NOKIA

UltraSite EDGE BTS Product Description

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Contents

1 Statutory Information

1.1 CE Marking

Standard	Description
CE 0168 !	Hereby, Nokia Corporation, declares that this Nokia UltraSite EDGE Base Station is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC.

1.2 FCC Statement

Standard	Description
FCC Statement	Hereby, Nokia Corporation declares that this Nokia UltraSite EDGE Base Station is in compliance with the essential requirements and other relevant provisions of Directive: 1999/5/EC. The product is marked with the CE marking and Notified Body number according to the Directive 1999/5/EC. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The term "IC:" before the radio certification number only signifies that Industry Canada technical specifications were met.

2 Technical overview of UltraSite EDGE BTS

2.1 Technical overview of UltraSite EDGE BTS

2.1.1 General description

Nokia UltraSite EDGE BTS supports both omni-directional and sectorised configurations for traditional voice and future data applications. The BTS can be used in GSM/EDGE 800, 900, 1800 or 1900 MHz systems. With the addition of EDGE/EGPRS, the BTS offers a maximum data rate of more than 400 kbit/s with multiple timeslots, as compared to more than 100 kbit/s with multiple timeslots for GSM/GPRS.

Nokia UltraSite EDGE BTS is available in the following cabinets for outdoor and indoor applications:

- Nokia UltraSite EDGE BTS Outdoor (*OAKA*)
- Nokia UltraSite EDGE BTS Outdoor co-sited with Talk-family (*OAKB*)
- Nokia UltraSite EDGE BTS Indoor (*IAKA*)
- Nokia UltraSite EDGE BTS Midi Indoor (used when vertical space is limited) (*IAKC*)
- Nokia UltraSite EDGE BTS Midi Outdoor (used when vertical space is limited) (*OAKC*)
- Nokia UltraSite EDGE BTS Midi Outdoor co-sited with Talk-family (used when vertical space is limited) (*OBKB*)

Note

This equipment has been tested and found to comply with the limits for a /class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to

provide reasonable protection against harmful interference when the equipment is operated 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 manual, may 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.

Note

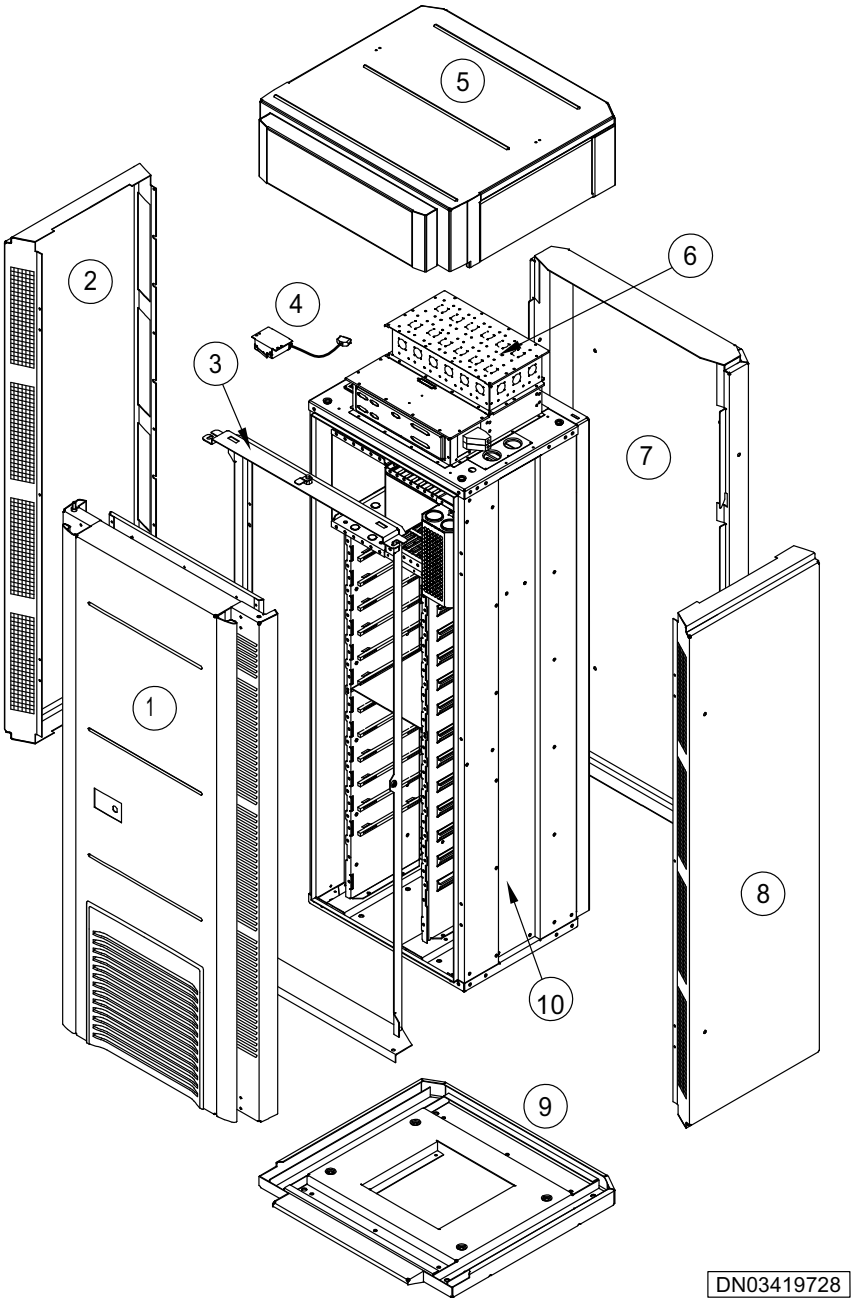
For sites with minimised requirements, both Nokia UltraSite EDGE BTS Outdoor and Indoor cabinets can hold an Integrated Battery Backup (IBBU). However, an IBBU reduces the maximum number of Transceiver (TSxx) units in the cabinet from 12 to 6. Nokia UltraSite EDGE Midi BTS cabinets cannot accommodate the IBBU.

Note

To upgrade Nokia UltraSite EDGE BTS from GSM to GSM/EDGE requires the *GSM/EDGE* version of:

- BTS software
- Transceiver (TSxx) unit
- Transceiver Baseband (BB2x) unit

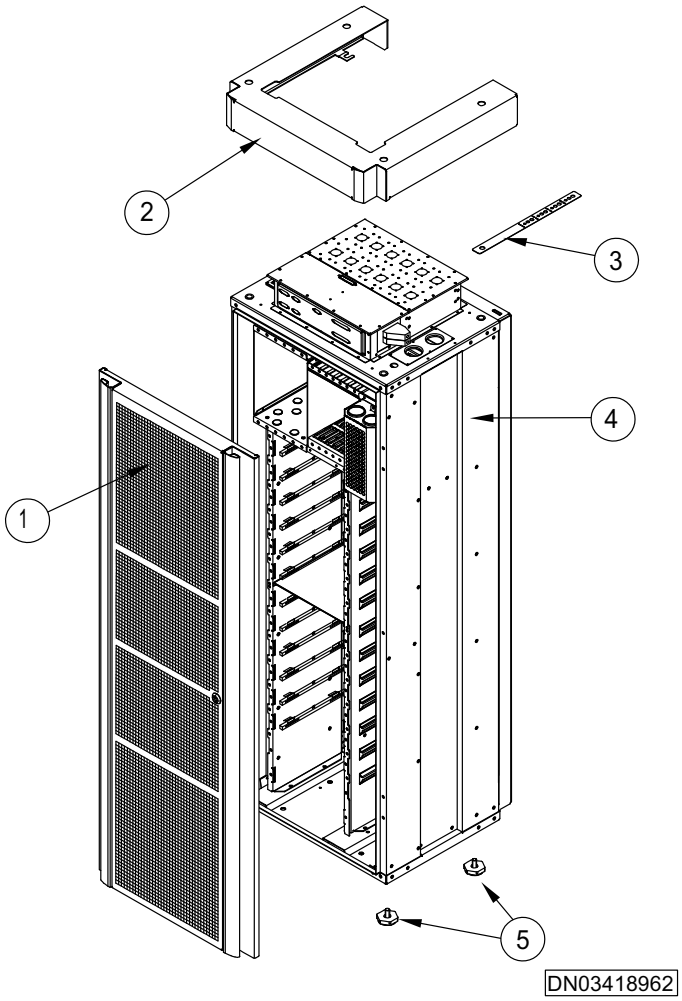
The BTS cabinet, backplane, and other units do not change.



1	Door
2	Side wall
3	Door frame

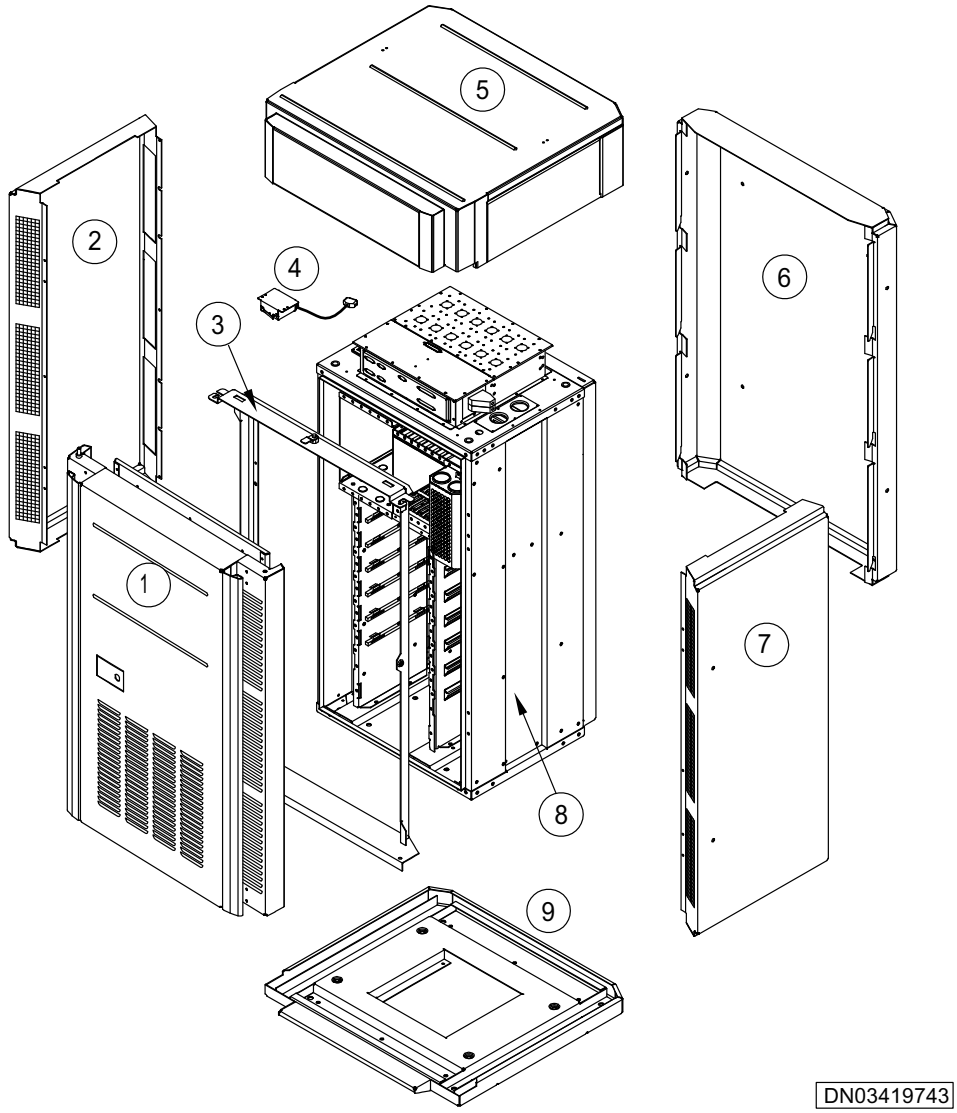
4	Door switch assembly
5	Roof
6	Antenna box extension
7	Back wall
8	Side wall
9	Plinth
10	Cabinet core (CRMA)

Figure 1. Nokia UltraSite EDGE BTS Outdoor (CRMA/OAKA)



1	Door
2	Roof
3	Wall brackets
4	Cabinet core (CRMA)
	Feet (four places)
5	

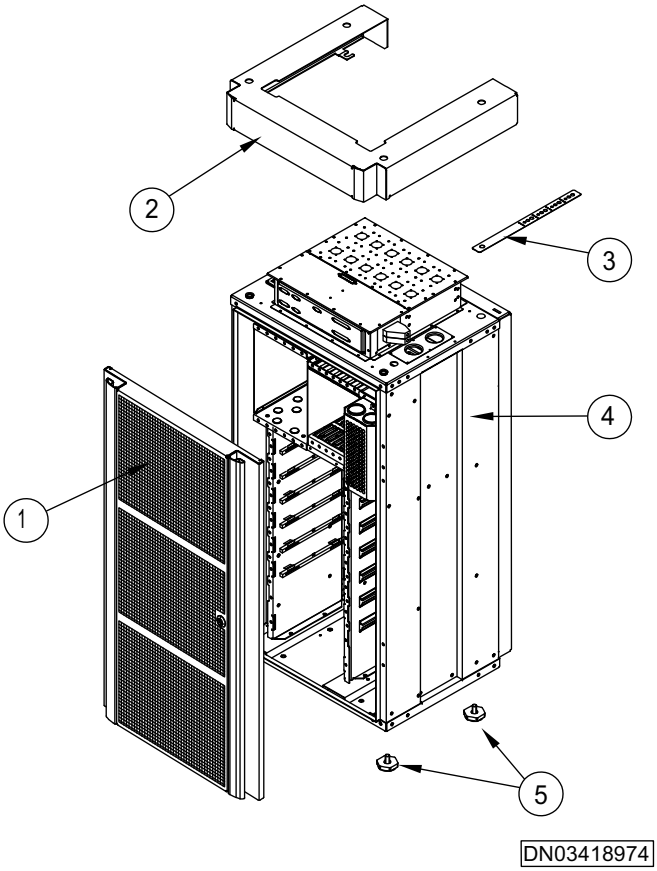
Figure 2. Nokia UltraSite EDGE BTS Indoor (CRMA/IAKA)



1	Door
2	Side wall
3	Door frame
4	Door switch assembly
5	Roof
6	Back wall

7	Side wall
8	Cabinet core
9	Plinth

Figure 3. Nokia UltraSite EDGE BTS Midi Outdoor (CRMC/OAKC)



1	Door
2	Roof
3	Wall brackets
4	Cabinet core
5	Feet

Figure 4. Nokia UltraSite EDGE BTS Midi Indoor (CRMC/IAKC)

2.1.2 Construction

Nokia UltraSite EDGE BTS features self-standing cabinet cores with unit guides. The Nokia UltraSite EDGE BTS Outdoor and Indoor cabinets are constructed on identical cabinet cores (CRMA). The difference between the cabinets is in the external application kits. Nokia UltraSite EDGE BTS Midi cabinets are also constructed on identical cabinet cores (CRMC).

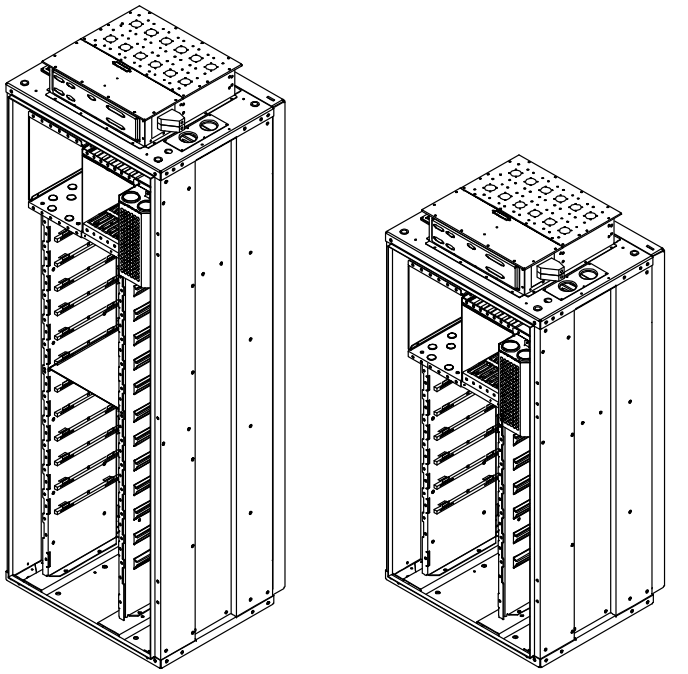


Figure 5. Cabinet cores

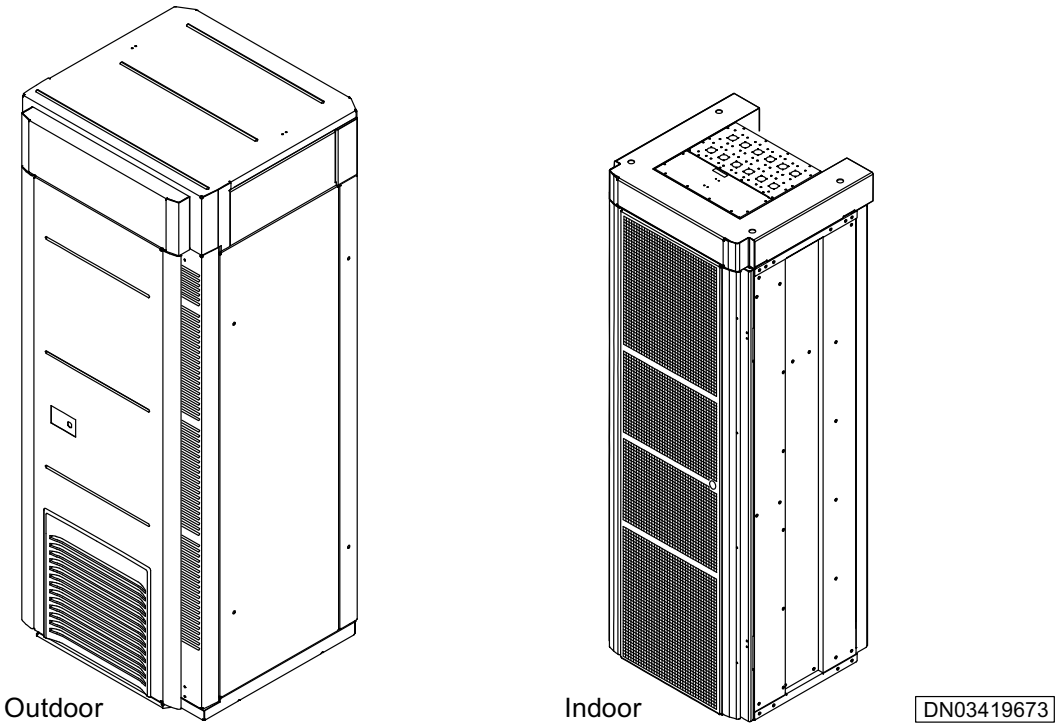


Figure 6. Nokia UltraSite EDGE BTS Indoor and Outdoor cabinets

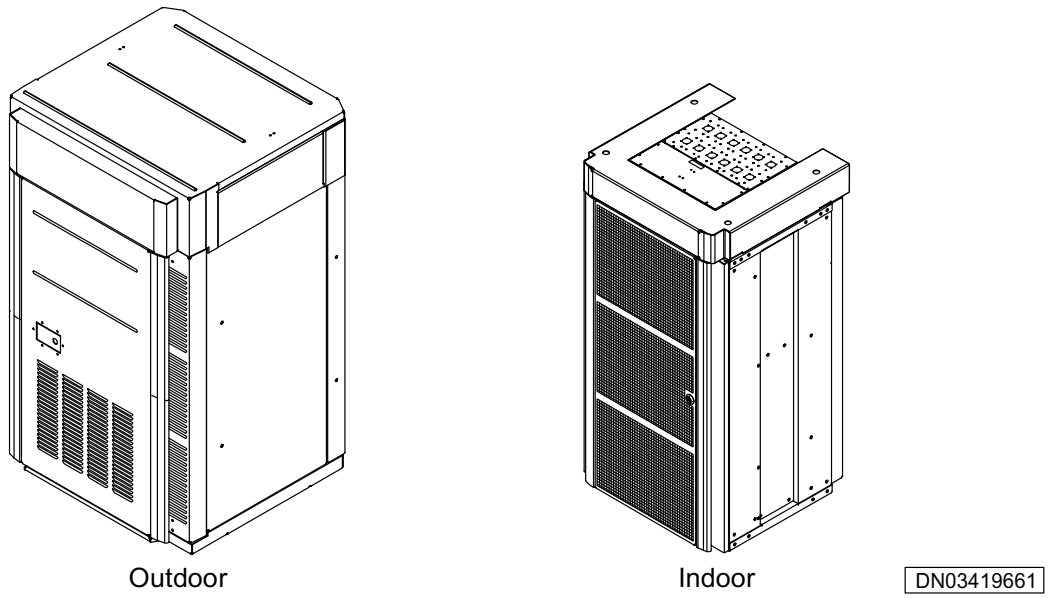


Figure 7. Nokia UltraSite EDGE BTS Midi Indoor and Outdoor cabinets

For information about dimensions and weight of UltraSite EDGE BTS, see *Physical properties of UltraSite EDGE BTS*.

For information about climatic conditions for UltraSite EDGE BTS operation, see *Operating conditions for UltraSite EDGE BTS*.

2.1.3 Operation

Nokia UltraSite EDGE BTS performs the radio functions of the Base Station Subsystem (BSS).

The BTS receives and sends signals through:

- Air interface – frequencies that connect the BTS to the Mobile Station (MS)
- Abis interface – cable or radio link that connects the BTS to the Base Station Controller (BSC), which is the central element of the BSS

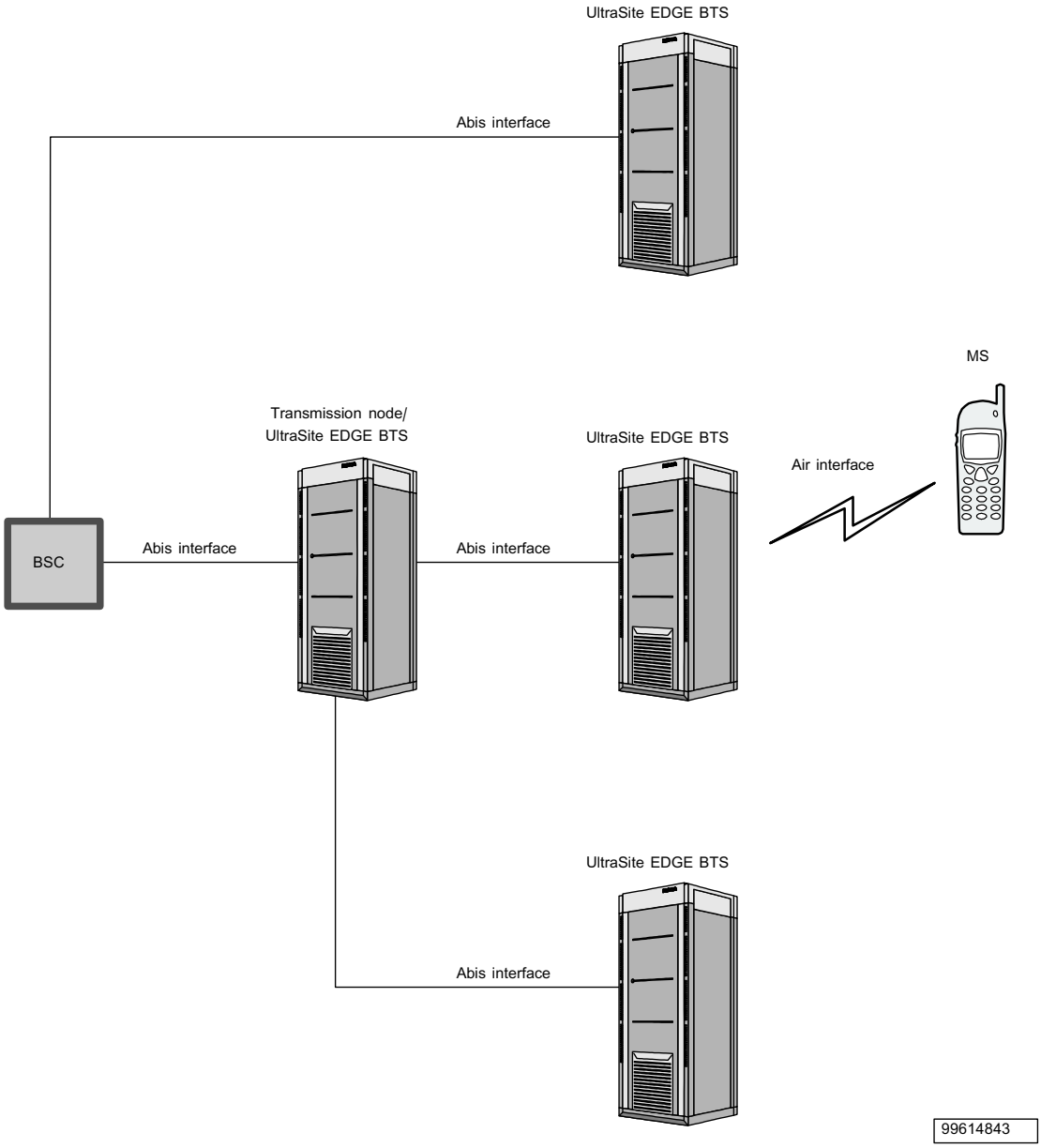


Figure 8. BTS interfaces

Uplink and downlink signalling

In the uplink path, the BTS receives signals from the MS. In the downlink path, the BTS sends signals to the MS. Uplink and downlink signals travel through the Air interface on different frequencies, with the higher frequency carrying downlink signals.

The uplink signal path involves the following actions:

- The antenna picks up a signal from the MS through the Air interface.
- The antenna passes the signal to the optional Masthead Amplifier (MNxx) and Bias Tee (BPxx) units or to the optional Dual Band Diplex Filter (DU2A) unit.
- The signal passes through either the Dual Variable Gain Duplex Filter (DVxx) or Remote Tune Combiner (RTxx) unit to the Receiver Multicoupler (M2xA or M6xA) and Transceiver RF (TSxx) units.
- The Transceiver module (TRX) on the TSxx unit converts the received signal to Intermediate Frequency (IF) levels and filters the signal.
- The TSxx unit then sends the signal to the Transceiver Baseband (BB2x) unit for digital signal processing.
- The BB2x unit sends the processed signal to the Transmission (VXxx) unit, which transmits the signal to the BSC utilizing standard transmission technologies.

The downlink signal path involves the following actions:

- The BSC receives a signal from the core network and sends the signal to the VXxx unit utilizing standard transmission technologies.
- The VXxx passes the signal to the BB2x unit for digital signal processing.
- The BB2x unit sends the processed signal to the TSxx unit.
- The TRX module on the TSxx unit filters the signal, raises it to the carrier frequency, and amplifies it.
- The TSxx unit then sends the signal either to the RTxx unit or through the optional Wideband Combiner (WCxA) unit to the DVxx unit.
- The DVxx or RTxx unit sends the signal through either the optional DU2A unit or the BPxx and MNxx units to the antenna, which passes the signal through the Air interface to the MS.

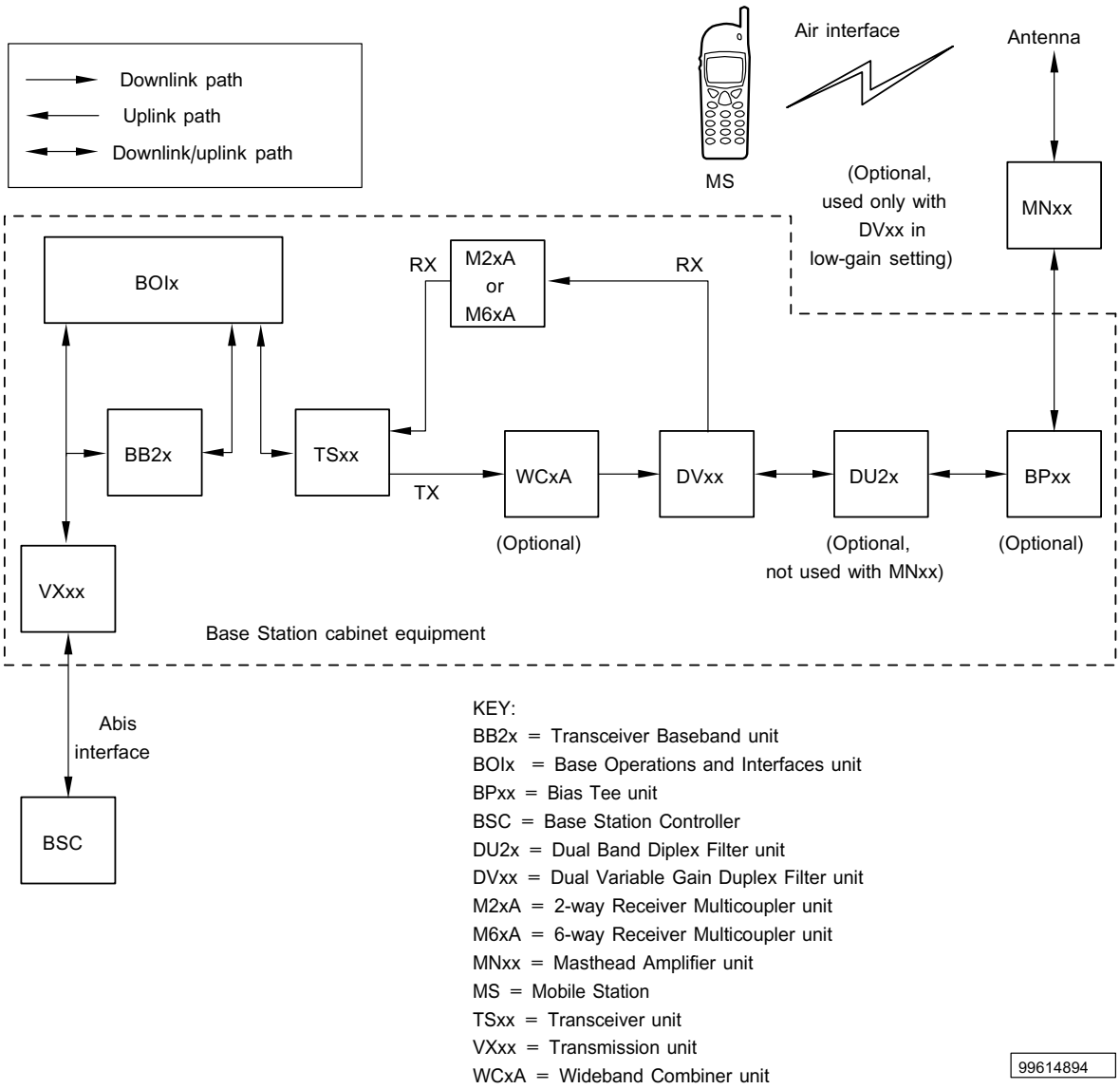


Figure 9. Uplink and downlink signal paths (using DVxx)

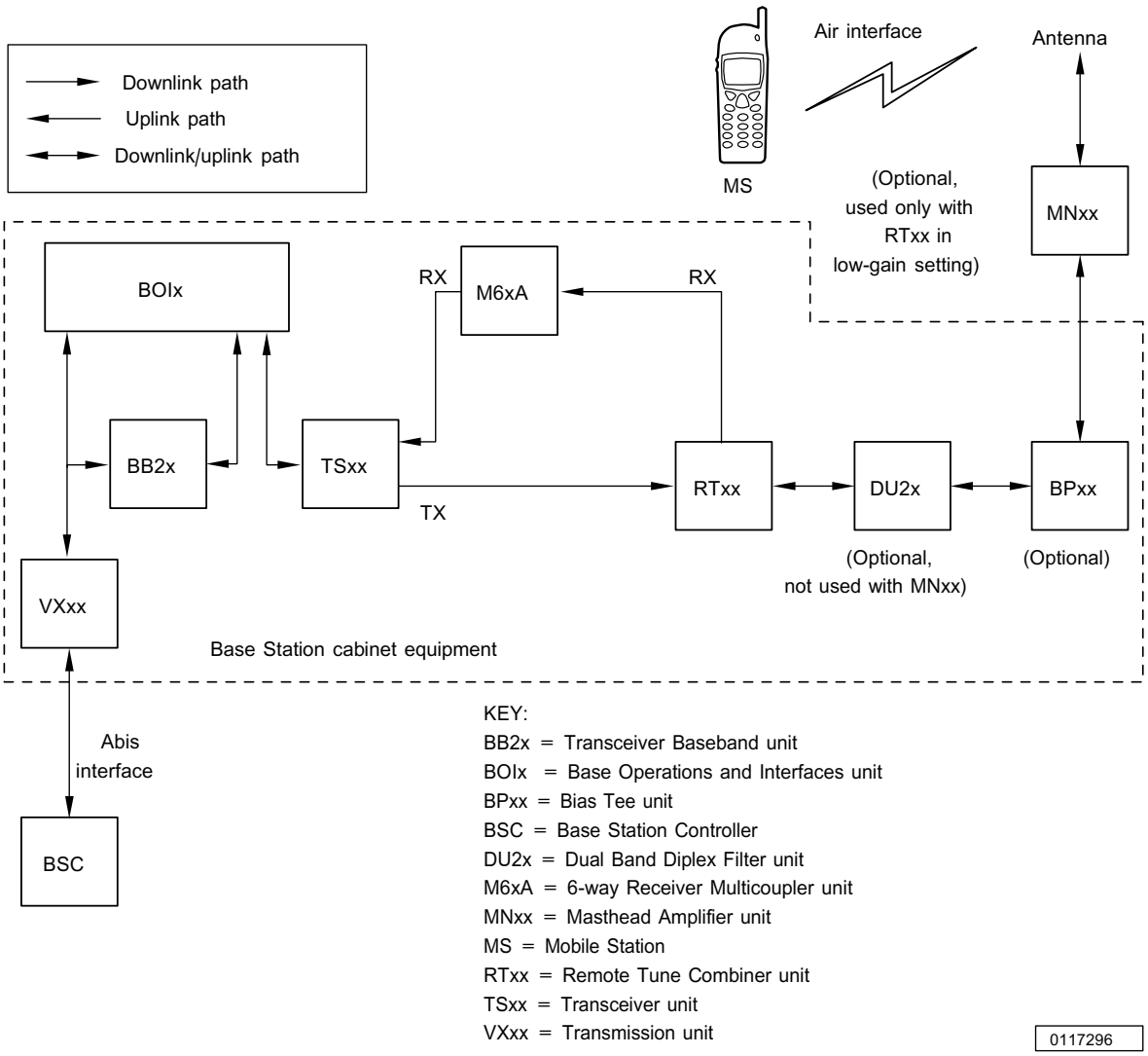


Figure 10. Uplink and downlink signal paths (using RTxx)

Internal BTS signalling

Buses on the BTS backplane and interconnected cables carry signals between the internal BTS units.

Table 1. BTS buses

Bus	Function
D1-bus	Data transfer and signalling between BOIx, BB2x, and VXxx units: • GSM - uses one D1-bus • EDGE - uses three D1-buses
D2-bus	Internal Operations and Maintenance (O&M) functions and communication between BOIx, BB2x, and RTxx units; software download
Local Management Bus (LMB)	Control of VXxx unit
Q1-bus	Polling and management of VXxx units and other equipment at site with Q1 management interface.
I^2C-data buses	Polling, auto detection, temperature readings, and alarm collection – Power Supply (PWSx) unit, DVxx unit, and interface module
Uplink/downlink serial data bus[1]	Control, status, and traffic data between BB2x and TSxx units
F-bus[2]	Baseband frequency hopping

[1] Located between the BB2x and TSxx units (through the BOIx unit cross-connection).

[2] Located between BB2x units.

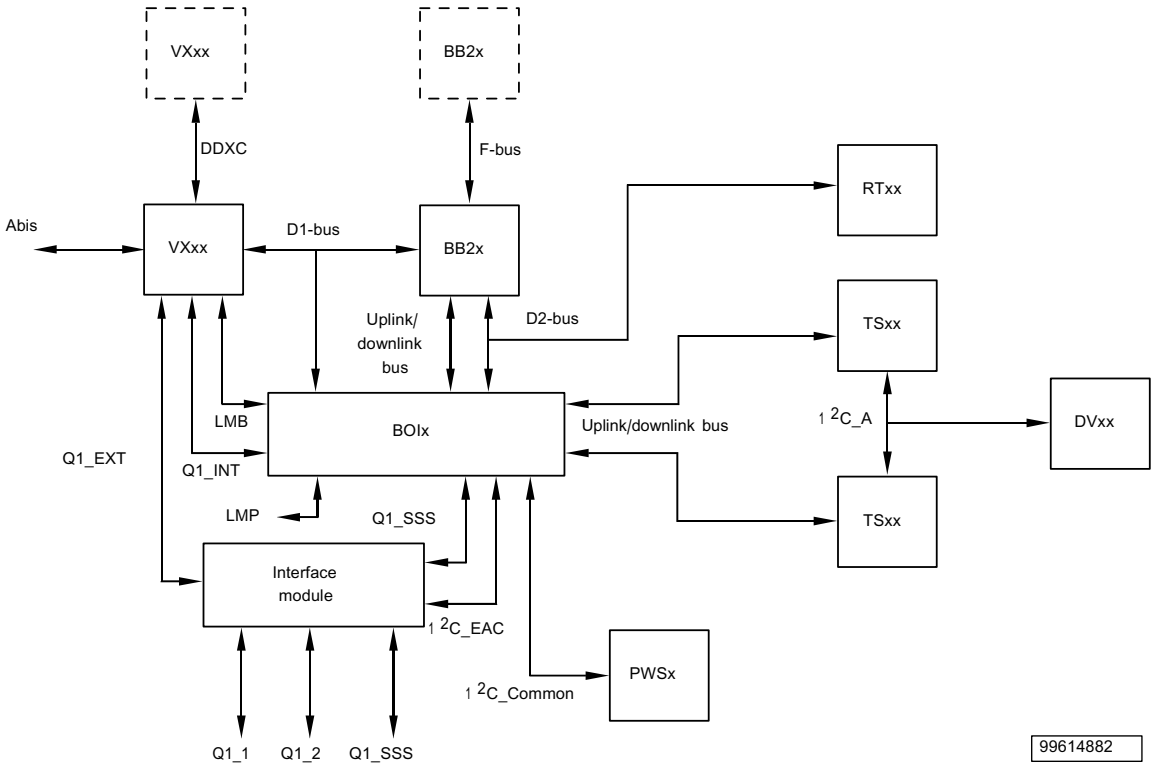


Figure 11. Internal bus architecture

2.1.4 Transmission

Nokia UltraSite EDGE BTS provides scalable, high-capacity access transmission for large-capacity networks and data services. Nokia UltraSite EDGE BTS supports 16, 32 and 64 kbit/s telecom signalling through the Abis interface. The O&M signalling speed can be 16, 32, or 64 kbit/s.

Transmission media

Nokia UltraSite EDGE BTS supports the following transmissions:

- radio-link
- wireline

The signals are multiplexed and cross-connected to a level of 8 kbit/s in the BTS using either the Plesiochronous Digital Hierarchy (PDH).

Radio-link transmission

The FXC RRI unit is the radio-link transmission unit for Nokia UltraSite EDGE BTS. The unit has two Flexbus interfaces for connecting:

- one or two microwave radio outdoor units
- two FXC RRI units in different BTS cabinets or transmission nodes
- one FXC RRI unit to another transmission device offering a FlexBus interface (such as F1U19)

The proprietary Nokia Flexbus is a coaxial cable that:

- carries power for the radio outdoor unit
- carries a maximum of 16 x 2 Mbit/s in both directions
- has a maximum cable length of 300 metres
- is compatible with Nokia FlexiHopper Microwave Radio and Nokia MetroHopper Radio

Wireline transmission

Cellular access networks are based mainly on the E1 (ETSI) and T1 (ANSI) standards. E1 capacity is 2 Mbit/s; T1 capacity is 1.5 Mbit/s. Nokia UltraSite EDGE BTS supports these standards with the following wireline transmission units:

- FC E1/T1 – 120 Ω twisted pair for E1 or 100 Ω twisted pair for T1, 75 Ω coaxial for E1
- FXC E1 – four 75 Ω coaxial for E1
- FXC E1/T1 – four 120 Ω twisted pair for E1 or 100 Ω twisted pair for T1

Any combination of up to four of these units can be used in one UltraSite EDGE BTS cabinet.

Network configuration

For information about UltraSite EDGE BTS configurations, see *Overview of configurations for UltraSite EDGE BTS*.

The BTS uses the following transmission units:

- FXC RRI
- FXC E1
- FXC E1/T1
- FC E1/T1

FXC RRI unit

With two radio-link Flexbus connections per unit, the FXC RRI unit operates as a repeater and interconnects Nokia UltraSite EDGE BTS cabinets and the BSC using loop, chain, star, and point-to-point network configurations. Each FlexBus interface has a capacity of up to 16 x 2M, dependent on the capacity of the microwave link of if the FlexBus is used for direct interconnection to a different FlexBus interface.

FXC E1 or FXC E1/T1 or FC E1/T1 unit

With four wireline connections per unit (E1 has 2Mbit/s capacity, and T1 has 1.5 Mbit/s capacity), the FXC E1 or FXC E1/T1 unit operates as a branching point and interconnects Nokia UltraSite EDGE BTS cabinets and the BSC using the loop, chain, star, and point-to-point network configurations. With up to four FXC E1 or FXC E1/T1 units per cabinet, a single cabinet supports a maximum of 16 wireline connections. The FC E1/T1 unit can be used as a termination point in a chain, star, or point-to-point network configuration. Because it has one wireline connection, only one FC E1/T1 unit per BTS cabinet is supported. And, it is not possible to deploy FXC units together with the FC E1/T1 unit.

Co-located Nokia Talk-family

A co-located Nokia Talk-family BTS can connect to Nokia UltraSite EDGE BTS using the integrated E1/T1 interface or Flexbus. During the upgrade phase, the Nokia Talk-family transmission interface to the BSC can provide the Abis capacity for the Nokia UltraSite EDGE BTS. This configuration, however, limits the capacity and expandability of the BTS; therefore, it is recommended that the Abis capacity for the Nokia Talk BTS is connected through the Nokia Ultrasite EDGE BTS transmission Hub.

Cross-connections

The BTS integrated transmission Hub does provide the cross-connect functionality and granularities needed for creating a transmission network supporting the specific needs of GSM/EDGE. The maximum DXC capacity of the BTS integrated transmission Hub is 56 x 2 Mbit/s. Various cross-connection granularities are suported down to a level of 8kbit/s. 16kbit/s cross connects can be used for example to cross-connect BTS signalling links or BTS O&M channels when these have a bandwidth of 16kbit/s.

Nokia UltraSite EDGE BTS can handle the following cross-connection granularities:

- 8k (1 bit in a time slot)
- 16K (2 bits in a time slot)
- 32K (4 bits in a time slot)
- 64K (all 8 bits in a time slot)
- n x 64k
- 2M

Note

All 2Mbit/s interfaces are terminated, which means that TS0 is not cross connected but regenerated. Only the 2Mbit/s cross-connections that are made from FlexBus to FlexBus inside one FXC RRI are transparent.

Note

VC-12 – virtual container inside VC-4 with a capacity of 2 Mbit/s

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Protection

The BTS integrated transmission Hub supports protection functions against transmission problems, such as cable cuts, equipment faults, or fading radio links:

- Transmission network protection using loop topology
- Hot Stand By (HSB)
- Lazy transmitter changeover

Transmission network protection using loop topology

Nokia loop protection is an efficient way to protect traffic in a transmission network, such as a GSM base station subsystem. In a live telecommunication network, it is important to secure, in addition to actual payload traffic, the network synchronisation and the centralised network management during any period of abnormal circumstances.

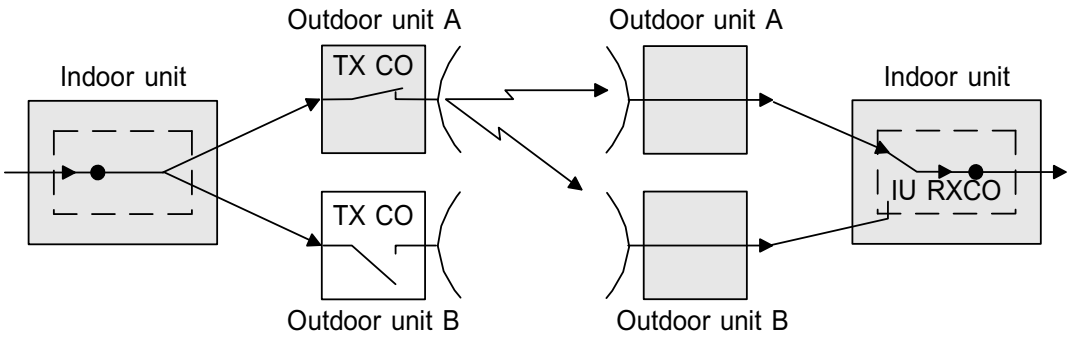
For these reasons, Nokia loop protection protects:

- Payload traffic
- Network synchronisation
- Network management connections

Hot Stand By (HSB)

HSB is a method of equipment redundancy in which two radio transmitters are kept ready (switched on), so that if one fails, the other one immediately picks up where the first one left off.

In single use, the signal is not protected against equipment or propagation faults. In the event of a fault, the connection remains broken until the equipment fault has been repaired or the cause for the propagation fault vanishes. HSB provides protection against equipment faults.



IU RXCO Indoor unit hitless changeover switch (In ASIC)

TX CO Transmitter changeover switch (transmitter mute control)

Figure 12. Nokia FlexiHoppers with FXC RRI, 1IU/2OU HSB (only one direction shown)

Lazy transmitter changeover

Lazy transmitter changeover is a protection method against transmitter faults that cannot be detected by the equipment itself, for example, a faulty antenna. The FXC RRI unit sends periodic notifications to the far-end about the radio signal quality. Lazy transmitter changeover is performed, if there are errors in the transmitted data over a specified time interval that are caused by the near-end transmitter.

2.1.5 Related software

The following Nokia software applications relate to Nokia UltraSite EDGE BTS:

- *Network Management System (NMS) and BSC software*
- *Nokia SiteWizard*
- *BTS software*
- *Nokia PSM software*

2.2 Software compatibility of UltraSite EDGE BTS

2.2.1 Compatibility between BTS hardware and BTS software

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
ACFU	468755A	.101, .203, .204, .205	Y	Y	Y	Y
ADUA	C-S71506.02		Y	Y	Y	Y
ATCA	468686A	.101, .102	Y	Y	Y	Y
BATA	C-S71505.02		Y	Y	Y	Y
BBAG	C-S70403.00		Y	Y	Y	Y
BB2A	467869A	.103, .104, .105, .106, .107[3]	Y	Y	Y	Y
BB2E	468131A	.101, .202	N	Y	Y	Y
BB2F	469643A	X02, X03, X04, .101	N	N	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
BOIA	467868A	.102, .103, .104, .105, .106	Y	Y	Y	Y
BPDN (GSM 800-1900)	C-S72994.01		Y	Y	Y	Y
BPDV (GSM 1800/1900 W/VSWR)	C-S72994.03		Y	Y	Y	Y
BPGV (GSM 800/ 900 W/ VSWR)	C-S72994.02		Y	Y	Y	Y
CCUA	C-S71508.02		Y	Y	Y	Y
CRMA	467851A	X53, X54	With restric-tions[1]	With restric-tions[1]	With restrictions[1]	With restrictions[1]
		.101, .102, .103, .204, . 205, .206, .207, .208	Y	Y	Y	Y
CRMB	468080A	X52, X53, X54, X55, .101, .102, .103	Y	Y	Y	Y
CRMC	468126A	X301, .101, .102	Y	Y	Y	Y
DU2A	467812A	.101	With restric-tions[1]	With restric-tions[1]	With restrictions[1]	With restrictions[1]

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
DVDA (GSM 1800)	468219A	.101, .102, .103, .104	Y	Y	Y	Y
DVDB (GSM 1800)	468220A	.101, .102, .103, .104	Y	Y	Y	Y
DVDC (GSM 1800)	468619A	X11, .101, .102	Y	Y	Y	Y
DVGA (GSM 900)	468216A	.101, .102	Y	Y	Y	Y
DVHA (GSM 900)	468217A	X21, .101, .102	Y	Y	Y	Y
DVJA (GSM 900)	468218A	X12, .101, .102	Y	Y	Y	Y
DVPA (GSM 1900)	468221A	.101, .102	Y	Y	Y	Y
DVTB (EDGE 800)	468133A	.101, .102	N	With restrictions[2]	With restrictions[2]	With restrictions[21]
DVTC (EDGE 800)	468877A	.101, .102	N	With restrictions[2]	With restrictions[2]	With restrictions[2]
DVTD (EDGE 800)	469644A	.101, .102	N	With restrictions[2]	With restrictions[2]	With restrictions[2]
HETA	467937A	.101	Y	Y	Y	Y
	467937X	.301	Y	Y	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
IAKA	467852A	.101, .102, .203, .204, .205, .206	Y	Y	Y	Y
IAKC	468792A	.101	Y	Y	Y	Y
LMU (GSM 800 and 1900 or 1800)	469592A	SW4.0	N	Y	Y	Y
LMU (GSM 900 and 1800 or 1900)	468765A	.101	N	Y	Y	Y
M2HA (GSM 1800/1900 2-Way)	468532A	X301, .101, .102, .103, .104, .105, .106	Y	Y	Y	Y
M2LA (GSM 800/ 900 2-Way)	468530A	.101, .102, .103, .104, .105, .106	Y	Y	Y	Y
M6HA (GSM 1800/1900 6-Way)	468533A	.101, .102, .103, .104	Y	Y	Y	Y
M6LA (GSM 800/ 900 6-Way)	468531A	.101, .102, .103, .104	Y	Y	Y	Y
MNGA (GSM 900)	C-S72991.01		Y	Y	Y	Y
MNTB (EDGE 800 R)	C-S72991.02		N	With restric-tions[2]	With restrictions[2]	With restrictions[2]

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
MNTC (EDGE 800)	C-S72991.03		N	With restrictions[2]	With restrictions[2]	With restrictions[2]
MNTB (EDGE 800 M)	C-S72991.04		N	With restrictions[2]	With restrictions[2]	With restrictions[2]
MNDA (GSM 1800)	C-S72992.01		Y	Y	Y	Y
Ultra MHA (GSM 1800 high band)	C-S72992.02		Y	Y	Y	Y
Ultra MHA (GSM 1800 low band)	C-S72992.03		Y	Y	Y	Y
MNPA (GSM 1900)	C-S72993.01		Y	Y	Y	Y
MNPB (GSM 1900)	C-S72993.02		Y	Y	Y	Y
MNPC (GSM 1900)	C-S72993.03		Y	Y	Y	Y
Ultra MHA (DB bands)	C-S72993.04		Y	Y	Y	Y
Ultra MHA (EFC bands)	C-S72993.05		Y	Y	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
Ultra MHA (BEF bands)	C-S72993.06		Y	Y	Y	Y
MNPF (GSM 1900)	C-S72993.07		Y	Y	Y	Y
MNPF (GSM 1900 w/bypass)	C-S72993.08		N	N	Y	Y
OAKA	467853A	.101, .102, .203, .304, .305, .306	Y	Y	Y	Y
OAKA Kit	C-S71503.03		Y	Y	Y	Y
OAKB	469095A	.101, .202, .203, .204	Y	Y	Y	Y
OAKC	469152A	.101	Y	Y	Y	Y
PWSA (AC)	467865A	X01, X302, X303, .101, .102, .103, .104	Y	Y	Y	Y
PWSB (DC -48 V)	467866A	.101, .102, .103, .104	Y	Y	Y	Y
PWSC (DC +24 V)	468664A	.101, .102, .104	N	Y	Y	Y
RTDA (GSM 1800)	467858A	.102	Y	Y	Y	Y
RTDB (GSM 1800)	467859A	.102	Y	Y	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
RTDC (GSM 1800)	468721A	.101	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
RTGA (GSM 900)	467857A	.102	Y	Y	Y	Y
RTHA (GSM 900)	467861A	.101, .102	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
RTJA (GSM 900)	467862A	.101, .102	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
RTPA (GSM 1900)	467860A	.102	Y	Y	Y	Y
TSDA (GSM 1800)	467828A	.101, .102, .104, .105, .105A, .106, .107, .108, .109, .110	Y	Y	Y	Y
TSDB (EDGE 1800)	468705A	X55	N	Y	Y	Y
	469089A	X44, X46, X48, X64, X65, X67, X69, .101, .102, .103, .104, .105	N	Y	Y	Y
TSDC (GSM 1800)	469065A	X41	N	N	N	Y
TSGA (GSM 900)	467800A	.102, .104, .105, .106, .107, .108, .109	Y	Y	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
TSGB (EDGE 900)	468704A	.102, .103, .104, .105	N	Y	Y	Y
TSPA (GSM 1900)	467829A	.101, .103, .104, .105, .106	Y	Y	Y	Y
TSPB (EDGE 1900)	468706A	X51, X57, X64, X65, X71, X73, X2C, X4B, .101, .102, .103, .104, .105, .106	N	Y	Y	Y
TSPC (GSM 1900)	469066A	X32	N	N	N	Y
TSTB (EDGE 800)	469087A	X56, X59, X63, X64, X81, X3G, .101, .102, .103, .104, .105, .106	N	With restrictions[2]	With restrictions[2]	With restrictions[2]
TSTC (GSM 800)	469063A	X34	N	N	N	Y
UABA	469107A	.101	Y	Y	Y	Y
VXEA (FC E1/T1)	467201A	.101, .102	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
		.103	Y	Y	Y	Y
VXRB (FXC RRI)	467610A	X04[4]	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
		.101, .102, .103, .104[4]	Y	Y	Y	Y

Table 2. Compatibility between HW and SW in Nokia UltraSite EDGE BTS (cont.)

Unit	Unit code	Unit version	SW Release PU1.0-x	SW Release CX3.0-x	SW Release CX3.3	SW Release CX3.3-1
VXTA (FXC E1)	467612A	X06[4]	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
		X07, .101, .102, .103, .104[4]	Y	Y	Y	Y
VXTB (FXC E1/ T1)	467611A	X06[4]	With restrictions[1]	With restrictions[1]	With restrictions[1]	With restrictions[1]
		X07, .101, .102, .103, .104[4]	Y	Y	Y	Y
WCDA (GSM 1800)	467834A	X31, .101, .102, .103	Y	Y	Y	Y
WCGA (GSM 800/ 900)	467833A	X31, .101, .102	Y	Y	Y	Y
WCPA (GSM 1900)	467835A	.101, .102	Y	Y	Y	

Y = Compatible

N = Not compatible

[1]There are no compatibility problems detected. However, the compatibility is not properly tested.

[2]EDGE 800 requires BSC SW version S10.

[3]PU1.0-2 SW or newer required for .107.

[4]For more detailed information about transmission unit hardware and software compatibility, refer to *ITN hardware and software compatibility* and *ITN compatibility in BSS transmission networks*.

2.2.2 Compatibility between BTS, SiteWizard, BSC, NMS/2000/NetAct and LMU software

Table 3. Compatibility between BTS, SiteWizard and BSC SW versions

BTS SW	Site Wizard	BSC SW			
		S9	S10	S10.5	S10.5ED
PU1.0	2.0[1]	Y	Y	Y	N
PU1.0-1	2.0[1] update	Y	Y	Y	N
PU1.0-2	2.1	Y	Y	Y	N
PU1.0-3	2.1	Y	Y	Y	N
PU1.0-4	2.1	Y	Y	Y	N
PU1E (-1, -2)	3.0	Y	Y[2]	Y	N
CX3L (-1, -2)	3.0	Y	Y	Y	N
CX3.0 (-1, -2, -2A)	3.0	Y[2]	Y[3]	Y	N
CX3.0-3	3.0	Y[2]	Y[3]	Y	Y
CX3.3	3.0[4]	N	N	Y	Y
CX3.3-1	3.0	Y	Y	Y	Y

Y = Compatible

N = Not compatible

[1]SiteWizard 2.0 is also compatible with PU1.0-2.

[2]BSS10 level features cannot be used.

[3]BSC SW S10 does not support ‘Support of PCCCH/PBCCH’ and ‘GSM-WCDMA Interworking.’

[4]SiteWizard 3.0 with BTS Manager 3.3 and BTS HW Configurator 3.3.

Table 4. Compatibility between BTS, SiteWizard, NMS/2000/NetAct and LMU SW versions

BTS SW	**Site Wizard**	**NMS 2000/NetAct SW**				**LMU SW**
		T12	**OSS 3.1**	**OSS 3.1 ED1**	**OSS 3.1 ED2**	**LMU1**
PU1.0	2.0[1]	Y	Y	N	N	N
PU1.0-1	2.0[1] update	Y	Y	N	N	N
PU1.0-2	2.1	Y	Y	N	N	N
PU1.0-3	2.1	Y	Y	N	N	N
PU1.0-4	2.1	Y	Y	N	N	N
PU1E (-1, -2)	3.0	Y	Y	N	N	N
CX3L (-1, -2)	3.0	Y	Y	N	N	Y
CX3.0 (-1, -2, -2A)	3.0	Y	Y	Y	N	Y
CX3.0-3	3.0	Y	Y	Y	Y	Y
CX3.3	3.0[2]	Y	N	Y	Y	Y
CX3.3-1	3.0	Y	Y	Y	Y	Y

Y = Compatible

N = Not compatible

[1]SiteWizard 2.0 is also compatible with PU1.0-2.

[2]SiteWizard 3.0 with BTS Manager 3.3 and BTS HW Configurator 3.3.

2.2.3 Compatibility between new features of UltraSite EDGE BTS software release CX3.3 and other network elements

Table 5. Compatibility between new features of CX3.3 and other network elements

New BSS10.5 features that are standard in BTS	BSC SW	NMS SW
Enhanced General Packet Radio Service (MCS 1-9)	S10.5 ED	OSS3.1
Dynamic Abis allocation	S10.5 ED	OSS3.1
Incremental Redundancy (IR)	S10.5 ED	OSS3.1
Link Adaptation (LA)	S10.5 ED	OSS3.1
Remote BTS Manager	S10.5 S10.5 ED	T12 OSS3.1 (ED1, ED2)

2.3 UltraSite EDGE BTS assembly tree

The UltraSite EDGE BTS is a subsystem in the UltraSite System concept, which includes the following:

- Base Station Terminal (BTS)
- Site Support System
- Radio Relay System
- Masthead Amplifier (MHA) Kit
- Antenna System

UltraSite EDGE BTS performs the radio functions of the Base Station Subsystem (BSS). The BTS receives and sends signals through the following interfaces:

- Air interface – frequencies that connect the BTS to the Mobile Station (MS)
- Abis interface – cable or radio link that connects the BTS to the Base Station Controller (BSC), which is the central element of the BSS

With the BSC, Nokia NetAct manages the entire GSM/EDGE network, including UltraSite EDGE BTS.

UltraSite EDGE BTS components

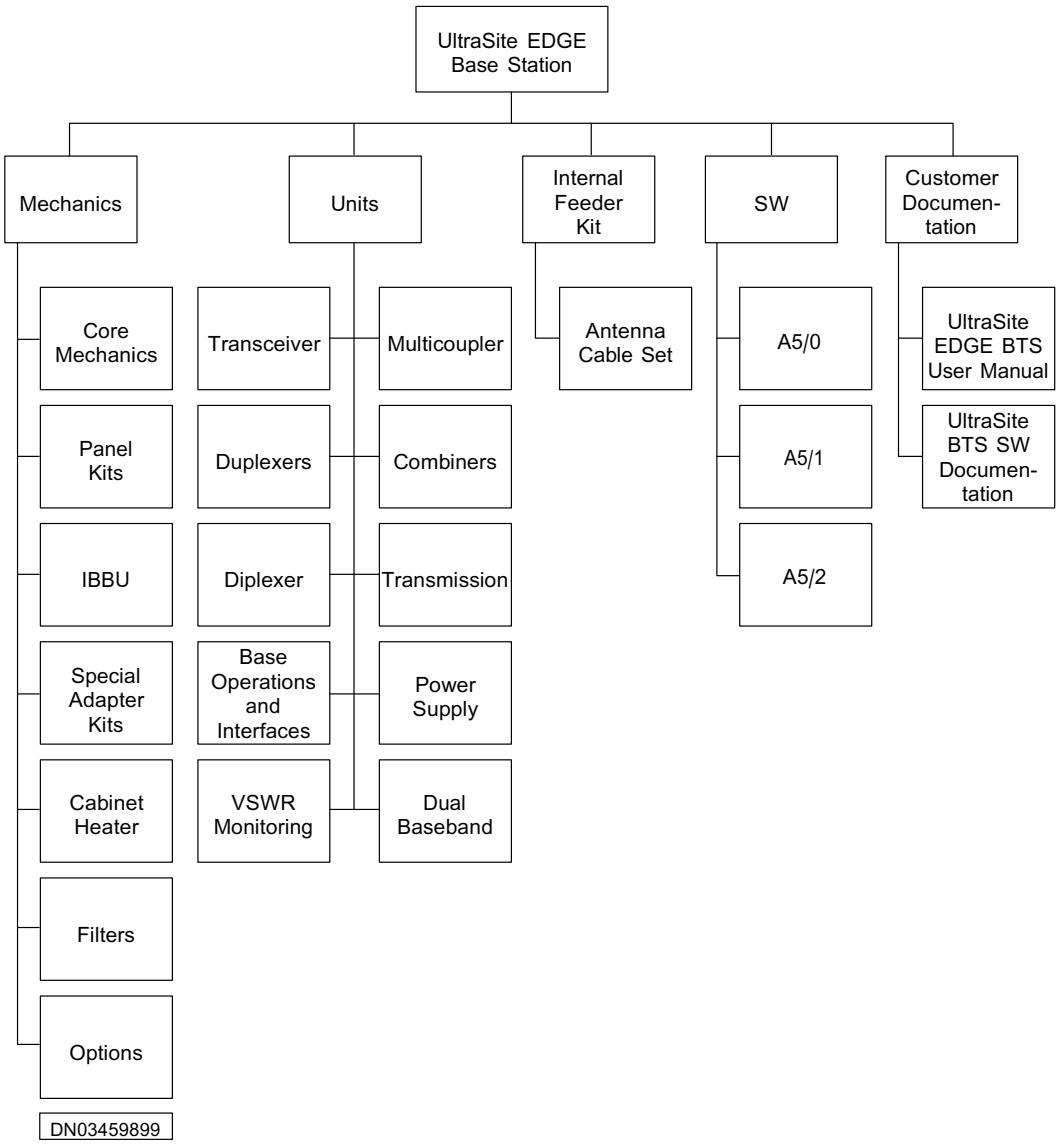


Figure 13. UltraSite EDGE BTS product tree

2.3.1 Mechanics

Nokia UltraSite EDGE BTS is available in the following cabinets for outdoor and indoor applications:

- UltraSite EDGE BTS Outdoor
- UltraSite EDGE BTS Indoor
- UltraSite EDGE BTS Midi Indoor (used when vertical space is limited)
- UltraSite EDGE BTS Midi Outdoor (used when vertical space is limited)

Table 6. Mechanics

Category	Property
Mechanics	Core Mechanics
Mechanics	Panel Kits
Mechanics	IBBU
Mechanics	Special Adapter Kits
Mechanics	Cabinet Heater
Mechanics	Filters
Mechanics	Options

2.3.1.1 Core Mechanics

Table 7. Core Mechanics

ID	Category	Property
020423A	Mechanics	Core Mechanics 12 TRX CRMA
020424A	Mechanics	Core Mechanics 6 TRX + IBB
020425A	Mechanics	Core Mechanics 6 TRX + WDCMA
468126A	Mechanics	Core Mechanics 6 TRX CRMC

Table 8. Core Mechanics 12 TRX CRMA

ID	Category	Property
467851A	Mechanics	Core Mechanics 6 TRX CRMA
469170A	Mechanics	TRSA Mechanics 6 TRX

Table 9. TRSA Mechanics 6 TRX

ID	Category	Property
073671A	Mechanics	TRSA Mechanics Module
063912A	Mechanics	RFU Backplane Module
066971A	Mechanics	Unit Cooling Fan Module

Table 10. Core Mechanics 6 TRX CRMA

ID	Category	Property
065895A	Mechanics	Core Mechanics Module
063897A	Mechanics	Common Backplane Module
064276A	Mechanics	Interface Module
065551A	Mechanics	BIAS-T Interface Module
065681A	Mechanics	DC-Filter Module
066971A	Mechanics	Unit Cooling Fan Module
067035A	Mechanics	Transmission Mechanics Module

Table 10. Core Mechanics 6 TRX CRMA (cont.)

ID	Category	Property
063912A	Mechanics	RFU Backplane Module
067014A	Mechanics	Transmission Backplane Module
065920A	Mechanics	Cable Kit Module
066123A	Mechanics	Voltage Distribution Bar
078917A	Mechanics	Packing Material

Table 11. Core Mechanics 6 TRX + IBB

ID	Category	Property
467851A	Mechanics	Core Mechanics 6 TRX CRMA
CS71550.04	Mechanics	IBBU Mechanics

Table 12. Core Mechanics 6 TRX CRMA

ID	Category	Property
065895A	Mechanics	Core Mechanics Module
063897A	Mechanics	Common Backplane Module
064276A	Mechanics	Interface Module
065551A	Mechanics	BIAS-T Interface Module
065681A	Mechanics	DC-Filter Module
066971A	Mechanics	Unit Cooling Fan Module

Table 12. Core Mechanics 6 TRX CRMA (cont.)

ID	Category	Property
067035A	Mechanics	Transmission Mechanics Module
063912A	Mechanics	RFU Backplane Module
067014A	Mechanics	Transmission Backplane Module
065920A	Mechanics	Cable Kit Module
066123A	Mechanics	Voltage Distribution Bus Bar Module
078917A	Mechanics	Packing Material

Table 13. IBBU Mechanics

ID	Category	Property
065918A	Mechanics	IBBU Mechanics Module
CS71514.01	Mechanics	BATA Backplane
CS71506.02	Mechanics	ADUA
CS71508.02	Mechanics	CCUA
CS71519.03	Mechanics	Cable Kit
CS71522.01	Mechanics	Cable Signal Q1
468755A	Mechanics	AC-Filter

Table 14. Core Mechanics 6 TRX + WCDMA

ID	Category	Property
467851A	Mechanics	Core Mechanics 6 TRX CRMA

Table 14. Core Mechanics 6 TRX + WCDMA (cont.)

ID	Category	Property
	Mechanics	WCDMA

Table 15. Core Mechanics 6 TRX CRMA

ID	Category	Property
065895A	Mechanics	Core Mechanics Module
063897A	Mechanics	Common Backplane Module
064276A	Mechanics	Interface Module
065551A	Mechanics	BIAS-T- Interface Module
065681A	Mechanics	DC-Filter Module
066971A	Mechanics	Unit Cooling Fan Module
067035A	Mechanics	Transmission Mechanics Module
063912A	Mechanics	RFU Backplane Module
067014A	Mechanics	Transmission Backplane Module
065920A	Mechanics	Cable Kit Module
066123A	Mechanics	Voltage Distribution Bus Bar Module
078917A	Mechanics	Packing Material

Table 16. Core Mechanics 6 TRX CRMC

ID	Category	Property
066123A	Mechanics	Voltage Distribution bar
063897A	Mechanics	Common Backplane Module
064276A	Mechanics	Interface Module
066090A	Mechanics	Mechanics Module, CRMC
074969A	Mechanics	Packing Material CRMC
067014A	Mechanics	Transmission Backplane Module
066971A	Mechanics	Cooling Fan Module
063912A	Mechanics	RFU Backplane Module
065681A	Mechanics	DC Filter Module
065920A	Mechanics	Cable Kit CRMC
067035A	Mechanics	Transmission Mechanics Module
065551A	Mechanics	BIAS-T Interface Module

2.3.1.2 Panel Kits

Table 17. Panel Kits

ID	Category	Property
467852A	Mechanics	Indoor Application Kit IAKA

Table 17. Panel Kits (cont.)

ID	Category	Property
467853A	Mechanics	Outdoor Application Kit OAKA
469152A	Mechanics	MIDI Outdoor Kit OAKC
468792A	Mechanics	MIDI Indoor Application Kit IAKC

Table 18. Indoor Application Kit IAKA

ID	Category	Property
065926A	Mechanics	IAKA Mechanics Module
077830A	Mechanics	IAKA Packing Material Module

Table 19. Outdoor Application Kit OAKA

ID	Category	Property
065922A	Mechanics	Mechanics Module
065924A	Mechanics	OAK Electronics Module
077821A	Mechanics	Packing Material Module
073216A	Mechanics	BB2 Dummy Module
073217A	Mechanics	DTRU Dummy Module

Table 20. MIDI Outdoor Kit OAKC

ID	Category	Property
065924A	Mechanics	OAK Electronic Module
073216A	Mechanics	BB2 Dummy Module
073217A	Mechanics	DTRU Dummy Module
073230A	Mechanics	OAKC Mechanic Module
074913A	Mechanics	Packing Material

Table 21. MIDI Indoor Application Kit IAKC

ID	Category	Property
073228A	Mechanics	IAKC Mechanics Module
073229A	Mechanics	IAKC Packing Material Module

2.3.1.3 IBBU

Table 22. IBBU

ID	Category	Property
CS71505.02	Mechanics	Rectifier Unit BATA
CS71506.02	Mechanics	Connection Unit ADUA
CS70403.02	Mechanics	Battery Backup Unit BBAG
467876A	Mechanics	Cabinet Control Unit CCUA

2.3.1.4 Special Adapter Kits

Table 23. Special Adapter Kits

ID	Category	Property
469107A	Mechanics	Abis Cable Set UABA 11

Table 24. Co-Site HW

ID	Category	Property
468790A	Mechanics	ULTRA/TALK Co-Site HW
468789A	Mechanics	ULTRA/ULTRA Co-Site HW

Table 25. Abis Cable Set UABA 11

ID	Category	Property
072185A	Mechanics	ABIS Cable Kit

Table 26. ULTRA/TALK Co-Site HW

ID	Category	Property
468790A	Mechanics	Talk/Ultra Co-Site Cable Set UTAA 11
469046A	Mechanics	Talk/Ultra Splitter Cable Set SPKA 11
467598A	Mechanics	Talk/Ultra Splitter Cable Set RSKA

Table 26. ULTRA/TALK Co-Site HW (cont.)

ID	Category	Property
469109A	Mechanics	Talk/Ultra Synch Cable Set UTHA 11
469110A	Mechanics	Talk/Ultra Synch Cable Set UTIA 11
469049A	Mechanics	Talk/Ultra Synch Cable Set UTJA 11
469095A	Mechanics	Outdoor Adapter Kit Outdoor Application Kit OAKB
469372A	Mechanics	Outdoor Application Bridge Kit OBKB
467525A	Mechanics	Jumper Cable Cover MFCA
467935A	Mechanics	Jumper Cable Cover MFCB
468434A	Mechanics	BCFB
469645A	Mechanics	Cable and Plate Kit BBPA
469642A	Mechanics	Extension Cable Kit SXCA

Table 27. ULTRA/ULTRA Co-Site HW

ID	Category	Property
468789A	Mechanics	Ultra/Ultra Co-Site Cable Set UUAA 11
469111A	Mechanics	Ulta/Ultra Synch Cable Set UUHA 11

Table 27. ULTRA/ULTRA Co-Site HW (cont.)

ID	Category	Property
469112A	Mechanics	Ultra/Ultra Synch Cable Set UUIA 11
469050A	Mechanics	Ultra/Ultra Synch Cable Set UUJA 11

Table 28. Ultra/Ultra Co-Site Cable Set UUAA 11

ID	Category	Property
072186A	Mechanics	RF Diversity Cable Kit
076398A	Mechanics	Packing Material

Table 29. Ultra/Ultra Synch Cable Set UUHA 11

ID	Category	Property
072190A	Mechanics	Cable Kit
076309A	Mechanics	Packing Material

Table 30. Ultra/Ultra Synch Cable Set UUIA 11

ID	Category	Property
072191A	Mechanics	Cable Kit
076310A	Mechanics	Packing Material

Table 31. Ultra/Ultra Synch Cable Set UUJA 11

ID	Category	Property
072192A	Mechanics	Cable Kit
076310A	Mechanics	Packing Material

2.3.1.5 Cabinet Heater

Table 32. Cabinet Heater

ID	Category	Property
467937A	Mechanics	Cabinet Heater HETA

2.3.1.6 Filters

Table 33. Filters

ID	Category	Property
468755A	Mechanics	AC Filter ACFU[a]
469166A	Mechanics	Filter Unit 24/27 VDC DCFB
469442A	Mechanics	Installation Kit (used w/DCFB) FIKA

a. The AC Filter is an optional unit to be used with the AC Power Supply only.

Table 34. Filter Unit 24/27 VDC DCFB

ID	Category	Property
075429A	Mechanics	Filter Module
076664A	Mechanics	Packing Material

Table 35. Installation Kit (used w/DCFB) FIKA

ID	Category	Property
075893A	Mechanics	Filter Module

2.3.1.7 Options

Table 36. Options

ID	Category	Property
468094A	Mechanics	Bridge Kit OBKA
468091A	Mechanics	Entry Kit OEKA
468092A	Mechanics	Air Filter Kit OFKA
468095A	Mechanics	Indoor Lock kit ILKA

Table 37. Bridge Kit OBKA

ID	Category	Property
065935A	Mechanics	Bridge Kit Mechanics
065931A	Mechanics	Bridge Kit Packing Material

Table 38. Entry Kit OEKA

ID	Category	Property
065923A	Mechanics	Entry Mechanics Module
065928A	Mechanics	Packing Material Module

Table 39. Air Filter Kit OFKA

ID	Category	Property
065933A	Mechanics	Filter Mechanics Module

Table 40. Indoor Lock Kit ILKA

ID	Category	Property
065936A	Mechanics	ILKA Mechanics Module
065932A	Mechanics	Packing Material Module

2.3.2 Units

Table 41. Units

Category	Property
Units	Transceiver
Units	Multicoupler
Units	Duplexers
Units	Diplexer
Units	Combiners
Units	Dual Baseband
Units	Transmission
Units	Base Operations and Interfaces
Units	Power Supply
Units	VSWR Monitor

2.3.2.1 Transceiver

Table 42. Transceiver

ID	Category	Property
469087A	Units	EDGE 800 TSTB
468704A	Units	EDGE 900 TSGB
469089A	Units	EDGE 1800 TSDB
468706A	Units	EDGE 1900 TSPB
467800A	Units	GSM 900 TSGA
467828A	Units	GSM 1800 TSDA
467829A	Units	GSM 1900 TSPA

Table 43. EDGE 800 TSTB

ID	Category	Property
066102A	Units	TRX Board Module
069451A	Units	Power Amplifier Module
066103A	Units	FHS Module
073981A	Units	Power Supply Module
066929A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit TS_A
075986A	Units	Label Module

Table 44. EDGE 900 TSGB

ID	Category	Property
066106A	Units	TRX Board Module
069454A	Units	Power Amplifier Module
070967A	Units	FHS Module
073981A	Units	Power Supply Module
066929A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit TS_A

Table 45. EDGE 1800 TSDB

ID	Category	Property
066110A	Units	TRX Board Module
069456A	Units	Power Amplifier Module
071077A	Units	FHS Module
073981A	Units	Power Supply Module
066929A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit TS_A

Table 46. EDGE 1900 TSPB

ID	Category	Property
066114A	Units	TRX Board Module
069458A	Units	Power Amplifier Module
066115A	Units	FHS Module
073981A	Units	Power Supply Module
066929A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit TS_A
075987A	Units	Label Module

Table 47. GSM 900 TSGA

ID	Category	Property
071789A	Units	TRX Board Module
071791A	Units	Power Amplifier Module
064313A	Units	FHS Module
072692A	Units	Power Supply Module
075490A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit RT_A

Table 48. GSM 1800 TSDA

ID	Category	Property
071790A	Units	TRX Board Module
074926A	Units	Power Amplifier Module
064317A	Units	FHS Module
072692A	Units	Power Supply Module
075490A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit RT_A

Table 49. GSM 1900 TSPA

ID	Category	Property
064309A	Units	TRX Board Module
074927A	Units	Power Amplifier Module
064315A	Units	FHS Module
064319A	Units	Power Supply Module
075490A	Units	Mechanics Module
068163A	Units	Packing Material
066641A	Units	Cable Kit RT_A
817595	Units	FCC label

2.3.2.2 Multicoupler

Table 50. Multicoupler

ID	Category	Property
468530A	Units	GSM800/900 2-Way Multicoupler M2LA
468532A	Units	GSM1800/1900 2-Way Multicoupler M2HA
468531A	Units	GSM800/900 6-Way Multicoupler M6LA
468533A	Units	GSM1800/1900 6-Way Multicoupler M6HA

Table 51. GSM800/900 2-Way Multicoupler M2LA

ID	Category	Property
068068A	Units	Receiver Multicoupler Module M2LA
068062A	Units	Mechanics Module M2LA/M2HA
068186A	Units	Packing Material
066644A	Units	Cable M2_A

Table 52. GSM1800/1900 2-Way Multicoupler M2HA

ID	Category	Property
068069A	Units	Receiver Multicoupler Module M2HA

Table 52. GSM1800/1900 2-Way Multicoupler M2HA (cont.)

ID	Category	Property
068062A	Units	Mechanics Module M2LA/M2HA
068186A	Units	Packing Material
066644A	Units	Cable M2_A

Table 53. GSM800/900 6-Way Multicoupler M6LA

ID	Category	Property
068070A	Units	Receiver Multicoupler Module M6LA
068064A	Units	Mechanics Module M6LA/M6HA
068187A	Units	Packing Material
066643A	Units	Cable M6_A

Table 54. GSM1800/1900 6-Way Multicoupler M6HA

ID	Category	Property
068071A	Units	Receiver Multicoupler Module M6HA
068064A	Units	Mechanics Module M6LA/M6HA
068187A	Units	Packing Material
066643A	Units	Cable M6_A

2.3.2.3 Duplexer

Note

All Duplex Filters can be used for both GSM and EDGE products.

Table 55. Duplexer

ID	Category	Property
468133A	Units	EDGE800 DVTB Full Band
468877A	Units	EDGE800 DVTC Co-Site Full Band
469644A	Units	EDGE800 DVTD Co-Site Full Band
468216A	Units	GSM900 DVGA Full Band
468217A	Units	GSM900 DVHA H Band
468218A	Units	GSM900 DVJA J Band
468220A	Units	GSM1800 DVDB B Band
468219A	Units	GSM1800 DVDA A Band
468619A	Units	GSM1800 DVDC Full Band
468221A	Units	GSM1900 DVPA Full Band

Table 56. EDGE800 DVTB Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 57. EDGE800 DVTC Co-Site Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 58. EDGE800 DVTD Co-Site Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 59. GSM900 DVGA Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 60. GSM900 DVHA H Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 61. GSM900 DVJA J Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 62. GSM1800 DVDB B Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 63. GSM1800 DVDA A Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 64. GSM1800 DVDC Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

Table 65. GSM1900 DVPA Full Band

ID	Category	Property
066646A	Units	Cable Kit DVxx/ RTxx
068185A	Units	Packing Material

2.3.2.4 Diplexer

Table 66. Diplexer

ID	Category	Property
467812A	Units	Dual Band Diplex DU2A
073925A	Units	Packing Material

2.3.2.5 Combiner

Table 67. Combiner

ID	Category	Property
	Units	Remote Tuned Combiners
	Units	Wide Band Combiner Unit

Table 68. Remote Tuned Combiners

ID	Category	Property
467861A	Units	GSM900 RTHA H-Band
467862A	Units	GSM900 RTJA J-Band
467857A	Units	GSM900 RTGA Full Band
467859A	Units	GSM1800 RTDB B-Band
467858A	Units	GSM1800 RTDA A-Band
468721A	Units	GSM1800 RTDC Full Band
467860A	Units	GSM1900 RTPA Full Band

Table 69. GSM900 RTHA H-Band

ID	Category	Property
064203A	Units	Selector Module
064239A	Units	Combiner Module
064269A	Units	Controller Module
064654A	Units	Filter Module
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 70. GSM900 RTJA J-Band

ID	Category	Property
064203A	Units	Selector Module
064239A	Units	Combiner Module
064269A	Units	Controller Module
064655A	Units	Filter Module
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 71. GSM900 RTGA Full Band

ID	Category	Property
064203A	Units	Selector Module
064239A	Units	Combiner Module
064269A	Units	Controller Module
064653A	Units	Filter
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 72. GSM1800 RTDB B-Band

ID	Category	Property
064204A	Units	Selector

Table 72. GSM1800 RTDB B-Band (cont.)

ID	Category	Property
066450A	Units	Combiner
064269A	Units	Controller Module
064658A	Units	Filter Module
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 73. GSM1800 RTDA A-Band

ID	Category	Property
064204A	Units	Selector
064240A	Units	Combiner
064269A	Units	Controller
064657A	Units	Filter
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 74. GSM1800 RTDC Full Band

ID	Category	Property
064204A	Units	Selector
069693A	Units	Combiner
064269A	Units	Controller

Table 74. GSM1800 RTDC Full Band (cont.)

ID	Category	Property
069692A	Units	Filter
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 75. GSM1900 RTPA Full Band

ID	Category	Property
064205A	Units	Selector Module
064241A	Units	Combiner Module
064269A	Units	Controller Module
064659A	Units	Filter Module
066057A	Units	RTC Mechanics
066097A	Units	Packing Material
066646A	Units	Cable Kit DVxx/ RTxx

Table 76. WideBand Combiner Unit

ID	Category	Property
467835A	Units	GSM1900 WCPA
467833A	Units	GSM800/900 WCGA
467834A	Units	GSM1800 WCDA

Table 77. GSM1900 WCPA

ID	Category	Property
066647A	Units	Cable Kit WC_A
073759A	Units	Packing Material

Table 78. GSM800/900 WCGA

ID	Category	Property
066647A	Units	Cable Kit WC_A
073759A	Units	Packing Material

Table 79. GSM1800 WCDA

ID	Category	Property
066647A	Units	Cable Kit WC_A
073759A	Units	Packing Material

2.3.2.6 Dual Baseband

Table 80. Dual Baseband

ID	Category	Property
467869A	Units	Dual Baseband Unit BB2A
468131A	Units	Dual Baseband Unit BB2E
469643A	Units	Dual Baseband Unit BB2F

Table 81. Dual Baseband Unit BB2A

ID	Category	Property
064162A	Units	Dual Baseband Module
066160A	Units	Mechanics Module
068164A	Units	Packing Material

Table 82. Dual Baseband Unit BB2E

ID	Category	Property
067794A	Units	Dual Baseband Module
066160A	Units	Mechanics Module
068164A	Units	Packing Material

Table 83. Dual Baseband Unit BB2F

ID	Category	Property
079905A	Units	Dual Baseband Module
066160A	Units	Mechanics Module
068164A	Units	Packing Material

2.3.2.7 Transmission

Table 84. Transmission

ID	Category	Property
467201A T336110.51	Units	DTRU FC E1/T1 VXEA

Table 84. Transmission (cont.)

ID	Category	Property
467611A T36130.51	Units	DTRU FXC E1/T1 VXTB
467612A T36120.51	Units	DTRU FXC E1 VXTA
467610A T55830.51	Units	DTRU FXC RRI VXRB

2.3.2.8 Base Operations and Interface

Table 85. Base Operations and Interface

ID	Category	Property
467868A	Units	BOIA Unit

Table 86. BOIA Unit

ID	Category	Property
065016A	Units	BOI Module
066159A	Units	BOI Mechanics Module
068164A	Units	Packing Material

2.3.2.9 Power Supply

Table 87. Power Supply

ID	Category	Property
467865A	Units	PWSA AC
467866A	Units	PWSB DC

Table 87. Power Supply (cont.)

ID	Category	Property
468664A	Units	PWSC 24/27 VDC
469441A	Units	PWKA Installation Kit (used w/ PWSC)

Table 88. PWSA AC

ID	Category	Property
073565A	Units	AC Power Supply
068165A	Units	Packing Material

Table 89. PWSB DC

ID	Category	Property
071566A	Units	DC Power Supply
069090A	Units	Packing Material

Table 90. PWSC 24/27 VDC

ID	Category	Property
075830A	Units	DC Power Supply
068165A	Units	Packing Material

Table 91. PWKA Installation Kit

ID	Category	Property
075784A	Units	Installation Module

2.3.2.10 VSWR Monitor

Table 92. VSWR Monitor

ID	Category	Property
468163A	Units	GSM 850/900 W/ VSWR BPGV
468164A	Units	GSM 1800/1900 W/VSWR BPDV

Table 93. GSM 850/900 W/VSWR BPGV

ID	Category	Property
069314A	Units	Bias-T Cable Kit

Table 94. GSM 1800/1900 W/VSWR BPDV

ID	Category	Property
069314A	Units	Bias-T Cable Kit

2.3.3 Internal Feeder Kit

Table 95. Internal Feeder Kit

ID	Category	Property
468686A	Internal Feeder Kit	Antenna Cable Set ATCA

Table 96. Antenna Cable Set ATCA

ID	Category	Property
069313A	Internal Feeder Kit	Cable Kit Module

Table 96. Antenna Cable Set ATCA (cont.)

ID	Category	Property
070413A	Internal Feeder Kit	Packing Material

2.3.4 Software

Table 97. Software

ID	Category	Property
469057A	Software	A5/0 ciphering algorithm
469365A	Software	A5/1 ciphering algorithm (Americas only)
	Software	A5/2 ciphering algorithm (Americas only)

2.3.5 Customer Documentation

Table 98. Customer Documentation

ID	Category	Property
468514A	Customer Documentation	UltraSite EDGE BTS Product Documentation
	Customer Documentation	Ultrasite BTS SW Documentation

2.4 Physical properties of UltraSite EDGE BTS

2.4.1 Dimensions and weight

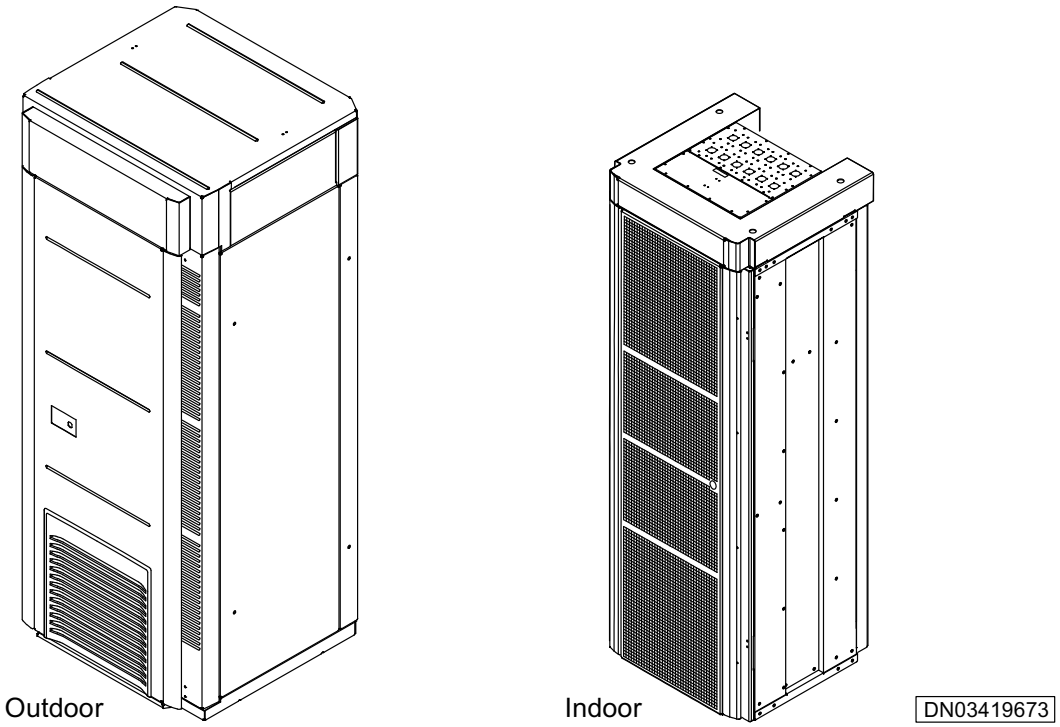


Figure 14. Nokia UltraSite EDGE BTS Indoor and Outdoor cabinets

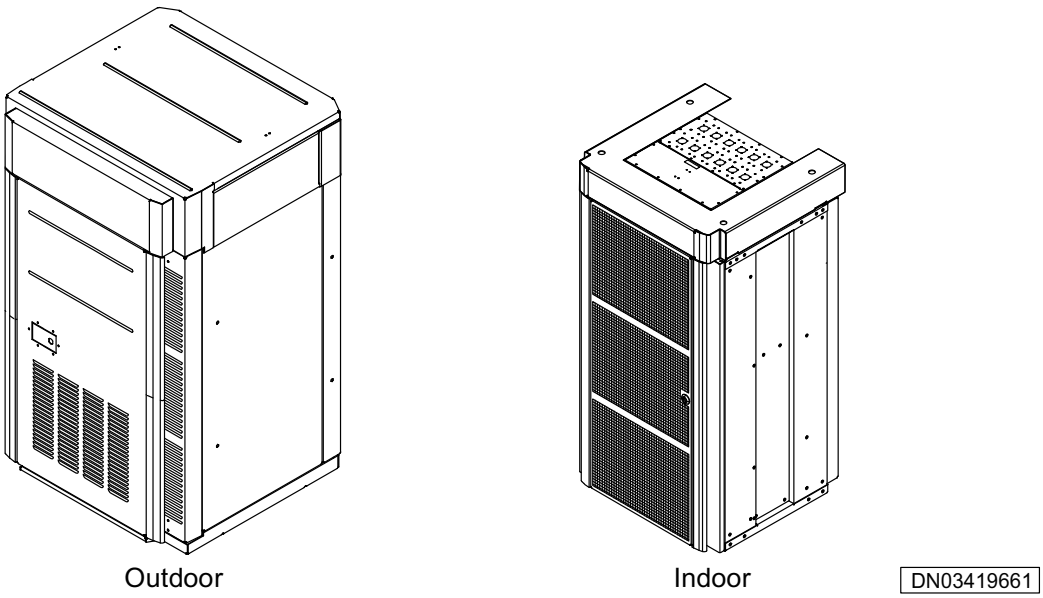


Figure 15. Nokia UltraSite EDGE BTS Midi Indoor and Outdoor cabinets

Table 99. Dimensions and weights

Parameter	Outdoor	Indoor	Midi Outdoor	Midi Indoor
Height	1940 mm 76.4 in.	1800 mm 70.9 in.	1320 mm 52.0 in.	1180 mm 46.5 in.
Depth	750 mm 29.5 in.	620 mm[1] 24.4 in.	750 mm 29.5 in.	620 mm[1] 24.4 in.
Width	770 mm 30.0 in.	600 mm 23.6 in.	770 mm 30.0 in.	600 mm 23.6 in.
Maximum cabinet weight (with units)	350 kg 770 lb	270 kg 594 lb	233 kg 513.7 lb	170 kg 374.8 lb
Maximum cabinet weight (without units)	150 kg 330.7 lb	84 kg 185.2 lb	125.1 kg 275.7 lb	62.4 kg 137.5 lb

[1] Includes 52 mm behind the cabinet for the spacer part, which is required for cabinet cooling.

2.5 Electrical properties of UltraSite EDGE BTS

For information about mains power specifications and operating ranges and power consumption, refer to the appropriate power requirements:

- *Power requirements for AC UltraSite EDGE BTS*
- *Power requirements for +24 VDC UltraSite EDGE BTS*
- *Power requirements for -48 VDC UltraSite EDGE BTS*

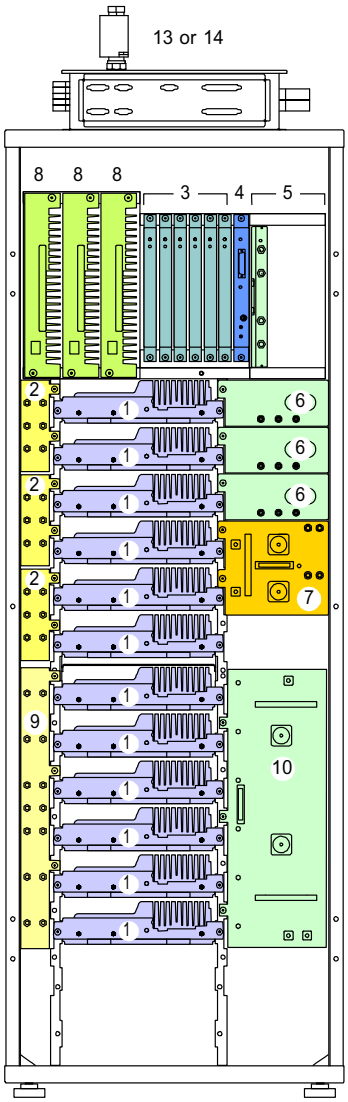
2.6 Acoustic sound parameters of UltraSite EDGE BTS

The following table provides the maximum acoustic noise emissions at 43° C (109.4° F):

Indoor Cabinet	Outdoor Cabinet
73 dB (A) /7.3 Bells (A)	65 dB (A)/6.5 Bells (A)

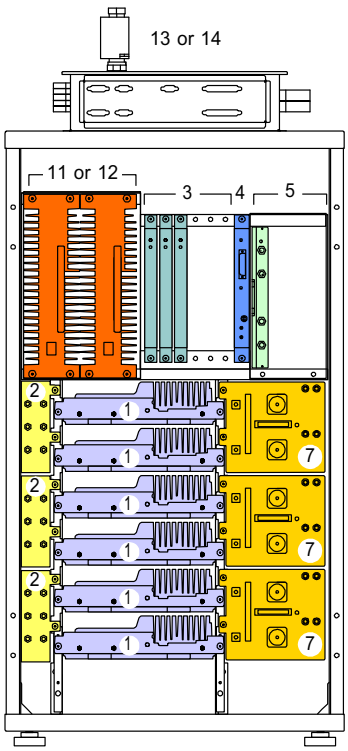
The acoustic sound power level is higher when the ambient temperature increases rapidly or when ambient temperature is higher. For example, the maximum acoustic noise emissions for the Outdoor cabinet at 50° C (122° F) is 68 dB (A) / 6.8 Bells (A).

2.7 Overview of UltraSite EDGE BTS unit technical descriptions



DN03420293

UltraSite cabinet core



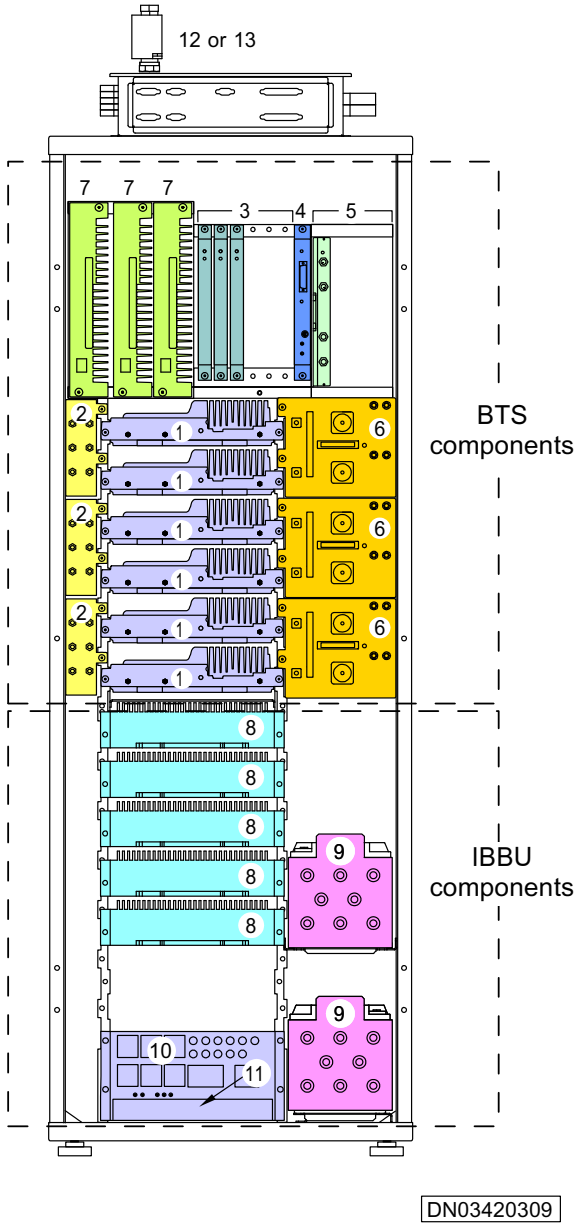
UltraSite MIDI cabinet core

1	Transceiver unit (TSxx)
2	2-way Receiver Multicoupler unit (M2xA)
3	Transceiver Baseband unit (BB2x)

4	Base Operations and Interfaces unit (BOIx)
5	Transmission unit (VXxx)
6	Wideband Combiner unit (WCxA)
7	Dual Variable Gain Duplex Filter unit (DVxx)
8	DC/DC Power Supply unit (PWSB)
9	6-way Receiver Multicoupler unit (M6xA)
10	Remote Tune Combiner unit (RTxx)
11	AC/DC Power Supply unit (PWSA)
12	DC/DC Power supply unit (PWSC)
13	Bias Tee unit (BPxx)[1]
14	Dual Band Diplex Filter unit (DU2A)[1]

[1]Items 13 and 14 are not plug-in units.

Figure 16. UltraSite EDGE BTS units (without IBBU)



1	Transceiver unit (TSxx)
2	2-way Receiver Multicoupler unit (M2xA)
3	Transceiver Baseband unit (BB2x)

4	Base Operations and Interfaces unit (BOIx)
5	Transmission unit (VXxx)
6	Wideband Combiner unit (WCxA)
7	Dual Variable Gain Duplex Filter unit (DVxx)
8	Rectifier unit (BATx)
9	Battery unit for IBBU (BBAx)
10	AC/DC Distribution unit for IBBU (ADUx)
11	Cabinet Control unit (CCUx) 9
12	Bias Tee unit (BPxx)[1]
13	Dual Band Diplex Filter unit (DU2A)[1]

[1]Items 12 and 13 are not plug-in units.

Figure 17. UltraSite EDGE BTS units (with IBBU)

The table below shows the required (R) and optional (O) units for each UltraSite EDGE BTS cabinet. N/A indicates that the unit is not applicable for that cabinet.

Table 100. BTS units

Unit	**Outdoor**	**Indoor**	**Midi Outdoor**	**Midi Indoor**
Cabinet core mechanics (CRMx)				
CRMA	R (1)	R (1)	N/A	N/A
CRMB	R (1)	N/A	N/A	N/A
CRMC	N/A	N/A	R (1)	R (1)
Base Operations and Interfaces (BOIx)				
BOIA (GSM/ EDGE)	R (1)	R (1)	R (1)	R (1)
Dual Band Diplex Filter (DU2x)				

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
DU2A (GSM/ EDGE)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
Transceiver Baseband (BB2x)				
BB2A (GSM)	R (1 to 6)	R (1 to 6)	R (1 to 3)	R (1 to 3)
BB2E (GSM/ EDGE)	R (1 to 6)	R (1 to 6)	R (1 to 3)	R (1 to 3)
BB2F	R (1 to 6)	R (1 to 6)	R (1 to 3)	R (1 to 3)
Dual Variable Gain Duplex Filter (DVxx)[1]				
DVTB (GSM/ EDGE 800 Full Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVTC (GSM/ EDGE 800 Co-site)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVTD (GSM/ EDGE 800 Co-site)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVGA (GSM/ EDGE 900 Full Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVHA (GSM/ EDGE 900 H Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVJA (GSM/ EDGE 900 J Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVDA (GSM/ EDGE 1800 A Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVDB (GSM/ EDGE 1800 B Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
DVDC (GSM/ EDGE 1800 Full Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
DVPA (GSM/ EDGE 1900 Full Band)	O (0 to 6)	O (0 to 6)	O (0 to 3)	O (0 to 3)
Masthead Amplifier (MNxx)				
MNTB (GSM/ EDGE 800 Full Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNTC (GSM/ EDGE 800 Co-site)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNGA (GSM/ EDGE 900 Full Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNDA (GSM/ EDGE 1800 A Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNDB (GSM/ EDGE 1800 B Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNPA (GSM/ EDGE 1900 A Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNPB (GSM/ EDGE 1900 B Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNPC (GSM/ EDGE 1900 C Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
MNPF (GSM/ EDGE 1900 Full Band)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
Bias Tee (BPxx)				

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
BPGV[2] (GSM/ EDGE 800/ 900)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
BPDV (GSM/ EDGE 1800/ 1900)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
BPDN[3] (GSM/ EDGE 800/ 900/1800/ 1900)	O (0 to 12)	O (0 to 12)	O (0 to 6)	O (0 to 6)
Receiver Multicoupler[4] (2-way and 6-way)				
M2LA (2-way) (GSM/EDGE 800/900)	R (1 to 7)	R (1 to 7)	R (1 to 3)	R (1 to 3)
M2HA (2-way) (GSM/EDGE 1800/1900)	R (1 to 7)	R (1 to 7)	R (1 to 3)	R (1 to 3)
M6LA (6-way) (GSM/EDGE 800/900)	R (1 to 2)	R (1 to 2)	R (1)	R (1)
M6HA (6-way) (GSM/EDGE 1800/1900)	R (1 to 2)	R (1 to 2)	R (1)	R (1)
Power Supply (PWSx)				
PWSA (230 VAC)	R (1 to 2)	R (1 to 2)	R (1 to 2)	R (1 to 2)
PWSB (-48 VDC)	R (1 to 3)	R (1 to 3)	R (1 to 3)	R (1 to 3)
PWSC (+24 VDC)	R (1 to 2)	R (1 to 2)	R (1 to 2)	R (1 to 2)
Remote Tune Combiner (RTxx)[5]				
RTGA (GSM/ EDGE 900 Full Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
RTHA (GSM/ EDGE 900 H Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
RTJA (GSM/ EDGE 900 J Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
RTDC (GSM/ EDGE 1800 Full Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
RTDA (GSM/ EDGE 1800 A Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
RTDB (GSM/ EDGE 1800 B Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
RTPA (GSM/ EDGE 1900 Full Band)	O (0 to 2)	O (0 to 2)	O (0 to 1)	O (0 to 1)
Temperature Control System (TCS)				
Unit cooling fans (included in cabinet core mechanics)	R (11)	R (11)	R (7)	R (7)
Heater (HETA) (optional in Outdoor Application Kit)	O (1)	N/A	O (1)	N/A
Cabinet cooling fan (included in Outdoor Application Kit)	R (1)	N/A	R (1)	N/A
Transceiver (TSxx)				

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
TSGA (GSM 900)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSDA (GSM 1800)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSPA (GSM 1900)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSTB (GSM/ EDGE 800)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSGB (GSM/ EDGE 900)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSDB (GSM/ EDGE 1800)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
TSPB (GSM/ EDGE 1900)	R (1 to 12)	R (1 to 12)	R (1 to 6)	R (1 to 6)
Transmission (VXxx)				
VXEA (FC E1/ T1)	R (1 to 4)	R (1 to 4)	R (1 to 4)	R (1 to 4)
VXTA (FXC E1)	R (1 to 4)	R (1 to 4)	R (1 to 4)	R (1 to 4)
VXTB (FXC E1/T1)	R (1 to 4)	R (1 to 4)	R (1 to 4)	R (1 to 4)
VXRA (FC RR1)	R (1 to 4)	R (1 to 4)	R (1 to 4)	R (1 to 4)
VXRB (FXC RR1)	R (1 to 4)	R (1 to 4)	R (1 to 4)	R (1 to 4)
Wideband Combiner (WCxA)[6]				
WCGA (GSM/ EDGE 800/ 900)	O (0 to 9)	O (0 to 9)	O (0 to 4)	O (0 to 4)
WCDA (GSM/ EDGE 1800)	O (0 to 9)	O (0 to 9)	O (0 to 4)	O (0 to 4)

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
WCPA (GSM/ EDGE 1900)	O (0 to 9)	O (0 to 9)	O (0 to 4)	O (0 to 4)
Indoor Application Kit (IAKx)				
IAKA (Indoor BTS)	N/A	R (1)	N/A	N/A
IAKC (Midi Indoor BTS)	N/A	N/A	N/A	R (1)
Outdoor Application Kit (OAKx)				
OAKA (Outdoor BTS)	R (1)	N/A	N/A	N/A
OAKB (Outdoor Site Support)	O (0 to 1)	N/A	N/A	N/A
OAKC (Midi Outdoor BTS)	N/A	N/A	R (1)	N/A
Outdoor Entry Kit (OEKA)	O (0 to 1)	N/A	O (0 to 1)	N/A
Outdoor Bridge Kit (OBKA)	O (0 to 1)	N/A	O (0 to 1)	N/A
AC Filter Unit (ACFU)	O (0 to 1)	O (0 to 1)	O (0 to 1)	O (0 to 1)
Air Filter Kit (OFKx)	O (0 to 1)	O (0 to 1)	O (0 to 1)	O (0 to 1)
Integrated Battery Backup (IBBU)[7]	O (1)	O (0 to 1)	N/A	N/A
Rectifier Unit (BATA)	R (1 to 6)	R (1 to 6)	N/A	N/A

Table 100. BTS units (cont.)

Unit	Outdoor	Indoor	Midi Outdoor	Midi Indoor
Battery Unit for Integrated Battery Backup (BBAG)	R (0 to 1)	R (0 to 1)	N/A	N/A
AC/DC Unit for Integrated Battery Backup (ADUA) (with cabinet control unit *[CCUA]*)	R (0 to 1)	R (0 to 1)	N/A	N/A

[1]DVxx eliminates RTxx unit for that antenna.

[2]BPxV (with VSWR antenna monitoring) can be used with or without MNxx.

[3]BPxN (without VSWR antenna monitoring) can be used only with MNxx.

[4]M2xA and M6xA can be used together as cabinet space allows.

[5]RTxx in Midi Indoor eliminates WCxA and DVxx units.

[6]WCxA in Midi Indoor eliminates RTxx unit.

[7]IBBU replaces lower five TSxx units. The BATA, BBAG, and ADUA are only used with IBBU installations.

2.8 Tools requirements for UltraSite EDGE BTS

Nokia recommends the tools and equipment listed below for installing the components, cables, and plug-in units of the BTS.

Note

Nokia does not include installation tools and equipment in the delivery package.

Table 101. Standard installation tools

European	*U.S.*
Antistatic wrist strap and cable	
Automatic puncher to mark hole locations	
Cable cutters, 2.5 to 50 mm[^{2}]	8” electricians cable cutters
Cable stripper, 0.25 and 0.4 wire	Standard electricians wire strippers
Cable stripper, 2.5 to 50 mm[^{2}]	Cable stripping knife
Cable ties for securing cables	
Calliper square, 160 mm	Generic calliper - 6” square, adjustable
Coaxial cable stripper for 75 ohm transmission cables	
Concrete drill bit, 12 mm	Concrete drill bit, 1/2”
Crimping tool for grounding cable shoes	
Drill with screwdriver bit set	
Drill bit set, 1 to 13 mm	
Extension cord	
Flashlight, pocket lamp, or torch	Flashlight
Hammer	
Hammer drill	
Hexagon keys, 8 mm	
Indelible marker	
Insulated wrench for installing batteries	
Insulated side cutters	

Table 101. Standard installation tools (cont.)

Ladder	
Level	Basic level
Lifting eye bolts, four pieces, M12 (not included)	
Pliers: • Insulated needle nose pliers, 115 mm • Insulated flat nose pliers, 210 mm • Multigrip pliers, 250 mm	Pliers: • Insulated needle nose pliers, 4.5" • Insulated standard pliers, 8" • Vise-grips, 10"
Right angle	
RJ modular plug crimp tool	
Safety glasses	
Scissors	
Screwdriver sets: • Flathead • Phillips • TORX, T10 through T25	
SMA torque wrench 1 Nm (0.74 ft lb) and 0.45 Nm (0.33 ft lb)	
Socket wrench (10 to 19 mm) and extension socket	Socket sets, metric (1/4” and 3/8”) drive and extension socket
Tape measure, 5 M	Tape measure, 16 ft
Torque 38” driver 6.7 - 101.7 Nm (15 - 75 ft lb)	
Utility knife	
Wrench, adjustable 8"	
Wrench set, metric combo, 7 to 19 mm	

Table 102. Electronic instruments

Instrument	Required Capabilities
Frequency counter Example: HP 53132A	• Digital readout with accuracy better than 0.1 Hz • Capable of at least 14 MHz clock signal with needed accuracy
Power meter Example: Gigatronic 8652A	• Digital readout with accuracy to at least one decimal place • Capable of TX measurement of 50W/ +47 dBm or less • Optional: TX in and TX out (external terminator/attenuator) for troubleshooting

Table 103. Installation tools for external transmission cables

Tool	Cable
Radiall crimping tool R282.281.000 and positioner R282.967.034	Radiall connectors BQ (100/120 Ω)
Rosenberger crimping tool: • 11W150-000 • 11W150-7R9 for cable TWC-124-1A • 11W150-7W2 for cable Belden 8132	Rosenberger connectors BQ (100/ 120 Ω)
Crimping tool: • AGK 2353 with crimp inserts for cables RG 179 B/U, RG 187 A/U: AGK 2709 • AKG 2365 with crimp inserts for cables RG 179 B/U, RG 187 A/U: AGK 2727	SMB/BT43 (75 Ω) with cable RG 179 B/U, RG 187 A/U

2.9 Torque settings of UltraSite EDGE BTS

Nokia recommends the following torque values for various fasteners used in UltraSite EDGE BTS.

Note

Over-tightening causes stress on the connectors. For the TSxx, BB2x and BOIx units, ensure a gap of 1.0 to 3.0 mm exists between the front flange of the unit and the cabinet when tightened to 1.0 Nm (maximum).

Note

The following table provides the torque measurements that Nokia recommends for installing the GSM/EDGE BTS units. All torque values assume a lubricated bolt or fastener.

Note

These are basic torque values. Any exceptions to these values are provided in the installation procedures.

Table 104. Cabinet installation torque recommendations

Bolt/screw type	DIN	Size	Torque
Plastic connector finger screws			0.2 - 0.3 Nm (0.15 - 0.22 ft lb)
Slotted head, phillips head or Torx head screw		M3	0.7 - 1.0 Nm (0.52 - 0.74 ft lb)
Slotted head, phillips head or Torx head screw		M4	1.2 - 1.6 Nm (0.88 - 1.18 ft lb)
Slotted head, phillips head or Torx head screw		M5	2.0 - 2.6 Nm (1.47 - 1.92 ft lb)
Hexagon socket head screw	933-A2	M6	4.2 - 5.5 Nm (3.1 - 4.05 ft lb

Table 104. Cabinet installation torque recommendations (cont.)

Bolt/screw type	DIN	Size	Torque
Nut	934-A2	M6	4.2 - 5.5 Nm (3.1 - 4.05 ft lb)
Hexagon socket head screw	912-A2	M8	8.0 - 10.0 Nm (5.9 - 7.37 ft lb)
3/8 hexagon head bolt	933-A2	M10	24 Nm (17.69 ft lb)
Lifting eye bolt (not included)	580	M12	39 Nm (28.74 ft lb)
Torx socket head screw cylinder head	934-A2	M3	0.7 Nm 0.52 ft lb
Torx socket head screw cylinder head	934-A2	M4	1.2 Nm 0.89 ft lb
Torx socket head screw cylinder head	934-A2	M5	2.5Nm 1.84 ft lb

Table 105. Unit installation torque recommendations

Bolt/screw type	DIN	Size	Torque
Antenna flange mount connector 7/16 in. (4 each)	934-A2	M3	1.0 Nm 0.7 ft lb
Thumb screw	934-A2	M4	1.0 Nm 0.7 ft lb
Ground lug nut	934-A2	M5	2.0 Nm 1.5 ft lb
Ground lug nut		M8	4.0 Nm 3.0 ft lb
Battery terminal screws		Not available	6.78 Nm 5.0 ft lb

Table 105. Unit installation torque recommendations (cont.)

Bolt/screw type	DIN	Size	Torque
Antenna connector		7/16 in	25 Nm 18.5 ft lb
SMA connector		Not available	1.0 Nm 0.7 ft lb
PWSC terminals		M8	10 Nm 7.0 ft lb
DCFB Output terminals		M8	10 Nm 7.0 ft lb
DCFB Input terminals		M10	28 Nm 19.6 ft lb

Table 106. WCDMA unit installation torque recommendations

Bolt/Screw Type	Size	Torque
Antenna Flange Mount Connector (4 ea.)	M3	0.1 Nm 0.074 ft lb
Unit mounting screw	M3	0.7 Nm 0.52 ft lb
Unit mounting screw	M4	1.2 Nm 0.89 ft lb
Right angle Antenna connector	N/A	25 Nm 18.5 ft lb

3 RF properties of UltraSite EDGE BTS

3.1 RF properties of 800 MHz UltraSite EDGE BTS

Table 107. RF properties

Property	**Value**	
TX frequency range	869 - 894 MHz	
RX frequency range	824 - 849 MHz	
Channel spacing	200 kHz	
Available radio channels	124 (25 MHz band)	
Minimum Frequency Spacing in combiners: WBC	600 kHz	
TX output power at antenna connector (guaranteed level):	*GMSK*:	*8PSK*:
Combining by-pass	44.5 dBm	42.5 dBm
2:1 Wideband Combiner	41.0 dBm	39.0 dBm
4:1 Wideband Combiner	37.5 dBm	35.5 dBm
Dynamic power control	*GMSK:*	*8PSK*:
	30 dB	18 dB
RX sensitivity:		
Single branch (static)	-110.5 dBm	

Table 107. RF properties (cont.)

Property	Value	
Single branch (static) w/ UltraSite MHA	-111.0 dBm	

3.2 RF properties of 900 MHz UltraSite EDGE BTS

Table 108. RF properties

Property	Value	
TX frequency range	A: 925.0 to 960.0 MHz H: 942.5 to 960.0 MHz J: 935.0 to 960.0 MHz	
RX frequency range	A: 880.0 to 915.0 MHz H: 897.5 to 915.0 MHz J: 890.0 to 915.0 MHz	
Channel spacing	200 kHz	
Available radio channels	A: 174 H: 87 J: 124	
Minimum Frequency Spacing in combiners:		
WBC	600 kHz	
RTC	600 kHz	
TX output power at antenna connector (guaranteed level):	GMSK:	8PSK:
Combining by-pass	44.5 dBm	42.5 dBm
2:1 Wideband Combiner	41.0 dBm	39.0 dBm
4:1 Wideband Combiner	37.5 dBm	35.5 dBm

Table 108. RF properties (cont.)

Property	Value	
RTC	42.0 dBm	40.0 dBm
Dynamic power control	GMSK: 30 dB (15 steps in 2 dB increments)	8PSK: 18 dB
RX sensitivity:		
Single branch (static)	-110.5 dBm	
Single branch (static) w/UltraSite MHA	111.0 dBm	

3.3 RF properties of 1800 MHz UltraSite EDGE BTS

Table 109. RF properties

Property	Value
TX frequency range	A: 1805-1850 MHz B: 1835-1880 MHz C: 1805-1880 MHz (Full-band)
RX frequency range	A: 1710-1755 MHz B: 1740-1785 MHz C: 1710-1785 MHz (Full-band)
Channel spacing	200 kHz
Available radio channels	A: 224 B: 224 C: 374
Minimum Frequency Spacing in combiners:	
WBC	600 kHz
RTC	800 kHz

Table 109. RF properties (cont.)

Property	Value			
TX output power at antenna connector (guaranteed level):	Sub-banded units		Full-banded units	
	GMSK:	8PSK:	GMSK:	8PSK:
Combining by-pass	+44.5 dBm	+42.5 dBm	+44.0 dBm	+42.0 dBm
2:1 Wideband Combiner	+41.0 dBm	+39.0 dBm	+40.3 dBm	+38.3 dBm
4:1 Wideband Combiner	+37.5 dBm	+35.5 dBm	+36.6 dBm	+34.6 dBm
RTC	+42.0 dBm	+40.0 dBm	+41.3 dBm	+39.3 dBm
Dynamic power control	GMSK: 30 dB (15 steps in 2 dB increments)		8PSK: 18 dB	
RX sensitivity:	Without MHA		With MHA	
	Sub- banded units	Full- banded units	Sub-banded units	
Static, single branch	-112.0 dBm	-111.5 dBm	-112.5 dBm	
Dynamic, single branch	-110.0 dBm	-109.5 dBm	-110.5 dBm	
2-way diversity (all profiles)	-115.0 dBm	-114.5 dBm	-115.5 dBm	
4-way diversity (all profiles)	-118.0 dBm	-117.5 dBm	-118.5 dBm	

3.4 RF properties of 1900 MHz UltraSite EDGE BTS

Table 110. RF properties

Property	Value
TX frequency range	1930-1990 MHz
RX frequency range	1850-1910 MHz
Channel spacing	200 kHz

Table 110. RF properties (cont.)

Property	**Value**	
Available radio channels	299	
Blocked channels (5)	586, 611, 686, 711, 736	
Reduced power channels (12)	512, 585, 587, 610, 612, 685, 687, 710, 712, 735, 737, 810	
Minimum Frequency Spacing in combiners:		
WBC	600 kHz	
RTC	800 kHz	
TX output power at antenna connector (guaranteed level):	GMSK:	8PSK:
Combining by-pass	+44.5 dBm	+42.5 dBm
2:1 Wideband Combiner	+41.0 dBm	+39.0 dBm
4:1 Wideband Combiner	+37.5 dBm	+35.5 dBm
RTC	+42.0 dBm	+40.0 dBm
Dynamic power control	GMSK: 30 dB (15 steps in 2 dB increments)	8PSK: 18 dB
RX sensitivity:	Without MHA	With MHA

Table 111. RF properties

Static, single branch	-111.0 dBm	-112.0 dBm
Dynamic, single branch	-109.0 dBm	-110.0 dBm
2-way diversity (all profiles)	-114.0 dBm	-115.0 dBm
4-way diversity (all profiles)	-117.0 dBm	-118.0 dBm

3.5 Static performance properties of UltraSite EDGE BTS receivers

Table 112. Receiver performance

Receiver performance for 10% BLER	
Channel type	Static level
MCS-1 GMSK	-112.0 dBm
MCS-2 GMSK	-110.9 dBm
MCS-3 GMSK	-109.0 dBm
MCS-4 GMSK	-106.6 dBm
MCS-5 8PSK	-105.8 dBm
MCS-6 8PSK	-103.8 dBm
MCS-7 8PSK	-100.7 dBm
MCS-8 8PSK	-97.7 dBm
MCS-9 8PSK	-95.7 dBm

4 Technical description of UltraSite EDGE BTS installation kits

4.1 Technical description of Outdoor Application kit (OAKA/OAKC) of UltraSite EDGE BTS

The OAKx protects the outdoor BTS against EMI, dust, water, snow, and solid foreign objects. The outdoor BTS electrical parts are weatherproof to IP 55 standards.

The following types of OAKx are available:

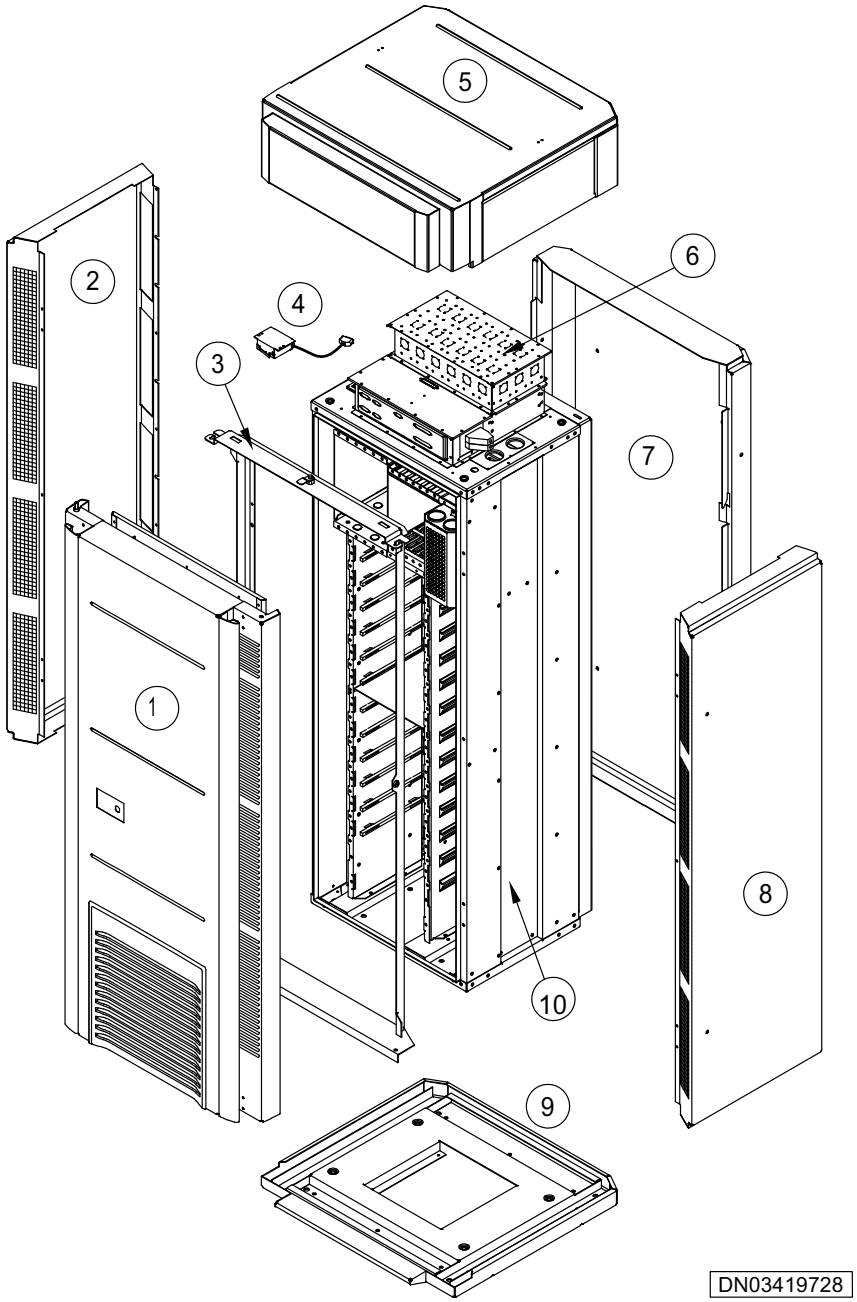
- OAKA - used for UltraSite EDGE BTS installation
- *OAKB* - used for Citytalk/UltraSite EDGE BTS co-siting and site support
- OAKC - used for UltraSite EDGE BTS Midi installation

Corrosion prevention measures

The current version of OAKx includes corrosion prevention measures. Contact your Nokia representative to inquire about adding or replacing the following components for corrosion prevention on currently installed outdoor BTS cabinets:

- additional gaskets on fan connectors
- fully PVC moulded cables
- acid-proofed stainless steel screws

4.1.1 OAKA

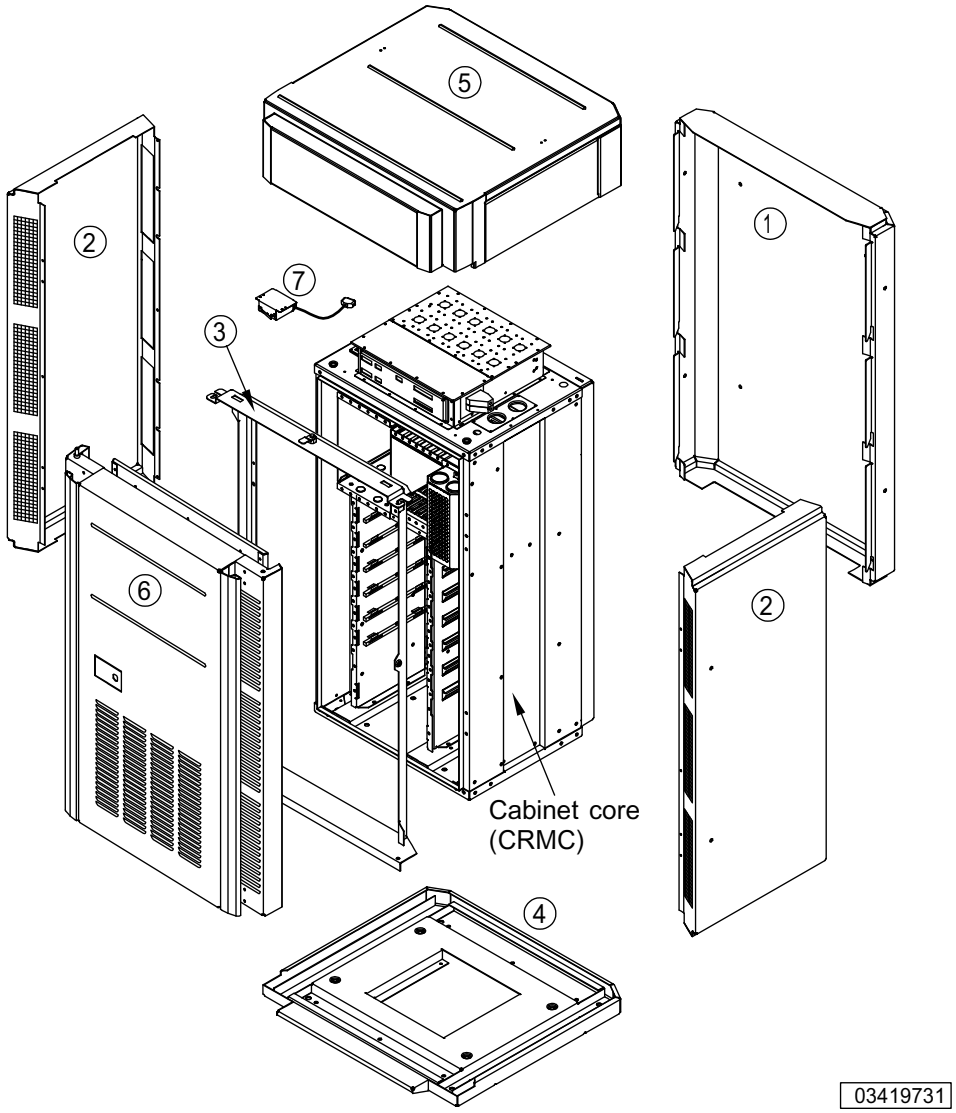


1	Door
2	Side wall
3	Door frame

4	Door switch assembly
5	Roof
6	Antenna box extension
7	Back wall
8	Side wall
9	Plinth
10	Cabinet core (CRMA)

Figure 18. OAKA

4.1.2 OAKC



1	Back wall
2	Side wall
3	Door frame
4	Plinth
5	Roof
6	Door

7	Door switch assembly

Figure 19. OAKC

4.2 Delivery content of UltraSite EDGE BTS CRMA/ OAKA transportation package

Table 113. Delivery content of UltraSite EDGE BTS CRMA/OAKA transportation package

Part	Notes	Quanti-ty	Check
Cabinet core (CRMA)	The cabinet core houses the units and Temperature Control System.	1	
Outdoor application kit (OAKA)	The Outdoor Application Kit (OAKA) consists of the following components:	1	
	• plinth for one cabinet	1	
	• antenna box extension assembly (optional)	1	
	• back wall	1	
	• side wall	2	
	• door frame	1	
	• door with a pre-installed Cabinet Cooling fan	1	
	• door switch assembly	1	
	• roof	1	
	• required mounting hardware		

4.3 Delivery content of UltraSite EDGE BTS CRMC/ OAKC transportation package

Table 114. Delivery content of UltraSite EDGE BTS CRMC/OAKC transportation package

Part	Notes	Quanti-ty	Check
Cabinet core (CRMC)	The Midi BTS cabinet core houses the units and Temperature Control System.	1	
Outdoor application kit (OAKC)	The Midi Outdoor Application Kit (OAKC) consists of the following components:	1	
	• plinth for one cabinet	1	
	• antenna box extension assembly (optional)	1	
	• back wall	1	
	• side wall	2	
	• door frame	1	
	• door with a pre-installed Cabinet Cooling fan	1	
	• door switch assembly	1	
	• roof	1	
	• required mounting hardware		

4.4 Delivery content of outdoor cable entry kit (OEKx) for UltraSite EDGE BTS

Table 115. Outdoor cable entry kit for co-siting (OEKx) component list

Part	Quantity	Check
Cable entry blocks	6	
Cable bushings	24 pairs	

4.5 Delivery content of UltraSite EDGE BTS OFKA/ OFKC transportation package

Table 116. Delivery content of UltraSite EDGE BTS OFKA/OFKC transportation package

Part	Notes	Quanti-ty	Check
Optional cabinet filter kit (OFKA)	The optional cabinet filter kit (OFKA) consists of the following components:	1	
	• filter roll	1	
	• trim fasteners	16	
Optional Midi cabinet filter kit (OFKC)	The optional Midi cabinet filter kit (OFKC) consists of the following components:		
	• filter roll	1	
	• trim fasteners	12	

4.6 Technical description of Outdoor Application kit (OAKB) of UltraSite EDGE BTS

The OAKB protects the outdoor BTS against EMI, dust, water, snow, and solid foreign objects. The outdoor BTS electrical parts are weatherproof to IP 55 standards.

The OAKB is similar to the standard *UltraSite Outdoor Application Kit (OAKA)*, except that the co-siting version replaces one of the side walls with a co-siting side wall and provides a new co-siting cable entry for the roof assembly.

Corrosion prevention measures

The current version of OAKB includes corrosion prevention measures. Contact your Nokia representative to inquire about adding or replacing the following components for corrosion prevention on currently installed outdoor BTS cabinets:

- additional gaskets on fan connectors
- fully PVC moulded cables
- acid-proofed stainless steel screws

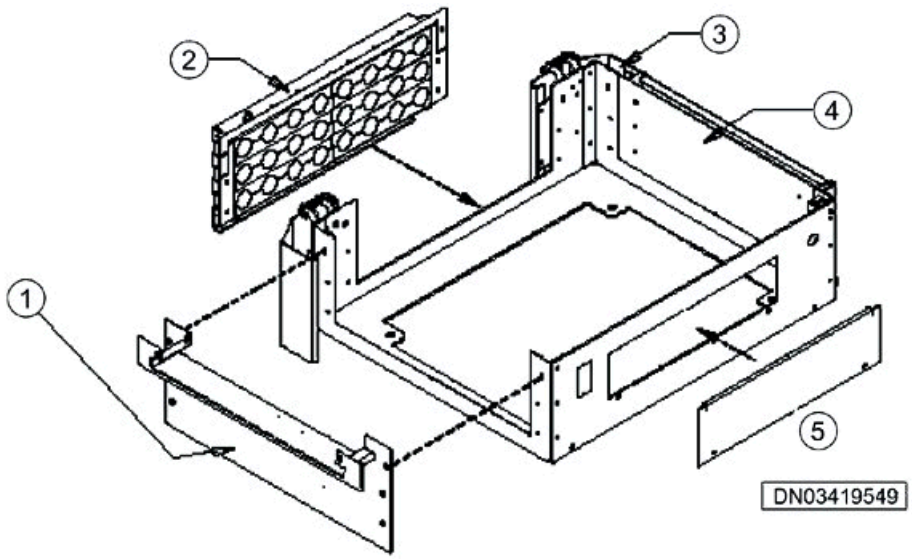
4.7 Delivery content of UltraSite EDGE BTS OAKB transportation package

Table 117. Outdoor Application Kit for co-siting (OAKB) component list

Part	Quantity	Check
Plinth for one cabinet	1	
Back wall	1	
Plain side wall	1	
Co-siting side wall	1	
Door frame	1	
Door with a pre-installed Cabinet Cooling fan	1	
Door switch assembly	1	
Roof	1	
Co-siting cable entry	1	
Antenna box cover assembly	1	
Required mounting hardware	1	

4.8 Technical description of UltraSite Midi to Talk Bridge kit (OBKB) of UltraSite EDGE BTS co-siting with Talk-family BTS

The OBKB is a bridge kit for the roof assembly when co-siting the UltraSite EDGE Midi Outdoor Base Station cabinet with a Citytalk cabinet. The Midi to Talk Bridge kit provides a protected channel for inter-cabinet cables routed between adjoining Citytalk and UltraSite Midi Outdoor cabinets.



1	Midi to Talk Bridge (OBKB)
2	UltraSite cable entry
3	Roof support
4	Dummy cable entry
5	External Interface cover panel

Figure 20. Midi to Talk Bridge (OBKB)

4.9 Delivery content of UltraSite EDGE BTS OBKB transportation package

Table 118. UltraSite Midi to Talk Bridge kit for co-siting (OBKB) component list

Part	Quantity	Check
Inter-cabinet cable channel	1	
Screws	6	
Bridge cover	1	

4.10 Technical description of Bridge kit (OBKA) of UltraSite EDGE BTS outdoor cabinet

The OBKA is a bridge kit for the roof assembly of the UltraSite EDGE BTS outdoor cabinet. The kit provides a protected channel for inter-cabinet cables routed between adjoining Outdoor cabinets.

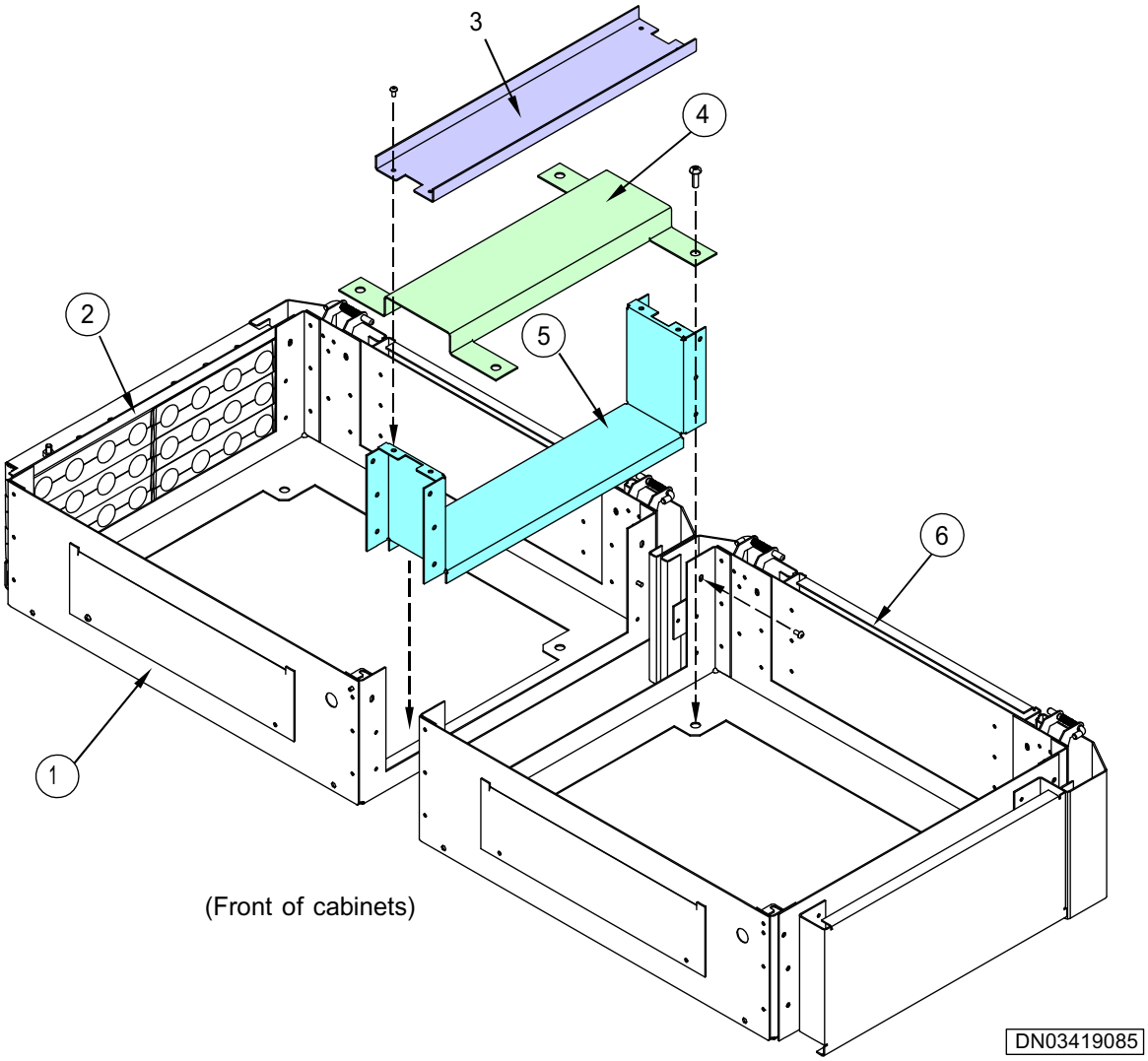


Figure 21. Bridge kit (OBKA)

4.11 Delivery content of UltraSite EDGE BTS OBKA transportation package

Table 119. UltraSite Bridge Kit (OBKA) component list

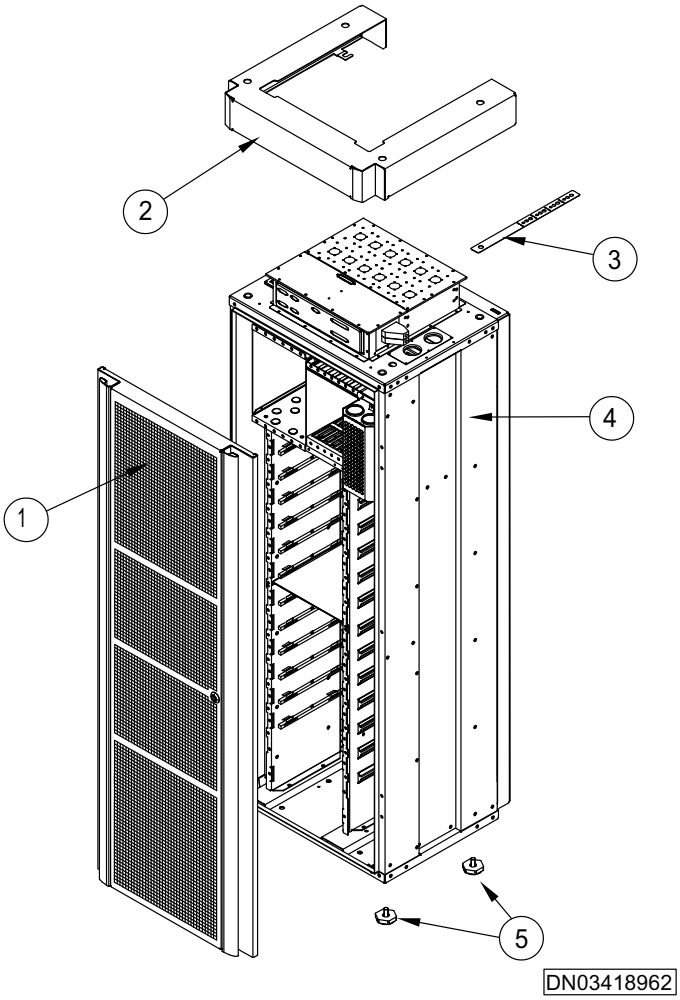
Part	Quantity	Check
Bridge	1	
Bridge support	1	
Bridge cover	1	
Screws (M5)	4	

4.12 Technical description of Indoor Application Kit (IAKA/IAKC) of UltraSite EDGE BTS

The IAKx protects the indoor BTS against EMI, dust and solid foreign objects. The following types of IAKx are available:

- IAKA - used for UltraSite EDGE BTS installation
- IAKC - used for UltraSite EDGE BTS Midi installation

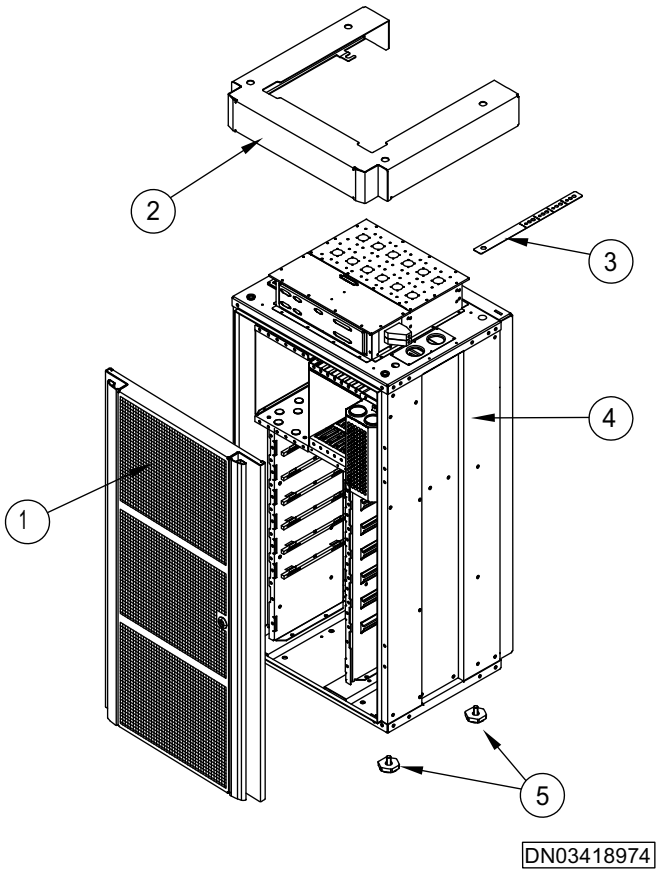
4.12.1 IAKA



1	Door
2	Roof
3	Wall brackets
4	Cabinet core (CRMA)
5	Feet (four places)

Figure 22. IAKA

4.12.2 IAKC



1	Door
2	Roof
3	Wall brackets
4	Cabinet core
5	Feet

Figure 23. IAKC

4.13 Delivery content of UltraSite EDGE BTS CRMA/ IAKA transportation package

Table 120. Delivery content of UltraSite EDGE BTS CRMA/IAKA transportation package

Part	Notes	Quanti-ty	Check
Cabinet core (CRMA)	The cabinet core houses the units and Temperature Control System.	1	
Indoor application kit (IAKA)	The Indoor Application Kit (IAKA) consists of the following components:	1	
	• door	1	
	• roof	1	
	• feet	4	
	• wall brackets	2	
	• washers	8	
	• anchor bolts	8	
	• nuts	8	

4.14 Delivery content of UltraSite EDGE BTS CRMC/ IAKC transportation package

Table 121. Delivery content of UltraSite EDGE BTS CRMC/IAKC transportation package

Part	Notes	Quanti-ty	Check
Cabinet core (CRMC)	The Midi BTS cabinet core houses the units and Temperature Control System.	1	

Table 121. Delivery content of UltraSite EDGE BTS CRMC/IAKC transportation package (cont.)

Part	Notes	Quanti-ty	Check
Indoor application kit (IAKC)	The Midi Indoor Application Kit (IAKC) consists of the following components:	1	
	• door	1	
	• roof	1	
	• feet	4	
	• wall brackets	2	
	• washers	8	
	• anchor bolts	8	
	• nuts	8	

4.15 Technical description of Battery Box Plate (BBPA) kit of UltraSite EDGE BTS

The BBPA kit is used for modification of the Integrated Battery Back-up Unit installed in Nokia UltraSite EDGE Base Station. The BBPA kit replaces the existing Battery Box support plate and supplies six extended RF cables for installation of three WCxA units and three DVxA units in a UltraSite EDGE BTS with the IBBU installed.

Installation of the BBPA kit provides additional clearance above the upper Battery Box assembly, which facilitates installation of a 2+2+2 UltraSite EDGE BTS Co-siting to TDMA BTS configuration.

4.16 Delivery content of UltraSite EDGE BTS IBBU upgrade transportation package

Table 122. Delivery content of UltraSite EDGE BTS IBBU upgrade transportation package

Part	Quantity	Check
BATA backplane (pre-installed)	1	
Rectifiers (BATx)	1-5 (user-defined)	
Batteries (BBAx)	2	
ADUA (pre-installed with cabinet control unit)	1	

4.17 Delivery content of UltraSite EDGE BTS BBPA transportation package

Table 123. Delivery content of UltraSite EDGE BTS BBPA transportation package

Part	Quantity	Check
BBPA kit	1	
Plate Assembly (part of BBPA kit)	1	
RF Cable kit (part of BBPA kit)	1	
RF Cables (part of RF Cable kit)	6 ea	

4.18 Technical description of System Extension Cable (SXCA) kit of UltraSite EDGE BTS

The SXCA cable kit provides extended RF diversity cables for signalling between the DVxx units and WCxA units in a 5+5+5 or greater UltraSite EDGE BTS configuration. The kit can be utilized in both indoor and outdoor installations.

The extended SXCA cables included in the SXCA kit are installed in the lower right of the BTS cabinet and each kit includes any additional cables for various configurations, as determined during planning.

4.19 Delivery content of UltraSite EDGE BTS SXCA transportation package

Table 124. Delivery content of UltraSite EDGE BTS SXCA transportation package

Part	Quantity	Check
SXCA kit	1 ea.	
RF Cable assembly (part of SXCA kit)	2 ea.	

Note

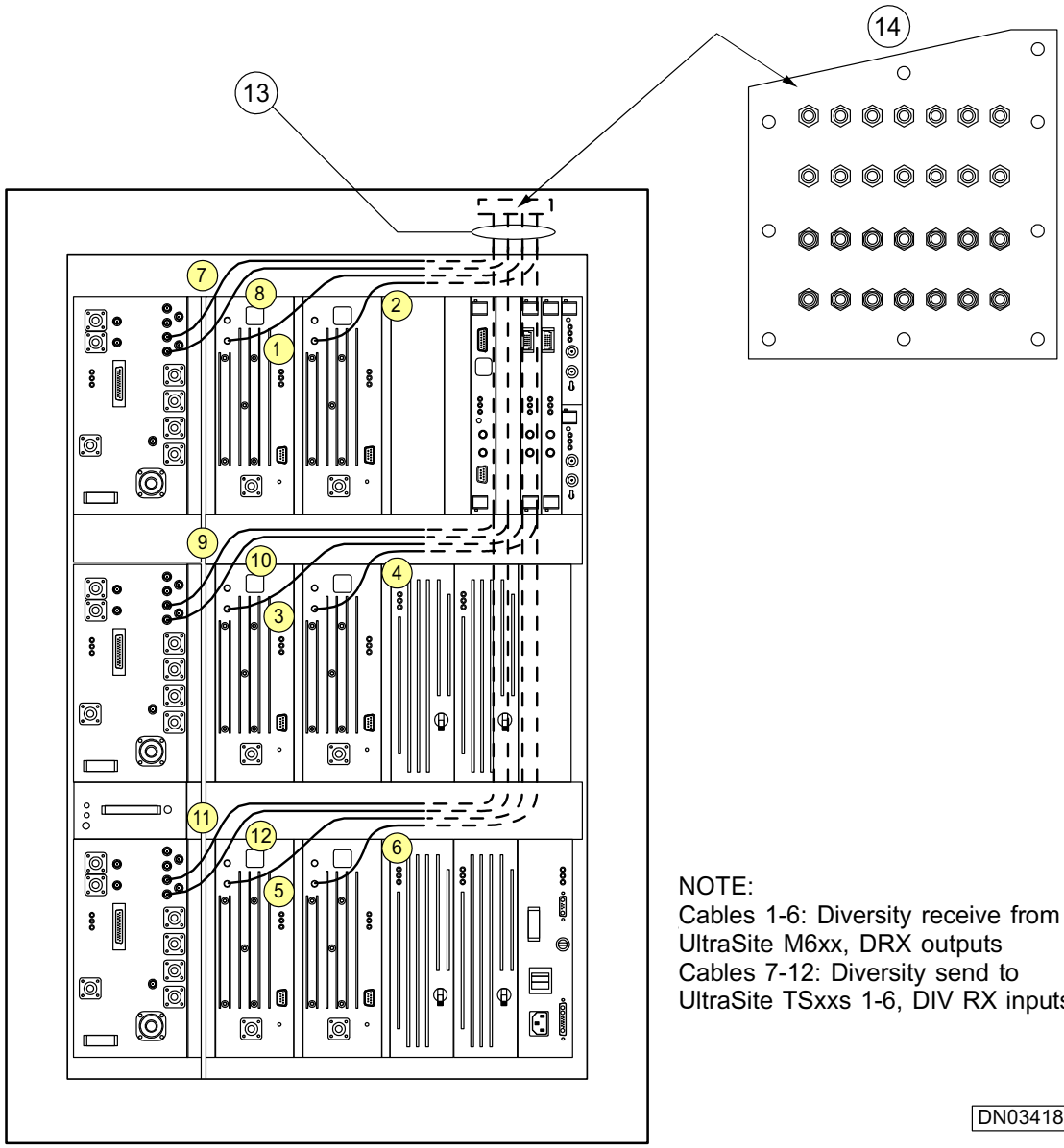
The SXCA kit is a customer specific item created for various BTS configurations. Contact your local Nokia representative for ordering information.

4.20 Technical description of UltraSite EDGE BTS co-siting with Talk-family RF diversity kits

An RF diversity cable kit allows antenna sharing between an existing Talk-family BTS and an UltraSite EDGE BTS. The *UTAA cable kit (468790A)* is the basic RF diversity kit that is used with all co-siting configurations. Depending on the configuration, up to three UTAA cable kits may be required.

Some configurations require the use of splitter kits. There are two different kits available: *SPKA* and *RSKA*. SPKA is used in splitting RF diversity cabling between UltraSite DVxx - M2xA, UltraSite M2xA - Talk TRX, and Talk RMU/AFE - UltraSite TRX. RSKA is used between RTC and RMU in Talk-family BTS.

Following is a general illustration of diversity sharing cable connections in a Talk-family cabinet. The Citytalk BTS is used for depiction purposes.



NOTE:
Cables 1-6: Diversity receive from UltraSite M6xx, DRX outputs
Cables 7-12: Diversity send to UltraSite TSxxs 1-6, DIV RX inputs

DN03418908

Cables 1-6	Diversity receives from UltraSite M6xx, DR X outputs
Cables 7-12	Diversity send to UltraSite TSxxs 1-6, DIV RX inputs

13	Route internal diversity cables within cabinet to feed-through connectors mounted on RF cable termination plate
14	RF cable termination plate (located at top of cabinet)

Figure 24. General view of diversity cables for Talk-family (Citytalk cabinet shown)

The RF cable termination plate can be installed in different locations on both the Citytalk BTS and the Intratalk BTS.

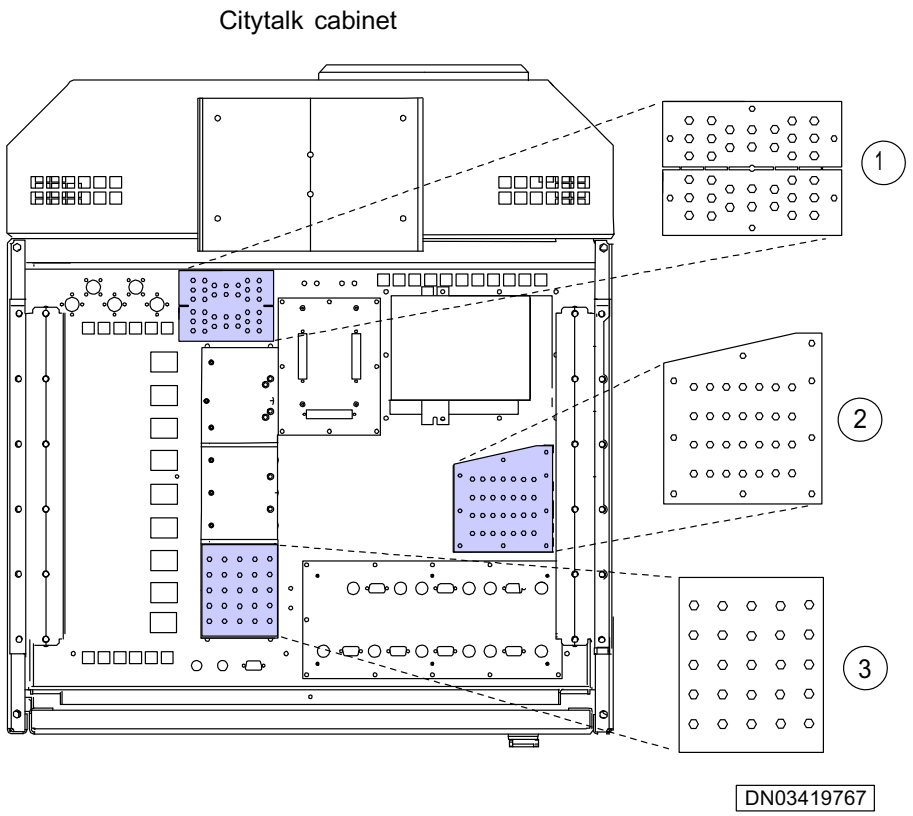
Note

The inter cabinet tunnel cannot be used if the extension cabinet is connected.

Any of the three antenna connection boxes can be removed and replaced with Talk-family termination plates. It is recommended that in the basic cabinet, the antenna box located towards the front of the cabinet is removed, as shown in *Optional Citytalk BTS RF diversity termination plates and mounting locations*. In the extension cabinet it is recommended to remove the antenna box located towards the rear of the cabinet.

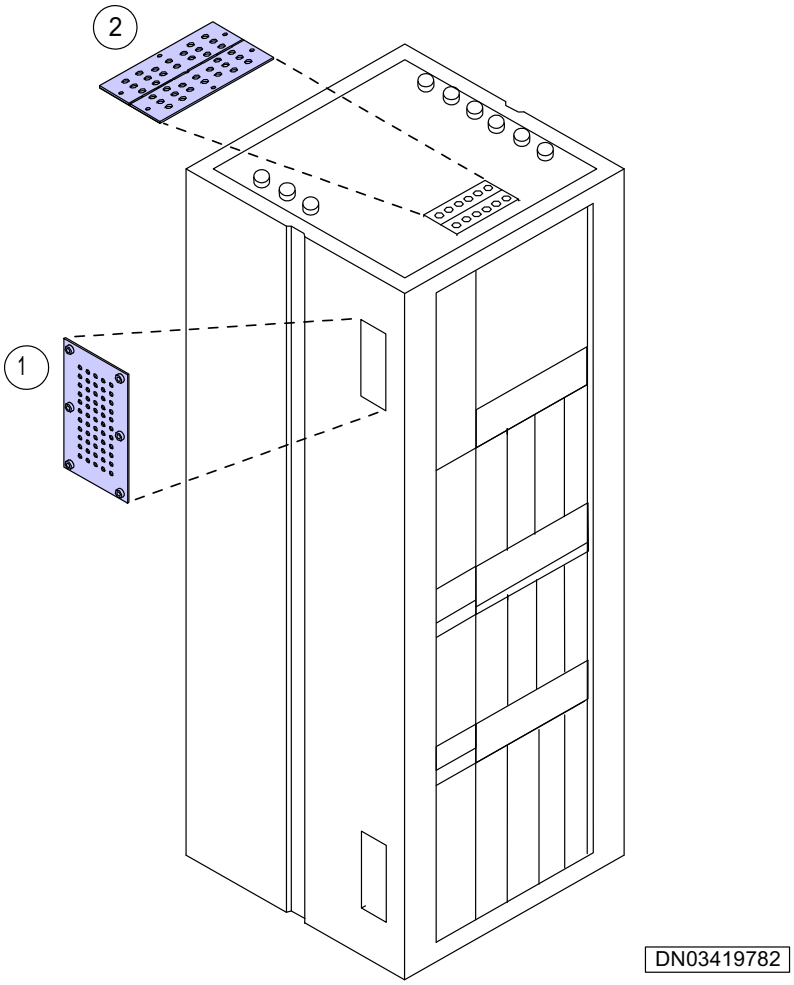
Note

When using the antenna connector box RF cable termination plate, reorganize the existing Citytalk antenna cables connected to the antenna boxes.



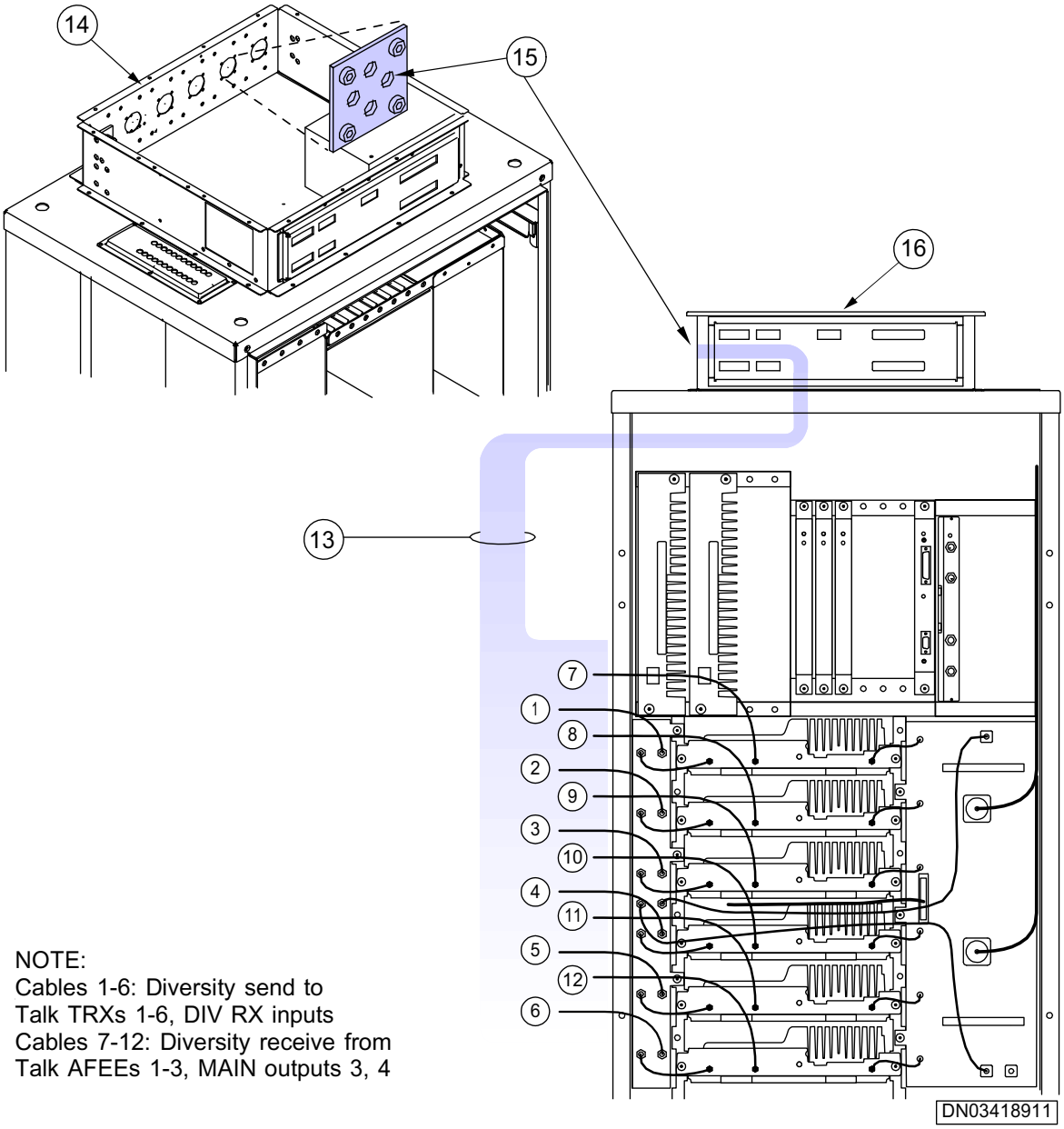
1	RF-diversity termination plate / Bias Tee power connector
2	RF-diversity termination plate / CityTalk inter-cabinet tunnel
3	RF-diversity termination plate / Antenna connector box

Figure 25. Optional Citytalk BTS RF diversity termination plates and mounting locations



1	Side install
2	Top install

Figure 26. Optional Intratalk BTS RF diversity termination plates and mounting locations



NOTE:
Cables 1-6: Diversity send to Talk TRXs 1-6, DIV RX inputs
Cables 7-12: Diversity receive from Talk AFEEs 1-3, MAIN outputs 3, 4

13	Route internal diversity cables within cabinet to feed-through connectors mounted on RF cable termination plate(s)
14	Antenna box
15	RF cable termination plate(s) as required

16	Antenna box

Figure 27. General view of diversity cables for UltraSite

Note

The termination plates can be placed on top of the antenna box if it is not being used for antenna connections.

4.21 Delivery content of UltraSite EDGE BTS co-siting to Talk-family UTAA RF diversity cable kit transportation package

Table 125. Delivery content of UltraSite EDGE BTS co-siting to Talk-family UTAA RF diversity cable kit transportation package

Part	Notes	Quanti-ty	Check
Internal RF diversity cables - 2m (993960A)		24	
External RF diversity cables - 3m (993959A)		12	
UltraSite RF cable termination plates		3	
Assortment of Talk-family RF cable termination plates (1 for each location option)	• 1 each TALK Mtg. Plate (CityTalk inter-cabinet tunnel) • 1 each TALK Mtg. Plate (antenna connector box) • 1 each TALK Mtg. Plate (Bias Tee power connector) • 1 each TALK Mtg. Plate (IntraTalk side install)	4 pcs.	
M3x8 mounting screws (UltraSite)		12 pcs.	
M6x10 mounting screws (Talk)		6 pcs.	

4.22 Delivery content of UltraSite EDGE BTS co-siting to Talk-family SPKA splitter kit transportation package

Table 126. Delivery content of UltraSite EDGE BTS co-siting to Talk-family SPKA splitter kit transportation package

Part	Quantity	Check
Splitters (5601046)	6	
Splitter cables (994131XX)	12	

4.23 Delivery content of UltraSite EDGE BTS co-siting to Talk-family RSKA splitter kit transportation package

Table 127. Delivery content of UltraSite EDGE BTS co-siting to Talk-family RSKA splitter kit transportation package

Part	Quantity	Check
Splitters (5600052)	2	
Splitter cables	6, total	
RTC Rx Out to Splitter In (993546A)	2	
Splitter Out to RMU Div Ant (993547A)	2	
Splitter Out to RMU Ant (993563A)	1	
Splitter Out to RMU Ant (993564A)	1	

4.24 Delivery content of Talk/Talk synchronisation kit for UltraSite EDGE BTS co-site with Talk-family BTS

Table 128. Talk/Talk synchronisation kit for co-siting (020068A) component list

Part	Quantity	Check
Synchronisation cable set (SCSA) (468667A)	2	
BCFB unit (468434A)	1	
Abis interface (ABSA), includes two terminating plugs (468666A)	1	

4.25 Delivery content of UltraSite/Talk synchronisation kits (UTxA) for UltraSite EDGE BTS co-site with Talk-family BTS

Table 129. UTHA, 469109A, component list

Part	Notes	Quantity	Check
Cable (994098xx)	2.5m	1	

Table 130. UTIA, 469110A, component list

Part	Notes	Quantity	Check
Cable (994099xx)	12.5m	1	

Table 131. UTJA, 469049A, component list

Part	Notes	Quantity	Check
Cable (993910xx)	25m		

4.26 Delivery content of UltraSite/UltraSite synchronisation kits (UUxA) for UltraSite EDGE BTS co-site with Talk-family BTS

Table 132. UUxA, 070366xx, component list

Part	Notes	Quantity	Check
Cable (993872xx)	Customer-specific length	1	

4.27 Technical description of Talk 222AFE/UltraSite 222DVxx UltraSite EDGE BTS co-site with Talk-family BTS

One UTAA RF diversity cable kit is used for indoor or outdoor Talk 222AFE and UltraSite 222DVxx, or smaller configurations. One kit consists of the following components:

Note

The installed number of components is presented in parentheses.

- 24 (24) internal RF diversity cables
- 12 (12) external RF diversity cables
- 3 (3) UltraSite RF cable termination plates
- 4 (1) Talk-family RF cable termination plates
- 12 pcs. M3x8 mounting screws (UltraSite)
- 6 pcs. M6x10 mounting screws (Talk)

4.28 Technical description of Talk 444RTC/UltraSite 222DVxx UltraSite EDGE BTS co-site with Talk-family BTS

One UTAA RF diversity cable kit and one SPKA splitter kit are used for indoor or outdoor Talk 444RTC and UltraSite 222DVxx, or smaller co-site configurations. The combined kits contain the following components:

Note

The installed number of components is presented in parentheses.

- 24 (24) internal RF diversity cables
- 12 (12) external RF diversity cables (2.5m)
- 3 (3) UltraSite RF cable termination plates
- 4 (2) Talk-family RF cable termination plates
- 12 pcs. M3x8 mounting screws (UltraSite)
- 6 pcs. M6x10 mounting screws (Talk)
- 6 (6) SPKA splitters
- 12 (12) splitter cables for SPKA splitters

4.29 Technical description of Talk 444RTC/UltraSite 444RTC UltraSite EDGE BTS co-site with Talk-family BTS

Two UTAA RF diversity cable kits and one SPKA splitter kit are used for indoor or outdoor Talk 444RTC and UltraSite 444RTC, or smaller co-site configurations. The combined kits contain the following components:

Note

The installed number of components is presented in parentheses.

- 48 (36) internal RF diversity cables
- 24 (18) external RF diversity cables
- 6 (5) UltraSite RF cable termination plates
- 8 (2) Talk-family RF cable termination plates
- 12 pcs. M3x8 mounting screws (UltraSite)
- 6 pcs. M6x10 mounting screws (Talk)
- 6 (6) splitters
- 12 (12) splitter cables

4.30 Technical description of Talk 666RTC/UltraSite 222DVxx WBC 2:1 UltraSite EDGE BTS co-site with Talk-family BTS

Two UTAA RF diversity cable kits, one SPKA kit and two RSKA splitter kits, are used for indoor or outdoor Talk 666RTC and UltraSite 222DVxx 2:1 co-site configurations. The combined kits contain the following components:

Note

The installed number of components is presented in parentheses.

- 48 (48) internal RF diversity cables
- 24 (24) external RF diversity cables
- 6 (6) UltraSite RF cable termination plates
- 8 (3) Talk-family RF cable termination plates
- 24 pcs. M3x8 mounting screws (UltraSite)
- 12 pcs. M6x10 mounting screws (Talk)
- 4 (3) RSKA splitters
- 12 (9) splitter cables for RSKA splitters
- 6 (6) SPKA splitters
- 12 (12) splitter cables for SPKA splitters

4.31 Technical description of Talk 666RTC/UltraSite 666RTC UltraSite EDGE BTS co-site with Talk-family BTS

Three UTAA RF diversity cable kits and two RSKA splitter kits are used for indoor or outdoor Talk 666RTC and UltraSite 666RTC, or smaller co-site configurations. The combined kits contain the following components:

Note

The installed number of components is presented in parentheses.

- 72 (72) internal RF diversity cables
- 36 (36) external RF diversity cables
- 9 (9) UltraSite RF cable termination plates
- 12 (3) Talk-family RF cable termination plates
- 36 pcs. M3x8 mounting screws (UltraSite)
- 18 pcs. M6x10 mounting screws (Talk)
- 4 (3) RSKA splitters
- 12 (9) splitter cables for RSKA splitters

The recommended Talk 666RTC/UltraSite 666RTC configuration is shown in *Recommended configuration for Talk 666RTC/UltraSite 666RTC*.

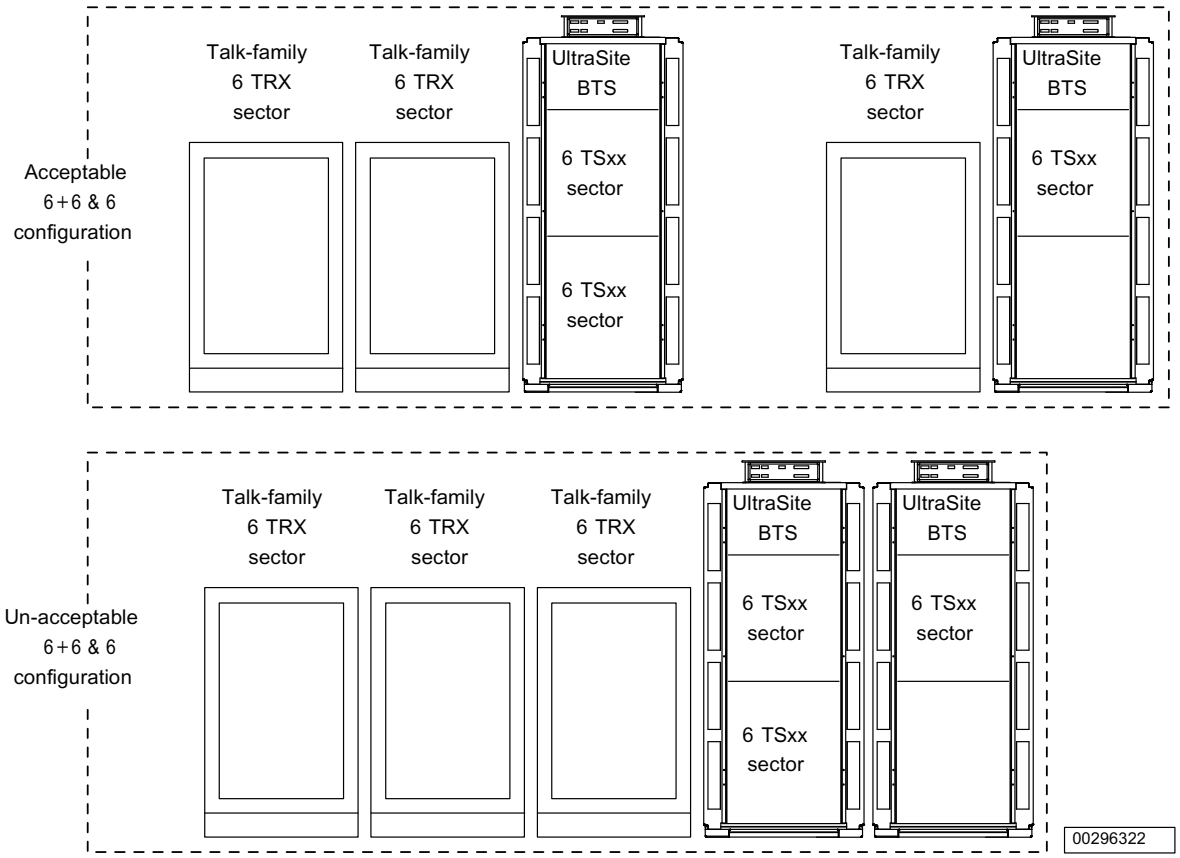


Figure 28. Recommended configuration for Talk 666RTC/UltraSite 666RTC

5 Technical description of UltraSite EDGE BTS cables

5.1 External interfaces of UltraSite EDGE BTS

5.1.1 External hardware interfaces of UltraSite EDGE BTS 800, 900, 1800 and 1900

Table 133. External hardware interfaces

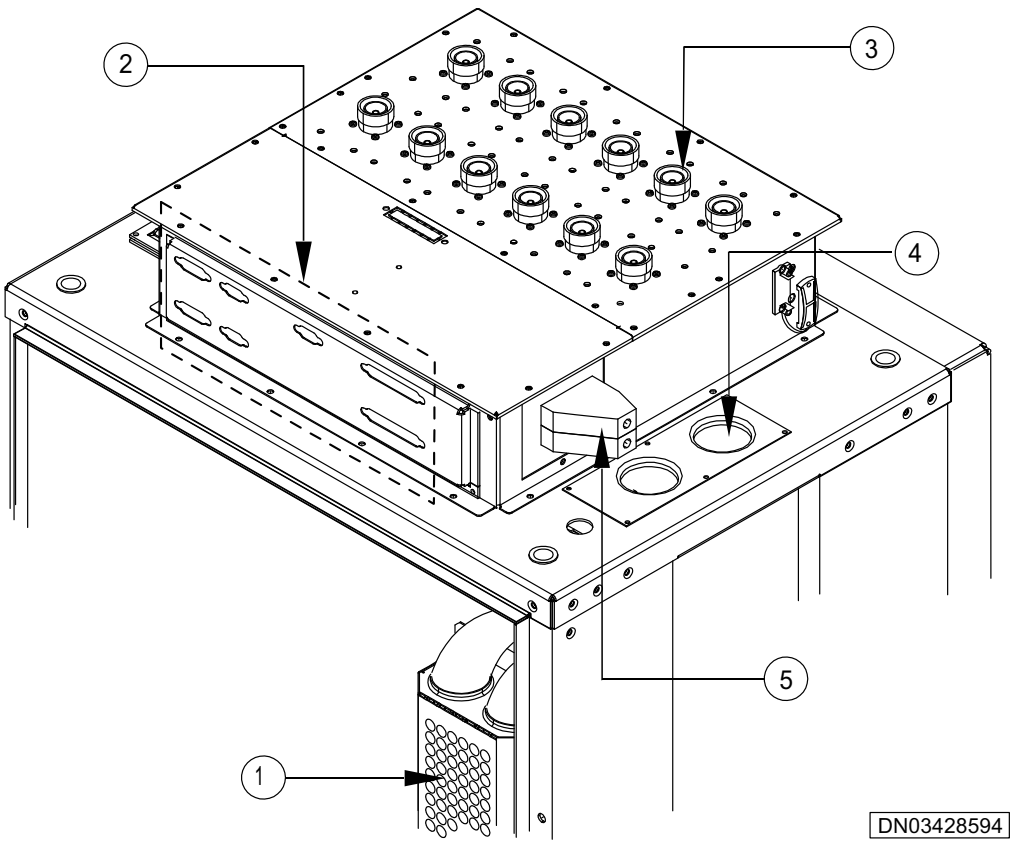
Interface	Value	Connector Type
TX/RX antenna	6 (standard) + 6 (optional)	7/16 (DIN) female flange mount
AC Power input	184 to 276 VAC	Phoenix clamp Screw latch 0.5-16 mm
DC Power input	+20 to +32 VDC	Terminal stud (+24 VDC) Terminal lugs 10 mm
DC Power input	-36 to -60 VDC	Phoenix clamp (-48VDC) Screw latch 16-50 mm

Table 133. External hardware interfaces (cont.)

Interface	Value	Connector Type
Grounding (earthing)		Three grounding alternatives: • Single M8 stud (Europe) • Two M5 studs (US and Canada) • Single M8 stud and Two M5 studs (+24 VDC) **Note** Use two M8 studs on newer version cabinets. M6 cable shoe (ground lug) is recommended for 2-point grounding with M5 studs.
ESD stud		
External alarms and controls	• TTL/open collector • 24 external alarms • 6 controls	D-37 pin (female)
Frame number, frame clock, mains and UltraSite Support alarm input	RS-485	D-15 pin (female)
Frame number, frame clock, mains and UltraSite Support alarm output	RS-485	D-15 pin (female)
E1/T1	2 Mbit/s (E1) or 1.5 Mbit/s (T1) PCM	TQ for 120 Ω E1 TQ for 100 Ω T1 BT 43 for 75 Ω E1

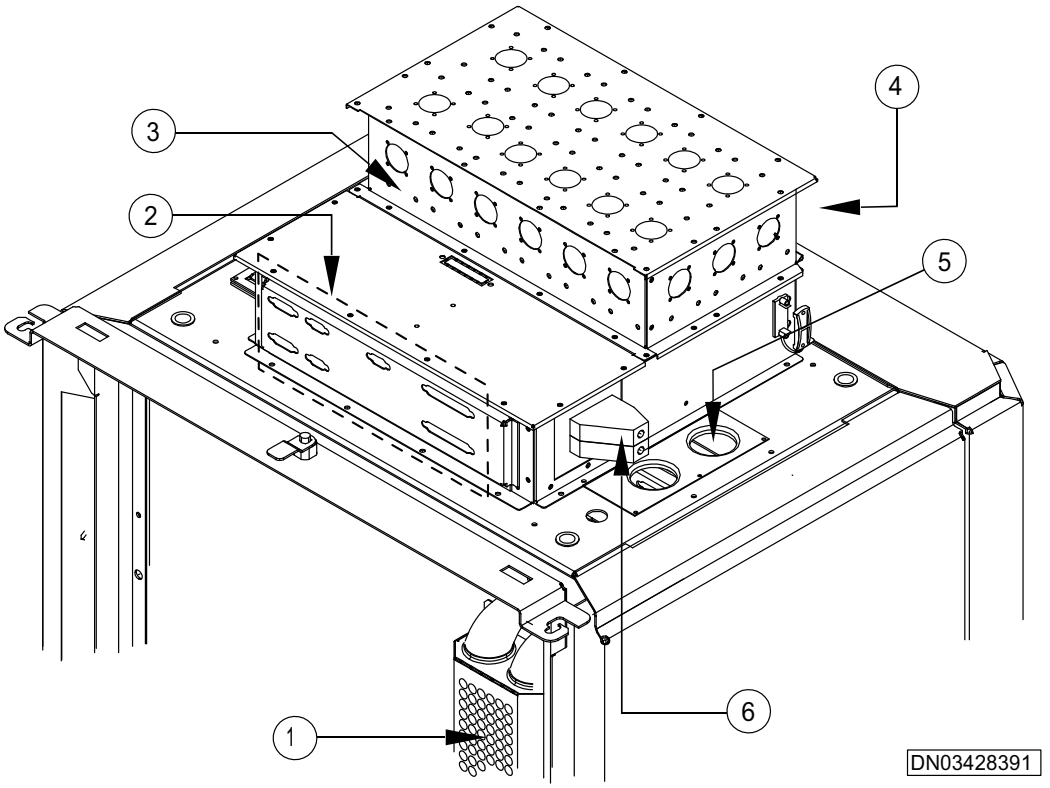
Table 133. External hardware interfaces (cont.)

Interface	Value	Connector Type
RRI	RRI Flexbus Radiolink I/O and power output (55 VDC)	TNC
Q1 interface	RS-485	D-9 pin (female)
LMP for BTS Manager/ SiteWizard	RS-232	D-9 pin (female)
13 MHz test clock		50 Ω SMB (female)
Test FCLK		50 Ω SMB (female)
Test/monitor interface		D-25 (female)
IBBU	RS-485	D-9 pin (female)



1	Transmission units cover
2	Interface Module (IFM)
3	12 TX/RX antennas
4	Abis interface access to Transmission unit
5	DC Power input - right side (optional AC Power input - left side)

Figure 29. Indoor (IAKx) cabinet interfaces



1Transmission units cover2Interface Module (IFM)3Antenna box extension412 TX/RX antennas5Abis interface access to Transmission unit6DC Power input - right side (optional AC Power input - left side)

Figure 30. Outdoor cabinet interfaces (OAKx roof and door not shown)

5.1.2 Front-mounted interface module board interfaces

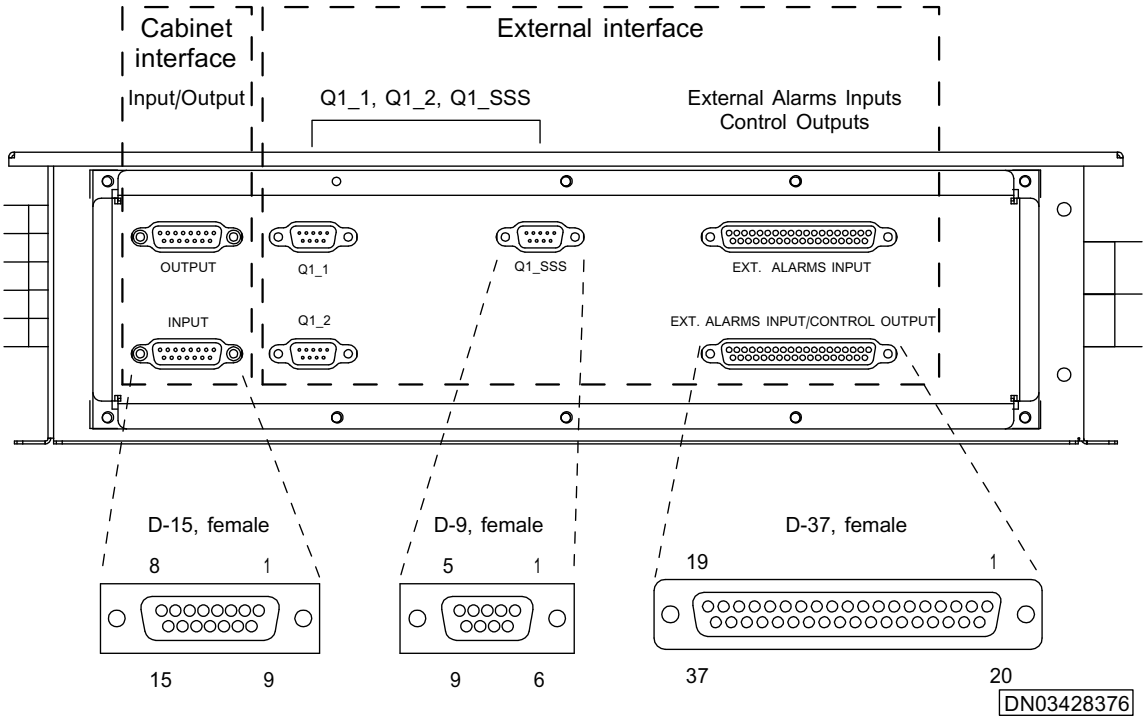


Figure 31. IFM board (front-mounted connectors)

Table 134. Front-mounted connectors

Interface	Reference designator	Connector type
Cabinet output	X2	D-15 (female)
Cabinet input	X1	D-15 (female)
Q1-1	X3	D-9 (female)

Table 134. Front-mounted connectors (cont.)

Interface	Reference designator	Connector type
Q1-2	X4	D-9 (female)
Q1-SSS	X7	D-9 (female)
External alarm input	X8	D-37 (female)
External alarm input/ control output	X9	D-37 (female)

Pin configurations

Table 135. Cabinet output pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	FCKP	2	FCKN	3	FNP
4	FNN	5	MAINS_A-LARM_OUTP	6	MAINS_A-LARM_OUTN
7	RLY	8	RELAY	9	SSS_CO-N_OUTP
10	SSS_CO-N_OUTN	11	CBL_C_O-UT	12	GND
13	Not used	14	Not used	15	Not used

Table 136. Cabinet input pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	FCKP	2	FCKN	3	FNP
4	FNN	5	MAINS_A-LARM_INP	6	MAINS_A-LARM_INN
7	RLY	8	GND	9	SSS_CO-N_INP

Table 136. Cabinet input pin configuration (cont.)

Pin	Signal	Pin	Signal	Pin	Signal
10	SSS_CO-N_INN	11	CBL_C_IN	12	GND
13	V48N	14	V48RTN	15	Not used

Table 137. Q1_1 pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_EXT-D_1P	2	Not used	3	GND
4	Not used	5	Q1_EXT-U_1P	6	Q1_EXT-D_1N
7	Not used	8	Not used	9	Q1_EX-TU_1N

Table 138. Q1_2 pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_EXT-D_2P	2	Not used	3	GND
4	Not used	5	Q1_EXT-U_2P	6	Q1_EXT-D_2N
7	Not used	8	Not used	9	Q1_EX-TU_2N

Table 139. Q1_SSS pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_SSS_-UP	2	Not used	3	GND

Table 139. Q1_SSS pin configuration (cont.)

Pin	Signal	Pin	Signal	Pin	Signal
4	Not used	5	Q1_SSS_-DP	6	Q1_SSS_-UN
7	Not used	8	Not used	9	Q1_SSS_-DN

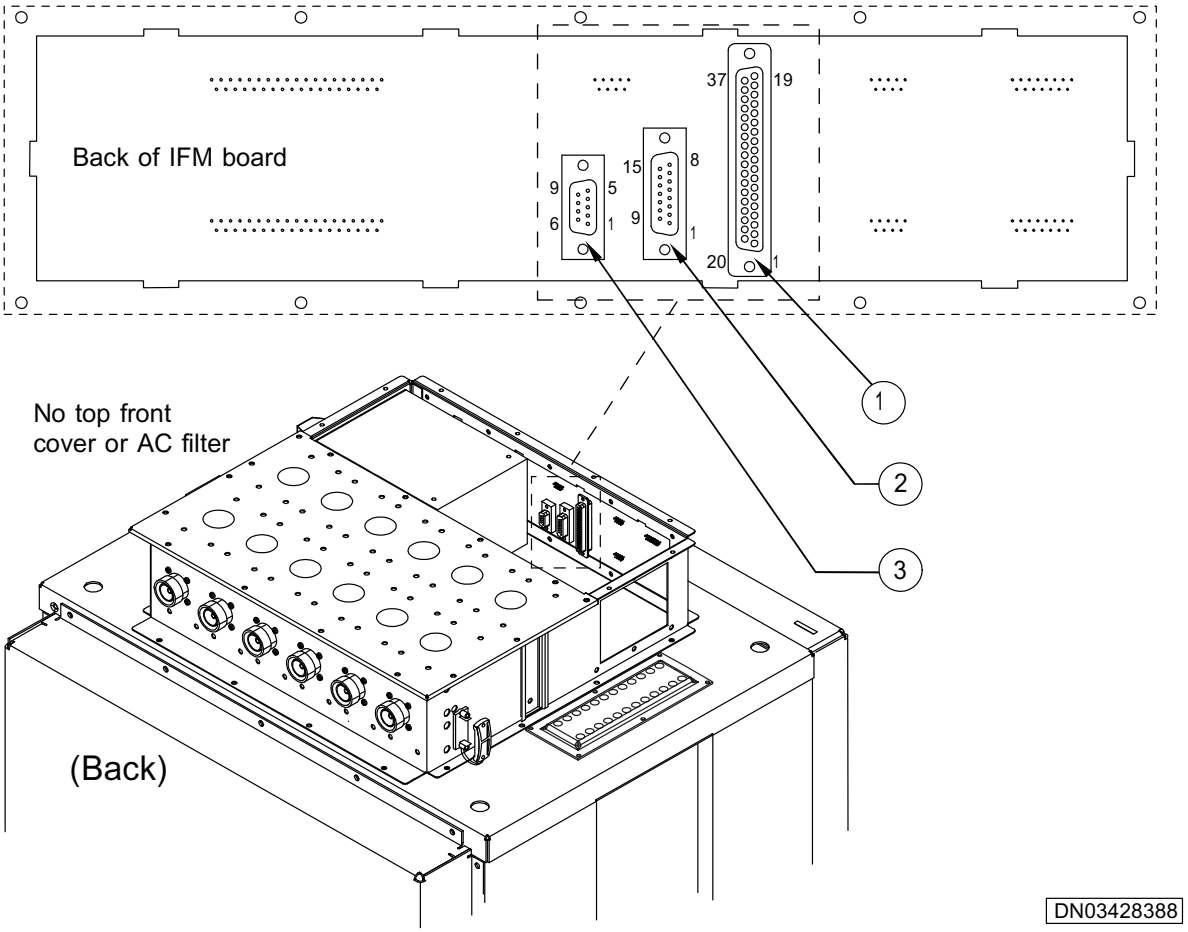
Table 140. External alarm pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	EXT_AL13	2	EXT_AL14	3	EXT_AL15
4	EXT_AL16	5	EXT_AL17	6	EXT_AL18
7	EXT_AL19	8	EXT_AL20	9	EXT_AL21
10	EXT_AL22	11	EXT_AL23	12	EXT_AL24
13	Not used	14	Not used	15	Not used
16	Not used	17	Not used	18	Not used
19	GND	20	GND	21	GND
22	GND	23	GND	24	GND
25	GND	26	GND	27	GND
28	GND	29	GND	30	GND
31	Not used	32	Not used	33	Not used
34	Not used	35	Not used	36	Not used
37	Not used				

Table 141. External alarm input/control output pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	EXT_CO1	2	EXT_CO2	3	EXT_CO3
4	EXT_CO4	5	EXT_CO5	6	EXT_CO6
7	EXT_AL1	8	EXT_AL2	9	EXT_AL3
10	EXT_AL4	11	EXT_AL5	12	EXT_AL6
13	EXT_AL7	14	EXT_AL8	15	EXT_AL9
16	EXT_AL10	17	EXT_AL11	18	EXT_AL12
19	GND	20	V5P	21	V5P
22	V5P	23	V5P	24	V5P
25	V5P	26	GND	27	GND
28	GND	29	GND	30	GND
31	GND	32	GND	33	GND
34	GND	35	GND	36	GND
37	GND				

5.1.3 Rear-mounted interface module board interfaces



1	Common backplane interface
2	Bias Tee interface
3	IBBU-Q1 interface

Figure 32. IFM board (rear-mounted connectors)

Table 142. Rear-mounted connectors

Interface	Reference designator	Connector type
Common backplane	X5	D-37 (female)
Bias Tee interface module	X6	D-15 (female)
IBBU - Q1	X10	D-9 (female)

Pin configurations

Table 143. Common backplane pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	ECO12CD	2	GND	3	ECO12CC
4	GND	5	Q1_SSS_-UP	6	Q1_SSS_-UN
7	Q1_SSS_-DP	8	Q1_SSS_-DN	9	EXT_FCK-P
10	EXT_FCK-N	11	Not used	12	Not used
13	Q1EXTU	14	GND	15	Q1EXTD
16	GND	17	V5P	18	GND
19	Not used	20	V5P	21	GND
22	EXT_FNP	23	EXT_FNN	24	V3P
25	GND	26	V3P	27	GND
28	V5P	29	GND	30	V48N
31	V48RTN	32	Not used	33	Not used
34	Not used	35	Not used	36	Not used
37	Not used				

Table 144. Bias Tee Interface Module pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	VSWR1	2	VSWR2	3	VSWR3
4	VSWR4	5	VSWR5	6	VSWR6
7	VSWR7	8	VSWR8	9	VSWR9
10	VSWR10	11	VSWR11	12	VSWR12
13	Not used	14	Not used	15	Not used

Table 145. IBBU Q1 pin configuration

Pin	Signal	Pin	Signal	Pin	Signal
1	Q1_SSS_-UP	2	Not used	3	GND
4	Not used	5	Q1_SSS_-DP	6	Q1_SSS_-UN
7	Not used	8	Not used	9	Q1_SSS_-DN

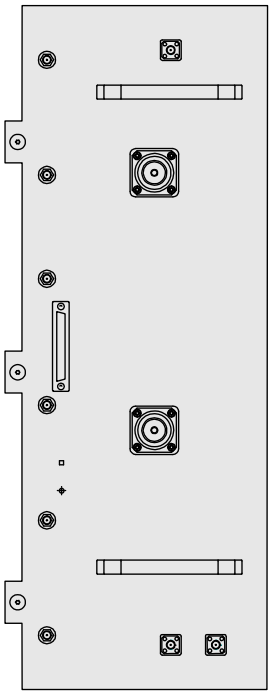
5.2 Technical data for the UltraSite EDGE BTS unit cable kits

Table 146. Unit cable kits

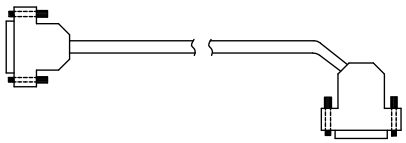
Category	Property	Cable quantity	From unit	To unit
066641x	993857xx (TSxx)	2 each	TSxx	M2xA or M6xA DVxx or RTxx or WCxA
066643x	994081x (M2xA)	2 each	DVxx or RTxx	M2xA

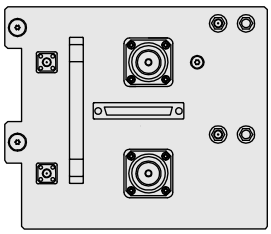
Table 146. Unit cable kits (cont.)

Category	Property	Cable quantity	From unit	To unit
066644x	993856x (M6xA)	2 each	DVxx or RTxx	M6xA
066647x	993747x (WCxA)	1 each	WCxA	WCxA or DVxx
069314x	993935x (Bias Tee)	2 each (Indoor cabinet) 4 each (Outdoor cabinet) 1 - Adaptor plate	Bias Tee Interface Module	BPxx
066646x	993997x (RTxx)	1 each	RTxx	RFU backplane
	993997x (DVxx)	1 each	DVxx	RFU backplane
069313x	993744x (Antenna: 2.0 m)	2 each	DVxx or RTxx	Antenna box
	993936x (Antenna: 1.4 m)	2 each	DVxx or RTxx	Antenna box
	993937x (Antenna: 1.7 m)	2 each	DVxx or RTxx	Antenna box

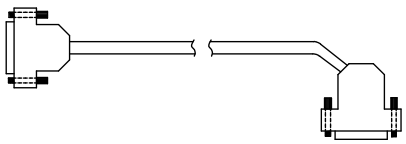


RTxx to RFU Backplane
Kit # 066646x.xxx / Part #993997x, quantity one





DVxx to RFU Backplane
Kit # 066646x.xxx / Part #993997x, quantity one



Antenna cable kit

Kit #069313x.xxx
Part:
#993744X, 2.0m long, quantity two
#993937X, 1.7m long, quantity two
#993936X, 1.4m long, quantity two

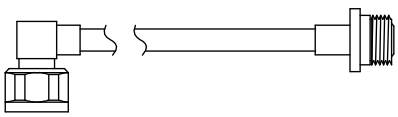


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Figure 33. Plug-in units with cable kits

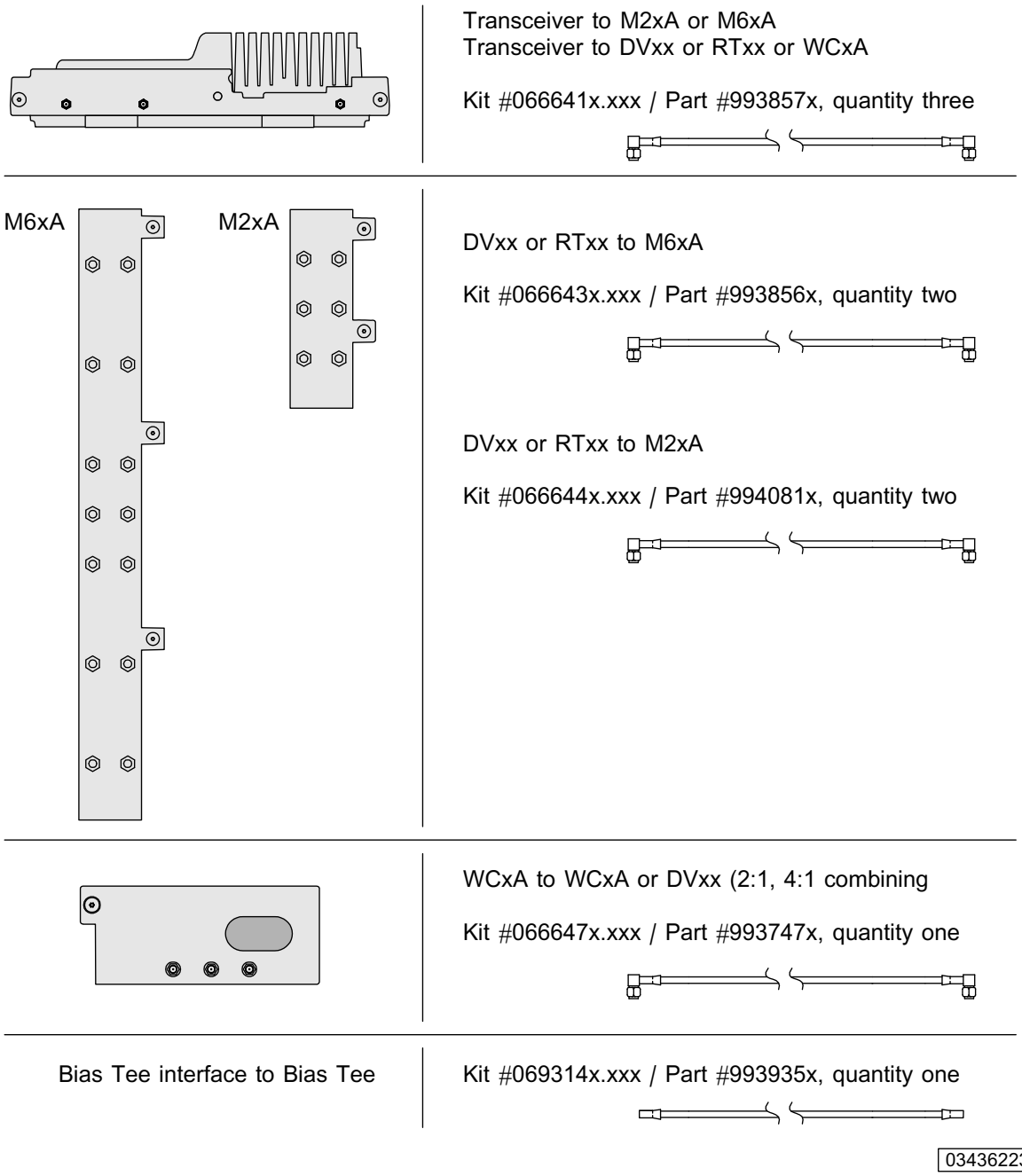


Figure 34. Plug-in units with cable kits

5.3 Technical data for the LMP cable of UltraSite EDGE BTS

The LMP cable provides a connection between the laptop computer and the LMP port on the CCUA.

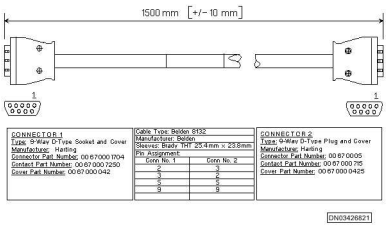


Figure 35. LMP cable specification

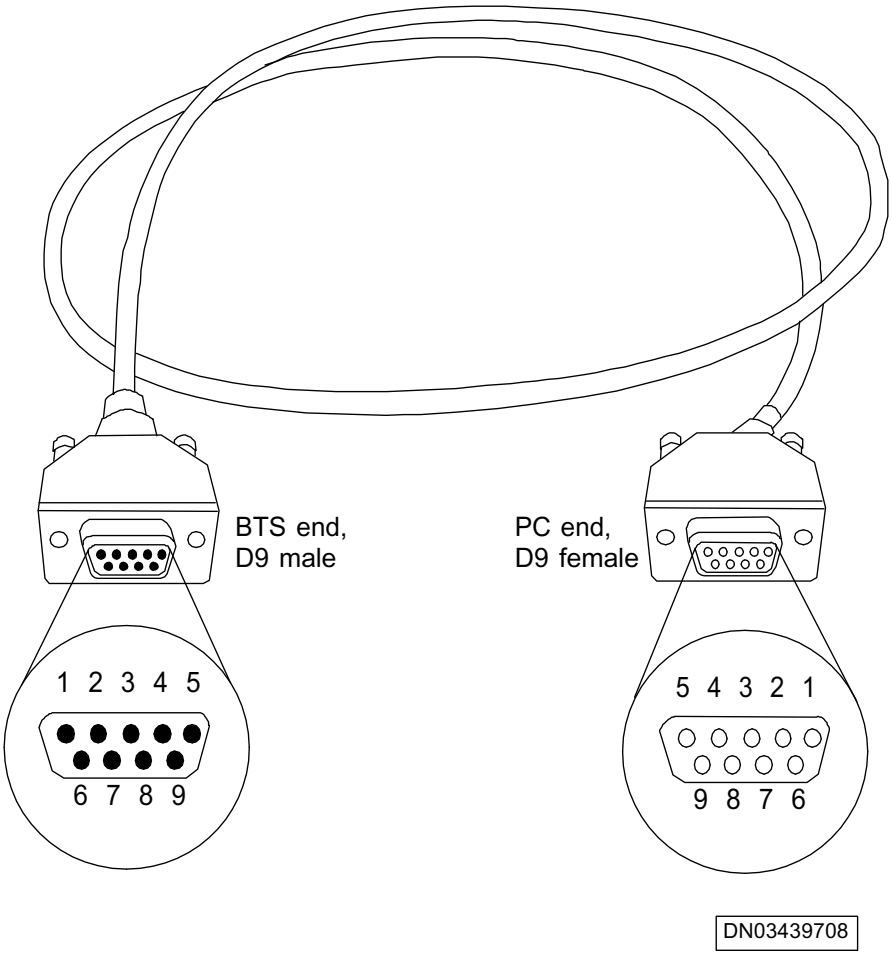


Figure 36. LMP cable

Table 147. Connector pin order

BTS end, D9 male, pin number	PC end, D9 female, pin number	PC end, D25 female, pin number
2, LMP in	3, transmitted data	2, transmitted data
3, LMP out	2, received data	3, received data
5, ground	5, ground	7, ground

6 Configurations for UltraSite EDGE BTS

6.1 Overview of configurations for UltraSite EDGE BTS

The choice of network configuration depends mainly on the requirements for transmission media and availability. The loop network configuration is the most reliable, providing excellent protection against equipment failures and radio-link fading.

Nokia UltraSite EDGE BTS directly supports all network configurations—*loop*, *chain*, *star*, point-to-point, and mesh. Separate transmission nodes are unnecessary, because the Nokia UltraSite EDGE BTS cabinet can hold up to four integrated transmission units.

Each BTS cabinet uses the FXC transmission units to add or drop capacity to other sites. The integrated transmission can groom traffic and serve as a PDHloop master. Cross-connections to 8 k granularity and grooming at the BTS further optimise transmission capacity.

6.2 Example network configuration: Loop

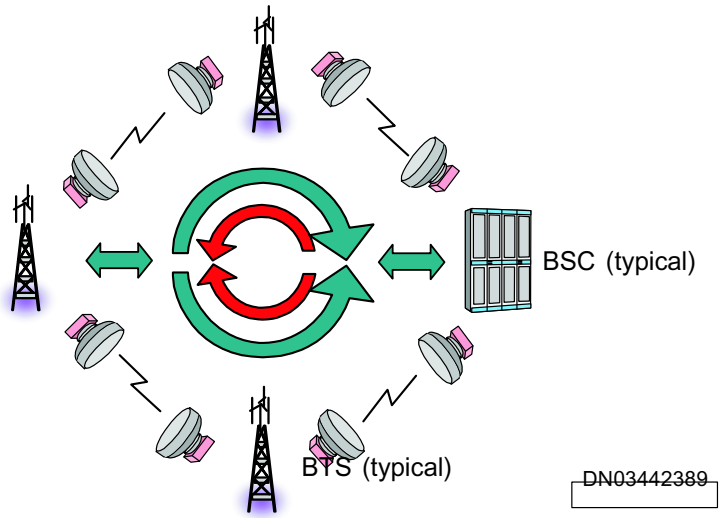


Figure 37. Nokia UltraSite loop configuration

For information about transmission network protection using loop topology, see *Transmission network protection using loop topology.*

6.3 Transmission network protection using loop topology

Introduction

Nokia Loop Protection is considered the most efficient way to protect traffic in a transmission network such as a GSM base station subsystem. In a live telecommunications network it is important to secure the network synchronisation and the centralised network management, in addition to the actual payload traffic, during any period of abnormal circumstances.

For these reasons, Nokia Loop Protection protects

- payload traffic
- network synchronisation
- network management connections.

A transmission loop formed with Nokia elements consists of one loop master and several loop slaves. Usually the loop master is a transmission node whereas the loop slaves can be either transmission nodes, BTSs or a combination of both inside one loop.

The loop principle is that the transmitted signal is always sent in both directions but the received signal must be chosen from only one direction. The loop master sends pilot bits on the basis of which the switching decision is made. Each individually protected slave station needs one pilot bit.

Network synchronisation must also be ensured in a loop network and it follows the loop principle in a similar way. The synchronisation switching takes place independently from the pilot bits by having a master clock bit (MCB) and a loop control bit (LCB).

Each network element decides individually from which direction the signal and the synchronisation will be received, and so it does not require any external or additional supervision for its decision.

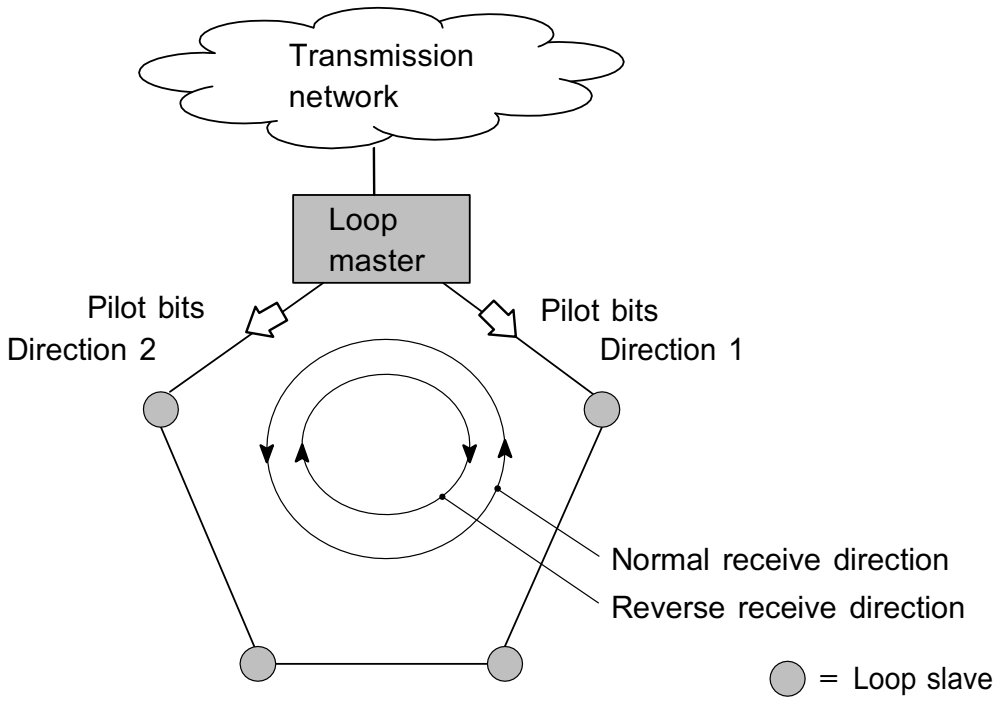


Figure 38. Loop principle

Nokia's way of implementing loop protection is ultimately secure, providing very fast route switching that recovers the transmission connections instantly. Nokia loop protection is embedded and thus very fast. Nokia loop protection protects against failures, such as cable-cut, equipment failure, heavy rain and multipath fading, and against obstacles in the line-of-sight, such as cranes and growing trees.

Compared to an unprotected wireless network, Nokia loop protection increases site availability at least tenfold and prevents end-of-chain availability degradation. Further, it enables significant hop length increases without site availability sacrifices and helps minimise radio link antenna sizes.

Nokia loop protection is an easily activated system feature where Nokia MetroHub and UltraSite BTS can act as a master node. In addition, several Nokia MetroHub nodes, UltraSite base stations, and MetroSite base stations can be looped together.

The protection functionality is compatible with the existing Nokia BSS transmission.

For more information refer to *Nokia PDH Loop Protection in GSM Networks*, which can be obtained from a Nokia representative upon request.

Protecting payload traffic

A pilot bit is a special bit with a preset value (zero), sent among the protected traffic in a known position.

For example, protecting a 2 Mbit/s link requires one bit out of the 2 Mbit/s stream to be reserved for this purpose. Similarly, if the traffic is protected at a partial 2 Mbit/s level, for example, because two different base transceiver stations share one 2 Mbit/s line, one pilot bit is required for each slave station.

The location of the pilot bit is defined in the network plan, and it is often within one of the last time slots of the 2 Mbit/s frame. In principle, the location can be selected freely, but a harmonised practise in the network may be advisable for easy site commissioning and network documentation.

The state of a pilot bit is set to zero at the sending station, which sends identical digital streams (payload and the pilot bit protecting it) in directions 1 and 2 in the loop.

Any failure in the connection between the sending station and the intended destination causes the pilot bit to change from zero to one (based on AIS). The target station, receiving a one instead of a zero then knows that the connection is faulty.

The following figure shows the loop principle between the loop master and one slave. The traffic in the other slave stations is bypassed.

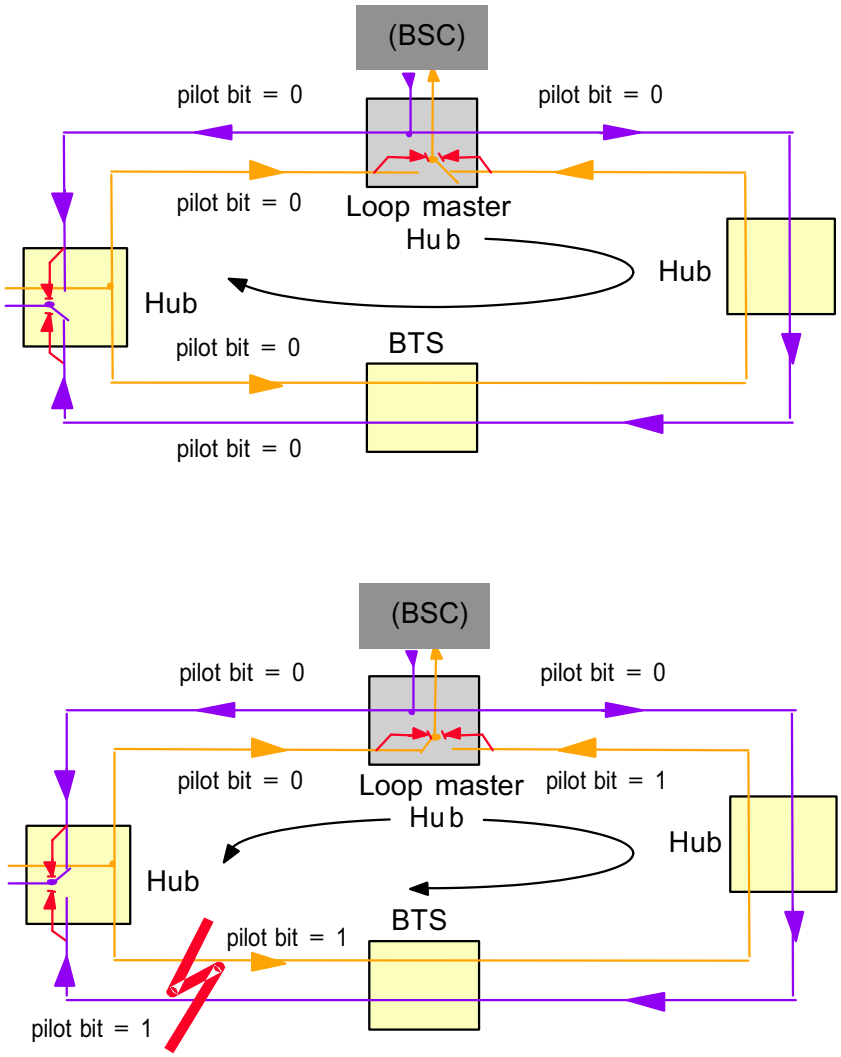


Figure 39. Traffic protection guided by pilot bit monitoring

The pilot bit is sent at the loop master Hub site for all the slave stations as zero with "Uni-directional fixed data" or "Bi-directional Masked" types of cross-connections. By using "Bi-directional Masked," you can reduce the amount of connections from two uni-directional to one bi-directional.

Masking pilot bits

The principle of masking in the loop network is to use the logical "AND" operation with zero, when the result is always zero, and masking with one when the output is the same as the input signal (either unchanged zero or one).

In the example in the following figure, pilot bits are sent to four slave nodes in the loop. The view is from a cross-connection termination point setting.

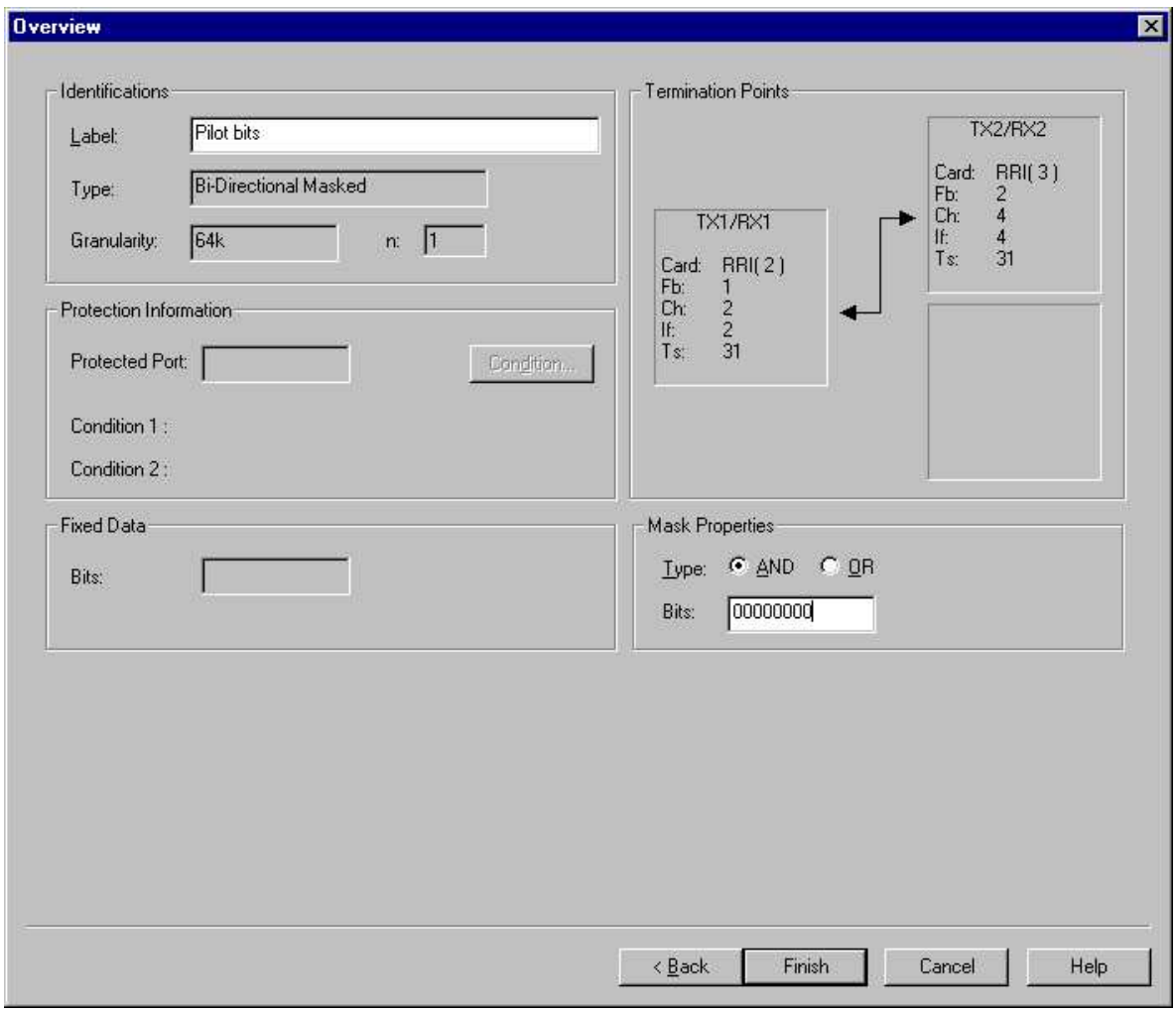


Figure 40. Pilot bit sent from a loop master

In loop slave sites, each node must forward the pilot bits from other slave stations unchanged and send its own pilot bit as zero in both loop directions. This is done with "Bi-directional Masked" type of cross-connection. The following figure presents the pilot bit masking of the second slave node (bit 2) and other pilot bits forwarding in the loop. The view is from a cross-connection termination point setting.

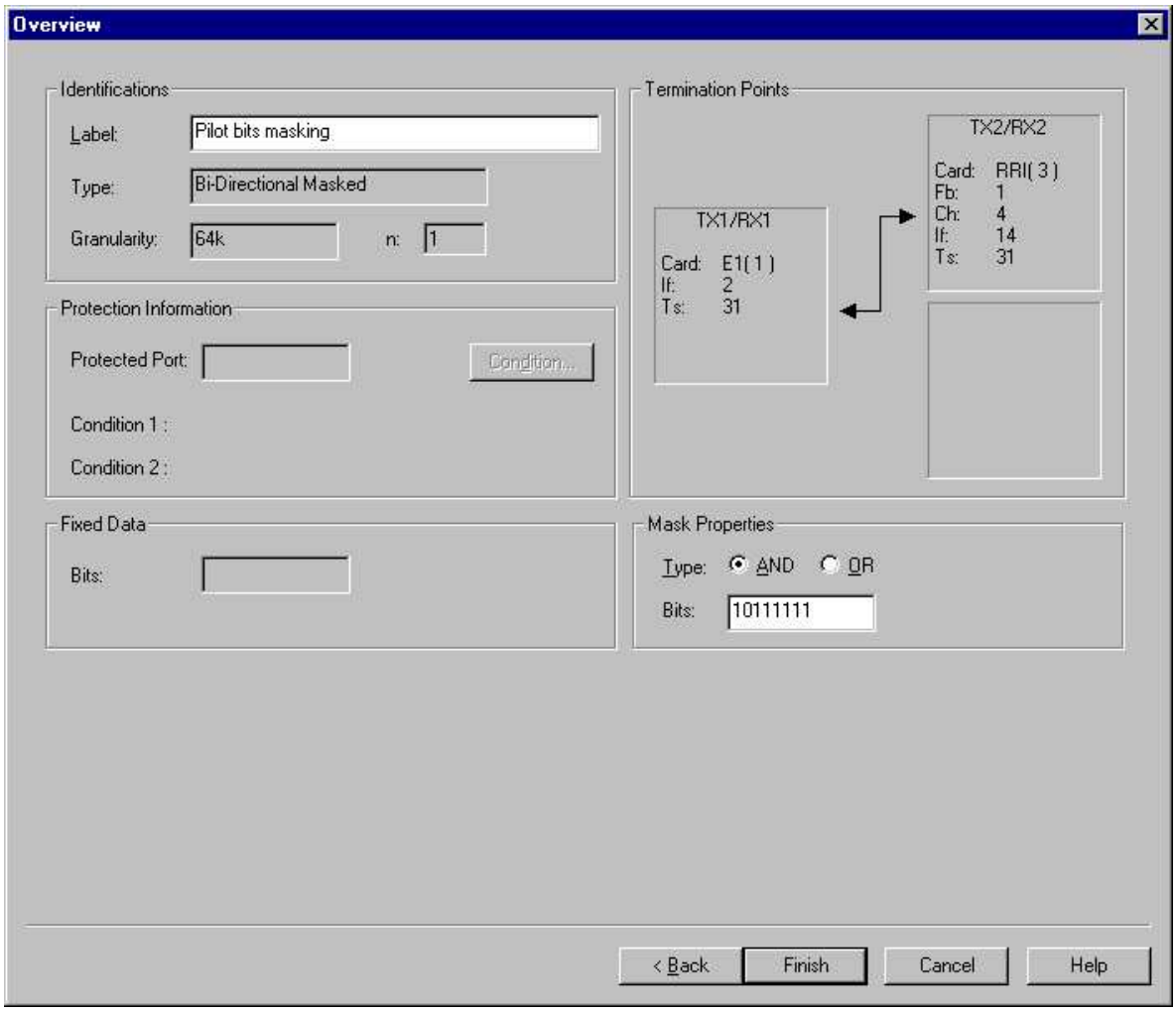


Figure 41. Pilot bit masking in the second loop slave

Nokia Loop Protection can be configured either as *equal switching* or *priority switching*. The difference between these is that in the priority switching the connection returns to the initial route as soon as the problem on that link is solved, whereas with the equal switching the system stays on the chosen link until it gets faulty. The equal switching provides better stability for the connection, and it is therefore the recommended choice for a BSS network.

Protecting network synchronisation

The implementation mechanism for an automatic detection and recovery of missing or looped network synchronisation is based on loop network clock control bits carried within the protected 2 Mbit/s stream:

- one bit for detecting if the incoming signal is synchronised by the original network synchronisation master or not (master clock bit, MCB), and
- one bit for detecting any breaks or loopbacks in the synchronisation chain (Loop Control Bit, LCB).

The loop master sets the MCB and LCB to zero state in both directions. Any station using a certain received signal for synchronisation sends the LCB back as one, and so the counterpart knows that the synchronisation of the incoming stream is inherited in such a way that it must not be used for synchronisation to avoid a loopback or otherwise faulty synchronisation. The same applies to all slaves to make sure the synchronisation remains intact.

Similarly, faulty transmission replaces MCB and LCB with one and affected stations know they are not receiving a valid source signal from that direction.

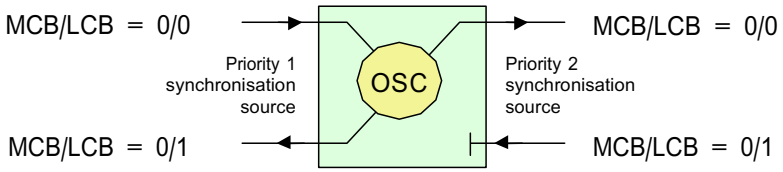


Figure 42. Manipulating synchronisation loop control bit

In the loop master Hub, the MCB/LCB can be sent as zero in both directions of the loop with "Uni-directional fixed data" or "Bi-directional Masked" types of cross-connections, but it is recommended to use Configuration → Synchronisation → Loop Bits setting to define the MCB/LCB bit positions.

Node master-slave detection

The Hub will recognise that it is defined as the master of the loop based on the following information. A synchronisation priority list is always defined first, then the MCB and LCB. The system recognises if the MCB and LCB are in the Synchronisation list and that makes the Hub a slave. If the MCB and LCB bits are not in the list, the node is a master. This detection is automatic. There are a couple of network cases which require the use of real MCB/LCB settings, so this is a better practice for common use.

These cases are, for example:

- Q1 loop termination is done based on the incoming LCB bit status. If the loop master node does not have the definition, the Q1 loop protection is not working.
- The Hub is acting as the master of one loop and the slave of another. The equipment uses loop synchronisation MCB/LCB definition, MCB = incoming MCB bit and LCB = 0 (except towards the interface where the clock is coming, where LCB = 1).
- MCB status is forwarded as received from an upper network element (loop master using chain synchronisation with MCB definition, MCB = incoming MCB bit and LCB = 0).
- Node master running ON internal clock which is not in priority l level (MCB/LCB = 1/0)

The following figure presents the setting of MCB/LCB bits in two directions in different FXC RRI units.

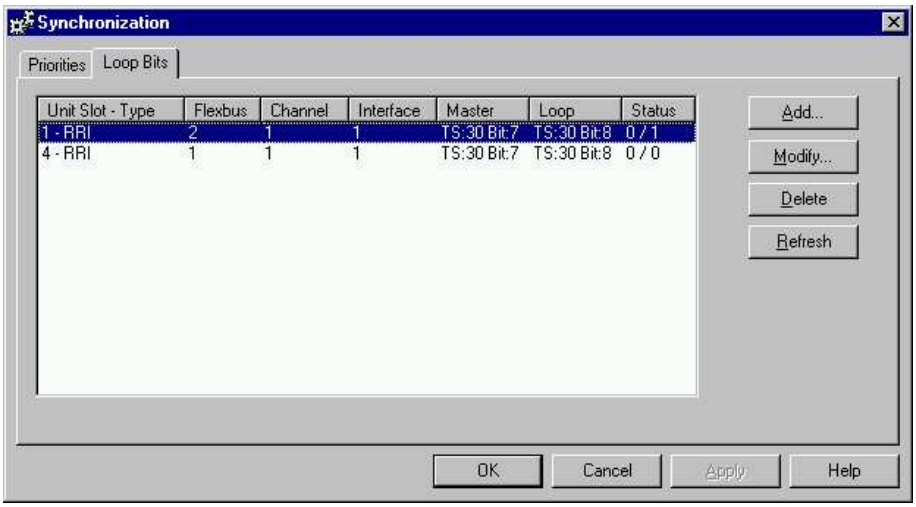


Figure 43. Setting of loop control bits

Note that node synchronisation is always based on priority and will thus return to a higher priority route whenever the problem on that link is solved, of course after certain hysteresis. This does not cause any problem to traffic because the synchronisation is coming from the same loop master.

The location of the MCB and LCB is defined in the network plan. In principle, the location can be selected freely, but a harmonised practise in the network may be advisable for easy site commissioning and network documentation.

Protecting remote network management channel

The Q1 network management channel used to manage Nokia PDH transmission elements is a bus, and therefore must not get looped.

Q1 loop protection is based on switching into a faultless direction when there is a breakage somewhere in transmission. The direction is changed according to an LCB bit (loop control bit which also controls the synchronisation in a loop network).

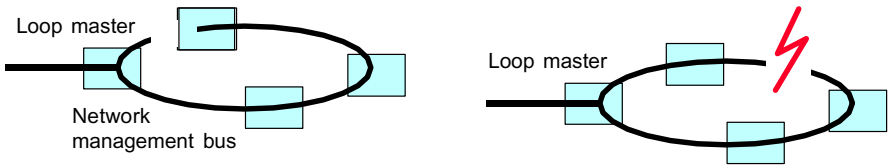


Figure 44. Network management bus circulation prevention

To avoid ringing and simultaneous polling from two directions, the Q1 loop must be terminated at the master node.

To terminate the loop at the master node:

- LCB (from the last slave node) = 0 → no faults in the network → forced termination towards the last slave node
- LCB (from the last slave node) = 1 → fault in the network → forced termination removed

This termination is used when the loop master is a Nokia MetroHub node, UltraSite BTS node, or Nokia DN2. The loop master is configured so that it sends network management channel in just one direction. When a fault occurs in that direction (the loop master detects that from the received LCB), it knows to allow the network management channel propagate in both directions. The Q1 EOC

hybrid switch must be set to "OFF" state towards the "Secondary Port" direction in the loop master. In this case, no additional settings to normal Q1 EOC channel are needed in the slave nodes. This is the recommended way to implement Q1 network management bus protection with Nokia PDH loop protection.

In some cases, when the loop master is an older Nokia BTS integrated transmission unit (TRUx or BIUMD), Q1 protection must be done in the first loop slave on the secondary port side of the loop master. In this case, both the Q1 primary port and the secondary port must be defined for the loop slave. Nokia MetroHub, UltraSite BTS, and MetroSite BTS support Q1 slave protection.

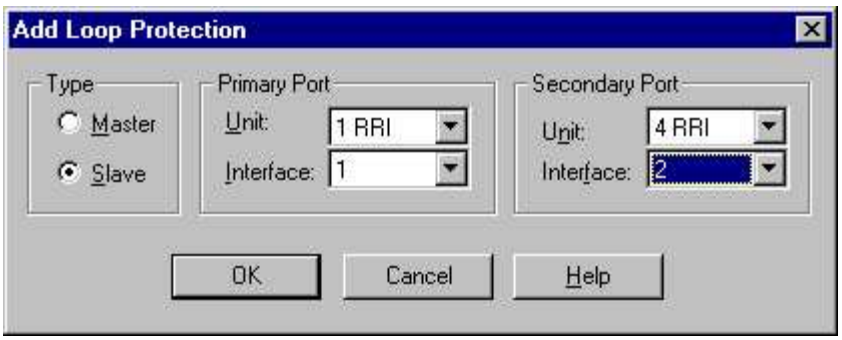


Figure 45. Setting of Q1 protection in the slave (in case of slave protection)

Note

Both the EOC and the MCB/LCB in the secondary port side must be defined in the same 2M interface in order for the Q1 loop protection to work.

Hints for using a loop network

- It is recommended that you use different FXC units for the Protected and Protecting ports of a connection to gain the maximum protection in the hardware reliability sense.
- When 16 x 2 Mbit/s capacity loops are built, each of the three loop directions requires a separate FXC RRI unit.

6.4 Example network configuration: Star

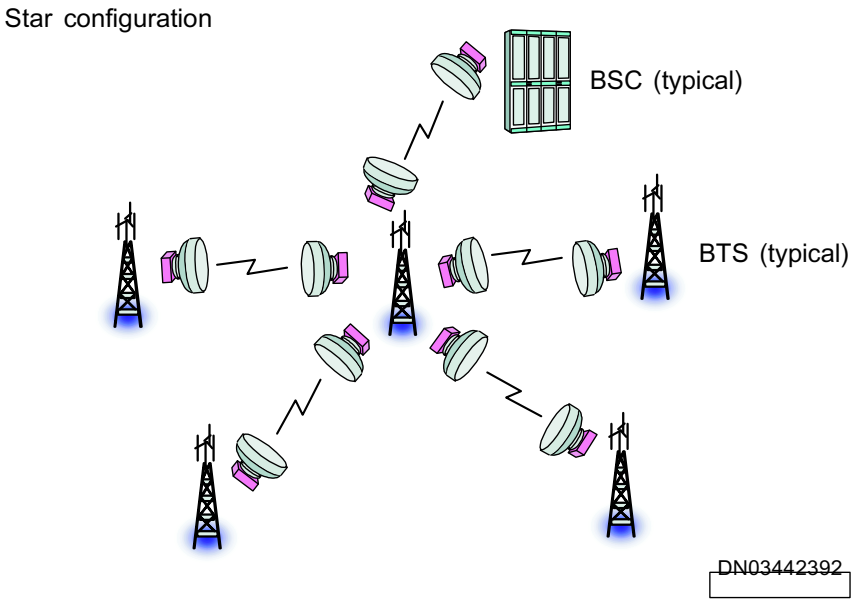


Figure 46. Nokia UltraSite star configuration

6.5 Example network configuration: Chain

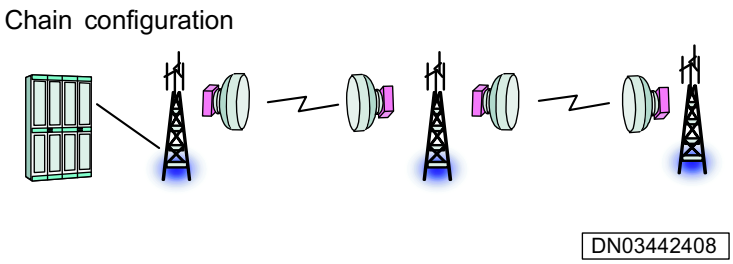


Figure 47. Nokia UltraSite chain configuration

7 Technical descriptions of UltraSite BTS Hub Manager

7.1 UltraSite BTS Hub or MetroHub Manager menu overview

All UltraSite BTS Hub and MetroHub Manager functions can be accessed through the application menus. The main functions under the menus are briefly described in the figure below.

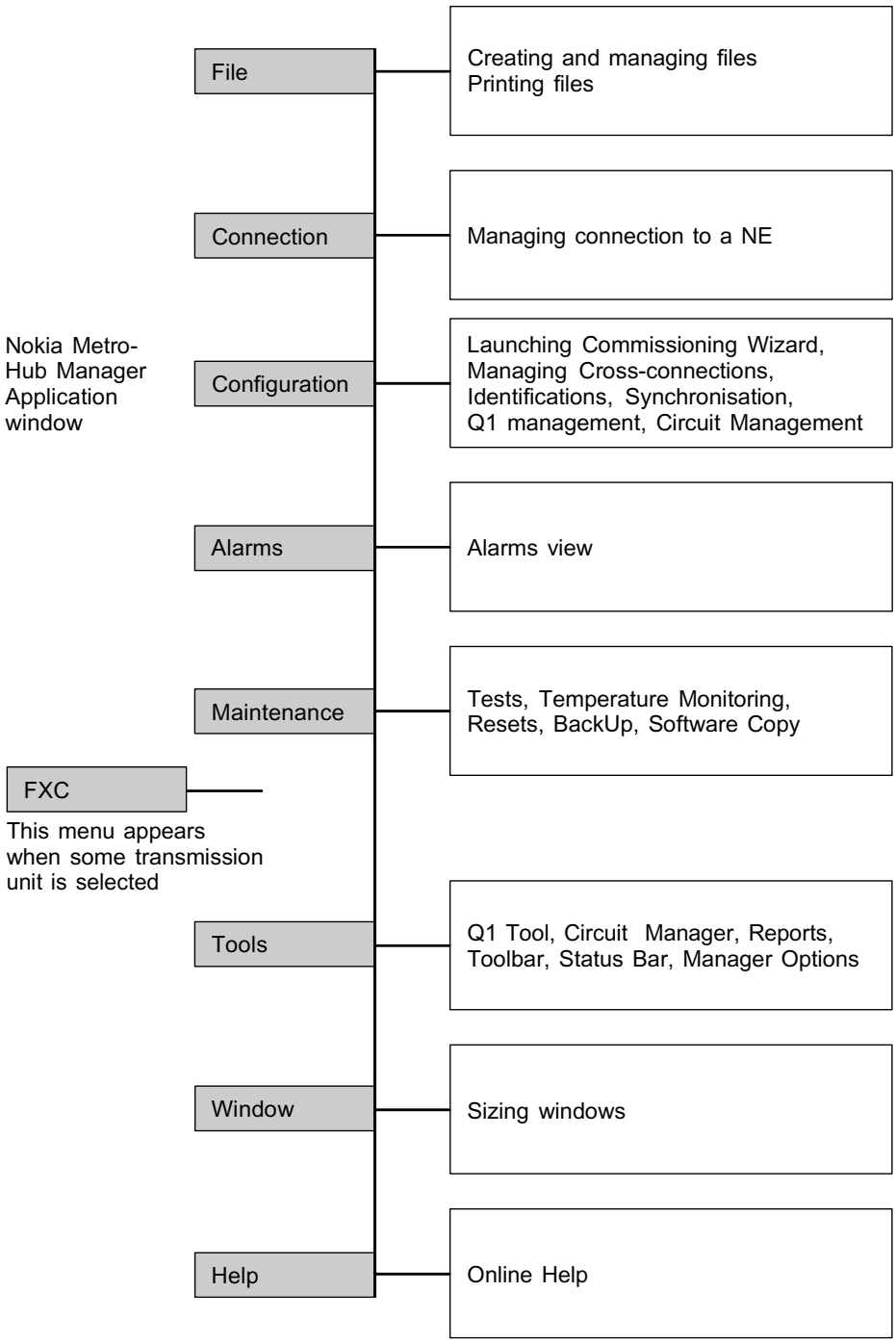


Figure 48. Overview of UltraSite BTS Hub or MetroHub Manager menus

7.2 Transmission capacity expansion

In addition to being a transmission node, UltraSite BTS Hub or MetroHub serves as a flexible transmission capacity reserve in the network, enabling rapid revenue growth by easy and flexible capacity increase with minimised implementation time and cost.

The growing amount of traffic in the network requires flexible transmission capacity expansion. This is accomplished by adding transmission units into the BTS Transmission Hub when needed. With these transmission units, BTS Transmission Hub can be connected, for example, to eight Nokia FlexiHopper radios, with up to 16 x 2 Mbit/s capacity each, or to eight Nokia MetroHopper radios, with 4 x 2 Mbit/s capacity each. The radio connections are made via a single Flexbus cable that carries the payload and the radio power feed. The maximum interface capacity of the BTS Transmission Hub is 128 x 2 Mbit/s. From this capacity, 56 x 2 Mbit/s can be cross connected. It is also possible to connect BTS Transmission Hub to a separate MetroHub or to other transmission equipment. The maximum number of E1 or T1 connections is sixteen. Furthermore, several BTS Transmission Hubs can be chained.

7.3 Transmission unit cross-connections

Cross-connection bus

The transmission units offer dynamic allocation and deallocation of the 56 x 2 Mbit/s cross-connection bus of the MetroHub and the UltraSite BTS according to the physical interfaces that are present in the node configuration. The user can create cross-connections between any physical interfaces connected to the cross-connection bus.

When the first cross-connection is created to the interface, the 2M cross-connection block is allocated to it. If there are no free blocks to be allocated, the node gives the alarm *20 Blocked from use*.

Backup

The active cross-connection bank is backed up in the transmission unit's non-volatile memory: so if the unit is removed, the cross-connections are restored when the unit is inserted again.

Grooming

The cross-connection feature of the transmission units makes traffic grooming possible.

The FXC units are capable of grooming traffic at 8 kbit/s granularity, which enables fully optimised and flexible use of available transmission resources. This ensures that the Abis transmission capacity can be used efficiently.

Cross-connection granularities

There are several types of cross-connection available, and each has a different granularity.

Granularity means the number of bits connected into a specific direction in a cross-connection. In the 2 Mbit/s mode, the available granularities are:

- 8k (1 bit)
- 16k (2 bits)
- 32k (4 bits)
- 64k (all the 8 bits in a time slot)
- n x 64k
- 2M

Note

All 2 Mbit/s platform interfaces are terminated which means that time slot 0 is regenerated.

Note

Only 2 Mbit/s cross-connections that are made from Flexbus to Flexbus inside a FXC RRI unit are transparent.

Basic cross-connection types

The cross-connections are created into banks. The node contains two cross-connection banks.

The transmission units support all the cross-connection types described below.

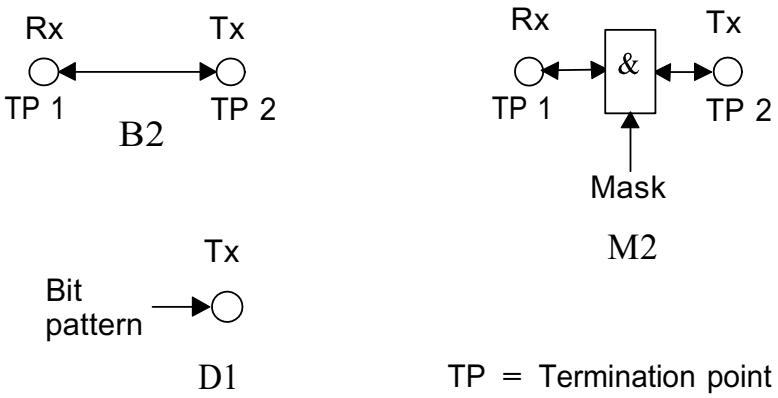


Figure 49. Basic cross-connection types supported

- B2 bi-directional cross-connection

The B2 cross-connection is a bi-directional connection between two termination points. The granularities are 2M, nx64k, 64k, 32k, 16k and 8k.

- M2 bi-directional masked cross-connection

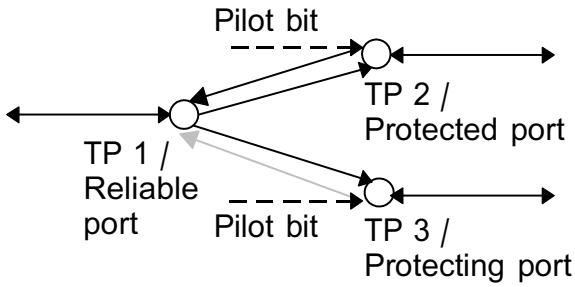
The M2 bi-directional masked cross-connection is a bi-directional connection between two termination points. The received data stream is masked bit by bit with fixed data. Masking can be done with a logical AND or OR operation. The masking is made in both directions. The M2 cross-connection supports 64k, 32k and 16k granularity.

- D1 uni-directional fixed cross-connection

The D1 cross-connection is a uni-directional cross-connection where fixed data is sent from the Tx port as shown in the figure above. The user sets the fixed bit pattern used (for example: 01101101) and the time slot where the bit pattern is transmitted. The D1 cross-connection supports 64k, 32k, 16k and 8k granularities.

Cross-connection protection

The B2 cross-connection can be protected. Protection means that the data path through the network element has two alternative routes. The protected bi-directional cross-connection is called the PB2 cross-connection.



TP = Termination point

Figure 50. Protected bi-directional cross-connection

When a protected bi-directional cross-connection is made, both the switch and data duplicating cross-connections are created. Data received from the reliable port is duplicated and sent to both the protected and protecting port. The switching decision is made according to the incoming value of the chosen condition bits (pilot bits).

The granularities for protected cross-connections are n x 64k, 64k, 32k and 16k.

The port selection is called a *switch.* After creating the switch, the user must define the *switching condition.* The supported conditions are *Priority* and *Equal.*

For more details on loop protection, see *Transmission network protection using loop topology.*

7.4 Node control unit

When any of the FXC units is inserted into unit slot 1, it automatically starts to function as a node control unit. The role of the unit is thus only determined by the slot position.

The node control unit provides a common clock to synchronise all the other FXC units with. An FXC unit must always be used in unit slot 1 in order for the configuration to work.

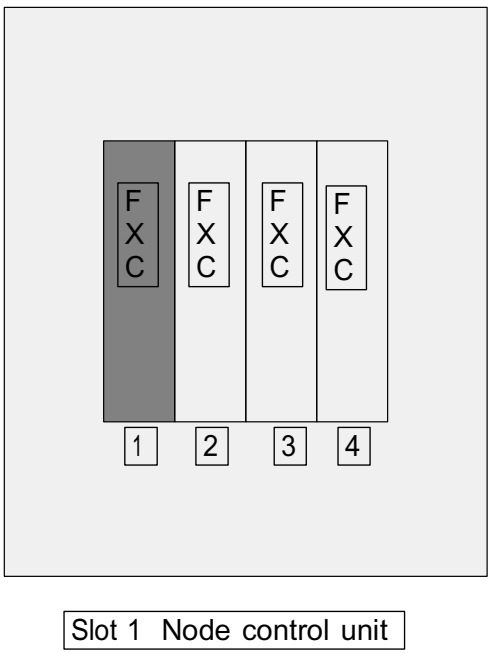


Figure 51. Transmission unit slots

7.5 Synchronisation

The node control unit provides a common clock signal for synchronising all the other FXC units. Synchronisation is needed to be able to make cross-connections on a bit level and to avoid slips in transmission. It is recommended that the synchronisation input is taken from an upper network element, typically a base station controller (BSC) in BSS.

All platform interfaces can be used as a synchronisation source. The clock is selected from a four-level priority list generated by the user according to the current network configuration.

If none of the recovered line clocks in the priority list is available, all the FXC units are synchronised to the internal oscillator of the node control unit.

7.6 Performance management

FXC E1/T1 and FXC E1 line interfaces and FXC RRI platform interfaces support the following performance measurements:

Table 148. Interface performance measurements

ID text	Infinite counter	24 h counter	15 min counter	Current value	Measuring unit	Description
G.826 TT	X	X	X		seconds	Total time as specified in G.826
G.826 AT	X	X	X		seconds	Available time as specified in G.826
G.826 ES	X	X	X		seconds	Errored seconds as specified in G.826
G.826 SES	X	X	X		seconds	Severely errored seconds as specified in G.826
G.826 BBE	X	X	X		counter	Background block errors as specified in G.826
G.826 EB	X	X	X		counter	Errored block as specified in G.826
Frame sync lost	X				counter	Number of FSL errors since the counter was last cleared
Line attenuation				X	dB	Current line attenuation*)

*) Line attenuation measurement is only supported for FXC E1 and FXC E1/T1 line interfaces

Table 149. Unit performance measurement

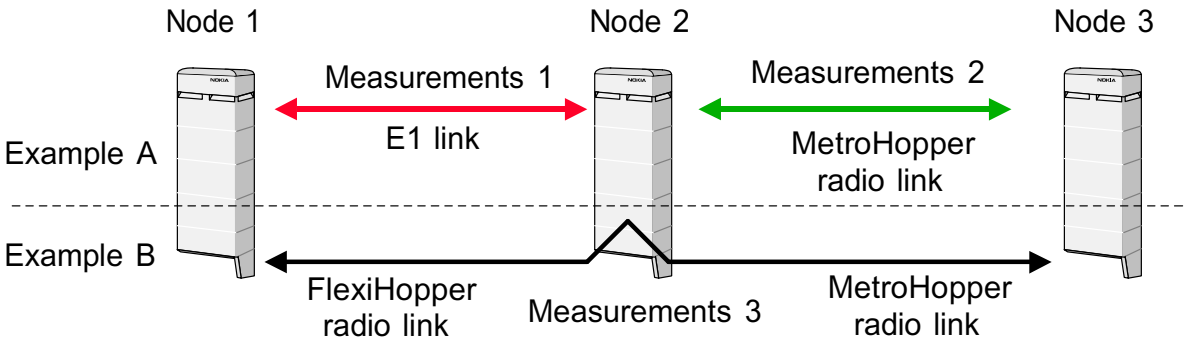
ID text	Infinite counter	24 h counter	15 min counter	Current value	Measuring unit	Description
CPU reset	X				counter	Number of unit CPU resets since the counter was last cleared
Timeslot monitoring				X	data	Data of selected timeslot

Unit reset clears all counters exept CPU reset counter, the value of which is saved to flash memory. With the node manager, the user can clear all counters.

Performance monitoring data can be read with the node manager and with BSC. With node manager all supported measurements can be reviewed exept FXC RRI 24h and 15min G.826 counters.

BSC has TRE (G.826) and TRE_SEL (G.826 and RX-input level Max_Min from radio outdoor unit) measurements. Measurement period with TRE is always 24h. For the TRE_SEL measurement, the intervals of 15, 30 or 60 minutes, or 2, 3, or 24 hours are available. Note: With 24h period RX-input level Max_Min is not available.

The measurements are only made in the receiving direction. In order to measure both directions, one must set up two different measurements. The measurements can be made as described in the following figure.



Node = Nokia UltraSite, MetroSite or MetroHub

Figure 52. Measurements

Example A

Measurements 1 are carried out between Node 1 and Node 2, where the connection is set up via an E1 line. Measurements 2 are made between Node 2 and Node 3 along a connection created with Nokia MetroHopper.

Example B

Measurements 3 are carried out between Node 1 and Node 3, where the cross-connection in Node 2 is implemented by using the traffic bypass feature. In this case the signal is not terminated in Node 2, since cross-connections made by traffic bypass are transparent on the 2 Mbit/s level. The connection between Node 1 and Node 2 is set up by using Nokia FlexiHopper and the connection between Node 2 and Node 3 is set up via Nokia MetroHopper.

8 Glossary

8.1 Glossary for UltraSite EDGE BTS

8.1.1 Abbreviations and acronyms

This section lists abbreviations and acronyms used throughout Nokia UltraSite EDGE Solution documentation.

AC	Alternating Current
ACFU	AC Filter Unit
A/D	Analog/Digital
ADC	Analog to Digital Converter
ADUA	AC/DC control and distribution unit for Integrated Battery Backup (IBBU)
AGC	Automatic Gain Control
ALS	Automatic Laser Shutdown
AMR	Adaptive Multi-Rate coding
ANSI	American National Standards Institute
ANT	Antenna connector
ARFN	Absolute Radio Frequency Channel Number
ASIC	Application Specific Integrated Circuit
ATM	Asynchronous Transfer Mode

AWG	American Wire Gauge
AXC	ATM cross-connect
AXU	ATM cross-connect unit
BAPT	Bundesamt für Post und Telekommunikation Telecommunications advisory agency of Federal Republic of Germany
BATx	Rectifier for battery backup
BBAG	12 V battery for Integrated Battery Backup (IBBU)
BB2x	Transceiver Baseband unit • BB2A for GSM • BB2E for GSM/EDGE
BCCH	Broadcast Control Channel
BCF	Base Control Function
BER	Bit Error Ratio The ratio of the number of bit errors to the total number of bits transmitted in a given time interval.
BIST	Built-In Self Test A technique that provides a circuit the capability to carry out an implicit test of itself.
BOIx	Base Operations and Interfaces unit
BPxN	Bias Tee without VSWR monitoring • BPDN for GSM 900/1800/1900 • BPxV Bias Tee with VSWR monitoring • BPGV for GSM 900 • BPDV for GSM 1800/1900
BS	British Standards
BSC	Base Station Controller

BSS	Base Station Subsystem
BTS	Base Transceiver Station (Base Station)
CC	Cross-Connection
CCCH	Common Control Channel
CCITT	Comité Consultatif International Télégraphique et Téléphonique International Telegraph and Telephone Consultative Committee (Telecommunications advisory agency of France)
CCUA	Cabinet Control Unit
CDMA	Code Division Multiple Access A technique in which the radio transmissions using the same frequency band are coded in a way that a signal from a certain transmitter can be received only by certain receivers
CE	Cable Entry; Consumer Electronics; Conformit Européen (European Conformity) CH Channel
CHDSP	Channel Digital Signal Processor
CN	Change Note A short trouble management document in a specified form sent to a customer about a modification in a product
CRC	Cyclic Redundancy Check A method for detecting errors in data transmission.
CRMx	Core Mechanics for Nokia UltraSite EDGE Base Station Indoor and Outdoor cabinet • CRMA for Indoor and Outdoor cabinets • CRMB for Site Support cabinets • CRMC for Midi Indoor and Outdoor cabinets
CSC	Customer Services Centre
D/A	Digital/Analog

DC	Direct Current
DCS	Digital Cellular System
DDS	Direct Digital Synthesis The frequency synthesis in which logic and memory are used to digitally construct the desired output signal, and a digital-to-analogue converter is used.
DL	(Downlink) The direction of transmission in which the BTS is the transmitting facility and the mobile station is the receiving facility.
DIP	Dual In-line Package
DRAM	Dynamic Random Access Memory
DRX	Discontinuous Reception
DSP	Digital Signal Processor
DTX	Discontinuous Transmission
DU2A	Dual Band Diplex Filter unit for GSM 900/1800
DVxx	Dual Variable Gain Duplex Filter unit • DVTB for GSM/EDGE 800 • DVTC for GSM/EDGE 800 co-siting • DVGA for GSM/EDGE 900 • DVHA for GSM/EDGE 900 customer-specific H band • DVJA for GSM/EDGE 900 customer-specific J band • DVDC for GSM/EDGE 1800 • DVDA for GSM/EDGE 1800 A band • DVDB for GSM/EDGE 1800 B band • DVPA for GSM/EDGE 1900
E1	European Digital Transmission Format Standard (2.048 Mbit/s)
EAC	External Alarms and Controsl

EC	European Community
EDGE	Enhanced Data rates for Global Evolution
EEC	European Economic Community
EEPROM	Electronically Erasable Programmable Read Only Memory
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EMP	Electromagnetic Pulse
EN	European Norm
EQDSP	Equaliser Digital Signal Processor
ESD	Electrostatic Discharge
ET	Exchange Terminal
ETSI	European Telecommunications Standards Institute
Ext.	External
FACCH	Fast Associated Control Channel
FACH	Forward Access Channel
FCC	Federal Communications Commission The United States federal agency responsible for the regulation of interstate and international communications by radio, television, wire, satellite, and cable.
FC E1/T1	Wireline transmission unit (75 [ohm] E1, 120 [ohm] E1, or 100 [ohm] T1) of Nokia UltraSite EDGE Base Station without cross-connection capability.
FCLK	Frame Clock
FET	Field Effect Transistor
FHS	Frequency Hopping Synthesiser

FIFP	Forwarded Intermediate Frequency Power
FIKA	+24 VDC Installation Kit
FPGA	Field Programmable Gate Array
FXC E1	Wireline transmission unit (75 [ohm] E1) with four line interfaces to the 2 Mbit/s (E1) transmission line; cross-connection capability at 8 kbit/s level.
FXC E1/T1	Wireline transmission unit (120 [ohm] E1 or 100 [ohm] T1) with four line interfaces to the 2 Mbit/s (E1) or 1.5 Mbit/s (T1) transmission line; cross-connection capability at 8 kbit/s level.
FXC RRI	Radio link transmission unit (radio indoor unit) with cross-connection capability at 8 kbit/s level. Used with MetroHopper Radio and FlexiHopper Microwave Radio.
Gb	Interface between RNC and SGSN
GMSK	Gaussian Minimum Shift Keying
GND	Ground; Grounding (protective earthing). See Grounding and PE.
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications • GSM 800 GSM 800 MHz frequency band • GSM 900 GSM 900 MHz frequency band • GSM 1800 GSM 1800 MHz frequency band • GSM 1900 GSM 1900 MHz frequency band
GUI	Graphical User Interface
HDLC	High-level Data Link Control
HETA	Base station cabinet heater
HO	Handover

	The action of switching a call in progress from one radio channel to another, to secure the continuity of the established call
HSCSD	High-Speed Circuit Switched Data
HV	High Voltage
HW	Hardware Specfically, electronic equipment supporting data transmission and processing tasks, and the electrical and mechanical devices related to their operation
IAKx	Indoor Application Kit for Nokia UltraSite EDGE Base Station • IAKA for UltraSite Indoor cabinet • IAKC for UltraSite Midi Indoor cabinet
IBBU	Integrated Battery Backup
IC	Integrated Cell
ICE	Intelligent Coverage Enhancement
ID	Identification; Identifier IE Information Element The basic unit of a transaction capabilities application part (TCAP) message.
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IF	Intermediate Frequency
IFM	Interface Module
IFU	Interface unit
ILKA	Indoor Lock Kit
ILMT	Integrated Local Management Tool

IMA	Inverse Multiplexed ATM
IP	Ingress Protection
IRPA	International Radiation Protection Association
ISDN	Integrated Services Digital Network
ISHO	Inter-system handover The handover from one system to another.
ISO	International Organization for Standardization
ITU	International Telecommunication Union
L2	AC Phase 2
L3	AC Phase 3
Iu	The interconnection point between the RNC and the Core Network
Iub	Interface between the RNC and node B
Iubis	Interface between the RNC and the BTS
Iur	The logical interface for the interconnection of two radio network controller (RNC) components of the UMTS terrestrial radio access network (UTRAN) system
JIS	Japanese Industrial Standard
LAN	Local Area Network A data transmission network covering a small area.
LAPD	Link Access Protocol on D-channel between the BSC and BTS
LED	Light Emitting Diode
LMB	Local Management Bus
LMP	Local Management Port

LNA	Low-Noise Amplifier
LO	Local Oscillator
LTE	Line Terminal Equipment
LV	Low Voltage
LVD	Low Voltage Disconnect
LVDS	Low Voltage Differential Signalling
LVTTL	Low Voltage Transistor Transistor Logic
M2xA	2-way Receiver Multicoupler unit • M2LA for GSM/EDGE 800/900 • M2HA for GSM/EDGE 1800/1900 • M6xA 6-way Receiver Multicoupler unit • M6LA for GSM/EDGE 800/900 • M6HA for GSM/EDGE 1800/1900
MAC	Medium Access Control function, handles the channel allocation and multiplexing, that is, the use of physical layer functions.
MCLG	Master Clock Generator
MDF	Main Distribution Frame
MHA	Masthead Amplifier
MMI	Man-Machine Interface
MML	Man-Machine Language A text-based command language with a standardised structure, designed to facilitate direct user control of a system.
MNxx	Masthead Amplifier specific to Nokia UltraSite EDGE Base Station • MNGA for GSM/EDGE 800/900 • MNDA for GSM/EDGE 1800 A band • MNDB for GSM/EDGE 1800 B band

- MNPA for GSM/EDGE 1900 A band
- MNPB for GSM/EDGE 1900 B band
- MNPC for GSM/EDGE 1900 C band

MPT — Ministry of Posts and Telecommunications

Telecommunications regulatory agency of Great Britain.

MS — Mobile Station

User equipment which uses a radio connection, and which can be used in motion or at unspecified points. This is usually a mobile phone.

MSC — Mobile Switching Centre

The mobile network element which performs the switching functions in its area of operation, and controls cooperation with other networks.

MTBF — Mean Time Between Failure

NCRP — National Council on Radiation Protection and Measurements

NCU — Node Control Unit

NEBS — Network Equipment Building Systems

NED — Nokia Electronic Documentation

NMS — Network Management System

O&M — Operation and Maintenance

OAKB — Cable entry kit for BTS co-siting

OAKx — Outdoor Application Kit for Nokia UltraSite EDGE Base Station

- OAKA for UltraSite Outdoor cabinet
- OAKC for UltraSite Midi Outdoor cabinet
- OAKD for UltraSite Midi Outdoor to Talk-family Co-siting

OBKA — Outdoor Bridge Kit

OCXO	Oven Controlled Crystal Oscillator An oscillator in which the crystal and critical circuits are temperature-controlled by an oven.
OEKA	Outdoor (cable) Entry Kit
OFKA	Outdoor Air Filter Kit
OFKC	MIDI Outdoor Air Filter Kit
OMU	Operation and Maintenance Unit
OMUSIG	OMU Signalling
OVP	Over-Voltage Protection
PC	Personal Computer
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PE	Protective earthing (grounding) See GND and Grounding.
PFC	Power Factor Correction
PLL	Phase-Locked Loop
Point-to-point	Transmission between two fixed points
PSM	Power System Management
PWM	Pulse Width Modulation
PWSx	AC/DC Power Supply unit • PWSA for 230 VAC input • PWSB for -48 VDC input • PWSC for +24 VDC input
Q1	Nokia proprietary transmission management protocol

RACH	Random Access Channel
RAKE	A receiver capable of receiving and combining multipath signals
RAM	Random Access Memory
RAN	Radio Access Network A third generation network that provides mobile access to a number of core networks of both mobile and fixed origin.
RCD	Residual Current Device
RF	Radio Frequency
RFF	Radio Frequency Fingerprinting
RIFP	Reflected Intermediate Frequency Power
RLE	Radio Link Equipment
RNC	Radio Network Controller The network element in a radio access network which is in charge of the use and the integrity of radio resources.
ROM	Read Only Memory
RRI	Radio Relay Interface
RSSI	Received Signal Strength Indicator
RTC	Remote Tune Combining
RTxx	Remote Tune Combiner • RTGA for GSM/EDGE 900 • RTHA for GSM/EDGE 900 H band • RTJA for GSM/EDGE 900 J band • RTDC for GSM/EDGE 1800 • RTDA for GSM/EDGE 1800 A band • RTDB for GSM/EDGE 1800 B band • RTPA for GSM/EDGE 1900

RTN	Return
RX	Receiver; Receive
SCF	Site Configuration File
SCT	Site Configuration Tool
SDCCH	Stand-alone Dedicated Control Channel
SDH	Synchronous Digital Hierarchy
SMB	Sub-Miniature B Connector
SMS	Short Message Service
SSS	Site Support System
STM	Synchronous Transport Module
STM-1	Synchronous Transport Module (155 Mbit/s)
SW	Software
Sync	Synchronization The process of adjusting corresponding significant instances of signals, in order to obtain the desired phase relationship between these instances.
T1	North American Digital Transmission Format Standard (1.544 Mbit/s)
TC	Transcoder
TCH	Traffic Channel The logical radio channel that is assigned to a base transceiver station and is primarily intended for conversation.
TCP/IP	Transport Control Protocol/Internet Protocol
TCS	Temperature Control System
TDMA	Time Division Multiple Access

TE	Terminal Equipment Equipment that provides the functions necessary for user operation of the access protocols.
TMS	Transmission Management System The network system for managing equipment settings, and for centralised retrieval of statistics and alarm information from transmission equipment connected to the system.
TS	Time Slot A cyclic time interval that can be recognised and given a unique definition.
TRE	Transmission Equipment
TRX	Transceiver
TRXSIG	TRX Signalling
TS	Time Slot
TSxx	Transceiver (RF unit), specific to Nokia UltraSite EDGE Base Station • TSTB for GSM/EDGE 800 • TSGA for GSM 900 • TSGB for GSM/EDGE 900 • TSDA for GSM 1800 • TSDB for GSM/EDGE 1800 • TSPA for GSM 1900 • TSPB for GSM/EDGE 1900
TTL	Transistor Transistor Logic
TX	Transmitter; Transmit
UC	Unit Controller
UI	User Interface
UL	Underwriters Laboratories

UL (Uplink) The direction of transmission in which the mobile station is the transmitting facility and the BTS is the receiving facility.

- 2-way uplink diversity - The function by which a BTS uses two antennas and two receivers simultaneously on a single channel to obtain improved overall BTS receiver sensitivity in an environment that is subject to random multipath fading.
- 4-way uplink diversity - The function by which a BTS uses four antennas and four receivers simultaneously on a single channel to obtain improved overall BTS receiver sensitivity in an environment that is subject to random multipath fading.

UMTS Universal Mobile Telecommunications System

UTRAN / UMTS
Terrestrial Radio Access Network

A radio access network (RAN) consisting of radio network controllers (RNCs) and base transceiver stations (BTSs). It is located between the Iu interface and the wideband code division multiple access (WCDMA) radio interface.

UPS Uninterruptible Power Supply

VC Virtual Channel

VCO Voltage Controlled Oscillator

An oscillator for which a change in tuning voltage results in a predetermined change in output frequency.

VLL Line-to-Line Voltage

VP Virtual Path

The unidirectional transport of ATM cells belonging to virtual channels that are associated by a common identifier value.

VPCI Virtual Path Connection Identifier

An identifier which identifies the virtual path connection between two B-ISDN ATM exchanges, or between a B-ISDN ATM exchange and a B-ISDN user.

VPI — Virtual Path Identifier

An identifier which identifies a group of virtual channel links at a given reference point that share the same virtual path connection.

VSWR — Voltage Standing Wave Ratio

The ratio of maximum to minimum voltage in the standing wave pattern that appears along a transmission line. It is used as a measure of impedance mismatch between the transmission line and its load.

VXxx — Transmission unit, specific to Nokia UltraSite EDGE Base Station

- VXEA for FC E1/T1
- VXRA for FC RRI
- VXRB for FXC RRI
- VXTA for FXC E1
- VXTB for FXC E1/T1

WAF — Wideband Antenna Filter unit

WAM

Wideband Application Manager unit

WBC — Wideband Combining unit

WCC — Wideband Cabinet Core

WCDMA — Wide band Code Division Multiple Access

A spread spectrum CDMA technique used to increase the capacity and coverage of wireless communication networks.

WCH — Wideband Cabinet Heater

WCxA — Wideband Combiner, specific to Nokia UltraSite EDGE Base Station

- WCGA for GSM/EDGE 800/900
- WCDA for GSM/EDGE 1800
- WCPA for GSM/EDGE 1900

WEK	Wideband Extension Kit
WFA	Wideband Fan
WHX	Wideband Heat Exchanger
WIC	Wideband Input Combiner
WIK	Wideband Indoor Kit
WOC	Wideband Output Combiner
WOK	Wideband Outdoor Kit
WPA	Wideband Power Amplifier unit
WPS	Wideband Power Supply unit
WSC	Wideband System Clock
WSM	Wideband Summing and Multiplexing unit
WSP	Wideband Signal Processor unit
WTR	Wideband Transmitter and Receiver

8.1.2 Terms

This section provides definitions for terms used throughout Nokia UltraSite Solution documentation.

Abis Interface
: Interface between a Base Transceiver Station (BTS) and the Base Station Controller (BSC) and between two BTSs.

Absolute radio frequency channel number
: See absolute radio frequency number.

Absolute radio frequency number; absolute radio frequency channel number; ARFN; ARFCN
: Radio frequency used in connection with, for example, mobile originating and terminating test calls.

Adaptive multi-rate speech codec; AMR speech codec; AMR codec; AMR
: Speech codec which adapts its operation optimally according to the prevailing channel conditions.

Air Interface — Interface between MS and BTS.

Alarm — Announcement given to the operating personnel about abnormal functioning of the system or about a failure, or an indication of the degradation of the service level or reliability.

Alarm Status — Classification of the severity of an alarm, such as Critical, Major, Minor, and Information.

Alternating current; AC
A periodic current having a mean value zero.

Analogue-to-digital converter; Analog-to-digital converter /US/; A/D converter; ADC
A device which converts an analogue input signal to a digital output signal carrying equivalent information.

Application-specific integrated circuit; custom circuit; custom IC; ASIC
Integrated circuit which is designed for a specific application and a specific customer and which is not available to other customers.

ATM connection control; connection control; CC
Function that keeps track of connection resources and based on those handles the operations related to different kind of cross-connections.

ATM inverse multiplexing
See inverse multiplexing for ATM.

Backplane — Connector board at the back of Nokia UltraSite cabinets to which plug-in units are directly connected. See also BATA backplane and RFU backplane.

Base station — See base transceiver station.

Base station controller; BSC
Network element in the public land mobile network (PLMN) for controlling one or more base transceiver stations (BTS) in the call set-up functions, in signalling, in the use of radio channels and in various maintenance tasks.

Base station system; BSS
System of base stations (BSs) and base station controllers which is viewed by the mobile services switching centre (MSC) through a single interface.

Base transceiver station; base station; BTS; BS
: Network element in a mobile network responsible for radio transmission and reception to or from the mobile station.

BATA backplane
: Additional backplane required in a Site Support cabinet when using 12 rectifiers.

Bias Tee
: Unit that provides DC power for an associated MHA unit.

Cabinet Control Unit
: Module of the ADUA or ADUB that manages battery control, climatic control, alarm reporting, and serial and version number reporting for the IBBU or Nokia UltraSite Support cabinet. The CCU connects to the BOIx with Q1-bus.

Cell
: Coverage area of a given BTS where transmission is acceptably received.

Cell breathing
: Variation of the cell coverage area; depends on the interference and power requirements.

Cellular Network
: Two or more base stations connected together to provide an area of coverage for Mobile Stations (MS).

CENELEC
: Comité European de Normalisation ELECtrotechnique. European Committee for Electrotechnical Standardization.

Chain Connection
: Transmission solution in which the BTSs are interconnected through a chain, and the first BTS in the chain is connected to the BSC. See Loop Connection, Multidrop Connection, and Star Connection.

Chip
: Signal element.

Chip rate
: Number of chips transmitted in one second.

Commissioning
: Tasks performed to enable the BTS to be connected to the network. Includes operational tests and configuring of the transmission equipment.

Coverage Area
: See Cell.

Cross-connection
: Connection between input and output ports of a network element.

Cross-connection bank
: Information base that defines the cross-connections of a network element. The network element contains two or more banks, one of which is always active.

Custom circuit
: See application-specific integrated circuit.

Custom IC
: See application-specific integrated circuit.

D-bus
: Bus used for traffic communication between the transmission units and BB2x units (D1-bus) and for internal O&M communication with the BOIx, BB2x, and RTxx units (D2-bus).

Despreading
: The received wideband signal is modulated with the spreading code to get a narrowband signal after the multipath propagation in spread spectrum systems.

Digital signal processor; DSP
: A processor designed for signal handling, resembling an ordinary microprocessor.

Discontinuous reception; DRX
: Means of saving battery power (for example in hand-portable units) by periodically and automatically switching the mobile station receiver on and off.

Discontinuous transmission; DTX
: Feature which enables saving battery power (for example in hand-portable units) and reducing interference by automatically switching the transmitter off when no speech or data are to be sent.

Downlink Diversity
: See Frequency Hopping.

Earthing
: See Grounding.

F-bus
: Frequency Hopping bus. See Frequency Hopping.

Finger; rake finger; RAKE finger
: Receiver unit that despreads one multipath signal.

Four-way uplink diversity; 4-way uplink diversity
: Function by which a base transceiver station (BTS) uses four antennas and four receivers simultaneously on a single channel to obtain improved overall BTS receiver sensitivity in an environment that is subject to random multipath fading.

Forward link
: See downlink.

Flash memory
: Nonvolatile, electronically writable memory, similar to EEPROM in function, but which must be erased in blocks.

Flexbus
: Bidirectional coaxial cable that carries up to 16 x 2 Mbit/s signals and power between transmission equipment, such as a radio outdoor and indoor unit.

Frequency-change oscillator
: See local oscillator.

Frequency Hopping
: Function in which a BTS swaps two transmitters on a single channel to obtain improved overall MS receiver sensitivity in a system that is subject to random fading.

Gain
: Signal amplification, expressed in dBi—decibels over a theoretic, isotropic, and uniformly radiating antenna.

Grounding
: Protecting the equipment and the users against lightning and surges through the external connections.

I^2C-bus
: Integrated Inter Cell communication bus used for polling, autodetection, version and serial number management, temperature polling, and alarm collection in units without a microprocessor.

Handover
: The handover occurs between two cells; the signal goes through one base station or base station sector at a time.

Human-machine interface; man-machine interface; HMI; MMI
: A subsystem or function which provides user interface functions in a man-machine language.

Installation
: Tasks performed to enable the BTS to be mounted at the site.

Integration
: Tasks performed to make the BTS functional in the cellular network. Includes making test calls.

Inter-frequency handover
: Handover where the new carrier frequency is different from the current one.

Inter-system handover
: Handover from one system to another, e.g. between a 3rd generation system and GSM.

Inverse multiplexing for ATM; ATM inverse multiplexing; inverse multiplexing; IMA
: The transmission method in which ATM cells in a cell stream are divided across several physical E1 links on a cell-by-cell basis, and then reassembled at the receiving end without affecting the original cell order.

Loop connection
: Transmission solution in which BTSs are interconnected in a loop. For example, the first and last BTSs are connected to the BSC. See Chain Connection, Multidrop Connection, and Star Connection.

Macrocellular
: Application that covers large areas with a cell radius of 1 to 10 km (0.6 to 6 miles). The coverage area is achieved when the antenna is installed high and off the ground.

Maximum ratio combining
: A signal combining technique in which each signal is multiplied by a weight factor that is proportional to the signal amplitude: the strong signals are further amplified, while the weak signals are attenuated.

Microcellular
: Application that typically covers areas with a cell radius of 100 m to 1 km (327 feet to 0.6 miles). The antennas are installed below rooftop level.

Microwave radio
: Radio equipment for establishing an aligned and fixed radio connection between two points.

Midi
: Indoor or Outdoor cabinet with up to six TRXs.

Multidrop Connection
: Transmission solution in which one or more BTS chains are connected to one BTS that is connected to the BSC. See Chain Connection, Loop Connection, and Star Connection.

Network Element

Any equipment that can be managed, monitored, or controlled in a telecommunications network.

Network Topology

Method of transmission between the cells of a network. Examples of transmission solutions are chain, loop, multidrop, and star connections.

Node Manager

A feature of Power System Management (PSM), the Node Manager software called PSMMan is used to control network elements, or nodes, of the Site Support System.

Nokia FlexiHopper

Nokia family of Flexbus-compatible microwave radios for the 13, 15, 18, 23, 26, and 38 GHz frequency bands, in which the radio transmission capacity can be selected using software. The radio transmission capacity of Nokia FlexiHopper can be 2 x 2, 4 x 2, 8 x 2, or 16 x 2 Mbit/s.

Nokia FlexiHopper outdoor unit can be used with different indoor units: FIU 19, RRIC, FC RRI, and FXC RRI.

Nokia Hopper Manager

PC software application used for controlling and monitoring Nokia FlexiHopper and Nokia MetroHopper radios connected to FIU19 or RRIC indoor units.

Nokia MetroHopper

Nokia Flexbus-compatible radio for the 58 GHz frequency band that does not require coordinated frequency planning. The main use of Nokia MetroHopper is to provide 4 x 2 Mbit/s, point-to-point wireless access for Nokia MetroSite BTS and Nokia MetroHub.

Nokia MetroHopper outdoor unit can be used with different indoor units: FIU 19, RRIC, FC RRI, and FXC RRI.

Nokia MetroHub

Nokia's compact transmission node with cross-connection and grooming functions, such as FXC RRI. Nokia MetroHub contains up to five transmission units.

Nokia MetroSite GSM BTS

Nokia's compact four-TRX GSM base station for Nokia MetroSite capacity solution. Nokia MetroSite GSM BTS can contain one transmission unit.

Nokia Q1 Connection Tool
: Program that makes connection and node definitions for identifying objects on a Nokia Q1 managed network. See Q1.

Nokia UltraSite
: Multimedia coverage and capacity macrocellular base station.

Omnidirectional Cell
: Cell with a 360× sector; also known as standard cell.

Operator
: Telecommunications company running telecommunications services in a specific geographical area.

PCM time slot
: 1.5 Mbit/s PCM circuit is divided into twenty-four 64 kbit/s time slots.

  2 Mbit/s PCM circuit is divided into thirty-two 64 kbit/s time slots.

Peltier elements
: Elements that absorb or emit heat when an electric current passes across a junction between two materials. Used for heating and cooling IP20 protection class equipment.

Point-to-point
: Transmission between two fixed points.

Q1-bus
: Bus in Nokia UltraSite EDGE BTS, used for local transmission management (Q1int) and for extending the management to external equipment.

Radio interface; air interface; AI
: The interface between the mobile station (MS) and the radio equipment in the network. This is defined by functional characteristics, common radio (physical) interconnection characteristics, and other characteristics as appropriate.

Radio Relay
: Microwave radio unit that replaces a fixed cable with a microwave radio link in the Abis Interface.

Rectifier
: Device for converting alternating current to direct current. See BATx.

RFU backplane
: Backplane in Nokia UltraSite EDGE BTS cabinet to which RF units are attached.

Sectored BTS Site
: A site with multiple cells positioned to supply the desired radiation.

Sectored Cell — A cell with a conical coverage area achieved by means of a directional aerial.

Single Sector — A part of the BTS's physical equipment that serves a single cell in the network radio topology.

Site — Location where telecommunication equipment has been installed. For example, a site can contain a base station and transmission equipment with an equipment shelter and antenna tower.

Several network elements can be located at a site.

Soft handover — Handover where the signal goes through two base stations or base station sectors at a time.

Softer handover — Handover where the signal goes through two sectors in one base station area at a time.

Software Package — Software collection consisting of the components of the BTS operating system.

Spreading — A process in which the signal is modulated with the pseudo noise code to get a wideband signal for multipath propagation in spread spectrum systems.

Spreading code — A code that is used to despread a signal in spread spectrum communications.

Star Connection — Transmission solution in which three branches with one BTS in each are connected to a common node. See Chain Connection, Loop Connection, and Multidrop Connection.

Synchronisation (Sync) — Process of adjusting the corresponding significant instances of signals (between adjacent and serving cells) to obtain the desired phase relationship between these instances.

Uplink — Direction of transmission in which the mobile station is the transmitting facility and the BTS is the receiving facility.

Uplink Diversity

2-way uplink diversity – Function in which a BTS uses two antennas and two receivers simultaneously on a single channel to obtain improved overall BTS receiver sensitivity in an environment that is subject to random multipath fading.

4-way uplink diversity – Function in which a BTS uses four antennas and four receivers simultaneously on a single channel to obtain improved overall BTS receiver sensitivity in an environment that is subject to random multipath fading.

See Frequency Hopping.

Related Topics

Technical overview of UltraSite EDGE BTS

Instructions

Overview of planning UltraSite EDGE BTS cabinet installation

Overview of UltraSite EDGE BTS installation at a new site

Overview of UltraSite EDGE BTS installation at an existing UltraSite EDGE BTS site

Overview of UltraSite EDGE BTS with WCDMA upgrade installation at a new site

Overview of UltraSite EDGE BTS with WCDMA Upgrade installation at an existing UltraSite EDGE BTS site

Overview of UltraSite EDGE BTS with IBBU installation at a new site

Overview of UltraSite EDGE BTS with IBBU installation at an existing site

Overview of UltraSite EDGE BTS co-site with Talk-family BTS installation

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Overview of UltraSite EDGE BTS unit technical descriptions

Overview of configurations for UltraSite EDGE BTS

Technical description of Outdoor Application kit (OAKA) of UltraSite EDGE BTS

Technical description of Outdoor Application kit (OAKB) of UltraSite EDGE BTS

Technical description of Outdoor Application kit (OAKC) of UltraSite EDGE BTS

Technical description of Outdoor Application (OBKB) kit of UltraSite EDGE

BTS

Technical description of Indoor Application (IAKA/IAKC) of UltraSite EDGE BTS

Technical description of BBPA kit of UltraSite EDGE BTS

Technical description of SXCA kit of UltraSite EDGE BTS

Technical description of UltraSite EDGE BTS co-siting with Talk-family RF diversity kits

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Physical properties of UltraSite EDGE BTS

Electrical properties of UltraSite EDGE BTS

RF properties of 800 MHz UltraSite EDGE BTS

RF properties of 900 MHz UltraSite EDGE BTS

RF properties of 1800 MHz UltraSite EDGE BTS

RF properties of 1900 MHz UltraSite EDGE BTS

Receiver properties of UltraSite EDGE BTS

Acoustic sound parameters of UltraSite EDGE BTS

Technical description of Outdoor Application kit (OAKA/OAKC) of UltraSite EDGE BTS

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Overview of installing outdoor core mechanics to UltraSite EDGE BTS

Overview of removing core mechanics from UltraSite EDGE BTS outdoor cabinet

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Delivery content of UltraSite EDGE BTS CRMA/OAKA transportation package

Delivery content of UltraSite EDGE BTS CRMC/OAKC transportation package

Technical description of Outdoor Application kit (OAKB) of UltraSite EDGE BTS

Instructions

Installing the co-siting Outdoor Application kit (OAKB)

Reference

Delivery content of UltraSite EDGE BTS OAKB

Technical description of UltraSite Midi to Talk Bridge kit (OBKB) of UltraSite EDGE BTS co-siting with Talk-family BTS

Instructions

Installing the outdoor MIDI to Talk Bridge (OBKB) of UltraSite EDGE BTS

Reference

Delivery content of UltraSite EDGE BTS OBKB transportation package

Technical description of Bridge kit (OBKA) of UltraSite EDGE BTS outdoor cabinet

Instructions

Installing the Bridge kit of outdoor UltraSite EDGE BTS

Reference

Delivery content of UltraSite EDGE BTS OBKA transportation package

Technical description of Indoor Application Kit (IAKA/IAKC) of UltraSite EDGE BTS

Instructions

Overview of installing UltraSite EDGE BTS core mechanics

Reference

Delivery content of UltraSite EDGE BTS CRMA/IAKA transportation package

Delivery content of UltraSite EDGE BTS CRMC/IAKC transportation package

Technical description of Battery Box Plate (BBPA) kit of UltraSite EDGE BTS

Instructions

Overview of UltraSite EDGE BTS BBPA kit installation

Reference

Delivery content of UltraSite EDGE BTS BBPA transportation package

Technical description of System Extension Cable (SXCA) kit of UltraSite EDGE BTS

Reference

Delivery content of UltraSite EDGE BTS SXCA transportation package

Technical description of UltraSite EDGE BTS co-siting with Talk-family RF diversity kits

Reference

Delivery content of UTAA

Delivery content of SPKA

Delivery content of RSKA

Delivery content of UltraSite EDGE BTS co-siting to Talk-family UTAA RF diversity cable kit transportation package

Reference

Delivery content of UltraSite EDGE BTS co-siting to Talk-family SPKA splitter kit transportation package

Delivery content of UltraSite EDGE BTS co-siting to Talk-family RSKA splitter kit transportation package

Technical description of Talk 222AFE/UltraSite 222DVxx UltraSite EDGE BTS co-site with Talk-family BTS

Reference

Delivery content of UltraSite EDGE BTS co-siting to Talk-family basic RF diversity kit transportation package

Technical description of Talk 444RTC/UltraSite 222DVxx UltraSite EDGE BTS co-site with Talk-family BTS

Reference

Delivery content of UltraSite EDGE BTS co-siting to Talk-family basic RF diversity kit transportation package

Technical description of Talk 444RTC/UltraSite 444RTC UltraSite EDGE BTS co-site with Talk-family BTS

Reference

Delivery content of UltraSite EDGE BTS co-siting to Talk-family basic RF diversity kit transportation package

Technical description of Talk 666RTC/UltraSite 222DVxx WBC 2:1 UltraSite EDGE BTS co-site with Talk-family BTS

Reference

Delivery content of UltraSite EDGE BTS co-siting to Talk-family basic RF diversity kit transportation package

Technical description of Talk 666RTC/UltraSite 666RTC UltraSite EDGE BTS co-site with Talk-family BTS

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Transmission network protection using loop topology

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Instructions

Adjusting synchronisation settings

Adjusting synchronisation loop bit settings

Performance management

Instructions

Monitoring performance