

Install the RF Module into the Prism Remote Chassis

- 1 Hold the RF Module so that the DART card(s) face away from the PRU and the Mounting Hook is toward the Receiving flange on the PRU chassis.

NOTE: Always install RF Modules from the bottom up. Do not skip a bay, as this provides more efficient heat dissipation.

- 2 Holding the RF Module at a 45° angle in respect to the rear heatsink, rest the bottom surface of the module on the RF Module shelf, as shown in one of the following graphics, and as applicable to the RF Module.

- Single-Bay RF Module: [Figure 11 on page 26](#)
- HDM RF Module: [Figure 12 on page 27](#)
- Dual-Bay RF Module: [Figure 13 on Page 28](#)
- Legacy Dual-Bay 40W RF Module: [Figure 14 on Page 29.](#)

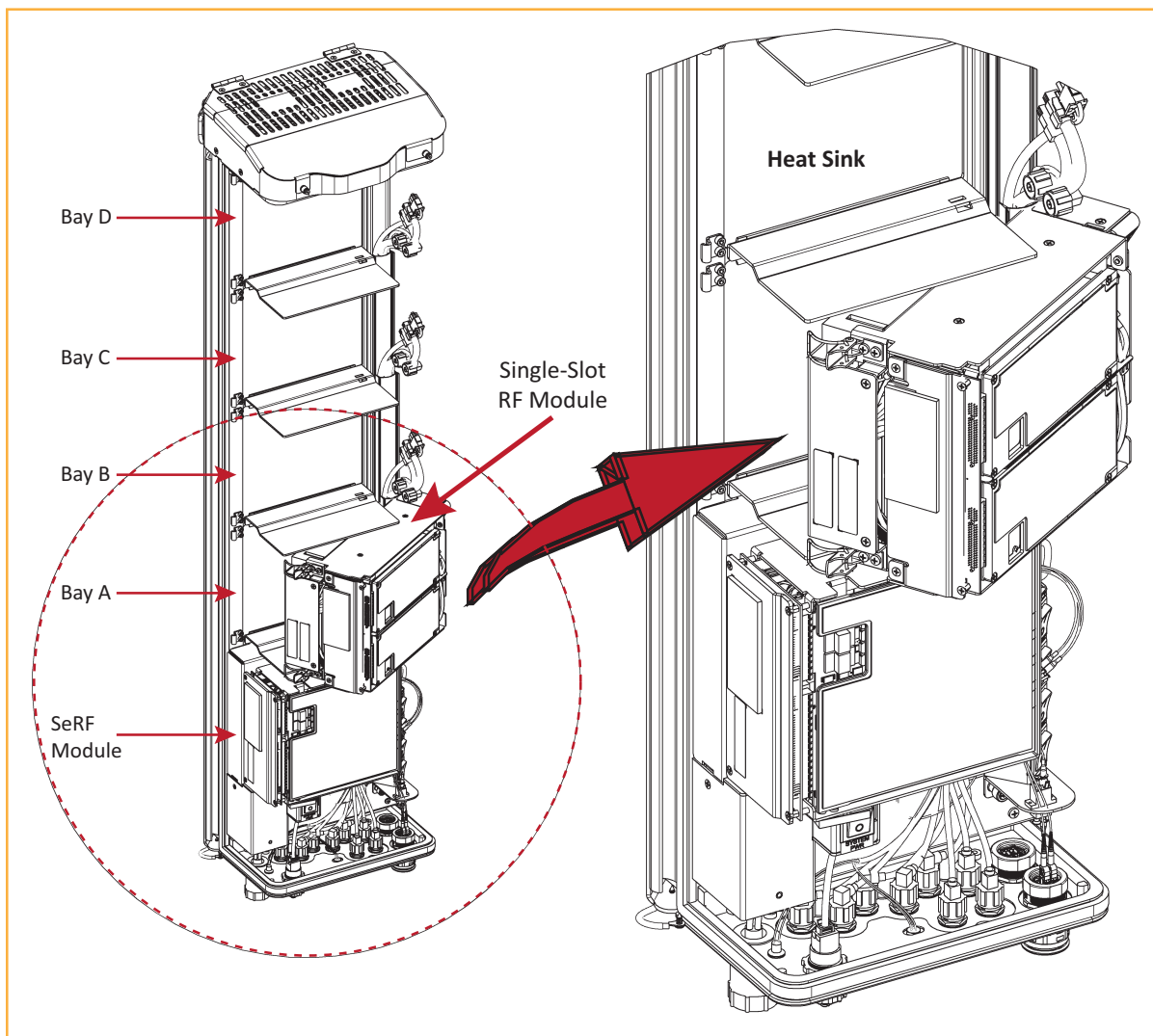


Figure 11. Installing a Single-Bay RF Module

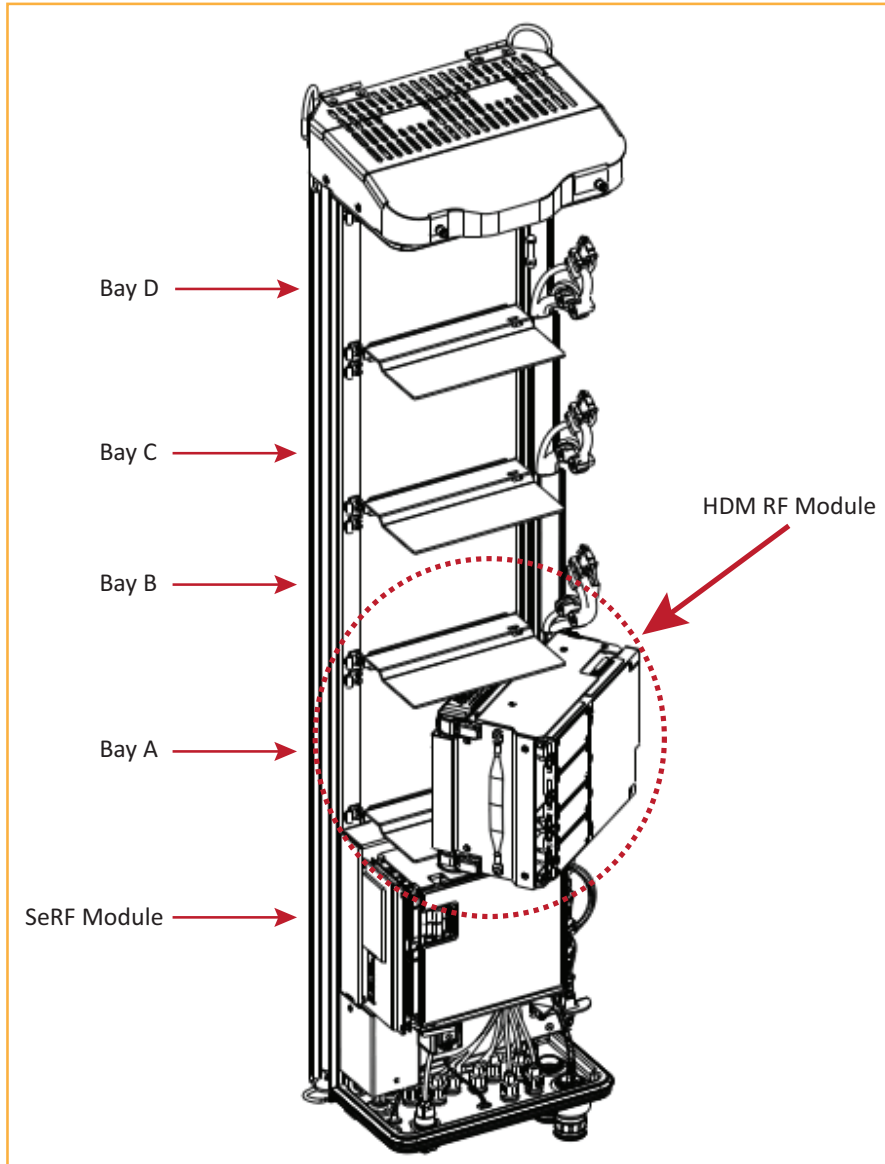


Figure 12. Installing an HDM RF Module

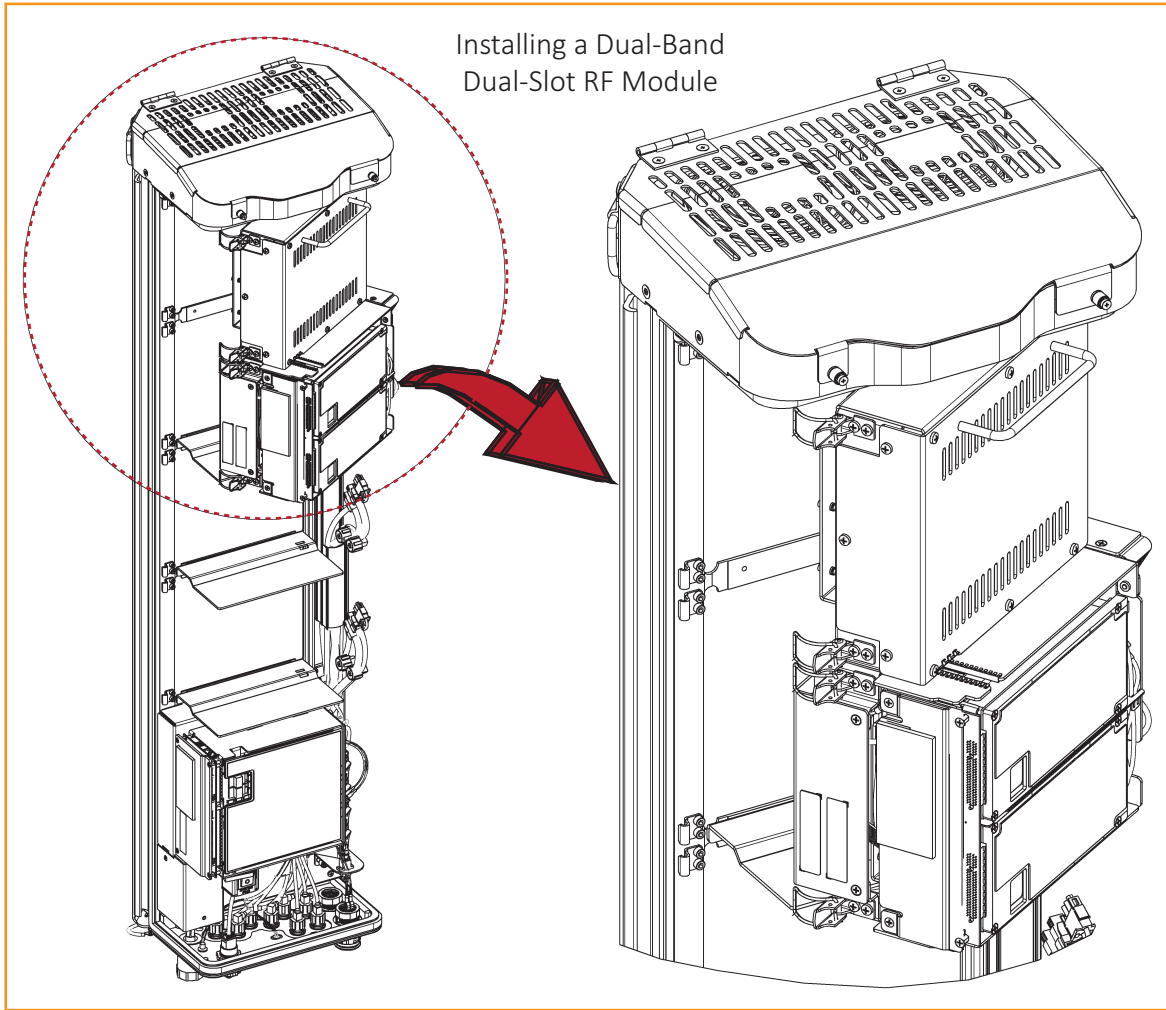


Figure 13. Installing a Dual-Bay RF Module

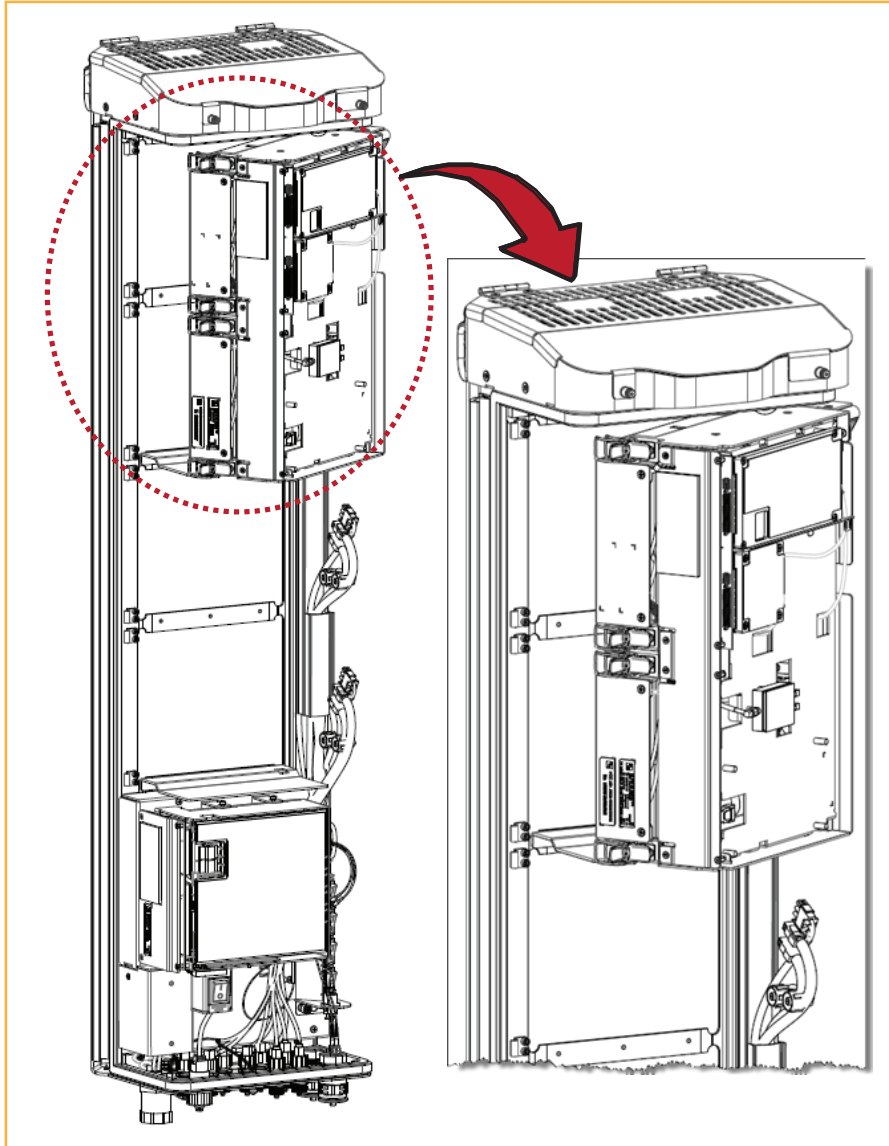
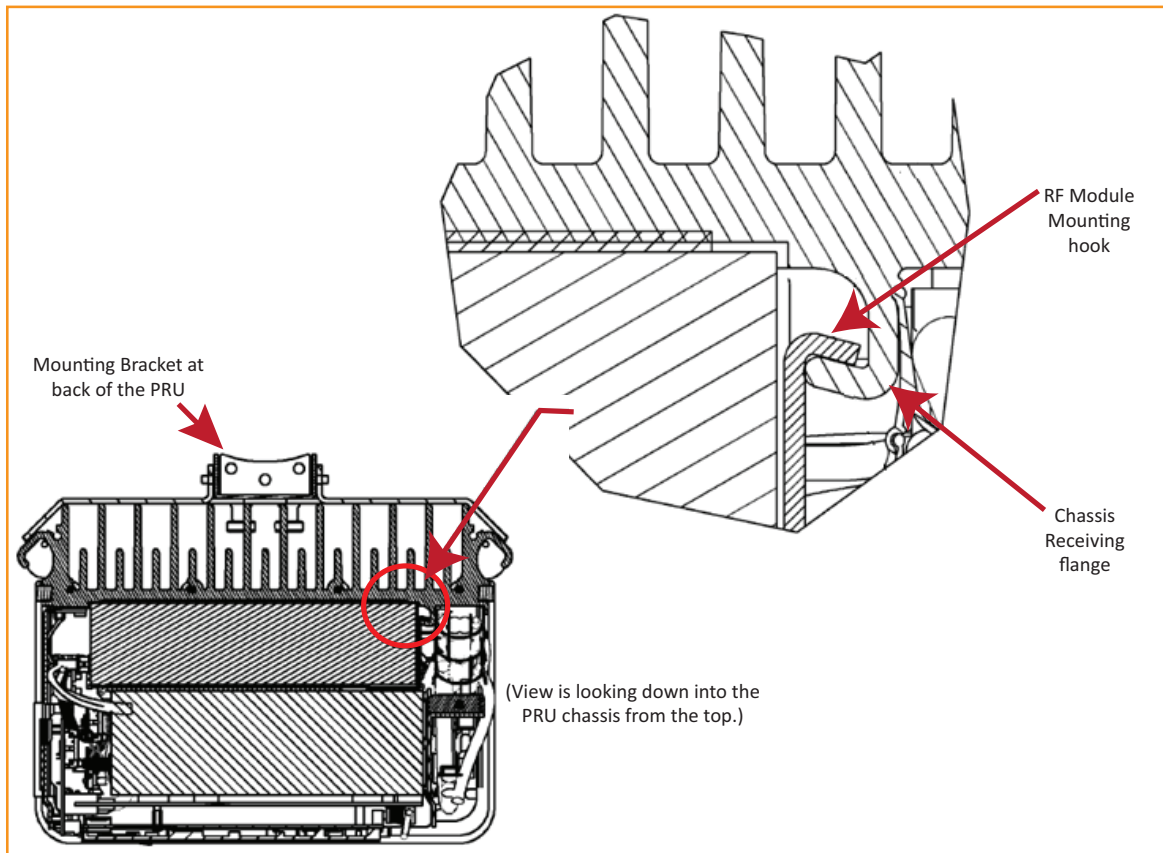


Figure 14. Installing a Legacy Dual-Bay 40W RF Module

- 3 Align the Mounting Hook on the module with the receiving flange on the PRU heat sink, and then slide the RF Module in toward the flange until it can go no further.



- 4 Push the left edge of the RF Module back and into the PRU chassis until it can go no further, as shown in the following graphics:
 - For Single-Bay RF Modules, see [Figure 15 on page 31](#).
 - For HDM RF Modules, see [Figure 16 on page 32](#).
 - For Dual-Bay RF Modules, see [Figure 17 on page 33](#), which uses the Legacy Dual-Bay 40W RF Module as an example.

CAUTION! Make sure the RF Module is seated correctly in the Module shelf. Incorrect alignment of the RF Module can cause the RF Module to fail due to overheating.

- The front edge of the RF Module should be parallel with the shelf above it.
- The Mounting Hook on the RF Module should be fully engaged with the Receiving flange on the Remote Unit chassis.
- An incorrectly seated RF Module makes closing the Prism door difficult. If you later cannot shut the Remote Unit door, verify that the RF Module is installed correctly.

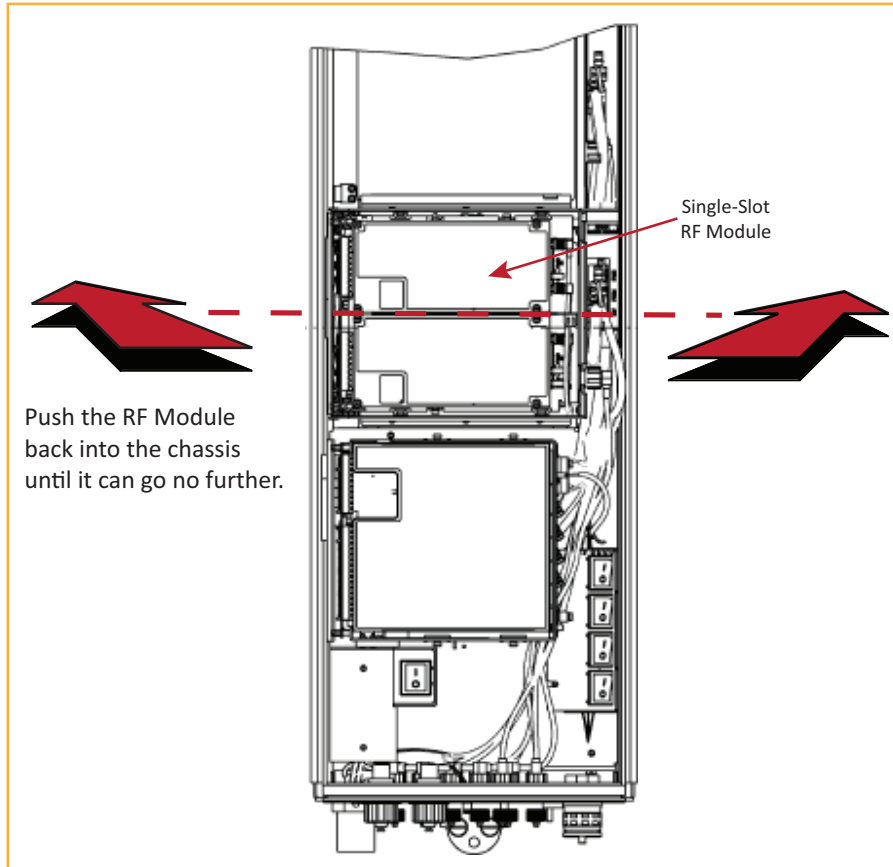


Figure 15. Seating a Single-Bay RF Module

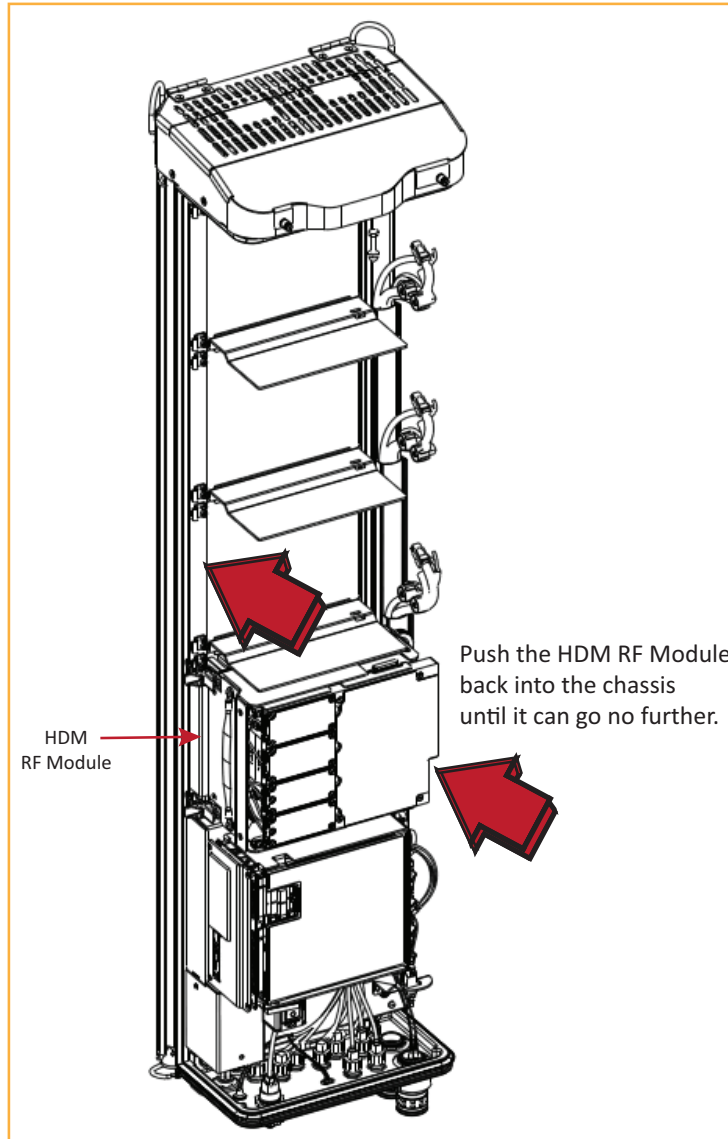


Figure 16. Seating an HDM RF Module

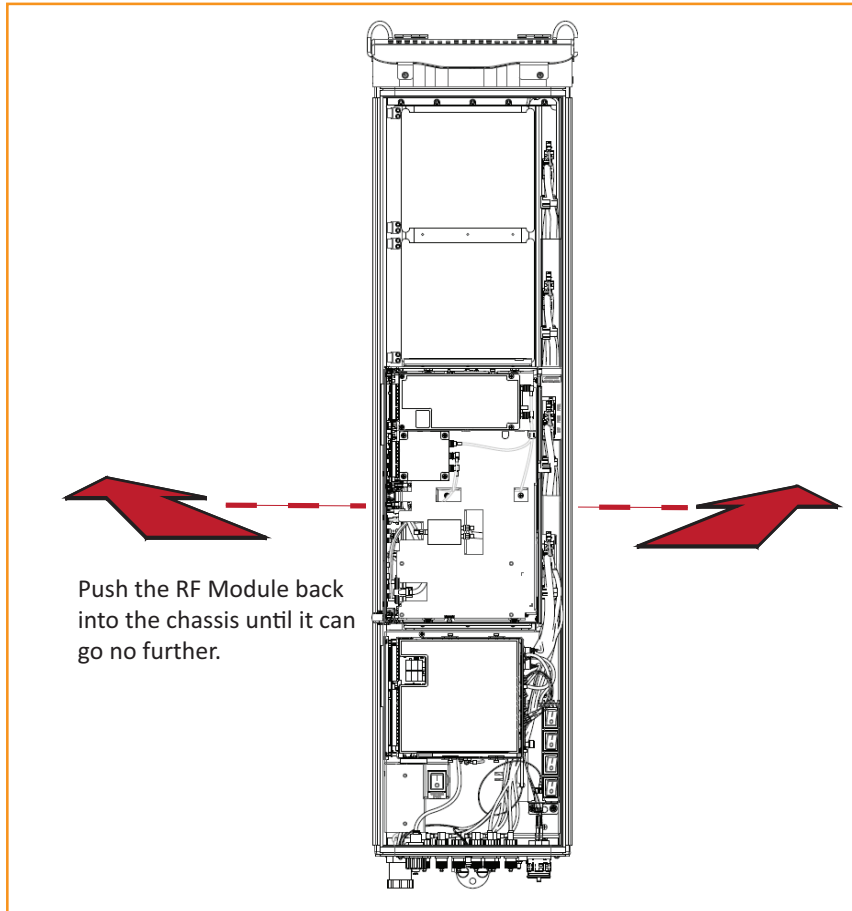


Figure 17. Seating a Dual-Bay RF Module

Secure RF Module Latches

- 1 To secure the module latches on the left side of the RF Module, do one of the following, as appropriate for the RF Module being installed:
 - “Connect Latches on Single-Bay and HDM RF Modules” on page 34
 - “Connect Latches on Dual-Bay RF Modules” on page 35.

Connect Latches on Single-Bay and HDM RF Modules

For Single-Bay and HDM RF Modules, secure two latches, as shown in [Figure 18](#).

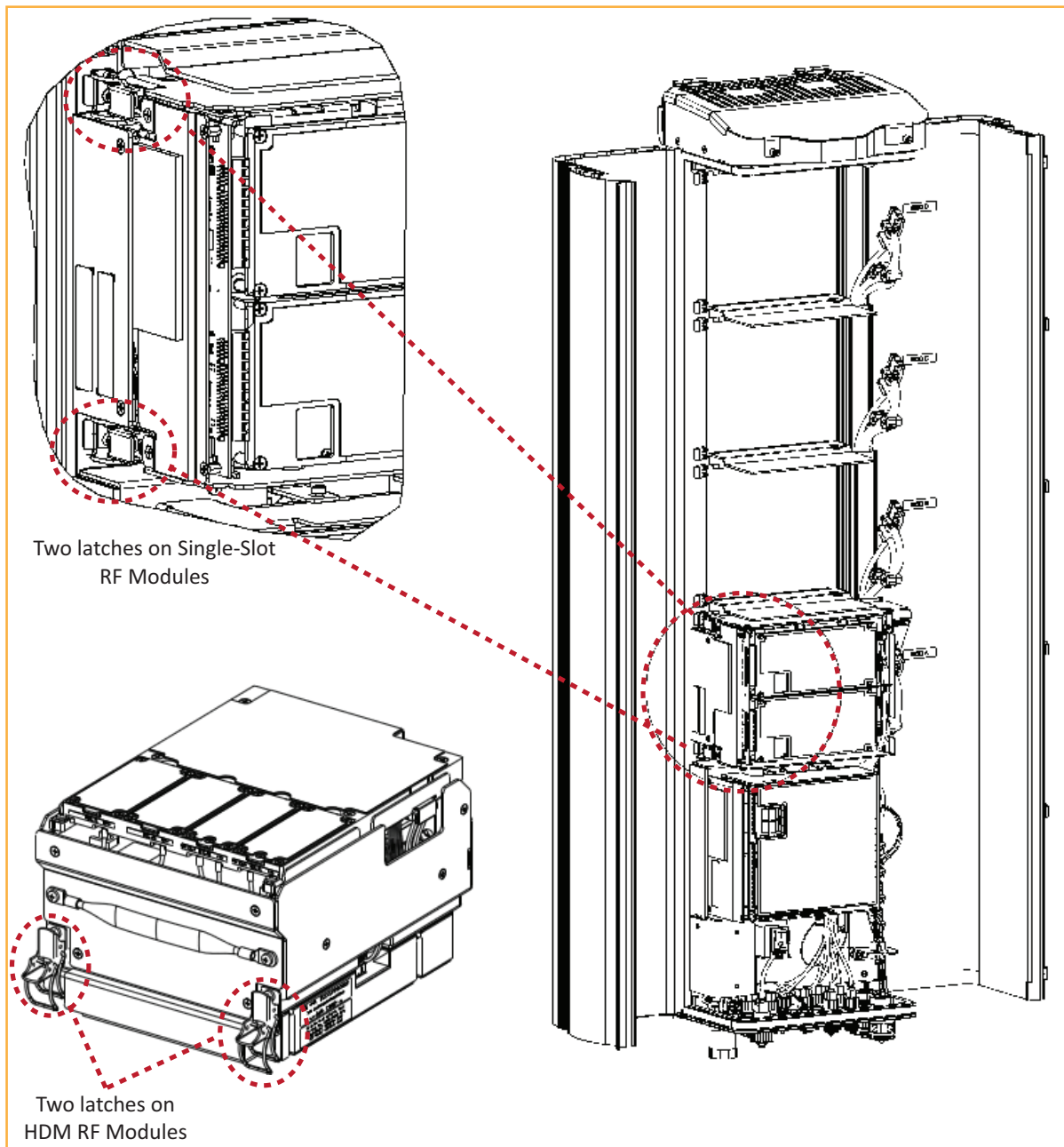


Figure 18. Latches on Single-Bay and HDM RF Modules

Connect Latches on Dual-Bay RF Modules

For Dual-Bay RF Modules, secure four latches, as shown in Figure 19.

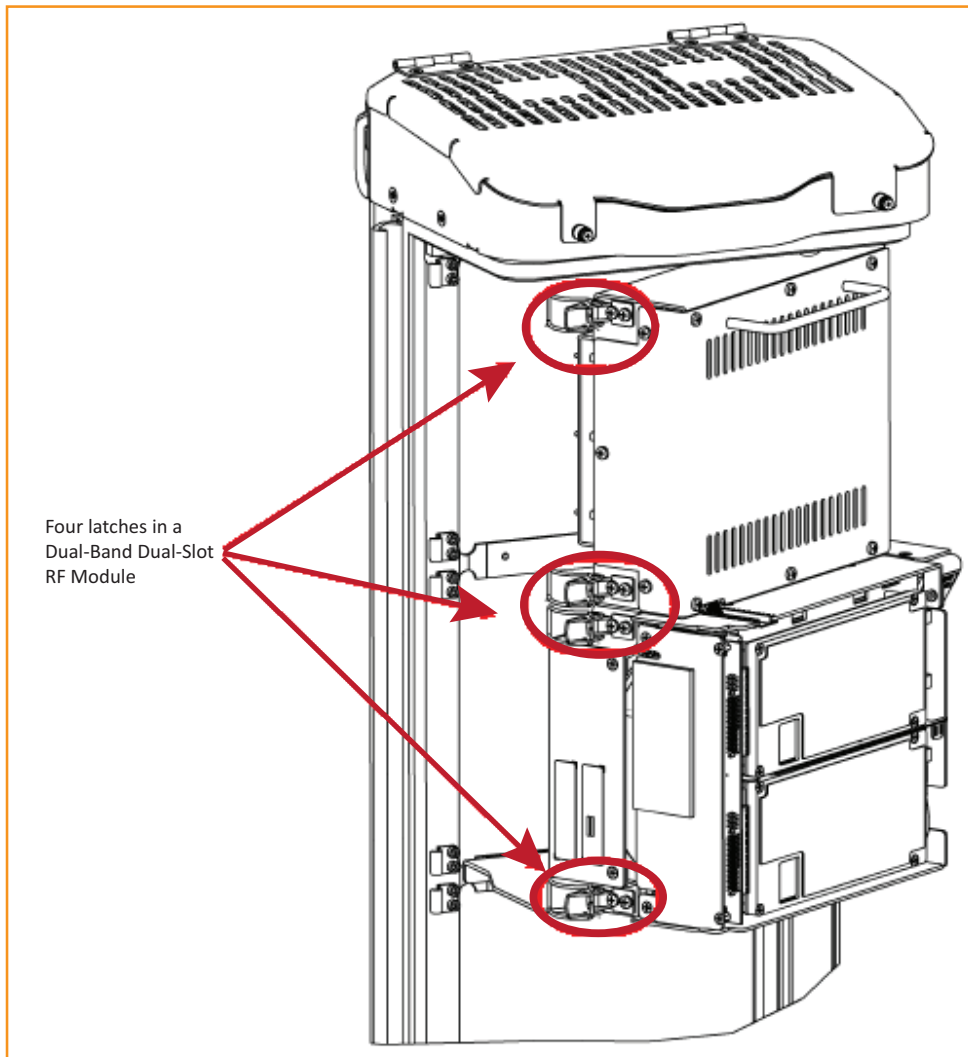


Figure 19. Dual-Bay RF Module Latches

Latches on Legacy Dual-Bay 40W RF Modules

For Legacy Dual-Bay 40W RF Modules, secure four latches, as shown in [Figure 20](#).

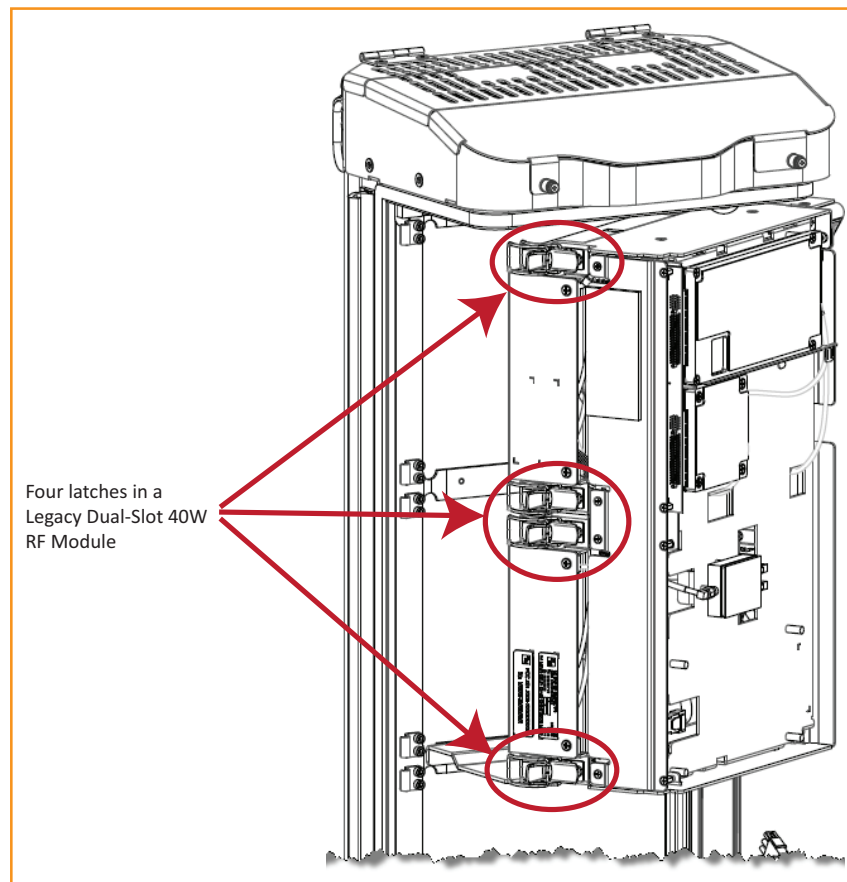


Figure 20. Legacy Dual-Bay 40W RF Module Latches

Verify that the RF Module Mounting Hook is Engaged

Verify that the RF Module Mounting Hook is engaged correctly by pulling the module away from the heat sink. The RF Module should not move. If the RF Module moves during this check, repeat all the steps starting at [“Install the RF Module into the Prism Remote Chassis”](#) on page 26 through this step.

Connect the RF Module Cables to the PRU Chassis

The steps to connect the RF Module cables have been separated into two different procedures; follow the steps that correspond to the RF Module being installed.

- [“Connecting Cables in a Single-Bay RF Module Installation”](#) on page 37
- [“Connecting Cables in a Dual-Bay RF Module Installation”](#) on page 40.

Connecting Cables in a Single-Bay RF Module Installation

- 1 Position the cables so that they are under the right edge of the RF Module, pointing up.
- 2 Follow the rules listed in “Understanding RF Cable Rules” on page 18.
- 3 Connect the RF Module cables, in the order shown below. As you work, refer to the graphic that corresponds to the RF Module being installed into a single bay of the PRU: for a Single-Bay RF Module, refer to [Figure 21 on page 38](#), and for an HDM RF Module, refer to [Figure 22 on page 39](#) and [Table 12 on page 39](#).
 - a Connect the MOD *N* TX0/RX0 cable to the RF Module (the RF cables and connectors are referred to as MOD *N* TX0/RX0 where *N* equals **A**, **B**, **C**, or **D**).
 - i Insert the N-Style Plug of the MOD *N* TX0/RX0 cable into the TX0/RX0 N-Style Jack of the RF Module.
 - ii Turn the coupling nut of the plug clockwise to thread onto the jack and finger-tighten.
 - iii Torque coupling nut to 8 ±1 in-lbs to ensure full connection.

NOTE: **Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.**

- b Connect the MOD *N* TX1/RX1 cable to the RF Module (the RF cables and connectors are referred to as MOD *N* TX1/RX1 where *N* equals **B**, **C**, or **D**).
 - i If a TX1/RX1 RF Module connection is available, insert the N-Style Plug of the MOD *N* TX1/RX1 cable into the TX1/RX1 N-Style Jack of the RF Module. If RF Module connection is not available, constrain the MOD *N* TX1/RX1 cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing.
 - ii Turn the coupling nut of the plug clockwise to thread onto the jack and finger-tighten.
 - iii Torque coupling nut to 8 ±1 in-lbs to ensure full connection.

NOTE: **Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.**

- c Connect the LVDS Cables to the RF Module—the LVDS cables labeled PRIM and DIV should always either be connected to a RF Module or strain relieved to adjacent cables, as this protects the cable against damage through misplacement. Maintain adequate strain-relief distances from the connection points to the RF Module.
 - i Connect the MOD *N* DIV LVDS Cable to the DIV receptacle of the RF Module by inserting and sliding in until fully seated. Full insertion can be recognized by an audible click as the LVDS Cable Connector locks into the RF Module Receptacle.
 - ii Connect the MOD *N* PRIM LVDS Cable to the PRIM connector, following the same steps as above. Full insertion can be recognized by an audible click as the LVDS Cable Connector locks into the RF Module Receptacle.
 - iii Ensure the two LVDS cables are fully seated and latched into their respective receptacles on the RF Module by lightly pulling outward on the connectors. If fully seated and locked into position, the cable connectors will not slide back out.

- d Connect the Power cable to the PWR receptacle of the RF Module.
 - i Ensure that the DC power switch that corresponds to the bay(s) in which the RF Module is to be installed is in the Off position (see “Check the DC Power Switch for the Module Bay” on page 24).
 - i Insert the Power cable into the PWR connector, and slide it in until fully seated. Full insertion can be recognized by an audible click as the Power cable Connector locks into the RF Module Receptacle.
 - ii Verify that the Power cable is fully seated by lightly pulling back on it while making sure to not depress the release triggers on the ends of the connector. When fully inserted, the cable should not be able to be removed from the receptacle.
- 4 Repeat all the steps in “Install the RF Module(s)” on page 21 to install other RF Modules.

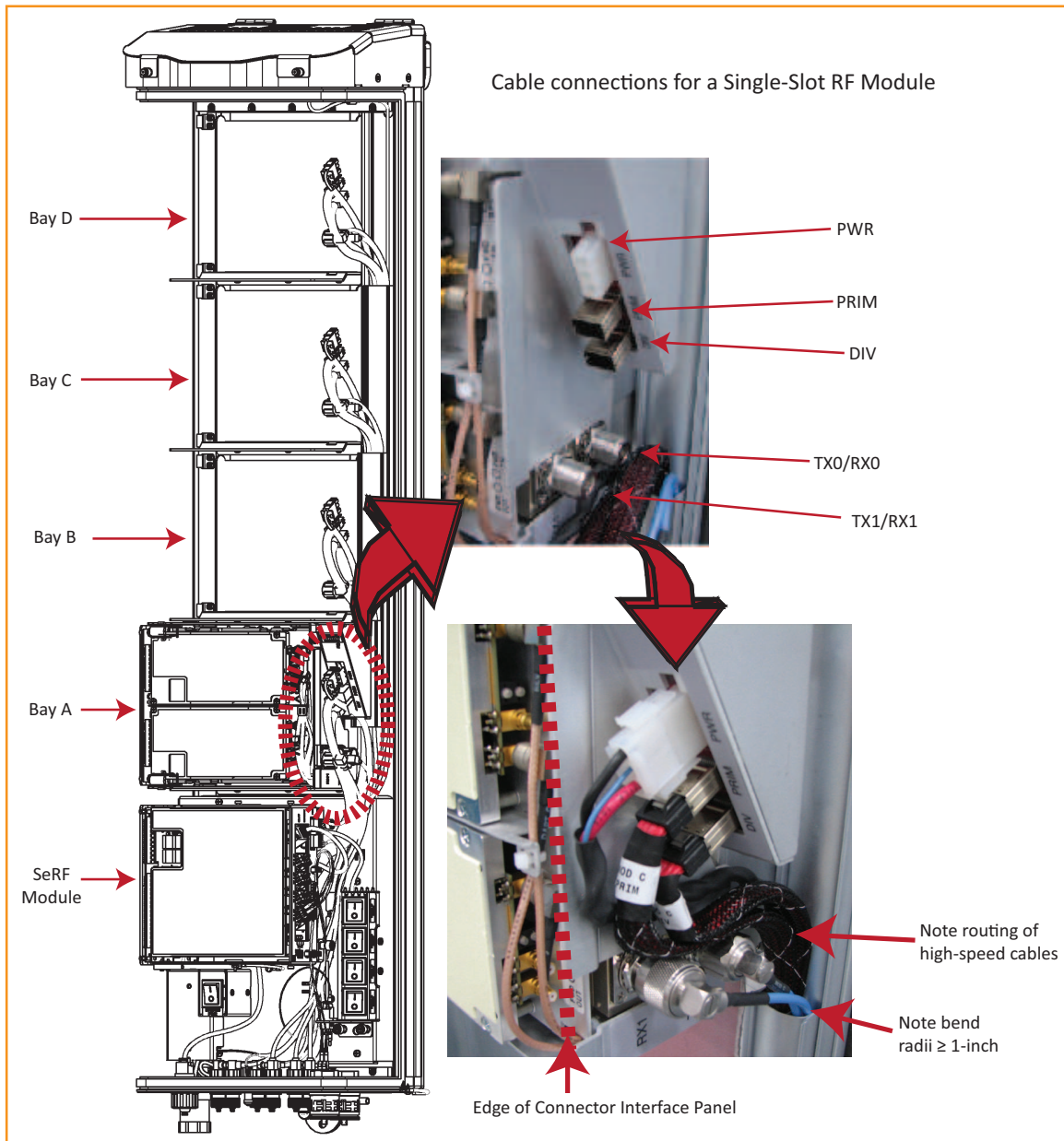


Figure 21. Cable Connections for Single-Bay RF Modules

CAUTION! Ensure that all cable bends are below the top edge of the Connector Interface Panel as indicated by the dashed line in the preceding figure. Failure to correctly position the cables could inhibit closing the Remote Unit door, which can result in damage to the cables.

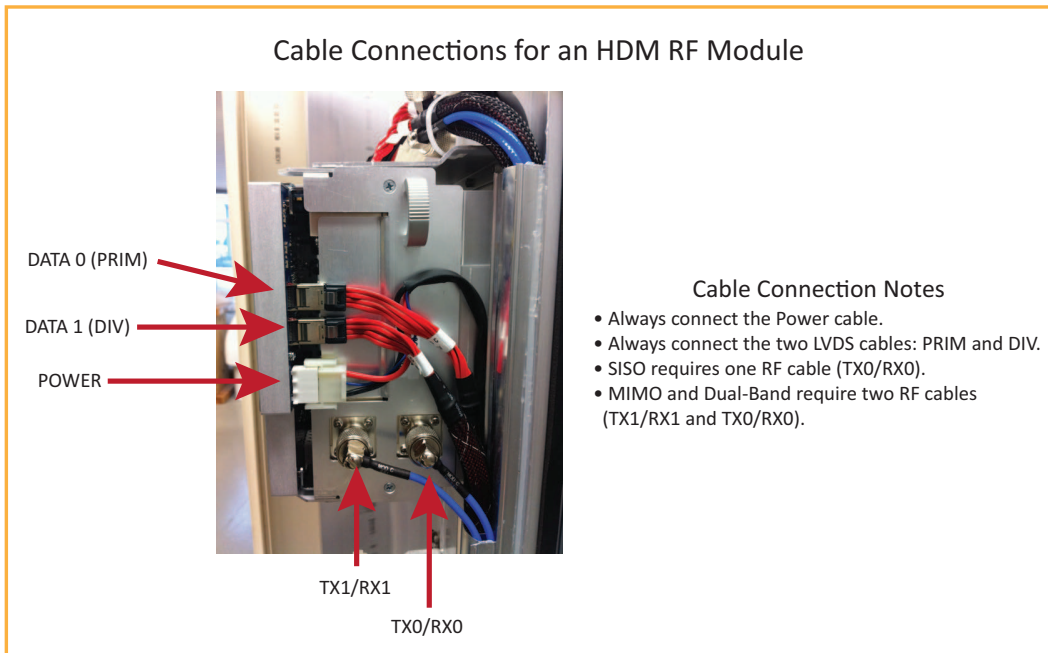


Figure 22. Cable Connections for HDM RF Modules

Table 12 lists how to correctly connect HDM RF Modules to the Antenna ports on the bottom of the Remote Unit.

Table 12. HDM Antenna Port Mapping

| RF Module Catalog # | Description | TX0/RX0 | TX1/RX1 |
|-------------------------------|---|----------|---------|
| FWP-L4MT000MOD | 20W 700 IABC Module, MIMO HDM, Single-Bay | Path 1 | Path 2 |
| FWP-U4MT000MOD | 20W 700 uC Module, MIMO HDM, Single-Bay | Path 1 | Path 2 |
| FWP-L4MTU4MMOD | 20W 700 IABC/700uC, Dual, Single-Bay | 700 IABC | 700 uC |
| FWP-44MT000MOD | 20W 800 MIMO, Single Bay, with two External Filters | Path 1 | Path 2 |
| FWP-441T841MOD ⁽¹⁾ | 20W 800 SMR/ 1900 PCS, Dual RF Module | 1900 | 800 |
| FWP-B4MT000MOD | 20W 850 DUAL, MIMO, Single Bay | Path 1 | Path 2 |
| FWP-C4MT000MOD | 20W 850 Cell/1900 PCS, Dual, Single-Bay | 1900 | 850 |
| FWP-84MT000MOD | 20W 1900 PCS Dual MIMO, Single-Bay | Path 1 | Path 2 |
| FWP-84MTA4MMOD | 20W 1900/2100 Dual, Single Bay | 2100 | 1900 |
| FWP-A4MT000MOD | 20W HDM AWS Band 4 MIMO, Single-Bay | Path 1 | Path 2 |

(1) A 20W 800 SMR/ 1900 PCS, Dual RF Module RF Module (FWP-441T841MOD) requires a FlexWave Notch Filter (FWP-SPRINTFILTER) between the Remote Unit and the antenna to provide protection from spurious emissions in the Public Safety band below 861.35 MHz and the Cellular band above 869.5 MHz. Information on how to install the Notch Filter is provided in “FlexWave Notch Filter (FWP-SPRINTFILTER)” on page 47.

Connecting Cables in a Dual-Bay RF Module Installation

- 1 Position the cables so that they are under the right edge of the RF Module, pointing up.
- 2 Follow the rules listed in “Understanding RF Cable Rules” on page 18.
- 3 Working from the bottom connector up, connect the RF Module cables, as described below. As you work, refer to the graphic that corresponds to the RF Module being installed in the Dual-Bay: for a Dual-Bay RF Module, refer to [Figure 23 on Page 42](#), and for a Legacy Dual-Bay 40W RF Module, refer to [Figure 24 on Page 43](#).
 - a Connect the MOD *N* TX1/RX1 cable to the N-Style RF connector on the Dual-Bay RF Module (the RF cables and connectors are referred to as MOD *N* TX1/RX1 where *N* equals **B**, **C**, or **D**).
 - i Constrain the MOD *N* TX1/RX1 cable of the lower RF Module bay to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing.
 - ii Connect the MOD *N* TX1/RX1 cable to the TX1/RX1 N-Style Jack of the upper RF Module Bay.
 - iii Turn the coupling nut of the plug clockwise to thread onto the jack and finger-tighten.
 - iv Torque coupling nut to 8 ± 1 in-lbs to ensure full connection.

NOTE: **Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.**

- b Connect the MOD *N* TX0/RX0 cable to the RF Module (the RF cables and connectors are referred to as MOD *N* TX0/RX0 where *N* equals **A**, **B**, **C**, or **D**).
 - i Insert the N-Style Plug of the MOD *N* TX0/RX0 cable into the TX0/RX0 N-Style Jack of the lower RF Module bay. If RF Module connection is not available, constrain the MOD *N* TX0/RX0 cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing.
 - ii Turn the coupling nut of the plug clockwise to thread onto the jack and finger-tighten.
 - iii Torque coupling nut to 8 ± 1 in-lbs to ensure full connection.

NOTE: **Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.**

- c Connect the LVDS Cables to the RF Module.
 - i If available, connect the MOD *N* DIV LVDS Cable to the DIV receptacle of the lower RF Module by inserting and sliding in until fully seated. If DIV receptacle is not available, constrain the MOD *N* DIV LVDS Cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing. Full insertion can be recognized by an audible click as the LVDS Cable Connector locks into the RF Module Receptacle.
 - ii Connect the MOD *N* DIV LVDS Cable to the DIV receptacle of the upper RF Module by inserting and sliding in until fully seated. If DIV receptacle is not available, constrain the MOD *N* DIV LVDS Cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing. Full insertion can be recognized by an audible click as the LVDS Cable Connector locks into the RF Module Receptacle.

- iii If available, connect the MOD N PRIM LVDS Cable to the PRIM receptacle of the upper RF Module by inserting and sliding in until fully seated. If DIV receptacle is not available, constrain the N PRIM LVDS Cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing.
 - iv Ensure the two LVDS cables are fully seated and latched into their respective receptacles on the RF Module by lightly pulling outward on the connectors. If fully seated and locked into position, the cable connectors will not slide back out.
- d Connect the Power cable to the PWR receptacle of the RF Module.
- i Ensure that the DC power switch that corresponds to the bay(s) in which the RF Module is to be installed is in the Off position (see [“Check the DC Power Switch for the Module Bay” on page 24](#)).
 - ii Insert the Power cable into the PWR receptacle of the lower RF Module bay, and slide it in until fully seated. Full insertion can be recognized by an audible click as the Power cable Connector locks into the RF Module Receptacle.
 - i Insert the Power cable into the PWR receptacle of the upper RF Module bay, and slide it in until fully seated. Full insertion can be recognized by an audible click as the Power cable Connector locks into the RF Module Receptacle. If the PWR receptacle is not available, constrain the Power cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote Unit door from closing.
 - ii Verify that the Power cable is fully seated by lightly pulling back on it while making sure to not depress the release triggers on the ends of the connector. When fully inserted, the cable should not be able to be removed from the receptacle.
- 4 Repeat all the steps in [“Install the RF Module\(s\)” on page 21](#) to install other RF Modules.

Cable Connections for a Dual-Slot RF Module

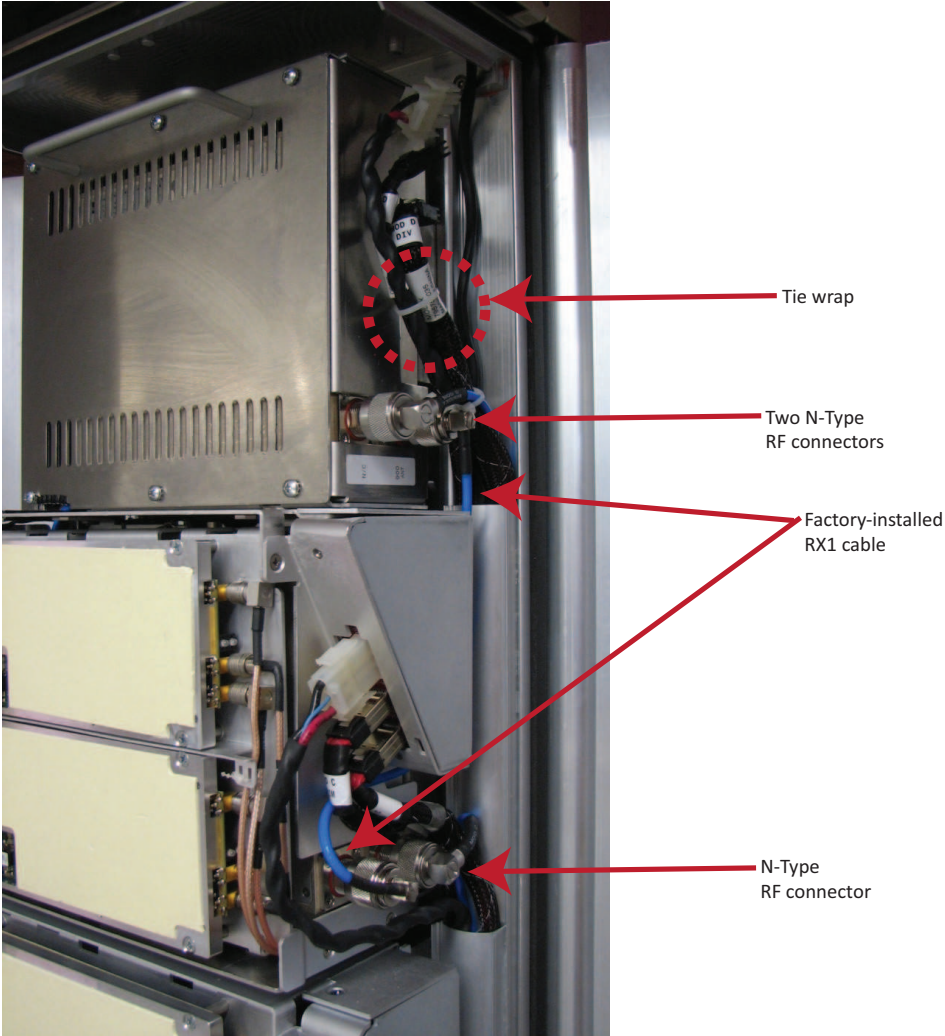


Figure 23. Cable Connections for Dual-Band Dual-Bay RF Modules

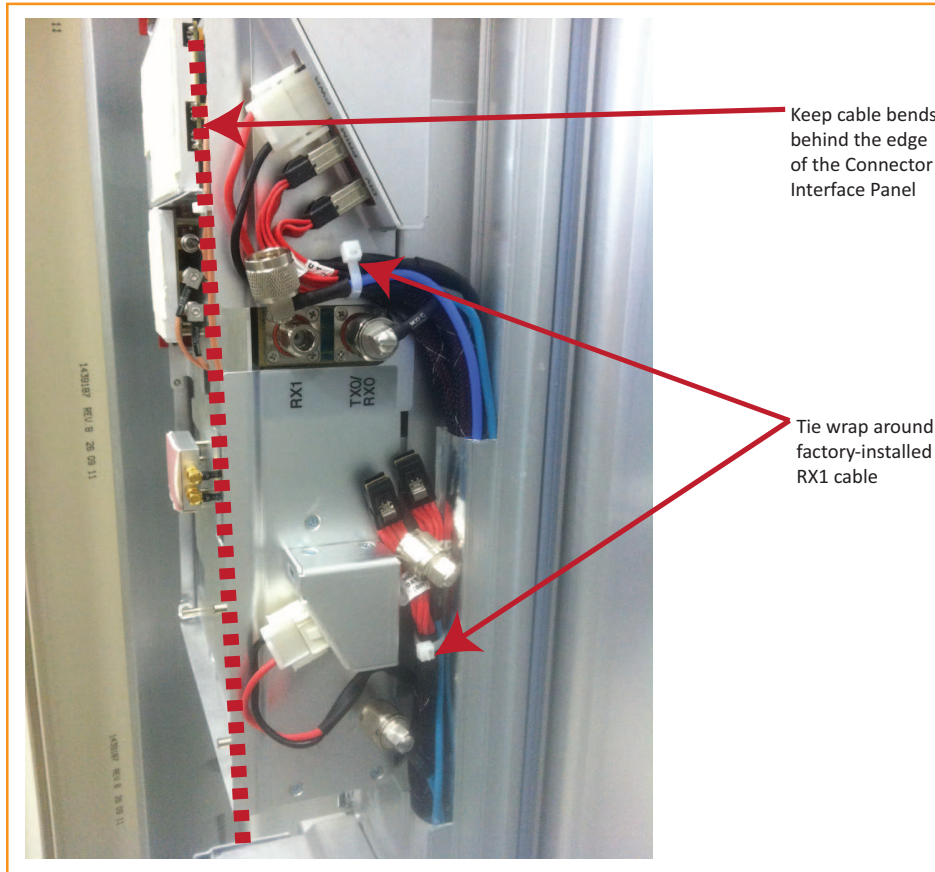
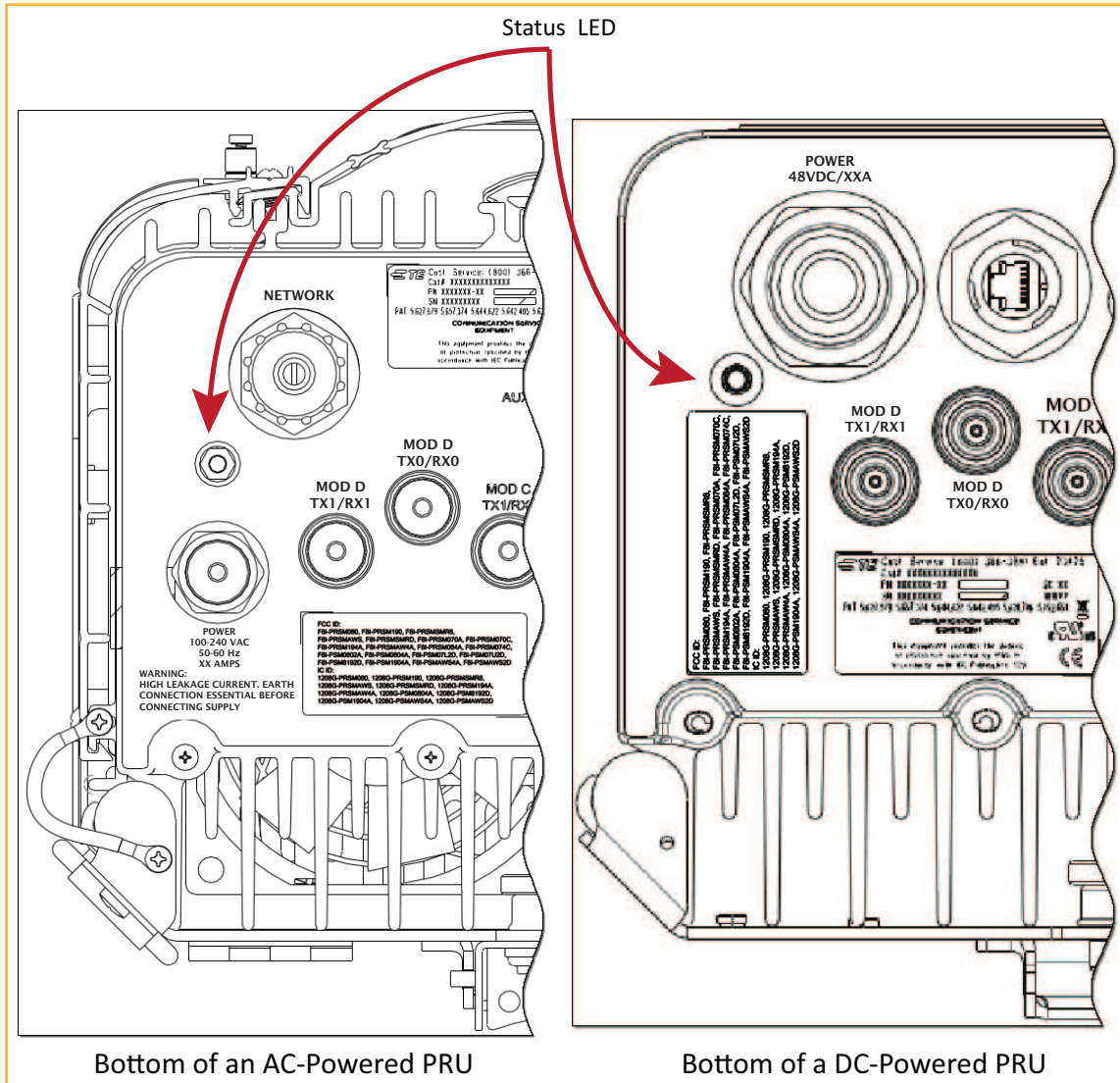


Figure 24. Cable Connections for Legacy Dual-Bay 40W RF Modules

CAUTION! Ensure that all cable bends are below the top edge of the Connector Interface Panel as indicated by the dashed line in the preceding figure. Failure to correctly position the cables could inhibit closing the Remote Unit door, which can result in damage to the cables.

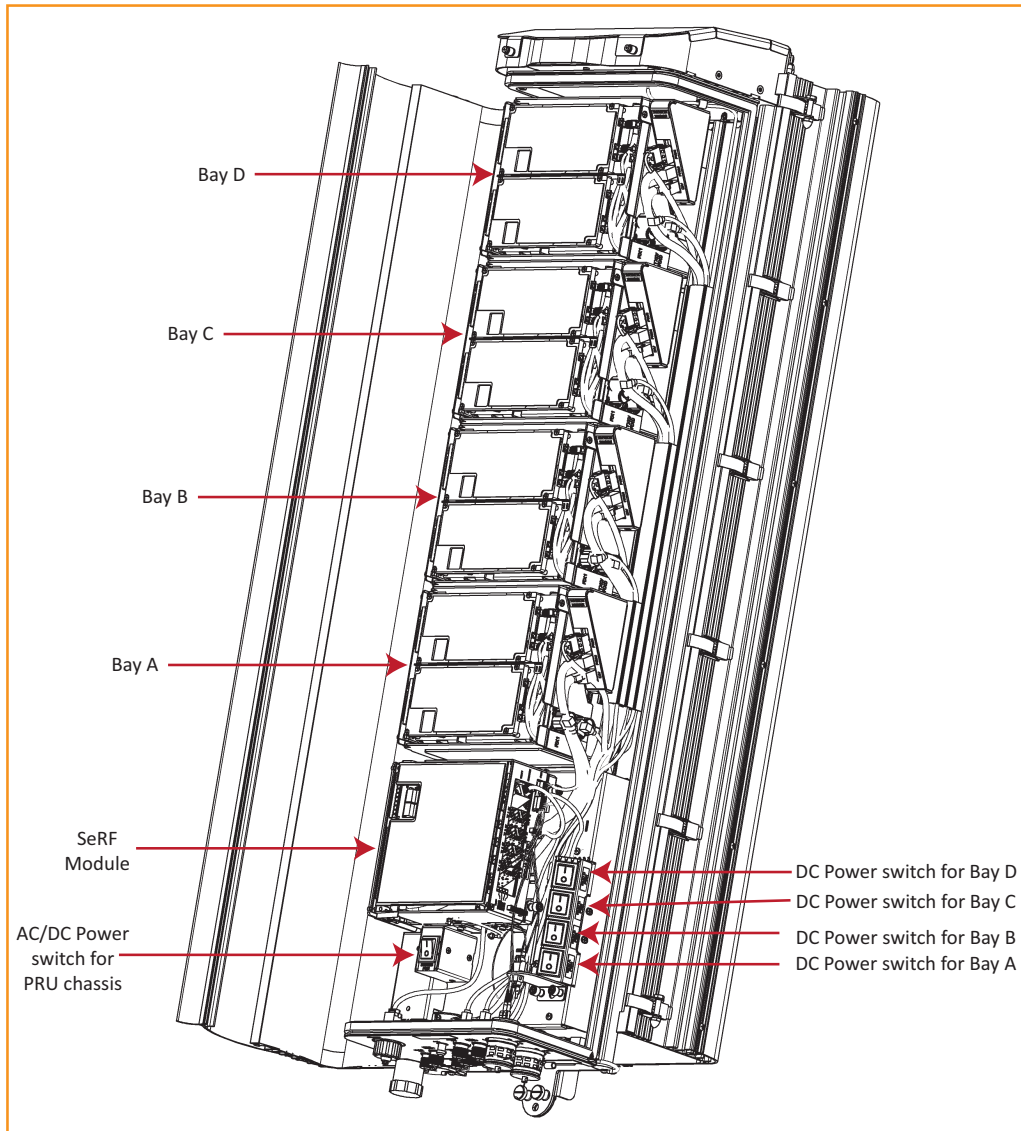
Power on the RF Module(s) and the Prism Remote Unit

- 1 If necessary, power up the Remote Unit by turning its AC or DC power switch to On.
- 2 Ensure that the external Status LED on the bottom of the Remote Unit goes off. (At system startup, the Status LED is red to indicate that the Remote Unit is powering up and that the SeRF processor does not yet control the Remote Unit; the Status LED will remain red for no more than 1 minute.)



NOTE: The preceding graphic illustrates the Status LED on a Quad-Bay PRU. The Status LED for the Single-Bay, Dual-Bay, and Tri-Bay PRUs is in the same location and functions the same as the Status LED for the Quad-Bay PRU.

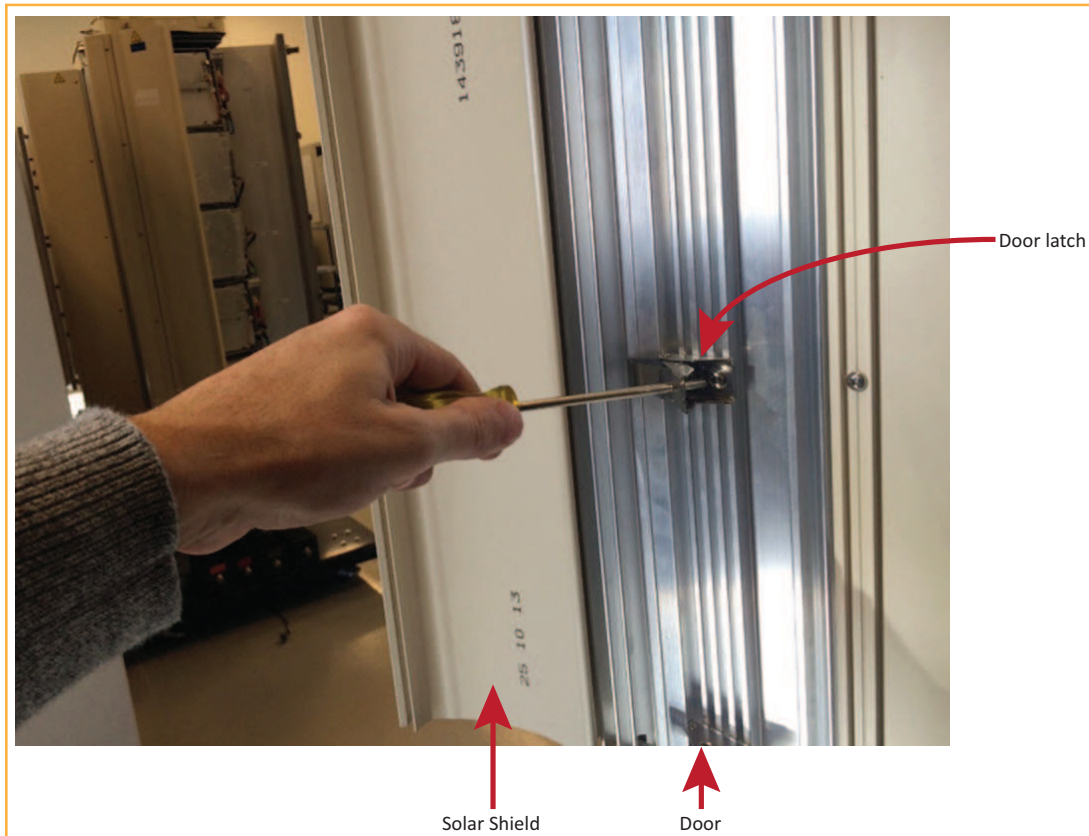
- 3 Follow the rules listed below to toggle the Power switch that corresponds to each RF Module to its ON position.
- For Dual-Band Dual-Bay RF Modules, use the Power switch for the lower module. For example, to power up a Dual-Bay RF Module in combined bays C+D in a Quad-Bay chassis, turn ON DC Power switch for Mod C; leave the DC Power switch for Mod D OFF.
 - A Legacy Dual-Bay 40W RF Module uses the Power Supplies in both bays. If the Legacy Dual-Bay 40W RF Module is installed in bays C+D, turn ON the Power switch for Mod C and Mod D.



- 4 Verify that the LEDs for all installed RF Modules (located next to their respective connectors) are green. If any of the RF Module LEDs are not green, verify that each RF Module cable is seated fully in its respective connector. If after checking the cable connections and an LED is not green, contact TE for assistance (see [“Contacting TE Connectivity” on page 52](#)).

Close the Remote Unit Door and Solar Shield

- 1 Do not slam the door to close it—gently swing the door shut and press it firmly closed.
- 2 Slowly close each door latch in a smooth fluid motion—do not allow the door latches to snap closed. For best results, starting with the top latch and working down to the bottom latch, use a flat-head screwdriver to close each latch as shown below.
- 3 Do not slam the Solar Shield to close it—gently swing it shut and press it firmly closed.



CAUTION! Service personnel must confirm that the perimeter gasket and door-to-door gaskets are in place when closing the Remote Unit doors after servicing.

CAUTION! If the PRU door was allowed to snap closed, RF output from an HDM RF Module may be disabled for up to three minutes. Any alarms generated immediately following the opening/closing of the PRU Doors, such as Door Open, RF Power Low, System VSWR Fault, and LPA VSWR Fault, automatically clear once the RF has recovered. If alarms do not clear after three minutes, please contact TE for technical support; see “[Contacting TE Connectivity](#)” on page 52.

Provision the Prism Remote Unit

Refer to the current *EMS System Setup and Provisioning Guide* for information on configuring the PRU for a FlexWave Prism system.

FLEXWAVE NOTCH FILTER (FWP-SPRINTFILTER)

A FlexWave Notch Filter (FWP-SPRINTFILTER) ships with and is required in installations of the following RF Modules:

- 20W 800 SMR/ 1900 PCS, Dual RF Module (FWP-441T841MOD)
- 20W 800 MIMO, Single Bay, with two External Filters (FWP-44MT000MOD).

Notch Filter Installation Tips

You install the Notch Filter between the Prism Remote Unit and the antenna to provide protection from spurious emissions in the Public Safety band below 861.35 MHz and the Cellular band above 869.0 MHz.

The following are installation tips for the Notch Filter:

- You can use the same mounting method to mount the Notch Filter as you used to mount the Remote Unit.
- Mount the Notch Filter vertically with the N-type female connectors at the bottom.
- There are two Ground lugs on the Notch Filter, which are on the back of the two mounting brackets. Follow local practice to ground the Notch Filter.

Figure 25 provides the dimensions required to create a mounting template.

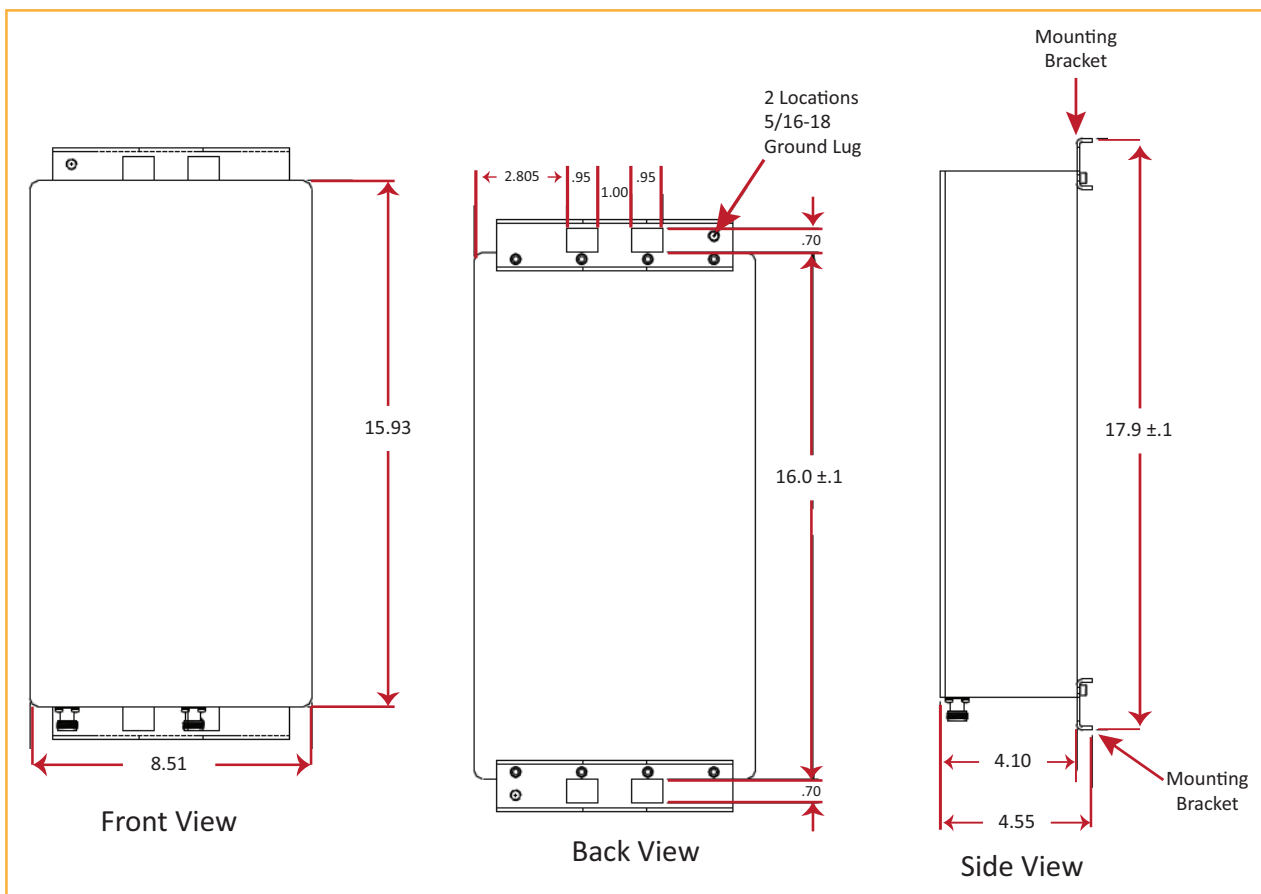


Figure 25. Notch Filter Mounting Dimensions

Figure 26 illustrates how to pole mount the Notch Filter.

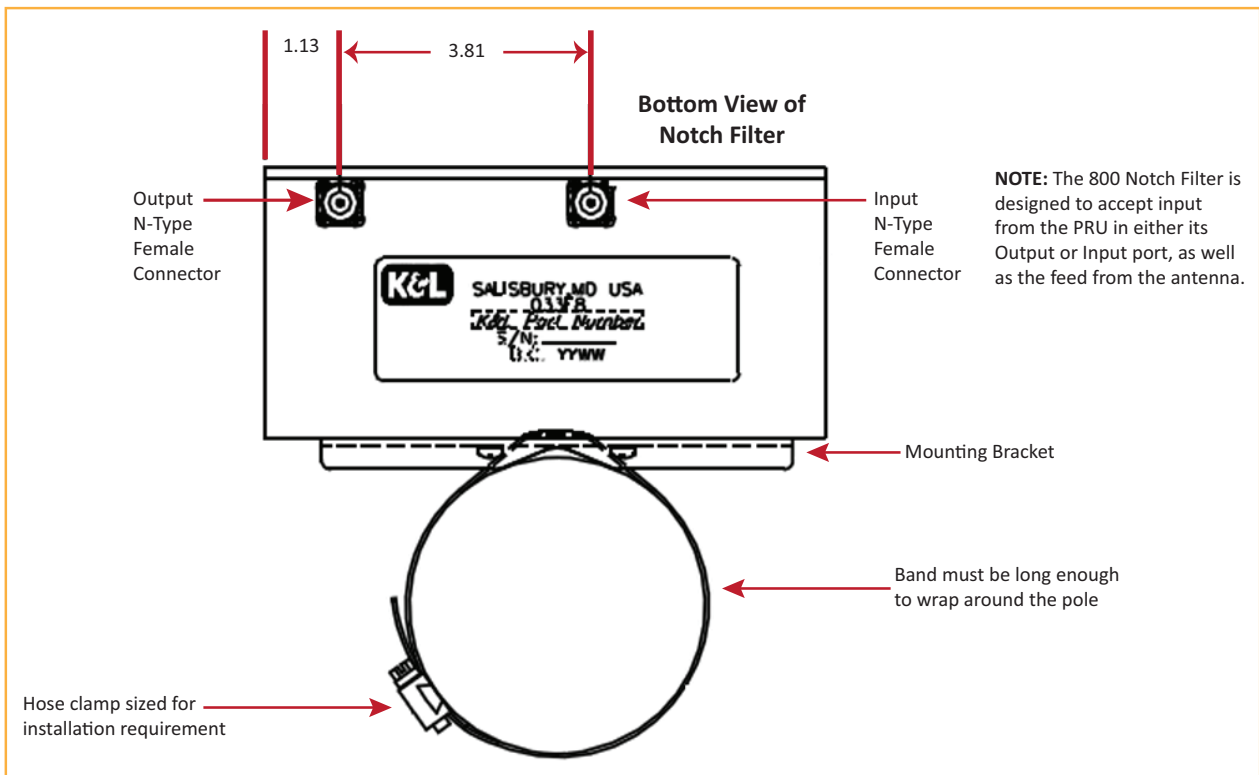


Figure 26. Pole Mounting a Notch Filter

Notch Filter Specifications

| Frequency Range (MHz) | Maximum Emissions (Sprint requirement) per 30 kHz |
|-------------------------------------|--|
| 817-824 | — |
| < 854 | < -76 dBm |
| 854-859 | < -76 dBm |
| 859-861.35 | < -76 dBm |
| 861.35-861.5 | < -56 dBm |
| 861.5-861.6 | < -42 dBm |
| 862-869 | — |
| Enclosure Rating | IP67 |
| RF Connectors | N-Type Connector, Female (2) |
| Ground Studs (w/star washer) | All ground Studs must accept AWG 6 wire |
| Mounting | Strap mount (Vertical and Horizontal) on up to 12" pole, or Wall mount |
| Size | 15.93" x 8.51" x 4.10" |
| Weight | 18 LBS |
| Operational Temperature | -25°C to +65°C |
| Humidity | ETSI 300-019-1-3 10%-100% Condensing |
| Vibration-operation | ETSI 300-019-1-4 |
| Vibration-transportation | ETSI 300-019-1-2 |

STANDARDS CERTIFICATION

FCC

This equipment complies with the applicable sections of Title 47 CFR Part 15 (Host Unit), Part 22 (800 MHz Cellular), Part 24 (1900 MHz - PCS), Part 90 (800/900 - SMR), and Part 27 (2100 MHz - AWS, 700 MHz -LTE, 2300 MHz - WCS, and 2500 TDD).

WARNING. This is NOT a CONSUMER device. It is designated for installation by FCC LICENSEES and QUALIFIED INSTALLERS. You MUST have an FCC LICENSE or express Consent of an FCC Licensee to operate this device. Unauthorized use may result in Significant forfeiture penalties, including penalties in excess of \$100,000 for each continuing violation.

IC

This equipment complies with the applicable sections of RSS-131- Zone Enhancers for the Land Mobile Service. The term "IC:" before the radio certification number only signifies that Industry Canada Technical Specifications were met.

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

Note: To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite output from the antenna cannot exceed 1000 Watts ERP (LTE, Cellular and SMR), the antenna cannot exceed 1640 Watts EIRP (PCS and AWS), and the antenna must be permanently installed in a fixed location that provides at least 6 meters (20 feet) of separation from all persons.

UL/CUL

This will be installed in a restricted access location. This equipment complies with Type 4, per UL and CUL 50, Standard for Enclosures for Electrical Equipment. This equipment provides the degree of protection specified by IPX6 as defined in IEC Publication 529.

FDA/CDRH

This equipment uses a Class 1 LASER according to FDA/CDRH Rules. This product conforms to all applicable standards of 21 CFR Part 1040.

Caution: Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

EU Harmonized Standards

Meets essential requirements of R&TTE 1999/5/EC.

- Article 3.1a—The protection of the health and the safety of the user and any other person, including the objectives with respect to safety requirements contained in Directive 2006/95/EC, but with no voltage limit applying.
- Article 3.1b—The protection requirements with respect to electromagnetic compatibility contained in Directive 2004/108/EC.
- Article 3.2—In addition, radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communication and orbital resources so as to avoid harmful interference.

EMC Standards

EN 55022 and EN55024 (CE marked)

Safety Standards

This equipment complies with IEC 60950-1, 2ND Edition + Amendment 1 (CE marked) and with UL 60950-1, 2ND Edition + Amendment 1 (File number E174166) (USA and Canada)

ACCESSING USER DOCUMENTATION ON THE TE CUSTOMER PORTAL

You can access additional user documentation on the TE Customer Portal, as described below.

- 1 Click on the following URL link:

<https://www.te.com/portal/wireless/>

(Alternatively, enter the preceding URL into your web browser, and then press **ENTER** on your keyboard.)

- 2 Access to the Customer Portal requires a user account and password. On the **Sign In** page, do one of the following:
 - If you have an account, in the **Already Registered? Sign In Now** panel, enter your **Email** and **Password**, and then click **Sign In**.
 - If you don't have an account, under **Create an Account**, click **Register Now** and follow the prompts.
- 3 On the **Wireless Customer Portal** home page, in either the **Resources** or **Documents** panel, click the **Manuals and Data Sheets** link.
- 4 On the **Manuals and Data Sheets** page, do the following:
 - a Open the folder for the product line that corresponds to the document that you want to access.
 - b Click on the title of the manual that you wish to open.
 - c (Optional) Save the PDF to your computer.

CONTACTING TE CONNECTIVITY

Telephone Numbers

Sales

| | |
|------------------------|----------------|
| Asia Pacific | +65-6294-9948 |
| France | 0800 914032 |
| Germany | 0180 2232923 |
| Italy | 0800 782374 |
| Spain | 900 983291 |
| United Kingdom | 0800 960236 |
| USA or Canada | 1-800-366-3891 |
| Extension | 73000 |
| Connectivity Extension | 73475 |
| Wireless Extension | 73476 |

Technical Support

| | |
|---------------|-----------------|
| USA or Canada | 1-800-530-9960 |
| Elsewhere | +1-952-917-0761 |

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Customer Portal

<https://www.te.com/portal/wireless/>

Technical Support for Wireless Products

<http://www.te.com/WirelessSupport>

www.te.com/wireless

