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Nokia UltraSite EDGE BTS Mini Outdoor

Installation and Commissioning Instructions

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1 Statutory Information

1.1 CE Marking

Standard	Description
CE 0523 !	Hereby, Nokia Corporation declares that this Nokia UltraSite EDGE Mini outdoor 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 Requirements for Installation and Operation

2.1 Storage conditions

Climatic conditions for storage

Before you accept the delivery of the BTS, you must ensure acceptable climatic and mechanical conditions for its storage until installation. The BTS is not operational under these conditions.

The climatic conditions during the storage of the UltraSite EDGE BTS Mini Outdoor are presented in the table below according to ETS 300 019-1-1, class 1.3E (IEC class 1M4).

Table 1. Climatic conditions for storage

Climatic condition	Class 1.3E Value
Temperature range for storage	-25 °C to +55 °C
Relative humidity	10% to 100%
Absolute humidity	0.5 to 29 g/m ^{3}
Rain intensity	no rain
Change rate of temperature (-10 °C to +40 °C)	0.5 °C/min maximum
Air pressure	70 to 106 kPa
Solar radiation	1120 W/m 2

Surrounding air movement	30 m/s
Precipitation (rain, snow, hail, etc.) allowed	no
Low rain temperature	Not applicable
Water from sources other than rain allowed	dripping water
Icing and frosting allowed	Yes

Mechanical conditions for storage

The mechanical conditions during the storage of the UltraSite EDGE BTS Mini Outdoor are presented in the table below according to ETS 300 019-1-1, class 1.3E (IEC class 1M4).

Table 2. Mechanical conditions for storage

Mechanical conditions	Class 1.3E Value
Stationary vibration, sinusoidal: peak value of displacement amplitude at frequency range 9 to 200 Hz	1.5 mm
Non-stationary vibration, including shock: peak value of acceleration	40 m/s ^{2}
Static load	5 kPa

Transportation conditions

Caution

Unprotected equipment may be damaged during transportation. Transport the equipment to the installation site in its original transportation package.

Note

The UltraSite EDGE BTS Mini Outdoor and its plug-in units are delivered to the customer separately.

Note

The typical transportation time is considered to be 30 days or less. When the total transportation time exceeds 30 days, additional storage or packaging precautions must be considered.

Climatic conditions for transportation

Before transporting BTS, you must ensure acceptable climatic and mechanical conditions while loading and unloading. The BTS is not operational if these conditions do not apply.

Conditions for UltraSite EDGE BTS Mini Outdoor's transportation are defined according to ETS 300 019-1-2, environmental class 2.2 requirements, climate conditions according to class 2.3. Special care must be taken with respect to low temperature and handling.

Table 3. Climatic conditions for transportation

Climatic condition	Class 2.3 Value
Low air temperature	-40 ºC
High temperature, air in unventilated enclosures	+70 ºC
Temperature change:	
air/air	-40 ºC to +30 ºC
air/water	+40 ºC to +5 ºC
Relative humidity, not combined with rapid temperature changes	95% at +45 ºC
Relative humidity, combined with rapid temperature changes air/air, at high relative humidity	95% at -40 to +30 ºC
Absolute humidity, combined with rapid temperature changes air/air, at high water content	60 g/m^3 at +70 to +15 ºC
Low air pressure	70 kPa minimum
Change of air pressure	N/A
Surrounding air movement	20 m/s maximum
Rain intensity	6 mm/min maximum
Solar radiation	1120 W/m^2 maximum

Heat radiation	600 W/ m^2 maximum
Water from sources other than rain allowed (velocity)	1 m/s maximum
Conditions of wetness	Wet surfaces

Mechanical conditions for transportation

Mechanical conditions for transportation are defined according to class 2.3.

Table 4. Mechanical conditions for transportation

Mechanical condition	**Class 2.3 Value**
Stationary vibration, sinusoidal:	
Peak value of displacement amplitude at frequency range 2 to 9 Hz	3.5 mm
Peak value of displacement amplitude at frequency range 9 to 200 Hz	10 m/s^2
Peak value of displacement amplitude at frequency range 200 to 500 Hz	15 m/s^2
Stationary vibration, random: acceleration spectral density at the following frequency range:	
Acceleration spectral density at frequency range 10 to 200 Hz	1 m^2 / s^3
Acceleration spectral density at frequency range 200 to 2000 Hz	0.3 m^2 / s^3
Peak acceleration for non-stationary vibration, including shock -duration 11 ms - duration 6 ms	 100 m/s^2 300 m/s^2
Free fall:	
Mass <10 kg	0.75 m
Mass 10 to 25 kg	0.6 m
Mass 25 to 50 kg	0.525 m
Mass 50 to 100 kg	0.45 m
Mass over 100 kg	0.3 m

Steady state acceleration	20 m/s ^{2}
Toppling:	
Mass <20 kg	Around any edges
Mass 20 to 100 kg	Around any edges
Mass over 100 kg	Not allowed
Rolling, Pitching	
Angle	35 degrees
Period	8 s
Steady state acceleration	20 m/s ^{2}
Static load	10 kPa

Operating conditions

When surveying the prospective sites, consider the values presented in this section.

Operating conditions are defined as stationary: the equipment is mounted on a structure, or on a mounting device, or it is permanently placed at a certain site.

UltraSite EDGE BTS Mini Outdoor is not intended for portable use.

Climatic conditions for operation

The climatic conditions for UltraSite EDGE BTS Mini Outdoor are defined according to ETSI 300 019-1-4 class 4.1 IEC 4M3: temperature controlled, weather protected locations.

UltraSite EDGE BTS Mini Outdoor can operate in the climatic conditions and mechanical conditions listed in the tables below.

The weather shielding of the UltraSite EDGE BTS Mini Outdoor is valid when the BTS is mounted in the recommended positions.

Table 5. Climatic conditions for operation

Climatic condition	Class 4.1 value
Temperature range of operation	-33 ºC to +55 ºC (with heater)* -10 ºC to +55 ºC (without heater)
Relative humidity	15% to 100%
Absolute humidity	0.26 g/m ^{3} to 36 g/ m ^{3}
Rain intensity	6 mm/min maximum
Temperature change rate (average of 5 minutes)	0.5 ºC / min.
Air pressure	70 kPa to 106 kPa
Solar radiation	1120 W/m ^{2} maximum
Heat radiation	1120 W/m ^{2} maximum
Surrounding air movement	50 m/s maximum
Conditions of condensation	Yes
Precipitation (rain, snow, hail etc.)allowed	Yes
Low rain temperature	5 ºC
Water from sources other than rain allowed	Splashing water
Icing and frosting allowed	Yes
*When started at -33 ºC, the BTS takes up to 3 hours to warm up at heater's nominal voltage of 230 V.	

Mechanical conditions for operatio

Table 6. Mechanical conditions for operation

Mechanical condition	Class 4.1E value
Stationary vibration, sinusoidal:	
Peak value of displacement amplitude at frequency range 5 to 9 Hz	1.2 mm
•peak value of displacement amplitude at frequency range 9 to 200 Hz	4 m/s ^{2}

Peak acceleration for non-stationary vibration, including shock	50 m/s^2

IP class

UltraSite EDGE BTS Mini Outdoor electronics is weather-proof to prevent the ingress of rain and snow.

UltraSite EDGE BTS Mini Outdoor cabinet can be used under IP55 circumstances.

Acoustic noise

The acoustic noise is measured according to ISO 3744 and ISO 7779. The noise is sound power.

The fan units of the UltraSite EDGE BTS Mini Outdoor generate acoustic noise. The level of acoustic sound power depends on the following factors:

- Ambient temperature
- Rate of temperature change

The acoustic sound power level is higher when the ambient temperature is rising.

The acoustic sound power of UltraSite EDGE BTS Mini Outdoor is shown in the table below.

Table 7. The maximum acoustic sound power of the BTS

Condition	Value (max.)
+50 ºC	67 dB (A)
+40 ºC	64 dB (A)
+30 ºC	61 dB (A)
+20 ºC	58 dB (A)

0 ºC	55 dB (A)
-5 ºC	55 dB (A)
-10 ºC	55 dB (A)

2.2 Compliance on EMC, RF and Safety

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

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

EMC

Emission

- ETSI EN 301 489-1:‘Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Electromagnetic Compatibility (EMC)standard for radio equipment and services -Part 1:Common technical requirements’
- N55022:"Limits and methods of measurement of radio disturbance characteristics of information technology equipment"
- 3GPP TS 25.113:’3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; Base station electromagnetic compatibility (EMC)

Immunity

- ETSI EN 301 489-1:‘Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Electromagnetic Compatibility (EMC)standard for radio equipment and services -Part 1:Common technical requirements ’
- ETSI EN 301 489-23:‘Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Electromagnetic Compatibility (EMC)standard for radio equipment and services -Part 23:Specific conditions for IMT-

2000 CDMA Direct Spread (UTRA)Base Station (BS)radio, repeater and ancillary equipment ’

- 3GPP TS 25.113:’3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; Base station electromagnetic compatibility (EMC)
- IEC 1000-4-9:Pulse magnetic field immunity test
- IEC 1000-4-8:"Electromagnetic Compatibility (EMC)Part 4.Testing and measurement techniques Section 8:Power frequency magnetic field immunity test, Basic EMC Publication"

RF

- ETSI EN 301 908-1:‘Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Base Stations (BS)and User equipment (UE)for IMT-2000 third-generation cellular networks -Part 1:Harmonized standard for IMT-2000,introduction and common requirements, covering essential requirements of article 3.2 of the R&TTE Directive ’
- ETSI EN 301 908-3:‘Electromagnetic Compatibility and Radio Spectrum Matters (ERM);Base Stations (BS)and User equipment (UE)for IMT-2000 third-generation cellular networks -Part 3:Harmonized standard for IMT-2000 CDMA Direct Spread (UTRA FDD)(BS)covering essential requirements of article 3.2 of the R&TTE Directive ’
- 3GPP TS 25.141:’3rd Generation Partnership Project; Technical Specification Group Radio Access Networks; Base station conformance testing (FDD)’

Safety

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

- EN 50385:Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunications systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields (110 MHz -40 GHz)-General public

2.3 Planning and preparing the site

Purpose

Before installing the cabinet, the site must be properly surveyed and prepared, and all required external connections must be correctly installed. Any special requirements for installation must also be identified during the survey (e.g. two people needed for lifting the equipment).

Before you start

WARNING

Risk of personal injury. Wear the necessary protective gear, such as gloves and safety glasses, when drilling.

Caution

Moisture may damage the equipment. Do not expose the cabinet top or interior to rain or snow.

Tip

Use a protective shelter around the installation if required to prevent rain or snow ingress.

Steps

1. Check that the cabinet(s)can be installed safely:

- The site is accessible, adequately lit and safe for working.
- Safety distance calculations are made and taken into account. See section *Safety distance requirements*.

- Site is prepared according to drawings
- Site survey is complete
- Site Survey Report is available
- Site is clean
- Product delivery is complete
- All wiring is done in accordance with national electric code
- Needed equipment is available as defined in the Site Survey Report
- Sufficient service clearances are available

2. Verify that the following external cabinet connections are available:

- Grounding busbar
- Mains power (AC or DC, depending on the site)
- Transmission connection point

2.4 Site requirements

Ensure that the following BTS site requirements are met:

1. All required documentation is available, for example, site-specific installation instructions.
2. When radio link transmission is used, the line-of-sight to the far end radios has been ensured.
3. External connections for the cabinet are available: site grounding point, mains power (AC or DC according to the site) and transmission connection point. Also AC or DC distribution panel and AC electric are available for power tools.
4. Main grounding (earthing) is installed and tested.
5. Minimum recommended clearance of 450 mm is available in front of the BTS to open and close the front door.
6. All the external interface connectors are located on the bottom of the UltraSite EDGE Mini Outdoor BTS; the BTS may require back or side access after installation for maintenance purposes. The BTS can be installed on a pole / mast, on a plinth or on a wall. All maintenance can be performed from the front of the BTS.
7. The wall or pole at the BTS site is strong enough to withstand the weight of the BTS (max.120 kg for full cabinet with pole brackets).For more details of UltraSite EDGE BTS Mini Outdoor cabinet weights, see section *Cabinet dimensions and weight*.

8. The BTS is not taken out of its delivery package until the site construction work is finished and the site is clean and dry.
9. Site security is established so the BTS and other units can remain undisturbed at the site.
10. Make sure you can take the BTS to the installation site. For example, in roof top installations, the hole through which you take the BTS to the roof must be large enough. For more details of UltraSite EDGE BTS Mini Outdoor cabinet weights and dimensions, see section *Cabinet dimensions and weight*.

Wind load

For pole mounting, the selected pole must not break off even in stormy winds. Recommended pole diameter is 60 – 300 mm.

The table below shows the load imposed on the pole by the BTS at two wind velocities.

Table 8. Wind Loading

Wind velocity	Load imposed on the pole by the BTS
40 m/s	780 N
50 m/s	1210 N

2.5 Cabinet clearances

Caution

Risk of overheating. Secure adequate ventilation around the base transceiver station (BTS). The ambient temperature must not exceed 55°C (131°F).

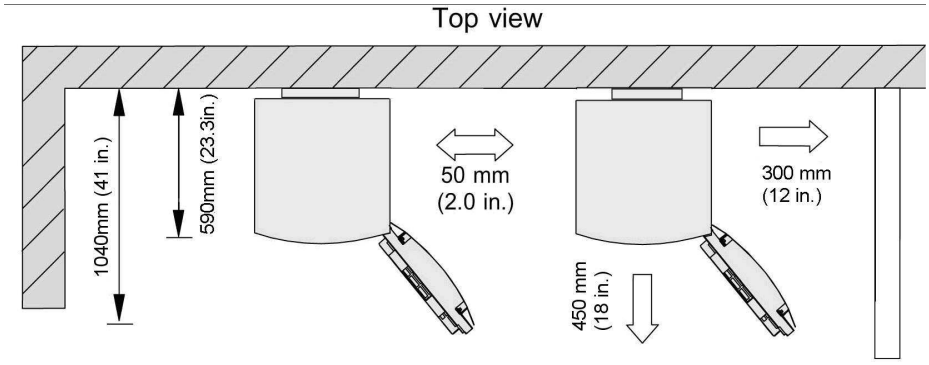
When installed on the plinth, the available installation space under the cabinet is 175 mm. Two plinths may be stacked vertically to allow greater clearance where required. The hinged panel with the EMC box is designed to allow room

for cabling.

Cabinet clearances in wall mounting

The figure below presents the required minimum cabinet clearances for Nokia UltraSite EDGE BTS Mini Outdoor when cabinet is mounted on a wall.

Figure 1 : Cabinet clearances for wall mounting



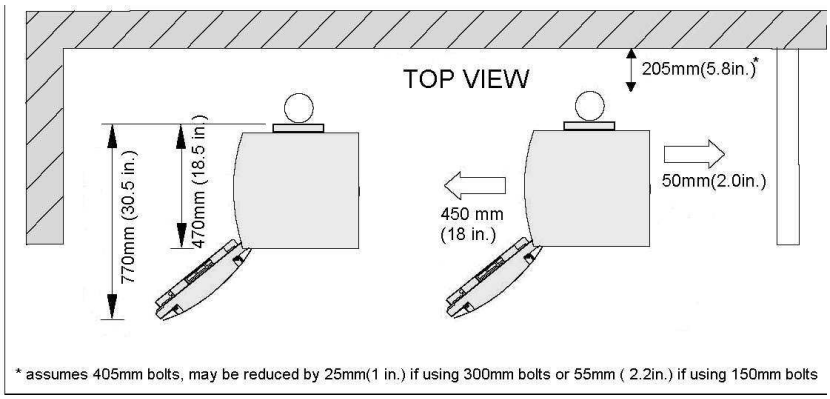
Cabinet clearances in pole mounting

The Mini Outdoor cabinet needs to be mounted on pole sideways.

The UltraSite EDGE BTS Mini Outdoor can be installed on a pole with a pole mounting kit. The kit is designed for poles between 60-300 mm. in diameter

The following figure presents the required minimum cabinet clearances for UltraSite EDGE BTS Mini Outdoor when the cabinet is mounted on a pole.

Figure 2 : Pole installation minimum clearances



2.6 Safety distance requirements

To ensure public safety when installing base stations, take into account the following facts. This equipment generates radio frequency energy, which has a thermal effect when absorbed by the human body. For this reason compliance boundaries specific to this equipment have been established. The thermal effect of radio frequency energy can exceed safety levels when a person is inside the established compliance boundaries. Observing the compliance boundary and ensuring the general public has no access to areas inside the established boundaries will ensure that the general public has no exposure to levels in excess of the safety limits.

To ensure installer safety when installing base stations, installation engineers need to be aware of the potential risk of the thermal effects of radio frequency energy and of how to protect themselves against undue risk.

When working close to transmitter antennas, the proper safety distances must be observed. The minimum safe distance from an antenna is measured in metres.

WARNING

Do not go any closer to a live antenna than the compliance boundary. The radio frequency energy generated by the antenna poses a serious health risk.

WARNING

If performing installation or maintenance procedures on the BTS, make sure that all transmitters in the area are switched off.

When assessing the applicable boundaries, the European standards EN 50383, EN 50384, EN 50385 and Council Recommendation 1999/519/EC for occupational and general public electromagnetic exposure limits -see Annex A - have been applied.

Assessment applying SAR measurements

European standards EN 50383, EN 50384 and EN 50385 do not include specifications for whole body SAR measurements. Whole body SAR measurements are not required for transmitters that have maximum output power levels too low to result in exposure levels that can reach the whole body SAR compliance limits under any conditions. Whole body SAR exclusion power levels have been based on the worst case assumptions. For details, see the following table:

Table 9: Whole body SAR exclusion power levels

Exposure category	Maximum output power (rms)
General public	Max power [W] = general public whole body SAR limit 0.08 [W/kg] * 4-year old child mass 12.5 [kg] = 1 W
Occupational	Max power [W] = occupational whole body SAR limit 0.4 [W/kg] * 16-year old worker 42 [kg] = 16.8 W

Localised SAR measurement can only be used when:

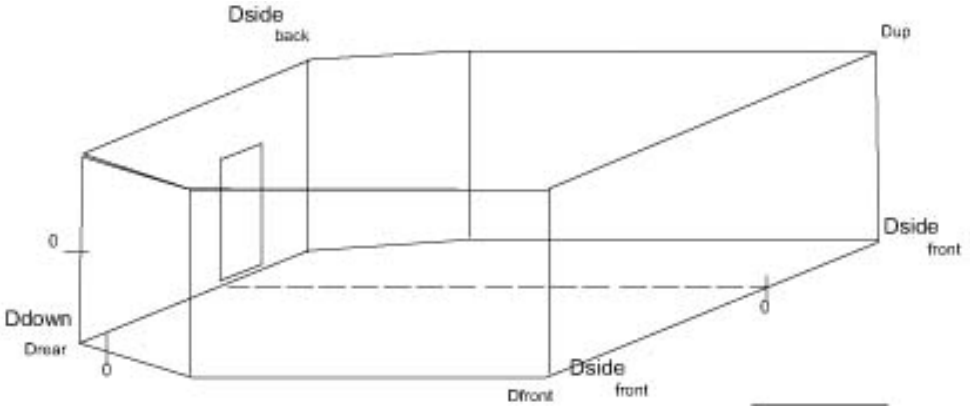
1. The separation between the phantom and the outer surface of the energy generating element is 40 cm or less.
2. The surface area of the energy generating element is less than 60 cm by 30 cm.
3. The frequency is in the range of 800 to 3000 MHz.

For the reasons above, whole body SAR measurements are not applicable to EDGE UltraSite BTS Mini Outdoor Base station.

Assessment of compliance boundary

The compliance boundary is defined as the area around the antenna, shown in the first diagram below. The antenna is located at the origin. Distances from the antenna are shown. The top and side views are shown in the second diagrams following:-

Figure 3 : Area around the antenna



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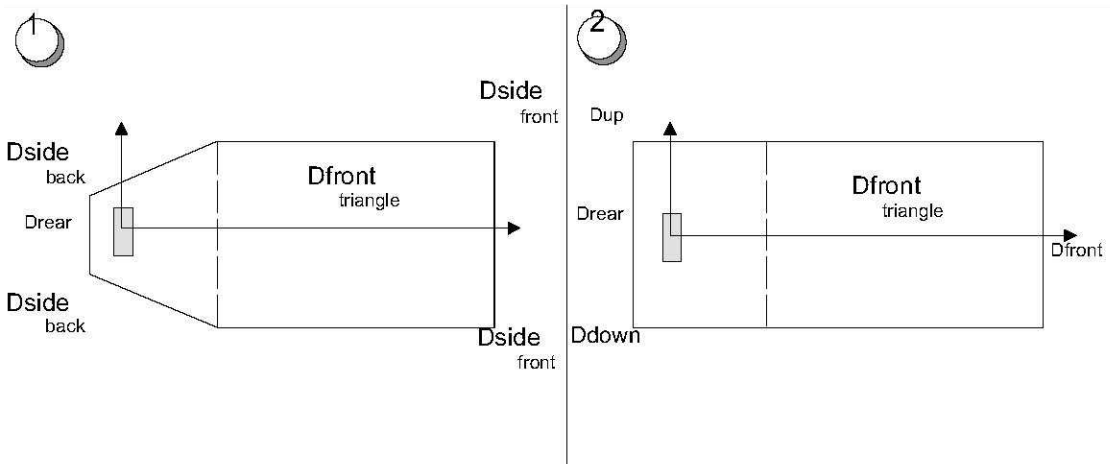


Figure 4 : Antenna side and top view

The compliance boundaries for the UltraSite EDGE BTS Mini Outdoor Base Station are given in the table below at maximum power level at the antenna input for general public (GP) and occupational (O) exposure limits, **when an external 18 dBi gain antenna is used**.

Table 10 : Dimensions of compliance boundary in meters for 2000 MHz

Power at antenna input	**Dfront**	**Dfron-$t_{triangle}$**	**Drear**	**Dside-back**	**Dside-front**	**Dup**	**Ddown**
40 W	GP: 4.4 O: 1.1	GP: 1.2 O: 1.1	GP: 0.1 O: 0	GP: 0.4 O: 0.3	GP: 1.5 O: 0.3	GP: 0.7 O: 0.5	GP: 0.7 O: 0.5
35 W	GP: 4.1 O: 1	GP: 1.5 O: 1	GP: 0 O: 0	GP: 0.4 O: 0.3	GP: 1.3 O: 0.3	GP: 0.7 O: 0.5	GP: 0.7 O: 0.5
30 W	GP: 3.7 O: 0.9	GP: 1 O: 0.9	GP: 0 O: 0	GP: 0.2 O: 0.3	GP: 1.1 O: 0.3	GP: 0.7 O: 0.5	GP: 0.7 O: 0.5
25 W	GP: 3.4 O: 0.7	GP: 1 O: 0.7	GP: 0 O: 0	GP: 0.2 O: 0.2	GP: 1.1 O: 0.2	GP: 0.5 O: 0.5	GP: 0.5 O: 0.5
20 W	GP: 2.9 O: 0.6	GP: 1.2 O: 0.6	GP: 0 O: 0	GP: 0.2 O: 0.2	GP: 0.9 O: 0.2	GP: 0.5 O: 0.5	GP: 0.5 O: 0.5
15 W	GP: 2.3 O: 0.5	GP: 0.9 O: 0.5	GP: 0 O: 0	GP: 0.2 O: 0.2	GP: 0.7 O: 0.2	GP: 0.5 O: 0.5	GP: 0.5 O: 0.5
10 W	GP: 1.8 O: 0.3	GP: 0.2 O: 0.3	GP: 0 O: 0	GP: 0.2 O: 0.2	GP: 0.3 O: 0.2	GP: 0.5 O: 0.5	GP: 0.5 O: 0.5

Example of typical configuration

Table 11: Detailed description of the components

Power (Pout)	**40 W**
Total connector loss	0.0 dB
Total cable loss	0.0 dB
Total loss (L)= Total connector loss + Total cable loss	0.0 dB
Number of transmitter unit (N)	1
Power at antenna input = PoutN10-L/10	40 W

Table 12 : Antenna specification

	External antenna
Gain	18 dBi
Half-power beam width	H-plane: 60 deg.
	E-plane: 8 deg.
Electrical downtilt	0 deg.
Height/width/depth	1100/200/100 mm

When using different configurations

IMPORTANT

- In table *Dimensions of compliance boundary in meters for 2000 MHz*, the compliance boundaries are given for a typical external antenna with different power levels. If an exposure limit, antenna, and/or configuration is used which does not correspond to the levels given in table *Detailed description of the components,* the compliance boundary must be recalculated according to EN 50383.

- The formula for calculating the compliance boundary using the far-field model, which is referenced in EN 50383, is given in Annex B. This

model is applicable for calculating the compliance boundary for the far-field region and over estimates the compliance boundary for the radiating near-field region, but is not applicable for calculating the compliance boundary for the reactive near-field region where the distance from the antenna is less than or equal to λ/4.

2.7 Grounding requirements

To protect the UltraSite EDGE BTS Mini Outdoor from damaging overvoltages through antenna equipment, communication cables, or power supply lines, grounding cabling must be planned and installed before the installation of the base station. To avoid interference, it is recommended that large grounding systems be designed case-specifically.

A power plug with a protective ground connection is **not** sufficient for UltraSite EDGE BTS Mini Outdoor. Grounding must have a fixed, non-removable connection.

Note

Regulations issued by local authorities / relevant national legislation must be followed when planning the grounding of a BTS site. Also the site specific requirements need to be considered.

Observe the following recommendations when planning the cabinet grounding:

- The grounding cable is connected with screws to the grounding point of the UltraSite EDGE BTS Mini Outdoor.
- The minimum cross-section of the copper (Cu) grounding conductor is as follows:
  - When 220-240 VAC is used, power cables shall be 1.5...2.5mm^2 (15...13 AWG) and grounding cable 2.5 mm^2 (13 AWG).
  - When 48 VDC is used, power cables shall be 6...10 mm^2 (9...7 AWG) and grounding cable 6 mm^2 (9 AWG).
  - When 24 VDC is used, power cables shall be 25 mm^2 (2 AWG) and grounding cable 16 mm^2 (4 AWG)
- Grounding resistance of the BTS site is 10Ω maximum.

- The ground cable must be connected to a main grounding busbar.
- Route the ground cables as directly as possible from the equipment to the grounding point. Avoid unnecessary loops and sharp bending of the grounding cable. The ground cables should not be run parallel with power cables.
- The external antenna feeders must also be grounded according to the local legislation if the antennas are likely to be exposed to lightning.

2.8 Mains power requirements

WARNING

Danger of lethal voltages! When connecting power cables, there is a risk of electric shock. Make sure that the site power is off and that the cabinet is properly earthed (grounded).

The power switch on the power supply unit of the UltraSite EDGE BTS Mini Outdoor does not disconnect it from the power network (AC or DC), but leaves it in a stand-by mode. The switch has two positions: ON and stand-by. A separate main switch on the site is considered a disconnect device for safety and service purposes.

Follow the national legislation when working with the power supply. The UltraSite EDGE BTS Mini Outdoor must be permanently wired to a disconnect device (for instance, circuit breaker) in accordance with current local and national wiring standards.

All ground connections must be secure and non-removable. All power cabling must meet the requirements of the appropriate national standards

The UltraSite EDGE BTS Mini Outdoor has three power supply options: 230 VAC, -48 VDC and +24VDC. The permitted voltage for the different options is presented in the table below:

Table 13: Permitted operating voltage

Nominal operating voltage	Permitted operating voltage

230 VAC (50/60 Hz)	Normal operation : 184 to 276 VAC (45 -66 Hz) Extended operation : 150 to 183VAC and 277 to 315VAC
-48 VDC	-38 to -56 VDC
+24VDC	Normal Operation : +20 to +32VDC Extended operation : +18 to +20 VDC

Table 14: Fuse rates (cables and fuses must comply with the *Grounding requirements* section)

Configuration	**Nominal Input voltage**	**Fuse rating**
External DC supply	-48VDC	50 A
External AC supply	230 VAC	25 A
External DC supply	+24 VDC	100 A

Nokia recommends that the AC mains is protected with a lightning and transient overvoltage protector (mains wire-in protector).

Note

The protection for the AC and DC mains does not come with the base transceiver station (BTS) delivery. To order mains protection, contact your local Nokia representative.

2.9 BTS power consumption

Table 15 : BTS power consumption

	AC or +24VDC		**-48VDC**	
Configuration	Typical full load	Theoretical maximum	Typical full load	Theoretical maximum

1	0.3kW	0.3kW	0.3kW	0.3kW
22	0.6 kW	0.8 kW	0.6 kW	0.8 kW
111	0.5 kW	0.5 kW	0.5 kW	0.5 kW
111	0.8 kW	0.8 kW	0.8 kW	0.8 kW

Notes:

- The tolerance of power consumption values is +/- 10%
- Typical full load values circumstance – 2% blocking with interference rejection techniques activated
- Theoretical maximum values circumstance – All TRXs on full power, all timeslots activated, with TSxBs operating in GMSK mode.
- One DVxx per sector
- MHA and external units excluded

2.10 Cabinet dimensions and weights

The table below lists the dimensions and weights of UltraSite EDGE BTS Mini Outdoor

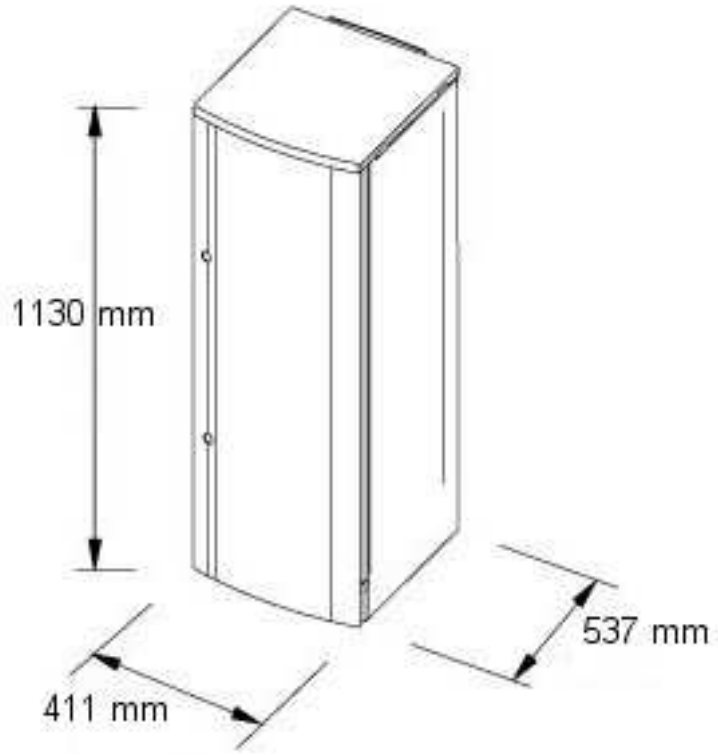
Table 16 : Physical properties of UltraSite EDGE BTS Mini Outdoor

Parameter	**Value**
Height	1130 mm
Depth	537 mm
Width	411 mm
Cabinet weight, empty	38 kg (max)
Cabinet weight, 1-Omni	58 kg (max)
Cabinet weight, 1+1	78 kg (max)

Cabinet weight, 2+2	93 kg (max)

The overall dimensions of UltraSite EDGE BTS Mini Outdoor are also presented in the figure following.

Figure 5 : UltraSite EDGE BTS Mini Outdoor dimensions



3 Overview of installing UltraSite EDGE BTS Mini Outdoor

3.1 UltraSite EDGE BTS Mini Outdoor installation

Before you start

Review the *Requirements for installation and operation* section of this document. Pay careful attention to all warning and cautions.

Nokia requires that personnel who perform installation tasks have basic knowledge of base station systems and equipment.

Summary

Check that:

- Site is prepared for installation.
- The proper installation tools are on site.
- The BTS delivery is complete and in good condition

WARNING

Base transceiver station (BTS) cabinets have sharp edges. Take care when working with or near the BTS.

WARNING

Risk of personal injury. Wear the necessary protective gear, such as gloves and safety glasses, when drilling.

WARNING

When lifting or positioning a cabinet, loose components may fall out. Do not tilt the cabinet forwards.

Caution

Risk of damage to the bottom interface connectors. When unpacking or installing the cabinet, do not stand the cabinet on its base as it may damage the base interface connectors.

Note

Configuring the base transceiver station (BTS) for +24 VDC power supply and/or optional heater requires access to the back of the cabinet. Configure the BTS before mounting the cabinet in a position where back access is difficult.

Note

Installation tools are not included in the delivery package.

This overview describes how to install UltraSite EDGE Mini outdoor Base Station (BTS), cable the BTS, and install the units.

Steps

1. Complete installation preparations including installation of any options.
2. Lift and mount the cabinet using one of the mounting options.
3. Install any optional kits.
4. Cable the UltraSite EDGE BTS Mini Outdoor.
5. Install the units in UltraSite EDGE BTS Mini Outdoor.
6. Cable the units in UltraSite EDGE BTS Mini Outdoor.
7. Power on the new BTS site.

8. Commission the new BTS.

3.2 Torque settings of UltraSite EDGE BTS Mini Outdoor

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

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).

The following table provides the torque measurements that Nokia recommends for installing the GSM/EDGE BTS units.

Table 17 : 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
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)

The values presented in the table above are basic torque values. Any exceptions to these values are provided in the installation procedures.

Table 18 : Unit installation torque recommendations

Bolt / screw type	**DIN**	**Size**	**Torque**
Antenna flange mount connector 7-16 (4 each)	934-A2	M3	1.0 Nm (0.7 ft lb)
Antenna flange nut	7-16		10-14 Nm (7.0 ft lb-9.8 ft lb)
Thumb screw	934-A2	M4	1.0 Nm (0.7 ft lb)
Ground lug nut	934-A2	M5	10.0 Nm (7.0 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)

Antenna connector	7-16		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)

The values presented in the table above are basic torque values. Any exceptions to these values are provided in the installation procedures.

4 Preparing to install UltraSite EDGE BTS Mini Outdoor

4.1 Unpacking and inspecting the UltraSite EDGE BTS Mini Outdoor delivery

Before you start

Caution

The cabinets are heavy. Additional personnel or lifting equipment may be needed when the cabinets are moved, unpacked, or lined up. In addition, follow any local regulations applicable to the installation.

Caution

Risk of damage to the bottom interface connectors. When unpacking or installing the cabinet, do not stand the cabinet on its base as it may damage the base interface connectors.

Steps

1. Open the transportation package.
2. Remove the packing material on top of and around the BTS.
3. Check the delivery contents.

4.2 Contents of the cabinet delivery

The cabinet delivery contains the following items presented in the table below.

Table 19 : Cabinet delivery contents

Item	Quantity
Cabinet	1 pc
Door-open key	1 pc (attached to the door with a cable tie)
Quick Guide	1 pc
Wall mounting bracket	1 pc

In order to get the site pack you must first open the door of the cabinet with the door-open key.

Steps

1. Get the door-open key from the cabinet bottom. It is attached with a cable tie.
2. Open the door of the BTS.

4.3 Contents of the pole mounting kit delivery (optional)

The Nokia UltraSite EDGE BTS Mini Outdoor BTS pole mounting kit is delivered in its own packaging. See the following figure for contents:

Figure 6: Contents of the Nokia UltraSite EDGE BTS Mini Outdoor pole mounting kit delivery

The contents of the kit are detailed in the following table:

Table 20: Pole mounting kit delivery

Item	Quantity
M12 x 405 mm bolt	4 pcs
M12 x 300 mm bolt	4 pcs
M12 x 210 mm bolt	4 pcs
M8 shouldered bolt	4 pcs
M6 x 16 mm screw	8 pcs
M6 spring washer	8 pcs
M12 plain washer	8 pcs
M8 plain washer	4 pcs

M8 nut	8 pcs
M12 spring washer	4 pcs
M12 nut	4 pcs
Pole mount bracket	4 pcs
Fixing plate	2 pcs

4.4 Contents of floor mounting kit delivery (optional)

The cabinet can be mounted onto a horizontal surface. The delivery contains the following items:

Table 21: Floor mounting kit delivery

Item	Quantity
Plinth	1 pc
Cabinet mounting bolts	6 pcs

4.5 Contents of heater kit delivery (optional)

The cabinet may be fitted with a heater. The delivery contains the following items:

Table 22 : Heater kit delivery

Item	Quantity
Heater	1 pc
Temperature sensor	1 pc
Heater fixings	? pc
Heater control cable	1 pc
Heater power cable	1 pc

4.5.1 Installing the optional heater

Steps

1. Remove the rear panel from the cabinet.
2. Attach the heater to the rear of the internal cabinet structure.
3. Connect supply cable to heater.
4. Attach the temperature sensor inside the cabinet in the designated location.
5. Connect the temperature sensor to the heater.
6. Attach control cable to heater and door switch.
7. Replace the back panel of the cabinet.

4.6 Contents of the security lock delivery (optional)

The cabinet can be fitted with a security lock. The delivery contains the following items:

Table 23 : Security lock delivery

Item	Quantity
Lock body	1 pc
Lock plate	1 pc
Lock latch	1 pc
Nut	1 pc

Table 24 : Security key delivery

Item	Quantity
Security key	1 pc

4.6.1 Installing the optional security lock

Steps

1. Take the UltraSite EDGE BTS Mini Outdoor specific security lock body and plate from the site pack.
2. Remove the external door trim panel; there are four screws fixing the side flange of the trim to the door, see figure below for locations:

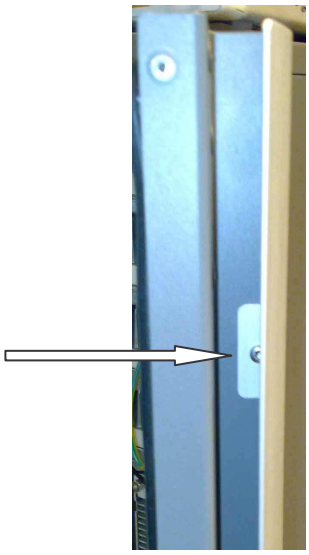
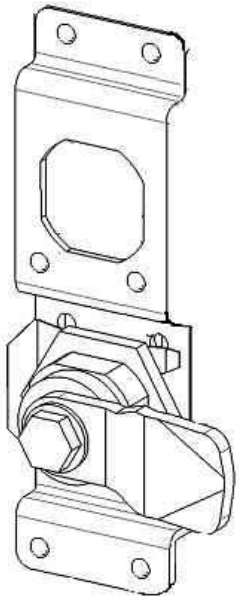


Figure 7 : Location of one of the door trim mounting screws: door shown end on

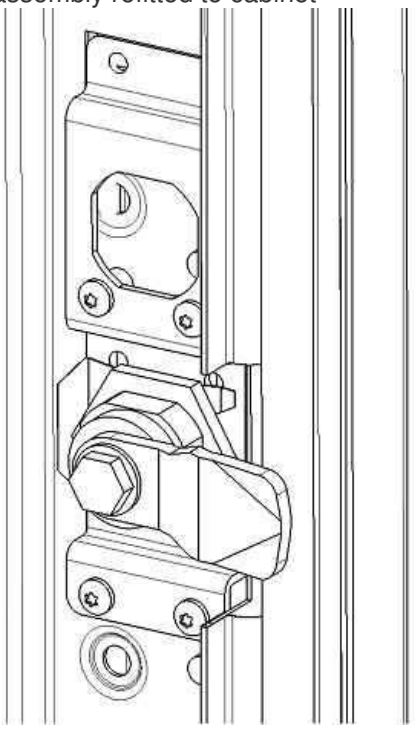
3. Remove the triangle key lock from the upper of the two lock positions.
4. Remove the lock bracket by unscrewing the four retaining screws; retain the screws for re-use.
5. Feed the barrel of the security lock through the smaller cut out in the lock bracket; then slip the locking plate over the lock barrel.
6. Attach the locking lever to the rear of the lock barrel using the nut. See the following figure for view of sub-assembly at this point.

Figure 8. Lock sub-assembly prior to re-fitting



7. Screw the sub-assembly back into place on the rear of the door using the four screws. Refer to figure following for correct positioning:

Figure 9. Lock assembly refitted to cabinet



8. Test the security lock.

   Test the lock by turning the key in the lock. Check that the latch moves correctly and that the door can be locked.

9. Reinstall the door trim panel. Refitting is the reverse of removal.

5 Mounting the Nokia UltraSite EDGE BTS Mini Outdoor

5.1 Lifting the cabinet

Follow these instructions if the BTS must be lifted to the desired installation location.

WARNING

The cabinets are heavy. Additional personnel or lifting equipment may be needed when the cabinets are moved, unpacked, or lined up. In addition, follow any local regulations applicable to the installation.

Note

Lifting eye bolts are not included in delivery; please contact your Nokia representative for details.

Note

Configuring of the BTS to utilise +24VDC power supply and / or optional heater requires access to the rear of the cabinet. Perform these actions if required before mounting the cabinet in a position where rear access after installation will be difficult.

Before you start

Do not install the plug-in units before lifting the cabinet.

Steps

1. Remove the protective plugs from the lifting eye bolt holes

   Store the protective plugs in a safe place if the lifting eye bolts are to be removed from the BTS at the end of installation
2. Attach the lifting eye bolts to the attachment points.
3. Attach the hoisting belt or rope to the lifting eye bolts.

   Attach the belt /rope so that the angle between the belt and the cabinet roof is a minimum 60 degrees.
4. Lift the cabinet carefully to the desired installation height.
5. Mount the cabinet.

   For detailed instructions, see the following sections.
6. Remove the lifting equipment
7. Re-insert the protective plugs if the lifting eye bolts have been removed.

5.2 Mounting the cabinet on a pole

Purpose

The Nokia UltraSite EDGE BTS Mini Outdoor can be installed on a pole 60-300 mm in diameter with a pole mounting kit. Follow this procedure to mount the cabinet on a pole.

Before you start

Check that the following tasks are completed:-

- The site is prepared as described in *Preparing the site* section.
- The delivery is unpacked and complete. For more information, refer to *Unpacking the delivery*, *Contents of the cabinet delivery* and *Contents of the pole mounting kit* sections in this document.

There are 3 different lengths of bolts available. Use the appropriate size bolt for the diameter of the pole; see the following table.

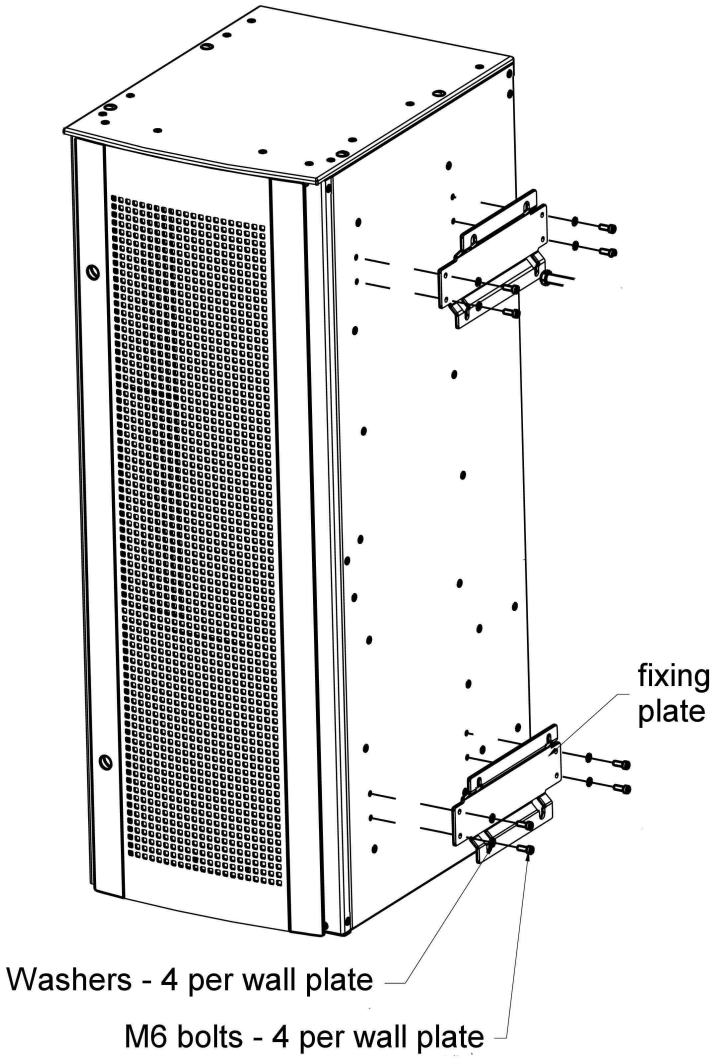
Table 25 : Bolt lengths in relation to pole diameter

Pole diameter	Bolt length
60 – xx? mm	210 mm
xx – yy? mm	300 mm
yy -300 mm	405 mm

Steps

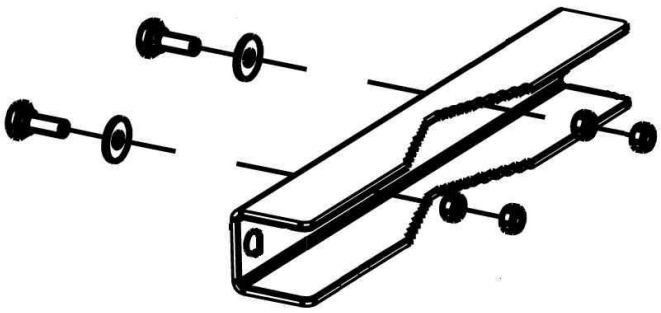
1. Using a 6 mm Hex key, attach the fixing plates to the cabinet, using 4 screws and 4 washers to fix each plate. The cabinet may be mounted on either the left or right hand side, fix the wall plates on the appropriate side. Ensure the plates are correctly orientated so that the shorter part of the plate points towards the outer edges of the cabinet. See the following figure for fixing hole positions on the cabinet:

Figure 10 : Attaching fixing plates to the cabinet



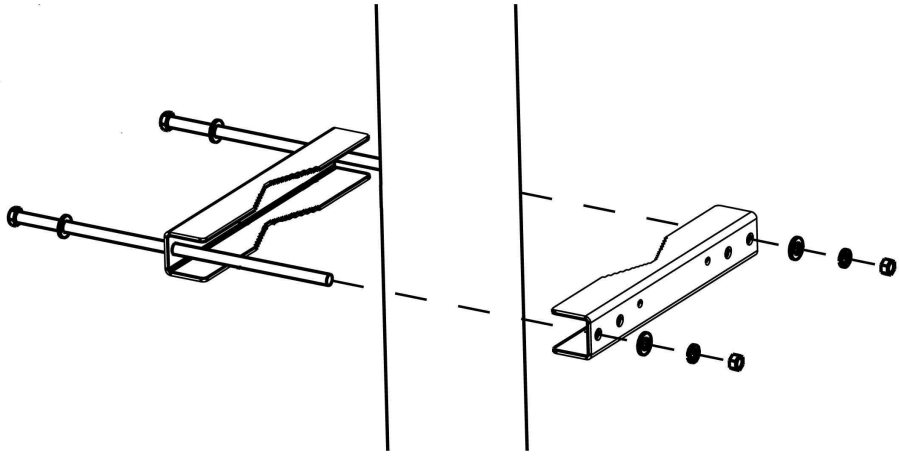
2. Attach two shouldered bolts to each of the two pole mounting brackets using a washer between each bolt and the mounting bracket. Then secure each bolt with two M8 nuts behind the mounting bracket. See the following figure:

Figure 11 : Attaching bolts to pole mounting brackets.



3. Feed a pair of the appropriate length pole mounting bolts through one of the pole mounting brackets used in the step above with a washer between the head of the bolt and the bracket. Then place the assembly against the pole in the position required for the upper mounting bracket.
4. Slip another bracket, without shouldered bolts, over the end of the bolts, followed by a plain washer, a spring washer, and lastly an M12 nut; on the end of each bolt. Tighten the assembly to the appropriate torque. See the following figure:

Figure 12 : Attaching pole mounting brackets to pole.



5. Repeat steps 3 and 4 with the remaining parts for the lower mounting bracket, but only tighten the M12 nuts finger tight, so that the position of the lower mounting bracket on the pole can be adjusted.

6. Lift the cabinet to the pole either manually or by hoisting it with a hoisting belt or a rope.

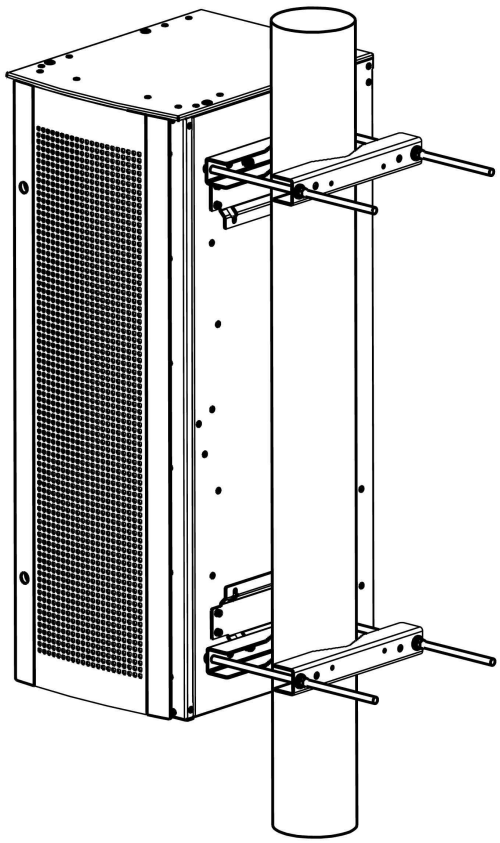
   Refer to section 5.1 of this document

7. Fit the cabinet over the shouldered screws in the upper pole mounting bracket.
8. Adjust the position of the lower mounting bracket so the heads of the shouldered bolts in the lower pole mounting bracket are located in the bottom slots of the lower cabinet fixing plate.
9. Tighten the nuts on the lower pole mounting bracket through bolts to the appropriate torque.

Desired Output

See the following figure for a completed installation.

Figure 13 : Completed pole mounting installation



5.3 Mounting the cabinet on a wall

Purpose

The Nokia UltraSite EDGE BTS Mini Outdoor can be attached to a wall using appropriate fixings. Follow this procedure to mount the cabinet on a wall.

Before you start

Note

The anchor screws must be M10 size stainless steel, with a minimum tensile strength of 800 (tbc) N/mm^2.

Make sure that the mounting surface is even, so that the cabinet does not become twisted when mounted to it.

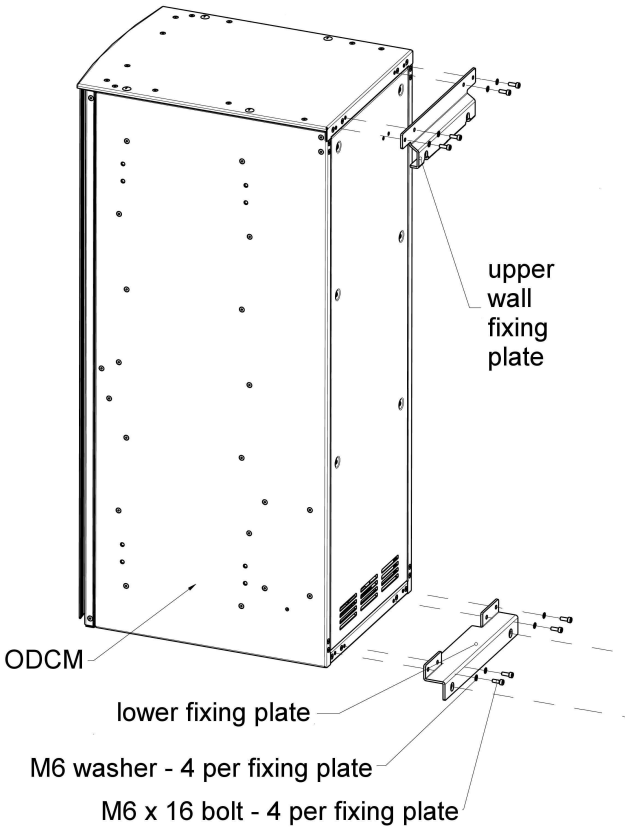
Check that the following tasks are completed:-

- The site is prepared as described earlier in this document
- The delivery is unpacked and complete; refer to the relevant section of this document.

Steps

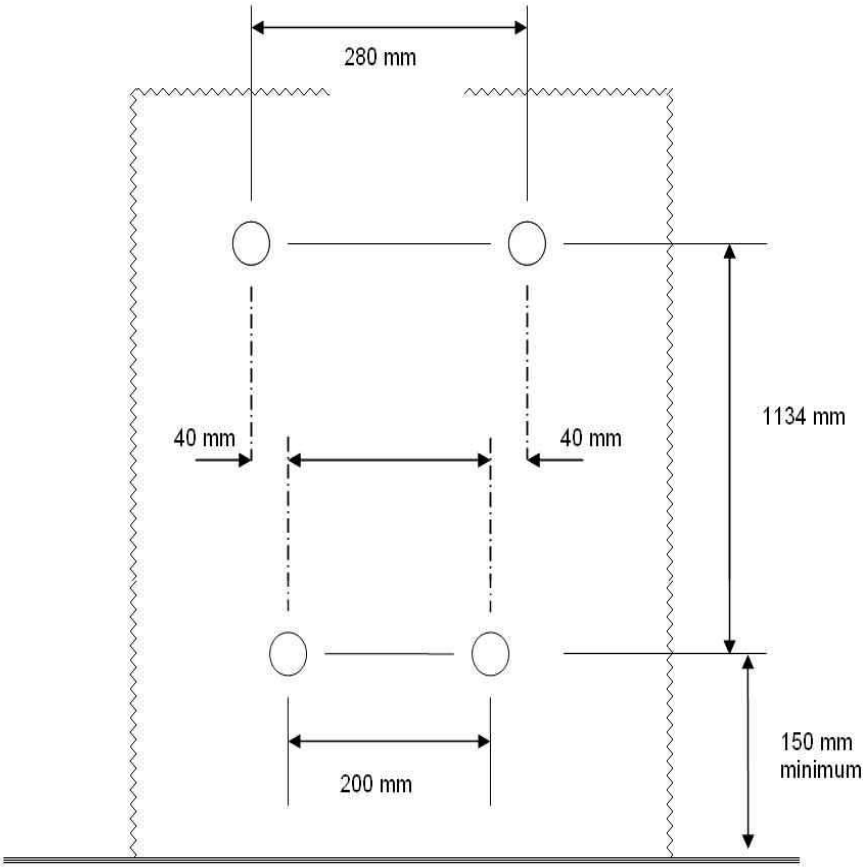
1. Using a 6 mm hex key attach the fixing plates to the cabinet, using 4 screws and 4 washers to fix each plate. Refer to figure following for fixing hole positions:

Figure 14 : Attaching fixing plates to the cabinet



2. Mark the mounting bolt locations on the wall. See the following figure for dimensions.

Figure 15 : Hole positions for wall mounting

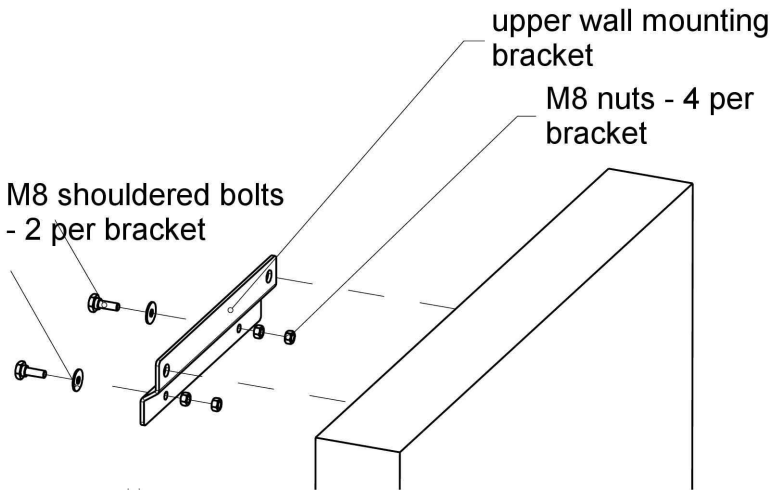


3. Drill the holes for the mounting bolts.

   Take appropriate safety precautions when drilling; see appropriate section of this document.

4. Attach two shouldered bolts to the wall mounting bracket, using a washer between the bolts and the bracket, and two M8 nuts behind the mounting bracket to retain each bolt.

Figure 16 : Attaching bolts to wall mounting bracket



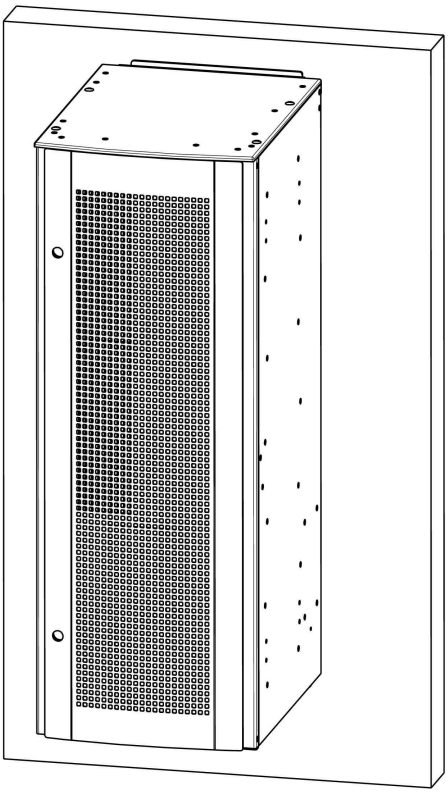
5. Attach the upper mounting bracket to the wall using the mounting bolts. Ensure that the bracket is correctly orientated so that the shouldered bolts are protruding from the lower half of the bracket; and that the bracket is level.
6. Lift the cabinet into position on the mounting bracket, hooking the slots in the cabinet wall plate over the shouldered bolts on the upper mounting bracket.

   Use appropriate mechanical aids to lift the cabinet: see warning about cabinet weight in section 4.1 of this document.
7. Ensure the cabinet is level. Then bolt the cabinet to the wall using two fixing bolts through the lower fixing plate.

Desired Output

After the installation process the installation should look like this:

Figure 17 : Completed wall Installation



5.4 Mounting the cabinet on the plinth

Purpose

The Nokia UltraSite EDGE BTS Mini Outdoor can be attached to the plinth using appropriate fixings. Follow this procedure to mount the cabinet on the plinth.

Before you start

Make sure that the floor surface is even, so that the cabinet does not become twisted when mounted to it.

Check that the following tasks are completed:

- The site is prepared as described in section *Planning and preparing the site* of this document.
- The delivery is unpacked and complete. See section *Unpacking and inspecting the UltraSite EDGE BTS Mini Outdoor delivery* of this document.

Steps

1. Mark the mounting bolt locations on the floor

   Refer to following diagram for dimensions:

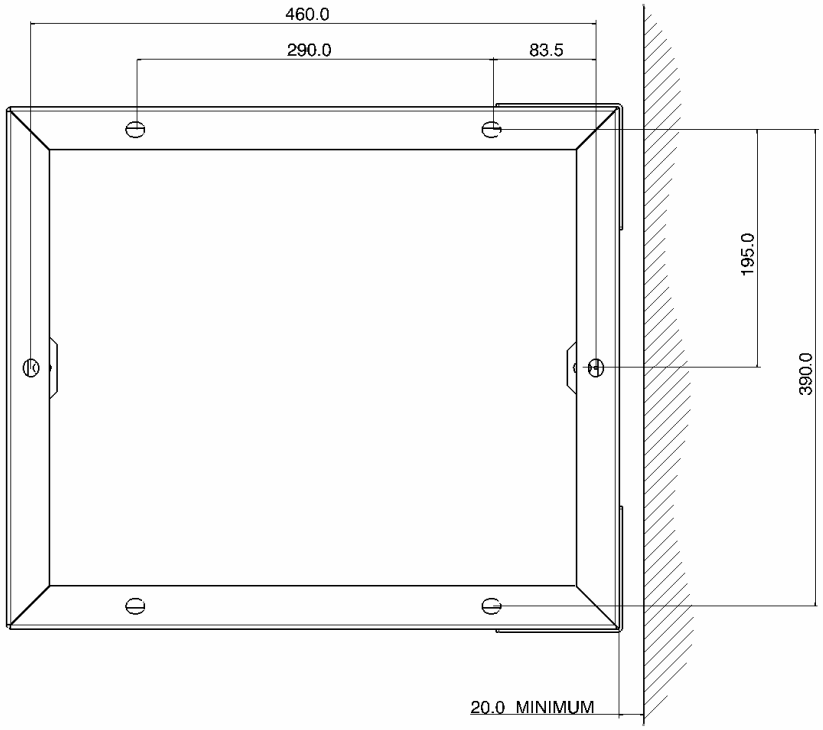


   Figure 18 : dimensions for floor mounting holes

2. Drill the holes for the mounting bolts.

   Take appropriate safety precautions when drilling; see section *UltraSite EDGE BTS mini outdoor installation* of this document.

3. Fix the plinth to the floor.

   Use a spirit level to ensure the plinth is level on all axes

4. Lift the cabinet into position on the mounting brackets.

Use appropriate mechanical aids to lift the cabinet : see warning about cabinet weight in section Lifting the cabinet

5. Fix the cabinet to the plinth.

   Use the appropriate bolts; ensure that the cabinet is level after bolts have been tightened.

6 Cabling Nokia UltraSite EDGE BTS Mini Outdoor

6.1 Overview of cabling UltraSite EDGE BTS Mini Outdoor

Before you start

It is recommended to use outdoor-rated cables for the Outdoor cabinets.

Summary

WARNING

Risk of lethal voltages and electric shock exist when routing power cables. Verify that mains power breaker is OFF and that the cabinet is properly grounded before attempting to remove any connections to the cabinet.

Caution

All cables connected between the interface module (Q1, Q1_SSS, etc.) and BTS units must be grounded and shielded on both ends.

Caution

Data cables over four feet in length that are installed between Outdoor cabinets must be routed through solid metal conduit (US only).

Caution

Cabling the BTS will require removal and refitting of a number of panels with the cabinet structure. Ensure these panels are not separated from the cabinet during installation.

Note

Using external synchronisation, external alarms and controls (EAC), and external transmission equipment is optional.

The cable sets are delivered with the units when the configuration is ordered from the factory. All cables are identified by the cable code and the cable label. During commissioning, the code and label information can be stored into a file in the BTS.

Steps

1. Connect grounding cables.
2. Connect AC power cables.
3. Connect DC power cables.
4. Connect external antenna cables.

6.2 Connecting grounding cables to UltraSite EDGE BTS Mini Outdoor

Summary

WARNING

Risk of lethal voltages and electric shock exists when routing power cables. Ensure that the mains power breaker is off and that the cabinet is properly grounded before attempting any connections to the cabinet.

Caution

Risk of fire. The cable cross-section dimension must meet national, state, and local regulations.

Tip

For connecting grounding cables, use an 8 mm (0.31 in.) single-hole lug or a two-hole lug PE connector of 5 mm (0.2 in.) or 6 mm (0.24 in.).

Steps

1. On the underside of the cabinet, unscrew the nut(s) from the ground connection.
2. Strip about 2 cm (0.75 in.) off from the main grounding cable.
3. Insert the stripped end of the cable into a suitably sized cable shoe lug and crimp it.
4. Fit the lug end of the grounding cable over the ground connection(s).
5. Install the star washer(s) and tighten the ground nut(s) on the grounding cable stud(s).
6. See section *Torque settings of UltraSite EDGE BTS Mini Outdoor*.

6.3 Connecting AC power cables to UltraSite EDGE mini outdoor BTS

6.3.1 Overview of connecting AC power cables to UltraSite EDGE BTS Mini Outdoor

Summary

WARNING

Damage to cabinet components or personnel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

The AC terminal block is rated to accept cable from 10 to 16 mm^2. The recommended cross sectional area of cable connecting to the AC terminal block is 13.3 mm^2 (flexible stranded #6 AWG).

Ensure connections are made only to the correct terminals on the power filter block. See Section *Connecting single-phase AC power to UltraSite EDGE BTS Mini Outdoor.*

6.3.2 Connecting single-phase AC power to UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Overview of connecting AC power cables to UltraSite EDGE BTS Mini Outdoor.*

Pay careful attention to all warnings and cautions.

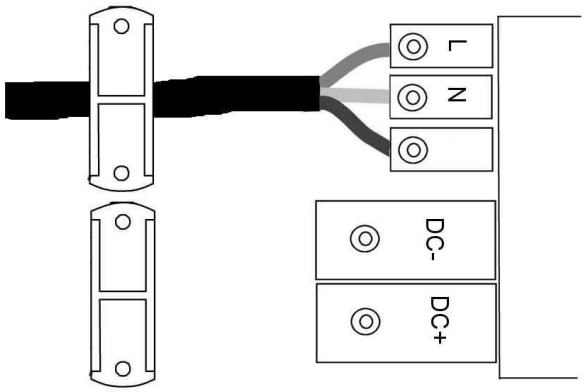


Figure 19 : Connecting single-phase AC power to the BTS

WARNING

Risk of electric shock. When the mains power breaker is switched on, the terminals on the filter are live. Make sure that the cover is replaced before switching the mains power on.

Steps

1. Ensure that the cabinet is properly grounded and that the mains power breaker is OFF.
2. Cut the outer sheath of the AC power cable to expose the three internal wires.
3. Unscrew the cover plate on the bottom panel of the cabinet; which sits over the supply terminals; it is attached by 6 off T20 Torx screws
4. Route the power cable through the gland on the cover plate and then the cable clamp.
5. Strip about 13 mm (0.5 in.) of insulation from each of the three exposed wires.
6. To open the L, N, and PE connector terminals, turn the screws anti-clockwise using a posidrive screwdriver.
7. Insert the ground wire into the PE connector and then turn the screw clockwise until the connection is tight.
8. Insert the live wire into the L connector and then turn the screw clockwise until the connection is tight.
9. Insert the neutral wire into the N connector and then turn the screw clockwise until the connection is tight.
10. To secure the power cable, tighten the screws on the cable clamp.

    See *Torque settings of UltraSite EDGE BTS Mini Outdoor*.
11. Reinstall the cover plate over the connector terminals and screw it into position.

6.4 Connecting DC power cables to UltraSite EDGE mini outdoor BTS

6.4.1 Overview of connecting DC power cables to UltraSite EDGE BTS Mini Outdoor

Before you start

Review section *Cabling GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

WARNING

Damage to cabinet components or personnel can occur if the power cable is not secure. Ensure the power cable is secure within the strain relief.

For the maximum current, see relevant section of this document.

Steps

1. Connect -48 VDC power cables to UltraSite EDGE BTS Mini Outdoor.

   or

2. Connect +24 VDC power cables to UltraSite EDGE BTS Mini Outdoor.

6.4.2 Connecting -48 VDC power cables to UltraSite EDGE BTS Mini Outdoor

Before you start

Review *Connecting DC power cables to UltraSite EDGE BTS Mini Outdoor.*

Pay careful attention to all warnings and cautions.

Summary

WARNING

Risk of personal injury. Wear the necessary protective gear, such as gloves and safety glasses, when drilling.

Caution

If the DC power cables are reversed during installation, a fuse will blow or open in the transceiver (TSxA) unit. Before you connect the power cables, check their polarity with a multimeter.

Caution

Moisture may damage the equipment. Do not expose the cabinet top or interior to rain or snow.

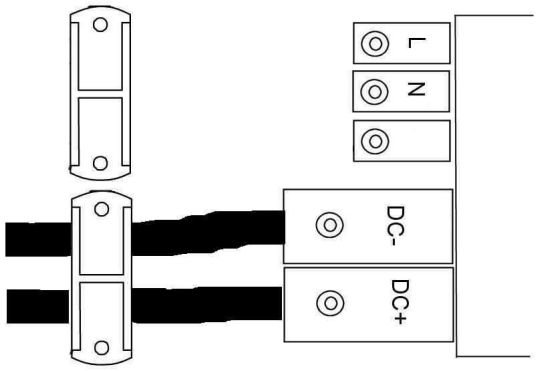


Figure 20.Connecting -48 VDC power to the BTS

Steps

1. Cut the outer sheath of each of the DC power cables to expose the internal wires.
2. Unscrew the cover plate on the bottom panel of the cabinet; which sits over the supply terminals
3. Route the power cable through the gland on the cover plate and then the cable clamp.
4. Strip about 13 mm (0.5 in.) of insulation from each of the two exposed wires.

5. To open the DC+ and DC- connector terminals, turn the screws anti-clockwise using a 5mm A/F Allen key.
6. Insert the blue wire into the DC - terminal and then turn the screw clockwise until the connection is tight.
7. Insert the black wire into the DC +terminal and then turn the screw clockwise until the connection is tight.
8. To secure the power cable, tighten the screws on the cable clamp.

   See *Torque settings of UltraSite EDGE BTS Mini Outdoor.*
9. Replace the cover plate over the connector terminals and screw it into position

6.4.3 Connecting +24 VDC power cables to UltraSite EDGE BTS Mini Outdoor

Before you start

Review C*onnecting DC power cables to UltraSite EDGE BTS Mini Outdoor.*

Pay careful attention to all warnings and cautions.

Summary

WARNING

Risk of personal injury. Do not touch the fans in the rear of the cabinet.

WARNING

Risk of personal injury. Wear the necessary protective gear, such as gloves and safety glasses, when drilling.

Caution

Moisture may damage the equipment. Do not expose the cabinet top or interior to rain or snow.

Caution

If the DC power cables are reversed during installation, a fuse will blow or open in the transceiver (TSxA) unit. Before you connect the power cables, check their polarity with a multimeter.

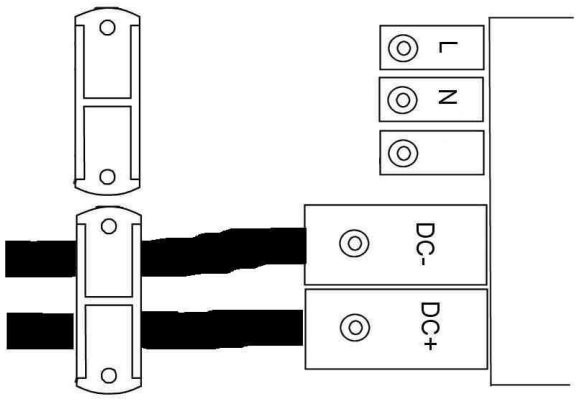


Figure 21 : Connecting +24 VDC power to the BTS

Steps

1. Ensure that the cabinet is properly grounded and that the main power breaker is OFF.
2. Cut the outer sheath each of the DC power cables to expose the internal wires.
3. Unscrew the cover plate on the bottom panel of the cabinet, which sits over the supply terminals
4. Route the power cable through the gland on the cover plate and then the cable clamp.
5. Strip about 13 mm (0.5 in.) of insulation from each of the two exposed wires.
6. To open the DC+ and DC- connector terminals, turn the screws anti-clockwise using a 5mm A/F Allen key.
7. Insert the black wire into the DC - terminal and then turn the screw clockwise until the connection is tight.

8. Insert the red wire into the DC +terminal and then turn the screw clockwise until the connection is tight.
9. Replace the top of the cable clamp and tighten the screws to secure the cable.
10. Tie-wrap any loose cables.
11. Replace the cover plate over the connector terminals and screw it into position
12. Open the front door of the cabinet, then unscrew the two screws at the top of the cabinet, refer to figure following: then remove the rear panel from the cabinet by unscrewing the 4 screws visible from the rear of the cabinet.

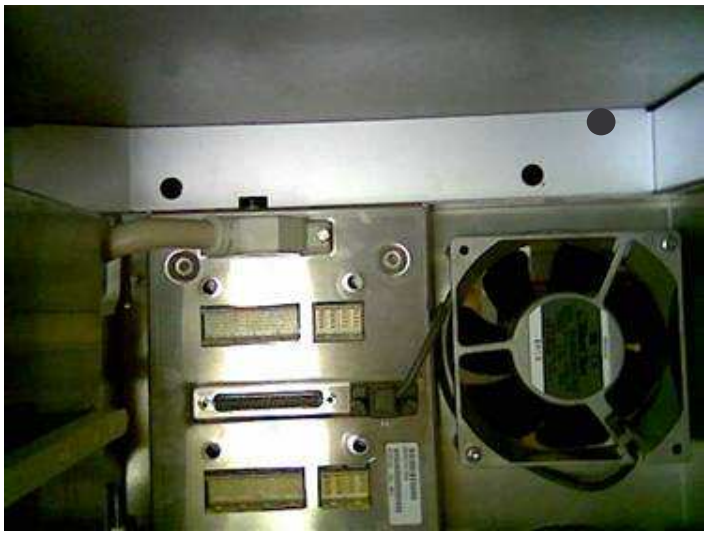


Figure 22 : Rear panel retaining screw holes viewed from front of cabinet

13. Gently push a screwdriver through the middle hole show in the figure above to release the rear panel.
14. Viewing the cabinet from the rear, remove the four screws which retain the fan plate using a T20 Torx driver. Refer to following figure for locations:

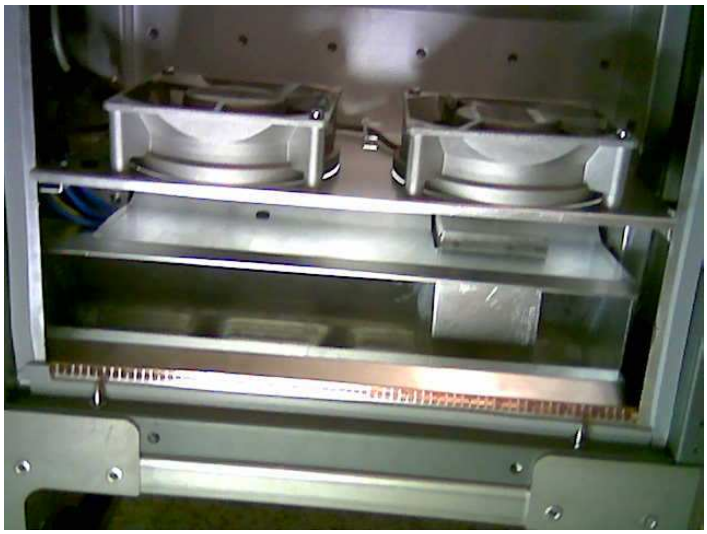


Figure 23 : rear of cabinet showing fan plate retaining screws

15. Remove the two screws which secure the baffle plate to the fan plate using a T15 Torx driver, then bend the baffle plate upwards to view the power supply cabling.
16. Disconnect the power supply leads on the output side of the filter box, they can be identified as shown in the following figure:

Figure 24 : Rear cabling showing +24V supply cables

17. Connect the +24V cables.
18. Secure the baffle plate and fan tray; refitting is the reverse of removal.
19. Refit the rear panel by first screwing the two fittings on the inside; then the four screws from the outside rear.
20. Connect the power cables to the front of the PWSC.

6.5 Connecting external cables

6.5.1 Installing external antenna cables to the cabinet

Caution

Over bending the feeder cables and jumper cables damages the cables and can detach or damage the connectors. If the cabinet is mounted on a plinth, do not bend the feeder cables or jumper cables to a radius smaller than the minimum radius of 35 mm (1.38 in.).

Before you start

Review C*abling UltraSite EDGE BTS Mini Outdoor at a new site*. Pay careful attention to all warnings and cautions.

Ensure that the site is ready for antenna jumper cable installation.

Steps

1. Connect each external antenna cable to the appropriate 7-16 connection on the bottom panel of the cabinet.
2. Tighten each 7/16 in. connector using a torque wrench.

   See Torque settings.

6.5.2 Installing external alarm cables to the cabinet

Before you start

Review C*abling UltraSite EDGE BTS Mini Outdoor at a new site*. Pay careful attention to all warnings and cautions.

Ensure that the site is ready for external alarm cable installation.

Steps

1. Route the external alarm cabling through the cable entry block and connect it to the appropriate connectors on the interface panel within the EMC enclosure, see the following figures:

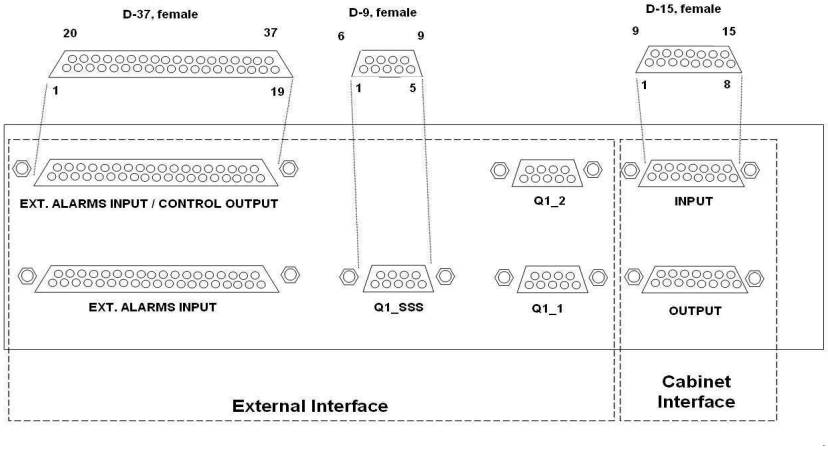


Figure 25 : Pin out of connections on interface panel

Figure 26 : location of EAC connectors within EMC enclosure
(front panel removed for clarity)

2. Ensure screwlocks are tightened and alarm cables are a tight fit within cable entry block

Pin-outs for the external alarm connections are as follows:

Table 26: 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 27 : 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				

7 Installing the units of UltraSite EDGE BTS Mini Outdoor

7.1 Overview of installing the units of the UltraSite EDGE BTS Mini Outdoor

Summary

WARNING

Disconnect Nokia UltraSite EDGE BTS Mini Outdoor from the mains power network with a dedicated switch. When you turn OFF Nokia UltraSite EDGE BTS Mini Outdoor using the BTS power supply (PWSx) switch, the BTS is in STAND BY mode.
To switch the BTS power OFF, follow the Powering down UltraSite EDGE BTS procedure.

Warning

Unit-mounting fasteners may be nickel-plated. Personnel who are sensitive to nickel should wear protective gloves when handling units.

Caution

Keep the equipment in its original package during storage and transportation. This reduces the risk of mechanical damage, protects units against electrostatic discharge (ESD), and maintains traceability.

Caution

Always use the antistatic hand strap when handling units that are marked with the ESD sign. Units carrying the ESD sign are sensitive to electrostatic discharging.

Caution

The backplanes and connectors are fragile. Install the units into the slots with great care to avoid damage to the backplanes and connectors.

Caution

Overbending the RF and antenna cables damages the cables and can detach or damage the connectors. Do not bend RF or antenna cables to a radius smaller than the minimum radius of 25 mm (0.98 inches) for internal cabling.

Note

Follow all applicable national regulations when working with power supply and power cables.

Note

When installing a unit within the Nokia UltraSite EDGE BTS Mini Outdoor, make sure that the unit is properly secured with mounting screws so that the unit stays in place and is adequately earthed (grounded).

Tip

In order to minimise internal working temperatures and hence minimise acoustic noise, populate the TRX pairs with the top one first. For instance, TRX1 should be fitted if TRX2 is used and TRX3 should be fitted if TRX4 is used.

Have the following tools available on site when installing Nokia UltraSite EDGE BTS units:

- Nokia BTS key
- Antistatic wrist strap
- PC with Nokia BTS Manager SW
- Local Managements Port (LMP) cable
- TORX bit 10 screwdriver

- T20 Torx driver

Steps

1. Verify that the installation tools are available on site.
2. Connect the antistatic wrist strap to UltraSite EDGE BTS Mini Outdoor.
3. Unpack the units.
4. See *Installing units with ejectors*.

7.2 Connecting the antistatic wrist strap to UltraSite EDGE BTS

Summary

Warning

Always use the antistatic wrist strap when handling units marked with the Electrostatic Sensitive Device (ESD) sign. Units carrying the ESD sign are sensitive to electrostatic discharge.

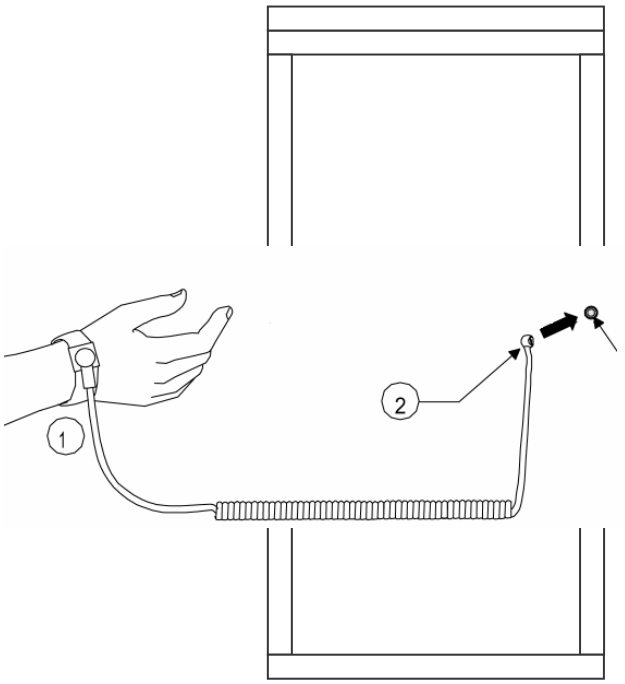


Figure 27 : Antistatic wrist strap connection

Steps

1. Discharge to ground any electrostatic charges that may have accumulated (before you touch the assembly) by touching the ground stud with your bare hand. A ground stud is provided on all system units.
2. Use a grounding wrist strap to remain discharged. The grounding wrist strap should be worn around your bare wrist and attached to the ground stud until you have completed work with the ESD-sensitive unit or assembly. Do not handle any exposed connector contacts.

7.3 Handling and unpacking units

Before you start

Ensure that the site is ready for unit installation. Refer to the *Installing units* section of this document. Pay careful attention to all warnings and cautions.

Steps

1. Unpack the unit from its protective package and check for damage.
2. Check the contents of the delivery against the packing list.
3. Recycle the packing material.

Nokia recommends that a suitable sampling of packing material be retained for shipment of faulty units if necessary.

Expected outcome

Units are prepared for installation and have sustained no damage.

7.4 Installing units with handles

Before you start

Ensure that the site is ready for unit installation. See the *Overview of installing units* section. Pay careful attention to all warnings and cautions.

Steps

1. Align the unit and rack guides.

   Line up the unit's top and bottom guides or the left and right side guide rails to the guide rails of the rack.
2. Slide the plug-in unit in until the rear connectors are fully engaged.
3. When all the units in the rack are in place, tighten the screws.

   Slightly lift the unit and tighten the screws on the front panel. Lifting the units eases the tightening. Use a TORX bit 10 screwdriver.

7.5 Installing GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor

7.5.1 Installing GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor

Before you start

Ensure that the site is ready for unit installation.

Review the *Installing the units of UltraSite EDGE BTS Mini Outdoor* section. Pay careful attention to all warnings and cautions.

Summary

The GSM/EDGE unit positions in the cabinet are pre-determined. You can launch the Site Hardware Configuration Manager from the SiteWizard to check the configuration.

Warning

Electrical hazards exist while installing DVxx cables to the RFU backplane of a powered Nokia BTS. Hold the cable being connected clear of all conductive surfaces during installation.

Caution

The cabinet does not contain dust filters. Protect all unused connectors and slots in the outdoor cabinet with connector caps and sealing units.

Caution

To ensure proper weather shielding, tighten all unit-mounting screws.

Tip

It is recommended to install the DVxx cable to the RFU backplane before you install the Transceiver RF unit in the cabinet.

Note

The layout of units as displayed by the Site Hardware Configuration manager does not match the physical layout of units within the UltraSite EDGE BTS Mini Outdoor.

Note

The layout of units as displayed by the Site Hardware Configuration manager does not match the physical layout of units within the UltraSite EDGE BTS Mini Outdoor.

The online help provides information on using SiteWizard, Nokia BTS Manager, and Site Hardware Configuration Manager.

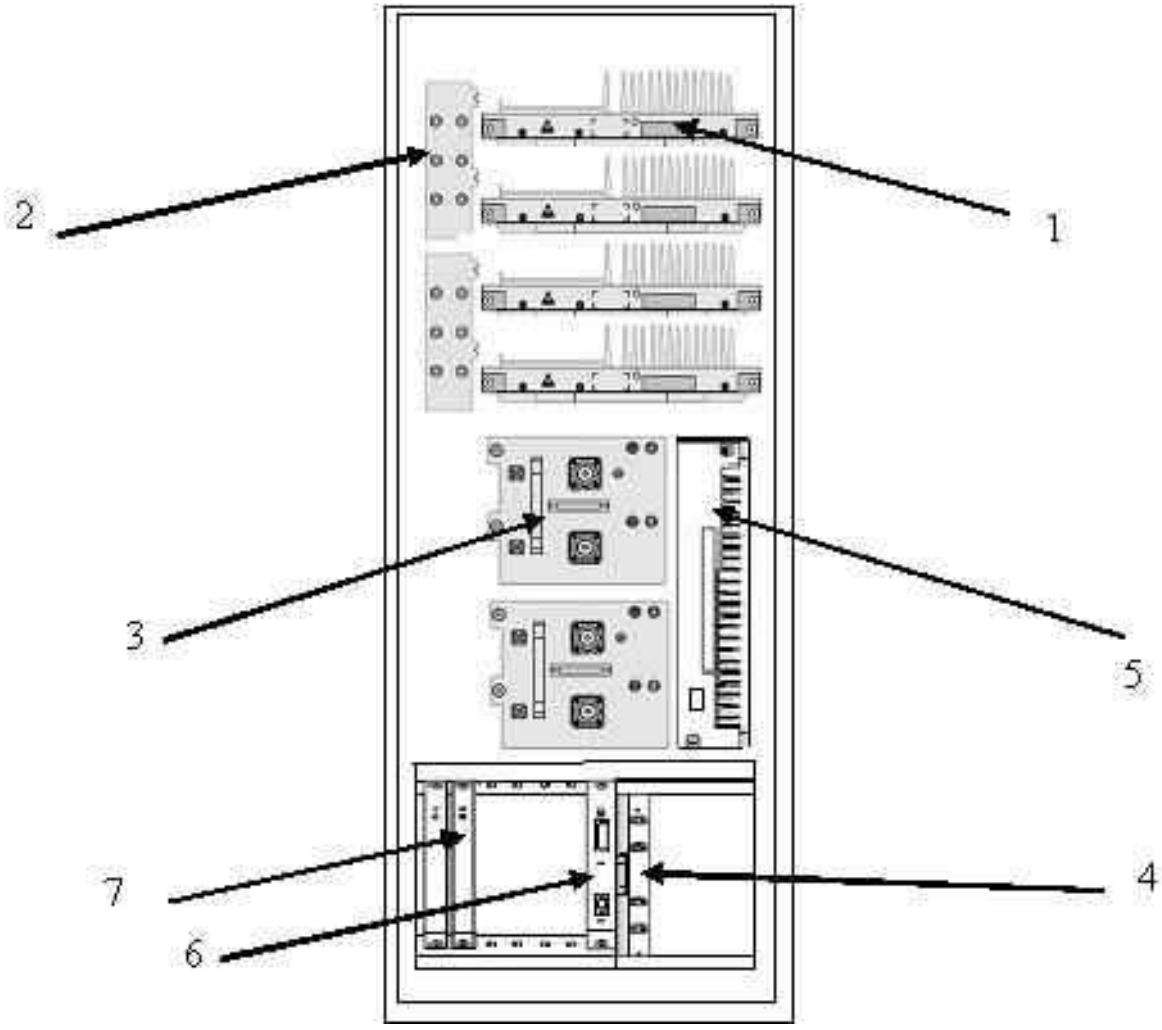


Figure 28 : Unit positions in the BTS

Table 28 : Unit identification

ID #	Description
1	Transceiver unit (TSxx)
2	2-way Receiver Multicoupler unit (M2xA)
3	Dual Variable Gain Duplex Filter unit (DVxx)
4	Transmission unit (VXxx)
5	Power Supply unit (PWSx)
6	Base Operations and Interfaces unit (BOIx)
7	Transceiver Baseband unit (BB2x)

Steps

1. Install a Dual Variable Gain Duplex Filter (DVxx) unit.
2. Install a Transceiver (TSxx) unit.
3. Install a Receiver Multicoupler (M2xA) unit.
4. Install a Base Operations and Interfaces (BOIx) unit.
5. Install a Transceiver Baseband (BB2x) unit.
6. Install a Transmission unit.
7. Install a Power Supply (PWSx) unit.

7.5.2 Installing a Dual Variable Gain Duplex Filter (DVxx) unit in UltraSite EDGE BTS

Before you start

Review the *Installing the units of the UltraSite EDGE BTS Mini Outdoor* and the *installing GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

WARNING

Risk of electric shock. Hold the DVxx and RTxx cables clear of all conductive surfaces during installation and removal.

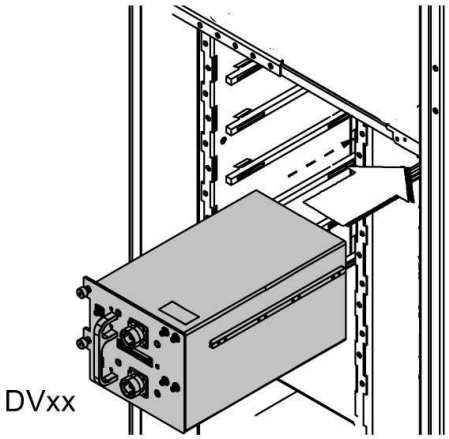


Figure 29 : DVxx unit installation

The cabinet provides slots for up to two DVxx units

Steps

1. Align the top and bottom DVxx unit guides with those on the rack.
2. Use the handle on the front of the unit to slide the unit into the cabinet.
3. Check that the rear connectors are fully engaged.
4. Tighten the unit retaining screws.

   See *Torque settings of UltraSite EDGE BTS Mini Outdoor*.
5. Remove the connector cap from the backplane.
6. Connect the DVxx cable from the X14 connector on the RFU backplane to the DVxx unit.
7. Repeat the previous steps for second DVxx unit when fitted.

7.5.3 Installing a Transceiver (TSxx) unit in UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Overview of installing units*. Pay careful attention to all warnings and cautions.

Summary

Caution

The connector pins are fragile. Do not use excessive force when inserting the transceiver (TSxx) unit into position during installation.

Caution

The backplanes and connectors are fragile. Do not force the transmission (VXxx) unit into position during installation. Gently tilt the rear of the transmission (VXxx) unit up to engage the backplane connector.

Note

A connector cap on unused connectors is necessary for outdoor installations.

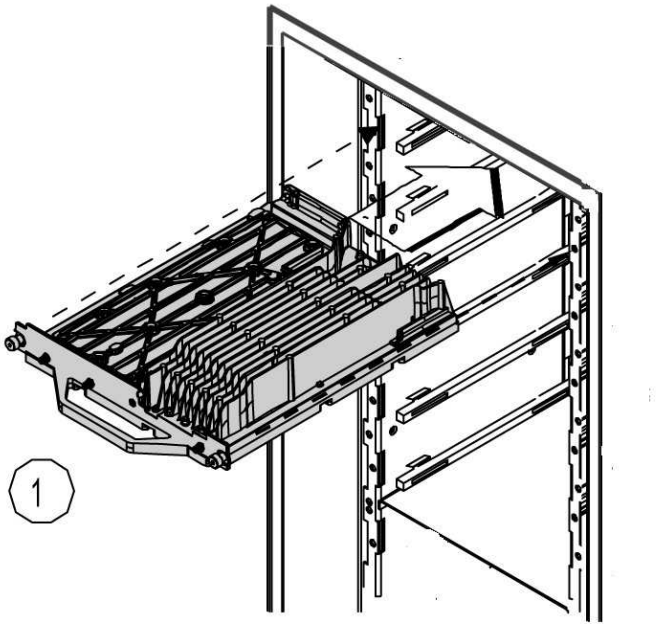


Figure 30 : TSxx unit installation

The Transceiver (TSxx) unit consists of one transmitter, one main receiver, and one diversity receiver. The slots in the top of the cabinet can hold up to 4 TSxx units from top to bottom.

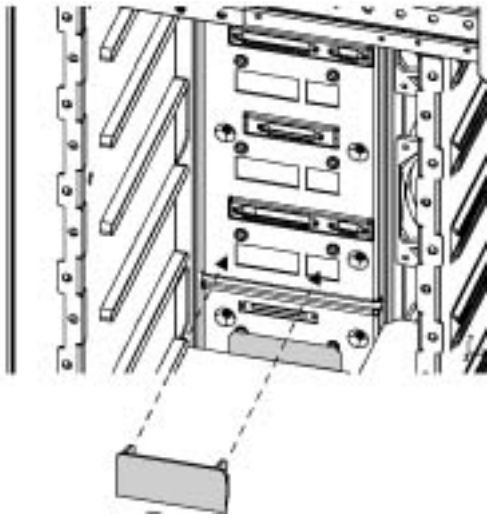


Figure 31 : TSxx connector cap installation

Steps

1. Insert the TSxx unit into a free slot.
2. Hand tighten the retaining screws.

   See *Torque settings*.
3. Repeat steps 1 and 2 for each additional TSxx unit.
4. Place one connector cap on each unused connector slot.

7.5.4 Installing a Receiver Multicoupler (M2xA) unit in UltraSite EDGE BTS mini outdoor

Before you start

Review the *Overview of installing the units* of the UltraSite EDGE BTS Mini Outdoor. Pay careful attention to all warnings and cautions.

Summary

The cabinet core holds up to two M2xA units.

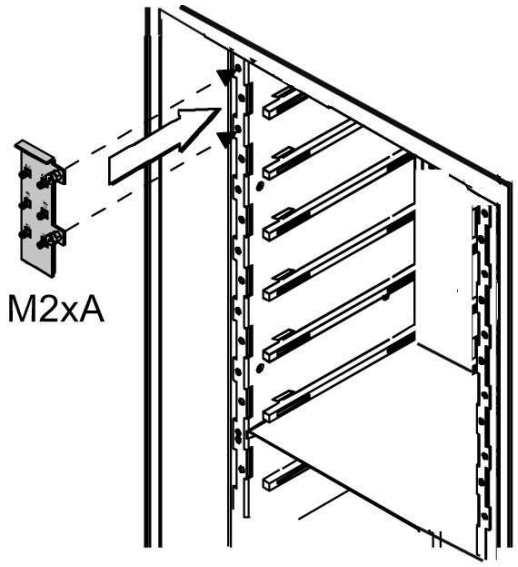


Figure 32 : M2xA unit installation

Steps

1. Mount the unit in the top left front area of the cabinet.
2. Tighten the unit retaining screws.

   See *Torque settings*.
3. Repeat steps 1 through 2 for each additional M2xA unit.

7.5.5 Installing a Base Operations and Interfaces (BOIx) unit in UltraSite EDGE BTS

Before you start

Review the *Overview of installing the units of the UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

WARNING

Ensure that the Faraday cage surrounding the FXC cards is not removed (or that it is replaced if already removed) before removing the BOIA card.

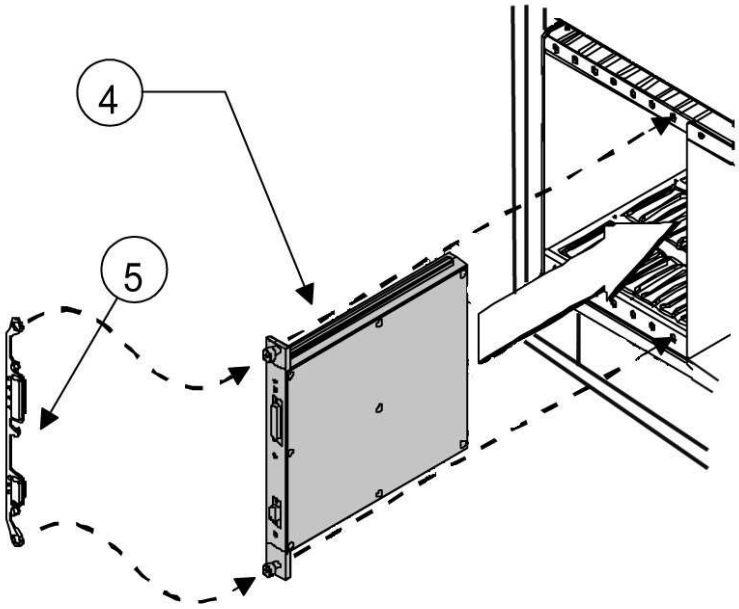


Figure 33 : BOIx unit installation

Steps

1. Insert the BOIx unit into the far right slot of the common rack area, bottom left of the cabinet.
2. Attach a rubber cover to the BOIx unit.
3. Tighten the retaining screws.

   See *Torque settings*.

7.5.6 Installing a Transceiver Baseband (BB2x) unit in UltraSite EDGE BTS Mini Outdoor

Purpose

The BB2x unit consists of two independent baseband modules. Each module functions with its respective TSxx unit. The cabinet provides slots from left to right for up to two BB2x units.

Before you start

Caution

This unit is sensitive to Electro Static Discharge (ESD). Proper ESD handling procedures must be used when installing this unit.

Caution

Ensure no BB2x unit is installed in the far right slot of the common subrack area. This position is only for installation of a BOIx unit.

Tip

Install the units from left to right in a sequential order.

Tip

A dummy unit is required for each unused BB2x slot.

Summary

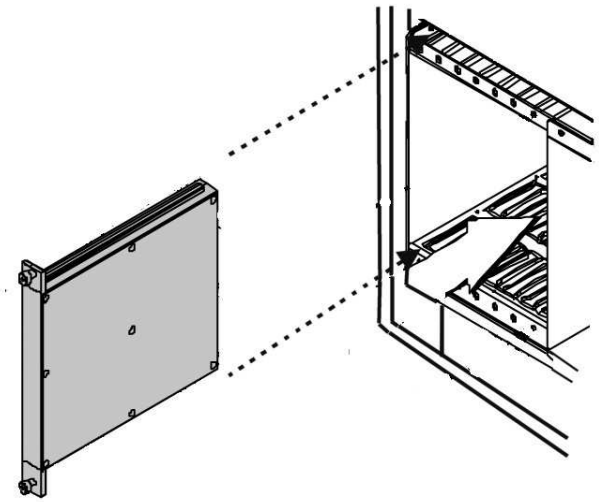


Figure 34 : BB2x unit installation

Steps

1. Remove the BB2x unit from its protective package and check for visible damage.
2. Insert the BB2x unit into an unused slot.
3. Tighten the retaining screws to 1.0 Nm (0.74 ft lb) with a T20 Torx driver.
4. Repeat the previous steps for any additional BB2x unit.
5. Install dummy BB2x units into any vacant slots.

   a. Unpack the dummy BB2x unit from its protective package and check for visible damage.

   b. Insert the dummy unit into the unused slot.

   c. Tighten the unit retaining screws with a T20 Torx driver.

   d. Repeat the previous steps for additional unused slots.

6. Recycle the packing material.

7.5.7 Installing a Transmission (VXxx) unit in UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Installing the units of the UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

Caution

The backplanes and connectors are fragile. Do not force the transmission (VXxx) unit into position during installation. Gently tilt the rear of the transmission (VXxx) unit up to engage the backplane connector.

Slide the unit into the appropriate slot. The units can be installed in any slot, with the exception of the following:-

Both FXC STM-1 and FXC Bridge must be installed for the intended SDH functionality. If there is no FXC Bridge present, the FXC STM-1 unit will be limited in operation.

Install the FXC STM-1 and FXC Bridge units side by side with the FXC Bridge unit on the left.

Do not install an FXC STM-1 unit in the first slot, as the FXC STM-1 does not support node master functionality, the FXC bridge must be used in the first slot to provide node master functionality

Do not install more than one FXC STM-1 unit, or more than one FXC Bridge unit.

The lower right cabinet area holds up to four Transmission (VXxx) units. The unit positions are 1 to 4 from left to right.

You can install only one FC E1/T1 transmission unit per cabinet, and you must use slot 1 (far left). You can install up to four FXC transmission units, but you must install one of the units in slot 1.

Figure 35 : Removing VXxx unit cover

Steps

1. Remove the VXxx unit cover.

   a. Remove the two screws from the VXxx unit box.

   b. Pull out the bottom of the VXxx unit cover while pulling down to disengage the tab.

   c. Remove the cover and set aside until after you route the interface cables.

2. Install VXxx units.

   a. Insert the VXxx unit into the cabinet.

   b. Tighten the retaining screws. See Torque settings .

   c. Repeat steps 1(a) through 2(b) for any additional VXxx unit.

3. Install dummy VXxx unit.

   a. Insert the dummy unit into an unused slot.

   b. Tighten the two retaining screws. See Torque settings.

   c. Repeat steps 1(a) through 2(b) for any additional dummy VXxx unit.

   d. Recycle the packing material.

4. Install VXxx unit box cover.

   a. After you route the interface cables, place the cover on the VXxx unit box. For information on cables, see cabling GSM/EDGE units,

   b. Insert and tighten the two screws until the cover is flush on the VXxx unit box. See Torque settings.

7.5.8 Installing a Power Supply (PWSx) unit in UltraSite EDGE BTS Mini Outdoor

Before you start

Review the I*nstalling the units of the UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

WARNING

Danger of lethal voltages! Make sure that the mains power breaker is off before repositioning the backplane connectors of the PWSx power supply unit.

Caution

Do not insert PWSx unit if the PWSx switch is in the ON position.

Steps

1. Install AC or DC power supply unit.

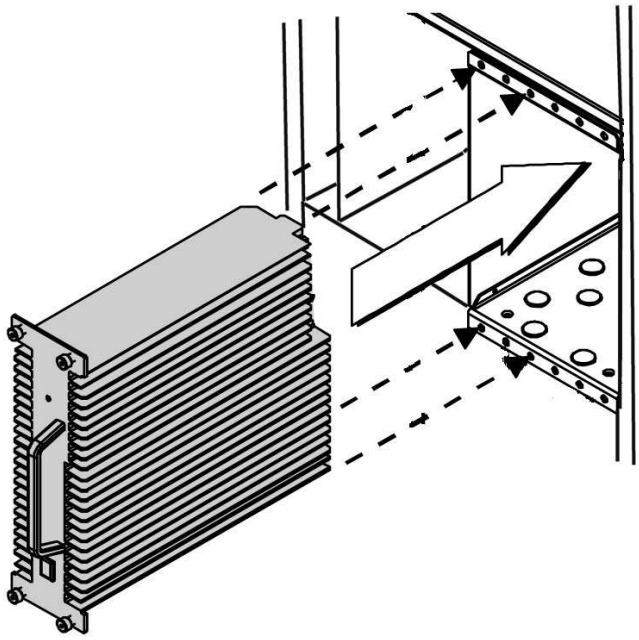


Figure 36 : PWSA unit installation

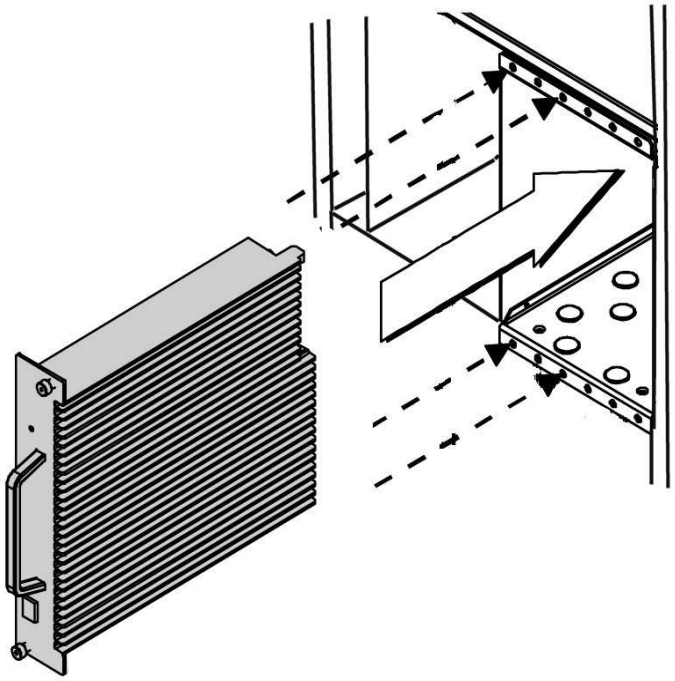


Figure 37 : PWSB unit installation

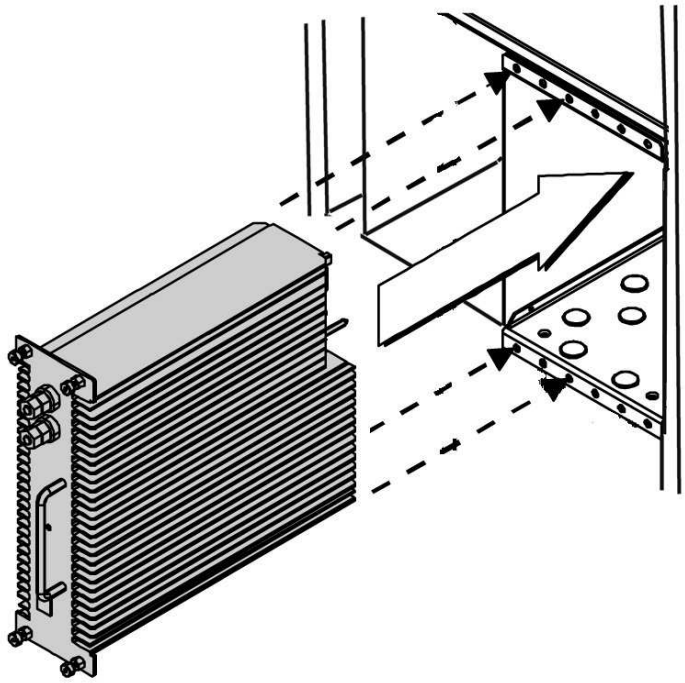


Figure 38 : PWSC unit installation

2. Ensure that the power supply switch of the PWSx unit is in STANDBY position.
3. Slide the PWSx unit into the middle right area of the cabinet.

   Ensure that the locating pins are within the cabinet locating holes. Ensure that the locating pin for the power supply connector engages with the locating hole in the rack.
4. Tighten the PWSx retaining screws.

   See *Torque settings*.

8 Cabling UltraSite EDGE BTS Mini Outdoor units

8.1 Cabling GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor

8.1.1 Overview of cabling GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Planning UltraSite EDGE BTS Mini Outdoor installation* section. Pay careful attention to all warnings and cautions.

Summary

The majority of the unit cabling required is supplied with the plug in units; the only exception is the cabling between the TRX TX outputs and the DVxx units. These cables are supplied with the cabinet.

WARNING

Comply with all illustrations of power cable routing.

Caution

Risk of damage to units. Terminate unused radio receiver (RX) outputs and use environmentally sealed protective caps for any unused antenna ports.

Note

The installer determines the exact route of the connecting cable, except when routing power cables. Cable illustrations show only one possible path for connecting two ports.

Tip

Use tie-wrap or lacing cord to tie cables every metre, when appropriate.

Steps

1. Route antenna cabling to DVxx units
2. Route transmission cables.
3. Cable radio transmission units.
4. Cable wireline transmission units.
5. Connect cables to the FXC STM-1 transmission unit.
6. Cable a DC filter module to the PWSx unit.

8.1.2 Cabling an antenna in UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Cabling GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor* section. Pay careful attention to all warnings and cautions.

Summary

Note

When installing cables, Nokia recommends starting from left to right and top to bottom, meaning the first cable you connect should be in the furthest slot to the left at the top of the cabinet and connect to the top DVxx connector inside the cabinet. The next cable you install should be connected to the next slot to the right and the next DVxx connector slot down.

Note

The minimum internal antenna cable bend radius of 25 mm (1.0 in.) must be taken into account when routing antenna cables.

Steps

1. Connect the antenna cables to the DVxx units inside the cabinet.

   See *Torque settings of UltraSite EDGE BTS Mini Outdoor*.

8.1.3 Cabling a GSM/EDGE transmission (VXxx) unit in UltraSite EDGE BTS Mini Outdoor

Before you start

Review the *Cabling GSM/EDGE units of UltraSite EDGE BTS Mini Outdoor*. Pay careful attention to all warnings and cautions.

Summary

The Transmission (VXxx) unit connects UltraSite EDGE BTS Mini Outdoor to the Abis interface through one of the following media:-

- Radio-link
- wireline

Note

An E1/T1 adapter cable (RJ45 to TQ) is available to connect the Abis cable to the Transmission units (except for FXC E1 and FC E1/T1 units when using the 75 ohm E1). To order the adapter cable, contact your local Nokia representative.

Steps

1. Remove the VXxx unit cover to install the VXxx unit(s) and Abis cable (s).
2. Route the Abis cable(s) through the EMC sleeve.
3. If you are routing cables to radio transmission units,

   Then

   see *Cabling a GSM/EDGE radio transmission unit of UltraSite EDGE BTS Mini Outdoor*
4. If you are routing cables to wireline transmission units,

   Then

   see *Cabling a wireline to GSM/EDGE transmission unit in UltraSite EDGE BTS Mini Outdoor*
5. If you are cabling an FXC STM-1 transmission unit

   Then

   see *Connecting cables to the FXC STM-1 transmission unit*.

8.1.4 Cabling a GSM/EDGE radio transmission unit of UltraSite EDGE BTS Mini Outdoor

Before you start

Review Cabling a GSM/EDGE transmission (VXxx) unit in UltraSite EDGE BTS Mini Outdoor.

Summary

The FXC RRI transmission unit includes two Flexbus interfaces for connecting to Nokia FlexiHopper or Nokia MetroHopper outdoor units, or to some other indoor radio unit.

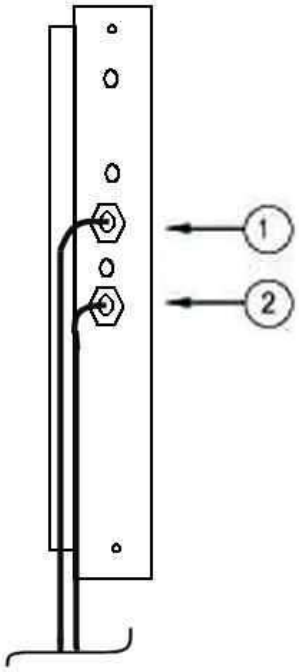


Figure 39 : Routing the Flexbus cable to FXC RRI unit

Steps

1. Connect the RX/TX Flexbus cable to the TNC connector on the FXC RRI transmission unit.
2. Tighten the connector nut.

   See *Torque settings of UltraSite EDGE BTS Mini Outdoor*.

8.1.5 Cabling a wireline to GSM/EDGE transmission unit in UltraSite EDGE BTS Mini Outdoor

Before you start

Review *Cabling a GSM/EDGE transmission (VXxx) unit in UltraSite EDGE BTS Mini Outdoor*.

Summary

Caution

Trickle charge on transmission lines may damage equipment. The 75 Ω radio transmitter (TX) is earthed (grounded) only when the earthing (grounding) bridge between the TX and radio receiver (RX) connectors is in place.

Caution

Trickle charge on transmission lines may damage equipment. If you remove the earthing (grounding) bridge, the earthing (grounding) of the radio receiver (RX) connector's outer conductor changes from direct earthing (grounding) to capacitive.

Caution

If you remove the grounding bridge, the grounding of the RX connector's outer conductor changes from direct grounding to capacitive.

Tip

When routing the cables, make sure that the cable connector and shrinking sleeve combination is not too long so that the cable has enough space to bend when you install the cabinet cover.

Use either separate 75 Ω RX and TX connectors (BT-43) or one 120/100 Ω TX/RX connector (TQ). The following wireline transmission units are available with UltraSite EDGE BTS Mini Outdoor:

- FC E1/T1 unit - includes the following connectors:

  - one coaxial 75 ohm TX/RX connector for E1 use

  - one twisted pair 120/100 ohm TX/RX interface connector for either E1or T1 use

- FXC E1 unit - includes four pairs of 75 ohm connectors (BT-43) for E1 use

- FXC E1/T1 unit - includes four 120/100 ohm TX/RX connectors (TQ) for either E1 or T1 use

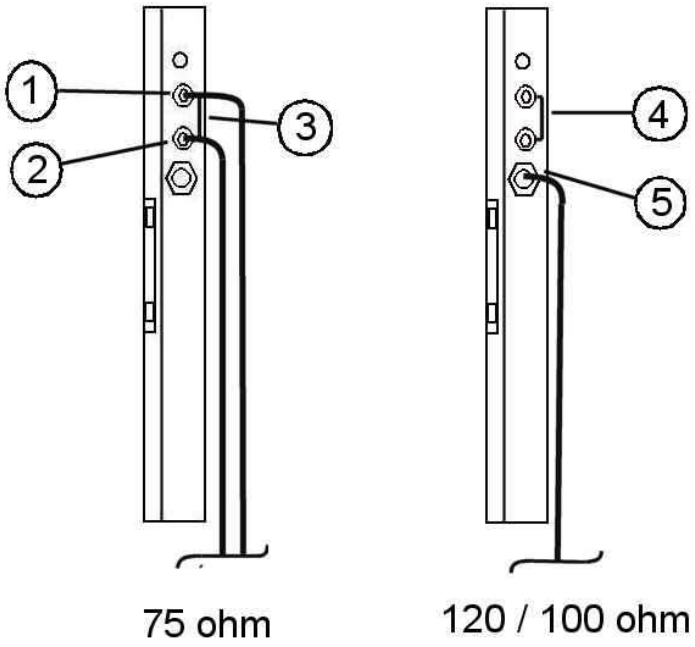


Figure 40 : Routing cables to the FC E1/T1 unit

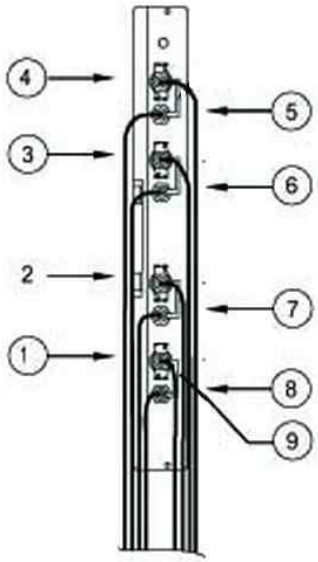


Figure 41 : Routing cables to the FXC E1 unit

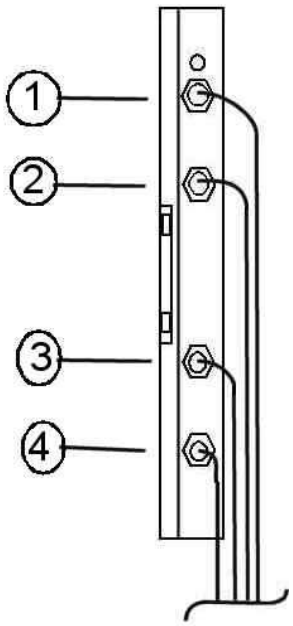


Figure 42 : Routing cables to the FXC E1/T1 unit

Steps

1. If you are routing cables to the 75 ohm connector on the FC E1/T1 unit,

Then

Perform these tasks:

a. If necessary, remove the grounding bridge with a 10 mm (0.39 in.) spanner (wrench).

b. Connect the RX cable to the 75 ohm RX connector on the front of the FC E1/ T1 unit.

c. Connect the TX cable to the 75 ohm TX connector on the front of the

FC E1/ T1 unit.

d. Tighten the connector nut.
See Torque settings of UltraSite EDGE BTS Mini Outdoor.

2. If you are routing cables to the 120/100 ohm connector on the FC E1/T1 unit,

Then

Perform the following tasks:

a. Connect the TX/RX cable to the 120/100 ohm TX/RX connector on the front of the FC E1/T1 unit.

b. Tighten the connector nut.
See Torque settings of UltraSite EDGE BTS Mini Outdoor.

3. If you are routing cables to the FXC E1 unit,

Then

Perform the following tasks**:**

a. Remove the grounding bridge with a 10 mm (0.39 in.) spanner (wrench), if necessary.

b. Connect the RX cable to the 75 ohm RX connector at IF1 on the FXC E1 unit.

c. Connect the TX cable to the 75 ohm TX connector on IF1.

d. Repeat the previous steps to connect the remaining IFs.

4. If you are routing cables to the FXC E1/T1 unit,

Then

Perform the following tasks:

a. Connect the TX/RX cables to the 120/100 ohm TX/RX connectors on the front of the FXC E1/T1 unit.

b. Tighten each connector nut.
See *Torque settings of UltraSite EDGE BTS Mini Outdoor.*

8.1.6 Connecting cables to the FXC STM-1 transmission unit

Summary

The FXC STM-1 transmission unit has two long-haul, optical STM-1 interfaces.

Caution

The optical fibre cable is fragile. Be careful when connecting the optical fibre cable to FXC STM-1.

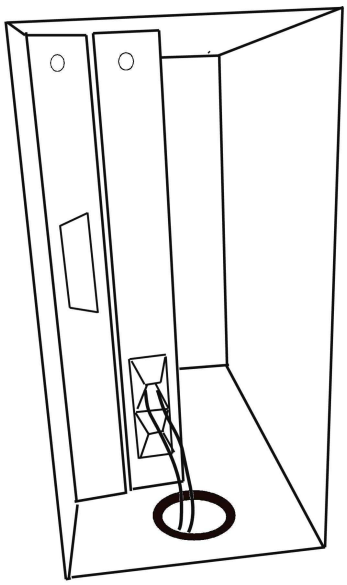


Figure 43 : Installation example of fibre within the cabinet

Caution

Overbending the optical fibre cables damages the cables and can detach or damage the connectors. Do not bend optical fibre cables to a radius smaller than the minimum radius of 75 mm (3 inches).

Caution

The optical fibre cable is fragile. Do not put the fibre under permanent tensile stress.

Steps

1. Remove the protective caps from the LC connector plugs.
   Do not touch the connector tips with your fingers.
2. Feed the LC connector plugs into the LC holes in the weather cover.

   Feed the LC connector plugs into the LC interface holes in the weather cover. Take care not to strain the small latch lever of the LC connector plug.
3. Connect the transmitter (Tx) fibre cable to the upper optical port.
4. Connect the receiver (Rx) fibre cable to the lower optical port.
5. Slide the weather cover over the LC connector.

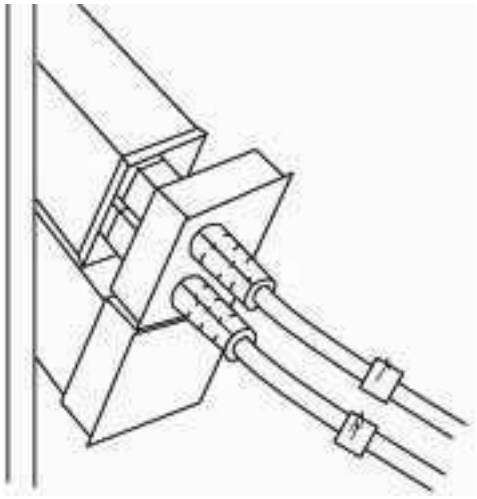


Figure 44 : LC connectors with weather covers plugged into FXC STM

6. Make sure the lips of the rubber shield are properly in place over the LC connector.

Expected outcome

The fibre optic cables are connected to the LC plugs on the FXC STM-1 transmission unit. The weather cover is in place.

Further information

Caution

Risk of damage to the laser module. If the receiving power is above -10 dBm, attenuate the optical input power.

9 Commissioning UltraSite EDGE BTS Mini Outdoor

9.1 Overview of commissioning UltraSite EDGE BTS mini outdoor

The general principles of commissioning the UltraSite EDGE BTS mini outdoor are the same as for other BTSs within the UltraSite BTS product range, full details are given in document *Commissioning UltraSite EDGE BTS*. Any differences in procedure are detailed in the following sections.

9.2 Preparing to commission UltraSite EDGE BTS mini outdoor

Proceed as detailed in the appropriate section of document *Commissioning UltraSite EDGE BTS;* note that there are two options for connecting to the LMP port within the BTS: connecting directly to the BOI LMP connection, or connecting to the BTS external interface point: see figures following-

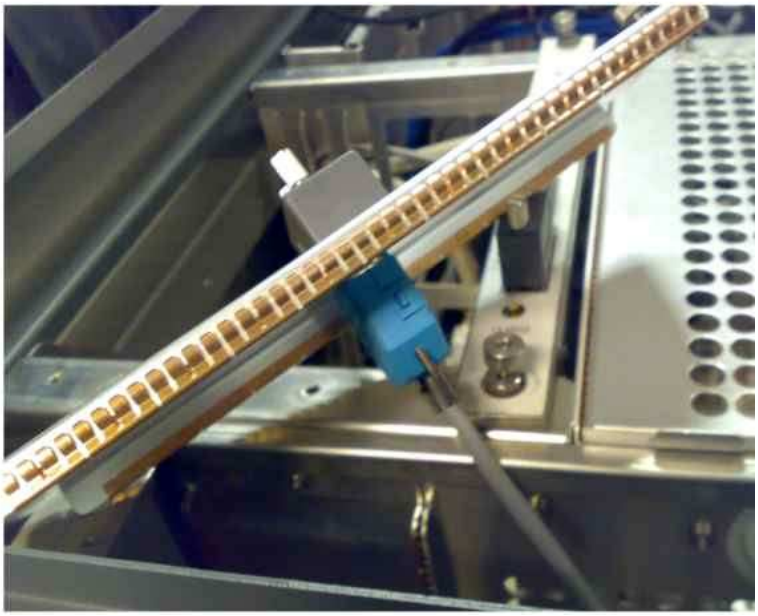


Figure 45 : Direct LMP cable connection to BOIA and LMP connection via external interface panel

9.3 Using Site Wizard

In general, proceed as detailed in the appropriate section of document *Commissioning UltraSite EDGE BTS*. Note that the physical representation of the UltraSite EDGE BTS mini outdoor will not be matched by the image shown on the PC screen.

However, BTS Manager and Hardware Configurator 4.1 CD2.2 are required for commissioning and maintaining the UltraSite EDGE BTS Mini Outdoor. This version of BTS Manager and Hardware Configurator should only be used for the Mini UltraSite. For standard UltraSite cabinets the latest version of BTS Manager and Hardware Configurator available should be used (currently 4.1 CD3.0)

Note

Administrator privileges are required to perform these actions.

New installation of BTS Manager / Hardware Configurator

Steps

1. Using Nokia SiteWizard, install BTS Manager, Hardware Configurator and General Communication Services as instructed in SiteWizard installation instructions.

   To install BTS Manager 4.1 CD2.2 for Mini UltraSite, follow the steps below:
2. Download BTS Manager and Hardware Configurator 4.1 CD2.2 from www.online.nokia.com and save these files to a temporary directory on the PC.
3. Create a directory called C:\Program Files\Nokia\Mini UltraSite
4. Change the data under NOKIAMGR registry value to the target path: C:\Program Files\Nokia\Mini UltraSite.

From the Windows Start menu select Run and enter regedit followed by OK

Browse to: HKEY_LOCAL_MACHINE\SOFTWARE\Nokia\GCS Communication Service

Change the value of the data field to C:\Program Files\Nokia\Mini UltraSite e.g.

Registry key: HKEY_LOCAL_MACHINE\SOFTWARE\Nokia\GCS Communication Service
Registry Value: NOKIAMGR
Data: C:\Program Files\Nokia\Mini UltraSite

5. Edit the Environment Variable for NOKIAMGR

   Tip: Right Click on the “My Computer” icon on the desktop

   Select the “Properties” tab and “Advanced” tab followed by “Environment Variables”

   Select NOKIAMGR from the System Variables and edit this to read “C:\Program Files\Nokia\Mini UltraSite”

6. Install the Mini UltraSite BTS Hardware Configurator 4.1 CD2.2 software to C:\Program Files\Nokia\Mini UltraSite\HWConfig by running the setup.exe program within the temporary directory created earlier.

7. Desktop shortcut icons can be added as required for the above applications.

Installation with existing BTS Manager / Hardware Configurator

For installing BTS Manager and Hardware Configurator 4.1 CD2.2 on a PC that already contains other versions of BTS Manager and Hardware Configurator follow steps 2-8 above.

Restrictions of use

- Only Microsoft Windows 2000 Professional and Microsoft Windows XP Professional editions are supported.
- Simultaneous use of both of the BTS Manager / Hardware Configurator versions is not supported.

- Launching of Transmission Element Managers from within BTS manager is not supported. Element managers should be launched using the appropriate shortcut or start menu item.

- Different versions of BTS Manager and Hardware Configurator cannot be used remotely when installed on the same NetAct Node Manager Server Platform. Due to this duplicate NetAct Node Manager Servers are required for Mini UltraSite if remote management is required.

Remote Use

Different versions of BTS Manager and Hardware Configurator cannot be used remotely when installed on the same NetAct Node Manager Server Platform. Due to this duplicate NetAct Node Manager Servers are required for Mini UltraSite if remote management is required. Refer to NetAct documentation for installation and administration of the NetAct Node Manager Server.

9.4 Commissioning UltraSite EDGE BTS Mini Outdoor

Proceed as detailed in the appropriate section of document *Commissioning UltraSite EDGE BTS.*

When selecting the type of commissioning activity, choose *Using an existing hardware configuration*. When selecting the cabinet type in the *cabinet properties* selection window, ensure the type selected is “mini cabinet, with room for 4 TRXs.

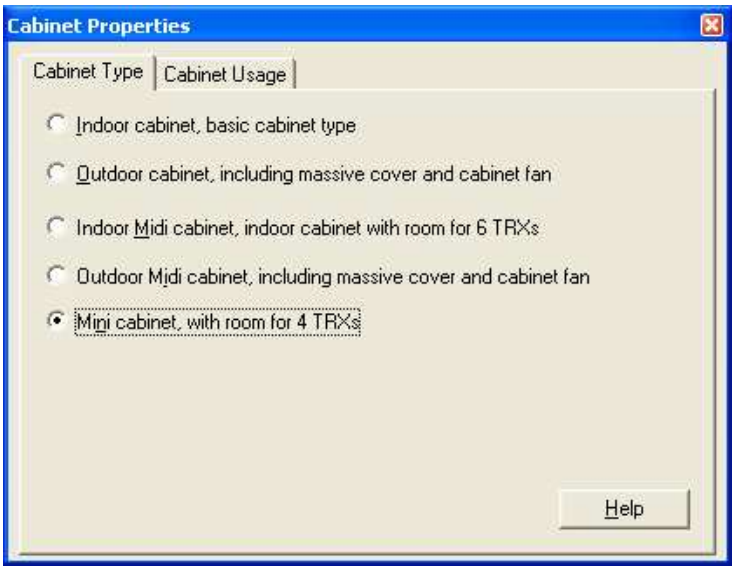


Figure 46 : Cabinet properties selection

Proceed with the commissioning as if the cabinet is a midi: the unit layout used in HW Configurator for Mini UltraSite cabinet is the same as for a Midi cabinet.

9.5 Test and activate UltraSite EDGE BTS mini outdoor

Proceed as detailed in the appropriate section of document *Commissioning UltraSite EDGE BTS.*

9.6 Completing commissioning outdoor

Proceed as detailed in the appropriate section of document *Commissioning UltraSite EDGE BTS.*

10 Glossary

10.1 Glossary for UltraSite EDGE BTS Mini Outdoor

10.1.1 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
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
ATCA	Antenna Cable Kit
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
BB2x	Transceiver Baseband unit
	BB2A for GSM
	BB2E for GSM/EDGE
	BB2F for GSM and 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 RedundancyCheck
	A method for detecting errors in data transmission.
CRMx	Core Mechanics for Nokia UltraSite EDGE Base Station Indoor and Outdoor cabinet
	CRMA for 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 800/900 and 1800/1900
DVxx	Dual Variable Gain Duplex Filter unit
	DVTB for GSM/EDGE 800
	DVTD for GSM/EDGE 800
	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 Controls
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) transmission line; with four line interfaces to the 2 Mbit/s (E1) or 1.5Mbit/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.
FXC STM-1/STM Bridge	Transmission units that enable cross-connections between PDH and SDH transmisison rates FXC STM-1 performs the main SDH functions FXC Bridge forms a bridge for the signals between the SDH part and the PDH cross-connect part of the node These two units are used together.
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 Kid for Nokia UltraSite EDGE Base Station
	IAKC for UltraSite Midi Indoor cabinet
IC	Integrated Cell / Integrated Circuit
ICE	Intelligent Coverage Enhancement
ID	Identification; Identifier IE Information Element
	The basic unit of a transaction capabilities application part (TCAP) message.
IDCA	Indoor cabinet for Nokia UltraSite EDGE Base Station

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
	OAKA 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
	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
	VXOA for FXC/STM-1
	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	Wideband 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

10.1.2 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 which adapts its operation optimally according to the prevailing channel

speech codec; AMR codec; AMR	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 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 Hoppingbus. 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 2 C-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 StarConnection.
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 theweak 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 UltraSite EDGE BTS Mini Outdoor 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 EDGE BTS	Nokia's compact four-TRX GSM EDGE base station for Nokia MetroSite capacity solution. Nokia MetroSite GSM EDGE 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 Mini Outdoor, 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.