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Flexi Multiradio BTS RF Module and Remote Radio Head Description

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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.

This document is common for all Radio Access Technologies (RAT). You may find here information about solutions that are not available or supported in a specific SW release or RAT. Table *RAT releases covered by the document* lists all SW releases covered by the content of this document. For features supported in your SW release, see respective feature documentation chapter in the system library.

Table 1 Releases covered by the document

Product	Release
GSM/EDGE (BSS)	RG40 (BSS), GSM 16
WCDMA RAN	RU50, RU50 EP1, WCDMA 16
Long Term Evolution	RL70, FDD-LTE 15A, FDD-LTE 16, FDD-LTE 16A

Changes between issues 18 (2016-04-22) and 19 (2016-05-23)

Flexi RF Module 3TX 1800 (FXEB)

- [Table 119: FXEB functional specification](#): DL instantaneous bandwidth has been updated.
- [Table 123: FXEB power consumption](#): MSR mode has been added.

Flexi RFM 3-pipe 1800 240 W (FXEF)

- [Table 141: FXEF power consumption](#): GSM mode has been removed and LTE mode has been updated.

Flexi RFM 6-pipe 700 240 W (FRPD)

- Information on Fast Delivery Mode support has been added.

Flexi RRH 4-pipe 2100 120 W (FHGB)

- [Table 454: FHGB functional specification](#): 2x60 W mode has been added.
- [Table 458: FHGB power consumption](#) has been updated.

Changes between issues 17 (2016-04-12) and 18 (2016-04-22)

Flexi RRHs Rel.4 compatibility with Nokia AirScale Radios

- Chapter has been added.

Flexi RF Module 3TX 850 (FXCB)

- [Table 105: FXCB power consumption](#): WCDMA mode has been updated.

Flexi RFM 3-pipe 1800 240 W (FXEF)

- Chapter has been added.

Flexi RFM 6-pipe 700 240 W (FRPD)

- Chapter has been added.

Flexi RFM 6-pipe 1450 360 W (FRSA)

- Chapter has been added.

Flexi RRH 2-pipe 450 80 W (FRAA)

- [Table 486: FRAA installation and mechanical specifications](#): book mount installation option and Corona 2T2R Book Mount HW Kit (FMFH) have been added.

Flexi RRH 2-pipe 850 80 W (FRCC)

- [Table 495: FRCC installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 2-pipe 850 120 W (FRCG)

- [Table 504: FRCG installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 2-pipe 873 120 W (FRCJ)

- Chapter has been added.

Flexi RRH 2-pipe 2100 120 W (FRGY)

- [Table 521: FRGY installation and mechanical specifications](#): book mount installation option and Corona 2T2R Book Mount HW Kit (FMFH) have been added.

Flexi RRH 4-pipe 2300 120 W (FRNC)

- [Table 530: FRNC installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 720/730 160 W (FRBG)

- [Table 539: FRBG installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 720/750 160 W (FRBE)

- [Table 548: FRBE installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 760 160 W (FRBF)

- [Table 557: FRBF installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 1800 160 W (FHED)

- [Table 566: FHED installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 1800 160 W (FHEH)

- [Table 575: FHEH installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 1900 160 W (FHFB)

- [Table 584: FHFB installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Flexi RRH 4-pipe 2600 160 W (FRHG)

- [Table 593: FRHG installation and mechanical specifications](#): book mount installation option and Corona 4T4R Book Mount HW Kit (FMFB) have been added.

Changes between issues 16 (2016-02-19) and 17 (2016-04-12)**Flexi RF Module 3TX 850 (FXCB)**

- [Table 105: FXCB power consumption](#): MSR RF sharing data has been added.

Flexi RF Module 3TX 900 (FXDB)

- [Table 114: FXDB power consumption](#): LTE mode has been added.

Flexi RF Module 3TX 1800 (FXEB)

- [Table 123: FXEB power consumption](#): LTE mode has been updated.

Flexi RFM 3-pipe 1800 240 W (FXEE)

- [Table 130: FXEE ALD support](#) has been updated.

Flexi RF Module 3TX 2100 (FRGT)

- [Table 169: FRGT power consumption](#): LTE mode has been added.

Flexi RFM 3-pipe 2100 240 W (FRGX)

- Chapter has been added.

Flexi RF Module 6TX 700 (FRPA)

- [Table 196: FRPA power consumption](#) has been updated.

Flexi RF Module 6TX 700 (FRPB)

- [Table 205: FRPB power consumption](#) has been updated.

Flexi RFM 6-pipe 1800 360 W (FXED)

- [Table 277: FXED power consumption](#): MSR RF sharing data has been added.

Flexi RFM 6-pipe 2100 360 W (FRGU)

- [Table 284: FRGU ALD support](#) has been updated.

Flexi Remote Radio Head 2TX 2600 (FRHB)

- [Table 385: FRHB power consumption](#) has been updated.

Flexi Remote Radio Head 2TX 900 (FHDB)

- [Table 431: FHDB power consumption](#): LTE mode has been updated and MSR RF sharing data has been added.

Flexi RRH 2-pipe 1800 120 W (FHEG)

- [Table 440: FHEG power consumption](#) 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, Nokia declares that this equipment is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC.

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

CE ⓘ R&TTE Directive 1995/5/EC							
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 Nokia.

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 RF Performance

The topic describes the radios RF sensitivity and TX output power tolerance.

RF sensitivity

Nokia Flexi radios have superior field proven RX sensitivity which correlates as top uplink performance without any compromises to the uplink coverage. Accuracy was maintained during the Uplink performance tests by following 3GPP standard 36.104 and using real commercial radio hardware units. The receiver sensitivity results of up to -106.6 dBm have been measured using commercial radio hardware under realistic circumstances, ultimately this produces accurate mean -106.3 dBm.

TX output power tolerance

Nokia Flexi radios power amplifier design brings benefits to the wider operating and instantaneous bandwidth radio units. This design produces a competitive output power tolerance which is less than +/-0.8dB. The benefit produces robust power amplifier design is the high maximum downlink throughput levels in real operating environments.

6 Flexi RRHs Rel.4 compatibility with Nokia AirScale Radios

Flexi RRHs Rel.4 are compatible with Nokia AirScale Radio via conversion kit.

Flexi RRHs Rel.4 have forward-compatibility with Nokia AirScale Radios. Using a conversion kit, Flexi RRH Rel.4 can be installed with AirScale Radio in a book mount option. The conversion kits are:

- Corona 2T2R Book Mount HW Kit (FMFH)
- Corona 4T4R Book Mount HW Kit (FMFB)

FMFH and FMFB are optional items.

For more information on AirScale Radios, see *Nokia AirScale Radio Description DN09236379*.

7 Descriptions of 3TX RF Modules

7.1 Flexi RF Module 3TX 800 (FRMA)

FRMA technical specifications.

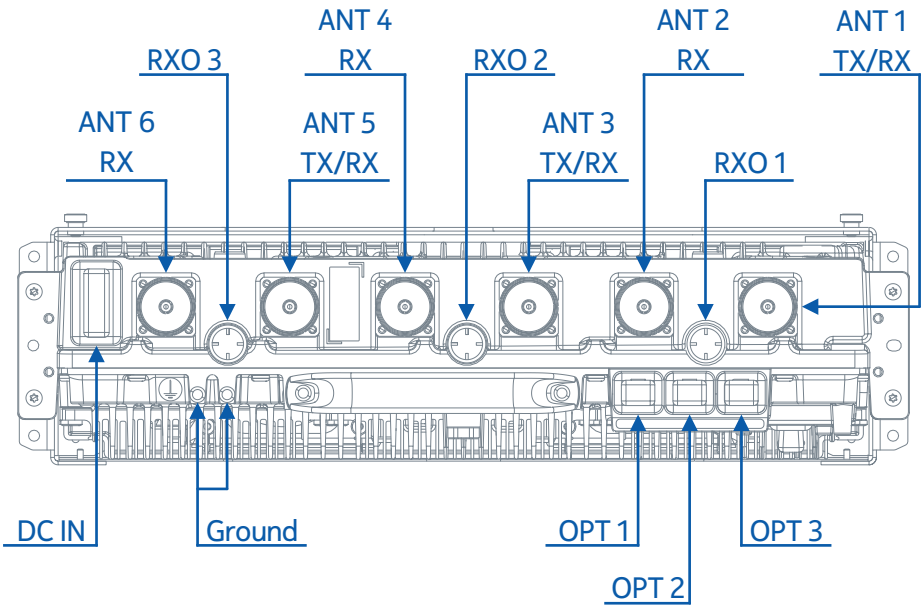
Functional description

Table 2 FRMA functional specification

Property	Value
Output power	3x60 W
MIMO	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

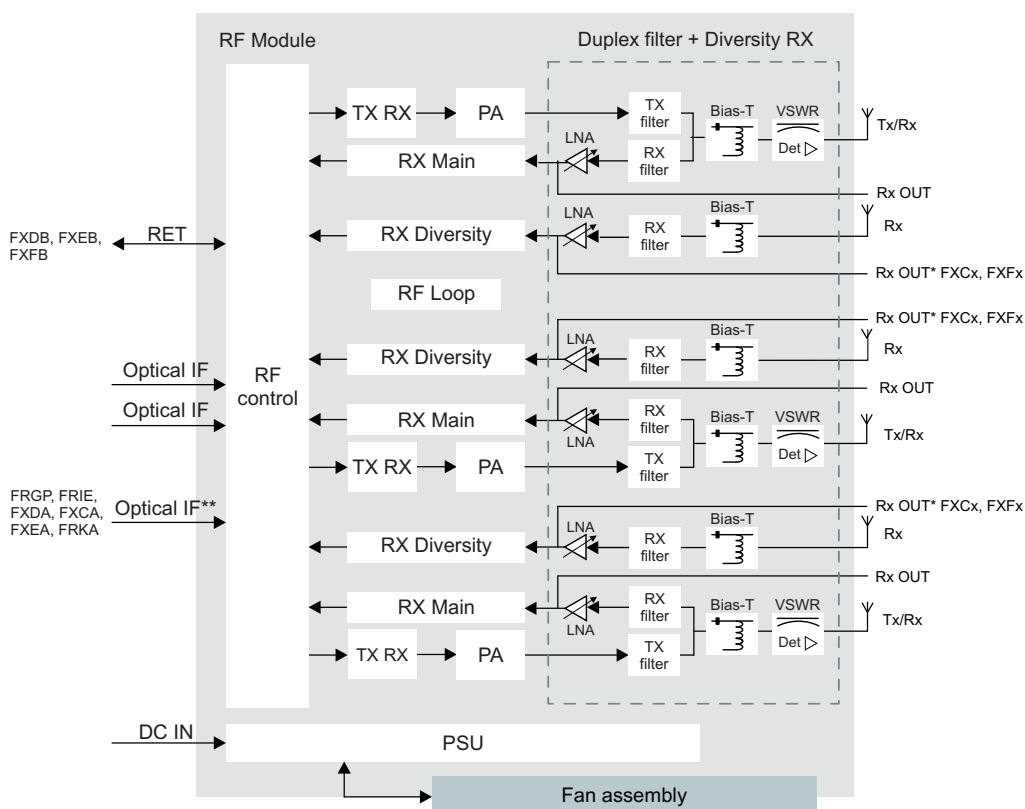


Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	2-pin multibeam XL	
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
Optical interface	OPT	3	SFP	3 Gbps

Table 4 FRMA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 24 V
Power per port	30 W

Figure 3 FRMA functional block diagram



Electrical specifications

Table 5 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 6 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 7 FRMA installation and mechanical specifications

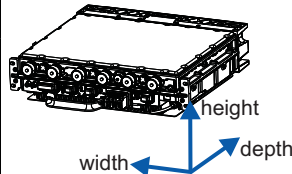
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	FRMA includes casing • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Pole Mounting Kit (VMPB)

Table 7 FRMA installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Mounting Covers for Back and Front (FMCx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Mounting Covers for Back and Front (FMCx) Outdoor 19" rack - Flexi Mounting Covers for Back and Front (FMCx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 8 FRMA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	 The diagram shows a 3D perspective of the FRMA unit. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points to the left from the front face, and 'depth' points into the page from the front face.
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)	
Volume	25 l	

Environmental specifications

Table 9 FRMA 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 10 FRMA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 10 FRMA LEDs (Cont.)

LED color	Description	Alarm
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.



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

7.2 Flexi RF Module 3TX 800 (FRMD)

FRMD technical specifications.

Functional description

Table 11 FRMD functional specification

Property	Value
Output power	3x60 W
MIMO	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

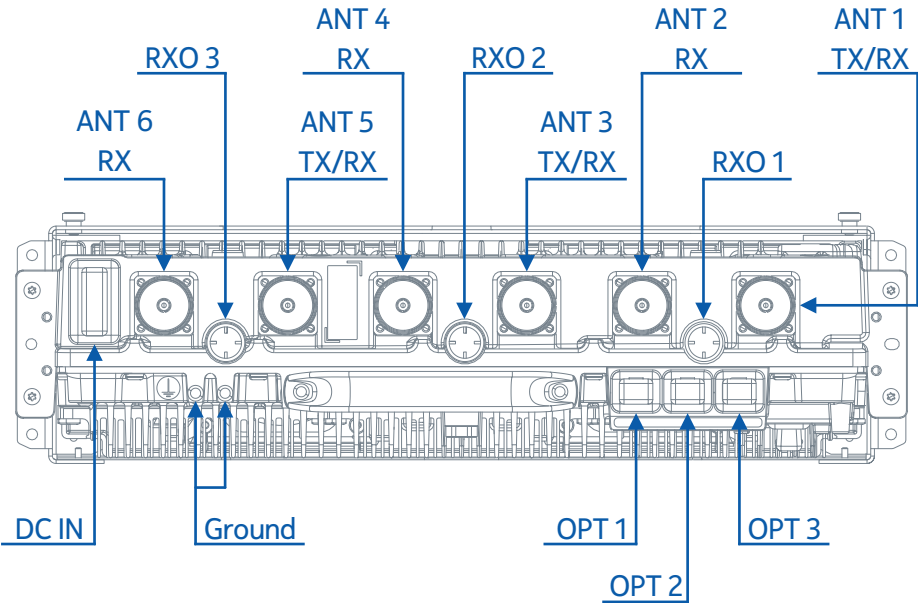


Table 12 FRMD interfaces

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	7/16	
RF output connector	RxO	3	QMA	
Optical interface	OPT	3	SFP	3 Gbps

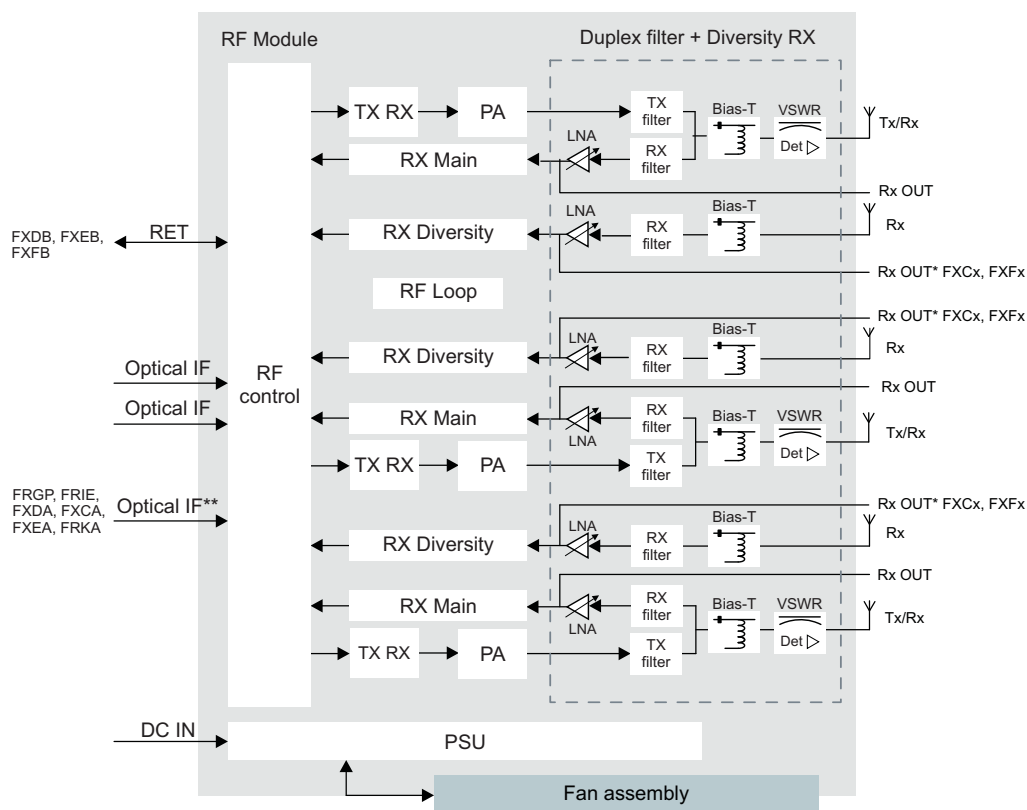
Antenna Line Devices (ALDs) support

Table 13 FRMD ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 24 V
Power per port	30 W

Functional block diagram

Figure 5 FRMD functional block diagram



Electrical specifications

Table 14 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 15 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

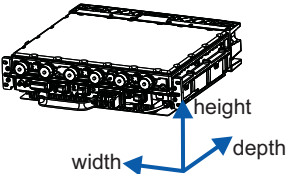
Installation and mechanical specifications

Table 16 FRMD installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 17 FRMD dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.) in millimeters and inches	 The diagram shows a 3D perspective of the FRMD module. Three blue arrows indicate the dimensions: 'height' points to the vertical thickness, 'width' points to the front-facing horizontal dimension, and 'depth' points to the side horizontal dimension.
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)	
Volume	25 l	

Environmental specifications

Table 18 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 19 FRMD LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 19 FRMD LEDs (Cont.)

LED color	Description	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.



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

7.3 Flexi RFM 3-pipe 850 180 W (FXCA)

FXCA technical specifications.

Functional description

Table 20 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

Table 20 FXCA functional specification (Cont.)

Property	Value
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

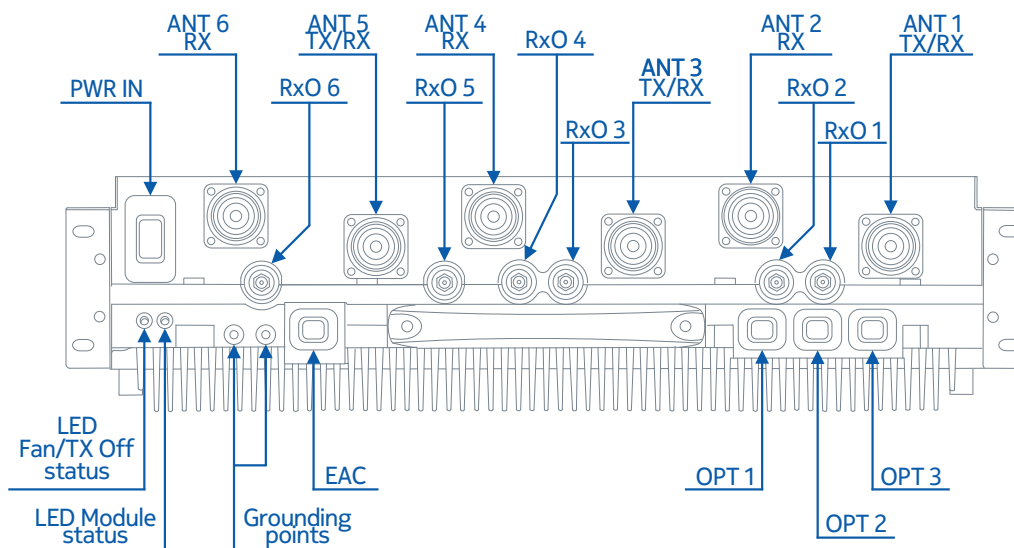


Table 21 FXCA interfaces

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	3	SFP	3 Gbps

Antenna Line Devices (ALDs) support

Table 22 FXCA ALD support

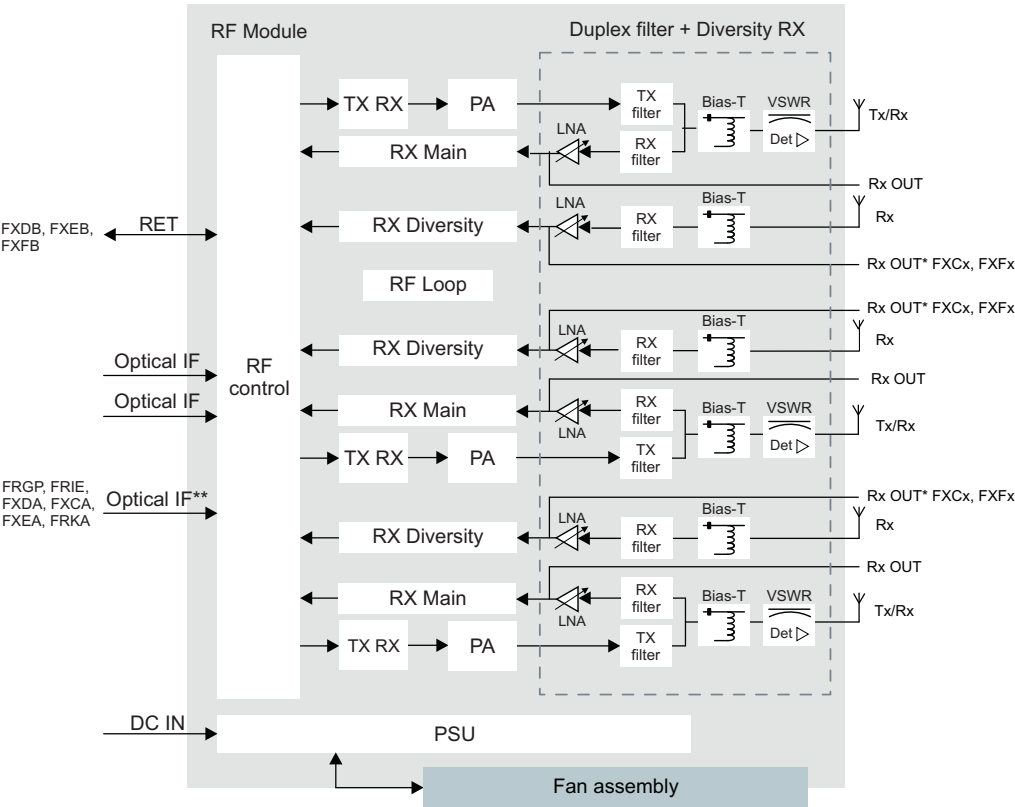
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes

Table 22 FXCA ALD support (Cont.)

ALD support via antenna ports	Value
Voltage	ANT1, ANT3, ANT5: 24V or 12V ANT2, ANT4, ANT6: 12V
Power per port	30 W

Functional block diagram

Figure 7 FXCA functional block diagram



Electrical specifications

Table 23 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 24 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

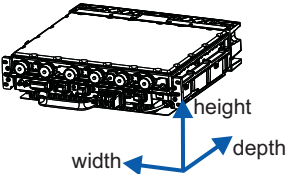
Installation and mechanical specifications

Table 25 FXCA installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 26 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)	
Volume	25 l	

Environmental specifications

Table 27 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 28 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 alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm

Table 28 FXCA LEDs (Cont.)

LED color	Description	Alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.4 Flexi RF Module 3TX 900 (FXDA)

FXDA technical specifications.

Functional description

Table 29 FXDA functional specification

Property	Value
Output power	3x60 W
MIMO	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	20 MHz
UL instantaneous bandwidth	20 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

Interfaces

Figure 8 FXDA interfaces

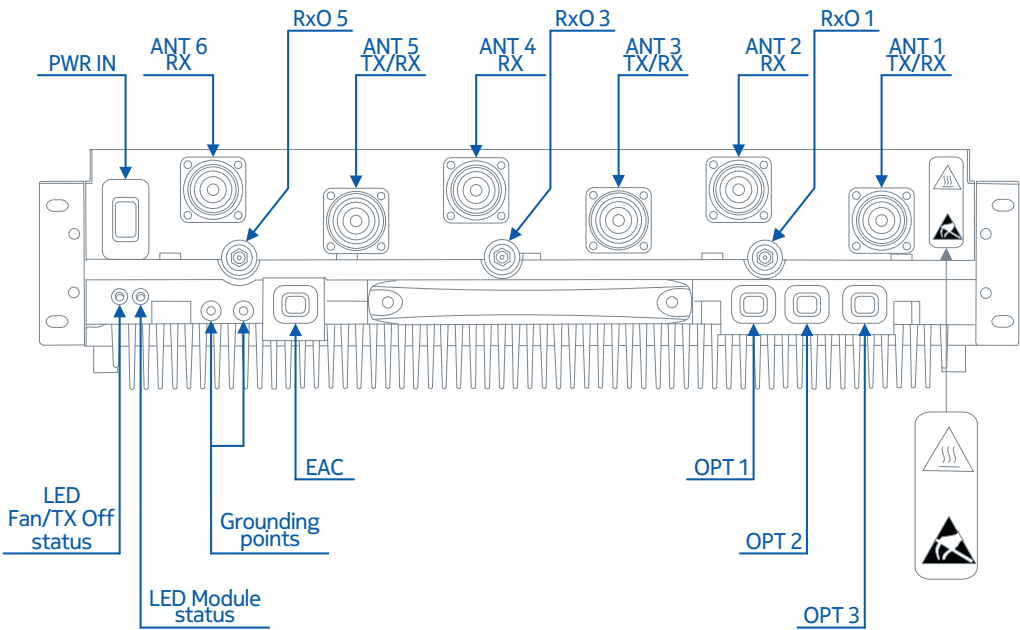


Table 30 FXDA interfaces

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

Table 30 FXDA interfaces (Cont.)

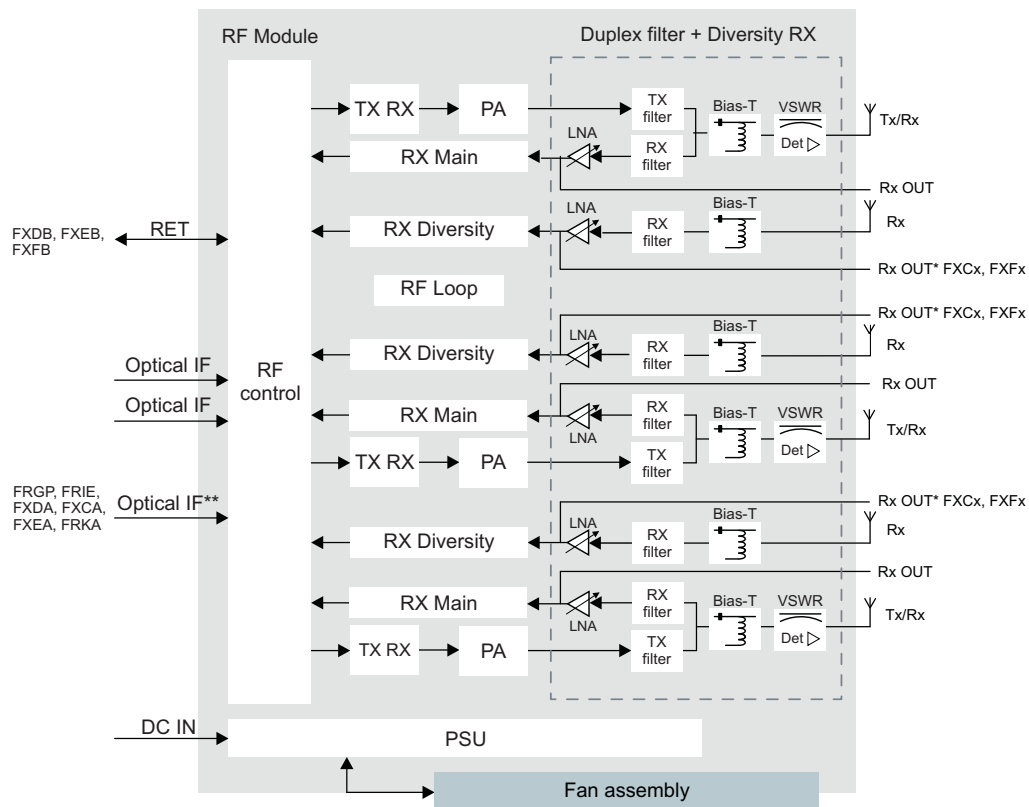
Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
RF output connector	RxO	3	QMA	
External Alarm Connection	EAC	1	RJ45	
Optical interface	OPT	3	SFP	3 Gbps

Antenna Line Devices (ALDs) support

Table 31 FXDA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12V ANT2, ANT4, ANT6: 12V
Power per port	30 W

Functional block diagram



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

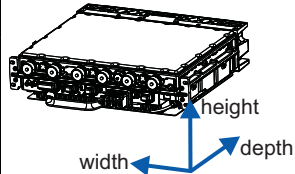
Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
3	60	700	932
	40	533	672
	20	447	523

Table 34 FXDA installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 35 FXDA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	 The diagram shows a 3D perspective of the FXDA module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face to the other side.
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)	
Volume	25 l	

Environmental specifications

Table 36 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 37 FXDA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 37 FXDA LEDs (Cont.)

LED color	Description	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.



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

7.5 Flexi RF Module 3TX 900 (FXDJ)

FXDJ technical specifications.

Functional description

Table 38 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

Table 38 FXDJ functional specification (Cont.)

Property	Value
UL filter bandwidth	12.5 MHz

Interfaces

Figure 10 FXDJ interfaces

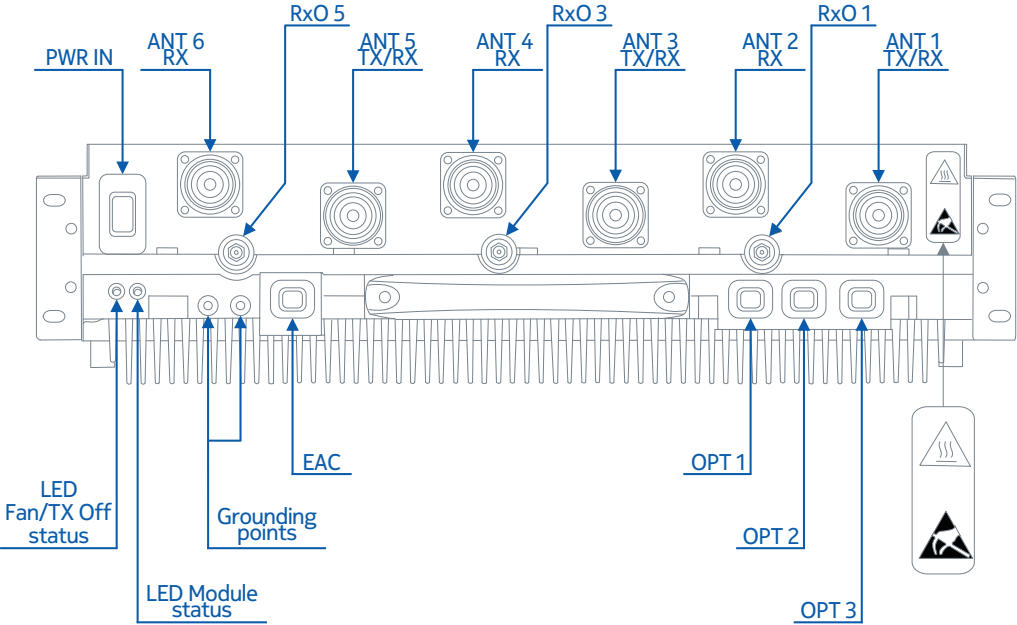


Table 39 FXDJ interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	PWR 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	3	SFP	3 Gbps

Antenna Line Devices (ALDs) support

Table 40 FXDJ ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12 V

ALD support via antenna ports	Value
	ANT2, ANT4, ANT6: 12V
Power per port	30 W

Figure 11 FXDJ functional block diagram



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

57

Table 42 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

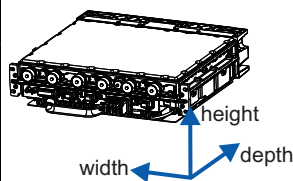
Installation and mechanical specifications

Table 43 FXDJ installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 44 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.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	25 l	

Environmental specifications

Table 45 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 46 FXDJ LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm

Table 46 FXDJ LEDs (Cont.)

LED color	Description	Alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.6 Flexi RFM 3-pipe 1500 180 W (FRKA)

FRKA technical specifications.

Functional description

Table 47 FRKA functional specification

Property	Value
Output power	3x60 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	1485.9-1495.9 MHz
RX frequency range	1427.9 - 1437.8 MHz
DL instantaneous bandwidth	10 MHz
UL instantaneous bandwidth	10 MHz
DL filter bandwidth	10 MHz
UL filter bandwidth	10 MHz

Interfaces

Figure 12 FRKA interfaces

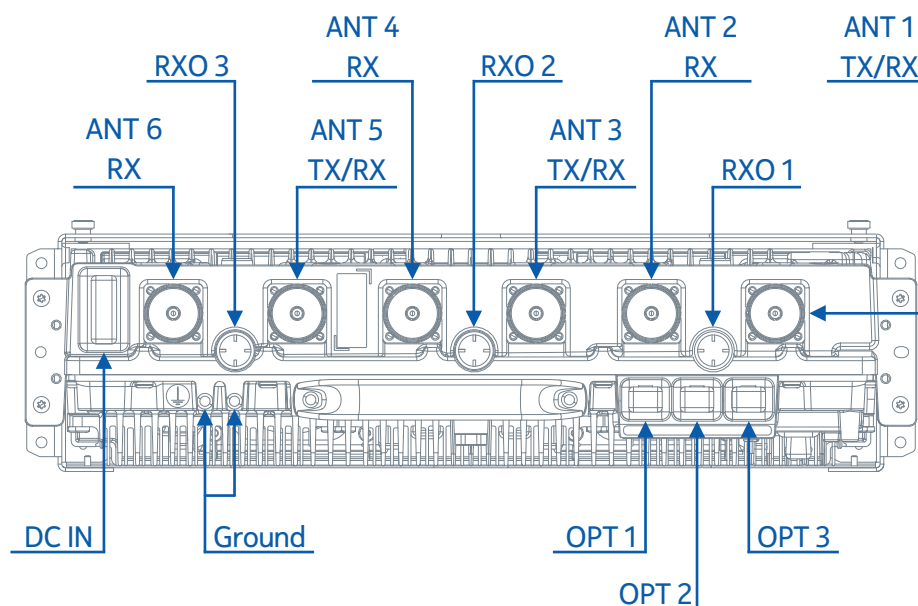


Table 48 FRKA interfaces

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

Table 48 FRKA 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	
Optical interface	OPT	3	SFP	3 Gbps

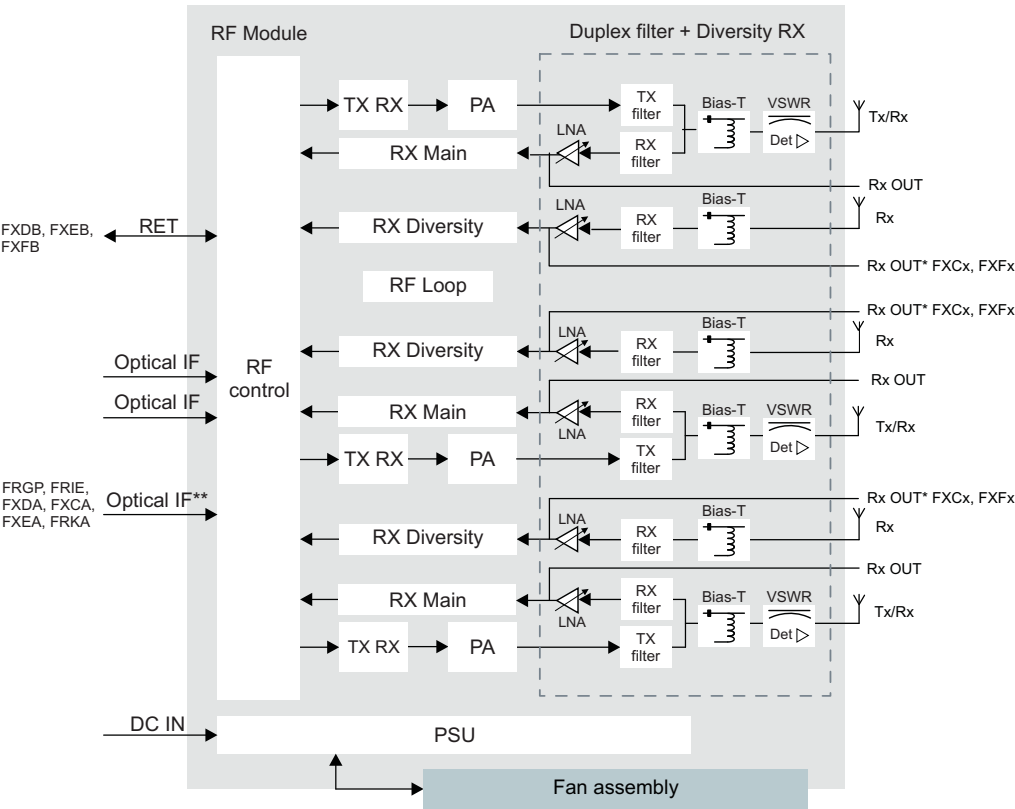
Antenna Line Devices (ALDs) support

Table 49 FRKA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 28V or 12V ANT2, ANT4, ANT6: 12V
Power per port	30 W

Functional block diagram

Figure 13 FRKA functional block diagram



Electrical specifications

Table 50 FRKA 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 51 FRKA 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	640	880
	40	460	605
	20	385	480

Installation and mechanical specifications

Table 52 FRKA installation and mechanical specifications

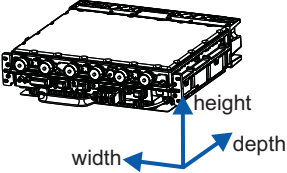
Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	FRKA includes casing - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Mounting Covers for Back and Front (FMCx) Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Mounting Covers for Back and Front (FMCx) Floor/Wall installation

Table 52 FRKA installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Mounting Covers for Back and Front (FMCx) Outdoor 19" rack - Flexi Mounting Covers for Back and Front (FMCx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 53 FRKA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	 Diagram illustrating the dimensions of the FRKA module: height, width, and depth.
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)	
Volume	25 l	

Environmental specifications

Table 54 FRKA 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 55 FRKA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 55 FRKA LEDs (Cont.)

LED color	Description	Alarm
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.



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

7.7 Flexi RF Module 3TX 1800 (FXEA)

FXEA technical specifications.

Functional description

Table 56 FXEA functional specification

Property	Value
Output power	3x60 W
MIMO	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 14 FXEA interfaces

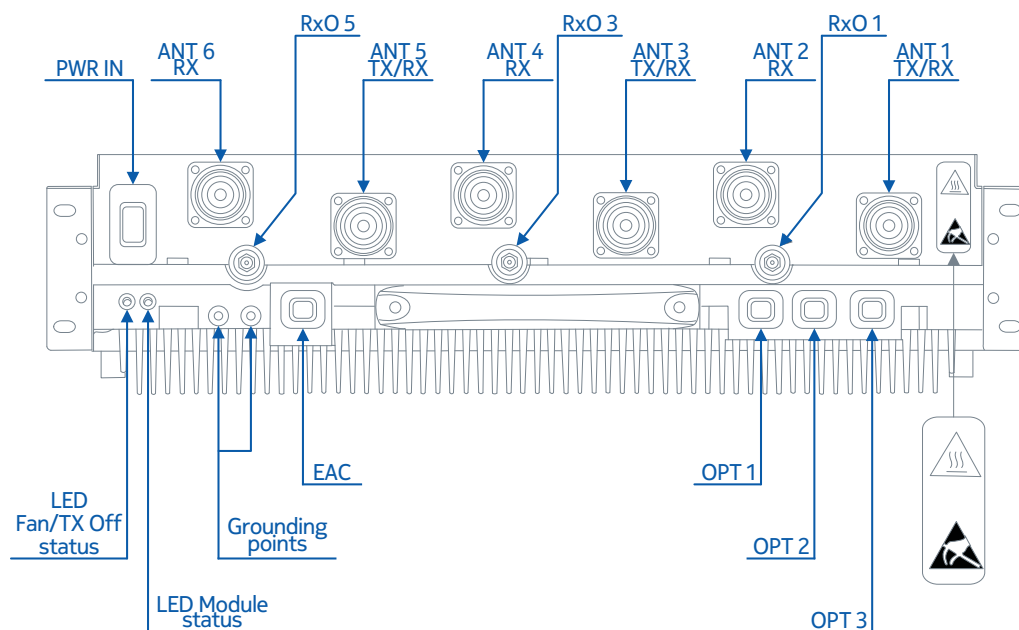


Table 57 FXEA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	PWR 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	3	SFP	3 Gbps

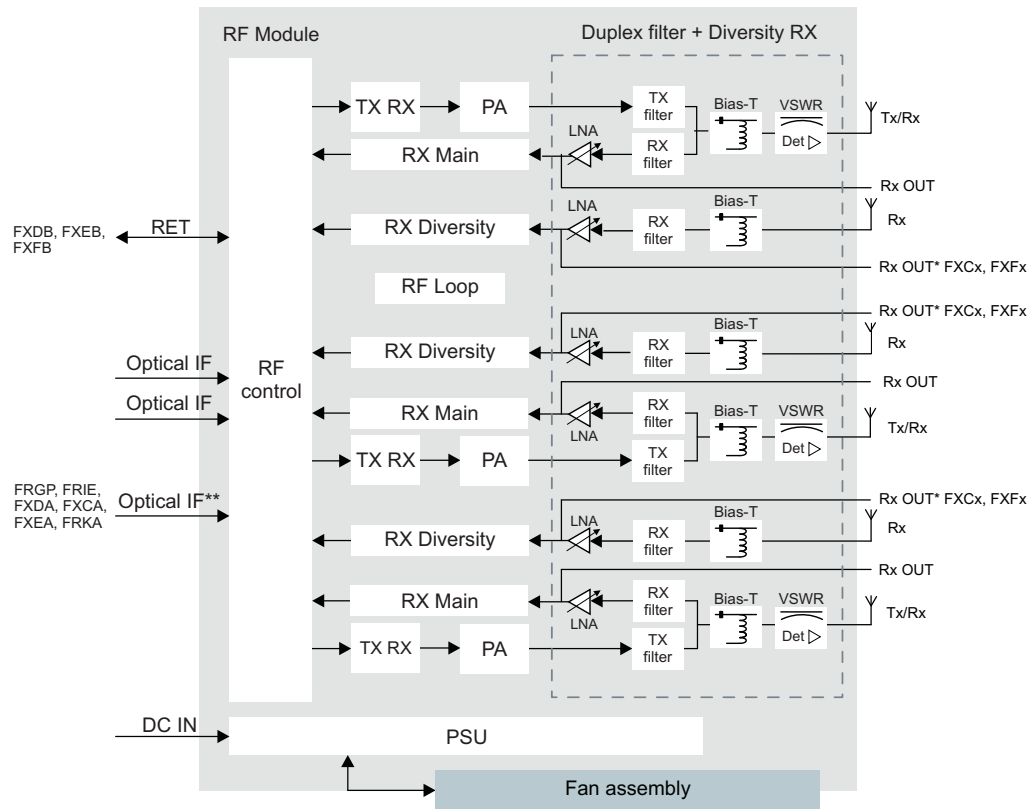
Antenna Line Devices (ALDs) support

Table 58 FXEA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V
Power per port	30 W

Functional block diagram

Figure 15 FXEA functional block diagram



Electrical specifications

Table 59 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 60 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

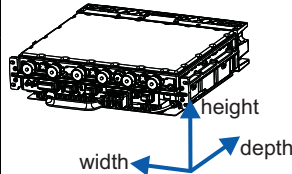
Installation and mechanical specifications

Table 61 FXEA installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 62 FXEA dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	 The diagram shows a 3D perspective of the FXEA module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face towards the front.
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)	
Volume	25 l	

Environmental specifications

Table 63 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 64 FXEA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 64 FXEA LEDs (Cont.)

LED color	Description	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.



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

7.8 Flexi RF Module 3TX 1900 (FXFB)

FXFB technical specifications.

Functional description

Table 65 FXFB functional specification

Property	Value
Output power	3x60 W
MIMO	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

Table 65 FXFB functional specification (Cont.)

Property	Value
UL filter bandwidth	20 MHz

Interfaces

Figure 16 FXFB interfaces

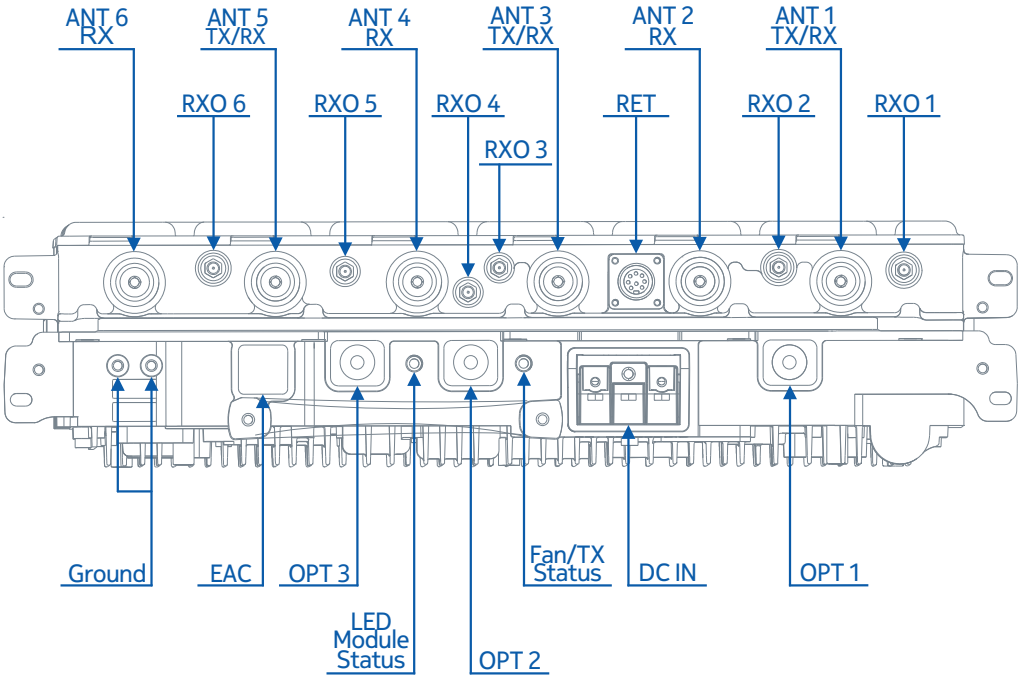


Table 66 FXFB interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	PWR IN	1	Screw-terminal	
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 67 FXFB ALD support

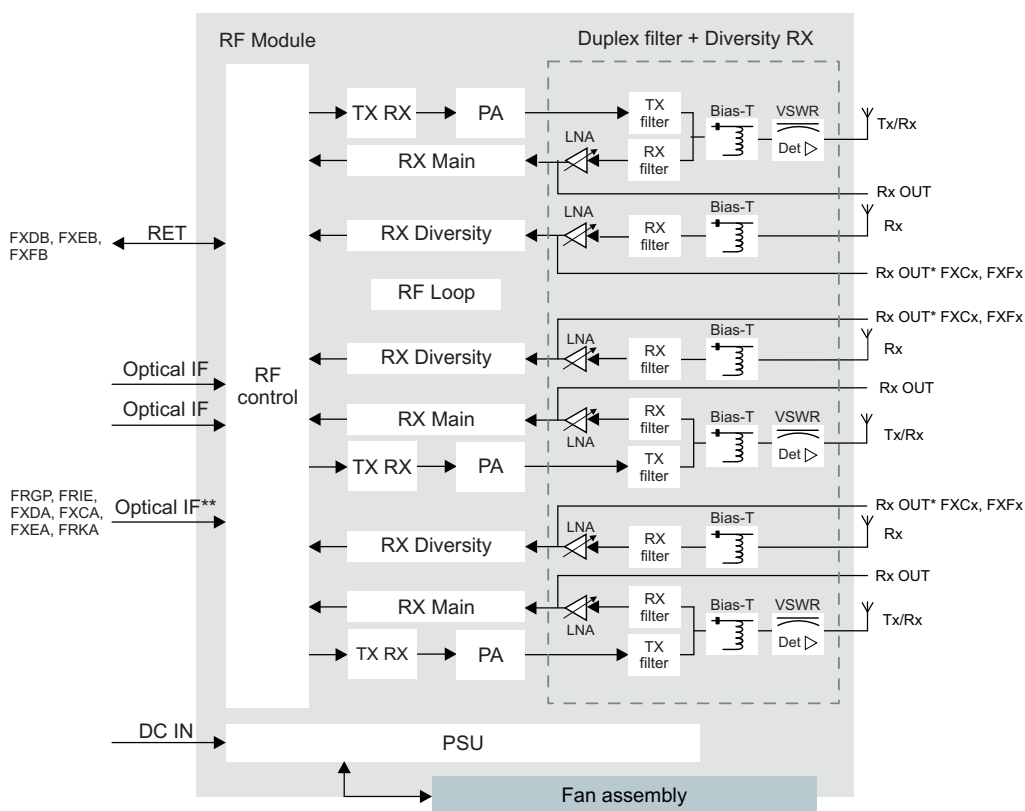
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG: 2.0
Proprietary AISG 1.1	No

Table 67 FXFB ALD support (Cont.)

ALD support via antenna ports	Value
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V RET: 24V
Power per port	30 W

Functional block diagram

Figure 17 FXFB functional block diagram



Electrical specifications

Table 68 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 69 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

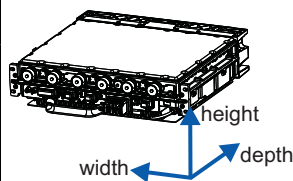
Installation and mechanical specifications

Table 70 FXFB installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 71 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)	
Volume	25 l	

Environmental specifications

Table 72 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 73 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 alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm

Table 73 FXFB LEDs (Cont.)

LED color	Description	Alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.9 Flexi RF Module 3TX 2100 (FRGP)

FRGP technical specifications.

Functional description

Table 74 FRGP functional specification

Property	Value
Output power	3x60 W
MIMO	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 18 FRGP interfaces

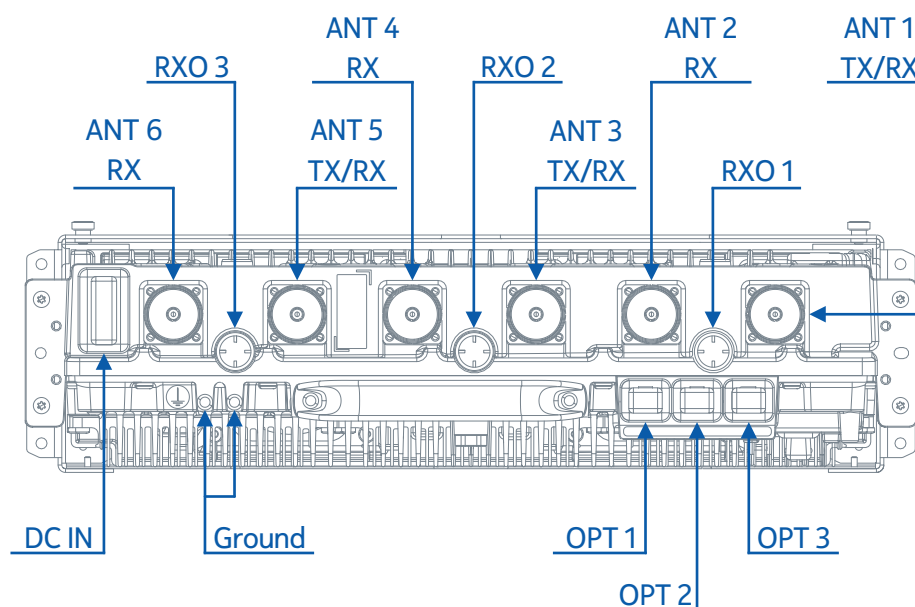


Table 75 FRGP interfaces

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

Table 75 FRGP 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	
Optical interface	OPT	3	SFP	3 Gbps

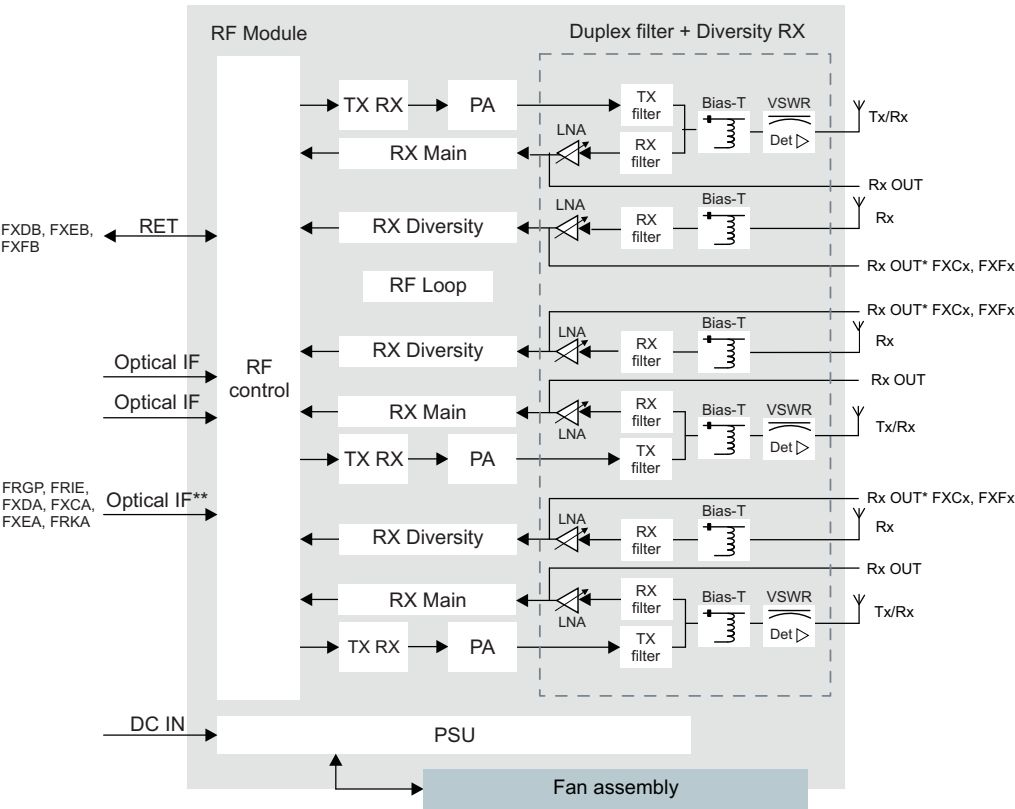
Antenna Line Devices (ALDs) support

Table 76 FRGP ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	Yes
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12V ANT2, ANT4, ANT6: 12V
Power per port	30 W

Functional block diagram

Figure 19 FRGP functional block diagram



Electrical specifications

Table 77 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 78 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	557	759
	40	427	553
	20	317	384

Installation and mechanical specifications

Table 79 FRGP installation and mechanical specifications

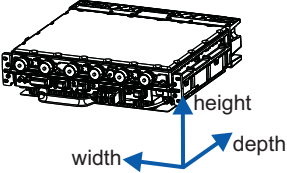
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	FRGP includes casing • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Floor/Wall installation

Table 79 FRGP installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Mounting Covers for Back and Front (FMCx) Outdoor 19" rack - Flexi Mounting Covers for Back and Front (FMCx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 80 FRGP dimensions and weight

Property	Value	Dimensions orientation
Height	133 mm/ 3U (5.2 in.)	 The diagram shows a 3D perspective of the FRGP module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points to the left from the front face, and 'depth' points to the right from the front face.
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)	
Volume	25 l	

Environmental specifications

Table 81 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 82 FRGP LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 82 FRGP LEDs (Cont.)

LED color	Description	Alarm
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.



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

7.10 Flexi RF Module 3TX 2600 (FRHA)

FRHA technical specifications.

Functional description

Table 83 FRHA functional specification

Property	Value
Output power	3x60 W
MIMO	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 20 FRHA interfaces

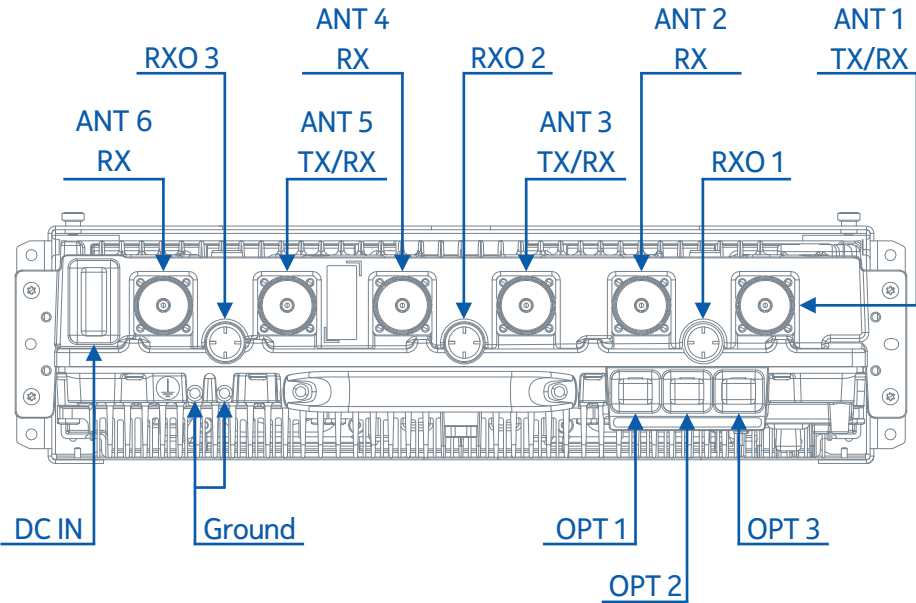


Table 84 FRHA interfaces

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	
RF output connector	RxO	3	QMA	
Optical interface	OPT	3	SFP	3 Gbps

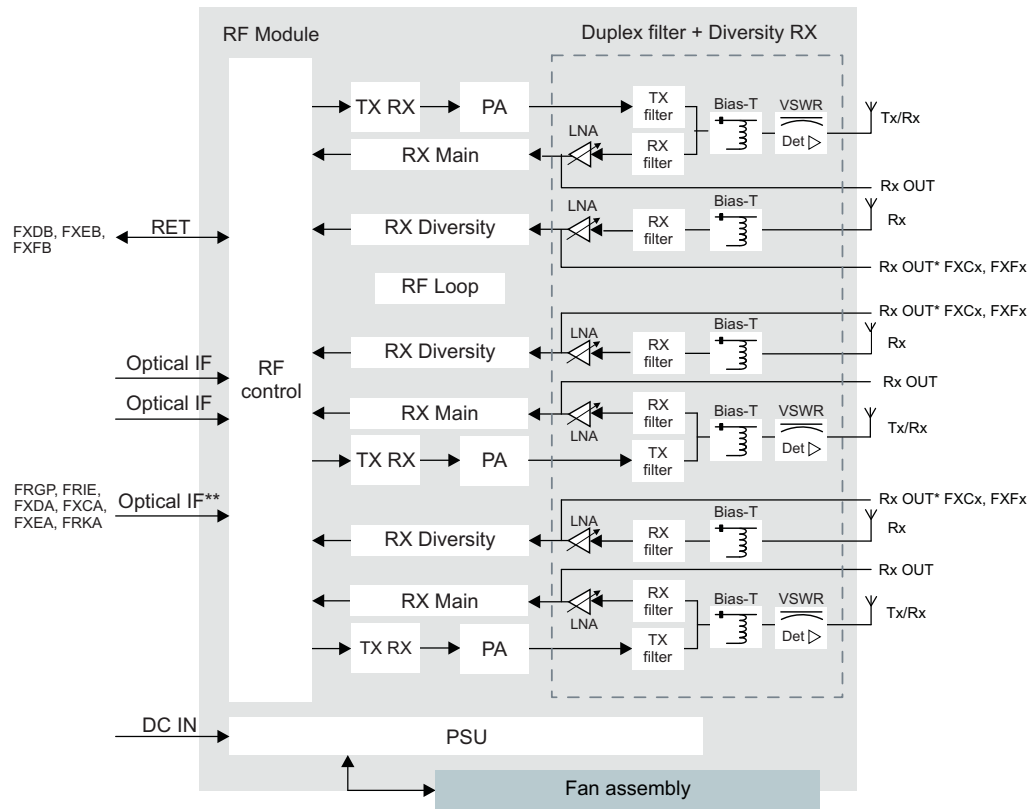
Antenna Line Devices (ALDs) support

Table 85 FRHA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 24V
Power per port	30 W

Functional block diagram

Figure 21 FRHA functional block diagram



Electrical specifications

Table 86 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 87 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 88 FRHA installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Mounting Covers for Back and Front (FMCx) Outdoor 19" rack • Flexi Mounting Covers for Back and Front (FMCx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 89 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.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	25 l	

Environmental specifications

Table 90 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 91 FRHA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 91 FRHA LEDs (Cont.)

LED color	Description	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.



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

7.11 Flexi RF Module 3TX 1700/2100 (FRIE)

FRIE technical specifications.

Functional description

Table 92 FRIE functional specification

Property	Value
Output power	3x60 W
MIMO	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

Table 92 FRIE functional specification (Cont.)

Property	Value
UL filter bandwidth	45 MHz

Interfaces

Figure 22 FRIE interfaces

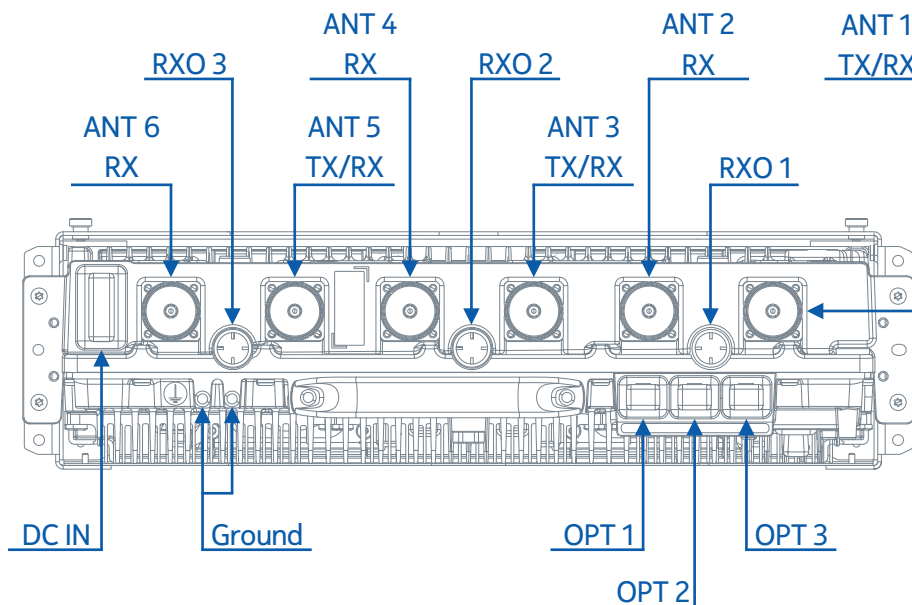


Table 93 FRIE interfaces

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	
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 94 FRIE ALD support

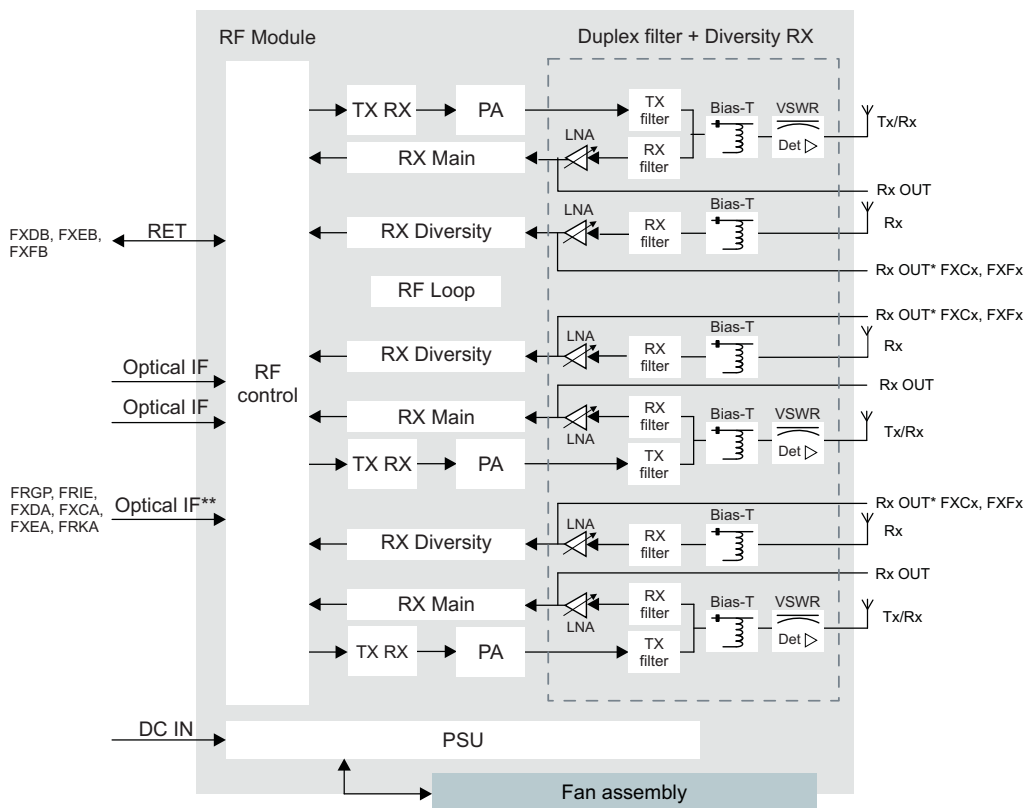
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12V

Table 94 FRIE ALD support (Cont.)

ALD support via antenna ports	Value
	ANT2, ANT4, ANT6: 12V
Power per port	30 W

Functional block diagram

Figure 23 FRIE functional block diagram



Electrical specifications

Table 95 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 96 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 97 FRIE installation and mechanical specifications

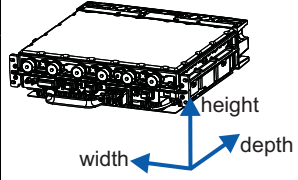
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	FRIE includes casing • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Mounting Covers for Back and Front (FMCx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Mounting Covers for Back and Front (FMCx) Outdoor 19" rack • Flexi Mounting Covers for Back and Front (FMCx) Cabinet/indoor 19" rack

Table 97 FRIE installation and mechanical specifications (Cont.)

Property	Value
	No optional items needed

Dimensions and weight

Table 98 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.)	
Width	Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	25 l	

Environmental specifications

Table 99 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 100 FRIE LEDs

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

Table 100 FRIE LEDs (Cont.)

LED color	Description	Alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.12 Flexi RF Module 3TX 850 (FXCB)

FXCB technical specifications.

Functional description

Table 101 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	25 MHz
UL instantaneous bandwidth	25 MHz
DL filter bandwidth	25 MHz
UL filter bandwidth	25 MHz

Interfaces

Figure 24 FXCB interfaces

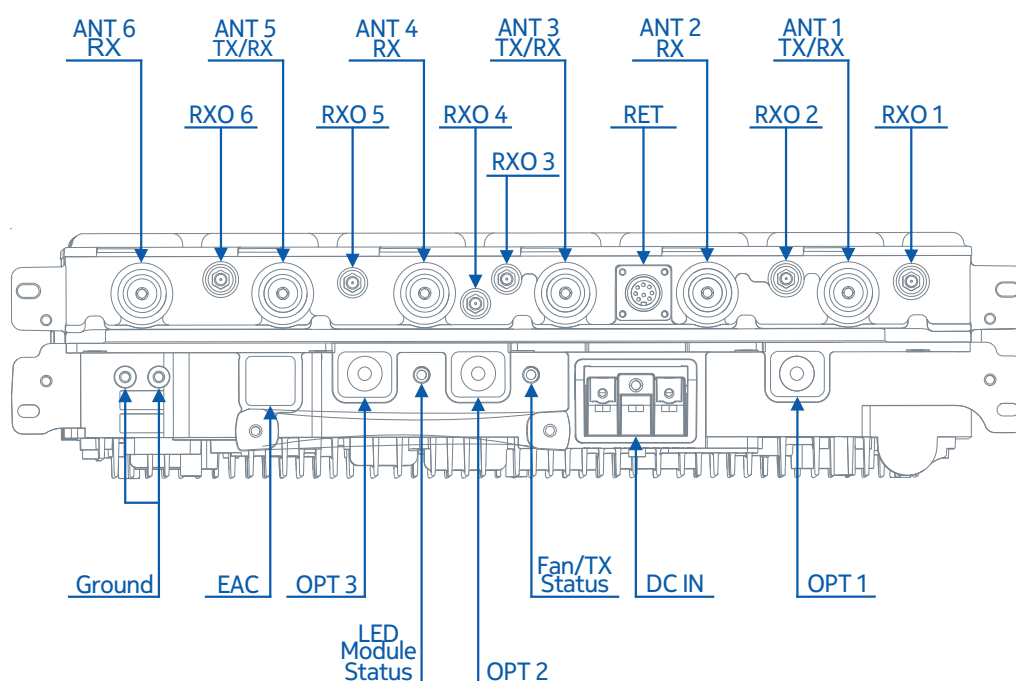


Table 102 FXCB interfaces

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	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

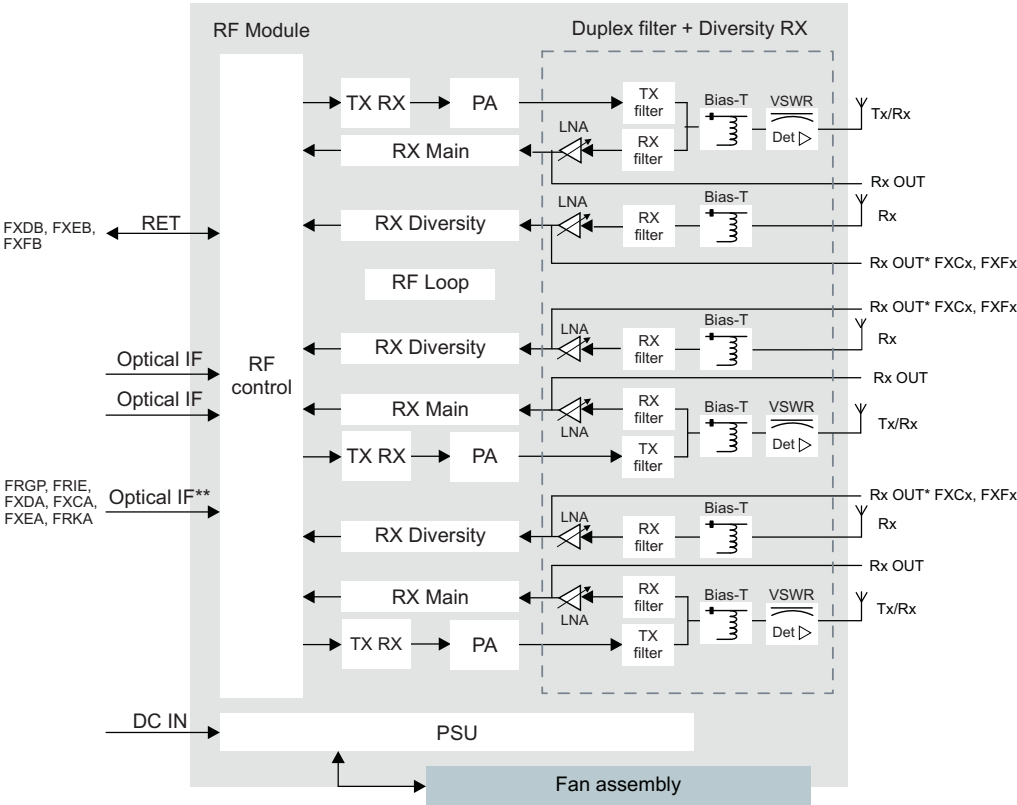
Antenna Line Devices (ALDs) support

Table 103 FXCB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 25 FXCB functional block diagram



Electrical specifications

Table 104 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 105 FXCB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI 202706 average P_{RRH} , static	Power consumption ETSI 202706 busy hour load P_{BH} , static	Power consumption 100% RF power load $P_{100\%}$, RRH	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	460	460	460	460	460	460
	2/2/2	20	474	492	580	470	474	478
	4/4/4	20	606	699	872	517	543	572
WCDMA	1/1/1	20	330	372	455			
	2/2/2	20	393	460	600			
	3/3/3	20	503	604	820			
	4/4/4	20	559	684	947			
MSR	GSM 2/2/2 WCDMA 1/1/1	20 20	638	697	829			

Installation and mechanical specifications

Table 106 FXCB installation and mechanical specifications

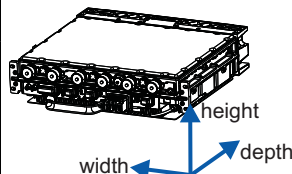
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation

Table 106 FXCB installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 107 FXCB dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FXCB module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face to the other side.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 108 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 109 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 alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 109 FXCB LEDs (Cont.)

LED color	Description	Alarm
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.



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

7.13 Flexi RF Module 3TX 900 (FXDB)

FXDB technical specifications.

Functional description

Table 110 FXDB functional specification

Property	Value
Output power	3x80 W
MIMO	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 26 FXDB interfaces

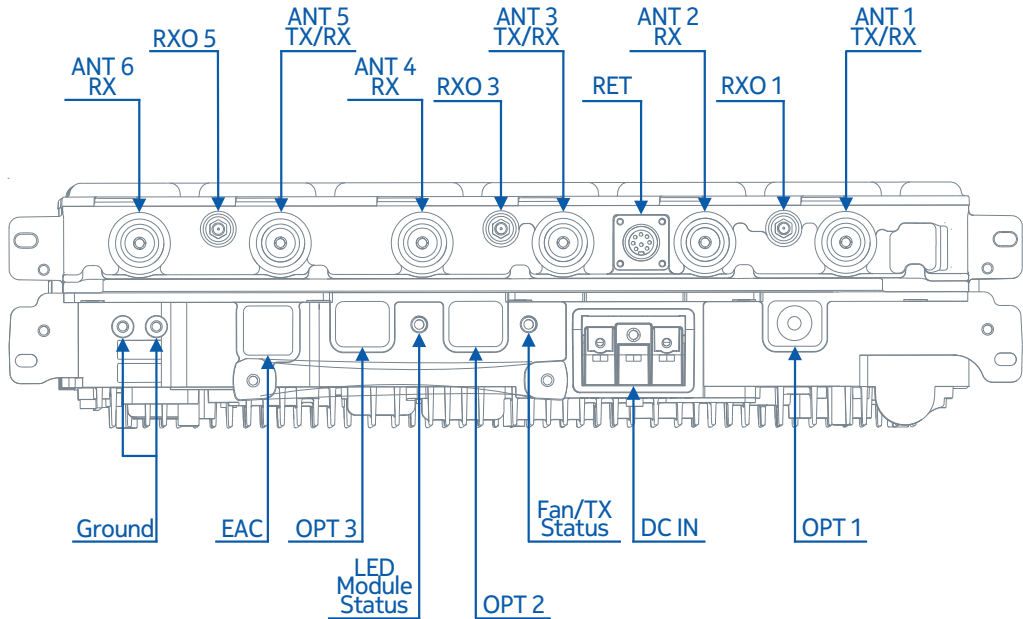


Table 111 FXDB interfaces

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	
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

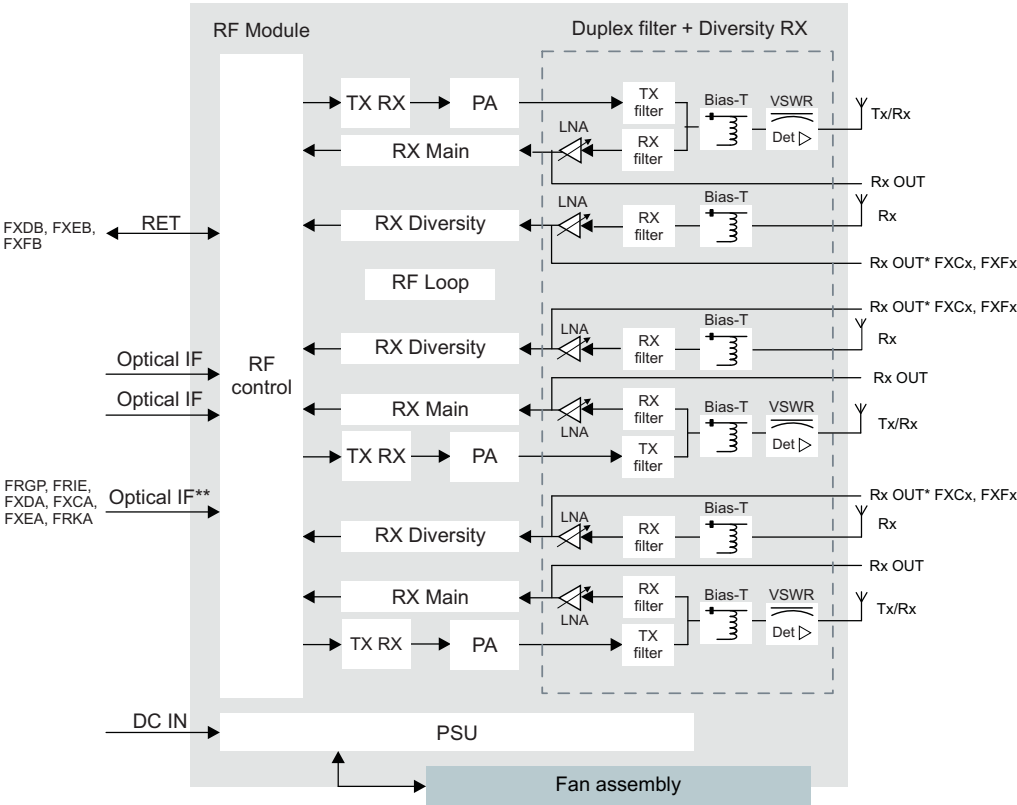
Antenna Line Devices (ALDs) support

Table 112 FXDB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5. RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V RET: 24V
Power per port	30 W

Functional block diagram

Figure 27 FXDB functional block diagram



Electrical specifications

Table 113 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 114 FXDB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	460	460	460	460	460	460
	2/2/2	20	473	492	586	480	485	490
	4/4/4	20	629	731	930	534	561	592
WCDMA	1/1/1	20	331	372	453			
	2/2/2	20	393	460	606			
	3/3/3	20	486	588	813			
	4/4/4	20	543	671	952			
LTE	1/1/1 2T2R	20+20	665	753	916			
	1/1/1 2T2R	40+40	787	932	1223			
	1/1/1 2T2R	60+60	983	1209	1661			
	1/1/1 2T2R	80+80	1098	1381	1939			
MSR	GSM 2/2/2 WCDMA 1/1/1	20 20	584	637	827			

Installation and mechanical specifications

Table 115 FXDB installation and mechanical specifications

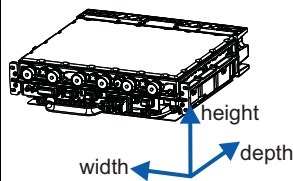
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65

Table 115 FXDB installation and mechanical specifications (Cont.)

Property	Value
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 116 FXDB dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FXDB module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face towards the front.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 117 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 118 FXDB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 118 FXDB LEDs (Cont.)

LED color	Description	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.



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

7.14 Flexi RF Module 3TX 1800 (FXEB)

FXEB technical specifications.

Functional description

Table 119 FXEB functional specification

Property	Value
Output power	3x80 W
MIMO	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 in GSM 50 MHz in LTE
UL instantaneous bandwidth	60 MHz

Table 119 FXEB functional specification (Cont.)

Property	Value
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 28 FXEB interfaces

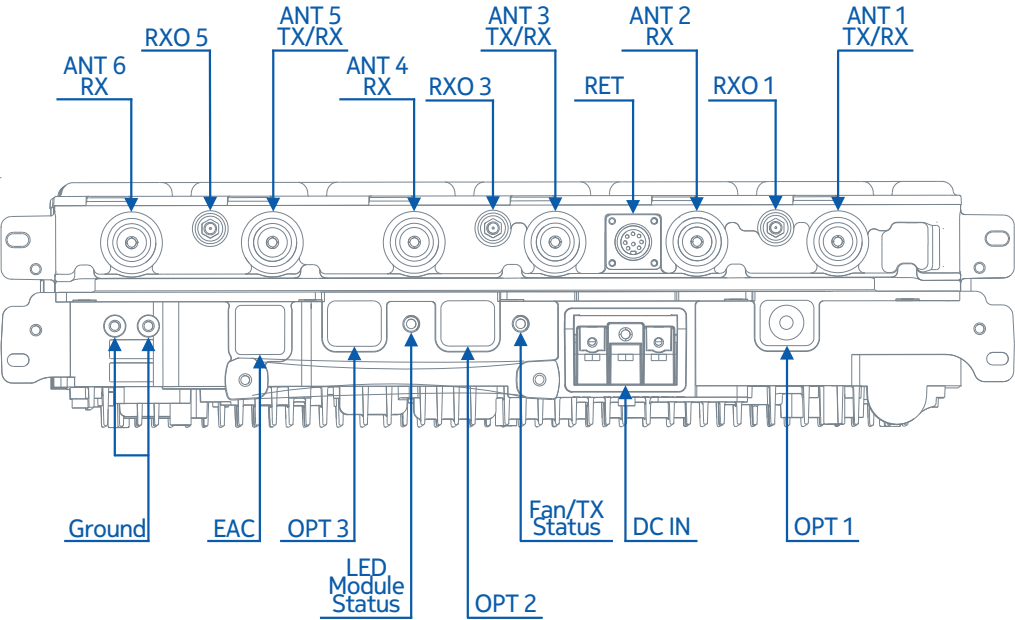


Table 120 FXEB interfaces

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	
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 121 FXEB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No

ALD support via antenna ports	Value
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V RET: 24V
Power per port	30 W

Figure 29 FXEB functional block diagram



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

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Table 123 FXEB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average P_{RRH} , static	Power consumption ETSI ES 202706 busy hour load P_{BH} RRH, static	Power consumption 100% RF power load $P_{100\%}$ RRH	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	438	438	438	438	438	438
	2/2/2	20	454	481	601	452	457	463
	4/4/4	20	596	709	957	491	520	554
	8/8/8	20	998	1387	1869			
LTE	1/1/1 2T2R	20+20	657	728	891			
	1/1/1 2T2R	40+40	770	907	1226			
	1/1/1 2T2R	60+60	915	1118	1589			
	1/1/1 2T2R	80+80	1022	1284	1900			
MSR	GSM 2/2/2 LTE 1/1/1 2T2R	20 20+20	836	937	1206			
	GSM 4/4/4 LTE 1/1/1 2T2R	20 20+20	1002	1198	1592			

Installation and mechanical specifications

Table 124 FXEB installation and mechanical specifications

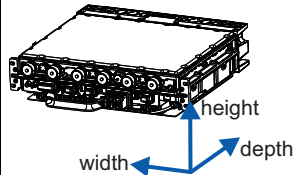
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation

Table 124 FXEB installation and mechanical specifications (Cont.)

Property	Value
	19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 125 FXEB dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FXEB module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points to the left from the front face, and 'depth' points into the page from the front face.
Depth	Core RFM: 400 mm (15.7 in.)	
	Without front covers: 422 mm (16.6 in.)	
	With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.)	
	Without front covers: 447 mm (17.6 in.)	
	With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 126 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 127 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 alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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

Table 127 FXEB LEDs (Cont.)

LED color	Description	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.



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

7.15 Flexi RFM 3-pipe 1800 240 W (FXEE)

FXEE technical specifications.

Functional description

Table 128 FXEE functional specification

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

Table 128 FXEE functional specification (Cont.)

Property	Value
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 30 FXEE interfaces

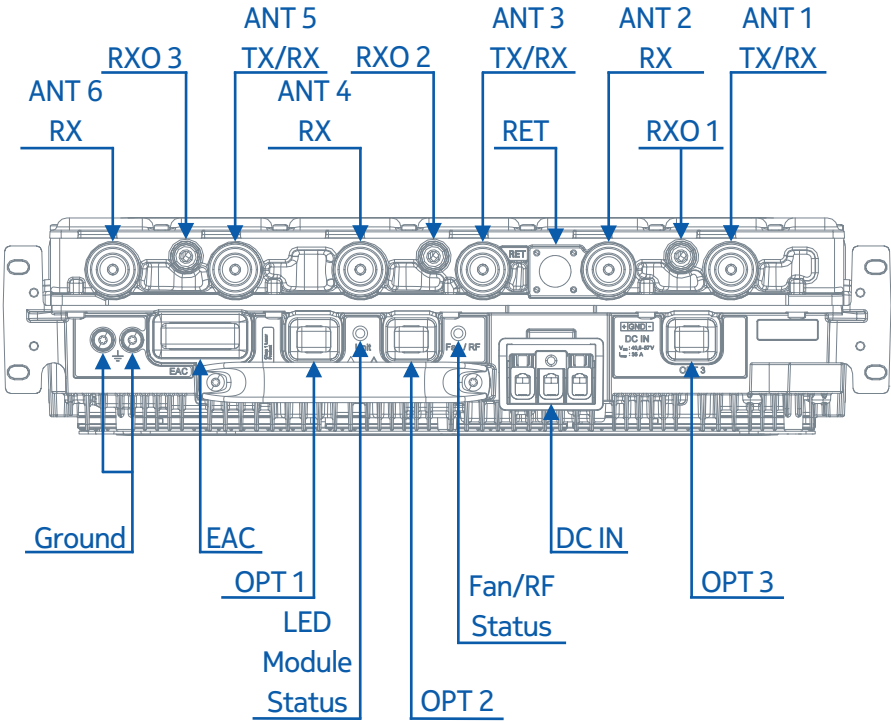


Table 129 FXEE interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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 to 6 Gbps

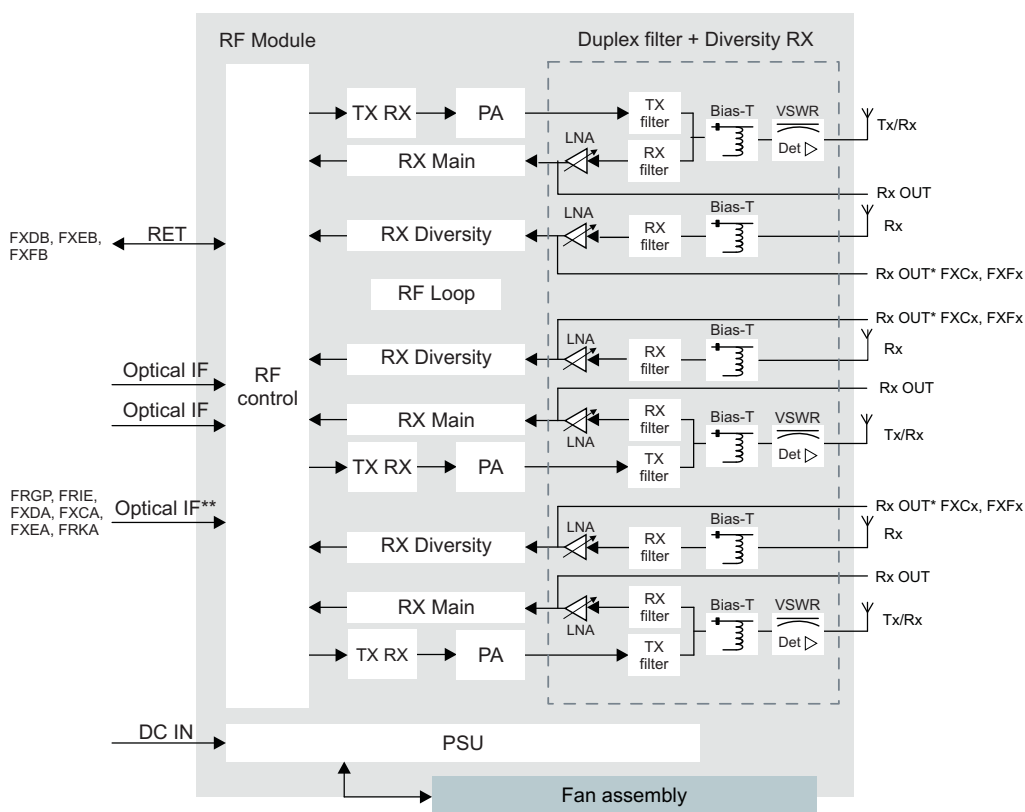
Antenna Line Devices (ALDs) support

Table 130 FXEE ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 25 V or 12 V ANT2, ANT4, ANT6: 12 V RET: 25 V
Power per port	30 W

Functional block diagram

Figure 31 FXEE functional block diagram



Electrical specifications

Table 131 FXEE 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 132 FXEE power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average P_{RRH} , static	Power consumption ETSI ES 202706 busy hour load P_{BH} RRH, static	Power consumption 100% RF power load $P_{100\%}$ RRH	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	492	492	492	492	492	492
	2/2/2	20	520	545	633	518	523	528
	4/4/4	20	674	766	962	583	609	639
LTE	1/1/1 2T2R	20+20	701	774	936			
	1/1/1 2T2R	40+40	815	957	1246			
	1/1/1 2T2R	60+60	960	1149	1559			
	1/1/1 2T2R	80+80	1108	1346	1886			

Installation and mechanical specifications

Table 133 FXEE installation and mechanical specifications

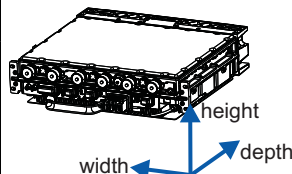
Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation

Table 133 FXEE installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 134 FXEE dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FXEE module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face towards the front.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 135 FXEE 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 136 FXEE LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 136 FXEE LEDs (Cont.)

LED color	Description	Alarm
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.



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

7.16 Flexi RFM 3-pipe 1800 240 W (FXEF)

FXEF technical specifications.



Note: This module is supported in FDD-LTE 16A.

Functional description

Table 137 FXEF functional specification

Property	Value
Output power	3x80 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	GSM, FDD-LTE
TX frequency range	1805 - 1880 MHz
RX frequency range	1710 - 1785 MHz
DL instantaneous bandwidth	75 MHz
UL instantaneous bandwidth	75 MHz in LTE, LTE/GSM Sharing
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 32 FXEF interfaces

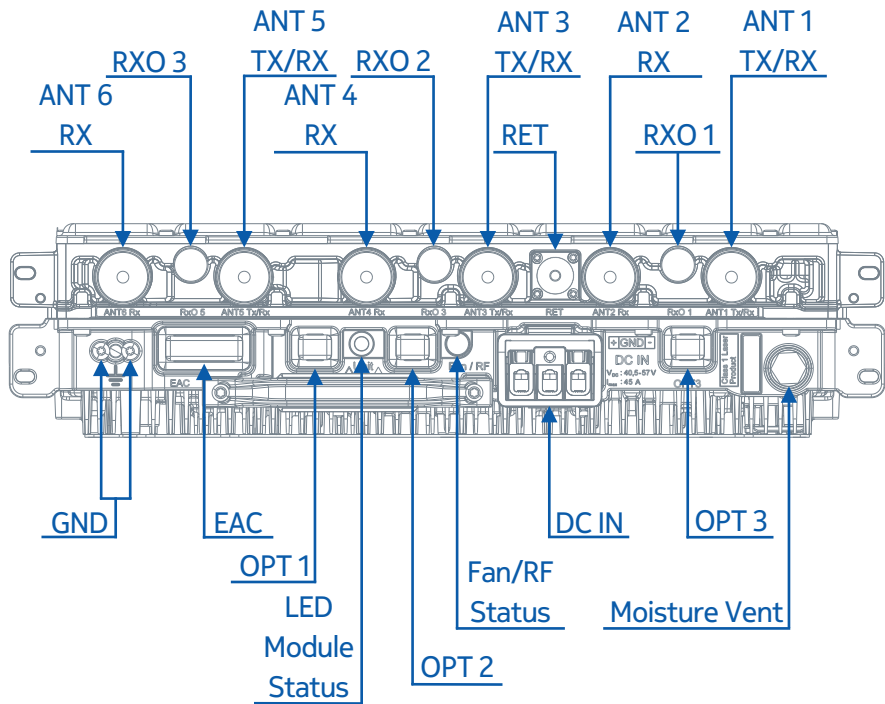


Table 138 FXEF interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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 to 6 Gbps
Ground		1	M8 or dual M5 screws	
Moisture Vent	Moisture Vent	1		

Antenna Line Devices (ALDs) support

Table 139 FXEF ALD support

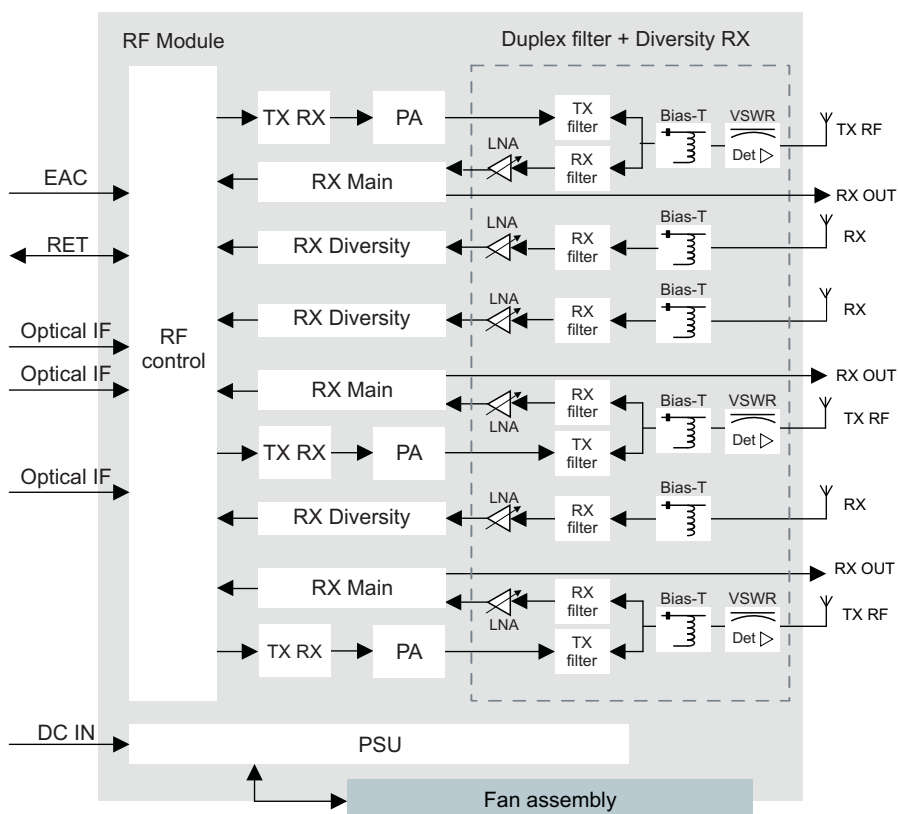
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG1.1	No
CWA (for non-AISG installations)	Yes

Table 139 FXEF ALD support (Cont.)

ALD support via antenna ports	Value
Voltage	ANT1, ANT3, ANT5: 25 V or 12 V ANT2, ANT4, ANT6: 12 V RET: 25 V
Power per port	30 W

Functional block diagram

Figure 33 FXEF functional block diagram



Electrical specifications

Table 140 FXEF 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 FXEF power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	579	649	789
	1/1/1 2T2R	40+40	733	812	1089
	1/1/1 2T2R	60+60	838	1018	1435
	1/1/1 2T2R	80+80	1003	1244	1808

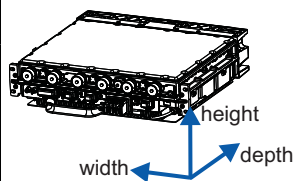
Installation and mechanical specifications

Table 142 FXEF installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 143 FXEF dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 118 mm (4.6 in.)	
Depth	Core RFM: 404 mm (15.9 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 441 mm (17.4 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 144 FXEF 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 FXEF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 145 FXEF LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.17 Flexi RF Module 3TX 1900 (FXFC)

FXFC technical specifications.

Functional description

Table 146 FXFC functional specification

Property	Value
Output power	3x80 W
MIMO	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	50 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	60 MHz
UL filter bandwidth	60 MHz

Interfaces

Figure 34 FXFC interfaces

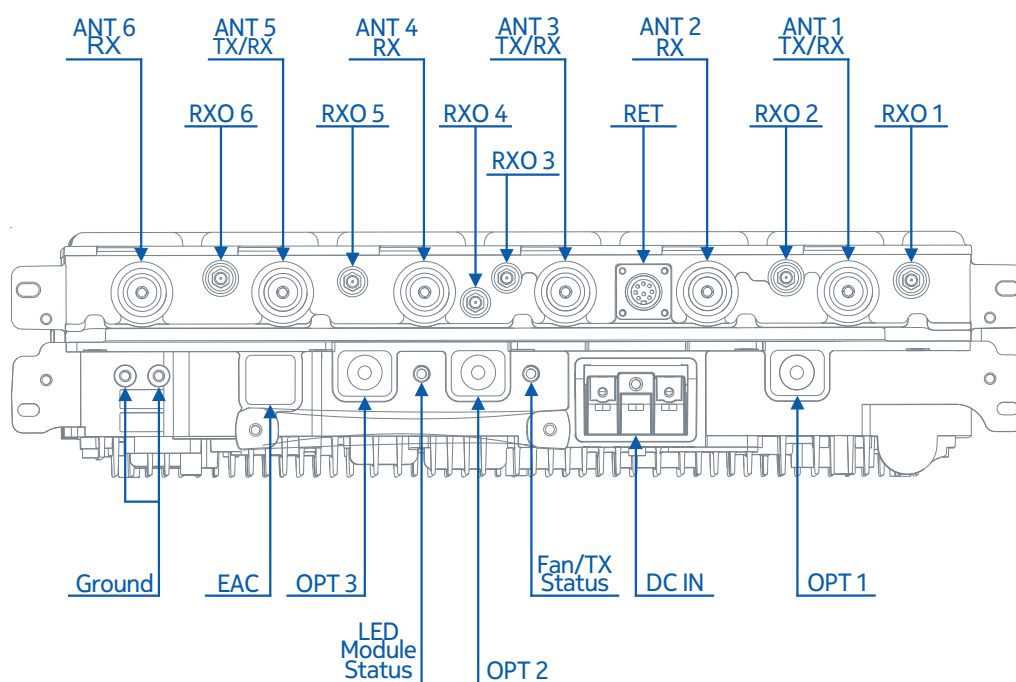


Table 147 FXFC interfaces

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	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

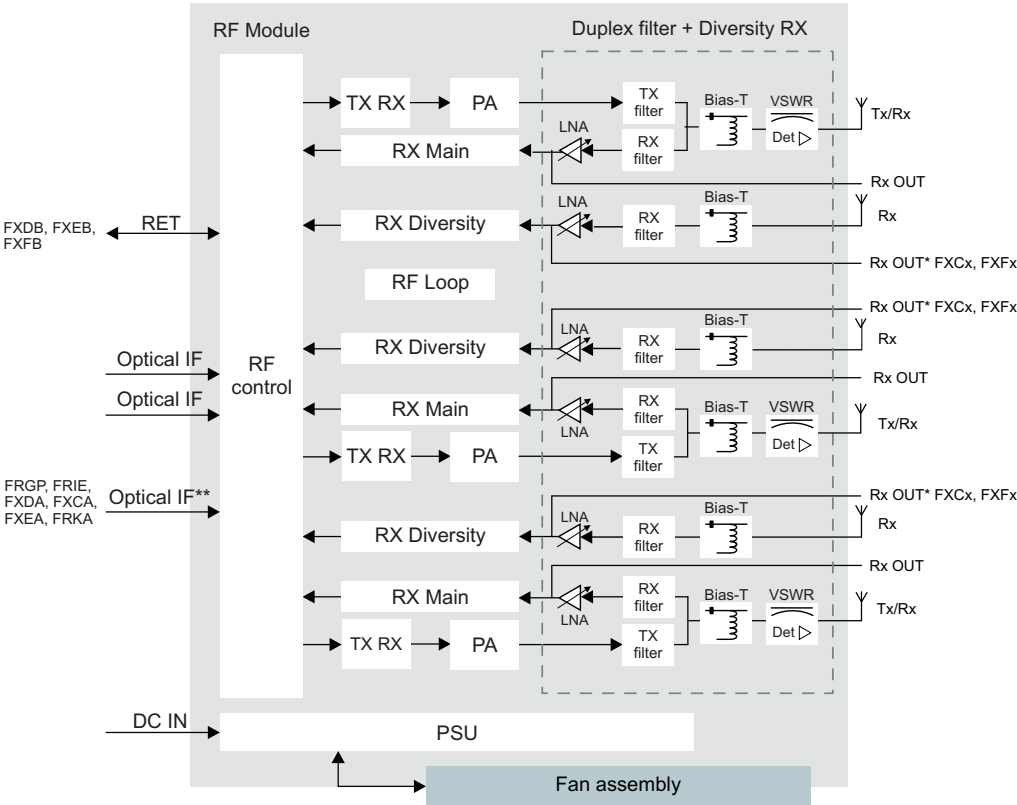
Antenna Line Devices (ALDs) support

Table 148 FXFC ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 13V ANT2, ANT4, ANT6: 13V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 35 FXFC functional block diagram



Electrical specifications

Table 149 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 150 FXFC power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	483	483	483	483	483	483
	2/2/2	20	498	527	653	496	502	508
	4/4/4	20	674	799	1060	557	590	628
WCDMA	1/1/1	20	318	353	428			
	2/2/2	20	377	439	587			
	3/3/3	20	465	554	778			
	4/4/4	20	515	641	923			

Installation and mechanical specifications

Table 151 FXFC installation and mechanical specifications

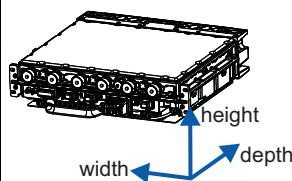
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack

Table 151 FXFC installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 152 FXFC dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FXFC module. Three blue arrows indicate the dimensions: 'height' points upwards from the base, 'width' points from the front face to the back, and 'depth' points from the side face towards the front.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 153 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 154 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 154 FXFC LEDs (Cont.)

LED color	Description	Alarm
	- Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.18 Flexi RFM 3-pipe 900 240 W (FXJB)

FXJB technical specifications.

Functional description

Table 155 FXJB functional specification

Property	Value
Output power	3x80 W
MIMO	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 36 FXJB interfaces

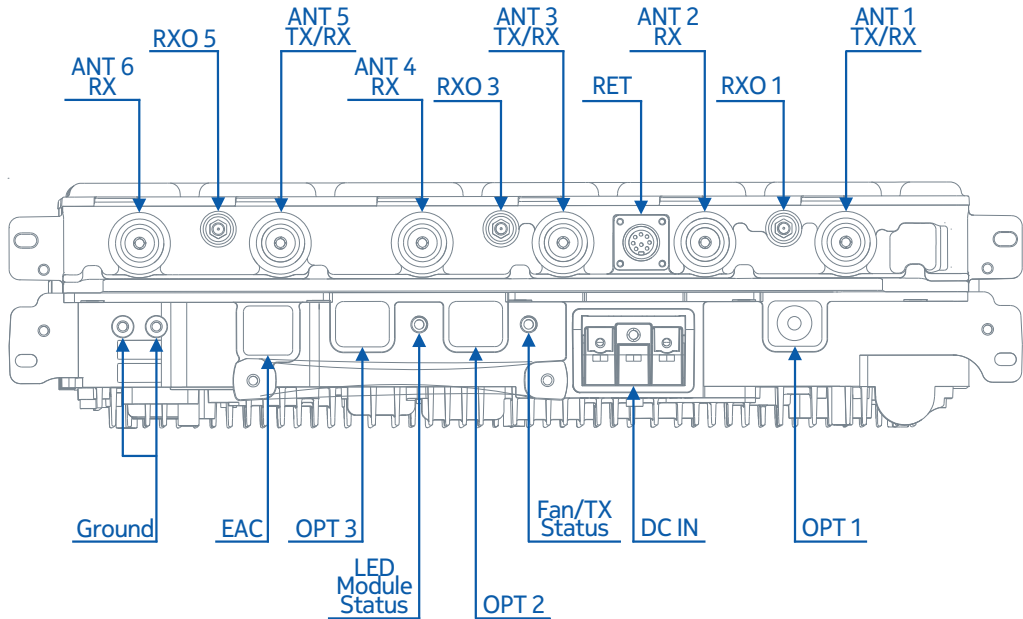


Table 156 FXJB interfaces

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	
RF optical 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

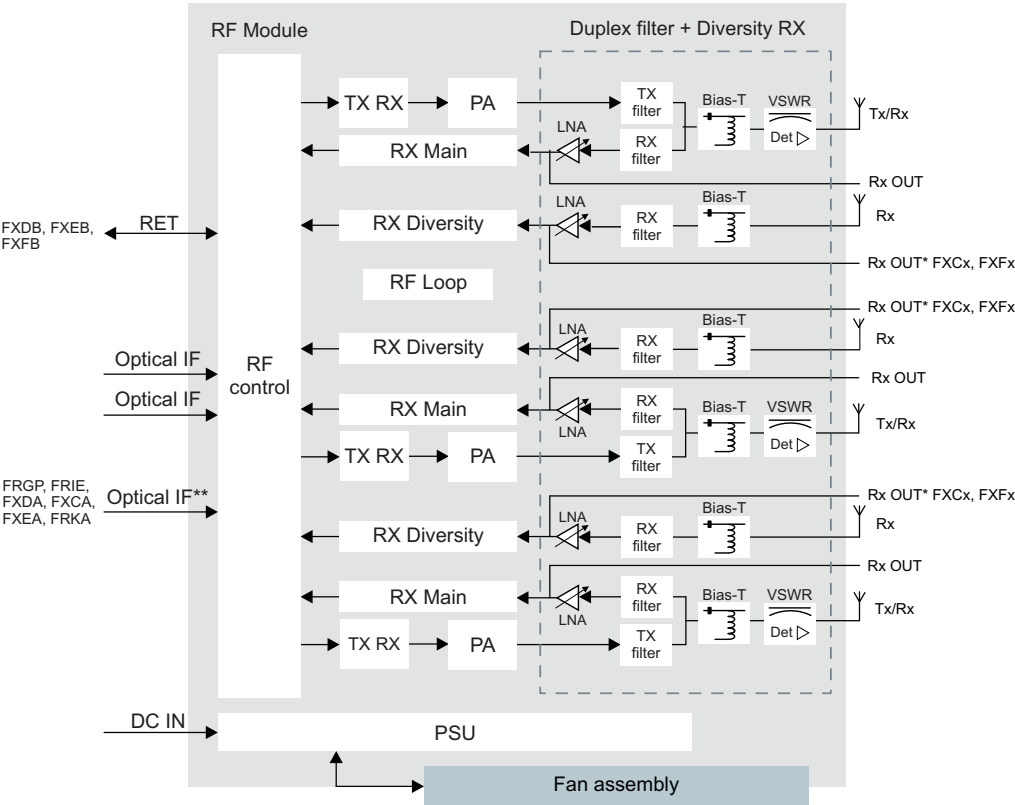
Antenna Line Devices (ALDs) support

Table 157 FXJB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V ANT2, ANT4, ANT6: 12V RET: 24V
Power per port	30 W

Functional block diagram

Figure 37 FXJB functional block diagram



Electrical specifications

Table 158 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 159 FXJB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	467	467	467	467	467	467
	2/2/2	20	497	519	625	470	474	478
	4/4/4	20	671	783	987	569	598	632
WCDMA	1/1/1	20	321	359	437			
	2/2/2	20	379	441	575			
	3/3/3	20	481	577	794			
	4/4/4	20	534	657	923			

Installation and mechanical specifications

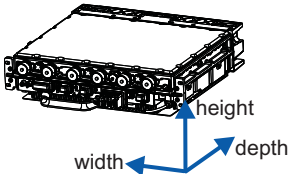
Table 160 FXJB installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack

Table 160 FXJB installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight**Table 161** FXJB dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications**Table 162** 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 163** FXJB 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 163 FXJB LEDs (Cont.)

LED color	Description	Alarm
	- Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.19 Flexi RF Module 3TX 2100 (FRGT)

FRGT technical specifications.

Functional description

Table 164 FRGT functional specification

Property	Value
Output power	3x80 W
MIMO	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 165 FRGT output power in RU40 release and onwards

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 38 FRGT interfaces

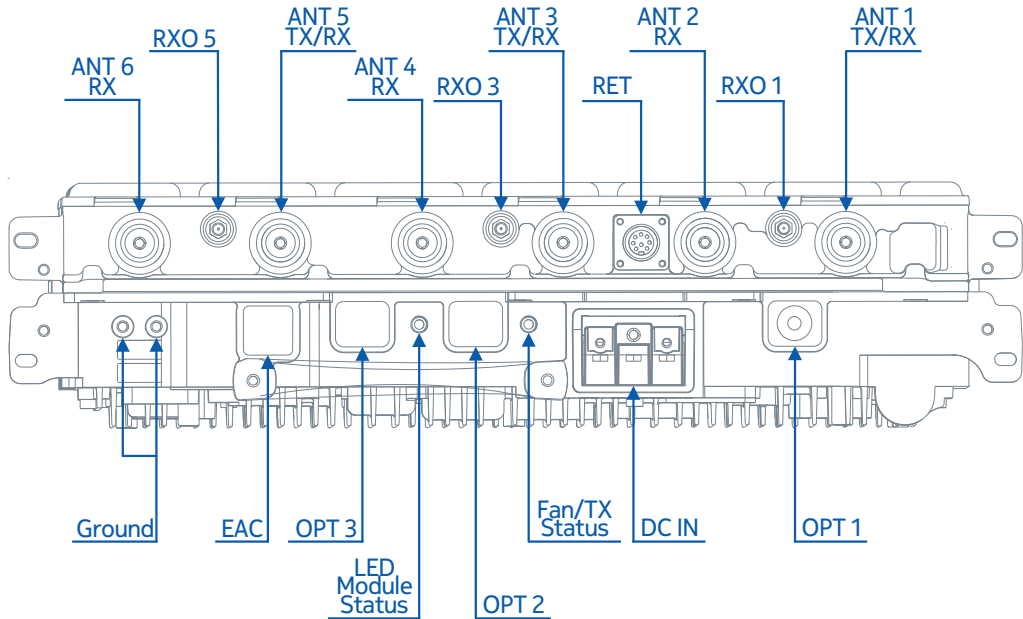


Table 166 FRGT interfaces

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	
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

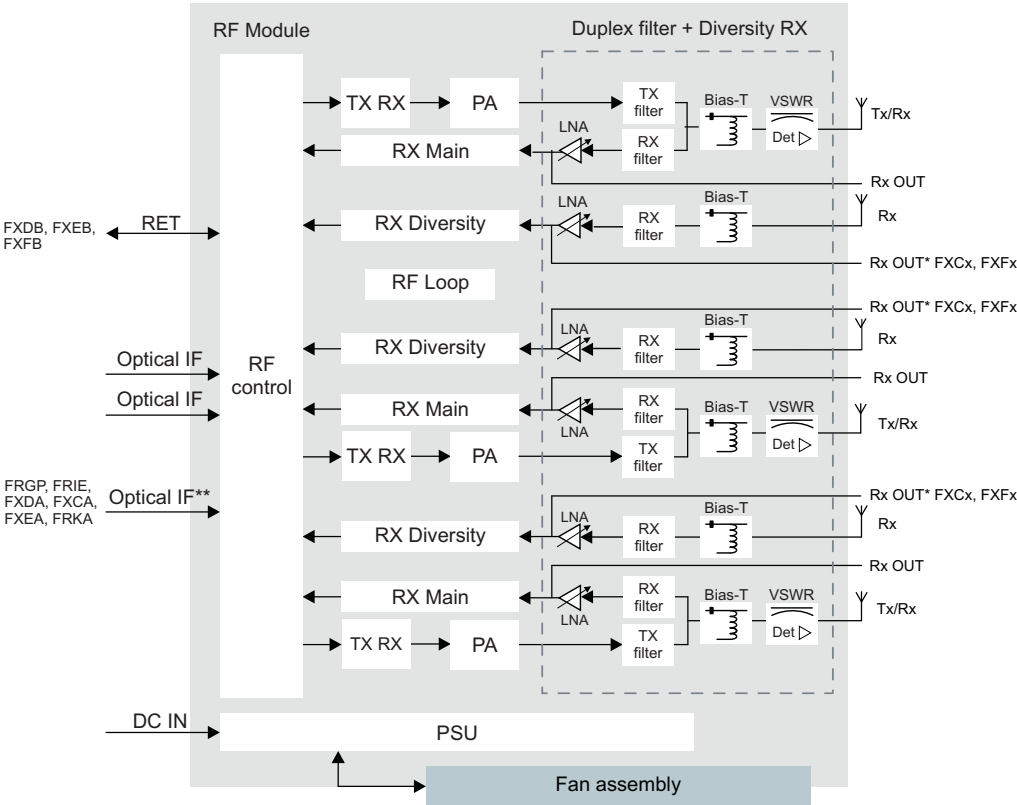
Antenna Line Devices (ALDs) support

Table 167 FRGT ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12V ANT2, ANT4, ANT6: 12V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 39 FRGT functional block diagram



Electrical specifications

Table 168 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 169 FRGT power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI 202706 average $P_{RRH, static}$	Power consumption ETSI 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
WCDMA	1/1/1	20	287	316	386
	2/2/2	20	356	414	547
	3/3/3	20	437	522	729
	4/4/4	20	494	608	885
LTE	1/1/1 2T2R	20+20	580	651	796
	1/1/1 2T2R	40+40	711	843	1117
	1/1/1 2T2R	60+60	818	1010	1427
	1/1/1 2T2R	80+80	976	1232	1803

Installation and mechanical specifications

Table 170 FRGT installation and mechanical specifications

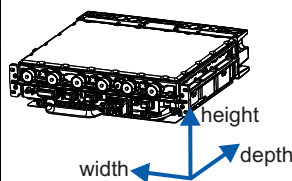
Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack

Table 170 FRGT installation and mechanical specifications (Cont.)

Property	Value
	- Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 171 FRGT dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FRGT module. Three blue arrows indicate the dimensions: 'height' points to the vertical thickness, 'width' points to the front-facing horizontal dimension, and 'depth' points to the side horizontal dimension.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 172 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 173 FRGT 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 173 FRGT LEDs (Cont.)

LED color	Description	Alarm
	- Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

7.20 Flexi RF Module 3TX 2100 (FRGS)

FRGS technical specifications.

Functional description

Table 174 FRGS functional specification

Property	Value
Output power	3x80 W
MIMO	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 175 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 40 FRGS interfaces

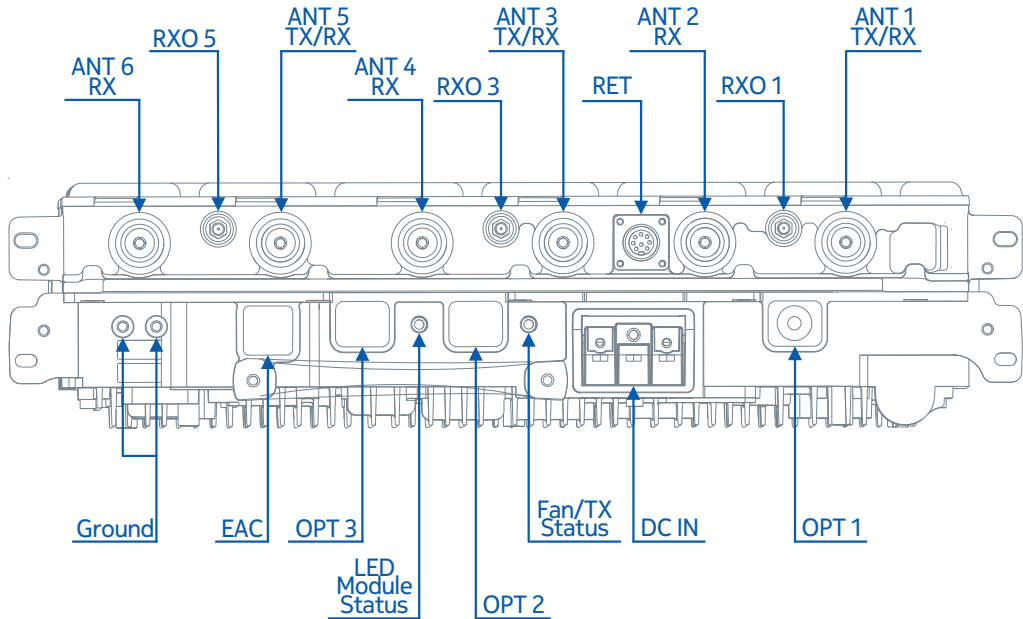


Table 176 FRGS interfaces

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	
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

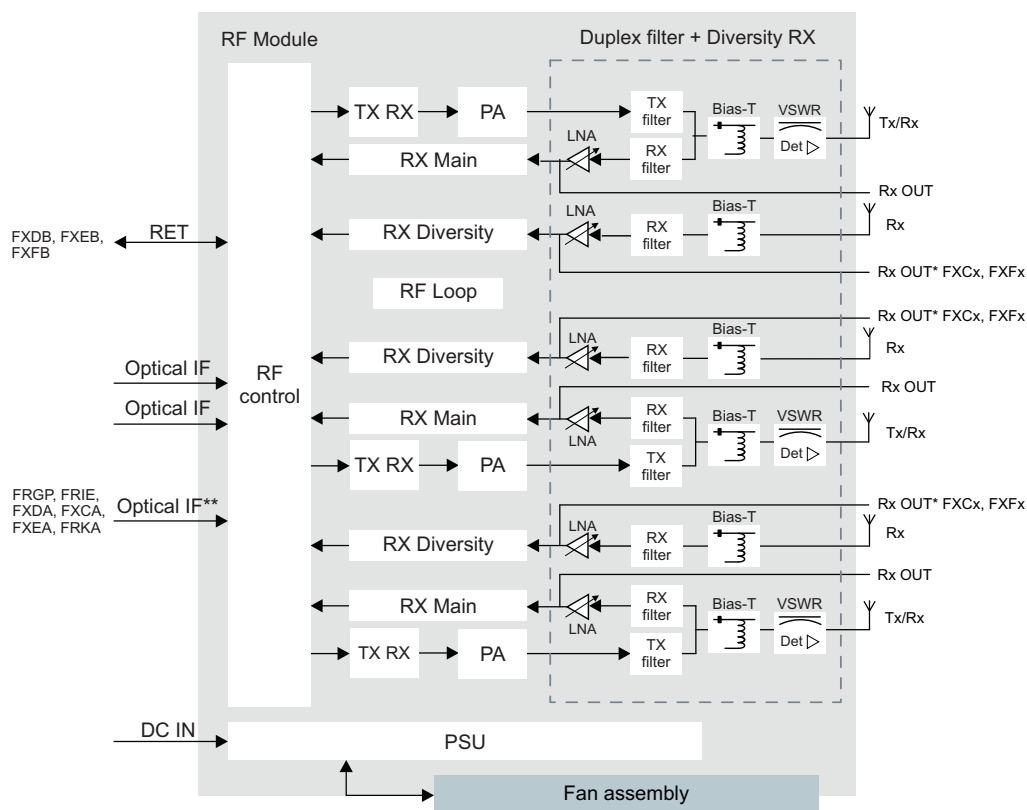
Antenna Line Devices (ALDs) support

Table 177 FRGS ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 24V or 12V ANT2, ANT4, ANT6: 12V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 41 FRGS functional block diagram



Electrical specifications

Table 178 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 179 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 180 FRGS installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 181 FRGS dimensions and weight

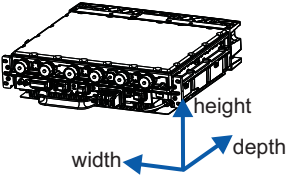
Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	

Table 181 FRGS dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Volume	19.3 l	

Environmental specifications

Table 182 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 183 FRGS LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm
Green, blinking	Software downloading and updating	No alarm

Table 183 FRGS LEDs (Cont.)

LED color	Description	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.



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

7.21 Flexi RFM 3-pipe 2100 240 W (FRGX)

FRGX technical specifications.

Functional description

Table 184 FRGX functional specification

Property	Value
Output power	3x80 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	WCDMA, FDD-LTE
TX frequency range	2110 - 2170 MHz

Table 184 FRGX functional specification (Cont.)

Property	Value
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 42 FRGX interfaces

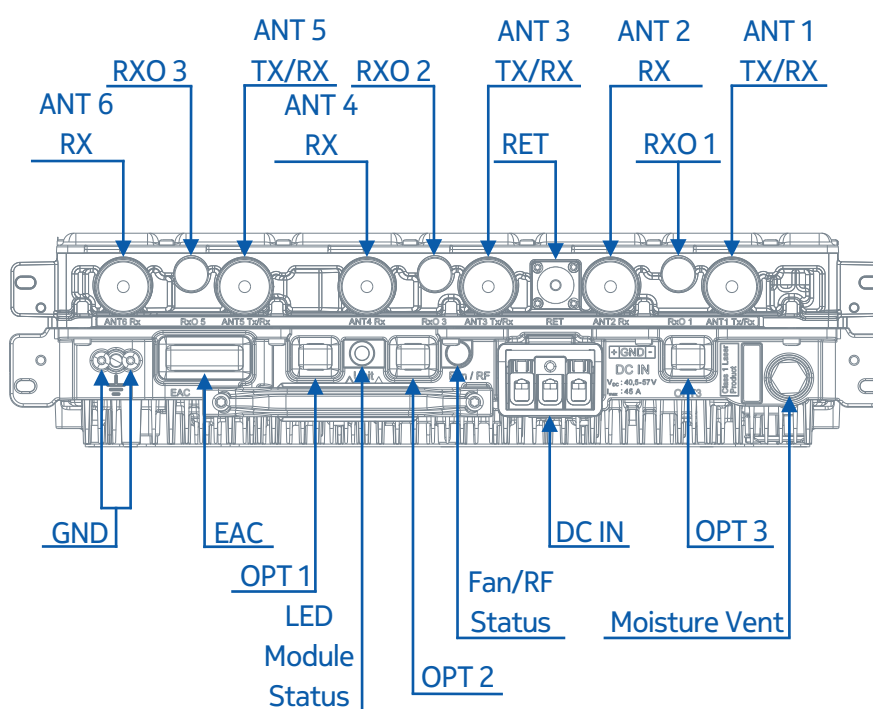


Table 185 FRGX interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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 to 6 Gbps

Table 185 FRGX interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Ground		1	M8 or dual M5 screws	
Moisture Vent	-	1	Core Vent	

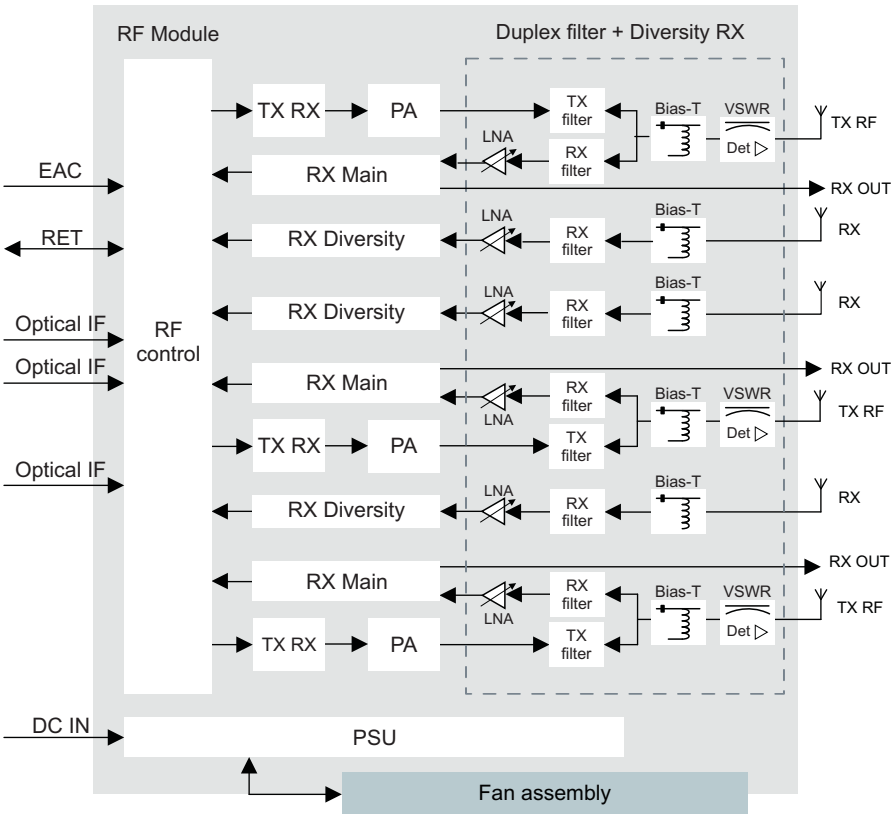
Antenna Line Devices (ALDs) support

Table 186 FRGX ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 25 V or 12 V ANT2, ANT4, ANT6: 12 V RET: 25 V
Power per port	30 W

Functional block diagram

Figure 43 FRGX functional block diagram



Electrical specifications

Table 187 FRGX 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



Note: This information will be provided in further releases.

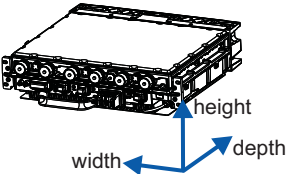
Installation and mechanical specifications

Table 188 FRGX installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 189 FRGX dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 118 mm (4.6 in.)	
Depth	Core RFM: 404 mm (15.9 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 441 mm (17.4 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	25 kg (55.1 lbs)	
Volume	19.3 l	

Environmental specifications

Table 190 FRGX 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 FRGX LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 191 FRGX LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	


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.



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

8 Descriptions of 6TX RF Modules

8.1 Flexi RF Module 6TX 700 (FRPA)

FRPA technical specifications.

Functional description

Table 192 FRPA functional specification

Property	Value
Output power	6x40 W
MIMO	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 44 FRPA interfaces

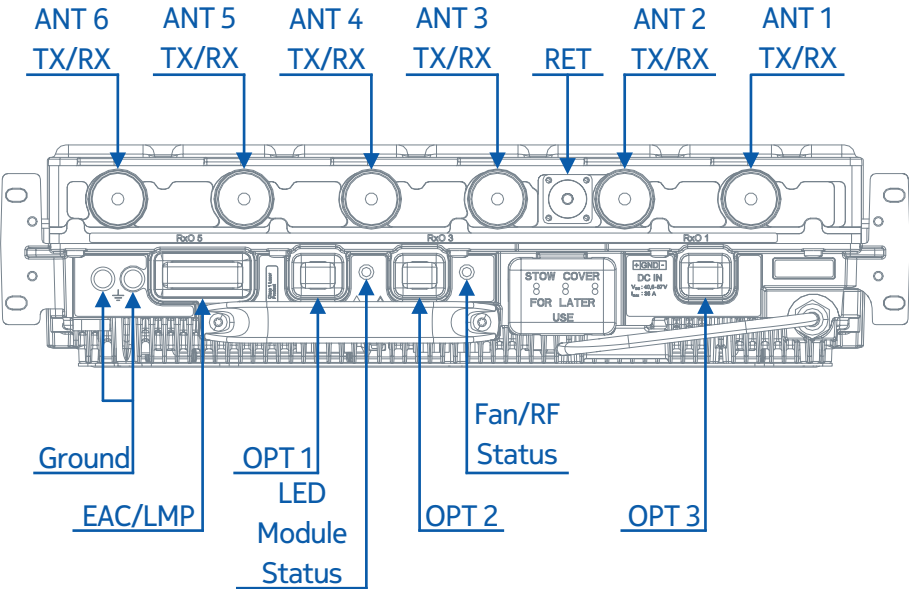


Table 193 FRPA interfaces

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

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25V RET: 25V
Power per port	30 W

Functional block diagram

The diagram illustrates the internal architecture of the RF Module, which is divided into four parallel processing channels. The inputs on the left are EAC, RET, Optical IF, Optical IF, and Optical IF**. The module is controlled by RF control signals. Each channel contains a TX RF and RX RF block, a PA (Power Amplifier) block with PA Main and PA Div sections, and an LNA (Low Noise Amplifier) block. The PA and LNA blocks are connected to a Filter section, which includes TX and RX filters, a Bias-T, and a VSWR (Voltage Standing Wave Ratio) detector. The output of each channel is labeled Tx/Rx. The module is powered by a PSU (Power Supply Unit) and a Fan assembly, which are connected to the DC IN and DC OUT lines.

Table 195 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

Issue: 19

Table 196 FRPA power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	399	453	568
	1/1/1 2T2R	40+40	576	692	934

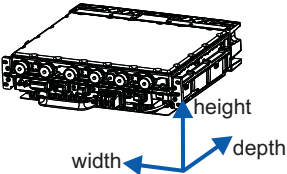
Installation and mechanical specifications

Table 197 FRPA installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 198 FRPA dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications**Table 199** 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 200** FRPA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 200 FRPA LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.2 Flexi RF Module 6TX 700 (FRPB)

FRPB technical specifications.

Functional description

Table 201 FRPB functional specification

Property	Value
Output power	6x40 W
MIMO	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 46 FRPB interfaces

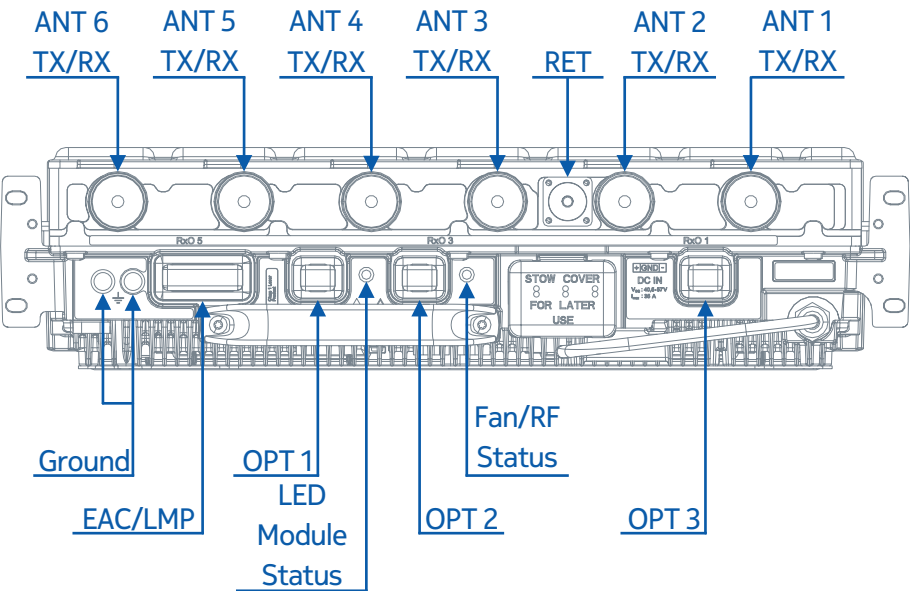


Table 202 FRPB interfaces

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

Table 202 FRPB interfaces (Cont.)

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

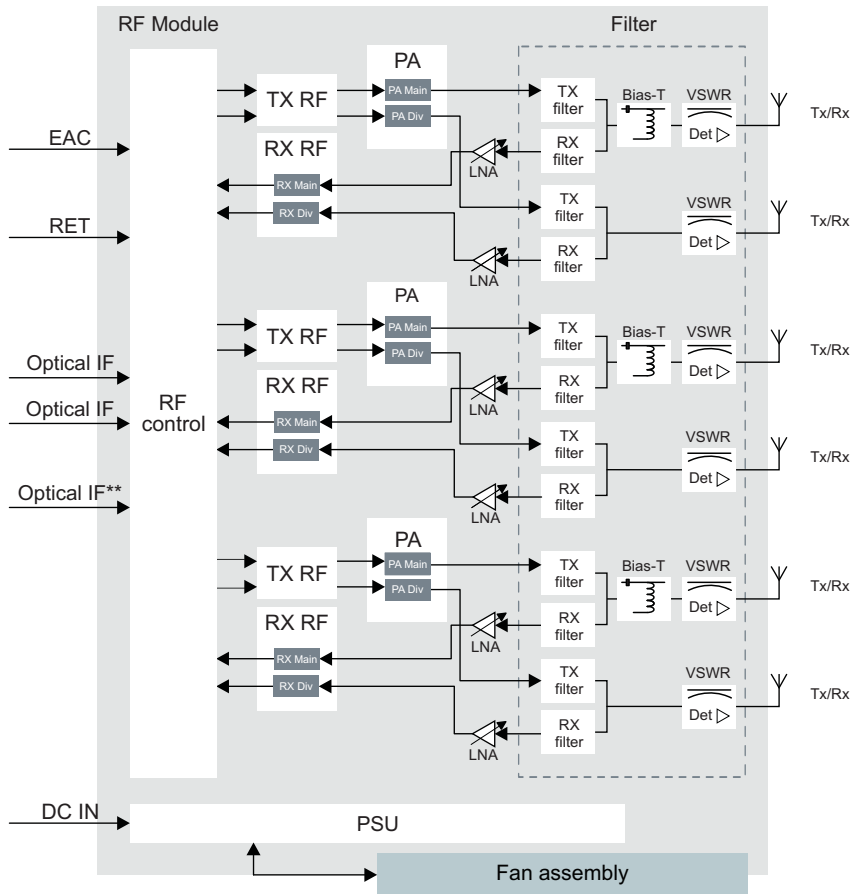
Antenna Line Devices (ALDs) support

Table 203 FRPB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25V RET: 25V
Power per port	30 W

Functional block diagram

Figure 47 FRPB functional block diagram



Electrical specifications

Table 204 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 205 FRPB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	399	453	568
	1/1/1 2T2R	40+40	576	692	934

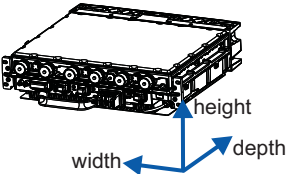
Installation and mechanical specifications

Table 206 FRBP installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 207 FRPB dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications**Table 208** 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 209** FRPB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 209 FRPB LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.3 Flexi RFM 6-pipe 700 240 W (FRPD)

FRPD technical specifications.

Note: This HW variant supports Fast Delivery Mode on top of FL16 release.

Functional description

Table 210 FRPD functional specification

Property	Value
Output power	6x40 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	758 - 788 MHz
RX frequency range	703 - 733 MHz
DL instantaneous bandwidth	30 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

Interfaces

Figure 48 FRPD interfaces

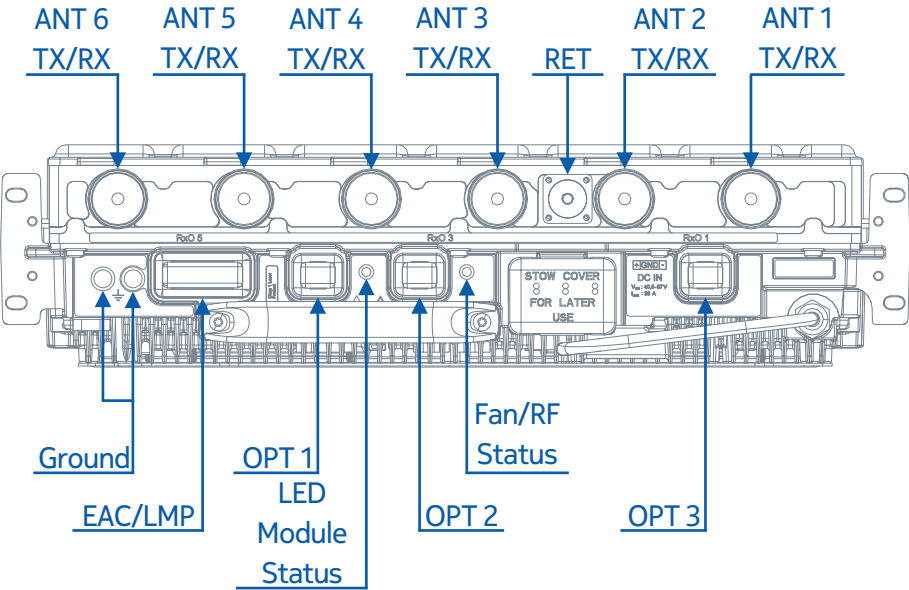


Table 211 FRPD interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power Connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	6	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	RS-485
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	1.5 to 6 Gbps, OBSAI

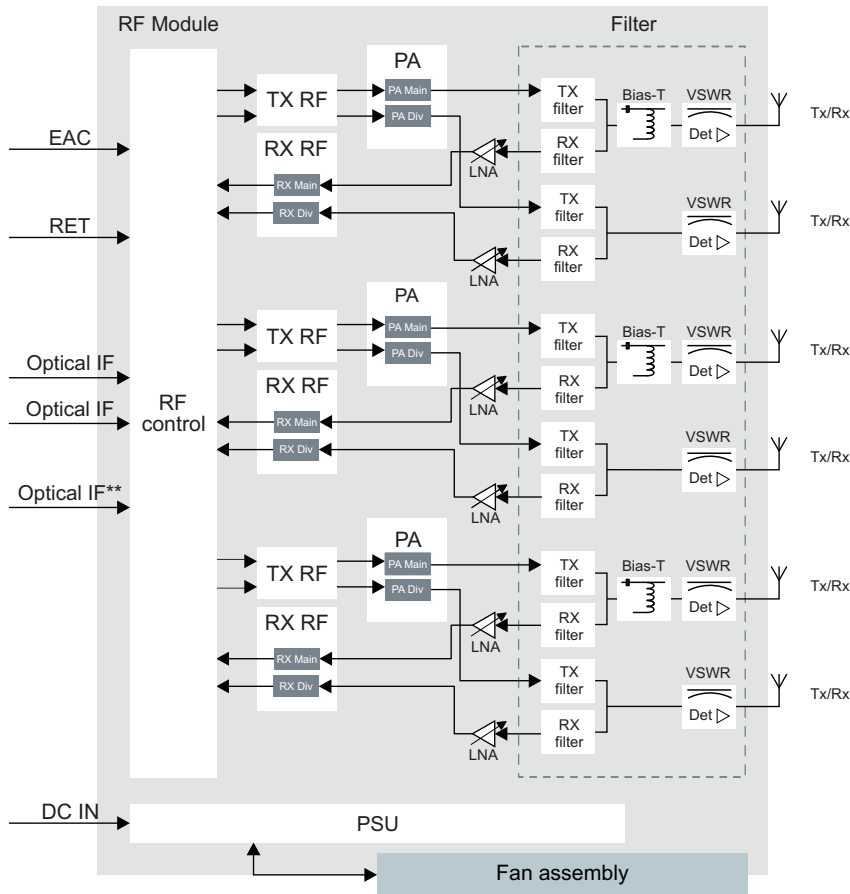
Antenna Line Devices (ALDs) support

Table 212 FRPD ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 24 V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 49 FRPD functional block diagram



Electrical specifications

Table 213 FRPD 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 FRPD power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 6h busy hour load) / 24h		
			Power consumption ETSI 202706 average $P_{RRH, static}$	Power consumption ETSI 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	419	476	591
	1/1/1 2T2R	40+40	610	735	981

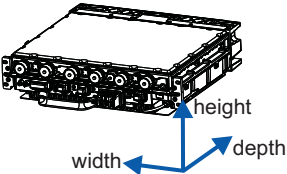
Installation and mechanical specifications

Table 215 FRPD installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 216 FRPD dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 217 FRPD 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 218 FRPD LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 218 FRPD LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.4 Flexi RF Module 6TX 2600 (FRHC)

FRHC technical specifications.

Functional description

Table 219 FRHC functional specification

Property	Value
Output power	6x40 W
MIMO	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 50 FRHC interfaces

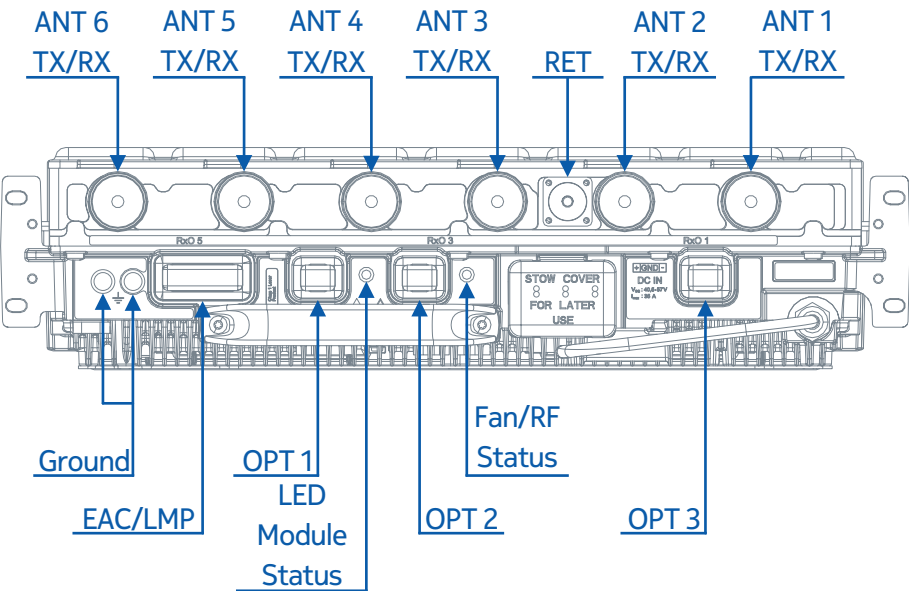


Table 220 FRHC interfaces

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

Table 220 FRHC interfaces (Cont.)

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

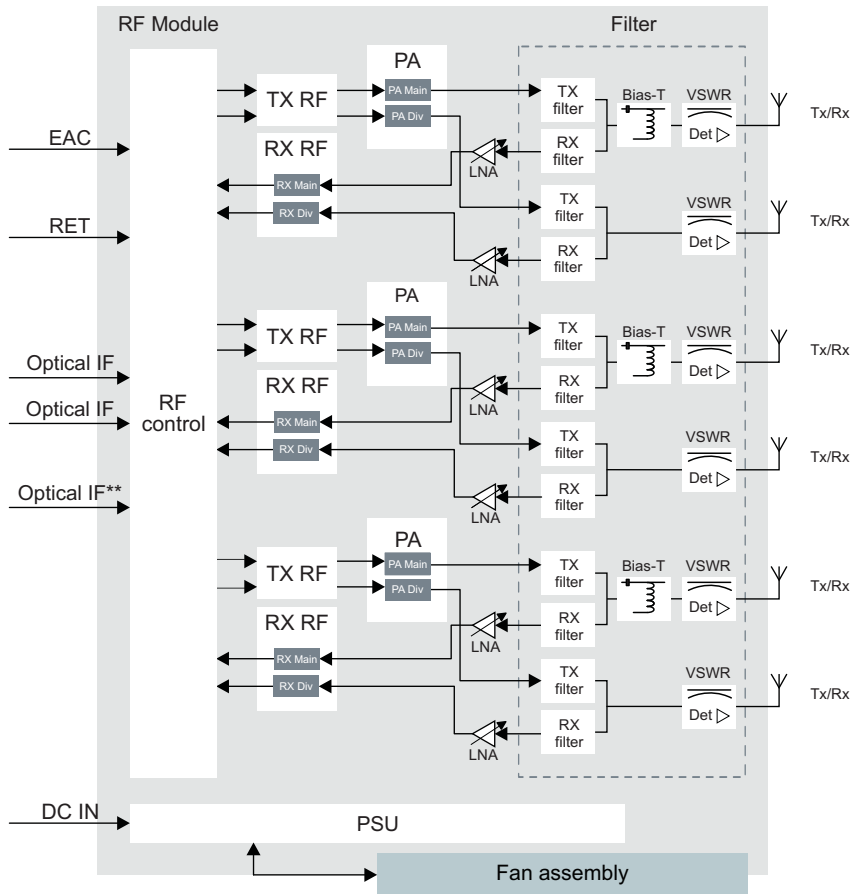
Antenna Line Devices (ALDs) support

Table 221 FRHC ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25V RET: 25V
Power per port	30 W

Functional block diagram

Figure 51 FRHC functional block diagram



Electrical specifications

Table 222 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 223 FRHC power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	476	566	769
	1/1/1 2T2R	40+40	641	790	1142

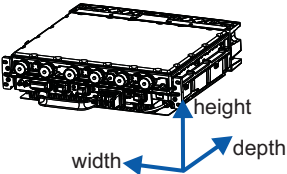
Installation and mechanical specifications

Table 224 FRHC installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 225 FRHC dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 226 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 227 FRHC LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 227 FRHC LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.5 Flexi RF Module 6TX 2600 (FRHF)

FRHF technical specifications.

Functional description

Table 228 FRHF functional specification

Property	Value
Output power	6x40 W
MIMO	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 52 FRHF interfaces

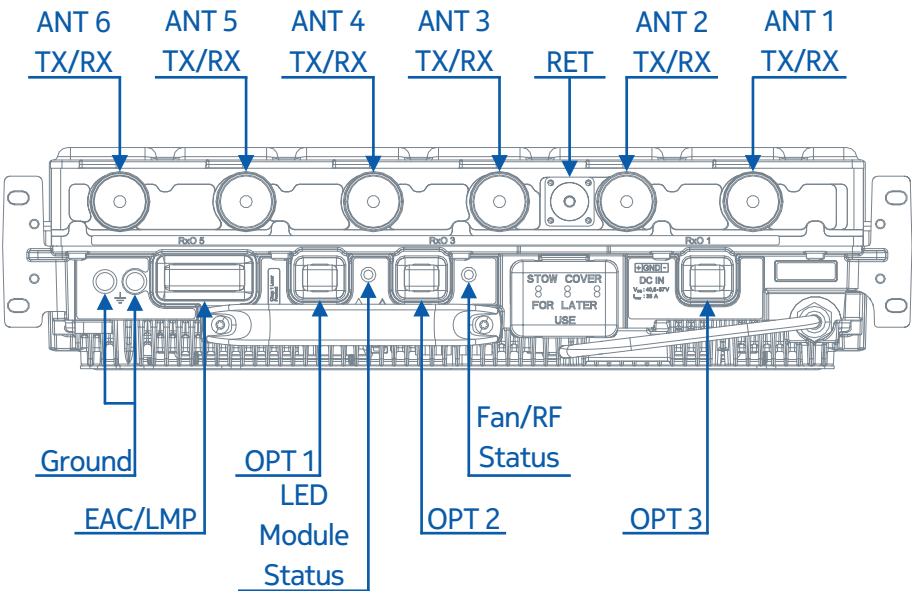


Table 229 FRHF interfaces

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

Table 229 FRHF interfaces (Cont.)

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

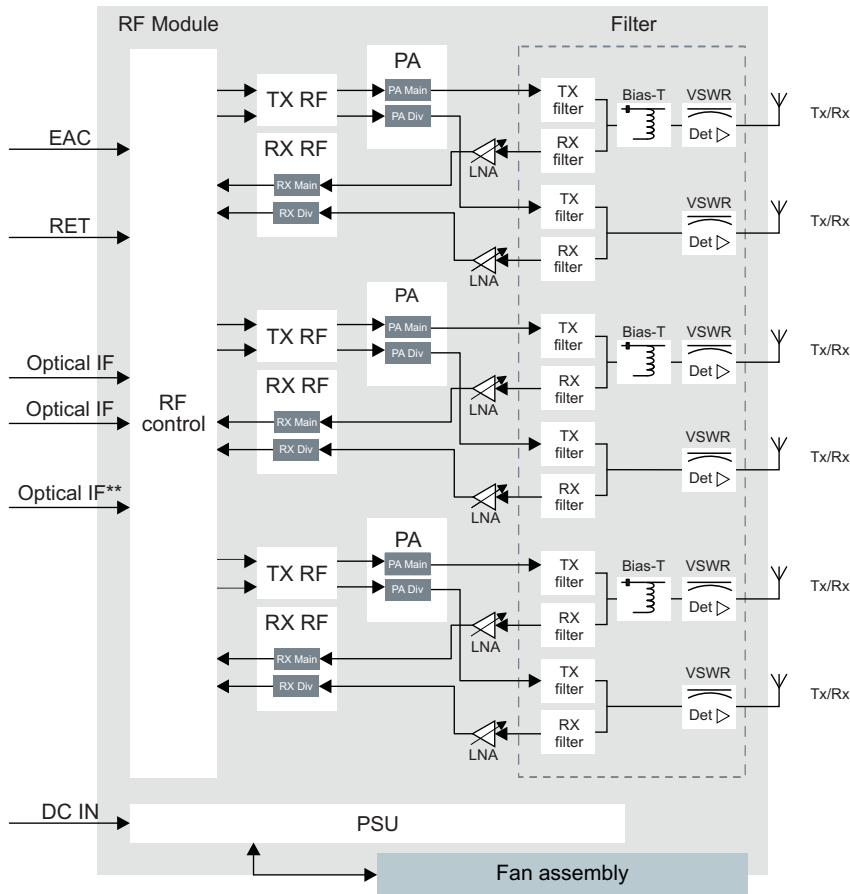
Antenna Line Devices (ALDs) support

Table 230 FRHF ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25V RET: 25V
Power per port	30 W

Functional block diagram

Figure 53 FRHF functional block diagram



Electrical specifications

Table 231 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 232 FRHF power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	476	566	769
	1/1/1 2T2R	40+40	641	790	1142

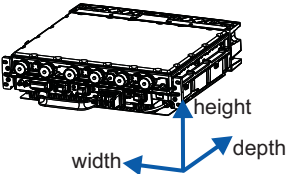
Installation and mechanical specifications

Table 233 FRHF installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 234 FRHF dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 235 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 236 FRHF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 236 FRHF LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.6 Flexi RF Module 6TX 800 (FRMC)

FRMC technical specifications.

Functional description

Table 237 FRMC functional specification

Property	Value
Output power	6x40 W
MIMO	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	30 MHz

Interfaces

Figure 54 FRMC interfaces

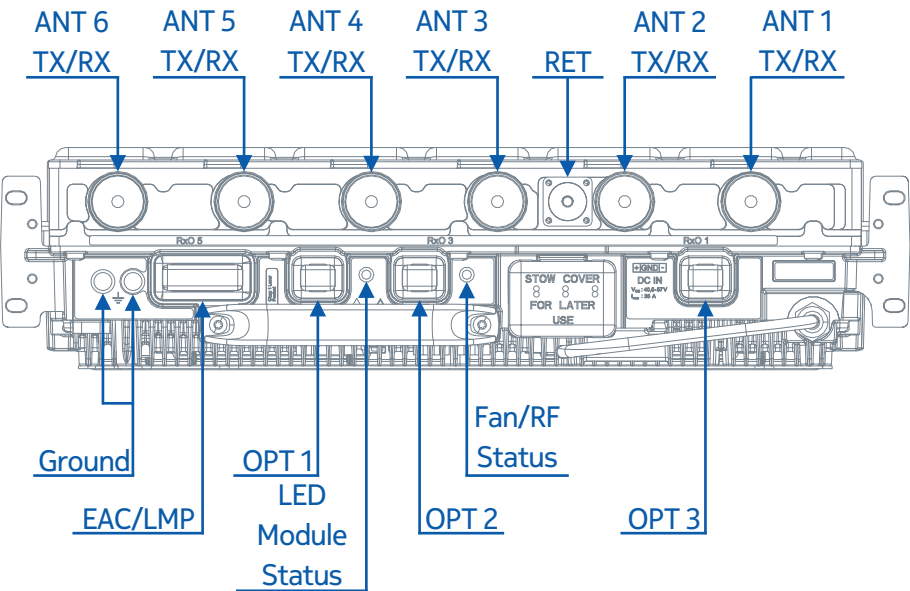


Table 238 FRMC interfaces

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

Table 238 FRMC interfaces (Cont.)

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

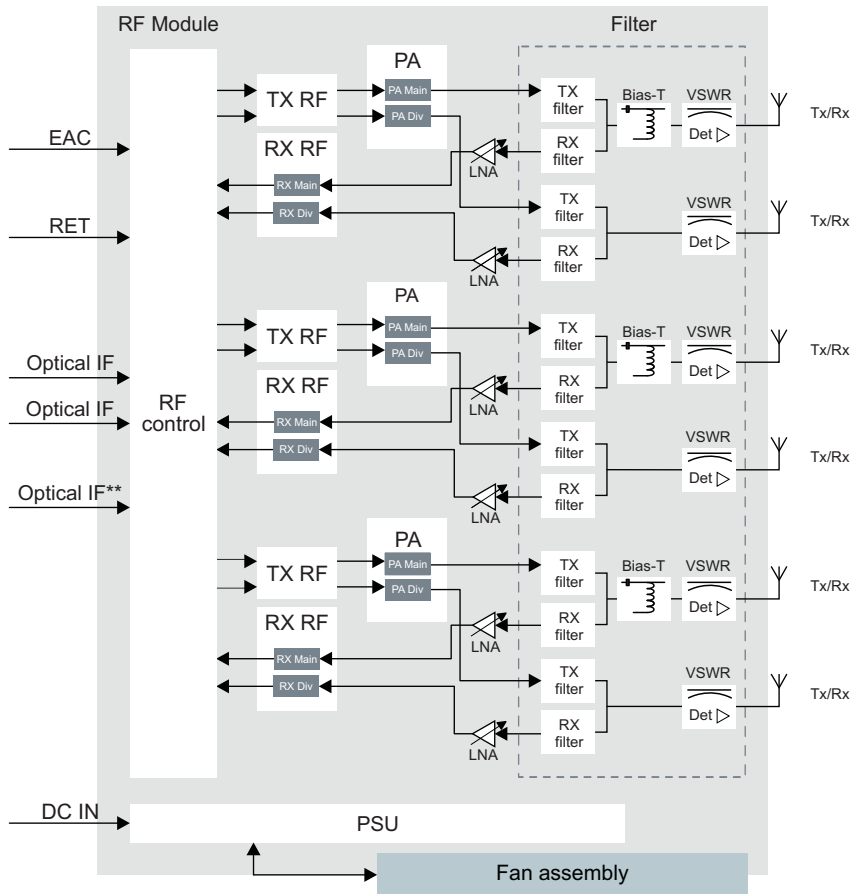
Antenna Line Devices (ALDs) support

Table 239 FRMC ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25V RET: 25V
Power per port	30 W

Functional block diagram

Figure 55 FRMC functional block diagram



Electrical specifications

Table 240 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 241 FRMC power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ER 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	418	479	616
	1/1/1 2T2R	40+40	591	714	987

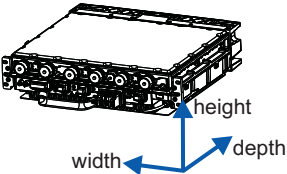
Installation and mechanical specifications

Table 242 FRMC installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 243 FRMC dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 244 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 245 FRMC LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 245 FRMC LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	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.



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

8.7 Flexi RFM 6-pipe 800 240 W (FRME)

FRME technical specifications.

Functional description

Table 246 FRME functional specification

Property	Value
Output power	6x40 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	791 - 811 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	30 MHz

Interfaces

Figure 56 FRME interfaces

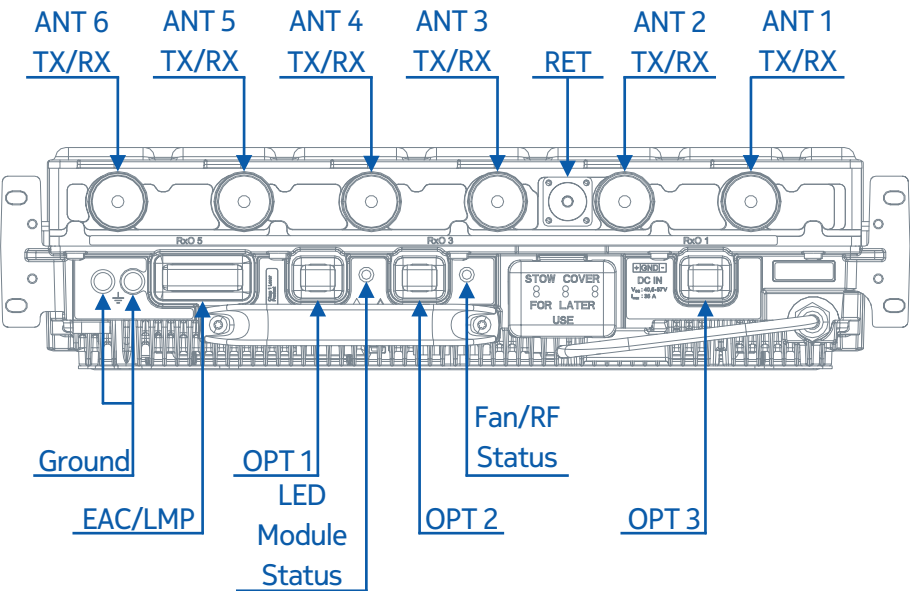


Table 247 FRME interfaces

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

Table 247 FRME interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Antenna connector	ANT	6	7/16	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	1.5 to 6 Gbps, OBSAI

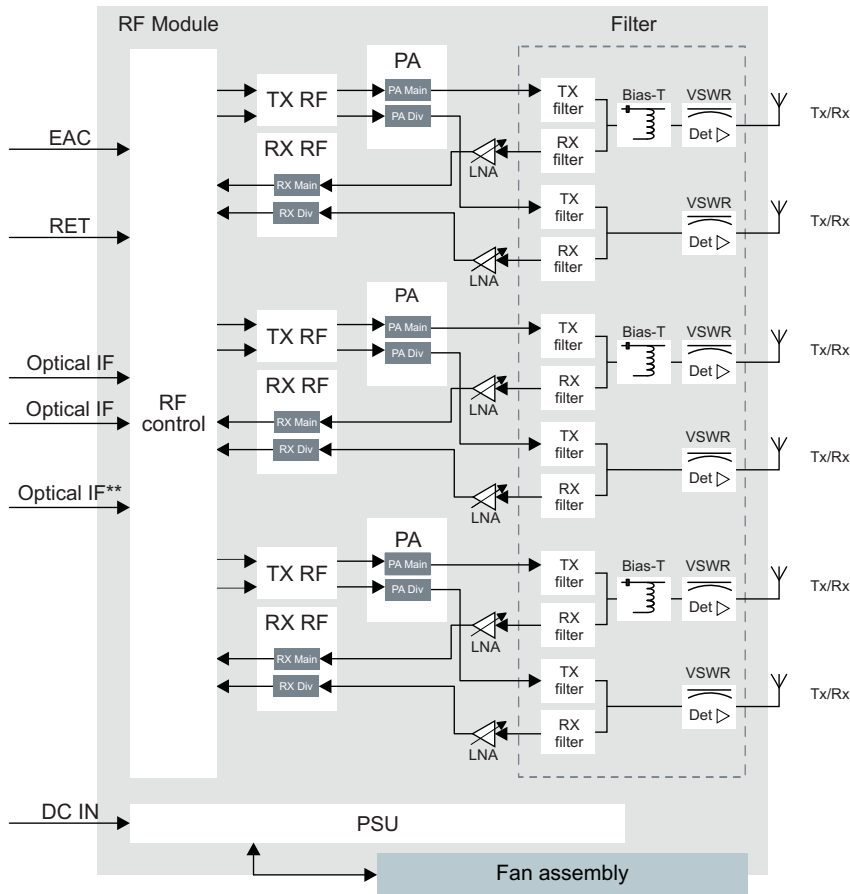
Antenna Line Devices (ALDs) support

Table 248 FRME ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25 V RET: 25 V
Power per port	30 W

Functional block diagram

Figure 57 FRME functional block diagram



Electrical specifications

Table 249 FRME 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 FRME power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1	20+20	363	467	605
	1/1/1	40+40	596	722	997

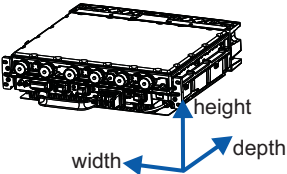
Installation and mechanical specifications

Table 251 FRME installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 252 FRME dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 253 FRME 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 254 FRME LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	Until software download begins	No alarm

Table 254 FRME LEDs (Cont.)

LED color	Description	Alarm
	- The carriers are blocked from BTS - There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	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.



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

8.8 Flexi RFM 6-pipe 800 360 W (FRMF)

FRMF technical specifications.

Functional description

Table 255 FRMF functional specification

Property	Value
Output power	6x60 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	791 - 821 MHz
RX frequency range	832 - 862 MHz
DL instantaneous bandwidth	30 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

Interfaces

Figure 58 FRMF interfaces

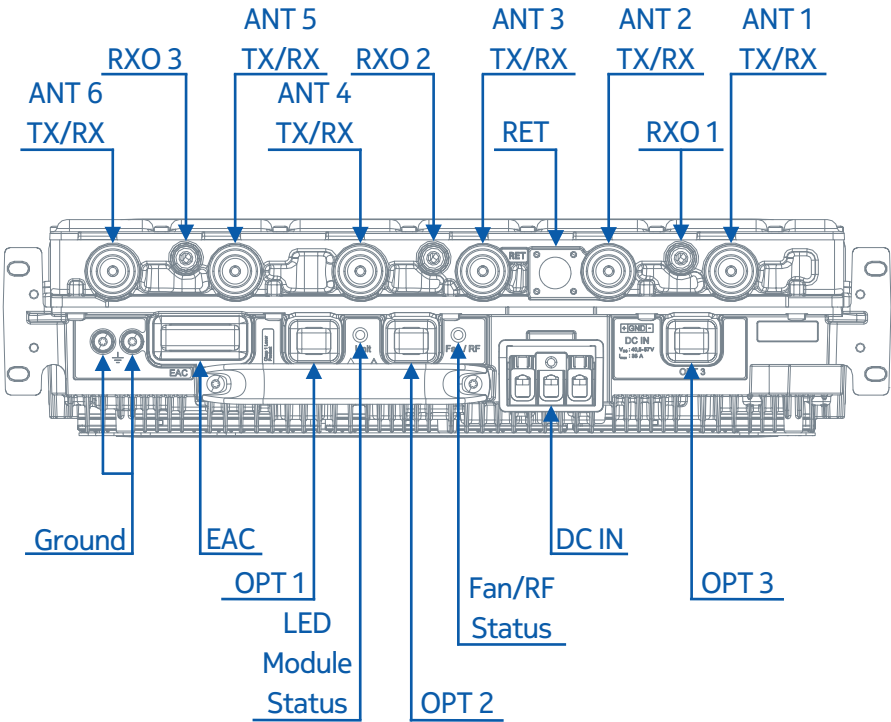


Table 256 FRMF interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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 257 FRMF ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT3, ANT5: 25 V RET: 25 V
Power per port	30 W

Functional block diagram

The diagram illustrates the internal architecture of the RF Module, which is divided into several functional blocks:

- RF Module:** The main container for the RF components.
- RF control:** Receives external control signals: EAC, RET, and three Optical IF signals.
- PA (Power Amplifier):** Consists of PA Main and PA Div sub-blocks.
- RX RF (Receiver RF):** Consists of RX Main and RX Div sub-blocks.
- Filter:** A dashed box containing:
 - TX filter and RX filter:** For each of the three channels.
 - Bias-T:** Bias tee components for each channel.
 - VSWR and Det:** Voltage Standing Wave Ratio and Detector components for each channel.
- LNA (Low Noise Amplifier):** Three LNA blocks are shown, each receiving input from the RX Div and PA Div blocks.
- PSU (Power Supply Unit):** Receives a DC IN signal and provides power to the module.
- Fan assembly:** Connected to the PSU for thermal management.

Signal flow is indicated by arrows: EAC and RET enter the RF control; Optical IF signals enter the RF control and are distributed to TX RF and RX RF blocks. TX RF blocks connect to PA Main/Div, which then connect to the TX filter in the Filter block. RX RF blocks connect to RX Main/Div, which connect to the RX filter in the Filter block. The Filter block outputs Tx/Rx signals to the antenna (represented by a Y-antenna symbol). The PSU and Fan assembly are at the bottom, with the PSU receiving DC IN and providing power to the module.

Table 258 FRMF 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

Issue: 19

Table 259 FRMF power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI 202706 average $P_{RRH, static}$	Power consumption ETSI 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1	20+20	466	533	665
	1/1/1	40+40	606	733	985
	1/1/1	60+60	755	942	1362

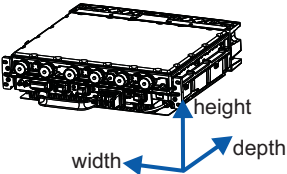
Installation and mechanical specifications

Table 260 FRMF installation and mechanical specifications

Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 261 FRMF dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 262 FRMF 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 263 FRMF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	Until software download begins	No alarm

Table 263 FRMF LEDs (Cont.)

LED color	Description	Alarm
	- The carriers are blocked from BTS - There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.9 Flexi RFM 6-pipe 1450 360 W (FRSA)

FRSA technical specifications.



Note: This module is supported in FDD-LTE 16A.

Functional description

Table 264 FRSA functional specification

Property	Value
Output power	6x60 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	1452 - 1492 MHz
RX frequency range	832 - 862 MHz
DL instantaneous bandwidth	40 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	40 MHz
UL filter bandwidth	30 MHz

Interfaces

Figure 60 FRSA interfaces

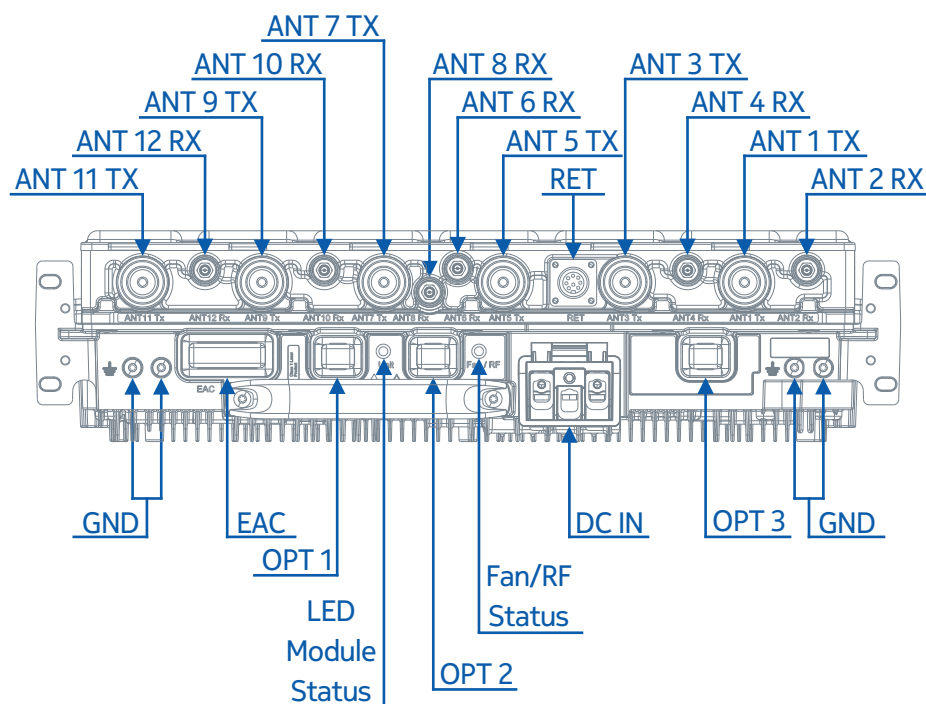


Table 265 FRSA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT TX	6	7/16	
Antenna connector	ANT RX	6	QMA	
Remote Electrical Tilt	RET	1	8-pin circular	
External Alarm Connection	EAC	1	MDR36	
Optical interface	OPT	3	SFP	1.5 Gbps or 6 Gbps

Antenna Line Devices (ALDs) support

Note: ALD support is for TX antenna ports (band 32) only.

Table 266 FRSA ALD support

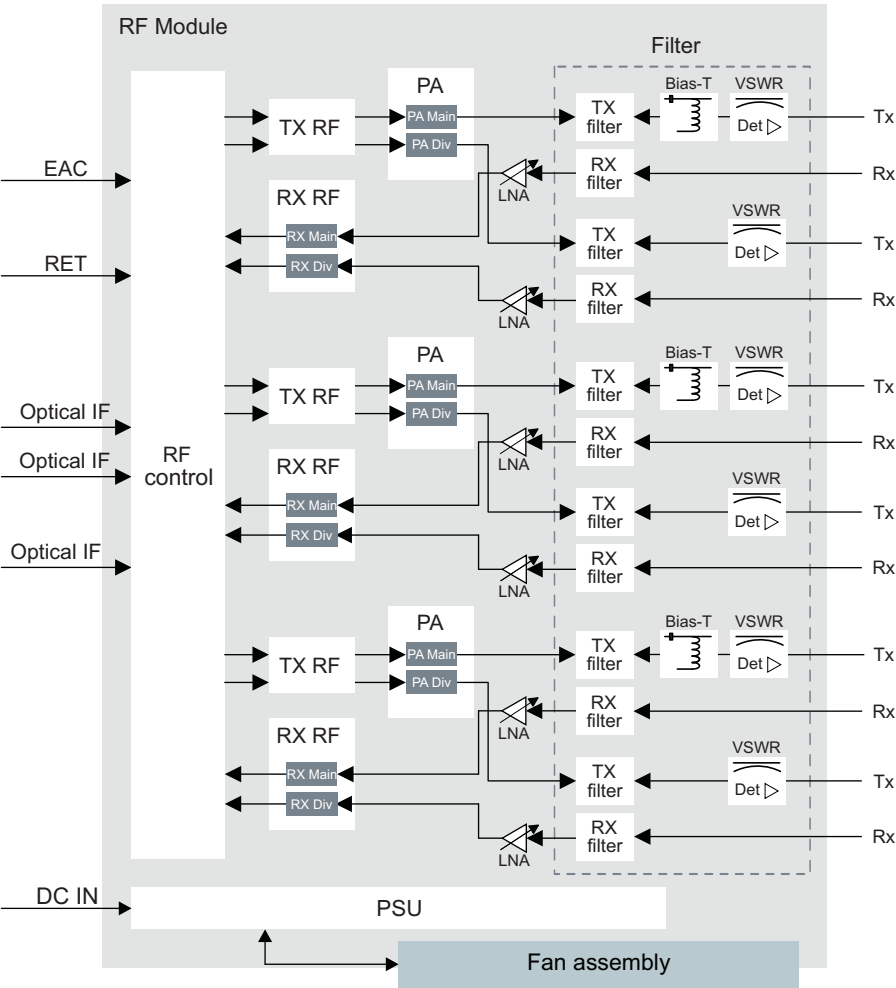
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 25 V

Table 266 FRSA ALD support (Cont.)

ALD support via antenna ports	Value
	RET: 25 V
Power per port	30 W

Functional block diagram

Figure 61 FRSA functional block diagram



Electrical specifications

Table 267 FRSA 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 FRSA power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
			 Note: Values preliminary estimated.		
LTE	1/1/1	20+20	470	538	692
	1/1/1	40+40	598	723	1020
	1/1/1	60+60	739	923	1377

Installation and mechanical specifications

Table 269 FRSA installation and mechanical specifications

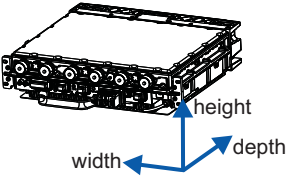
Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx) Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx)

Table 269 FRSA installation and mechanical specifications (Cont.)

Property	Value
	Cabinet/indoor 19" rack No optional items needed

Dimensions and weight

Table 270 FRSA dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 271 FRSA 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 272 FRSA LEDs

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

Table 272 FRSA LEDs (Cont.)

LED color	Description	Alarm
	- Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



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

8.10 Flexi RFM 6-pipe 1800 360 W (FXED)

FXED technical specifications.

Functional description

Table 273 FXED functional specification

Property	Value
Output power	6x60 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	GSM, FDD-LTE
TX frequency range	1805 - 1880 MHz
RX frequency range	1710 - 1785 MHz
DL instantaneous bandwidth	60 MHz in LTE, LTE/GSM Sharing 40 MHz in GSM* *Single-RAT GSM support enabled on version A20x onwards.
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 62 FXED interfaces

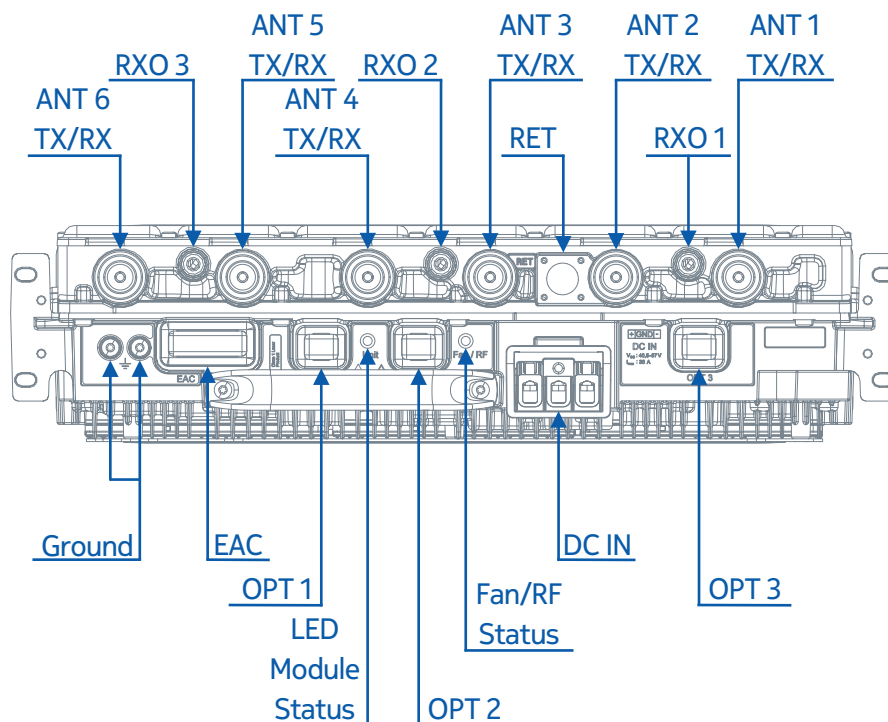


Table 274 FXED interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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 275 FXED ALD support

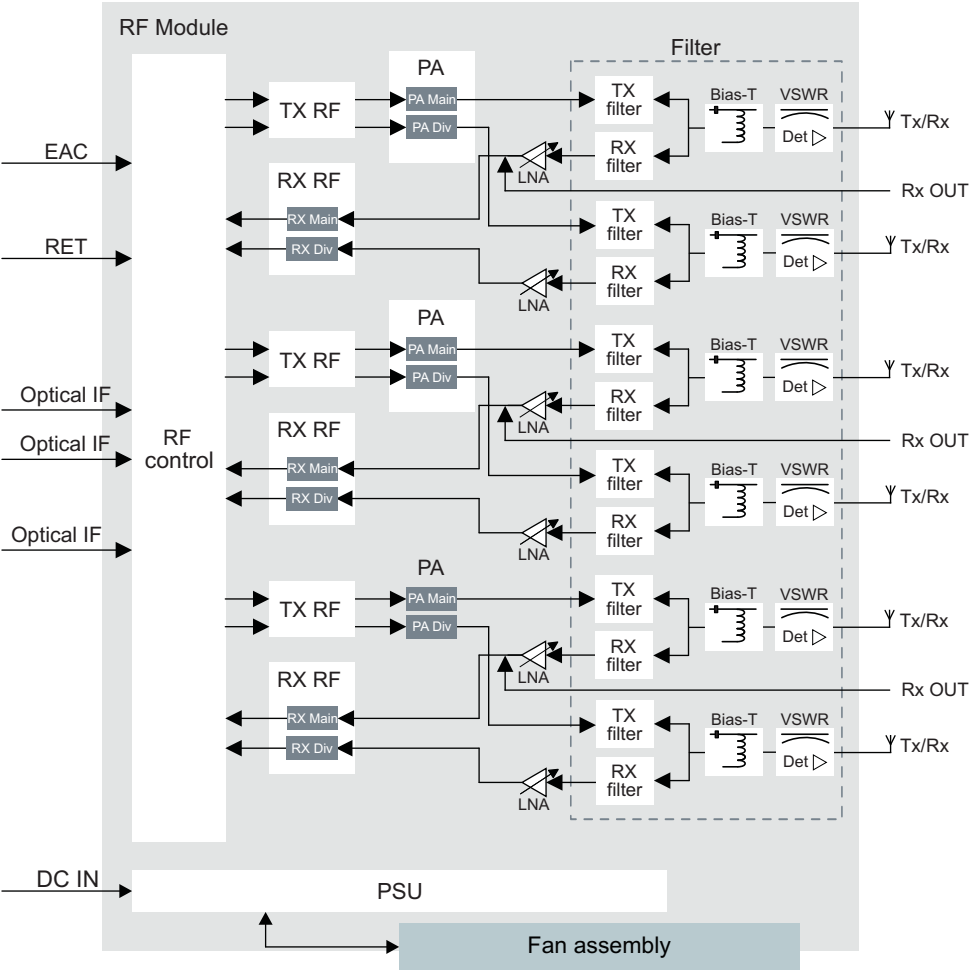
ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 25V or 12V ANT2, ANT4, ANT6: 12V

Table 275 FXED ALD support (Cont.)

ALD support via antenna ports	Value
	RET: 25V
Power per port	30 W

Functional block diagram

Figure 63 FXED functional block diagram



Electrical specifications

Table 276 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 277 FXED power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	390	390	390	390	390	390
	2/2/2	20	422	451	547	447	452	457
	4/4/4	20	726	827	1041	635	661	691
			 Note: Values preliminary estimated for this configuration.					
LTE	1/1/1 2T2R	20+20	415	487	634			
	1/1/1 2T2R	40+40	537	664	957			
	1/1/1 2T2R	60+60	676	865	1310			
MSR	GSM 2/2/2 LTE 1/1/1 2T2R 10 MHz	20 20+20	651	742	1010			
	GSM 4/4/4 LTE 1/1/1 2T2R 10 MHz	20 20+20	802	976	1410			
	GSM 4/4/4 LTE 1/1/1 2T2R 20 MHz	15 40+40	715	854	1170			

Installation and mechanical specifications

Table 278 FXED installation and mechanical specifications

Property	Value
Installation options	• floor/stack installation • pole installation • wall installation • 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Pole Kit (FPKA) • Flexi Pole Kit (FPKC) • Flexi Module Casing (EMHx) Floor/Wall installation • Flexi Mounting Kit for Floor, Wall and Pole (FMFA) • Flexi Module Casing (EMHx) Outdoor 19" rack • Flexi Module Casing (EMHx) Cabinet/indoor 19" rack • No optional items needed

Dimensions and weight

Table 279 FXED dimensions and weight

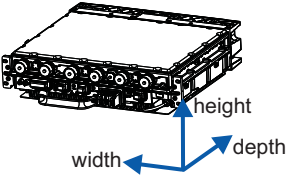
Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the RF module. Three blue arrows indicate the dimensions: 'height' points to the vertical thickness, 'width' points to the front-facing horizontal dimension, and 'depth' points to the side horizontal dimension.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	

Table 279 FXED dimensions and weight (Cont.)

Property	Value	Dimensions orientation
Volume	19.3 l	

Environmental specifications

Table 280 FXED 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 281 FXED LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm
Green, blinking	Software downloading and updating	No alarm

Table 281 FXED LEDs (Cont.)

LED color	Description	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.



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

8.11 Flexi RFM 6-pipe 2100 360 W (FRGU)

FRGU technical specifications.

Functional description

Table 282 FRGU functional specification

Property	Value
Output power	6x60 W
MIMO	4TX
Outdoor installation	Yes
SW supported technology	WCDMA, FDD-LTE
TX frequency range	2110 - 2170 MHz

Table 282 FRGU functional specification (Cont.)

Property	Value
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 64 FRGU interfaces

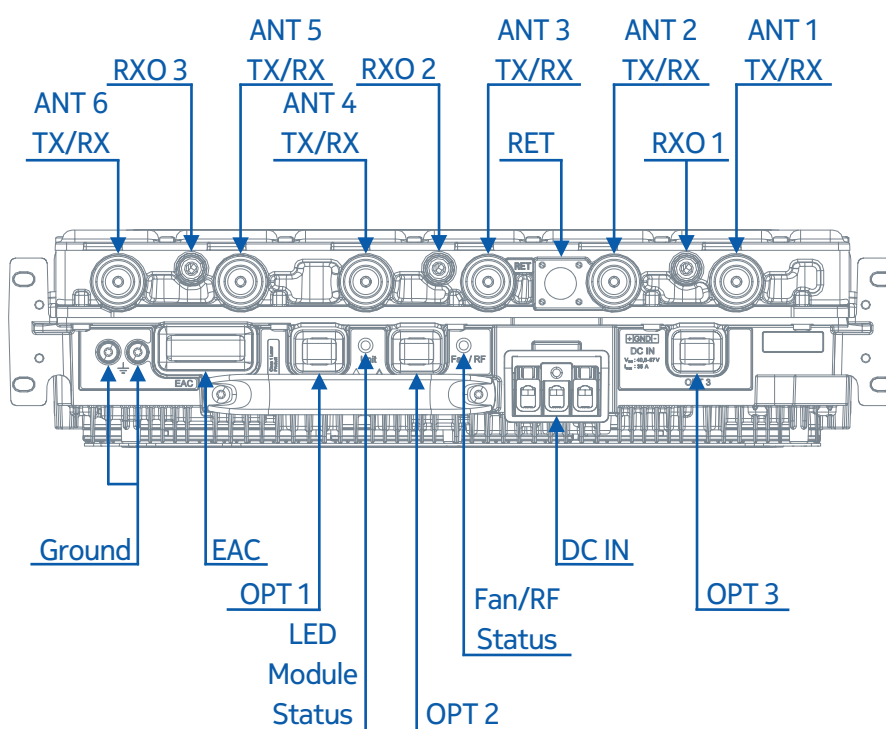


Table 283 FRGU interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	DC IN	1	3-pole screw terminal	
Antenna connector	ANT	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	1.5 to 6 Gbps

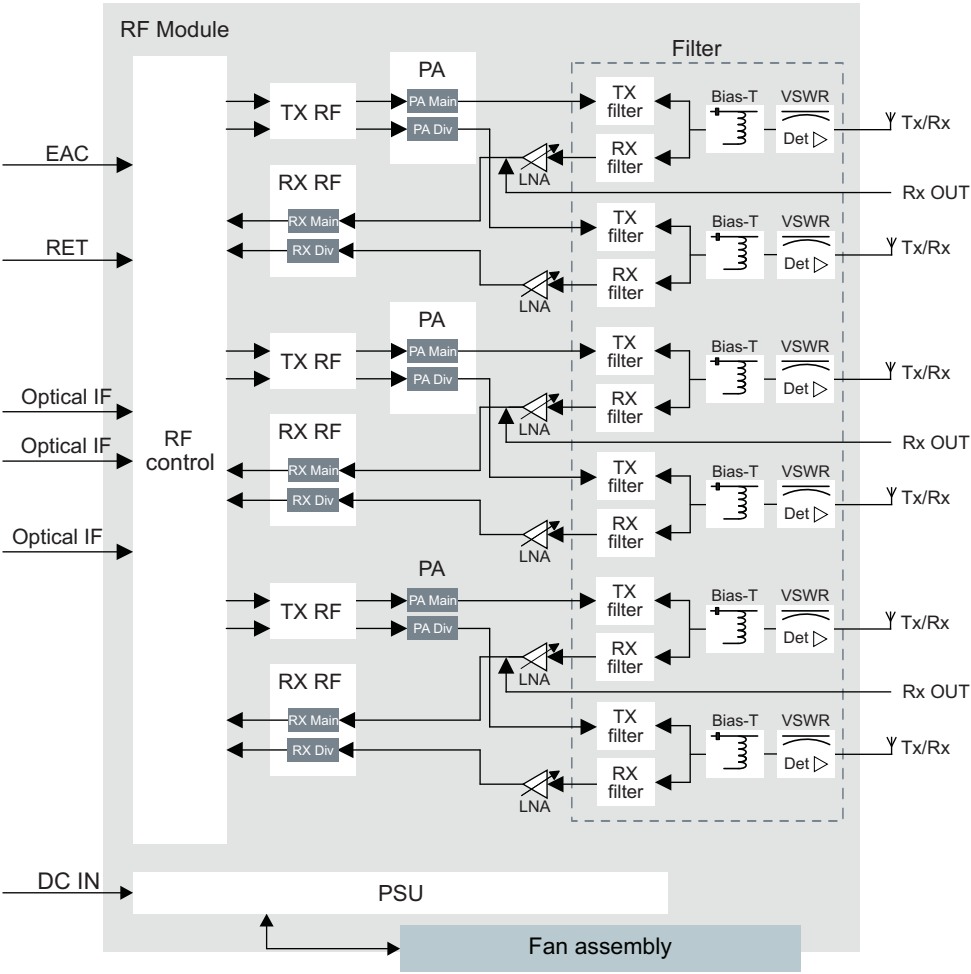
Antenna Line Devices (ALDs) support

Table 284 FRGU ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT3, ANT5, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	Yes
Voltage	ANT1, ANT3, ANT5: 25 V or 12 V ANT2, ANT4, ANT6: 12 V RET: 25 V
Power per port	30 W

Functional block diagram

Figure 65 FRGU functional block diagram



Electrical specifications

Table 285 FRGU 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 FRGU power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
WCDMA	1/1/1	20	282	313	386
	2/2/2	20	344	400	538
	3/3/3	20	409	489	689
LTE	1/1/1	20+20	470	538	692
	1/1/1	40+40	598	723	1020
	1/1/1	60+60	739	923	1377

Installation and mechanical specifications

Table 287 FRGU installation and mechanical specifications

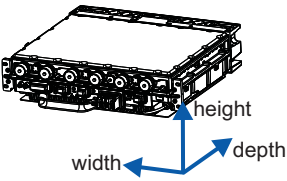
Property	Value
Installation options	- floor/stack installation - pole installation - wall installation 19" rack/cabinet
IP rating	IP65
Related optional items	Pole installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Pole Kit (FPKA) - Flexi Pole Kit (FPKC) - Flexi Module Casing (EMHx)

Table 287 FRGU installation and mechanical specifications (Cont.)

Property	Value
	Floor/Wall installation - Flexi Mounting Kit for Floor, Wall and Pole (FMFA) - Flexi Module Casing (EMHx) Outdoor 19" rack - Flexi Module Casing (EMHx) Cabinet/indoor 19" rack - No optional items needed

Dimensions and weight

Table 288 FRGU dimensions and weight

Property	Value	Dimensions orientation
Height	Core RFM: 115 mm (4.5 in.)	 The diagram shows a 3D perspective of the FRGU module. Three blue arrows indicate the dimensions: 'height' points to the vertical thickness, 'width' points to the front-facing horizontal dimension, and 'depth' points to the side horizontal dimension.
Depth	Core RFM: 400 mm (15.7 in.) Without front covers: 422 mm (16.6 in.) With front covers: 560 mm (22.1 in.)	
Width	Core RFM: 420 mm (16.5 in.) Without front covers: 447 mm (17.6 in.) With front covers: 492 mm (19.4 in.)	
Weight	24 kg (52.9 lbs)	
Volume	19.3 l	

Environmental specifications

Table 289 FRGU 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 290 FRGU LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Major alarm affecting the whole RF Module - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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	

Table 290 FRGU LEDs (Cont.)

LED color	Description	Alarm
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.



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

9 Descriptions of Flexi Metro RRH

9.1 Flexi Metro RRH 2-pipe 900H 10 W (FHDG)

FHDG technical specifications.

Functional description

Table 291 FHDG functional specification

Property	Value
Output power	2x5 W
MIMO	2TX
Outdoor installation	Yes
SW supported technologies	FDD-LTE
TX frequency range	945 - 960 MHz
RX frequency range	900 - 915 MHz
DL instantaneous bandwidth (supported but not tested due to limitation of UE)	15 MHz
UL instantaneous bandwidth (supported but not tested due to limitation of UE)	15 MHz
DL filter bandwidth	15 MHz
UL filter bandwidth	15 MHz

Interfaces

Figure 66 FHDG interfaces

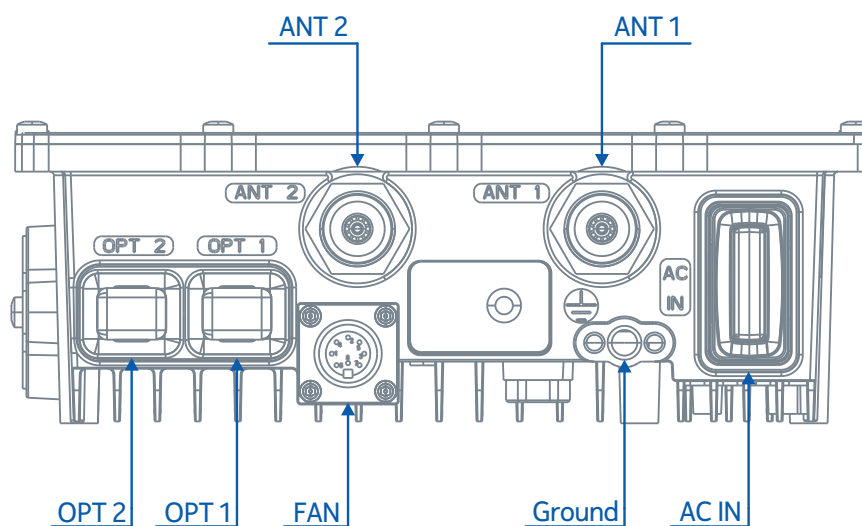


Table 292 FHDG interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	AC IN	1	MicroFit 1x3P Plug	
Antenna connector	ANT	2	4.3-10	
Fan control	FAN	1	8-pin circular	Power and control for fan option
Optical interface	OPT	2	SFP	1.5 to 6 Gbps, OBSAI
Local Management Port	LMP	1	2x15 pin header	

Antenna Line Devices (ALDs) support

Table 293 FHDG ALD support

ALD support via antenna ports	Value
AISG	None

Functional block diagram

Figure 67 FHDG functional block diagram

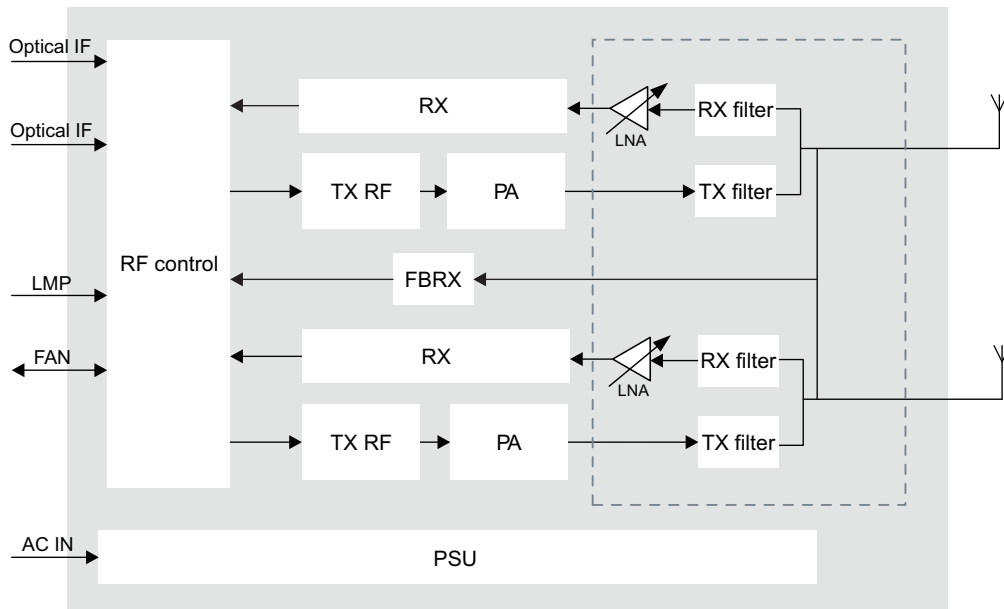
**Electrical specifications**

Table 294 FHDG electrical specifications

Property	Value
Nominal input voltage range	100 V AC to 240 V AC
Extended input voltage range	88 V AC to 276 V DC

Power consumption

Table 295 FHDG power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 230VAC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	5+5	196	213	246

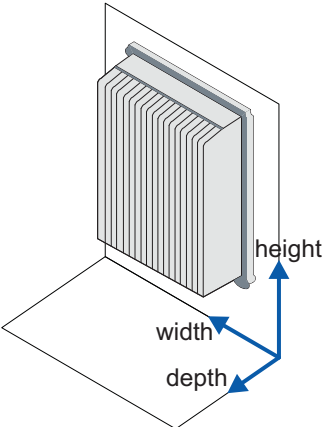
Installation and mechanical specifications

Table 296 FHDG installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - rooftop installation - bookshelf/stacking installation
IP rating	IP65
Related optional items	- Flexi Metro Wall/Pole/Stacking Mounting Kit (FMDB) - Flexi Metro Wall/Bookshelf Mounting Kit (FMDD) - Flexi Metro Visual Cover (FMDE) - Flexi Metro Fan Assembly Kit (FMDF) - Flexi Pole Mounting Kit (FPKA), not recommended

Dimensions and weight

Table 297 FHDG dimensions and weight

Property	Value	Dimensions orientation
Height	Without mounting brackets, flange, screw boss and connectors: 269 mm (10.6 in.)	
Depth	Without mounting brackets, flange, screw boss and connectors: 77 mm (3.0 in.)	
Width	Without mounting brackets, flange, screw boss and connectors: 202 mm (7.9 in.)	
Weight	Without mounting brackets: <5 kg (11.0 lbs)	
Volume	<5 l	

Environmental specifications

Table 298 FHDG environmental specifications

Property	Value
Maximum operational ambient temperature (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational ambient temperature	+45°C (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 299 FHDG LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 299 FHDG LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



Note: The RRH with optional fan module can be mounted in horizontal orientation.

9.2 Flexi Metro RRH 2-pipe 1800 10 W (FHEE)

FHEE technical specifications.

Functional description

Table 300 FHEE functional specification

Property	Value
Output power	2x5 W
MIMO	2TX

Table 300 FHEE functional specification (Cont.)

Property	Value
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
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 68 FHEE interfaces

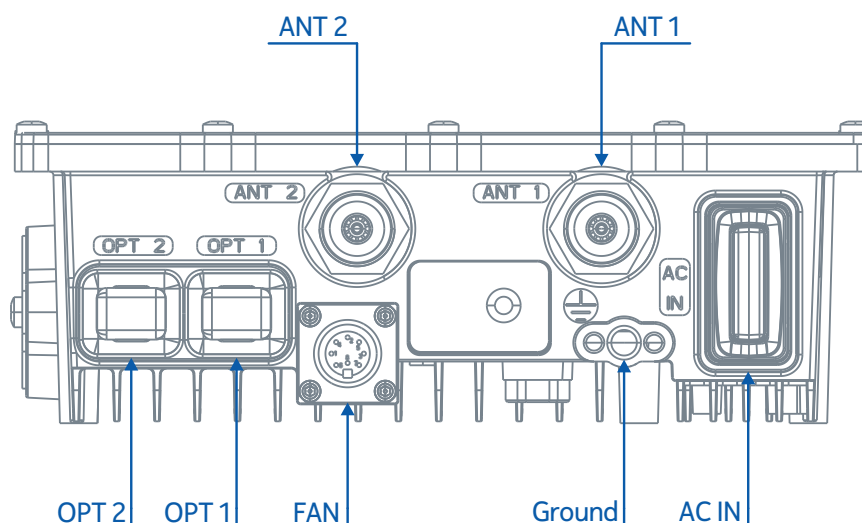


Table 301 FHEE interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	AC IN	1	MicroFit 1x3P Plug	
Antenna connector	ANT	2	4.3-10	
Fan control	FAN	1	8-pin circular	Power and control for fan option
Optical interface	OPT	2	SFP	1.5 to 6 Gbps, OBSAI
Local Management Port	LMP	1	2x15 pin header	

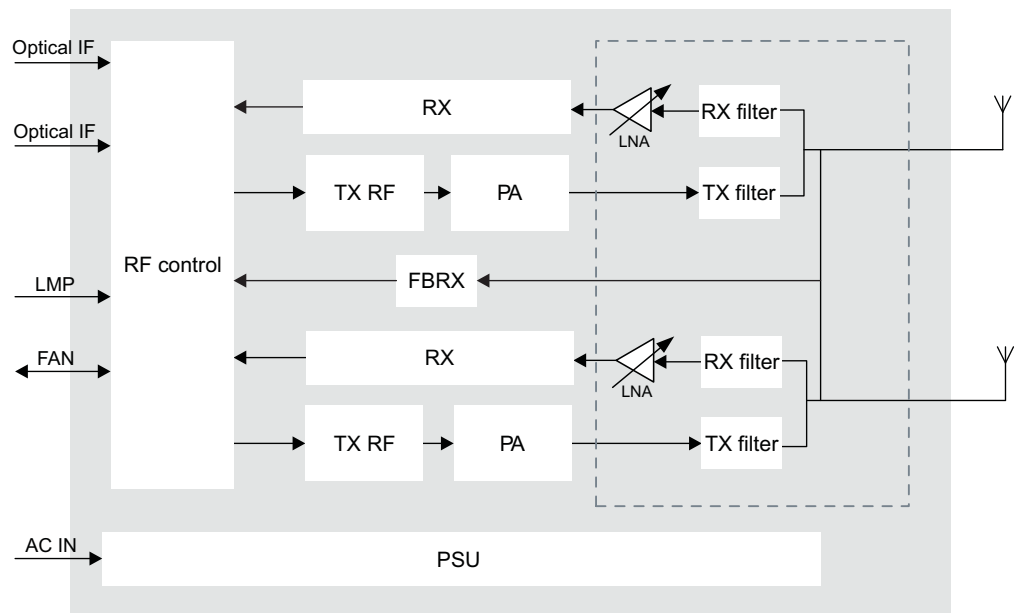
Antenna Line Devices (ALDs) support

Table 302 FHEE ALD support

ALD support via antenna ports	Value
AISG	None

Functional block diagram

Figure 69 FHEE functional block diagram



Electrical specifications

Table 303 FHEE electrical specifications

Property	Value
Nominal input voltage range	100 V AC to 240 V AC
Extended input voltage range	88 V AC to 276 V DC

Power consumption

Table 304 FHEE power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 230VAC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h Values preliminary estimated.		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	5+5	217	238	272

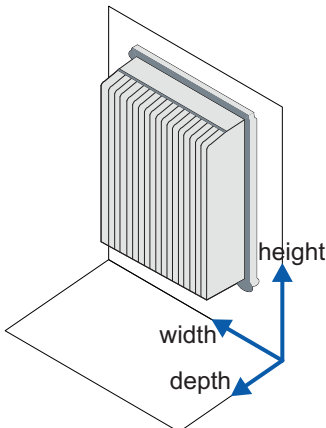
Installation and mechanical specifications

Table 305 FHEE installation and mechanical specifications

Property	Value
Installation options	• pole/wall installation • rooftop installation • bookshelf/stacking installation
IP rating	IP65
Related optional items	• Flexi Metro Wall/Pole/Stacking Mounting Kit (FMDB) • Flexi Metro Wall/Bookshelf Mounting Kit (FMDD) • Flexi Metro Visual Cover (FMDE) • Flexi Metro Integrated Antenna (1.7G-2.2G) (FAGH) • Flexi Metro Fan Assembly Kit (FMDf) • Flexi Pole Mounting Kit (FPKA), not recommended

Dimensions and weight

Table 306 FHEE dimensions and weight

Property	Value	Dimensions orientation
Height	Without mounting brackets, flange, screw boss and connectors: 269 mm (10.6 in.)	
Depth	Without mounting brackets, flange, screw boss and connectors: 77 mm (3.0 in.)	
Width	Without mounting brackets, flange, screw boss and connectors: 202 mm (7.9 in.)	
Weight	Without mounting brackets: <5 kg (11.0 lbs)	
Volume	<5 l	

Environmental specifications

Table 307 FHEE environmental specifications

Property	Value
Maximum operational ambient temperature (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational ambient temperature	+45°C (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 308 FHEE LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 308 FHEE LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 RRH with optional fan module can be mounted in horizontal orientation.



Note: The RRH with optional fan module can be mounted in horizontal orientation.

9.3 Flexi Metro RRH 2-pipe 1800L 10 W (FHEI)

FHEI technical specifications.

Functional description

Table 309 FHEI functional specification

Property	Value
Output power	2x5 W
MIMO	2TX

Table 309 FHEI functional specification (Cont.)

Property	Value
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	1805 - 1865 MHz
RX frequency range	1710 - 1770 MHz
DL instantaneous bandwidth	60 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	60 MHz
UL filter bandwidth	60 MHz

Interfaces

Figure 70 FHEI interfaces

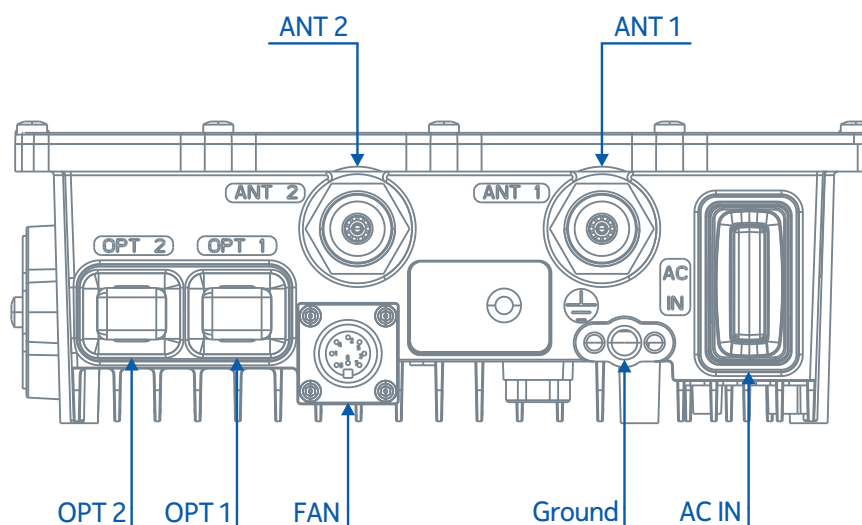


Table 310 FHEI interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	AC IN	1	MicroFit 1x3P Plug	
Antenna connector	ANT	2	4.3-10	
Fan control	FAN	1	8-pin circular	Power and control for fan option
Optical interface	OPT	2	SFP	1.5 to 6 Gbps, OBSAI
Local Management Port	LMP	1	2x15 pin header	

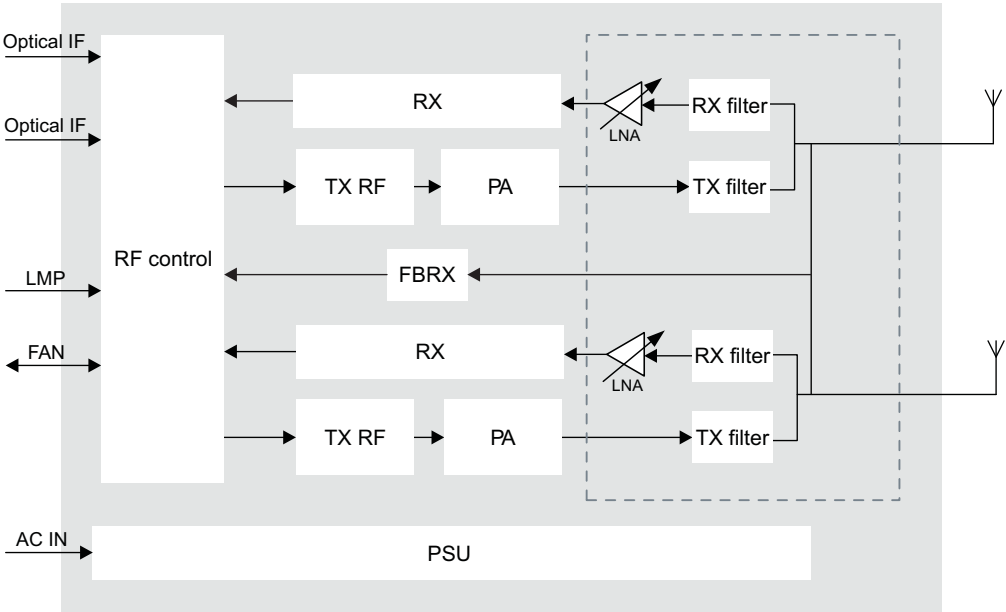
Antenna Line Devices (ALDs) support

Table 311 FHEI ALD support

ALD support via antenna ports	Value
AISG	None

Functional block diagram

Figure 71 FHEI functional block diagram



Electrical specifications

Table 312 FHEI electrical specifications

Property	Value
Nominal input voltage range	100 V AC to 240 V AC
Extended input voltage range	88 V AC to 276 V DC

Power consumption

Table 313 FHEI power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 230VAC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h Values preliminary estimated.		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	5+5	217	238	272

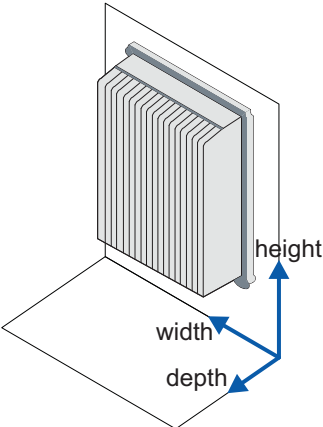
Installation and mechanical specifications

Table 314 FHEI installation and mechanical specifications

Property	Value
Installation options	• pole/wall installation • rooftop installation • bookshelf/stacking installation
IP rating	IP65
Related optional items	• Flexi Metro Wall/Pole/Stacking Mounting Kit (FMDB) • Flexi Metro Wall/Bookshelf Mounting Kit (FMDD) • Flexi Metro Visual Cover (FMDE) • Flexi Metro Fan Assembly Kit (FMDF) • Flexi Pole Mounting Kit (FPKA), not recommended • Flexi Metro Integrated Antenna (1.7G-2.2G) (FAGH)

Dimensions and weight

Table 315 FHEI dimensions and weight

Property	Value	Dimensions orientation
Height	Without mounting brackets, flange, screw boss and connectors: 269 mm (10.6 in.)	
Depth	Without mounting brackets, flange, screw boss and connectors: 82.7 mm (3.2 in.)	
Width	Without mounting brackets, flange, screw boss and connectors: 202 mm (7.9 in.)	
Weight	Without mounting brackets: 5 kg (11.0 lbs)	
Volume	4.2 l	

Environmental specifications

Table 316 FHEI environmental specifications

Property	Value
Maximum operational ambient temperature (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational ambient temperature	+45°C (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 317 FHEI LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS	No alarm

Table 317 FHEI LEDs (Cont.)

LED color	Description	Alarm
	There is no connection to any System Module	
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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.



Note: The RRH with optional fan module can be mounted in horizontal orientation.

9.4 Flexi Metro RRH 2-pipe 2100 10 W (FHGA)

FHGA technical specifications.

Functional description

Table 318 FHGA functional specification

Property	Value
Output power	2x5 W
MIMO	2TX
Outdoor installation	Yes

Table 318 FHGA functional specification (Cont.)

Property	Value
SW supported technologies	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

Interfaces

Figure 72 FHGA interfaces

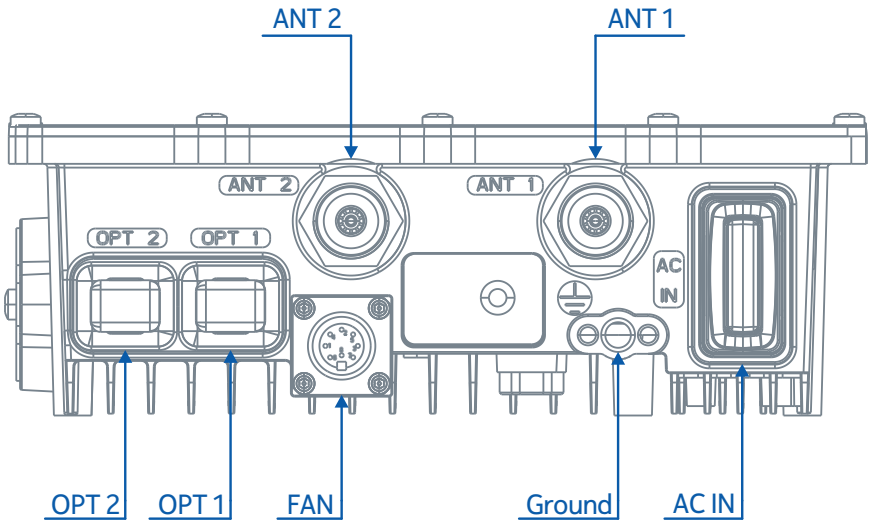


Table 319 FHGA interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	AC IN	1	MicroFit 1x3P Plug	
Antenna connector	ANT	2	4.3-10	
Fan control	FAN	1	8-pin circular	Power and control for fan option
Optical interface	OPT	2	SFP	1.5 to 6 Gbps, OBSAI
Local Management Port	LMP	1	2x15 pin header	

Antenna Line Devices (ALDs) support

Table 320 FHGA ALD support

ALD support via antenna ports	Value
AISG	None

Functional block diagram

Figure 73 FHGA functional block diagram

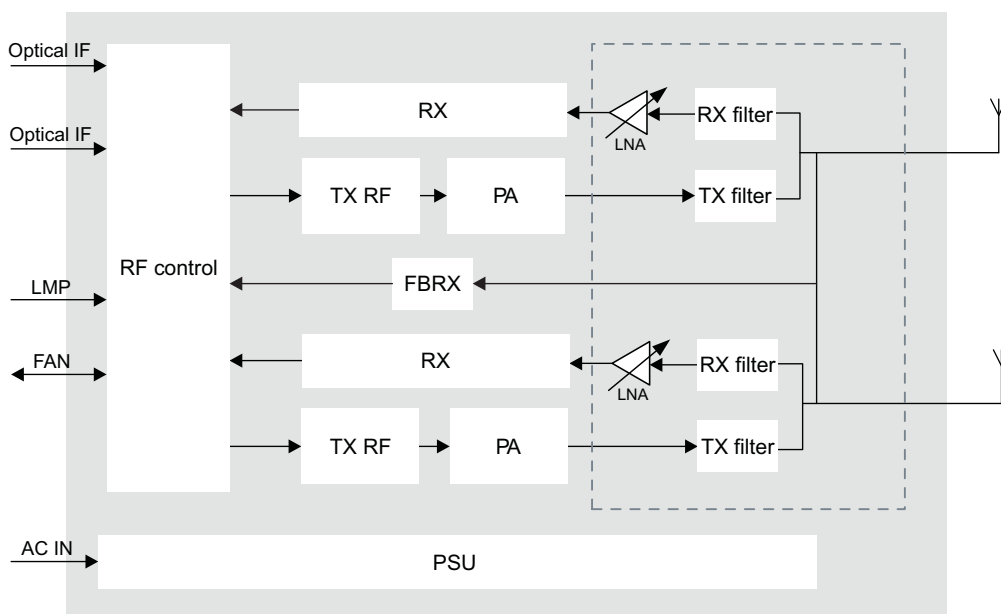
**Electrical specifications**

Table 321 FHGA electrical specifications

Property	Value
Nominal input voltage range	100 V AC to 240 V AC
Extended input voltage range	88 V AC to 276 V DC

Power consumption

Table 322 FHGA power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 230VAC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	5+5	215	232	260

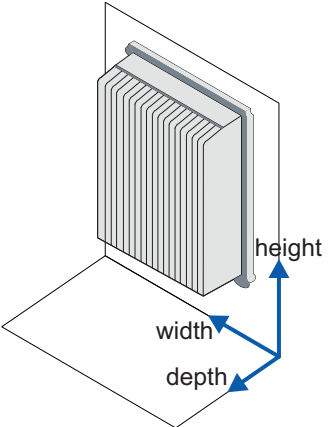
Installation and mechanical specifications

Table 323 FHGA installation and mechanical specifications

Property	Value
Installation options	• pole/wall installation • rooftop installation • bookshelf/stacking installation
IP rating	IP65
Related optional items	• Flexi Metro Wall/Pole/Stacking Mounting Kit (FMDB) • Flexi Metro Wall/Bookshelf Mounting Kit (FMDD) • Flexi Metro Visual Cover (FMDE) • Flexi Metro Integrated Antenna (1.7G-2.2G) (FAGH) • Flexi Metro Fan Assembly Kit (FMDF) • Flexi Pole Mounting Kit (FPKA), not recommended

Dimensions and weight

Table 324 FHGA dimensions and weight

Property	Value	Dimensions orientation
Height	Without mounting brackets, flange, screw boss and connectors: 269 mm (10.6 in.)	 The diagram shows a 3D perspective of the FHGA unit. It is a rectangular device with a series of vertical fins on the front face. Three blue arrows indicate the dimensions: 'height' points upwards along the right side, 'width' points horizontally along the bottom front edge, and 'depth' points diagonally into the page along the bottom left edge.
Depth	Without mounting brackets, flange, screw boss and connectors: 77 mm (3.0 in.)	
Width	Without mounting brackets, flange, screw boss and connectors: 202 mm (7.9 in.)	
Weight	Without mounting brackets: <5 kg (11.0 lbs)	
Volume	4.2 l	

Environmental specifications

Table 325 FHGA environmental specifications

Property	Value
Maximum operational ambient temperature (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational ambient temperature	+45°C (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 326 FHGA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 RRH with optional fan module can be mounted in horizontal orientation.



Note: The RRH with optional fan module can be mounted in horizontal orientation.

10 Flexi Remote Radio Head 1TX 2100 (FRGG)

FRGG technical specifications.

Functional description

Table 327 FRGG functional specification

Property	Value
Output power	1x60 W
MIMO	1TX
Outdoor installation	Yes
SW supported technology	WCDMA
TX frequency range	2110 - 2170 MHz
RX frequency range	1920 - 1980 MHz
DL instantaneous bandwidth	20 MHz
UL instantaneous bandwidth	45 MHz
DL filter bandwidth	20 MHz
UL filter bandwidth	20 MHz

Interfaces

Figure 74 FRGG (471882A) interfaces

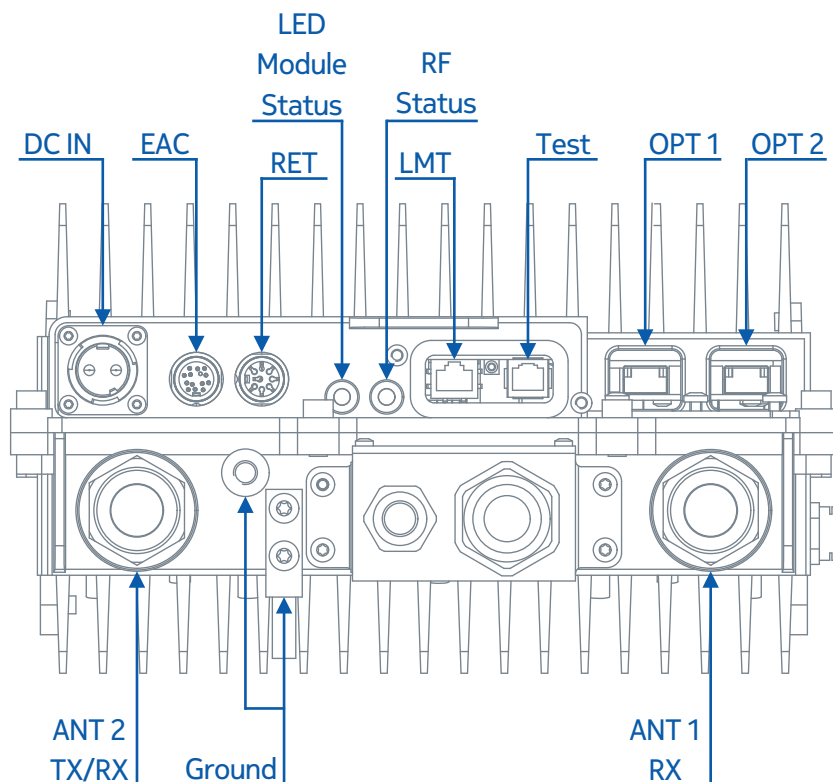


Table 328 FRGG (471882A) interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power Connector	DC IN	1	2-pin ITT Cannon	Optional DC connection box (FPOC) 16mm ²
Antenna connector	ANT	2	7/16, female	
Remote Electrical Tilt	RET	1	8-pin Amphenol C 091 D	
External Alarm Connection	EAC	1	14-pin Amphenol C 091 D	
Optical interface	OPT	2	SFP	OBSAI
Local Maintenance Terminal	LMT	1	RJ-45	

Antenna Line Devices (ALDs) support

Table 329 FRGG ALD support

ALD support via antenna ports	Value
AISG	RET: AISG 2.0
Proprietary AISG1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1: 28.5V or 12V ANT2: 12V
Power per port	30 W

Functional block diagram

Figure 75 FRGG functional block diagram

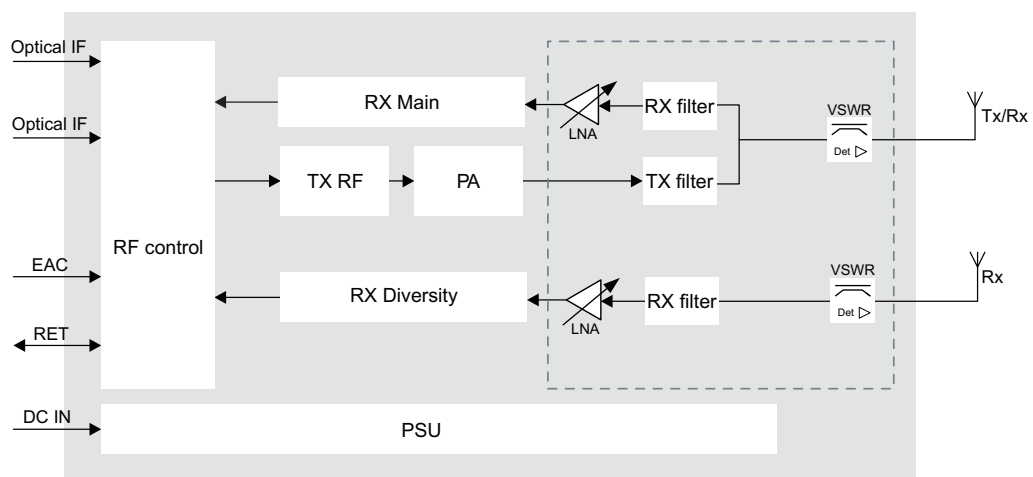
**Electrical specifications**

Table 330 FRGG 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** FRGG power consumption

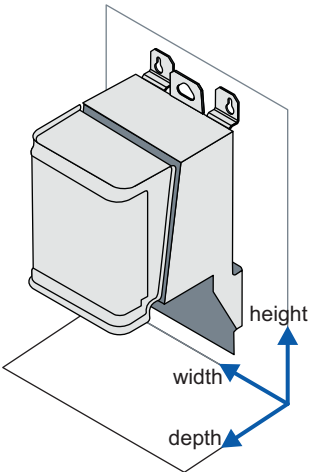
Number of TXs	RF output power per TX [W]	Estimated power consumption [W] at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
		50% RF Load	100% RF Load
1	60	212	290
	40	183	240
	20	150	184

Installation and mechanical specifications**Table 332** FRGG installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 333 FRGG dimensions and weight

Property	Value	Dimensions orientation
Height	450 mm (17.7 in.) With solar shield: 500 mm (19.7 in.)	
Depth	159 mm (6.3 in.) With solar shield: 174 mm (6.8 in.)	
Width	260 mm (10.2 in.) With solar shield: 280.5 mm (11.0 in.)	
Weight	15.9 kg (35.0 lbs)	
Volume	17.9 l	

Environmental specifications

Table 334 FRGG 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 335 FRGG LEDs

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

Table 335 FRGG LEDs (Cont.)

LED color	Description	Alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 proper cooling.



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

11 Descriptions of 2TX RRHs

11.1 Flexi Remote Radio Head 2TX 850 (FHCA)

FHCA technical specifications.

Functional description

Table 336 FHCA functional specification

Property	Value
Output power	2x20 W
MIMO	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 76 FHCA interfaces

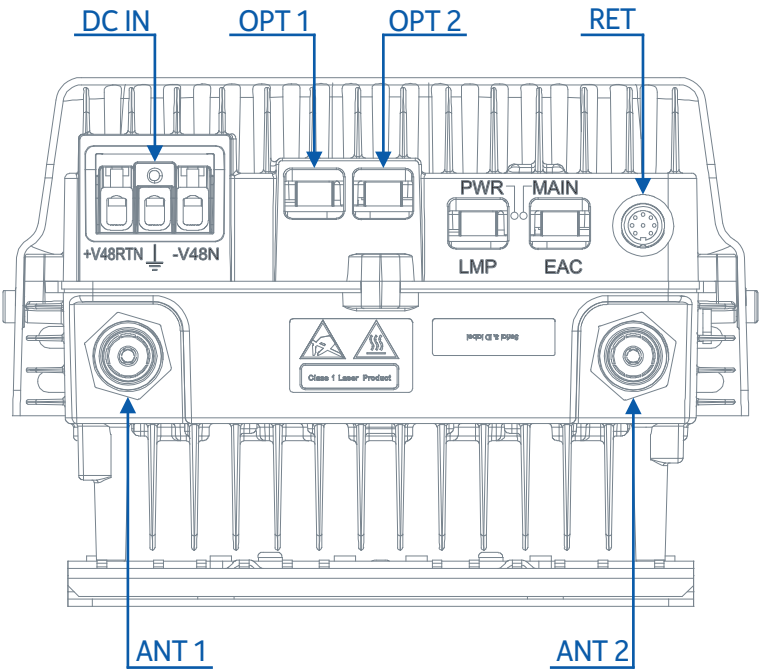


Table 337 FHCA interfaces

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

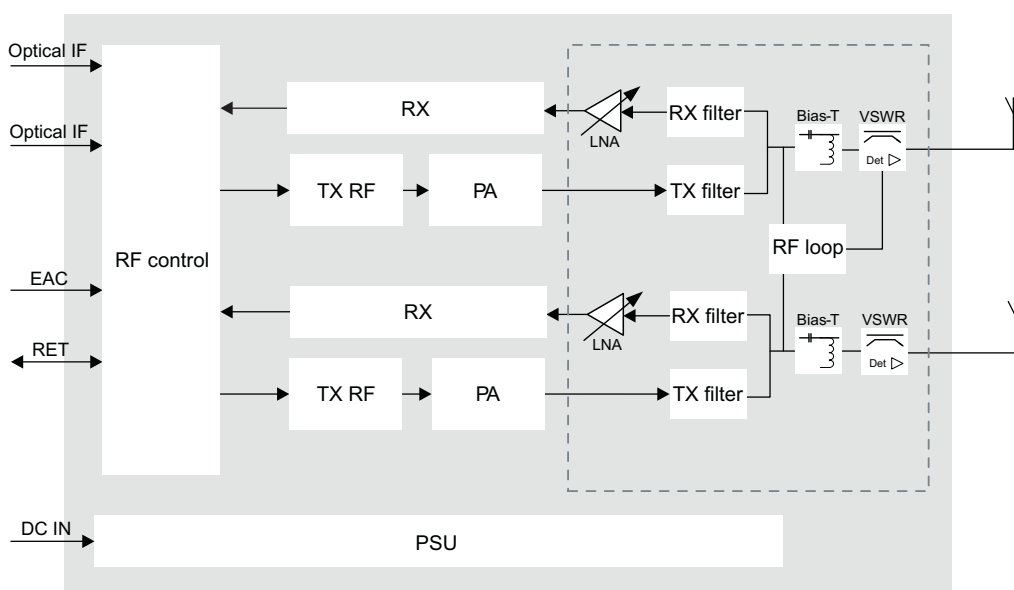
Antenna Line Devices (ALDs) support

Table 338 FHCA ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT2, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT2: 14.5 V RET: 14.5 V
Power per port	17 W

Functional block diagram

Figure 77 FHCA functional block diagram



Electrical specifications

Table 339 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 340 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

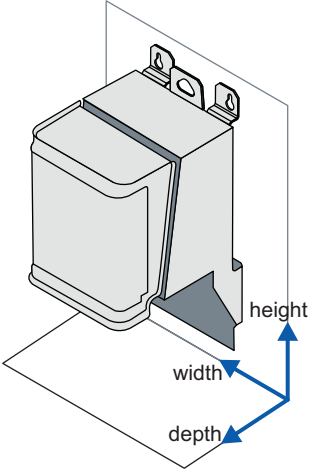
Installation and mechanical specifications

Table 341 FHCA installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 342 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.)	
Depth	215 mm (8.4 in.)	
Width	358 mm (14.1 in.)	
Weight	20 kg (44 lbs)	
Volume	18 l	

Environmental specifications*Table 343* 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs*Table 344* FHCA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	Software configuration is complete or supervisory: RF resources activated and transmission is possible	No alarm

Table 344 FHCA LEDs (Cont.)

LED color	Description	Alarm
	Working normally, no alarm on the RF Module	
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 proper cooling.



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

11.2 Flexi Remote Radio Head 2TX 730 (FRLB)

FRLB technical specifications.

Functional description

Table 345 FRLB functional specification

Property	Value
Output power	2x30 W
MIMO	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 78 FRLB interfaces

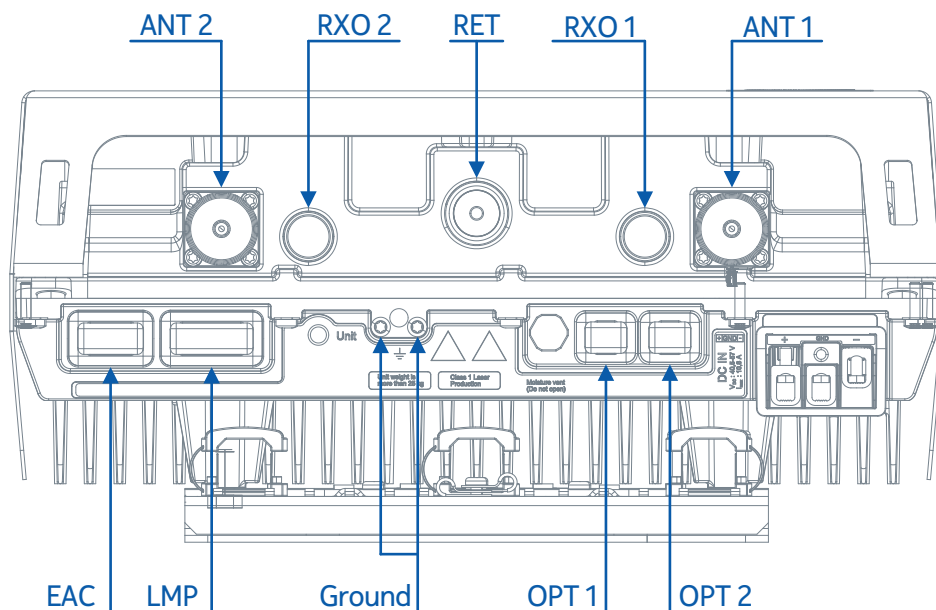


Table 346 FRLB interfaces

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	

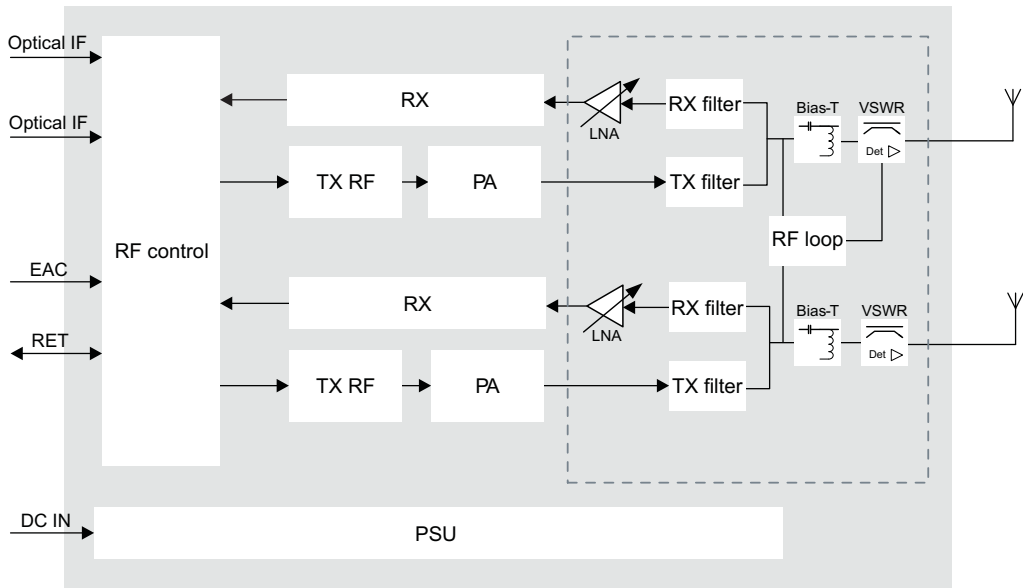
Antenna Line Devices (ALDs) support

Table 347 FRLB ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT2, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT2: 24 V RET: 24 V
Power per port	30 W

Functional block diagram

Figure 79 FRLB functional block diagram



Electrical specifications

Table 348 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 349 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 350 FRLB installation and mechanical specifications

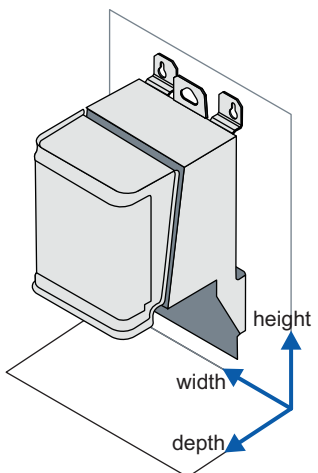
Property	Value
Installation options	- pole/wall installation - directly on the wall installation

Table 350 FRLB installation and mechanical specifications (Cont.)

Property	Value
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 351 FRLB dimensions and weight

Property	Value	Dimensions orientation
Height	400 mm (15.7 in.)	
Depth	150 mm (5.9 in.)	
Width	400 mm (15.7 in.)	
Weight	Without solar shield and mounting shroud: 27 kg (59.5 lbs)	
Volume	25 l	

Environmental specifications

Table 352 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 353 FRLB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 proper cooling.



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

11.3 Flexi RRH 2-pipe 900 80 W (FHDA)

FHDA technical specifications.

Functional description

Table 354 FHDA functional specification

Property	Value
Output power	2x40 W
MIMO	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 80 FHDA interfaces

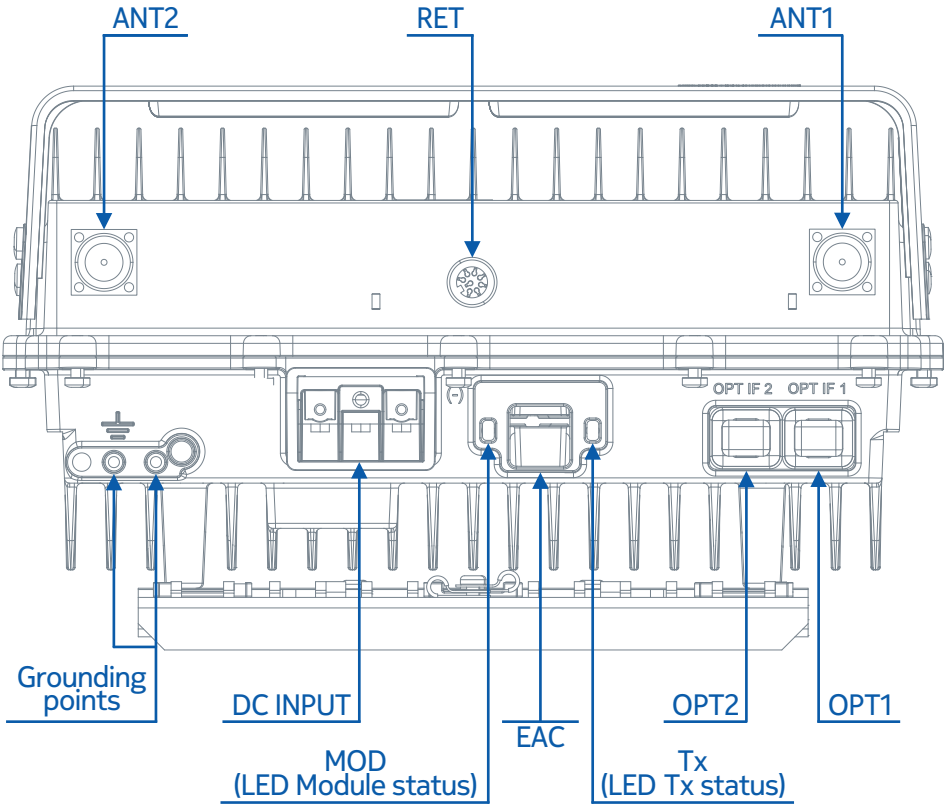


Table 355 FHDA interfaces

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	2x15 pin header	

Antenna Line Devices (ALDs) support

Table 356 FHDA ALD support

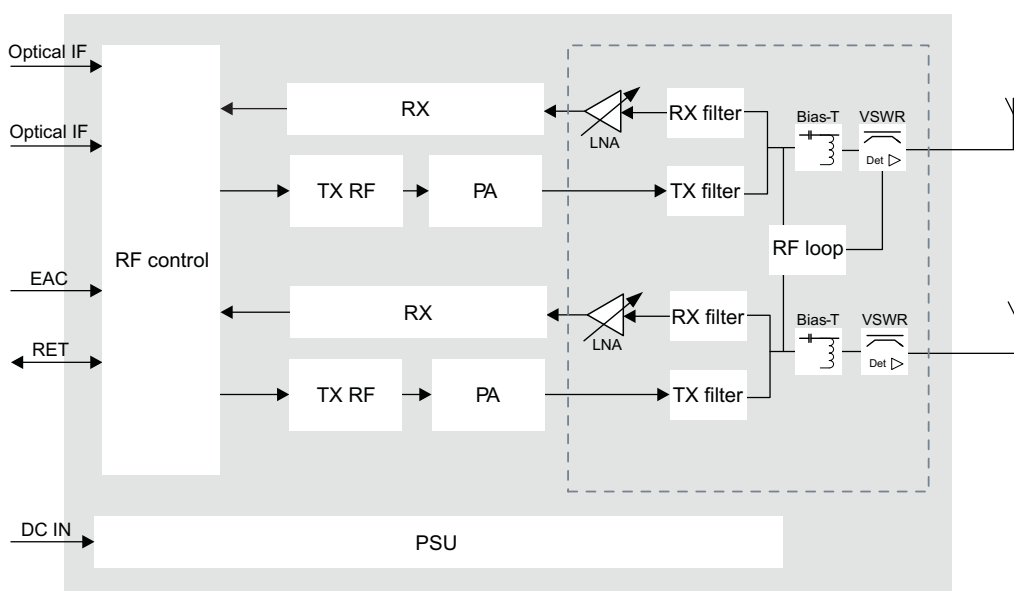
ALD support via antenna ports	Value
AISG	ANT1, ANT2, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No

Table 356 FHDA ALD support (Cont.)

ALD support via antenna ports	Value
Voltage	ANT1, ANT2: 14.5 V RET: 14.5 V
Power per port	30 W

Functional block diagram

Figure 81 FHDA functional block diagram



Electrical specifications

Table 357 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 358 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

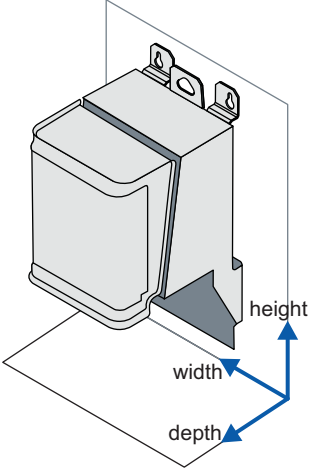
Installation and mechanical specifications

Table 359 FHDA installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 360 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.)	
Depth	215 mm (8.4 in.)	
Width	358 mm (14.1 in.)	
Weight	20 kg (44.0 lbs)	
Volume	25 l	

Environmental specifications

Table 361 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 362 FHDA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 proper cooling.



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

11.4 Flexi Remote Radio Head 2TX 1800 (FHEA)

FHEA technical specifications.

Functional description

Table 363 FHEA functional specification

Property	Value
Output power	2x40 W
MIMO	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 82 FHEA interfaces

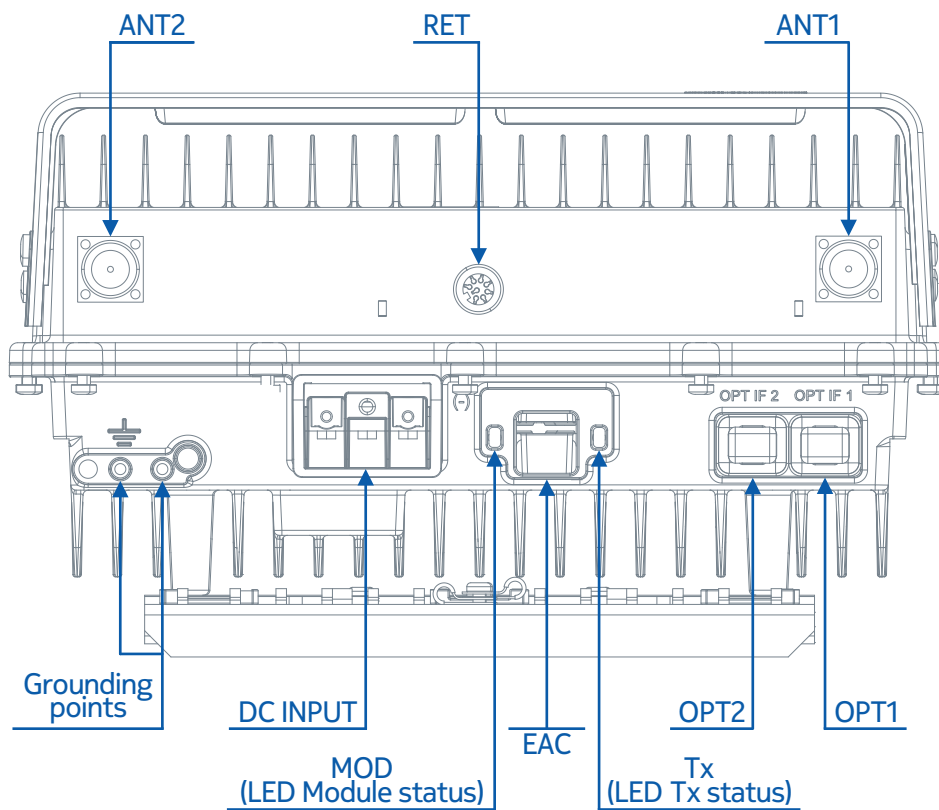


Table 364 FHEA interfaces

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
Local Management Port	LMP	1	2x15 pin header	

Antenna Line Devices (ALDs) support

Table 365 FHEA ALD support

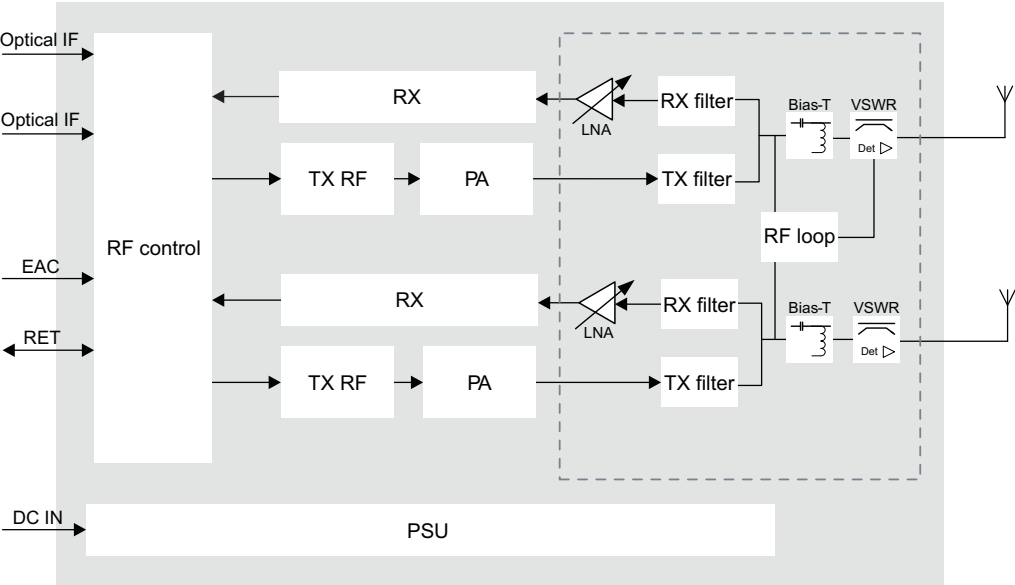
ALD support via antenna ports	Value
AISG	ANT1, ANT2, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT2: 14.5 V

Table 365 FHEA ALD support (Cont.)

ALD support via antenna ports	Value
	RET: 14.5 V
Power per port	30 W

Functional block diagram

Figure 83 FHEA functional block diagram



Electrical specifications

Table 366 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 367 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

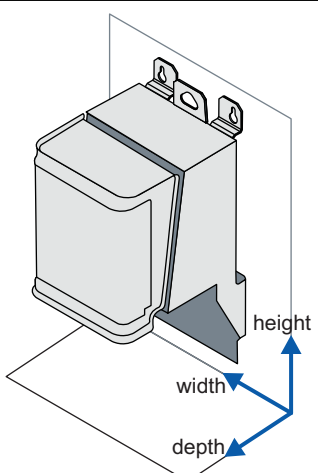
Installation and mechanical specifications

Table 368 FHEA installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 369 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 kg (44.0 lbs)	
Volume	25 l	

Environmental specifications

Table 370 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 371 FHEA LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 proper cooling.



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

11.5 Flexi Remote Radio Head 2TX 2100 (FRGQ)

FRGQ technical specifications.

Functional description

Table 372 FRGQ functional specification

Property	Value
Output power	2x40 W
MIMO	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 84 FRGQ interfaces

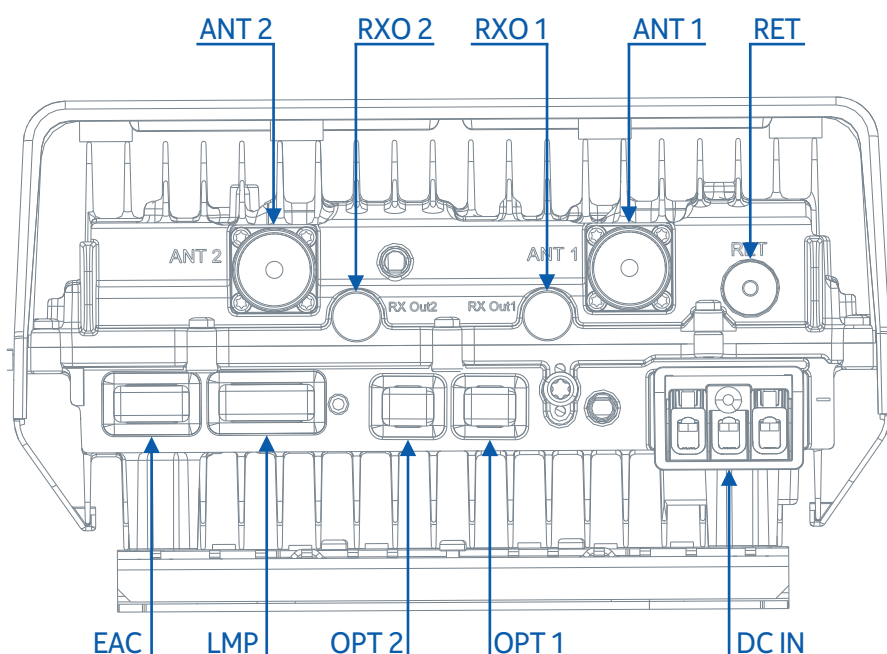


Table 373 FRGQ interfaces

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	

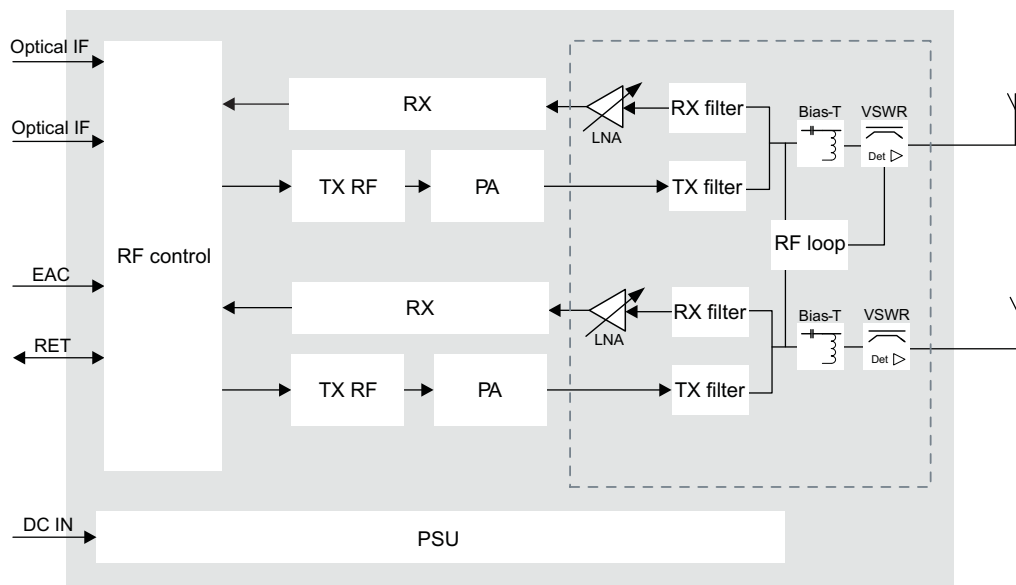
Antenna Line Devices (ALDs) support

Table 374 FRGQ ALD support

ALD support via antenna ports	Value
AISG	ANT1, ANT2, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1, ANT2: 14.5 V RET: 14.5 V
Power per port	30 W

Functional block diagram

Figure 85 FRGQ functional block diagram



Electrical specifications

Table 375 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 376 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

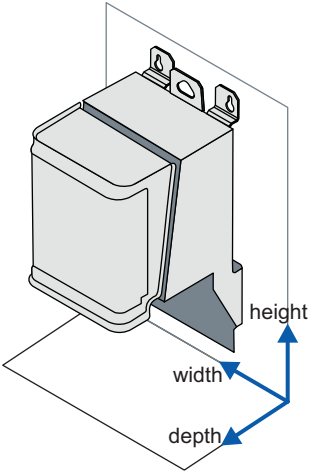
Table 377 FRGQ installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation

Table 377 FRGQ installation and mechanical specifications (Cont.)

Property	Value
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight**Table 378** 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)	
Volume	21 l	

Environmental specifications**Table 379** 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 380 FRGQ LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 proper cooling.



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

11.6 Flexi Remote Radio Head 2TX 2600 (FRHB)

FRHB technical specifications.

Functional description

Table 381 FRHB functional specification

Property	Value
Output power	2x40 W
MIMO	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 86 FRHB interfaces

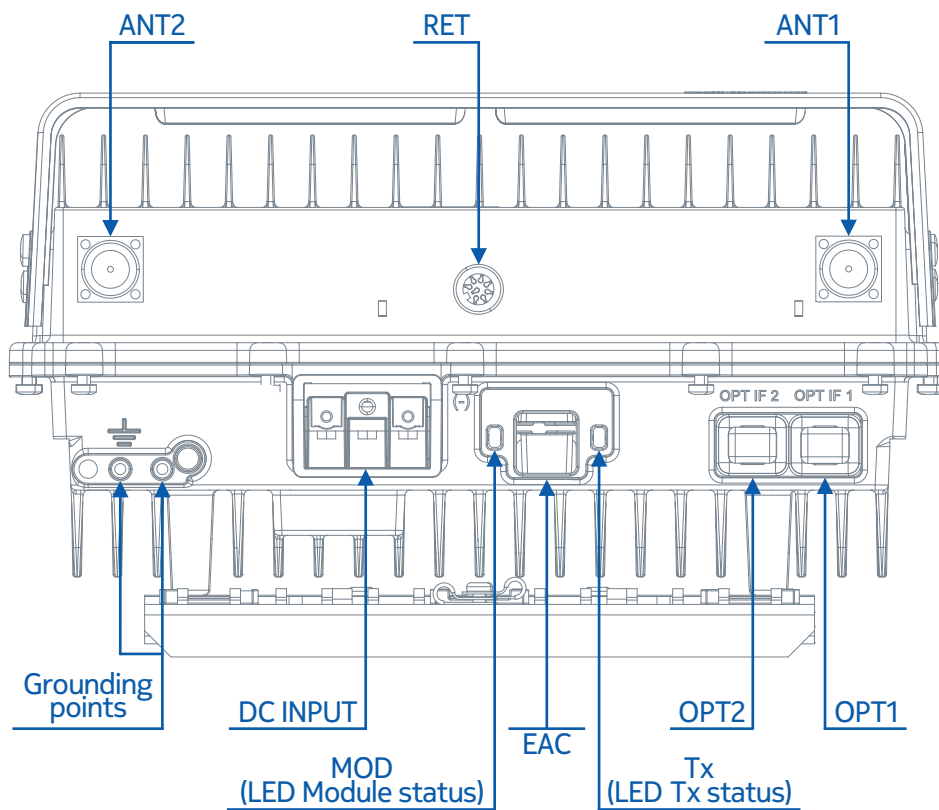


Table 382 FRHB interfaces

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 383 FRHB ALD support

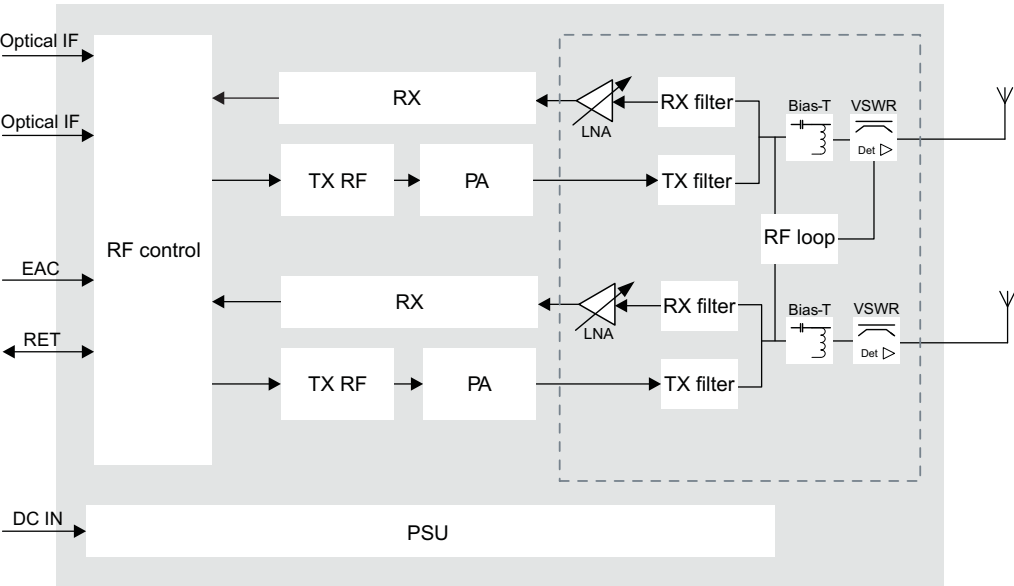
ALD support via antenna ports	Value
AISG	ANT1, RET: AISG 2.0
Proprietary AISG 1.1	No

Table 383 FRHB ALD support (Cont.)

ALD support via antenna ports	Value
CWA (for non-AISG installations)	No
Voltage	ANT1: 14.5 V RET: 14.5 V
Power per port	30 W

Functional block diagram

Figure 87 FRHB functional block diagram



Electrical specifications

Table 384 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 385 FRHB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	597	687	873
	1/1/1 2T2R	40+40	797	945	1263

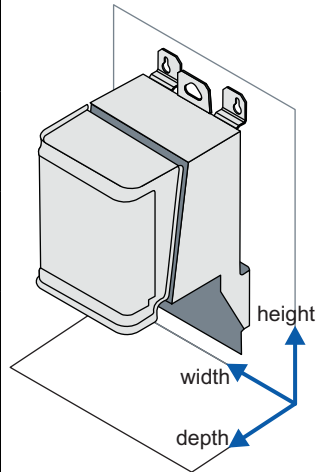
Installation and mechanical specifications

Table 386 FRHB installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 387 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)	
Volume	20 l	

Environmental specifications

Table 388 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 389 FRHB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm
Green, blinking	Software downloading and updating	No alarm

Table 389 FRHB LEDs (Cont.)

LED color	Description	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 proper cooling.



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

11.7 Flexi Remote Radio Head 2TX 800EU (FRMB)

FRMB technical specifications.

Functional description

Table 390 FRMB functional specification

Property	Value
Output power	2x40 W
MIMO	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 88 FRMB interfaces

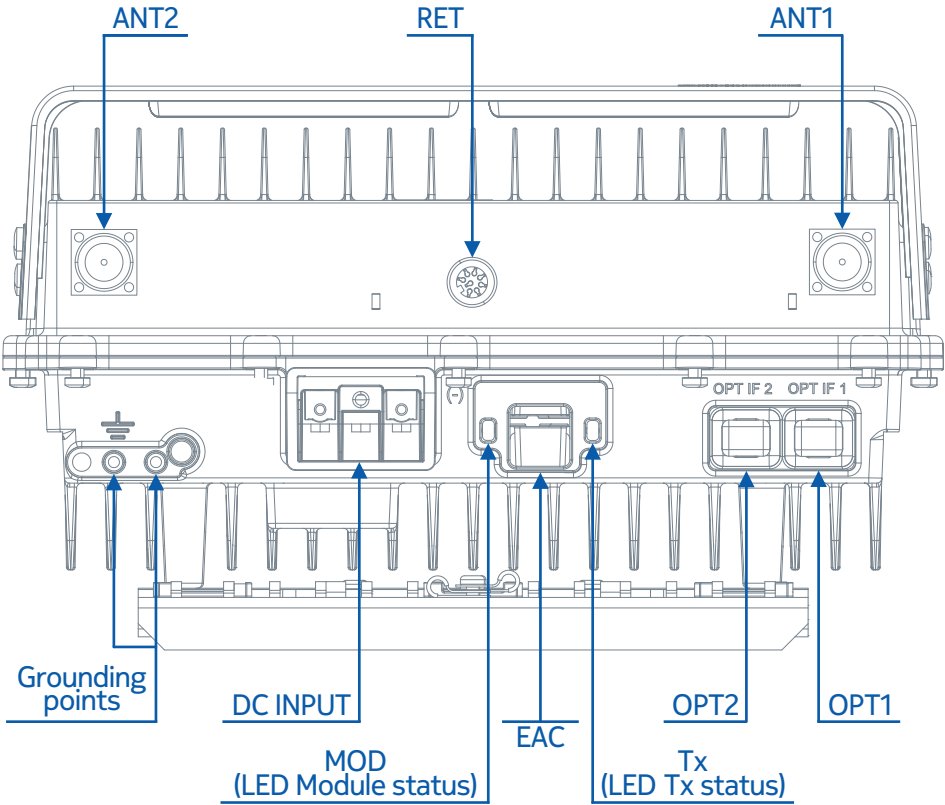


Table 391 FRMB interfaces

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 392 FRMB ALD support

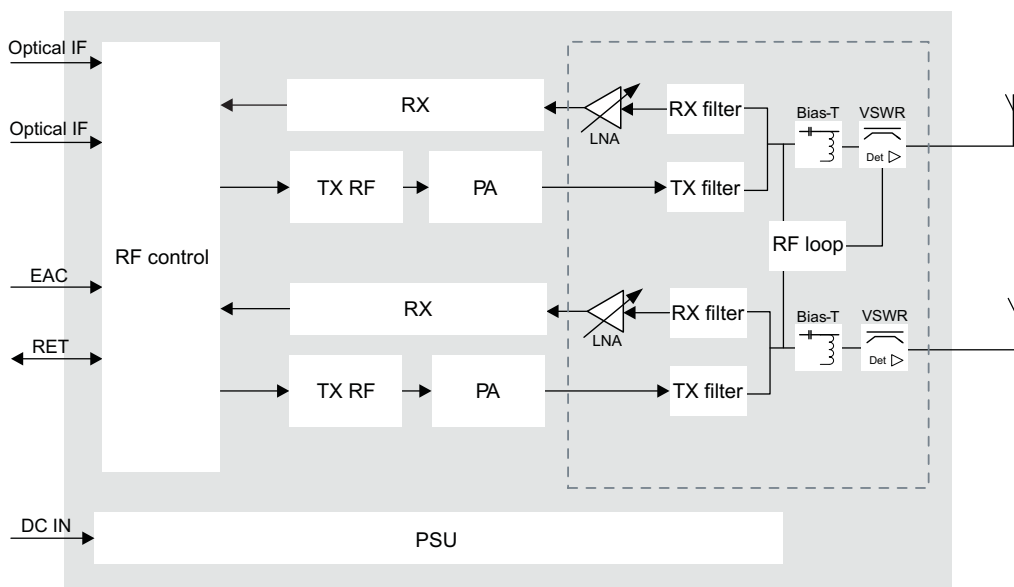
ALD support via antenna ports	Value
AISG	ANT1, RET: AISG 2.0
Proprietary AISG 1.1	No

Table 392 FRMB ALD support (Cont.)

ALD support via antenna ports	Value
CWA (for non-AISG installations)	No
Voltage	ANT1: 14.5 V RET: 14.5 V
Power per port	30 W

Functional block diagram

Figure 89 FRMB functional block diagram



Electrical specifications

Table 393 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 394 FRMB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 230VAC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h		
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH RRH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$
LTE	1/1/1 2T2R	20+20	486	549	667
	1/1/1 2T2R	40+40	750	896	1170

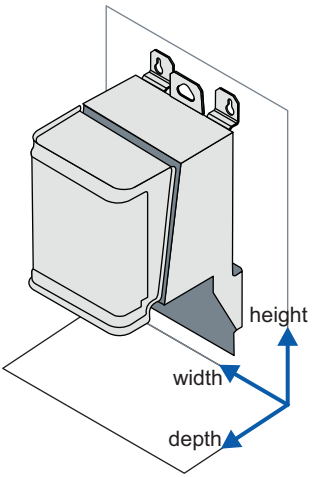
Installation and mechanical specifications

Table 395 FRMB installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 396 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)	
Volume	21 l	

Environmental specifications

Table 397 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 (113°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 398 FRMB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm

Table 398 FRMB LEDs (Cont.)

LED color	Description	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 proper cooling.



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

11.8 Flexi RRH 2-pipe 700/840 100 W (FHPC)

FHPC technical specifications.

Functional description

Table 399 FHPC functional specification

Property	Value
Output power	B18: 2x30 W, B28: 2x20 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	B18: 860 - 875 MHz B28: 773 - 783 MHz
RX frequency range	B18: 815 - 830 MHz B28: 718 - 728 MHz
DL instantaneous bandwidth	B18: 15 MHz B28: 10 MHz
UL instantaneous bandwidth	B18: 15 MHz B28: 10 MHz

Table 399 FHPC functional specification (Cont.)

Property	Value
DL filter bandwidth	B18: 15 MHz B28: 10 MHz
UL filter bandwidth	B18: 15 MHz B28: 10 MHz

Interfaces

Figure 90 FHPC interfaces

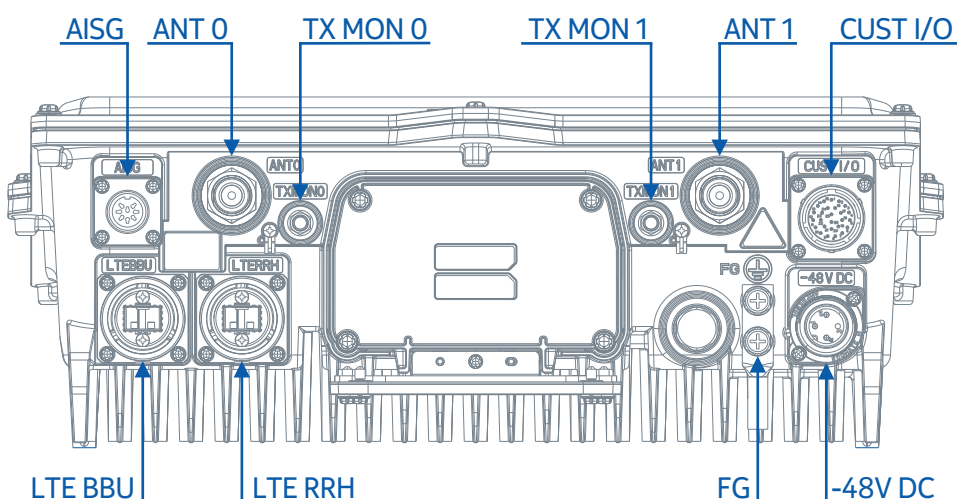


Table 400 FHPC interfaces

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Power connector	-48V DC	1	Amphenol C016 20C003 100 12	
Antenna connector	ANT 0 ANT 1	2	N-type	Connection to antenna line
RF external connector	TX MON 0 TX MON 1 RX MON 0 RX MON 1	2	SMA-J	RX MON interfaces are inside of maintenance cover
Antenna Control Interface	AISG	1	DDK AIC-M16R-8SC	
Optical interface	LTE BBU LTE RRH	2	SFP	CPRI interface to/from FSM CPRI interface to/from RRH 2.4 Gbps

Table 400 FHPC interfaces (Cont.)

Interface	Label on the HW	Number of interfaces	Connector type	Additional info
Customer Input/Output Connection	CUST I/O	1	Amphenol PJ02S-21-26P	
Grounding cable connection	FG	1	M6 blind holes with 16 mm spacing	
Frequency Reference Output	10 MHz	1	SMA-J	Inside of maintenance cover

Antenna Line Devices (ALDs) support

Table 401 FHPC ALD support

ALD support via antenna ports	Value
AISG	RET: AISG2.0
Legacy Siemens equipment	No
CWA (for non-AISG installations)	No
Voltage	RET: 27 V
Power per port	30 W

Functional block diagram

Figure 91 FHPC functional block diagram

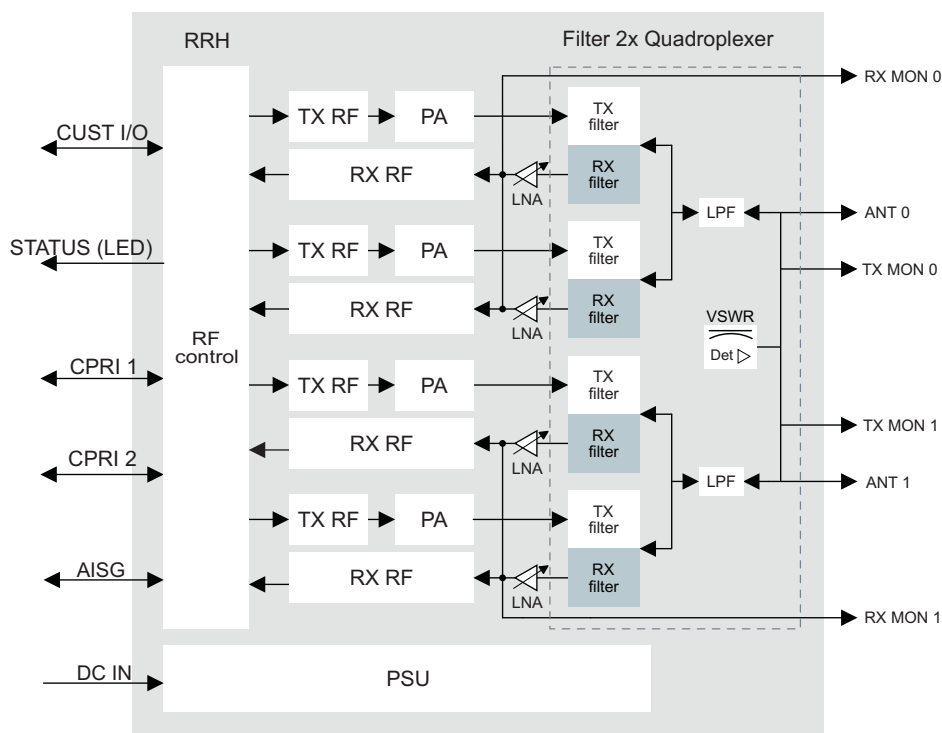
**Electrical specifications**

Table 402 FHPC electrical specifications

Property	Value
Nominal supply voltage	-48.0 V DC
Nominal input voltage range	-40.0 V DC to -56.0 V DC

Power consumption

Table 403 FHPC power consumption

Number of TXs	RF output power per TX [W]		Estimated power consumption [W] without AISG at 48 VDC input at 23°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin.	
	700 MHz	800 MHz	50% RF Load	100% RF Load
2	20+20	-	155	220
	-	30+30	199	310
	20+20	30+30	275	455
	20+20	20+20	253	408

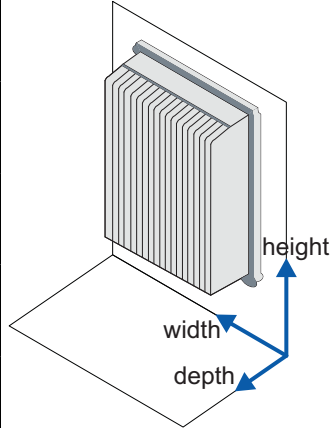
Installation and mechanical specifications

Table 404 FHPC installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 405 FHPC dimensions and weight

Property	Value	Dimensions orientation
Height	460 mm (18.1 in.)	
Depth	136 mm (5.3 in.)	
Width	350 mm (13.8 in.)	
Weight	19.9 kg (43.9 lbs)	
Volume	21.9 l	

Environmental specifications*Table 406* FHPC environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade (at constant high ambient temperature, maximum output power might be limited)	+50°C (122°F)
Maximum operational outdoor temperature in the sun	+45°C (113°F)
Maximum indoor temperature (this is valid for fanless products)	+45°C (113°F)
Minimum operational temperature (including cold start)	-30°C (-22°F)

LEDs*Table 407* FHPC LEDs (RRH Status)

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module	Fault
Red, blinking	Operation degraded Major alarm affecting the whole RF Module	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 407 FHPC LEDs (RRH Status) (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

Table 408 FHPC LEDs (TX Status)

LED color	Description	Alarm
Yellow, stable	O&M control is missing	No alarm
Green, stable	Transmission ON	No alarm
Green, blinking	Transmission OFF	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 proper cooling.



Note: The minimum startup voltage is 40.0 V DC. If the input voltage is below/beyond extended limits, unit might shut down.

11.9 Flexi Remote Radio Head 2TX 1800 (FHEB)

FHEB technical specifications.

Functional description

Table 409 FHEB functional specification

Property	Value
Output power	2x60 W
MIMO	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 LTE: 40 MHz
UL instantaneous bandwidth	60 MHz
DL filter bandwidth	75 MHz
UL filter bandwidth	75 MHz

Interfaces

Figure 92 FHEB interfaces

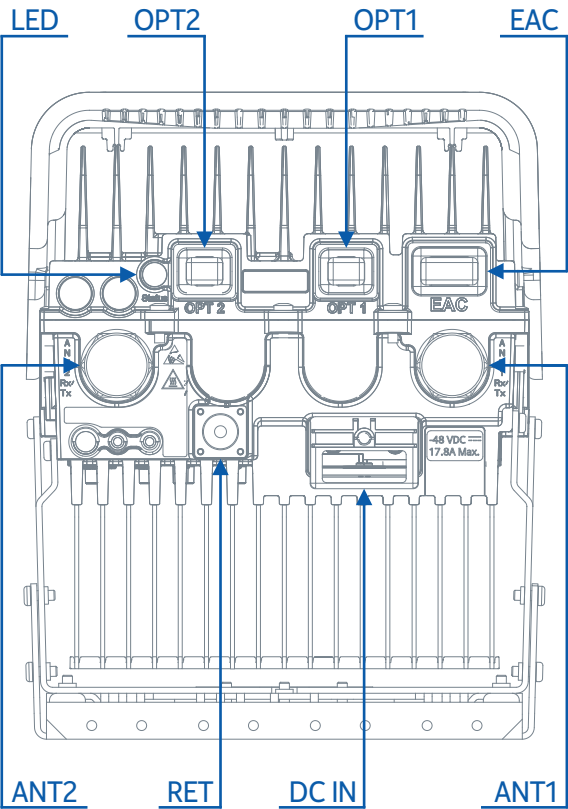


Table 410 FHEB interfaces

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 411 FHEB ALD support

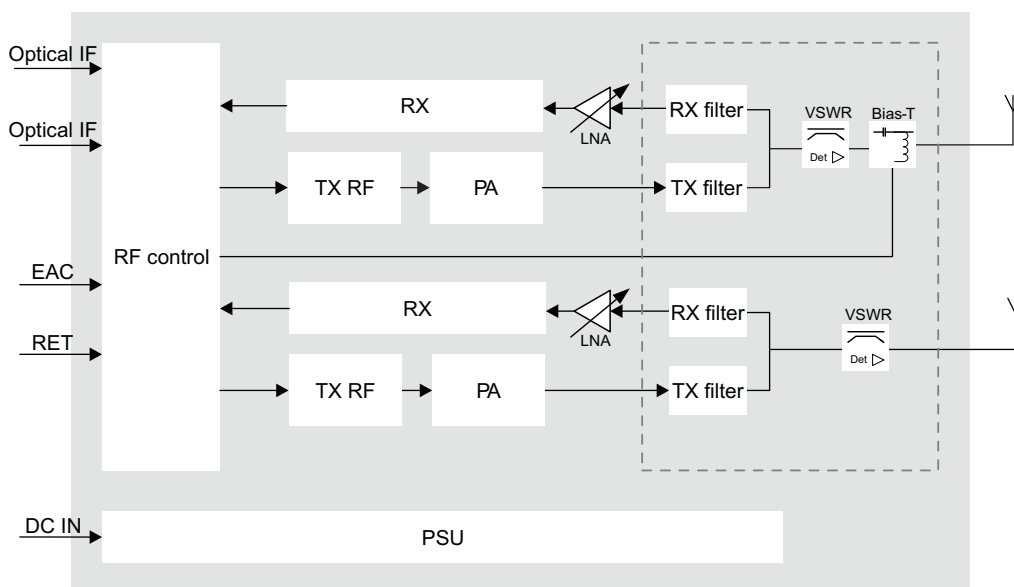
ALD support via antenna ports	Value
AISG	ANT1, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1: 14.5 V

Table 411 FHEB ALD support (Cont.)

ALD support via antenna ports	Value
	RET: 14.5 V
Power per port	15 W

Functional block diagram

Figure 93 FHEB functional block diagram



Electrical specifications

Table 412 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 413 FHEB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average P_{RRH} , static	Power consumption ETSI ES 202706 busy hour load P_{BH} RRH, static	Power consumption 100% RF power load $P_{100\%}$ RRH	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	538	538	538	538	538	538
	2/2/2	20	547	567	655	546	549	553
	4/4/4	20	884	1019	1267	777	801	829
	8/8/8	15	973	1226	1521			
LTE	1/1/1 2T2R	20+20	553	641	789			
	1/1/1 2T2R	40+40	689	831	1079			
	1/1/1 2T2R	60+60	875	1082	1462			

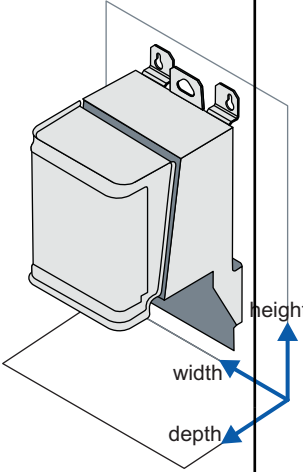
Installation and mechanical specifications

Table 414 FHEB installation and mechanical specifications

Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 415 FHEB dimensions and weight

Property	Value		Dimensions orientation
Height	A.101 or A.102 version	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.)	 The diagram shows a 3D perspective of the FHEB unit. Three blue arrows indicate the dimensions: 'height' points vertically along the right side, 'width' points horizontally along the front face, and 'depth' points horizontally along the bottom edge.
	A.103 version	As delivered, cable tie point recessed: 425.8 mm (16.8 in.) With upper and lower mounting brackets: 572.1 mm (22.5 in.)	
Depth	A.101 or A.102 version	324 mm (12.8 in.)	
	A.103 version	287 mm (11.3 in.)	
Width	A.101 or A.102 version	260 mm (10.2 in.)	
	A.103 version	256.7 mm (10.1 in.)	
Weight	A.101 or A.102 version	17.3 kg (38.1 lbs)	
	A.103 version	16.3 kg (35.9 lbs)	
Volume	A.101 or A.102 version	21 l	
	A.103 version	19.1 l	

Environmental specifications

Table 416 FHEB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade, assuming wind speed is 3 m/s (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun, assuming wind speed is 3 m/s	+50°C (122°F)
Maximum indoor temperature, assuming wind speed is 0 m/s (this is valid for fanless products)	+40°C (104°F)

Table 416 FHEB environmental specifications (Cont.)

Property	Value
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 417 FHEB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	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 417 FHEB 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

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 proper cooling.



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

11.10 Flexi RRH 2-pipe 1800 120 W (FHEF)

FHEF technical specifications.

Functional description

Table 418 FHEF functional specification

Property	Value
Output power	2x60 W
MIMO	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	For WCDMA/LTE when shared with GSM: 35/40 MHz LTE: 40 MHz
UL instantaneous bandwidth	55 MHz
DL filter bandwidth	55 MHz
UL filter bandwidth	55 MHz

Interfaces

Figure 94 FHEF interfaces

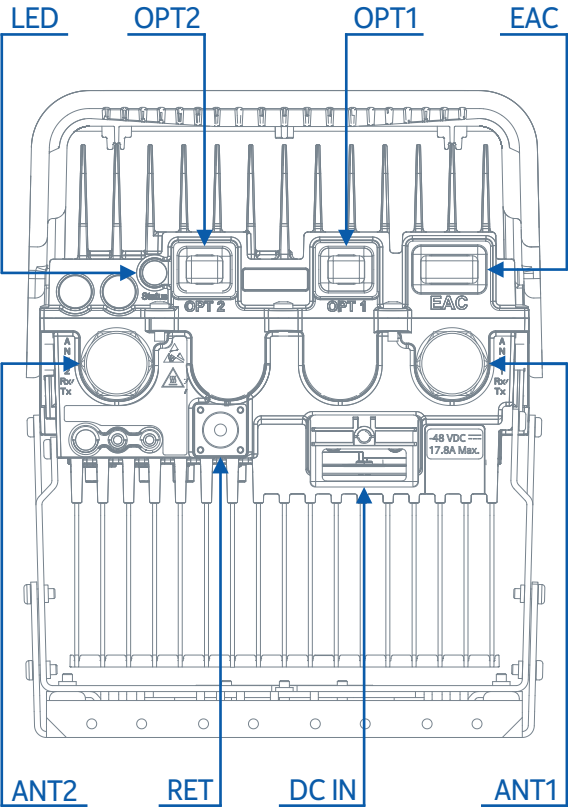


Table 419 FHEF interfaces

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

Antenna Line Devices (ALDs) support

Table 420 FHEF ALD support

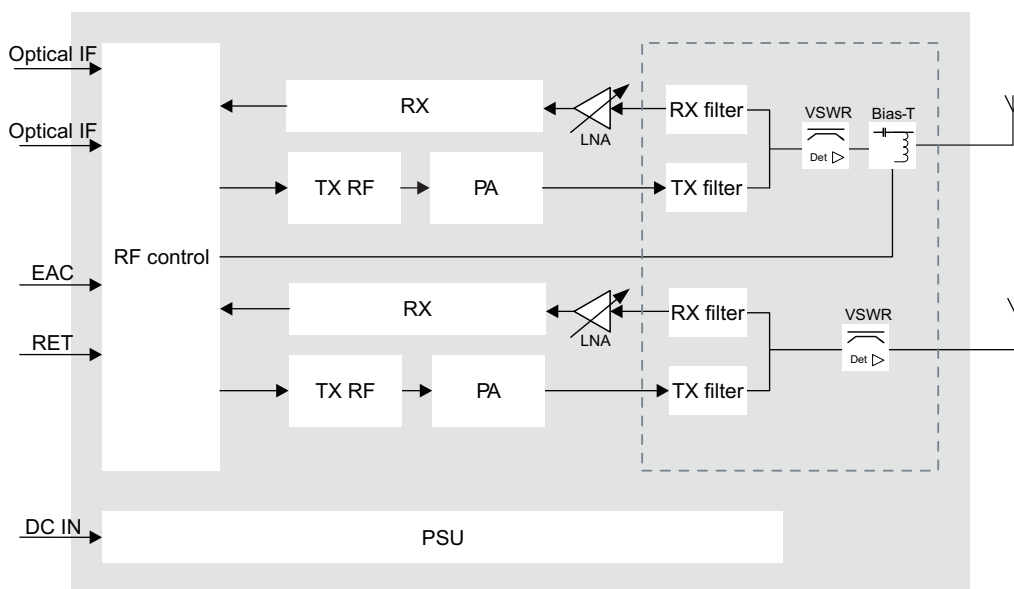
ALD support via antenna ports	Value
AISG	ANT1, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1: 14.5 V RET: 14.5 V

Table 420 FHEF ALD support (Cont.)

ALD support via antenna ports	Value
Power per port	15 W

Functional block diagram

Figure 95 FHEF functional block diagram



Electrical specifications

Table 421 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 422 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

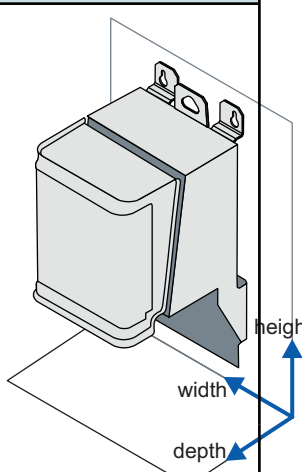
Installation and mechanical specifications

Table 423 FHEF installation and mechanical specifications

Property	Value
Installation options	• pole/wall installation • directly on the wall installation
IP rating	IP65
Related optional items	• Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 424 FHEF dimensions and weight

Property	Value		Dimensions orientation
Height	A.101 version	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.)	
	A.102 version	As delivered, cable tie point recessed: 425.8 mm (16.8 in.) With upper and lower mounting brackets: 572.1 mm (22.5 in.)	
Depth	A.101 version	324 mm (12.8 in.)	
	A.102 version	287 mm (11.3 in.)	
Width	A.101 version	260 mm (10.2 in.)	
	A.102 version	256.7 mm (10.1 in.)	
Weight	A.101 version	17.3 kg (38.1 lbs)	
	A.102 version	16.3 kg (35.9 lbs)	
Volume	A.101 version	21 l	
	A.102 version	19.1 l	

Environmental specifications

Table 425 FHEF environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade, assuming wind speed is 3 m/s (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)
Maximum operational outdoor temperature in the sun, assuming wind speed is 3 m/s	+50°C (122°F)
Maximum indoor temperature, assuming wind speed is 0 m/s (this is valid for fanless products)	+40°C (104°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs

Table 426 FHEF LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm

Table 426 FHEF LEDs (Cont.)

LED color	Description	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 proper cooling.



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

11.11 Flexi Remote Radio Head 2TX 900 (FHDB)

FHDB technical specifications.

Functional description

Table 427 FHDB functional specification

Property	Value
Output power	2x60 W
MIMO	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 96 FHDB interfaces

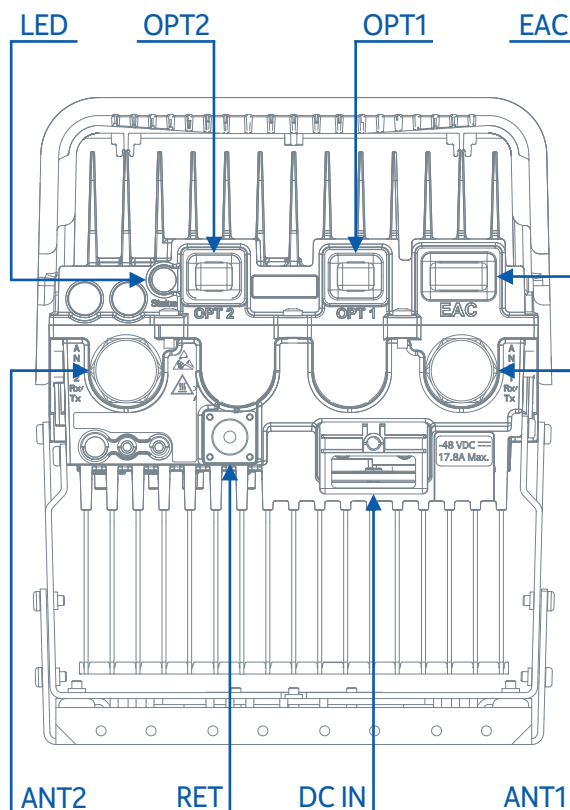


Table 428 FHDB interfaces

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 429 FHDB ALD support

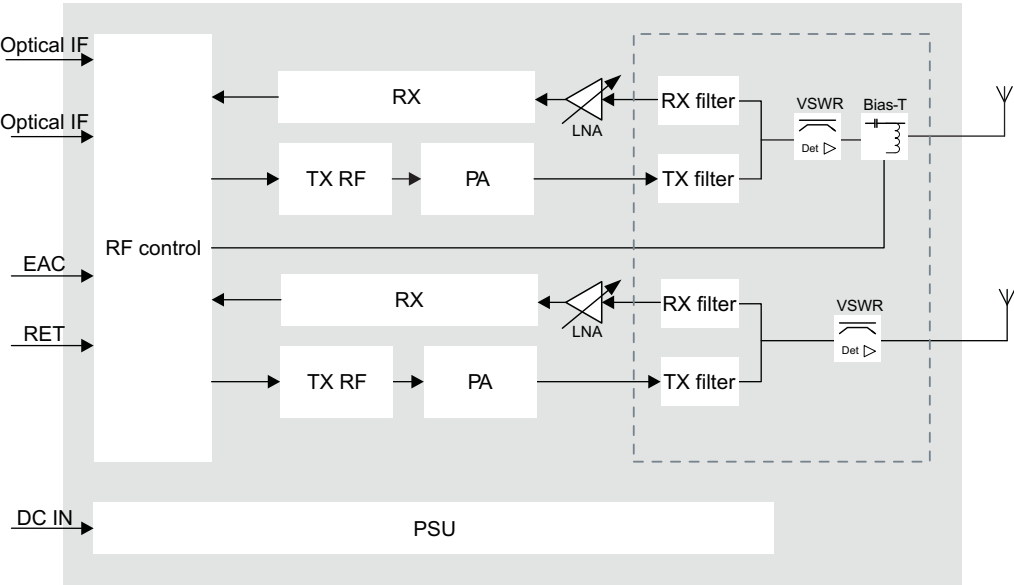
ALD support via antenna ports	Value
AISG	ANT1, RET: AISG 2.0
Proprietary AISG 1.1	No
CWA (for non-AISG installations)	No
Voltage	ANT1: 14.5 V RET: 14.5 V

Table 429 FHDB ALD support (Cont.)

ALD support via antenna ports	Value
Power per port	15 W

Functional block diagram

Figure 97 FHDB functional block diagram



Electrical specifications

Table 430 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 431 FHDB power consumption

Mode	Configuration	Output power per carrier [W]	Estimated power consumption [W] at 48VDC input at 25°C. Non-committed estimated values depend on the final product HW and SW optimization with +/- 10% margin. Average = (6h low hour load, 10h medium hour load and 8h busy hour load) / 24h					
			Power consumption ETSI ES 202706 average $P_{RRH, static}$	Power consumption ETSI ES 202706 busy hour load $P_{BH, static}$	Power consumption 100% RF power load $P_{100\% RRH}$	Power consumption Typical as 25% TCH load, 60% DTX, 4dB PC	Power consumption Busy as 50% TCH load, 60% DTX, 4dB PC	Power consumption Max load (2% GoS), 60% DTX, 4dB PC
GSM	1/1/1	20	477	477	477	477	477	477
	2/2/2	20	501	521	615	500	503	507
	4/4/4	20	658	823	1115	658	751	779
	8/8/8	15	804	1062	1401			
WCDMA	1/1/1	20	333	363	426			
	2/2/2	20	410	462	578			
	3/3/3	20	490	567	736			
	4/4/4	20	669	783	1026			
LTE	1/1/1	20+20	513	582	720			
	1/1/1	40+40	654	780	1044			
	1/1/1	60+60	830	1024	1422			
MSR	GSM 2/2/2	20	633	727	948			
	WCDMA 1/1/1	20						
	GSM 4/4/4	20	714	874	1258			
	WCDMA 1/1/1	20						

Installation and mechanical specifications

Table 432 FHDB installation and mechanical specifications

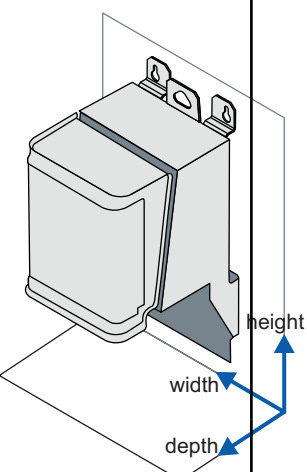
Property	Value
Installation options	- pole/wall installation - directly on the wall installation
IP rating	IP65

Table 432 FHDB installation and mechanical specifications (Cont.)

Property	Value
Related optional items	Flexi Pole Mounting Kit (FPKA/C)

Dimensions and weight

Table 433 FHDB dimensions and weight

Property	Value		Dimensions orientation
Height	A.101 or A.102 version	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.)	
	A.103 version	As delivered, cable tie point recessed: 425.8 mm (16.8 in.) With upper and lower mounting brackets: 572.1 mm (22.5 in.)	
Depth	A.101 or A.102 version	324 mm (12.8 in.)	
	A.103 version	287 mm (11.3 in.)	
Width	A.101 or A.102 version	260 mm (10.2 in.)	
	A.103 version	256.7 mm (10.1 in.)	
Weight	A.101 or A.102 version	17.3 kg (38.1 lbs)	
	A.103 version	16.3 kg (35.9 lbs)	
Volume	A.101 or A.102 version	21 l	
	A.103 version	19.1 l	

Environmental specifications

Table 434 FHDB environmental specifications

Property	Value
Maximum operational outdoor temperature in the shade, assuming wind speed is 3 m/s (at constant high ambient temperature, maximum output power might be limited)	+55°C (131°F)

Table 434 FHDB environmental specifications (Cont.)

Property	Value
Maximum operational outdoor temperature in the sun, assuming wind speed is 3 m/s	+50°C (122°F)
Maximum indoor temperature, assuming wind speed is 0 m/s (this is valid for fanless products)	+40°C (104°F)
Minimum operational temperature (including cold start)	-40°C (-40°F)

LEDs**Table 435** FHDB LEDs

LED color	Description	Alarm
Red, stable	Critical alarm affecting the whole RF module or all antenna carriers	Fault
Red, blinking	Operation degraded - Major alarm affecting the whole RF Module - Critical alarm affecting fans - Major/Critical alarm affecting a module subcomponent or antenna carrier	Major/critical alarm
Yellow, stable	- Until software download begins - The carriers are blocked from BTS - There is no connection to any System Module	No alarm
Yellow, blinking	- Software download in progress - Configuration in progress: RF resources are being setup, but not yet activated	No alarm
Green, stable	- Software configuration is complete or supervisory: RF resources activated and transmission is possible - Working normally, no alarm on the RF Module	No alarm
Green, blinking	Software downloading and updating	No alarm

Table 435 FHDB LEDs (Cont.)

LED color	Description	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 proper cooling.



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

11.12 Flexi RRH 2-pipe 1800 120 W (FHEG)

FHEG technical specifications.

Functional description

Table 436 FHEG functional specification

Property	Value
Output power	2x60 W
MIMO	2TX
Outdoor installation	Yes
SW supported technology	FDD-LTE
TX frequency range	1850 - 1880 MHz
RX frequency range	1755 - 1785 MHz
DL instantaneous bandwidth	30 MHz
UL instantaneous bandwidth	30 MHz
DL filter bandwidth	30 MHz
UL filter bandwidth	30 MHz

Interfaces