Chapter 8 Tracing NodeB Iub Interface Signaling

8.1 About This Chapter

This chapter describes the Iub interface signaling tracing as follows:

- Overview
- Creating NodeB Iub Interface Tracing Task
- Browsing NodeB Traced Message

8.2 Overview

8.2.1 Principle of Tracing NodeB Iub Interface Signaling

The tracing management is used to conduct routine equipment maintenance. The tracing to Iub interfaces and signaling links helps you verify the data and locate the faults.

For example, after the equipment data configuration, you can check the signaling links by establishing tracing tasks. If the signaling links are abnormal, you can make preliminary fault location.

Table 8-1 shows the procedure of Iub interface signaling tracing.

Table 8-1 Procedure of Iub interface signaling tracing

Step	Action	Description	Reference
1	Create a tracing task	To start the Iub interface tracing	See 8.3 "Creating NodeB Iub Interface Tracing Task"
2	Browse traced messages online	To display reported traced messages by opening a message browse window after creating a tracing task	See 8.4.1 "Browsing NodeB Traced Message"
3	Save traced messages	To save important traced messages as required	See 8.4.3 "Saving NodeB Traced Messages " and 8.4.4 "Saving NodeB Traced Messages "
4	Stop tracing task	To stop the tracing task	--

5	Browse traced messages offline	To browse the saved traced messages offline	See 8.4.5 "Browsing NodeB Traced Messages"

8.2.2 Introduction to NodeB Iub Interface Tracing

The NodeB message tracing refers to the NodeB Iub interface tracing.

The Iub interface is a standard open interface between the NodeB and the RNC in the WCDMA system. The Iub interface is used to transmit messages of the user plane, signaling plane and specific O&M.

There are two tracing directions:

- **OUT**: from NodeB to RNC (for a macro NodeB, from NMPT to Iub interface boards)
- **IN**: from RNC to NodeB (for a macro NodeB, from Iub interface boards to NMPT)

8.3 Creating NodeB Iub Interface Tracing Task

I. Task Introduction

Creating an Iub interface tracing task refers to starting the Iub interface tracing. This can trace all the Iub interface messages.

After creating a tracing task, the system automatically sends two messages respectively to the master CPU and slave CPU of each available Iub interface board. The aim is to trace messages that the system sends and receives. The maximum message number that the system can send is 4 (number of boards) x 2 (the active and slave CPUs on the board) x 2 (two directions: send and receive) = 16.

Note:

- Only one Iub interface tracing task can be created in the NodeB O&M system each time, and one message display window can be created for this tracing task.
- The prompt for busy system and failure in starting a standard interface tracing task may lie in the overloaded CPU. It is recommended to start the tracing task 30 seconds later when the CPU overloading is cleared.

II. Prerequisite

None.

III. Procedure

Follow the steps below to create a tracing task:

1) Choose **Maintenance Navigator** -> **Tracing Management**. Then double-click **Standard Interface Tracing** subnode.
A prompt dialog box opens up.

Note:

You may clear the check box of **Show tips at startup next time** in the dialog box. This dialog box does not appear when you start a tracing task next time.

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2) Click **Continue** in the dialog box.
The **Standard Interface Tracing** dialog box opens up as shown in Figure 8-1.

Figure 8-1 shows the **Standard Interface Tracing** dialog box.

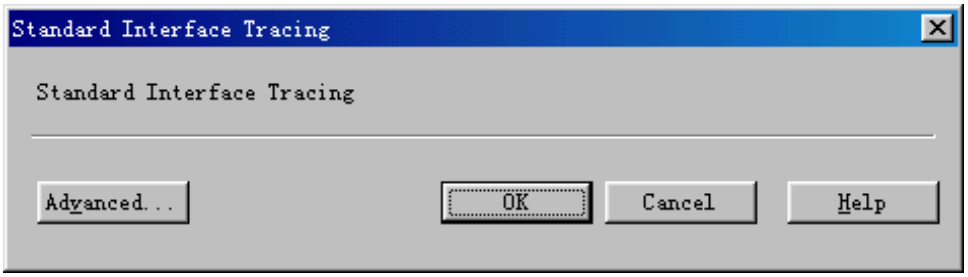

Figure 8-1 Standard Interface Tracing dialog box

3) Click **Advanced…**.
The **Advanced** dialog box opens up as shown in Figure 8-2.

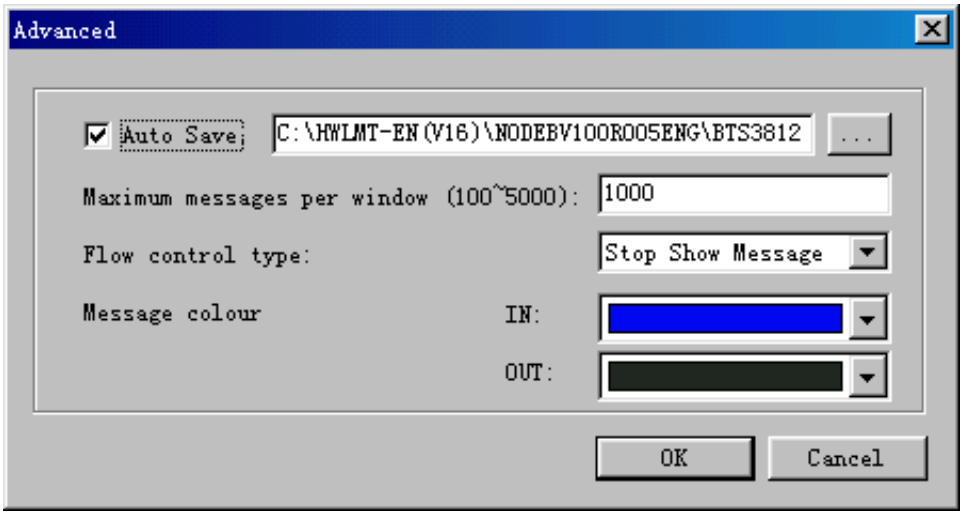

Figure 8-2 Advanced dialog box

Table 8-1 describes the fields of the **Advanced** dialog box.

Table 8-2 Field description of Advanced dialog box

Field	Description
Auto Save	Select **Auto Save**. The system saves reported messages in the **Trace** directory of the running version by default. You may modify the saving directory. Each reported message is to be saved in the message file.
Maximum messages per window	To set the maximum number of messages displayed in the message browse window Range: 100 to 5000 Default value: 1000
Flow control type	**Stop Show Message**: If the message flow is too large, the system stops displaying messages on the interface. **Stop Trace Task**: If the message flow is too large, the system stops the tracing task.
Message colour	To set the display colors of messages in two directions • **IN**: from RNC to NodeB • **OUT**: from NodeB to RNC Both directions have 16 optional colors.

4) Set parameters in the **Advanced** dialog box.
5) Click **OK**.
You are presented with the **Standard Interface Tracing** window as shown in Figure 8-3.

Figure 8-3 shows the **Standard Interface Tracing** window.

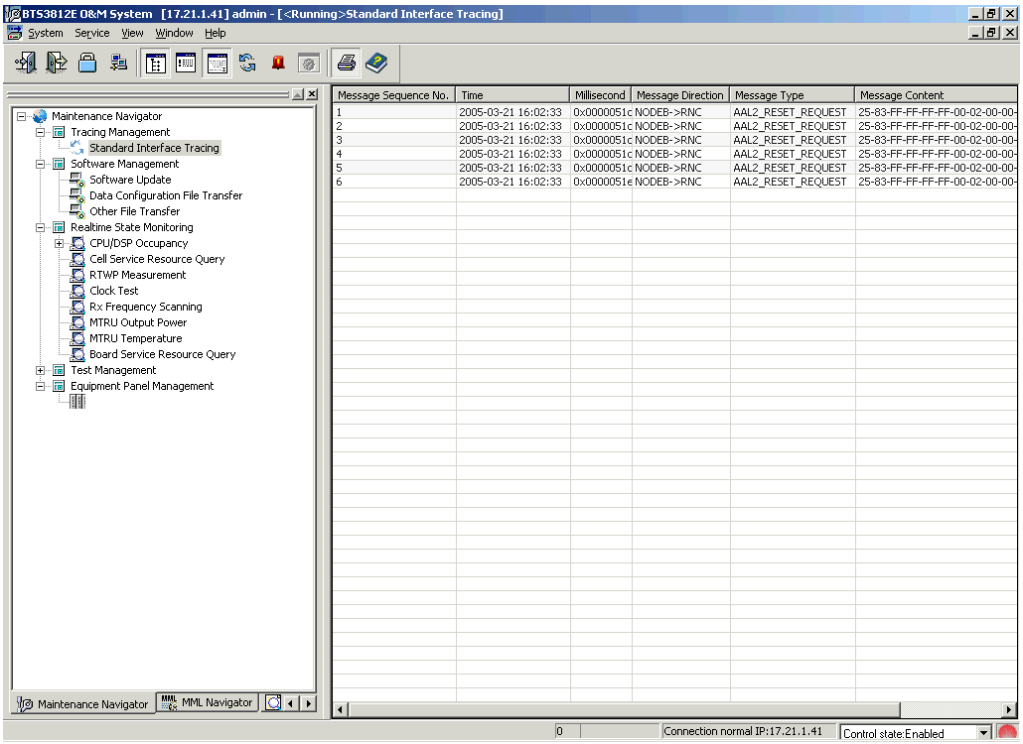

Figure 8-3 Standard Interface Tracing window

Table 8-3 describes the fields of the **Standard Interface Tracing** window.

Table 8-3 Fields in the Standard Interface Tracing window

Field	Description
Message Sequence No.	Sequence number of the message by arrival time
Time	Message arrival time in the format of YYYY-MM-DD HH:MM:SS
Millisecond	Traced message reporting interval: 100 ms
Message Direction	**RNC->NodeB**: from RNC to NodeB **NodeB->RNC**: from NodeB to RNC
Message Type	NBAP messages starting with NBAP_ ALCAP messages starting with ALL2_
Message Content	The system translates the message contents displayed in binary into message codes according to the message type.

8.4 Browsing NodeB Traced Message

8.4.1 Browsing NodeB Traced Message Online

I. Introduction

When you create a tracing task, the system starts a message browse window and displays the reported traced messages. The message browse window displays the traced messages in columns and adds messages in sequential order in real time.

II. Prerequisite

None.

III. Procedure

Follow the steps below to browse traced messages:

1) Create a tracing task.
   For details, see 8.3 “Creating NodeB Iub Interface Tracing Task”.
2) Double-click a message in the **Standard Interface Tracing** window.
   The message explanation window opens up as shown in Figure 8-4.

Figure 8-4 lists details in the message explanation window.

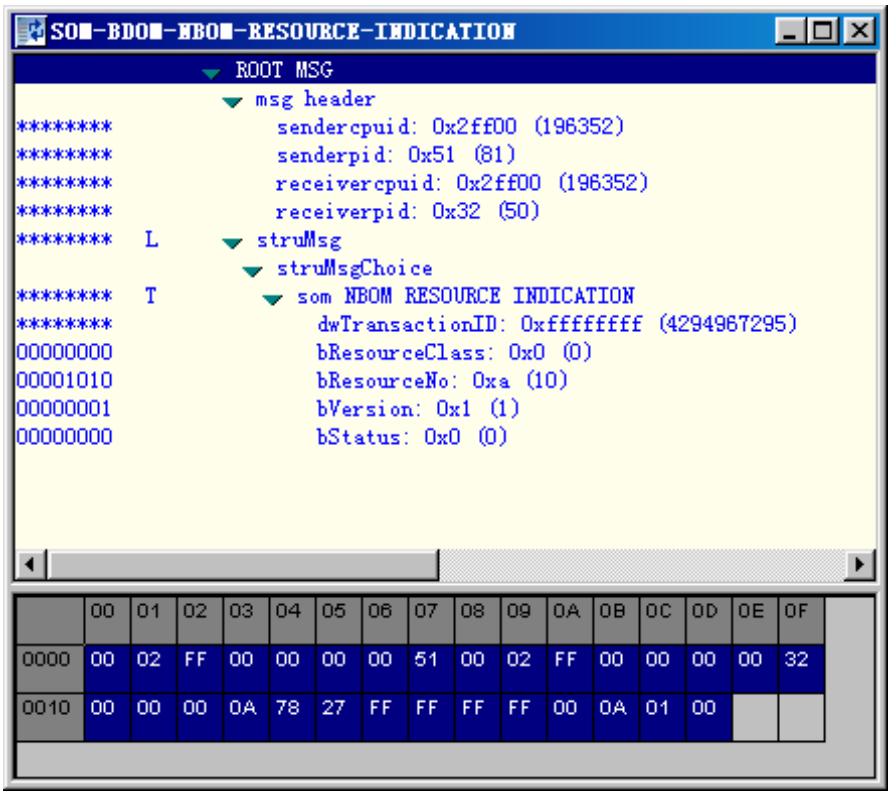

Figure 8-4 Message explanation window

The upper part of the window shows the explanation of the message and the lower part shows the source code.

3) Click the **Close** button on the upper right corner of the window. The **Standard Interface Tracing** window and the message explanation window are closed.

Note:

- To clear all message records in the window, right-click in the Standard Interface Tracing window, and select Clear All on the shortcut menu. The system clears all the message records from the list and displays the traced messages reported afterwards from the first line.
- If you double-click another message with the message explanation window open, the system does not generate a new message explanation window but refreshes the explanations. The system explains only one message each time.
- If you double-click multiple messages selected, the system explains the one clicked only.
- For more detailed message explanations, see relevant interface protocol.

8.4.2 Setting Browsing Properties of NodeB Traced Message

I. Introduction

The following functions enable you to browse messages in the **Standard Interface Tracing** window:

- Setting traced message color: When you create a tracing task, the system displays the traced results in different colors according to their transmission directions. **IN** is the color for messages from RNC to NodeB while **OUT** is the color for messages from NodeB to RNC. You can modify the value of **IN** and **OUT**.
- Setting message window scroll: It is used to set whether to scroll the window.
- Setting message filter: For the unimportant but frequently reported messages, you may choose to filter them.

II. Prerequisite

None.

III. Procedure

Follow the steps below to set traced message display:

1) Right-click in the **Standard Interface Tracing** window.
2) Select relevant menus on the shortcut menu.

Table 8-4 shows how to set the browsing properties of the NodeB traced message.

Table 8-4 Description of setting browsing properties of NodeB traced message

Property	Shortcut menu	Description
Traced message color setting	**Modify Color Settings**	You can also set the message color when creating an Iub interface tracing task. See 8.3 “Creating NodeB Iub Interface Tracing Task”.
Message window scroll setting	**Automatic Scroll**	--
Message Filter setting	**Filter**	--

8.4.3 Saving NodeB Traced Messages Automatically

I. Introduction

- Saving traced messages automatically indicates the system saves the reported messages in the format of *.tmf into the **Trace** directory of the running NodeB. You can select another new path.
- When a message file does not satisfy the save condition, a new message file is generated. All message files related to the task are associated through the Index value. When a file is created, index value will ascend until the task is terminated.

The message file name takes the following format: office direction name_Interface type_YYYY-MM-DD_HH-MM-SS[_Index].tmf, where,

- YYYY-MM-DD_HH-MM-SS shows the task creation time.
- YYYY, MM, DD, HH, MM and SS stands for year, month, day, hour, minute and second respectively.
- Index indicates multiple traced message files created in an interface tracing task. The index value ascends from 1.

II. Prerequisite

None.

III. Procedure

Follow the steps below to save the reported interface traced messages automatically:

1) Open the **Standard Interface Tracing** dialog box as shown in Figure 8-1.
2) Click **Advanced**.
3) Select **Auto Save** in the **Advanced** dialog box as shown in Figure 8-2.

8.4.4 Saving NodeB Traced Messages Manually

I. Introduction

You can choose to save selected or all traced messages.

II. Prerequistie

None.

III. Procedure

Follow the steps below to save the selected traced messages manually:

1) Right-click in the **Standard Interface Tracing** window.
2) Select **Stop Task** on the shortcut menu.

3) Select the traced messages to be saved. Shortcut keys of **Ctrl** and **Shift** are applicable.
4) Right-click on the messages and select **Save Selected Record** on the shortcut menu.
5) Specify a path and name for the file.
6) Click **Save**.

Follow the steps below to save all the traced messages manually:

1) Right-click in the **Standard Interface Tracing** window.
2) Select **Save All Records** on the shortcut menu.
3) Specify a path and name for the file.
4) Click **Save**.

8.4.5 Browsing NodeB Traced Messages Offline

I. Introduction

You can browse message files (*.tmf) offline with the TraceViewer.

II. Prerequisite

There are message files automatically saved by the system and manually saved by you.

III. Procedure

Follow the steps below to view traced messages offline:

1) Select **Service** -> **TraceViewer** in the NodeB O&M system, or click the shortcut icon  .
2) Select the relevant NodeB version in the **Select Version** dialog box as shown in Figure 8-5.

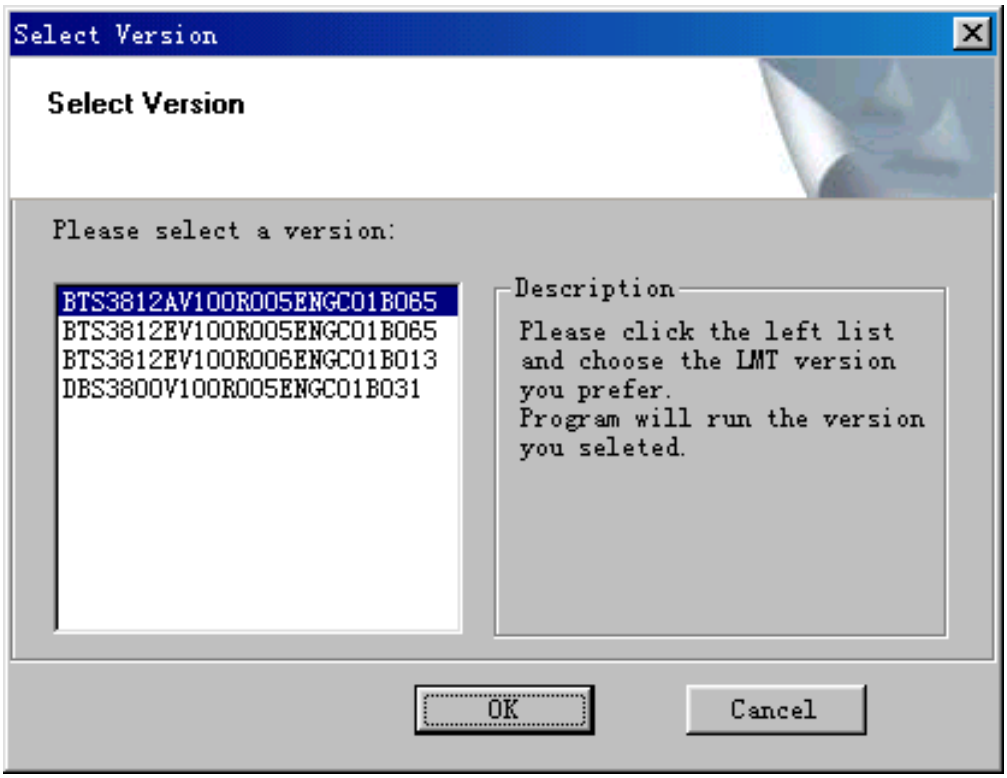

Figure 8-5 Select Version dialog box

3) Click **OK** and start the TraceViewer.
4) Select the message file to be browsed in the **Open** dialog box.
5) Click **OK**.
   The TraceViewer window is displayed.
6) Double-click a message record in the window.
   You are presented with the explanations of it.

Note:

You can carry out the following actions with the NodeB TraceViewer:

- To save the selected messages to a message file, right-click on the message records and then select Save Selected Record on the shortcut menu.
- Click different buttons on the title bar. Then the messages shall be sequenced according to message number, time, direction or type.
- To filter the messages, right-click the mouse and then select Filter or Filter on Column on the shortcut menu. See section 8.4.6 "Filtering NodeB Traced Messages ".

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7) Select **File** -> **Exit**.

The message browse window is closed.

8.4.6 Filtering NodeB Traced Messages

I. Introduction

The filtering traced messages function enables you to filter out unwanted messages. There are two ways for filtering messages:

- Filtering messages with customized conditions: you can filter out unwanted messages according to one or more conditions by defining the filter.
- Filtering messages on column: You can filter out unwanted messages according to the property of a column.

II. Prerequisite

None.

III. Procedure

Follow the steps below to define filters:

1) Select **Operate** -> **Filter…** after opening a message tracing file, or right-click in an open message tracing file and then select **Filter** on the shortcut menu.
2) Click **New…** in the **Filter** dialog box as shown in Figure 8-6.

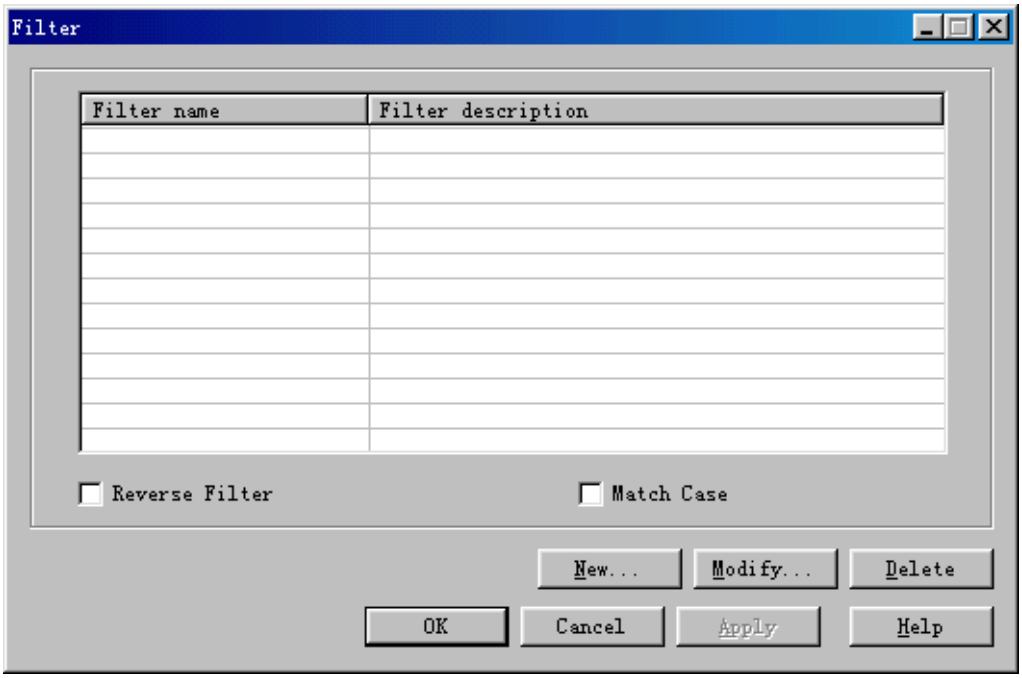

Figure 8-6 Filter dialog box

3) Set one or more filtering conditions in the **Filter Define** dialog box as shown in Figure 8-7.

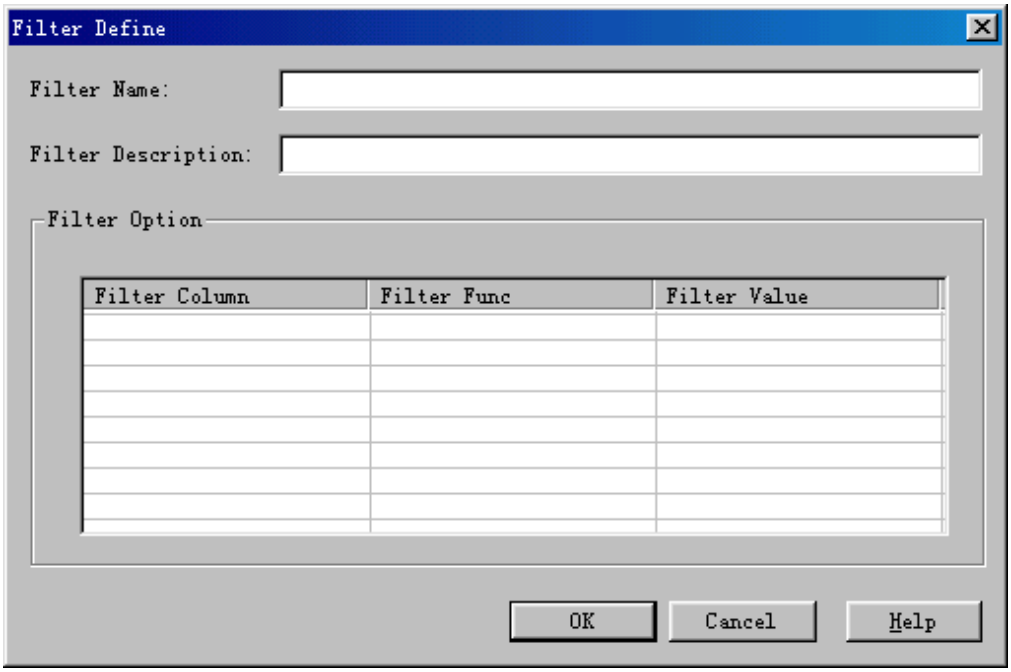

Figure 8-7 Filter Define dialog box

4) Click **OK**.
You are presented with the **Filter** dialog box.
5) Select the defined filter and then click **Apply**.

Note:

To perform invert filtering, select **Reverse Filter** in the **Filter** dialog box

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Follow the steps below to filter messages on column:

1) Open a message file and then select a column of message records to be filtered.
2) Right-click on the column.
3) Select **Filter on Column** on the shortcut menu.
4) Choose a message property in the drop-down list of the **Column Filter** dialog box.
5) Click **OK**.

You may cancel the message filtering as follows:

- Choose **Operate** -> **Cancel Filter**, or

- Right-click in the **TraceViewer** window and then select **Cancel Filter** on the shortcut menu.

The system displays all messages in the message file.

Table of Contents

Chapter 9 Monitoring NodeB Performance and State in Real Time

9.1 About This Chapter

This chapter describes how to monitor the NodeB performance and state through the LMT.

9.2 Overview

The NodeB supports the following performance tests:

- Querying CPU/DSP Occupancy
- Querying Cell Service Resource
- Testing NodeB RTWP
- Testing NodeB Clock
- Scanning NodeB Rx Frequency
- Testing MTRU Output Power
- Testing MTRU Temperature
- Testing MRRU Output Power
- Testing MRRU Temperature
- Querying Board Service Resource
- Routine Testing NodeB E1/T1
- Routine Testing STM-1

9.3 Querying CPU/DSP Occupancy

I. Introduction

The CPU/DSP occupancy shows the use of system resources.

II. Prerequisite

None.

III. Procedure

Caution:

This test cannot be applied to the NFCB, NEMU, GPSRCV or MAFU.

Follow the steps below to test CPU/DSP occupancy:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **CPU/DSP Occupancy** subnode.
2) Click**Create Monitor Task**.
3) The system displays the **CPU/DSP Occupancy** dialog box, as shown in Figure 9-1.

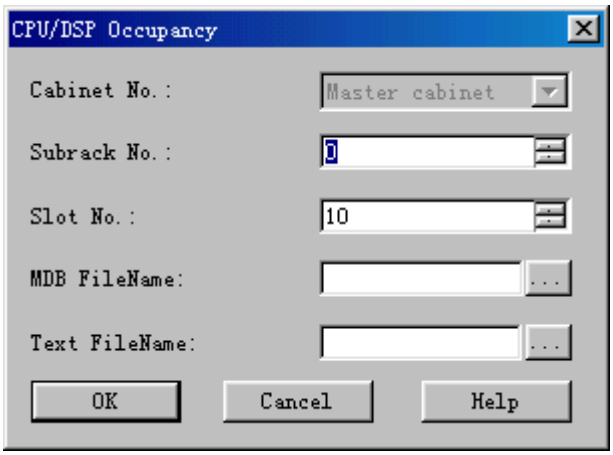

Figure 9-1 CPU/DSP Occupancy dialog box

Table 9-2 describes the fields in the **CPU/DSP Occupancy** dialog box.

Table 9-1 Field description of CPU/DSP Occupancy dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	• For the macro NodeB, the baseband subrack number is 0 while the MTRU subrack number is 2. • For the DBS3800, the MRRU subrack number is any value from 20 to 199.
Slot No.	To set the number of the slot that hosts the board • For the macro NodeB, the slot number of a board in the baseband subrack can be 16 or any number from 0 to13. • For the DBS3800, the slot number of the MRRU subrack board is 0 by default. The NDTI/NAOI has two CPUs: CPU0 (master CPU) and CPU1 (slave CPU). Any other board has only one CPU. The HULP/NULP has four DSPs. The HDLP/NDLP has three DSPs. The HBBI has four DSPs. All others have no DSP.

MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves the test curve into the default file under the default directory.
Text FileName	• To create a *.txt file to save the test data • If it is blank, the system will not save the data.

4) Set parameters in the dialog box.
5) Click **OK**. A monitor window is displayed showing the CPU/DSP occupancy curve.
6) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Then click **Delete Task** on the shortcut menu.

IV. Test Result Analysis

1) Analysis of CPU occupancy test results

- When the NodeB works well without carrying services, the CPU occupancy of all boards shall stay between 5% and 10%.
- The CPU occupancy increases when the NodeB carries services. The occupancy of all boards shall be smaller than 75%. The system reports alarms if the occupancy is greater than 75%.
- It is normal for the CPU occupancy to stay at 100% for a few seconds. However, if the CPU occupancy stays at 100% for more than one minute while the NodeB does not carry services, the CPU is faulty.

2) Analysis of DSP occupancy test results

None.

Note:

- You can open and query the text file that saves the CPU/DSP occupancy test results.
- The corresponding board is presented at the beginning of the file. The occupancy of all CPUs and DSPs under test at one time are recorded in one row with the test time.

9.4 Querying Cell Service Resource

I. Introduction

The cell service resource query shows the use of service resources of the cell in real time. It includes:

- Number of UEs
- Number of idle HULP CEs
- Number of HULP CEs in use
- Number of idle HDLP CEs
- Number of HDLP CEs in use

II. Prerequisite

None.

III. Procedure

Follow the steps below to query the cell service resource:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **Cell Service Resource Query** subnode.
2) Click **Create Monitor Task**.
   The system displays the **Cell Resource Query** dialog box, as shown in Figure 9-2.

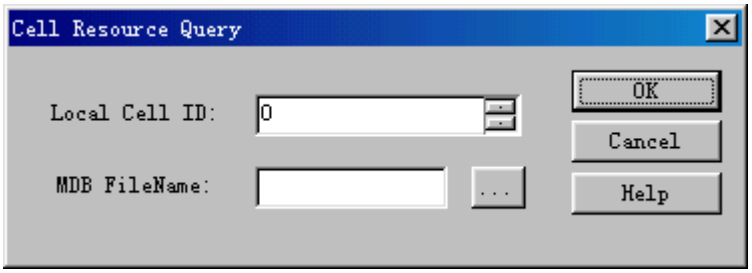

Figure 9-2 Cell Resource Query dialog box

Table 9-2 describes the fields of the **Cell Resource Query** dialog box.

Table 9-2 Field description of Cell Resource Query dialog box

Field	Description
Local Cell ID	To set the ID of the local cell
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.A monitor window is displayed showing the service resource occupancy curve.
5) Stop the test in either way below:

- Close the monitor window.

- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

Test result analysis of the querying the cell service resource is as follows:

- Uplink resources: include uplink demodulation resources and uplink decoding resources. The LMT reports uplink resources in points.
- Downlink resources: include downlink modulation resources and downlink encoding resources. The LMT reports downlink resources in points.

Note:

The resources for a 12.2 kbit/s voice service channel are regarded as a point. Other service channel resources can be converted into a multitude of points.

9.5 Testing NodeB RTWP

I. Introduction

The received total wideband power (RTWP) is the received wideband power in the band of an uplink channel measured at the UTRAN access point. You can calibrate the gain of uplink RF channels through RTWP measurement.

The NodeB RTWP test has no negative effect on the services.

II. Prerequisite

None.

III. Procedure

Follow the steps below to test the NodeB RTWP:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **RTWP Measurement** subnode.
2) Click **Create Monitor Task**. The system displays the **RTWP Measurement** dialog box, as shown in Figure 9-3.

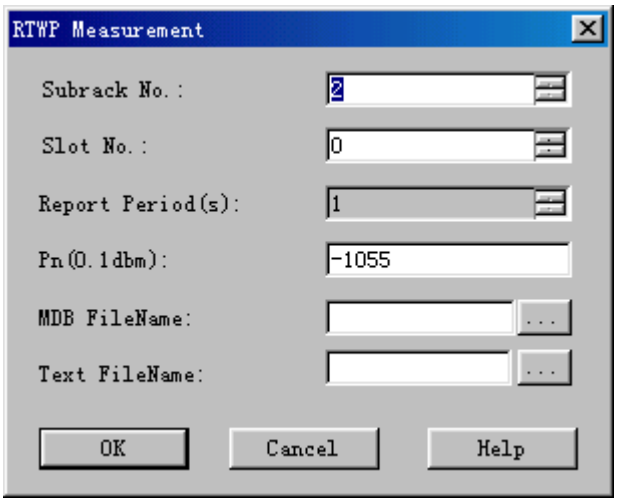

Figure 9-3 RTWP Measurement dialog box

Table 9-3 describes the fields of the **RTWP Measurement** dialog box.

Table 9-3 Field description of RTWP Measurement dialog box

Field	Description
Subrack No.	• For the macro NodeB, to set the number of the subrack that hosts the MTRU with default value 2 • For the DBS3800, to set the number of the subrack that hosts the MRRU with value range from 20 to 199
Slot No.	• For the macro NodeB, to set the number of the slot that hosts the MTRU with value range from 0 to 5 • For the DBS3800, to set the number of the slot that hosts the MRRU with default value 0
Report Period(s)	• To set intervals of report • Unit: Second • Value range: 1 second
Pn(0.1 dBm)	• To set the RTWP when the NodeB carries no service, that is, the initial gain of the uplink channel • It is the initial reference value to calculate the uplink load of the cell. • Default value: –105.5 dBm.
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory
Text FileName	• To create a *.txt file to save the test data • If it is blank, the system will not save the data. • You can open the file to view the data. The file shows the MTRU/MRRU corresponding to the antennas at the start. In each line are the GPS time and the RTWP values of a pair of main and diversity antennas.

3) Set parameters in the dialog box.
4) Click **OK**. A monitor window is displayed showing the RTWP curve.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

The analysis of the RTWP test result is as follows:

- If the NodeB is not connected to the antenna and feeder system or a matched load, the RTWP is about –108 dBm.
- If the NodeB is connected to the antenna and feeder system (with TMA switched on) or a matched load, the RTWP is about –105 dBm.
- If the servicses are normal and the uplink load reaches 75%, the RTWP is 6 dB higher than the RTWP when the NodeB does not carry any service.

Note:

- When the RTWP reported is valid, the curve is normal. The vertical axis corresponds to the reported RTWP with unit of 0.1 dBm.
- When the reported RTWPs are invalid, abnormal RTWP curves are displayed. The RTWPs for the main antenna form a horizontal line at –1120 dBm on the vertical axis. The RTWPs for the diversity antenna form a horizontal line at –1115 dBm on the vertical axis. The error may lie in the absent MTRU/MRRU, a broken link, or a faulty channel. In this case, you shall clear the fault first.

9.6 Testing NodeB Clock

I. Introduction

The clock source quality is crucial to the operation of the system. You need to handle the clock alarm in time.

You can test the quality of the clock source beforehand.

The NodeB clock test has no negative effect on the system or services.

II. Prerequisite

A reference clock source to the NodeB must be configured before the clock test.

III. Procedure

Follow the steps below to perform the clock test:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **Clock Test** subnode.
2) Click **Create Monitor Task**. The system displays the **Clock Test** dialog box, as shown in Figure 9-3.

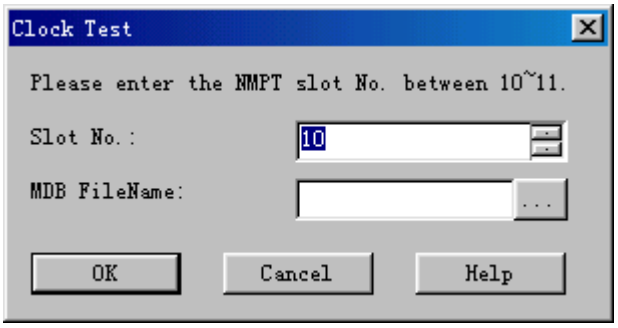

Figure 9-4 Clock Test dialog box

Table 9-4 describes the fields of the **Clock Test** dialog box.

Table 9-4 Field description of Clock Test dialog box

Field	Description
Slot No.	• For the macro NodeB, the number of the slot that hosts the NMPT can be 10 or 11. • For the DBS3800, the number of the slot that hosts the MBBU is 0 by default.
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**. A monitor window is displayed showing the clock test curve.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

Analyses of the NodeB clock test result are as follows:

1) Result reporting period

The reporting periods of phase discrimination value and DA value are different. The reporting period of phase discrimination value is 1 second. The reporting period of DA value depends on the type of the clock source.

- For the GPS or BITS clock source, the reporting period of DA value is 2 minutes in normal condition. If there is fluctuation or frequency deviation on the clock, the period may be longer than 2 minutes. It is normal if the first reporting period is greater than 2 minutes.
- For the Iub clock source, the reporting period of DA value is 30 minutes in normal situation. If there is fluctuation or frequency deviation on the clock, the period may be longer than 30 minutes. It is normal if the first reporting period is greater than 30 minutes.

2) Phase discrimination value

If the difference of the reported phase discrimination value and the actual value (10 MHz) is greater than ±1 Hz, you need to check whether there is problem in the clock source.

9.7 Scanning NodeB Rx Frequency

I. Introduction

The Rx frequency scanning helps you examine electromagnetic environment and internal interference of the NodeB.

The process is as follows: The MTRU/MRRU scans the frequency, calculates the strength of received signals, and then reports the result.

II. Prerequisites

- It is recommended to do Rx frequency scanning before cell configuration.
- The MTRU/MRRU must be blocked before Rx frequency scanning starts.

III. Procedure

Follow the steps below to scan the NodeB Rx frequency:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **Rx Frequency Scanning** subnode.
2) Click **Create Monitor Task**. The system displays the **Rx Frequency Scanning** dialog box, as shown in Figure 9-5.

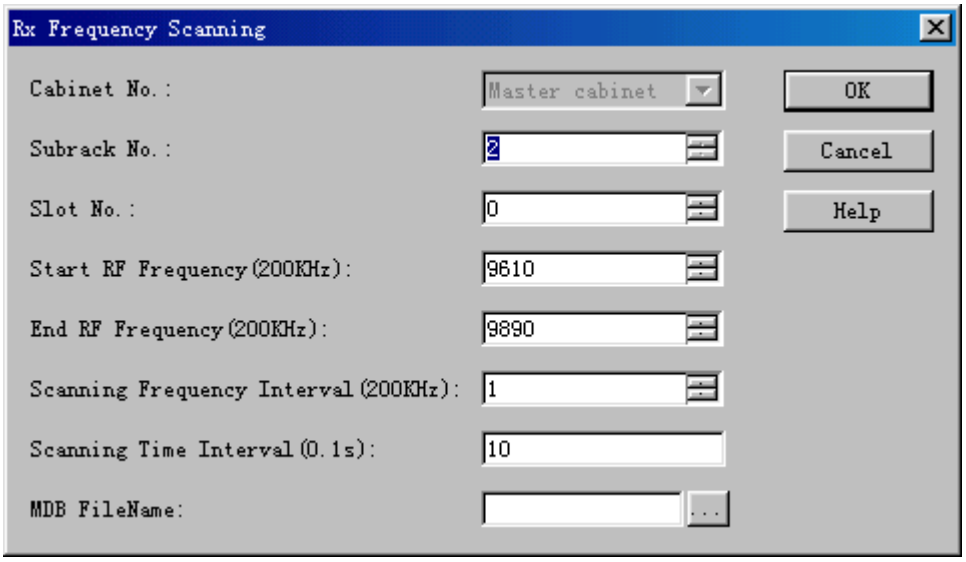

Figure 9-5 Rx Frequency Scanning dialog box

Table 9-5 describes the fields of the **Rx Frequency Scanning** dialog box.

Table 9-5 Field description of Rx Frequency Scanning dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	• For the macro NodeB, the number of the subrack that hosts the MTRU is 2. • For the DBS3800, the number of the subrack that hosts the MTRU can be any number from 20 to 199.
Slot No.	• For the macro NodeB, the number of the slot that hosts the MTRU is any number from 0 to 5. • For the DBS3800, the number of the slot that hosts the MTRU is the default value 0.
Start RF Frequency (200kHz)	• To set the start frequency of the scanning • Value range: 9610 to 9890 • Unit: 200 kHz
End RF Frequency (200kHz)	• To set the end frequency of the scanning • Value range: 9610 to 9890 • Unit: 200 kHz • Note that the End RF Frequency has to be higher than the Start RF Frequency.
Scanning Frequency Interval (200kHz)	• To set the frequency intervals of the scanning • Value range: 1 to 300 • Unit: 200 kHz
Scanning Time Interval (0.1s)	• Value range: 2 to 600 • Unit: 0.1 s

Field	Description
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.
   A dialog box prompts you whether to start the Rx frequency scanning.
5) Click **Yes**.
   A monitor window is displayed showing the scanning curve.

Note:

The scanning automatically stops when it reaches the end RF frequency.

---

6) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

The test result analysis of Rx frequency scanning is as follows:

- If the NodeB is separated from the antenna and feeder system, the curve has jumps greatly higher than –108 dBm. This indicates that there must be internal interference of the NodeB.
- If the NodeB is connected to the antenna and feeder system with NTTA powered on, the curve has jumps greatly higher than –105 dBm. This indicates that there must be external interference of the NodeB.
- The shape of jumps tells the interference type in most cases:
- A triangular or trapezium jump: There are broadband interferences. The peak of the jump is the central frequency of the interference.
- A rectangle jump or a jump added with a rectangle: There is individual tone interference. The central point of the upper side of the rectangle is the interfering frequency.

9.8 Testing MTRU Output Power

I. Introduction

The MTRU output power test measures the output power of the MTRU, including:

- Total output power
- Output power of each carrier.

II. Prerequisite

none.

III. Procedure

Follow the steps below to test the MTRU output power:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **MTRU Output Power** subnode.
2) Click **Create Monitor Task.**
   The system displays the **MTRU Output Power** dialog box, as shown in Figure 9-6

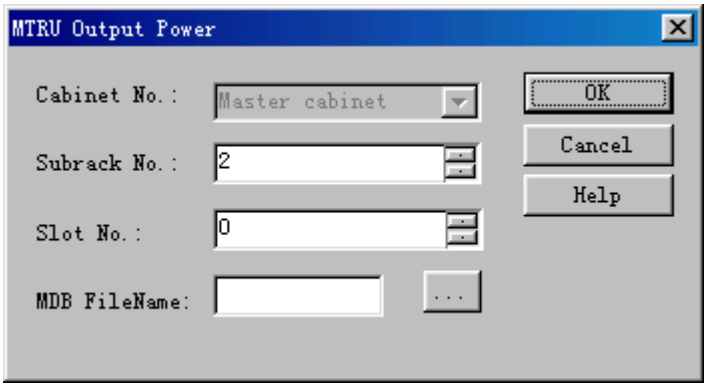

Figure 9-6 MTRU Output Power dialog box

Table 9-6 describes the fields of the **MTRU Output Power** dialog box.

Table 9-6 Field description of MTRU Output Power dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	• To set the number of the subrack that hosts the MTRU • Value: 2
Slot No.	• To set the number of the slot that hosts MTRU. • Value range: 0 to 5.
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.

4) Click **OK**.
A monitor window is displayed showing the service resource occupancy curve.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

Once the test is started, the system reports the output power of the MTRU and each carrier every two seconds.

9.9 Testing MTRU Temperature

I. Introduction

The MTRU temperature test measures the temperatures of the MTRU board and the internal power amplifier.

II. Prerequisite

None.

III. Procedure

Follow the steps below to test the MTRU temperature:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **MTRU Temperature** subnode.
2) Click **Create Monitor Task**.
The system displays the **MTRU Temperature** dialog box, as shown in Figure 9-7.

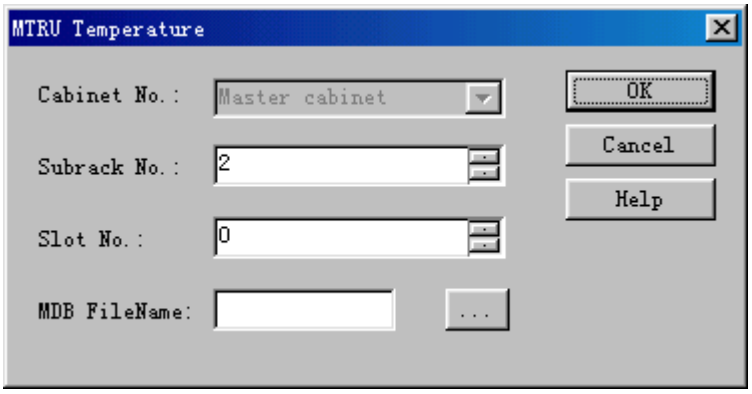

Figure 9-7 MTRU Temperature dialog box

Table 9-7 describes the fields of the **MTRU Temperature** dialog box.

Table 9-7 Field description of MTRU Temperature dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	• To set the number of the subrack that hosts the MTRU • Value: 2
Slot No.	• To set the number of the slot that hosts MTRU. • Value range: 0 to 5
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.
   A monitor window is displayed showing the MTRU temperature curve.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

- Once the test is started, the system reports the temperatures of the MTRU board and the internal power amplifier every two seconds.
- Alarms are reported if the temperature of the power amplifier is higher than the allowed temperature.

9.10 Testing MRRU Output Power

I. Introduction

The MRRU output power test tells the output power status of MRRU, including

- Total output power of MRRU
- Output power of each carrier

II. Prerequisite

None.

III. Procedure

Follow the steps below to test the MRRU output power:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **MRRU Output Power** subnode.

2) Click **Create Monitor Task**.
The system displays the **MRRU Output Power** dialog box, as shown in Figure 9-8.

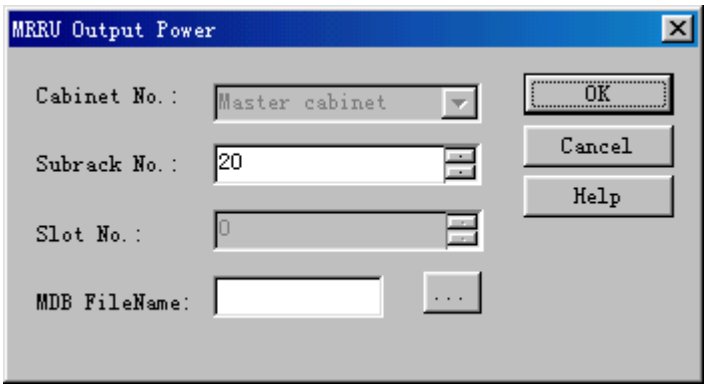

Figure 9-8 MRRU Output Power dialog box

Table 9-8 describes the fields of the **MRRU Output Power** dialog box.

Table 9-8 Field description of MRRU Output Power dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	• To set the number of the subrack that hosts the MRRU • Value range: from 20 to 199
Slot No.	Default value: 0
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.
A monitor window is displayed showing the curve of the current task.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

Once the test is started, the system reports the output power of the MRRU and each carrier every two seconds.

9.11 Testing MRRU Temperature

I. Introduction

The MRRU temperature test tells temperatures of the MRRU and power amplifier in the MRRU.

II. Prerequisite

None.

III. Procedure

Follow the steps below to test temperatures of the MRRU board and the power amplifier:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **MRRU Temperature** subnode.
2) Click **Create Monitor Task**.
   The system displays the **MRRU Temperature** dialog box, as shown in Figure 9-9.

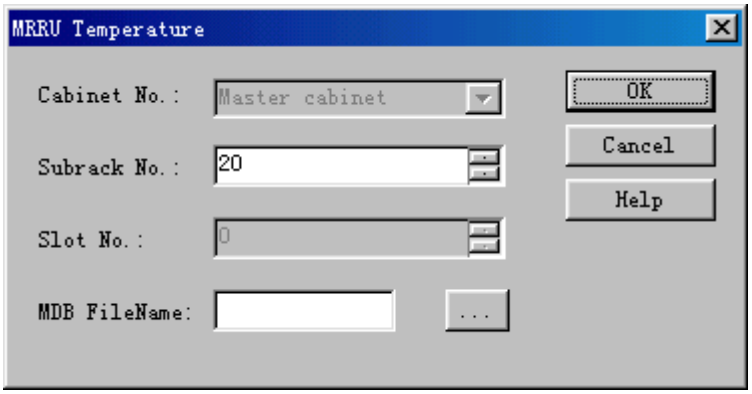

Figure 9-9 MRRU Temperature dialog box

Table 9-9 describes the fields of the **MRRU Temperature** dialog box.

Table 9-9 Field description of the MRRU Temperature dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Subrack No.	Value range: 20 to 199
Slot No.	• To set the number of the slot that hosts the MRRU • Default value: 0

Field	Description
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.
   A monitor window is displayed showing the curve of the current task.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

- Once the test is started, the system reports the temperatures of the MRRU and the power amplifier in the MRRU every two seconds.
- Alarms are reported when the temperature of the power amplifier is higher than the allowed temperature.

9.12 Querying Board Service Resource

I. Introduction

The board service resource query shows the use of service resources of the board in real time. It includes:

- Total service resources of a board
- Service resources in use
- Idle service resources

II. Prerequisite

None.

III. Procedure

Follow the steps below to test the board service resources:

1) Choose **Maintenance Navigator** -> **Realtime State Monitoring**. Right-click on the **Board Resource Query** subnode.
2) Click **Create Monitor Task**.
   The system displays the **Board Resource Query** dialog box, as shown in Figure 9-10.

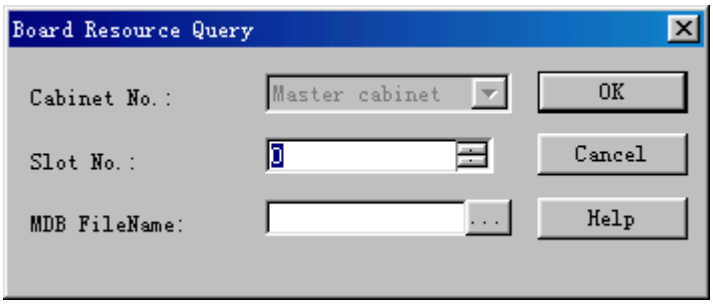

Figure 9-10 Board Resource Query dialog box

Table 9-10 describes the fields of the **Board Resource Query** dialog box.

Table 9-10 Field description of Board Resource Query dialog box

Field	Description
Cabinet No.	Value: Master cabinet
Slot No.	• For the macro NodeB, to set the numbers of the slots that host HULP/NDLP, HDLP/NDLP and HBBI with value range from 0 to 9 • For the DBS3800, to set the number of the slot that hosts the MBBU with default value 0
MDB FileName	• To create a *.mdb file to save the test curve • If it is blank, the system saves curve into the default file under the default directory.

3) Set parameters in the dialog box.
4) Click **OK**.
   A monitor window is displayed showing the curve of the current task.
5) Stop the test in either way below:

- Close the monitor window.
- Right-click the task in the task list below the graphical area. Click **Delete Task** on the shortcut menu to delete the task and curve.

IV. Test Result Analysis

The board service resource occupancy is presented in percentage calculated through dividing the total points by the occupied points. It includes

- NBBI: resource occupancy for demodulating, decoding and encoding the DSP
- HULP: resource occupancy for demodulating and decoding the DSP
- HDLP: resource occupancy for encoding the DSP

Note:

- This query is only for the usable DSP. There is no result for the unusable DSP.
- The resources for a 12.2 kbps voice service channel are regarded as a "point". Other service channel resources can be converted into a multitude of points.

9.13 Routine Testing NodeB E1/T1 Performance

I. Introduction

The E1/T1 performance routine test shows the quality of the E1/T1 cable.

This test has no negative effect on the services, and can be done by the MML command only.

II. Prerequisite

The E1/T1 cable has no physical damage but has error bit in transmission.

III. Procedure

Follow the steps below to perform an E1/T1 performance routine test:

1) Execute the MML command of **STR E1T1RTTST**. An E1/T1 performance routine test is started.
2) Note down the ID for the task under test.

Note:

- When the E1/T1 routine test is started, the NodeB assigns an ID to each task and sends it to you. With this ID, you can query the task under test.
- If you lose the ID, execute the MML command of **LST RTTST** to get it.

3) Wait for a while longer than the test time set by the MML command of **STR E1T1RTTST**. Execute the MML command of **STP RTTST** to stop the test.

Then the system displays the E1/T1 performance routine test result.

IV. Test Result Analysis

You can tell the E1/T1 link status through E1/T1 performance routine test in real time. Any error in the test results indicates a line fault.

The test result is invalid when there is signal loss or out-of-synchronization frame. In this case, all the indices should be 0.

The indices in the E1/T1 performance routine test results include

- **Line Conflicting Error Rate**: measures conflicts in line code type.
- **Framing Error Rate**: measures errors in frame synchronization signals.
- **CRC Error Rate**: measures errors in CRC4 multi-frame receiving.
- **Ebit Error Rate**: measures errors in CRC4 multi-frame transmitting at the peer end.

The above indices reflect the transmission status of the E1/T1 link, which is related to the code and frame structure of the link.

- If an error occurs, check that the code types and frame structures at both ends of the link are the same.
- If they are the same but the error still exists, check the clock status. This is because of vibrations of the clock.

9.14 Routine Testing STM-1 Performance

I. Introduction

The STM-1 performance routine test shows the STM-1 link status.

This routine test has no negative impact on the services and can be done by the MML command only.

II. Prerequisite

The STM-1 link has no physical damage but has error bit in transmission.

III. Procedure

Follow the steps below to perform the STM-1 performance routine test:

1) Execute the MML command of **STR STM1RTTST**. An STM-1 performance routine test is started.
2) Note down the ID for the task under test.

Note:

- When the STM-1 performance routine test is started, the NodeB assigns an ID to each task and sends it to you. With this ID, you can query the task under test.
- If you lose the ID, execute the MML command of **LST RTTST** to get it.

---

3) Wait for a while longer than the test time set by the MML command of **STR STM1RTTST**. Execute the MML command of **STP RTTST** to stop the test.

Then the system displays the results of the STM-1 performance routine test.

IV. Test Result Analysis

You can tell the STM-1 link status by the STM-1 performance routine test in real time. Any error in the test results indicates a line fault.

The test result is invalid when there is signal loss or out-of-synchronization frame. In this case, all the indices should be 0.

The indices in the STM-1 performance routine test results include

- **LOCD Event Rate**: measures lost cells.
- **Rx Corrected HEC Error Rate**: measures HEC errors because of single-bit errors during cell delimitation.
- **Rx Uncorrectable HEC Error Rate**: measures HEC errors because of multi-bit errors during cell delimitation.
- **Off Event Rate**: measures errors in SDH frame synchronization.
- **Line BIP Error Rate**: measures line bit errors.
- **Section BIP Error Rate**: measures section bit errors.
- **Path BIP Error Rate**: measures path bit errors.
- **Line FEBE Error Rate**: measures bit errors in receiving on the line.
- **Path FEBE Error Rate**: measures bit errors in receiving on the path.
- **Idle Cell Rate**: measures wrongly inserted cells.
- **Tx Cell Rate**: measures cells sent over the UTOPIA port.
- **Rx Cell Rate**: measures cells received over the UTOPIA port.

The above indices reflects the receive status of the STM-1 link. STM-1 link status depends on the cable clock and the physical status of the link. If there is any error, query the alarm and line clock status.

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Chapter 10 Monitoring External Environment of NodeB

10.1 About This Chapter

This chapter describes how to monitor the external environment of the NodeB through the LMT.

10.2 Monitoring External Environment of NodeB

10.2.1 Overview of External Environment

To ensure long-term stable running of the NodeB, you need to monitor the environment of the NodeB equipment room. It includes:

- Monitoring Input Power Supply
- Monitoring Temperature and Humidity
- Smoke and Anti-theft Alarms
- Customized Alarms

10.2.2 Monitoring Input Power Supply

I. DC Power Supply

The NodeB uses －48 V DC power supply which shall meet the following requirements:

- Allowed voltage fluctuation range: －40 V to +60 V DC
- Regulated voltage precision: when the AC input voltage fluctuates between 85% and 110% of the rated value and the load current fluctuates between 5% and 100% of the rated value, the output voltage of the rectifier stays at a value in the range between －46.0 V and －56.4 V. The regulated voltage precision is smaller or equal to 1%.
- Overshoot range of powering on or off NodeB: within the range of ±5% of the rated DC output voltage
- Peak to peak noise voltage: smaller or equal to 200 mV
- Dynamic response: The restore time is shorter than 200 ms. The overshoot value is within the range of －5% to +5% of the rectified DC output voltage.

II. AC Output Power Supply

The AC power supply for the NodeB shall meet the following requirements:

- The electric network for the NodeB is independently and good in quality.
- The AC power distribution capacity of the equipment room depends on the working current and fault current of the equipment. Each independent device must be equipped with independent facilities for AC power distribution protection. The threshold of the protection switch shall be higher than the downstream electric equipment.
- Use voltage regulation devices in either case below:
- When the communications equipment is directly powered by mains supply, the power supply voltage is 5% higher or 10% lower than the rated voltage or out of the allowed voltage range of the communications equipment.
- When the communications equipment is not directly powered by mains supply, the power supply voltage is 10% higher or 15% lower than the rated voltage or out of the allowed AC input voltage range of the DC power equipment.
- Apply the UPS or DC-to-AC converters to the power supply for normal services.
- To ensure critical communications load and power load in mains failure, the office site shall be equipped with a generator set for power supply. The capability of the set is 1.5 to 2 times of the total capability of AC uninterruptible electric equipment.
- The AC voltage and its fluctuation range shall meet the requirements listed in Table 10-1.

Table 10-1 Requirements for AC voltage and its fluctuation range

Input voltage range	Power frequency	Wave distortion
90% to 110% of rated voltage	98% to 102% of rated power frequency	Smaller than the total harmonic component

10.2.3 Monitoring Temperature and Humidity

Table 10-2 lists the requirements for the temperature and humidity of the equipment room.

Table 10-2 NodeB working conditions

	Item	Range
Normal operating conditions	Temperature	0°C to 45°C
	Relative humidity	20% RH to 85% RH
Safe operating conditions	Temperature	－5°C to +50°C
	Relative humidity	5% RH to 95% RH

Note:

- In normal operating conditions, measure the temperature and humidity 2 meters above the floor and 0.4 meter in front of the equipment. Make sure that there are no fenders in front of or behind the rack during the process.
- Safe operating condition means the system operates for less than 48 hours continuously at a time and less than 360 hours in sum in a year.

10.2.4 Smoke and Anti-theft Alarms

- Smoke alarm: monitors smoke and fire in the NodeB site in real time.
- Anti-theft alarm: monitors the equipment room in case of theft. It is recommended to use dual-mode detector with infrared and short wave.

10.2.5 Customized Alarms

Customized alarms refer to alarms customized by you.

Elements for customizing an alarm include:

- External interface of the NodeB
- Alarming ID corresponding to the external interface
- Test mode for the external interface, such as high electric level, low electric level
- Whether to close the customized alarm of the external interface

The value range for the customized alarm is from 65334 to 65534.

Note:

- The NodeB does not support modification on the customized alarm severity.
- The alarm name, alarm ID and alarm severity are defined in the M2000 server. For details, see *iManager M2000 Mobile Element Management System Operation Manual*.

10.3 Monitoring Input Power Supply

10.3.1 Overview

The input power monitoring refers to monitoring the input power in real time. Once the input voltage does not conform to the threshold settings, the system reports an alarm.

10.3.2 Setting NEMU Input Voltage Alarm Thresholds

I. Introduction

You can set the alarm thresholds for the NEMU input voltage.

II. Procedure

Execute the MML command of **SET NEMUINVLIMIT**.

10.3.3 Querying NEMU Alarm Thresholds for Input Voltage

I. Introduction

You can query the alarm thresholds for NEMU input voltage.

II. Procedure

Execute the MML command of **LST NEMUINVLIMIT**.

10.3.4 Querying NEMU Input Voltage

I. Introduction

You can query the NEMU input voltage.

II. Procedure

Execute the MML command of **DSP NEMUINV**.

10.4 Monitoring Temperature and Humidity

10.4.1 Overview

Monitoring the temperature and humidity refers to monitoring the temperature and humidity of the NodeB external environment in real time. Once the input power does not conform to the thresholds, the system reports an alarm.

10.4.2 Querying NEMU Temperature and Humidity

I. Introduction

You can monitor the cabinet ambient temperature and humidity by querying the NEMU temperature and humidity.

II. Procedure

Execute the MML command of **DSP NEMUTH**.

10.4.3 Setting Thresholds of NEMU Temperature and Humidity

I. Introduction

You can set the thresholds of the ambient temperature and humidity of the NEMU.

The NEMU measures the ambient temperature and humidity of the equipment room through the temperature and humidity sensors, and compares the measured values with the preset thresholds. If the values do not conform to the thresholds, the NEMU generates corresponding temperature and humidity alarms.

II. Procedure

Caution:

- Execute the command only when the NEMU works well.
- There must be a gap of no less than 3°C between the upper limit and the lower limit of the temperature, and a gap of no less than 5% between those of the humidity.

Execute the MML command of **MOD NEMUTHLIMIT**.

10.4.4 Querying Thresholds of NEMU Temperature and Humidity

I. Introduction

You can query the thresholds of the ambient temperature and humidity of the NEMU.

II. Procedure

Caution:

Execute the command only when the NEMU works well.

Execute the MML command of **LST NEMUTHLIMIT**.

10.5 Smoke and Anti-theft Alarms

10.5.1 Overview

You can monitor whether there is smoke, fire or theft in the equipment room in real time with the smoke and anti-theft alarms.

10.5.2 Clearing NEMU Smoke and Enclosure Alarms

I. Introduction

You can clear the NEMU smoke and enclosure alarms.

II. Procedure

Execute the MML command of **CLR NEMUALM**.

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Chapter 11 141 Test

11.1 About This Chapter

This chapter describes how to test the NodeB RF performance through the LMT, including

- Overview
- Setting Cell Parameters
- UL 141 Test
- DL 141 Test

11.2 Overview

11.2.1 Introduction to 141 Test

The 141 test is based on the 3GPP TS25.141 protocol, which tests the NodeB RF performance.

The 141 test mainly depends on the self-test of the equipment. This means the functional test and index test of the equipment are completed by the built-in test modules such as the software module and hardware module.

The 141 test needs external devices to set up a test environment before the NodeB carries services. The 141 test applies to preliminary RF performance acceptance in the initial phase of NodeB.

The 141 test on the NodeB include

- UL 141 Test
- DL 141 Test

11.2.2 Precautions

Be cautious about the following items before a 141 test:

- External devices are required for the test because it cannot be done on the NodeB alone.

Note:

For details of setting up compatible test environment and operating other devices, see relevant RF test guides.

- You need to disconnect the NodeB with the RNC before the 141 test. In that case the NodeB cannot carry services. Try to avoid this test on a running NodeB.
- It is recommended to finish this test before the NodeB starts to carry services.
- To ensure normal services on the NodeB, reset the NodeB after the 141 test.

You can get the 141 test result as shown on the **141 test** tab page in the output area.

11.3 Setting Cell Parameters

I. Introduction

Before a 141 test, select the cell to be tested and then the test item.

The system sets up a channel according to the test item and other specified parameters. You need to set part of the parameters manually.

II. Prerequisite

None.

III. Procedure

To set the cell parameters, proceed as follows:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.

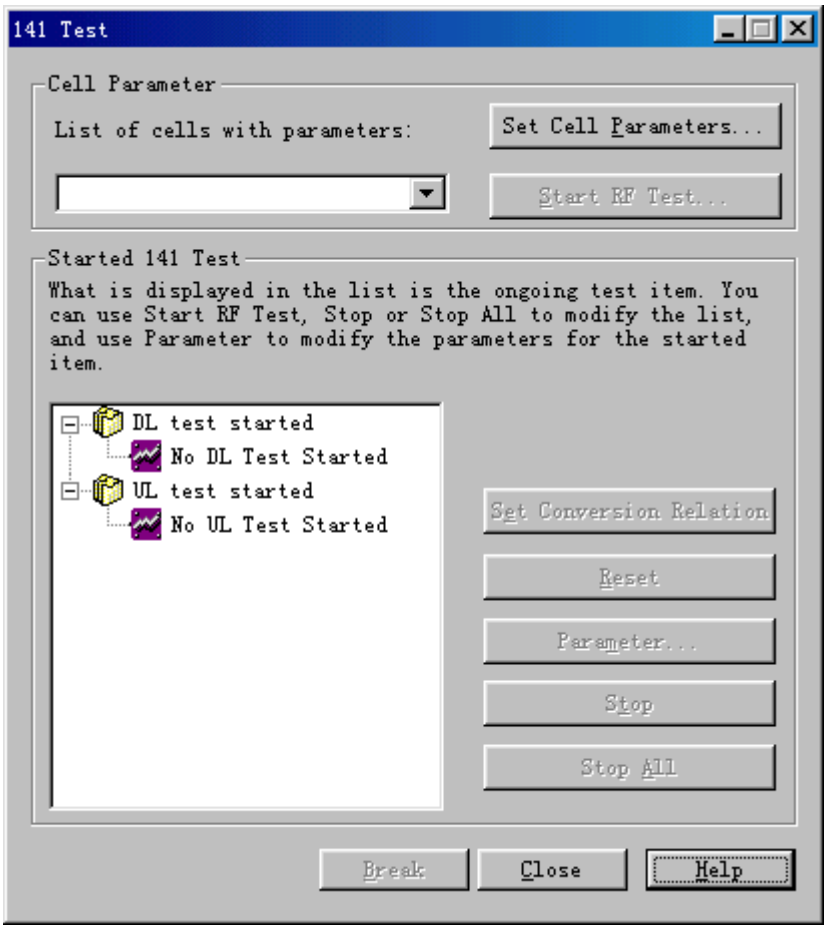

Figure 11-1 141 Test dialog box

Table 11-1 describes the fields of the **141 Test** dialog box.

Table 11-1 Field description of 141 Test dialog box

Field	Description
List of cells with parameters	To list the cells set with parameters.
Set Cell Parameters…	By clicking this button, you can set the parameters of a cell or modify the preset parameters for a cell.
Start RF Test…	This button is applicable only when cell parameters have been set. By clicking this button you can start an RF 141 test.

Field	Description
Started 141 Test	There are two nodes in this pane: • DL test started • UL test started The subnodes respectively display the started UL and DL test items. The information in this pane is automatically refreshed.
Set Conversion Relation	The TPC commands in the UL need to be transferred to the DL in test of power control steps of the DL 141 test. Therefore, you need to set relations between the UL channel and the DL channel before the test. By clicking this button, you can set relations between the UL and the DL channels before starting the test of power control steps.
Reset	By clicking this button, you can reset the reported information during the UL 141 test.
Parameter	By choosing an item under test and clicking this button, you can query parameters of that item. It is only available in modifying some parameters for the total dynamic range test in the DL 141 test. For other tests, you can only query other than modify the parameters by clicking this button.
Stop	By choosing an item under test and clicking this button, you can stop that item.
Stop All	By clicking this button, you can stop all the test items under test.
Close	By clicking this button, you can close the dialog box.

3) Click **Set Cell Parameters** in the dialog box. The system displays **Cell Parameters** dialog box as shown in Figure 11-2.

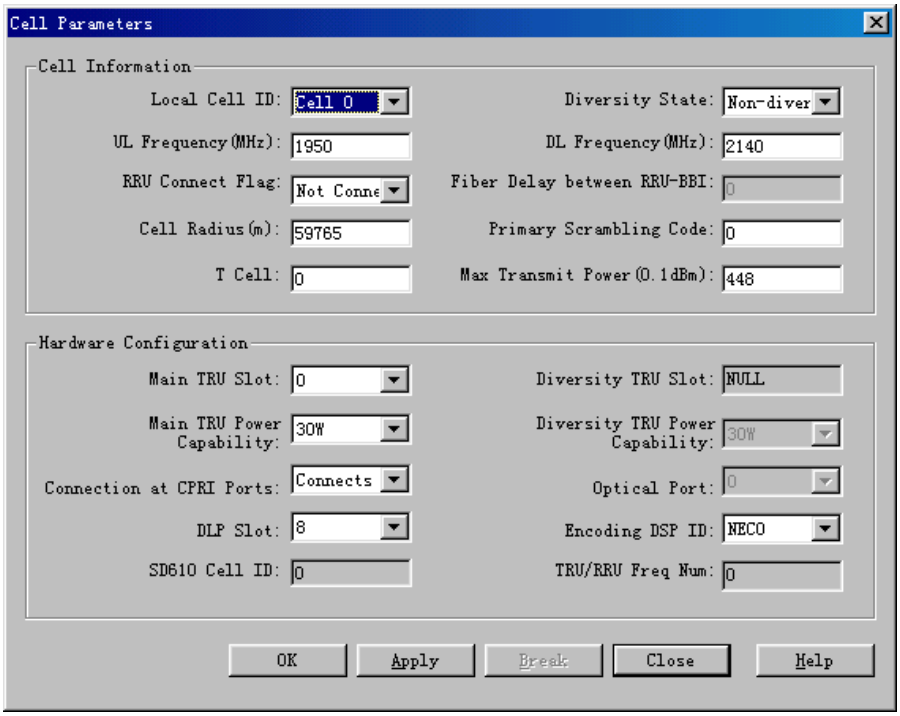

Figure 11-2 Cell Parameters dialog box (macro NodeB)

Table 11-2 describes the fields of the **Cell Parameters** dialog box of the macro NodeB.

Table 11-2 Field description of Cell Parameters dialog box

Field	Description
Local Cell ID	Value range: Cell 0 to Cell 11
Diversity State	Value range: Non-diversity, Diversity
UL Frequency (MHz)	Value range: 400.0 to 2500.0 Unit: MHz
DL Frequency (MHz)	Value range: 400.0 to 2500.0 Unit: MHz
RRU Connect Flag	whether the RRU is connected or not Be sure to select **Connected with RRU** when an RRU is configured.
Fiber Delay between RRU-BBI	The delay caused by optical fibers between the BBI and the RRU When the space between the BBI and the RRU is greater than three meters, connect them through optical fibers. When you select **RRU Connect Flag** -> **Not Connected with RRU**, the value is unavailable.

Field	Description
Cell Radius (m)	Value range: 150 to 180000 Unit: meter
Primary Scrambling Code	Value range: 0 to 511 Default value: 0 Unit: Chip
T Cell	Value range: 0 to 9 Default value: 0 Unit: 256Chip
Max Transmit Power (0.1dbm)	Value range: 0 to 50 dBm Precision: 0.1 dBm
Main TRU Slot	To set the Tx main channel for the cell • When you select **Diversity State** -> **Diversity**, the value of the Tx main channel for that cell is 0, 2, 4. • When you select **Diversity State** -> **Non-diversity**, the value of the Tx channel for that cell is 0, 1, 2, 3, 4, 5.
Diversity TRU Slot	To set the Tx diversity channel for the cell • When you select **Diversity State** -> **Diversity**, it will be dimmed as 1. • When you select **Diversity State** -> **Non-diversity**, it will be dimmed as **NULL**.
Main TRU Power Capability	The PA specification in the main MTRU The value must be consistent with the MTRU type. Value range: 30 W, 40 W.
Diversity TRU Power Capability	It refers to the PA specification in the diversity MTRU. • When you select **Diversity State** -> **Diversity**, the value is either 30 W or 40 W, which is decided by the MTRU type. • When you select **Diversity State** -> **Non-diversity**, the value is not available.
Connection at CPRI Ports	The connection between the MTRU and HBBI Value range: Connects to NBBI0 only, Connects to NBBI1 only, Connects to both NBBI0 and NBBI1
Optical Port	Unavailable value: 0
DLP Slot	To set the number of the slot that hosts the HDLP/NDLP and HBBI which contain encoding DSPs Value range: 0, 1, 8, 9 0 and 1 indicate the HBBI while 8 and 9 indicate the HDLP/NDLP.

Field	Description
Encoding DSP ID	One HDLP/NDLP contains three encoding DSPs. One HBBI Contains one encoding DSP. Each encoding DSP supports up to two cells. • When you set the **DLP Slot** as 0 or 1, the value can be NEC0 only. • When you set the **DLP Slot** as 8 or 9, the value can be NEC0, NEC1 or NEC2.
SD610 Cell ID	Unavailable value: 0
TRU/RRU Freq Num	Unavailable value: 0

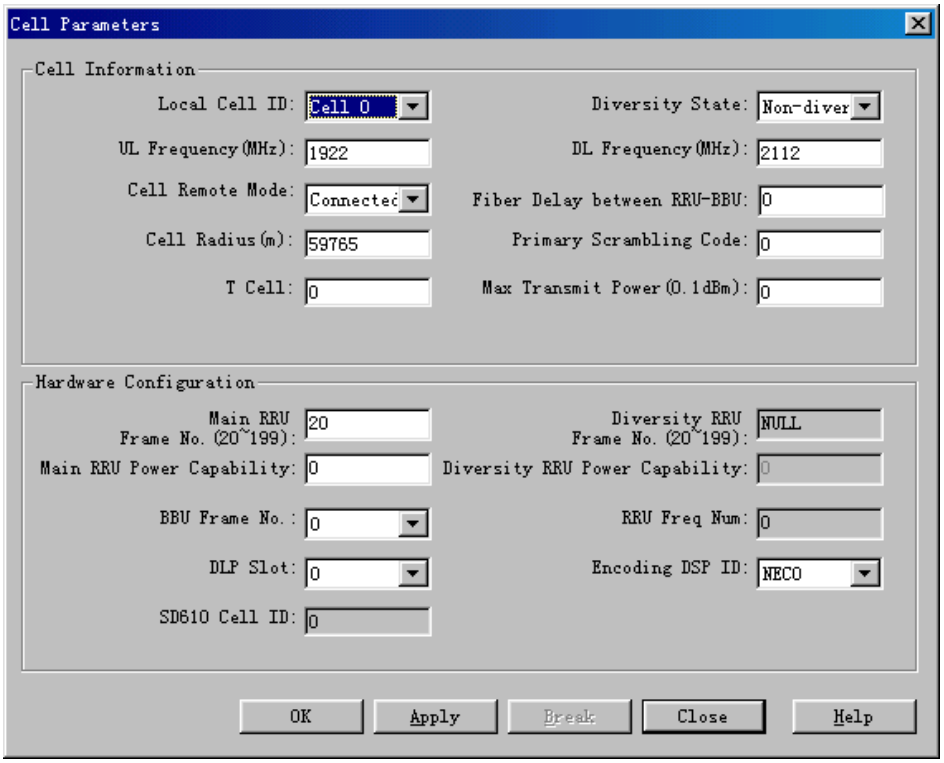

Figure 11-3 Cell Parameters dialog box (DBS3800)

Table 11-3 describes the fields of the **Cell Parameters** dialog box of the DBS3800.

Table 11-3 Cell Parameters dialog box of DBS3800

Field	Description
Local Cell ID	Value range: Cell 0 to Cell 2
Diversity State	Value range: Diversity, Non-diversity

Field	Description
UL Frequency (MHz)	Value range: 400.0 to 2500.0 Unit: MHz
DL Frequency (MHz)	Value range: 400.0 to 2500.0 Unit: MHz
Cell Remote Mode	To decide whether to use the remote mode Be sure to select **Connected with RRU** when an RRU is configured.
Fiber Delay between RRU-BBU	It refers to the delay caused by optical fibers between the BBU and RRU. When the space between the BBU the RRU is greater than three meters, connect them through optical fibers.
Cell Radius (m)	Value range: 150 to 180000 Unit: MHz
Primary Scrambling Code	Value range: 0 to 511 Default value: 0 Unit: Chip
T Cell	Value range: 0 to 9 Default value: 0 Unit: 256Chip
Max Transmit Power (0.1 dBm)	Value range: 0 to 50.0 dBm Precision: 0.1 dBm
Main RRU Frame No. (20~199)	Value range: 20 to 199
Diversity RRU Frame No. (20~199)	• When you select **Diversity State** -> **Diversity**, the default value is 21. • When you select **Diversity State** -> **Non-diversity**, the value is dimmed as NULL.
Main RRU Power Capability	It refers to the PA specifications in the main RRU. The value must be consistent with the RRU type.
Diversity RRU Power Capability	It refers to the PA specifications in the diversity RRU. • When you select **Diversity State** -> **Diversity**, the value must be consistent with the RRU type. • When you select **Diversity State** -> **Non-diversity**, the value is unavailable as 0.
BBU Frame No.	Default value: 0
RRU Freq Num	Unavailable value: 0.
DLP Slot	Default value: 0

Field	Description
Encoding DSP ID	Default value: NEC0
SD610 Cell ID	Unavailable value: 0.

4) Set the parameters for the cell to be tested in the dialog box.
5) Click **OK** and return to the **141 Test** dialog box.

Then the **Start RF Test…** button becomes available.

11.4 UL 141 Test

11.4.1 Introduction to UL 141 Test

The UL 141 test is to test the RF performance of the NodeB Rx channels. During the test, the NodeB sets up UL channels between the boards of MTRU, HBBI and HULP (NULP).

According to different UL channels, the UL 141 test is divided into

- UL DPCH 141 test
- UL RACH 141 test
- UL HS-DPCCH 141 test

The test process is as follows:

1) Use a signal generator to transmit signals for the UL 141 test. For any type of 141 test, the NodeB only receives and displays the measured BER/BLER values on the LMT interface.
2) Adjust the transmitted signals until the BER/BLER values meet the RF performance requirements.
3) Record the data measured.

Then you get the test result. You can verify the result with the 3GPP TS25.141 protocol.

The UL 141 test items include

- Reference receive sensitivity
- Dynamic range of received signals
- Adjacent channel selectivity
- Blocking feature
- Intermodulation feature
- Rx spurious emissions
- Internal BER/BLER verification

During the test, select different test items for different NodeB RF performance. For details, see the 3GPP TS25.141 protocol.

11.4.2 Testing UL DPCH

I. Introduction to UL DPCH Test

Before a UL DPCH test, the NodeB runs as follows:

1) Decide whether the test mode is Diversity Test, Main Test or Main/Diversity on the MTRU/MRRU.
2) Close the channels not in use.
3) Establish channels between UL processing units according to preset parameters.
4) Start the UL DPCH test.

II. Prerequisite

You have set the cell parameters related to this test.

III. Procedure

Follow the steps below to test the UL DPCH:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.

Click **Start RF Test…**.

The **141 test type** dialog box opens up as shown in Figure 11-4.

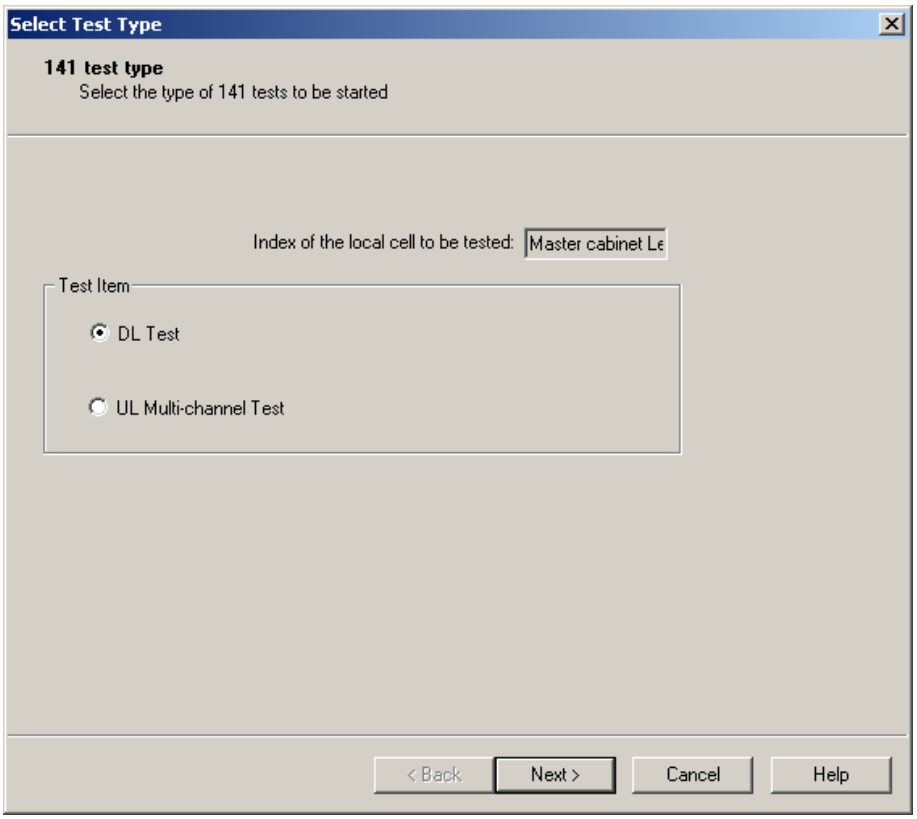

Figure 11-4 141 test type dialog box

3) Choose **UL Multi-channel Test** in the dialog box.
4) Click **Next**.
   The **UL Test Item** dialog box opens up as shown in Figure 11-5.

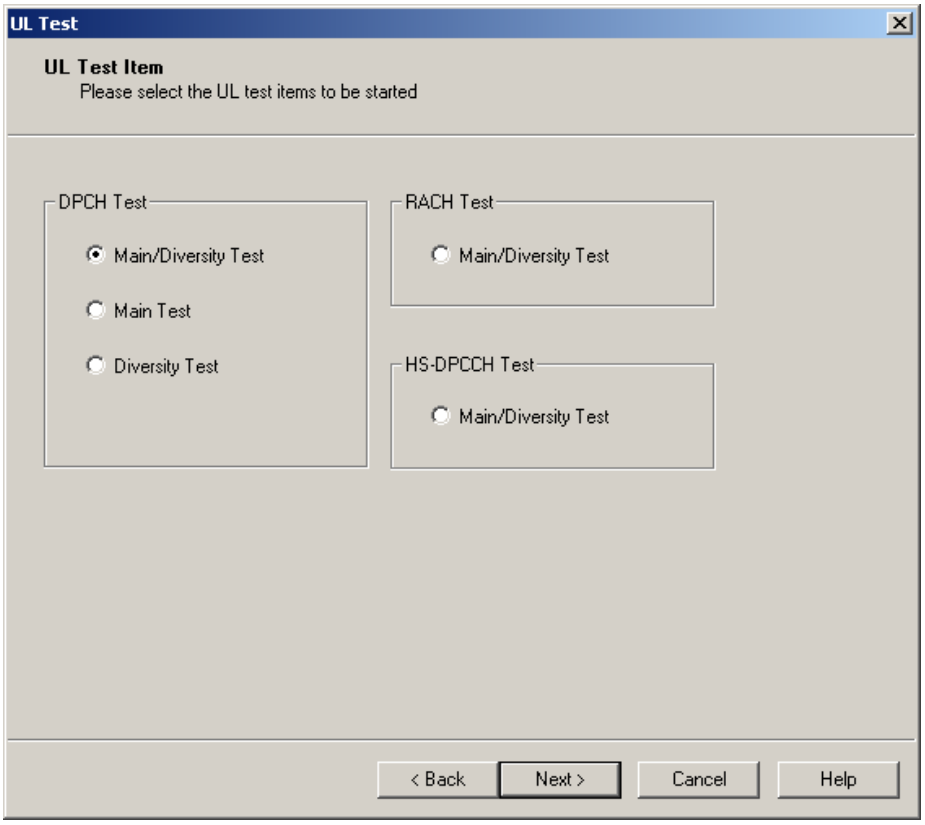

Figure 11-5 UL Test Item dialog box

5) Choose **Main/Diversity Test**, **Main Test** or **Diversity Test** under DPCH Test in the dialog box.

Click **Next**.

The **Test Parameter** dialog box opens up as shown in Figure 11-6.

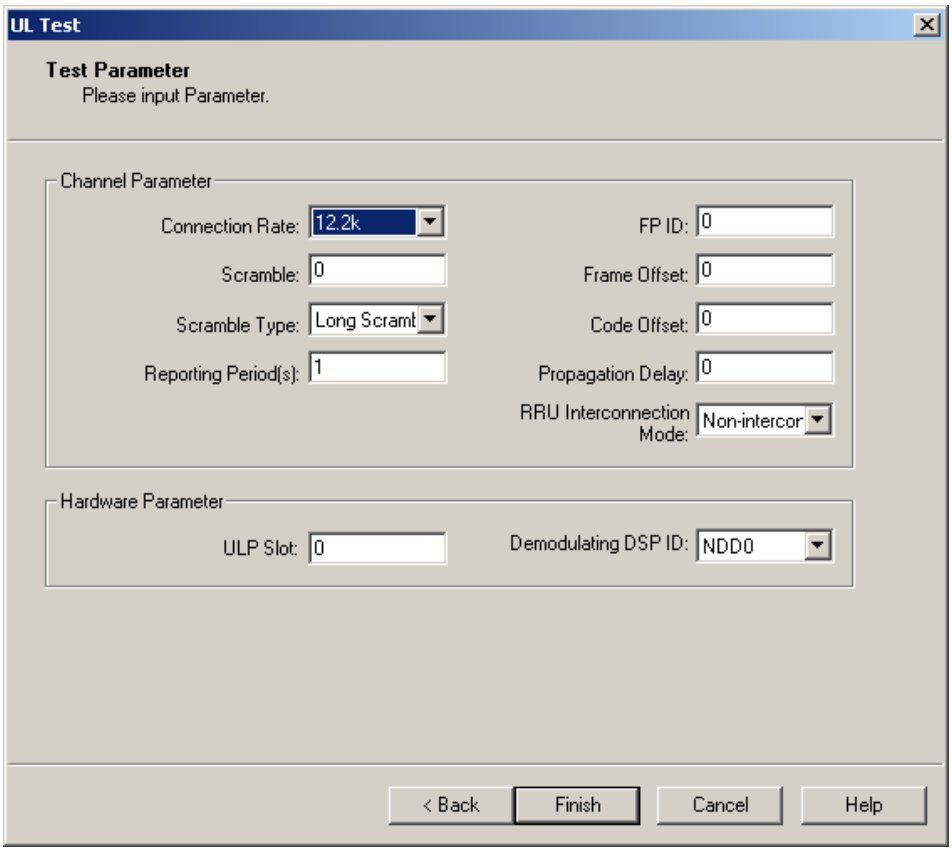

Figure 11-6 Test Parameters dialog box (UL DPCH 141 test)

Table 11-4 describes the fields of the **Test Parameter** dialog box (UL DPCH test).

Table 11-4 Field description of Test Parameter dialog box (UL DPCH test)

Field	Description
Connection Rate	• To set the service bit rate of the channel • Value range: 12.2 kbit/s, 64 kbit/s, 144 kbit/s, 384 kbit/s
FP ID	Value range: 0 to 499
Scramble	Value range: 0 to 16777215
Frame Offset	Value range: 0 to 255
Scramble Type	Value range: Long Scramble, Short Scramble
Code Offset	Value range: 0 to 38399
Reporting Period(s)	• To set the reporting period of test result • Value range: 1 to 255
Propagation Delay	Value range: 0 to 255

Field	Description
RRU Interconnection Mode	Value range: Non-interconnection Mode, Interconnection Mode
ULP Slot	• To set the number of the slot that hosts the HULP (and/or NULP) and HBBI which contain demodulating DSPs. • Value range: 0 to 7 • 0 and 1 indicate the HBBI while 2 to 7 indicate the HULP (and/or NULP).
Demodulating DSP ID	• One HULP (and/or NULP) has two demodulating DSPs. One HBBI has one demodulating DSP. • When you set the **ULP Slot** as 0 or 1, this value can be **Demodulating NDD0** only. • When you set the **ULP Slot** as any number from 2 to 7, this value can be **Demodulating NDD0** or **Demodulating NDD1**.

6) Set the parameters in the dialog box.
7) Click **Finish**.
   A UL DPCH test is started. You are presented with the **141 Test** dialog box. A **DPCH Test** subnode is added under the **UL test started** node at the same time.
8) Adjust the transmitted signals until the BER/BLER values displayed on **Test Output** meet the NodeB RF performance requirements.
9) Record the test results.
10) Select the **DPCH Test** subnode under **UL test started**. Then click **Stop**.

The test is stopped and the **DPCH Test** subnode is deleted.

IV. Analysis of UL DPCH Test Results

Compare the test results under different test environments with technical specifications in the 3GPP TS25.141 protocol. If the results comply with the technical specifications, the system passes the UL DPCH test.

11.4.3 Testing UL RACH

I. Introduction to UL RACH 141 Test

Before a UL RACH test, the NodeB runs as follows:

1) Choose the test mode of **Main/Diversity Test** on the MTRU/MRRU.
2) Establish channels on UL processing units according to preset parameters.
3) Start the UL RACH test.

II. Prerequisite

You have set the cell parameters related to this test.

III. Procedure

Follow the steps below to test the UL RACH 141:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **UL Multi-channel Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **UL Test Item** dialog box opens up as shown in Figure 11-5.
6) Choose **Main Diversity Test** under **RACH Test** in the dialog box.
7) Click **Next** in the dialog box.
   The **Test Parameter** dialog box opens up as shown in Figure 11-7.

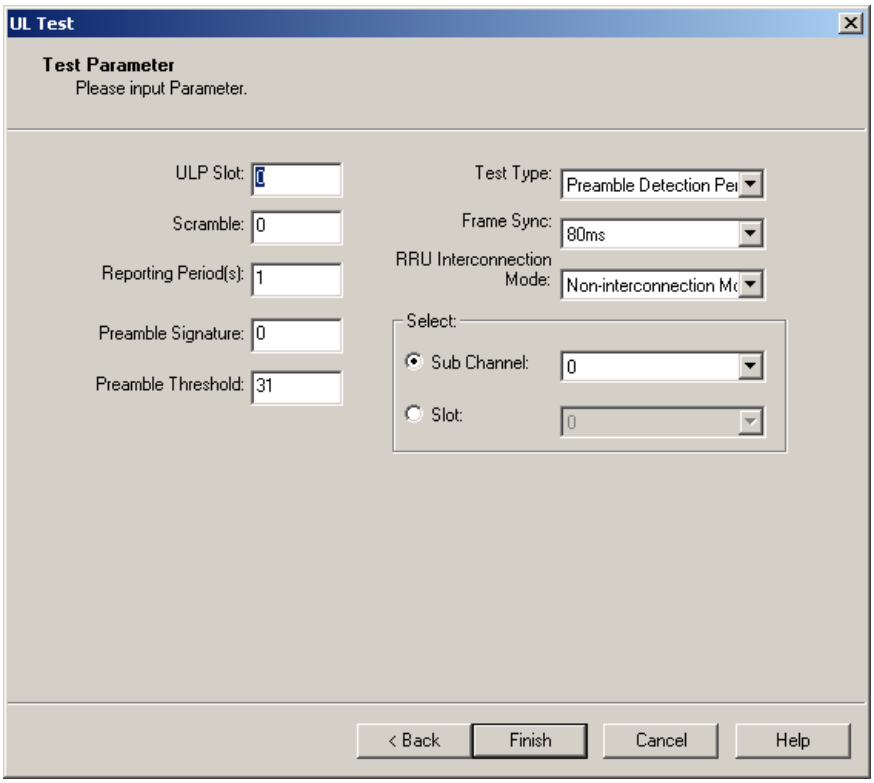

Figure 11-7 Test Parameter dialog box (UL RACH test)

Table 11-5 describes the fields of the **Test Parameter** dialog box (UL RACH test).

Table 11-5 Field description of Test Parameter dialog box (UL RACH test)

Field	Description
ULP Slot	• To set the number of the slot that hosts the HULP (and/or NULP) and HBBI which contain the demodulating DSPs • Value range: 0 to 7 • 0 and 1 indicate the HBBI while 2 to 7 indicate the HDLP/NDLP.
Scramble	Value range: 0 to 8191
Reporting Period(s)	• To set the reporting period of the test result • Value range: 1 to 255
Preamble Signature	Value range: 0 to 15
Preamble Threshold	Value range: 27 to 35
Test Type	Value range: Preamble Detection Performance, Message Demodulation Performance • Preamble Detection Performance test: measures the capture performance of RACH preamble, including false alarm rate and detection rate. • Message Demodulation Performance test: measures the RACH message demodulation performance. The demodulation performance refers to that on messages after the system detects the access of a subscriber.
Frame Sync	• To set the intervals of frame synchronization signals output by NMPT • Value range: 20 ms, 40 ms, 80 ms
RRU Interconnection Mode	Value range: Non-interconnections Mode, Interconnection Mode
Sub Channel	• If you select **Sub Channel**, **Slot** is unavailable. • If you select **Sub Channel**, the test will have to be conducted in the sub channel mode. The test device has to support the test in this mode. • Value range: 0 to 11, ALL
Slot	• If you select **Slot**, **Sub Channel** is unavailable. • If you select **Slot**, the test will have to be conducted in the time slot mode. The test device has to support the test in this mode. • Value range: 0 to 14, ALL

8) Set the parameters in the dialog box.

9) Click **Finish**.

A UL DPCH test is started. You are presented with the **141 Test** dialog box. A **RACH Test** subnode is added under the **UL test started** node at the same time.

10) Adjust the transmitted signals until the BER/BLER values meet the NodeB RF performance requirements.
11) Record the test results.
12) Select the **RACH Test** subnode under **UL test started**. Then click **Stop**.

The test is stopped and the **RACH Test** subnode is deleted.

IV. Analysis of UL RACH Test Results

Compare the test results under different test environments with technical specifications in the 3GPP TS25.141 protocol. If the results comply with the technical specifications, the system passes the UL RACH test.

11.5 DL 141 Test

11.5.1 Introduction to DL 141 Test

The DL 141 test is to test the RF performance of the NodeB Tx channels. During the test, the encoding DSPs in the HDLP/NDLP establish radio channels with specified parameters according to different test modes.

Table 11-6 shows the relations between test items and test modes of DL 141 test.

Table 11-6 Relations between test items and test modes of DL 141 test

Test item	Test mode
Max Transmit Power	Test mode 1
CPICH Power Accuracy	Test mode2
Frequency Error	Test mode4
Transmit Intermodulation	Test mode 1
IPDL Time Mask	Test mode 1
Power Control Steps	Test mode 2
Power Control Step or Dyn Range	Test mode 2
Total Dynamic Range	Test mode 4
Occupied Bandwidth	Test mode 1
Spurious Emission	Test mode 1
Spectrum Emission Mask	Test mode 1
Adjacent Channel Leakage Power ratio	Test mode 1
Modulation Accuracy	Test mode 4
Peak Code Domain Error	Test mode 3

Different test modes correspond to different feature channels. The system automatically establishes a feature channel for each test item based on the corresponding test mode.

For details of the test mode, see technical specifications of the 3GPP TS25.141 protocol.

11.5.2 Testing Max Transmit Power

I. Introduction to Max Transmit Power Test

The maximum transmit power of NodeB is the average power of each carrier at the antenna connector under certain conditions.

The max transmit power test is to test the difference between the maximum transmit power and the rated transmit power of the NodeB within the entire frequency bands under test.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a power meter.

III. Procedure

Follow the steps below to test the max transmit power:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.

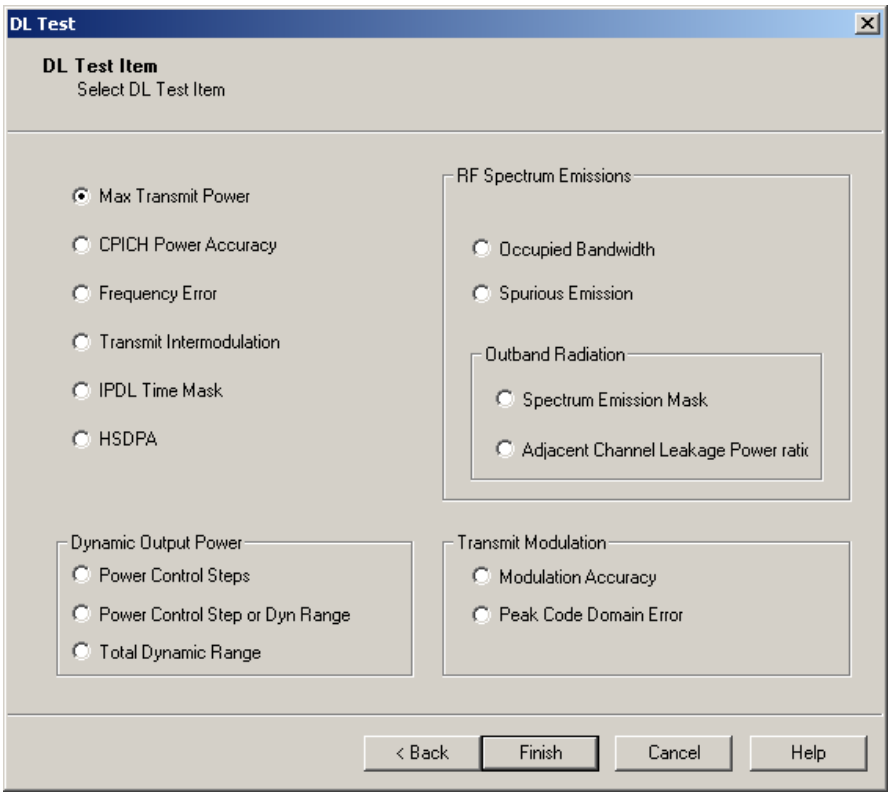

Figure 11-8 DL Test Item dialog box

6) Choose **Max Transmit Power** in the dialog box.
7) Click **Finish**.
   A DL max transmit power test is started. You are presented with the **141 Test** dialog box. A maximum transmit power test subnode is added under **DL test started** at the same time.
8) Read and record the test result from the power meter.
9) Select the Max Transmit Power test subnode under DL test started. Then click Stop.

The max transmit power test is stopped and the **Max Transmit Power test** subnode is deleted.

IV. Analysis of Max Transmit Power Test Result

Under normal test environment, the NodeB maximum transmit power is within ±2 dB of the NodeB rated transmit power.

11.5.3 Testing CPICH Power Accuracy

I. Introduction to CPICH Power Accuracy Test

The common pilot channel (CPICH) power accuracy refers to the deviation between the ordered channel power and the pilot channel power measured at the antenna interface. The CPICH power is a reference parameter for cell planning. This reference parameter is broadcast to each UE through the DL BCH channel.

The CPICH power accuracy test is to verify the deviation between the ordered channel power and the pilot channel power measured at the antenna interface.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare an RF signal tester.

III. Procedure

Follow the steps below to test the CPICH power accuracy:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **CPICH Power Accuracy** in the dialog box.
7) Click **Finish**.
   A DL CPICH power accuracy test is started. You are presented with the **141 Test** dialog box. A **CPICH Power Accuracy Test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the RF signal tester.
9) Select the **CPICH Power Accuracy Test** subnode under **DL test started**. Then click **Stop**.

The CPICH power accuracy test is stopped and the **CPICH Power Accuracy Test** subnode is deleted.

IV. Analysis of CPICH Power Accuracy Test Result

Under normal test environment, the measured CPICH power shall be within ±2.1 dB of the ordered absolute value.

11.5.4 Testing Frequency Error

I. Introduction to Frequency Error Test

Frequency error is the measure of the difference between the assigned frequency and the actual NodeB transmit frequency. It is required to use the same source for both the NodeB RF frequency and the data clock generation.

The frequency error test is to test the accuracy of the NodeB transmit frequency.

II. Prerequisite

You have set the cell parameters related to this test.

III. Procedure

Follow the steps below to test the frequency error:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Frequency Error** in the dialog box.
7) Click **Next** in the dialog box.
   The **DL test parameter** dialog box opens up as shown in Figure 11-9.

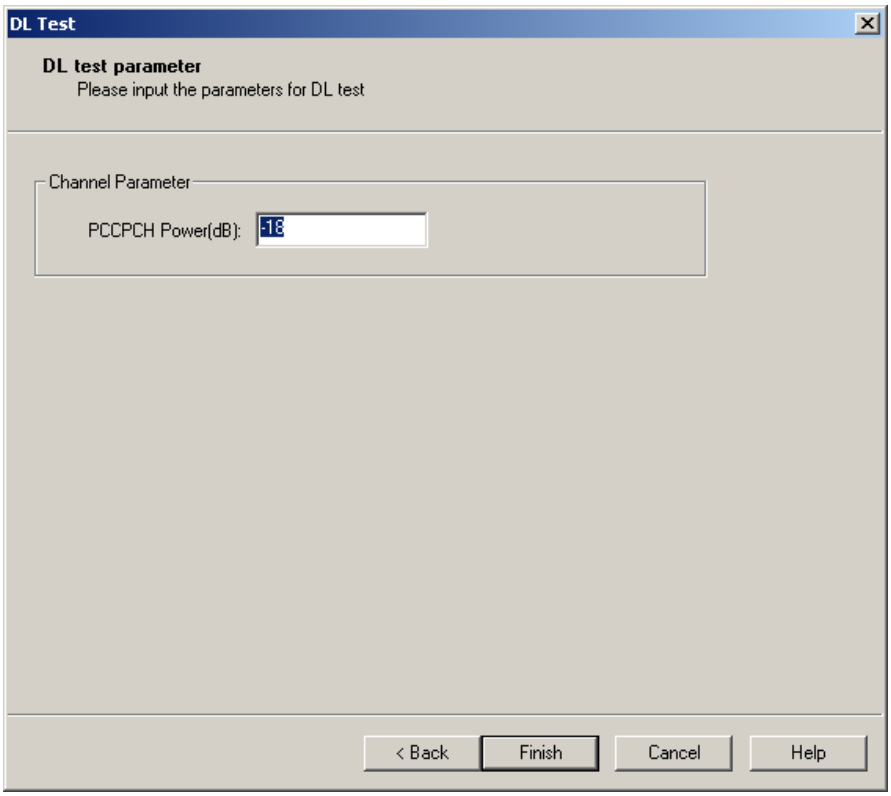

Figure 11-9 DL test parameter dialog box (frequency error test)

Table 11-7 describes the fields of the DL test parameter dialog box (frequency error test).

Table 11-7 Field description of DL test parameter dialog box (frequency error test)

Field	Description
PCCPCH Power(dB)	To set the deviation from the maximum cell transmit power Value range: –3 dB to –44 dB

8) Set the parameters in the dialog box.
9) Click **Finish**. A frequency error test is started. You are presented with the **141 Test** dialog box. A **Frequency Error Test** subnode is added under **DL test started** at the same time.
10) Read and record the test result from the tester.
11) Select the **Frequency Error Test** subnode under **DL test started**. Then click **Stop**. The frequency error test is stopped and the **Frequency Error Test** subnode is deleted.

IV. Analysis of Frequency Error Test Result

Under normal test environment, the difference between measured transmit frequency and actual transmit frequency is within ±0.05 ppm.

11.5.5 Testing Transmit Intermodulation

I. Introduction to Transmit Intermodulation Test

Transmit intermodulation performance is a measure of the capability of the transmitter to inhibit the generation of signals in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter through the antenna.

The test is to verify the ability of the NodeB transmitter to restrict the generation of intermodulation products in its non linear elements caused by presence of the wanted signal and an interfering signal reaching the transmitter via the antenna to below specified levels

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare an RF signal tester.

III. Procedure

Follow the steps below to test the transmit intermodulation:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Transmit Intermodulation** in the dialog box.
7) Click **Finish**.
   A transmit intermodulation test is started. You are presented with the **141 Test** dialog box. A **Transmitter Intermodulation Test** subnode is added under **DL test started** at the same time.
8) Select the cell to be tested under **List of cells with parameters** of the **141 Test** dialog box.
9) Read and record the test result from the tester.

10) Select the **Transmit Intermodulation test** subnode under **DL test started**. Then click **Stop**.

The test is stopped and the **Transmit Intermodulation test** subnode is deleted.

IV. Analysis of Transmit Intermodulation Test Result

Interference signals are generated through NodeB. You can generate one more test signal in another cell with the procedure above, and inject the signal into the cell under test as interference signal through external test devices.

The power of the interference WCDMA signal shall be 30 dB lower than that of the wanted signal. The frequency of the interference WCDMA signal shall be 5 MHz, 10 MHz and 15 MHz offset below the first or above the last carrier frequency used.

Under normal test environment, the spectrum emission mask, ACLR and spurious emissions shall meet the technical specifications defined in the protocol in case of inverse intermodulation interference.

11.5.6 Testing IPDL Time Mask

I. Introduction to IPDL Time Mask Test

Idle period of DL (IPDL) refers to the idle period of DL signal. During IPDL, the NodeB shuts down all the DL channels temporarily to minimize interference to the UE during measuring DL signals in different cells. Therefore, the accuracy of measurement for DL signals in neighboring NodeBs is improved.

The IPDL time mask test is to check whether the power active/idle suppression of NodeB DL signals meets requirements during the test time specified by IPDL.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a power meter.

III. Procedure

Follow the steps below to test the IPDL time mask:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.

4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **IPDL Time Mask** in the dialog box.
7) Click **Finish**.
   An IPDL time mask test is started. You are presented with the **141 Test** dialog box. An **IPDL Time Mask test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **IPDL Time Mask test** subnode under **DL test started**. Then click **Stop**.

The IPDL time mask test is stopped and the **IPDL Time Mask Test** subnode is deleted.

IV. Analysis of IPDL Time Mask Test Result

There are two items of the IPDL time mask test:

- idle time
- power active/idle suppression

The results of the test items must be consistent with the corresponding requirement.

11.5.7 Testing Power Control Steps

I. Introduction to Power Control Steps Test

Inner loop power control in the DL is the transmission ability of the NodeB transmitter. It adjusts the DL transmitter output power according to the corresponding TPC symbols received in the UL.

The power control step is the required step change in the DL transmitter output power of a code channel in response to the corresponding power control command.

The power control step test is to verify whether the DL power control step size and response meet relevant requirements.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the power control steps:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.

2) Click **OK**.
The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start** **RF** **Test…**.
The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Power Control Steps** in the dialog box.
7) Click **Next** in the dialog box.
The **DL test parameter** dialog box opens up as shown in Figure 11-10.

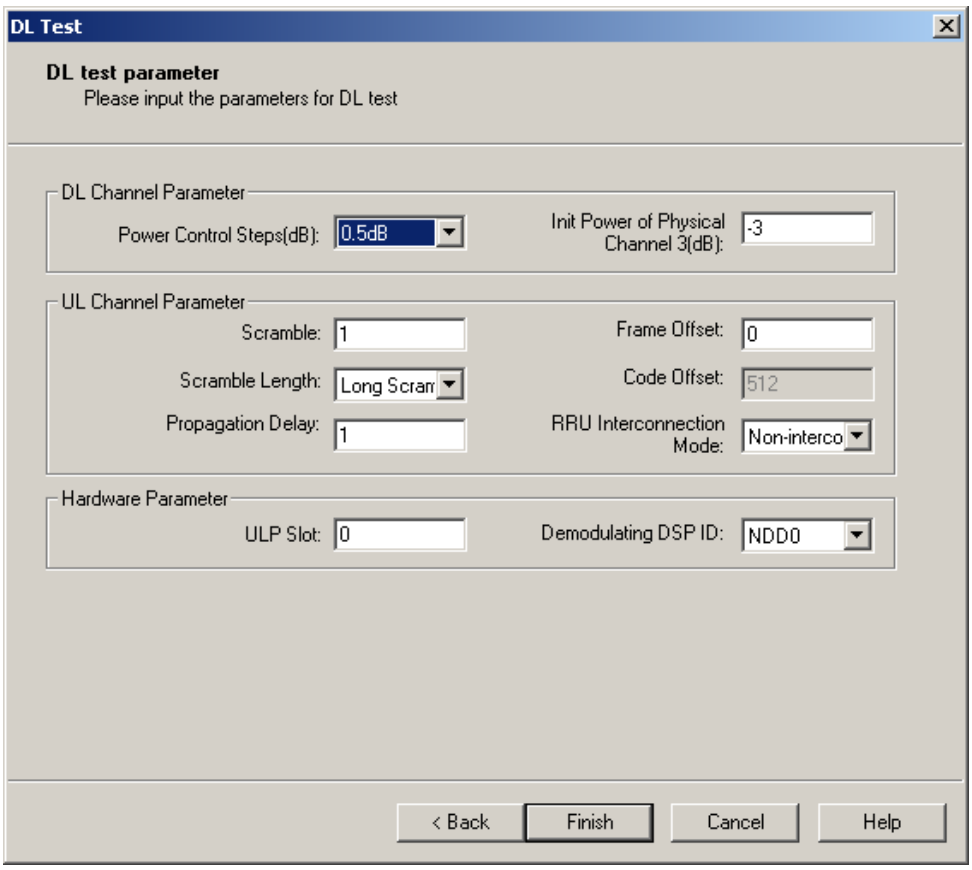

Figure 11-10 DL test parameter dialog box (power control steps test)

Table 11-8 describes the fields of the **DL test parameter** dialog box.

Table 11-8 Field description of DL test parameter (power control steps test)

Field	Description
Power Control Steps (dB)	Value range: 0.5 dB, 1 dB, 1.5 dB, 2 dB
Init Power of Physical Channel 3 (dB)	Value range: –3 dB to –45 dB
Scramble	Value range: 0 to 16777215

Field	Description
Scramble Length	Value range: Long Scramble, Short Scramble
Frame Offset	Value range: 0 to 255
Code Offset	Unavailable value: 512
Propagation Delay	Value range: 0 to 255
RRU Interconnection Mode	Value range: Non-interconnection Mode, Interconnection Mode
ULP Slot	To set the number of the slot that hosts the HULP (and/or NULP) and HBBI which contain the demodulating DSPs Value range: 0 to 7 0 and 1 indicate the HBBI while 2 to 7 indicate the HDLP/NDLP.
Demodulating DSP ID	One HULP (and/or NULP) has two demodulating DSPs. One HBBI has one demodulating DSP. When you set the **ULP Slot** as 0 or 1, the value can be NEC0 only. When you set the **ULP Slot** as any number from 2 to 7, the value can be NEC0 or NEC1.

8) Set the parameters in the dialog box.
9) Click **Finish**.
   A power control steps test is started. You are presented with the **141 Test** dialog box. A **Power Control Step test** subnode is added under **DL test started** at the same time.
10) Read and record the test result from the tester.
11) Select the **Power Control Step test** subnode under **DL test started**. Then click **Stop**.

The power control steps test is stopped and the **Power Control Step test** subnode is deleted.

IV. Analysis of Power Control Steps Test Result

Perform Up/Down tests based on different power control steps. The power changes by 1 dB after one power control with the power step of 1 dB. The power changes by 10 dB after 10 power controls with the power step of 1 dB. The same is true for the power step of 0.5 dB.

Under normal test environment, the measured power control steps must satisfy Table 11-9 (single step) and Table 11-10 (10 consecutive steps).

Table 11-9 Power control step requirements (single step)

TPC Command in DL	Transmitter Power Control Step Tolerance			
	1 dB Step		0.5 dB Step	
	Lower	Upper	Lower	Upper
Up (TPC command **1**)	+0.5 dB	+1.5 dB	+0.25 dB	+0.75 dB
Down (TPC command **0**)	–0.5 dB	–1.5 dB	–0.25 dB	–0.75 dB

Table 11-10 Power control step requirements (10 consecutive steps)

TPC Command in DL	Transmitter Combined Output Power Change Tolerance after 10 Consecutive Equal Commands (Up or Down)			
	1 dB Step		0.5 dB Step	
	Lower	Upper	Lower	Upper
Up (TPC command **1**)	+8 dB	+12 dB	+4 dB	+6 dB
Down (TPC command **0**)	–8 dB	–12 dB	–4 dB	–6 dB

11.5.8 Testing Power Control Step or Dynamic Range

I. Introduction to Power Control Step or Dyn Range Test

The power control dynamic range is the difference between the maximum and the minimum code domain powers of a code channel under specified conditions.

The test is to check that the power control dynamic range of the code channel meets the requirement.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the power control step or dynamic range:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.

3) Click **Start** **RF** **Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box. The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Power Control Step or Dyn Range** in the dialog box.
7) Click **Next** in the dialog box. The **DL test parameter** dialog box opens up as shown in Figure 11-11.

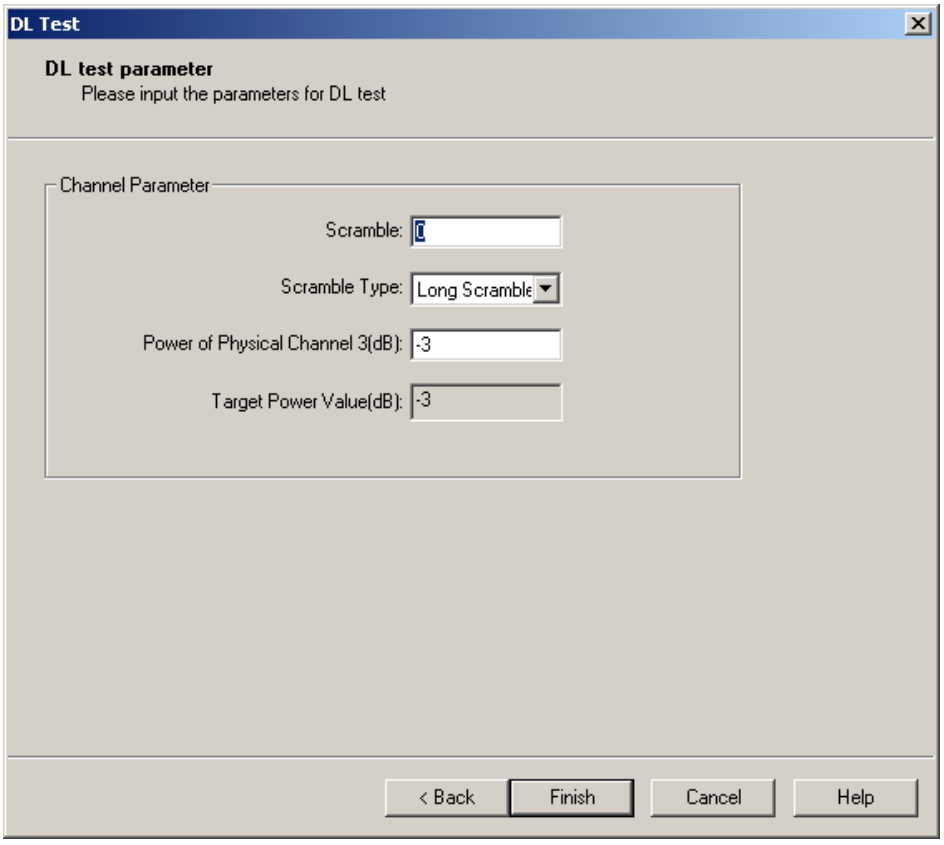

Figure 11-11 DL test parameter dialog box (power control step or dynamic range test)

Table 11-11 describes the fields of the DL test parameter dialog box (power control step or dynamic range test).

Table 11-11 Field description of DL test parameter dialog box

Field	Description
Scramble	Value range: 0 to 16777215
Scramble Type	Value range: Long Scramble, Short Scramble
Power of Physical Channel 3 (dB)	Value range: –3 dB to –45 dB

Field	Description
Target Power Value	Power change at each time Precision: 0.5 dB

8) Set the parameters in the dialog box.
9) Click **Finish**. A power control step or dynamic range test is started. You are presented with the **141 Test** dialog box. A **Power Control Step or Dynamic Range test** subnode is added under **DL test started** at the same time.
10) Record the test result from the tester as result 1.
11) Select this subnode and click **Parameter…** in the **141 Test** dialog box. You are presented with **Test Parameter** dialog box.
12) Set **Power of Physical Channel 3** to a lower value if the initial value is -3 dB or to a higher value if the initial value is －45 dB.
13) Record the test result from the tester as result 2.
14) Repeat steps 10) to 12) until the value after **Power of Physical Channel 3** reaches the other boundary, for example, －45dB. Record the results in turn.
15) Select the **Power Control Step or Dynamic Range test** subnode under **DL test** started. Then click **Stop**.

The test is stopped and the **Power Control Step or Dynamic Range test** subnode is deleted.

IV. Analysis of Power Control Step or Dynamic Range Test Result

Under normal test environment, the power control step size or dynamic range shall satisfy the following requirements:

- Maximum code domain power ≥ NodeB maximum output power –3 dB
- Minimum code domain power ≤ NodeB maximum output power –28 dB

11.5.9 Testing Total Dynamic Range

I. Introduction to Total Dynamic Range Test

Power control dynamic range is difference between the maximum and the minimum transmit output power of a code channel for a specified reference condition.

This test is to verify that the minimum power control dynamic range is meet the requirement

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test this total dynamic range:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Total Dynamic Range** in the dialog box.
7) Click **Finish**.
   A total dynamic range test is started. You are presented with the **141 Test** dialog box. A **Dynamic Range for Total Power test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the power meter.
9) Select the **Dynamic Range for Total Power test** subnode under **DL test** started. Then click **Stop**.

The test is stopped and the **Dynamic Range for Total Power test** subnode is deleted.

IV. Analysis of Total Dynamic Range Test Result

Under normal test environment, the dynamic range of total DL power, which is equal to the maximum transmit power minus minimum transmit power, is no smaller than 18 dB.

11.5.10 Testing Occupied Bandwidth

I. Introduction to Occupied Bandwidth Test

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage of 0.5% of the total mean transmitted power. Therefore, the total power in the occupied bandwidth shall be no less than 99% of the total mean transmitted power.

The test is to verify whether the occupied bandwidth of a channel meets the requirement.

II. Prerequisites

- You have set the cell parameters related to this test.

- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the occupied bandwidth:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Occupied Bandwidth** in the dialog box.
7) Click **Finish**.
   An occupied bandwidth test is started. You are presented with the **141 Test** dialog box. An **Occupied Bandwidth test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **Occupied Bandwidth test** subnode under **DL test started**. Then click **Stop**.

The test is stopped and the **Occupied Bandwidth test** subnode is deleted.

IV. Analysis of Occupied Bandwidth Test Result

Under normal test environment, the occupied bandwidth of chip rate at 3.84 Mcps shall be less than 5 MHz.

11.5.11 Testing Spurious Emission

I. Introduction to Spurious Emission Test

Spurious emissions include harmonic emission, parasitic emission, intermodulation products and frequency conversion products produced by unwanted transmitter effects. These emissions interfere in devices within other frequency bands. The test is to check that special frequency bands meet relevant standards. It is applicable to multi-carrier cases and specified frequency ranges, which are more than 12.5 MHz under the first carrier frequency used or more than 12.5 MHz above the last carrier frequency used. The detection is conducted in the true RMS level mode or in the true average level mode.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the spurious emission:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Spurious Emission** in the dialog box.
7) Click **Finish**.
   A spurious emission test is started. You are presented with the **141 Test** dialog box. A **Spurious Emission** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **Spurious Emission test** subnode under **DL test started**. Then click **Stop**.

The test is stopped and the **Spurious Emission test** subnode is deleted.

IV. Analysis of Spurious Emission Test Result

Spurious emission test categories include **Category A**, **Category B**, **protection of special frequency band**. The settings of RF signal tester vary with the test categories.

Under normal test environment, the test result must satisfy Table 11-12, Table 11-13 and Table 11-14.

Table 11-12 Spurious emission requirements (Category A)

Band	Max level	Measurement bandwidth
9 kHz to 150 kHz	-13 dBm	1 kHz
150 kHz to 30 MHz		10 kHz
30 MHz to 1 GHz		100 kHz
1 GHz to 12.75 GHz		1 MHz

Table 11-13 Spurious emission requirements (Category B)

Band	Max level	Measurement bandwidth
9 kHz to 150 kHz	–36 dBm	1 kHz
150 kHz to 30 MHz		10 kHz
30 MHz to 1 GHz		100 kHz
1 GHz to Max (fc1-60 MHz, 2100 MHz	–30 dBm	1 MHz
Max (fc1-60 MHz, 2100 MHz) to Max (fc1-50 MHz, 2100 MHz)	–25 dBm	1 MHz
Max (fc1-50 MHz, 2100 MHz) to Min (fc2+50 MHz, 2180 MHz)	–15 dBm	1 MHz
Min (fc2+50 MHz, 2180 MHz) to Min (fc2+60 MHz, 2180 MHz)	–25 dBm	1 MHz
Min (fc2+60 MHz, 2180 MHz) to 12.75 GHz	–30 dBm	1 MHz

Table 11-14 Spurious emission requirements (protection of special frequency band)

Band description	Band	Max level	Measurement bandwidth
Receive band	1920 MHz to 1980 MHz	–96 dBm	100 kHz
Co-existing with GSM900	921 MHz to 960 MHz	–57 dBm	100 kHz
GSM900 BTS co-located with UTRS NodeB	876 MHz to 915 MHz	–98 dBm	100 kHz
Co-existing with DSC1800	1805 MHz to 1880 MHz	–47 dBm	100 kHz
DSC1800 BTS co-located with UTRS NodeB	1710 MHz to 1785 MHz	–98 dBm	100 kHz
Co-existing with PHS	1893.5 MHz to 1919.6 MHz	–41 dBm	300 kHz
Co-existing with services in adjacent frequency bands	2100 MHz to 2105 MHz	–30+3.4 (f-2100 MHz)	1 MHz
Co-existing with services in adjacent frequency bands	2175 MHz to 2180 MHz	–30+3.4 (2180MHz-f)	1 MHz

11.5.12 Testing Spectrum Emission

I. Introduction to Spectrum Emission Mask Test

Emissions shall not exceed the maximum level for the appropriate NodeB maximum output power, in the frequency range from Df =2.5 MHz to f_offsetmax from the carrier frequency. These level requirements form a spectrum emission mask.

The test is to verify the out-of-band spectrum leakage of the NodeB.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the spectrum emission:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Spectrum Emission Mask** in the dialog box.
7) Click **Finish**.
   A spectrum emission mask test is started. You are presented with the **141 Test** dialog box. A **Spectrum Output Template test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **Spectrum Output Template test** subnode under **DL test started**. Then click **Stop**.

The test is stopped and the **Spectrum Output Template test** subnode is deleted.

IV. Analysis of Spectrum Emission Mask Test Result

Under normal test environment, the test result must satisfy the technical specifications in protocol of 3GPP TS25.141.

11.5.13 Testing ACLR

I. Introduction to ACLR Test

Adjacent channel leakage power ratio (ACLR) is the ratio of the transmitted power within the specified carrier frequency band to the mean power leaked into the adjacent carrier band.

The test is to verify whether the adjacent channel leakage power radio meets the requirements for adjacent channel interference.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the ACLR:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose Adjacent Channel Leakage Power ratio in the dialog box.
7) Click **Finish**.
   An ACLR test is started. You are presented with the **141 Test** dialog box. An **Adjacent Channel Leakage Power ratio test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **Adjacent Channel Leakage Power ratio test** subnode under **UL test** started. Then click **Stop**.

The test is stopped and the Adjacent Channel Leakage Power ratio test subnode is deleted.

IV. Analysis of ACLR Test Result

Under normal test environment, the ACLR test result must satisfy Table 11-15.

Table 11-15 ACLR requirements

NodeB channel offset below first or above last carrier frequency used	ACLR limit
5 MHz	> 45 dB
10 MHz	> 50 dB

Note:

- Matched filter used the filter (Root Raised Cosine and roll-off 0.22) with a noise power bandwidth equal to the chip rate.
- The detection is conducted either in the true RMS level mode or in the true average level mode. Measure the ACLR for 5 MHz and 10 MHz offsets on both sides of channel frequency.

11.5.14 Testing EVM

I. Introduction to EVM Test

Error vector magnitude (EVM) shows the difference between the reference waveform and the measured waveform.

In this manual, EVM refers to the modulation accuracy.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the modulation accuracy:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.
2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.

6) Choose **Modulation Accuracy** in the dialog box.
7) Click **Next** in the dialog box.
   The **DL test parameter** dialog box opens up as shown in Figure 11-9.
8) Set the parameters in the dialog box.
9) Click **Finish**.
   A modulation accuracy test is started. You are presented with the **141 Test** dialog box. A **Modulation Accuracy test** subnode is added under **DL test started** at the same time.
10) Record the test result from the tester as result 1.
11) Select this subnode and click **Parameter…** in the **141 Test** dialog box. You are presented with **Test Parameter** dialog box.
12) Change **PCCPCH Power** into another boundary value in the dialog box.
13) Repeat step 9). Record the test result from the tester as result 2.
14) Select the **Modulation Accuracy test** subnode under **DL test started**. Then click **Stop**.

The modulation accuracy test is stopped and the **Modulation Accuracy test** subnode is deleted.

IV. Analysis of EVM Test Result

Compare two test results with standard values. Under normal test environment, the EVM shall be smaller than 17.5%.

11.5.15 Testing PCDE

I. Introduction to PCDE Test

The code domain error (PCDE) is calculated by projecting the error vector onto the code domain. It is expressed in dB. The PCDE is defined as the maximum value of the code domain error for all codes at a specific spreading factor.

The test is to discover and limit inter-code cross-talk.

II. Prerequisites

- You have set the cell parameters related to this test.
- You need to prepare a signal generator.

III. Procedure

Follow the steps below to test the PCDE:

1) Choose **Maintenance Navigator** -> **Test Management**. Then double-click the **141 Test** subnode.
   A dialog box opens up for your confirmation.

2) Click **OK**.
   The system displays the **141 Test** dialog box as shown in Figure 11-1.
3) Click **Start RF Test…**.
   The **141 test type** dialog box opens up as shown in Figure 11-4.
4) Choose **DL Test** in the dialog box.
5) Click **Next** in the dialog box.
   The **DL Test Item** dialog box opens up as shown in Figure 11-8.
6) Choose **Peak Code Domain Error** in the dialog box.
7) Click **Finish**.
   A peak code domain error test is started. You are presented with the **141 Test** dialog box. A **Peak Code Domain Error test** subnode is added under **DL test started** at the same time.
8) Read and record the test result from the tester.
9) Select the **Peak Code Domain Error test** subnode under **DL test started**. Then click **Stop**.

The test is stopped and the **Peak Code Domain Error test** subnode is deleted.

IV. Analysis of PCDE Test Result

Under normal test environment, the peak code domain error must be smaller than –33 dB at spreading factor 256.

Table of Contents

Chapter 12 Managing NodeB Clock

12.1 About This Chapter

This chapter presents knowledge of the NodeB clock and means of maintaining the clock.

12.2 Overview of NodeB Clock

12.2.1 Principle of Clock

The NodeB clock module is mounted on the NMPT to provide timing signals for the NodeB. Under normal conditions, the NodeB clock works in the phase-lock mode. It keeps precision by tracing the assigned high-precision reference clock source.

There are three reference clock sources for the NodeB:

- Iub interface clock
- GPS clock
- External clock

Only one clock synchronization mode is available at the same time.

When the NodeB clock synchronization source is faulty, the NodeB works in free-run mode. This enables the NodeB clock to run for another 90 days.

12.2.2 Center Frequency DA Value

The center frequency value is also called center DA value. When the NodeB is in normal operation, the master clock frequency is about 10 MHz, which is output from the Oven Controlled Crystal Oscillator (OCXO) in the NMPT. Fine tuning on the main clock frequency can be realized by adjusting voltage on the OCXO. The quantized value of the voltage corresponding to the exact 10 MHz is referred to as the center frequency DA.

12.2.3 Current Frequency DA Value

The current frequency DA value is also referred to as current DA value.

- When the NodeB clock works in the free-run mode, the current DA value is the same as the center DA value.

- When the NodeB is using a reference clock source, the current DA value of the NodeB clock synchronizes with the frequency of the clock source. Namely, the current DA value is adjusted according to the frequency difference of the clock source during the software phase-locking.
- If the external clock source stays locked for seven consecutive days, it shows that the clock source is stable. In that case, the clock module shall overwrite the center DA value with the current DA value. Upon resetting the NMPT or the NodeB, the current DA value shall be overwritten with the center DA value.

12.2.4 Initial DA Value

The initial DA value is the center frequency DA value preset in the NMPT before its delivery. When the NodeB is started for the first time, this value is written into the configuration file as the center frequency DA value. Therefore, the initial DA value can be regarded as the center frequency DA value preset before the NodeB delivery.

12.3 Querying Clock Status

12.3.1 Overview of Querying Clock Status

You can query the following clock status:

- Current clock status
- History clock status

12.3.2 Introduction to Clock Status

I. Current Clock Status

The current clock status may include:

- Configured clock source
- Configured clock source status
- Configured work mode
- Current work mode
- Clock status
- Center DA
- Current DA
- Original DA

II. History Clock Status

The history clock status may include:

- Time

- Clock Status
- Current DA
- Center DA

12.3.3 Querying Current Clock Status

I. Introduction

You can query the current clock status to

- Know the running status of the NodeB clock
- Check the clock modifications
- Check whether the clock needs to be maintained

II. Prerequisite

None.

III. Procedure

Follow the steps below to query the current clock status:

1) Select the NMPT on the equipment panel.

Note:

For the DBS3800, select the MBBU/HBBU on the equipment panel.

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2) Right-click on the NMPT.
   A shortcut menu opens up.
3) Select **Display Current Clock Status**.
   The **Query Result** dialog box opens up as shown in Figure 12-1 and Figure 12-2.

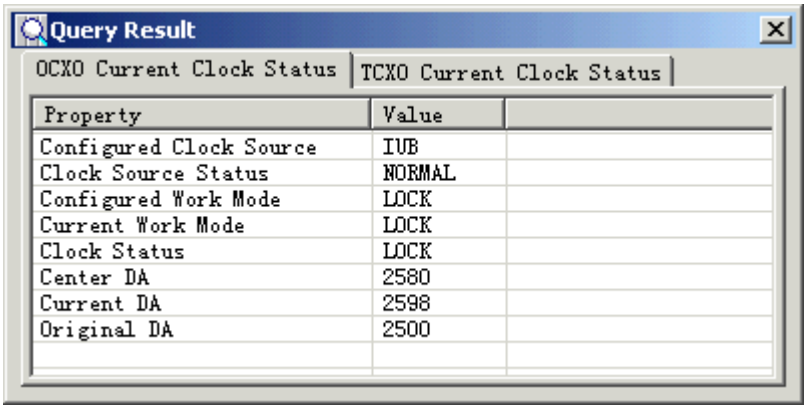

Figure 12-1 OCXO Current Clock Status in Query Result dialog box

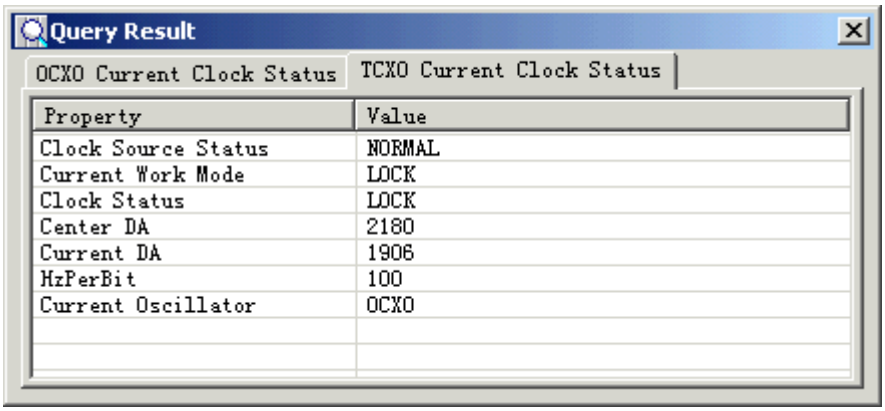

Figure 12-2 TCXO Current Clock Status in Query Result dialog box

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Note:

For the macro NodeB,

- You can query the current clock status only when the active and standby NMPTs work well.
- You can query the clocks on the active and standby NMPTs which are independent from each other.
- In the query result, parameters for the active and standby NMPTs may be inconsistent except for those in the clock source and clock status.

For the DBS3800, you can query the current clock status only when the MBBU or HBBI works well.

Note:

You can query the current NodeB clock status by the MML command of **DSP CURRCLK**.

12.3.4 Querying History Clock Record

I. Introduction

You may query the history clock record to know the change in current frequency DA value. The history clock record stores details about changes of the clock DA value.

II. Prerequisite

None.

III. Procedure

You can query the history clock status by the MML command of **LST CLKRECORD**.

12.4 Managing NodeB Clock Source

12.4.1 Overview

Managing the clock source refers to

- Setting NodeB clock work mode
- Setting NodeB clock source
- Testing NodeB clock source quality

12.4.2 Introduction to NodeB Clock Source

The NodeB needs to lock to an external clock to calibrate its master clock frequency. Then the external clock is the clock source.

There are three clock sources available for the NodeB, including

- Iub interface clock source: It is the default setting by the system. The NodeB extracts clock signals from the Iub interface between NodeB and RNC as its reference clock source.
- External clock source: The NodeB locks to a 2.048 MHz external clock as its reference clock source. The clock source can be a BITS clock or a clock at the synchronous interface of the SDH equipment.
- GPS clock source: The NodeB uses the clock signals generated from the GPS receive card built in the NMPT as its reference clock source.

12.4.3 Setting NodeB Clock Work Mode

I. Introduction

⚠ **Caution:**

- This operation causes faults easily.
- Do Not execute this command without Huawei technical support.

The NodeB clock work modes include lock mode and free mode.

- The clock work mode can be set to "lock" only when there is an external reference clock source.

- When the clock work mode is "free", the NodeB clock works in the free-run mode and the clock source does not work.
- If the clock source is faulty and needs calibrating, set the work mode into the free mode and then calibrate the frequency value to the center frequency DA value. This action is usually performed together with actions in subsection 12.5.4 "Setting NodeB Clock Current Frequency ".
- You need to set the NodeB clock work mode before setting the current frequency value.

II. Prerequisite

Be sure to set the clock work mode one minute after the NodeB initialization.

III. Procedure

You can modify the NodeB clock work mode by the MML of **MOD CLKMODE** only.

12.4.4 Setting NodeB Clock Source

I. Introduction

The NodeB needs to lock to an external clock to calibrate its master clock frequency. Then the external clock is the clock source.

You must select a proper clock source for the NodeB before it starts running. The system automatically locks to the clock source after setting the clock source. There is no need for other manual settings.

II. Prerequisites

Be cautious about the following items before you set the clock source:

- To use the Iub interface clock or GPS clock, make sure the clock source is available.
- To use the GPS clock, make sure there is a GPS card on the NMPT. If there is a GPS card, execute the MML command of **DSP GPS** to check whether the GPS clock source is available. You can set the clock source only when the GPS clock source is available.
- To use the Iub interface clock, set the Iub interface and the Iub interface board from which the NodeB extracts clock signals. And then check the settings by the MML commands of **DSP IUBCLK**, **ADD IUBCLK** and **RMV IUBCLK**.

III. Procedure

You can set the reference clock source by the MML command of **MOD CLKSRC**.

12.4.5 Testing NodeB Clock Source Quality

See section 9.6 "Clock Test".

12.5 Setting NodeB Clock Frequency

12.5.1 Overview

Setting the NodeB clock frequency includes

- Setting NodeB Clock Center Frequency
- Setting NodeB Clock Current Frequency

12.5.2 Introduction to Clock Frequency Values

For details, see 12.2.2 "Center Frequency DA Value", 12.2.3 "Current Frequency DA Value" and 12.2.4 "Initial DA Value".

12.5.3 Setting NodeB Clock Center Frequency

I. Introduction

⚠ **Caution:**

- This operation causes faults easily.
- Do Not execute this command without Huawei technical support.

The center frequency DA value has been written into each NMPT before delivery. The value is the initial DA value. In most cases, there is no need to set the NodeB clock center frequency on site.

You need to set the center frequency under the following occasions:

- When you adjust the NodeB clock before the NodeB starts to carry services
- When the clock is faulty

II. Prerequisite

None.

III. Procedure

You can set the clock center frequency by the MML command of **MOD CENTERDA**.

12.5.4 Setting NodeB Clock Current Frequency

I. Introduction

Caution:

- This operation causes faults easily.
- Do Not execute this command without Huawei technical support.

This operation helps calibrate the clock. You can use this command to change the current DA value until it reaches the standard value. When the value meets requirements, you need to execute the MML command of **MOD CENTERDA** to rewrite the center frequency DA value.

II. Prerequisite

Set the NodeB clock work mode at first. See 12.4.3 "Setting NodeB Clock Work Mode".

III. Procedure

You can set the current frequency of the master cabinet clock by the MML command of **MOD CURRDA**.

Note:

For the DBS3800, set the current frequency of the NodeB clock with this command.

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Chapter 13 Managing NodeB Cells

13.1 About This Chapter

This chapter describes knowledge of the NodeB cell and means of managing the cell.

13.2 Overview

13.2.1 Local Cell and Logical Cell

A local cell is an integration of physical resources (hardware and software resources) of a cell in NodeB. The local cell relates to the implementation of a device. Local cells are configured on and managed by the NodeB.

A logical cell is a standard logical model of cell radio resources controlled by an RNC. It is independent from the implementation of the NodeB local cell. Logical cells are configured on and managed by the RNC.

One logical cell corresponds to one local cell.

13.2.2 Cell Radius and Handover Radius

Definitions of cell radius and handover radius are as follows:

- Cell Radius: refers to the access radius of a cell, that is, radius of the coverage area. A UE in the coverage area of a cell can access the cell in theory.
- Handover Radius: refers to the radius where a UE is handed over from the source cell to the target cell. The inner handover radius is defined to avoid resources waste by preventing frequent handover of the UE between the margins of the two cells. The UE is handed over only when the UE oversteps the inner handover radius.

Relations between the cell radius and the handover radius are as follows:

- The cell radius refers to the cell outer handover radius. It is greater than the cell inner handover radius. The area between the two radiuses is the handover area of the cell.
- There is overlap between the access radiuses of two cells. This prevents call drops during the UE handover and ensures cell breathing.
- There is no overlap between the inner handover radiuses of two cells. This ensures an area for handover.

- There shall be an overlapped area between the inner handover radius of the source cell and the access radius of the target cell. Handover is not available in this area to reduce the handover area between two cells and avoid frequency handover.

13.2.3 Cell Status

There are the following categories of cell status.

I. Local Cell Status

The local cell status consists of

- Local Cell Unavailable-All Resource fault
- Local Cell Unavailable-RF and Baseband Interface Resource fault
- Local Cell Unavailable-RF and Baseband Resource fault
- Local Cell Unavailable-RF Resource fault
- Local Cell Unavailable-Baseband and Baseband Interface Resource fault
- Local Cell Unavailable-Baseband Interface Resource fault
- Local Cell Unavailable-Baseband Resource fault
- Local Cell Available-NCP fault
- Local Cell Available

II. Cell Operation Status

- Enable: The logical cell has been set up and ready for use.
- Disable: The logical cell is not available.

III. Cell Administration Status

- Unblocked: The cell is not blocked. It works normally. You can block a cell in this state.
- Shutting down: It is a transitional state before the RNC delivers a block response. The RNC delivers a block response only after a period or after the cell is idle.
- Blocked: The cell has been blocked. You can unblock a cell in this state.

13.2.4 Blocking Cell

There are three modes to block a cell:

- High: blocking now
- Normal: blocking by schedule
- Low: blocking when resources are idle

High is of the highest priority at the risk of partial service loss.

If you select Normal, you may specify a period (1 to 3600 s). During this period, the cell no longer carries new services. After this period, the system blocks the cell even if it is carrying service.

Low is of the lowest priority. In this mode, the system blocks the cell only when the cell does not carry service.

13.3 Querying Cell Configuration

13.3.1 Overview of Cell Configuration Query

Querying cell configuration includes:

- Querying cell configuration
- Querying cell status

13.3.2 Introduction to Cell Configuration and Cell Status

I. Cell Configuration

The local cell configuration consists of

- Local cell ID
- Logical cell ID
- Site ID
- Sector ID
- Local cell radius
- Local cell inner handover radius

The logical cell configuration consists of

- Local cell ID
- Logical cell ID
- Uplink frequency (0.2 MHz)
- Downlink frequency (0.2 MHz)
- Cell max transmit power (0.1 dBm)
- Cell primary scramble code
- Cell transmit diversity indicator
- Configuration of various channels

II. Cell Status

The cell status consists of

- Local cell ID
- Local cell status
- Local cell administration status

- Logical cell ID
- Logical cell operation status
- Logical cell transmit diversity status
- Logical cell setup date
- Logical cell setup time

13.3.3 Querying Cell Configuration

I. Introduction to Cell Configuration Query

Before configuring or modifying a cell, you need to query the cell configuration to avoid incorrect configuration.

II. Prerequisite

None.

III. Procedure

- Query the local cell configuration by the MML command of **LST LOCELL**.
- Query the logical cell configuration by the MML command of **DSP CELLCFG**.

13.3.4 Querying Cell Status

I. Introduction to Cell Status Query

You can query the status of a local cell or a logical cell. The information helps you know the cell running status and maintain the cell.

II. Prerequisite

None.

III. Procedure

Query the status of the local cell and the logical cell by the MML command of **DSP LOCELL**.

13.3.5 Auditing Resources

I. Introduction to Resource Auditing

The NodeB resources may change, for example, when a board is replaced or the NodeB configuration is modified. In this case, the logical resources between the RNC and the NodeB are inconsistent.

To inform the RNC about changes in the NodeB resources in time,

1) The NodeB sends a resource audit request to the RNC.
2) Then the RNC adjusts logical resources according to audit report.

As a result,

1) Logical resources between the RNC and the NodeB are balanced.
2) The NodeB resources are fully used.

II. Prerequisite

None.

III. Procedure

Proceed with resources auditing by the MML command of **ADT RES**.

13.4 Modifying Local Cell

13.4.1 Overview of Modifying Local Cell

Modifying local cell includes

- Modifying local cell parameters
- Blocking/Unblocking a cell

13.4.2 Introduction to Cell Parameters

The cell parameter refers to the local cell radius, including

- Local cell radius
- Local cell inner handover radius

13.4.3 Modifying Local Cell Parameters

I. Introduction

To optimize the cell performance, you can modify the local cell parameters.

II. Prerequisite

None.

III. Procedure

Modify the local cell parameters by the MML command of **MOD LOCELL**.

13.4.4 Blocking/Unblocking Cell

I. Introduction

To block a cell is to

1) Transfer services on a cell to a neighboring cell.
2) Then close the Tx channels of the previous cell.

The cell resources are not available after this operation. In this way, you can maintain the faulty NodeB without interrupting services.

- After blocking the cell, the NodeB switches off the Tx channels of that cell. The logical resources related to the cell are regarded as blocked.
- After unblocking the cell, the NodeB switches on the Tx channels and restores the administration status of the cell. The cell is in service.

II. Prerequisite

None.

III. Procedure

- Block a local cell by the MML command of **BLK LOCELL**.
- Unblock a local cell by the MML command of **UBL LOCELL**.

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Chapter 14 NodeB Software Update and Data Configuration File Transfer

14.1 About This Chapter

This chapter describes software update and data configuration file transfer, including

- Upgrading NodeB Software
- Upgrading NodeB BOOTROM
- Upgrading Patches
- Downloading Data Configuration File

14.2 Overview of Software Update

In order to provide new functions or clear defects, it is necessary to upgrade the NodeB software. Such software includes

- NodeB software
- BOOTROM software
- Patches

The core to upgrade the NodeB software is to download the software and then activate it.

The NodeB supports resumable download. When you log into the LMT and double-click **Software Update** under the **Software Management** node,

- If there is a resumed download task in the software package, the system automatically displays the task status and downloading progress.
- To view the task status and downloading progress in real time, you can obtain the authority required for the control of download progress browse.
- If there is no such resumed download task, you can update the software in the **Software Update** dialog box.

14.3 Upgrading NodeB Software

14.3.1 Overview of Upgrading NodeB Software

To upgrade the NodeB software is to upgrade the NodeB software from the previous version to a new version.

Before the update, record details of the previous version and obtain the software for update.

14.3.2 Introduction to NodeB Software

The NodeB software package is a compressed file named **NodeB.pck**.

For a macro NodeB, the NAOI and the NDTI both have NodeB software for the master CPU and the slave CPU.

14.3.3 Procedure of Upgrading NodeB Software

Table 14-1 shows the procedure of upgrading the NodeB software.

Table 14-1 Procedure of upgrading NodeB software

Step	Procedure	Description	Reference
1	Backup data configuration file	• If the upgrade fails, fallback to the previous software version to ensure normal services. • This step is optional.	14.6.3 "Backing up Data Configuration File
2	Download NodeB software package	The software downloaded must be the one for upgrade.	14.3.4 "Downloading NodeB Software"
3	Activate NodeB software	To activate all the boards	14.3.6 "Activating NodeB Software"
4	Upgrade LMT	Ensure versions of the LMT and the upgraded NodeB software are consistent.	Chapter 3 "Installing LMT Software"
5	Activate board software	• Re-log into the NodeB and view the details. • Re-activate the board failed to be activated previously.	14.3.7 "Activating Board Software
6	Supply NodeB software	After you download the NodeB software as configured, the NodeB configuration changes. Then you need to download the required board software that failed to be downloaded before.	14.3.5 "Supplying NodeB Software

Step	Procedure	Description	Reference
7	Check whether the software upgrade is successful	To check whether the services are normal by viewing NodeB version, board version, board status and cell status. • If Yes, it indicates that the upgrade is successful. • If No, fallback the NodeB version to the previous version immediately. Then locate and solve the problem.	--
8	Synchronize NodeB software version	Backup the upgraded version after the NodeB runs normally for two or three days.	14.3.8 "Synchronizing Version"

Note:

- If upgrading the NodeB software fails; fallback to the previous software version. The fallback procedure is the same as the procedure of **Activate NodeB Software**. The difference is that you have to select the software version before the upgrade.
- The system integrates step 1), step 2) and step 3) into one dialog box. You can select **Upgrade NodeB Software** to perform the three steps.
- Step 4) is mandatory. The versions are inconsistent after step 3) when the NodeB is activated and reset. If you skip step 4), you cannot log into NodeB through the LMT.

14.3.4 Downloading NodeB Software

I. Introduction

To download the NodeB software is to download the NodeB software from the FTP server to the NodeB. The downloaded NodeB software in the standby file directory does not take effect immediately or damage the running software.

II. Prerequisites

- The FTP server works well and is properly connected to the NodeB in the same Intranet.
- There shall be no firewall between the FTP server and the NodeB.
- The user name and password for the specified FTP server is correct. Ensure you have the authority to read the data in the specified directory.

III. Procedure

Follow the steps below to download the NodeB software:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode. The **Software Update** dialog box opens up as shown in Figure 14-1.

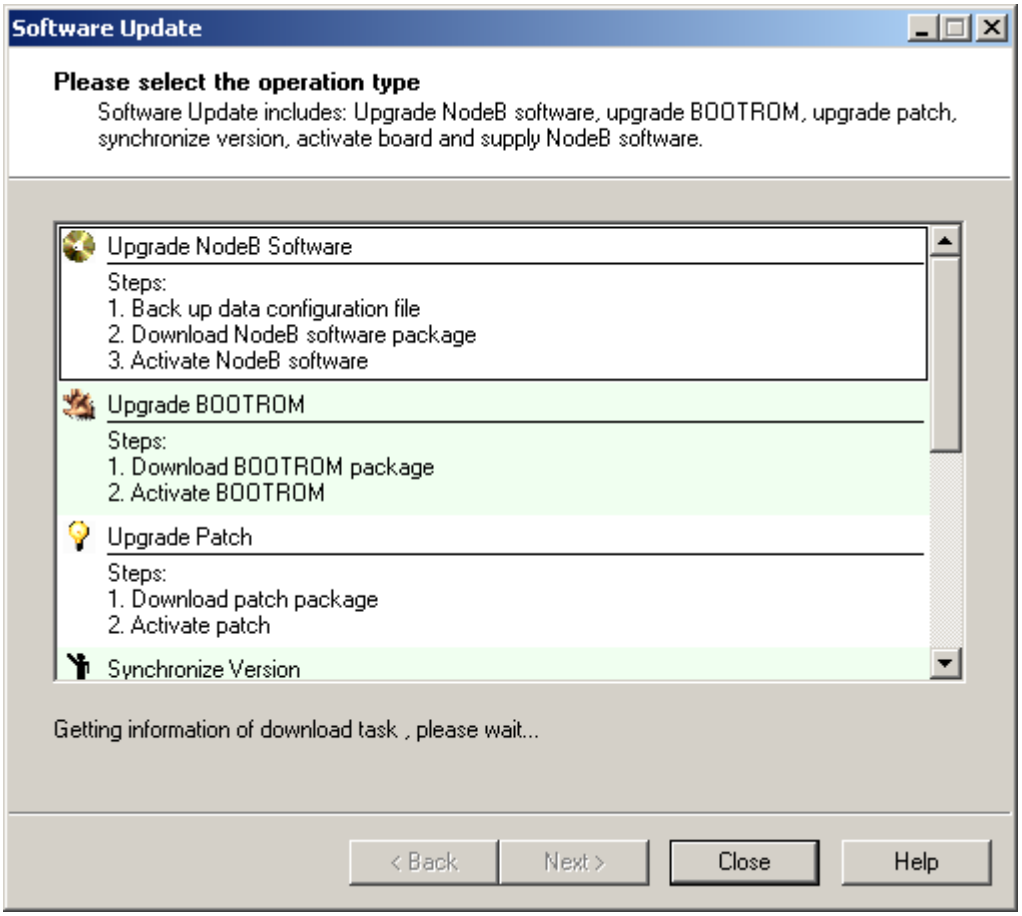

Figure 14-1 Software Update dialog box

2) Select **Upgrade NodeB Software** in the dialog box.
3) Click **Next**.
   The **Upgrade NodeB Software** dialog box opens up as shown in Figure 14-2.

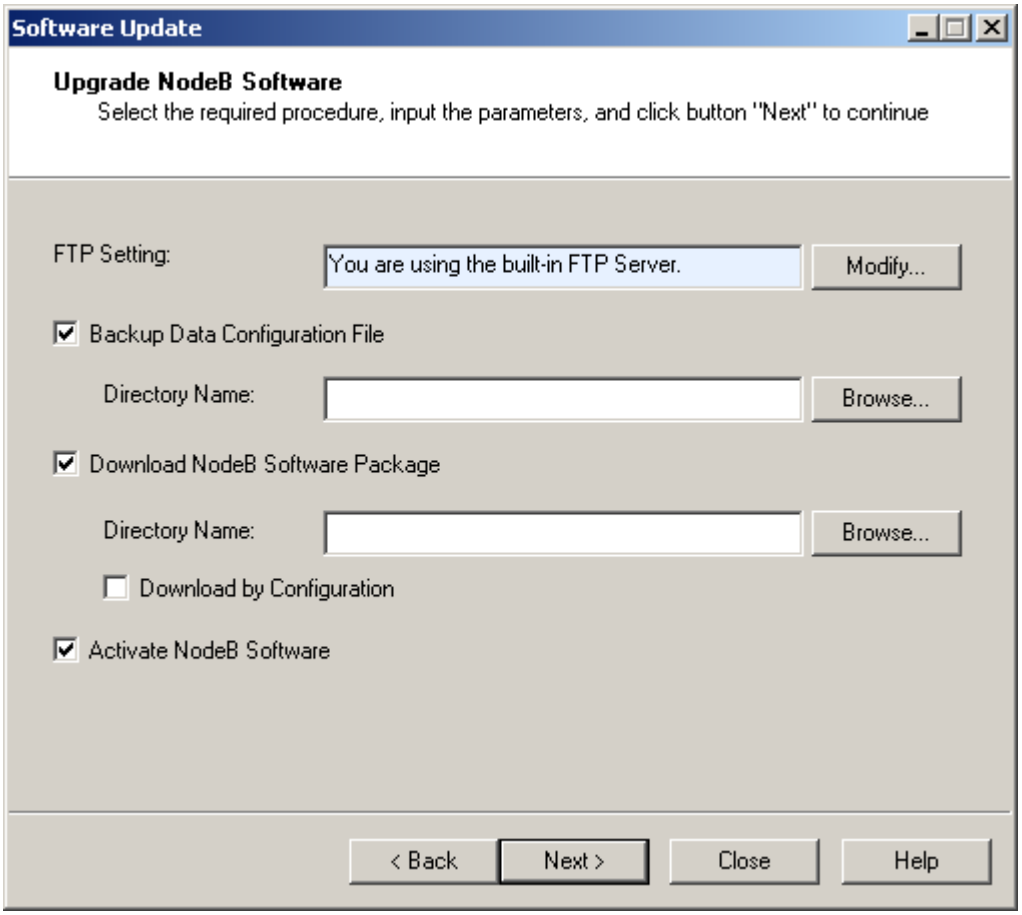

Figure 14-2 Upgrade NodeB Software dialog box

Table 14-2 describes the fields of the **Upgrade NodeB Software** dialog box.

Table 14-2 Field description of Upgrade NodeB Software dialog box

Field	Description
FTP Setting	To set the FTP Server for file download • The FTP Server in use is shown in the box for user's reference. The FPT server can be a built-in server or another type of server specified by user. • Click **Modify…** on the right to set the FTP Server.
Backup Data Configuration File	To upload the configuration file from the NodeB to the FTP Server • Click **Browse…** under **Backup Data Configuration File** to specify a directory for the file upload. • Select it to backup the active configuration file in the system. • If you have backed up the file, you may skip this step. • In case of upgrade failure, you can reload the backup configuration file in the FTP server to guarantee stable operation of the NodeB.

Field	Description
Download NodeB Software Package	To download the NodeB software package from the FTP Server to the NodeB standby directory • Click **Browse…** under **Download NodeB Software Package**. Select the directory of the package in the FTP Server. • This operation is mandatory for NodeB software upgrade. The system will start the download after backing up the configuration file. • Because the NodeB software package has a fixed filename of **NodeB.pck**, you just need to specify the path of it.
Download by Configuration	By selecting **Download by Configuration**, all wanted board software is downloaded according to the current NodeB configuration.
Activate NodeB Software	To activate NodeB software means to download the unpacked software package in the NodeB standby area to the target boards, and then activate the package. • The NodeB shall be reset after conducting this operation. • If you select both **Download NodeB Software Package** and **Activate NodeB Software**, the software to be activated is the NodeB software package downloaded from the FTP Server. There is no need to select the version. • If you select **Activate NodeB Software** without selecting **Download NodeB Software Package**, the system will list all the NodeB software versions that can be activated. Select the version to activate in the drop-down list.

🕮 **Note:**

- The system performs the above three steps in order: **Backup Data Configuration File**, **Download NodeB Software Package** and then **Activate NodeB Software**.
- You can choose one or some steps. The system shall proceed with the task customized by you.

4) Click **Modify…** in the dialog box. The **FTP Settings** dialog box opens up as shown in Figure 14-3.

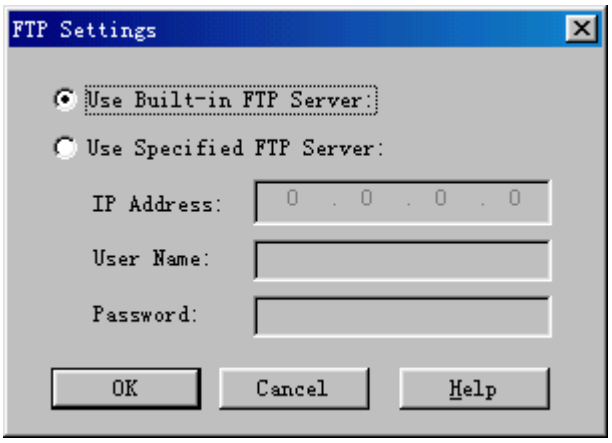

Figure 14-3 FTP Settings dialog box

Table 14-3 describes the fields of the **FTP Settings** dialog box.

Table 14-3 Field description of FTP Settings dialog box

Field		Description
Use Built-in FTP Server		• The built-in FTP server of the system is started by default. • To stop the FTP server, select **System** -> **Stop FTP Server**. • To restart the FTP server, select **System** -> **Start FTP Server**. • Select **System** -> **System Configuration** to display the **System Configuration** dialog box. Set the user name and password for the built-in FTP server.
Use Specified FTP Server	IP Address	To specify the IP address of the computer hosting the FTP server • The FTP Server can be the one started from the LMT computer or from another computer.
	User Name	To specify the user name to log into the FTP Server
	Password	To specify the password to log in to the FTP Server

5) Set parameters in the dialog box.
6) Click **OK**.
   The dialog box is closed and you are presented with the **Upgrade NodeB Software** dialog box.
7) Select **Backup Data Configuration File** to specify a directory for backing up the file.
   Select **Download NodeB Software Package** to specify a directory for downloading the NodeB software package.

🕮 **Note:**

Backup Data Configuration File is optional.

8) Click **Next**.
9) Click **Yes**.
   The **Upgrading NodeB Software Progress** dialog box opens up.

The dialog box indicates the status and progress of the upgrade procedure. You may check whether the operation is successful.

🕮 **Note:**

The NodeB file directories include

- Active directory: stores the running NodeB software version.
- Standby directory: stores the inactive NodeB software version.

14.3.5 Supplying NodeB Software

I. Introduction

When downloading the NodeB software, you may choose **Download by Configuration** in the **Upgrade NodeB Software** dialog box. If the NodeB configuration changes by adding a new board, the NodeB shall automatically download the needed board software with either method below:

- Automatically downloading the needed board software from the download path of the active NodeB software package
- Automatically downloading the needed board software from the M2000 server

If the automatic download fails, the NodeB reports a **Board Version Mismatch** alarm for your manual handling. Then you can supply the NodeB software by downloading the needed board software.

Note:

- After the board software is automatically downloaded, it shall take effect immediately without being activated.
- After you download the board software manually, the software package is stored in the NodeB active file directory and shall not take effect immediately. You need to activate the board software. See 14.3.7 "Activating Board Software".

II. Prerequisites

- There must be the source file path of the software to be downloaded. That is to say, there must be the **NodeB.pck** file under the source file path.
- The FTP server works well and is properly connected to the NodeB in the same Intranet.
- There shall be no firewall between the FTP server and the NodeB.
- The user name and password for the specified FTP server is correct. Ensure you have the authority to read the data in the specified directory.

III. Procedure

Follow the steps below to supply the NodeB software:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Supply NodeB Software** in the dialog box.
3) Click **Next**.
   The **Supply NodeB Software** dialog box opens up as shown in Figure 14-4.

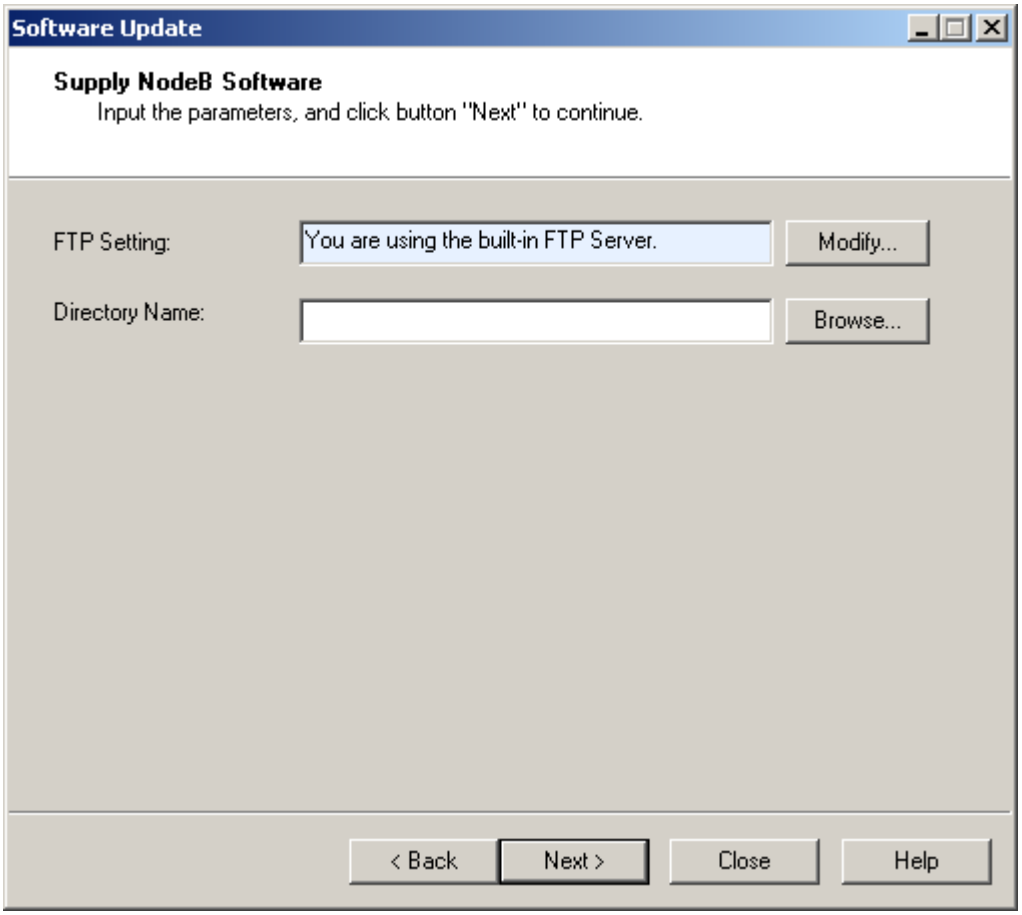

Figure 14-4 Supply NodeB Software dialog box

Table 14-4 describes the fields of the **Supply NodeB Software** dialog box.

Table 14-4 Field description of Supply NodeB Software dialog box

Field	Description
FTP Setting	To set the FTP server for the NodeB software download • The FTP server in use is shown in the box for your reference. It can be a built-in server or another type of server specified by you. • Click **Modify…** on the right to set the FTP server.
Directory Name	Click **Browse…** to select the directory of the software package in the FTP server.

4) Click **Modify…** in the dialog box.
The **FTP Settings** dialog box opens up as shown in Figure 14-3.
5) Set parameters in the dialog box.

6) Click **OK**.
The **FTP Settings** dialog box is closed and you are presented with the **Supply NodeB Software** dialog box.
7) Click **Browse**.
Set the downloading path for the NodeB software package.
8) Click **Next**.
A dialog box opens up for your confirmation.
9) Click **Yes**.
The **Supplying NodeB Software Progress** dialog box opens up.

The status and progress of supplying NodeB software is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

14.3.6 Activating NodeB Software

I. Introduction

The downloaded NodeB software in the standby file directory does not take effect immediately or damage the running software. You may activate the NodeB software to make the new software effective.

You may activate a specified NodeB software version during the NodeB operation. In this way, you can download the software to each board an put it into effect. You may activate the NodeB software right after the downloading or later on.

II. Prerequisite

None.

III. Procedure

Follow the steps below to activate the NodeB software:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Upgrade NodeB Software** in the dialog box.
3) Click **Next**.
The **Upgrade NodeB Software** dialog box opens up as shown in Figure 14-2.
4) Select **Activate NodeB Software**.
Select the NodeB software version to be upgraded in the **Version** drop-down list box.
5) Click **Next**.
A dialog box opens up for your confirmation.

🕮 **Note:**

The **Version** drop-down list box opens up only when you do not select the **Download NodeB Software**.

6) Click **Yes**.
The **Software Update Progress** dialog box opens up.

The status and progress of the upgrade procedure is displayed in the dialog box. You may check whether the upgrade is completed by viewing this dialog box.

🕮 **Note:**

14.3.7 If the activation of a board fails, locate the cause and then activate the software of that board again. See 14.3.7 "Activating Board Software

- The NodeB shall be reset and the new NodeB software version shall be started upon successful NodeB software activation.
- Reactivate the NodeB software version in the standby file directory or reinstall the NodeB software upon failure in activation.

14.3.8 Activating Board Software

I. Introduction

To activate the board software is to put a board software version into effect on one board or a type of boards. The target version of the board software to be activated is the relevant board software version in the active file directory.

Activate the board software in the following cases:

- A single board of a type of boards fails to be activated in the activation.
- A single board or a type of boards is added or replaced after activating the NodeB software.
- A single board or a type of boards is loaded with patches.
- The NodeB software has been supplied manually.

II. Prerequisite

None.

III. Procedure

Follow the steps below to activate the NodeB software:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Activate Board** in the dialog box.
3) Click **Next**.
   The **Activate Board** dialog box opens up as shown in Figure 14-5.

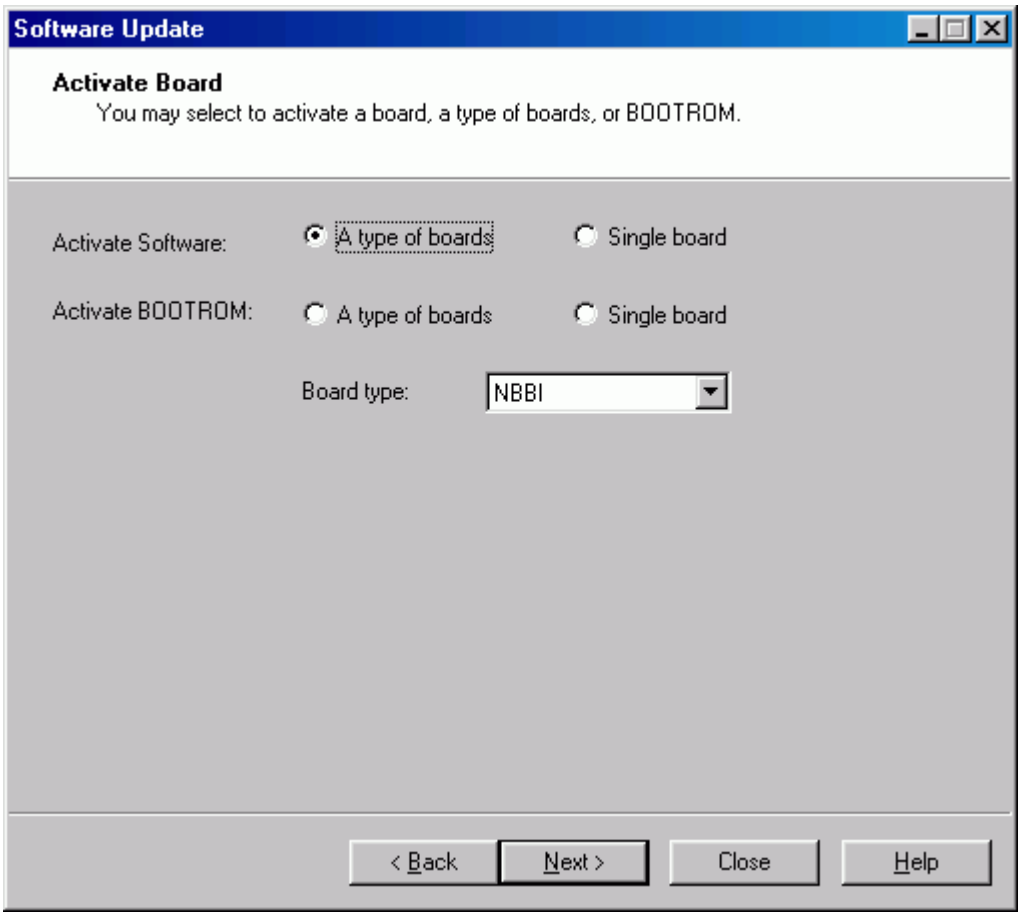

Figure 14-5 Activate Board dialog box

Table 14-5 describes the fields of the **Activate Board** dialog box.

Table 14-5 Field description of Activate Board dialog box

Field	Description	
Activate Software	A type of boards	To activate the software of a type of boards each time • You need to select the board type from the **Board type** drop-down combo box.

Field	Description	
	Single board	To activate the software of one board each time • You need to set the **Subrack No.** and **Slot No.** according to the board location. For details, see the equipment panel. • For the DBS3800, the default value in **Slot No.** is 0.
Activate BOOTROM	A type of boards	To activate the BOOTROM of a type of boards each time • You need to select the board type from the **Board type** drop-down combo box.
	Single board	To activate the BOOTROM of one board each time • You need to set **Subrack No.** and **Slot No.** according to the board location. For details, see the equipment panel. • For the DBS3800, the default value in **Slot No.** is 0.

4) Choose **A type of boards** or **Single board** on the right of **Activate Software**.
5) Click **Next**.
   A dialog box opens up for your confirmation.
6) Click **Yes**.
   The **Activating Board Progress** dialog box opens up.

The status and progress of the board activation is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

14.3.9 Synchronizing Version

I. Introduction

When the new-version NodeB software is proved reliable after trial for a period (three days recommended, two days at least), you need to synchronize files in the standby directory with those in the active directory. That is, you need to backup the active NodeB software version and the BOOTROM software version to the standby directory. This ensures that the same versions in the standby directory can be activated in case of failure in the NodeB software version and the BOOTROM software version.

II. Prerequisite

None.

III. Procedure

Follow the steps below to synchronize the software versions:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Synchronize Version** in the dialog box.
3) Click **Next**.
   The **Synchronize Version** dialog box opens up.
4) If the synchronization status is **Synchronizing** or **Synchronized**, it indicates the NodeB software version is synchronizing or has been synchronized. The operation is complete.
5) If the synchronization status is **Not Synchronized**, click **Next** in the dialog box. A dialog box opens up for you confirmation.
6) Click **Yes**.
   The **Synchronization Version Progress** dialog box opens up.
7) The status and progress of synchronization is displayed in the dialog box.
8) Click **Close**.

The synchronization process is stopped when the synchronization is complete.

14.4 Upgrading NodeB BOOTROM

14.4.1 Overview

To upgrade the NodeB BOOTROM is to upgrade all the BOOTROM software of each board on the NodeB.

14.4.2 Introduction to BOOTROM Software

A BOOTROM is a writable and erasable storage medium for binary data (machine code). The BOOTROM software refers to the software bound with hardware. It provides basic device drive function and can be started and updated manually.

All the boards on the NodeB have the BOOTROM software. For a macro NodeB, the NAOI and the NDTI both are equipped with BOOTROMs that are located in the master CPU and the slave CPU.

The BOOTROM software is a compressed file with the fixed filename of **NodeB.pck**.

14.4.3 Procedure of Upgrading NodeB BOOTROM Software

Table 14-6 describes how to upgrade the NodeB BOOTROM software.

Table 14-6 Procedure of upgrading NodeB BOOTROM

Step	Procedure	Description	Reference
1	Download NodeB BOOTROM package	To download the new software version for upgrade	See 14.4.4 "Downloading NodeB BOOTROM Package"
2	Activate NodeB BOOTROM	To activate all the boards on the NodeB	See 14.4.5 "Activating NodeB BOOTROM"
3	Activate board BOOTROM	To activate the board failing to be activated in the previous step by viewing details	See 14.4.6 "Activating Board BOOTROM"

Note:

- The BOOTROM version shall be automatically refreshed after the NodeB BOOTROM upgrade. Then you may check whether the upgrade is successful by viewing the NodeB version and the board version.
- Step 1) and step 2) are integrated into one. You can perform the two steps in one process.
- The NodeB shall not be reset due to upgrading the NodeB BOOTROM. The BOOTROM software does not affect the NodeB services. Therefore, there is no need to reset the NodeB or board to make the BOOTROM software effective after the upgrade. The NodeB starts with the upgraded BOOTROM during next reset.

14.4.4 Downloading NodeB BOOTROM Package

I. Introduction

To download the NodeB BOOTROM package is to download the NodeB BOOTROM software package from the FTP server to the NodeB standby file directory.

II. Prerequisites

- The FTP server works well and is properly connected to the NodeB in the same Intranet.
- There shall be no firewall between the FTP server and the NodeB.
- The user name and password for the specified FTP server is correct. Ensure you have the authority to read the data in the specified directory.

III. Procedure

Follow the steps below to download the NodeB BOOTROM software package:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Upgrade BOOTROM** in the dialog box.
3) Click **Next**.
   The **Upgrade BOOTROM** dialog box opens up as shown in Figure 14-6.

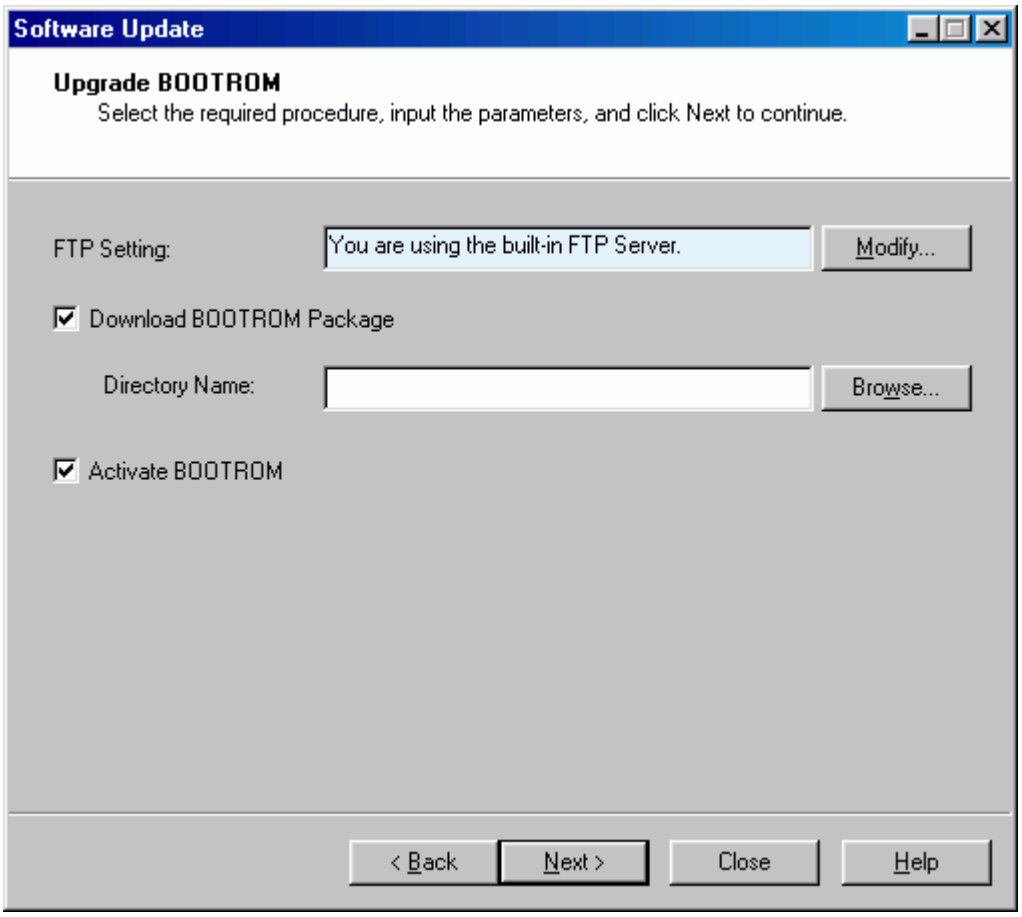

Figure 14-6 Upgrade BOOTROM dialog box

Table 14-7 describes the fields of the **Upgrade BOOTROM** dialog box.

Table 14-7 Field description of Upgrade BOOTROM dialog box

Filed	Description
FTP Setting	To set the FTP server for file upload and download • The FTP server in use is shown in the box for your reference. The FPT server can be a built-in server or another type of server specified by you. • Click **Modify…** on the right to set the FTP Server.

Filed	Description
Download BOOTROM Package	To download the NodeB BOOTROM package from the FTP server to the NodeB standby file directory • Click **Browse…** to select the directory of the BOOTROM software package in the FTP server. • Select it to download the NodeB BOOTROM package. This operation is mandatory for upgrading the NodeB BOOTROM package. • Because the NodeB BOOTROM package has a fixed filename **NbRom.pck**, you just need to specify the path of it.
Activate BOOTROM	To activate the NodeB BOOTROM right after downloading the NodeB BOOTROM package by selecting this box. • If you select both **Download BOOTROM Package** and **Activate BOOTROM**, the BOOTROM to be activated is the NodeB BOOTROM package downloaded from the FTP Server. There is no need to select the version. • If you select **Activate BOOTROM** without selecting **Download BOOTROM Package**, the system shall list all the NodeB BOOTROM versions that can be activated. Select the NodeB BOOTROM version to be upgraded in the **Version** drop-down box.

Note:

- The system downloads the NodeB BOOTROM package first and then activates it.
- You may choose to perform either step. In that case, the system shall skip the other step.

4) Click **Modify…** in the dialog box.
   The **FTP Settings** dialog box opens up as shown in Figure 14-3.
5) Set parameters in the dialog box.
6) Click **OK**.
   The **FTP Settings** dialog box is closed and you are presented with the **Upgrade BOOTROM** dialog box.
7) Select **Download BOOTROM Package**.
   Specify a directory to download the BOOTROM package.
8) Click **Next**.
   A dialog box opens up for your confirmation.
9) Click **Yes**.
   The **Upgrading BOOTROM Progress** dialog box opens up.

You may check whether the process is completed by viewing this dialog box.

14.4.5 Activating NodeB BOOTROM

I. Introduction

To activate the NodeB BOOTROM is to download the BOOTROM in the NodeB standby file directory to each board and upgrade the board BOOTROM.

Before the activation, the system checks the BOOTROM versions of the boards. It activates the board BOOTROM only when there is a new BOOTROM version.

II. Prerequisite

None.

III. Procedure

Follow the steps below to activate the NodeB BOOTROM:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Upgrade BOOTROM** in the dialog box.
3) Click **Next**.
   The **Upgrade BOOTROM** dialog box opens up as shown in Figure 14-6.
4) Select **Activate NodeB Software** in the dialog box. Select the NodeB BOOTROM software version to be upgraded in the **Version** drop-down list box.
5) Click **Next**.
   A dialog box opens up for your confirmation.
6) Click **Yes**.
   The **Upgrading BOOTROM Progress** dialog box opens up.

The status and progress of upgrading BOOTROM is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

🕮 **Note:**

14.4.6 If the BOOTROM activation of a board fails, locate the cause and then activate the BOOTROM software of that board again. See 14.4.6 "Activating Board BOOTROM

- Because the BOOTROM software does not affect the NodeB services, there is no need to reset the NodeB to make the NodeB BOOTROM effective. The NodeB starts with the upgraded BOOTROM during next reset.
- The NodeB BOOTROM activation does not lead to NodeB reset.

14.4.7 Activating Board BOOTROM

I. Introduction

To activate the board BOOTROM software is to activate the BOOTROM software of a single board or a type of boards.

Activate the board BOOTROM software in the following cases:

- The BOOTROM of a single board or a type of boards fails to be activated in the NodeB BOOTROM activation.
- The BOOTROM of a single board or a type of board needs to be upgraded.

II. Prerequisite

None.

III. Procedure

Follow the steps below to activate the board BOOTROM:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Activate Board** in the dialog box.
3) Click **Next**.
   The **Activate Board** dialog box opens up as shown in Figure 14-5.
4) Choose **A type of boards** or **Single board** on the right of **Activate BOOTROM**.
5) Click **Next**.
   A dialog box opens up for your confirmation.
6) Click **Yes**.
   The **Activating Board Progress** dialog box opens up.

The status and progress of the board BOOTROM activation is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

14.5 Upgrading Patches

14.5.1 Overview

To upgrade a patch is to upgrade a specified board or module on the NodeB for the purpose of perfecting a function or clearing a defect.

14.5.2 Introduction to Patch

A patch is a compressed file with a fixed filename of **NodeB.pck**.

14.5.3 Procedure of Upgrading Patches

Table 14-8 describes how to upgrade a patch.

Table 14-8 Procedure of upgrading a patch

Step	Procedure	Description	Reference
1	Download patch package	To download the new patch for upgrade	14.5.4 "Downloading Patch Package
2	Activate patch package	To activate the patches to upgrade the board or module	14.5.5 "Activating Patches"
3	Reactivate patch for the board failing to be activated	To reactivate the board failing to be activated by viewing the detailed list.	14.5.5 "Activating Patches"

Note:

- Step 1) and step 2) are integrated into one. You can perform the two in one step.
- Patch upgrade leads to reset of the related board. Therefore, services on that board shall be interrupted.
- You may check whether the upgrade is successful by viewing the upgraded patch version.

14.5.4 Downloading Patch Package

I. Introduction

To download the patch is to download the patch package from the FTP server to the NodeB standby file directory.

II. Prerequisites

- The FTP server works well and is properly connected to the NodeB in the same Intranet.
- There shall be no firewall between the FTP server and the NodeB.
- The user name and password for the specified FTP server is correct. Ensure you have the authority to read the data in the specified directory.

III. Procedure

Follow the steps below to download the patch package:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Upgrade Patch** in the dialog box.
3) Click **Next**.
   The **Upgrade Patch** dialog box opens up as shown in Figure 14-7.

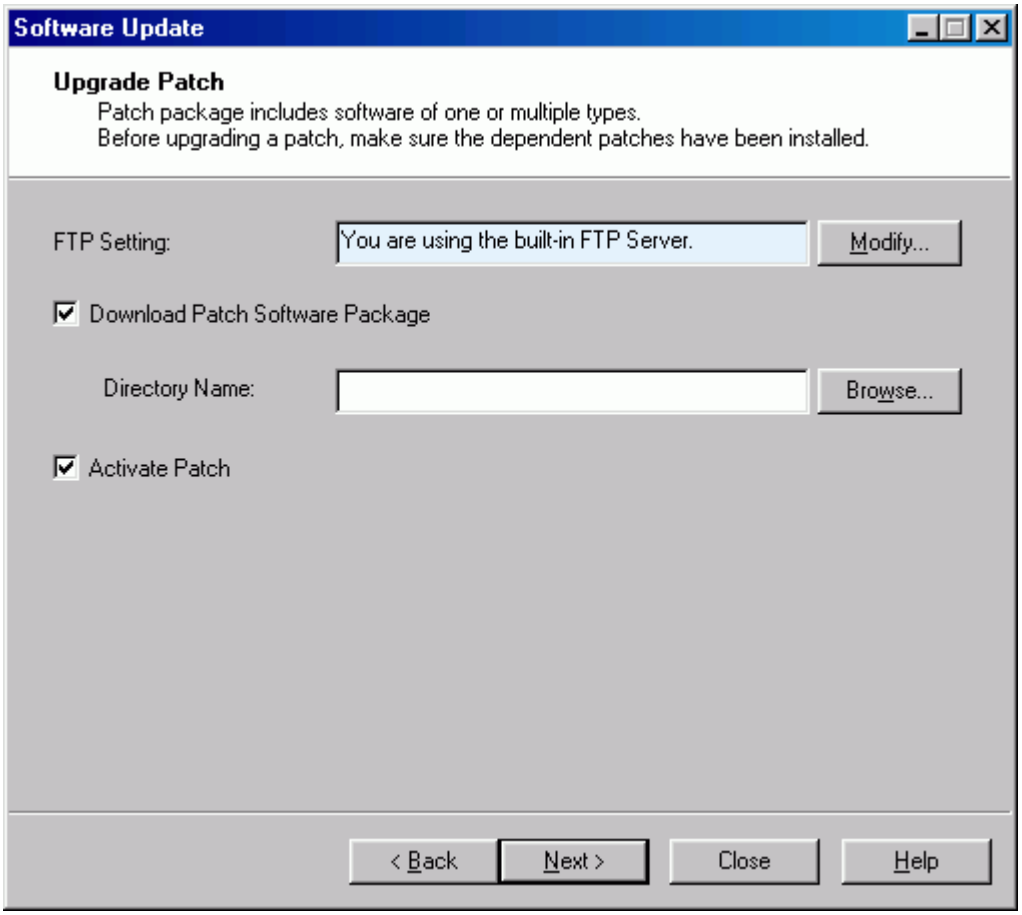

Figure 14-7 Upgrade Patch dialog box

Table 14-9 describes the fields of the **Upgrade Patch** dialog box.

Table 14-9 Field description of Upgrade Patch dialog box

Field	Description
FTP Setting	To set the FTP server for downloading the patch • The FTP server in use is shown in the box for your reference. It can be a built-in server or another type of server specified by you. • Click **Modify…** on the right to set the FTP server.
Download Patch Software Package	To download the patch package from the FTP server to the NodeB standby file directory • Click **Browse…** to select the directory of the package in the FTP server. • Select it to download the NodeB BOOTROM package. This operation is mandatory for patch upgrade. • Because the patch package has a fixed filename **NbPatch.pck**, you just need to specify the path of it.

Field	Description
Activate Patch	To activate the patch right after downloading the patch package by choosing this box.

Note:

- The system downloads the patch package first and then activates it.
- You may choose to perform either step. In that case, the system shall skip the other step.

4) Click **Modify…** in the dialog box.
   The **FTP Settings** dialog box opens up as shown in Figure 14-3.
5) Set parameters in the dialog box.
6) Click **OK**.
   The **FTP Settings** dialog box is closed and you are presented with the **Upgrade Patch** dialog box.
7) Select **Download Patch Software Package**. Specify a directory to download the patch package.
8) Click **Next**.
   A dialog box opens up for your confirmation.
9) Click **Yes**.
   The **Upgrading Patch Progress** dialog box opens up.

The status and progress of upgrading patch is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

14.5.5 Activating Patches

I. Introduction

To activate a patch is to download the patch in the NodeB standby file directory to the target board and then upgrade the patch release of that board.

II. Prerequisite

None.

III. Procedure

Follow the steps below to activate a patch:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Software Update** subnode.
   The **Software Update** dialog box opens up as shown in Figure 14-1.
2) Select **Upgrade Patch** in the dialog box.
3) Click **Next**.
   The **Upgrade Patch** dialog box opens up as shown in Figure 14-7.
4) Select **Activate Patch** in the dialog box.
5) Click **Next**.
   A dialog box opens up for your confirmation.
6) Click **Yes**.
   The **Upgrading Patch Progress** dialog box opens up.

The status and progress of upgrading patch is displayed in the dialog box. You may check whether the process is completed by viewing this dialog box.

🕮 **Note:**

- If the activation of a board fails, locate the cause and then activate the patch release of that board again.
- Patch upgrade leads to reset of the related board. Therefore, services on that board shall be interrupted.

14.6 Downloading Data Configuration File

14.6.1 Introduction Data Configuration File

The data configuration file records the settings of each NodeB module. It has a fixed filename of **NodeBCfg.xml**.

You may upload or download the data configuration file.

14.6.2 Downloading Data Configuration File

I. Introduction

To download a data configuration file is to download a data configuration file from the FTP server to the NodeB. The new data configuration file takes effect after resetting the NodeB.

II. Prerequisite

None.

III. Procedure

Follow the steps below to download the data configuration file:

1) Choose **Maintenance Navigator** -> **Software Management**. Then double-click the **Data Configuration File Transfer** subnode. The **Data Configuration File Transfer** dialog box opens up as shown in Figure 14-8.

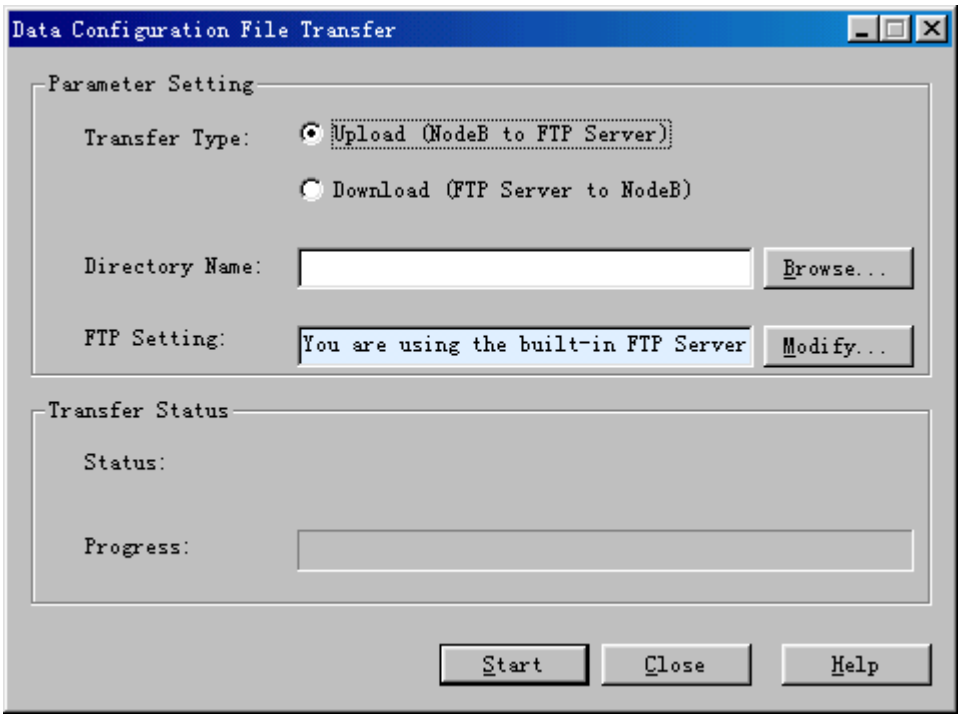

Figure 14-8 Data Configuration File Transfer dialog box

Table 14-10 describes the fields of the **Data Configuration File Transfer** dialog box.

Table 14-10 Field description of **Data Configuration File Transfer** dialog box

Field	Description
Transfer Type	• **Upload (NodeB to FTP Server)**: The system uploads the configuration file of **NodeBCfg.xml** from the NodeB to the FTP Server for viewing, modifying and saving. • **Download (FTP Server to NodeB)**: The system downloads the configuration file of **NodeBCfg.xml** from the FTP Server to the NodeB. The configuration file of the latest version takes effect after resetting the NodeB.

Directory Name	To specify the directory for the configuration file in the FTP Server • The configuration file has a fixed filename. Therefore, the system can identify it in the directory. • If you select **Upload (NodeB to FTP Server)**, it is the destination path. • If you select **Download (FTP Server to NodeB)**, it is the source path.
FTP Setting	To set the FTP Server for file upload and download • The FTP Server in use is shown in the box for your reference. • Click **Modify…** on the right to set the FTP Server.

2) Click **Modify…** in the dialog box.
   The **FTP Settings** dialog box opens up as shown in Figure 14-3.
3) Set parameters in the dialog box. See section 6.3.1 "Uploading Operation Log File".
4) Click **OK**.
   The **FTP Settings** dialog box is closed and you are presented with the **Data Configuration File Transfer** dialog box.
5) Select **Download (FTP Server to NodeB)** after **Transfer Type**.
6) Set other parameters in the dialog box.
7) Click **Start**.

The system starts to download the data configuration file.

Note:

You can also download the data configuration file by the MML command of **DLD CFGFILE**.

14.6.3 Backing up Data Configuration File

I. Introduction

To backup a data configuration file is to upload a data configuration file from the NodeB to the FTP server for saving and viewing.

II. Prerequisite

None.

III. Procedure

The procedure of backing up the data configuration file is almost the same as that of downloading the data configuration file. The only difference lies in step 5) that you need to select **Upload (NodeB to FTP Server)** after **Transfer Type**. See 14.6.2 "Downloading Data Configuration File".

Note:

You can also backup the data configuration file by the MML command of **ULD CFGFILE**.

Table of Contents

Appendix A Acronyms and Abbreviations

A	
ALCAP	Access Link Control Application Part
AMI	Alternate Mark Inversion
ATM	Asynchronous Transfer Mode
B	
BCH	Broadcast Channel
BER	Basic Encoding Rules
BIP	Bit Interleaved Parity
BITS	Building Integrated Timing Supply
BLER	Block Error Rate
C	
CES	Circuit Emulation Service
CPICH	Common Pilot Channel
CPU	Center Processing Unit
CRC	Cyclic Redundancy Check
D	
DPCH	Dedicated Physical Channel
DSP	Digital Signal Processor
F	
FEBE	Far End Bit Error
FP	Frame protocol
FTP	File Transfer Protocol
G	
GPS	Global Position System
GUI	Graphic User Interface
H	
HBBI	NodeB HSDPA Baseband processing and Interface unit
HBOI	NodeB HSDPA Baseband processing and Optical Interface unit
HEC	Header Error Control
HDLP	NodeB HSDPA supported Down Link Processing Unit

HULP	NodeB HSDPA supported Uplink Processing Unit
I	
ID	Identity
IUB	Iub Interface
L	
LMT	Local Maintenance Terminal
M	
MAFU	Multicarrier Antenna Filter Unit
MML	Human-Machine Language (formerly Man-Machine Language)
MTRU	NodeB Multi-carrier TRansceiver Unit
N	
NAOI	NodeB ATM Optical Interface unit
NBAP	NodeB Application Part
NBBI	NodeB Baseband processing and Interface unit
NCCU	NodeB Cable Connected Unit
NDTI	NodeB Digital Trunk Interface unit
NFAN	NodeB FAN box
NMON	NodeB Monitor unit
NMPT	NodeB Main Processor & Timing unit
O	
OCXO	Oven Controlled Crystal Oscillator
OTSR	Omi-directional Transmit Sector Receive
P	
PCCPCH	Primary Common Control Physical Channel
PHS	Packet Handling Switching
PMU	Power and Environment Monitoring unit
PSU	Power Supply Unit
R	
RACH	Random Access Channel
RMS	Root Mean Square
RNC	Radio Network Controller
RRU	Radio Remote Unit
RTWP	Received Total Wideband Power
S	

SDH	Synchronous Digital Hierarchy
T	
TPC	Transmission power control
U	
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
UTOPIA	Universal Test & Operations PHY Interface for ATM
UTRA	UMTS Terrestrial radio access (ETSI)
UTRAN	UMTS Terrestrial Radio Access Network
W	
WCDMA	Wideband Code Division Multiple Access