Agilent Technologies 83212D GSM Mobile Station Test Software

Reference Guide

Manufacturing Part Number: 83212-90019
October 1998

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Subject matter

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In any correspondence or telephone conversations, refer to the power sensor by its model number and full serial number. With this information, the Agilent Technologies representative can quickly determine whether your unit is still within its warranty period.

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Product overview

The Agilent 83212D is an easy-to-use software solution for automatic testing of GSM mobile stations. The Agilent 83212D software runs on the HP/Agilent 8922 GSM Test Set and provides a comprehensive set of tests ideal for incoming inspection and repair. By adding an Agilent 83220A or 83220E Test Set you can also perform measurements in the DCS1800 and PCS1900 bands, and perform Dual-Band Handover.

The flexibility and modularity of the Agilent 83212D software allows you to select and change test sequences, test parameters, and pass/fail limits without programming expertise. Test procedures can be simply saved on RAM cards for reuse and distribution guaranteeing repeatable and consistent test methods. All test results are displayed on the screen and can be documented with hard-copy printouts when an external printer is added. Three levels of testing are available with the Agilent 83212D: manual mobile station troubleshooting, quick functional checkout, and full parametric testing.

Compatibility with earlier software versions

All HP/Agilent 83212 versions

As the purpose of the Agilent 83212D software is to test a mobile station's compliance with the GSM specifications, the software is now simplified and the ability to edit many of the test specifications is now removed. This eliminates complexity and reduces the possibility of erroneous test results due to misconfiguration of certain specifications. These specifications are now hardcoded in the software and are no longer user editable.

If you have written test procedures for previous versions of the HP/ Agilent 83212 test software and these tests contain edited specification values, then these tests will still work with the Agilent 83212D software. Note, however, that the hardcoded specification values are always used instead of the edited values.

Overview of changes contained in Agilent 83212D

- **Dual-Band** testing of mobiles (GSM900 and DCS1800) is now supported. If you start the procedure Dual-Band, only the test sequence for the full test is taken from this procedure. Other values (especially specifications but also parameters) are taken either from the procedure GSM900 or from DCS1800 depending on the radio mode. The test starts in GSM900. The Quick and Full Tests include a Dual-Band handover. Within the flow chart, a Dual-Band Handover is available via the field `Chng chan` by entering a channel of the other band. An individual test, TEST_16 allows you to perform a Dual-Band Handover test within your own test sequences.
- **Phase II Power Levels** are supported by all parts of the software. The supported power levels are 1-19 for GSM900, 0-15 for DCS1800 and 30, 31, 0-15 for PCS. Parameters 31, `TX Default Power Control Level` and parameter 48, `TX Minimum Power Level` are affected. For example, the individual test TEST_06 TX Peak Power Error starts at the power level that is defined by parameter 31 and measurements are made at decreasing power levels according to parameter 36, `TX Power Level Step for Peak Power` until the level defined by parameter 48 is reached.
- **Power vs Time mask** (used by TEST_05, TEST_15 and Quicktest) is modified to take into account the new absolute limits as well. The results are shown either in dBc or dBm, whichever limit applies according to the ETSI specifications.
- **ORFS measurements** (TEST_07 and TEST_08) are modified. The averaging and peak comparisons are now performed in software for improved accuracy. ORFS Due to Modulation now also takes into

account the absolute limits for offsets at or above 600kHz.

- **E-GSM** is supported. To use the E-GSM frequencies, you must set parameter 47 `CP System` to the value 3 indicating E-GSM. The following 173 ARFCNs are available for E-GSM: 975 - 1023 (880.2 - 889.8 MHz) and 0 - 124 (890.0 - 918.4 MHz).

  To test the mobiles at the most extreme conditions, tests should be executed at the lowest and the highest possible frequencies. For more details, see page 161.

- **Specification changes**. The following test specifications are now hardcoded in the software and no longer user editable. For more details, see chapter 5 , Test Specifications.

  Power vs Time mask: Specification numbers 21, 22, 23, 32, 33, 34 and 35 are now hardcoded.

  Power accuracy: Specifications numbers 17, 18, 29 and 39 are now hardcoded.

- **ORFS due to modulation and ramping:** Specifications 8, 9, 10, 11, 12, 13, 14, 15 and 16 are now hardcoded.

- **RX Usable Input Level Range RF Level:** Parameter number 29, used in TEST_10, has a new default value of -15 dBm (changed from -19 dBm) to better adhere to the ETSI specifications. Note however that -15 dBm is not suitable for use on the HP/Agilent 8922E or G. For more details, see page 94 and page 152.

HP/Agilent 83212A users

The Agilent 83212D software provides an improved interface to many of the existing HP/Agilent 83212A features, and supports PCS1900 in addition to GSM900 and DCS1800. Dual-Band Handover test and GSM Phase II power levels are now also supported.

The 83212D is fully backwards compatible with the 83212A and all test procedures developed for the 83212A also run on the 83212D (see “Overview of changes contained in Agilent 83212D” on page 3 for more details).

A menu system allows greater flexibility when accessing tests, while the individual test routines remain as before.

NOTE

Points to note while running the Agilent 83212D software:

- You must remove all previous versions of the software before loading the Agilent 83212D software (see “Upgrading to a new software revision” on page 9).

- Selecting *Run* from the TESTS screen does not execute the selected procedure, but runs the Agilent 83212D software. After

several seconds the new Procedure Menu is displayed, from which you can make a selection.

- To run modified test procedures which have not yet been saved to a card, you must use the *Edit Proc* screen (see “Making your own test procedures” on page 24). Attempting to run from elsewhere may cause another procedure to be loaded, thus overwriting any modifications.
- Printer set-up now may be performed using a single Printer Menu (see “Printing test results” on page 35). There is no need to use the Edit Configure screen. The 83212D also supports the Centronics printer interface.
- You can now access the *Manual* procedure using the *Flowchart* option from the Sequence Menu (see “Flowchart Test” on page 20).

HP/Agilent 83212B users

The 83212D Software supports PCS1900 in addition to GSM900 and DCS1800. Dual-Band Handover test and GSM Phase II power levels are now also supported.

The 83212D is fully backwards compatible with the 83212B. All test procedures developed for the 83212B also run on the 83212D (see “Overview of changes contained in Agilent 83212D” on page 3 for more details).

In addition to GPIB and RS-232 printer interfaces, the 83212D also supports the Centronics parallel printer interface.

HP/Agilent 83212C users

Dual-Band Handover test and GSM Phase II power levels are now also supported.

The 83212D is fully backwards compatible with the 83212C. All test procedures developed for the 83212C also run on the 83212D, although if certain specification values have been edited then these will be overridden by the hardcoded values in the new software (see “Overview of changes contained in Agilent 83212D” on page 3 for more details).

Getting started

Operating the software with an HP/Agilent 8922

Compatibility

The 83212D software is compatible with any HP/Agilent 8922 (excluding the HP/Agilent 8922A and HP/Agilent 8922B) that contains firmware revisions C.01.00, B.07.04 and later. Note that the software may work with older firmware revisions but this has not been fully tested.

Installed firmware version

To determine the firmware version installed, use the knob on the front panel of the HP/Agilent 8922 to navigate to the `CONFIG` screen. The firmware revision is displayed in the bottom half of this screen, for example B.07.02.

Before running the Pre-Defined Test Procedures, you must load the Agilent 83212D Mobile Station Measurement Test Software into the HP/Agilent 8922.

RX Usable Input Level Range RF Level

Parameter number 29, `RX Usable Input Level Range RF Level`, used in TEST_10, has a new default value of -15 dBm (changed from -19 dBm) to better adhere to the ETSI specifications. Note however that -15 dBm is not suitable for use on the HP/Agilent 8922E or G. For more details, see page 94 and page 152.

Dual-Band testing

For Dual-Band testing, you need an HP/Agilent 8922 Multi-Band Test System. If you run the Dual-Band test procedure on a non multi-band test system, unexpected errors will occur.

NOTE

When the Agilent 83212D software is run on an HP/Agilent 8922E, you are unable to test the mobile station's ability to tune its oscillator to a source that has a frequency offset. This feature is called **Tunable Reference** and is not available on the HP/Agilent 8922E.

NOTE

The Spectrum Analyzer is available as option 006 on the HP/Agilent 8922E, F and H and comes as standard on the HP/Agilent 8922G. If the Spectrum Analyzer Option is not installed in your HP/Agilent 8922, the following additional tests are unable to be performed:

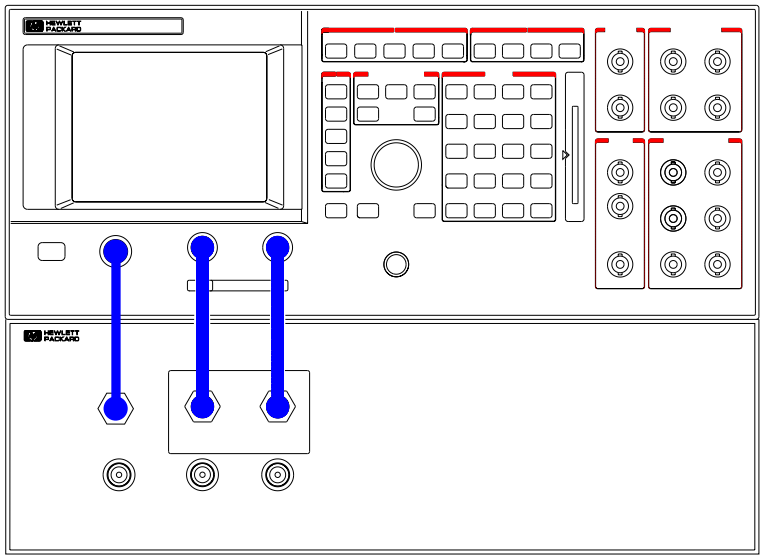
- You are unable to measure the output RF spectrum with an HP/Agilent 8922 without Option 006 (Spectrum Analyzer) due to modulation or ramping.
- You are unable to measure the pulse on/off ratio without Option 006 (Spectrum Analyzer) (-70 dBc point of the power/time template).

Testing a DCS1800, PCS1900 or Dual-Band mobile

To test a DCS1800, PCS1900 or Dual-Band mobile, you need an Agilent 83220 in addition to an HP/Agilent 8922.

For full details of the required connections etc. for testing DCS1800 and PCS1900 mobiles see the *Agilent 83220 Test Set Users Guide*, and for full details of the required connections etc. for testing Dual-Band mobiles, see the *Agilent 8922 Multi-Band Test System Supplementary User's Guide*.

Figure 1-1 An HP/Agilent 83220 and HP/Agilent 8922 configured to test DCS1800/PCS1900 and Dual-Band mobiles



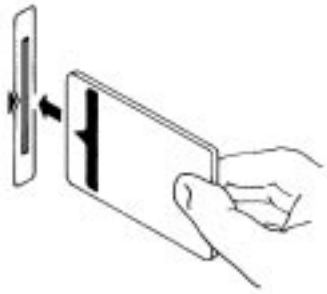
Getting started

Loading the Agilent 83212D software from memory card

NOTE The first time you run the program, there is a delay of approximately two minutes while the new code is read from the memory card. Subsequent running of the program does not have this delay. When the program is successfully read on the first run, the new software revision number appears on the screen below the copyright notice for a few seconds.

Step 1. Insert the Agilent 83212D memory card in the slot on the front panel of the HP/Agilent 8922.

Figure 1-2 Inserting a memory card



You can insert or remove memory cards with the HP/Agilent 8922 powered on or off. Memory cards must be inserted for test procedures to run. To remove a memory card, simply pull it out. For more details on memory cards, see chapter 8 , Working with Memory Cards..

NOTE Do not remove or change a memory card while running a test.

Step 2. Press the TESTS key on the front panel of the HP/Agilent 8922 to go to the TESTS screen, select the field named `Location` and from the `Choices` Menu select `Card`.

Step 3. Select the preceding field `Procedure` and from the `Choices` Menu select `GSM900`, `DCS1800` or `PCS1900` (see “Pre-defined test procedures” on page 14 for more details).

Step 4. Set the `Autostart` field toggle to `On` (see “Using Autostart” on page 10 for more details) and press L1 or select `Run Tests` to run the tests.

Upgrading to a new software revision

NOTE It is essential when loading the new revision of the Agilent 83212D for the first time that you remove any previous revision, otherwise the new software does not load correctly. The simplest way to remove the old revision is to run an IBASIC application from ROM as follows.

Ignore the instructions that appear on the HP/Agilent 8922 display during the procedure.

Step 1. Go to the TESTS screen and select the field named `Location`.

Step 2. From the list of choices, select `ROM`.

Step 3. Select the preceding field `Procedure`.

Step 4. Select `RAM_MNG` (RAM Manager).

Step 5. Select L1 or select `Run Test` which will cause the selected program to overwrite any existing code.

Step 6. Select L2 or select `No` in reply to the question `Do you want to continue?`

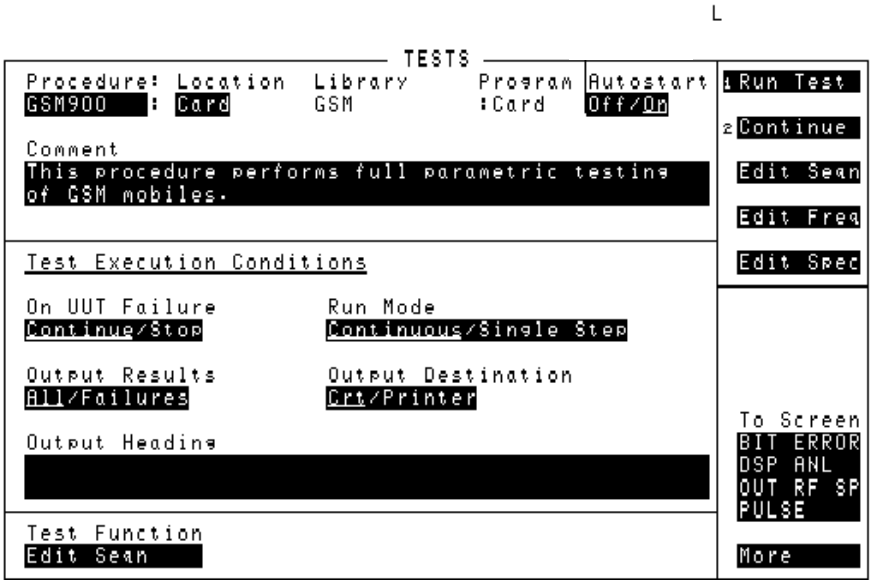
Step 7. Return to the TESTS screen and load up the Agilent 83212D software from the memory card as described in “Loading the Agilent 83212D software from memory card” on page 8.

Using Autostart

Ensure the `Autostart` field toggle is set to `On` (see Figure 1-3 on page 10). This allows the HP/Agilent 8922 to go straight to the Procedure Menu each time you switch the HP/Agilent 8922 on, providing a memory card is inserted in the front panel of the HP/Agilent 8922.

If the Procedure Menu screen (see Figure 1-5 on page 14) does not appear on the HP/Agilent 8922 display, select TESTS and load the procedure as described in “Loading the Agilent 83212D software from memory card” on page 8.

Figure 1-3 Tests screen of the HP 8922



Testing a mobile

Overview

The Agilent 83212D GSM Mobile Station Test Software provides an extensive range of tests for GSM900, Dual-Band mobiles, DCS1800 and PCS1900. The ease of use of the HP/Agilent 8922 with the Agilent 83212D makes testing these formats simple and effective.

Controlling the Agilent 83212D software

The 83212D software is controlled mainly using the HP/Agilent 8922 front panel knob and two softkeys, L1 and L2 . Turning the knob on the front panel of the HP/Agilent 8922 moves an on screen cursor which may be used to highlight a particular option. Pushing the knob then selects the highlighted option.

Softkeys L1 and L2 are located to the left of the knob. The function of these keys is indicated by the top two softkey labels, marked 1 and 2, on the top right of the screen.

NOTE It is not possible to select other screens while the Agilent 83212D software is running.

The CANCEL key, located below and to the left of the knob, may be used to pause the program.

To resume program operation, press followed either by L1 or Continue.

NOTE Pressing L1 or selecting Run will run the Agilent 83212D software from the start.

The two highlighted lines at the top of the display provide instructions as to what, if any, user input is required.

Testing a mobile

Connect the GSM900 mobile station RF output to the HP/Agilent 8922 RF IN/OUT connector (DCS1800, PCS1900 and Dual-Band mobile stations require an HP/Agilent 83220—see “Testing a DCS1800, PCS1900 or Dual-Band mobile” on page 7).

Step 1. Select the desired Procedure from the `Procedure Menu` screen (see Figure 1-5 on page 14) and push the knob on the front panel of the HP/Agilent 8922.

Step 2. Push the knob again to begin testing.

Step 3. Power on the mobile. Once the mobile finds service, press L2 to continue.

Step 4. Now follow the instructions given on the top lines of the HP/Agilent 8922 screen.

Step 5. Select L2 to abort testing.

Once testing is completed:

Step 1. Press L1 to repeat the test.

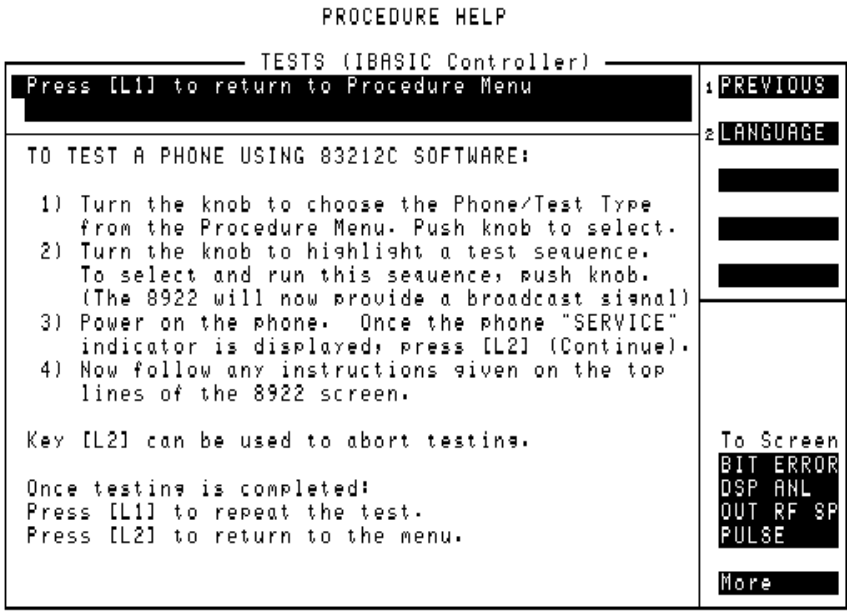
Step 2. Press L2 to return to the menu.

Accessing on-line help

On-line help is available to help test a mobile.

To access the Help screen go to the `Test Procedure Menu`, press L1 or turn the knob to highlight `HELP` and push the knob to select.

Figure 1-4 Help screen of the Agilent 83212D



SIM cards

It is recommended that you use an HP/Agilent 8922 option 007 test SIM card or HP/Agilent 8922 option 008 micro SIM card when testing a mobile with the Agilent 83212D software. These cards are available from Agilent Technologies sales offices. For more details, see chapter 3 , Problem Solving.

Selecting a test procedure — Test Procedure menu

A Test Procedure consists of:

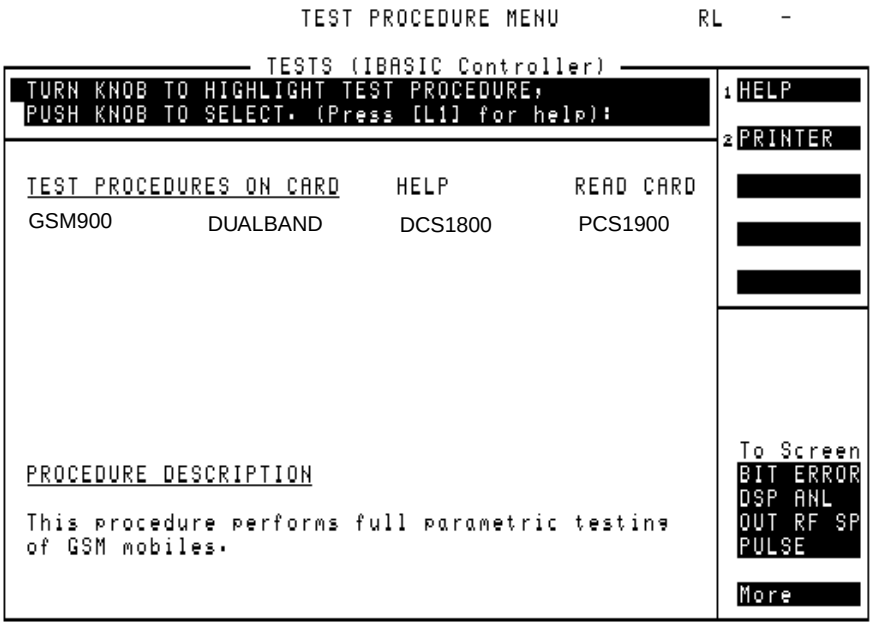
- a **Sequence** of individual tests
- a set of test **Specifications**
- a set of test **Parameters**

Pre-defined test procedures

There are four fixed procedures that you can use. These are:

- GSM900
- DUALBAND
- DCS1800
- PCS1900

Figure 1-5 Opening screen of the Agilent 83212D



Accessing the Test Procedure menu

The Test Procedure Menu shown in Figure 1-5 on page 14 is the first screen displayed when you run the Agilent 83212D software. To return to this screen at any point, Press (SHIFT) - (CANCEL) , then (TESTS) followed by (L1) Run Test to restart software. If you have problems, see "Loading the Agilent 83212D software from memory card" on page 8.

Test Procedure menu

Any test procedures on the current card are displayed on this menu. If the card has been changed since running the software, you must use the READ CARD option to update the menu as subsequently described.

Turn the knob on the front panel of the HP/Agilent 8922 to highlight a test procedure, then push the knob to select the procedure. When you select a procedure the Sequence menu is displayed and you can select a test (see "Selecting a test sequence — Test Sequence menu" on page 17).

To get a summary of how to test a mobile press (L1) to access the Procedure Help screen (see Figure 1-4 on page 13).

To set up a printer to output test results (see "Printing test results" on page 35) press (L2) to access the Printer Configuration Menu.

Running procedures from another card

The READ CARD option allows you to run user–defined procedures from another card as follows:

Step 1. Highlight READ CARD on the Procedure Menu.

Step 2. Insert the card containing desired procedures in slot.

Step 3. Push the knob on the front panel of the HP/Agilent 8922 to update list of available procedures.

NOTE The Agilent 83212D software displays up to 38 procedures from a single card. If there are too many procedures to display on one screen, a Next Page option allows you to view the remaining procedures on the card.

For details on how to create your own test procedures and save them to a memory card, see "Making your own test procedures" on page 24 and "Saving test procedures to an SRAM memory card" on page 33.

Running user-defined test procedures

Step 1. Ensure that the Test Procedure Menu is currently displayed as described in “Accessing the Test Procedure menu” on page 15.

Step 2. Update the procedure menu using the READ CARD option as described in “Running procedures from another card” on page 15.

Step 3. Select the test procedure use the knob on the front panel of the HP/ Agilent 8922.

The name of the selected procedure now appears as the first item on the sequence menu.

Step 4. Select this procedure to run the user-defined procedure.

When creating your own procedures, you can define the test sequence, specifications and parameters. For more information see “Making your own test procedures” on page 24.

Selecting a test sequence — Test Sequence menu

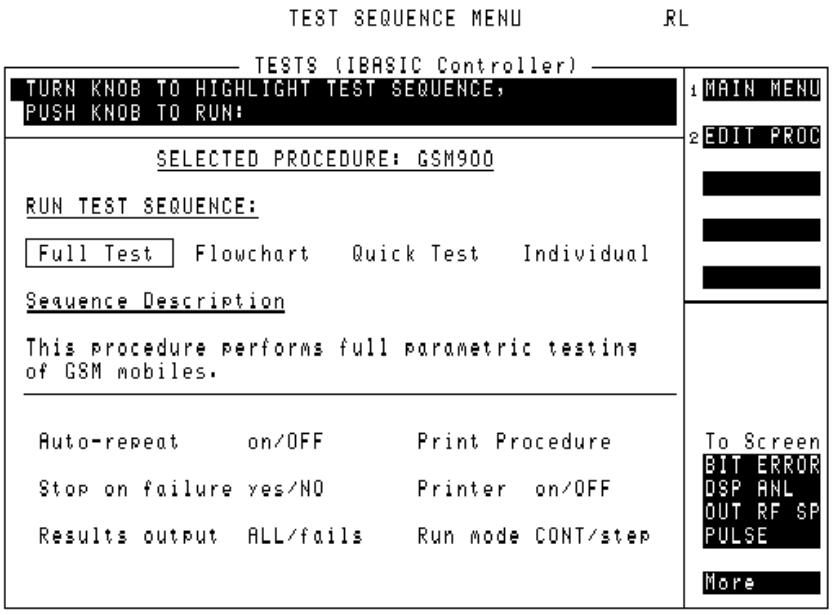
The Agilent 83212D GSM Mobile Station Test Software includes the following four Test Sequences that are designed to meet most test requirements.

- **Full Test** (or name given by user definition)
- **Flowchart**
- **Quick Test**
- **Individual**

These test sequences apply to all types of mobile testing (GSM900, Dual-Band, DCS1800 and PCS1900) using the HP/Agilent 8922.

The `Test Sequence Menu` lets you run various test sequences using the specifications and parameters defined in the selected procedure. At this point pressing L1 allows you to return to the `Test Procedure Menu` and select another procedure.

Figure 1-6 Sequence Menu Screen on the Agilent 83212D



To initiate the appropriate sequence select `Full Test`, `Flowchart` or `Quick Test`. Selecting `Individual` leads to a sub menu from which you can use the knob to select and run one of the fifteen individual tests listed in Table 1-1 on page 22. Pressing L1 exits this sub menu without executing a test.

Pausing and aborting tests

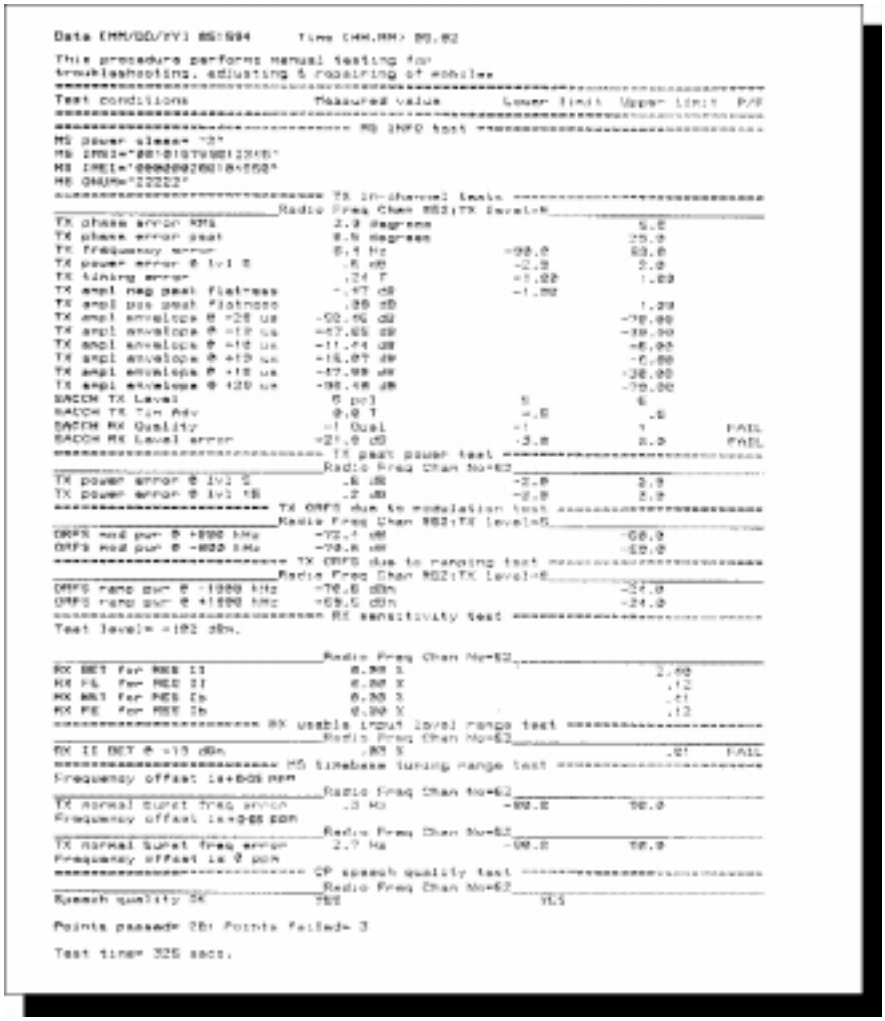
At various times throughout a test, pressing softkey L1 pauses testing, and pressing softkey L2 aborts the current test. Two softkey labels, marked 1 and 2, on the top right of the screen indicate when these softkeys are active.

Full Test

If you select any of the Pre–Defined procedures (GSM900, Dual-Band DCS1800 or PCS1900), a Full Test option is available on the sequence menu. Selecting this sequence executes ten of the fifteen available tests as shown in Table 1-1 on page 22.

If you select a user–defined test procedure, the procedure name appears as the first option on the sequence menu. For example, if you select the user-defined test procedure QA_TEST from the procedure menu, the first option on the sequence menu is QA_TEST. Selecting this option runs the procedure as stored on the card.

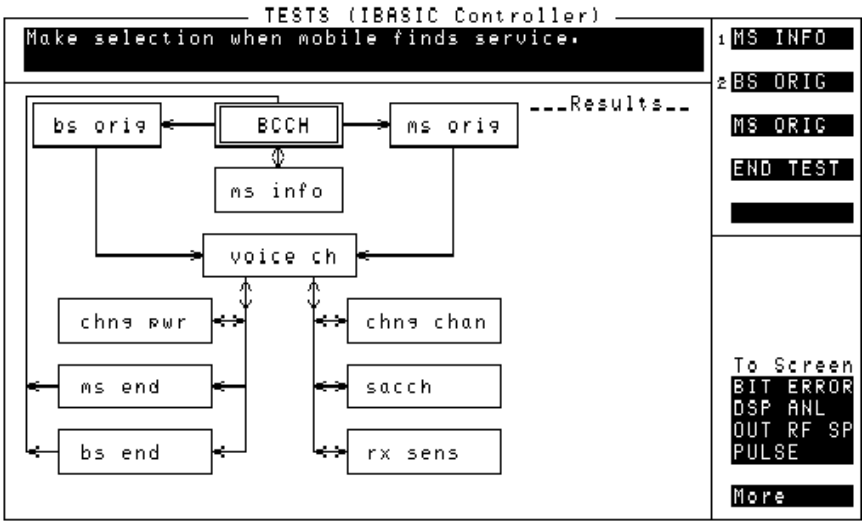
Figure 1-7 Output of a Full Test Sequence on the Agilent 83212D



Flowchart Test

The Flowchart Test allows you to perform a comprehensive first pass at the functional status of the mobile.

Figure 1-8 Flowchart Test Screen on the Agilent 83212D



When you select the Flowchart sequence, a flowchart is displayed on the HP/Agilent 8922 screen to make it easier to select test choices at different stages of call processing. Power, Frequency Error and Phase Error are displayed along with signalling information. To move through the flowchart blocks, select a softkey on the right of the display.

Quick Test

The Quick Test provides a general confidence test of the mobile.

Figure 1-9 Output of Quick Test Sequence on the Agilent 83212D

```
RUNNING QUICK TEST

==================== Quick Test ====================
_____________Radio Freq Chan No=62_____________
SACCH TX Level                    7.0  pcl
SACCH TX Tim Adv                  0.0  T
SACCH RX Quality                  0 Qual
SACCH RX Level error              1.0  dB
TX phase error RMS                2.8  degrees
TX phase error peak               9.9  degrees
TX frequency error              -27.1  Hz
TX timing error                   .27  T
TX ampl neg peak flatness        -.13  dB
TX ampl pos peak flatness         .24  dB
TX ampl envelope @ -28 us      -94.90  dB
TX ampl envelope @ -18 us      -44.12  dB
TX ampl envelope @ -10 us      -32.62  dB
TX ampl envelope @ +10 us      -11.00  dB
TX ampl envelope @ +18 us      -43.65  dB
TX ampl envelope @ +28 us      -94.53  dB
TX power error @ lvl 7          -2.2  dB              F
TX power error @ lvl 11         -1.7  dB
TX power error @ lvl 15         -1.1  dB
RX sens. BET resTypeII               .02  %

Points passed= 19: Points failed=1

Test time= 63 secs.
```

The results of the Quick Test procedure are displayed on the screen as they are completed. At the end of the test the call is not terminated. This allows you the option of quickly re-checking one or more of the tests.

Individual

This final sequence option lets you access and run an individual test. This is done either to verify a suspect failure or as a post-repair check. A full list of the library tests available are shown in Table 1-1 on page 22.

Cross–reference of tests to pre–defined test sequences

Use the following table to find descriptions of tests used in Pre-Defined Test Sequences. Only one test at a time can be run.

Table 1-1 Cross reference of tests to pre-defined test sequences

		Pre–Defined Test Sequences		
Test Name	**Description**	**Flowchart**	**Quick Test**	**Full Test**
TEST_01	MS Information			Used
TEST_02	CP BS Originate			
TEST_03	CP MS Originate			
TEST_04	MS Speech Quality			Used
TEST_05	TX In-channel Tests			Used
TEST_06	TX Peak Power Error			Used
TEST_07	TX ORFS Due to Modulation[1]			Used
TEST_08	TX ORFS Due to Ramping[1]			Used
TEST_09	RX Reference Sensitivity (TCH/FS)			Used
TEST_10	RX Usable Input Level Range			Used
TEST_11	RX Timebase Tuning Range[2]			Used
TEST_12	MS Quick Test		Used	
TEST_13	MS Flow Chart	Used		
TEST_14	TX RACH Test			
TEST_15	CP End Call			Used
TEST_16	Dual-Band Handover			Used[3]

1 HP/Agilent 8922 with option 006 only

2 Not available on HP/Agilent 8922E

3 Only if Dual-Band procedure is used

If you select test 12 (MS Quick Test) from the `Individual` sub-menu, the test that is run is exactly the same as if you had selected `Quick Test` from the `Test Sequence Menu`. Similarly, if you select test 13 individually, then this executes the same test as `Flowchart` from the Test Sequence Menu. For details on the individual tests, see chapter 4 , Tests.

Test execution conditions

On the lower half of the Sequence Menu there are a number of toggle fields which affect test operation:

- Auto-repeat ON/OFF : When this field is set to ON, the selected test sequence will run repeatedly WITHOUT prompting you. However, an ABORT softkey (L2) will be available at various times throughout testing.
- Stop on failure YES/NO : When this field is set to YES, testing will stop whenever the mobile fails to meet a test specification limit (defined by the selected procedure). You will then be prompted to continue the test.
- Results output ALL/FAILS : When this field is set to ALL, all test results are sent to the HP/Agilent 8922 display and printer (if enabled). When this field is set to FAILS, only the following are sent to the HP/Agilent 8922 display and printer (if enabled):
  - — Test results which fail to meet specification limits (which are defined by the selected procedure).
  - — Testing errors (for example, failure of a mobile to respond).
- Printer ON/OFF : When this field is set to ON, test results which are displayed on the HP/Agilent 8922 screen will also be output to a printer. The printer first must be set up using the Printer Configuration Menu (see “Printing test results” on page 35 for further details.)
- Run mode CONT/STEP : When this field is set to STEP, the program will step through the test, pausing after each result. Each time the user will be prompted to continue testing by pressing (L2).

  When this field is set to CONT, the program does not pause after each result.
- Print Procedure : Selecting this option allows a listing of the test sequence, specifications and parameters of the currently selected procedure to be sent to a printer. The printer first must be set up using the Printer Configuration Menu as described in “Printing test results” on page 35.

Making your own test procedures

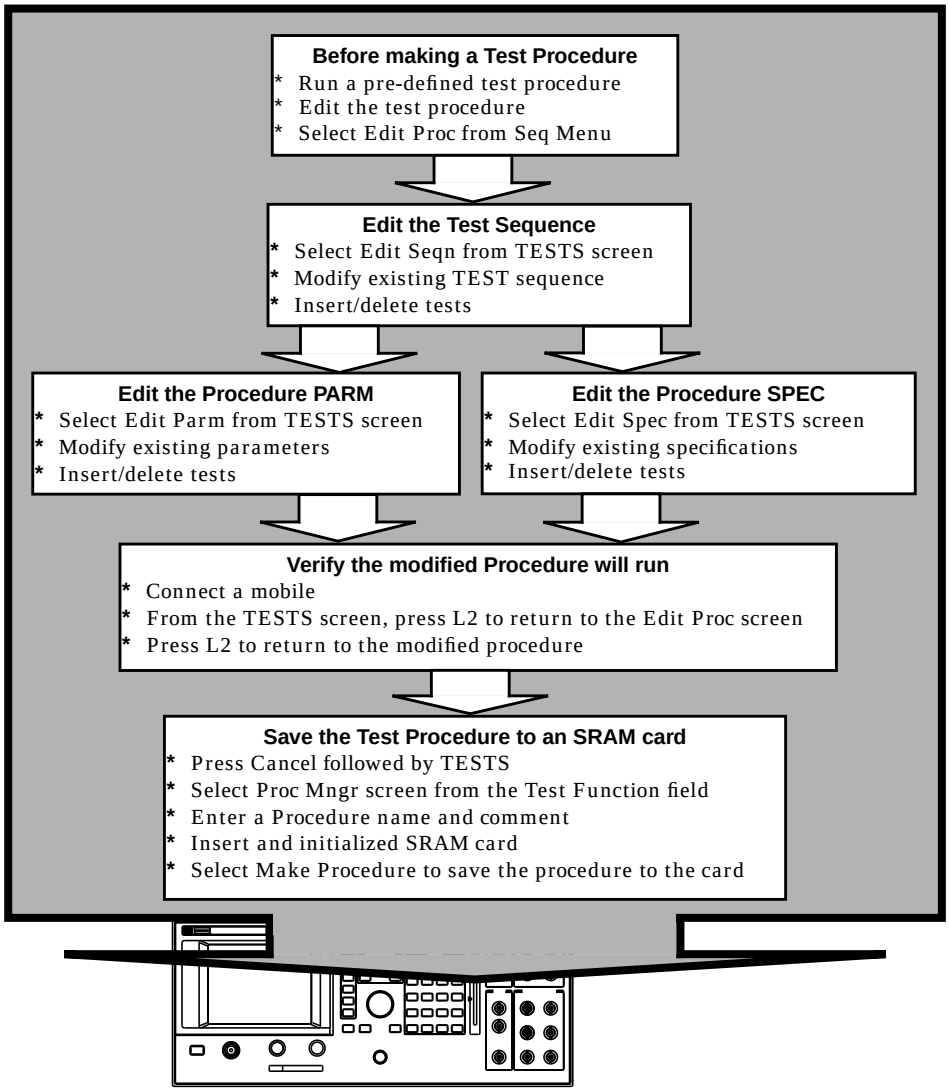
Quick overview

To make a test procedure may require some understanding of HP/Agilent 8922 operation. If necessary, refer to the *HP/Agilent 8922 User's Guide*. An overview of the process for making your own test procedure is shown below.

NOTE

To create your own Dual-Band procedure, or change any of the parameter values, you must use a separate memory card. The procedure must be called DUALBAND and the procedures for GSM900 and DCS1800 must also exist on the memory card to provide the Dual-Band procedure with the necessary parameters and specifications for each band.

Figure 1-10 Overview of making a test procedure



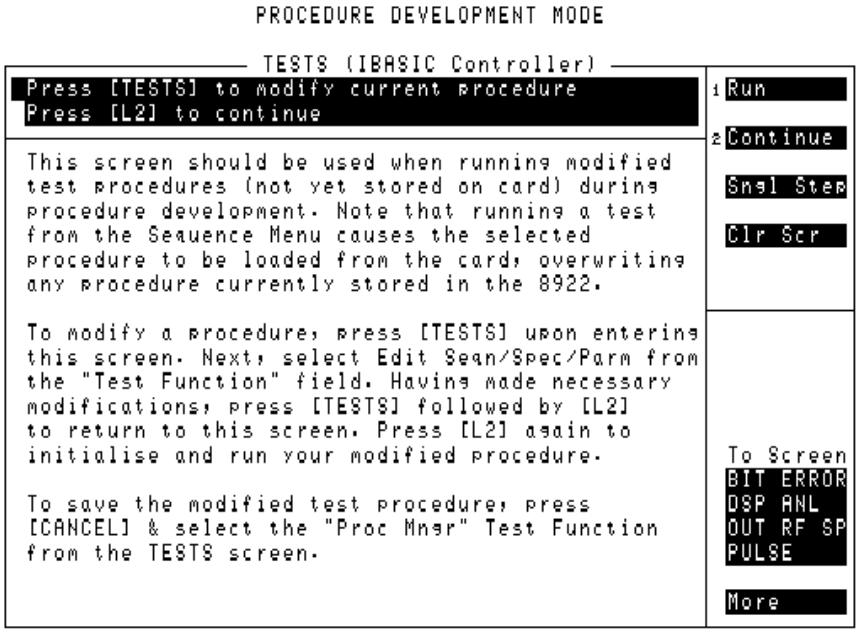
Procedure development – edit procedure

The `Procedure Development` screen is used when running a modified test procedure (for example, during procedure development) which has not yet been stored on an SRAM Memory card.

To access the Procedure Development screen pressing L2 or select `Edit Proc` from the Sequence Menu.

To save a modified test procedure, see “Saving test procedures to an SRAM memory card” on page 33.

Figure 1-11 Procedure Development Screen on the Agilent 83212D



NOTE If you do not save the procedure to a memory card, and another procedure is selected or a ROM program is run, the procedure you have defined is over-written.

- You must have loaded a Pre-Defined Test Procedure to have access to test data on the TESTS screen. See “Pre-defined test procedures” on page 14.
- To save your Test Procedure, you must have an initialized SRAM memory card available (see “Initializing an SRAM memory card” on page 182.)
- The worksheets at the end of this chapter will help you make a test procedure.

Editing the test sequence

From the Edit Procedure screen (see "Procedure development – edit procedure" on page 25), select the following keys:

Step 1. TESTS and select the field `Test Function` at the bottom of the screen.

Step 2. From the list of `Choices` in the revealed box, select `Edit Seqn` and edit the Test Sequence as described below.

Step 3. When finished editing sequence select TESTS to return to test screen.

1. Select either `Edit Parm` or `Edit Spec` from the test function field to continue editing, or
2. If editing is complete, select TESTS and press L2 or select `Continue` to return to the `Edit Proc` screen, then press L1 or select `Run` to run the modified test procedure.

NOTE For a fuller explanation of the fields see "TESTS (Edit Sequence)" on page 168.

To add tests To add tests, select the following keys according to the labelled steps in Figure 1-12 on page 27.

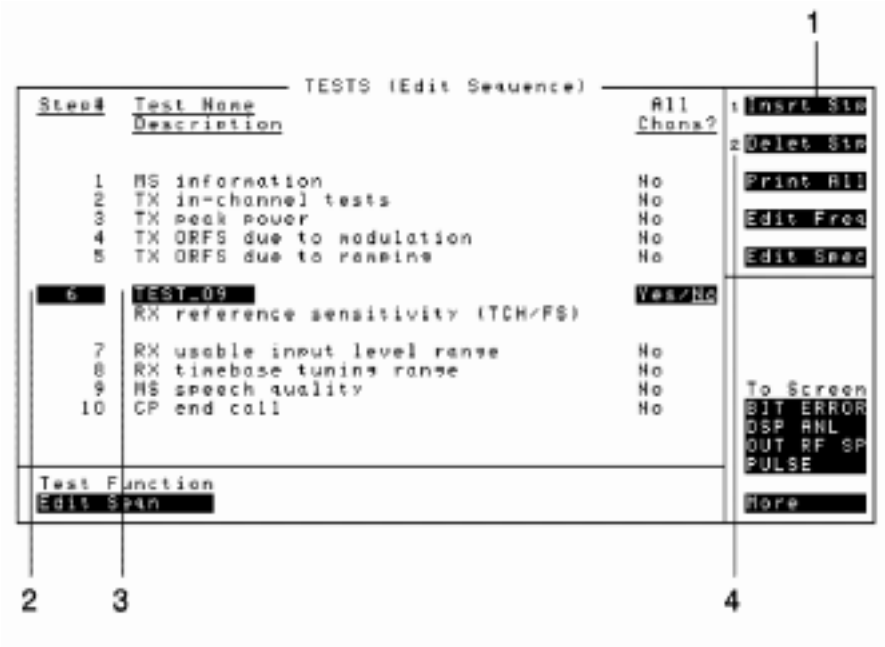
Step 1. Press L1 or select `Insrt Stp` to insert a step.

Step 2. Select the test name (example TEST_09) to modify the inserted step.

Step 3. Select a new Test name for the inserted step.

Step 4. Press L2 or select `Delet Stp` to remove steps from a procedure.

Figure 1-12 Edit Sequence Screen on the Agilent 83212D



Editing the test parameters

From the Edit Procedure screen (see “Procedure development – edit procedure” on page 25), select the following keys:

Step 1. (TESTS) and select the field `Test Function` at the bottom of the screen.

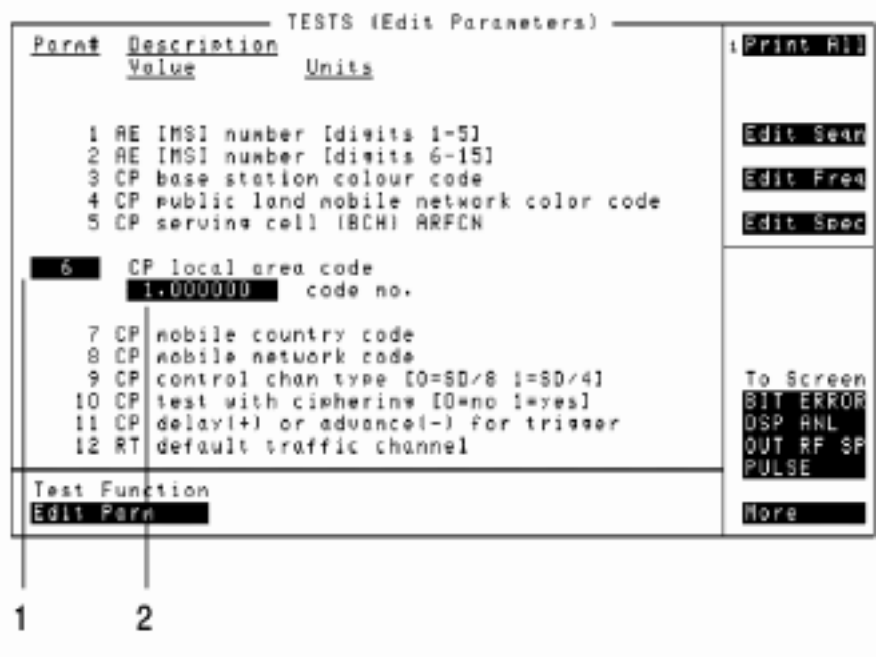
Step 2. From the list of `Choices` in the revealed box, select `Edit Parm` and edit the Test Parameters as described below.

Step 3. When finished editing parameters select (TESTS) to return to test screen.

1. Select either `Edit Seqn` or `Edit Spec` from the test function field to continue editing, or
2. If editing is complete, select (TESTS) and press (L2) or select `Continue` to return to the `Edit Proc` screen, then press (L2) or select `Run` to run the modified test procedure.

NOTE For a fuller explanation of the fields, see “TESTS (Edit Parameters)” on page 172.

Figure 1-13 Edit Parameters screen on the Agilent 83212D



Select the following information (refer to Figure 1-13).

1. Select the parameter to modify, either by scrolling with the knob on the front panel of the HP/Agilent 8922, or by entering the Parameter Number with the Data Keypad.
2. Select the `Description Value` and enter a new parameter value.

Cross reference of tests to parameters

Most tests are influenced by one or more parameters. Use the following table to identify which parameters are applicable to each test.

Table 1-2 Cross–Reference of Tests to Pre–Defined Test Sequences

Description	Test name	Parameters used
TEST_01	MS Information	1-12, 14, 16, 20, 31, 47
TEST_02	CP BS Originate	1-12, 14, 16, 20, 31, 47
TEST_03	CP MS Originate	3-12, 14, 16, 20, 31, 47
TEST_04	CP Speech Quality	3-12, 14, 16, 20, 31, 47
TEST_05	TX In-channel Tests	3-11, 14-16, 20, 31-35, 45, 47
TEST_06	TX Peak Power	3-11, 14-16, 20, 31, 36-39, 47, 48
TEST_07	TX ORFS Due to Modulation	3-12, 14-16, 20, 31, 40, 41, 44, 47
TEST_08	TX ORFS Due to Ramping	3-12, 14, 16, 20, 31, 47
TEST_09	RX Reference Sensitivity (TCH/FS)	1-11, 14, 16, 21-28, 31, 47
TEST_10	RX Usable Input Level Range	3-12, 14-16, 21, 22, 26-31, 47
TEST_11	RX Timebase Tuning Range	3-11, 14-16, 18, 20, 31, 47
TEST_12	MS Quick Test	3-12, 16, 20, 22, 23, 31, 32, 47
TEST_13	MS Flow Chart	3-12, 14-16, 20-25, 31, 47
TEST_14	TX RACH test	11, 12, 31
TEST_15	CP End Call	—
TEST_16	Dual-Band Handover	—

Editing the test specifications

From the Edit Procedure screen (see “Procedure development – edit procedure” on page 25), do the following:

Step 1. Press TESTS and select the field `Test Function`.

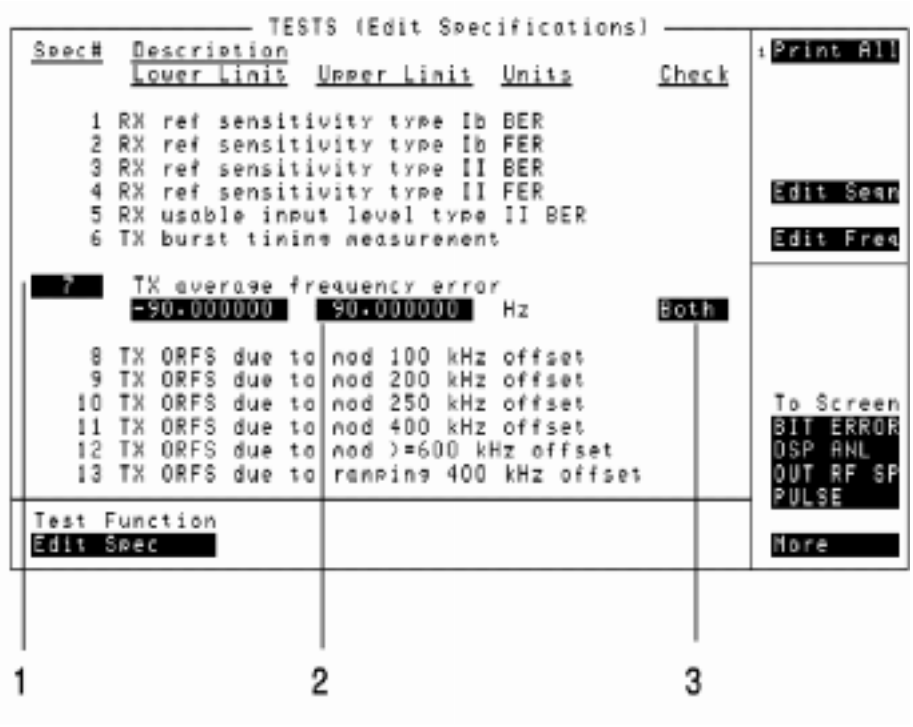
Step 2. From the list of `Choices` in the revealed box, select `Edit Spec` and edit the Test Specifications as described below.

Step 3. When finished editing parameters select TESTS to return to the test screen.

1. Select either `Edit Seqn` or `Edit Parm` from the test function field to continue editing, or
2. If editing is complete, select TESTS and press L2 or select `Continue` to return to the `Edit Proc` screen, then press L1 or select `Run` to run the modified test procedure.

For more details of the fields, see “TESTS (Edit Specifications)” on page 170.

Figure 1-14 Edit Specifications Screen on the Agilent 83212D



Edit the specifications as follows (refer to Figure 1-14):

Step 1. Select the specification to modify, either by scrolling with the knob or entering the Specification Number with the Data Keypad.

Step 2. Select the Description Limit and enter a new specification value.

Step 3. From the list of `Choices` in the revealed box, select the Check modes.

Cross reference of tests to specifications

Most tests have related specifications that determine pass-fail results. Use the following table to identify these specifications.

Table 1-3 Cross–Reference of Tests to Pre–Defined Test Sequences

Test name	Description	Specifications used
TEST_01	MS Information	—
TEST_02	CP BS Originate	—
TEST_03	CP MS Originate	—
TEST_04	CP Speech Quality	—
TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47
TEST_06	TX Peak Power	17, 18, 39
TEST_07	TX ORFS Due to Modulation[1]	8-12
TEST_08	TX ORFS Due to Ramping[1]	13-16
TEST_09	RX Reference Sensitivity (TCH/FS)	1-4
TEST_10	RX Usable Input Level Range	5
TEST_11	RX Timebase Tuning Range[2]	7
TEST_12	MS Quick Test	3, 6, 7, 18-26, 39
TEST_13	MS Flow Chart	—
TEST_14	TX RACH Test	27-35
TEST_15	CP End Call	—
TEST_16	Dual-Band Handover	—

1 HP/Agilent 8922 with Spectrum Analyzer option 006 only

2 Not available on HP/Agilent 8922E

Verifying the modified test procedure will run

Once you have modified a procedure, verify that it will run as follows:

Step 1. Connect your mobile station's RF output to your HP/Agilent 8922.

Step 2. Press the TEST button on the front panel of the HP/Agilent 8922 to display the TESTS screen.

Step 3. Select `Continue` to go to the `Edit Procedure` screen.

Step 4. Press the L2 button on the front panel of the HP/Agilent 8922 to run the modified test procedure.

If you encounter problems see chapter 3 , Problem Solving.

If no further modifications are necessary and you want to save the test procedure to a memory card, see "Saving test procedures to an SRAM memory card" on page 33.

NOTE If you do not save the procedure to a memory card, and another procedure is selected or a ROM program is run, the procedure you have defined is over-written.

To printout test results, or get a listing of tests, specifications, or parameters, see "Printing test results" on page 35.

Saving test procedures to an SRAM memory card

NOTE Your memory card must be initialized before it can be used (see “Initializing an SRAM memory card” on page 182 for details). Memory cards are sent from the factory uninitialized.

NOTE To create your own Dual-Band procedure, you must use a separate memory card. The procedure must be called DUALBAND and the procedures for GSM900 and DCS1800 must also exist on the memory card to provide the Dual-Band procedure with the necessary parameters and specifications for each band.

After running a test program, to save it to an SRAM Memory Card:

Step 1. Press CANCEL

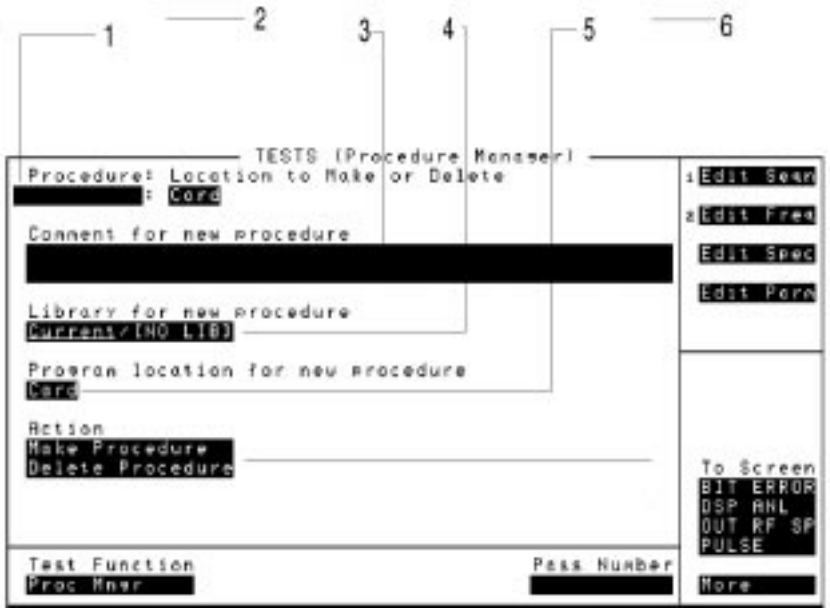
Step 2. Press TESTS

Step 3. Highlight the `Test Function` field and select `Proc Mngr`

Step 4. Insert an initialized SRAM Memory Card into the slot on the front of the HP/Agilent 8922.

Select the following commands described by Figure 1-15 on page 33.

Figure 1-15 Procedure Manager Screen



Step 1. Select `Procedure` and, using the knob on the front panel of the HP/ Agilent 8922 to identify the relevant letter, enter a name for the Test Procedure. Select `Done` from the choices menu when you have completed this task.

NOTE If you are creating a Dual-Band procedure, then this procedure must be called DUALBAND and the two procedures for GSM900 and DCS1800 must also exist on the card.

Step 2. Select `Card`.

Step 3. Select `Comment for new procedure` and use the front panel knob to enter a procedure description (this description is saved with the procedure).

Step 4. Select Current.

Step 5. Select Card.

Step 6. Select Make Procedure (this saves the current procedure to the memory card).

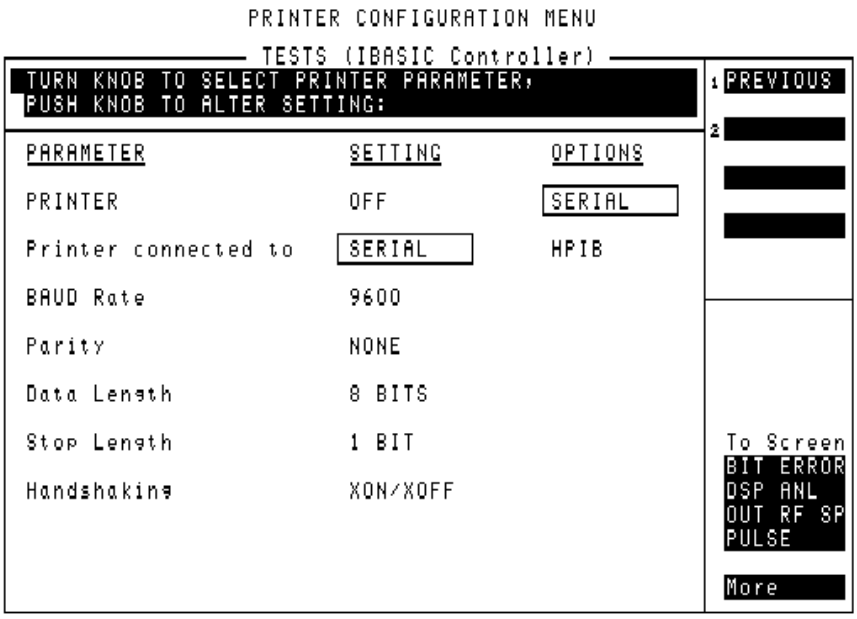
Press TEST followed by L1 to return to the Test Procedure Menu. To run the saved procedure see “Running user-defined test procedures” on page 16.

Printing test results

The printer screen is accessed from the opening screen by selecting the Test Procedure Menu.

1. Selecting softkey PRINTER or L2 reveals the current printer settings.
2. By setting each field, the configuration can be altered to suit your printer. Turn the knob to highlight a printer parameter, then push the knob to alter its setting.
3. Select L1 or select PREVIOUS to return to main menu.

Figure 1-16 Printer Configuration Screen



NOTE Setting the PRINTER parameter to ON causes results to be printed when a test is run. This field is also available on the Sequence Menu.

GPIB, RS-232 and Centronics parallel printer interfaces are all supported by the Agilent 83212D software.

NOTE If your HP/Agilent 8922 does not have a Centronics interface port, you can use the following accessories to provide a Centronics interface capability:

- ITEL-45CH (Centronics GPIB Converter)

- F1011A (AC/DC Adapter)
- C2912B (Printer Cable)
- 10833D (0.5m GPIB Cable)

Contact your nearest Sales and Service Office for a list of printers supported by the Agilent 83212D software.

Optional printer configuration

To limit the number of lines printed to a page:

Step 1. Press (CANCEL) and press (TESTS)

Step 2. Select `Edit Cnfg` from the Test Function field at the bottom of the screen.

Step 3. Select the `Calling Name` and use the knob to enter PRINTER (all capital letters).

Step 4. Select the `Address` field and enter the Printer address (example 701).

Step 5. Select the `Options` field and enter the following code:
`LN=#,START,END` where # is the number of lines on each page, `START` causes a form feed at the start of each printout and `END` causes a form feed at the end of each printout.

The `Options` field is located on the `Edit Configuration` screen directly below the field used to enter the word `PRINTER`.

For full details of the `Edit Configuration`n screen, see chapter 7 , Screens.

Step 6. Press (TESTS) followed by Run or (L1) to restart the Agilent 83212D software.

NOTE Having modified the `Edit Cnfg` screen, you must re-start the Agilent 83212D software using (L1) `Run` as opposed to (L2) Continue.

Setting up a GPIB Power Supply

Power supplies

The Agilent 83212D software supports all power supplies that support SCPI programming mnemonics. Contact your nearest Sales and Service Office for further information on power supplies supported by this software.

- HP/Agilent 6630A (100W System Power Supplies)
- HP/Agilent 6640A (200W System Power Supplies)
- HP/Agilent 6650A (500W System Power Supplies)
- HP/Agilent 6670A (1000W System Power Supplies)

To set up an HP-IB power supply

Step 1. Connect your GPIB power supply to GPIB port at the rear of the HP/Agilent 8922.

Step 2. Press TESTS to display the TESTS screen.

Step 3. Select the list of Test Functions.

Step 4. Select an Inst#.

Step 5. Select the Calling Name field and enter the Calling Name.

1. Turn the knob on the front panel of the HP/Agilent 8922 to scroll through the list of characters.
2. Select characters to enter POWER SUPPLY (all capital letters).
3. Select Done to enter the name.

Step 6. Optionally, enter the model of the power supply.

Step 7. Enter the 3-digit GPIB address of the power supply.

Step 8. Press TESTS followed by L1 to return to the Agilent 83212D software.

NOTE

Having modified the Edit Cnfg screen, you must re-start the Agilent 83212D software using L1 or Run, as opposed to L2 or Continue.

The power supply's output voltage is determined by parameter 17, RT Nominal Supply Voltage. In addition, you may set the supply's maximum current output using parameter 46, TX Current Limit. See "Editing the test parameters" on page 27 for details on setting parameters.

2 Using Worksheets

Worksheets

Filling in the worksheets helps organize your test procedure information. The worksheets also provide a record of which tests are included in a test procedure, the specifications and parameters that affect the test procedure, and the values chosen for those specifications and parameters.

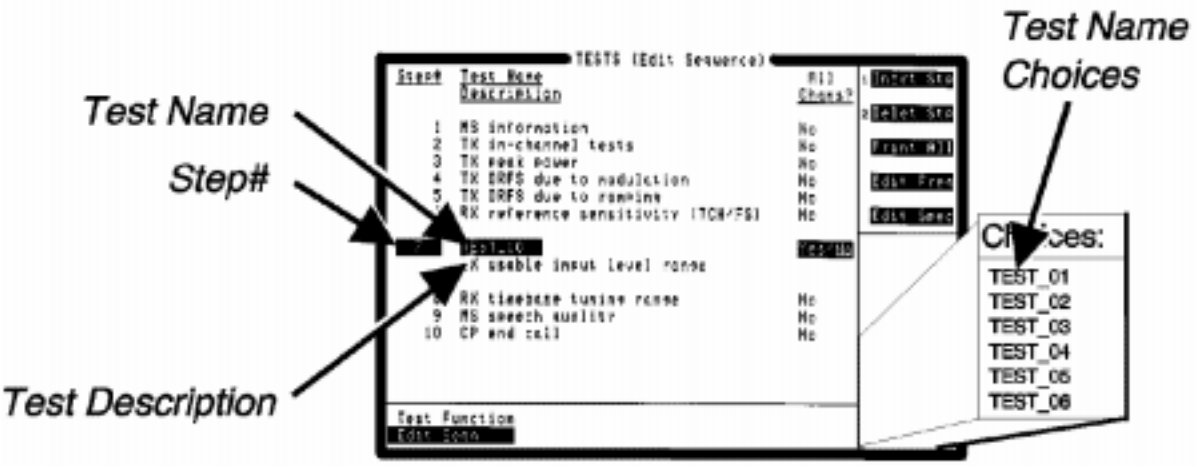
NOTE For details on making test procedures, see See “Making your own test procedures” on page 24.

Choosing the tests

All tests are listed on the Tests Worksheet. Put a number in the `Step #` column next to each test you want to run. This number indicates the order that tests are run in.

For a description of each test see chapter 4 , Tests.

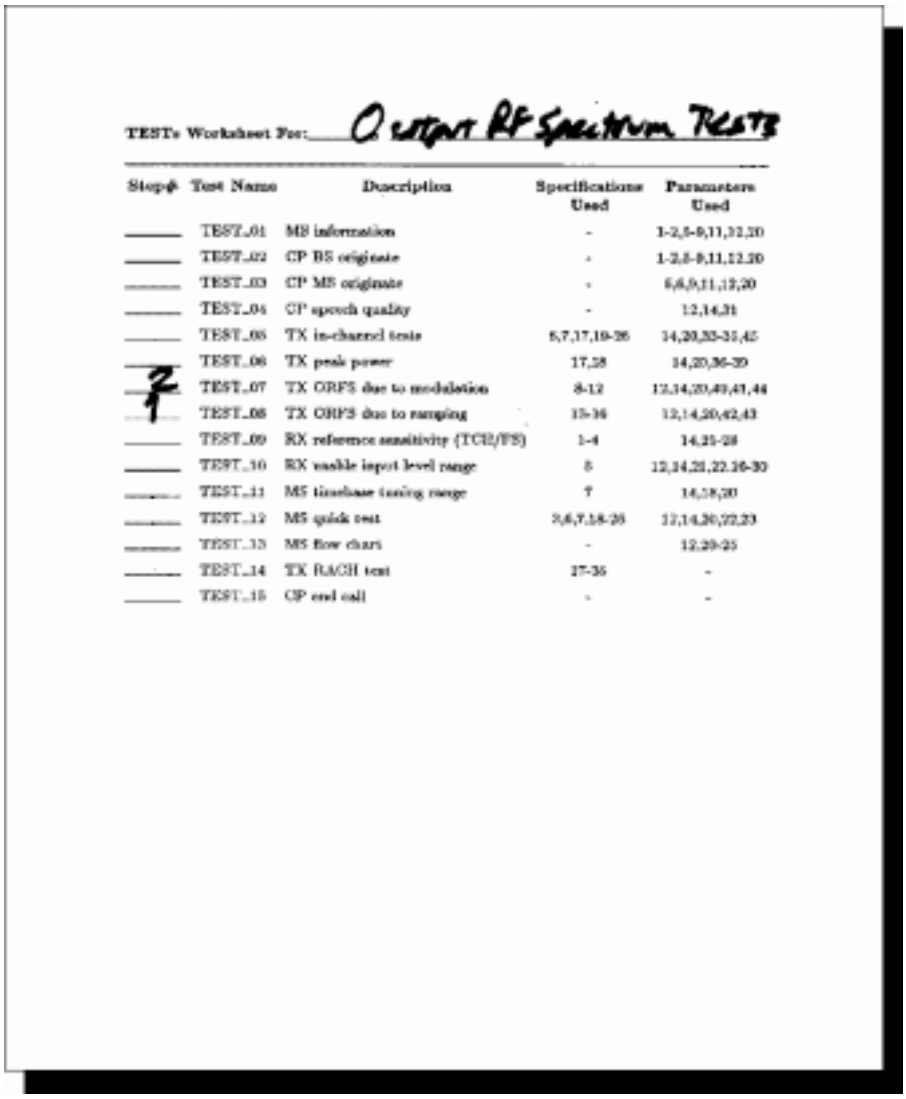
Figure 2-1 Choosing tests screen



Example

The TESTS Worksheet gives an example of choosing TEST_08 as the first Step in a Test Procedure. The second Step will be TEST_07.

Figure 2-2 Example TESTS output



TESTs Worksheet For: Output RF Spectrum Tests

Step#	Test Name	Description	Specifications Used	Parameters Used
_____	TEST_01	MS information	-	1-2,5-9,11,12,20
_____	TEST_02	CP BS originate	-	1-2,5-9,11,12,20
_____	TEST_03	CP MS originate	-	5,6,9,11,12,20
_____	TEST_04	CP speech quality	-	12,14,31
_____	TEST_05	TX in-channel tests	5,7,17,19-26	14,20,33-35,45
_____	TEST_06	TX peak power	17,28	14,20,36-39
_____	TEST_07	TX ORFS due to modulation	8-12	12,14,20,40,41,44
_____	TEST_08	TX ORFS due to ramping	13-16	12,14,20,42,43
_____	TEST_09	RX reference sensitivity (TCH/FS)	1-4	14,25-28
_____	TEST_10	RX usable input level range	5	12,14,21,22,28-30
_____	TEST_11	MS timebase tuning range	7	14,18,20
_____	TEST_12	MS quick test	5,6,7,18-26	12,14,20,22,23
_____	TEST_13	MS flow chart	-	12,20-25
_____	TEST_14	TX RACH test	27-36	-
_____	TEST_15	CP end call	-	-

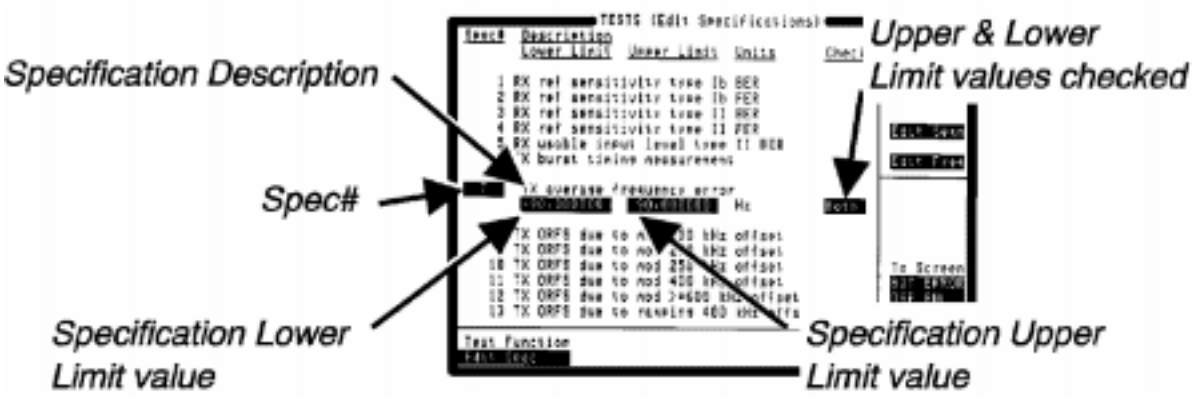
Define the Specifications

NOTE The default specifications values are defined for testing a Class 5 mobile station.

Place a checkmark (✔) next to specifications that are used in any of the tests you have chosen (use the specifications column in the Tests Worksheet). Include each specification's upper and lower limits if applicable.

For a description of each specification, see chapter 5 , Test Specifications.

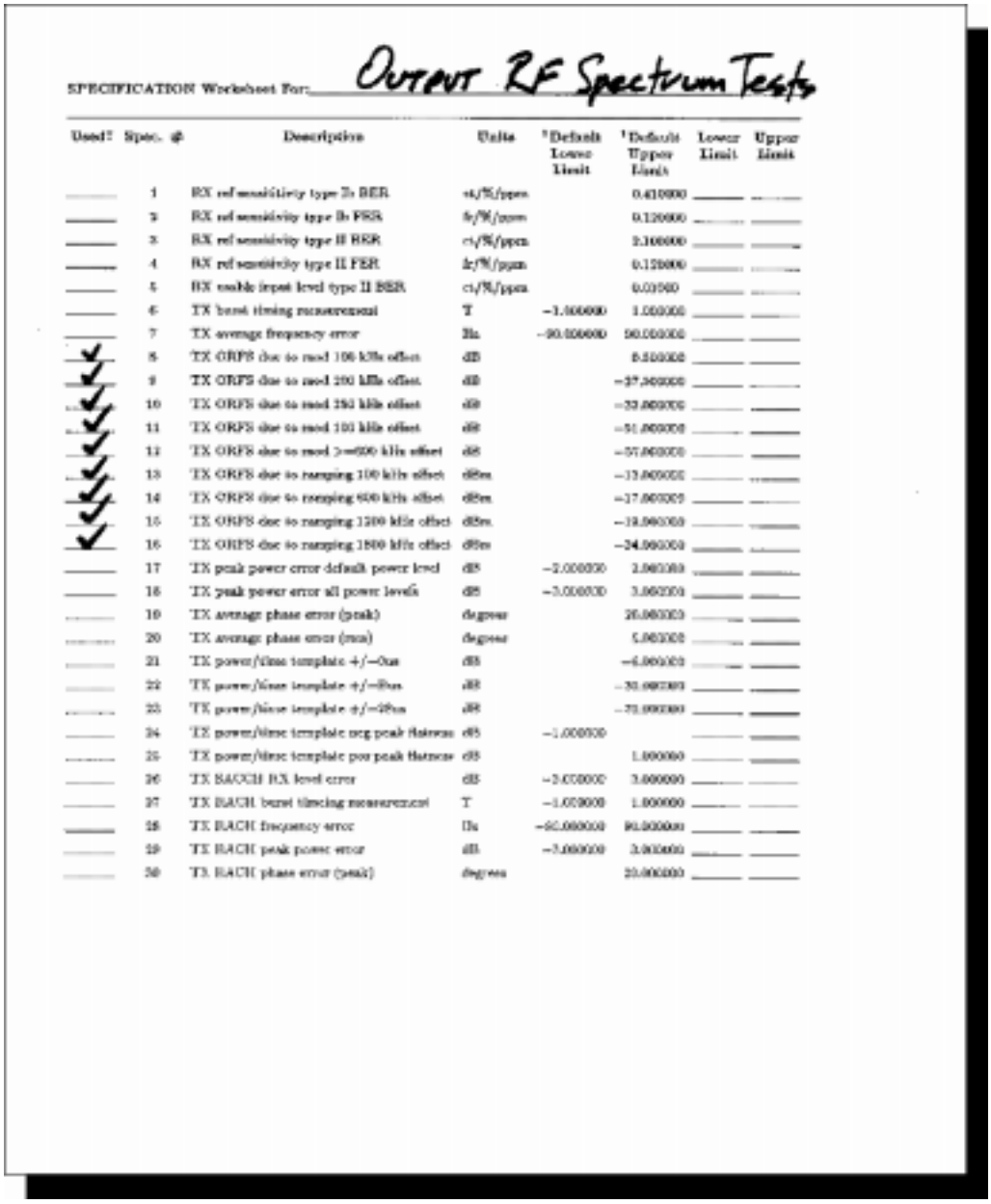
Figure 2-3 Defining the specifications screen



Example

If you chose to run TEST_07 and TEST_08 in a test procedure, your SPECIFICATIONS worksheet would resemble the following example.

Figure 2-4 **Example Specifications output from running TEST_07 and TEST_08**



SPECIFICATION Worksheet For: Output RF Spectrum Tests

Used?	Spec. #	Description	Units	†Default Lower Limit	†Default Upper Limit	Lower Limit	Upper Limit
	1	RX ref sensitivity type Ib BER	rt/%/ppm		0.410000		
	2	RX ref sensitivity type Ib FER	fr/%/ppm		0.120000		
	3	RX ref sensitivity type II BER	rt/%/ppm		2.100000		
	4	RX ref sensitivity type II FER	fr/%/ppm		0.120000		
	5	RX usable input level type II BER	rt/%/ppm		0.03500		
	6	TX burst timing measurement	T	−1.000000	1.000000		
	7	TX average frequency error	Hz	−90.000000	90.000000		
✓	8	TX ORFS due to mod 100 kHz offset	dB		0.500000		
✓	9	TX ORFS due to mod 200 kHz offset	dB		−37.000000		
✓	10	TX ORFS due to mod 250 kHz offset	dB		−39.000000		
✓	11	TX ORFS due to mod 400 kHz offset	dB		−51.000000		
✓	12	TX ORFS due to mod >=600 kHz offset	dB		−57.000000		
✓	13	TX ORFS due to ramping 100 kHz offset	dBm		−13.000000		
✓	14	TX ORFS due to ramping 600 kHz offset	dBm		−17.000000		
✓	15	TX ORFS due to ramping 1200 kHz offset	dBm		−18.000000		
✓	16	TX ORFS due to ramping 1800 kHz offset	dBm		−24.000000		
	17	TX peak power error default power level	dB	−2.000000	2.000000		
	18	TX peak power error all power levels	dB	−3.000000	3.000000		
	19	TX average phase error (peak)	degrees		20.000000		
	20	TX average phase error (rms)	degrees		5.000000		
	21	TX power/time template +/−0us	dB		−6.000000		
	22	TX power/time template +/−9us	dB		−30.000000		
	23	TX power/time template +/−28us	dB		−70.000000		
	24	TX power/time template neg peak flatness	dB	−1.000000			
	25	TX power/time template pos peak flatness	dB		1.000000		
	26	TX SACCH RX level error	dB	−3.000000	3.000000		
	27	TX SACCH burst timing measurement	T	−1.000000	1.000000		
	28	TX SACCH frequency error	Hz	−90.000000	90.000000		
	29	TX SACCH peak power error	dB	−3.000000	3.000000		
	30	TX SACCH phase error (peak)	degrees		20.000000		

Define the parameters

NOTE

If the mobile country code (MCC) and mobile network code (MNC) from your test SIM do not match the parameters list associated with a procedure you create, base station originated calls cannot be made. This will prevent certain tests from running (see “If there are SIM switching problems” on page 70).

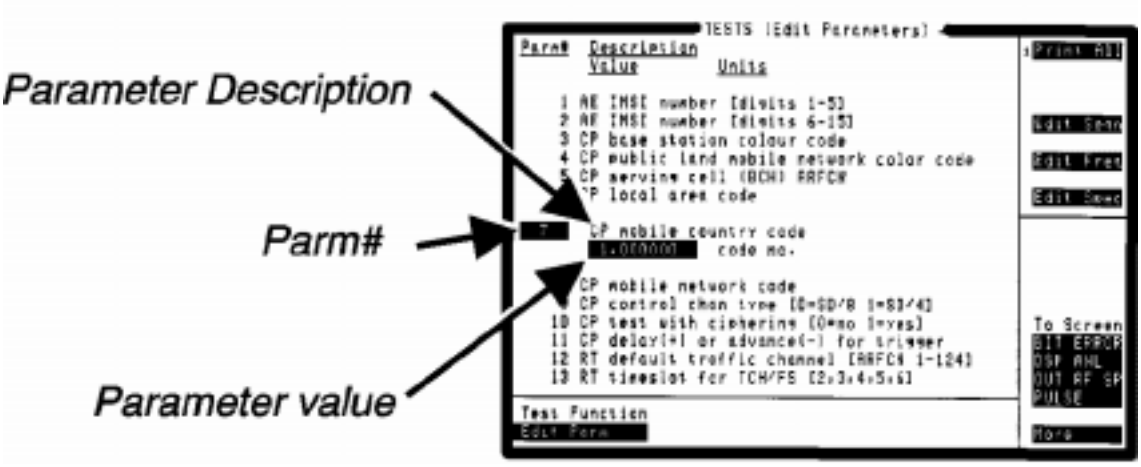
Put a checkmark (✔) next to the parameters that are used in any of the tests you have chosen, including `CP mobile country code` and `CP mobile network code` (use the Parameters column in the Tests Worksheet).

Write in the values necessary for your testing purposes.

Parameters already marked with a ✔ must have values entered that match the mobile station's test SIM.

Refer to chapter 2b, Parameters, for a description of each parameter.

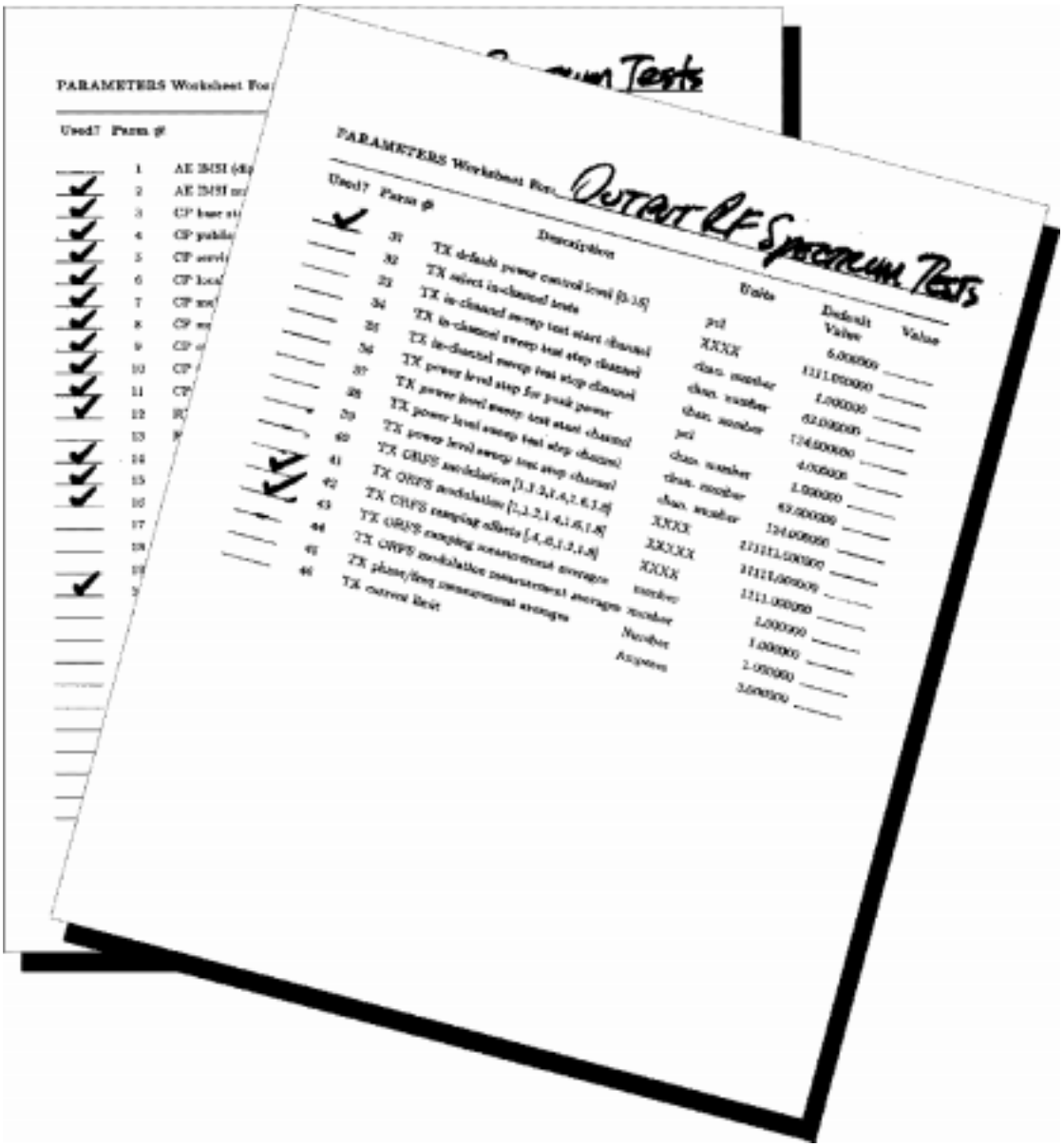
Figure 2-5 Defining the parameters screen



Example

If you chose to run TEST_07 and TEST_08 in a test procedure, your PARAMETERS worksheet would resemble the following example.

Figure 2-6 Example Parameters worksheet output from running TEST_07 and TEST_08



WORKSHEETS FOR GSM900

The following worksheets are used for filling in Tests, Specifications, and Parameters. Make copies of the worksheets before you use them.

GSM900 TESTs worksheet For:				
Step no.	**Test**	**Description**	**Specs used**	**Parameters used**
	TEST_01	MS Information	–	1-12, 14, 16, 20, 31, 47
	TEST_02	CP BS Originate	–	1-12, 14, 16, 20, 31, 47
	TEST_03	CP MS Originate	–	3-12, 14, 16, 20, 31, 47
	TEST_04	CP Speech Quality	–	3-12, 14, 16, 20, 31, 47
	TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47	3-11, 14-16, 20, 31-35, 45,47
	TEST_06	TX Peak Power	17, 18, 39	3-11, 14-16, 20,31, 36-39, 47, 48
	TEST_07	TX ORFS Due to Modulation[1]	8-12	3-12, 14-16, 20, 31, 40, 41, 44, 47
	TEST_08	TX ORFS Due to Ramping[1]	13-16	3-12, 14, 16, 20, 31, 47
	TEST_09	RX Reference Sensitivity TCH/FS)	1-4	1-11, 14, 16, 21-28, 31, 47
	TEST_10	RX Usable Input Level Range	5	3-12, 14-16, 21, 22, 26-31, 47
	TEST_11	RX Timebase Tuning Range[2]	7	3-11, 14-16, 18, 20, 31, 47
	TEST_12	MS Quick Test	3, 6, 7, 18-26, 39	3-12, 16, 20, 22, 23, 31, 32, 47
	TEST_13	MS Flow Chart	–	3-12, 14-16, 20-25, 31, 47
	TEST_14	TX RACH Test	27-35	11, 12, 31
	TEST_15	CP End Call	–	–
	TEST_16	Dual-Band Handover	–	–

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

2 Not available on HP/Agilent 8922E

NOTE Each time a test procedure is selected, the list of tests (that is, sequence) assumes the values defined by that procedure.

GSM900 SPECIFICATIONS worksheet For:

Used?	Step no.	Description	Units	GSM900 default lower limit	GSM900 default upper limit	Lower limit	Upper limit
	1	RX ref sensitivity type Ib BER	ct/%/ ppm		0.41		
	2	RX ref sensitivity type Ib FER	fr/%/ ppm		0.12		
	3	RX ref sensitivity type II BER	ct/%/ ppm		2.40		
	4	RX ref sensitivity type II FER	fr/%/ ppm		0.12		
	5	RX usable input level type II BER	ct/%/ ppm		0.10		
	6	TX burst timing measurement	T	–1.00	1.00		
	7	TX average frequency error	Hz	–90.00	90.00		
	8	TX ORFS due to mod 100 kHz offset[1]	dBc or dBm		+0.50 dBc or -36 dBm	n/a	n/a
	9	TX ORFS due to mod 200 kHz offset[1]	dBc or dBm		-27.5 dBc or -34.5 dBm	n/a	n/a
	10	TX ORFS due to mod 250 kHz offset[1]	dBc or dBm		-32 dBc or -33 dBm	n/a	n/a
	11	TX ORFS due to mod 400 kHz offset[1]	dBc or dBm		-51 dBc or -27 dBm	n/a	n/a
	12	TX ORFS due to mod >=600 kHz offset[1]	dBc or dBm		-60 dBc or -51 dBm	n/a	n/a
	13	TX ORFS due to ramping 100 kHz offset[1]	dBm		–17.00	n/a	n/a
	14	TX ORFS due to ramping 600 kHz offset[1]	dBm		–22.00	n/a	n/a
	15	TX ORFS due to ramping 1200 kHz offset[1]	dBm		–30.00	n/a	n/a
	17	TX peak power error default power level	dBm	[4]	[4]	n/a	n/a
	18	TX peak power error for pcl < 9[2]	dBm	[4]	[4]	n/a	n/a
	19	TX average phase error (peak)	degrees		20.00		
	20	TX average phase error (rms)	degrees		5.00		
	21	TX power/time template ±10 µs	dB		–6.00[3]	n/a	n/a

GSM900 SPECIFICATIONS worksheet For:							
Used?	**Step no.**	**Description**	**Units**	**GSM900 default lower limit**	**GSM900 default upper limit**	**Lower limit**	**Upper limit**
	22	TX power/time template ±18 µs	dBc or dBm		–30 dBc or –17 dBm	n/a	n/a
	23	TX power/time template ±28 µs[1]	dBc or dBm		-59 dBc or -36 dBm	n/a	n/a
	24	TX power/time template neg peak flatness	dB	–1.00			
	25	TX power/time template pos peak flatness	dB		1.00		
	26	TX SACCH RX level error	dB	–3.00	3.00		
	27	TX RACH burst timing meas.	T	–1.00	1.00		
	28	TX RACH frequency error	Hz	–90.00	90.00		
	29	TX RACH peak power error	dB	[4]	[4]	n/a	n/a
	30	TX RACH phase error (peak)	degrees		20.00		
	31	TX RACH phase error (rms)	degrees		5.00		
	32	TX RACH power/time temp. ±10 µs	dB		–6.00[3]	n/a	n/a
	33	TX RACH power/time temp. ±18µs	dB		–30 dBc or –17 dBm	n/a	n/a
	34	TX RACH power/time neg. peak flatness	dB	–1.00			
	35	TX RACH power/time pos. peak flatness	dB		1.00		
	36	TX worst case frequency error	Hz	–90.00	90.00		
	37	TX worst case phase error (peak)	degrees		20.00		
	38	TX worst case phase error (rms)	degrees		5.00		
	39	TX peak power error pcl ≥ 9 [1]		[4]	[4]	n/a	n/a

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

2 PCL (Power Control Level) refers to mobile TX level

3 For power control levels 16, 17 and 18 and above see page 123

4 Dependent on power control level, see page 123

GSM900 PARAMETERS worksheet For:					
Used?	**Parm no.**	**Description**	**Units**	**GSM900 default value**	**Value**
	1	AE IMSI (digits 1-5)	number	0.00	
	2	AE IMSI number (digits 6-15)	number	0.00	
	3	CP base station color code	code number	5.00	
	4	CP public land mobile network color code	code number	1.00	
	5	CP serving cell (BCH) ARFCN	chan.no.	25.00	
	6	CP local area code	code number	1.00	
	7	CP mobile country code	code number	1.00	
	8	CP mobile network code	code number	1.00	
	9	CP control chan type [0=SD/8, 1=SD/4]	0 or1	1.00	
	10	CP test with ciphering [0=no 1=yes]	0 or 1	0.00	
	11	CP delay(+) or advance(–) for trigger	T	0.00	
	12	RT default traffic channel [ARFCN 1-124]	chann. no.	62.00	
	13	RT timeslot for TCH/FS [2, 3, 4, 5, 6]	number	4.00	
	14	RT TCH [0=static 1=hopping 3 freqs]	0 or1	0.00	
	15	RT cell TCH H.O. [0=inter 1=intra]	0 or1	1.00	
	16	RT external pad and cable loss	dB	0.00	
	17	RT nominal supply voltage	Vdc	0.00	
	18	RT test set reference offset [1]	ppm	0.05	
	19	RT report TCH uplink errors (0=off 1=on)	0 or 1	0.00	
	20	RX RF level for signalling	dBm	–60.00	
	21	RX loopback delay [0=autoset XX=value] (frames)	0 or number	0.00	
	22	RX BER/FER results [0=count 1=% 2=ppm]	0,1, or 2	1.00	
	23	RX RF level TCH/FS reference sensitivity	dBm	–102.00	
	24	RX bits to test reference sensitivity Ib	bits	20000.00	
	25	RX bits to test reference sensitivity II	bits	10000.00	
	26	RX ref sens sweep test start channel	chann. no.	1.00	
	27	RX ref sens sweep test step channel	chann. no.	124.00	
	28	RX ref sens sweep test stop channel	chann. no.	124.00	
	29	RX usable input level range RF level	dBm	–15.00	
	30	RX bits to test usable input level II	bits	10000.00	
	31	TX default power control level	pcl	7.00	
	32	TX select in-channel tests	XXXX	1111.00	
	33	TX in-channel sweep test start channel	chann. no.	1.00	

GSM900 PARAMETERS worksheet For:					
Used?	**Parm no.**	**Description**	**Units**	**GSM900 default value**	**Value**
	34	TX in-channel sweep test step channel	chann. no.	62.00	
	35	TX in-channel sweep test stop channel	chann. no.	124.00	
	36	TX power level step for peak power	pcl	4.00	
	37	TX power level sweep test start channel	chann. no.	1.00	
	38	TX power level sweep test step channel	chann. no.	62.00	
	39	TX power level sweep test stop channel	chann. no.	124.00	
	40	TX ORFS modulation [0.1, 0.2, 0.25, 0.4, 0.6] [1]	XXXXXX	111111.00	
	41	TX ORFS modulation [1, 1.2, 1.4, 1.6] [1]	XXXXX	11111.00	
	42	TX ORFS ramp offsets [0.4, 0.6, 1.2, 1.6] [1]	XXXX	1111.00	
	43	TX ORFS ramping measurement averages[1]	number	1.00	
	44	TX ORFS mod measurement averages[1]	number	1.00	
	45	TX phase/freq measurement averages	number	1.00	
	46	TX current limit	Amperes	3.00	
	47	CP system [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.00	
	48	TX minimum power level	pcl	15	
	49	TX power level control for TEST_08	pcl	10	

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

NOTE Each time a test procedure is selected, the parameters list assumes the values defined by that procedure.

WORKSHEETS FOR DCS1800

The following worksheets are used for filling in Tests, Specifications, and Parameters. Make copies of the worksheets before you write on them.

DCS1800 TESTs worksheet for:

Step	Test	Description	Specifications used	Parameters used
	TEST_01	MS Information	–	1-12, 14, 16, 20, 31, 47
	TEST_02	CP BS Originate	–	1-12, 14, 16, 20, 31, 47
	TEST_03	CP MS Originate	–	3-12, 14, 16, 20, 31, 47
	TEST_04	CP Speech Quality	–	3-12, 14, 16, 20, 31, 47
	TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47	3-11, 14-16, 20, 31-35, 45, 47
	TEST_06	TX Peak Power	17, 18, 39	3-11, 14-16, 20, 31, 36-39, 47, 48
	TEST_07	TX ORFS Due to Modulation[1]	8-12	3-12, 14-16, 20, 31, 40, 41, 44, 47
	TEST_08	TX ORFS Due to Ramping[1]	13-16	3-12, 14, 16, 20, 31, 47
	TEST_09	RX Reference Sensitivity (TCH/FS)	1-4	1-11, 14, 16, 21-28, 31, 47
	TEST_10	RX Usable Input Level Range	5	3-12, 14-16, 21, 22, 26-31, 47
	TEST_11	RX Timebase Tuning Range[2]	7	3-11,14-16, 18, 20, 31, 47
	TEST_12	MS Quick Test	3, 6, 7, 18-26, 39	3-12, 16, 20, 22, 23, 31, 32, 47
	TEST_13	MS Flow Chart	–	3-12,14-16,20-25,31,47
	TEST_14	TX RACH Test	27-35	11,12,31
	TEST_15	CP End Call	–	–
	TEST_16	Dual-Band Handover	–	–

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

2 Not available on HP/Agilent 8922E

NOTE Each time a test procedure is selected, the list of tests (that is sequence) assumes the values defined by that procedure.

DCS1800 SPECIFICATIONS worksheet for:							
Used?	**Step no.**	**Description**	**Units**	**DCS1800 default lower limit**	**DCS1800 default upper limit**	**Lower limit**	**Upper limit**
	1	RX ref sensitivity type Ib BER	ct/%/ ppm		0.41		
	2	RX ref sensitivity type Ib FER	fr/%/ ppm		0.12		
	3	RX ref sensitivity type II BER	ct/%/ ppm		2.40		
	4	RX ref sensitivity type II FER	fr/%/ ppm		0.12		
	5	RX usable input level type II BER	ct/%/ ppm		0.10		
	6	TX burst timing measurement	T	–1.00	1.00		
	7	TX average frequency error	Hz	–180.00	180.00		
	8	TX ORFS due to mod 100 kHz offset[1]	dBc or dBm		0.5 dBc or –36 dBm	n/a	n/a
	9	TX ORFS due to mod 200 kHz offset[1]	dBc or dBm		–27.5 dBc or –34.5 dBm	n/a	n/a
	10	TX ORFS due to mod 250 kHz offset[1]	dBc or dBm		–32 dBc or –27 dBm	n/a	n/a
	11	TX ORFS due to mod 400 kHz offset[1]	dBc or dBm		–51 dBc or –27 dBm	n/a	n/a
	12	TX ORFS due to mod ≥600 kHz offset[1]	dBc or dBm		–60 dBc or –56 dBm	n/a	n/a
	13	TX ORFS due to ramping 100 kHz offset[1]	dBm		–17.00	n/a	n/a
	14	TX ORFS due to ramping 600 kHz offset[1]	dBm		–22.00	n/a	n/a
	15	TX ORFS due to ramping 1200 kHz offset[1]	dBm		–28.00	n/a	n/a
	17	TX peak power error default power level	dB	[4]	[4]	n/a	n/a
	18	TX peak power error for pcl < 9[2]	dB	[4]	[4]		
	19	TX average phase error (peak)	degrees		20.00		
	20	TX average phase error (rms)	degrees		5.00		
	21	TX power/time template ±10µs	dB		–6.00[3]	n/a	n/a

DCS1800 SPECIFICATIONS worksheet for:

Used?	Step no.	Description	Units	DCS1800 default lower limit	DCS1800 default upper limit	Lower limit	Upper limit
	22	TX power/time template ±18µs	dBc or dBm		–30 dBc or –20 dBm	n/a	n/a
	23	TX power/time template ±28µs[1]	dBc or dBm		–48 dBc or –48 dBm	n/a	n/a
	24	TX power/time template neg peak flatness	dB	–1.00			
	25	TX power/time template pos peak flatness	dB		1.00		
	26	TX SACCH RX level error	dB	–3.00	3.00		
	27	TX RACH burst timing measurement	T	–1.00	1.00		
	28	TX RACH frequency error	Hz	–180.00	180.00		
	29	TX RACH peak power error	dB	[4]	[4]	n/a	n/a
	30	TX RACH phase error (peak)	degrees		20.00		
	31	TX RACH phase error (rms)	degrees		5.00		
	32	TX RACH power/time template at ±10 µs	dB		–6.00[3]	n/a	n/a
	33	TX RACH power/time template at ±18 µs	dB		–30.00	n/a	n/a
	34	TX RACH power/time neg peak flatness	dB	–1.00			
	35	TX RACH power/time pos peak flatness	dB		1.00		
	36	TX worst case frequency error	Hz	–180.00	180.00		
	37	TX worst case phase error (peak)	degrees		20.00		
	38	TX worst case phase error (rms)	degrees		5.00		
	39	TX peak power error for pcl ≥ 9	dB	[4]	[4]	n/a	n/a

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

2 PCL (power Control Level) refers to mobile TX level

3 For power control levels 16, 17 and 18 and above see page 123

4 Dependent on power control level, see page 123

NOTE Each time a procedure is selected, the specifications list assumes the values defined by that procedure.

DCS1800 PARAMETERS worksheet for:					
Used?	**Parm no.**	**Description**	**Units**	**DCS1800 default value**	**Value**
	1	AE IMSI (digits 1-5)	number	0.00	
	2	AE IMSI number (digits 6-15)	number	0.00	
	3	CP base station color code	code number	5.00	
	4	CP public land mobile network color code	code number	1.00	
	5	CP serving cell (BCH) ARFCN	chann. no.	600.00	
	6	CP local area code	code number	1.00	
	7	CP mobile country code	code number	1.00	
	8	CP mobile network code	code number	1.00	
	9	CP control chan type [0=SD/8, 1=SD/4]	0 or1	1.00	
	10	CP test with ciphering [0=no1=yes]	0 or 1	0.00	
	11	CP delay(+) or advance (–) for trigger	T	0.00	
	12	RT default traffic channel [ARFCN 1-124]	chann. no.	699.00	
	13	RT timeslot for TCH/FS [2,3,4,5,6]	number	4.00	
	14	RT TCH [0=static 1=hopping 3 freqs]	0 or1	0.00	
	15	RT cell TCH H.O. [0=inter 1=intra]	0 or1	1.00	
	16	RT external pad and cable loss	dB	0.00	
	17	RT nominal supply voltage	Vdc	0.00	
	18	RT test set reference offset [1]	ppm	0.05	
	19	RT report TCH uplink errors (0=off 1=on)	0 or 1	0.00	
	20	RX RF level for signalling	dBm	–60.00	
	21	RX loopback delay [0=autoset XX=value] (frames)	0 or number	0.00	
	22	RX BER/FER results [0=count 1=% 2=ppm]	0, 1, or 2	1.00	
	23	RX RF level TCH/FS reference sensitivity	dBm	–100.00	
	24	RX bits to test reference sensitivity Ib	bits	20000.00	
	25	RX bits to test reference sensitivity II	bits	10000.00	
	26	RX ref sens sweep test start channel	chann. no.	512.00	
	27	RX ref sens sweep test step channel	chann. no.	373.00	
	28	RX ref sens sweep test stop channel	chann. no.	885.00	
	29	RX usable input level range RF level	dBm	–23.00	
	30	RX bits to test usable input level II	bits	10000.00	
	31	TX default power control level	pcl	3.00	
	32	TX select in-channel tests	XXXX	1111.00	
	33	TX in-channel sweep test start channel	chann. no.	512.00	

DCS1800 PARAMETERS worksheet for:					
Used?	**Parm no.**	**Description**	**Units**	**DCS1800 default value**	**Value**
	34	TX in-channel sweep test step channel	chann. no.	187.00	
	35	TX in-channel sweep test stop channel	chann. no.	885.00	
	36	TX power level step for peak power	pcl	4.00	
	37	TX power level sweep test start channel	chann. no.	512.00	
	38	TX power level sweep test step channel	chann. no.	187.00	
	39	TX power level sweep test stop channel	chann. no.	885.00	
	40	TX ORFS modulation [0.1, 0.2, 0.25, 0.4, 0.6]	XXXXXX	111111.0	
	41	TX ORFS modulation [1, 1.2, 1.4, 1.6]	XXXXX	11111.00	
	42	TX ORFS ramping offsets [0.4, 0.6, 1.2, 1.6]	XXXX	1111.00	
	43	TX ORFS ramping measurement averages	number	1.00	
	44	TX ORFS modulation measurement averages	number	1.00	
	45	TX phase/freq measurement averages	number	1.00	
	46	TX current limit	Amperes	3.00	
	47	CP system [0=GSM900, 1=DCS1800, 2=PCS1900]	0, 1 or 2	1.00	
	48	TX minimum power level for DCS1800	pcl	10.00	

1 Not available on HP/Agilent 8922E

NOTE Each time a test procedure is selected, the parameters list assumes the values defined by that procedure.

WORKSHEETS FOR PCS1900

The following worksheets are used for filling in Tests, Specifications, and Parameters. Make copies of the worksheets before you write on them.

NOTE Each time a test procedure is selected, the list of tests (that is sequence) assumes the values defined by that procedure.

PCS1900 TESTs worksheet for:

Step no.	Test	Description	Specifications used	Parameters used
	TEST_01	MS Information	–	1-12, 14, 16, 20, 31, 47
	TEST_02	CP BS Originate	–	1-12, 14, 16, 20, 31, 47
	TEST_03	CP MS Originate	–	3-12, 14, 16, 20, 31, 47
	TEST_04	CP Speech Quality	–	3-12, 14, 16, 20, 31, 47
	TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47	3-11, 14-16, 20, 31-35, 45, 47
	TEST_06	TX Peak Power	17, 18, 39	3-11, 14-16, 20, 31, 36-39, 47, 48
	TEST_07	TX ORFS Due to Modulation[1]	8-12	3-12, 14-16, 20, 31, 40, 41, 44, 47
	TEST_08	TX ORFS Due to Ramping[1]	13-16	3-12, 14, 16, 20, 31, 47
	TEST_09	RX Reference Sensitivity (TCH/FS)	1-4	1-11, 14, 16, 21-28, 31, 47
	TEST_10	RX Usable Input Level Range	5	3-12, 14-16, 21, 22, 26-31, 47
	TEST_11	RX Timebase Tuning Range[2]	7	3-11, 14-16, 18, 20, 31, 47
	TEST_12	MS Quick Test	3, 6, 7, 18-26, 39	3-12, 16, 20, 22, 23, 31, 32, 47
	TEST_13	MS Flow Chart	–	3-12, 14-16, 20-25, 31, 47
	TEST_14	TX RACH Test	27-35	11, 12, 31
	TEST_15	CP End Call	–	–
	TEST_16	Dual-Band Handover	–	–

1 HP/Agilent 8922 Spectrum Analyzer Option 006 only

2 Not available on HP/Agilent 8922E

PCS1900 SPECIFICATIONS worksheet for:							
Used?	**Step no.**	**Description**	**Units**	**PCS1900 default lower limit**	**PCS1900 default upper limit**	**Lower limit**	**Upper limit**
	1	RX ref sensitivity type Ib BER	ct/%/ ppm		0.40		
	2	RX ref sensitivity type Ib FER	fr/%/ ppm		0.10		
	3	RX ref sensitivity type II BER	ct/%/ ppm		2.00		
	4	RX ref sensitivity type II FER	fr/%/ ppm		0.10		
	5	RX usable input level type II BER	ct/%/ ppm		0.10		
	6	TX burst timing measurement	T	–1.00	1.00		
	7	TX average frequency error	Hz	–190.00	190.00		
	8	TX ORFS due to mod 100 kHz offset[1]	dBc or dBm		+0.5 dBc or –32.00 dBm	n/a	n/a
	9	TX ORFS due to mod 200 kHz offset[1]	dBc or dBm		–27.5 dBc or –34.5 dBm	n/a	n/a
	10	TX ORFS due to mod 250 kHz offset[1]	dBc or dBm		–32 dBc or –35 dBm	n/a	n/a
	11	TX ORFS due to mod 400 kHz offset[1]	dBc or dBm		–51 dBc or –27 dBm	n/a	n/a
	12	TX ORFS due to mod ≥600 kHz offset[1]	dBc or dBm		–60 dBc or –56 dBm	n/a	n/a
	13	TX ORFS due to ramping 100 kHz offset[1]	dBm		–17.00	n/a	n/a
	14	TX ORFS due to ramping 600 kHz offset[1]	dBm		–22.00	n/a	n/a
	15	TX ORFS due to ramping 1200 kHz offset[1]	dBm		–30.00	n/a	n/a
	17	TX peak power error default power level	dB	[4]	[4]	n/a	n/a
	18	TX peak power error for pcl < 9[2]	dB	[4]	[4]	n/a	n/a
	19	TX average phase error (peak)	degrees		20.00		
	20	TX average phase error (rms)	degrees		5.00		

PCS1900 SPECIFICATIONS worksheet for:							
Used?	**Step no.**	**Description**	**Units**	**PCS1900 default lower limit**	**PCS1900 default upper limit**	**Lower limit**	**Upper limit**
	21	TX power/time template ±10 µs	dB		–6.00[3]	n/a	n/a
	22	TX power/time template ±18 µs	dBc or dBm		–30 dBc or –20 dBm	n/a	n/a
	23	TX power/time template ±28 µs	dBc or dBm		–48 dBc or –48 dBm	n/a	n/a
	24	TX power/time template neg peak flatness	dB	–1.00			
	25	TX power/time template pos peak flatness	dB		1.00		
	26	TX SACCH RX level error	dB	–3.00	3.00		
	27	TX RACH burst timing measurement	T	–1.00	1.00		
	28	TX RACH frequency error	Hz	–190.00	190.00		
	29	TX RACH peak power error	dB	–3.00	3.00	n/a	n/a
	30	TX RACH phase error (peak)	degrees		20.00		
	31	TX RACH phase error (rms)	degrees		5.00		
	32	TX RACH power/time template at ±10 µs	dB		–6.00	n/a	n/a
	33	TX RACH power/time template at ±18 µs	dB		–30 dBc or –20 dBm	n/a	n/a
	34	TX RACH power/time neg peak flatness	dB	–1.00			
	35	TX RACH power/time pos peak flatness	dB		1.00		
	36	TX worst case frequency error	Hz	–190.00	190.00		
	37	TX worst case phase error (peak)	degrees		20.00		
	38	TX worst case phase error (rms)	degrees		5.00		
	39	TX peak power error for pcl ≥ 9[2]	dB	[4]	[4]	n/a	n/a

1 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

2 PCL (Power Control Level) refers to mobile TX level

3 For power control levels 16, 17 and 18 and above see page 123

4 Dependent on power control level, see page 123

PCS1900 PARAMETERS worksheet for:

Used?	Parm no.	Description	Units	PCS1900 default value	Value
	1	AE IMSI (digits 1-5)	number	0.00	
	2	AE IMSI number (digits 6-15)	number	0.00	
	3	CP base station color code	code no.	5.00	
	4	CP public land mobile network color code	code no.	1.00	
	5	CP serving cell (BCH) ARFCN	chann. no.	600.00	
	6	CP local area code	code no.	1.00	
	7	CP mobile country code	code no.	1.00	
	8	CP mobile network code	code no.	1.00	
	9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.00	
	10	CP test with ciphering [0=no1=yes]	0 or 1	0.00	
	11	CP delay (+) or advance (-) for trigger	T	0.00	
	12	RT default traffic channel [ARFCN 1-124]	chann. no.	699.00	
	13	RT timeslot for TCH/FS[2,3,4,5,6]	number	4.00	
	14	RT TCH [0=static 1=hopping 3 freqs]	0 or1	0.00	
	15	RT cell TCH H.O. [0=inter 1=intra]	0 or1	1.00	
	16	RT external pad and cable loss	dB	0.00	
	17	RT nominal supply voltage	Vdc	0.00	
	18	RT test set reference offset [1]	ppm	0.05	
	19	RT report TCH uplink errors (0=off 1=on)	0 or 1	0.00	
	20	RX RF level for signalling	dBm	–60.00	
	21	RX loopback delay [0=autoset XX=value] (frames)	0 or no.	0.00	
	22	RX BER/FER results [0=count 1=% 2=ppm]	0,1, or 2	1.00	
	23	RX RF level TCH/FS reference sensitivity	dBm	–102.00	
	24	RX bits to test reference sensitivity Ib	bits	20000.00	
	25	RX bits to test reference sensitivity II	bits	10000.00	
	26	RX ref sens sweep test start channel	chann. no.	512.00	
	27	RX ref sens sweep test step channel	chann. no.	298.00	
	28	RX ref sens sweep test stop channel	chann. no.	810.00	
	29	RX usable input level range RF level	dBm	–23.00	
	30	RX bits to test usable input level II	bits	10000.00	
	31	TX default power control level	pcl	3.00	
	32	TX select in-channel tests	XXXX	1111.00	
	33	TX in-channel sweep test start channel	chann. no.	512.00	

PCS1900 PARAMETERS worksheet for:					
Used?	**Parm no.**	**Description**	**Units**	**PCS1900 default value**	**Value**
	34	TX in-channel sweep test step channel	chann. no.	149.00	
	35	TX in-channel sweep test stop channel	chann. no.	810.00	
	36	TX power level step for peak power	pcl	4.00	
	37	TX power level sweep test start channel	chann. no.	512.00	
	38	TX power level sweep test step channel	chann. no.	149.00	
	39	TX power level sweep test stop channel	chann. no.	810.00	
	40	TX ORFS mod [0.1, 0.2, 0.25, 0.4, 0.6] [2]	XXXXX	11111.00	
	41	TX ORFS modulation [1, 1.2, 1.4, 1.6] [2]	XXXX	11111.00	
	42	TX ORFS ramp offsets [0.4, 0.6, 1.2, 1.6] [2]	XXXX	1111.00	
	43	TX ORFS ramping measurement averages [2]	number	1.00	
	44	TX ORFS modulation measurement averages [2]	number	1.00	
	45	TX phase/freq measurement averages	number	1.00	
	46	TX current limit	Amperes	3.00	
	47	CP system [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	2.00	
	48	TX minimum power level	pcl	10	
	49	TX power level control for TEST_08	pcl	5	

1 Not available on HP/Agilent 8922E

2 HP/Agilent 8922 with Spectrum Analyzer Option 006 only

NOTE Each time a test procedure is selected, the parameters list assumes the values defined by that procedure.

WORKSHEETS FOR DUAL-BAND

The following worksheets are used for filling in Tests, Specifications, and Parameters. Make copies of the worksheets before you write on them.

Note that the Dual-Band test procedure uses parameters and specifications from the GSM900 and DCS1800 test procedures.

NOTE Each time a test procedure is selected, the list of tests (that is sequence) assumes the values defined by that procedure.

DUAL-BAND TESTs worksheet for:

Step no.	Test	Description	Specifications used	Parameters used
	TEST_01	MS Information	–	1-12, 14, 16, 20, 31, 47
	TEST_02	CP BS Originate	–	1-12, 14, 16, 20, 31, 47
	TEST_03	CP MS Originate	–	3-12, 14, 16, 20, 31, 47
	TEST_04	CP Speech Quality	–	3-12, 14, 16, 20, 31, 47
	TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47	3-11, 14-16, 20, 31-35, 45, 47
	TEST_06	TX Peak Power	17, 18, 39	3-11, 14-16, 20, 31, 36-39, 47, 48
	TEST_07	TX ORFS Due to Modulation[1]	8-12	3-12, 14-16, 20, 31, 40, 41, 44, 47
	TEST_08	TX ORFS Due to Ramping[1]	13-16	3-12, 14, 16, 20, 31, 47
	TEST_09	RX Reference Sensitivity (TCH/FS)	1-4	1-11, 14, 16, 21-28, 31, 47
	TEST_10	RX Usable Input Level Range	5	3-12, 14-16, 21, 22, 26-31, 47
	TEST_11	RX Timebase Tuning Range[2]	7	3-11, 14-16, 18, 20, 31, 47
	TEST_12	MS Quick Test	3, 6, 7, 18-26, 39	3-12, 16, 20, 22, 23, 31, 32, 47
	TEST_13	MS Flow Chart	–	3-12, 14-16, 20-25, 31, 47
	TEST_14	TX RACH Test	27-35	11, 12, 31
	TEST_15	CP End Call	–	–
	TEST_16	Dual-Band Handover	–	–
	TEST_04	CP Speech Quality	–	3-12, 14, 16, 20, 31, 47
	TEST_05	TX In-channel Tests	6, 7, 17, 19-26, 36-38, 47	3-11, 14-16, 20, 31-35, 45, 47

DUAL-BAND TESTs worksheet for:				
Step no.	**Test**	**Description**	**Specifications used**	**Parameters used**
	TEST_06	TX Peak Power	17, 18, 39	3-11, 14-16, 20, 31, 36-39, 47, 48
	TEST_07	TX ORFS Due to Modulation[1]	8-12	3-12, 14-16, 20, 31, 40, 41, 44, 47
	TEST_08	TX ORFS Due to Ramping[1]	13-16	3-12, 14, 16, 20, 31, 47
	TEST_09	RX Reference Sensitivity (TCH/FS)	1-4	1-11, 14, 16, 21-28, 31, 47
	TEST_10	RX Usable Input Level Range	5	3-12, 14-16, 21, 22, 26-31, 47
	TEST_15	CP End Call	–	–

1 HP/Agilent 8922 Spectrum Analyzer Option 006 only

2 Not available on HP/Agilent 8922E

NOTE Note that tests 1, 2, 3, 11, 12, 13 and 14 are not used after dual-band handover.

Specification and parameter worksheets

For worksheets for specifications and parameters use the existing worksheets for GSM and DCS/PCS.

3 Problem Solving

This chapter describes how to solve some of the most common problems related to using the Agilent 83212D Mobile Station Test Software.

If you have a problem with mobile station testing

NOTE Press the SHIFT key and then the MEAS SYNC key to enter the Message screen which lists errors or operating messages that have occurred since the instrument was turned on.

Pausing and restarting tests

If you pause a test, make changes to certain values within the test and then restart the test, errors can result. It is therefore recommended that if you pause a test to change certain values, that you then rerun the test with the new values from the beginning.

If a test procedure does not run

NOTE

Running a pre-defined test procedure ensures that the software necessary to run a test procedure is loaded into the HP/Agilent 8922 RAM memory. Try running a pre-defined test procedure, then re-try the test procedure that would not run.

- Make sure the memory card is correctly inserted into the HP/Agilent 8922.
- Make sure that a Test Procedure file has been loaded into the HP/Agilent 8922.

  In the upper left corner of the TESTS screen, a file name should be seen in the Procedure field. If the field is blank, then a Test Procedure file has not been loaded. Refer to “Pre-defined test procedures” on page 14.
- Make sure that you have selected the Run Test field to start testing.
- Make sure that if running the procedure DUALBAND, then the test system is a Multi-Band Test System.

  The test procedure DUALBAND only runs on a Multi-Band Test System. Unpredictable results can occur if it is run on a non Multi-Band Test System.

If an error message appears

Bad TCH number

This means that an invalid traffic channel number has been entered in the parameter list. Valid traffic channel numbers are 1 through 124 for GSM900, 512 through 885 for DCS1800, and 512 through 810 for PCS1900. Check parameters `RT Default Traffic Channel` and `RT TCH`.

BET trigger not found

This means a bit error test would not run. Some possible causes are:

- The RF link was dropped before the bit error test started.
- The RF level from the HP/Agilent 8922 is too low.

Connection Failure

This means the RF link between the mobile station and HP/Agilent 8922 was dropped. If the Mobile Station is operating correctly, check parameters `AE IMSI` (there are two).

Error in parameter “CP control channel type”

An invalid control channel type was entered in the parameter list. Valid field entries are 0 and 1. Check parameter `CP Control Chan Type`.

Error in power class number

This means the mobile station has returned an incorrect power class number. The allowable power class numbers are 1 through 5 for GSM900 and 1 or 2 for DCS1800.

Error in TCH handover

An invalid number was entered for the TCH handover parameter. Valid field entries are 0 and 1. Check parameter `RT Cell TCH H.O.`

Improper context terminator or filename is undefined

This could mean the software has not been loaded. Run a pre-defined test procedure to make sure the software is loaded into the HP/Agilent 8922.

Mobile did not change power properly

This means that the mobile station did not change to the assigned power control level. Some possible causes are:

- The power control level entered is higher than the mobile station is capable of generating.
- The mobile station did not go into loopback mode.
- A test SIM was not inserted in the mobile station under test.

TCH Hop Parameter is illegal value

An invalid value was entered in the parameter list for the parameter that selects between a single or a hopped traffic channel. Allowable field entries for this parameter are 0 and 1. Check parameter RT TCH.

If the printer does not respond

- Check that the printer is turned on.
- Check that the cable from the HP/Agilent 8922 to the printer is connected.
- Check settings on Printer Menu (see “Printing test results” on page 35).

If the mobile station does not find service

- Check parameters `CP Mobile Network Code` and `CP Mobile Country Code` (see “Editing the test parameters” on page 27).
- Check the connection from the mobile station to the HP/Agilent 8922. The `RF IN/OUT` connector (not the `AUX RF OUT` or `AUX RF IN` connectors) should be used.
- Check the LO OUT to LO IN connection on the HP/Agilent 8922 rear panel. These connectors appear on older versions of the HP/Agilent 8922 and must be connected with a coax cable.
- If your HP/Agilent 8922 is equipped with Option 001, check that the rear panel Opt 001 REF OUT connector is connected to REF IN with a coax cable.
- If your HP/Agilent 8922 is equipped with Option 001, use a frequency counter to ensure that the High-Stability timebase is on frequency.
- If the Mobile Station is unable to make or receive calls, see SIM Switching Problems.

If there are SIM switching problems

Problems can occur when switching between SIM cards or mobiles. The two most likely cases are:

- Using different SIM cards from one country:

  The first time a test is run following the loading of a procedure, the user will be prompted to make a call from the mobile. The HP/Agilent 8922 then will acquire the SIM card's IMSI number over the GSM link.

  Should the call end, any subsequent tests will attempt to page the mobile using the stored IMSI number. Should this IMSI have changed (by changing SIM cards or mobiles), then the `MS information` individual test (Test 1) should be rerun (see "Selecting a test sequence — Test Sequence menu" on page 17). This test always prompts the user to originate a call from a mobile and in doing so the IMSI number stored in the test set will be updated.

- Using SIM cards from different countries:

  The MCC and MNC parameters (numbers 7 and 8) of the procedure must match those of the SIM card (the defaults are both 1), otherwise the mobile may not "camp on" to the network.

- To use a different MCC or MNC from the default:

Step 1. Create a custom procedure (see "Making your own test procedures" on page 24) with MCC and MNC parameters 7 and 8 set accordingly. When this procedure is selected, all tests will run using these values, or

Step 2. Select `Edit Proc` by pressing `L2` on Sequence menu (see "Procedure development – edit procedure" on page 25). Press `TESTS`, then select `Edit Parm` from test function field. Having modified the MCC and MNC (see "Editing the test parameters" on page 27), press `TESTS` followed by `L2`. (Continue) to return to Procedure Development mode. Press `L2` to run procedure using any parameter, sequence or specification modifications.

NOTE Modified procedures must be run from the Procedure Development screen only. Running a test from the Sequence menu causes the selected procedure to be loaded from the card, overwriting any procedure currently stored in the HP/Agilent 8922.

4 Tests

This chapter describes each test in the Agilent 83212D Mobile Station Test Software. Each test is described along with the specifications and parameters used (if any).

Test types

Before the list of Test choices can be displayed, you must select one of the pre-defined test procedures from the memory card. See “Pre-defined test procedures” on page 14.

The TESTS `Edit Seqn` screen displays names and descriptions of each test in the current procedure. This list can be printed out by setting up the Printer Configuration Menu screen as shown in “Printing test results” on page 35, and then selecting the `Print All` field.

There are 4 types of tests:

- Mobile Station Tests (MS)
- Call Processing Tests (CP)
- Transmitter Tests (TX)
- Receiver Tests (RX)

Tests are derived from ETSI – Technical Specifications GSM 11.10, ETSI – Technical Specifications GSM 11.10-DCS, and the document – PN 3389 Personal Communications Services Air Interface Specification.

List of tests

Test	Description
TEST_01	MS Information
TEST_02	CP BS Originate
TEST_03	CP MS Originate
TEST_04	CP Speech Quality
TEST_05	TX In-Channel Tests
TEST_06	TX Peak Power Error
TEST_07	TX ORFS Due to Modulation (HP/Agilent 8922 with Spectrum Analyzer Option 006 only)
TEST_08	TX ORFS Due to Ramping (HP/Agilent 8922 with Spectrum Analyzer Option 006 only)
TEST_09	RX Reference Sensitivity (TCH/FS)
TEST_10	RX Usable Input Level Range
TEST_11	RX Timebase Tuning Range (Not available on the HP/Agilent 8922E)
TEST_12	MS Quick Test
TEST_13	MS Flow Chart
TEST_14	TX RACH Test
TEST_15	CP End Call
TEST_16	Dual-Band Handover

TEST_01 MS Information

Description

This test prompts you to make a mobile station originated call, and the IMSI number is acquired by the HP/Agilent 8922. At the beginning of the test you also have the option to enter the mobile's serial number.

The following MS Information is displayed:

- GSM Phase
- Which bands the mobile supports
- MS Power Class
- MS IMSI (International Mobile Subscriber Identity Number)
- MS IMEI (International Mobile Equipment Identification)
- MS ONUM (Originated Number)
- Whether or not the MS has passed an IMEI consistency check. The read IMEI must be in the format of 15 decimal digits (no Hex) and the final character must be 0. The message `IMEI check successfully passed` or `IMEI does not fulfill requirements` appears depending on the outcome of the check.

Specifications

None

Parameters

The following parameters are used in TEST_01.

Parm no.	Description	Units	GSM900 default value	DCS1800 default value	PCS1900 default value
1	AE IMSI (digits 1-5)	number	0.0	0.0	0.0
2	AE IMSI number (digits 8-15)	number	0.0	0.0	0.0
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(-) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan. no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0

Parm no.	Description	Units	GSM900 default value	DCS1800 default value	PCS1900 default value
20	RX RF level for signalling	dBm	-60.0	-60.0	-60.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_02 CP BS Originate

Description

This test verifies that a mobile station can be paged by simulating a base station originated call.

Entering the IMSI number into the parameters list is optional. If the default IMSI (all 0's) is detected, the software prompts you to make a mobile station originated call. The IMSI is then obtained by the HP/Agilent 8922 and a base station originated call is attempted. If an incorrect IMSI is entered, a base station originated call is unsuccessful.

The following information is displayed when the test is run:

- Pages until mobile is connected
- RACHs until mobile is connected
- Call-processing timing advance
- Call-processing mobile station TX level
- Call-processing trigger-timing error

Specifications

None

Parameters

Parm no.	Description	Units	GSM900 default value	DCS1800 default value	PCS1900 default value
1	AE IMSI (digits 1-5)	number	0.0	0.0	0.0
2	AE IMSI number (digits 8-15)	number	0.0	0.0	0.0
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance (-) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan. no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0

Parm no.	Description	Units	GSM900 default value	DCS1800 default value	PCS1900 default value
20	RX RF level for signalling	dBm	-60.0	-60.0	-60.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_03 CP MS Originate

Description

This test verifies that a mobile station can originate a call.

You are instructed to enter a number (any number) on the mobile station and send it.

The following information is displayed after the test is run:

- Number of RACH bursts until mobile is connected
- Call-processing timing advance
- Call-processing mobile station TX level
- Call-processing trigger-timing error

Specifications

None

Parameters

Parm no.	Description	Units	GSM900 default value	DCS1800 default value	PCS1900 default value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(-) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan.no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	-60.0	-60.0	-60.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_04 CP Speech Quality

Description

This test allows you to listen to the mobile station's speech quality. The HP/Agilent 8922 demodulates your voice from the mobile station and routes the data through a channel decoder. After a one second delay, the data is routed through a channel coder, and transmitted using 0.3 GMSK modulation on an RF carrier to the mobile station.

This is a qualitative test on the speech quality. After listening to the speech quality, you are prompted to pass or fail the speech quality test. The decision is displayed both on the screen and the printout.

Specifications

None

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(-) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan.no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_05 TX In-Channel Tests

Description

This test performs the following in-channel tests on the transmitter portion of the mobile station:

- TX phase error (rms and peak)
- TX frequency error
- TX power error (measured at the default power control level)
- TX timing error
- TX amplitude negative and positive peak flatness
- TX amplitude envelope at ±28µs[1], ±18µs, and ±10µs
- SACCH TX level and timing advance
- SACCH RX quality and level error

The frequency error must be < 0.1 ppm and the phase error must be <5°rms, and < 20° peak for the mobile station to pass.

The amplitude envelope flatness measurement is made over the 147 useful bits of the GSM burst, and must be within ±1.0 dB for the mobile station to pass.

The amplitude envelope rising and falling edge measurements are made at the following points, with the negative values relative to bit 0 (rising edge) and the positive values relative to bit 147 (falling edge):

- ±28µs[1] point: Limit = –70 dBc
- ±18µs point: Limit = – 30 dBc
- ±10µs point: Limit = – 6 dBc

The RX quality level must be zero for the mobile station to pass. However, at the RF signalling levels of less than –98 dBm the mobile station will not fail the RX quality test (the RF signalling level is set by parameter 20).

All pass/fail limits are set to verify transmitter compliance with GSM 11.10 recommendations, GSM 11.10 DCS recommendations, and the document – PN 3389 Personal Communications Services Air Interface Specification.

Specifications

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
6	TX burst timing measurement	T	–1.0	1.0	–1.0	1.0	–1.0	1.0
7	TX average frequency error	Hz	–90.0	90.0	–180.0	180.0	–190.0	190.0
17	TX peak power error default power level	dB	This specification is now fixed in the software. See page 120 for details.					
19	TX average phase error (peak)	degrees		20.0		20.0		20.0
20	TX average phase error (rms)	degrees		5.0		5.0		5.0
21	TX power/ time template ±6µs	dB	This specification is now fixed in the software. See page 123 for details.					
22	TX power/ time template ±10µs	dB	This specification is now fixed in the software. See page 123 for details.					
23	TX power/ time template ±28µs[1]	dB	This specification is now fixed in the software. See page 123 for details.					
24	TX power/ time template neg peak flatness	dB	–1.0		–1.0		–1.0	
25	TX power/ time template pos peak flatness	dB		1.0		1.0		1.0
26	TX SACCH RX level error	dB	–3.0	3.0	–3.0	3.0	–3.0	3.0

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
36	TX worst case frequency error	Hz	–90.0	90.0	–180.0	180.0	–190.0	190.0
37	TX worst case phase error (peak)	degrees		20.0		20.0		20.0
38	TX worst case phase error (rms)	degrees		5.0		5.0		5.0

1. Available only when Spectrum Analyzer Option 006 is fitted.

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	1.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
32	TX select in-channel tests	XXXX	1111.0	1111.0	1111.0
33	TX in-channel sweep test start channel	chan. no.	1.0	512.0	512.0
34	TX in-channel sweep test step channel	chan. no.	62.0	187.0	149.0
35	TX in-channel sweep test stop channel	chan. no.	124.0	885.0	810.0
45	TX phase/freq measurement averages	Number	1.0	1.0	1.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_06 TX Peak Power Error

Description

This test verifies that the mobile station transmits the proper power level for its power control levels (TX Levels). The mobile's transmitted power is compared with the GSM 11.10 recommended, GSM 11.10 DCS recommended, and PN 3389 recommended levels, and the amount of error is displayed.

The `TX default power control level` parameter determines the starting level for power measurements.

Measurements are made on decreasing power levels according to the `TX power level step for peak power` parameter.

The sequence of power control levels is repeated for each channel selected in the `TX in-channel sweep test channel` parameter.

Peak power is measured by averaging the transmitted carrier power over the middle of the pulse (when the 147 useful bits are present).

GSM900 Test Limits				
Power Class of MS	**Power Control Level**	**Peak Power (dBm)**	**Tolerance (±dB) for conditions**	
			Normal	**Extreme**[2]
1	0	43	2.0	2.5
	1	41	3.0	4.0
2	2	39	3.0[1]	4.0
3	3	37	3.0[1]	4.0
	4	35	3.0	4.0
4	5	33	3.0[1]	4.0
	6	31	3.0	4.0
5	7	29	3.0[1]	4.0
	8	27	3.0	4.0
	9	25	3.0	4.0
	10	23	3.0	4.0
	11	21	3.0	4.0
	12	19	3.0	4.0
	13	17	3.0	4.0
	14	15	3.0	4.0

GSM900 Test Limits				
Power Class of MS	**Power Control Level**	**Peak Power (dBm)**	**Tolerance (±dB) for conditions**	
			Normal	**Extreme**[2]
	15	13	3.0	4.0
	16	11	5.0	6.0
	17	9	5.0	6.0
	18	7	5.0	6.0
	19[3]	5	5.0	6.0

1. If power control level corresponds to the power class of MS, then the maximum tolerances shall be 2.0 dB under normal measurement tolerances and 2.5 dB under extreme measurement tolerances.

2. Extreme test condition tolerances are not used within the test software.

DCS1800/PCS1900 Test Limits				
Power Class of MS	**Power Control Level**	**Peak Power (dBm)**	**Normal Test Conditions Tolerance (±dB)**	**Extreme Test Conditions Tolerance (±dB)**[2]
3	30	34	3.0[1]	4.0[1]
	31	32	3.0	4.0
1	0	30	3.0[1]	4.0[1]
	1	28	3.0	4.0
2	2	26	3.0[1]	4.0[1]
	3	24	3.0	4.0
	4	22	3.0	4.0
	5	20	3.0	4.0
	6	18	3.0	4.0
	7	16	3.0	4.0
	8	14	3.0	4.0
	9	12	4.0	5.0
	10	10	4.0	5.0
	11	8	4.0	5.0
	12	6	4.0	5.0
	13	4	4.0	5.0
	14	2	5.0	6.0
	15	0	5.0	6.0

1. If power control level corresponds to the power class of MS, then the maximum tolerances shall be 2.0 dB under normal measurement tolerances and 2.5 dB under extreme measurement tolerances.

2. Extreme test condition tolerances are not used within the test software.

Specifications

Spec no.	Description	Units	Default Lower Limit	Default Upper Limit
17	TX peak power error default power level	dB	This specification is now fixed in the software. See page 120 for details.	
18	TX peak power error for pcl < 9	dB	This specification is now fixed in the software. See page 120 for details.	
39	Tx peak power error for pcl ≥ 9	dB	This specification is now fixed in the software. See page 136 for details.	

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	1.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
36	TX power level step for peak power	pcl	4.0	4.0	4.0
37	TX power level sweep test start channel	chan. no.	1.0	512.0	512.0
38	TX power level sweep test step channel	chan. no.	62.0	187.0	149.0
39	TX power level sweep test stop channel	chan. no.	124.0	885.0	810.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0
48	TX minimum power level for DCS1800	pcl	0.0	10.0	10.0

TEST_07 TX ORFS Due to Modulation

NOTE This test does not run on an HP/Agilent 8922 without a Spectrum Analyzer Option 006.

Description

This test measures the mobile station's out-of-channel power due to modulation. The "TX ORFS modulation" parameters select which frequency offsets are measured.

The test is performed using the default power control level as specified by parameter number 31 TX Default Power Control Level (see page 153 for details).

The HP/Agilent 8922 makes Output RF Spectrum (ORFS) measurements using a 3-pole synchronously tuned measurement filter. Refer to the technical reference sheet *Output RF Spectrum Measurements Using a 3-Pole Synchronously Tuned Measurement Filter* (Agilent part number 1000-1223) available from the nearest Regional Sales and Service Office.

The GSM 11.10, GSM 11.10 DCS, and PN 3389 recommendations specify power levels relative to average TX power at the following frequency offsets:

- Spec 8 (± 100 kHz)
- Spec 9 (± 200 kHz)
- Spec 10 (± 250 kHz)
- Spec 11 (± 200 kHz × N for N = 2 through 8)

References: GSM 11.10 II.3.4.2.2 Ver 3.13 June 1993 and HP Technical Reference Sheet *Output RF Spectrum Measurements Using a 3-Pole Synchronously Tuned Measurement Filter* (Agilent part number 1000-1223) available from the nearest Regional Sales and Service Office.

NOTE The specifications for ORFS due to Modulation do not allow for the exceptions in GSM 11.10 DCS II.3.4.2.2 for several discrete failures of up to –36dBm at various points in the band.

Specifications

The following values are used for specifications 8 to 12. Either the relative limit in dBc or the absolute limit in dBM is taken, whichever is

the greater.

	Frequency offset				
	100 kHz	**200 kHz**	**250 kHz**	**400 kHz**	**600 - 1600 kHz**
GSM	+0.5 dBc or -36 dBm	-27.5 dBc or -34.5 dBm	-32 dBc or -35 dBm	-51 dBc or -27 dBm	-60 dBc or -51 dBm
DCS/PCS					-60 dBc or -56 dBm

The following offsets are used with specifications 8 to 12.

	Frequency offset				
	100 kHz	**200 kHz**	**250 kHz**	**400 kHz**	**600 - 1600 kHz**
GSM	0	2.5	1.0	9.0	0

NOTE

Default specifications 8-11 have been adjusted because a 3-pole filter is used instead of the 5-pole filter indicated in the GSM/DCS/PCS recommendations. These values are for a Class 5 GSM and Class 2 DCS/PCS mobile stations. Refer to the technical reference sheet *Output RF Spectrum Measurements Using a 3-Pole Synchronously Tuned Measurement Filter*, Agilent part number 1000-1223, available from the nearest Regional Sales and Service Office.

Default specification 12 has been adjusted because only a single measurement is taken when using the Agilent 83212D. The GSM approval specification requires an average of 200 readings.

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
12	RT default traffic channel [ARFCN 1-124]	chan. no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	1.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
40	TX ORFS modulation [0.1, 0.2, 0.25, 0.4, 0.6]	XXXXX	11111.0	11111.0	11111.0
41	TX ORFS modulation [1, 1.2, 1.4, 1.6]	XXXX	1111.0	1111.0	1111.0
44	TX ORFS modulation measurement averages	number	1.0	1.0	1.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_08 TX ORFS Due to Ramping

NOTE This test does not run on an HP/Agilent 8922 without a Spectrum Analyzer Option 006.

Description

This test measures the mobile station's out-of-channel power due to ramping (the rising and falling of the pulsed carrier).

The `TX ORFS ramping offsets` parameter selects which frequency offsets will be measured.

The test is performed at the power control level specified by parameter number 49 `TX Power Control Level for TEST_08` (see page 162 for details).

The HP/Agilent 8922 makes Output RF Spectrum (ORFS) measurements using a 3-pole synchronously tuned measurement filter. Refer to the technical reference sheet *Output RF Spectrum Measurements Using a 3-Pole Synchronously Tuned Measurement Filter* (Agilent part number 1000-1223) available from the nearest Regional Sales and Service Office.

The GSM 11.10, GSM 11.10 DCS, and PN 3389 recommendations specify what the power levels should be relative to peak TX power at the following frequency offsets:

- Spec 13 (± 400 kHz)
- Spec 14 (± 600 kHz)
- Spec 15 (± 1200 kHz)
- Spec 16 (± 1600 kHz)

NOTE The specifications for ORFS due to Modulation do not allow for the exceptions in GSM 11.10 DCS II.3.4.2.2 for several discrete failures of up to –36dBm at various points in the band.

NOTE Offsets greater than 1200kHz are not measured.

Specifications The following hardcoded values are used for specifications 13 to 16:

	Frequency offset				
	100 kHz	**200 kHz**	**250 kHz**	**400 kHz**	**600 - 1600 kHz**
GSM	+0.5 dBc or -36 dBm	-27.5 dBc or -34.5 dBm	-32 dBc or -35 dBm	-51 dBc or -27 dBm	-60 dBc or -51 dBm
DCS/PCS					-60 dBc or -56 dBm

NOTE Default specifications have been adjusted for a 3-pole filter instead of the 5-pole filter indicated in the GSM recommendations. These values are for Class 5 GSM and Class 2 DCS/PCS mobile stations. Refer to the technical reference sheet *Output RF Spectrum Measurements Using a 3-Pole Synchronously Tuned Measurement Filter* (Agilent part number 1000-1223) available from the nearest Regional Sales and Service Office.

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan.no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
42	TX ORFS Ramping Offsets [0010 = 1.2 MHz; 0100 = 0.6 MHz; 1000 = 0.4 MHz; 1110 = all of above]	0010, 0100, 1000, or 1110	1110	1110	1110
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_09 RX Reference Sensitivity (TCH/FS)

Description

This test displays bit-errors (RX BET) and frame erasures (RX FE).

The measured values returned for bit errors or frame erasures can be expressed in count, percent, or ppm (set by the “RX BER/FER results” parameter).

With the HP/Agilent 8922 acting as a base-station simulator, the mobile station is put in loopback mode. A pseudo-random bit sequence is transmitted by the HP/Agilent 8922 at a low RF level. The mobile station re-transmits the bit sequence, using full rate speech at a high RF level. Bit Errors (BETs) and Frame Erasures (FEs) are displayed for the chosen Radio Frequency Channel and types of bits chosen in the parameters list.

Channels	**Static Conditions**	
TCH/FS	**Max Events**	**Max Samples**
FER	200X (0.122X%)[1]	164,000
Class Ib (RBER)	82,000/X (0.41/X%)	20,000,000
Class II (RBER)	200 (2.44%)	8,200

1. Where “X” is a parameter which can range from 1 to 1.6. The value for “X” must be the same for the FER and class Ib bits.

Specifications

Spec no.	**Description**	**Units**	**GSM900 Default Lower Limit**	**GSM900 Default Upper Limit**	**DCS1800 Default Lower Limit**	**DCS1800 Default Upper Limit**	**PCS1900 Default Lower Limit**	**PCS1900 Default Upper Limit**
1	RX ref sensitivity type Ib BER	ct/%/ ppm		0.41		0.41		0.40
2	RX ref sensitivity type Ib FER	fr/%/ ppm		0.12		0.12		0.10
3	RX ref sensitivity type II BER	ct/%/ ppm		2.40		2.40		2.00
4	RX ref sensitivity type II FER	fr/%/ ppm		0.12		0.12		0.10

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
1	AE IMSI (digits 1-5)	number	0.0	0.0	0.0
2	AE IMSI number (digits 8-15)	number	0.0	0.0	0.0
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. number	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
21	RX Loopback delay [0=autoset XX=value] (frames)	0 or number	0.0	0.0	0.0
22	RX BER/FER results [0=count 1=% 2=ppm]	0, 1, or 2	1.0	1.0	1.0
23	RX RF level TCH/FS reference sensitivity	dBm	–102.0	–100.0	–102.0
24	RX bits to test reference sensitivity Ib	bits	20000.0	20000.0	20000.0
25	RX bits to test reference sensitivity II	bits	10000.0	10000.0	10000.0
26	RX tests sweep start channel	chan. number	1.0	512.0	512.0
27	RX tests sweep step channel	chan. number	124.0	373.0	298.0
28	RX tests sweep stop channel	chan. number	124.0	885.0	810.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP system [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_10 RX Usable Input Level Range

Description

This test verifies the dynamic range of the mobile station's receiver by performing bit error testing at a high signal level. The default level transmitted to the mobile station is –15 dBm, set by the parameter 29, `RX usable input level range RF level`.

NOTE

The default value of parameter 29, `RX usable input level range RF level` for GSM is -15 dBm which adheres to the ETSI specifications. However, this default does not run on the HP/Agilent 8922 model E or G. If you have an HP/Agilent 8922 E or G, you must either create a procedure with the value of parameter 29 set to -19 dBm, or upgrade your HP/Agilent 8922 to a model S, M, R or P. For more details on how to create your own test procedures, see "Making your own test procedures" on page 24.

Test results display the bit error count or ratio and pass/fail result for each channel selected. Receiver usable input level range is measured in count, percent, or ppm error (depending upon how the `RX BER/FER results` parameter is set).

Propagation Type	Max Events	Max Samples
Static (Class II)	200 (0.0122%)	1,640,000

Specification used

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
5	RX usable input level type II BER	ct/%/ ppm		0.1		0.1		0.1

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. number	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan. number	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	1.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
21	RX loopback delay [0=autoset XX=value] (frames)	0 or number	0.0	0.0	0.0
22	RX BER/FER results [0=count 1=% 2=ppm]	0, 1, or 2	1.0	1.0	1.0
26	RX ref sens sweep test start channel	chan. number	1.0	512.0	512.0
27	RX ref sens sweep test step channel	chan. number	124.0	373.0	298.0
28	RX ref sens sweep test stop channel	chan. number	124.0	885.0	810.0
29	RX usable input level range RF level	dBm	–15.0	–23.0	–23.0
30	RX bits to test usable input level II	bits	10000.0	10000.0	10000.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_11 RX Timebase Tuning Range

NOTE This test cannot be run using an HP/Agilent 8922E.

Description

This test verifies that the mobile station can tune its reference oscillator to match that of the base station.

This test does not verify any specific GSM, DCS or PCS recommendation, but may be used to simulate typical mobile operating conditions such as: “hot and cold” start up when the phone’s oscillator is likely to be off frequency; doppler frequency shift; or frequency error in the GSM system. During testing using the pre-defined procedures, the default frequency offset of the HP/Agilent 8922 is first set to +0.05 ppm. The frequency error at Radio Frequency Channel Numbers 1, 63, and 124 is measured. Then, the measurement is repeated with the frequency offset at –0.05 ppm. When running this test, it is possible that the phone will loose camp when the timebase of the HP/Agilent 8922 is moved. If this happens and the phone does not regain camp, cycle the power on the mobile so that it responds to the page from the HP/Agilent 8922. To change the frequency offset, modify the parameter “RT test set reference offset”. The default value is ±0.05 ppm; this corresponds to the GSM 11.10 specified accuracy for a base station under normal conditions.

Specifications

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
7	TX average frequency error	Hz	–90.0	90.0	–180.0	180.0	–190.0	190.0

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code number	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. number	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	1.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
18	RT test set reference offset	ppm	0.05	0.05	0.05
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_12 MS Quick Test

Description

This test performs a subset of both receiver and transmitter tests for the mobile. This test is designed to quickly display the following mobile station measurements:

- SACCH TX level and timing advance
- SACCH RX quality and level error
- TX phase error (rms and peak)
- TX frequency error
- TX burst timing error
- TX amplitude envelope
- TX peak power error
- RX BET for Residual type II bits

Specifications

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
3	RX ref sensitivity type II BER	ct/%/ppm		2.4		2.4		2.0
6	TX burst timing measurement	T	–1.0	1.0	–1.0	1.0	–1.0	1.0
7	TX average frequency error	Hz	–90.0	90.0	–180.0	180.0	–190.0	190.0
17	TX peak power error default power level	dB	This specification is now fixed in the software. See page 121 for details.					
18	TX peak power error < PCL 9 power levels	dB	This specification is now fixed in the software. See page 121 for details.					
19	TX average phase error (peak)	degrees		20.0		20.0		20.0

Spec no.	Description	Units	GSM900 Default Lower Limit	GSM900 Default Upper Limit	DCS1800 Default Lower Limit	DCS1800 Default Upper Limit	PCS1900 Default Lower Limit	PCS1900 Default Upper Limit
20	TX average phase error (rms)	degrees		5.0		5.0		5.0
21	TX power/ time template ±10µs	dB	This specification is now fixed in the software. See page 123 for details.					
22	TX power/ time template ±18µs	dB	This specification is now fixed in the software. See page 123 for details.					
23	TX power/ time template ±28µs[1]	dB	This specification is now fixed in the software. See page 123 for details.					
24	TX power/ time template neg peak flatness	dB	–1.0		–1.0		–1.0	
25	TX power/ time template pos peak flatness	dB		1.0		1.0		1.0
26	TX SACCH RX level error	dB	–3.0	3.0	–3.0	3.0	–3.0	3.0
39	TX peak power error ≤ PCL 9 power levels	dB	This specification is now fixed in the software. See page 136 for details.					

1. HP/Agilent 8922G or HP/Agilent 8922 with Spectrum Analyzer Option 006 only

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan.no.	62.0	699.0	699.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–60.0	–60.0	–60.0
22	RX BER/FER results [0=count 1=% 2=ppm]	0, 1, or 2	1.0	1.0	1.0
23	RX RF level TCH/FS reference sensitivity	dBm	–102.0	–100.0	–102.0
31	TX default power control level	pcl	7.0	3.0	3.0
32	TX minimum power level for DCS1800	pcl	0.0	10.0	10.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

Test conditions that cannot be modified

- Receiver reference sensitivity type II bits are set to 10000.
- Power levels are tested at the default power control level and at power-level settings:
  - — 7, 11, and 15 for GSM900 and E-GSM
  - — 3, 7 and 10 for DCS1800/PCS1900

TEST_13 MS Flow Chart

Description

This test can be run by selecting and running the Test Sequence `Flowchart` from the Sequence Menu.

When this test is run, a block diagram with various call-processing states is shown on the HP/Agilent 8922 screen. You may change the mobile station's operating state by selecting the softkeys which correspond to the blocks in the flow chart.

The call-processing states that are available are:

- `BCCH` – indicates that the HP/Agilent 8922 is transmitting a broadcast channel
- `MS ORIG` – to originate a call by entering a number on the mobile station and sending it
- `BS ORIG` – to originate a call from the base station
- `MS INFO` – to display mobile station's and SIM information
- `VOICE CHANNEL` Once a voice channel is obtained, you may select:
  - — `CHNG CHAN` – to change RF channels, or perform a Dual-Band Handover if the Dual-Band procedure is started and a specific channel number from the GSM or DCS band is entered
  - — `SACCH` – to obtain slow associated control channel information from the mobile station
  - — `RX SENS` – to check the mobile station's receiver bit-error performance at the reference sensitivity (for a TCH/FS)
  - — `CHNG PWR` – to change the mobile station's power level
  - — `HOP/SING` – to switch between a hopping traffic channel (hops over 3 channels) or a single traffic channel
  - — `BS END` – to end the call from a base station
  - — `MS END` – to end the call using the mobile station
  - — `ECHO/MEAS` – to switch between a mode that echoes audio input to the mobile station or performs continuous measurements
- `MORE` – to see other softkey options for the flow chart

Specifications

None

Parameters

Parm no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
3	CP base station color code	code no.	5.0	5.0	5.0
4	CP public land mobile network color code	code no.	1.0	1.0	1.0
5	CP serving cell (BCH) ARFCN	chan. no.	25.0	600.0	600.0
6	CP local area code	code no.	1.0	1.0	1.0
7	CP mobile country code	code no.	1.0	1.0	1.0
8	CP mobile network code	code no.	1.0	1.0	1.0
9	CP control chan type [0=SD/8, 1=SD/4]	0 or 1	1.0	1.0	1.0
10	CP test with ciphering [0=no 1=yes]	0 or 1	0.0	0.0	0.0
11	CP delay(+) or advance(–) for trigger	T	0.0	0.0	0.0
12	RT default traffic channel [ARFCN 1-124]	chan.no.	62.0	699.0	699.0
14	RT TCH [0=static 1=hopping 3 freqs]	0 or 1	0.0	0.0	0.0
15	RT cell TCH H.O. [0=inter 1=intra]	0 or 1	1.0	1.0	0.0
16	RT external pad and cable loss	dB	0.0	0.0	0.0
20	RX RF level for signalling	dBm	–90.0	–90.0	–90.0
21	RX loopback delay [0=autoset XX=value] (frames)	0 or number	0.0	0.0	0.0
22	RX BER/FER results [0=count 1=% 2=ppm]	0, 1, or 2	1.0	1.0	1.0
23	RX RF level TCH/FS reference sensitivity	dBm	–102.0	–100.0	–102.0
24	RX bits to test reference sensitivity Ib	bits	20000.0	20000.0	20000.0
25	RX bits to test reference sensitivity II	bits	10000.0	10000.0	10000.0
31	TX default power control level	pcl	7.0	3.0	3.0
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]	0, 1, 2 or 3	0.0	1.0	2.0

TEST_14 TX RACH Test

Description

This test verifies the mobile station transmitter's ability to generate a Random Access Channel (RACH) that meets specifications.

A RACH is used by the mobile station during a mobile originated call or location update to gain access to the GSM system. The test data for a RACH measurement is similar to a traffic channel.

- TX RACH frequency error
- TX RACH phase error (rms and peak)
- TX RACH power error
- TX RACH amplitude envelope
- TX RACH amplitude (negative and positive) peak flatness
- TX RACH burst timing error

Specifications

Spec	Description	Units	GSM900 default lower limit	GSM900 default upper limit	DCS1800 default lower limit	DCS1800 default upper limit	PCS1900 default lower limit	PCS1900 default upper limit
27	TX RACH burst timing measurement	T	–1.0	1.0	–1.0	1.0	–1.0	1.0
28	TX RACH frequency error	Hz	–90.0	90.0	–180.0	180.0	–190.0	190.0
29	TX RACH peak power error	dB	This specification is now fixed in the software. See page 128 for details.					
30	TX RACH phase error (peak)	degrees		20.0		20.0		20.0
31	TX RACH phase error (rms)	degrees		5.0		5.0		5.0
32	TX RACH power/time template at ±10µs	dB		–6.0		–6.0		–6.0

Spec	Description	Units	GSM900 default lower limit	GSM900 default upper limit	DCS1800 default lower limit	DCS1800 default upper limit	PCS1900 default lower limit	PCS1900 default upper limit
33	TX RACH power/time template at ±18µs	dB		–30.0		–30.0		–30.0
34	TX RACH power/time neg peak flatness	dB	–1.0		–1.0		–1.0	
35	TX RACH power/time pos peak flatness	dB		1.0		1.0		1.0

Parameters

Spec no.	Description	Units	GSM900 Default Value	DCS1800 Default Value	PCS1900 Default Value
11	CP delay	T	0	0	0
12	RT Default traffic channel	chan. number	62	699	699
31	TX default power control level	pcl	7.0	3.0	3.0

TEST_15 CP end call

Description This test ends a call from the HP/Agilent 8922 (acting as a base station).

Specifications None

Parameters None

Test_16 Dual-Band Handover

Description

This test verifies that the mobile can successfully perform Dual-Band Handover between the GSM900 and DCS1800 radio modes.

While operating in the GSM900 or DCS1800 radio mode, the mobile is tested using the existing GSM900 and DCS1800 sets of specifications and parameters. The Dual-Band Handover is executed according to the ARFCN specified by parameter number 12, `RT Default Traffic Channel` (see page 145), the value of which depends on the radio mode the mobile is operating in at the time Dual-Band Handover occurs. The Mobile TX level in the new band is set to the value read from parameter number 31, `TX Default Power Control Level`. The Dual-Band Handover uses the following hardcoded values for the Downlink Amplitude:

- GSM BCH and TCH: -85 dBm
- DCS TCH: -85 dBm
- GSM BCH Attenuation: 20 dBm

NOTE Note that in test procedures including TEST_16 Dual-Band Handover, it does not make sense to use the following tests after TEST_16: 1, 2, 3, 11, 12, 13 and 14. These tests will work under these conditions but if the call is ended in the DCS band after a Dual-Band Handover, then it is restarted in the GSM band.

NOTE When running a Dual-Band procedure it is recommended that you do not change cards during the procedure.

NOTE Frequency hopping is not available as long as the Dual-Band procedure is executed.

Specifications

All of the existing specifications are used in GSM900 and DCS1800 radio modes before and after Dual-Band Handover occurs.

Parameters

All of the existing GSM900 parameters are used before Dual-Band Handover occurs. After Dual-Band Handover occurs and the mobile switches radio mode, the Call Processing (CP) parameters (that is, the parameters involved with setting up the call etc.) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and parameters 14, 18 and 46 are redundant in the procedure for the new radio mode as the call is already established. These parameter values are left unchanged after the Dual-Band Handover occurs.

5 Test Specifications

This chapter describes each specification in the Agilent 83212D `Mobile Station Test Software` specifications file, and gives the default specifications used in the factory defined tests.

Default specifications

The default specifications come from the GSM 11.10 recommendations for Class 5 mobile stations, GSM 11.10-DCS recommendations and the document PN 3389 Personal Communications Services Air Interface Specification for Class 2 mobile stations.

When a test procedure is run, an “F” (for fail) is displayed next to each measurement result that exceeds its limits from the specifications file. Any combination of upper and lower limits can be selected in the Check column. See “TESTS (Edit Specifications)” on page 170.

The test procedure stops when a specification value is exceeded if the `Stop on failure` field is set to `Yes`. See “Test execution conditions” on page 23.

NOTE A Test Procedure must be selected before the Specifications list appears.

NOTE Specifications 8 – 16 and 23 only apply to the HP/Agilent 8922 with Spectrum Analyzer option.

NOTE Certain specifications are hardcoded into the Agilent 83212D software and are not user editable. This makes it easier to define tests and removes scope for error due to misconfiguration.

List of specifications

No.	Description	Editable
1	RX ref sensitivity type Ib BER	Yes
2	RX ref sensitivity type Ib FER	Yes
3	RX ref sensitivity type II BER	Yes
4	RX ref sensitivity type II FER	Yes
5	RX usable input level type II BER	Yes
6	TX burst timing measurement	Yes
7	TX average frequency error	Yes
8	TX ORFS due to mod 100 kHz offset	No
9	TX ORFS due to mod 200 kHz offset	No
10	TX ORFS due to mod 250 kHz offset	No
11	TX ORFS due to mod 400 kHz offset	No
12	TX ORFS due to mod ≥ 600 kHz offset	No
13	TX ORFS due to ramping 100 kHz offset	No
14	TX ORFS due to ramping 600 kHz offset	No
15	TX ORFS due to ramping 1200 kHz offset	No
16	TX ORFS due to ramping 1800 kHz offset	No
17	TX peak power error default power level	No
18	TX peak power error for pcl < 9	No
19	TX average phase error (peak)	Yes
20	TX average phase error (rms)	Yes
21	TX power/time template ±10µs	No
22	TX power/time template ±18µs	No
23	TX power/time template ±28µs	No
24	TX power/time template neg peak flatness	Yes
25	TX power/time template pos peak flatness	Yes
26	TX SACCH RX level error	Yes
27	TX RACH burst timing measurement	Yes
28	TX RACH frequency error	Yes
29	TX RACH peak power error	No
30	TX RACH phase error (peak)	Yes
31	TX RACH phase error (rms)	Yes
32	TX RACH power/time template at ±10µs	No
33	TX RACH power/time template at ±18µs	No
34	TX RACH power/time neg peak flatness	Yes
35	TX RACH power/time pos peak flatness	Yes
36	TX worst case frequency error	Yes
37	TX worst case phase error (peak)	Yes
38	TX worst case phase error (rms)	Yes
39	TX peak power error for pcl ≥ 9	No

1 RX Ref Sensitivity Type Ib BER

Description

This specification sets the upper limit for residual type Ib BER (Bit Errors) on a full-rate speech traffic channel (TCH/FS). If this upper limit is exceeded, an “F” (for fail) will be displayed next to the `RX BET for RES Ib` measurement result.

Default value

The default value for the GSM900 Upper Limit is 0.41 (%).

The default value for the DCS1800 Upper Limit is 0.41 (%).

The default value for the PCS1900 Upper Limit is 0.40 (%).

NOTE

Parameter 22, (RX BER/FER results) sets the units for this specification (percent, ppm, or count).

Example

If you want your test procedure to report a failure if the number of residual Type Ib bit errors exceeds 82000, enter `0` in the lower-limit column and `82000` in the upper-limit column. Next, set parameter `RX BER/FER Results` to `0` to have results displayed in bit error count.

2 RX Ref Sensitivity Type Ib FER

Description

This specification sets the upper limit for residual type Ib FER (Frame Erasures) on a full-rate speech traffic channel (TCH/FS). If this upper limit is exceeded, an “F” (for fail) will be displayed next to the `RX FE for RES Ib` measurement result.

Default value

The default value for the GSM900 Upper Limit is 0.12 (%). The default value for the DCS1800 Upper Limit is 0.12 (%). The default value for the PCS1900 Upper Limit is 0.10 (%).

NOTE

Parameter 22, (RX BER/FER results) sets the units for this specification (percent, ppm, or count).

Example

If you want your test procedure to report a failure if the number of residual Type Ib frame erasures exceeds 200, you would enter `0` in the lower-limit column and `200` in the upper-limit column. Next, set parameter `RX BER/FER Results` to `0` to have results displayed in frame erasure count.

3 RX Ref Sensitivity Type II BER

Description

This specification sets the upper limit for residual type II BER (Bit Errors) on a full-rate speech traffic channel (TCH/FS). If this upper limit is exceeded, an “F” (for fail) will be displayed next to the `RX BET for RES II` measurement result.

Default value

The default value for the GSM900 Upper Limit is 2.4 (%). The default value for the DCS1800 Upper Limit is 2.4 (%). The default value for the PCS1900 Upper Limit is 2.0 (%).

NOTE

Parameter 22, (RX BER/FER results) sets the units for this specification (percent, ppm, or count).

Example

If you want your test procedure to report a failure if the number of residual Type II bit errors exceeds 200, enter `0` in the lower-limit column and `200` in the upper-limit column. Next, set parameter `RX BER/FER Results` to `0` to have results displayed in bit error count.

4 RX Ref Sensitivity Type II FER

Description

This specification sets the upper limit for residual type II FER (Frame Erasures) on a full-rate speech traffic channel (TCH/FS). If this upper limit is exceeded, an “F” (for fail) will be displayed next to the `RX FE for RES II` measurement result.

Default value

The default value for the GSM900 Upper Limit is 0.12 (%). The default value for the DCS1800 Upper Limit is 0.12 (%). The default value for the PCS1900 Upper Limit is 0.10 (%).

NOTE

Parameter 22, (RX BER/FER results) sets the units for this specification (percent, ppm, or count).

Example

If you want your test procedure to report a failure if the number of residual Type II frame erasures exceeds 200, you would enter `0` in the lower-limit column and `200` in the upper-limit column. Next, set parameter `RX BER/FER Results` to `0` to have results displayed in frame erasure count.

5 RX Usable Input Lvl Type II BER

Description

This specification sets the upper limit for type II BER (Bit Errors) during usable input level range measurements on a full-rate speech traffic channel (TCH/FS).

If this upper limit is exceeded, an “F” (for fail) will be displayed next to the `RX II BET` measurement result.

Default value

The default value for the Upper Limit is 0.1 (%).

NOTE

Parameter 22, (RX BER/FER results) sets the units for this specification (percent, ppm, or count).

Example

If you want your test procedure to report a failure if the number of Type II bit errors exceeds 200, you would enter `0` in the lower-limit column and `200` in the upper-limit column. Next, set parameter `RX BER/FER Results` to `0` to have results displayed in bit error count.

6 TX Burst Timing Measurement

Description

This specification sets the mobile station's burst timing error limits.

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `TX timing error` measurement result.

Default values

The default value for the lower limit is –1 T (bit period). The default setting for the upper limit is 1 T (bit period).

Example

If you want your test procedure to report a failure if the burst timing error of the mobile station exceeds ±2 T, you would enter –2 in the lower-limit column and 2 in the upper-limit column. Limits are entered in units of "T" (bit period).

7 TX Average Frequency Error

Description

This specification sets the pass/fail limits for measuring the mobile station transmitter's frequency error.

If a selected limit is exceeded, an "F" (for fail) is displayed next to the `TX N avg frequency err` measurement result, where `N` is the number of averages set in parameter `RX BER/FER results`.

NOTE

"Average", in phase and frequency error measurements, only applies when parameter `TX phase/freq measurement averages` is not set to its default value of 1.

Default values

The GSM900 default lower limit value is –90 Hz. The GSM900 default upper limit value is 90 Hz. The DCS1800 default lower limit value is –180 Hz. The DCS1800 default upper limit value is 180 Hz. The PCS1900 default lower limit value is –190 Hz. The PCS1900 default upper limit value is 190 Hz.

Example

If you want your test procedure to report a failure if the average frequency error from the mobile station transmitter exceeds ±95 Hz for GSM 900, ±185 Hz for DCS1800, and ±195 Hz for PCS1900, you would enter –95 (–185 or –195) in the lower-limit column and 95 (185 or 195) in the upper-limit column. Limits are in units of Hz.

8 — 12 TX ORFS Due to Modulation at Various Offset Frequencies

NOTE These specifications are not used if you are running software on an HP/Agilent 8922 without a spectrum analyzer.

Description

The ORFS Modulation specifications set the Output RF Spectrum (ORFS) upper limits for a mobile station transmitter's unwanted power caused by modulation. These are fixed in the Agilent 83212D software and are not user editable.

Note that ORFS test TEST_08 is executed using the power control level set using parameter number 49 `TX Power Control Level for ORFS Tests`. See page 162 for details.

NOTE Only GSM power classes 4 and 5, and DCS/PCS power class 1 are supported. If parameter 49 is in the range of 0 to 4 for GSM, or 29 to 31 for DCS/PCS, then the test produces the following error message:

`Power control level not supported by this test. Please reconfigure parameter 31.`

Measurements are made at the following offset frequencies from the nominal center frequency of the mobile station: 100, 200, 250, 400 kHz and above 600 kHz up to 1600 KHz. If the upper limit is exceeded, an "F" is displayed next to the `ORFS mod power` measurement result.

For greater accuracy of the ORFS measurements, the averaging is done in software. Minimum values of five averages at the reference level and two averages at each offset are used by default. Higher numbers of averages are set using parameter 44 `TX ORFS Modulation Meas. Averages [> 1]`.

Hardcoded values

The following hardcoded values are used. Either the relative limit in dBc or the absolute limit in dBm is taken, whichever is greater.

	Frequency offset				
	100 KHz	**200 KHz**	**250 KHz**	**400 KHz**	**600 - 1600 KHz**
GSM	+0.5 dBc or -36 dBm	-27.5 dBc or -34.5 dBm	-32 dBc or -35 dBm	-51 dBc or -27 dBm	-60 dBc or -51 dBm
DCS/PCS					-60 dBc or -56 dBm

Offsets used

The following offsets are used when calculating ORFS due to modulation calculations:

	100 KHz	200 KHz	250 KHz	400 KHz	600 - 1600 KHz
dB	0	2.5	1.0	9.0	0

13 — 16 TX ORFS Due to Ramping

NOTE These specifications are not used if you are running software on an HP/Agilent 8922 without spectrum analyzer.

Description

These specifications set the mobile station's ORFS (Output RF Spectrum) upper limits. They apply when testing the amount of unwanted power transmitted by the mobile station as a result of the RF power pulsing on and off (ramping). Testing can be done at frequency offsets of 400 kHz, 600 kHz and 1200 kHz from the nominal center frequency of the mobile station. If the upper limit is exceeded, an "F" (for fail) is displayed next to the `ORFS ramp pwr` measurement result.

Note that ORFS test TEST_08 is executed using the power control level set using parameter number 49 `TX Power Control Level for ORFS Tests`. See page 162 for details.

NOTE Only GSM power classes 4 and 5, and DCS/PCS power class 1 are supported. If parameter 49 is in the range of 0 to 4 for GSM, or 29 to 31 for DCS/PCS, then the test produces the following error message:

```
Power control level not supported by this test. Please
reconfigure parameter 31.
```

For greater accuracy of ORFS measurements, the peak comparison is done in software. Values of two peak measurements at each offset are compared by default. Higher numbers of comparisons can be chosen using parameter 43 `TX ORFS Ramping Meas. Comparisons [> 1]`. See page 159 for more details.

Hardcoded values

The following hardcoded values are used:

	Frequency offset		
	400 KHz	**600 KHz**	**1200 KHz**
GSM/DCS/PCS	-17 dBm	-22 dB	-30 dBm
GSM 39 dBm	-15 dBm	-22 dB	-30 dBm

Offsets used

The following offsets are used when calculating ORFS due to modulation calculations:

	400 KHz	**600 KHz**	**1200 KHz**
dBm	6	4	2

17 — 18 TX Peak Power Error

Description

Specifications 17 and 18 (`TX Peak Power Error Default Power Level` and `TX Peak Power Error for PCL < 9`) set the limits for the mobile station transmitter's power error when it is transmitting at the default power control level set by parameter `TX default power control level` or `TX power level step for peak power`.

If a selected limit is exceeded, an "F" (for fail) is displayed next to the `TX power error` measurement.

Hardcoded values

GSM Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
≤ 5	33	2
6	31	3
7	29	3
8	27	3
9	25	3
10	23	3
11	21	3
12	19	3
13	17	3
14	15	3
15	13	3
16	11	5
17	9	5
18	7	5
≥ 19	5	5

DCS/PCS Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
0	30	2
1	28	3
2	26	3
3	24	3
4	22	3
5	20	3
6	18	3
7	16	3
8	14	3
9	12	3
10	10	3
11	8	4
12	6	4
13	4	4
14	2	5
≥ 15	0	5

19 TX Average Phase Error (peak)

Description

This specification sets the upper limit for the mobile station transmitter's average peak phase error, expressed in degrees.

If the limit is exceeded, an "F" (for fail) is displayed next to the `TX phase error peak` measurement.

Default value

The default value for the upper limit is 20° peak.

Example

If you want your test procedure to report a failure if the transmitter average peak phase error exceeds 25 degrees, you would enter `0` in the lower-limit column and `25` in the upper-limit column. Values are entered in degrees.

20 TX Average Phase Error (RMS)

Description

This specification sets the upper limit for the mobile station transmitter's average RMS phase error, expressed in degrees.

If the limit is exceeded, an "F" (for fail) is displayed next to the `TX phase error RMS` measurement.

Default value

The default value for the upper limit is 5° peak.

Example

If you want your test procedure to report a failure if the transmitter average phase error exceeds 6 degrees, you would enter `0` in the lower-limit column and `6` in the upper-limit column. Values are entered in degrees.

21 — 23 TX Power/Time Template ±10, 18, and 28 µs

Description

These specifications set the amplitude limits for measurements taken relative to bit 0 of the burst.

NOTE

Measurements at ±28 µs require an HP/Agilent 8922G or HP/Agilent 8922 with Spectrum Analyzer Option 006.

If a selected limit is exceeded, an "F" (for fail) is displayed next to the `TX ampl envelope` measurement result.

Hardcoded values

The hardcoded values are as follows:

	10µsec	**18µsec**	**-28 µsec**	**+28 µsec**
GSM900	-6dBc	-30dBc or -17dBm whichever is greater	-59dBc or -36dBm whichever is greater	-59dBc or -54dBm whichever is greater
Except level = 16	-4dBc			
Except level =17	-2dBc			
Except level ≥ 18	-1dBc			
DCS1800/PCS1900	-6dBc	-30dBc or -20dBm whichever is greater	-48dBc or -48dBm whichever is greater	
Except level = 11	-4dBc			
Except level = 12	-2dBc			
Except level = ≥ 13	-1dBc			

Example

To be defined showing how the table of hardcoded values gets applied during the test.

24 — 25 TX Power/Time Template Neg and Pos Peak Flatness

Description

These specifications set the amplitude envelope limits for flatness measurements taken over the useful bits of a GSM burst.

If a selected limit is exceeded, an “F” (for fail) will be displayed next to the `TX neg peak flatness` or `TX pos peak flatness` measurement result.

Default values

- The default value for neg peak flatness is –1 dB.
- The default value for pos peak flatness is 1 dB.

Example

If you want your test procedure to report a failure when the flatness of the amplitude envelope exceeds ±0.5 dB you would enter:

- –0.5 in the lower-limit column and 0 in the upper-limit column for specification `TX power/time template neg flatness`, and
- 0 in the lower-limit column and 0.5 in the upper-limit column for specification `TX power/time template pos flatness`.

Limits are in units of dB.

26 TX SACCH RX Level Error

Description

This specification sets the limits for testing the mobile station's reported RX level error on the SACCH (Slow Associated Control Channel).

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `SACCH RX Level error` results.

Default value

The default value for the lower limit is –3.0 dB. The default value for the upper limit is 3.0 dB.

Example

If you want your test procedure to report a failure when the reported RX Level error exceeds ±2.5 dB, you would enter –2.5 in the lower-limit column and 2.5 in the upper-limit column. Limits are entered in dB.

27 TX RACH Burst Timing Measurement

Description

This specification sets the test limits on the relative mobile station timing error for a RACH (Random Access Channel) burst.

If a selected limit is exceeded, an F (for fail) will be displayed next to the `TX RACH burst timing error` measurement result.

Default values

The default value for the lower limit is –1 T. The default value for the upper limit is 1 T

Example

If you want your test procedure to report a failure when the burst timing error for a RACH exceeds ±2 bit periods, you would enter –2 in the lower-limit column and 2 in the upper-limit column. Limits are entered in units of “T” (bit periods).

28 TX RACH Frequency Error

Description

This specification sets the limits for the mobile station's frequency error while transmitting a RACH (Random Access Channel) burst.

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `TX RACH freq error` measurement result.

Default values

The GSM900 default value for the lower limit is –90 Hz The GSM900 default value for the upper limit is 90 Hz The DCS1800 default value for the lower limit is –180 Hz The DCS1800 default value for the upper limit is 180 Hz The PCS1900 default value for the lower limit is –190 Hz The PCS1900 default value for the upper limit is 190 Hz.

Example

If you want your test procedure to report a failure when the frequency error for a RACH exceeds ±60 Hz or &120 Hz, you would enter –60 or –120 in the lower-limit column and 60 or 120 in the upper-limit column. Limits are entered in units of Hz.

29 TX RACH Peak Power Error

Description

This specification sets the limits for the mobile station's peak power error while transmitting a RACH (Random Access Channel) burst.

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `TX RACH peak pwr error` measurement result.

Default values

GSM Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
≤ 5	33	2
6	31	3
7	29	3
8	27	3
9	25	3
10	23	3
11	21	3
12	19	3
13	17	3
14	15	3
15	13	3
16	11	5
17	9	5
18	7	5
≥ 19	5	5

DCS/PCS Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
0	30	2
1	28	3
2	26	3
3	24	3
4	22	3
5	20	3
6	18	3
7	16	3
8	14	3
9	12	3
10	10	3
11	8	4
12	6	4
13	4	4
14	2	5
≥ 15	0	5

Example

If you want your test procedure to report a failure when the peak power error for a RACH exceeds ±2 dB, you would enter –2 in the lower-limit column and 2 in the upper-limit column. Limits are entered in units of dB.

30 TX RACH Phase Error (peak)

Description

This specification sets the upper limit for the mobile station's peak phase error while transmitting a RACH (Random Access Channel) burst.

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `TX RACH phase error peak` measurement result.

Default values

The default limit is 20°.

Example

If you want your test procedure to report a failure when the phase error for a RACH exceeds 30° you would enter 0 in the lower-limit column and `30` in the upper-limit column. Limits are entered in units of degrees.

31 TX RACH Phase Error (RMS)

Description

This specification sets the upper limit for the mobile station's RMS phase error while transmitting a RACH (Random Access Channel) burst.

If a selected limit is exceeded, an "F" (for fail) will be displayed next to the `TX RACH phase error RMS` measurement result.

Default values

The default limit is 5°.

Example

If you want your test procedure to report a failure when the phase error for a RACH exceeds 6° you would enter `0` in the lower-limit column and `6` in the upper-limit column. Limits are entered in units of degrees.

32 — 33 TX RACH Pwr/Time Template ±10, ±18 and ±28 µs

Description

These specifications set the amplitude limits for measurements taken on a RACH (Random Access Channel) during the rising and falling edges of the amplitude envelope.

If a selected limit is exceeded, an “F” (for fail) is displayed next to the `TX RACH ampl envelope` measurement result.

Hardcoded values

The default values are as follows. Note that the pcl taken is the highest level (either absolute or relative) ±2dB tolerance:

	10µsec	**18µsec**	**+28 µsec**	**-28 µsec**
GSM900	-6dBc	-30dBc or -17dBm whichever is greater	-59dBc or -36dBm whichever is greater	-59dBc or -54dBm whichever is greater
Except level = 16	-4dBc			
Except level =17	-2dBc			
Except level ≥ 18	-1dBc			
DCS1800/PCS1900	-6dBc	-30dBc or -20dBm whichever is greater	-48dBc or -48dBm whichever is greater	
Except level = 11	-4dBc			
Except level = 12	-2dBc			
Except level = ≥ 13	-1dBc			

34 — 35 TX RACH Power/Time Neg and Pos Peak Flatness

Description

These specifications set the amplitude envelope limits for flatness measurements on a RACH (Random Access Channel) taken over the useful bits of a burst.

If a selected limit is exceeded, an “F” (for fail) will be displayed next to the `TX RACH neg pk flat` or `TX RACH pos pk flat` measurement results.

Default values

- The default value for neg peak flatness is –1 dB.
- The default value for pos peak flatness is 1 dB.

Example

If you want your test procedure to report a failure when the amplitude flatness exceeds ±0.5 dB you would enter:

- –0.5 dB in the lower-limit column and `0 dB` in the upper-limit column for specification `TX power/time template neg flatness`, and
- `0 dB` in the lower-limit column and `0.5 dB` in the upper-limit column for specification `TX power/time template pos flatness`.

Limits are in units of dB.

36 TX Worst Case Frequency Error

Description

This specification sets the upper limit for the mobile station transmitter's worst case frequency error, expressed in Hz.

NOTE

"Worst case" phase and frequency error measurements only apply when parameter `TX phase/freq measurement averages` is set to something other than its default value of 1.

If the limit is exceeded, an "F" (for fail) is displayed next to the `TX wc frequency error` measurement.

Default value

- The GSM900 default value for the lower limit is –90 Hz and for the upper limit is 90 Hz.
- The DCS1800 default value for the lower limit is –180 Hz and for the upper limit is 180 Hz.
- The PCS1900 default value for the lower limit is –190 Hz and for the upper limit is 190 Hz.

Example

If you want your test procedure to report a failure if the transmitter worst case frequency error exceeds 60 Hz, you would enter –60 in the lower-limit column and 60 in the upper-limit column.

37 TX Worst Case Phase Error (peak)

Description

This specification sets the upper limit for the mobile station transmitter's worst case phase error, expressed in degrees (peak).

NOTE

"Worst case" phase and frequency error measurements only apply when parameter `TX phase/freq measurement averages` is set to something other than its default value of 1.

If the limit is exceeded, an "F" (for fail) is displayed next to the `TX wc phase error peak` measurement.

Default value

The default value for the upper limit is 20° peak.

Example

If you want your test procedure to report a failure if the transmitter worst case phase error exceeds 25 degrees you would enter `0` in the lower-limit column and `25` in the upper-limit column.

38 TX Worst Case Phase Error (RMS)

Description

This specification sets the upper limit for the mobile station transmitter's worst case phase error, expressed in degrees (RMS).

NOTE

"Worst case" phase and frequency error measurements only apply when parameter `TX phase/freq measurement averages` is not set to its default value of 1.

If the limit is exceeded, an "F" (for fail) is displayed next to the `TX wc phase error RMS` measurement.

Default Value

The default value for the upper limit is 5° rms.

Example

If you want your test procedure to report a failure if the transmitter worst case phase error exceeds 6 degrees you would enter 0 in the lower-limit column and 6 in the upper-limit column.

39 TX Peak Power Error For PCL ≥ 9

Description

This specification sets the limits for the mobile station transmitter's power error when it is transmitting at power-control levels (PCL's) of nine or greater. Parameters 31, 36, and 48 determine which power-control levels are transmitted by the mobile station.

If a selected limit is exceeded, an "F" (for fail) is displayed next to the `TX power error` measurement.

Hardcoded values

GSM Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
≤ 5	33	2
6	31	3
7	29	3
8	27	3
9	25	3
10	23	3
11	21	3
12	19	3
13	17	3
14	15	3
15	13	3
16	11	5
17	9	5
18	7	5
≥ 19	5	5

DCS/PCS Power Accuracy specifications		
PCL	**Nominal Output Power (dBm)**	**Spec (dB)**
0	30	2
1	28	3
2	26	3
3	24	3
4	22	3
5	20	3
6	18	3
7	16	3
8	14	3
9	12	3
10	10	3
11	8	4
12	6	4
13	4	4
14	2	5
≥ 15	0	5

6 Test Parameters

This chapter describes each parameter on the Agilent 83212D Mobile Station Test Software memory card.

Parameter types

To access Parameters, see “Editing the test parameters” on page 27.

There are five types of parameters:

- Additional/Extra Parameters (AE)
- Call Processing Parameters (CP)
- Receiver/Transmitter Parameters (RT)
- Receiver Parameters (RX)
- Transmitter Parameters (TX)

NOTE Parameters 40 – 44 only apply to the HP/Agilent 8922G or HP/Agilent 8922 with Spectrum Analyzer Option.

NOTE Parameters 20, 23 and 29:

The HP/Agilent 8922E and HP/Agilent 8922G are specified to a maximum RF Generator amplitude limit of -19 dBm.

The HP/Agilent 8922F and HP/Agilent 8922H are specified to a maximum RF Generator amplitude limit of -13 dBm.

The Agilent 8922S and Agilent 8922M are specified to a maximum RF Generator amplitude limit of -14 dBm.

List of Parameters

1	AE IMSI (digits 1- 5)
2	AE IMSI Number (digits 8-15)
3	CP Base Station Color Code
4	CP Public Land Mobile Network Color Code
5	CP Serving Cell (BCH) ARFCN
6	CP Local Area Code
7	CP Mobile Country Code
8	CP Mobile Network Code
9	CP Control Chan Type [0=SD/8, 1=SD/4]
10	CP Test With Ciphering [0=no 1=yes]
11	CP Delay(+) or Advance(–) for Trigger
12	RT Default Traffic Channel [ARFCN 1-124]
13	RT Timeslot for TCH/FS [2, 3, 4, 5, 6]
14	RT TCH [0=static 1=hopping 3 freqs]
15	RT Cell TCH H.O. [0=inter 1=intra]
16	RT External Pad and Cable Loss
17	RT Nominal Supply Voltage
18	RT Test Set Reference Offset (HP 8922G only)
19	RT Report TCH Uplink Errors (0=off 1=on)
20	RX RF Level for Signalling
21	RX Loopback Delay [0=autoset XX=value] (frames)
22	RX BER/FER Results [0=count 1=% 2=ppm]
23	RX RF Level TCH/FS Reference Sensitivity
24	RX Bits to Test Reference Sensitivity Ib
25	RX Bits to Test Reference Sensitivity II
26	RX Ref Sens Sweep Test Start Channel
27	RX Ref Sens Sweep Test Step Channel
28	RX Ref Sens Sweep Test Stop Channel
29	RX Usable Input Level Range RF Level
30	RX Bits to Test Usable Input Level II
31	TX Default Power Control Level
32	TX Select In-Channel Tests
33	TX In-Channel Sweep Test Start Channel
34	TX In-Channel Sweep Test Step Channel
35	TX In-Channel Sweep Test Stop Channel
36	TX Power Level Step for Peak Power
37	TX Power Level Sweep Test Start Channel

38	TX Power Level Sweep Test Step Channel
39	TX Power Level Sweep Test Stop Channel
40	TX ORFS Modulation [0.1, 0.2, 0.25, 0.4, 0.6]
41	TX ORFS Modulation [1, 1.2, 1.4, 1.6]
42	TX ORFS Ramping Offsets [0.4, 0.6, 1.2]
43	TX ORFS Ramping Measurement Averages
44	TX ORFS Modulation Measurement Averages
45	TX Phase/Freq Measurement Averages
46	TX Current Limit
47	CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]
48	TX Minimum Power Level
49	TX Power Level Control for TEST_08

Parameter descriptions

1 AE IMSI Number [digits 1-5]

This parameter sets the first five (of 15) digits in the International Mobile Subscriber Identity (IMSI) number.

NOTE

If you leave the IMSI field at its default setting the software prompts you to make a mobile station originated call, and the HP/Agilent 8922 will acquire the SIM card's IMSI number over the GSM link.

If you enter the IMSI number from the mobile station's SIM card, the HP/Agilent 8922 will use it to page the mobile station during a base station originated call. If the IMSI you entered is incorrect, an error message will be displayed, and you will have to make an emergency (112) call to establish the link.

Default value

The default value for the IMSI number is all 0's.

Example

If the first five digits in your mobile's IMSI number are 00101, you can enter `101` into the value field. The display will show 101.000000. Leading 0's do not have to be entered.

The first three digits of the IMSI represent the MCC (mobile country code). The next 2 are the MNC (mobile network code).

2 AE IMSI Number [digits 6-15]

This parameter sets the last ten (of 15) digits in the International Mobile Subscriber Identity (IMSI) number.

NOTE

If you leave the IMSI field at its default setting, the software will prompt you to make a mobile station originated call, and the HP/Agilent 8922 will acquire the SIM card's IMSI number over the GSM link.

If you enter the IMSI number from the mobile station's SIM card, the HP/Agilent 8922 will use it to page the mobile station during a base station originated call. If the IMSI you entered is incorrect, an error message will be displayed, and you will have to make an emergency (112) call to establish the link.

Default value The default value for the IMSI number is all 0's.

Example If the last ten digits in your mobile's IMSI number are 0123456789, you would enter `123456789` into the value field. Leading 0's do not have to be entered.

3 CP Base Station Color Code

This parameter sets the base station's color code (BCC). The range is 0 to 7.

Default value The default BCC is 5.

Example If you want to use a BCC of 4, you would enter 4 into the value field.

4 CP Public Land Mobile Network Color Code

This parameter sets the public-land mobile Network Color Code (NCC). The range is 0 to 7.

Default value The default NCC is 1.

Example If you want to use an NCC number of 2, you would enter 2 into the value field.

5 CP Serving Cell (BCH) ARFCN

This parameter sets the Absolute RF Channel Number (ARFCN) for the Broadcast Channel's (BCH) serving cell. The range is 1 to 124 for GSM900 and 512 to 885 for DCS1800.

Default value The GSM900 default Serving Cell ARFCN is 25. The DCS1800 default Serving Cell ARFCN is 600. The PCS1900 default Serving Cell ARFCN is 600.

Example If you want to use 62 as the ARFCN serving-cell number, you would enter `62` in the value field.

6 CP Local Area Code

This parameter sets the local area code (LAC) portion of the LAI. If the last LAI on the mobile station's SIM card does not match the HP/Agilent 8922 version (when the mobile station is powered on and brought up on a GSM link), the mobile station will store the value from the HP/Agilent 8922 to its SIM card.

Default value The default LAC is 1.

Example If you want the broadcast channel's LAC to be 2, you would enter `2` into the value field.

7 CP Mobile Country Code

This parameter must match the mobile station's country code (MCC). The combination of the MCC and MNC (the mobile station's network code) make up the private-land mobile network (PLMN). A mobile station will not "camp on" to the HP/Agilent 8922 if its test SIM PLMN does not match parameters `CP mobile country code` and `CP mobile network code`. The range is 0 to 999.

Default value The default MCC is 1.

Example If you want to use an MCC number of 123, you would enter `123` in the value field.

8 CP Mobile Network Code

This parameter specifies the mobile station's network code (MNC). The combination of the MNC and MCC (mobile station country code) make up the private-land mobile network (PLMN). A mobile station will not "camp on" to the HP/Agilent 8922 if its test SIM PLMN does not match parameters `CP mobile country code` and `CP mobile network code`. The range is 0 to 99.

Default value The default MNC is 1.

Example If you want to use an MNC number of 54, you would enter `54` in the value field.

9 CP Control Chan Type

This parameter selects the type of control channel the HP/Agilent 8922 will use when establishing a link with the mobile station.

Two types of control channels are available:

- SD/4 – uses a stand-alone dedicated control channel (SDCCH) on the same physical channel as the broadcast channel (BCH).
- SD/8 – uses a stand-alone dedicated control channel (SDCCH) on a different physical channel than the broadcast channel.

Default value The default setting is 1 (SD/4 channel configuration) for GSM900, DCS1800 and PCS1900.

Example If you want to use the SD/4 format, you would enter `1` into the value field. If you want to use the SD/8 format, you would enter `0` into the value field.

10 CP Test With Ciphering

This parameter controls whether the mobile is tested with ciphering on or off. To test with ciphering requires that the HP/Agilent 8922 has option 005 installed.

Default value The default Ciphering setting is 0 (no).

Example If you want ciphering turned on, you would enter `1` in the value field.

11 CP Delay (+) or Advance (–) for Trigger

This parameter controls a trigger delay that provides an internal trigger to the HP/Agilent 8922 analyzer 3 timeslots after a burst is sent on the downlink. Since the mobile station timing error is measured relative to this trigger event, the delay or advance for trigger should normally be left at its default value of 0. The range is 0 to 1354.0 T (bit periods).

Default value The default delay is 0 T (bit periods).

Example If the mobile station has a timing error that causes it to respond on the uplink 10 bit periods later than the expected time period of 3 timeslots, you could enter `10` in this field to correct for this error.

12 RT Default Traffic Channel

This parameter sets the traffic channel for the serving cell.

Default value The GSM900 default RT Traffic Channel is 62. The DCS1800 default RT Traffic Channel is 699. The PCS1900 default RT Traffic Channel is 699.

Example For GSM, if you want a traffic channel (ARFCN) of 124, you would enter `124` into the value field. The range is 1 to 124. For DCS this value would be between 512 and 885, and for PCS between 512 and 810.

NOTE This parameter is ignored if parameter `RT TCH [0=single 1=hopping 3 freqs]` is set to 1.

13 RT Timeslot for TCH/FS

This parameter selects the timeslot for a full-rate speech traffic channel (TCH/FS). The range is 2 through 6.

NOTE The HP 8922 uses timeslot 0 for transmitting a BCH. Timeslots 1 and 7 are not allowed for traffic channels because they are needed for the HP/Agilent 8922 RF generator to switch from BCH to TCH ARFCN frequencies.

Default value The default TCH timeslot is 4.

Example If you want to assign the uplink/downlink TCH to the timeslot position of 2, 3, 5, or 6, enter that number in the value field.

14 RT TCH

This parameter selects the traffic channel's (TCH) mode for transmitting information. The mode may be either single (non-hopped), or hopped over 3 frequencies. Frequency hopping occurs over these 3 absolute radio frequency channel numbers (ARFCNs):

- GSM900: 1, 63, 124
- DCS1800: 512, 699, 885
- PCS1900: 512, 661, 810

Default value The default RT TCH setting is `0` (non-hopped)

Example If you want a hopping traffic channel, select `1` in the value field.

15 RT Cell TCH H.O.

This parameter selects between intra-cell and inter-cell handover signalling. Handovers occur when the same test is performed on more than one absolute radio frequency channel (ARFCN). The range is 0 to 1.

Note that parameter 15 influences whether Dual-Band Handover occurs as Assignment or as Handover. If parameter 15 is set to 1 in the procedure of the band the mobile is in, then Dual-Band Handover to the other band is performed as Assignment, and if it is set to 0 then the Dual-Band Handover is performed as Handover.

NOTE Inter-cell handovers occur between a channel of one base station to a channel of another base station. Intra-cell hand-overs occur between channels within the same base station.

Default value The default TCH handover is 1 (intra-cell signaling)

Example If you want inter-cell hand-overs to occur during receiver and transmitter testing, you would enter `0` in the value field.

16 RT External Pad and Cable Loss

This parameter adjusts measurement results and RF Generator operation to cancel out any loss due to external cables or attenuators connected to the HP/Agilent 8922 RF IN\OUT connector. After you enter the loss in the value field, all measurements will be adjusted in order to take into account the offset level.

Note that the value of parameter 16 appears on any hardcopy printout at the start of each test and after a Dual-Band handover.

Default value Not applicable. Note that if the value of parameter 16 is set to 0, then the RF Offset value of the HP/Agilent 8922 is taken and used during the execution of a procedure. This does not apply if you started the procedure for Dual-Band, as different offsets are needed for each frequency band. In this case, the offset is always taken from the value of parameter 16.

Example If a 30 dB attenuator is connected in line with the mobile station's antenna, you would enter `30` in the value column. Next, if you wanted a –90 dBm input to the mobile station, you would leave the `RX RF level for signaling` (parameter `RX RF level for signaling`) at its default value of –90 dBm.

17 RT Nominal Supply Voltage

This parameter sets the nominal dc power-supply voltage when a power supply is under GPIB control. See "Setting up a GPIB Power Supply" on page 37 for details.

Default value The default power supply voltage is 0 V.

Example If your mobile specification requires a nominal supply voltage of +13 Vdc, you would enter `13` in the value column.

Use a power supply that supports SCPI programming mnemonics. For a list of supported power supplies, see "Power supplies" on page 37.

18 RT Test Set Reference Offset

This parameter sets the timebase reference offset for the HP/Agilent 8922.

NOTE This parameter is not used with the HP/Agilent 8922E.

Units are in parts-per-million (ppm). The range is 0 to 35 for GSM900 and 0 to 30 for DCS 1800 and PCS 1900.

Default value The default reference offset is 0.05 ppm.

Example If you want to have a timebase reference offset of 5 parts-per-million (ppm), you would enter `5` in the value field.

19 RT Report TCH Uplink Errors

This parameter determines if errors between the mobile station and base station are displayed in the test results. Errors on the traffic channel during testing are recorded.

Default value The default setting is 0 (off).

Example If you want to display TCH uplink errors during testing, you would enter `1` in the value field.

20 RX RF Level for Signaling

This parameter sets the RF level on the HP/Agilent 8922. This RF level will be used for all tests except `RX Reference Sensitivity` and `RX Usable Input Level Range`. Range is –19 dBm to –127 dBm.

Default value The default RF level is –60 dBm.

Example If you want an RF level of –85 dBm, you would enter `–85` in the value field.

NOTE The HP/Agilent 8922F and HP/Agilent 8922H are specified to a maximum RF Generator amplitude limit of –13 dBm, whereas the HP/Agilent 8922E and HP/Agilent 8922G are specified to a maximum RF Generator amplitude limit of –19 dBm. However, a 7dB overrange is provided on all HP/Agilent 8922's.

21 RX Loopback Delay

This parameter allows you to manually control the number of speech frames of delay the HP/Agilent 8922 will use after putting the mobile station in loopback mode. The range is 1 to 15.

NOTE Loopback mode is used during receiver sensitivity and receiver usable input level range tests, and can only be enabled if a test SIM is inserted in the mobile.

Default setting The default loopback delay setting is 0 (autoset).

Example If you want to set the loopback delay to 9 speech frames, you would enter `9` in the value field.

22 RX BER/FER Results

This parameter determines whether bit-error-rate (BER) and frame-erasure ratio (FER) test results are displayed in

- 0: count
- 1: percent (%)
- 2: parts-per-million (ppm)

NOTE When you change the setting of parameter 22, make sure you adjust the specification limits correctly to match the new setting.

Default Setting The default BER/FER results setting is `1` (%)

Example If you want to display the bit errors and frame erasure results in count, you would enter `0` in the value field.

23 RX RF Level TCH/FS Reference Sensitivity

This parameter sets the amplitude of the RF signal to be used when testing the receiver's reference sensitivity (bit error testing). The range is –12 dBm to –127 dBm.

Default value The default RF level for sensitivity testing is –102 dBm for GSM900.
The default RF level for sensitivity testing is –100 dBm for DCS1800.
The default RF level for sensitivity testing is –102 dBm for PCS1900.

Example If you want the RF level to be set at –104 dBm, you would enter –104 in the value field.

NOTE The HP/Agilent 8922F and HP/Agilent 8922H are specified to a maximum RF Generator amplitude limit of –13 dBm, whereas the HP/Agilent 8922E and HP/Agilent 8922G are specified to a maximum RF Generator amplitude limit of –19 dBm. However, a 7dB overrange is provided on all HP/Agilent 8922s.

24 RX Bits to Test Reference Sensitivity Ib

This parameter sets the number of residual type Ib bits to test during reference sensitivity testing. The range is 0 to 99999999.

Default value The default number of type Ib bits to test is 20000.

Example If you want sensitivity testing to occur over 50,000 residual type Ib bits, you would enter 50000 in the value field.

25 RX Bits to Test Reference Sensitivity II

This parameter sets the number of residual type II bits to test during reference sensitivity testing. The range is 0 to 99999999.

Default value The default number of type II bits to test is 10000.

Example If you want sensitivity testing to occur over 40000 residual type II bits, you would enter 40000 in the value field.

26–28 RX Tests Start, Step, and Stop Channels

These parameters allow you to set up the channels to be used when performing receiver (RX) tests. The range is 1 to 124.

Default values

	Default start channel	Default step channel	Default stop channel
GSM900	1	62	124
DCS1800	512	187	885
PCS1900	512	149	810

Example

If you want a receiver test performed on channels 10, 62, and 114, enter the following:

- `10` as the start value for parameter `RX ref sens sweep test start channel`,
- `52` as the step value for parameter `RX ref sens sweep test step channel`, and
- `114` as the stop value for parameter `RX ref sens sweep test stop channel`.

NOTE When parameter `RT TCH [0=static 1=hopping 3 freqs]` is set to `Hopping 3 freqs` (1), the HP/Agilent 8922 will hop between traffic channels 1, 63, and 124 (512, 699, and 885 for DCS1800; 512, 661 and 810 for PCS1900). The values entered for RX Tests Start, Step, and Stop Channels will not be used.

29 RX Usable Input Level Range RF Level

This parameter sets the HP/Agilent 8922 RF generator's amplitude level to be used during input level range testing. The range is –19 to –127 dBm.

Default value The GSM900 default RF level for input level range testing is –15 dBm
The DCS1800 default RF level for input level range testing is –23 dBm
The PCS1900 default RF level for input level range testing is –23 dBm

NOTE The default value of parameter 29, `RX usable input level range RF level` for GSM is -15 dBm which adheres to the ETSI specifications. However, this default value does not run on the HP/Agilent 8922E or G. If you have an HP/Agilent 8922E or G, you must either create a procedure with the value of parameter 29 set to -19 dBm, or upgrade your HP/Agilent 8922 to a model S, M, R or P. For more details on how to create your own test procedures, see "Making your own test procedures" on page 24.

Example If you want the RF level set to –20 dBm when testing the receiver's usable-input level range, you would enter `–20` in the value field.

NOTE The HP/Agilent 8922E and HP/Agilent 8922G are specified to a maximum RF Generator amplitude limit of –19 dBm.

The HP/Agilent 8922F and HP/Agilent 8922H are specified to a maximum RF Generator amplitude limit of –13 dBm.

The Agilent 8922S and Agilent 8922M are specified to a maximum RF Generator amplitude limit of –14 dBm.

30 RX Bits to Test Usable Input Level II

This parameter allows you to enter the number of type II bits to test during receiver usable input level testing. The range is 0 to 99999999.

Default value The default type II bits to test is 10000.

Example If you want to test usable input level using 40,000 type II bits, enter `40000` in the value field.

31 TX Default Power Control Level

This parameter allows you to set the mobile station's output power during transmitter and receiver testing. The range is:

- 1 to 19 for GSM and E-GSM
- 30, 31 and 0 to 15 for PCS
- 0 to 15 for DCS

Default value

- The GSM900 default power control level is 7 (Power class 5)
- The DCS1800 default power control level is 3 (Power class 2)
- The PCS1900 default power control level is 3 (Power class 2)

Note that these values are supported by all mobiles, regardless of Power class.

Example

If you want the default power-control level to be 1, enter `1` in the value field.

NOTE

The default power-control level will typically be set to the highest power the mobile station is capable of producing. When test `TX peak power` is run, the power-control level will begin with a measurement at the default value and decrease power according to parameter `TX Power Level Step for Peak Power`.

32 TX Select In-Channel Tests

This parameter allows you to select any combination of the following in-channel tests:

- 0001 = SACCH TX level and timing advance
- 0010 = TX phase and frequency error
- 0100 = TX power error
- 1000 = TX timing error, TX amplitude negative and positive peak flatness, and TX amplitude envelope
- 1111 = All in-channel tests

Tests are selected by entering a numeral "1" in the correct parameter "XXXX" position.

Default value

The default in-channel tests value is 1111 (all tests).

Example

To run the "TX phase error (rms and peak)" and "TX frequency error" tests, enter `10` as the parameter value. This number corresponds with the parameter position "XX1X".

33–35 TX In-Channel Test Start, Step, and Stop Channels

These parameters allow you to set up the channels to be used during transmitter in-channel testing. The range is 1 to 124 for GSM900, 512 to 885 for DCS1800, and 512 to 810 for PCS1900.

Default values

The default start in-channel test channel is 1 for GSM900. The default step in-channel test channel is 62 for GSM900. The default stop in-channel test channel is 124 for GSM900.

The default start in-channel test channel is 512 for DCS1800. The default step in-channel test channel is 187 for DCS1800. The default stop in-channel test channel is 885 for DCS1800. The default start in-channel test channel is 512 for PCS1900.

The default step in-channel test channel is 149 for PCS1900. The default stop in-channel test channel is 810 for PCS1900.

Example

If you want in-channel testing to occur on channels 10, 62, and 114 you would enter:

- `10` as the start value for parameter `TX in-channel sweep test start channel`,
- `52` as the step value for parameter `TX in-channel sweep test step channel`, and
- `114` as the stop value for parameter `TX in-channel sweep test stop channel`.

NOTE

When parameter `RT TCH [0=static 1=hopping 3 freqs]` is set to `Hopping 3 freqs`, the HP/Agilent 8922 will hop between traffic channels 1, 63, and 124 (512, 699, and 885 for DCS1800; 512, 661, and 810 for PCS1900). The values entered for parameters `TX In-Channel Sweep Test Start, Step and Stop Channels` will not be used.

36 TX Power Level Step for Peak Power

This parameter allows you to choose the power-control level (PCL) step size for peak-power measurements. Testing will begin at the PCL set by parameter 31 `TX default power control level`. The range is:

- 1 to 19 for GSM and E-GSM
- 1 to 17 for DCS
- 0 to 15 for PCS

Default value The default power-control level step size is 4.

Example If you wanted to test transmitter peak power at power control levels of 3, 5, 7, 9, 11, 13, and 15, you would enter `3` in the value field for parameter `TX default power control level`, and you would enter `2` in the step size value field.

NOTE When testing DCS1800 mobiles, the minimum power level is set by parameter 48.

37–39 TX Power Level Start, Step, and Stop Channels

These parameters set up the channels to be used during transmitter power-level testing. The range is 1 to 124 for GSM900, 512 to 885 for DCS1800, and 512 to 810 for PCS1900.

Default values

The default start TX power level channel is 1 for GSM900. The default step TX power level channel is 62 for GSM900. The default stop TX power level channel is 124 for GSM900. The default start TX power level channel is 512 for DCS1800. The default step TX power level channel is 187 for DCS1800. The default stop TX power level channel is 885 for DCS1800. The default start TX power level channel is 512 for PCS1900. The default step TX power level channel is 149 for PCS1900. The default stop TX power level channel is 810 for PCS1900.

Example

If you want power-level testing to occur on channels 10, 62 and 114, you would enter:

- `10` as the start value for parameter `TX power level sweep test start channel`,
- `52` as the step value for parameter `TX power level sweep test step channel`, and
- `114` as the stop value for parameter `TX power level sweep test stop channel`.

NOTE

When parameter `RT TCH [0=static 1=hopping 3 freqs]` is set to `Hopping 3 freqs` the HP/Agilent 8922 will hop between traffic channels 1, 63, and 124 (512, 699, and 885 for DCS1800; 512, 661, and 810 for PCS1900). The values entered for parameters `TX Power Level Start, Step, and Stop Channels` will not be used.

40 TX ORFS Modulation

NOTE This parameter is not used with the HP/Agilent 8922 unless a spectrum analyzer is installed.

This parameter allows you to select the first 6 (of 11) frequency offsets to be used when testing the output-RF-spectrum (ORFS) due to modulation.

- 000010 = 0.6 MHz
- 000100 = 0.4 MHz
- 001000 = 0.25 MHz
- 010000 = 0.2 MHz
- 100000 = 0.1 MHz
- 111110 = All of the above offset frequencies

The offset frequencies are selected by entering a numeral “1” in the correct “XXXXXX” position.

NOTE The value 000001 is not used and is reserved for future use.

Default value The default frequency offsets are 111110 (all offsets).

Example Enter `100000` in the value field to test ORFS modulation at 0.1 MHz, which corresponds with the “1XXXXX” parameter position.

NOTE ORFS due to modulation measurements are performed both below and above the carrier at each of the selected offset frequencies.

41 TX ORFS Modulation

NOTE This parameter is not used with the HP/Agilent 8922 unless a spectrum analyzer is installed.

This parameter allows you to select the last 4 (of 10) frequency offsets to be used when testing the output-RF-spectrum (ORFS) due to modulation.

- 00010 = 1.6 MHz
- 00100 = 1.4 MHz
- 01000 = 1.2 MHz
- 10000 = 1 MHz
- 11110 = All of the above offset frequencies

The offset frequencies are selected by entering a numeral “1” in the correct “XXXXX” position.

NOTE The value 00001 is not used and is reserved for future use.

Default value The default frequency offsets are 11111 (all offsets).

Example Enter `10000` in the value field to test ORFS modulation at an offset frequency of 1 MHz, which corresponds with the “1XXXX” parameter position.

NOTE ORFS due to modulation measurements are performed both below and above the carrier at each of the selected offset frequencies.

42 TX ORFS Ramping Offsets

NOTE This parameter is not used with the HP/Agilent 8922 unless a spectrum analyzer is installed.

This parameter allows you to select the frequency offsets to be used when testing the output-RF-spectrum (ORFS) due to ramping (the RF pulse rise and fall).

- 0010 = 1.2 MHz
- 0100 = 0.6 MHz
- 1000 = 0.4 MHz
- 1110 = All of the above offset frequencies

The offset frequencies are selected by entering a numeral “1” in the correct “XXXX” position.

NOTE The value 0001 is not used and is reserved for future use.

Default value The default frequency offsets are 1110 (all offsets).

Example Enter `1000` in the value field to test ORFS modulation at 0.4 MHz, which corresponds with the “1XXX” parameter position.

NOTE ORFS due to ramping measurements are performed both below and above the carrier at each of the selected offset frequencies.

43 TX ORFS Ramping Measurement Averages [>1]

NOTE This parameter is not used with the HP/Agilent 8922 unless spectrum analyzer is installed.

This parameter determines how many measurements to average for each offset frequency defined in parameter `TX ORFS ramping offsets`. The range is 1 to 999.

Default value The default number of measurement averages for ORFS due to ramping is 2 which is enough to provide the required accuracy.

Example If you want to average over 10 measurement results taken during the ORFS due to ramping test, you would enter `10` in the value field.

NOTE If 10 is entered, ten measurements are made at each offset selected both below and above the carrier frequency.

44 TX ORFS Modulation Measurement Averages [>1]

NOTE This parameter is not used with the HP/Agilent 8922 unless spectrum analyzer is installed.

This parameter determines how many measurements to average for each offset frequency defined in parameters `TX ORFS modulation [0.1, 0.2, 0.25, 0.4, 0.6]` and `TX ORFS modulation [1, 1.2, 1.4, 1.6]`. The range is 1 to 999.

Default value The default number of measurement averages for ORFS due to modulation is 2 which is enough to provide the required accuracy.

Example If you want to average over 10 measurement results taken during the ORFS due to modulation test, you would enter `10` in the value field.

NOTE If 10 is entered, ten measurements are made at each offset selected both below and above the carrier frequency.

45 TX Phase/Freq Averages

This parameter determines how many measurements to average during transmitter (TX) phase and frequency error testing. The range is 1 to 999.

Default value The default number of measurement averages for phase and frequency error is 1.

Example If you want to average over 10 measurement results taken during the phase and frequency error test, you would enter `10` in the value field.

46 TX Current Limit

This parameter allows you to set a limit on the current drawn from an external GPIB power supply, if one is used. The power supply must be connected to the HP/Agilent 8922 rear-panel GPIB connector in order for this parameter to work. See also “Setting up a GPIB Power Supply” on page 37.

Default value The default current limit is 3 Amperes.

Example If you want to put a current limit of 4 Amperes on the external power supply, you would enter 4 in the value field. Enter the value in Amperes.

47 CP System [0=GSM900, 1=DCS1800, 2=PCS1900, 3=E-GSM]

This parameter allows selection of the radio type being tested.

Default value

Not applicable.

Supported ARFCNs for each band

The following ARFCNs are supported for each band:

- GSM: 1 to 124
- E-GSM: 975 to 1023 and 0 to 124
- DCS: 512 to 885
- PCS: 512 to 810

Testing in E-GSM band

The following channels are available for E-GSM: 975 to 1023 (880.2 to 889.8 MHz) and 0 to 124 (890.0 to 914.8 MHz). There are therefore 173 ARFCNs available for E-GSM. To test mobiles in the most extreme conditions, tests should be executed at the lowest and highest possible frequencies. It is recommended that you perform the tests in E-GSM mode at the following three ARFCNs: 975, 38 and 124. These are the channels that are used if frequency hopping (parameter number 14 set to 1) and E-GSM (parameter number 47) are enabled.

Without frequency hopping, the parameters for the start, step, stop channels (26, 27, 28 and 33, 34, 35 and 37, 38, 38) should be set manually to suitable values, for example (other values are also possible): Start=975, Step=87, Stop=124. In this case the tests will also use the ARFCNs 975, 38, and 124.

The numbering scheme follows the physical frequencies from high to low as the following example shows: Start=1020, Step=1, Stop=3. In this case the test is executed at the following ARFCNs: 1020, 1021, 1022, 1023, 0, 1, 2, 3.

NOTE For testing in E-GSM it is recommended that you create a new procedure with the relevant values configured.

Example

If you want to test a GSM900 radio, select 0 in the value field.

48 TX Minimum Power Level

This parameter allows you to choose the minimum power control level (PCL) for peak-power measurements. Testing begins at the PCL set by the parameter `TX Default Power Control Level`. The PCL increments by the value entered in the parameter `TX Power Level Step for Peak Power`, and ends at the value set by `TX Minimum Power Level`. The range is:

- 1 to 19 for GSM and E-GSM
- 30, 31 and 0 to 15 for PCS
- 0 to 15 for DCS

Default value

- 15 for GSM and E-GSM
- 10 for DCS/PCS

Example

If you wanted to test a radio with a minimum power level of 13 (Power Class 2), you would enter `13` in the value field.

49 TX Power Level Control for TEST_08

This parameter sets the power control level that is used for the ORFS test number 8.

Default value

- 10 for GSM
- 5 for DCS/PCS

Error message

If you set a higher pcl than the default, then the following error message is displayed at the start of the test:

```
ORFS due to ramping tests above PCL 10/5 are not recommended due to the limited dynamic range. Please reconfigure parameter 49.
```

NOTE

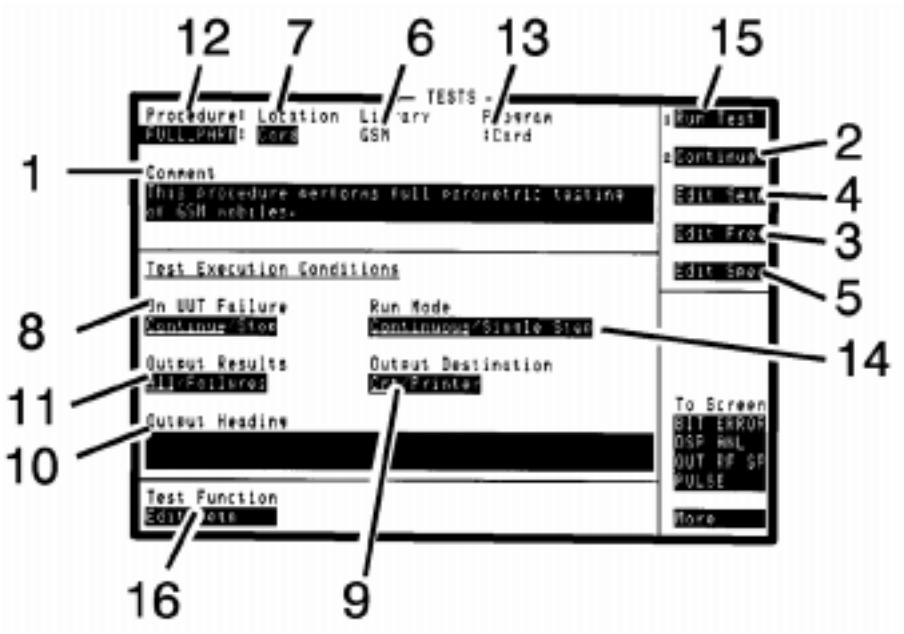
Only GSM power classes 4 and 5, and DCS/PCS power classes 1 are supported for ORFS tests (TEST_07 and TEST_08). If parameter 49 is in the range of 0 to 4 for GSM, or 29 to 31 for DCS/PCS, then the test does not execute and produces the following error message:

```
Power control level not supported by this test. Please reconfigure parameter 49.
```

7 Screens

TESTS

Figure 7-1 **TESTS screen**



1. Comment This field allows descriptions of test procedures to be displayed on the CRT display and printouts. Comments are saved with test procedures.

To enter a comment:

Step 1. Select the `Comment` field (an alphanumeric list of characters appears in the lower-right corner of the screen).

Step 2. Use the knob on the front panel of the HP/Agilent 8922 to select characters (two lines of comments, 50 characters in length, may be entered).

Step 3. Select `Done` when you are finished.

2. Continue This field continues a program after it has been paused. Pressing the `CANCEL` key pauses a program.

3. Edit freq This field is not used in GSM/DCS Mobile Station testing (firmware versions of 5.00 and above will show `Edit Parm` in this position).

4. Edit seqn This field is used to edit the sequence of tests in a procedure.

5. Edit spec This field is used to enter test specification limits in a procedure.

6. Library This field displays the name of the library file.

7. Location

This field selects the location of programs, test procedures, and files. Choices are:

- `Card` selects a memory card inserted in the MEMORY CARD slot in the HP/Agilent 8922 front panel.
- `ROM` selects internal ROM. Several programs will be displayed under `Choices` in the lower right portion of the display. A program is selected using the `Procedure` field; select `Run Test` to run the program.
- `RAM` selects internal RAM.
- `Disk` selects an external disk drive.

8. On UUT Failure

Choices are:

- `Continue`: when `Continue` is selected, testing continues even when the mobile fails to meet its test specification limits.
- `Stop`: When `Stop` is selected, testing stops whenever the mobile fails to meet test specification limits.

Note that test fields 8, 9, 11, and 14 are replicated on the `Sequence` menu. Hence, it is not necessary to set these fields on this screen.

9. Output Destination

Choices are:

- `Crt`: when `Crt` is selected, test results are output to the HP/Agilent 8922 CRT screen only.
- `Printer`: When `Printer` is selected, test results are output to the CRT and the system printer. The printer must be correctly configured to get a printout—see “Printing test results” on page 35.

10. Output Heading

This field is used to enter a heading which will appear with test results, both on the CRT display and a printout.

To enter an output heading:

Step 1. Select the `Output Heading` field (an alpha/numeric list of characters appears in the lower-right corner of the screen.)

Step 2. Use the knob on the front panel of the HP/Agilent 8922 to select characters (two lines of comments, 50 characters in length, may be entered.)

Step 3. Select `Done` when you are finished.

11. Output Results

Choices are:

- `All`: when `All` is selected, all test results are shown on the CRT and/or printout.

  To send data to a printer see “Printing test results” on page 35.

- `Failures`: when `Failures` is selected, test results are shown only when a UUT fails to meet test specification limits or when a software error occurs.

12. Procedure

This field selects and displays a test procedure or program from the `Choices` area in the lower right portion of the display. To display a list of choices, choose `CARD` or `ROM` in the `Location` field, then select the `Procedure` field.

NOTE

Selecting procedures in this field loads a new procedure, causing existing sequence, specifications, and parameters to be overwritten.

13. Program

This field displays the location of the program file.

14. Run Mode

Choices are:

- `Continuous`: in Continuous Mode, all tests run in sequence. The test will pause only when the operator is required to interact with the UUT or HP/Agilent 8922, such as when entering a phone number on the mobile station, or when the `CANCEL` key is pressed or the `Abort` softkey is selected.
- `Single Step`: in Single Step Mode, the program pauses at the completion of each measurement in the test procedure. The test-system operator is prompted to select `Continue` to proceed with testing.

15. Run Test

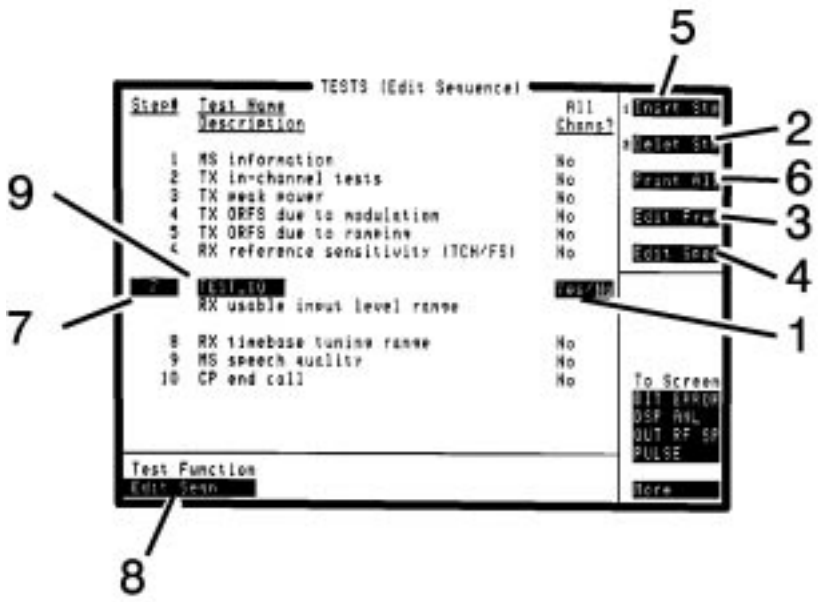
This field begins running Agilent 83212D software. If the Agilent 83212D software has not been loaded, selecting this field will display “Loading program - Enter SHIFT-CANCEL to abort”. The software takes about two minutes to load. The loading operation is performed the first time the program is run. The software does not have to be re-loaded unless a ROM program is run or RAM is cleared.

16. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.
- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

TESTS (Edit Sequence)

Figure 7-2 TESTS (Edit Sequence) screen



1. All Chans? This field is not used by the Agilent 83212D software.

2. Delet Stp This field deletes the currently selected test.

3. Edit Freq This field is not used by the Agilent 83212D software. (Firmware versions of 5.00 and above will show `Edit Parm` in this position)

4. Edit Spec This field is used to enter test limits.

5. Insrt Stp This field inserts a duplicate of the currently selected test.

6. Print All This field outputs a listing of the currently selected tests to a printer. See “Printing test results” on page 35 for details.

7. Step# This field selects and displays the step numbers of all tests in a test procedure. These numbers determine the test sequence.

8. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.

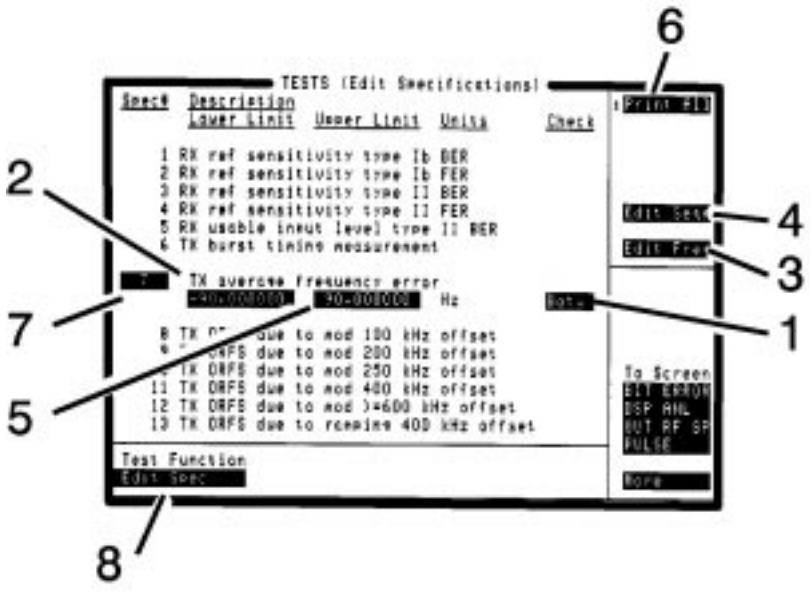
- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

9. Test Name and Description

This field selects and displays the name (for example, TEST_01) and description (for example, MS information) of all tests currently selected. A complete list of available tests will appear under `Choices` in the lower-right portion of the display when this field is selected.

TESTS (Edit Specifications)

Figure 7-3 **TESTS (Edit Specifications) screen**



1. Check This field enables measurement limits. Choices are:

- `Upper` causes the upper limit to be checked.
- `Lower` causes the lower limit to be checked.
- `Both` causes both limits to be checked.
- `None` causes neither limit to be checked.

2. Description This field displays a description (for example, TX average phase error) of a specification.

3. Edit Freq This field is not used by the Agilent 83212D software. (Firmware versions of 5.00 and above will show `Edit Parm` in this position)

4. Edit Seqn This field is used to select tests and the test sequence.

5. Lower and Upper Limits These fields allow measurement limits to be set for the selected specification. When enabled and measurement limits are exceeded, an “F” (for fail) is displayed next to the measurement result.

6. Print All This field outputs a list of the current specifications to a printer. See “Printing test results” on page 35 for details.

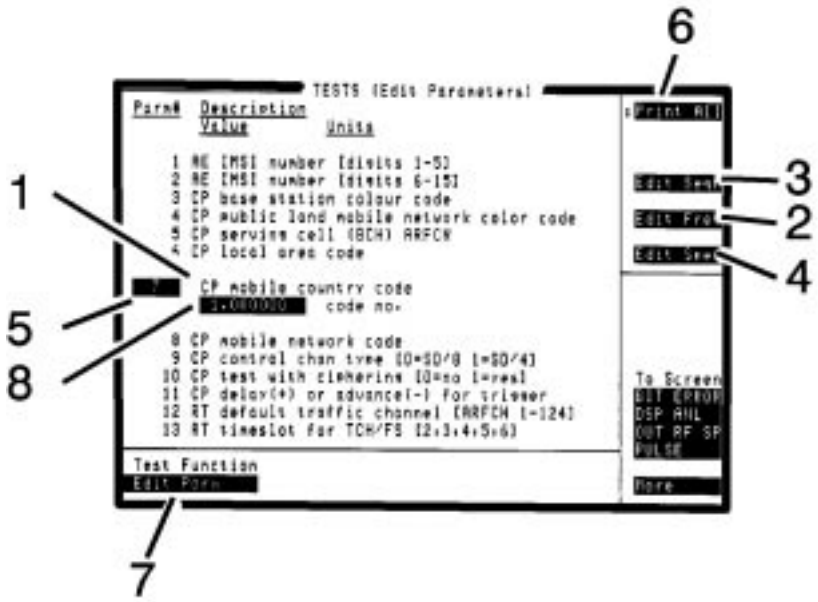
7. Spec# This field selects the specification to edit.

8. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.
- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

TESTS (Edit Parameters)

Figure 7-4 TESTS (Edit Parameters) screen



1. Description This field displays the description (for example, CP local area code) of a parameter.

2. Edit Freq This field is not used by the Agilent 83212D software.

3. Edit Seqn This field is used to select tests and test sequence.

4. Edit Spec This field is used to enter test limits.

5. Parm# This field selects the parameter to edit.

6. Print All This field outputs a list of the current parameters to a printer. See “Printing test results” on page 35 for details.

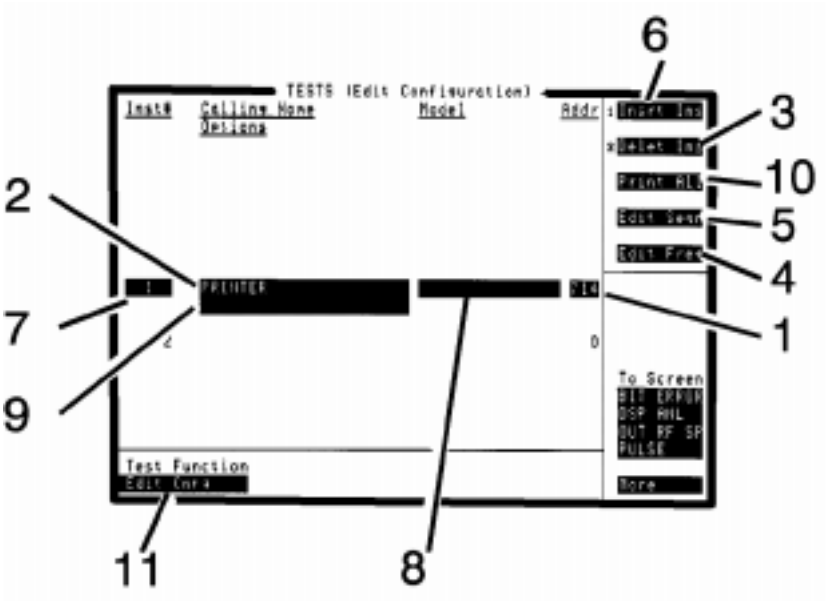
7. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.
- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

8. Value This field requires a numeric data entry to set a test parameter.

TESTS (Edit Configuration)

Figure 7-5 TESTS (Edit Configuration) screen



1. Addr This field is used to enter the select code and address of the device described in the `Calling Name` field.

When using the GPIB bus, this field entry must be a three digit number (for example, 701). When using a serial device, enter “9” in this field. For a printer connected to the parallel port, use “15”.

2. Calling Name This field is used to enter the name of a peripheral device. The calling name must be entered in upper case, with a space inserted between words.

Examples of calling names are:

- PRINTER
- POWER SUPPLY

To enter a calling name:

Step 1. Select the `Calling Name` field. (An alpha/numeric list of characters appears in the lower-right corner of the screen.)

Step 2. Use the knob on the front panel of the HP/Agilent 8922 to select characters (upper-case only).

Step 3. Select `Done` when you are finished.

3. Delet Ins This field deletes the currently selected device.

4. Edit Freq This field is not used by the Agilent 83212D software. (Firmware versions of 5.00 and above will show `Edit Parm` in this position)

5. Edit Seqn This field is used to select tests and test sequence.

6. Insrt Ins This field inserts a duplicate of the currently selected device.

7. Inst# This field assigns a number to the instruments being configured.

8. Model This field is used for entering the model number of the device described in the `Calling Name` field. This field can be left blank.

9. Options This field is for additional information about the configuration. This field can be left blank.

To enter options:

Step 1. Select the `Options` field. (An alpha/numeric list of characters appears in the lower-right corner of the screen.)

Step 2. Use the knob on the front panel of the HP/Agilent 8922 to select characters.

Step 3. Select `Done` when you are finished.

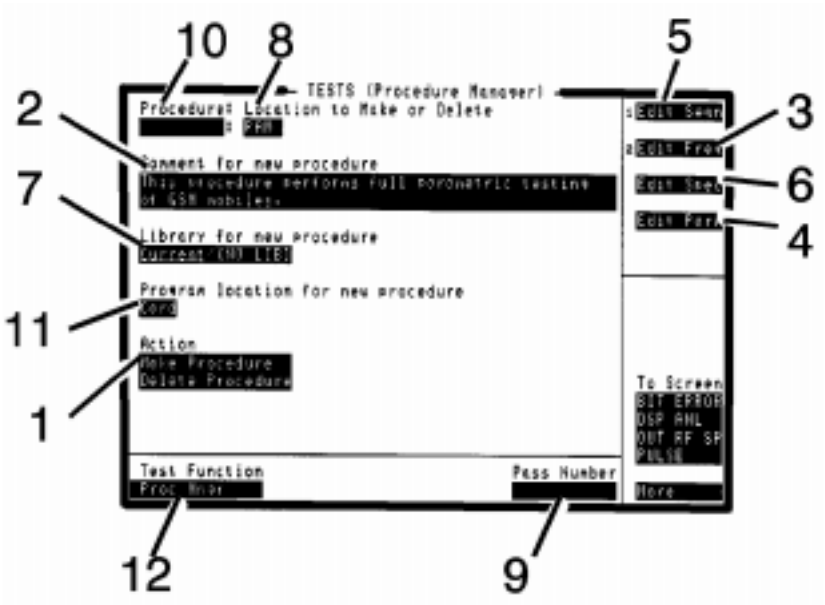
10. Print All This field outputs the contents of the CRT display to a printer.

11. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.
- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

TESTS (Procedure Manager)

Figure 7-6 **TESTS (Procedure Manager) screen**



1. Action Choices are:

- `Make Procedure` causes the currently defined test procedure to be saved to the destination indicated in the `Location to Make or Delete` field.
- `Delete Procedure` causes the procedure indicated in the `Procedure` field to be deleted.

2. Comment For New Procedure This field is used for describing a test procedure.

To enter a comment:

Step 1. Select the `Comment for new procedure` field. (An alpha/numeric list of characters appears in the lower-right corner of the screen.)

Step 2. Use the knob to select characters. (Two lines of comments, 50 characters in length, may be entered.)

Step 3. Select `Done` when you are finished.

This comment is saved with the procedure.

3. Edit Freq This field is not used by the Agilent 83212D software.

4. Edit Parm This field is used to enter test parameters.

5. Edit Seqn This field is used to select tests and test sequence.

6. Edit Spec This field is used to enter test limits.

7. Library For New Procedure Choices are:

- Current selects use of the current library file with the test procedure.
- NO LIB will cause test procedures to be created with no associated library file.

8. Location to Make or Delete Choices are:

- `Card` selects the MEMORY CARD slot on the front panel of the HP/Agilent 8922.
- `RAM` selects internal RAM.
- `Disk` selects and external disk drive.

9. Pass Number This field is not used for by the Agilent 83212D software.

10. Procedure This field is used to compose the name of a test procedure.

Step 1. Select the `Procedure` field. (An alpha/numeric list of characters appears in the lower-right corner of the screen.)

Step 2. Use the knob on the front panel of the HP/Agilent 8922 to select characters in order to compose the procedure name.

Step 3. Select Done when you are finished.

11. Program Location For New Procedure This field selects the location for the Agilent 83212D program file when a test is run. For Agilent 83212D operation, it is recommended that this selection be `CARD`. Choices are:

- `Card`: selects the memory card in the MEMORY CARD slot on the front panel of the HP/Agilent 8922 as the location for the Agilent 83212D program file.
- `ROM`: selects internal ROM.
- `RAM`: selects internal RAM.
- `Disk`: selects an external disk drive.

12. Test Function This field selects the screens used in the tests subsystem. Choices are:

- `Edit Seqn` is used to select tests and test sequence.
- `Edit Freq` is not used for by the Agilent 83212D software.
- `Edit Spec` is used to enter test limits.
- `Edit Parm` is used to enter test parameters.

- `Edit Cnfg` is used to configure the HP/Agilent 8922 for peripheral devices such as printers and power supplies.
- `Proc Mngr` is used to make or delete test procedures.
- `IBASIC` provides direct access to the IBASIC controller.

8 Working with Memory Cards

Types of memory cards

Two following types of memory cards may be purchased from Agilent Technologies.

1. SRAM (Static Random-Access Memory), or
2. OTP (One-Time Programmable).

The table below lists the part numbers and memory space of several types of memory cards available.

Table 8-1. Memory card part numbers

Memory	Type	Part Number
32 kilobytes	SRAM	Agilent 85700A
128 kilobytes	OTP	Agilent 85701A
128 kilobytes	SRAM	Agilent 85702A
256 kilobytes	OTP	Agilent 85703A
256 kilobytes	SRAM	Agilent 85704A
512 kilobytes	SRAM	Agilent 85705A
512 kilobytes	OTP	Agilent 85706A

The Agilent 83212D Mobile Station Test Software is supplied on an OTP memory card.

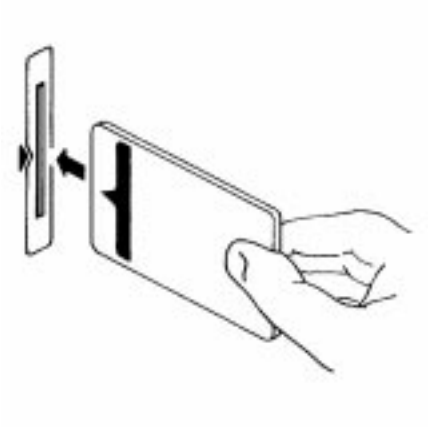
An SRAM memory card is supplied with the software and is used for saving test procedures. You can store and erase the SRAM card many times.

NOTE Although OTP memory cards are programmable, they require a ROM burning device and cannot be programmed by the HP/Agilent 8922.

Inserting and removing a memory card

You can insert and remove memory cards with the HP/Agilent 8922 powered on or off. Memory cards must be inserted for test procedures to run.To remove a memory card, simply pull it out.

Figure 8-1 Inserting a memory card



Initializing an SRAM memory card

You can initialize SRAM memory cards in two ways.

- The Automated Method, which is the fastest method to initialize. Use this method when initializing a memory card before making a test procedure.

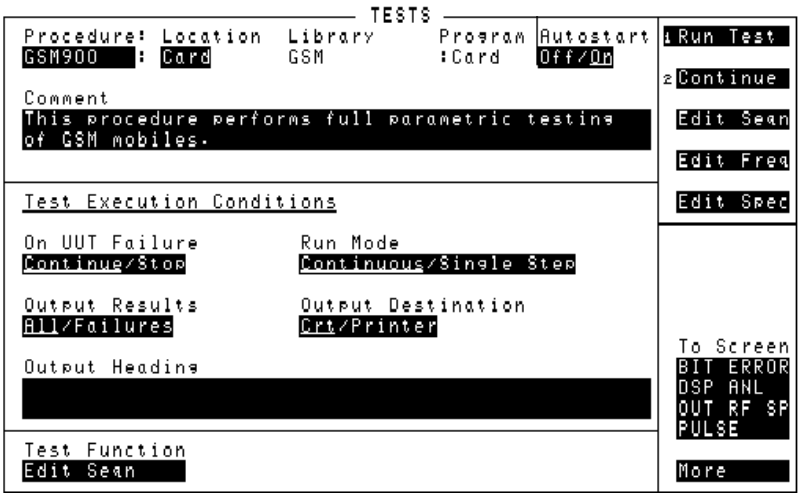
NOTE The Automated method uses a program stored in HP/Agilent 8922 ROM memory. As a result of running the ROM program, the HP/Agilent 8922 internal RAM memory is erased, including the Agilent 83212D software and any test procedure not already saved to a memory card.

- The IBASIC Method. Use this method if you have a test procedure defined but have not yet initialized a memory card. Note that the IBASIC method is slower than the Automated method, but is the only way to initialize a memory card without losing any software currently in the HP/Agilent 8922.

To initialize a memory card using the automated method

Step 1. Press TESTS on the front panel of the HP/Agilent 8922 to access the TESTS screen.

Figure 8-2 Tests screen of the HP/Agilent 8922



Step 2. Select the `Location` field and from the list of locations select `ROM`.

Step 3. Select the `Procedure` field and from the list of Procedures, select `RAM_MNG`.

Step 4. Select the `Run Test` field to start the procedure.

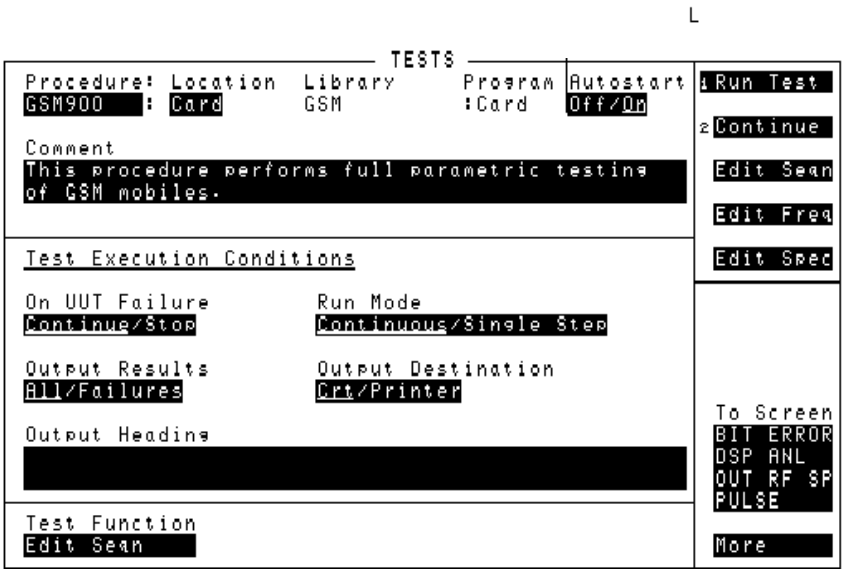
Step 5. Follow the directions and prompts on the screen to complete the initialization.

To initialize a memory cards using the IBASIC method

Step 1. Insert an SRAM memory card into the slot at the front of the HP/Agilent 8922.

Step 2. Press TESTS on the front panel of the HP/Agilent 8922 to access the TESTS screen.

Figure 8-3 Tests screen of the HP/Agilent 8922



Step 3. Select the `Test Function` field and from the list of test functions, select `IBASIC`.

Step 4. Select the IBASIC editing characters and use the knob on the front panel of the HP/Agilent 8922 to enter `INITIALIZE ":INTERNAL"` (all capital letters).

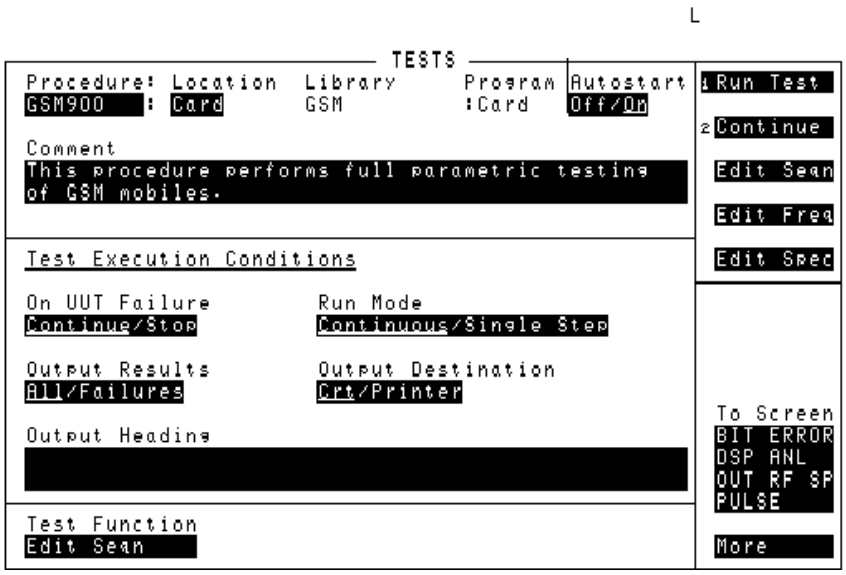
Step 5. Select `Done` to enter the command.

Determining the contents of a memory card

Step 1. Insert an SRAM memory card into the slot at the front of the HP/Agilent 8922.

Step 2. Press TESTS on the front panel of the HP/Agilent 8922 to access the TESTS screen.

Figure 8-4 Tests screen of the HP/Agilent 8922



Step 3. Select the `Test Function` field and from the list of test functions, select `IBASIC`.

Step 4. Select the IBASIC editing characters and use the knob on the front panel of the HP/Agilent 8922 to enter `CAT ":INTERNAL"` (all capital letters).

Step 5. Select `Done` to enter the command.

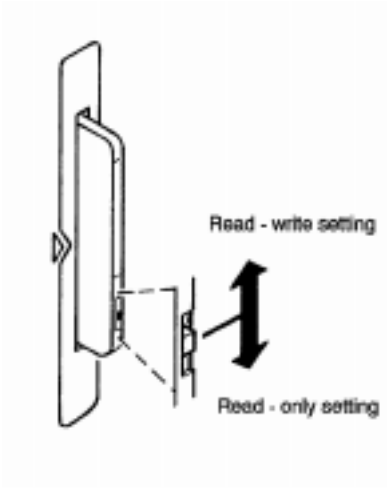
NOTE If the error message `ERROR85 Medium uninitialized` appears on the screen, either the battery in the card is dead, or the memory card needs to be initialized.

Setting the write-protect switch

The SRAM memory card's write-protect switch has two positions:

- Read-write—The memory card must be in this position when saving a test procedure.
- Read-only—The memory-card contents can be read by the HP/Agilent 8922, but cannot be changed or erased.

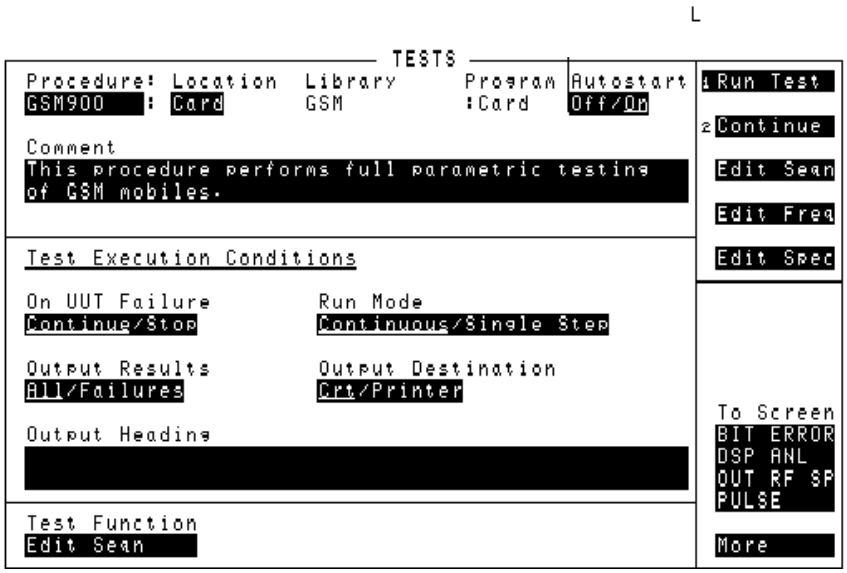
Figure 8-5 Setting the write-protect switch on a memory card



Copying a procedure from one memory card to another

Step 1. Press TESTS on the front panel of the HP/Agilent 8922 to access the TESTS screen.

Figure 8-6 Tests screen of the HP/Agilent 8922



Step 2. Select the Location field and from the list of locations select ROM.

Step 3. Select the Procedure field and from the list of Procedures, select COPY_CARD.

Step 4. Select the Run Test field to start the procedure.

Step 5. Follow the directions and prompts on the screen to perform the copy operation.

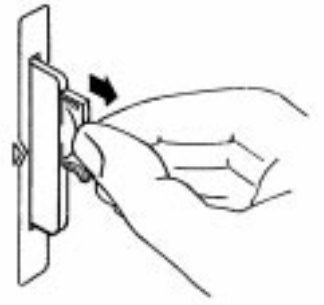
Replacing the memory card battery

The SRAM memory-card requires a 3 volt 2016 coin cell.

Step 1. With the power on, insert the card into the HP/Agilent 8922. An inserted memory card takes power from the HP/Agilent 8922, preventing the card's contents from being lost.

Step 2. Hold the card in the slot with one hand while pulling the battery out with the other. Also, be sure to install the battery with the side marked "+" on the same side marked "+" on the battery holder.

Figure 8-7 Replacing the memory card battery



NOTE Avoid touching the flat sides of the battery when replacing it. Finger oils may contaminate battery contacts in the memory-card.

WARNING **Discard unused batteries according to the manufacturer's instructions.**

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