

will'tek

Willtek 41000/42000

CATS Test Sequencer



user's guide

version 2.01

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1 Introduction

Automatic testing has become essential for achieving a high degree of test depth, test speed and test repeatability. To save test time and to make full use of expensive test equipment, it is often necessary to run long-term automatic test campaigns overnight or even over the weekend.

The popular National Instruments LabWindows CVI / Test Executive product was selected as a platform for the development of a family of test automation products, called CATS (**C**omfortable **A**utomated **T**est **S**equencer).

1.1 Willtek CATS

The CATS 4100/4200 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 4100/4200 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 4100/4200 CATS test cases

The test cases described in this documentation are designed for the integration of the Willtek 4100 or 4200 Mobile Service 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 4100/4200 and work only with a one-channel system. No channel masking is provided.

The 4100/4200 test cases are encapsulated in 8 object files and grouped according to their functions. Seven first object files listed below are grouped in the **gsm4200** directory and the last one is located in the **toolkit** directory:

1. **Call functions**, which read the call parameters and provide a call to the mobile station or vice versa.
2. **Configuration functions**, which set the network type, BCCH/TCH (channel number and power level), the audio loop, the pre-attenuations, RF Generator output level and GSM modulation.
3. **Instrument functions**, which do a device selftest, reset the device, get the system information, set and get the event status register.
4. **Measurement functions**, which get the operation and signaling status register, do the following measurements and compare the results to the given limits:
 - Peak phase error, RMS phase error, frequency error, burst duration and peak power.
 - Power/time template measurements.
 - Bit Error Rate and Frame Erasure Rate measurements.
 - Received transmitted power for TX Power Tuning and TX I/Q Tuning.The measurement functions return PASS or FAIL.

5. **Asynchron functions**, which set the asynchronous mode or set the state of the auto synchronize mode in the asynchronous test mode.
6. **Tool kit functions**, which give us possibility to get device informations, to send SCPI commands, to create a user pop-up, etc.

Remark on the Willtek 4107S Mobile Service Tester:

All test cases described in this document are designed primarily for the 4200. The 4100 can do the same test cases, but with a reduced set of parameters. The differences between the 4200 and the 4100 are marked in the specific test case descriptions.

2 Standard test sequences

This section contains a brief explanation of the terms test sequence and test case, together with descriptions of the sequences supplied by Willtek with the CATS Test Sequencer.

2.1 General

The CATS 4100/4200 Test Sequencer tests automation products, provides the framework for running, creating or modifying sequences of test cases. The CATS 4100/4200 Test Sequencer is supplied with a complete set of standard test cases. Test case libraries can be ordered as options for the CATS Test Sequencer.

The CATS 4100/4200 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 4100/4200 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 <CATS installation path>\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 4100/4200 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 4100/4200 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 four standard test sequences, which allow testing of either a single or a dual-band mobile.

- _demo.squ
- _toolkit.squ
- demo_1800.squ
- demo_900.squ

2.2.1 demo_900.squ and _demo.squ

This sequence executes a function test on a single-band mobile. The function parameters are checked for a low, mid and high channel of the band. The audio loop-back is also tested and the call is set up again when the user changes the antenna connection from internal to external. The bit error rate is also checked for three channels within the band. Different pre-attenuations are set for the different antennas.

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 Set_Network_Type	Sets the base station network type: GSM 900 (GSM), GSM 1800 (PCN), GSM 1900 (PCS), GSM 900/1800 (GSM/PCN) or GSM 900/1900 (GSM/PCS) depending on the network type needed for the mobile.
Pre Att. 1.5dB Set_Pre_Attenuation	Sets the RX and TX pre-attenuation of the 4100/4200.
TCH:1 Power:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Output Level:-70dBm Set_RF_Output_Level	Sets the RF generator output level in dBm of the 4100/4200.
Mobile Call->WT4200 Mobile_Call_to_WT42xx	4100/4200 expects a call from the mobile. The network should have been set up previously. Dial a number on the mobile to set up the connection.
Dial No. _user_io	Opens a pop-up window showing the dialed number. The sequence continues when you click on OK.
Call->WT4200 exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
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 TCH:1 Pow:5 Check_Measure	Executes a measurement using the specified bursts.
TCH:65 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Measure TCH:65 Pow:5 Check_Measure	Executes a measurement using the specified bursts.
TCH:124 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.

Table 2-1 "demo_900.squ" and "_demo.squ" test sequences: test cases used and their functions

Test case, function name	Function
Measure TCH:124 Pow:5 Check_Measure	Executes a measurement using the specified bursts.
Release Call->WT4200 Release_Mobile	The 4100/4200 releases the connection to the mobile.
Call->WT4200 end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
Output Level:-103dBm Set_RF_Output_Level	Sets the RF generator output level in dBm of the 4100/4200.
Call WT2000->Mobile WT42xx_Call_to_Mobile	The 4100/4200 sets up a connection to the mobile. The network should have been set up previously. As soon as the mobile rings, press the "hook off" button on the mobile to set up the connection.
Go Off Hook _user_io	Opens a pop-up window displaying the message "Please go off hook". The sequence continues when you click on OK.
WT4200->call exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
TCH:5 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Bert TCH:5 Pow:5 Check_Measure_Ber_and_Fer	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.
TCH:70 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Bert TCH:70 Pow:5 Check_Measure_Ber_and_Fer	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.
TCH:120 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Bert TCH:120 Check_Measure_Ber_and_Fer	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.
Close Audio Loop Set_ALoop	Opens a window for activating the audio loopback of the 4100/4200 for the chosen network type. Speak a test message into the mobile. The echo should be heard after one second, otherwise there are signal path problems.
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 on "No".
Release WT 4200->Call Release_Mobile	The 4100/4200 releases the connection to the mobile.

Table 2-1 "demo_900.squ" and "_demo.squ" test sequences: test cases used and their functions

Test case, function name	Function
WT4200->Call end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
Output Level:-60 dBm Set_RF_Output_Level	Sets the RF generator output level in dBm on the 4100/4200.
Pre Att. 5.5dB Set_Pre_Attenuation	Sets the RX and TX pre-attenuation of the 4100/4200.
Disconnect Antenna _user_io	Opens a pop-up window displaying the message "Disconnect the external antenna and connect the internal". Follow the further instructions in the message. The sequence continues when you click on OK.
WT4200->Mobile WT42xx_Call_to_Mobile	The 4100/4200 sets up a connection to the mobile. The network should have been set up previously. As soon as the mobile rings, press the "hook off" button on the mobile to set up the connection.
#1 Go Off Hook _user_io	Opens a pop-up window displaying the message "Please go off hook". The sequence continues when you click on OK.
WT4200->Mobile exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
#1 TCH:1 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
#1 Measure TCH:1 Check_Measure	Executes a measurement using the specified bursts.
#1 TCH:65 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
#1 Measure TCH:65 Check_Measure	Executes a measurement using the specified bursts.
#1 TCH:124 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
#1 Measure TCH:124 Check_Measure	Executes a measurement using the specified bursts.
Release Mobile-WT420 Mobile_Release	The mobile releases the connection to the 4100/4200. Press the release button on the mobile to close down the connection.
Release Mobile user_io	Opens a pop-up window displaying the message "Release the call from the mobile". The sequence continues when you click on OK.
Mobile->WT4200 end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the actual status of the 4100/4200.
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 "demo_900.squ" and "_demo.squ" test sequences: test cases used and their functions

2.2.2 demo_1800.squ

This sequence executes a function test on a dual-band mobile. The function parameters are checked on three channels in the 900 MHz and the 1800 MHz bands. The audio loopback is also tested and the call is set up again when the user changes the antenna connection from internal to external.

The bit error rate is also checked for three channels within the band. Different pre-attenuations are set for the different antennas.

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 Set_Network_Type	Sets the base station network type: GSM 900/1800.
Pre Att. 1.5dB Set_Pre_Attenuation	Sets the RX and TX pre-attenuation of the 4100/4200.
TCH:1 Power:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Output Level:-70dBm Set_RF_Output_Level	Sets the RF generator output level in dBm of the 4100/4200.
Mobile Call->WT4200 Mobile_Call_to_WT42xx	4100/4200 expects a call from the mobile. The network should have been set up previously. Dial a number on the mobile to set up the connection.
Dial No. _user_io	Opens a pop-up window showing the dialed number. The sequence continues when you click on OK.
Call->WT4200 exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
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.
TCH:62 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Measure TCH:62 Check_Measure	Executes a measurement using the specified bursts.
TCH:700 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Measure TCH:700 Check_Measure	Executes a measurement using the specified bursts.

Table 2-2 "demo_1800.squ" test sequence: test cases used and their functions

Test case, function name	Function
Release Call->WT4200 Release_Mobile	The 4100/4200 releases the connection to the mobile.
Call->WT4200 end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
Output Level:-103dBm Set_RF_Output_Level	Sets the RF generator output level in dBm of the 4100/4200.
Call WT2000->Mobile WT42xx_Call_to_Mobile	The 4100/4200 sets up a connection to the mobile. The network should have been set up previously. As soon as the mobile rings, press the "hook off" button on the mobile to set up the connection.
Go Off Hook _user_io	Opens a pop-up window displaying the message "Please go off hook". The sequence continues when you click on OK.
WT4200->call exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
#1 TCH:62 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Bert TCH:62 Check_Measure_Ber_and_Fer	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.
#1 TCH:700 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
Bert TCH:700 Check_Measure_Ber_and_Fer	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.
Close Audio Loop Set_ALoop	Switches in the audio loopback of the 4100/4200 for the chosen network type. Speak a test message into the mobile. The echo should be heard after one second, otherwise there are signal path problems.
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 on "No".
Release WT 4200->Call Release_Mobile	The 4100/4200 releases the connection to the mobile.
WT4200->Call end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
Output Level:-60 dBm Set_RF_Output_Level	Sets the RF generator output level in dBm of the 4100/4200.
Pre Att. 5.5dB Set_Pre_Attenuation	Sets the RX and TX pre-attenuation of the 4100/4200.

Table 2-2 "demo_1800.squ" test sequence: test cases used and their functions

Test case, function name	Function
Disconnect Antenna _user_io	Opens a pop-up window displaying the message "Disconnect the external antenna and connect the internal". Follow the further instructions in the message. The sequence continues when you click on OK.
WT4200->Mobile WT42xx_Call_to_Mobile	The 4100/4200 sets up a connection to the mobile. The network should have been set up previously. As soon as the mobile rings, press the "hook off" button on the mobile to set up the connection.
#1 Go Off Hook _user_io	Opens a pop-up window displaying the message "Please go off hook". The sequence continues when you click on OK.
WT4200->Mobile exist Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
#2 TCH:62 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
#1 Measure TCH:62 Check_Measure	Executes a measurement using the specified bursts.
#2 TCH:700 Pow:5 Set_TCH	Sets the traffic channel number and power level of the 4100/4200 for the chosen network type.
#1 Measure TCH:700 Check_Measure	Executes a measurement using the specified bursts.
Release Mobile-WT420 Mobile_Release	The mobile releases the connection to the 4100/4200. Press the release button on the mobile to close down the connection.
Release Mobile _user_io	Opens a pop-up window displaying the message "Release the call from the mobile". The sequence continues when you click on OK.
Mobile->WT4200 end Check_Signalling_Register	Calls the signaling register of the 4100/4200, which gives information about the current status of the 4100/4200.
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 2-2 "demo_1800.squ" test sequence: test cases used and their functions

2.2.3 `_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 2-3 "`_toolkit.squ`" test sequence: test cases used and their functions

3 Commissioning

This section contains information about:

- System requirements
- Install your CATS Test Sequencer
- Start your CATS Test Sequencer

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

3.2 Items included

The CATS software for 4100/4200 is packed onto three 1.44 MB floppy disks.

- The first floppy disk contains **setup.exe** and **cats4200.001**.
- The other two floppy disks contain **cats4200.002** and **cats4200.003**.

3.3 Configuring the 4200

To ensure that the 4200 and the CATS software operate together without errors, the following settings must be made on the 4200.

1. Connect the 4200 to the serial port (COM1 or COM2) of the PC to use it with the CATS software on your PC.
2. Press softkey "F5" on the 4200 display.
The 4200 Configuration menu opens.
3. Select the "Serial Port" command using the up/down arrow keys and confirm with [Enter].
4. Set the following values:
 - Baud rate: 38400
 - RXTX lines: Normal
 - Protocol: X-ON/X-OFF

3.4 Installing the CATS 4200 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.

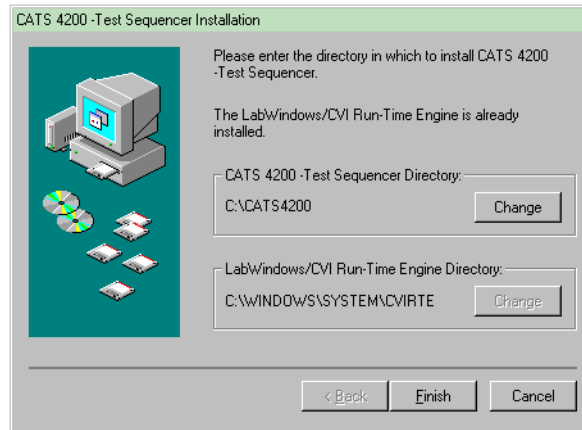


Figure 3-1 “Installation” window

3. Specify the directory where you want the software to be installed.
4. Click on the [Finish] button.
The program will be installed.
A new folder “CATS 4200” will be created in the Programs folder of the Windows Start menu.

3.5 Starting the CATS 4200 Test Sequencer

Log-in and password

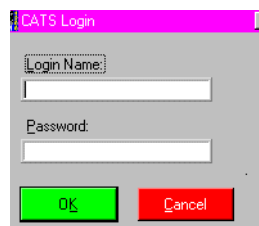
When the software is started, the “CATS Login” window opens first, prompting you to enter the log-in name and password.

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 “cats4200.exe” icon on the Windows Desktop.
The CATS 4100/4200 Test Sequencer software starts.
The “CATS Login” window opens.



2. If necessary, enter the password and confirm it.
The first “CATS Test Sequencer” window is activated.

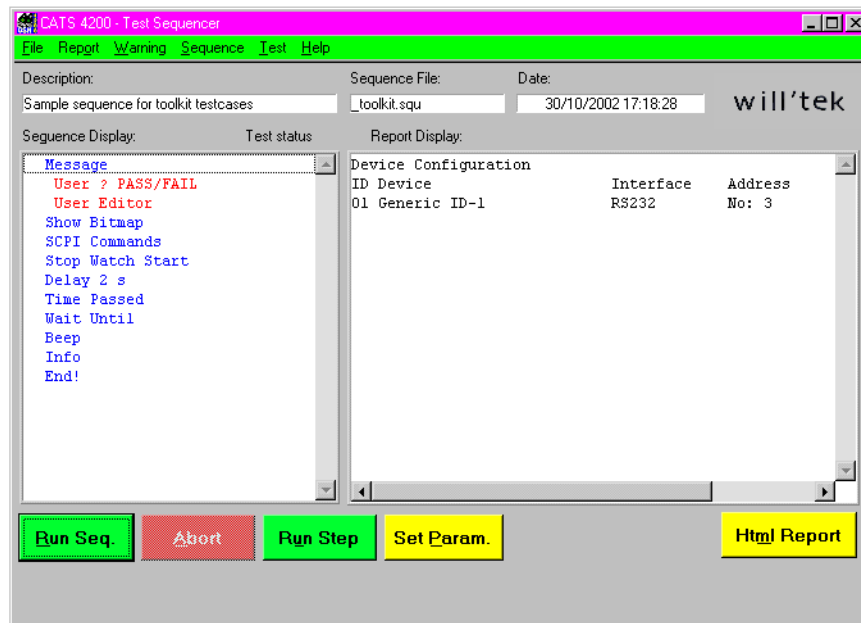


Figure 3-2 “CATS Test Sequencer” window

4 Getting started

This section tells you how to:

- Load test sequences
- Adjust settings
- Start and stop measurements

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 6-20.

4.2 Selecting a test sequence

The first time that the CATS 4100/4200 Test Sequencer is started, the default test sequence “_toolkit.squ” will be opened and shown in the “Sequence Display”.

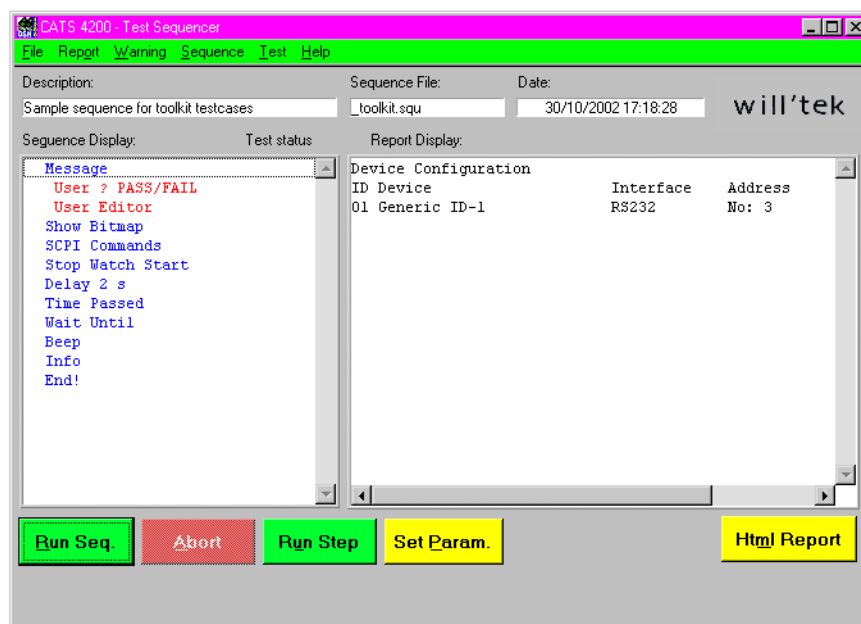


Figure 4-1 Display of loaded test sequence in the “Sequence Display” of the “CATS Test Sequencer” window

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 “.\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.

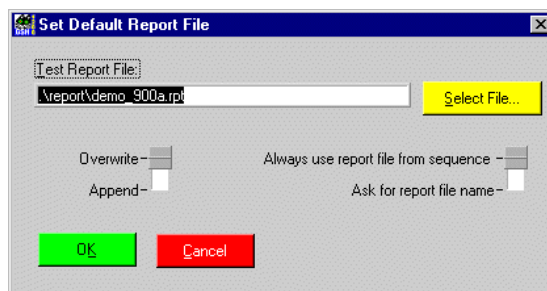
1. Select the “Save As” command in the “File” menu.
The “Save Test Sequence” window opens.
2. Enter a destination folder and a suitable name for the sequence.

4.4 Storing the result files

By default, the result files will be stored in the <CATS installation path>\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.
- or –
- ⇒ 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.
- or –
- ⇒ 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

This section tells you how to

- modify existing test sequences
- create new test sequences

5.1 Sequence editing

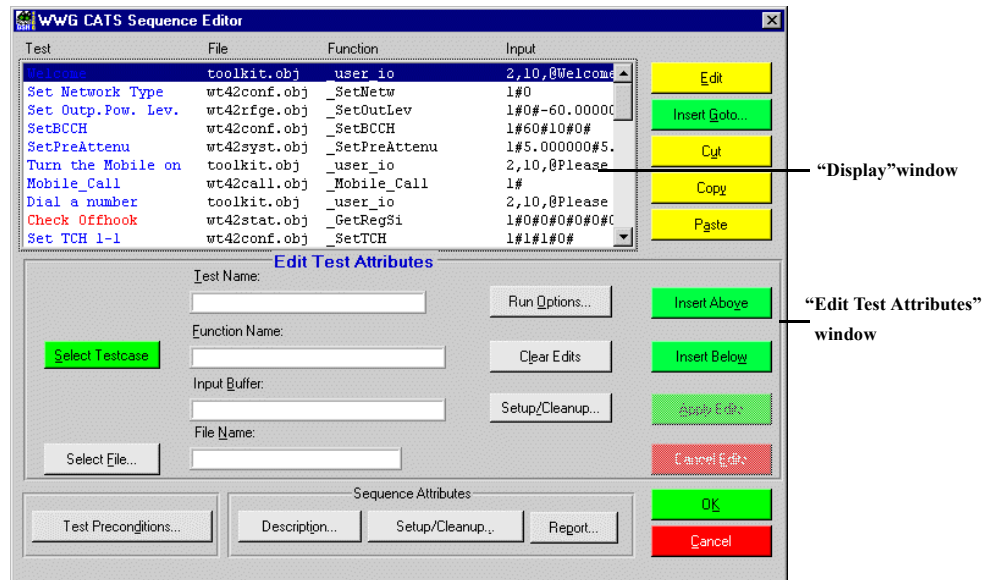


Figure 5-1 “Sequence editor” window

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 4100/4200 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.

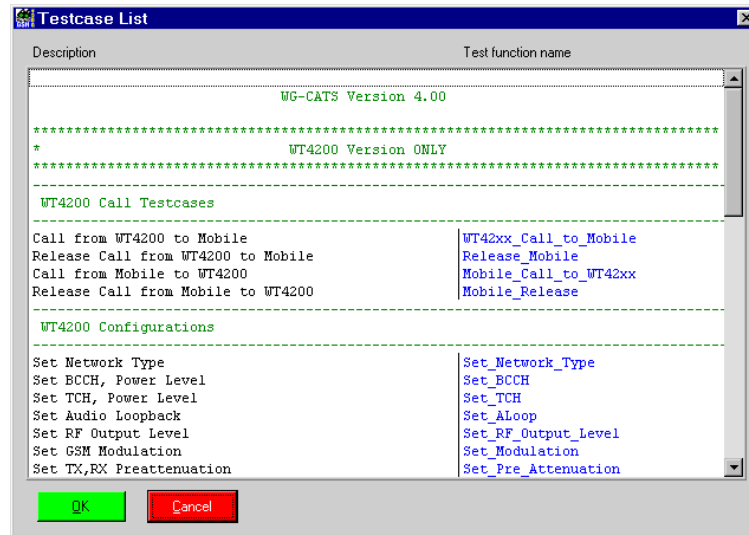


Figure 5-2 “Testcase List” window

- 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.
Wenn 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 sub-sequence 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” window.

- ✓ 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.

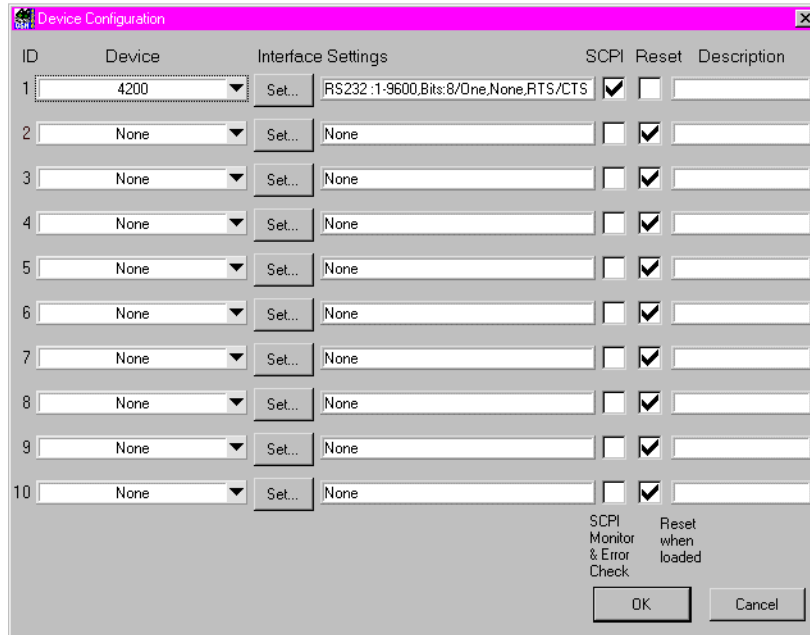


Figure 5-3 Device Configuration

2. Select the requested device.
A new window for the device settings appears.
OR
Click on “Set...” to change the settings of the actually selected device.
Press OK to accept the device settings.

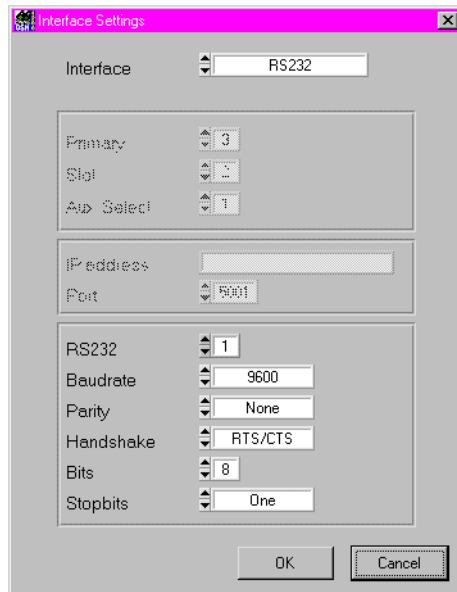


Figure 5-4 “Interface Settings” window for an RS-232-connected device

3. 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

The windows, controls and functions of all variants of the CATS Test Sequencer software are described in this section.

6.1 CATS Test Sequencer window

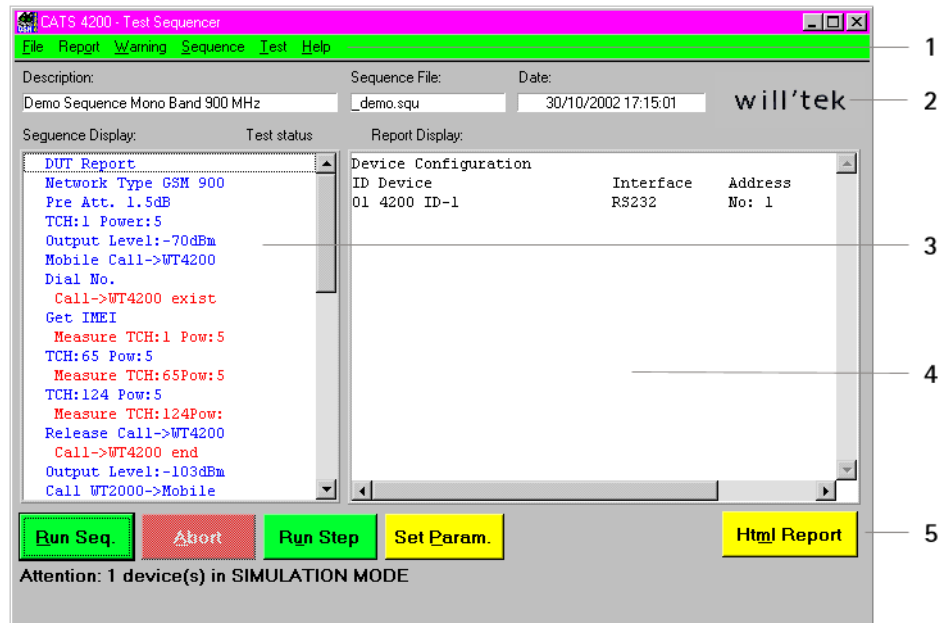


Figure 6-1 “CATS Test Sequencer” window

[1]	<p>Main menu</p> <ul style="list-style-type: none"> • File, see chapter 6.1.1, page 6-1 • Report, see chapter 6.1.2, page 6-3 • 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]	<p>Information line</p> <ul style="list-style-type: none"> • Description, see chapter 6.1.5, page 6-5 • Sequence File, see chapter 6.1.6, page 6-5 • 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 6-6
[5]	Buttons, see chapter 6.1.10, page 6-7 to chapter 6.1.13, page 6-7

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 4100/4200 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

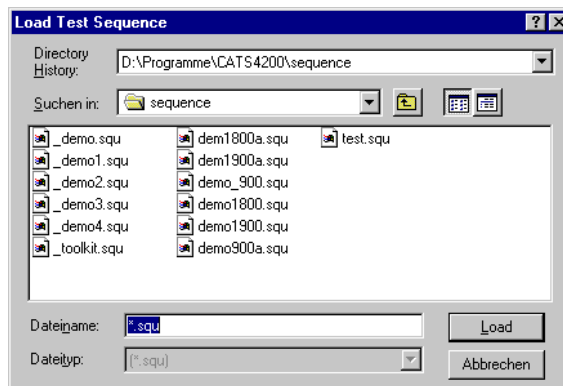


Figure 6-3 “Load Test Sequence” window

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

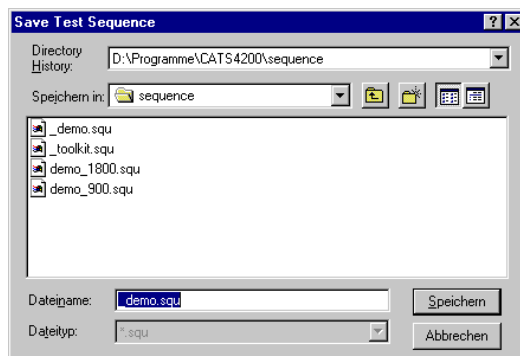


Figure 6-4 “Save Test Sequence” window

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 4100/4200 Test Sequencer software and the current log-in level.

6.1.1.7 Exit

Menu: File – Exit

Meaning: Exits from the CATS 4100/4200 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 6-6.

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 6-6.

6.1.2.3 View HTML

Menu: Report – View HTML

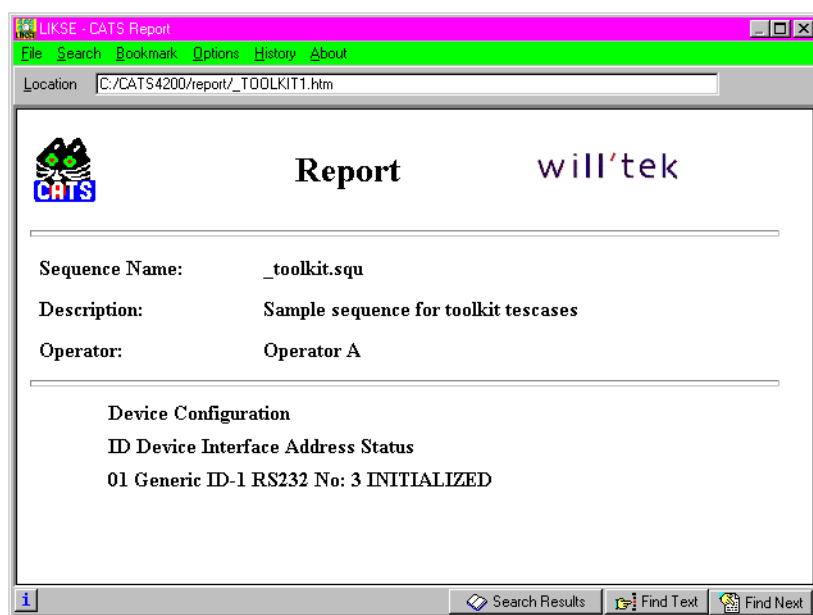


Figure 6-5 “Report” window

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 6-6.

6.1.2.5 Clear

Menu: Report – Clear

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

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

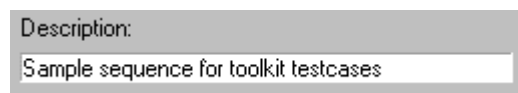


Figure 6-6 “Description Display” area of “CATS Test Sequencer” window

Meaning: User-defined description of test sequence. Defined in the “Test Description” window; see chapter 6.2.8.1, page 6-17.

6.1.6 Sequence File

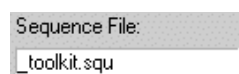


Figure 6-7 “Sequence File Display” area of “CATS Test Sequencer” window

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

6.1.7 Date



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

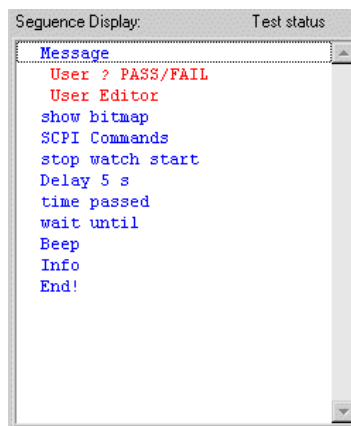


Figure 6-9 “Sequence Display” area of the “CATS Test Sequencer” window

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

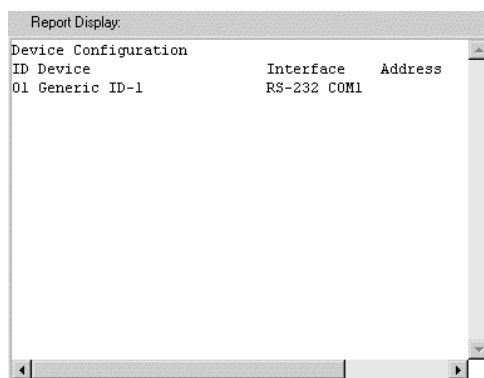


Figure 6-10 “Report Display” area of the “CATS Test Sequencer” window

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 6-19).
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



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

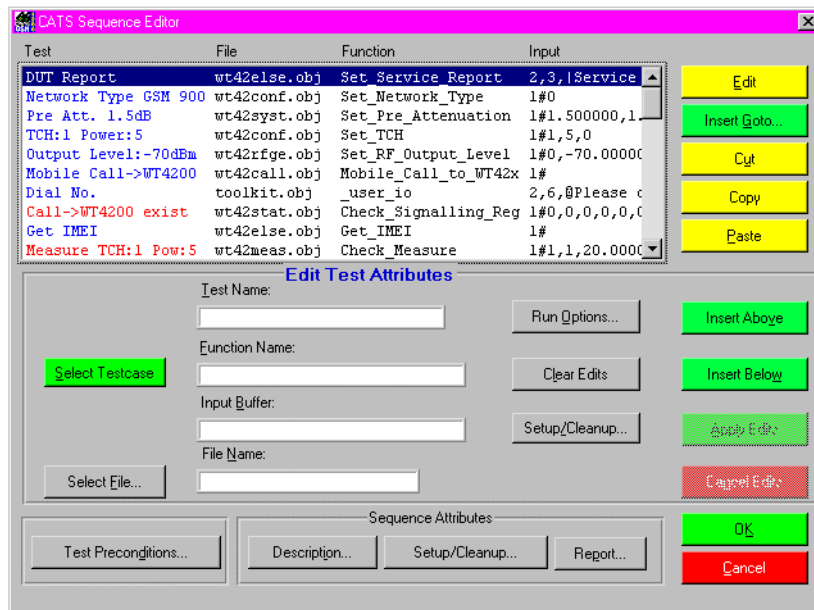


Figure 6-15 “Sequence Editor” window

[1]	Sequence contents <ul style="list-style-type: none"> • “Display” Window, see chapter 6.2.1, page 6-8 • 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 6-10
[3]	Test Preconditions, see chapter 6.2.7, page 6-14
[4]	Sequence Attributes, see chapter 6.2.8, page 6-17

6.2.1 Display window

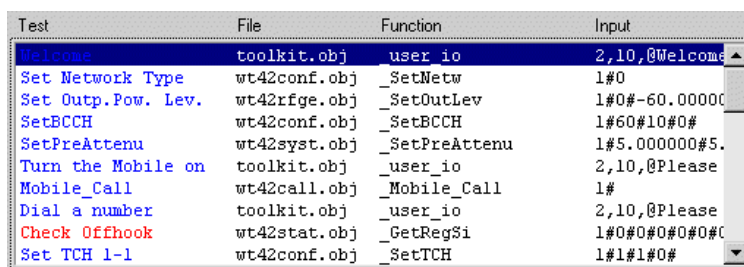


Figure 6-16 “Display window” area of the “Sequence Editor” window

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 6-10.

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.

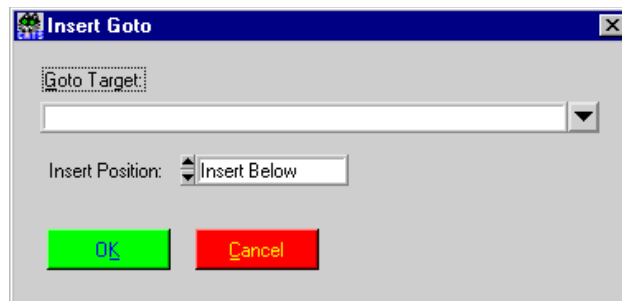


Figure 6-19 “Insert Goto” window

Goto Target	Enter the target for the Goto command
Insert Position	Select position of Goto command <ul style="list-style-type: none"> • Replace: Replace the selected test case. • Above: Insert above selected test case. • Below: Insert below selected test case.

6.2.4 Cut button

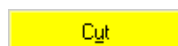


Figure 6-20 [Cut] button in the “Sequence Editor” window

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

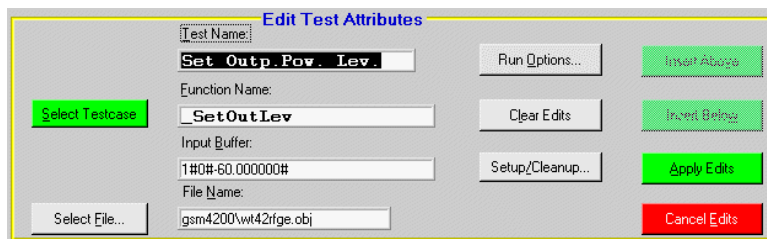


Figure 6-23 “Edit Test Attributes” window area of the “Sequence Editor” window

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 depend 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.

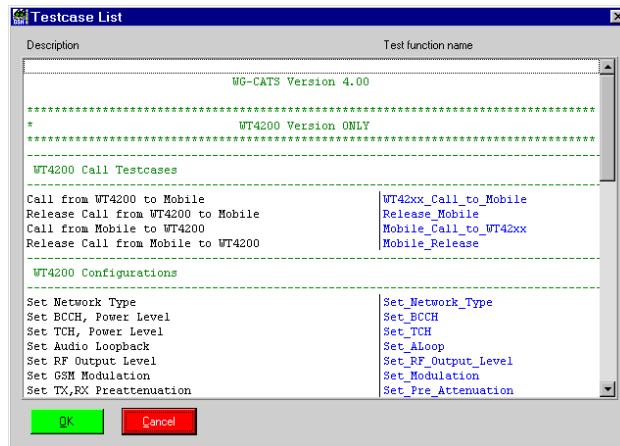


Figure 6-25 “Testcase List” window

Meaning: Lists all available CATS 4100/4200 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.

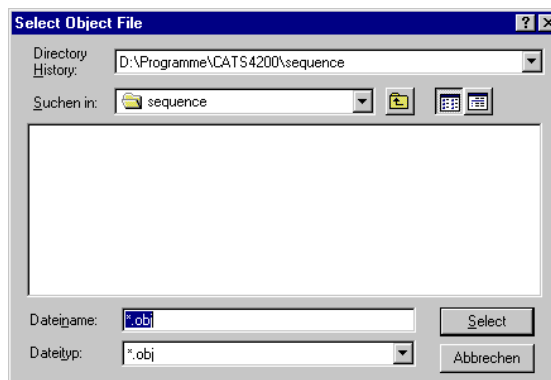


Figure 6-27 “Select Object File” window

Meaning: Select *.obj file in which the test sequence is to be saved.

6.2.6.3 Run Options button



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

Meaning: Specify the Run mode.
Opens the “Test Run Options” window.

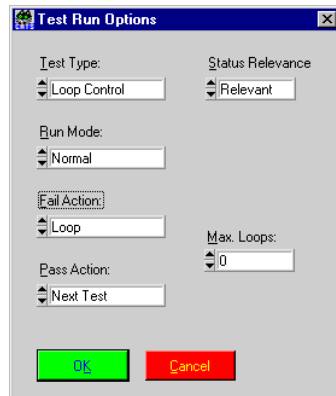


Figure 6-29 “Test Run Option” window

Test Type	<ul style="list-style-type: none"> • Normal • Loop Control
Run Mode	<ul style="list-style-type: none"> • Normal • Skip • Force to Fail • Force to Pass
Fail Action	<ul style="list-style-type: none"> • Next Test • Loop • Stop
Pass Action	<ul style="list-style-type: none"> • Next Test • Loop • Stop
Status relevance	<ul style="list-style-type: none"> • Relevant: Indicator color red Pass and Fail are evaluated • Don't care: Indicator color blue Pass and Fail not evaluated
Max. Loops	<ul style="list-style-type: none"> • Enter maximum number of loops

6.2.6.4 Clear Edits button

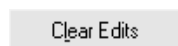


Figure 6-30 [Clear Edits] button in the “Sequence Editor” window

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

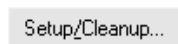


Figure 6-31 [Setup/Cleanup] button in the “Sequence Editor” window

Meaning: Opens the “Test Setup/Cleanup Routines” window for an individual test case. These settings normally do not have to be changed.

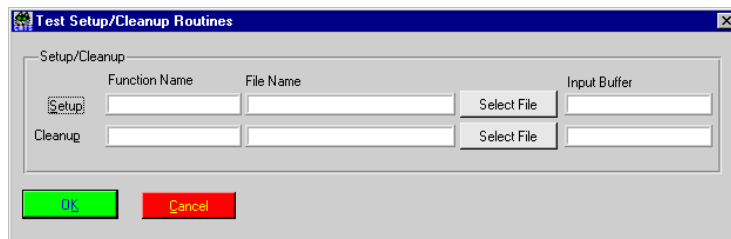


Figure 6-32 “Test Setup/Cleanup Routines” window

Setup	<p>A setup function is executed before a test case.</p> <ul style="list-style-type: none"> • 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	<p>A cleanup function is executed after a test case.</p> <ul style="list-style-type: none"> • 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



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 6-8.

Note: The [Insert Above] button is only available if you have selected a test case from the “Select Test Case 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



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 6-8.

Note: The [Insert Below] button is only available if you have selected a test case from the “Select Test Case 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



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



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

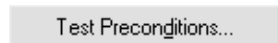


Figure 6-37 [Test Preconditions] button in the “Sequence Editor” window

Meaning: Opens the “Precondition Editor” window.

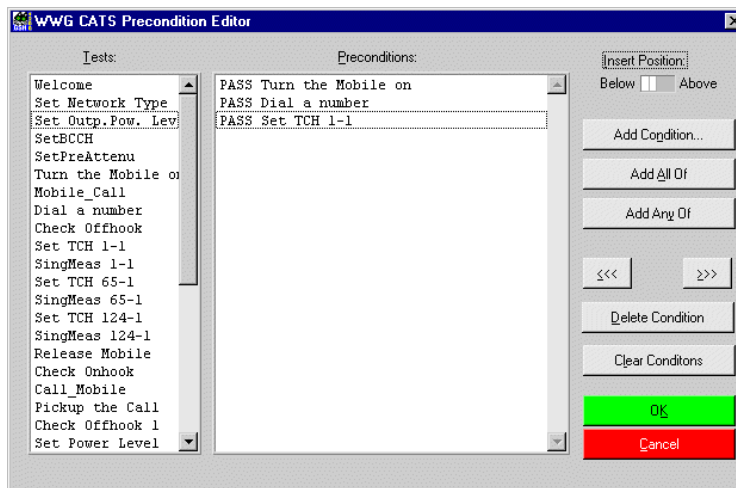


Figure 6-38 “Preconditions Editor” window

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

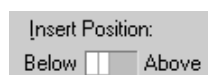


Figure 6-39 [Insert Position] switch in the “Precondition Editor” window

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

6.2.7.2 Add Conditions ... buttons

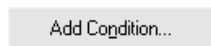


Figure 6-40 [Add Condition ...] button in the “Precondition Editor” window

Meaning: Opens the “Add Condition” window.

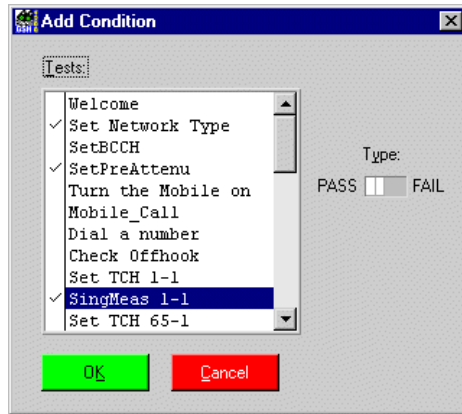


Figure 6-41 “Add Condition” window

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

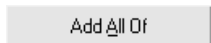


Figure 6-42 [Add All Of] button in the “Precondition Editor” window

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

6.2.7.4 Add Any of button

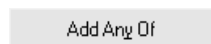


Figure 6-43 [Add Any Of] button in the “Precondition Editor” window

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



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

Meaning: Deletes the selected precondition.

6.2.7.7 Clear Conditions button



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

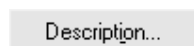


Figure 6-47 [Description] button in the “Sequence Editor” window

Meaning: Opens the “Test Description” window.

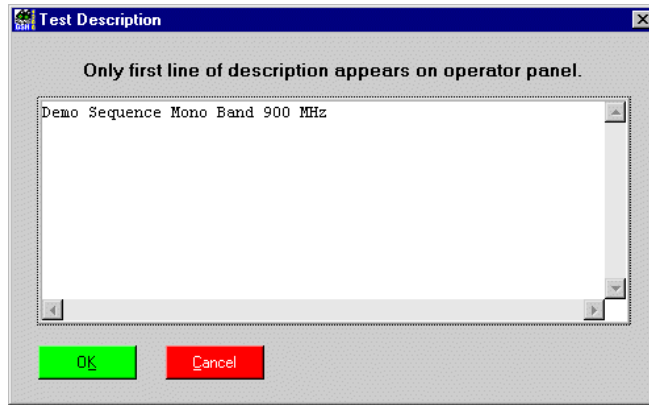


Figure 6-48 “Test Description” window

Meaning: Insert 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

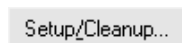


Figure 6-49 [Setup/Cleanup] button in the “Sequence Editor” window

Meaning: Opens the “Sequence Setup/Cleanup Routines” window.

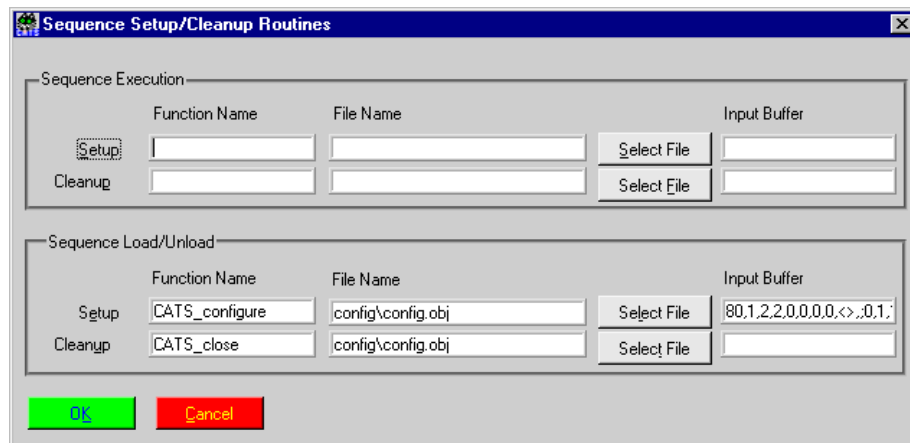


Figure 6-50 “Sequence Setup/Cleanup Routines” Window

Meaning: In the CATS 4100/4200 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 sequences prepared by Willtek.

Setup function	_CATS_configure
Cleanup function	_CATS_close

6.2.8.3 Report button

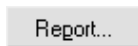


Figure 6-51 [Report] button in the “Sequence Editor” window

Meaning: Opens the “Set Default Report File” window.

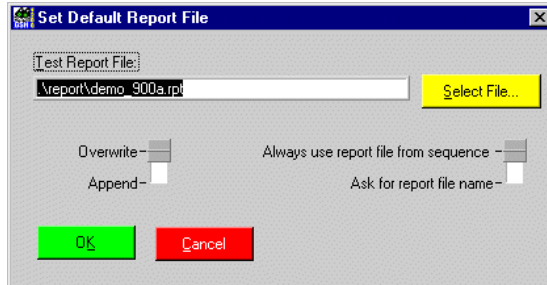


Figure 6-52 “Set Default Report File” window

Test Report File	Select a report file. The default directory for reports is .\REPORT. The default file name extension is *.rpt.
Switch Overwrite – Append	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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

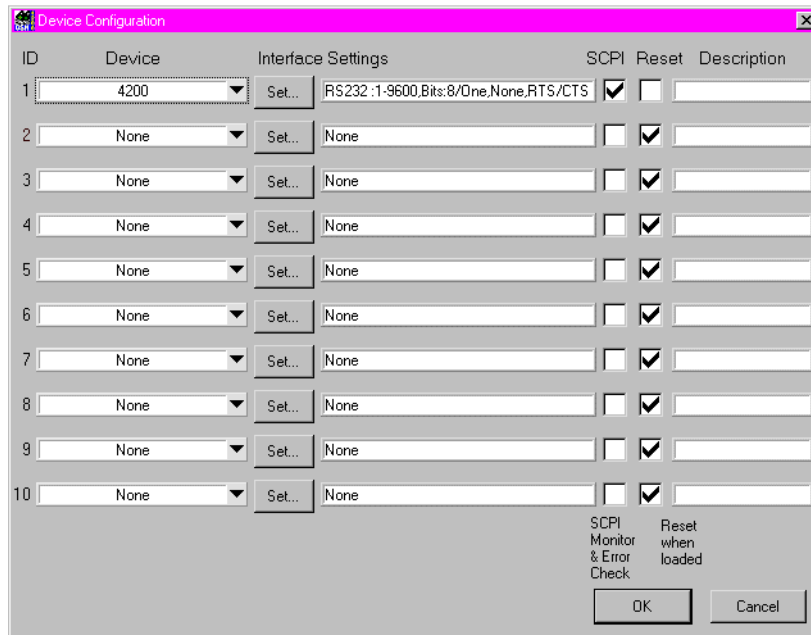


Figure 6-53 “Device Configuration” window

Note: The parameter SCPI (SCPI 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.
SCPI 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.
SCPI (Monitor & Error Check)	This check box enables monitor mode. When activated, all internal SCPI commands transmitted between the CATS 4100/4200 Test Sequencer and the measurement hardware, including warnings and error messages, will be monitored and written into a display window.
Reset	When ticked, the device is reset before the start of the test sequence.
Description	Optional text field to describe the instrument ID.

Each device can be configured on the following window after pressing the “Set...” button.

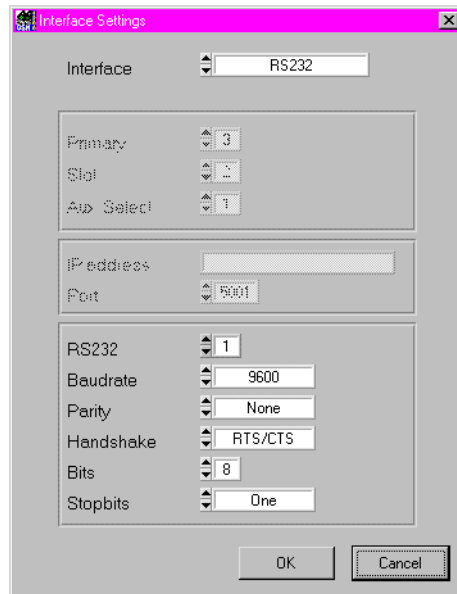


Figure 6-54 "Interface Settings" window

The screen above is an example for the case where a device is connected via serial (RS-232) interface. Other parameters will appear if you select a different interface type e.g. GPIB. Please check with the individual device how it is connected and what the correct settings are.

7 Test cases function overview

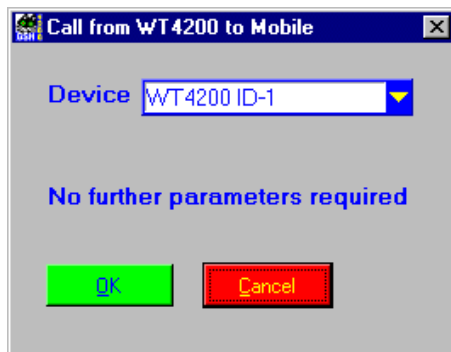
7.1 4100/4200 call test cases

7.1.1 Call from 4100/4200 to mobile

Function Name

WT42xx_Call_to_Mobile
 .\gsm4200\wt42call.obj

User Interface



Description

Purpose: The 4100/4200 sets up a connection to the mobile. The network should be set up before. As soon as the mobile rings, press the hook off button on the mobile and the connection is set up.

Caution: Never press the release button on the mobile (hook on) before calling the test case "Release Mobile". Otherwise other functions in the sequence will not work properly and the 4100/4200 must be reset.

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Report Example

Test 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**

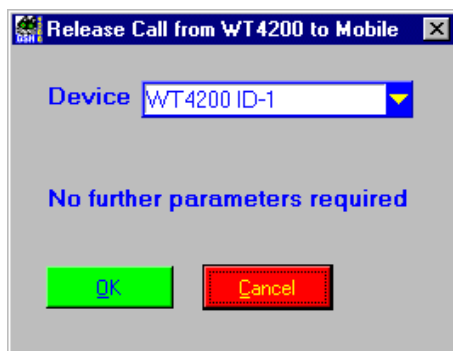
Returns 1 in case of error, otherwise 0.

7.1.2 Release Call from 4100/4200 to Mobile

Function Name

Release_Mobile
.\gsm4200\wt42call.obj

User Interface



Description

Purpose: The 4100/4200 releases the connection to the mobile. It is not necessary to press the release button (hook on) on the mobile. The connection will be released automatically.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Release Mobile done

Applications

–

Parameters

Device ID: Integer 1...10

Remote Control of Test Case

Input Buffer: %d#
Device ID

Output Buffer: No results

Return Value

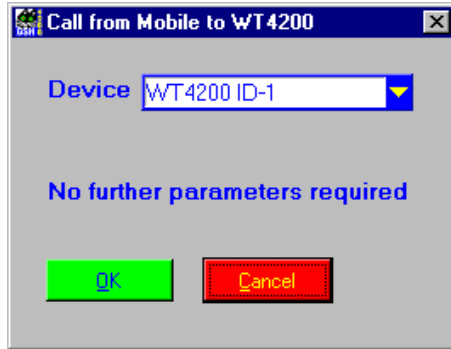
Returns 1 in case of error, otherwise 0.

7.1.3 Call from Mobile to 4100/4200

Function Name

Mobile_Call_to_WT42xx
.\gsm4200\wt4200call.obj

User Interface



Description

Purpose: 4100/4200 expects to be called from the mobile. The network should be set up before. Dial a number on the mobile and the connection is set up.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test 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

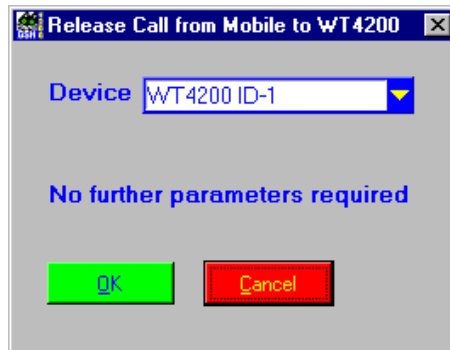
Returns 1 in case of error, otherwise 0.

7.1.4 Release Call from Mobile to 4100/4200

Function Name

Mobile_Release
.\gsm4200\wt4200conf.obj

User Interface



Description

Purpose: The mobile releases the connection to the 4100/4200. Press the release button on the mobile and the connection will be closed.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Mobile release done

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.

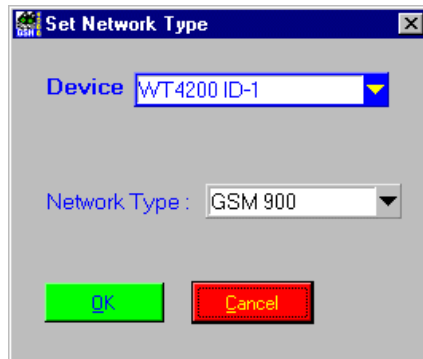
7.2 4100/4200 Configurations

7.2.1 Set Network Type

Function Name

Set_Network_Type
.\gsm4200\wt4200conf.obj

User Interface



Description

Purpose: Sets the network type on the base station: GSM 900 (GSM), GSM 1800 (PCN), GSM 1900 (PCS), GSM 900/1800 (GSM/PCN) or GSM 900/1900 (GSM/PCS) depending on the network type needed for the mobile.

Caution: -

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Network type: GSM 900

Applications

-

Parameters

Device ID: Integer 1...10
Network Type: Enumeration:

- GSM = 0 (900 MHz)
- PCN = 1 (1800 MHz)
- PCS = 2 (1900 MHz)
- GSM/PCN = 3 (900/1800 MHz)
- GSM/PCS = 4 (900/1900 MHz)

Remote Control of Test Case

Input Buffer: %d#%d
Device ID, Network Type

Output Buffer: No results

Return Value

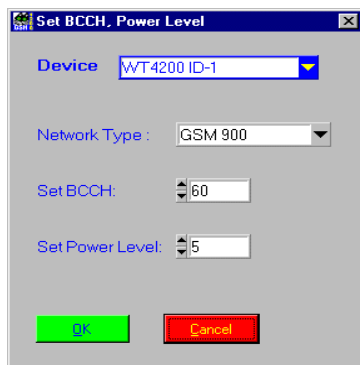
Returns 1 in case of error, otherwise 0.

7.2.2 Set BCCH, Power Level

Function Name

Set_BCCH

.\gsm4200\wt4200conf.obj



Description

Purpose: Sets the broadcast channel number and power level on the 4100/4200 for the chosen network type. The values must be in the allowed ranges.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
 Network Type: GSM 900
 BCCH: 60
 BCCH Power Level: 5

Applications

–

Parameters

<i>Device ID:</i>	Integer 1...10
<i>BCCH Channel:</i>	Integer: <ul style="list-style-type: none">• GSM: 1...124• E-GSM: 0...124 and 975...1023• PCN: 512...885 (only even numbers)• PCS: 512...810 (only odd numbers)
<i>BCCH Power Level:</i>	Integer: <ul style="list-style-type: none">• GSM: 0...19• PCN: 0...15 and 29...31• PCS: 0...15 and 30, 31
<i>Network Type:</i>	Enumeration: <ul style="list-style-type: none">• GSM = 0• PCN = 1• PCS = 2

Remote Control of Test Case

Input Buffer: %d#%d,%d,%d
Device ID, BCCH Channel, BCCH Power Level, Network Type

Output Buffer: No results

Return Value

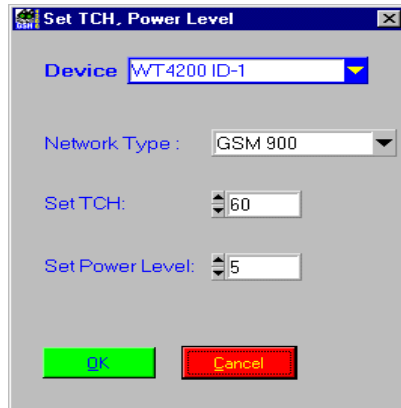
Returns 1 in case of error, otherwise 0.

7.2.3 Set TCH, Power Level

Function Name

Set_TCH

.\gsm4200\wt4200conf.obj



Description

Purpose: Sets the traffic channel number and power level on the 4100/4200 for the chosen network type. The values must be in the allowed ranges.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Test                                     OK
  Network Type: GSM 900
  TCH: 1
  TCH Power Level: 5
```

Applications

–

Parameters

<i>Device ID:</i>	Integer 1...10
<i>TCH Channel:</i>	Integer: <ul style="list-style-type: none">• GSM: 1...124• E-GSM: 0...124 and 975...1023• PCN: 512...885• PCS: 512...810 Remark WT4100: <ul style="list-style-type: none">• PCN: 512...885 (only even numbers)• PCS: 512...810 (only odd numbers)
<i>TCH Power Level:</i>	Integer: <ul style="list-style-type: none">• GSM: 0...19• PCN: 0...15 and 29...31• PCS: 0...15 and 30, 31
<i>Network Type:</i>	Enumeration: <ul style="list-style-type: none">• GSM = 0• PCN = 1• PCS = 2

Remote Control of Test Case

<i>Input Buffer:</i>	%d#%d,%d,%d Device ID, TCH Channel, TCH Power Level, Network Type
<i>Output Buffer:</i>	No results

Return Value

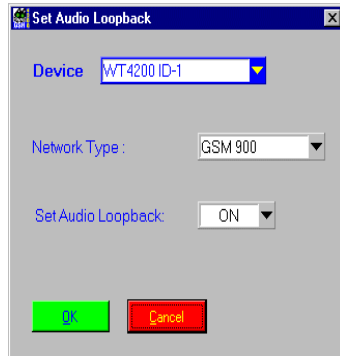
Returns 1 in case of error, otherwise 0.

7.2.4 Set Audio Loopback

Function Name

Set_ALoop
 .\gsm4200\wt4200conf.obj

User Interface



Description

Purpose: Switch the audio loopback on the 4100/4200 for the chosen network type. Speak a test message into the mobile. After one second the echo must be heard. Otherwise one or more signal ways have problems.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Test                                     OK
    Network Type: GSM 900
    The Audio Loopback: ON
```

Applications

–

Parameters

<i>Device ID:</i>	Integer 1...10
<i>Audio Loopback Switch:</i>	Enumeration: <ul style="list-style-type: none">• OFF = 0• ON = 1
<i>Network Type:</i>	Enumeration: <ul style="list-style-type: none">• GSM = 0• PCN = 1• PCS = 2

Remote Control of Test Case

Input Buffer: %d#%d,%d
Device ID, Audio Loopback Switch, Network Type

Output Buffer: No results

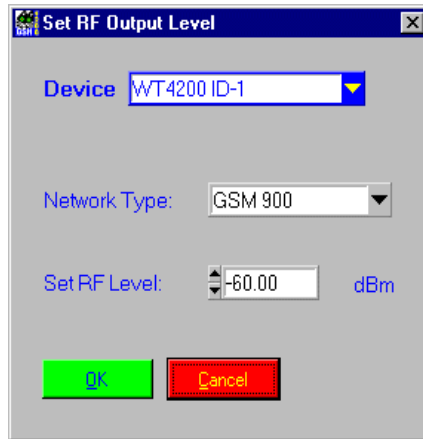
Return Value

Returns 1 in case of error, otherwise 0.

7.2.5 Set RF Output Level

Function Name

Set_RF_Output_Level
.\gsm4200\wt42rfge.obj



Description

Purpose: Sets the RF generator output level in dBm on the 4100/4200.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Network Type: GSM 900
Output Level: -70.0 dBm

Applications

–

Parameters

Device ID: Integer 1...10
Network Type: Enumeration:

- GSM = 0
- PCN = 1
- PCS = 2

Output Level: Double:

- GSM: -45...-117
- PCN: -50...-117
- PCS: -50...-117

Remote Control of Test Case

Input Buffer: %d#,%d,%lf
Device ID, Network Type, Output Level

Output Buffer: No results

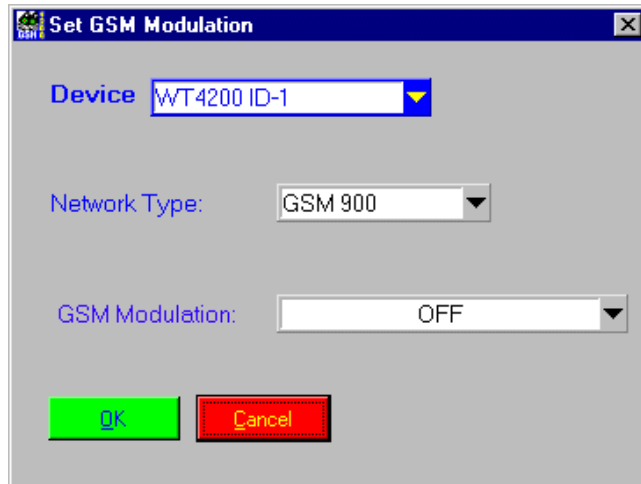
Return Value

Returns 1 in case of error, otherwise 0.

7.2.6 Set GSM Modulation

Function Name

Set_Modulation
 .\gsm4200\wt42rfge.obj



Description

Purpose: Switch the GSM modulation on the 4100/4200 for the chosen network.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
 Network Type: GSM 900
 GSM modulation: OFF

Applications

–

Parameters

Device ID: Integer 1...10

Network Type: Enumeration:

- GSM = 0
- PCN = 1
- PCS = 2

Switch: Enumeration:

- On = 1
- Off = 0

Remote Control of Test Case

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

Device ID, Network Type, Switch

Output Buffer: No results

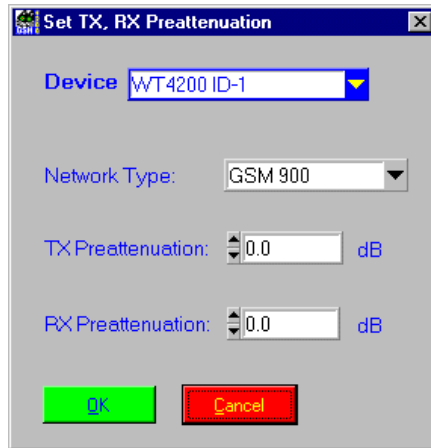
Return Value

Returns 1 in case of error, otherwise 0.

7.2.7 Set TX, RX Preattenuation

Function Name

Set_Pre_Attenuation
 .\gsm4200\wt42sysst.obj



Description

Purpose: Sets the RX and TX pre-attenuation on 4100/4200.

Caution: -

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test	OK
Network Type:	GSM 900
TX Preattenuation:	1.5
RX Preattenuation:	1.5

Applications

-

Parameters

Device ID: Integer 1...10
RX Pre-Attenuation: Double 0.00...50.00
TX Pre-Attenuation: Double 0.00...50.00

Remote Control of Test Case

Input Buffer: %d#%lf,%lf
Device ID, RX Pre-Attenuation, TX Pre-Attenuation

Output Buffer: No results

Return Value

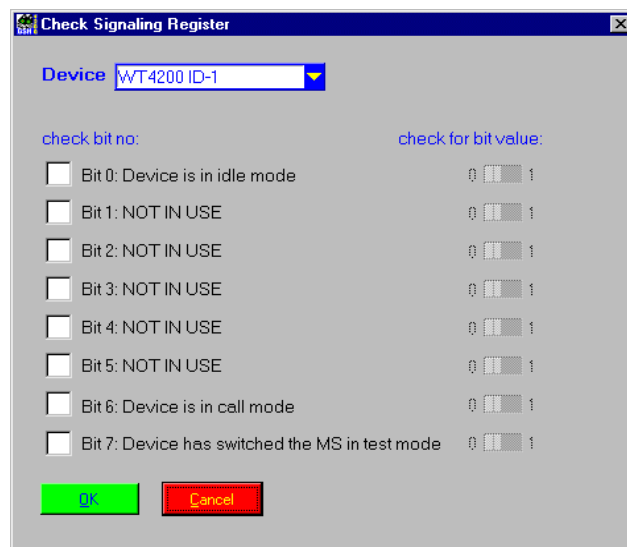
Returns 1 in case of error, otherwise 0.

7.3 4100/4200 Measurement Test cases

7.3.1 Check Signaling Register

Function Name

Check_Signalling_Register
.\gsm4200\wt42stat.obj



Description

Purpose: Gets the signaling register in the 4100/4200, which gives information about the actual status of 4100/4200. The device sends an 8 bit binary word. The meaning of each bit is declared in the User Interface.

On the left column you can set the bits to be tested. Only marked bits will be tested, the others will be ignored and their corresponding bits on the right column are dimmed.

If not dimmed, you can set for each bit the value it will be checked against. These values will be compared to the actual values from the device. If matched, the bit indicates PASS, otherwise FAIL.

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

Test		PASS		
Bit no:	7	check for:	0 measured:	0 PASS
Bit no:	6	check for:	0 measured:	0 PASS
Bit no:	5	check for:	0 measured:	0 PASS
Bit no:	4	check for:	0 measured:	0 PASS
Bit no:	3	check for:	0 measured:	0 PASS
Bit no:	2	check for:	0 measured:	0 PASS
Bit no:	1	check for:	0 measured:	0 PASS
Bit no:	0	check for:	0 measured:	0 PASS

Applications

—

Parameters

Device ID: Integer 1...10

Bit 0: Enumeration:

- To be checked = 1
- Not to be checked = 0

...

...

Bit 7: Enumeration:

- To be checked = 1
- Not to be checked = 0

Bitset 0: Enumeration:

- On = 1
- Off = 0

...

...

Bitset 7: Enumeration:

- On = 1
- Off = 0

Remote Control of Test Case

Input Buffer: %d#%d,%d,%d,%d,%d,%d,%d,%d,
%d,%d,%d,%d,%d,%d,%d,%d,
Device ID, Bit0, Bit1, Bit2, Bit3, Bit4, Bit5, Bit6, Bit7
Bitset0, Bitset1, Bitset2, Bitset3, Bitset4, Bitset5, Bitset6, Bitset7

Output Buffer: No results

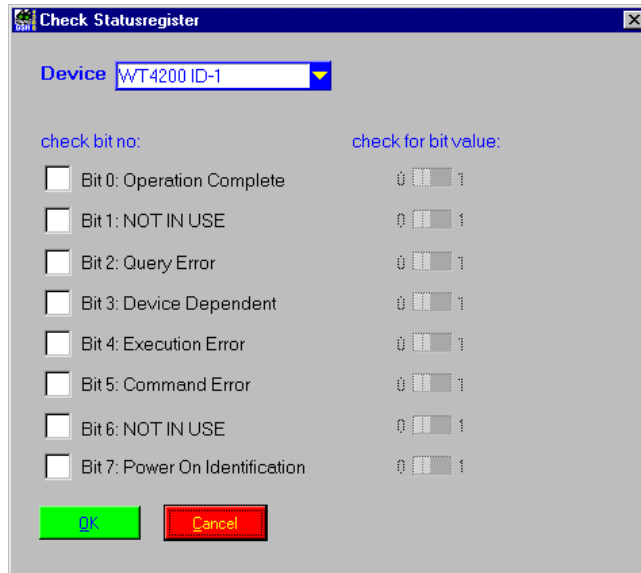
Return Value

Returns 1 in case of error, otherwise 0.

7.3.2 Check Status Register

Function Name

Check_Status_Register
 .\gsm4200\wt42stat.obj



Description

Purpose: Gets the status register from the 4100/4200. The device sends an 8 bit binary word. The meaning of each bit is declared in the User Interface.

On the left column you can set the bits to be tested. Only marked bits will be tested, the others will be ignored and their corresponding bits on the right column are dimmed.

If not dimmed, you can set for each bit the value it will be checked against. These values will be compared to the actual values from the device. If matched, the bit indicates PASS, otherwise FAIL.

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

Test		PASS		
Bit no:	7 check for:	0 measured:	0	PASS
Bit no:	6 check for:	0 measured:	0	PASS
Bit no:	5 check for:	0 measured:	0	PASS
Bit no:	4 check for:	0 measured:	0	PASS
Bit no:	3 check for:	0 measured:	0	PASS
Bit no:	2 check for:	0 measured:	0	PASS
Bit no:	1 check for:	0 measured:	0	PASS
Bit no:	0 check for:	0 measured:	0	PASS

Applications

—

Parameters

Device ID: Integer 1...10

Bit 0: Enumeration:

- To be checked = 1
- Not to be checked = 0

...

...

Bit 7: Enumeration:

- To be checked = 1
- Not to be checked = 0

Bitset 0: Enumeration:

- On = 1
- Off = 0

...

...

Bitset 7: Enumeration:

- On = 1
- Off = 0

Remote Control of Test Case

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

 Device ID, Bit0, Bit1, Bit2, Bit3, Bit4, Bit5, Bit6, Bit7
 Bitset0, Bitset1, Bitset2, Bitset3, Bitset4, Bitset5, Bitset6, Bitset7

Output Buffer: No results

Return Value

Returns 1 in case of error, otherwise 0.

7.3.3 Check RF Measurement (power, phase, burst, freq. dev.)

Function Name

Check_Measure

.\gsm4200\wt4200meas.obj

Measurement	Upper Limit	Lower Limit	Unit
<input checked="" type="checkbox"/> Mobile Power	45.0	0.0	dBm
<input checked="" type="checkbox"/> Phase RMS	5.00	-5.00	deg
<input checked="" type="checkbox"/> Phase Peak	20.00	-20.00	deg
<input checked="" type="checkbox"/> Frequency Error	90	-90	Hz
<input checked="" type="checkbox"/> Burst Length	570	543	μs

Description

Purpose:

Executes a measurement using multiple bursts. The number of measurements/bursts must be specified in the User Interface. The following values can be measured:

- Transmit power in dBm
- RMS phase error in degree
- Peak phase error in degree
- Frequency error in Hz
- Burst duration in μs

Each measured value will be checked whether it is within the limits ranges (which are set in the User Interface). If so, the status will be PASS, otherwise FAIL.

If the upper limit is smaller than the lower limit, the two values will be exchanged. If both of them are equal, the lower limit will be subtracted by 1. If both of them are -32000, the upper limit will be set to -31999. If both of them are 32000, the lower limit will be set to 31999.

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

Test PASS
Mobile Power: 33.0 dBm PASS [0.0...45.0 dBm]
Phase RMS: 3.51 deg PASS [-5.00...5.00 deg]
Phase Peak: 9.76 deg PASS [-20.00...20.00 deg]
Frequency Error: -40 Hz PASS [-90...90 Hz]
Burst Length: 557 μ s PASS [0...560 μ s]

Applications

—

Parameters

<i>Device ID:</i>	Integer 1...10
<i>Number Meas.:</i>	Integer 1...10
<i>Peak Phase Error:</i>	Enumeration: <ul style="list-style-type: none">• Checked = 1• Not checked = 0
<i>Upper Peak Phase Err. Limit:</i>	Double -31999...+32000
<i>Lower Peak Phase Err. Limit:</i>	Double -32000...+31999
<i>RMS Phase Error:</i>	Enumeration: <ul style="list-style-type: none">• Checked = 1• Not checked = 0
<i>Upper RMS Phase Err. Limit:</i>	Double -31999...+32000
<i>Lower RMS Phase Err. Limit:</i>	Double -32000...+31999
<i>Frequency Error:</i>	Enumeration: <ul style="list-style-type: none">• Checked = 1• Not checked = 0
<i>Upper Frequency Err. Limit:</i>	Double -31999...+32000
<i>Lower Frequency Err. Limit:</i>	Double -32000...+31999
<i>Burst Duration:</i>	Enumeration: <ul style="list-style-type: none">• Checked = 1• Not checked = 0
<i>Upper Burst Duration Limit:</i>	Double -31999...+32000
<i>Lower Burst Duration Limit:</i>	Double -32000...+31999
<i>Power:</i>	Enumeration: <ul style="list-style-type: none">• Checked = 1• Not checked = 0
<i>Upper Power Limit:</i>	Double -31999...+32000
<i>Lower Power Limit:</i>	Double -32000...+31999

Remote Control of Test Case

Input Buffer: %d#%d,%d,%lf,%lf,%d,%lf,%lf,%d,%lf,%lf,%d,%lf,%lf,%d,%lf,
 %lf
 Device ID, Number Meas., Peak Phase Error, Upper Peak Phase
 Error Limit, Lower Peak Phase Error Limit, RMS Phase Error,
 Upper RMS Phase Error Limit, Lower RMS Phase Error Limit,
 Frequency Error, Upper Frequency Error Limit, Lower Frequency
 Error Limit, Burst Duration, Upper Burst Duration Limit, Lower
 Burst Duration Limit, Power, Upper Power Limit, Lower Power
 Limit

Output Buffer: No results

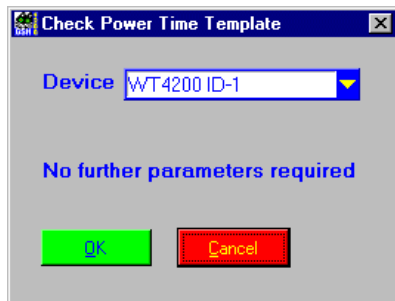
Return Value

Returns 1 in case of error, otherwise 0.

7.3.4 Check Power/Time Template

Function Name

Check_Power_Time_Template
.\gsm4200\wt42meas.obj



Description

Purpose: Executes a power/time template measurement using one burst. This measurement gives information about a burst. The following parameters will be measured :

- Total burst
- Rising and falling flank
- Middle range
- Asynchronous burst information

Each measured value will be checked for PASS/FAIL.

Caution: –

PASS / FAIL Conditions

PASS: If none of the checked values (except asynchronous burst information) indicates FAIL, the whole test is PASS.

FAIL: If at least one of the checked values (except asynchronous burst information) indicates FAIL, the whole test is FAIL.

Test Report

Test PASS
Rising edge: PASS
Middle Range: PASS
Falling edge: PASS
Async Burst Info: Not Async.

Applications

—

Parameters

Device ID: Integer 1...10

Remote Control of Test Case

Input Buffer: %d#
 Device ID

Output Buffer: No results

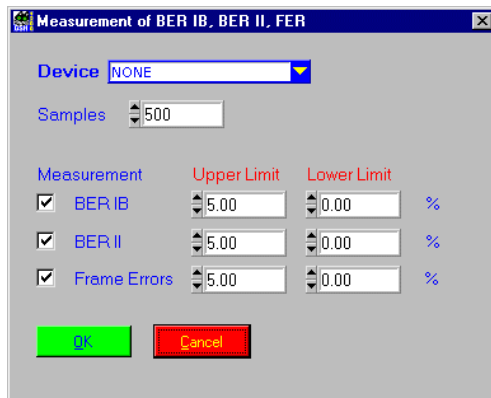
Return Value

Returns 1 in case of error, otherwise 0.

7.3.5 Check Measurement of BER IB, BER II, FER

Function Name

Check_Measure_BER_and_FER
 .\gsm4200\wt4200meas.obj



Description

Purpose: Executes a BER measurement.

The following BER values can be selected:

- BER IB
- BER II
- Frame Errors

The measured values will be checked whether they are within the limit range (which is set in the User Interface). If so, the status will be PASS, otherwise FAIL.

If the upper limit is smaller than the lower limit, the two values will be exchanged. If both of them are equal, the lower limit will be subtracted by 1. If both of them are -32000, the upper limit will be set to -31999. If both of them are 32000, the lower will be set to 31999.

Caution: Remark WT4100: BER IB has to be switched off.

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

Test PASS
 Frame Error: 0.00 % PASS [0.00...5.00 %]
 BER II: 0.00 % PASS [0.00...5.00 %]
 BER IB: 0.00 % PASS [0.00...5.00 %]

Applications

—

Parameters

Device ID: Integer 1...10
Samples: Integer 500...100000
BERIB: Enumeration:
 • Checked = 1
 • Not checked = 0
Upper BERIB Limit: Double -31999...+32000
Lower BERIB Limit: Double -32000...+31999
BERII: Enumeration:
 • Checked = 1
 • Not checked = 0
Upper BERII Limit: Double -31999...+32000
Lower BERII Limit: Double -32000...+31999
FER: Enumeration:
 • Checked = 1
 • Not checked = 0
Upper FER Limit: Double -31999...+32000
Lower FER Limit: Double -32000...+31999

Remote Control of Test Case

Input Buffer: %d#%d,%d,%lf,%lf,%d,%lf,%lf,%d,%lf,%lf
 Device ID, Samples, BERIB, Upper BERIB Limit, Lower BERIB Limit, BERII, Upper BERII Limit, Lower BERII Limit, FER, Upper FER Limit, Lower FER Limit

Output Buffer: No results
 1#1000,1,2.000000,0.000000,1,3.000000,0.000000,1,5.000000,0.000000

Return Value

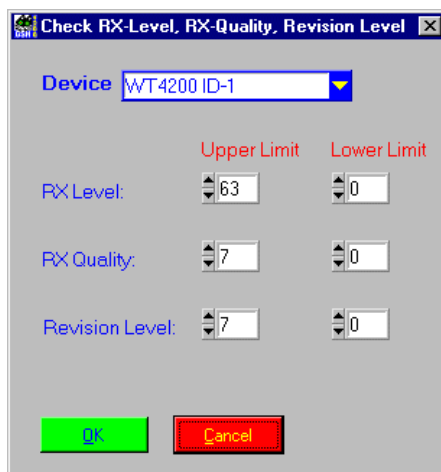
Returns 1 in case of error, otherwise 0.

7.3.6 Check RX-Level, RX-Quality, Revision Level

Function Name

Check_Mobile_Param
.\gsm4200\wt42call.obj

User Interface



Description

Purpose: Checks Rx Level, Rx Quality and the Revision Level from the 4100/4200. If the read values are within the limit range (which is set in the User Interface) the status will be PASS, otherwise FAIL.

If the upper limit is smaller than the lower limit, the two values will be exchanged. If both of them are equal, the lower limit will be subtracted by 1. If both of them are 0, the upper limit will be set to 1.

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

Test PASS
RX Level: 44 PASS [0...63]
RX Quality: 0 PASS [0...7]
RX Revision: 0 PASS [0...7]

Applications

—

Parameters

Device ID: Integer 1...10

Level Upper Limit: Integer 1...63

Quality Upper Limit: Integer 1...7

Revision Upper Limit: Integer 1...7

Level Lower Limit: Integer 0...62

Quality Lower Limit: Integer 0...6

Revision Lower Limit: Integer 0...6

Remote Control of Test Case

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

Device ID, Level Upper Limit, Quality Upper Limit, Revision
Upper Limit, Level Lower Limit, Quality Lower Limit, Revision
Lower Limit

Output Buffer: No Results

Return Value

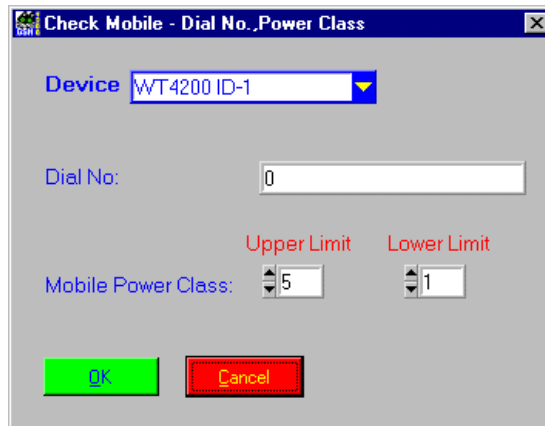
Returns 1 in case of error, otherwise 0.

7.3.7 Check Mobile – Dial No., Power Class

Function Name

Check_Mobile_Sign_Param
.\gsm4200\wt42call.obj

User Interface



Description

Purpose: Gets dialed number, IMEI number, IMSI number and the MS Power Class from the 4100/4200. The MS Power Class is compared with the limits. If it is within the limit range (which is set in the User Interface) the status will be PASS, otherwise FAIL. The dialed number is compared with the given number. If it is identical the status will be PASS, otherwise FAIL.

If the upper limit is smaller than the lower limit, the two values will be exchanged. If both of them are equal, the lower limit will be subtracted by 1. If both of them are 0, the upper limit will be set to 1.

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

Test PASS
IMSI: 001011234567890
IMEI: 490130207939800
Mobile Dialed No.: 12345 PASS
Power Class: 4 PASS [1..5]

Applications

-

Parameters

Device ID: Integer 1...10
Level Upper Limit: Integer 2...5
Level Lower Limit: Integer 1...4
Calling Number: String

Remote Control of Test Case

Input Buffer: %d#%d,%d,|%s|
Device ID, Level Upper Limit, Level Lower Limit, Calling
Number
Output Buffer: No Results

Return Value

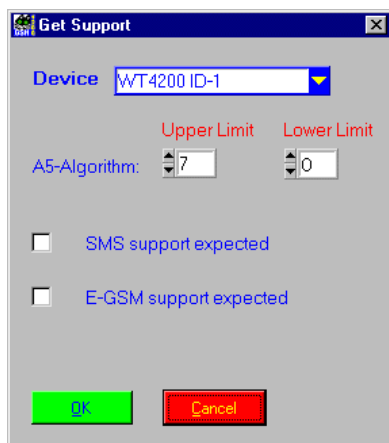
Returns 1 in case of error, otherwise 0.

7.3.8 Check SMS, E-GSM, A5 Algorithm

Function Name

Check_Mobile_Support_Param
.\gsm4200\wt42call.obj

User Interface



Description

Purpose: Checks A5 Algorithm, SMS Support and E-GSM Support from the 4100/4200. The A5 Algorithm is compared with the limits. If it is within the limit range (which is set in the User Interface) the status will be PASS, otherwise FAIL. The two switches in the User Interface indicate the expected SMS Support and E-GSM Support status. If the setting of the switch fits the actual value, it is PASS, otherwise FAIL.

If the upper limit is smaller than the lower limit, the two values will be exchanged. If both of them are equal, the lower limit will be subtracted by 1. If both of them are 0, the upper limit will be set to 1.

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

Test PASS
A5-Algorithm: 1 PASS [0..7]
SMS support: YES PASS
E-GSM support: YES PASS

Applications

-

Parameters

Device ID: Integer 1...10
Level Upper Limit: Integer 1...7
Level Lower Limit: Integer 0...6
SMS Switch: Enumeration: No = 0, Yes = 1
E-GSM Switch: Enumeration: No = 0, Yes = 1

Remote Control of Test Case

Input Buffer: %d#%d,%d,%d,%d
Device ID, A5 Upper Limit, A5 Lower Limit, SMS Switch,
E-GSM Switch

Output Buffer: No Results

Return Value

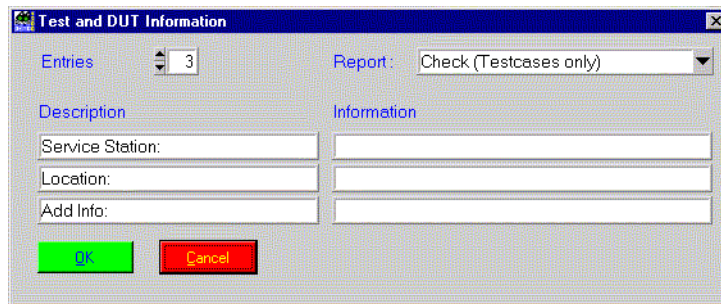
Returns 1 in case of error, otherwise 0.

7.4 4100/4200 Service Report Test cases

7.4.1 Set Service Report – DUT Information

Function Name

Set_Service_Report
.\gsm4200\wt42else.obj



Description

Purpose: The test case creates a special result file in directory .\report. From 1 to 15 additional description lines can be defined, and to each line an arbitrary name can be assigned. The operator is prompted to fill in appropriate entries during executing the test case or the sequence, and the lines are added to the report file, too. The file is closed and renamed / printed by the Print_Service_Report test case which should appear later or at the end of the sequence. If you call the test case Get_IMEI somewhere after the Set_Service_Report test case, but before Print_Service_Report the report file will be renamed with the first eight digits of the IMEI number ending with an increasing number (i.e. "12345678.001").

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
 Service Station:
 Location:
 Add Info:

Applications

—

Parameters

Report Mode: Enumeration:
 • All Setting and Check Test Cases = 1
 • Check Test Cases = 2

Number of Entries: Integer 1...15

Name 1: String
Entry 1: String
Name 2: String
Entry 2: String

.....

Name 15: String
Entry 15: String

Remote Control of Test Case

Input Buffer: %d,%d,|%s|,|%s|,...,|%s|
 Report Mode, Number of Entries, Name 1, Entry 1, Name 2,
 Entry 2, ...,Name 15, Entry 15

Output Buffer: No results

Return Value

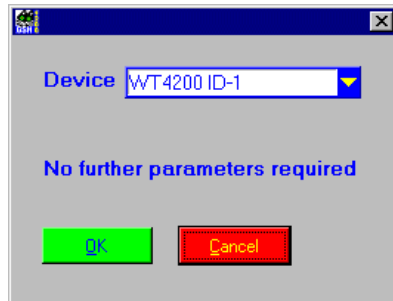
Returns 1 in case of error, otherwise 0.

7.4.2 Get IMEI

Function Name

Get_IMEI

.\gsm4200\wt42else.obj



Description

Purpose: Gets the IMEI number from the mobile. In use with `Set_Service_Report` it writes the IMEI to the result file, and the IMEI will be used for the filename.

Caution: -

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
IMEI No.: 490130207939800

Applications

-

Parameters

Device ID: Integer 1...10

Remote Control of Test Case

Input Buffer: %d#
Device ID

Output Buffer: No results

Return Value

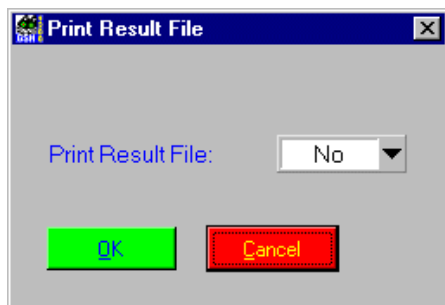
Returns 1 in case of error, otherwise 0.

7.4.3 Print Service Result File

Note: See also section 7.4.1 Set Service Report – DUT Information on page 7-41.

Function Name

Print_Service_Report
 .\gsm4200\wt42else.obj



Description

Purpose: Renames the result file with the IMEI number if Get_IMEI was executed before, otherwise the file name will be “default.001” in the directory .report. If the switch is set to be ON, the file will be printed on the Windows default printer.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK

Applications

–

Parameters

Print Switch: Enumeration:
ON = Yes, OFF = No

Remote Control of Test Case

Input Buffer: %d
Print Switch

Output Buffer: No results

Return Value

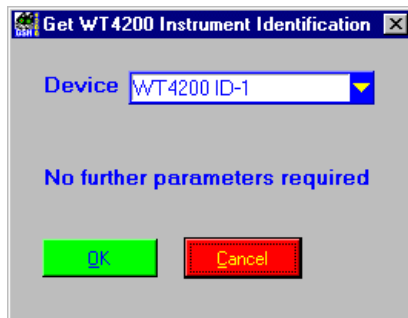
Returns 1 in case of error, otherwise 0.

7.5 4100/4200 Instrument Test cases

7.5.1 Get 4100/4200 Instrument Identification

Function Name

WT42xx_Get_System_Info
.\gsm4200\wt42gene.obj



Description

Purpose: Gets the 4100/4200 system information: manufacturer, model, serial number and firmware version number. The items are separated from each other by a comma.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Device Identification: Willtek,4201S,00123456,1.21

Applications

–

Parameters

Device ID: Integer 1...10

Remote Control of Test Case

Input Buffer: %d#
Device ID

Output Buffer: No results

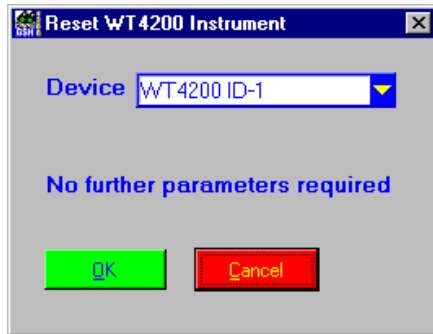
Return Value

Returns 1 in case of error, otherwise 0.

7.5.2 Reset 4100/4200 Instrument

Function Name

WT42xx_Reset_Instrument
.\gsm4200\wt42gene.obj



Description

Purpose: Resets the 4100/4200 device. The status report system will be erased and signaling will be shut down. During the reset process the device does not respond incoming commands for a short time.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
WT42xx Reset done

Applications

–

Parameters

Device ID: Integer 1...10

Remote Control of Test Case

Input Buffer: %d#
Device ID

Output Buffer: No results

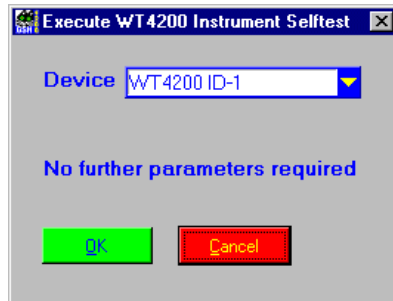
Return Value

Returns 1 in case of error, otherwise 0.

7.5.3 Execute 4100/4200 Instrument Selftest

Function Name

WT42xx_Selftest
.\gsm4200\wt42gene.obj



Description

Purpose: Executes a selftest on 4100/4200. It checks 13 parameters, each of them will be evaluated with PASS/FAIL.

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

Test	PASS
Selftest has been executed!	
Sumbit:	PASS
GSM-Loop:	PASS
GSM 1800-Loop:	PASS
+3V:	PASS
+5V:	PASS
VCC:	PASS
-18V:	PASS
+15V:	PASS
+4.9V:	PASS
-10V:	PASS
+5-V-Loop:	PASS
+5-V-IQ:	PASS
Synth. Sync.:	PASS

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.

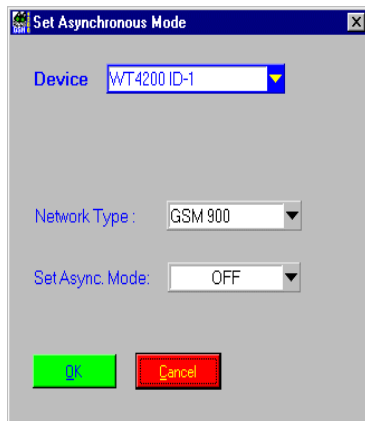
7.6 4100/4200 Asynchronous Mode

7.6.1 Set Asynchronous Mode

Function Name

Set_Async

.\gsm4200\wt42conf.obj



Description

Purpose: Sets the asynchronous mode: ON (for all other measurements except I/Q Tuning), Fast Power Measurement, I/Q Tuning or OFF.

Caution: -

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
 Network type: GSM 900
 Async. Mode: OFF

Applications

-

Parameters

Device ID: Integer 1...10
Network Type: Enumeration:

- GSM = 0
- PCN = 1
- PCS = 2

Asynchronous Mode: Enumeration:

- ON = 0
- Fast Power Measurement = 1
- I/Q Tuning = 2
- OFF = 3

Remote Control of Test Case

Input Buffer: %d#%d,%d
Device ID, Network Type, Asynchronous Mode

Output Buffer: No results

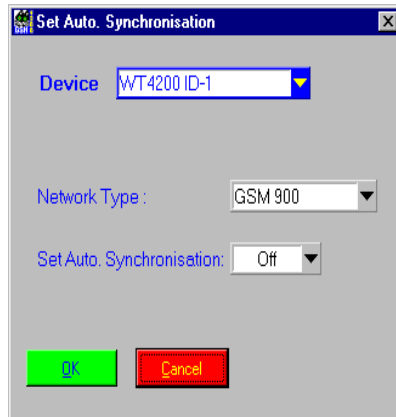
Return Value

Returns 1 in case of error, otherwise 0.

7.6.2 Set Auto-Synchronization

Function Name

Set_Auto_Synch
.\gsm4200\wt4200conf.obj



Description

Purpose: Sets the state of the auto-synchronize mode in the Asynchronous Test Mode.

- ON: The tester synchronizes periodically on recognized bursts.
- OFF: The tester synchronizes on the first recognized burst.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

Test OK
Network type: GSM 900
Auto Synch.Mode: ON

Applications

–

Parameters

<i>Device ID:</i>	Integer 1...10
<i>Synchronize State Switch:</i>	Enumeration: <ul style="list-style-type: none">• ON = 0• OFF = 1
<i>Network Type:</i>	Enumeration: <ul style="list-style-type: none">• GSM = 0• PCN = 1• PCS = 2

Remote Control of Test Case

Input Buffer: %d#%d,%d
Device ID, Synch. State, Network Type

Output Buffer: No results

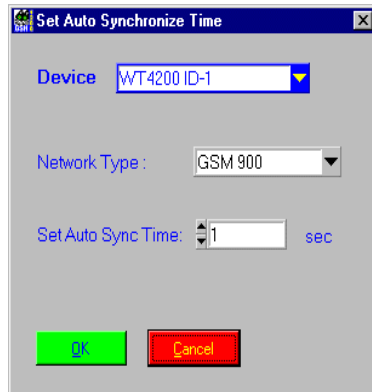
Return Value

Returns 1 in case of error, otherwise 0.

7.6.3 Set Auto-Synchronize Time

Function Name

Set_Async_Time
.\gsm4200\wt4200conf.obj

**Description**

Purpose: Sets the time for the auto-synchronize mode in seconds in Asynchronous Test Mode.

Caution: –

PASS / FAIL Conditions

PASS: Not applicable.

FAIL: Not applicable.

Test Report

```
Set_Async_Time           OK
  Network type: GSM 900
  Async. Time: 1 sec
```

Applications

–

Parameters

Device ID: Integer 1...10
Time: Integer 1...300
Network Type: Enumeration:

- GSM = 0
- PCN = 1
- PCS = 2

Remote Control of Test Case

Input Buffer: %d#%d,%d
Device ID, Time, Network Type

Output Buffer: No results

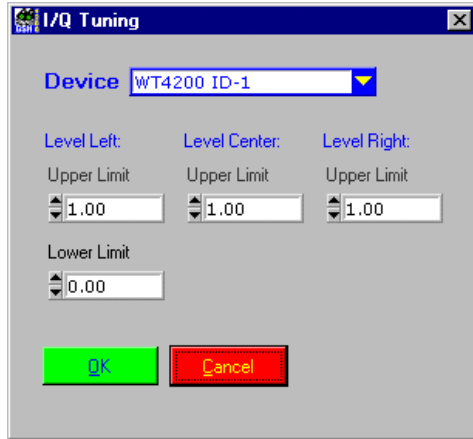
Return Value

Returns 1 in case of error, otherwise 0.

7.6.4 I/Q Tuning – TX Power Level (left, center, right)

Function Name

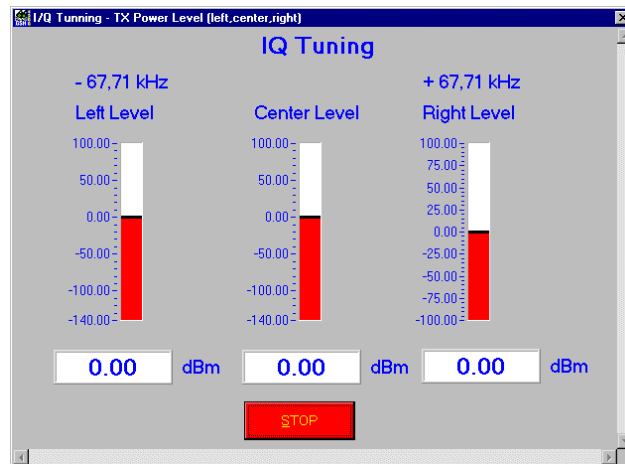
Check_IQ_Measure
 .\gsm4200\wt42meas.obj



Description

Purpose: Executes an I/Q tuning.

The measured values will be displayed in a window as follows:



Now you can tune the mobile until the display shows the required values. Press the "STOP" button to stop the tuning. If the levels are within the limits the status will be PASS, otherwise FAIL.

Caution: –

PASS / FAIL Conditions

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

FAIL: If the measured value is without the limit range, the test is FAIL.

Test Report

I/Q Tuning				OK
Low Power	0.00 dBm	FAIL		
Middle Power	0.00 dBm	FAIL		
High Power	0.00 dBm	FAIL		

Applications

-

Parameters

<i>Device ID:</i>	Integer 1...10
<i>Left Upper Limit:</i>	Double 0.00 ... -150.00
<i>Left Lower Limit:</i>	Double 0.00 ... -150.00
<i>Middle Upper Limit:</i>	Double 0.00 ... -150.00
<i>Right Upper Limit:</i>	Double 0.00 ... -150.00

Remote Control of Test Case

Input Buffer: %d#%lf,%lf,%lf,%lf
Device ID, Left Upper Limit, Left Lower Limit, Middle Upper Limit, Right Upper Limit

Output Buffer: No results

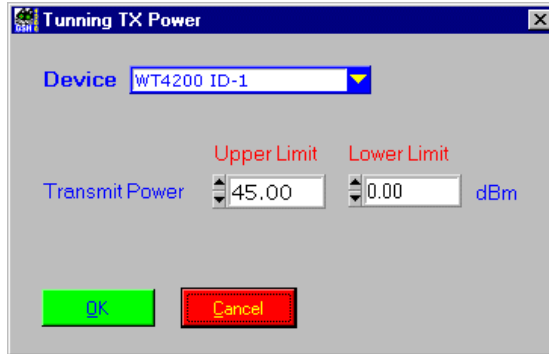
Return Value

Returns 1 in case of error, otherwise 0.

7.6.5 Tuning – TX Power

Function Name

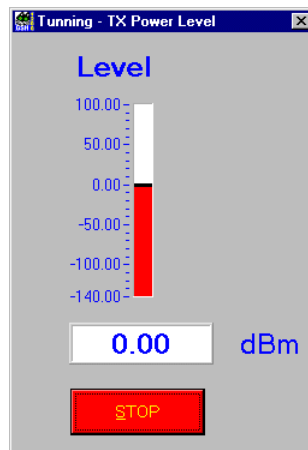
TX_Power_Tuning
 .\gsm4200\wt42meas.obj



Description

Purpose: Executes a transmit power tuning.

The measured value will be displayed in a window as follows:



Now you can tune the mobile until the display shows the required value. Press the "STOP" button to stop the tuning. A pop-up window will then appear.

You can now decide, whether the mobile under test should PASS/ FAIL, according to the measured transmit power after tuning.

This mechanism allows you to pass/fail mobiles which are in the critical area.

Caution: –

PASS / FAIL Conditions

PASS: Decided by the user.

FAIL: Decided by the user.

Parameters

Delay: Integer 100...10000000 [msec]
Slider: Enumeration:

- Checked = 1
- Not checked = 0

Remote Control of Test Case

Input Buffer: %d#%d
Delay, Slider

Output Buffer: No results

Return Value

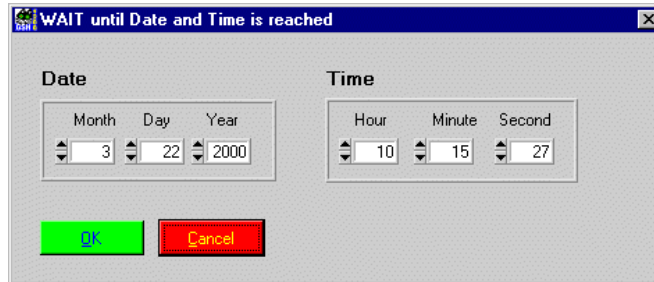
Returns 1 in case of error, otherwise 0.

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 OK
03-21-2001 14:06:45

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.

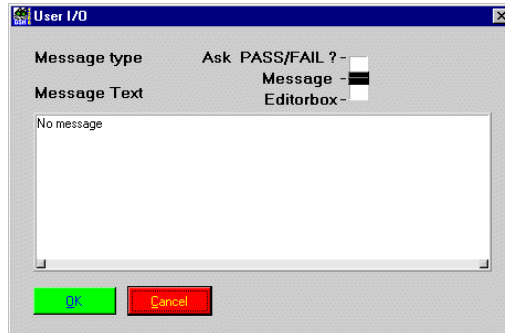
7.7.3 Pop-up Message or Question towards User

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".

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

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 OK
Please change the frequency.

Applications

—

Parameters

MessageType: Enumeration:
• PASS/FAIL = 0
• Message = 2
• Editor Box = 3

Number of Lines: Integer 1...10

Message Line 1: String begins and ends with @

...

Message Line 10: String begins and ends with @

Remote Control of Test Case

Input Buffer: %d#%d,@%s@,...
Message Type, Number of Lines, Message Line 1,...

Output Buffer: No results

Return Value

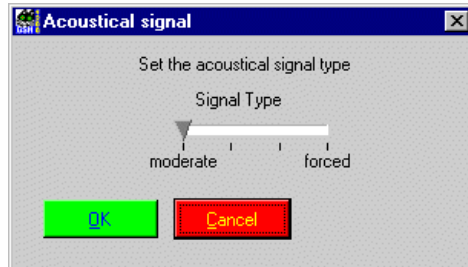
Returns 1 in case of error, otherwise 0.

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

OK

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.

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.

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.

Parameters

<i>Not used:</i>	Integer 1
<i>max. field number:</i>	Integer 1...15
<i>Description 1:</i>	String containing the Description
<i>Information 1:</i>	String containing Information the operator can change
...	...
...	...
<i>Description 15:</i>	String containing the Description
<i>Information 15:</i>	String containing Information the operator can change

Remote Control of Test Case

<i>Input Buffer:</i>	%d#%d,#%s#,%#s#,...#%s# Not used, Number of Entries, Description1, Information1 ... Description15, Information15
<i>Output Buffer:</i>	No result

Parameters

Not used: Integer 1
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#
Not used#Type, Wait Time, File Name

Output Buffer: No results.

Return Value

Returns 1 in case of error, otherwise 0.

Publication History

Revision	Comment
0104-100-A	First revision.
0211-201-A	New company name and format.

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