

# **LTE Radio Access, Rel. RL70, Operating Documentation, Issue 01**

## **Flexi Multiradio BTS RF Module and Remote Radio Head Description**

**DN0951745**

**Issue 08**

**Approval Date 2014-11-27**

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## Summary of changes

Changes between document issues are cumulative. Therefore, the latest document issue contains all changes made to previous issues.

### **Changes between issues 07 (2014-11-21) and 08 (2014-11-27)**

Information on the following module has been added: FXJB.

### **Changes between issues 06 (2014-10-16) and 07 (2014-11-21)**

The format of the document has been changed.

Information on the following modules has been added: FXED, FHDA, FHEF, FHFB.

Information on the FXCA has been updated.

### **Changes between issues 05 (2014-05-30) and 06 (2014-10-16)**

#### ***RF Module frequency range and bandwidth***

- Information on FXCA, FXEA and FRGS has been updated.

#### ***Overview of Flexi Multiradio BTS RRH***

- **Table 4: RRH naming convention** has been updated.

#### ***RRH frequency range and bandwidth***

- Information on FRGY has been updated.

#### ***RF Module power requirements and output power***

- Information on *DC cable requirements for 60 W RF Modules* and *DC cable requirements for 6TX 40W RF Modules* has been updated.

#### ***RRH Module power requirements***

- Information on FRGY in **Table 16: RRH power consumption** has been updated.

#### ***RF Module and RRH Module dimensions and weight***

- **Table 18: RRH dimensions and weights** has been updated.

## 1 **RSS-310 compliance**

This equipment complies with RSS-310 of Industry Canada. Operation is subject to the condition that this device does not cause harmful interference.

## 2 EU RoHS statement

This equipment complies with the European Union RoHS Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The directive applies to the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic equipment.

### 3 CE marking

#### Declaration of Conformity with Regard to the EU Directive 1999/5/EC (R&TTE Directive)

Hereby, NSN declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC. TEST

Figure 1 List of countries respecting EU Directive 1999/5/EC

<b>CE ⓘ R&amp;TTE Directive 1995/5/EC</b>							
AT	✓	FR	✓	LV	✓	LI	✓
BE	✓	DE	✓	LT	✓	RO	✓
BG	✓	GB	✓	LU	✓	SK	✓
CY	✓	GR	✓	MT	✓	SI	✓
CZ	✓	HU	✓	NL	✓	ES	✓
DK	✓	IS	✓	NO	✓	SE	✓
EE	✓	IE	✓	PL	✓	CH	✓
FI	✓	IT	✓	PT	✓	TR	✓

This declaration is only valid for configurations (combinations of software, firmware, and hardware) provided and/or supported by NSN.

---

## 4 FCC Part 15 compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference, in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manuals, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 5 Flexi RF Module 3TX 800 (FRMA)

FRMA technical specifications.

### Functional description

Table 1 FRMA functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	791 - 821 MHz
RX frequency range	832 - 862 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

### Interfaces

Figure 2 FRMA interfaces

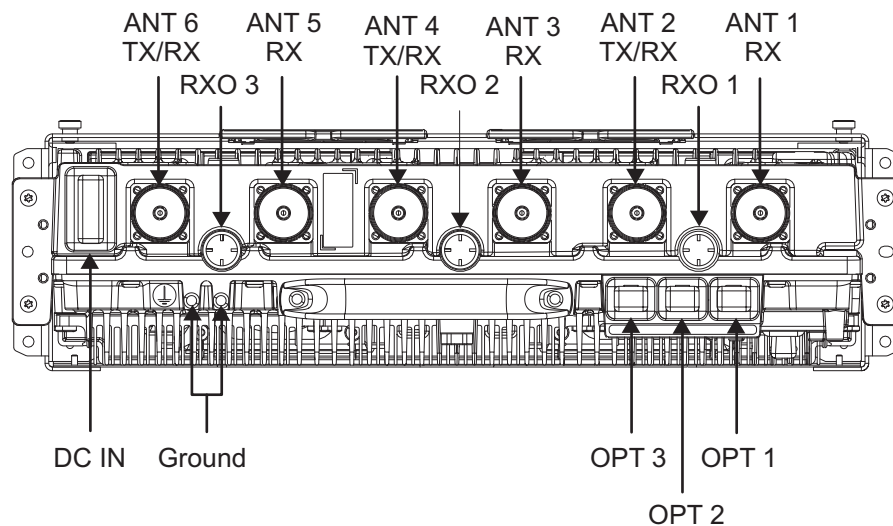


Table 2 FRMA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 2 FRMA interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	3	QMA	
Optical interface	OPT	3	SFP	3 Gbps

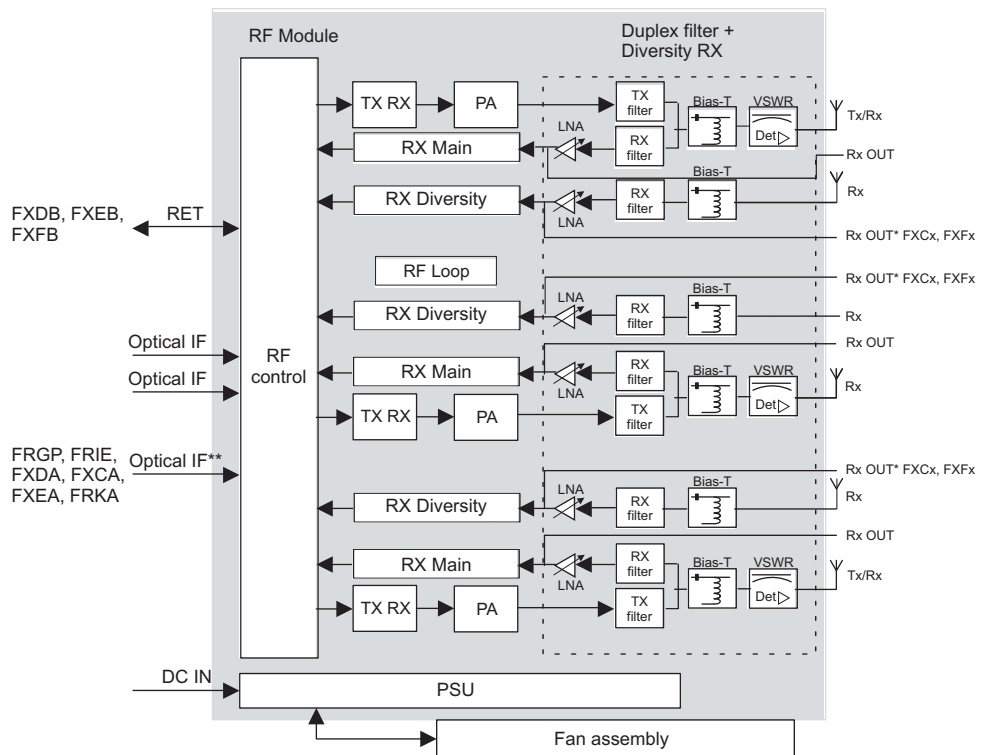
### Antenna Line Devices (ALDs) support

Table 3 FRMA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	24 V Main only
Power per port	30 W

### Functional block diagram

Figure 3 FRMA functional block diagram



## Electrical specifications

Table 4 FRMA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 5 FRMA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	669	943
	40	510	673
	20	374	450

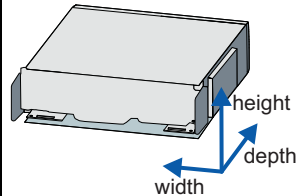
## Installation and mechanical specifications

Table 6 FRMA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 7 FRMA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 7** FRMA dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

**Table 8** FRGS environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

**Table 9** FRMA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 9 FRMA LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 6 Flexi RF Module 3TX 800 (FRMD)

FRMD technical specifications.

### Functional description

Table 10 FRMD functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	791 -806 MHz
RX frequency range	832 - 847 MHz
DL instantaneous bandwidth	15 MHz
UL instantaneous bandwidth	15 MHz
DL filter bandwidth	15 MHz
UL filter bandwidth	15 MHz

### Interfaces

Figure 4 FRMD interfaces

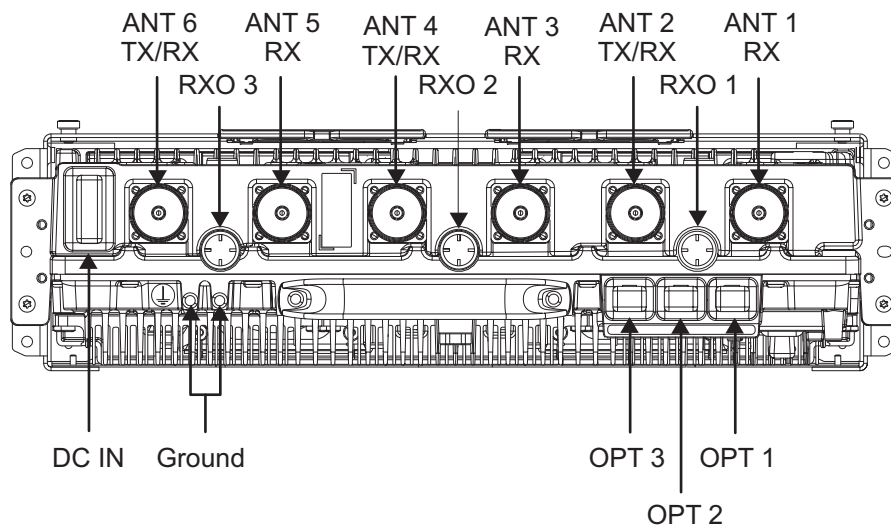


Table 11 FRMD interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	6x 7/16	

Table 11 FRMD interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	3	QMA	
Optical interface	OPT	3	SFP	3 Gbps

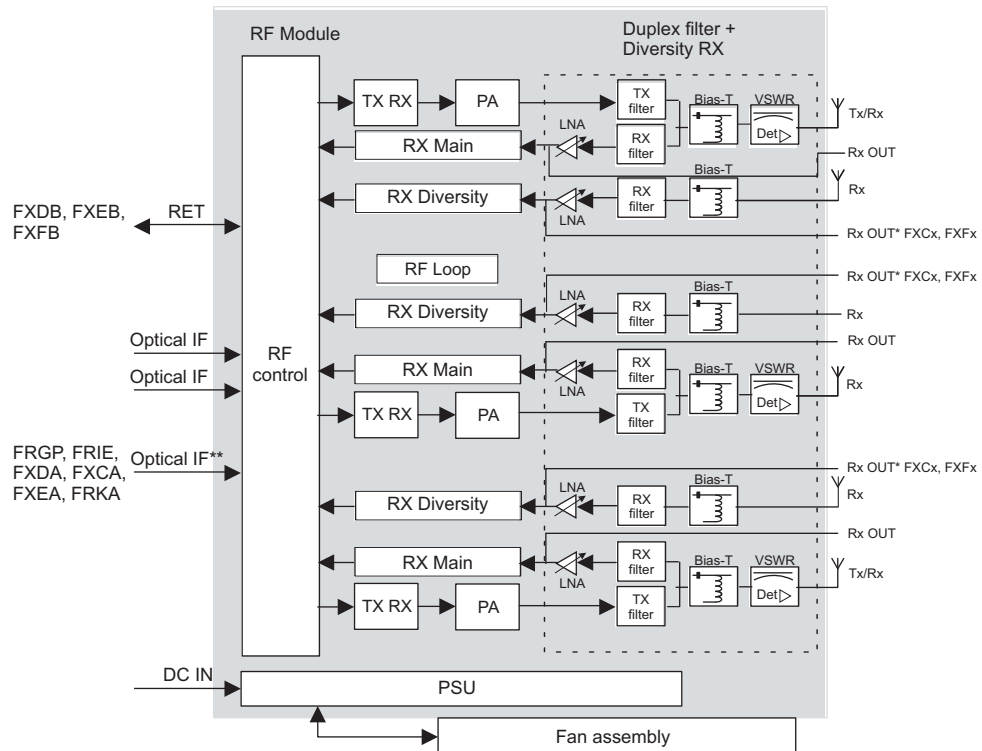
### Antenna Line Devices (ALDs) support

Table 12 FRMD ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	24 V Main only
Power per port	30 W

### Functional block diagram

Figure 5 FRMD functional block diagram



## Electrical specifications

Table 13 FRMD electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 14 FRMD power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	621	826
	40	486	616
	20	369	435

## Installation and mechanical specifications

Table 15 FRMD installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 16 FRMD dimensions and weight

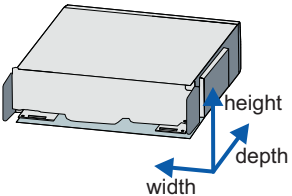
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

Table 16 FRMD dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 17 FRMD environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 18 FRMD LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 18 FRMD LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 7 Flexi RFM 3-pipe 850 180W (FXCA)

FXCA technical specifications.

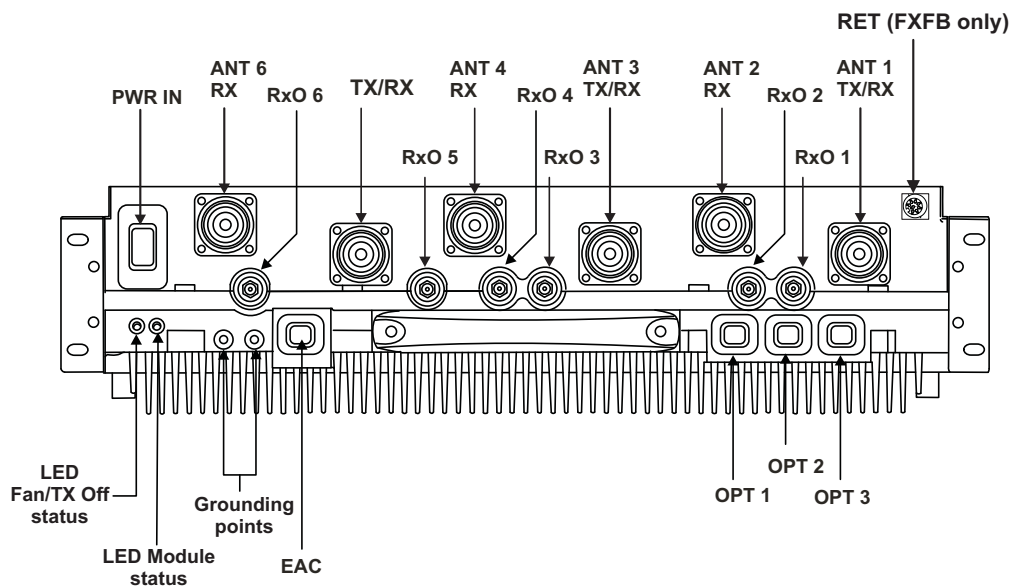
### Functional description

Table 19 FXCA functional specification

Property	Value
Output power	3x60 W
MIMO	no
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	869-894 MHz 30x version: 852-894 MHz
RX frequency range	824-849 MHz 30x version: 807-849 MHz
DL instantaneous bandwidth	15 MHz, 18 MHz in GSM dedicated mode
UL instantaneous bandwidth	15 MHz, 18 MHz in GSM dedicated mode
DL filter bandwidth	15 MHz, 18 MHz in GSM dedicated mode
UL filter bandwidth	15 MHz, 18 MHz in GSM dedicated mode

### Interfaces

Figure 6 FXCA interfaces



*Table 20* FXCA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT		SFP	3 Gbps

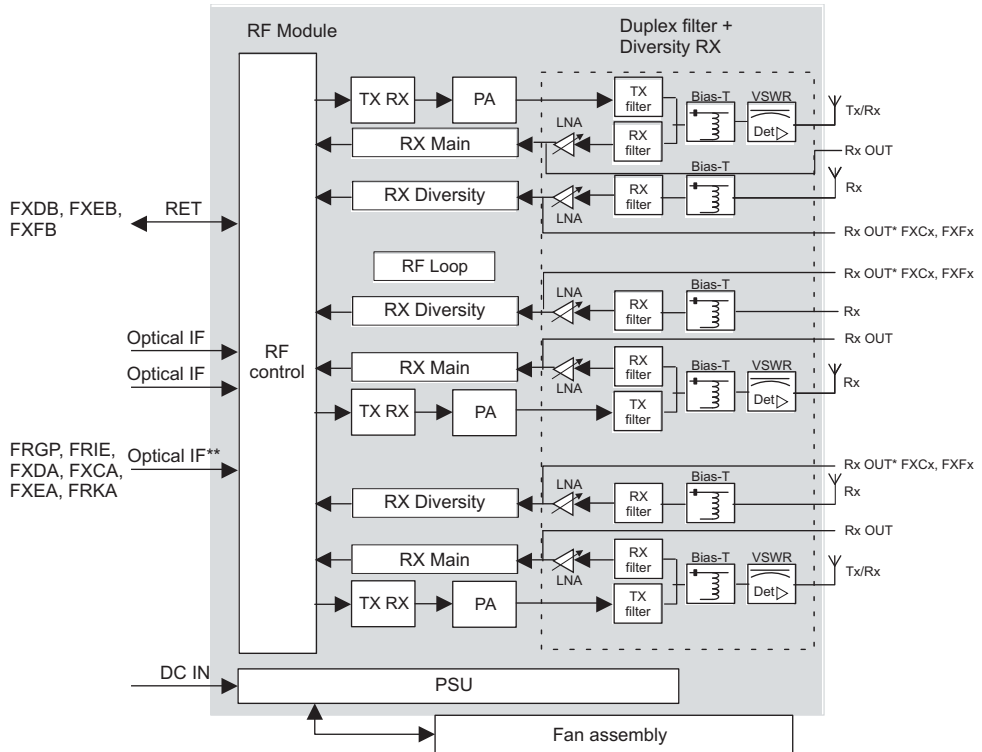
**Antenna Line Devices (ALDs) support**

*Table 21* FXCA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	Yes
CWA (for non-AISG installations)	Yes
Voltage	Main = 12V/1A or 24V/30W
Power per port	Div = 12V/1A

## Functional block diagram

Figure 7 FXCA functional block diagram



## Electrical specifications

Table 22 FXCA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 23 FXCA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	545	794
	40	468	644
	20	393	494

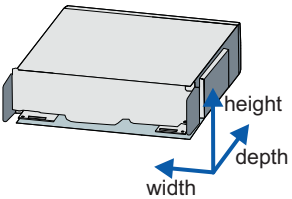
## Installation and mechanical specifications

Table 24 FXCA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 25 FXCA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 26 FXCA environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 27 FXCA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded	Major/critical alarm

Table 27 FXCA LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

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## Warnings, cautions or notes related to the product

**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 8 Flexi RF Module 3TX 900 (FXDA)

FXDA technical specifications.

### Functional description

Table 28 FXDA functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GDM, WCDMA, FDD-LTE
TX frequency range	925-960 MHz
RX frequency range	880-915 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

### Interfaces

Figure 8 FXDA interfaces

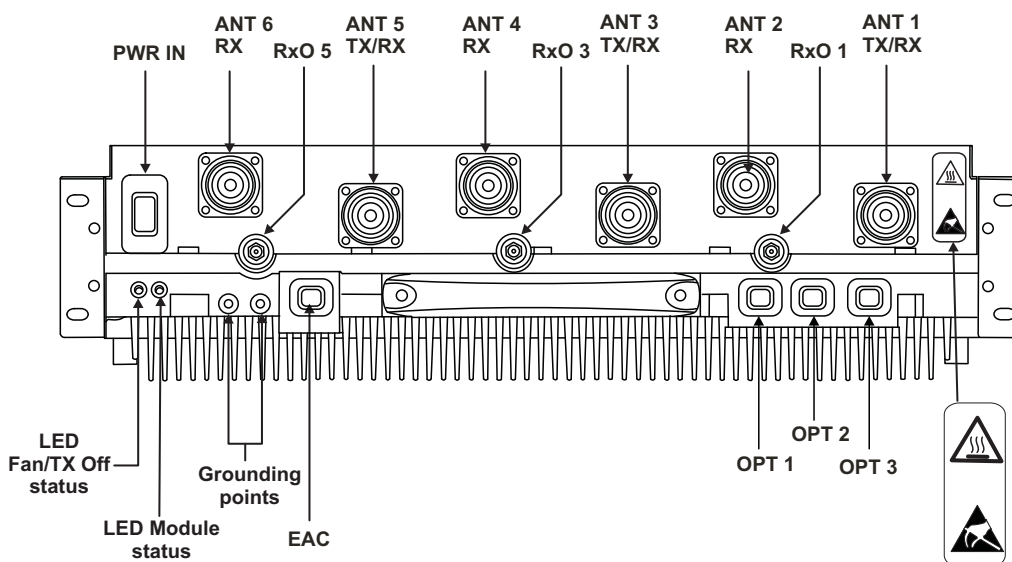


Table 29 FXDA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 29 FXDA interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

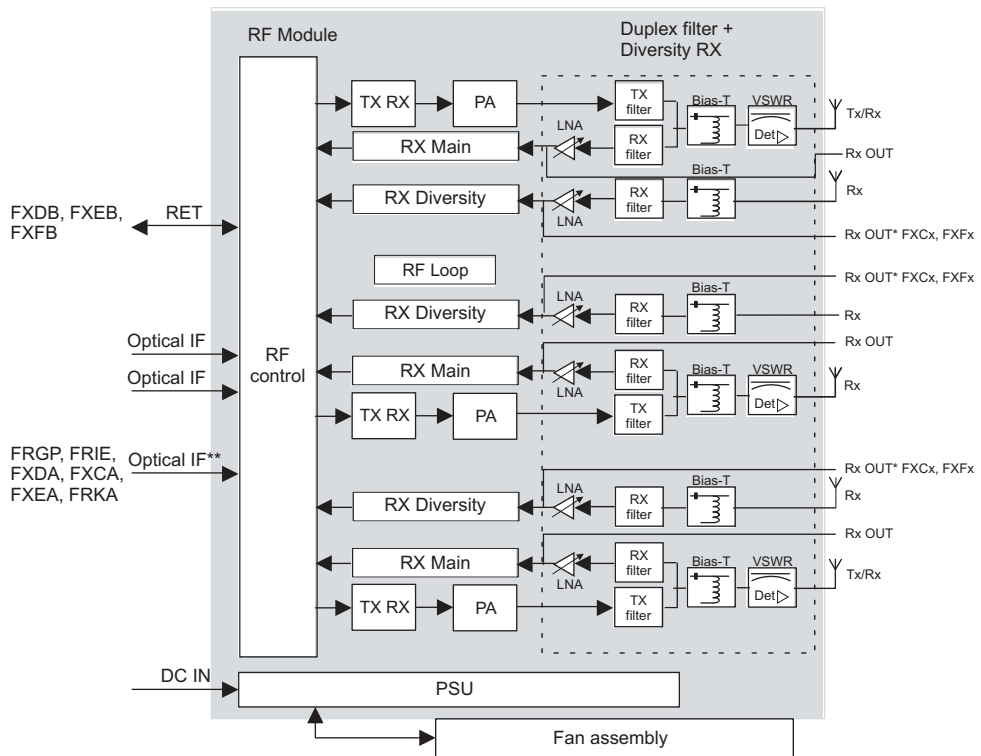
**Antenna Line Devices (ALDs) support**

Table 30 FXDA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	Yes
CWA (for non-AISG installations)	Yes
Voltage	Main = 12V/1A or 24V/30W
Power per port	Div = 12V/1A

**Functional block diagram**

Figure 9 FXDA functional block diagram



## Electrical specifications

Table 31 FXDA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 32 FXDA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	700	932
	40	533	672
	20	447	523

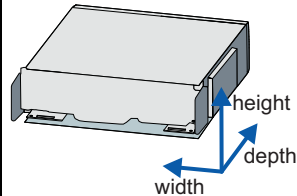
## Installation and mechanical specifications

Table 33 FXDA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 34 FXDA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 34** FXDA dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

**Table 35** FXDA environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

**Table 36** FXDA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 36 FXDA LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 9 Flexi RF Module 3TX 900 (FXDJ)

FXDJ technical specifications.

### Functional description

Table 37 FXDJ functional specification

Property	Value
Output power	3x60 W
MIMO	no
Outdoor installation	yes
SW supported technologies	GMS, WCDMA
TX frequency range	935-960 MHz
RX frequency range	890-915 MHz
DL instantaneous bandwidth	12.5 MHz
UL instantaneous bandwidth	12.5 MHz
DL filter bandwidth	12.5 MHz
UL filter bandwidth	12.5 MHz

### Interfaces

Figure 10 FXDJ interfaces

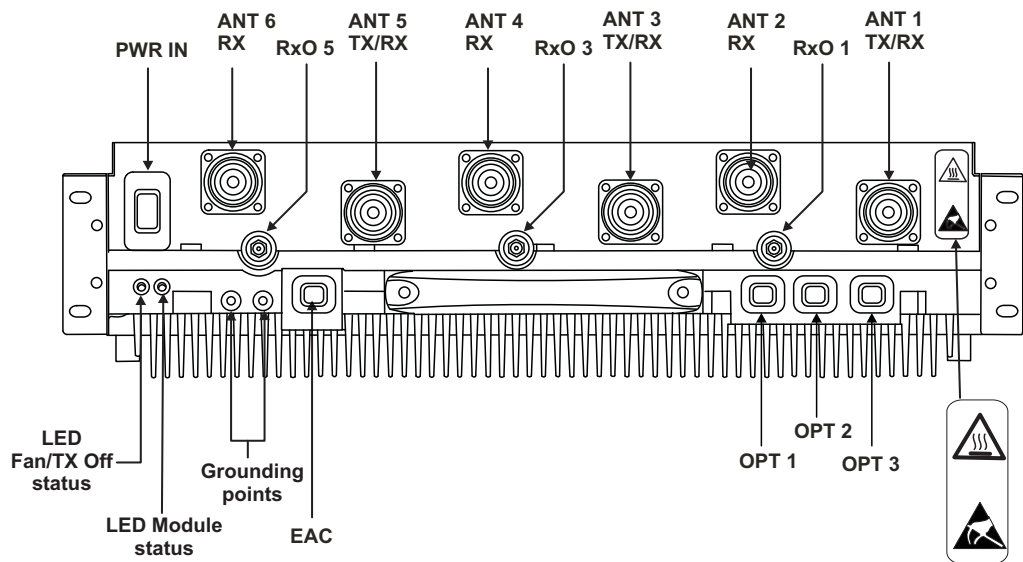


Table 38 FXDJ interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 38 FXDJ interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

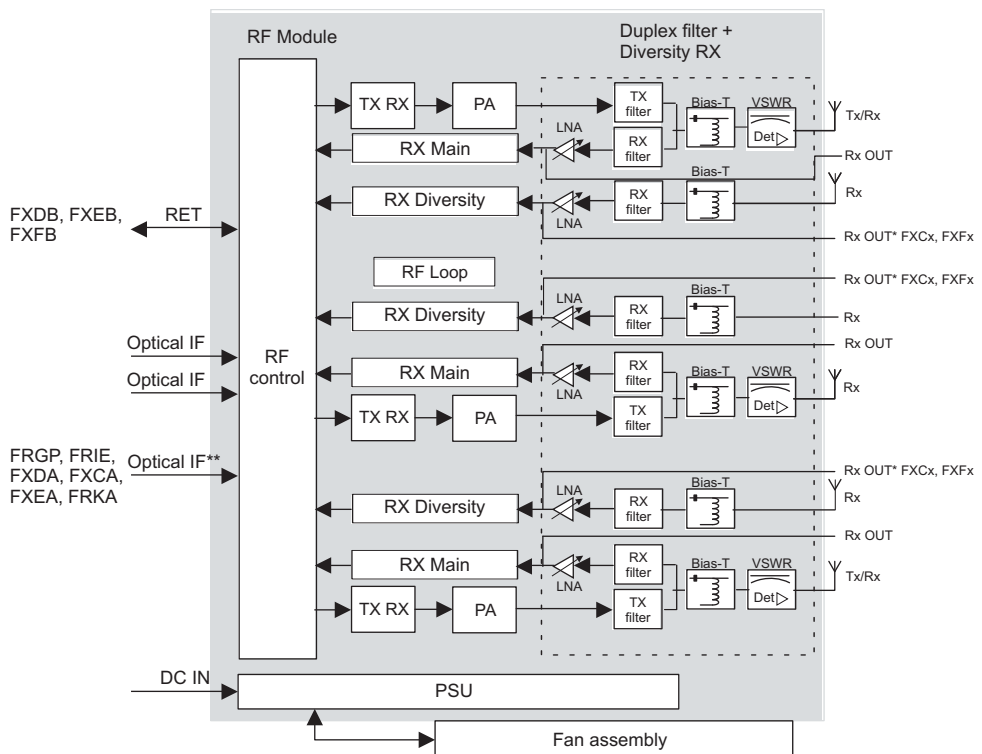
### Antenna Line Devices (ALDs) support

Table 39 FXDJ ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	Yes
CWA (for non-AISG installations)	Yes
Voltage	Main = 12V/1A or 24V/30W
Power per port	Div = 12V/1A

### Functional block diagram

Figure 11 FXDJ functional block diagram



### Electrical specifications

Table 40 FXDJ electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 41 FXDJ power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	700	932
	40	533	672
	20	447	523

### Installation and mechanical specifications

Table 42 FXDJ installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 43 FXDJ dimensions and weight

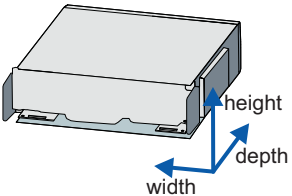
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

Table 43 FXDJ dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 44 FXDJ environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 45 FXDJ LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 45 FXDJ LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 10 Flexi RF Module 3TX 1800 (FXEA)

FXEA technical specifications.

### Functional description

Table 46 FXEA functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	1805-1880 MHz
RX frequency range	1710-1785 MHz
DL instantaneous bandwidth	A.10x version: 20 MHz A.20x version: 25 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

### Interfaces

Figure 12 FXEA interfaces

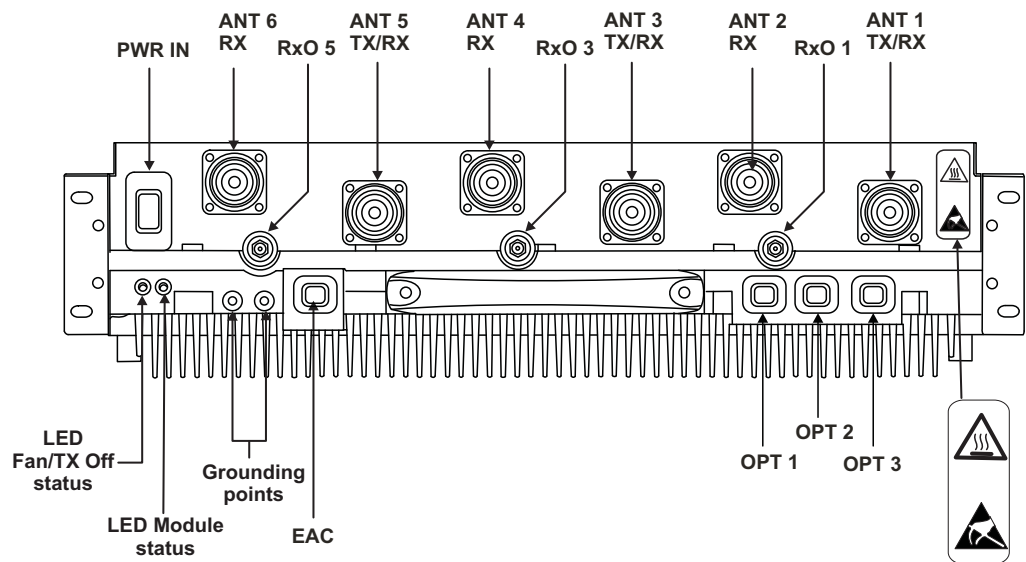


Table 47 FXEA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	PWR IN	1	2-pin multibeam XL	

Table 47 FXEA interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA <td></td>	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

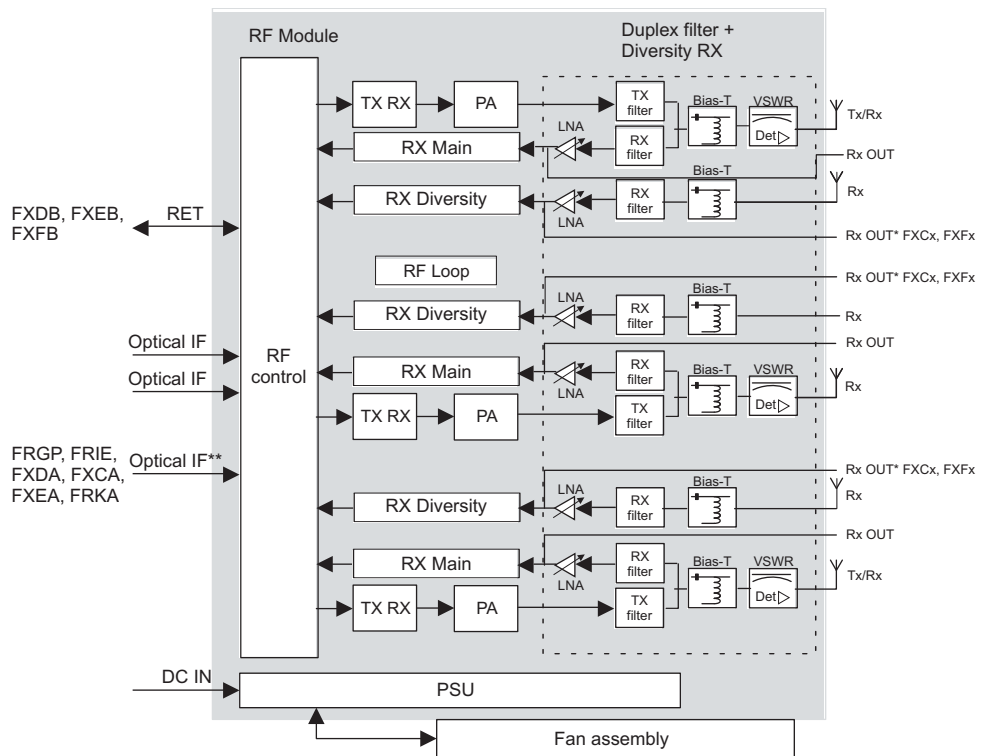
**Antenna Line Devices (ALDs) support**

Table 48 FXEA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	Yes
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A

**Functional block diagram**

Figure 13 FXEA functional block diagram



## Electrical specifications

Table 49 FXEA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 50 FXEA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	679	909
	40	565	719
	20	466	555

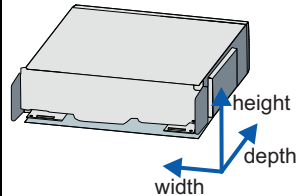
## Installation and mechanical specifications

Table 51 FXEA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 52 FXEA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 52** FXEA dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

**Table 53** FXEA environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

**Table 54** FXEA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 54 FXEA LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

# 11 Flexi RF Module 3TX 1900 (FXFB)

FXFB technical specifications.

## Functional description

Table 55 FXFB functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	1930-1990 MHz
RX frequency range	1850-1910 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

## Interfaces

Figure 14 FXFB interfaces

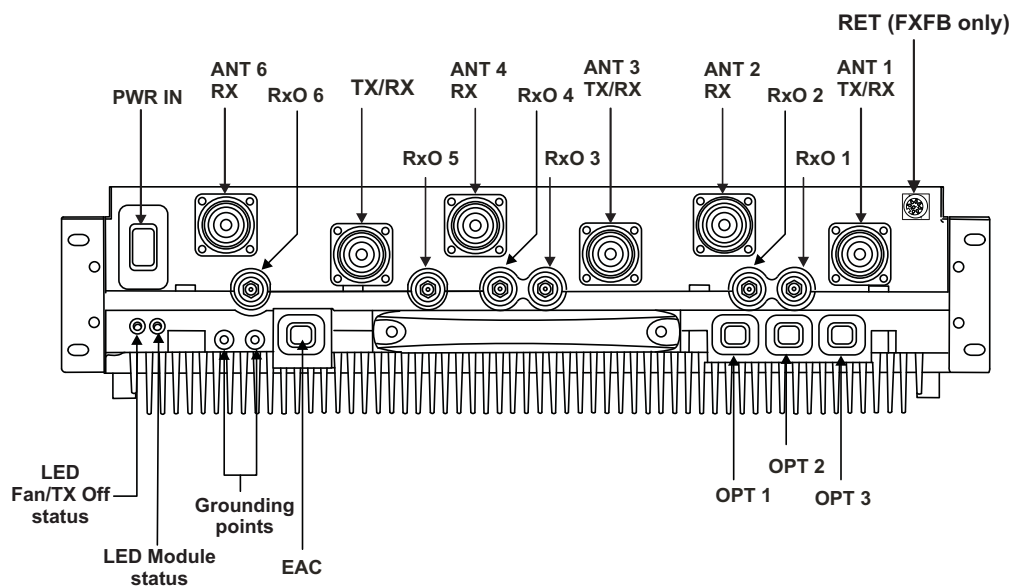


Table 56 FXFB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	PWR IN	1	2-pin multibeam XL	

*Table 56* FXFB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	6	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

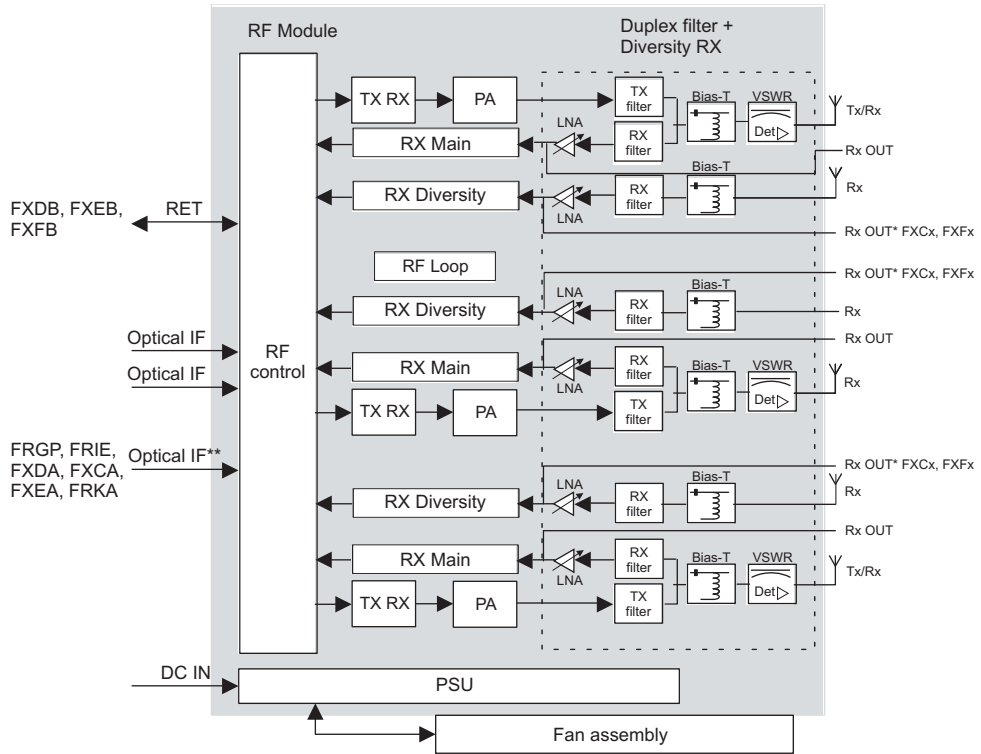
### Antenna Line Devices (ALDs) support

*Table 57* FXFB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A

### Functional block diagram

Figure 15 FXFB functional block diagram



### Electrical specifications

Table 58 FXFB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 59 FXFB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	709	977
	40	612	776
	20	508	599

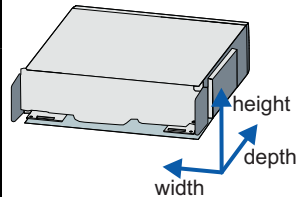
## Installation and mechanical specifications

Table 60 FXFB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 61 FXFB dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 62 FXFB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 63 FXFB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded	Major/critical alarm

Table 63 FXFB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 12 Flexi RF Module 3TX 2100 (FRGP)

FRGP technical specifications.

### Functional description

Table 64 FRGP functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	WCDMA, FDD-LTE
TX frequency range	2110-2170 MHz
RX frequency range	1920-1980 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

### Interfaces

Figure 16 FRGP interfaces

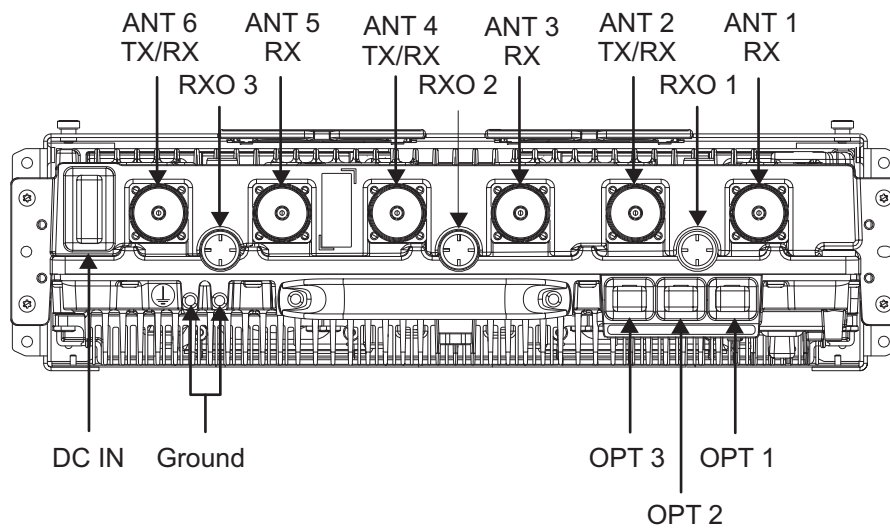


Table 65 FRGP interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 65 FRGP interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	1	QMA	
Optical interface	OPT	3	SFP	3 Gbps

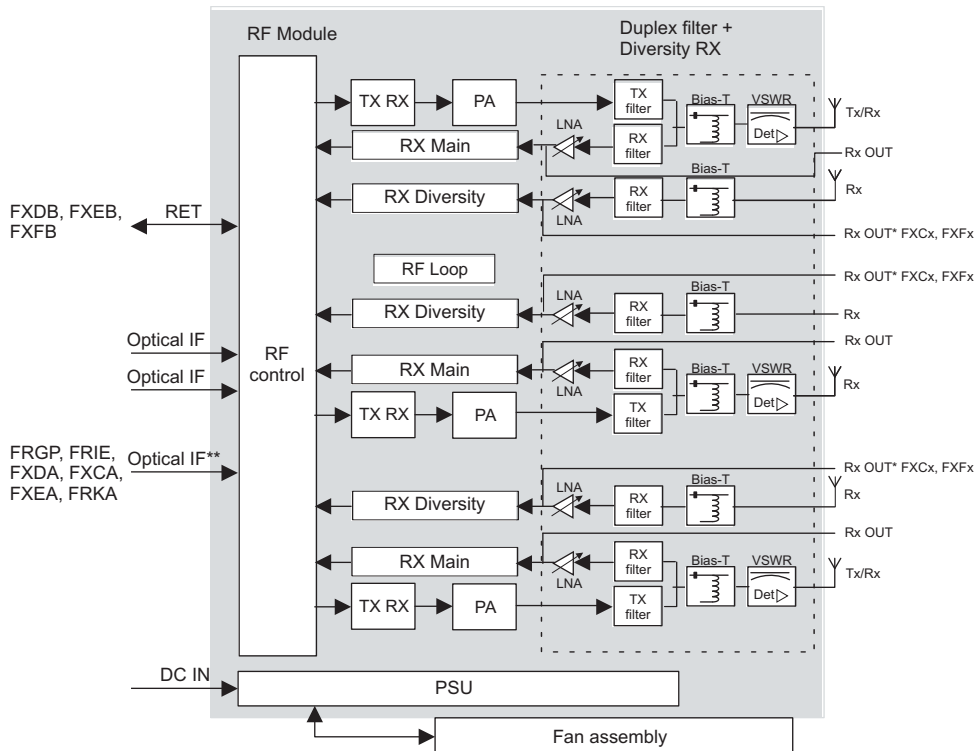
### Antenna Line Devices (ALDs) support

Table 66 FRGP ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	Yes
CWA (for non-AISG installations)	Yes
Voltage	Main 24V/12V Div 12V
Power per port	30 W

### Functional block diagram

Figure 17 FRGP functional block diagram



## Electrical specifications

Table 67 FRGP electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	38.0 V DC to 60.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 68 FRGP power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	584	804
	40	490	647
	20	393	476

## Installation and mechanical specifications

Table 69 FRGP installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 70 FRGP dimensions and weight

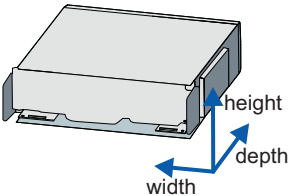
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

Table 70 FRGP dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 71 FRGP environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 72 FRGP LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 72 FRGP LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 13 Flexi RF Module 3TX 2600 (FRHA)

FRHA technical specifications.

### Functional description

Table 73 FRHA functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2620-2690 MHz
RX frequency range	2500-2570 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	70 MHz
UL filter bandwidth	70 MHz

### Interfaces

Figure 18 FRHA interfaces

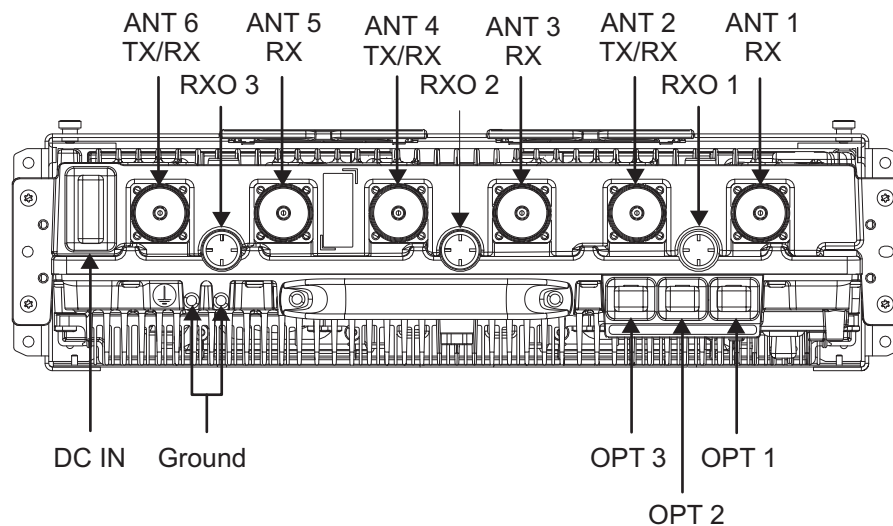


Table 74 FRHA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 74 FRHA interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	6	QMA	
Optical interface	OPT	3	SFP	3 Gbps

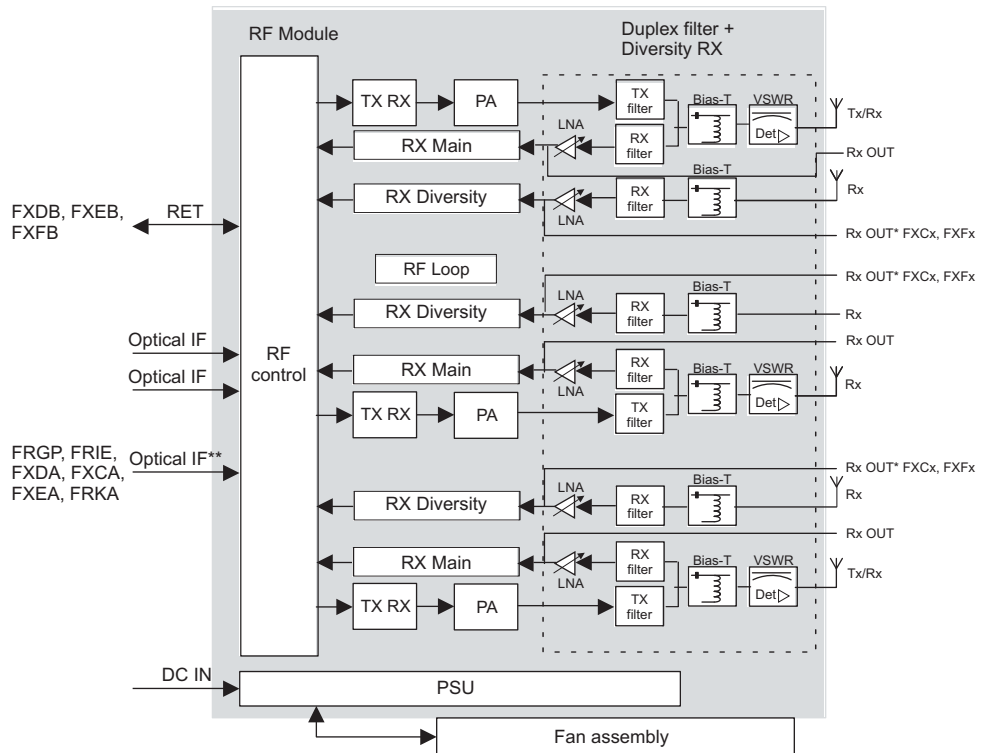
**Antenna Line Devices (ALDs) support**

Table 75 FRHA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	24 V Main only
Power per port	30 W

**Functional block diagram**

Figure 19 FRHA functional block diagram



## Electrical specifications

Table 76 FRHA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	38.0 V DC to 60.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 77 FRHA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	806	1130
	40	622	825
	20	462	580

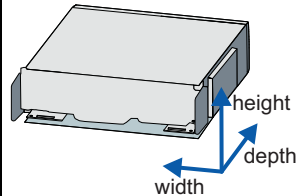
## Installation and mechanical specifications

Table 78 FRHA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 79 FRHA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 79** FRHA dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

**Table 80** FRHA environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

**Table 81** FRHA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 81 FRHA LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 14 Flexi RF Module 3TX 1700/2100 (FRIE)

FRIE technical specifications.

### Functional description

Table 82 FRIE functional specification

Property	Value
Output power	3x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	WCDMA, FDD-LTE
TX frequency range	2110-2170 MHz
RX frequency range	1710-1770 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	45 MHz
UL filter bandwidth	45 MHz

### Interfaces

Figure 20 FRIE interfaces

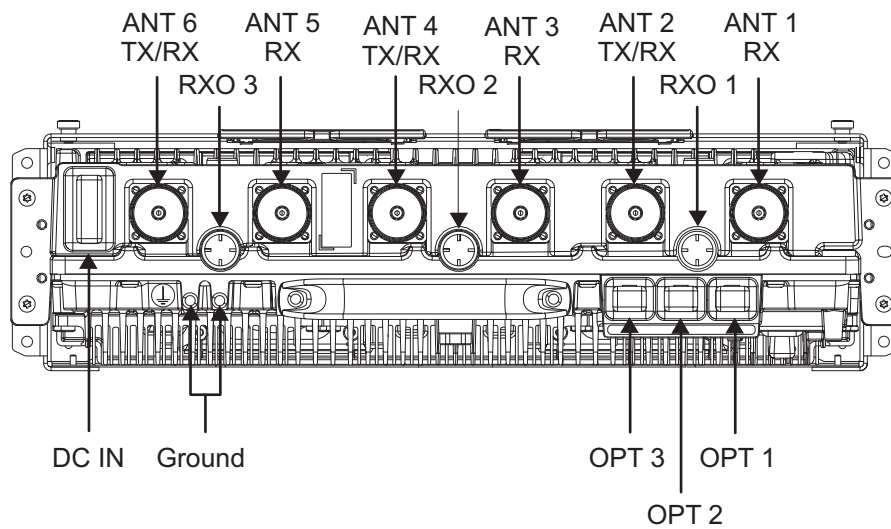


Table 83 FRIE interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	

Table 83 FRIE interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
RF output connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

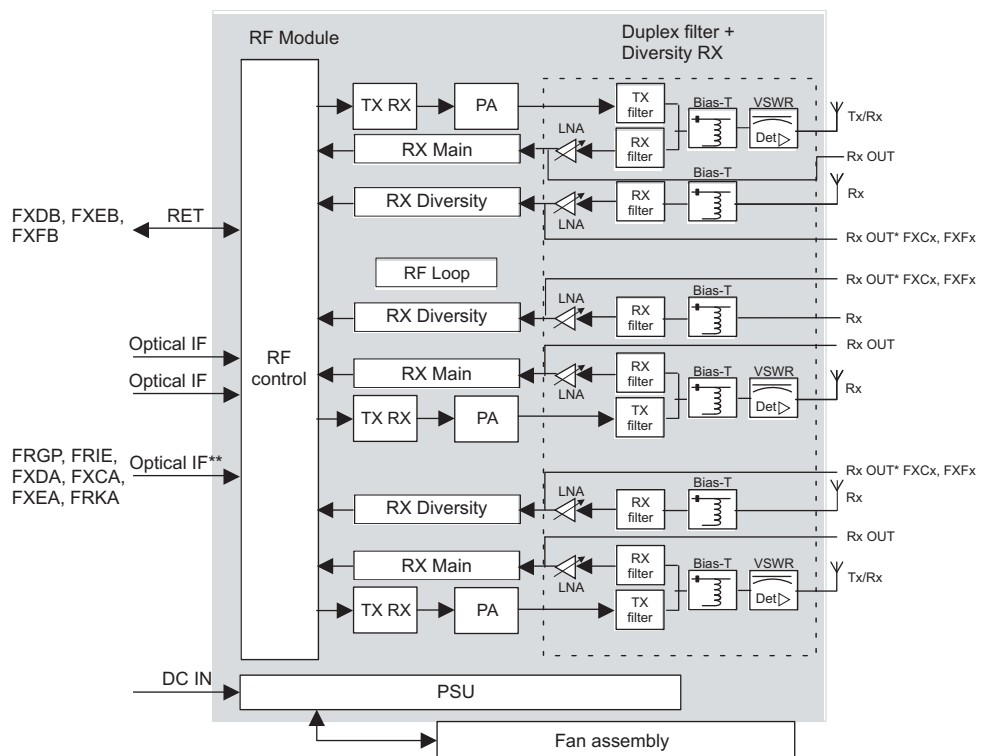
### Antenna Line Devices (ALDs) support

Table 84 FRIE ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main 24V/12V Div 12V
Power per port	30 W

### Functional block diagram

Figure 21 FRIE functional block diagram



## Electrical specifications

Table 85 FRIE electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 86 FRIE power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	590	805
	40	465	610
	20	345	420

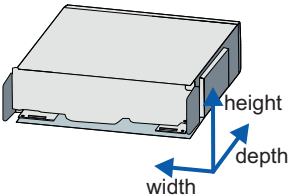
## Installation and mechanical specifications

Table 87 FRIE installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 88 FRIE dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 88** FRIE dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

### Environmental specifications

**Table 89** FRIE environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

### LEDs

**Table 90** FRIE LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 90 FRIE LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 15 Flexi RF Module 3TX 850 (FXCB)

FXCB technical specifications.

### Functional description

Table 91 FXCB functional specification

Property	Value
Output power	3x80 W
MIMO	no
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	869-894 MHz
RX frequency range	824-849 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	25 MHz
DL filter bandwidth	25 MHz
UL filter bandwidth	25 MHz

### Interfaces

Figure 22 FXCB interfaces

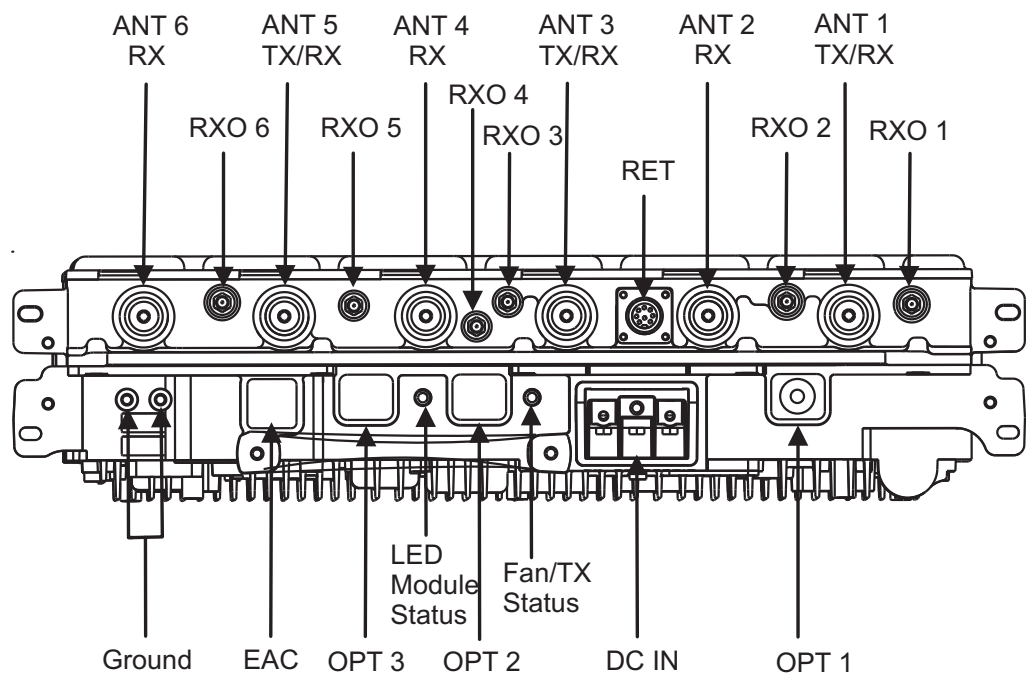


Table 92 FXCB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-terminal	

*Table 92* FXCB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	6	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

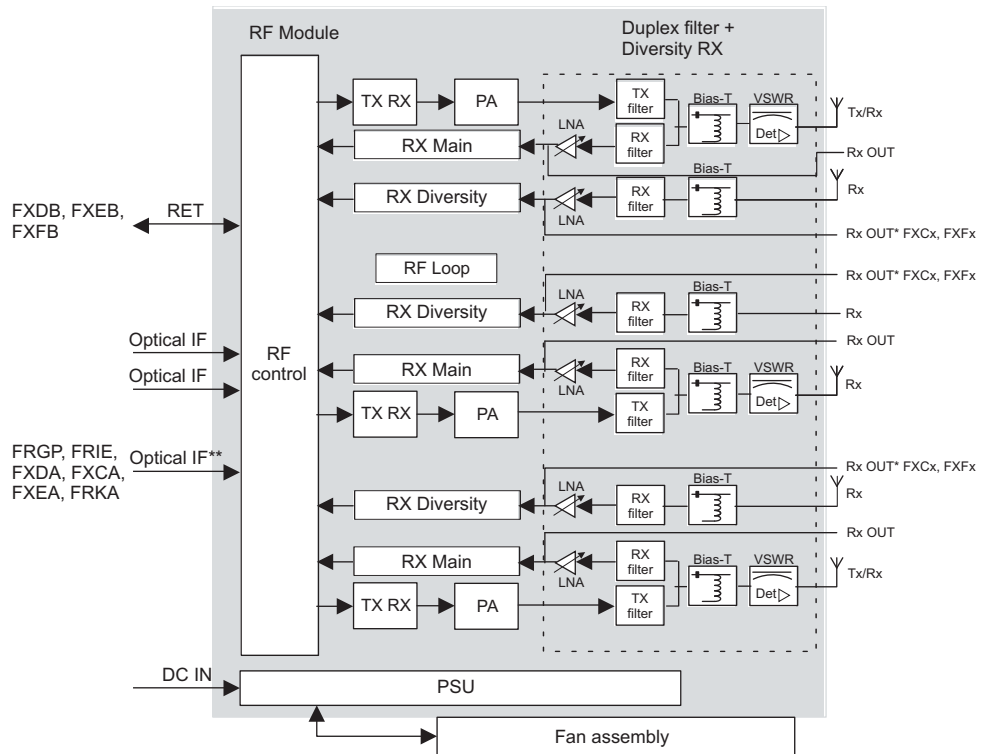
**Antenna Line Devices (ALDs) support**

*Table 93* FXCB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A

## Functional block diagram

Figure 23 FXCB functional block diagram



## Electrical specifications

Table 94 FXCB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 95 FXCB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	80	671	935
	60	594	810
	40	444	581
	20	351	428

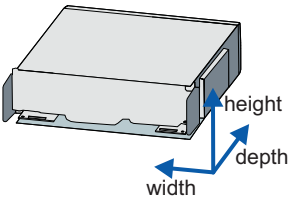
## Installation and mechanical specifications

Table 96 FXCB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>• stack/pole/wall installation</li> <li>• directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>• Flexi Pole Mounting Kit (FPKA/C)</li> <li>• Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 97 FXCB dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 98 FXCB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 99 FXCB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded	Major/critical alarm

Table 99 FXCB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

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## Warnings, cautions or notes related to the product

**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 16 Flexi RF Module 3TX 900 (FXDB)

FXDB technical specifications.

### Functional description

Table 100 FXDB functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	925-960 MHz
RX frequency range	880-915 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	35 MHz
DL filter bandwidth	35 MHz
UL filter bandwidth	35 MHz

### Interfaces

Figure 24 FXDB interfaces

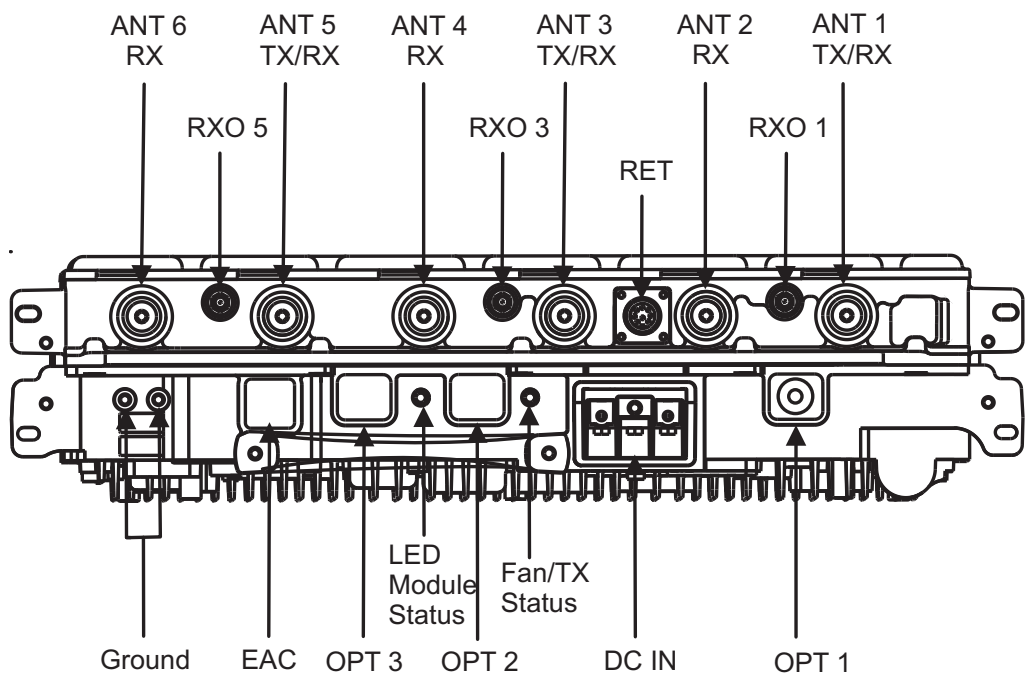


Table 101 FXDB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-terminal	

Table 101 FXDB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA <td></td>	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

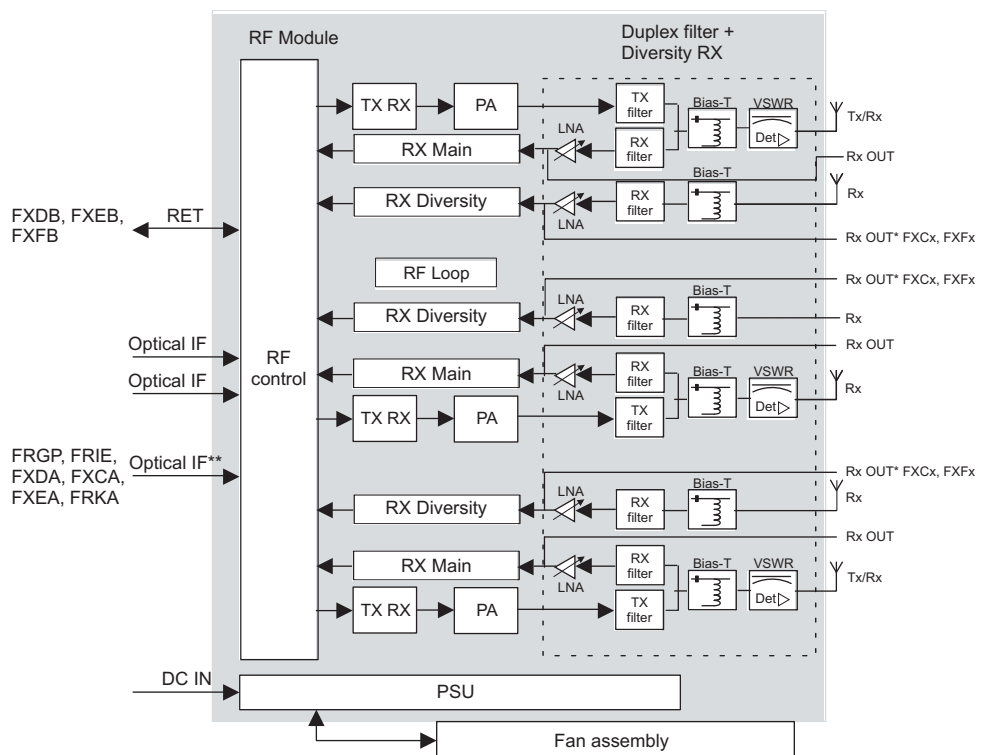
**Antenna Line Devices (ALDs) support**

Table 102 FXDB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A

**Functional block diagram**

Figure 25 FXDB functional block diagram



## Electrical specifications

Table 103 FXDB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 104 FXDB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for WCDMA mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	80	643	903
	60	575	776
	40	409	533
	20	327	395

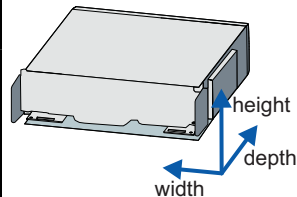
## Installation and mechanical specifications

Table 105 FXDB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 106 FXDB dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	

**Table 106** FXDB dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

**Table 107** FXDB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

**Table 108** FXDB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory:</li> </ul>	No alarm

Table 108 FXDB LEDs (Cont.)

LED color	Description	Alarm
	RF resources activated and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	All fans are faulty	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 17 Flexi RF Module 3TX 1800 (FXEB)

FXEB technical specifications.

### Functional description

Table 109 FXEB functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, FDD-LTE
TX frequency range	1805-1880 MHz
RX frequency range	1710-1785 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

### Interfaces

Figure 26 FXEB interfaces

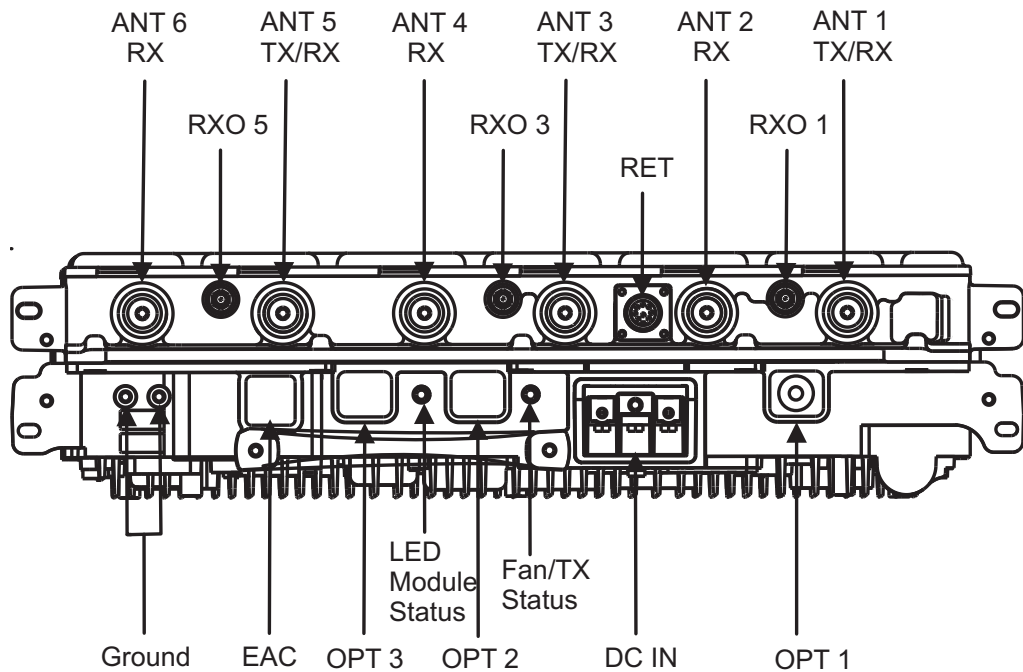


Table 110 FXEB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	

*Table 110* FXEB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

### Antenna Line Devices (ALDs) support

*Table 111* FXEB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A



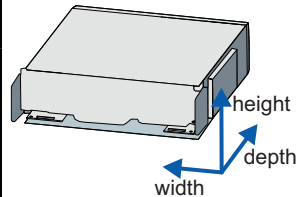
## Installation and mechanical specifications

Table 114 FXEB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 115 FXEB dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 116 FXEB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 117 FXEB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded	Major/critical alarm

Table 117 FXEB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 18 Flexi RF Module 3TX 1900 (FXFC)

FXFC technical specifications.

### Functional description

Table 118 FXFC functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	1930-1990 MHz
RX frequency range	1850-1915 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	65 MHz
UL filter bandwidth	65 MHz

### Interfaces

Figure 28 FXFC interfaces

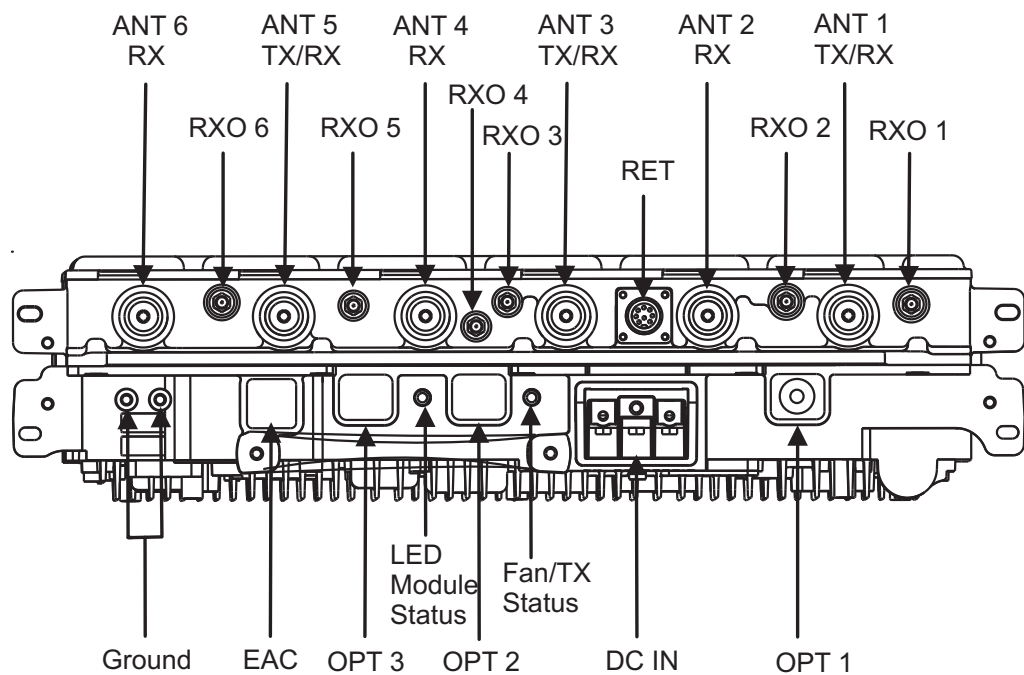


Table 119 FXFC interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	

*Table 119* FXFC interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	6	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

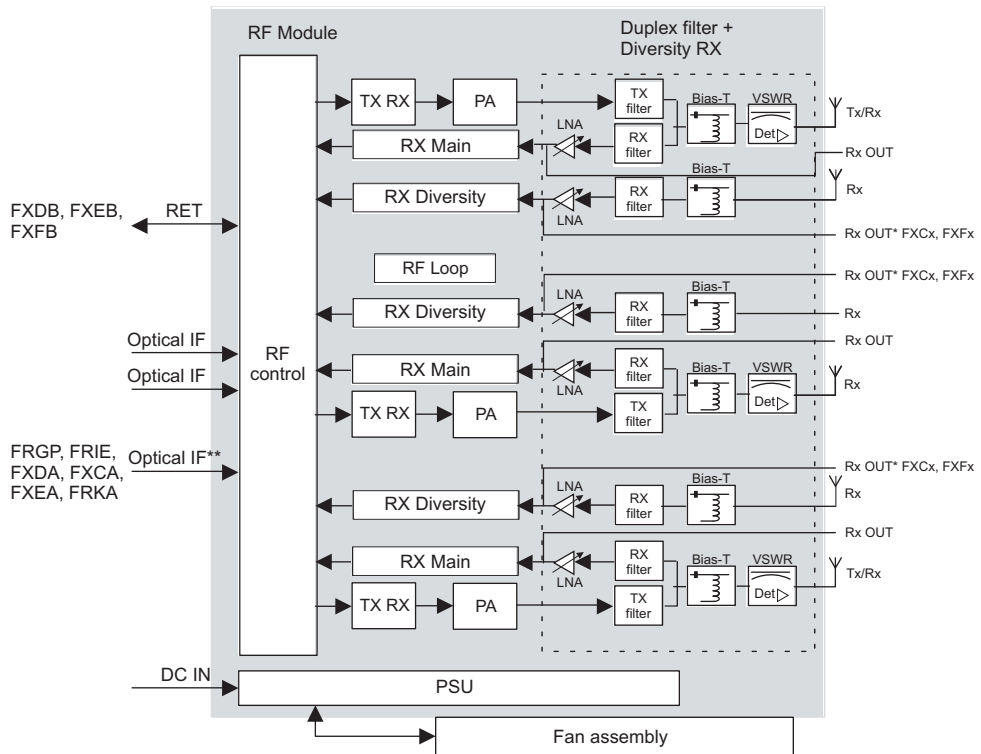
### Antenna Line Devices (ALDs) support

*Table 120* FXFC ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 13V/1.3A or 24V/30W
Power per port	Div = 13V/1A

### Functional block diagram

Figure 29 FXFC functional block diagram



### Electrical specifications

Table 121 FXFC electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 122 FXFC power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for WCDMA mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	80	641	923
	60	554	778
	40	439	587
	20	353	428

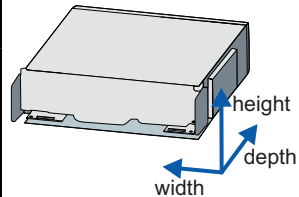
## Installation and mechanical specifications

Table 123 FXFC installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 124 FXFC dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 125 FXFC environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 126 FXFC LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded	Major/critical alarm

Table 126 FXFC LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 19 Flexi RFM 3-pipe 900 240W (FXJB)

FXJB technical specifications.

### Functional description

Table 127 FXJB functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA
TX frequency range	935-960 MHz
RX frequency range	890-915 MHz
DL instantaneous bandwidth	25 MHz
UL instantaneous bandwidth	25 MHz
DL filter bandwidth	25 MHz
UL filter bandwidth	25 MHz

### Interfaces

Figure 30 FXJB interfaces

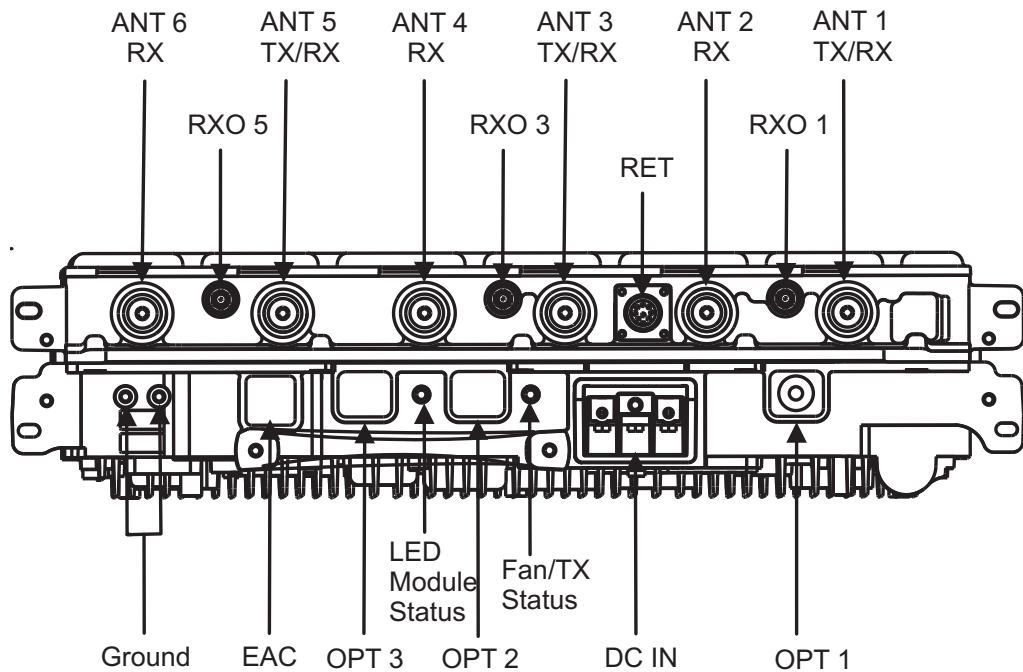


Table 128 FXJB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	

Table 128 FXJB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF optical connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps, OBSAI

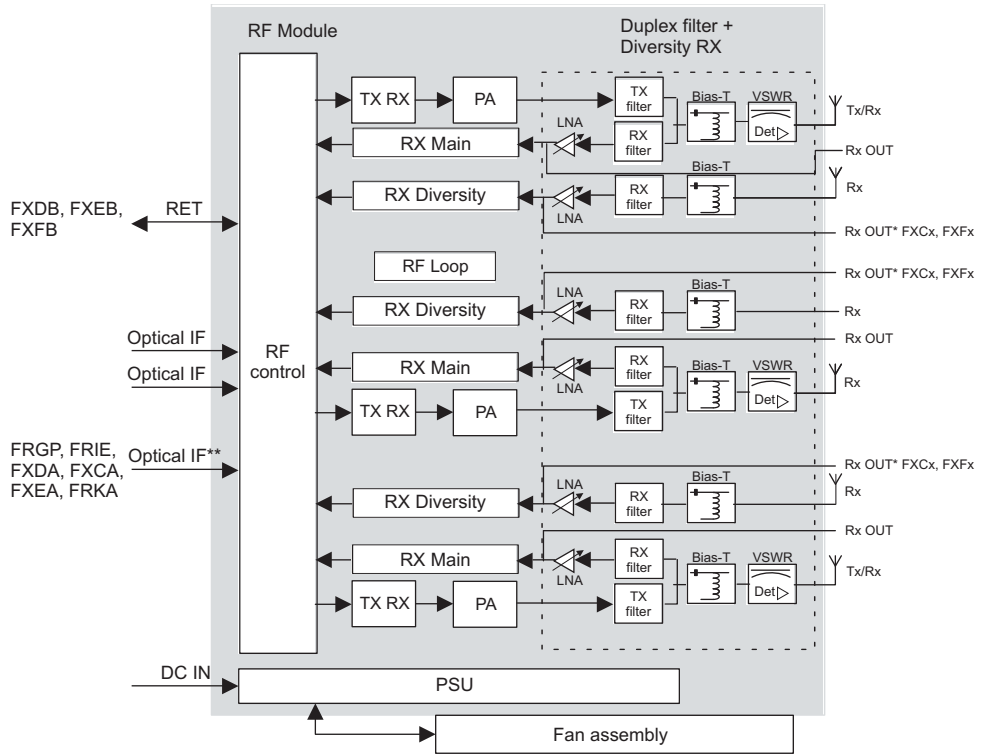
### Antenna Line Devices (ALDs) support

Table 129 FXJB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	Main 24V Div 12V
Power per port	30 W

### Functional block diagram

Figure 31 FXJB functional block diagram



### Electrical specifications

Table 130 FXJB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 131 FXJB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for WCDMA mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Values preliminary estimate.	
		50% RF Load	100% RF Load
3	80	643	903

Table 131 FXJB power consumption (Cont.)

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for WCDMA mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Values preliminary estimate.	
		50% RF Load	100% RF Load
	60	575	776
	40	409	533
	20	327	395

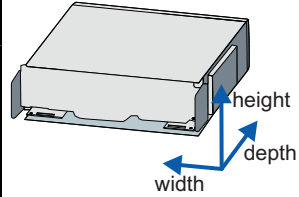
### Installation and mechanical specifications

Table 132 FXJB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>• pole/wall installation</li> <li>• directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>• Flexi Pole Mounting Kit (FPKA/C)</li> <li>• Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 133 FXJB dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 134 FXJB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 135 FXJB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm

Table 135 FXJB LEDs (Cont.)

LED color	Description	Alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 20 Flexi RF Module 3TX 2100 (FRGT)

FRGT technical specifications.

### Functional description

Table 136 FRGT functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	WCDMA, FDD-LTE
TX frequency range	2110-2170 MHz
RX frequency range	1920-1980 MHz
DL instantaneous bandwidth	60 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	60 MHz
UL filter bandwidth	60 MHz

Table 137 FRGT output power in RU40

DL bandwidth	Output power
0-20 MHz	80 W
20-45 MHz	70 W (BTS can be commissioned as 80 W (for example 4x20 W per pipe) and RFM internal power control limits the total power to 70 W when needed.)
45-60 MHz	60 W

## Interfaces

Figure 32 FRGT interfaces

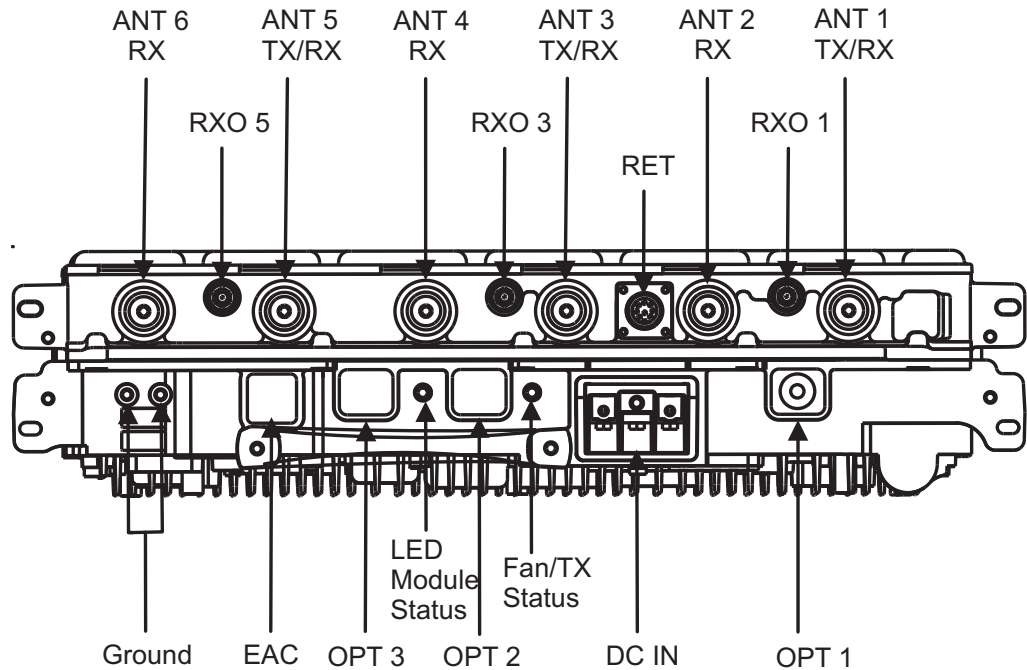


Table 138 FRGT interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

## Antenna Line Devices (ALDs) support

Table 139 FRGT ALD support

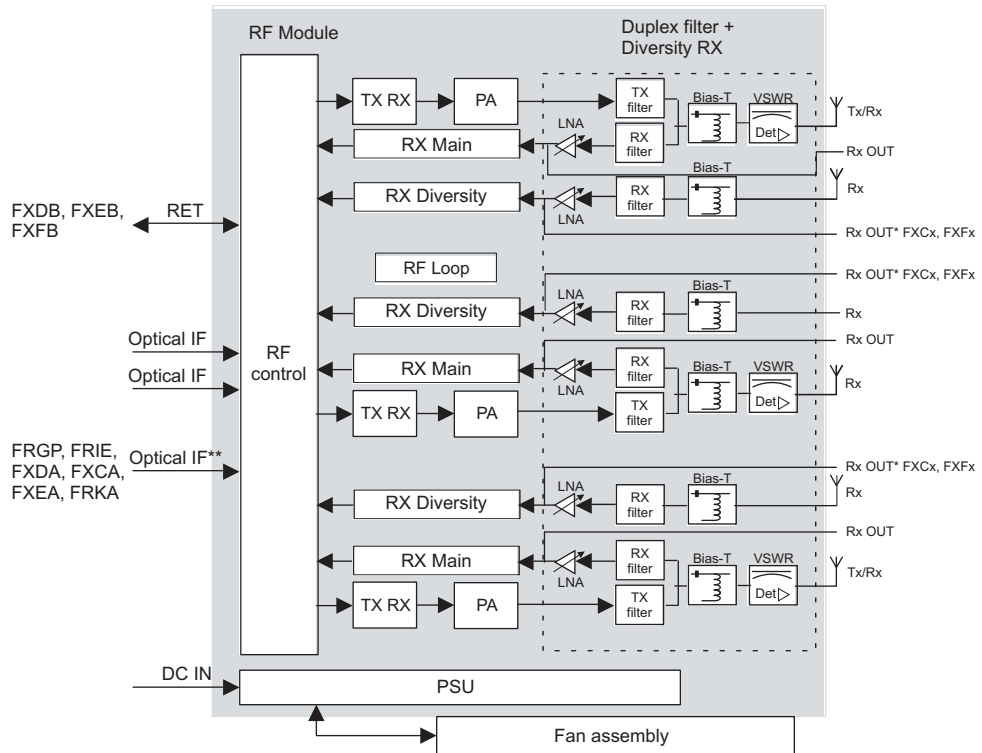
ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 12V/1A or 24V/30W Div = 12V/1A

Table 139 FRGT ALD support (Cont.)

ALD support via antenna ports	Value
Power per port	30 W

Functional block diagram

Figure 33 FRGT functional block diagram



Electrical specifications

Table 140 FRGT electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 141 FRGT power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	80	560	884
	60	522	729
	40	407	544
	20	316	386

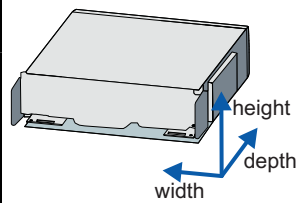
## Installation and mechanical specifications

Table 142 FRGT installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 143 FRGT dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 144 FRGT environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 145 FRGT LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm

Table 145 FRGT LEDs (Cont.)

LED color	Description	Alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 21 Flexi RF Module 3TX 2100 (FRGS)

FRGS technical specifications.

### Functional description

Table 146 FRGS functional specification

Property	Value
Output power	3x80 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	WCDMA, FDD-LTE
TX frequency range	2130-2170 MHz
RX frequency range	1940-1980 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	40 MHz
UL filter bandwidth	40 MHz

Table 147 FRGS output power in RU40

DL bandwidth	Output power
0-20 MHz	80 W
20-40 MHz	70 W (BTS can be commissioned as 80 W (for example 4x20 W per pipe) and RFM internal power control limits the total power to 70 W when needed.)

## Interfaces

Figure 34 FRGS interfaces

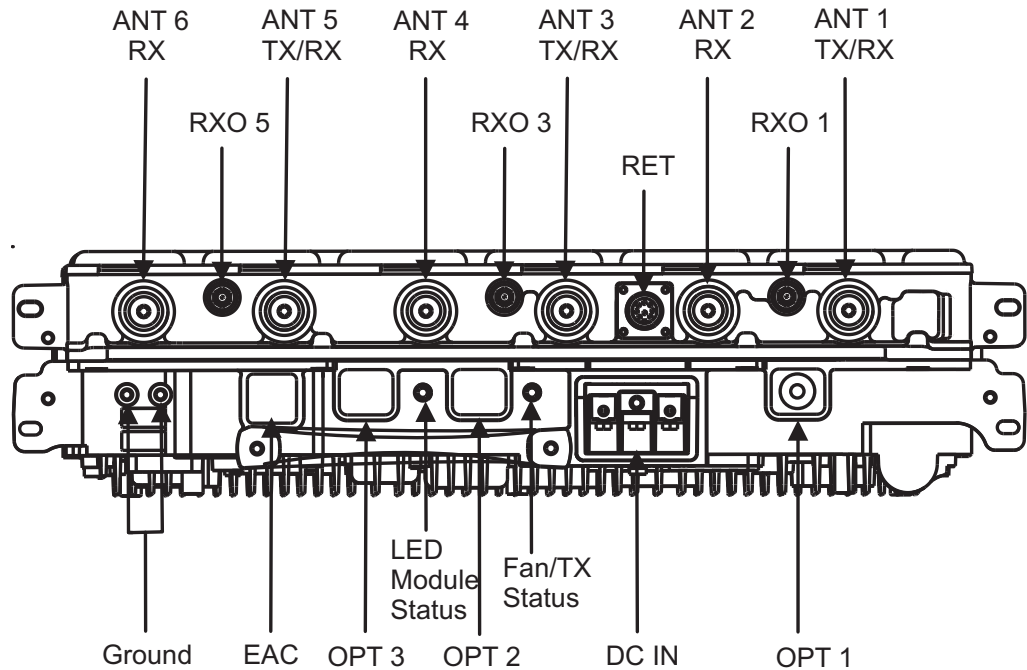


Table 148 FRGS interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

## Antenna Line Devices (ALDs) support

Table 149 FRGS ALD support

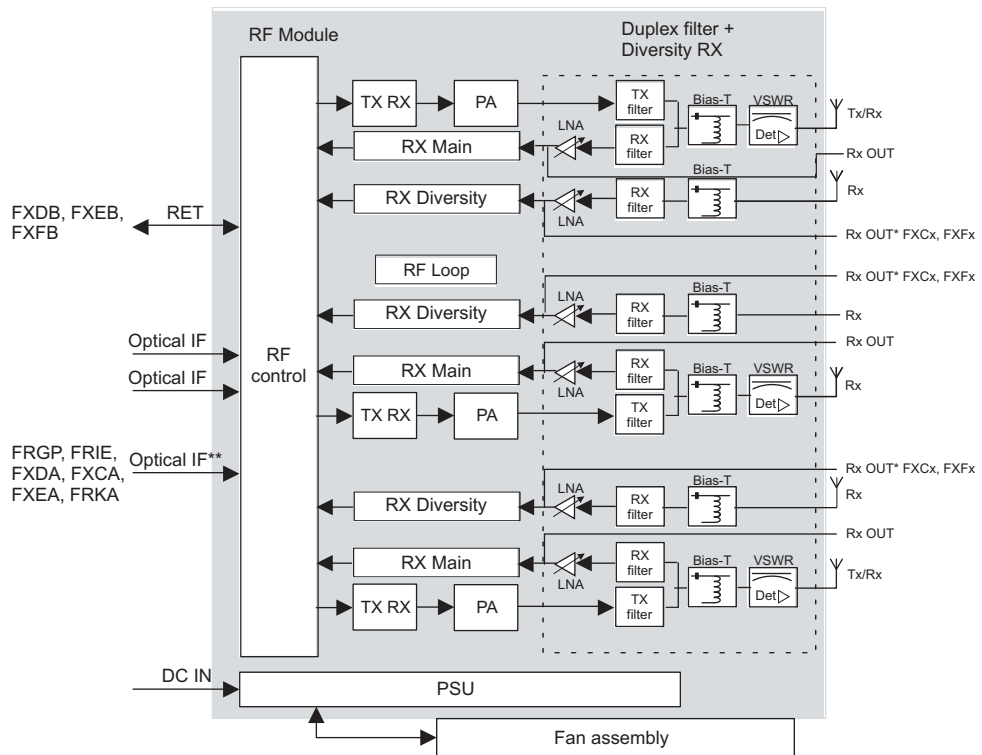
ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	Yes
Voltage	Main = 12V/1A or 24V/30W Div = 12V/1A

Table 149 FRGS ALD support (Cont.)

ALD support via antenna ports	Value
Power per port	30 W

**Functional block diagram**

Figure 35 FRGS functional block diagram



**Electrical specifications**

Table 150 FRGS electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 151 FRGS power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	80	595	892
	60	524	738
	40	405	541
	20	314	381

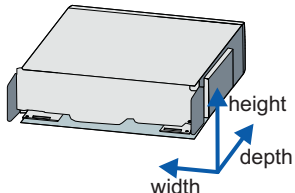
## Installation and mechanical specifications

Table 152 FRGS installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 153 FRGS dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 154 FRGS environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 155 FRGS LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm

Table 155 FRGS LEDs (Cont.)

LED color	Description	Alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 22 Flexi RF Module 6TX 700 (FRPA)

FRPA technical specifications.

### Functional description

Table 156 FRPA functional specification

Property	Value
Output power	6x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	758-793 MHz
RX frequency range	703-738 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	35 MHz
DL filter bandwidth	35 MHz
UL filter bandwidth	35 MHz

### Interfaces

Figure 36 FRPA interfaces

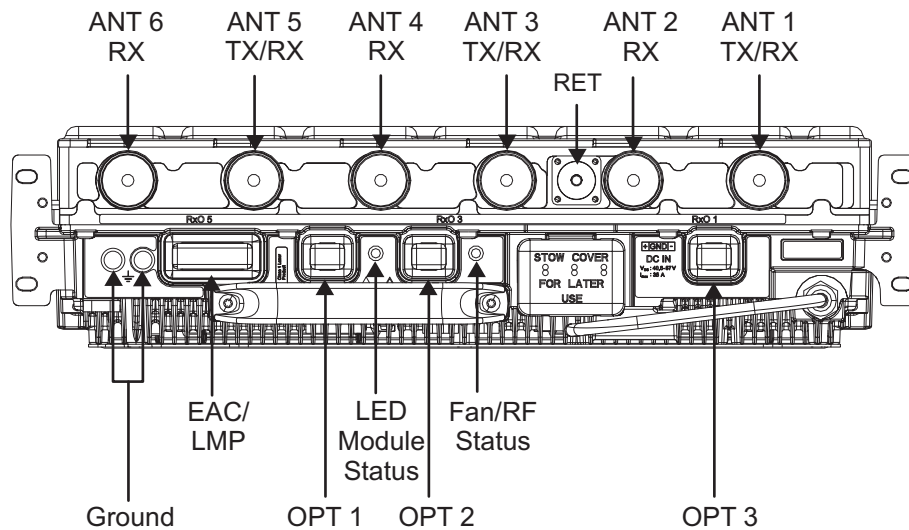


Table 157 FRPA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	
Antenna connector	ANT	6	7/16	

Table 157 FRPA interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

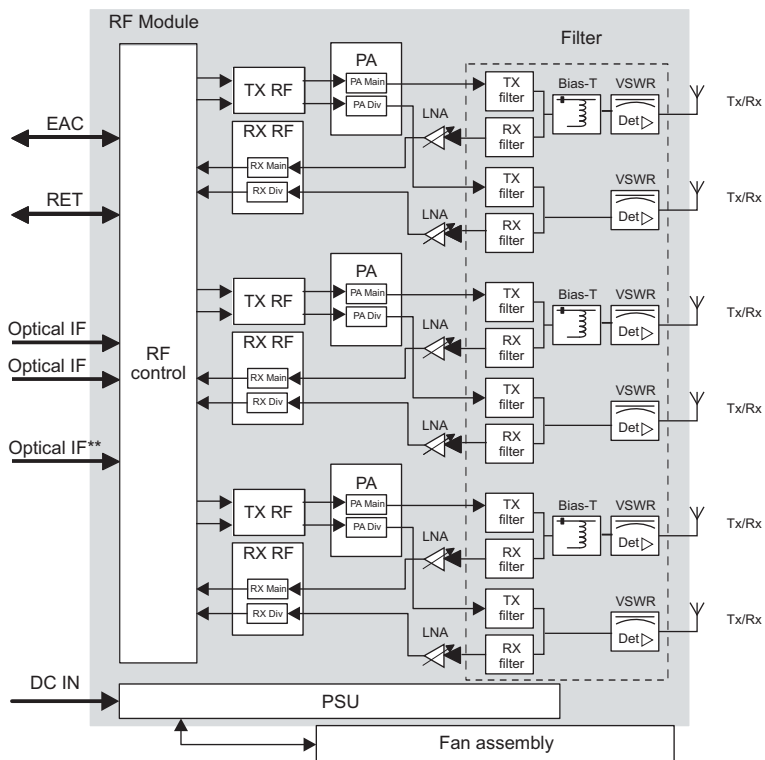
### Antenna Line Devices (ALDs) support

Table 158 FRPA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	25 V Main only
Power per port	30 W

### Functional block diagram

Figure 37 FRPA functional block diagram



## Electrical specifications

Table 159 FRPA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 160 FRPA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
6	40	778	1038
	20	514	632

## Installation and mechanical specifications

Table 161 FRPA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 162 FRPA dimensions and weight

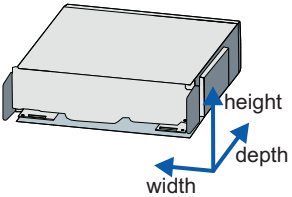
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	

Table 162 FRPA dimensions and weight (Cont.)

Property	Value	Dimensions orientation
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 163 FRPA environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 164 FRPA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> </ul>	No alarm

Table 164 FRPA LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 23 Flexi RF Module 6TX 700 (FRPB)

FRPB technical specifications.

### Functional description

Table 165 FRPB functional specification

Property	Value
Output power	6x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	773-803 MHz
RX frequency range	718-748 MHz
DL instantaneous bandwidth	30 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

### Interfaces

Figure 38 FRPB interfaces

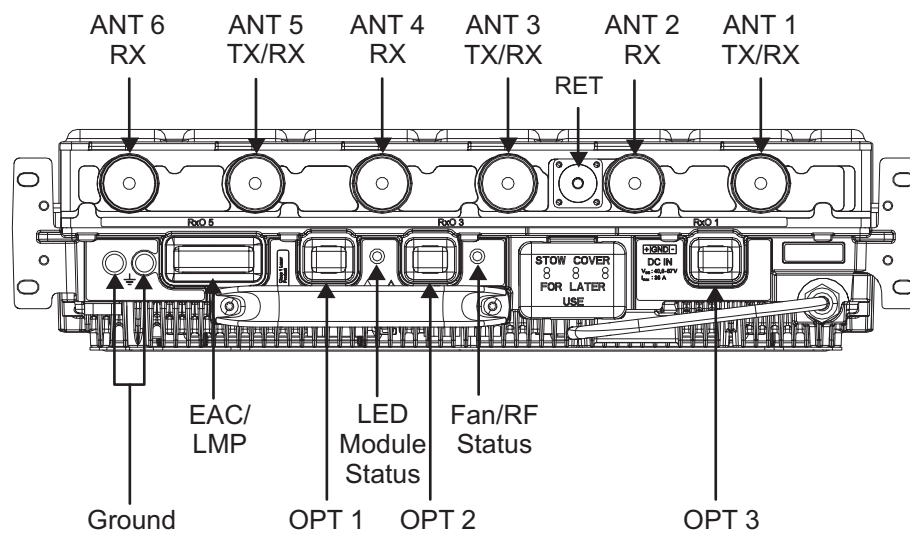


Table 166 FRPB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interterminal	
Antenna connector	ANT	6	7/16	

Table 166 FRPB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

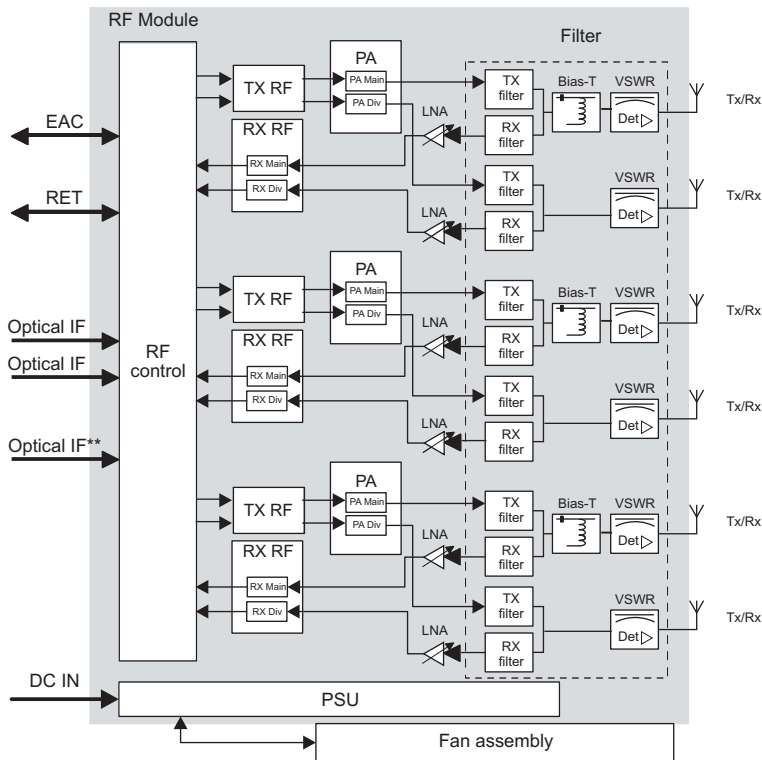
**Antenna Line Devices (ALDs) support**

Table 167 FRPB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	25 V Main only
Power per port	30 W

**Functional block diagram**

Figure 39 FRPB functional block diagram



## Electrical specifications

Table 168 FRPB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 169 FRPB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
6	40	778	1033
	20	517	637

## Installation and mechanical specifications

Table 170 FRPB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 171 FRPB dimensions and weight

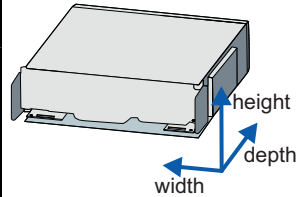
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	

Table 171 FRPB dimensions and weight (Cont.)

Property	Value	Dimensions orientation
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

### Environmental specifications

Table 172 FRPB environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

### LEDs

Table 173 FRPB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> </ul>	No alarm

Table 173 FRPB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

### Warnings, cautions or notes related to the product



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 24 Flexi RF Module 6TX 2600 (FRHC)

FRHC technical specifications.

### Functional description

Table 174 FRHC functional specification

Property	Value
Output power	6x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2620-2675 MHz
RX frequency range	2500-2555 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	55 MHz
UL filter bandwidth	55 MHz

### Interfaces

Figure 40 FRHC interfaces

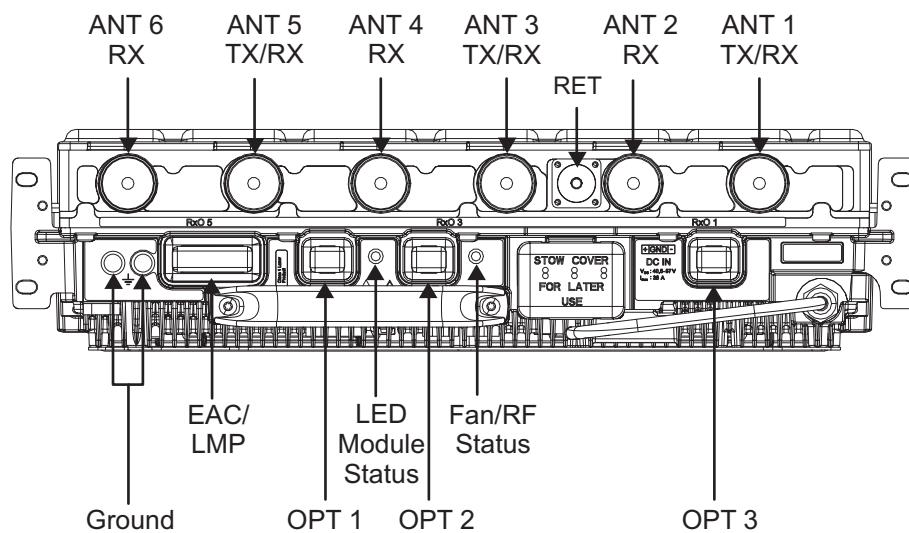


Table 175 FRHC interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interminal	
Antenna connector	ANT	6	7/16	

Table 175 FRHC interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

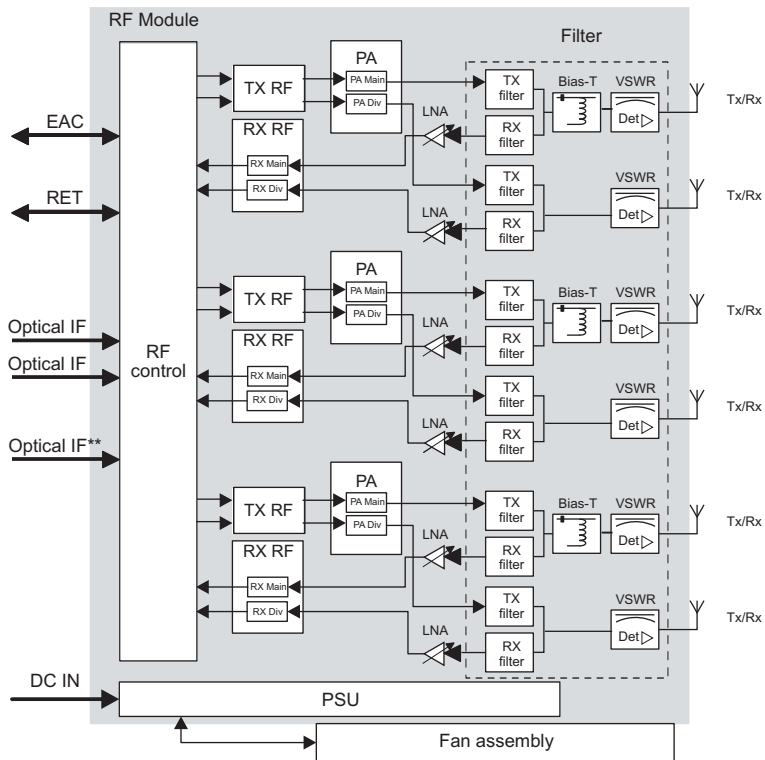
**Antenna Line Devices (ALDs) support**

Table 176 FRHC ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	25 V Main only
Power per port	30 W

**Functional block diagram**

Figure 41 FRHC functional block diagram



## Electrical specifications

Table 177 FRHC electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 178 FRHC power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
6	40	808	1101
	20	548	698

## Installation and mechanical specifications

Table 179 FRHC installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 180 FRHC dimensions and weight

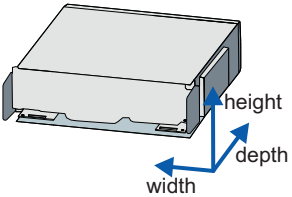
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	

Table 180 FRHC dimensions and weight (Cont.)

Property	Value	Dimensions orientation
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

## Environmental specifications

Table 181 FRHC environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 182 FRHC LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> </ul>	No alarm

Table 182 FRHC LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 25 Flexi RF Module 6TX 2600 (FRHF)

FRHF technical specifications.

### Functional description

Table 183 FRHF functional specification

Property	Value
Output power	6x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2640-2690 MHz
RX frequency range	2520-2570 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	50 MHz
UL filter bandwidth	50 MHz

### Interfaces

Figure 42 FRHF interfaces

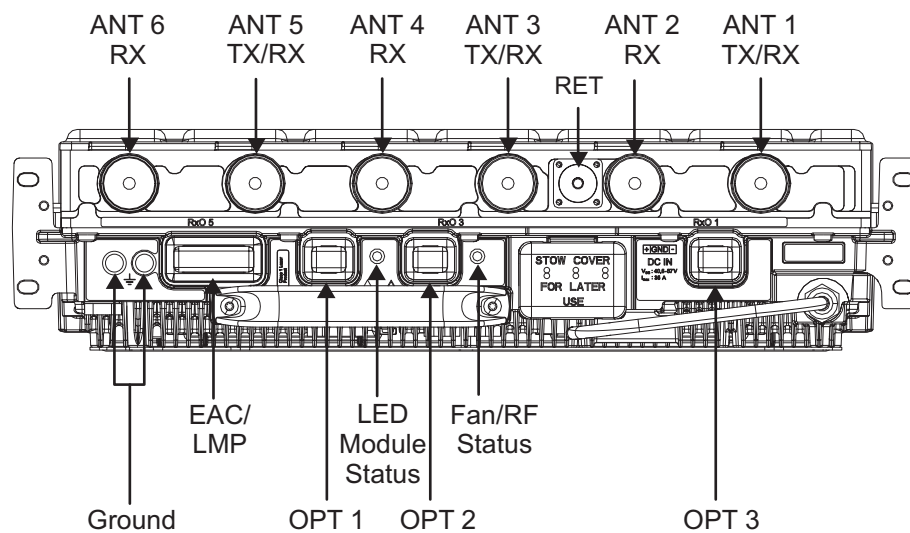


Table 184 FRHF interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interterminal	
Antenna connector	ANT	6	7/16	

Table 184 FRHF interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

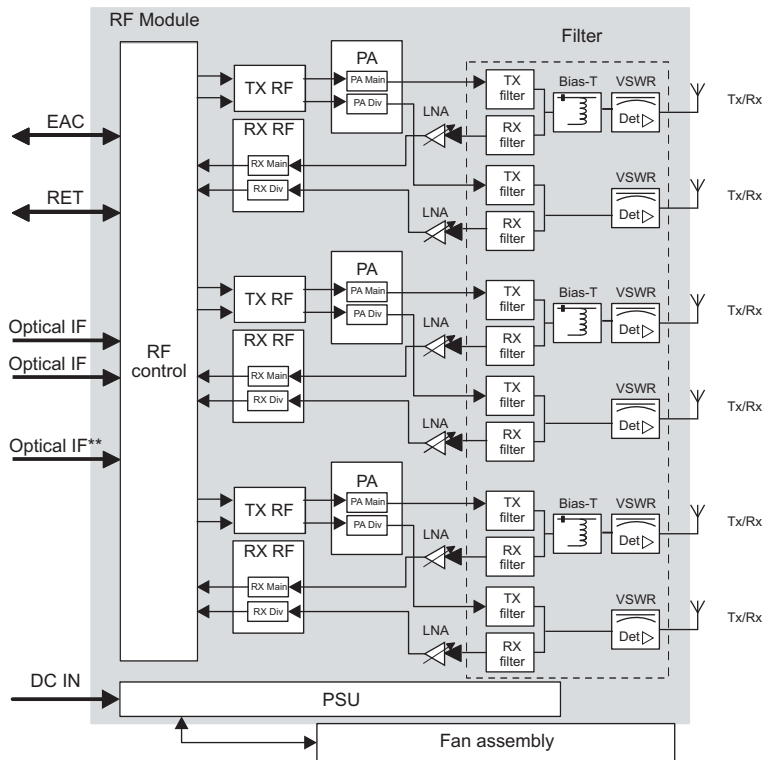
**Antenna Line Devices (ALDs) support**

Table 185 FRHF ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	25 V Main only
Power per port	30 W

**Functional block diagram**

Figure 43 FRHF functional block diagram



## Electrical specifications

Table 186 FRHF electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 187 FRHF power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
6	40	828	1148
	20	574	748

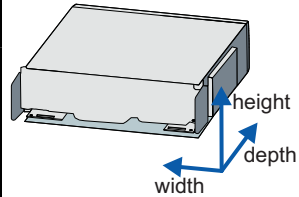
## Installation and mechanical specifications

Table 188 FRHF installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 189 FRHF dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	

*Table 189* FRHF dimensions and weight (Cont.)

Property	Value	Dimensions orientation
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

**Environmental specifications**

*Table 190* FRHF environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

**LEDs**

*Table 191* FRHF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> </ul>	No alarm

Table 191 FRHF LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 26 Flexi RF Module 6TX 800 (FRMC)

FRMC technical specifications.

### Functional description

Table 192 FRMC functional specification

Property	Value
Output power	6x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	801-821 MHz
RX frequency range	832-862 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

### Interfaces

Figure 44 FRMC interfaces

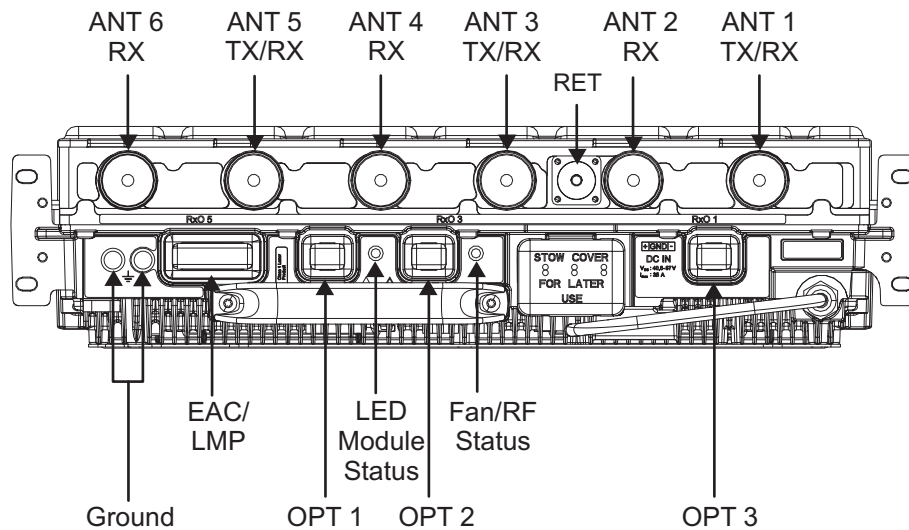


Table 193 FRMC interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	Screw-interterminal	
Antenna connector	ANT	6	7/16	

Table 193 FRMC interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

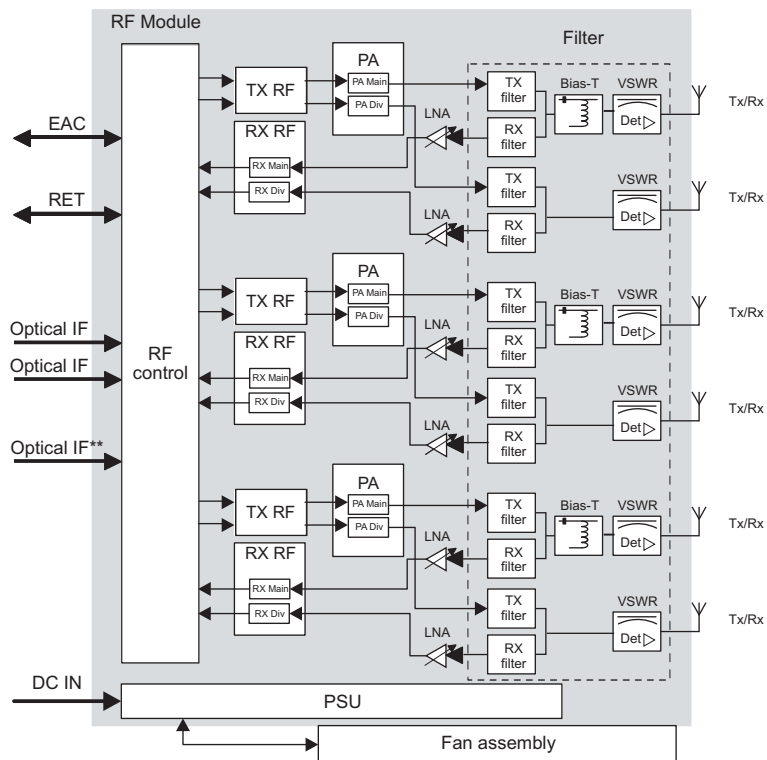
### Antenna Line Devices (ALDs) support

Table 194 FRMC ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	25 V Main only
Power per port	30 W

### Functional block diagram

Figure 45 FRMC functional block diagram



## Electrical specifications

Table 195 FRMC electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 196 FRMC power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
6	40	784	1071
	20	510	657

## Installation and mechanical specifications

Table 197 FRMC installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 198 FRMC dimensions and weight

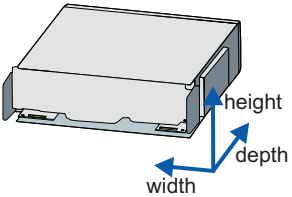
Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	

Table 198 FRMC dimensions and weight (Cont.)

Property	Value	Dimensions orientation
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

### Environmental specifications

Table 199 FRMC environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Minimum operational temperature (including cold start)	-35°C (-31°F)

### LEDs

Table 200 FRMC LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> </ul>	No alarm

Table 200 FRMC LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	All fans are faulty	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 27 Flexi RFM 6-pipe 1800 360W (FXED)

FXED technical specifications.

### Functional description

Table 201 FXED functional specification

Property	Value
Output power	6x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	1805 - 1880 MHz
RX frequency range	1710 - 1785 MHz
DL instantaneous bandwidth	60 MHz 45 MHz in GSM/multimode
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

### Interfaces

Figure 46 FXED interfaces

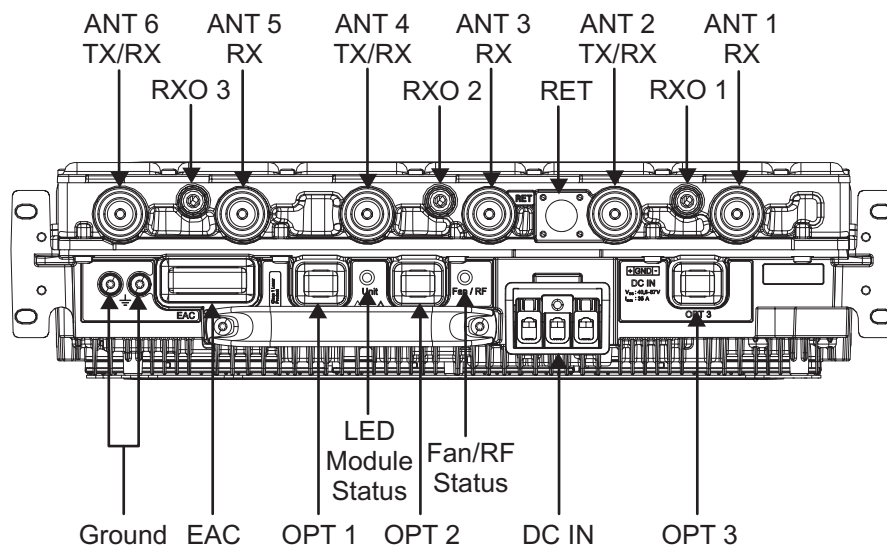


Table 202 FXED interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	

*Table 202* FXED interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	3 Gbps or 6 Gbps

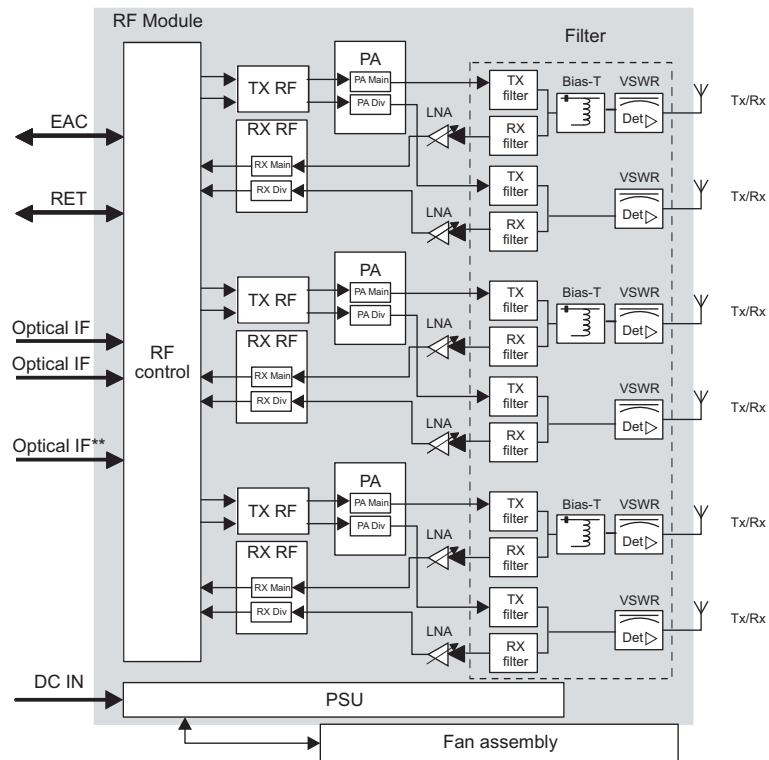
**Antenna Line Devices (ALDs) support**

*Table 203* FXED ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	Main 25V/12V Div 12V
Power per port	30 W

## Functional block diagram

Figure 47 FXED functional block diagram



## Electrical specifications

Table 204 FXED electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 205 FXED power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Values preliminary estimated.	
		50% RF Load	100% RF Load
6	60	1100	1547
	40	812	1140

Table 205 FXED power consumption (Cont.)

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Values preliminary estimated.	
		50% RF Load	100% RF Load
	20	499	667

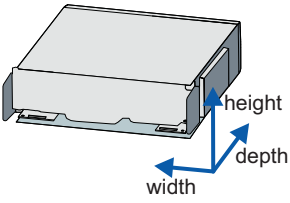
### Installation and mechanical specifications

Table 206 FXED installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>stack/pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 207 FXED dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	
Depth	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Without front covers: 447 mm (17.6 in.)	
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

### Environmental specifications

Table 208 FXED environmental specifications

Property	Value
Maximum operational outdoor temperature (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)

Table 208 FXED environmental specifications (Cont.)

Property	Value
Minimum operational temperature (including cold start)	-35°C (-31°F)

## LEDs

Table 209 FXED LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Major alarm affecting the whole RF Module</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm

Table 209 FXED LEDs (Cont.)

LED color	Description	Alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm
RF Module fan/TX status LED: Red	At least one fan is faulty or degraded	
RF Module fan/TX status LED: Green	All fans are working	
RF Module fan/TX status LED: Color set according to fan status, stable	RF transmission is ON	
RF Module fan/TX status LED: Color set according to fan status, blinking	RF transmission is OFF	

**Warnings, cautions or notes related to the product**



**WARNING! Risk of electric shock.**

Before turning RF power on, RF ports have to be terminated by nominal 50Ω load (for example, feeder with antenna). However, if these conditions are not met, the plastic caps that are delivered within the unused RF ports should remain in place. The plastic caps isolate RF power from the environment, and thus provide electric shock security in case RF power is accidentally on.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 28 Flexi Remote Radio Head 2TX 850 (FHCA)

FHCA technical specifications.

### Functional description

Table 210 FHCA functional specification

Property	Value
Output power	2x20 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	869-894 MHz
RX frequency range	824-849 MHz
DL instantaneous bandwidth	15 MHz
UL instantaneous bandwidth	15 MHz
DL filter bandwidth	25 MHz
UL filter bandwidth	25 MHz

### Interfaces

Figure 48 FHCA interfaces

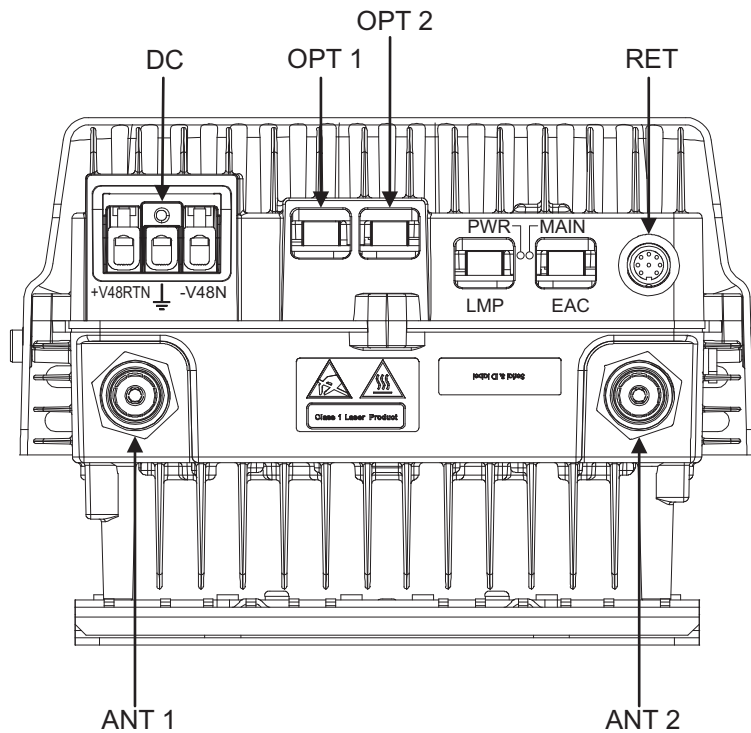


Table 211 FHCA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	6 Gbps

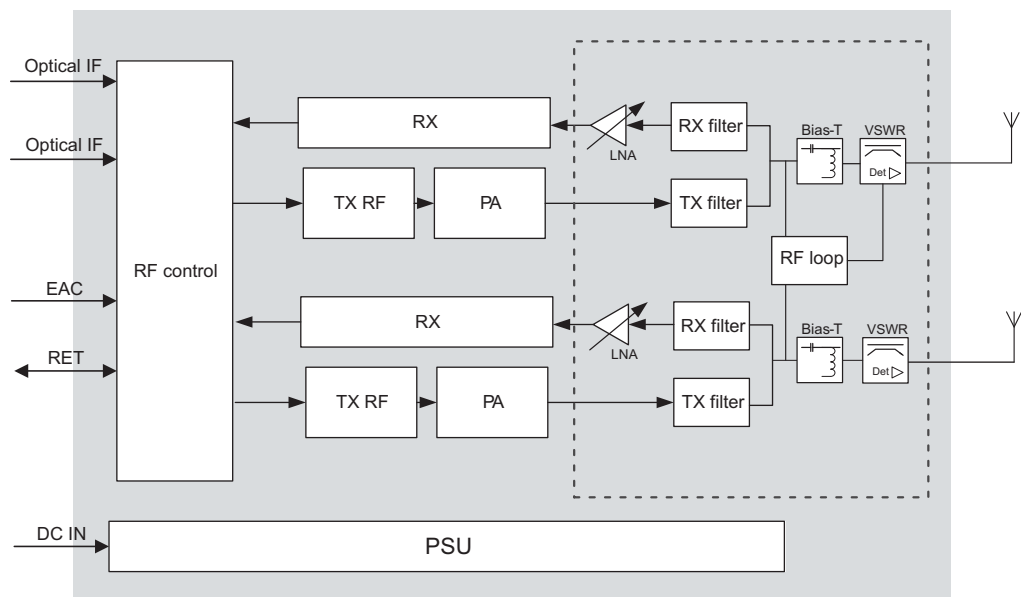
**Antenna Line Devices (ALDs) support**

Table 212 FHCA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	17 W

**Functional block diagram**

Figure 49 FHCA functional block diagram



## Electrical specifications

Table 213 FHCA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 214 FHCA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	20	200	240

## Installation and mechanical specifications

Table 215 FHCA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 216 FHCA dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 579 mm (22.7 in.) As installed, cable tie point released due to brackets and solar shields: 733 mm (28.8 in.)	<p>The diagram shows a 3D perspective view of the FHCA unit. Three blue arrows indicate the dimensions: 'height' points to the vertical dimension, 'width' points to the front horizontal dimension, and 'depth' points to the side horizontal dimension.</p>
Depth	215 mm (8.4 in.)	
Width	358 mm (14.1 in.)	
Weight	20 kg (44 lbs)	

## Environmental specifications

Table 217 FHCA environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 218 FHCA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 218 FHCA LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 29 Flexi Remote Radio Head 2TX 730 (FRLB)

FRLB technical specifications.

### Functional description

Table 219 FRLB functional specification

Property	Value
Output power	2x30 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	729-745 MHz
RX frequency range	699-715 MHz
DL instantaneous bandwidth	16 MHz
UL instantaneous bandwidth	16 MHz
DL filter bandwidth	16 MHz
UL filter bandwidth	16 MHz

### Interfaces

Figure 50 FRLB interfaces

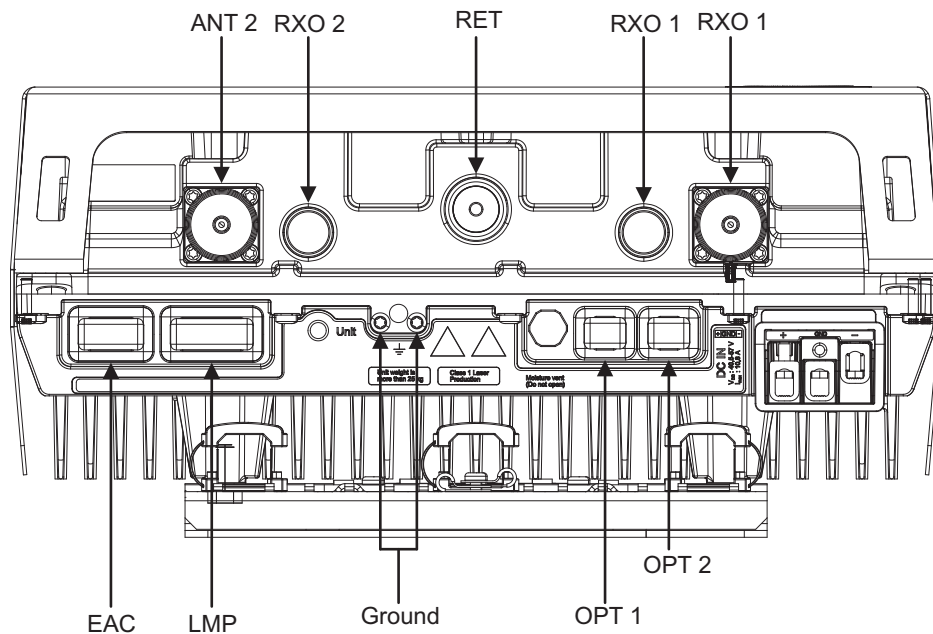


Table 220 FRLB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	

Table 220 FRLB interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	2	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	3 Gbps
Local Management Port	LMP	1	2x15 pin header	

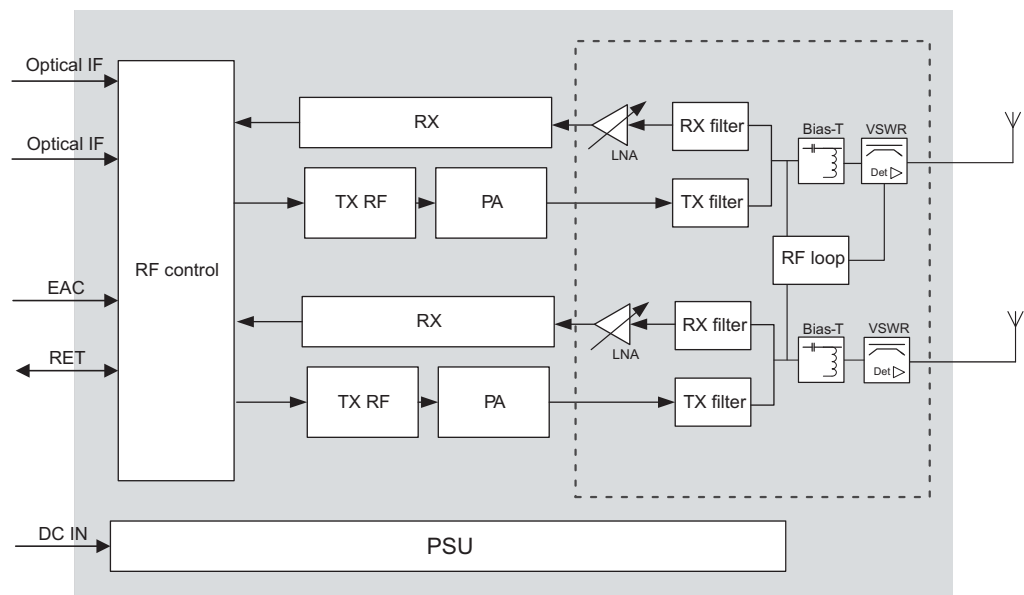
### Antenna Line Devices (ALDs) support

Table 221 FRLB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	24 V
Power per port	30 W

### Functional block diagram

Figure 51 FRLB functional block diagram



## Electrical specifications

Table 222 FRLB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 223 FRLB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	30	248	321
	20	192	239

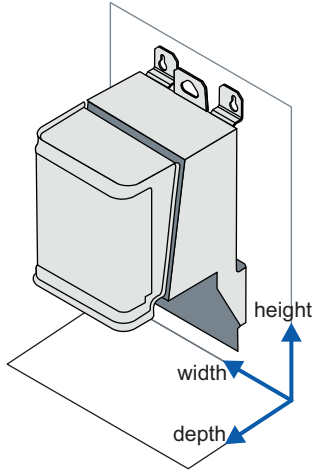
## Installation and mechanical specifications

Table 224 FRLB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 225 FRLB dimensions and weight

Property	Value	Dimensions orientation
Height	400 mm (15.7 in.)	 <p>The diagram shows a 3D perspective view of the FRLB. Three blue arrows indicate the dimensions: 'height' points vertically upwards from the base to the top edge; 'width' points horizontally across the front face; and 'depth' points horizontally from the front face towards the back of the device.</p>
Depth	150 mm (5.9 in.)	
Width	400 mm (15.7 in.)	
Weight	Without solar shield and mounting shroud: 27 kg (59.5 lbs)	

## Environmental specifications

Table 226 FRLB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 227 FRLB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 227 FRLB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 30 Flexi RRH 2-pipe 900 80W (FHDA)

FHDA technical specifications.

### Functional description

Table 228 FHDA functional specification

Property	Value
Output power	2x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA
TX frequency range	925-960 MHz
RX frequency range	880-915 MHz
DL instantaneous bandwidth	A.10x version: 25 MHz A.20x version: 30.2 MHz
UL instantaneous bandwidth	35 MHz
DL filter bandwidth	35 MHz
UL filter bandwidth	35 MHz

### Interfaces

Figure 52 FHDA interfaces

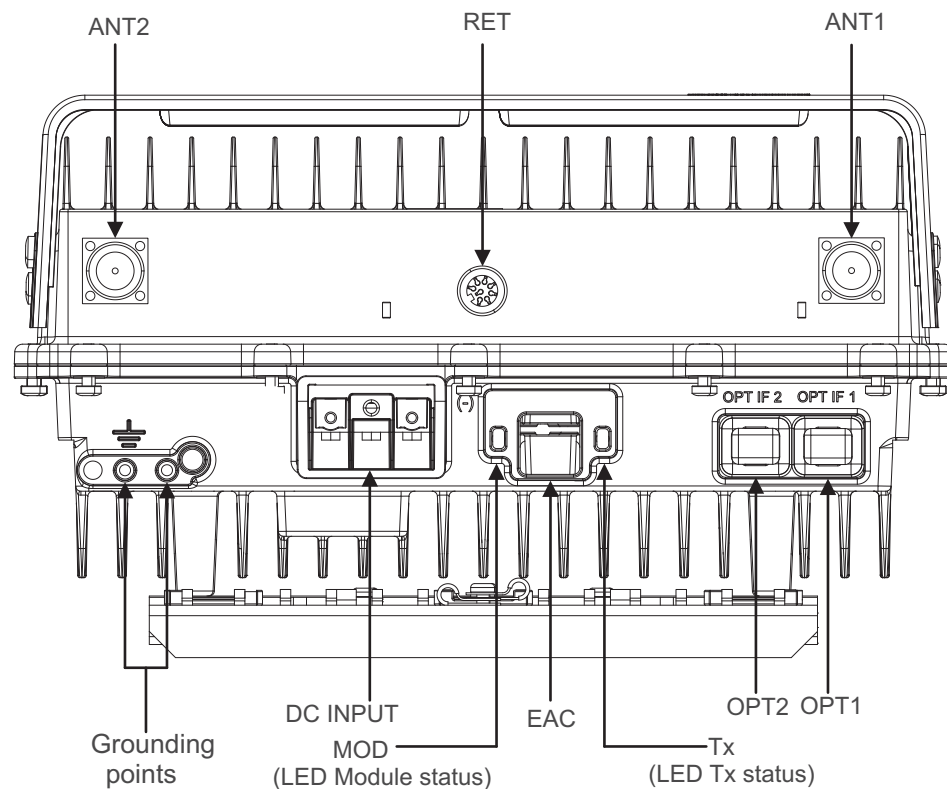


Table 229 FHDA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	2	SFP	3 Gbps
Local Management Port	LMP	1	-	

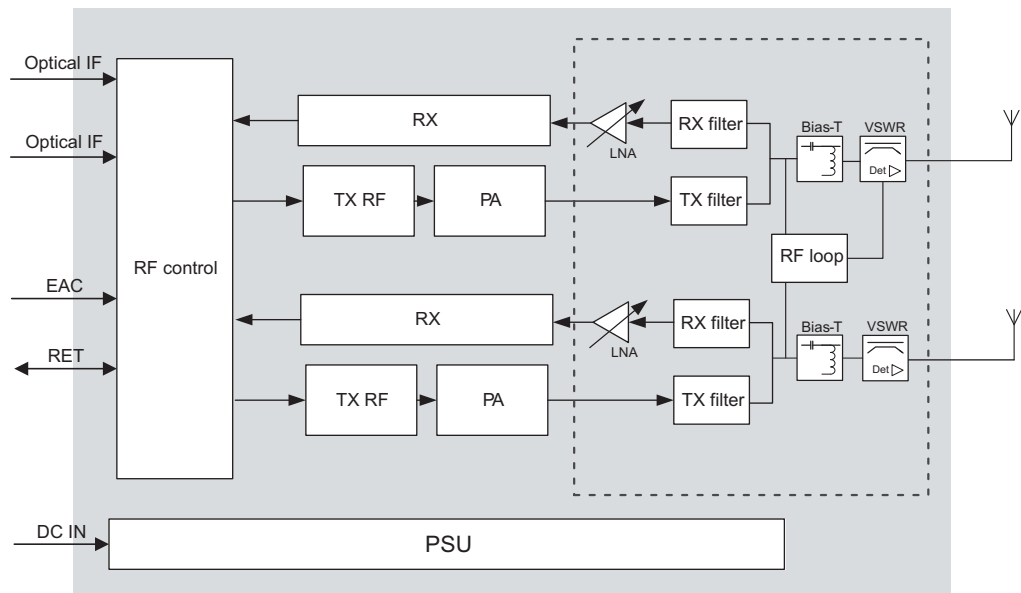
### Antenna Line Devices (ALDs) support

Table 230 FHDA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main+Div
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

### Functional block diagram

Figure 53 FHDA functional block diagram



## Electrical specifications

Table 231 FHDA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 232 FHDA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	40	305	344
	20	192	233

## Installation and mechanical specifications

Table 233 FHDA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 234 FHDA dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 579 mm (22.7 in.) As installed, cable tie point released due to brackets and solar shields: 733 mm (28.8 in.)	<p>The diagram shows a 3D perspective view of the Flexi RRH 2-pipe 900 80W (FHDA) module. Three blue arrows indicate the dimensions: 'height' points to the vertical dimension, 'width' points to the front horizontal dimension, and 'depth' points to the side horizontal dimension. The module has a rectangular shape with a slightly protruding top edge and a recessed area for cable tie points.</p>
Depth	215 mm (8.4 in.)	
Width	358 mm (14.1 in.)	
Weight	20 kg (44.0 lbs)	

## Environmental specifications

Table 235 FHDA environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 236 FHDA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 236 FHDA LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

# 31 Flexi Remote Radio Head 2TX 1800 (FHEA)

FHEA technical specifications.

## Functional description

Table 237 FHEA functional specification

Property	Value
Output power	2x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, FDD-LTE
TX frequency range	1805-1880 MHz
RX frequency range	1710-1785 MHz
DL instantaneous bandwidth	A.10x version: 23 MHz A.20x version: 25 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

## Interfaces

Figure 54 FHEA interfaces

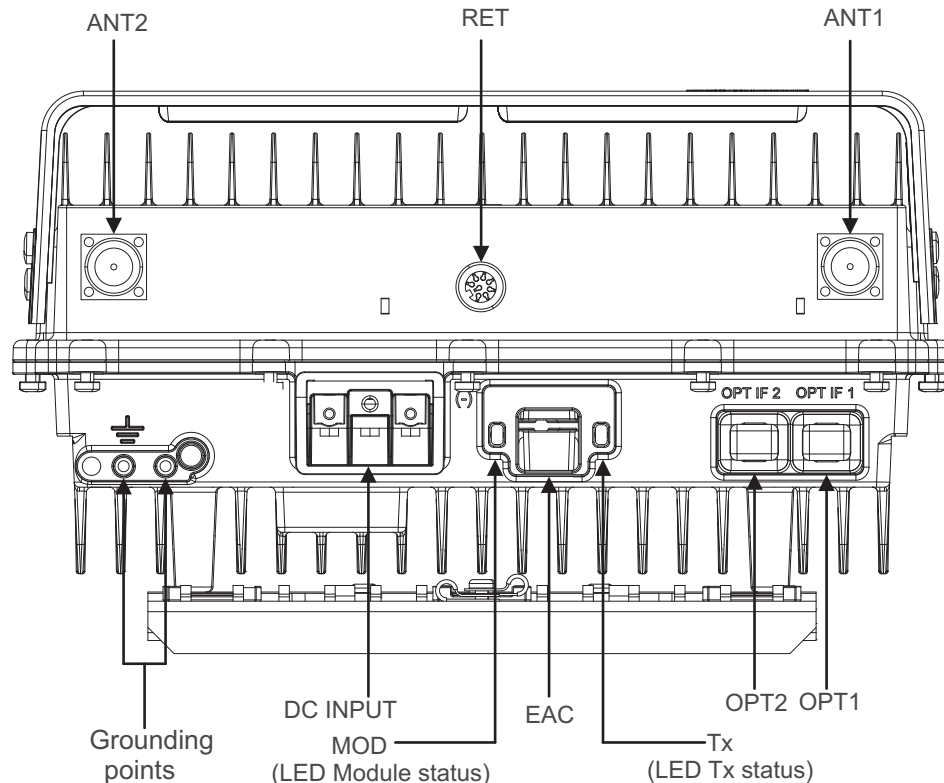


Table 238 FHEA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	2	SFP	3 Gbps

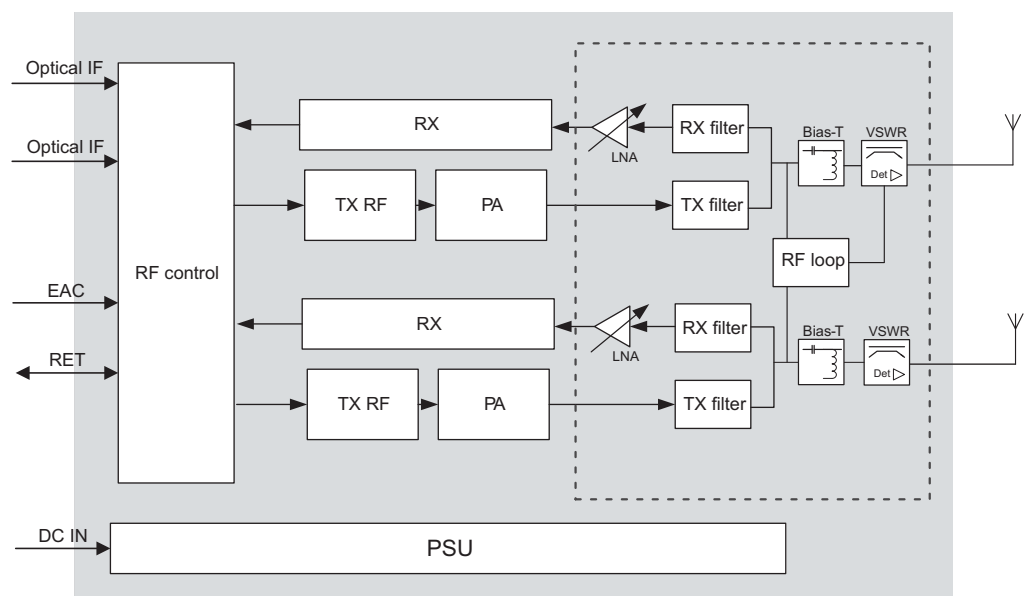
### Antenna Line Devices (ALDs) support

Table 239 FHEA ALD support

ALD support via antenna ports	Value
AISG	2.0 Main+Div
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

### Functional block diagram

Figure 55 FHEA functional block diagram



### Electrical specifications

Table 240 FHEA electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 241 FHEA power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	40	303	397
	20	225	275

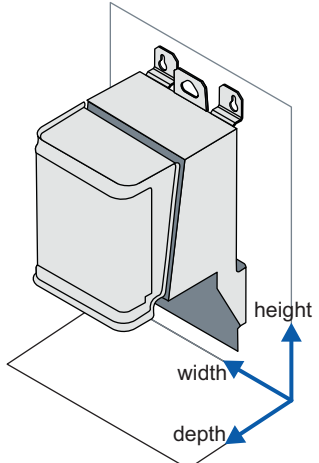
### Installation and mechanical specifications

Table 242 FHEA installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 243 FHEA dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 579 mm (22.7 in.) As installed, cable tie point released due to brackets and solar shields: 733 mm (28.8 in.)	
Depth	215 mm (8.4 in.)	
Width	358 mm (14.1 in.)	
Weight	20 (44.0 lbs)	

## Environmental specifications

Table 244 FHEA environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 245 FHEA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 245 FHEA LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 32 Flexi Remote Radio Head 2TX 2100 (FRGQ)

FRGQ technical specifications.

### Functional description

Table 246 FRGQ functional specification

Property	Value
Output power	2x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	WCDMA, FDD-LTE
TX frequency range	2110-2170 MHz
RX frequency range	1920-1980 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	60 MHz
UL filter bandwidth	60 MHz

### Interfaces

Figure 56 FRGQ interfaces

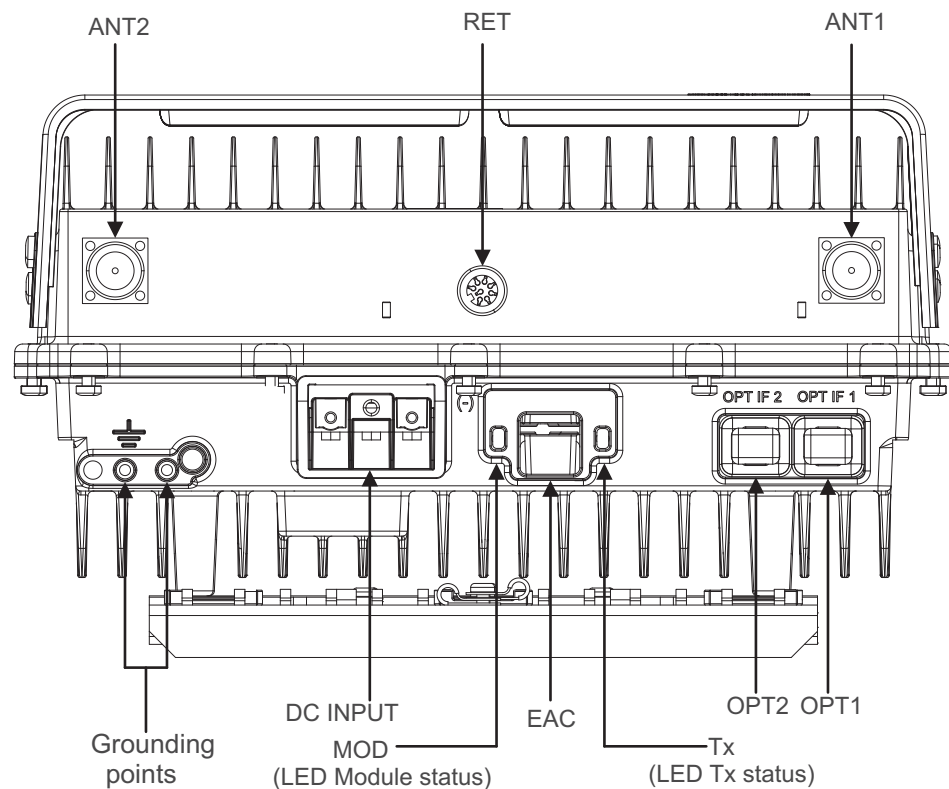


Table 247 FRGQ interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	3 Gbps
Local Management Port	LMP	1	2x15 pin header	

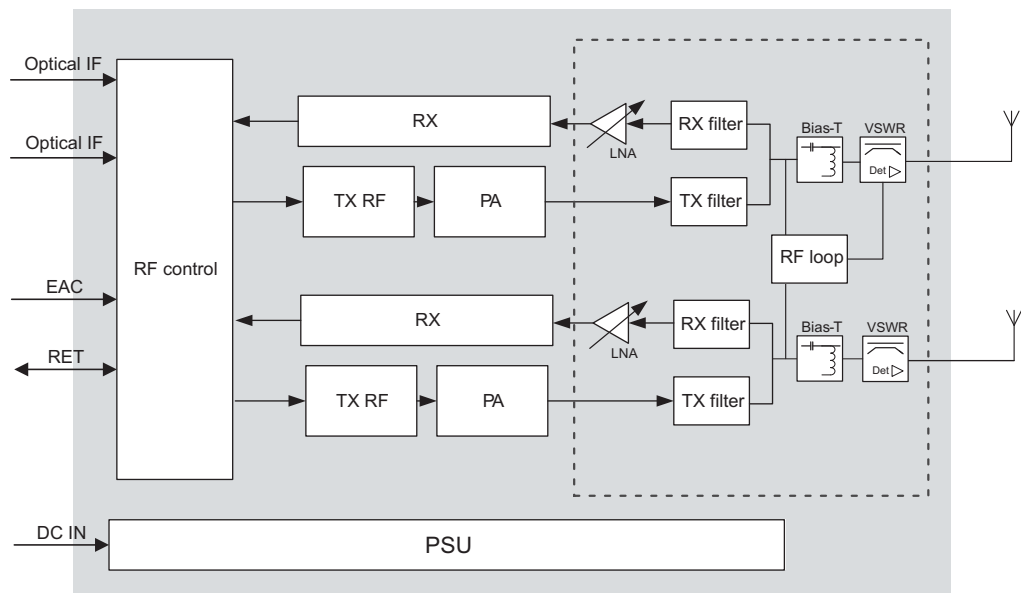
### Antenna Line Devices (ALDs) support

Table 248 FRGQ ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

### Functional block diagram

Figure 57 FRGQ functional block diagram



## Electrical specifications

Table 249 FRGQ electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 250 FRGQ power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	40	292	382
	30	265	334
	20	212	259

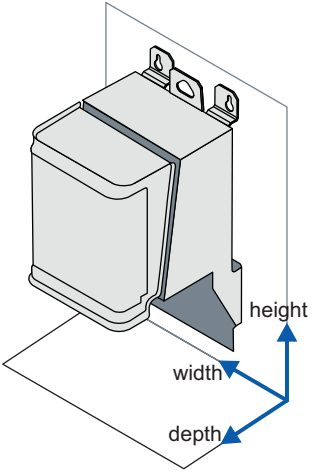
## Installation and mechanical specifications

Table 251 FRGQ installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 252 FRGQ dimensions and weight

Property	Value	Dimensions orientation
Height	486 mm (19.1 in.)	
Depth	155 mm (6.1 in.)	
Width	324 mm (12.8 in.)	
Weight	17 kg (37.5 lbs)	

## Environmental specifications

Table 253 FRGQ environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 254 FRGQ LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 254 FRGQ LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

### 33 Flexi Remote Radio Head 2TX 2600 (FRHB)

FRHB technical specifications.

#### Functional description

Table 255 FRHB functional specification

Property	Value
Output power	2x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2620-2690 MHz
RX frequency range	2500-2570 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	70 MHz
UL filter bandwidth	70 MHz

#### Interfaces

Figure 58 FRHB interfaces

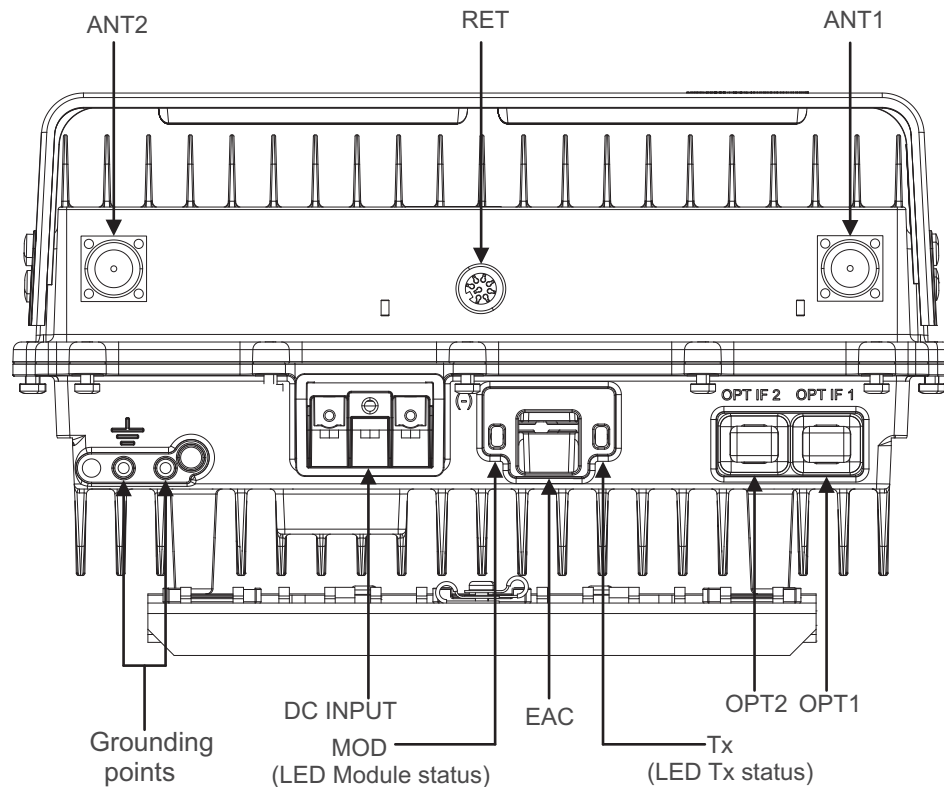


Table 256 FRHB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
RF external connector	Rx EXT	2	SMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	3 Gbps
Local Management Port	LMP	1	2x15 pin header	

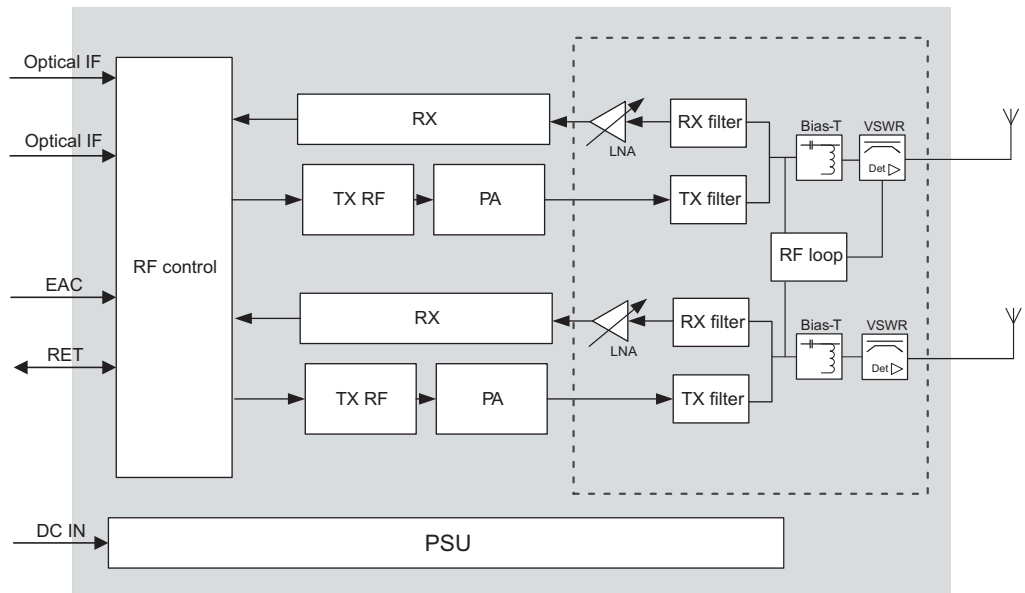
**Antenna Line Devices (ALDs) support**

Table 257 FRHB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

**Functional block diagram**

Figure 59 FRHB functional block diagram



## Electrical specifications

Table 258 FRHB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 259 FRHB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	40	317	439
	30	272	370
	20	227	298

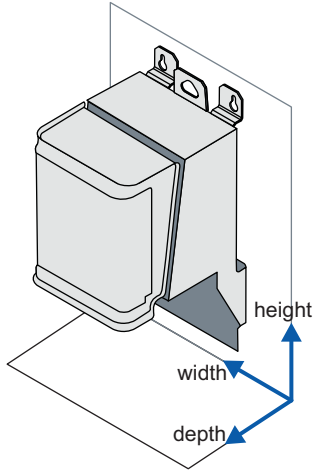
## Installation and mechanical specifications

Table 260 FRHB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 261 FRHB dimensions and weight

Property	Value	Dimensions orientation
Height	514 mm (20.3 in.)	
Depth	148 mm (5.8 in.)	
Width	326 mm (12.8 in.)	
Weight	Without solar shield and mounting shroud: 17.3 kg (38.1 lbs)	

## Environmental specifications

Table 262 FRHB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 263 FRHB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 263 FRHB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 34 Flexi Remote Radio Head 2TX 800EU (FRMB)

FRMB technical specifications.

### Functional description

Table 264 FRMB functional specification

Property	Value
Output power	2x40 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	791-821 MHz
RX frequency range	832-862 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

### Interfaces

Figure 60 FRMB interfaces

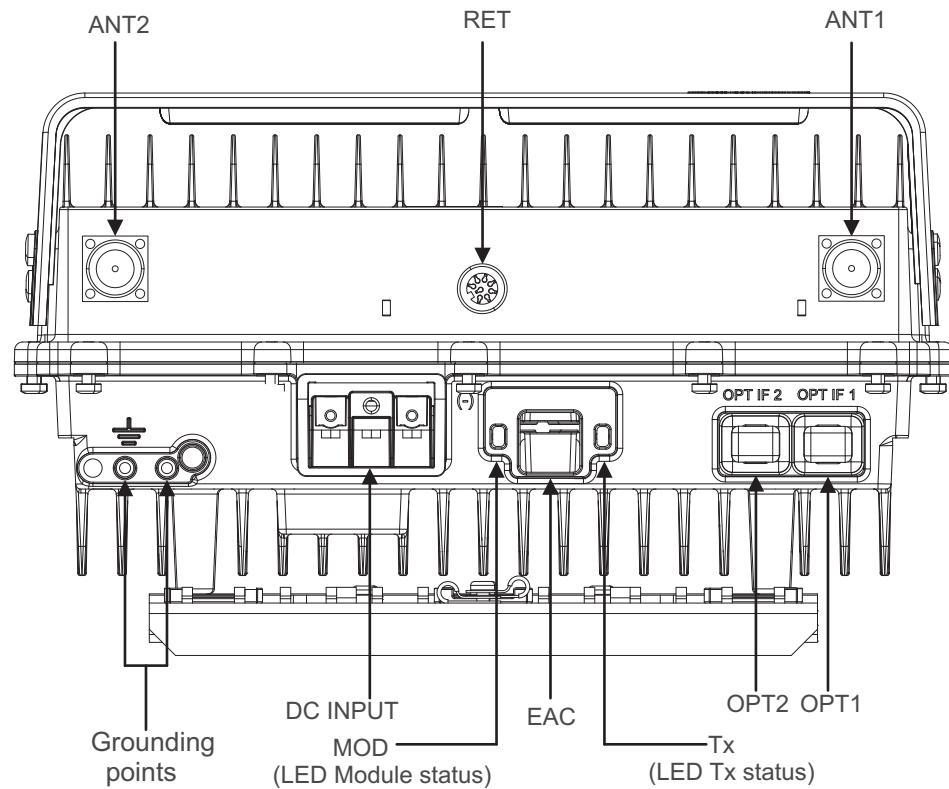


Table 265 FRMB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
RF external connector	Rx EXT	2	SMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	3 Gbps
Local Management Port	LMP	1	2x15 pin header	

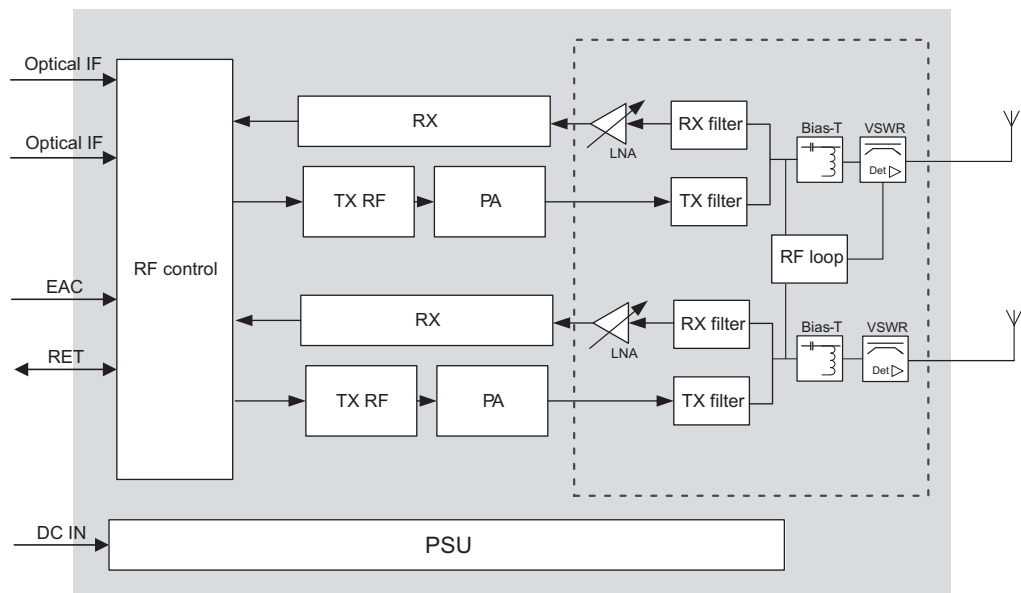
### Antenna Line Devices (ALDs) support

Table 266 FRMB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

### Functional block diagram

Figure 61 FRMB functional block diagram



## Electrical specifications

Table 267 FRMB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 268 FRMB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	40	274	373
	20	174	218

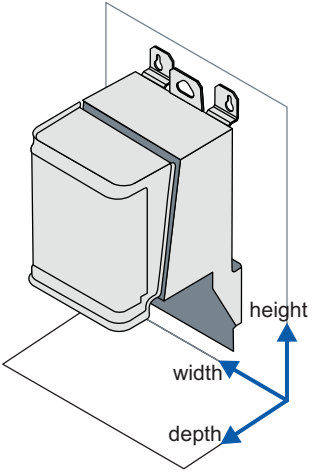
## Installation and mechanical specifications

Table 269 FRMB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 270 FRMB dimensions and weight

Property	Value	Dimensions orientation
Height	514 mm (20.3 in.)	
Depth	148 mm (5.8 in.)	
Width	326 mm (12.8 in.)	
Weight	Without solar shield and mounting shroud: 17.3 kg (38.1 lbs)	

## Environmental specifications

Table 271 FRMB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 272 FRMB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 272 FRMB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 35 Flexi Remote Radio Head 2TX 1800 (FHEB)

FHEB technical specifications.

### Functional description

Table 273 FHEB functional specification

Property	Value
Output power	2x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, FDD-LTE
TX frequency range	1805-1880 MHz
RX frequency range	1710-1785 MHz
DL instantaneous bandwidth	For WCDMA/LTE when shared with GSM: 35/40 MHz For WCDMA and LTE: 40 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

## Interfaces

Figure 62 FHEB interfaces

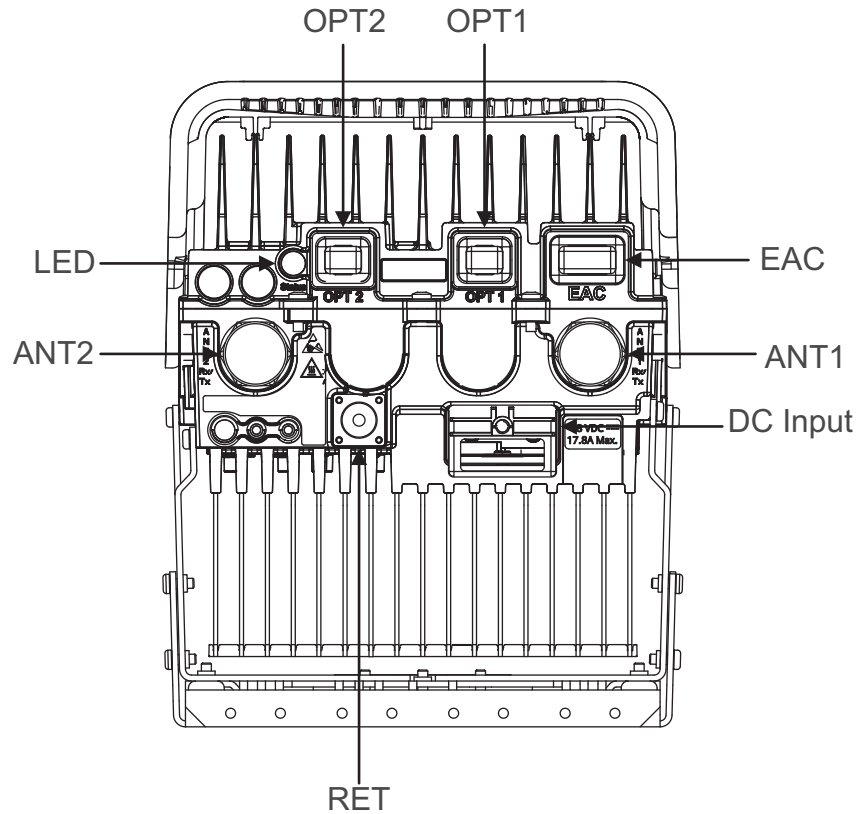


Table 274 FHEB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	6 Gbps

## Antenna Line Devices (ALDs) support

Table 275 FHEB ALD support

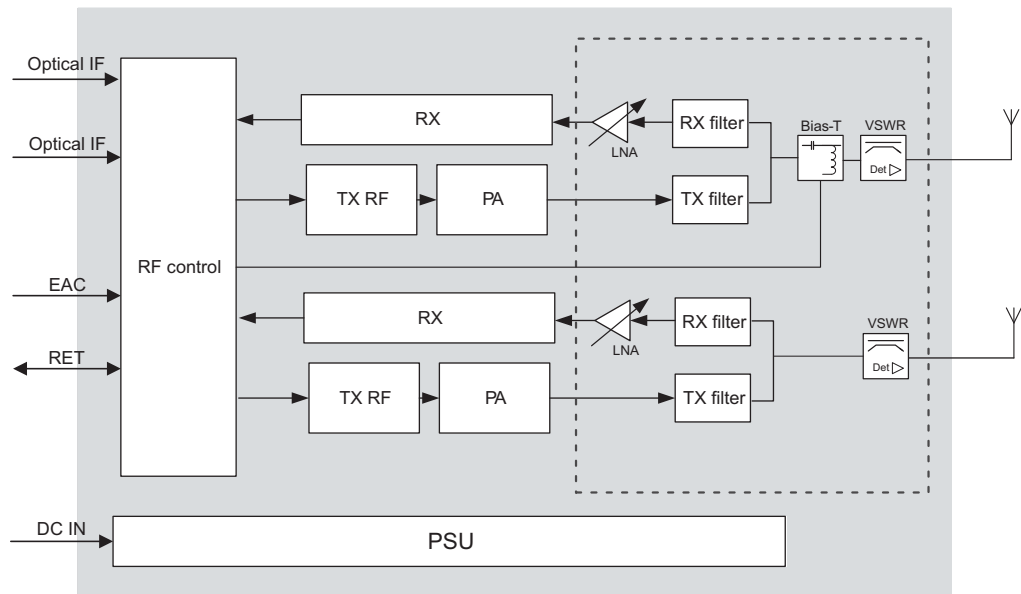
ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V

Table 275 FHEB ALD support (Cont.)

ALD support via antenna ports	Value
Power per port	15 W

### Functional block diagram

Figure 63 FHEB functional block diagram



### Electrical specifications

Table 276 FHEB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 277 FHEB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for LTE mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	60	353	486
	40	280	378
	20	213	266

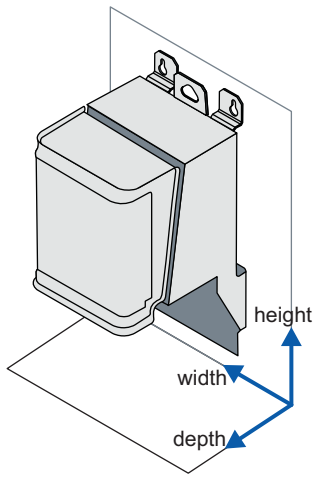
## Installation and mechanical specifications

Table 278 FHEB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>• pole/wall installation</li> <li>• directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>• Flexi Pole Mounting Kit (FPKA/C)</li> <li>• Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 279 FHEB dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 335.2 mm (13.2 in.)  With lower mounting bracket in the "FMFA" position: 571 mm (22.5 in.)  With lower mounting bracket in the alternative "ALT" position: 621 mm (24.4 in.)	 <p>The diagram shows a perspective view of the FHEB unit. Three blue arrows indicate the dimensions: 'height' points to the top edge, 'width' points to the front edge, and 'depth' points to the side edge.</p>
Depth	324 mm (12.8 in.)	
Width	260 mm (10.2 in.)	
Weight	17.3 kg (38.1 lbs)	

## Environmental specifications

Table 280 FHEB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 281 FHEB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

### Warnings, cautions or notes related to the product



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 36 Flexi RRH 2-pipe 1800 120W (FHEF)

FHEF technical specifications.

### Functional description

Table 282 FHEF functional specification

Property	Value
Output power	2x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, FDD-LTE
TX frequency range	1805 - 1860 MHz
RX frequency range	1710 - 1765 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	55 MHz
DL filter bandwidth	55 MHz
UL filter bandwidth	55 MHz

### Interfaces

Figure 64 FHEF interfaces

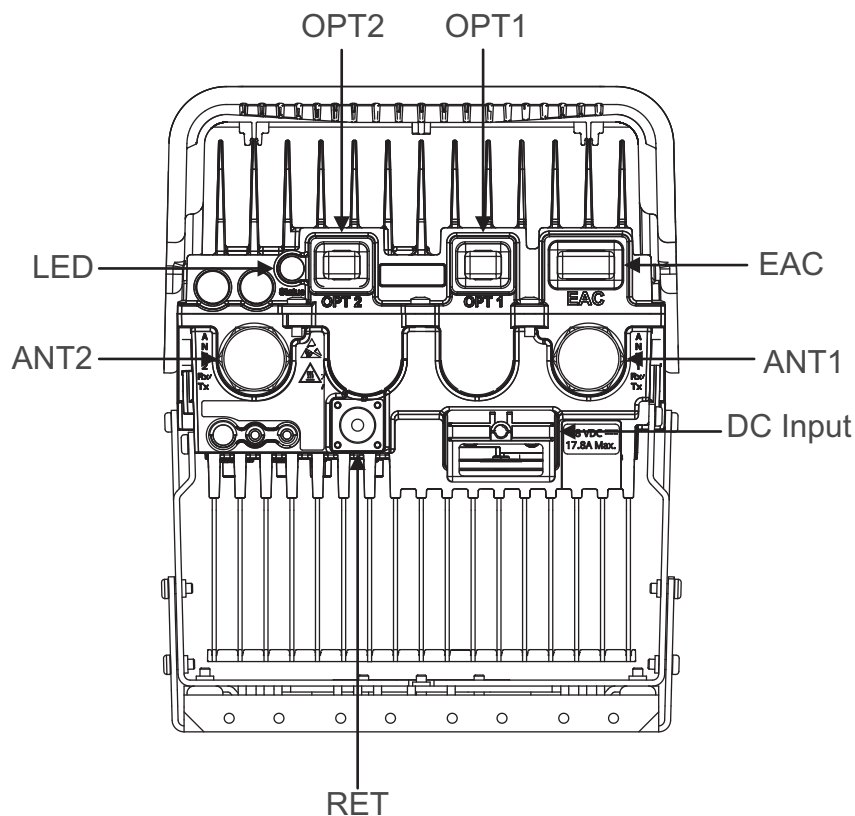


Table 283 FHEF interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	4	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	3	SFP	6 Gbps, OBSAI
Local Management Port	LMP	1	2x15 pin header	

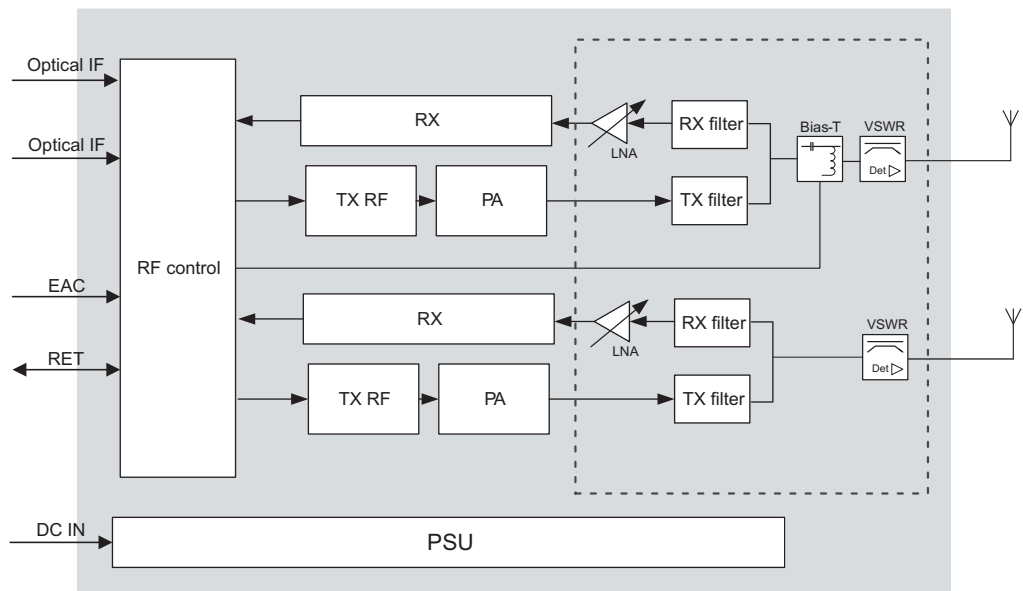
### Antenna Line Devices (ALDs) support

Table 284 FHEF ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	15 W

### Functional block diagram

Figure 65 FHEF functional block diagram



### Electrical specifications

Table 285 FHEF electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 286 FHEF power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100%RF Load
2	60	353	487
	40	270	358
	20	207	259

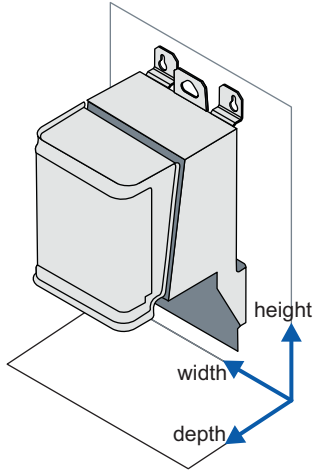
### Installation and mechanical specifications

Table 287 FHEF installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 288 FHEF dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 335.2 mm (13.2 in.) With lower mounting bracket in the "FMFA" position: 571 mm (22.5 in.) With lower mounting bracket in the alternative "ALT" position: 621 mm (24.4 in.)	
Depth	324 mm (12.8 in.)	
Width	260 mm (10.2 in.)	
Weight	17.3 kg (38.1 lbs)	

## Environmental specifications

Table 289 FHEF environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 290 FHEF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 290 FHEF LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 37 Flexi Remote Radio Head 2TX 900 (FHDB)

FHDB technical specifications.

### Functional description

Table 291 FHDB functional specification

Property	Value
Output power	2x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technologies	GSM, WCDMA, FDD-LTE
TX frequency range	925-960 MHz
RX frequency range	880-915 MHz
DL instantaneous bandwidth	35 MHz
UL instantaneous bandwidth	35 MHz
DL filter bandwidth	35 MHz
UL filter bandwidth	35 MHz

### Interfaces

Figure 66 FHDB interfaces

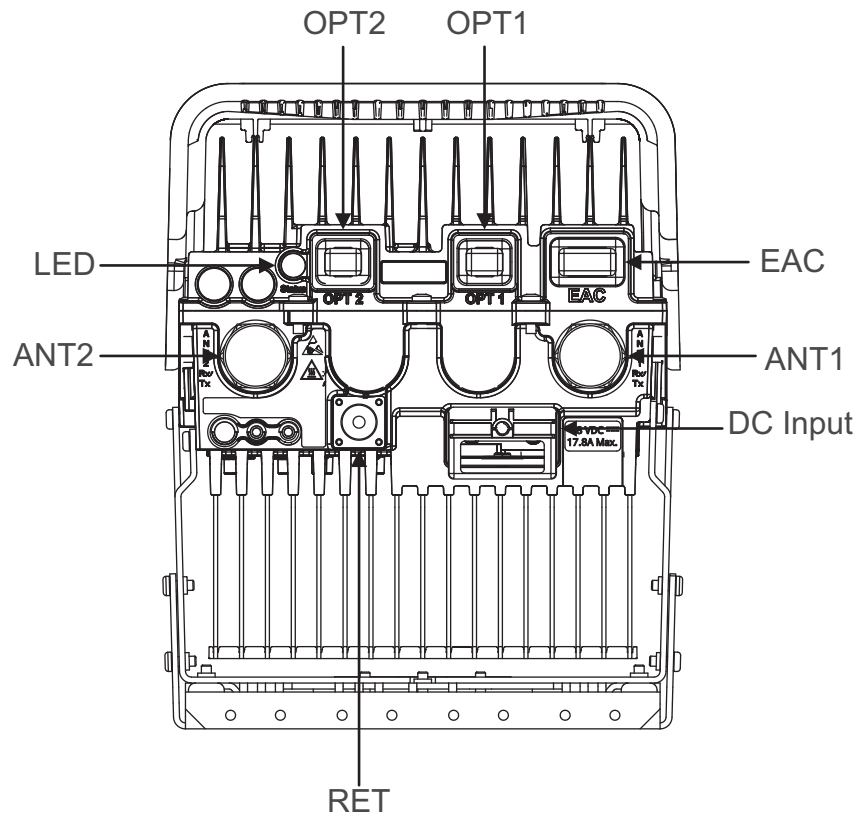


Table 292 FHDB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	6 Gbps

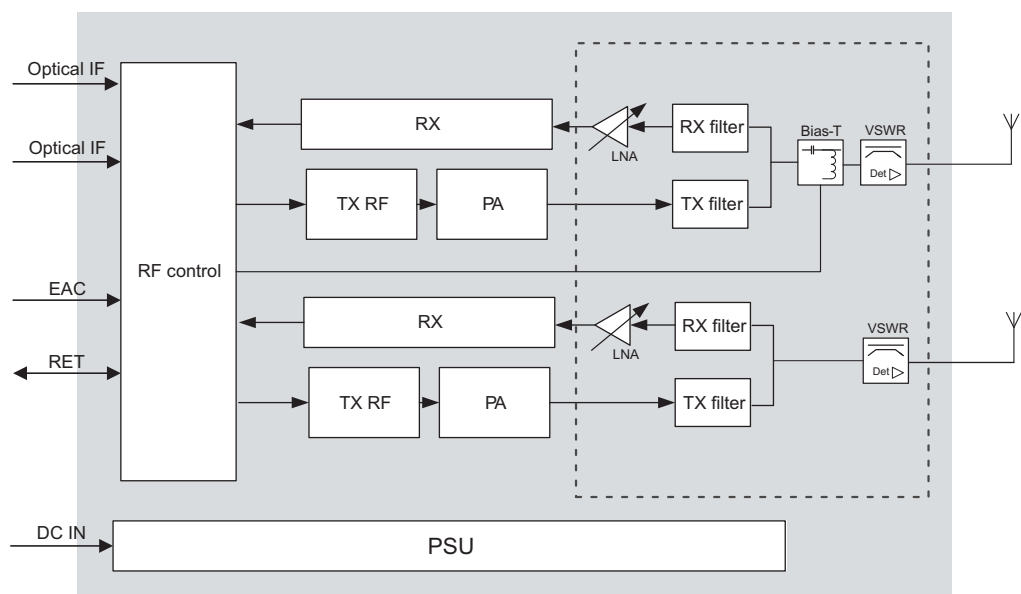
### Antenna Line Devices (ALDs) support

Table 293 FHDB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	15 W

### Functional block diagram

Figure 67 FHDB functional block diagram



## Electrical specifications

Table 294 FHDB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 295 FHDB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C for WCDMA mode. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	60	335	458
	40	266	351
	20	189	232

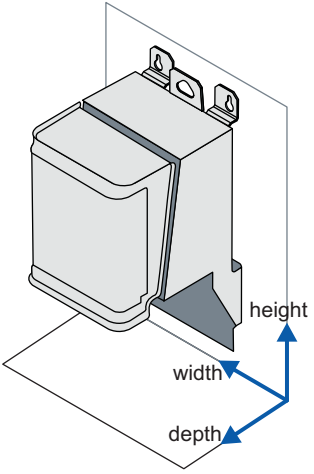
## Installation and mechanical specifications

Table 296 FHDB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 297 FHDB dimensions and weight

Property	Value	Dimensions orientation
Height	As delivered, cable tie point recessed: 335.2 (13.2 in.) with lower mounting bracket in the "FMFA" position: 571 mm (22.5 in.) with lower mounting bracket in the alternative "ALT" position: 621 mm (24.4 in.)	
Depth	324 mm (12.8 in.)	
Width	260 mm (10.2 in.)	
Weight	17.3 kg (38.1 lbs)	

## Environmental specifications

Table 298 FHDB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 299 FHDB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 299 FHDB LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 38 Flexi Remote Radio Head 2TX 2100 (FRGY)

FRGY technical specifications.

### Functional description

Table 300 FRGY functional specification

Property	Value
Output power	2x60 W
MIMO	yes, 2TX
Outdoor installation	yes
SW supported technology	WCDMA
TX frequency range	2110-2170 MHz
RX frequency range	1920-1980 MHz
DL instantaneous bandwidth	60 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	60 MHz
UL filter bandwidth	60 MHz

### Interfaces

Figure 68 FRGY interfaces

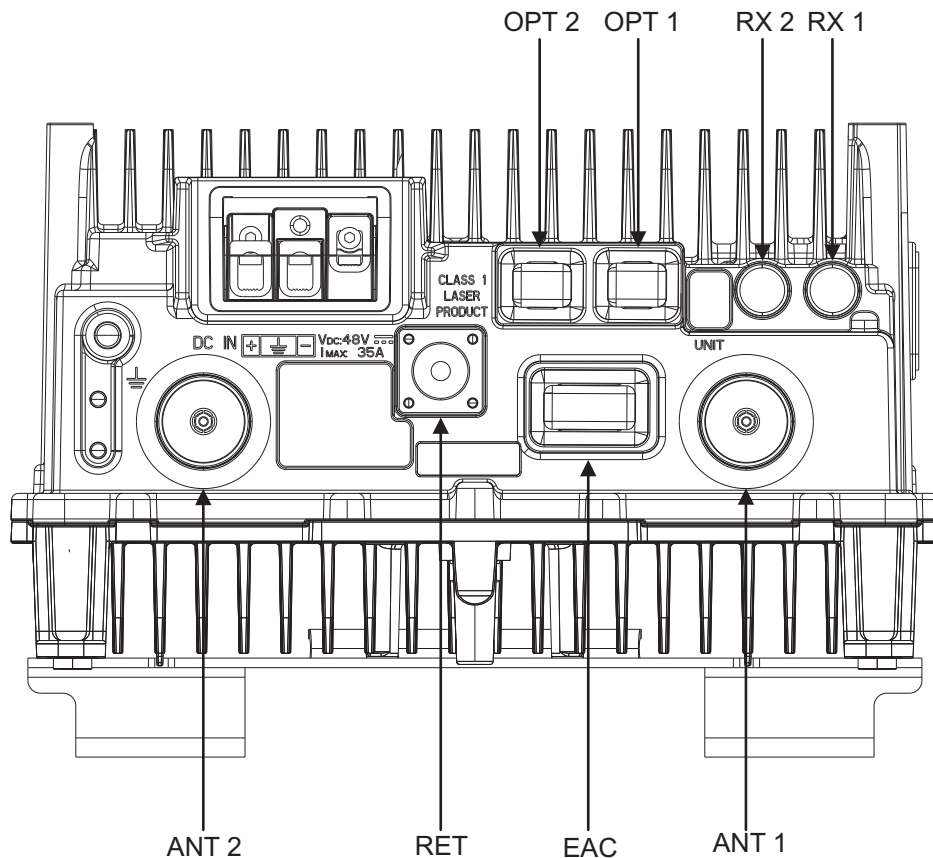


Table 301 FRGY interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	2	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	6 Gbps, OBSAI

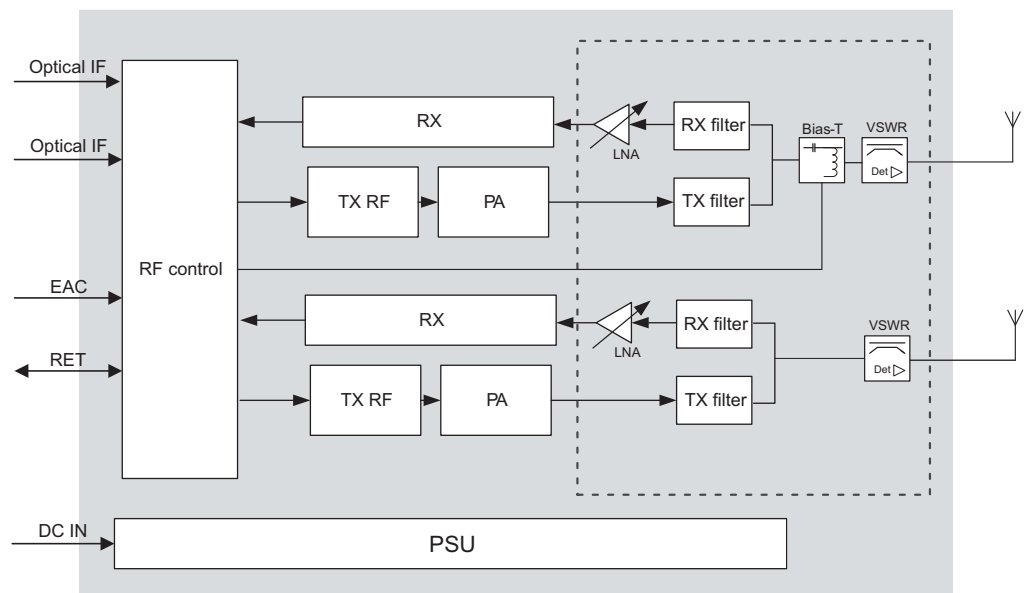
### Antenna Line Devices (ALDs) support

Table 302 FRGY ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	30 W

### Functional block diagram

Figure 69 FRGY functional block diagram



## Electrical specifications

Table 303 FRGY electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

## Power consumption

Table 304 FRGY power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
2	60	330	522
	40	262	383
	30	217	309
	20	178	240

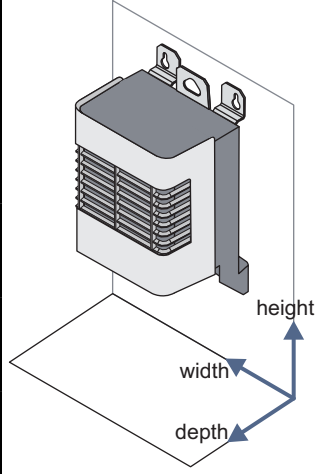
## Installation and mechanical specifications

Table 305 FRGY installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

## Dimensions and weight

Table 306 FRGY dimensions and weight

Property	Value	Dimensions orientation
Height	With lower bracket: 702 mm (27.6 in.) Without lower bracket: 437 mm (17.2 in.) Module only: 366 mm (14.4 in.)	 <p>The diagram shows a 3D perspective view of the FRGY Remote Radio Head. It is a rectangular unit with a fan grille on the front and a lower bracket on the bottom. Three arrows indicate the dimensions: 'height' points upwards from the base to the top, 'width' points from the front-left to the front-right, and 'depth' points from the front-right to the back-right.</p>
Depth	206 mm (8.1 in.)	
Width	302 mm (11.9 in.)	
Weight	15 kg (33.1 lbs)	

## Environmental specifications

Table 307 FRGY environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 308 FRGY LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> </ul>	Major/critical alarm

Table 308 FRGY LEDs (Cont.)

LED color	Description	Alarm
	<ul style="list-style-type: none"> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated and transmission is possible</li> <li>Working normally, no alarm on the RF Module</li> </ul>	No alarm
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 39 Flexi Remote Radio Head 4TX 1700/2100 (FRIG)

FRIG technical specifications.

### Functional description

Table 309 FRIG functional specification

Property	Value
Output power	4x30 W/2x60 W
MIMO	yes, 4TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2110-2155 MHz
RX frequency range	1710-1755 MHz
DL instantaneous bandwidth	45 MHz
UL instantaneous bandwidth	45 MHz
DL filter bandwidth	45 MHz
UL filter bandwidth	45 MHz

### Interfaces

Figure 70 FRIG interfaces

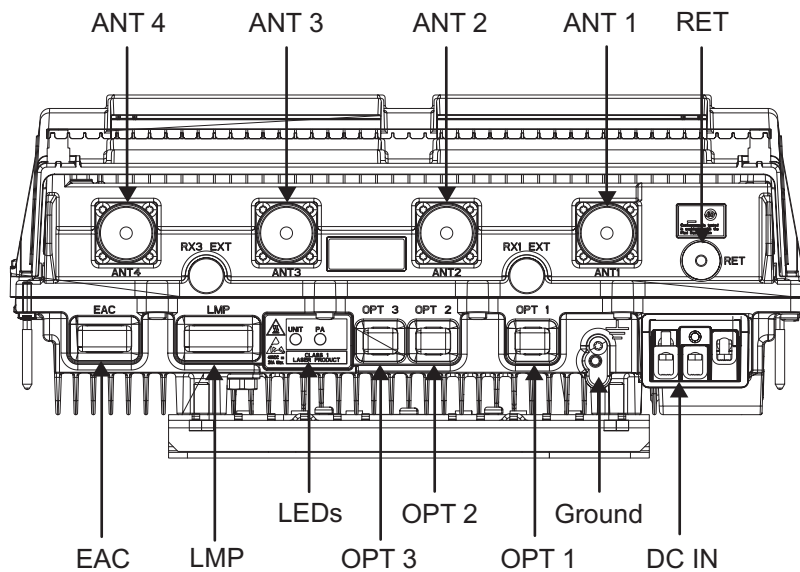


Table 310 FRIG interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	

*Table 310* FRIG interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	4	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	2	SFP	6 Gbps
Local Management Port	LMP	1	2x15 pin header	

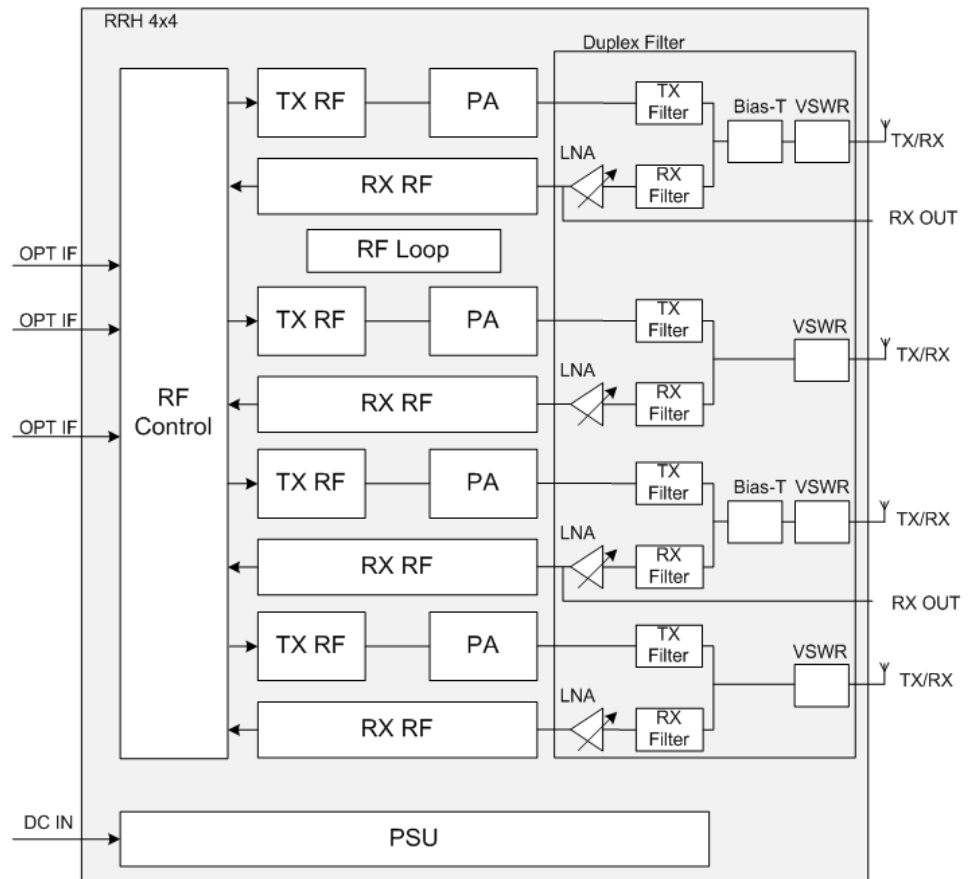
**Antenna Line Devices (ALDs) support**

*Table 311* FRIG ALD support

ALD support via antenna ports	Value
AISG	2.0 Port 1 & 3 only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	15.5 V
Power per port	30 W (shared 60 W across three ports)

### Functional block diagram

Figure 71 FRIG functional block diagram



### Electrical specifications

Table 312 FRIG electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 313 FRIG power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
4	30	479	673
	20	417	533
	10	355	415
2	60	394	595

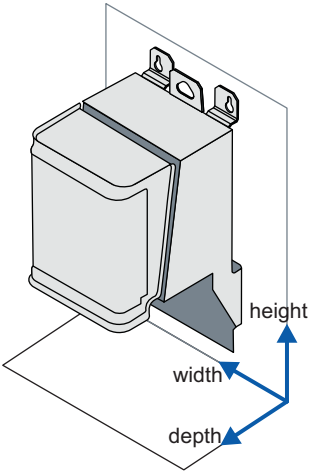
### Installation and mechanical specifications

Table 314 FRIG installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 315 FRIG dimensions and weight

Property	Value	Dimensions orientation
Height	459.5 mm (18.1 in.)	
Depth	2x60 W version: 133.4 mm (5.2 in.) 3x40 W version: 162.3 mm (6.4 in.)	
Width	400 mm (15.7 in.)	
Weight	23.7 kg (52.5 lbs)	

## Environmental specifications

Table 316 FRIG environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 317 FRIG LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated</li> </ul>	No alarm

Table 317 FRIG LEDs (Cont.)

LED color	Description	Alarm
	and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 40 Flexi Remote Radio Head 4TX 2600 (FRHD)

FRHD technical specifications.

### Functional description

Table 318 FRHD functional specification

Property	Value
Output power	4x30 W
MIMO	yes, 4TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2640 - 2690 MHz
RX frequency range	2520 - 2570 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	50 MHz
UL filter bandwidth	50 MHz

### Interfaces

Figure 72 FRHD interfaces

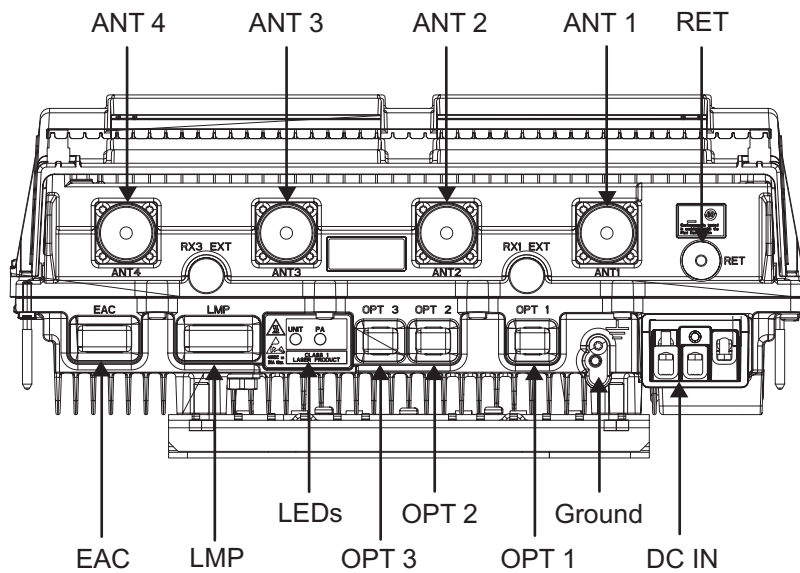


Table 319 FRHD interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	

*Table 319* FRHD interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	4	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	3	SFP	6 Gbps
Local Management Port	LMP	1	2x15 pin header	

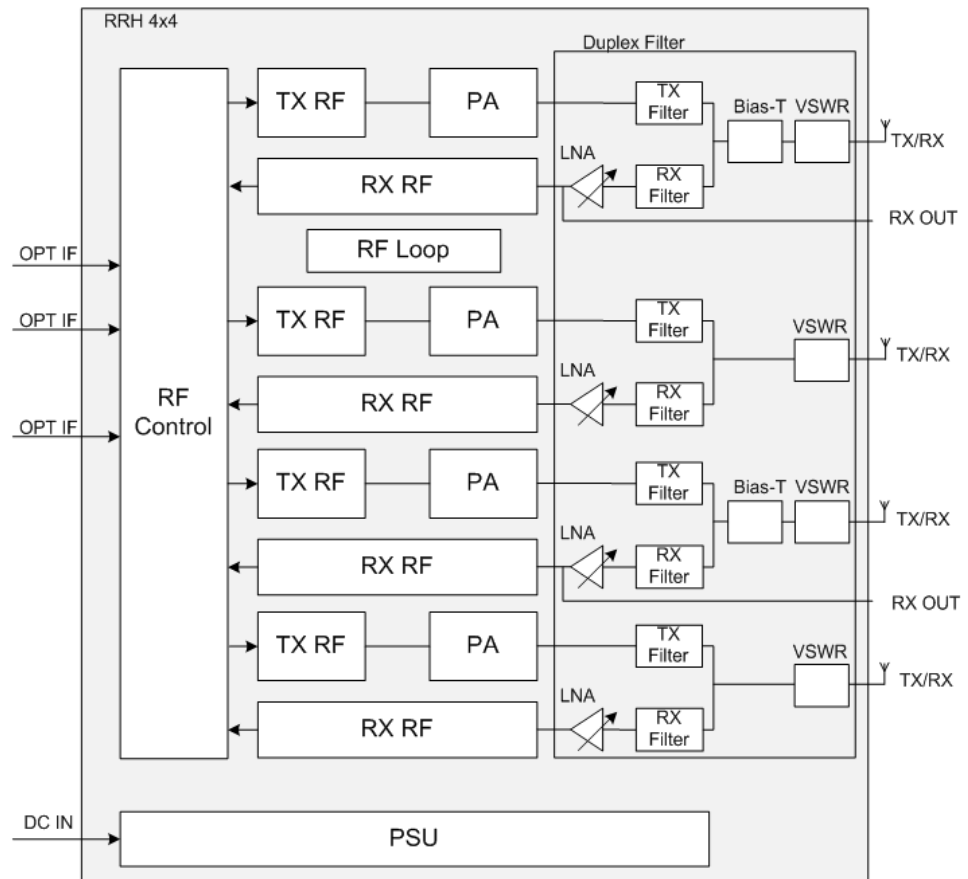
### Antenna Line Devices (ALDs) support

*Table 320* FRHD ALD support

ALD support via antenna ports	Value
AISG	2.0 Port 1 & 3 only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	15.5 V
Power per port	30 W (shared 60W across three ports)

### Functional block diagram

Figure 73 FRHD functional block diagram



### Electrical specifications

Table 321 FRHD electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 322 FRHD power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
4	30	484	664
	20	417	544
	10	346	417

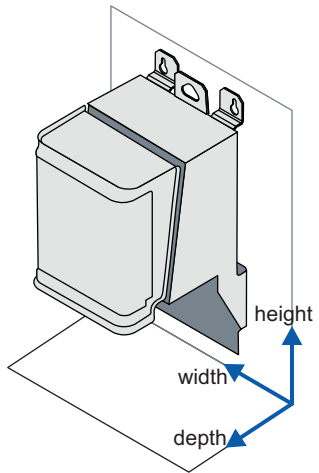
### Installation and mechanical specifications

Table 323 FRHD installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>• pole/wall installation</li> <li>• directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>• Flexi Pole Mounting Kit (FPKA/C)</li> <li>• Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 324 FRHD dimensions and weight

Property	Value	Dimensions orientation
Height	578 mm (22.7 in.)	
Depth	201.5 mm (7.9 in.)	
Width	400 mm (15.7 in.)	
Weight	max. 28.5 kg (62.8 lbs)	

## Environmental specifications

Table 325 FRHE environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 326 FRHD LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated</li> </ul>	No alarm

Table 326 FRHD LEDs (Cont.)

LED color	Description	Alarm
	and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

# 41 Flexi Remote Radio Head 4TX 2600 (FRHE)

FRHE technical specifications.

## Functional description

Table 327 FRHE functional specification

Property	Value
Output power	4x30 W
MIMO	yes, 4TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	2620-2675 MHz
RX frequency range	2500-2555 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	40 MHz
DL filter bandwidth	55 MHz
UL filter bandwidth	55 MHz

## Interfaces

Figure 74 FRHE interfaces

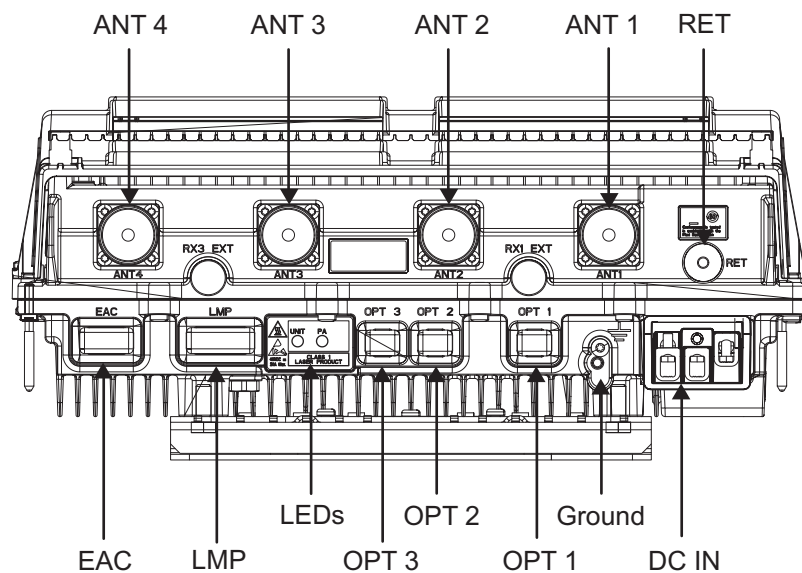


Table 328 FRHE interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	

*Table 328* FRHE interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	4	7/16	
RF external connector	Rx EXT	2	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	3	SFP	6 Gbps
Local Management Port	LMP	1	2x15 pin header	

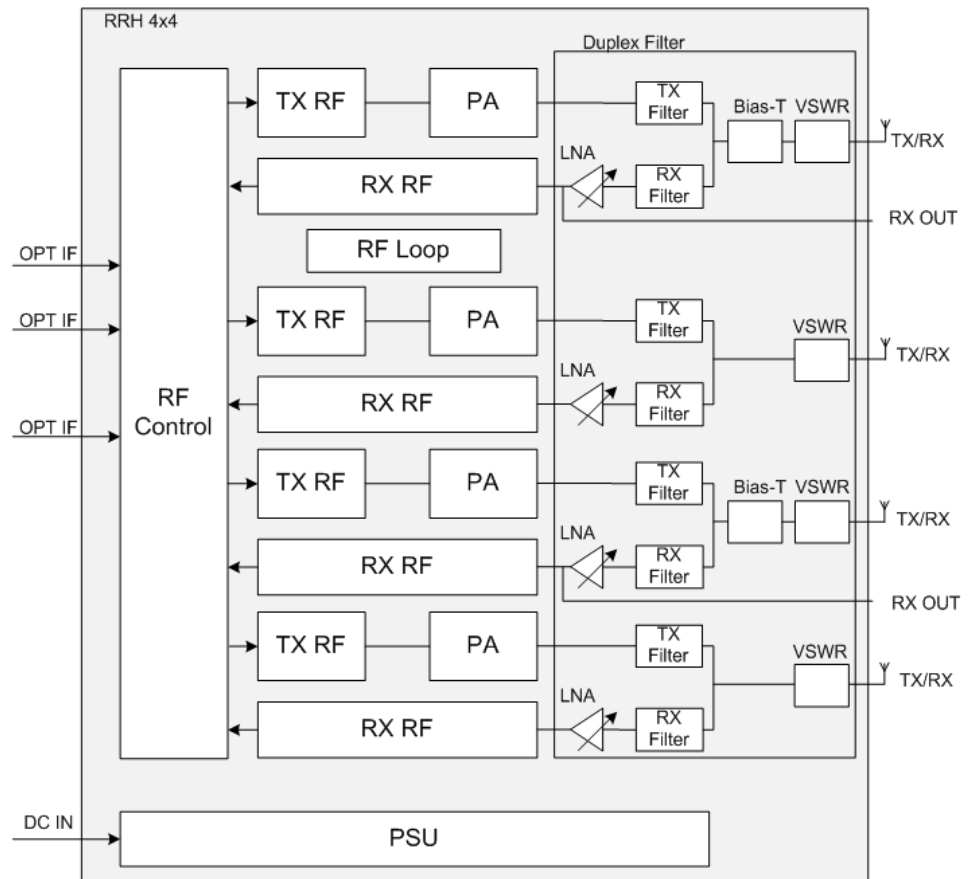
### Antenna Line Devices (ALDs) support

*Table 329* FRHE ALD support

ALD support via antenna ports	Value
AISG	2.0 Port 1 & 3 only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	15.5 V
Power per port	30 W (shared 60W across three ports)

### Functional block diagram

Figure 75 FRHE functional block diagram



### Electrical specifications

Table 330 FRHE electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 331 FRHE power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
4	30	484	664
	20	417	544
	10	346	417

### Installation and mechanical specifications

Table 332 FRHE installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 333 FRHE dimensions and weight

Property	Value	Dimensions orientation
Height	578 mm (22.7 in.)	<p>The diagram shows a 3D perspective view of the FRHE unit. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points across the front face, and 'depth' points into the unit from the front.</p>
Depth	201.5 mm (7.9 in.)	
Width	400 mm (15.7 in.)	
Weight	max. 28.5 kg (62.8 lbs)	

## Environmental specifications

Table 334 FRHE environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 335 FRHE LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated</li> </ul>	No alarm

Table 335 FRHE LEDs (Cont.)

LED color	Description	Alarm
	and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

## 42 Flexi RRH 4-pipe 1900 160W (FHFB)

FHFB technical specifications.

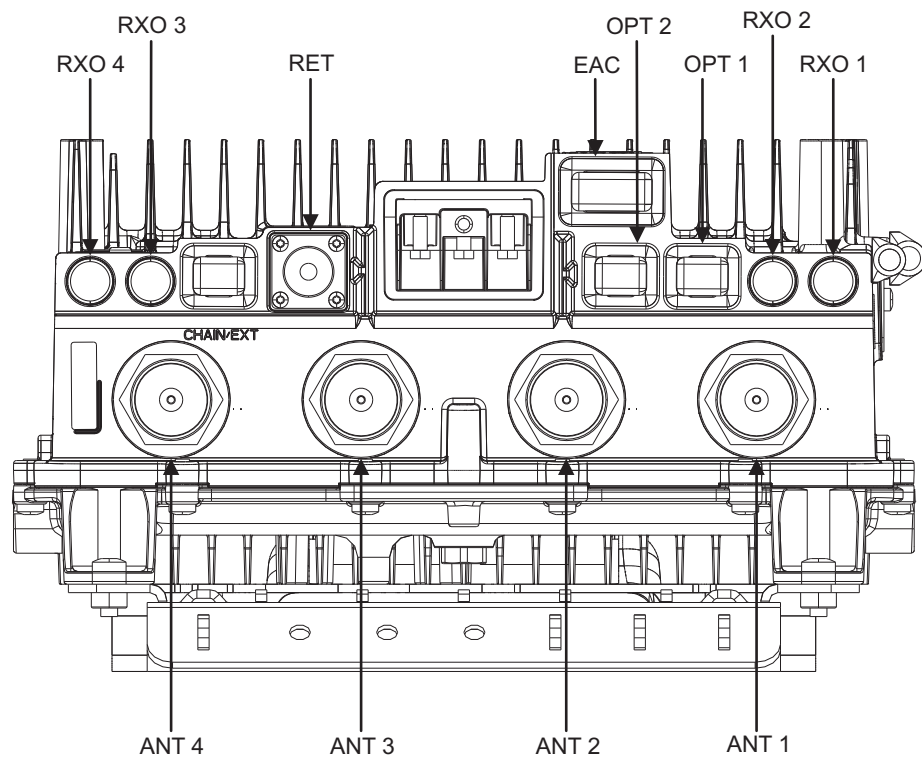
### Functional description

Table 336 FHFB functional specification

Property	Value
Output power	4x40 W
MIMO	yes, 4TX
Outdoor installation	yes
SW supported technology	FDD-LTE
TX frequency range	1930-1995 MHz
RX frequency range	1850-1915 MHz
DL instantaneous bandwidth	65 MHz
UL instantaneous bandwidth	65 MHz
DL filter bandwidth	65 MHz
UL filter bandwidth	65 MHz

### Interfaces

Figure 76 FHFB interfaces



*Table 337* FHFB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	4	7/16	
RF external connector	Rx EXT	4	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	D-sub MDR14	
Optical interface	OPT	3	SFP	
Local Management Port	LMP	1	2x15 pin header	

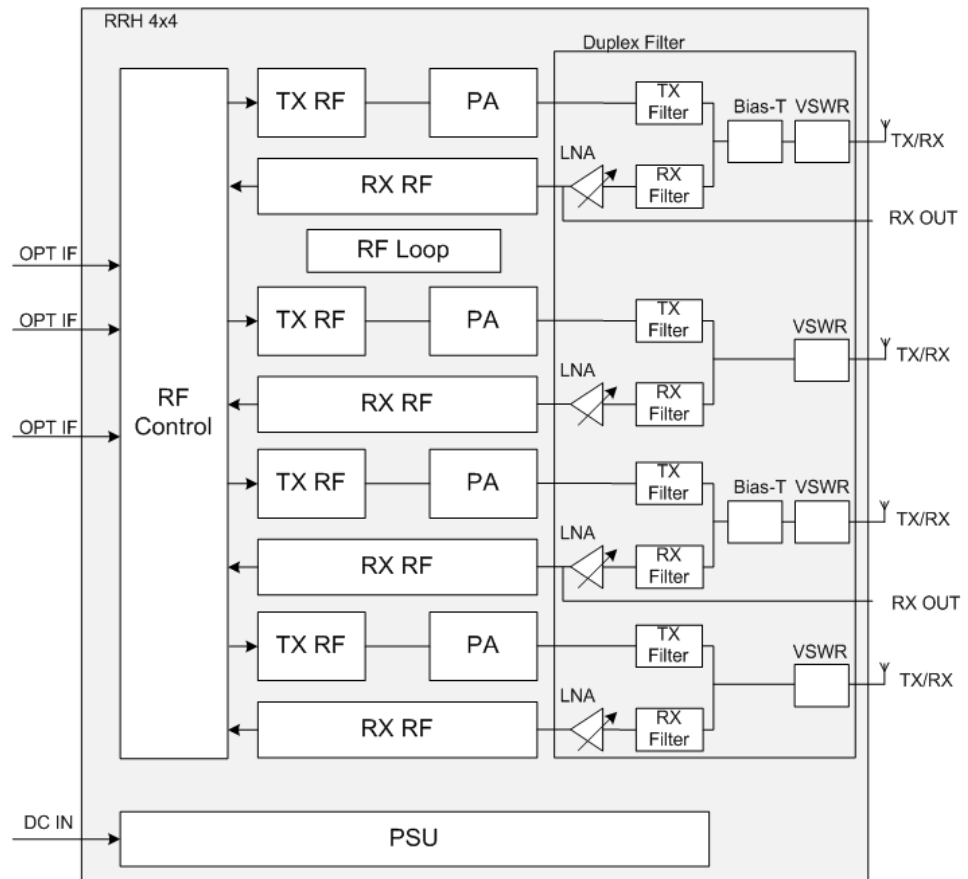
**Antenna Line Devices (ALDs) support**

*Table 338* FHFB ALD support

ALD support via antenna ports	Value
AISG	2.0 Main only
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	14.5 V
Power per port	15 W

### Functional block diagram

Figure 77 FHFB functional block diagram



### Electrical specifications

Table 339 FHFB electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.5 V DC to -57.0 V DC
Extended input voltage range	-36.0 V DC to -40.5 V DC -57.0 V DC to -60.0 V DC

### Power consumption

Table 340 FHFB power consumption

Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Values preliminary estimate.	
		50% RF Load	100% RF Load
4	40	663	900
	20	520	663

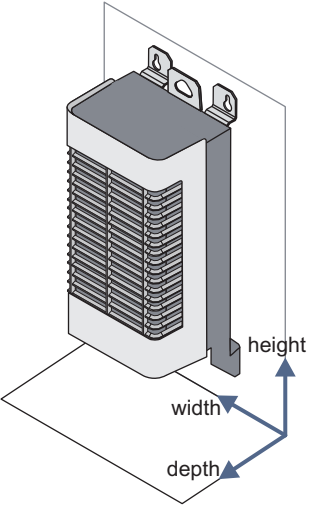
### Installation and mechanical specifications

Table 341 FHFB installation and mechanical specifications

Property	Value
Installation options	<ul style="list-style-type: none"> <li>pole/wall installation</li> <li>directly on the wall installation</li> </ul>
IP rating	IP65
Related optional items	<ul style="list-style-type: none"> <li>Flexi Pole Mounting Kit (FPKA/C)</li> <li>Pole Mounting Kit (VMPB)</li> </ul>

### Dimensions and weight

Table 342 FHFB dimensions and weight

Property	Value	Dimensions orientation
Height	With lower bracket: 872 mm (34.3 in.) Without lower bracket: 637 mm (25.1 in.) Without brackets: 585 mm (23.0 in.)	
Depth	200 mm (7.8 in.)	
Width	Without solar shield: 320 mm (12.6 in.)	
Weight	With lower bracket: 23 kg (51.0 lbs) Without solar shield and mounting shroud: 22 kg (68.5 lbs)	

## Environmental specifications

Table 343 FHFB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun (according to GR-487-Core specification)	+50°C (122°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (129.2°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

## LEDs

Table 344 FHFB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded <ul style="list-style-type: none"> <li>Major alarm affecting the whole RF Module</li> <li>Critical alarm affecting fans</li> <li>Major/Critical alarm affecting a module subcomponent or antenna carrier</li> </ul>	Major/critical alarm
Yellow, stable	<ul style="list-style-type: none"> <li>Until software download begins</li> <li>The carriers are blocked from BTS</li> <li>There is no connection to any System Module</li> </ul>	No alarm
Yellow, blinking	<ul style="list-style-type: none"> <li>Software download in progress</li> <li>Configuration in progress: RF resources are being setup, but not yet activated</li> </ul>	No alarm
Green, stable	<ul style="list-style-type: none"> <li>Software configuration is complete or supervisory: RF resources activated</li> </ul>	No alarm

Table 344 FHFB LEDs (Cont.)

LED color	Description	Alarm
	and transmission is possible <ul style="list-style-type: none"> <li>Working normally, no alarm on the RF Module</li> </ul>	
Green, blinking	Software downloading and updating	No alarm
Stable Red for less than 5 seconds and changes to Stable Yellow	Switched ON, but the next conditions are not reached yet	No alarm
Stable Red for less than 5 seconds	The module is in the process of resetting	No alarm
Periodic Red and Green	Antenna line device faulty/degraded	No alarm
Blinking Colors (Red, Yellow, and Green), each color stable for 0.5 second	Module highlighting (Flexi BTS SM functionality that can help identifying faulty module)	No alarm

**Warnings, cautions or notes related to the product**



**NOTICE:** The RRH should always be mounted in a vertical orientation with connectors on the bottom side to ensure convection cooling.



The minimum startup voltage is 40.5 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

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## 43 Compliance with EMC, RF, and safety

Short reference description.

In Europe, this means compliance with Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

In other market areas additional compliance is fulfilled according to relevant authority requirements.

### EMC emission

- ETSI EN 301 489-1: Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.
- ETSI EN 301 489-8: Part 8: Specific conditions for GSM base stations.
- EN55022: "Limits and methods of measurement of radio disturbance characteristics of information technology equipment".

### RF

- **GSM:** ETSI EN 301 502: Harmonized EN for Global System for Mobile communications (GSM) - Base Station and Repeater equipment covering essential requirements under article 3.2 of the R&TTE directive.
- **WCDMA:** ETSI EN 301 908-3: IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 3: CDMA Direct Spread (UTRA FDD) Base Stations (BS).
- **LTE:** ETSI EN 301 908-14: IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 14: Evolved Universal Terrestrial Radio Access (E-UTRA) Base Stations (BS)

### Safety

- IEC 60950-1/ EN 60950-1: "Safety of Information Technology equipment including electrical business equipment".
- IEC 60950-22/ EN 60950-22: "Information technology equipment - Safety - Part 22: Equipment to be installed outdoors"
- EN 50383: Basic standard for the calculation and measurement of the electromagnetic field strength and SAR related to human exposure from radio base stations and fixed terminal stations for wireless telecommunications system (110 MHz - 40 GHz).
- EN 50384: Product standard to demonstrate the compliance of radio base stations and fixed terminal stations for wireless telecommunications systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz - 40 GHz) - Occupational.

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- EN 50385: Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunications systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz - 40 GHz) - General public.
  - UL 60950-1: Safety of Information Technology Equipment.
  - CSA C22.2 No. 60950-00: Safety of Information Technology Equipment.

## 44 Avoiding Passive Intermodulation during RF Module and RRH operation

In wideband frequencies when several transmitting and receiving signals are sharing same hardware there could be noted effect called Passive Intermodulation (PIM) Interference. Using RF Modules might cause a potential risk of generating third-order intermodulation that results in distortions in own receiver (RX) channel. Antenna Line Devices (ALD) have important role in preventing Passive Intermodulation generation, even if used RF Module and RRH performance at the antenna connector complies with 3GPP requirements. Poor PIM performance of ALD might degrade significantly the reference sensitivity. ALDs, like MHAs, provided by NSN have high PIM requirements.

The risk might be high in the following cases:

- maximum bandwidth (BW) used for the carriers is more than 0.5 x duplex separation of the band
- carriers in configuration are wideband in nature (for example WCDMA or LTE), or combination of wideband and narrow band carriers (for example RF sharing GSM-WCDMA or GSM-LTE).
- antenna line PIM performance is poor, or not on the required level for the configuration.

*Table 345* Typical reference sensitivity degradation with different Antenna line PIM performance.

PIM performance	Typical degradation	Note
-140 dBc @ 2x43 dBm	~10 dB	High degradation, carrier configuration unusable in many cases
-153 dBc @ 2x43 dBm	~2 dB	Modest degradation, tolerable in many cases
-161 dBc @ 2x43 dBm	~0.2 dB	Minimal degradation, however, difficult to reach on the typical site environment.

When using wideband carrier configurations where PIM products fall into own receiver band, it is recommended that antenna line PIM performance is at least -153 dBc measured with 2 x 43dB test signals.

However, this kind of performance might be very difficult to achieve and maintain over time in outdoor environment due to mechanisms behind the PIM including corrosion, oxidation, material imperfections, and defects in workmanship. Some of these parameters might change, and can degrade performance during operation. Taking that into consideration, it is highly recommended not to use carrier configurations which are generating intermodulation results in landing in own receiver channels.