Alcatel-Lucent GSM

G2 BTS Commissioning Manual

BTS Document

Commissioning Manual

Release B10

3BK 17430 3031 RJZZA Ed.03

Status RELEASED

Short title Com

Contents

Preface

Purpose

This document describes how to commission a G2 BTS of an Alcatel-Lucent BSS.

What's New

In Edition 03

Update for new equipment naming.

In Edition 02

Update of system title.

In Edition 01

First release of the document.

Audience

This document is intended for:

- Site administrators
- Project managers
- Field service technician
- Supervisors
- Occasional users (e.g. subcontractors).

Assumed Knowledge

You must have a basic understanding of the following:

- Alcatel-Lucent Operations & Maintenance (O&M) concepts for the Base Station Subsystem (BSS)
- Commissioning tools (including BHART)
- Personal Computers (PCs) using the Windows environment

1 Overview

This chapter provides general information concerning the operating principle and requirements of the procedure:

- Hardware description
- Restrictions
- Prerequisites
- Initial state
- Final state
- Operating principle
- Time schedule
- Information required
- Conventions.

1.1 Presentation

1.1.1 Hardware Description

1.1.1.1 BTS G2 Mini Indoor, 2 TRX

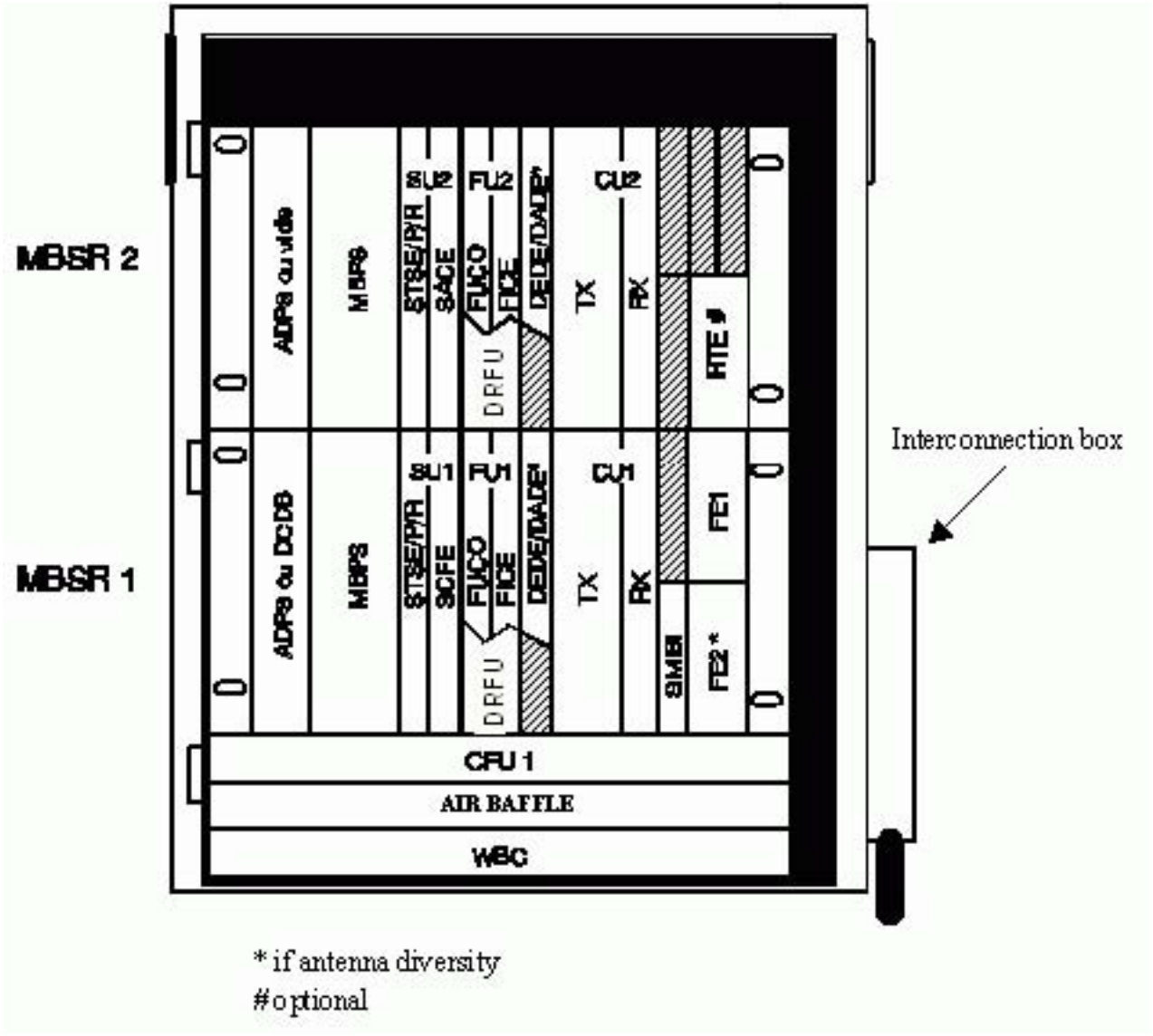


Figure 1: BTS G2 Mini Indoor, 2 TRX

1.1.1.2 BTS G2 Mini Outdoor, 2 TRX

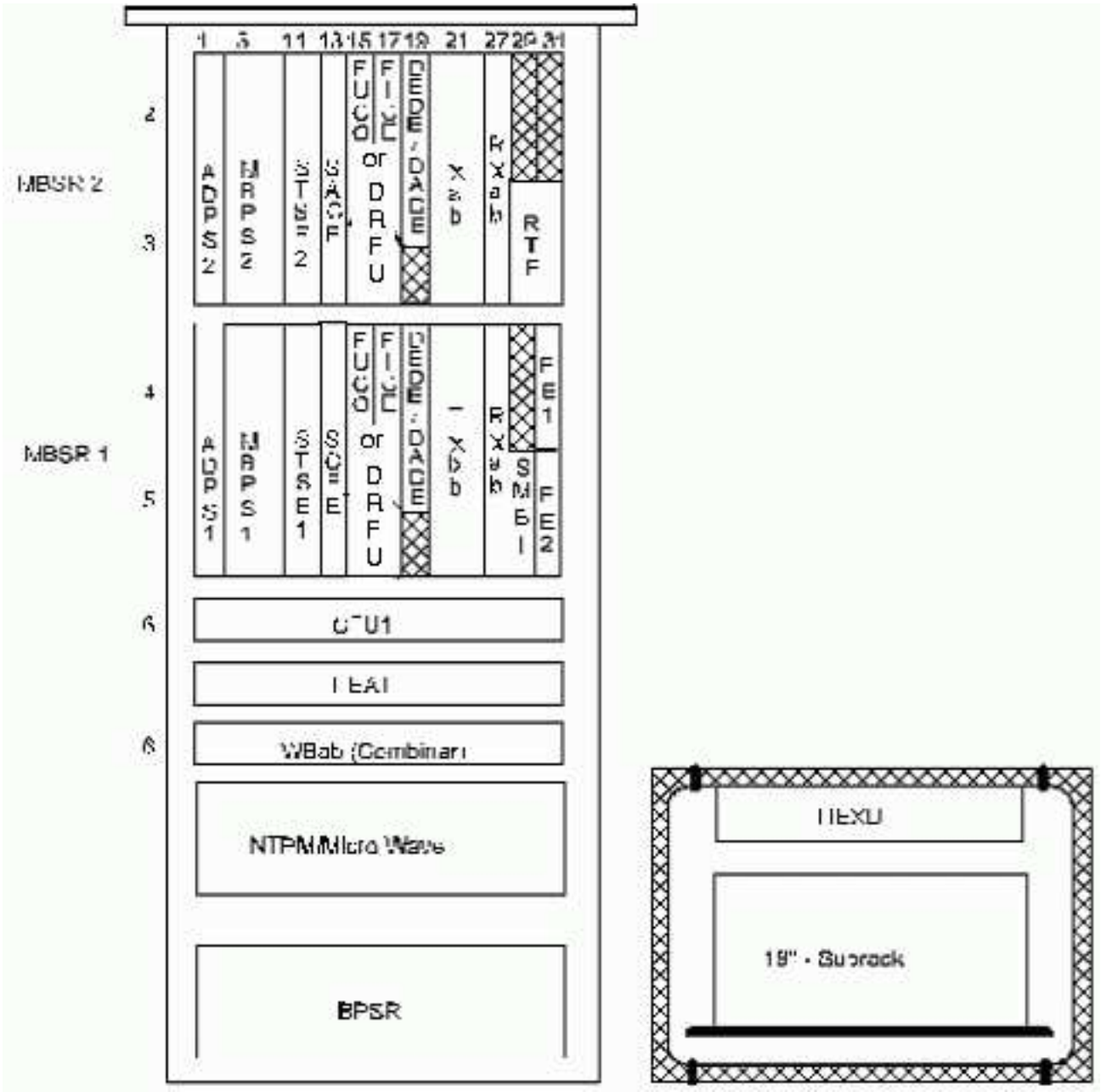


Figure 2: BTS G2 Mini Outdoor, 2 TRX

1.1.1.3 BTS G2 Standard 2m Indoor 3x2

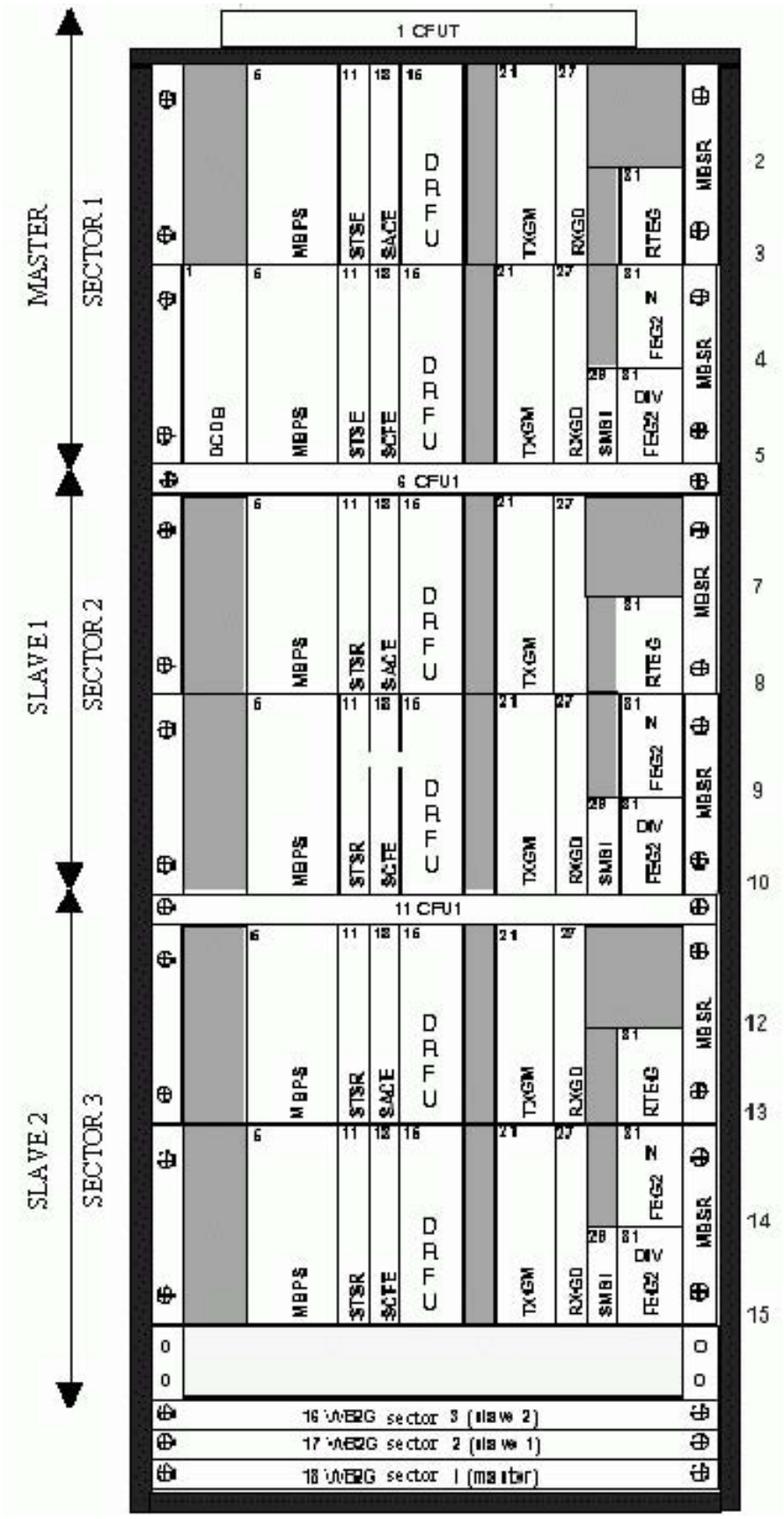


Figure 3: BTS G2 Standard 2m Indoor 3x2

1.1.1.4 BTS G2 Standard 1.25m Indoor 4 FU, TRX TXGM

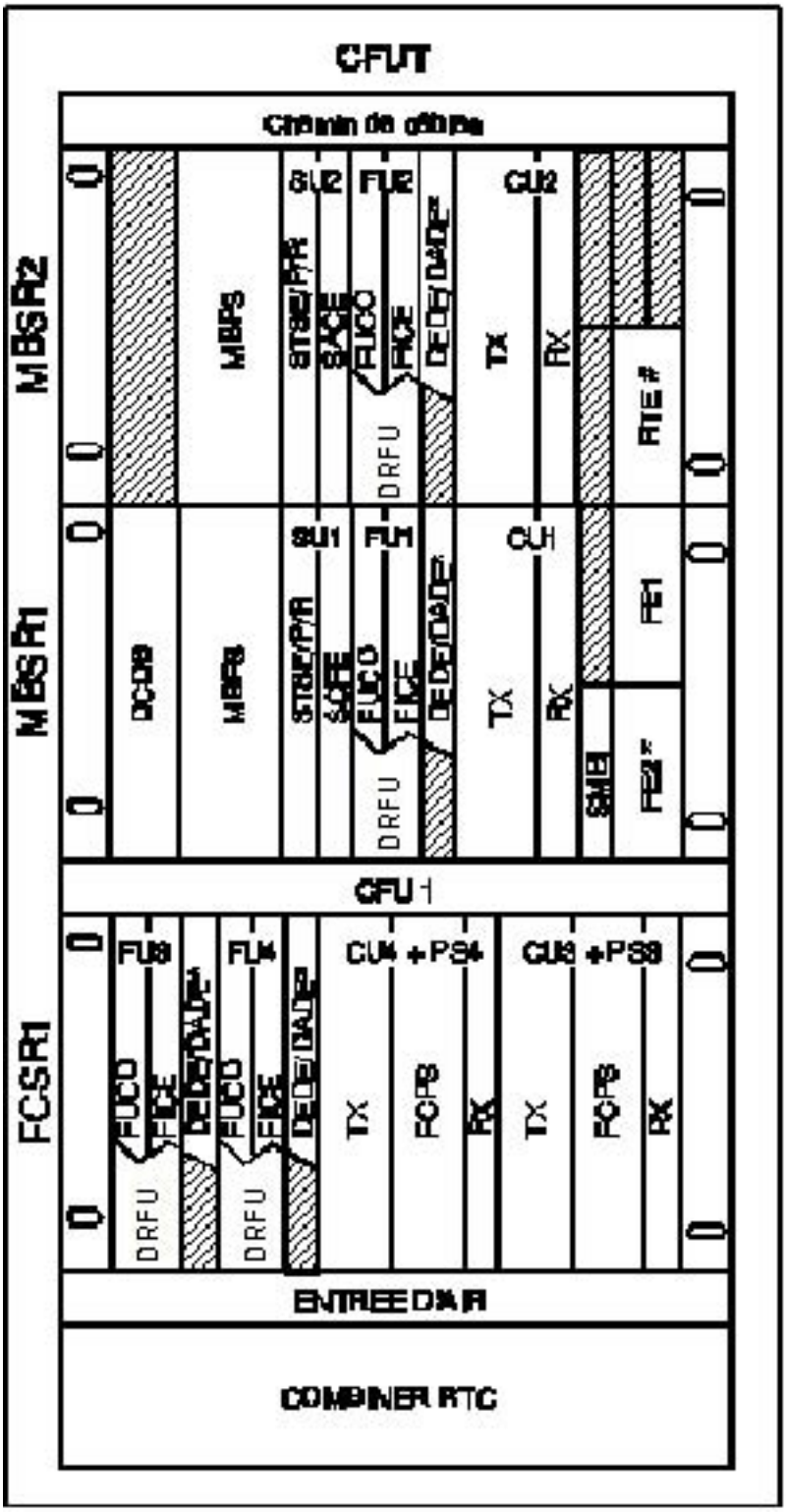


Figure 4: BTS G2 Standard 1.25m Indoor 4 FU, TRX TXGM

1.1.1.5 BTS G2 Standard Outdoor, 4 TRX

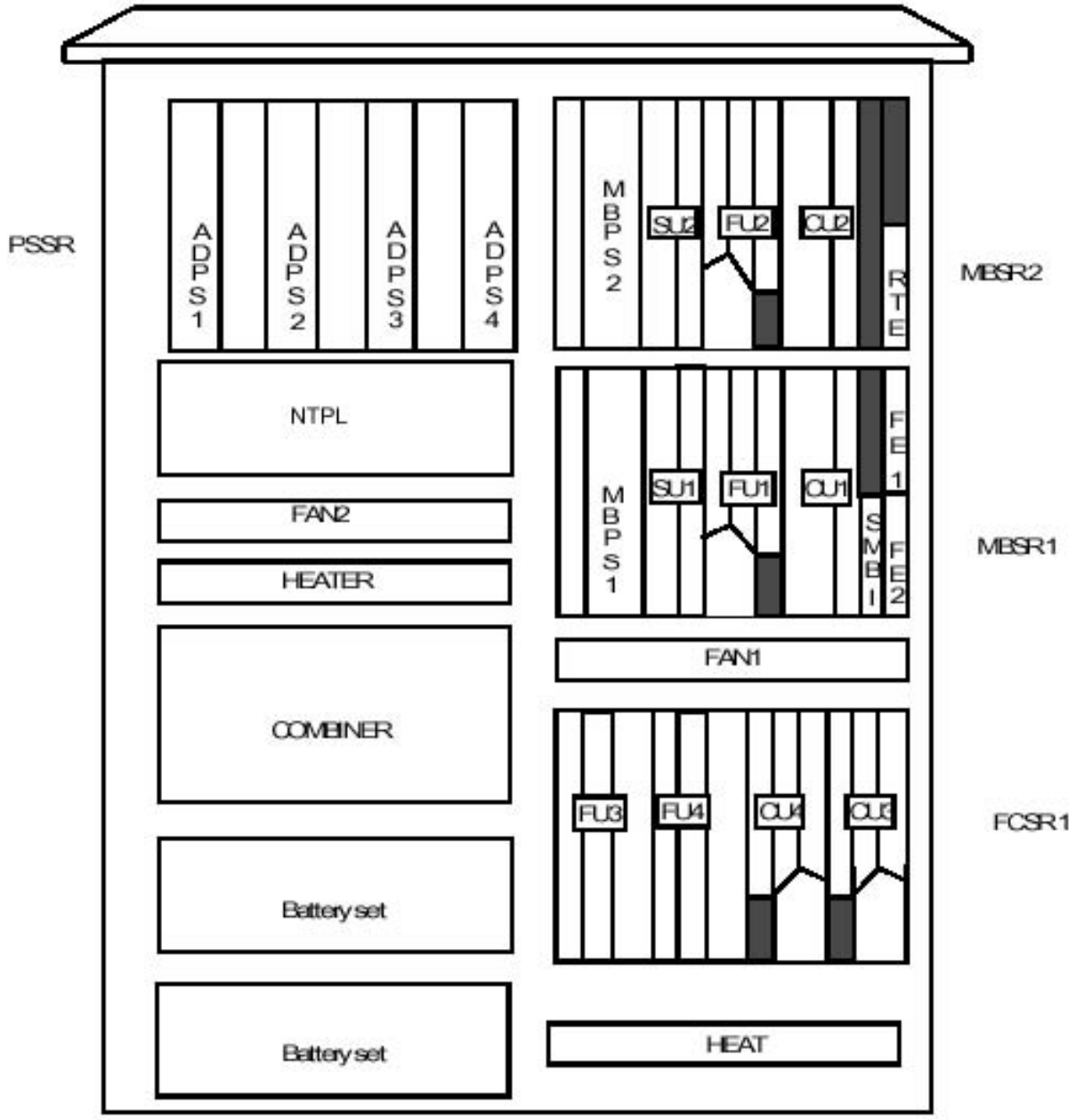


Figure 5: BTS G2 Standard Outdoor, 4 TRX

1.1.2 Cases

None.

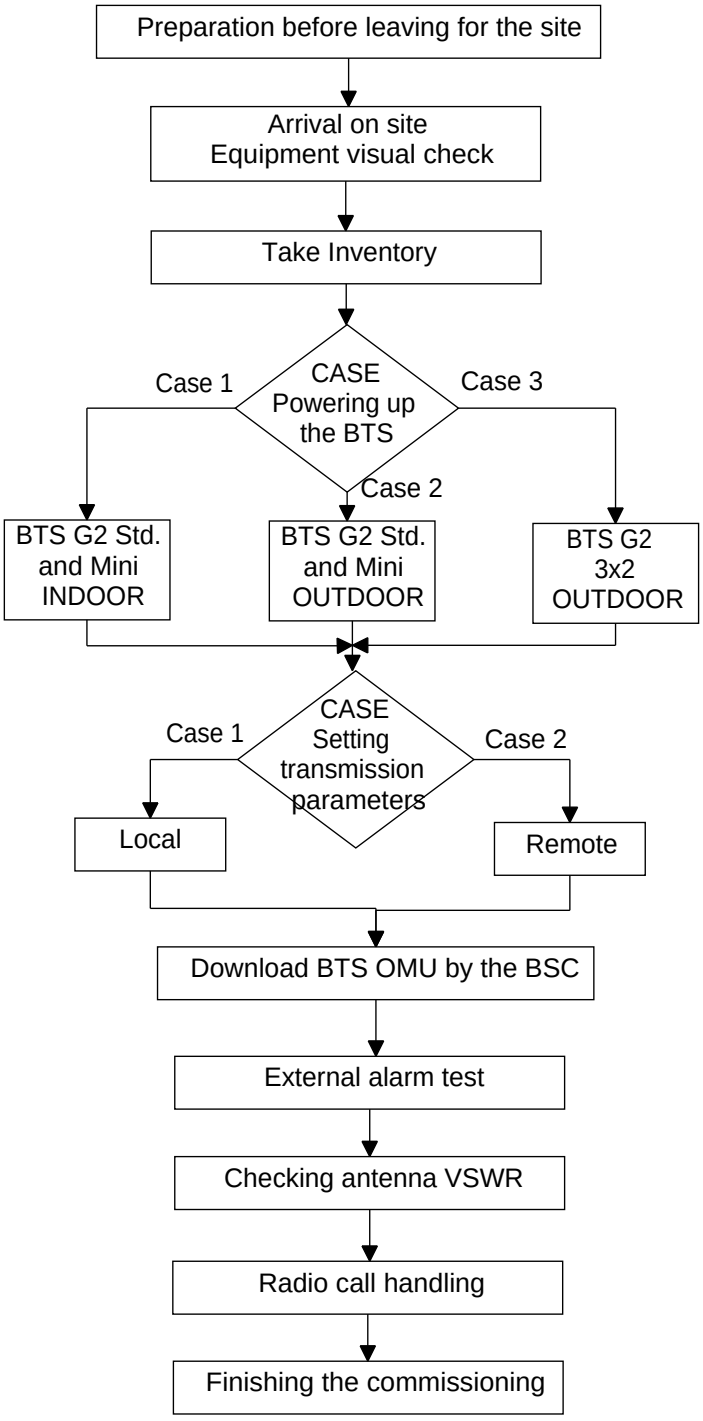
1.1.3 Options

None.

1.1.4 Restrictions

None.

1.1.5 Grouped Tasks Sequence



1.2 Preparation

1.2.1 Prerequisites

The following prerequisiotes apply:

- The site must comply with the "safety rules" (see *BSS Methods Handbook*).
- The following requirements are recommended but not mandatory:
  - Antennas are present and connected.
  - Abis cables are available.

1.2.2 Site Specific Information

Site

- BTS position on site.
- DDF position on site.
- Position of BTS power breakers on the customer’s power panel.

Equipment configuration

- Rack configuration
- BSS topology
- Qmux address and TS
- Test frequencies
- CRC ’On’ or ’Off’.

1.3 Scheduling

Duration (min)	1st person	2nd person
Preliminary checks		
Before leaving for the site (1)	20	20
Before starting (on arrival at the site) (1)	20	20
Taking the Inventory	50	-
Checking the power supply (1)	25	25
BTS G2 Commissioning		
Setting transmission parameters. BTS OMU download	.	
▶ Case 1: With local download of transmission data files	40	
▶ Case 2: Remote download	30	
Checking antenna VSWR	30	
Radio call handling	20	
Finishing commissioning	10	10
Total	**4h05**	**1h15**

(1) : Tasks where two persons are mandatory for execution

The times given are based on technical constraints, not taking into account safety considerations.

1.4 Resources

1.4.1 Tools

1.4.1.1 Hardware Tools

The following table is used to check, at base, the availability of the necessary tools.

see *Tools Catalogue* for checking the content

Kit name	Reference	Calibration	Quantity
Basic kit	OUT 001	No	1
Test cables and plugs (9100 BTS)	OUT 013	No	1
Radio connection kit	OUT 014	No	1
Digital multimeter	DES 001	YES	1
Utility PC (BTS LMT)	DES 002	No	1
Power / Reflection Meter	DES 003	YES	-
Trace mobile	DES 004	No	1
Inventory kit Nr. 7	OUT 017	No	-

1.4.1.2 Software Tools

The following table is used to check, at base, the availability and the version of the necessary software.

Refer to the corresponding document for checking the SW version.

Name	Version checking
Operating System	See *Tools Catalogue*
BTS Terminal (BTSWxxxxx)	BSS Software List
Transmission Data Files	From OMC-R

1.4.2 Supplies

None.

1.4.3 Applicable Documents

The following table is used to check, at base, the availability of the necessary documents.

Document title	Reference
Completion Check List (CCL)	3BK 17430 3031 QZZZA
BSS site premises inspection, post handover	8BL 00704 0016 DRBRA
Site premises inspection form (CEL)	8BL 00704 0015 DRBRA
CI-08 Site Equipment Inventory	3BK 17257 0001 RJZZA
Tools Catalogue for Field Activity	3BK 20458 0001 RJZZA
Catalogue of Techincal and Logistic Information (ITLs)	3DF 00462 0004 AAAGA
Catalogue of Instruction Operation (IO)	3DF 00300 0004 UAZZA
BSS Methods Handbook	3BK 17430 0002 PCZZA
BSS Software List	Depending of the software version asked by the customer

2 Acceptance Tests

Additional Tests presents all the checks needed before starting the tests and all detailed tasks to be performed on site.

2.1 Before Going On Site

Before going on site, you must check that the following information and supplies are available:

- The customer has been informed of the:
  - Date
  - Time
  - Site name
  - Site address
  - Purpose of the operation
- All *Prerequisites (Section 1.2.1)* are fulfilled
- Personnel are available and ready for operation (refer to *Scheduling (Section 1.3)*
- *Site Specific Information (Section 1.2.2)* is available and ready for operation
- *Tools (Section 1.4.1)*are available and ready for operation
- *Software Tools (Section 1.4.1.2)* are available and ready for operation
- *Applicable Documents (Section 1.4.3)* are available.

2.2 Before You Start (On Arrival at the Site)

2.2.1 Checks

Before you start, perform the following operations:

- Check that all *Prerequisites (Section 1.2.1)* are fulfilled
- Check applicable notifications and operating instructions (refer to the *Applicable Notifications List* and *Applicable Operation Instructions List*)
- Check the availability of all necessary tools and supplies.
- Check that the safety precautions have been taken in accordance with the safety instructions described in the *BSS Methods Handbook*
- Check if any *Cases (Section 1.1.2)* or *Options (Section 1.1.3)* apply
- Complete the header field of the CCL. The CCL is completed as each instruction is carried out.
  Note the type of the BTS in the CCL (refer to *Hardware Description (Section 1.1.1)*)
- Complete the Site Premises Inspection Form (CEL)
- Check that the resistance of the anti-static wrist strap is greater than 1 Mohm and connect the anti-static wrist strap to the rack earth.

2.2.2 Required Knowledge

You must be familiar with the following:

- The safety rules and precautions given in the *BSS Methods Handbook*
- How to document faults and anomalies as described in the *BSS Methods Handbook*
- How to complete the Site Premises Inspection Form (CEL)
- *Grouped Tasks Sequence (Section 1.1.5)*.

2.3 Powering Up the BTS

Purpose To set up the electrical power supply.

To measure the power supply voltage.

To check the power supply to the boards in the BTS subracks.

Before powering up the BTS, ensure that the safety instructions are followed (see *BSS Methods Handbook*).

It is essential that:

- The protective earth is connected to the equipment earth terminal.
- The electrical power to the equipment is disconnected from the site power panel.

2.3.1 Case 1: BTS G2 Standard and Mini Indoor

2.3.1.1 Check or Set the Switch Positions

1. Check that switches DCDB 1, 2, 3 and 4 are in the power "OFF" position, marked "0", otherwise set them to the "0" position.
See Figure *6* .

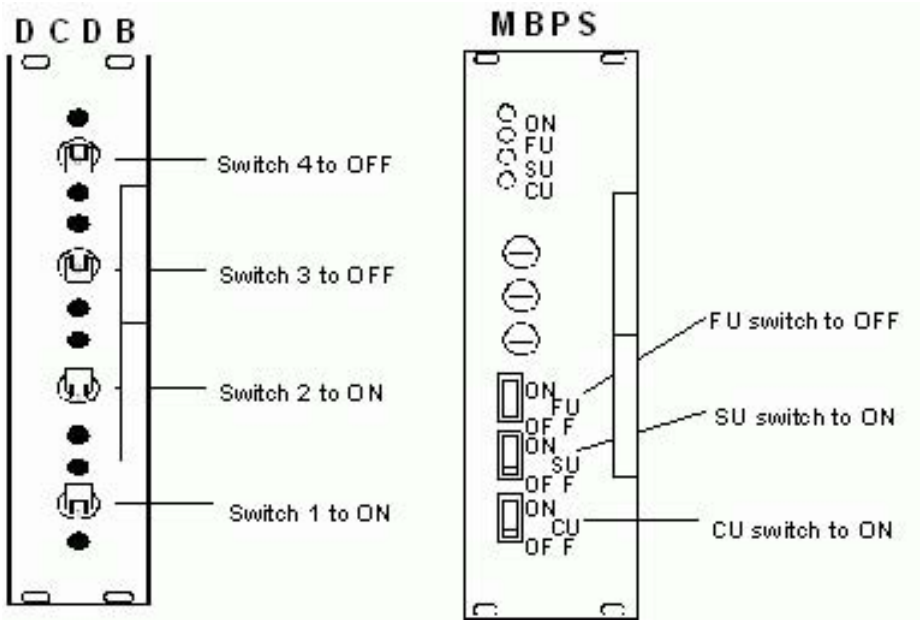


Figure 6: DCDB and MBPS Module Front Panels

2. Check that switches MBPS 1 and 2 are in the power "OFF" position.

For BTS G2 Standard Indoor

3. Only for BTS G2 Standard Indoor check that the switches of the FCPS installed (up to 8) are in the power "OFF" position.
See Figure *7* .

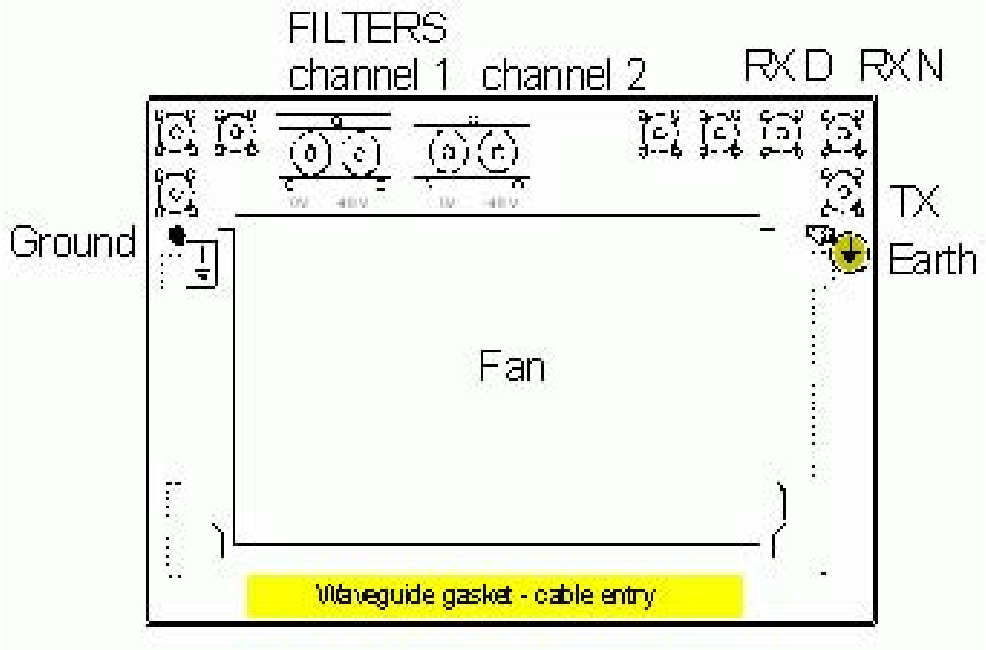


Figure 7: Racktop Power Supply for BTS G2 Standard Indoor

2.3.1.2 Power Up the BTS and Measure the Power Supply Voltage

For BTS G2 Mini Indoor

1. For BTS G2 Mini Indoor, at the power supply unit, measure the voltage between the 0V and -48V terminals.
2. Check that the value is within the range [-57.6 V; - 38.4 V] DC (-48 V +/– 20%).

For BTS G2 Standard Indoor, on Top of the Rack

1. Remove the rubber protective caps from the power supply terminals (rack top).
2. At the power panel, set up power supply line 1, operate fuseholder 1 (e.g.: BS X-1 in which X is the BTS rack number).
   Line 1 is connected, line 2 is disconnected.
3. Measure the voltage between the 0 V and -48 V terminals for WAY 1.
   Value must be within the range [-57.6 V; - 38.4 V] DC (-48 V +/– 20%).
4. At the power panel, disconnect power supply line 1, operate fuseholder 1.
   Line 1 and line 2 are disconnected.
5. At the power panel, connect power supply line 2, operate fuseholder 2 (e.g.: BS X-2 in which X is the BTS rack number).
   Line 1 is disconnected, line 2 is connected.
6. Measure the voltage between the 0 V and -48 V terminals for WAY 2.
   Value must be within the range [-57.6 V; - 38.4 V] DC (-48 V +/– 20%).
7. At the power panel, disconnect power supply line 2, operate fuseholder 2.
   Line 1 and line 2 are disconnected.
8. Replace the rubber protective caps on the power supply terminals (rack top).

Check the Power Supply to the Modules

1. At the power panel, connect both line 1 and line 2.
   Line 1 and line 2 are connected.
2. If appropriate, set the "Power on" switch to "ON" on the FRBG or CRBG module (combiner).
3. On the DCDB module, put the switches 1, 2, 3, 4 to ’1’ (’1’- power supply enabled; ’0’- power supply disabled).
   MBPS modules are powered ("ON" LED is lit).
   FCPS modules (if present) powered ("ON" LED is lit).
   RTC module (FRBG or CRBG) powered ("ON" LED is lit).
4. For each MBPS:
   - "SU" switch to "ON". The "SU" LED comes on.
   - "CU" switch to "ON". The "CU" LED comes on.
   - "FU" switch to "ON". The "FU" LED comes on.

For BTS G2 Standard Indoor

5. Only for BTS G2 Standard Indoor, for each FCPS:
   - "CU" switch to "ON". The "CU" LED comes on.
   - "FU" switch to "ON". The "FU" LED comes on.

All the boards are powered up now.

2.3.2 Case 2: BTS G2 Standard and Mini Outdoor

2.3.2.1 Check or Set the Switch Positions

1. Check that switches BHPS 1, 2 are in the power "OFF" position.
2. Check that switches ADPS 1, 2, 3 and 4 are in the power "OFF" position.
3. Check that switches MBPS 1 and 2 are in the power "OFF" position.
4. If appropriate, check that switches FCPS, FRBG or CRBG are in the power "OFF" position.

Power OFF the Battery Supply

5. Set to "ON" all the BHPS Switches located at the back of the BHPS unit.

2.3.2.2 Power Up the BTS and Measure the Power Supply Voltage

Power Up the BTS

1. At the rear of the rack, undo the two screws and remove the metal plate from the COB1 power supply unit.
2. Set the circuit breaker inside the COB1 power supply unit to OFF.
3. Set up the BTS power supply, connecting to the 220V mains.
4. Set the circuit breaker inside the COB1 power supply unit to ON.
5. Check the colour of the LED lit on the safety circuit breaker.
   - Green - proper protection.
   - Red - protection faulty, change the circuit breaker.
6. Measure the voltage between the L and N terminals.
   Value must be within the range [195.5V; 264.5V] AC

Check the Power Supply to the BHPS Modules

1. Set to "ON" the breaker of BHPS module 1.
   "AC IN" LED is lit at BHPS1.
   - If T < 0°C (temperature inside the BTS) close all the doors of the BTS and wait until T>0°C and "AC IN" LED is lit in ADPS1 and ADPS2 (ADPS1, ADPS3 for BTS Standard Outdoor). The HEAT module will heat the BTS.
   - If T > 0°C (temperature inside the BTS)
     - "AC IN" LED is lit in ADPS 1 and ADPS2 (ADPS1, ADPS3 for BTS Standard Outdoor).
     - The cooler on the top of the HEXU 1 module (right) is operating.
     - CFU1 module number 1 is in function ("ON" LED is lit).

Only for BTS G2 Standard Outdoor

2. Set "ON" the breaker of the BHPS module 2.
"AC IN" LED is lit at BHPS2.

- If T < 0°C (temperature inside the BTS) close all the doors of the BTS and wait until T>0°C and "AC IN" LED is lit in ADPS2 and ADPS4. The HEAT module will heat the BTS.
- If T > 0°C (temperature inside the BTS)
  - "AC IN" LED is lit in ADPS2 and ADPS4.
  - The cooler on the top of the HEXU 2 module (left) is operating.
  - CFU1 module number 2 is in function ("ON" LED is lit).

Check the Power Supply to the Modules

1. For each ADPS set the switch to "ON".
The green LED is lit.

2. For each MBPS:

- Set the SU switch to "ON". MBPS ("SU" LED is lit), STSE/P/R, SCFE, SACE, SMBI, FEG2, RTG (if present) are powered.
- Set the CU switch to "ON". MBPS ("CU" LED is lit), TX and RX.
- Set the FU switch to "ON". MBPS ("FU" LED is lit), FUCO/FICE/DADE or DRFU.

3. If appropriate, for each FCPS:

- Set the CU switch to "ON". The "CU" LED is lit.
- Set the FU switch to "ON". The "FU" LED is lit.

Set the Switches of the BHPS Unit

4. Set all the switches at the back of the BHPS unit according to the number of TRX installed.

   See tables below:

BHPS nr.	Switch nr.	1 TRX	2 TRX	3 TRX	4 TRX
1	1	OFF	OFF	OFF	OFF
	2	ON	ON	OFF	OFF
2	1	ON	OFF	OFF	OFF
	2	ON	ON	ON	OFF

Table 1: BHPS Switches for BTS G2 Standard Outdoor

Switch nr.	1 TRX	2 TRX
1	OFF	OFF
2	ON	OFF

Table 2: BHPS Switches for BTS G2 Mini Outdoor

All the boards are powered up now.

2.3.2.3 Check the Battery Operation

When the battery is operating, the ADPS switches must be in the "ON" position. Do not set the ADPS switches to "OFF", otherwise the BHPS modules will be damaged!

1. Set the right-hand breaker in the COB1 power supply unit to OFF at the rear of the rack.

   The BTS is no longer powered by the 220V supply.

   All the modules in the rack are powered by the battery.

2. Set the right-hand breaker in the COB1 power supply unit to ON at the rear of the rack.

   All the modules in the rack are powered by the power converters.

2.3.3 Case 3: Powering Up the BTS G2 3x2 Outdoor

2.3.3.1 Check or Set the Switch Positions

1. Check that switches of DCDB are in the "OFF" position.
2. Check that switches of MBPS are in the "OFF" position.
3. Set 63 A fuses at the back of the BTS slave 1 to "ON" position (internal distribution panel).

2.3.3.2 Power Up the BTS and Measure the Power Supply Voltage at the Back of the Rack

1. At the rear of the rack, undo the two screws and remove the plastic plate from the power supply unit.

See Figure *8*

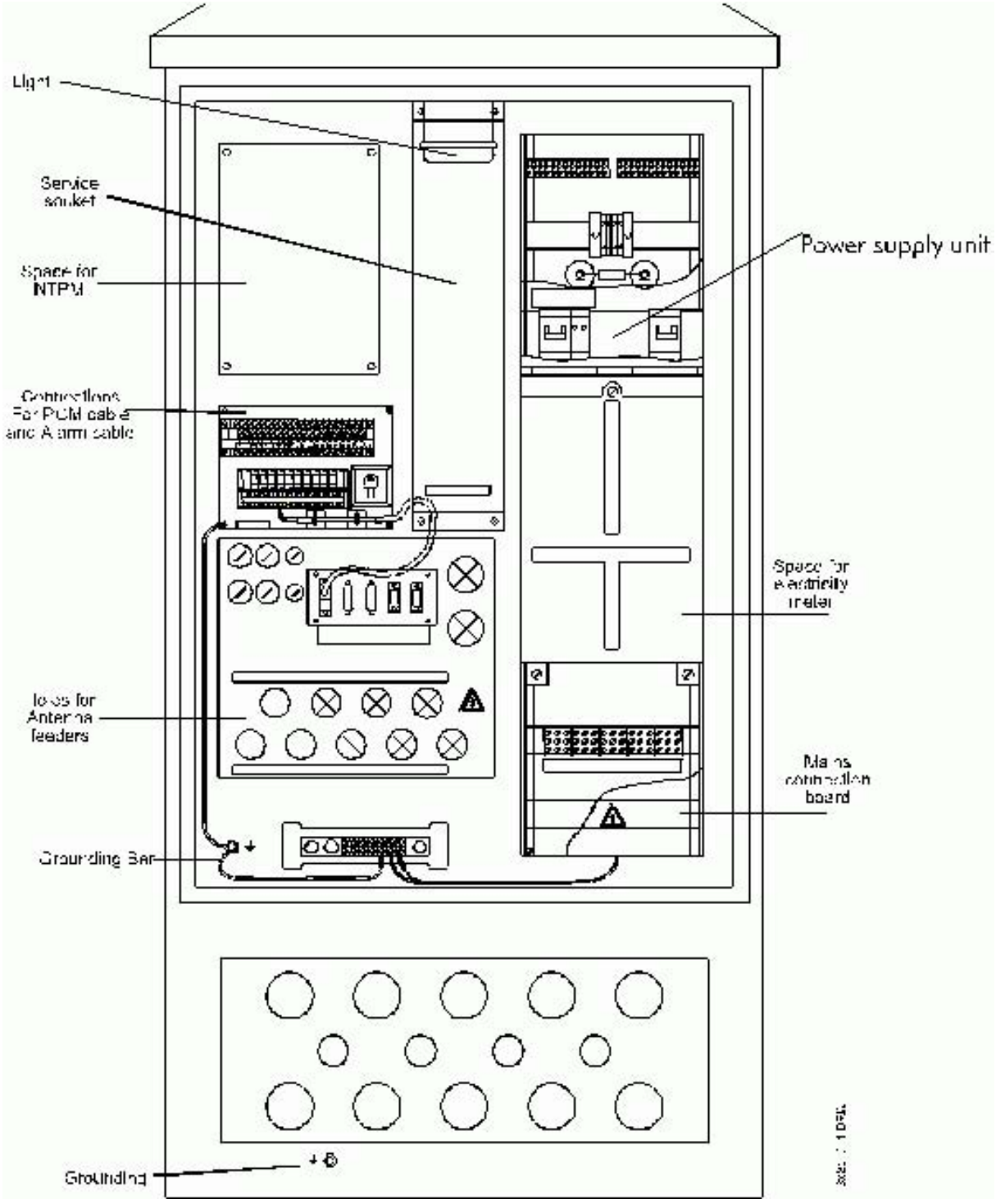


Figure 8: Power Supply Unit, BTS G2 3x2 Outdoor. (View from the left side of BTS2 Slave1)

2. Set the circuit breaker inside the power supply unit to OFF.
3. Set up the BTS power supply, connecting to the 220V mains.
4. Set the circuit breaker inside the power supply unit to ON.
5. Check the colour of the LED lit on the safety circuit breaker.
   - Green - proper protection.
   - Red - protection faulty, change the circuit breaker.
6. Measure the voltage between the L and N terminals.
   Value must be within the range [195.5V; 264.5V] AC.

Check the Power Supply to the DCDB and MBPS Modules

1. Check the power supply of the DCDB MBPS modules according to switch positions.
2. Check in the following table the module power supply according to switch position
   See table below (* = if present).

DCDB	MBPS	Boards or modules powered
Switch 1 ON		MBPS1 module ("ON" LED lit); CFU1 and WB2G*
	MBPS1 SU ON	MBPS1 module ("SU" LED lit), STSE/P/R, SCFE, SACE, SMBI, FEG2 and RTEG* within MBSR1 and/or MBSR2
	MBPS1 CU ON	MBPS1 module ("CU" LED lit), TX and RX* within MBSR1
	MBPS1 FU ON	MBPS1 module ("FU" LED lit), FUCO/FICE/DADE within MBSR1
Switch 1 OFF		No board or module powered
Switch 2 ON		MBPS2 module ("ON" LED lit), CFU1 and WB2G*
	MBPS2 SU ON	MBPS2 module ("SU" LED lit), STSE/P/R, SCFE, SACE, SMBI, FEG2 and RTEG* within MBSR1 and/or MBSR2
	MBPS2 CU ON	MBPS2 module ("CU" LED lit), TX and RX* within MBSR2
	MBPS2 FU ON	MBPS2 module ("FU" LED lit), FUCO/FICE/DADE within MBSR2
Switch 2 OFF		No board or module powered

Table 3: Module Power Supply According to Switch Positions

Set the Switch Positions

1. Set BTS Master switches DCDB (breakers 1, 2, 3, 4 to "ON").
   See *Hardware Description (Section 1.1.1)*.
2. Set BTS slave 1 and 2 switches DCDB (breakers 1, 2, 3 to "ON").

2.3.3.3 Check the Battery Operation

When the battery is operating, the ADPS switches must be in the "ON" position. Do not set the ADPS switches to "OFF", otherwise the BHPS modules will be damaged!

1. Set the right-hand breaker in the power supply unit to OFF at the rear of the rack.
   The BTS is no longer powered by the 220V supply.
   All the modules in the rack are powered by the battery.
2. Set the right-hand breaker in the power supply unit to ON at the rear of the rack.
   All the modules in the rack are powered by the power converters.

2.4 Perform BTS Inventory

Purpose To take the inventory of the boards and modules of the installed equipment.

To verify that the technical level and boards installed in the equipment are as requested by the customer.

Procedure

1. Verify the presence and position of the boards according to requested configuration.
   See *Hardware Description (Section 1.1.1)*.
2. Take the Inventory.
   Refer to *CI-08 Site Equipment Inventory*.

2.5 Check the Combiner Configuration

On the RTC Combiner:

1. Set the VSWR switch to 1.7 on the RTC Combiner.
2. Set the "Q1/Local" switch to Q1 (FRBG,CRBG) on the combiner.

2.6 Set the Transmission Parameters and Download the BTS OMU

Purpose To download transmission data:

- locally
- remotely.

Notify the Operator

1. Call the operator at the OMC-R and notify him that you are working on the BTS site and that you are about to connect the BTS to the BSC.

Install the Configuration Utility

2. Disconnect the Abis links from the SMBI board (in the MBSR1 subrack).
   See Figure *9* .

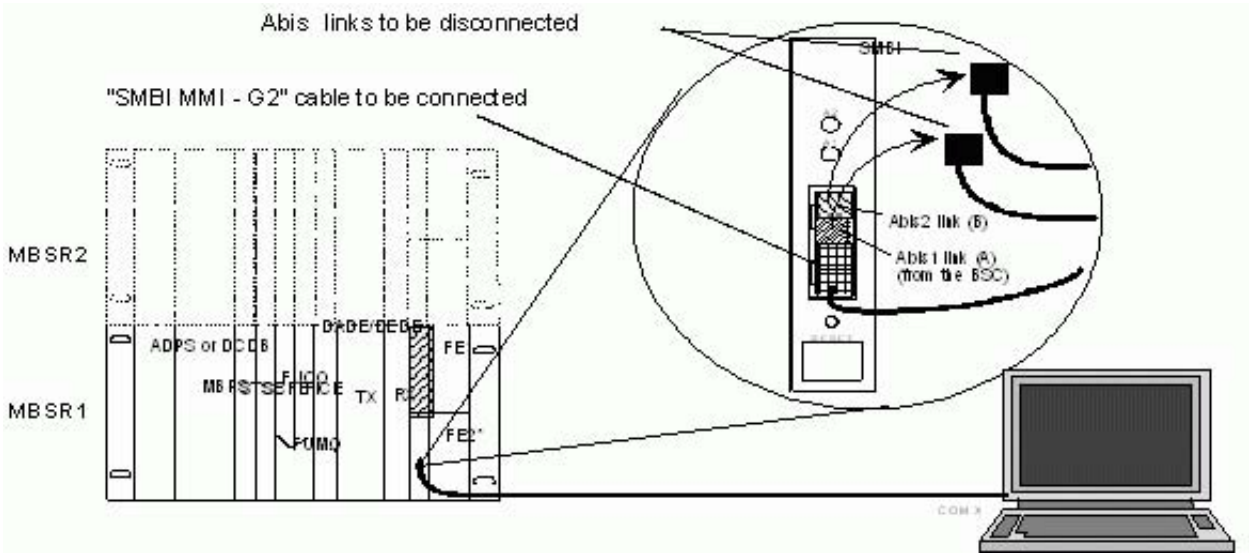


Figure 9: Connecting the PC to the SMBI Board

3. Connect the PC's 9-way serial port COM1 or COM2 to the SMBI board using the SMBI MMI - G2 cable.

2.6.1 Case 1: Setting Transmission Parameters Locally

2.6.1.1 Start the MMI Software

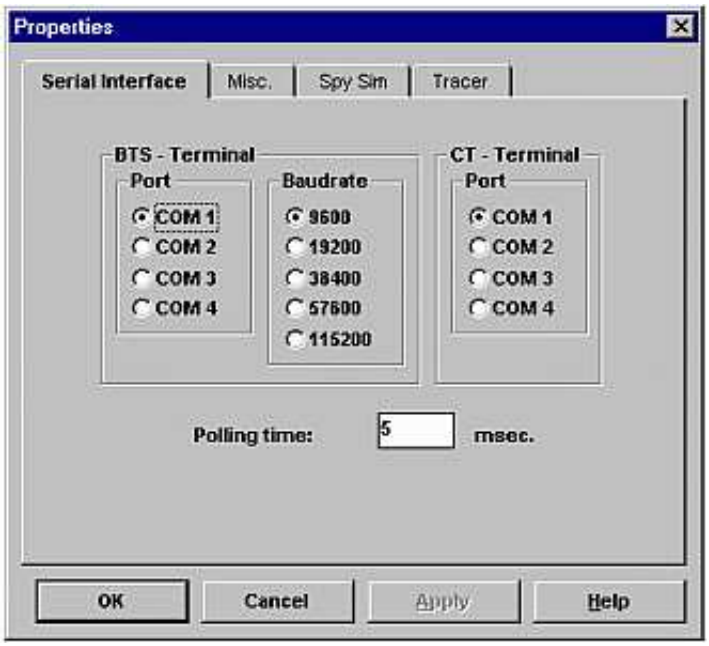
1. Under Windows, from the Taskbar-menu select:
Start ⇒ ***Programs*** ⇒ ***BTS Terminal***
(or double click the “BTS Terminal” shortcut Icon).
“BTS Terminal” windows opens and “Password” window appears.

2. In the “User Login” window enter:

- User/Group name:
  ⏩ COMMTE
- Password:
  ⏩ COMMTE
- Click [Logon]

3. In the Main Menu use:
Select ⇒ ***CT Terminal (G2)***

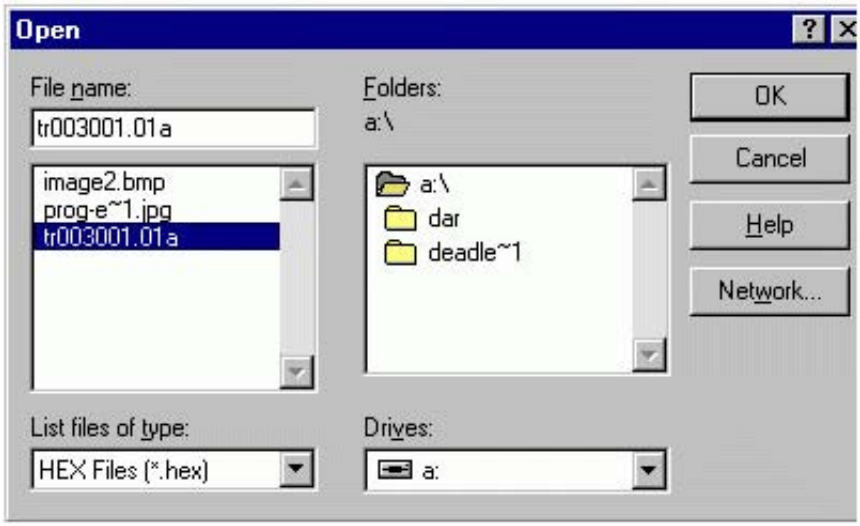
4. In the Main Menu use:
Settings ⇒ ***Terminal***
to configure serial port and baud rates (see example below) then click [OK].



5. In the Main Menu select:
File ⇒ ***Connect***
The connection with the SMBI board is established.
Check that the 2 Mbit link is disconnected from the BTS.

2.6.1.2 Download the SMBI Board Configuration File

1. In the main menu select:
   Transmission ⇒ ***Download Setting-File***
   "Open" window appears.



TIP

In the "Open" window, display a non-hex file by using **'File name'** field. replace the hex extension with an asterisk '*' and press the [Enter] key on your keyboard.

2. Select the transmission filename and click [OK], see *Site Specific Information (Section 1.2.2)*.
   "Download" message window opens.
3. Verify that the file to be downloaded is the correct one and click [OK].
   Wait for the message window "Download Complete finished" and click [OK].

2.6.1.3 Option: BTS with Slave SMBI (for more than 4 FU)

1. Reset the slave SMBI board manually in the MBSR2 subrack.
   Wait 15 seconds: the master SMBI downloads to the slave SMBI.
2. Check the LEDs on the slave SMBI board.
   LED A1 is lit and A2 off.

2.6.1.4 Check the Qmux Address, CRC and SMBI Environment

1. Check the configuration settings using the following selection in the “SMBI” main menu:

   Transmission ⇒ Initial Settings

   “Initial Settings” window opens.

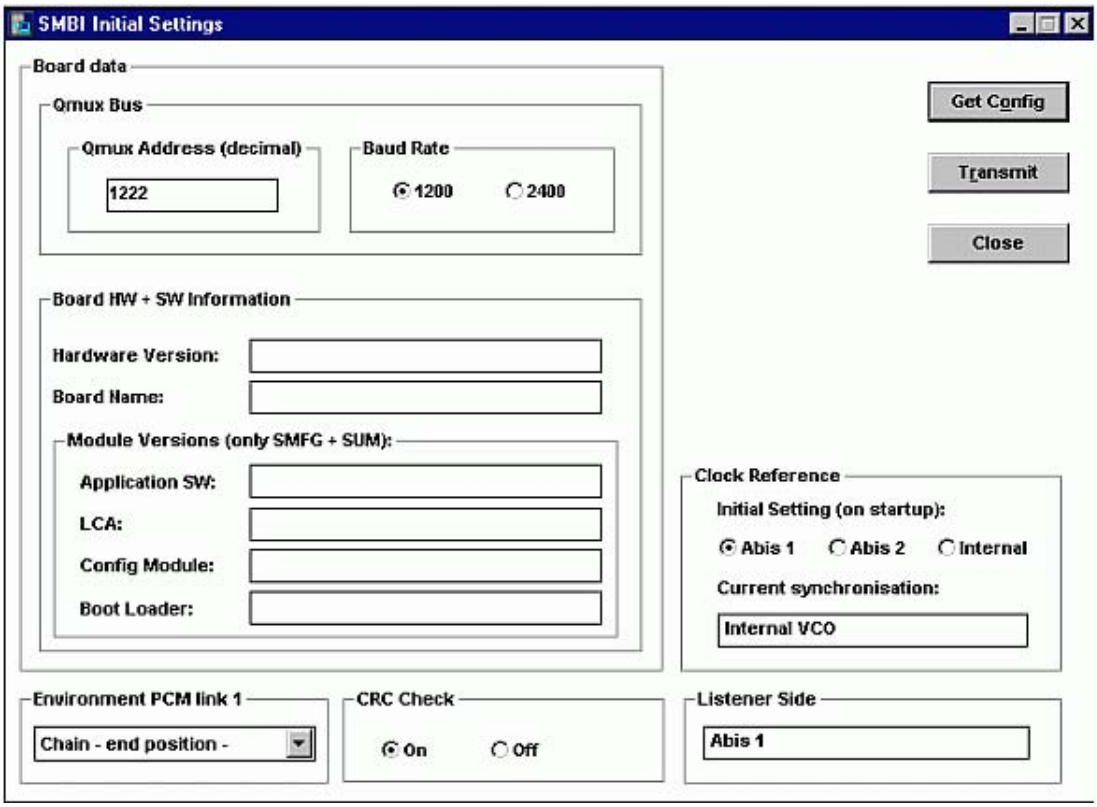


Figure 10: SMBI Initial Settings Window

2. Click [Get Config]. Check the following information to OMC-R, see *Site Specific Information (Section 1.2.2)*.

   - Qmux Address
   - CRC (“ON” or “OFF”)
   - Environment SMBI (Star end position, Chain end position, Chain middle position, etc.).

   Make the necessary correction and click [Transmit] to send the settings to the board.

3. Check the settings again (Repeat action 2.)

4. Check the Qmux alarms by using:

   Transmission ⇒ Qmux Status

   “Qmux Status” window opens. Click [Fault Status.]. The only alarm is ‘Loss of incoming signal’.

ATTENTION

At this point apply *Workaround - Disable the use of the Additional Far End Alarm Bits 1*.

5. Disconnect the SMBI MMI - G2 cable from the SMBI board (master)
6. **Reconnect the Abis (A) and (B) links to the SMBI board (master)**
   - **Abis 1 link (A): PCM link from BSC**
   - **Abis 2 link (B): PCM link to next BTS**

2.6.2 Case 2: Loading Transmission Parameters Remotely

Check the Qmux Address, CRC and SMBI Environment

1. Check the configuration settings using the following selection in the “SMBI” main menu:
   Transmission ⇒ ***Initial Settings***
   “Initial Settings” window opens (see Figure*10*).
2. Click [Get Config]. Check the following information to OMC-R, see *Site Specific Information (Section 1.2.2)* .
   - Qmux Address
   - CRC (“ON” or “OFF”)
   - Environment SMBI (Star end position, Chain end position, Chain middle position, etc).

   Make the necessary correction and click [Transmit] to send the settings to the board.
3. Check the settings again (Repeat action 2.)
4. Check the Qmux alarms by using:
   Transmission ⇒ ***Qmux Status***
   “Qmux Status” window opens. Click [Fault Status.]. The only alarm is ‘Loss of incoming signal’.

ATTENTION

At this point apply *Workaround - Disable the use of the Additional Far End Alarm Bits 1*.

5. Disconnect the SMBI MMI - G2 cable from the SMBI board (master)
6. **Reconnect the Abis (A) and (B) links to the SMBI board (master)**
   - **Abis 1 link (A): PCM link from BSC**
   - **Abis 2 link (B): PCM link to next BTS**

2.7 Download the BTS OMU by the BSC

CAUTION

If there are no antennas, connect a 50 Ω / 50 W load to the combiner output or to the top of the rack (TX position).

2.7.1 Connect the BTS to the BSC

To connect the BTS:

1. Connect the PCM link of the BTS to the DDF.
   LED A1 on steady.
2. Disconnect the loop between the transmit and receive terminal blocks on the DDF.
3. Check the of LEDs states A1 and A2 on the SMBI board.
   See Figure *11*.

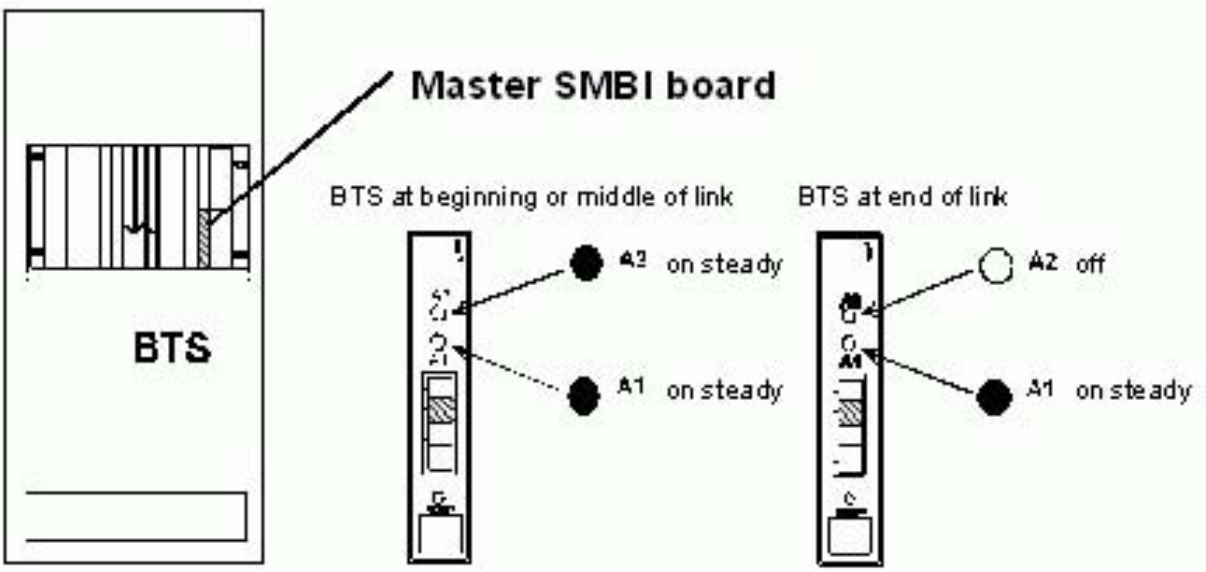


Figure 11: LEDs on the SMBI master board

NOTICE

If the state of the LEDs on the SMBI board is not as in Figure, make the checks from the following tables:

Site	Verify if:
BTS	PCM link correctly wired, transmit and receive pairs PCM link unlooped
BSC	BIUA OF THE BSC connected to the PCM link PCM link correctly wired, transmit and receive pairs PCM link unlooped

Table 4: Failure Checks

LED State	Meaning	Comments
A1 and A2: off	No power	—
A1 and A2: lit	No error detected in direction	Upline PCM A1, downline PCM A2
A1 and A2: blinking slow	Error in direction	Upline PCM A1, downline PCM A2
A1 and A2: blinking fast	Fatal error on SMBI board	—

Table 5: Description of SMBI Alarms (in MBSR1 Subrack)

2.7.2 Check BTS Downloading

To check the BTS download:

1. Check that the OMU has been downloaded (SCFE/SCFP/SCFR board).
   See Figure *13* .
   Downloading of the BTS takes approximately 15 minutes.
2. If the BTS is not downloaded, ask the OMC-R to run the "RESET BTS" commands.

2.7.3 Reset the BTS

To reset the BTS:

1. At OMC-R, in the ’BSS - Release x” window select:
   ⇒ ***BTS Nr.*** ⇒ ***Reset***
   Wait for the “Follow up” report message.
2. At BTS site, check the temperature alarm LED.
   Red LED on the clock boards (STSE / STSP / STSR) disappears.

3. At the end of the download, check the three LEDs relating to the OMU.
   The three LEDs relating to the OMU on SCFE board are blinking fast.
4. Check that the BTS modules are initialized.
   On the CUs: check that the channel numbers are displayed and the alarm indications are off.
   On the FUs: red LEDs off.

2.7.4 Option: Switch to the Test Channel According to the Customer's Specification

Do not carry out this section if the test channels have already been assigned.
Do not carry out this section if there are no antennas.

To switch to test channel:

1. Record the frequencies of all CUs (initial frequencies).
2. **Ask the OMC-R** to change the radio channel allocation:
   - Block the cells of the BTS.
   - Stop transmission of neighbouring cells, using the test frequency.
   - Change the CU frequencies, assign the test frequency channel (specified by customer).

Assign the Test Frequencies

3. If the CU frequencies are not assigned, ask the OMC-R to apply usable frequencies that are allowed for testing.

On CUs: "-1" displayed. Example:

CU	1	2	3*	4*	(*) if installed
ARFCN	5	57	54	51	

Table 6: Test Frequencies (Examples)

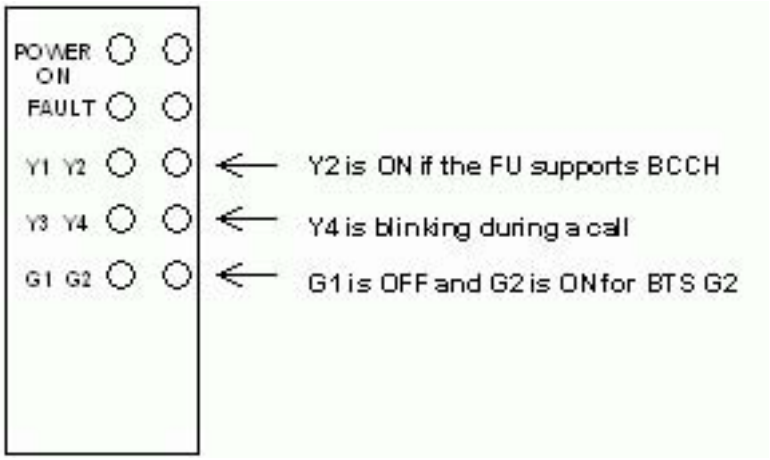


Figure 12: LED States on DRFU During Download

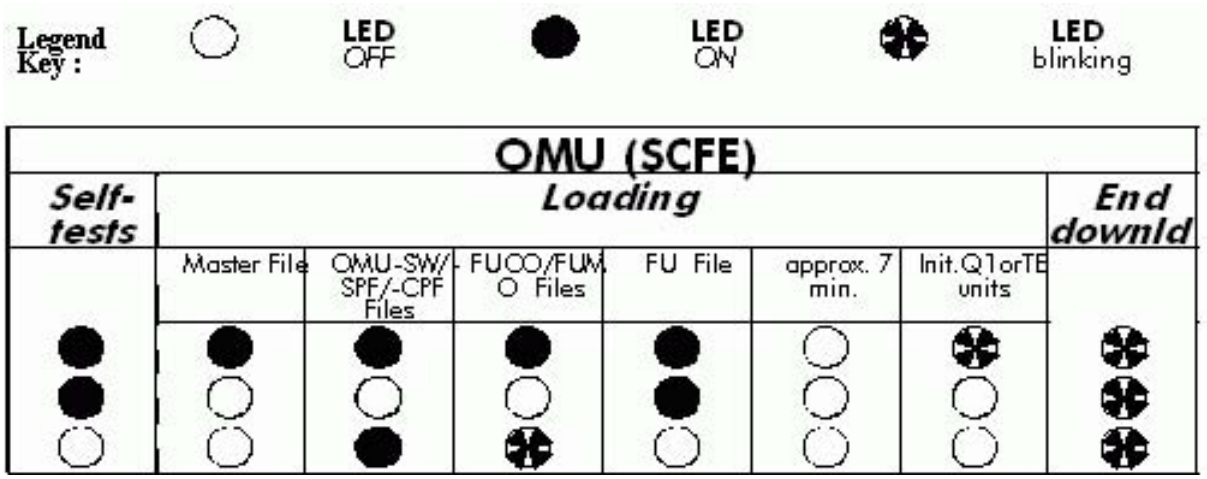


Figure 13: LED States on OMU During Download

SW2	SW1	SW0	Meaning
OFF	OFF	OFF	OMU Reset
OFF	ON	OFF	OMU Restart
ON	ON	ON	OMU Selftest running
OFF	OFF	ON	Selftest failure: RAM test
OFF	OFF	BLINKING	Selftest failure: Inverse parity check
OFF	ON	ON	Selftest failure: Timer test
OFF	ON	BLINKING	Selftest failure: Serial interface test
OFF	BLINKING	OFF	Selftest failure: Token bus test
OFF	BLINKING	ON	Selftest failure: BS interface test
OFF	BLINKING	BLINKING	Selftest failure: Test of RTC and SRAM
ON	OFF	OFF	DLL of Master-file
ON	OFF	ON	DLL of files OMU_SW, OMU_SPF, OMU_CPF
ON	OFF	BLINKING	DLL of FUCO-SW-files
ON	ON	OFF	DLL of FU-Entity-files
ON	ON	BLINKING	Failure during DLL of Master-file
ON	BLINKING	OFF	Failure during DLL of OMU_SW, OMU_SPF, OMU_CPF
ON	BLINKING	ON	Failure during DLL of FUCO-SW-files
ON	BLINKING	BLINKING	Failure during DLL of FU-Entity-files
BLINKING	OFF	OFF	Init of Q1 or TB units
BLINKING	OFF	ON	Failure during init of Q1 unit
BLINKING	ON	OFF	Failure during init of TB unit
BLINKING	ON	ON	Failure during init of Q1 and TB unit

SW2	SW1	SW0	Meaning
BLINKING	BLINKING	BLINKING	Master OMU after BTS-initialisation
BLINKING	BLINKING	OFF	Backup OMU after BTS-initialisation

Table 7: LED States on OMU During Download With Abnormal Cases

2.8 Check Module Status and Test External Alarms

2.8.1 Connect the BTS Terminal

1. Connect the COM1 port of the BTS Terminal to the "MMI" connector of the SCFE board in the MBSR 1 subrack using the BTS Terminal cable.
2. Under Windows, from the Taskbar-menu select:
   Start ⇒ ***Programs*** ⇒ ***BTS Terminal***
   (or double click the “BTS Terminal” shortcut Icon).
   “BTS Terminal” windows opens and “Password” window appears.
3. In the “User Login” window enter:
   - User/Group name:
     ⏩ COMMTE
   - Password :
     ⏩ COMMTE
   - Click [Logon]
4. In the Main Menu use:
   Settings ⇒ ***Terminal*** to configure
   - ’Port’ field: COM1
   - ’Baudrate’: 9600
   - ’Pooling time’: 10 msec

   then click [OK].
5. In the Main Menu use:
   Select ⇒ ***BTS Terminal (G1 MKII/G2)***
6. In the Main Menu select the path:
   See Figure *9* .
   File ⇒ ***Connect***
   The connection with the BTS OMU is established.

2.8.2 Check the BTS Modules Status

1. In the BTS Terminal Main window:
   Monitoring ⇒ ***BTS Modules***
   "SBL Modules States" window opens.
2. Check that all the modules in the BTS are "IT".

Note: BTS can be "FIT" if externals are active, e.g. EACB1 Ext3.

At the OMC-R

3. Ask the OMC-R to run a Hardware + Alarm/BTS State Audit
   BTS Nr ⇒ ***Hardware Audit***
   BTS Nr ⇒ ***Alarm/ State Audit***
4. Wait for the end of audit message in the "Follow up" window.

2.8.3 External Alarm Test

Check External Alarms

1. At BTS Site in the BTS Terminal Main window:
   Monitoring ⇒ ***Active Alarms***
   "Alarm" window opens.
2. Check that there are no external alarms, except EACB1 Ext3 - door alarm (the door is open). See table *8*.

Alarm Pin Nr	Message Appearing on the BTS Terminal	Assignment (Example)
1 (SCFE)	EACB1 EXT 1 - 001	rectifier failure
2 (SCFE)	EACB1 EXT 2 - 001	mains
3 (SCFE)	EACB1 EXT 3 - 001	door
4 (SCFE)	EACB1 EXT 4 - 001	door override
5 (SCFE)	EACB1 EXT 5 - 001	fire
6 (SCFE)	EACB1 EXT 6 - 001	water
7 (SCFE)	EACB1 EXT 7 - 001	fan
8 (SCFE)	EACB1 EXT 8 - 001	temperature level 1
9 (SCFE)	EACB1 EXT 9 - 001	temperature level 2
10 (SCFE)	EACB1 EXT 10 - 001	antenna support
11 (SCFE)	EACB1 EXT 11 - 001	battery
12 (SCFE)	EACB1 EXT 12 - 001	fault in temperature control (BHPS faulty)
13 (SCFE)	EACB2 EXT 13 - 001	antenna support
14 (SCFE)	EACB2 EXT 14 - 001	antenna support

Alarm Pin Nr	Message Appearing on the BTS Terminal	Assignment (Example)
15 (SCFE)	EACB2 EXT 15 - 001	failure of door alarm
16 (SCFE)	EACB2 EXT 16 - 001	inverter

Table 8: Mapping of Alarm Numbers to Messages on the BTS Terminal

Perform For Each Alarm

1. For each external alarm circuit wired (see DDF map), proceed as follows:

NOTICE

Only if the alarms have been connected to a terminal block that is already present on site (where no cable + cross-connect assembly has been fitted at the factory)

2. At the distribution frame, on the terminal block, open one of the external alarm circuits by inserting a disconnecting plug or removing the shunt.
See *Site Specific Information (Section 1.2.2)* .

3. On the BTS Terminal, check that the appropriate alarm message is displayed. See table *8* .

4. Remove the disconnecting plug or reconnect the shunt at the alarm pin.

5. Check that the alarm message is cleared.

2.9 Check the Antenna VSWR

2.9.1 Measure the BCCH Output Power Under Load

Before transmitting on the antenna check that transmission is allowed at the nominal frequency, otherwise ascertain that the test channel specified by the customer has been assigned (action performed in chapter 4).

Stop BCCH Transmission

1. In BTS Terminal Main window:
   Commands ⇒ ***SBL Management***
   “SBL Management” window opens.
2. Select ‘BTS TEL’ and click [Disable].
   “WTC Parameter” window opens.
3. In ‘WTC Selection’ field, select: ‘0’ and click [Execute]
   “BTS SBL Disable Request” report message appears.
4. Check in "Disable SBL Report" that the SBL is "OPR".
5. BTS Terminal Main window:
   Commands ⇒ ***SBL Management***.
   “SBL Management” window opens.
6. Select ‘FUx’ (supporting BCCH) and click [Restart]
   “BTS SBL Restart Request” report message appears.
7. Check in "Restart SBL Report" that the SBL is "IT".

Connect the Power Meter and the Loads

8. Connect the power meter to the combiner output and connect a 50W load to the power meter output.

Restart BCCH Transmission

9. BTS Terminal Main window:
   Commands ⇒ ***SBL Management***
   “SBL Management” window opens.
10. Select ‘BTS TEL’ and click [Init].
    “BTS TEL SBL Init Request” report message appears.
11. Check in "Init SBL Report" that the SBL is "IT".

Compare the Values

1. Record the reading (dBm) displayed on the power meter (call this value **M**).
   Check that **M** >= 24 dBm, if not, change the attenuation value (BSTXPWRMAX parameter) at the OMC-R so that the value is not less than (-15).
   Ask the OMC-R for the BSTXPWRMAX (loss) value
2. Calculate **P**, the value according to the loss applied at the OMC-R:
   P = M + | BSTXPWRMAX |

NOTICE

The "BS TXPWR MAX" parameter is negative or zero. In the formula, the absolute value (positive) must be used.

3. Compare the calculated value with the expected value, checking that **P** is within the required limits.
   See tables below.

Transmitter Type	Combiner	Combiner Output Power, dBm
TXGM	CRBG or FRBG	40.0 ≤ P ≤ 43.7
TXGH	CRBG or FRBG	42.5 ≤ P ≤ 46.2
TXGM	CRBG or FRBG	40.0 ≤ P ≤ 43.45
TXGM	CRBG + CREG or FRBG + FREG	39.8 ≤ P ≤ 42.95
TXGH	CRBG or FRBG	42.5 ≤ P ≤ 45.95

Table 9: Power Limits, BTS G2 Standard Indoor and Outdoor

Transmitter Type	Combiner	Combiner Output Power, dBm
TXGM	WB2G	38.0 ≤ P ≤ 42.0

Table 10: Power Limits, BTS G2 Mini Indoor and Outdoor

Transmitter Type	TXGM	TXGM	TXGH
Combiner	CRBG or FRBG	CRBG + CREG or FRBG + FREG	CRBG or FRBG
Power	42 +/- 2dBm	41.5 +/- 2dBm	44.5 +/- 2dBm

Table 11: Typical Power Values, BTS G2 Standard Indoor and Outdoor

Transmitter Type	TXGL	TXGM	TXGH
Combiner DUPG	36.6 +/- 2.5dBm	40.6 +/- 2.5dBm	42.8 +/- 2.5 dBm

Table 12: Typical Power Values, BTS G2 3x2 Outdoor

Transmitter Type	TXGM
Combiner WB2G	40 +/- 2dBm

Table 13: Typical Power Values, BTS G2 Mini Indoor and Outdoor

2.9.2 Check the VSWR Value

2.9.2.1 Measure the VSWR

ATTENTION

Measure the VSWR across the load if antennas are not available.

1. Have the attenuation value (BSTXPWRMAX parameter) changed at the OMC-R so that the value is not less than (-10).
2. Measure VSWR value.
3. Check that the VSWR is ≤ 1.2.

Measure the VSWR1

4. Measure the VSWR (VSWR1 value) of the antenna at the combiner output.
5. Have the attenuation value (BSTXPWRMAX parameter) changed at the OMC-R so that the value is not less than (-10).

Stop BCCH Transmission

6. Disable **BTS_TEL1**
   Restart **FUx**
   Check that the BTS does not transmit.
   SBL **BTS_TEL** is OPR.
   SBL **FUx** is IT.

Connect the Power Meter

7. Disconnect the load and instead connect the antenna to the power meter output.

Restart BCCH Transmission

8. Init **BTS_TEL1**
   Wait until **BTS_TEL** is IT
   Red strip (displayed on the CU transmitting the BCCH) disappears.

Measure the VSWR

9. Measure the VSWR1 value.
   Check that VSWR1 is ≤ 1,3

2.9.2.2 Case VSWR > 3: Measure the VSWR at the Transmit Link Output (VSWR2 Value)

ATTENTION

Apply this only if the VSWR at the combiner output is greater than 1.3.

Stop BCCH Transmission

1. Disable **BTS_TEL1**.
   Restart **FUx**
   Check that the BTS does not transmit.
   SBL **BTS_TEL** is OPR.
   SBL **FUx** is IT.

Connect the Power Meter on the Load

2. Connect a power meter, then a 50W load to the transmit link output (before the duplexer or feeder).

Restart BCCH Transmission

3. Init **BTS_TEL1**
   Wait until **BTS_TEL** is IT
   Wait for the red strip to disappear on the CU transmitting the BCCH.
4. Measure the VSWR2 value.
5. Analyze the rezults, see table below.

Value	Sanction	Action
VSWR2 >1.2	Fault in equipment supplied by Alcatel	Check the tightness of the connectors Check the SBL status
VSWR2 ≤ 1.2 and **VSWR1 ≤ 1.5**	Fault of the antenna or duplexer (when present)	Set the combiner's VSWR switch to 1.9 Inform the operator that the VSWR is within a critical range.
VSWR2 ≤ 1.2 and **VSWR1 > 1.5**	Fault of the antenna or duplexer (when present)	Report the high value reading to the Site Manager.

Table 14: VSWR Limits

2.9.2.3 Restore the BTS to the Initial Configuration

Stop BCCH Transmission

1. Disable **BTS_TEL1**.
   Restart **FUx**
   Check that the BTS does not transmit.
   SBL **BTS_TEL** is OPR.
   SBL **FUx** is IT.

Disconnect the Power Meter

2. Disconnect the power meter and connect the antenna cable to the combiner output.
   If necessary (VSWR2 measurement taken), disconnect the load and reconnect the link to the duplexer or feeder.

Start BCCH Transmission

3. Init **BTS_TEL1**
   Wait until SBL **BTS_TEL** is IT.
   Wait for the red strip to disappear on the CU transmitting the BCCH, meaning the CU is transmitting.

2.9.2.4 Option: Restore the Initial BTS Frequencies (if Changed), Attenuation and Frequency Hopping

At the OMC-R

1. Ask the OMC-R to restore the allocation of the radio channels:
   - Change the frequency of the CUs, reassign the initial frequencies
   - Restore adjacent cell transmissions using the test frequency.
2. Restore the attenuation.
   Ask the OMC-R to return the BSTXPWRMAX parameter to its normal setting.
3. Ask the OMC-R to restore frequency hopping (if changed).

2.10 Radio Call Tests

Identify the Signalling

1. Using the BTS Terminal, for each FU in BTS Terminal Main window:
   Show ⇒ ***Logical Configuration*** ⇒ ***Radio Channel Configuration***
2. Check the radio channels assigned as signalling links:
   B = FCCH + SCH + BCCH + CCCH + SDCCH/4 + SACCH/4 and S = SDCCH/8 + SACCH/8
   Other time slots are assigned to traffic channels TCH.
3. Call the OMC-R to get the LAC and CI values.

Start the Transmission

4. Unlock the cell under test:
   Init **BTS_TEL1** and wait for the successful init report.

Start the Test Mobile

5. Insert the SIM card in the test mobile and power up the mobile.
6. Start the mobile trace function using the relevant MDT document.

Make the Calls

7. Check the handling of radio calls on time slots of each TRE:
   - Make radio calls on a Time slot (TCH) of each FU.
   - Make one incoming call on each FU from a fixed station (have someone call you). Check speech quality in both directions (subjectively).
   - Make one outgoing call on each FU to a fixed station. Check speech quality in both directions (subjectively).
   - Make calls to the voice mailbox for all the remaining Time slots.

For Each Call

8. Check:

- on the trace mobile that the call is handled by this BTS
- the cell number (hexadecimal)
- the BCCH frequency used
- the radio resource used: radio channel (ARFCN)
- the time slot (TN)

2.11 Preparing for Network Integration and Finishing Commissionning

Preparing for Network Integration

1. Check that the status of the modules in the BTS is "IT" using BTS Terminal main window:
Monitor ⇒ ***BTS Modules***

2. Power down the CUs and FUs by using:
Disable **RA1**
Wait for the "Disable SBL Report" and check that the SBL is "OPR".

3. Leave the BTS powered up.

Finishing the Commissioning Procedure

1. Leave the diskettes of the installed software on site.

2. Let the site tidy.

3. Close the site and hand the keys to the keyholder.

4. Return the completed forms and the inventory files relating to the operation to base.

2.12 Workaround - Disable the use of the Additional Far End Alarm Bits

Disable the use of the additional Far End Alarm bits (F bits)

Purpose To disable the use of additional Far End Alarm bits (F bits) in the transmission settings of the BTS.

Procedure

1. On the BTS terminal open the “Board configuration” window:
   Transmission ⇒ Board Configuration
   See Figure below

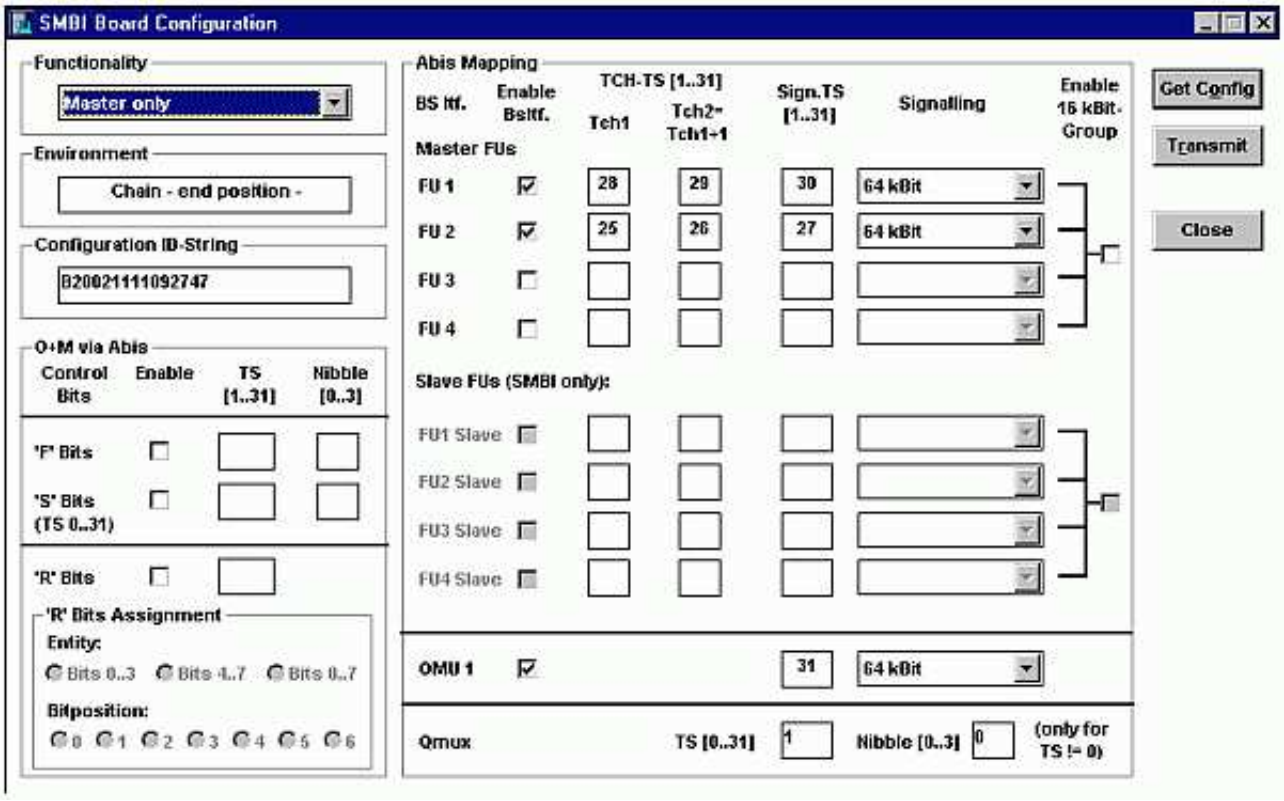


Figure 14: SMBI Board Configuration Window

2. Click [Get Config].
3. Check that the use of F bits is disabled (not checked) in ’O+M via Abis’ block in the left side, otherwise uncheck the corresponding check box.
4. Click [Transmit] if modifications were done.
5. Click [Cancel].