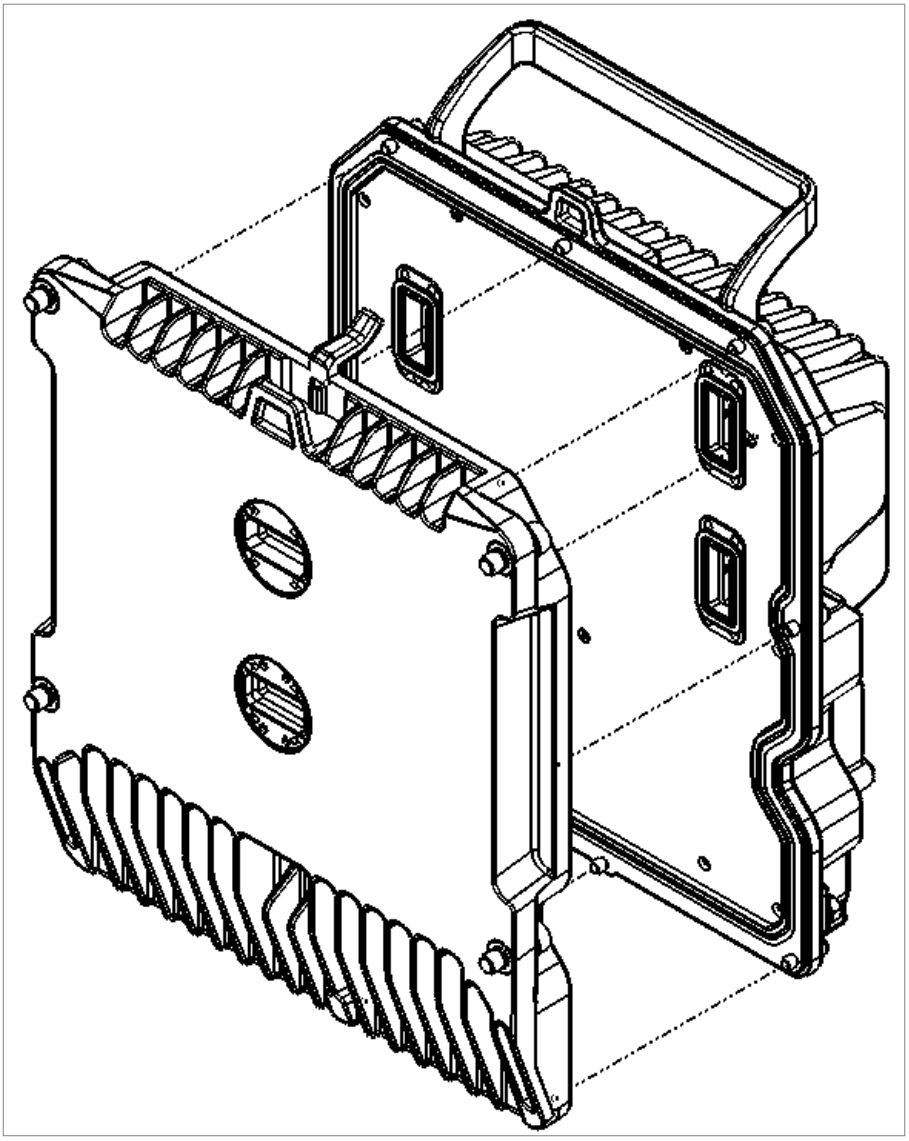


Figure 33: *Radio and Diplexer Units Together*

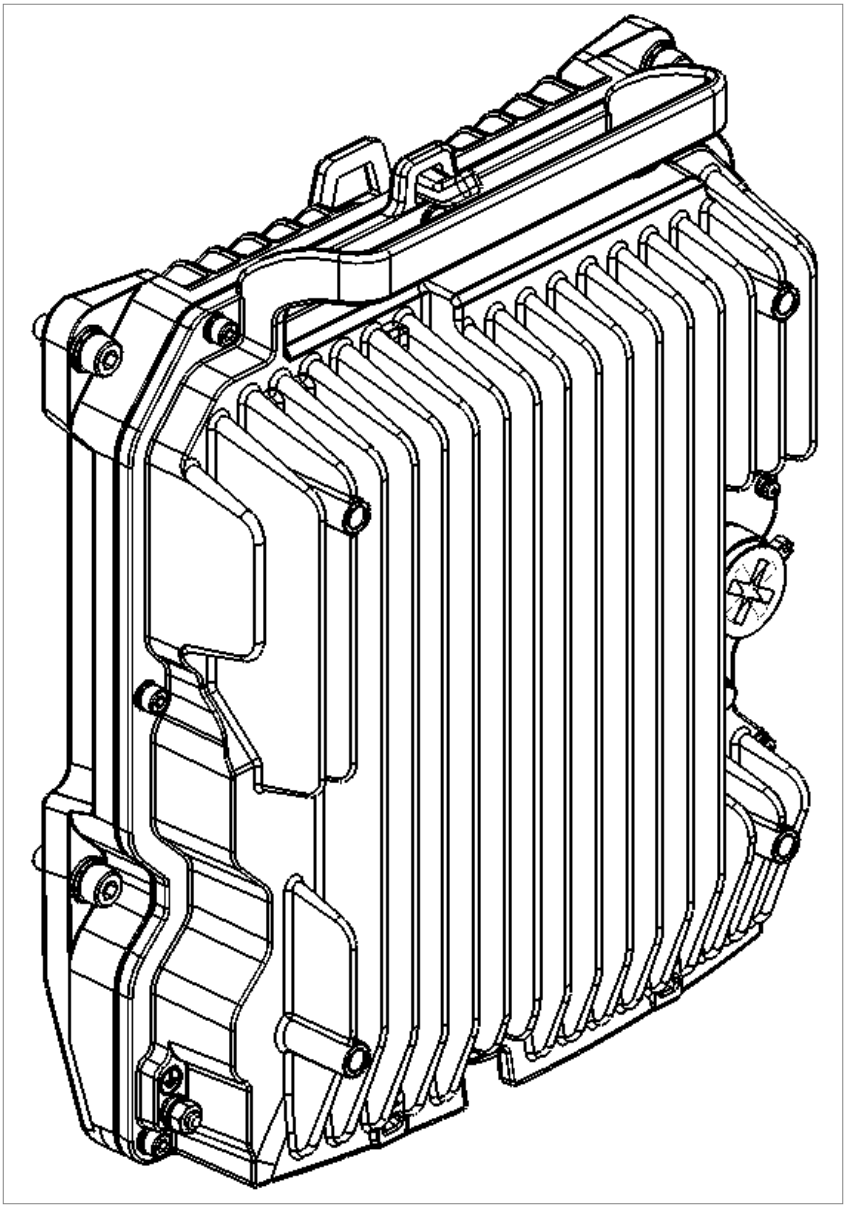
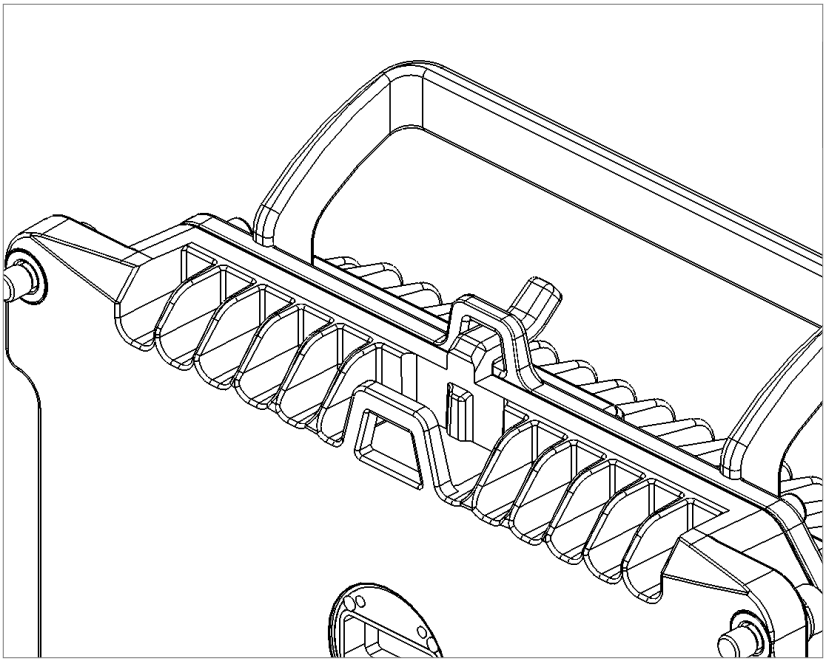
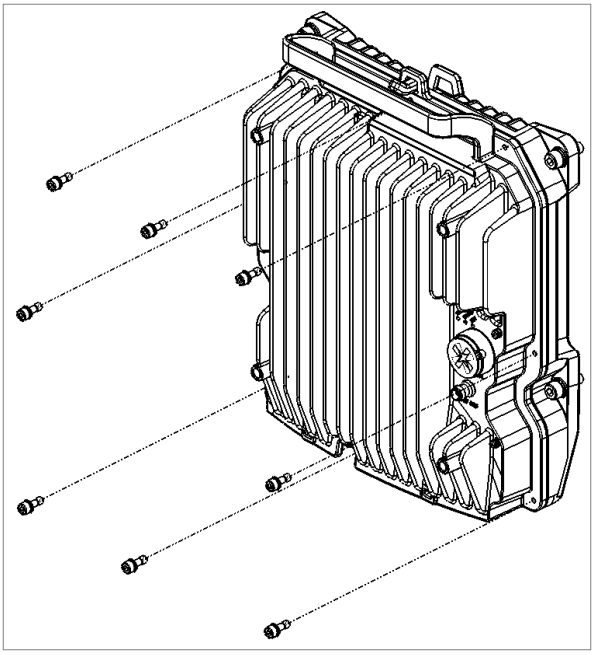


Figure 34: *Hook and Carrying Handle*



4. Secure the diplexer unit to the radio unit using the eight M5 screws supplied with the radio unit. First, gently tighten the screws in the order shown in Figure 35. Then strongly tighten the screws in the same order.

Figure 35: *Securing the Diplexer Unit to the Radio Unit*

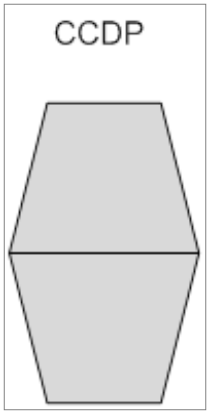


5. Proceed to install the RFU-D-HP in the desired configuration, as described in the following sections.

2+0 Dual Polarization Direct Mount

Note:

This procedure can also be used for 1+0 DP HW ready for 2+0 DP configuration and for the single-RFU side of an ASD configuration.



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT KIT	1	DXDH-MD-OMT-*ff*
4	CIRC./CIRC. Adaptor	1	Per Antenna Vendor

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

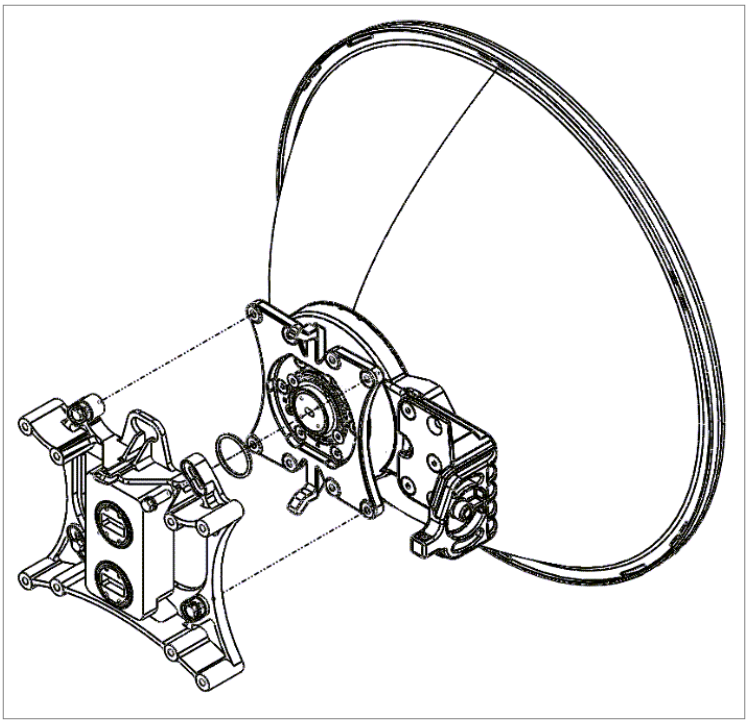
Procedure

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.

Note:

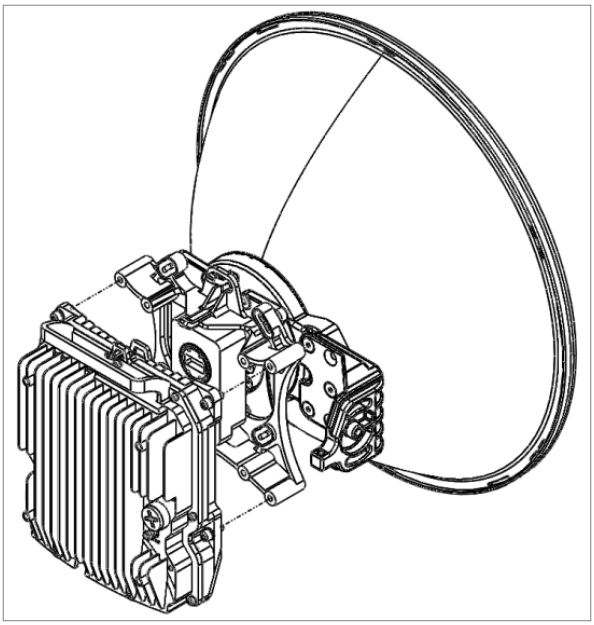
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



3. Connect the RFU-D-HP DC radio/dual coupler to the OMT kit using the four M8 captive screws and washers supplied, and tighten the screws.

Note:

Verify that the O-rings are properly mounted between the OMT ports and the radio.



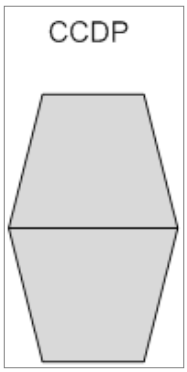
2+0 Dual Polarization Remote Mount

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 1+0 DP HW ready for 2+0 DP configurations and for the single-RFU side of an ASD configuration.



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit

Item	Description	Quantity	Marketing Model
3	RFU-D-HP OMT Kit	1	DXDH-MD-OMT-*ff*
4	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-*ff*
5	Flexible Waveguide Kit	2	
6	Adaptor Remote Mount Kit	1	DXDH-RM-MOUNT-ADPT-*ff*
7	Circ./Circ. Adaptor	1	Per Antenna Vendor. Not used for standard interface antennas (six feet and larger).
8	RFU-D-HP Pole Mount Kit	1	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

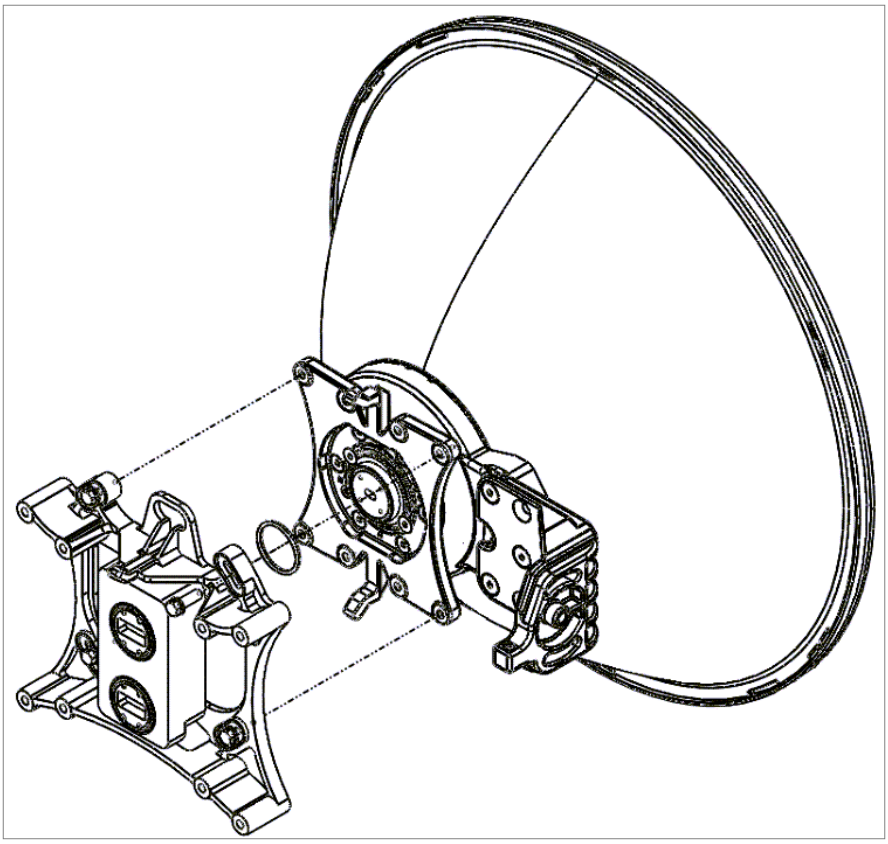
Common Installation

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

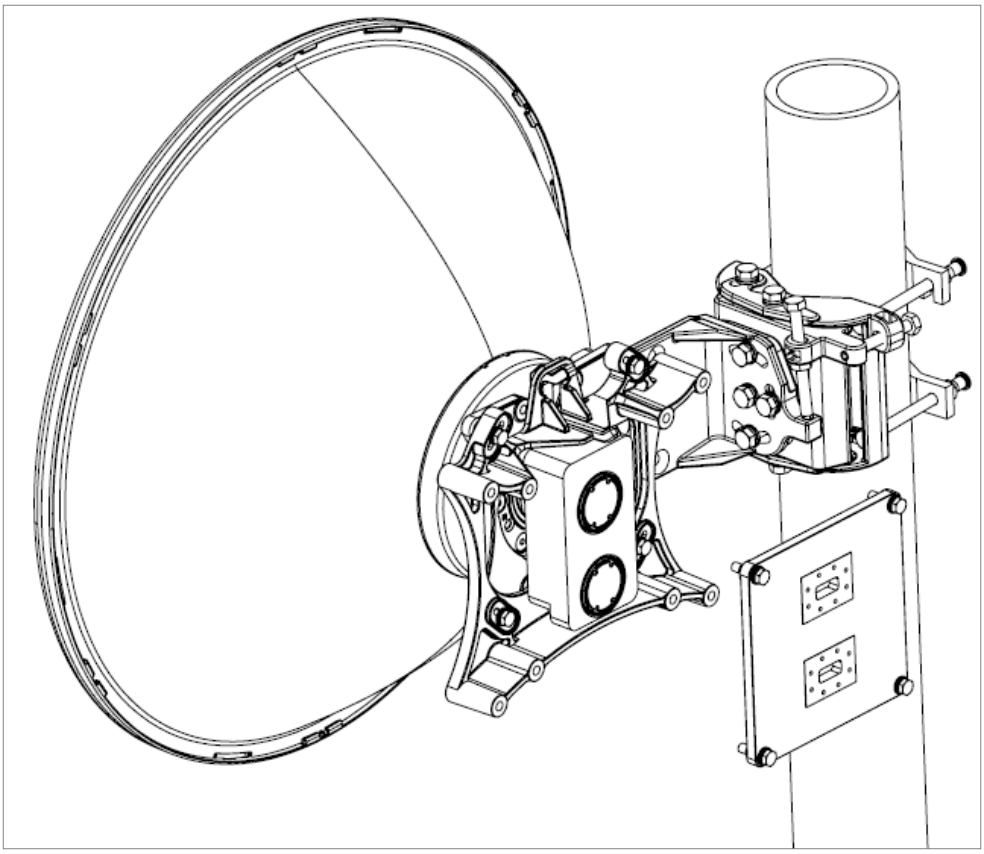
2. Connect the OMT kit to the antenna and secure it with four screws.

Note:

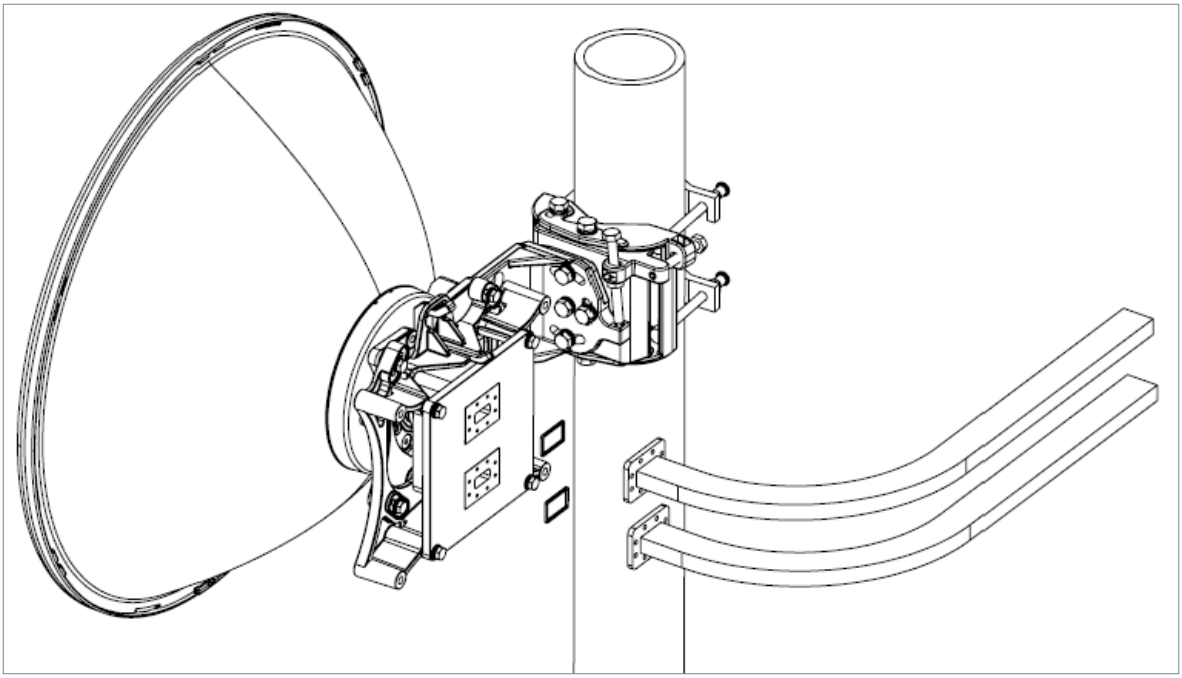
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



3. Mount and tighten the OMT Plate Adaptor to the RFU-D-HP OMT ports using the screws supplied with the adapter kit.



4. Mount and tighten the O-ring and the flexible waveguide to the adapter ports using the screws supplied with the flexible waveguide kit.



Note:

Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.

5. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit. Use 30 Nm torque.

Figure 36: *Remote Pole Mount Kit – 6-11 GHz*

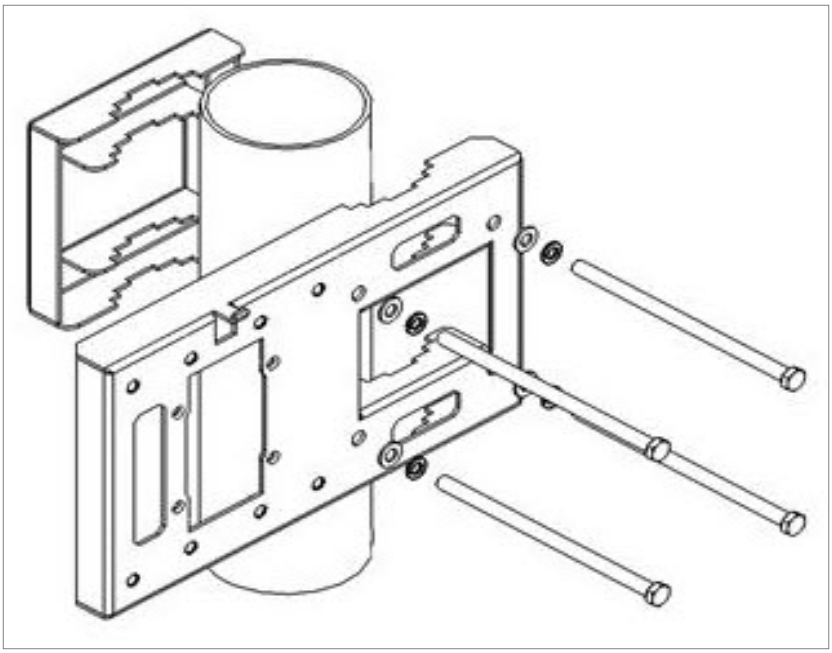
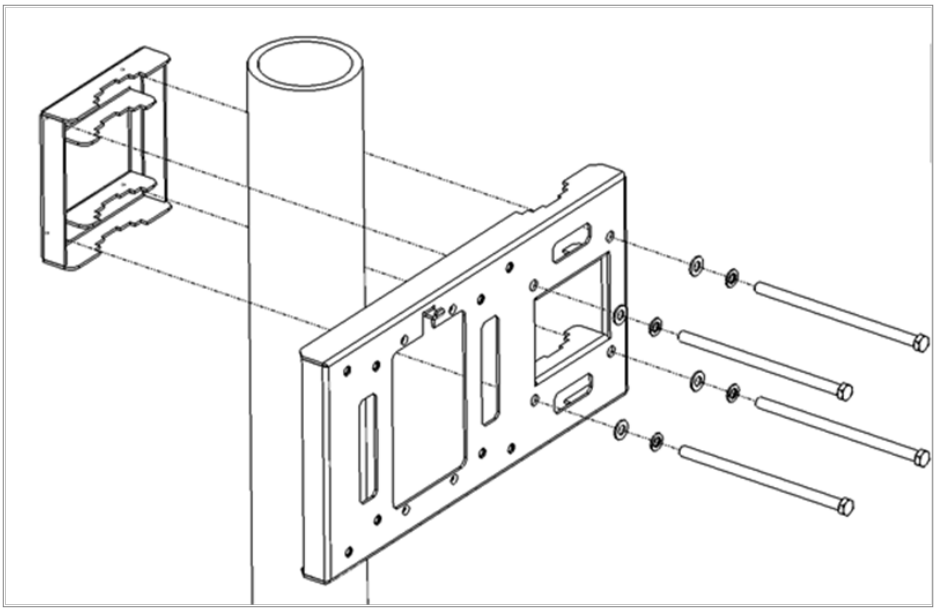


Figure 37: *Remote Pole Mount Kit – 4-5 GHz*



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

Figure 38: *Remote Pole Mount Kit – 6-11 GHz*

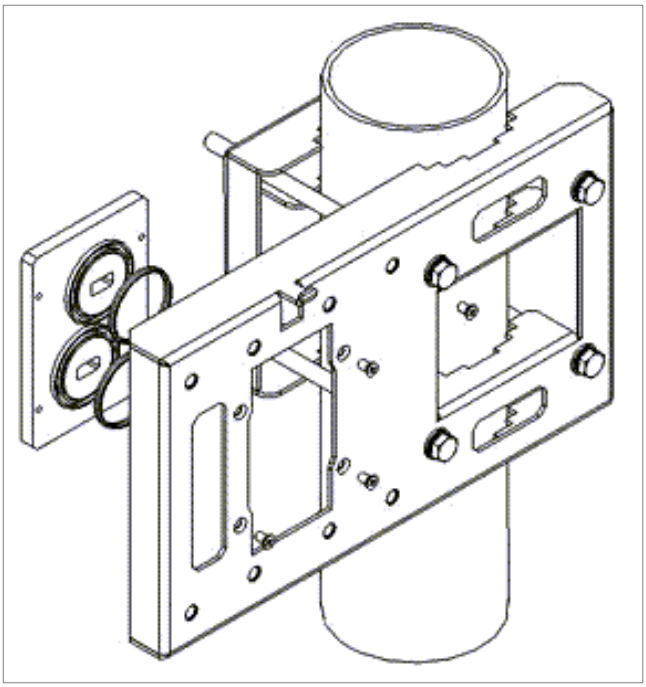
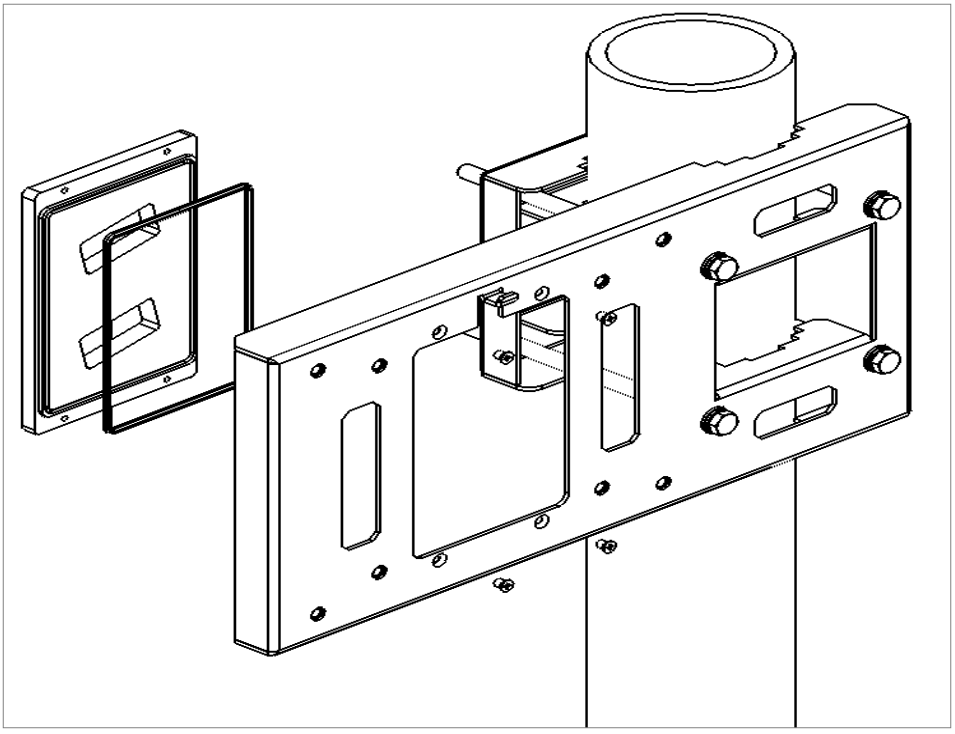
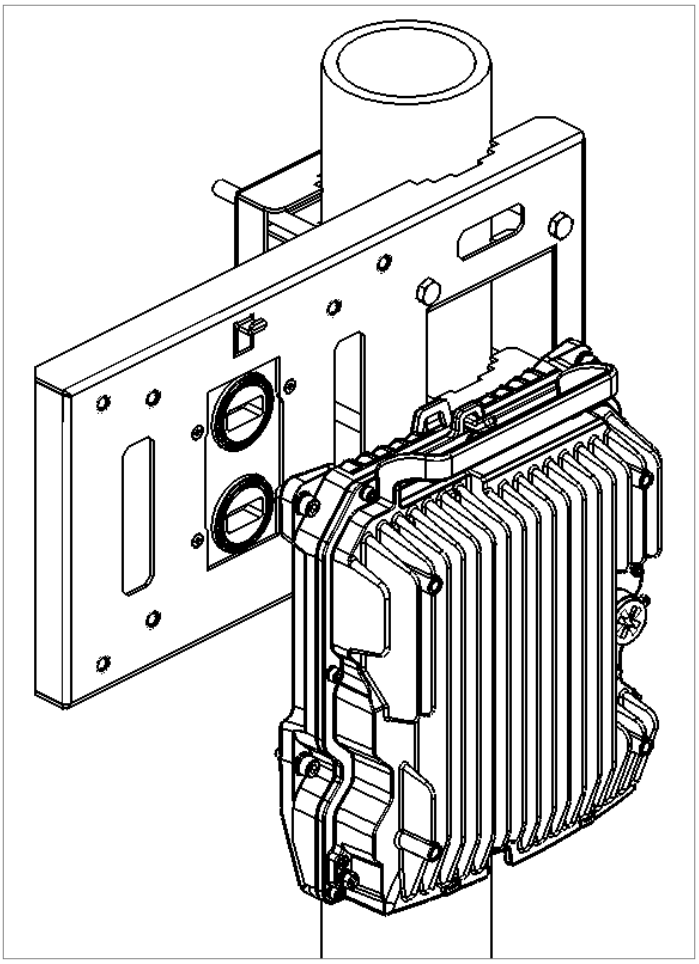


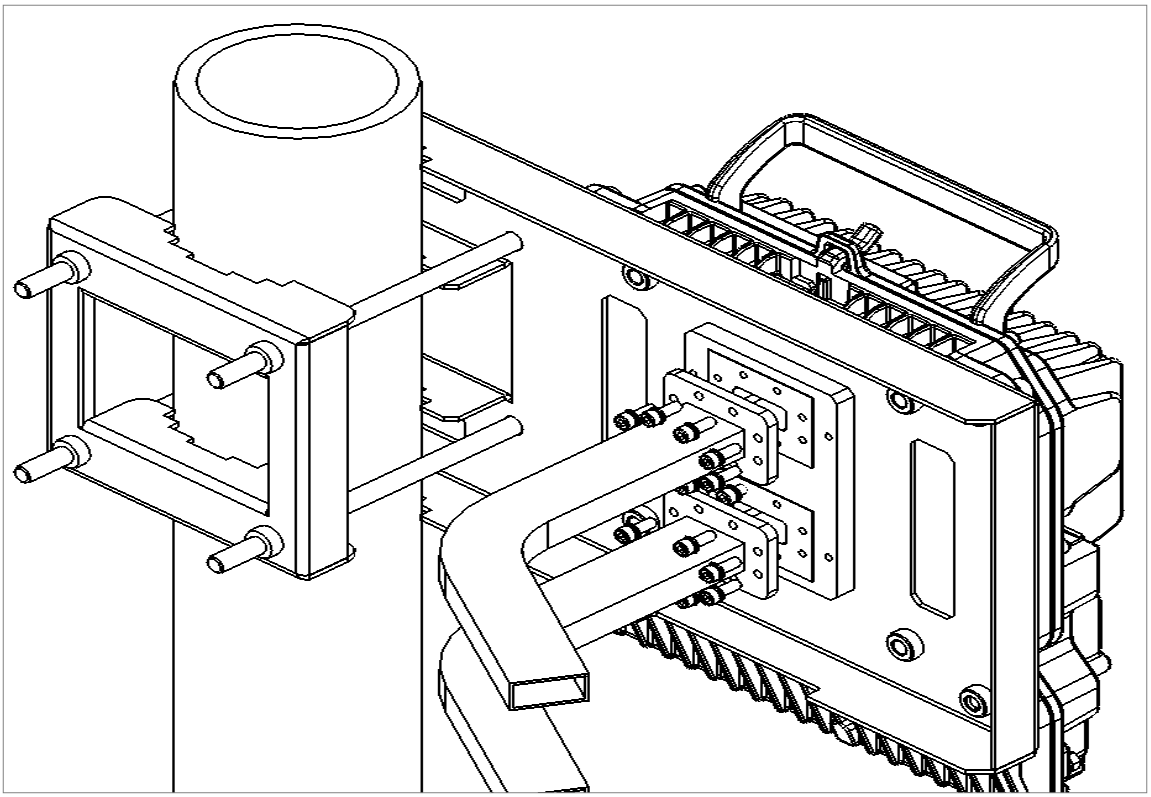
Figure 39: *Remote Pole Mount Kit – 4-5 GHz*



7. Mount and tighten the RFU-D-HP Radio to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Radio.



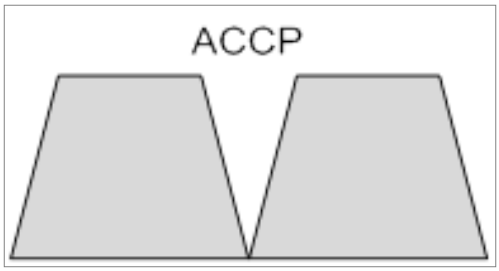
8. Mount and tighten both Flexible WGs with their O-ring to the RFU-D-HP Remote Mount Adaptor ports using the four screws supplied with each Flexible WG kit.



2+0 Single Polarization Direct Mount

Note:

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



List of Items

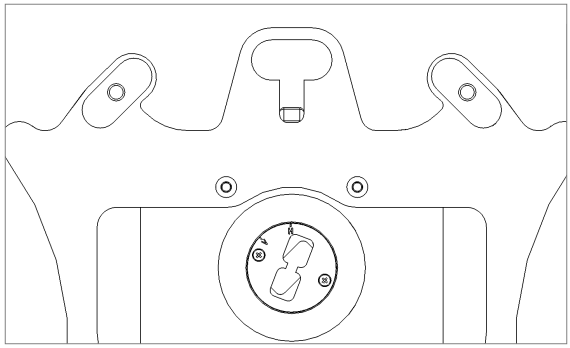
Item	Description	Quantity	Marketing Model
1	RFU-D-HP RADIO	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP Splitter Kit	1	DXDH-MD-SPLTR-*ff*

Required Tools

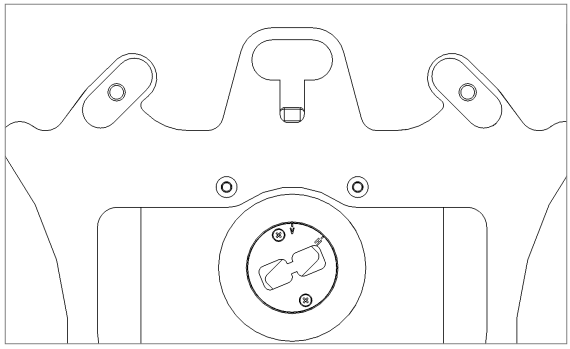
- Metric offset hexagon key set
- Phillips #1, #2 screwdriver

Procedure

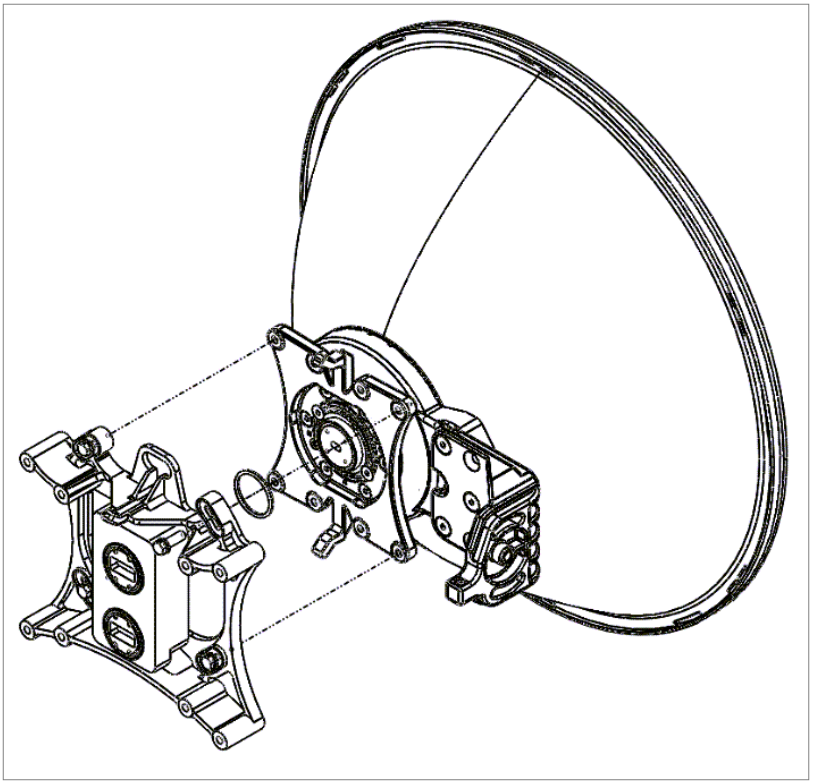
1. Adjust the twist on the Splitter Kit. Perform one of the following steps, according to the required polarization (horizontal or vertical).
   - For horizontal polarization, locate the twist with the letter “H” on top.



   - For vertical polarization, locate the twist with the letter “V” on top.



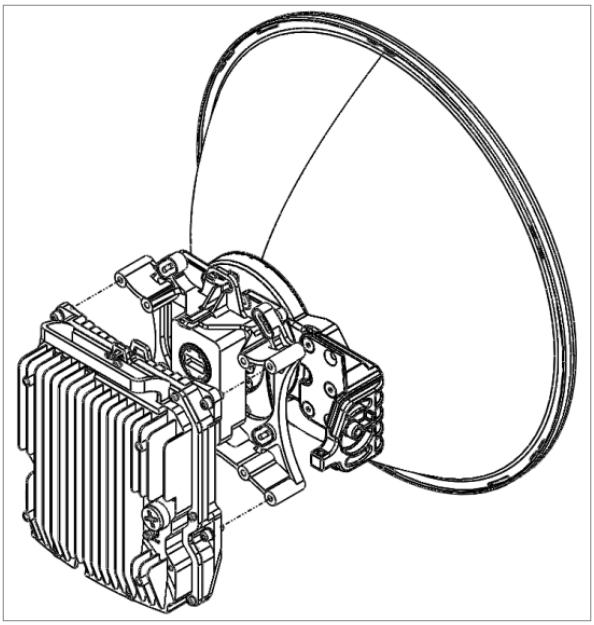
2. Mount and tighten the RFU-D-HP Splitter Kit on the antenna using the four M8 screws and washers.



Note:

Verify that the O-ring is properly mounted between the antenna transition and the splitter.

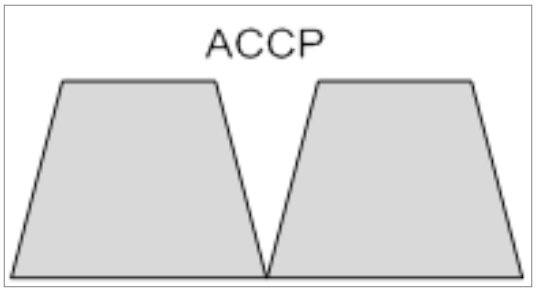
3. Connect the RFU-D-HP DC radio to the splitter kit using the four M8 captive screws and washers supplied, and tighten the screws.



Note:

Verify that the O-rings are properly mounted between the OMT ports and the radio/dual coupler.

2+0 Single Polarization Remote Mount



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Splitter RFU-D-HP Circulator	1	DXDH-MD-SPLTR-ff DXDH-MD-CIRC-ff
2	RFU-D-HP RADIO	1	See Section Marketing Models for Radio Unit
3	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit
4	RFU-D-HP Remote Pole Mount Kit	1	PTP 820C-Pole-Mount

Item	Description	Quantity	Marketing Model
5	RFU-D-HP R2 RM Adapter For Single Port Kit	1	DXDH-RM-MOUNT-ADPT-1P-ff
6	Screw, Hex cap, SS, DIN 933-M8x20-A2-70	4	Included in Splitter/Circulator kit.
7	Washer, Helical spring lock, SS, DIN 127-B8-A2-70	4	Included in Splitter/Circulator kit.
8	Washer, Plain, SS, DIN 125-A8.4-A2-70	4	Included in Splitter/Circulator kit.

Required Tools

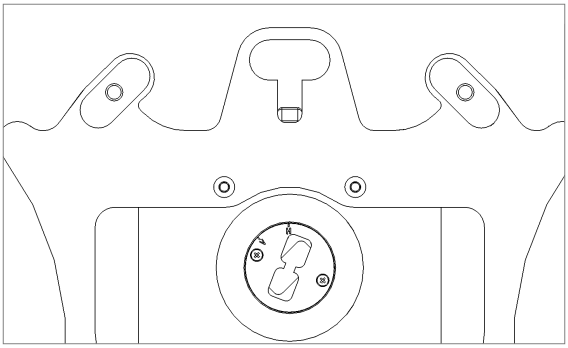
- Metric offset hexagon key set
- Metric wrench key set

Procedure

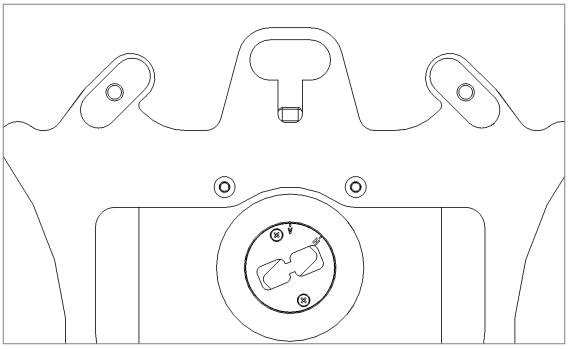
Note:

Some versions of the RFU-D-HP Splitter/Circulator do not require you to align the twist. In these cases, the RFU-D-HP Splitter/Circulator is not changeable. See below.

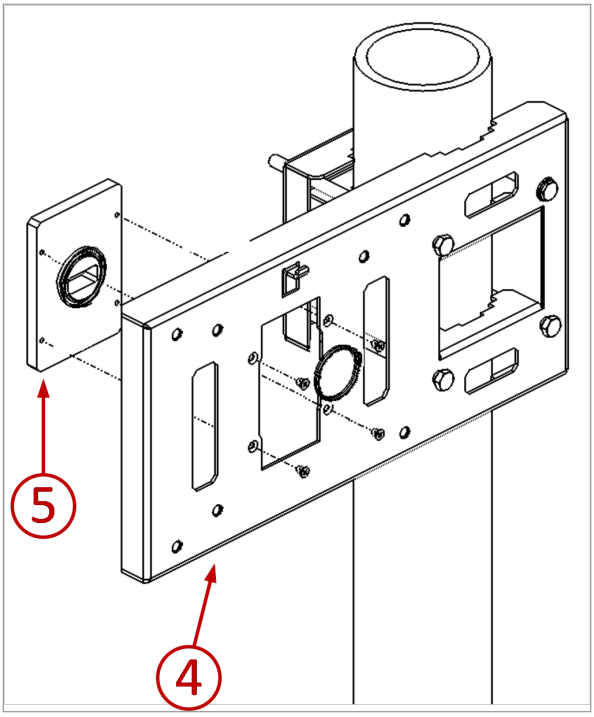
1. Adjust the twist on the Splitter Kit. Perform one of the following steps, according to the required polarization (horizontal or vertical).
   - For horizontal polarization, locate the twist with the letter “H” on top.



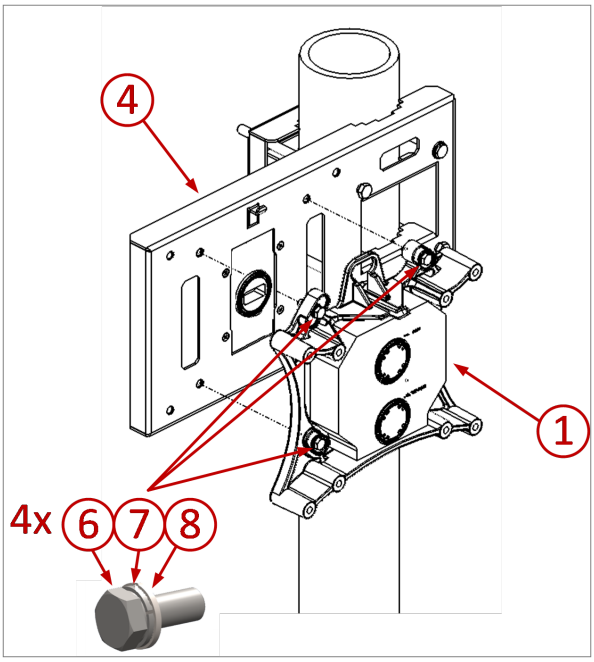
- For vertical polarization, locate the twist with the letter “V” on top.



2. Mount the Single Polarization Remote Pole Mount Adaptor (5) on the Remote Pole Mount (4), using the four screws supplied with the kit. Make sure that the Remote Pole Mount Adaptor (5) O-rings are properly mounted on the adaptor.



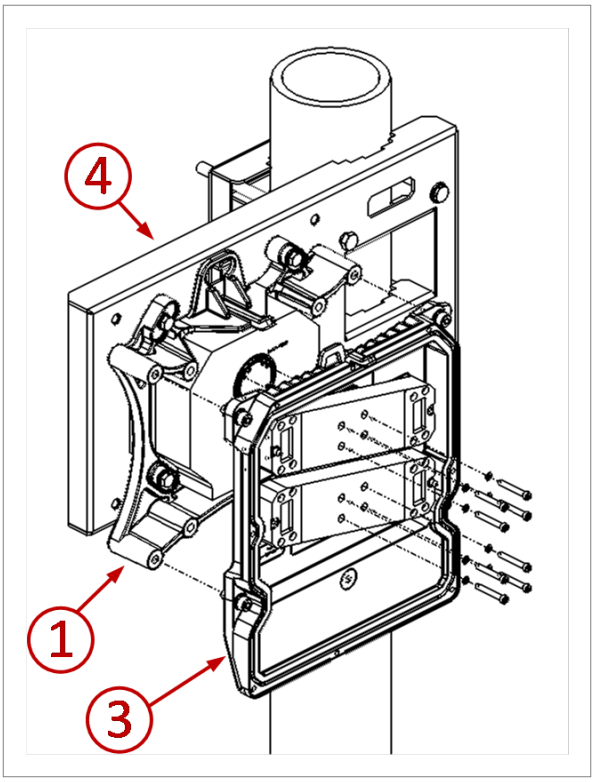
3. Mount and tighten the RFU-D-HP Splitter/Circulator (1) to the Remote Pole Mount (4) using the four M8 screws (6) and washers (7, 8) that are supplied with the Splitter/Circulator kit. Make sure that the Remote Pole Mount Adaptor (5) O-rings are properly mounted between the Adaptor and the Splitter/Circulator.



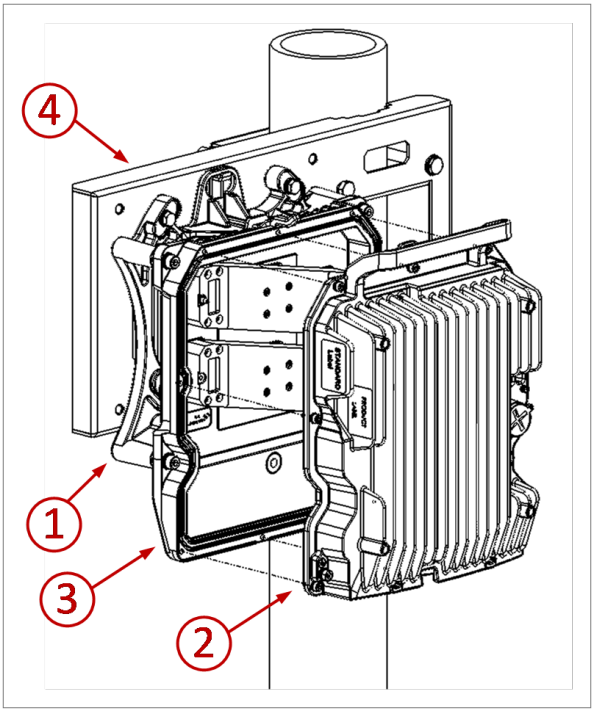
4. Attach the RFU-D-HP Diplexer units (3) to the RFU-D-HP Splitter/Circulator (1). Then, tighten the 8 M4x35 screws and washers supplied with RFU-D-HP splitter or circulator unit (3).

Note:

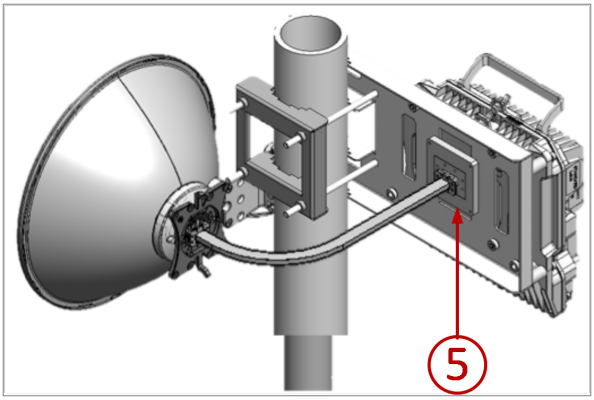
Make sure to attach the RFU-D-HP Diplexer unit (3) to the RFU-D-HP Splitter/Circulator (1) before attaching the RFU-D-HP Radio unit (2) to the RFU-D-HP Diplexer unit (3).



5. Mount and tighten the RFU-D-HP radio (2) to the RFU-D-HP Diplexer unit (3) using the 8 screws and washers connected to the RFU-D-HP Radio unit (2). Make sure that the RFU-D-HP Diplexer Unit (3) O-ring is properly mounted between both units.



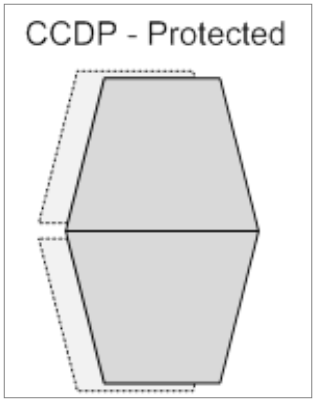
6. Mount and tighten the Flexible Waveguide to the Single Polarization Remote Pole Mount Adaptor (5) flange.



2+2 HSB Dual Polarization Direct Mount

Note:

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



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT KIT	1	DXDH-MD-OMT-*ff*
4	RFU-D-HP Dual Coupler Kit	1	DXDH-MD-DUAL-CPLR-*ff*
5	CIRC./CIRC. Adaptor	1	Per Antenna Vendor

Required Tools

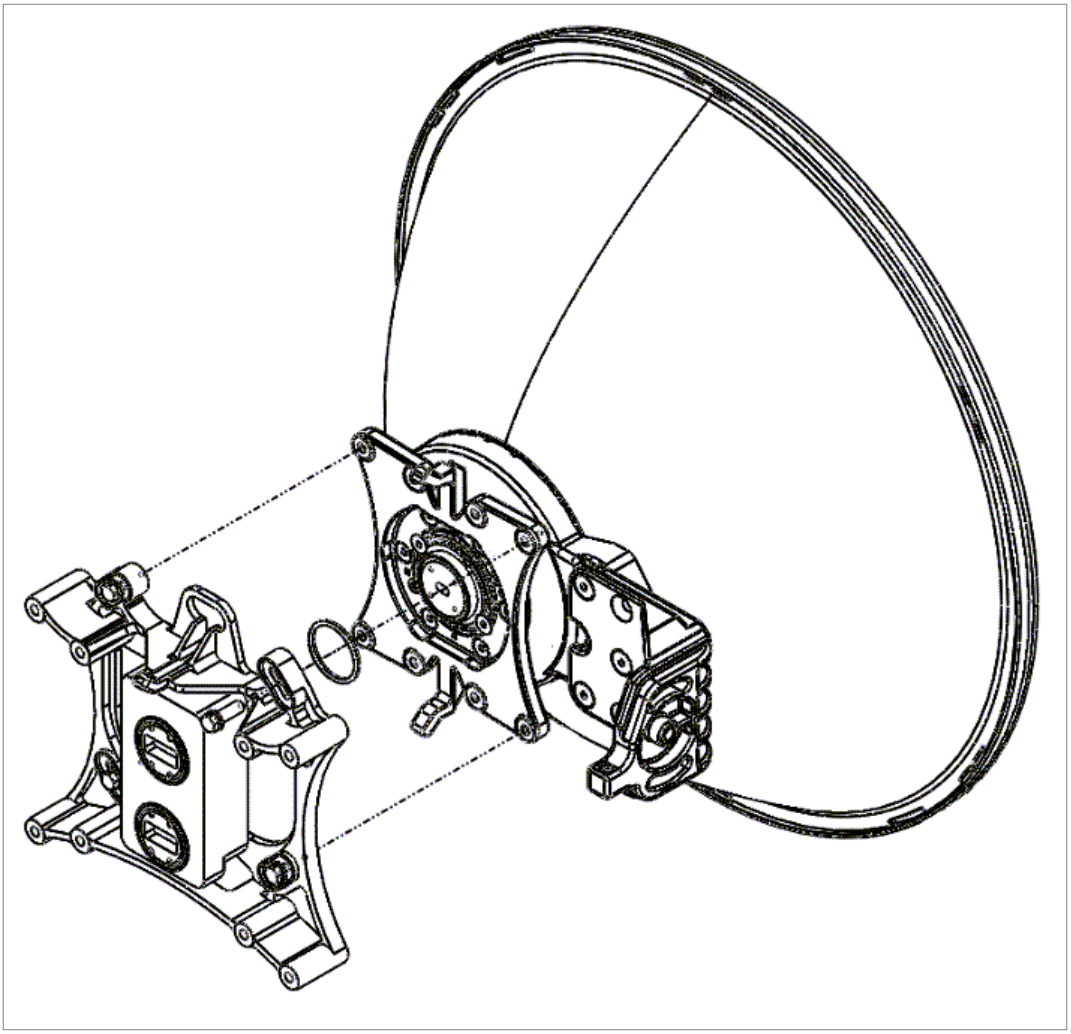
- Metric offset hexagon key set
- Metric wrench key set

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 RFU-D-HP OMT Kit to the antenna and secure it with four screws. Verify existence of the

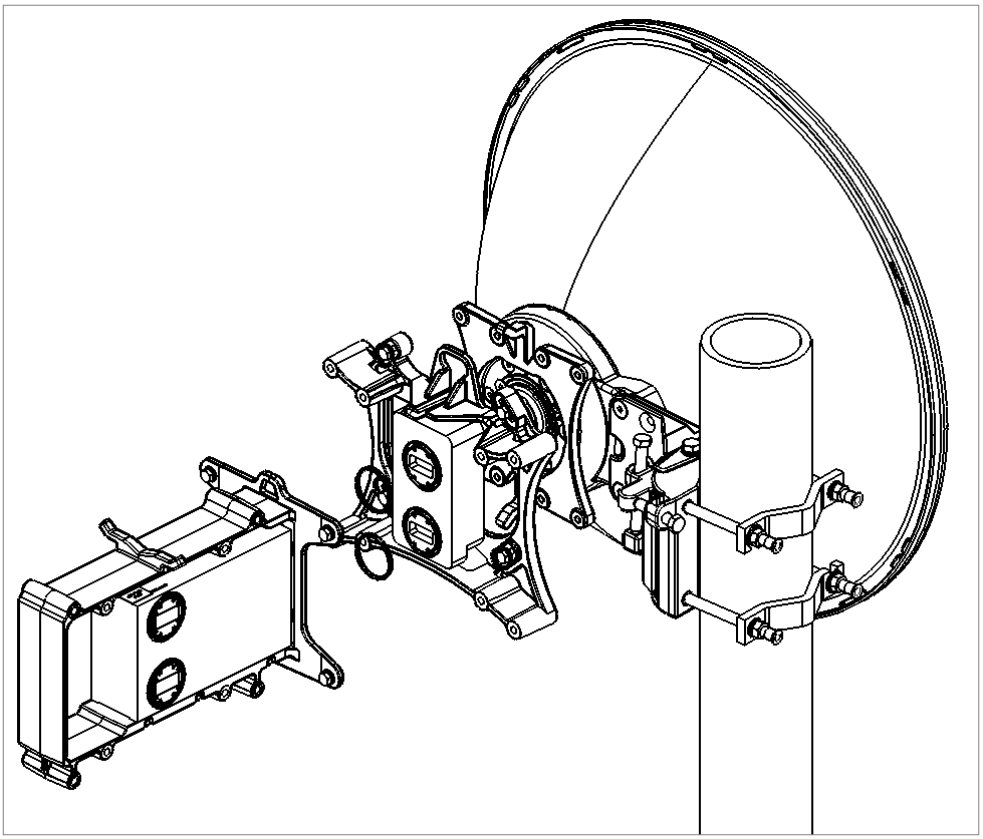
O-ring.



Note:

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

3. Connect the RFU-D-HP Dual Coupler Kit to the OMT Kit using four M8 screws and washers, and tighten the screws.

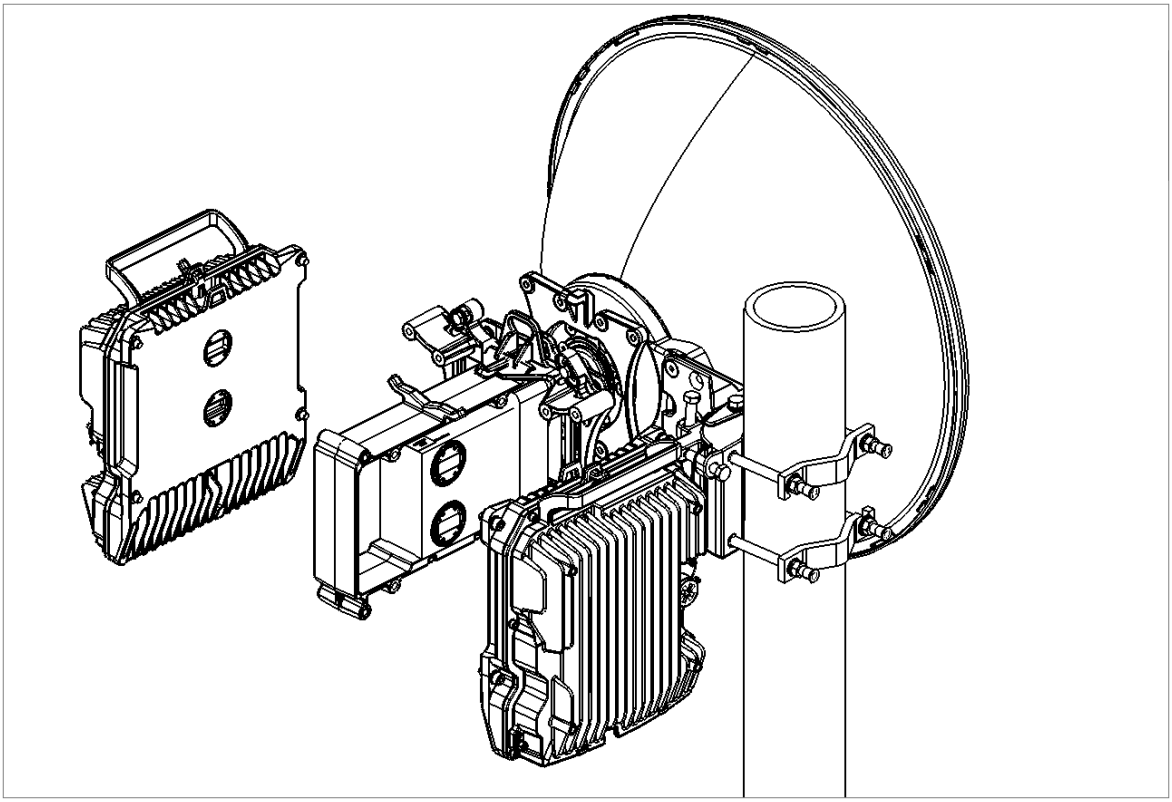


Note:

Verify that the O-rings are properly mounted between the OMT ports and the dual coupler.

4. Mount and tighten the RFU-D-HP DC 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

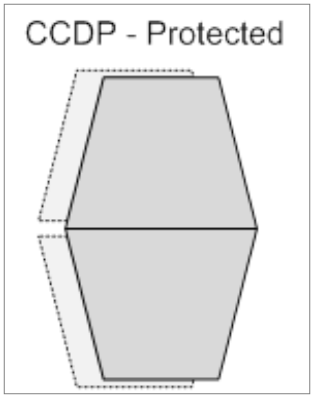
radio ports of the RFU-D-HP Dual Coupler.



2+2 HSB Dual Polarization Remote Mount

Note:

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



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP RADIO	2	See Section Marketing Models for Radio Unit

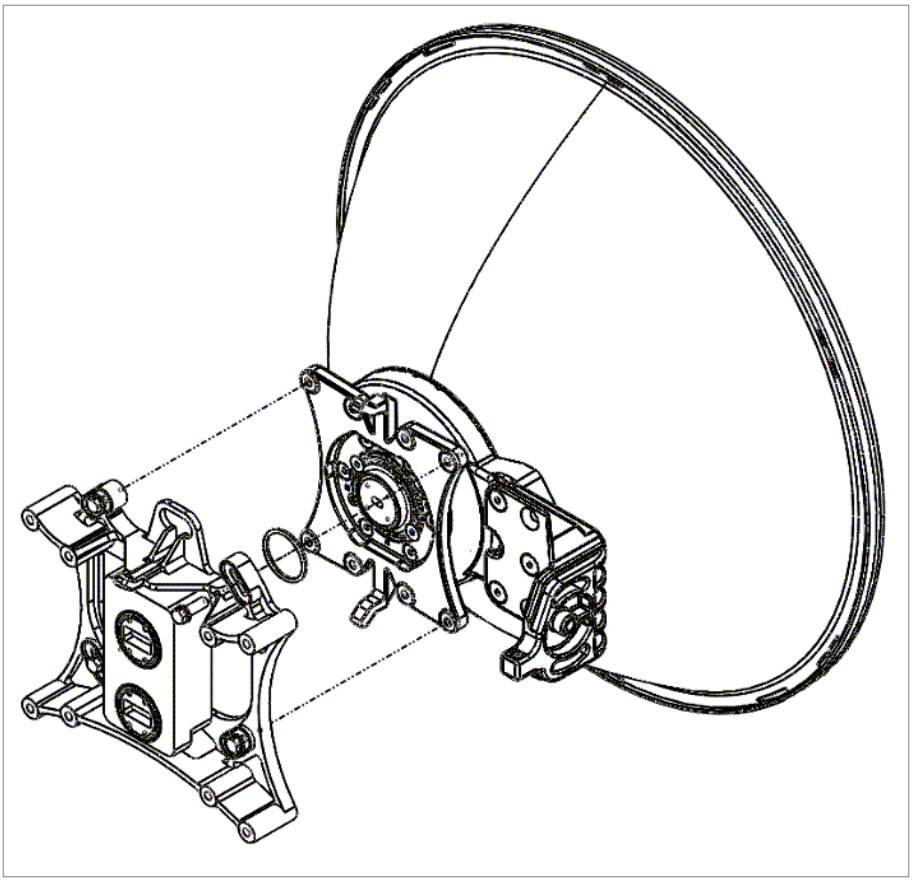
Item	Description	Quantity	Marketing Model
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT KIT	1	DXDH-MD-OMT-*ff*
4	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-*ff*
5	RFU-D-HP DUAL COUPLER KIT	1	DXDH-MD-DUAL-CPLR-*ff*
6	FLEXIBLE WG KIT	2	
7	RFU-D-HP DC POLE MOUNT KIT	1	DXDH-RM-MOUNT-ADPT-*ff*
8	RFU-D-HP DC Adaptor Remote Mount Kit, *ff* GHz	1	DXDH-RM-MOUNT-ADPT-*ff* Not Required for 4-5 GHz
9	CIRC./CIRC. ADAPTOR	1	Per Antenna Vendor.
10	RFU-D-HP Pole Mount Kit	1	

Required Tools

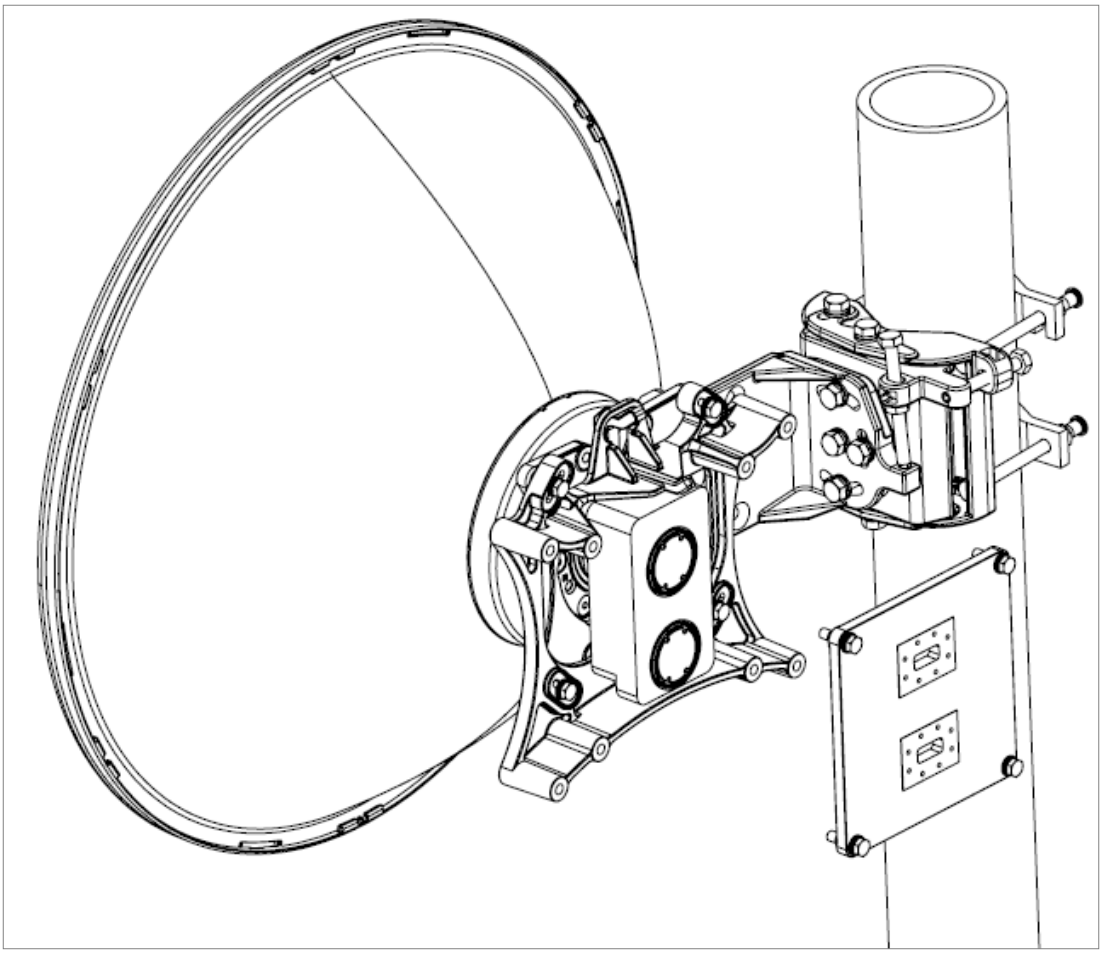
- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver

Procedure

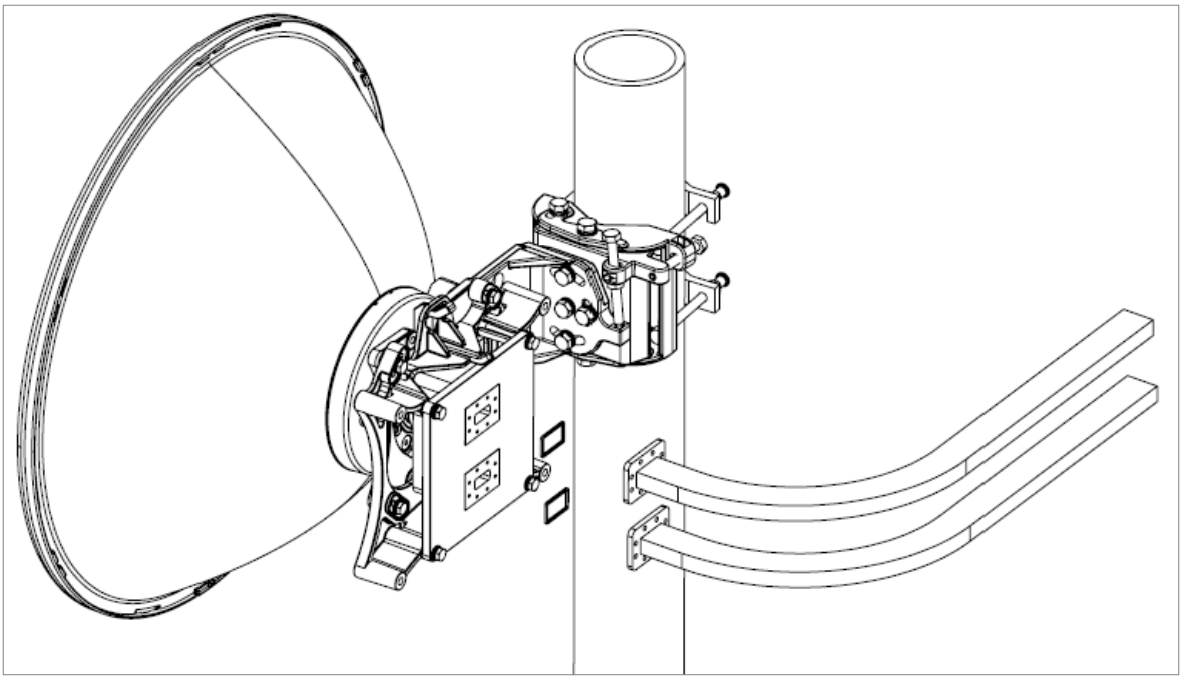
1. Prior to the installation, follow the antenna manufacturer's instructions to use the circular adaptor. (Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.)



2. Connect the OMT Kit to the antenna and secure it with four screws. Verify the existence of the O-ring.
3. Mount and tighten the OMT Plate Adapter to the RFU-D-HP OMT ports using the screws supplied with the adapter kit.

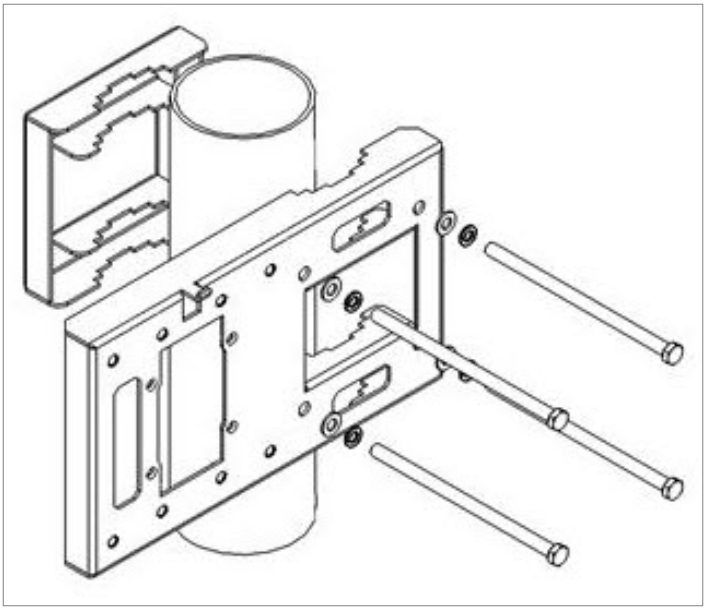


4. Mount and tighten the O-ring and the flexible waveguide to the adapter ports using the screws supplied with the flexible waveguide kit.

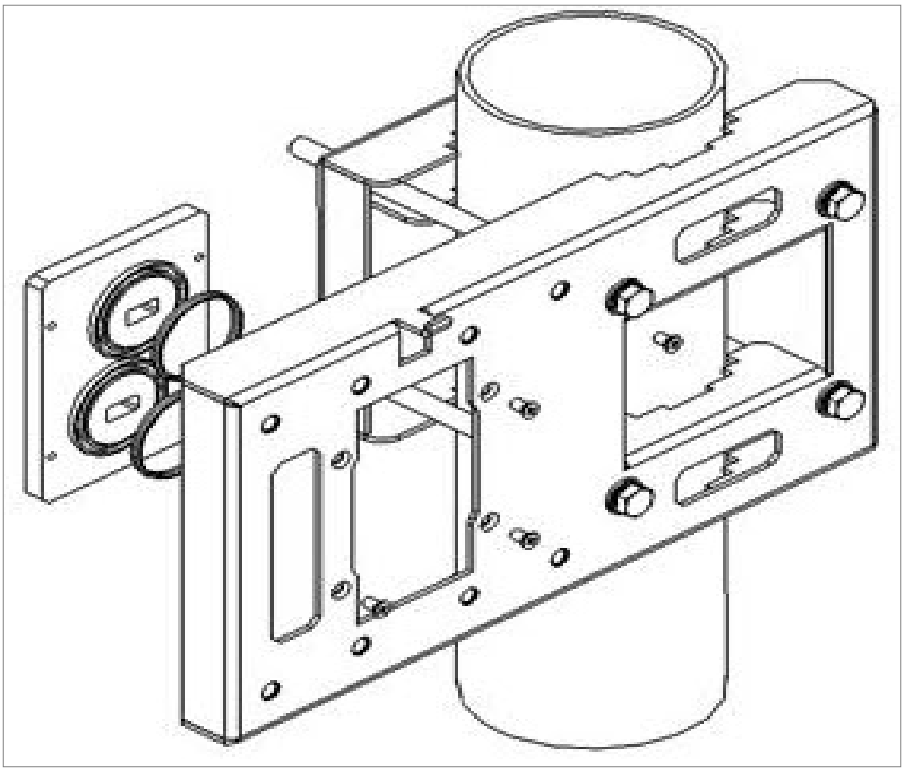


Note:

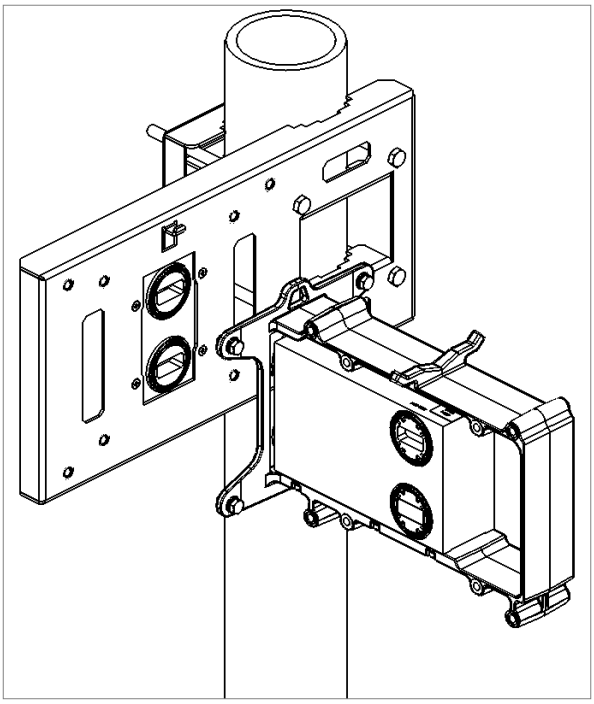
Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.



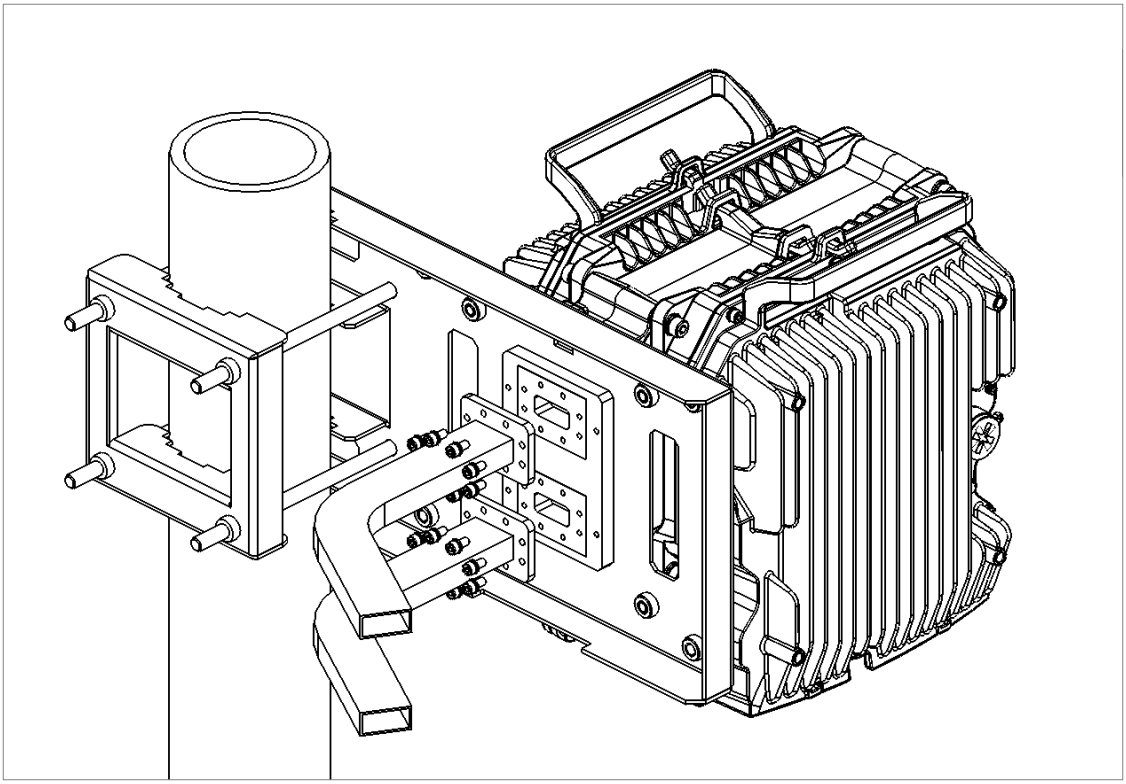
5. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit. See Steps 6 in Section 2+0 Dual Polarization Remote Mount.



6. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit.
7. Mount and tighten the RFU-D-HP Dual Coupler to the RFU-D-HP Pole Mount using the four screws and washers that are supplied with the RFU-D-HP Dual Coupler kit. Pay attention that the O-rings are mounted on the RFU-D-HP Remote Mount Adaptor.



8. Mount and tighten the RFU-D-HP radios on each side of the RFU-D-HP Dual Coupler using the screws assembled on RFU-D-HP radio. Pay attention that the O-rings are correctly assembled on the radio port of the RFU-D-HP Dual coupler.

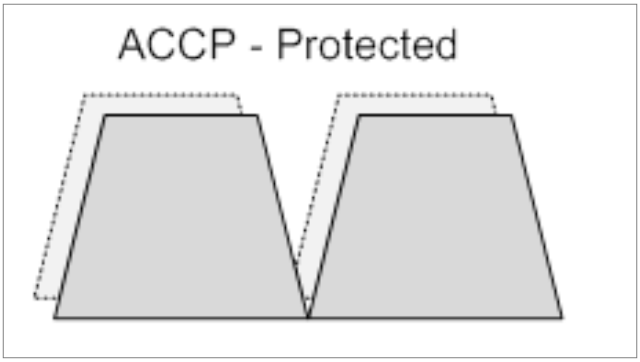


9. Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the RFU-D-HP Dual Coupler antenna ports. Tighten the screws and washers supplied with the Flexible Waveguide Kit.

2+2 HSB Single Polarization Direct Mount

Note:

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



List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP RADIO	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP SPLITTER KIT	1	DXDH-MD-SPLTR-*ff*
4	RFU-D-HP DUAL COUPLER KIT	1	DXDH-MD-DUAL-CPLR-*ff*

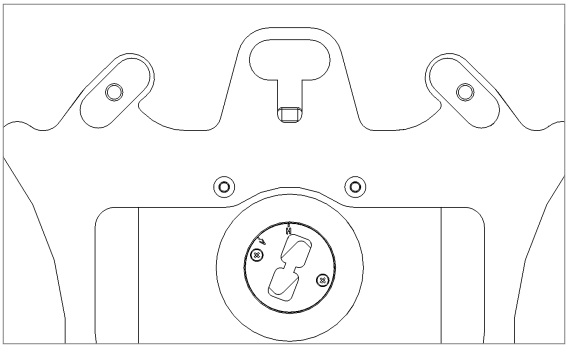
Required Tools

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

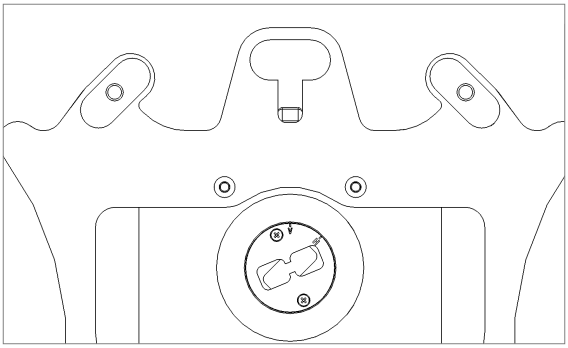
Procedure

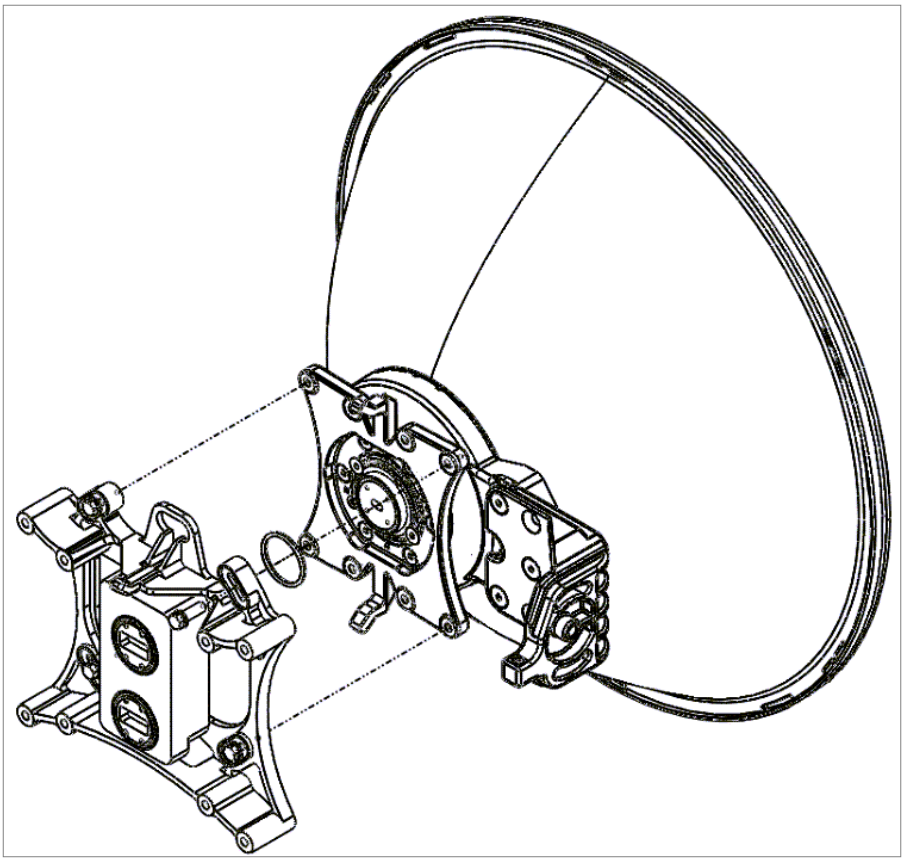
1. Adjust the twist on the Splitter Kit. Perform one of the procedures below, according to the required polarization (horizontal or vertical).

- For horizontal polarization, locate the twist with the letter “H” on top.

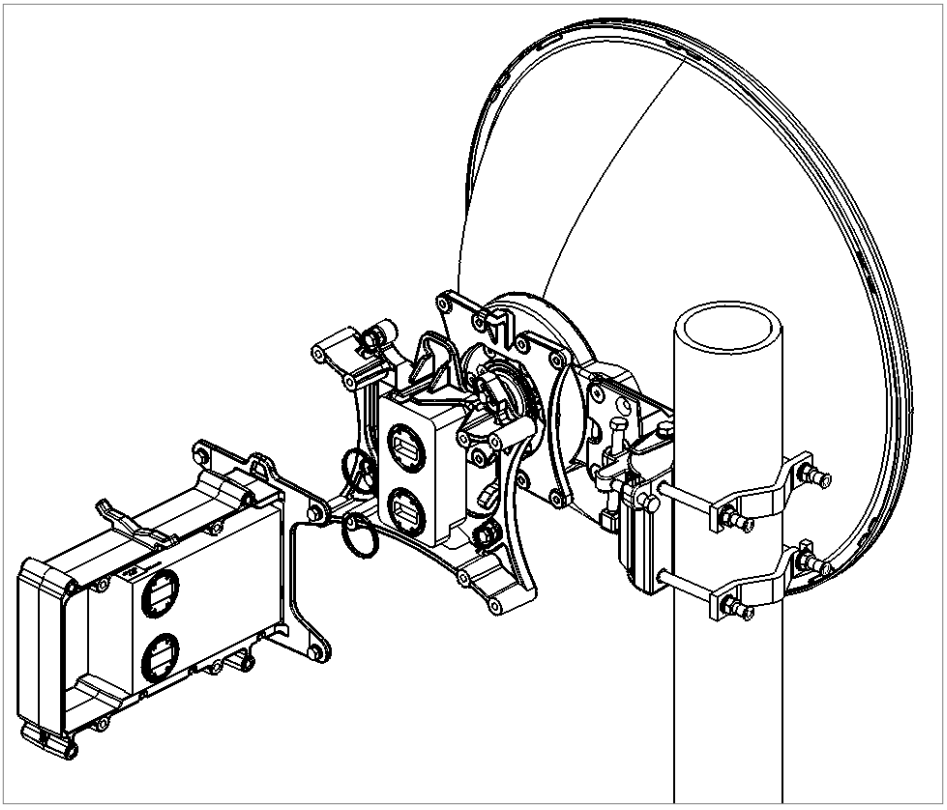


- For vertical polarization, locate the twist with the letter “V” on top.

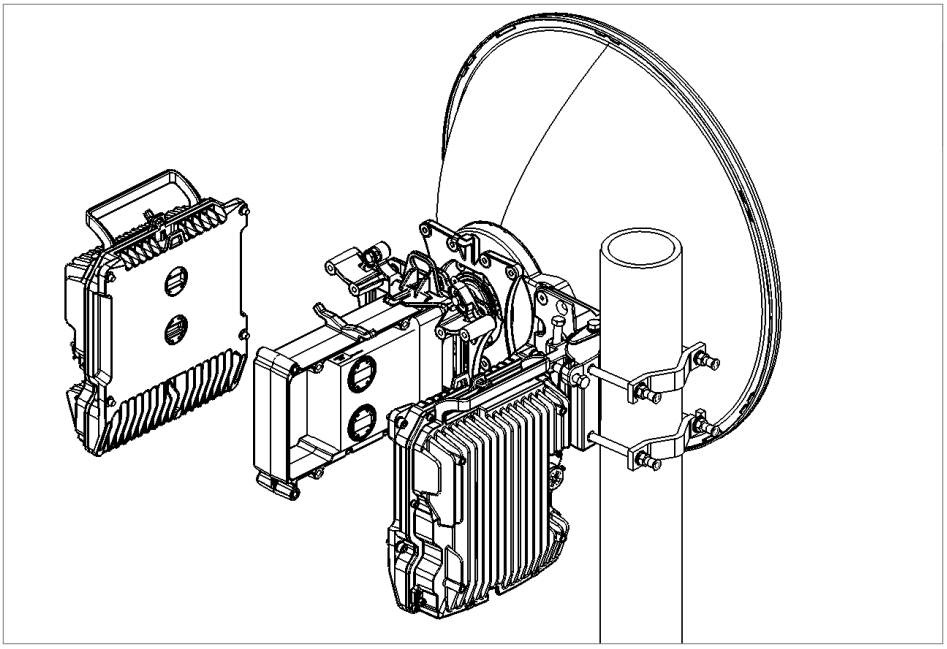




2. Mount the Splitter Kit on the antenna using four M8 screws and washers and tighten the screws.



3. Connect the RFU-D-HP Dual Coupler Kit to the Splitter Kit using four M8 screws and washers, and tighten the screws.

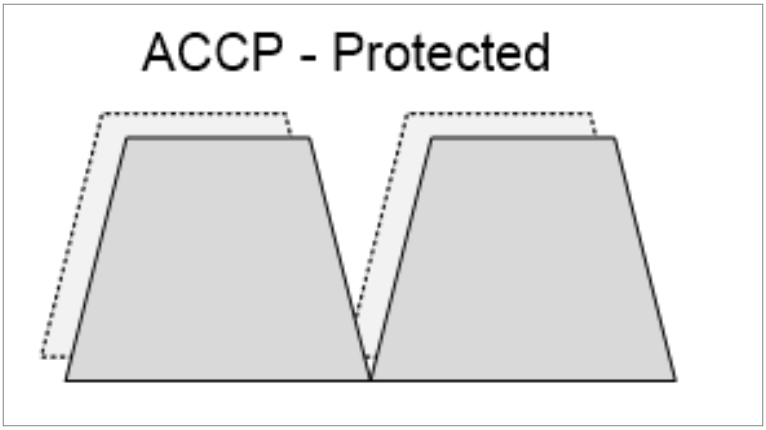


4. Mount and tighten the RFU-D-HP DC radio unit to both sides of the Dual Coupler Kit using the supplied captive screws and washers. Pay attention that the O-rings are correctly mounted on the radio ports of the RFU-D-HP Dual Coupler.
5. Connect the protection signaling cable between the management ports of both units.

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.



List of Items

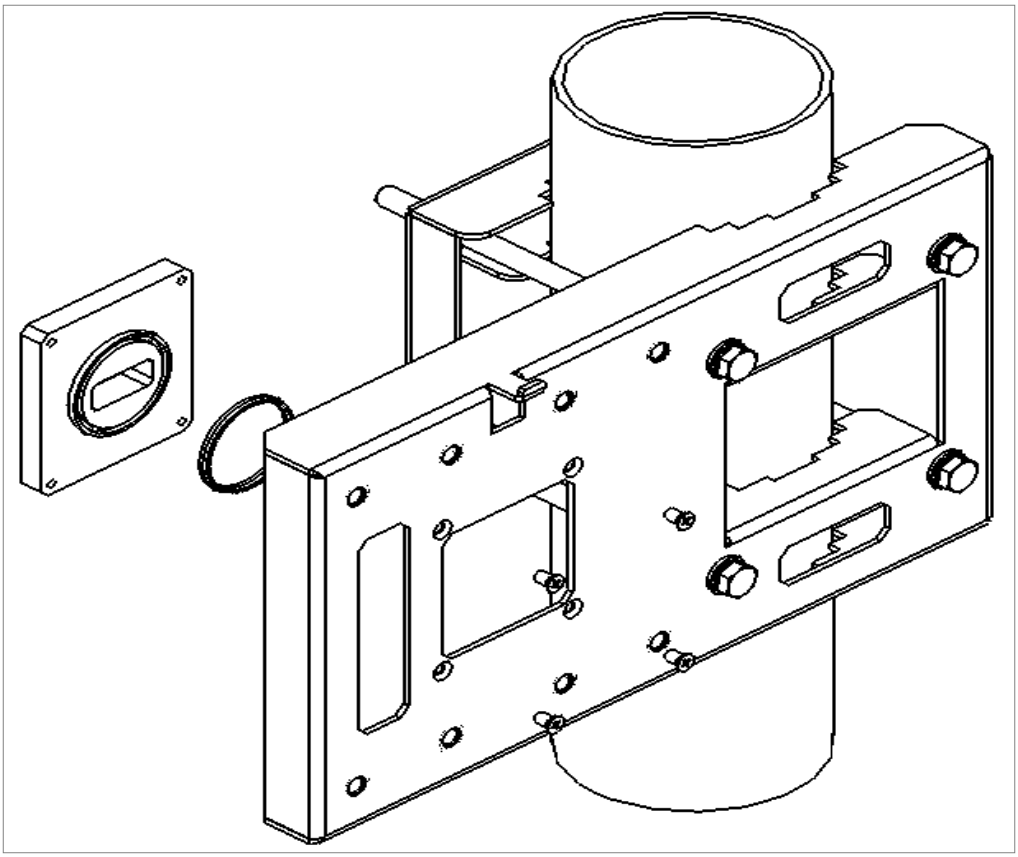
Item	Description	Quantity	Marketing Model
1	RFU-D-HP RADIO	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	Remote Mount Kit	1	RFU-D-HP DC Adaptor Remote Mount Kit, *ff* GHz
4	RFU-D-HP SPLITTER KIT	1	DXDH-MD-SPLTR-*ff*
5	RFU-D-HP DUAL COUPLER KIT	1	DXDH-MD-DUAL-CPLR-*ff*
6	FLEXIBLE WG KIT	2	
7	RFU-D-HP Pole Mount Kit	1	

Required Tools

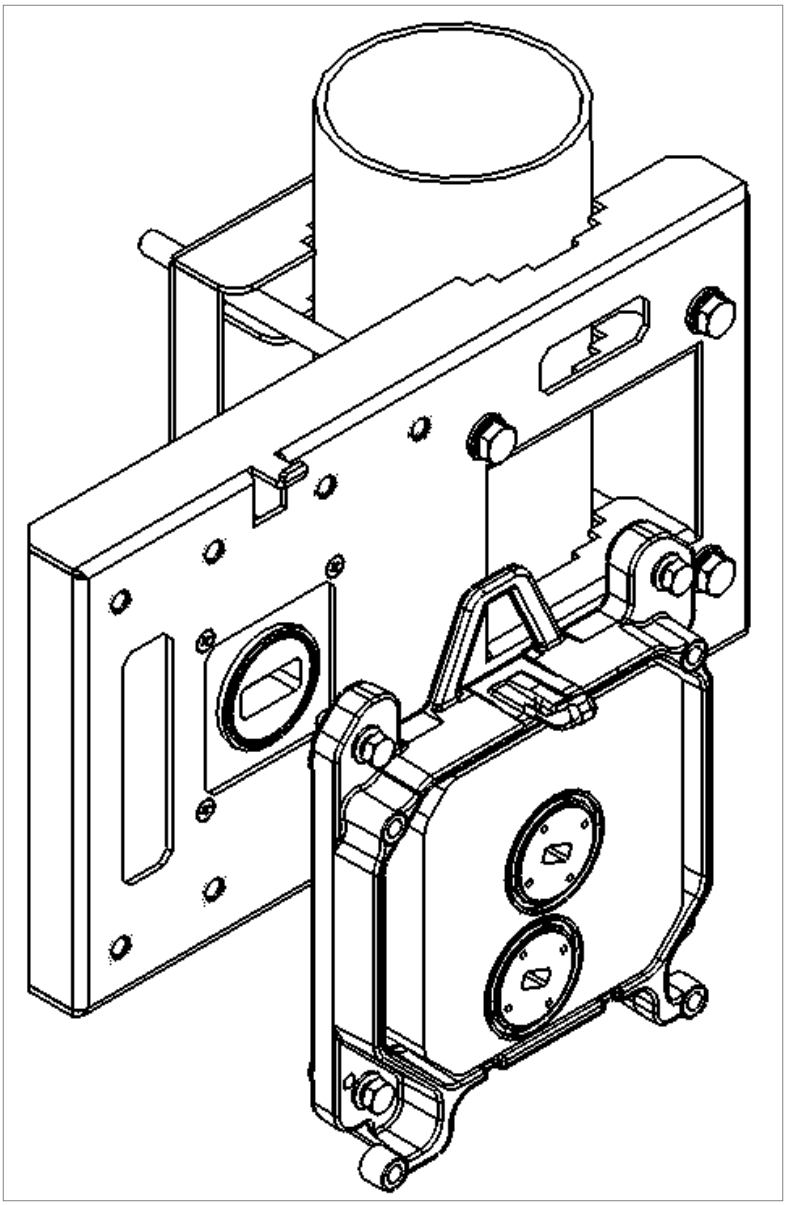
- Metric offset hexagon key set
- Metric wrench key set
- Phillips #1, #2 screwdriver

Procedure

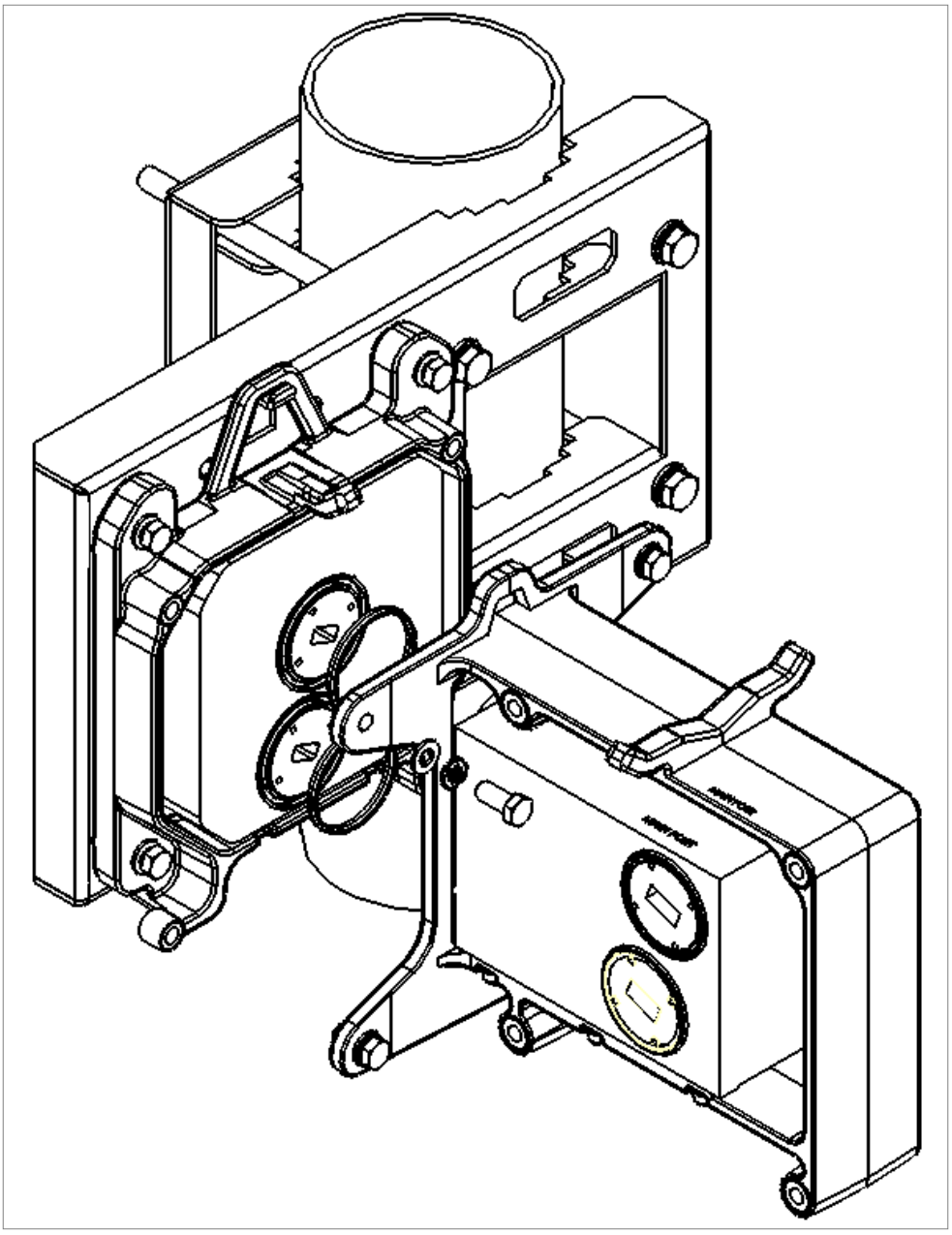
1. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in the RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit.



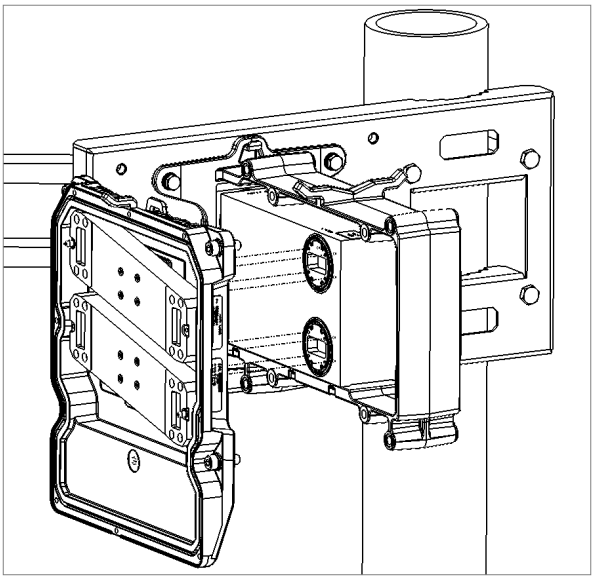
2. Mount and tighten the RFU-D-HP Splitter to the RFU-D-HP Pole Mount using the four captive screws and washers that are assembled to the RFU-D-HP Splitter kit.

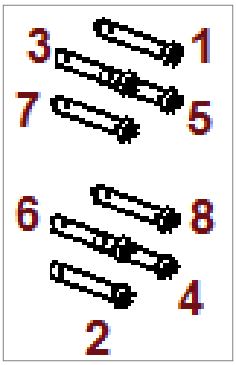


3. Mount and tighten the RFU-D-HP Dual Coupler to the RFU-D-HP Splitter using the four captive screws and washers that are supplied with the RFU-D-HP Dual Coupler kit. Make sure that the O-rings are mounted on the RFU-D-HP Splitter.



4. Attach the Diplexer unit to the Dual Coupler using 8 M4 screws provided with the Diplexer kit, as shown below, using 20Nm torque.



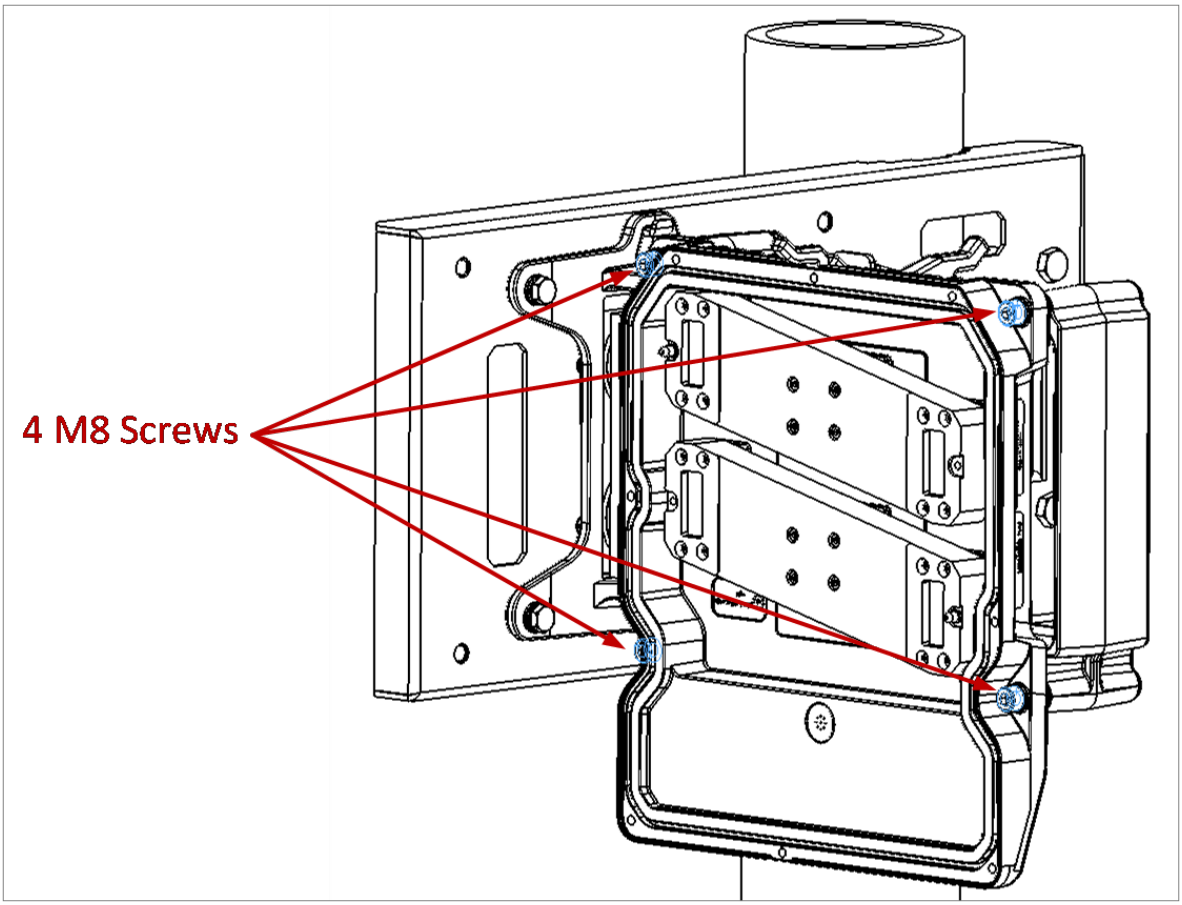


Note:

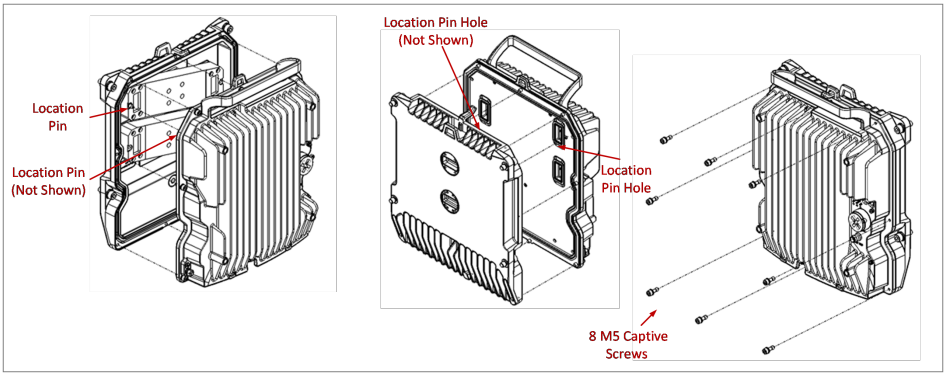
Tighten the screws diagonally. First begin to fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

Verify that the O-rings on the Dual Coupler are properly mounted between the Dual Coupler ports and the Diplexer unit.

5. Secure the edges of the Diplexer unit to the Dual Coupler using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.

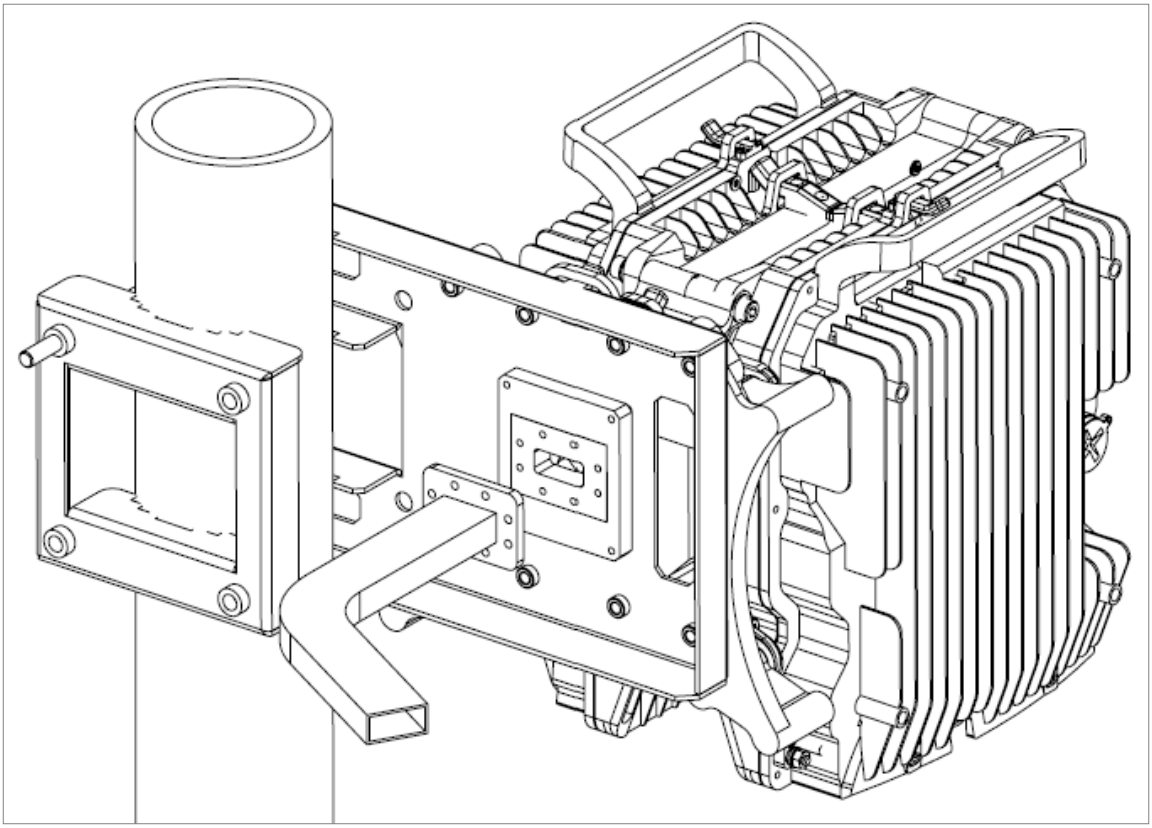


6. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX port, depending on the frequency.



7. Repeat steps 4-6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Coupler, Dual Splitter, or Dual Circulator.

8. 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+0 Space Diversity (Internal) Direct Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit
3	Space Diversity Mediation Device	1	DXDH-MD-SD-ff
4	LDF4 Cable	1	LDF4-JA-15M/ LDF
5	Waveguide-Coax Adaptor	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations

Required Tools

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

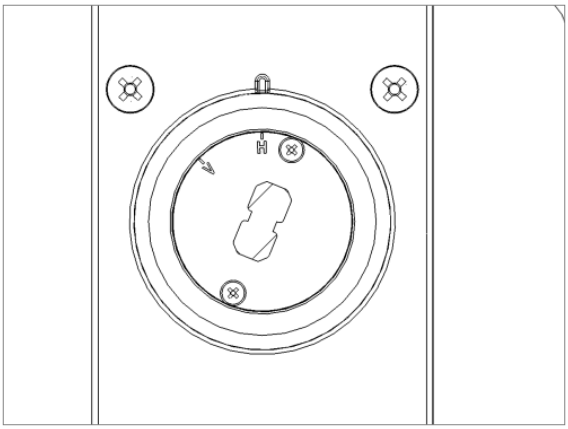
Procedure

1. Adjust the twist on the Space Diversity mediation device according to the required polarization.

Note:

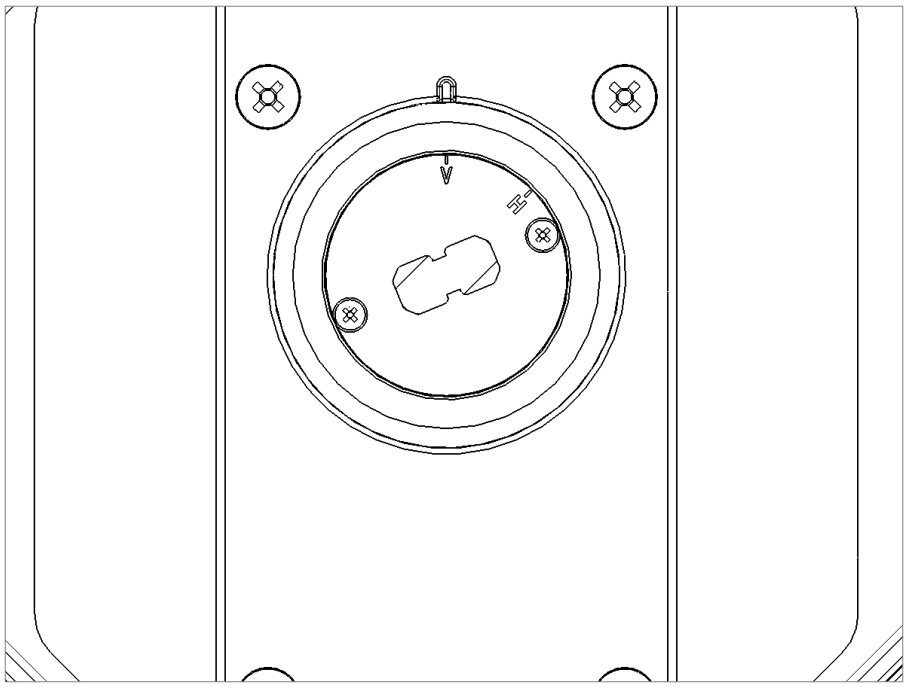
Make sure the polarization mounting direction of the twist to the Space Diversity mediation device is according to the antenna polarization.

- 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

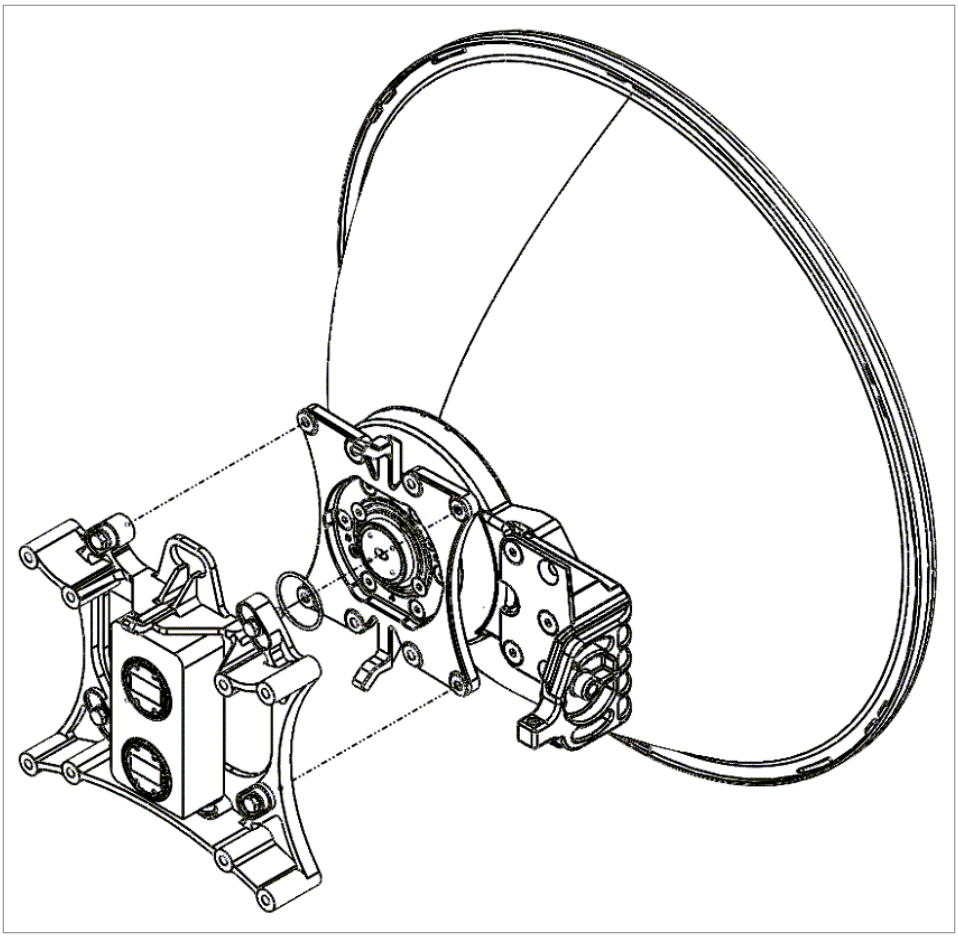
the two screws.



2. Connect the Space Diversity mediation device to the antenna and secure it using the four M8 screws and washers provided with the Space Diversity mediation device kit.

Note:

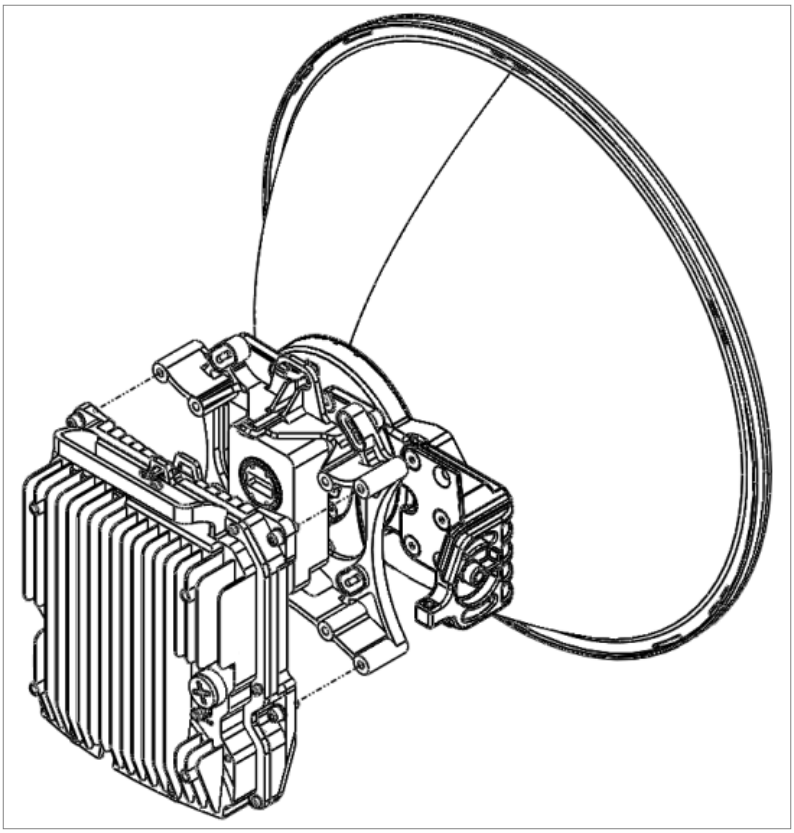
Verify that the O-ring is properly mounted between the antenna transition and the dual core.



3. Connect the RFU-D-HP radio to the Space Diversity mediation device using the four M8 captive screws and washers supplied with the radio, and tighten the screws.

Note:

Verify that the O-rings are properly mounted between the OMT ports and the radio.



4. Connect the LDF4 cable between the Space Diversity mediation device and a Waveguide-Coax Adaptor on the Diversity antenna. See Section Connecting the Space Diversity Antenna for Direct Mount Internal Space Diversity Configurations.

1+0 Space Diversity (Internal) Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	1	See Section Marketing Models for Diplexer Unit
3	Remote Mount Kit	1	DXDH-RM-MOUNT-kit
4	Adaptor Remote Mount Kit	1	DXDH-RM-MOUNT-ADPT-ff

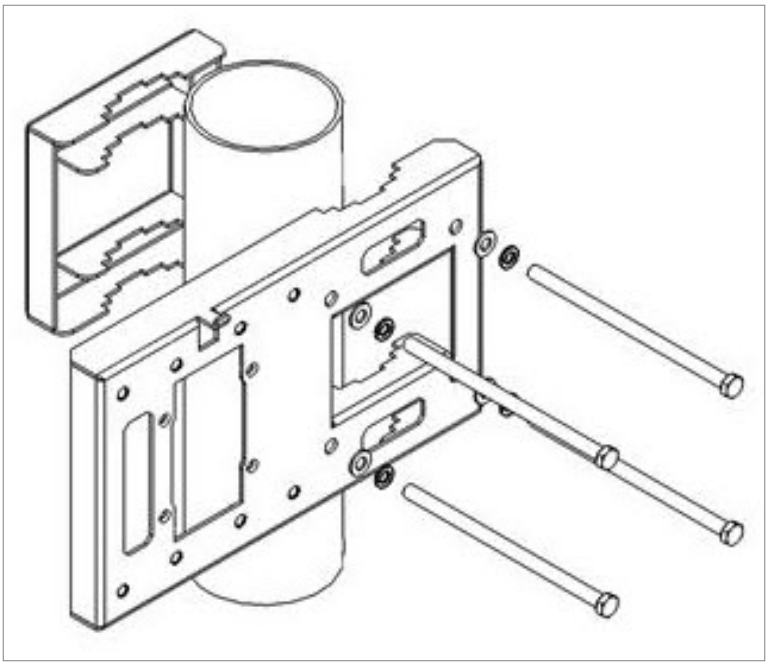
Item	Description	Quantity	Marketing Models
5	SD Adaptor for Remote Mount	1	DXDH-RM-MOUNT-SD-ADPT-ff
6	Flexible Waveguide Kit	1	WAVEGUIDE-ffFT
7	LDF4 Cable	1	LDF4-JA-15M/ LDF
8	Waveguide-Coax Adaptor	2	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
9	RFU-D-HP Pole Mount Kit	1	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

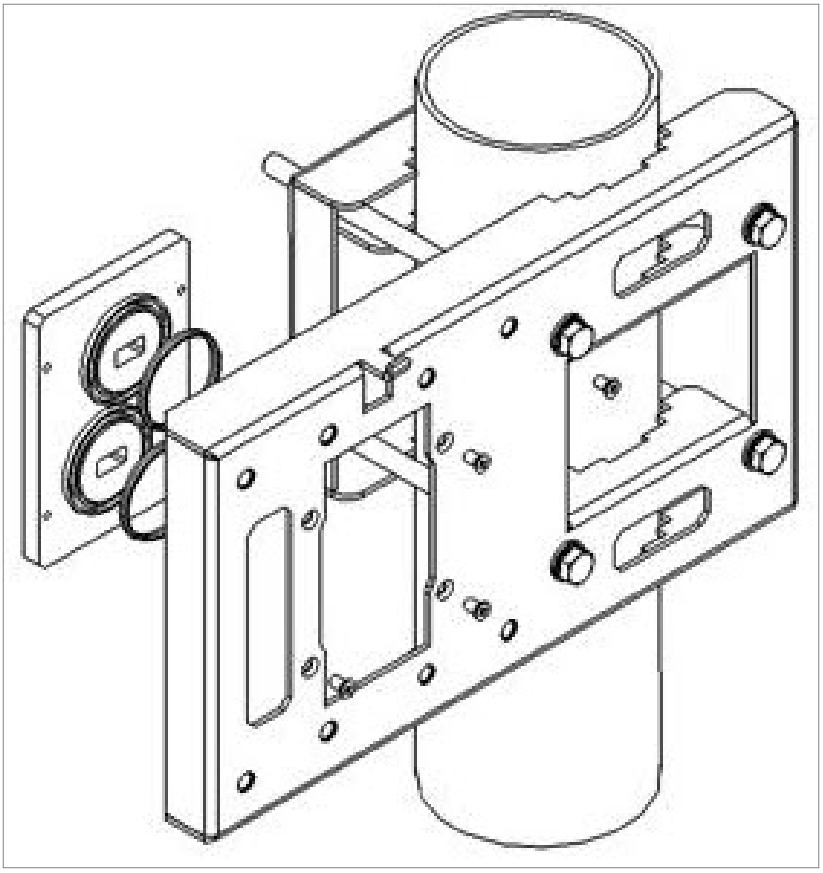
Procedure

1. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit. See Steps 5 and 6 in Section 2+0 Dual Polarization Remote Mount.



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

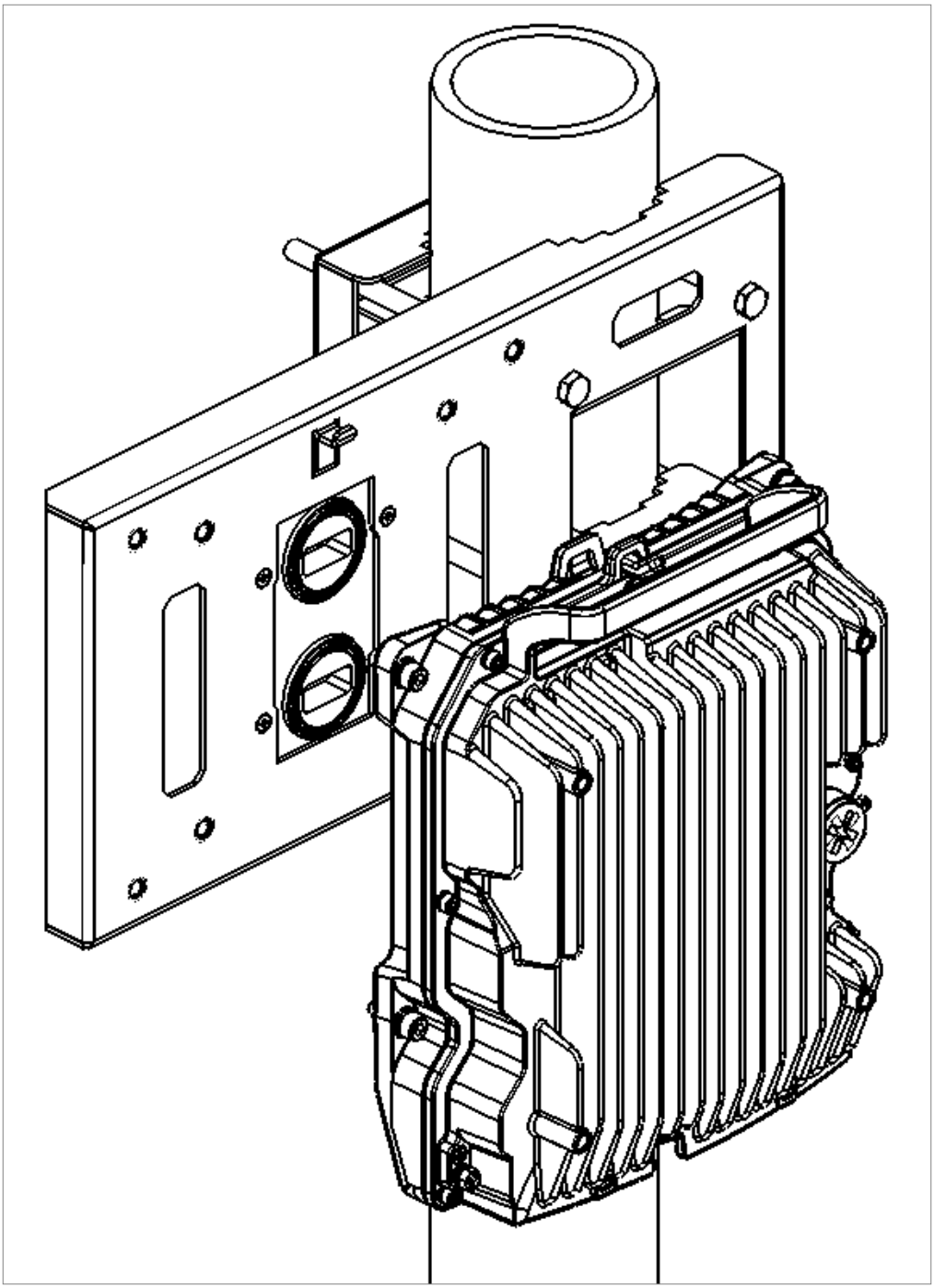
Adaptor Remote Mount kit.



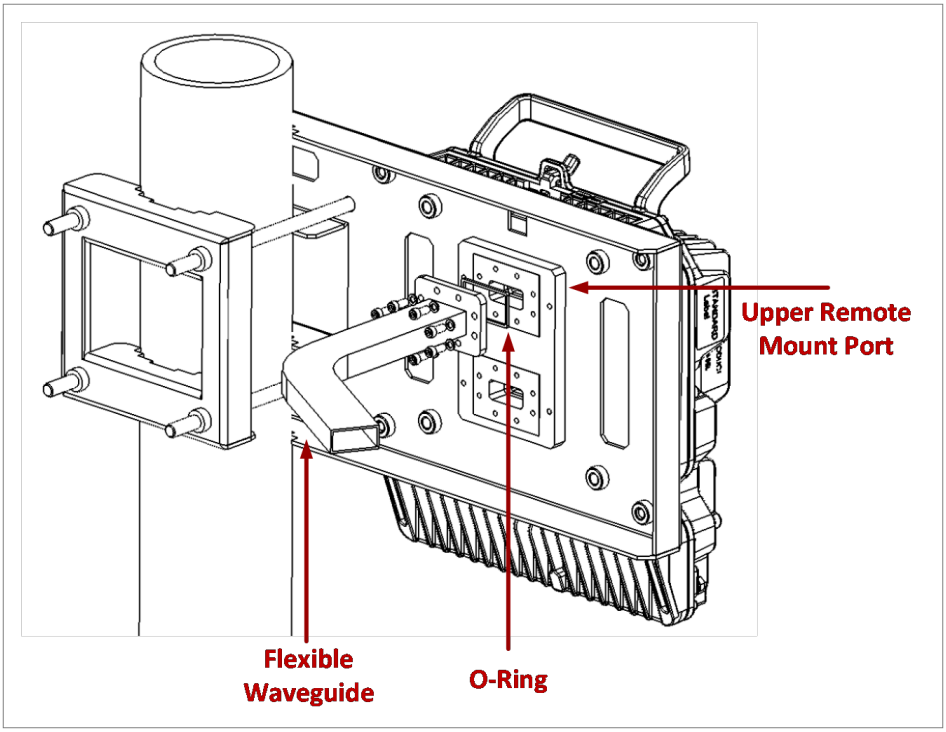
Note:

Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.

3. Mount and tighten the RFU-D-HP radio to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP radio.



4. Mount and tighten Flexible Waveguide with its O-ring to the upper RFU-D-HP Remote Mount Adaptor port using the eight screws supplied with each Flexible WG kit.



Note:

The Flexible Waveguide is not shown in this picture for purposes of clarity.

5. Connect a Waveguide-Coax Adaptor and an SD Adaptor for Remote Mount to the lower RFU-D-HP Remote Mount Adaptor port. Then, connect the LDF4 cable between Waveguide-Coax Adaptors on the lower antenna port of the Remote Mount Adaptor and the Diversity antenna. See Section Connecting the Space Diversity Antenna for Remote Mount Internal Space Diversity Configurations.

1+1 HSB-SD (Internal) and 2+0 SD (Internal) Direct Mount

Note:

This procedure can only be used for single polarization. Space Diversity is implemented via BBC

For 2+0 SD (Internal) Direct Mount configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit

Item	Description	Quantity	Marketing Models
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	Space Diversity Mediation Device	1	DXDH-MD-SD-ff
4	RFU-D-HP Dual Splitter or Dual Circulator for 2+2. RFU-D-HP Dual Coupler for 2+0	1	DXDH-MD-DUAL-SPLTR-ff DXDH-MD-DUAL-CIRC-ff DXDH-MD-DUAL-CPLR-ff
5	LDF4 Cable	1	LDF4-JA-15M/ LDF
6	Waveguide-Coax Adaptor	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations

Required Tools

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

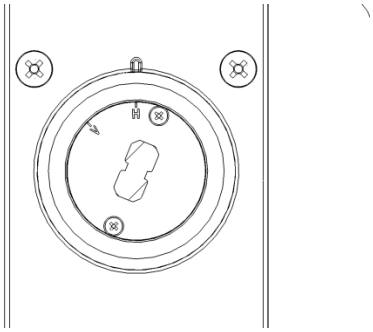
Procedure

1. Adjust the twist on the Space Diversity mediation device according to the required polarization.

Note:

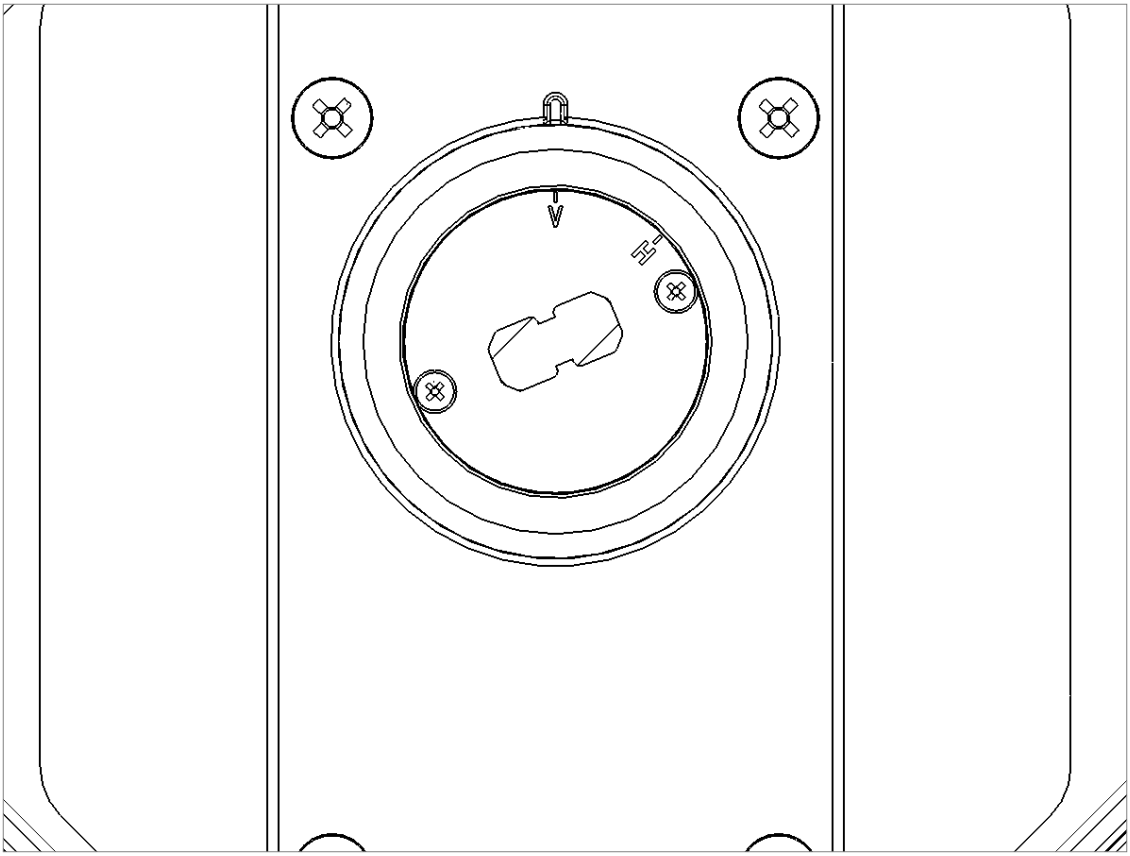
Make sure the polarization mounting direction of the twist to the Space Diversity mediation device is according to the antenna polarization.

- 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

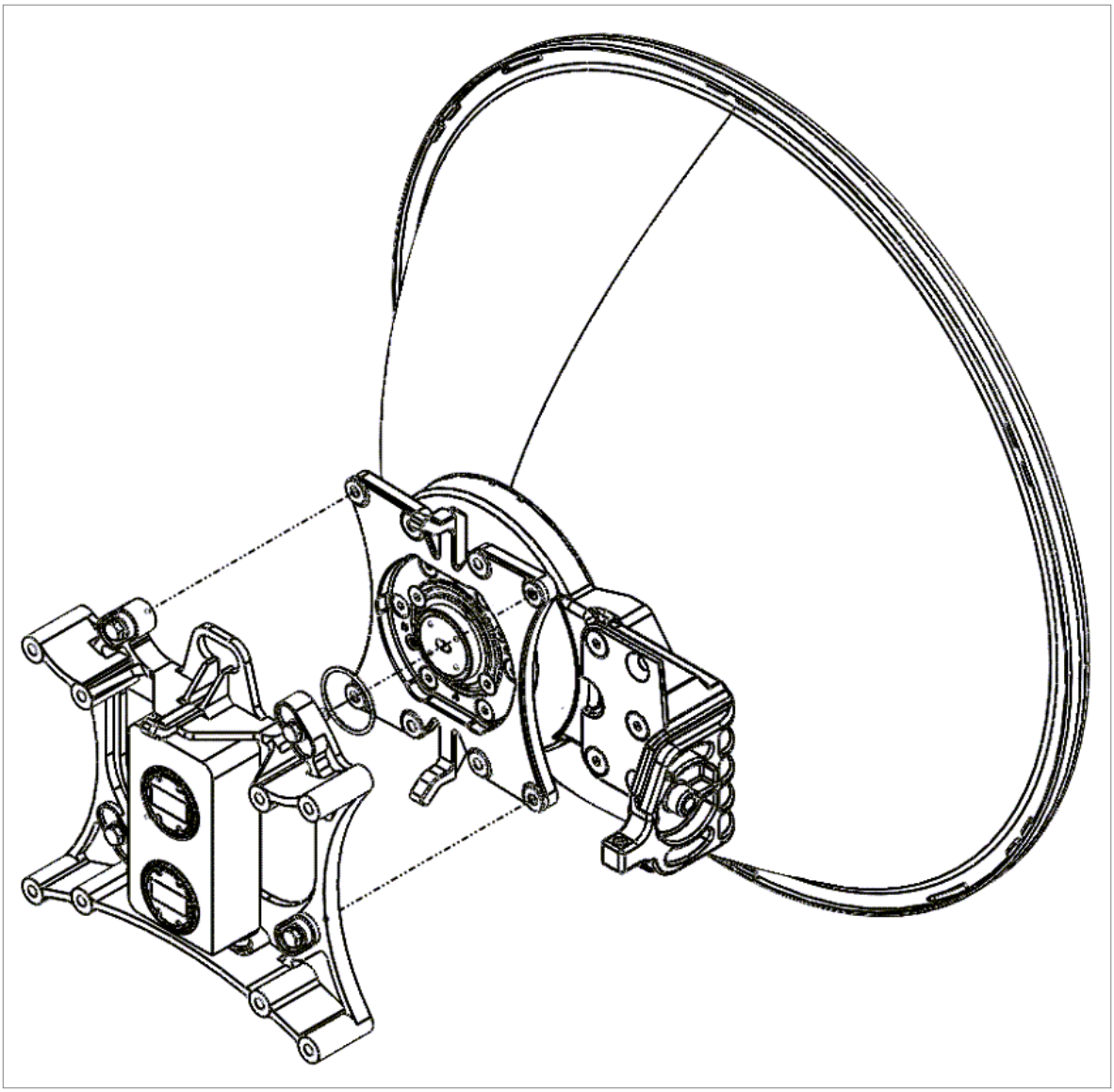
the two screws.



2. Connect the Space Diversity mediation device to the antenna and secure it using the four M8 screws and washers provided with the Space Diversity mediation device kit.

Note:

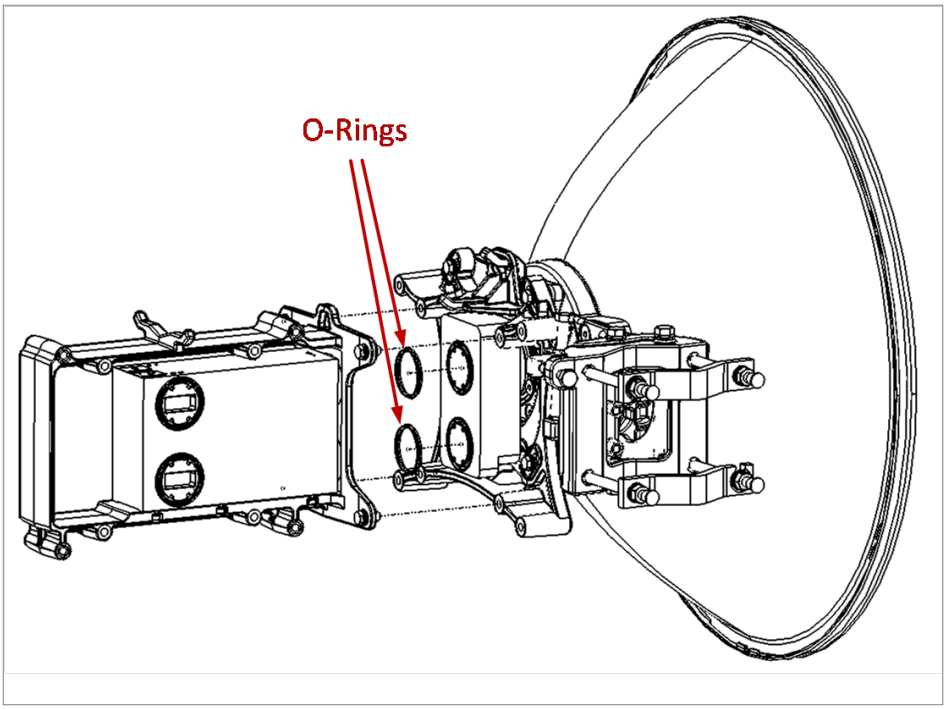
Verify that the O-ring is properly mounted between the antenna transition and the dual core.



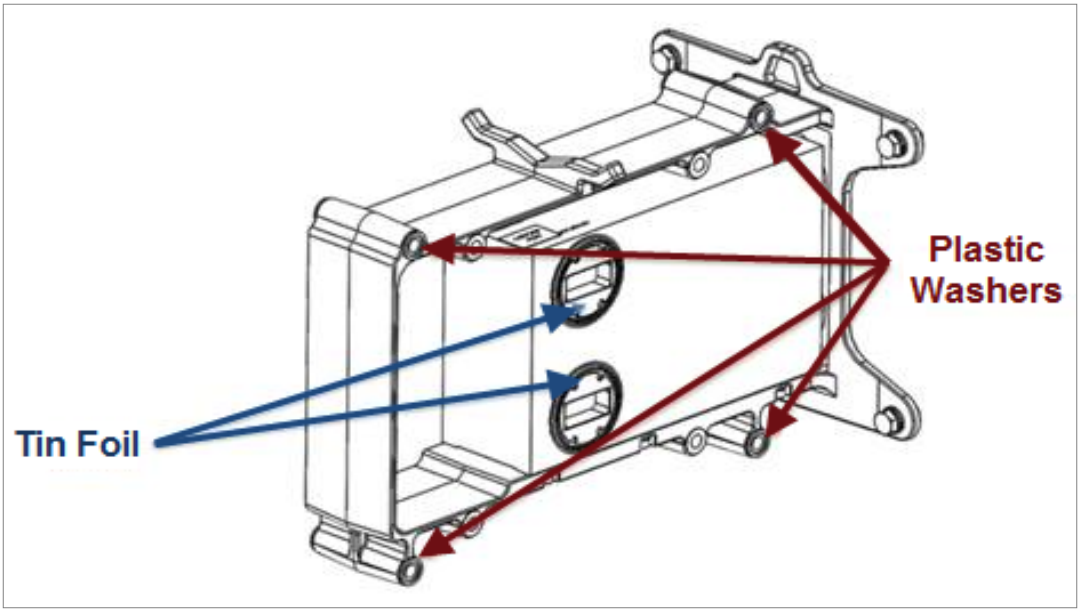
3. Connect the RFU-D-HP Dual Splitter, Dual Circulator, or Dual Coupler to the Space Diversity mediation device using four M8 screws and washers, supplied in the Dual Splitter, Dual Circulator, or Dual Coupler kit, and tighten the screws.

Note:

Verify that the O-rings on the Space Diversity mediation device are properly mounted between the Space Diversity mediation device ports and the Dual Splitter, Dual Circulator, or Dual Coupler.



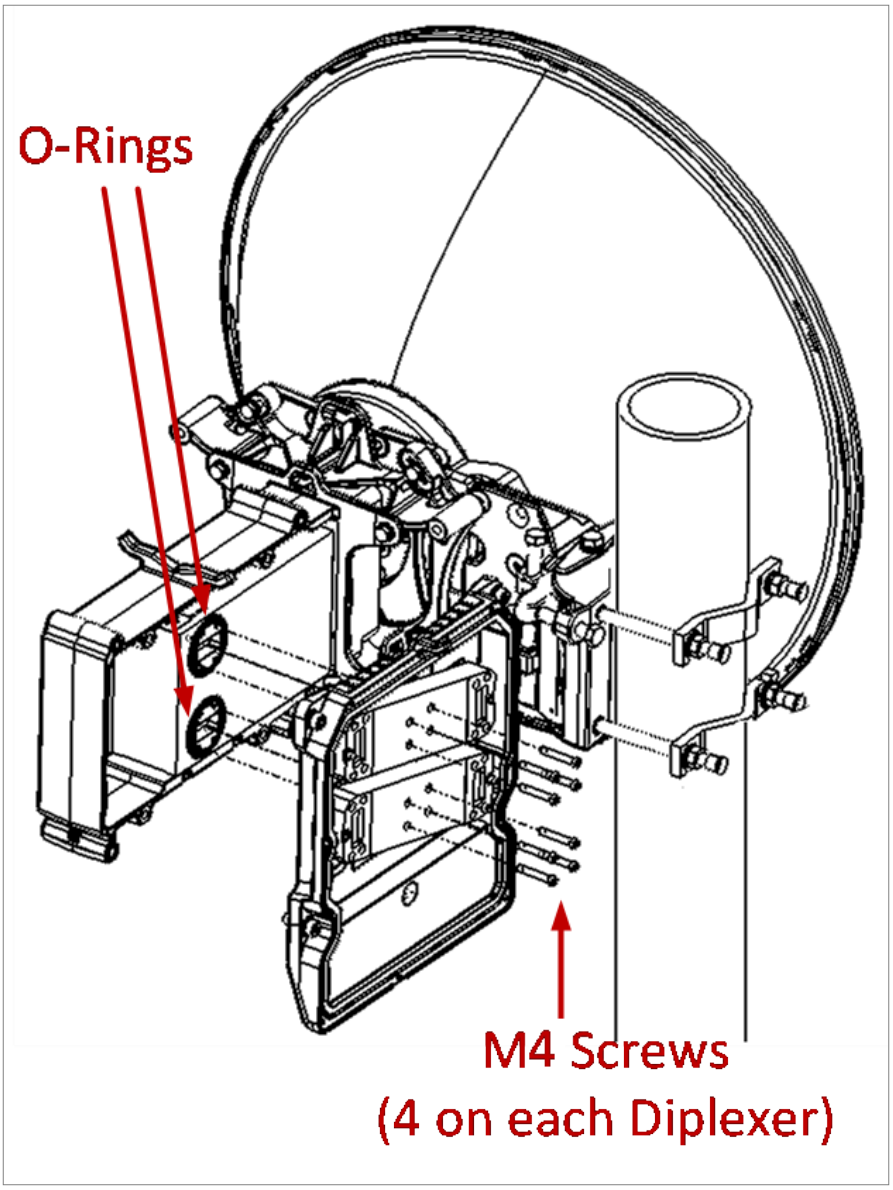
4. Make sure the following items are attached to the Dual Splitter, Dual Circulator, or Dual Coupler before attaching the Diplexer units:
    - Four plastic washers on either side of the Dual Splitter, Dual Circulator, or Dual Coupler on the surface around the screw threads for the Diplexer unit.
    - Smooth tin foil sheets on the side facing the waveguide interfaces. Make sure they are properly placed and not bent or wrinkled. It is also important to ensure that the tin foil sheets do not get wrinkled or bent during installation.

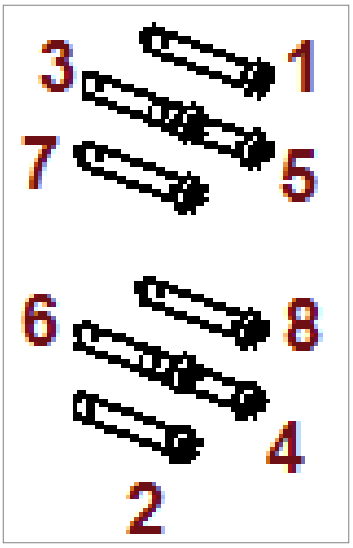


5. Attach the Diplexer unit to the Dual Splitter, Dual Circulator, or Dual Coupler using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.

Note:

Verify that the O-rings on the Dual Splitter, Dual Circulator, or Dual Coupler are properly mounted between the Dual Splitter, Dual Circulator, or Dual Coupler and the Diplexer unit.

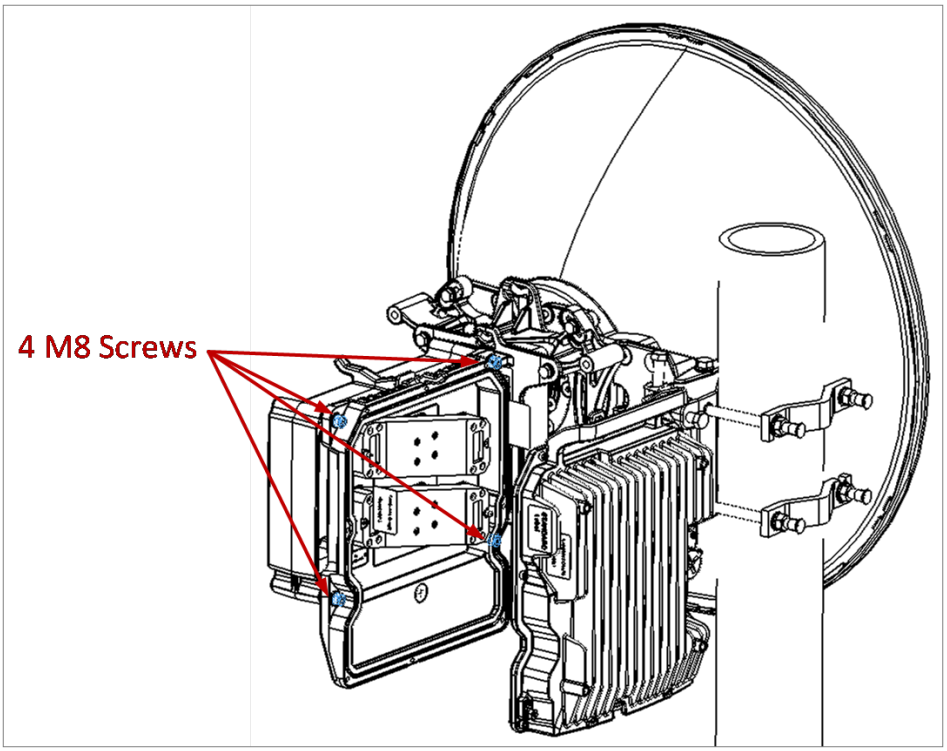




Note:

The screws should be tightened diagonally. Fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

6. Secure the edges of the Diplexer unit to the Dual Splitter, Dual Circulator, or Dual Coupler using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.



7. Repeat steps 5 and 6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Splitter, Dual Circulator, or Dual Coupler.
8. Connect the LDF4 cable between the Space Diversity mediation device and a Waveguide-Coax Adaptor on the Diversity antenna. See Section Connecting the Space Diversity Antenna for Direct Mount Internal Space Diversity Configurations.

1+1 HSB SD (Internal) and 2+0 SD (Internal) Remote Mount

Note:

This procedure can only be used for single polarization. Space Diversity is implemented via BBC.

For 2+0 SD (Internal) Remote Mount configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

1+1 HSB-SD configurations require a dual-transmitter hardware model.

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit

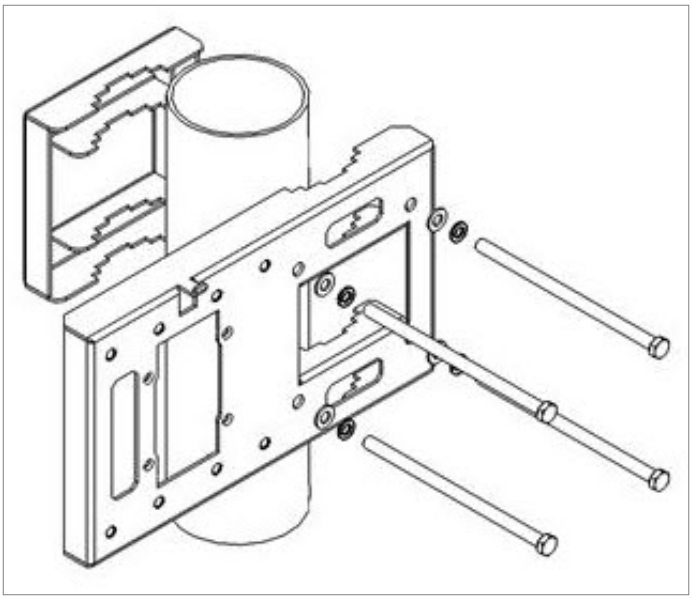
Item	Description	Quantity	Marketing Models
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	Remote Mount Kit	1	DXDH-RM-MOUNT-kit
4	Adaptor Remote Mount Kit	1	DXDH-RM-MOUNT-ADPT-ff
5	RFU-D-HP Dual Coupler	1	DXDH-MD-DUAL-CPLR-ff
6	SD Adaptor for Remote Mount	1	DXDH-RM-MOUNT-SD-ADPT-ff
7	Flexible Waveguide Kit	1	WAVEGUIDE-ffFT
8	LDF4 Cable	1	LDF4-JA-15M/ LDF
9	Waveguide-Coax Adaptor	2	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
10	RFU-D-HP Pole Mount Kit	1	

Required Tools

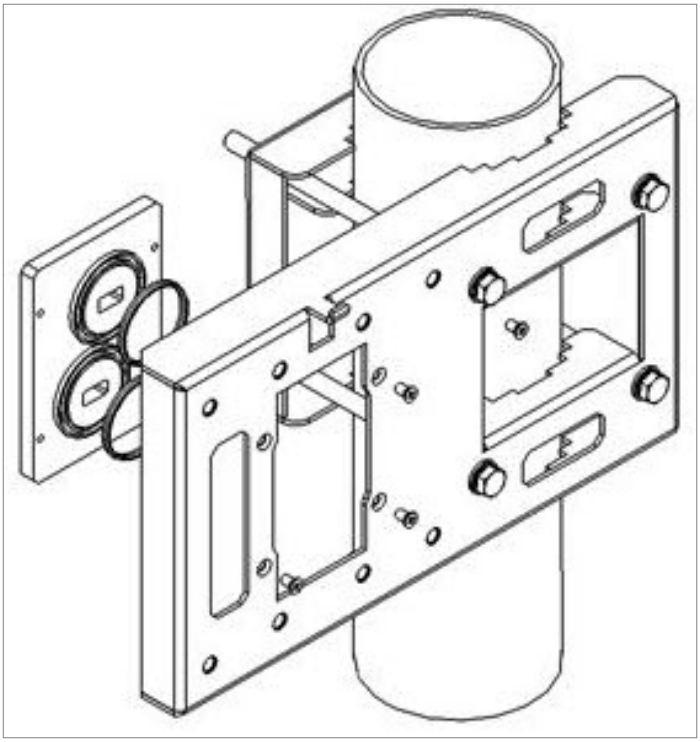
- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit.



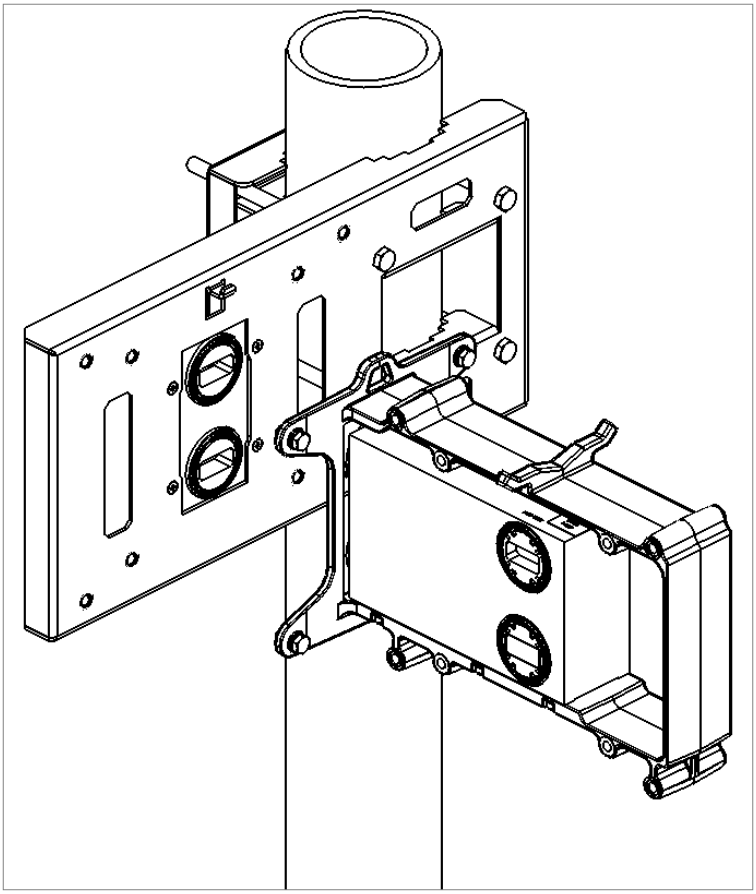
2. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit.



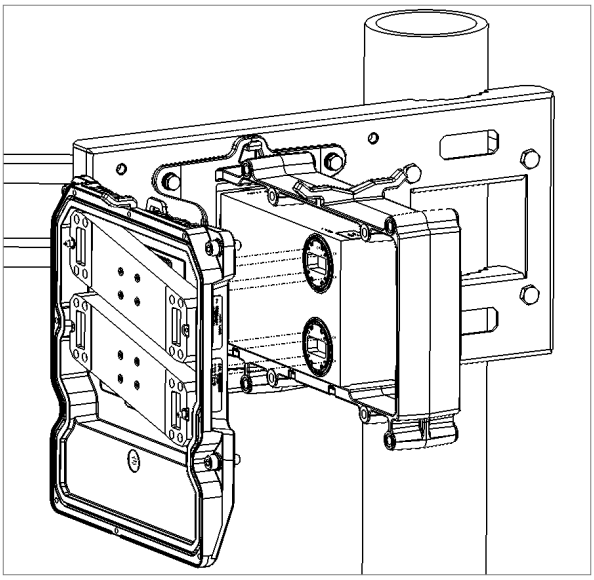
Note:

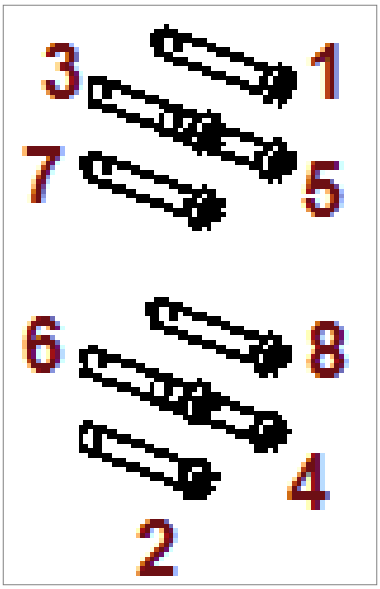
Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.

3. Mount and tighten the RFU-D-HP Dual Coupler to the RFU-D-HP Pole Mount using the four screws and washers that are supplied with the RFU-D-HP Dual Coupler kit. Make sure that the O-rings are mounted on the RFU-D-HP Remote Mount Adaptor.



4. Attach the Diplexer unit to the Dual Coupler using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.



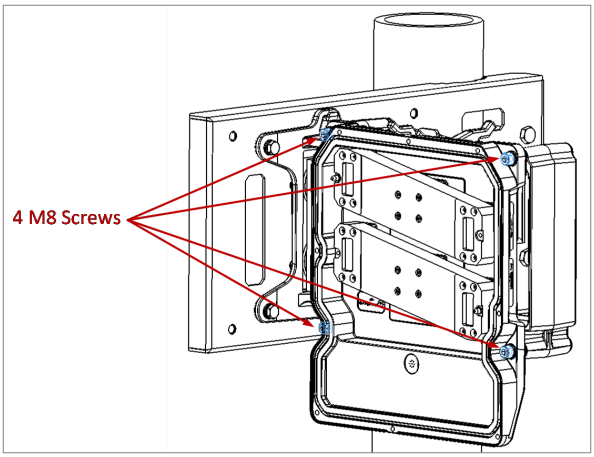


Note:

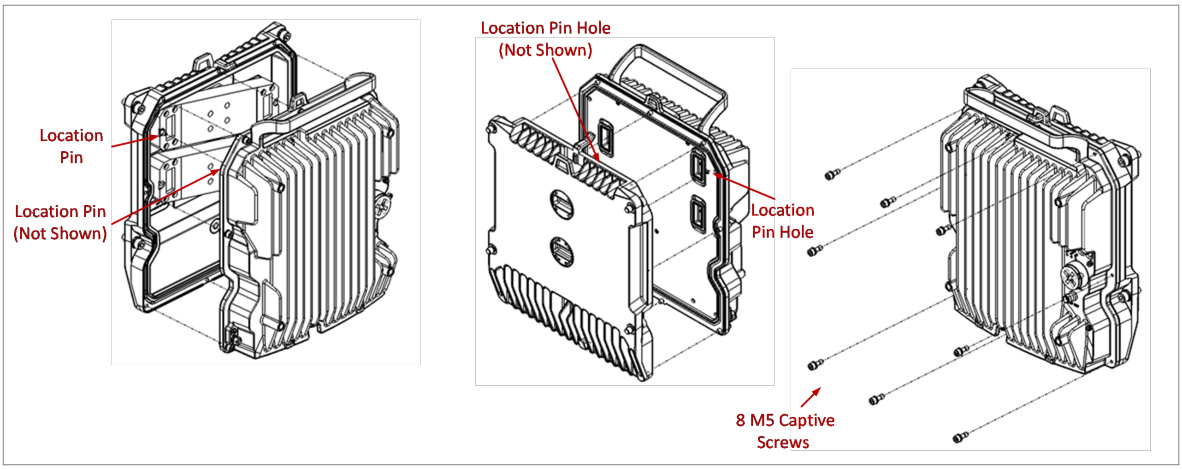
Tighten the screws diagonally. First begin to fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

Verify that the O-rings on the Dual Coupler are properly mounted between the Dual Coupler ports and the Diplexer unit.

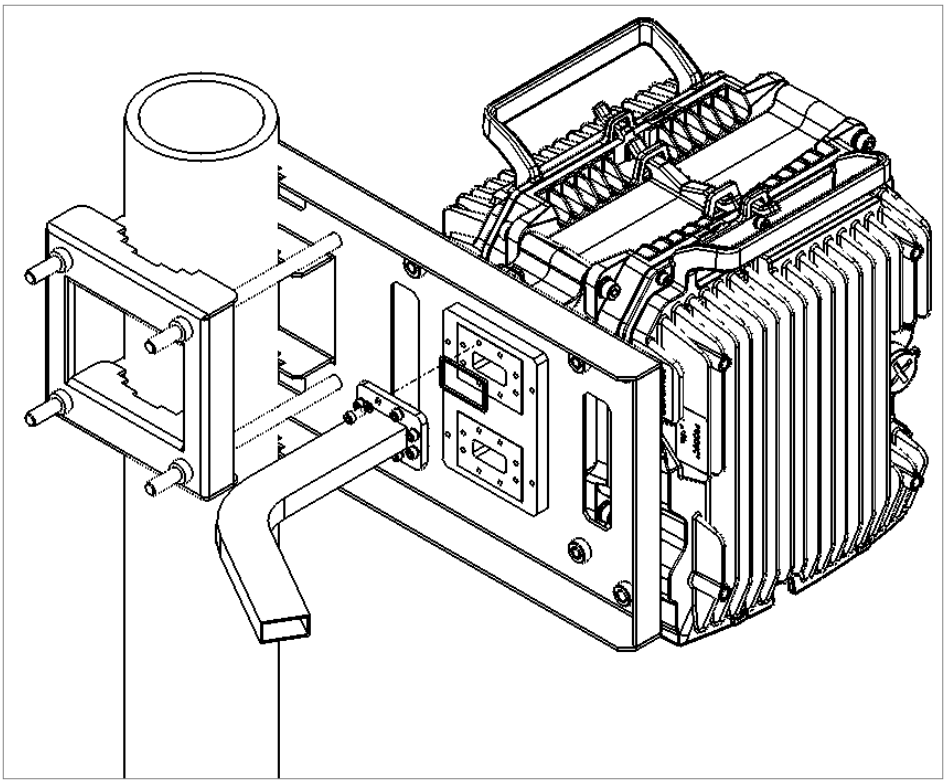
5. Secure the edges of the Diplexer unit to the Dual Coupler using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.



6. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX port, depending on the frequency.



7. Repeat steps 4-6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Coupler.
8. Connect the Flexible Waveguide and the sealing Gasket supplied with the Flexible Waveguide Kit to the upper antenna port on the Remote Mount Adaptor. Tighten the screws and washers supplied with the Flexible Waveguide Kit.



9. Connect a Waveguide-Coax Adaptor and an SD Adaptor for Remote Mount to the lower RFU-D-HP Remote Mount Adaptor port. Then, connect the LDF4 cable between Waveguide-Coax Adaptors on the lower antenna port of the Remote Mount Adaptor and the Diversity antenna. See Section Connecting the Space Diversity Antenna for Remote Mount Internal Space Diversity Configurations.

2+0 Space Diversity and ASD Direct Mount

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT Kit	2	DXDH-MD-OMT-ff
4	Data Sharing Cable	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
5	Source Sharing	1	See Section Cables for External XPIC, External SD, and ASD

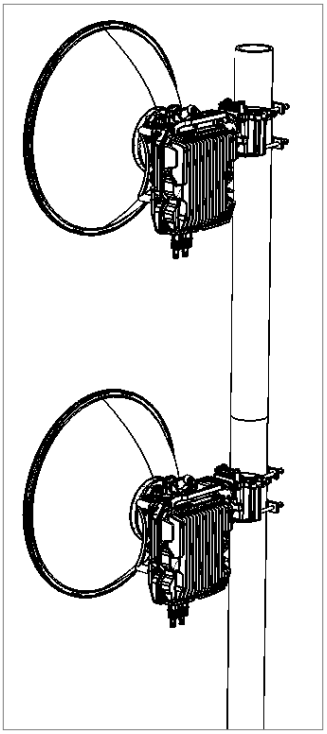
Item	Description	Quantity	Marketing Models
	Cable		Configurations
6	Circ./Circ. Adaptor	2	Per Antenna Vendor

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. For instructions on installation of the RFU-D-HP OMT and radios, see 2+0 Dual Polarization Direct Mount.



2. If External XPIC and/or External Space Diversity is used, and for the dual-RFU side of an ASD configuration, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity and ASD). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

4+0 Space Diversity and ASD Direct Mount

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	4	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT Kit	2	DXDH-MD-OMT-ff
4	RFU-D-HP Dual Splitter or Dual Circulator	2	DXDH-MD-DUAL-SPLTR-ff DXDH-MD-DUAL-CIRC-ff
5	Data Sharing Cable	2	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
6	Source Sharing Cable	2	See Section Cables for External XPIC, External SD, and ASD Configurations
7	Circ./Circ. Adaptor	2	Per Antenna Vendor

Required Tools

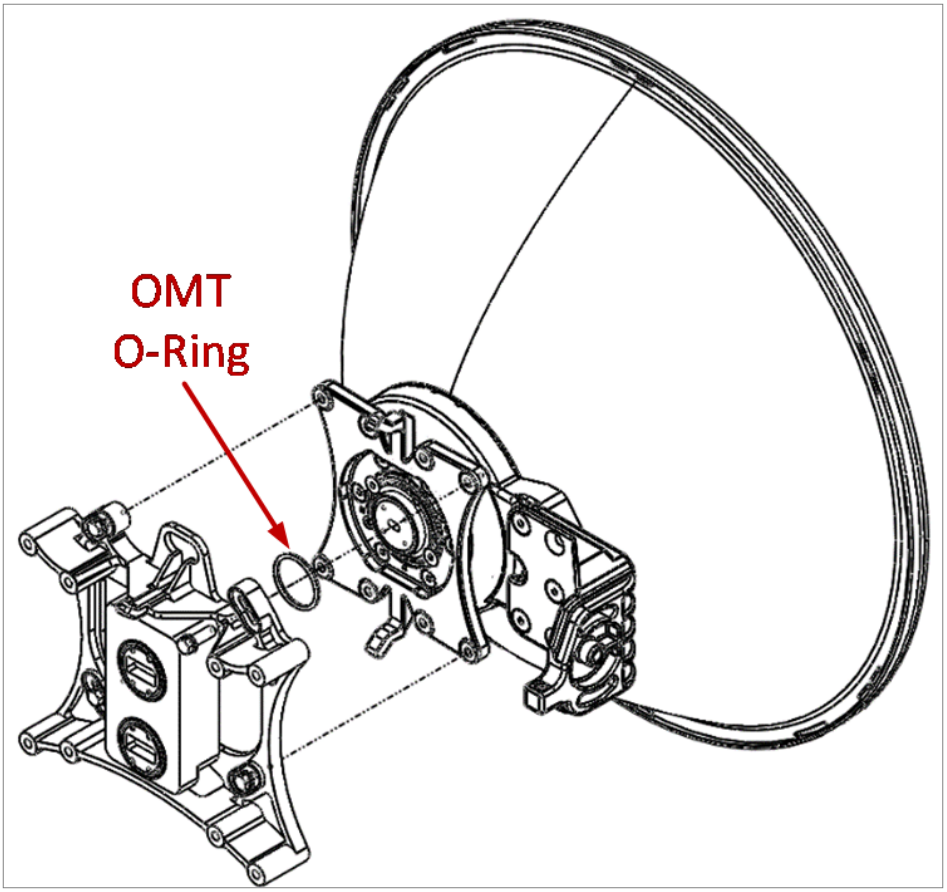
- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. For the Master RFU units, mount an OMT to the antenna and secure it with four screws.

Note:

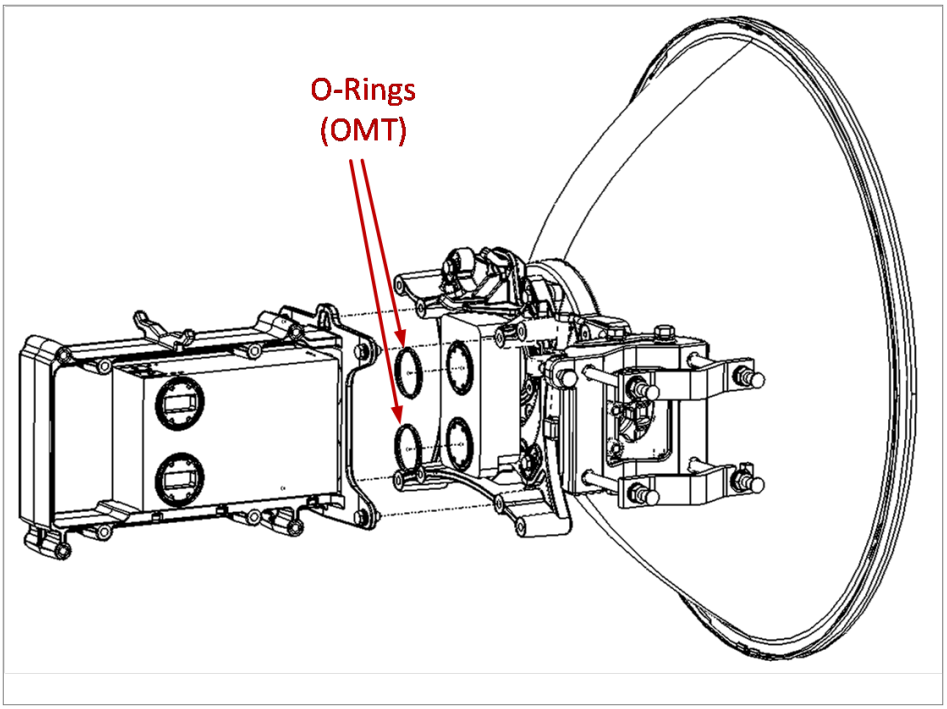
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



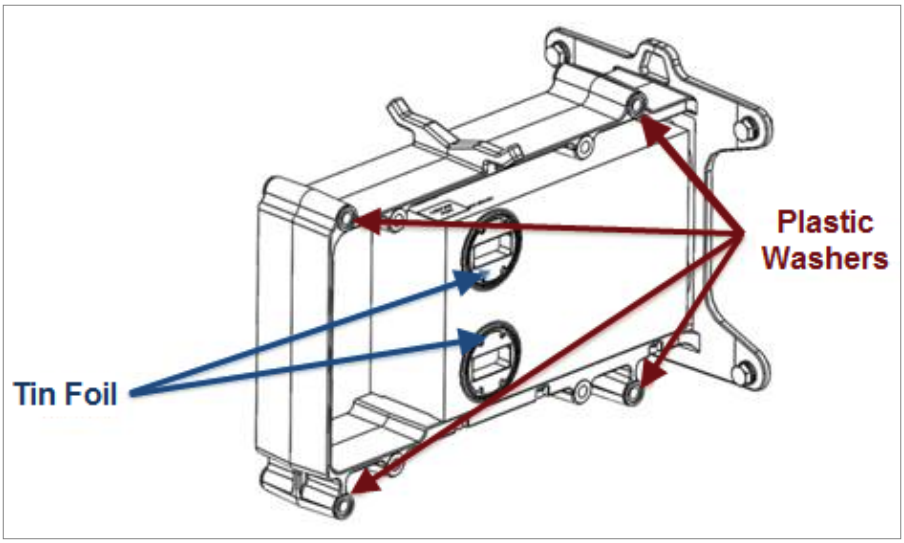
2. Connect the RFU-D-HP Dual Splitter or Dual Circulator kit to the OMT using four M8 screws and washers, supplied in the Dual Coupler, and tighten the screws.

Note:

Verify that the O-rings on the OMT are properly mounted between the OMT ports and the Dual Splitter/Dual Circulator.



3. Make sure the following items are attached to the Dual Splitter or Dual Circulator before attaching the Diplexer units:
    - Four plastic washers on either side of the Dual Splitter or Dual Circulator on the surface around the screw threads for the Diplexer unit.

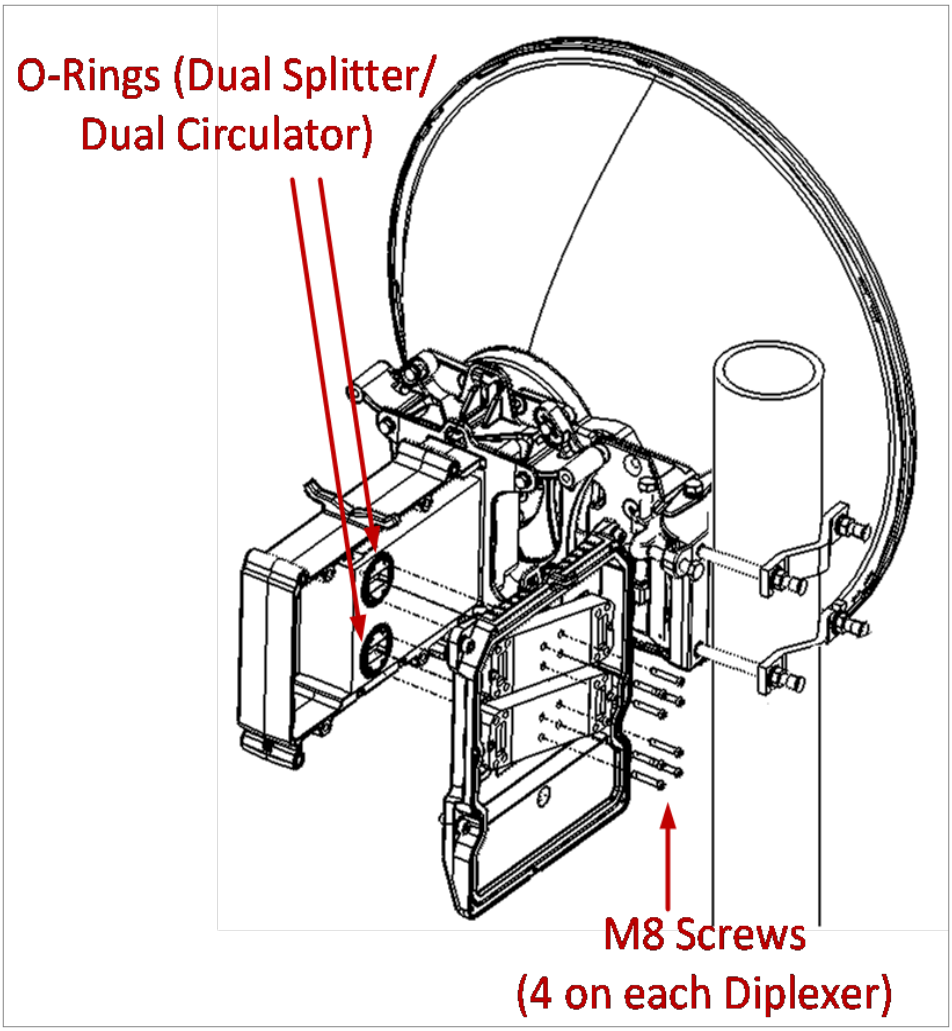


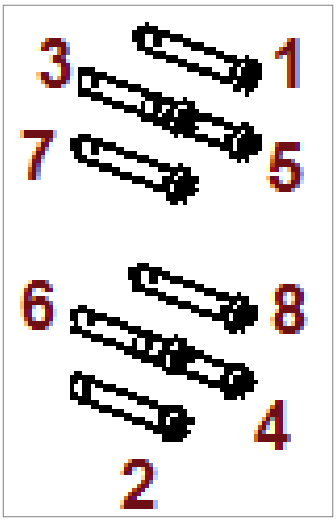
    - Smooth tin foil sheets on the side facing the waveguide interfaces. Make sure they are properly placed and not bent or wrinkled. It is also important to ensure that the tin foil sheets do not get wrinkled or bent during installation.

4. Attach the Diplexer unit to the Dual Splitter or Dual Circulator using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.

Note:

Verify that the O-rings on the Dual Splitter or Dual Circulator are properly mounted between the Dual Splitter or Dual Circulator ports and the Diplexer unit.

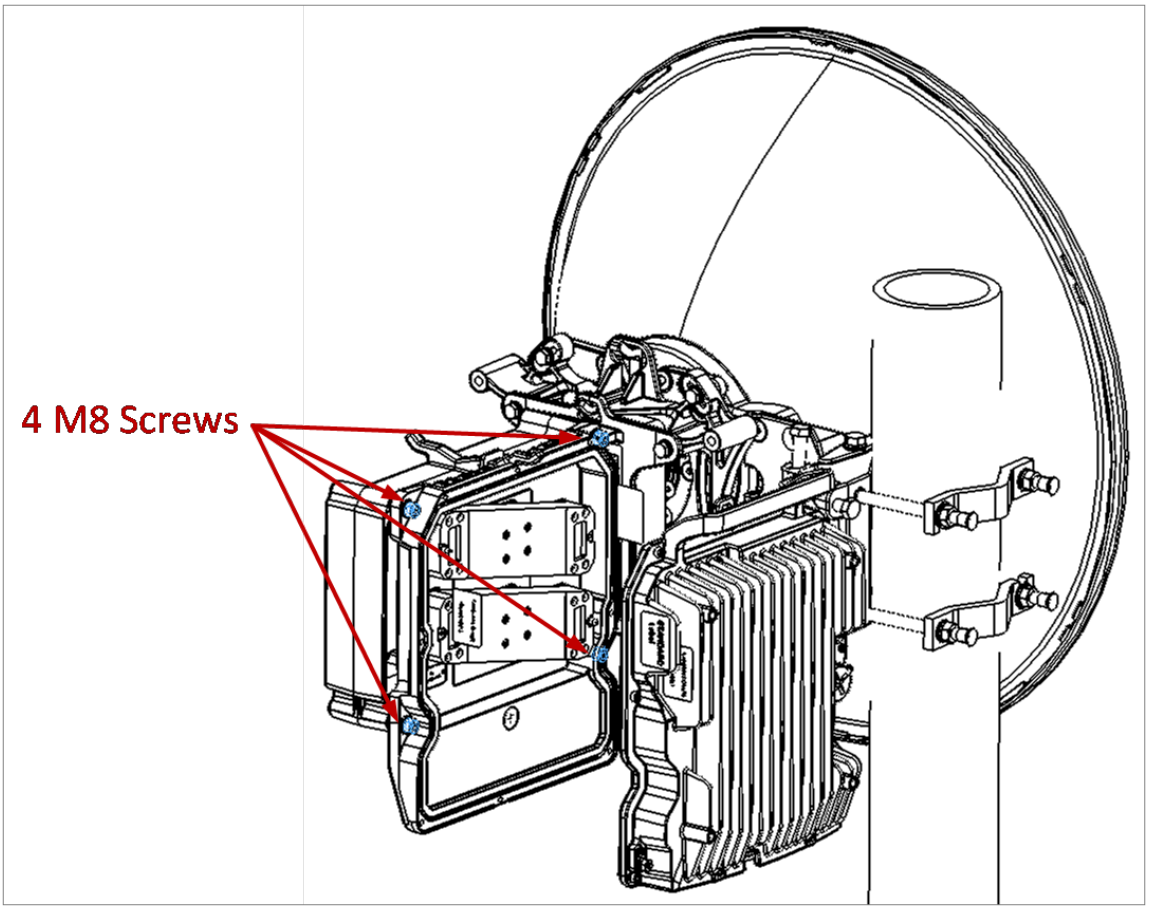




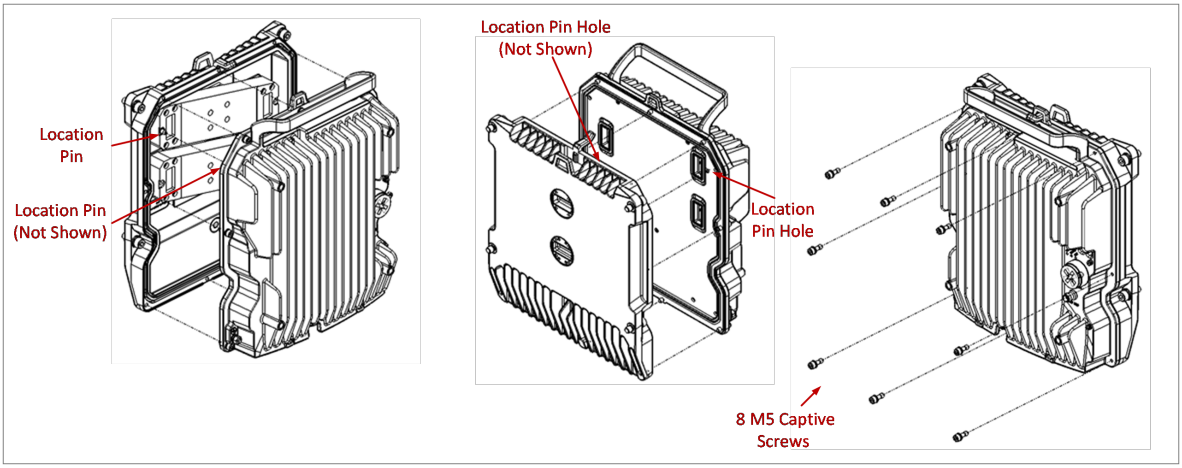
Note:

The screws should be tightened diagonally. Fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

5. Secure the edges of the Diplexer unit to the Dual Splitter or Dual Circulator using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.



6. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX port, depending on the frequency.



7. Repeat steps 4-6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Splitter or Dual Circulator.
8. Repeat steps 1-7 to attach the Slave RFUs to the Diversity antenna.
9. For each Master-Slave RFU pair, connect a data sharing cable and a source sharing cable between the two RFUs. For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

4+0 Single/Dual Polarization, Direct Mount

List of Items

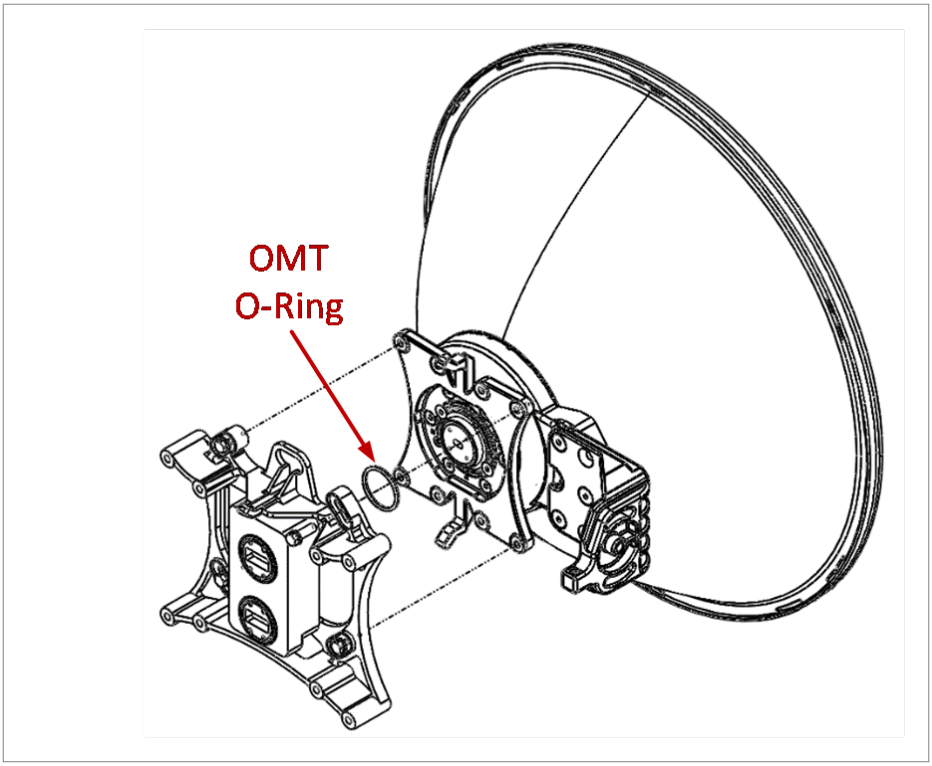
Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radios	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Units	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP Dual Splitters or Dual Circulators	1	DXDH-MD-DUAL-SPLTR-ff DXDH-MD-DUAL-CIRC-ff
4	RFU-D-HP OMT/Splitter Kit	1	DXDH-MD-OMT-ff DXDH-MD-SPLTR-ff

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. Mount the OMT (for dual polarization) or Splitter (for single polarization) to the antenna and secure it with four screws.

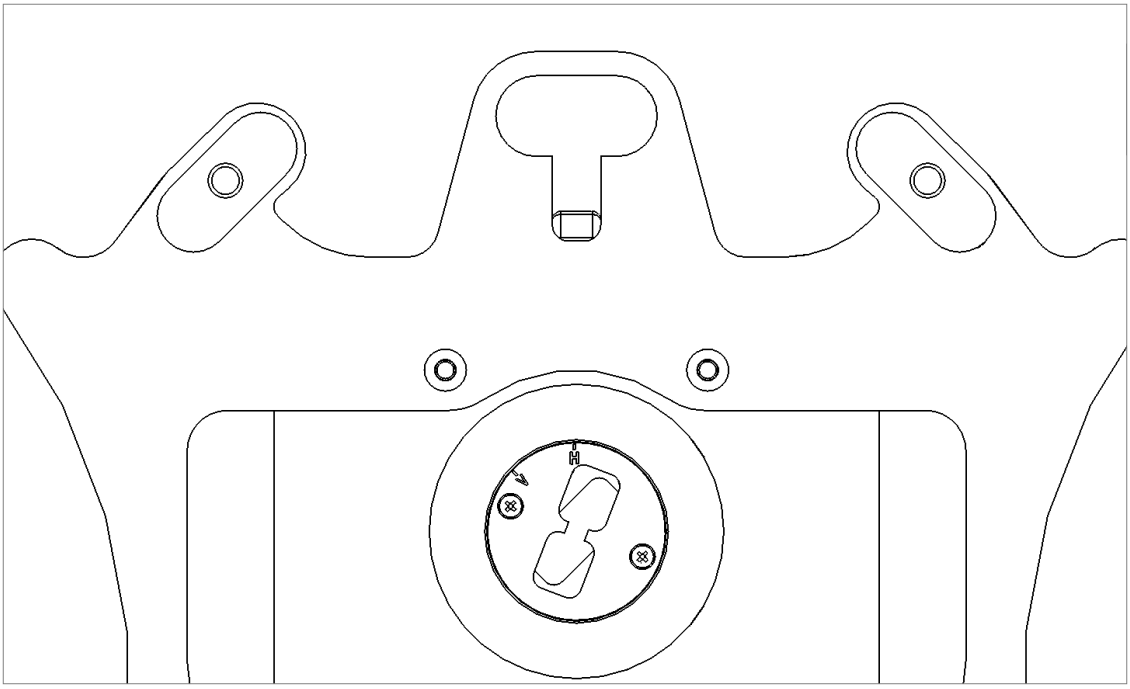


Note:

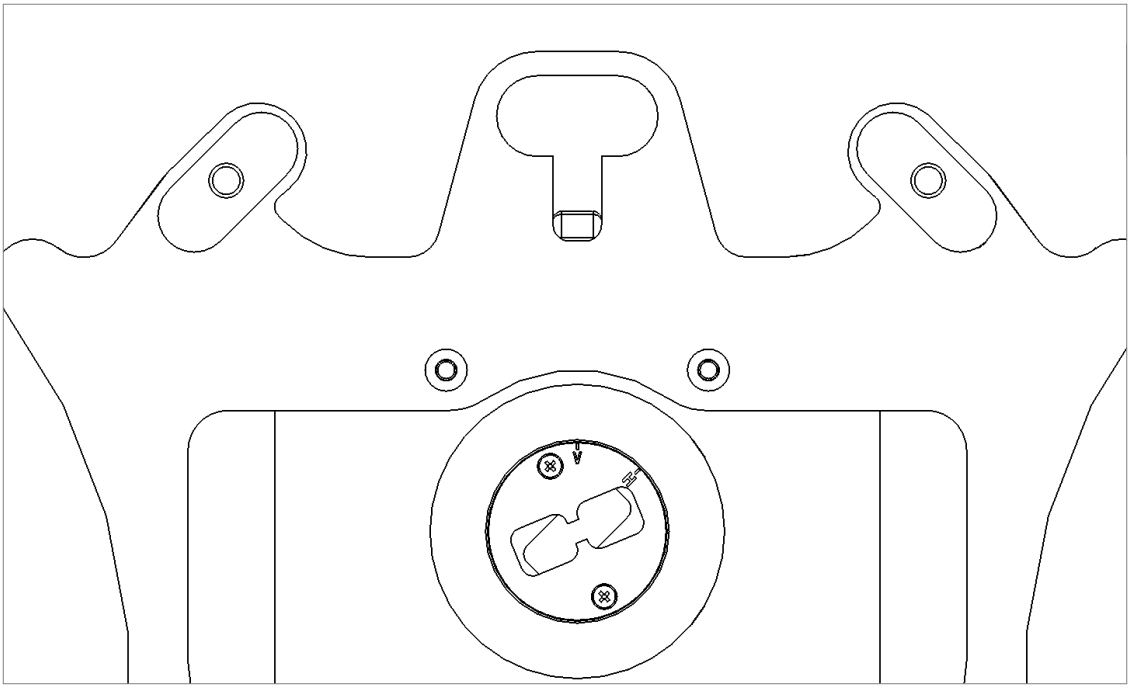
Verify that the O-ring is properly mounted between the antenna transition and the OMT/Splitter.

2. If you are using a Splitter, 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 twist with the letter “H” on top.



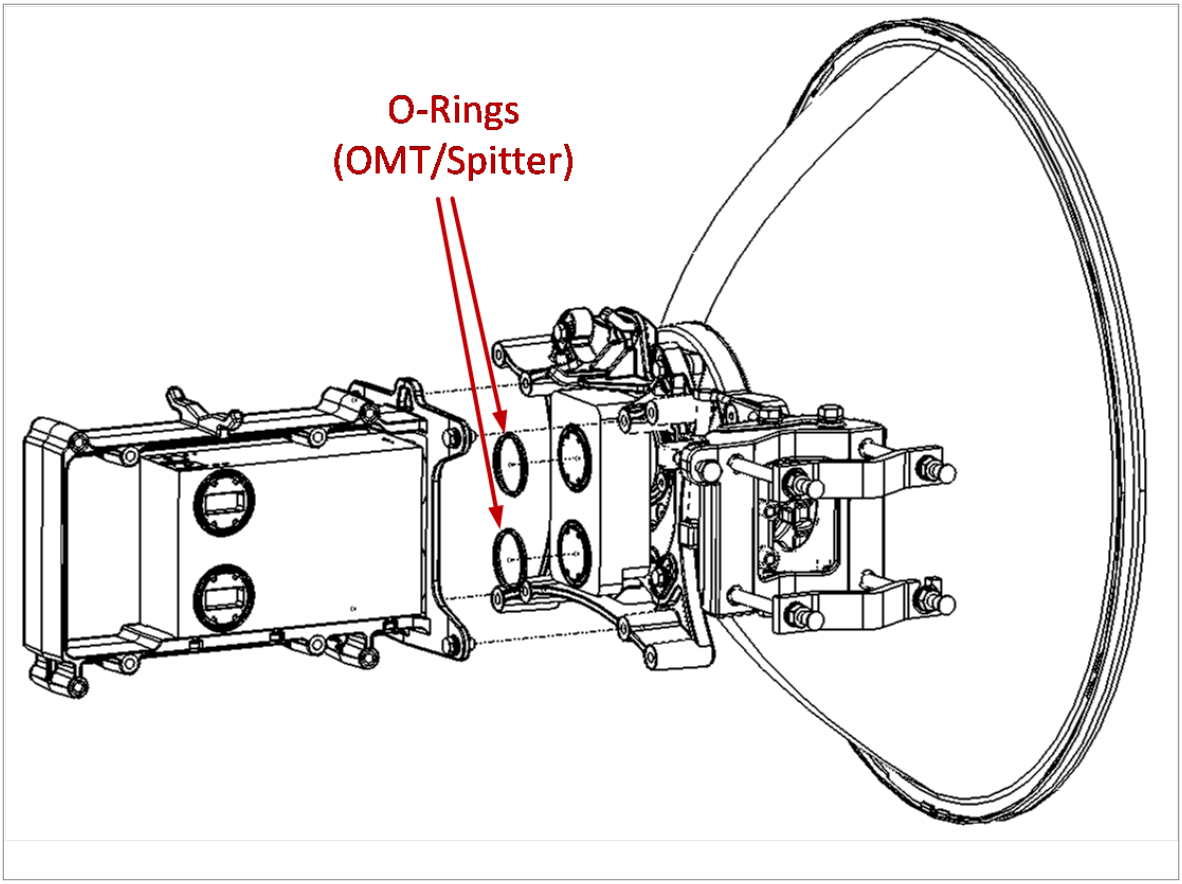
- For vertical polarization, locate the twist with the letter “V” on top.



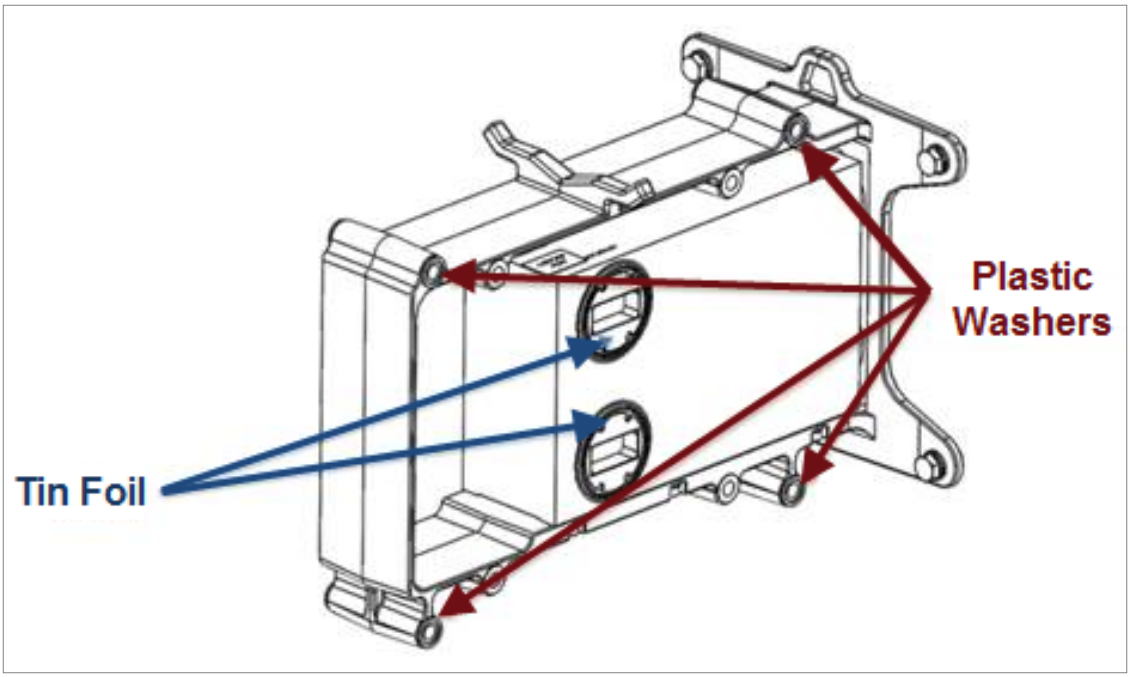
3. Connect the RFU-D-HP Dual Splitter or Dual Circulator kit to the OMT/Splitter using four M8 screws and washers, supplied in the Dual Mediation Device (Dual Splitter/Circulator), and tighten the screws.

Note:

Verify that the O-rings on the OMT or Splitter are properly mounted between the OMT/Splitter ports and the Dual Splitter/Dual Circulator.



4. Make sure the following items are attached to the Dual Splitter or Dual Circulator before attaching the Diplexer units:
    - Four plastic washers on either side of the Dual Splitter or Dual Circulator on the surface around the screw threads for the Diplexer unit.

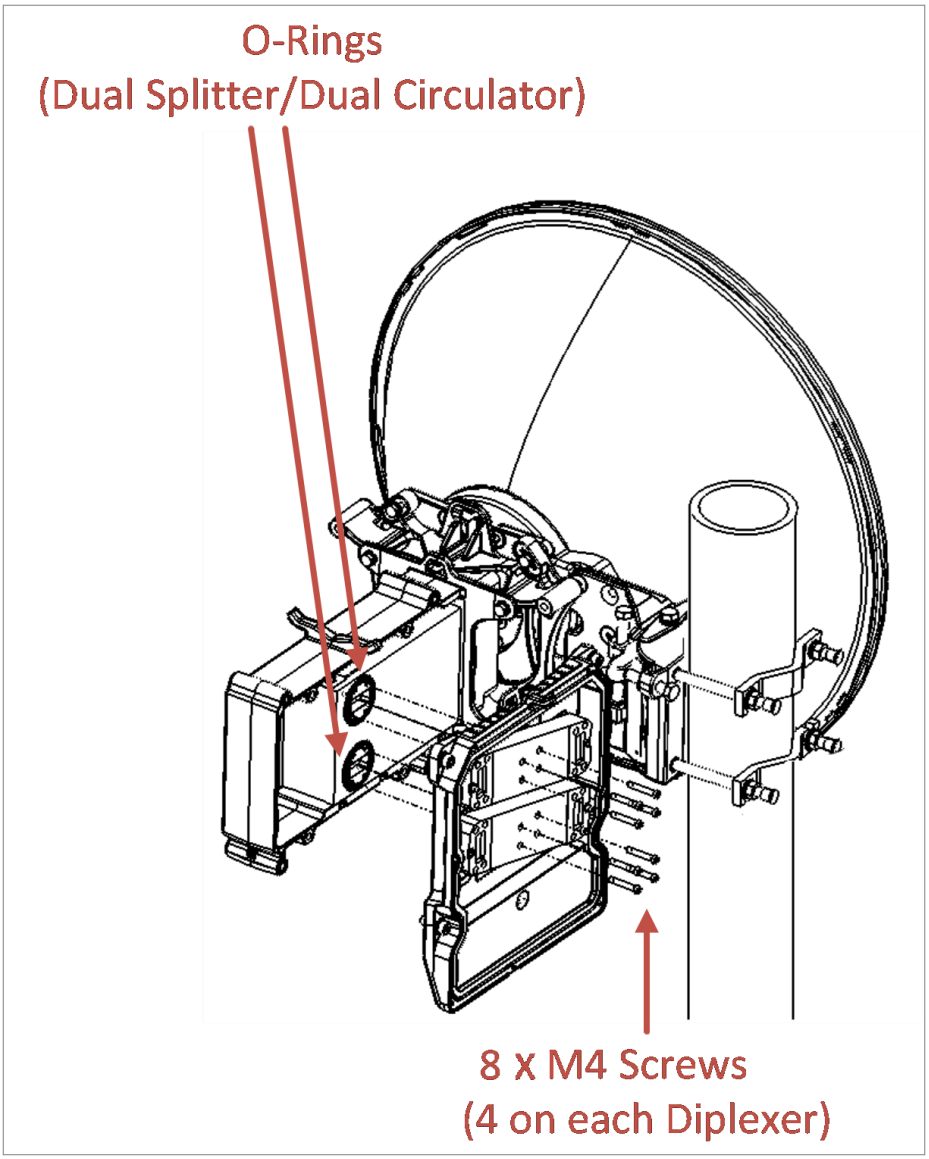


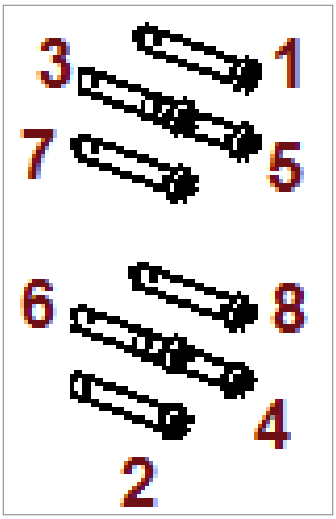
- Smooth tin foil sheets on the side facing the waveguide interfaces. Make sure they are properly placed and not bent or wrinkled. It is also important to ensure that the tin foil sheets do not get wrinkled or bent during installation.

5. Attach the Diplexer unit to the Dual Splitter or Dual Circulator using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.

Note:

Verify that the O-rings on the Dual Splitter or Dual Circulator are properly mounted between the Dual Splitter or Dual Circulator ports and the Diplexer unit.

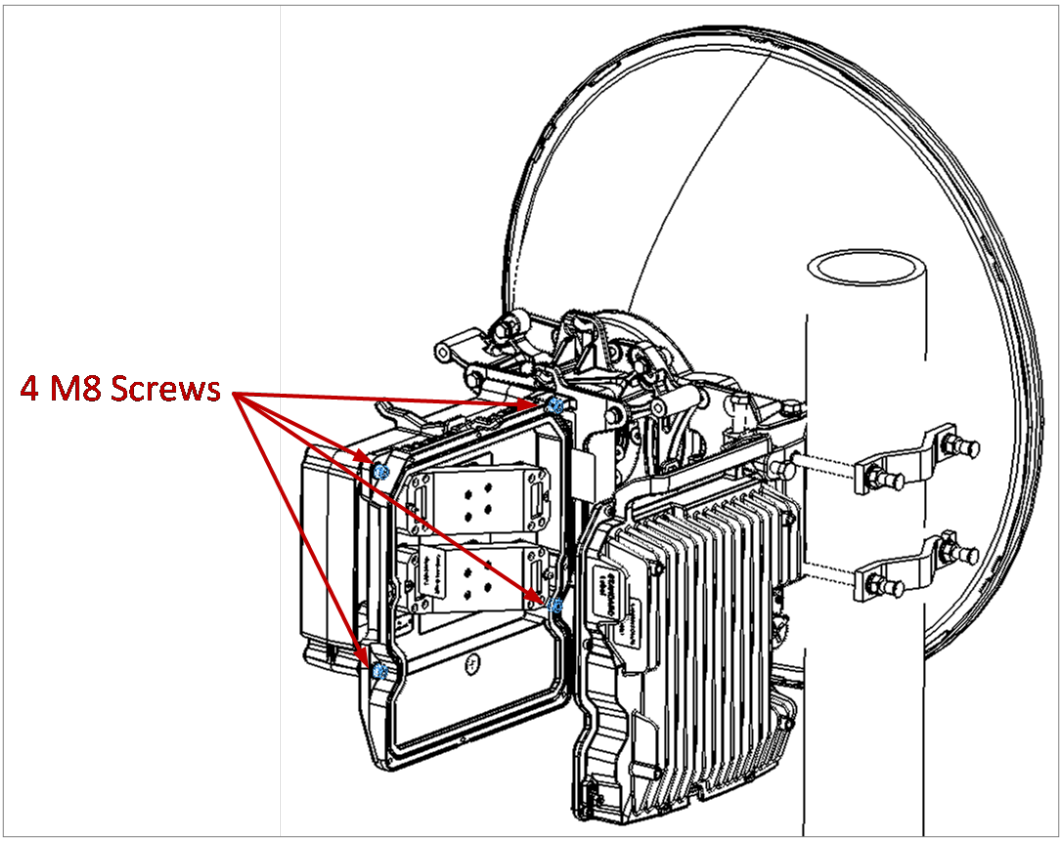

O-Rings
(Dual Splitter/Dual Circulator)
8 x M4 Screws
(4 on each Diplexer)



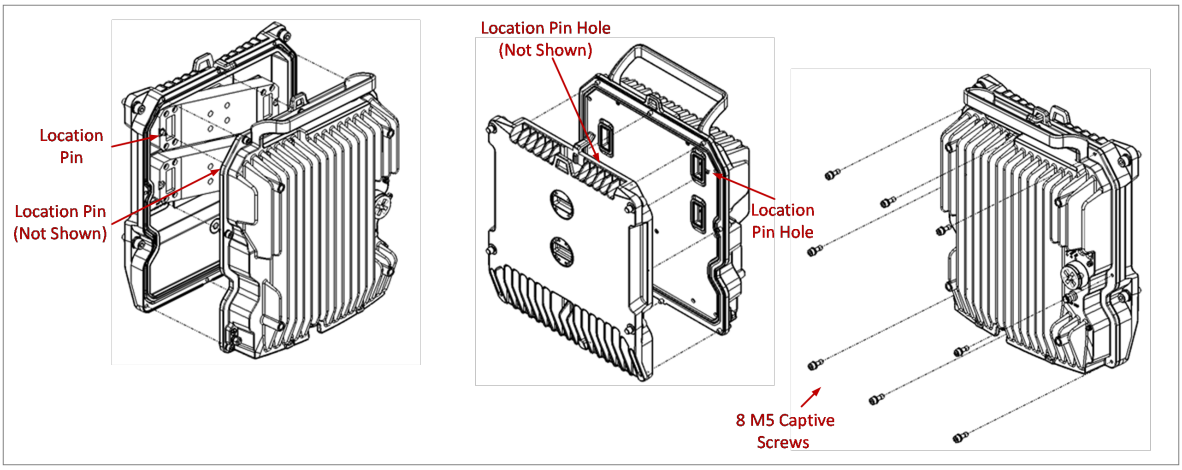
Note:

The screws should be tightened diagonally. Fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

6. Secure the edges of the Diplexer unit to the Dual Splitter or Dual Circulator using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.



7. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX port, depending on the frequency.



8. Repeat steps 5-7 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Splitter or Dual Circulator.

4+0 Dual Polarization, Remote Mount

Note:

This configuration can also be used for the single-RFU side of an ASD configuration.

List of Items

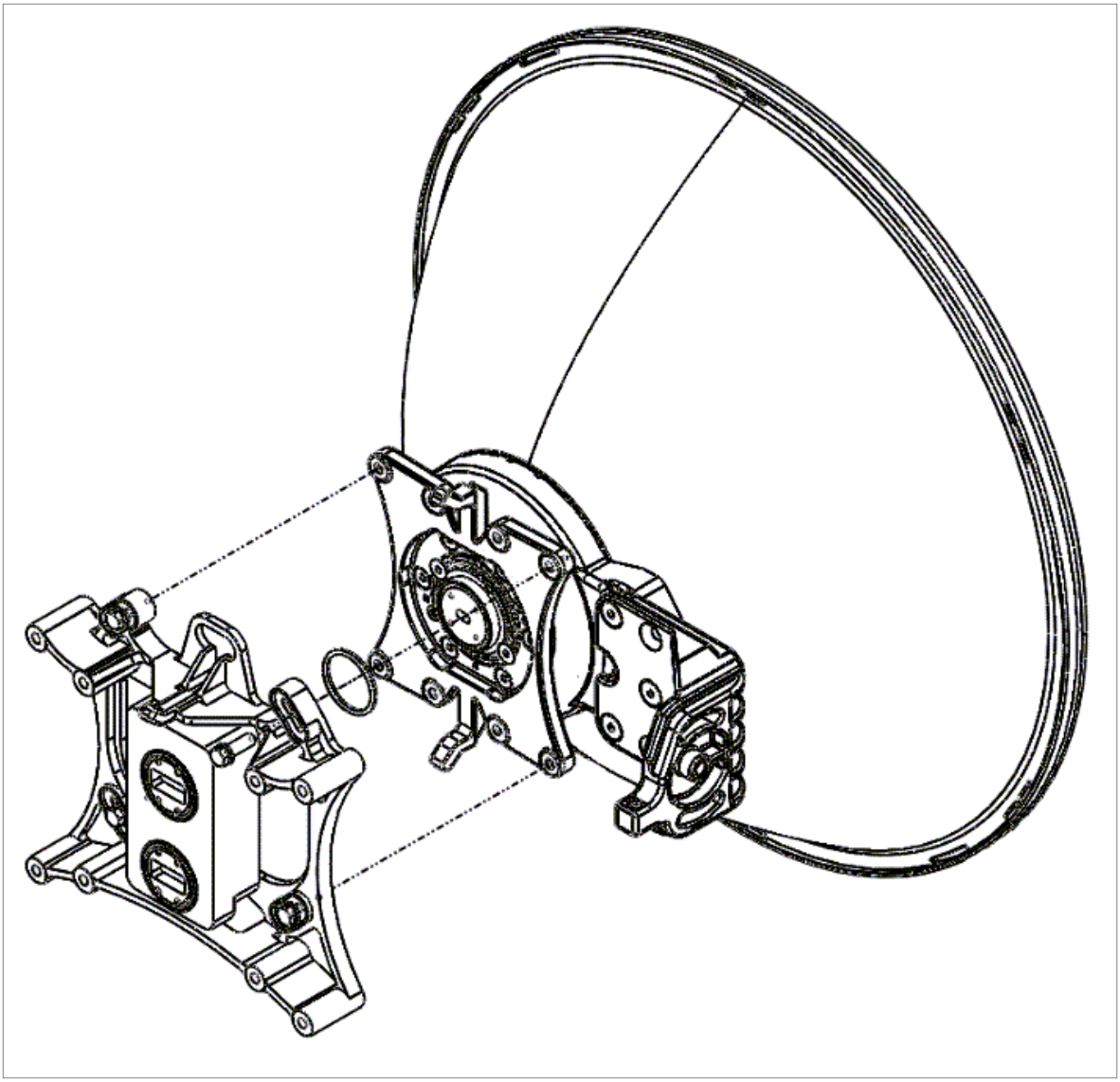
Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radios	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Units	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT Kit	1	DXDH-MD-OMT-ff
4	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-ff
5	Flexible Waveguide Kit	2	
6	RFU-D-HP Dual Circulator/Splitter	1	DXDH-MD-DUAL-CIRC-ff DXDH-MD-DUAL-SPLTR-ff
7	Adaptor Remote Mount Kit	1	DXDH-RM-MOUNT-ADPT-ff
8	RFU-D-HP Pole Mount Kit	1	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

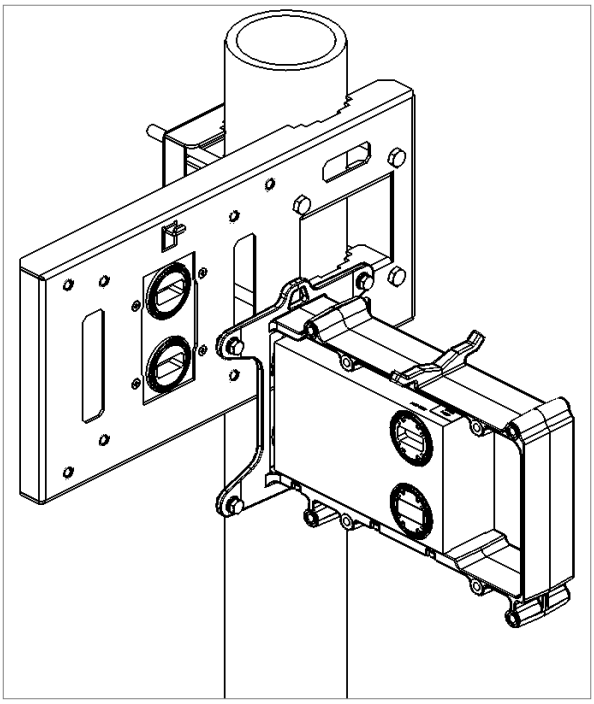
1. Connect the OMT kit to the antenna and secure it with four screws.



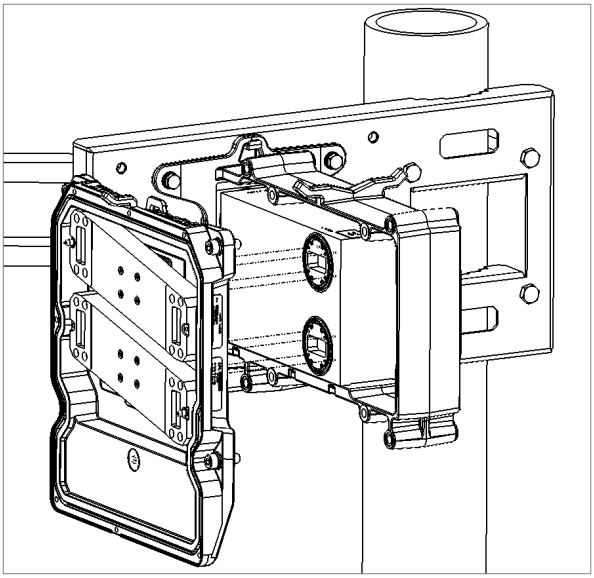
Note:

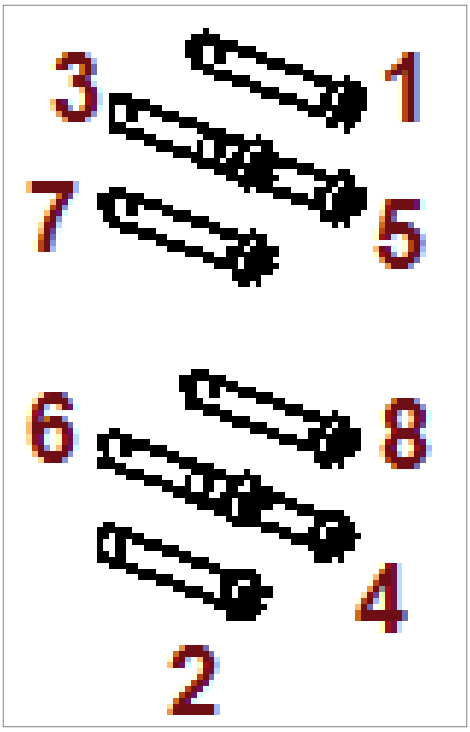
Verify that the O-ring is properly mounted between the antenna transition and the OMT.

2. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in the RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit. See Steps 5 and 6 in Section 2+0 Dual Polarization Remote Mount.
3. Mount and tighten the RFU-D-HP Dual Circulator/Splitter to the RFU-D-HP Pole Mount using the four screws and washers that are supplied with the RFU-D-HP Dual Circulator/Splitter kit. Make sure that the O-rings are mounted on the RFU-D-HP Remote Mount Adaptor.



4. Attach the Diplexer unit to the Dual Circulator/Splitter using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.



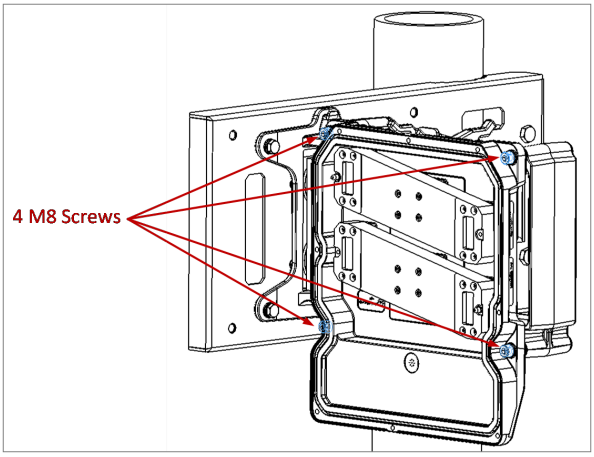


Note:

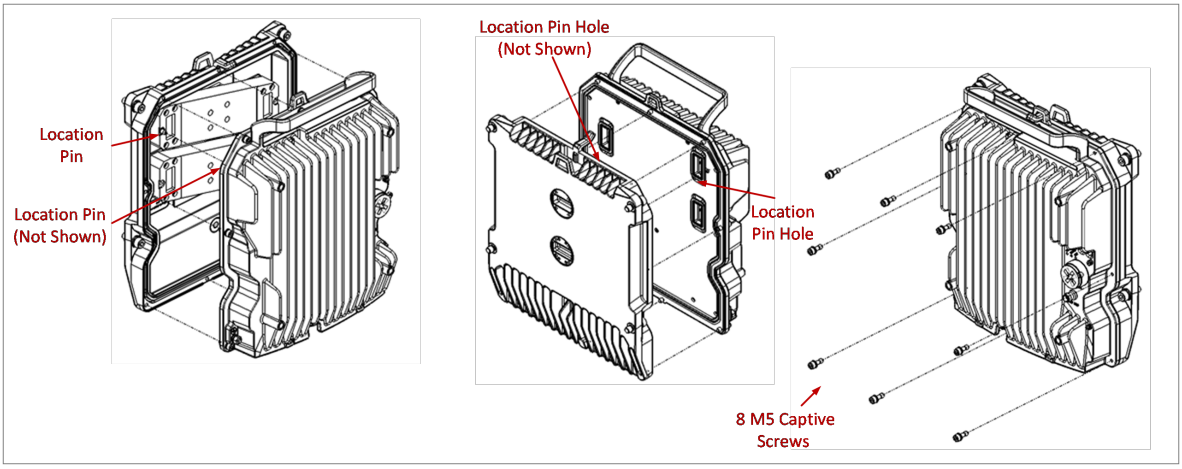
Tighten the screws diagonally. First begin to fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion with the central screws. Then proceed to fully tighten all the screws in the same order.

Verify that the O-rings on the Dual Circulator/Splitter are properly mounted between the Dual Circulator/Splitter ports and the Diplexer unit.

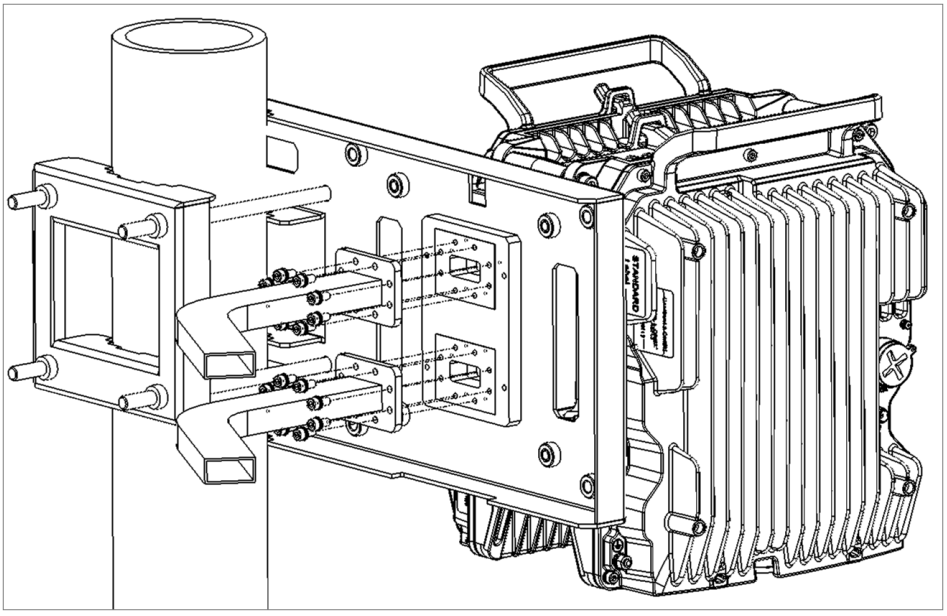
5. Secure the edges of the Diplexer unit to the Dual Circulator/Splitter using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.



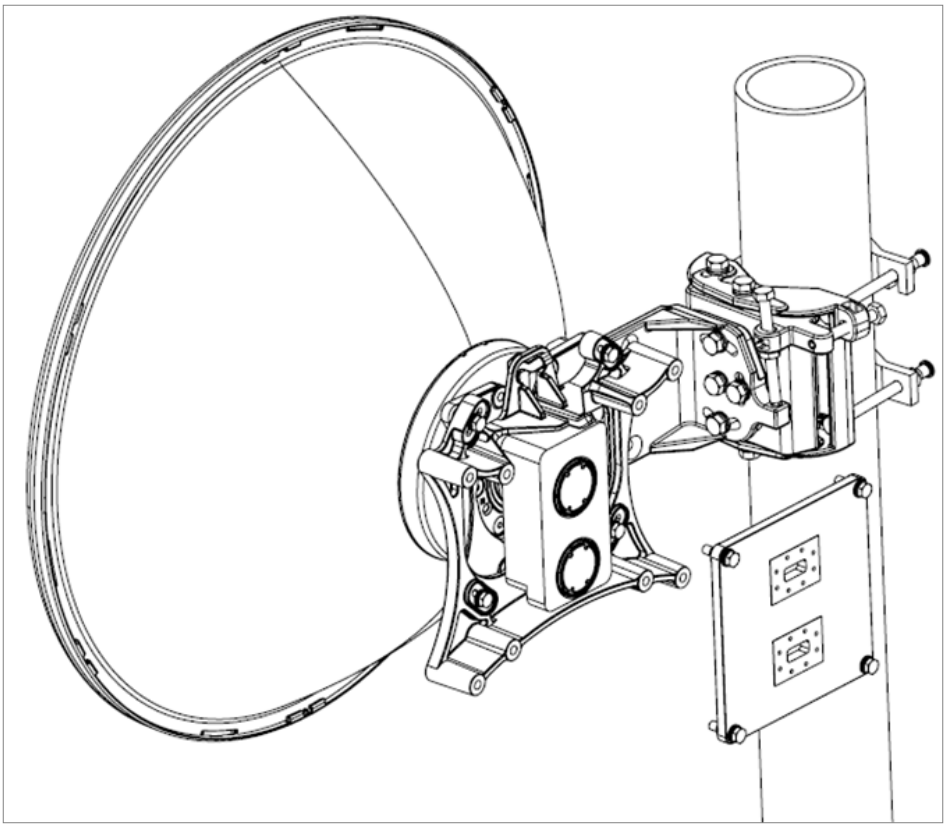
6. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX port, depending on the frequency.



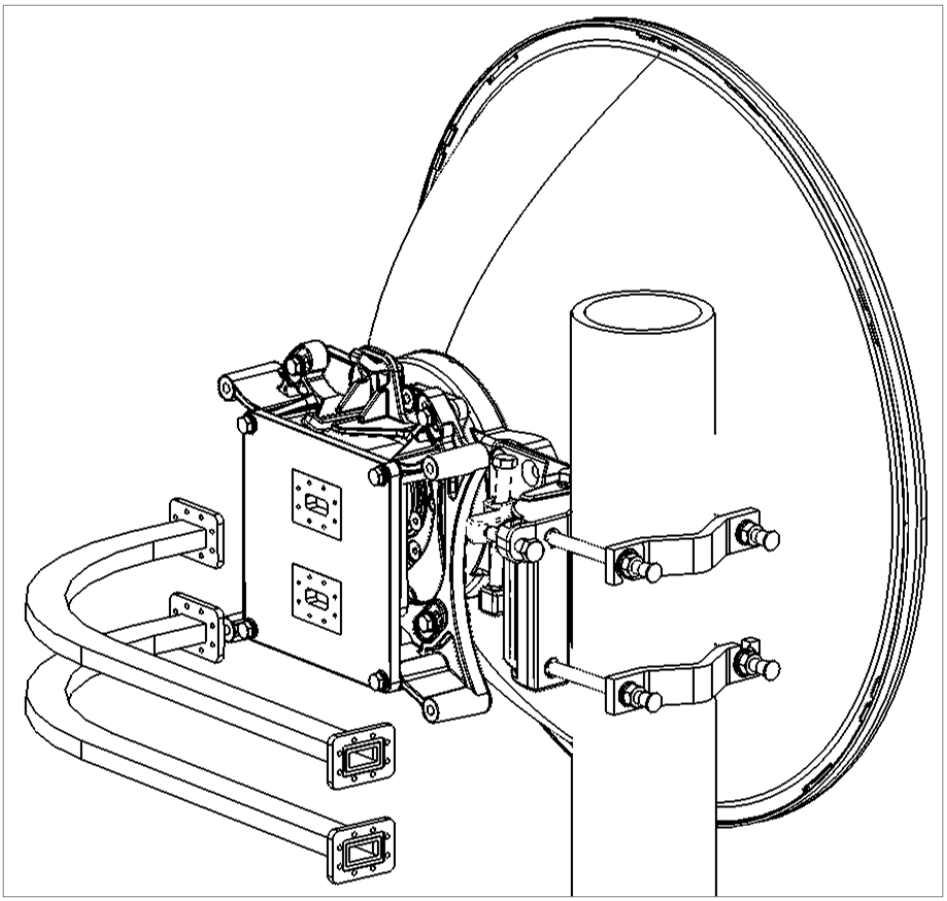
7. Repeat steps 4-6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Circulator/Splitter.
8. Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the antenna ports on the Remote Mount Adaptor. Tighten the screws and washers supplied with the Flexible Waveguide Kit.



9. Attach the OMT Plate Adapter to the OMT using the screws supplied with the OMT Plate Adapter kit.



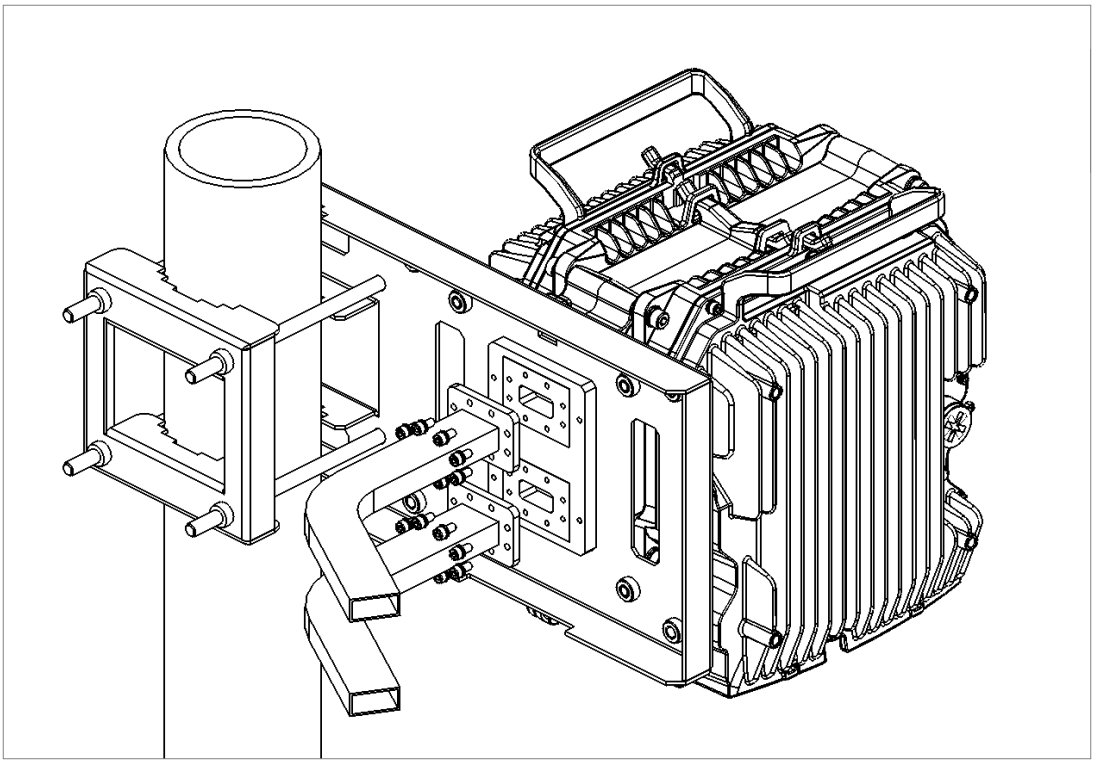
10. Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the OMT Remote Mount Adaptor using the screws supplied with the Flexible Waveguide kits.



4+0 with Dual Circulator Remote Mount

The following example illustrates a typical configuration, assuming that:

- The regulation specifies a channelization of 8 consecutive 28/38MHz channels (1-8 ch).
- The actual channels in use are channels 1,5.



4+0 Dual Polarization and Space Diversity, Adjacent Channel, Remote Mount

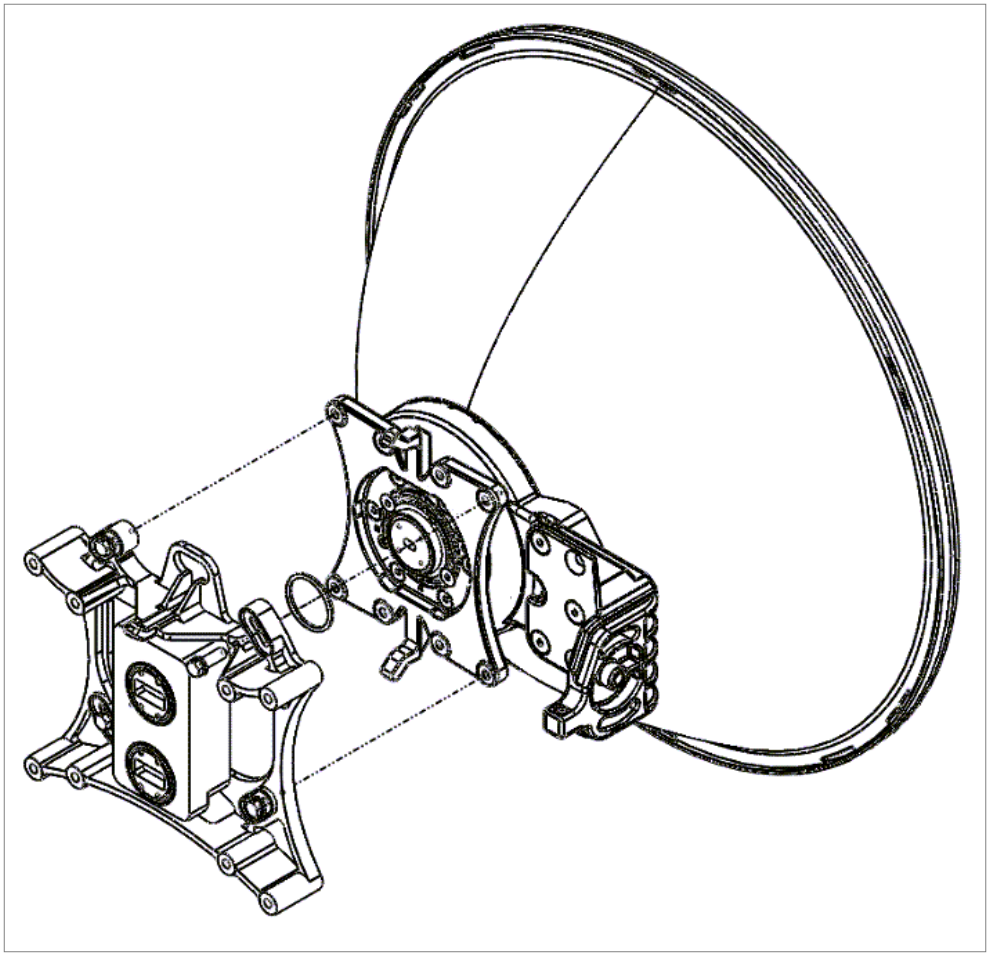
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radios	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Units	4	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT Kit	2	DXDH-MD-OMT-ff
4	RFU-D-HP OMT Plate Adaptor	2	DXDH-MD-PLATE-ADAPT-ff
5	Flexible Waveguide Kit	4	
6	RFU-D-HP Dual Circulator/Splitter	2	DXDH-MD-DUAL-CIRC-ff DXDH-MD-DUAL-SPLTR-ff
7	Adaptor Remote Mount Kit	2	DXDH-RM-MOUNT-ADPT-ff
8	RFU-D-HP Pole Mount Kit	2	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

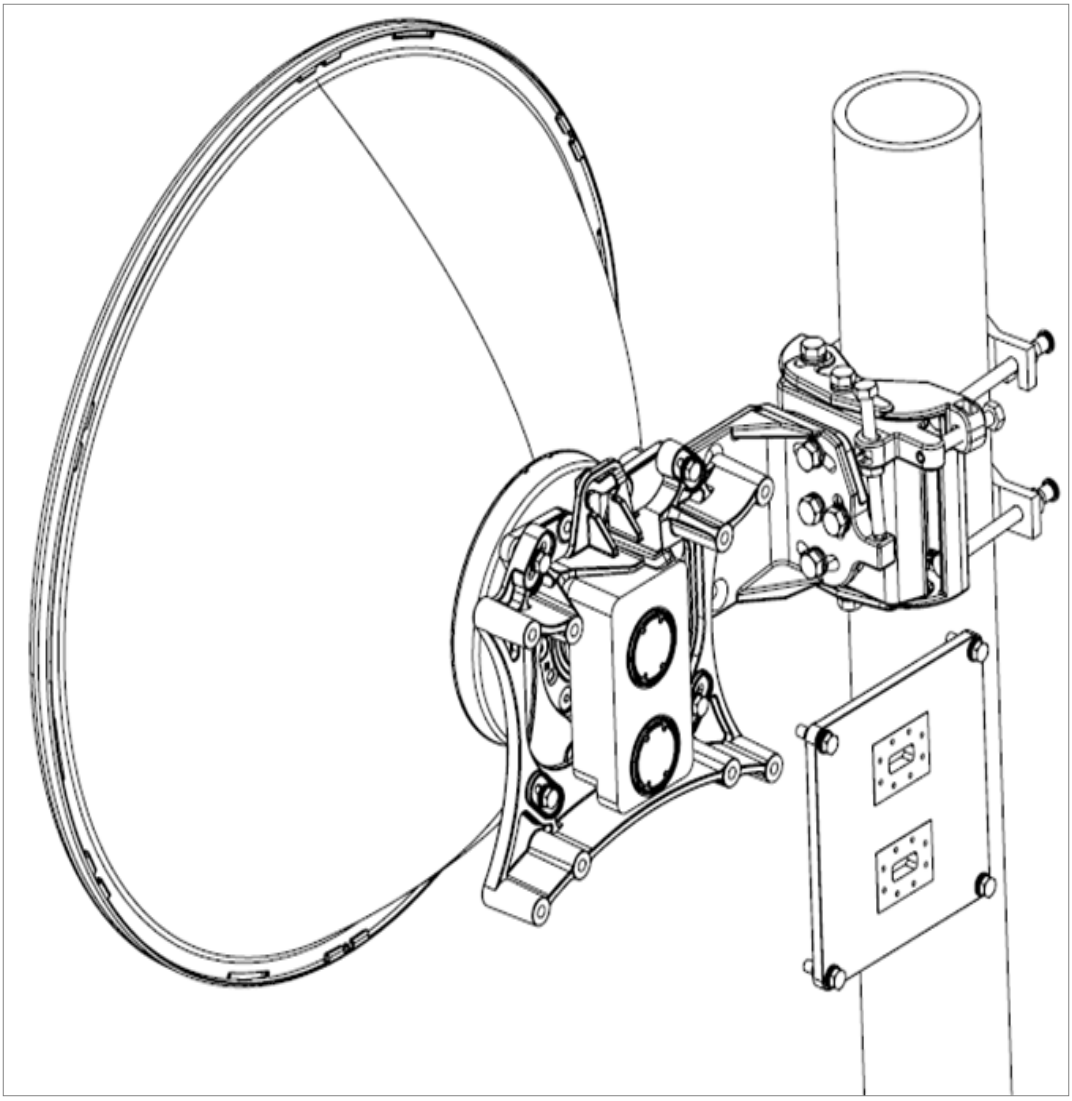


1. Connect the OMT kit to the antenna and secure it with four screws.

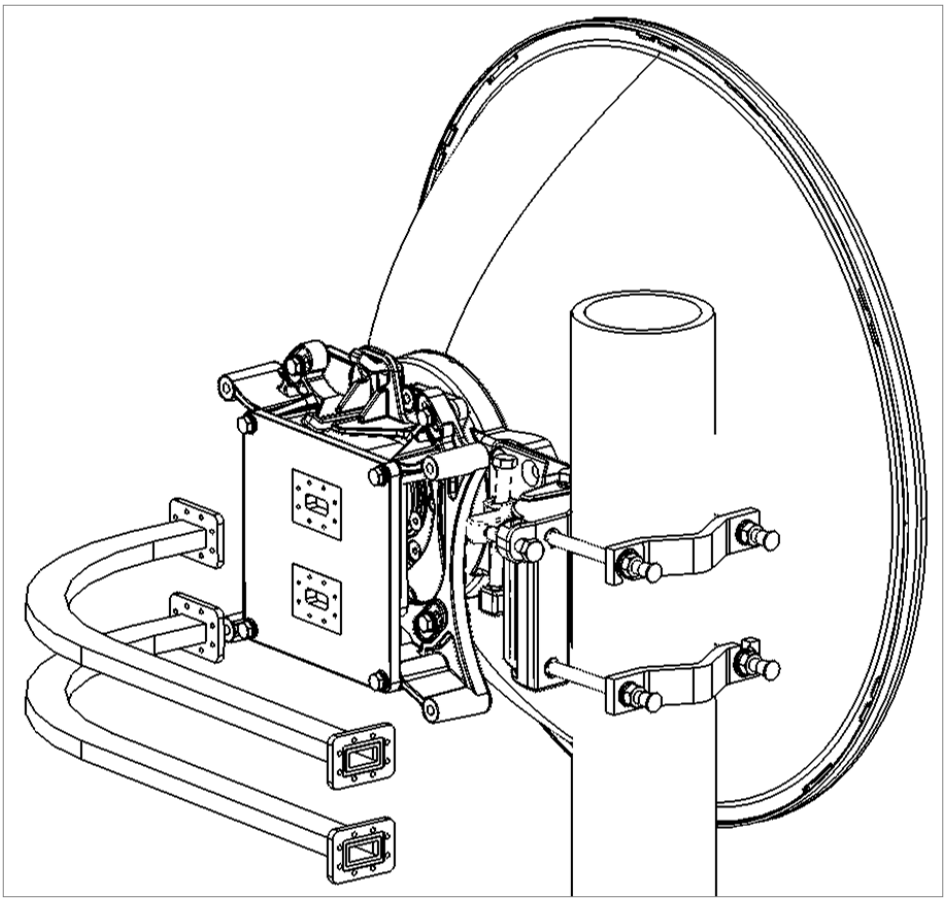
Note:

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

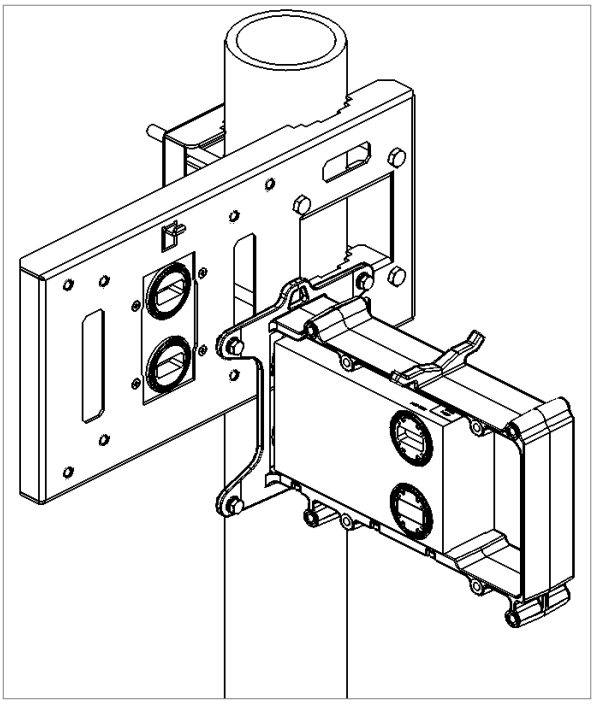
2. Attach the OMT Plate Adapter to the OMT using the screws supplied with the OMT Plate Adapter kit.



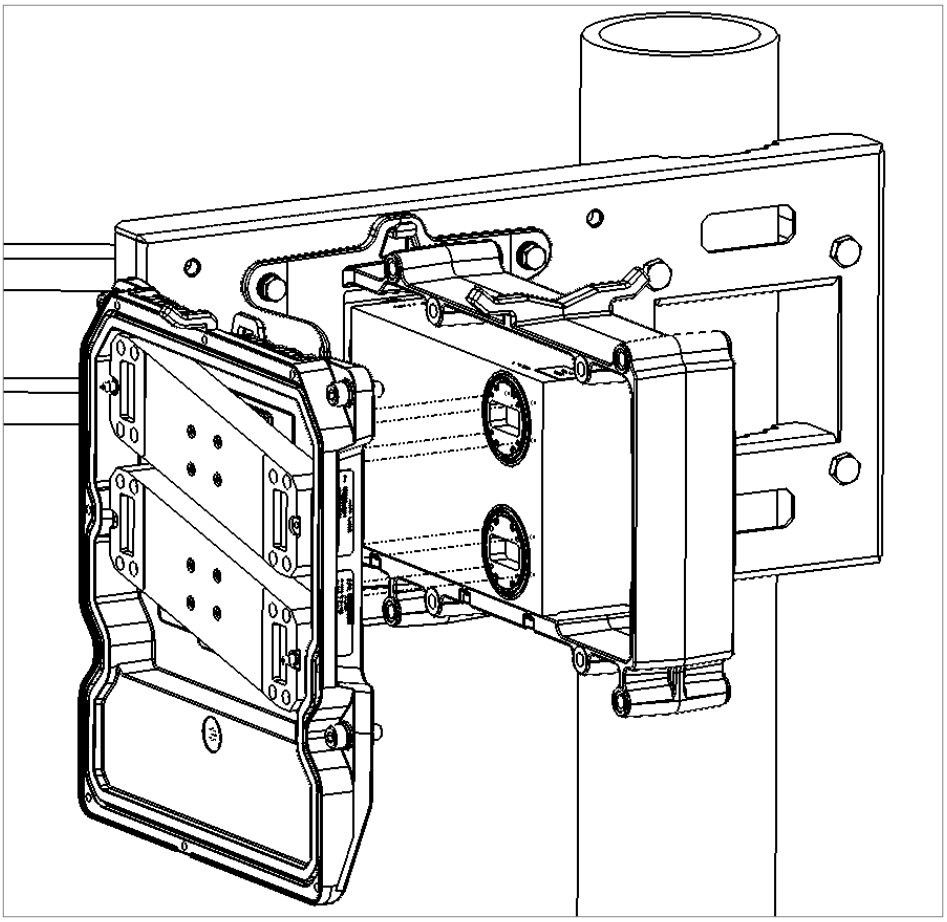
3. Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the OMT Remote Mount Adaptor using the screws supplied with the Flexible Waveguide kits.

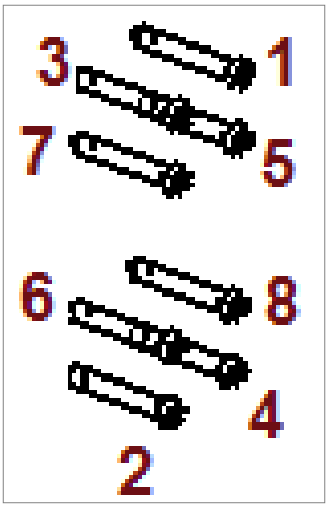


4. Repeat the assembly for the Space diversity antenna.
5. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in the RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit. See Steps 5 and 6 in Section 2+0 Dual Polarization Remote Mount.
6. Mount and tighten the RFU-D-HP Dual Circulator/Splitter to the RFU-D-HP Pole Mount using the four screws and washers that are supplied with the RFU-D-HP Dual Circulator/Splitter kit. Make sure that the O-rings are mounted on the RFU-D-HP Remote Mount Adaptor.



7. Attach the Diplexer unit to the Dual Circulator/Splitter using 8 M4x35 screws provided with the dual splitter or dual circulator unit, as shown below, using 20Nm torque.





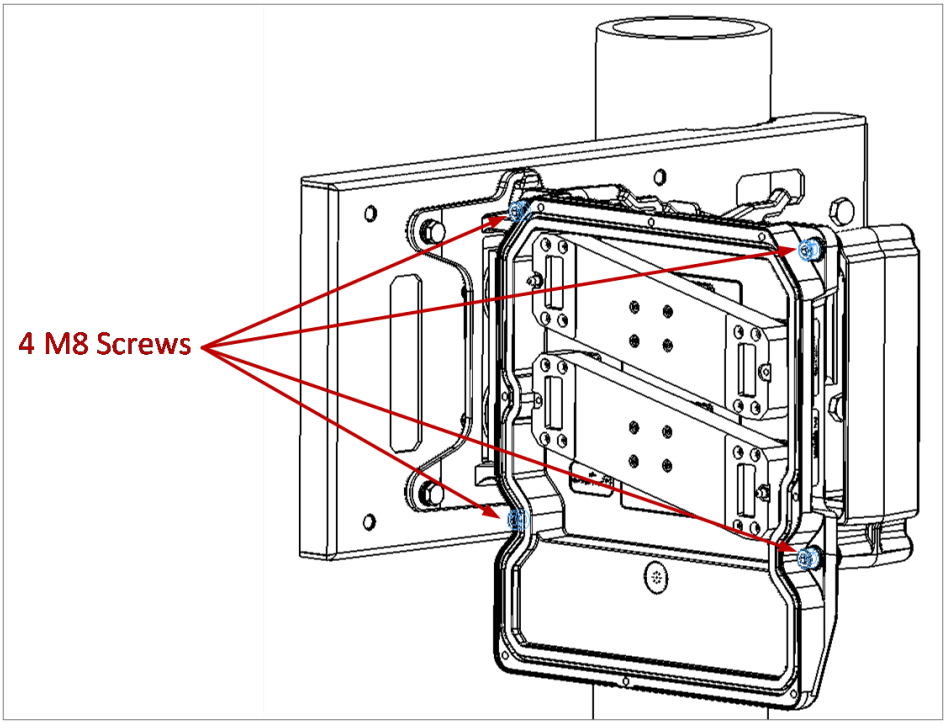
Note:

Tighten the screws diagonally. First begin to fasten the upper right screw of the top Diplexer and then the lower left screw of the bottom Diplexer, then fasten the upper left screw of the top Diplexer and then the lower right screw of the bottom Diplexer. Once the outer screws have all been partially tightened, repeat this process in a similar fashion

with the central screws. Then proceed to fully tighten all the screws in the same order.

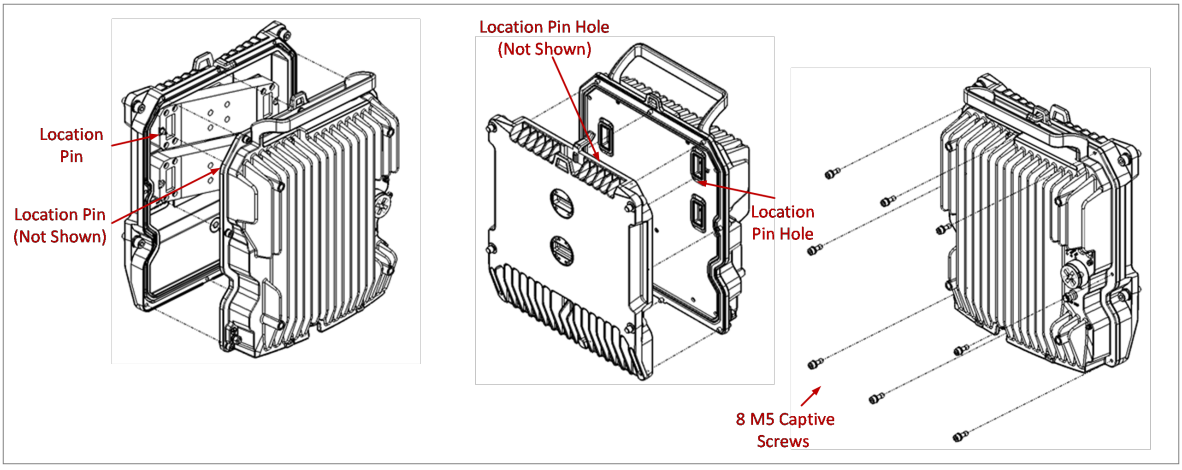
Verify that the O-rings on the Dual Circulator/Splitter are properly mounted between the Dual Circulator/Splitter ports and the Diplexer unit.

8. Secure the edges of the Diplexer unit to the Dual Circulator/Splitter using the four M8 captive screws and washers supplied with the Diplexer kit, using 20Nm torque. These screws are colored blue in the following picture. Be sure to tighten the screws in the same diagonal manner as in the previous step.

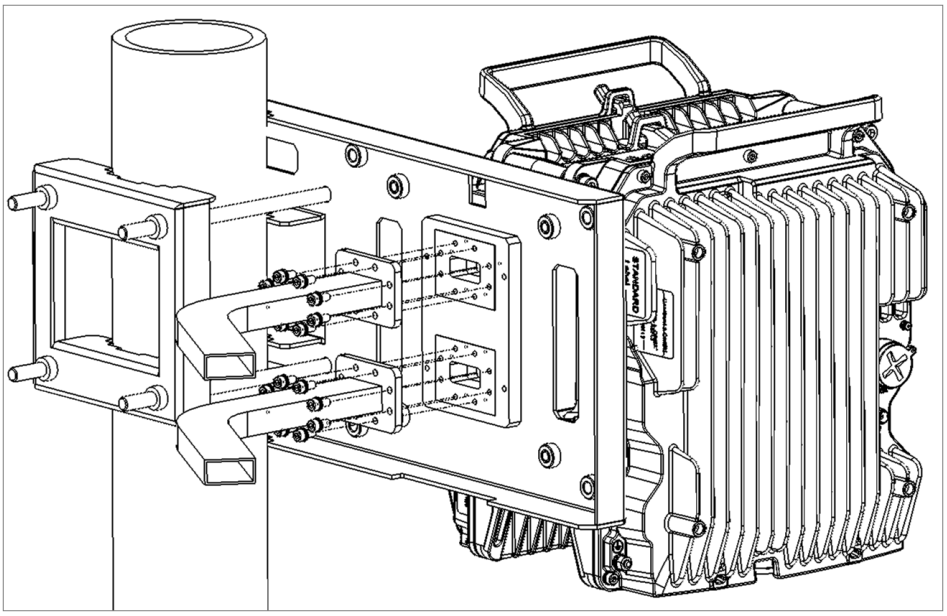


9. Attach the Radio unit to the Diplexer unit using the 8 M5 captive screws supplied with the Radio kit. Position the Radio unit on the Diplexer unit so that the two location pins mounted on the TRX ports of the Diplexer unit fit into the corresponding holes in the Radio unit. Perform the fastening in diagonal fashion as in the previous steps. The location pins are located on either the left of the upper TRX port and the right of the lower TRX port or the right of the upper TRX port and the left of the lower TRX

port, depending on the frequency.



10. Repeat steps 4-6 to attach the second Diplexer unit and the second Radio unit to the other side of the Dual Circulator/Splitter.
11. Connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the ‘H’ antenna ports on the Remote Mount Adaptor of the main and diversity antenna respectively. Tighten the screws and washers supplied with the Flexible Waveguide Kit.



12. Repeat the assembly on the second RFU-D-HP Remote Mount kit and connect both Flexible Waveguides and Sealing Gaskets supplied with each Flexible Waveguide Kit to the ‘V’ antenna ports on the Remote Mount Adaptor of the main and diversity antenna respectively. Tighten the screws and washers supplied with the Flexible Waveguide Kit.
13. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space

Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

2+0 External XPIC, Remote Mount

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP OMT Kit	1	DXDH-MD-OMT-ff
4	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-ff
5	RFU-D-HP Remote Mount Kit	2	DXDH-RM-MOUNT-kit
6	RFU-D-HP Adaptor Remote Mount Kit	2	DXDH-RM-MOUNT-ADPT-ff
7	Flexible Waveguide Kit	2	WAVEGUIDE-ffFT
8	Termination kit	2	FXDH-RM-TERM-ff
9	Data Sharing Cable	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
10	Source Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

Note:

The software automatically considers the RFU connected to the lower slot to be the vertical RFU. For example, in a configuration using slots 3 and 4, slot 3 must be connected to the vertical RFU and slot 4 must be connected to the horizontal RFU. In a configuration using slots 5 and 6, slot 5 must be connected to the vertical RFU and slot 6 must be connected to the horizontal RFU. In a configuration using slots 7 and 8, slot 7 must be connected to the vertical RFU and slot 8 must be connected to the horizontal RFU, and so on.

This cannot be modified via the software. Therefore, it is vitally important to connect the RFU connected to the lower slot during installation as the vertical RFU and the RFU connected to the upper slot as the horizontal RFU.

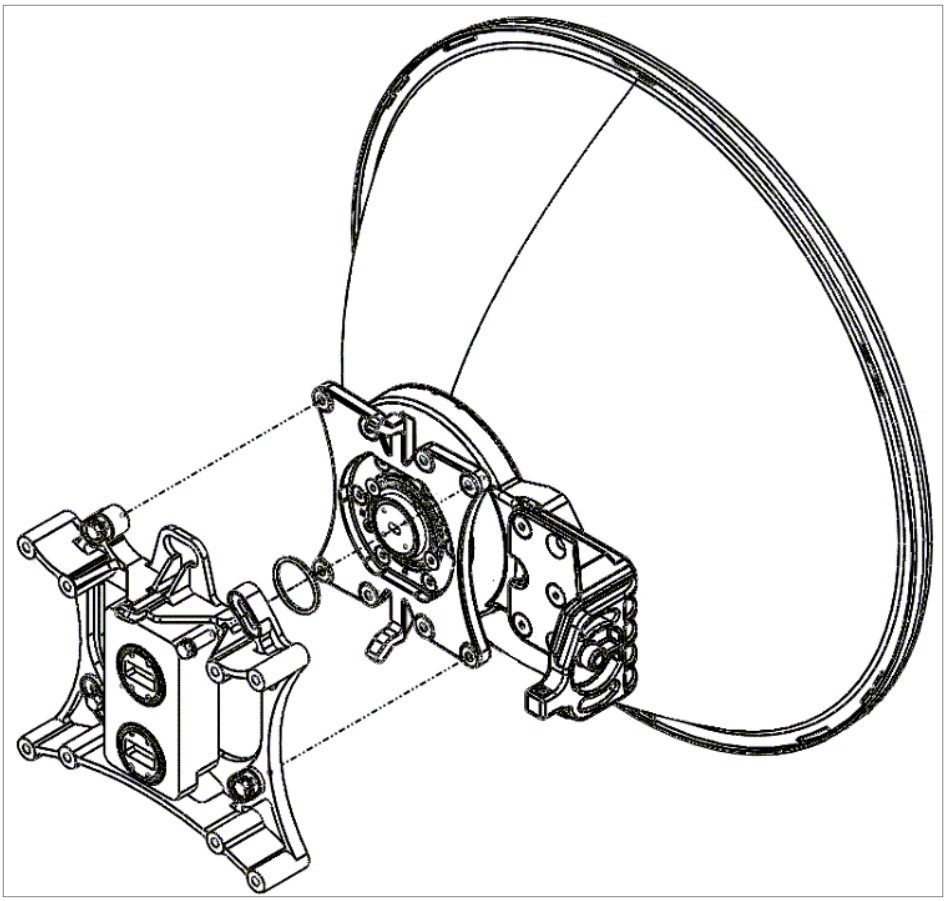
1. Prior to the installation, follow the antenna manufacturer's instructions for using the circular transition (adaptor). Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.

   In case of a Remote Mount antenna (antennas with separate V and H WG interfaces), skip to Step 4.

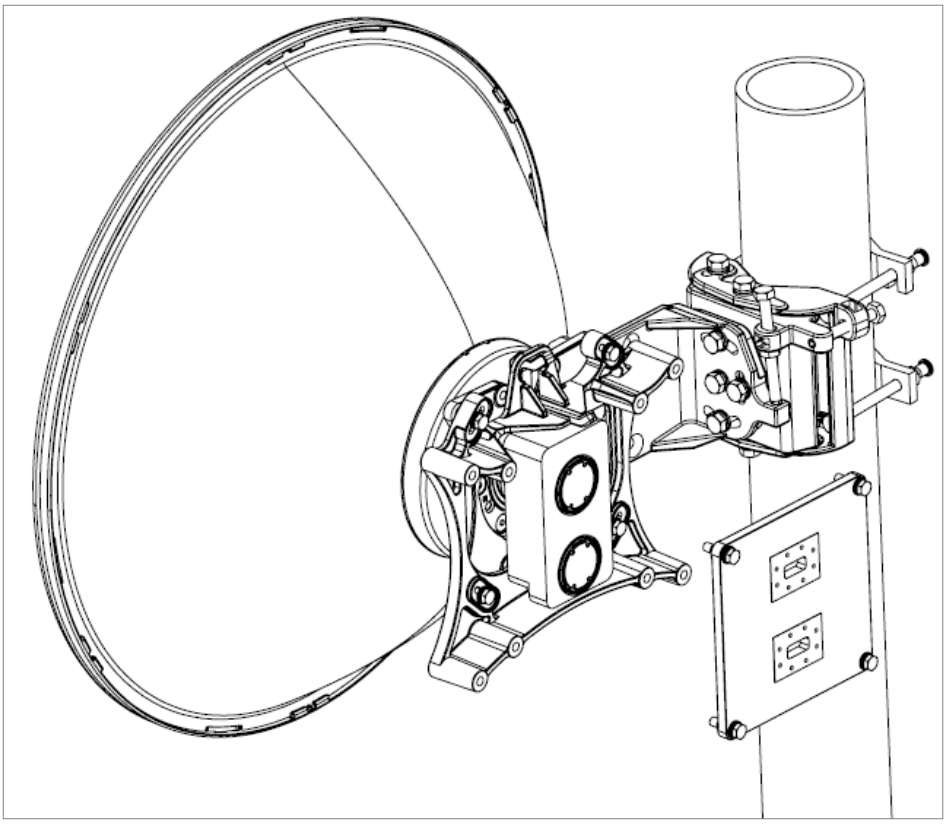
2. Connect the OMT kit to the antenna and secure it with four screws.

Note:

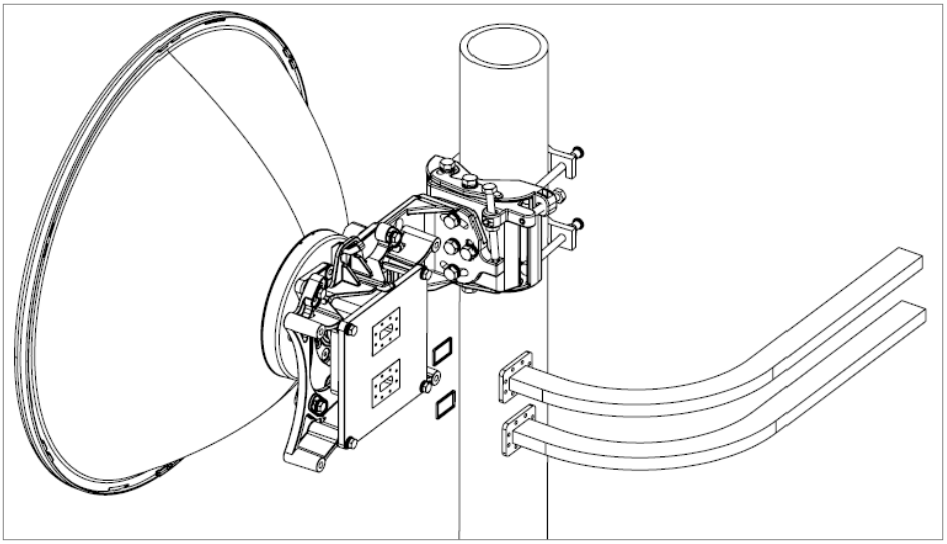
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



3. Mount and tighten the OMT Plate Adaptor to the RFU-D-HP OMT ports using the screws supplied with the adapter kit.



4. Mount and tighten the O-ring and the flexible waveguide to the adapter ports using the screws supplied with the flexible waveguide kit.



Note:

Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.

5. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit. Use 30 Nm torque.

Figure 40: *Remote Pole Mount Kit – 6-11 GHz*

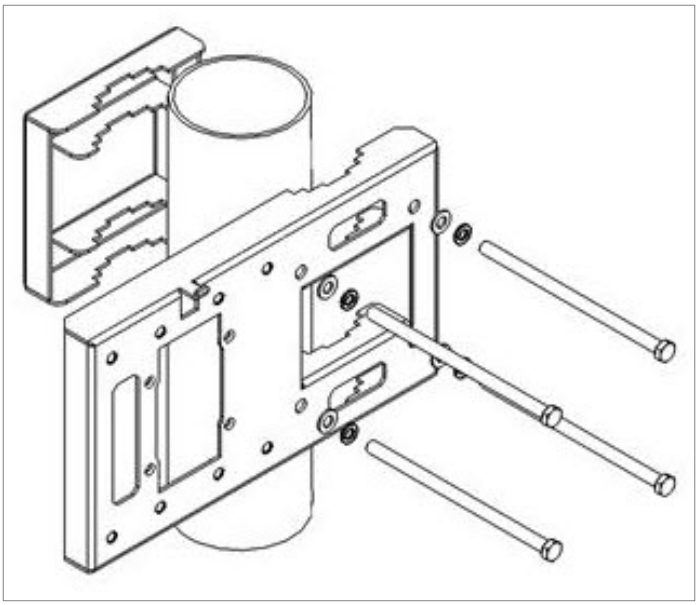
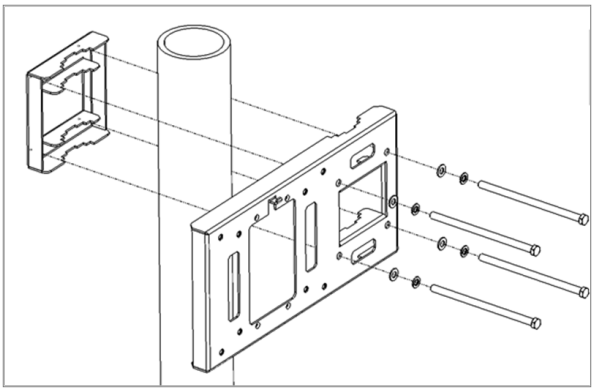
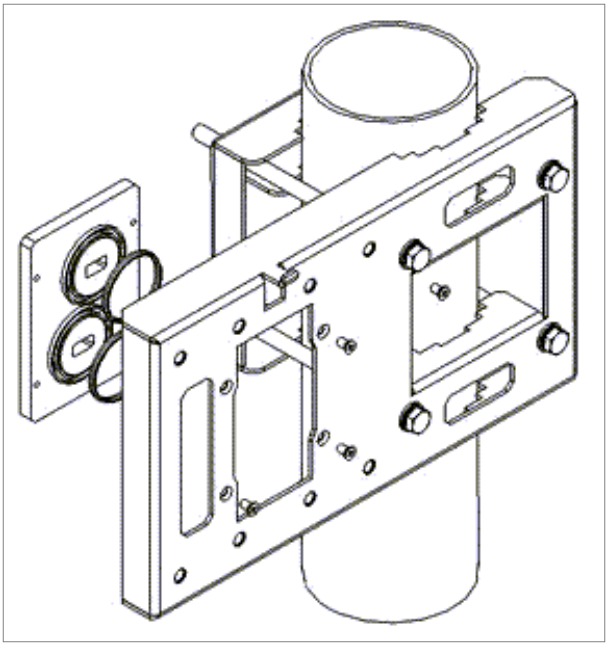


Figure 41: *Remote Pole Mount Kit – 4-5 GHz*

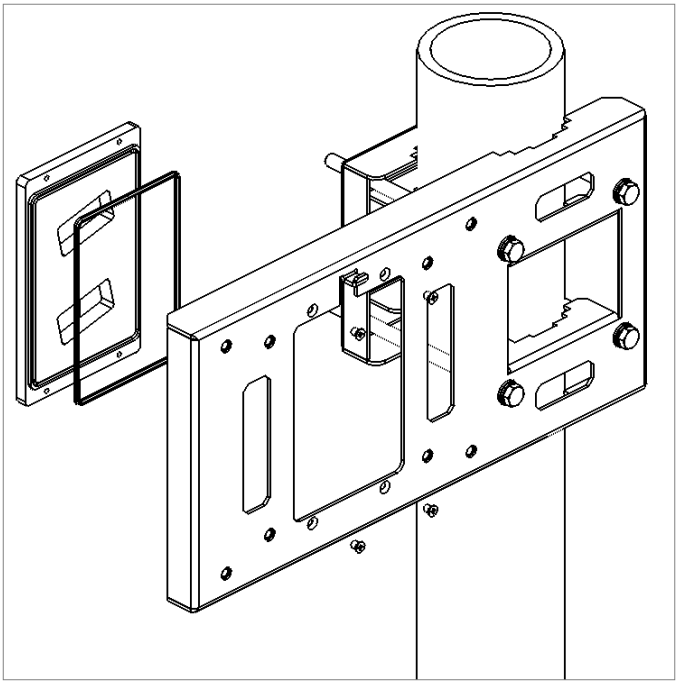


6. Mount and tighten the RFU-D-HP Remote Mount Adaptor plate (supplied in RFU-D-HP Adaptor Remote Mount kit) to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Adaptor Remote Mount kit.

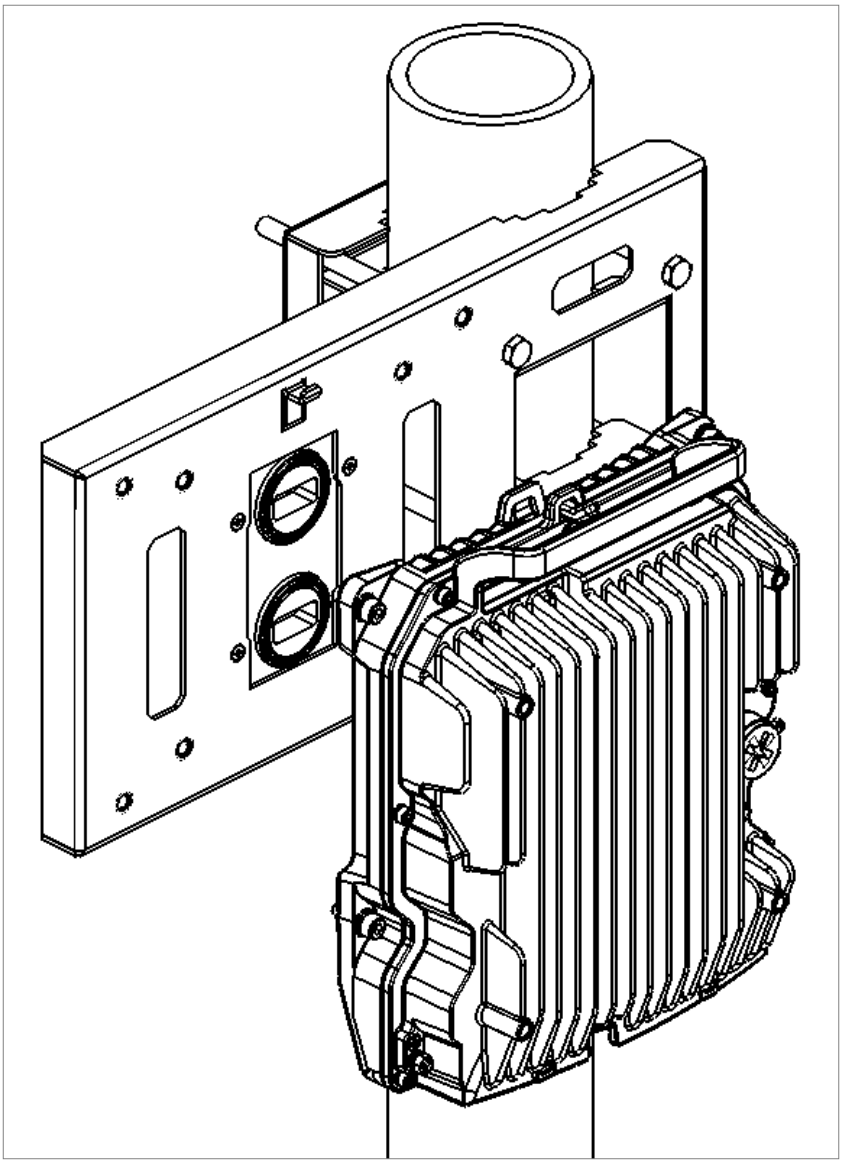
Figure 42: *Remote Pole Mount Kit – 6-11 GHz*



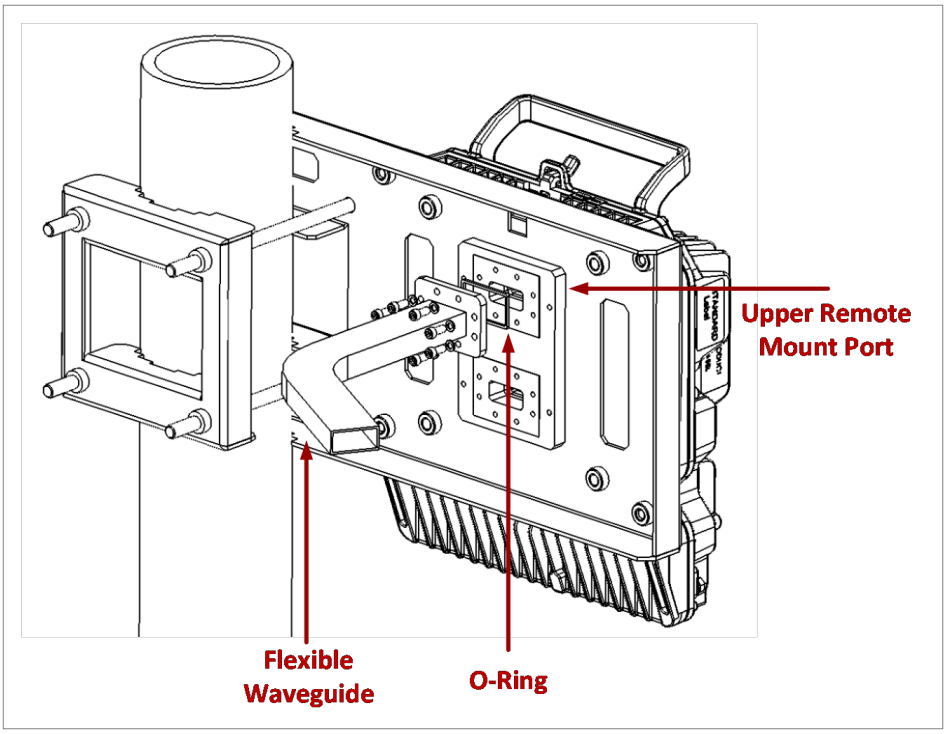
Remote Pole Mount Kit – 4-5 GHz



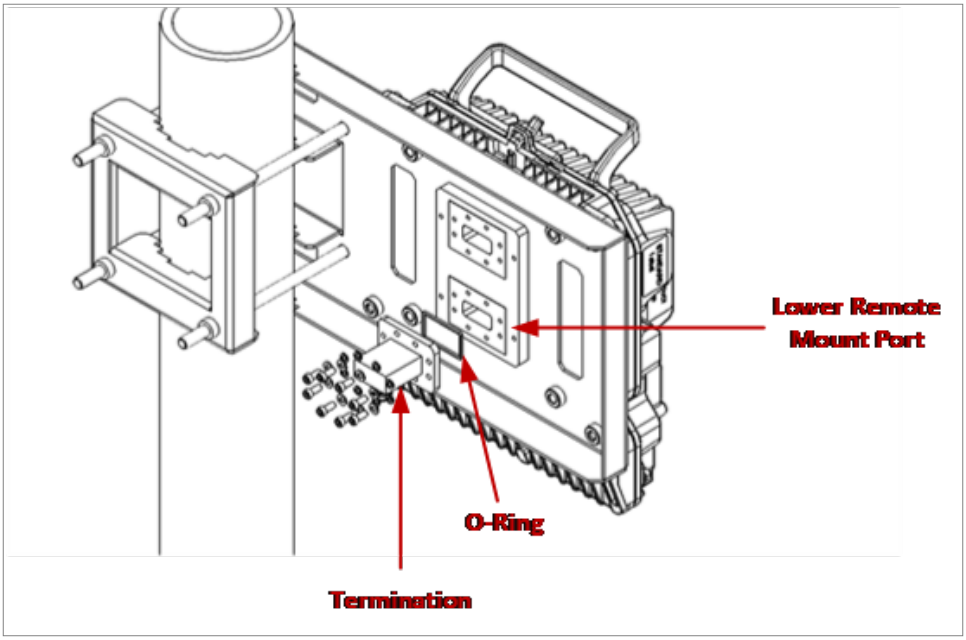
7. Mount and tighten the RFU-D-HP Radio to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Radio.



8. Mount and tighten a Flexible Waveguide with its O-ring to the upper RFU-D-HP Remote Mount Adaptor port of each Remote Mount Adaptor using the eight screws supplied with each Flexible WG kit.



9. Mount and tighten a Termination with its O-ring to the lower RFU-D-HP Remote Mount Adaptor port of each Remote Mount Adaptor using the eight screws supplied with the Termination kit.



Note:

The Flexible Waveguide is not shown in this picture for purposes of clarity.

10. Repeat the same installation for the second RFU.
11. Connect a data sharing cable and a source sharing cable between the RFU-D-HP units. For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

2+0 External XPIC with Space Diversity (Internal), Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Models
1	RFU-D-HP Radio	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Diplexer Unit	2	See Section Marketing Models for Diplexer Unit
3	RFU-D-HP Remote Mount Kit	2	DXDH-RM-MOUNT-kit
4	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-ff
5	RFU-D-HP Adaptor Remote Mount Kit	2	DXDH-RM-MOUNT-ADPT-ff
6	Flexible Waveguide Kit	2	WAVEGUIDE-ffFT
7	LDF4 Cable	2	LDF4-JA-15M/ LDF
8	Waveguide-Coax Adaptor	4	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
9	Data Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations
10	Source Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations
11	RFU-D-HP Pole Mount Kit	1	

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

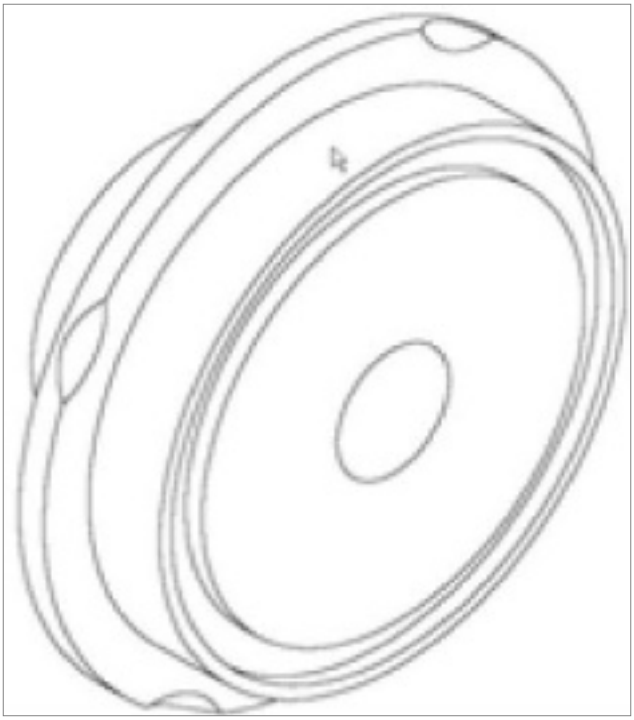
Note:

The software automatically considers the RFU connected to the lower slot to be the vertical RFU. For example, in a configuration using slots 3 and 4, slot 3 must be connected to the vertical RFU and slot 4 must be connected to the horizontal RFU. In a configuration using slots 5 and 6, slot 5 must be connected to the vertical RFU and slot 6 must be connected to the horizontal RFU. In a configuration using slots 7 and 8, slot 7 must be connected to the vertical RFU and slot 8 must be connected to the horizontal RFU, and so on.

This cannot be modified via the software. Therefore, it is vitally important to connect the RFU connected to the lower slot during installation as the vertical RFU and the RFU connected to the upper slot as the horizontal RFU.

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

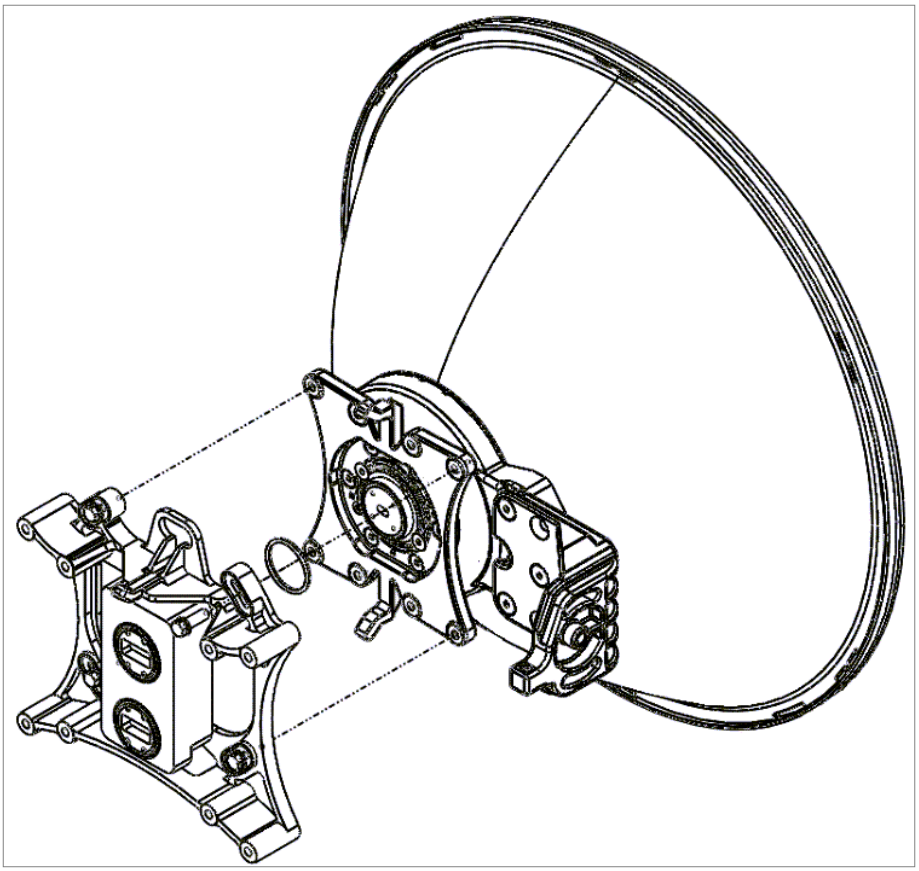
   In case of a Remote Mount antenna (antennas with separate V and H WG interfaces), skip to Step 4.



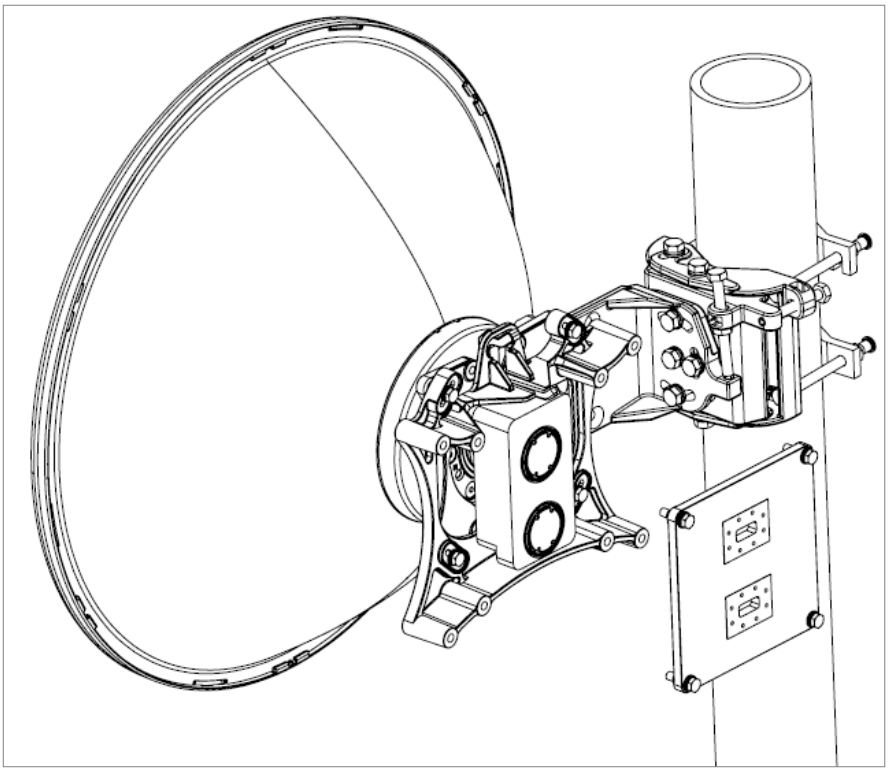
2. Connect the OMT kit to the antenna and secure it with four screws.

Note:

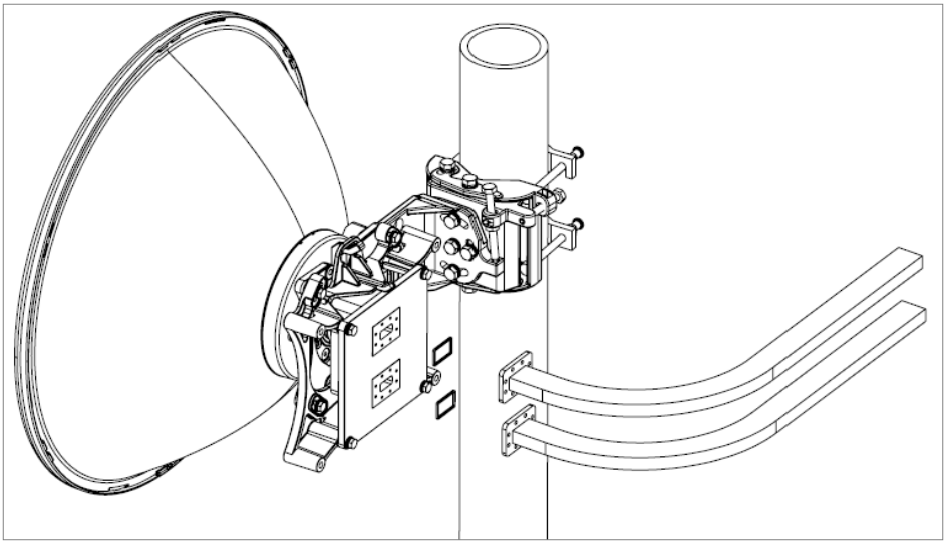
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



3. Mount and tighten the OMT Plate Adaptor to the RFU-D-HP OMT ports using the screws supplied with the adapter kit.



4. Mount and tighten the O-ring and the flexible waveguide to the adapter ports using the screws supplied with the flexible waveguide kit.



Note:

Verify that the O-rings are correctly mounted between the OMT ports and each flexible waveguide.

5. Mount and tighten the RFU-D-HP DC pole mount to the pole using the four washers and screws supplied with the RFU-D-HP DC pole mount kit. Use 30 Nm torque.

Figure 43: *Remote Pole Mount Kit – 6-11 GHz*

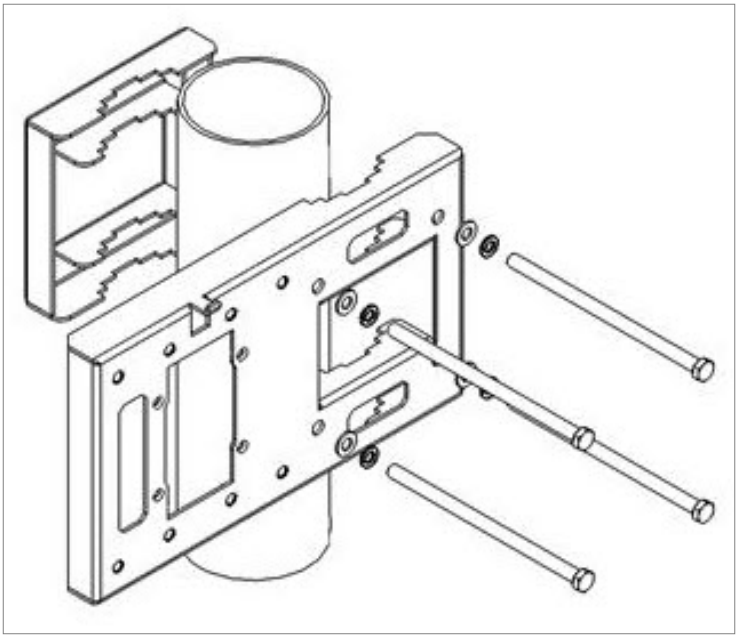
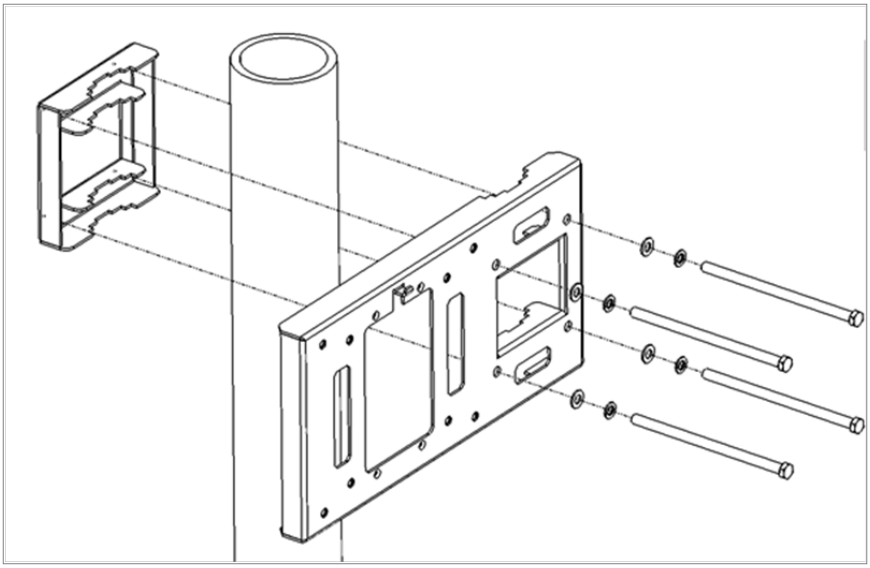


Figure 44: *Remote Pole Mount Kit – 4-5 GHz*



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

Figure 45: *Remote Pole Mount Kit – 6-11 GHz*

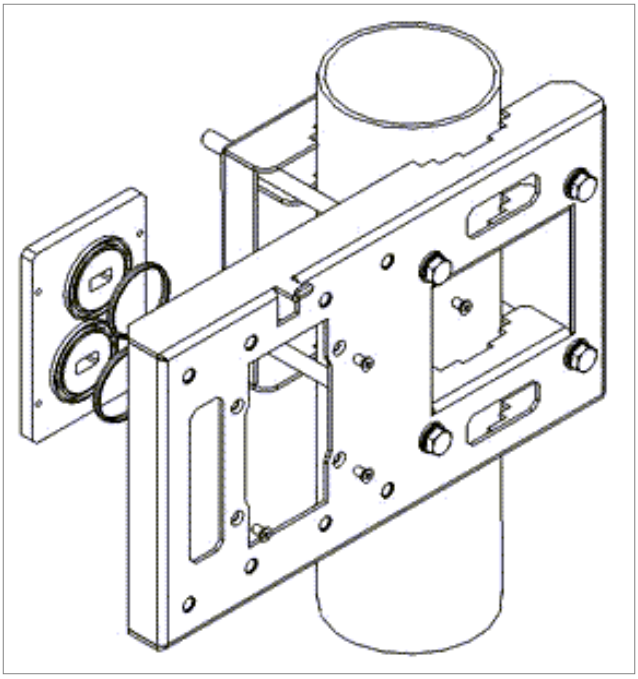
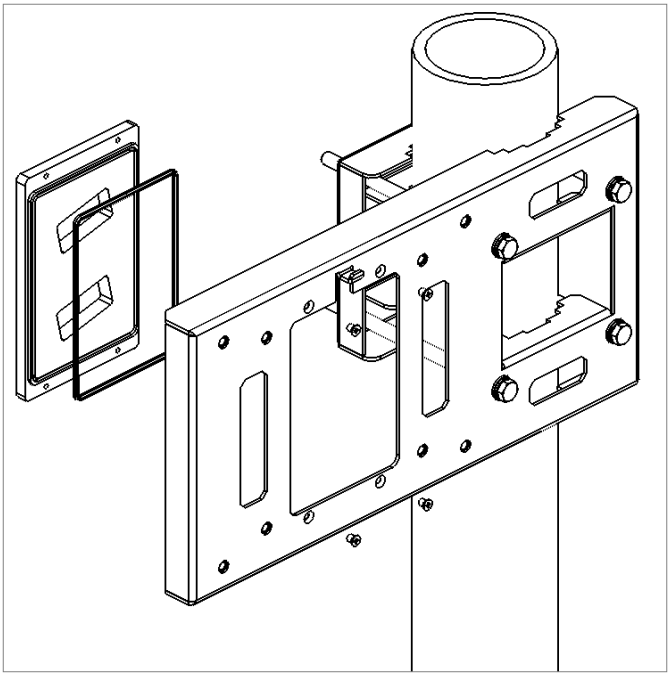
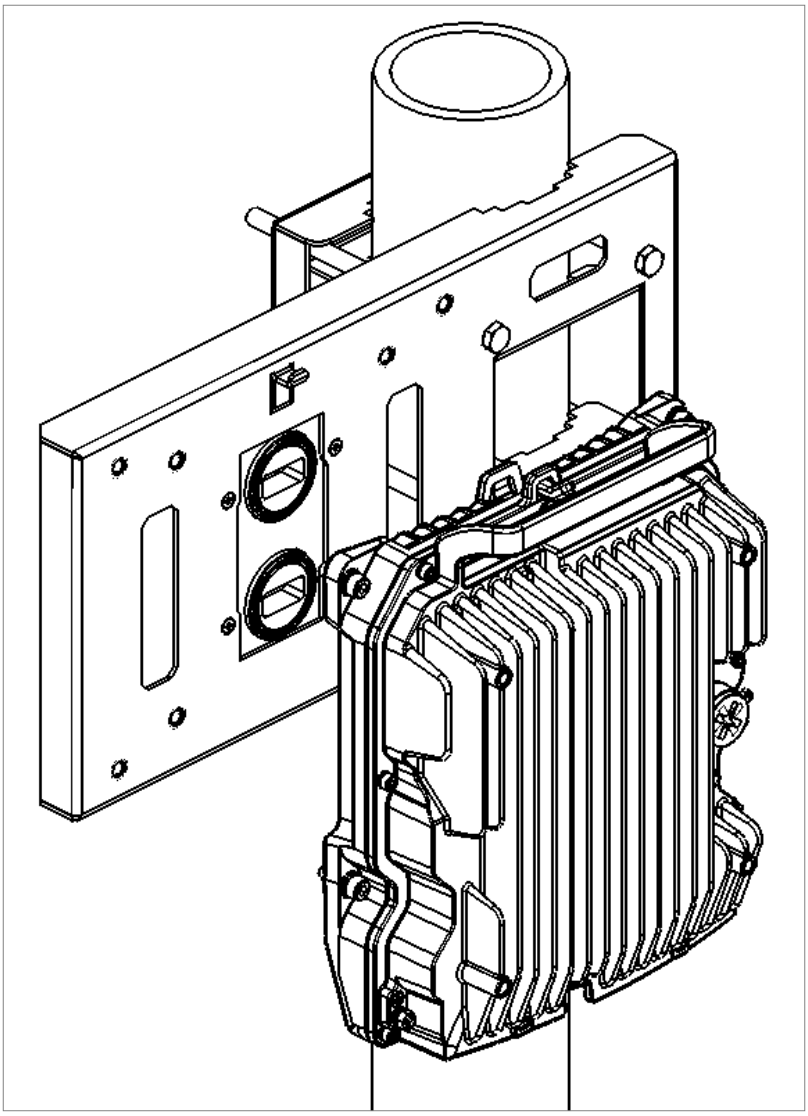


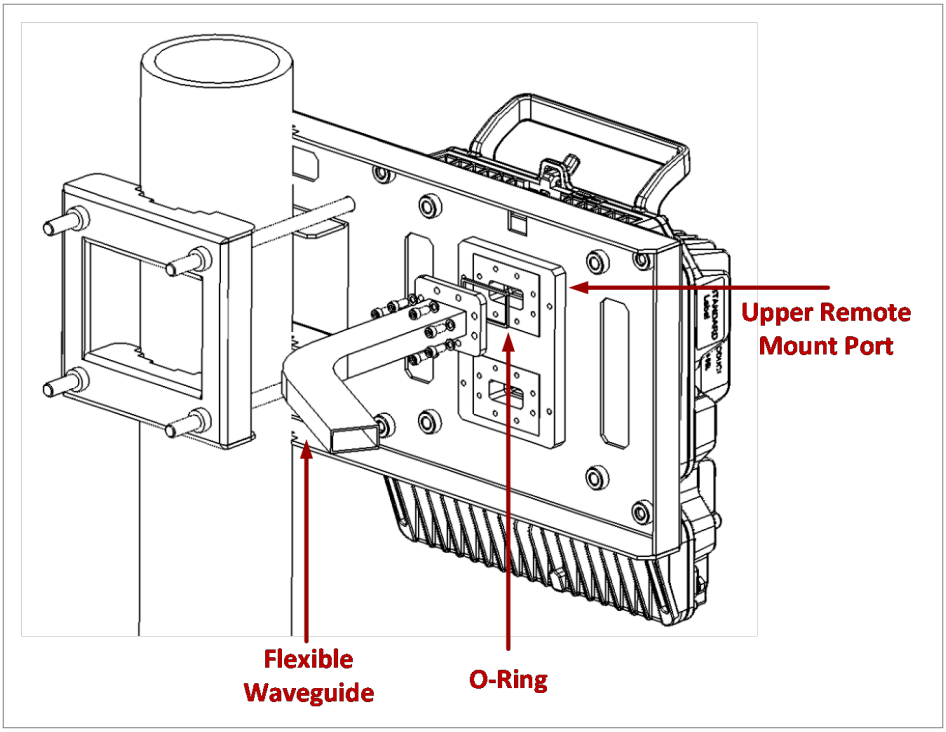
Figure 46: *Remote Pole Mount Kit – 4-5 GHz*



7. Mount and tighten the RFU-D-HP Radio to the RFU-D-HP Pole Mount using the four flat screws supplied with the RFU-D-HP Radio.



8. Mount and tighten Flexible Waveguide with its O-ring to the upper RFU-D-HP Remote Mount Adaptor port using the eight screws supplied with each Flexible WG kit.



9. Connect the LDF4 cable between Waveguide-Coax Adaptors on the lower antenna port of the Remote Mount Adaptor and the Diversity antenna. See Section Connecting the Space Diversity Antenna for Remote Mount Internal Space Diversity Configurations.
10. Repeat the same installation for the second RFU.
11. Connect a data sharing cable and a source sharing cable between the RFU-D-HP units. For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

Common Procedures for Internal Space Diversity Configurations with Diplexer-Based Branching

These sections describe how to connect the diversity port to the diversity antenna using LDF4 Cables and Waveguide-Coax Adaptors, for direct and remote diplexer-based configurations.

Connecting the Space Diversity Antenna for Direct Mount Internal Space Diversity Configurations

Optionally for Internal Space Diversity configurations, LDF4 cables can be used instead of flexible waveguides to connect the radio ports of the RFU to the diversity antenna.

Use this procedure when using the Direct Mount Space Diversity Mediation Device (DXDH-MD-SD-*ff*).

List of Items

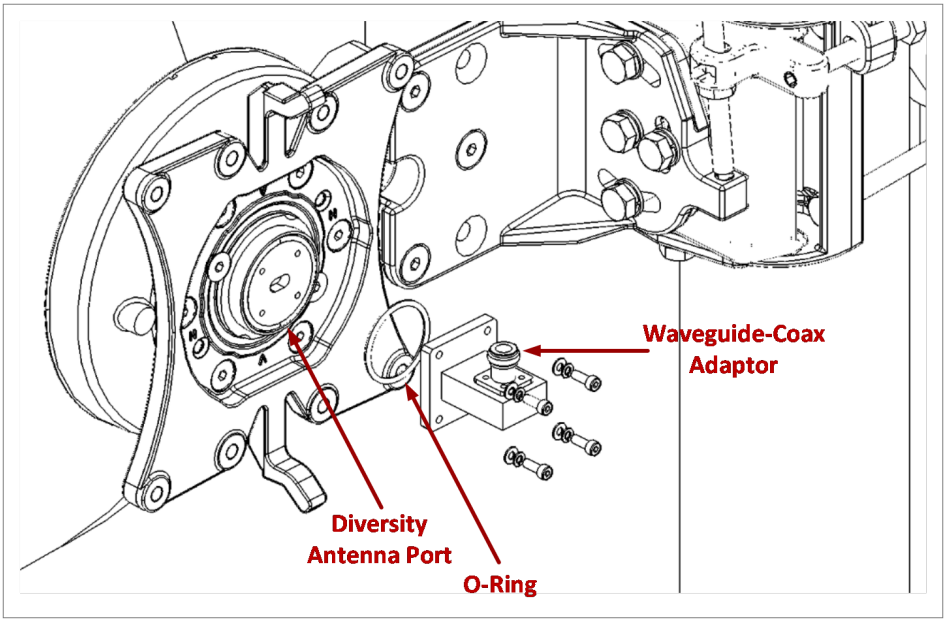
Item	Description	Quantity	Marketing Model
1	LDF4 Cable	1	LDF4-JA-15M/ LDF
2	Waveguide-Coax Adaptor	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations

Required Tools

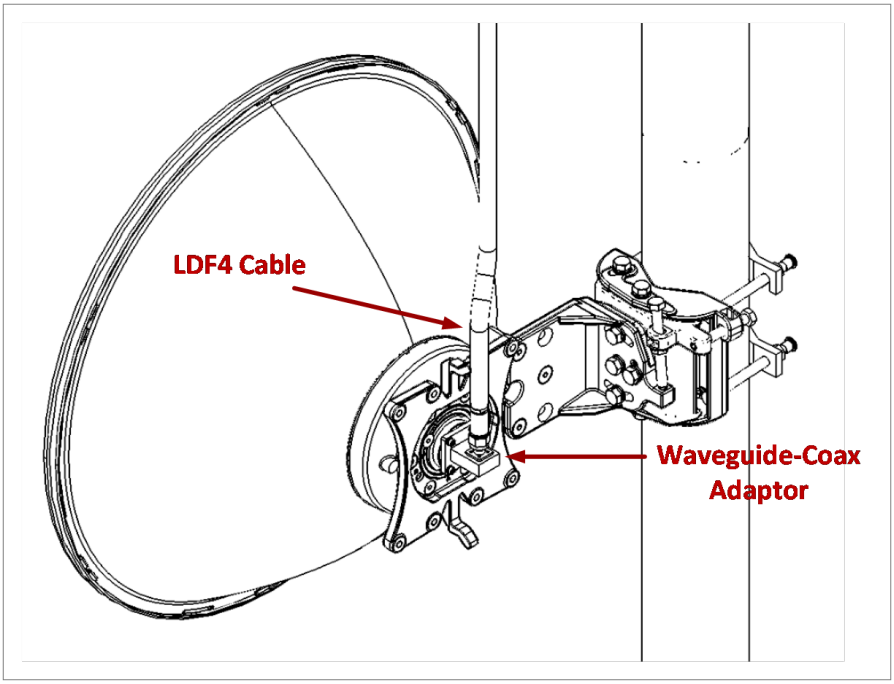
- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. Connect a Waveguide-Coax Adaptor to the Diversity antenna.



2. Connect the LDF4 cable to the Waveguide-Coax adaptor mounted on the Diversity antenna.



3. Connect the LDF4 cable from the Remote port on the Space Diversity mediation device to the antenna.

Figure 47: *LDF4 Cable to Space Diversity Mediation Device – 1+0*

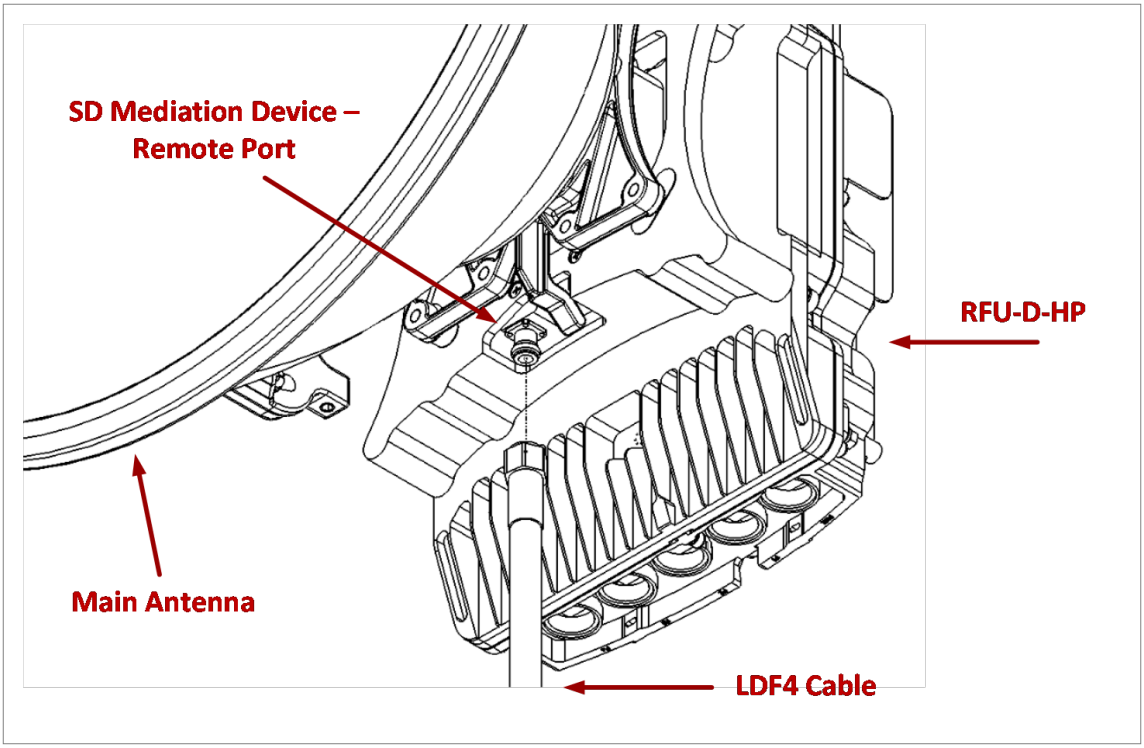
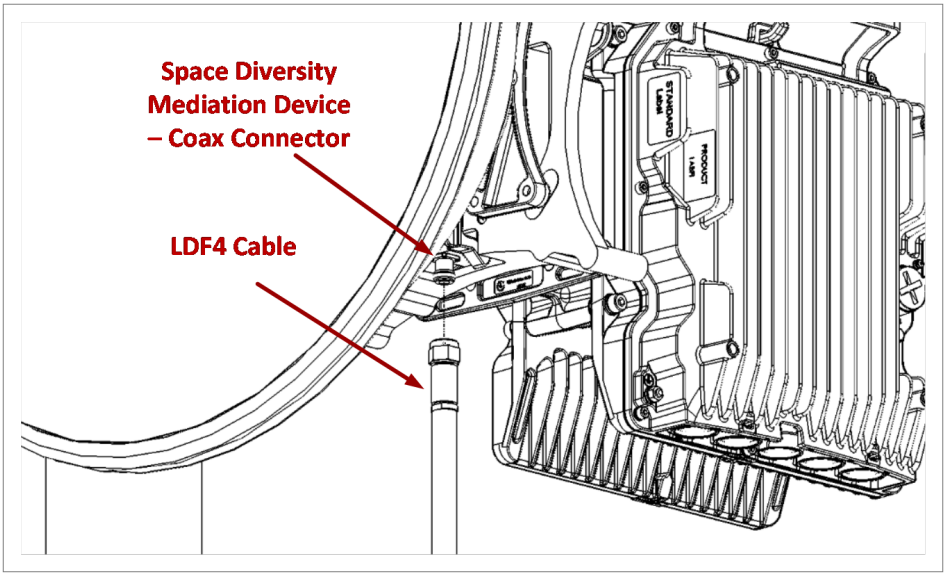


Figure 48: *LDF4 Cable to Space Diversity Mediation Device – 1+1/2+2*



Connecting the Space Diversity Antenna for Remote Mount Internal Space Diversity Configurations

Optionally for Internal Space Diversity configurations, LDF4 cables can be used instead of flexible waveguides to connect the radio ports of the RFU to the diversity antenna.

Use this procedure when using a Remote Mount Adaptor.

List of Items

Item	Description	Quantity	Marketing Model
1	LDF4 Cable	1	LDF4-JA-15M/ LDF
2	Waveguide-Coax Adaptor	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
3	SD Adaptor for Remote Mount	1	DXDH-RM-MOUNT-SD-ADPT-ff

Required Tools

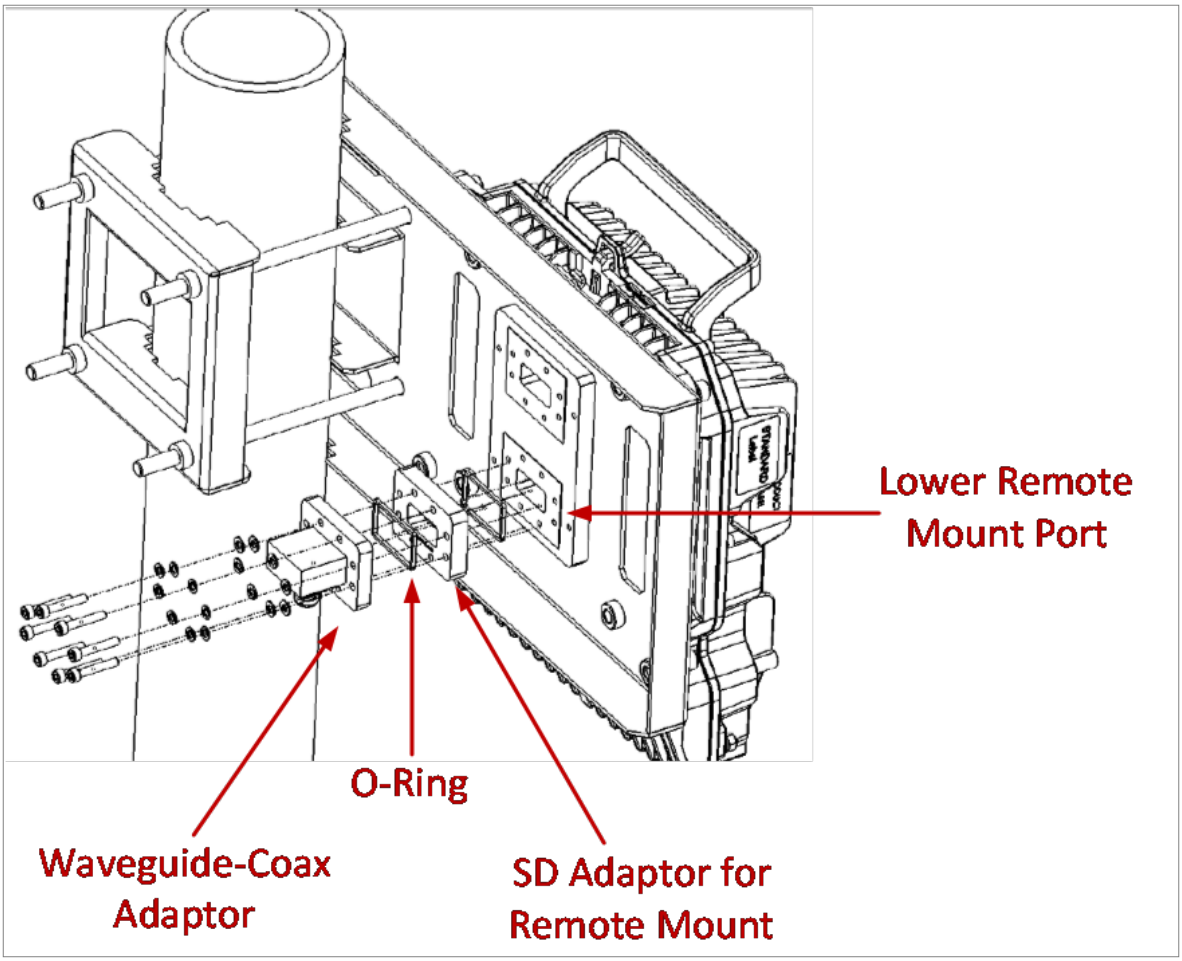
- Metric offset hexagon key set
- Metric wrench key set

Procedure

1. Mount and tighten a Waveguide-Coax Adaptor with its O-ring to the lower RFU-D-HP Remote Mount Adaptor port, with an SD Adaptor for Remote Mount inserted between the O-Ring and the Remote

Mount Adaptor Port, using the eight screws supplied with each Waveguide-Coax Adaptor kit. Tighten the screws and washers.

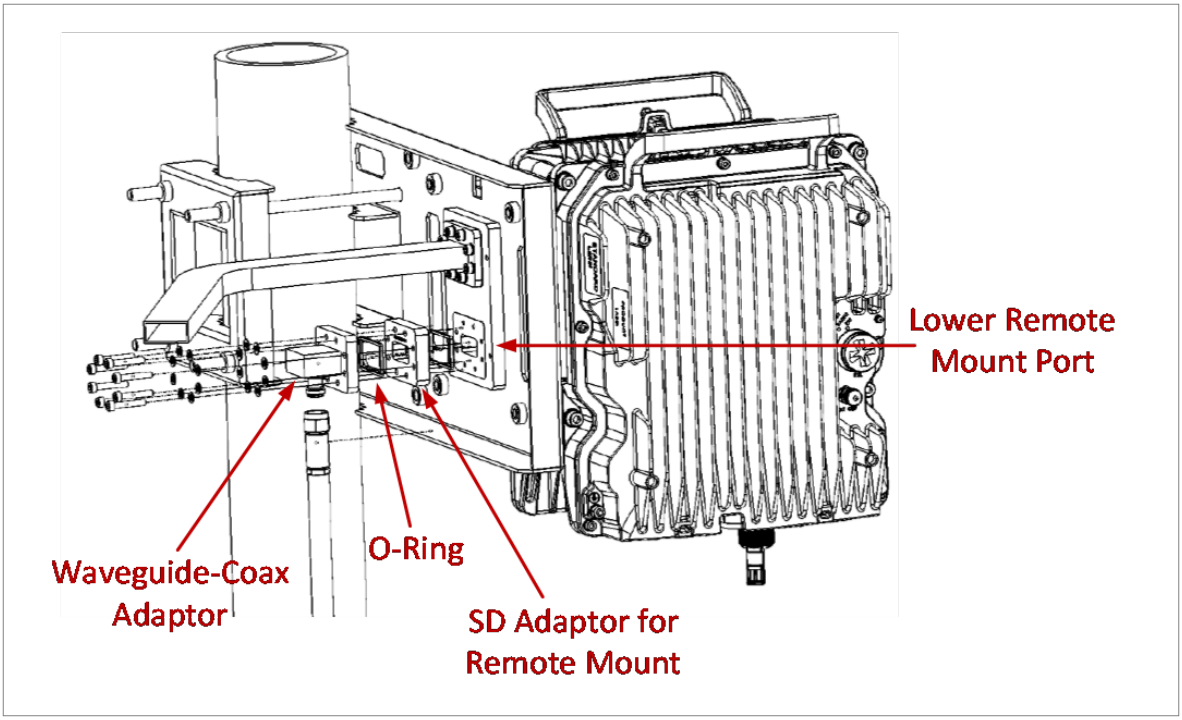
Figure 49: *LDF4 Cable to Remote Mount Adaptor – 1+0*



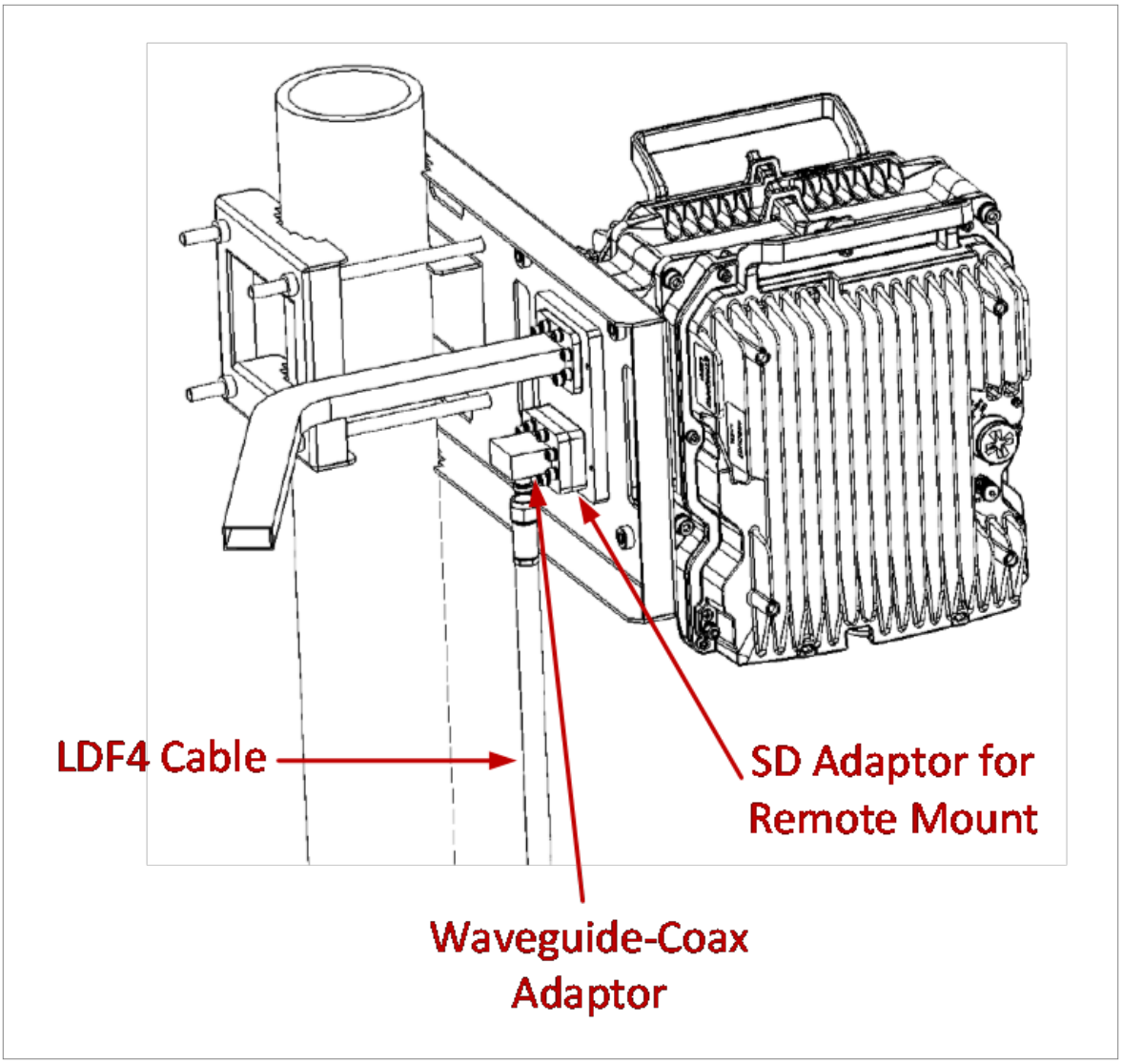
Note:

The figure above shows a 1+0 Space Diversity (Internal) configuration, but the SD Adaptor for Remote Mount is used for all remote mount Internal SD configurations. For purposes of clarity, the Flexible Waveguide is not shown in this figure.

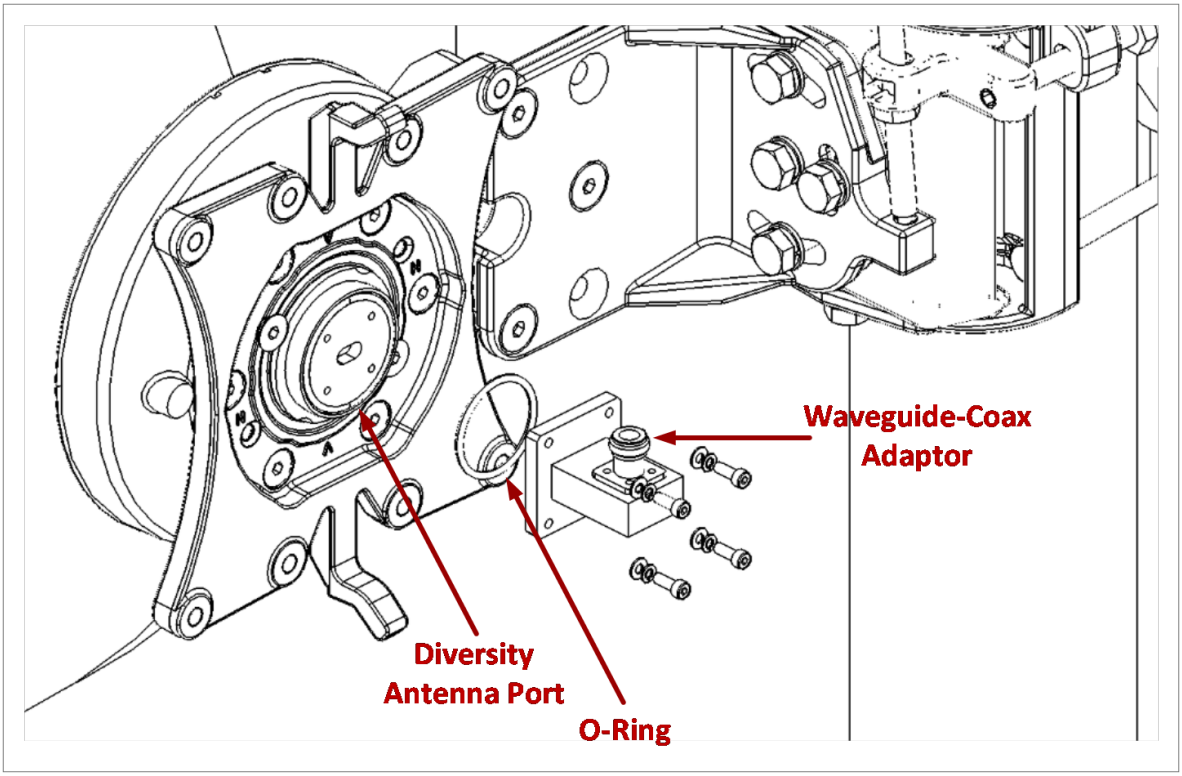
Figure 50: *LDF4 Cable to Remote Mount Adaptor – 1+1/2+2*



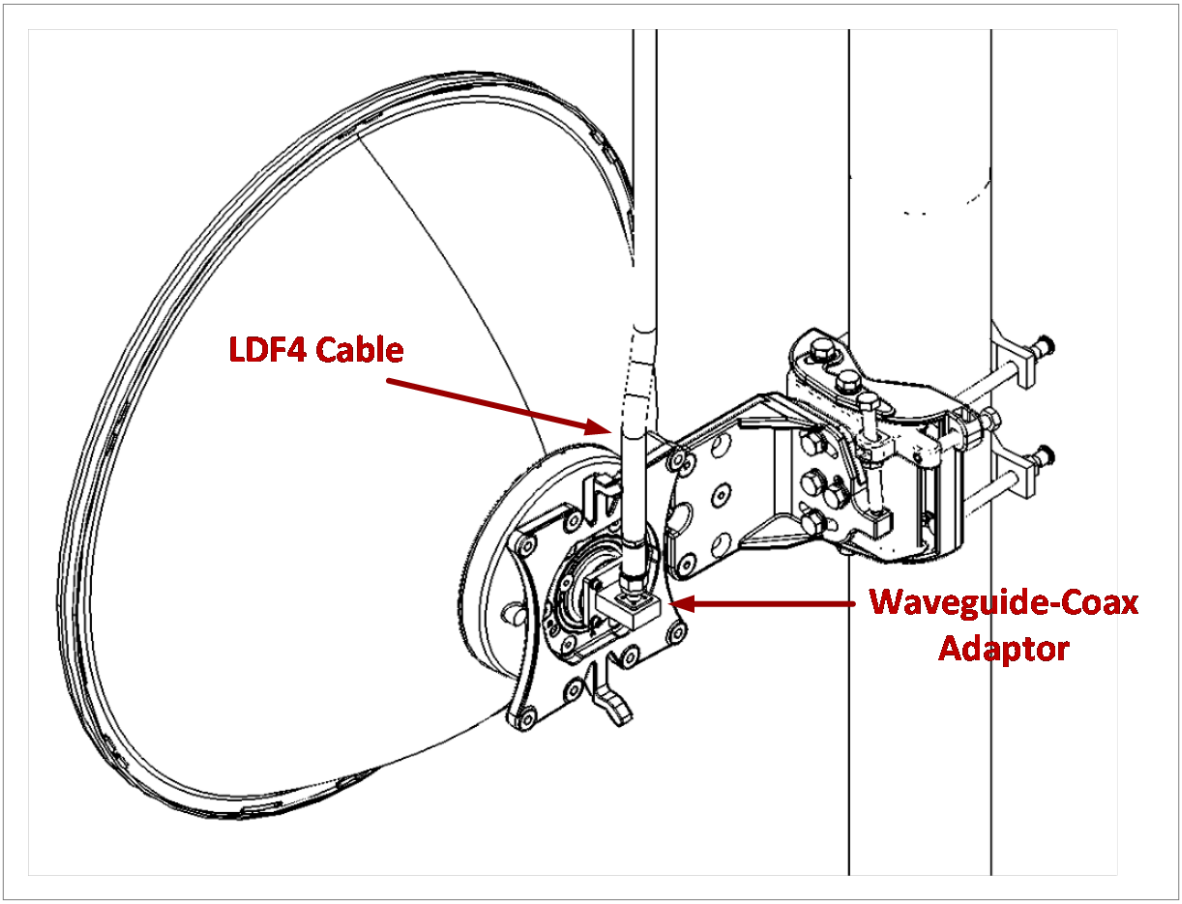
2. Connect the LDF4 Cable to the Waveguide-Coax Adaptor.



3. Connect a Waveguide-Coax Adaptor to the Diversity antenna.



4. Connect the LDF4 cable to the Waveguide-Coax adaptor mounted on the Diversity antenna.


LDF4 Cable
Waveguide-Coax
Adaptor

Installation Instructions for Configurations with Channel Filter-Based Branching

Channel filter-based branching configurations utilize the following components:

- OCU
- OCU Mounting Kit
- Short U-Bend
- Long-U-Bend
- Termination and Adaptor Plate
- Splitter/Coupler

This chapter is set up as follows:

- Channel Filter-Based Branching – Component Assembly – Explains how to assemble each individual component used in channel filter-based branching configurations.
- Channel Filter-Based Branching – Configurations – Explains how to assemble channel filter-based branching configurations, with references to the relevant component assembly instructions.

Channel Filter-Based Branching – Component Assembly

Assembling the OCU Mounting Kit

This section explains how to attach the OCU mounting kit for RFU-D-HP radio units to a 114 mm pole.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, FXDH-RM-MOUNT-kit
2	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, FXDH-RM-MOUNT-kit

Figure 51: *Branching Pole Profile*

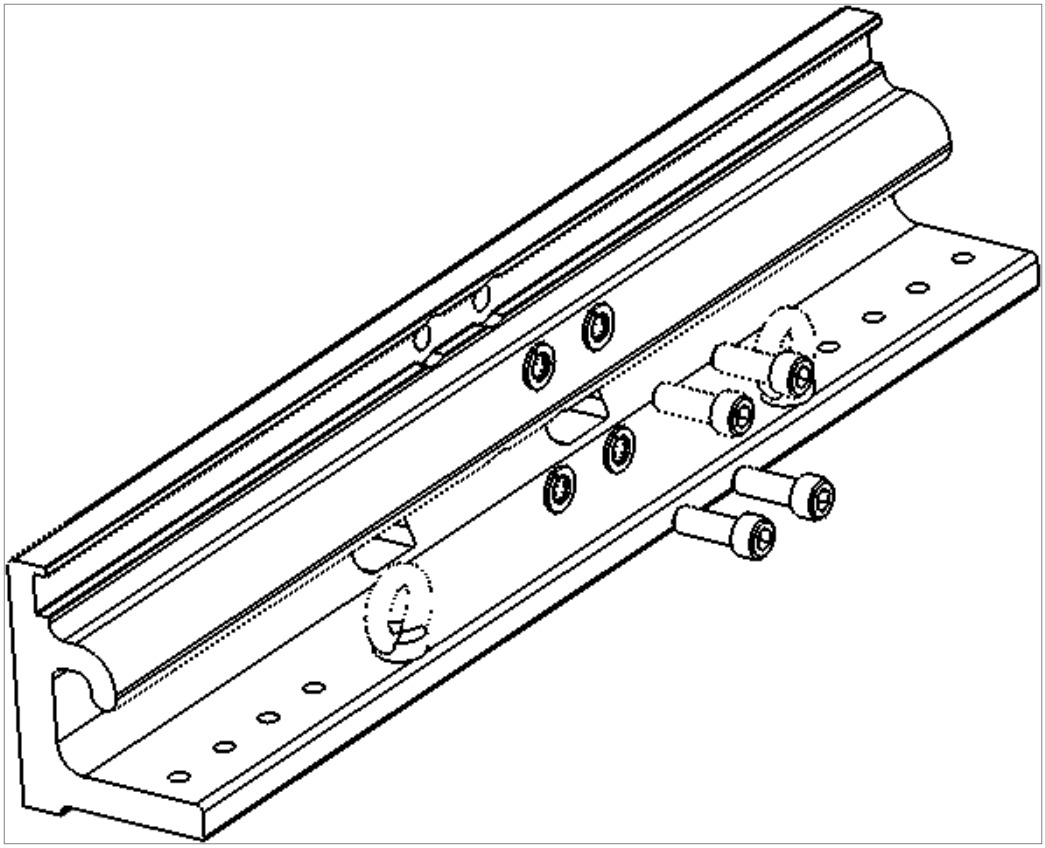
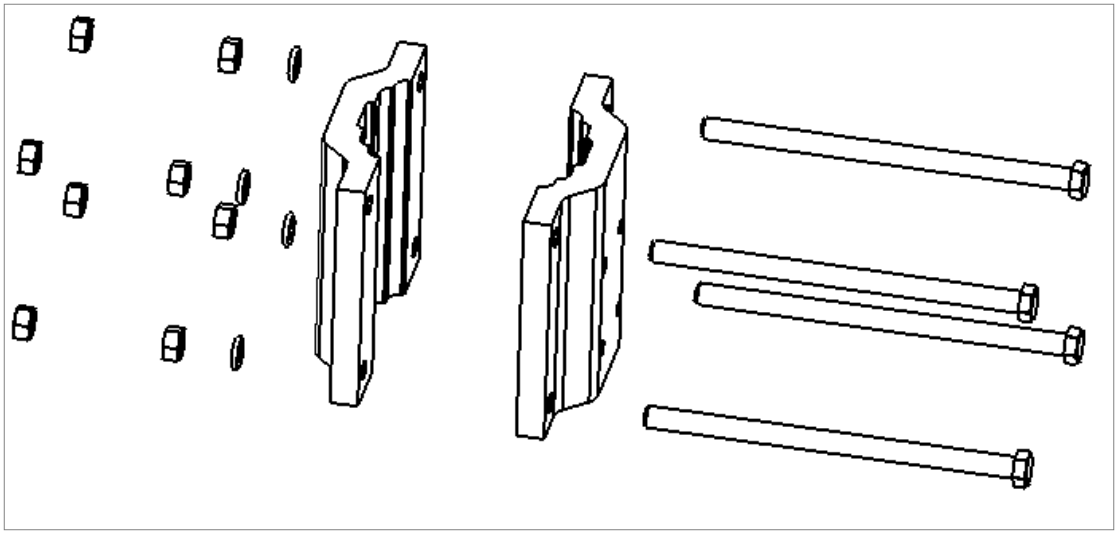


Figure 52: *Branching Pillars (with Screws, Nuts, and Washers)*

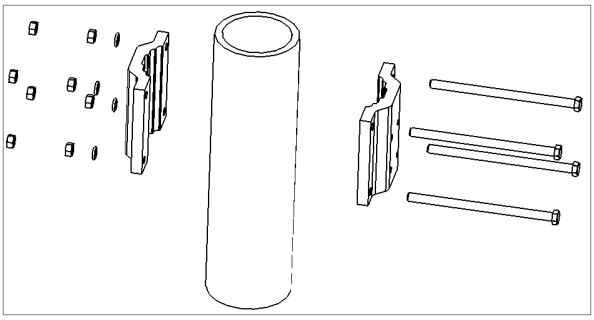


Required Tools

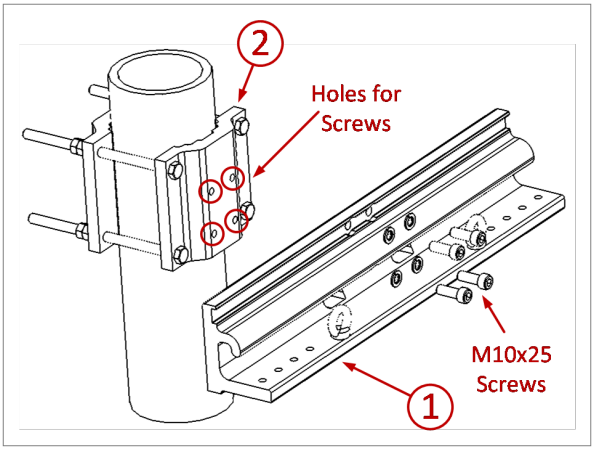
- Metric offset wrench key wrench set

Procedure

1. Mount and tighten the two Branching Pillars to a pole with a diameter of 114 mm using the four M10x150 screws, four washers, and eight nuts supplied with the OCU Mounting kit. Use torque of 45 Nm.



2. Mount and tighten the Branching Pole to one of the Branching Pillars using the four M10x25 screws supplied with the OCU Mounting kit. Use torque of 45 Nm.



Assembling the OCU

List of Items

Item	Description	Quantity	Marketing Model
	RFU-D-HP OCU Kit	1 per radio	See Section Marketing Models for OCU Unit
1	OCU Body	1 per OCU kit	Included in OCU kit
2	OCU Rail	1 per OCU kit	Included in OCU kit
3	RFU-D-HP Radio	2-4	RFU-D-HP-ff-abc
4	Screw Socket hex head SS DIN 912-M8x25-A2-70	4 per OCU kit	Included in OCU kit

Item	Description	Quantity	Marketing Model
5	Screw Socket hex head SS DIN 912-M8x30-A2-70	2 per OCU kit	Included in OCU kit
6	Washer, Plain, SS, DIN 125-A8.4-A2-70	6 per OCU kit	Included in OCU kit
7	Washer, Helical spring lock SS DIN 127-B8-A2-70	6 per OCU kit	Included in OCU kit
8	Branching Pole Profile	1	Part of OCU Mounting kit, FXDH-RM-MOUNT-kit

Figure 53: *OCU Kit (Body, Rail, and M8x25 Screws*

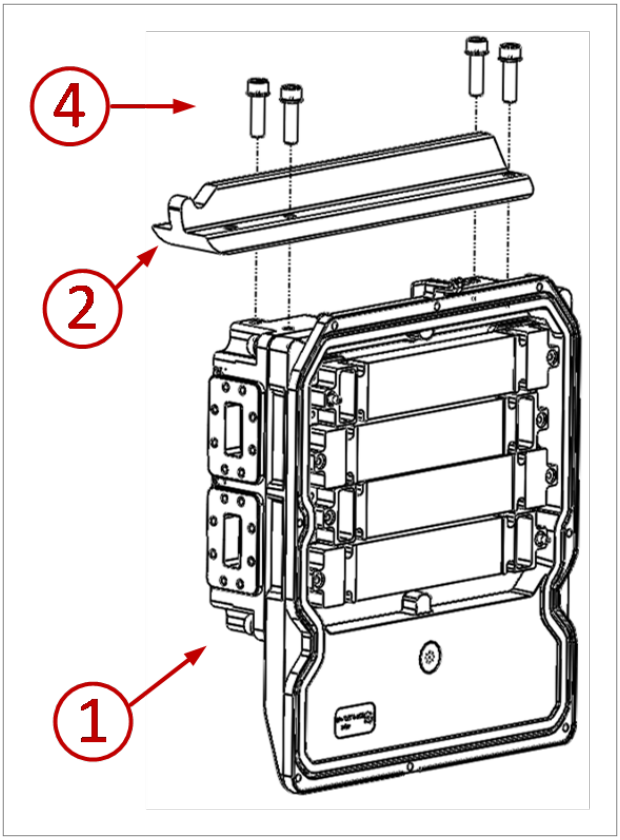


Figure 54: *RFU-D-HP Radio*

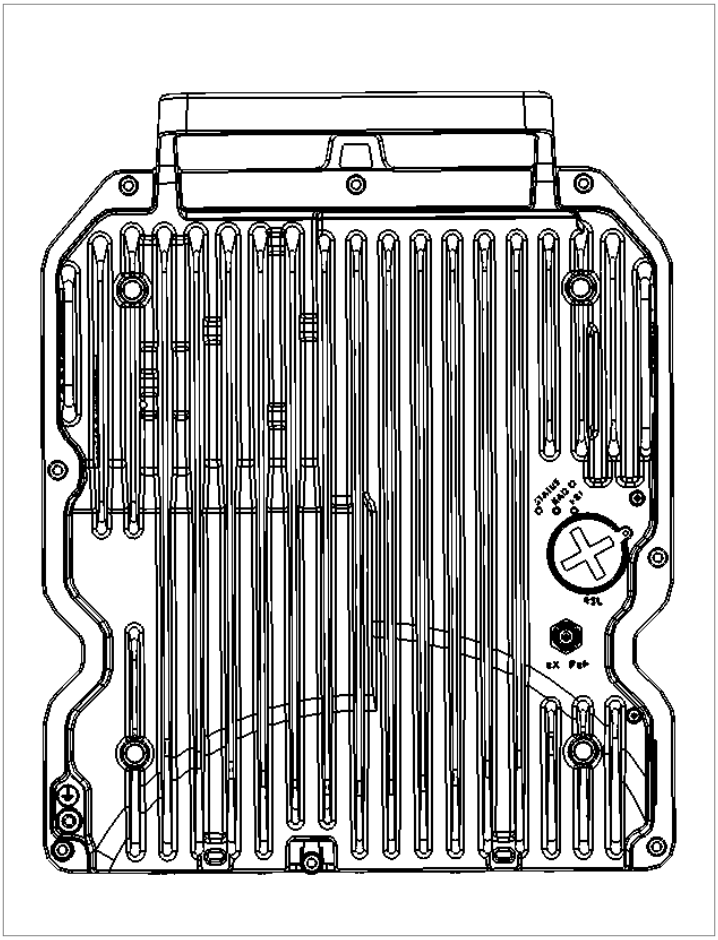


Figure 55: *M8x25 Screw*

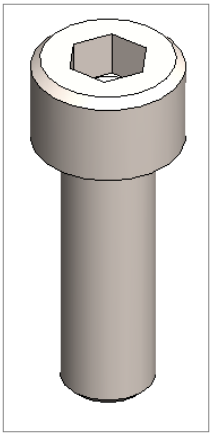


Figure 56: *M8x30 Screw*

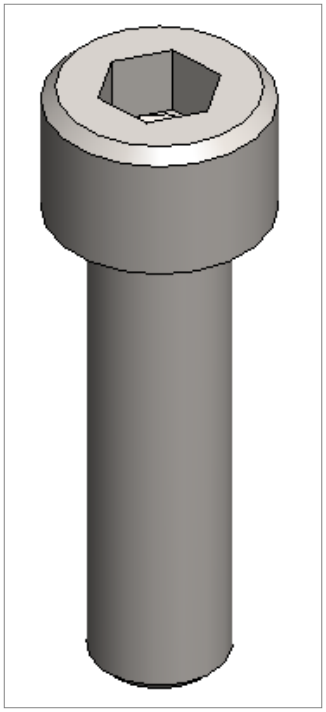


Figure 57: *Washers, Plain*

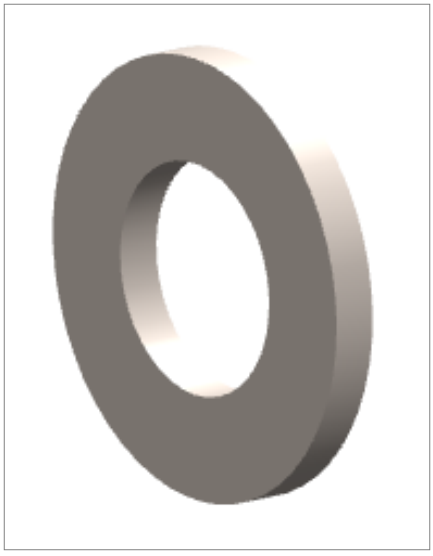
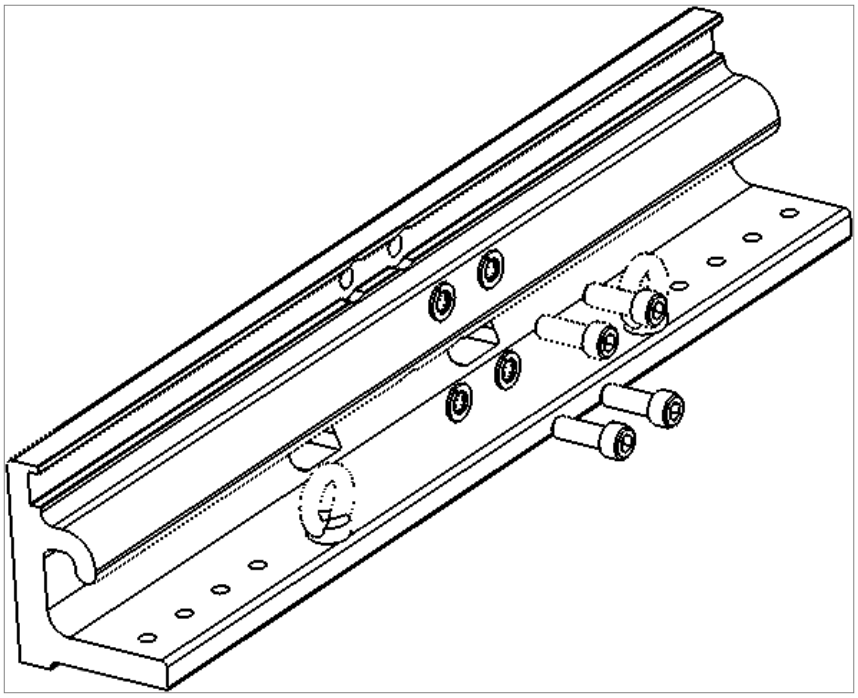


Figure 58: *Washers, Helical spring lock*

Figure 59: *Branching Pole Profile*



Required Tools

- Metric offset wrench key wrench set
- Metric Allen key set

Required Torque

- M5 screws (with radio) – 5.5 Nm
- M8 screws (with OCU) – 20 Nm

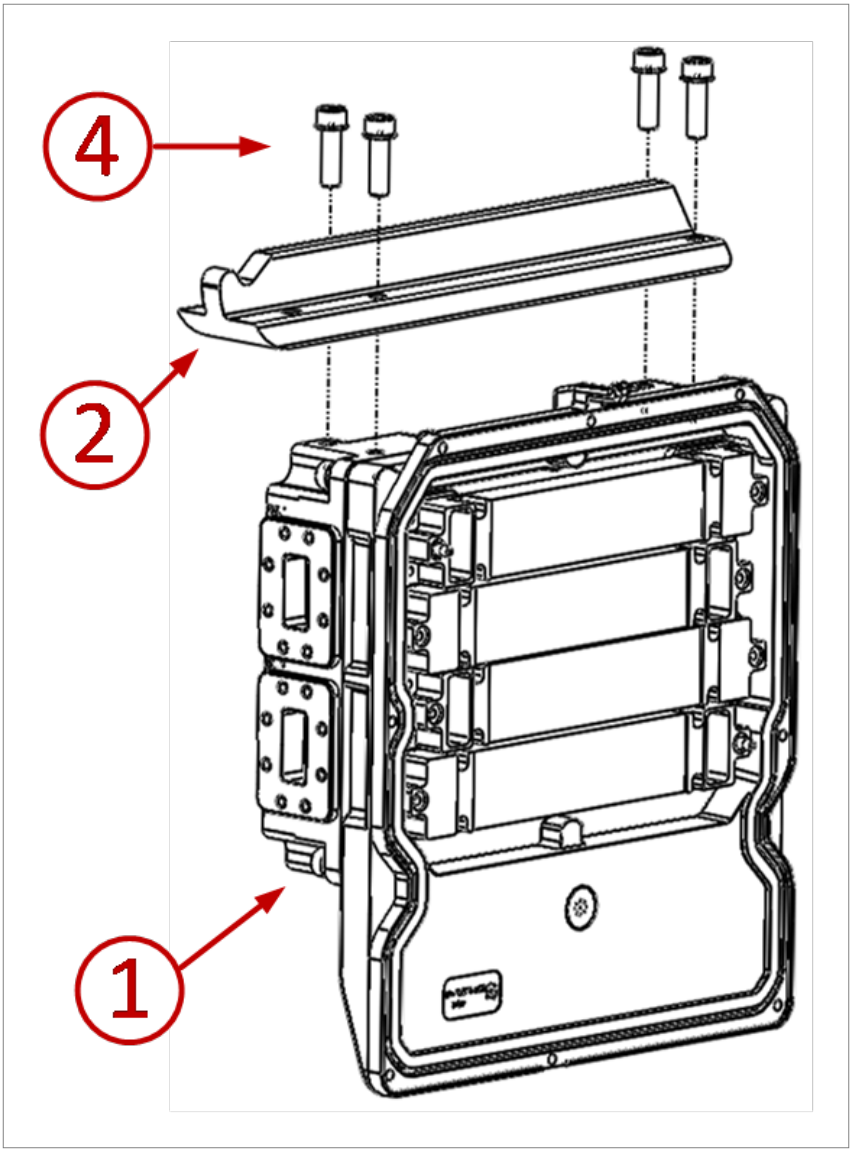
Configuration Options for OCU Kit Assembly

Attach the OCU rail to the OCU body, using the 4 M8 X 25 screws, helical washers, and flat washers, provided with the OCU kit.

The rail can be oriented in either of the two ways shown below:

- With the nose of the rail protruding to the left when facing the inside of the OCU Figure 60.

  Figure 60: *Left Rail Configuration*



- With the nose of the rail protruding to the right when facing the inside of the OCU as shown in Figure 61.

Figure 61: *Right Rail Configuration*

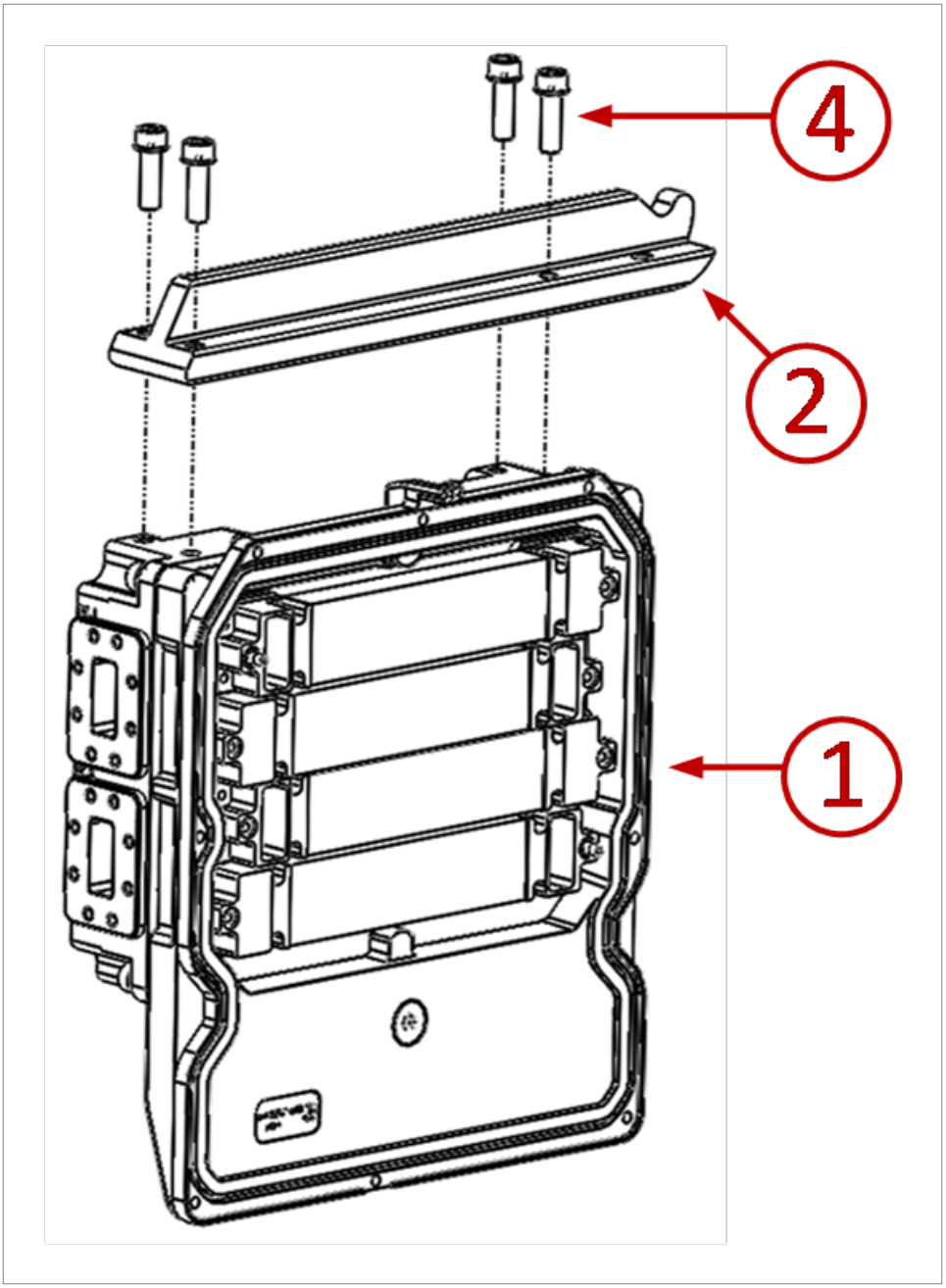
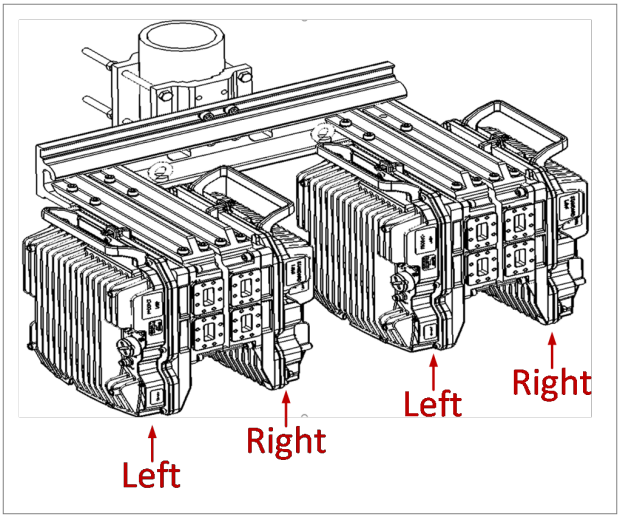


Figure 62 shows the Left Rail and Right Rail configurations in the context of a full configuration in which four radios and four OCUs are attached to the Branching Pole Profile.

Note:

The figure below is illustrative only. Do not mount the OCU to the Branching Pole Profile until the radio unit has been attached to the OCU, as described below.

Figure 62: *Left and Right Rail Configurations Together*



Connecting the OCU to the RFU-D-HP Radio

Attach the M5 captive screws on the radio to the OCU kit, as shown in Figure 63. Partially fasten the screws, without tightening them, in a diagonal fashion as shown in Figure 64. Once all the screws have been partially fastened, tighten all the screws in the same order, using 5.5 Nm torque.

Figure 63: *Attaching the Radio to the OCU*

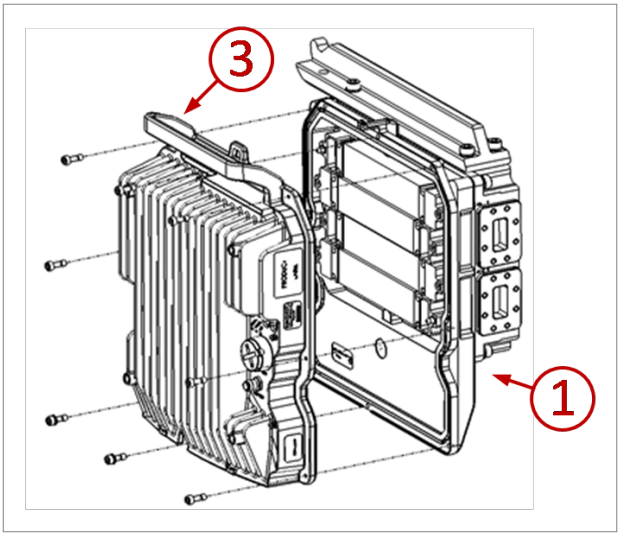
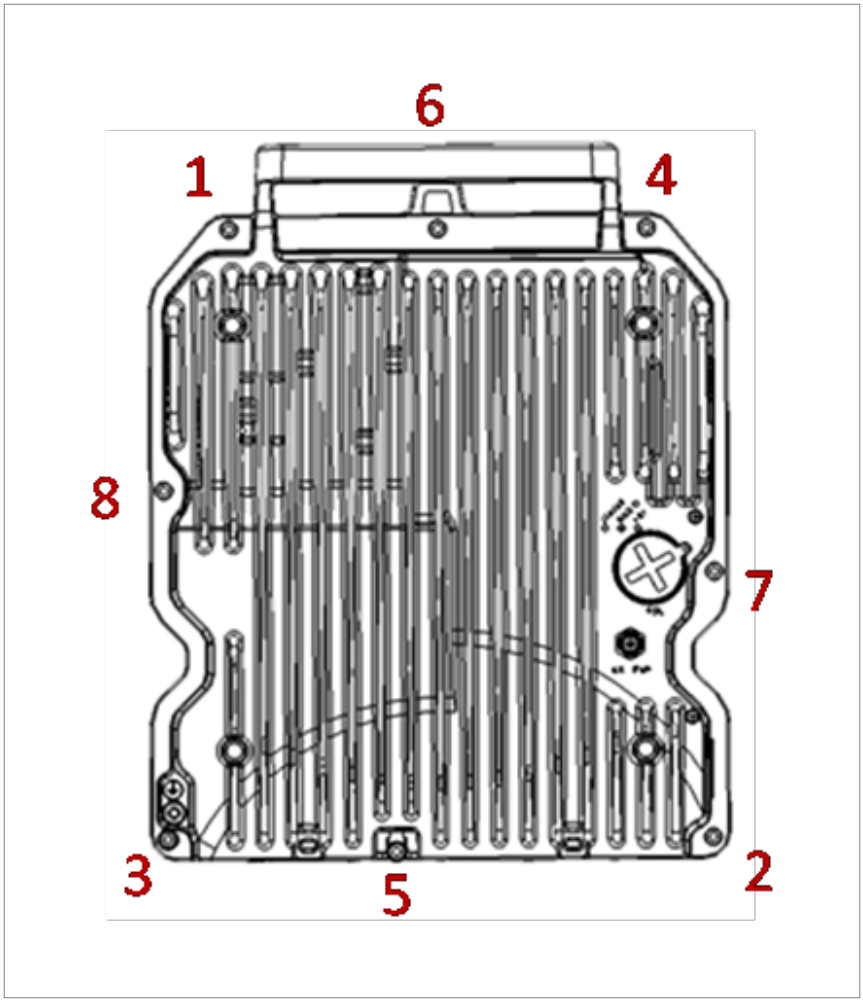


Figure 64: *Order of Fastening Screws*

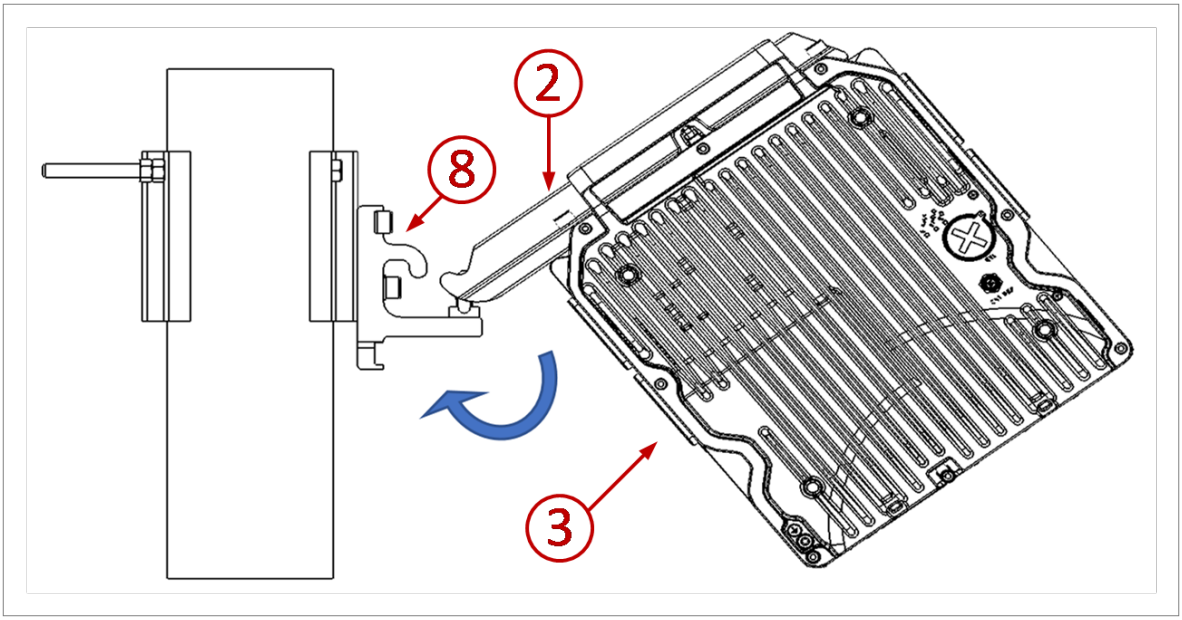


Connecting the Combined OCU and Radio to the Branching Pole Profile

Once the OCU and radio unit have been connected, mount the complete OCU-radio unit to the Branching Pole Profile, as shown in Figure 65 and Figure 66.

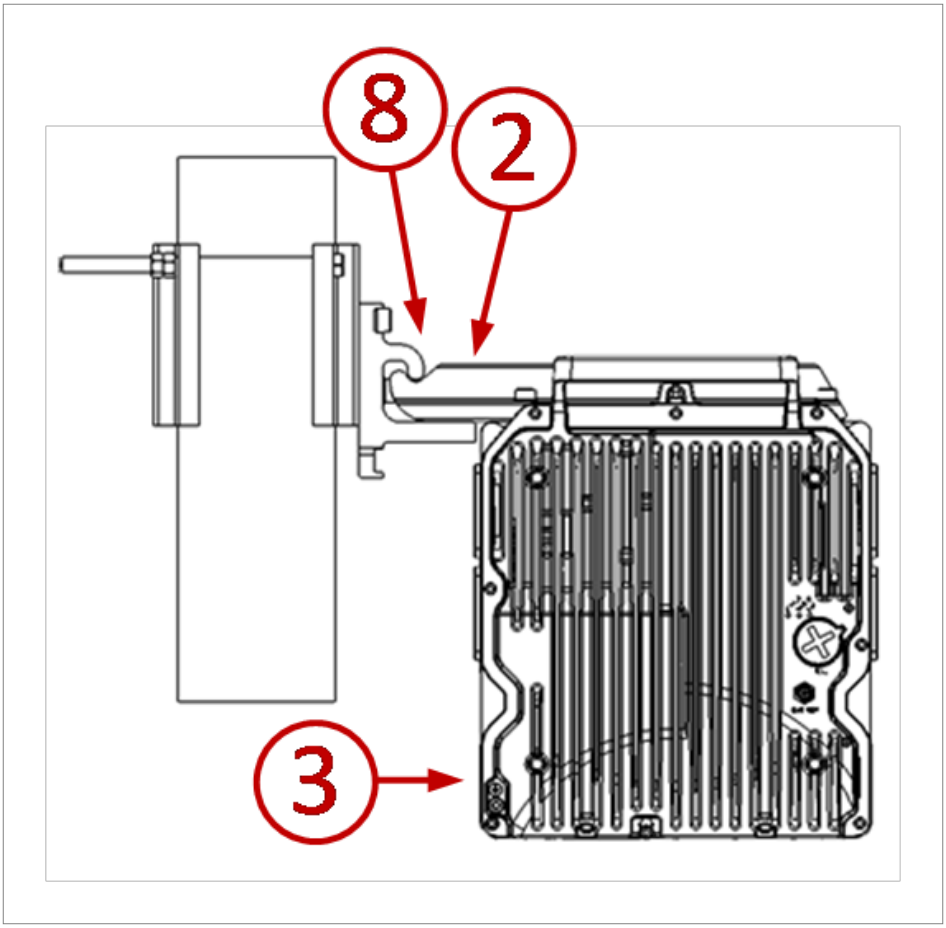
1. Angle the nose of the OCU Rail so as to hook underneath the nose of the Branching Pole Profile.

Figure 65: *Angling the OCU Rail Underneath the Nose of the Branching Pole Profile*



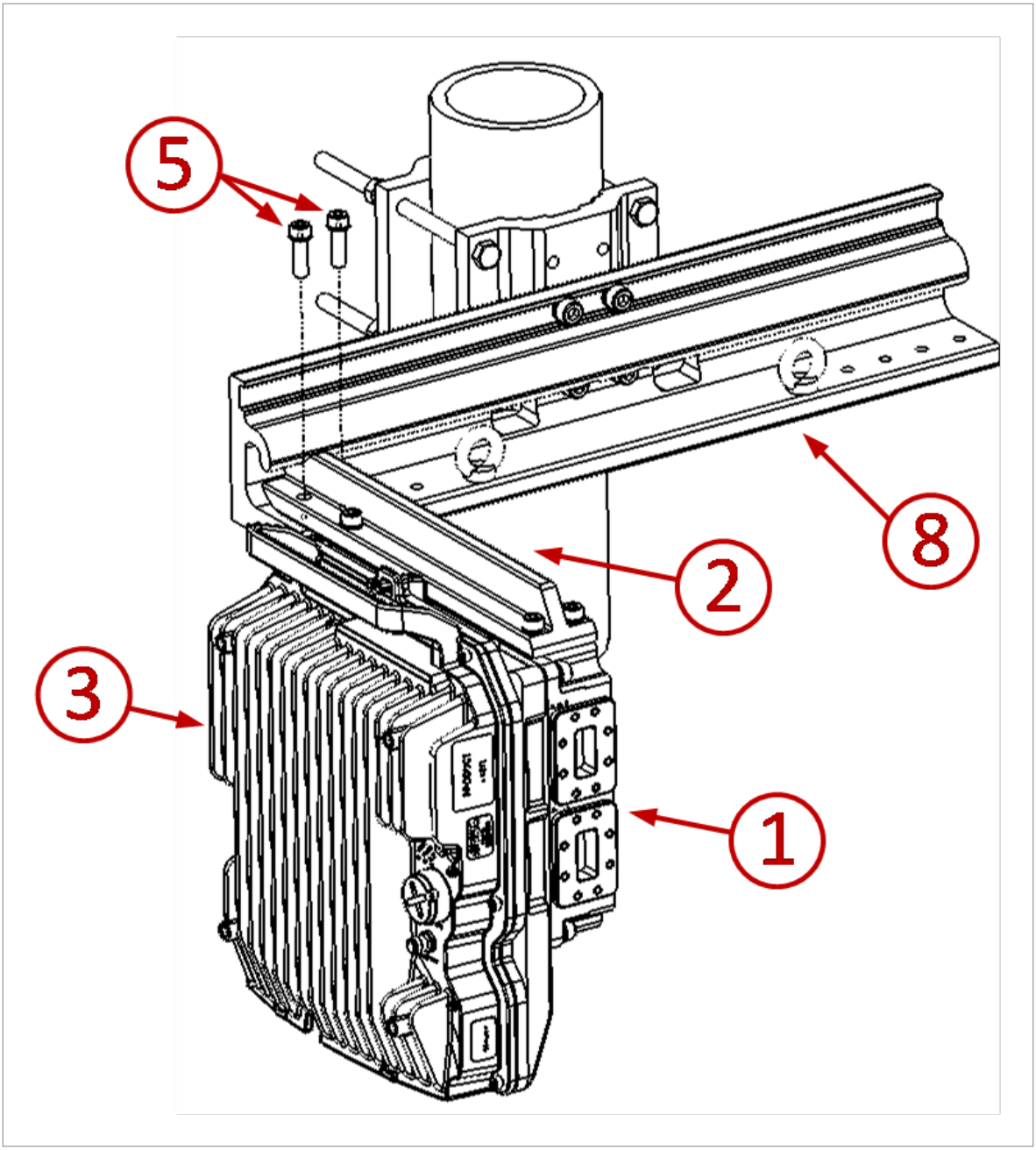
2. Level the OCU-radio unit so that the nose of the OCU Rail is locked underneath and inside of the nose of the Branching Pole Profile.

Figure 66: *Final Position of OCU-Radio Locked into Branching Pole Profile*



3. Partially attach the OCU-radio unit to the Branching Pole Profile with the two M8-30 screws included in the OCU kit, along with the remaining helical and flat washers, as shown in Figure 67. *It is very important that at this point in the procedure, you do not fully tighten the screws. The screws should only be fully tightened after all the U-Bends and (if necessary) Terminations have been attached!*

Figure 67: *Securing the OCU-Radio Unit to the Branching Pole Profile*



Waveguide Assemblies

At this point in the installation, you must install all required waveguide assemblies, such as U-Bends, Flexible Waveguides, and Terminations. For instructions, refer to the specific type of configuration you are installing in Section Channel Filter-Based Branching – Configurations.

Tightening the M8-30 Screws

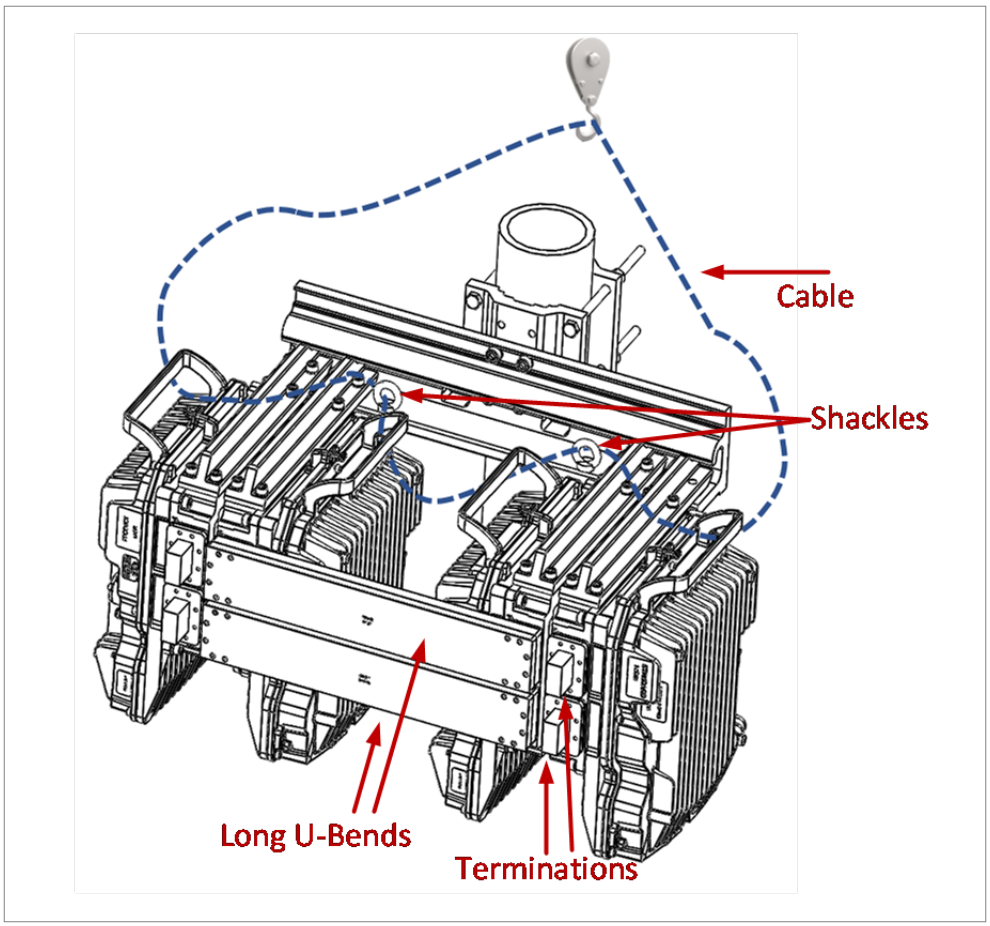
When you have finished installing all waveguides, and all of the radio ports have been covered, you must fully tighten the two M8-30 screws that attach the OCU-radio unit to the Branching Pole Profile as shown

above in Figure 67.

Cable and Shackle Assembly

Once all the screws have been fully fastened, the complete assembly is ready to be raised via a crane. Make sure to loop the cable through both shackles on the OCU Rail, as shown in . You must also loop the cable through all the RFU-D-HP radio handles in the configuration.

Figure 68: *Raising the Assembly Via Crane*



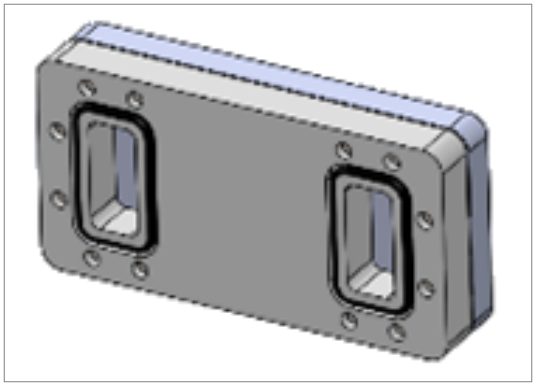
Assembling a Short U-Bend

This guide explains how to attach a Short U-Bend between the radio ports of two OCUs. Short U-Bends are used to connect the radio ports of adjacent OCUs on the side closest to the pole mount.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Branching Short U-Bend Kit	Depends on Configuration	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
2	#8-32 Socket Hex Screws	12 Per U-Bend	Embedded in U-Bend

Figure 69: *Short U-Bend*



Required Tools

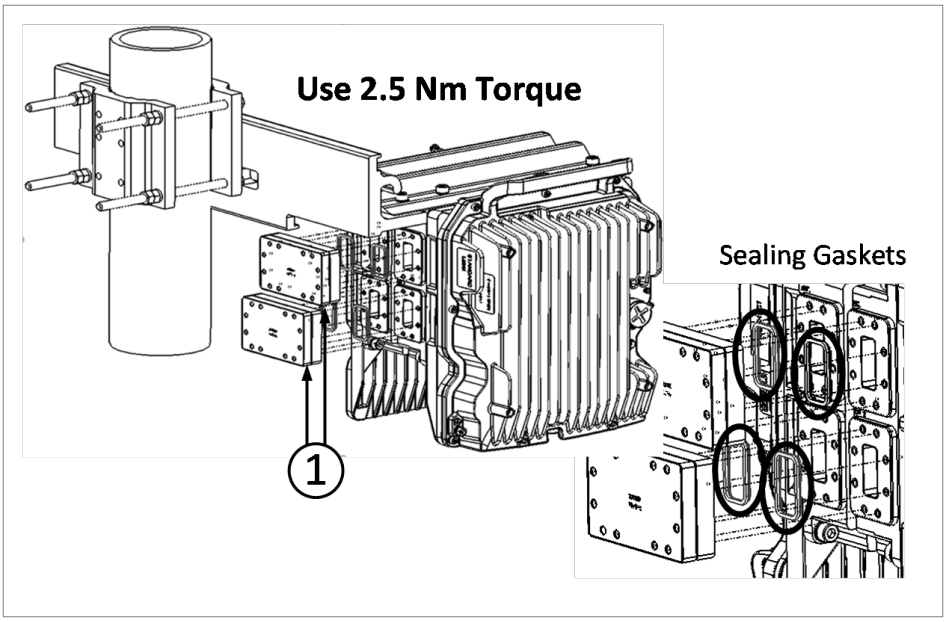
- Imperial Allen key set

Required Torque

- #8-32 socket hex screws (embedded in U-Bend) – 2.5 Nm

Procedure

1. Before attaching the U-Bend, make sure that the U-Bend is already fitted with bushings in both ports. The U-Bend should be supplied with bushings to seal the RF.
2. Short U-Bends are connected between adjacent radio ports on the side closest to the Pole Mount. Place the U-Bend so that the embedded #8-32 socket hex screws are in line with the radio ports of the OCUs, as shown in the figure below. Make sure the sealing gaskets supplied with the U-Bend are in place before mounting the U-Bends.



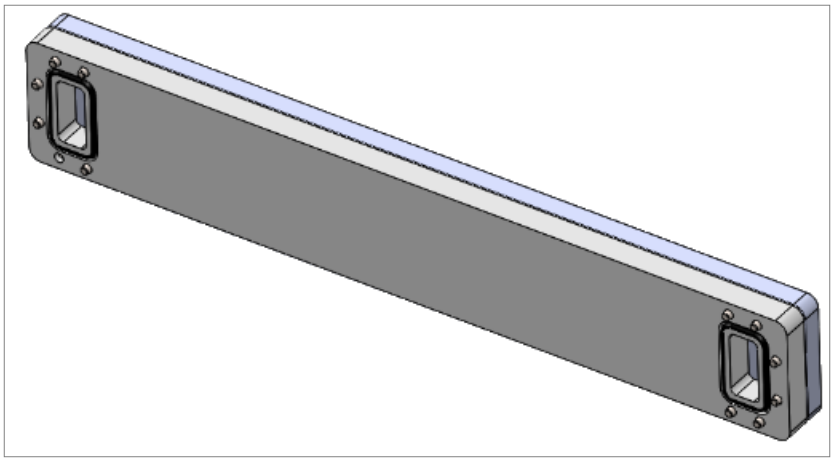
Assembling a Long U-Bend

Long U-Bends are used to connect the radio ports of adjacent OCUs on the far side from the pole mount.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Branching Long U-Bend Kit	Depends on Configuration	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
2	#8-32 Socket Hex Screws	12 Per U-Bend	Embedded in U-Bend

Long U-Bend



Required Tools

- Imperial Allen key set

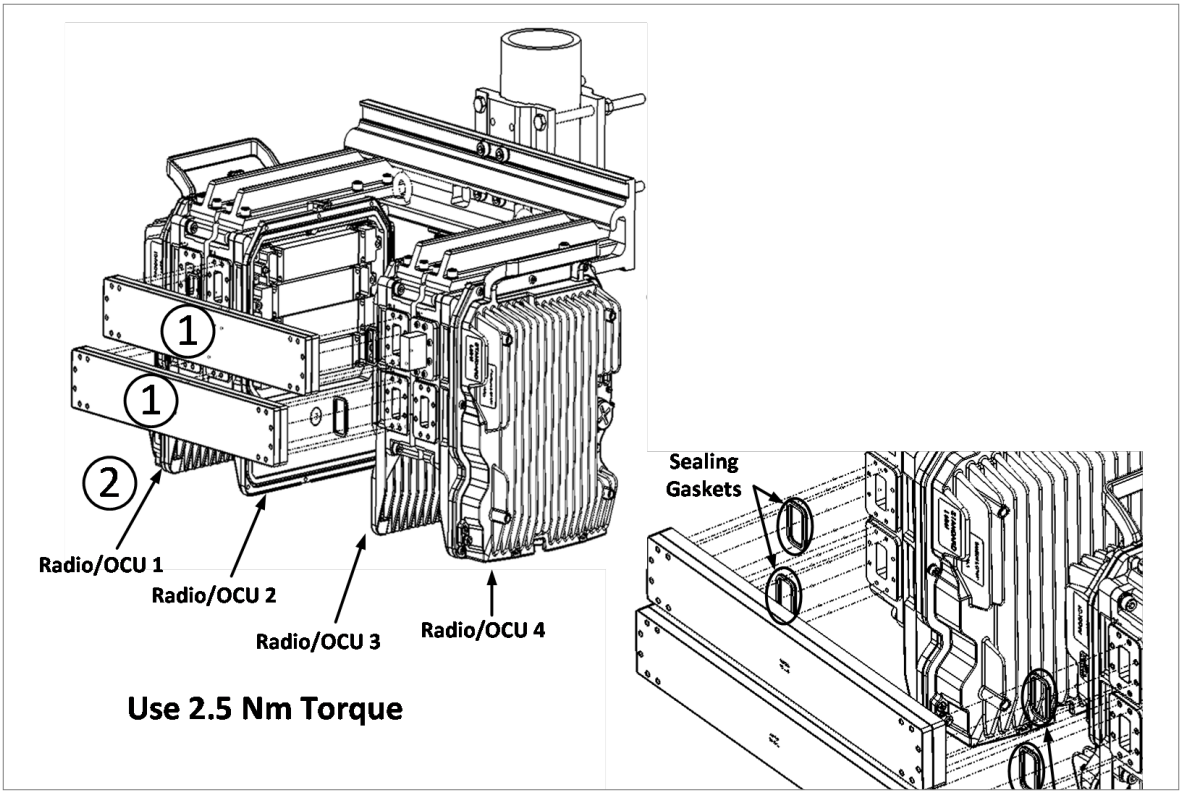
Required Torque

- #8-32 socket hex screws (embedded in U-Bend) – 2.5 Nm

Procedure

1. Before attaching the U-Bend, make sure that the U-Bend is already fitted with bushings in both ports. The U-Bend should be supplied with bushings to seal the RF.
2. Long U-Bends are connected between adjacent radio ports on opposite sides of the Branching Pole Profile. Place the U-Bend so that the embedded #8-32 socket hex screws are in line with the radio ports of the OCUs, as shown in the figure below. Make sure the sealing gaskets supplied with the U-

Bend are in place before mounting the U-Bends.



Assembling a Termination

All ports not otherwise covered or in use should be covered by a Termination. An Adaptor Plate must be inserted between the Termination and the OCU. This plate is used to improve the return loss of the Termination.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Termination Kit	Depends on Configuration	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
2	Adaptor Plate	1 per Termination	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
3	#8-32/#10-32 Socket Hex Screws	8 Per Termination Kit	Included in Termination Kit
4	Washer, Helical spring lock, SS, ANSI, #8/#10	8 Per Termination Kit	Included in Termination Kit

Item	Description	Quantity	Marketing Model
5	Washer, Plain, SS, DIN-125 A4/A5. 3-A2-70	8 Per Termination Kit	Included in Termination Kit
6	Sealing Gasket	1 Per Termination Kit	Included in Termination Kit

Note:

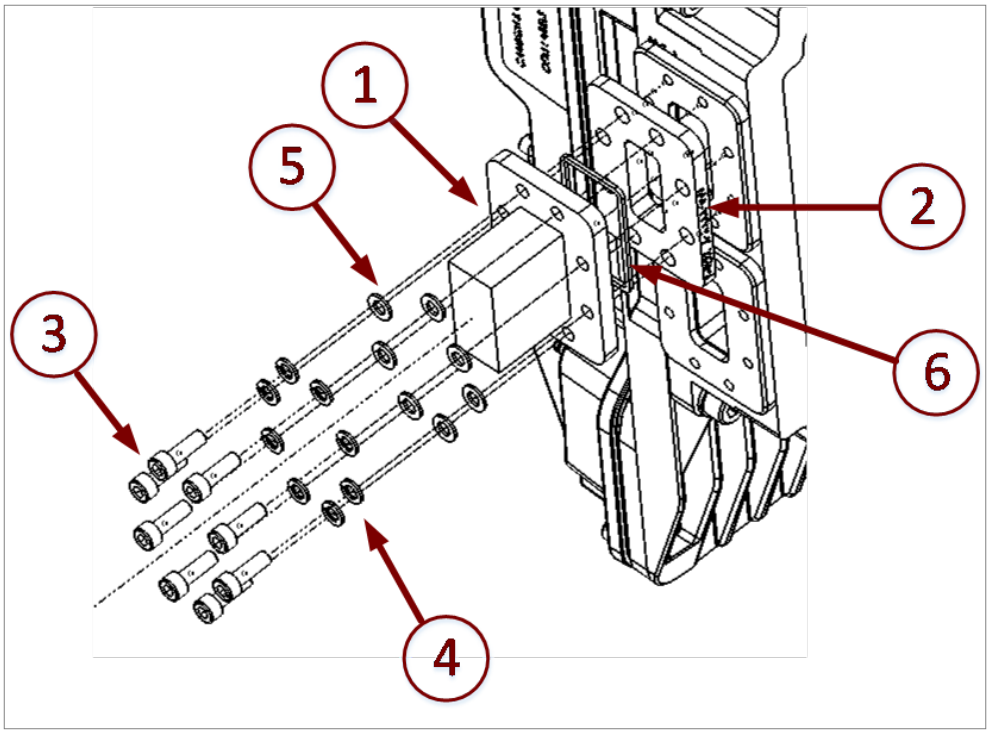
The numbering in the figure below refers to Imperial screws and washers. If necessary, a Metric screw and washer assembly package has also been provided (#6 above).

Required Tools

- Imperial Allen key set
- Metric Allen key set

Required Torque

- #8-32/M4 socket hex screws – 3 Nm
- #10-32/M5 socket hex screws – 5.4 Nm



Assembling a Splitter or Coupler for Filter-Based Branching

List of Items

Item	Description	Quantity	Marketing Model
1a	RFU-D-HP Splitter Kit	Depends on Configuration	FXDH-RM-MD-SPLTR-06 FXDH-RM-MD-SPLTR-7-8 FXDH-RM-MD-SPLTR-11
1b	RFU-D-HP Coupler Kit	Depends on Configuration	FXDH-RM-MD-CPLR-06 FXDH-RM-MD-CPLR-7-8 FXDH-RM-MD-CPLR-11
2	6 GHz: #10-32 Screws 7-11 GHz #8-32 Screws	8 Per Kit	Included in Splitter/Coupler Kit
3	6 GHz: Washer, Helical spring lock, SS, ANSI, #10 7-11GHz: Washer, Helical spring lock,SS,ANSI,#8	8 Per Kit	Included in Splitter/Coupler Kit
4	6GHz: Washer, Plain, SS, DIN 125-A5.3-A2-70 7-11GHz: Washer, Plain, SS DIN 125-A4.3-A2-70	8 Per Kit	Included in Splitter/Coupler Kit
5	Sealing Gasket	1 Per Kit	Included in Splitter/Coupler Kit

Required Tools

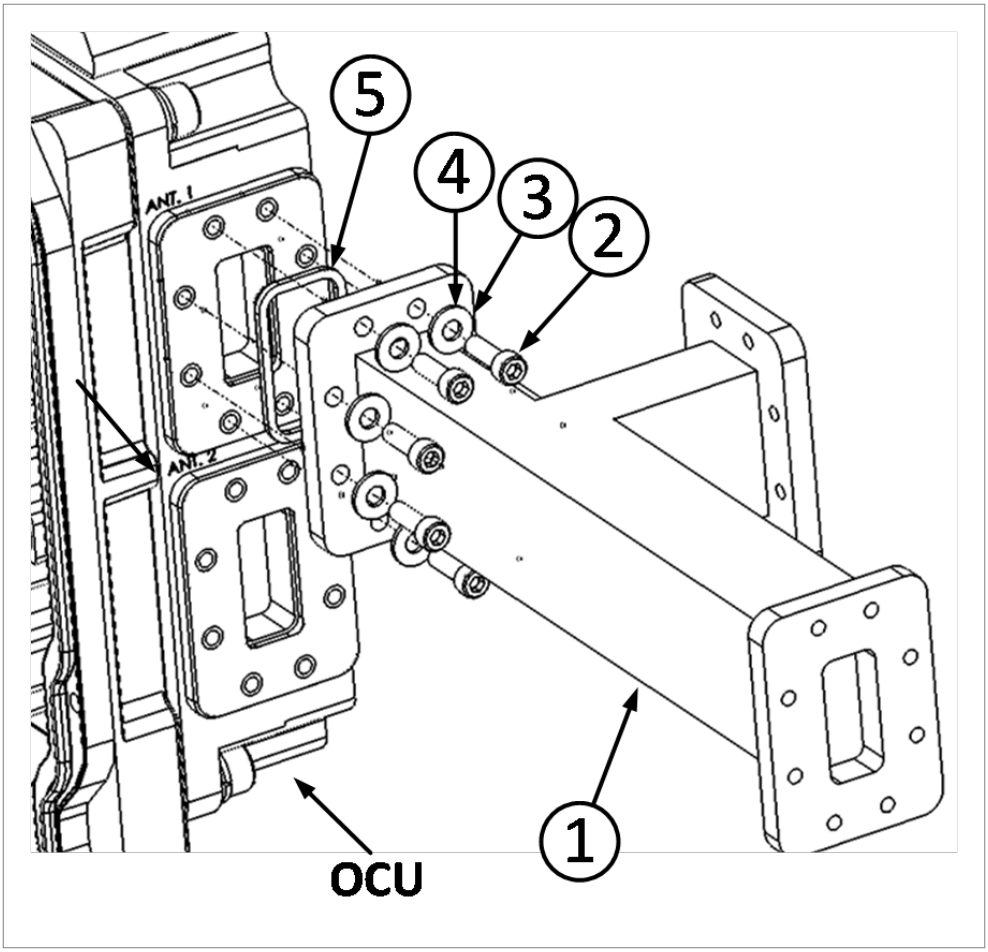
- Imperial Allen key set

Required Torque

- #8-32 socket hex screws – 2 Nm
- #10-32 socket hex screws – 3.2 Nm

Procedure

A Remote Mount Splitter or Remote Mount Coupler is attached to the OCU using the 8 screws, helical spring washers, and plain washers provided with the Coupler or Splitter kit, as shown in the figure below. The other interfaces can be connected to the antenna or flexible waveguide, depending on the configuration.



Attaching the OMT Kit to the Antenna

Note:

The OMT kit is only required if using a Cambium Direct Mount antenna for a remote mount configuration.

For antennas with standard waveguide interfaces, the OMT kit should not be used.

List of Items

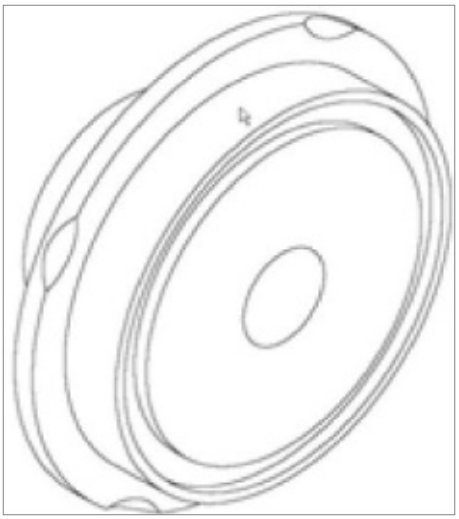
Item	Description	Quantity	Marketing Model
1	RFU-D-HP OMT Kit	1	DXDH-MD-OMT-ff
2	RFU-D-HP OMT Plate Adaptor	1	DXDH-MD-PLATE-ADAPT-ff

Required Tools

- Metric offset hexagon key set
- Metric wrench key set

Procedure

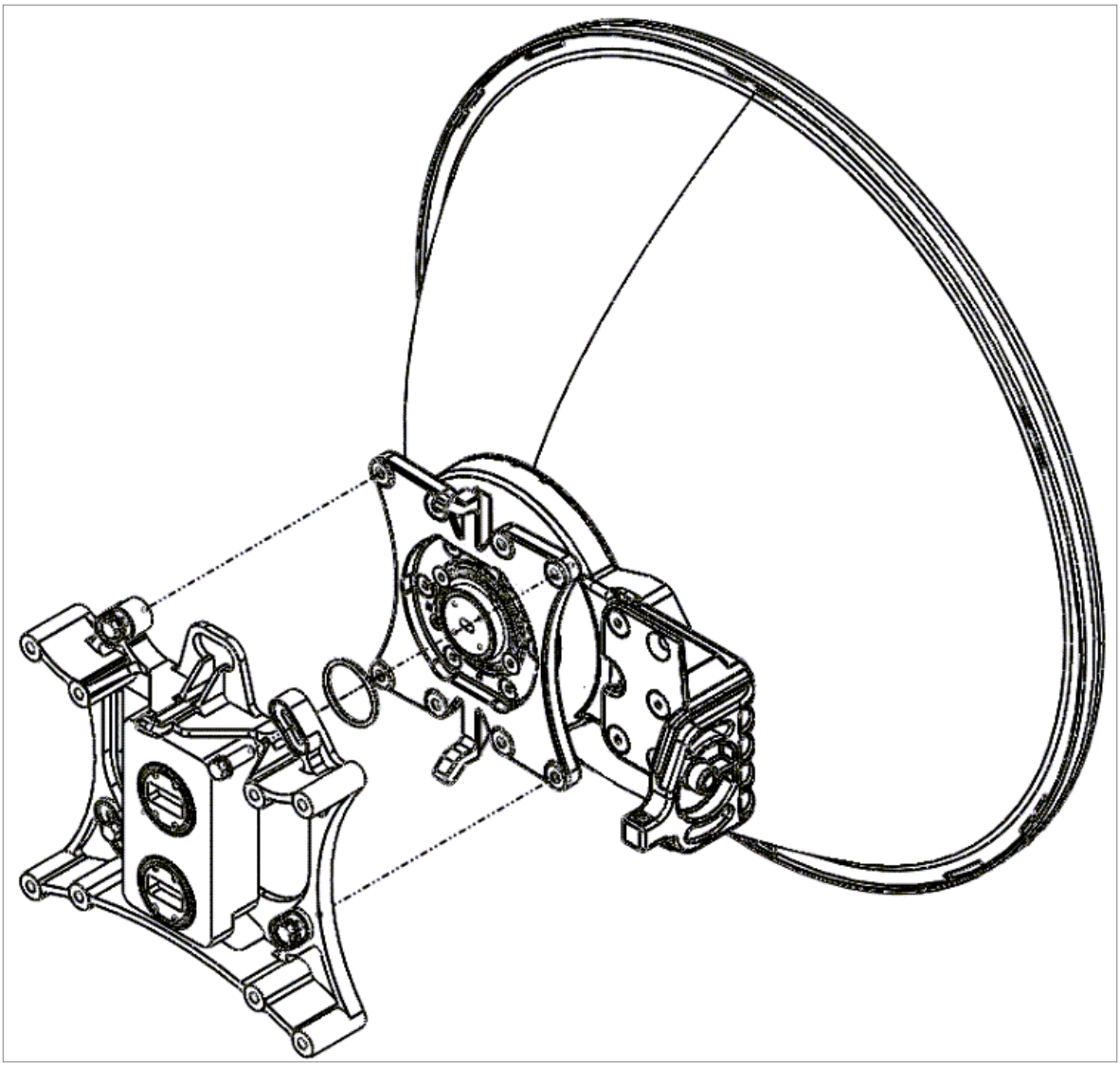
1. Prior to the installation, follow the antenna manufacturer's instructions for using the circular transition (adaptor). Remove the existing rectangular transition, swap the O-ring, and install the circular transition instead.



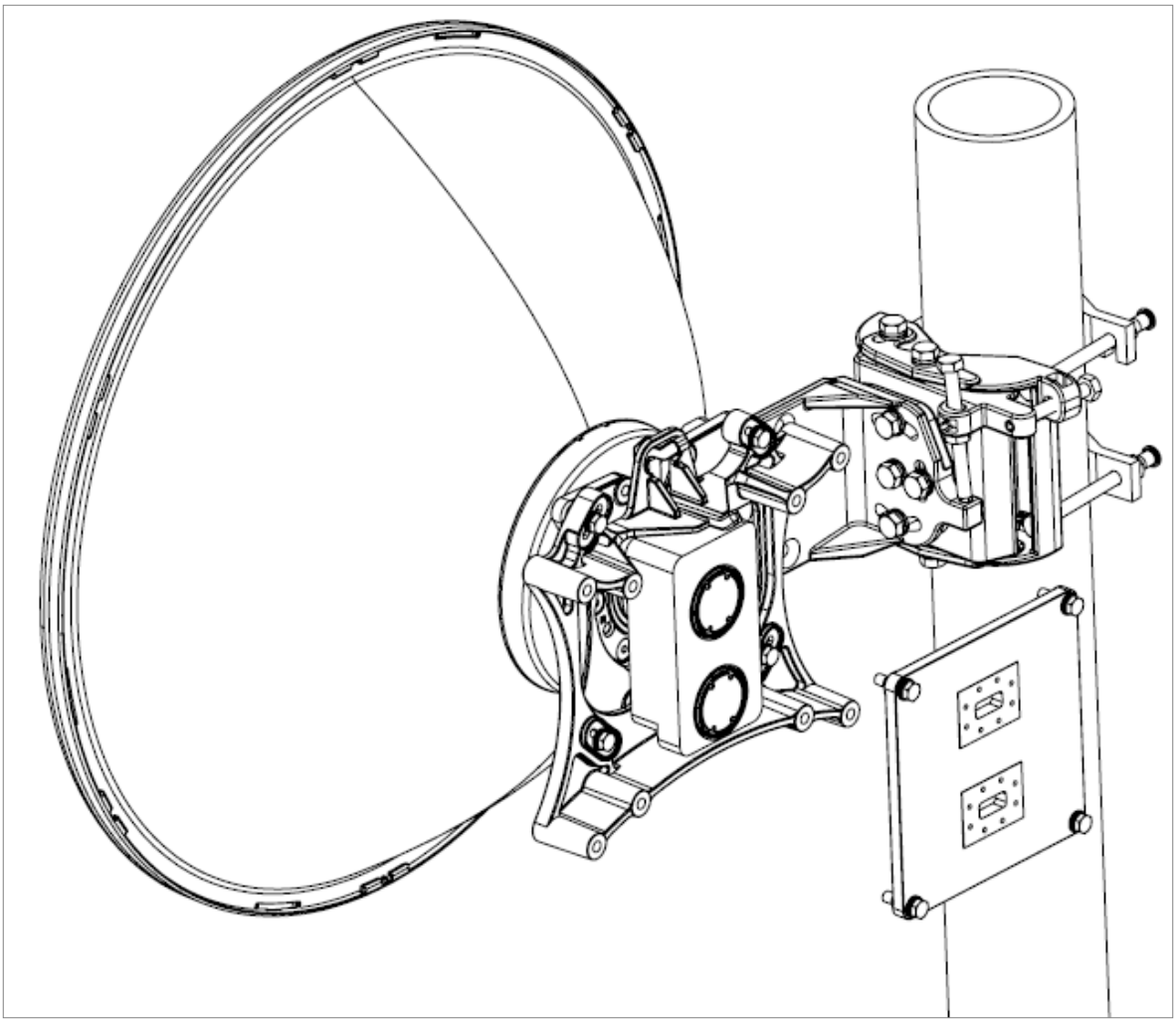
2. Connect the OMT kit to the antenna and secure it with four screws.

Note:

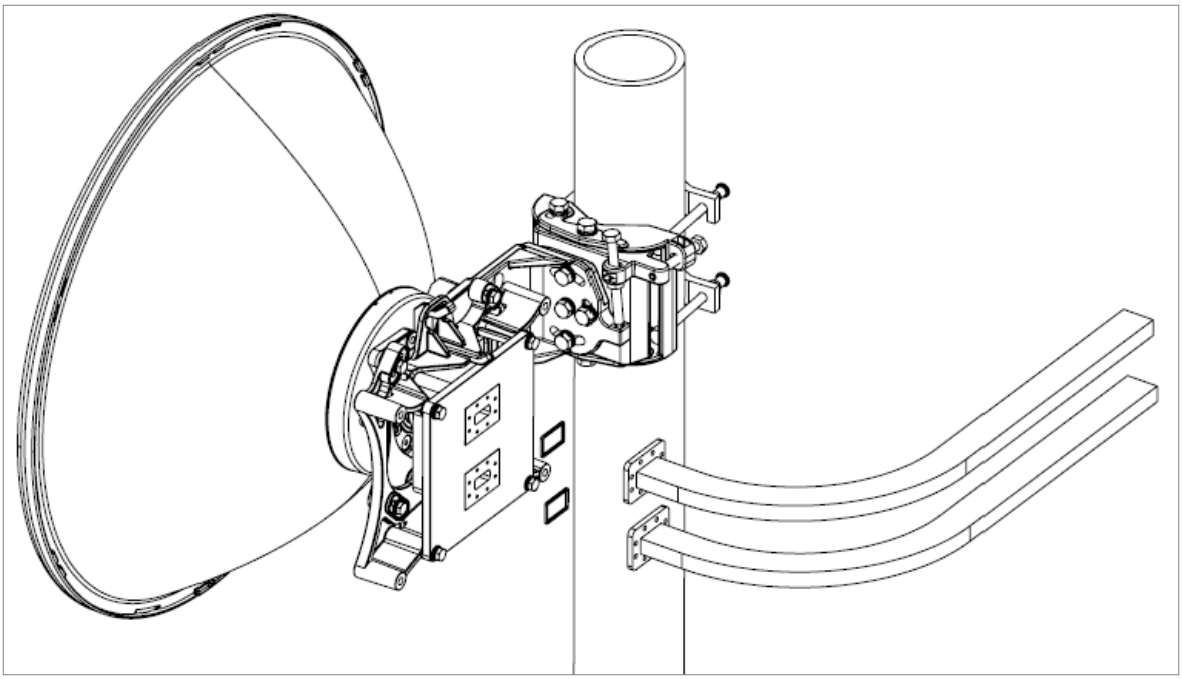
Verify that the O-ring is properly mounted between the antenna transition and the OMT.



3. Mount and tighten the OMT Plate Adaptor to the RFU-D-HP OMT ports using the screws supplied with the adapter kit.



4. Mount and tighten the O-ring and the flexible waveguide to the antenna's waveguide adaptor (or OMT adaptor) using the screws supplied with the flexible waveguide kit.



Note:

Verify that the O-rings are correctly mounted between the antenna ports and each flexible waveguide.

Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching

Optionally for Internal Space Diversity configurations, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU to the diversity antenna.

List of Items

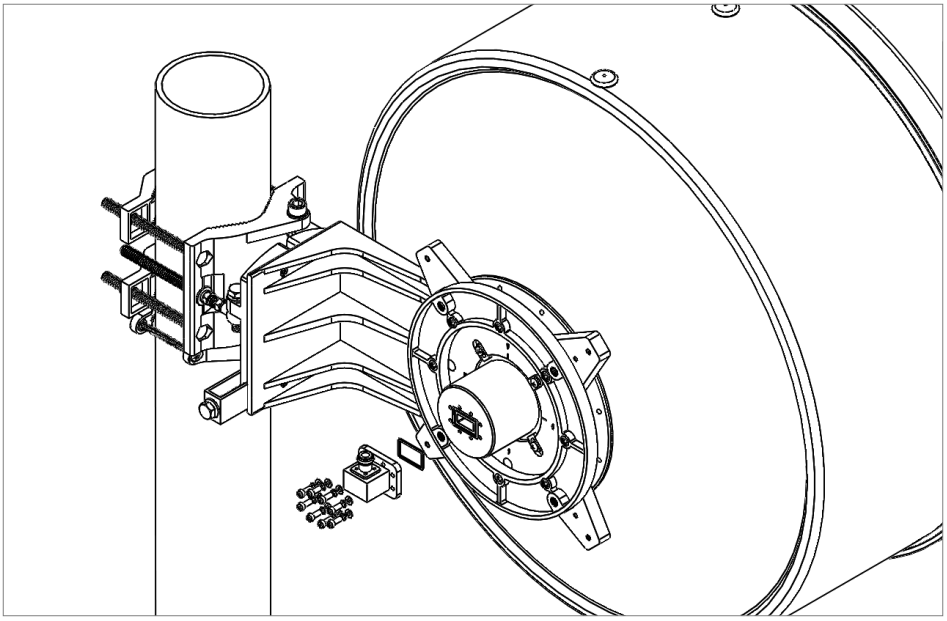
Item	Description	Quantity	Marketing Model
1	LDF4 Cable	1	LDF4-JA-15M/ LDF
2	Waveguide-Coax Adaptor	2	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations

Required Tools

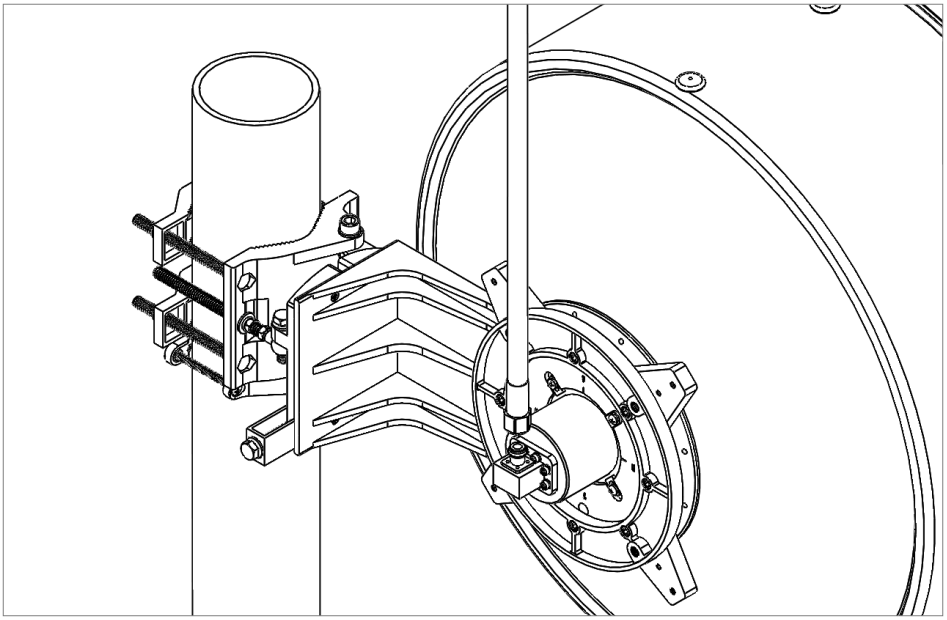
- Metric offset hexagon key set
- Metric wrench key set

Procedure

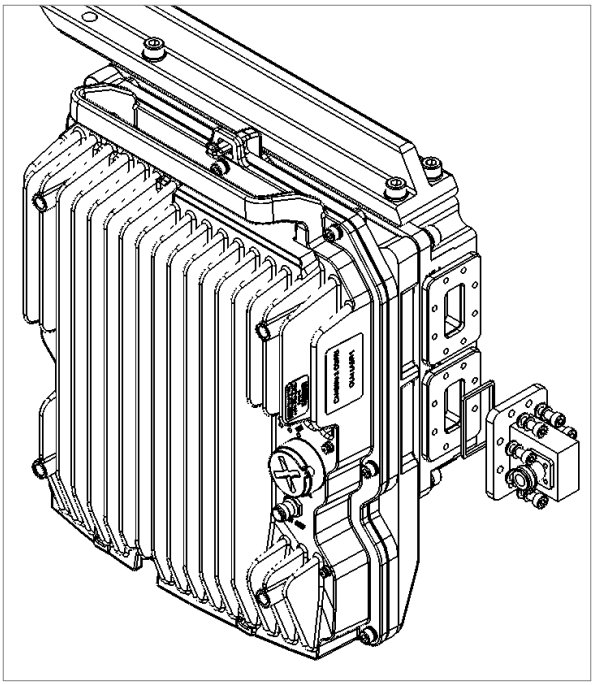
1. Connect a Waveguide-Coax Adaptor to the Diversity antenna.



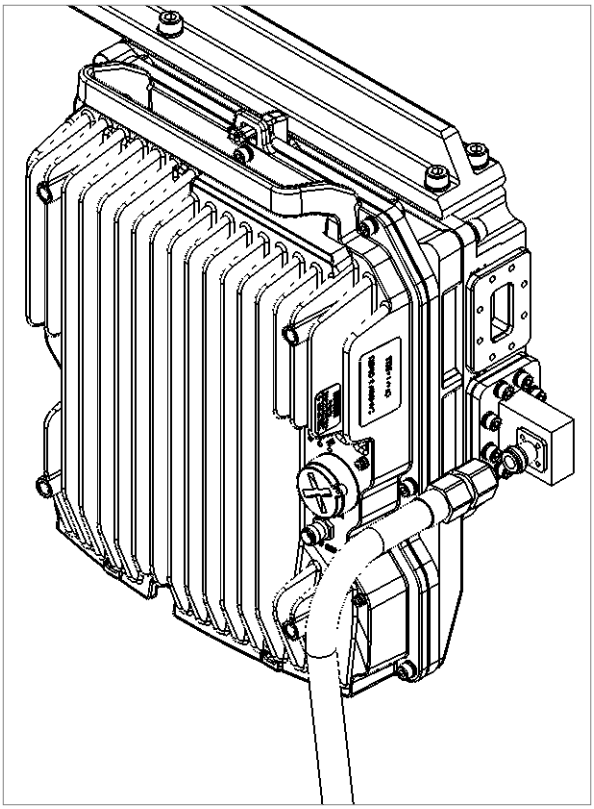
2. Connect the LDF4 cable to the Waveguide-Coax adaptor mounted on the Diversity antenna.



3. Connect a Waveguide-Coax adaptor to the antenna port of the OCU.



4. Connect the other end of the LDF4 cable to the Waveguide-Coax adaptor attached to the antenna port of the OCU.



Channel Filter-Based Branching – Configurations

2+0 Dual Polarization and 1+0 Space Diversity (Internal)

Note:

For 1+0 Space Diversity (Internal) configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

2+0 Dual Polarization configurations require a dual-transmitter hardware model.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	1	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	2	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	2	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	Flexible Waveguide Kit	1 2	For 2+0 Dual Polarization and 1+0 SD, when using the SD Kit For 1+0 SD when using flexible waveguide for the SD connection

Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble the OCU, attach the RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. Use a Left Rail Configuration to assemble the OCU. See Section Assembling the OCU.
3. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each radio port. See Section Assembling a Termination.
4. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT kit to the antenna. See Section Attaching the OMT Kit to the Antenna.

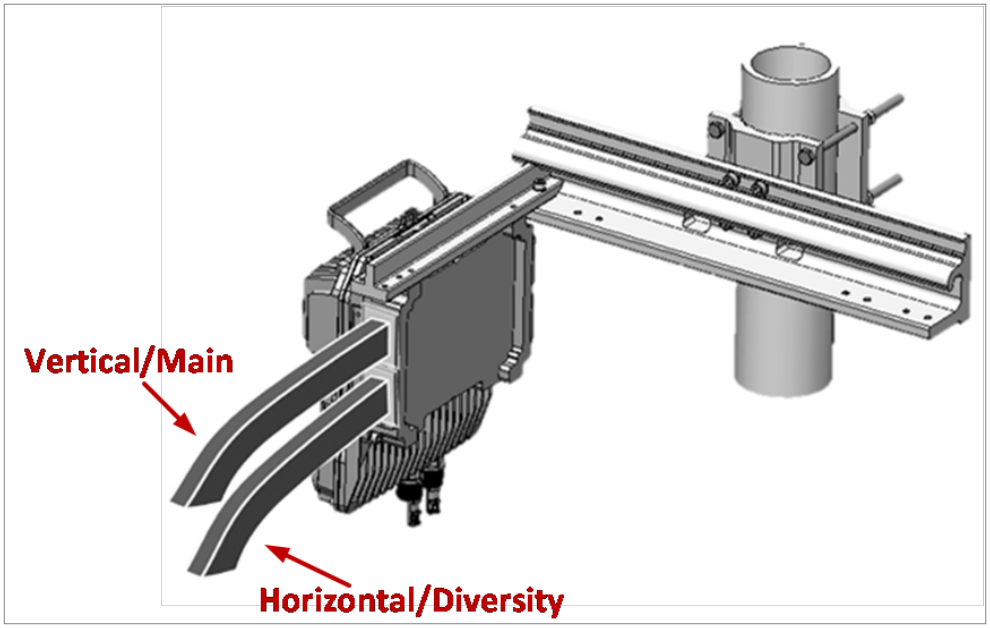
Note:

For antennas with a standard interface, the OMT kit should not be used.

5. On the side of the OCU facing away from the pole, connect the flexible waveguides between the radio ports and the antenna's waveguide adaptor (or OMT).

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



2+0 Single Polarization

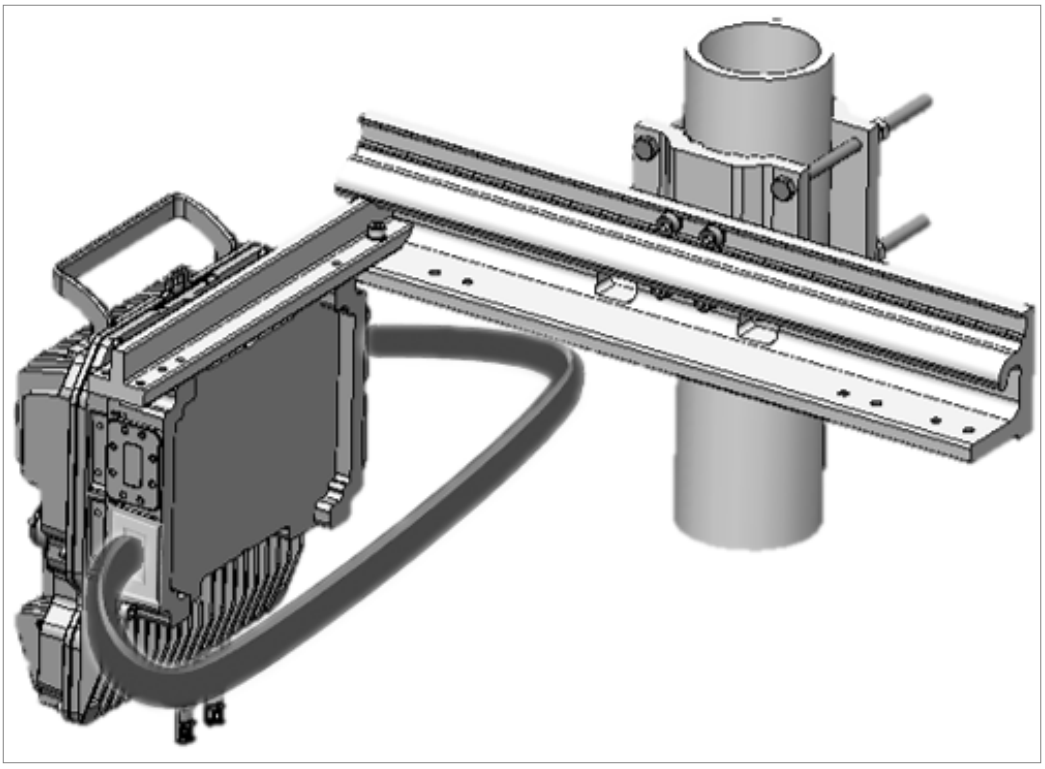
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	1	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	1	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	1	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	1	FXDH-AI-V-WG-ADPT-06

Item	Description	Quantity	Marketing Model
			FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	Flexible Waveguides	2	

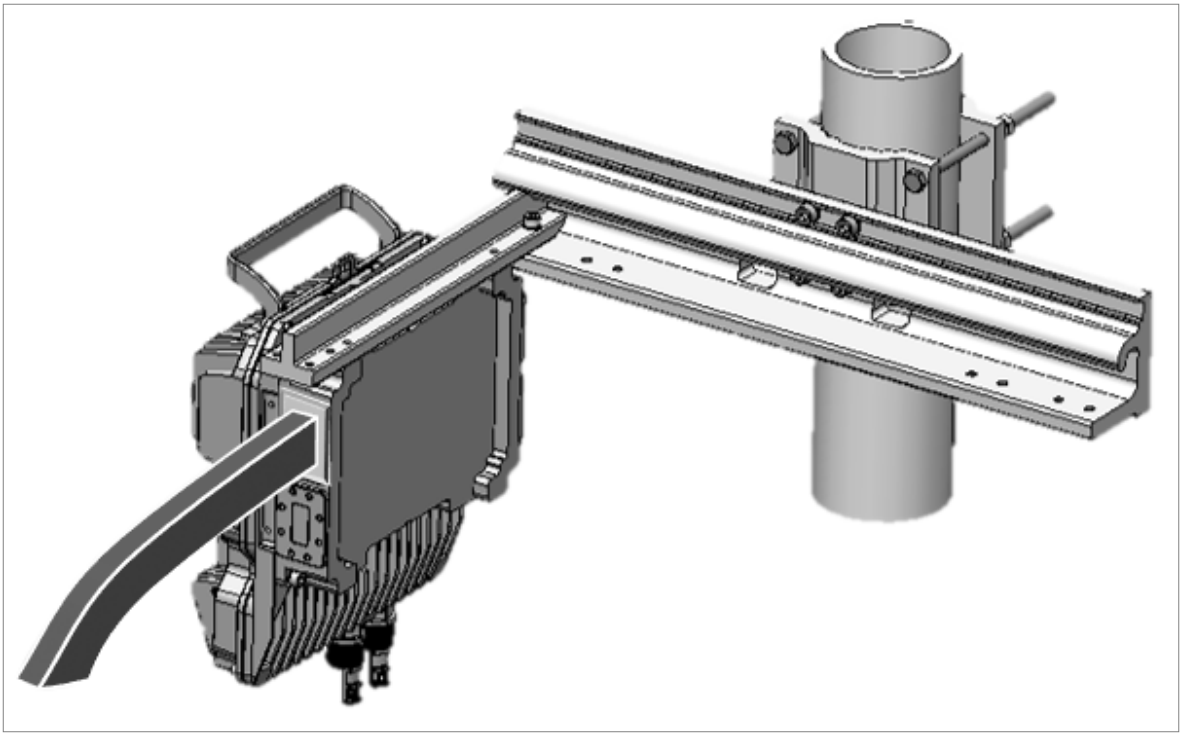
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble the OCU, attach the RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. Use a Left Rail Configuration to assemble the OCU. See Section Assembling the OCU.
3. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to the lower radio port. See Section Assembling a Termination.
4. Connect a flexible waveguide from the lower radio port (ANT 2) of the OCU on the side facing away from the pole to the upper radio port (EXT 1) of the OCU on the side facing towards the pole.



5. Connect a flexible waveguide from the upper radio port of the OCU (ANT 1) on the side facing away

from the pole to the antenna.



4+0 Single Polarization

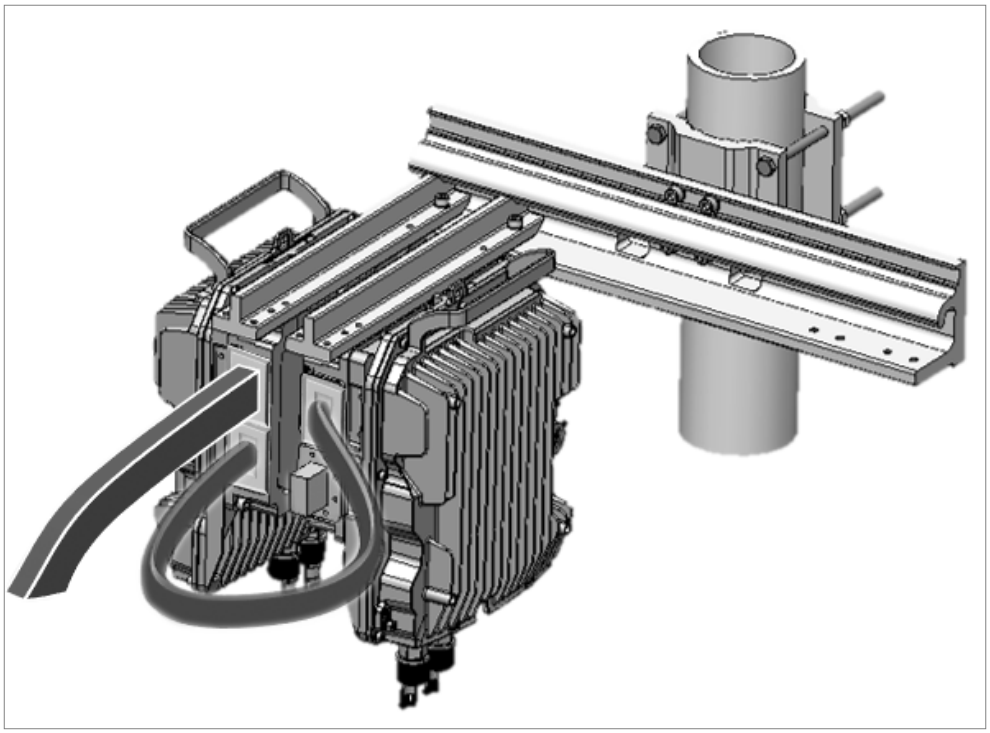
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	1	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	1	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11

Item	Description	Quantity	Marketing Model
8	Flexible Waveguides	2	

Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble an OCU using a Left Rail Configuration, attach the RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. See Section Assembling the OCU.
3. Assemble the second OCU using a Right Rail Configuration, attach the second RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. See Section Assembling the OCU.
4. On the side of the OCU facing the pole, attach Short U-Bends between the radio ports of the two OCUs. See Section Assembling a Short U-Bend.
5. On the side facing away from the pole:
   - Connect a flexible waveguide from the lower radio port of the OCU (ANT 2) on the left to the upper radio port of the OCU (EXT 1) on the right.
   - Connect a flexible waveguide from the upper radio port of the OCU on the left to the antenna.
   - Connect a Termination and Adaptor Plate to the lower radio port of the OCU on the right. See Section Assembling a Termination.



4+0 Dual Polarization and 2+0 Space Diversity (Internal)

Note:

For 2+0 Space Diversity (Internal) configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

4+0 Dual Polarization configurations require a dual-transmitter hardware model.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	2	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	2	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	Flexible Waveguides	2	

Procedure

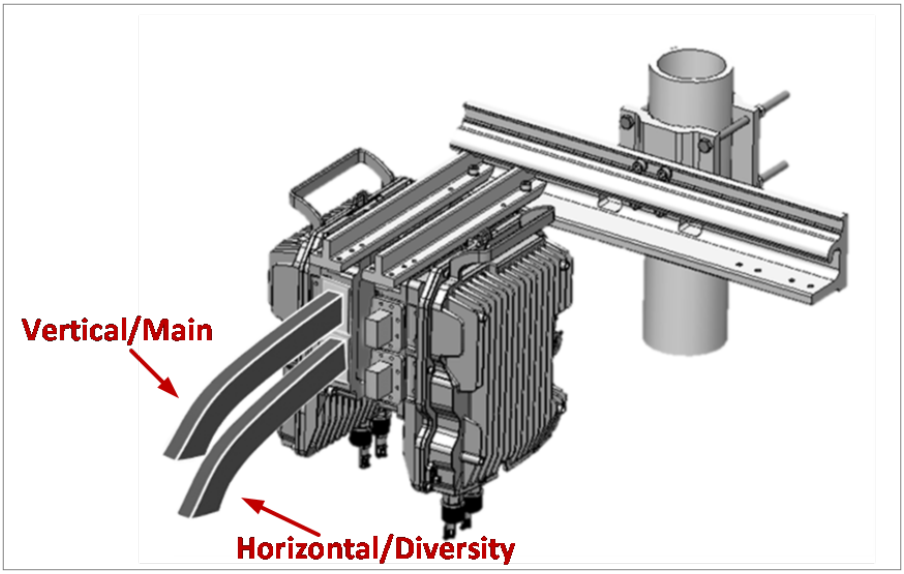
1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble an OCU using a Left Rail Configuration, attach the RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. See Section Assembling the OCU.
3. Assemble the second OCU using a Right Rail Configuration, attach the second RFU-D-HP radio to the OCU, and connect the radio-OCU assembly to the Branching Pole Profile. See Section Assembling the OCU.
4. On the side of the OCU facing the pole, attach Short U-Bends between the radio ports of the two OCUs. See Section Assembling a Short U-Bend.

5. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

> **Note**:
>
> For antennas with a standard interface, the OMT kit should not be used.

6. On the side facing away from the pole:
   - Connect flexible waveguides from both radio ports of the OCU (ANT 1 and ANT 2) on the left to the antenna's waveguide adaptor (or OMT).
   - Connect Terminations and Adaptor Plates to both radio ports of the OCU (EXT 1 and EXT 2) on the right. See Section Assembling a Termination.

> **Note**:
>
> Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



6+0 Single Polarization

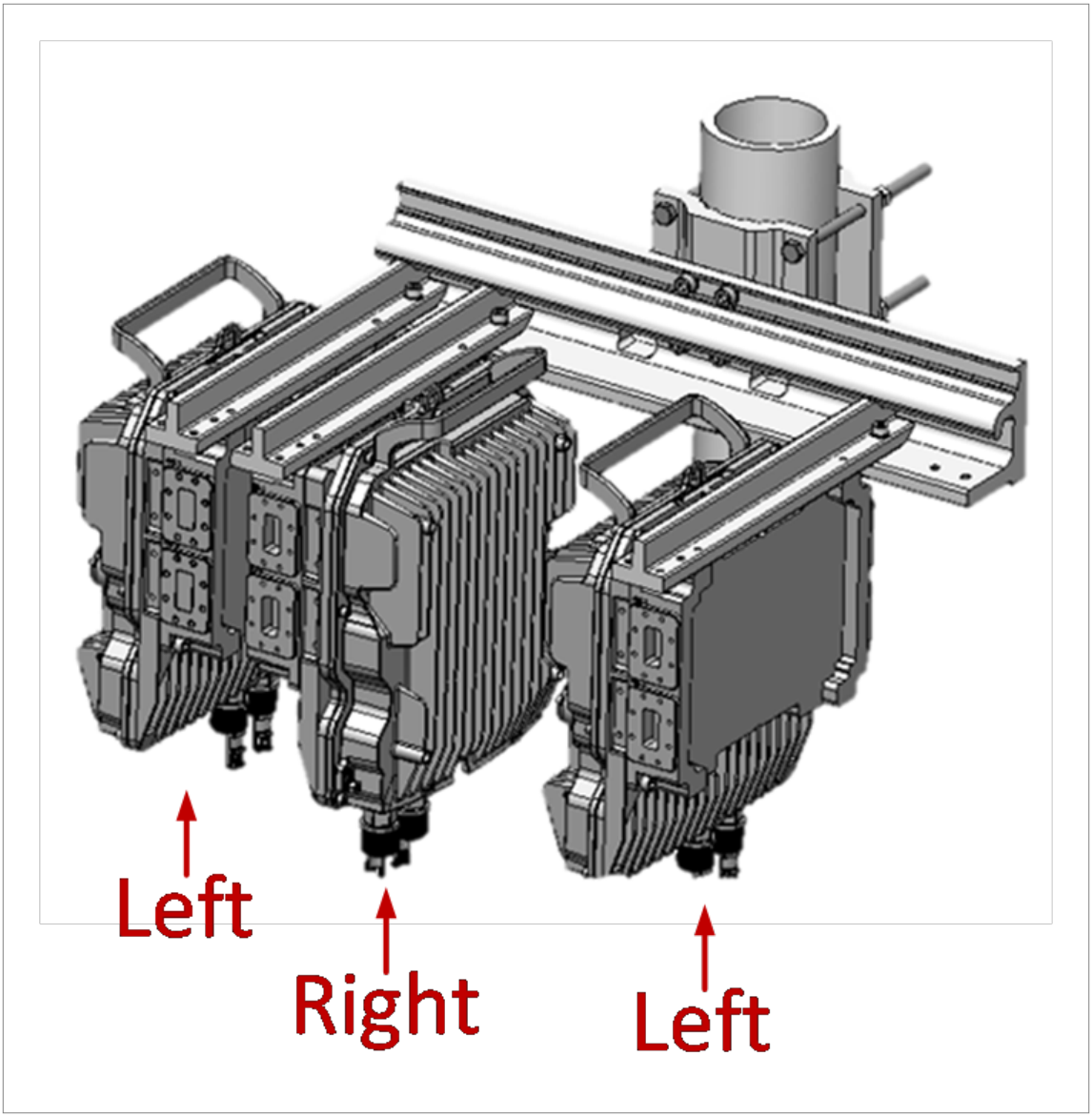
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	3	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*

Item	Description	Quantity	Marketing Model
4	RFU-D-HP OCU Kit	3	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	1	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	1	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	RFU-D-HP Branching Long U-Bend Kit	1	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
9	Flexible Waveguides	3	

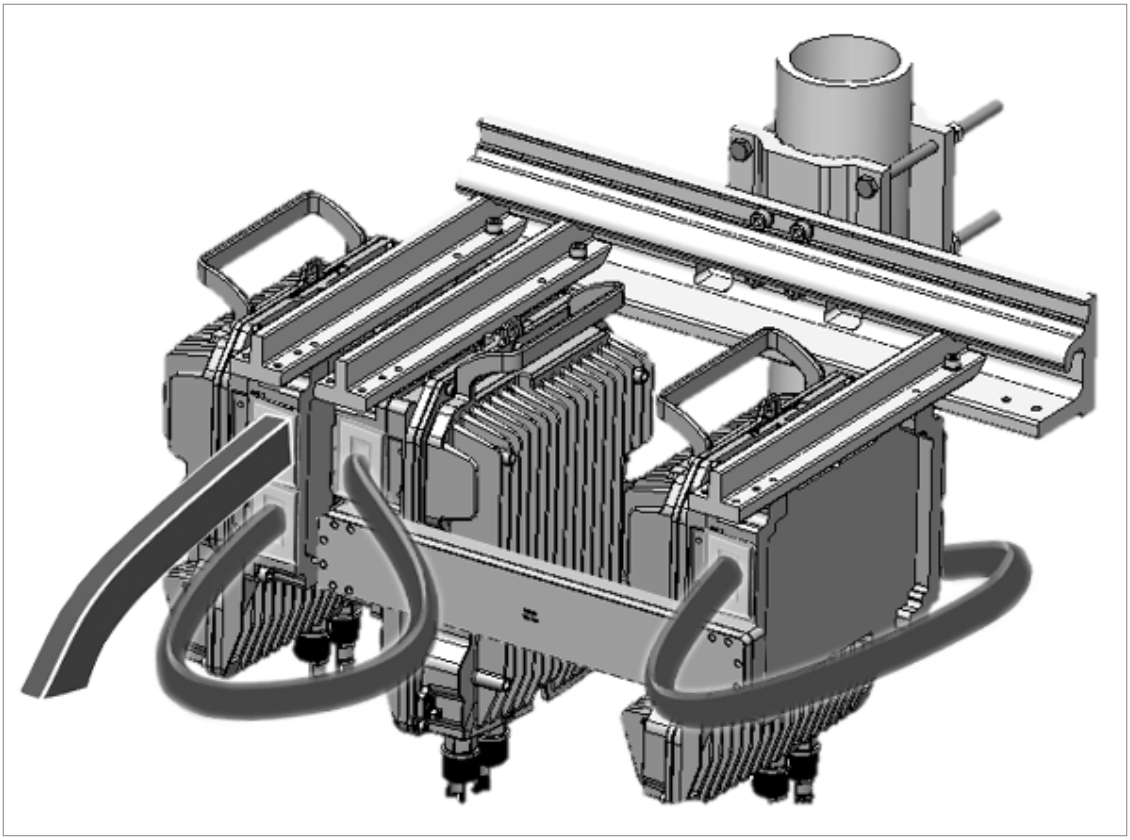
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble three OCUs, two using a Left Rail Configuration and one using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole:
   - Attach Short U-Bends between the radio ports of the two OCUs. See Section Assembling a Short U-Bend.
   - Attach a Termination and Adaptor Plate to the upper radio port of the OCU on the right. See Section Assembling a Termination.
4. On the side facing away from the pole:
   - Connect a flexible waveguide from the upper radio port of the OCU on the left to the antenna.
   - Connect a flexible waveguide from the lower radio port of the OCU (ANT 2) on the left to the upper radio port of the adjacent OCU (EXT1).

- Connect a Long U-Bend between the lower radio port of the middle OCU and the lower radio port of the OCU on the right. See Section Assembling a Long U-Bend.
- On the OCU on the right, connect a flexible waveguide from the upper radio port (EXT 1) to the lower radio port on the side of the OCU (ANT 2) facing the pole.



6+0 Dual Polarization and 3+0 Space Diversity (Internal)

Note:

For 3+0 Space Diversity (Internal) configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

6+0 Dual Polarization configurations require a dual-transmitter hardware model.

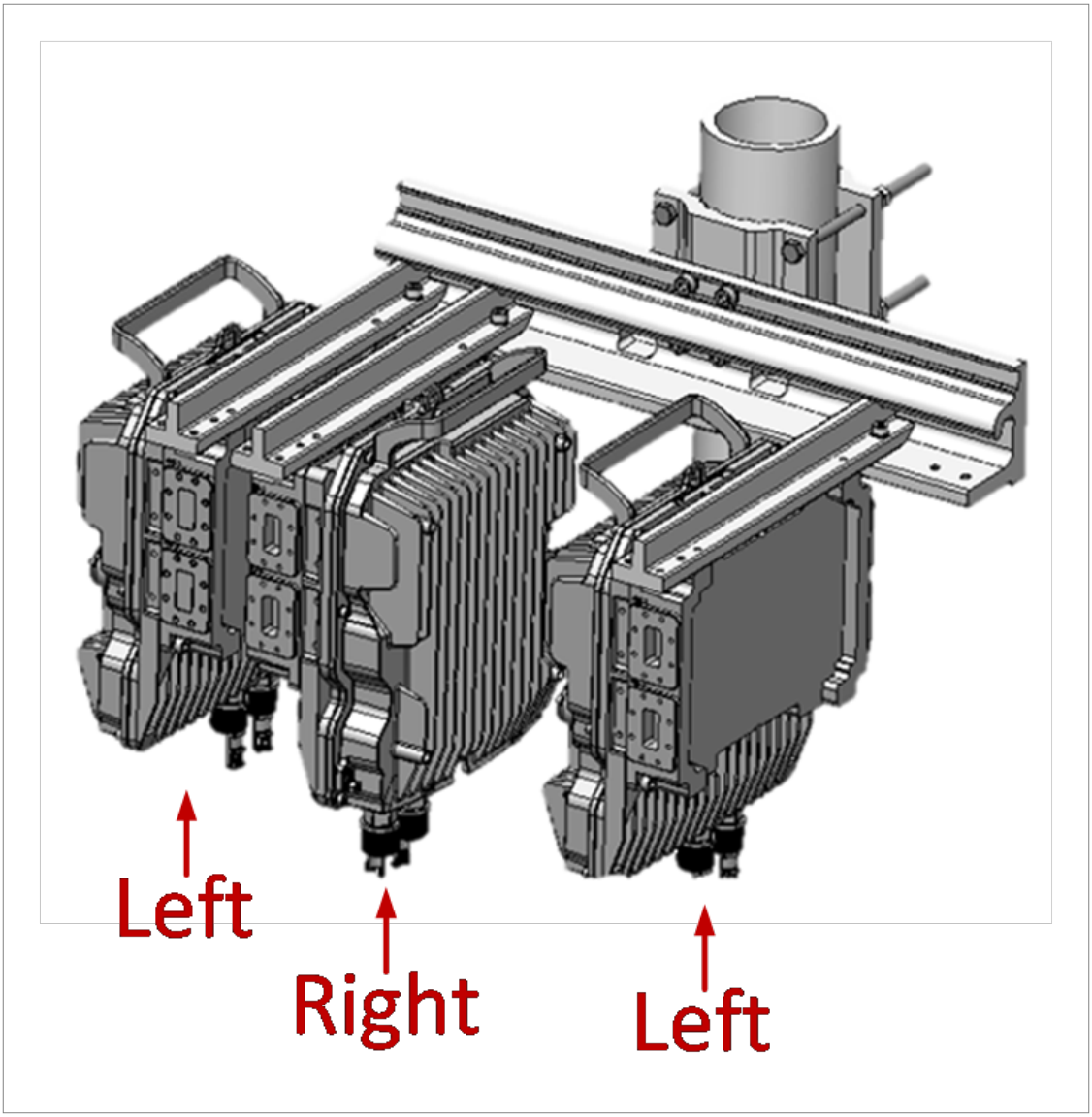
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	3	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-*

Item	Description	Quantity	Marketing Model
			MOUNT-kit
4	RFU-D-HP OCU Kit	3	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	2	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	2	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	RFU-D-HP Branching Long U-Bend Kit	2	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
9	Flexible Waveguides	2	

Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble three OCUs, two using a Left Rail Configuration and one using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole:
   - Attach Short U-Bends between the radio ports of the two OCUs. See Section Assembling a Short U-Bend.
   - Attach a Termination and Adaptor Plate to each radio port of the OCU on the right. See Section Assembling a Termination.
4. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

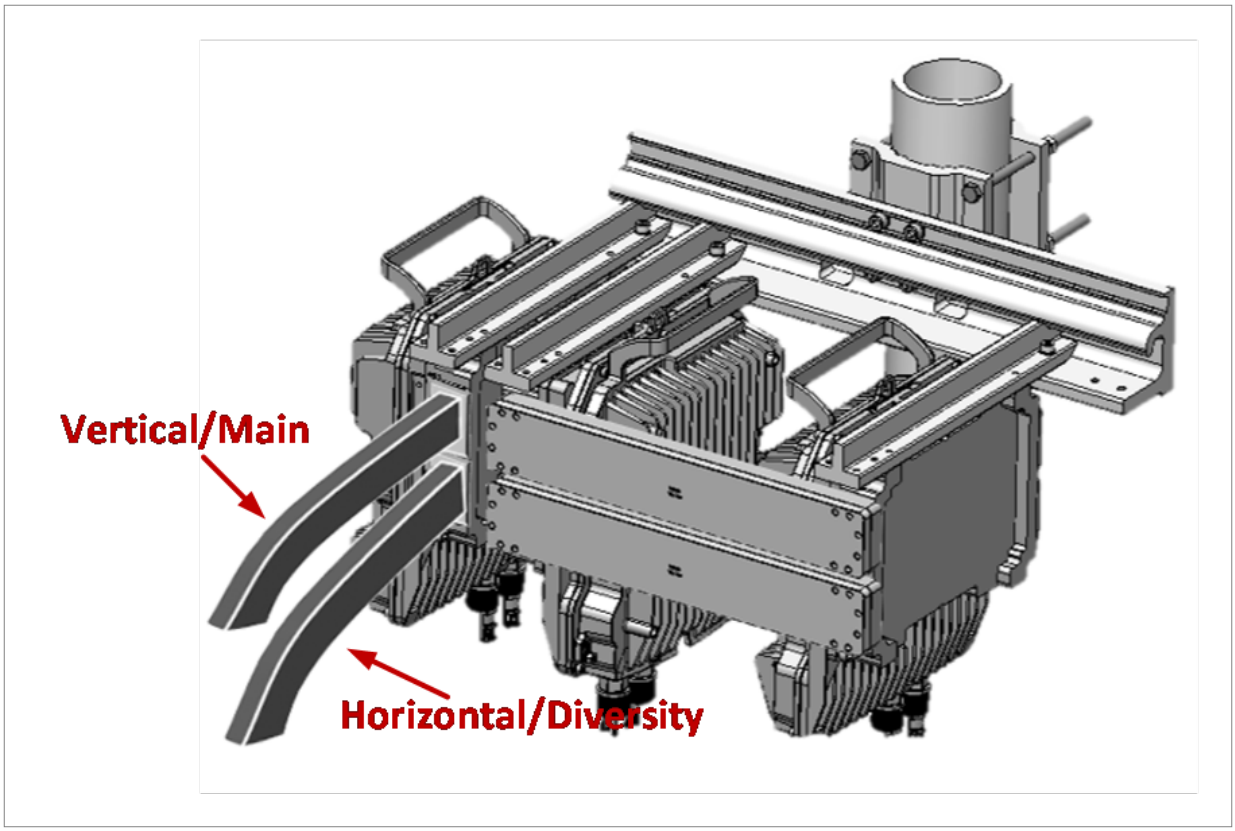
Note:

For antennas with a standard interface, the OMT kit should not be used.

5. On the side facing away from the pole:
    - On the OCU to the left, connect a flexible waveguide from each radio port of the OCU (ANT 1 and ANT 2) to the antenna's waveguide adaptor (or OMT).
    - Connect a Long U-Bend between each set of radio ports on the two OCUs to the right. See Section Assembling a Long U-Bend.

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU (ANT 2) to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



8+0 Single Polarization

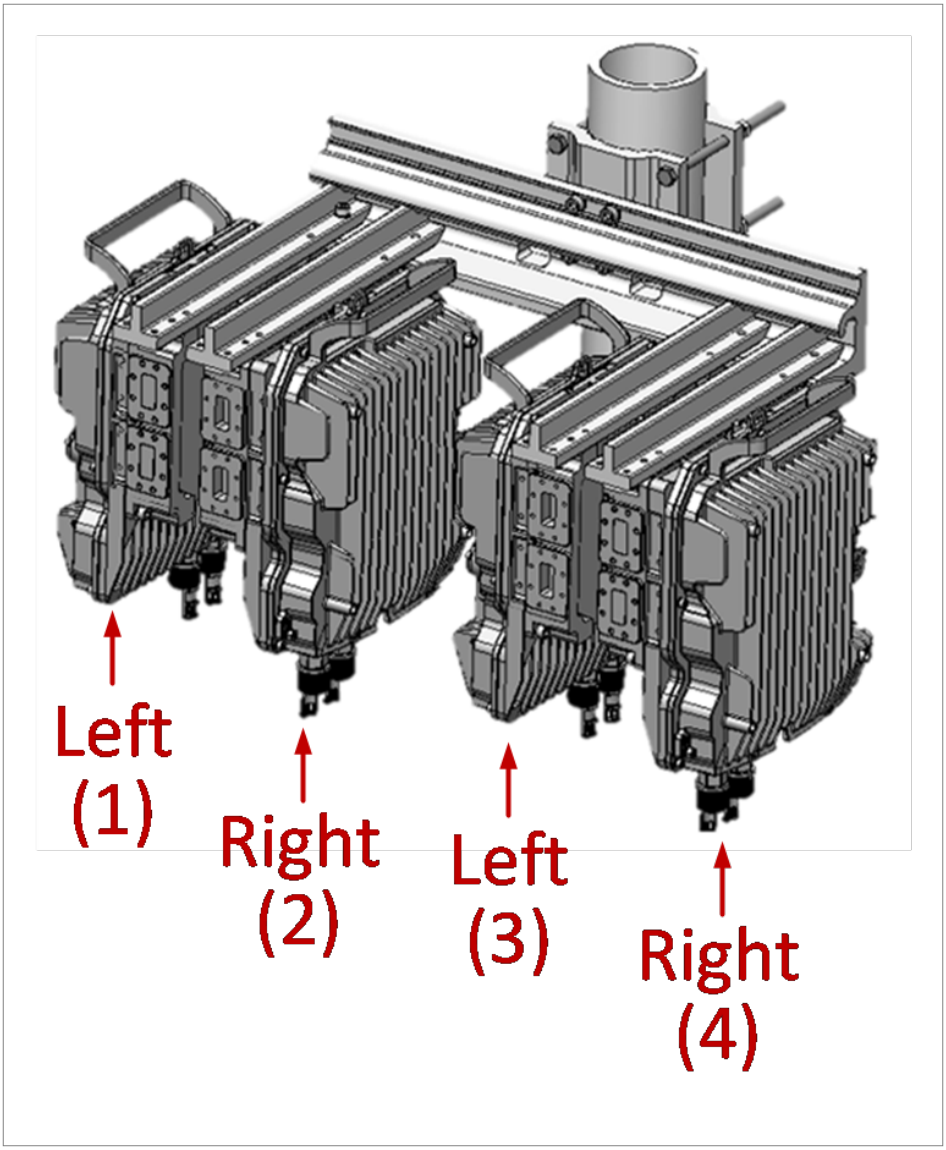
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-*

Item	Description	Quantity	Marketing Model
			MOUNT-kit
4	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	1	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	1	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	4	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	RFU-D-HP Branching Long U-Bend Kit	1	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
9	Flexible Waveguides	3	

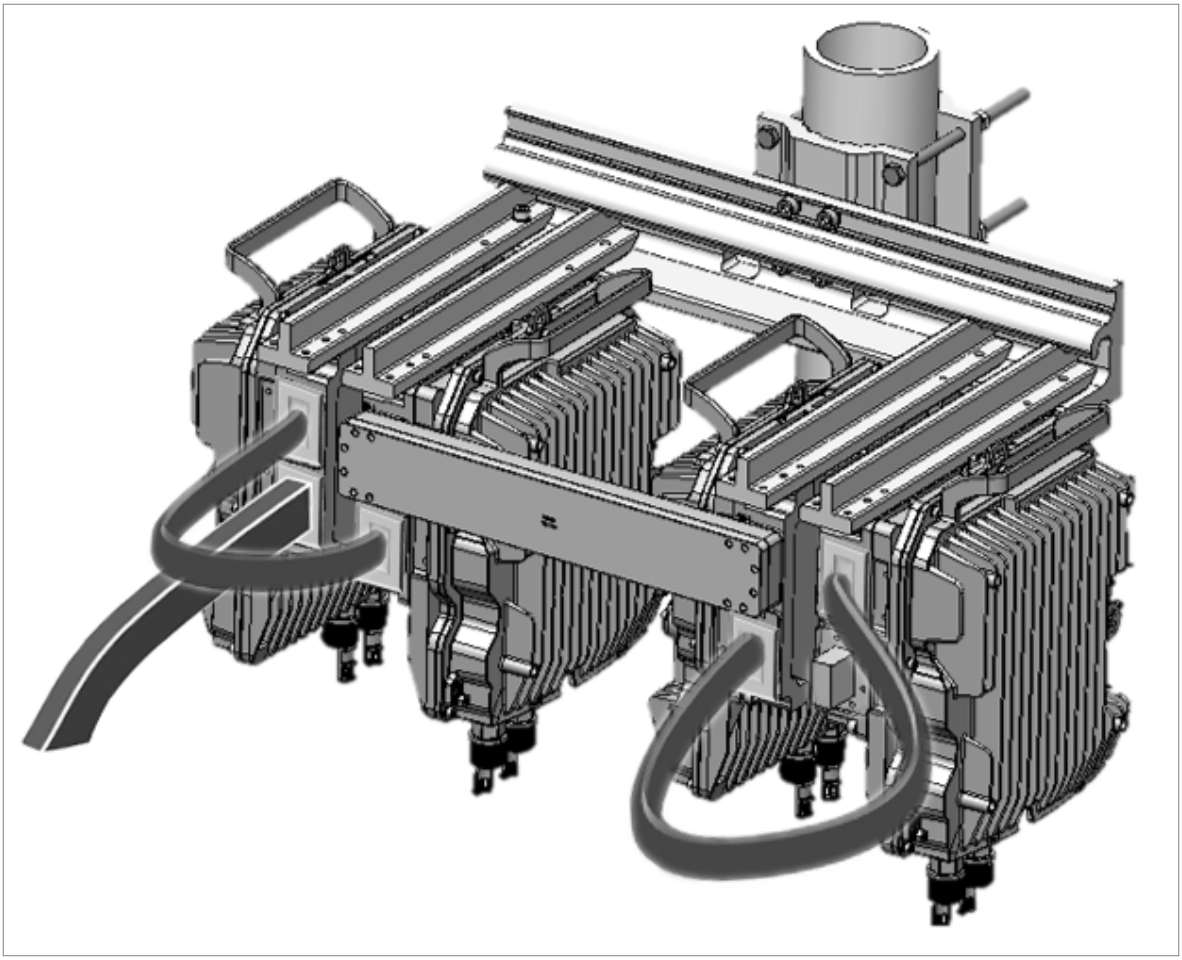
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU Assembling the OCU Mounting Kit.



3. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
4. On the side facing away from the pole (refer to the numbering in the figure above):
   - Connect a flexible waveguide from the upper radio port of OCU 1 (ANT 1) to the lower radio port of OCU 2 (EXT 2).
   - Connect a flexible waveguide from the lower radio port of OCU 1 (ANT 2) to the antenna.
   - Connect a flexible waveguide from the lower radio port of OCU 3 (ANT 2) to the upper radio port of OCU 4 (EXT 1).
   - Connect a Long U-Bend between the upper radio port of OCU 2 and the upper radio port of OCU 3. See Section Assembling a Long U-Bend.

- Attach a Termination and Adaptor Plate to the lower radio port of OCU 4 (EXT 2). See Section Assembling a Termination.



8+0 Dual Polarization and 4+0 Space Diversity (Internal)

Note:

For 4+0 Space Diversity (Internal) configurations, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters "-SD" at the end of the marketing model. See Section Marketing Models for Radio Unit

8+0 Dual Polarization configurations require a dual-transmitter hardware model.

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*

Item	Description	Quantity	Marketing Model
4	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	2	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	2	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	4	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	RFU-D-HP Branching Long U-Bend Kit	2	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
9	Flexible Waveguides	2	
10	Data Sharing Cable (for XPIC)	1	See Section Waveguide-Coax Adaptors for Internal Space Diversity Configurations
11	Source Sharing Cable (for XPIC)	1	See Section Cables for External XPIC, External SD, and ASD Configurations

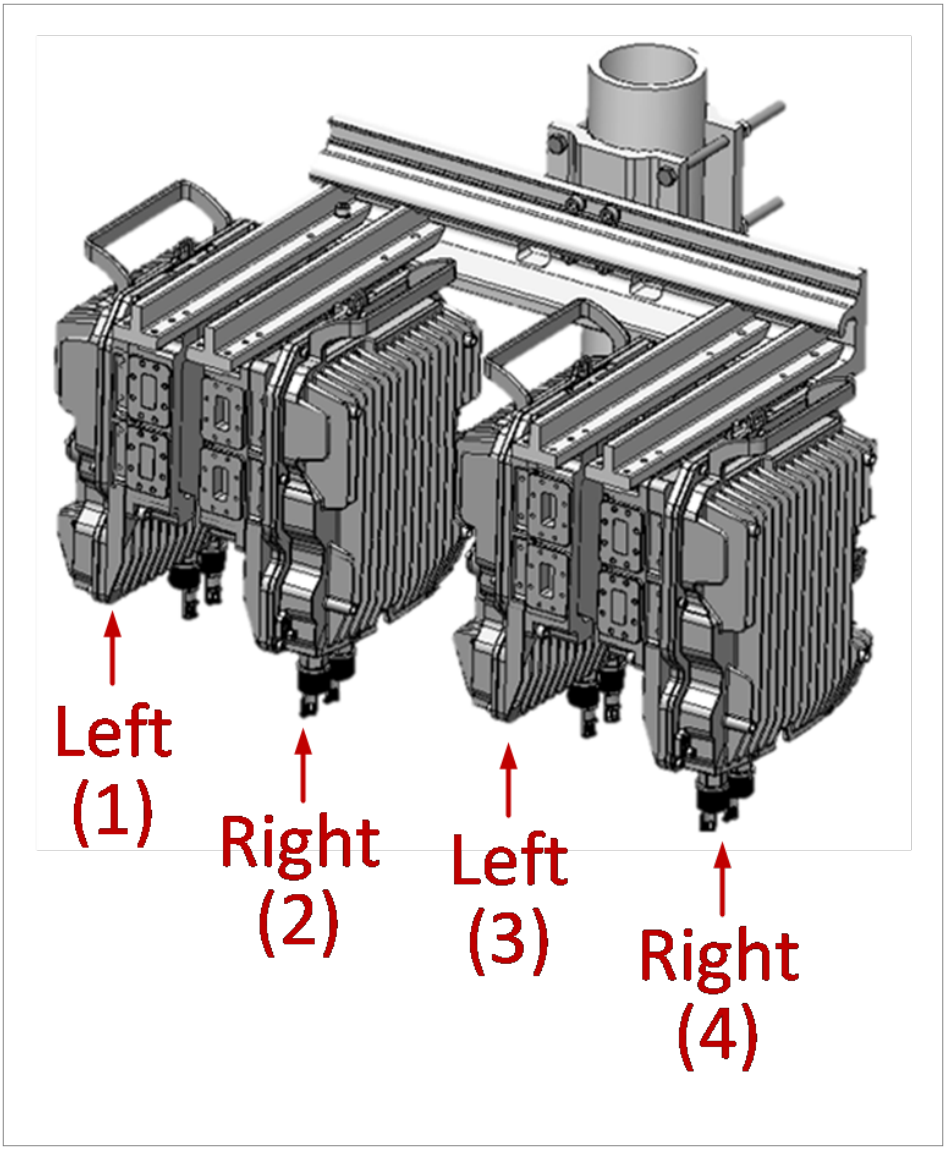
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

   Note:

   For antennas with a standard interface, the OMT kit should not be used.

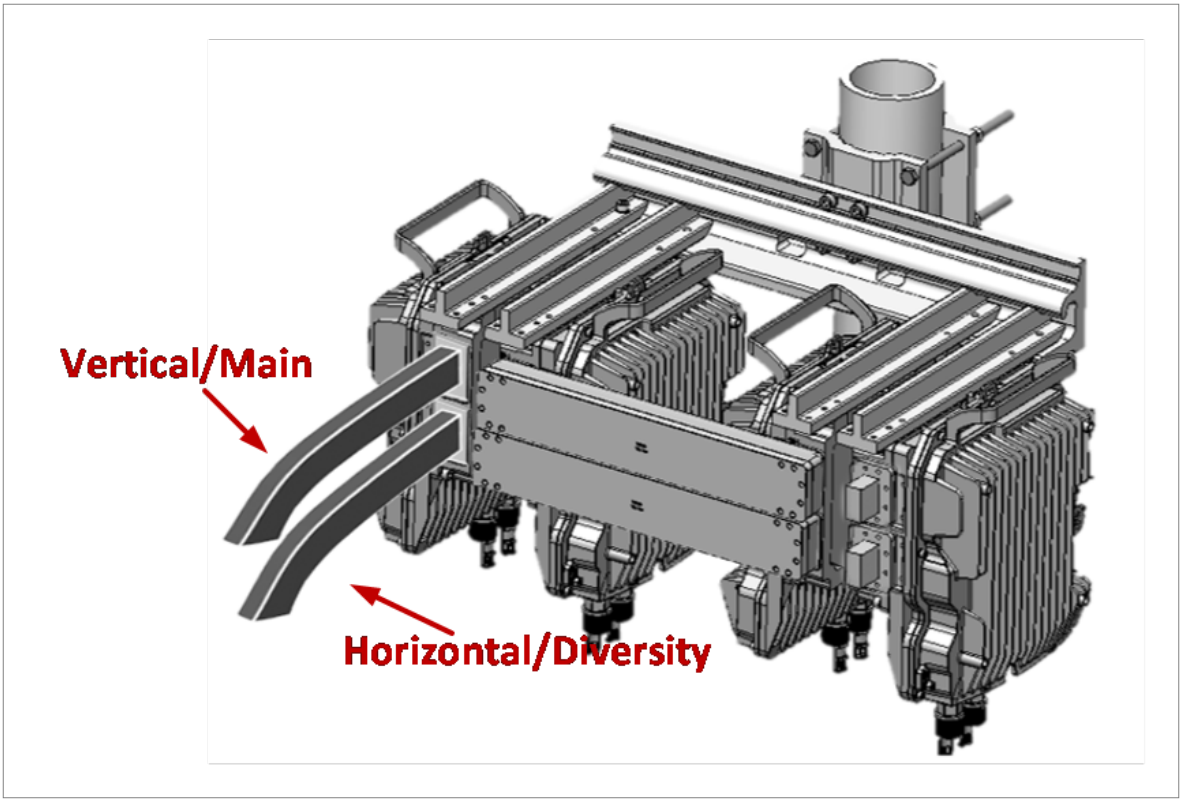
2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



4. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
5. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect a flexible waveguide from each of the radio ports on OCU 1 (ANT 1 and ANT 2) to the OMT.
    - Connect Long U-Bends between the upper and lower radio ports of OCU 2 and OCU 3. See Section Assembling a Long U-Bend.
    - Attach a Termination and Adaptor Plate to each radio port on OCU 4. See Section Assembling a Termination.

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU (ANT 2) to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



6. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

4+0 Dual Polarization and Space Diversity (Internal), Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP OCU Mounting kit	1	FXDH-RM-MOUNT-kit, see Section 7.1.1
3	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
4	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
5	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
6	RFU-D-HP Branching Short U-Bend Kit	4	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
7	Flexible Waveguides	4	
8	Data Sharing Cable (for XPIC)	2	See Section Cables for External XPIC, External SD, and ASD Configurations
9	Source Sharing Cable (for XPIC)	2	See Section Cables for External XPIC, External SD, and ASD Configurations

Procedure

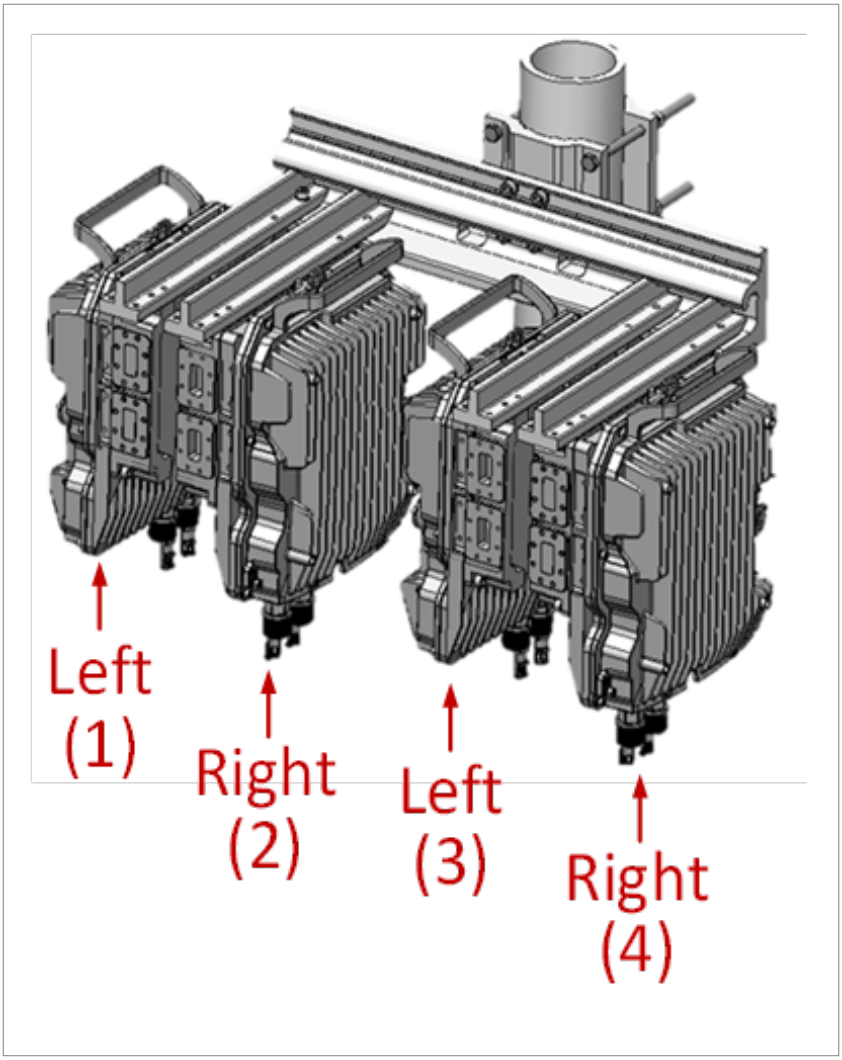
1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

   Note:

   For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.

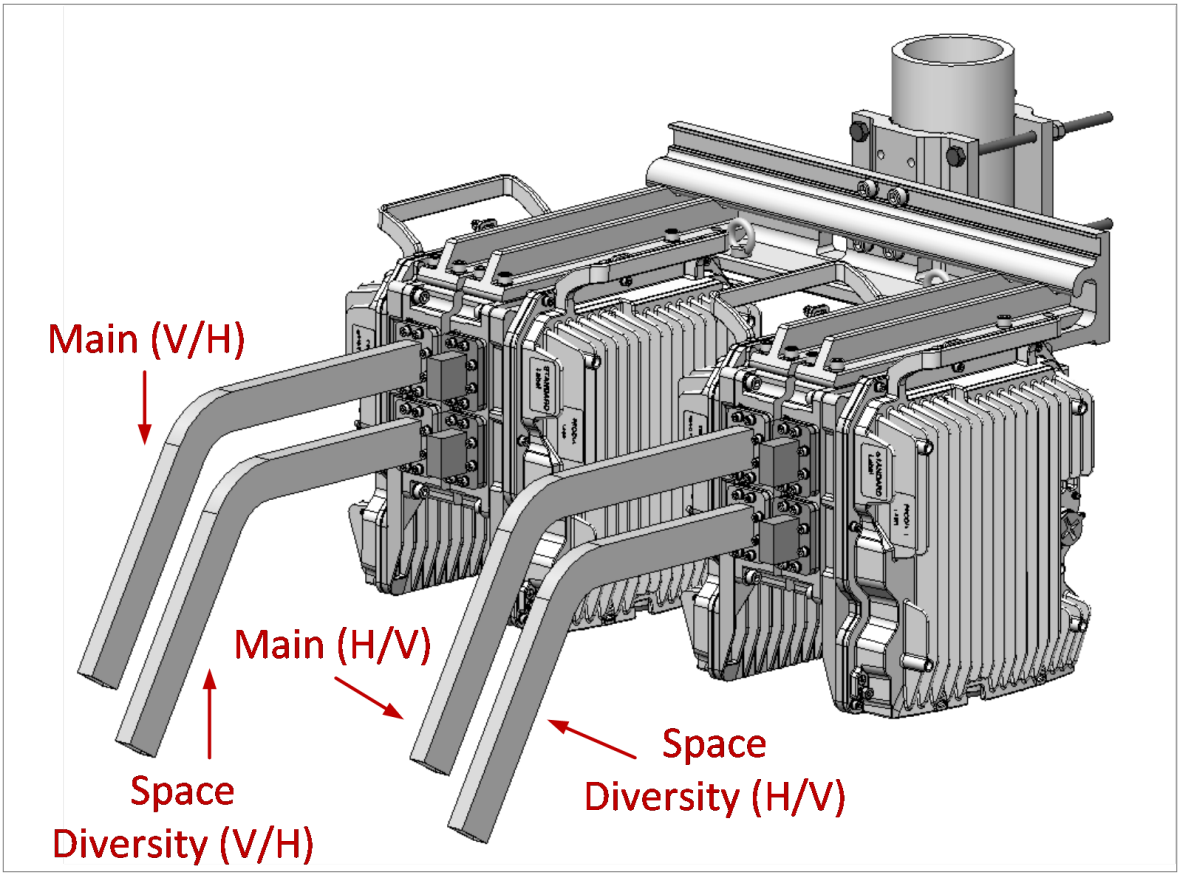
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU Mounting Kit.



4. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section 7.1.3, Assembling a Short U-Bend.
5. On the side facing away from the pole (refer to the numbering in the figure above):
   - Connect a flexible waveguide from each of the radio ports on OCU 1 and OCU 3 (ANT 1 and ANT 2) to the antenna's waveguide adaptor (or OMT).
   - Attach a Termination and Adaptor Plate to each radio port on OCU 2 and OCU 4 (EXT 1 and EXT 2). See Section Assembling a Termination.

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU (ANT 2) to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



6. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

4+0 Dual Polarization and Space Diversity (Internal), Adjacent Channel, Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP OCU Mounting kit	1	FXDH-RM-MOUNT-kit

Item	Description	Quantity	Marketing Model
3	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
4	RFU-D-HP Termination Kit	8	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
5	Adaptor Plate	8	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
6	RFU-D-HP Splitter Kit	2	FXDH-RM-MD-SPLTR-06 FXDH-RM-MD-SPLTR-7-8 FXDH-RM-MD-SPLTR-11
7	Flexible Waveguides	4	
8	Data Sharing Cable (for XPIC)	2	See Section Cables for External XPIC, External SD, and ASD Configurations
9	Source Sharing Cable (for XPIC)	2	See Section Cables for External XPIC, External SD, and ASD Configurations

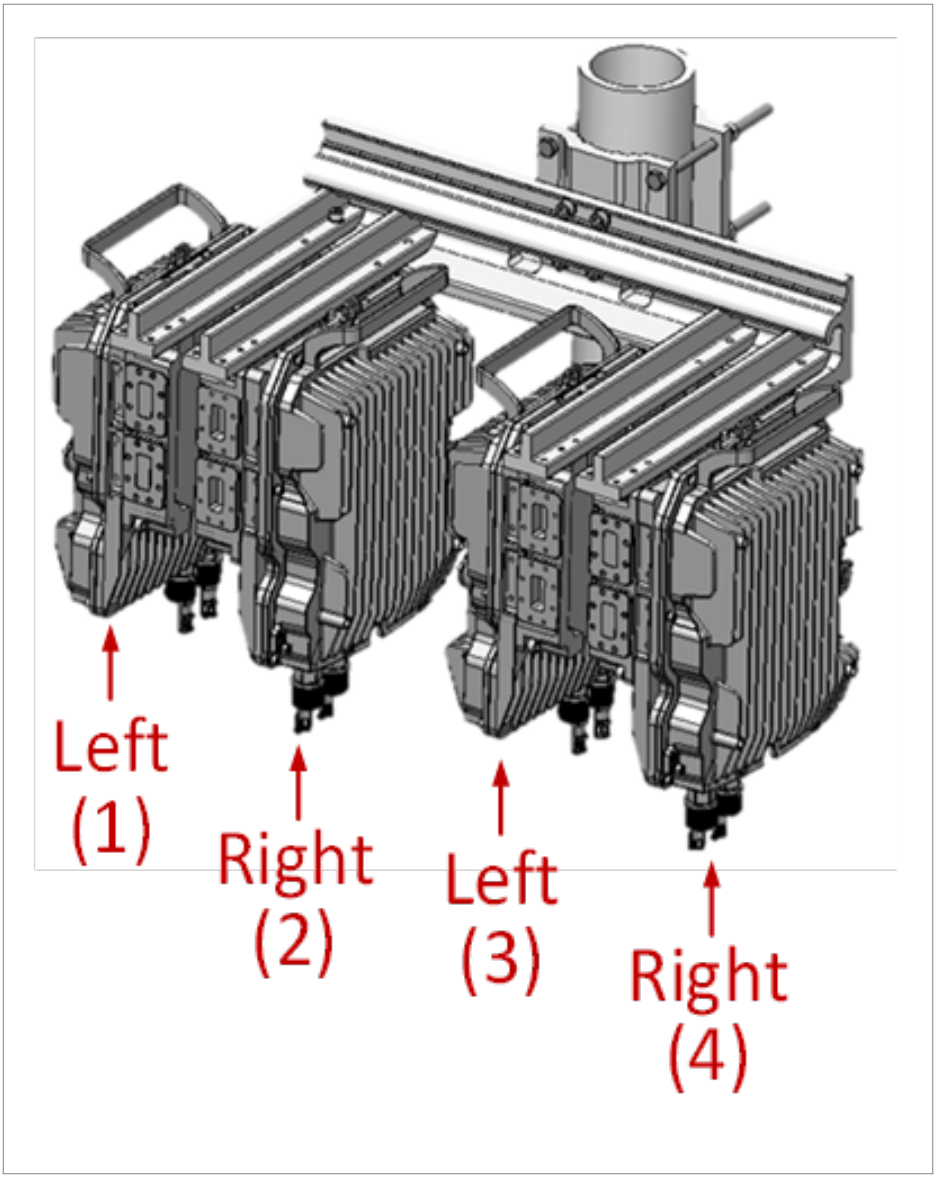
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna, *Attaching the OMT Kit to the Antenna*.

   Note:

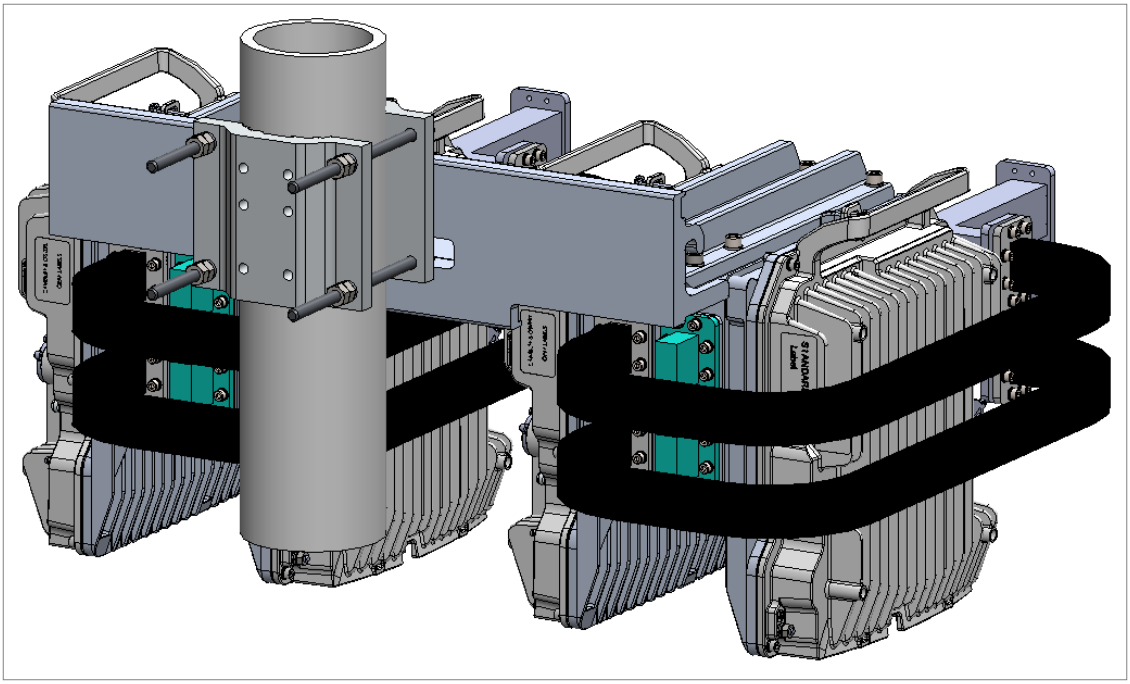
   For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU Mounting Kit.



4. On the side of the OCU facing the pole:
    - Attach a Termination and Adaptor Plate on each port of OCU 1 and OCU 3 (EXT 1 and EXT2). See Section Assembling a Termination.
    - Connect a flexible waveguide on each port of OCU 2 and OCU 4 (ANT 1, ANT 2) to the coupling

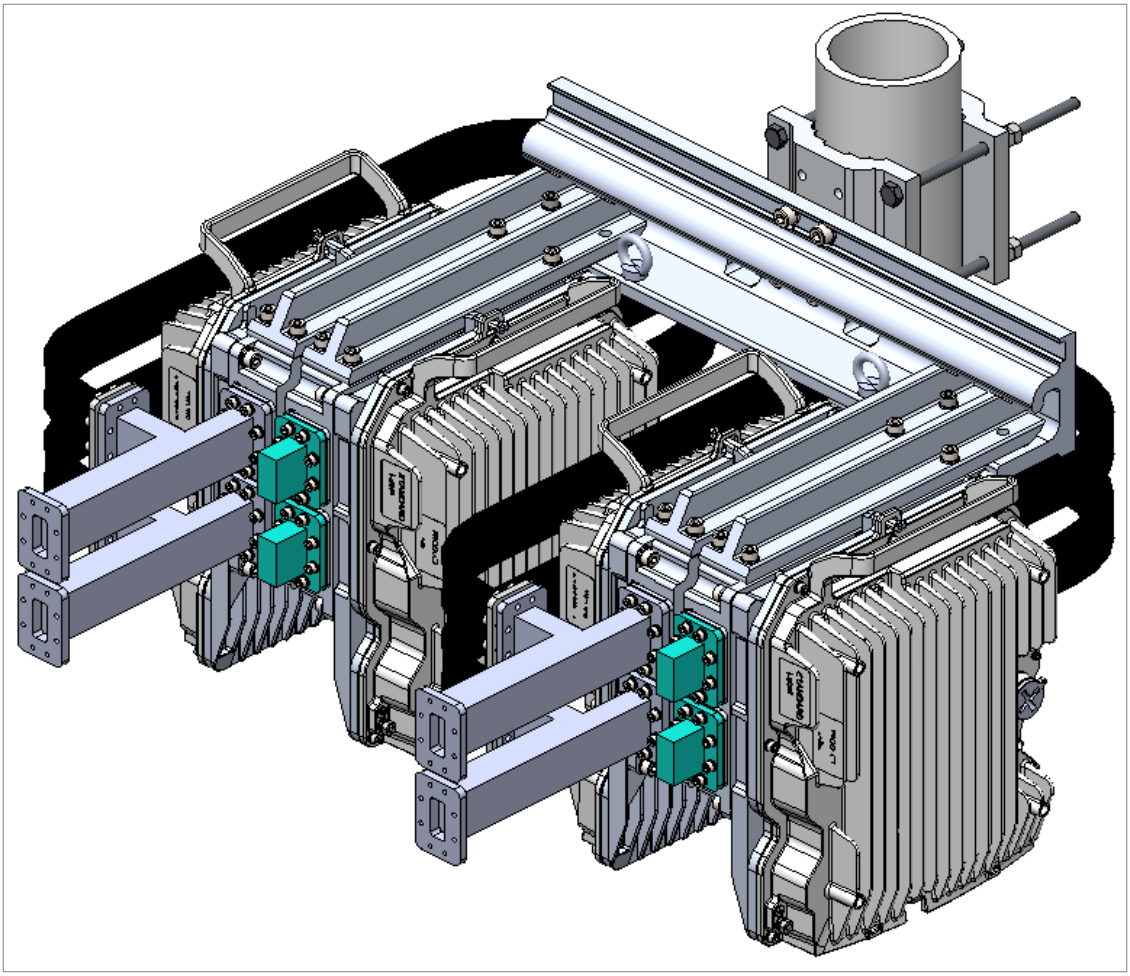
port of RFU-D-HP Splitter respectively.



5. On the side facing away from the pole (refer to the numbering in the figure above):
   - Connect a RFU-D-HP Splitter on each ports of OCU 1 and OCU 3 (ANT 1 and ANT 2).
   - Attach a Termination and Adaptor Plate to each port on OCU 2 and OCU 4 (EXT 1 and EXT 2). See Section Assembling a Termination.
   - Connect a flexible waveguide on each RFU-D-HP Splitter 'Antenna' port on OCU 1 and OCU 3 to the antenna's waveguide adaptor (or OMT).

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna port of the splitters connected to the ANT 2 ports of the OCUs to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



6. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

8+0 Dual Polarization and Space Diversity (Internal), Adjacent Channel, Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	8	See Section Marketing Models for Radio Unit

Item	Description	Quantity	Marketing Model
2	RFU-D-HP OCU Mounting kit	2	FXDH-RM-MOUNT-kit, see *Section 7.1.1*
3	RFU-D-HP OCU Kit	8	See Section Marketing Models for OCU Unit
4	RFU-D-HP Termination Kit	8	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
5	Adaptor Plate	8	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
6	RFU-D-HP Splitter Kit	4	FXDH-RM-MD-SPLTR-06 FXDH-RM-MD-SPLTR-7-8 FXDH-RM-MD-SPLTR-11
7	Flexible Waveguides	4	
8	Data Sharing Cable (for XPIC)	4	See Section Cables for External XPIC, External SD, and ASD Configurations
9	Source Sharing Cable (for XPIC)	4	See Section Cables for External XPIC, External SD, and ASD Configurations

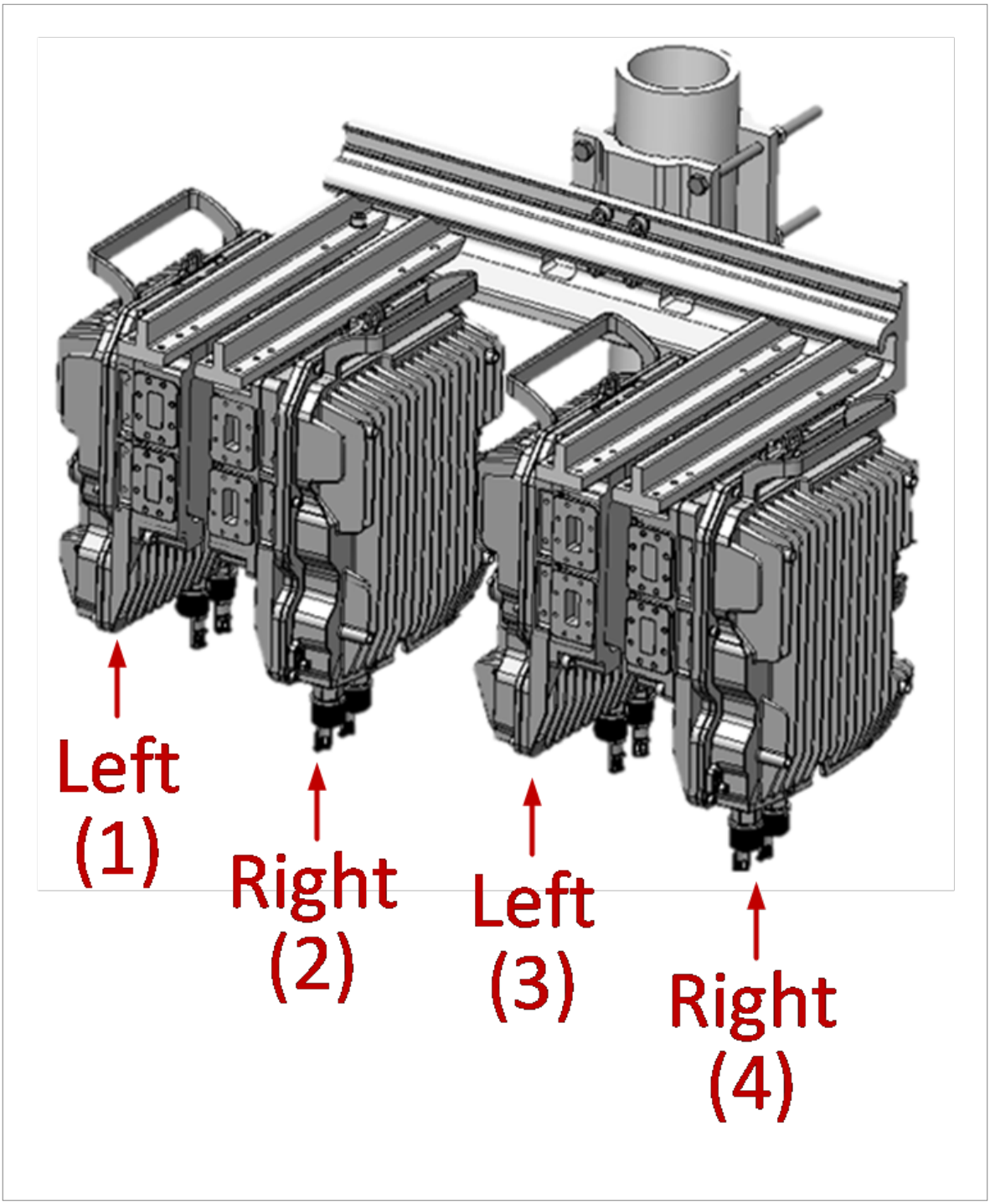
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

Note:

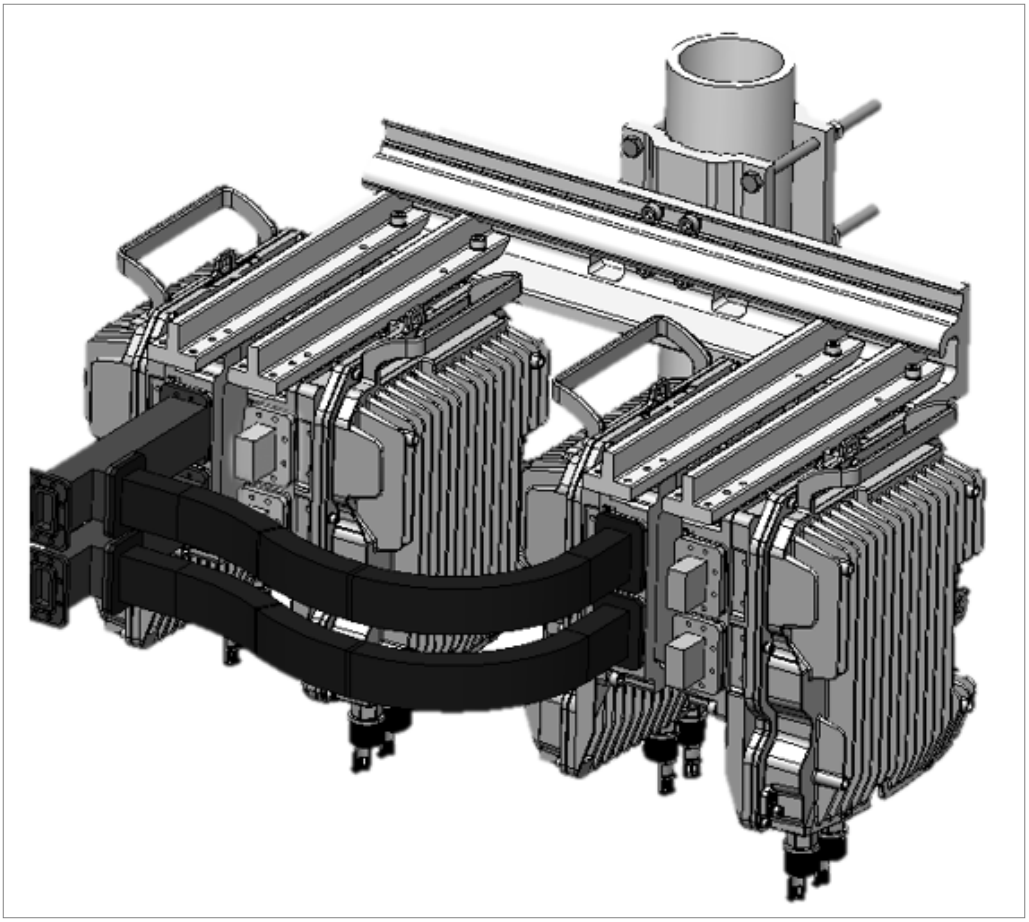
For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



4. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
5. On the side facing away from the pole (refer to the numbering in the figure above):

- Connect a splitter to each radio port of OCU 1. See Section Assembling a Splitter or Coupler for Filter-Based Branching.
- Attach a Termination and Adaptor Plate to each of the radio ports on OCU 2 and OCU 4 (EXT 1 and EXT 2) . See Section Assembling a Termination.
- Connect a flexible waveguide from the upper coupler to the upper radio port of OCU 3.
- Connect a flexible waveguide from the lower coupler to the lower radio port of OCU 3.



6. Connect a flexible waveguide from each RFU-D-HP Splitter ‘Antenna’ port to ‘H’ port of main and space diversity Remote Plate Adapter respectively.
7. Repeat the assembly on a second mounting kit and connect the flexible waveguides to ‘V’ port of main and space diversity Remote Plate Adapter respectively.

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.

8. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

8+0 Dual Polarization and Space Diversity (Internal), Remote Mount

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters "-SD" at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	8	See Section Marketing Models for Radio Unit
2	RFU-D-HP OCU Mounting kit	2	FXDH-RM-MOUNT-kit , See Section 7.1.1
3	RFU-D-HP OCU Kit	8	See Section Marketing Models for OCU Unit
4	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
5	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
6	RFU-D-HP Branching Short U-Bend Kit	8	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
7	RFU-D-HP Branching Long U-Bend Kit	4	FXDH-RM-LU-Bend-06 FXDH-RM-LU-Bend-7-8 FXDH-RM-LU-Bend-11
8	Flexible Waveguides	4	
9	Data Sharing Cable (for XPIC)	4	See Section Cables for External XPIC, External SD, and ASD Configurations
10	Source Sharing Cable (for XPIC)	4	See Section Cables for External XPIC, External SD, and ASD Configurations

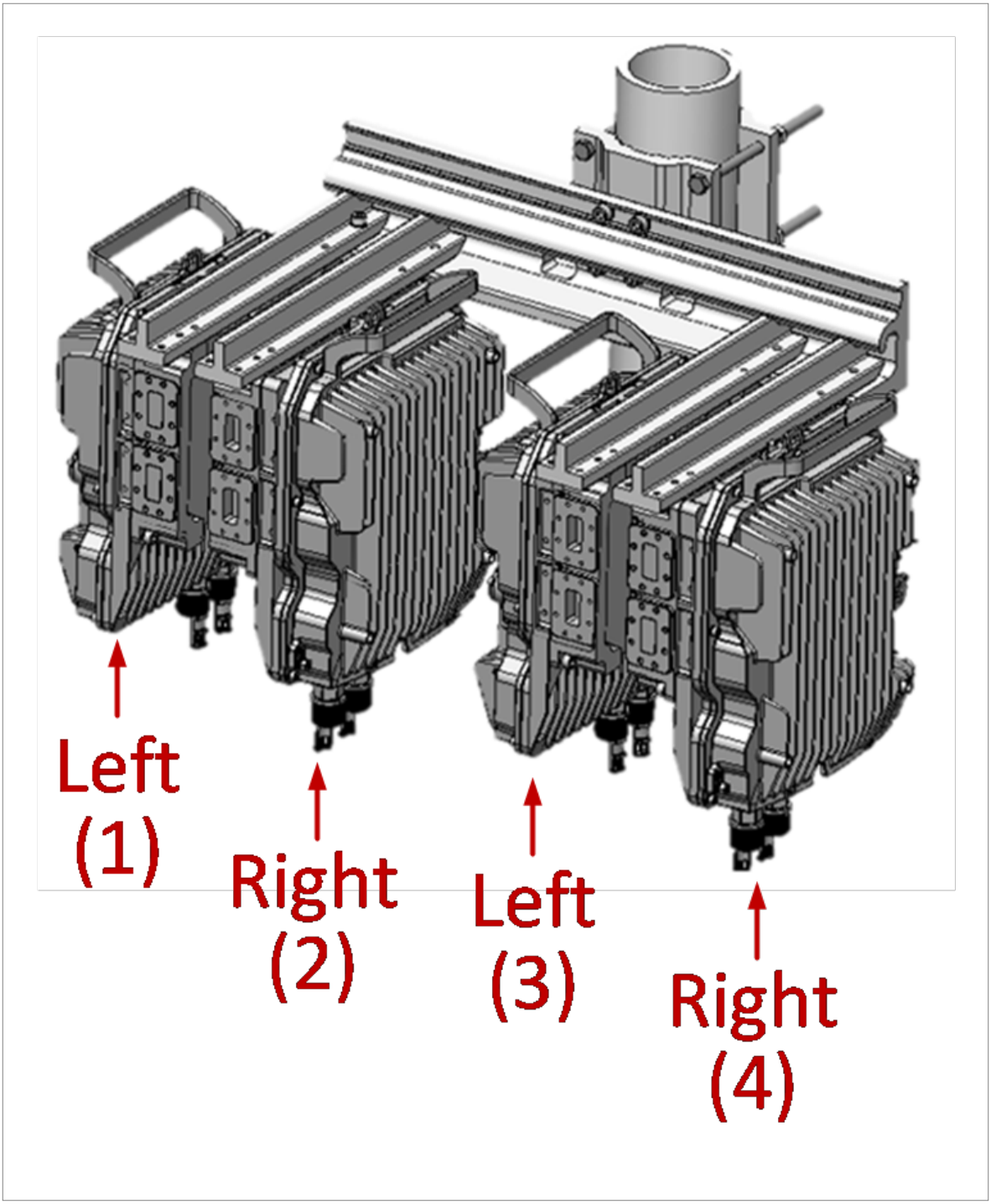
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

   Note:

   For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.

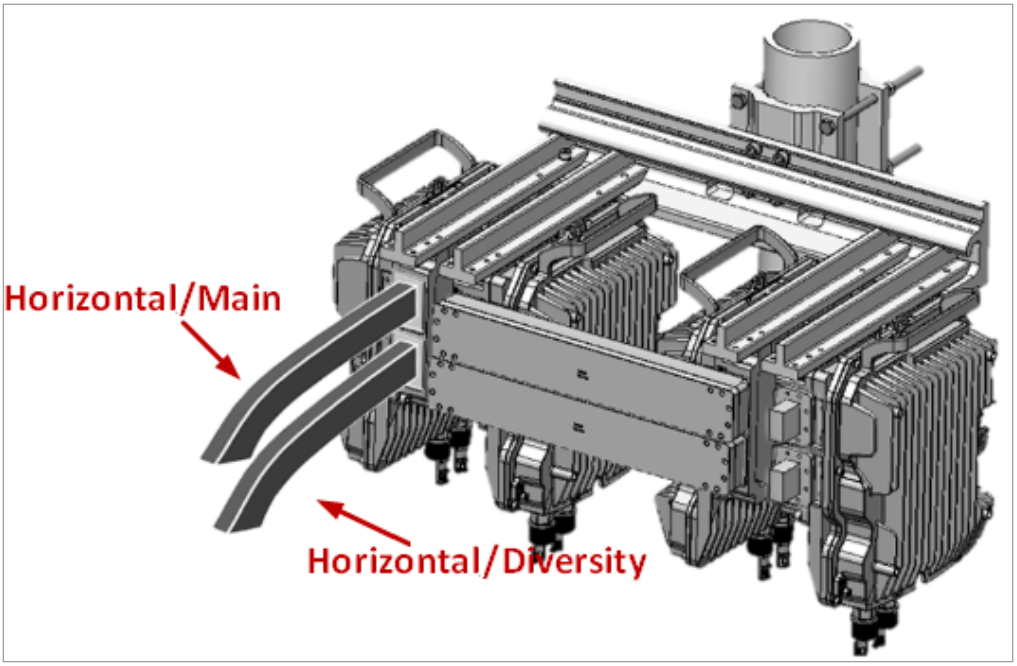


4. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
5. On the side facing away from the pole (refer to the numbering in the figure above):

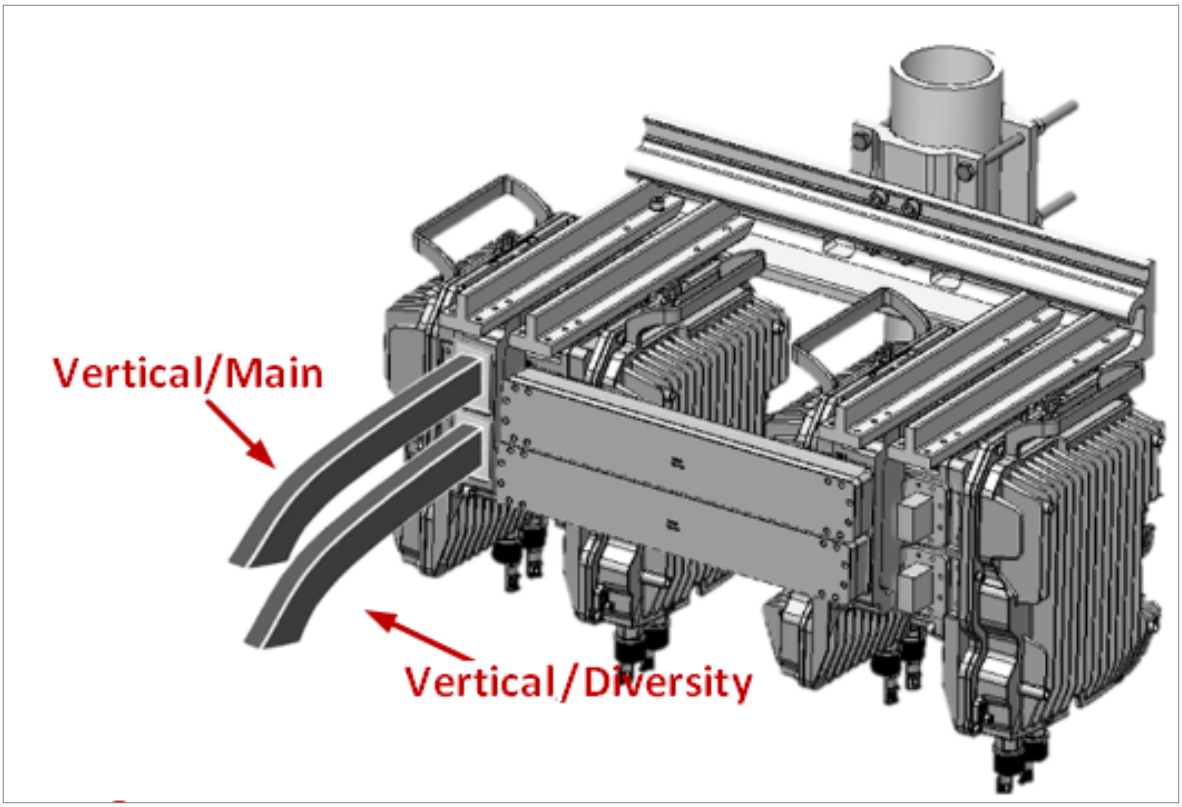
- Connect Long U-Bends between the upper and lower radio ports of OCU 2 and OCU 3. See Section Assembling a Long U-Bend.
- Attach a Termination and Adaptor Plate to each radio port on OCU 4. See Section Assembling a Termination.
- Connect a flexible waveguide from each of the ANT ports on OCU 1 (ANT 1 and ANT 2) to the antenna (or OMT).

Note:

Optionally, LDF4 cables can be used instead of flexible waveguides to connect the antenna ports of the OCU (ANT 2) to the diversity antenna. For instructions, see Section Connecting the Space Diversity Antenna for Internal Space Diversity Configurations with Channel Filter-Based Branching.



6. Repeat the assembly on a second mounting kit and connect the flexible waveguides to 'V' port of main and space diversity Remote Plate Adapter respectively.



7. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

1+1 HSB

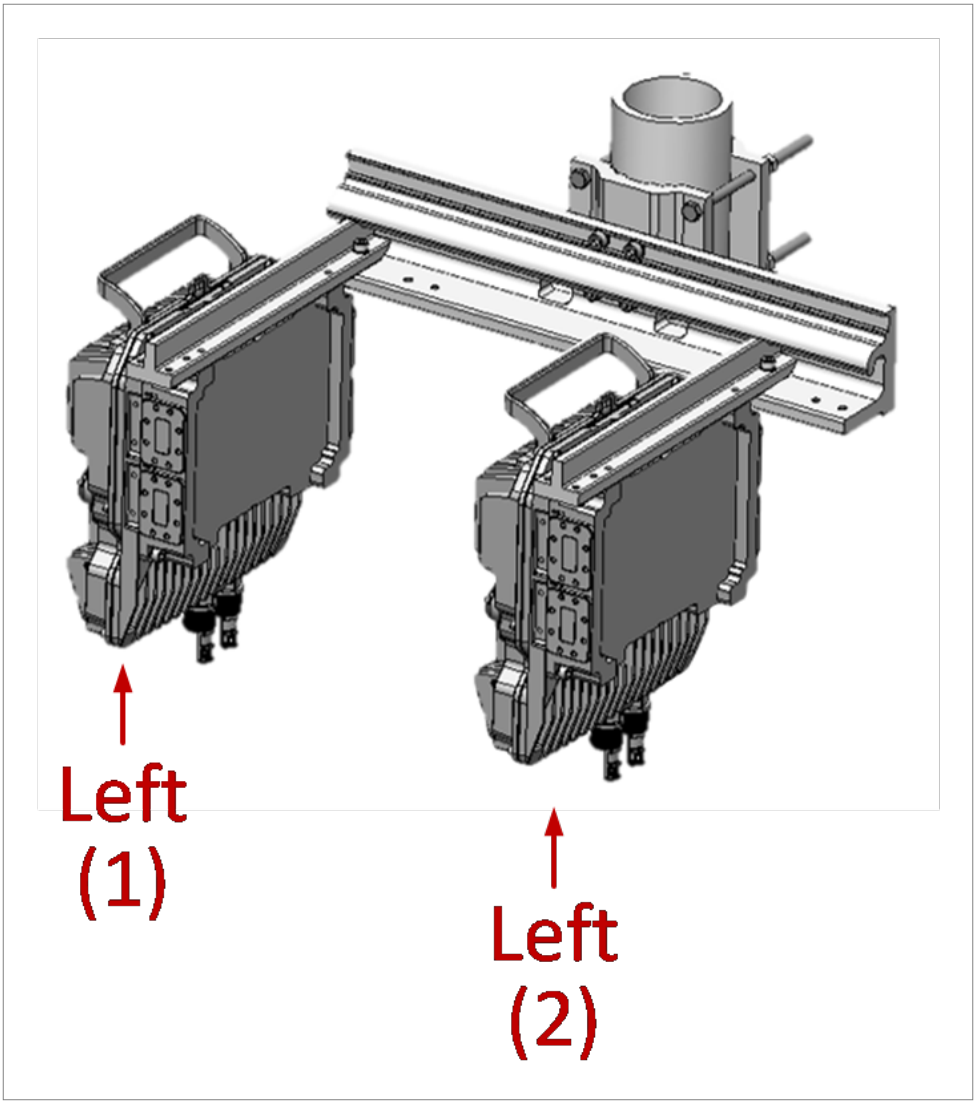
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU

Item	Description	Quantity	Marketing Model
			Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	6	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	6	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Coupler Kit	1	FXDH-RM-MD-CPLR-06 FXDH-RM-MD-CPLR-7-8 FXDH-RM-MD-CPLR-11
8	Flexible Waveguides	2	

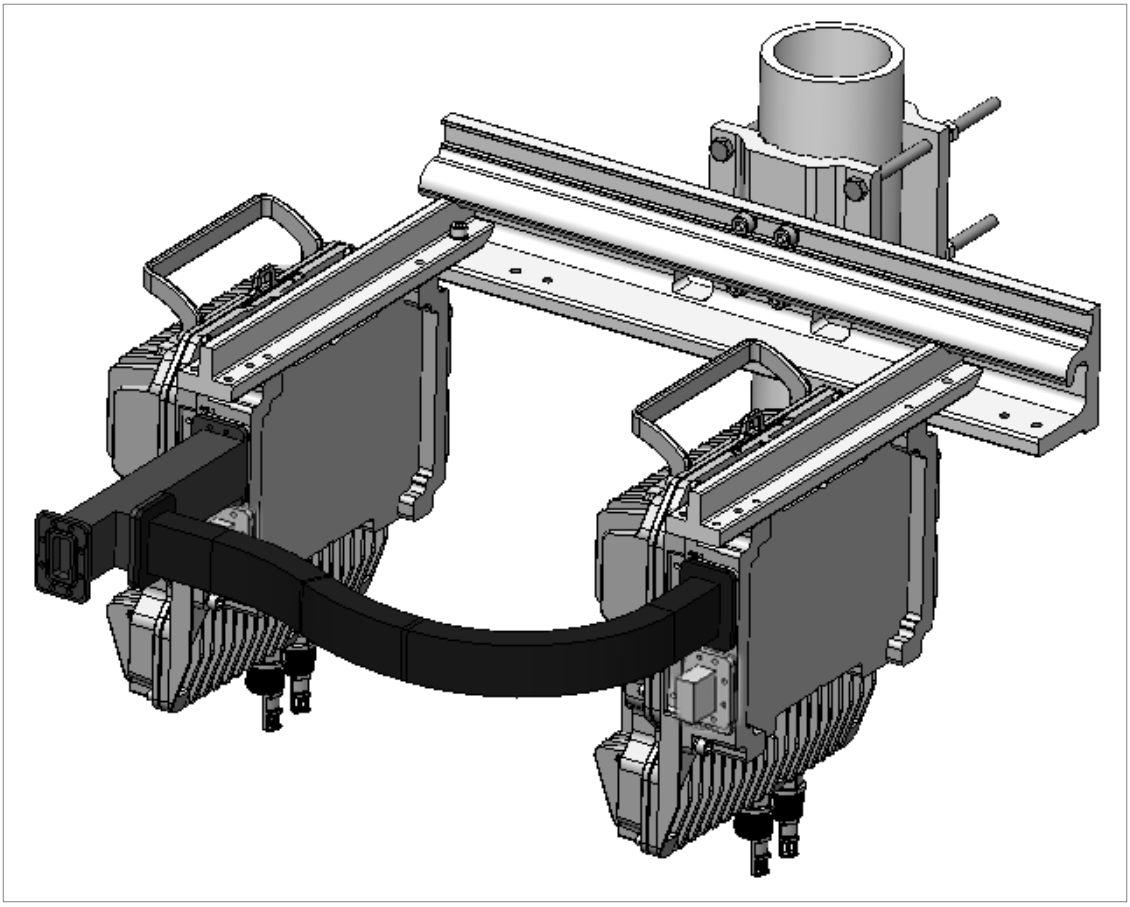
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four radio ports. See Section Assembling a Termination.
4. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect a Coupler to the upper radio port of OCU 1. See Section Assembling a Splitter or Coupler for Filter-Based Branching.
    - Connect a flexible waveguide from the Coupler to the upper radio port of OCU 2 (ANT 1).
    - Attach a Termination and Adaptor Plate to each of the lower radio ports (ANT 2). See Section

Assembling a Termination.



5. Connect a flexible waveguide between the coupler and antenna.

1+1 HSB SD (Internal)

Note:

This procedure is implemented using BBC Space Diversity.

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

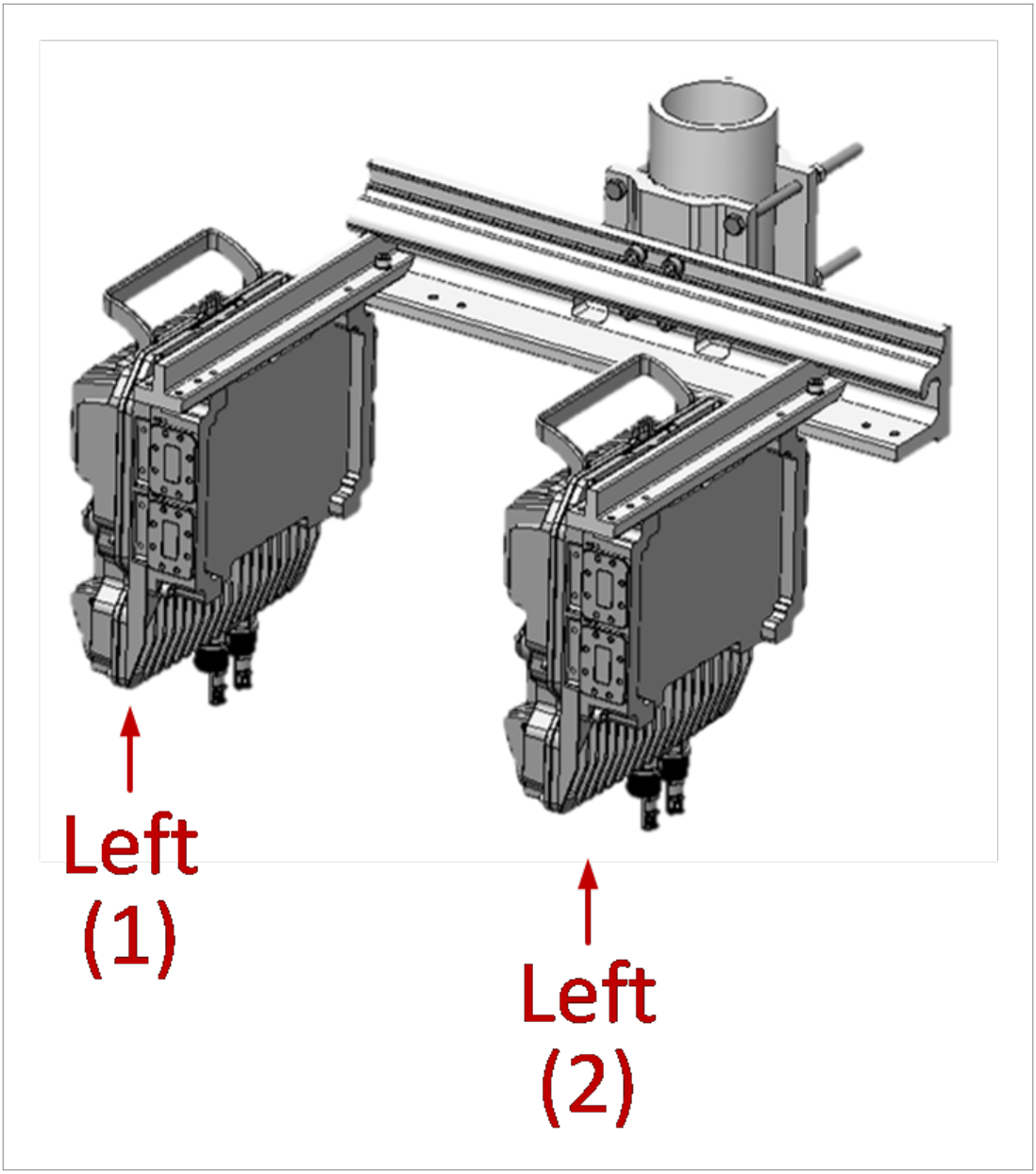
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
4	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06

Item	Description	Quantity	Marketing Model
			FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
5	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
6	RFU-D-HP Coupler Kit	2	FXDH-RM-MD-CPLR-06 FXDH-RM-MD-CPLR-7-8 FXDH-RM-MD-CPLR-11
7	Flexible Waveguides	4	

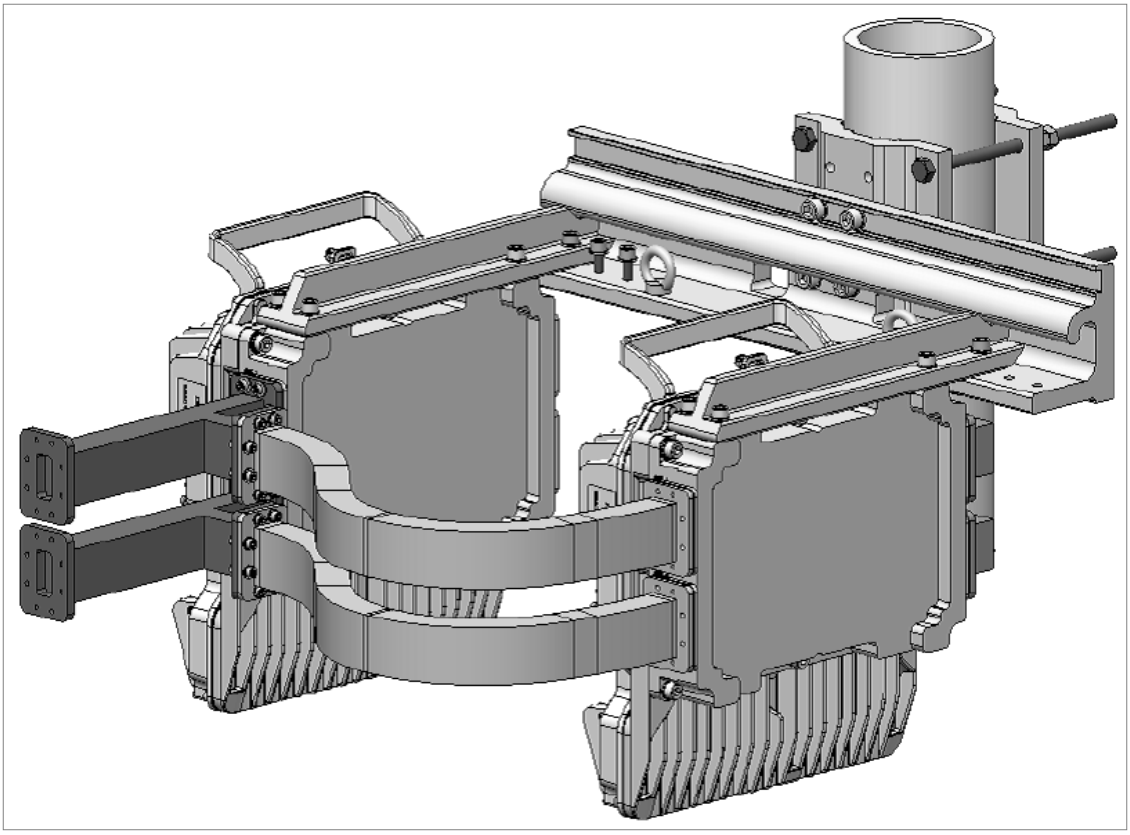
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four radio ports (EXT 1 and EXT 2 on both OCUs). See Section Assembling a Termination.
4. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect Couplers to the radio port of OCU 1 (ANT 1 and ANT 2). See Section Assembling a Splitter or Coupler for Filter-Based Branching.

- Connect flexible waveguide from the Coupler to the radio port of OCU 2 (ANT 1 and ANT 2).



5. Connect a flexible waveguide between the Couplers and Antennas.

2+2 HSB Dual Polarization

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Coupler Kit	2	FXDH-RM-MD-CPLR-06

Item	Description	Quantity	Marketing Model
			FXDH-RM-MD-CPLR-7-8 FXDH-RM-MD-CPLR-11
8	Flexible Waveguides	4	

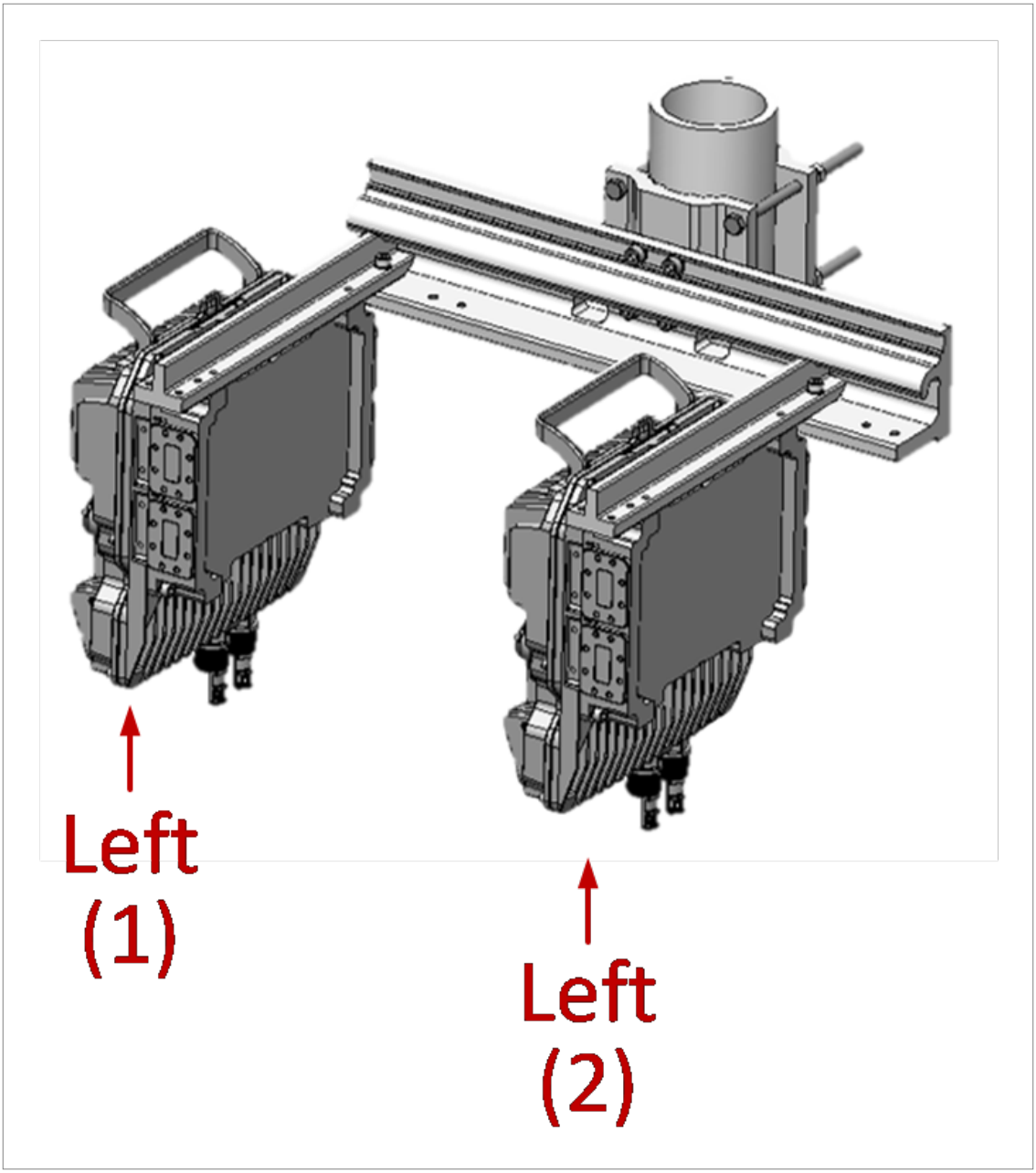
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

Note:

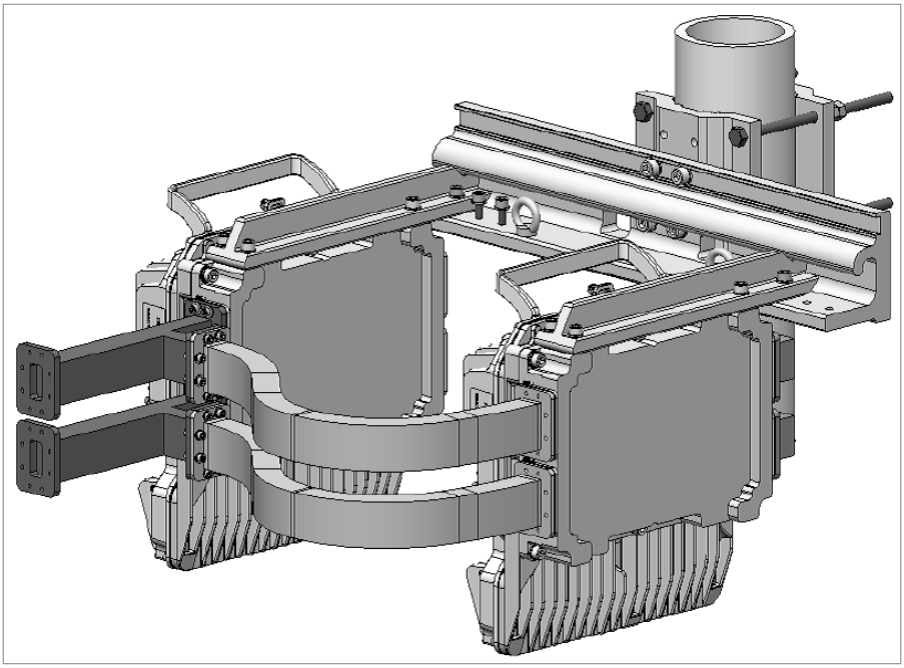
For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



4. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four radio ports (EXT 1 and EXT 2). See Section Assembling a Termination.
5. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect a Coupler to the upper and lowers radio ports of OCU 1 (ANT 1 and ANT 2). See Section Assembling a Splitter or Coupler for Filter-Based Branching.
    - Connect a flexible waveguide from the upper Coupler to the upper radio port of OCU 2 (ANT 1).

- Connect a flexible waveguide from the lower Coupler to the lower radio port of OCU 2 (ANT 2).



6. Connect the flexible waveguides between the couplers and remote plate adapter.

4+0 Dual Polarization (non-Space Diversity), Adjacent Channel

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Splitter Kit	2	FXDH-RM-MD-SPLTR-06 FXDH-RM-MD-SPLTR-7-8 FXDH-RM-MD-SPLTR-11

Item	Description	Quantity	Marketing Model
8	Flexible Waveguides	4	

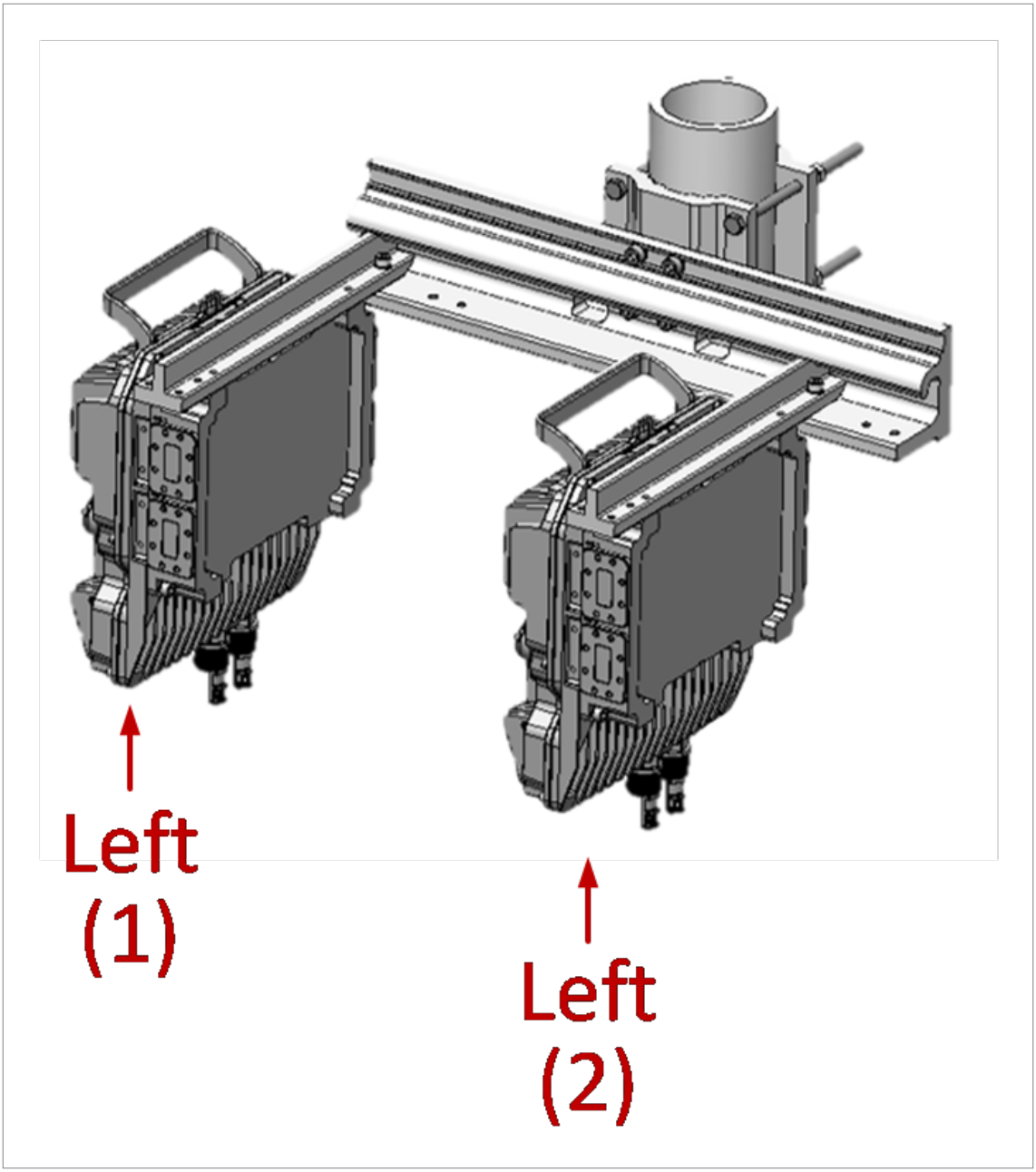
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

   Note:

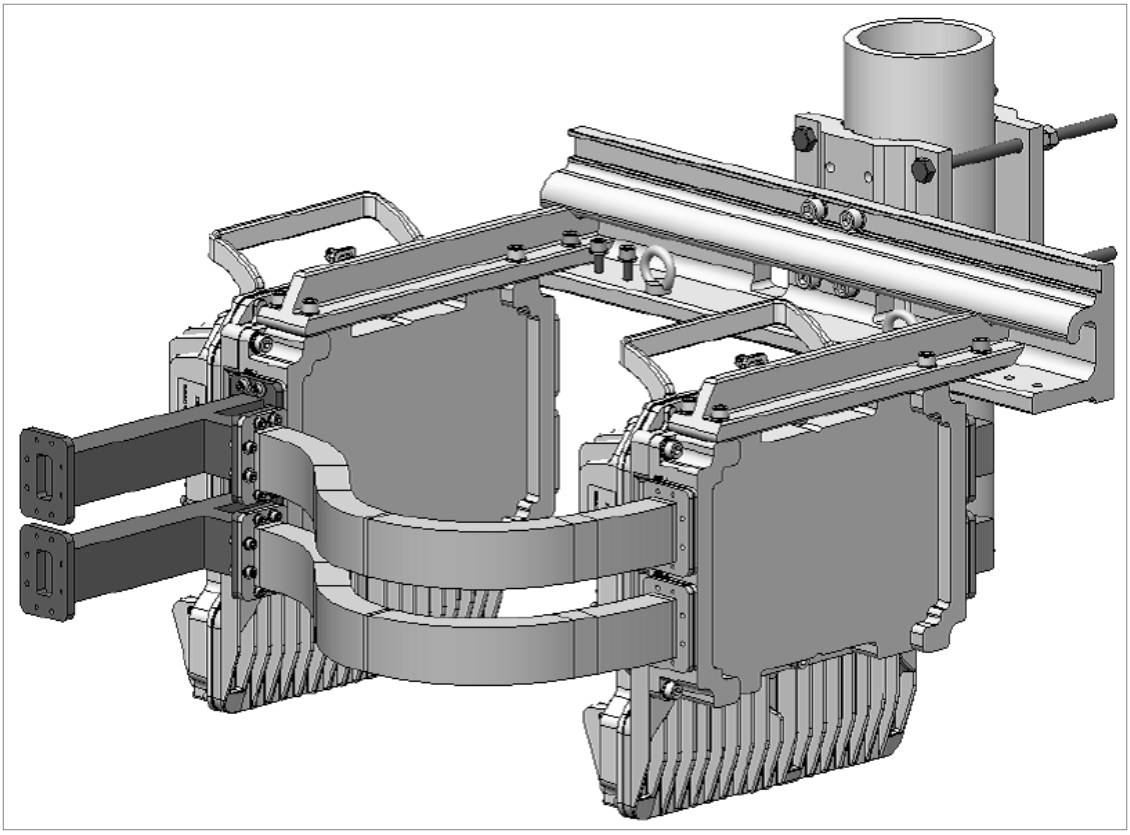
   For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



4. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four radio ports (EXT 1 and EXT 2). See Section Assembling a Termination.
5. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect a Splitter to the upper and lowers radio ports of OCU 1 (ANT 1 and ANT 2). See Section Assembling a Splitter or Coupler for Filter-Based Branching.
    - Connect a flexible waveguide from the upper Splitter to the upper radio port of OCU 2 (ANT 1).

- Connect a flexible waveguide from the lower Splitter to the lower radio port of OCU 2 (ANT 2).



6. Connect the flexible waveguides between the splitters and remote plate adapter.

2+2 HSB Single Polarization

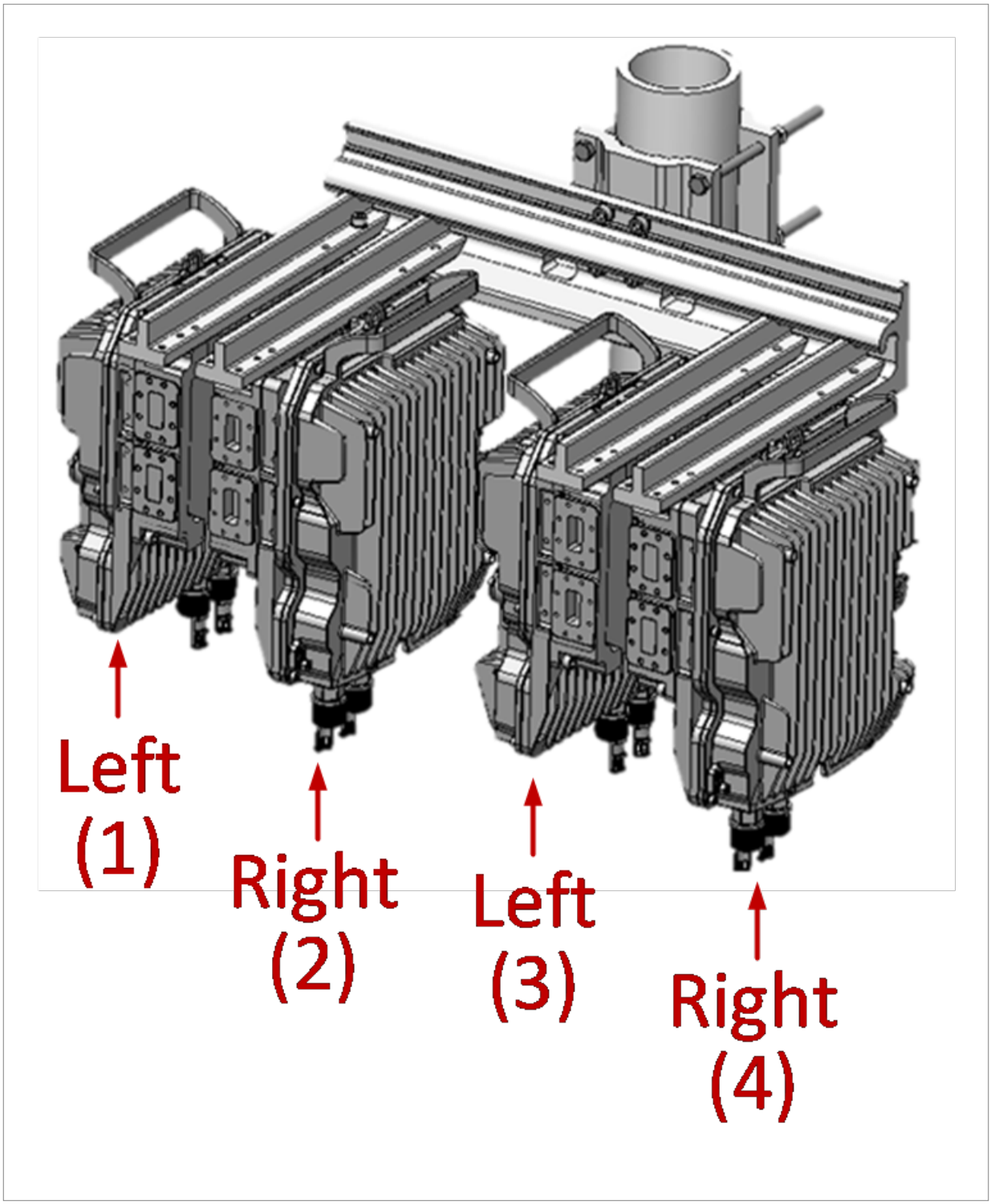
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	8	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	8	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8

Item	Description	Quantity	Marketing Model
			FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	Flexible Waveguides	2	

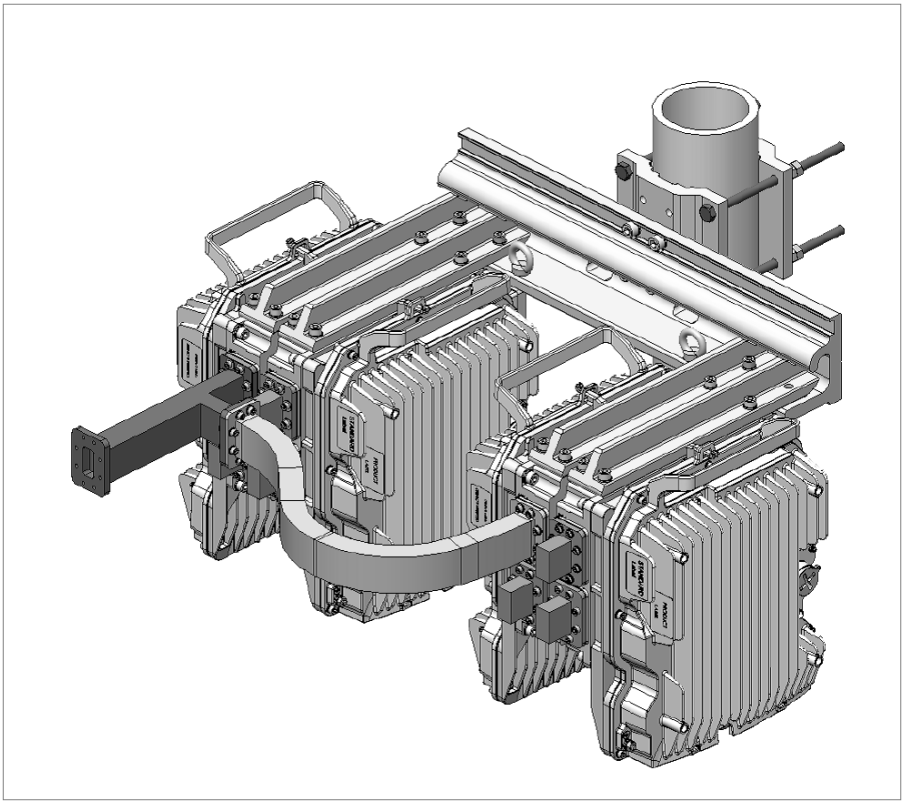
Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.

4. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to the unused radio ports (EXT1, EXT 2, and ANT 2). See Section Assembling a Termination.
5. On the side facing away from the pole (refer to the numbering in the figure above):
   - Connect a Splitter to each radio port of OCU 1 (ANT 1). See Section Assembling a Splitter or Coupler for Filter-Based Branching.
   - Connect a flexible waveguide from the upper Coupler to the upper radio port of OCU 3 (ANT 1).
   - Attach a Termination and Adaptor Plate to each of the radio ports on OCU 2 and OCU 4 (EXT 1, EXT 2, and ANT 2). See Section Assembling a Termination.



6. Connect flexible waveguide between the Coupler and the antenna.

2+2 HSB SD (BBC) Single Polarization

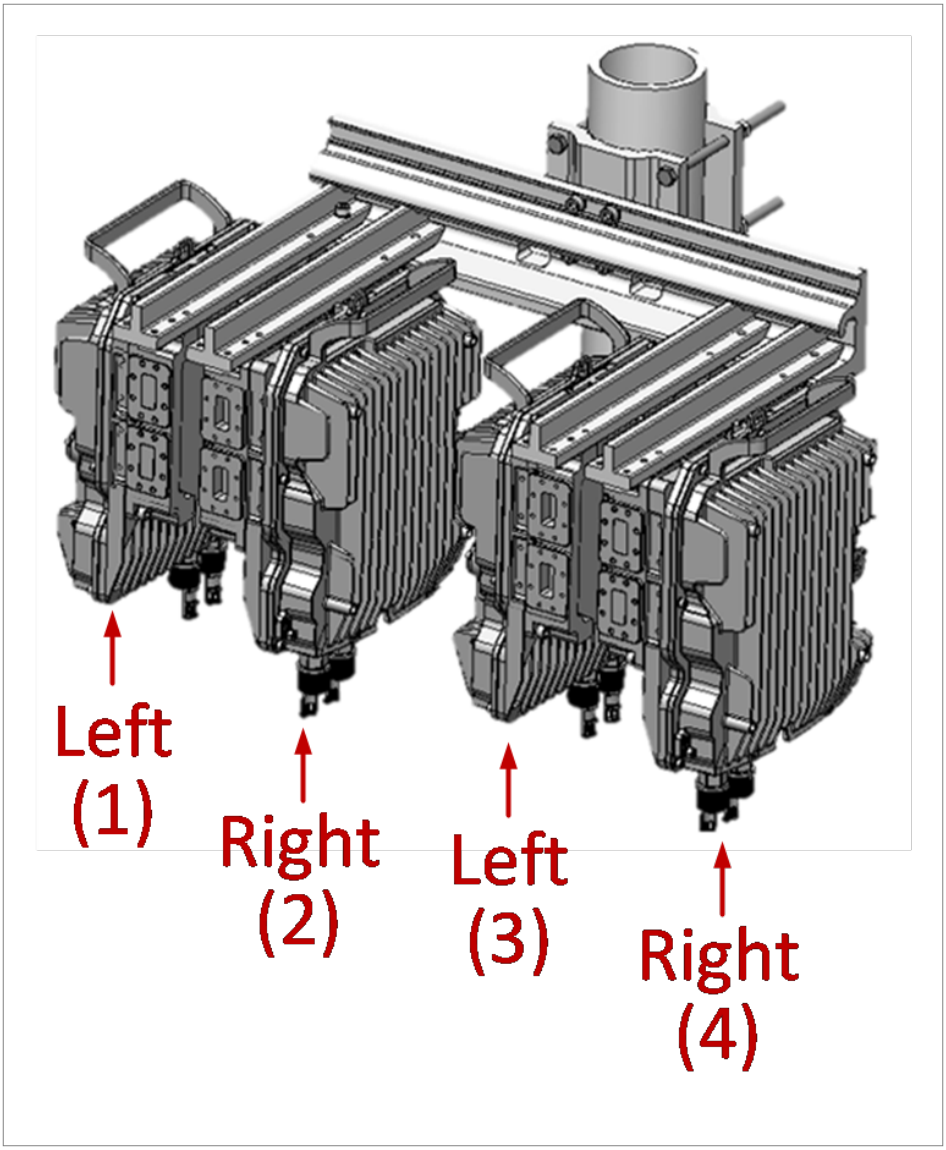
List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*

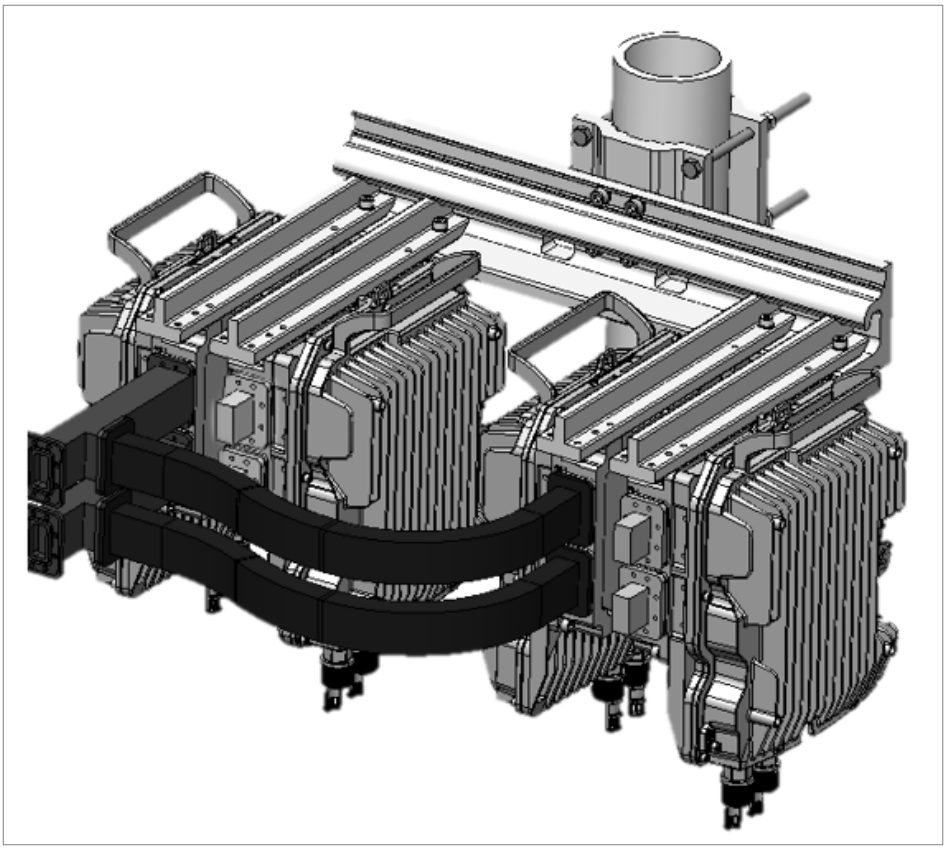
Item	Description	Quantity	Marketing Model
4	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	4	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	Flexible Waveguides	4	

Procedure

1. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
2. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
4. On the side facing away from the pole (refer to the numbering in the figure above):
   - Connect a coupler to each radio port of OCU 1 (ANT 1 and ANT 2). See Section Assembling a Splitter or Coupler for Filter-Based Branching,.
   - Connect a flexible waveguide from the upper coupler to the upper radio port of OCU 3 (ANT 1).
   - Connect a flexible waveguide from the lower coupler to the lower radio port of OCU 3 (ANT 2).
   - Attach a Termination and Adaptor Plate to each of the radio ports on OCU 2 and OCU 4 (EXT 1 and EXT 2). See Section Assembling a Termination.



5. Connect a flexible waveguide to the upper coupler and to the main antenna and another flexible waveguide to the lower coupler and to the diversity antenna.

4+4 HSB Dual Polarization

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	2	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Coupler Kit	2	FXDH-RM-MD-CPLR-06

Item	Description	Quantity	Marketing Model
			FXDH-RM-MD-CPLR-7-8 FXDH-RM-MD-CPLR-11
8	Flexible Waveguides	2	

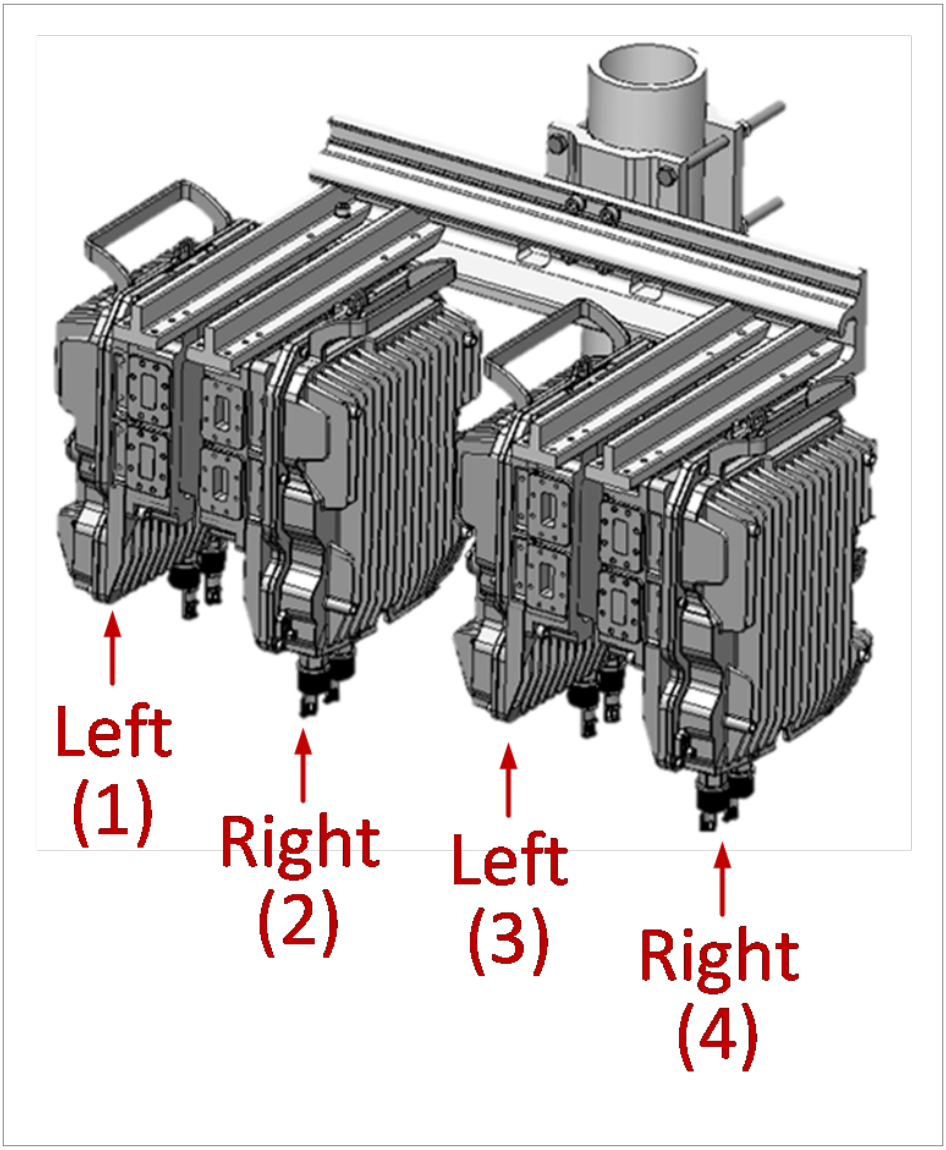
Procedure

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

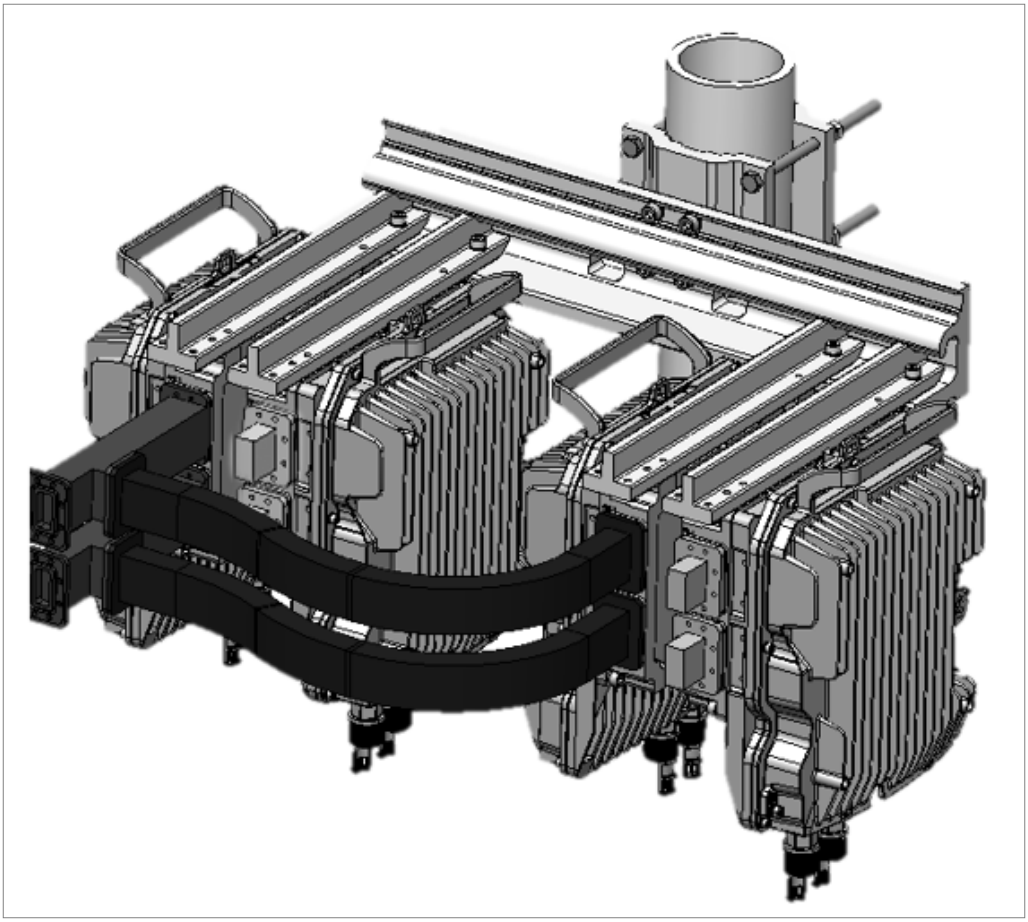
   Note:

   For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit, *Assembling the OCU Mounting Kit*.
3. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU, *Assembling the OCU*.



4. On the side of the OCU facing the pole, for each pair of adjacent OCUs attach two Short U-Bends between the adjacent radio ports. See Section Assembling a Short U-Bend.
5. On the side facing away from the pole (refer to the numbering in the figure above):
    - Connect a coupler to each radio port of OCU 1 (ANT 1 and ANT 2). See Section Assembling a Splitter or Coupler for Filter-Based Branching.
    - Connect a flexible waveguide from the upper coupler to the upper radio port of OCU 3 (ANT 1).
    - Connect a flexible waveguide from the lower Coupler to the lower radio port of OCU 3 (ANT 2).
    - Attach a Termination and Adaptor Plate to each of the radio ports on OCU 2 and OCU 4 (EXT 1 and EXT 2). See Section Assembling a Termination.



6. Connect a flexible waveguide from upper and lower couplers to Remote Plate Adapter ports.

2+0 External XPIC High Availability

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	6	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	6	FXDH-AI-V-WG-ADPT-06

Item	Description	Quantity	Marketing Model
			FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	Flexible Waveguides	2	
8	Data Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations
9	Source Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations

Note:

In this configuration, only Carrier 1 on each radio unit is active. Carrier 2 is not used.

Procedure

Note:

The software automatically considers the RFU connected to the lower slot to be the vertical RFU. For example, in a configuration using slots 3 and 4, slot 3 must be connected to the vertical RFU and slot 4 must be connected to the horizontal RFU. In a configuration using slots 5 and 6, slot 5 must be connected to the vertical RFU and slot 6 must be connected to the horizontal RFU. In a configuration using slots 7 and 8, slot 7 must be connected to the vertical RFU and slot 8 must be connected to the horizontal RFU, and so on.

This cannot be modified via the software. Therefore, it is vitally important to connect the RFU connected to the lower slot during installation as the vertical RFU and the RFU connected to the upper slot as the horizontal RFU.

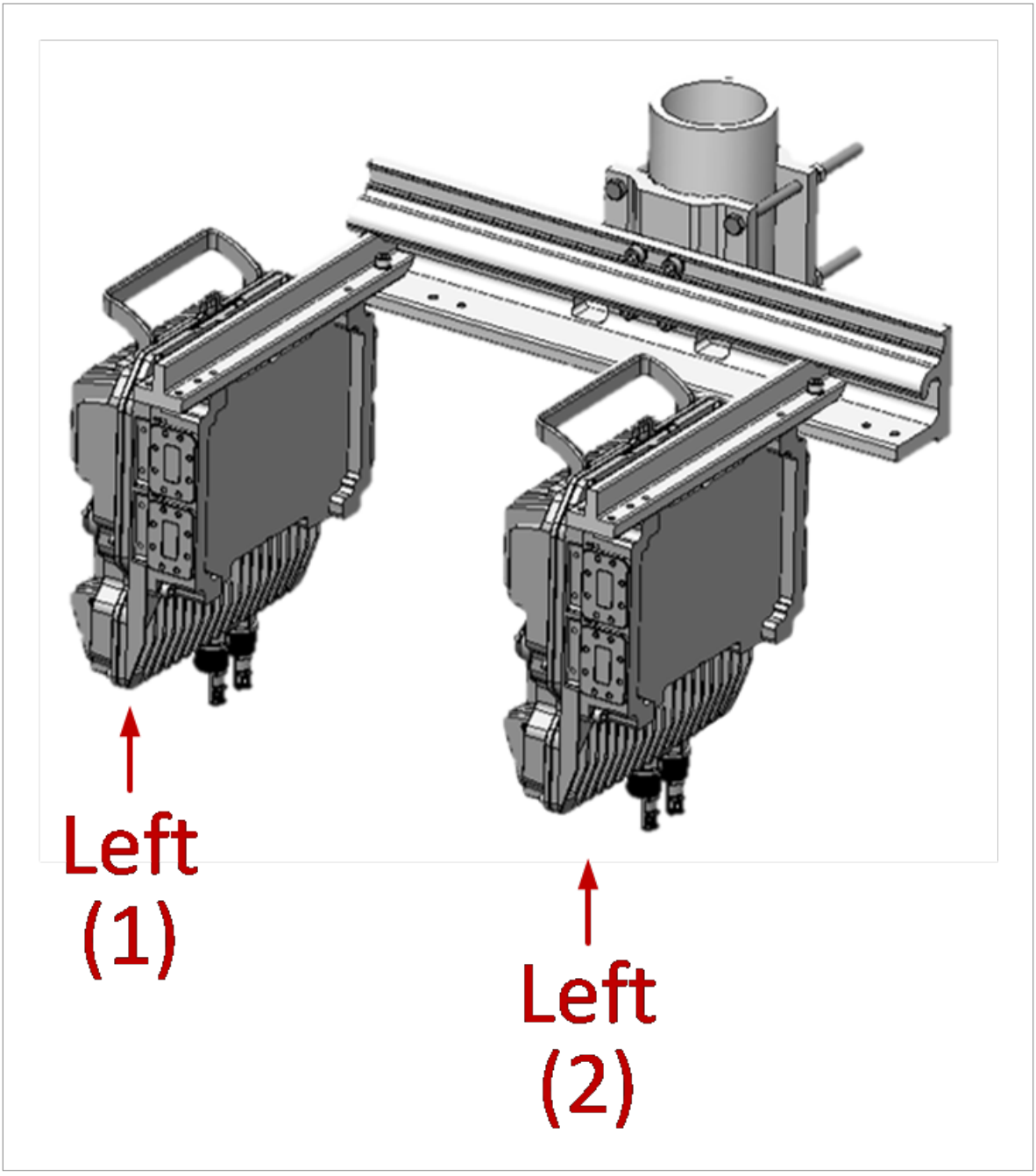
1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna, *Attaching the OMT Kit to the Antenna*.

   Note:

   For antennas with a standard interface, the OMT kit should not be used.

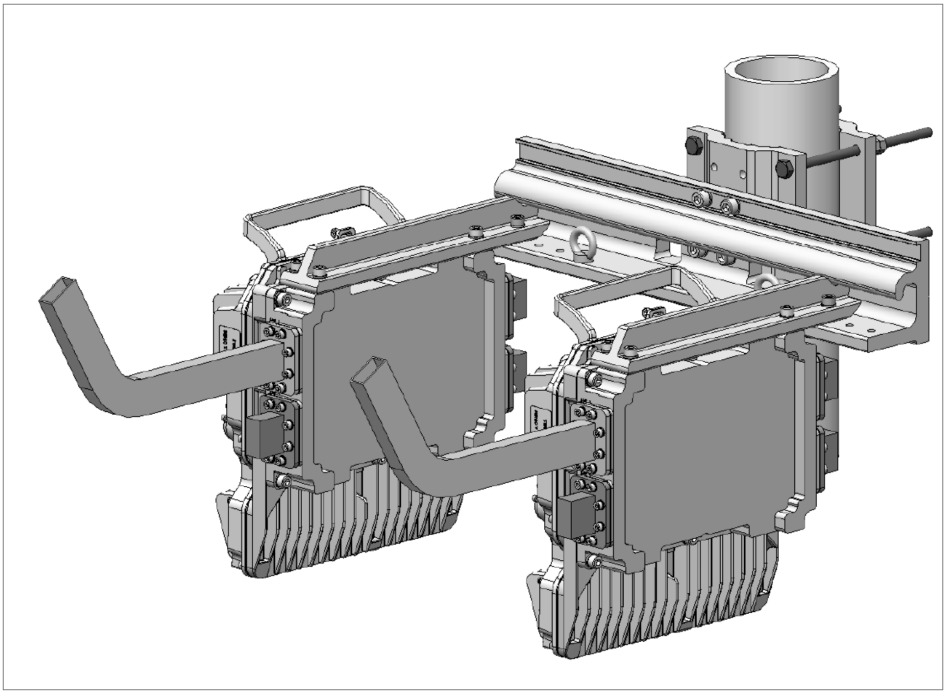
2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure.

See Section Assembling the OCU.



4. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four radio ports (EXT 1 and EXT 2). See Section Assembling a Termination.
5. On the side facing away from the pole, attach a Termination and Adaptor Plate to each lower port of OCU 1 and OCU 2 (ANT 2). See Section Assembling a Termination.

6. On the side facing away from the pole (refer to the numbering in the figure above), connect a flexible waveguide to each upper radio port of OCU 1 and OCU 2 (ANT 1).



7. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

4+0 External XPIC High Availability

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	4	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	4	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	10	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	10	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8

Item	Description	Quantity	Marketing Model
			FXDH-AI-V-WG-ADPT-11
7	RFU-D-HP Branching Short U-Bend Kit	2	FXDH-RM-U-Bend-06 FXDH-RM-U-Bend-7-8 FXDH-RM-U-Bend-11
8	Flexible Waveguides	2	
9	Data Sharing Cable	2	See Section Cables for External XPIC, External SD, and ASD Configurations
10	Source Sharing Cable	2	See Section Cables for External XPIC, External SD, and ASD Configurations

Note:

In this configuration, only Carrier 1 on each radio unit is active. Carrier 2 is not used.

Procedure

Note:

The software automatically considers the RFU connected to the lower slot to be the vertical RFU. For example, in a configuration using slots 3 and 4, slot 3 must be connected to the vertical RFU and slot 4 must be connected to the horizontal RFU. In a configuration using slots 5 and 6, slot 5 must be connected to the vertical RFU and slot 6 must be connected to the horizontal RFU. In a configuration using slots 7 and 8, slot 7 must be connected to the vertical RFU and slot 8 must be connected to the horizontal RFU, and so on.

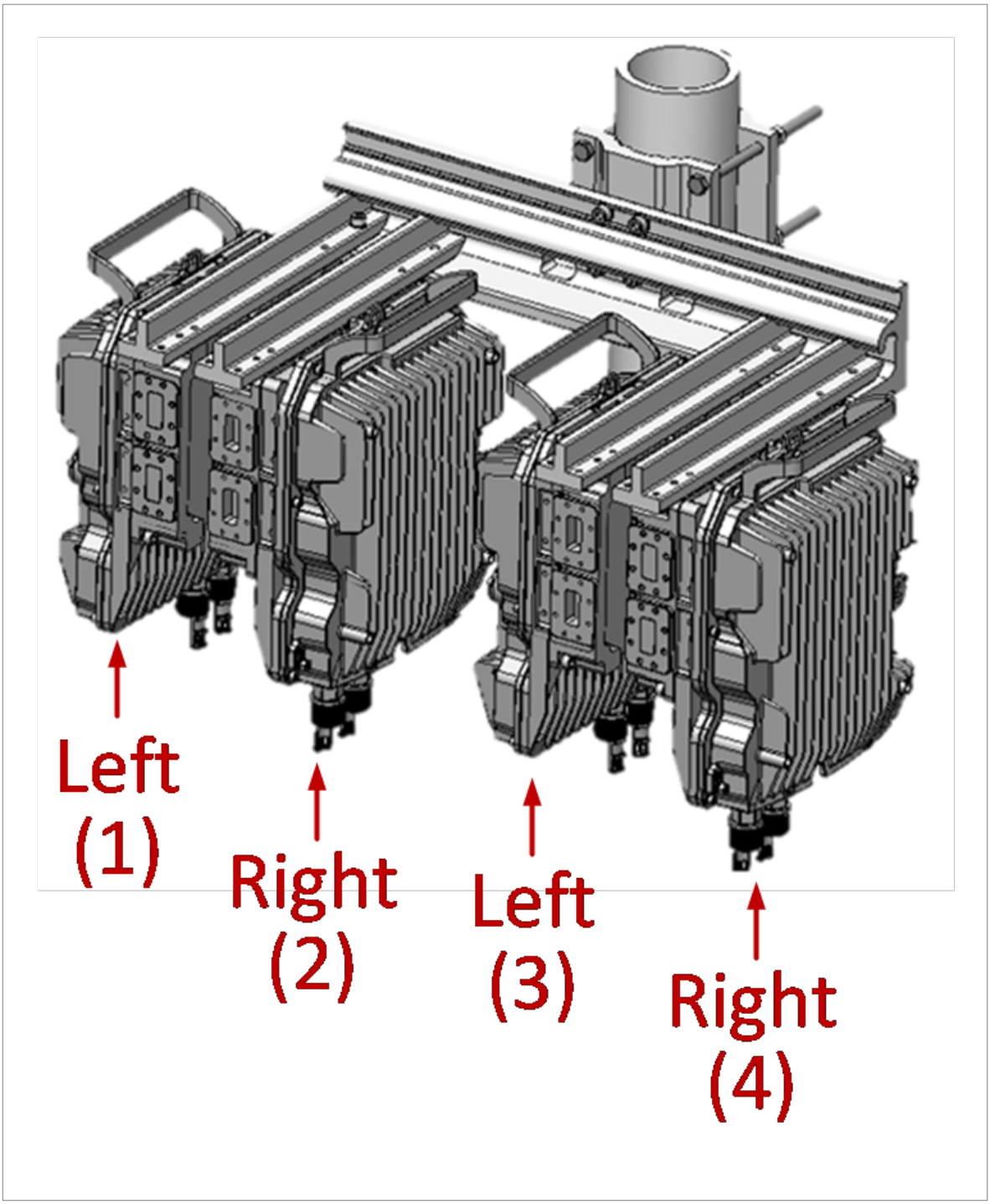
This cannot be modified via the software. Therefore, it is vitally important to connect the RFU connected to the lower slot during installation as the vertical RFU and the RFU connected to the upper slot as the horizontal RFU.

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

   Note:

   For antennas with a standard interface, the OMT kit should not be used.

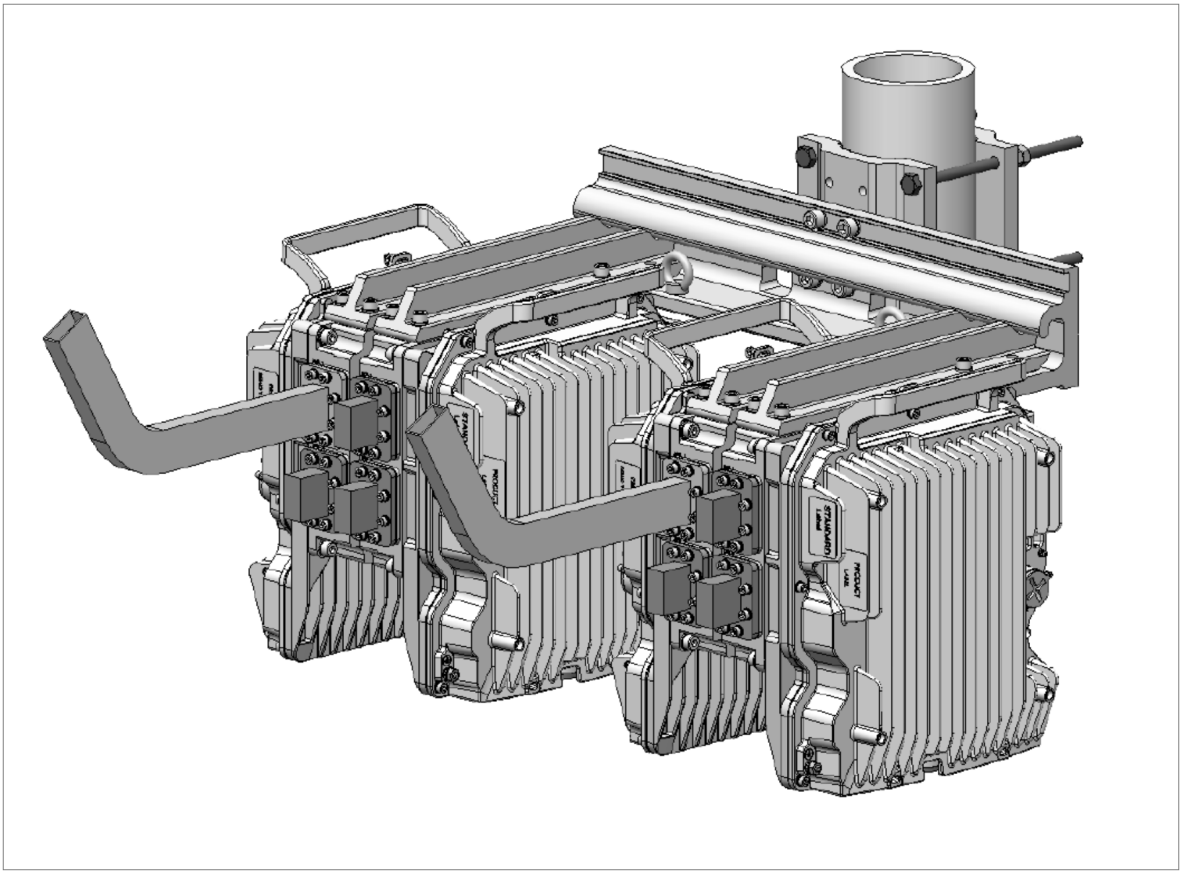
2. Assemble four OCUs, two using a Left Rail Configuration and two using a Right Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



3. On the side of the OCU facing the pole:
   - Attach Short U-Bends between the upper ports of coupled OCUs. See Section Assembling a Short U-Bend.

- Attach a Termination and Adaptor Plate to each of the lower OCU ports (EXT 2). See Section Assembling a Termination.

4. On the side facing away from the pole:
   - Attach flexible waveguide to each upper radio port of both left OCUs (ANT 1).
   - Attach a Termination and Adaptor Plate to all OCUs lower ports (ANT 2). See Section Assembling a Termination.
   - Attach a Termination and Adaptor Plate to each radio port of the right OCUs (ANT 1 and ANT 2). See Section Assembling a Termination.



5. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

2+0 External XPIC with Space Diversity (Internal)

Note:

For this configuration, you can use a Space Diversity-optimized hardware option. The single-transmitter, dual-receiver marketing models are identified by the letters “-SD” at the end of the marketing model. See Section Marketing Models for Radio Unit .

List of Items

Item	Description	Quantity	Marketing Model
1	RFU-D-HP Radio Unit	2	See Section Marketing Models for Radio Unit
2	RFU-D-HP Branching Pole Profile	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
3	RFU-D-HP Branching Pillar	1	Part of OCU Mounting kit, *FXDH-RM-MOUNT-kit*
4	RFU-D-HP OCU Kit	2	See Section Marketing Models for OCU Unit
5	RFU-D-HP Termination Kit	4	FXDH-RM-TERM-06 FXDH-RM-TERM-7-8 FXDH-RM-TERM-11
6	Adaptor Plate	4	FXDH-AI-V-WG-ADPT-06 FXDH-AI-V-WG-ADPT-7_8 FXDH-AI-V-WG-ADPT-11
7	Flexible Waveguides	4	
8	Data Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations
9	Source Sharing Cable	1	See Section Cables for External XPIC, External SD, and ASD Configurations

Procedure

Note:

The software automatically considers the RFU connected to the lower slot to be the vertical RFU. For example, in a configuration using slots 3 and 4, slot 3 must be connected to the vertical RFU and slot 4 must be connected to the horizontal RFU. In a configuration using slots 5 and 6, slot 5 must be connected to the vertical RFU and slot 6 must be connected to the horizontal RFU. In a configuration using slots 7 and 8, slot 7 must be connected to the vertical RFU and slot 8 must be connected to the horizontal RFU, and so on.

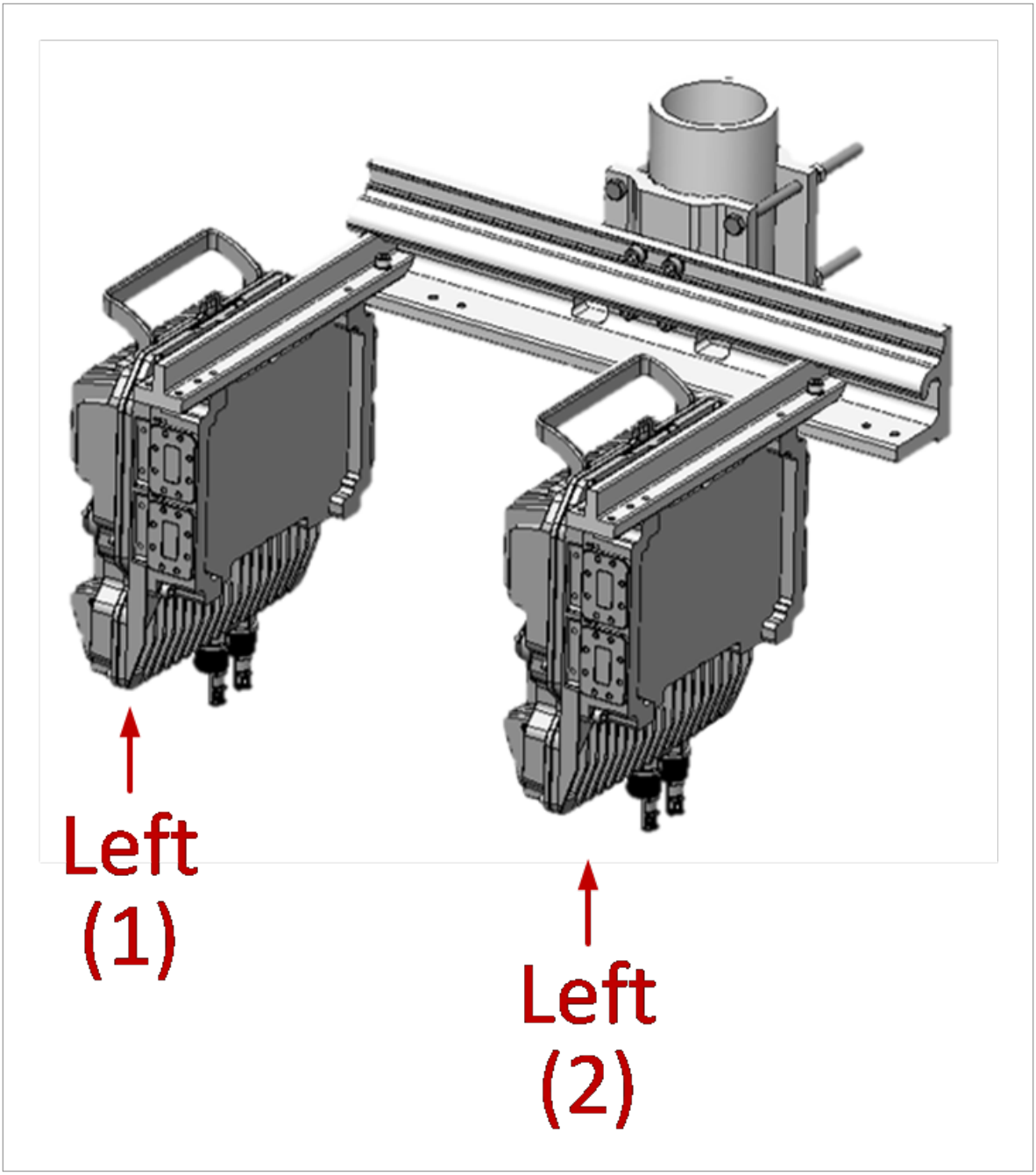
This cannot be modified via the software. Therefore, it is vitally important to connect the RFU connected to the lower slot during installation as the vertical RFU and the RFU connected to the upper slot as the horizontal RFU.

1. When using a Cambium Direct Mount antenna for a remote mount configuration, connect the OMT to the antenna. See Section Attaching the OMT Kit to the Antenna.

Note:

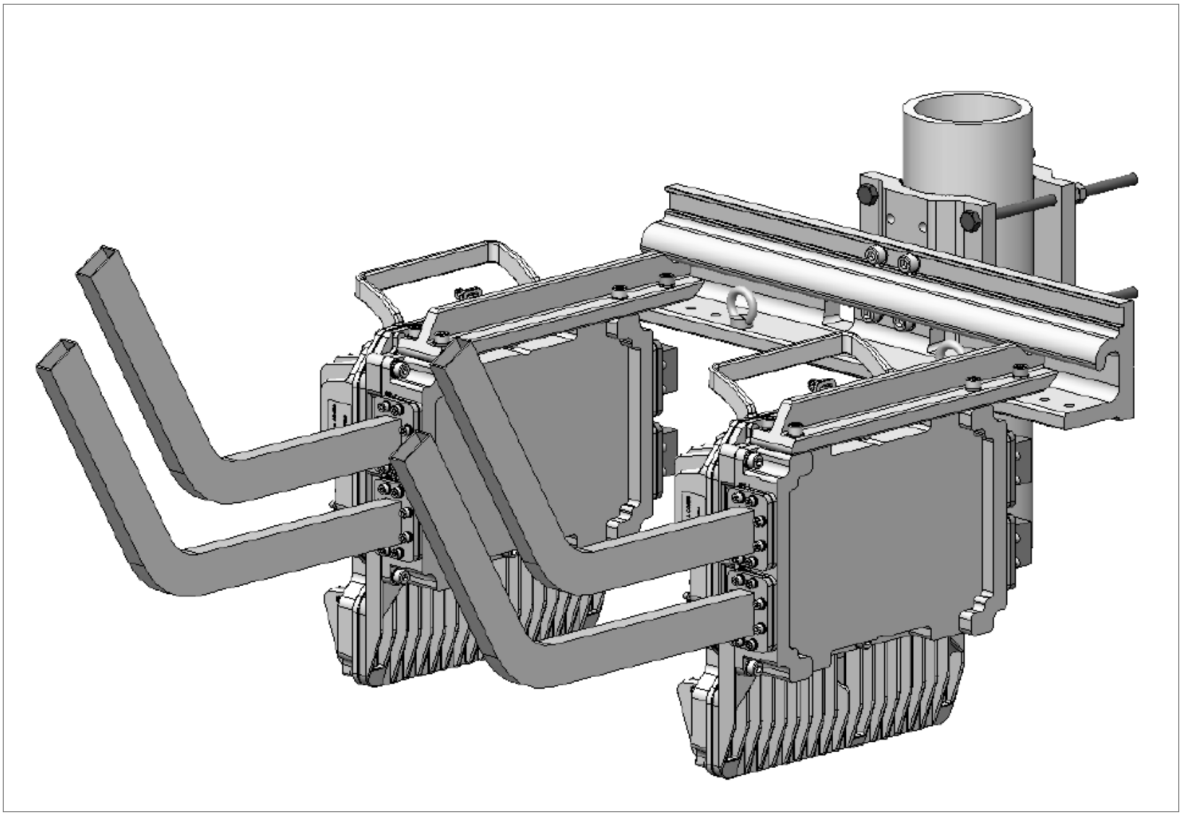
For antennas with a standard interface, the OMT kit should not be used.

2. Assemble the OCU Mounting Kit. See Section Assembling the OCU Mounting Kit.
3. Assemble two OCUs, both using a Left Rail Configuration. Attach an RFU-D-HP radio to each OCU, and connect the radio-OCU assemblies to the Branching Pole Profile as shown in the following figure. See Section Assembling the OCU.



4. On the side of the OCU facing the pole, attach a Termination and Adaptor Plate to each of the four ports (EXT 1 and EXT 2). See Section Assembling a Termination, *Assembling a Termination*.

5. On the side facing away from the pole (refer to the numbering in the figure above), Connect a flexible waveguide to each port of OCU 1 and OCU 2 (ANT 1 and ANT 2).



6. If External XPIC and/or External Space Diversity is used, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

Configuration Instructions for Vertical All-Indoor Configurations

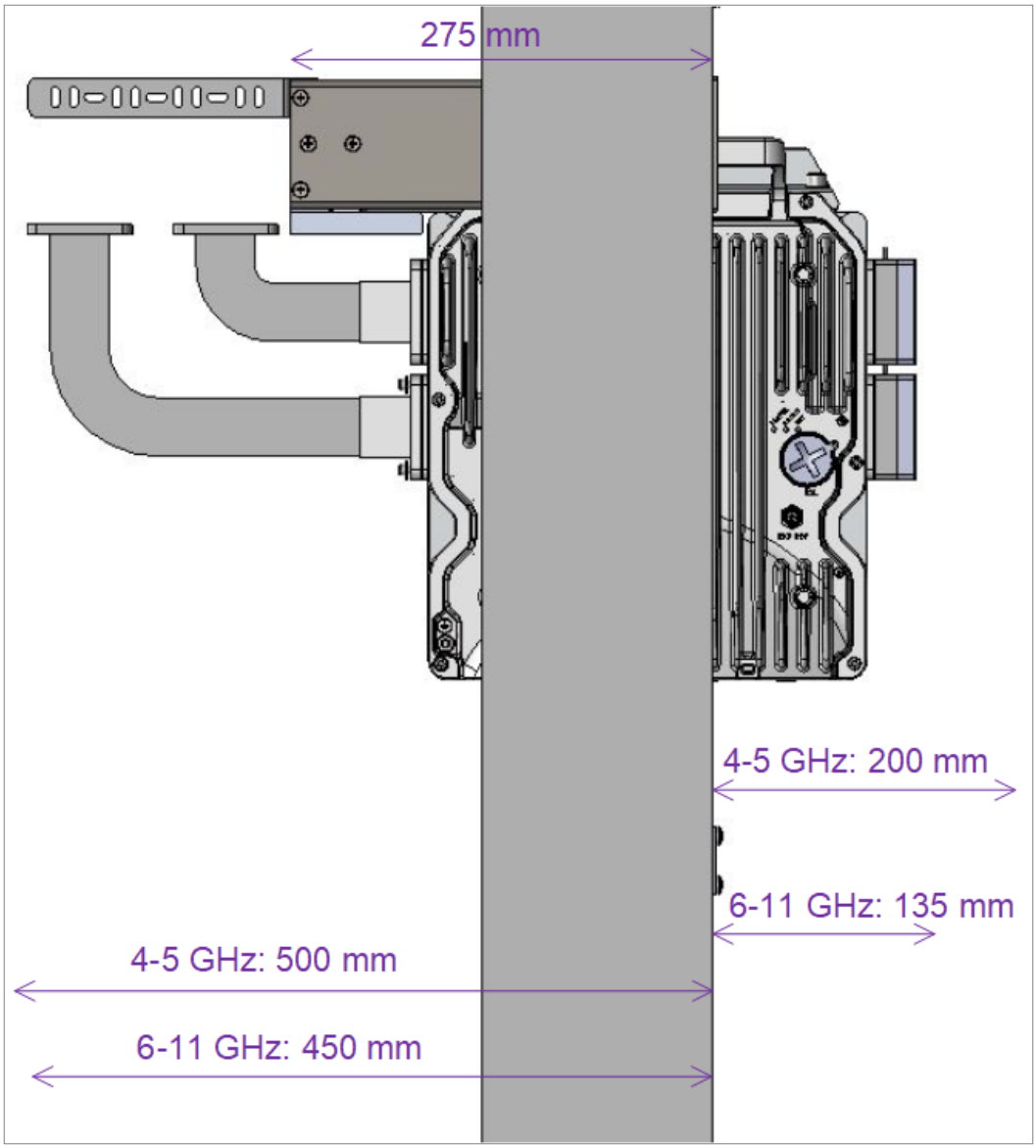
This section provides assembly instructions for an RFU-D-HP Vertical All-Indoor configuration in a 19 inch open rack. Configurations are site-specific but all use the same building blocks and the same method of installation described in this section.

When installing the rack, make sure to leave the following minimum distances from the rack rails to the wall, as indicated in the figure below:

- 6 to 11 GHz: 450 mm
- 4, 5 GHz: 500 mm

On the other side, make sure to leave the following minimum distances from the wall or any other obstacle, as indicated in the figure below:

- 6 to 11 GHz: 135 mm
- 4, 5 GHz: 200 mm



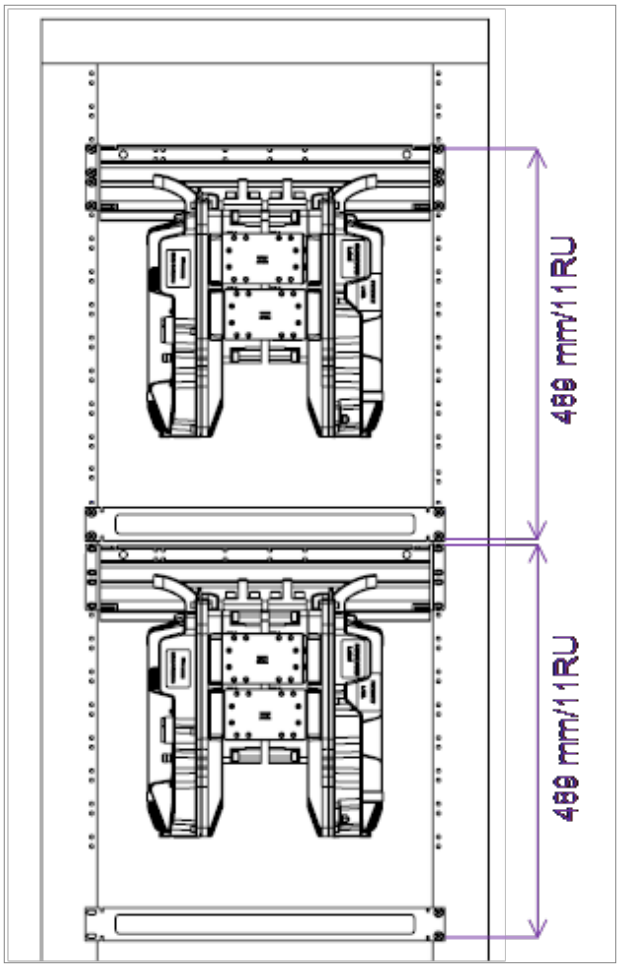
Make sure to leave a minimum distance of 489 mm/11RU between the vertical mounting and the lower side of the cable management rail, as indicated in the figures below, in order to allow minimum bend of the connected cables. This applies to each level of the rack.

For configurations that require splitters or couplers, in order for the antenna port to be aligned with the top of the rack, the upper level vertical mounting brackets should be installed 3 RU from the top of the rack.

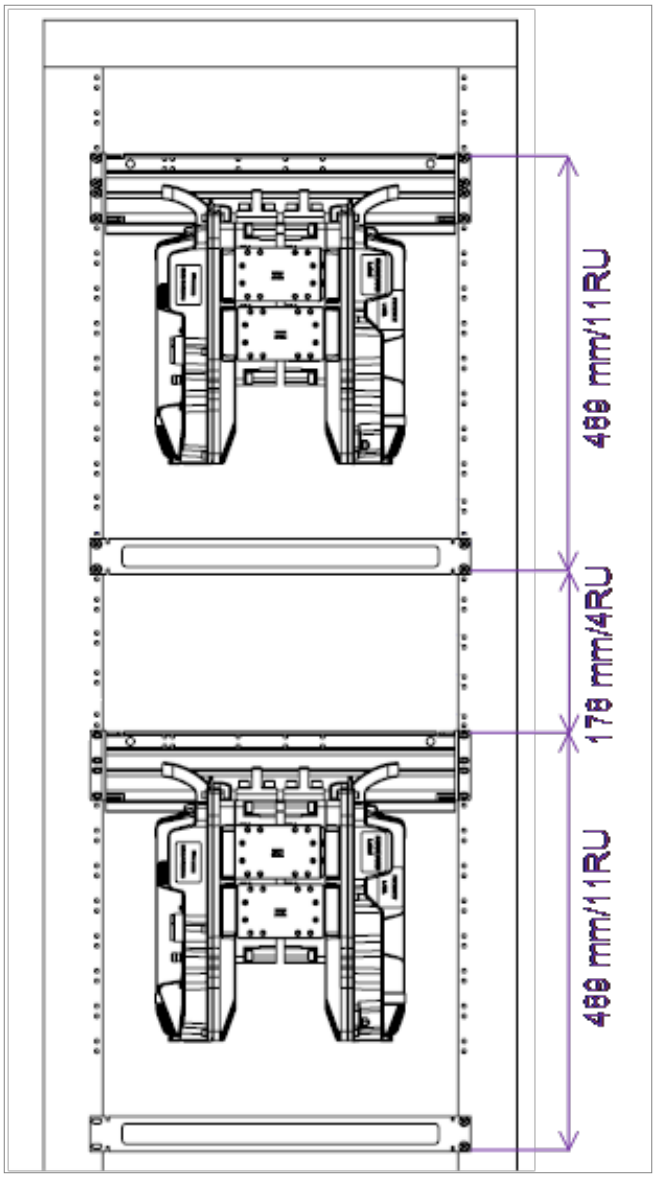
For configurations that require splitters or couplers, 178 mm/4RU should be left between the cable management rail and the mounting bracket underneath it, as shown below in the figure on the right.

For configurations that do not require splitters or couplers, the cable management rail can be flush with the mounting bracket underneath it, as shown below in the figure on the left.

For configurations not requiring splitters or couplers.



For configurations requiring splitters or couplers.



Vertical All-Indoor Configurations – Component Assembly

Assembling the Vertical All-Indoor Mounting Kit

The vertical all-indoor mounting kit has the following marketing model:

- FXDH-AI-V-MOUNT-1-kit

The components listed below are included in the vertical all-indoor mounting kit.

List of Items

Item	Description	Quantity
1	RFU-D-HP Vertical All-Indoor Installation Side Brackets	2 per kit
2	Screw, Phillips Flat head DIN 965-M5x10-A2-70-H	8 Per Kit
3	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1 Per Kit
4	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Flex WG holder	2 Per Kit
5	Screw, Phillips Pan head SS DIN 7985-M6x16-A2-70-H	4 Per Kit
6	Washer, Plain, SS DIN 125-A6.4-A2-70	4 Per Kit

Required Tools

- Metric Allen key set
- Phillips screw driver

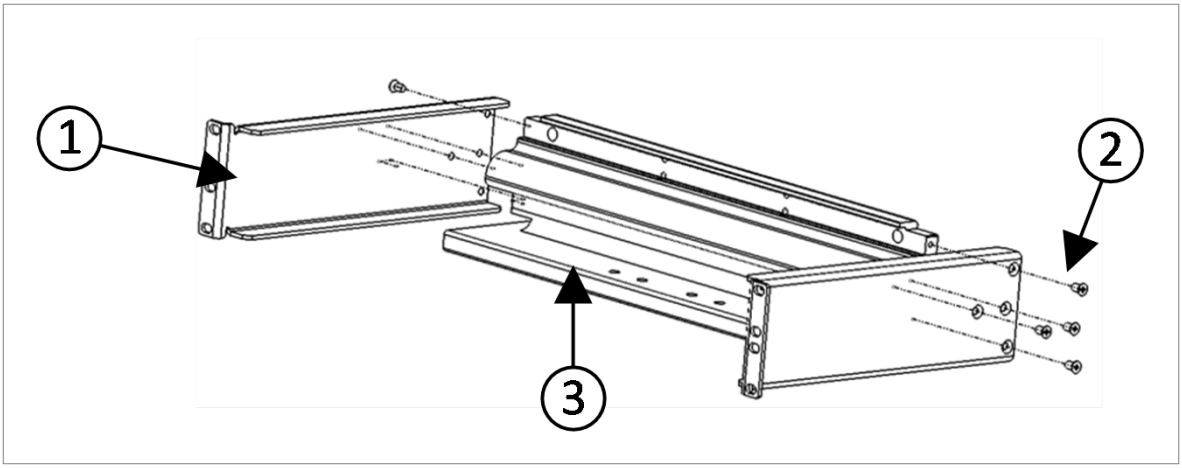
Required Torque

- M6 socket hex screws – 7 Nm
- M5 Screw, Phillips Flat head - 3.4Nm

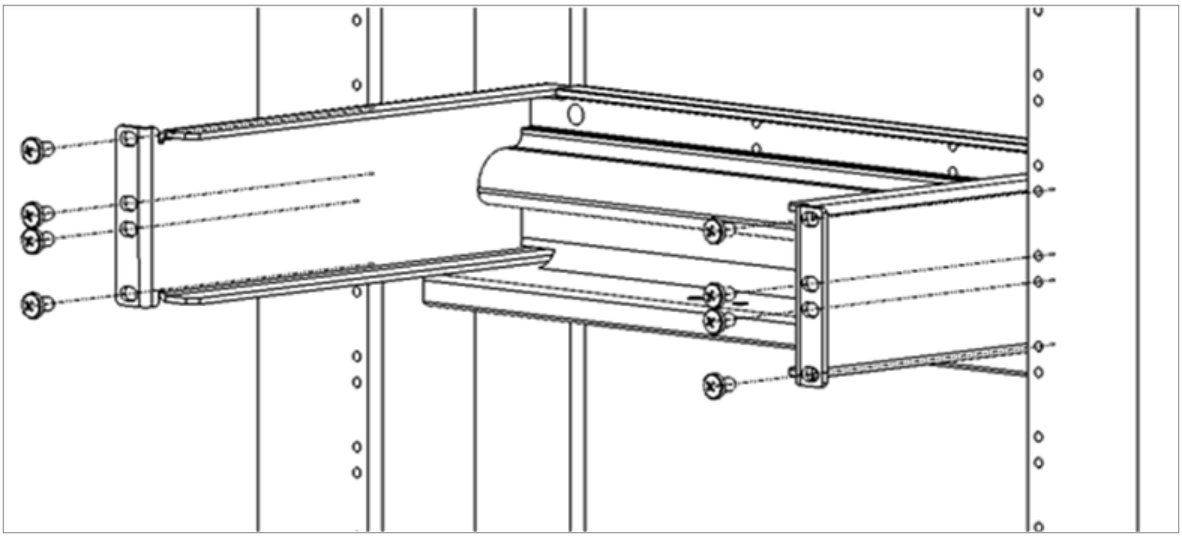
Procedure

1. Assemble the vertical profile (MA-3635-X) to the Side Brackets (MA-0981-X) and fasten them using the screws (JA-0219-X).

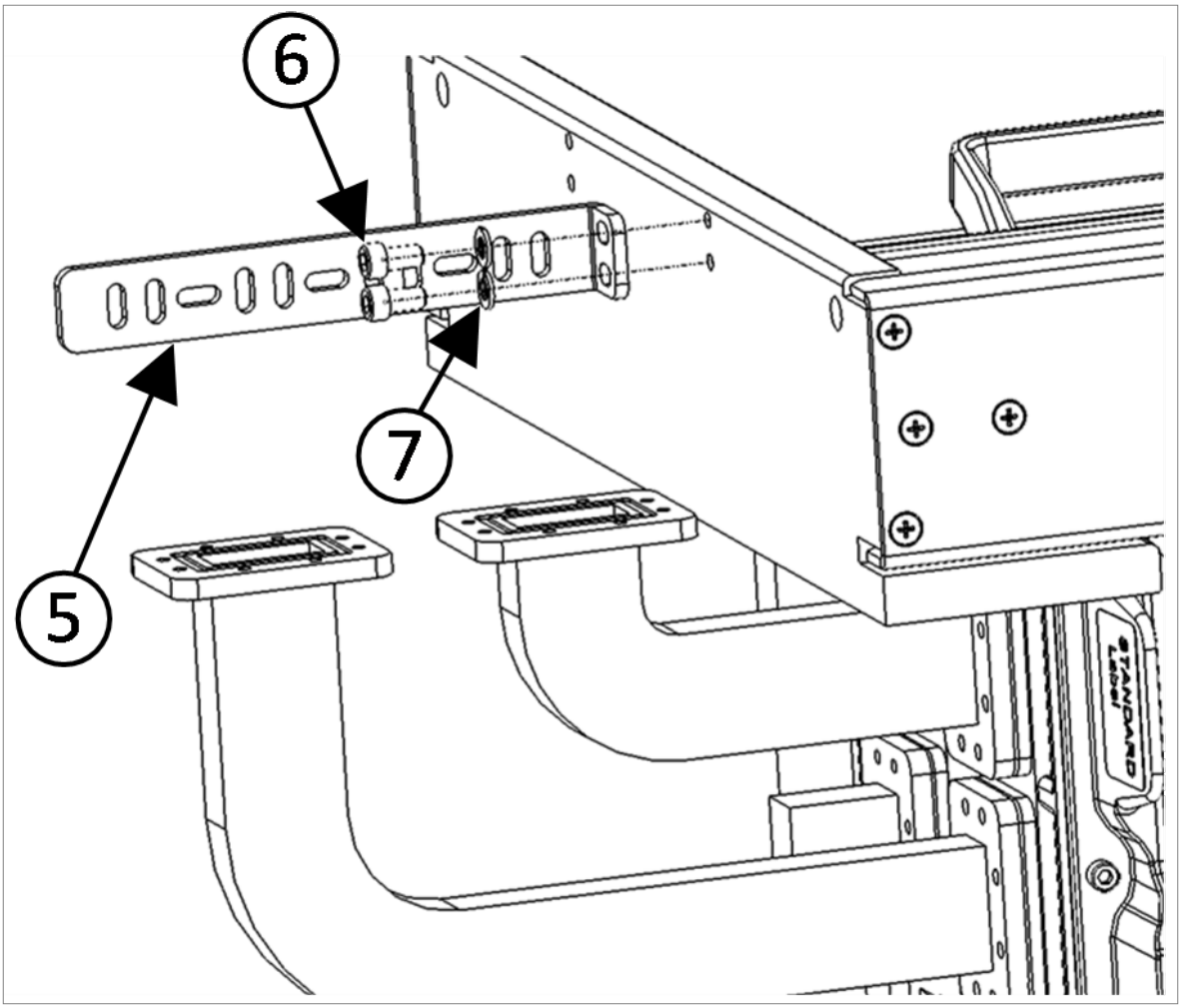
   Figure 70: *Sub-Rack Assembly for Vertical All-Indoor Configurations*

2. Assemble the above assembly to the 19” open Rack, and fasten using 8 screws with a maximum diameter of 7mm (NOT supplied with kit).



3. Fasten the L-Bracket (MA-3934-X) to the Vertical profile (MA-3635-X) using screws (JA-0150-X) and washers (JC-0061-X). The flexible WG can then be safely secured to the L-Bracket using tie wraps.

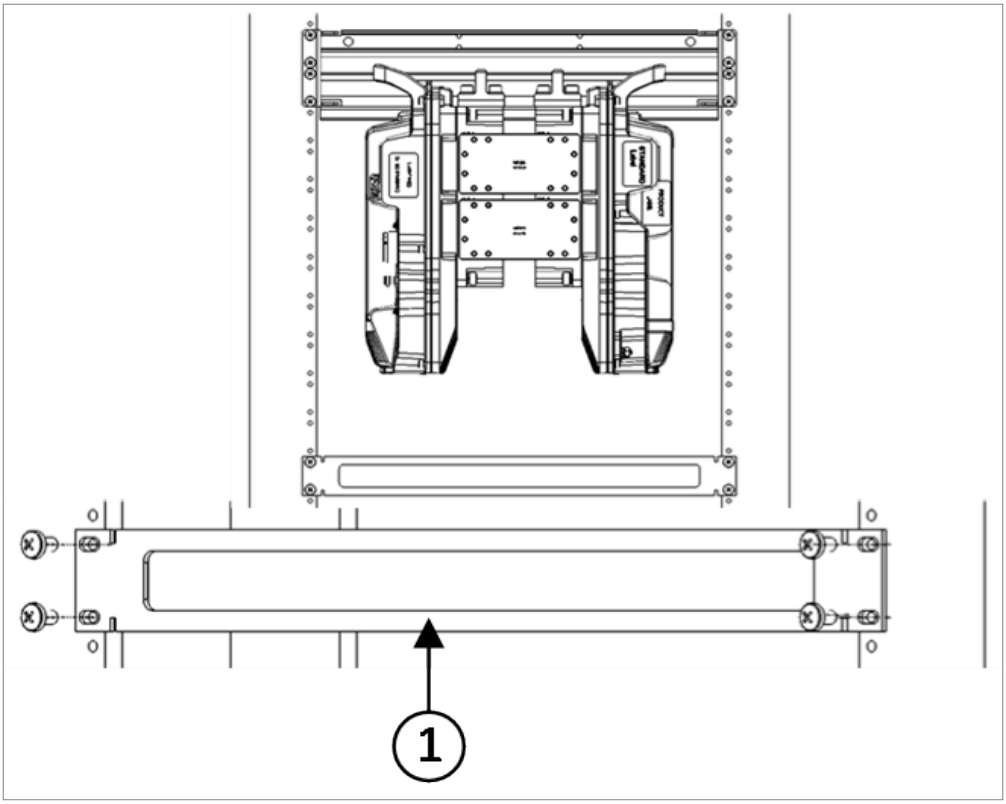


Assembling the 1U Cable Management Panel

A 1 U cable management panel can be attached at the operator's discretion to assist with the RFU-D-HP cable management. The panel is attached using 4 screws with a maximum diameter of 5.94mm (the screws are NOT supplied with the kit).

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor 1RU cable management lacer bar	1 per kit, depending on configuration	Included with N060082L287A



Assembling the Vertical L-Bends

The Vertical L-Bends are sold in kits with the following marketing models:

- Long L-Bend kits: FXDH-AI-V-L-Bend-2-*ff*
- Short L-Bend kits: FXDH-AI-V-L-Bend-1-*ff*

The components listed below are included in these kits.

List of Items

Item	Description	Quantity
1	RFU-D-HP Vertical All-Indoor Mount - XGhz Short L-BEND	
	RFU-D-HP Vertical All-Indoor Mount - XGhz Long L-BEND	
2	Socket HEX HD cap & helical washer, SS, ~DIN 912-M6x20-A2-70 and ~DIN 127-B6-A2-70 (4-5 GHz) #10-32 Socket Hex Screws (6 GHz) #8-32 (7-11 GHz)	10 Per L-Bend Kit (4-5 GHz) 8 Per L-Bend Kit (6-11 GHz)
3	Washer, Helical spring lock, SS,ANSI,#10 (6 GHz) Washer, Helical spring lock, SS,ANSI,#8 (7-11 GHz) Note: For 4-5 GHz, the washers are listed with the screws above.	8-10 Per L-Bend Kit (4-5 GHz) 8 Per L-Bend Kit (6-11 GHz)

Assemble the short L-Bend to the upper “ANT” port (ANT 1) of the RFU-D-HP OCU.

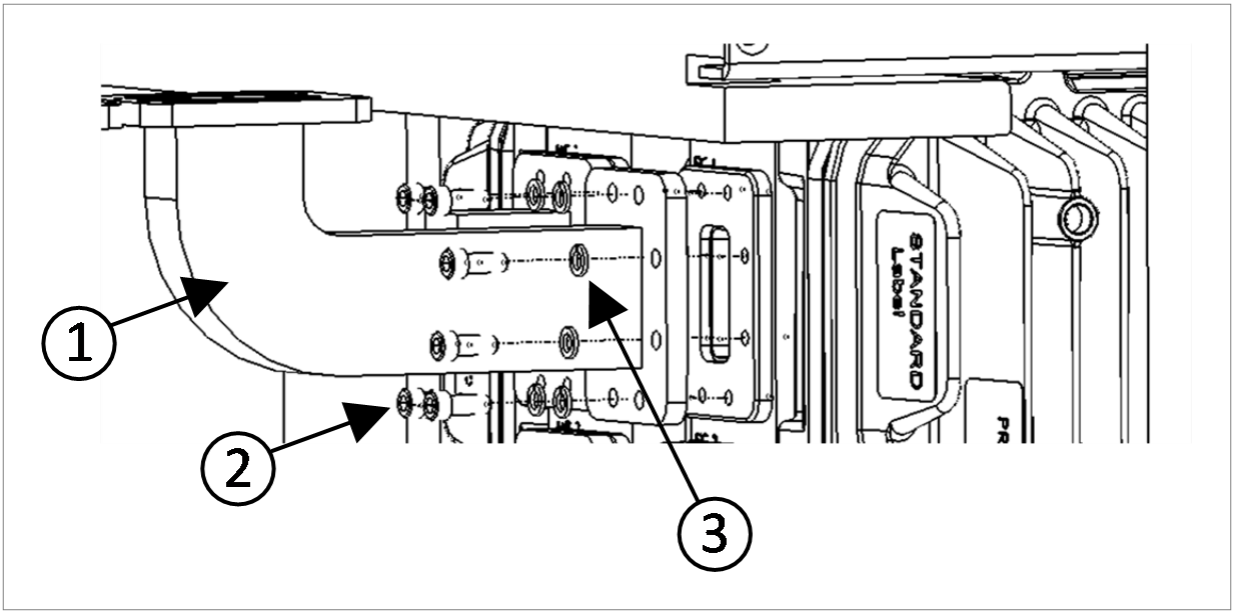
Assemble the long L-Bend (when required) to the lower “ANT” port (ANT 2) of the RFU-D-HP OCU.

Required Tools

- Imperial Allen key set

Required Torque

- Socket HEX HD cap & helical washer – 6.5 Nm
- #8-32 socket hex screws – 3 Nm
- #10-32 socket hex screws – 5.4 Nm



Note:

The ridged side of the L-Bend should face the OCU.

Installing an Adaptor Plate

Certain configurations require an Adaptor Plate. This plate is used to prevent PIM (Passive Intermodulation) and improve Return Loss of the interfaces.

An adaptor plate can be used between the following components:

- Between a Flexible Waveguide and L-Bend where the other side of the Flexible Waveguide is attached to an antenna
- Between a Flexible Waveguide and OCU, when the waveguide is longer than five meters
- Between a Termination and OCU

An Adaptor Plate is not required when connecting a Flexible Waveguide to the secondary or antenna side of a Splitter or Coupler.

The following table lists the available kits for the adaptor plate, per frequency. Each kit includes a set of screws, flat washers, and helical washers. These should be used in place of the screws and washers provided with the relevant mediation device, since adding the adaptor plate increases the length of screw required.

Table 34 *Adaptor Plate Marketing Models*

Frequency	Marketing Model	Description
6 GHz	N060082L294A	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, 06 GHz
7-8 GHz	FXDH-AI-V-WG-ADPT-7_8	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, 7_8 GHz
10-11 GHz	FXDH-AI-V-WG-ADPT-11	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, 11 GHz

The following figures show the position of the adaptor plate in each scenario in which it is used.

Figure 71: *Flexible Waveguide and L-Bend*

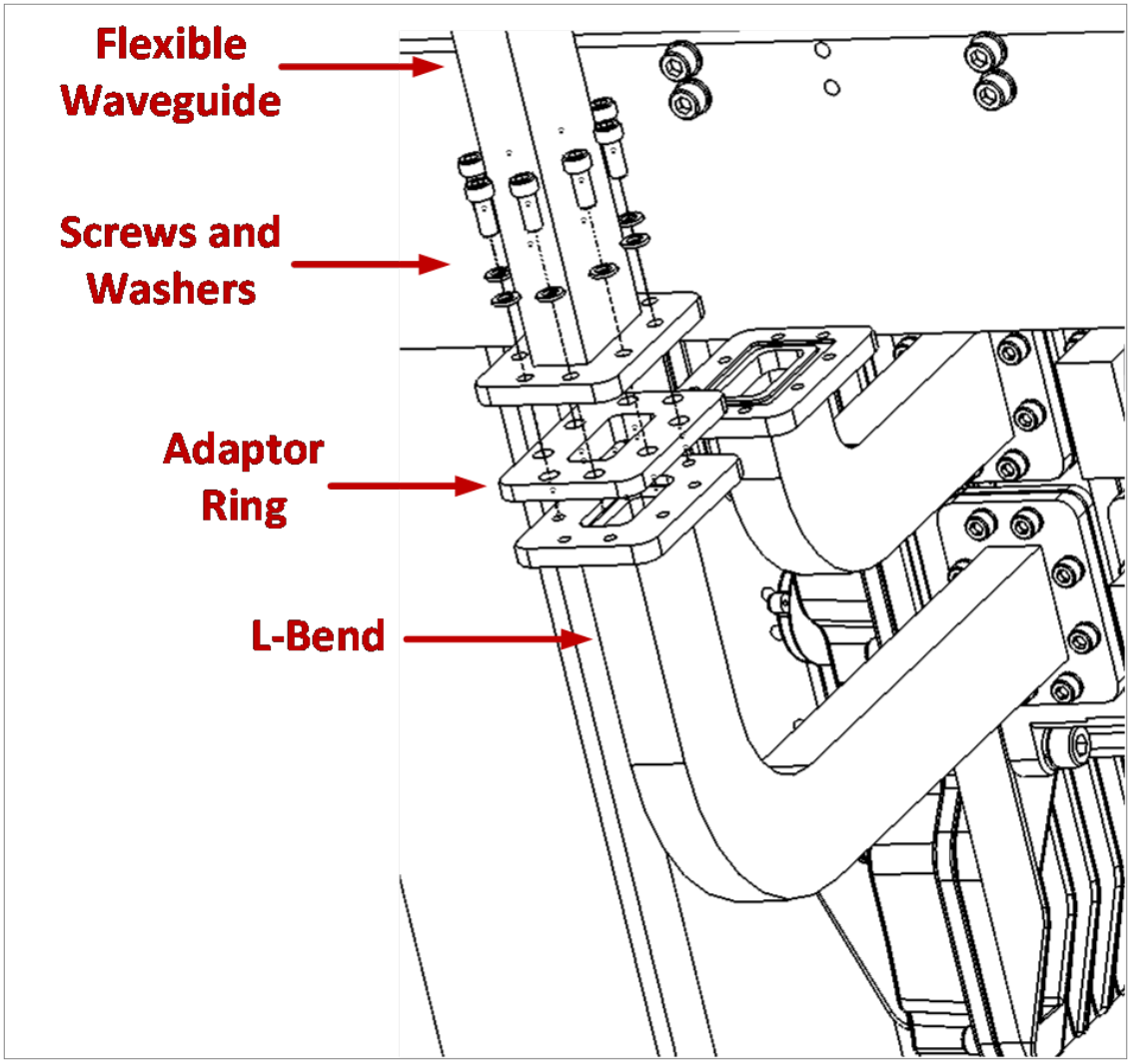


Figure 72: *Flexible Waveguide and OCU*

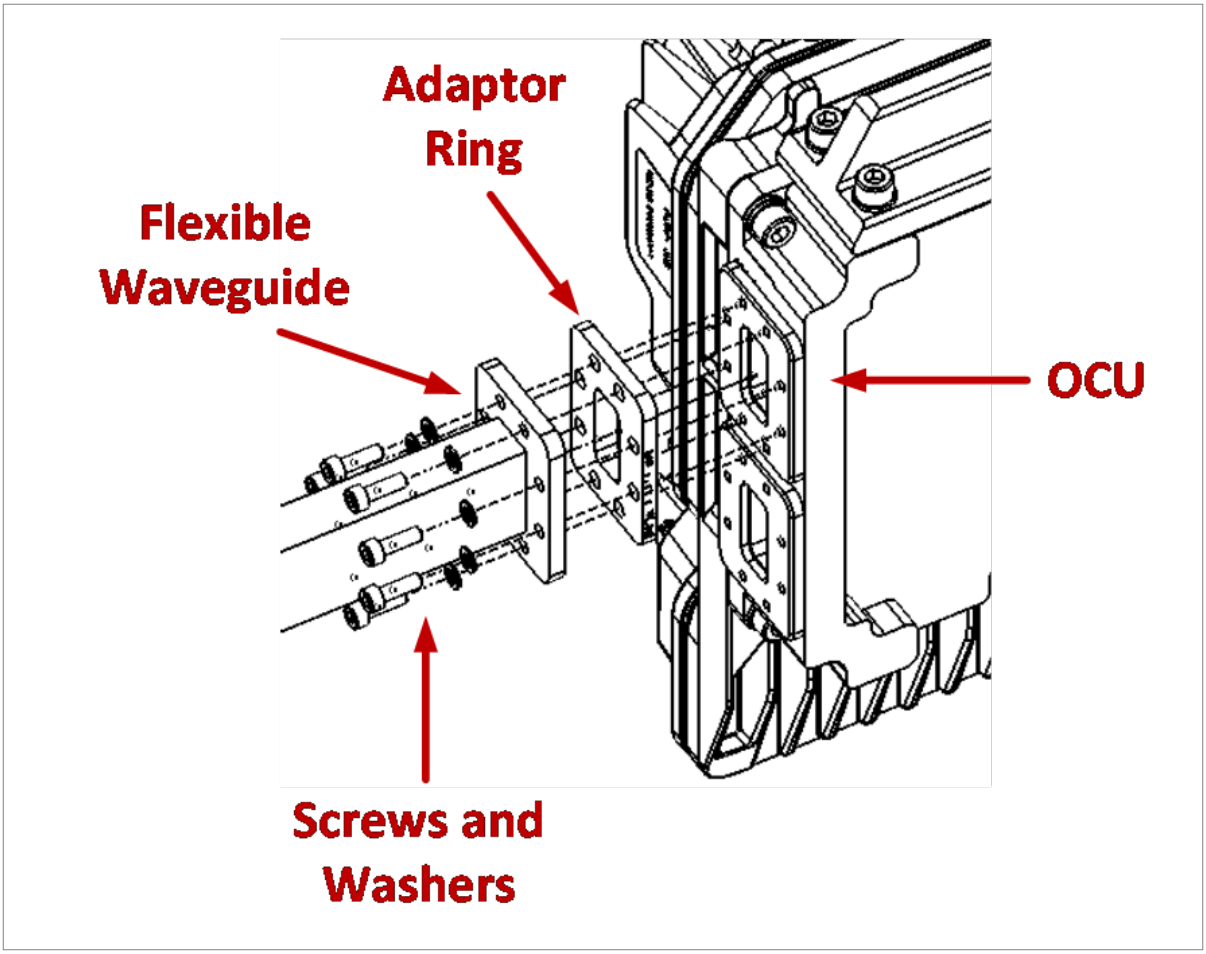
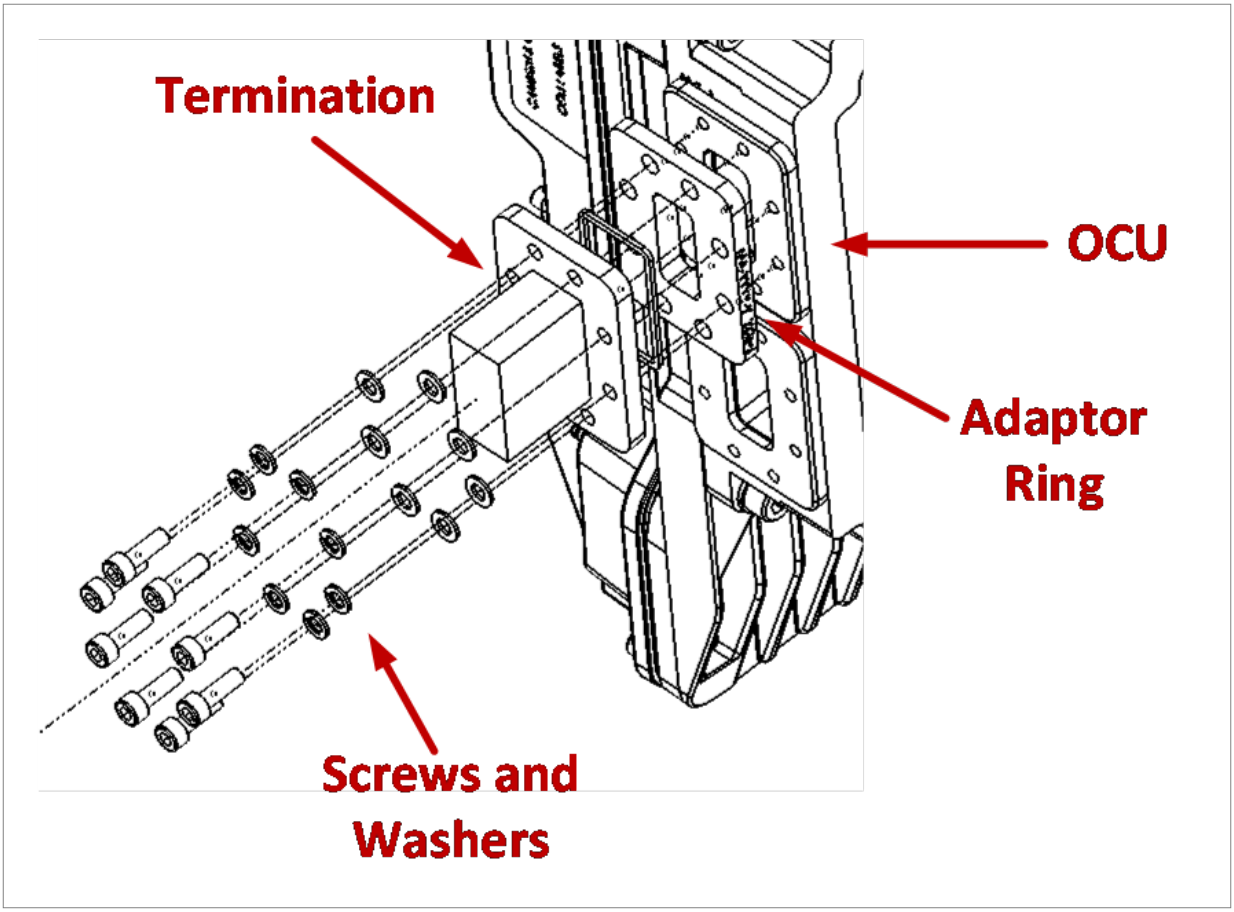


Figure 73: *Termination and OCU*



Vertical All-Indoor – Configuration Instructions

1+0 Space Diversity, 2+0 Dual Polarization, 2+0 XPIC

List of Items

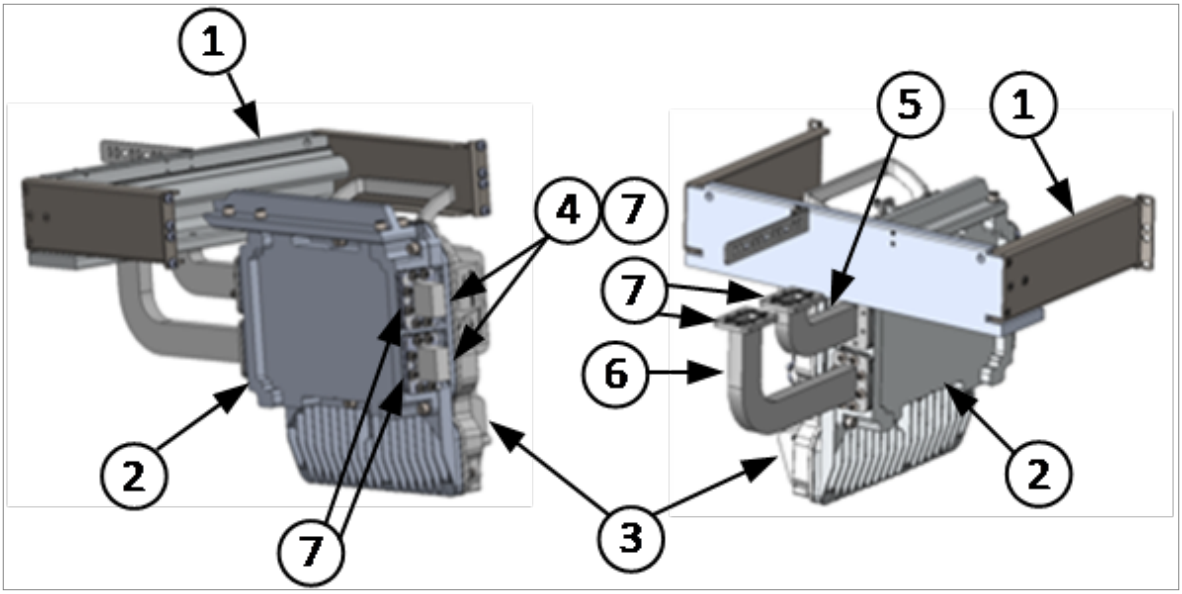
Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	N060082L287A
2	OCU	1	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	1	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor	1	FXDH-AI-V-L-Bend-1-*ff*

Item	Description	Quantity	Marketing Model
	Short L-Bend Kit, *ff* GHz		
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	4	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCU to the RFU-D-HP radio according to the instructions given in Section Assembling the OCU.
3. Attach the combined OCU and radio to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Long L-Bend the Lower ANT port (ANT 2) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends.
7. Attach the Adaptor Plates and the flexible Waveguides (not shown in the figures below) to the L-Bends and secure them to the protruding Bracket on the rear of the assembly. See Installing an Adaptor Plate.

Figure 74: *1+0 SD, 2+0 DP, 2+0 XPIC – Front View and Rear View*



2+0 Single Polarization

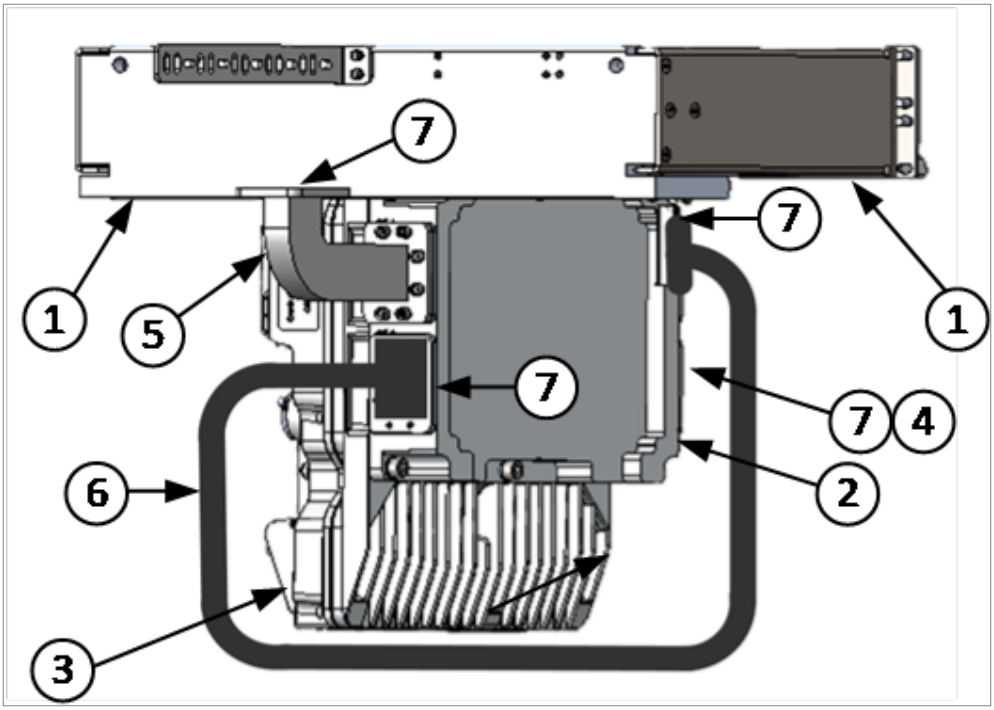
List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	1	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	1	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	1	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	Flexible Waveguide	1	Flexible Waveguide Length: · 4-5 GHz: 4ft · 6, 7, 8 GHz: 4 ft · 11 GHz: 3 ft For Marketing Models, see latest Price List.
7	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	4	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCU to the RFU-D-HP radio according to the instructions given in Section Assembling the OCU.
3. Attach the combined OCU and radio to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Termination and Adaptor Plate to EXT 2 of the OCU according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to ANT 1 on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.

6. Attach one side of the flexible Waveguide to ANT 2 and the second side of the flexible waveguide to EXT 1. Use an Adaptor Plate with each flexible Waveguide, as shown in Installing an Adaptor Plate. Secure the flexible Waveguide to the rack.



2+0 Single Polarization Adjacent Channel

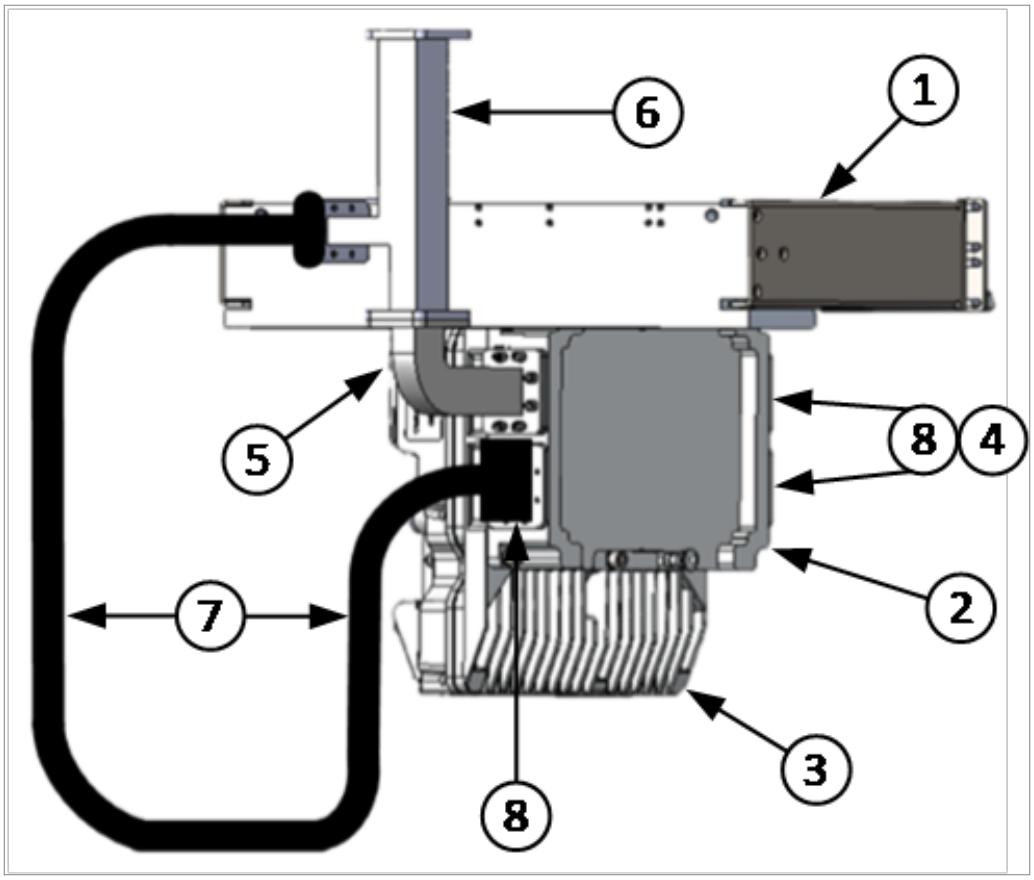
List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	1	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	1	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	Splitter	1	FXDH-RM-MD-SPLTR-*ff*
7	Flexible Waveguide	1	Flexible Waveguide Length: · 4-5 GHz: 3 ft · 6-11 GHz: 3 ft

Item	Description	Quantity	Marketing Model
			For Marketing Models, see latest Price List.
8	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	3	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCU to the RFU-D-HP radio according to the instructions given in Section Assembling the OCU.
3. Attach the combined OCU and radio to the profile of the Vertical All-Indoor Mounting kit according to .
4. Attach the Terminations and Adaptor Plates to ports EXT 1 and EXT 2 according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Splitter to the Short L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based Branching.
7. Attach the Adaptor Plate and flexible Waveguide to the lower ANT (ANT 2) port and secure it to the Splitter.



2 x 1+0 Space Diversity, 2x 2+0 Dual Polarization, 2x 2+0 XPIC, 2+0 Space Diversity Dual Polarization/XPIC, 2+2 HSB Space Diversity, ASD

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

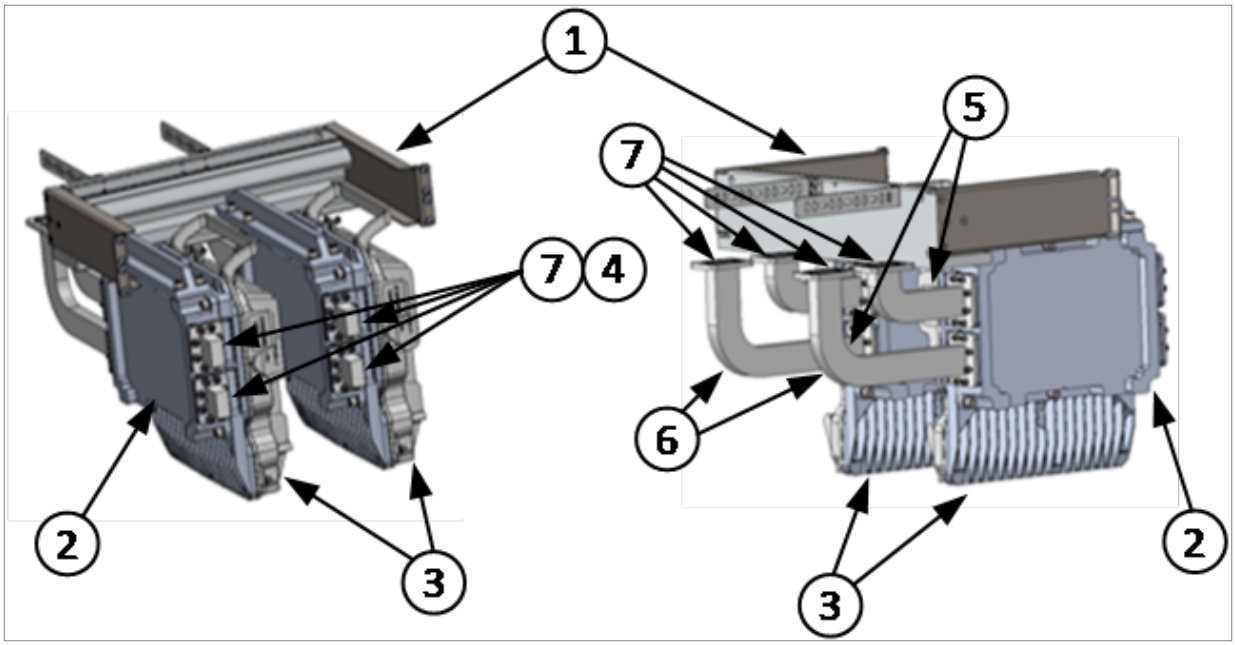
Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	2	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	2	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*

Item	Description	Quantity	Marketing Model
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, ff GHz	2	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, ff GHz	2	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	8	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the front side of the RFU-OCU Vertical All-Indoor assemblies, as shown in the figures below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
6. Attach the Long L-Bend the Lower ANT port (ANT 2) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
7. Attach the flexible Waveguides and Adaptor Plates (not shown in the figures below) to the L-Bend and secure them to the protruding Bracket on the rear of the assembly.
8. If External XPIC and/or External Space Diversity is used, and for the dual-RFU side of an ASD configuration, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

2 x 1+0 SD, 2+0 DP, 2+0 XPIC, 2+2 HSB-SD – Front View and Rear View



2+0 Space Diversity Single Polarization Adjacent Channel, 4+0 Dual Polarization/XPIC Adjacent Channel, 4+0 Space Diversity Dual Polarization/XPIC Adjacent Channel, 1+1 HSB Space Diversity, 2+2 HSB Dual Polarization/XPIC, ASD

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	2	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	2	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor	1	FXDH-AI-V-L-Bend-2-*ff*

Item	Description	Quantity	Marketing Model
	Long L-Bend Kit, *ff* GHz		
7	Splitter or Coupler (for HSB configurations)	2	FXDH-RM-MD-SPLTR-*ff* FXDH-RM-MD-CPLR-ff
8	Flexible Waveguide	2	Flexible Waveguide Length: · 4-5 GHz: 4 ft · 6-11 GHz: 3 ft For Marketing Models, see latest Price List.
9	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	6	FXDH-AI-V-WG-ADPT-*ff*

Note:

For 4+0 Space Diversity Dual Polarization/XPIC Adjacent Channel configurations, the quantity of each item is double the numbers listed above.

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions given in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the Vertical All-Indoor assembly, as shown in the figure below, according to the instructions in Section Assembling a Termination.

   Note:

   Only two of the terminations are shown in the figure below. Another two terminations must be attached to the EXT ports on the rear side of the second OCU-radio assembly, which is partially hidden in the figure below.

5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly shown on the left in the figure below, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Long L-Bend to the lower ANT port (ANT 2) on the rear side of the Vertical All-Indoor assembly shown on the left in the figure below, according to the instructions in Section Assembling the Vertical L-Bends.
7. Attach one Splitter or Coupler to the Short L-Bend and the other Splitter or Coupler to the Long L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based

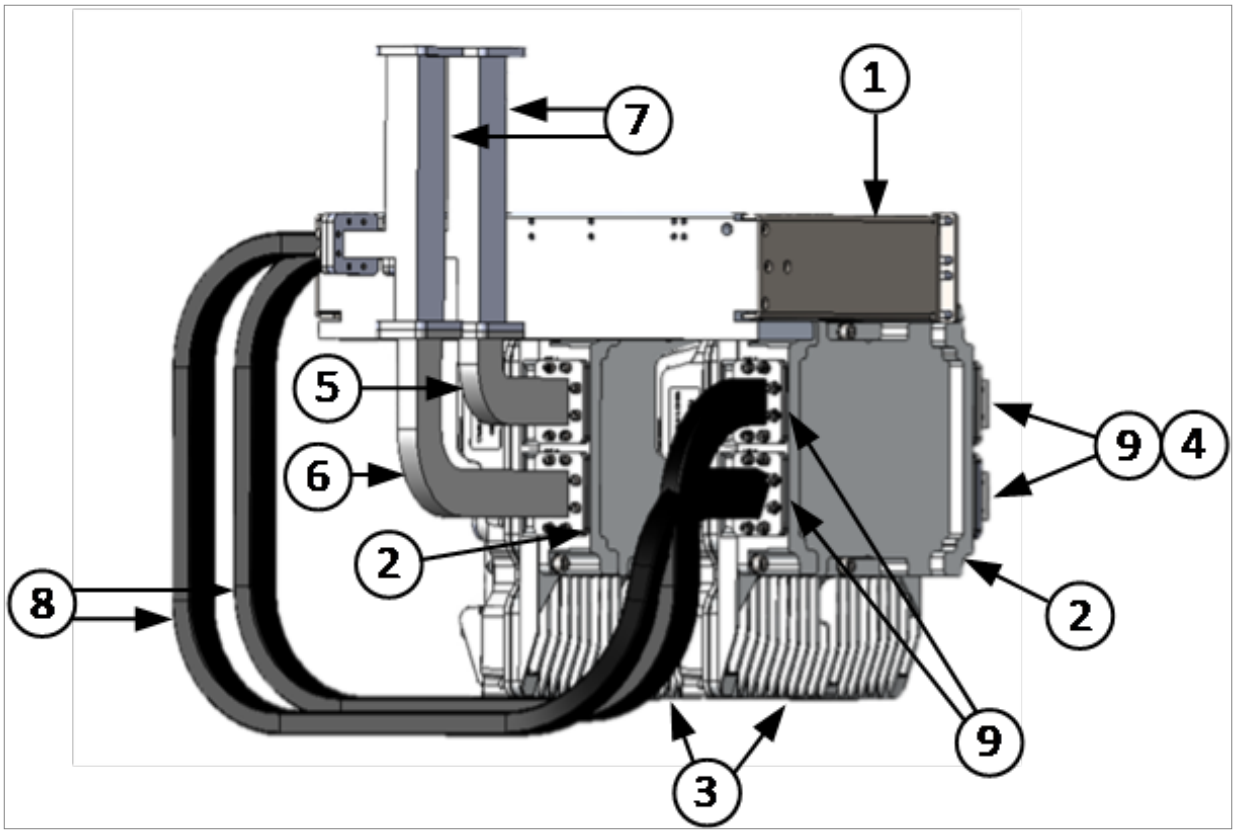
Branching.

8. If External XPIC and/or External Space Diversity is used, and for the dual-RFU side of an ASD configuration, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity and ASD). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

Note:

Use a Coupler for HSB configurations and a Splitter for all the other configurations described in this section.

9. Attach the flexible Waveguides as follows:
   - Attach one flexible Waveguide from the splitter or coupler connected to the Long L-Bend to the lower ANT port (ANT 2) on the Vertical All-Indoor assembly on the right, with an Adaptor Plate between the Waveguide and the ANT port.
   - Attach the other flexible Waveguide from the spitter or coupler connected to the Short L-Bend to the upper ANT port (ANT 1) on the Vertical All-Indoor assembly on the right, with an Adaptor Plate between the Waveguide and the ANT port.
   - 10 For 4+0 Space Diversity Dual Polarization/XPIC Adjacent Channel, repeat all these steps to configure a second node underneath the first.



2+0 Space Diversity Single Polarization, 4+0 Space Diversity Dual Polarization/XPIC, 4+0 XPIC, ASD

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	2	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	2	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	2	FXDH-RM-U-Bend-*ff*
8	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	4	FXDH-AI-V-WG-ADPT-*ff*

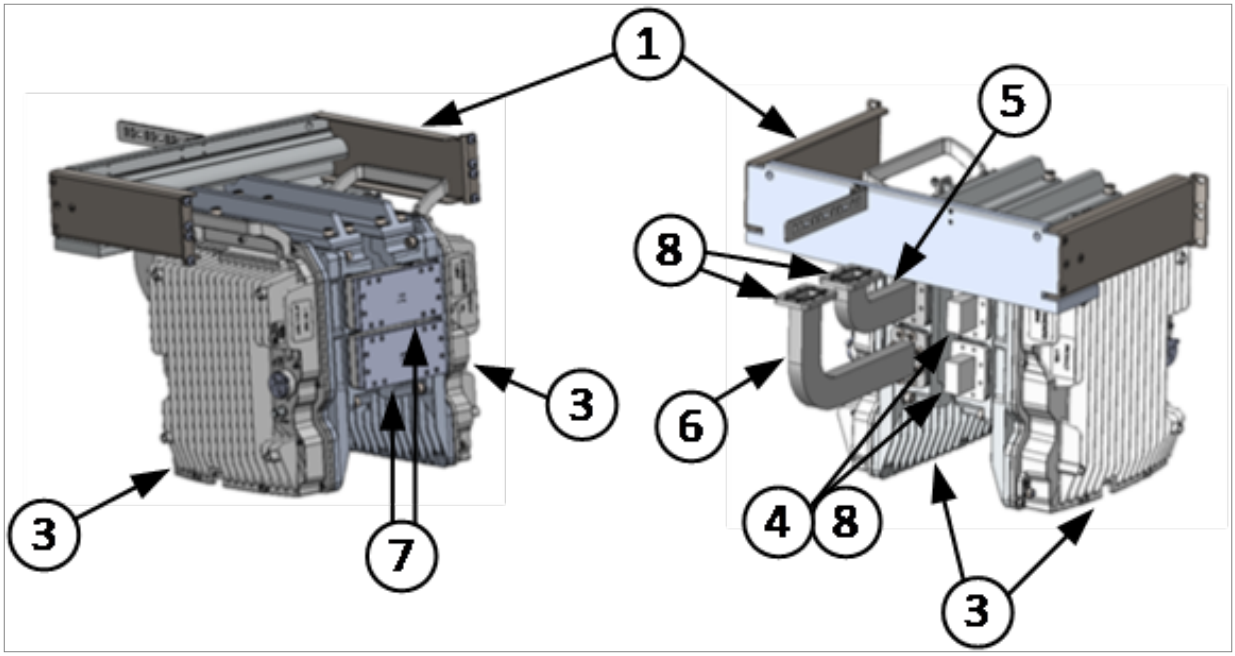
Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the Vertical All-Indoor assembly as shown on the right in the figures below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly on the left, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in

the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.

6. Attach the Long L-Bend the lower ANT port (ANT 2) on the rear side of the Vertical All-Indoor assembly on the left, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
7. Attach the U-Bend to the front ports of the Vertical All-Indoor assembly, as shown in the figures below, according to the instructions in Section Assembling a Short U-Bend.
8. If External XPIC and/or External Space Diversity is used, and for the dual-RFU side of an ASD configuration, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity and ASD). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

Figure 75: *2+0 SD, 4+0 DP, 4+0 XPIC – Front View and Rear View*



4+0 Space Diversity Dual Polarization, 4+0 Space Diversity XPIC, ASD

Note:

This configuration can be used for the dual-RFU side of an ASD configuration.

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	2	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	2	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	4	FXDH-RM-U-Bend-*ff*
8	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	8	FXDH-AI-V-WG-ADPT-*ff*

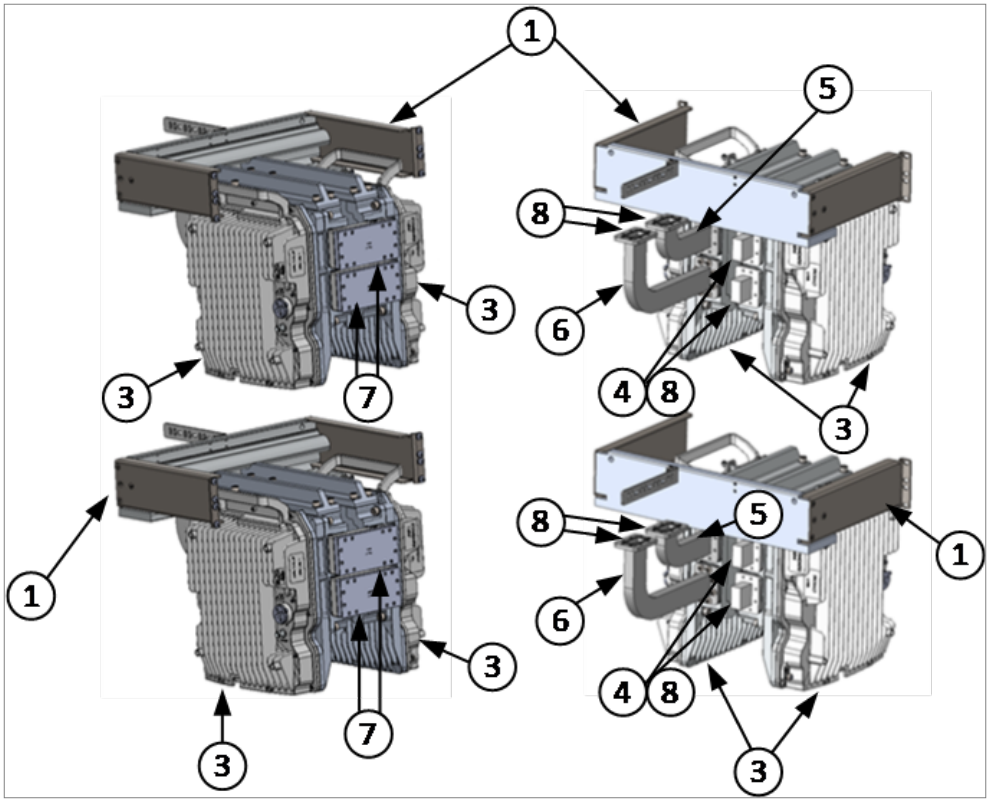
Procedure

1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit. Start with the upper level, then perform Steps 2-7. At the end of the procedure, repeat this step for the lower level.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profiles of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the upper and lower EXT ports on the rear side of the Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper and lower Vertical All-Indoor assemblies on the left, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
6. Attach the Long L-Bend the lower ANT port (ANT 2) on the rear side of the upper and lower Vertical All-Indoor assemblies on the left, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the

waveguide, according to the instructions in Installing an Adaptor Plate.

7. Attach the U-Bend to the front ports of the upper and lower Vertical All-Indoor assembly, as shown in the figures below, according to the instructions in Section Assembling a Short U-Bend.
8. If External XPIC and/or External Space Diversity is used, and for the dual-RFU side of an ASD configuration, a data sharing cable and a source sharing cable must be connected between each pair of RFU-D-HP units operating on the same frequency and alternate polarization (for XPIC) or between the Main and Space Diversity (for External Space Diversity and ASD). For instructions, see Section Connecting the Data Sharing and Source Sharing Cables for XPIC, External Space Diversity, and ASD Configurations.

Figure 76: *4+0 SD DP, 4+0 SD XPIC – Front View and rear view*



4+0 Single Polarization

List of Items

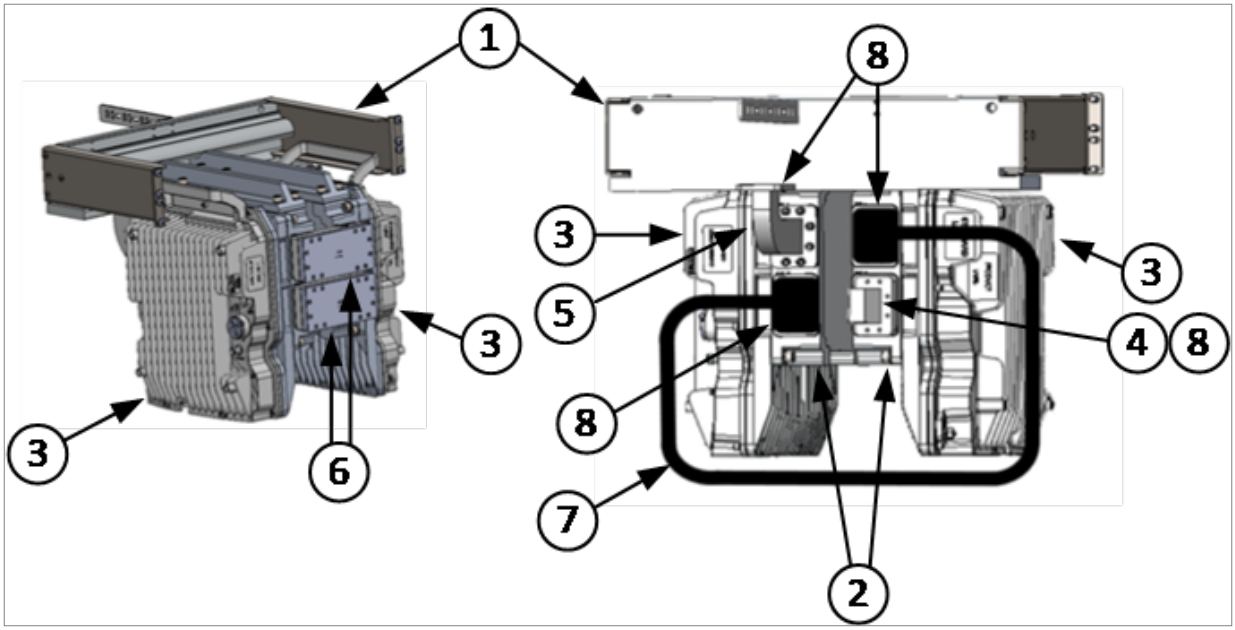
Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	2	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	2	RFU-D-HP-*ff*

Item	Description	Quantity	Marketing Model
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	1	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	2	FXDH-RM-U-Bend-*ff*
7	Flexible Waveguide	1	Flexible Waveguide Length: · 4-5 GHz: 3 ft · 6-11 GHz: 3 ft For Marketing Models, see latest Price List.
8	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	4	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Termination and Adaptor Plate to the lower EXT port (EXT 2) on the rear side of the Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
6. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the figures below, according to the instructions in Section Assembling a Short U-Bend.
7. Attach the flexible Waveguide between the lower ANT port (ANT 2) of the Vertical All-Indoor assembly on the left and the upper EXT port (EXT 1) of the Vertical All-Indoor assembly on the right as shown in the Rear View figure below. You must insert an Adaptor Plate between each side of the Waveguide and each ANT port. See Installing an Adaptor Plate.

Figure 77: *4+0 SP – Front View and Rear View*



4+0 Single Polarization Adjacent Channel

List of Items

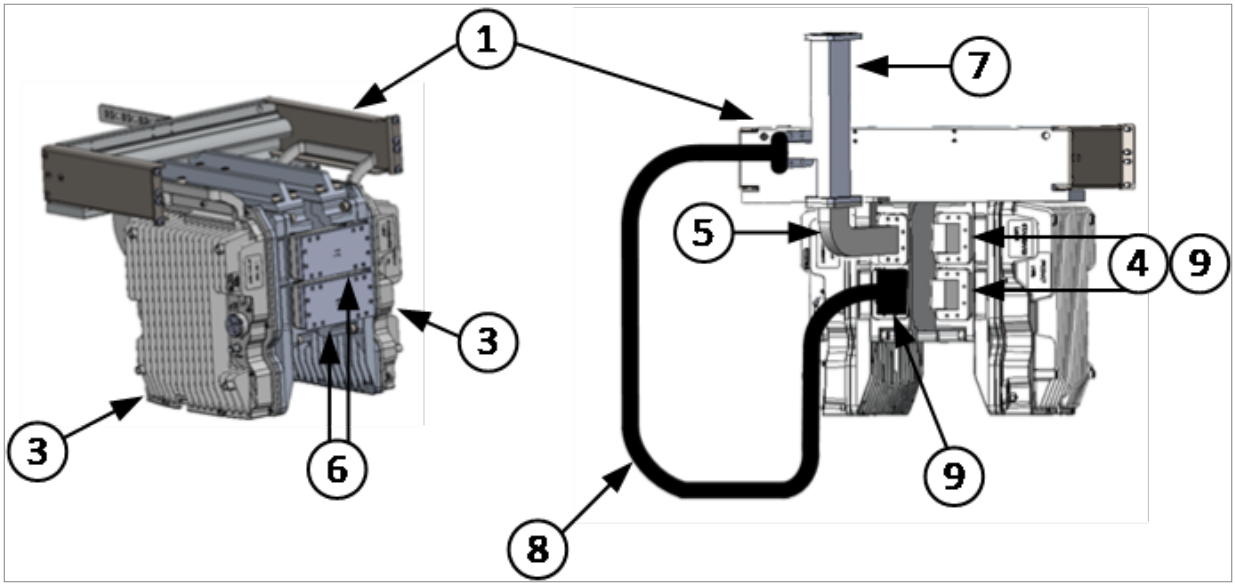
Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	1	FXDH-AI-V-MOUNT-1-kit
2	OCU	2	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	2	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	2	FXDH-RM-U-Bend-*ff*
7	Splitter	1	FXDH-RM-MD-SPLTR-*ff*
8	Flexible Waveguide	1	Flexible Waveguide Length: · 4-5 GHz: 3 ft · 6-11 GHz: 3 ft For Marketing Models, see

Item	Description	Quantity	Marketing Model
			latest Price List.
9	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	3	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kit to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the upper and lower EXT ports on the rear side of the Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
7. Attach the Splitter to the Short L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based Branching.
8. Attach the flexible Waveguide between the lower ANT port (ANT 2) of the Vertical All-Indoor assembly on the left and the Splitter as shown in the Rear View figure below. You must insert an Adaptor Plate between the Waveguide and the ANT port. See Installing an Adaptor Plate.

Figure 78: *4+0 SP Adjacent Channel – Front View and Rear View*



4+0 Space Diversity Single Polarization

List of Items

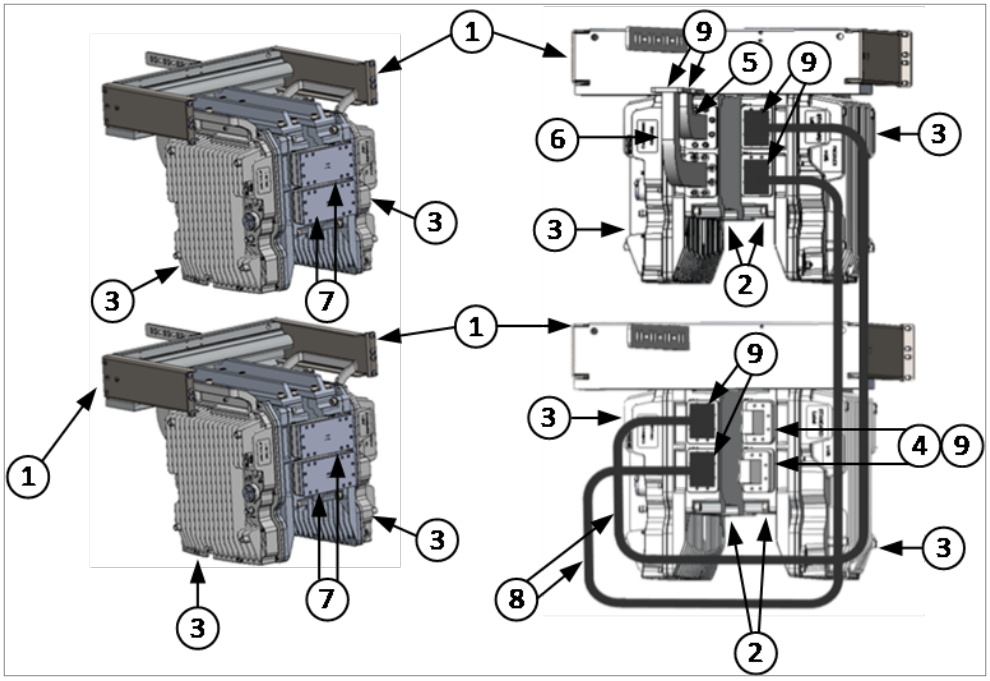
Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	4	FXDH-RM-U-Bend-*ff*
8	Flexible Waveguide	2	Flexible Waveguide Length: · 4-5 GHz: 3 ft · 6-11 GHz: 3 ft For Marketing Models, see latest Price List.

Item	Description	Quantity	Marketing Model
9	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	8	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profiles of the Vertical All-Indoor Mounting kits according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the lower Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
6. Attach the Long L-Bend the lower ANT port (ANT 2) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
7. Attach the U-Bends to the front ports of the upper and lower Vertical All-Indoor assemblies, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
8. Attach the flexible Waveguides as follows:
   - Attach one flexible Waveguide from the upper EXT (EXT 1) port on the rear side of the upper Vertical All-Indoor assembly on the right to the upper ANT port on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.
   - Attach the other flexible Waveguide from the lower EXT (ANT 2) port on the rear side of the upper Vertical All-Indoor assembly on the right to the lower ANT port (ANT 2) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.
   - You must insert an Adaptor Plate between each side of each Waveguide and each ANT port. See Installing an Adaptor Plate.

Figure 79: *4+0 SD SP – Front View and Rear View*



4+0 Space Diversity Single Polarization Adjacent Channel

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	4	FXDH-RM-U-Bend-*ff*
8	Splitter	2	FXDH-RM-MD-SPLTR-*ff*
9	Flexible Waveguide	2	Flexible Waveguide Length:

Item	Description	Quantity	Marketing Model
			· 4-5 GHz: 4 ft · 6-11 GHz: 4 ft For Marketing Models, see latest Price List.
10	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	6	FXDH-AI-V-WG-ADPT-*ff*

Procedure

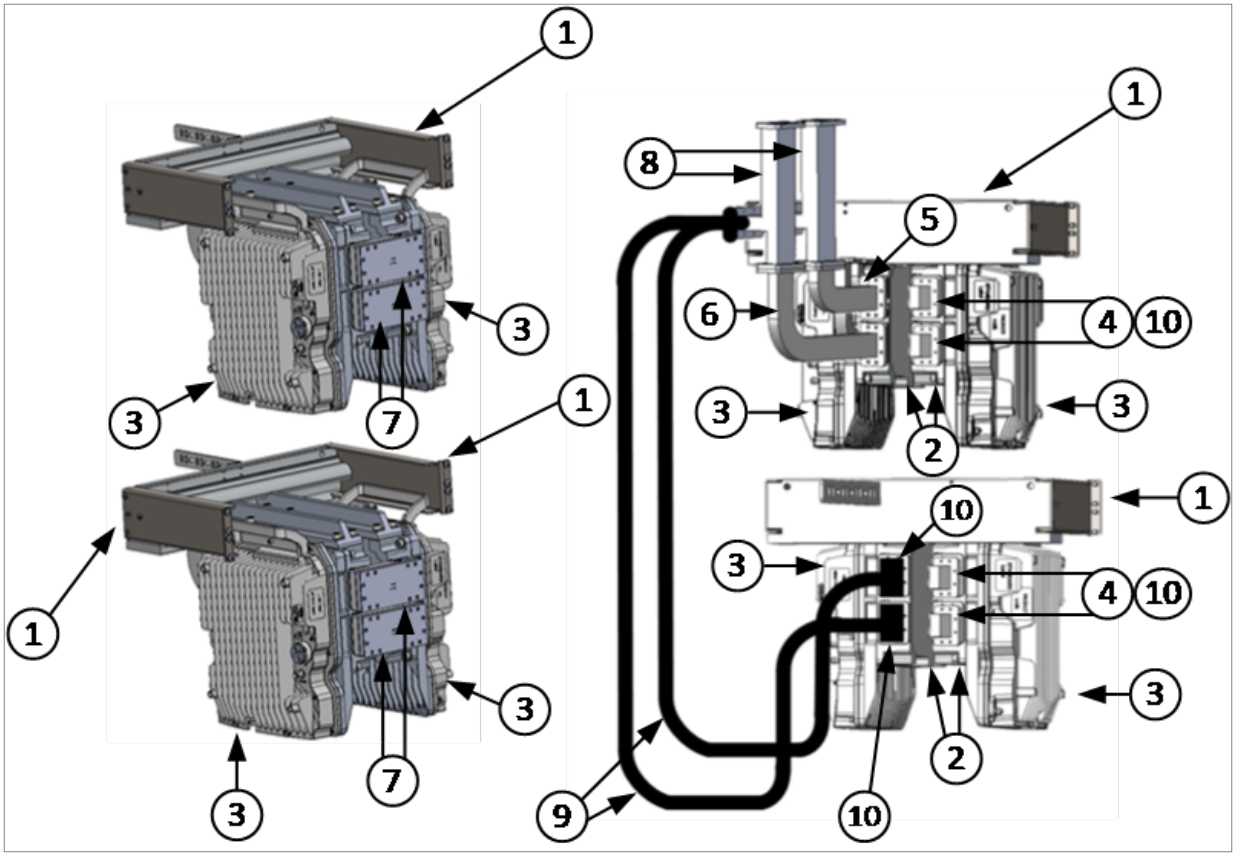
1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profiles of the Vertical All-Indoor Mounting kits according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of both the upper and lower Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Long L-Bend to the lower ANT port (ANT 2) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
7. Attach the Splitters to the Short L-Bend and the Long L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based Branching.
8. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
9. Attach the flexible Waveguides as follows:

   Attach one flexible Waveguide from the Splitter connected to the Long L-Bend to the upper ANT port (ANT 1) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.

   Attach the other flexible Waveguide from the Splitter connected to the Short L-Bend to the lower ANT port (ANT 2) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.

   You must insert an Adaptor Plate between each Waveguide and the ANT port to which it is connected. See Installing an Adaptor Plate.

Figure 80: *4+0 SD SP Adjacent Channel – Front View and Rear View*



8+0 Dual Polarization/XPIC

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	2	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching	4	FXDH-RM-U-Bend-*ff*

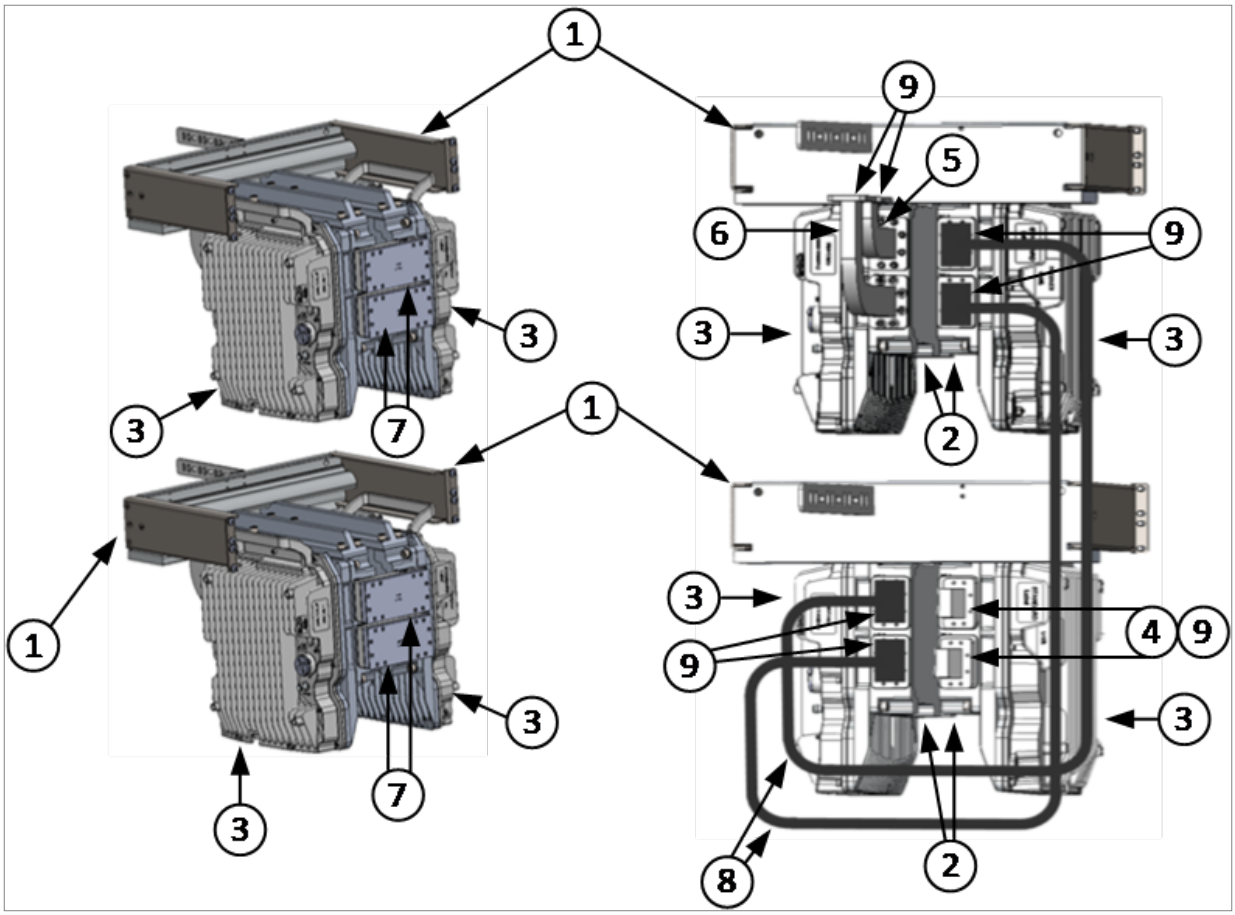
Item	Description	Quantity	Marketing Model
	U Bend, *ff* GHz		
8	Flexible Waveguide	2	Flexible Waveguide Length: · 4-5 GHz: 3 ft · 6-11 GHz: 3 ft For Marketing Models, see latest Price List.
9	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	8	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the lower Vertical All-Indoor assembly on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
6. Attach the Long L-Bend the lower ANT port (ANT 2) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends. When attaching the other side of the L-Bend to a flexible waveguide leading to the antenna (not shown in the figure below), make sure to attach an Adaptor Plate between the L-Bend and the waveguide, according to the instructions in Installing an Adaptor Plate.
7. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
8. Attach the flexible Waveguides as follows:
   - Attach one flexible Waveguide from the upper EXT port (EXT 1) on the rear side of the upper Vertical All-Indoor assembly on the right to the upper ANT port (ANT 1) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.
   - Attach the other flexible Waveguide from the lower EXT (EXT 2) port on the rear side of the upper Vertical All-Indoor assembly on the right to the lower ANT port (ANT 2) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.

- You must insert an Adaptor Plate between each side of each Waveguide and each EXT and ANT port. See Installing an Adaptor Plate.

Figure 81: *8+0 Dual Polarization/XPIC – Front View and Rear View*



8+0 Dual Polarization/XPIC Adjacent Channel

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*

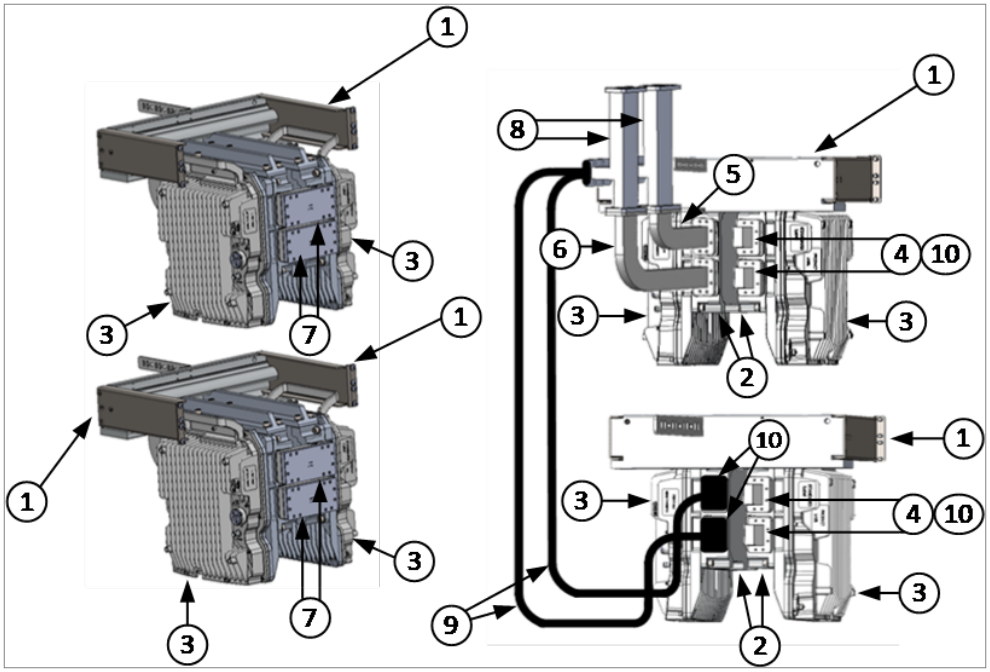
Item	Description	Quantity	Marketing Model
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	4	FXDH-RM-U-Bend-*ff*
8	Splitter	2	FXDH-RM-MD-SPLTR-*ff*
9	Flexible Waveguide	2	Flexible Waveguide Length: · 4-5 GHz: 4 ft · 6-11 GHz: 4 ft For Marketing Models, see latest Price List.
10	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	6	FXDH-AI-V-WG-ADPT-*ff*

Procedure

1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the upper and lower Vertical All-Indoor assemblies on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Long L-Bend to the lower ANT port (ANT 2) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
7. Attach the Splitters to the Short L-Bend and the Long L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based Branching.
8. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
9. Attach the flexible Waveguides as follows:
   - Attach one flexible Waveguide from the Splitter connected to the Long L-Bend to the upper ANT port (ANT 1) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.

- Attach the other flexible Waveguide from the Splitter connected to the Short L-Bend to the lower ANT port (ANT 2) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.
- You must insert an Adaptor Plate between each Waveguide and the ANT port to which it is connected. See Installing an Adaptor Plate.

Figure 82: *8+0 DP/XPIC Adjacent Channel – Front View and Rear View*



4+4 HSB SD

List of Items

Item	Description	Quantity	Marketing Model
1	PTP 820C-HP R2/RFU-D-HP OCUs Vertical Mounting Bracket (kit 1) Mount Kit	2	FXDH-AI-V-MOUNT-1-kit
2	OCU	4	FXDH*ff-xxxYZccT-mmmNZddT-t*
3	RFU-D-HP Radio	4	RFU-D-HP-*ff*
4	PTP 820C-HP R2/RFU-D-HP waveguide termination kit (varies with frequency)	4	FXDH-RM-TERM-*ff*
5	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Short L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-1-*ff*
6	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor Long L-Bend Kit, *ff* GHz	1	FXDH-AI-V-L-Bend-2-*ff*

Item	Description	Quantity	Marketing Model
7	PTP 820C-HP R2/RFU-D-HP Filters Cover Branching U Bend, *ff* GHz	4	FXDH-RM-U-Bend-*ff*
8	Coupler	2	FXDH-RM-MD-CPLR-*ff*
9	Flexible Waveguide	2	Flexible Waveguide Length: · 4-5 GHz: 4 ft · 6-11 GHz: 4 ft For Marketing Models, see latest Price List.
10	PTP 820C-HP R2/RFU-D-HP OCUs Vertical All-Indoor WG Adaptor, *ff* GHz	6	FXDH-AI-V-WG-ADPT-*ff*

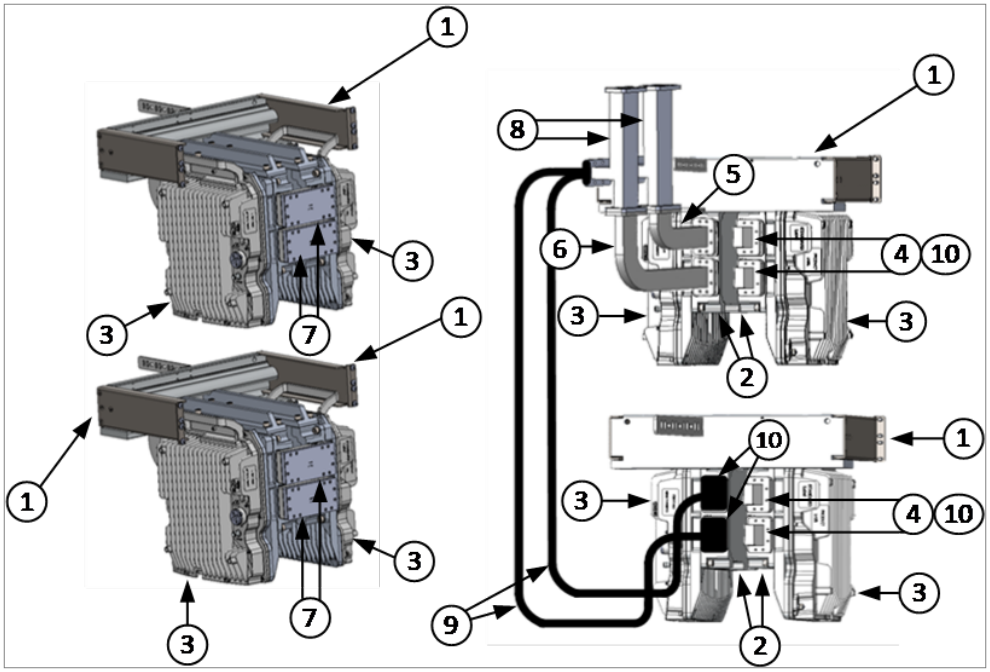
Procedure

1. Attach the Vertical All-Indoor Mounting kits to the rack according to the instructions in Section Assembling the Vertical All-Indoor Mounting Kit.
2. Attach the OCUs to the RFU-D-HP radios according to the instructions in Section Assembling the OCU.
3. Attach the combined OCUs and radios to the profile of the Vertical All-Indoor Mounting kit according to Figure 65.
4. Attach the Terminations and Adaptor Plates to the EXT ports on the rear side of the upper and lower Vertical All-Indoor assemblies on the right as shown in the Rear View figure below, according to the instructions in Section Assembling a Termination.
5. Attach the Short L-Bend to the upper ANT port (ANT 1) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
6. Attach the Long L-Bend to the lower ANT port (ANT 2) on the rear side of the upper Vertical All-Indoor assembly on the left as shown in the Rear View figure below, according to the instructions in Section Assembling the Vertical L-Bends.
7. Attach the Couplers to the Short L-Bend and the Long L-Bend, according to the instructions in Section Assembling a Splitter or Coupler for Filter-Based Branching.
8. Attach the U-Bends to the front ports of the Vertical All-Indoor assembly, as shown in the Front View figure below, according to the instructions in Section Assembling a Short U-Bend.
9. Attach the flexible Waveguides as follows:
   - Attach one flexible Waveguide from the Coupler connected to the Long L-Bend to the upper ANT port (ANT 1) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in the Rear View figure below.
   - Attach the other flexible Waveguide from the Coupler connected to the Short L-Bend to the lower ANT port (ANT 2) on the rear side of the lower Vertical All-Indoor assembly on the left as shown in

the Rear View figure below.

- You must insert an Adaptor Plate between each Waveguide and the ANT port to which it is connected. See Installing an Adaptor Plate.

Figure 83: *8+0 DP/XPIC Adjacent Channel – Front View and Rear View*



Configurations Requiring Multiple Racks

The single rack configurations described above, can be extended to configurations requiring multiple racks.

For example, 16+0 Dual Polarization configuration can be implemented by duplicating the 8+0 Dual Polarization HW and connecting the Antenna Ports of the two racks using a Splitter, installed on one of the rack L-Bends.

RFU-D-HP LEDs

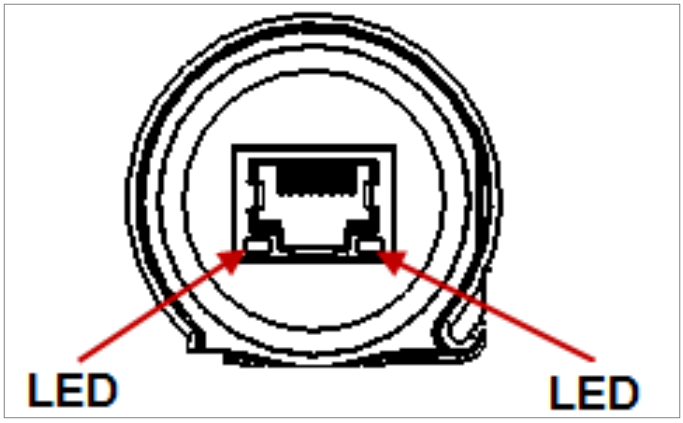
The RFU-D-HP provides the following LEDs to indicate the status of the unit's interfaces, and the unit as a whole:

- Electrical GbE Interface (RJ-45) LEDs
- Optical GbE Interface (SFP) LED
- Status LED
- EXT LED

Electrical GbE Interface (RJ-45) LEDs

There are two Green LEDs on either side of the electrical (RJ-45) interface.

Figure 84: *RFU-D-HP LEDs – RJ-45 Interface*



The LED on the left indicates the port's Admin state:

- **Off** – Admin is Disabled.
- **Green** – Admin is Enabled.

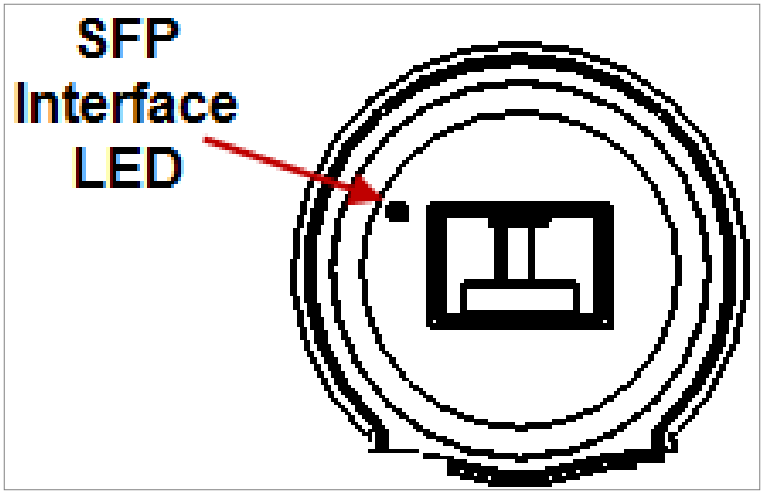
The LED on the right indicates the interface's Admin and cable connection status, and whether there is traffic on the interface:

- **Off** - Admin is Disabled *or* no cable is connected to the interface.
- **Green** - Admin is Enabled and a cable is connected to the interface.
- **Blinking Green** - Admin is Enabled and a cable is connected to the interface, *and* there is traffic on the interface.

Optical GbE Interface (SFP) LED

There is a single green LED to the upper left of the SFP interface.

Figure 85: *RFU-D-HP LED – SFP Interface*



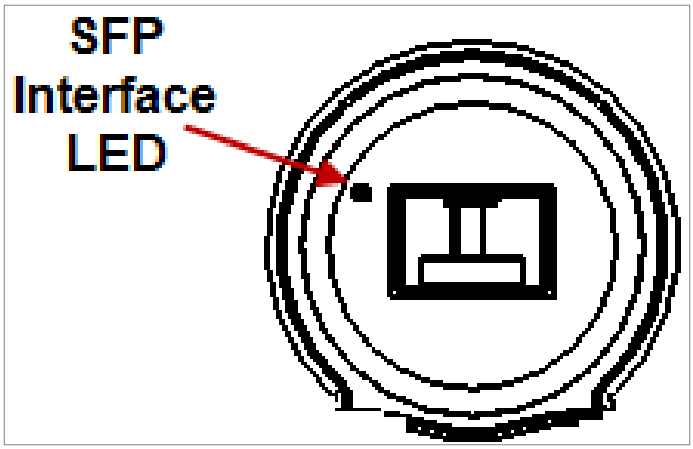
The SFP LED indicates the interface's Admin and cable connection status, and whether there is traffic on the interface:

- **Off** - Admin is Disabled *or* no cable is connected to the interface.
- **Green** - Admin is Enabled and a cable is connected to the interface.

Data Sharing Interface (SFP) LED

There is a single green LED to the upper left of the Data Sharing interface.

Figure 86: *RFU-D-HP LED – Data Sharing Interface*



The Data Sharing LED indicates the interface's cable connection status:

- **Off** – No cable is connected.
- **Green** – A cable is connected.

Unit LEDs

The RFU-D-HP has three LEDs that indicate the status of the radio link and the unit as a whole: Status, Radio, and EXT.

Status LED

The Status LED indicates the power status of the RFU:

- **Off** – The power is off.
- **Red** - The power is on, the system is in initialization phase, and the link to the IDU is not yet up.
- **Green** - The power is on, and the link to the IDU is up.

Radio LED

The Radio LED indicates the status of the radio link:

- **Off** – The radio is off.
- **Green** - The power is on, and all carriers are operational (up).
- **Red** - A loss of frame (LOF), excessive BER, or signal degraded condition exists in at least one carrier.

EXT LED

Reserved for future use.

Cambium Networks

Cambium Networks delivers wireless communications that work for businesses, communities, and cities worldwide. Millions of our radios are deployed to connect people, places, and things with a unified wireless fabric that spans multiple standards and frequencies of fixed wireless and Wi-Fi, all managed centrally via the cloud. Our multi-gigabit wireless fabric offers a compelling value proposition over traditional fiber and alternative wireless solutions. We work with our Cambium certified Connected Partners to deliver purpose built networks for service provider, enterprise, industrial, and government connectivity solutions in urban, suburban, and rural environments, with wireless that just works.

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