BTS3900(A) GSM

V300R008

Commissioning Guide

Issue 02

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About This Document

Overview

This document describes the procedures for commissioning and verifying the BTS3900/BTS3900A GSM after it is installed. The commissioning and verification procedures ensure that the BTS3900/BTS3900A GSM operates as required. The BTS3900/BTS3900A commissioning scenarios include the transmission available scenario and transmission unavailable scenario.

Version

The following table lists the product versions related to this document.

Product Name	Version
BTS3900 GSM (hereinafter referred to as BTS3900)	V300R008
BTS3900A GSM (hereinafter referred to as BTS3900A)	V300R008

Intended Audience

This document is intended for:

- Field engineers
- Technical support engineers

Organization

1 Changes in BTS3900(A) GSM Commissioning Guide

This describes the changes in the “BTS3900(A) GSM Commissioning Guide”.

2 General Requirements for the Commissioning

The general requirements for the commissioning are the commissioning prerequisites and commissioning resources.

3 Commissioning Procedure

This describes the commissioning procedure of the BTS. According to the transmission situation between the BSC and BTS, the commissioning procedure of the BTS can be classified into two types: commissioning procedure in transmission available scenario and commissioning procedure in transmission unavailable scenario.

4 Commissioning the BTS (Transmission Available)

This describes how to commission the BTS when the transmission cable between the BSC and the BTS is properly connected.

5 Commissioning the BTS (Transmission Unavailable)

This describes how to commission the BTS in the transmission unavailable scenario. The commissioning of the BTS consists of two phases. In the initial phase of the commissioning, the transmission cable between the BSC and the BTS is not properly connected. Commission the BTS at the local end. In the later phase of the commissioning, the transmission cable between the BSC and the BTS is properly connected. Commission the BTS on the BSC side.

6 Optional Commissioning Tasks

The optional commissioning tasks are the VSWR check, output power of the TRX check, loopback test check, settings of the DIP switches on the board check, transmission between the BBU and the BSC on the BTS side check, transmission between cascaded TRXs check, and TRX ring topology check.

7 FAQs for BTS Commissioning

This describes the fault symptoms and cause analysis in the BTS commissioning.

8 Commissioning Record Data Sheet

This describes the data sheet that is used to record the process and result of the BTS commissioning.

9 Communication Ports Used by the GBTS

Conventions

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
DANGER	Indicates a hazard with a high level of risk, which if not avoided,will result in death or serious injury.
WARNING	Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.
CAUTION	Indicates a potentially hazardous situation, which if not avoided,could result in equipment damage, data loss, performance degradation, or unexpected results.
TIP	Indicates a tip that may help you solve a problem or save time.
NOTE	Provides additional information to emphasize or supplement important points of the main text.

General Conventions

The general conventions that may be found in this document are defined as follows.

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Boldface	Names of files, directories, folders, and users are in **boldface**. For example, log in as user **root**.
Italic	Book titles are in *italics*.
`Courier New`	Examples of information displayed on the screen are in Courier New.

Command Conventions

The command conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	The keywords of a command line are in **boldface**.
Italic	Command arguments are in *italics*.
[ ]	Items (keywords or arguments) in brackets [ ] are optional.
{ x | y | ... }	Optional items are grouped in braces and separated by vertical bars. One item is selected.
[x | y | ...]	Optional items are grouped in brackets and separated by vertical bars. One item is selected or no item is selected.
{ x | y | ... }*	Optional items are grouped in braces and separated by vertical bars. A minimum of one item or a maximum of all items can be selected.
[x | y | ...]*	Optional items are grouped in brackets and separated by vertical bars. Several items or no item can be selected.

GUI Conventions

The GUI conventions that may be found in this document are defined as follows.

Convention	Description
Boldface	Buttons, menus, parameters, tabs, window, and dialog titles are in **boldface**. For example, click **OK**.
>	Multi-level menus are in **boldface** and separated by the ">" signs. For example, choose **File** > **Create** > **Folder** .

Keyboard Operations

The keyboard operations that may be found in this document are defined as follows.

Format	Description
Key	Press the key. For example, press **Enter** and press **Tab**.
Key 1+**Key 2**	Press the keys concurrently. For example, pressing **Ctrl**+**Alt**+**A** means the three keys should be pressed concurrently.
Key 1, **Key 2**	Press the keys in turn. For example, pressing **Alt**, **A** means the two keys should be pressed in turn.

Mouse Operations

The mouse operations that may be found in this document are defined as follows.

Action	Description
Click	Select and release the primary mouse button without moving the pointer.
Double-click	Press the primary mouse button twice continuously and quickly without moving the pointer.
Drag	Press and hold the primary mouse button and move the pointer to a certain position.

1 Changes in BTS3900(A) GSM Commissioning Guide

This describes the changes in the "BTS3900(A) GSM Commissioning Guide".

02(2009-04-20)

Second commercial release

Compared with issue 01 (2009-02-16) of V300R008, no contents are deleted. The changes are as follows:

The solution to trouble is added. For details, see **5.2.3 Configuring Logical Objects of the BTS on the SMT**, **4.2.3 Checking the Transmission Between BTSs in Ring Topology**, **4.2.1 Checking the Transmission Between the RRU and the BBU or Between the BBU and the BSC on the LMT** and **5.2.1 Obtaining the Site Management Rights**.

01 (2009-02-16)

Initial commercial release

2 General Requirements for the Commissioning

About This Chapter

The general requirements for the commissioning are the commissioning prerequisites and commissioning resources.

2.1 Commissioning Resources
Before the commissioning, you must arrange for the tools, obtain the information about the site to be commissioned, and download the correct software for the boards in the BTS3900/ BTS3900A.

2.2 Commissioning Prerequisites
Before the commissioning, you must check the operating status of the BTS3900/BTS3900A and BSC.

2.1 Commissioning Resources

Before the commissioning, you must arrange for the tools, obtain the information about the site to be commissioned, and download the correct software for the boards in the BTS3900/ BTS3900A.

Tools

Table 2-1 describes the tools and instruments required for the commissioning.

Table 2-1 Tools required for the commissioning of the BTS3900/BTS3900A

Tools	Quantity	Specification
PC	1	Optional. The PC is used for the commissioning on the BTS side when the transmission between the BSC and BTS is unavailable. For details on the configuration, see **Configuration Requirements for the Site Maintenance Terminal PC**.
		For details on how to install and use the SMT application, see **BTS3900A GSM Site Maintenance Terminal User Guide**.
Multimeter	1	Mandatory
Power Meter	1	Mandatory. The power meter is used to measure the output power of TRXs.
Site Master	1	Mandatory. The Site Master is used to measure the VSWR.
GSM MSs for testing	2	Mandatory. The MSs are used for the BTS service commissioning and antenna system commissioning.
		The requirements for the GSM MS for testing are as follows: ● The UE is configured with the SIM card. ● The MS is registered with the HLR on the network.
Ethernet cable	1	Optional. The Ethernet cable is used to connect the SMT PC to the BBU when the transmission is unavailable. **NOTE** If the SMT PC is installed with the windows 98 operating system, the type of the Ethernet cables should be crossover cable.

Tools	Quantity	Specification
Serial port cable	1	Optional. The serial port cable is used when you query the IP address of the board on the BTS side. The auxiliary cables are listed as follows: ● One commissioning cable connected to the serial Ethernet port ● One extended serial port cable
Flat-head screwdriver	1	Optional. The flat-head screwdriver is used to remove the Ethernet cable when the transmission between the BSC and the BTS is unavailable. When removing the Ethernet port, you must use a flat-head screwdriver to press the RJ45 connector and then remove the RJ45 connector.
Light emitting diode (LED)	2	Optional. The LEDs are used to determine the RX or TX end of the E1 line.

Information About the Base Station

Before the commissioning, you must obtain the following information about the base station:

- Information on BTS networking and related configuration, including the BTS type, transmission mode, networking mode, and cell configuration.
- BTS3900/BTS3900A data configured on the BSC side.

Board Software

When the transmission is unavailable, download the matching software for the boards to the SMT PC before the commissioning.

The software for the boards in the BTS3900/BTS3900A is as follows:

- RFU software
- GTMU software
- GATM software
- PMU software

2.2 Commissioning Prerequisites

Before the commissioning, you must check the operating status of the BTS3900/BTS3900A and BSC.

Hardware Requirements

- The BTS3900/BTS3900A cabinet is installed and the cables are connected.
- The BTS3900/BTS3900A has passed the hardware installation check before it is powered on.

- The BTS3900/BTS3900A is powered on. For details, see **Powering On the BTS3900A** or **Powering On the BTS3900**.
- The BSC is installed. The system commissioning is complete, and the system is running normally.

Software Requirements

- The data of the BTS3900/BTS3900A is configured on the BSC.

3 Commissioning Procedure

This describes the commissioning procedure of the BTS. According to the transmission situation between the BSC and BTS, the commissioning procedure of the BTS can be classified into two types: commissioning procedure in transmission available scenario and commissioning procedure in transmission unavailable scenario.

Context

- To solve common problems that occur during the commissioning, see **7 FAQs for BTS Commissioning**.
- In this document, RFUs are classified into two types: DRFUs and GRFUs.

Procedure

- Commissioning procedure in transmission available scenario

  In the transmission available scenario, the transmission cables between the BSC and the BTS are properly connected before the commissioning. Generally, the commissioning is performed on the BSC6000 LMT. If the commissioning can not be performed on the LMT independently, contact engineers on the BTS side to perform the commissioning task.

Figure 3-1 Commissioning procedure (transmission available)

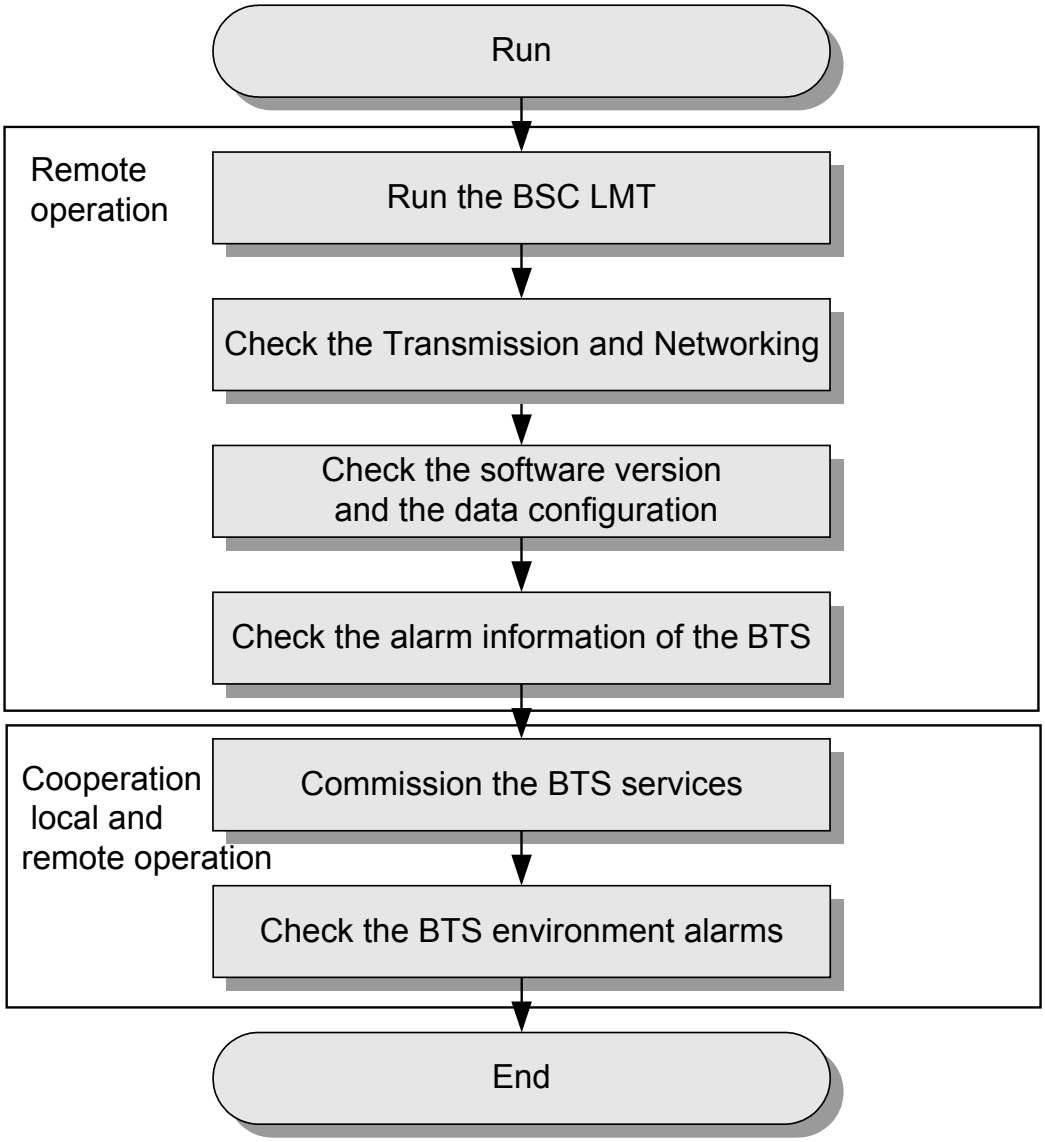


Table 3-1 Commissioning procedure (transmission available)

No.	Operation Procedure		Mandatory/ Optional
1	Operation on the BSC LMT	Run the BSC LMT software. For details, see **4.1 Starting the LMT**.	Mandatory

No.	Operation Procedure		Mandatory/ Optional
2		Check the transmission and networking to ensure that the transmission between the BBU and BSC, BBU and RFU, cascaded BBUs, and cascaded RFUs is normal. For details, see **4.2 Checking the Transmission and Networking**.	Mandatory
3		Check the software version and configuration data. For details, see **4.3 Checking Software Version and Data Configuration**.	Mandatory
4		Check the alarm information of the BTS. For details, see **4.4 Checking the Alarm Information of the BTS (on the LMT)**.	Mandatory
5	Operation on the BTS side.	Commission the antenna system. The commissioning consists of the following items: output power of the TRXs, voltage standing wave ratio (VSWR), and connection between the antenna system and BTS. For details, see **6.1 Commissioning the Antenna System**.	Optional
6	Operation on the BSC LMT	Perform the channel loopback test on the LMT to ensure the normal operation of the signaling channel and service channel. For details, see **6.2 Performing the Loopback Test**.	Optional
7	Operation requiring for the cooperation of the BTS side and BSC side.	Commission the CS services and PS services. For details, see **4.5 Commissioning the BTS Services**.	Mandatory
8		Check the environment monitoring alarm. For details, see **4.6.2 Checking the Environment Monitoring Alarms on the LMT**.	Mandatory

- Commissioning procedure in transmission unavailable scenario

  In transmission unavailable scenario, the BTS commissioning consists of two phases: In the initial phase of the commissioning, the transmission cables between the BSC and the BTS are not properly connected. Commission the BTS at the local end. In the later phase of the commissioning, the transmission cable between the BSC and the BTS is properly connected. Commission the BTS on the LMT.

Figure 3-2 Commissioning procedure (transmission unavailable)

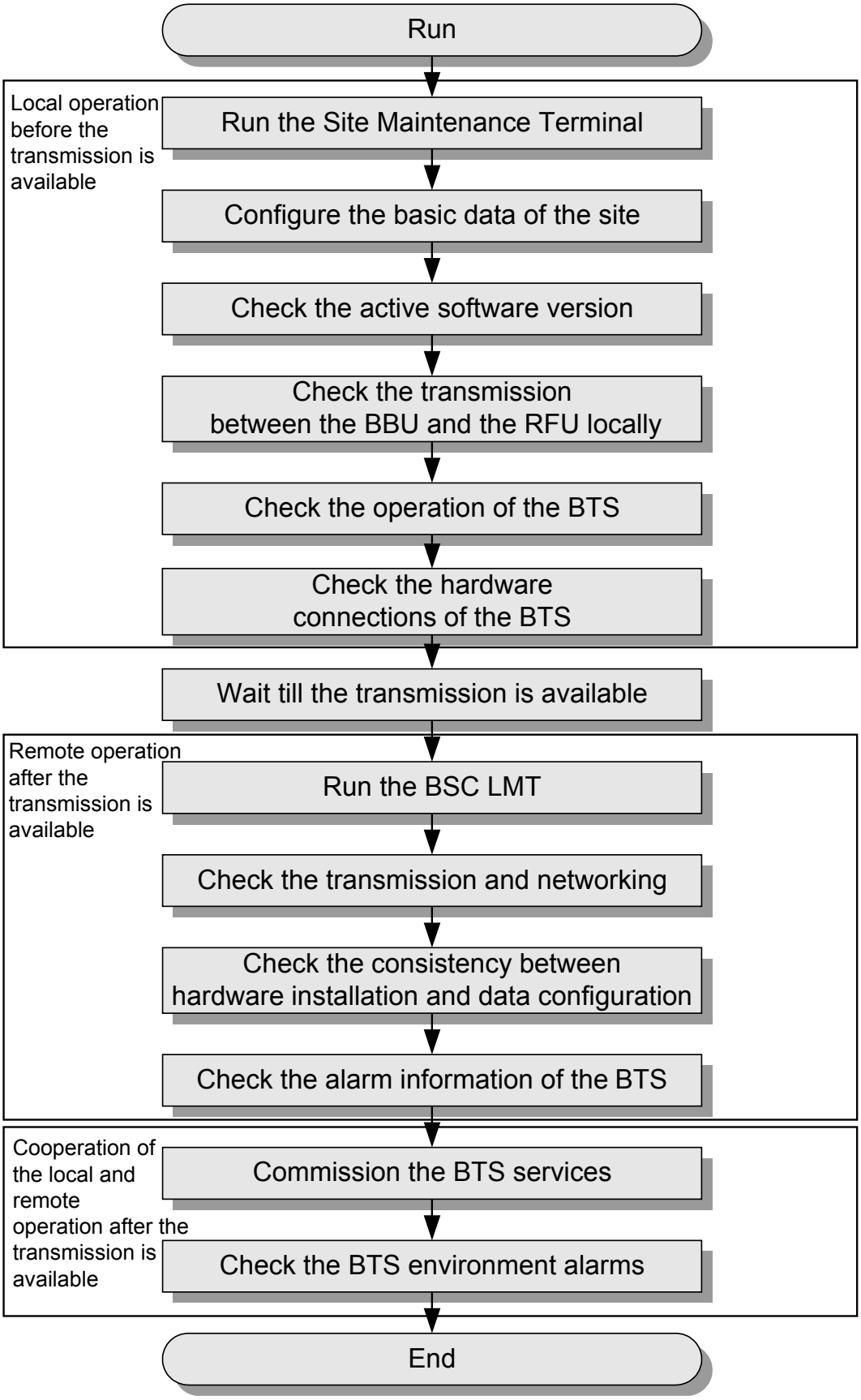


Table 3-2 Commissioning procedure (transmission unavailable)

No.	Operation Procedure		Mandatory/ Optional
1	Operation on the BTS side.	Run the Site Maintenance Terminal. For details, see **5.1 Starting the Site Maintenance Terminal**.	Mandatory
2		Configure the basic data of the BTS such as boards of the BTS and logical objects of the site to ensure that the SMT can support the local commissioning tasks. For details, see **5.2 Configuring the Basic Data of the BTS**.	Mandatory
3		Check the active software version. For details, see **5.3 Checking the Active Software Version on the SMT**.	Mandatory
4		Check the transmission between the BBU and RFU. For details, see **5.4 Checking the Transmission Between the BBU and RFU on the BTS Side**.	Mandatory
5		Check the running status of the BTS. The procedure for checking the running status of the BTS involves checking the state of LEDs and alarm information. For details, see **5.5 Checking the Running Status of the BTS**.	Mandatory
6		Check the hardware connection of the BTS. For details, see **5.6 Checking the Hardware Connection of the BTS**.	Mandatory
7		Commission the antenna system. The commissioning consists of the following items: output power of the TRXs, VSWR, and connection between the antenna system and the BTS. For details, see **6.1 Commissioning the Antenna System**.	Optional
Wait till the transmission is available.			
8	Operation on the BSC LMT	Run the BSC LMT software. For details, see **4.1 Starting the LMT**.	Mandatory
9		Check the transmission and networking to ensure that the transmission between the BBU and BSC, BBU and RFU, cascaded BBUs, and cascaded RFUs is normal. For details, see **4.2 Checking the Transmission and Networking**.	Mandatory
10		Check the software version and configuration data. For details, see **4.3 Checking Software Version and Data Configuration**.	Mandatory

No.	Operation Procedure		Mandatory/ Optional
11		Check the alarm information of the BTS. For details, see **4.4 Checking the Alarm Information of the BTS (on the LMT)**.	Mandatory
12		Perform the channel loopback test on the LMT to ensure the normal operation of the signaling channel and service channel. For details, see **6.2 Performing the Loopback Test**.	Optional
13	Operation requiring for the cooperation of the BTS side and BSC side.	Commission the CS services and PS services. For details, see **4.5 Commissioning the BTS Services**.	Mandatory
14		Check the environment monitoring alarm. For details, see **4.6.2 Checking the Environment Monitoring Alarms on the LMT**.	Mandatory

----End

4 Commissioning the BTS (Transmission Available)

About This Chapter

This describes how to commission the BTS when the transmission cable between the BSC and the BTS is properly connected.

4.1 Starting the LMT
You can directly log in to the LMT, or log in to the LMT through the M2000 client.

4.2 Checking the Transmission and Networking
This describes how to check the transmission and networking. The purpose of checking the transmission and networking is to ensure that the BTS3900A transmission cables and hardware are correctly installed. The items to be checked consist of the transmission between the BBU and the BSC, the transmission between the BBU and the RFU, the transmission between the cascaded BTSs, and the transmission between the BTSs in ring topology.

4.3 Checking Software Version and Data Configuration
This describes how to check software version and data configuration to ensure the correctness of the software version and configuration data. The items to be checked are the configuration and status of the board, the software version information, and the consistency between the hardware installation and the data configuration.

4.4 Checking the Alarm Information of the BTS (on the LMT)
This describes how to check the alarm information of the BTS on the **BSC6000 Local Maintenance Terminal**. If an alarm is generated, you need clear the alarm based on the suggestions in the BSS Help System.

4.5 Commissioning the BTS Services
This describes how to use an MS to test whether the BTS supports CS services and PS services.

4.6 Checking the BTS Environment Alarms
This describes how to check the BTS environment alarms. It also describes how to monitor the operating environment of the BTS.

4.1 Starting the LMT

You can directly log in to the LMT, or log in to the LMT through the M2000 client.

Context

CAUTION

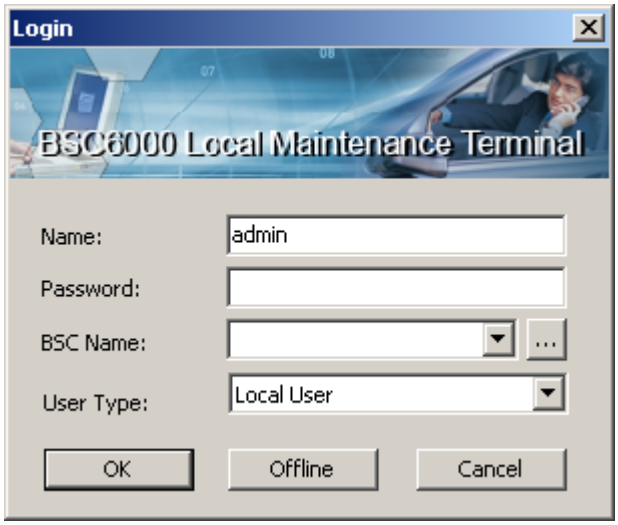
Do not modify the system time when the LMT application is running. Otherwise, critical errors may occur on the system. If you have to modify the server time, stop the LMT application first.

The default user name and password for the first login are both admin. After you log in to the system for the first time, you are required to change the password. The new password should comply with the default password policy.

Procedure

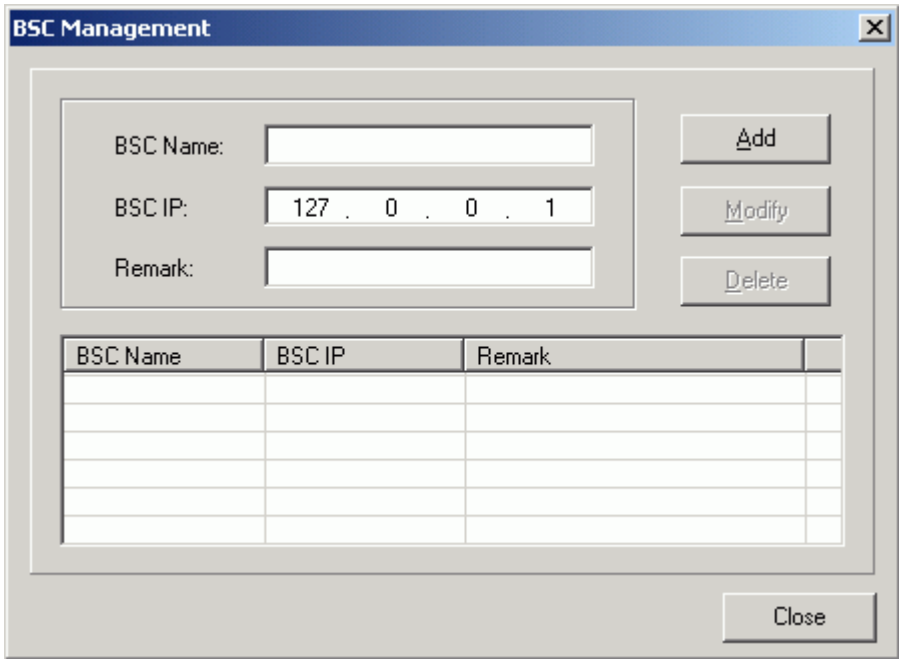
- Directly log in to the LMT.
  1. Choose **Start** > **All Programs** > **Huawei Local Maintenance Terminal** > **BSC6000V900B008Cxx** > **BSC6000 Local Maintenance Terminal**. The **BSC6000 Local Maintenance Terminal** window is displayed, as shown in **Figure 4-1**.
     - If you can find the target BSC for login from the **BSC Name** drop-down list, go to **Step 5**.
     - If you cannot find the target BSC for login from the **BSC Name** drop-down list, go to **Step 2**.

     Figure 4-1 Login dialog box of the BSC6000 Local Maintenance Terminal

  2. Click ... . The **BSC Management** dialog box is displayed, as shown in **Figure 4-2**.

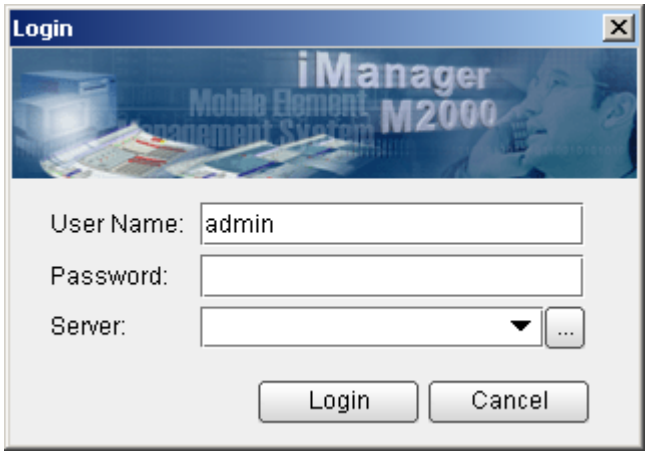
Figure 4-2 BSC Management dialog box



3. Type the IP address of the BSC, the name of the BSC, and the remarks (optional) in corresponding fields. Then, click **Add**.
4. Click **Close** to return to the **Login** dialog box, as shown in **Figure 4-1**.
5. Type the user name and the password in the **Name** and **Password** text boxes. Select the BSC name from the **BSC Name** drop-down list, and set **User Type** to **Local User**. Then, click **OK**.

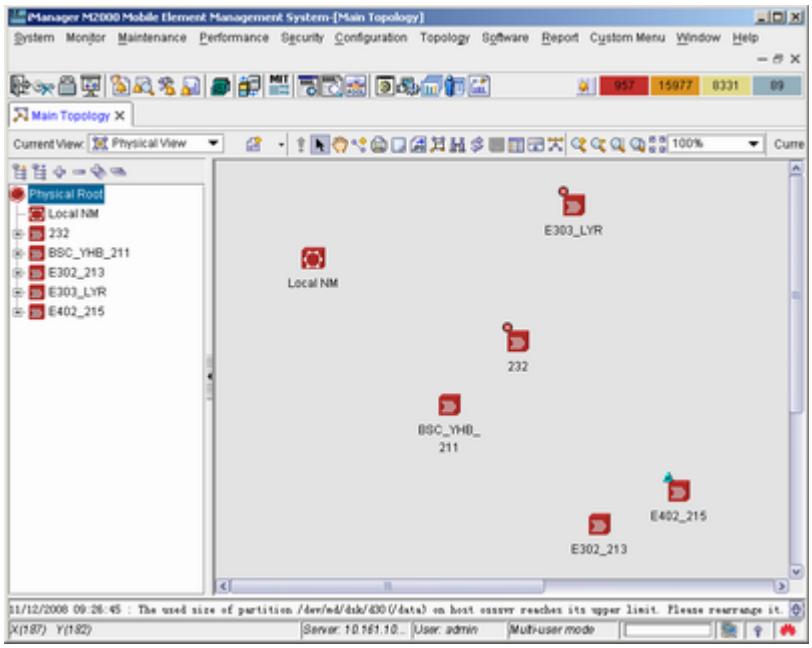
- Log in to the BSC LMT through the M2000 client.
  1. Choose **Start** > **All Programs** > **iManager M2000 Client** > **M2000 Client**.
     The *Login* dialog box is displayed, as shown in **Figure 4-3**.

Figure 4-3 Login dialog box of the M2000 client



2. Enter user name in **User Name**, enter the password in **Password**, and enter **IP address of the server** in **Server**. Click **Login**.
3. In the **iManager M2000 Mobile Element Management System** window, choose **Topology** > **Main Topology**, as shown in **Figure 4-4**. **Main Topology** is displayed on the left side of the dialog box.

Figure 4-4 iManager M2000 Mobile Element Management System window



4. Choose **Physical Root** on the **Main Topology** tab page, right-click the BSC that the BTS belongs to, and choose **Maintenance Client** from the displayed shortcut menu. The **BSC6000 Local Maintenance Terminal** window is displayed.

----End

4.2 Checking the Transmission and Networking

This describes how to check the transmission and networking. The purpose of checking the transmission and networking is to ensure that the BTS3900A transmission cables and hardware are correctly installed. The items to be checked consist of the transmission between the BBU and the BSC, the transmission between the BBU and the RFU, the transmission between the cascaded BTSs, and the transmission between the BTSs in ring topology.

4.2.1 Checking the Transmission Between the RRU and the BBU or Between the BBU and the BSC on the LMT

This describes how to check the transmission between the BBU and the BSC and the transmission between the BBU and the RFU.

4.2.2 Checking the Transmission Between Cascaded BTSs

This describes how to check the transmission between cascaded BTSs when there are cascaded BTSs on site. The following description takes the level 3 cascaded BTSs as an example, and describes how to check the transmission between cascaded BTSs.

4.2.3 Checking the Transmission Between BTSs in Ring Topology
This describes how to check the transmission between BTSs in ring topology. The following description is based on three BTSs in ring topology.

4.2.1 Checking the Transmission Between the RRU and the BBU or Between the BBU and the BSC on the LMT

This describes how to check the transmission between the BBU and the BSC and the transmission between the BBU and the RFU.

Procedure

Step 1 Choose **BSC Maintenance** > **Maintain Transmission and Signaling** > **Maintain LAPD Link** on the LMT.

The **Maintain LAPD Link** dialog box is displayed.

Step 2 Select the link and site to be queried, and click **Query**. The result is displayed on the **Query Result** window.

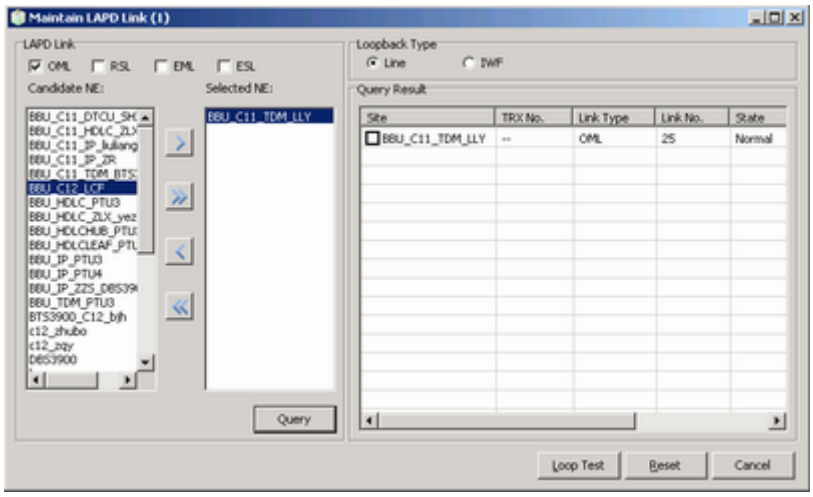
If...	Then...
OML links and RSL links are normal	End the checking task.
OML links or RSL links are faulty	Check for the related alarm, for example, 1000 LAPD_OML Fault alarm. Then rectify the fault according to the alarm help. The possible causes of the faulty links are as follows: ● The BTS does not work properly. ● The transmission cables between the BSC and the RFU or BBU are damaged, or the ports to which the transmission cables are connected are faulty. **NOTE** If the BTS data has just been configured on the LMT, you should reset the BBU first. After the BBU detects the information sent by the BSC and initiates the link setup procedure, the OML link can be detected.

----End

Example

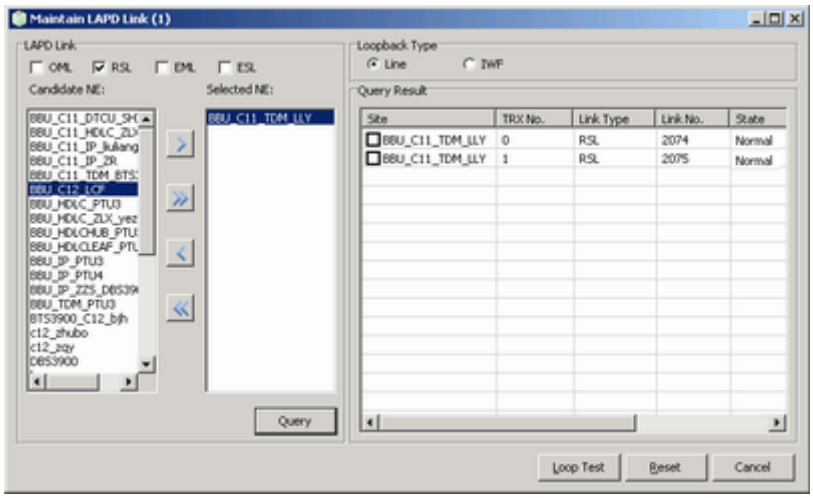
- Check whether the OML link between the BBU and the BSC is normal. If the state of the OML link is normal, the BBU is properly connected to the BSC, as shown in **Figure 4-5**.

Figure 4-5 Check whether the link between the BBU and the BSC is normal



- Check whether the RSL link between the BBU and the RFU is normal. If the state of the RSL link is normal, the BBU is properly connected to the RFU, as shown in **Figure 4-6**.

Figure 4-6 Check whether the link between the BBU and the RFU is normal



4.2.2 Checking the Transmission Between Cascaded BTSs

This describes how to check the transmission between cascaded BTSs when there are cascaded BTSs on site. The following description takes the level 3 cascaded BTSs as an example, and describes how to check the transmission between cascaded BTSs.

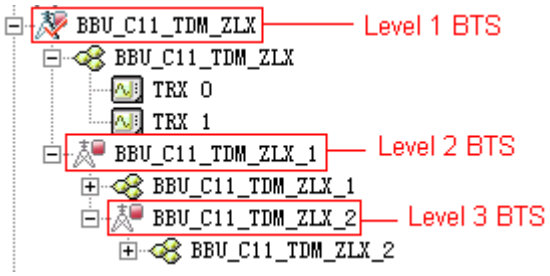
Prerequisite

- The physical connection between cascaded BTSs on the BTS side is complete.
- The BTS is in TDM or HDLC transmission mode.

Context

Figure 4-7 shows the cascaded BTSs in the **BSC6000 Local Maintenance Terminal** window.

Figure 4-7 Cascaded BTSs on the LMT



Procedure

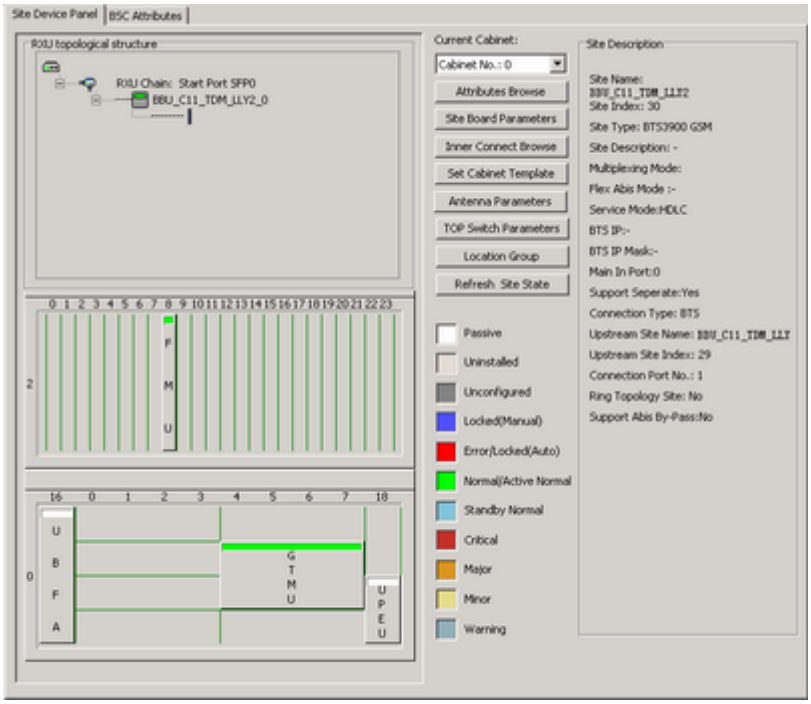
Step 1 Check whether cascaded BTSs are configured on the LMT.

If...	Then...
Cascaded BTSs are configured	Go to **Step 2**.
Cascaded BTSs are not configured	See the *BSC Initial Configuration Guide* to configure the BTSs.

Step 2 In the left pane of the **BSC6000 Local Maintenance Terminal** window, select the level 2 BTS and level 3 BTS respectively. Check whether each board on the **Site Device Panel** tab ipage s displayed in green, as shown in **Figure 4-8**.

- If the board is displayed in green, you can infer that the board is functional. End this task.
- If the board is not displayed in green, you can infer that the transmission between cascaded BTSs is abnormal. Go to **Step 3**.

Figure 4-8 Site Device Panel tab page



Step 3 On the BTS side, check the physical connection between the BBU of the level 1 BTS and BBU of the level 2 BTS. Normally, the **T1** of the first E1/T1 of the level 2 BTS should be connected to the **R2** of the second E1/T1 of the level 1 BTS, and the **R1** of the first E1/T1 of the level 2 BTS should be connected to the **T2** of the second E1/T1 of the level 1 BTS.

- If the link is normal, the status of the **LIU1** LED on the level 1 BTS and the **LIU0** LED on the level 2 BTS changes from **ON** disconnected to **OFF** connected.
- If the link is still not normal, contact Huawei technical support engineers on the BTS side for troubleshooting.

Step 4 On the BTS side, see **Step 3** to check the physical connection between the BBU of the level 2 BTS and BBU of the level 3 BTS.

----End

4.2.3 Checking the Transmission Between BTSs in Ring Topology

This describes how to check the transmission between BTSs in ring topology. The following description is based on three BTSs in ring topology.

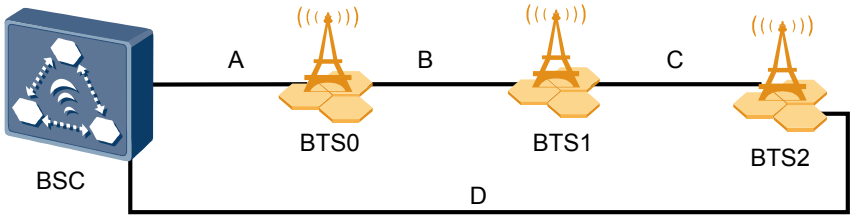
Prerequisite

The physical connection between BTSs in ring topology on the BTS side is complete.

Context

- **Figure 4-9** shows the connection between BTSs in ring topology. A, B, C, and D show the positions where the link may be broken during the ring topology transmission.

Figure 4-9 Connection between ring topology BTSs



- In this document, set the forward port to port 0 and reverse port to port 1.

Procedure

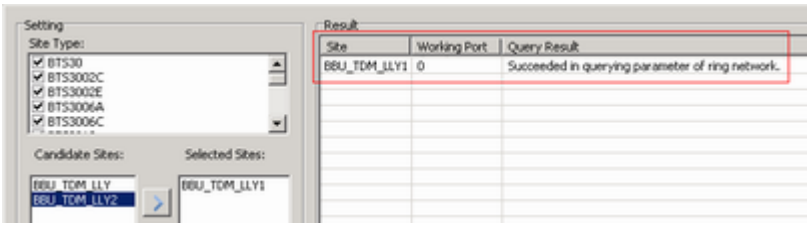
Step 1 Check whether of BTSs in ring topology are configured on the LMT.

If...	Then...
The ring topology is configured	Go to **Step 2**.
The ring topology is not configured	Configure the ring topology. For details, see the *BSC Initial Configuration Guide*.

Step 2 In the **BSC6000 Local Maintenance Terminal** window, choose **BTS Maintenance** > **Maintain Site** > **Maintain Ring Network**, and the **Maintain Ring Network** dialog box is displayed.

Step 3 In the **Setting** text box, select **Site Type** and level 2 BTS, and click **Query**. The query results are displayed in the **Result** area, as shown in **Figure 4-10**. Port 0 serves as the working port. **Query Result** shows **Ring Topology Parameter Query Success**. The query result indicates that the link setup is successful and the OML receives the related data configuration.

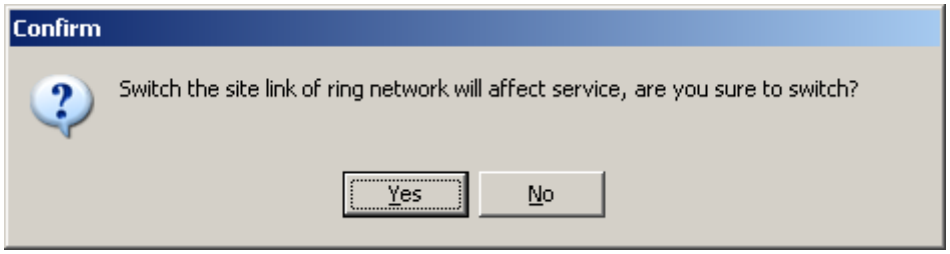
Figure 4-10 Maintain Ring Network dialog box



Step 4 Check the switchover of the forward ring port and the reverse ring port on the LMT.

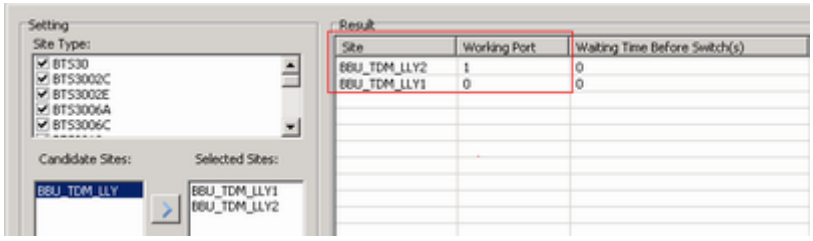
1. In the **Query Result** area, right-click the level 2 BTS. A dialog box is displayed. Click **Switch**. The **Confirm** dialog box is displayed, as shown in **Figure 4-11**.

Figure 4-11 Confirm dialog box



2. Click**Yes**, the **Switchover Success** dialog box is displayed. The level 2 BTS and level 3 BTS reset automatically.
3. After the level 2 and level 3 BTS are reset, query the information about the ring topology of the level 2 and level 3 BTSs. **Figure 4-12** shows the query result. The level 3 BTS is successfully connected in the reverse direction, and the working port is changed from port 0 to port 1. You can infer that the BTS can perform the switchover from the forward ring port to the reverse ring port.

Figure 4-12 Result of the ring topology switchover (1)

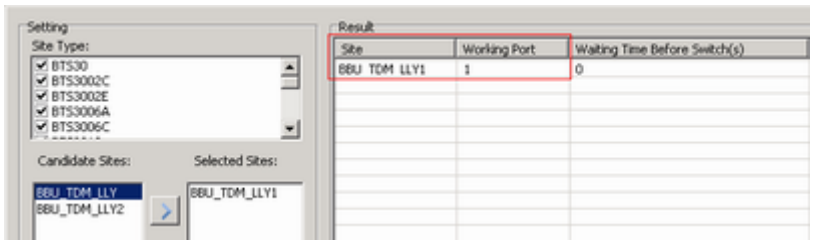


4.

Step 5 Disconnect the BTSs in ring topology manually, and check the automatic switchover of BTSs in ring topology. When the physical connection between BTSs in ring topology is disconnected, the lower-level BTS at the disconnected point works in the reverse link, and the upper-level BTS works in the forward link.

1. On the BTS side, disconnect the transmission cable between the level 1 BTS and level 2 BTS. The level 2 BTS resets automatically.
2. After the reset of the level 2 BTS is complete, see **Step 2** and **Step 3** to query the information about ring topology. **Figure 4-13** shows the query result. The working port of the level 2 BTS is changed from port 0 to port 1. You can infer that the automatic switchover of the lower-level BTS is complete.

Figure 4-13 Result of the ring topology switchover (2)



CAUTION

In normal situations, after **Step 4** or **Step 5** is performed, the cascaded BTSs will automatically switch over to the forward link. If the BTSs fail to switch over to the forward link automatically, check the connections of the transmission cables, for example, the connections of the TX and RX ends of the E1 cable.

----End

4.3 Checking Software Version and Data Configuration

This describes how to check software version and data configuration to ensure the correctness of the software version and configuration data. The items to be checked are the configuration and status of the board, the software version information, and the consistency between the hardware installation and the data configuration.

4.3.1 Checking the Board Configuration and Status on the LMT
This describes how to check the configuration and status of the BTS boards.

4.3.2 Checking the Current Software Version on the LMT
This describes how to check the current software version of the boards and modules of the BTS.

4.3.3 Checking the Consistency Between Hardware Installation and Data Configuration
This describes how to check the consistency between hardware installation and data configuration. The consistency is confirmed by checking the configuration and board status on the LMT.

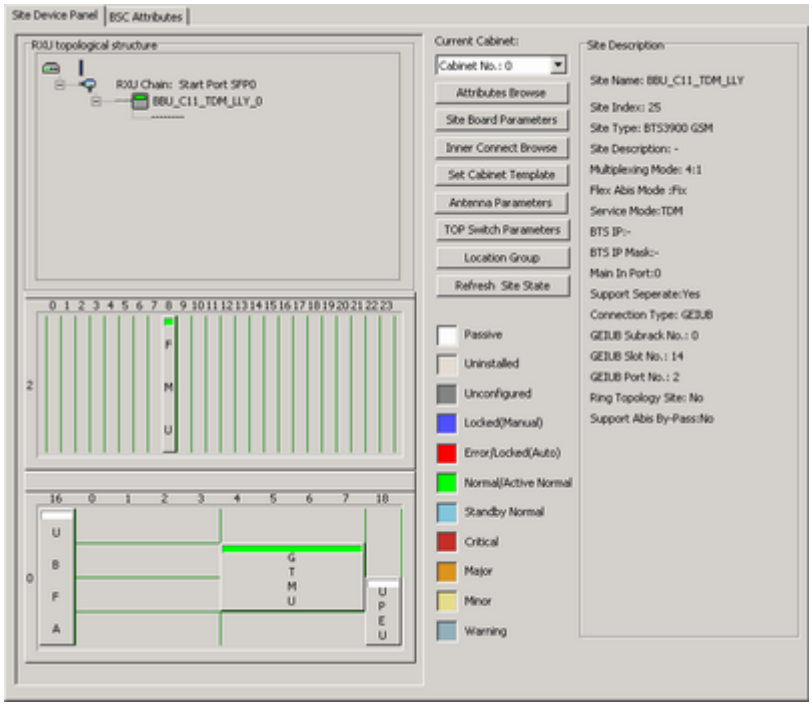
4.3.1 Checking the Board Configuration and Status on the LMT

This describes how to check the configuration and status of the BTS boards.

Procedure

Step 1 Click **Site Device Panel** to check the configured boards, as shown in **Figure 4-14**.

Figure 4-14 Site Device Panel tab page

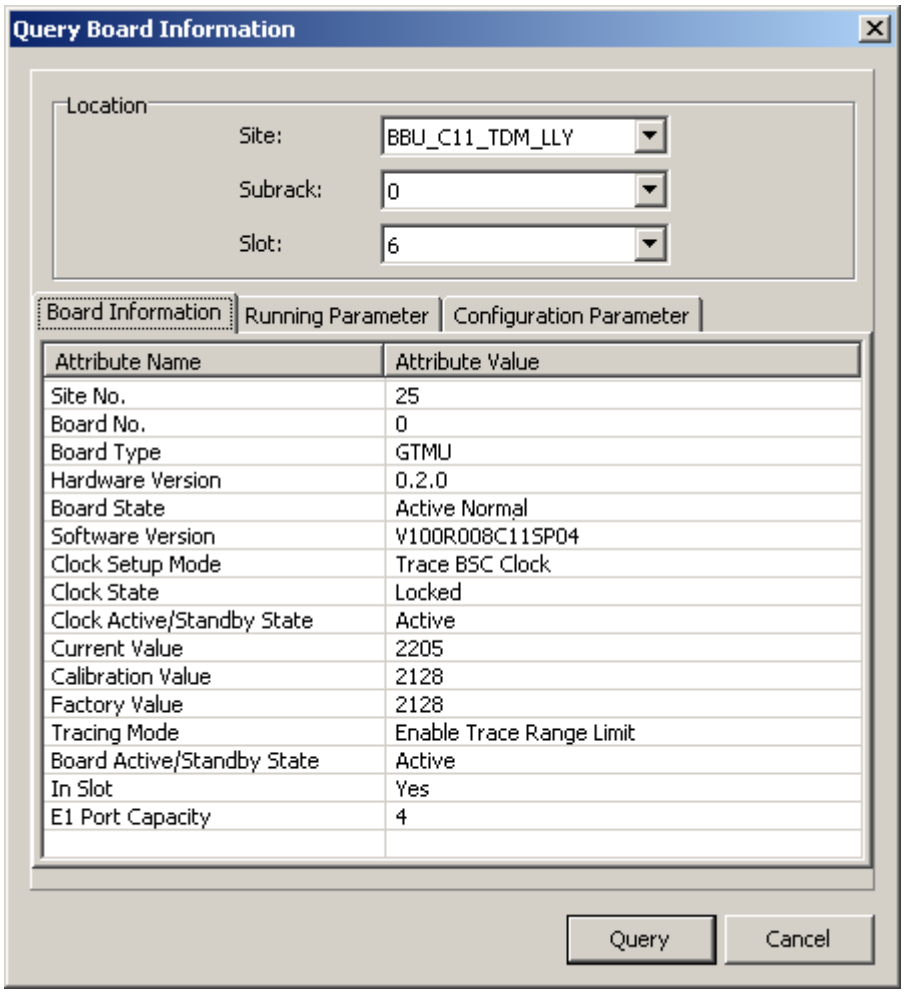


Step 2 Check the status of boards: The green color indicates that the board is **Normal**. The red color indicates that the board is **Faulty**. The white color indicates that the board is **Passive**, that is, the board has no input power.

Step 3 Check the board status further: Right-click the board to be queried, and then choose **Query Board Information** from the shortcut menu.

The **Query Board Information** dialog box is displayed, as shown in **Figure 4-15**.

Figure 4-15 Query Board Information dialog box



Step 4 Check whether **Board State** is **Actively Normal** in the **Query Board Information** dialog box. If the status is **Faulty**, go to **Step 5** to check the alarm information.

Step 5 See **4.4 Checking the Alarm Information of the BTS (on the LMT)** to check the alarm information and clear the alarm according to the *BSS Alarm Reference*.

----End

4.3.2 Checking the Current Software Version on the LMT

This describes how to check the current software version of the boards and modules of the BTS.

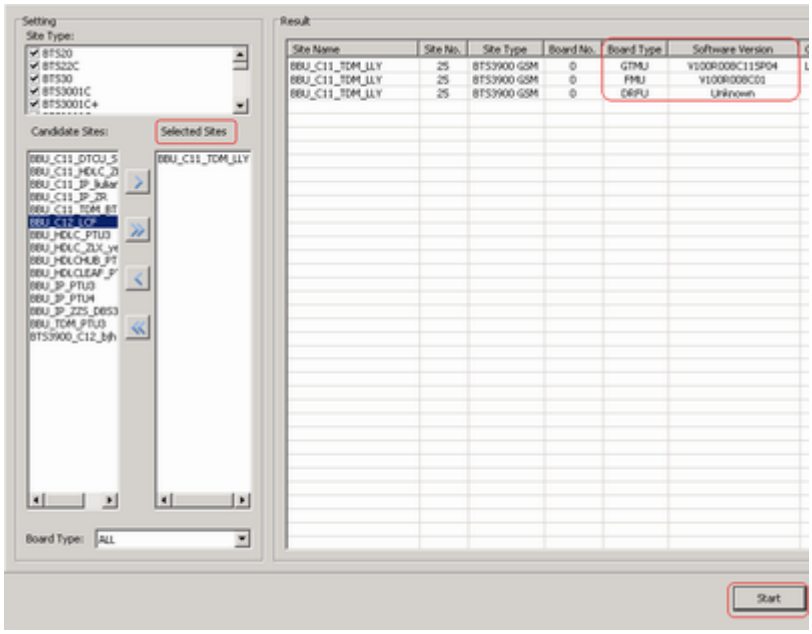
Procedure

Step 1 In the **BSC6000 Local Maintenance Terminal** window, choose **BTS Maintenance** > **Query Board Running Software Version**.

The **Query Board Running Software Version** dialog box is displayed.

Step 2 Select **BTS3900/BTS3900A** under **Site Type**, and select the site to be queried under **Candidate Sites**, and then add the site to the **Selected Sites** area. Click **Start** to query the software version of the BTS3900/BTS3900A boards, as shown in **Figure 4-16**.

Figure 4-16 Query Board Running Software Version dialog box



Step 3 If the software version is correct, end this task. If the software version is incorrect, update the software version through the loading and activation function of the LMT. For details, see the *BSC LMT User Guide*.

----End

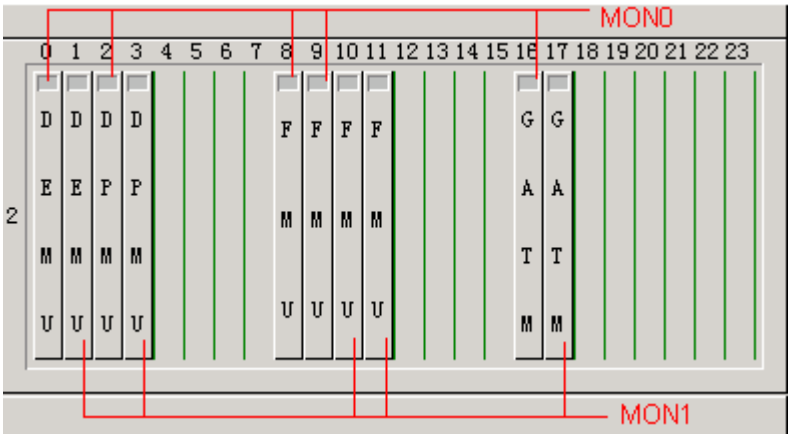
4.3.3 Checking the Consistency Between Hardware Installation and Data Configuration

This describes how to check the consistency between hardware installation and data configuration. The consistency is confirmed by checking the configuration and board status on the LMT.

Context

- CPRI connections: The port numbers SFP0 to SFP5 in the **RXU topological structure** area on the LMT correspond to the ports CPRI0 to CPRI5 on the panel of the BBU.
- Slots for the RFUs: On the LMT, the RFUs are configured in subrack 3. The slot numbers of the RFUs are based on the configuration sequence of the TRXs, starting from slot 0. In actual installation, the installation slot of the RFU is determined by the actual requirements.
- The relations between the data configuration and the physical connections of monitoring boards connected to RS485 ports are described as follows:
  - **Figure 4-17** shows the relation between data configuration and physical connection of the BTS3900 monitoring boards.

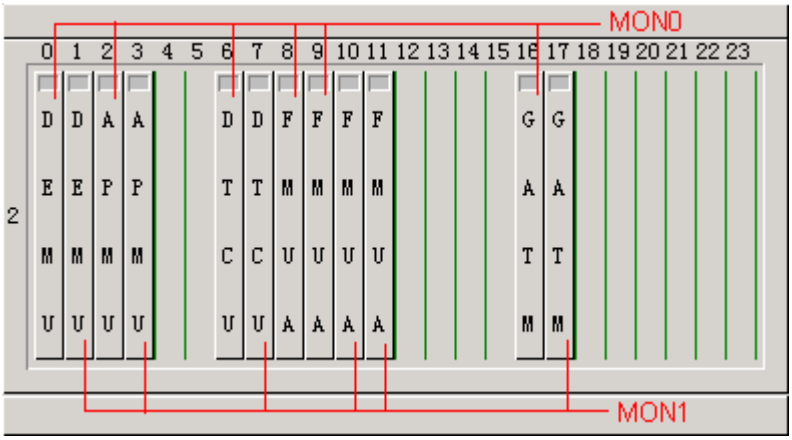
Figure 4-17 Relation between data configuration and physical connection of the BTS3900 monitoring boards



Monitoring Port on the GTMU	Relation Between Data Configuration and Physical Connection
MON0	In subrack 2, the DEMU in slot 0, DPMU in slot 2, FMUs in slot 8 and 9, and GATM in slot 16 are all connected to the MON0 port on the GTMU physically. Physical connections: The monitoring signal cable connects the MON0 port on the GTMU and one monitoring board, and the other monitoring boards are connected to this board in cascaded mode.
MON1	In subrack 2, the DEMU in slot 1, DPMU in slot 3, FMUs in slot 10 and 11, GATM in slot 17 are all connected to the MON1 port on the GTMU physically. Physical connections: The monitoring signal cable connects the MON1 port on the GTMU and one monitoring board, and the other monitoring boards are connected to this board in cascaded mode.

- **Figure 4-18** shows the relation between data configuration and physical connection of the BTS3900A monitoring boards.

Figure 4-18 Relation between data configuration and physical connection of the BTS3900A monitoring boards



Monitoring Port on the GTMU	Relation Between Data Configuration and Physical Connection
MON0	In subrack 2, the DEMU in slot 0, DPMU or APMU in slot 2, DTCU in slot 6, FMUs or FMUAs in slot 8 and 9, and GATM in slot 16 are all connected to the MON0 port on the GTMU physically. Physical connections: The monitoring signal cable connects the MON0 port on the GTMU and one monitoring board, and the other monitoring boards are connected to this board in cascaded mode.
MON1	In subrack 2, the DEMU in slot 1, DPMU or APMU in slot 3, DTCU in slot 7, FMUs or FMUAs in slot 10 and 11, and GATM in slot 17 are all connected to the MON1 port on the GTMU physically. Physical connections: The monitoring signal cable connects the MON1 port on the GTMU and one monitoring board, and the other monitoring boards are connected to this board in cascaded mode.

NOTE

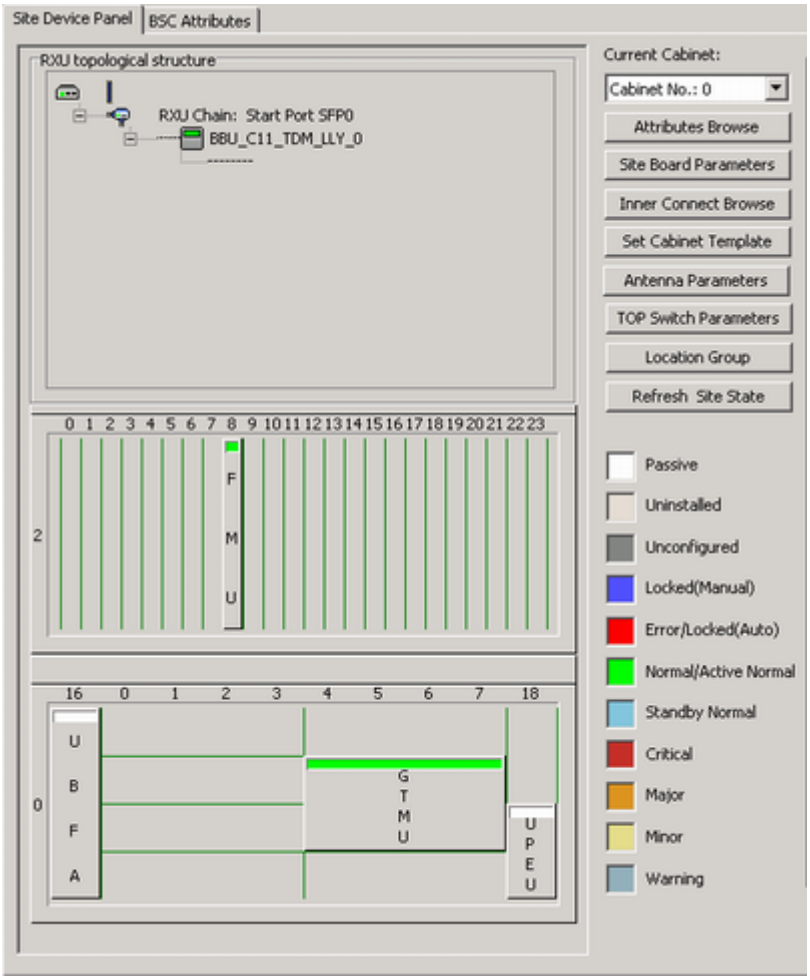
- Connection between the MON0 port and the two FMUs or FMUAs: The FMU or FMUA in slot 9 is connected to the MON0 port through the FMU or FMUA in slot 8.
- Connection between the MON1 port and the two FMUs or FMUAs: The FMU or FMUA in slot 11 is connected to the MON1 port through the FMU or FMUA in slot 10.
- A maximum of two DEMUs, DPMUs, APMUs, DTCUs, and GATMs can be configured for each BTS, while a maximum of four FMUs or FMUAs can be configured.

Procedure

Step 1 In the **BSC6000 Local Maintenance Terminal** window, click the **Site Device Panel** tab page to check the board configuration of the BTS.

Step 2 Check the boards status. If the configured boards are operational, the boards are shown in green, as shown in **Figure 4-19**. If the boards are shown in red, the boards are faulty.

Figure 4-19 Site Device Panel tab page

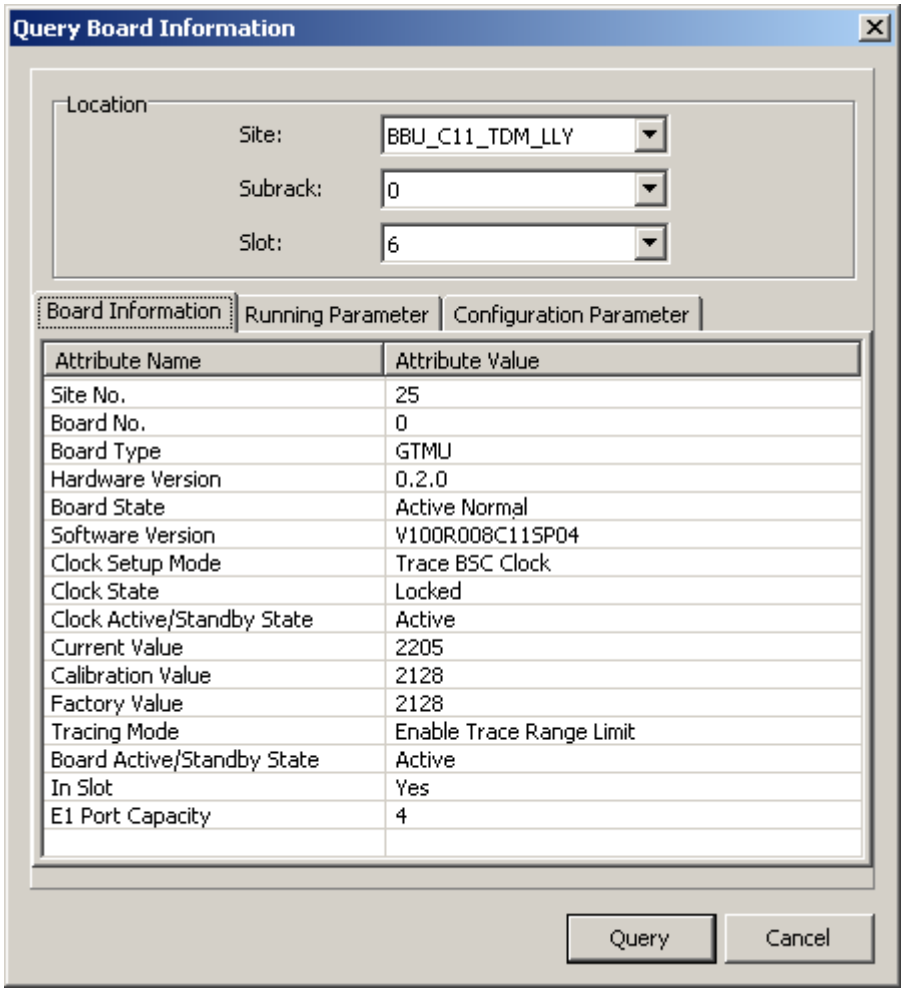


Step 3 Check board status further: Right-click the board to be queried, and then choose the **Query Board Information** dialog box from the shortcut menu. The **Query Board Information** dialog box is displayed.

Step 4 Check whether the **Board State** is Active Normal in the **Board Information** tab page, as shown in **Figure 4-20**.

- If it is Active Normal, the hardware installation and data configuration of the boards are consistent.
- If it is Faulty, check for the related alarms. For details about how to handle the alarms, see the *BSS Alarm Reference*.

Figure 4-20 Query Board Information dialog box



TIP

If...	Then...
The number of BBUs installed is different from the number of BBUs configured	The system reports **E1 Local Alarm**.
More RFUs are installed than those configured	The system reports **SFP Port Inconsistency Alarm**.
Fewer RFUs are installed than those configured	The system reports **SFP Port Inconsistency Alarm** and **TRX Communication Alarm**.
A board other than the BBU and RFU is configured but not installed.	The system reports ****** Communication Alarm**, such as **Fan Subassembly Communication Alarm** and **PMU Communication Alarm**.

If...	Then...
A board other than the BBU and RFU is installed but not configured	No alarm is reported.

----End

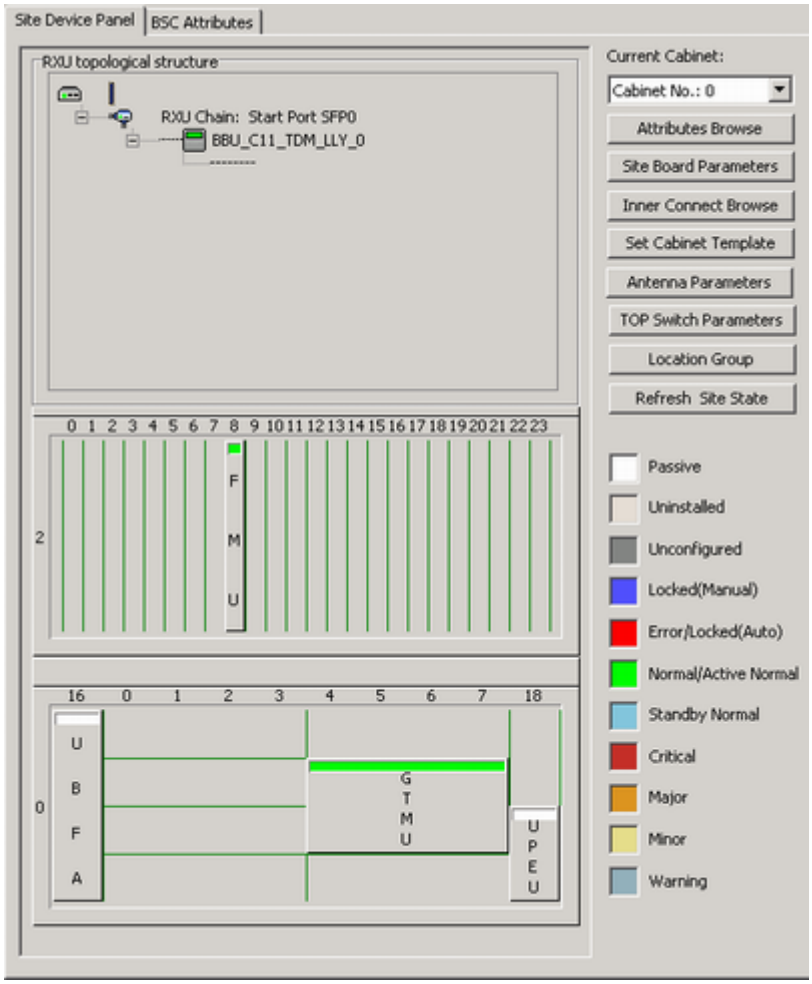
4.4 Checking the Alarm Information of the BTS (on the LMT)

This describes how to check the alarm information of the BTS on the **BSC6000 Local Maintenance Terminal**. If an alarm is generated, you need clear the alarm based on the suggestions in the BSS Help System.

Procedure

Step 1 Choose **BTS** in the navigation bar on the left pane of the **BSC6000 Local Maintenance Terminal**. In the displayed **Site Device Panel** tab page, check whether alarms related to the BTS boards exist. Check the status of boards: The green color indicates that the board is **Normal**. The red color indicates that the board is **Error**, and an alarm exists. **Figure 4-21** shows the **Site Device Panel** tab page.

Figure 4-21 Site Device Panel tab page

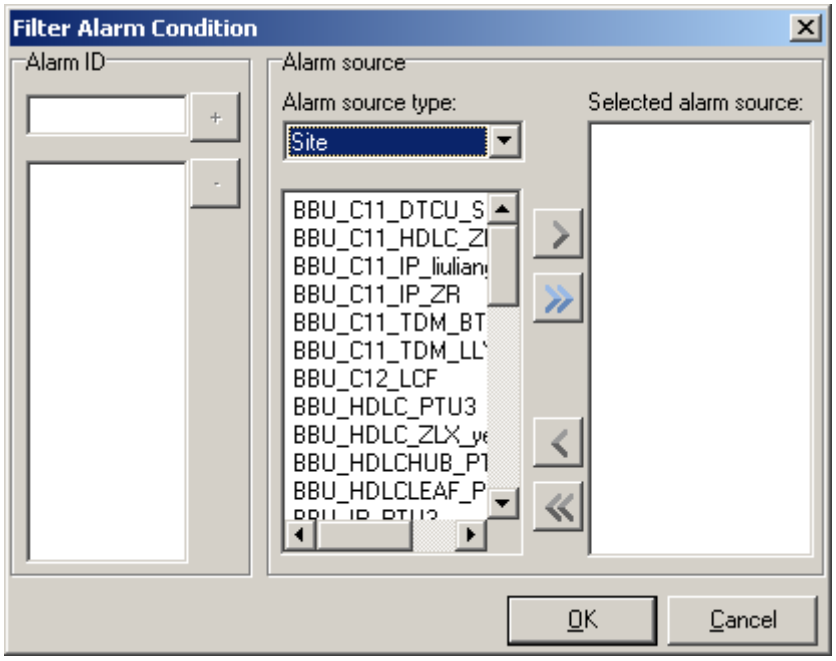


If...	Then...
No alarm is generated	Repeat **1** to check the alarm information of other BTSs.
An alarm is generated	Go to **2**. Check the alarm generated on this BTS through **Alarm Maintenance**. Clear the alarm based on the troubleshooting suggestions.

Step 2 Alarm maintenance: Check the alarms of the BTS.

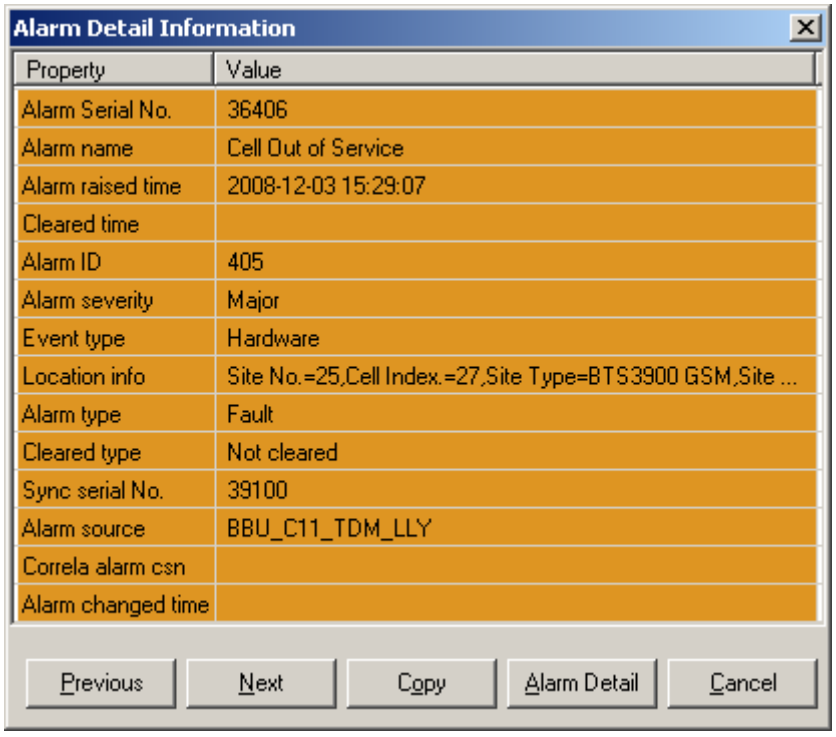
1. Choose **Alarm Maintenance** > **Browse Alarm**. The **Browse Alarm** dialog box is displayed.
2. Right-click an alarm, and choose **Filter Alarms...** from the shortcut menu. The **Filter Alarm Condition** dialog box is displayed, as shown in **Figure 4-22**.

Figure 4-22 Filter Alarm Condition dialog box



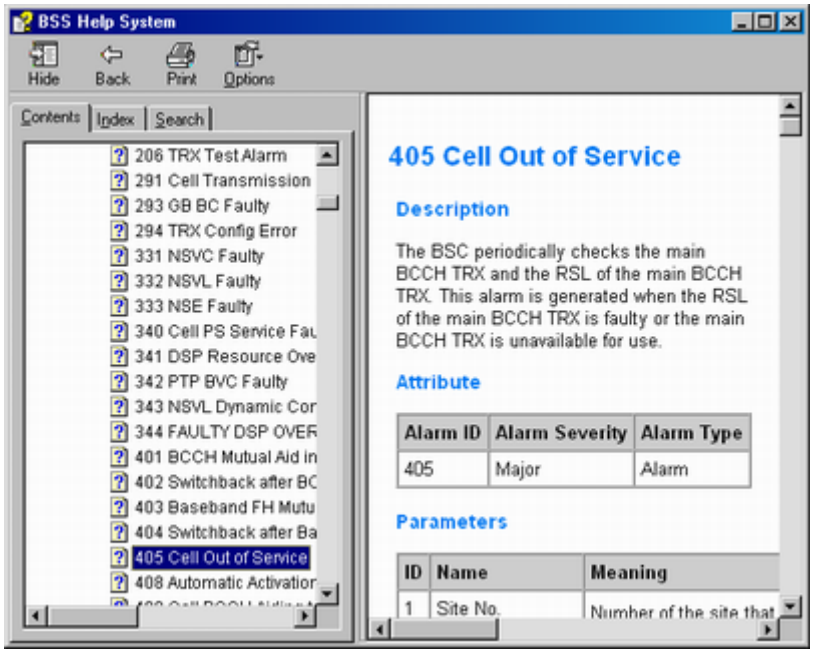
3. Choose the *Site* to be queried, and click **OK**.
4. Double-click an alarm. The **Alarm Detail Information** dialog box is displayed, as shown in **Figure 4-23**.

Figure 4-23 Alarm Detail Information dialog box



5. Click **Alarm Detail**, and the *BSS Help System* is displayed, as shown in **Figure 4-24**. Handle the alarm according to the *BSS Alarm Reference*.

Figure 4-24 BSS Help System



----End

4.5 Commissioning the BTS Services

This describes how to use an MS to test whether the BTS supports CS services and PS services.

Prerequisite

- The transmission between the BSC and the BTS is normal, and the transmission between the BSC and the LMT is normal.
- The current software version and data configuration are correct.
- No alarm related to disruption of BTS services is reported on the LMT.

4.5.1 Testing the CS Services

This describes how to test the CS services by making test calls between two MSs or between an MS and a PSTN phone.

4.5.2 Commissioning PS Services

This describes how to commission PS services by website browsing and file downloading through an MS. A laptop is required to monitor the commissioning. You need to commission only the BTS that is configured with the GPRS or EGPRS services.

4.5.1 Testing the CS Services

This describes how to test the CS services by making test calls between two MSs or between an MS and a PSTN phone.

Prerequisite

- Two test MSs which support GSM are registered with the HLR.
- The logical cells to be checked are activated.
- The BSC functions properly.

Procedure

Step 1 Power on one test MS, and check that the MS automatically searches for the GSM network.

If...	Then...
The testing MS fails to find the GSM network	Check that the test MS is configured with the SIM card and the SIM card supports authentication and encryption.
The test MS finds the GSM network	Go to **Step 2**.

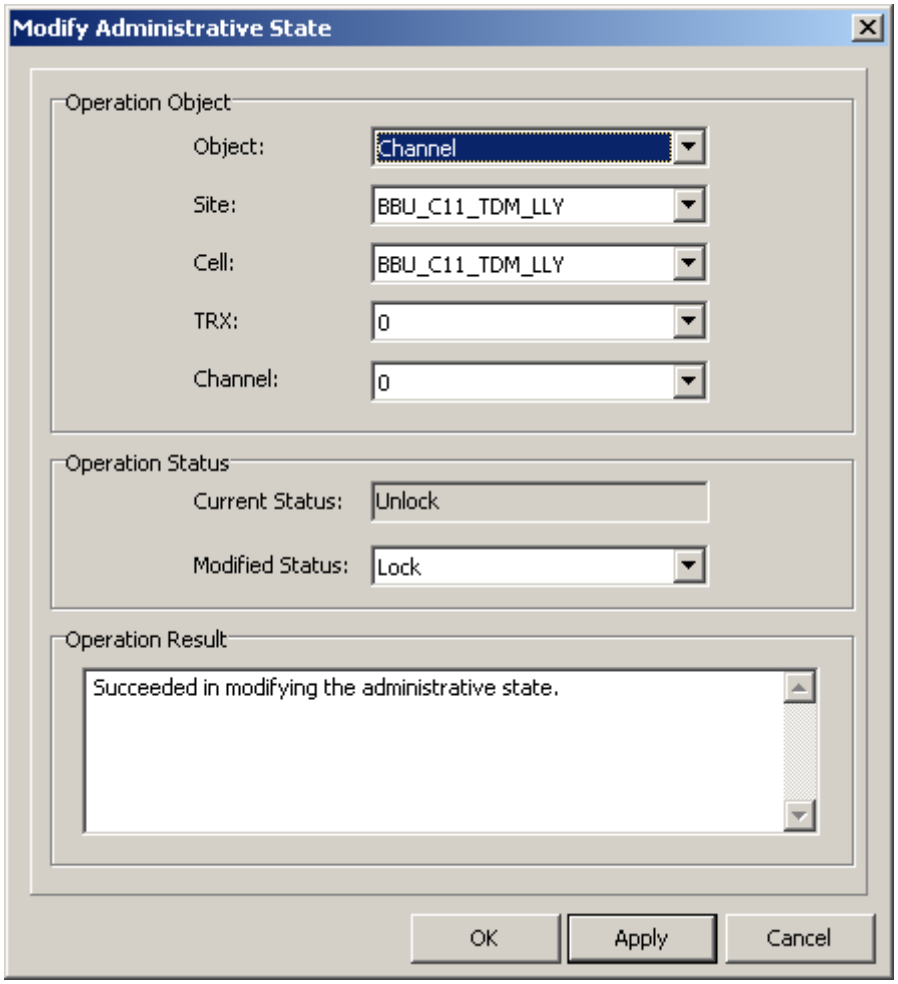
Step 2 Lock the testing MS on a frequency in a logical cell under the BTS.

If...	Then...
The test lasts at least 40n minutes (n is the number of carriers)	Go to **Step 3**. Conduct the call test on a special TCH.
The test lasts less than 40n minutes	Go to **Step 4**. Conduct the call test directly.

Step 3 Set the state of the TRX TCH.

1. On the LMT, choose **BTS Maintenance** > **Modify Administrative State**. The **Modify Administrative State** dialog box is displayed, as shown in **Figure 4-25**.

Figure 4-25 Modify Administrative State dialog box



2. Change the status of all the TRX TCHs in the cell from Unlocked to Locked. If the operation succeeds, the Succeeded in modifying the administrative state. message is displayed in the Operation Result area.
3. Lock the testing MS on a specific frequency. Change the state of one or two TCHs on the frequency from Locked to Unlocked. Then, conduct the call tests on this TCH.

Step 4 Conduct the call test as follows:

1. Make a call from one MS to the other, and hook on after the conversation.
2. Make a call from one MS to a PSTN phone, and hook on after the conversation.
3. Make a call from a PSTN phone to one MS, and hook on after the conversation.

NOTE

- It is recommended that each type of test calls be conducted for more than five times to ensure the results.
- If time permits, it is recommended that one call test be conducted for each the channels of all the TRXs. For detailed operations, see **Step 3**.

Step 5 Ensure that all calls are successful, the conversion is normal, and voice quality is clear.

If...	Then...
Mobile-originated call succeeds	1. Check the LEDs and alarms. If an alarm is generated on the BTS side, clear the alarm. 2. If an alarm is generated on the BSC side, contact BSC technical support engineers to handle it. 3. After the fault is rectified, go to **Step 1** to test the CS services for another time.
Mobile-originated call succeeds, and mobile-terminated call fails	The data configuration on the BSC side is improper. Contact BSC technical support engineers for troubleshooting.

Step 6 Test short message service (SMS) as follows: Use two testing MSs to send SMS messages to each other, and ensure that all the SMS messages are successfully sent and received.

Step 7 Choose a proper operation procedure based on actual conditions.

If...	Then...
Step 3 is performed	1. Repeat **Step 3** through **Step 6** to verify the CS services of other TCHs on the same frequency. 2. Repeat steps **Step 2** through **Step 6** to test the CS services in other logical cells at the site.
Step 3 is not performed	Repeat **Step 2**, and **Step 4** through **Step 6** to verify the CS services in other logical cells at the site.

----End

4.5.2 Commissioning PS Services

This describes how to commission PS services by website browsing and file downloading through an MS. A laptop is required to monitor the commissioning. You need to commission only the BTS that is configured with the GPRS or EGPRS services.

Prerequisite

- One test MS that supports GSM and PS services is registered with the HLR.
- The BTS cell to be checked is configured with the GPRS or EGPRS services.
- The logical cell to be checked is activated.
- The computer and the BSC work properly.

Procedure

Step 1 Activate the GPRS or EGPRS data service with the MS. Then, commission PS services through multi-service testing. The PS service test involves sending multimedia message, browsing websites, and downloading files.

Step 2 Check whether the MS can successfully send multimedia messages, browse webpages, and download files.

If...	Then...
One of the three PS service tests is successful	The hardware on the BTS side meets the requirements for PS services.
All the three PS service tests fail	Check whether the test MS works properly, for example, the test MS is configured with the SIM card or the SIM card supports authentication and encryption.

Step 3 Repeat **Step 1** through **Step 2** to test PS services in other cells under the BTS.

----End

4.6 Checking the BTS Environment Alarms

This describes how to check the BTS environment alarms. It also describes how to monitor the operating environment of the BTS.

4.6.1 BTS Environment Alarm Types
This describes the various types of environment alarms of the BTS. The alarms consist of the fire alarm, smoke alarm, infrared alarm, water alarm, temperature alarm, humidity alarm, air-conditioner alarm, door status alarm, and burglar alarm.

4.6.2 Checking the Environment Monitoring Alarms on the LMT
This describes how to check the environment monitoring alarms. Checking the environment monitoring alarms is implemented through simulating the environment factors that may generate alarms, thus checking whether the physical connections of the BTS can report and clear the alarms. Note that the BTS technical support engineers should assist in checking the Boolean environment monitoring alarm.

4.6.1 BTS Environment Alarm Types

This describes the various types of environment alarms of the BTS. The alarms consist of the fire alarm, smoke alarm, infrared alarm, water alarm, temperature alarm, humidity alarm, air-conditioner alarm, door status alarm, and burglar alarm.

NOTE

- Critical alarm: devices or resources may be unusable, and restoration should be performed at once.
- Major alarm: The QoS of devices or resources severely deteriorates, and measures should be taken as soon as possible.
- The thresholds of temperature alarm and humidity alarm are subject to the local climate and terrain conditions and should be specified on the basis of the field requirements.

Fire Alarm

The fire alarm is the environment alarm generated when the equipment room is on fire. This is a critical alarm.

Smoke Alarm

The smoke alarm is an environment alarm generated when the smoke density in the equipment room reaches a predefined threshold. This is a critical alarm.

Infrared Alarm

The infrared alarm is an environment alarm generated when an infrared facility is taken into the equipment room or is in the infrared detection range of the cabinet. This is a major alarm.

Water Alarm

The water alarm is an environment alarm generated when water immersion occurs in the equipment room. This is a major alarm.

Temperature Alarm

The temperature alarm consists of the overtemperature alarm and the undertemperature alarm. This is a major alarm.

- The overtemperature alarm is generated when the ambient temperature is higher than the predefined upper threshold of the temperature.
- The undertemperature alarm is generated when the ambient temperature is lower than the predefined lower threshold of the temperature.

Humidity Alarm

The humidity alarm consists of the high humidity alarm and the low humidity alarm. This is a major alarm.

- The high humidity alarm is generated when the environment humidity is higher than the predefined upper threshold of the humidity.
- The low humidity alarm is generated when the environment humidity is lower than the predefined lower threshold of the humidity.

Air-Conditioner Alarm

The air-conditioner alarm is generated when the air-conditioner is not running properly or the AC power supply is not normal. This is a major alarm.

Door Status Alarm

The door status alarm is an environment alarm generated when the door of the equipment room or the door of the cabinet is opened. This is a major alarm.

Burglar Alarm

The burglar alarm is generated when the infrared alarm or door status alarm occurs. This is a critical alarm.

4.6.2 Checking the Environment Monitoring Alarms on the LMT

This describes how to check the environment monitoring alarms. Checking the environment monitoring alarms is implemented through simulating the environment factors that may generate alarms, thus checking whether the physical connections of the BTS can report and clear the alarms. Note that the BTS technical support engineers should assist in checking the Boolean environment monitoring alarm.

Context

The BTS3900 GSM supports the monitoring boards of the DEMU, DPMU, FMU, and GATM. Besides the monitoring boards of the BTS3900 GSM, the BTS3900A GSM also supports the APMU, FMUA, and DTCU. **Table 4-1** describes the detailed configuration.

Table 4-1 Monitoring boards of the BTS3900 and the BTS3900A

Slot in Subrack 2	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
BTS3900 GSM	DEMU	DEMU	DPMU	DPMU	-	-	-	-	FMU	FMU	FMU	FMU	-	-	-	-	GATM	GATM
BTS3900A GSM	DEMU	DEMU	DPMU or APMU	DPMU or APMU	-	-	DTCU	DTCU	FMU or FMUA	FMU or FMUA	FMU or FMUA	FMU or FMUA	-	-	-	-	GATM	GATM

Procedure

- Commissioning the Boolean alarm (Door Open Alarm of the DEMU)

Alarm switch enabled and alarm switch valid level are required to be noted when checking the Boolean alarm both on the SMT and the LMT. The following part takes the **Door Open Alarm** of the DEMU as an example to describe the procedure for testing the Boolean alarm.

NOTE

- Trigger conditions of the **Door Open Alarm**: When the cabinet door of the BTS is open, the DEMU reports **Door Open Alarm**; when the cabinet door of the BTS is closed, the **Door Open Alarm** is cleared.
- Disable the **Door Open Alarm** and configure the alarm valid level: When the **Door Open Alarm** is disabled, the DEMU does not report the **Door Open Alarm**. In other words, the **Door Open Alarm** is shielded. Alarm valid level configuration specifies the valid level of the door sensor alarm, which is determined by the attribute of the field Gate Magnetism.
- On the LMT, choose **Alarm Maintenance** > **Browse Alarm**. Check the alarm information in the displayed **Browse Alarm** dialog box.

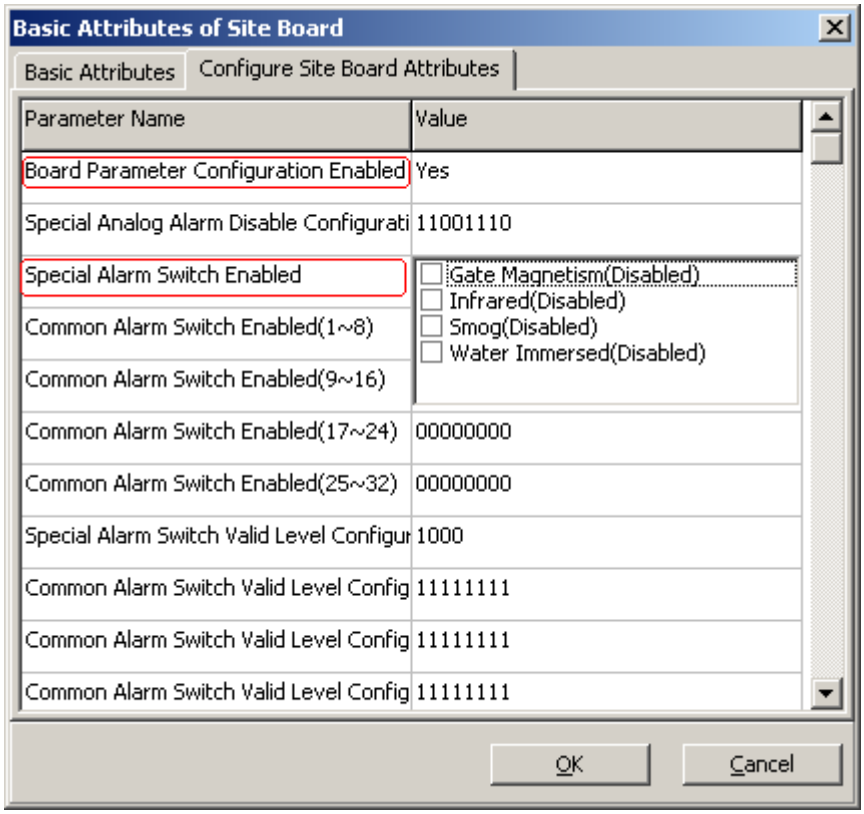
1. Check whether the **Door Open Alarm** can be reported normally by opening the cabinet door of the BTS and be cleared normally by closing the cabinet door of the BTS.
   - If the alarm can be reported and cleared normally, end the checking task.
   - If the alarm cannot be reported, go to **Step 2** to check the data configuration of the Gate Magnetism.

   TIP

   If the valid level of the door sensor alarm on site is inconsistent with the valid level of the door sensor alarm based on the data configuration, the reported alarms are opposite. For example, if the valid level of the door sensor alarm on site is high and the configured valid level is low, then:

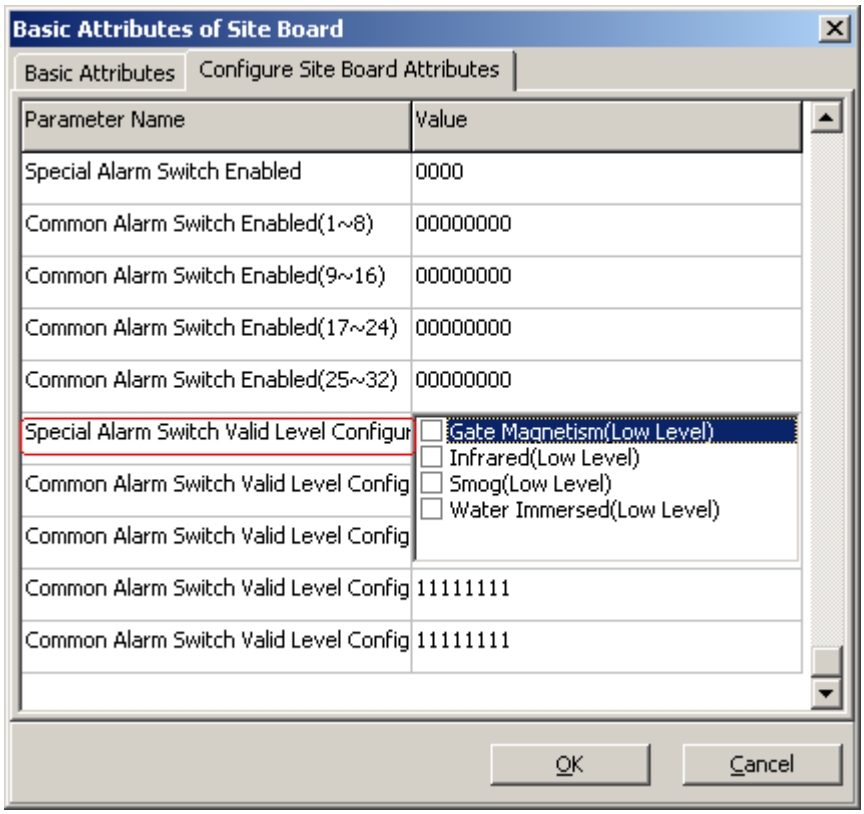
   When the cabinet door of the BTS is closed, the DEMU reports the **Door Open Alarm**; when the cabinet door of the BTS is open, the **Door Open Alarm** is cleared.
2. In the **BSC6000 Local Maintenance Terminal** window, right-click the site to be queried and choose **Configure Site Board Attributes**. The **Configure Site Board Attributes** dialog box is displayed.
3. Click **Configure Site Board Attributes**, the **Site Device Attributes** dialog box is displayed.
4. Right-click **DEMU**, choose **Configure Site Board Attributes**. The **Basic Attributes of Site Board** dialog box is displayed.
5. Click the **Configure Site Board Attributes** tab. Then set **Board Parameter Configuration Enabled** to Yes. Click **Special Alarm Switch Enabled** to check whether Gate Magnetism(Disabled) is selected, as shown in **Figure 4-26**.
   - In normal conditions, the check box Gate Magnetism(Disabled) is deselected, which means it is enabled and the Door Open Alarm is reported once the alarm is generated.
   - If the check box Gate Magnetism(Disabled) is selected, deselect the check box.

Figure 4-26 Basic Attributes of Site Board (1)



6. Click **Special Alarm Switch Valid Level Configuration** in the **Basic Attributes of Site Board** dialog box. Check whether the configuration of the Gate Magnetism(Low Level) is consistent with the actual alarm switch valid level of the Gate Magnetism, as shown in **Figure 4-27**. If the alarm switch valid level of the field Gate Magnetism is high level, then
   - In normal conditions, the check box Gate Magnetism(Low Level) is deselected, which means the **Door Open Alarm** is reported at a high level.
   - If the check box Gate Magnetism(Low Level) is selected, deselect the check box.

Figure 4-27 Basic Attributes of Site Board (2)



7. When the checking is complete, check whether the **Door Open Alarm** can be reported normally by opening the cabinet door of the BTS and be cleared normally by closing the cabinet door of the BTS.
   - If the alarm can be reported and cleared normally, end the checking task.
   - If the alarm cannot be reported, reconnect the related monitoring signal cable. For details, see the *BTS3900 Quick Installation Guide* or the *BTS3900A Quick Installation Guide*.

- Commissioning the alarm reported through the RS485 port (temperature monitoring alarm of the DTCU)

  The following part takes the temperature monitoring of the DTCU as an example to describe the commissioning of the temperature monitoring alarm of the monitoring board.

  NOTE

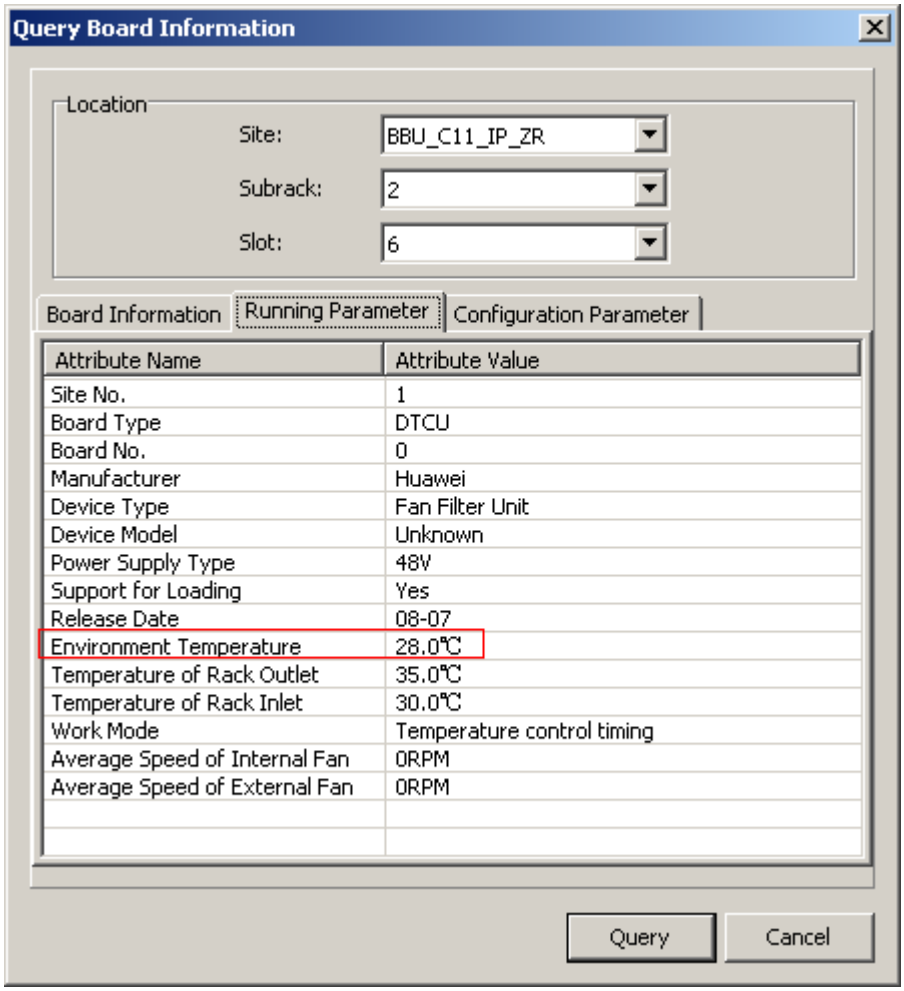
  - Trigger conditions of Temperature Too High Alarm: When the actual temperature of DTCU exceeds the **High Temperature Alarm Threshold**, the DTCU reports the Temperature Too High Alarm.
  - Trigger condition of Temperature Too Low Alarm: When the actual temperature of DTCU exceeds the **Low Temperature Alarm Threshold**, the DTCU reports the Temperature Too Low Alarm.
  - On the LMT, choose **Alarm Maintenance** > **Browse Alarm**. Check the alarm information in the displayed **Browse Alarm** dialog box.

  1. On the LMT, query the ambient temperature of the BTS DTCU.
     (1) In the **BSC6000 Local Maintenance Terminal** window, select the site to be queried. Right-click the monitoring board to be queried on the **Site Device**

Panel tab page and choose **Query Board Information**. The **Query Board Information** dialog box is displayed.

(2) Click the **Running Parameter** tab, and then click **Query** on the **Running Parameter** tab. The query is successful, and the running status of the board is displayed in the dialog box. The current **Environment Temperature** is 28.0℃, as shown in **Figure 4-28**.

Figure 4-28 Query Board Information dialog box



2. On the LMT, set the High Temperature Alarm Threshold to a value lower than the normal temperature to trigger the alarm.

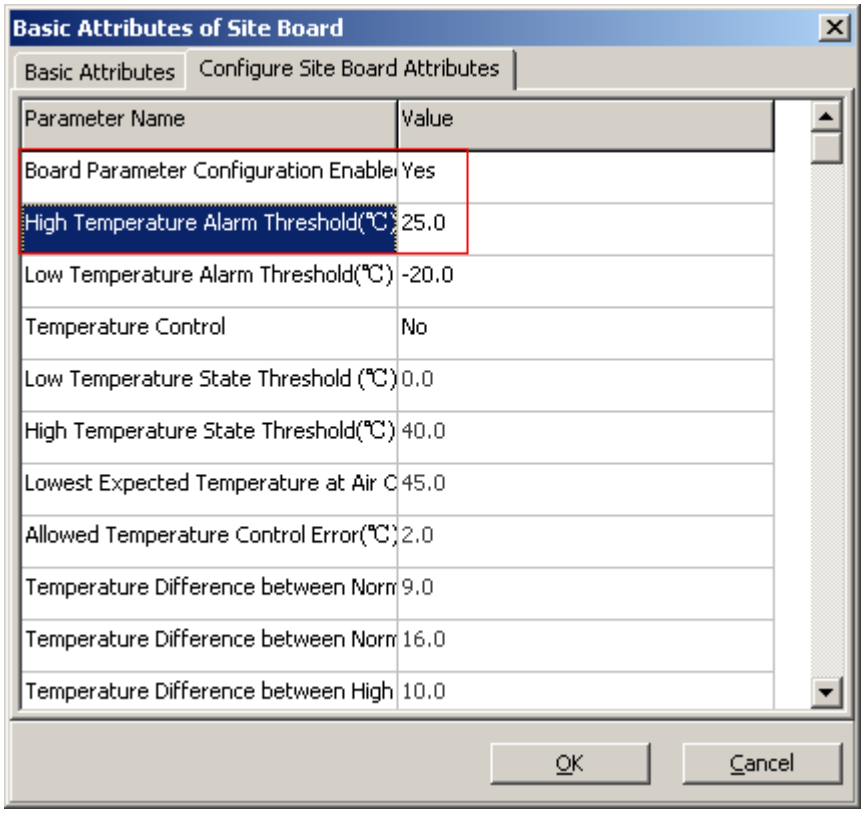
(1) In the **BSC6000 Local Maintenance Terminal** window, right-click the site to be queried and choose **Configure Site Board Attributes**. The **Configure Site Board Attributes** dialog box is displayed.

(2) Click **Configure Site Board Attributes**, the **Site Device Attributes** dialog box is displayed.

(3) Right-click DTCU and choose **Configure Site Board Attributes**. The **Basic Attributes of Site Board** dialog box is displayed.

(4) Click **Configure Site Board Attributes** tab. Then set **Board Parameter Configuration Enabled** to Yes and set **High Temperature Alarm Threshold** to 25.0, as shown in **Figure 4-29**.

Figure 4-29 Basic Attributes of Site Board (3)



(5) Click **OK** to complete the setting of the temperature alarm threshold.

3. Check the alarm information of the DTCU. For details, see **4.4 Checking the Alarm Information of the BTS (on the LMT)**. If the DTCU reports **Temperature Too High Alarm**, the ambient temperature alarm can be reported normally. If the alarm cannot be reported normally, reconnect the related monitoring signal cables. For details, see the *Quick Installation Guide*.
4. Set **High Temperature Alarm Threshold** again to clear **Temperature Too High Alarm**. For details, see **Step 2**.

----End

5 Commissioning the BTS (Transmission Unavailable)

About This Chapter

This describes how to commission the BTS in the transmission unavailable scenario. The commissioning of the BTS consists of two phases. In the initial phase of the commissioning, the transmission cable between the BSC and the BTS is not properly connected. Commission the BTS at the local end. In the later phase of the commissioning, the transmission cable between the BSC and the BTS is properly connected. Commission the BTS on the BSC side.

5.1 Starting the Site Maintenance Terminal
This describes how to start the SMT. To start the SMT, you need to set the IP address of the SMT PC, connect the SMT PC to the BTS, and then log in to the SMT.

5.2 Configuring the Basic Data of the BTS
This describes how to configure the basic data of the BTS such as the BTS boards and logical objects of the site. If the commissioning is performed on the BTS side, other commissioning tasks can be performed only after the configuration of the basic data of the BTS.

5.3 Checking the Active Software Version on the SMT
This describes how to check the software versions of the boards and modules in the BTS in the **Site Maintenance Terminal System** window.

5.4 Checking the Transmission Between the BBU and RFU on the BTS Side
This describes how to check the transmission between the BBU and the RFU on the BTS side. By checking the link status of the BBU and RFU, you can rectify the fault caused by abnormal connection, thus ensuring normal communication between the BBU and the RFU.

5.5 Checking the Running Status of the BTS
This describes how to check the running status of the BTS. Check the running status of the BTS involves checking the status of LEDs and alarm information on the SMT.

5.6 Checking the Hardware Connection of the BTS
This describes how to check the hardware connection of the BTS by checking the connection of power cables, grounding cables, and all kinds of signal cables.

5.1 Starting the Site Maintenance Terminal

This describes how to start the SMT. To start the SMT, you need to set the IP address of the SMT PC, connect the SMT PC to the BTS, and then log in to the SMT.

5.1.1 Setting the IP Address of the Site Maintenance Terminal PC
This describes how to set the IP address of the SMT PC to the same network segment as the IP address (192.168.0.72/255.255.255.0) of the BTS.

5.1.2 Locally Connecting the SMT PC to the BTS
This describes how to connect the Site Maintenance Terminal (SMT) PC to the ETH port on the main control module of the BTS through an Ethernet cable. After they are connected, you can operate and maintain the BTS on the SMT.

5.1.3 Logging in to the BTS at the Local End
This describes how to log in to the BTS. You can run the SMT to directly log in to the BTS at the local end.

5.1.1 Setting the IP Address of the Site Maintenance Terminal PC

This describes how to set the IP address of the SMT PC to the same network segment as the IP address (192.168.0.72/255.255.255.0) of the BTS.

Prerequisite

The TCP/IP protocol is installed on the SMT PC.

Procedure

Step 1 To set the IP address of the PC, perform the following steps where the Windows XP operating system is taken as an example: On Windows XP, choose **Start** > **Setting** > **Control Panel** .

Step 2 Double-click **Network Connections** in the displayed **Control Panel** window. Right-click **Local Area Connection** in the displayed dialog box.

Step 3 Choose **Properties** from the shortcut menu. The **Local Area Connection Properties** dialog box is displayed.

Step 4 Select **Internet Protocol (TCP/IP)**, and click **Properties**. The **Internet Protocol (TCP/IP) Properties** dialog box is displayed.

Step 5 Select **Use the following IP address**.

Step 6 Enter the correct IP address, subnet mask, and default gateway. Ensure that the IP address of the SMT PC is in the same network segment as the IP addresses (192.168.0.72/255.255.255.0) of the BTS so that a maintenance channel on the BTS side can be established.

Step 7 Click **OK** to complete the settings.

----End

5.1.2 Locally Connecting the SMT PC to the BTS

This describes how to connect the Site Maintenance Terminal (SMT) PC to the ETH port on the main control module of the BTS through an Ethernet cable. After they are connected, you can operate and maintain the BTS on the SMT.

Prerequisite

The IP address and subnet mask of the SMT PC are set correctly. The IP address is in the same network segment as the IP address (192.168.0.72/255.255.255.0) of the BTS.

Procedure

Step 1 Connect the SMT PC to the BTS through an Ethernet cable. One end is connected to the ETH port on the main control board of the basic cabinet, and the other end is connected to the Ethernet port on the SMT PC (usually a portable PC).

Step 2 Open the MS-DOS Prompt dialog box.

- If the PC is Windows 2000/XP operating system based, choose **Start** > **Run** on the SMT. In the **Run** dialog box, run the **cmd** command. The MS-DOS Prompt dialog box is displayed.

Step 3 Run **ping 192.168.0.72** to verify the network connection between the computer and the BTS.

NOTE

The IP address of the BTS is **192.168.0.72**.

- If the information similar to that in the following example is returned, the SMT PC and the BBU can communicate normally.

```
Pinging 192.168.0.72 with 32 bytes of data:
Pinging 192.168.0.72 with 32 bytes of data:
Reply from 192.168.0.72: bytes=32 time=1ms TTL=253
Reply from 192.168.0.72: bytes=32 time=1ms TTL=253
Reply from 192.168.0.72: bytes=32 time=1ms TTL=253
Reply from 192.168.0.72: bytes=32 time=1ms TTL=253
Ping statistics for 192.168.0.72:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

- If the SMT PC and the BBU fail to communicate, the possible reason is as follows:
  - The GTMU is faulty.
  - The Ethernet cable is faulty, or its connectors are loose.
  - The Ethernet port on the SMT PC is faulty.
  - The BTS is resetting.
  - The IP address is incorrect.

----End

5.1.3 Logging in to the BTS at the Local End

This describes how to log in to the BTS. You can run the SMT to directly log in to the BTS at the local end.

Prerequisite

- The SMT PC is properly connected to the BTS.

- The latest software of the SMT is installed in the SMT PC.

Procedure

Step 1 Start the SMT.

- If the SMT PC communicates with the BTS normally, a window is displayed, as shown in **Figure 5-1**. The SMT is successfully started.
- If the SMT PC cannot communicate with the BTS, the **Communication failed** dialog box is displayed, as shown in **Figure 5-2**. Go to **Step 2**.

Figure 5-1 Site Maintenance Terminal system window

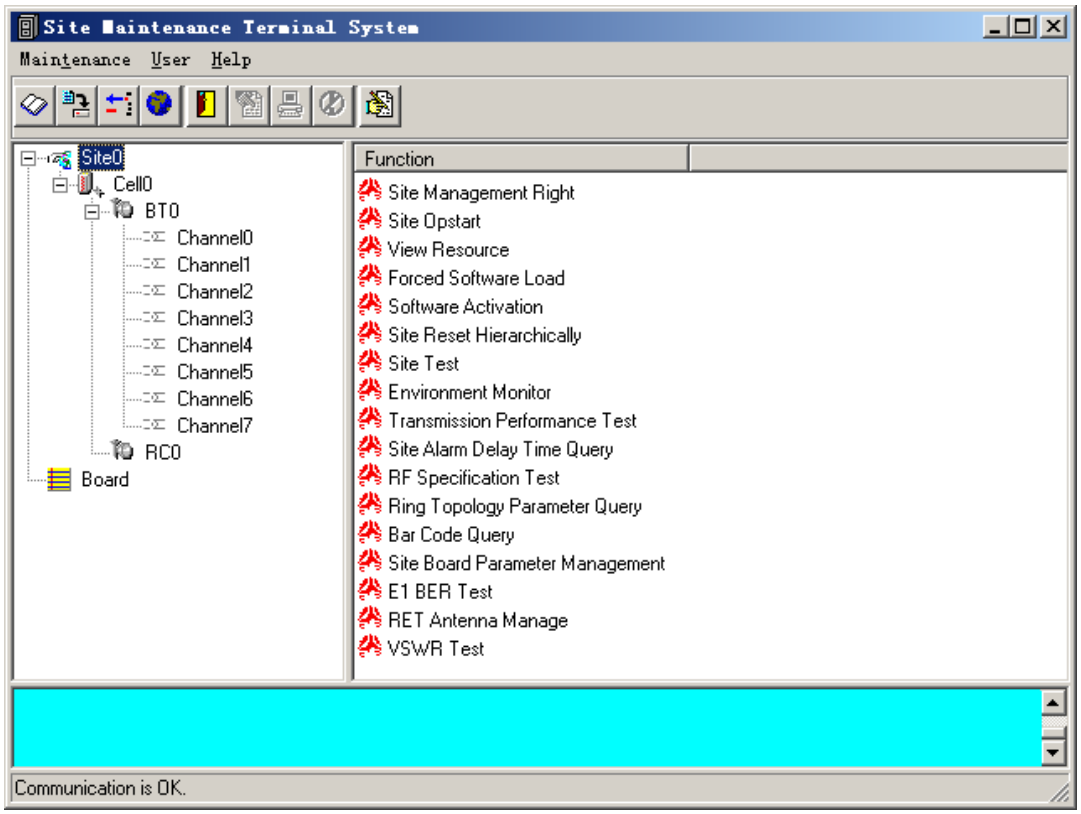
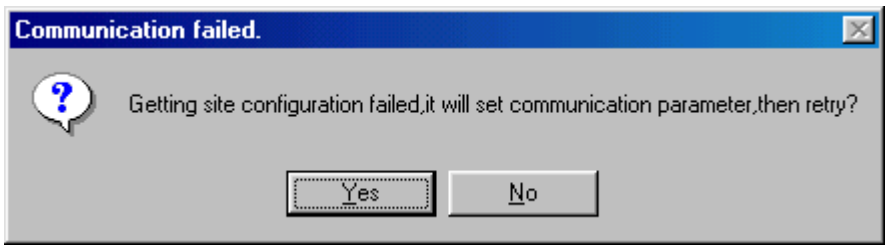


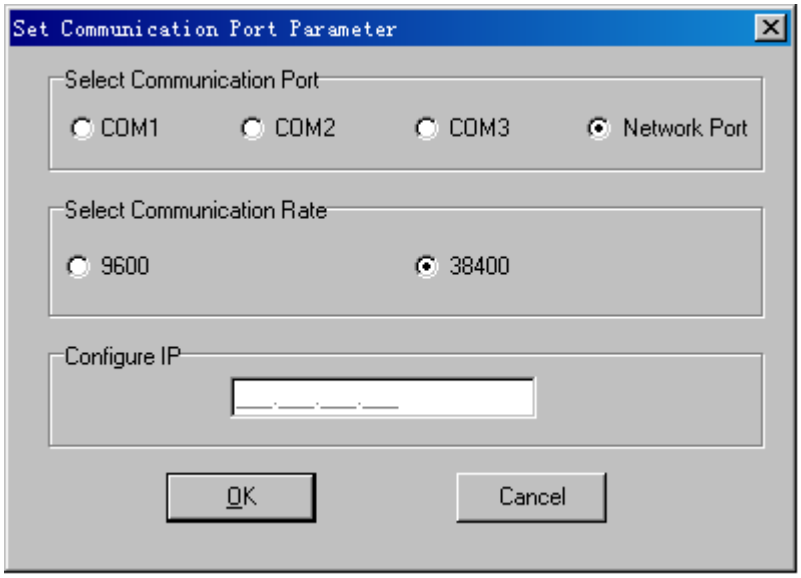
Figure 5-2 Communication failed dialog box



Step 2 Click **Yes**.

The **Set Communication Port Parameter** dialog box is displayed, as shown in **Figure 5-3**.

Figure 5-3 Set Communication Port Parameter dialog box



Step 3 In the **Select Communication Port** area, click **Network Port**. In the **Configure IP** area, set the IP address to **192.168.0.72**.

Step 4 Click **OK**.

The Site Maintenance Terminal System window is displayed, as shown in **Figure 5-1**.

Step 5 In the **Site Maintenance Terminal System** window, click **User**, and select **User Login**. Enter **User Name** (Omc by default) and **User Password** (omc by default). Logging in to the BTS succeeds.

----End

5.2 Configuring the Basic Data of the BTS

This describes how to configure the basic data of the BTS such as the BTS boards and logical objects of the site. If the commissioning is performed on the BTS side, other commissioning tasks can be performed only after the configuration of the basic data of the BTS.

5.2.1 Obtaining the Site Management Rights

This describes how to obtain the site management rights. Before configuring the BTS board and site logical objects, you must obtain the site management rights after logging into the BTS at the local end.

5.2.2 Configuring the Boards of the BTS on the SMT

This describes how to configure the TRX boards and other boards of the BTS.

5.2.3 Configuring Logical Objects of the BTS on the SMT

This describes how to configure logical objects of the BTS. The BTS logical object configuration consists of the cell configuration, carrier binding, and activation of cell configuration data.

5.2.1 Obtaining the Site Management Rights

This describes how to obtain the site management rights. Before configuring the BTS board and site logical objects, you must obtain the site management rights after logging into the BTS at the local end.

Prerequisite

You have logged in to the BTS successfully through the SMT.

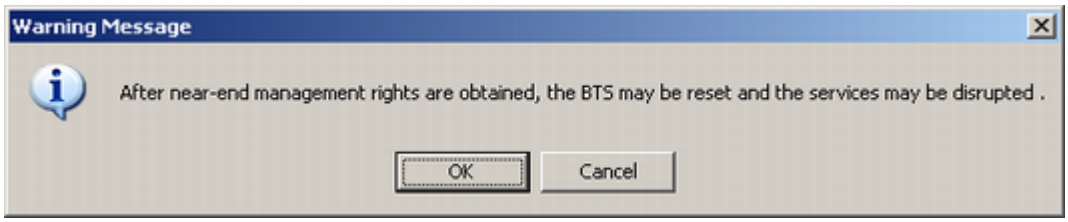
Procedure

Step 1 In the **Site Maintenance Terminal System** window, select **Site**, and double-click **Site Management Right**.

The **Site Management Right** dialog box is displayed.

Step 2 Click **Obtain**. The **Warning Message** dialog box is displayed, as shown in **Figure 5-4**.

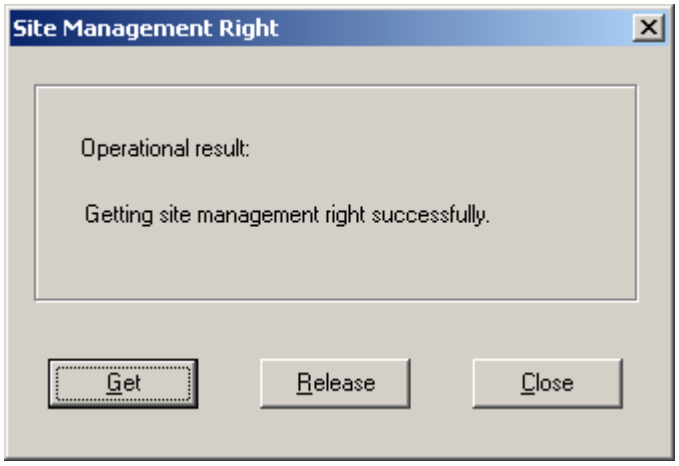
Figure 5-4 Warning message for obtaining the site management right



Step 3 Click **OK**, and wait for the response.

- If the obtaining succeeds, a dialog box is displayed, as shown in **Figure 5-5**.
- If the engineers are configuring or managing the BTS data on the LMT, you cannot obtain the site management rights successfully. In this case, wait till the engineers finish the operation on the LMT, and then repeat **Step 2** and **Step 3** to obtain the site management rights.

Figure 5-5 Site Management Right dialog box



Step 4 Click **Close** to close the **Site Management Right** dialog box.

CAUTION

After the commissioning task in the transmission unavailable scenario is complete, you should release the site management rights. Otherwise, the BTS cannot be monitored on the LMT in fifteen minutes.

The procedure for releasing the site management rights is as follows:

Click **Release** in the **Site Management Right** dialog box. When **Releasing site management right successfully.** is displayed, click **Close** to close the dialog box.

----End

5.2.2 Configuring the Boards of the BTS on the SMT

This describes how to configure the TRX boards and other boards of the BTS.

Context

Table 5-1 shows the types of TRXs that can be configured on the BTS3900 GSM or BTS3900A GSM.

Table 5-1 TRX types configured on the BTS3900 GSM or the BTS3900A GSM

BTS Type	TRX Type
BTS3900 GSM	DRRU, DRFU, GRRU, and GRFU
BTS3900A GSM	DRRU, DRFU, GRRU, and GRFU

NOTE

The following description takes one DRFU of the CPRI0 port as an example to describe the configuration of the TRX board. One DRFU of the CPRI0 port is configured on the first level of the SPF0 link.

Procedure

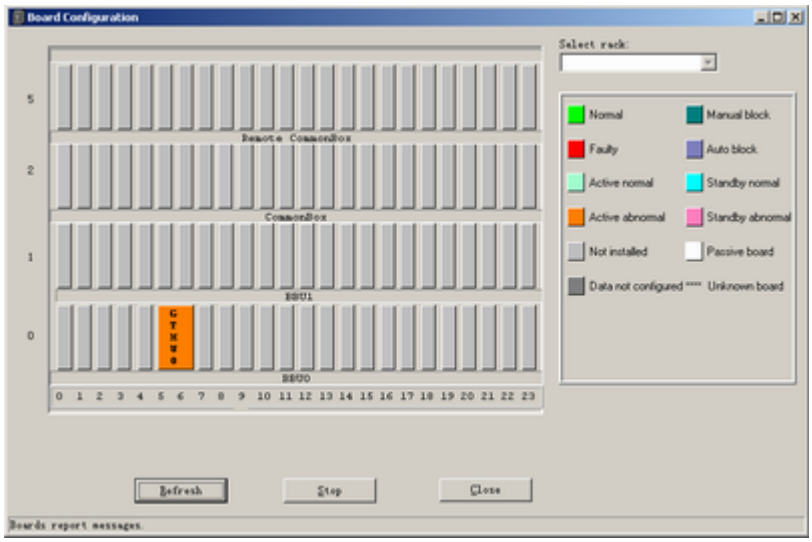
Step 1 Click **Board** in the navigation pane.

The **Board Configuration** and **Board Management** windows are displayed.

Step 2 Double-click **Board Configuration**.

The **Board Configuration** window is displayed, as shown in Figure 5-6.

Figure 5-6 Board Configuration window



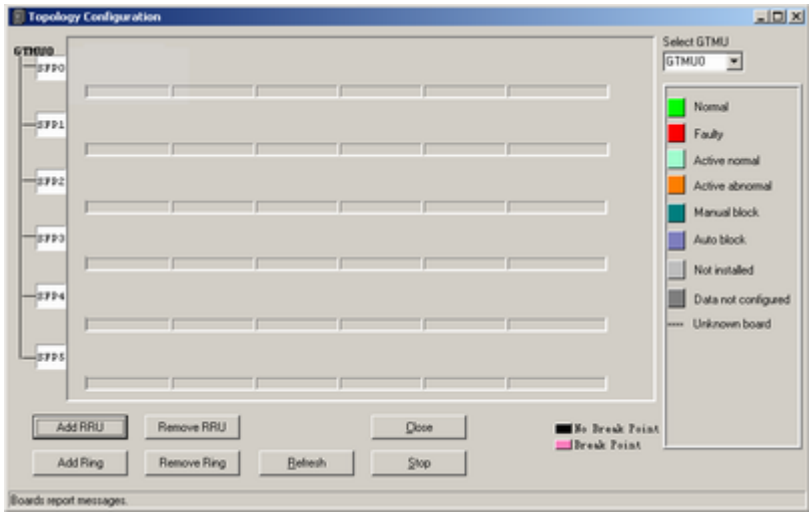
NOTE

In the transmission unavailable scenario, no site information is configured, thus, there is only the GTMU in the **Board Configuration** window. The status of the GTMU is **Active abnormal**.

Step 3 Double-click **GTMU**.

The **Topology Configuration** window is displayed, as shown in **Figure 5-7**.

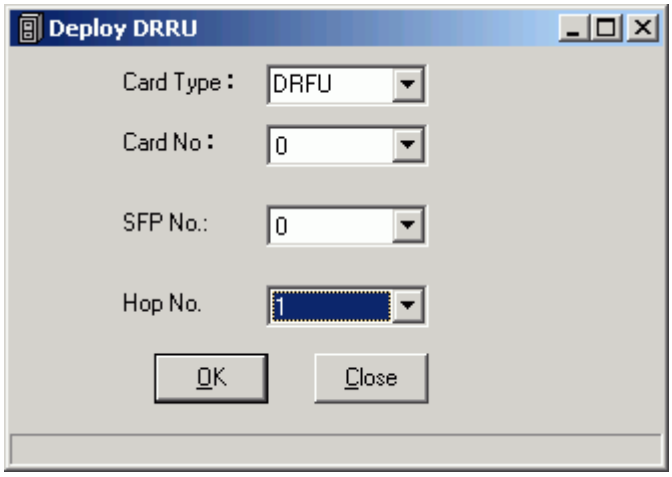
Figure 5-7 Topology Configuration window



Step 4 Click **Add RRU**.

Set the parameters in the **Deploy DRRU** dialog box, as shown in **Figure 5-8**. Set **Card Type** to *DRFU*, **Card No.** to *0*, **SFP No.** to *0*, and **Hop No.** to *1*. These values are taken only as an example in this section.

Figure 5-8 Deploy DRRU dialog box



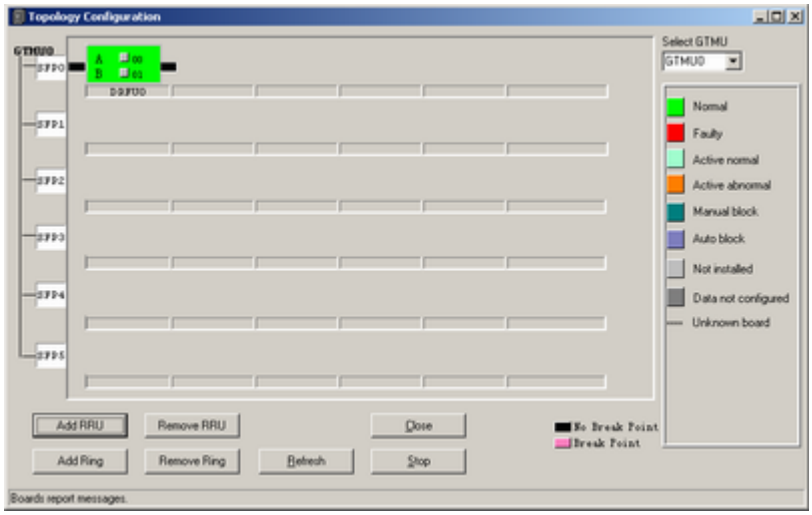
NOTE

Card Type refers to the DRRU, DRFU, MRRU, GRRU, MRFU, or GRFU. The card number starts from 0 in sequence. The SFP number ranges from 0 to 5 and each number refers to the SFP port where the board is configured. The hop number ranges from 1 to 6 and each number refers to the level of the TRXs under the same SFP number.

Step 5 Click**OK**. The configuration of the RF module is complete.

Figure 5-9 shows the **Topology Configuration** window.

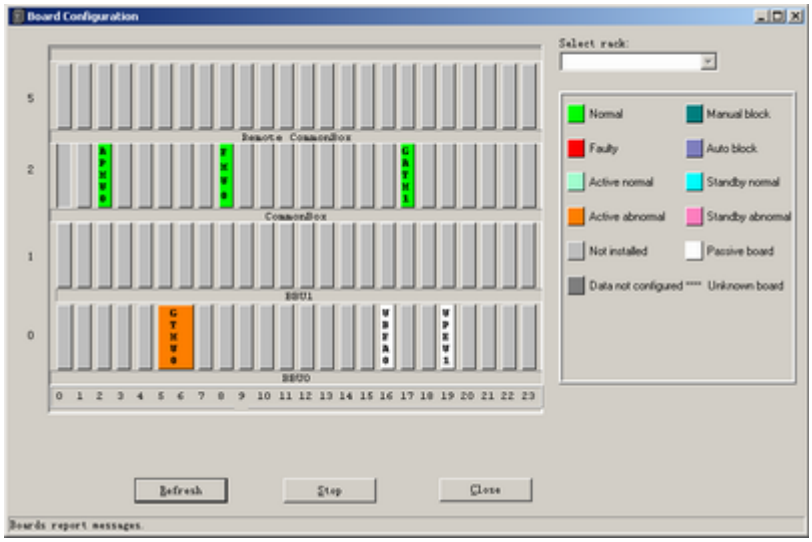
Figure 5-9 Topology Configuration window



Step 6 Click **Close** to return to the **Board Configuration** window. Right-click the slot where the board is configured, and choose the board to be configured from the shortcut menu.

Configure the **APMU/DPMU**, **FMU**, and **GATM** as shown in Figure 5-10.

Figure 5-10 Board Configuration window



Step 7 Set the parameters: On the SMT, the parameter of **DEMU** cannot be set. The parameters of **DEMU** and **DPMU** are set by default, therefore, no parameter setting is required.

Step 8 Configure the APMU: The **APMU** is added for the BTS3900A GSM. Perform the following steps to configure the new types of **APMU**, such as APM100 and APM30.

1. Click **Board** in the navigation pane.

   The **Board Configuration** and **Board Management** windows are displayed.

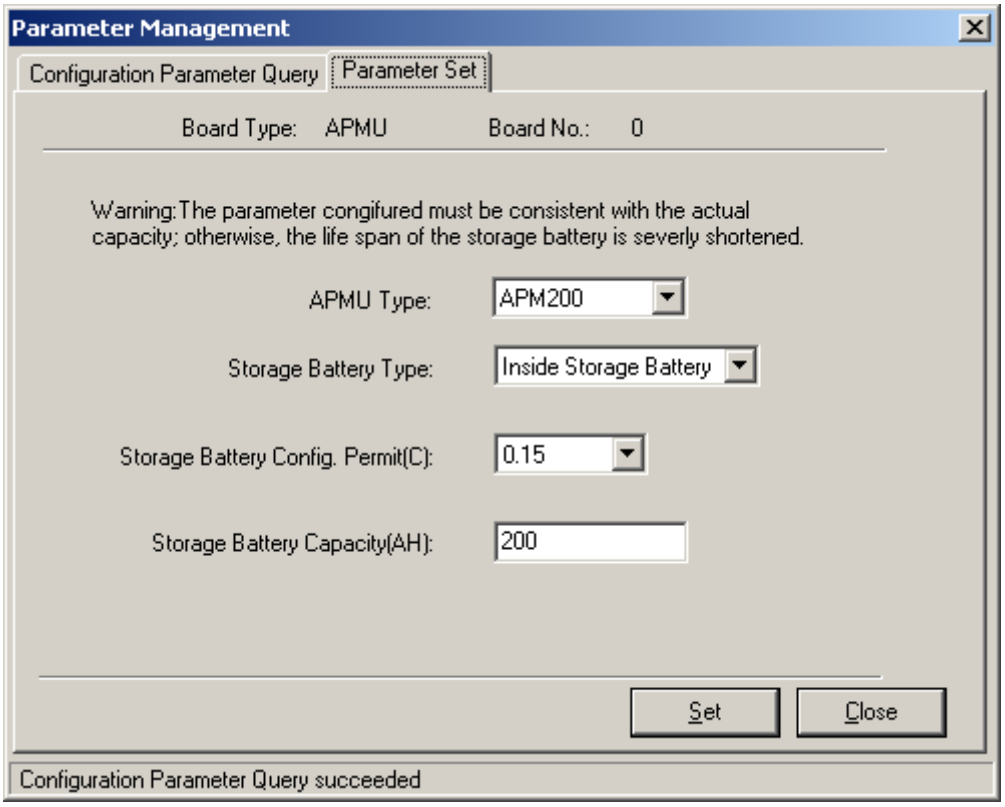
2. Double-click **Board Management**. The **Board Management** window is displayed.

3. In the **Board Management** window, right-click **APMU**, and then click **Parameter Management**.

   The **Parameter Management** dialog box is displayed.

4. In the **Parameter Management** dialog box, click **Parameter Set**. Select *APM30* or other boards under **APMU Type** according to the configuration data, as shown in **Figure 5-11**.

Figure 5-11 Parameter Management dialog box



Step 9 Click **Close** to end the board configuration of the BTS.

----End

5.2.3 Configuring Logical Objects of the BTS on the SMT

This describes how to configure logical objects of the BTS. The BTS logical object configuration consists of the cell configuration, carrier binding, and activation of cell configuration data.

Context

NOTE

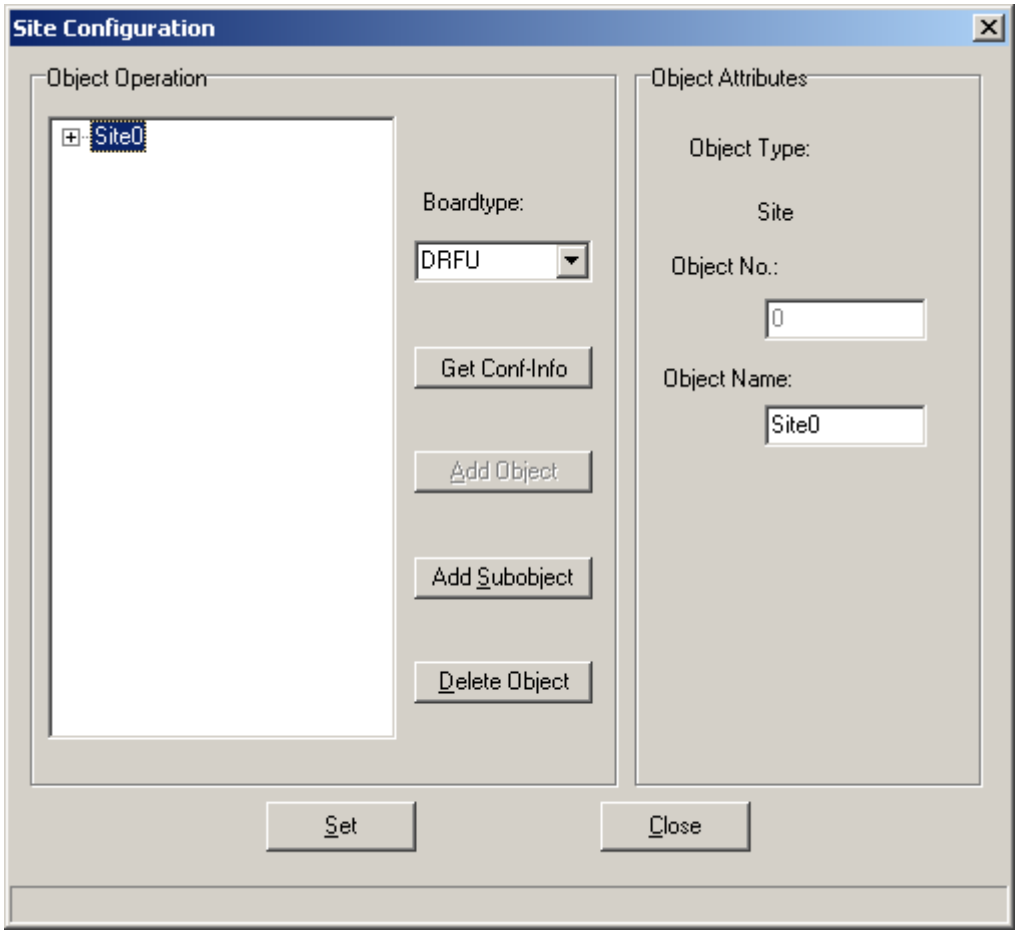
The following part describes the configuration and binding of carriers based on one DRFU configured with two carriers.

Procedure

Step 1 Add a cell. Click **Site0**, and double-click **Site Configuration** in the **Function** area.

The **Site Configuration** dialog box is displayed, as shown in **Figure 5-12**.

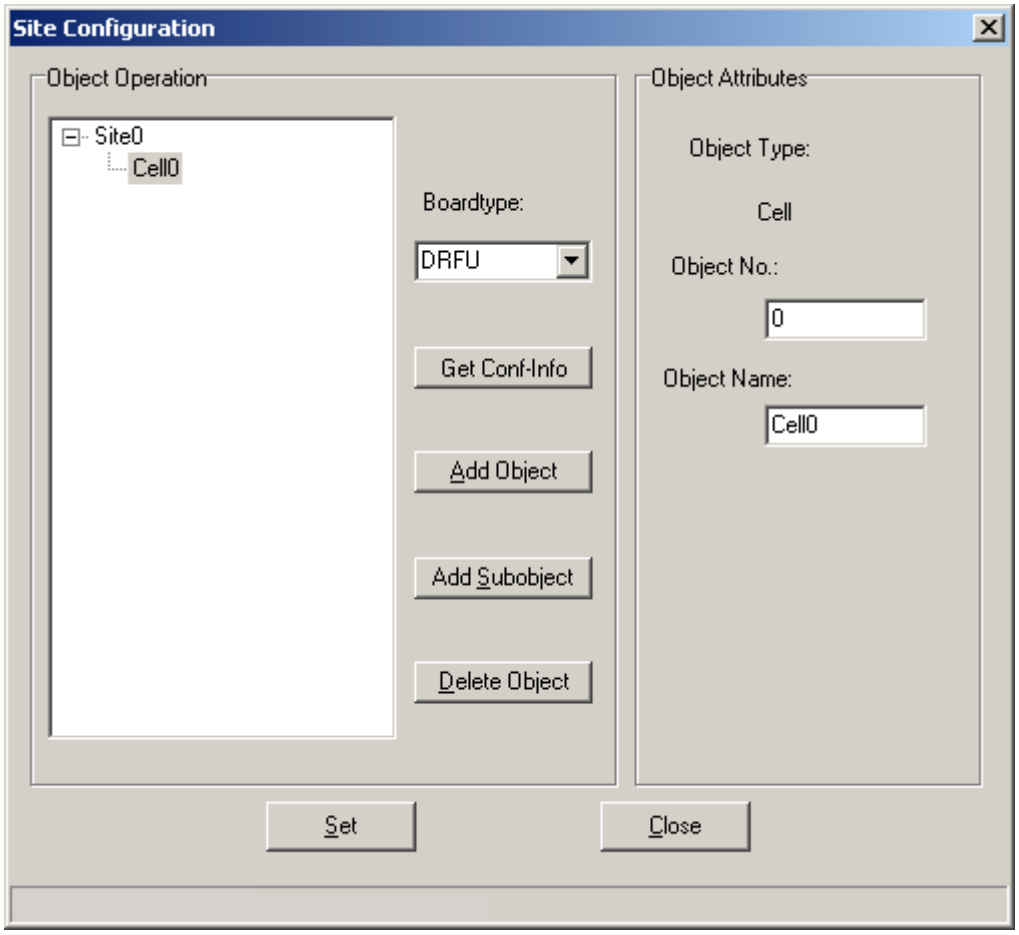
Figure 5-12 Site Configuration dialog box (1)



Step 2 Click **Site0**, and then click **Add Subobject**. In the **Object Attributes** area, specify **Object No.** and **Object Name**.

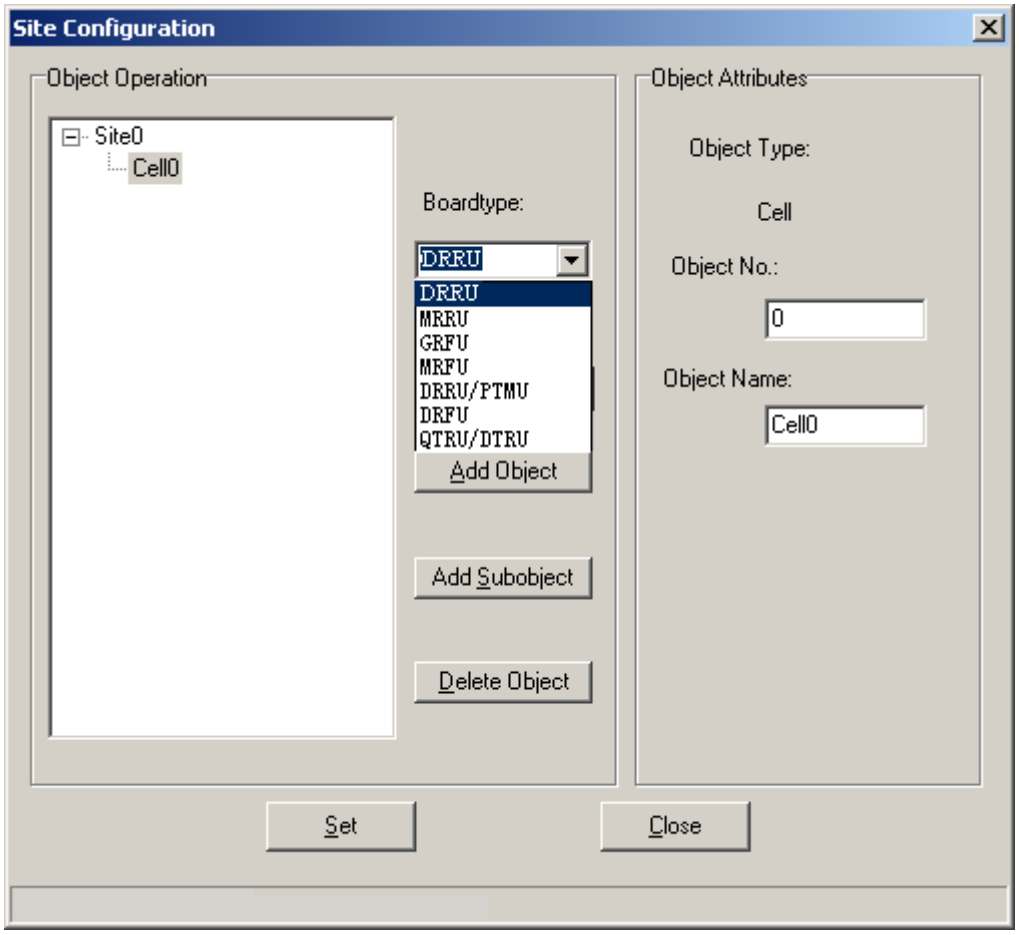
In the **Object Operation** area, **Cell0** is added, as shown in **Figure 5-13**.

Figure 5-13 Site Configuration dialog box (2)



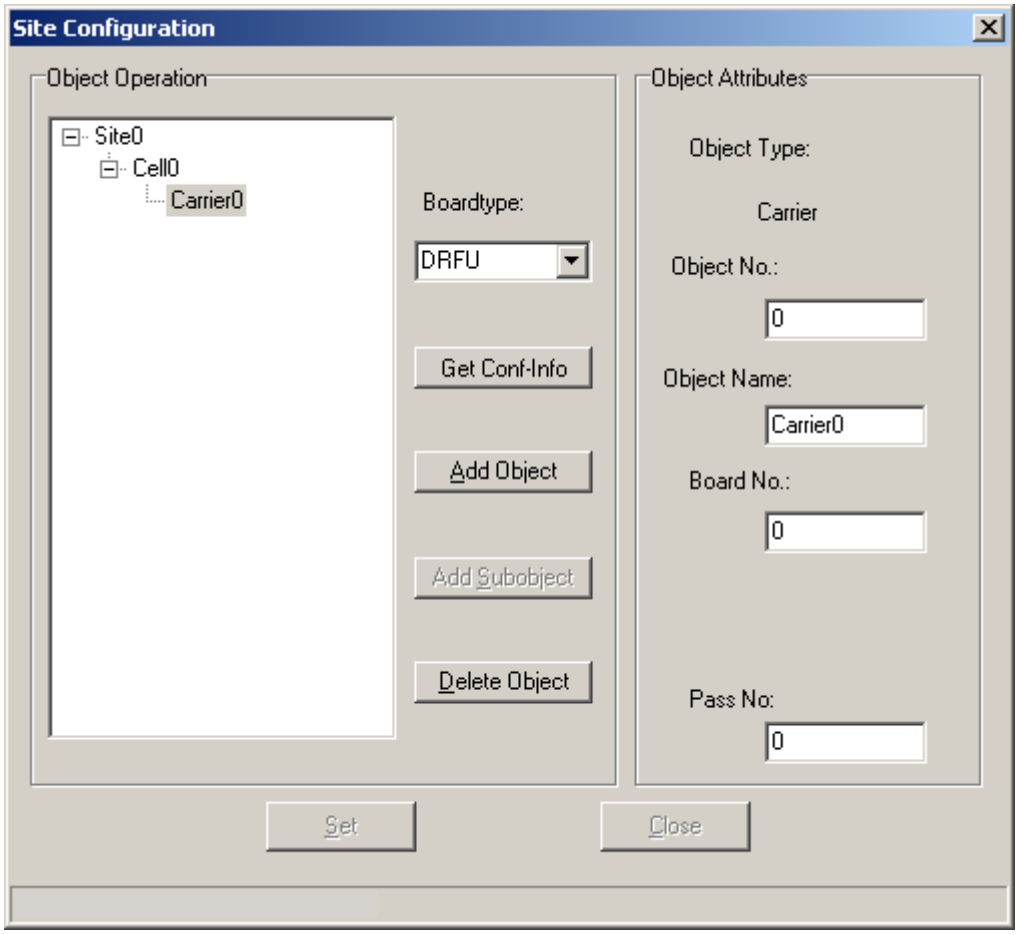
Step 3 Bind the carrier. Click **Cell0**, and select the TRX to be configured in the **Boardtype** drop-down list box. Set the board type to *DRFU*, as shown in **Figure 5-14**.

Figure 5-14 Site Configuration dialog box (3)



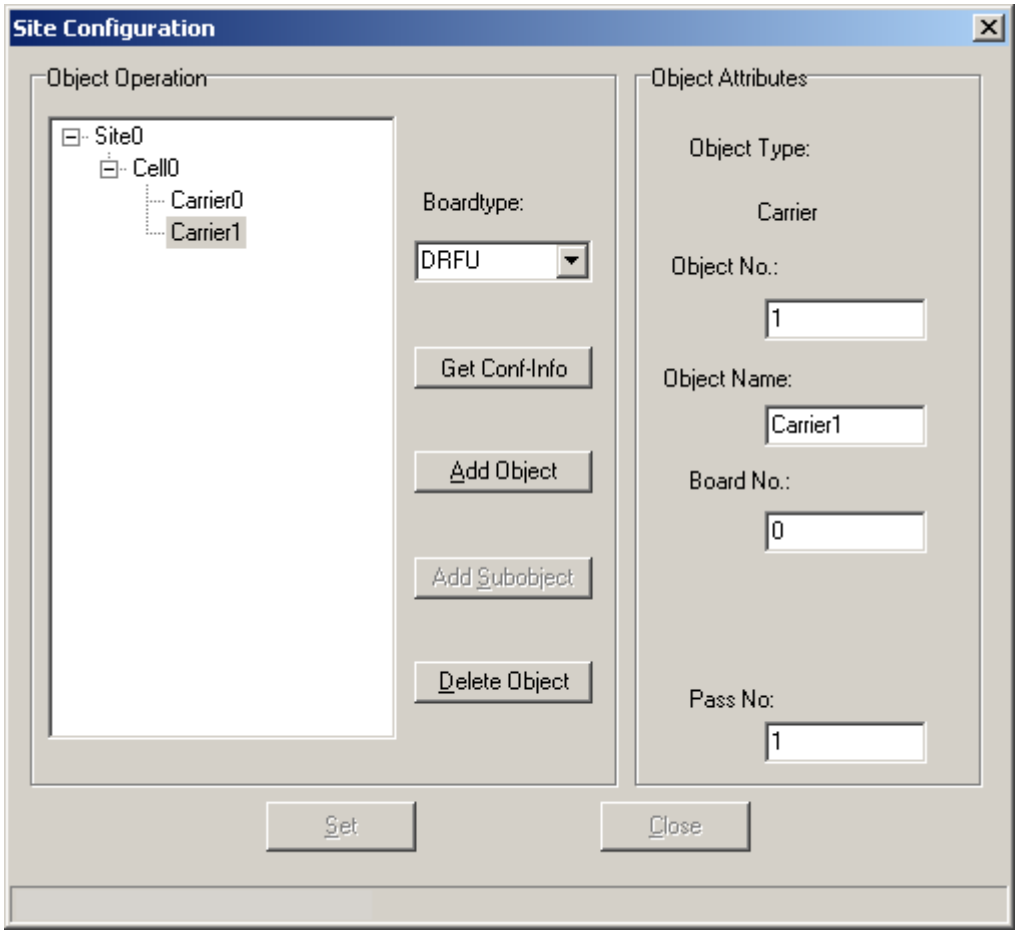
Step 4 Click **Add Subobject**. In the **Object Attributes** area, specify **Object No.**, **Object Name**, **Board No.**, and **Pass No.**. **Carrier0** is added in the **Object Operation** area. The carrier is bound to pass 0 of the TRX whose board number is 0, as shown in **Figure 5-15**. Pass 0 is also called carrier A. The number of paths at an RFU depends on the number of carriers configured for the RFU.

Figure 5-15 Site Configuration dialog box (4)



Step 5 Configure the second carrier: Set **Object Name** to *Carrier1*, **Board No.** to *0*, and **Pass No.** to *1*, as shown in **Figure 5-16**. The DRFU 0 is configured with two carriers.

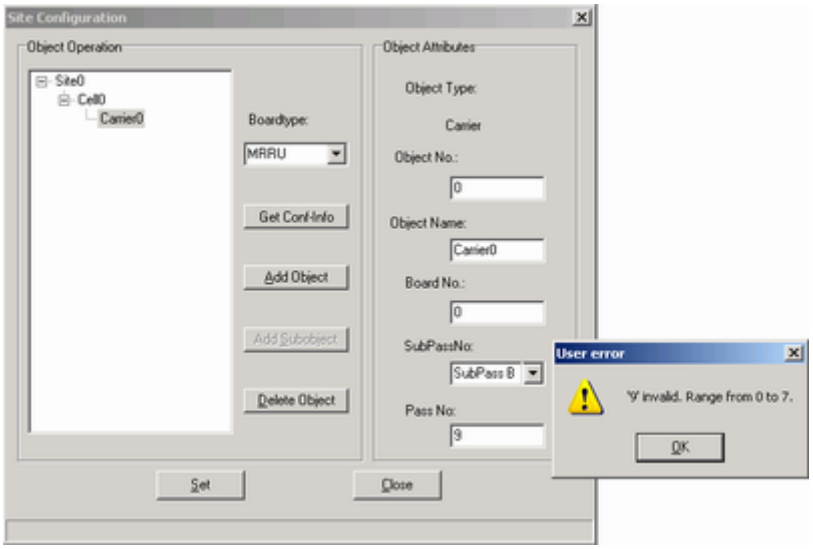
Figure 5-16 Site Configuration dialog box (5)



NOTE

- The procedure for adding carriers for other TRX boards is the same as adding carrier for the DRFU.
- The GRFU can be configured with 6 carriers, that is, there are 6 pass numbers ranging from 0 to 5 for the same board number. The GRRU can be configured with 8 carriers, that is, there are 8 numbers ranging from 0 to 7 for the same board number.
- The GRRU has two tributaries: tributary A and tributary B. For other TRXs, there is only one tributary. Therefore, you can configure the carrier according to the configuration data.
- The SMT provides the self-check function. When an invalid value is specified, the **User Error** dialog box is displayed, as shown in **Figure 5-17**.

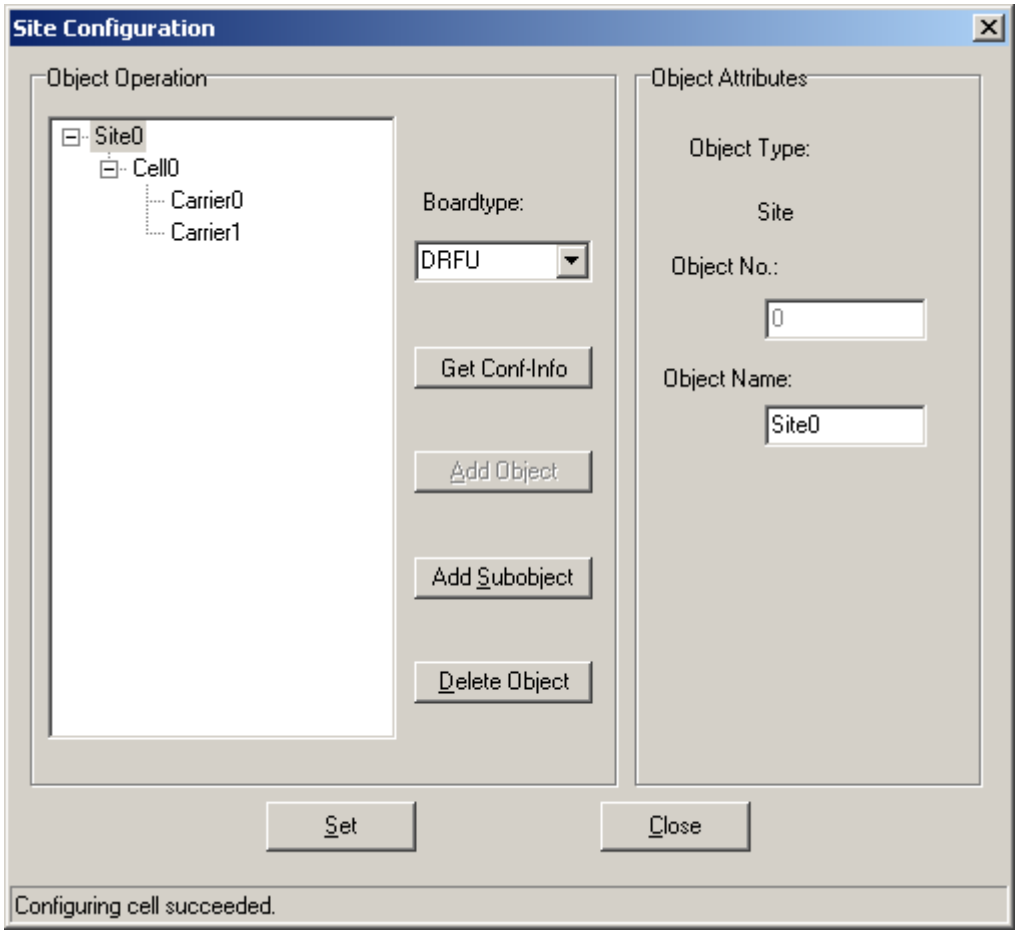
Figure 5-17 User Error dialog box



Step 6 Click **Site0**.

The **Set** button is available. Click **Set**, **Configuring cell succeeded** is available, as shown in **Figure 5-18**.

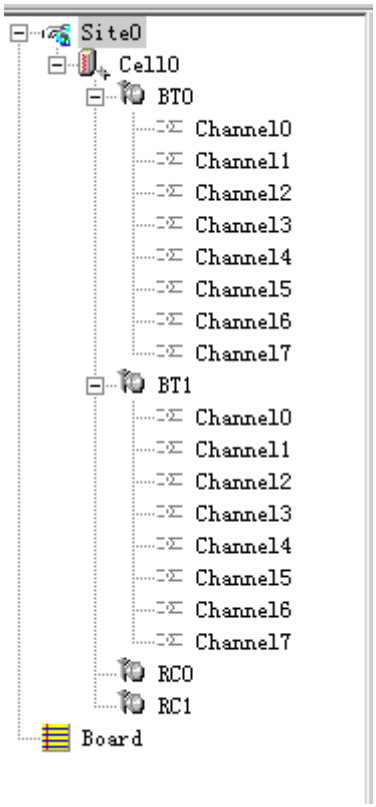
Figure 5-18 Site Configuration dialog box (6)



Step 7 Close the dialog box.

The configured cell is displayed in the navigation pane, as shown in **Figure 5-19**. The data is configured but not activated. To activate the data, go to **Step 8**.

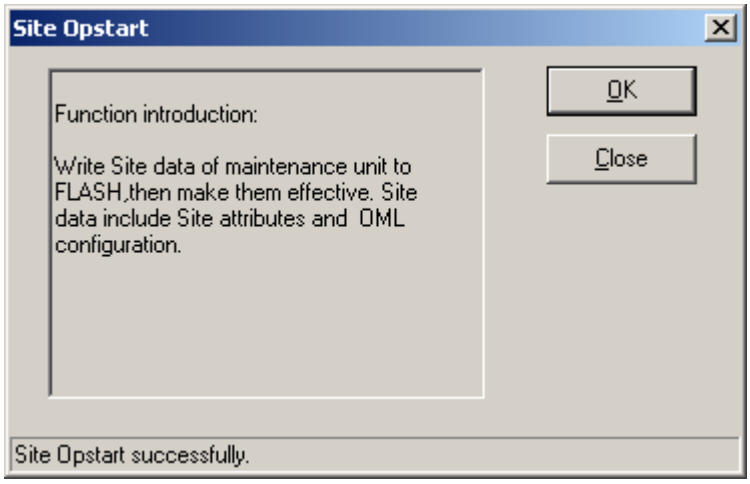
Figure 5-19 Configured cell and channels



Step 8 Choose **Site0** > **Site Opstart** > **OK**. The **Site Opstart** dialog box is displayed, as shown in **Figure 5-20**.

If...	Then...
Site Opstart successfully. is displayed	Click **close** to perform the next step.
Site startup fails	1. Repeat **Step 8**. If the operation succeeds, go to **Step 9**. If the operation still fails, go to **8.2**. 2. Check whether there is any inconsistent data configuration. If there is, modify the inconsistent data configuration. If the data configuration is correct, contact the BTS technical support engineers for troubleshooting.

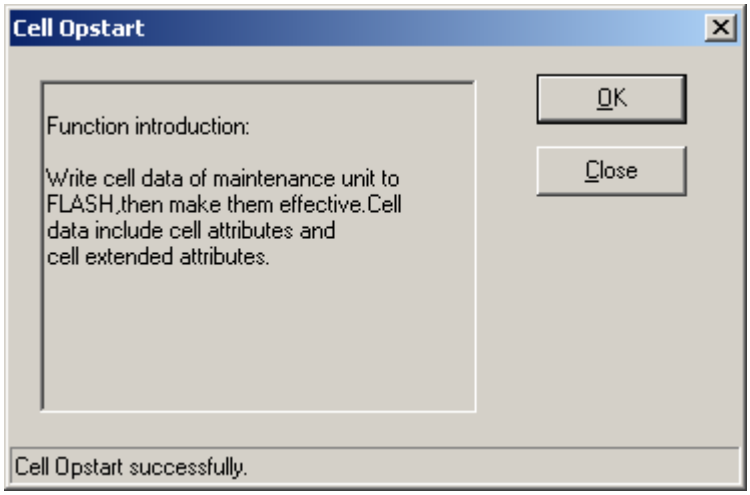
Figure 5-20 Site Opstart dialog box



Step 9 Choose **Cell0** > **Cell Opstart** > **OK**. The **Cell Opstart** dialog box is displayed, as shown in **Figure 5-21**.

If...	Then...
Cell Opstart successfully. is displayed	Click **close** to perform the next step.
Cell startup fails	See **Step 8** for further operation.

Figure 5-21 Cell Opstart dialog box

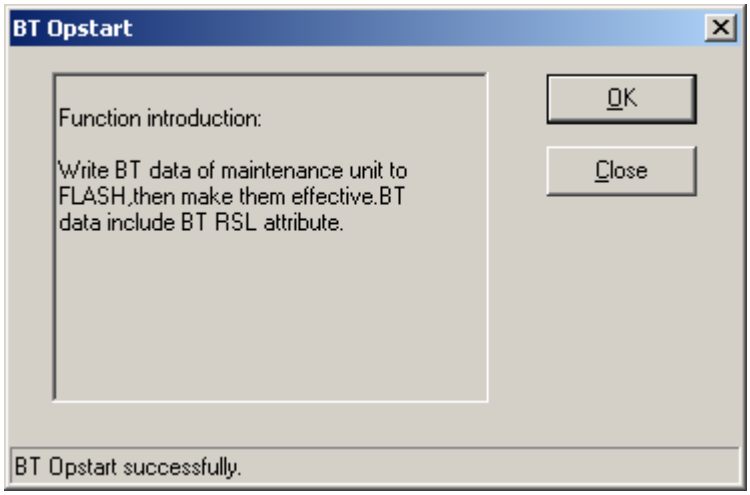


Step 10 The site configuration takes effect.

Step 11 Make the attributes of other TRXs take effect: Choose **BT0** > **BT Opstart** > **OK**. The **BT Opstart** dialog box is displayed, as shown in **Figure 5-22**.

If...	Then...
BT Opstart successfully. is displayed	Click **close** to perform the next step.
BT startup fails	See **Step 8** for further operation.

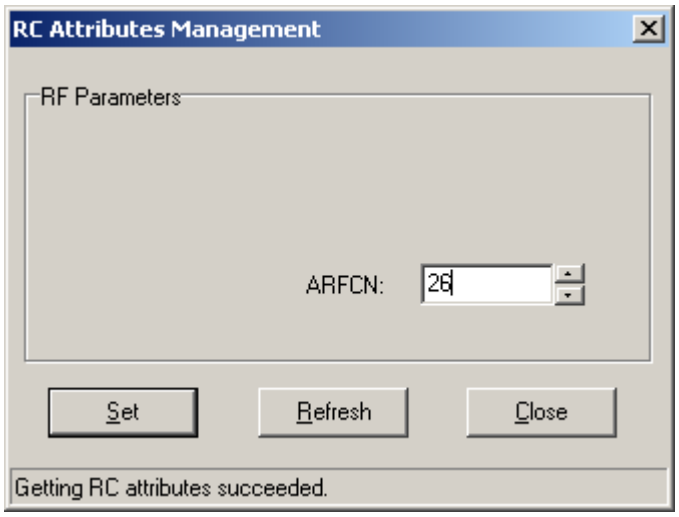
Figure 5-22 BT Opstart dialog box



Step 12 Choose **RC0** > **RC Attributes Management**. Specify frequency in **ARFCN**, and click **Set**. **Getting RC attributes succeeded** is displayed. Click **Close**.

Repeat the procedure of **Step 12** to set the frequencies of other TRXs. **Figure 5-23** shows the **RC Attributes Management** dialog box.

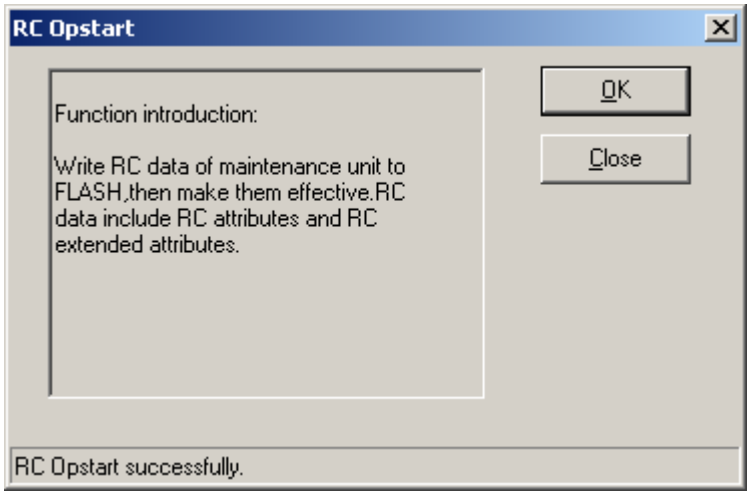
Figure 5-23 RC Attributes Management dialog box



Step 13 Choose **RC0** > **RC Opstart** > **OK**. The **RC Opstart** dialog box is displayed, as shown in **Figure 5-24**.

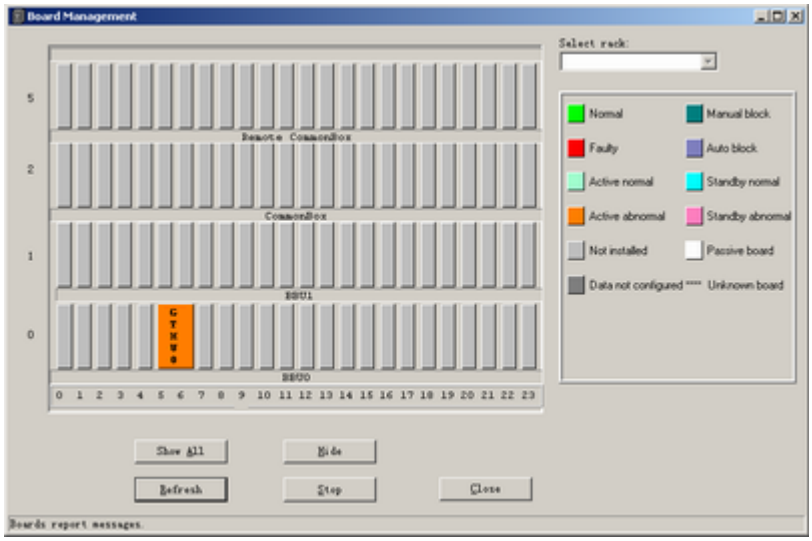
If...	Then...
RC Opstart successfully. is displayed	Click **Close**. Repeat **Step 13** to make the frequency settings of other RCs take effect.
RC startup fails	See **Step 8** for further operation.

Figure 5-24 RC Opstart successfully dialog box



Step 14 **SFP Port Inconsistency Alarm** is cleared. Since the transmission is unavailable, **LAPD Alarm** persists, and the status of the GTMU is **Active abnormal**,
as shown in **Figure 5-25**.

Figure 5-25 Board Management window



----End

5.3 Checking the Active Software Version on the SMT

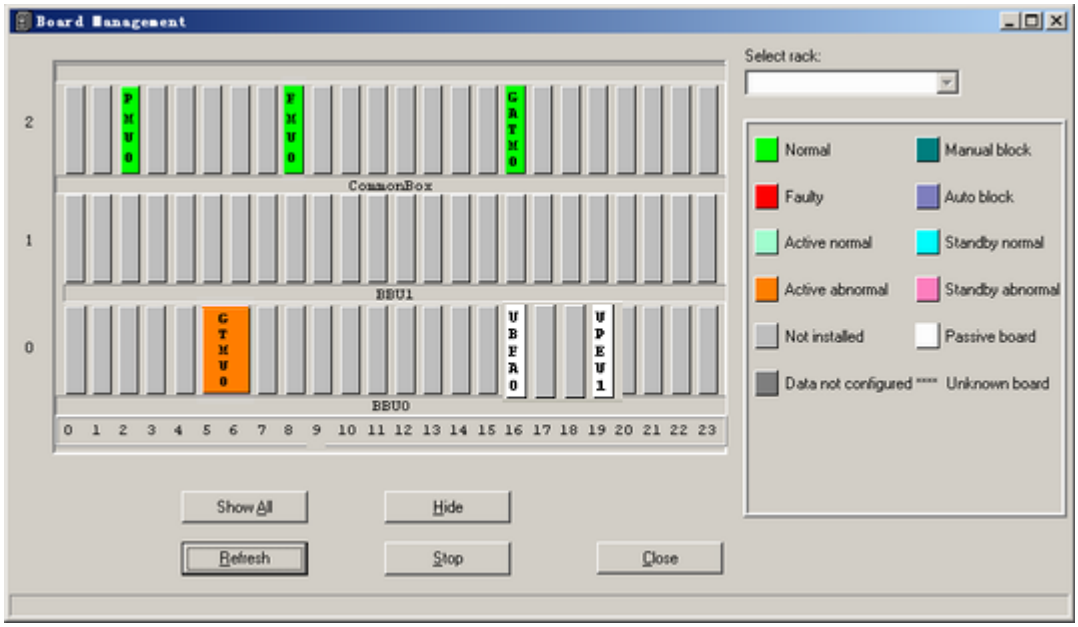
This describes how to check the software versions of the boards and modules in the BTS in the **Site Maintenance Terminal System** window.

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, select **Board**. In the right pane of the window, double-click **Board Management**.

The **Board Management** window is displayed, as shown in **Figure 5-26**.

Figure 5-26 Board Management window (1)



Step 2 Select a board or a module to be checked.

If...	Then...
The DRFU is to be viewed	Go to **Step 3**.
The GTMU, GATM, or PMU is to be viewed	Go to **Step 4**.

Step 3 Double-click **GTMU** in the **Board Management** window. The **Topology Management** window is displayed, as shown in **Figure 5-27**. Right-click **DRFU0**, and then click **Board Information**. The query is successful. The **Board Information** dialog box is displayed, as shown in **Figure 5-28**. Check the software version. If the version needs to be upgraded, reload and activate the version, and then close the dialog box.

Figure 5-27 Topology Management window

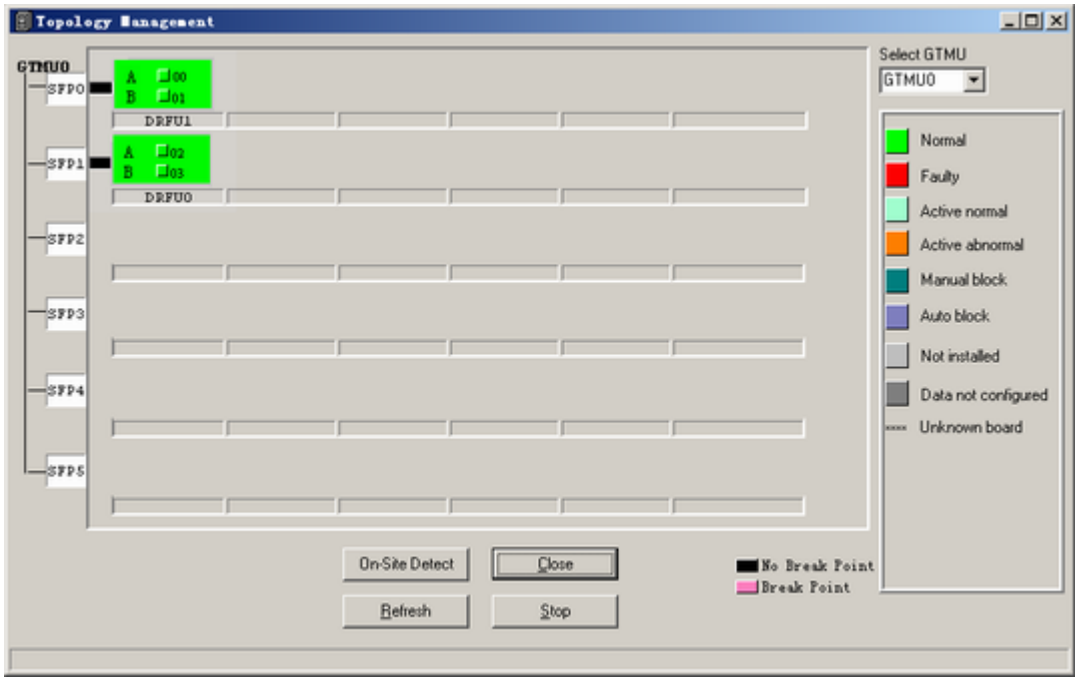
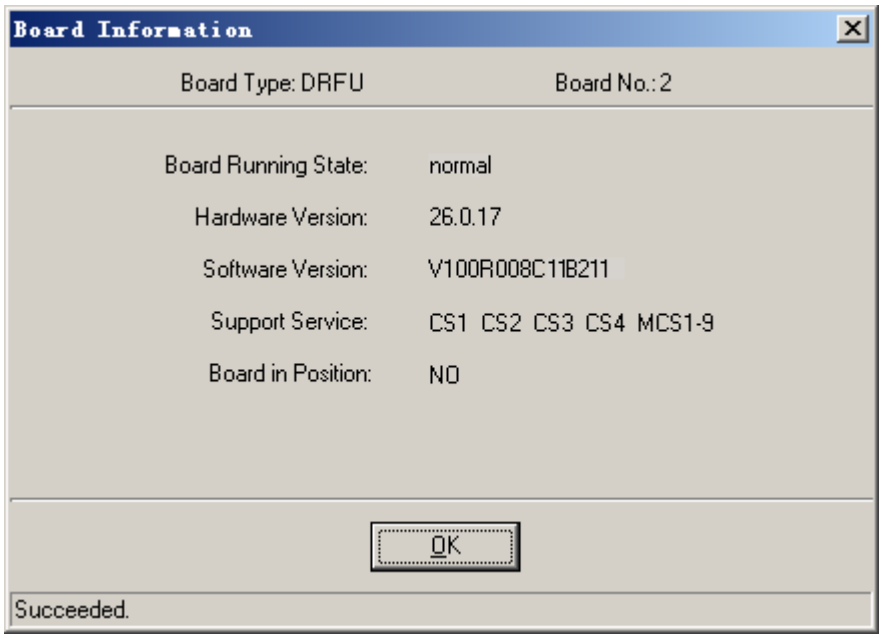


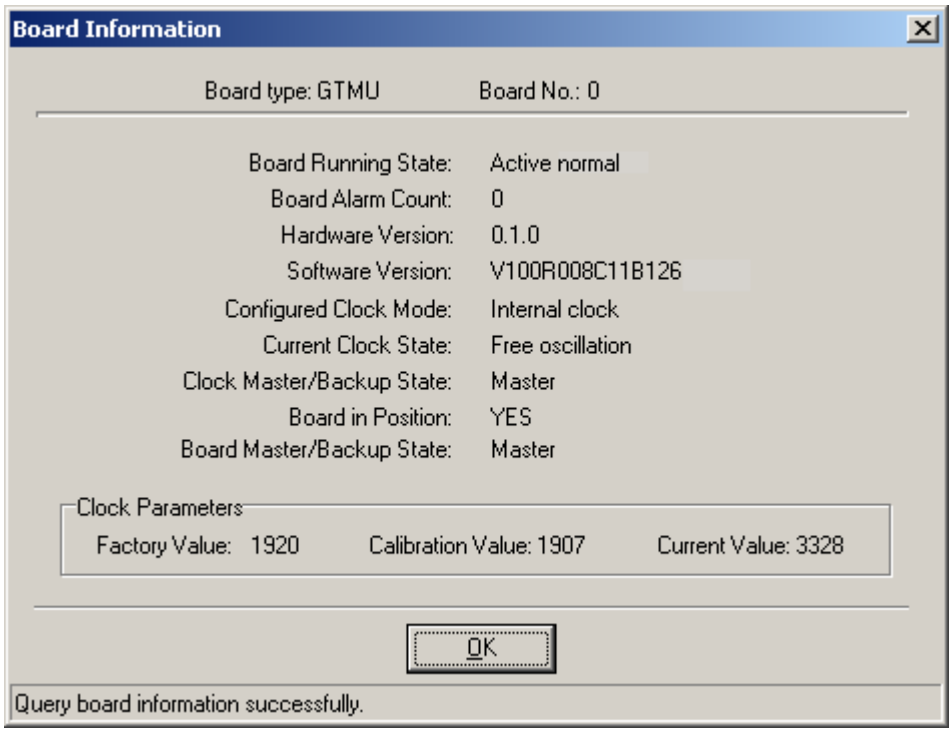
Figure 5-28 Board Information dialog box (1)



Step 4 Take the GTMU as an example. Right-click **GTMU**, and choose **Board Information** from the shortcut menu.

The **Board Information** dialog box is displayed, as shown in **Figure 5-29**. Check the software version. If the software version is not correct, upgrade the software version. For details, see the *Software Upgrade Guide*.

Figure 5-29 Board Information dialog box (2)



----End

5.4 Checking the Transmission Between the BBU and RFU on the BTS Side

This describes how to check the transmission between the BBU and the RFU on the BTS side. By checking the link status of the BBU and RFU, you can rectify the fault caused by abnormal connection, thus ensuring normal communication between the BBU and the RFU.

Context

In this document, RFUs are classified into two types: DRFUs and GRFUs.

Procedure

Step 1 Check the status of the **CPRI0** LED on the GTMU panel of the BBU and the status of the **CPRI0** and **CPRI1** LEDs in the RFU panel.

If...	Then...
All the LEDs are in the on in green status	The communication between the **CPRI0** port on the BBU and the RFU is normal. Go to **Step 4**.

If...	Then...
Some LEDs are not in the on in green status	The communication between the **CPRI0** port on the BBU and the RFU is faulty. Go to **Step 2**.

NOTE

The status of the LED corresponding to the **CPRI** port that is not in use should be **OFF**.

Step 2 Check the connection between the RFU and the BBU.

1. Check that one end of the CPRI signal cable is securely connected to the **CPRI0** port on the RFU, and the other end is securely connected to the **CPRI** port on the BBU.
2. Check the SFP male connectors at both ends of the CPRI signal cable. If the connector is faulty, replace it.
3. If the LEDs is still in the **on in green** status, replace the optical module of the CPRI port.

Step 3 Check the connection between the cascaded RFUs.

1. Check that the signal cables between cascaded RFUs are securely connected to the **CPRI0** and **CPRI1** ports.
2. Check the SFP male connectors at both ends of the signal cables between cascaded RFUs. If the connector is faulty, replace it.
3. If the LEDs is still in the **on in green** status, replace the optical module connected to the CPRI port.

Step 4 Repeat **Step 1** through **Step 3** to check the transmission between other **CPRI** ports on the GTMU panel and other RFUs.

----End

5.5 Checking the Running Status of the BTS

This describes how to check the running status of the BTS. Check the running status of the BTS involves checking the status of LEDs and alarm information on the SMT.

5.5.1 Checking the State of the BTS LEDs
To determine the running status of the BTS boards or modules, you need to check the state of the LEDs on them. The LEDs are distributed on the following boards or modules: GTMU (mandatory), UBFA, UPEU, RFU, GATM (optional), FAN unit, PMU, PSU (AC/DC), and PSU (DC/DC).

5.5.2 Checking the Alarm Information of the BTS on the SMT
This describes how to check the BTS alarms on the SMT. If an alarm is generated, you need to clear the alarm according to the handling suggestions on the SMT.

5.5.1 Checking the State of the BTS LEDs

To determine the running status of the BTS boards or modules, you need to check the state of the LEDs on them. The LEDs are distributed on the following boards or modules: GTMU (mandatory), UBFA, UPEU, RFU, GATM (optional), FAN unit, PMU, PSU (AC/DC), and PSU (DC/DC).

Prerequisite

The output power of the TRX is within the normal range, and the RFU operates properly.

Context

- The PSU (AC/DC) that converts 220 V AC power into -48 V DC power is used when the external 220 V AC power input is used.
- The PSU (DC/DC) that converts +24 V AC power into -48 V DC power is used when the external +24 V AC power input is used.

Procedure

Step 1 Check the state of the LEDs on the boards or modules in the BBU. **Table 5-2** lists the normal states of the LEDs on the boards or modules.

Table 5-2 Normal states of the LEDs on the board and modules in the BBU

Board or Module	LED	Color	Normal State
GTMU	RUN	Green	Blinking (ON for 1s and OFF for 1s)
	ALM	Red	OFF
	ACT	Green	ON
	LIU0 to LIU3	Green	LEDs LIU0 to LIU3 represent the four E1 links. If the links are connected normally, LIU LEDs are **OFF**. If the links are not connected to the BSC yet or the transmission is unavailable, LIU LEDs are **ON**.
	CPRI0 to CPRI5	Green	When CPRI0 to CPRI5 ports are not in use, the LEDs are **OFF**. When the BBU is normally connected to the RFU, the corresponding LED is **ON**.
UBFA	STATE	Green	Blinking (ON for 1s and OFF for 1s)
UPEU	RUN	Green	ON

Step 2 Check the state of the LEDs on the RFU panel. **Table 5-3** takes the DRFU as an example to list the normal states of the LEDs on the RFU panel.

Table 5-3 Normal states of the LEDs on the DRFU

LED	Color	Normal State
RUN	-	Blinking (ON for 1s and OFF for 1s)
ALM	-	OFF
ACT	-	ON steady: The DRFU works properly.
VSWR	Red	OFF

LED	Color	Normal State
CPRI0	Green	If the DRFU is normally connected to the BBU or another RFU, the LED is **ON**. If the DRFU is not connected, the LED is **OFF**.
CPRI1	Green	If the DRFU is normally connected to the BBU or another RFU, the LED is **ON**. If the DRFU is not connected, the LED is **OFF**.

NOTE

The LEDs on other RFUs have the same states as those on the DRFU, but the silkscreens of some LEDs are different.

Step 3 Check the status of the LEDs on the GATM panel. **Table 5-4** lists the normal status of the LEDs.

Table 5-4 Normal states of the LEDs on the GATM

LED	Color	Normal State
RUN	Green	Blinking (ON for 1s and OFF for 1s)
ACT	Green	ON: The AISG link is available.
	Green	Blinking quickly: The AISG link is in transmission status.
ALM	Red	OFF

Step 4 Check the states of the LEDs on the FAN unit panel. **Table 5-5** lists the normal states of the LEDs.

Table 5-5 Normal states of the LEDs on the FAN unit

LED	Color	Normal State
RUN	Green	Blinking (ON for 1s and OFF for 1s)
ALM	Red	OFF

Step 5 Check the state of the LEDs on the PMU panel. **Table 5-6** lists the normal states of the LEDs on the PMU.

Table 5-6 Normal states of the LEDs on the PMU

LED	Color	Normal State
RUN	Green	Blinking (ON for 1s and OFF for 1s)
ALM	Red	OFF

Step 6 Check the state of the LEDs on the PSU (AC/DC) or PSU (DC/DC) panel. **Table 5-7** lists the normal states of the LEDs on the PSU.

Table 5-7 Normal states of the LEDs on the PSU

PSU	LED	Color	Normal State
PSU (AC/DC)	Power input LED (top)	Green	ON
	Power protection LED (middle)	Yellow	OFF
	Power failure LED (bottom)	Red	OFF
PSU (DC/DC)	Power input LED (left)	Green	ON
	Power protection LED (middle)	Yellow	OFF
	Power failure LED (right)	Red	OFF

Step 7 If the LEDs on the boards or modules are not in the normal state, check the alarm information on the SMT and rectify the faults according to the suggestions displayed.

----End

5.5.2 Checking the Alarm Information of the BTS on the SMT

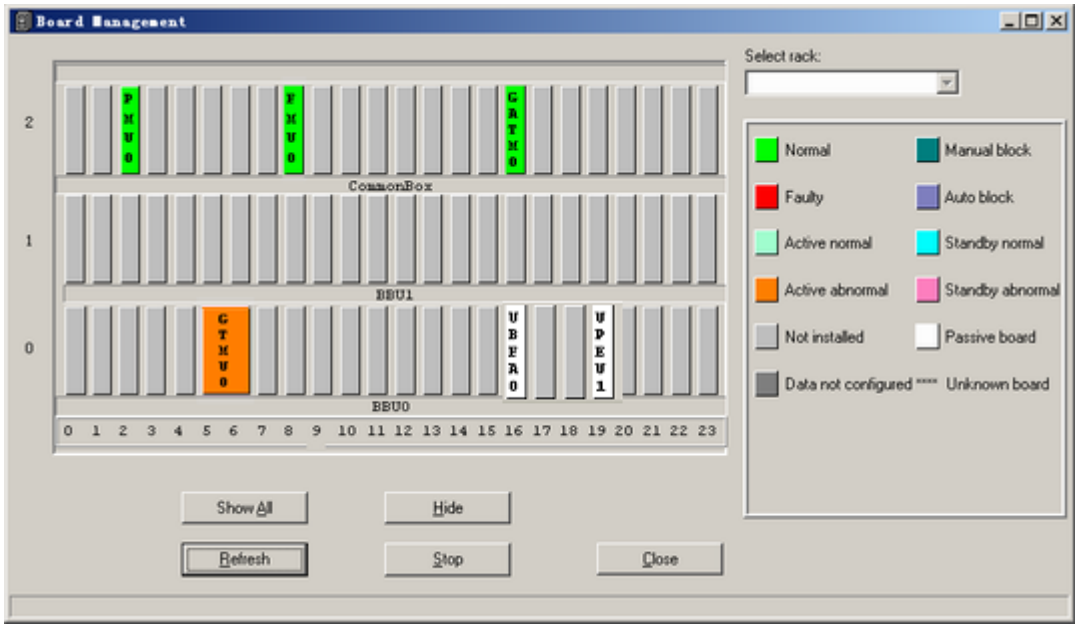
This describes how to check the BTS alarms on the SMT. If an alarm is generated, you need to clear the alarm according to the handling suggestions on the SMT.

Procedure

Step 1 In the left pane of the **Site Maintenance Terminal System** window, choose **Board**. In the right pane of the window, double-click **Board Management**.

The **Board Management** window is displayed, as shown in **Figure 5-30**.

Figure 5-30 Board Management window



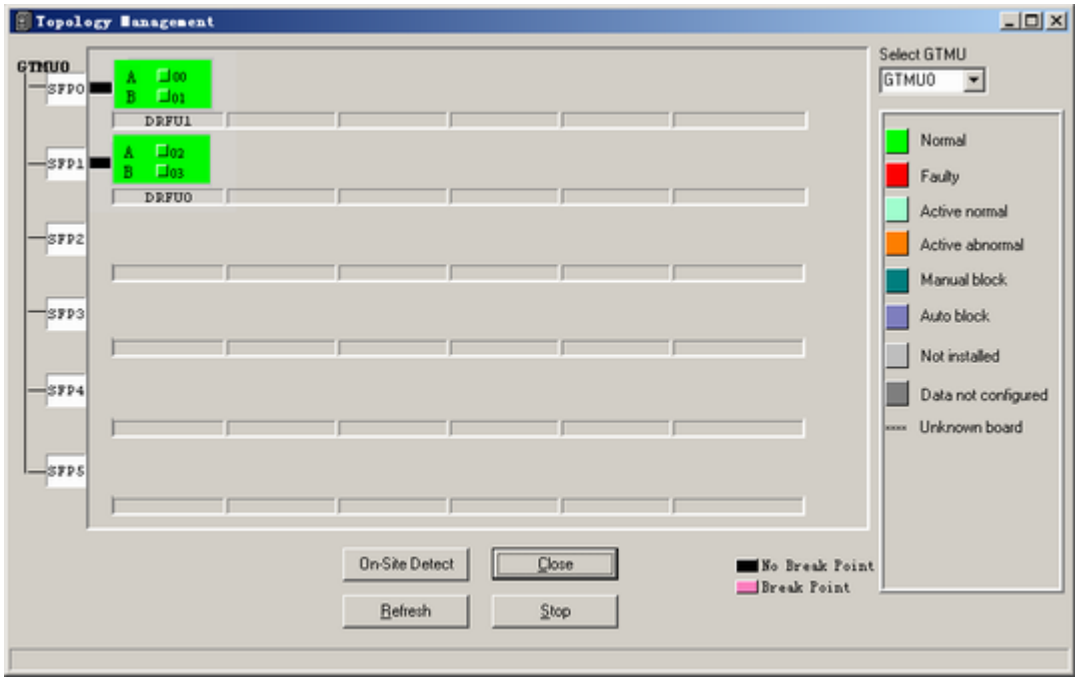
Step 2 Check the type of the board or module where alarms are generated.

If...	Then...
The board or module is RFU	Go to **Step 3** to query the alarms.
The board or module is GTMU, UBFA, UPEU, UEIU, GATM, or PMU	Go to **Step 4** to query the alarms.

Step 3 In the **Board Management** window, double-click **GTMU**.

The **Topology Management** window is displayed, as shown in **Figure 5-31**.

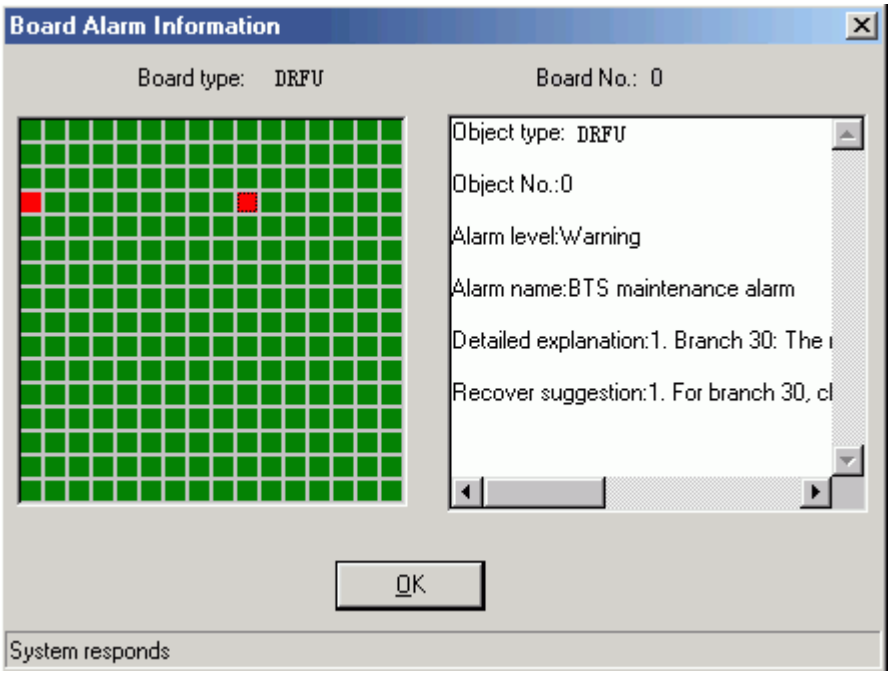
Figure 5-31 Topology Management window



Step 4 Right-click the board or module to be queried, and choose **Board Alarm**.

The **Board Alarm Information** dialog box is displayed. Click the red grid, then the details about the alarm are displayed in the right pane, as shown in **Figure 5-32**.

Figure 5-32 Board Alarm Information dialog box



NOTE

Each red grid represents an alarm.

Step 5 Perform the next operation according to the result displayed in the **Board Alarm Information** dialog box.

If...	Then...
No alarm is generated	Close the **Board Alarm Information** dialog box. Repeat steps **Step 2** through **Step 5** and query alarms generated in other boards or modules.
An alarm is generated	Clear the alarm based on the troubleshooting suggestions.

NOTE

When the transmission is unavailable, which indicates that the BTS is not connected to the BSC, certain alarms are generated in common cases. These alarms are the**E1 Local Alarm** of the GTMU, the **SW Not Activated Alarm**, the **LAPD Alarm**, and the **SFP Port Inconsistency Alarm**. The **SFP Port Inconsistency Alarm** is reported only when the TRX is connected but not configured or is configured but not connected.

----End

5.6 Checking the Hardware Connection of the BTS

This describes how to check the hardware connection of the BTS by checking the connection of power cables, grounding cables, and all kinds of signal cables.

Procedure

Step 1 For checking the connection of power cables and grounding cables, see **Table 5-8**.

Table 5-8 Checklist for the connection of the power cables and grounding cables

SN	Check Item
1	The unused connectors of the power cables are capped.
2	The PGND cable is green and yellow. The DC grounding cable is black. The -48 V DC power cable is blue. The cross-sectional area of the PGND cable is 16 mm^2.
3	All the power cables and grounding cables are copper-core cables. The outer diameter of the external power cables and grounding cables is about 11 mm.
4	The power cables and grounding cables are not short-circuited or reversely connected.
5	The power cables and grounding cables are bound separately from other cables.

SN	Check Item
6	Labels are attached to both ends of the power cables and grounding cables.
7	The power cables and grounding cables are not damaged or broken.
8	There are no connectors or joints on the power cables or grounding cables.
9	There are no breaking equipment, such as switches and fuses, in the electrical connection of the grounding system.
10	The redundant part of the power cables or grounding cables is stripped off rather than coiled.
11	The lugs on both ends of the power cables or grounding cables are soldered or crimped securely.
12	Bare wires and lug handles at the wiring terminals are tightly wrapped with insulating tapes or heat-shrinkable tubes.
13	The flat washers and spring washers are well mounted on all wiring terminals.
14	The diameter of the positive pole of the primary power supply connected to the earth complies with the standard requirements.
15	The working grounding and protection grounding of the BTS and the surge protection grounding of the building share one group of grounding conductors.
16	The grounding grids of the tower, equipment room, and distribution transformer (if the distance between the transformer and the equipment room is less than 30 m) constitute an integrated grounding grid.

Step 2 See **Table 5-9** to check the connection of all the signal cables.

Table 5-9 Checklist for the connection of the signal cables

SN	Check Item
1	The connectors of the E1 cables are tight and secure.
2	The connectors of the E1 cables are intact.
3	The E1 cables or RF cables are not damaged or broken.
4	The connectors of the RF cables are fixed in position to prevent the possible false connection from causing abnormal voltage standing wave ratio (VSWR).
5	The horizontal RF cables are clamped to the cable trough.
6	The proper cable surpluses are reserved at the connectors.
7	All cables are neatly bound with ties installed at even intervals, to a proper tightness, and in the same direction.
8	Extra cable ties are cut off. All cuts are smooth without sharp projections.

SN	Check Item
9	The cable layout facilitates maintenance and future capacity expansion.
10	All the labels and tags at both ends of the cables are legible.
11	The unused ports are covered with dust-proof covers and matching plugs.
12	The indoor 1/2-inch jumpers are distributed according to the layer and sector.
13	The indoor 1/2-inch jumpers are kept straight for 300 mm at their joints with the cabinet.

----End

6 Optional Commissioning Tasks

About This Chapter

The optional commissioning tasks are the VSWR check, output power of the TRX check, loopback test check, settings of the DIP switches on the board check, transmission between the BBU and the BSC on the BTS side check, transmission between cascaded TRXs check, and TRX ring topology check.

6.1 Commissioning the Antenna System
This describes how to commission the antenna system. You must check whether the VSWR is normal, whether the output power of the TRX is normal, and whether the antenna is connected properly. If an RET antenna is configured, you need to commission it.

6.2 Performing the Loopback Test
This describes how to perform the loopback test. The loopback test is optional. Before testing CS and PS services, you must check the transmission links of the signaling channels and traffic channels in the BTS. Loopback tests can be classified into the carrier loopback test and the channel loopback test.

6.3 Checking the DIP Switch Settings of the Boards
This describes how to check whether the settings of the DIP switches on the board are correct. You can perform this task by checking whether the attribute values corresponding to the DIP switches meet the actual requirements on the LMT.

6.4 Locally Checking the Transmission Between the BBU and the BSC
This describes how to check the status of the LEDs on the GTMU panel, how to check the connections of the E1 cable and E1 surge protection transfer cable. It also describes how to clear the fault caused by improper connections to ensure that the BBU communicates properly with the BSC.

6.5 Checking the Transmission Between Cascaded TRXs
This describes how to check the transmission between cascaded TRXs. The following description is based on three levels of cascaded TRXs.

6.6 Checking TRXs in Ring Topology
This describes how to check TRXs in ring topology on site. The following description is based on level 3 of TRXs in ring topology.

6.1 Commissioning the Antenna System

This describes how to commission the antenna system. You must check whether the VSWR is normal, whether the output power of the TRX is normal, and whether the antenna is connected properly. If an RET antenna is configured, you need to commission it.

6.1.1 Measuring the VSWR
This describes how to measure whether the VSWR is less than or equal to 1.5. If the VSWR is less than or equal to 1.5, the transmission of the antenna system is normal. To measure the VSWR, perform the following steps where the Site Master is taken as an example.

6.1.2 Monitoring the Output Power of TRXs
This describes how to obtain the output power of the TRX, which indicates the running status of the TRXs.

6.1.3 Checking the Antenna Connection
This describes how to check the antenna connections with an MS. You can lock the MS on a cell frequency and perform the dialing test. If the MS dialing test is successful, the antenna is properly connected.

6.1.1 Measuring the VSWR

This describes how to measure whether the VSWR is less than or equal to 1.5. If the VSWR is less than or equal to 1.5, the transmission of the antenna system is normal. To measure the VSWR, perform the following steps where the Site Master is taken as an example.

Prerequisite

The BTS is powered off.

NOTE

If you have checked the VSWR before powering on the BTS, you do not need to perform this task.

Procedure

Step 1 Measure the VSWR at the antenna port by using the Site Master.

If...	Then...
The VSWR is less than or equal to 1.5	The transmission of the antenna system is operational. Record the VSWR in the Commissioning Record Data Sheet.
If the VSWR is greater than 1.5	The transmission of the antenna system is faulty. Go to **Step 2**.

Step 2 Use the Site Master to locate the fault point of the abnormal VSWR on the jumper or feeder. When a fault point is found, check whether the connections are secure at the fault point, and whether the connectors are intact. If the connector is faulty, replace it.

NOTE

The fault points are usually at the connection point between the jumper and the feeder or between the jumper and the antenna.

----End

6.1.2 Monitoring the Output Power of TRXs

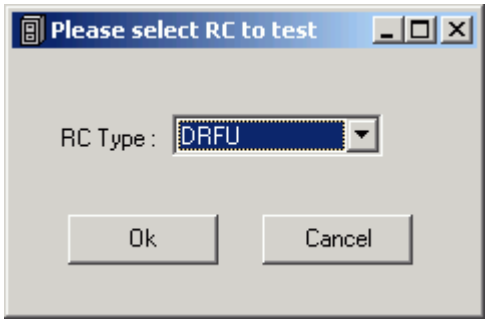
This describes how to obtain the output power of the TRX, which indicates the running status of the TRXs.

Procedure

Step 1 Connect the power meter to the ANT port on the RFU.

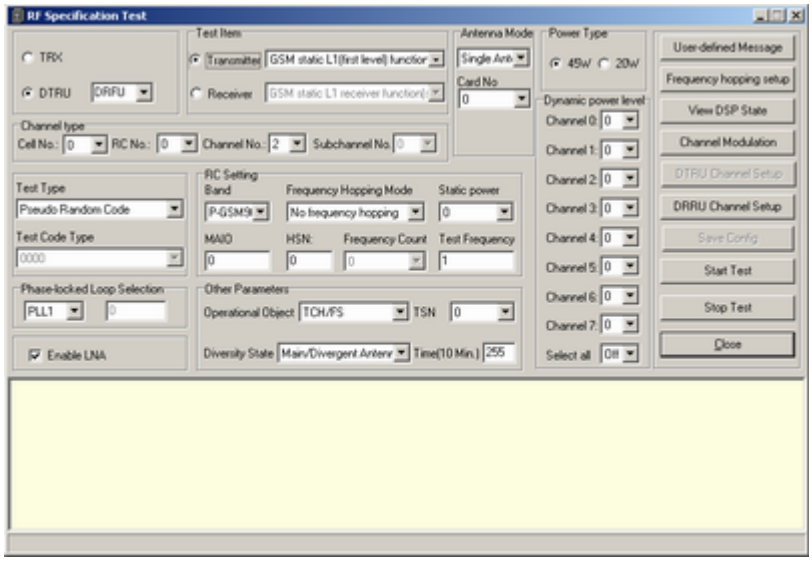
Step 2 In the navigation bar of the **Site Maintenance Terminal System** window, choose **Site**. In the browse window, double-click **RF Specification Test**. The **Please select RC to test** dialog box is displayed. Select the board to be tested, as shown in **Figure 6-1**.

Figure 6-1 Please select RC to test dialog box



Step 3 Click **OK**. The **RF Specification Test** dialog box is displayed, as shown in **Figure 6-2**.

Figure 6-2 RF Performance Test dialog box



Step 4 Set the parameters listed in **Table 6-1**. Then, click **User-defined Message**. Then, click **Start Test** to initiate the test on the output power of the TRXs.

NOTE

The parameters not involved in **Table 6-1** can use the default values.

Table 6-1 Parameter required in RF performance test

Group Box Type	Parameter Setting Description
Testing Items	Select **Transmitter**, and retain the default settings of the drop-down list.
Antenna Mode	Set the corresponding antenna mode and **Card No.** based on the actual configuration.
Power Type	Set **Power Type** according to the actual configuration.
Channel Type	Select **Cell No.**, **RC No.**, and **Channel No.** based on the actual configuration.
AC Setting	Select **Band** based on actual configuration. Set **Static power** to 0.

Step 5 Check the output power displayed in the power meter. Determine whether the output power of the TRX is within the normal range.

If...	Then...
The output power is within the normal range	Record the power in the **8 Commissioning Record Data Sheet**.
The output power is beyond the normal range	1. Check whether the connection between the power meter and the cable is secure. 2. Check whether the power meter is correctly set. If any fault exists, clear it. 3. Check whether the RFU is correctly configured and can transmit power. 4. Replace the RFU in which the TRX does not transmit power normally.

NOTE

- The output power displayed in the power meter is the power of the BTS with power sharing disabled. The permissible offset of the power is ±1 dBm.
- The TX output power displayed on the power meter is only that of a single carrier, rather than the total power of all the carriers in the RFU module.

Step 6 Repeat steps **Step 2** through **Step 5** to check the output power of all the carriers at the site.

----End

6.1.3 Checking the Antenna Connection

This describes how to check the antenna connections with an MS. You can lock the MS on a cell frequency and perform the dialing test. If the MS dialing test is successful, the antenna is properly connected.

Prerequisite

- The BTS is powered on and works normally.
- The transmission between the BSC and the BTS is normal.
- The antenna system is connected to the cabinet.
- The test MS is registered in the HLR.

Procedure

Step 1 Power on one test MS, and check that the MS automatically searches for the GSM network.

If...	Then...
The test MS fails to find the GSM network	• Check whether the test MS has a SIM card. If the test MS does not have a SIM card, insert the SIM card in the MS. • Check whether the SIM card supports authentication and encryption. If the SIM card does not support authentication or encryption, replace it. • Check whether the test MS is functional. If the test MS is faulty, replace it.
The test MS finds the GSM network	Go to **Step 2**.

Step 2 Lock the test MS on a frequency in a logical cell under the BTS.

Step 3 Perform the dialing test using the test MS. Then, check whether the antenna corresponding to the frequency is connected properly according to the test results.

If...	Then...
The dialing test is successful	You can infer that the feeder corresponding to the frequency is connected properly. Go to **Step 4**.
The dialing test is not successful	You can infer that the antenna system on the frequency may be connected improperly. Check the antenna connection and adjust the antenna.

NOTE

You are advised to do as follows to ensure the accuracy of test results:

- Make test calls within the power range of -30 dBm to -70 dBm under the tower.
- Perform the dialing test for more than five times.

Step 4 Repeat steps **Step 2** through **Step 3** to check the antenna connections on all the frequencies of the BTS.

----End

6.2 Performing the Loopback Test

This describes how to perform the loopback test. The loopback test is optional. Before testing CS and PS services, you must check the transmission links of the signaling channels and traffic channels in the BTS. Loopback tests can be classified into the carrier loopback test and the channel loopback test.

Prerequisite

- The transmission between the BSC and the BTS is normal.
- The current software version and data configuration on the LMT are correct.
- No alarm related to disruption of BTS services is reported.

6.2.1 Performing the Carrier Loopback Test
This describes how to perform the carrier loopback test. Before testing CS and PS services, you must check the transmission links of the signaling channels in the BTS.

6.2.2 Performing Channel Loopback Tests
This describes how to perform channel loopback tests. Before testing CS and PS services, you must check that the transmission links of the traffic channels in the BTS are proper.

6.2.1 Performing the Carrier Loopback Test

This describes how to perform the carrier loopback test. Before testing CS and PS services, you must check the transmission links of the signaling channels in the BTS.

Context

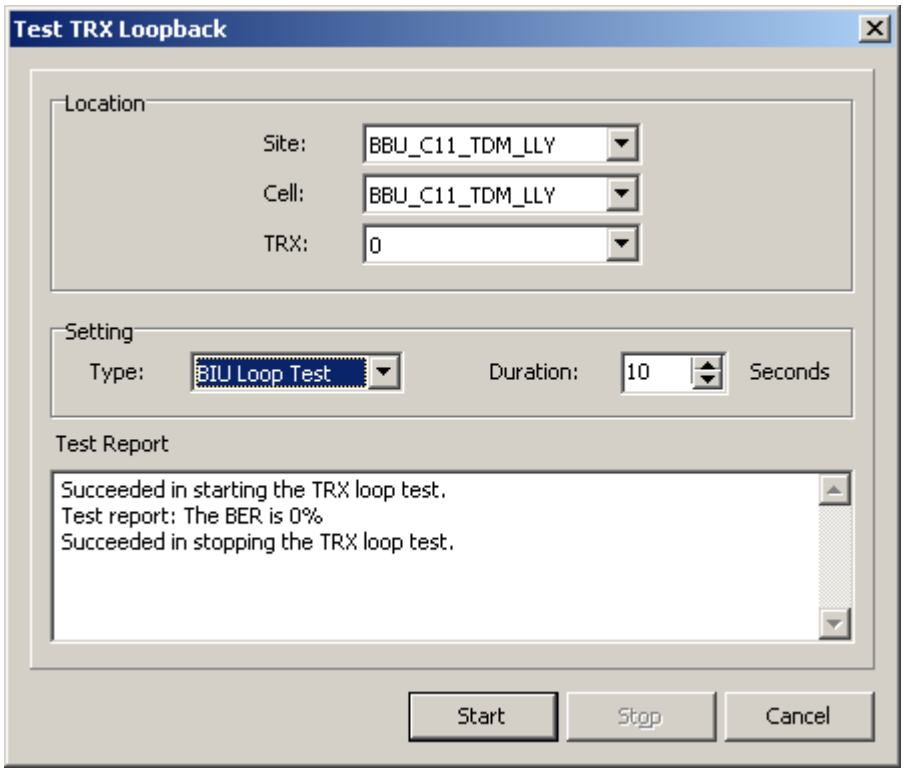
The BIU loopback test is performed to test the link transmission of the TRX timeslots on the BTS DBUS.

Procedure

Step 1 On the **BSC6000 Local Maintenance Terminal** window, choose **BTS Maintenance** > **Maintain TRX** > **Test TRX Loopback**.

The **Test TRX Loopback** dialog box is displayed, as shown in **Figure 6-3**.

Figure 6-3 Test TRX Loopback dialog box



Step 2 Set the parameters in the **Location** and **Setting** areas. That is, set **Type** to **BIU Loop Test**, and set **Site**, **Cell**, and **TRX** as required.

NOTE

The maximum **Duration** of the BIU loop test is the default value, which is 10s. In most cases, the default value is used.

Step 3 Click **Start** to perform the test. The result is displayed in the **Test Result** area, as shown in **Figure 6-3**.

If...	Then...
The BER is 0%	The signaling channel is normal.
The BER is not 0%	The signaling channel is abnormal. Record the number of the faulty TRX, and contact Huawei BTS technical support engineers for troubleshooting.

NOTE

During the test, you can click **Stop** to stop the test. The **Succeeded in stopping the TRX loop test.** message is displayed in the **Test Result** area.

Step 4 Repeat steps **Step 1** through **Step 3** to perform the loopback test on the other TRXs.

----End

6.2.2 Performing Channel Loopback Tests

This describes how to perform channel loopback tests. Before testing CS and PS services, you must check that the transmission links of the traffic channels in the BTS are proper.

Context

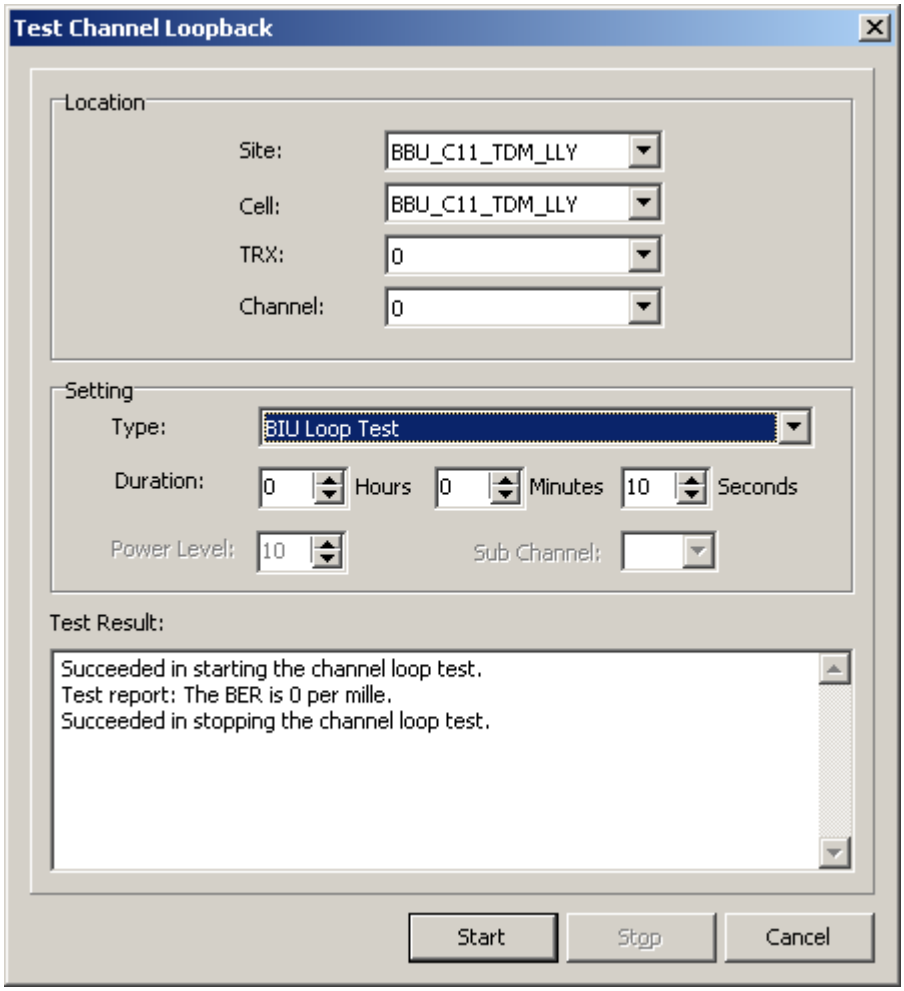
The BIU loopback test is performed to test the timeslot transmission over the TRX traffic channel on the DBUS in the BTS.

Procedure

Step 1 On the **BSC6000 Local Maintenance Terminal** window, choose **BTS Maintenance** > **Maintain TRX** > **Test Channel Loopback**.

The **Test Channel Loopback** dialog box is displayed, as shown in **Figure 6-4**.

Figure 6-4 Test Channel Loopback dialog box



Step 2 Set the parameters in the **Location** and **Setting** areas. That is, set **Type** to **BIU Loop Test**, and set **Site**, **Cell**, **TRX** and **Channel**as required.

NOTE

The maximum **Duration** of the BIU loop test is the default value, which is 10s. In most cases, the default value is used.

Step 3 Click **Start**. The **Confirm** dialog box is displayed. Click **Yes** to perform the test. The result is displayed in the **Test Result** area, as shown in **Figure 6-4**.

If...	Then...
The BER is 0 per mille	The service channel is normal.
The BER is not 0 per mille	The service channel is abnormal. Record the number of the faulty TRX, and contact Huawei BTS technical support engineers for troubleshooting.

NOTE

During the test, you can click **Stop** to stop the test. The **Succeeded in stopping the TRX loop test.** message is displayed in the **Test Result** area.

Step 4 Repeat steps **Step 1** through **Step 3** to perform the loopback test on the other channels.

----End

6.3 Checking the DIP Switch Settings of the Boards

This describes how to check whether the settings of the DIP switches on the board are correct. You can perform this task by checking whether the attribute values corresponding to the DIP switches meet the actual requirements on the LMT.

Prerequisite

- The BTS is in TDM transmission mode.
- The transmission between the BSC and the BTS is normal.

Procedure

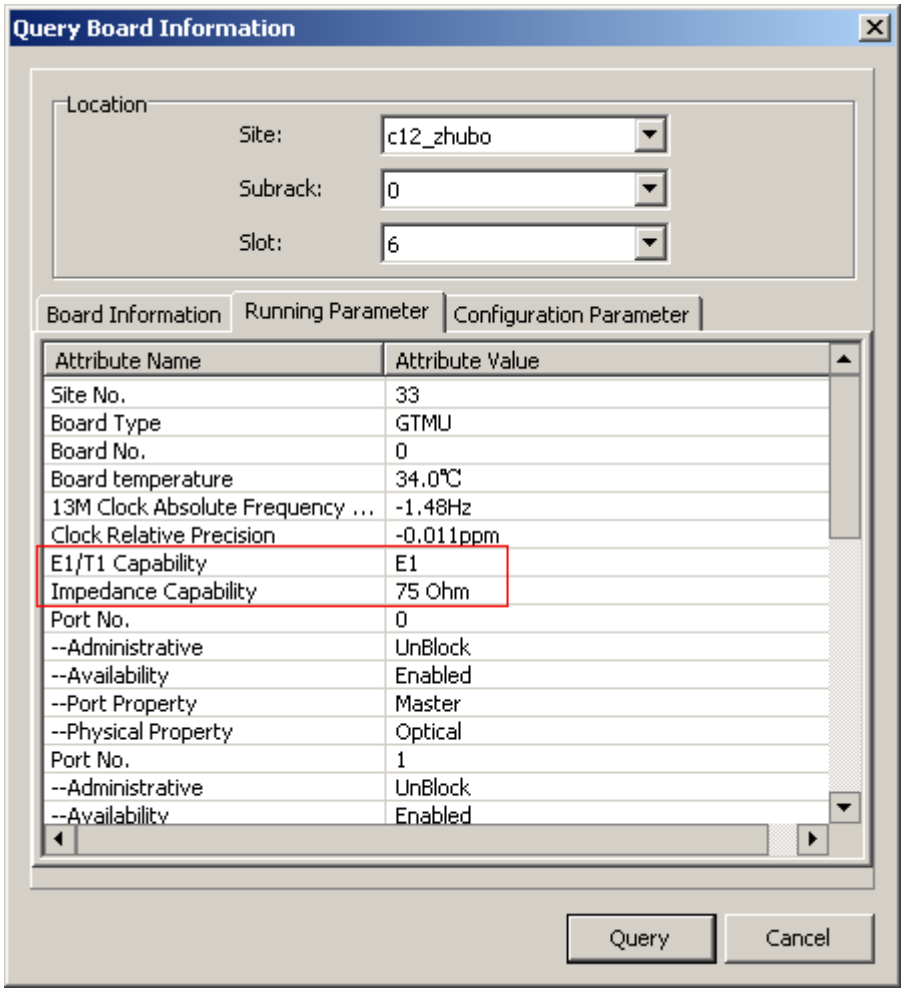
Step 1 Query the information of the GTMU: In the **BSC6000 Local Maintenance Terminal** window, select the target site. Right-click GTMU on the **Site Device Panel** tab page, and choose **Query Board Information**. The **Query Board Information** dialog box is displayed.

Step 2 Click the **Running Parameter** tab, and then click **Query** on the **Running Parameter** tab page. The query is successful, and the running status of the board is displayed in the dialog box.

Step 3 Check whether **Attribute Value** of **E1/T1 Capability** and **Impedance Capability** consistent with the actual condition, as shown in **Figure 6-5**.

- If the attribute values are consistent with the actual condition, end the task.
- If the attribute values are not consistent with the actual condition, see the *BTS3900 Quick Installation Guide* or the *BTS3900A Quick Installation Guide* to set the corresponding DIP switches on the BTS side again.

Figure 6-5 Site Device Attributes dialog box



----End

6.4 Locally Checking the Transmission Between the BBU and the BSC

This describes how to check the status of the LEDs on the GTMU panel, how to check the connections of the E1 cable and E1 surge protection transfer cable. It also describes how to clear the fault caused by improper connections to ensure that the BBU communicates properly with the BSC.

Prerequisite

- The BBU is connected to the BSC through an E1/T1 cable.
- The BBU and the BSC are successfully powered on.

Procedure

Step 1 Check whether the settings of DIP switch meet the field requirements. if not, modify the settings of DIP switch as required.

Step 2 Check the status of the LEDs **LIU0** to **LIU3** on the panel of the GTMU in the BBU. The LEDs **LIU0** to **LIU3** correspond to link 1 to 4 of the E1/T1 cable. Each link has one TX line and one RX line.

If...	Then...
The LEDs are OFF	The E1/T1 links are normal. End this task.
The LEDs are ON or ON for 0.125s and OFF for 0.125s	The E1/T1 links are abnormal. Go to **Step 3**.

NOTE

You need check the status of only the **LIU** LEDs corresponding to the E1/T1 line in use. The **LIU** LEDs corresponding to the unused E1/T1 cables are **ON**.

- If the BBU is in non cascaded, there is only one E1/T1 link between the BBU and the BSC and the corresponding LED is LIU0. If the LIU0 LED is **OFF**, it indicates the communication between the BBU and the BSC is normal. Otherwise, the communication is abnormal.
- If the two BBUs are cascaded, the second E1/T1 link of level 1 BBU is connected to the first E1/T1 link of level 2 BBU. Check the LIU1 LED and LIU0 LED on level 1 BBU and level 2 BBU respectively to verify whether the physical link is operational. If multiple BBUs are cascaded, check the LEDs of the corresponding links.
- If the BBU and the BSC form a ring, check the LIUs corresponding to the links in the ring to verify whether the communication is normal. For the connections of multiple BBUs and the LEDs to be checked, see that of the two BBUs in cascading connection.

Step 3 Check the connections and connectors at both ends of the cables. If the connector is damaged, replace it.

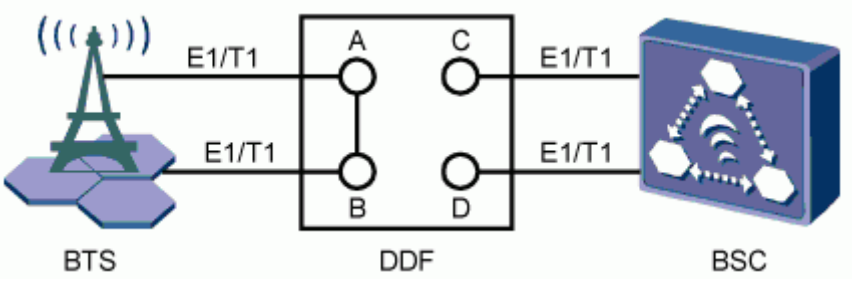
If...	Then...
The UELP is configured	• Check whether the E1/T1 cable is connected properly to the **OUTSIDE** port on the UELP. • Check whether the E1 surge protection transfer cable is connected properly to the **INSIDE** port on the UELP. • Check whether the E1 surge protection transfer cable is connected properly to the **E1/T1** on the GTMU.
The UELP is not configured	Check whether the E1/T1 cable is connected properly to the **E1/T1** port on the GTMU.

Step 4 At the DDF on the BTS side, check the soldering conditions for the connectors of the E1/T1 link where the communication is abnormal. Ensure sound jointing, since poor jointing may cause poor E1/T1 connection.

Step 5 Perform a physical loopback test on the E1/T1 cable where the communication is abnormal. Check whether the transmission of the E1/T1 cable is normal on the BTS side.

1. For a pair of E1s/T1s connecting the BTS and BSC through the DDF, the A port is connected to the C port, and the B port is connected to the D port. In the loopback test, disconnect the A port from the C port, and the B port from the D port, and then connect the A port to the B port, as shown in **Figure 6-6**. In this way, the TX end and RX end of the E1/T1 line is connected and the physical loopback is formed on the BTS side.

Figure 6-6 Physical loopback of E1/T1 at the DDF



2. Check the status of the **LIU** LEDs on the GTMU panel again.

If...	Then...
The LEDs are **OFF**	The E1/T1 connections are normal on the BTS side. The problem may be that the connection between the BTS and the BSC or the connections on the BSC side are faulty. End the check, and contact the BSC technical support engineer to clear the fault.
The LEDs are **ON** or **ON for 0.125s and OFF for 0.125s**	The cable connections on the BTS side are faulty. Clear the fault on the BTS side.

3. Set the E1s/T1s at the DDF on the BTS side from physical loopback to normal connection. Ensure that the connections are sound.

Step 6 Check the E1/T1 connections at the DDF. Ensure that the TX and RX ends of the E1 cables are connected properly.

NOTE

Do as follows to distinguish the E1 RX end from the E1 TX end:

Connect a pin of an LED to the wire of the E1/T1 cable, and the other pin to the shielding layer of the E1/T1 cable. If the LED is ON, this end is the TX end. If the LED is OFF, this end is the RX end.

----End

6.5 Checking the Transmission Between Cascaded TRXs

This describes how to check the transmission between cascaded TRXs. The following description is based on three levels of cascaded TRXs.

Prerequisite

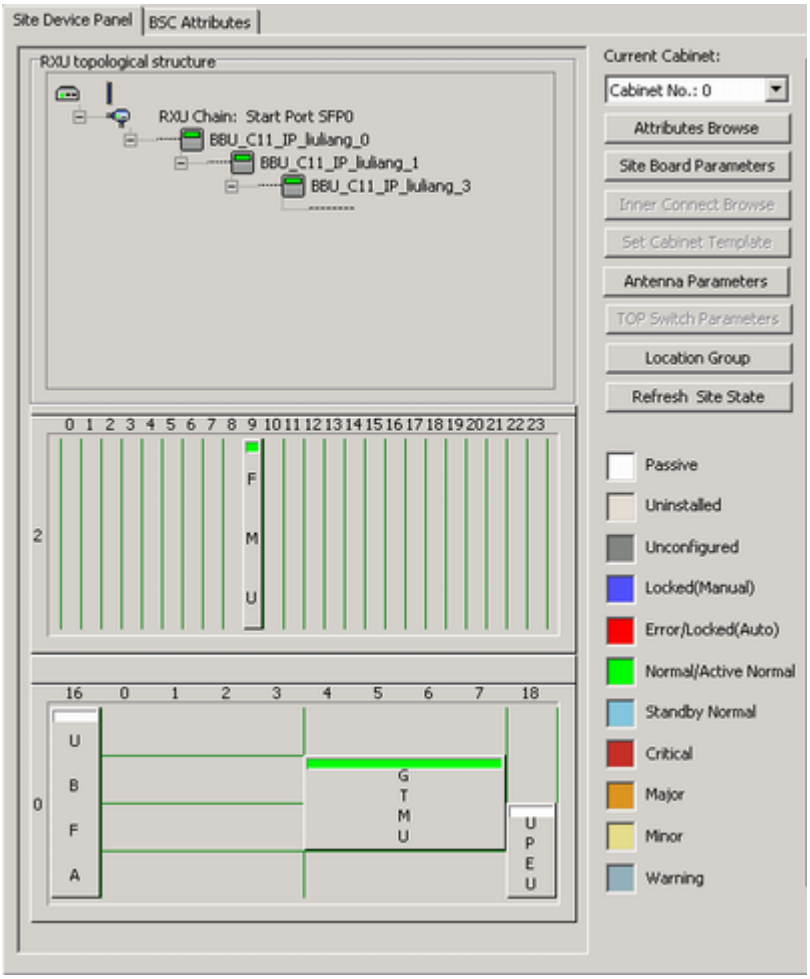
The physical connection between cascaded TRXs on the BTS side is complete.

Procedure

Step 1 In the navigation tree in the left pane of the **BSC6000 Local Maintenance Terminal** window, select the BTS, and check whether the status of the three cascaded TRXs on the **Site Device Panel** tab page is green, as shown in **Figure 6-7**.

- If the TRXs are displayed in green, you can infer that the TRXs are functional. End this task.
- If the TRXs are displayed in other colors, you can infer that the transmission between cascaded TRXs is abnormal. Go to **Step 2**.

Figure 6-7 Site Device Panel tab page



Step 2 If the status of the level 2 TRX and level 3 TRX is red, you can infer that the link between the level 1 TRX and level 2 TRX is faulty. The system reports **SFP Port Inconsistency Alarm**. Check whether the connection between the TRXs on the BTS side is normal, or clear the alarm based on the *BSS Alarm Reference*.

Step 3 If the status of the level 3 TRX is red, you can infer that the link between the level 2 TRX and level 3 TRX is faulty. The system reports **SFP Port Inconsistency Alarm**. Check the

transmission between the TRXs on the BTS side, or clear the alarm based on the *BSS Alarm Reference*.

----End

6.6 Checking TRXs in Ring Topology

This describes how to check TRXs in ring topology on site. The following description is based on level 3 of TRXs in ring topology.

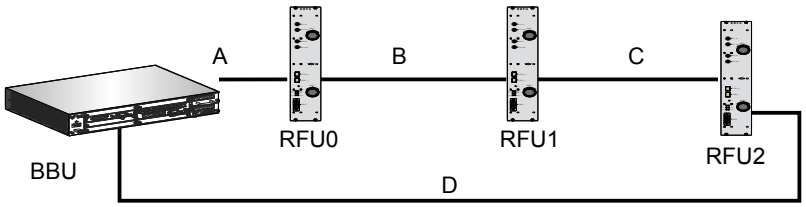
Prerequisite

- The physical connection between TRXs in ring topology on the BTS side is complete.
- The configuration of the TRXs in ring topology on the BSC side is complete.

Context

- **Figure 6-8** shows the connection between TRXs in ring topology. A, B, C, and D indicate the positions where the link may be broken during the ring topology transmission.

Figure 6-8 Connection between TRXs in ring topology



- The GTMU reports **SFP Port Inconsistency Alarm** when the ring topology is used in physical connection but not in data configuration, or when the ring topology is used in data configuration but not in physical connection.

CAUTION

Do not set breakpoints on the LMT when the TRXs are cascaded through the SFP high-speed signal cable. Otherwise, the board will be seriously damaged. You can directly connect and disconnect the signal cable between the cascaded TRXs to check the connection between them.

Procedure

Step 1 Check whether the TRX ring topology is configured on the LMT.

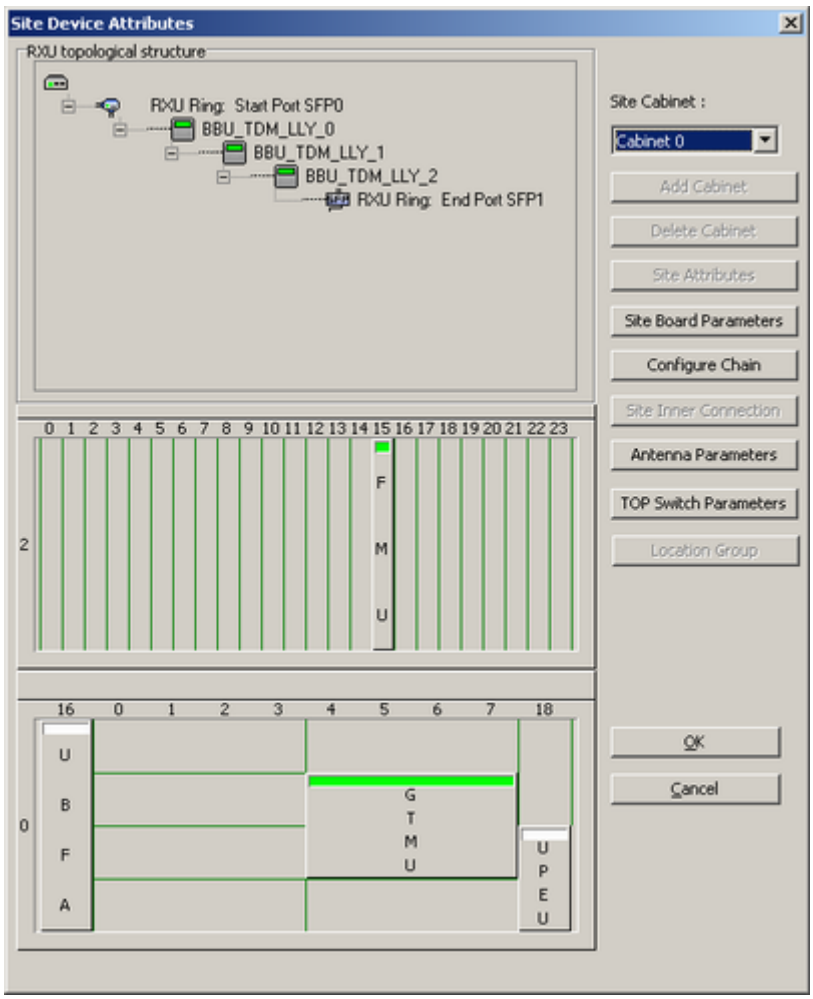
If...	Then...
The ring topology is configured	Go to **Step 2**.

If...	Then...
The ring topology is not configured	Configure the ring topology. For details, see the *BSC Initial Configuration Guide*.

Step 2 Change the TRX ring topology test to TRX cascaded test. The purpose of setting breakpoints on the LMT is to simulate the scenario that faults occur on the transmission link. In this way, you can check whether the TRXs are automatically switched to chain topology and whether the alarm is reported.

1. in the **BSC6000 Local Maintenance Terminal** window, right-click the target site, and choose **Configure Site Board Attributes**. The **Site Device Attributes** dialog box is displayed.
2. Click **Configure Site Board Attributes**. The **Site Device Attributes** dialog box is displayed, as shown in **Figure 6-9**.

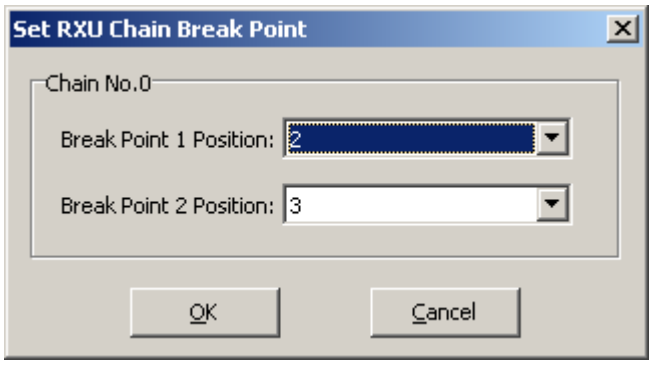
Figure 6-9 Site Device Attributes dialog box



3. Right-click the RXU chain, and choose **Set Break Point**. The **Set RXU Chain Break Point** dialog box is displayed.

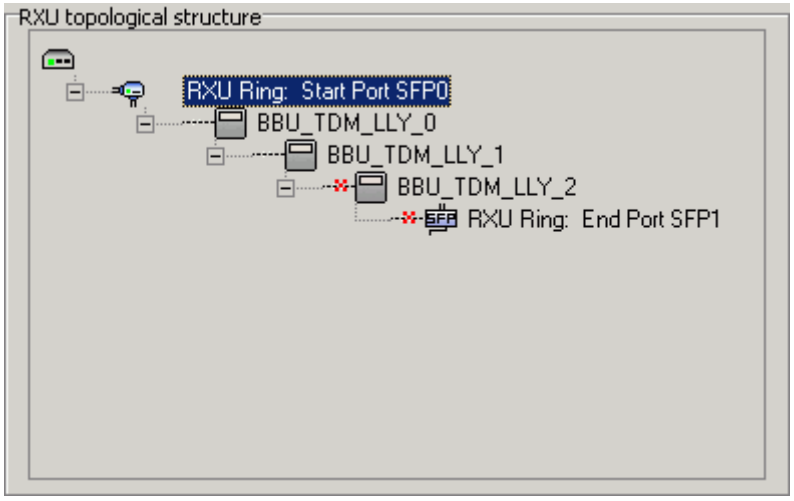
4. Set the breakpoint to disconnect the level 3 TRX, as shown in **Figure 6-10**.

Figure 6-10 Set RXU Chain Break Point dialog box



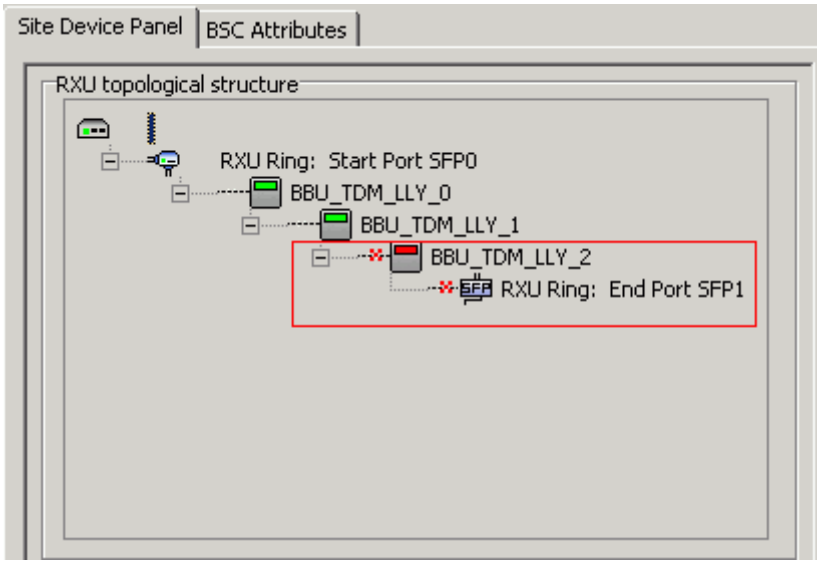
5. Click **OK** to return to the **Site Device Attributes** dialog box. The breakpoints marked with red cross are displayed, as shown in **Figure 6-11**.

Figure 6-11 Setting breakpoint successfully



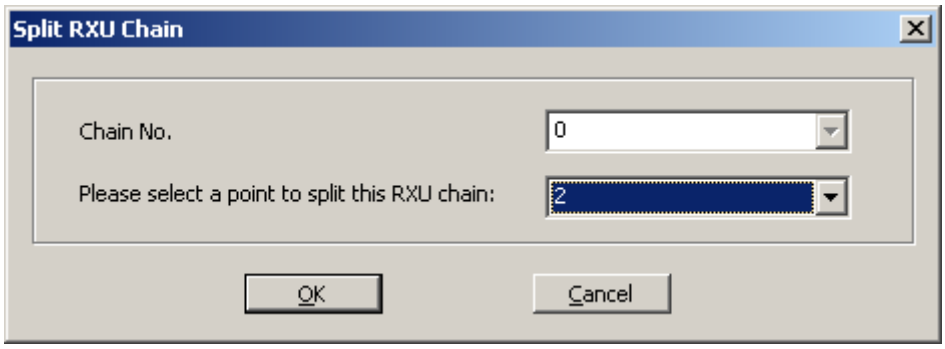
6. Click **OK**, and then click **Finish** to return to the **BSC6000 Local Maintenance Terminal** window. The level 3 TRX is disconnected, and the **Site Device Panel** tab page displays the faulty state, as shown in **Figure 6-12**.

Figure 6-12 Status of the disconnected TRX ring topology



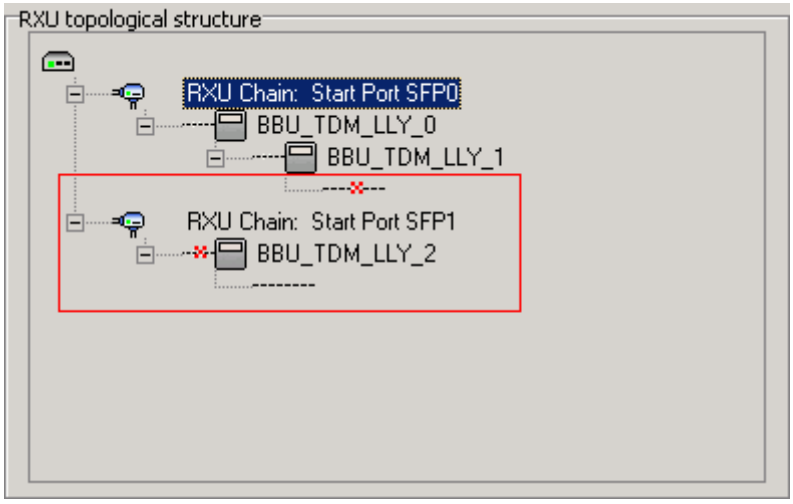
7. Right-click the site, and choose **Configure Site Board Attributes** from the shortcut menu. The **Configure Site Boards Attributes** dialog box is displayed.
8. Click **Configure Site Board Attributes**, the **Site Device Attributes** dialog box is displayed.
9. Right-click the RXU chain, and choose **Combine or Separate RXU Chain**. The **Split RXU Chain** dialog box is displayed, as shown in **Figure 6-13**.

Figure 6-13 Split RXU Chain dialog box



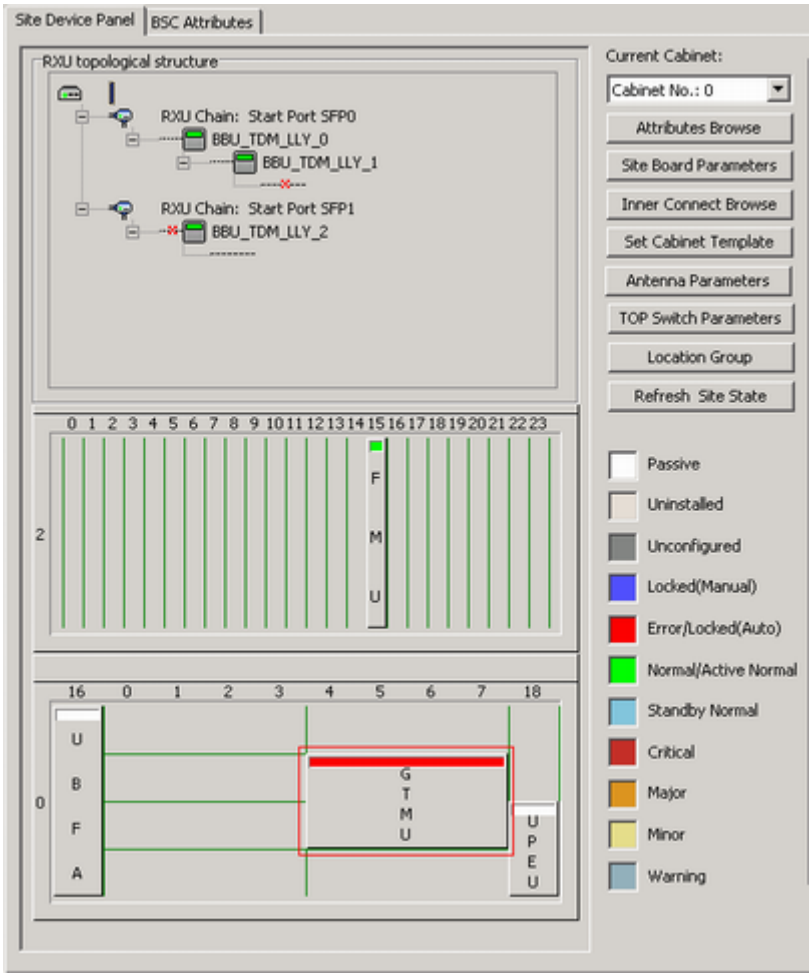
10. Set **Please select a point to split this RXU Chain** to 2. Click **OK**, and then return to the **Site Device Attributes** dialog box. The level 3 TRX is configured under the RXU link. The start port is SFP1, as shown in **Figure 6-14**.

Figure 6-14 Splitting RXU chain successfully



11. Click **OK**, and then click **Finish** to return to the **BSC6000 Local Maintenance Terminal** window. Figure 6-15 shows the data configuration on the **Site Device Panel** tab page. The GTMU reports the **SFP Port Inconsistency Alarm**.

Figure 6-15 TRX ring topology in splitting state



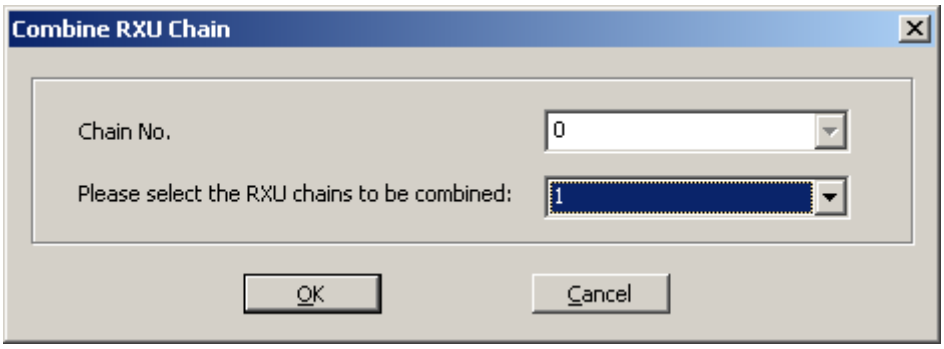
NOTE

After **Step 2.11** is performed, the status of the RFU is Faulty, and the **TRX Communication Alarm** is reported. Wait one to two minutes, and the **TRX Communication Alarm** is cleared, and the state of the RFU is Normal.

Step 3 Change the TRX cascaded test to TRX ring topology test. The purpose of removing breakpoints on the LMT is to simulate the scenario that the faults on the transmission link. In this way, you can check whether the TRXs are automatically switched to ring topology and whether the alarm is automatically cleared.

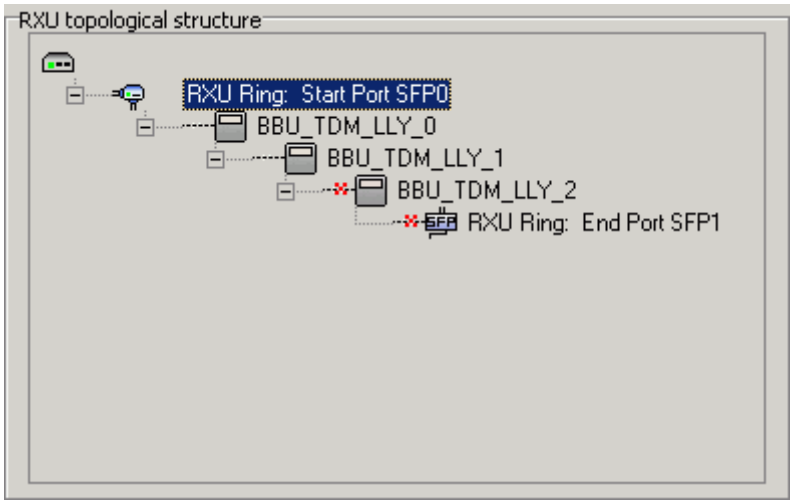
1. In the **BSC6000 Local Maintenance Terminal** window, right-click the target site and choose **Configure Site Board Attributes**. The **Site Device Attributes** dialog box is displayed.
2. Click **Configure Site Board Attributes**. The **Site Device Attributes** dialog box is displayed.
3. Right-click the RXU chain, and choose **Combine or Separate RXU Chain**. The **Combine RXU Chain** dialog box is displayed.
4. Set **Chain No.** and **Please select the RXU chains to be combined**, as shown in **Figure 6-16**. The following description takes combining RXU chain 1 to RXU chain 0 as an example.

Figure 6-16 Combine RXU Chain dialog box



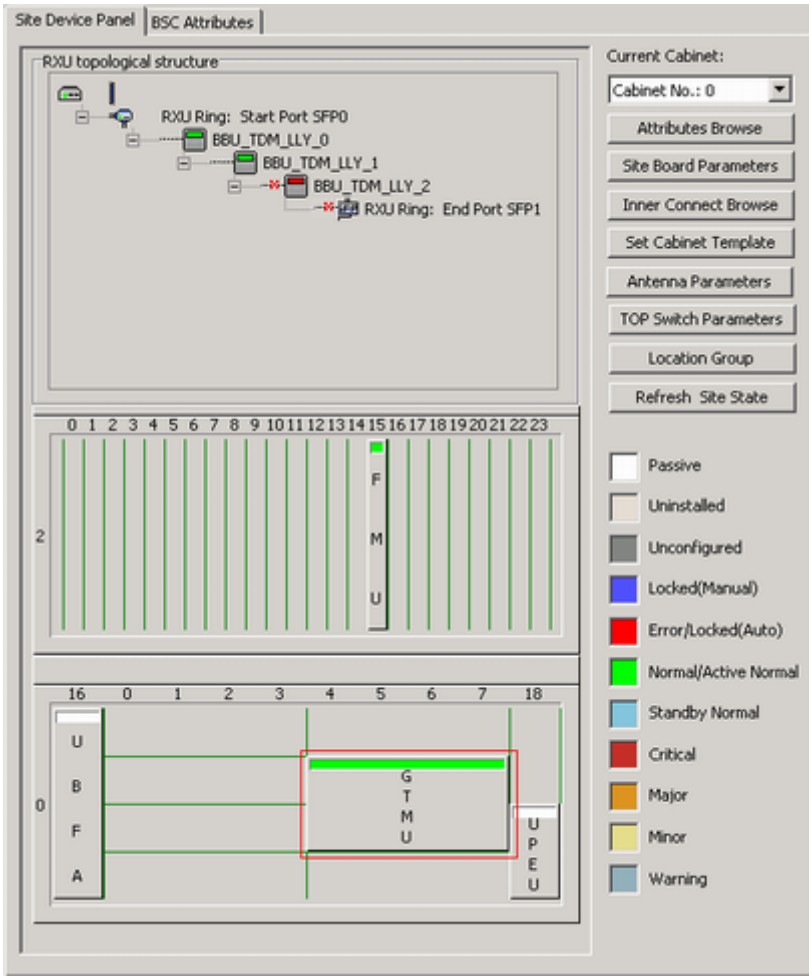
5. Click **OK**, and return to the **Site Device Attributes** dialog box. The RXU Chain becomes RXU Ring, as shown in **Figure 6-17**.

Figure 6-17 Combining RXU chain successfully



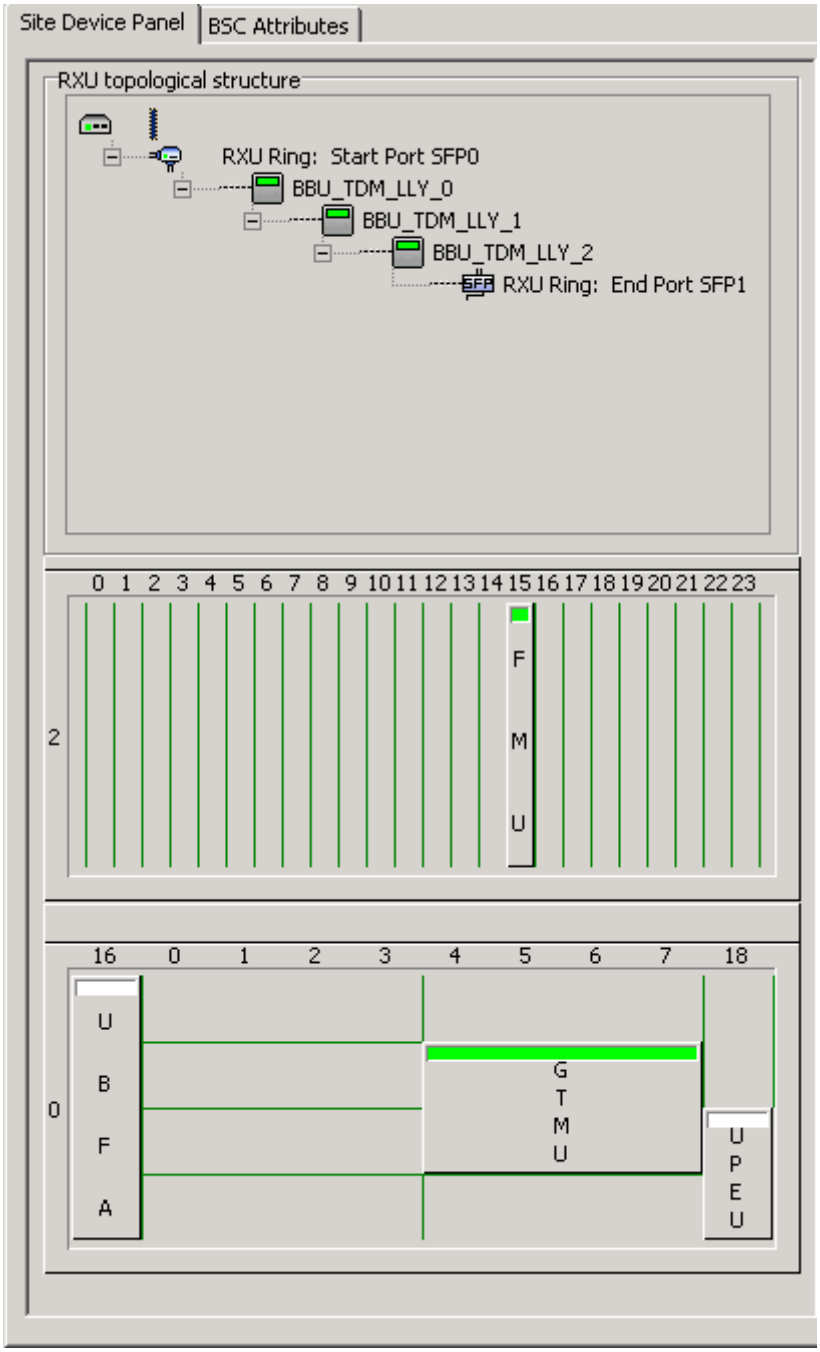
6. Click **OK**, and then click **Finish** to return to the **BSC6000 Local Maintenance Terminal** window. **Figure 6-18** shows the status of boards on the **Site Device Panel** tab page. **SFP Port Inconsistency Alarm** is cleared. The level 3 TRX, however, is in the disconnected state due to the breakpoint. Therefore, **TRX Communication Alarm** is reported.

Figure 6-18 RXU ring in combined state



7. In the **BSC6000 Local Maintenance Terminal** window, right-click the target site and choose **Configure Site Board Attributes**, and the **Site Device Attributes** dialog box is displayed.
8. Click **Configure Site Board Attributes**. The **Site Device Attributes** dialog box is displayed.
9. Right-click the RXU chain, and choose **Set Break Point**. The **Set RXU Chain Break Point** dialog box is displayed.
10. Delete breakpoints: Set **Break Point 1 Position** and **Break Point 2 Position** to NULL.
11. Click **OK**, and return to the **Site Device Attributes** dialog box. The two breakpoints marked with red cross are cleared.
12. Click **OK**, and then click **Finish** to return to the **BSC6000 Local Maintenance Terminal** window. All the alarms are cleared, and the status of each board is normal, as shown in **Figure 6-19**.

Figure 6-19 RXU Ring in normal state



NOTE

After **Step 3.12** is performed, the status of the RFU is Faulty, and the **TRX Communication Alarm** is reported. Wait one to two minutes, and the **TRX Communication Alarm** will be cleared, and the status of the RFU is Normal.

----End

7 FAQs for BTS Commissioning

About This Chapter

This describes the fault symptoms and cause analysis in the BTS commissioning.

7.1 Failed Communication Between the SMT and the BTS
This describes the symptom of the communication failure between the SMT and the BTS and analyzes the cause of the failed communication. It also provides the fault handling suggestions.

7.2 Faulty E1 Link
This describes the fault symptom and analyzes the cause of the faulty E1 link. It also provides the fault handling suggestions.

7.3 Failure of an MS to Search the Network
This describes the fault symptom and analyzes the cause of the failure of an MS to search the network.

7.4 Service Dialing Failure
This describes the fault symptom and analyzes the cause of the service dialing failure. It also provides the fault handling suggestions.

7.5 Low GPRS Data Transmission Rate
This describes the fault symptom and analyzes the cause of low GPRS data transmission rate.

7.1 Failed Communication Between the SMT and the BTS

This describes the symptom of the communication failure between the SMT and the BTS and analyzes the cause of the failed communication. It also provides the fault handling suggestions.

Fault Symptom

Log in to the BTS on the SMT fails. The result of running the **ping** commands shows that the connection between the SMT PC and the BTS cannot be established.

Cause Analysis and Handling Suggestions

Table 7-1 lists the possible causes and related suggestions to handle the fault.

Table 7-1 Possible causes and handling suggestions for failed communication between the SMT and the BTS

Fault Cause	Handling Suggestion
The Ethernet cable is faulty.	Check the connection of the Ethernet cable. Check whether the RJ45 connectors on both ends are functional. If the RJ45 connector is faulty, replace it.
The IP address of the SMT PC is incorrect.	Check whether the IP address of the SMT PC is on the same network segment as that of the board.

7.2 Faulty E1 Link

This describes the fault symptom and analyzes the cause of the faulty E1 link. It also provides the fault handling suggestions.

Fault Symptom

Alarms related to the E1/T1 link are reported, or the upper link is faulty.

Analysis

When the E1 links are faulty, the cause may be one of the following:

- The physical connection of cable is faulty.
- The crossed pair connection exists.
- The BER in transmission is high.

Handling Suggestion

1. Check the connections and connectors at both ends of the E1 link. Ensure that the connections are reliable and the connectors are functional.

2. Check for the crossed pair connection on the LMT.
3. Perform a physical loopback test to check whether the transmission of the E1 cable is normal on the BTS side.
4. Check the transmission channels to ensure that all the transmission channels are available.

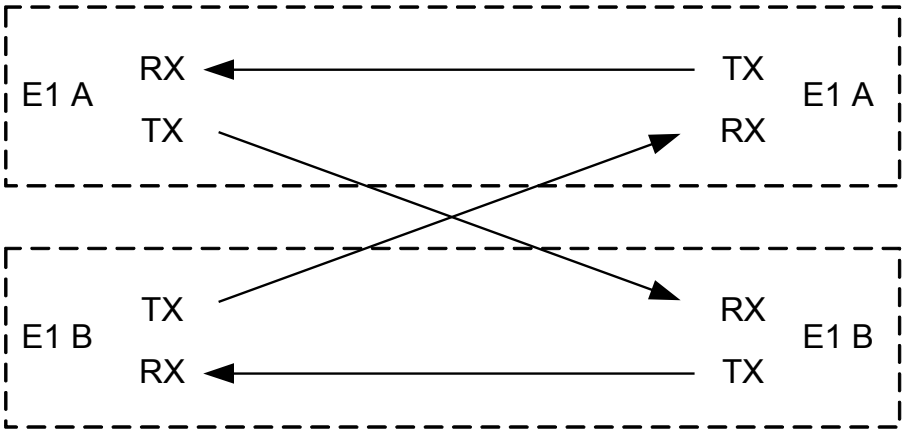
Example One: Detection of Crossed Pair Connection

NOTE

The detection method in this example is applicable to check for the improper E1 connection between the BTS and the BSC or the improper E1 connection on the BSC side. This detection method also can be used to check the improper T1 connection.

The crossed pair connection refers to the incorrect RX and TX connections between two pairs of E1 cables, as shown in **Figure 7-1**.

Figure 7-1 Crossed pair connection



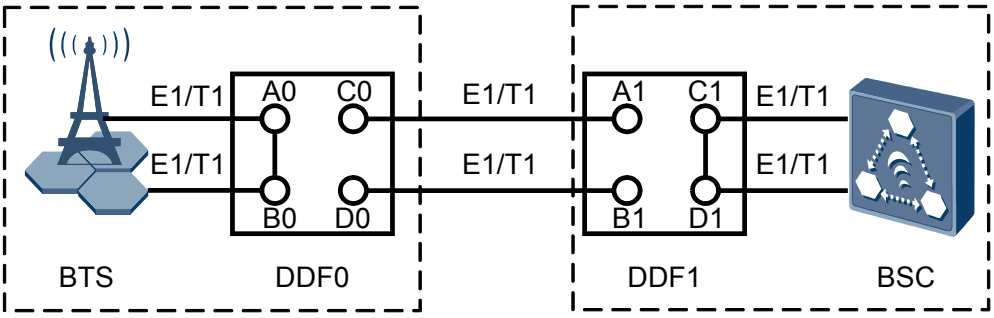
Perform the loopback method on the BSC side to check for crossed pair connection. Perform different steps according to different E1 connection modes.

NOTE

Loopback test: Set the port on the BTS side to the directly physical loopback mode. Send the test data, which carries the E1 port number, to the TX end of the E1 from the BSC side. After the loopback, check whether the received port information is the same as the transmitted one. If yes, you can infer that the E1 cable is correctly connected. If not, you can infer that the crossed pair connection occurs.

- E1 link between the BTS and the BSC (1): BTS→DDF on the BTS side→DDF on the BSC side→BSC, as shown in **Figure 7-2**.

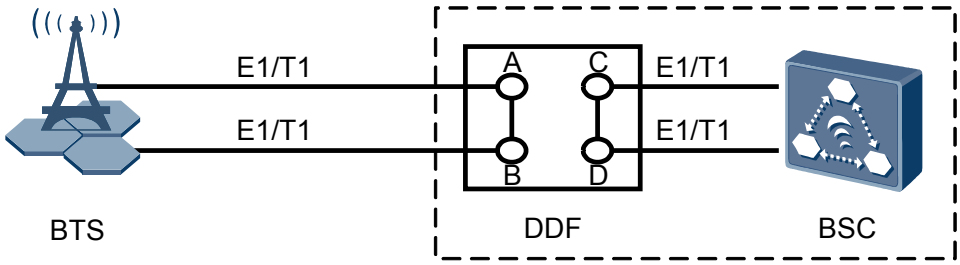
Figure 7-2 E1 link between the BTS and the BSC (1)



1. Check for the crossed pair connection on the E1 cable between the DDF on the BSC side and the BSC.
   (1) Perform a physical loopback on each E1 cable at the DDF subrack of the BSC, as shown in **Figure 7-2**. Connect port C1 and port D1
   (2) Run **CHK E1T1CRS** to query the results. If the results of all the ports are **NOT CROSS**, you can infer that the E1 cable is correctly connected on the BSC side. If the results are **CROSS EXIST**, correctly connect the E1 cable to this port.
   (3) Restore the E1 connections between the BSC and the DDR. That is, connect port C1 to port A1 and connect port D1 to port B1.
2. Check for the crossed pair connection on the E1 cable at the DDF subrack of the BSC. That is, connect port A1 and port B1. The detection method is similar to that in **1**.
3. Check for the crossed pair connection on the E1 cable between the DDF subrack of the BTS and the DDF subrack of the BSC. That is, connect port C0 and port D0. The detection method is similar to that in **1**.
4. Check for the crossed pair connection on the E1 cable at the DDF subrack of the BTS. That is, connect port A0 and port B0. The detection method is similar to that in **1**.

- E1 link between the BTS and the BSC (2): BTS→DDF on the BSC side→BSC, as shown in **Figure 7-3**.

Figure 7-3 E1 link between the BTS and the BSC (2)



1. Check for the crossed pair connection on the E1 cable between the DDF subrack of the BSC and the BSC.
   (1) Perform a physical loopback on each E1 cable at the DDF subrack of the BSC, as shown in **Figure 7-2**. Connect port C and port D.
   (2) Run **CHK E1T1CRS** to query the results. If the results of all the ports are **NOT CROSS**, you can infer that the E1 cable is correctly connected on the BSC side. If the results are **CROSS EXIST**, correctly connect the E1 cable to this port.
   (3) Restore the E1 connections between the BSC and the DDR subrack. That is, connect port C to port A and connect port D to port B.
2. Check for the crossed pair connection on the E1 cable at the DDF subrack of the BSC. That is, connect port A and port B. For details, see **1**.

Example Two: Check for UELP Faults Through Physical Loopback Test

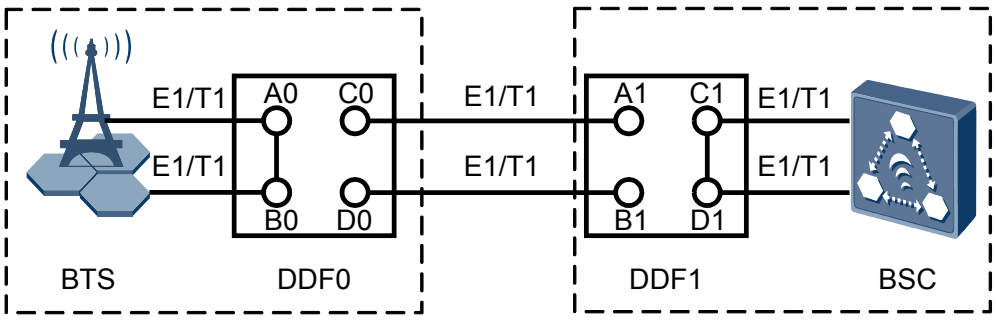
NOTE

The physcial loopback test in this example is applicable to check for the improper E1 connection on the BTS side.

1. Ensure that the E1/T1 cable is securely connected to the OUTSIDE port on the UELP, and that the connectors are in sound condition. If the connector is damaged, replace it.
2. Ensure that the E1 transfer cable is securely connected to the INSIDE port on the UELP and the E1/T1 port on the GTMU, and that the connectors are in sound condition. If the connector is damaged, replace it.
3. Perform the physical loopback test and troubleshoot the fault in the UELP.

   (1) Perform a physical loopback on the BTS side. In general, for a pair of E1s/T1s connecting the BTS and BSC through the DDF, port A0 is connected to port C0, and port B0 is connected to port D0. In the loopback test, disconnect port A0 from port C0, and port B0 from port D0, and then connect port A0 to port B0, as shown in **Figure 7-4**. In this way, the physical loopback is formed on the BTS side.

   Figure 7-4 Physical loopback of E1/T1 on the BTS side



   (2) You need check the state of the **LIU** LEDs corresponding to the E1/T1 in use, as shown in **Table 7-2**.

   Table 7-2 Meaning of the state of the **LIU** LEDs (UELP used)

If...	Then...
The LEDs are **OFF**	The cable connections on the BTS side are operational. The fault of the UELP is cleared. The testing task on the BTS side is complete.
The LEDs are **ON** or **ON for 0.125s and OFF for 0.125s**	The cable connections on the BTS side are faulty. Clear the fault of the UELP.

   (3) Disconnect the E1 transfer cable and the E1/T1 cable. Then, directly connect the E1/T1 cable to the E1/T1 port on the GTMU.

   (4) When the UELP is not used, determine whether the E1/T1 link is normal based on the state of the **LIU** LEDs on the GTMU panel, as listed in **Table 7-3**.

Table 7-3 Meaning of the state of the **LIU** LEDs (UELP not used)

If...	Then...
The LEDs are **OFF**	The UELP is faulty. a. Check whether the connection between the UELP and the backplane of the BBU is reliable. b. Replace the UELP.
The LEDs are **ON** or **ON for 0.125s and OFF for 0.125s**	The UELP is functional, but the E1 link on the BTS side is faulty.

(5) Reconnect the E1/T1 cable to the OUTSIDE port on the UELP and ensure that the connection is proper.

(6) Reconnect the E1/T1 cable to the INSIDE port on the UELP and the E1/T1 port on the GTMU, and ensure that the connection is proper.

CAUTION

After the physical loopback test, set the E1/T1 at the DDF on the BTS side from physical loopback to normal connection. Ensure that the connections are sound.

7.3 Failure of an MS to Search the Network

This describes the fault symptom and analyzes the cause of the failure of an MS to search the network.

Fault Symptom

An MS fails to find the network.

Cause Analysis

The possible causes are as follows:

- Cell parameters such as CGI, BCCH, TA, and BSIC are improperly configured.
- The MS does not support the frequency band of this base station.
- The downlink signals are weak. Therefore, the MS is unable to locate the cell.
- The downlink interference is strong. The MS is unable to locate the cell or receive the correct downlink system information.
- The cell radius is small.

NOTE

When the MS fails to find the network, pay attention to the output power of the local cell and the radio network coverage.

7.4 Service Dialing Failure

This describes the fault symptom and analyzes the cause of the service dialing failure. It also provides the fault handling suggestions.

Fault Symptom

Service dialing failure may occur in either of the following cases:

- Location update failure
- Service dialing failure

Cause Analysis and Handling Suggestion

Table 7-4 lists the possible causes and related suggestions.

Table 7-4 Possible causes and handling suggestions for service dialing failure

Cause of the Fault	Handling Suggestion
The MS is faulty.	Replace the MS with a new one.
The CS domain or the PS domain on the CN side is not ready.	Keep the CS domain and the PS domain ready.

7.5 Low GPRS Data Transmission Rate

This describes the fault symptom and analyzes the cause of low GPRS data transmission rate.

Fault Symptom

During the service test, the following problems may occur: low GPRS data rate in the PS domain of the newly added BTS, or a high BER on the Abis interface.

Cause Analysis

The possible causes are as follows:

- The E1 cable is not properly grounded. You can enable the grounding status of the E1 cable by setting the DIP switch **SW2** on the **GTMU**. Table 7-5 describes the DIP switch **SW2**.

Table 7-5 Description of the DIP switch SW2 on the GTMU

Setting of DIP Bit				Description
1	2	3	4	
ON	ON	ON	ON	The E1 cable is grounded.
OFF	OFF	OFF	OFF	The E1 cable is not grounded.

If...	Then...
Only one end of the E1 cable is grounded,	The E1 cable is grounded properly.
Both ends of the E1 cable are grounded,	The E1 cable is not grounded properly.

- The data configuration negotiated between the BSC and the BTS is not consistent.
- The cell signals are weak.
- The MS capability is limited.

8 Commissioning Record Data Sheet

This describes the data sheet that is used to record the process and result of the BTS commissioning.

Table 8-1 Data sheet for BTS commissioning

Site Name				
BTS Model				
Commissioning Time				
Commissioning Engineer				
Scenario		☐ Transmission available scenario ☐ Transmission unavailable scenario		
Commissioning Result		☐ Successful ☐ Failed		
Commissioning Item			Conclusion	Handling Exceptional Case
Commissioning Preparation Phase		The resources required for commissioning are available.		
		The commissioning requirements are met.		
Commissioning Phase	Transmission Unavailable Phase	You have logged in to the BTS through the SMT.		
		The BTS board and logical objects are available.		
		The current software version is correct.		

		The transmission between the BBU and the RXU is normal.		
		No other alarms are reported except the alarms related to the transmission.		
		The hardware connections are correct.		
		Site management rights are released.		
	The transmission between the BBU and the BSC is available.			
	Transmission Available Phase (on the LMT)	The transmission between the BBU and the RXU and the transmission between the BBU and the BSC is normal.		
		The transmission between cascaded BTSs is normal.		
		The transmission between BTSs in ring topology is normal.		
		The board configuration is correct and the boards are in normal operation.		
		The current software version is correct.		
		The hardware installation and the data configuration are consistent with each other.		
		No alarms related to the BTS are reported.		
		The CS service test is successful.		
		The PS service test is successful.		
		The environment monitoring alarm is reported normally.		
	Optional Commissioning Task	The VSWR is correct. Record the value of the VSWR.		
		The output power of the TRX is normal. Record the value of the output power per carrier.		

		The antenna system is properly connected.		
		The result of the carrier loopback test is normal.		
		The result of the channel loopback test is normal.		
		The DIP switch settings are correct.		
Commissioning Result				
		Unsolved Problems	Impact	
Unsolved Problems After Commissioning				

9 Communication Ports Used by the GBTS

Table 9-1 lists the communication port used by the GBTS

Table 9-1 The Communication Port Used by GBTS

Protocol	Side A	Side A Ports (Listening)	Side B	Side B Ports (Launch)	Service	Authentication
TCP	GBTS	700	SMT	1024-65535	It will be used by SMT for local maintenance before GBTS connects in the network	-