

**470318A**  
**Nokia Flexi EDGE Base Station, Rel. EP1,**  
**Product Documentation, v.1**

**Optional Items Description**

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# 1 Introduction to Optional Items

This document describes the optional items available for Nokia Flexi EDGE BTS. It describes the modules in terms of their function as well as their dimensions and weight and the interfaces, if applicable. The document also lists the ordering codes for the optional items.



# 2 Flexi EDGE Wideband Combiner Sub-module (EWxx)

## 2.1 Wideband Combiner sub-module (EWxx) operation

Two optional Wideband Combiner (WBC) sub-modules can be attached to the Dual TRX Module. One Wideband Combiner combines two TX signals together. The module can be used for combining carriers that have the same or different frequencies.

Nokia Flexi EDGE BTS supports 2-way and 4-way combining. In 2-way combining, two TX carriers from the same Dual TRX Module are combined together in one Wideband Combiner Module. In 4-way combining, 2-way combined signals are further combined together in one Wideband Combiner Module.

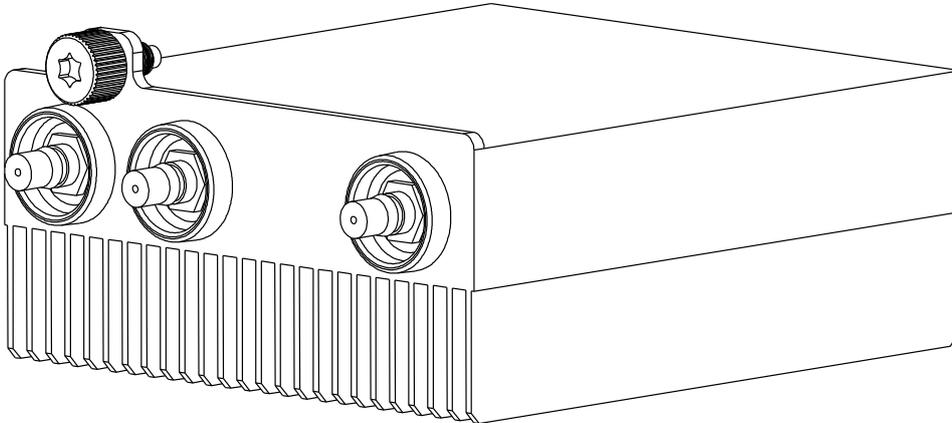
When using the Wideband Combiner for synchronised combining of the TX signals of both TRXs in one Dual TRX, Double Power TRX (DPTRX) is created. The Double Power TRX with double (+2.5 dBm) output power and single TRX capacity is a licensed feature, activated from the BSC.

Note that the EWxB does not support DPTRX.

There are currently three separate variants for the Wideband Combiner sub-module depending on the frequency band:

- EWGB GSM 800/900 MHz
- EWDB GSM 1800 MHz
- EWPB GSM 1900 MHz

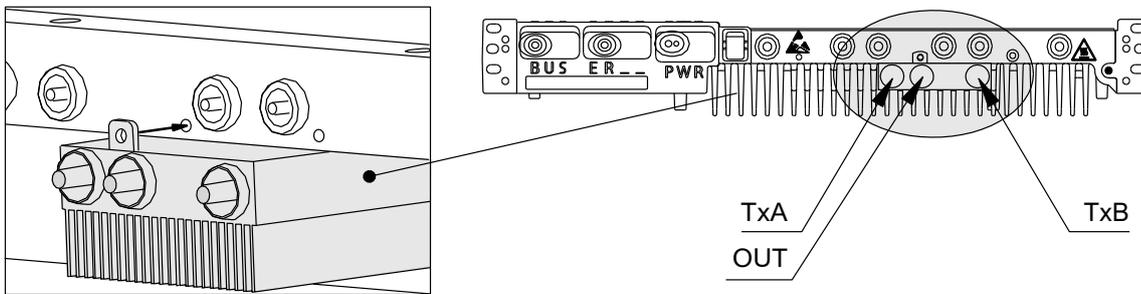
EWxB is presented in the following figure:



DN70296642

Figure 1. EWxB

## 2.2 Wideband Combiner Sub-module (EWxx) interfaces



DN70131639

Figure 2. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxB) front panel connectors

Table 1. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxx) front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
TxA, TxB	2 Tx inputs	QMA	EXxA
DP (in EWxA only)	Synchronous combining of both transmitters in the module to generate one GSM/EDGE carrier capacity with increased output power.	4-pin Microfit	EXxA
OUT	Tx output	QMA	ERxA

Note that the EWxB does not have the DP connector as the DPTRX is not supported.

## 2.3 Wideband Combiner sub-module (EWxx) dimensions and weight

The dimensions and weight of the Flexi EDGE Wideband Combiner sub-module are presented in the table below.

Table 2. EWxx dimensions and weight

Property	Value
Width	86 mm ( 3.4 in.)
Height	48 mm ( 1.9 in.)
Depth	124 mm ( 4.9 in.)
Weight	approx. 1 kg 2.2 lbs



# 3 Flexi EDGE Remote Tune Combiner (ECxA) Module

## 3.1 Remote Tune Combiner Module (ECxA) operation

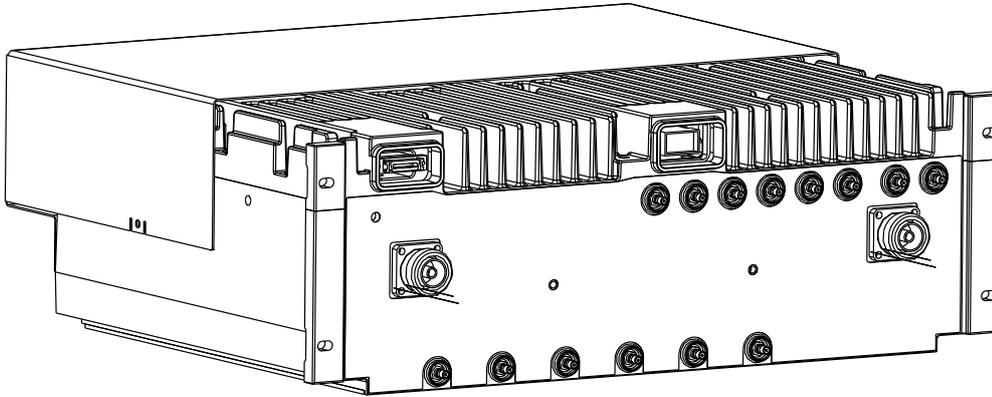
The optional Remote Tune Combiner (RTC) Module combines up to six TX signals from the Dual TRX Modules together into a single TX antenna with a minimum loss in large configurations. It also provides the antenna connections for duplexed RX and TX signals, as well as antenna connection for RX diversity signal. The Remote Tune Combiner Module is always used together with Dual TRX Modules; the Dual Duplexer Module is then not needed. The System Extension Module is needed with the Remote Tune Combiner Module. The Remote Tune Combiner Module supports antenna sharing (co-siting) with another BTS.

Note that if diversity is changed from the BSC with the Remote Tune Combiner Module, BCF reset is needed to bring the change into use.

ECxA can only be installed in a cabinet and it is available for the following ETSI frequency bands:

- ECGA 900 MHz
- ECJA 900 MHz J-subband
- ECDA 1800 MHz

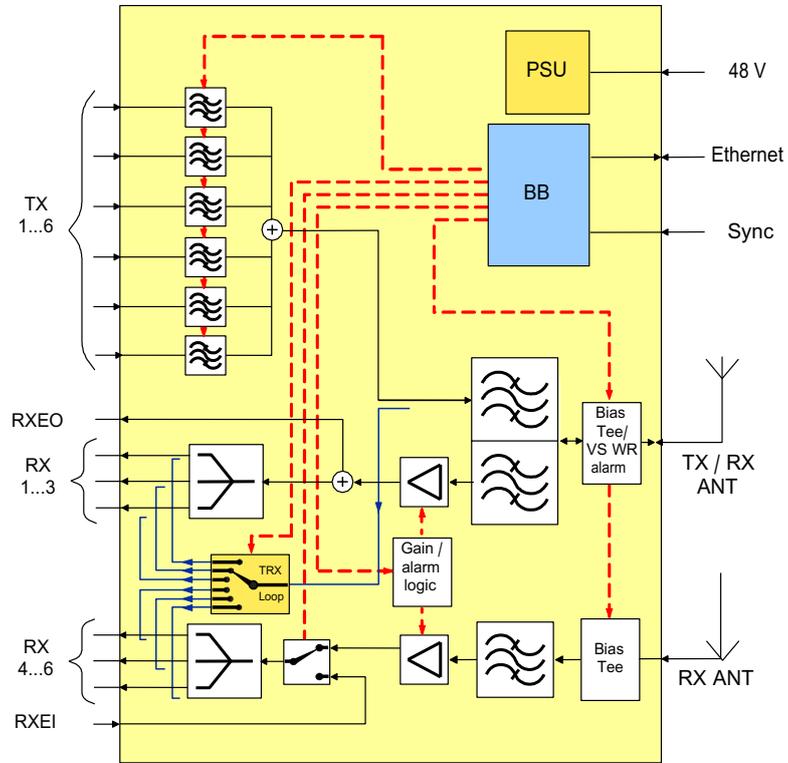
The ECxA is presented in the following figure:



DN70295994

Figure 3. ECxA

Following figure presents the ECxA block diagram.



DN70292728

Figure 4. ECxA block diagram

### 3.2 Remote Tune Combiner Module (ECxA) interfaces

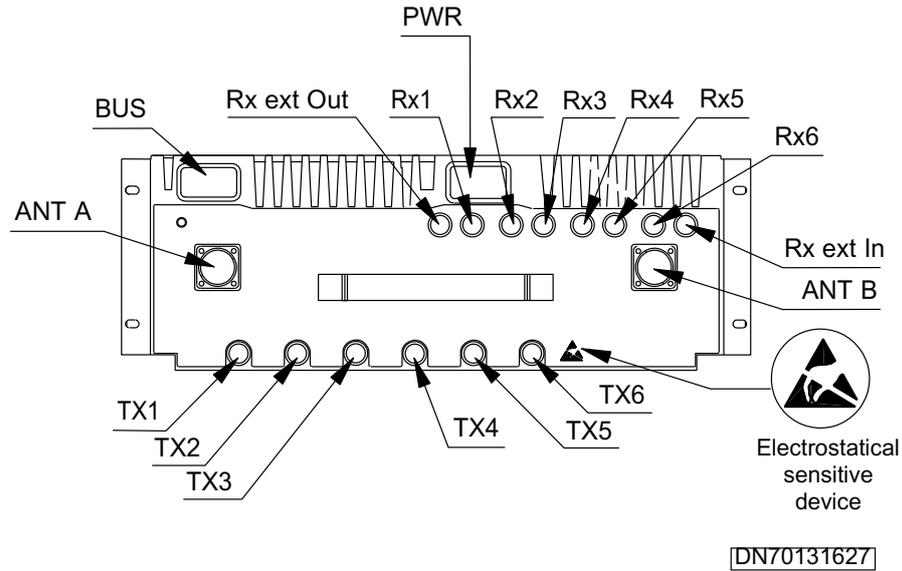


Figure 5. Nokia Flexi EDGE Remote Tune Combiner Module (ECxA) front panel connectors and labels

Table 3. Nokia Flexi EDGE Remote Tune Combiner Module (ECxA) front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
BUS	Ethernet (1000 Base-T/100 Base-TX) baseband processing of end user, hopping, synchronisation and O&M data.	MDR 26 F RA	ESMA, ESEA
PWR	-48 VDC input power with fuse protection.	Multi-Beam XL	ESMA, ESEA
ANT A, ANT B	Duplexer antenna interface	7/16	Antenna jumper or feeder cables
RX DIV	RX filter antenna interface	7/16	Antenna jumper or feeder cables
Rx1...Rx6	Output to EXxA RX	QMA	EXxA
Tx1...Tx6	Input from EXxA TX	QMA	EXxA

Table 3. Nokia Flexi EDGE Remote Tune Combiner Module (ECxA) front panel connectors and interfaces (cont.)

Label name on module	Description	Connector type	Interface(s)
RX ext OUT	RX co-siting output	QMA	External RX or EXxA (12 RTC)
RX ext IN	RX co-siting input	QMA	External RX or EXxA (12 RTC)

### 3.3 Remote Tune Combiner Module (ECxA) dimensions and weight

The dimensions and weight of the EDGE Remote Tune Combiner Module are presented in the table below

Table 4. ECxA dimensions and weight

Property	Value
Width	447 mm (17.6 in.)
Height	178 mm (7 in.)
Depth	422 mm (16.6 in.)
Weight	28.5 kg (63.0 lbs)



#### Warning

**The module is heavy. Take care when lifting the module.**

---

### 3.4 Remote Tune Combiner (ECxA) Module LED indications

Remote Tune Combiner Module (ECxA) has one tri-colour LED on the front panel to indicate the operational status of the module and all fault conditions during operation.

Table 5. Remote Tune Combiner Module LED indications

Colour	Explanation
Cycling colours	EM has requested indication for RTC and timer is still running
Stable red	RTC SW is not running, or Alarm is active with class critical (***) and RTC is disabled (all cavities are disabled).
Red, blinking	Alarm is active with class major (**) and RTC is still enabled (at least one of the cavities is enabled).
Yellow, blinking	RTC SW is in the startup sub-states: Initial boot loader, Wait for external input, software downloading, Initialization and hardware tests or RTC configured
Stable green	Module is in supervisory state and no major or critical alarms are active

# 4 Flexi Power Module (FPMA) description

## 4.1 Flexi Power Module (FPMA) and sub-modules (FPAA and FPBA) operation

Flexi Power Module (FPMA) is an optional module. It comprises FPMA mechanics and AC and DC interfaces. The actual power sub-modules are the following:

- Flexi Power AC/DC sub-module 230 V (FPAA)
- Flexi Power Battery sub-module (FPBA)

The maximum number of sub-modules in an FPMA is four.

For installation instructions, see section Installing Flexi Power Module (FPMA) in the Installing the Modules document.

The FPMA is presented in the following figures.

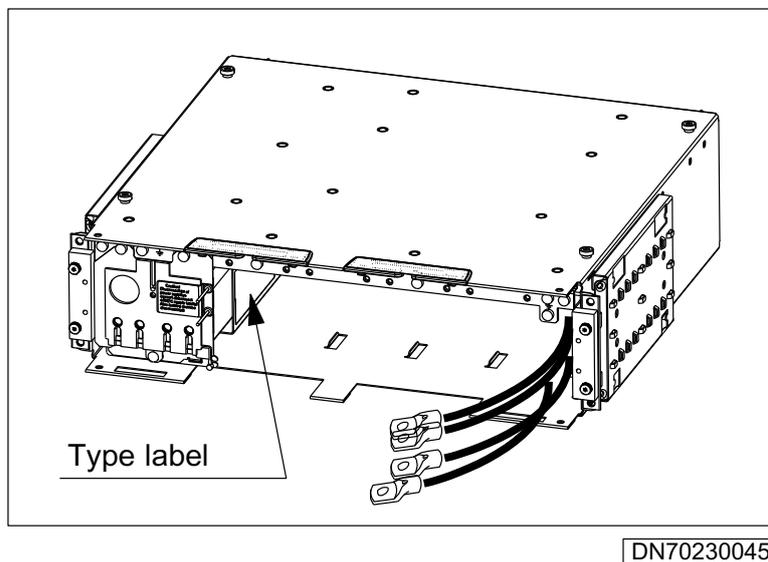


Figure 6. Power Module (FPMA)

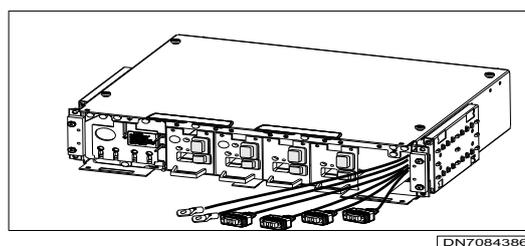


Figure 7. FPMA: full configuration with four FPAAs

### 4.1.1 Operation

The FPMA can support 1-phase or 3-phase AC input. The nominal input voltage is 200-240 V AC (the operating voltage range is 180 - 276 V AC). The maximum output power from the FPMA is 4kW (with 4 FPAA's).

#### Flexi Power AC-DC sub-module (FPAA)

The main function of the FPAA is to provide the BTS with nominal 48 V DC power from an AC supply. Maximum DC output power of one FPAA module is 1000 W. The FPAA includes its own integrated self-controlled fan. In case the fan fails, an alarm is generated and the FPAA has to be replaced (the fan alone cannot be replaced).

#### Flexi Power Battery sub-module (FPBA)

The Flexi Power Battery Sub-Module (FPBA) is a separate optional sub-module used together with the FPAA.

The FPBA provides short-term battery backup time when the AC power mains is down on a Flexi BTS site. The FPBA is a lithium ion battery. The maximum DC output power from one FPBA module is 1000 W. The input power for the BTS cannot exceed the maximum output power of the installed batteries. Otherwise the batteries do not provide the BTS with the needed power during power failure.

## 4.2 Flexi Power Module (FPMA) and sub-module (FPAA and FPBA) interfaces

### FPMA front panel connectors

The connectors on the FPMA front panel, their types and purposes are listed in the table below.

Table 6. FPMA front panel connectors, types and purposes

Connector	Type	Purpose
Power supply in	Terminal block	AC main power supply in
Power supply out	2-wire DC cable 4 x multi-beam	DC feed to the BTS
Grounding	2 x M5	Module grounding

### FPAA front panel connectors

There is a stand-by switch on the front panel of the FPAA.

The connectors on the FPAA front panel, their types and purposes are listed in the table below.

Table 7. FPAA front panel connectors, types and purposes

Connector	Type	Purpose
AC cable connector	Mate-N-Lock	AC input
DC connector	Multi-beam power supply connector	DC output
Alarm connector	2 x RJ-45*	Alarms**
Operational state visual indication	tri-colour LED	FPAA state or alarm indication

\*for chaining

\*\*Alarm 1 (AL01): AC input failure (alarm is sent when AC input voltage is missing or it is out of range).

\*\*Alarm 2 (AL02): maintenance needed (possible reasons are unit failure, cooling fan failure, output power is low or over temperature shut down is ON).

### FPBA front panel connectors

There is a stand-by switch on the front panel of the FPBA.

The connectors on the FPBA front panel, their types and purposes are listed in the table below.

Table 8. FPBA front panel connectors, types and purposes

Connector	Type	Purpose
DC input/output connector	Multi-beam power supply connector	DC input and output
Alarm connector	2 x RJ-45*	Alarms**

Table 8. FPBA front panel connectors, types and purposes (cont.)

Connector	Type	Purpose
Operational state visual indication	tri-colour LED	FPBA state or alarm indication

\*for chaining

\*\*Alarm 2 (AL02): maintenance needed (possible reasons are unit failure, output power is low or unit has reached end of it's life).

\*\*Unit has an input for Alarm 1 (AL01) from FPAA unit (Alarm 1 is a trigger for battery discharging).

## 4.3 Flexi Power Module (FPMA) dimensions and weight

The following table lists the dimensions and weight for the Power Module.

Table 9. Dimensions and weight of the Power Module

Property	FPMA
Height	133 mm/3 U (5.2 in.)
Width	447 mm (17.6 in.)
Depth without covers	422 mm (16.6 in.)
Depth with covers	560 mm (22.1 in.)
Weight (empty)	< 11 kg (< 24.3 lbs)
Weight (fully equipped with one AC/DC power module and batteries)	28 kg (61.9 lbs)

## 4.4 Flexi power sub-module (FPAA and FPBA) LED indications

### FPAA LED indications

The FPAA LED indications are listed and explained in the table below.

Table 10. FPAA LED indications

Colour	Explanation
Stable yellow	Stand-by (AC connected)
Stable green	Normal operation
Stable red	Alarm or fault
Red, blinking	Unit operating with abnormal input voltage

### FPBA LED indications

The FPBA LED indications are listed and explained in the table below.

Table 11. FPBA LED indications

Colour	Explanation
Stable yellow	Stand-by (DC connected from FPAA)
Stable green	Normal operation, battery OK
Green, blinking slowly	Charging
Green, blinking fast	Discharging
Blinking fast between green and yellow	Forced discharge mode
Red, blinking fast	Minor alarm
Stable red	Major alarm or fault

The LED's slow blinking frequency is 1 Hz (1 sec) and fast blinking frequency 2 Hz (0.5 sec).

# 5 Flexi Power DC/DC Sub-Module (FPDA) description

## 5.1 Flexi power DC/DC module operation

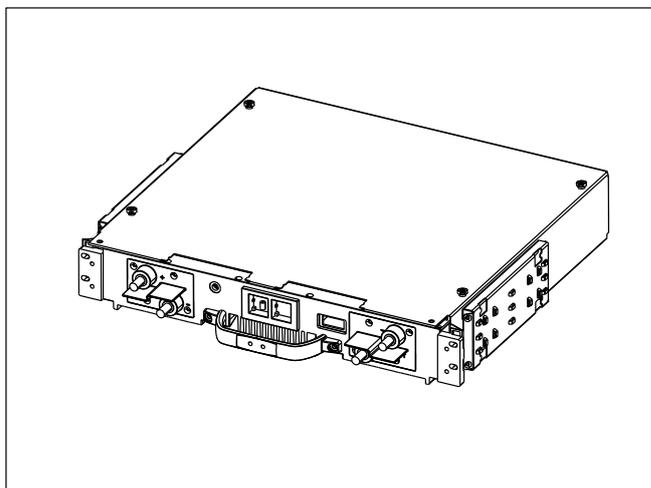
Flexi power DC/DC module (FPDA) is an optional stand-alone 2 kW DC/DC module.

The FPDA converts nominal 24 V DC input voltage (normally negative grounded) 53-55 V DC output voltage. The 53-55 V DC is then distributed to BTS loads. A maximum of two FDPDA modules can be connected in parallel using external connecting cables between the output connectors of the two units.

The FPDA includes its own integrated self-controlled fan. In case the fan fails, an alarm is generated and the FPDA has to be replaced (the fan alone cannot be replaced).

For installation instructions, see the Installing Flexi Power DC/DC Module 24V FPDA section in the Installing the Modules document.

The FPDA is presented in the following figure.



DN70150502

Figure 8. The power DC/DC module

## 5.2 Flexi power DC/DC sub-module (FPDA) interfaces

The FPDA is equipped with the following interfaces:

- Front panel connectors

### Front panel connectors

There is a stand-by switch on the front panel of the FPDA.

The connectors on the FPDA front panel, their types and purposes are listed in the table below.

Table 12. FPDA front panel connectors, connector types and purposes

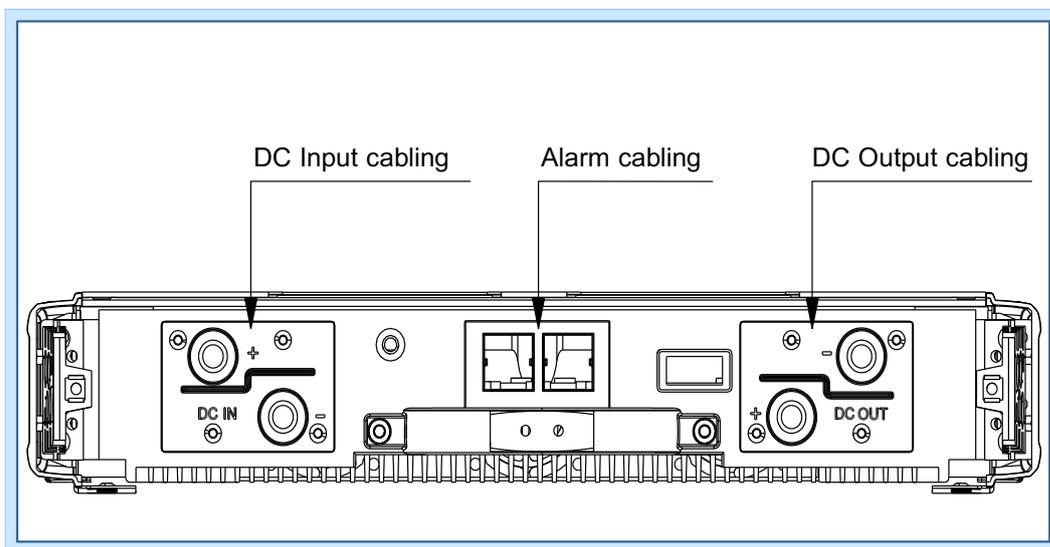
Connector	Connector type	Purpose
Input connector	M10 bolts	DC input
Output connector	M10 bolts	DC output
Alarm connectors	2 x RJ-45*	Alarms**

\*for chaining

\*\*Alarm 1 (AL01): DC input failure (alarm is sent when DC input voltage is missing or it is out of range).

\*\*Alarm 2 (AL02): maintenance needed (possible reasons are unit failure, cooling fan failure, output power is low or over temperature shut down is ON).

The FPDA front panel is presented in the following figure.



DN70141402

Figure 9. Front panel of the FPDA

### 5.3 Flexi power DC/DC module dimensions and weight

The following table lists the dimensions and weight for the FPDA.

Table 13. Dimensions and weight of the FPDA

Property	Value
Height	90 mm (2U) (3.5 in.)
Width	447 mm (17.6 in.)
Depth without covers	422 mm (16.6 in.)
Depth with covers	560 mm (22.1 in.)
Weight	< 15 kg (< 33.1 lbs)

## 5.4 Flexi power DC/DC module LED indications

The FPDA has a tri-colour LED on the front panel to indicate the operational status of the module and all fault conditions during operation.

The LED indications of the FPDA are listed and explained in the table below.

Table 14. FPDA LED indications

Colour	Explanation
Green	Normal operation
Red	Alarm or fault
Yellow	Stand-by
Red, blinking	Abnormal input voltage

# 6 Flexi EDGE System Extension Module (ESEA)

## 6.1 System Extension Module (ESEA) operation

System Extension Module is required for large Nokia Flexi EDGE BTS configurations (more than 12 TRX), and it is always needed in RTC configurations. The functionalities of the System Extension Module are:

- Handling the power distribution for additional modules (from the seventh Dual TRX Module). The power distribution unit has six 48V outputs
- Providing all 12 Ethernet and synchronisation connections to the Dual TRX Modules and a connection to the System Module.

ESEA is presented in the following figure:

## 6.2 System Extension Module (ESEA) interfaces

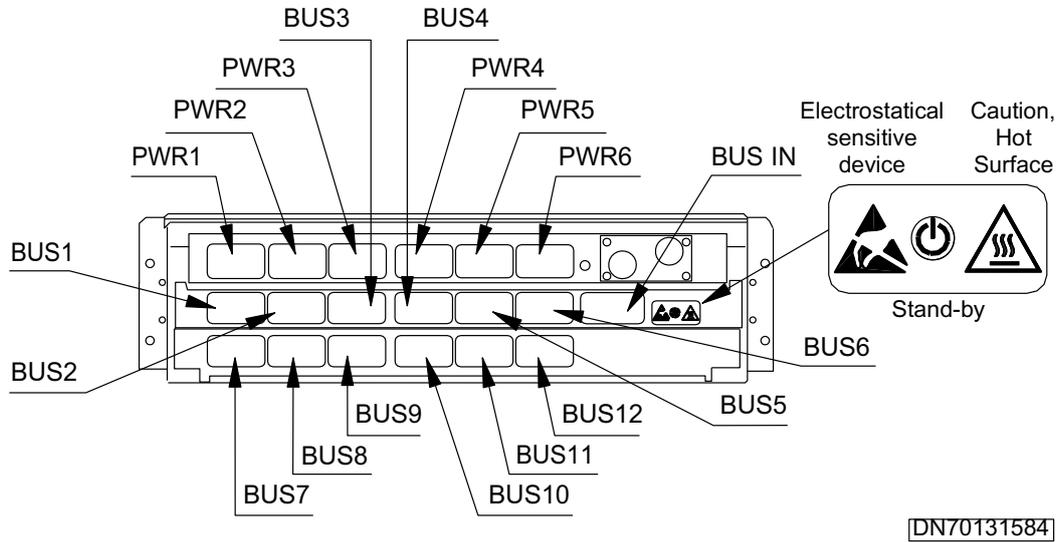


Figure 10. Nokia Flexi EDGE System Extension Module (ESEA) front panel connectors and labels

Table 15. Nokia Flexi EDGE System Extension Module (ESEA) front panel connectors and interfaces

Label name on module	Description	Connector type	Interface(s)
V48N (+/-)	-48 V DC input power for base station	M10 terminal bolts	FPMA, FPDA, site support, or other external power supply
PWR 1/7...6/12	-48 V DC output power with fuse protection to six other modules.	Multi-Beam XL	EXxA, ECxA, FCFA
BUS1...12, IN	12 x Ethernet (1000 Base-T/100 Base-TX) baseband processing of end user, hopping, synchronisation and O&M data.	MDR 26 F RA	EXxA

## 6.3 System Extension Module (ESEA) dimensions and weight

The dimensions and weight of the Flexi EDGE System Extension Module are presented in the table below.

Table 16. ESEA dimensions and weight

Property	Value
Width	447 mm (17.6 in.)
Height	133 mm (5.24 in.)
Depth	422 mm (16.6 in.)
Weight	9.1 kg (20.1. lbs)

## 6.4 System Extension Module (ESEA) LED indications

System Extension Module (ESEA) has one tri-colour LED on the front panel to indicate the operational status of the module and all fault conditions during operation.

Table 17. System Extension Module LED indications

Colour	Explanation
Cycling colours	EM has requested indication for System Extension Module and timer is still running
Stable red	System Extension Module is switched on and SW is not yet running
Blinking red	After startup the POST test has failed or illegal unit connection
Stable yellow	Not used. Although this is not used the colour/frequency can be set for testing purposes

Table 17. System Extension Module LED indications (cont.)

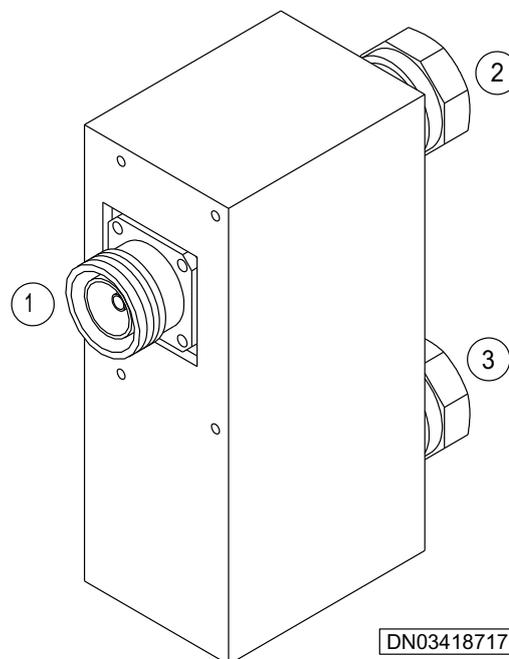
<b>Colour</b>	<b>Explanation</b>
Blinking yellow	Not used. Although this is not used the colour/ frequency can be set for testing purposes
Blinking green	SW upgrade is running
Stable green	After startup the POST test was successful. Module is configured and is supervisory

# 7 Diplexer Unit (DU2A)

## 7.1 Technical description of Dual Band Diplex Filter (DU2A) unit

### 7.1.1 Function

The Dual Band Diplex Filter Unit (DU2A) either combines signals of different frequencies onto one antenna, or splits an antenna signal into different frequencies. It handles TX and RX signals from the GSM/EDGE 800/900 bands and the GSM/EDGE 1800/1900 bands.



1	Dual band antenna
2	RX/TX GSM 1800/1900 band
3	RX/TX GSM 800/900 band

Figure 11. DU2A unit

### Lightning protection

The centre pin of the DU2A unit antenna port is DC grounded. This connection prevents a charge buildup on the antenna and protects the DU2A unit against lightning.

## 7.1.2 Operation

The DU2A unit operates on the following frequency bands:

- GSM/EDGE 800/900 band – 824 to 960 MHz
- GSM/EDGE 1800/1900 band – 1710 to 1990 MHz

The normal operating temperatures for the DU2A unit are -10° C to 65° C (14° F to 149° F). However, the unit can operate in temperatures as low as -33° C (-27.4° F) with degraded RF performance.

## 7.1.3 Main blocks

The main blocks of the DU2A unit are the following passive filter sections:

- GSM/EDGE 800/900 RX/TX filter
- GSM/EDGE 1800/1900 RX/TX filter

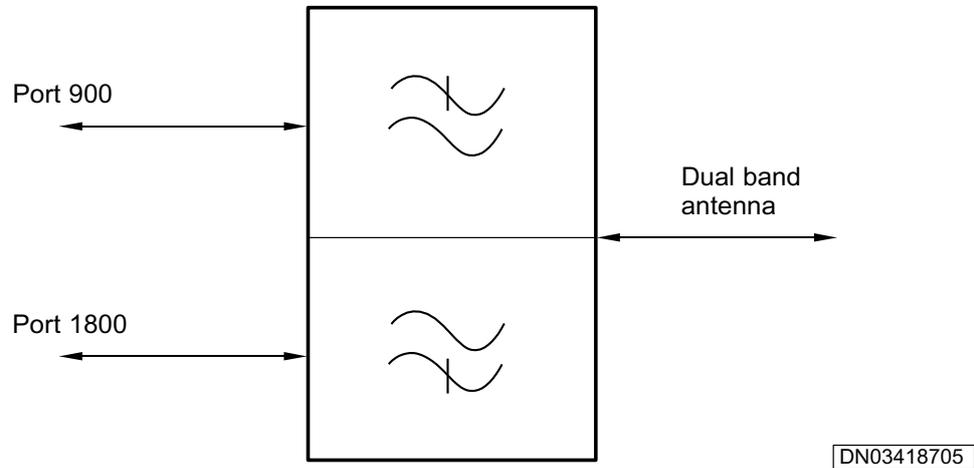


Figure 12. DU2A main blocks

Port 900 is dedicated to the 800/900 bands and port 1800 is dedicated to the 1800/1900 bands.

## 7.2 Interfaces of the Dual Band Diplex Filter (DU2A) unit

Table 18. RF connectors

Interface	Connector type
Antenna	7/16, flange jack
900	7/16, flange plug, 800/900-band input/output
1800	7/16, flange plug, 1800/1900-band input/output

## 7.3 Dimensions and weight of Dual Band Diplex Filter (DU2A) unit

Table 19. Dimensions and weight

Property	Value (metric)	Value (imperial)
Height	150 mm	5.91 in.
Width	55 mm	2.17 in.
Depth	75 mm	2.95 in.
Weight	2.0 kg	4.42 lb

# 8

## Flexi System External Alarm Box (FSEB)

### 8.1 Flexi System External Alarm Box (FSEB) operation

The FSEB box is used for extending the Flexi EDGE BTS alarm connector to support up to 24 alarm interfaces. Support for the heat detector is also provided.

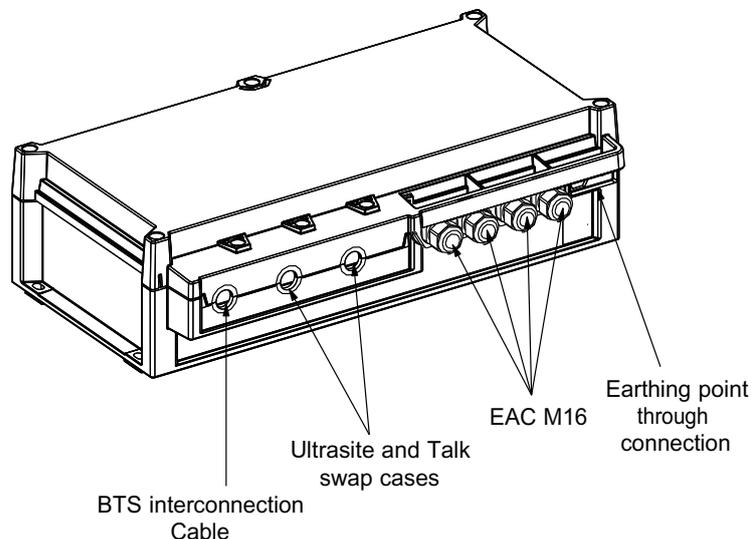
In outdoor applications, the box can be attached to the outdoor cabinet roof. There are fixing points for the FSEB in the outdoor cabinet. In indoor or stacked applications, the box is attached in the proximity of the modules, for example, on a wall.

The Flexi Mounting Auxiliary Brackets (FMAA) can be used to mount the FSEB on the top or outer casings in pole, wall, and stack configurations. The brackets are mounted on the top or outer casing using the existing connection pin holes. See the Appendix A *Contents of delivery* section in this document for product ordering and delivery contents details.

### 8.2 Flexi system external alarm box (FSEB) interfaces

This section describes the FSEB interfaces.

See the figure below for the FSEB interfaces:



DN70283679

Figure 13. FSEB interfaces

### PWB interface

The PWB interface and connectors are presented in the table below.

Table 20. Interface and connector overview

Interface	Type	Description
ESM	Sub-D37, male	Interface to the System Module, CAN bus
EACX-I	Sub-D37, female	<ul style="list-style-type: none"> <li>• 12 direct alarm inputs</li> <li>• 6 alarm outputs (ESM extension, compatible to EAC on ESM)</li> </ul>
EACX-II	Sub-D37, female	12 alarm inputs via CAN bus
EACX-S	10 SMDK1/6-3.5	60 pin screw terminal combines EACX-I, EACX-II

Table 20. Interface and connector overview (cont.)

Interface	Type	Description
Heat detector power supply	Screw terminal	DC power supply for the optional heat detector

### 8.3 Flexi system external alarm box (FSEB) dimensions and weight

The dimensions and weight of the FSEB are presented in the following table.

Table 21. FSEB dimensions

Property	Value
Width	360 mm (14.2 in.)
Height	90 mm (3.5 in.)
Depth	195 mm (7.7 in.)
Weight	Max. 2 kg (4.4 lbs)

The material of the box is plastic.



# 9 Flexi Cabinet for Indoor (FCIA)

## 9.1 FCIA cabinet construction

Nokia Flexi EDGE BTS modules can be installed in optional indoor and outdoor BTS cabinets. The capacity can be smoothly expanded from one TRX up to 24 TRX per single cabinet. The carriers come in groups of two (two carriers per Dual TRX). With licensing keys (pooled at the BSC), it is possible to employ a single TRX of the DTRX module if necessary.

Nokia Flexi Module casings (EMxA) that are used for modules installed without cabinets are not used in cabinet installations. The modules inserted into the cabinets are environmentally protected to IP54 level already; the casings and outdoor cabinet raise the protection level of the modules to IP55. The cabinets do not carry any BTS functionality; there are no traditional backplanes or electronics.

The same optional cabinets can house Nokia Flexi WCDMA and BBU modules. Therefore, it is possible to build GSM/EDGE, WCDMA/HSPA or multiradio (GSM/EDGE/WCDMA/HSPA/WIMAX) configurations.

In the indoor cabinet, the cable entries are located on top of the cabinet and the jumpers are connected directly to the modules.

The optional indoor cabinet can include the following optional items:

- Integrated long term battery backup solution (MIBBU)
- EAC connection box (FSEB)
- Heat detector (FCDA)

Figure below presents the Nokia Flexi Cabinet for Indoor (FCIA).

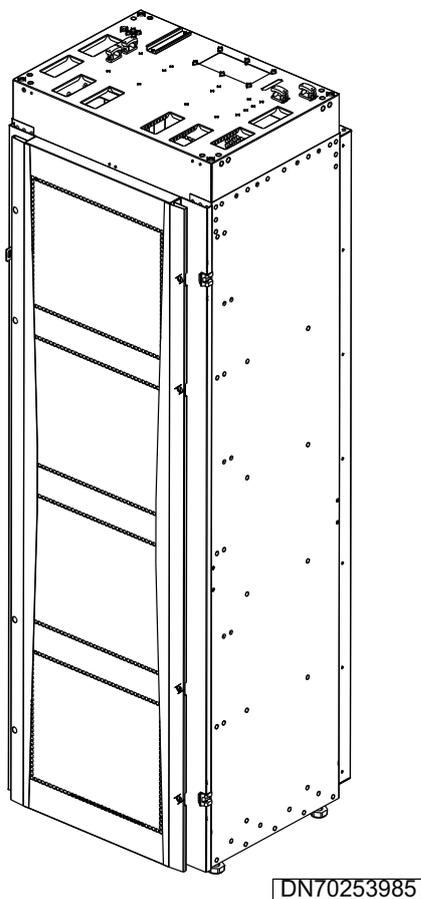


Figure 14. FCIA cabinet

## 9.2 FCIA cabinet locking

The cabinet door can be locked with a door-open key. When the key is turned anticlockwise, the door opens and when it is turned clockwise, the door is locked.

The cabinet can also be fitted with an optional security lock for additional protection. The security lock functions in a similar way with the BTS lock.

## 9.3 FCIA dimensions and weight

See the following table for the dimensions and weight of the Flexi Cabinet for Indoor (FCIA).

Table 22. Dimensions and weight of Flexi Cabinet for Indoor (FCIA).

Property	Value
Height	1800 mm (70.87 in.)
Width	600 mm (23.62 in.)
Depth	600 mm (23.62 in.)
Weight (empty cabinet)	62 kg (136 lbs.)
Free space for modules	36 U

## 9.4 FCIA optional items

Flexi BTS Indoor Cabinet (FCIA) can include the following optional items:

### **Flexi System External Alarm Module (FSEB)**

Flexi System External Alarm box (FSEB) is installed on the cabinet roof and contains 24 external alarms and 6 controls.

### **Heat Detector (FCDA)**

The heat detector is installed on the cabinet roof, and the cables are routed to the Flexi System External Alarm box (FSEB).

### **Multi Integrated Battery Backup Solution (MIBBU)**

The optional Multi Integrated Battery Backup solution (MIBBU) with a separate battery can be installed in Nokia Flexi BTS Indoor Cabinet.

The Multi Integrated Battery Backup Solution consists of

- one power distribution unit (WPU) with one control unit (CU), and
- one to four rectifier power units (WPM).

The power distribution unit mainly distributes the input AC mains to the rectifier units. The control unit controls the rectifier power units and monitors the alarms in the event of low supply voltage, or if the MIBBU enters the battery backup mode in the event of an AC mains failure. The alarm generated by the control unit is forwarded to the BTS O&M software.

# 10 Flexi Cabinet for Outdoor (FCOA)

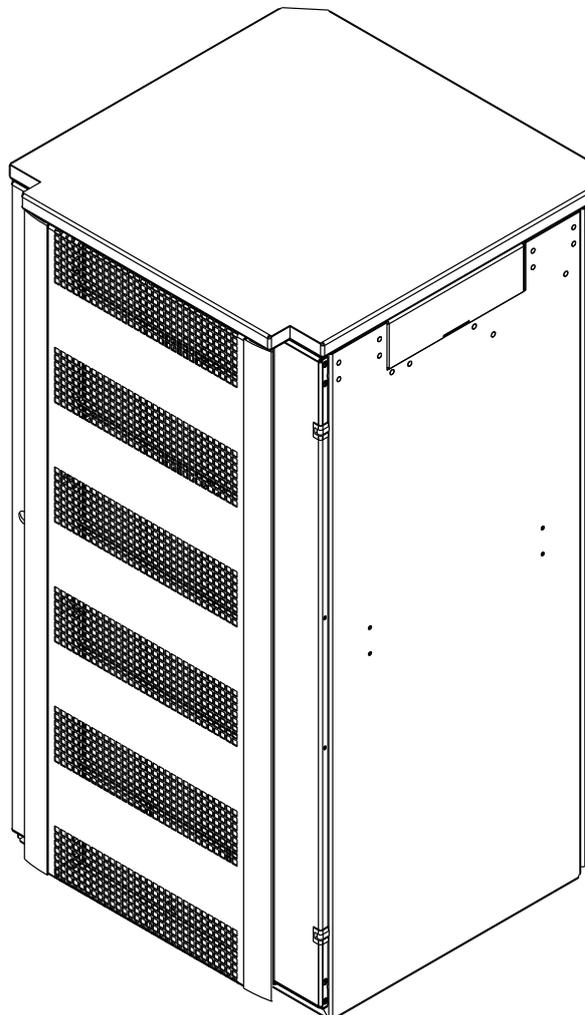
## 10.1 FCOA cabinet construction

Nokia Flexi BTS Outdoor cabinet (FCOA) has a cabinet core made of an aluminium chassis enclosed with aluminium covers. The cabinet door can be locked with a tri-angle door-open key. The cabinet can also be fitted with an optional security lock for additional protection. The FCOA itself does not have any electrical functionality and therefore, it does not increase Flexi BTS Site power consumption

The cabinet has the following functions:

- it provides the base station and cables protection against external damage and foreign objects
- it supports earthquake protection
- it houses the Flexi cabinet site support module (FCSA) that provides long-term battery back-up and a 4U-high IP20-protected space for LTE
- together with Flexi cabinet air filter (FCFA), it protects the BTS in harsh conditions

The FCIA provides earthquake protection for an installation of more than nine modules.



DN70138414

Figure 15. FCOA cabinet

## 10.2 FCOA cabinet locking

The cabinet door can be locked with a door-open key. When the key is turned anticlockwise, the door opens and when it is turned clockwise, the door is locked.

The cabinet can also be fitted with an optional security lock for additional protection. The security lock functions in a similar way with the BTS lock.

## 10.3 FCOA cabinet optional items

This section describes the optional items of Flexi BTS Outdoor cabinet (FCOA).

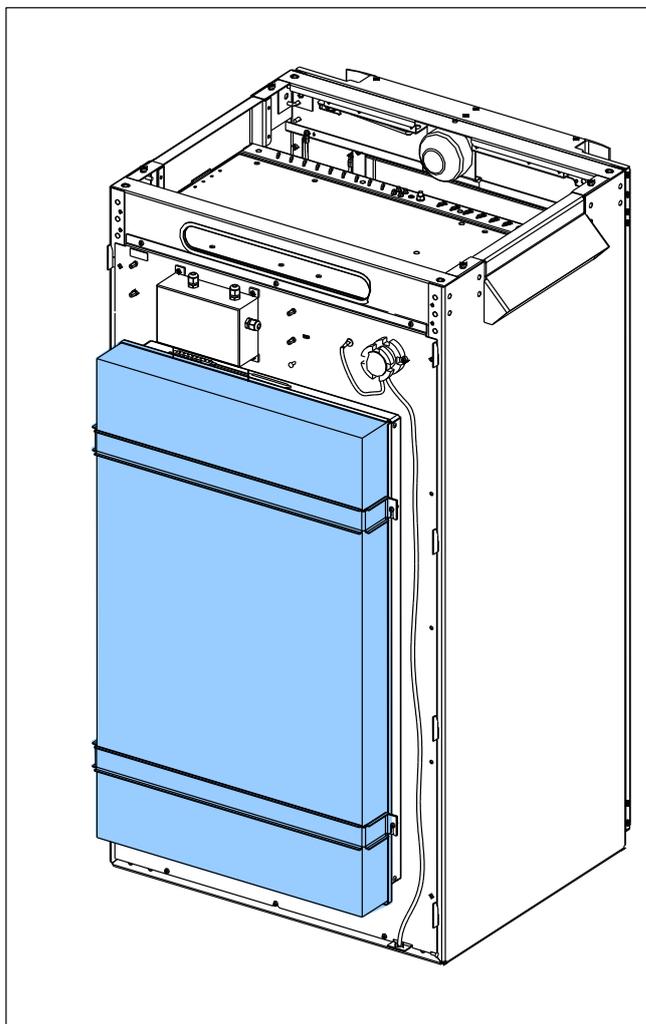
### **Flexi Cabinet Air Filter (FCFA)**

The optional air filter can be added in case of extremely dirty environment (for fresh air cooled modules). The optional air filter provides cover for extremely dirty conditions by over-pressurizing the cabinet.

The wind breaker for the cabinet door is included in the FCFA delivery. It is recommended to be used in locations where continuous heavy wind blows against the cabinet front door.

The air filter is installed in the back of the cabinet, replacing the original back wall. It consists of a filter element, 8 x diagonal fans, a pressure sensor, a control logic, and back wall mechanics. The wind breaker is installed in the cabinet door.

The air filter is presented in the following figure.



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Figure 16. Air filter (back plate removed in the figure)

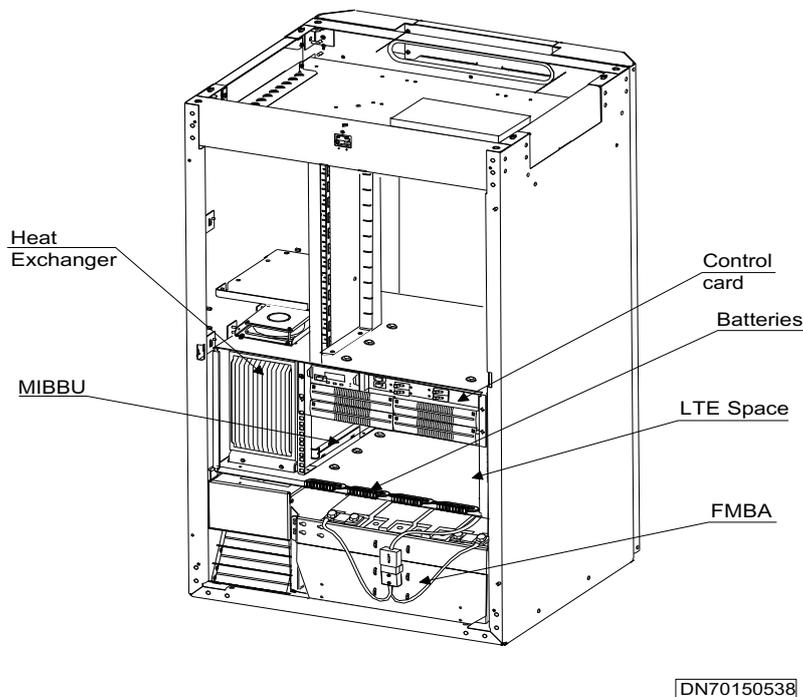
### Flexi Cabinet Site Support Module (FCSA)

The optional site support module can be used with the outdoor cabinet to provide long-term battery back-up time for the Flexi EDGE BTS and a space for installing LTE units. The FCSA includes a control card, heat exchanger, and fans. The FCSA can accommodate MIBBU (that can house WPM) and line terminal equipment (max. 4 U).

The site support module with MIBBU also provides support for 62 Ah or 92 Ah batteries (one string of four batteries). There is space for the batteries at the bottom of the cabinet. Batteries are fixed and cabled using Flexi Mounting Kit for Batteries (FMBA). The kit contains battery cables, a cable from MIBBU to the battery cables for safe installation, rubber spacers, and front fixing parts to the batteries.

For more information on MIBBU, see UltraSite BTS documentation.

The site support is presented in the following figure.



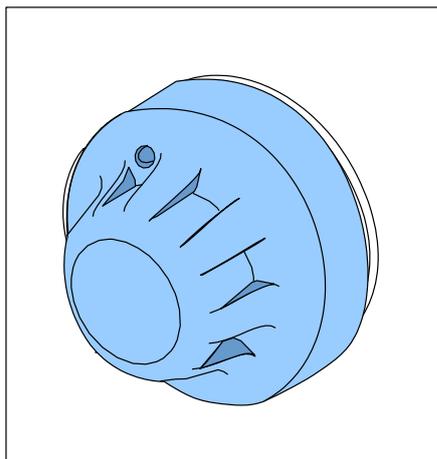
DN70150538

Figure 17. Site support installed with batteries

### Heat detector (FCDA)

The Heat detector is installed on the cabinet roof, and the cables are routed to the Flexi system external alarm box (FSEB).

The following figure presents the heat detector.



DN70150541

Figure 18. Heat detector

### Flexi System External Alarm (FSEB)

IP55-protected Flexi System External Alarm box (FSEB) is installed on the cabinet roof and contains 24 external alarms and 6 controls.

## 10.4 FCOA dimensions and weight

See the following table for the dimensions and weight of the Flexi Cabinet for Outdoor (FCOA).

Table 23. Dimensions and weight of the Flexi Cabinet for Outdoor (FCOA)

Property	Value
Height	1550 mm (61 in.)

Table 23. Dimensions and weight of the Flexi Cabinet for Outdoor (FCOA) (cont.)

<b>Property</b>	<b>Value</b>
Width	770 mm (30.3 in.)
Depth	770 mm (30.3 in.)
Depth with air filter	930 mm (36.6 in.)
Depth with air filter and wind breaker	1020 mm (40.2 in.)
Weight (empty cabinet)	Max. 80 kg (177 lbs)
Weight (with air filter)	104 kg (230 lbs)
Weight (with air filter and wind breaker)	110 kg (243 lbs)
Total weight (Fully equipped with batteries)	365 kg (807 lbs)
Free space for modules	40 U (30 U horizontally + 5 U + 5 U vertically)
Free space for modules (site support and batteries installed)	21 U (16 U horizontally + 5 U vertically)



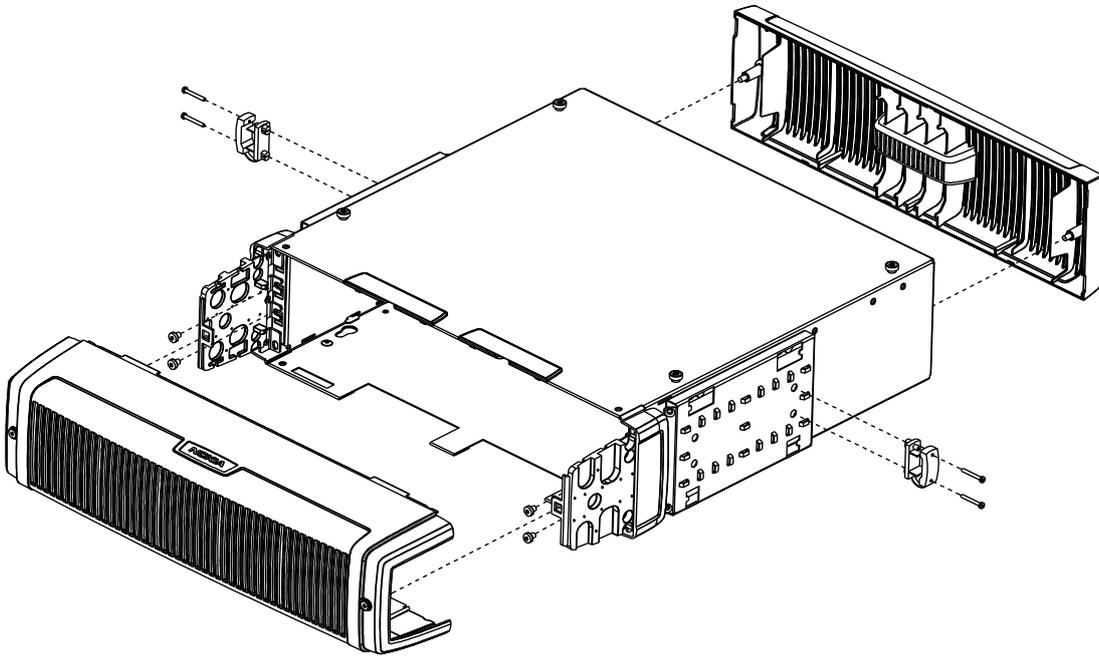
# 11 Flexi EDGE Module Casing (EMxA)

Optional Nokia Flexi Module Casing (EMxA) is used to fix the modules to floor, wall, or pole. Module casings enable module replacement without the need to completely dismantle the BTS installation and ensure environmental protection (IP55) against different environments.

There are two optional casings available depending on the unit height:

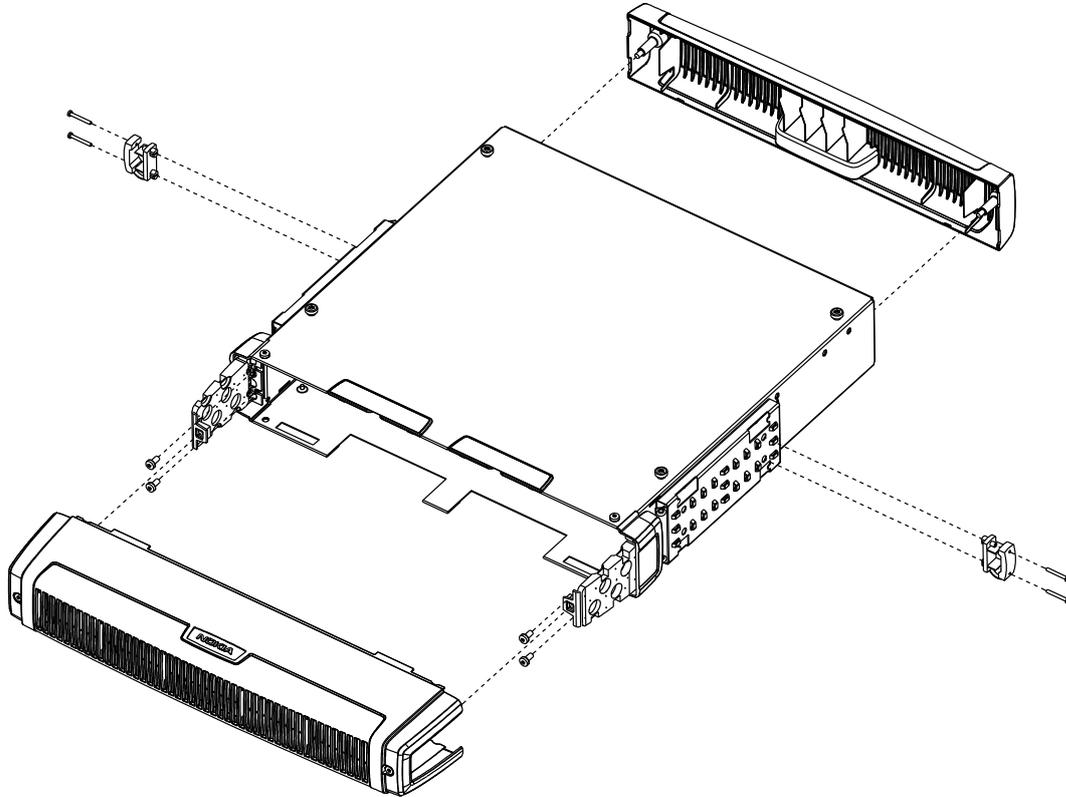
- Flexi EDGE Module Casing EMHA for 3 height units (3HU)
- Flexi EDGE Module Casing EMTA for 2 height units (2HU)

The figure below shows EMHA and EMTA casings:



DN70296799

Figure 19. EMHA casing



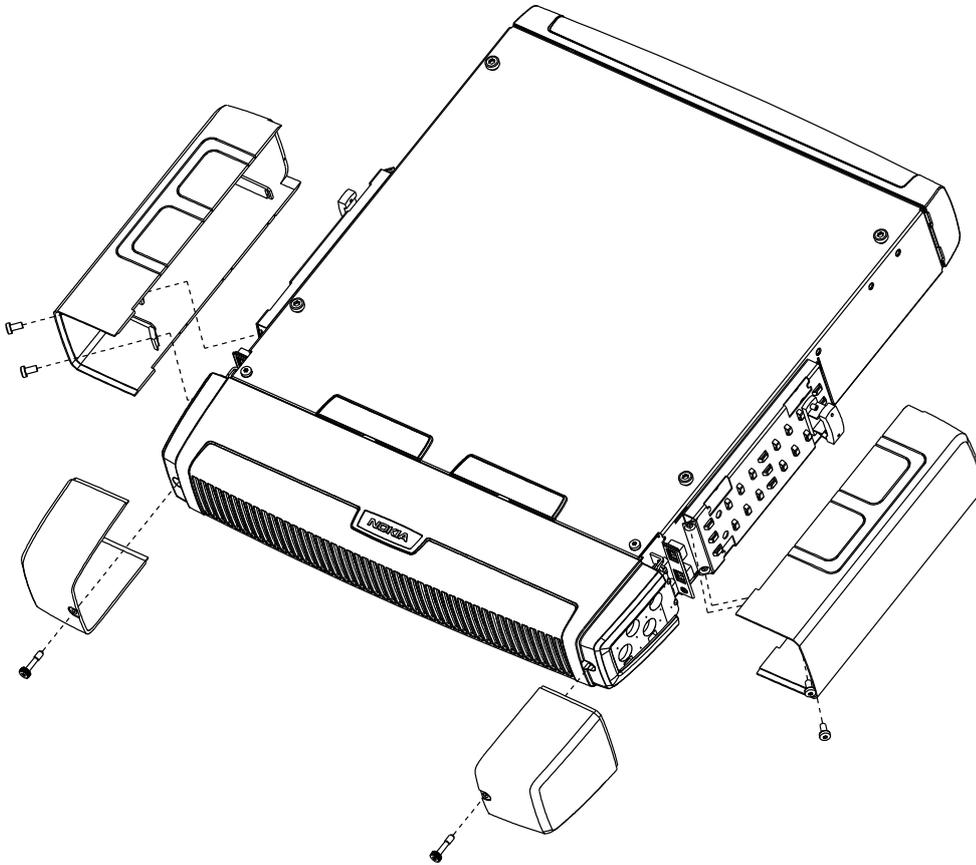
DN70296981

Figure 20. EMTA casing

### Flexi EDGE Side Covers

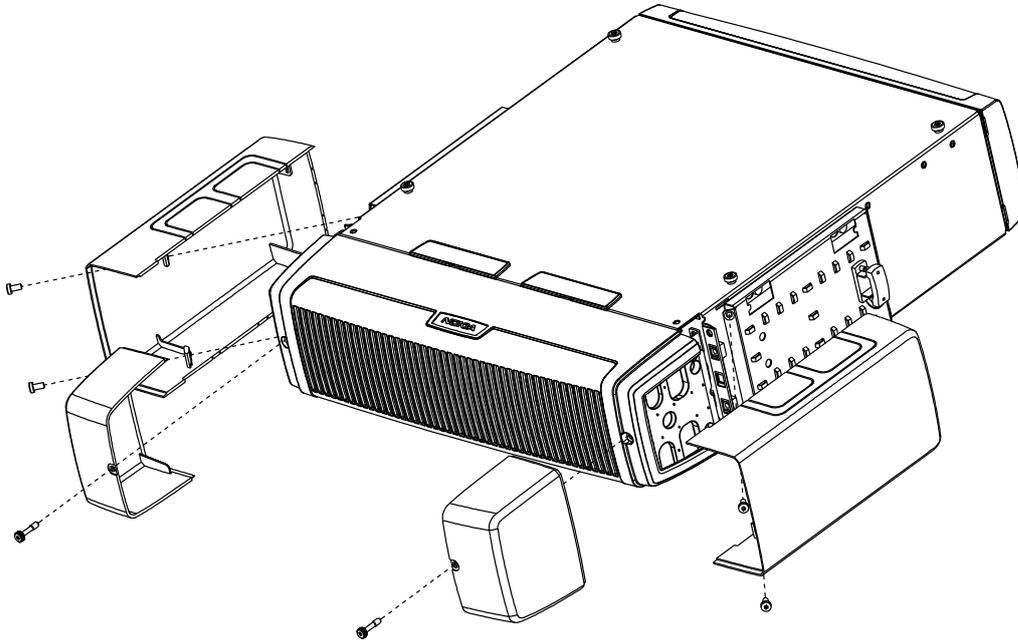
Flexi EDGE Side Covers are available as an optional item. The FMTA and FMHA are presented in the following figures:

Note that Flexi EDGE Side Covers FMTA for 2 height units (2U) and Flexi EDGE Side Covers FMHA for 3 height units (3U) must be ordered separately. The codes are: 471523A (FMTA) and 471524A (FMHA).



DN70297798

Figure 21. Flexi EDGE Side Covers (FMTA)



DN70297817

Figure 22. Flexi EDGE Side Covers (FMHA)



# 12

## Flexi mounting kit for floor, wall and pole (FMFA) description

Flexi BTS modules are installed on the floor, wall or pole using Flexi mounting kit for floor, wall and pole (FMFA). It is a plinth that is required in BTS site installations without a cabinet. The plinth provides grounding points for BTS and module grounding. The mounting principles are the following:

- In floor mounting, the plinth is fixed directly onto the floor. For the maximum number of stacked modules, see section Environmental specifications and requirements for a stand-alone BTS in the Requirements for Installation and Operation document.

See the following figure for an isometric view of the FMFA.

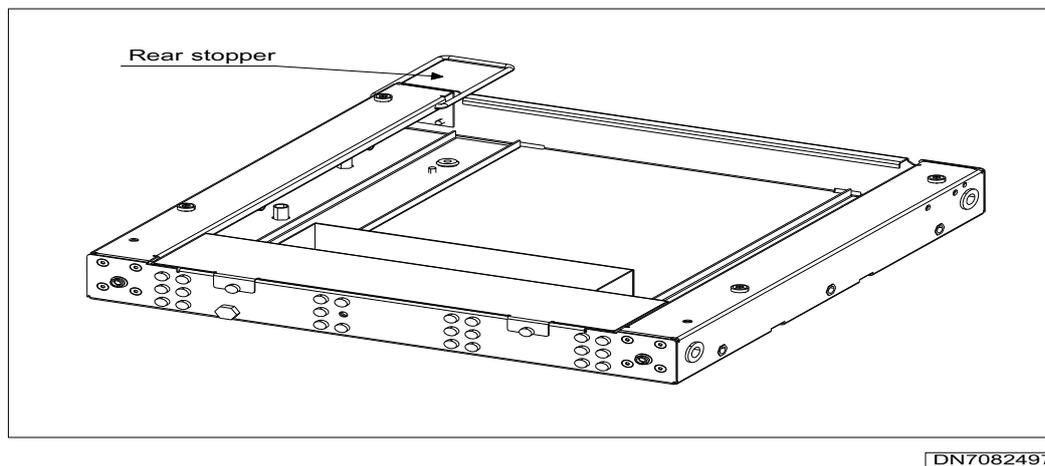


Figure 23. Isometric view of the plinth

- In wall mounting, the plinth is fixed onto the wall either by using adapter mechanics. The maximum number of modules per plinth is two. Secure the fixing plate screws with thread locking compound.
- In pole mounting, the plinth is fixed onto the pole mounting kit (WMPB) by using adapter mechanics. Adapters are needed to reduce the influence of non-parallel surfaces of the mounting brackets. The maximum number of modules per plinth is two. When fixing screws casing to casing, plinth to casing, or plinth to pole, it is recommended that the screws be secured with thread locking compound.

See the following figure for the adapter mechanics.

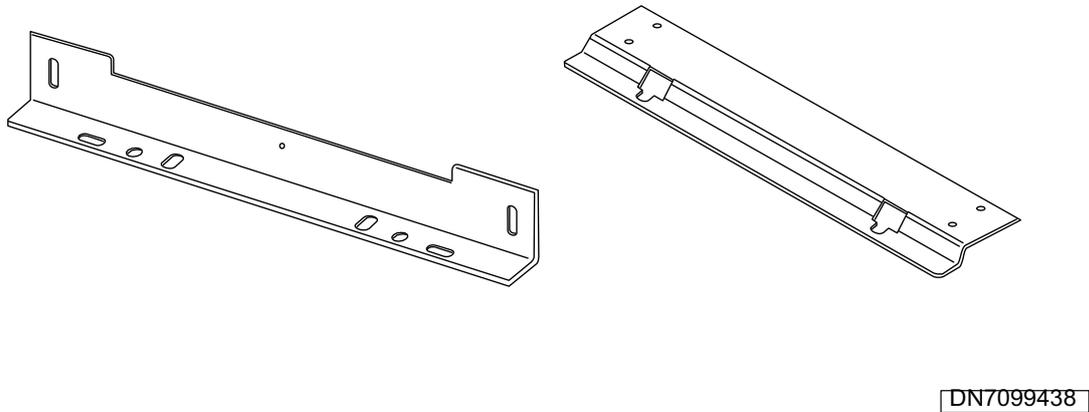


Figure 24. Adapter mechanics

The plinth has a rear stopper that prevents installing the BTS too near to a facility wall (40 mm).

The compartment behind the front panel of the plinth is used as a storage place, for example, for seal caps.

### FMFA dimensions and weight

The dimensions and weight of the FMFA are presented in the following table.

Table 24. Dimensions and weight of the FMFA.

Property	Value
Height	69 mm (2.7 in.)
Width	455 mm (17.9 in.)
Depth	459 mm (18.1 in.)
Weight	7 kg (15.5 lbs)

The material of the plinth is 1.5 mm (0.06 in.) sheet metal.

For installation instructions, see Installing the Modules.

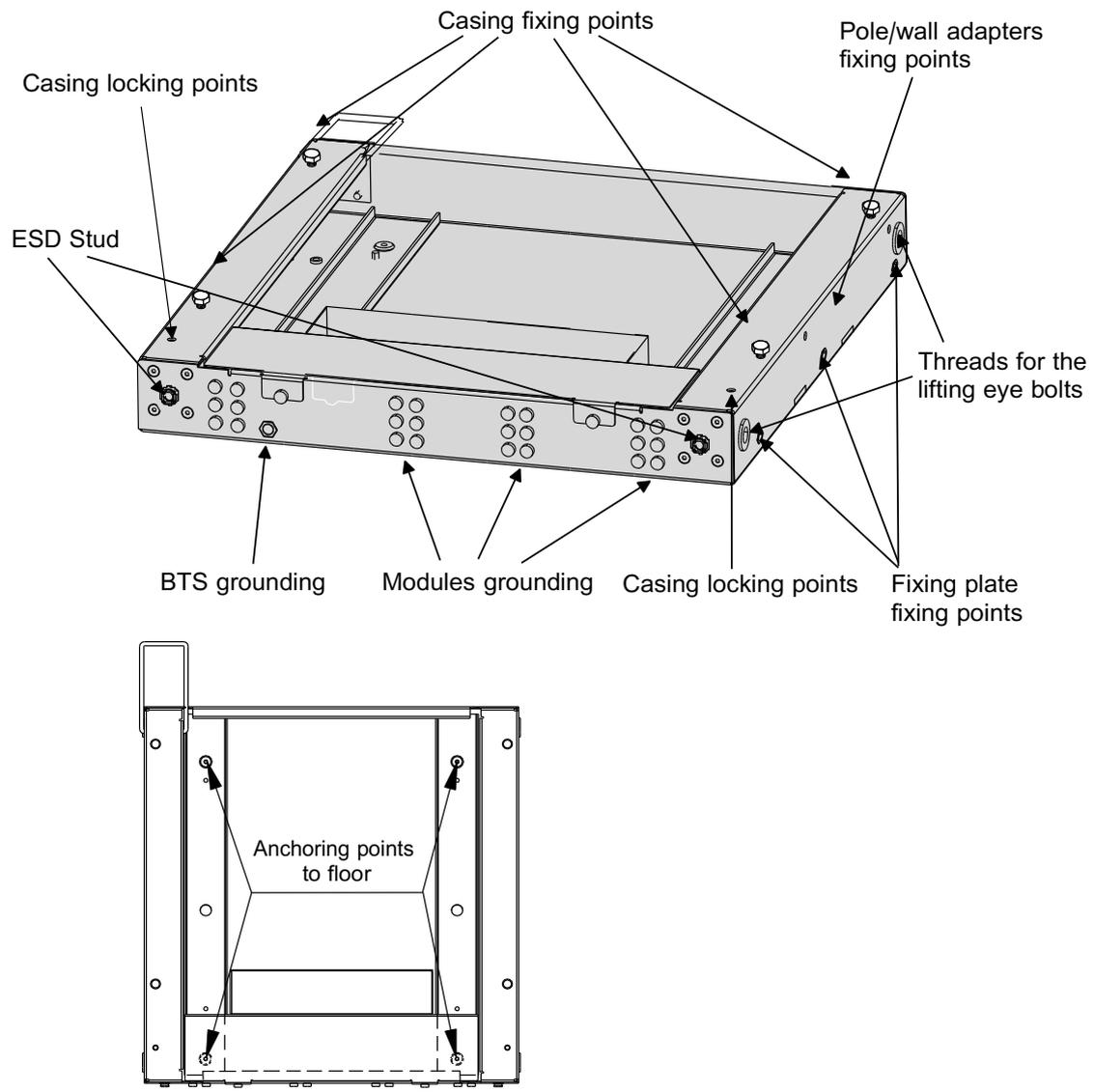
### **External connections**

The plinth has the following fixing interfaces:

- ESD studs
- Casing fixing points
- Pole/wall adapter fixing points
- Threads for the lifting eye bolts
- Modules grounding
- BTS grounding
- Casing locking points
- Anchoring points to floor
- Fixing plate fixing points

The main grounding area is the grounding area on the left. The three other grounding areas are intended for module grounding.

See the following figure for the external fixing interfaces of the FMFA.



DN7082504

Figure 25. External interfaces of the plinth



# 13 Pole mounting kit (WMPB) description

The pole mounting kit (WMPB) enables BTS installation on a pole 60-300 mm (2.4-11.8 in.) in diameter.

Table 25. Delivery contents

Item	Product code	Quantity
Pole Mounting Kit (WMPB)	469978A	1
Mounting blocks		2 pcs
M8x25 bolts		8 pcs
M10x120 bolts		4 pcs
M10x200 bolts		4 pcs
M10x300 bolts		4 pcs
Washers		4 pcs

See the following figure for the delivery contents of the pole mounting kit.

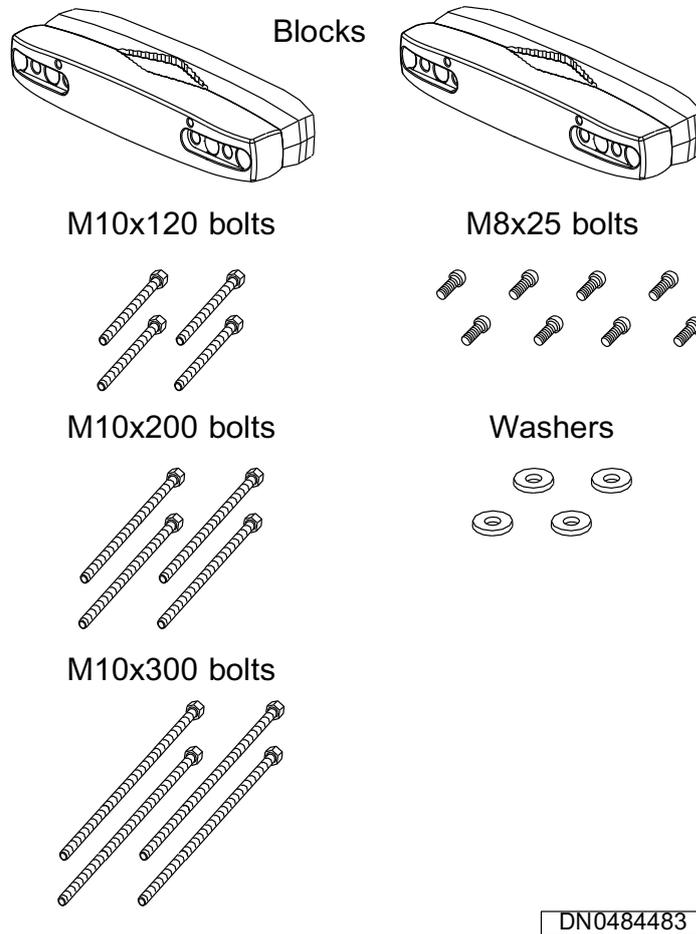


Figure 26. Pole mounting kit

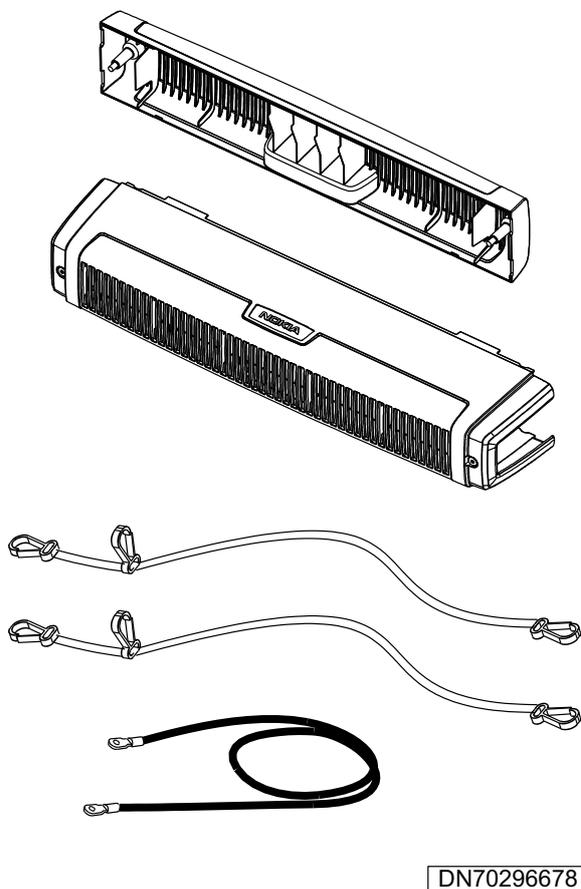
# 14 Flexi mounting covers for back and front (FMCB) description

Flexi mounting covers for back and front is an optional 2U (FMCB) module cover that is required in FPDA installations without a cabinet. The primary functions of the covers are to provide protection against wind-driven rain, visual protection, and mechanical protection for the cables. Furthermore, the back cover protects the installer's fingers from the rotating fans.

The covers are attached to the casing or the external cable entry using safety catches that prevent the covers from falling off during installation.

The FMCB delivery includes a grounding cable. Note that it is not included in any module deliveries.

The back and front covers, the safety catches and the grounding cable are illustrated in the following figure.



DN70296678

Figure 27. FMCB: 2U back cover, 2U front cover, 2 x safety catch and grounding cable.

### FMCB dimensions

The dimensions of the FMCB are presented in the following table.

Table 26. Dimensions of the FMCB

Property	Front cover	Back cover
Height	83 mm (3.3 in.)	83 mm (3.3 in.)
Width	492 mm (19.4 in.)	446 mm (17.6 in.)

Table 26. Dimensions of the FMCB (cont.)

Property	Front cover	Back cover
Depth	100 mm (3.9 in.)	37 mm (1.5 in.)

The material of the covers is plastic.

Table 27. Grounding cable

Length	1.3 m (4.3 ft.)
Thickness	16 mm <sup>2</sup> (5 AWG)



# 15

## Integrated long term battery backup solution (MIBBU)

In indoor sites, the optional Multi Integrated Battery Backup solution (MIBBU) provides a long-term battery backup solution for Nokia Flexi EDGE BTS. In outdoor sites, MIBBU and separate battery provide a long-term battery backup solution for Nokia Flexi EDGE BTS. In outdoor cabinet, MIBBU is installed in Nokia Flexi Cabinet Site Support Module (FCSA).

The MIBBU consists of one power distribution unit (WPU) with one control unit (CU), and one to four rectifier power units (WPM). The power distribution unit mainly distributes the input AC mains to the rectifier units. The control unit controls the rectifier power units and monitors the alarms in the event of low supply voltage, or if the MIBBU enters the battery backup mode in the event of an AC mains failure. The alarm generated by the control unit is forwarded to the BTS O&M software.

The rectifier power unit supplies power to the BTS via the power distribution unit. The power distribution unit also recharges the optional batteries after discharge. The rectifier power unit has output power of 1.5 kW at 48 V DC.

### Integrated long-term battery

The default capacity of the separate long-term battery package is 62 Ah. The battery is charged and controlled by the MIBBU. With a typical 2+2+2 configuration, the default battery can provide a battery backup time of up to three hours 50 minutes. By installing a high capacity 92 Ah battery, the backup time can be extended according to the requirements of each site.

In order to fulfill strict safety, type-approval, and performance requirements and to keep the BTS warranty valid, only Nokia-tested and approved batteries can be used, when integrated in cabinet together with MIBBU.



# 16

## Talk Conversion Kit (EMIA)

Flexi EDGE BTS modules can be installed into the CityTalk cabinet by using the Talk conversion kit EMIA. The inner parts of the CityTalk cabinet are removed before the Flexi EDGE modules are installed and certain parts of the CityTalk cabinet are replaced with new parts belonging to the EMIA kit

The CityTalk cabinet retains its outline dimensions and the mechanical shape when modified with EMIA. The Flexi EDGE BTS within the modified cabinet fulfills the Flexi EDGE temperature and IP requirements. Flexi EDGE BTS within the cabinet has only standard EAC control or alarm connections to the cabinet if needed. It is also possible to equip the cabinet with an optional air filter kit. CityTalk cabinet with EMIA supports up to 4+4 +4 single band or 2+2+2 dual band configurations.



# 17 Upgrade Cable Kit (EUCA)

The Upgrade Cable Kit (EUCA) is available for expansion needs. The EUCA is used for the stack 4+4+4 expansion case or custom configurations requiring extra long RF cables. It can also be used for 12 +12+12 RTC with two cabinets.



## Appendix A Contents of delivery

### A.1 Contents of Flexi Cabinet for Indoor (FCIA) delivery

Table 28. Nokia Flexi Cabinet for Indoor (FCIA) delivery contents

Description	Product code	Quantity
Nokia Flexi Cabinet for Indoor (FCIA)	470152A	1
Cabinet key		1
Cage nuts; pre-installed for the following configurations: <ul style="list-style-type: none"> <li>1+1+1/2+2+2 bypass</li> <li>3+3+3/4+4+4 2-way WBC</li> </ul>		62
Site packs; the site packs are attached with cable ties inside the cabinet. Contents of the site packs: <ul style="list-style-type: none"> <li>Guide plates</li> </ul>		2  30

### A.2 Contents of the Wideband Combiner Sub-module (EWxx) delivery

Table 29. Nokia Flexi EDGE Wideband Combiner Sub-module (EWxB) delivery contents

Description	Product code	Quantity
EDGE Wideband Combiner Sub-module (EWxB): <ul style="list-style-type: none"> <li>EDGE Wideband Combiner Sub-module 800/900 MHz (EWGB)</li> <li>EDGE Wideband Combiner Sub-module 1800 MHz (EWDB)</li> <li>EDGE Wideband Combiner Sub-module 1900 MHz (EWPB)</li> </ul>	471492A 471493A 471494A	1
Wideband Combiner Sub-module Cable Set: <ul style="list-style-type: none"> <li>RF cable 275 mm (10.8 in.)</li> </ul>	083256A • 994933	1 1
Screw (pre-installed)		1

### A.3 Contents of the Remote Tune Combiner (ECxA) delivery

Table 30. Nokia Flexi EDGE Remote Tune Combiner (Cavity Combiner) Module (ECxA) delivery contents

Description	Product code	Quantity
EDGE Remote Tune Combiner (Cavity Combiner) Module (ECxA):		1
• EDGE Remote Tune Combiner (Cavity Combiner) Module 1800 MHz (ECDA)	470260A	
• EDGE Remote Tune Combiner (Cavity Combiner) Module 900 MHz (ECGA)	470258A	
• EDGE Remote Tune Combiner (Cavity Combiner) Module 900 MHz-J (ECJA)	470259A	
Remote Tune Combiner Cable Set:	083257	1
• Power cable 1188 mm (46.8 in.)	• 994940	1
• Bus cable 1054 mm (41.5 in.)	• 994938	1
• RF cable 275 mm (10.8 in.)	• 994933	8
M5 screws		4
Cage nuts		4

### A.4 Contents of the Power Module (FPMA) delivery

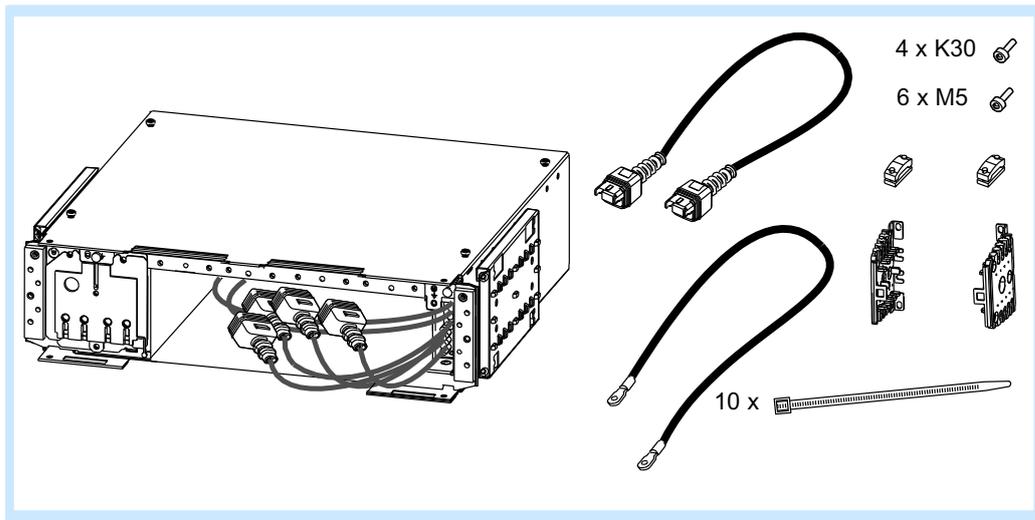
The FPMA Power Module is an optional item that has to be ordered separately, when needed.

The Power Module delivery contains the following items:

- Power Module (FPMA) with internal AC and DC cabling and cable support plates
- 2 x Power Module cable entries (identical to EMHA cable entries)
- Alarm cable to the System Module
- 2 x cable clamps
- 4 x M5 screws for fixing cable entries to the casing
- 4 x K30 screws for the cable clamps

- 2 x M5 screws for fixing the casing to another casing or plinth
- 10 x cable ties

See the following figure for more information on the delivery contents.



DN7090671

Figure 28. Delivery contents of the FPMA

#### A.4.1 Contents of the power AC/DC sub-module (FPAA) delivery

The FPAA power sub-module is an optional item that has to be ordered separately, when needed.

The FPAA power sub-module delivery contains the following items:

- Power sub-module (FPAA) with two RJ-45 connector seal caps installed
- Alarm cable
- 2 x M5 screws for fixing the FPAA to FPMA

See the following figure for more information on the delivery contents.

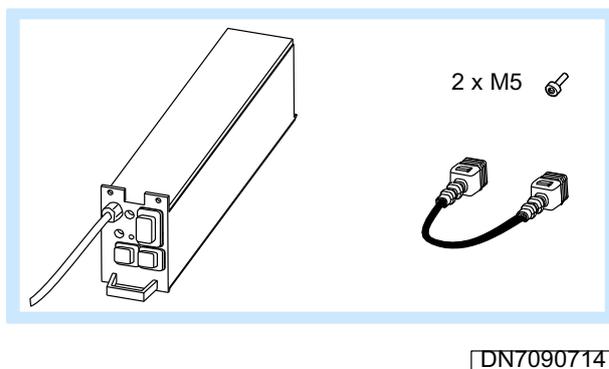


Figure 29. Delivery contents of the FPAA

#### A.4.2 Contents of the power battery sub-module (FPBA) delivery

The FPBA power battery sub-module is an optional item that has to be ordered separately, when needed.

The FPBA power sub-module delivery contains the following items:

- Power battery sub-module (FPBA) with two RJ-45 connector seal caps installed
- Alarm cable
- 2 x M5 screws for fixing the FPBA to FPMA

See the following figure for more information on the delivery contents.

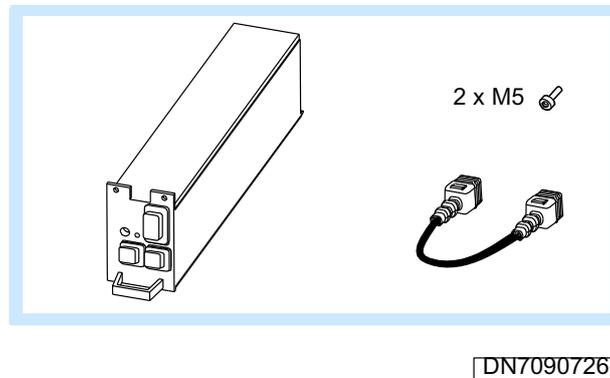


Figure 30. Delivery contents of the FPBA

## A.5 Contents of the 24V Power Module (FPDA) delivery

The 24V Power Module (FPDA) is an optional item that has to be ordered separately, when needed.

The 24V Power Module (FPDA) delivery contains the following items:

- DC/DC converter core pre-installed inside a 2U casing with cable support plates and with two RJ-45 connector seal caps installed
- 2 x cable entries
- 2 x DC output power cables
- Alarm cable
- 4 x AWG 4 (25 mm<sup>2</sup>) connector single rubber boot
- 2 x AWG 4 (25 mm<sup>2</sup>) connector double rubber boot
- 4 x M5 screws for fixing cable entries to the casing and 2 x M5 screws for fixing the casings to each other
- 2 x cable clamps
- 4 x K30 screws for cable clamps

See the following figure for more information on the delivery contents.

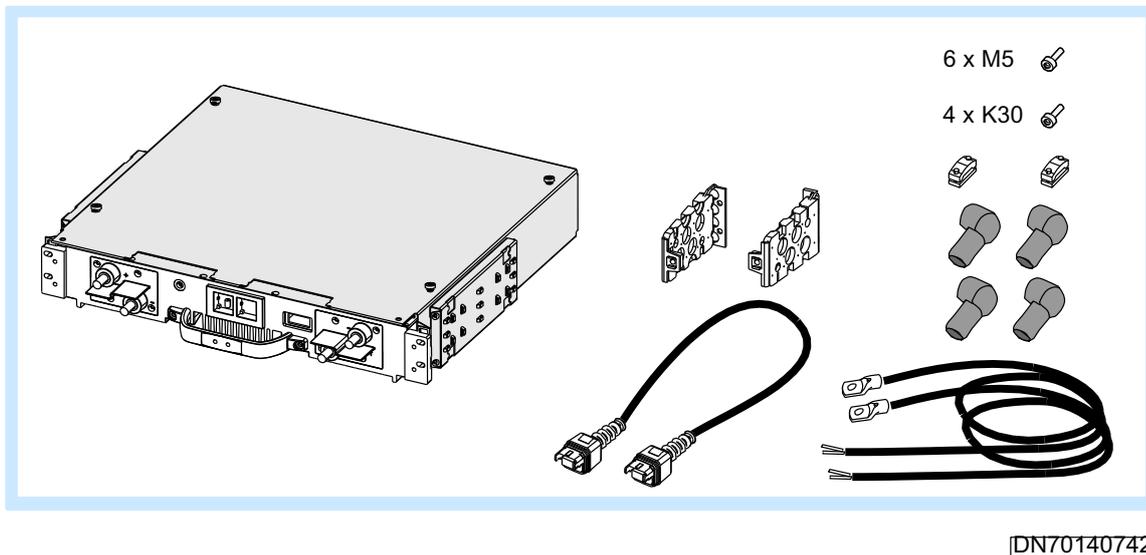


Figure 31. Delivery contents of the FPDA delivery

## A.6 Contents of the System Extension Module (ESEA) delivery

Table 31. Nokia Flexi EDGE System Extension Module (ESEA) delivery contents

Description	Product code	Quantity
EDGE System Extension Module (ESEA)	470330A	1
ESEA Cable Set:	083296	1
• Bus cables 1554 mm (61.2 in.)	994939	2
M5 screws	-	4

## A.7 Contents of the Flexi System External Alarm Module (FSEB)

Table 32. Nokia Flexi System External Alarm Module (FSEB) delivery contents

Description	Product code	Quantity
Flexi System External Alarm Module (FSEB):	471424A	1
• D37 Cable Assembly		1
• Cable tie, PER31		3

## A.8 Contents of the Upgrade Cable Kit (EUCA) delivery

Table 33. Nokia Flexi EDGE Upgrade Cable Kit (EUCA) delivery contents

Description	Product code	Quantity
EDGE Upgrade Cable Kit (EUCA):	470265A	1
• RF cable 1300 mm (51.2 in.)	• 994936	3

### A.9 Contents of the Pole Mounting Kit delivery (WMPB)

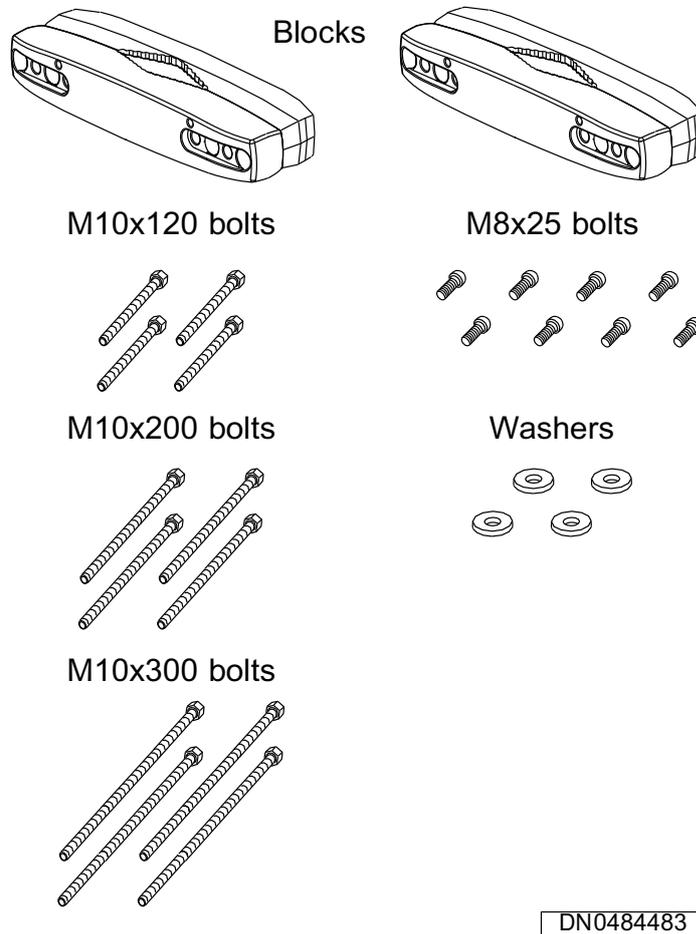


Figure 32. Contents of the Pole Mounting Kit (WMPB) delivery

Table 34. Contents of the Pole Mounting Kit (WMPB) delivery

Description	Product code	Quantity
Pole Mounting Kit (WMPB)	469978A	1
• Block		2
• M10 x 120 bolts		4
• M10 x 200 bolts		4
• M10 x 300 bolts		4

Table 34. Contents of the Pole Mounting Kit (WMPB) delivery (cont.)

Description	Product code	Quantity
• M8 x 25 bolts		8
• Washers		4

## A.10 Contents of the Flexi Mounting Kit for Batteries (FMBB) delivery

Table 35. Flexi Mounting Kit for Batteries (FMBB) delivery (used with Flexi Cabinet for Indoor)

Description	Product code	Quantity
Flexi Mounting Kit for Batteries (FMBB):	471459A	1
• Bottom plate		1
• Back plate		1
• Front plate		1
• M5 X 10 screws		14
• Cage nuts		10
• Cable ties		3

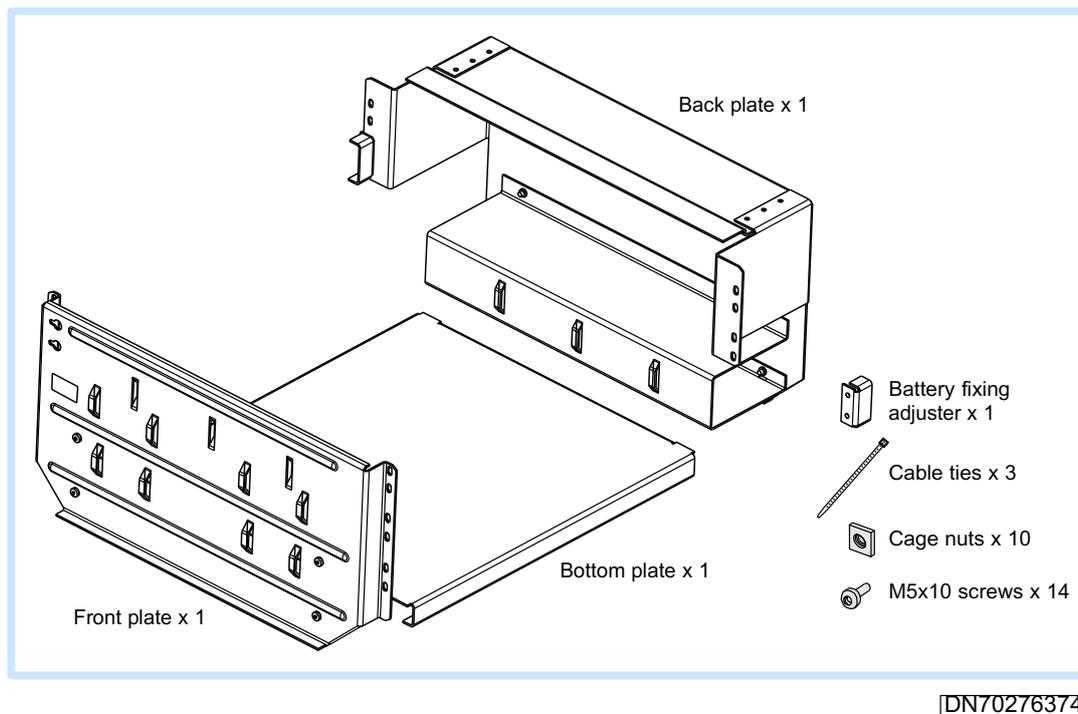


Figure 33. Delivery contents of the FMBB

## A.11 Contents of the 3 HU Module Casings (EMHA) delivery

Table 36. Nokia Flexi Module Casings for 3 height units (HU) modules (EMHA) delivery contents

Description	Product code	Quantity
3 HU casing (EMHA)	470316A	1
• 3 HU cable entries		2
• 3 HU front cover		1
• 3 HU rear cover		1
• M5 x 10 screws		4
• M5 x 5 screws		6
• Cage nuts		4

Table 36. Nokia Flexi Module Casings for 3 height units (HU) modules (EMHA) delivery contents (cont.)

Description	Product code	Quantity
• Safety catches		2
• Grounding cable		1

## A.12 Contents of the 2 HU Module Casings (EMTA) delivery

Table 37. Nokia Flexi Module Casings for 2 height units (HU) modules (EMTA) delivery contents

Description	Product code	Quantity
2 HU casing (EMTA)	470315A	1
• 2 HU cable entries		2
• 2 HU front cover		1
• 2 HU rear cover		1
• M5 x 10 screws		4
• M5 x 6 screws		6
• Cage nuts		4
• Safety catches		2
• Grounding cable		1

## A.13 Contents of the mounting kit for floor, wall and pole (FMFA) delivery

The FMFA mounting kit is an optional item that has to be ordered separately, when needed.

The plinth delivery contains the following items:

- Mounting kit for floor, wall and pole
- Adapter mechanics (used in wall and pole installations only)
- Spring washers (18 pcs for M5 screws and 8 pcs for M8 screws)

- 2 x fixing plate for the casing
- 12 x M5 screws
- 6 x M8 screws

See the following figure for more information on the delivery contents.

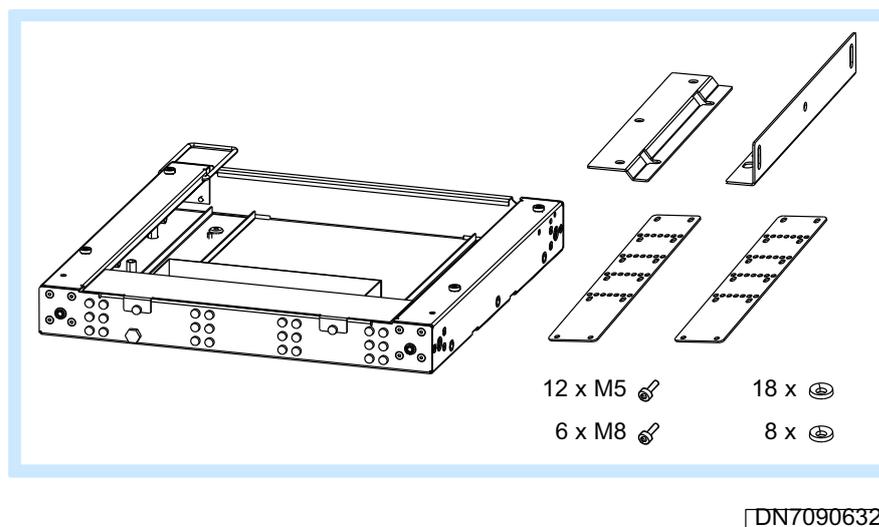


Figure 34. Delivery contents of the plinth

## A.14 Contents of the Flexi Mounting Covers Front and Back, 2 HU (FMCB)

Table 38. Nokia Flexi Mounting Covers Front and Back, 2 HU (FMCB), needed with Flexi Power DC/ DC Module 24 V (FPDA)

Description	Product code	Quantity
Flexi Mounting Covers Front and Back, 2 HU (FMCB)	470332A	1
• 2 HU front cover		1
• 2 HU back cover		1

### A.15 Contents of the Talk Conversion Kit (EMIA) delivery

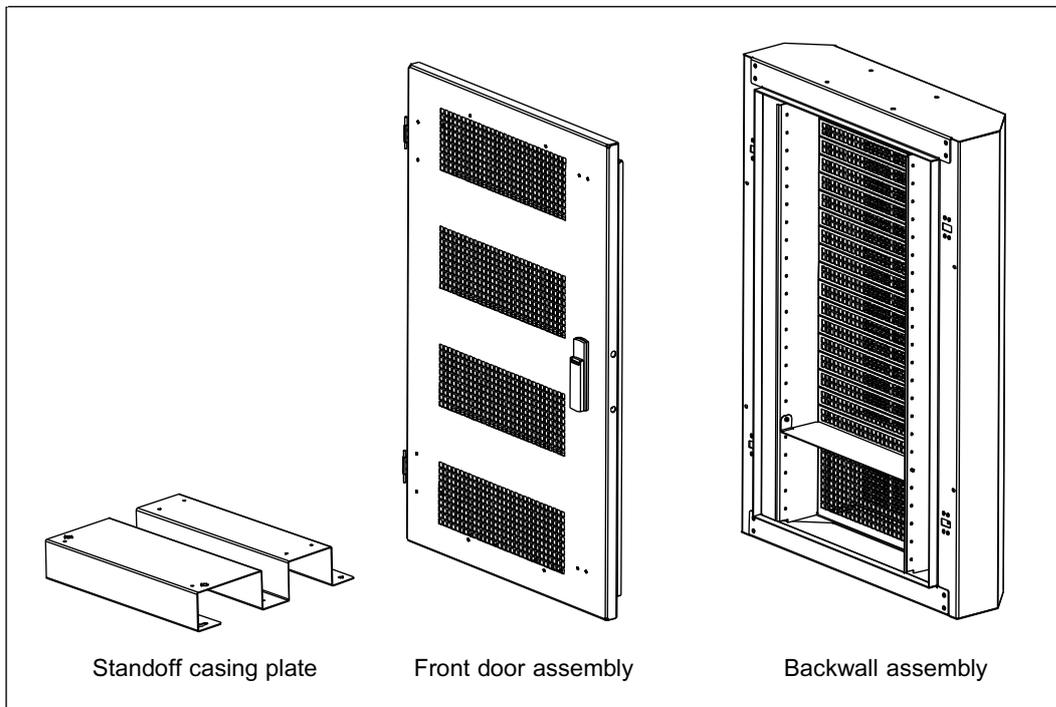


Figure 35. Nokia Flexi EDGE Talk Conversion Kit (EMIA) delivery contents

Table 39. Nokia Flexi EDGE Talk Conversion Kit (EMIA) delivery contents

Description	Product code	Quantity
Talk Conversion Kit (EMIA)	471429A	1
• Front door		1
• Back wall		1
• Standoff casing plate		1
• M8 x 16 screws		4
• Washer, flat M8		1
• Lock rod support, includes washer and screw		1
• Connection pins		4
• Upper lock rod supports		2

## A.16 Contents of the Flexi Mounting Auxiliary Brackets (FMAA)

Table 40. Nokia Flexi Mounting Auxiliary Brackets (FMAA) delivery contents

Description	Product code	Quantity
Flexi Mounting Auxiliary Brackets (FMAA):	471657A	
• Brackets	822962	2
• M5 x 6 screws	6150188	4