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468962A.505_NOLSD
Nokia MetroSite EDGE BTS, Release 5

Maintenance

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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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1   About this document

This document gives instructions on the maintenance of the Nokia MetroSite™ EDGE Base Station (BTS). Read carefully *Nokia MetroSite EDGE Base Station: Warnings and Cautions* before starting the maintenance work.

This document covers the following:

- preparations for maintenance

- periodic maintenance measures

- 13 MHz clock adjustment

- troubleshooting

- replacing units

- LED conditions of the MetroSite EDGE BTS units

Refer to the specific software release documentation for software updating instructions.

2 Preparations for maintenance

This chapter describes the issues that must be considered in the maintenance of the Nokia MetroSite EDGE BTS.

2.1 Site folder

A site folder contains site-specific information required on the site. The site folders include installation, commissioning, and integration check lists. The exact contents of the site folders are defined by the customer.

It is the responsibility of the customer to maintain and archive site-specific documents.

2.1.1 Fault reporting

Where possible, correct all damage, failures, and faults and report them to Nokia using the Failure Report Form provided by Nokia Customer Services.

Note

You can save the alarm information to a log file on your PC with Nokia BTS Manager.

2.2 Maintenance equipment

Check which tools are needed for the type of maintenance being done. For information on the tools required, refer to *Nokia MetroSite EDGE Base Station: Requirements for Installation and Operation.*

Always take the BTS key, antistatic wrist strap, and Nokia BTS Manager laptop PC and LMP cable with you for BTS maintenance operations.

2.2.1 Nokia BTS Manager

When replacing or adding units, Nokia BTS Manager software is used for local management of the BTS. Instructions for running specific maintenance operations with Nokia BTS Manager are included in the relevant sections of this document.

For more general information on using Nokia BTS Manager, refer to *Nokia MetroSite EDGE Base Station: Commissioning.*

2.3 Environmental precautions

When the cover of the Nokia MetroSite EDGE Base Station is removed to allow for maintenance work, the following conditions must be considered:

1. Rain or snow must not be allowed to fall on the internal surfaces of the equipment.

2. The cover must not be removed during conditions where dust can be blown into the cabinet.

2.4 Power supply precautions

⚠ **Warning**

Potentially lethal voltages!

The BTS power must be switched OFF at the main disconnect device or circuit breaker before starting maintenance work which involves the risk of electric shocks.

When working inside the BTS cabinet, prevent injury to personnel or damage to the BTS equipment by following the requirements presented in the *Power supply rules during maintenance procedures* Table.

Table 1.   Power supply rules during maintenance procedures

Procedure	Power supply rule
Replacing a power supply unit or PSU cable	Power OFF at main disconnect device PSU switch to Stand-by If a BBU is fitted, isolate power from BBU.
Replacing a grounding connection	Power OFF at main disconnect device PSU switch to Stand-by If a BBU is fitted, isolate power from BBU.
Disconnecting or connecting antenna or diversity cables on a TRX	PSU can be switched to ON but TRX must be blocked
Replacing a TRX	PSU can be switched to ON but TRX must be blocked
Disconnecting or connecting transmission cables	PSU can be switched to ON but TRX must be blocked
Replacing a transmission unit	PSU switch to Stand-by
Connecting or disconnecting cables to the interface unit (VIFA)	PSU switch to Stand-by is advised
Replacing an interface unit	PSU switch to Stand-by
Replacing a fan unit	Power OFF at main disconnect device PSU switch to Stand-by

2.5   Removing the BTS cover

Before removing the cover for internal maintenance of the BTS, refer to the power supply precautions and environmental restrictions presented in this document and to the safety precautions presented in *Nokia MetroSite EDGE Base Station: Warnings and Cautions.*

Note

Removing the cover issues an alarm to the BSC. Make sure that the OSS personnel are notified before removing the cover.

Removing the BTS cover

1.   Unlock the cabinet lock at the bottom of the BTS.

2.   Remove the cover by sliding it upwards to disengage the hooks at the side of the cover from the locking guides on the BTS chassis.

3.   When the cover is free, pull it away from the cabinet and hang it on the hook at the top left side of the chassis.

       You can also remove the cover completely to place it on the floor. Remove the safety strap before pulling the cover away (see the *Safety strap on the MetroSite EDGE BTS cover* Figure).

Fixing point
for safety strap
under the
cover top
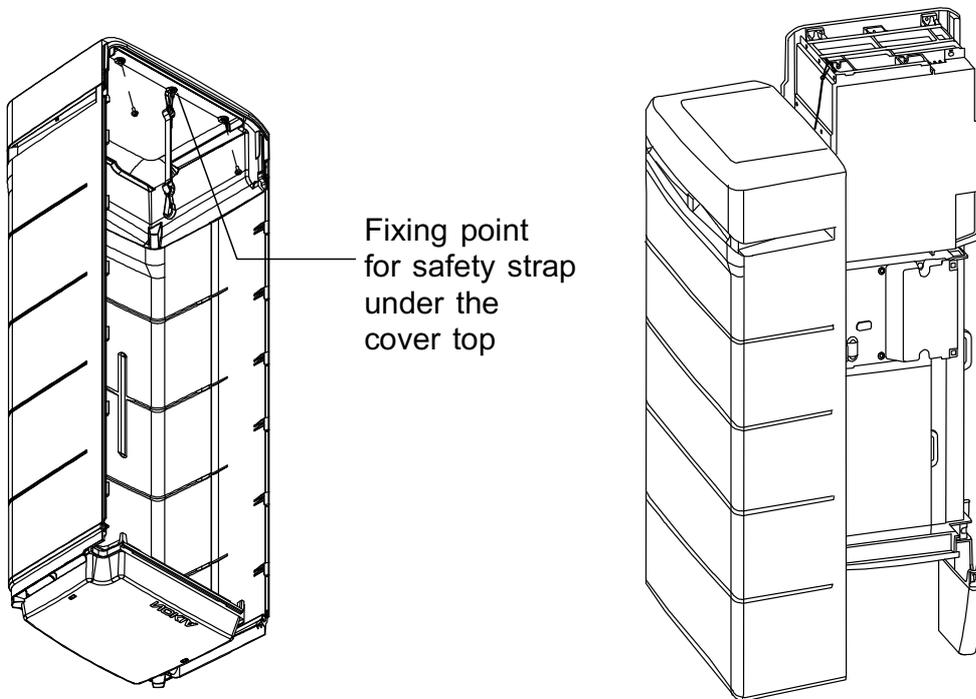
Figure 1.   Safety strap on the MetroSite EDGE BTS cover

3 Periodic maintenance

This chapter describes the periodic maintenance of the MetroSite EDGE Base Station.

3.1 Maintaining the cabinet

This section describes the cabinet maintenance measures.

3.1.1 Fan unit and air circulation

The fan unit must be cleaned of leaves and debris whenever necessary. To maintain proper circulation of air through the cabinet, air inlets and outlets must not be obstructed.

3.1.2 Cover

Clean the BTS cover of stains and dust whenever necessary. Wipe the surface of the cover with a piece of cloth moistened with water and a washing agent.

Caution

Do not use any washing agents that contain alkalis, esters, ketones, or aromatic, chlorinated, or fluorinated hydrocarbons, since these may damage the cover. Washing agents containing these chemicals can only be used if approved by the manufacturer for cleaning polycarbonate objects.

Caution

Do not spill any water or chemicals inside the cover.

3.1.3   Seals

Wipe the BTS seals (seal on the lower edge of the BTS, under the cover) whenever they are dirty. The cleaning interval depends on the environment.

Check the visible seals during every site visit. If the seals are dirty, wipe them clean with a piece of cloth. Replace worn or broken seals.

3.1.4   Lock

Lubricate the lock during site visits with lubricating oil. If the cabinet is used in temperatures below 0ºC (32ºF), lubricate the lock with lubricating anti-freeze oil or use both anti-freeze oil and lubricating oil.

3.2   Periodic testing of the BTS

The condition of the hardware in the MetroSite EDGE BTS can be tested periodically by running the Abis loop test and the TRX test remotely from the BSC/NMS. A TRX test can also be run locally with Nokia BTS Manager.

4 Adjusting the 13 MHz clock

The 13 MHz clock is adjusted using the Nokia BTS Manager PC and a frequency counter.

The 13 MHz clock should only need adjusting after a new installation or when the interface unit (VIFA) is replaced. During normal operation BTS master clock uses the synchronization signal coming from the transmission part as a reference.

Note

To meet the BTS Air interface accuracy requirement 0.05 ppm (set by ETSI), the signal used for synchronization of the transmission part (selected in the synchronization priority list by appropriate transmission manager) must meet the long-term accuracy of 0.015 ppm.

Note

Before commencing the adjustment procedure, switch ON the frequency counter and allow for a stabilising time of about 15 minutes, or as recommended by the instrument's manufacturer.

Use only a high stability frequency counter for this procedure.

Adjusting the 13 MHz clock

1. Remove the rubber dust shield from the side of the interface unit.

2. Connect the frequency counter to the X7 connector on the interface unit (first socket from the front). See the *13 MHz clock adjustment* Figure.

3. Connect the Nokia BTS Manager laptop PC to the LMP port of the interface unit. See the *13 MHz clock adjustment* Figure.

VIFA Unit

X7   LMP

Frequency counter

Laptop fitted
with Nokia BTS
Manager
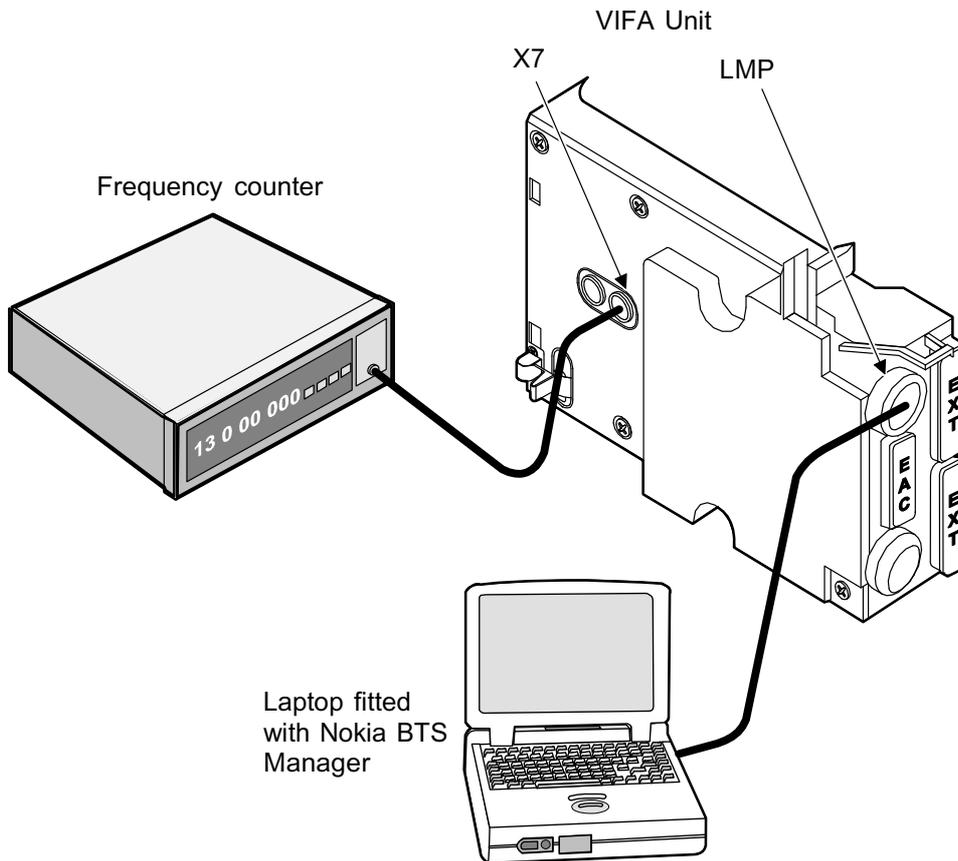
Figure 2.   13 MHz clock adjustment

4.   Open Nokia BTS Manager on your laptop PC.

5.   Open the calibration menu by selecting OBJECTS on the BTS Manager
main menu.

6.   Select CLOCK CONTROL from the drop-down menu.

7.   In the *Clock Control* window, enter a DAC (digital-to-analogue converter)
value which will tune the clock to 13 MHz (±1 Hz).

Change the DAC value with the slider or by typing the DAC value directly
in the box (see the *Clock control window - coarse adjustment* Figure).

Note

To increase the frequency, increase the DAC value. The range of DAC values is
from 0 to 4095, providing an adjustment of ±25 Hz.
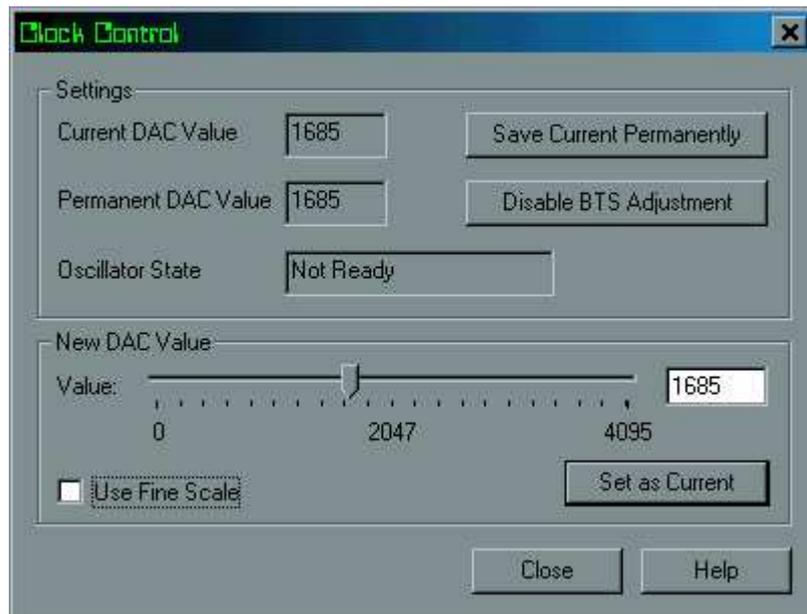
Figure 3.   Clock control window - coarse adjustment

Fine adjustment of the DAC value slider is achieved by clicking the 'Use
Fine Scale' check box in the *Clock Control* window (see the *Fine
adjustment of the DAC value* Figure).
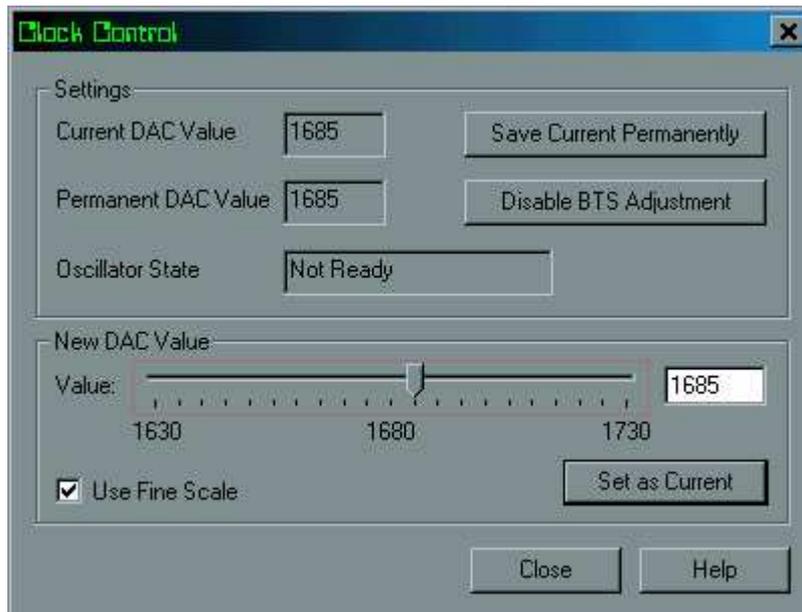
Figure 4.   Fine adjustment of the DAC value

8.   Save the DAC value by clicking the SAVE CURRENT PERMANENTLY button in the *Clock Control* window. Click the CLOSE button or press Enter on your keyboard.

Saving the DAC value permanently will ensure that it remains in the clock memory after reset.

9.   When asked if you want to continue, select YES in the dialogue box.

5 Troubleshooting

This chapter gives advice on how to identify and rectify possible faults in the operation of the Nokia MetroSite EDGE Base Station.

Note

Troubleshooting instructions related to BTS commissioning are given in *Nokia MetroSite EDGE Base Station: Commissioning.*

Note

Detailed descriptions of BTS alarms are presented in *Nokia MetroSite EDGE Base Station: Alarm Descriptions.* Descriptions of the LED unit status indicators are presented in the *LED indicator conditions* Chapter of this document.

Whenever problems occur in the operation of the BTS, connect the Nokia BTS Manager PC to the interface unit. The LED conditions and the alarm window usually indicate where and what the problem is. To obtain more information on the BTS's status, it is also advisable to be in contact with the BSC by mobile phone (MS).

5.1 Testing the BTS

If there is any reason to assume that the quality of calls in a cell is degraded, or that the number of calls in a cell is reduced, the Abis loop test and the TRX test can be run remotely from the BSC/NMS. A TRX test can also be run locally with Nokia BTS Manager.

Further troubleshooting tests can also be done locally at the BTS. See the *Troubleshooting checklist* in the *Troubleshooting checklist* Section of this document and the *LED indicator conditions* reference information in the *LED indicator conditions* Chapter of this document.

5.2 Troubleshooting checklist

Table 2.   Troubleshooting checklist

Symptom	Possible fault	Action
BTS is powered ON but the BTS Manager connection cannot be established.	1. Master TRX broken.	1. Replace the master TRX with one of the slave TRXs and insert a new TRX into the slave TRX's slot. Refer to the *Replacing the master TRX in BTS configurations with two or more TRXs* Section.
	2. Interface unit broken.	2. Replace the interface unit.
	3. Wrong BTS Manager port setting (COM 1, COM 2).	3. Correct the COM port settings.
	4. LMP cable broken or not properly connected.	4. Check the connection before replacing the cable.
No power to the BTS.	1. Fault in the site mains power supply.	1. Check the site's mains power source and fuses. Replace if necessary.
	2. Broken power cable.	2. Replace the cable.
	3. Power supply unit broken.	3. Replace the power supply unit.
	4. Short circuit in one of the BTS units.	4. Pull the units out one by one until the power comes back on. Start from the TRXs and proceed to the transmission unit, fan unit and finally to the interface unit. Return the units one by one and replace the faulty unit(s).

Table 2.   Troubleshooting checklist (cont.)

Symptom	Possible fault	Action
	5. Power supply unit switch in stand-by position.	5. Turn the PSU's switch to the ON position.
	6. Cold start active.	6. Wait until the units have warmed up to the operational temperature range and the power supply unit LED turns green.
No transmission connection to the BSC (yellow or red LED on transmission unit).	1. Abis cable not connected or connected incorrectly.	1. Check that the cable is connected on the transmission unit and at the BSC. Check that the RX and TX cables are connected to the correct connectors.
	2. Abis cable broken.	2. Replace the cable.
	3. Line interface broken.	3. Connect a jumper cable from the TX connector of each transmission interface to its RX connector. If the green LED is lit the line interface is OK. Otherwise, change the transmission unit.
	4. Transmission unit broken	4. Replace the transmission unit.
Transmission connection works but there is a yellow LED lit on the transmission unit.	No real time connection from the network to the transmission unit.	Establish the BSC connection.
The device status report in the BTS Manager indicates that the BCCH TRX and a slave TRX are in the 'Supervisory' state, but the yellow LED blinks on both TRXs.	Objects are locked from the BSC/NMS.	Request the state from the BSC/NMS. Request an unlock from the BSC/NMS if necessary.

6 Replacing units

This chapter describes how to replace plug-in units in the Nokia MetroSite EDGE Base Station.

⚠ Caution

BSC and/or NMS personnel must be notified before starting to replace or add units to the Nokia MetroSite EDGE Base Station.

6.1 ESD protection

⚠ Caution

Some units in the MetroSite BTS contain electro-static sensitive devices. The BTS is labelled with an electro-static sensitive device symbol as shown in the *Electro-static sensitive device symbol* Figure.

Always use an anti-static wrist strap connected to the cabinet ESD stud, whenever handling electro-static sensitive units. The wrist strap and connection stud is shown in the *Connecting the antistatic wrist strap.* Figure.
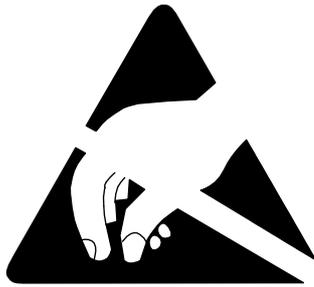
Figure 5.   Electro-static sensitive device symbol
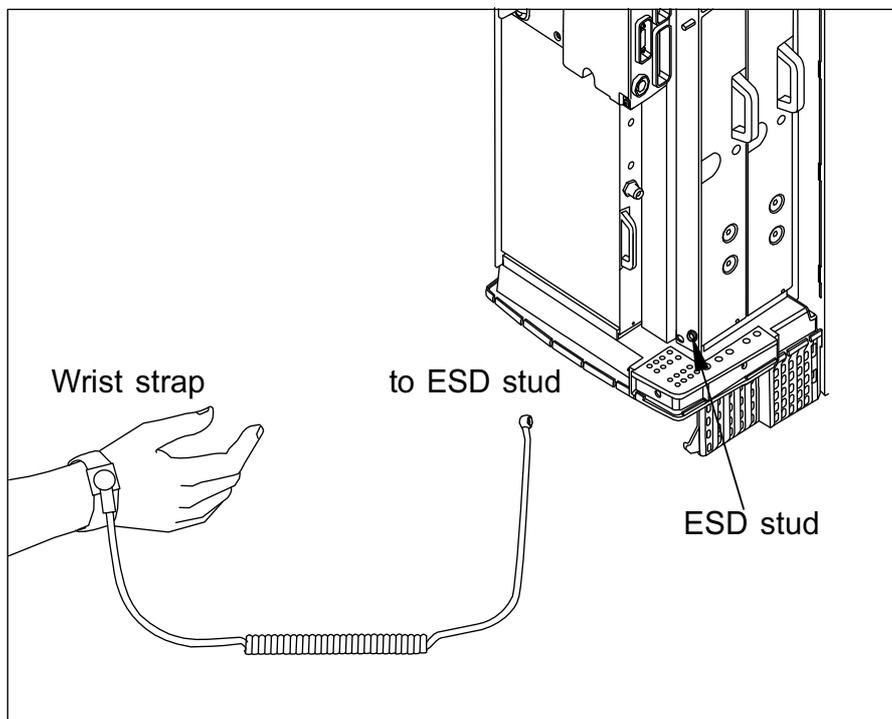
Figure 6.   Connecting the antistatic wrist strap.

6.2   Removing units

The *Removing the units* Figure shows how the units are pulled out from the unit slots. Read the detailed step instructions for each unit before pulling the units out.

If you are replacing BTS units, keep the units protected in their delivery packages until they are needed. After installation, keep some of the packaging material for packing the removed units when sending them for service. Recycle any remaining packaging material.

⚠ Caution

Handle the units with care. Do not knock the units or place them with their connectors facing the ground. Prevent dirt, water, or snow from entering the connectors.
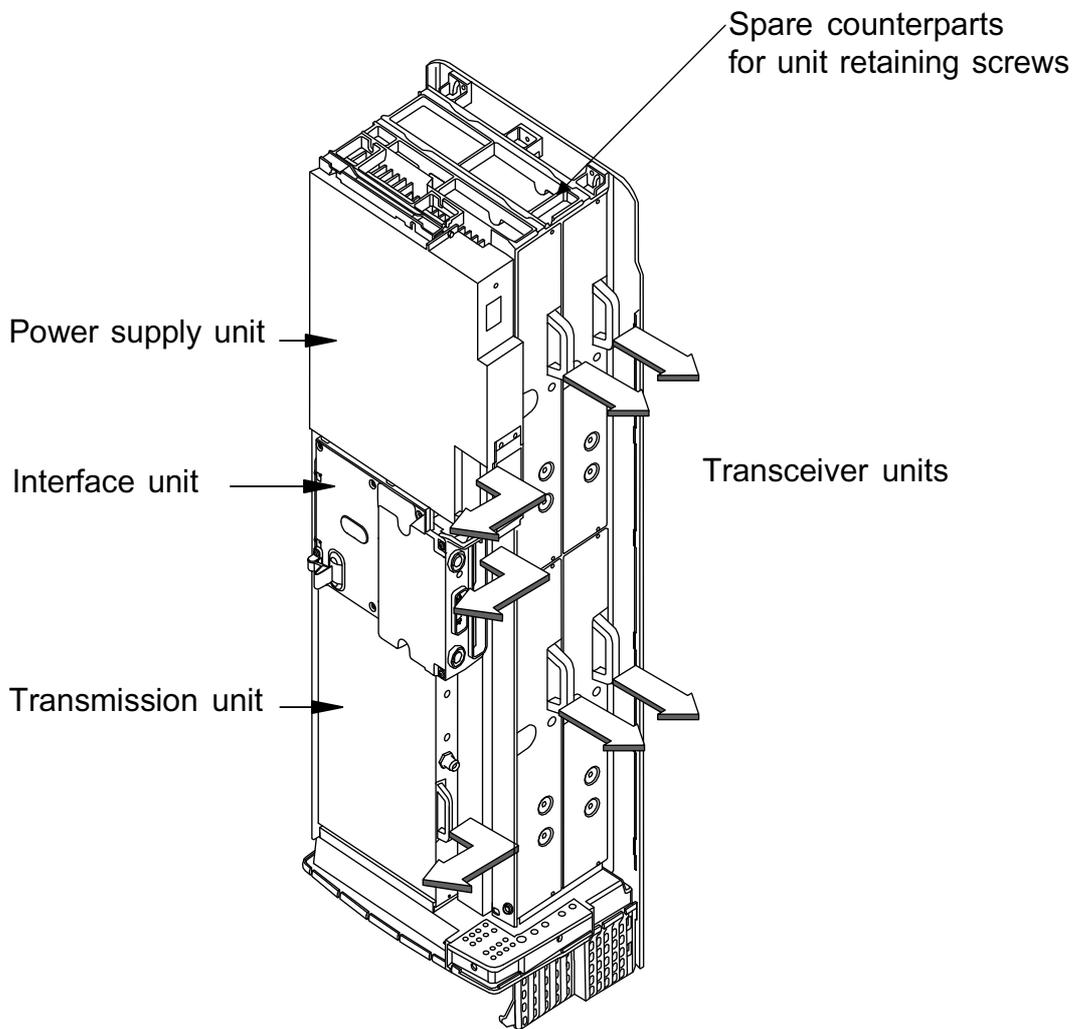
Figure 7.   Removing the units

Note

Examine the retaining screws when replacing units. If there are any traces of aluminium burrs on the thread, replace the screw.

Spare counterparts for unit retaining screws can be found attached to the uppermost TRX guide beam on the top of the BTS (see the *Removing the units* Figure).

Note

The shield unit fixing screws may only be tightened to 1.0 Nm (0.74 lb ft). Use a torque driver with a T10 Torx bit to tighten them.

6.3 Recycling of units

In case you need to dispose of the units or the whole BTS, contact Nokia Professional Services for information on recycling. An environmental data package, including disassembly instructions and a material balance document is also available via Nokia Operations Solutions.

6.4 Replacing TRXs

This section provides instructions on how to replace faulty TRXs. There are three different scenarios for replacing TRXs, as follows:

- replacing a slave TRX

- replacing the master TRX

- replacing the master TRX in a single TRX BTS

6.4.1 TRX slot identification

The TRX in slot 1 is the master TRX of the Nokia MetroSite EDGE Base Station. The *TRX slot numbering* Figure shows the numbering order of the TRX slots.
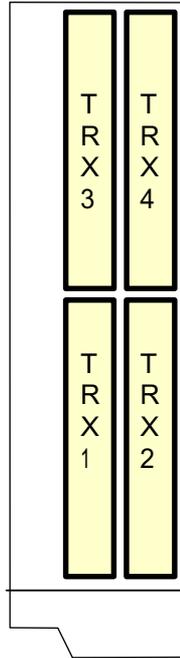
Figure 8.   TRX slot numbering

6.4.2   Replacing a slave TRX

⚠ Caution

Make sure the TRX that you are replacing is a slave TRX (slots 2, 3, or 4).

Replacing a slave TRX

1.   Connect your Nokia BTS Manager PC to the LMP connector on the interface unit.

2.   Block the TRX using Nokia BTS Manager (if the sector is not already locked from the BSC). In the *Supervision - Equipment View* window, right click on the TRX image and select the BLOCK button in the *Object Properties* dialogue window (see the *Example Object Properties window in Nokia BTS Manager (can be used for blocking a TRX)* Figure).

Object Properties window showing:

Property	Value
Object	ETRX4
Operational State	Waiting for system info
Power Control Range ...	15
TX Power Level	1000 mW
RX Diversity	Off
Network Type	GSM 1900E
Commissioned	Yes
ARFN	606
Device Existence	OK
Locked State	Unlocked
Blocked State	Unblocked
TRXSIG4	On
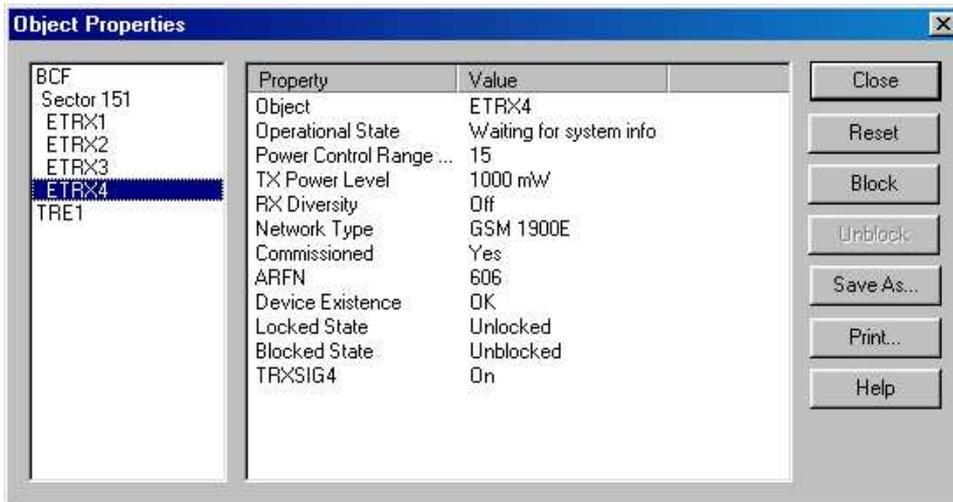
Figure 9.   Example *Object Properties* window in Nokia BTS Manager (can be used for blocking a TRX)

3.   Make a note of the TRX cabling.

4.   Disconnect the TRX cabling.

5.   Undo the retaining screws of the TRX unit with a T10 Torx driver. Loosen the screws enough to remove the unit, but leave them engaged in the thread to allow easy refitting.

6.   Remove the TRX.

7.   Unpack the new TRX.

8.   Insert the TRX into the free slot.

9.   Tighten the TRX retaining screws to 1.5 Nm (11.1 lb ft) with a T10 Torx driver.

10.   Reconnect the TRX cabling.

11.   Run the TRX test from Nokia BTS Manager (optional).

12.   With Nokia BTS Manager, right-click the BCF object in the *Equipment View* window and carry out a BCF Object Reset, or, if locked from the BSC/NMS, request an unlock from the BSC/NMS (the BCF reset is automatic in this case).

If the green LED is lit on the TRX after the replacement procedure, the BTS is in service. If the LED is yellow or red, check the alarms and run the TRX test from the BSC/NMS.

6.4.3   Replacing the master TRX in BTS configurations with two or more TRXs

Note

If you want to run the TRX test locally, you must do this *before* unlocking the site. If you want to run the TRX test remotely, you must do this *after* unlocking the site.

Replacing the master TRX

1.   Connect your Nokia BTS Manager PC to the LMP connector on the interface unit.

2.   Block the site locally (BCF Block) using Nokia BTS Manager if the site is not already locked from the BSC/NMS.

3.   Open the cable entry block.

4.   Make a note of the TRX cabling.

5.   Disconnect the cabling from the faulty master TRX.

6.   Disconnect the cabling from one of the slave TRXs.

7.   Open the master TRX retaining screws with a Torx T10 driver. Loosen the screws enough to remove the unit, but leave them engaged in the thread to allow easy refitting.

8.   Remove the master TRX.

9.   Open the slave TRX retaining screws with a Torx T10 driver.

10. Remove the uncabled slave TRX.

11. Insert the removed slave TRX to the slot of the master TRX and tighten the retaining screws with a Torx T10 driver.

12. Unpack a new TRX.

13. Insert the new TRX into the slot of the removed slave TRX and tighten the retaining screws with a Torx T10 driver.

14. Re-cable the TRXs.

15. Close the cable entry block.

16. With Nokia BTS Manager, right-click the BCF object in the *Equipment View* window and carry out a BCF Object Reset, or, if locked from the BSC/NMS, request an unlock from the BSC/NMS (the BCF reset is automatic in this case).

If the green LED is lit on the TRX after the replacement procedure, the BTS is in service. If the LED is yellow or red, check the alarms and run the TRX test from the BSC/NMS.

6.4.4 Replacing the master TRX in a single TRX BTS

Replacing the master TRX in a single TRX BTS

1. Connect your Nokia BTS Manager PC to the LMP connector on the interface unit.

2. Block the BCF locally with Nokia BTS Manager, or request a BCF lock from the BSC/NMS.

3. If the manager connection can still be established, open Traffic Manager from the Transmission menu and export the TS allocation information to your PC's hard disk.

4. Open the cable entry block.

5. Make a note of the TRX cabling.

6. Disconnect the TRX cabling.

7.   Open the TRX retaining screws with a Torx T10 driver. Loosen the screws enough to remove the unit, but leave them engaged in the threads to allow easy refitting.

8.   Remove the TRX.

9.   Unpack a new TRX.

10.   Insert the new uncommissioned TRX into the master TRX slot (slot 1).

11.   Tighten the TRX retaining screws to 1.5 Nm (1.11 lb ft) with a Torx T10 driver.

12.   Re-cable the TRX.

13.   Close the cable entry block.

14.   Either import the TS allocation file from your PC hard disk or manually allocate the transmission capacity.

15.   With Nokia BTS Manager, right-click the BCF object in the *Equipment View* window and carry out a BCF Object Reset, or, if locked from the BSC/NMS, request an unlock from the BSC/NMS (the BCF reset is automatic in this case).

If the green LED is lit on the TRX after the replacement procedure, the BTS is in service. If the LED is yellow or red, check the alarms and run the TRX test from the BSC/NMS.

6.5   Replacing the transmission unit

This section provides instructions on how to replace a faulty transmission unit with the same type of transmission unit.

⚠ Caution

If the transmission unit to be replaced is an FXC RRI type, the BTS power must be switched to the stand-by position from the switch on the BTS power supply unit before disconnecting the Flexbus cable!

Note

If the transmission unit to be replaced is an FXC E1 or FC E1/T1 type, the outer conductor of the 75 Ohm RX connector can either be grounded capacitively or directly. When the metal bridge connecting the TX and RX connector is removed, the grounding becomes capacitive.

Replacing the transmission unit

1. Connect your Nokia BTS Manager PC to the LMP connector on the interface unit.

2. Verify the type of transmission unit.

   If the transmission unit is an FXC E1 or FXC E1/T1 type, export the cross-connection information to a file before replacing the unit. You can import the cross-connection information from the file to the new unit. These procedures are detailed later in this section.

3. Block the BCF locally from Nokia BTS Manager or request a BCF lock from the BSC.

4. Switch the BTS power supply unit to the stand-by position.

5. Disconnect the transmission unit cabling.

Note

If the cables have not been labelled, make a note of which cable is TX and which cable is RX before disconnecting them.

6. Open the upper and lower retaining screws of the unit with a T10 Torx driver. Loosen the screw enough to remove the unit, but leave them engaged in the threads to allow easy refitting.

7. Remove the transmission unit. Pull the unit out from the front until the unit comes to a stop, then pull the unit out from the side. See the *Removing the units* Figure.

8. Unpack the new transmission unit.

9.   Insert the new transmission unit to the unit slot from the side of the cabinet. Push the unit towards the backplane. Do not use excessive force!

10.   Tighten the upper and lower retaining screws to 1.5 Nm (1.11 lb ft) with a T10 Torx driver.

11.   Reconnect the unit's cabling.

12.   Switch the BTS power supply unit to the ON position.

13.   If the transmission unit is an FXC E1 or FXC E1/T1, refer to the procedure below for importing the saved cross-connection information.

14.   With Nokia BTS Manager, right-click the BCF object in the *Equipment View* window and carry out a BCF Object Reset, or, if locked from the BSC/NMS, request an unlock from the BSC/NMS (the BCF reset is automatic in this case).

15.   Request the BSC/NMS to run the Abis loop test.

Exporting cross-connection information to a file before replacing an FXC E1 or FXC E1/T1 unit

1.   Select TRANSMISSION │ OPEN from the main menu in Nokia BTS Manager. BTS Manager closes and the E1/T1 Manager (Transmission Unit Manager) application starts and connects to the transmission unit.

2.   Select CONFIGURATION │ CROSS-CONNECTIONS from the main menu. The *Cross-connections* window opens.

3.   Select the active bank.

4.   Select FILE │ EXPORT FILE and specify a name and location for the cross-connection file.

5.   Exit the E1/T1 Manager (Transmission Unit Manager) application. Nokia BTS Manager restarts automatically.

Importing cross-connection information after replacing an FXC E1 or FXC E1/T1 unit

1.   Select TRANSMISSION │ OPEN from the main menu in Nokia BTS Manager. BTS Manager closes and the E1/T1 Manager (Transmission Unit Manager) application starts and connects to the transmission unit.

2.   Select CONFIGURATION │ CROSS-CONNECTIONS from the main menu. The *Cross-connections* window opens.

3. Select the inactive bank.

4. Select FILE │ IMPORT FILE and select the cross-connections file you exported from the previous transmission unit.

5. Click the 'Banks' ACTIVATE button.

6. Click YES when Transmission Unit Manager asks if you want to activate the inactive bank.

7. Exit the E1/T1 Manager (Transmission Unit Manager) application. Nokia BTS Manager restarts automatically.

6.6 Replacing the interface unit

Replacing the interface unit

1. Connect your Nokia BTS Manager PC to the LMP connector on the interface unit.

2. Block the BCF locally with the Nokia BTS Manager or request a BCF lock from the BSC.

3. Switch the BTS power supply unit to the stand-by position.

4. Disconnect the interface unit's cabling, including the BTS Manager connection.

5. Open the upper and lower retaining screws of the unit with a T10 Torx driver. Loosen the screws enough to remove the unit, but leave them engaged in the threads to allow easy refitting.

6. Remove the interface unit. Pull the unit out from the front until the unit comes to stop, then pull the unit out from the side. See the *Removing the units* Figure.

7. Unpack the new interface unit.

8. Insert the new interface unit to the unit's slot from the side of the cabinet. Push the unit towards the backplane. Do not use excessive force!

9. Tighten the interface unit retaining screws to 1.5 Nm (1.11 lb ft) with a T10 Torx driver.

10. Reconnect the unit's cabling, including the BTS Manager connection.

11. Switch the BTS power supply unit ON.

12. With BTS Manager, right-click the BCF object in the *Equipment View* window and carry out a BCF Object Reset, or, if locked from the BSC/ NMS, request an unlock from the BSC/NMS (the BCF reset is automatic in this case).

13. Re-set the 13 MHz clock according to the instructions given in the *Adjusting the 13 MHz clock* Chapter.

6.7 Replacing the power supply unit

⚠️ **Warning**

Lethal voltages!

Turn the site mains power OFF before disconnecting the power supply cable!

Replacing the power supply unit (PSU)

1. Turn the power feed to the BTS OFF at the main circuit breaker.

2. Open the power supply connector shield and the sealing pieces.

3. Disconnect the power cable from the connector on the PSU.

4. Open the upper and lower retaining screws of the unit with a T10 Torx driver. Loosen the screw enough to remove the unit, but leave them engaged in the threads to allow easy refitting.

5. Remove the power supply unit. Pull the unit out from the front until the unit comes to stop, then pull it out from the side. See the *Removing the units* Figure.

6. Unpack the new power supply unit.

7. Insert the new power supply unit to the unit's slot from the side of the cabinet. Push the unit towards the backplane. Do not use excessive force!

8. Tighten the retaining screws to 1.5 Nm (1.11 lb ft) with a T10 Torx driver.

9.   Reconnect the power supply cable.

10.   Fit the sealing piece into the power supply connector shield, close the shield, and tighten the retaining screws.

11.   Turn the site mains power ON from the main circuit breaker.

12.   Turn the BTS power supply unit ON.

6.8   Replacing the cooling fan

The fan unit and its controller module are inside the fan mounting assembly on the bottom of the BTS cabinet. For maintenance, the fan unit and controller module can be removed and replaced in the mounting assembly. The procedures for doing this are given here.

Alternatively, the complete fan assembly can be removed and replaced. The procedures for doing this are given in the document *Nokia MetroSite EDGE Base Station: Field Upgrade.*

There are two versions of the HVMF fan unit. Version 1 has a controller module which is fixed by tapper screws which are accessed from the top of the fan mounting (see the *HVMF fan assembly, version 1* Figure). Version 2 has a controller module which can be removed by accessing the tapper screws from the bottom of the fan mounting (see the *HVMF fan assembly, version 2* Figure).

⚠ **Warning**

The BTS power must be switched off before replacing the fan unit. Turn the switch on the PSU to the stand-by position and turn off the power supply at the main circuit breaker.

6.8.1   Replacing the HVMF cooling fan, version 1

In order to release version 1 of the fan unit's controller module, the fan assembly mounting must be removed from the bottom of the cabinet. To do this, the cable entry block must first be removed.

The *HVMF cooling fan assembly and mounting screws* Figure shows the HVMF fan assembly. For an exploded view of the fan assembly, see the *HVMF fan assembly, version 1* Figure.

Releasing the cabling from the cable entry block

1.   Make sure that the PSU is switched to the stand-by position and that the power to the BTS is switched off at the main circuit breaker.

2.   Unclip and slide the cable cover towards you.

3.   Disengage and remove the cable cover support plate.

4.   Remove all connecting cables to the units. If necessary, make a note of the cable connections before removing them.

Note

All connecting cables must be removed in order to remove the fan mounting assembly.

5.   Detach the outer sealing gasket at the point where it covers the cable entry block, see (A) in the *Displacing the sealing strip and releasing the cables* Figure.

6.   Remove the two 4 mm (0.157 in) Allen screws on the cable entry block. See (B) in the *Displacing the sealing strip and releasing the cables* Figure.

7.   Open the cable entry block at the point where the cables are routed.

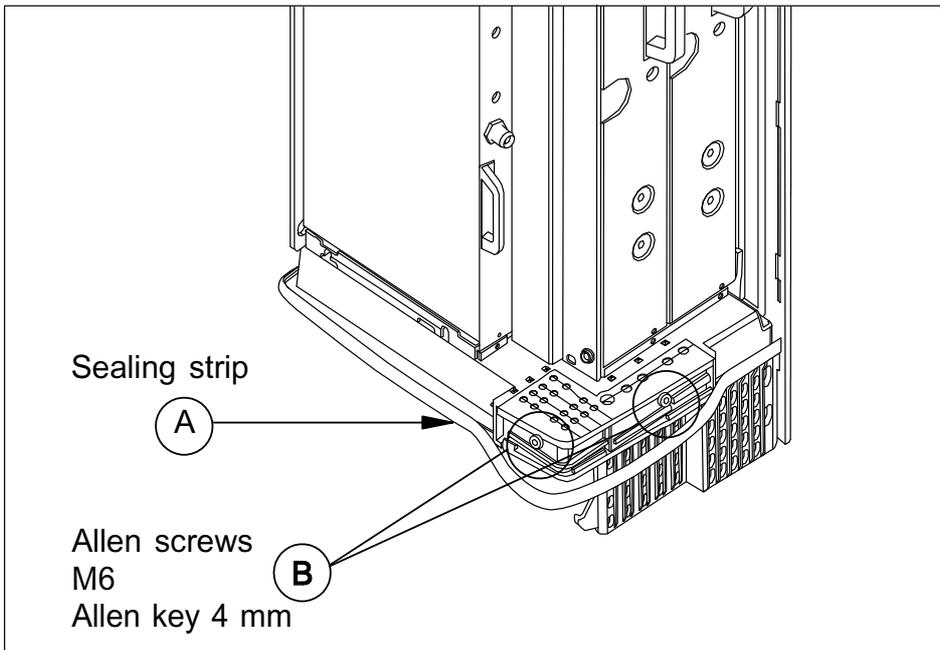8.   Disengage the cables from the cable entry block.

Figure 10.   Displacing the sealing strip and releasing the cables

Replacing the HVMF fan, version 1

1.   Remove the fan mounting assembly from the cabinet, as follows:

   a.   Remove the three T10 Torx screws and one T25 Torx screw from the right hand side of the mounting assembly. See the *HVMF cooling fan assembly and mounting screws* Figure.

   b.   Slide the mounting assembly sideways and disconnect the fan unit's connector from the backplane.

2.   Remove the three M4 x 60 Torx screws from the fan unit (see the *HVMF fan assembly, version 1* Figure) to release the fan unit and the lower fan guard.

3.   Remove the two 3 x 10 self tapper screws from the fan controller module (see the *HVMF fan assembly, version 1* Figure).

4.   Remove the fan unit, the fan controller module, and the lower fan guard.
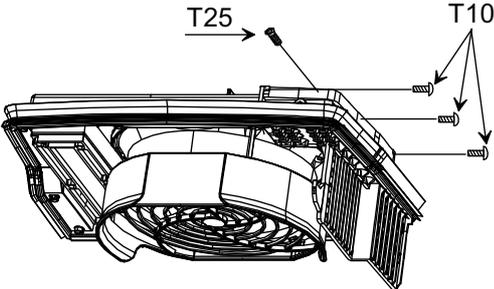
5.   To replace the fan, reverse the procedure.

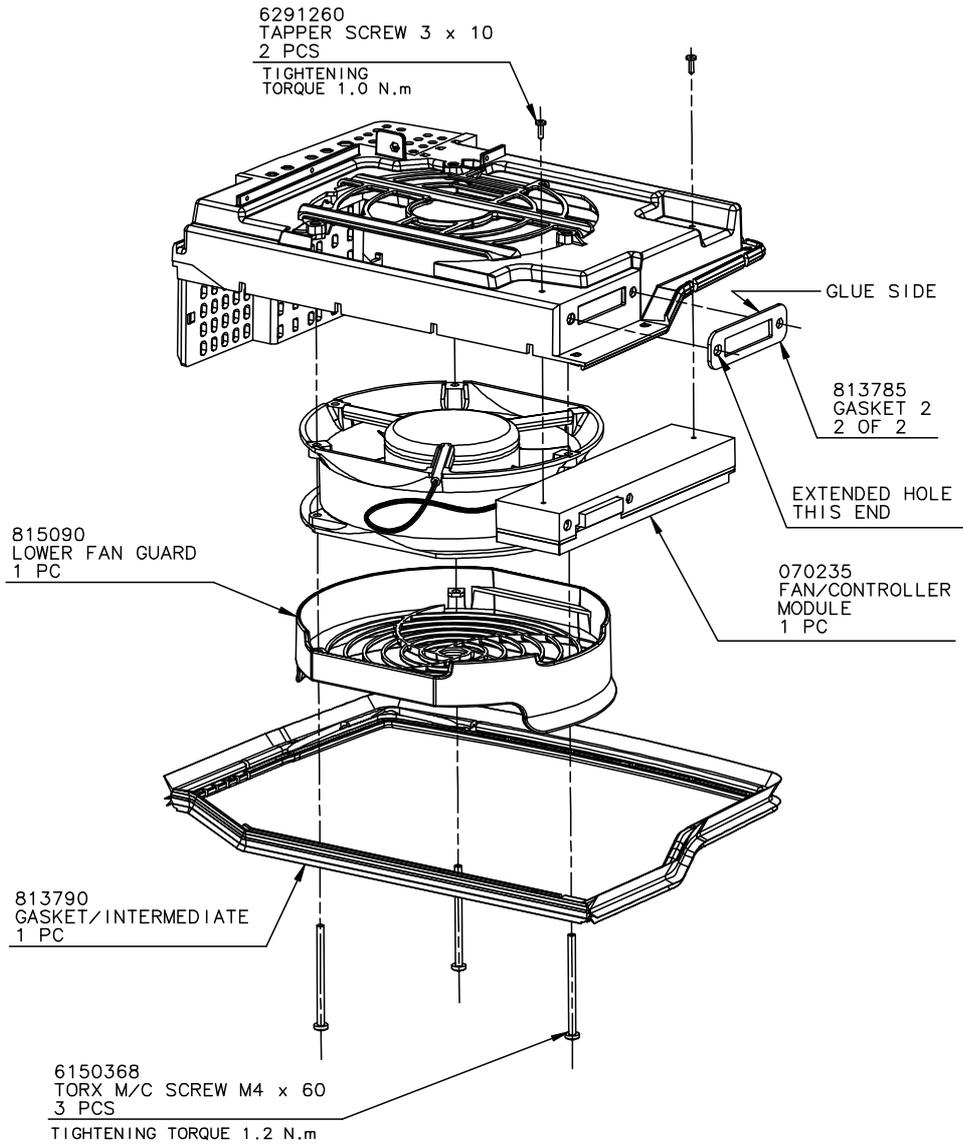Figure 11.   HVMF cooling fan assembly and mounting screws

6291260
TAPPER SCREW 3 x 10
2 PCS
TIGHTENING
TORQUE 1.0 N.m

GLUE SIDE

813785
GASKET 2
2 OF 2

EXTENDED HOLE
THIS END

815090
LOWER FAN GUARD
1 PC

070235
FAN/CONTROLLER
MODULE
1 PC

813790
GASKET/INTERMEDIATE
1 PC

6150368
TORX M/C SCREW M4 x 60
3 PCS

TIGHTENING TORQUE 1.2 N.m

Figure 12.   HVMF fan assembly, version 1

6.8.2   Replacing the HVMF cooling fan, version 2

BTS installations fitted with version 2 of the HVMF fan assembly can be removed without removing the complete fan assembly mounting. The screws retaining the fan unit and controller module can be reached from the underside of the BTS. Compare the *HVMF fan assembly, version 2* Figure with the *HVMF fan assembly, version 1* Figure.

Note

To replace a version 1 fan unit with a version 2 fan unit which can be replaced from the underside, the fan assembly mounting must also replaced with a version 2 compatible fan assembly mounting.

Replacing the HVMF fan, version 2

1.   Make sure that the PSU is switched to the stand-by position and that the power to the BTS is switched off at the main circuit breaker.

2.   Remove the three M4 x 60 Torx screws from the fan unit to release the fan unit and the lower fan guard. See the *HVMF fan assembly, version 1* Figure.

3.   Remove the two 3 x 10 self tapper screws on the side of the fan controller module. See the *HVMF fan assembly, version 2* Figure.

4.   Remove the fan controller module from the backplane and then remove the fan and lower fan guard.

5.   To replace the fan, reverse the procedure.
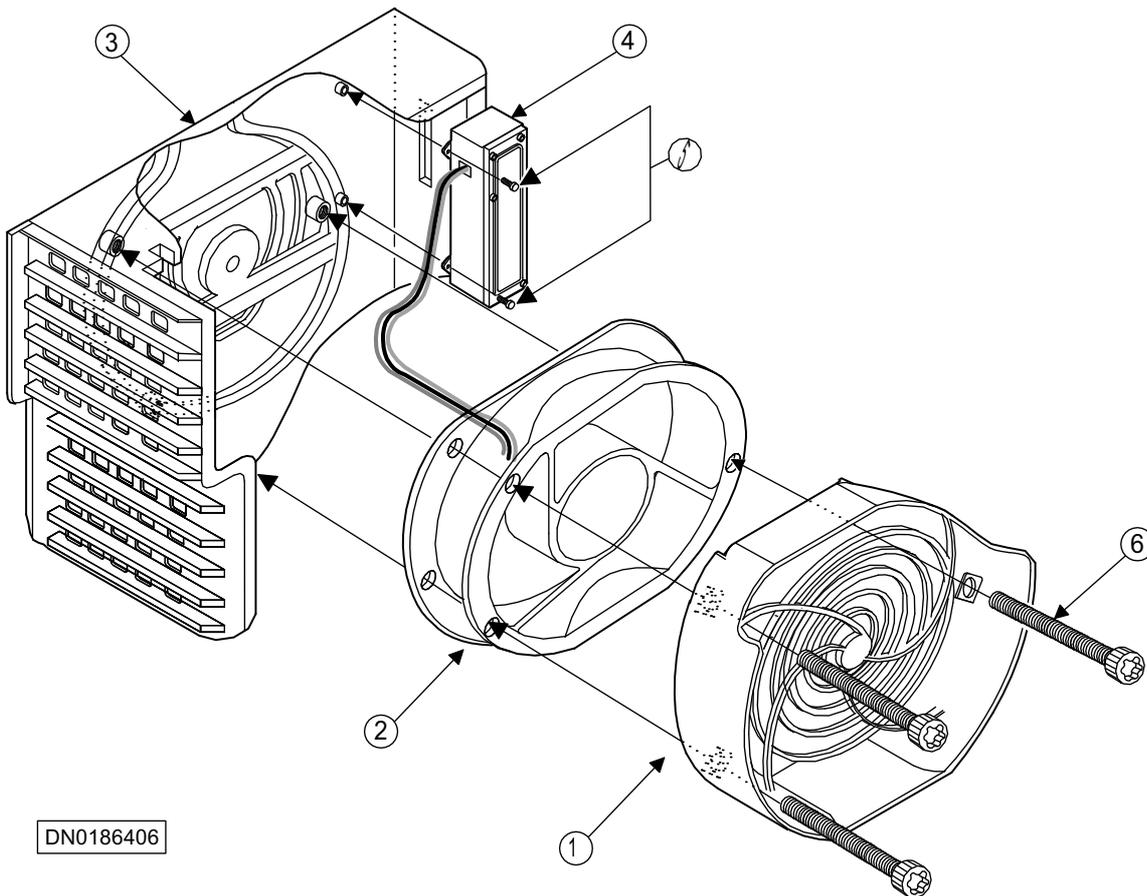
DN0186406

Legend:

1   Lower fan guard

2   Fan unit (HVMF)

3   Fan assembly mounting

4   Fan controller module

5   Tapper screws, 3x10, 2 pieces

6   Torx screws, M4x60, 3 pieces

Figure 13.   HVMF fan assembly, version 2

7 LED indicator conditions

In addition to the alarms a network element can produce, most functional units also have three-colour LED indicators. These indicators display the current state of the equipment for quick, on-site reference.

This chapter specifies the meaning of the LED conditions on the following units:

- transceiver unit

- transmission unit

- power supply unit

- interface unit

- fan unit

Inform your Operations Manager of any error situations detected on the units and enter the details in the site report.

7.1 Transceiver unit LED

The conditions on the transceiver unit's LED indicators are specified in the *LED conditions for TRX units* Table.

Table 3.   LED conditions for TRX units

LED Colour	Lit continuously	Flashing
Green	In service Traffic going through	In service No traffic going through
Yellow/Orange	No LapD	Configuring, not in service
Red	Unit broken	Unit operation degraded

7.2 Transmission unit LED

The conditions for the transmission unit's LED indicators are specified in the *LED conditions for a transmission unit* Table.

Table 4.   LED conditions for a transmission unit

LED colour	Lit continuously	Flashing
Green	Power is on and the operation is continuous and error-free	Unit is currently being accessed with a transmission management device
Yellow/ Orange	Control or test ongoing, or fault in incoming signal	Configuring, not in service
Red	Serious fault, or an active test interfering with normal traffic	-

The RRI transmission units incorporate an additional LED indicator for the Flexbus interface. The conditions for this LED are presented in the *LED conditions for an RRI transmission unit's Flexbus LED* Table.

Table 5.   LED conditions for an RRI transmission unit's Flexbus LED

LED Colour	Lit continuously	Flashing
Green	DC power feed to the outdoor unit and TX signal active	DC power feed to outdoor unit active, TX signal not active
No light	No power feed or TX signal	-

7.3 Interface unit LED

The conditions for the interface unit's LED indicators are specified in the *LED conditions for an interface unit* Table.

Table 6.   LED conditions for an interface unit

LED colour	Indication
Green	OCXO operating
Yellow	OCXO warming up
Red	OCXO broken

7.4   Power supply unit LED

The condition of the power supply unit's LED indicators are specified in the *LED conditions of the power supply unit* Table.

Table 7.   LED conditions of the power supply unit

LED colour	Condition
Green	Unit operating
Yellow	1. Output voltage OK, switch on the power supply unit is in the ON position, BTS in cold start mode 2. Power shut down signal sent from the BSC/NMS 3. Output voltage OFF because of a detected overtemperature
Red	Unit broken or short circuit in one of the BTS's units
Flashing yellow	Input voltage OK, switch the power supply unit to the stand-by position

7.5   Fan unit LED

The conditions for the fan unit's LED indicators are specified in the *LED conditions for the fan unit* Table.

Table 8.   LED conditions for the fan unit

LED colour	Conditions
Green	Unit operating
Yellow	Operation degraded
Red	Unit broken

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