

This installation guide provides the information you need to install TE Connectivity FlexWave Prism RF Modules into a Prism Remote Unit (PRU).

Installation instructions are provided for the following Prism Remote Unit RF Modules:

- Single-Bay RF Modules, which includes the HDM RF Modules
- Dual-Bay RF Modules
  - Dual-Band RF Modules
  - Legacy 40W RF Modules.

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## DOCUMENT OVERVIEW

Table 1 lists the RF Modules that this installation guide supports.

**Table 1.** *FlexWave Prism RF Modules Supported in this Installation Guide*

Catalog Number	Description
<b>High-Density Module (HDM); Single Bay</b>	
FWP-L4MT000MOD	20W 700 IABC Module, MIMO HDM, Single-Bay
FWP-L4MTU4MMOD	20W 700 IABC/700uC, Dual, Single-Bay
FWP-U4MT000MOD	20W 700 uC Module, MIMO HDM, Single-Bay
FWP-44MT000MOD	20W 800 MIMO, Single Bay, with two External Filters
FWP-441T841MOD	20W 800 SMR/ 1900 PCS, Dual RF Module
FWP-C4MT000MOD	20W 850 Cell/1900 PCS, Dual, Single-Bay
FWP-B4MT000MOD	20W 850 DUAL, MIMO, Single Bay
FWP-84MT000MOD	20W 1900 PCS Dual MIMO, Single-Bay
FWP-84MTA4MMOD	20W 1900/2100 Dual, Single Bay
FWP-W4MT000MOD	20W 2300 WCS FDD, MIMO HDM, Single-Bay
FWP-A416000MOD	20W AWS Module, Non-Diversity, HDM, Single Bay
FWP-A4MT000MOD	20W AWS Band 4 MIMO HDM, Single-Bay
FWP-8416000MOD	20W PCS Module, Non-Diversity, HDM, Single Bay
FWP-B410000MOD	20W Wideband Cell Module, Non-Diversity
FWP-A81T000MOD	40W AWS Band 4 SISO HDM, Single-Bay
FWP-881T000MOD	40W PCS Band 2 & 25 SISO HDM, Single-Bay
FWP-B810100MOD	40W Wideband Cell Module, Non-Diversity, Single-Bay
<b>Single SuperDART; Single Bay</b>	
FWP-I210000MOD	6.5W 800 APAC Module, Non-Diversity, Classic (Extended 1 MHz)
FWP-6216000MOD	10W 900 EGSM, Non-Diversity, Single SuperDART
FWP-K216000MOD	10W 900 P-GSM Module, Non-Diversity, Single SuperDART
FWP-F216000MOD	10W APAC EGSM Module, Single SuperDART
FWP-7416000MOD	20W 1800 GSM, Non-Diversity, Single SuperDART
FWP-9416D00MOD	20W 2100 UMTS Module, DIV Ready, Single SuperDART
FWP-9416000MOD	20W 2100 UMTS, Non-Diversity, Single SuperDART
FWP-L416000MOD	20W 700 Lower ABC Module, Non-Diversity, Single SuperDART
FWP-U416000MOD	20W 700 LTE, UPPER C, SISO, Single SuperDART
FWP-U816100MOD	40W 700 Upper C Module, Non-Diversity, Single SuperDART, Single-Bay
<b>Dual SuperDART; Single Bay</b>	
FWP-741S000MOD	20W 1800 GSM, Non-Diversity, DL SuperDART
FWP-A41S000MOD	20W AWS 2100 12S
FWP-841S000MOD	20W PCS 1900 12S
FWP-941S000MOD	20W, UMTS 2100, Non-Diversity, DL SuperDART

**Table 1.** *FlexWave Prism RF Modules Supported in this Installation Guide (Cont.)*

Catalog Number	Description
<b>Two Single SuperDARTs; Diversity; Single Bay</b>	
FWP-6226000MOD	10W 900 EGSM, Diversity, Single SuperDART
FWP-K226000MOD	10W 900 P-GSM Module, Diversity, Single SuperDART
FWP-7426000MOD	20W 1800 GSM, Diversity, Single SuperDART
FWP-9426000MOD	20W, 2100 UMTS, Diversity, Single SuperDART
FWP-A426000MOD	20W AWS Module, Diversity, Single SuperDART
FWP-8426000MOD	20W PCS Module, Diversity, Single SuperDART
<b>Classic DART; Single Bay</b>	
FWP-4210000MOD	6.5W 800 SMR Module, Non-Diversity, Classic
FWP-8420000MOD	20W 1900 PCS Diversity
FWP-8410000MOD	20W 1900 PCS Non-Diversity
FWP-A420000MOD	20W 2100 AWS Diversity
FWP-A410000MOD	20W 2100 AWS Non-Diversity
FWP-B420000MOD	20W Wideband Cell Module, Diversity, Classic
FWP-J410D00MOD	20W 850 Cell (870-890) Module, Diversity Ready, Classic
<b>Classic DART; Two-Bay</b>	
FWP-8810000MOD	40W PCS Module, Non-Diversity, Classic (Dual-Bay)
FWP-A810000MOD	40W AWS Module, Non-Diversity, Classic, Dual-Bay
<b>Dual Classic DART; Two-Bay</b>	
FWP-D210000MOD	6.5W 800/900 ESMR Module, Non-Diversity, Classic

The RF Modules listed in [Table 1](#) are compatible only with the Remote Units listed in [Table 2](#).

**Table 2.** *Supported FlexWave Prism Remote Unit Chassis*

Catalog Number	Description
FP1-XXXXXXXXXXRU	Single-Bay Prism Remote
FP2-XXXXXXXXXXRU	Dual-Bay Prism Remote
FP3-XXXXXXXXXXRU	Tri-Bay Prism Remote
FP4-XXXXXXXXXXRU	Quad-Bay Prism Remote

## Revision History

**Table 3.** *Revision History*

Issue	Document Date	Technical Updates
1	April 2012	Original
2	February 2013	Changed Prism Remote Unit model names from Single-/Dual-/Tri-/Quad-Band to Single-/Dual-/Tri-/Quad-Bay. (TECP-77-201).
3	May 2013	Added <a href="#">“Understanding RF Cable Rules” on page 18..</a>
4	October 2013	Added the 20W AWS Band 4 MIMO HDM, 40W AWS Band 4 SISO HDM and 40W PCS Band 25 SISO HDM RF Modules.
5	January 2014	Added FWP-84MT000MOD and FWP-L4MTU4MMOD RF Modules, and added <a href="#">Table 13 on page 39.</a>
6	August 2014	Added support for FWP-B4MT000MOD, FWP-44MT000MOD, and FWP-84MTA4MMOD RF Modules; added the external FlexWave Notch Filter (FWP-SPRINTFILTER), see <a href="#">“FlexWave Notch Filter (FWP-SPRINTFILTER)” on page 47.</a>
7	December 2014	Added caution about potential temporary loss of RF for HDM RF Modules after closing the chassis door.
8	March 2015	Adds support for the Dual 20W 2300 WCS FDD, MIMO, Single-Bay RF Module (FWP-W4MT000MOD); adds <a href="#">“Close the Remote Unit Door and Solar Shield” on page 46.</a>

## Document Cautions and Notes

Two types of messages, identified below, appear in the text:

**CAUTION!** Cautions indicate operations or steps that could cause personal injury, induce a safety problem in a managed device, destroy or corrupt information, or interrupt or stop services.

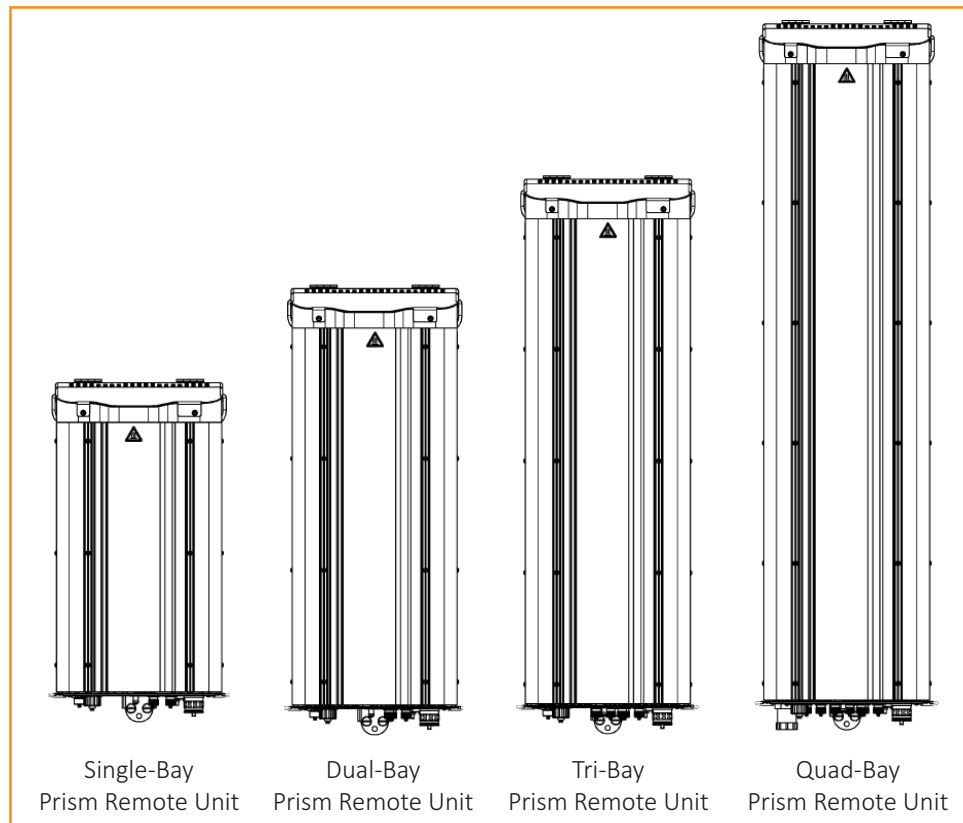
**NOTE:** Notes contain information about special circumstances.

## Abbreviations Used in this Guide

CDRH	Center for Diseases and Radiological Health	LVDS	Low-Voltage Differential Signaling
cm	Centimeter	MHz	Megahertz
DART	Digital/Analog Radio Transceiver	MIMO	Multiple-Input Multiple-Output
dB	Decibel	MOD	Module
dBm	Decibel-milliwatts	PA	Power Amplifier
DCS	Distributed Call Signaling	PRIM	Primary
DD	Digital Dividend	PRU	Prism Remote Unit
DIV	Diversity	PWR	Power
DPM	Digital Processing Module	REV	Reverse
EMC	Electromagnetic Compatibility	RF	Radio Frequency
ESD	Electro-Static Discharge	Rx	Receive
EU	European Union	SDART	Super Digital/Analog Radio Transceiver
FCC	Federal Communications Commission	SeRF	Serialized RF
FDA	Food and Drug Administration	SFP	Small Form-Factor Pluggable
FRU	Fullband Remote Unit	TIM	Thermal-Interface Material
FWD	Forward	Tx	Transmit
HDM	High Density Module	UL	Underwriters' Laboratories, Inc.
HMFOC	Hardened Multi-Fiber Optic Connector	UMTS	Universal Mobile Telecommunications System
IC	Industry Canada	W	Watt
LED	Light-Emitting Diode	WCS	Wireless Communications Services

## OVERVIEW OF RF MODULES FOR PRISM REMOTE UNITS

Figure 1 illustrates the Prism Remote Unit (PRU), which controls RF emissions, interfaces with the FlexWave Prism Host Unit.



**Figure 1.** Prism Remote Units (PRUs)

Depending on the Prism Remote Unit model, a PRU enclosure can have from one to four RF Module bays and can support up to four RF Modules, as indicated by the model name. That is, the Single-Bay PRU has one RF Module bay and can only support one RF Module, and the Quad-Bay PRU has four RF Module bays and can support up to four RF Modules.

The function of the Remote Unit RF Modules on the Forward Path is to:

- convert the digitized RF transported from the Host to Analog RF
- amplify the Analog RF signal
- provide signal filtering.

The function of the Remote Unit RF Modules on the Reverse Path is to:

- convert the Analog RF from the handset to Digital RF for transport to the Host
- amplify the Digital RF signal
- provide signal filtering.

**NOTE:** The RF Modules are field replaceable, but cannot be serviced in the field.

## RF Module Digital/Analog Radio Transceivers

Each RF Module can support any of the following Digital/Analog Radio Transceiver (DART) combinations:

- one Classic DART or one Single SuperDART
- two Classic DARTs (i.e., the 6.5W 800/900 ESMR Module, Non-Diversity, Classic)
- two Classic DARTs—Diversity
- two Single SuperDARTs—Diversity
- one Dual SuperDART
- one or two sets of Tx and Rx Boards (HDM).

Each RF Module will have up to two 6-timeslot DARTs or one 12-timeslot DART per RF Module.

The DART type determines the maximum number of links, where there can be up to eight Classic DARTs or Single SuperDARTs that support 39 MHz each, or up to 4 Dual SuperDARTs that support up to 75MHz each.

Prism supports the DART Module types listed below.

- Classic DARTs are 6-timeslot DARTs that support up to 35 MHz contiguous bandwidth (see [Table 4 on page 7](#)).
- Single SuperDARTs are 6-timeslot DARTs that support two non-contiguous bands in the entire frequency range of the DART, but cannot exceed 39 MHz total RF bandwidth (see [Table 5 on page 8](#)).
- Dual SuperDARTs are 12-timeslot DARTs that support up to 60-75 MHz (see [Table 6 on page 8](#))

**NOTE:** Industry Canada PCS 20 dB nominal bandwidth is less than 61.5 MHz.

**NOTE:** Industry Canada AWS 20 dB nominal bandwidth is less than 47.2 MHz

**Table 4.** *Single-Position Classic DARTs*

DART Module Type	Maximum Bandwidth (MHz)	Maximum Fiber Slots
800 APAC iDEN Classic	19	3
800 SMR Classic	7*	3
850 Cell Classic	25	4
900 SMR Classic	5	1
* Classic Prism RF Modules and Spectrum RAU support 18 MHz; Prism HDM 800 only supports 7 MHz, per Sprint direction.		

**Table 5.** *Single-Position SuperDARTs<sup>(1)</sup>*

DART Name	Used in...		Maximum Frequency Span (MHz)	Maximum Bandwidth (MHz)	Maximum Fiber Slots
	Host Units	HEUs			
1800 GSM SGL SuperDART	Yes	No	75	39	6
1900 PCS SGL SuperDART	Yes	Yes	70	39	6
2100 AWS SGL SuperDART	Yes	Yes	45	39	6
2100 UMTS SGL SuperDART	Yes	No	60	39	6
700 IABC SGL SuperDART	Yes	Yes	18	18	3
700 uC SGL SuperDART	Yes	Yes	10	10	2
900 EGSM SGL SuperDART	Yes	No	35	35	6
<p>(1) When using a Host Unit with both a SeRF II and System Board II or III, the bandwidths and fiber for the following Single SuperDARTs can be greater than 6 fiber slots, for full-band capability, when used in Host Unit Slots 1 and 3:</p> <ul style="list-style-type: none"> <li>• 1800 GSM SGL SuperDART</li> <li>• 1900 PCS SGL SuperDART</li> <li>• 2100 AWS SGL SuperDART</li> <li>• 2100 UMTS SGL SuperDART</li> </ul> <p>This requires 12 fiber slots when full-band passband is selected for these Single SuperDARTs in Host Unit DART positions 1 and 3.</p>					

**Table 6.** *Dual-Position SuperDARTs*

DART Module Type	Maximum Bandwidth (MHz)	Maximum Fiber Slots
1800 GSM DL SuperDART	75	12
1900 PCS DL SuperDART	70	12
2100 AWS DL SuperDART	45	8
2100 UMTS DL SuperDART	60	12



## RF Module Types

The Remote Unit RF Modules are available in the following formats, and as described in the following sections:

- “Single- and Dual-Bay RF Modules with Classic or SuperDARTs” on page 9
- “HDM RF Modules” on page 10
- “Legacy Dual-Bay 40W RF Modules” on page 11.

### Single- and Dual-Bay RF Modules with Classic or SuperDARTs

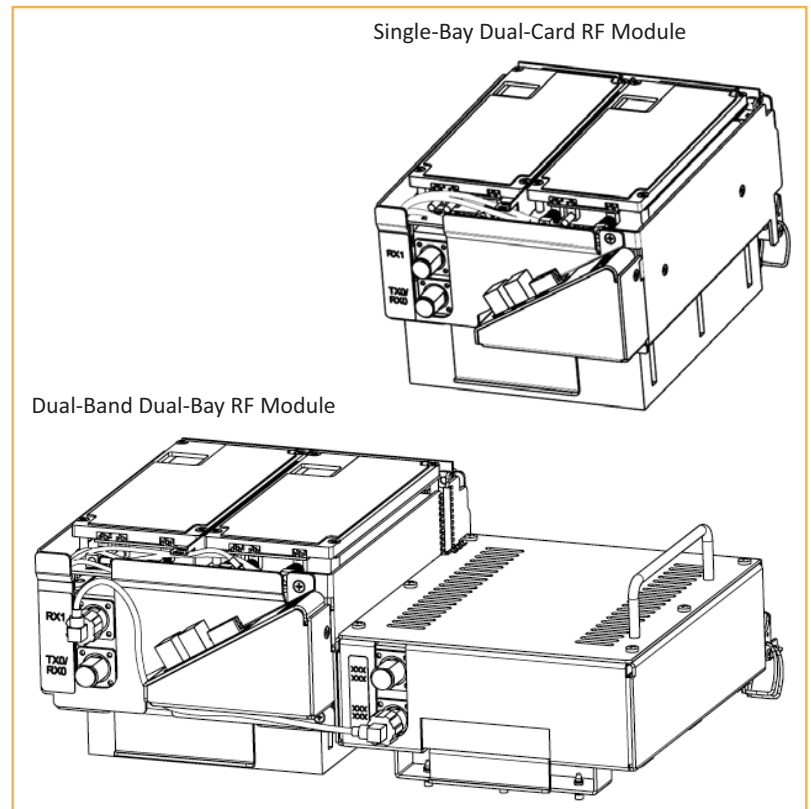
Figure 2 shows examples of Single- and Dual-Bay RF Modules, both of which have two DARTs.

Single-Bay RF Modules have the following elements:

- one or two DARTs
- one Duplexer that comprises
  - one Low Noise Amplifier (LNA)
  - one Power Detector (PD)
- one Linear Power Amplifier (LPA)
- one Remote DART Interface (RDI) board.

Dual-Band Dual-Bay RF Modules have the following elements:

- two DARTs
- two Duplexers, each of which comprises
  - one Low Noise Amplifier (LNA)
  - one Power Detector (PD)
- one Linear Power Amplifier (LPA)
- one Remote DART Interface (RDI) board.



**Figure 2.** Single- and Dual-Bay RF Modules

HDM RF Modules

High-Density Module (HDM) RF Modules (Figure 3) are designed to provide the ability to deploy either a two 20W Multiple Input Multiple Output (MIMO) paths of the same band, known as a MIMO RF Module; two 20W Single Input Single Output (SISO) with two different bands, known as dual RF Module; or a single 40W Single Input Single Output (SISO) RF Module within a single-bay of a PRU. An HDM RF Module does the following:

- interfaces with one Host DART-either Classic or SuperDART, or one CDIU
- supports two non-contiguous RF slices up to 39 MHz total bandwidth in a Dual or MIMO configuration
- supports full bandwidth in a SISO configuration, up to 75 MHz
- supports 20W per band/Path in a Dual/MIMO RF Module
- supports up to 40W RF output power in a SISO RF Module.

The components of a PRU HDM RF Module are dependent on the module type, as listed in Table 7.

Table 7. Components of PRU HDM RF Modules

RF Module Type	DPM	LPA	Duplexer	LNA	Power Detector	Rx Card	Tx Card
SISO	1	1	1	1	1	1	1
MIMO/Dual Band Module	1	2	2	2	2	2	2

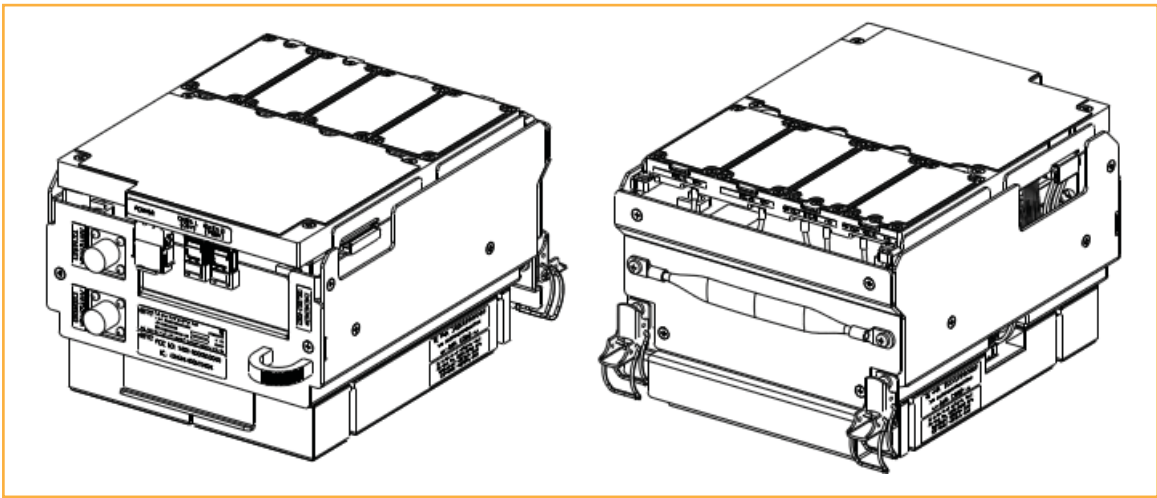


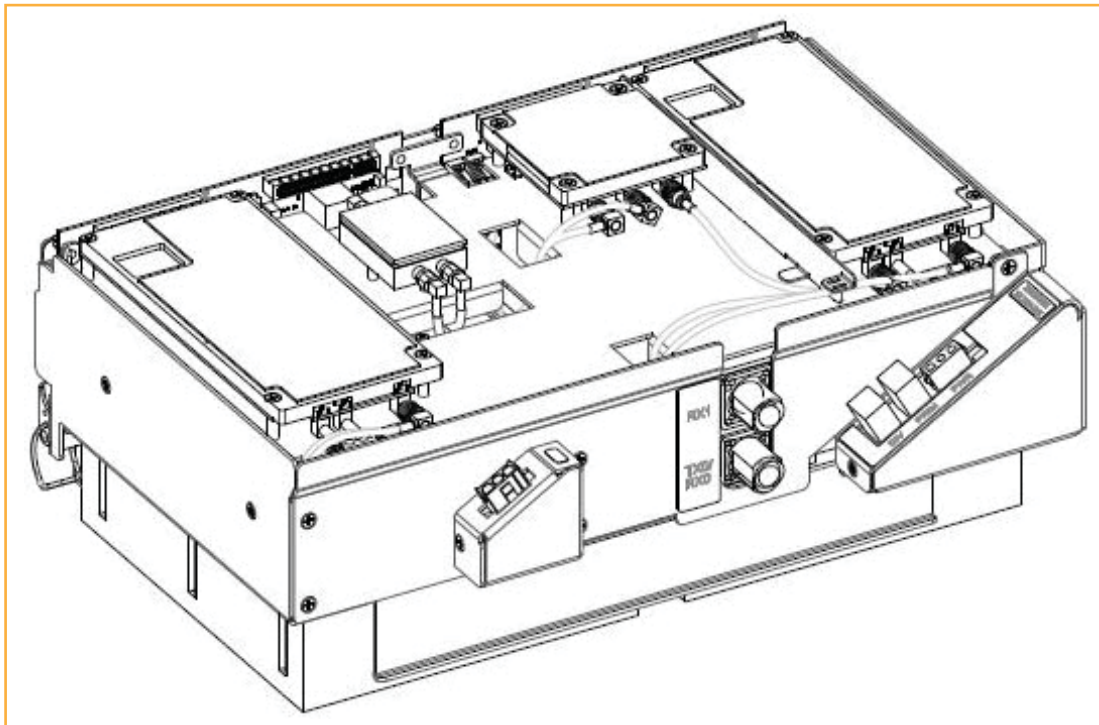
Figure 3. HDM RF Modules

## Legacy Dual-Bay 40W RF Modules

The Legacy Dual-Bay 40W RF Module ([Figure 5](#)) is designed for AWS and PCS frequencies and is supported only by Classic DARTs. The Legacy Dual-Bay 40W RF Module comprises:

- one Classic DART
- one Duplexer that comprises
  - one Low Noise Amplifier (LNA)
  - one Power Detector (PD)
- two Power Amplifiers (PAs)
- one Remote DART Interface (RDI) board.

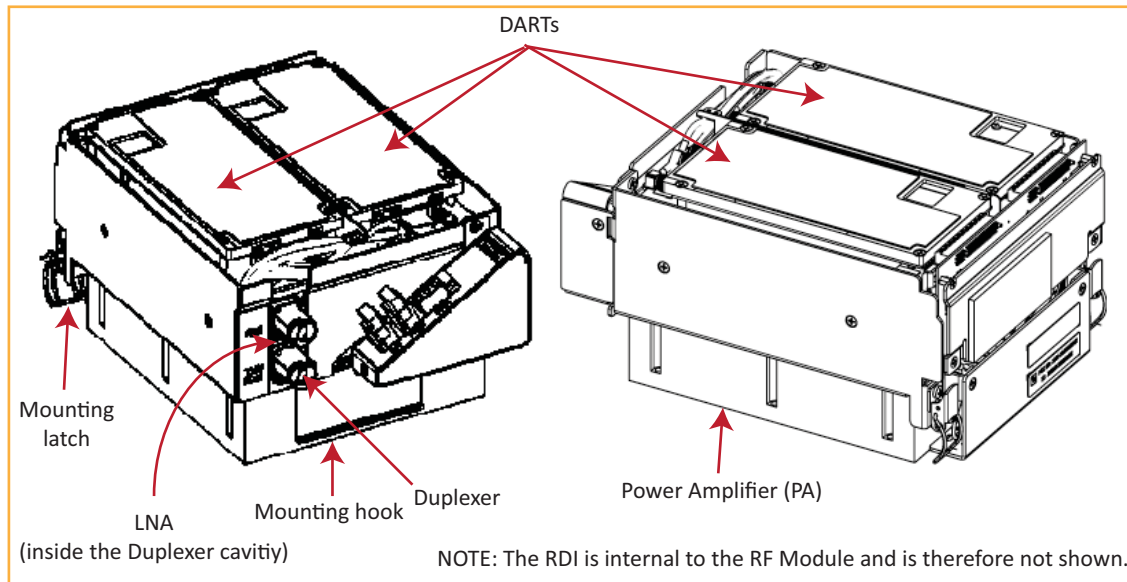
**NOTE:** This manual describes how to install the PCS 1900 and AWS 2100 Non-Diversity RF Modules.



**Figure 4.** Legacy Dual-Bay 40W RF Module

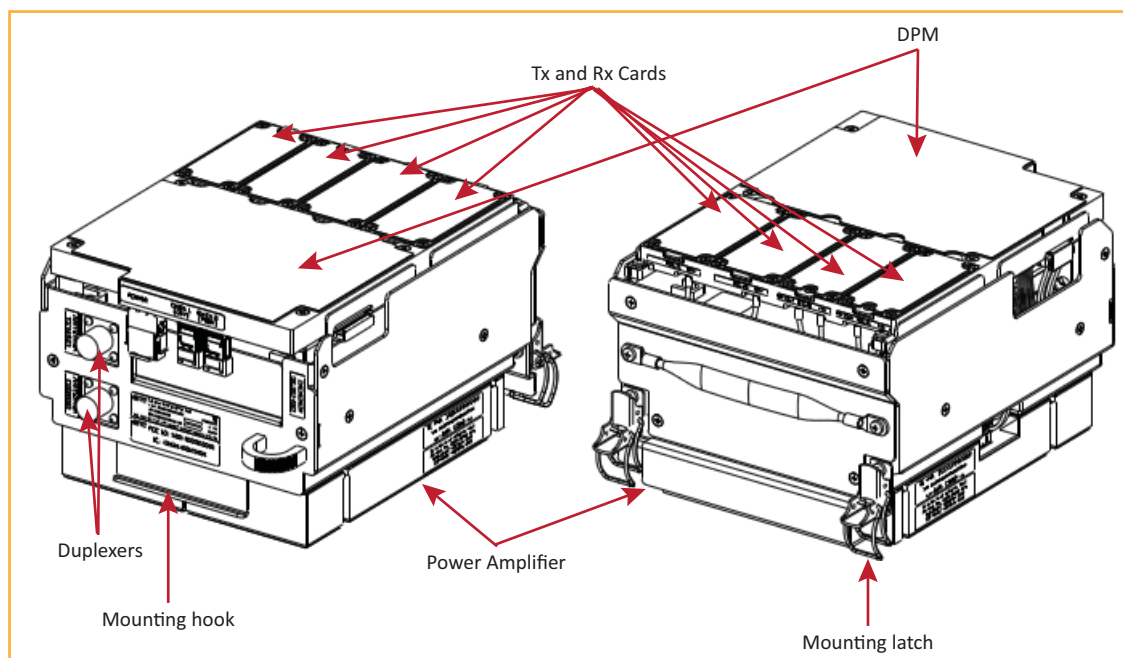
## RF MODULE COMPONENTS

Figure 5 shows typical RF Module components, using the Single-Bay RF Module as an example.



**Figure 5.** Single-Bay RF Module Components

Figure 6 shows the components of an HDM RF Module.



**Figure 6.** HDM RF Module Components

## Linear Power Amplifiers

The Linear Power Amplifier (LPA) is a high quality broadband RF amplifier used for achieving Prism product-rated power for the Remote Unit Tx forward path RF. The PAs are pass-band specific, with the maximum composite Tx power levels listed in [Table 8](#) for Single-Card, Dual-Card, and HDM RF Modules and [Table 9](#) on [page 13](#) for Legacy Dual-Bay 40W RF Modules.

The LPA is housed within the RF Module, and is not field serviceable.

**Table 8.** LPA Maximum Composite Tx Power Levels for Single-Card, Dual-Card, and HDM RF Modules

Passband	Maximum dBm	Watts	Bandwidth (MHz) supported across entire spectrum				
			HDM		Single Super DART	Classic DART	Dual SuperDART
			Dual/MIMO	SISO			
AWS 2100	43	20	39	45	39	NA	45
	46	40	NA	45	39	NA	45
Cellular 850	43	20	25	25	NA	25	NA
	46	40	25	25	NA	25	NA
EGSM 900	40	10	35	35	35	NA	NA
DCS 1800	42	15.8	39	75	39	NA	75
LTE 700 Lower ABC	43	20	18	18	18	NA	NA
LTE 700 Upper C	43	20	10	10	10	NA	NA
	46	40	10	10	10	NA	NA
PCS 1900	43	20	39	70	39	NA	70
	46	40	39	70	39	NA	70
PGSM 900	40	10	25	25	25	NA	NA
SMR 800	43	20	7	7	NA	7	NA
SMR 900	38	6.5	NA	NA	NA	5	NA
UMTS 2100	42	15.8	39	60	39	NA	60
2300 WCS	43	20	10	10	10	NA	NA

**Table 9.** LPA Maximum Composite Tx Power Levels for Legacy Dual-Bay 40W RF Modules

Passband	Maximum dBm	Watts	Bandwidth (MHz) supported across entire spectrum Classic DART
PCS 1900	+46	40	35
AWS 2100	+46	40	35

**NOTE:** Industry Canada 20 dB Pass Band Model Number FWP-C4MT000MOD Cellular 850 MHz = 26.3 MHz and the PCS 1900 = 66.8 MHz.

## Duplexer and Low Noise Amplifier

The RF Module provides the Remote Unit with an internal Duplexer that is optimized to provide the desired RF band-pass filtering and in-band equipment isolation between FWD and REV paths. The Duplexer provides the filtering necessary to the transmit and receive paths to and from the connected antenna.

The Duplexer for the Single- and Dual-Bay RF Modules and the Legacy Dual-Bay 40W RF Modules contains up to two REV path Low Noise Amplifiers (LNA for PRI and/or SEC reverse paths).

The Duplexer for an HDM RF Module does not have a Low Noise Amplifier.

Duplexers are not field serviceable.

## Digital Processing Module

The Digital Processing Module (DPM) is found only in the HDM RF Modules. The DPM provides the primary processing and logic functions for the HDM RF Module. It also provides the primary power interface for the HDM RF Module, and conversion of the native 28 Vdc voltage to lower voltages as necessary for functionality.

The DPM has a Transmit (Tx) Board and a Receive (Rx) Board:

- Tx Board—provides band specific filtering for the intended Transmit path.
- Rx Board—provides band specific filtering for the intended Receive path.

## Cables

Always provided at each RF Module shelf are five cables:

- two High-Speed Data Cables, which in this document are referred to as LVDS (Low-Voltage Differential Signaling) cables
- two RF Cables (TX0/RX0) and (TX1/RX1)
- one Power (PWR) Cable.

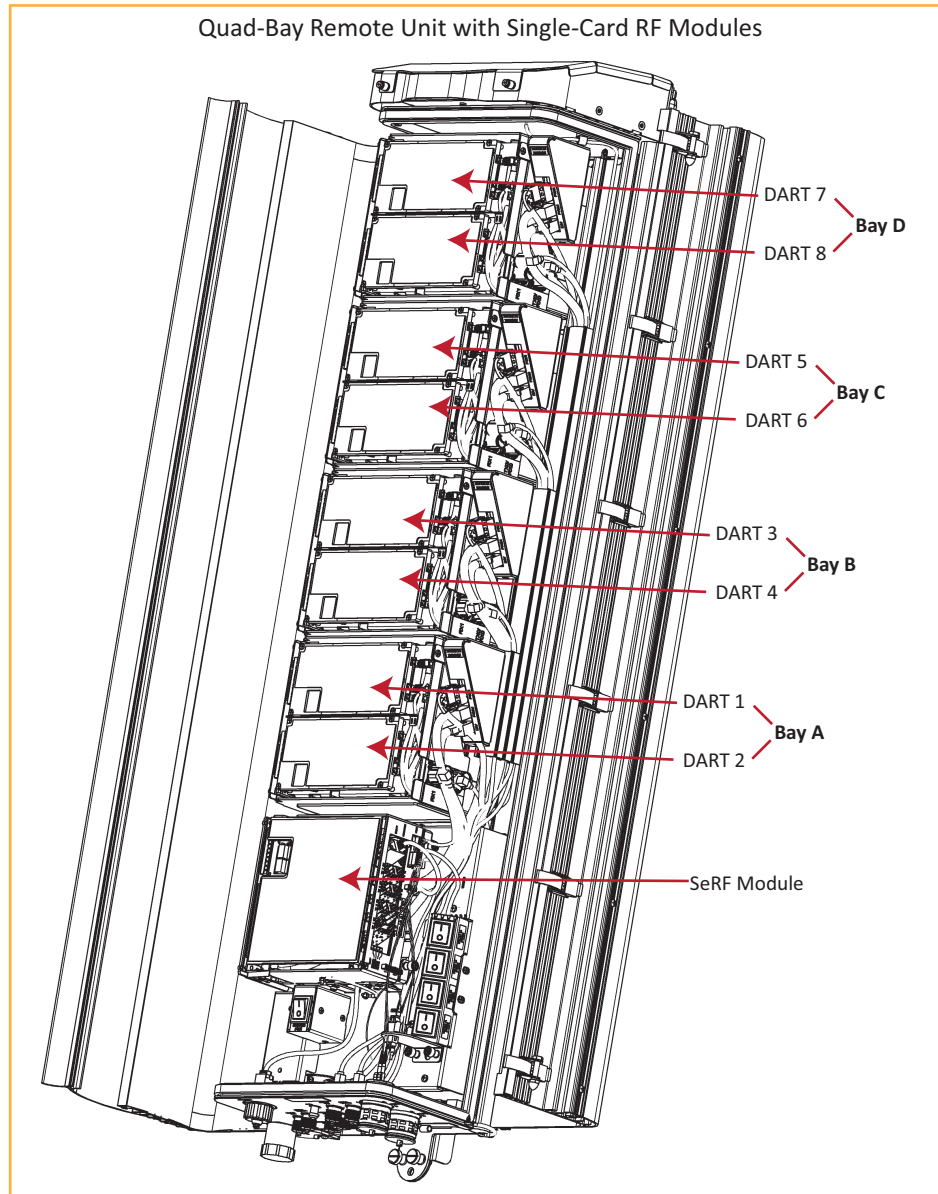
The RF Module cables that are pre-installed in the PRU connect to the corresponding connectors on the RF Module. The RF Module cables correlate to the antenna connectors on the bottom of the Remote Unit chassis.

-



## RF GROUP ASSIGNMENTS FOR PRU RF MODULE BAYS

A PRU comprises from one to four RF Module bays. [Figure 7](#) illustrates the numbering of RF Module bays and DARTs.



**Figure 7.** RF Modules Bays in a PRU

[Table 10](#) lists how the FlexWave Prism EMS references the RF group assignments and corresponding components of each RF Module.

**Table 10.** Remote Unit RF Group Assignments (from Top/Down)

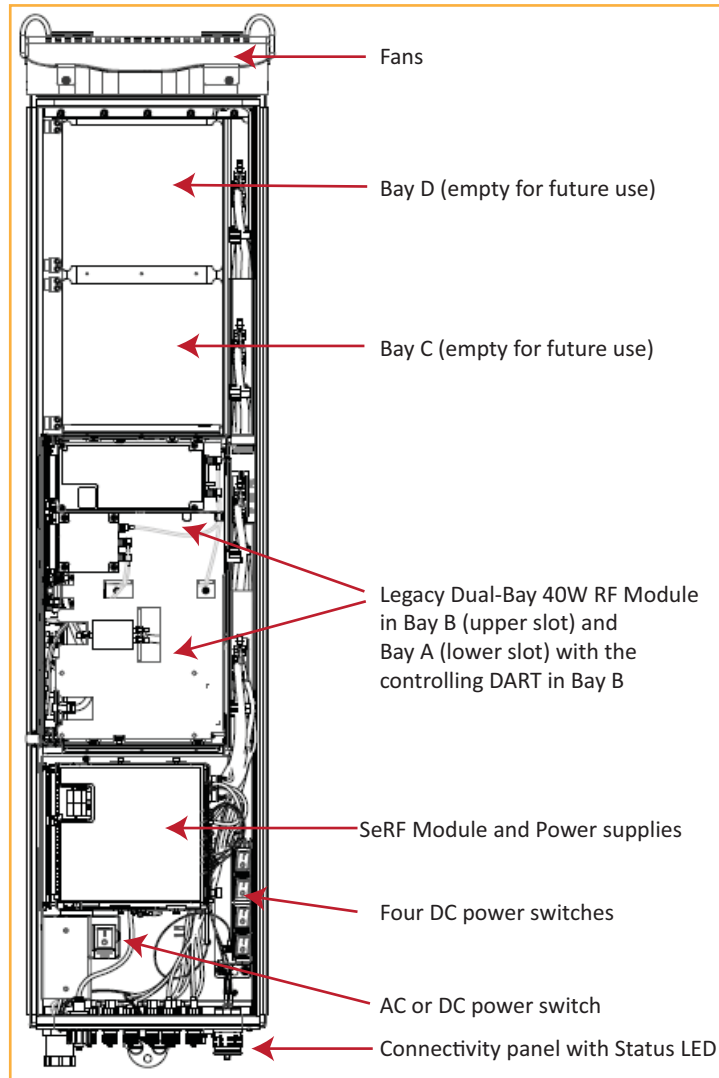
Physical RF Bay	DART Number	LNA Number		LPA Number for Single LPA	LPA Number for Dual LPAs	Power Detector Number for Single PD	Power Detector Number for Dual PDs
		Primary	Diversity				
D	8		8	7	8	7	8
	7	7			7		7
C	6		6	5	6	5	6
	5	5			5		5
B	4		4	3	4	3	4
	3	3			3		3
A	2		2	1	2	1	2
	1	1			1		1
NOTE: For software releases prior to 7.3, the LPAs were labeled as <b>1, 2, 3,</b> and <b>4.</b>							

**NOTE:** For Classic dual position 40W RF Modules only: in a dual LPA system, the Configure Remote Forward Gain page shows two values for the LPA status, one for each LPA. Changing the LPA Mode or resetting the LPA applies to both LPAs at the same time.

**CAUTION!** Should your system experience an LPA problem, refer to [Table 10](#) to ensure that you apply new settings or troubleshoot the correct RF Module.

The Legacy Dual-Bay 40W RF Module occupies two bays in a PRU. [Figure 8](#) shows the main components in a PRU enclosure, with a Legacy 40W RF Module occupying Bays A and B. The controlling DART will always be in the upper bay (B or D), and the second LPA is always in the lower bay (A or C).





**Figure 8.** Legacy Dual-Bay 40W RF Module in a Quad-Bay PRU

**NOTE:** If a Legacy Dual-Bay 40W RF Module AWS 2100 and a Legacy Dual-Bay 40W RF Module PCS 1900 are both installed in a Quad-Bay PRU, it is recommended that the PCS 1900 be installed in upper-most bay, and the AWS 2100 be installed in the lower-most bay.

**NOTE:** To accommodate two-bay modules, you need to remove a module bay shelf as described in [“Dual-Bay Modules Only—Remove the Module Bay Shelf”](#) on page 25.

## UNDERSTANDING RF CABLE RULES

- When installing a Diversity, MIMO or Dual-Band RF Module, both RF cables labeled MOD N TX0/RX0 and MOD N TX1/RX1 shall be connected to the N-Style connections of the RF Module. Note that older labeling schemes used “PRI” and “DIV”. To match old labeling schemes to current labeling:

Old Label	New Label
PRI	TX0/RX0
DIV	TX1/RX1

- When installing a Non-Diversity or SISO RF Module, or an SMR 800/900 Dual-Band Dual-Bay RF Module:
  - The MOD N TX0/RX0 cable shall be connected to the single available N-Style RF Connection of the RF Module.
  - The MOD N TX1/RX1 cable shall be constrained to the existing cables using a tie wrap or similarly accepted fastener so it cannot be pinched or prevent the Remote Unit door from closing. Do not cut or attempt to otherwise remove this RF Cable.
- RF cables are hand-formable; however, cables must adhere to a minimum bend radius of 1-inch from the outlet of the integrated cable guide to the respective N-Style RF connection on the RF Module.

### RF Module Cables and Supported Bay Use for Single-Card, Dual-Card, and HDM RF Modules

The RF cable and connector labels correspond to the RF Module bays in the Remote Unit chassis, where **MOD A** is the bottom bay and **MOD D** is the top bay.

- The cables and connectors have corresponding labels as shown in [Table 11](#) for Single-Card, Dual-Card, and HDM RF Modules. For Dual-Bay installations, the RF cables and connectors are labeled as **MOD N TX0/RX0** and **MOD N TX1/RX1**, where **N** refers to the top bay of the double-bay installation. For example:
  - For a Dual-Bay installation in a Quad-Bay chassis in which the RF Module is installed in the Bay D and Bay C combination, the RF cables and connectors are labeled as **MOD D TX0/RX0** and **MOD D TX1/RX1**.
  - For a Dual-Bay installation in a Tri-Bay chassis in which the RF Module is installed in the Bay B and Bay A combination, the RF cables and connectors are labeled as **MOD B TX0/RX0** and **MOD B TX1/RX1**.
- [Table 11](#) also shows which RF Module type can be installed in which PRU bay or bay combination.
- The Single-Bay chassis is not included in [Table 11](#).

**Table 11.** Supported Bay Use and RF Antenna Labels for Single-Card, Dual-Card, and HDM RF Modules  
(From Top of Remote Unit Chassis Down)

	Supported Bay Configurations for Single-Bay RF Modules	Supported Bay Combinations for Dual-Bay RF Modules			RF Module Cable, RF Module Connector, and Remote Antenna Connector Label	Function
		Supported Bays in Dual-Bay Chassis	Supported Bays in Tri-Bay Chassis	Supported Bays in Quad-Bay Chassis		
Bay D	MOD D	N/A	N/A	MOD D	Mod D TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module D
					Mod D TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module D
Bay C	MOD C	N/A	MOD C		Mod C TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module C
					Mod C TX1/RX1	Diversity receive/Path 2 for Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module C
Bay B	MOD B	MOD B	MOD B	MOD B	Mod B TX0/RX0	Transmit RF power and primary/Path 1receive to/from the antenna for RF Module B
					Mod B TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module B
Bay A	MOD A				Mod A TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module A
					Mod A TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module A

## RF Module Cables and Supported Bay Installations for Legacy Dual-Bay 40W RF Modules

The cables and connectors have corresponding labels as shown in [Table 12](#) for Legacy Dual-Bay 40W RF Modules. [Table 12](#) also shows which RF Module type can be installed in which PRU bay(s) when a 40W Dual-Bay RF Module is part of the RF Module mix in a PRU chassis. The Single-Bay chassis is not included in [Table 12](#).

For Dual-Bay installations, the RF cables and connectors are labeled as **MOD N TX0/RX0** and **MOD N TX1/RX1**, where **N** refers to the top bay of the double-bay installation. For example:

- For a Dual-Bay installation in a Quad-Bay chassis in which the RF Module is installed in the Bay D and Bay C combination, the RF cables and connectors are labeled as **MOD D TX0/RX0** and **MOD D TX1/RX1**.
- For a Dual-Bay installation in a Tri-Bay chassis in which the RF Module is installed in the Bay C and Bay B combination, the RF cables and connectors are labeled as **MOD C TX0/RX0** and **MOD C TX1/RX1**.

**Table 12.** Supported Bay Assignments and RF Antenna Labels for Legacy Dual-Bay 40W RF Modules  
(From Top of Remote Unit Chassis Down)

	Supported Bay Combinations for Legacy 40W Dual-Bay RF Modules						RF Module Cable, RF Module Connector, and Remote Antenna Connector Label	Function
	Dual-Bay	Tri-Bay	Tri-Bay	Quad-Bay				
Bay D	N/A	N/A	N/A	MOD D	MOD C	Mod D TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module D	
						Mod D TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module D	
Bay C	N/A	MOD C	MOD C			Mod C TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module C	
						Mod C TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module C	
Bay B	MOD B	MOD B		MOD C	Mod B TX0/RX0	Transmit RF power and primary/Path 1receive to/from the antenna for RF Module B		
					Mod B TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module B		
Bay A			MOD A		Mod A TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module A		
					Mod A TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module A		
<div>Note: For Dual Module installations the center module shelf needs to be removed; see “Dual-Bay Modules Only—Remove the Module Bay Shelf” on page 25.</div> <div>Note: Install the Legacy Dual-Bay 40W RF Module in the lower-most bay in the chassis. If, however, if two Legacy Dual-Bay 40W RF Modules are present, install the 2100 Module in the lower-most Bay and the 1900 Module in the upper-most Bay.</div>								

## INSTALL THE RF MODULE(S)

The following sections guide you through the installation of an RF Module into a Remote Unit chassis. The process to install the four different types of RF Modules is basically the same; however, differences are noted and should be followed.

**NOTE:** In the following steps, the RF cables and connectors are referred to as MOD N TX0/RX0 and as MOD N TX1/RX1 where N equals A, B, C, or D.

**NOTE:** When installing RF Modules, populate the RF Modules from highest frequency band to lowest within the Remote Unit chassis. Likewise for power output, populate from the bottom bay to the top; higher output to lower output. That is, for a deployment with 2100 40W, 1900 40W, 850 20W and 700 20W MIMO, install the RF Modules as follows:

- 2100 40W RF Module in Bay A
- 1900 40W RF Module in Bay B
- 850 20W RF Module in Bay C
- 700 20W MIMO RF Module in Bay D.

### Safety Precautions

**CAUTION!** This is restricted access equipment and only qualified service personnel should service and operate this equipment using appropriate tools.

**CAUTION!** Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.

**CAUTION!** Always allow sufficient fiber length to permit routing of patch cords and pigtails without severe bends. Fiber optic patch cords or pigtails may be permanently damaged if bent or curved to a radius of less than 2 inches (5.1 cm).

**CAUTION!** Exterior surfaces of the Prism Remote Unit may be hot. Use caution during servicing.

**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!** This equipment uses a Class 1 Laser according to FDA/CDRH rules. Laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not look directly into the optical transceiver of any digital unit or exposure to laser radiation may result. An optical power meter should be used to verify active fibers. A protective cap or hood **MUST** be immediately placed over any radiating transceiver or optical fiber connector to avoid the potential of dangerous amounts of radiation exposure. This practice also prevents dirt particles from entering the adapter or connector.

**CAUTION!** This system is an RF Transmitter and continuously emits RF energy. Maintain 3 foot (91.4 cm) minimum clearance from the antenna while the system is operating. Wherever possible, shut down the RAN before servicing the antenna.

## Guard against Damage from Electro-Static Discharge

**CAUTION!** Electro-Static Discharge (ESD) can damage electronic components. To prevent ESD damage, always wear an ESD wrist strap when working with a Prism Remote Unit or when handling any of its components—including the RF Modules. Connect the ground wire on the ESD wrist strap to an earth ground source before touching the Prism Remote Unit or any of its components. Wear the wrist strap the entire time that you work with the Prism Remote Unit and its components.

**CAUTION!** Place Prism RF Modules in anti-static packing material when transporting or storing them.

## Unpack and Inspect the RF Module

- 1 Inspect the exterior of the shipping container(s) for evidence of rough handling that may have damaged the components in the container.
- 2 Unpack each container while carefully checking the contents for damage and verify with the packing slip.
- 3 If damage is found or parts are missing, file a claim with the commercial carrier and notify TE Customer Service (see [“Contacting TE Connectivity” on page 51](#)). Save the damaged cartons for inspection by the carrier.
- 4 Save all shipping containers for use if the equipment requires shipment at a future date.

**CAUTION!** Handle the RF Module with care during installation. Be especially careful to not damage the thermal-interface material (TIM), which is attached to the LPA, DARTs, and/or Motherboard with TX/RX boards. If the TIM is damaged, the LPA can overheat. Before installing the RF Module, check to see if the heatsink material is gouged or cracked. If the TIM is damaged, do not install the RF Module and contact TE Connectivity for assistance (see [“Contacting TE Connectivity” on page 51](#) for contact information).

**CAUTION!** If the thermal-interface material is damaged, the installation and use of the RF Module may void the warranty of the RF Module.

## Remove Release Liners from the RF Module

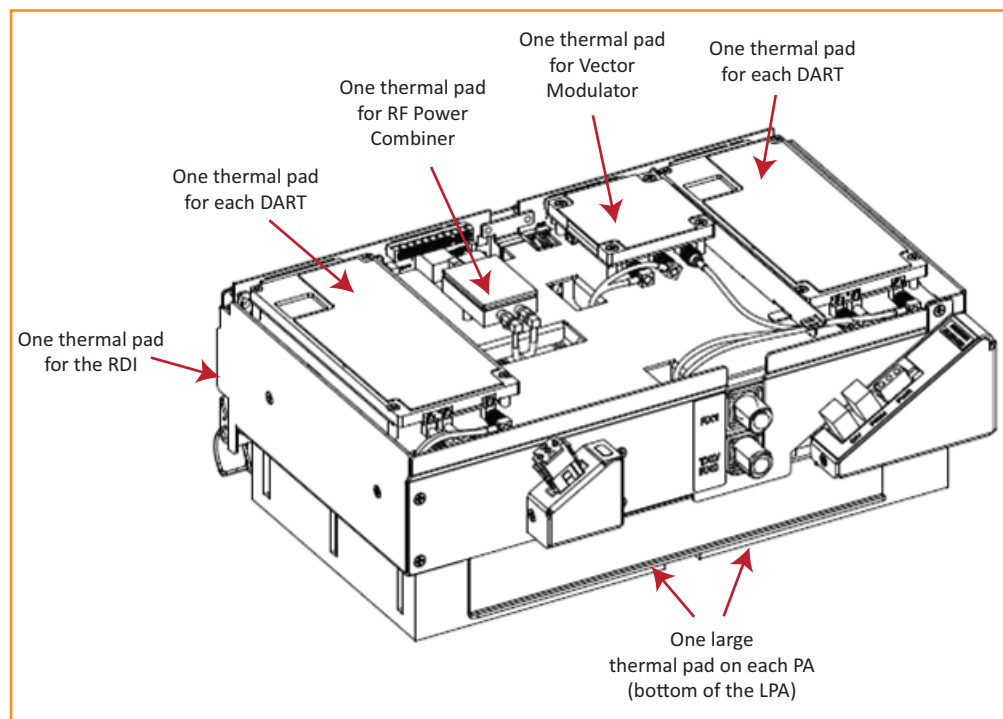
**NOTE:** Release Liners are present on front and back of new modules.

- 1 Open the Remote Unit enclosure.
- 2 Remove release liners, if present, from the thermal pads on the RF Module prior to installing the module into the Remote Unit chassis.

**CAUTION!** The thermal pads are very sensitive to mishandling—do not nick, scratch, or ding them.

For Single- and Dual-Bay RF Modules, the thermal pads are located as listed below and as shown in [Figure 9](#), which shows a Legacy Dual-Bay 40W RF Module.

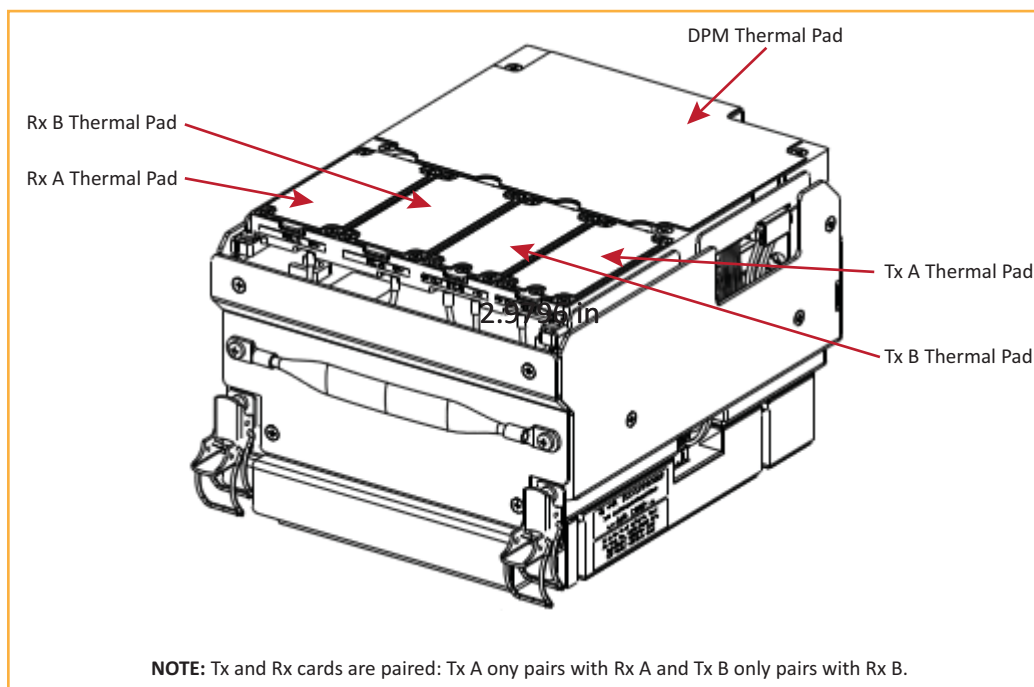
- one large pad on the back surface of each Linear Power Amplifier (LPA)
- up to two on the front surface (DARTs)
- one on the left side for the (RDI)
- one on the vector modulator board
- one on the RF power combiner.



**Figure 9.** Thermal Pads on a Legacy Dual-Bay 40W RF Module

For HDM RF Modules, the thermal pads are located as listed below and as shown in [Figure 10](#).

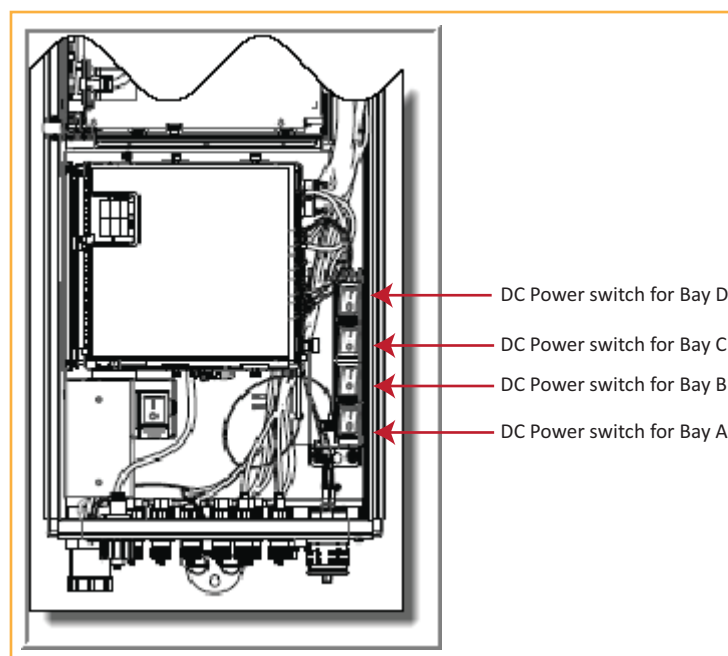
- one pad for each Rx and Tx board
- one large pad over the DPM
- one for each Power Amplifier (PA), which is on the bottom of the HDM RF Module.



**Figure 10.** Thermal Pads on an HDM RF Module

### Check the DC Power Switch for the Module Bay

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 graphic to the right).





## Dual-Bay Modules Only—Remove the Module Bay Shelf

### 1 FOR DUAL-BAY RF MODULES ONLY.

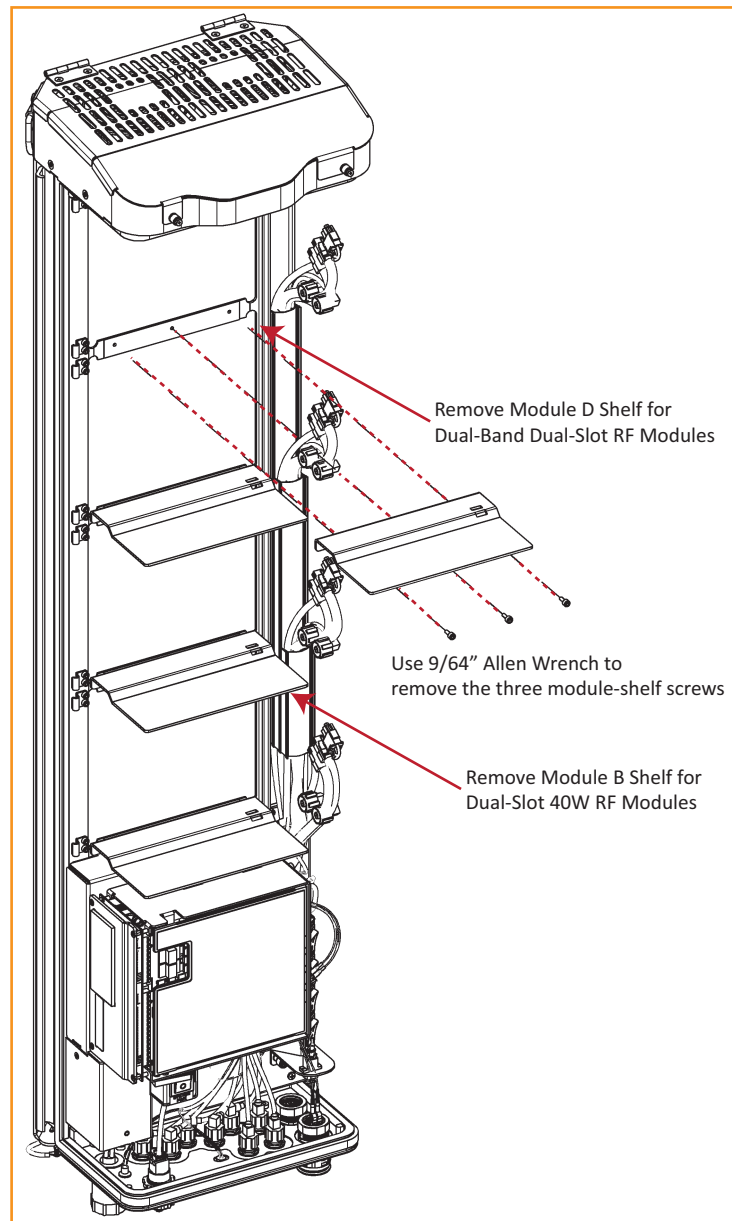
If you are installing a Dual-Bay RF Module, you must remove a module bay shelf from the PRU chassis to accommodate the module's size. (For further information, see [Table 11 on page 19](#).)

Remove the shelf as appropriate for the RF Module:

- When installing in the A and B Bays, remove the Module B Bay Shelf.
- When installing in the C and D Bays, remove Module D Bay Shelf.

To remove a Module Bay Shelf:

- a Use a 9/64" Allen™ wrench to remove the three screws that attach the module shelf to the PRU chassis, as shown in the following graphic.
- b Discard or store the module shelf and fasteners.

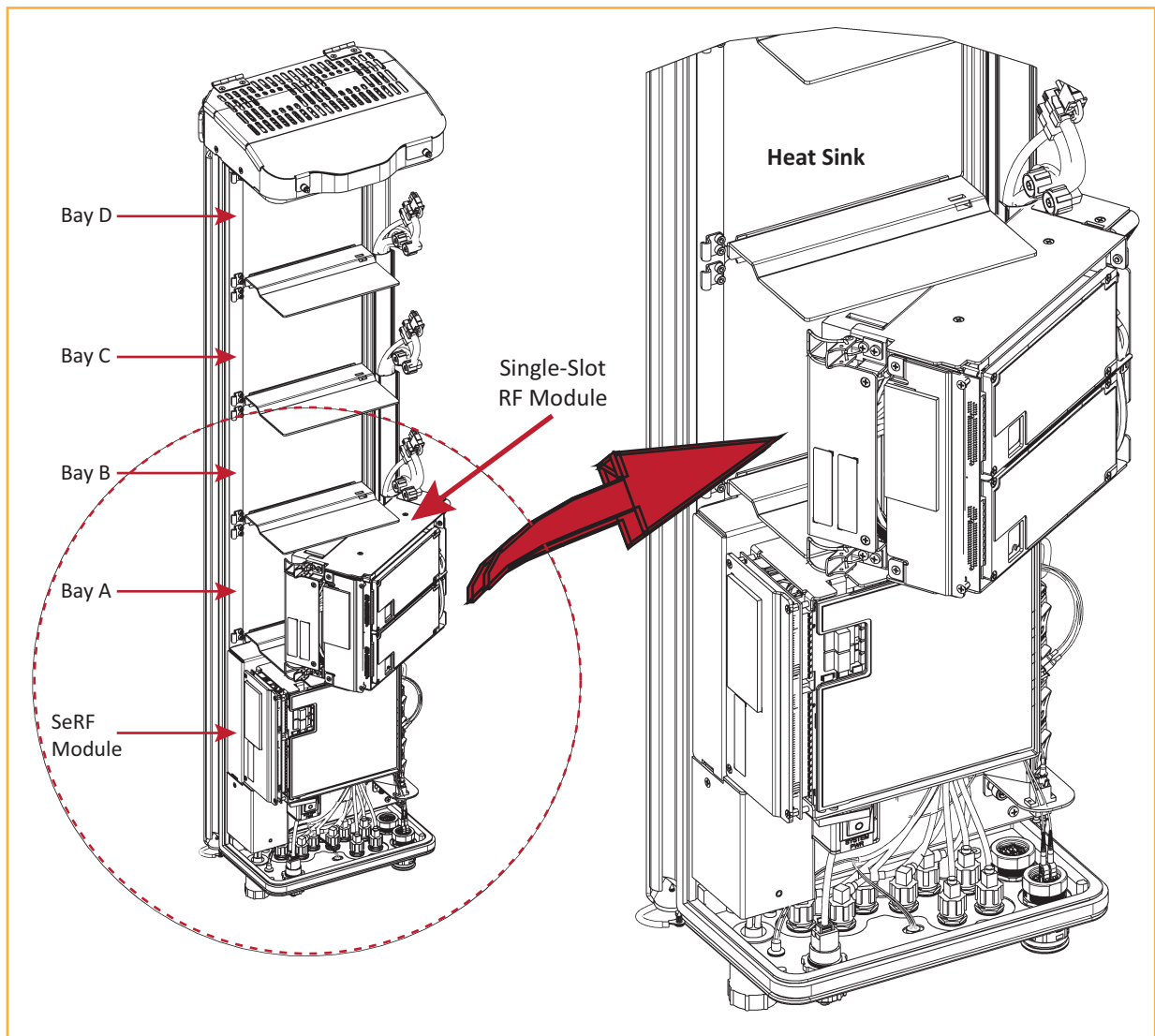


## Install the RF Module into the Prism Remote Chassis

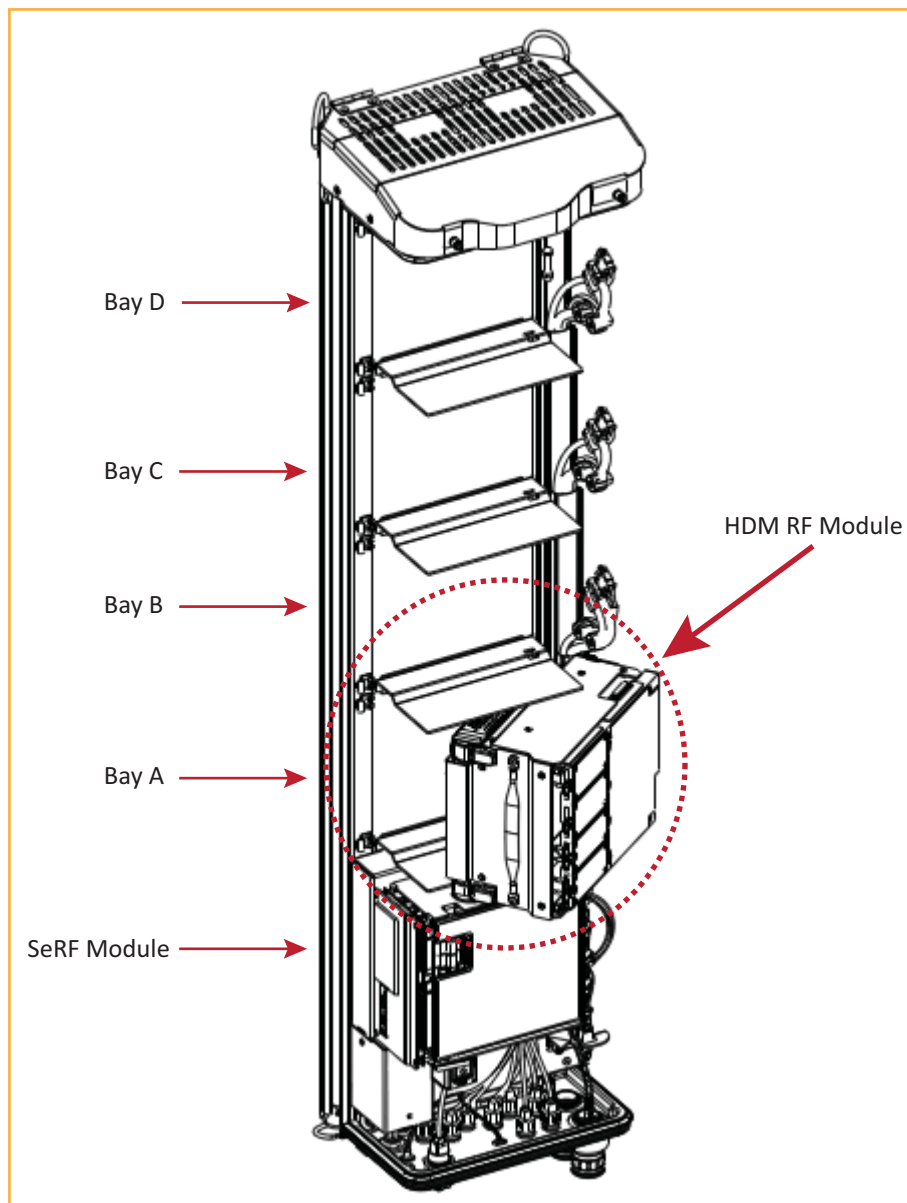
- 1 Hold the RF Module so that the DART card(s) face away from the PRU and the Mounting Hook is toward the Receiving flange on the PRU chassis.

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

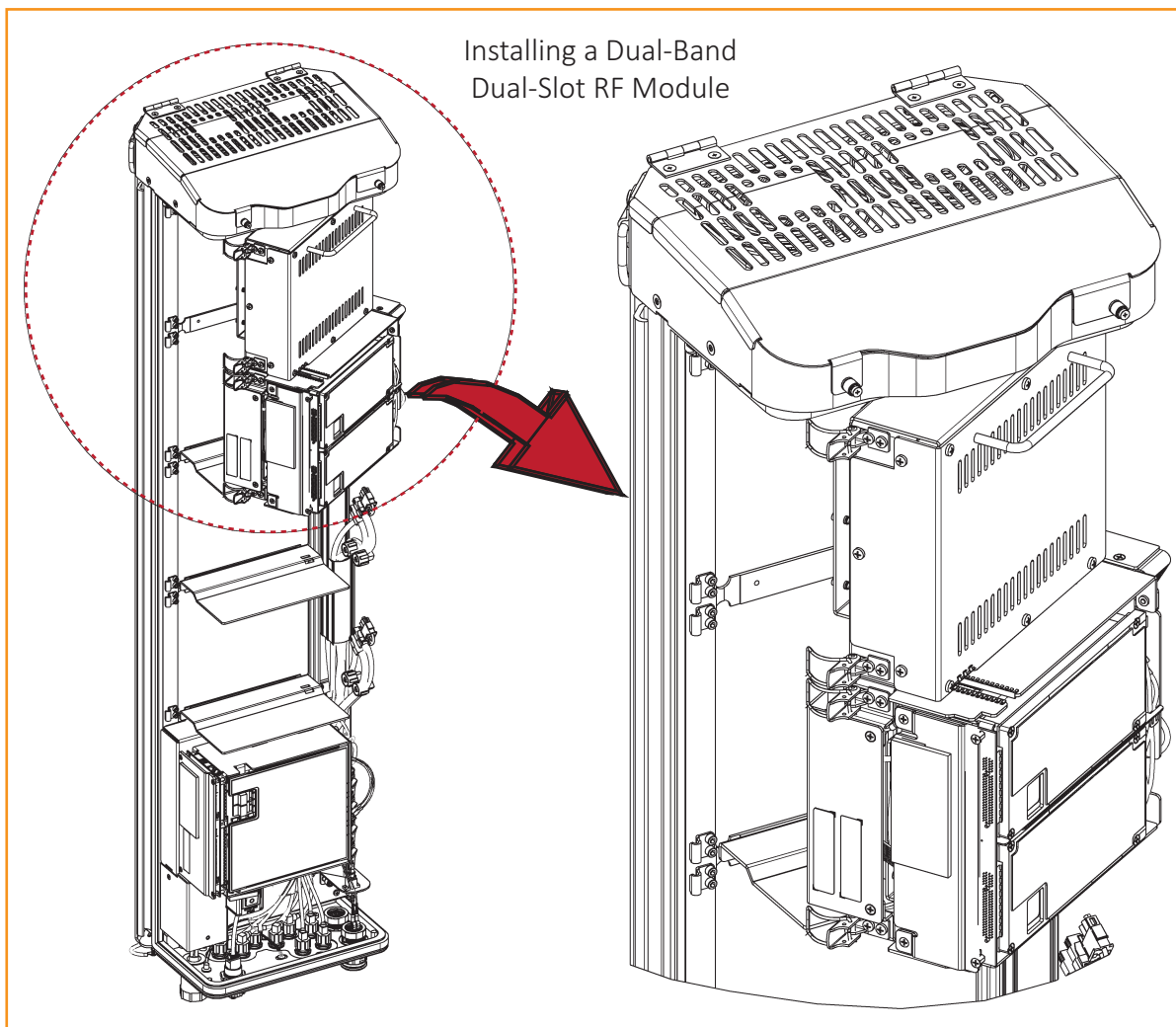
- 2 Holding the RF Module at a 45° angle in respect to the rear heatsink, rest the bottom surface of the module on the RF Module shelf, as shown in one of the following graphics, and as applicable to the RF Module.
  - Single-Bay RF Module: [Figure 11 on page 26](#)
  - HDM RF Module: [Figure 12 on page 27](#)
  - Dual-Bay RF Module: [Figure 13 on Page 28](#)
  - Legacy Dual-Bay 40W RF Module: [Figure 14 on Page 29](#).



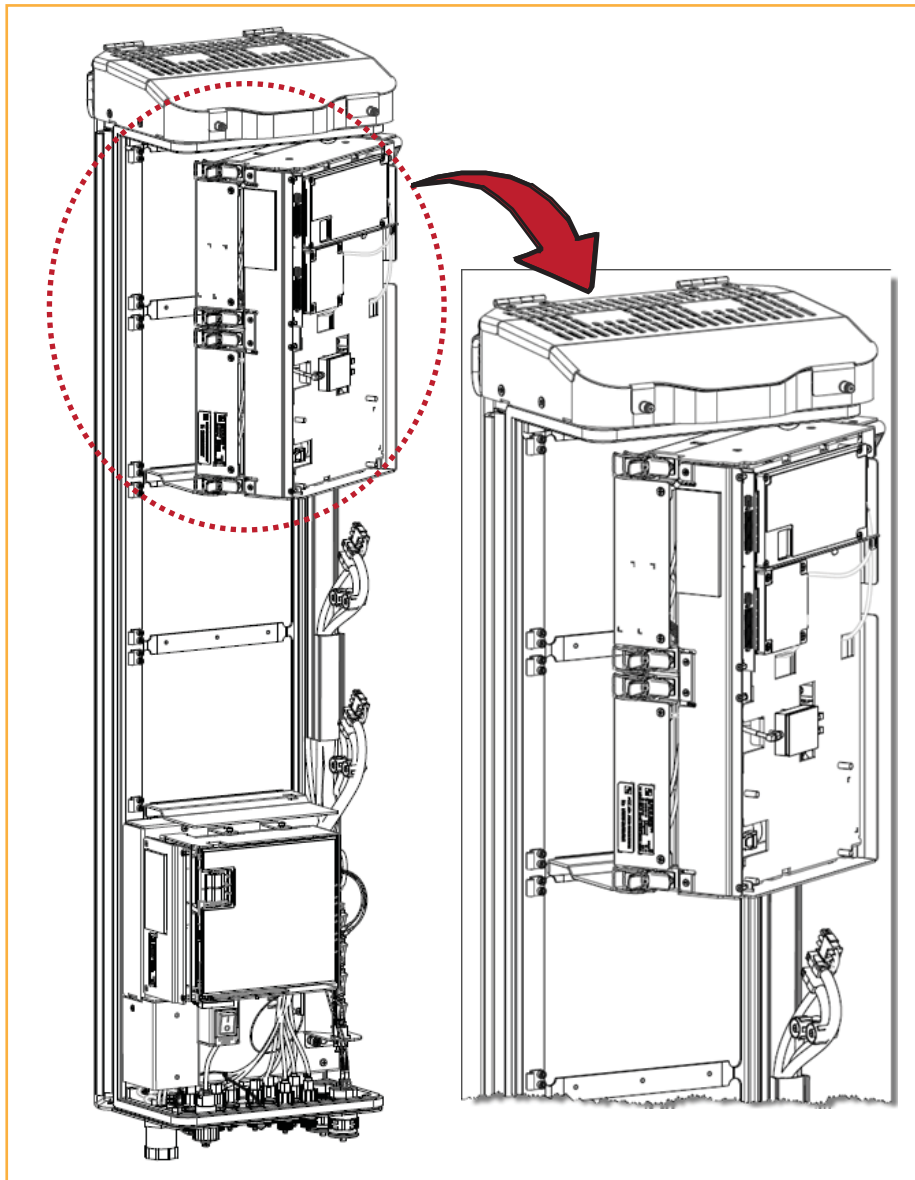
**Figure 11.** Installing a Single-Bay RF Module



**Figure 12.** Installing an HDM RF Module

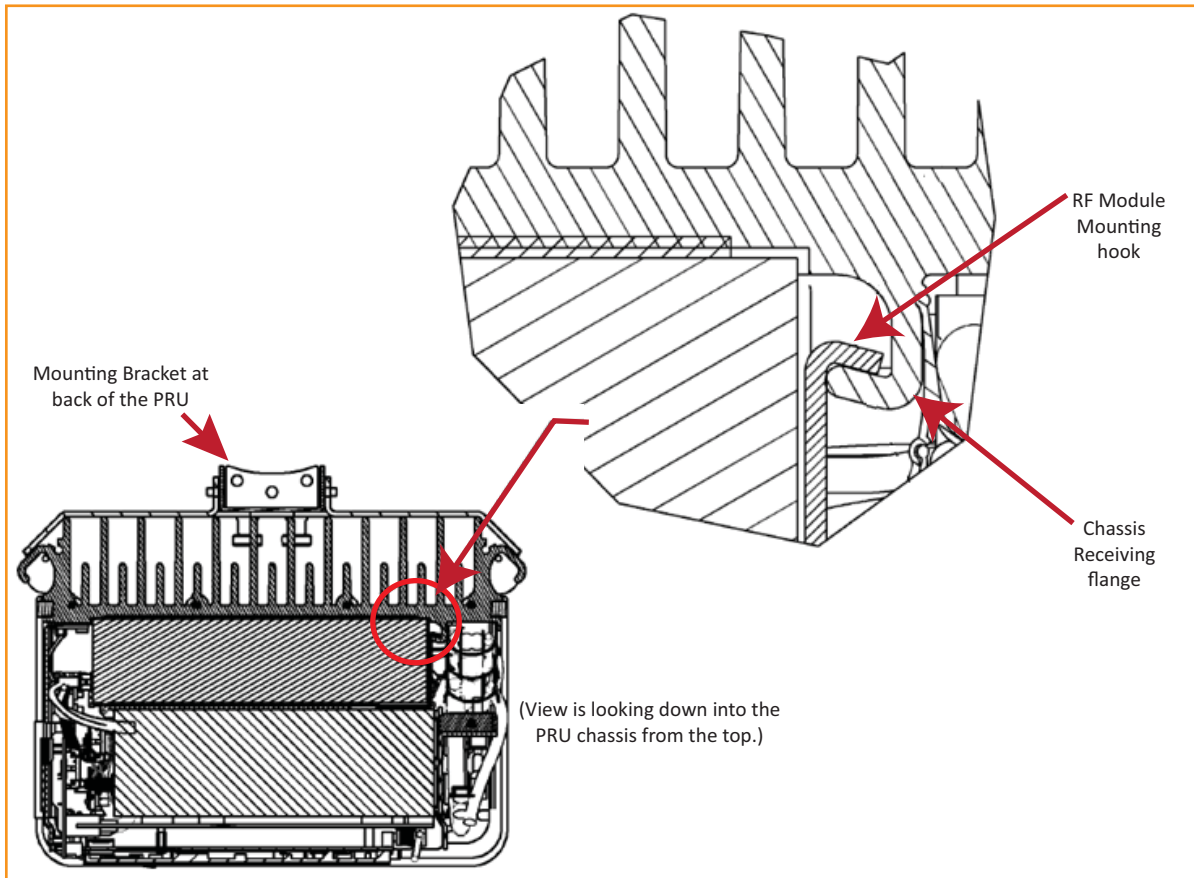


**Figure 13.** Installing a Dual-Bay RF Module



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

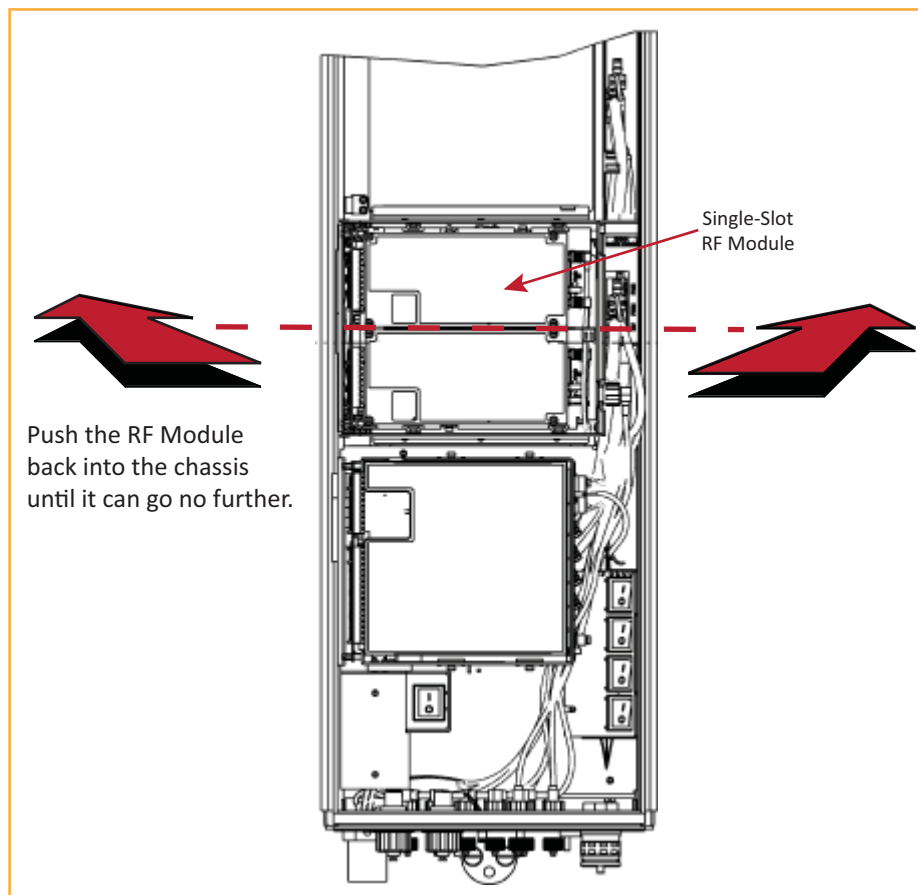
- 3 Align the Mounting Hook on the module with the receiving flange on the PRU heat sink, and then slide the RF Module in toward the flange until it can go no further.



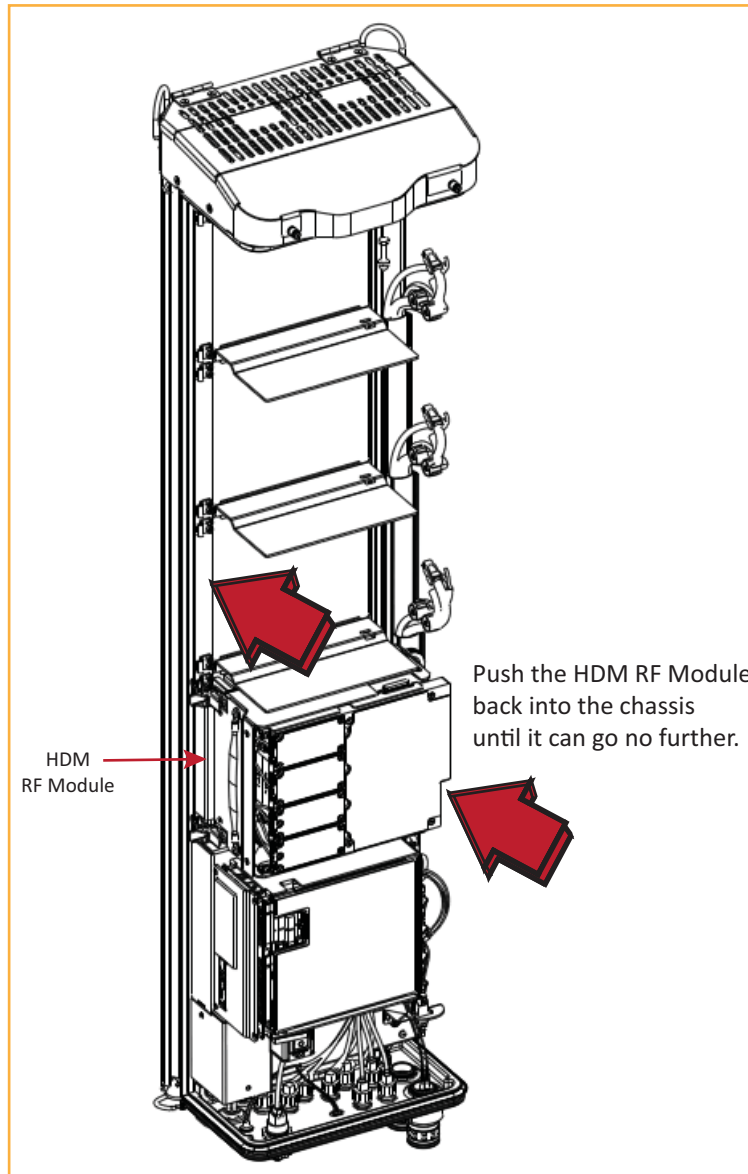
- 4 Push the left edge of the RF Module back and into the PRU chassis until it can go no further, as shown in the following graphics:
- For Single-Bay RF Modules, see [Figure 15 on page 31](#).
  - For HDM RF Modules, see [Figure 16 on page 32](#).
  - For Dual-Bay RF Modules, see [Figure 17 on page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

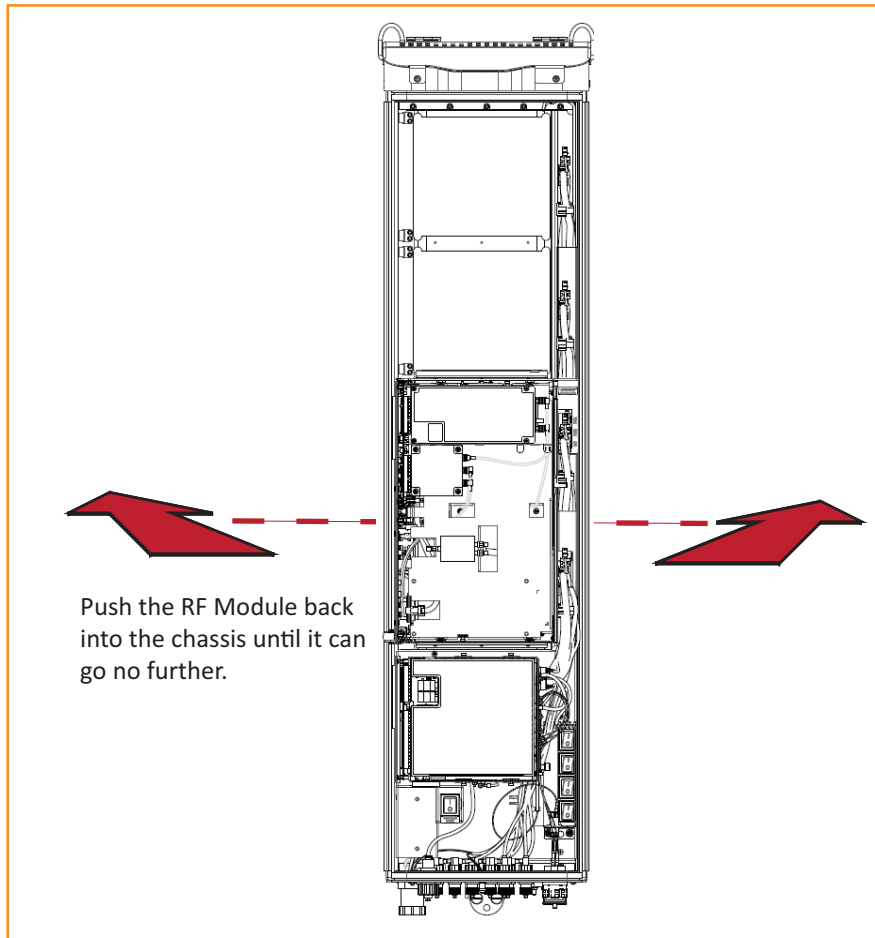


**Figure 15.** Seating a Single-Bay RF Module



**Figure 16.** Seating an HDM RF Module





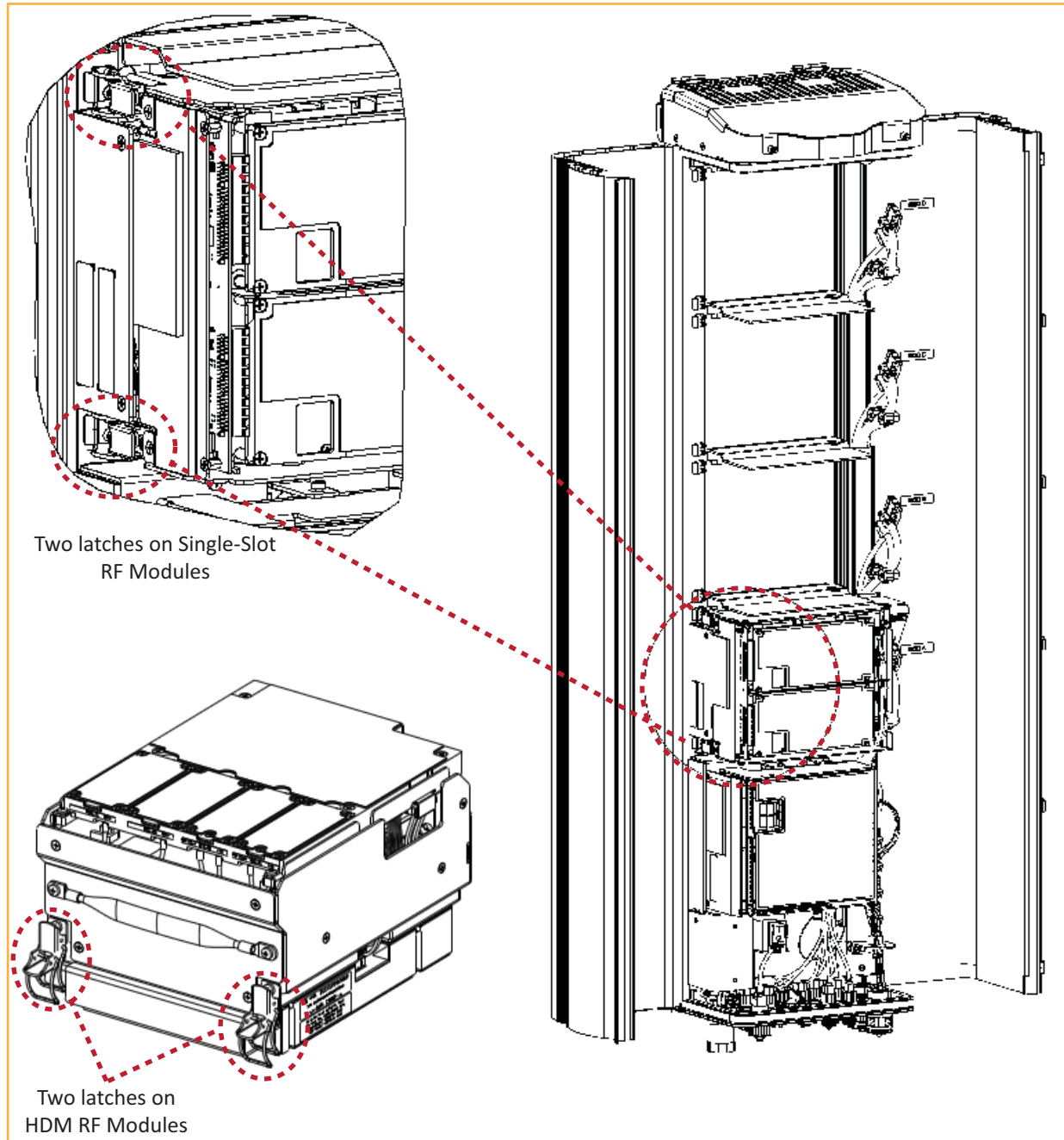
**Figure 17.** Seating a Dual-Bay RF Module

## 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

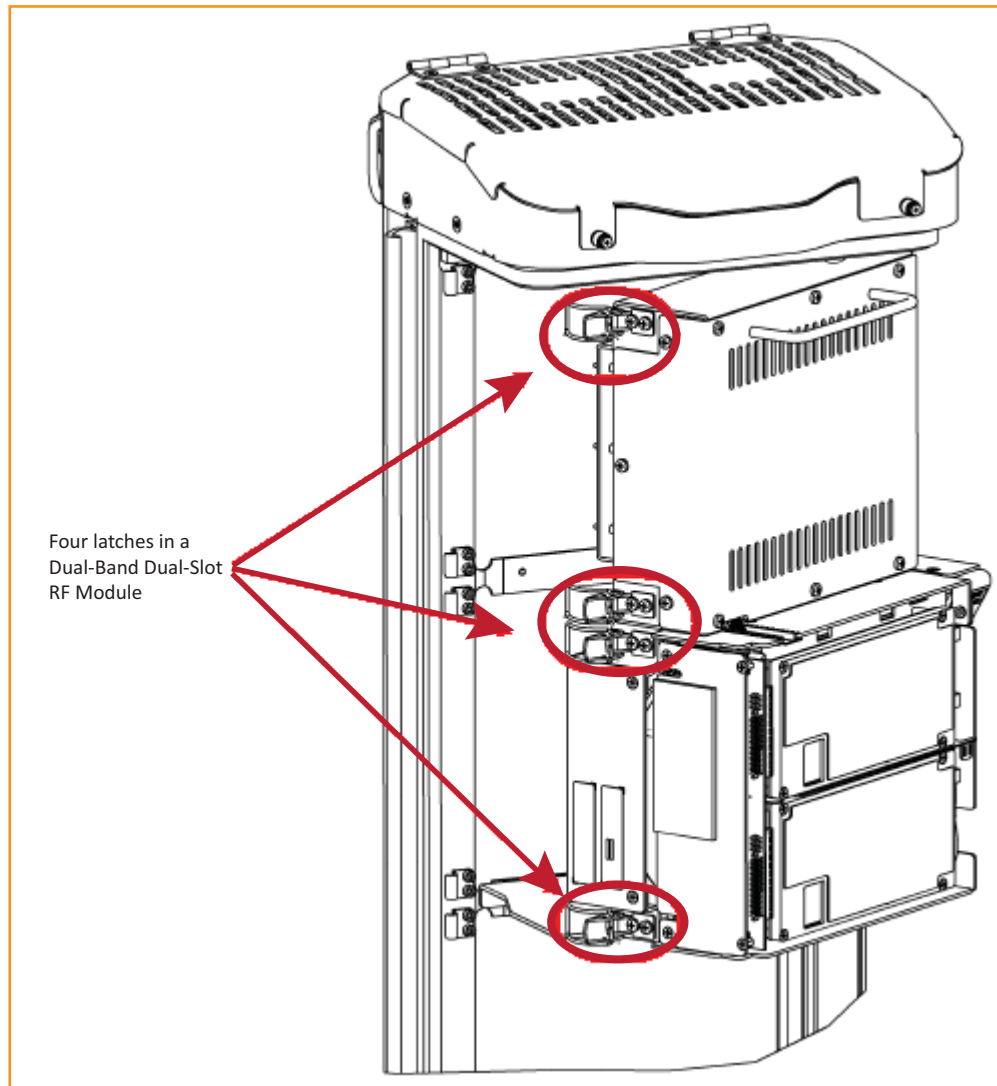
For Single-Bay and HDM RF Modules, secure two latches, as shown in [Figure 18](#).



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

## Connect Latches on Dual-Bay RF Modules

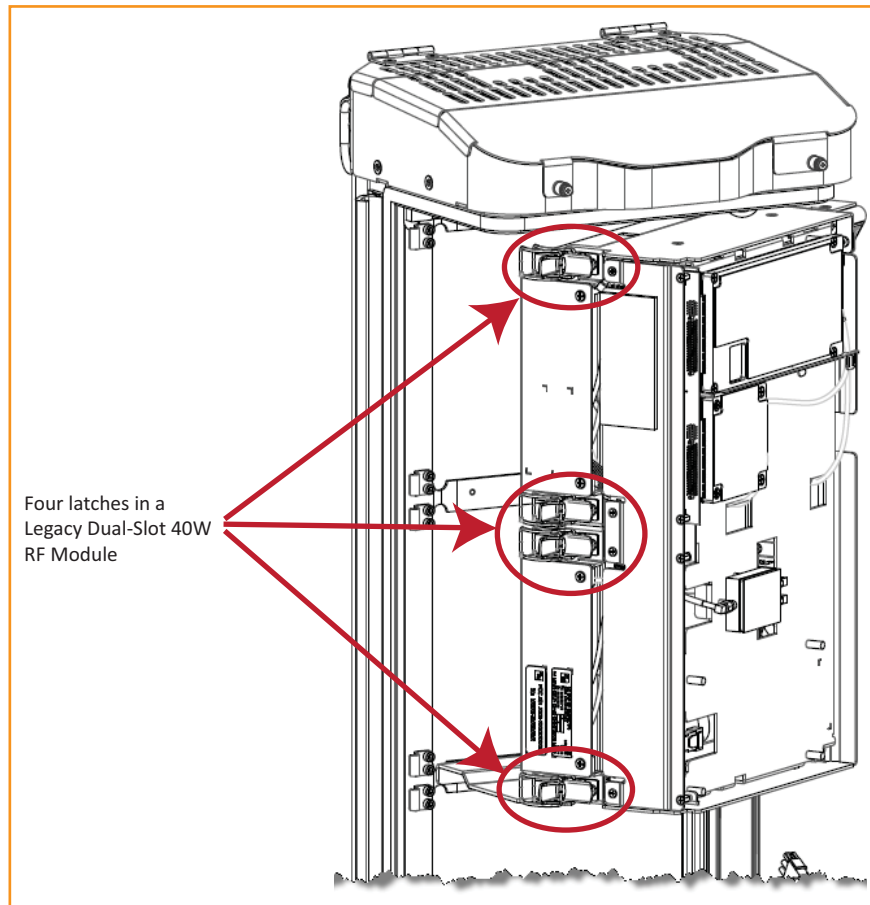
For Dual-Bay RF Modules, secure four latches, as shown in [Figure 19](#).



**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 13 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.

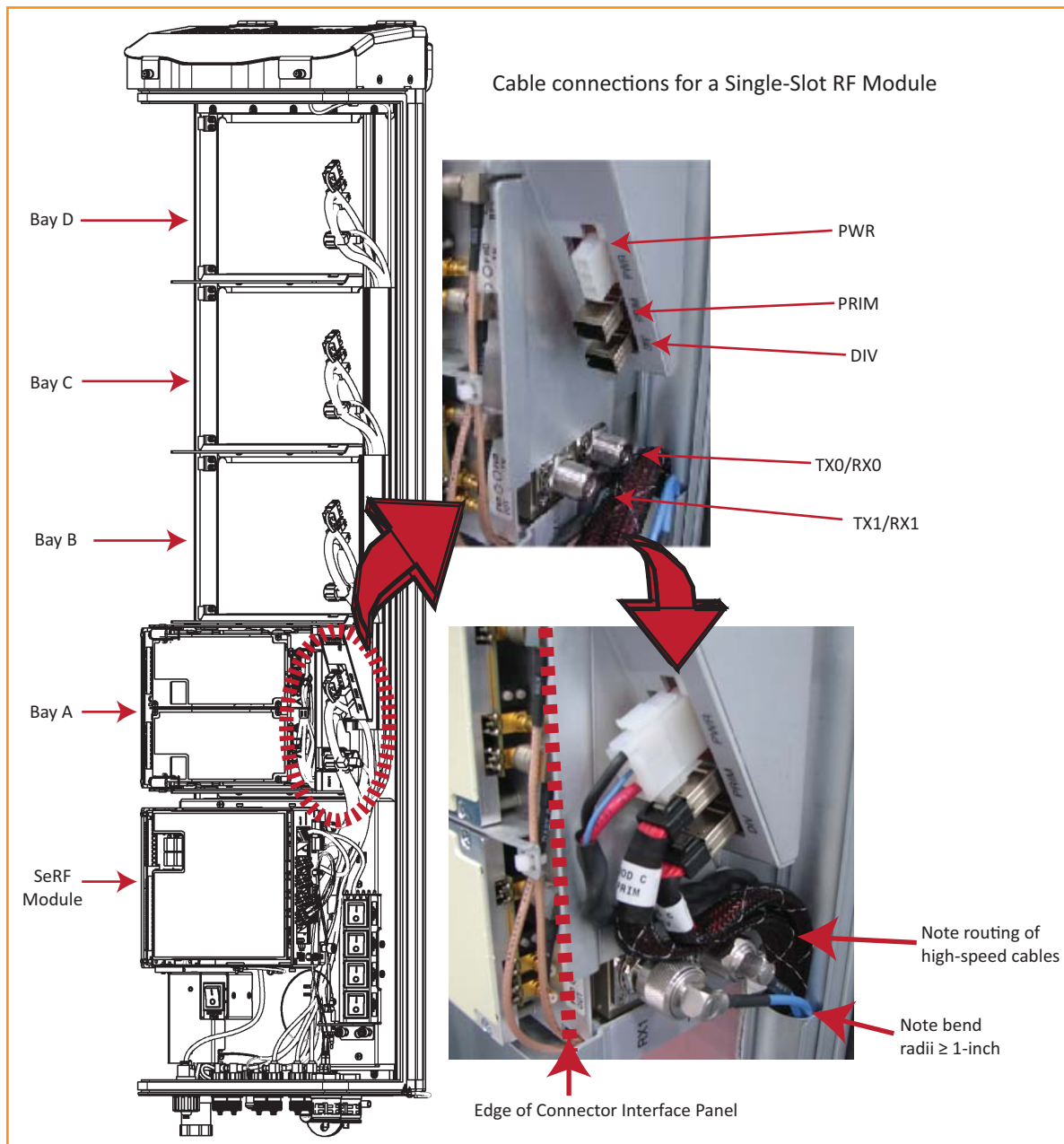
**NOTE:** Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.

- 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.

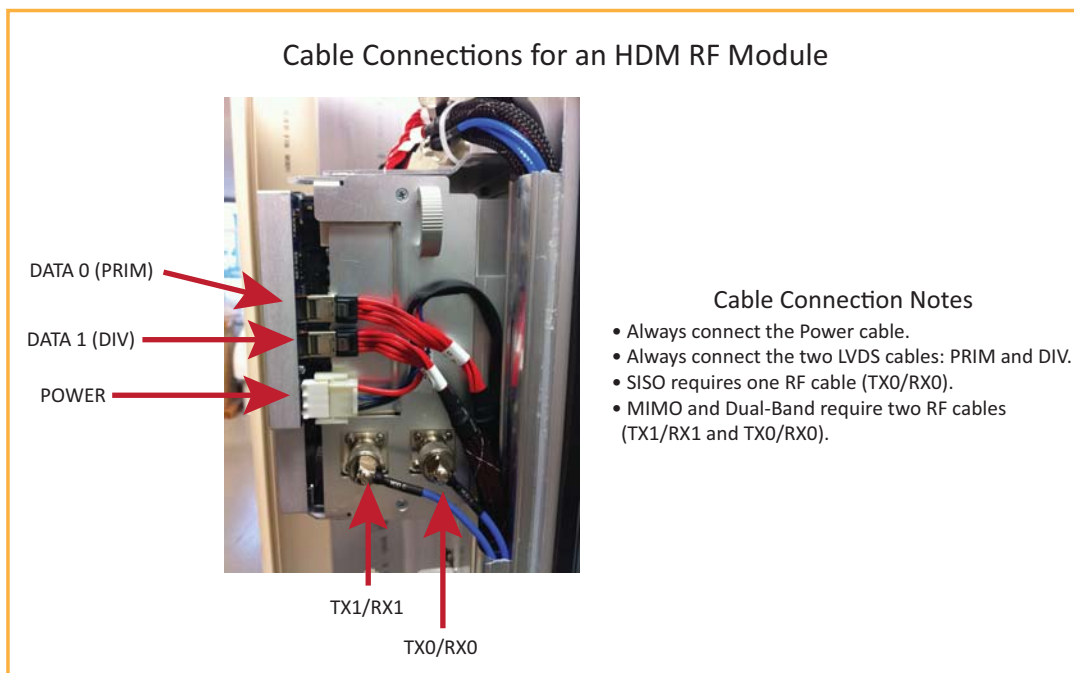
- c Connect the LVDS Cables to the RF Module—the LVDS cables labeled PRIM and DIV should always either be connected to a RF Module or strain relieved to adjacent cables, as this protects the cable against damage through misplacement. Maintain adequate strain-relief distances from the connection points 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 13 lists how to correctly connect HDM RF Modules to the Antenna ports on the bottom of the Remote Unit.

**Table 13.** 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 <sup>(1)</sup>	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.

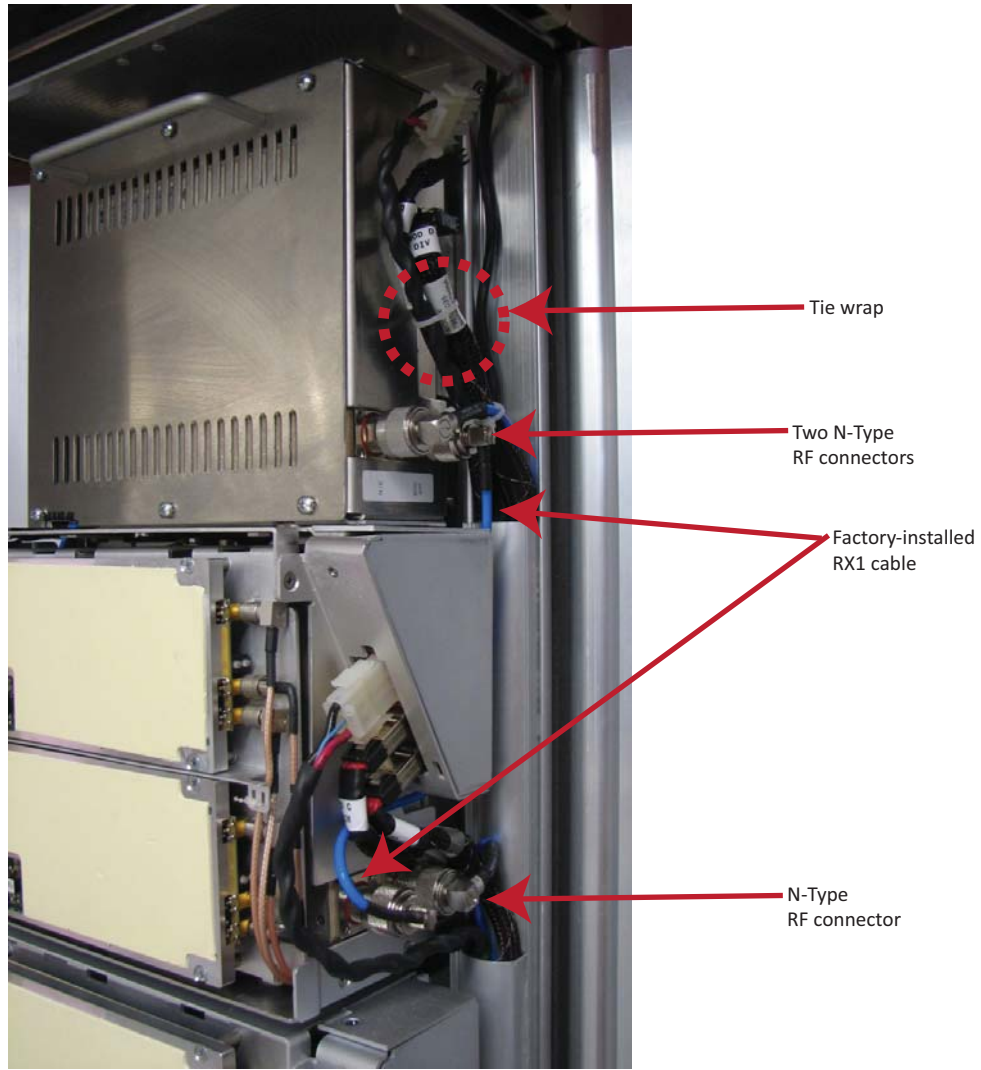
**NOTE:** Insufficient torque applied to RF Module connections can result in elevated insertion/return loss and higher than normal VSWR reported by the system.

- 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.

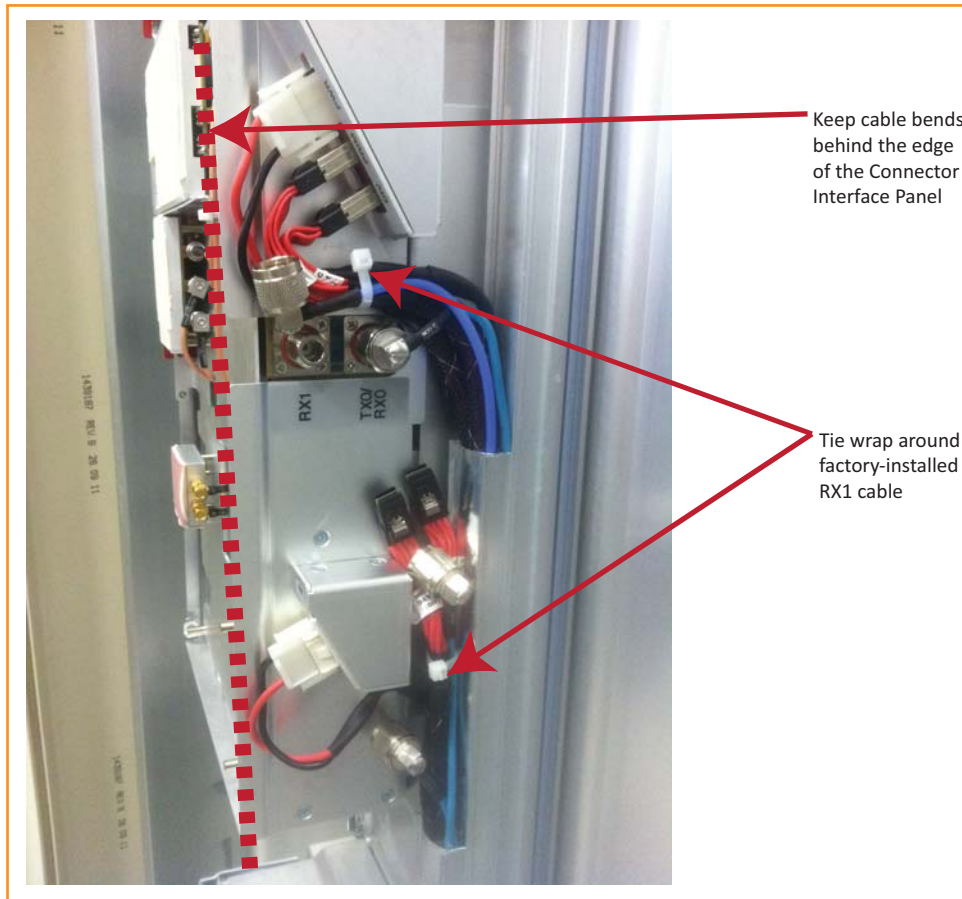


- iii If available, connect the MOD N PRIM LVDS Cable to the PRIM receptacle of the upper RF Module by inserting and sliding in until fully seated. If DIV receptacle is not available, constrain the N PRIM LVDS Cable to accompanying cables using a tie wrap so it cannot be pinched or prevent the Remote 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



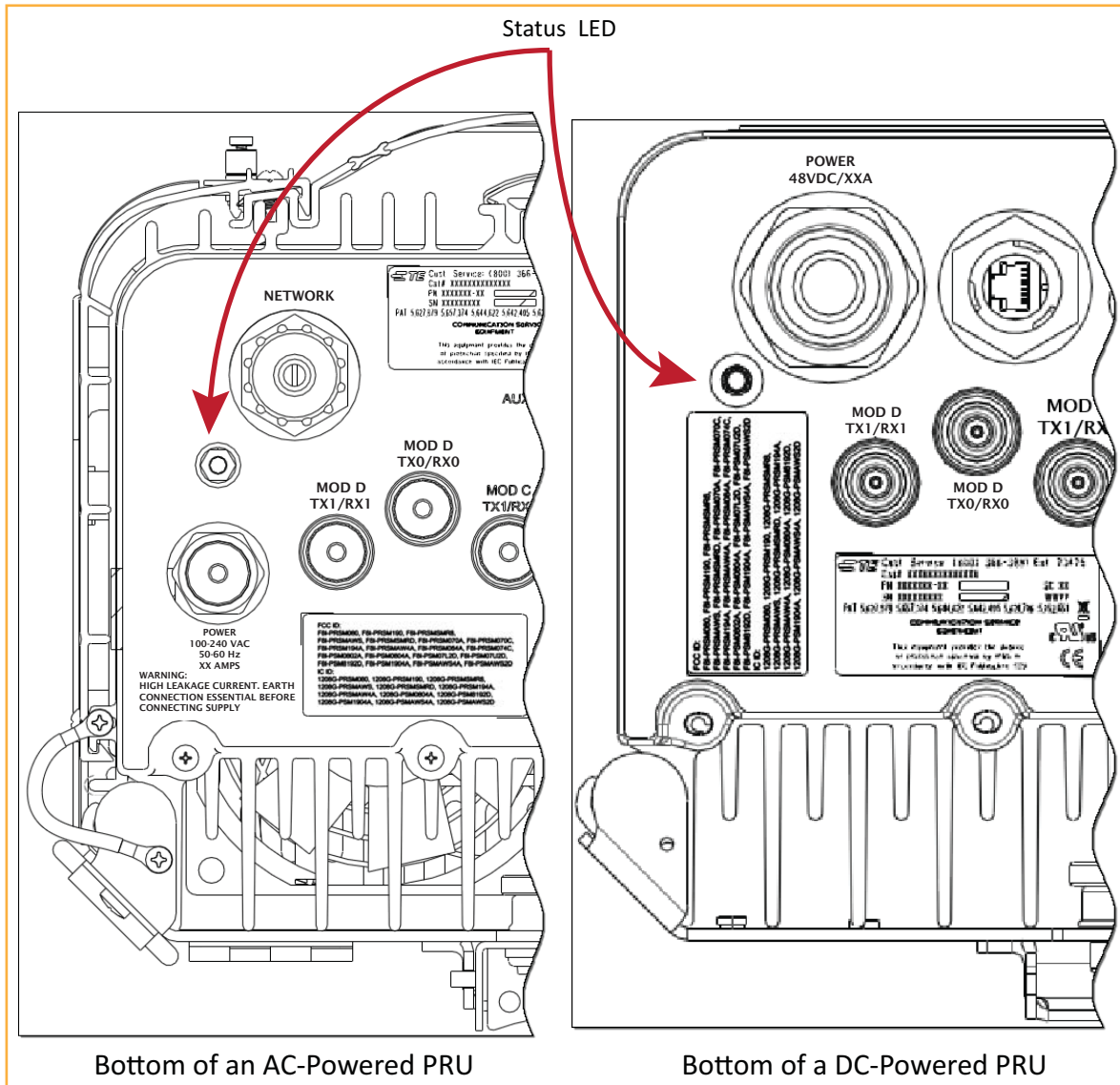
**Figure 24.** Cable Connections for Legacy Dual-Bay 40W RF Modules

**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

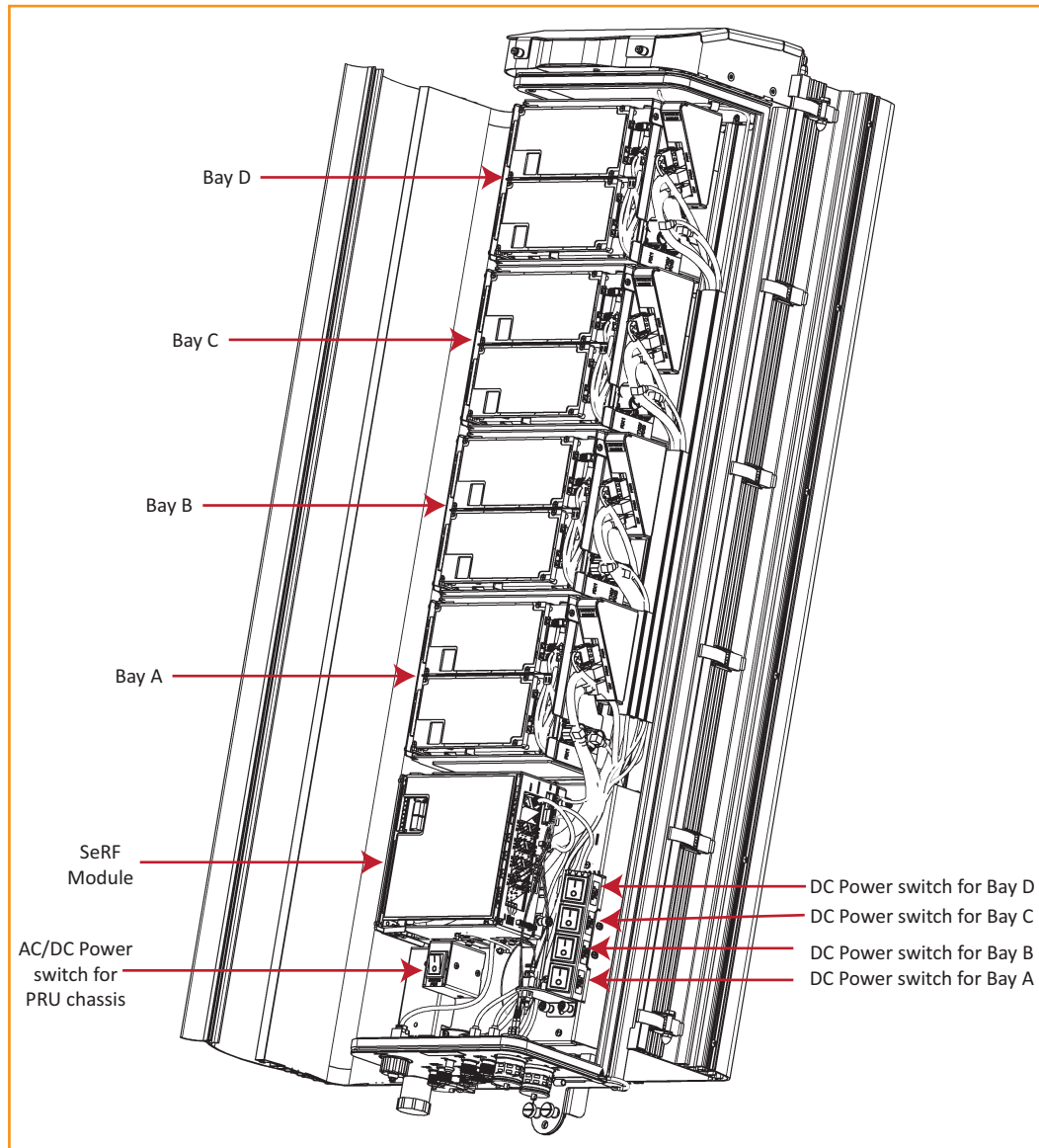
- 1 If necessary, power up the Remote Unit by turning its AC or DC power switch to On.
- 2 Ensure that the external Status LED on the bottom of the Remote Unit goes off.

**NOTE:** During bootup, this LED will be red. After approximately one minute, the LED should extinguish.



**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.

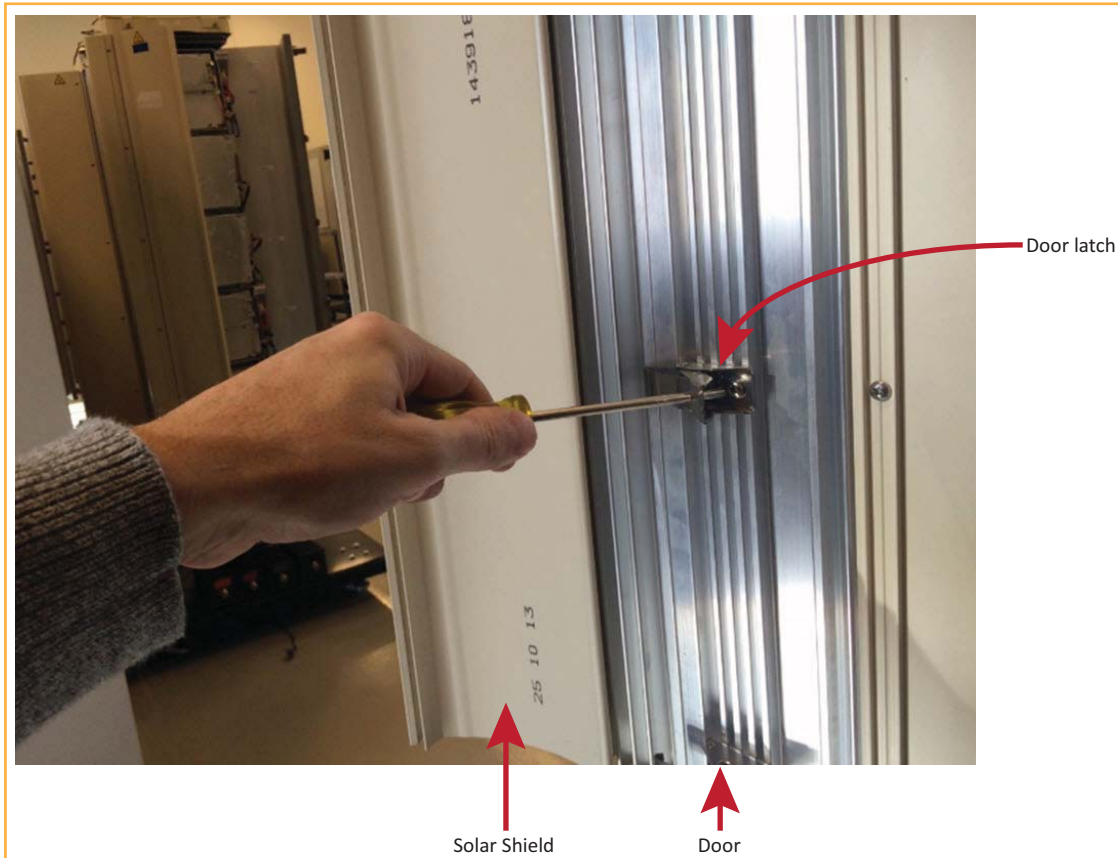


- 4** Verify that the LEDs for all installed RF Modules (located next to their respective connectors) are green. If any of the RF Module LEDs are not green, verify that each RF Module cable is seated fully in its respective connector. If after checking the cable connections and an LED is not green, contact TE for assistance (see [“Contacting TE Connectivity” on page 51](#)).



## 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 51](#).

## 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).

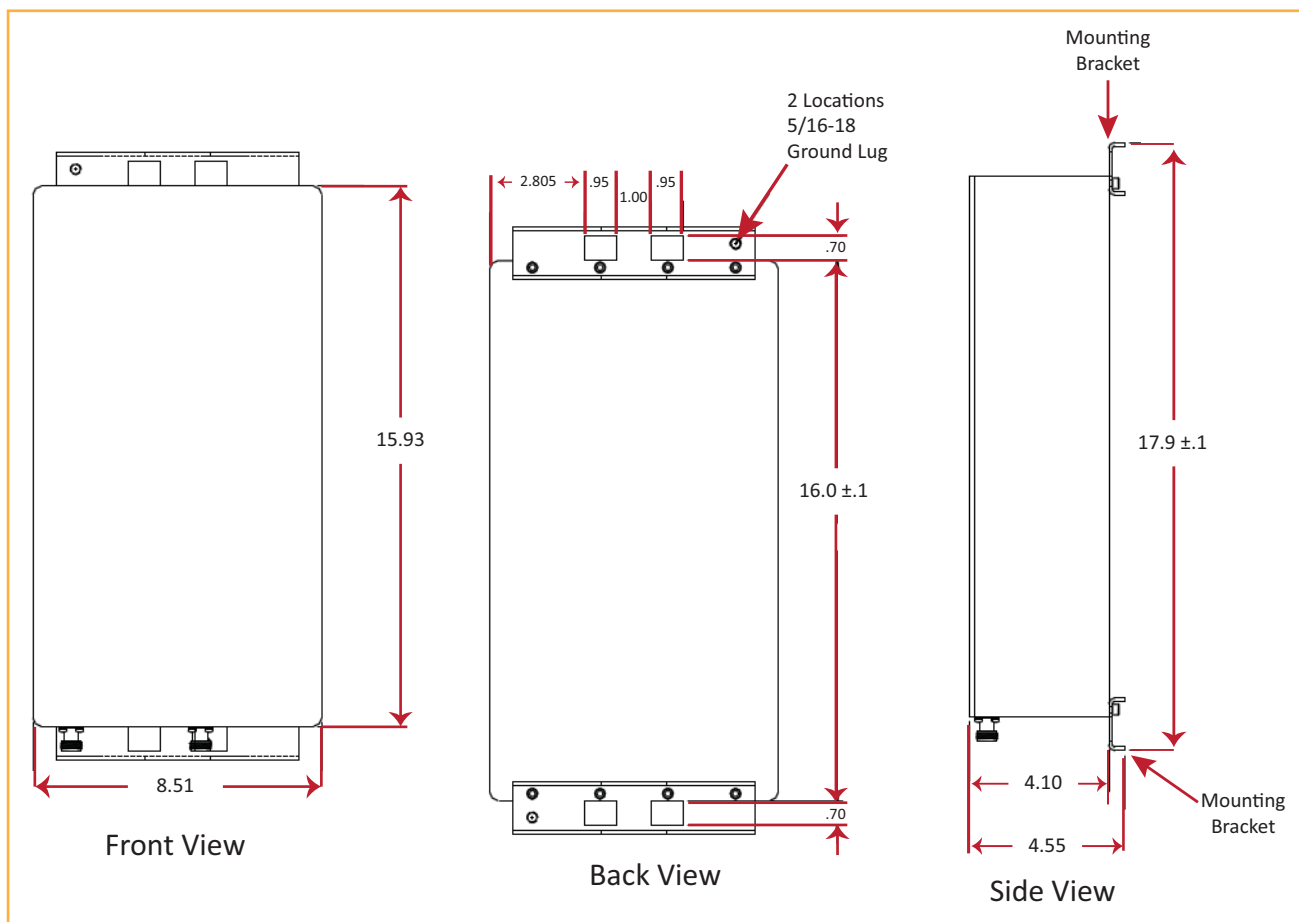
### Notch Filter Installation Tips

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.

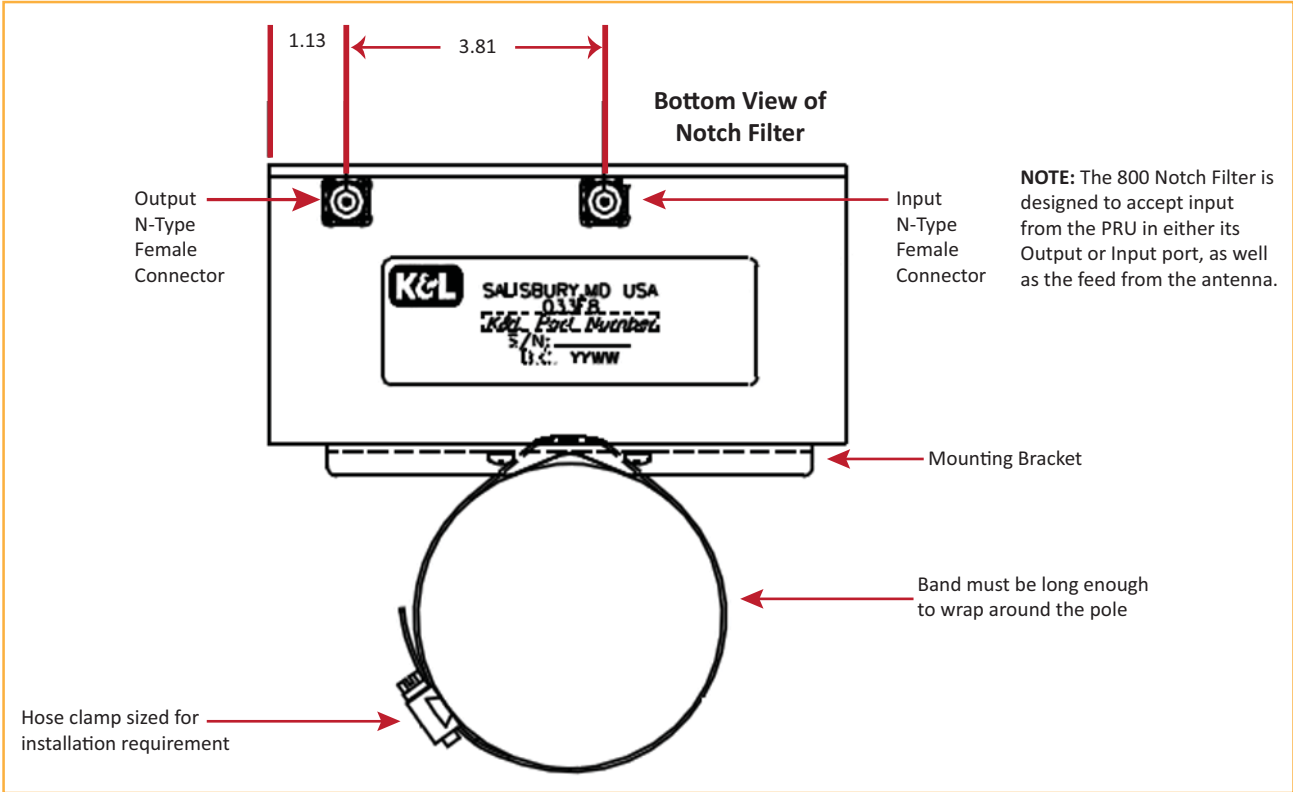


Figure 26. Pole Mounting a Notch Filter

## 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 and 2300 MHz - WCS).

**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

## Online Access

### Customer Portal

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

### Technical Support for Wireless Products

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

[www.te.com/wireless](http://www.te.com/wireless)

