SIEMENS

Installation Test

Base Transceiver Station Equipment

ITMN: BTSE BS11 DRAFT

A30808-X3247-B349-1-7630

CAUTION

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Important Notice on Product Safety

Elevated voltages are inevitably present at specific points in this electrical equipment. Some of the parts can also have elevated operating temperatures.

Non-observance of these conditions and the safety instructions can result in personal injury or in property damage.

Therefore only trained and qualified personnel may install and maintain the system.

The system complies with the standard EN 60950. All equipment connected has to comply with the applicable safety standards.

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Issues

Change indications (Ind.):

N = new; G = modified; 0 = deleted;

This document consists of a total of Pages

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1 BS11 Installation Test

1.1 Introduction

1.1.1 Aims of Installation and Commissioning

The installation and commissioning of a network element followed by unit acceptance is proof of:

- Correct, complete delivery according to network planning and the customer order.
- Correct mechanical and electrical installation according to the installation documents.
- The functional ability of the the supplied HW
  (correct functioning of the NEs at an interface in relation to other network elements)

It is assumed that:

The commissioning tests are concentrated on the function of the HW. This limits the commisioning test to simply a function test.

This is according to the requirements for modern communication systems regarding self-tests, and a quick and economic commissioning procedure. As the function test is based on self-test routines a high degree of reliability is achieved.

1.1.2 Test Strategy

The commissioning tests are based on the production end-test which is carried out for each BTSE in the customer configuration.
The production end-tests are documented in a report which is included in the BTS delivery, and attached to the site-specific documentation.

The commissioning and unit acceptance test can therefore be limited to a simple function test.
This checks the above-mentioned aims and can also check whether damage has occured during transport.

Any further tests or measurements must only be carried out if suspicion of a fault is proved during the function test.

1.1.3 Using the ITMN

1.1.3.1 Required knowledge

Only trained personnel should carry out the installation and installation tests.

1.1.3.2 Test Equipment

The test equipment and tools required for the tests are described in the corresponding chapters.

1.1.3.3 Procedure in the Event of Faults

If faults occur in on-line operation they should be localized and cleared in accordance with the instructions in the User Manual (UMN).

1.1.3.4 Procedure in the Event of Serious Faults

Serious faults are those which are not dealt with in the UMN. First the specialist in the installation team should try to clear the fault. If the installation technician is not qualified to eliminate serious faults, a fault report must be filled out, providing the following information in detail:

– description of the test step attempted
– description of the system response
– description of any system activities taking place at the same time, e.g. work done by other testers during modifications to hardware or software

The fault report must be sent to the Technical Assistance Center (TAC).

1.1.3.5 Dealing with Defective BTSE

If a BTSE should prove to be defective, it should be sent in appropriate packing to the repair center with the following information:

– Name and code number of the BTSE
– Description of the fault

1.1.3.6 Installation Test Sequence

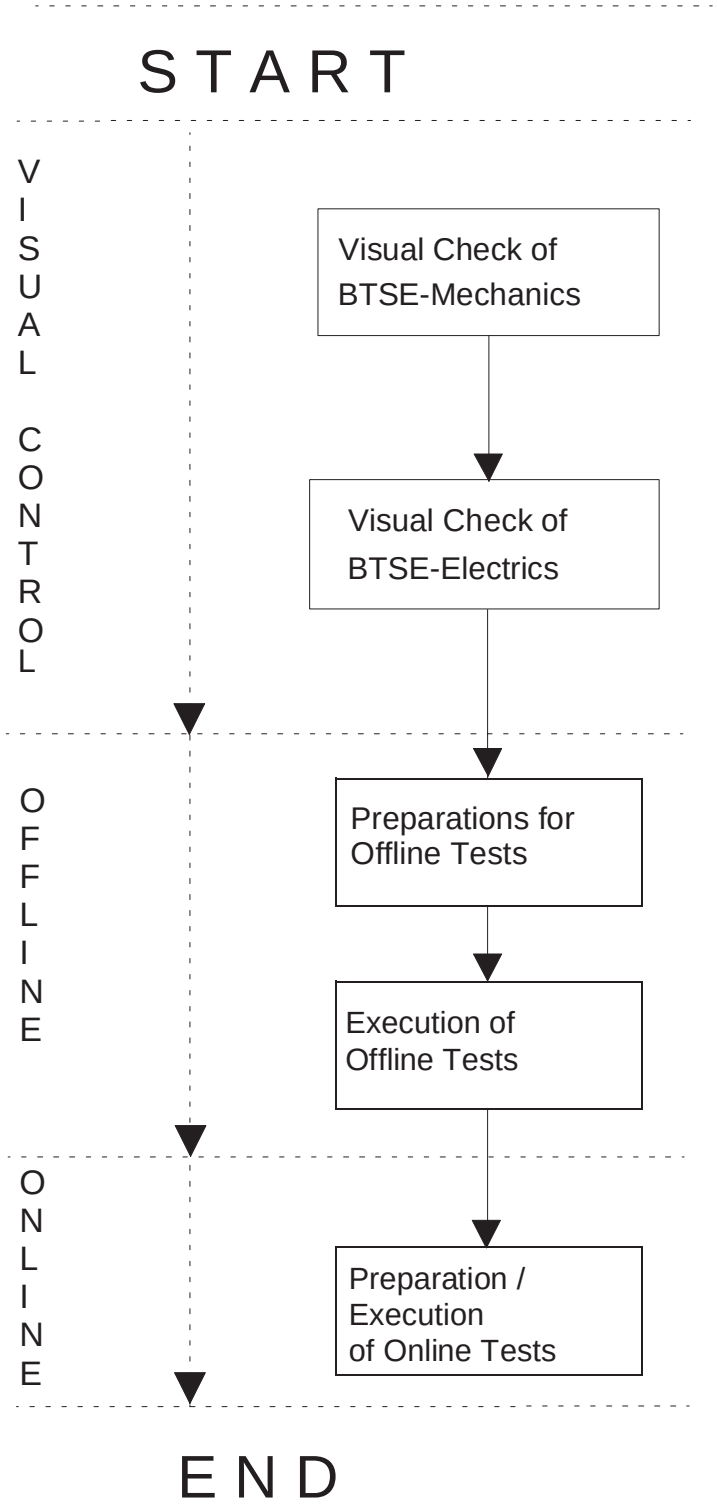


Fig. 1.1.1 Installation Test Sequence

1.1.4 Safety Instructions

1.1.4.1 System Voltages

The BTSE requires a power supply voltage from 83 Vac to 265 Vac with frequency from 45 Hz to 65 Hz.

1.1.4.2 Changing Fuses

Fuses may only be changed by operater. Only authorized fuses as given in the manual may be used. Fuses are to be changed as described in this manual.

1.1.4.3 Grounding of Modules / Racks

The BTSE must be plugged in correctly to ground it before power is switched on. Ground connections between racks must be plugged in correctly.

1.1.4.4 CE Declaration of Conformity

The CE declaration of conformity for the product will be fulfilled if the setup and cabling is undertaken in accordance with the specification in the manual and the documentation listed there, such as mounting instructions, cable lists etc.Where necessary, account should be taken of project-specific documentation.

Deviations from the specifications or independent changes during setup, such as use of cable types with lower screening values, for example, can lead to the CE requirements being violatad. In such cases the CE declaration of conformity is invalidated and the responsibility passes to the person who has caused the deviations.

1.2 Visual Inspection of BTSE mechanics

All of the visual checks of the BTSE installation mechanical part are listed below.

1.2.1 BS - 11 i/900.1

- Check that the BTSE has been fastened to the wall or pole in compliance with the safety conditions (refer to Micro BTS-IS para. 2.1). In particular, make sure that the wall or pole is capable of supporting the weight of the BTSE and the stresses due to wind load.
- Check that the BTSE code is correct: it must be 134-1791/01.
- Check that the solar shield is the correct color and that it has been correctly mounted.
- Where installation of the tilting mechanism is foreseen, check that the inclination is correct.
- Check that the antenna panel has been correctly mounted.
- Check that all cables necessary for operation are present and that they have been passed through the raceways.
- Check that the raceways for cable passage have been correctly positioned and fastened.

– Check that the connector panel closing cover with relative wrench is present.

1.2.2 BS - 11 e/900.1

– Check that the BTSE has been fastened to the wall or pole in compliance with the safety conditions (refer the IMN). In particular, make sure that the wall or pole is capable of supporting the weight of the BTSE and the stresses due to wind load.
– Check that the BTSE code is correct: it must be 134-1791/02.
– Check that the solar shield is the correct color and that it has been correctly mounted.
– Check that the dummy panel has been correctly mounted.
– Check that all cables necessary for operation are present and that they have been passed through the raceways.
– Check that the raceways for cable passage have been correctly positioned and fastened.
– Check that the antenna (external) has been correctly installed. Where installation of the tilting mechanism is foreseen, check that the inclination is correct.
– Check that the connector panel closing cover with relative wrench is present.

1.3 Visual Inspection of BTSE Electric Installation

All of the visual checks of the BTSE installation electrical part are listed below.

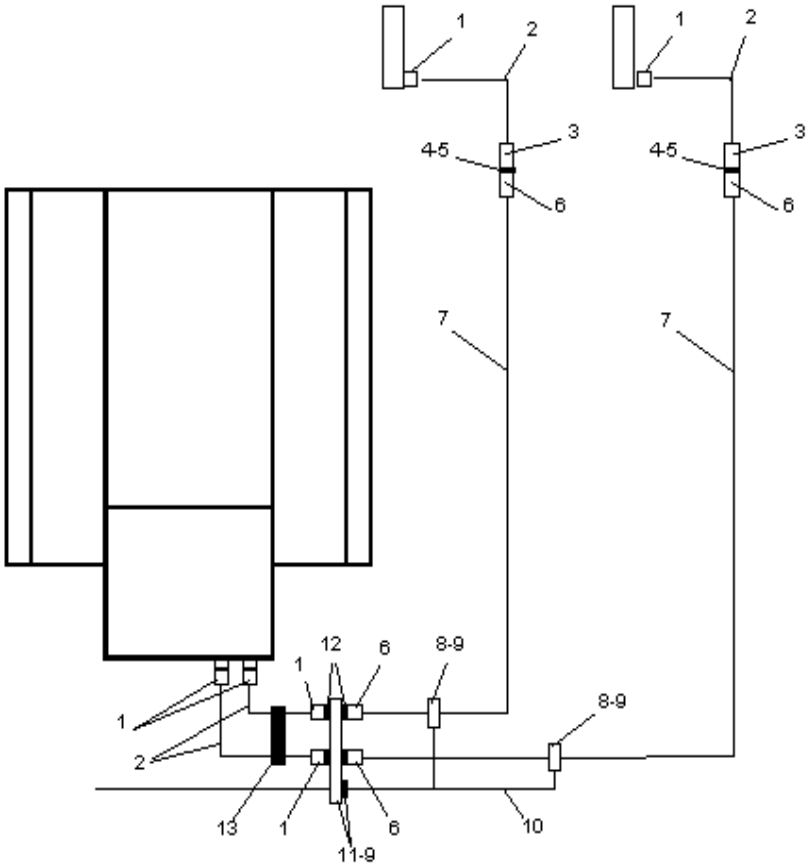
1.3.1 BS - 11 i/900.1

Open the connector panel cover and check that the following cables are present and correctly connected:

– power supply
– PCM
– RF

1.3.2 BS - 11 e/900.1

– Carry out the checks indicated in section 5.1.
– Check that the antenna cable has been correctly connected (Fig. 5.1.)
– Check that the antenna cable has been grounded at the top, in the middle and at the bottom.
– Check that the coaxial lightening discharges are present on both antenna cables.
– Check the grounding of the cable guiding-slit plate when present.
– Check that the antenna is correctly positioned and has the exact tilting value.



1 Coaxial connector mole type N N15015CA N-P/N 24504000018
2 Coaxial cable RT 5020
3 Coaxial connector female type N N15022C4 G-P/N 24504000025
4 Self-agglomerative Rubber tae P/N 20750000206
5 Isolation tape PVC P/N 2075000031
6 Coaxial connector Male type N for cable P/N 24504003077
7 Coaxial cable 1/2" P/N 22580000175
8 Grounding kit for 1/2" cable P/N 2259000086
9 Spade Pug for 6 mm cable P/N 2600440080
10 Ground cable 6 mm P/N 22271215152
11 Cable pass Plate with ground kit P/N 94287275
12 RF Oervoltage Protection Suhner 3400.17.0038 P/N 6047000010
13 Tolson neck P/N 20710000538

Fig. 1.3.1 Antenna Cabling (example)

1.3.3 Technical Data

Technical Data are listed in Tab. 1.1

OBJECT	BS-11 i/900.1	BS-11 e/900.1
Weight	~ 23 kg	~ 23 kg
Volume	0,5x0,45x0,13 (mm)	0,5x0,45x0,13 (mm)
Input AC Power	83 ÷ 265 Vac	83 ÷ 265 Vac
Watts	80W	250W
Operating temperature	-45° to +45°C	-45° to +45°C
Frequency uplink	880-915 MHz	880-915 MHz
Frequency downlink	925-960 MHz	925-960 MHz
TRX_max per rack	1	1
TRX_max per microcell	1	1
Antenna	Internal	External
TX Power	M1, M2, M3 and 2W GSM Power Classes	M1, M2, M3 and 2W GSM Power Classes

Tab. 1.3.1 Technical Data: BS-11i and BS-11e

1.3.4 Power Supply Check

Verify the presence of the power supply voltage and that its value is 230 VAC – 50 Hz or 110 VAC – 60 Hz.

1.3.5 Grounding Check

Measure the ground resistance value between the grounding screw placed on the BTSE and the grounding system ground plate. The resistance value must be less than or equal to 5W.

1.3.6 PCM Check

Verify the presence of the PCM flux and, if necessary, remove the line terminators or disconnecting switches present in the junction box.

1.3.7 RF Cables Check (only in case of external antenna)

Verify that the antenna and cable VSWR is less than 1.5.

1.3.8 Fuses

Four fuses are mounted in the connection panel. Their functions are listed in Tab. 1.2.

FUSE	TYPE	FUNCTION
F1	10 A delayed	Protects TRX0 power supply
F2	10 A delayed	Protects TRX0 power supply
F3	10 A delayed	Protects TRX1 power supply
F4	10 A delayed	Protects TRX1 power supply

Tab. 1.2 Fuses

1.4 Abis Interface

The BTSE is pre-set with 120 Ohm impedance at the factory.

It is possible, however, to change the impedance value and move it to 75 Ohm.

Proceed as follows to change the impedance:

– Open the connector panel cover, using the appropriate wrench supplied, to gain access to the panel.
– Unscrew (Fig. 1.1.) the 4 screws (1) and remove the cover (2), thus gaining access to the protection circuit.
– Unscrew the screw (1, Fig. 1.2.).
– Lift up the protection circuit using the two handles (2, Fig. 1.2.).
– Set the switches on the mini dip-switch SW3 Fig. 1.3.) as indicated in Tab. 1.1. (“75 Ohm impedance” column).

The jumpers for the connection with 75 Ohm impedance are placed in the inner of the entry cables cover.

DIP-SWITCH	75 Ohm IMPEDANCE	120 Ohm IMPEDANCE
1	C	O
2	C	O
3	C	O
4	C	O
5	O	C
6	O	C
7	O	C
8	O	C

Tab. 1.1 SW3 dip-switch configuration

Carry out the connections indicated in Fig. 1.2. on the T0B1 ÷ TB04 terminal board.

TERMINAL BOARD	75 Ohm IMPEDANCE	120 Ohm IMPEDANCE
TB01	2-3	NO JUMPER
TB02	2-3	NO JUMPER
TB03	2-3	NO JUMPER
TB04	2-3	NO JUMPER

Tab. 1.2 TB01 ÷ TB04 configuration

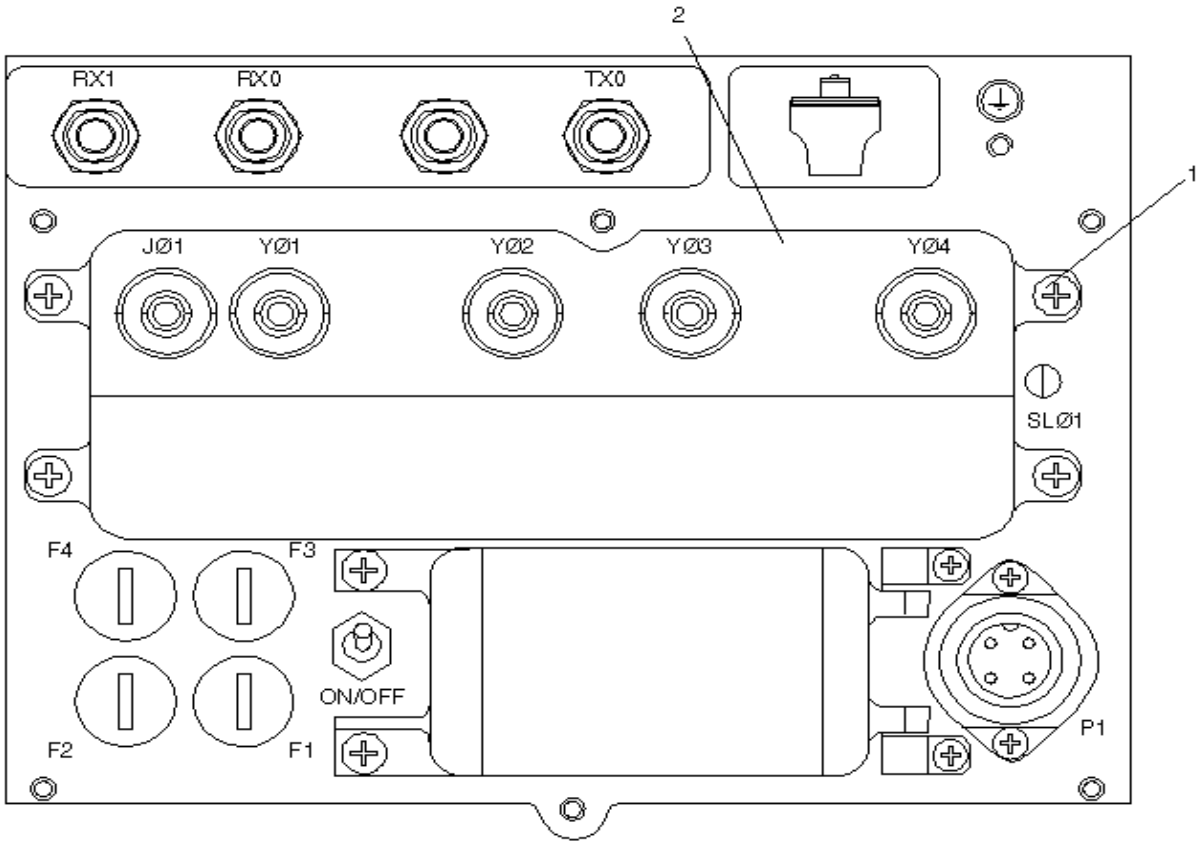
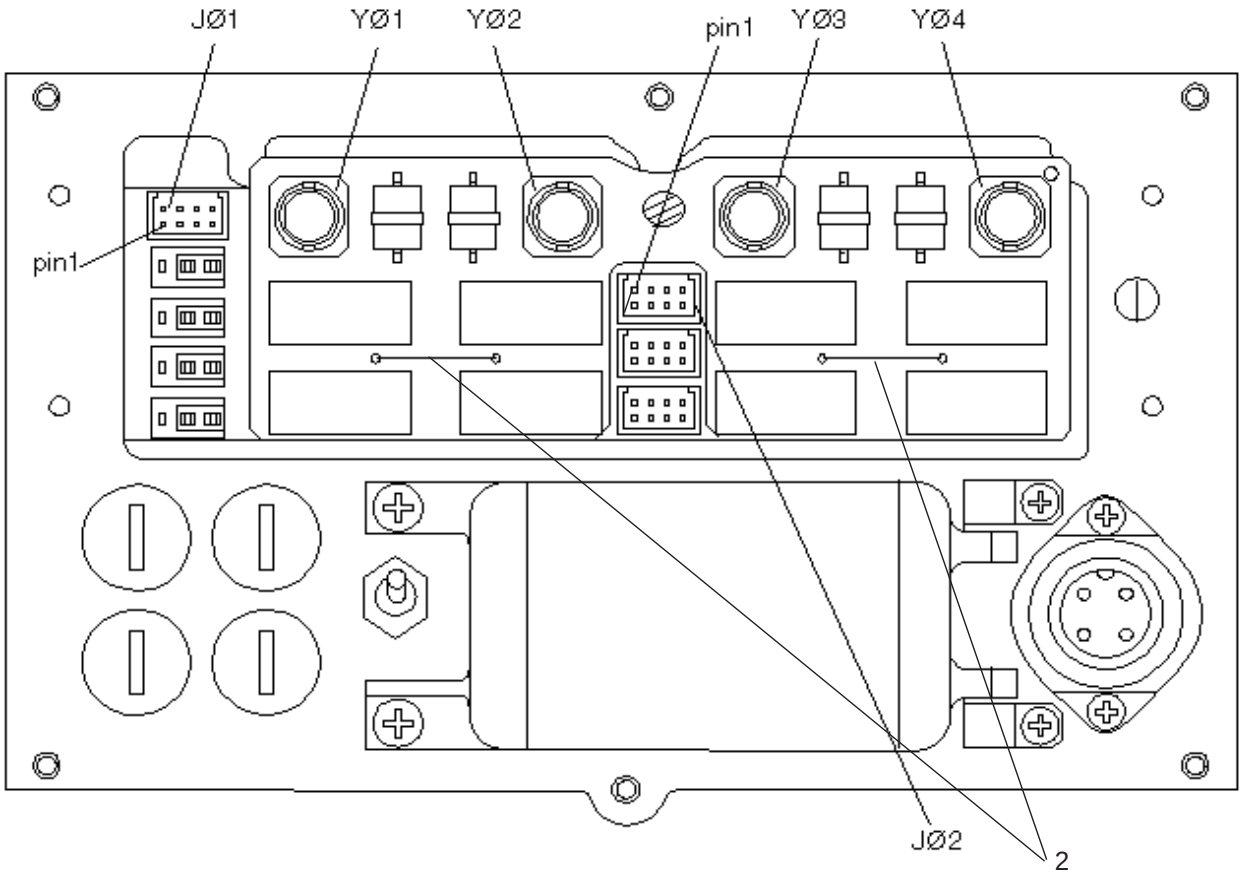
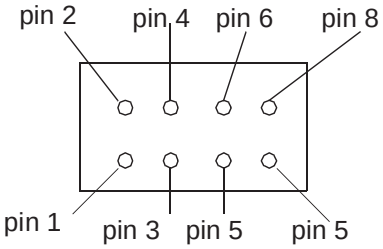


Fig. 1.1 Connection panel (for external antenna)





pinning of J01 and J02

Fig. 1.2 Protection circuit

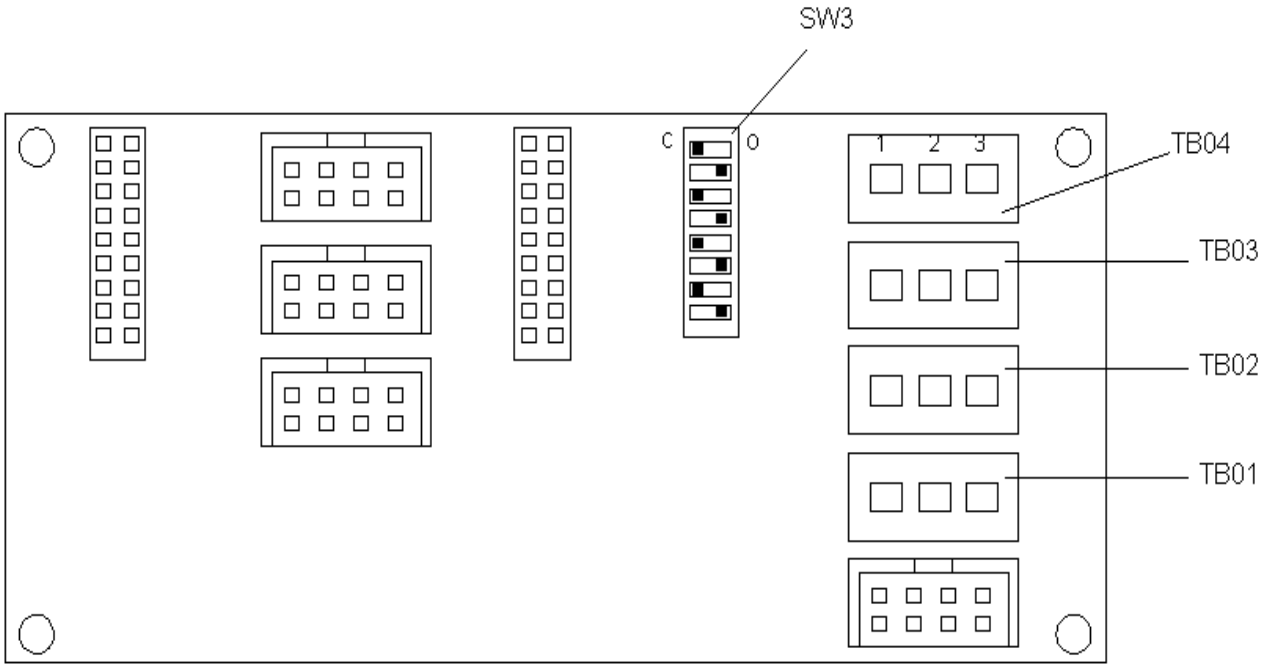


Fig. 1.4.3 SW3 /The black square stands for toggle) and TB01 ÷ TB04

– Set the protection circuit in its slot making sure that the plastic handles do not go between the connector pins.
– Place the protection circuit cover in position and tighten the 4 fastening screws.
– Close the connector panel cover with the appropriate wrench.

1.5 Preparation for Offline Tests

The purpose of this chapter is to execute all commissioning activities for checking the delivery quality and quantity of the BTSE on site.
The following steps have to be executed to start the system:

1. Obtain the recommended test and test equipment

2. Preparation of the test and test equipment

3. BTSE power on

4.Start of LMT

5. Download of the Safety SW

6. Creation of HW related MO

7. Set attributes for BTSE

8. Offline tests

Finally all documents must be filled in and all activities must be confirmed by the customer.

1.5.1 Recommended Test Equipment and Tools

Several devices, instruments, accessories and utensils have to be provided and prepared for commisioning on site.

1.5.1.1 Test equipment

The equipment listed below has to be present for call simulation and verification of correct operation.

SBS Abis Simulator

- HW:
  - Portable PC min.80386DX, 16Bit AT, 4 MByte RAM
  - 120MByte HD
  - VGA/SVGA 640x480 Monitor
  - Mouse
  - 2x serial IF
  - 1x parallel IF, 1hour Battery Time
  - Full-Size Expansion Slot for MA-10 Card

- SW: MA-10 Base Package, Abis application
- Cable: 120Ω-MA10-Card<->Abis
- 75Ω-MA10-Card<->Abis

Local Maintenance Terminal LMT

- HW:
  - Portable PC min.80386DX, 16Bit AT, 4 MByte RAM
  - 120MByte HD
  - VGA/SVGA 640x480 Monitor
  - Mouse
  - 2x serial IF
  - 1x parallel IF, 1hour Battery Time
  - Full-Size Expansion Slot for V.11-IF->EICON-CARD:X.21-Level1/LAPB-Level2
- SW:
  - MS-DOS-5.0 or higher
  - OSI-Gateway-V3R1
  - LMT Version:see actual SW Release Note
  - Virus Scanner e.g. McAFEE-V117
- Cable: 15-PIN (NE) - 26PIN (LMT)

Spectrum Analyser HP 8594A/E

- HW:
  - HP8594A/E
  - Option:004/010/021/101/102/105
- SW:
  - GSM: HP 85715B Personality Card
  - DCS: HP 85722B Personality Card
- Cable:
  - BNC_male-SMA_male: e.g.RG58
- Adapter:
  - N_male-BNC_female

MS_BS RF Coupling BOX

- HW:
  - MS_BS-Coupling-Box (RF)
- Cable:
  - BNC_male-BNC_male (MS)
  - 3x:7/16_male-N_male (RX/TX)
- Adapter:
  - 7/16_male-N_male
- Tool:

- Absorber 20dB/25Watt
- 50 Ω Termination N_male

Mobile Station MS

- HW:
  - GSM-P1
  - GSM-S1 +CarKit
    GSM-S3 +CarKit
  - DCS-PT-11+CarKit
    DCS Mercury one-to-one plus Car Kit
- SW:
  - Tracer SW-P1
  - Test-SIM
  - Test Plug-In SIM

Multimeter

- HW:
  - SIEMENS Multimeter

1.5.1.2 Tools

Special tools for commissioning activities on site are listed below.

IC Extraction Tools

- IC-Extraction Tool for DIL-EPROM
  -IC-Extraction Tool for PLCC

Antistatic Set

for ESD Module Handling

SMA Tool

for Semi-rigid Cable Connectors

SMC Tool

for Semi-rigid Cable Connectors

Semi Rigid Bending Tool

for Semi rigid cable connection

TDMA Measuring Tools (Tests with HP 8594A/E) and Trigger Adapter

- HW:
  - 2 Measuring cable with BNC-Plugs male (sufficient length)
  - Adapter SMC male - BNC female
  - Trigger adapter for TAD at MCLK or LI
    (50-pins AMP-Plug with 2 x BNC-Plug female)
  - 2 Adapter N-Connector male - BNC female

- HP 8590 series spectrum analyser operating manual
- User´s Guide HP85715B GSM900 Transmitter Measurement Personality
- User´s Guide HP 85722B DCS1800 Transmitter Measurement Personality

1.5.2 Preparation and Presetting of Test Equipment

1.5.2.1 Test equipment

For minimum test time and correct test results the devices have to be prepared on site.

Spectrum Analyzer

- HW: the HP8594A/E needs a warm-up time of 20 minutes depending on the available options.

  The display shows "OVEN COLD" during the heating phase. Afterwards a CALIBRATION has to be carried out for defined measurement execution.
- SW: The SW of GSM/DCS card has to be installed in advance.
- Cable: For special tests, e.g."Power versus Time" a BNC loop at the backplane has to be provided:
  GATE-OUTPUT(TTL) to EXTERN TRIGGER INPUT
  The cable from CCLK(TAD) to GATE-INPUT(TTL)
  for TDMA-FRAME Trigger has to be connected.

See analyzer operating manual for more detailed information.

1.5.2.2 Software (SW)

For all tests only released SW (corresponding to the BTSE HW/SW release) is allowed to be running on the test equipment (TE).

1.5.2.3 Boot Software/Firmware (SW/FW)

For all tests only the released SW is allowed to be running on the BTSE corresponding to the BTSE HW/SW/FW release/revision.

1.5.3 Connections

– Open the connector panel cover, using the appropriate wrench supplied, to gain access to the panel itself (Fig. 1.1.).
– Unscrew the 4 screws (1) and remove the cover (2), to gain access to connector J02 (Fig. 1.2.).

1.5.4 BTSE Power ON

1.5.4.1 Power On

Power the BTSE by setting the ON/OFF switch to ON.

NOTE: After having disconnected the power from the BTSE, it is necessary to wait a couple of seconds before powering it.

1.5.4.2 LED Indication

The SL01 LED on the connector panel must be illuminated with green light. This means that the BTSE is connected to the network.

2 Software Download and Activation

1. Switch on power of BS11
2. Activate LMT and Login as Administrator and Enter the PASSWORD (default=admin)
3. a. MBTS Phase 1: Warm up
   b. MBTS Phase 2: Normal (after a few minutes)
4. Download of safety SW
   Software -->Download-->Browse:
   (the Download window appears)
   select the file btsbmcXX.swi
   (XX=version numbe)r
   -->ok-->start Download
   wait about 15'
   - after Download:--> Cancel (100% readed)
   - after 1': LMT shows:

     MBTS Phase: 1 Load SMU SAFETY
     wait about 5'
5. Creation of the objects:
   LMT-window shows MBTS Phase: 2 wait Min Config
   - LI-->Create Obj: select desired properties-->Send-->o.k.
   - GPSU-->Create Obj-->send-->o.k.
   - ALCO-->Create Obj-->send-->o.k.
   - CCLK-->Create Obj-->send-->o.k.
   - BTSU-->SET Attributes: select desired properties-->send-->o.k.-->cancel
   - BBSIG 0-->Create Obj-->use default properties-->send-->o.k.
   - PA_0-->Create Obj-->select desired properties-->send-->o.k.
6. Configuration

   -->Get Attribute-->E.S.N: if error message appears-->go:step 7, if not: step 9

   -->Get Attribute-->CALIBRATION: if error message appears-->go:step XY, if not: step YY
7. Logoff-->Logon-->Factory-->E.S.N.: enter values according to the BS11 label

135	-	2044	/	02.	.	07
Code		Sequence Number		Edition Number		Version Number

+Serial-Number

-->send-->o.k.-->cancel

8. Configuration-->SET Attributes-->Calibration: enter for

   Chain 1: 0
   Chain 2: 0
   PLL Calibration: 1024
   Antenna Type: External or Internal
   -->send-->o.k.-->cancel

9. LMT window:
   MBTS phase: Load from BSC

   If the connection between BS11 and BSC already exists and the BTSU parameters are stored in the BSC (TEI...)
   an automatic download from BSC to BTSE is started
   if not: -->10

10. Download from LMT

    - Operator Access-->Logoff-->Logon-->Administrator:Password

    - Software-->Download-->Browse:

      -->select the desired SW-Load Header

    - o.k.-->start Download
    wait about 15’
    - after Download: Cancel (100% reached)
    after 1’: LMT shows:

      MBTS Phase: 1 Load SMU SAFETY
      wait about 5’

3 Execution of Offline Tests

3.1 RF and Function Tests

3.1.1 Purpose of the Abis Simulation on the MA-10 Card

The Mobile Radio Analyzer MA-10 is used for
offline functional tests on site.
A database download has to be done with the MA-10
after succesfull creation of HW related objects.

The DB download allows to execute two test procedures:

1. BERT test with MS loop.
2. Voice test with MA-10 loop.

3.1.2 Preparation of the Abis Simulation

The Abis Simulation contains a MA-10 Card with SW on disk and the application SW Abis Simulation Ext. SIEMENS. The SW requires a DOS computer with WINDOWS 3.X.

The MA-10 has to be installed and tested in advance,
according to the Installation Manual BN 3032/98.80(W&G).
In addition refer to the Operating Manual BN 3032/94.08(W&G)
of Abis Simulation Ext. SIEMENS.

The neccessary cable for the connetion to the BTSE Abis interface has to be provided.

The IMSI of TestSim, which will be used for the MS, has to be entered in "SAG.INI" -File (one of the ABIS SIMULATION EXT.SIEMENS files) in advance.

Note: See also additional information in the help menue of the simulator.

3.1.3 Connection of Test equipment (TE)

To achieve reliable measurement results the connections must be plugged correctly and faultless contact must be guaranteed.

The complete equipment has to be connected in the following order:

1.	Attenuator (20dB/25W)	to HYCOM/DUCOM/DUKIT(ANT)
2.	HYCOM/DUCOM/DUKIT (Test)	to RF-(Connection-)Box(Test)
3.	RF-Box(RXAMOD/RXAMCO)	to RXAMOD/RXAMCO (RFin)
4.	RXAMOD(RFout)	to RCAP(RX0-5)(with specific attenuation)
	RXAMCO (out)	to TPU (in)
5.	MS	to RF-Box(MS)
6.	MA-10 Card	to RCAP/OVPT-Abis

3.1.4 Check BTSE Phase

Before you start the Abis Simulation check the phase of the BTSE at the LMT. It must be in Phase three.

3.2 Start of Abis Simulation

1 Start MA-10 control

WINDOWS has to be started first before the MA-10 is started.
The start of Abis Simulation requires the start of MA-10 Control.
The HW and SW performs the necessary boot procedure automatically.

Click on the MA-10 Control icon
SIEMENSAbisSim
Application Start

The ABIS SIMULATION EXT SIEMENS Window appears.
SIEMENSAbisSim Phase x (Select from application field).

2 Load Test File

The released test sequence has to be loaded.

File
Load Test File...
<select File (bts_down.tes)>
OK

Wait a few seconds for the loading procedure to finish (the icons get some colours).
Choose released sequencefile .....tes.

3 Configuration MA-10

The additional Abis parameters have to be set.

Configuration
MA-10...
Line interface...
<select:
Clock: derived from signal
Impedance: terminated
CRC-4: on/off must be set as created in the BTSE>
OK

4 Configuration simulator

The current TestSim IMSI for the mobile station corresponding to the system standard GSM 900/DCS 1800 and the customer has to be choosen.

Only the TestSim IMSI that has been entered in the "SAG.INI" file can be choosen.

Configuration
Call Parameter...
<select IMSI and TCH type>
Apply
Close

Now the MA-10 is ready for the data base download procedure.

5 Configuration of the BTSE-type

The special BTSE parameters have to be set.

Configuration
BTS Equipment....
BTSE
< select: Network Type, No. of BTS and TRX>
Signalling
< select: Sign. channel type and BTSM as created in BTSE>
Apply
Close

6 Configuration of BCCH

The network codes have to be entered.

Configuration
BCCH Info...
LAC/CI
< Enter the corresponding network codes>
Apply
Close

7 Set site specific test parameter

Additionally parameter set for current site configuration will be performed.

Database
Edit
<select or enter the desired paramenters for:
BTS Side Manager, Power Control, Cells,.....>
OK

Now the Interactive Editor Window shows the available parameters which can be set depending on the configuration data.Select proper menues and parameter values

Typical Parameter which might be set (depending on the configuration):

Abis-Parameter:
1. BTSM_PCMSlot (set identically to configuration data (LMT))
2. BTSM_Tei (set identically to configuration data (LMT))

Um-Parameter:
3. Frequencies
4. NumBTS
5. NumTRX
6. BCCH_TRX
7. MsTxPowerMax
8.TXMaxPowerRed_BTS

Country/SIM-Parameter:
9. MobileCountryCode (see TestSim IMSI)
10. MobileNetworkCode (see TestSIM IMSI)
11. LocationAreaID

8 Start of Simulation

Test
Start

END

3.3 Database download

1 Start of Database download

Execution of database download.

Test
Start
OK

The MA-10 SW performs the boot and download procedure.
The Log-Output [xxx.sqz] window appears.
Check for correct parameter setting

2 Restart of Test Sequence

Start (Wait approximately 20 s)
OK
OK

The DB-Alignment window appears after about 20 seconds.
Afterwards the system information window will appear .
After the alignement procedure the SPA-LED at TPU and SPA-LED at BBSIG are flashing.

END

3.4 Call check with MA-10-Loop

This test provides a loop check via the MS.The MA-10 performs a MTC. The loop back can be heard with a delay of a few seconds after the connection to the MS has been established.

1 MA-10 Loop Configuration

Configuration
Measurement
select: Measurement mode = TCH Loop
- desired parameters

Apply
Close

2 Start Test

Test
Start

3 Stop Test

Test
Stop

END

3.5 Bit Error Rate (BERT) Test with MS-Loop

This test provides a BERT Test available on every equipped TRX and timeslot. The MA-10 performs a MTC.After establishment of the connection to the MS with the TestSim, the loop into the MS allows the decoding of sent messages.

1 **BERT**

Configuration
Measurement
select:
- Measurement mode = BERT MS Loop
- desired parameters

Apply
Close

2 **Start Test**

Test
Start

END

3.6 Settings at HP 8594A

Some additional RF-Measurements with the Spectrum Analyser (here HP 8594A) are useful to check the BTSE-Function.

Start the Abis-Simulation and check the SW-Card (Plug in Card, HP 85715B GSM 900 Measurements Personality Card or HP 85722 DCS 1800 Measurements Personality Card) before measurements are executed.

After the warm-up-phase of the spectrum analyser startthe self-calibration routine. Approximately 15 minutes later disappeares the "OVEN COLD" message from screen.

The following blocks show four tests (select from HP-Menu with Key or Soft-Keys):

1 Carrier Power

TRIG
EXTERNAL
MODE
DCS 1800/GSM Analyser
Physical Channel
Auto Function
Auto ARFCN
MODE
DCS 1800/GSM Analyser
Power
Carrier Power

Result: Mean TXRX Power in dBm.

2 P vs T Frame

TRIG
EXTERNAL
MODE
DCS 1800/GSM Analyser
Physical Channel
Auto Function
Auto ARFCN
MODE
DCS 1800/GSM Analyser
Power vs Time
P vs T Frame

Result: Limit Pass or Limit Fail

3 **P vs T Timeslot**

TRIG
EXTERNAL
MODE
DCS 1800/GSM Analyser
Physical Channel
Auto Function
Auto ARFCN
MODE
DCS 1800/GSM Analyser
Power vs Time
P vs T Timeslot

Result: Limit Pass or Limit Fail

4 **Output of spectrum switching transients**

TRIG
EXTERNAL
MODE
DCS 1800/GSM Analyser
Physical Channel
Auto Function
Auto ARFCN
MODE
DCS 1800/GSM Analyser
Out RF Spectrum
RF Spect Transient
Transient Swept

Result: Limit Pass or Limit Fail

For more details about RF-Measurements read HP User Guide.

END

3.7 RFI-Confirmation: Unit ATMN

All commissioning tasks on site for providing successful integration have to be confirmed in the ATMN:BTSE.

4 Appendix

4.1 Frequency/Channel Conversion Table

Frequency-Band		Quantity	Number
GSM:	935-960 890-915	=>124	001 ... 124
E-GSM:	925-960 880-915	=>174	975 ... 1023
DCS 1800:	1805-1880 1710-1785	=>374	512 ... 885
PCS 1900:	1930-1990 1850-1910	=>299	512 ... 810

Tab. 4.1 Frequency/Channel Conversion Table

4.1.1 GSM Table

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
1	890,20	935,20	41	898,20	943,20	81	906,20	951,20
2	890,40	935,40	42	898,40	943,40	82	906,40	951,40
3	890,60	935,60	43	898,60	943,60	83	906,60	951,60
4	890,80	935,80	44	898,80	943,80	84	906,80	951,80
5	891,00	936,00	45	899,00	944,00	85	907,00	952,00
6	891,20	936,20	46	899,20	944,20	86	907,20	952,20
7	891,40	936,40	47	899,40	944,40	87	907,40	952,40
8	891,60	936,60	48	899,60	944,60	88	907,60	952,60
9	891,80	936,80	49	899,80	944,80	89	907,80	952,80
10	892,00	937,00	50	900,00	945,00	90	908,00	953,00
11	892,20	937,20	51	900,20	945,20	91	908,20	953,20
12	892,40	937,40	52	900,40	945,40	92	908,40	953,40
13	892,60	937,60	53	900,60	945,60	93	908,60	953,60
14	892,80	937,80	54	900,80	945,80	94	908,80	953,80
15	893,00	938,00	55	901,00	946,00	95	909,00	954,00
16	893,20	938,20	56	901,20	946,20	96	909,20	954,20

Tab. 4.2 GSM Table

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
17	893,40	938,40	57	901,40	946,40	97	909,40	954,40
18	893,60	938,60	58	901,60	946,60	98	909,60	954,60
19	893,80	938,80	59	901,80	946,80	99	909,80	954,80
20	894,00	939,00	60	902,00	947,00	100	910,00	955,00
21	894,20	939,20	61	902,20	947,20	101	910,20	955,20
22	894,40	939,40	62	902,40	947,40	102	910,40	955,40
23	894,60	939,60	63	902,60	947,60	103	910,60	955,60
24	894,80	939,80	64	902,80	947,80	104	910,80	955,80
25	895,00	940,00	65	903,00	948,00	105	911,00	956,00
26	895,20	940,20	66	903,20	948,20	106	911,20	956,20
27	895,40	940,40	67	903,40	948,40	107	911,40	956,40
28	895,60	940,60	68	903,60	948,60	108	911,60	956,60
29	895,80	940,80	69	903,80	948,80	109	911,80	956,80
30	896,00	941,00	70	904,00	949,00	110	912,00	957,00
31	896,20	941,20	71	904,20	949,20	111	912,20	957,20
32	896,40	941,40	72	904,40	949,40	112	912,40	957,40
33	896,60	941,60	73	904,60	949,60	113	912,60	957,60
34	896,80	941,80	74	904,80	949,80	114	912,80	957,80
35	897,00	942,00	75	905,00	950,00	115	913,00	958,00
36	897,20	942,20	76	905,20	950,20	116	913,20	958,20
37	897,40	942,40	77	905,40	950,40	117	913,40	958,40
38	897,60	942,60	78	905,60	950,60	118	913,60	958,60
39	897,80	942,80	79	905,80	950,80	119	913,80	958,80
40	898,00	943,00	80	906,00	951,00	120	914,00	959,00
------	------	------	------	------	------	121	914,20	959,20
------	------	------	------	------	------	122	914,40	959,40
------	------	------	------	------	------	123	914,60	959,60
------	------	------	------	------	------	124	914,80	959,80

Tab. 4.2 GSM Table

4.1.2 E GSM Table

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink
975	880,20	925,20	1000	885,20	930,20
976	880,40	925,40	1001	885,40	930,40
977	880,60	925,60	1002	885,60	930,60
978	880,80	925,80	1003	885,80	930,80
979	881,00	926,00	1004	886,00	931,00
980	881,20	926,20	1005	886,20	931,20
981	881,40	926,40	1006	886,40	931,40
982	881,60	926,60	1007	886,60	931,60
983	881,80	926,80	1008	886,80	931,80
984	882,00	927,00	1009	887,00	932,00
985	882,20	927,20	1010	887,20	932,20
986	882,40	927,40	1011	887,40	932,40
987	882,60	927,60	1012	887,60	932,60
988	882,80	927,80	1013	887,80	932,80
989	883,00	928,00	1014	888,00	933,00
990	883,20	928,20	1015	888,20	933,20
991	883,40	928,40	1016	888,40	933,40
992	883,60	928,60	1017	888,60	933,60
993	883,80	928,80	1018	888,80	933,80
994	884,00	929,00	1019	889,00	934,00
995	884,20	929,20	1020	889,20	934,20
996	884,40	929,40	1021	889,40	934,40
997	884,60	929,60	1022	889,60	934,60
998	884,80	929,80	1023	889,80	934,80
999	885,00	930,00	-----	-----	-----

Tab. 4.3 E-GSM Table

4.1.3 DCS Table

4.1.3.1 DCS Table Part 1/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Down-link		Uplink	Down-link		Uplink	Down-link
512	1710,2	1805,2	549	1717,6	1812,6	586	1725	1820
513	1710,4	1805,4	550	1717,8	1812,8	587	1725,2	1820,2
514	1710,6	1805,6	551	1718	1813	588	1725,4	1820,4
515	1710,8	1805,8	552	1718,2	1813,2	589	1725,6	1820,6
516	1711	1806	553	1718,4	1813,4	590	1725,8	1820,8
517	1711,2	1806,2	554	1718,6	1813,6	591	1726	1821
518	1711,4	1806,4	555	1718,8	1813,8	592	1726,2	1821,2
519	1711,6	1806,6	556	1719	1814	593	1726,4	1821,4
520	1711,8	1806,8	557	1719,2	1814,2	594	1726,6	1821,6
521	1712	1807	558	1719,4	1814,4	595	1726,8	1821,8
522	1712,2	1807,2	559	1719,6	1814,6	596	1727	1822
523	1712,4	1807,4	560	1719,8	1814,8	597	1727,2	1822,2
524	1712,6	1807,6	561	1720	1815	598	1727,4	1822,4
525	1712,8	1807,8	562	1720,2	1815,2	599	1727,6	1822,6
526	1713	1808	563	1720,4	1815,4	600	1727,8	1822,8
527	1713,2	1808,2	564	1720,6	1815,6	601	1728	1823
528	1713,4	1808,4	565	1720,8	1815,8	602	1728,2	1823,2
529	1713,6	1808,6	566	1721	1816	603	1728,4	1823,4
530	1713,8	1808,8	567	1721,2	1816,2	604	1728,6	1823,6
531	1714	1809	568	1721,4	1816,4	605	1728,8	1823,8
532	1714,2	1809,2	569	1721,6	1816,6	606	1729	1824
533	1714,4	1809,4	570	1721,8	1816,8	607	1729,2	1824,2
534	1714,6	1809,6	571	1722	1817	608	1729,4	1824,4
535	1714,8	1809,8	572	1722,2	1817,2	609	1729,6	1824,6
536	1715	1810	573	1722,4	1817,4	610	1729,8	1824,8
537	1715,2	1810,2	574	1722,6	1817,6	611	1730	1825
538	1715,4	1810,4	575	1722,8	1817,8	612	1730,2	1825,2
539	1715,6	1810,6	576	1723	1818	613	1730,4	1825,4
540	1715,8	1810,8	577	1723,2	1818,2	614	1730,6	1825,6

Tab. 4.1.4 DCS Part 1/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Down-link		Uplink	Down-link		Uplink	Down-link
541	1716	1811	578	1723,4	1818,4	615	1730,8	1825,8
542	1716,2	1811,2	579	1723,6	1818,6	616	1731	1826
543	1716,4	1811,4	580	1723,8	1818,8	617	1731,2	1826,2
544	1716,6	1811,6	581	1724	1819	618	1731,4	1826,4
545	1716,8	1811,8	582	1724,2	1819,2	619	1731,6	1826,6
546	1717	1812	583	1724,4	1819,4	620	1731,8	1826,8
547	1717,2	1812,2	584	1724,6	1819,6	621	1732	1827
548	1717,4	1812,4	585	1724,8	1819,8	622	1732,2	1827,2

Tab. 4.1.4 DCS Part 1/3

4.1.3.2 DCS Table Part 2/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Down-link		Uplink	Down-link		Uplink	Down-link
623	1732,4	1827,4	660	1739,8	1834,8	697	1747,2	1842,2
624	1732,6	1827,6	661	1740	1835	698	1747,4	1842,4
625	1732,8	1827,8	662	1740,2	1835,2	699	1747,6	1842,6
626	1733	1828	663	1740,4	1835,4	700	1747,8	1842,8
627	1733,2	1828,2	664	1740,6	1835,6	701	1748	1843
628	1733,4	1828,4	665	1740,8	1835,8	702	1748,2	1843,2
629	1733,6	1828,6	666	1741	1836	703	1748,4	1843,4
630	1733,8	1828,8	667	1741,2	1836,2	704	1748,6	1843,6
631	1734	1829	668	1741,4	1836,4	705	1748,8	1843,8
632	1734,2	1829,2	669	1741,6	1836,6	706	1749	1844
633	1734,4	1829,4	670	1741,8	1836,8	707	1749,2	1844,2
634	1734,6	1829,6	671	1742	1837	708	1749,4	1844,4
635	1734,8	1829,8	672	1742,2	1837,2	709	1749,6	1844,6
636	1735	1830	673	1742,4	1837,4	710	1749,8	1844,8
637	1735,2	1830,2	674	1742,6	1837,6	711	1750	1845
638	1735,4	1830,4	675	1742,8	1837,8	712	1750,2	1845,2
639	1735,6	1830,6	676	1743	1838	713	1750,4	1845,4

Tab. 4.1.5 DCS Part 2/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Down-link		Uplink	Down-link		Uplink	Down-link
640	1735,8	1830,8	677	1743,2	1838,2	714	1750,6	1845,6
641	1736	1831	678	1743,4	1838,4	715	1750,8	1845,8
642	1736,2	1831,2	679	1743,6	1838,6	716	1751	1846
643	1736,4	1831,4	680	1743,8	1838,8	717	1751,2	1846,2
644	1736,6	1831,6	681	1744	1839	718	1751,4	1846,4
646	1737	1832	683	1744,4	1839,4	720	1751,8	1846,8
647	1737,2	1832,2	684	1744,6	1839,6	721	1752	1847
648	1737,4	1832,4	685	1744,8	1839,8	722	1752,2	1847,2
649	1737,6	1832,6	686	1745	1840	723	1752,4	1847,4
650	1737,8	1832,8	687	1745,2	1840,2	724	1752,6	1847,6
651	1738	1833	688	1745,4	1840,4	725	1752,8	1847,8
652	1738,2	1833,2	689	1745,6	1840,6	726	1753	1848
653	1738,4	1833,4	690	1745,8	1840,8	727	1753,2	1848,2
654	1738,6	1833,6	691	1746	1841	728	1753,4	1848,4
655	1738,8	1833,8	692	1746,2	1841,2	729	1753,6	1848,6
656	1739	1834	693	1746,4	1841,4	730	1753,8	1848,8
657	1739,2	1834,2	694	1746,6	1841,6	731	1754	1849
658	1739,4	1834,4	695	1746,8	1841,8	732	1754,2	1849,2
659	1739,6	1834,6	696	1747	1842	733	1754,4	1849,4

Tab. 4.1.5 DCS Part 2/3

4.1.3.3 DCS Table Part 3/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
734	1754,6	1849,6	770	1761,8	1856,8	806	1769	1864
735	1754,8	1849,8	771	1762	1857	807	1769,2	1864,2
736	1755	1850	772	1762,2	1857,2	808	1769,4	1864,4
737	1755,2	1850,2	773	1762,4	1857,4	809	1769,6	1864,6
738	1755,4	1850,4	774	1762,6	1857,6	810	1769,8	1864,8
739	1755,6	1850,6	775	1762,8	1857,8	811	1770	1865
740	1755,8	1850,8	776	1763	1858	812	1770,2	1865,2

Tab. 4.1.6 DCS Part 3/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
741	1756	1851	777	1763,2	1858,2	813	1770,4	1865,4
742	1756,2	1851,2	778	1763,4	1858,4	814	1770,6	1865,6
743	1756,4	1851,4	779	1763,6	1858,6	815	1770,8	1865,8
744	1756,6	1851,6	780	1763,8	1858,8	816	1771	1866
745	1756,8	1851,8	781	1764	1859	817	1771,2	1866,2
746	1757	1852	782	1764,2	1859,2	818	1771,4	1866,4
747	1757,2	1852,2	783	1764,4	1859,4	819	1771,6	1866,6
748	1757,4	1852,4	784	1764,6	1859,6	820	1771,8	1866,8
749	1757,6	1852,6	785	1764,8	1859,8	821	1772	1867
750	1757,8	1852,8	786	1765	1860	822	1772,2	1867,2
751	1758	1853	787	1765,2	1860,2	823	1772,4	1867,4
752	1758,2	1853,2	788	1765,4	1860,4	824	1772,6	1867,6
753	1758,4	1853,4	789	1765,6	1860,6	825	1772,8	1867,8
754	1758,6	1853,6	790	1765,8	1860,8	826	1773	1868
755	1758,8	1853,8	791	1766	1861	827	1773,2	1868,2
756	1759	1854	792	1766,2	1861,2	828	1773,4	1868,4
757	1759,2	1854,2	793	1766,4	1861,4	829	1773,6	1868,6
758	1759,4	1854,4	794	1766,6	1861,6	830	1773,8	1868,8
759	1759,6	1854,6	795	1766,8	1861,8	831	1774	1869
760	1759,8	1854,8	796	1767	1862	832	1774,2	1869,2
761	1760	1855	797	1767,2	1862,2	833	1774,4	1869,4
762	1760,2	1855,2	798	1767,4	1862,4	834	1774,6	1869,6
763	1760,4	1855,4	799	1767,6	1862,6	835	1774,8	1869,8
764	1760,6	1855,6	800	1767,8	1862,8	836	1775	1870
765	1760,8	1855,8	801	1768	1863	837	1775,2	1870,2
766	1761	1856	802	1768,2	1863,2	838	1775,4	1870,4
767	1761,2	1856,2	803	1768,4	1863,4	839	1775,6	1870,6
768	1761,4	1856,4	804	1768,6	1863,6	840	1775,8	1870,8
769	1761,6	1856,6	805	1768,8	1863,8	841	1776	1871

Tab. 4.1.6 DCS Part 3/3

4.1.4 PCS Table

4.1.4.1 PCS Table Part 1

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
842	1776,2	1871,2	857	1779,2	1874,2	872	1782,2	1877,2
843	1776,4	1871,4	858	1779,4	1874,4	873	1782,4	1877,4
844	1776,6	1871,6	859	1779,6	1874,6	874	1782,6	1877,6
845	1776,8	1871,8	860	1779,8	1874,8	875	1782,8	1877,8
846	1777	1872	861	1780	1875	876	1783	1878
847	1777,2	1872,2	862	1780,2	1875,2	877	1783,2	1878,2
848	1777,4	1872,4	863	1780,4	1875,4	878	1783,4	1878,4
849	1777,6	1872,6	864	1780,6	1875,6	879	1783,6	1878,6
850	1777,8	1872,8	865	1780,8	1875,8	880	1783,8	1878,8
851	1778	1873	866	1781	1876	881	1784	1879
852	1778,2	1873,2	867	1781,2	1876,2	882	1784,2	1879,2
853	1778,4	1873,4	868	1781,4	1876,4	883	1784,4	1879,4
854	1778,6	1873,6	869	1781,6	1876,6	884	1784,6	1879,6
855	1778,8	1873,8	870	1781,8	1876,8	885	1784,8	1879,8
856	1779	1874	871	1782	1877			

Tab. 4.1.7 PCS Part 1/3

4.1.4.2 PCS Table Part 2

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
629	1873,6	1953,6	668	1881,4	1961,4	707	1889,2	1969,2
630	1873,8	1953,8	669	1881,6	1961,6	708	1889,4	1969,4
631	1874	1954	670	1881,8	1961,8	709	1889,6	1969,6
632	1874,2	1954,2	671	1882	1962	710	1889,8	1969,8
633	1874,4	1954,4	672	1882,2	1962,2	711	1890	1970
634	1874,6	1954,6	673	1882,4	1962,4	712	1890,2	1970,2
635	1874,8	1954,8	674	1882,6	1962,6	713	1890,4	1970,4
636	1875	1955	675	1882,8	1962,8	714	1890,6	1970,6

Tab. 4.8 PCS Part 2/3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
637	1875,2	1955,2	676	1883	1963	715	1890,8	1970,8
638	1875,4	1955,4	677	1883,2	1963,2	716	1891	1971
639	1875,6	1955,6	678	1883,4	1963,4	717	1889,2	1971,2
640	1875,8	1955,8	679	1883,6	1963,6	718	1889,4	1971,4
641	1876	1956	680	1883,8	1963,8	719	1889,6	1971,6
642	1876,2	1956,2	681	1884	1964	720	1889,8	1971,8
643	1876,4	1956,4	682	1884,2	1964,2	721	1890	1972
644	1876,6	1956,6	683	1884,4	1964,4	722	1890,2	1972,2
645	1876,8	1956,8	684	1884,6	1964,6	723	1890,4	1972,4
646	1877	1957	685	1884,8	1964,8	724	1892,6	1972,6
647	1877,2	1957,2	686	1885	1965	725	1892,8	1972,8
648	1877,4	1957,4	687	1885,2	1965,2	726	1893	1973
649	1877,6	1957,6	688	1885,4	1965,4	727	1893,2	1973,2
650	1877,8	1957,8	689	1885,6	1965,6	728	1893,4	1973,4
651	1878	1958	690	1885,8	1965,8	729	1893,6	1973,6
652	1878,2	1958,2	691	1886	1966	730	1893,8	1973,8
653	1878,4	1958,4	692	1886,2	1966,2	731	1894	1974
654	1878,6	1958,6	693	1886,4	1966,4	732	1894,2	1974,2
655	1878,8	1958,8	694	1886,6	1966,6	733	1894,4	1974,4
656	1879	1959	695	1886,8	1966,8	734	1894,6	1974,6
657	1879,2	1959,2	696	1887	1967	735	1894,8	1974,8
658	1879,4	1959,4	697	1887,2	1967,2	736	1895	1975
659	1879,6	1959,6	698	1887,4	1967,4	737	1895,2	1975,2
660	1879,8	1959,8	699	1887,6	1967,6	738	1895,4	1975,4
661	1880	1960	700	1887,8	1967,8	739	1895,6	1975,6
662	1880,2	1960,2	701	1888	1968	740	1895,8	1975,8
663	1880,4	1960,4	702	1888,2	1968,2	741	1896	1976
664	1880,6	1960,6	703	1888,4	1968,4	742	1896,2	1976,2
665	1880,8	1960,8	704	1888,6	1968,6	743	1896,4	1976,4
666	1881	1961	705	1888,8	1968,8	744	1896,6	1976,6
667	1881,2	1961,2	706	1889	1969	745	1896,8	1976,8

Tab. 4.8 PCS Part 2/3

4.1.4.3 PCS Table Part 3

ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)		ARFCN	Frequency (MHz)	
	Uplink	Downlink		Uplink	Downlink		Uplink	Downlink
746	1897	1977	768	1901,4	1981,4	790	1905,8	1985,8
747	1897,2	1977,2	769	1901,6	1981,6	791	1906	1986
748	1897,4	1977,4	770	1901,8	1981,8	792	1906,2	1986,2
749	1897,6	1977,6	771	1902	1982	793	1906,4	1986,4
750	1897,8	1977,8	772	1902,2	1982,2	794	1906,6	1986,6
751	1898	1978	773	1902,4	1982,4	795	1906,8	1986,8
752	1898,2	1978,2	774	1902,6	1982,6	796	1907	1987
753	1898,4	1978,4	775	1902,8	1982,8	797	1907,2	1987,2
754	1898,6	1978,6	776	1903	1983	798	1907,4	1987,4
755	1898,8	1978,8	777	1903,2	1983,2	799	1907,6	1987,6
756	1899	1979	778	1903,4	1983,4	800	1907,8	1987,8
757	1899,2	1979,2	779	1903,6	1983,6	801	1908	1988
758	1899,4	1979,4	780	1903,8	1983,8	802	1908,2	1988,2
759	1899,6	1979,6	781	1904	1984	803	1908,4	1988,4
760	1899,8	1979,8	782	1904,2	1984,2	804	1908,6	1988,6
761	1900	1980	783	1904,4	1984,4	805	1908,8	1988,8
762	1900,2	1980,2	784	1904,6	1984,6	806	1909	1989
763	1900,4	1980,4	785	1904,8	1984,8	807	1909,2	1989,2
764	1900,6	1980,6	786	1905	1985	808	1909,4	1989,4
765	1900,8	1980,8	787	1905,2	1985,2	809	1909,6	1989,6
766	1901	1981	788	1905,4	1985,4	810	1909,8	1989,6
767	1901,2	1981,2	789	1905,6	1985,6			

Tab. 4.9 PCS Part3/3

4.2 Binary-HEX-Decimal Table

BINARY	HEX	DECIMAL
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	8	8
1001	9	9
1010	A	10
1011	B	11
1100	C	12
1101	D	13
1110	E	14
1111	F	15

Tab. 4.1 Binary-HEX-Decimal Table

4.3 Power/Level Conversion

The formula for power calculation:

Lp[dBm] = 10lg(Px/P0)

Px[Watt] = 10^{-3}

Lp[+dBm]	Px[Watt]
0	10^{-3}
10	10^{-2}
20	10^{-1}
30	1
33	2
37	5
39	8

Tab. 4.1 Power conversion table

Lp[+dBm]	Px[Watt]
40	10
44	25
46	40
47	50
50	100

Tab. 4.1 Power conversion table

+ 3dB ≅ factor 2
+ 5dB ≅ factor 3
+10dB ≅ factor 10

4.4 Used Expressions

-48V	-48V for test adapter
12V	+12 Volt
1ER-3	bit error rate >10^{-3} port 1
1ER-6	bit error rate > 10^{-6} port 1
1RAI	remote alarm indication port 1
2RAI	remote alarm indication port 2
2ER-3	bit error rate 10^{-3} port 2
2ER-6	bit error rate 10^{-6} port 2
5V	+5 Volt

5 Abbreviations

ACTAM	acom+txamod=>HYCOM
ARFCN	absolute radio frequency channel number
BCCH	broadcast control channel
BERT	bit error ratio
BTS	base transceiver station
BTSE	base transceiver station equipment
BTSM	BTS site manager
FW	firmware
HW	hardware
IMSI	international mobile subscriber identity
LAC	local area code
MO	managed object
MS	mobile station
MTC	mobile terminating call
NE	network element
O&M	operation and maintenance
SW	software
TAC	technical assistance center
TCH	traffic channel
TDMA	time devision multiple access
TE	test equipment
TEI	terminal endpoint identifier
UMN	user manual