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Maintaining UltraSite EDGE BTS

Contents

Contents 3

1 Summary of changes in Maintaining UltraSite EDGE BTS 5

2 Overview of preventing failures 7

3 Checklist for preventing failures 9

4 Routine maintenance checks 11
4.1 Checking the cabinet seals **11**
4.2 Checking the Temperature Control System **11**
4.3 Checking the cable connections **12**
4.4 Checking the screws **14**
4.5 Checking the dummy panels **14**
4.6 Checking the UltraSite EDGE BTS door/roof locks **15**
4.7 Cleaning dust from the BTS **16**
4.8 Maintaining the outdoor filter kit (ODFA) **18**
4.9 Maintaining the extreme outdoor filter kit (OEFA) **20**
4.10 Maintaining the ODCF cabinet filter kit **21**
4.11 Running system tests **21**

5 Transmission maintenance 23
5.1 Recalibrating the internal clock of the FXC STM-1 unit **23**
5.2 Monitoring transmission unit performance **24**
5.3 Monitoring transmission node temperature **36**
5.4 Maintaining FXC RRI transmission units **37**

1 Summary of changes in Maintaining UltraSite EDGE BTS

The following changes have taken place in the *Maintaining UltraSite EDGE BTS* document:

- Warnings and cautions relocated from the beginning of the document in applicable procedures.
- Section *Checking GSM/EDGE unit LEDs* removed from the document. The information on LEDs can be found in the *UltraSite EDGE BTS Unit Descriptions* document.

2 Overview of preventing failures

Steps

1. **Check the specific tools needed for the maintenance task in question.**

   You must always have installation tools, the BTS key, antistatic wrist strap, and Nokia Element Manager PC and PC cable with you. For installation tools and equipment, see *Tools requirements*.

2. **Keep the units in their delivery package until installation.**

3. **Perform the required maintenance actions.**
   - Check the cabinet seal.
   - Check the Temperature Control System.
   - Check the cable connections.
   - Check the screws.
   - Check the dummy panels.
   - Clean the dust from the cabinet.
   - Check the LEDs.
   - Run system tests.

4. **After installation, keep some of the packaging material for sending units to service and recycle the remaining packaging material.**

5. **Keep a site folder to contain all the required site-specific information.**

   The site folder must include installation, commissioning, and integration check lists. Note, however, that the exact contents of a site folder are defined by the customer project.

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

3 Checklist for preventing failures

Table 1. Checklist for preventing failures

Check	Refer to	Check mark
BTS Manager connection	Trouble management of the BTS	
Electrical power		
Transmission unit operation		
Transceiver unit operation		
Fan units operation		
Manage BTS alarms	Trouble management of BTS alarms	
Identify faulty BTS units	Identifying faulty units of the BTS	
Reclassification of BTS alarms	Reclassification of GSM/ EDGE BTS alarms	
Transmission alarms	Trouble management of BTS commissioning	
Commissioning reports		
Replace BTS units	Preparing to replace BTS units	
Transceiver RF unit LEDs	Overview of checking BTS LEDs	
Transceiver Baseband unit LEDs		
Transmission unit LEDs		
Dual Variable Gain Duplex Filter unit LEDs		
Base Operations and Interfaces unit LEDs		
Power Supply unit LEDs		
Remote Tune Combiner unit LEDs		

4 Routine maintenance checks

4.1 Checking the cabinet seals

Summary

The cabinet seals (rubber gasket strips) are under the roof and around the door. Inspect them periodically.

Steps

1. **Inspect the seals for dirt, damage, or wear.**
2. **Clean the seals with a cloth, if necessary.**
3. **Replace worn or broken seals, if necessary.**

4.2 Checking the Temperature Control System

Summary

It is necessary to perform a periodic check of the Temperature Control System to maintain proper air circulation and prevent overheating of the BTS.

Steps

1. **Periodically clear the BTS cabinet interior of debris and free all air inlets and outlets of obstructions.**
2. **Remove accumulated dust and debris from unit cooling fans and unit fan blades to ensure adequate heat dissipation.**
3. **Replace faulty units, if required.**

   See the applicable section for detailed instructions:

- *Replacing a GSM/EDGE heater (HETA) unit*
- *Replacing a unit cooling fan*
- *Replacing a cabinet cooling fan*

4.3 Checking the cable connections

Summary

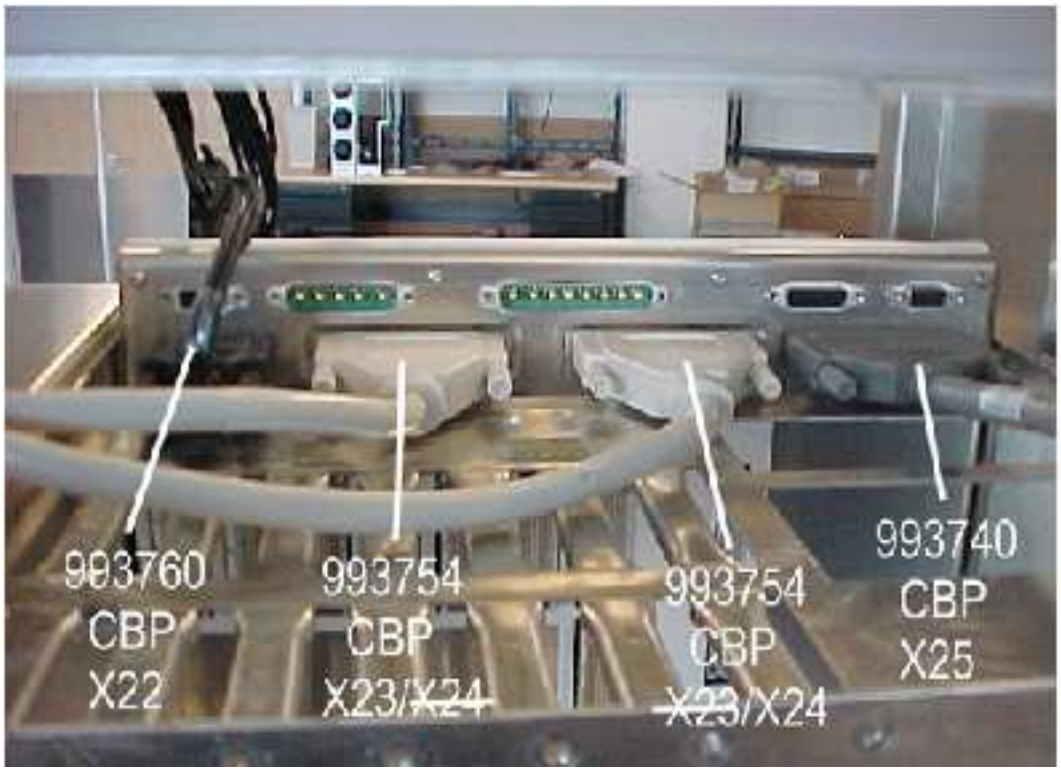


Figure 1. Common backplane bottom row cabling

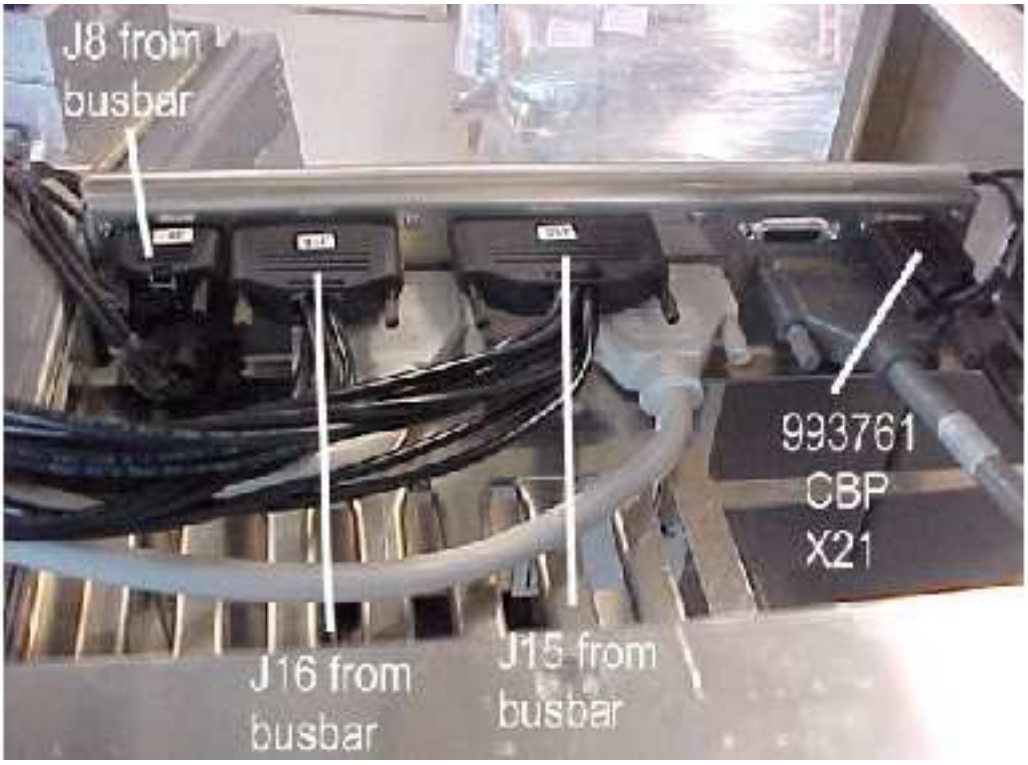


Figure 2. Common backplane upper row cabling

Steps

1. **Perform a visual check of the cables and the cable connections.**

2. **Replace all worn or broken cables.**

   Refer to the table below during cable replacement for the Common backplane (CBP), RFU backplane (RFBP), and Interface module (IFM) cable connections.

Table 2. Common backplane/Interface Module connections

Cable Assembly	Description	From	To
993760	Common rack fans (signal/power)	CBP - X22	Fan 1, 2, 3

Table 2. Common backplane/Interface Module connections (cont.)

Cable Assembly	Description	From	To
993761	Common backplane/RFU fan (signal/power)	CBP - X21	Fan 4, 5
993754	Common backplane/RFU backplane	CBP - X23/X24	RFBP - X1
993740	Common backplane/Interface module	CBP - X25	IFM - X5
993828	Interface module/ Bias Tee	IFM - X6	Bias Tee - X28
993741	RFU backplane/ DVxx/RTxx	RFBP - X5/X14/X23	RTxx/DVxx - Power In

4.4 Checking the screws

Steps

1. **Check the tightness of the fixing screws on the front panels of the plug-in units.**

2. **Replace all worn or missing screws.**

4.5 Checking the dummy panels

Summary

For cooling and Electromagnetic Compatibility (EMC) to function satisfactorily, empty slots in the BTS must be covered with dummy panels.

Tip

Store any extra dummy panels in case of future changes to the configuration.

Steps

1. **Check that empty slots are covered with dummy panels.**

2. *If* an empty slot is not covered with a dummy panel,

   Then

   cover the empty slot with a dummy panel.

4.6 Checking the UltraSite EDGE BTS door/roof locks

Before you start

Warning

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

Steps

1. **Check the door/roof locks during site visits.**

   Lubricate the door/roof locks, if required.

2. *If* the outdoor cabinet is operating in temperatures below 0° C (32° F),

   Then

   Lubricate each lock with a light, non-freezing, spray lubricant.

   Apply lubricating oil to moving parts of the lock assembly and within the lock cylinder by applying oil to the key and inserting it in the cylinder repeatedly.

Note

Any oil (aerosol) not including graphite, silicon or teflon can be used for lubricating the door locks.

4.7 Cleaning dust from the BTS

Purpose

Cleaning of the cabinet may be needed if the BTS is operated in environmental conditions where excessive dust, sand, and other foreign objects have entered the cabinet during operation. Consider using an air filter or cleaning the BTS if there is approximately 2 mm (0.08 in.) layer of dust on the units.

Before you start

Note

Ensure that the exposed connectors remain clean during the cleaning procedure.

The following cleaning tools and equipment are required:

- Set of nylon brushes: 9, 12, 15, 19, and 28 mm (0.35, 0.47, 0.59, 0.74, and 1.09 in.)
- Classic cloths for wiping units
- UltraJet air duster (spray for cleaning dust from sensitive areas)
- Dust retaining wipes (designed to remove dust)
- Suitable vacuum cleaner with a variety of brush nozzles
- Standard rigger gloves
- Lightweight safety goggles
- Respirator mask

Steps

1. **Power down the BTS.**

2. **Clean the BTS roof.**
   a. Expose the antenna connections, Abis (transmission) connections, and the power connections by lifting up the roof and hood and using the internal stand or by removing the roof and hood altogether.
   b. Vacuum the roof top with a suitable brush nozzle. Do not disconnect any of the cables on the roof, if not necessarily required. Cable contacts do not require regular cleaning.

3. **Remove and clean the units.**
   a. Open the BTS cabinet door with the BTS key.
   b. Using a vacuum cleaner do an initial clean by vacuuming any obvious loose dust and other foreign objects.
   c. Take a note of cable connections between the units within the cabinet and take a note of the locations of units within the cabinet in the maintenance logs for BTS.
   d. Disconnect antenna cables from either RTC(s) or duplexer(s) using appropriate wrench.
   e. Disconnect cables between RFU backplane and RTC/Duplexers.
   f. Disconnect SMA cables between all units using SMA Torque wrench.
   g. Using dust retaining wipes clean and wipe disconnected cables.
   h. Begin to remove the units. As each unit is removed brush, vacuum, and wipe away any residue dust.

4. **Clean the cabinet core.**

Warning

Do not disconnect internal cables which are connected to the backplanes.

Use the brush nozzle to clean between the fan blades and dislodge any loose dust. Starting from the top, brush, vacuum, and wipe away any residue dust on all surfaces.

5. **Clean the BTS back and side panels.**
   a. Remove the cable entry kit.
   b. Disassemble the antenna cables and roof.
   c. If the BTS site is located next to another cabinet and a bridge kit is used, remove the bridge kit.
   d. Lift up and away the cabinet.
   e. Clean the back wall and side walls; brush, vacuum, and wipe away any residue dust.

6. **Reassemble the BTS site.**

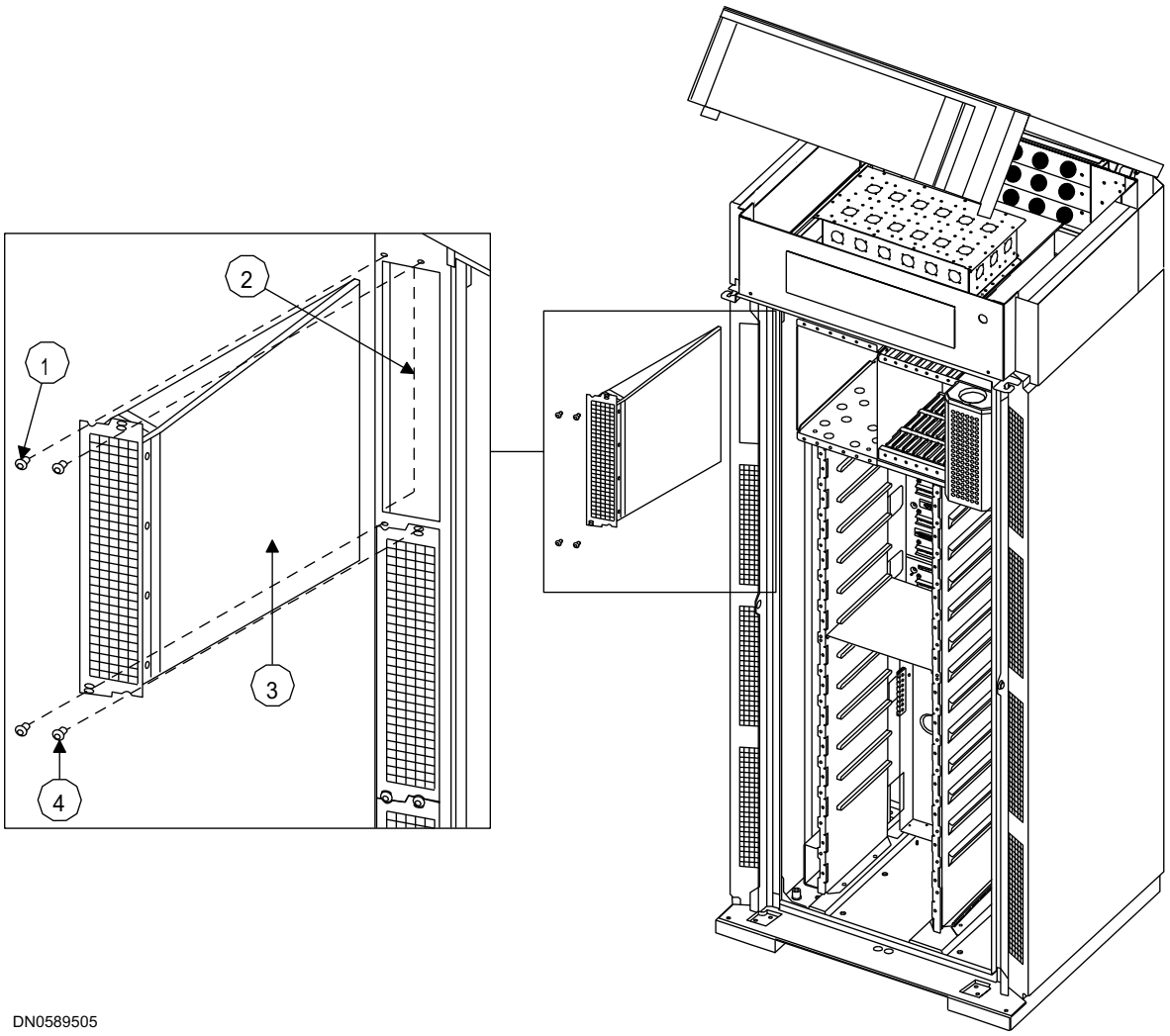
4.8 Maintaining the outdoor filter kit (ODFA)

Summary

A default maintenance interval for the filter is 12 months. If the cabinet alarms earlier (unit high temperature alarm), or the cabinet is getting dirty, the filter needs to be changed more often. If the cabinet is clean and there are no alarms, the maintenance interval can be extended to, for instance, 18 months.

Note

The filter has to be replaced, not cleaned.



1	Push fastener clip
2	Dust filter slot
3	ODFA
4	Push fastener clip

Figure 3. Maintaining the ODFA

Steps

1. Remove the door.

2. **Remove the push fastener clips that secure each filter kit, as illustrated.**

3. **Slide the dust filter kit out of the cabinet.**

4. **Replace the filter.**

5. **Slide each dust filter kit back into place.**

6. **Insert the push fastener clips to secure each filter kit, as illustrated.**

Note

After the filters are replaced in the cabinet, it is recommended that you open the filter bag by sticking a blunt bar through the front opening of each filter. Be careful not to pierce the bag.

7. **Reinstall the door.**

4.9 Maintaining the extreme outdoor filter kit (OEFA)

Summary

A default maintenance interval for the filter is 12 months. If the cabinet alarms earlier (unit high temperature alarm), or the cabinet is getting dirty, the filter needs to be changed more often. If the cabinet is clean and there are no alarms, the maintenance interval can be extended to, for instance, 18 months.

Note

The filter has to be replaced, not cleaned.

Steps

1. **Loosen the pre-installed M5 x 10 Torx screws that secure the cabinet back wall.**

2. **Remove the back wall.**

3. **Remove the Allen screws (6 pcs) and the cross bars (3 pcs) that secure the air filter.**

4. **Lift off the old air filter module and replace it with a new filter.**

5. **Reinstall the cross bars (3 pcs) and Allen screws (6 pcs).**

6. **Lift the back wall to pre-installed screws, lower it on place, and secure with the pre-installed screws.**

4.10 Maintaining the ODCF cabinet filter kit

Steps

1. **Loosen the back wall cover screws (6 pcs).**

2. **Remove the back wall cover by lifting it aside.**

3. **Remove the screws (6 pcs) and the cross bars (3 pcs) that secure the air filter.**

4. **Replace the air filter with a new one.**

5. **Reinstall the cross bars (3 pcs) with screws (6 pcs).**

6. **Fix the back wall cover to the filter frame by placing holes over screws.**

   Tighten the screws to the torque of 2.5 - 3 Nm.

4.11 Running system tests

Summary

To measure the quality and maximum number of calls in a cell, run the system tests as they apply to your system. The tests verify the condition of the hardware and help identify appropriate maintenance tasks.

Table 3. Remote testing

System	Action
GSM/EDGE system	Run system tests remotely from the Base Station Controller (BSC), NMS/2000, or NetAct.

Steps

1. **Run the Abis loop test.**

2. **Run the TRX test.**

5 Transmission maintenance

5.1 Recalibrating the internal clock of the FXC STM-1 unit

Purpose

The internal node clock of the FXC STM-1 unit should be recalibrated once a year, or the user will receive a 'calibration expired' alarm.

Steps

1. **Connect your PC to the transmission node.**
2. **Open the node manager.**
3. **Click Configuration → Synchronization to open the Synchronization dialogue box.**
4. **Select the Priorities tab.**
5. **Select internal clock and click Calibrate to calibrate the internal clock to the current active synchronisation source.**

   This button is not available in offline mode or when the status of the synchronisation source is not **OK**.

   Before calibration, check that the intended syncronisation source is active and that no synchronisation failures have been reported in the node or network.

   When calibrating to an external E1 or 2 MHz signal, ensure that the signal accuracy is sufficient for use as a synchronisation source.
6. **Click Apply or OK to apply the settings to the node.**

Expected outcome

The internal clock of the FXC STM-1 unit is successfully recalibrated.

5.2 Monitoring transmission unit performance

Purpose

You can view the statistical information of the FXC units in the manager.

Before you start

The equipment view is open.

Steps

1. **Click the transmission unit that you want to monitor.**

   The corresponding menu opens in the menu bar.

2. **Select Statistics on the menu corresponding to the transmission unit you clicked.**

   The **Statistics** dialogue box opens. Depending on the transmission unit, the appearance of the dialogue box is different. If it is an FXC E1 or FXC E1/T1 unit, it is as follows:

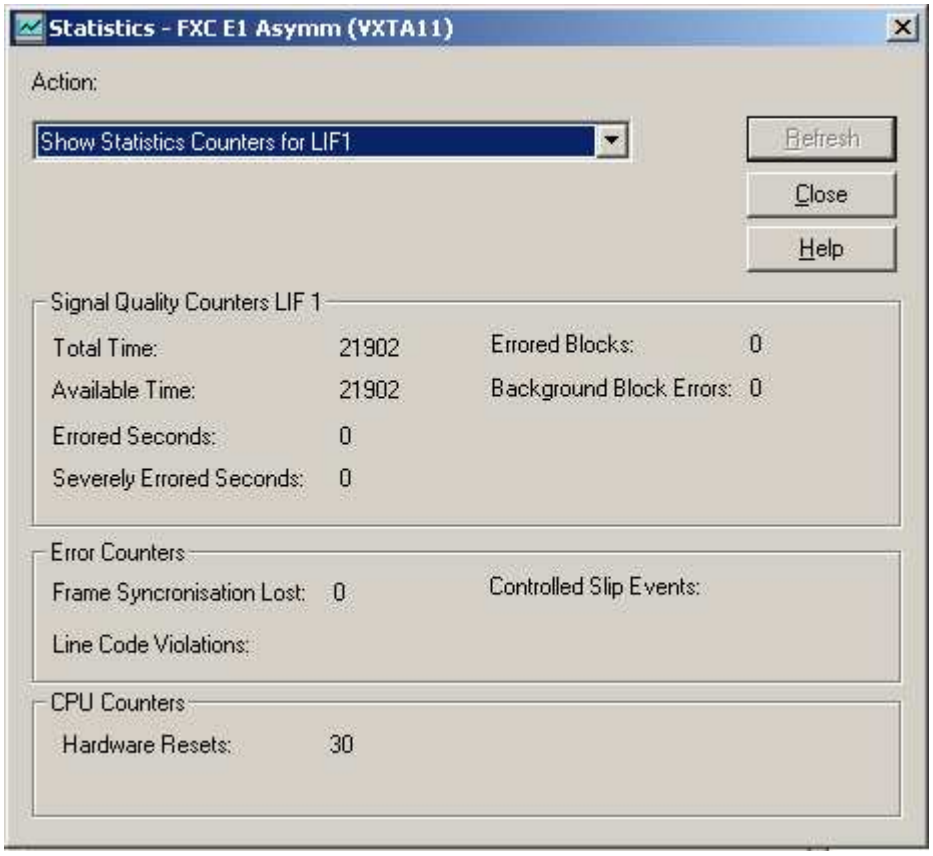


Figure 4. Statistics dialogue box for FXC E1(/T1)

The following figure shows the **Statistics** dialogue box when the transmission unit is FXC RRI.

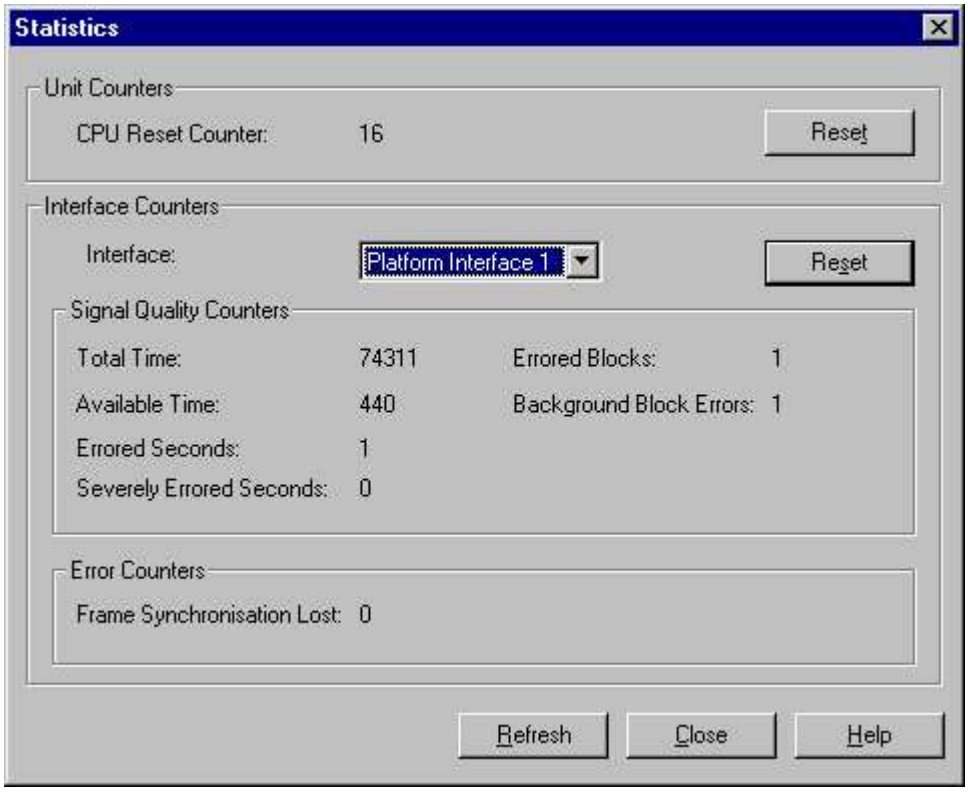


Figure 5. Statistics dialogue box for FXC RRI

The following figure shows the **Statistics** dialogue box when the transmission unit is FXC Bridge.

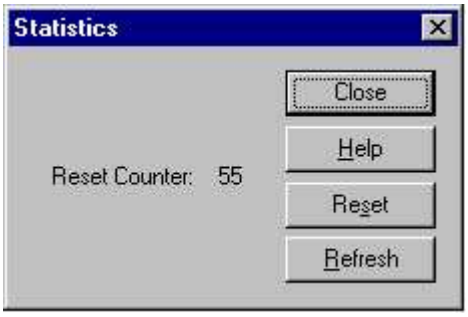


Figure 6. Statistics dialogue box for FXC Bridge

The following figure shows the **Statistics** dialogue box when the transmission unit is FXC STM-1.

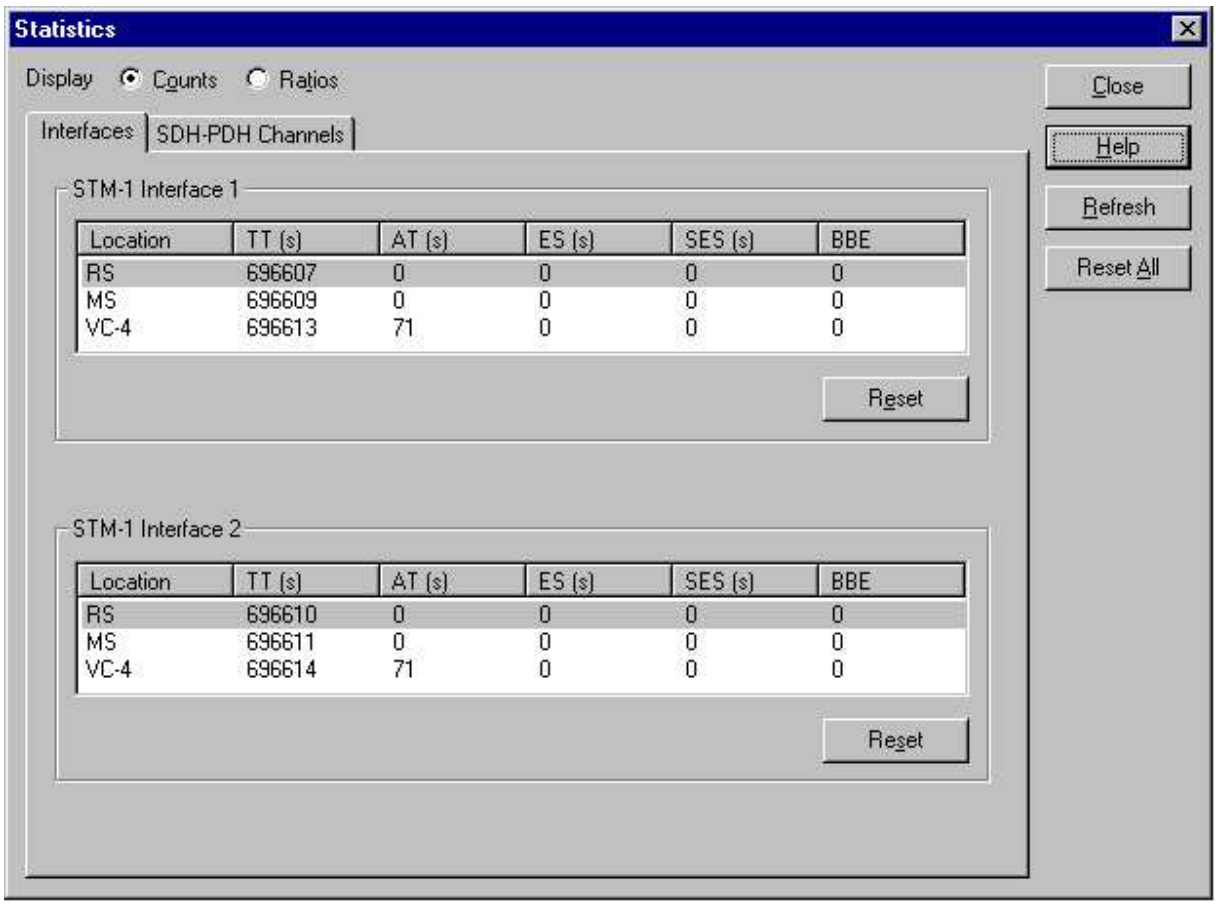


Figure 7. Statistics dialogue box for FXC STM-1 interfaces

The following figure shows the **Statistics** dialogue box when the transmission unit is FXC STM-1 SDH-PDH.

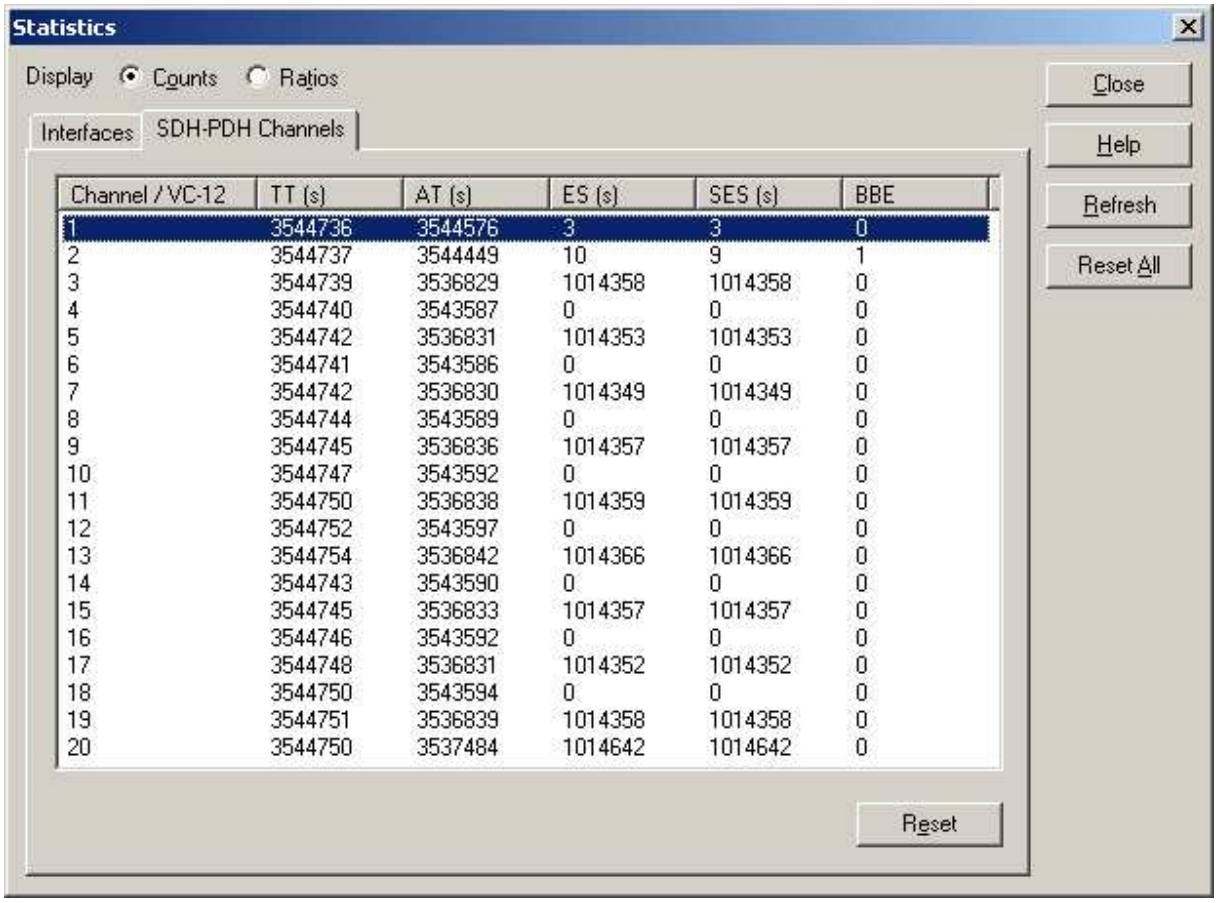


Figure 8. Statistics dialogue box for FXC STM-1 SDH-PDH channels

The **Reset** button is used to reset CPU, interface, or error counters.

Note

For the FXC E1(/T1), the **Reset** button only appears if you have first selected **Reset Signal Quality Counters**, **Reset Error Counters** or **Reset CPU counters** from the **Action** menu.

Note

For FXC RRI, the **Reset** button resets the counters of all platform interfaces and not only the currently displayed counters.

3. **Click Refresh to update the statistical information, (in the case of FXC E1(/T1), selectRefresh and click Refresh).**

Note

Statistics are only up-to-date once the **Refresh** button is clicked.

4. *If* you want to view the statistics history

   Then

   Select Statistics History from the menu bar.

   The **Statistics History** window opens.

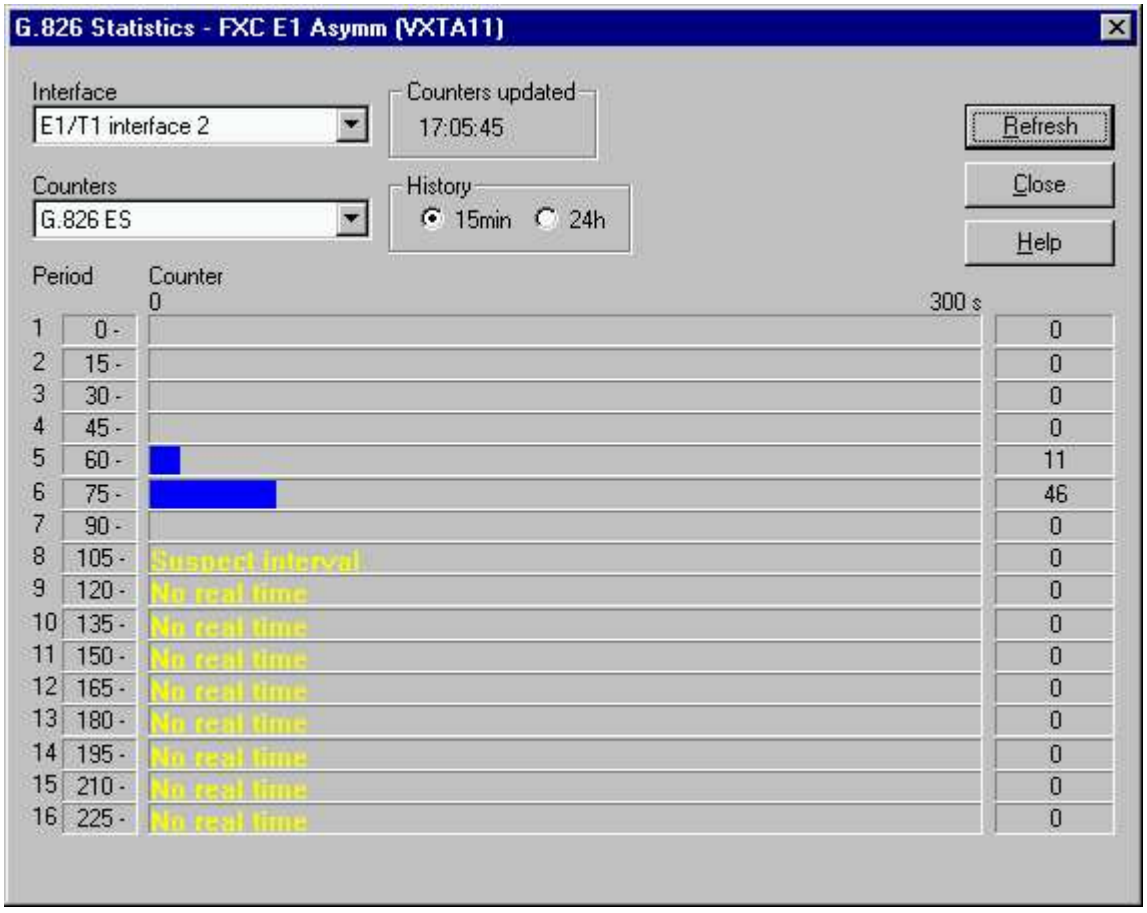


Figure 9. Statistics history for FXC E1/T1

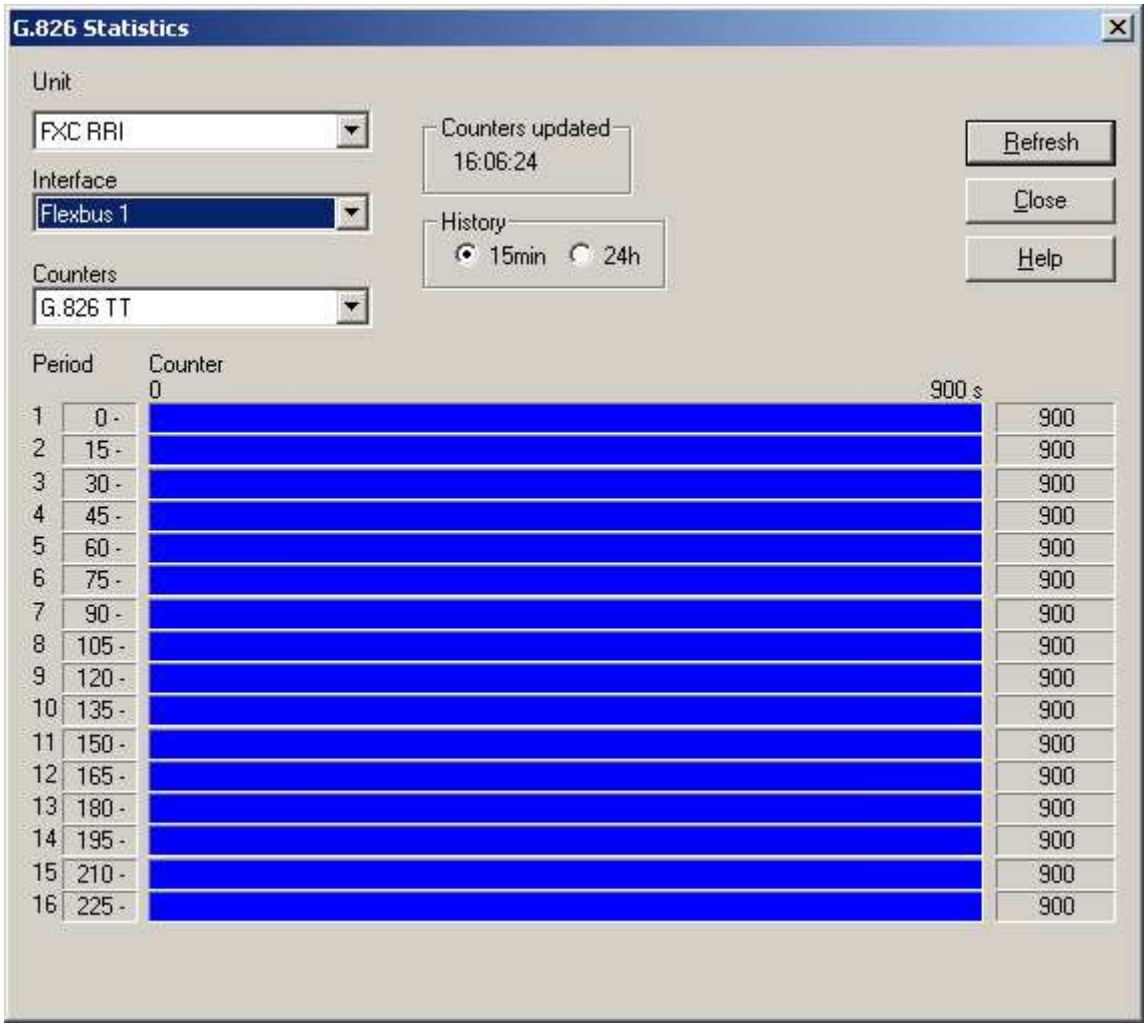


Figure 10. Statistics history for FXC RRI

If a radio outdoor unit is connected to the FXC RRI, the statistics history of the outdoor unit can be displayed as well (see figure below).

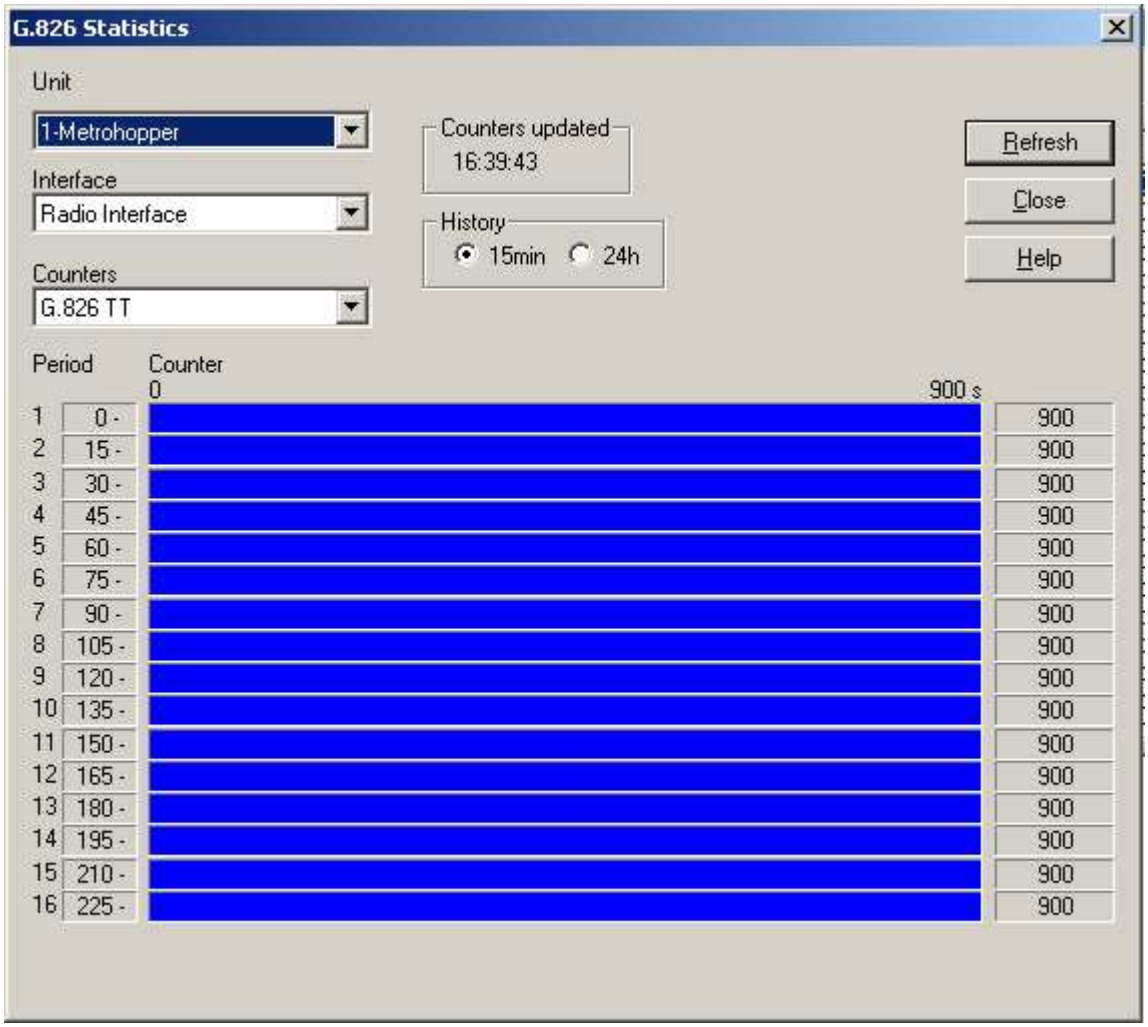
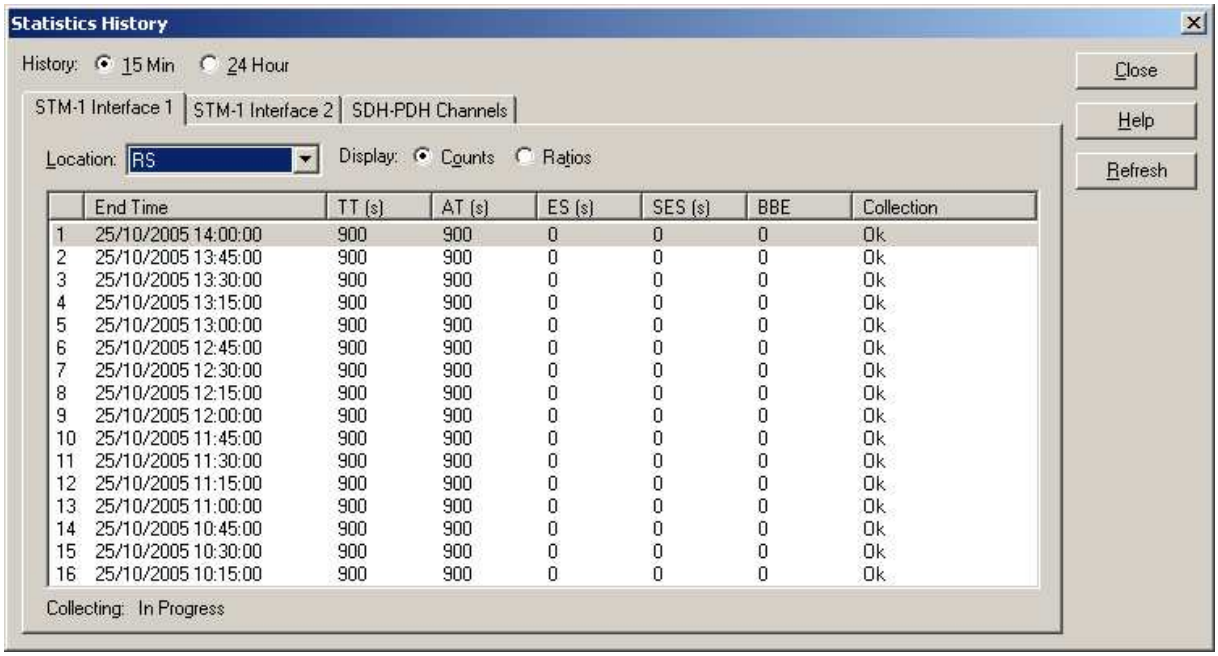


Figure 11. Statistics history for FXC RRI - MetroHopper

The records are displayed top down from the newest to the oldest.



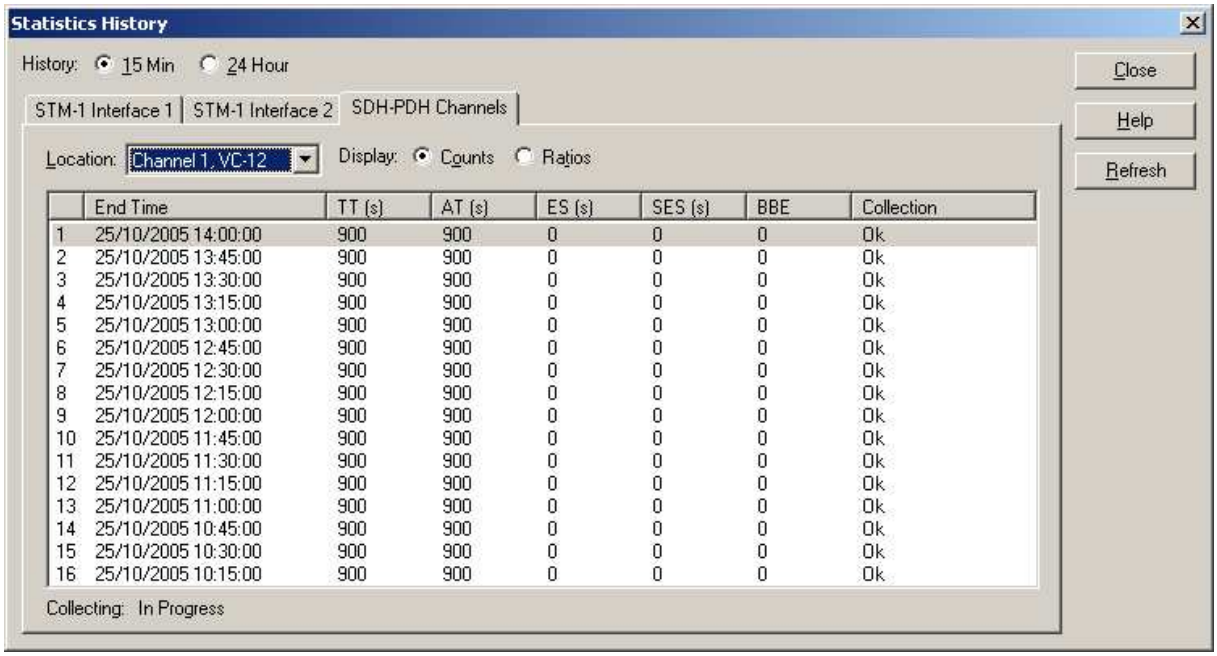
	End Time	TT (s)	AT (s)	ES (s)	SES (s)	BBE	Collection
1	25/10/2005 14:00:00	900	900	0	0	0	Ok
2	25/10/2005 13:45:00	900	900	0	0	0	Ok
3	25/10/2005 13:30:00	900	900	0	0	0	Ok
4	25/10/2005 13:15:00	900	900	0	0	0	Ok
5	25/10/2005 13:00:00	900	900	0	0	0	Ok
6	25/10/2005 12:45:00	900	900	0	0	0	Ok
7	25/10/2005 12:30:00	900	900	0	0	0	Ok
8	25/10/2005 12:15:00	900	900	0	0	0	Ok
9	25/10/2005 12:00:00	900	900	0	0	0	Ok
10	25/10/2005 11:45:00	900	900	0	0	0	Ok
11	25/10/2005 11:30:00	900	900	0	0	0	Ok
12	25/10/2005 11:15:00	900	900	0	0	0	Ok
13	25/10/2005 11:00:00	900	900	0	0	0	Ok
14	25/10/2005 10:45:00	900	900	0	0	0	Ok
15	25/10/2005 10:30:00	900	900	0	0	0	Ok
16	25/10/2005 10:15:00	900	900	0	0	0	Ok

Figure 12. Statistics history for FXC STM-1

A reading of "Suspect interval" in the **Statistics History** window signals that the measurement period was not exactly 15 minutes or 24 hours. This happens when the real time clock in the network element is adjusted more than 10 seconds during the measurement.

By way of example, a measurement interval of 15 minutes 11 seconds, or 24 hours 0 minutes 20 seconds, would result in "Suspect interval" being displayed. A measurement interval of 14 minutes 52 seconds, or 24 hours 0 minutes 8 seconds, would not.

The FXC STM-1 **Statistics History** window contains tabbed pages where you can view statistical history information. The tabbed pages are **STM-1 Interface 1**, **STM-1 Interface 2** and **SDH-PDH Channels**. Figure *Statistics history for FXC STM-1* above shows the statistics history for STM-1 Interface 1. To view statistics for SDH-PDH channels, click the **SDH-PDH Channels** tab.



	End Time	TT (s)	AT (s)	ES (s)	SES (s)	BBE	Collection
1	25/10/2005 14:00:00	900	900	0	0	0	Ok
2	25/10/2005 13:45:00	900	900	0	0	0	Ok
3	25/10/2005 13:30:00	900	900	0	0	0	Ok
4	25/10/2005 13:15:00	900	900	0	0	0	Ok
5	25/10/2005 13:00:00	900	900	0	0	0	Ok
6	25/10/2005 12:45:00	900	900	0	0	0	Ok
7	25/10/2005 12:30:00	900	900	0	0	0	Ok
8	25/10/2005 12:15:00	900	900	0	0	0	Ok
9	25/10/2005 12:00:00	900	900	0	0	0	Ok
10	25/10/2005 11:45:00	900	900	0	0	0	Ok
11	25/10/2005 11:30:00	900	900	0	0	0	Ok
12	25/10/2005 11:15:00	900	900	0	0	0	Ok
13	25/10/2005 11:00:00	900	900	0	0	0	Ok
14	25/10/2005 10:45:00	900	900	0	0	0	Ok
15	25/10/2005 10:30:00	900	900	0	0	0	Ok
16	25/10/2005 10:15:00	900	900	0	0	0	Ok

Figure 13. Statistics history for SDH-PDH channels

The statistics history is not supported by the FXC Bridge unit.

5. *If* you want to view the OU Rx level records

   Then

   on the FXC RRI menu, select Measurements.

   The **Select measurements** dialogue box appears.

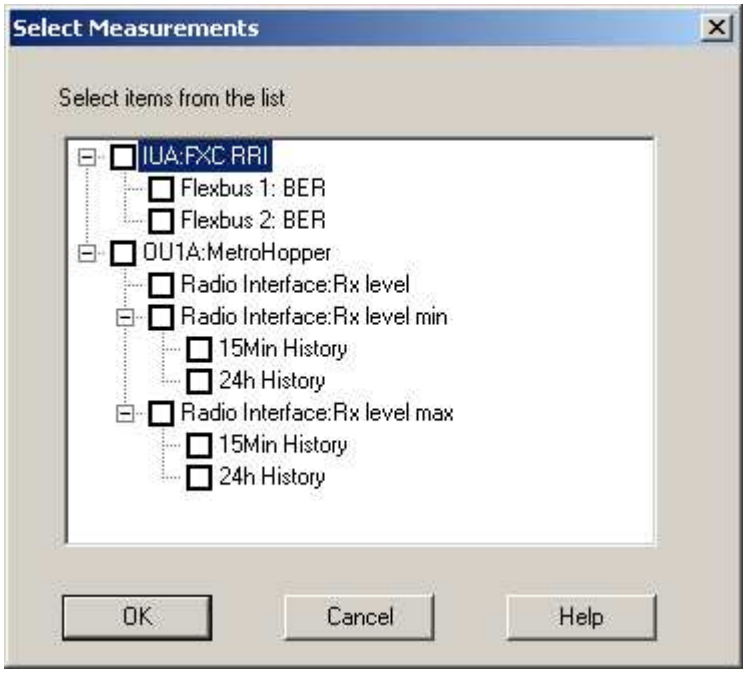


Figure 14. Select Measurements dialogue box

Check the measurements you want to view and click **OK**. The **Measurement** window opens displaying the selected measurements.

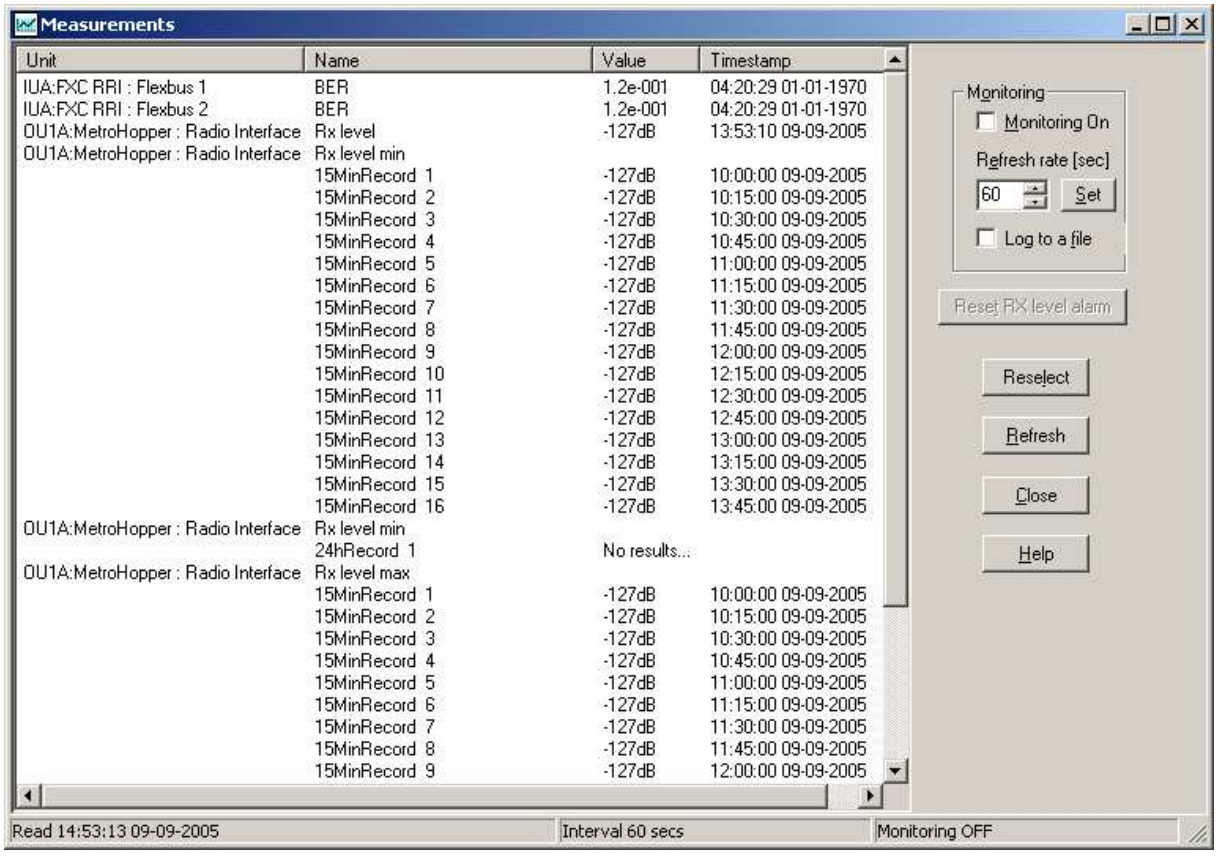


Figure 15. Measurements window

The measurement results will be refreshed automatically if the **Monitoring On** check box is checked. You can also set the refresh rate.

5.3 Monitoring transmission node temperature

Purpose

The temperature information of the node can be viewed in the manager.

Steps

1. **Select Maintenance → Temperature Monitoring.**

The **Temperature Monitoring** window opens.

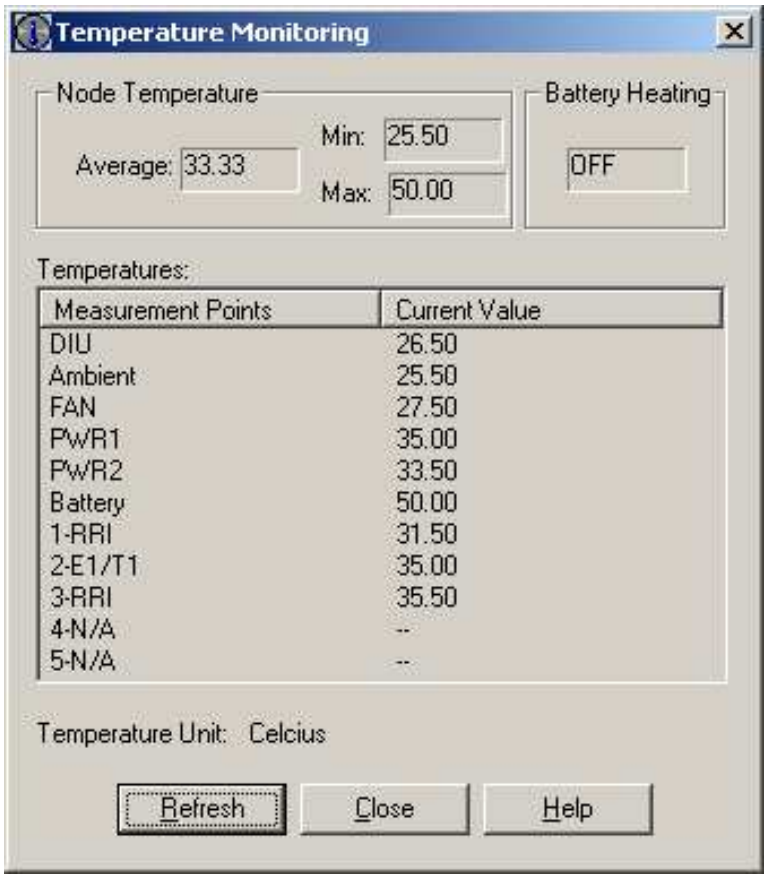


Figure 16. Temperature Monitoring window

2. As necessary, click Refresh to obtain the latest values.

5.4 Maintaining FXC RRI transmission units

Purpose

The oscillator of an FXC RRI unit must be tuned every 10 years.

Steps

1. Tune the oscillator of the FXC RRI every 10 years, at a Nokia service centre.

Tuning the oscillator of FXC RRI unit makes it stay accurate, that is, always in the range +/− 10 ppm. If tuning is not done, signal jitter may increase.

FXC RRI units have to be sent to a Nokia service centre for tuning.