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1 Commissioning Preparations

About This Chapter

The following table lists the contents of this chapter.

Title	Description
1.1 BTS Equipment	Describes the BTS equipment to be verified before commissioning.
1.2 Tools for Commissioning	Describes the tools involved in commissioning.
1.3 Personnel	Describes the personnel required for commissioning.
1.4 Site Information	Describes the site information to be collected before commissioning.
1.5 Data Configuration Files	Described the requirements for data configuration files.

1.1 BTS Equipment

Before commissioning, ensure that:

- The cabinet and its components are installed correctly.
- The antenna system is installed and connected.
- The transmission equipment is connected.
- The BTS O&M software and operational software are installed.
- The power system is installed.
- The equipment for monitoring the equipment room environment is installed. (optional)

1.2 Tools for Commissioning

Table 1-1 lists the tools for BTS commissioning.

Table 1-1 Tools for BTS commissioning

Tool	Quantity	Remark
CDMA MS	Two	Mandatory
Qualcomm CAIT or a BLUEROSE	One	Mandatory
RS NRT-Z44 power meter	One	Optional
SiteMaster 331A	One	Mandatory
30 dB low-power coaxial attenuator	One	Optional
20 dB low-power coaxial attenuator	Two	Optional
DIN-male to N-female adapter	One	Optional

1.3 Personnel

Huawei technical support engineers and the engineers representing the customers complete the system commissioning together. The customer representative should sign the acceptance list after the commissioning is complete.

1.4 Site Information

To facilitate the preparation of commissioning tools and commissioning schemes, collect the following basic information before you start the commissioning of the BTS:

- BTS ID

- IP address for O&M
- PN code
- Service type

1.5 Data Configuration Files

After making the data configuration files, the system commissioning personnel copies them into the workstation (WS). The system commissioning personnel must ensure that each data configuration file is named in the format of **BTSXXX.txt**.



NOTE

The names of the configuration files are in the format of **BTSXXX.txt**. "XXX" stands for the BTS ID. This part must be three digits long. If the BTS ID has fewer than three digits, zeroes are added on the ID's left to make up three digits.

The commissioning personnel can check the configuration data in the files and the site information. Pay special attention to the data of the Abis interfaces.

2 Commissioning Modes

About This Chapter

The following table lists the contents of this chapter.

Title	Description
2.1 Local Commissioning	Describes typical operation tasks and classification of the BTS local commissioning.
2.2 Remote Commissioning	Describes typical operation tasks and classification of the BTS remote commissioning.

2.1 Local Commissioning

The local commissioning is performed at the BTS site for the commissioning of the BTS3606E/3606AE or for the commissioning of the BSS. For the latter purpose, the coordination of the BSC is required.

The local commissioning includes local commissioning in Telnet mode and reverse maintenance.

2.1.1 Local Commissioning in Telnet Mode

In the case of local commissioning in Telnet mode, you can connect the WS to the BCKM by using a crossover Ethernet cable and then log in to the BTS. In this mode, you can use commands to perform BTS commissioning.

2.1.2 Reverse Maintenance

In the case of reverse maintenance, you can connect a BSC LMT to the BCKM by using a crossover Ethernet cable and then use this LMT to log in to the BAM of the BSC. In reverse maintenance mode, you can maintain the entire BSS system from a BTS site.

2.1.3 Local Commissioning Tasks

The operation tasks related to the local commissioning are as follows:

- Configuring the WS
- Locally Logging In to the BTS in Telnet Mode
- Configuring the IP Address and Routing Information of the BTS
- Loading the BTS Software Locally
- Performing the BSS Reverse Maintenance
- O&M Test
- RF Performance Test
- Service Function Test

For detailed steps of each operation task, see 3.3 "Starting Local Maintenance"

2.2 Remote Commissioning

By using maintenance tools, you can commission the entire BSS system remotely with the coordination of the BSC.

The remote commissioning includes the remote commissioning on LMT system and the remote commissioning in Telnet mode.

2.2.1 Remote Commissioning on the LMT System

In the case of the remote commissioning on the LMT, you can input a command for commissioning on the LMT. This command is processed by the BAM server and is then sent to the BTS for response. The BAM server records the operation results, such as successful,

failed, timeout, and abnormal, and then sends the result to the LMT. In such a case, you can know the operation result.

2.2.2 Remote Commissioning in Telnet Mode

In the case of remote commissioning in Telnet mode, you can log in to the BTS by using Telnet software. The commissioning for the BTS3606E/3606AE is performed with the coordination of the BSC.

2.2.3 Remote Commissioning Tasks

The operation tasks related to the remote commissioning are as follows:

- Configuring the WS
- Starting the LMT
- Remotely Logging In to the BTS in Telnet Mode
- Loading the BTS Software Remotely
- O&M Test
- RF Performance Test
- Service Function Test

For detailed steps of each operation task, see 3.3 "Starting Local Maintenance".

3 Commissioning Process

About This Chapter

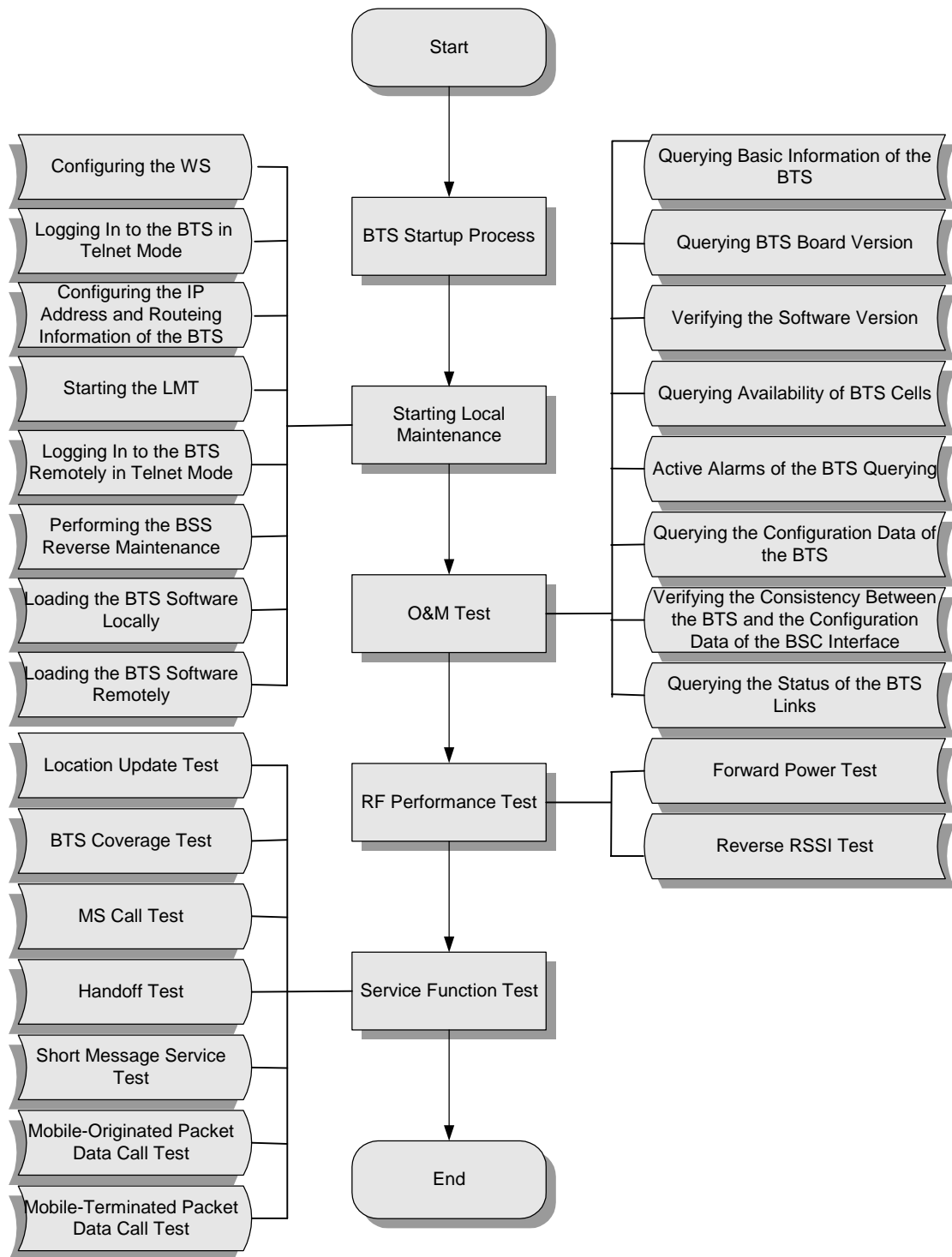
The following table lists the contents of this chapter.

Title	Description
3.1 Commissioning Flowchart	Describes the BTS commissioning process and operation tasks in terms of flowchart.
3.2 BTS Startup Process	Describes the general procedure for starting the BTS.
3.3 Starting Local Maintenance	Describes the procedure for starting local maintenance.
3.5 O&M Test	Describes the procedure of O&M commissioning.
3.6 RF Performance Test	Describes the procedure of the commissioning of the RF specifications.
3.6 Service Function Test	Describes the procedure of service function commissioning

3.1 Commissioning Flowchart

Figure 3-1 shows the flowchart for BTS commissioning.

Figure 3-1 BTS system commissioning flowchart



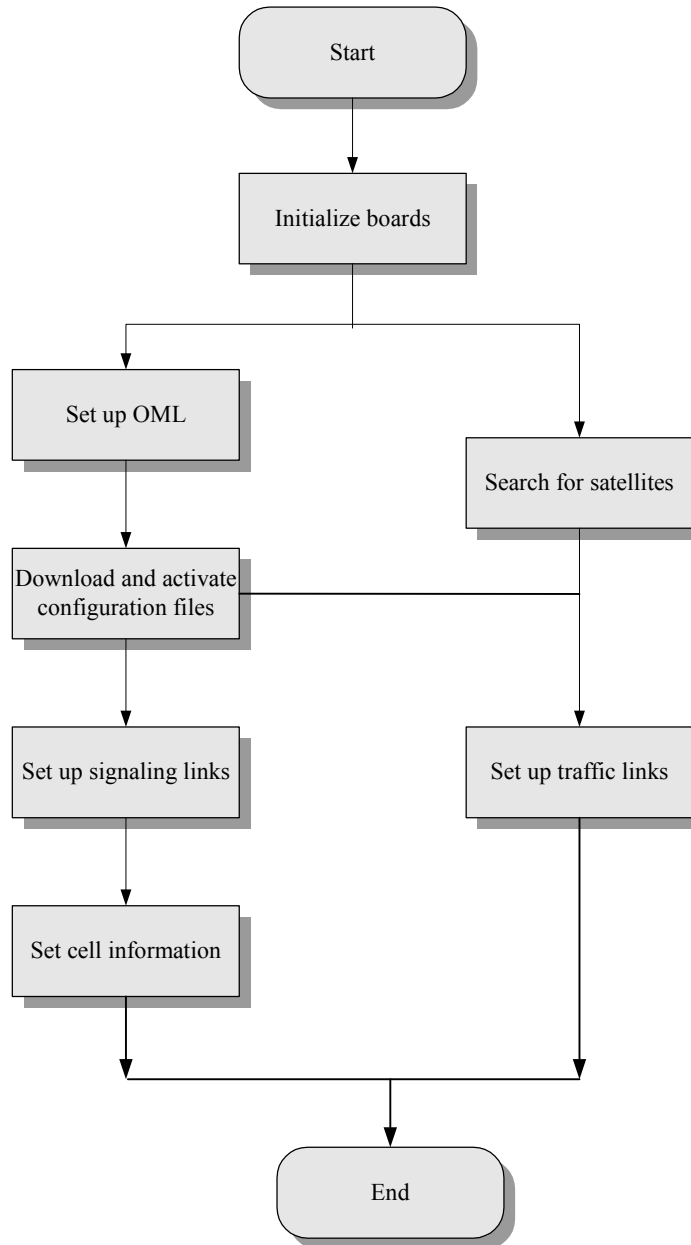
3.2 BTS Startup Process

This section describes the process of the BTS startup.

3.2.1 BTS Startup Flowchart

Figure 3-2 shows the flowchart for BTS startup.

Figure 3-2 BTS startup flowchart



 **NOTE**

- For the descriptions of board indicators or module indicators, see the *Airbridge BTS3606E CDMA Base Station Hardware Reference* or the *Airbridge BTS3606AE CDMA Base Station Hardware Reference*.
- For the detailed information of BTS alarms, see the online help and the *Airbridge BTS3606E&3606AE CDMA Base Station Site Maintenance Guide* or the detailed alarm description of the alarm management system.
- For the troubleshooting related to BTS startup, see the *Airbridge BTS3606E&3606AE CDMA Base Station Site Maintenance Guide*.

3.2.2 Description of the BTS Startup Process

This section details the steps shown in Figure 3-2.

Board Initialization

After the BTS is powered on, the BOOT software of each board transfers the board software from the Flash memory to the RAM. After the board self-test and initialization, the communication link between the boards is set up.

If the board initialization fails, the board resets.

Table 3-1 describes the symptom of board initialization.

Table 3-1 Symptom of board initialization

Observation Method	Description
Through indicators of the BTS	<p>During the power-on and initialization process of the BCKM and the BCIM, the RUN indicator flashes fast at 4 Hz.</p> <p>Before the operation and maintenance link (OML) is set up, the ACT indicator on the BCKM flashes fast at 4 Hz.</p> <p>The frequency at which the ALM indicator flashes varies with the alarm level.</p>
On the service maintenance system	The BTS is in the link interruption state.

Setting Up the OML

After the self-test, the baseband boards set up the OML with the BSC. Setting up the OML from the BTS to the BSC is the prerequisite for configuring the BTS at the far end.

The physical bearer between the BTS and the BSC can be E1/T1 or FE. These bears can be used to transmit ATM cells and IP packets.

The BTS supports the following three modes for setting up OMLs:

- Setting up the OML in ATM over E1/T1 mode
- Setting up the OML in IP over E1/T1 mode
- Setting up the OML in IP over FE mode



NOTE

- If the OML cannot be set up during the BTS startup, the BTS restarts five minutes later. If the OML is interrupted when the BTS is processing services, the BTS sets up the OML repeatedly but the BTS do not restart.
- Before querying the status of the CTRM/OMTR, ensure that the status of the CCPM/CECM is normal.

The following details three modes for setting up OMLs.

The process of setting up the OML in ATM over E1/T1 mode is as follows:

- Step 1** When the BTS is started, the BCKM sends a BOOTP request to the CMUX of the BSC.
- Step 2** The CMUX writes into the BOOTP frame the information of the transmission channel and transfers the information to the BAM.
This information is used as the address parameters of the client BTS and is called BOOTP information.
- Step 3** After receiving the BOOTP request, the BAM obtains the BTS ID according to the BOOTP information (execute the command **ADD BSBTINFO** to map the BTS ID to the BOOTP information).
- Step 4** The BAM obtains the maintenance IP address of the BTS according to the BTS ID (execute the command **ADD BTS** to map the BTS ID to the maintenance IP address).
- Step 5** The BAM writes the maintenance IP address into the BOOTP response frame and sends the frame to the BTS.
- Step 6** After obtaining the maintenance IP address, the BTS sends a request for setting up a TCP link to the BAM.
- Step 7** The BAM receives this request and sets up the OML from the BTS to the BAM.

----End

In the case of setting up the OML through the E1/T1 link in the IP transmission mode, after two BOOTP requests, the BTS obtains the IP address of the BCIM, routing information, and maintenance IP address of the BTS.

For the details of the BOOT requests of the BCKM, see the description of setting up the OML in ATM over E1/T1 mode in 3.2.2 "Description of the BTS Startup Process."

The process of setting up the OML in IP over E1/T1 mode is as follows:

- Step 1** When the BTS is started, the BCIM sends the PPP setup request to the BSC. After obtaining the PPP IP address, the BTS sets up a PPP connection with the BSC.
- Step 2** The BCIM sends a BOOTP request to the CBPE of the BSC.
- Step 3** After receiving the BOOTP request, the CBPE obtains the IP address and routing information of the BCIM from the BOOTP transmission channel.
- Step 4** The CBPE writes the maintenance IP address of the BCIM into the BOOTP response frame and sends it to the BCIM.
- Step 5** The BCKM sends the BOOTP request to the BSC and obtains the maintenance IP address of the BTS.
- Step 6** After obtaining the maintenance IP address, the BTS sends a request for setting up a TCP link to the BAM.

Step 7 The BAM receives this request and sets up the OML from the BTS to the BAM.

----End

In the case of setting up the OML in IP over FE mode, the IP address of the BCIM and the O&M IP address of the BTS cannot be obtained through the BOOTP if the BTS starts for the first time. You must configure them at the BTS side.

The process of setting up the OML in IP over FE mode is as follows:

Step 1 Execute the command **SET CBTSBCIMIP** to set the IP address of the BCIM.

Step 2 Execute the command **ADD CBTSFEPOR**T to set the FE port on the BCIM.

Step 3 Execute the command **ADD CBTSIPROUTE** to set the BTS routing information.

Step 4 Execute the command **SET CBTSOAMIP** to set an IP address of the BTS O&M.

Step 5 The BTS sends a request for setting up an OML with the BSC.

Step 6 The BAM receives the request and sets up an OML from the BTS to the BSC.

----End

Table 3-2 lists the indicator status during the OML setup.

Table 3-2 Indicator status during the OML setup

Observation Method	Description
Through the indicators of the BTS	After the OML is set up normally, the ACT indicators of the BCKM and BCIM are ON.
On service maintenance system	After the OML is set up normally, you can view the running status of the BCKM and the BCIM on the equipment panel.

Searching Satellites

After being initialized, the BCKM searches the satellite to obtain stable and reliable clock signals for the BTS. If satellite searching fails, the ACT indicator of the BCKM flashes slowly. At the same time, the CCPM or the CECM restarts repeatedly. If the standby BCKM is configured and it can search satellite normally, the standby BCKM switches over to the active one.

Downloading and Activating Data Configuration Files

The BTS downloads and activates the data configuration files from the BAM first. If the software version of the board is not consistent with that of the BAM and the switch of auto-download is on, the BTS downloads the board software automatically.

If the OML setup fails and the data configuration files are saved in the Flash memory of the BCKM, the BTS directly activates the data configuration files in the Flash memory.

Table 3-3 lists the indicator status when the BTS downloads data configuration files.

Table 3-3 Indicator status when the BTS downloads data configuration files

Observation Method	Description
Through the indicators of the BTS	The board resets. After the boards run normally, the ACT indicator switches on.
At the service maintenance system	After the configuration, you can view the running status of all the boards on the equipment panel.
Observing the correlated alarm	The alarm related to link interruption is generated.

Setting Up Traffic Links

After the BTS obtains a stable clock signal, the CCPM or the CECM sets up the Abis traffic link through the BCIM according to the configuration parameter obtained from the operation & maintenance unit (OMU). Then the CCPM or the CECM exchanges traffic data with the BSC.

Setting Up Signaling Links

After the configuration, the BCKM sets up the Abis signaling link to communicate with the BSC through the BCIM according to the configuration parameter obtained from the OMU.

When the Abis signaling link is interrupted, the BTS resets automatically 10 minutes later.

Setting Up Cells

After the Abis signaling link is set up, the BCKM reports the BTS resource configuration state to the BSC and requests logical configuration.

After the BSC sends the cell configuration data to the BCKM, the BTS configures the carrier properties, sets up the common channel, and updates the overhead message. After that, the MS is allowed to access the network and make a call.

3.3 Starting Local Maintenance

This section describes the process of starting local maintenance.

3.3.1 Configuring the WS

Task Description

Configure the IP address of the WS which is used for commissioning.

Prerequisites

To configure the WS, ensure that:

- The WS is installed with the Windows operating system.
- The network adapter of the WS works normally.

Operation Procedure

The WS mentioned in the procedure is installed with Windows XP.

To configure the IP address of the WS, do as follows:

Step 1 Choose **Start > Control Panel**.

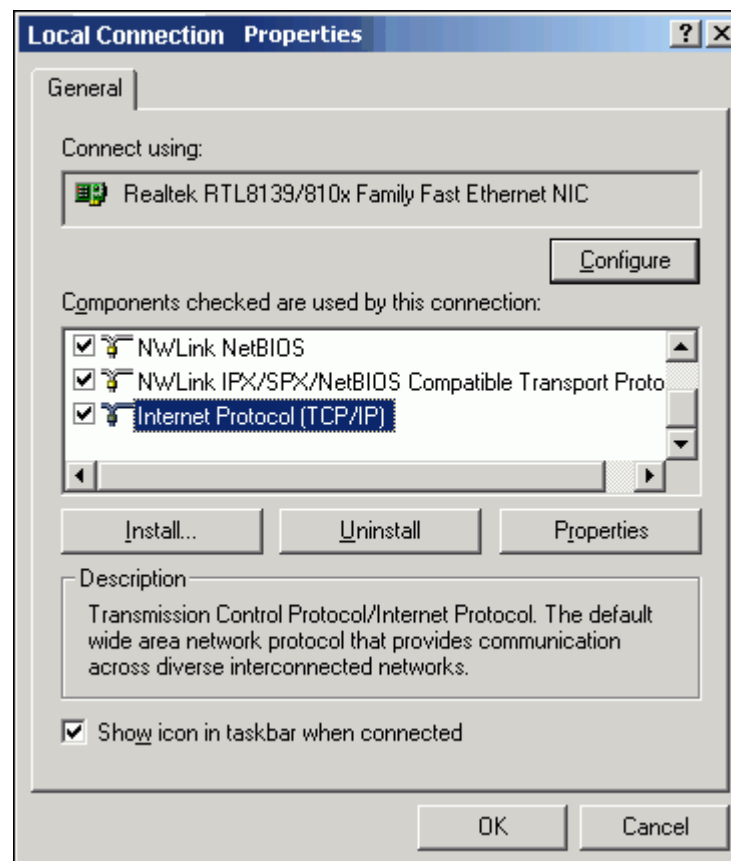
Step 2 Double-click **Network Connections**.

The **Network and Dial-up Connections** interface is displayed.

Step 3 Right-click **Local Connection** and choose **Properties**.

The **Local Connection Properties** dialog box is displayed, as shown in Figure 3-3.

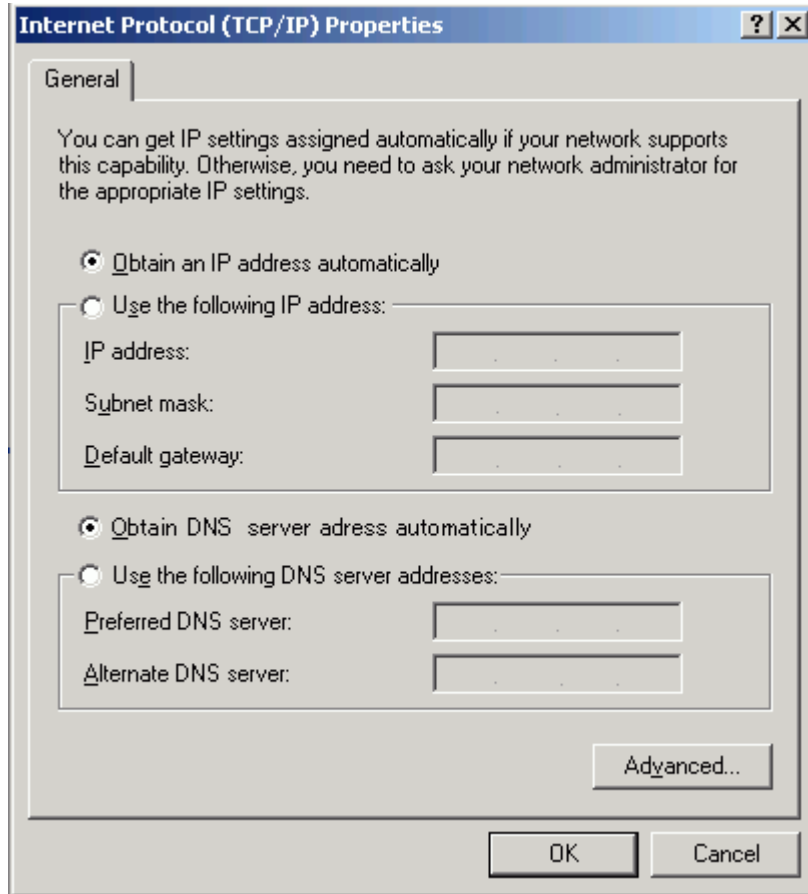
Figure 3-3 Local connection properties



Step 4 Choose **Internet Protocol (TCP/IP)** and click **Properties**.

The **Internet Protocol (TCP/IP) Properties** dialog box is displayed, as shown in Figure 3-4.

Figure 3-4 Internet protocol (TCP/IP) properties

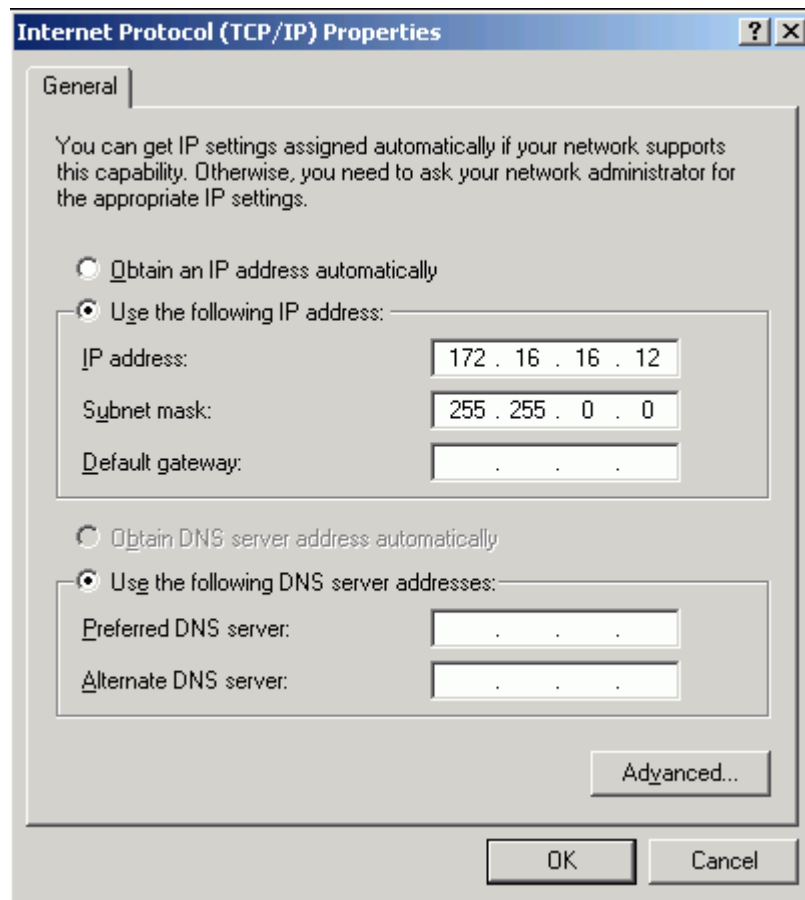


Step 5 In the **General** tab, choose **Use the following IP address** and set the IP address according to the following requirement.

- If the WS is used for local commissioning, the IP address must be in the same segment as the IP address (172.16.16.16 by default) of the local operation and maintenance. The mask of the subnet must be set to 255.255.0.0. The IP address of the gateway is not set by default.

Figure 3-5 shows the IP address of the WS used for local commissioning.

Figure 3-5 IP address of the WS used for local commissioning



- If the WS is used for remote commissioning, the IP address is set according to the requirement of the local network to which the WS belongs.

Step 6 Click **OK**.

----End

3.3.2 Locally Logging In to the BTS in Telnet Mode

Task Description

Log in to the BTS locally by using the Telnet software.

Prerequisites

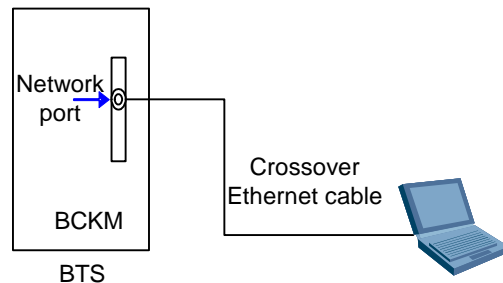
To configure the WS, ensure that the WS is in the same TCP/IP network as the BCKM.

Operation Procedure

To log in to the BTS in Telnet mode locally, do as follows:

- Step 1** Use a crossover Ethernet cable to connect the Ethernet port of the WS and that of the BCKM. Figure 3-6 shows the connection between the WS and the BCKM.

Figure 3-6 Connection between the WS and the BCKM



- Step 2** Click **Start > Run**.

- Step 3** In the **Run** dialog box, execute the command **cmd**.

The Command window is displayed.

- Step 4** In the Command window, execute the command **Ping xxx.xxx.xxx.xxx** to verify the connectivity between the WS and the BTS.

- Step 5** If the connection proves to be successful, execute the command **Telnet xxx.xxx.xxx.xxx** to log in to the BTS.

 **NOTE**

The IP address of the BCKM Ethernet port is 172.16.16.16 by default.

If the computer fails to access the BCKM, the possible causes are as follows:

- The crossover Ethernet cable is faulty.
- The IP address of the WS is wrong.

----End

3.3.3 Configuring the IP Address and Routing Information of the BTS

 **NOTE**

You need to carry out this task only when the BTS uses an FE link to bear the IP connection and when the BTS is started for the first time.

Task Description

Configure the IP address and routing information of the BTS that uses IP over FE transmission.

Prerequisites

- The WS is in the same TCP/IP network as the BCKM.
- The communication between the WS and the BCKM is normal.

- The BTS is configured with the QC54BCIM.

Operation Procedure

To configure the IP address and routing information of the BTS locally, do as follows:

- Step 1** Log in to the BTS locally. See 3.3.2 "Locally Logging In to the BTS in Telnet Mode" for details.
- Step 2** Set the IP address of the BCIM by executing the command **SET CBTSBCIMIP**.
- Step 3** Set the IP address of the FE port of the BCIM by executing the command **ADD CBTSFEPORT**.
- Step 4** Set the routing information of the BTS by executing the command **ADD CBTSIPROUTE**.
- Step 5** Set the IP address of the BTS O&M by executing the command **SET CBTSOAMIP**.
- End

3.3.4 Starting the LMT

This section describes how to start the LMT.

Task Description

Log in to the BAM through the LMT.

Prerequisites

Before starting the LMT, ensure that:

- The BAM server is operational.
- The LMT is installed with the O&M software.
- The network connection between the LMT and the BAM is normal.
- The user name, password, and related authorities of the WS have been defined in the BAM.

Operation Procedure

To start the LMT, do as follows:

- Step 1** Select **Start > All Programs > iManager M2000 > LocalWS**.

The **Local NE Management System** dialog box is displayed.

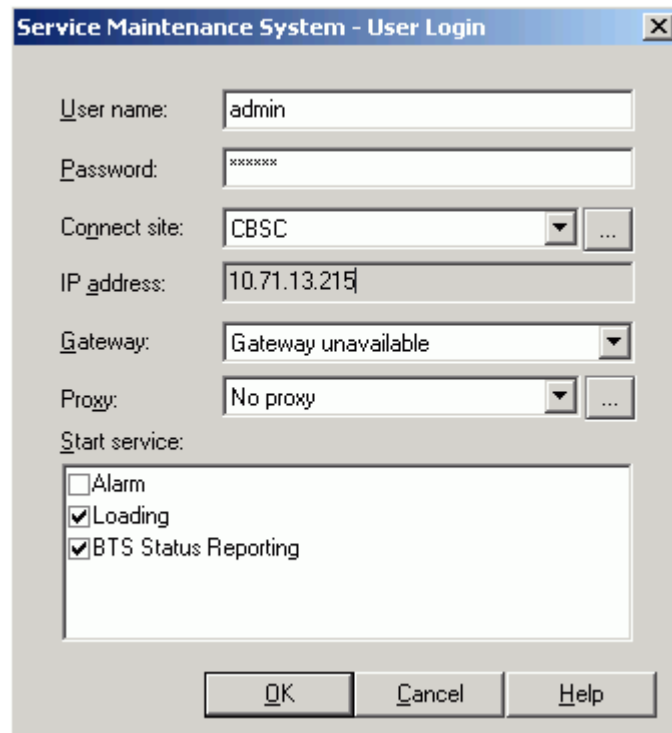
- Step 2** Click **Configure** to add the IP address of the BAM.

- Step 3** Select the BAM to be logged in to and click **OK**.

The system starts the service maintenance system automatically and the **User Login** dialog box is displayed.

- Step 4** Type in the valid user name and password, as shown in Figure 3-7.

Figure 3-7 User login dialog box



Step 5 Click **OK**.

If the login fails, the system reports the login failure.

----End

3.3.5 Remotely Logging In to the BTS in Telnet Mode

Task Description

Log in to a BTS remotely in Telnet mode.

Prerequisites

Before logging in to the BTS remotely in Telnet mode, ensure that:

- The WS and the BAM are in the same TCP/IP network.
- The communication between the WS and the BAM is normal.

Operation Procedure



NOTE

The Telnet software mentioned in this procedure is based on Windows XP system. The operation procedure is different if the Telnet software is based on other operating systems.

To log in to the BTS remotely in Telnet mode, do as follows:

Step 1 On the service maintenance system, execute the command **STR BTSTELPROXY** to start the Telnet proxy for the BTS to be maintained.

**NOTE**

The duration of the Telnet proxy is defined in this step. If this duration expires, the Telnet proxy stops.

Step 2 In the **Run** dialog box, execute the command **Telnet hostname port** to connect to the BCKM. The **Telnet** window is displayed.

**NOTE**

The **hostname** is the IP address of the BAM. The **port** is the port number set in the first step.

Step 3 After the BCKM is connected, log in to the BTS by using the following user name and password:

- User name: system
- Initial password: system

Step 4 After successful login, execute the command **opnday** to enable predictive text input for commands and execute commands in the **Telnet** window to maintain the BTS.

Step 5 Close the **Telnet** window.

Step 6 On the service maintenance system, execute the command **STP BTSTELPROXY** to stop the Telnet proxy.

----End

3.3.6 Performing the BSS Reverse Maintenance

Task Description

By using the reverse maintenance function, you can maintain the entire BSS system at the BTS side.

Prerequisites

Before performing the BSS reverse maintenance, ensure that:

- The WS and the BAM are in the same TCP/IP network.
- The communication between the WS and the BAM is normal.
- The OML between the BTS and the BAM is set up.



CAUTION

- To connect the WS and the BCKM, connect a crossover Ethernet cable to the Ethernet ports on the WS and the BCKM. The IP address of the WS and that of the BCKM Ethernet interface must be in the same network segment.
- By default, the IP address of the BCKM Ethernet interface is 172.16.16.16 and the mask is 255.255.0.0.

Procedure Description

To perform the BSS reverse maintenance, do as follows:

Step 1 Execute the command **STR CBTSRVSMNT** to start the reverse maintenance function.

Step 2 At the WS of the BAM side, add the WS and set the command authority for the WS of the BCKM side by using the LMT.



NOTE

When adding the WS, you must set the parameter **IP address** to the IP address of the BTS maintenance.

Step 3 At the WS of the BCKM side, run the local NE management system or independent LMT software to log in to the BTS.



NOTE

For the login to the BTS, the IP address of the BAM must be the IP address (172.16.16.16) of the BCKM Ethernet port rather than the real IP address of the BAM.

Step 4 Use the LMT software to maintain the BSS system.

Step 5 Execute the command **STP CBTSRVSMNT** to stop the inverse maintenance function.

Step 6 Exit the LMT software.

----End

3.3.7 Loading the BTS Software Locally

Task Description

Load the configuration files and board software into the BTS from the WS connected with the BCKM.

Prerequisites

Before loading the BTS software locally, ensure that:

- The IP address of the WS and the IP address of the BCKM are in the same network segment.
- The Ethernet port of the WS and that of the BCKM is connected by crossover Ethernet cables.

**CAUTION**

- The loading of the BTS software does not affect the service.
 - The service is affected if you activate the BTS software.
 - When using the FTP to load software, you can load only one software module by executing one command.
-

Operation Procedure

Step 1 Execute the command **FTP** *ipaddress* to log in to the BTS by using the following user name and password:

- User name: system
- Initial password: system

Step 2 Execute the command **PUT** *File.Path File.Name* to download the specified software to the BTS.

To load file **bckm3606.bzp** stored in drive D, execute the command **PUT D:\bckm3606.bzp**.

Step 3 After the loading is successful, execute the command **LI ACT** *Boardname.Type* to activate the specified software.

To activate the CPU software of the BCKM, execute the command **LI ACT** *bckm.cpu*.

**NOTE**

You can obtain the help information by executing the command **LI ACT?**.

**CAUTION**

- The loading sequence is: CMTR/OMTR→CCPM/CECM→BCIM→BCKM.
 - For the loading of each board, you must load the FPGA before loading the CPU software.
 - To minimize the impact on service provision, you can load all the BTS software and then activate the software in order when the traffic is low.
-

Step 4 Execute the command **DSP CBTSBRDVER** to check whether the activation is successful.

Step 5 If the activation is successful, repeat the steps 2 and 3 to activate all the BTS software.

----End

3.3.8 Loading the BTS Software Remotely

Task Description

Load the configuration files and BTS running software into the BTS from the LMT.

Prerequisites

Before starting the LMT, ensure that:

- The BAM server is operational.
- The WS is installed with the LMT software.
- The communication between the WS and the BAM is normal.

Operation Procedure

Step 1 Put the configuration files and BTS running software to the following directories:

- Configuration files: \cdma2000\BTSLoad\cfg (by default)
- BTS software: \cdma2000\BTSLoad\BTS3606 (by default)

Step 2 Log in to the BAM by using the LMT.

For details, see 3.3.4 "Starting the LMT."

Step 3 Execute the following commands to load BTS software.

- Execute the command **DLD CBTSSW** to load only or load and activate the specified BTS running software or configuration files.
- Execute the command **DLD CBTSALLSW** to load only or load and activate all the running software or configuration files of the specified BTS.



CAUTION

- The loading of the BTS software does not affect the service.
 - The service is affected if you activate the BTS software.
-

Step 4 After the loading is successful, exit the LMT.

----End

3.4 O&M Test

Unless otherwise specified, carry out the following tasks at the BAM side.



Before the O&M test, ensure that the CCPM/CECM and the CMTR/OMTR works normally.

3.4.1 Querying Basic Information of the BTS

To query the basic information of the BTS, do as follows:

Step 1 Enter the following command:

LST BSCBTSINF

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For example: **LST BSCBTSINF: BTSID=1;**

Step 4 Click  or press **F9** to execute the command.

----End

3.4.2 Querying BTS Board Version

To query the BTS board version, do as follows:


Step 1 Enter the following command:

DSP CBTSBRDVER

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For example: **DSP CBTSBRDVER: BTSNAME="BTS", BTSID=1, BRDTP=BCKM, BRDID=0;**

Step 4 Click  or press **F9** to execute the command.

----End

3.4.3 Verifying the Software Version



The command **CHK CBTSSWVER** is used only for verifying the consistency between the running software version of the BTS boards and the BAM version.

To verify the software version, do as follows:

Step 1 Enter the following command:

CHK CBTSSWVER

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For example: **CHK CBTSSWVER: BTSID=1;**

For the detailed explanation of the parameters, see the online help.

Step 4 Click  or press **F9** to execute the command.

----End

3.4.4 Querying Availability of BTS Cells

To query the availability of BTS cells, do as follows:

Step 1 Enter the command **DSP RES**.

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters. For detailed explanation of the parameters, see the online help.

For example: **DSP RES;**

Step 4 Click  or press **F9** to execute the command.

----End

3.4.5 Querying Active Alarms of the BTS

To query the active alarms of the BTS, do as follows:

Step 1 Enter the command **LST ALMFE**.

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For detailed explanation of the parameters, see the online help.

For example: **LST ALMFE: CNT=20;** (CNT is the returned record number.)

Step 4 Click  or press **F9** to execute the command.

----End

3.4.6 Querying the Configuration Data of the BTS

To query the configuration data of the BTS, do as follows:

Step 1 Execute the command **DSP CBTSCFG** to query the configuration data of the BTS.

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For detailed explanation of the parameters, see the online help.

For example: **DSP CBTSCFG**: BTSNAME="BTS", BTSID=1, CFGID=CBTSINFO;

Step 4 Click  or press **F9** to execute the command.

----End

3.4.7 Verifying the Consistency of the Configuration Data Between the BTS and the BSC Interface

To verify the consistency of the configuration data between the BTS and the BSC interface, do as follows:

Step 1 Enter the command **CHK CBTSIFCFG**.

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For detailed explanation of the parameters, see the online help.

For example: **CHK CBTSIFCFG**: BTSID=1, CFGINFO=ALL;

Step 4 Click  or press **F9** to execute the command.

----End

3.4.8 Querying the Status of the BTS Links

To query the status of the BTS links, do as follows:

Step 1 Enter the command **DSP CBTSLNKSTAT**.

Step 2 Click  or press **Enter**.

Step 3 Specify the values of the parameters.

For detailed explanation of the parameters, see the online help.

For example: **DSP CBTSLNKSTAT**: BTSID=1, BRDID=0;

Step 4 Click  or press **F9** to execute the command.

----End

3.5 RF Performance Test

The RF performance test consists of:

- Forward power test
- Reverse RSSI test



CAUTION

When the BTS3606E/BTS3606AE uses the multi-carrier transceiver, the CMTR/OMTR and CMPA/OMPA need about five minutes to perform self adaptation after software loading. During this period, the index of transmit signals cannot satisfy the rated requirement and the adjacent channels are affected.

3.5.1 Forward Power Test

This section describes how to conduct a forward power test. It also describes the precautions you must take before conducting a forward power test.

Precautions

Pay attention to the following points when conducting a forward power test:

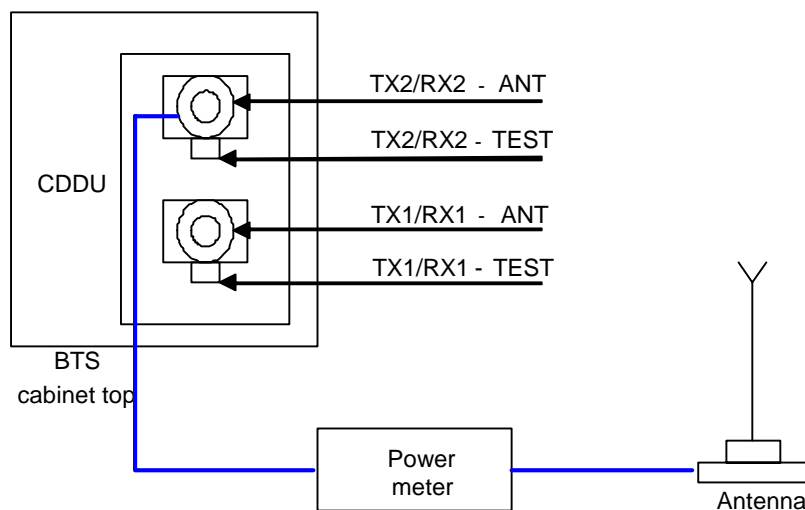
- The fan box must be installed to ensure the normal operation of the power amplifier.
- Power unit is 0.1 dBm.
- Ensure that the coupling port without the connection lines is connected to a matching load to avoid generating internal interference and external radiation.
- Consider RF cable loss (it is related to the texture and thickness of the RF cable) when analyzing the test result. In general, the loss of one-meter cable is 0.5 dB, and that of two-meter cable is 1 dB.
- Before the power test, stop all services. The TRM restarts after the test is complete.
- Connect the power meter to the TX/RX-TEST port using an RF coaxial cable and then perform the power test.
- Take the cable loss and the coupling degree of the TX/RXM-TEST port into account. The coupling degree of the TX/RX-TEST port is available in the model information of this port. It is generally 30 dB.
- If a high-precision power meter is used, carry out the test on the antenna port and test port. If a low-precision power meter is used, carry out the test on the antenna port.

Test Procedure

The test procedure is as follows:

- Step 1** Connect the cables.

Figure 3-8 shows the connection for forward power test when configuring a CDDU.

Figure 3-8 Connection for forward power test

Step 2 In the Windows operating system of the LMT, select **Start > Run**, type **Telnet xxx.xxx.xxx.xxx** in the **Run** dialog box, and then press **Enter** to start Telnet.

**NOTE**

For the near end Telnet, the default IP address of the Ethernet port is 172.16.16.16.

Step 3 Start the power test for the BTS transmitting at full power.

For example, for the 450A carrier, execute the following commands:

```
HW CBTS>str trmpowertst:brdid=2,chid=0,channo=210
Are you sure?(Y or N)y
Ok
HW CBTS>str trmpowertst:brdid=2,chid=1,channo=160
Are you sure?(Y or N)y
Ok
HW CBTS>str trmpowertst:brdid=2,chid=2,channo=260
Are you sure?(Y or N)y
Ok
```

**NOTE**

- "chid" is the ID of a carrier provided by the TRM. The IDs of the carriers provided by the CMTR/OMTR are 0, 1, and 2.
- "channo" is the center frequency of the carrier.
- You must test the powers of the three carriers of the CMTR/OMTR at the same time.

Step 4 After preheating the BTS for ten minutes, check the output power that is displayed on the power meter and record the value.

Step 5 Analyze the test result.

See section 3.5.2 "Forward Power Test Analysis."

If the result is abnormal, handle the situation according to section 3.5.2 "Forward Power Test Analysis."

Step 6 If the result is normal, conduct forward power interface tracing and compare the test result with the power test result.

For example, to trace the CMTR or OMTR configured in slot 2, execute the following commands:

```
HW CBTS>str infotrace
<(brdtp=?bckm_omu/bckm_sig/bckm_clk/bcim/ccpm/trm), mandatory >trm
<(brdid=?),mandatory >2
<(item=?),optional>"power"
ok
```

Step 7 Stop forward power interface tracing.

For example, to stop tracing the CMTR or OMTR configured in slot 2, execute the following commands:

```
HW CBTS>stp infotrace
<(brdtp=?bckm_omu/bckm_sig/bckm_clk/bcim/ccpm/trm), mandatory >trm
<(brdid=?),mandatory >2
<(item=?),optional>"power"
ok
```

Step 8 Repeat steps 1 to 5 to test other CMTRs or OMTRs.

Step 9 Stop the power test as follows:

```
HW CBTS>stp trmpowertst
<(brdid=?),mandatory >2
<(chid=?),mandatory >1
ok
```

----End

3.5.2 Forward Power Test Analysis

This section provides the parameters and analysis of forward power test results. Troubleshooting methods are also provided for abnormal test results.

Parameter Description

Table 3-4 describes the parameters associated with the forward power test.

Table 3-4 Parameter associated with the forward power test

Parameter	Description
Base band power	Set by the CSM5000 or CSM5500 of the CCPM or CECM
Digital power	Digital power
Attenuation	Attenuation
Digital power sum	Sum of digital power
HPA Output power	Output power of the high power amplifier
HPA Input power	Input power of the high power amplifier

Parameter	Description
Obs chan power	Channel power in the feedback
Obs gain adjust	Gain adjustment in the feedback
Obs gain Identical	Channel gain identical adjustment in the feedback
IF gain adjust	Adjustment of the intermediate frequency gain
RF gain adjust	Adjustment of the radio frequency gain
DDU gain adjust	Adjustment of the DDU gain
PD RMS Error	Adjust value of pre-distortion
DAC Input Power	Power before conversion
RF Forward Power	The power of the RF signal output port

Example of Test Result

This example shows the full power output of the BTS3606E or BTS3606AE when the CMTR or OMTR is used to provide three carriers.

```
TRM2:
Base band power: carrier0 = ***, carrier1 = ***, carrier2 = ***
Digital power : carrier0 = ***, carrier1 = ***, carrier2 = ***
Attenuation : carrier0 = ***, carrier1 = ***, carrier2 = ***
Digital power sum = ***. , HPA Output power = ***, HPA Input power = ***
Obs chan power = ***, Obs gain adjust = ***, Obs gain Identical = ***
IF gain adjust = ***, RF gain adjust = ***, DDU gain adjust = ***
PD RMS Error = ***, DAC Input Power = ***, RF Forward Power = ***
```

Analysis of Test Result

The analysis of the test result is described as follows:

- The normal output power (Digital power) for a carrier is 43 dBm ± 1 dB (that is, 20 W ± 1 dB).
- If the test result displayed on the power meter is out of normal range, compare it with the result of interface tracing.

Troubleshooting

Some common troubleshooting methods are as follows:

- If the test result displayed on the power meter is out of normal range, start interface tracing to check the values of the parameters **Base band power**, **Digital power**, and **HPA Output power**.
- In theory, if the value of the parameter **Base band power** is not normal, the values of **Digital power** and **HPA Output power** are also not normal. In such a case, check if the BTS gain is set correctly. If BTS gain is correct, analyze the CCPM performance and CECM performance by querying BTS configuration and checking the CSM5000/CSM5500/CSM6800.

- If **Base band power** is normal, but **Digital power** is not normal, the values of **HPA Output power** must be not normal in theory. In such a case, check the CMTR or OMTR to locate the fault. For example, insert and remove it, or replace it.
- If only **HPA Output power** is not normal, check the installation of CMPA or OMPA and its connection with the CMTR or OMTR.
- If all the parameter values reported in the interface tracing are normal, do as follows:
 - Check the connections between the CMPA/OMPA and the CDDU/IDFU/ODFU.
 - Check the antenna system and ports on the top of the cabinet for errors.

3.5.3 Reverse RSSI Test

The RSSI test includes the local RSSI test and the remote RSSI test.

In the case of the remote RSSI test, you can perform the reverse RSSI test by:

- Selecting **Resource Monitoring > RSSI Monitoring**, or
- Logging in to the BTS in Telnet mode.

In the case of local RSSI test, you can connect the WS to the BCKM by using a crossover Ethernet cable and then log in to the BTS in Telnet mode. In this mode, you can use commands to perform BTS commissioning.

This section describes how to conduct reverse RSSI tests in the local RSSI test. It also describes the precautions you must take when conducting the tests.

Precautions

Note the following points before conducting the forward power test:

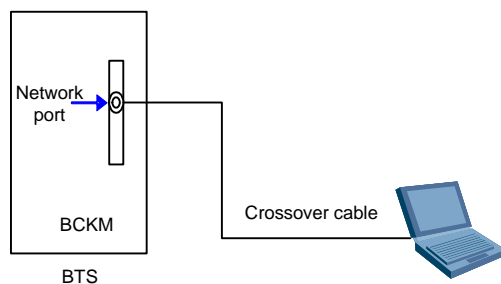
- You can choose not to install RF fans; however, to ensure zero transmission power, you have to connect the antenna with the CDDU/CDFU.
- The unit for the average and peak values of RSSI is 0.1 dBm.
- Check whether the coupling port without connection lines is connected to a matching load to avoid generating internal interference and external radiation.

Test Procedure

The test procedure is as follows:

- Step 1** Connect the cables as shown in Figure 3-9.

Figure 3-9 Connection for reverse RSSI test of the BTS



- Step 2** In the Windows operating system of the LMT, select **Start > Run**.
- Step 3** In the **Run** dialog box, type in **Telnet xxx.xxx.xxx.xxx**, and then press **Enter** to run the Telnet program.
- Step 4** Check the BTS configuration, and ensure that the data configuration complies with the actual cable connection of the RF subrack.
- Step 5** Start reverse RSSI test.

For example, to trace the CMTR or OMTR configured in slot 1, execute the following commands:

```
HW CBTS>str infotrace
<(brdtp=?bckm_omu/bckm_sig/bckm_clk/bcim/ccpm/trm), mandatory >trm
<(brdid=?),mandatory >1
<(item=?),optional>"rssi"
Ok
```

- Step 6** Record test results.
- Step 7** Stop the reverse RSSI test as follows:

```
HW CBTS>stp infotrace
<(brdtp=?bckm_omu/bckm_sig/bckm_clk/bcim/ccpm/trm), mandatory >trm
<(brdid=?),mandatory >1
<(item=?),optional>"rssi"
Ok
```



NOTE

You can also stop the RSSI test by restarting the Telnet program.

----End

3.5.4 Reverse RSSI Test Analysis

This section provides the parameters, examples, and analysis of reverse RSSI test results. Troubleshooting methods for abnormal test results are also provided.

Parameter Description

Table 3-5 describes the parameters associated with the reverse RSSI test.

Table 3-5 Parameters associated with the reverse RSSI test

Parameter	Description
Main Avg	Main RSSI average value
Main Peak	Main RSSI peak
Main Ratio	The main ratio is more than the main RSSI average value
Divs Avg	Diversity RSSI average value
Divs Peak	Diversity RSSI peak
Divs Ratio	Diversity ratio is larger than average value

Parameter	Description
Revs pwr	Reverse power
RF AGC gain	AGC gain of radio frequency

Example of Test Result

The following shows the RSSI value of the CMTR or OMTR configured in slot 2:

```
HW CBTS>str infotrace : brdtp=trm,brdid=2,item="rssi"
Ok
Carrier0 RSSI: Main Avg = -115.5, Main Peak = -114.3, Main Ratio = 0%
Carrier0 RSSI: Divs Avg = -109.8, Divs Peak = -108.7, Divs Ratio = 0%
Carrier1 RSSI: Main Avg = -115.9, Main Peak = -114.4, Main Ratio = 0%
Carrier1 RSSI: Divs Avg = -109.8, Divs Peak = -108.8, Divs Ratio = 0%
Carrier2 RSSI: Main Avg = -116.4, Main Peak = -114.4, Main Ratio = 0%
Carrier2 RSSI: Divs Avg = -109.8, Divs Peak = -108.8 Divs Ratio = 0%
Revs pwr: Main = -83.3, Divs = -97.1; RF AGC gain: Main = 0.0, Divs = 0.0
```

Analysis of Test Result

- If the main RSSI average value (Main Avg) ranges from -100.0 dBm to -108.0 dBm, the main receive channel is normal.
- If the diversity RSSI average value (Divs Avg) ranges from -100.0 dBm to -108.0 dBm, the diversity receive channel is normal.
- In the case of empty load, the average value of RSSI ranges from -105.0 dBm to -112.0 dBm.
- The average value difference between the main RSSI and diversity RSSI must be from 2 dB to 3 dB.

Troubleshooting

If the measured RSSI value is too small, check the connections of:

- Antenna and feeder
- Ports on top of the cabinet
- CDDU or IDFU/ODFU
- RF subrack

If the RSSI value is too large, check if there is an interference source nearby.

3.6 Service Function Test

The service function test help verify BTS services and functions.

They comprise:

- Location update test
- BTS coverage test

- MS call test
- Handoff test
- Short message service test
- Mobile-originated packet data call test
- Mobile-terminated packet data call test

3.6.1 Location Update Test

The test procedure is as follows:

Step 1 Define a test MS in the HLR.

Step 2 Ensure that the network data is correctly configured.

Step 3 Switch on the MS.

Step 4 Start the Abis interface tracing on the BAM by using the LMT.

Step 5 Observe the signaling on the Abis interface and check if either of the following cases occurs:

- The network side accepts the location update.
- The network side rejects the location update request.

----End

3.6.2 BTS Coverage Test

The test procedure is as follows:

Step 1 Define a test CDMA MS in the HLR.

Step 2 Select a proper road to carry out a drive test in the BTS coverage area.

Step 3 Record test data, including:

- Tested BTS
- Coverage area
- Sector
- Distance
- Signal strength and voice quality

Step 4 Check that the test result conforms to the requirements of engineering design documents.

----End

3.6.3 MS Call Test

The test procedure is as follows:

Step 1 Register two test MSs in the HLR.

Step 2 Power on the two MSs so that they connect to the network and they switch to idle mode.

Step 3 Carry out the following call tests.

- Make a call from one MS to the other and hook on after the conversation.

- Make a call from one MS to a PSTN subscriber and hook on after the conversation.
- Make a call from a PSTN subscriber to one MS and hook on after the conversation.

Step 4 Check that all calls are successful.

Step 5 Check that the calls are normal and voice quality is good.

----End

3.6.4 Handoff Test



NOTE

- Soft handoff refers to a handoff between different cells operating at the same frequency. Softer handoff refers to a handoff between different sectors operating at the same frequency and in the same cell.
- One cell may contain one or more sectors. This test is relevant when multiple sectors are planned.

The test procedure is as follows:

Step 1 Register two test CDMA MSs in the HLR.

Step 2 Power on the two MSs so that they are attached to the network and they switch to idle mode.

Step 3 Make a call in one sector to set up the conversation between the two MSs.

Step 4 Maintain the call and move one MS to the destination sector.

Step 5 Check that :

- The call is maintained and stable.
- Voice quality is good.

----End

3.6.5 Short Message Service Test



NOTE

Ensure that the network is configured with a message center (MC).

The test procedure is as follows:

Step 1 Register two test MSs in the HLR.

Step 2 Power on the two MSs so that they are attached to the network and they switch to idle mode.

Step 3 Send a short message from MS A to MS B.

Step 4 Check that:

- MS A displays a prompt that the short message is sent successfully.
- The message can be queried on the MC.
- MS B receives the message and displays the messages correctly.

----End

3.6.6 Mobile-Originated Packet Data Call Test

NOTE

Ensure that the system uses dynamic rate allocation.

The test procedure is as follows:

- Step 1** Register a test MS in the HLR.
- Step 2** Prepare a BlueRose and keep an FTP server ready.
- Step 3** Set up a connection between the test MS and the FTP server using the BlueRose and then initiate an FTP uploading process.
- Step 4** Observe the signaling messages and the state transition of the MS on BlueRose.
- Step 5** Check the channel setup between the MS and the sector.
 - If the packet data service is unavailable after you log in to the FTP server, infer that the MS is in dormant mode. If the packet data service is available, infer that the MS is in active mode.
 - After an FCH is set up, the BTS sends ESCAM messages repeatedly and performs SCH set-up or SCH extension repeatedly.

----End

3.6.7 Mobile-Terminated Packet Data Call Test

NOTE

- Ensure that the system uses dynamic rate allocation.
- There are various test conditions listed in test steps. You can select some of them and perform the test according to site conditions.

The test procedure is as follows:

- Step 1** Register a test MS in the HLR.
- Step 2** Prepare a BlueRose and keep an FTP server ready.
- Step 3** Set up a connection between the test MS and the FTP server using the BlueRose and then initiate an FTP uploading process.
- Step 4** Test the downlink rate of a user under the conditions listed in Table 3-6.

Table 3-6 lists the conditions for testing the packet data downlink rate of a user.

Table 3-6 Conditions for testing the packet data downlink rate of a user

No.	Status of Adjacent Cell	Status of Destination Sector	Status of MS	Distance from the MS to the BTS
1	Not loaded	Not loaded	Static	Short
2	Not loaded	Not loaded	Static	Long
3	Not loaded	Not loaded	Moving at 15 km/h, 30 km/h, and 70 km/h	Long

No.	Status of Adjacent Cell	Status of Destination Sector	Status of MS	Distance from the MS to the BTS
4	100% loaded	50% loaded	Static	Short
5	100% loaded	50% loaded	Static	Long
6	100% loaded	50% loaded	Moving at 15 km/h, 30 km/h, and 70 km/h	Short
7	100% loaded	50% loaded	Moving at 15 km/h, 30 km/h, and 70 km/h	Long

Step 5 Check that the downlink rate of data services is stable.

----End

4 Troubleshooting

About This Chapter

The following table lists the contents of this chapter.

Title	Description
4.1 Overview of Troubleshooting	Briefs the troubleshooting during the BTS commissioning.
4.2 Board Alarms	Describes the types of board alarms and their handling methods.
4.3 Room Environment Alarms	Describes the alarms related to the BTS equipment room environment and their handling methods.

4.1 Overview of Troubleshooting

The service commissioning includes the commissioning for the BSS, MSC/VLR, HLR, AUC, and the interfaces with the PSTN and internet. You must locate the fault by specific analysis.

You can know the working status of the BTS by judging:

- Whether the MS can access to the network.
- Whether the MS can set up the traffic links.

4.2 Board Alarms

This section describes the types of board alarms and their handling methods.

4.2.1 Alarm Description

The board faults that occur during the operation of BTS are reported to the OMU in the form of logs and alarms. The OMU records and processes the faults, and then reports them to the OMC.

The different types of board alarms are as follows:

- Public alarms such as T8206 related alarm, self-test failure alarm, TTP link alarm, and temperature alarm
- BCKM alarms such as software PLL unlocked alarm, clock alarm, and Abis signaling link interruption alarm
- CECM/CCPM alarms such as FPGA self-test failure alarm, 50fc PLL unlocked alarm, CSM5000 chip alarm, and message queue alarm
- CMTR/OMTR alarms such as PLL unlocked alarm, receive path input overload alarm, board temperature alarm, forward digital power too high alarm, DAGC alarm, FPGA alarm, EPLD alarm, RF PLL unlocked alarm, sector VSWR alarm, fan failure alarm, HPAU alarm, and LNA failure alarm

4.2.2 Alarm Handling

When a fault occurs or when a fault alarm is cleared, the board reports alarm messages to the OMU. The OMU determines the availability of the board according to the alarm severity.

Table 4-1 describes how to handle different types of board alarms.

Table 4-1 Handling board alarms

To Handle	Take the Following Action
Clock alarms or PLL unlocked alarms	Check that: <ul style="list-style-type: none"> • Related clock modules and the clock output are normal. • The clock is in the locked state.

To Handle	Take the Following Action
Power supply alarms, such as high voltage alarms, low voltage alarms, power failure alarms, and power fan failure alarms	Check that: <ul style="list-style-type: none"> • The PSU works normally. • The mains supply is normal.
Board environment alarms such as board temperature alarms	Check that: <ul style="list-style-type: none"> • The board is normal. • Environmental conditions are normal.
Other alarms, such as the alarms caused by board hardware faults and software operation errors	Handle according to the suggestions provided by the system.

4.3 Room Environment Alarms

This section describes the alarms related to the BTS3606E equipment room environment and their handling methods.

4.3.1 Alarm Description

Room environment alarms are collected by an environment alarm chest (EAC) connected with the BTS3606E. Such alarms include the fire alarm, smoke alarm, access control alarm, water alarm, temperature alarm, humidity alarm, and air-conditioner alarm.

4.3.2 Alarm Handling

The process for handling an environment alarm is as follows:

- Step 1** Upon receiving an environment alarm, the OMU starts the related external devices, such as air-conditioners, fire extinguishers, smoke removers, and dehumidifiers.
- Step 2** The OMU reports alarm messages to the OMC.
- Step 3** The OMC displays the alarm on terminals so that maintenance engineers can take actions to clear the alarms.

----End