will'tek
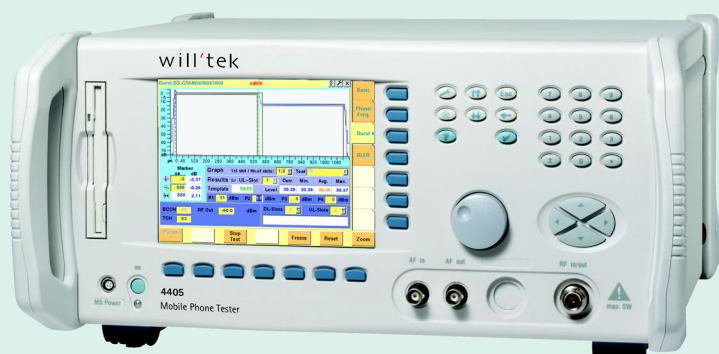
Willtek
4400

CATS 4400 Test Sequencer

user's guide
version 1.2.5

Contents

1   Introduction

1.1   Willtek CATS

The CATS 4400 Test Sequencer is a software package for creating automated test systems providing test sequencing (based on single test cases) and test result logging. The software may be used for complex applications that demand the integration of several different test instruments like in a full blown ATE (Automatic Test Equipment) system.

Test cases are built upon standard LabWindows CVI device drivers. Therefore the CATS 4400 Test Sequencer allows the easy integration of additional instruments.

The software package runs on almost every Windows PC; for instrument control commands being standard SCPI and drivers following the VISA standard, the devices controlled may be connected via an IEEE 488.2 or V.24 cable.

1.2   Willtek 4400 CATS Test cases

The test cases described in this documentation are for the integration of the Willtek 4400 GSM Mobile Phone Tester in Willtek CATS Test Sequencer. They offer several functions for setting up the device and doing the measurements. The functions are based on the SCPI commands of the 4400 and work only with a one-channel system. No channel masking is provided.

The 4400 test cases are encapsulated in six object files and grouped according to their functions. All object files listed below are grouped in **gsm4400** directory:

1. **Initialization**, which sets the network and coupling loss parameters and provide a call to the mobile station or vice versa. Additional a special start reduced signaling Test case is included.
2. **Setup Synchron**, which sets the base station parameters like TCH, BCCH, RF Output Level and so on. Lower PTT limits can be adjusted too.
3. **Setup Asynchron**, which sets the RF Generator and the RF Analyzer.
4. **Audio measurements**, which sets the AF Generator and AF Analyzer parameters and the AF Measurement tc which returns PASS or FAIL.
5. **TX measurements**, which do the following measurements and compare the results to the given limits:
   - Peak and Fast Power measurements.
   - Frequency and Min or Max Frequency Error measurements.
   - Phase Error, RMS Phase Error, Frequency Error, Burst Length, Time Advance, Peak Power, PTT, Corner points 1…8, Negative and Positive Flatness.
   - ACP measurement (Modulation and Transient Switching).
   The measurement functions return PASS or FAIL.
6. **RX measurements**, which do the MS Report, EFRC Report, set up the Bit Error Measurement and the Bit Error measurement itself which returns PASS or FAIL.

Note on 4200, 4100:

Test sequences which are designed to run on the Willtek 4200 Mobile Service Tester can also be measured with the 4400.

2   Standard test sequences

2.1   General

The CATS 4400 Test Sequencer provides the framework for running, creating or modifying sequences of test cases. The CATS 4400 Test Sequencer is supplied with a complete set of standard test cases. Test case libraries for additional devices can be ordered as options for the CATS Test Sequencer.

The CATS 4400 Test Sequencer can also be used to run test cases that have been created using the developer's environment of LabWindows CVI and CATS Test Sequencer. See CATS Test Sequencer developer's manual for details.

Although it is possible to create completely new sequences, we recommend that you use the sequences provided by Willtek as a basis for your own developments unless you are fully acquainted with the functions of the CATS Test Sequencer.

2.1.1   What is a sequence?

A CATS 4400 Test Sequencer sequence:

- is a collection of test cases, which are executed when the sequence is executed
- is defined using the CATS Test Sequencer sequence editor
- is stored as a standard file using the file extension *.SQU

A typical sequence includes a list of test cases, setup/cleanup functions, preconditions for flow control based on Pass/Fail results, test case report file information, description of the sequence, and database information.

The sequences supplied are stored in the directory <path or CATS> /wgtx_src/sequence. Preconditions can be used to define how the test cases of a sequence are executed.

2.1.2   What is a test case?

A CATS 4400 Test Sequencer test case consists of:

- Test algorithm
- Graphical user interface to set test parameters

2.1.2.1 Test algorithm

The test algorithm allows the performance of specific actions, such as setting up the instrument, interacting with the user, starting a measurement, evaluating test results against thresholds, etc. This test algorithm is a C-function that is found in a LabWindows CVI object file (file extension ".obj"). You do not need to know the details of this C-function to create and modify test sequences, but you must know the name of the function and the name of the ".obj" file where it can be found.

Note: All test case names, object files and detailed descriptions of what they actually do can be found in section 7.

2.1.2.2 Test case user interface

The user interface of each test case in a sequence can be opened by double-clicking on the test case in the "Sequence" display or by clicking the [Set param.] button in the "Test Sequencer" window. Most CATS Test Sequencer test cases are "generic", which means that they can be used for a number of different signal structures, etc.

Note: Each test case in a sequence is independent of any preceding test cases.

2.1.2.3 Test case relevance

The CATS 4400 Test Sequencer distinguishes between test cases that are relevant to the status of the test sequence (such as a bit error check) and those which do not affect the outcome of the test sequence, such as those that set up an instrument or send a message to the user.

- Test cases that are relevant to the test sequence status are displayed in red (status can be "PASS" or "FAIL")
- Test cases that are not relevant to sequence status are displayed in blue (status will always be "DC" = Don't Care)

If a test case marked as "Don't Care" fails, the sequence is stopped automatically. This is an illegal situation and should never occur in a debugged sequence.

2.2   Standard test sequences

The software includes two standard test sequences. One is the _toolkit.squ sequence and the Dual_Demo1800 allows the test of a GSM 900/1800 mobile.

- Dual_demo1800.squ
- _toolkit.squ

2.2.1 Dual_Demo1800.squ

This sequence executes a function test on a Dual-band mobile. Relevant parameters are checked at a low and high channel. Coupling Loss values are set in both cases. Two calls are built with two different output levels. The lower output level call includes the bit error measurement which is done parallel to the regular measurements to emphasize the special 4400 feature. At the end the Audio Loop is checked.

Test case, function name	Function
DUT Report Set_Service_Report	Opens a window for entering information pertinent to the Service Report, e.g. name of service station, and creates a special result file in ./report to which all measured values will be written. This file is created by this test case and is closed and renamed / printed by the Print_Service_Report test case. If you call the Get_IMEI test case after the Set_Service_Report test case but before Print_Service_Report, the file will be renamed with the first eight digits of the IMEI number and an incremental file name extension (e.g. ".001").
Network Type GSM 900/1800 SetMode	Sets the base station network type: GSM 900/1800 (GSM/PCN), GSM 900/1900 (GSM/PCS) or RF GEN (AsynchronMode) depending on the network type needed for the mobile.
Pre Att. 1.5dB SetCouplingLoss	Sets the pre-attenuation of the 4400 on a low and a high channel number.
TCH62 MSLev5 SetupBS	Sets the TCH channel number, the MS Level and power level of the 4400 for the chosen network type.
Info 1 _user_io	Informs the user to call the 4400 from the Mobile.
Call->WT4400 exist MSCall	4400 expects a call from the mobile. Dial a number on the mobile to set up the connection.
Get IMEI Get_IMEI	Gets the IMEI number from the mobile. When used with Set_Service_Report, it writes the IMEI to the result file, and the IMEI will be used for the file name.
Measure TCH62 RFTX	Executes a measurement with the chosen parameters. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
TCH700 SetupBS	Sets the TCH channel number, the MS Level and power level of the 4400 for the chosen network type.
Measure TCH700 RFTX	Executes a measurement with the chosen parameters. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
RelCall from mobile ReleaseCall	The 4400 releases the connection to the mobile.
Pre Att. 5.5dB SetCouplingLoss	Sets the pre-attenuation of the 4400 on a low and a high channel number.
RF -103dBm TCH62 SetupBS	Sets the TCH channel number, the MS Level and power level of the 4400 for the chosen network type.

Table 2-1 "Dual_Demo1800" test sequences: test cases used and their functions

Test case, function name	Function
Call WT4400->Mobile BSCall	The 4400 tries to establish a call to the mobile.
Start BERT StartBitError	Starts the Bit Error Measurement.
Measure TCH62-2 RFTX	Executes a measurement with the chosen parameters. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
Measure BER on TCH62 BitError	Executes a BER measurement. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
TCH700-2 SetupBS	Sets the TCH channel number, the MS Level and power level of the 4400 for the chosen network type.
Measure TCH700-2 RFTX	Executes a measurement with the chosen parameters. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
Measure BER on TCH700 BitError	Executes a BER measurement. The measured values are checked against the limit ranges (set with the user interface). If within the limits, the status is PASS, otherwise FAIL.
Stop BERT StopBitError	Stops the Bit Error Measurement.
Test Speaking _user_io	Opens a pop-up window displaying a message prompting you to speak into the microphone. You can decide whether or not to speak a test message. The sequence continues when you click "OK".
Release Call ReleaseCall	The 4400 releases the connection to the mobile.
Print _Service_Report Print_Service_Report	Renames the result file with the IMEI number if Get_IMEI was previously executed, otherwise the file name will be "default.001" in the ./report directory. If the switch is set to ON, the file will be printed out by the Windows default printer.

Table 2-1   "Dual_Demo1800" test sequences: test cases used and their functions

2.2.2   _toolkit.squ

This sequence demonstrates most of the non-instrument related test cases for the CATS product, such as:

- Messages to the user
- User data entry
- Show a bitmap or photograph
- Measuring test time
- Timer start
- Wait a fixed amount of time
- Sending any SCPI commands to other instruments
- Beep

Test case, function name	Function
Message _user_io	A user-defined message is displayed when this test is run. The next test case is executed when you click on "OK".
User ? PASS/FAIL _user_io	The user is prompted for a "Yes" or "No" response to a question.
User Editor _user_io	Opens a window for entering a message or comment. The next test case is executed when you click on "OK".
Show Bitmap _show_image	Displays a bitmap.
SCPI Commands _scpi_io	Sends user-defined SCPI commands to the specified instrument via the open interface. If a query is sent, the response is displayed. No PASS/FAIL result is derived from the contents of the received result string.
Stop watch start _stopwatch	Measures elapsed time between first call of this test case (start of stopwatch) and subsequent calls of the same test case.
Delay 5 s _wait	Waits for a specified period.
Time passed _stopwatch	Measures elapsed time between first call of this test case (start of stopwatch) and subsequent calls of the same test case.
Wait until _wait_until_time	Waits until a specific point in time.
Beep _acoustical_signal	Generates an audible signal (beep).
Info _show_info_field	Opens a window for entering data.
End! _user_io	A user-defined message is displayed when this test is run. The sequence ends when you click on "OK".

Table 2-2   "_toolkit.squ" test sequence: test cases used and their functions

3   Commissioning

3.1   System Requirements

- PC with Pentium or better
- Processor clock speed at least 66 MHz
- At least 32 MB RAM
- Windows 95/98/NT operating system
- VISA Library. Recommended National Instruments VISA Library Version 2.00 or higher.
  The VISA Library is shipped with your IEEE 488.2 card driver.

3.2   Items included

The CATS software for 4400 is packed onto three 1.44 MB floppy disks.

- The first floppy disk contains **setup.exe** and **gsm_4400.001**.
- The other two floppy disk contain **gsm_4400.002** and **gsm_4400.03**.

3.3   Configuring the 4400

To ensure that the 4400 and the CATS software operate together without errors, the following settings must be made. A GPIB (prefered NI) board must be installed on the PC motherboard prior to these settings.

1. Connect the 4400 to the GPIB board to use it with the CATS software on your PC.
2. Turn on the 4400.
3. Press the "Tool"-Button and then the "Config"-Button on the 4400.
4. Type in "4" in the GPIB Address field and make sure that the Terminator is set to "LF", otherwise CATS won't work.

3.4   Installing the CATS 4400 Test Sequencer

All other applications have been closed.

1. Insert the first floppy disk.
2. Open Windows Explorer and start the Setup.exe file by double-clicking on it.
   The "Installation" window opens.
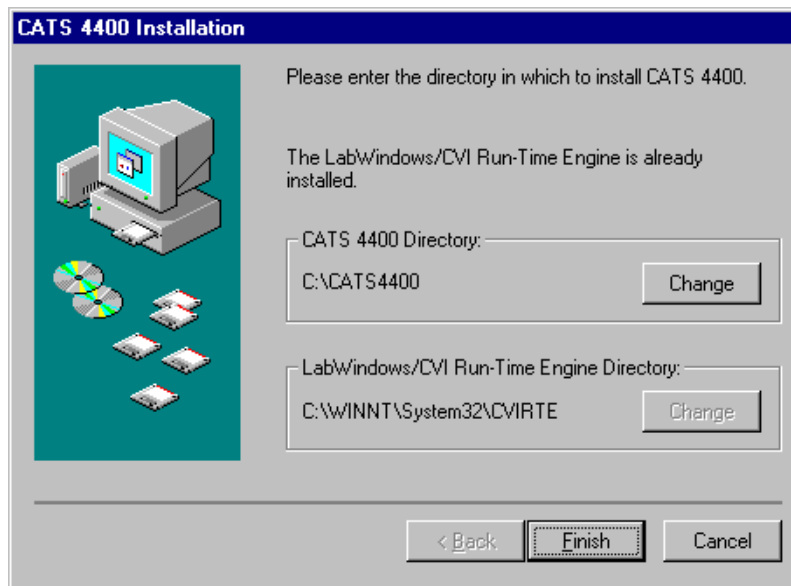
Figure 3-1   "Installation" window

3. Specify the directory where you want the software to be installed.
4. Click on the [Finish] button.
    The program will be installed.
    The icon "wt4400.exe" will be created on the Windows Desktop.
    The folder "CATS 4400" will be created in the Programs folder of the Windows
    Start menu.

3.5   Starting the CATS 4400 Test Sequencer

Log-in and password

When the software is started, the "WWG CATS Login" window opens first, prompting
you to enter the log-in name and password.

There are two levels of passwords with different default passwords that give different
access rights:

Password level	Default Password	Rights
Developer	developer	Definition of new or editing of existing sequences.
		The "Run Test Button" allows step-by-step execution of a sequence. This is useful for debugging sequences.
User	No password needed	No editing of sequences or parameters.
		Run sequences (Run Seq.).

Start-up

1. Double click on the "wt4400.exe" icon on the Windows Desktop.
   The CATS 4400 Test Sequencer software starts.
   The "WWG CATS Login" window opens.

2. If necessary, enter the password and confirm it.
   The first "CATS Test Sequencer" window is activated.
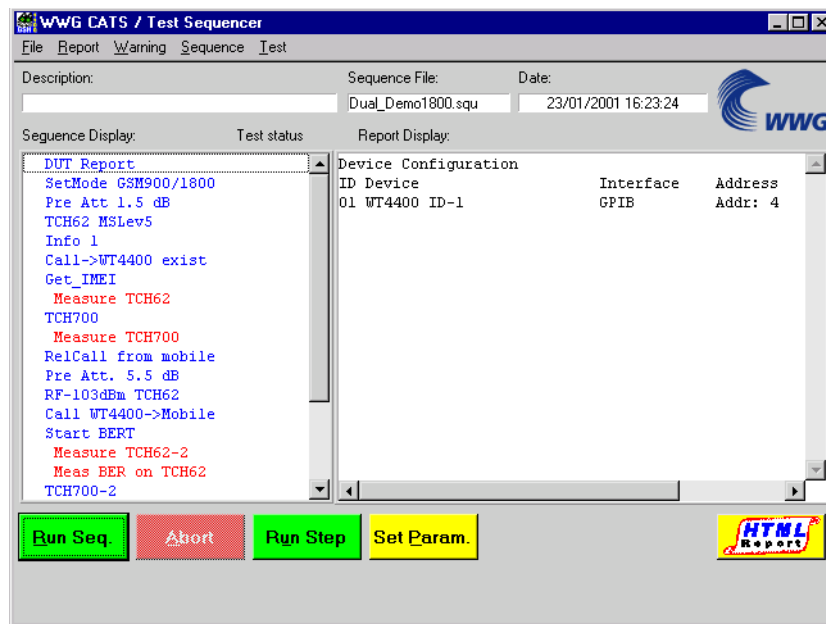
Figure 3-2 "CATS Test Sequencer" window

4 Getting started

4.1 Defining the device settings

1. Select the "Sequence" / "Device Configuration Interfaces, Adr." menu.
    The "Device Configuration" window opens.
2. Enter all the required information about the device;
    see chapter 6.3 "Device Configuration window", page 6-21.

4.2 Selecting a test sequence

The first time that the CATS 4400 Test Sequencer is started, the default test sequence "Dual_Demo1800.squ" will be opened and shown in the "Sequence Display".
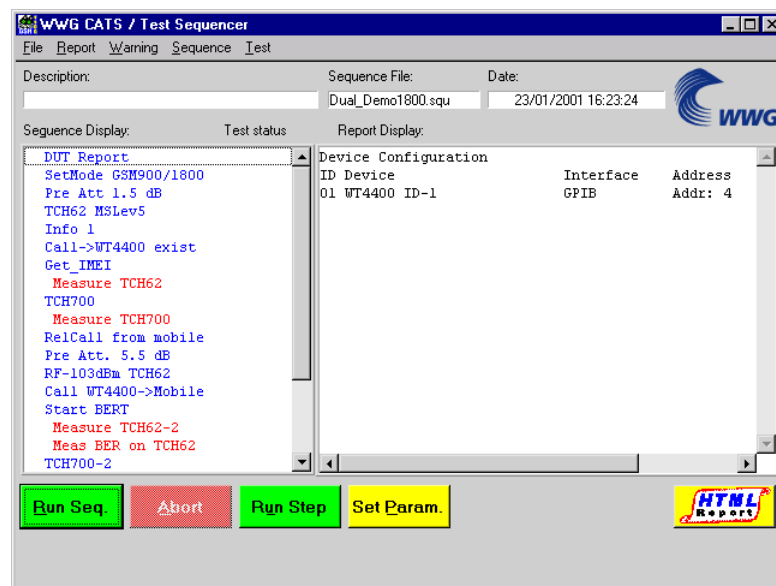
Figure 4-1   Display of loaded test sequence in the "Sequence Display" of the "CATS Test Sequencer" window

Each time the function is started subsequently, the last test sequence saved before switching off will be loaded. If other test sequences are available, they can be selected as follows:

1. Select "Open" in the "File" menu.
    The "Load Test Sequence" window opens.
2. Select the directory ".\cats4400\Sequence".
3. Select the test sequence required and click the [Load] button to load it.
    The "CATS Test Sequencer" window shows the name of the current test sequence in the "Sequence File" box.
    All the test cases that make up the test sequence are listed in the "Sequence Display".

Note: A list of the last test sequences opened is also displayed below the "Open" command in the "File" menu. Test sequences can also be opened by selecting these menu items.

4.3   Editing test cases

Every test case has two main parts:

- A test algorithm for collecting the data
- A user interface for adjusting the test parameters

Editing of the test algorithm is not envisaged, but the measurement parameters can be adjusted very easily with the aid of the user interface. Such adjustments can be saved as specific configurations of the sequence.

Test sequence (editing a sequence) see chapter 5, page 5-1.

Opening the user interface

1. Highlight the required test case in the "Sequence Display".
2. Double click on the test case to open its user interface.
3. Adjust the settings as required.

Note: The user interfaces for all test cases as well as the parameters are described in detail in the "Test cases function overview".

Saving the settings

If the same or a similar measurement is to be made more than once, it is a good idea to save the settings under a suitable name.

1. Select the "Save As" command in the "File" menu.
   The "Save Test Sequence" window opens.
2. Enter a destination folder and a suitable name for the sequence.

4.4   Storing the result files

By default, the result files will be stored in the directory .\Cats4400\report under the name of the selected test sequence. Two files are generated and saved for each measurement: One file in ASCII format with the file name extension *.RPT and one file in HTML format with the file name extension *.HTM. These files are deleted the next time the software is loaded. If you wish to retain these files, they should be saved under a different name or in a different folder, which you can specify in the "Set Default Report File" dialog.

Opening the "Set Default Report File" dialog

1. Select the "Sequence" / "Edit Sequence..." menu.
   The "Sequence Editor" window opens.
2. Click on the "Report..." button.
   The "Set Default Report File" window opens.
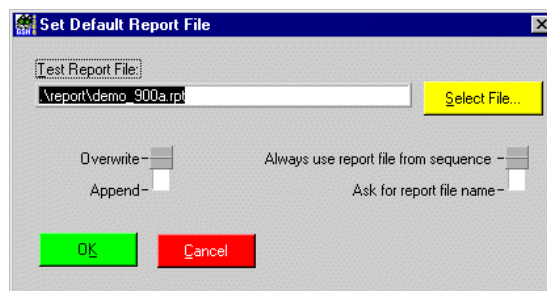
Saving a result file under a new name

The "Set Default Report File" window is open.

⇒ Enter the path and file name that you require in the "Test Report File" text box.
   The result file for the current measurement will be stored under the name you specified.

– oder –

⇒ Use the button on the right to select the option "Ask for report file name".
   Each time you load the sequence subsequently, you will be prompted to enter a name and path for the result file.

Defining the size of the result file

The selection button "Set Default Report File" is used to define whether the results of a series of measurements are entered into the result file one after the other or whether they are to be overwritten by the results of the next measurement.

⇒ If you only want to save the result of the last measurement, select the "Overwrite" option.

– oder –

⇒ If you want to save all the results since the start of the measurement, select the "Append" option.

4.5   Starting the test sequence

The required test sequence is activated.

1. Click the [Run Seq.] button.
    The test sequence runs. At some points of the sequence you may be required to confirm a message using the [Yes], [No] or [OK] buttons.
2. When you see the "Pass" or "Fail" banner at the end of the message, click the [OK] button.

4.6   Stopping a test sequence

1. Click the [Abort] button.
2. Confirm that you want to abort the test sequence.
    The test sequence will stop.

5 Editing test sequences

5.1 Sequence editing

Figure 5-1 "Sequence editor" window

Note: All parts of the "Sequence Editor" window and their functions are described in detail in the function overview (see chapter 6.2, page 6-8).

5.1.1 Opening the Sequence Editor

The "CATS Test Sequencer" window is open.

⇒ Select "Edit Sequence" in the "Sequence" menu.
The "Sequence Editor" window opens.
The loaded sequence is displayed in the same order as in the "Sequence" display of the "CATS Test Sequencer" window.

Note: You can display an overview of all the CATS 4400 Test Sequencer functions by clicking the [Select Testcase] button in the "Sequence Editor" window (see chapter 6.2.6.1, page 6-11).

5.1.2 Inserting a new test case into a sequence

Note: The Cut, Copy and Paste functions may be used to simplify building your own sequences.
Each test case in a sequence must have a unique name.
If you click the [Cancel] button in the Sequence Editor, any changes you made will be lost and you will return to the "CATS Test Sequencer" window.

There are three ways to insert a new test case into a sequence.

Selecting the test case from a list

The "Sequence Editor" window is open.

1. Mark the position where the new test case is to be inserted in the "Display" window.
2. Click the [Select Testcase] button.
   The "Testcase List" window opens.
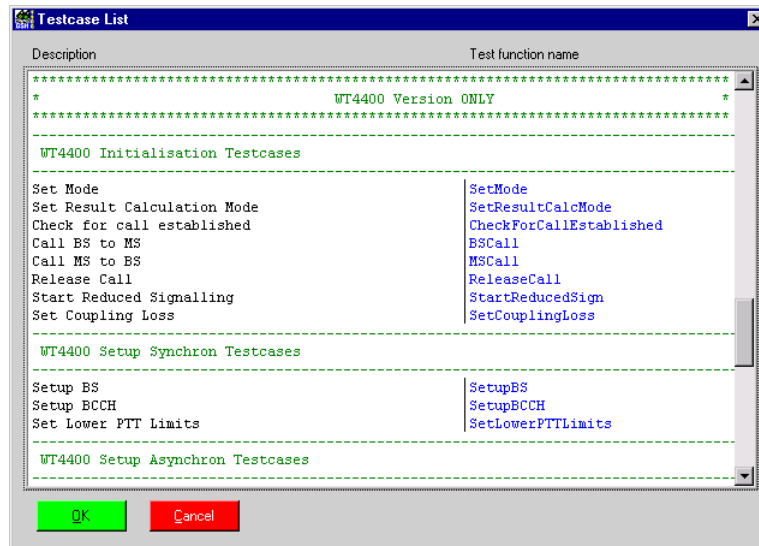
Figure 5-2   "Testcase List" window

3. Mark the test case required in the list of all the available test cases.
4. Click the [Insert Above] or [Insert Below] button in the "Sequence Editor" window.
   The new test case is shown in the "Display" window.
5. Click [OK] to confirm.
   The "Sequence Editor" window closes and the "CATS Test Sequencer" window is active.
6. Save the changes you made in the test sequence using the "File" / "Save" or "File" / "Save as" menu commands.

Entering the name of the required test case

The "Sequence Editor" window is open.

1. Enter the user-defined test case name, function name and file name in the "Edit Test Attribute" window.
2. Click the [Run options ...] button.
   The "Test Run Options" window opens.
3. Define the Test Run Options and click the [OK] button to confirm.
4. Mark the position where the new test case is to be inserted in the "Display" window.
5. Click the [Insert Above] or [Insert Below] button.
   The new test case is shown in the "Display" window.
6. Click [OK] to confirm.
   The "Sequence Editor" window closes and the "CATS Test Sequencer" window is active.
7. Save the changes you made in the test sequence using the "File" / "Save" or "File" / "Save as" menu commands.

Entering a new test case in edit mode

The "Sequence Editor" window is open.

1. Mark the position where the new test case is to be inserted in the "Display" window.
2. Click the [Insert Above] or [Insert Below] button.
   A new line is inserted in the "Display" window.
3. Mark the empty line.
4. Click the [Edit] button.
   The "Edit Test Attribute" window is active. All other parts of the "Sequence Editor" window are disabled.
5. Fill in the user-defined test case name, the function name and the file name.
6. Click the [Run options ...] button.
   The "Test Run Options" window opens.
7. Define the Test Run Options and click the [OK] button to confirm.
8. Press the [Apply Edits] button.
   The entries will be applied.
   The new test case is shown in the "Display" window.
9. Click [OK] to confirm.
   The "Sequence Editor" window closes and the "CATS Test Sequencer" window is active.
10. Save the changes you made in the test sequence using the "File" / "Save" or "File" / "Save as" menu commands.

5.1.3   Creating a new Test Sequence

Keep the following points in mind if you create sequences using the "Sequence Editor" window.

- A sequence is a collection of data that describes the flow of test execution.
- The main component of a sequence is a test case.
- A test case is a single execution step in the testing process.
- A test case executes a function or subsequence that performs the required test operation.

5.1.3.1 Saving an existing test sequence under a new name

Saving a test sequence

The "CATS Test Sequencer" window is open.

1. Select "Open" from the "File" menu.
2. Select the test sequence that is to be used as the basis for the new test sequence.
3. Click [OK] to confirm.
   The selected test sequence is shown in the "Sequence Display".
4. Save the opened sequence under a new name using the "File" / "Save as" menu command.
5. Start the "Sequence Editor" window using the "Sequence" / "Edit Sequence" menu command.

Deleting test cases from a sequence

1. Highlight the test case that is to be deleted from the test sequence.
2. Click on the [Cut] button.
   The highlighted test case is deleted from the test sequence.

Adding test cases to a test sequence

Inserting a new test case into a sequence: see chapter 5.1.2, page 5-1.

5.1.4   Editing a test case entry

Note: If you click the [Cancel] button in the Sequence Editor, any changes you
               made will be lost and you will return to the "CATS Test Sequencer" win-
               dow.

The "Sequence Editor" window is open.

1. Highlight the test case that is to be edited.
2. Click the [Edit] button.
   The "Edit Test Attribute" window is activated. All other parts of the "Sequence
   Editor" window are disabled.
3. Make changes if required.
4. Click the [Apply Edits] button.
   The edited parameters will be set.
5. Click [OK] to confirm.
   The "Sequence Editor" window closes and the "CATS Test Sequencer" window
   is activated.
6. Save the changes you made in the test sequence using the "File" / "Save" or
   "File" / "Save as" menu commands.

5.1.5   Saving a test sequence

The test sequence must be saved under a user-defined name when all the changes
have been completed.

1. Select "Save as" from the "File" menu.
   The "Save Test Sequence" window opens.
2. Enter the destination directory and user-defined name.

5.2 Device Configuration

The "CATS Test Sequencer" window is open.

1. Select the "Sequence", "Device Configuration Interfaces, Adr." menu.
   The "Device Configuration" window opens.
   The sequence last used is stored in the file "lastseq.seq". Leave the parameters as they are for the first attempt.
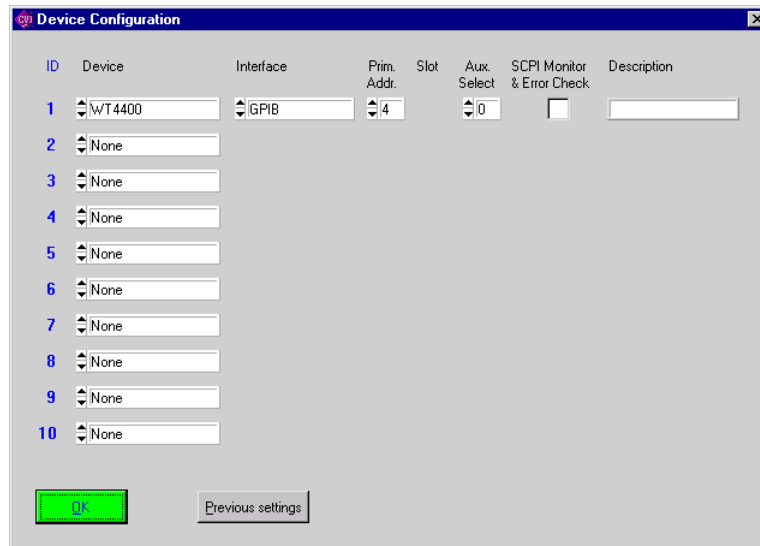
Figure 5-3 "Device Configuration" window

2. Click [OK] to open the devices requested.
   If the open procedure fails, a message will appear indicating that you may start a simulation.

Note: The appearance of the query "Start Device Simulation?" must be considered as an error when you are making "real" measurements. The message should only appear when a demonstration is performed with no measurement hardware connected to the controller PC.

6   Function overview

6.1   CATS Test Sequencer window
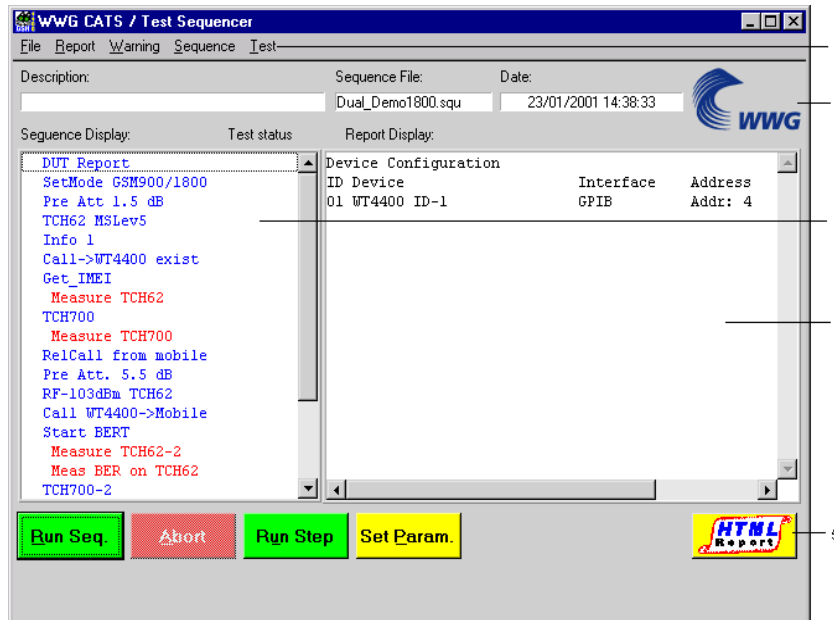
Figure 6-1   "CATS Test Sequencer" window

[1]	Main menu • File, see chapter 6.1.1, page 6-1 • Report, see chapter 6.1.2, page 6-4 • Warning, see chapter 6.1.3, page 6-5 • Sequence, see chapter 6.2, page 6-8 • Test, see chapter 6.1.4, page 6-5
[2]	Information line • Description, see chapter 6.1.5, page 6-5 • Sequence File, see chapter 6.1.6, page 6-6 • Date, see chapter 6.1.7, page 6-6
[3]	Sequence display, see chapter 6.1.8, page 6-6
[4]	Report display, see chapter 6.1.9, page 6-7
[5]	Buttons, see chapter 6.1.10, page 6-7 to chapter 6.1.13, page 6-8

6.1.1   File

The File menu provides functions for viewing the log-in level, for loading and saving sequences and for exiting the CATS 4400 Test Sequencer.

6.1.1.1 Login

Menu: File – Login

Figure 6-2   "Login" window

Meaning: Enter the log-in name and password.
There are two levels of passwords with different default passwords that give different access rights:

Password level	Default Password	Rights
Developer	developer	Definition of new or editing of existing sequences. The "Run Test Button" allows step-by-step execution of a sequence. This is useful for debugging sequences.
User	No password needed	No editing of sequences or parameters. Run sequences (Run Seq.).

6.1.1.2 New

Menu: File – New

Meaning: Open new test sequence.
The new test sequence is empty and must be filled in completely.
It is usually more practical to modify an existing test sequence.

6.1.1.3 Open

Menu: File – Open
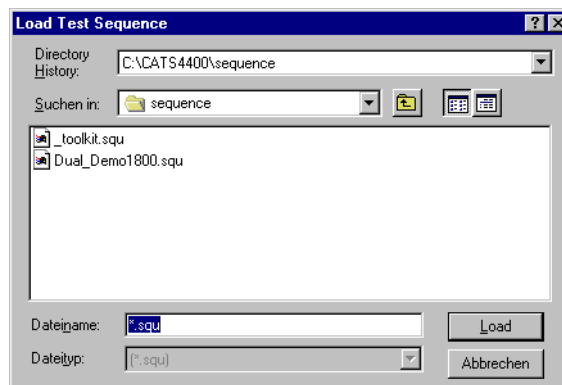
Figure 6-3   "Load Test Sequence" window

Meaning: Open an existing test sequence.
The file name extension *.squ is set as default.

6.1.1.4 Save

Menu: File – Save

Meaning: Saves the current settings for the test sequence under the existing
name.

6.1.1.5 Save as

Menu: File – Save as
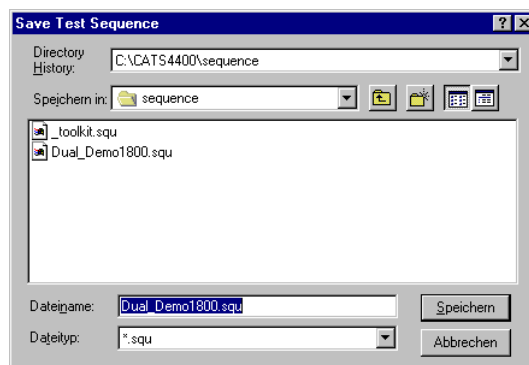
Figure 6-4   "Save Test Sequence" window

Meaning: Saves the current settings for the test sequence under a different name
with file name extension *.squ.

6.1.1.6 About

Menu: File – About

Meaning: Displays the current version of the CATS 4400 Test Sequencer software
and the current log-in level.

6.1.1.7 Exit

Menu: File – Exit

Meaning: Exits from the CATS 4400 Test Sequencer.

6.1.2   Report

The Report menu provides functions for changing the report mode and for viewing, printing out and clearing the report display.

6.1.2.1 Mode

Menu: Report – Mode

Meaning: The report file always contains all the information about the test sequence. Selecting a report mode determines the amount of detail shown in the test results in the "Report Display"; see chapter 6.1.9, page 6-7.

Display All	All test results are displayed and stored in full detail.
Failures Only	Only failed test cases are displayed in detail, passed test cases are shown with the "PASS" indication only.
Condensed	Only "PASS" or "FAIL" indication is shown for each test case.

6.1.2.2 View

Menu: Report – View

Meaning: "Report Display" is updated and jumps back to the start of the report; see chapter 6.1.9, page 6-7.

6.1.2.3 View HTML

Menu: Report – View HTML
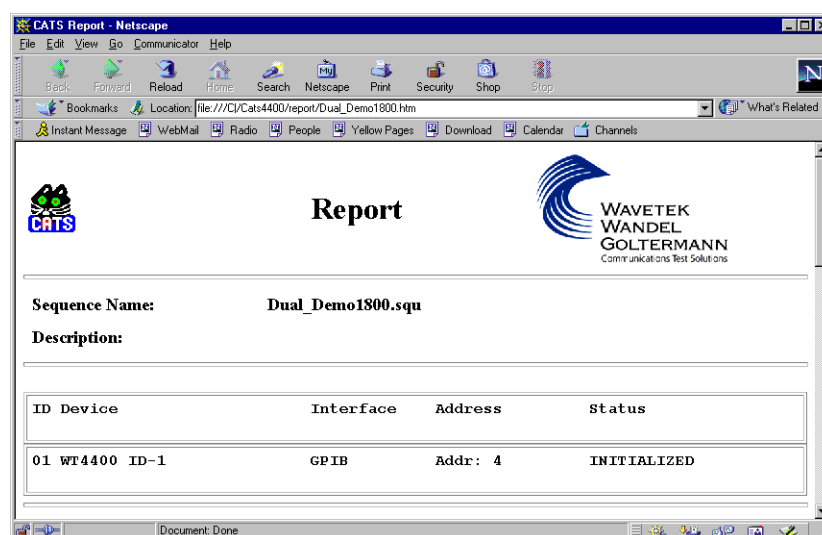
Figure 6-5   "Report" window

Meaning: Display report in HTML format.

6.1.2.4 Print

Menu: Report – Print

Meaning: Print "Report Display" as ASCII file; see chapter 6.1.9, page 6-7.

6.1.2.5 Clear

Menu: Report – Clear

Meaning: Clear test results from "Report Display"; see chapter 6.1.9, page 6-7.

6.1.3   Warning

Meaning: Switch specifying how the platform software should deal with warnings occurring during test execution.

Suppress	Warning is not displayed.
Write_to_Report	Warning is written into the report.
Prompt_Operator	Warning is signaled by a pop-up window that must be acknowledged. Default setting.

6.1.4   Test

Meaning: Switch forcing a specific test status for the selected test.

Normal	Test case generates "Pass", "Fail" and "Abort" statements.
Forced to Pass	Test case only generates "Pass" statements.
Forced to Fail	Test case only generates "Fail" statements.
Forced to Skip	Test case is skipped when the sequence is run.

6.1.5   Description

> Description:
> Sample sequence for toolkit tescases
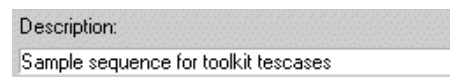
Figure 6-6   "Description Display" area of "CATS Test Sequencer" window

Meaning: User-defined description of test sequence.
Defined in the "Test Description" window;
see chapter 6.2.8.1, page 6-18.

6.1.6   Sequence File

Sequence File:
_toolkit.squ
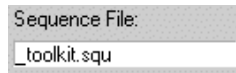
Figure 6-7   "Sequence File Display" area of "CATS Test Sequencer" window

Meaning: Indicates the name of the currently loaded test sequence; see chapter 6.1.1.3, page 6-2.

6.1.7   Date

Date:
20/01/2000 18:24:29

Figure 6-8   "Date Display" area of "CATS Test Sequencer" Window

Meaning: Displays current date and exact time to the nearest second. The contents of this display appear as a time stamp in the designation for the submenu where the measurement data are stored.

6.1.8   Sequence Display

Sequence Display: Test status
  Message
    User ? PASS/FAIL
    User Editor
  show bitmap
  SCPI Commands
  stop watch start
  Delay 5 s
  time passed
  wait until
  Beep
  Info
  End!
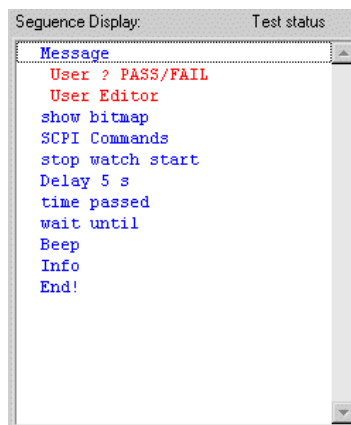
Figure 6-9   "Sequence Display" area of the "CATS Test Sequencer" window

Meaning: The Sequence Display lists all the test cases for the current test sequence and their status after the last run of the sequence. Double clicking on a test case or using the [Set Param.] button opens the windows where the test case parameters for the measurement are set.

Note: Test cases are usually shown in the test sequence under user-defined names. The "Sequence Editor" window gives information about the functions represented by the names (see chapter 6.2, page 6-8).

6.1.9   Report Display
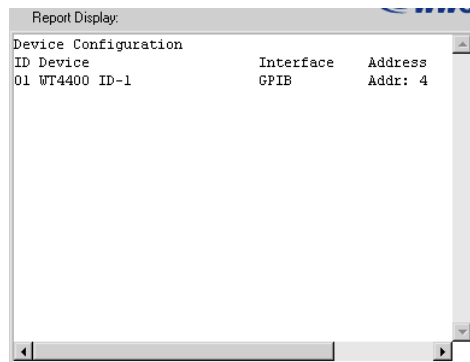
Figure 6-10 "Report Display" area of the "CATS Test Sequencer" window

Meaning: Shows the results of the last test.

Note: The test protocol is stored as an ASCII file. The name may be modified (or looked up) using the sequence editor "Report" selection (see chapter 6.2.8.3, page 6-20).
The default directory for reports is ".\REPORT*.RPT". HTML files are saved in the same directory with file name extension *.HTML.

6.1.10   Run Seq. button

Figure 6-11 [Run Seq] button in the "CATS Test Sequencer" window

Meaning: Starts the test sequence.

6.1.11   Abort button

Figure 6-12 [Abort] button in the "CATS Test Sequencer" window

Meaning: Cancels the test sequence.

6.1.12   Run Step button

Figure 6-13 [Run Step] button in the "CATS Test Sequencer" window

Meaning: Starts an individual test case for test purposes.

6.1.13 Set Param. button

Set Param.

Figure 6-14 [Set Param.] button in the "CATS Test Sequencer" window

Meaning: Opens the window for setting the parameters of the selected test case.

6.2   Sequence Editor window
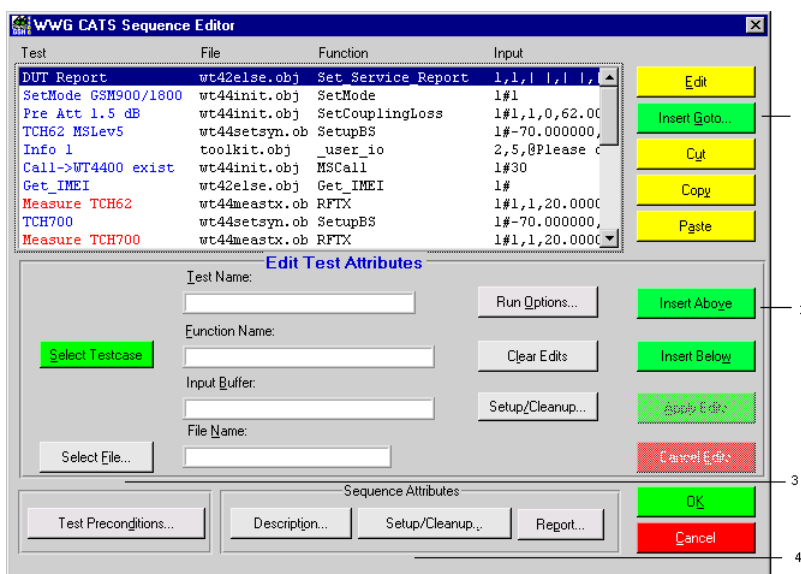
Figure 6-15 "Sequence Editor" window

[1]	Sequence contents
	• "Display" Window, see chapter 6.2.1, page 6-9 • Buttons, see chapter 6.2.2, page 6-9 to chapter 6.2.5, page 6-10
[2]	Edit Test Attributes, see chapter 6.2.6, page 6-11
[3]	Test Preconditions, see chapter 6.2.7, page 6-16
[4]	Sequence Attributes, see chapter 6.2.8, page 6-18

6.2.1 Display window

Figure 6-16 "Display window" area of the "Sequence Editor" window

Meaning: Overview of test sequence contents.

Test	User-defined name for the test case in the test sequence
File	Name of file containing the test case
Function	Function name of predefined test case
Input	Test case parameters

6.2.2 Edit button

Figure 6-17 [Edit] button in the "Sequence Editor" window

Meaning: The attributes of the test case selected in the "Display" window are transferred to the "Edit Test Attribute" window and can be edited there; see chapter 6.2.6, page 6-11.

6.2.3 Insert Goto button

Figure 6-18 [Insert Goto] button in the "Sequence Editor" window

Meaning: Inserts a Goto command above or below the test case selected in the "Display" window or replaces the selected test case by the Goto command.
Opens the "Insert Goto" window.

Figure 6-19 "Insert Goto" window

Goto Target	Enter the target for the Goto command
Insert Position	Select position of Goto command • Replace: Replace the selected test case. • Above: Insert above selected test case. • Below: Insert below selected test case.

6.2.4   Cut button
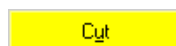
Figure 6-20 [Cut] button in the "Sequence Editor" window
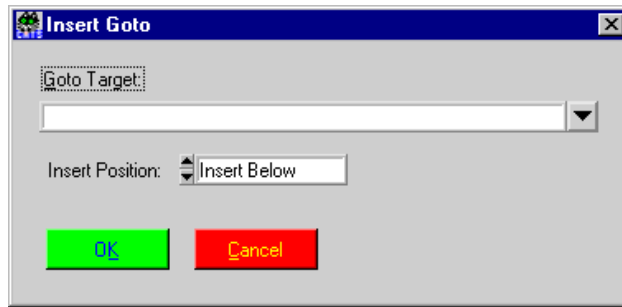
Meaning: Copies the highlighted test case in the "Display" window to the clipboard and deletes the test case from the sequence.

6.2.4.1 Copy button

Figure 6-21 [Copy] button in the "Sequence Editor" window

Meaning: Copies the highlighted test case in the "Display" window to the clipboard without deleting the test case from the sequence.

6.2.5   Paste button
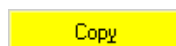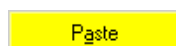

Figure 6-22 [Paste] button in the "Sequence Editor" window

Meaning: Pastes the test case from the clipboard into the "Display" window. The test case is inserted below the test case that is currently selected.

6.2.6   Edit Test Attributes
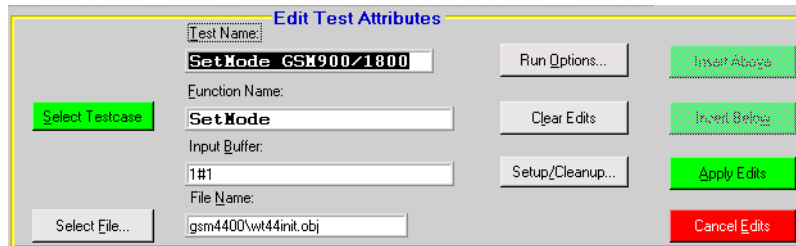
Figure 6-23 "Edit Test Attributes" window area of the "Sequence Editor" window

Meaning: Edit attributes of the selected test case.

Note: Each test case in a given sequence must have a unique name.

Test Name	User-defined test case name.
	Type any ASCII string in the Test Name dialog box.
	This name should describe the test case function, as it is the name used in the Report Display of the "CATS Test Sequencer" window.
Function Name	Type the name of the C-function into the Function Name dialog box.
	This name is the C-function of the corresponding C-object file.
Input Buffer	The Input Buffer dialog box displays a string that is added into the test case function. The contents and meaning of the string depends on the test case function.
File Name	Type the relative path name of the file that contains the test case.
	If you use a relative path, it is defined relative to the Test Executive project or executable, not your sequence file.

6.2.6.1 Select Testcase button

Figure 6-24 [Select Testcase] button in the "Sequence Editor" window

Meaning: Opens the "Testcase List" window.
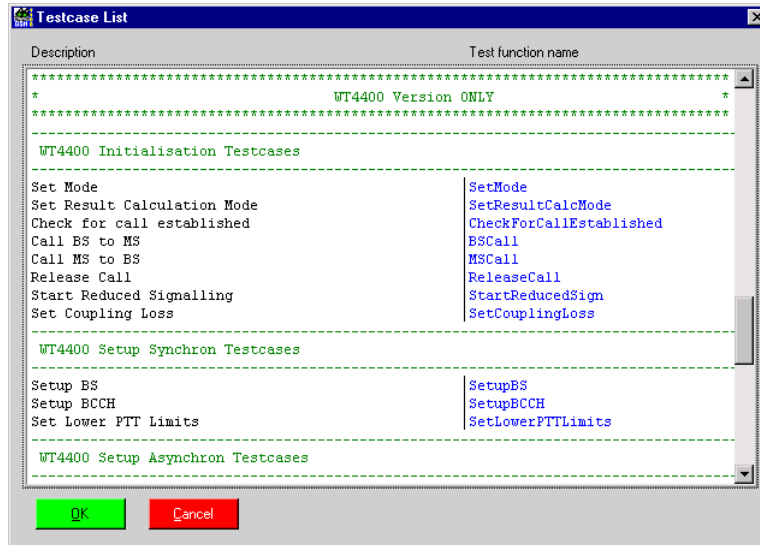
Figure 6-25 "Testcase List" window

Meaning: Lists all available CATS 4400 Test Sequencer test cases. A test case can be selected and its test attributes will appear in the Test Attributes dialog boxes.

6.2.6.2 Select File ... button

Figure 6-26 [Select File] button in the "Sequence Editor" window

Meaning: Opens the "Select Object File" window.
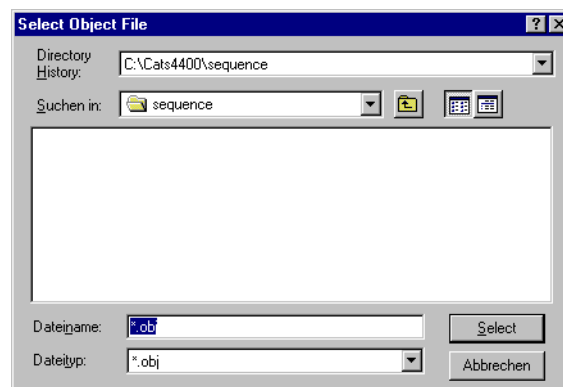
Figure 6-27 "Select Object File" window

Meaning: Select *.obj file in which the test sequence is to be saved.
         All *.obj files are stored in the ./optic directory by default.

6.2.6.3 Run Options button
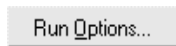
Run Options...

Figure 6-28 [Run Options] button in the "Sequence Editor" window

Meaning: Specify the Run mode.
Opens the "Test Run Options" window.
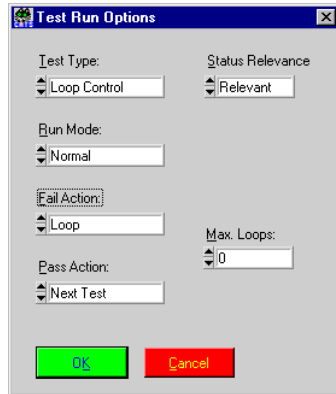
Figure 6-29 "Test Run Option" window

Test Type	• Normal • Loop Control
Run Mode	• Normal • Skip • Force to Fail • Force to Pass
Fail Action	• Next Test • Loop • Stop
Pass Action	• Next Test • Loop • Stop

Status relevance	• Relevant: Indicator color red
	  Pass and Fail are evaluated
	• Don't care: Indicator color blue
	  Pass and Fail not evaluated

Max. Loops	• Enter maximum number of loops

6.2.6.4 Clear Edits button
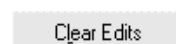
Clear Edits

Figure 6-30 [Clear Edits] button in the "Sequence Editor" window

Meaning: Clears the changes made in the Test Attributes.

Notice: If you have selected a test case and you press the [Clear Edits] button
and then the [Apply Edits] button, the selected test case will be deleted.

6.2.6.5 Setup/Cleanup button
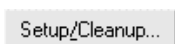
Setup/Cleanup...

Figure 6-31 [Setup/Cleanup] button in the "Sequence Editor" window

Meaning: Opens the "Test Setup/Cleanup Routines" window for an individual test case.
These settings normally do not have to be changed.
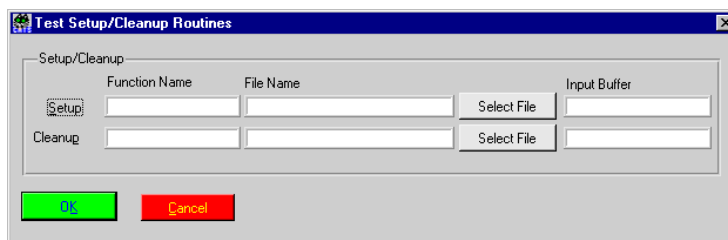
Figure 6-32 "Test Setup/Cleanup Routines" window

Setup	A setup function is executed before a test case. • Function Name Enter the name of the setup function. • File Name Enter the name of the file that contains the function, or click on the [Select File] button to open the "File dialog" window. • Buffer
Cleanup	A cleanup function is executed after a test case. • Function Name Enter the name of the cleanup function. • File Name: Enter the name of the file that contains the function, or click on the [Select File] button to open the "File dialog" window. • Buffer

6.2.6.6 Insert Above button

Insert Above

Figure 6-33 [Insert Above] button, part of the "Sequence Editor" Window

Meaning: Inserts an edited test case into the list of test cases in the "Display" window either above the test case; see chapter 6.2.1, page 6-9.

Note: The [Insert Above] button is only available if you have selected a test case from the "Select TC List" or if the test case was created by inserting the attributes into the Test Attributes. Otherwise, if you have selected the test case by double click in the "Display" Window or by pressing the [Edit] button, the [Insert Above] button is dimmed.

6.2.6.7 Insert Below button

Insert Below

Figure 6-34 [Insert Below] button, part of the "Sequence Editor" Window

Meaning: Inserts an edited test case into the list of test cases in the "Display" window below the selected test case; see chapter 6.2.1, page 6-9.

Note: The [Insert Below] button is only available if you have selected a test case from the "Select TC List" or if the test case was created by inserting the attributes into the Test Attributes. If you have selected the test case with a double click in the "Display" window or by pressing the [Edit] button, the [Insert Below] button is grayed out.

6.2.6.8 Apply Edits buttons

Apply Edits

Figure 6-35 [Apply Edits] button in the "Sequence Editor" window

Meaning: Applies the edits to an edited test case.

6.2.6.9 Cancel Edits button

Cancel Edits

Figure 6-36 [Cancel Edits] button in the "Sequence Editor" window

Meaning: Exits edit mode for the selected test case without applying any edits.

6.2.7   Test Preconditions button

Test Preconditions...
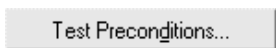
Figure 6-37 [Test Preconditions] button in the "Sequence Editor" window

Meaning: Opens the "Precondition Editor" window.
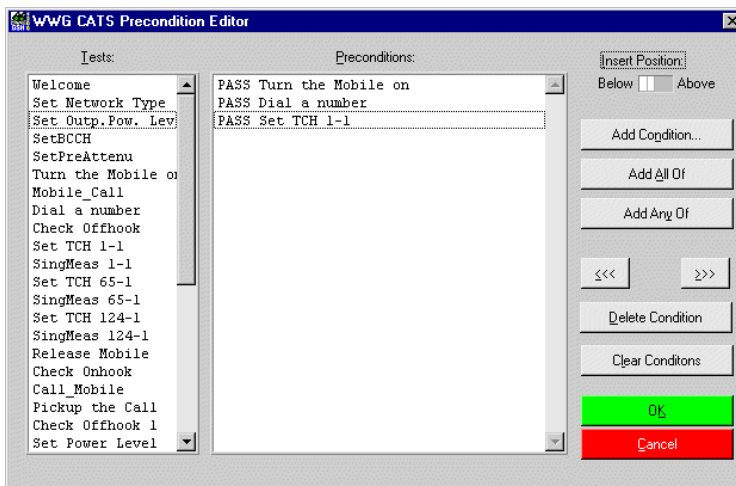
Figure 6-38 "Preconditions Editor" window

Meaning: The preconditions for a test case specify which other tests must pass or fail before this particular test case is executed.

Tests	The test case names appear in the "Test list" window.
Preconditions	The "Preconditions Editor" window shows the precondition tests. These are tests on which execution of the test case you select in the "Test list" window depends. You can make various settings to control the flow of the sequence here.

6.2.7.1 Insert Position switch

Insert Position:
Below ☐☐ Above

Figure 6-39 [Insert Position] switch in the "Precondition Editor" window

Meaning: The switch determines whether new preconditions are inserted before or after the current precondition.

6.2.7.2 Add Conditions ... buttons
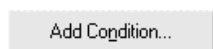
Add Condition...

Figure 6-40 [Add Condition ...] button in the "Precondition Editor" window

Meaning: Opens the "Add Condition" window.
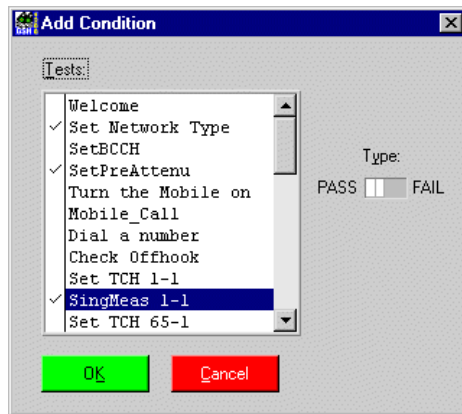
Figure 6-41 "Add Condition" window

Tests	Shows the available precondition test cases.
Type Switch	The setting of the Type switch (pass or fail) determines whether the selected precondition test case must pass or fail.

6.2.7.3 Add All of button
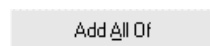
Figure 6-42 [Add All Of] button in the "Precondition Editor" window

Meaning: Starts a block of preconditions, all of which must be true.

6.2.7.4 Add Any of button
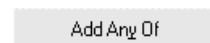
Figure 6-43 [Add Any Of] button in the "Precondition Editor" window

Meaning: Starts a block of preconditions of which at least one must be true.

6.2.7.5 Move to the Left and Move to the Right buttons

Figure 6-44 [Move to the Left] and [Move to the Right] buttons

Meaning: Adjusts the position of the selected precondition.

6.2.7.6 Delete Condition button

Delete Condition

Figure 6-45 [Delete Condition] button in the "Precondition Editor" window

Meaning: Deletes the selected precondition.

6.2.7.7 Clear Conditions button

Clear Conditons

Figure 6-46 [Clear Conditions] button in the "Precondition Editor" window

Meaning: Clears all the preconditions for the test case selected in the "Tests" list box.

6.2.8 Sequence Attributes

Meaning: Global settings for the test sequence can be made using the [Description ...], [Setup/Cleanup ...] and [Report ...] buttons.

6.2.8.1 Description button
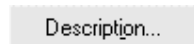
Description...

Figure 6-47 [Description] button in the "Sequence Editor" window

Meaning: Opens the "Test Description" window.

Test Description

Only first line of description appears on operator panel.

Demo Sequence Mono Band 900 MHz

OK   Cancel
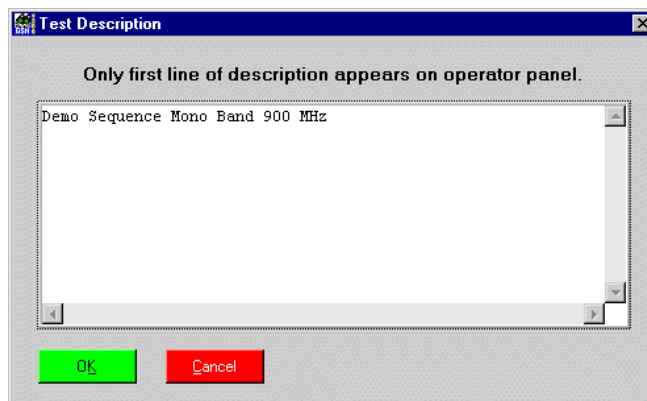
Figure 6-48 "Test Description" window

Meaning: Inserts a sequence description or edit the description of an existing sequence. The first line of this description will appear in the description text box in the "CATS Test Sequencer" window.

6.2.8.2 Setup/Cleanup button
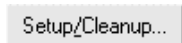
Setup/Cleanup...

Figure 6-49 [Setup/Cleanup] button in the "Sequence Editor" window

Meaning: Opens the "Sequence Setup/Cleanup Routines" window.
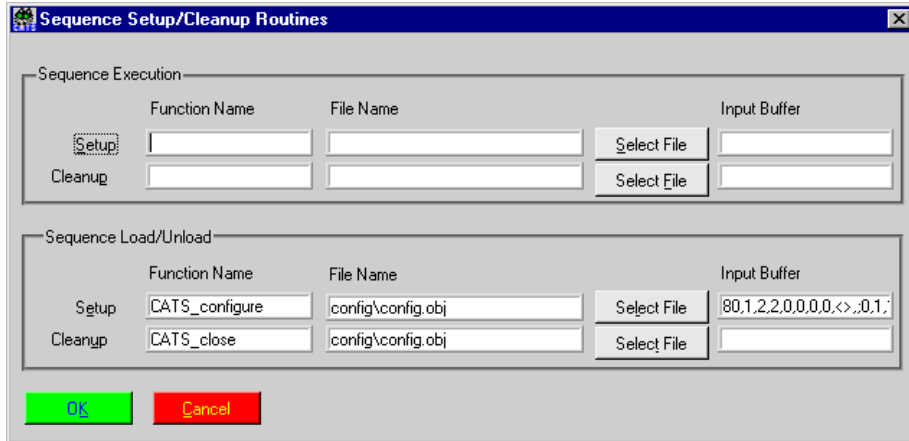
Figure 6-50 "Sequence Setup/Cleanup Routines" Window

Meaning: In the CATS 4400 Test Sequencer environment, Setup/Cleanup is used to open and close all connected devices when starting or finishing a sequence. For normal operation these settings should never be changed.
When starting a sequence from scratch with the "File – New" menu, make sure that you enter the Setup/Cleanup functions that are used with the sequences provided by Willtek.

Setup function	_CATS_configure
Cleanup function	_CATS_close

6.2.8.3 Report button
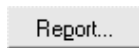
Report...

Figure 6-51 [Report] button in the "Sequence Editor" window

Meaning: Opens the "Set Default Report File" window.
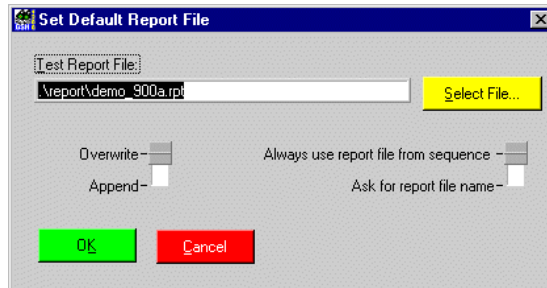
Figure 6-52 "Set Default Report File" window

Test Report File	Select a report file. The default directory for reports is .\REPORT. The default file name extension is *.rpt.

Switch Overwrite – Append	• Overwrite:
	  The current report always overwrites the previous report.
	• Append:
	  The current report is appended to the previous report.

Switch Always use ... – Ask for Report file name	• Always use report files from sequence:
	  The default file name for the report file is the name of the object file. The report file is overwritten automatically when the test sequence is closed and then re-opened.
	• Ask for report file name:
	  A name for the report file is requested by default whenever a test sequence is opened.

6.3   Device Configuration window
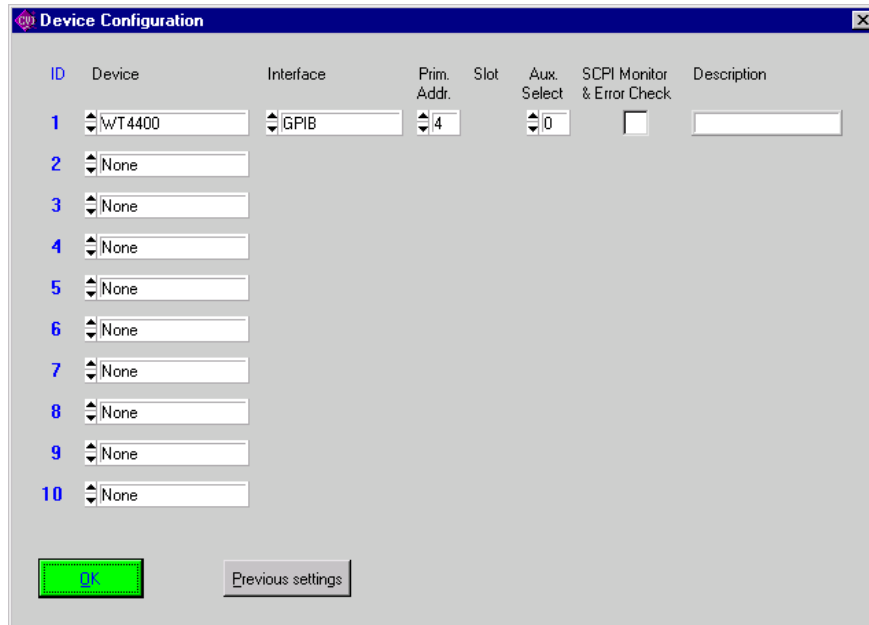
Figure 6-53 "Device Configuration" window

Note: Monitor&Error Check should always be ON when creating or modifying test sequences, as it allows the sequence developer to monitor all warnings and error messages output by the instrument firmware (debug mode). Setup errors will not be displayed if it is switched off. Monitor&Error Check should be switched OFF when running a fully tested, debugged sequence to increase speed and avoid "flicker" with certain test cases.

ID	Used to identify the logical device.
Device	Name of the instrument.

Interface	Selects the interface to be opened. Always select the GPIB when using the 4400!
	
	• INTERNAL:
	  Communication via the internal port
	• GPIB:
	  Communication via IEEE 488.2
	• GPIB-VXI:
	  Communication via IEEE 488.2 (VXI)
	• RS-232 COM1:
	  Communication via V.24 (COM1)
	• RS-232 COM2:
	  Communication via V.24 (COM2)

Prim. Addr.	Primary address of the device.
Slot	Slot number of the VXI card (Not used with 4400).

Aux. Select	Not used with 4400. Set it to 0.
SCPI Monitor&Error Check	This check box enables monitor mode. When activated, all internal SCPI commands transmitted between the CATS GSM 4400 Test Sequencer and the measurement hardware, including warnings and error messages, will be monitored and written into a display window.
Description	Optional text field to describe the instrument ID.

7   Test cases function overview

7.1   4400 Initialization

7.1.1   Set GSM Mode of 4400

Function Name

```
SetMode
            .\gsm4400\wt44init.obj
```

User Interface
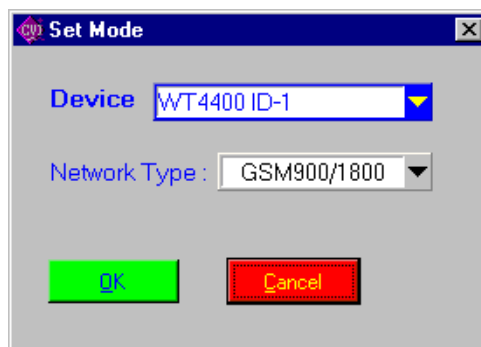
Description

Purpose: Sets the network type on the base station: NONE, GSM 900/
                    1800, GSM 900/1900 or RF GEN depending on the network type
                    needed for the mobile. RF GEN must be set when using the
                    asynchronous mode.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
SetMode      OK
Network Type: GSM 900/1800 (PCN)
```

Applications

–

Parameters

Device ID: Integer 1…10
Network Type: Enumeration:
- NONE = 0
- GSM 900/1800 = 1
- GSM 900/1900 = 2
- RF GEN = 3

Remote Control of Test Case

Input Buffer: %d#%d

                   Device ID, Network Type

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.2   Set Result Calculation Mode

Function Name   7-3

```
SetResultCalcMode
               .\gsm4400\wt44init.obj
```

User Interface
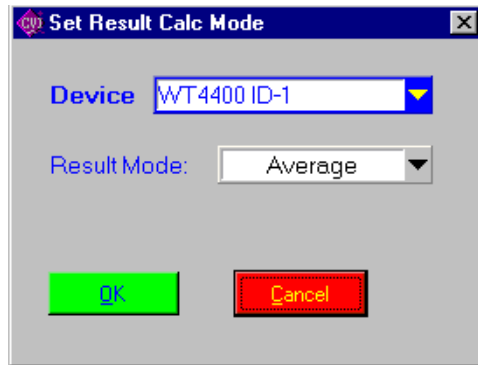
Description

Purpose: Sets the Result Calculation Mode of the 4400 of all measure-
                  ments except the ACPM Measurement (See the proper chapter
                  for more Info). A change of the mode can be done anytime. The
                  following modes are available: Min, Max and Average result
                  values.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Set Result Calculation Mode   OK
Calculation Mode: Average
```

Applications

–

Parameters

Device ID: Integer 1…10

Result Mode: Enumeration:
- AVERAGE= 0
- MINIMUM= 1
- MAXIMUM= 2

Remote Control of Test Case

Input Buffer: %d#%d

                    Device ID, Result Mode

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.3   Check MSCall to 4400

Function Name   7-5

```
CheckForCallEstablished
                .\gsm4400\wt4400init.obj
```

User Interface
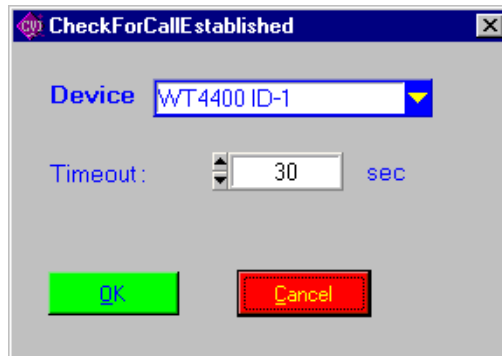
Description

Purpose: This test case checks if a call from the mobile to the 4400 is es-
                    tablished for a limited time.The timeout value unit is second.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
CheckForCallEstablished    OK
Base called
```


Applications

–

Parameters

Device ID: Integer 1…10

Timeout: Integer 1…100

Remote Control of Test Case

Input Buffer: %d#%d

                      Device ID, Timeout

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.4   Mobile call to 4400

Function Name

```
MSCall
                .\gsm4400\wt4400init.obj
```

User Interface

Description

Purpose: This test case checks if a call from the MS to the BS is established. The user can abort the procedure by pressing the 'Abort' button forcing a running test sequence to stop.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
MSCall                  OK
Base called
```

Applications

–

Parameters

Device ID: Integer 1…10

Remote Control of Test Case

Input Buffer: %d#

                      Device ID

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.5   4400 call to mobile

Function Name

```
BSCall
                .\gsm4400\wt4400init.obj
```

User Interface
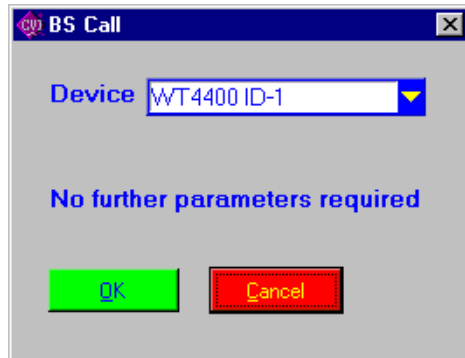
Description

Purpose: The base station tries to set up a connection to the mobile and continues after the connection is set. The user can abort the procedure by pressing the 'Abort' button forcing a running test sequence to stop.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
BSCall                    OK
Mobile called
```

Applications:

–

Parameters

Device ID: Integer 1…10

Remote Control of Test Case

Input Buffer: %d#

                      Device ID

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.6   Release a call

Function Name

```
ReleaseCall
                .\gsm4400\wt4400init.obj
```

User Interface

Description

Purpose: The base station disconnects an established call.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
ReleaseCall              OK
Call released
```

Applications:

–

Parameters

Device ID: Integer 1…10

Remote Control of Test Case

Input Buffer: %d#

                        Device ID

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.1.7   Start reduced signaling

Function Name   7-13

```
StartReducedSignaling
              .\gsm4400\wt4400init.obj
```

User Interface
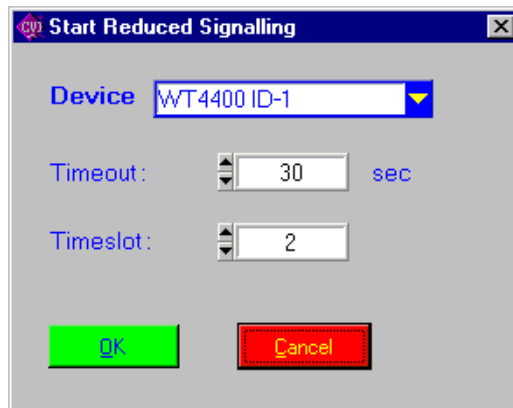
Description

Purpose: Establishes a call with reduced signal parameters.

Caution: This test case works only with special cell phones !

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
StartReducedSign        OK
Reduced signalling started
Timeslot:               2
```

Applications:

—

Parameters

Device ID: Integer 1…10

Timeout: Integer 1…100

Timeslot: Integer 2…6

Remote Control of Test Case

Input Buffer: %d#%d

                      Device ID, Timeout, Timeslot

Output Buffer: No results
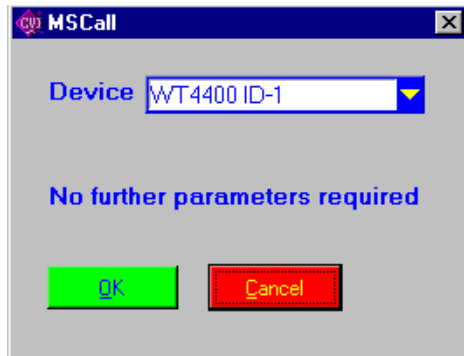

Return Value

Returns 1 in case of error, otherwise 0.

7.1.8   Set Coupling Loss

Function Name

```
SetCouplingLoss
              .\gsm4400\wt4400init.obj
```

User Interface

Description

Purpose: Up to 10 pairs of coupling loss values can be set. A pair includes
                a frequency value and an attenuation for the low and high band.
                Setting of frequency can also be done by setting channel and
                link. The frequency is calculated automatically. Because the
                channel-to-frequency mapping depends on the network type, set
                the network type for the high band first.

Caution: A Channel number of –1 indicates that the set frequency cannot
                be calculated in a valid channel number. This is due to the bigger
                frequency range of the instrument than the GSM specification.

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
SetCouplingLoss           OK
Coupling loss values set
```

Applications:

–

Parameters

Device ID:	Integer 1…10	7-17

Network Type: Enumeration:
- GSM900/1800 = 1
- GSM900/1900 = 2

Number of pairs:	Integer 1…10
LB Frequency 1:	Double 800.0…1000.0
LB Attenuation 1:	Double –5.0…40.0
. . . .	. . . .
LB Frequency 10:	Double 800.0…1000.0
LB Attenuation 10:	Double –5.0…40.0
HB Frequency 1:	Double 1700.0…2000.0
HB Attenuation 1:	Double –5.0…40.0
. . . .	. . . .
HB Attenuation 10:	Double –5.0…40.0
HB Attenuation 10:	Double –5.0…40.0

Remote Control of Test Case

Input Buffer:	%d#%d,%d,%lf,%lf,%lf,%lf,…,%lf,%lf,%lf,%lf

Device ID, Network Type, Number of pairs, LBFreq1, LBAtten1, LBFreq2, LBAtten2, …, LBFreq10, LBAtten10, HBFreq1, HBAtten1, …, HBFreq10, HBAtten10.

Output Buffer:	No results

Return Value

Returns 1 in case of error, otherwise 0.

7.2   4400 Setup Synchron

7.2.1   Setup Base Station

Function Name

```
SetupBS
                .\gsm4400\wt4400setsyn.obj
```

User Interface
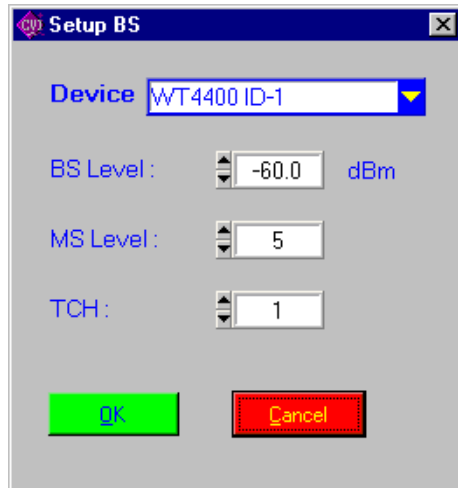
Description

Purpose: Sets the base station with the RF Output level, the MS Level and the Traffic Channel.

Caution: Dependencies of the TCH range the selected network type are not checked by the test case.

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Setup BS               OK
BS Level            : -60.0
Ms Level            : 5
TCH                 : 1
BS Set
```

Applications

–

Parameters

Device ID: Integer 1…10
BS Level: Double –120…–10
MS Level: Integer:

                      GSM 900/E-GSM: 0…19

                      GSM 1800 (PCN): 0…15 and 29…31

                      GSM 1900 (PCS): 0…15 and 30…31
TCH: Integer:

                      GSM 900: 1…124

                      E-GSM: 0…124 and 975…1023

                      GSM 1800 (PCN): 512…885

                      GSM 1900 (PCS): 512…810

Remote Control of Test Case

Input Buffer: %d#%lf%d%d

                      Device ID, BS Level, MS Level, TCH

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.2.2   Setup Broadcast Control Channel

Function Name

```
SetupBCCH
                .\gsm4400\wt4400setsyn.obj
```
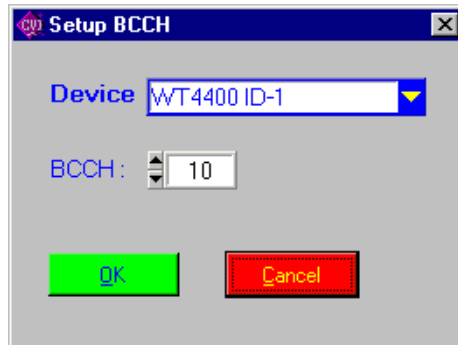
Description

Purpose: Sets the BCCH channel number on the BS for the chosen net-
                    work type. The values must be in the allowed ranges.

Caution: Dependencies of the BCCH range the selected network type are
                    not checked by the test case.

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Setup BCCH              OK
BCCH : 63
BCCH set
```

Applications

_

Parameters

Device ID: Integer 1…10
BCCH Channel: Integer:
- GSM: 1…124
- E-GSM: 0…124 and 975…1023
- PCN: 512…885
- PCS: 512…810

Remote Control of Test Case

Input Buffer: %d#%d

                    Device ID, BCCH Channel

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.3   4400 Setup Asynchron

7.3.1   Setup RF Generator

Function Name

```
SetupRFGenerator
            .\gsm4400\wt44setasyn.obj
```
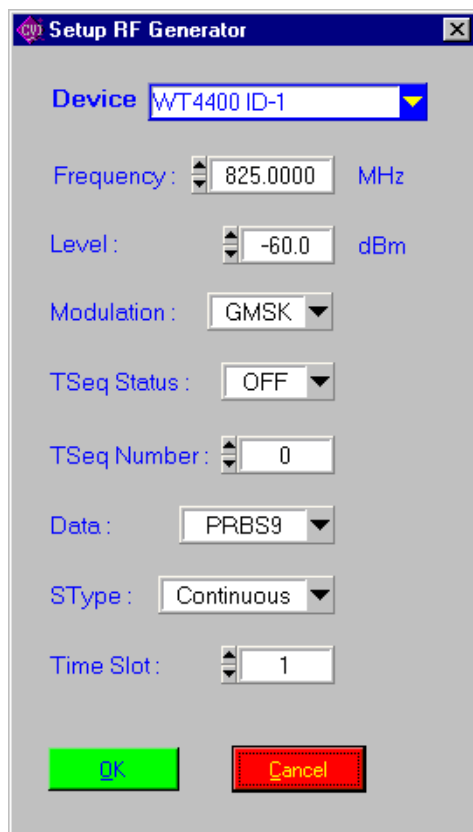

Description

Purpose: Sets up the RF Generator for the asysnchron mode. The following parameters can be set: Frequency, Level, Modulation Type, Training Sequence, Test Sequence Number, Data Type, Signal Type and the Timeslot.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

7-23

```
Setup RFGen            OK
Frequency          : 825.0000 MHz
Level              : -60.0 dBm
Modulation         : GMSK
TSC Status         : OFF
TSC Number         : 1
Data Type          : PRBS9
SType              : BURST
Timeslot           : 1
```

Applications

–

Parameters

Device ID:	Integer 1…10
Frequency:	Double 800…1200
Level:	Double –120…–10
Modulation:	Enumeration:
	• No modulation = 1
	• GMSK modulation = 2
TSC:	Enumeration:
	• On = 1
	• Off = 2
TSC Number:	Integer 0…7
Data Type:	Enumeration:
	• PRBS9 = 1
	• PRBS15 = 2
	• PRBS23 = 3
	• ALLZ = 4
	• ALLO = 5
	• ONES = 6
	• DOUB = 7
	• QUART = 8
	• EIGH = 9
SType:	Enumeration:
	• Burst = 1
	• Continious Wave = 2
Timeslot:	Integer 0…7

Remote Control of Test Case

Input Buffer: %d#%lf%lf%d%d%d%d%d%d

Device ID, Frequency, Level, Modulation, TSC, TSC Number, Data Type, SType, Timeslot

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.3.2   Setup RF Analayzer

Function Name

```
SetupRFAna
              .\gsm4400\wt44setasyn.obj
```
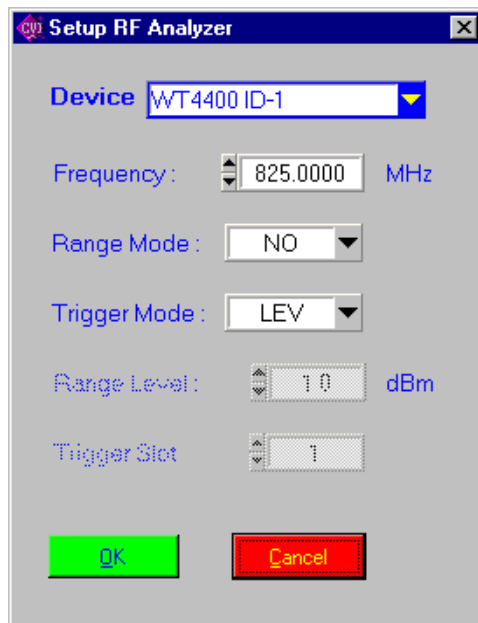

Description

Purpose: Sets the RF Analyzer with the following parameters: Frequency,
                     Range Mode, Trigger Mode, Range Level and Trigger Slot.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Setup RFGen              OK
Frequency              : 825.0000 MHz
Range Mode             : NO
Range Level            : 10.0 dBm
Trigger Mode           : LEV
Trigger Slot           : 1
```

Applications

–

Parameters

Device ID:	Integer 1…10
Frequency:	Double 800…1200
Range Mode:	Enumeration:

- AUTO = 1
- FIX = 2
- UP = 3
- DOWN = 4
- NO = 5
- FORC = 6

Range Level:	Double –30.0…3.0
Trigger Mode:	Enumeration:

- LEV = 1
- FRAM = 2
- EXTR = 3
- EXTF = 4
- AUT = 5

Trigger Slot:	Integer 0…7

Remote Control of Test Case

Input Buffer: %d#%lf%d%lf%d%d

Device ID, Frequency, Range Mode, Range Level, Trigger Mode, Trigger Slot

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.3.3   Set RF Generator

Function Name

```
SetRFGenerator
                .\gsm4400\wt44setasyn.obj
```
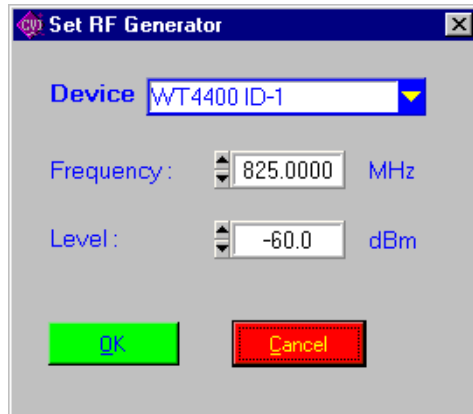

Description

Purpose: Sets the RF Generator with only the Frequency and the Level.
                    This is a short form of the SetupRFGenerator test case if only the
                    parameters mentioned above are to be set.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Setup RFGen           OK
Frequency           : 825.0000 MHz
Level               : -60.0 dBm
```

Applications

–

Parameters

Device ID: Integer 1…10
Frequency: Double 800…1000 or 1700…2000
Level: Double –120…–10

Remote Control of Test Case

Input Buffer: %d#%lf%lf

                     Device ID, Frequency, Level

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.4   4400 Audio Measurements

7.4.1   Set AF Generator Parameter

Function Name

```
SetAFGenParam
               .\gsm4400\wt44measau.obj
```
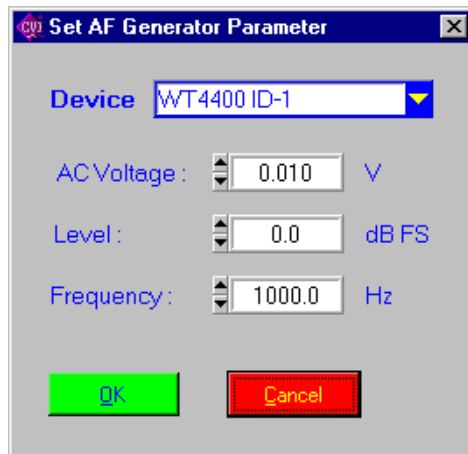

Description

Purpose: Sets the basic parameters for the AF Generator like AC Voltage, Level and Frequency.

Caution: Set the frequency to 1000.0 Hz if you intend to measure Distortion or SINAD values !

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
SetAFGenParam          OK
AC Voltage          : 0.010 V
Level               : -12.0 dB FS
Frequency           : 1000.0 Hz
```

Applications

–

Parameters

Device ID:	Integer 1…10	7-31
AC Voltage:	Double 0.0…5.6	
Level:	Double –55.0…0.0	
Frequency:	Double 20.0…20000.0	

Remote Control of Test Case

Input Buffer: %d#%lf%lf%lf

Device ID, AC Voltage, Level, Frequency

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.4.2   Set AF Link Mode

Function Name

```
SetAFMode
                .\gsm4400\wt44measau.obj
```
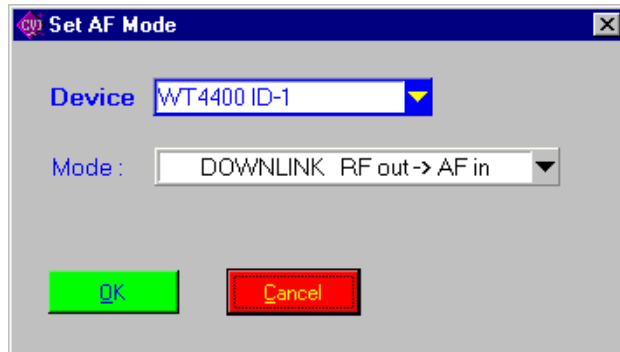

Description

Purpose: Sets the link mode of the Audioloop. The following modes can be set: Audioloop AFout/AFin, DOWNLINK RFout/AFin, UPLINK AFout/RFin, Audioloop AFout/MICinput, DOWNLINK RFout/ MICinput

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
SetAFUplink      OK
Link Mode      : Uplink
Generator      : AF out
Analyzer       : Codec
```

Applications

–

Parameters

Device ID: Integer 1…10
Mode: Enumeration:
- AF out/AF in = 0
- RF out/AF in = 1
- AF out/RF in = 2
- AF out/MIC input =3
- RF out/MIC input = 4

Remote Control of Test Case

Input Buffer: %d#%d

                     Device ID, Mode

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.4.3   Set AF Generator Shape

Function Name

```
SetAFGenShape
              .\gsm4400\wt44measau.obj
```
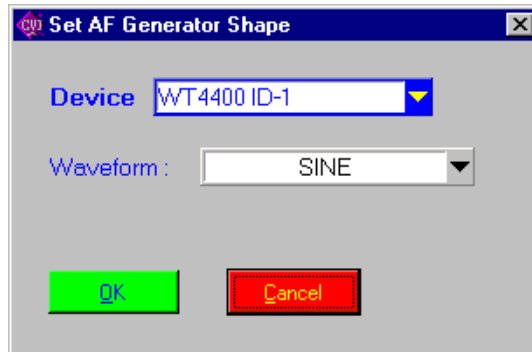
Description

Purpose: Sets the AF generator waveform. The following shapes are avail-
                    able: Sine, Rectangle, Triangle and Pulse.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
SetAFGenShape      OK
Shape           :  SINE
```

Applications

–

Parameters

Device ID: Integer 1… 10
Shape: Enumeration:
- Sine = 0
- Rectangle = 1
- Triangle = 2

Remote Control of Test Case

Input Buffer: %d#%d

Device ID, Shape

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.4.4   AF Measurement

Function Name

```
AFMeasurement
                .\gsm4400\wt44measau.obj
```
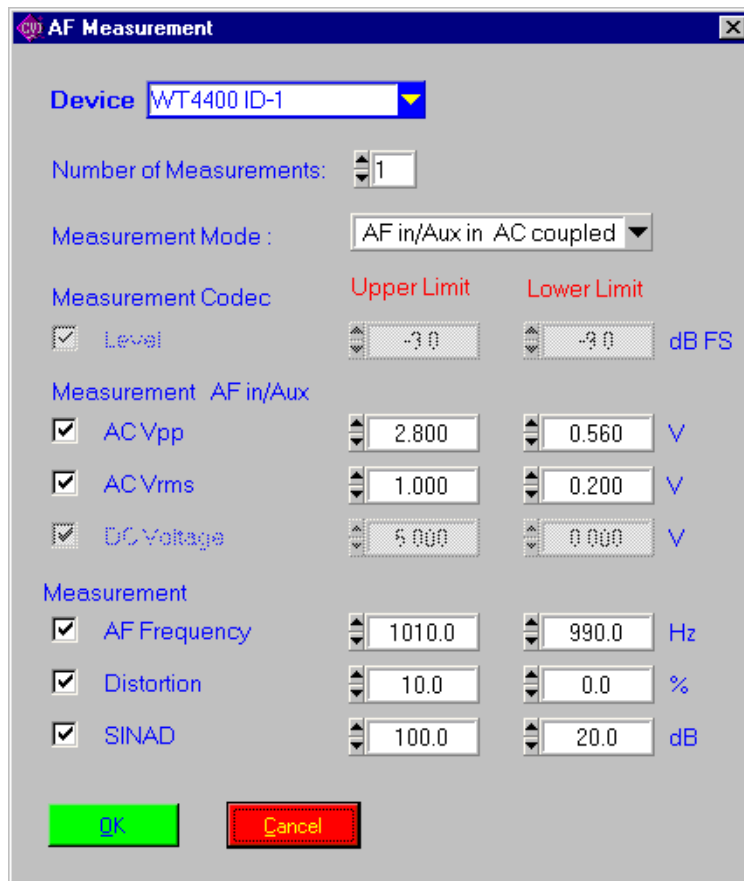

Description

Purpose: Performs an AF measurement with the following values: Level, AC Vpp, AC Vrms, DC V, AF Frequency Error, Distortion, SINAD. Additionally, the Measurement Mode must be set. Available are: RF in, AF in/MIC in AC coupled, AF in/MIC in DC coupled.

Caution: If the measured frequency is not 1000.0 Hz the Distortion and SINAD values will become inaccurate !

PASS / FAIL Conditions

PASS: If none of the checked values indicates FAIL, the whole test is PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole test is FAIL.

Test Report

```
                                                                    7-37
AFMeasurement          PASS
Level                : -0.5 dB FS PASS [-9.0…-3.0 dB FS]
AF Frequency         : 1000.0 Hz PASS [990.0…1010.0 Hz]
Distortion           : 0.5 % PASS [0.0…10.0 %]
SINAD                : 46.2 V PASS [20.0…100.0 V]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
Measurement Mode:	Enumeration:

- AF in/MIC in AC coupled = 0
- RF in = 1
- AF in/MIC in DC coupled = 2

Level_on_off:	Integer (0 = off , 1 = on)
UpperLimitLevel:	Double –55.0…0.0
LowerLimitLevel:	Double –55.0…0.0
ACVpp_on_off:	Integer (0 = off , 1 = on)
UpperLimitACVpp:	Double 0.0…11.2
LowerLimitACVpp:	Double 0.0…11.2
ACVrms_on_off:	Integer (0 = off , 1 = on)
UpperLimitACVrms:	Double 0.0…5.6
LowerLimitACVrms:	Double 0.0…5.6
DCVoltage_on_off:	Integer (0 = off , 1 = on)
UpperLimitDCVoltage:	Double –11.2…11.2
LowerLimitDCVoltage:	Double –11.2…11.2
AFFrequency_on_off:	Integer (0 = off , 1 = on)
UpperLimitAFFrequency:	Double 20.0…20000.0
LowerLimitAFFrequency:	Double 20.0…20000.0
Distortion_on_off:	Integer (0 = off , 1 = on)
UpperLimitDistortion:	Double 0.0…100.0
LowerLimitDistortion:	Double 0.0…100.0
SINAD_on_off:	Integer (0 = off , 1 = on)
UpperLimitSINAD:	Double 0.0…120.0
LowerLimitSINAD:	Double 0.0…100.0

Remote Control of Test Case

Input Buffer: %d#%d%d%d%lf%lf%d%lf%lf%d%lf%lf%d%lf%lf%d%lf%lf%d%lf%lf%d%lf%lf%d%lf%lf

Device ID, Number of Measurements, Measurement Mode, Level_on_off, UpperLimitLevel, LowerLimitLevel, ACVpp_on_off, UpperLimitACVpp, LowerLimitACVpp, ACVrms_on_off, UpperLimitACVrms, LowerLimitACVrms, DCV_on_off, UpperLimitDCV, LowerLimitDCV, AFFrequency_on_off, UpperLimitAFFrequency, LowerLimitAFFrequency, Distortion_on_off, UpperLimitDistortion, LowerLimitDistortion, SINAD_on_off, UpperLimitSINAD, LowerLimitSINAD

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5   4400 TX Measurements
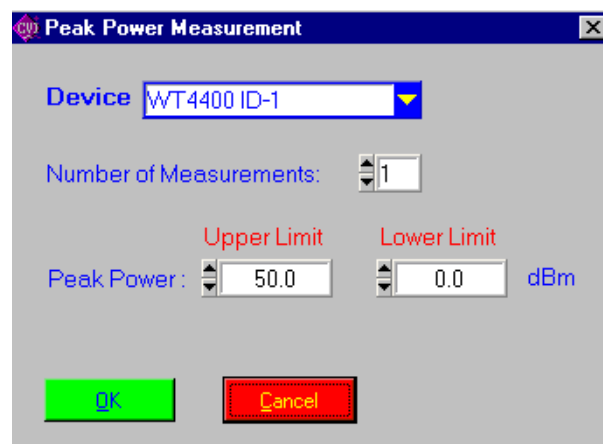
7.5.1   Peak Power Measurement

Function Name

```
PeakPower
              .\gsm4400\wt44meastx.obj
```


Description

Purpose: Measures the peak power.

Caution: –

PASS / FAIL Conditions

PASS: If the measured value is within the limit range, the test is PASS.

FAIL: If the measured value id out of the limit range, the test is FAIL.

Test Report

```
PeakPower                 PASS
Peak Power                : 28.6 dBm PASS [27.0…33.0 dBm]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of Bursts:	Integer 1…10
UpperLimitPeakPower:	Double –120…120
LowerLimitPeakPower:	Integer –120…120

Remote Control of Test Case

Input Buffer: %d#%d%lf%lf

Device ID, Number of Bursts, UpperLimitPeakPower, LowerLimitPeakPower
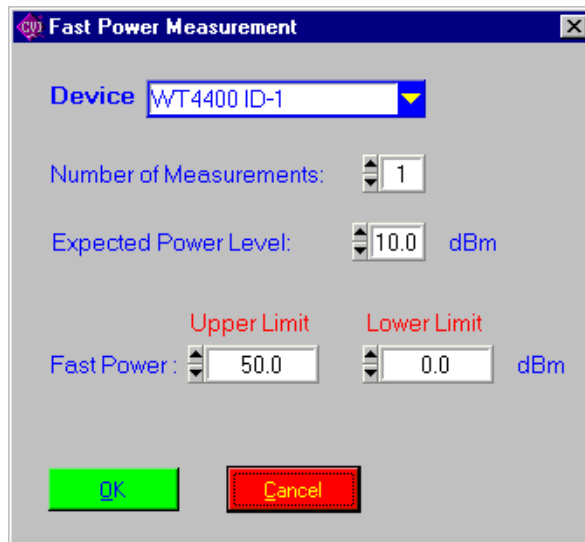
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.2   Fast Power Measurement

Function Name

```
FastPower
                .\gsm4400\wt44meastx.obj
```


Description

Purpose:	Performs a faster peak power measurement. Therefore an expected power level must be set. The real measured value must be within Expected Power Level –10 dBm and Expected Power Level +6 dBm.
Caution:	If the measured value is out of range the result will not be accurate ! In case of uncertainty prefer the peak power measurement.

PASS / FAIL Conditions

PASS:	If the measured value is within the limit range, the test is PASS.
FAIL:	If the measured value is out of the limit range, the test is FAIL.

Test Report

```
Fast Power              PASS
Fast Power            : 25.8 dBm PASS [23.0…27.0 dBm]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
ExpPowLev:	Double –30…30
UpperLimitExpPowLev:	Double –120…120
LowerLimitExpPowLev:	Double –120…120

Remote Control of Test Case

Input Buffer: %d#%d%lf%lf%lf

Device ID, Number of measurements, ExpPowLev, UpperLimitExpPowLev, LowerLimitExpPowLev
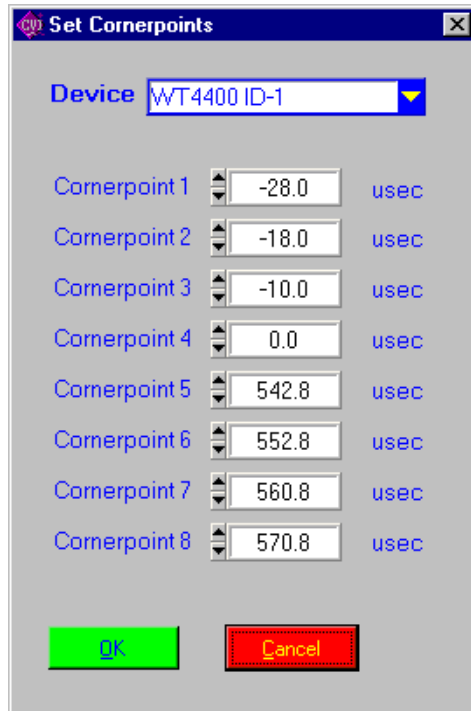
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.3   Set Cornerpoints

Function Name

```
SetCornerpoints
            .\gsm4400\wt44meastx.obj
```


Description

Purpose: Allows to set different time values than the 4400 default settings. They belong to the burst signal. The dBm value of each corner point can be measured with the RFTX test case. It is not mandatory to run this test case before the RFTX test case.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Set Cornerpoints   PASS
Cornerpoint 1   : -28.0 µsec
Cornerpoint 2   : -18.0 µsec
Cornerpoint 3   : -10.0 µsec
Cornerpoint 4   :    0.0 µsec
Cornerpoint 5   : 542.8 µsec
Cornerpoint 6   : 552.8 µsec
Cornerpoint 7   : 560.8 µsec
Cornerpoint 8   : 570.8 µsec
```

Applications

–

Parameters

Device ID:	Integer 1…10
CP 1:	Double –28.0…580.0
CP 2:	Double –28.0…580.0
CP 3:	Double –28.0…580.0
CP 4:	Double –28.0…580.0
CP 5:	Double –28.0…580.0
CP 6:	Double –28.0…580.0
CP 7:	Double –28.0…580.0
CP 8:	Double –28.0…580.0

Remote Control of Test Case

Input Buffer: %d#%lf%lf%lf%lf%lf%lf%lf%lf

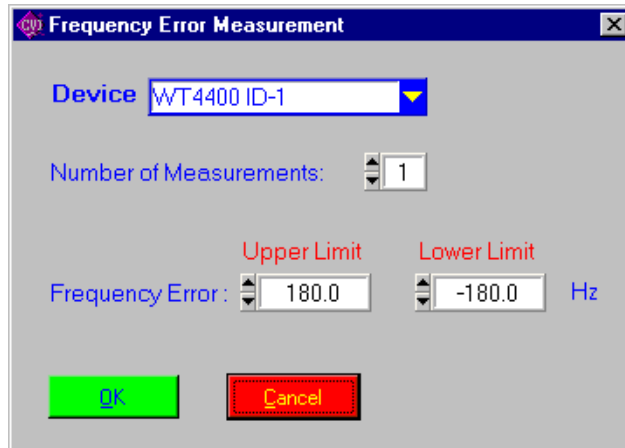Device ID, CP1, CP2, CP3, CP4, CP5, CP6, CP7, CP8

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.4   Frequency Error Measurement

Function Name   7-45

```
FrequencyError
                .\gsm4400\wt44meastx.obj
```


Description

Purpose: Measures the frequency error of the DUT.

Caution: –

PASS / FAIL Conditions

PASS: If the measured value is within the limit range, the test is PASS.

FAIL: If the measured value is out of the limit range, the test is FAIL.

Test Report

```
Frequency Error        PASS
Frequency Error      : -9.1 deg PASS [-180.0…180.0 deg]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
UpperLimitFreqError:	Double –120…120
LowerLimitFreqError:	Double –120…120

Remote Control of Test Case

Input Buffer: %d#%d%lf%lf

Device ID, Number of measurements,
UpperLimitFreqError, LowerLimitFreqError
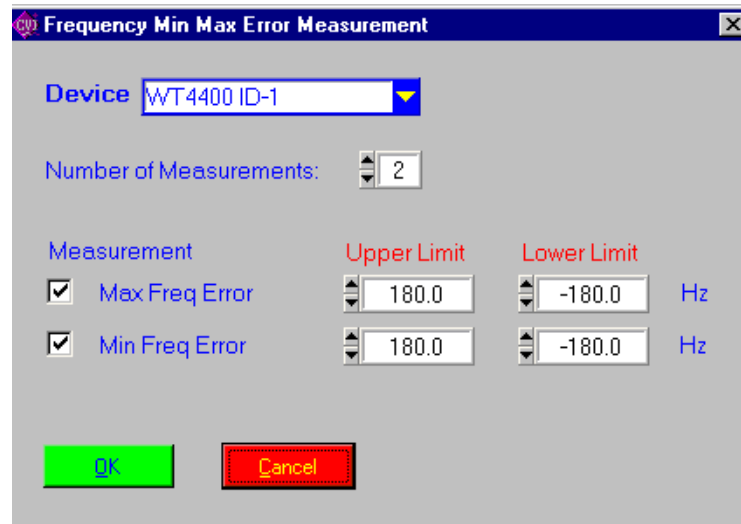
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.5   Frequency Min Max Error Measurement

Function Name

```
FreqMinMaxError
                .\gsm4400\wt44meastx.obj
```


Description

Purpose: Measures the maximum or minimum frequency error if checked.

Caution: –

PASS / FAIL Conditions

PASS: If none of the checked values indicates FAIL, the whole test is
                 PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole
                 test is FAIL.

Test Report

```
FreqMinMaxErorr        PASS
Min Frequency Error  : -12.6 Hz PASS [-180.0…180.0 Hz]
Max Frequency Error  : -3.8 Hz PASS [-180.0…180.0 Hz]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
MinFreqErr_on_off:	Integer (0 = off , 1 = on)
UpperLimitMinFreqErr:	Double –180…180
LowerLimitMinFreqErr:	Double –180…180
MaxFreqErr_on_off:	Integer (0 = off , 1 = on)
UpperLimitMaxFreqErr:	Double –180…180
LowerLimitMaxFreqErr:	Double –180…180

Remote Control of Test Case

Input Buffer: %d#%d,%d,%lf,%lf,%d,%lf%lf

Device ID, Number of measurements, MinFreqErr_on_off, UpperLimitMinFreqErr, LowerLimitMinFreqErr, MaxFreqErr_on_off, UpperLimitMaxFreqErr, LowerLimitMaxFreqErr

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.6   RFTX Measurement

Function Name

RFTX

`.\gsm4400\wt44meastx.obj`

Description

Purpose: Performs an RFTX measurement with the following values:

- Peak Errors (Phase and RMS)
- Frequency Error
- Time advance
- Burst length
- PTT and Cornerpoint values
- Positive and negative flatness

Caution: –

PASS / FAIL Conditions

PASS: If none of the checked values indicates FAIL, the whole test is PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole test is FAIL.

Test Report

```
RFTX                                PASS
Peak Phase Error      :     5.7 deg    PASS [-20.0…20.0 deg]
Phase RMS Error       :     1.8 deg    PASS [ -5.0…5.0 deg]
Frequency Error       :  -22.7 Hz      PASS [-90.0…90.0 Hz]
Burst length          :   557.5 µsec   PASS [542.8…562.8 µsec]
Time advance          :     2.0 µsec   PASS [-3.0…3.0 µsec]
Peak Power            :    30.6 dBm     PASS [0…40.0 dBm]
PTT check             :                PASS
Cornerpoint 1 -28.0   :  -72.8 dB      PASS [-150.0…4.0 dB]
Cornerpoint 2 -18.0   :  -55.4 dB      PASS [-150.0…4.0 dB]
Cornerpoint 3 -10.0   :  -37.0 dB      PASS [-150.0…4.0 dB]
Cornerpoint 4 0.0     :   -0.2 dB      PASS [-150.0…4.0 dB]
Cornerpoint 5 542.8   :   -0.2 dB      PASS [-150.0…4.0 dB]
Cornerpoint 6 552.8   :  -18.2 dB      PASS [-150.0…4.0 dB]
Cornerpoint 7 560.8   :  -47.4 dB      PASS [-150.0…4.0 dB]
Cornerpoint 8 570.8   :  -69.2 dB      PASS [-150.0…4.0 dB]
Neg. Flatness Error   :   25.8 dB      PASS [-0.1…0.0 dB]
Pos. Flatness Error   :   25.8 dB      PASS [0.0…-0.1 dB]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
PeakPhaseErr_on_off:	Integer (0 = off , 1 = on)
UpperLimitPeakPhaseErr:	Double −180…180
LowerLimitPeakPhaseErr:	Double −180…180
RMSPhaseErr_on_off:	Integer (0 = off , 1 = on)
UpperLimitRMSPhaseErr:	Double −180…180
LowerLimitRMSPhaseErr:	Double −180…180
FreqErr_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqErr:	Double −180…180
LowerLimitFreqErr:	Double −180…180
BurstLength_on_off:	Integer (0 = off , 1 = on)
UpperLimitBurstLength:	Double −180…180
LowerLimitBurstLength:	Double −180…180
TimAdv_on_off:	Integer (0 = off , 1 = on)
UpperLimitTimAdv:	Double −180…180
LowerLimitTimAdv:	Double −180…180
PeakPower_on_off:	Integer (0 = off , 1 = on)
UpperLimitPeakPower:	Double −180…180
LowerLimitPeakPower:	Double −180…180
PTTCheck_on_off:	Integer (0 = off , 1 = on)
CP1_on_off:	Integer (0 = off , 1 = on)
UpperLimitCP1:	Double −180…180
LowerLimitCP1:	Double −180…180
....	....
CP8_on_off:	Integer (0 = off , 1 = on)
UpperLimitCP8:	Double −180…180
LowerLimitCP8:	Double −180…180
NegFlatNegFlat_on_off:	Integer (0 = off , 1 = on)
UpperLimitNegFlat:	Double −180…180
LowerLimitNegFlat:	Double −180…180
PosFlat_on_off:	Integer (0 = off , 1 = on)
UpperLimitPosFlat:	Double −180…180
LowerLimitPosFlat:	Double −180…180

Remote Control of Test Case

Input Buffer:	%d#%d%d%fl%fl...%d%d%fl%fl...%d%fl%fl

Device ID, Number of measurements,
PeakPhaseErr_on_off, UpperLimitPeakPhaseErr,
LowerLimitPeakPhaseErr, …, PTTCheck_on_off,
CP1_on_off, UpperLimitCP1, LowerLimitCP1, ...,
PosFlat_on_off, UpperLimitPosFlat,
LowerLimitPosFlat

Output Buffer:	No results

Return Value

Returns 1 in case of error, otherwise 0.

7.5.7   ACPM Measurement

Function Name

ACPM

        `.\gsm4400\wt44meastx.obj`
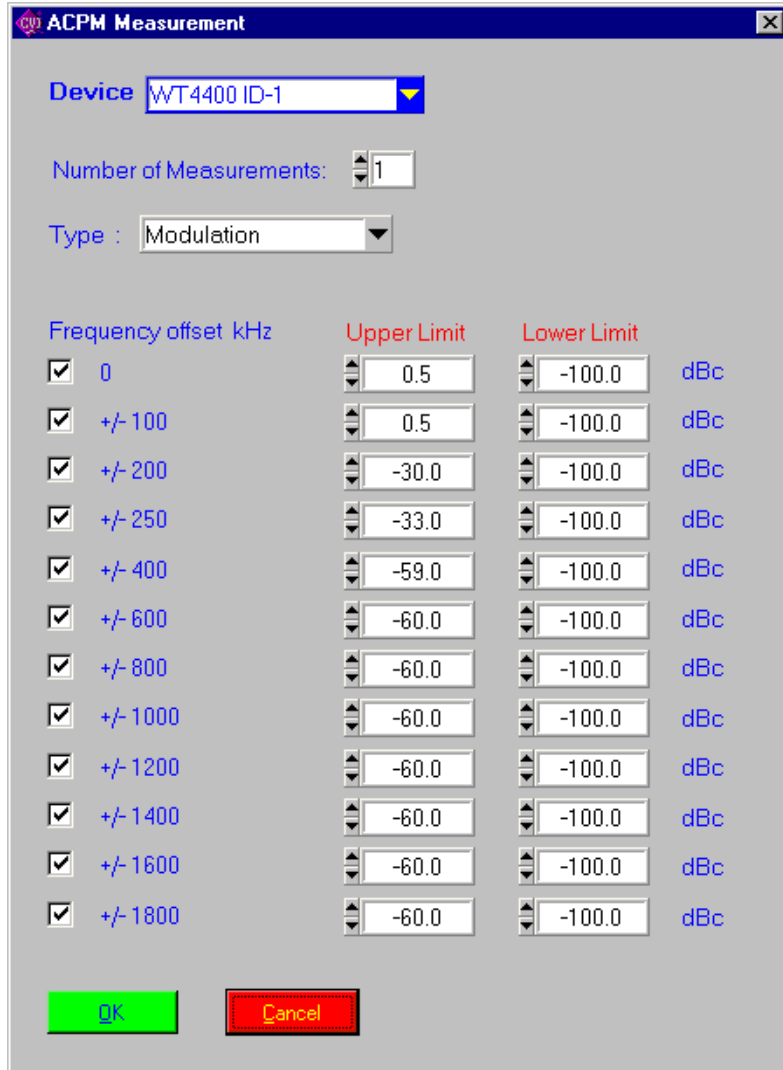
Description

Purpose: Performs an ACPM Modulation or ACPM Transient Switching measurement.

Caution: –

PASS / FAIL ConditionsTe

PASS: If none of the checked values indicates FAIL, the whole test is PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole test is FAIL.

Test Report

```
ACPM                                PASS
Modulation Spectrum
ACPM -1.8 MHz value   :  -80.9 dBc     PASS [-100.0…-60.0 deg]
ACPM -1.6 MHz value   :  -66.7 dBc     PASS [-100.0…-60.0 dBc]
ACPM 0.0 MHz value    :    0.1 dBc     PASS [-100.0…0.5 dBc]
ACMP +1.6 MHZ value   :  -68.4 dBc     PASS [-100.0…-60.0 dBc]
ACPM +1.8 MHz value   :  -86.4 dBc     PASS [-100.0…-60.0 dBc]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Number of measurements:	Integer 1…10
FreqOff0_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff0:	Double –100…30
LowerLimitFreqOff0:	Double –100…30
FreqOff100_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff100:	Double –100…5
LowerLimitFreqOff100:	Double –100…5
FreqOff200_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff200:	Double –100…0
LowerLimitFreqOff200:	Double –100…0
FreqOff250_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff250:	Double –100…0
LowerLimitFreqOff250:	Double –100…0
....	*.................................*
FreqOff800_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff800:	Double –100…0
LowerLimitFreqOff800:	Double –100…0
FreqOff1000_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff1000:	Double –100…0
LowerLimitFreqOff1000:	Double –100…0
FreqOff1200_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff1200:	Double –100…0
LowerLimitFreqOff1200:	Double –100…0
FreqOff1400_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff1400:	Double –100…0
LowerLimitFreqOff1400:	Double –100…0
FreqOff1600_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff1600:	Double –100…0
LowerLimitFreqOff1600:	Double –100…0
FreqOff1800_on_off:	Integer (0 = off , 1 = on)
UpperLimitFreqOff1800:	Double –100…0
LowerLimitFreqOff1800:	Double –100…0

Remote Control of Test Case

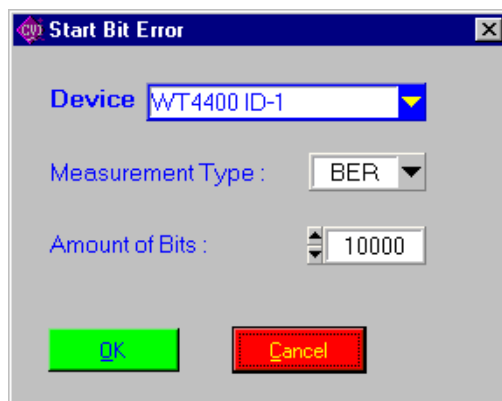|	
Input Buffer:	%d#%d...%d%fl%fl
	Device ID, Number of measurements, FreqOff1800_on_off, UpperLimitFreqOff1800, LowerLimitFreqOff1800
Output Buffer:	No results

Return Value

Returns 1 in case of error, otherwise 0.

7.6   4400 RX Measurements

7.6.1   Start Bit Error Measurement

Function Name

```
StartBitError
            .\gsm4400\wt44measrx.obj
```


Description

Purpose: Starts a bit error measurement of nBits (total). One of the follow-
                    ing Types can be set: BER, RBER and FBER.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Start Bit Error              OK
Measurement: BER
Number of samples : 10000
Bit Error Measurement started
```

Applications

–

Parameters

Device ID:	Integer 1…10
BER Type:	Enumeration:
	• BER = 1
	• RBER = 2
	• FBER = 3
Bits:	Integer 1…100000

Remote Control of Test Case

Input Buffer: %d#%d%d

Device ID, BER Type, Bits
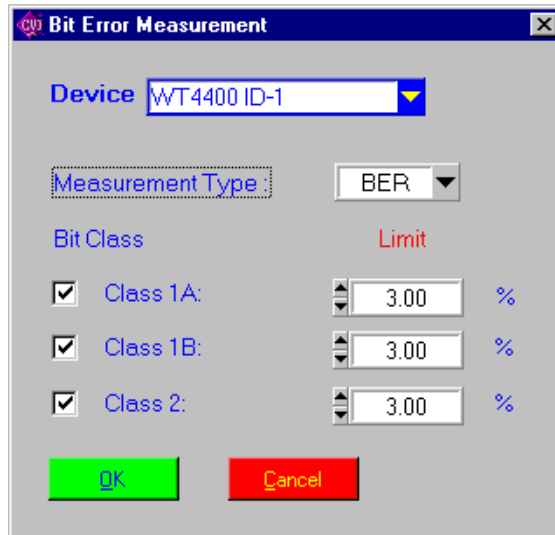
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.6.2   Bit Error Measurement

Function Name

```
BitError
              .\gsm4400\wt4400measrx.obj
```


Description

Purpose: Does the bit error measurement.

Caution: Sets the same Type as in the corrosponding Start Bit Error
                 Measurement test case. The StartBitError test case must be
                 executed prior to the BitError test case.

PASS / FAIL Conditions

PASS: If none of the checked values indicates FAIL, the whole test is
                 PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole
                 test is FAIL.

Test Report

```
Meas BitError             PASS
Bit Error Rate measured
Class 1A                : 0.000 %     PASS [3.0]
Class 1B                : 0.000 %     PASS [3.0]
Class 2                 : 0.037 %     PASS [3.0]
```

Applications

–

Parameters

Device ID:	Integer 1…10
Class1A on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitClass 1A:	Double 0…100
Class1B on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitClass 1B:	Double 0…100
Class2 on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitClass 2:	Double 0…100

Remote Control of Test Case

Input Buffer: %d#%d%lf%d%lf%d%lf

Device ID, Class1Aon/off, UpperLimitClass1A, Class1Bon/off, UpperLimitClass1B, Class2on/off, UpperLimitClass2
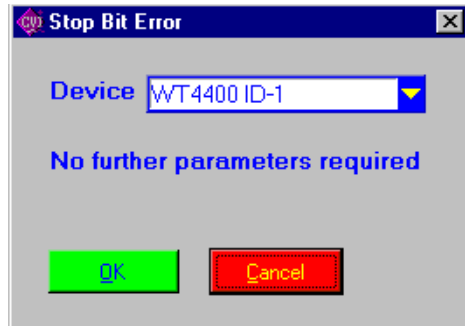
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.6.3   Stop Bit Error Measurement

Function Name

```
StopBitError
              .\gsm4400\wt4400measrx.obj
```

Description

Purpose: Stops the bit error measurement.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
StopBitError                        OK
Bit Error Measurement stopped
```

Applications

–

Parameters

Device ID: Integer 1…10

Remote Control of Test Case

Input Buffer: %d#

                      Device ID
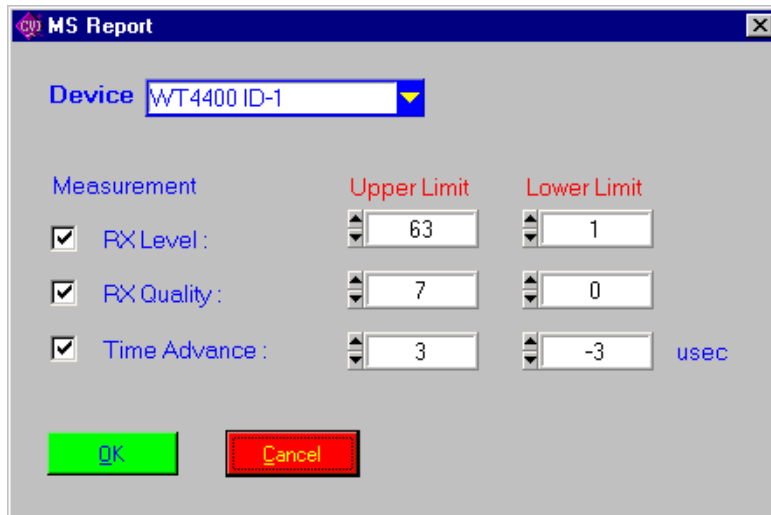
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.6.4   MS Report

Function Name

```
MS Report
                .\gsm4400\wt44measrx.obj
```


Description

Purpose: The mobile measures the RX Level, RX Quality and the Time
                    Advance.

Caution: –

PASS / FAIL Conditions

PASS: If none of the checked values indicates FAIL, the whole test is
                    PASS.

FAIL: If at least one of the checked values indicates FAIL, the whole
                    test is FAIL.

Test Report

```
MS Report           PASS
RX Level          : 15 (-95 dBm) PASS [15…18]
RX Quality        : 0 (<0.2%)    PASS [0…7]
Time Advance      : 0 μsec       PASS [-3…3 μsec]
```

Applications

–

Parameters

Device ID:	Integer 1…10
RX Level on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitRXLevel:	Integer 1…63
LowerLimitRXLevel:	Integer 1…63
RX Quality on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitRXQuality:	Integer 0…7
UpperLimitRXQuality:	Integer 0…7
Time advance on/off:	Enumeration:
	• ON = 1
	• OFF = 0
UpperLimitTimeAdvance:	Integer 0…10
LowerLimitTimeAdvance:	Integer –10…0

Remote Control of Test Case

Input Buffer: %d#%d%d%d%d%d%d%d%d%d

Device ID, RXLevelon/off, UpperLimitRXLevel, LowerLimitRXLevel, RXQualityon/off, UpperLimitRXQuality, LowerLimitRXQuality, TimeAdvanceon/off, UpperLimitTimeAdvance, LowerLimitTimeAdvance

Output Buffer: No results

Return Value

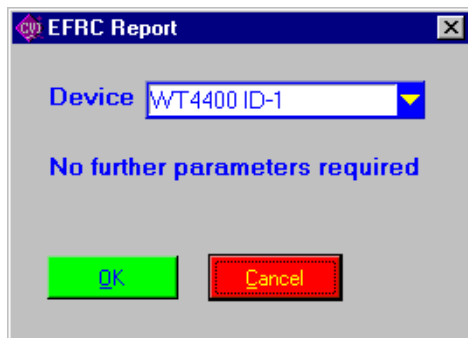Returns 1 in case of error, otherwise 0.

7.6.5   EFRC Report

Function Name

```
EFRC Report
                .\gsm4400\wt44measrx.obj
```


Description

Purpose: Checks whether the MS device is enhanced full rate capable or
                    not.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
EFRC Report                      OK
Enhanced Full Rate Capability:  NO
```

Applications

–

Parameters

Device ID: Integer 1…10

Remote Control of Test Case

Input Buffer: %d#

                      Device ID

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.
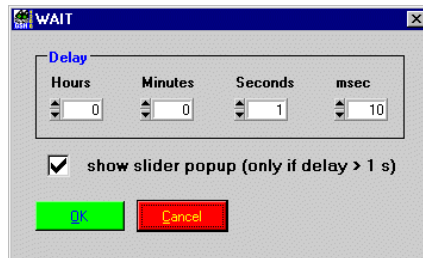
7.7   Auxiliary Test Cases (Tool Kit Functions)

7.7.1   Waiting Time (Delay in [ms])

Function Name

```
_wait
            .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Wait for a specified period. The overall resolution of a time delay can't be better than around 0.1 sec. If a better time resolution is required, internal functions of the test set have to be used.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Delay 2 s                 CONTINUE
    wait 2000 [msec]
```

Applications

–

Parameters

Delay: Integer 100…10000000 [msec]

Remote Control of Test Case

Input Buffer: %d#
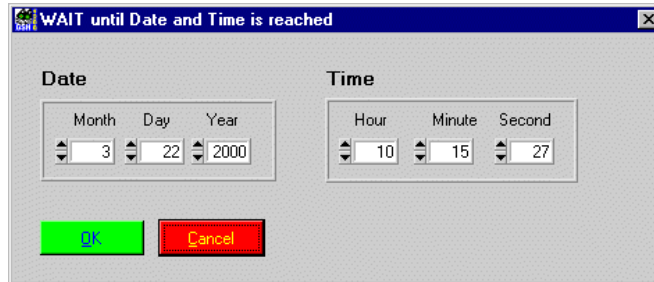
Delay

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.7.2   Wait until a Predefined Date / Time is Reached

Function Name

```
_wait_until_time
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Wait until a specified date and time. The overall resolution of a time delay cannot be better than around 1 sec.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Wait                            PASS
```

Applications

–

Parameters

Year:	Integer 1997…2020
Month:	Integer 1…12
Day:	Integer 1…31
Hour:	Integer 0…24
Minute:	Integer 0…59
Second:	Integer 0…59

Remote Control of Test Case

Input Buffer: %d#%d#%d#%d#%d#%d#

Year, Month, Day, Hour, Minute, Second
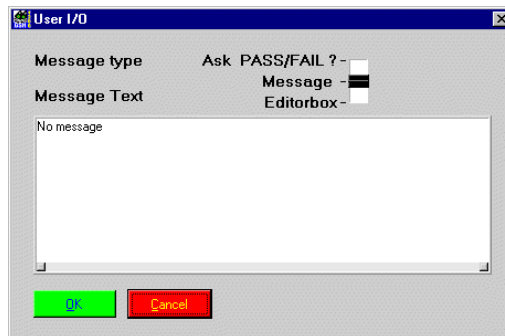
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.7.3 Popup Message or Question towards User

Function Name

```
_user_io
              .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: This test case allows an interaction with the user. A user-defined message text is displayed when running this test, next test case starts after "OK" is pressed. In a second mode ("Ask PASS/FAIL") the user is asked a question that can be answered "Yes" or "No".

Do not use the "#" character. Do not use empty lines between lines containing text.

Caution: –

PASS / FAIL Conditions

PASS: If the user answers "Yes", the test case is considered PASS.

FAIL: If the User answers "No", this test case is considered FAIL.

Test Report

```
Message                    PASS
    Please change the frequency.
```

Applications

–

Parameters

MessageType: Integer 1...3
       PASS/FAIL = 1
       Message = 2
       Editor Box = 3
Line Number: Integer 1...10
Message Line 1...10: String begun and ended with @

Remote Control of Test Case

Input Buffer: %d#%d#%s#%s#%s#%s#%s#%s#%s#%s#%s#%s#

       Message Type, Line Number, Message Line 1, Message Line 2, …

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.7.4   Send SCPI Command to Instrument and Read Result

Function Name

```
_scpi_io
              .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Sends user-defined SCPI commands to the specified instrument via the opened interface. If a query is sent, the response is displayed.

No PASS/FAIL is derived from the received result string.

Please keep in mind that commands sent to an instrument in this way may conflict with settings that are done using preceding or subsequent test cases.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
PCPI                              PASS
    *RST;
```

Applications

–

Parameters

Device ID: Integer 1…10
Line Number: Integer 1…10
SCPI Line 1...10:   String containing the SCPI commands.

Remote Control of Test Case

Input Buffer: %d#%d#%s#%s#%s#%s#%s#%s#%s#%s#%s#%s#

                    Device ID, Line Number, SCPI Line 1, SCPI Line 2, …
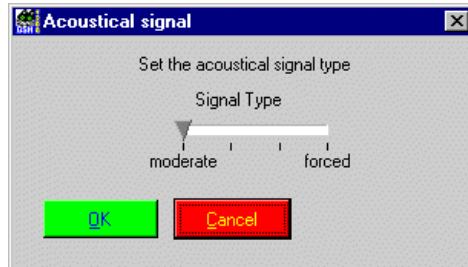
Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.7.5 Beep

Function Name

```
_acoustical_signal
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Generates an acoustical signal (beep).

May be used to alert the user when a specific test case is reached, or when a test sequence is about to end. This test case may also be used to alert the user when a specific preceding test failed.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
BEEP                            PASS
```

Applications

–

Parameters

Signal Type: Integer 0 (moderate)…3 (forced)

Remote Control of Test Case

Input Buffer: %d#

                    Signal Type

Output Buffer: No results

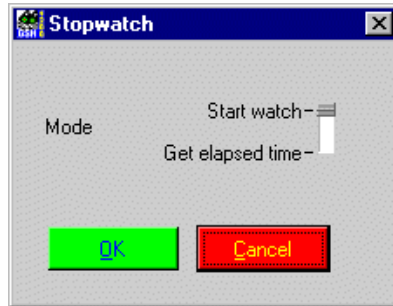**Return Value**

Returns 1 in case of error, otherwise 0.

7.7.6   Measure Elapsed Time between 3 Calls of this Test

Function Name

```
_stopwatch
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Measures elapsed time between first call of this test case (start of stopwatch) and subsequent calls of the same test case.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Start                                           PASS
     start stopwatch
Stop                                            PASS
     stop stopwatch, time passed: 38750 [msec]
```

Applications

–

Parameters

Mode: Enumeration:
                 Start stopwatch = 1, Stop stopwatch & get elapsed time = 2

Remote Control of Test Case

Input Buffer: %d#

                        Mode

Output Buffer: No results

Return Value
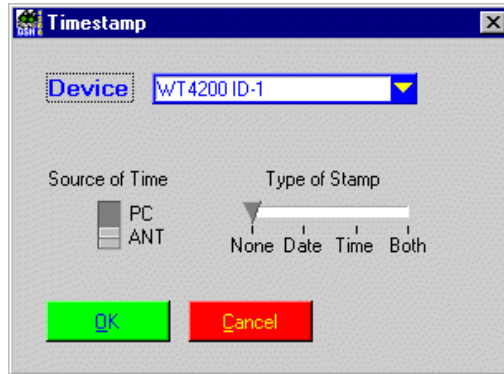
Returns 1 in case of error, otherwise 0.

7.7.7   Print Time Stamp to Report

Function Name

```
_time_stamp
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Inserts a time stamp in the report file.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
time_stamp                      PASS
```

Applications

–

Parameters

Device ID:	Integer 1…10
Source:	Enumeration:
	PC = 0, ANT-20 = 1
Type:	Enumeration:
	None = 0, Date = 1, Time = 2, Both = 3

Remote Control of Test Case

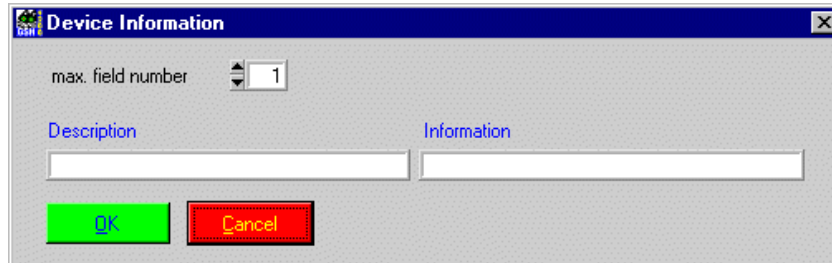|	
Input Buffer:	%d#, %d,%d
	Device ID#, Source, Type
Output Buffer:	No result

Return Value

Returns 1 in case of error, otherwise 0.

7.7.8   Entry Fields for UUT / User Info

Function Name

```
_show_info_field
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Insert UUT information to report file.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
show_info_field          OK
UUT Type: XYZ
Serial Number: 123
Technican: John Smith
```

Applications

–

Parameters

Max. field number: Integer 1…15
Description 1…15:   string
Information 1…15:   string

Remote Control of Test Case

Input Buffer: %#,%d,#%s#,#%s#,...#%s#

    %# max field number, #Description1#, #Information1# ... #Description15#,#Information15#

Output Buffer: No result
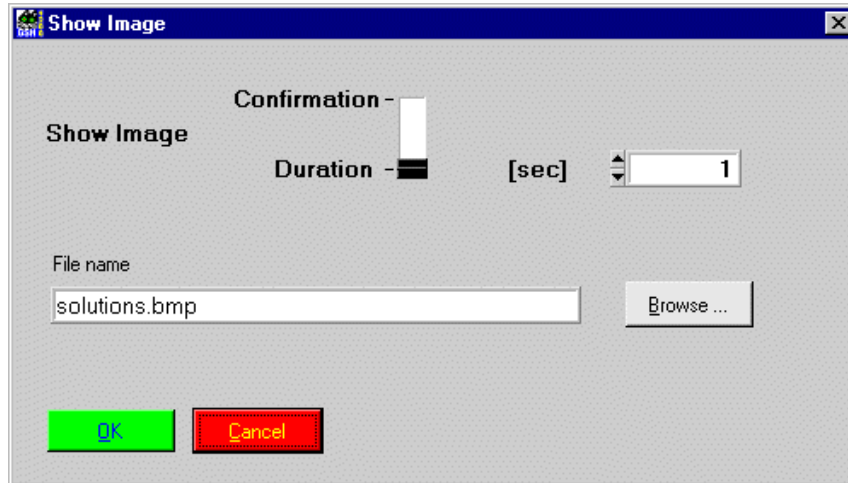
7.7.9   Show Bitmap (e.g. Picture of Cabling)

Function Name

```
_show_image
                .\toolkit\toolkit.obj
```

User Interface

Description

Purpose: Displays a picture for some informations.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
show_image:                 OK
```

Applications

–

Parameters

Type Enumeration:	Configuration = 1, Donation = 2
Wait time:	Double 1…1000
File name:	string

Remote Control of Test Case

Input Buffer: 1#%d,%lf,#%s#
                   1#Type, Wait Time, #File Name

Output Buffer: No results.

Return Value

Returns 1 in case of error, otherwise 0.

Publication History

Revision	Comment
0102-110-A	First revision.
0210-110-A	New company name.
0304-125-A	New software version takes IMEI check digit and SCPI command changes into account.

Worldwide Headquarter and Regional Sales Headquarter

Regional Sales Headquarters

West Europe/Middle East/ Africa/Asia Pacific

Willtek Communications GmbH
Gutenbergstr. 2–4
85737 Ismaning
Germany
Tel: +49 (0)89 99641-0
Fax: +49 (0)89 99641 160
info@willtek.com

United Kingdom/Ireland/ Benelux

Willtek Communications Ltd.
Roebuck Place
Roebuck Road
Chessington
Surrey KT9 1EU
United Kingdom
Tel: +44 (0)20 8408 5720
Fax: +44 (0)20 8397 6286
willtek.uk@willtek.com

North America/Latin America

Willtek Communications Inc.
7369 Shadeland Station Way, Suite 200
46256 Indianapolis
Indiana
USA
Tel: +1 317 595 2021
Fax: +1 317 595 2023
willtek.us@willtek.com

To find your local service center and sales office
go to: www.willtek.com

will′tek