HP E6387A Nortel
Base Station Test Software
User's Guide

Software Revision A.03.00 and above

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Rev. C

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Hewlett-Packard Company
3000 Hanover Street
Palo Alto, CA 94304
U.S.A.

In This Manual

This manual consists of the following chapters:

Chapter 1 -- Product Description

This chapter provides a description of the HP E6387A Nortel Cell Site Base Station Test Software.

Chapter 2 -- Introduction to Testing

This chapter provides information on loading the Test Software, setting up the Test Software, starting the tests, and the appropriate user responses to Test Software actions.

Chapter 3 -- Connections

This chapter provides information on equipment required for base station testing, and connections for cell site equipment, serial port, and printer.

Chapter 4 -- Reference

This chapter provides detailed descriptions of the general features and functions of the Test Software. Topics are arranged alphabetically for quick and easy reference.

Chapter 5 -- Tests, Parameters, and Specifications

This chapter describes each procedure, test, parameter, and pass/fail limits.

Conventions Used

Special presentations of text in this manual reflect the appearance of the referenced item. Examples of these special presentations are:

Menu -- A Test Set front panel key.

Pause/Continue (Reset) -- A Test Set front panel *shift* function key. The key name in parentheses is the title of the function. Press the **Shift** key then the specified key to access the *shift* function.

`Procedure`: -- Characters displayed on the Test Set screen.

k1 (**`Run Test`**) -- A USER key in the key column next to the display. The words in parentheses are displayed on the screen.

Title -- Titles of documentation are printed in italics.

Test Set -- Refers to the HP 8935 Series E6380A CDMA Base Station Test Set.

Test Software -- Refers to the HP 6387A Nortel Cell Site Test Software.

TEST -- Refers to the one of the individual test modules that is part of a test procedure.

PC card -- Refers to either the OTP card on which the Test Software is shipped or the SRAM card that is shipped with the Test Software for storing procedures.

PC card is an industry standard term that refers to two types of information storage cards. One meets the specifications of the Personal Computer Memory Card International Association (PCMCIA). The other meets the specifications of the Epson Corporation PC card standard. **HP 8935 Series Test Sets use only the PCMCIA type card.**

OTP card -- Refers to the type of PC card that is used to store the Test Software.

SRAM card -- Refers to the type of PC card that is shipped with the Test Software for storing procedures.

BTS -- Refers to the Base Transceiver Station.

In procedural steps in this manual, the following words are used to describe cursor and entry actions:

- **Select** refers to positioning the cursor at the appropriate field (**`inverse video`** area) and pressing the knob.
- **Enter** means to use the numeric keypad, and the Enter key or measurement units keys to make entries to fields. In some procedures, *enter* is used to describe the action of entering characters into a field.

Conventions Used

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1

Product Description

This chapter provides a description of the HP E6387A Nortel Cell Site Base Station Test Software.

HP E6387A Nortel Cell Site Base Station Test Software

The Test Software performs fast, accurate, and automated tests to determine if the RF and audio performance of Cellular Base Stations is within prescribed limits. It is used with the HP E6380A CDMA Base Station Test Set and various ancillary equipment in testing those Base Stations.

The Test Software can be used for the installation, maintenance, and/or repair of the following Base Stations:

CDMA 1900

CDMA C800

CDMA Macro

CDMA FCP-800

CDMA Metrocell 1900

CDMA Metrocell 800

Items Supplied

The Test Software package contains the following listed items.

- HP E6387A Nortel Cell Site Base Station
  Test Software PC card
  HP Part Number: E6387-10001
- HP E6387A Nortel Cell Site Base Station
  Test Software User's Guide
  HP Part Number: E6387A-90001
- SRAM Card, 1-Megabyte
  HP Part Number: 0950-2635
- BTS Laptop Utility
  HP Part Number: E6961-10001
- Software Licensing Agreement

The SRAM card listed above is to be used for storing customized test programs and results, and must be initialized before use (see **"Initializing a PC Card" on page 98**.

Items Required

The equipment required to operate the Test Software is as follows:

- HP 8935 Series E6380A CDMA Base Station Test Set
- HP 8935 firmware revision A.02.00 or later, and DSP software revision A.03.02 or later, for best results. However, the Test Software will work acceptably with older firmware.
- Accessories:

  HP 8935 Nortel Base Station Connection Kit
  HP Part Number: E8302-61001
  or
  Other interconnect arrangements

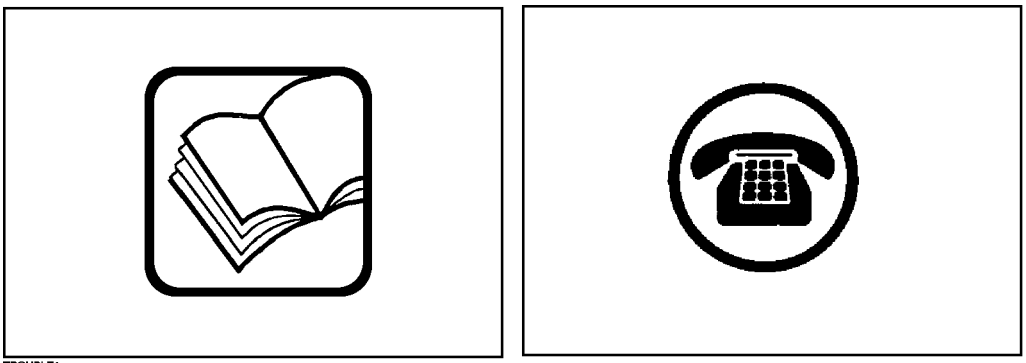
- Optional Items:

  Printer and printer connection cable for documenting test results

  PC or HP Palmtop computer and appropriate connection cable for storing test results

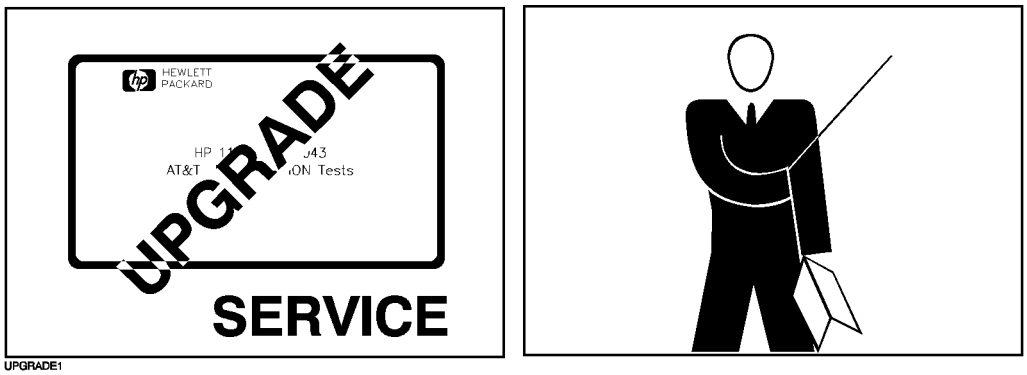
Additional Services Available

For information on services, see the *HP 8935 Series E6380A CDMA Test Set Assembly Level Repair Guide*, or call the HP Hotline (1-800-922-8920, USA and Canada only) and give your Test Software model number if you encounter a problem.



TROUBLE1

Contact your local HP Sales Representative for information about the Software Upgrade Service and the Start Up Assistance Training Course.



UPGRADE1

2

Introduction to Testing

This chapter provides information on loading the Test Software, setting up the Test Software, starting the test, and the appropriate user responses to Test Software actions.

Overview

The Test Software is designed for both ease of use and comprehensive testing. Operating the Test Software consists basically of a four-part process:

1. Loading the Test Software, which consists of turning on the Test Set, inserting the Test Software card, and selecting a procedure.
2. Setting up the Test Software for test operations.
3. Initiating the tests.
4. Responding to Test Set and Test Software actions.

This process is described in detail in the following sections.

Loading the Test Software

Before you can begin testing, you must load the Test Software into the Test Set's internal memory. The Test Software loading process is accomplished in ten steps as outlined in the following paragraphs.

The following illustration (see **figure 1**) outlines the first four steps, which consist of turning on the Test Set's power, inserting the Test Software PC card into the card slot on the Test Set's front panel, and initializing the Test Set.

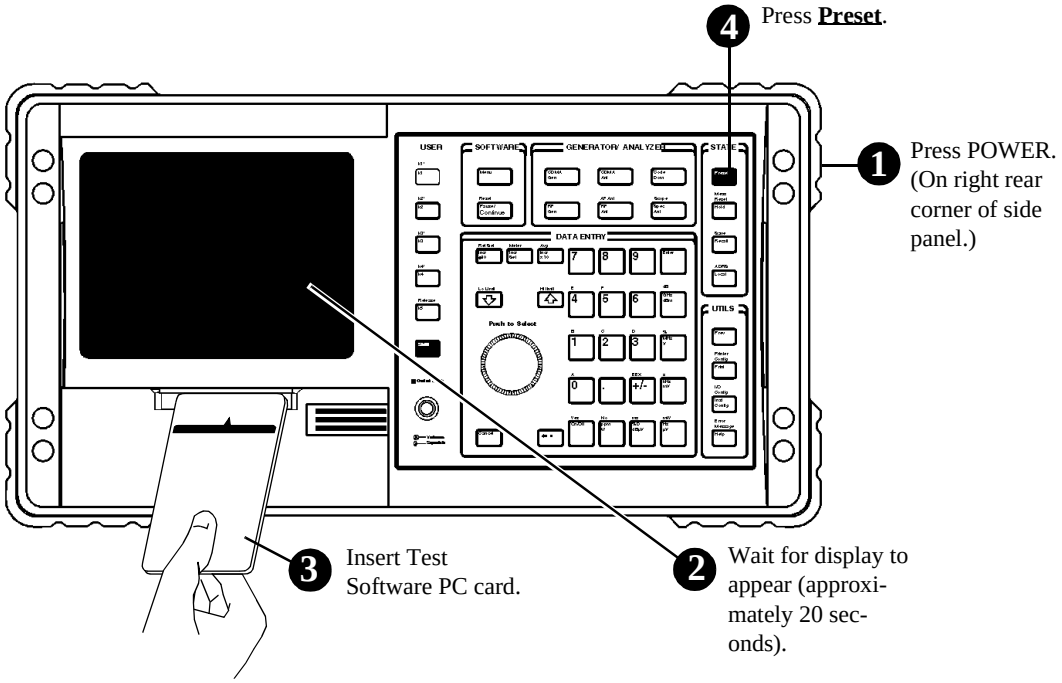


Figure 1 **Preparing for Loading the Test Software**

The following illustration (see **figure 2 on page 26**) outlines the next six steps, which consist of operating the Test Set's internal program to select and load the Test Software, select and load a test procedure, then run the Test Software.

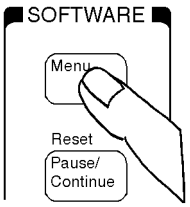
NOTE: When you insert the Test Software PC card and select a procedure for the first time, the Test Software is not actually loaded into the Test Set's memory until you select **`Run Test`** or press the k1 (**`Run Test`**) key. Loading the Test Software for the first time will require approximately 15 seconds. The Test Software will remain in the Test Set's memory (power for which is backed up by a battery) after a power-off/power-on cycle unless it is deleted manually or a new program is loaded.

On the Test Software PC card are 10 preprogrammed procedures. Each procedure allows for performing a particular group of tests, each with parameter and pass/fail limit defaults. Briefly, the procedures are as follows:

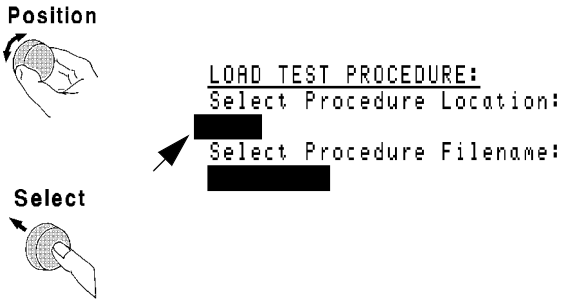
- PROCEDURE 1 MET_1900 – This procedure is used for installation of the Nortel Metro Cell 1900-MHz Base Station. It selects *Test Suite 8 – Nortel Metro Cell 1900 MHz Install* as the default. That Test Suite contains two test groups for commissioning Base Stations: Baseline, and Fault Isolation. The Baseline group includes the standard TESTs required for Base Station installation. The Fault Isolation group includes the TESTs that may be used for troubleshooting during Base Station installation.
- PROCEDURE 2 MET_800 – This procedure is used for installation of the Nortel Metro Cell 800-MHz Base Station. It selects *Test Suite 9 – Nortel Metro Cell 800 MHz Install* as the default. That Test Suite contains two test groups for commissioning Base Stations: Baseline, and Fault Isolation. The Baseline group includes the standard TESTs required for Base Station installation. The Fault Isolation group includes the TESTs that may be used for troubleshooting during Base Station installation.
- PROCEDURE 3 NT_1900 – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 0 – Nortel CDMA 1900 MHz Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 4 NT_C800 – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 2 – Nortel CDMA C800 Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 5 NT_FCP – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 6 – Nortel CDMA FCP800 Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

- PROCEDURE 6 NT_MACRO – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 4 – Nortel CDMA Macro Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 7 _1900 – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 1 – CDMA 1900 MHz Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 8 _C800 – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 3 – CDMA C800 Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 9 _FCP800 – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 7 – CDMA FCP800 Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.
- PROCEDURE 10 _MACRO – This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station. It selects *Test Suite 5 – CDMA Macro Install* as the default. That Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

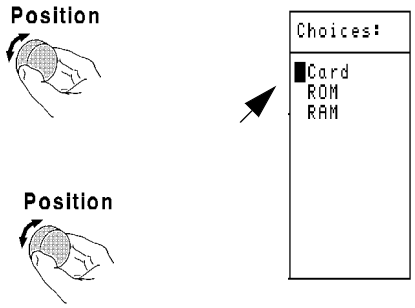
5 Press **Menu** key to display SOFTWARE MENU screen.



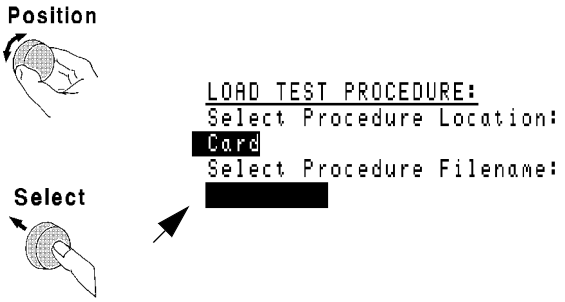
6 Position cursor at **Select Procedure Location:** and select it.



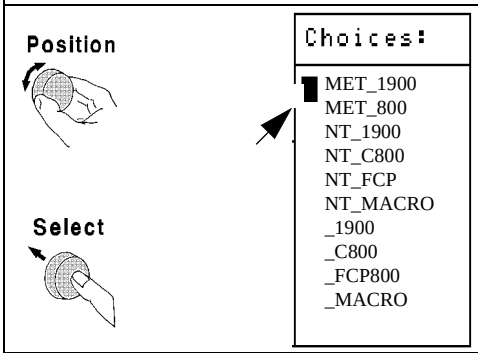
7 Position cursor at **Card** and select it.



8 Position cursor at **Select Procedure Filename:** and select it.



9 Position cursor at a name in **Choices:** list, and select it.



10 Position the cursor at **Run Test** and select it. The Software is now loading.

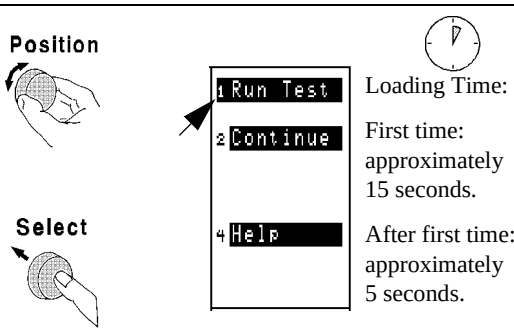


Figure 2 Loading the Test Software

If the Test Software did not load properly, check the following:

- Is the power on? Check the AC power connection. See the *HP 8935 Series E6380A CDMA Base Station Test Set Reference Guide*.
- Is the Test Software PC card inserted properly?
- Is the Test Software PC card firmly seated in the slot?
  It should slide in loosely, then require a firm push to seat properly.
- Was the SOFTWARE MENU screen displayed?
  Pressing the Preset key should display the CDMA ANALYZER screen.
  Pressing the Menu key should display the SOFTWARE MENU screen.

NOTE: If the Test Set displays an error message that states, "**`One or more self-tests failed.`**", there is a hardware problem. In such case, refer to the *HP 8935 Series E6380A CDMA Base Station Test Set Assembly Level Repair Guide*, as appropriate. If the problem persists, call the HP Factory Hotline from anywhere in the USA or Canada (1-800-922-8920), 8:30 AM to 5:00 PM, Pacific time.

Using the Configuration Menu Screen to Set up the Test Software

If you press the k1 (**Run Test**) key, the Test Software will display the Configuration Menu screen (see **figure 3**) upon initiation of the software and prior to running any procedure. All Test Software operations are started from this screen. The following sections describe the fields and the operations that are initiated from the fields.

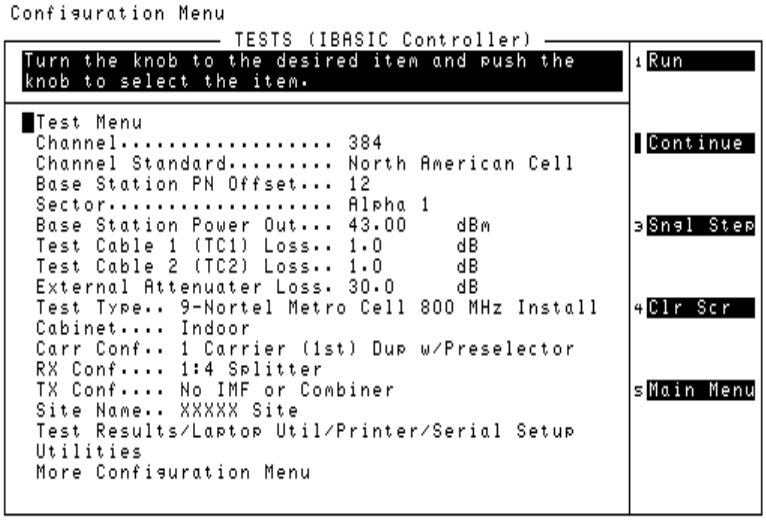


Figure 3 **Configuration Menu**

Test Menu

Select the **Test Menu** field or press the k1 (**Test Menu**) key to display the Test Menu. Dependent upon the selection made in the **Test Type** field, the Test Menu screen will be one of two kinds:

1 Legacy Base Station Test Menu (see **"Using the Legacy Test Menu Screen" on page 42**.

2 Metro Cell Base Station Test Menu (see **"Using the Metro Cell Test Menu Screen" on page 43**.

Channel

Select the **Channel** field to enter the channel number to be tested.

Channel Standard

Select the **Channel Standard** field to enter the choice for band from the **Choices:** list.

If the Test Suite selected in the **Test Type** field is that of a 1900-MHz type Base Station, the choices available are:

North American PCS
Korean PCS

If the Test Suite selected in the **Test Type** field is that of an 800-MHz type Base Station, the choice available is:

North American Cell

Base Station PN Offset

Select the **Base Station PN Offset** field to enter the PN offset for the Base Station to be tested.

Sector

Select the **Sector** field to enter the choice for the sector to be tested from the **Choices:** list.

If the Test Suite selected in the **Test Type** field is that of a Metro Cell type Base Station, the choices available are:

Alpha 1
Alpha 2
Alpha 3
Alpha 4
Beta 1
Beta 2
Beta 3
Beta 4
Gamma 1
Gamma 2
Gamma 3
Gamma 4

If the Test Suite selected in the **Test Type** field is that of any Base Station type other than Metro Cell, the choices available are:

Alpha
Beta
Gamma

Base Station Power Out

Select the **Base Station Power Out** field to enter the value to be used in the Base Station power output testing.

Test Cable 1 (TC1) Loss

Select the **Test Cable 1 (TC1) Loss** field to enter the measured value of the loss through Test Cable 1.

Test Cable 2 (TC2) Loss

Select the **Test Cable 2 (TC2) Loss** field to enter the measured value of the loss through Test Cable 2.

External Attenuator Loss

Select the **`External Attenuator Loss`** field to enter the measured value of the loss through the external attenuator to be used in testing.

NOTE: The external attenuator typically **is not** used for testing Legacy Base Stations, but it typically **is** used for testing Metro Cell Base Stations.

Tests on Legacy Base Stations typically are performed at 4 watts, which does not exceed the maximum level of 15 watts for the RF IN/OUT port of the Test Set. However, tests on Metro Cell Base Stations are performed at 20 watts, which does exceed the maximum level. Thus, the attenuator is required for Metro Cell Base Station testing.

Test Type

Select the **`Test Type`** field to enter the choice for the Test Suite from which testing is to be performed from the **`Choices:`** list. The choices available are:

```
0-Nortel CDMA 1900 MHz Install
1-CDMA 1900 MHz Install
2-Nortel CDMA C800 Install
3-CDMA C800 Install
4-Nortel CDMA Macro Install
5-CDMA Macro Install
6-Nortel CDMA FCP800 Install
7-CDMA FCP800 Install
8-Nortel Metro Cell 1900 MHz Install
9-Nortel Metro Cell 800 MHz Install
```

Cabinet

Select the **`Cabinet`** field to enter the choice for the cabinet style from the **`Choices:`** list. This field is applicable for Metro Cell Base Stations only. The choices available are:

```
Indoor
Outdoor
```

Carr Conf

Select the **Carr Conf** field to enter the choice for the carrier configuration from the **Choices:** list. This field is applicable for Metro Cell Base Stations only.

NOTE: Metro Cell Base Stations are of four basic configurations: 1 carrier, 2 carrier, 3 carrier, and 4 carrier. In the following lists then, for example, the carriers in a 4-carrier configuration are identified as 1st, 2nd, 3rd, and 4th.

If the Test Suite selected in the **Test Type** field is that of a 1900-MHz Metro Cell Base Station, the choices available are:

```
1 Carrier (1st) Dup w/Preselector
2 Carrier (1st) Dup w/o Preselector
2 Carrier (2nd) Dup w/o Preselector
3 Carrier (1st) Triplexer
3 Carrier (2nd) Dup w/o Preselector
3 Carrier (3rd) No Dup or Triplexer
4 Carrier (1st) Triplexer
4 Carrier (2nd) Triplexer
4 Carrier (3rd) No Dup or Triplexer
4 Carrier (4th) No Dup or Triplexer
```

If the Test Suite selected in the **Test Type** field is that of an 800-MHz Metro Cell Base Station, the choices available are:

```
1 Carrier (1st) Dup w/Preselector
2 Carrier (1st) Dup w/o Preselector
2 Carrier (2nd) Dup w/o Preselector
3 Carrier (1st) Dup w/o Presel w/Comb
3 Carrier (2nd) Dup w/o Preselector
3 Carrier (3rd) No Duplexer
4 Carrier (1st) Dup w/o Presel w/Comb
4 Carrier (2nd) Dup w/o Presel w/Comb
4 Carrier (3rd) No Duplexer
4 Carrier (4th) No Duplexer
```

RX Conf

Select the **RX Conf** field to enter the choice for configuration regarding a receiver splitter from the **Choices:** list. This field is applicable for 800-MHz Metro Cells only. The choices available are:

No Splitter
No Split Main/1:4 Split Div
1:4 Splitter
1:6 Splitter

TX Conf

Select the **TX Conf** field to enter the choice for configuration regarding an IMF or Combiner from the **Choices:** list. This field is applicable for 800-MHz Base Stations only. The choices available are:

No IMF or Combiner
IMF
Combiner
IMF and Combiner

Site Name

Select the **Site Name** field to enter the name of the cell site. Enter the characters in the cell site name from those available in the **Choices:** menu. Select **Done** when finished.

Test Results/Laptop Util/Printer/Serial Setup

Select the **Test Results/Laptop Util/Printer/Serial Setup** field to display the Test Results/Laptop Util/Printer/Serial Setup menu. The Test Results/Laptop Util/Printer/Serial Setup menu fields are described in the following paragraphs:

Field Name: Return

Select the **Return** field to return to the Initialization Screen.

Field Name: Edit Test Results Header

Select the **Edit Test Results Header** field to edit or enter the header text. Edit or add text using selections from the **Choices:** list in the lower right-hand area of the screen. The text will appear as entered in the box at the top of the screen.

Select **Done** when finished. The text that you edited or entered will then appear at the beginning of the test results.

Field Name: Use BTS Laptop Utility

NOTE: The BTS Laptop Utility is a PC-based program that allows you to view and save your test results on a PC. If the utility is loaded on your PC, and you wish to send the test result to the PC, toggle this field to **Yes**. For more information on this subject, see **"Sending Test Results to a PC Using the BTS Laptop Utility" on page 76**.

Select the **Use BTS Laptop Utility** field to select whether you wish to use the utility. When you select the field, the **Yes/No** section of the field will toggle.

If it is set to **No**, and you toggle it to **Yes**, two fields will be displayed below: **Serial Port 9 Settings**, and **Send Test Page to BTS Laptop Utility TR Window**. These fields are described starting on this page.

If it is set to **Yes**, and you toggle it to **No**, five fields will be displayed below: **Send Test Results to Printer at**, **Send Test Results to**, **Serial Port 9 Settings**, **Print Setup**, and **Print Test Page**.

Toggle to Yes -- If you toggle the **`Use BTS Laptop Utility`** field to **`Yes`**, set the two fields as described in the following two sub-sections.

Field Name: `Serial Port 9 Settings`

NOTE: For the Test Set to communicate with the PC, the SERIAL 9 port configuration on the Test Set and the PC must match. This field allows you to configure the Test Set's port to match the PC port.

Select the **`Serial Port 9 Settings`** field to configure the SERIAL 9 port. The Test Software will display the Serial Port 9 Settings menu. This menu allows you to match the configuration of the SERIAL 9 port to that of the port of the PC or similar device to which data will be transmitted. For each field, select from the **`Choices:`** list.

For **`Serial Baud`**, select **`300`** to **`115200`** baud.

For **`Parity`**, select **`None`**, **`Odd`**, **`Even`**, **`Marking`**, or **`Spacing`**.

For **`Data Length`**, select **`7 bits`** or **`8 bits`**.

For **`Stop Length`**, select **`1 bit`** or **`2 bits`**.

For **`Flow Control`**, select **`None`**, **`Xon/Xoff`**, or **`Hardware`**.

Select the **`Return`** field or press the k5 (**`Return`**) key when finished to return to the previous screen.

Field Name: `Send Test Page to BTS Laptop Utility TR Window`

Select the **`Send Test Page to BTS Laptop Utility TR Window`** field to test the connection between the Test Set and the PC that is running the BTS Laptop Utility. The Test Software will transmit one page of data to the laptop TR (test results) window as a test.

Toggle to No -- If you toggled the **`Use BTS Laptop Utilities`** field to **`No`**, set the six fields as described in the following six sub-sections.

Field Name: `Send Test Results to Printer at`

NOTE: Test results are always displayed on the Test Set's screen. In addition, you may direct the Test Software to send the results to a printer.

Select the **Send Test Results to Printer at** field to indicate to the Test Software the port address of the printer connection. Select the address from the **Choices:** list. If you select **Off**, no port will be used for transmitting test results to a printer. If you select **Serial 9**, **Parallel 15**, or **HP IB**, the selected port will be used for transmitting test results to a serial, parallel, or HP-IB printer, respectively. If you select the HP-IB printer, you must enter its address in the field. For more information, see **"Sending Test Results to a Serial Printer" on page 91**, **"Sending Test Results to a Parallel Printer" on page 93**, and **"Sending Test Results to an HP-IB Printer" on page 95**.

Field Name: Send Test Results to

NOTE: In addition to test results being displayed on the Test Set's screen, those results may be saved on an SRAM card or sent to a PC connected to the SERIAL 9 port. If you wish to send the results to a printer and also to a PC, this will require the use of a PC communication program such as Procomm (a product of DataStorm Technologies, Inc.).

Select the **Send Test Results to** field to indicate to the Test Software the destination to which you wish to send test results. Select the destination from the **Choices:** list.

If you select **Off**, the Test Software will assume no destination (other than the Test Set's screen) for test results.

If you select **Serial 9**, the Test Software will transmit the test results to a device connected to the SERIAL 9 port. For more information, see **"Sending Test Results to a PC" on page 81**.

If you select **PC Card**, the test results will be sent to an SRAM card. In such case, you must insert an initialized SRAM card into the Test Set's card slot. For more information, see **"Sending Test Results to an SRAM Card" on page 85**.

Field Name: Serial Port 9 Settings

Select the **Serial Port 9 Settings** field to configure the SERIAL 9 port. See the earlier description of this field.

Field Name: `Print Setup`

Select the **`Print Setup`** field to set the print configuration. The Test Software will display the Print Setup menu.

Enter the desired value for the **`Lines/Page`** field.

Set the toggles appropriately for the **`Form Feed at Start of Page`** and **`Form Feed at End of Page`** fields.

Select the **`Printer Model`** field to choose the printer model from the **`Choices:`** list.

Select the **`Return`** field or press the k5 (**`Return`**) key to return to the previous screen.

Field Name: `Print Test Page`

Select the **`Print Test Page`** field to check the connection between the Test Set and the printer before a test. The Test Software will send one page of data to the printer as a test.

A printer must be connected to a Test Set port and set up for printing, and the **`Send Test Results to Printer at`** field must be set to the port to which the printer is connected in order to print a test page.

Utilities

Select the **`Utilities`** field to display the Utilities Menu. Then, select the desired utility tool from the Utilities Menu. The Utilities Menu fields are described in the following paragraphs:

Field Name: `Return`

Select the **`Return`** field to return to the Configuration Menu screen.

Field Name: `Measure Test Cable Loss`

Select the **`Measure Test Cable Loss`** field to initiate the measurement. The Test Software will display the first of a series of cable loss test connection diagrams. Follow the screen prompts to make the measurement. Save the value for each measurement in turn by pressing the k3 **`Save Data`** key.

After the process for measuring the losses through the test cables, the Test Software will also offer the option of measuring the loss through an attenuator. Again, follow the on-screen prompts if you wish to make the measurement.

Field Name: `Search for Pilot PN Offset`

Select the **`Search for Pilot PN Offset`** field to direct the Test Software to derive the PN offset from the Base Station transmission. The Test Software will display a connection diagram. Follow the screen prompts to make the measurement.

Field Name: `Check Even Second Clock Signal`

Select the **`Check Even Second Clock Signal`** field to verify that the EVEN SECOND CLOCK signal from the Base Station is present. The Test Software will display two connection diagrams. Follow the on-screen prompts to check the signal.

Field Name: `Check Markov Calls (Legacy BTS)`

Select the **`Check Markov Calls (Legacy BTS)`** field to run a test that monitors and logs the active Walsh codes when the BTS Markov call test is run for Legacy Base Stations. The Test Software will display instructions and a connection diagram. Follow the on-screen prompts to check the calls.

Field Name: `Perform Return Loss Test`

Select the **`Perform Return Loss Test`** field to initiate the measurement. The Test Software will display the Swept Return Loss Setup screen. Select the **`Start Frequency in MHz`** field and enter the start frequency, select the **`Stop Frequency in MHz`** field and enter the stop frequency, then press the k1 (**`Begin Tst`**) key to invoke the test. The Test Software will display two connection diagrams and on-screen prompts to direct the measurement process.

Field Name: `Go to RF Tools Program`

Select the **`RF Tools`** field to initiate loading the RF tools utilities. The Test Software will display the introductory screen that explains loading the RF Tools. For more information on RF Tools, see the *HP 8935 Series E6380A CDMA Base Station Test Set Reference Guide.*

More Configuration Menu

Select the **More Configuration Menu** field to display the More Configuration screen. Dependent upon the type of Base Station, one of two screens will appear.

If the Test Suite selected in the **Test Type** field is that of a Legacy 1900-MHz type Base Station, the screen will include **all of** the following 11 fields.

If the Test Suite selected in the **Test Type** field is that of a Metro Cell or a Legacy 800-MHz type, the screen will include **only the first 4** of the following 11 fields.

Field Name: Return

Select the **Return** field or press the k5 (**Return**) key to display the initial Configuration Menu screen again.

Field Name: Connection Diagrams Menu

Select the **Connection Diagrams Menu** field to display the Drawing Selection Menu. That screen will offer the following selections:

```
Return
TX Connections
TX Code Domain Connections
RX0 Connections
RX1 Connections
TX Clearing Connections
RX Clearing Connections
```

Select the **Return** field to display the More Configuration screen again. Select any of the other fields to display the associated connection diagrams.

Field Name: Show Drawings with Tests

Select the **Show Drawings with Tests** field to select whether connection diagrams will be displayed during the testing process. Press the cursor control knob to toggle the setting.

Field Name: Use LNA for Spec Interfer

Select the **Use LNA for Spec Interfer** field to select whether a low-noise amplifier (LNA) will be used during the Spectral Interference Evaluation TEST. Press the cursor control knob to toggle the setting.

Field Name: `RFFE at Remote Location`

Select the **`RFFE at Remote Location`** field to indicate to the Test Software whether the RFFE is remotely located. Press the cursor control knob to toggle the setting.

If you select **`Yes`** in this field, the Test Software will display connection diagrams showing the TX and RX1 cables to the remote RFFE for performing tests on that unit. The Test Software will use the loss values entered into the following six fields to compensate for the additional cable loss.

NOTE: For each of the following six fields, include also the loss of the jumper cables used temporarily to connect the subject cable to the RFFE output. If you have not recorded the loss values for the cables, use the Determine Cable Loss Insertion Factors TEST (see **page 121** to determine those values.

Field Name: `Alpha TX/Jumper Loss to RFFE`

Select the **`Alpha TX/Jumper Loss to RFFE`** field to enter the value of the loss of the TX cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Field Name: `Alpha RX1/Jumper Loss to RFFE`

Select the **`Alpha RX1/Jumper Loss to RFFE`** field to enter the value of the loss of the RX1 cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Field Name: `Beta TX/Jumper Loss to RFFE`

Select the **`Beta TX/Jumper Loss to RFFE`** field to enter the value of the loss of the TX cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Field Name: `Beta RX1/Jumper Loss to RFFE`

Select the **`Beta RX1/Jumper Loss to RFFE`** field to enter the value of the loss of the RX1 cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Field Name: `Gamma TX/Jumper Loss to RFFE`

Select the **`Gamma TX/Jumper Loss to RFFE`** field to enter the value of the loss of the TX cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Field Name: `Gamma RX1/Jumper Loss to RFFE`

Select the Gamma RX1/Jumper Loss to RFFE field to enter the value of the loss of the RX1 cable and jumper cable running from the Base Station to the remote RFFE. Turn the cursor control knob to change the setting, then press the knob to enter the selected setting.

Using the Legacy Test Menu Screen

If you select a Test Suite to test a Legacy Base Station, the Test Menu that the Test Software will display will depend upon the particular Base Station Test Suite selected, but it will include all of the TESTs required for that particular Base Station type.

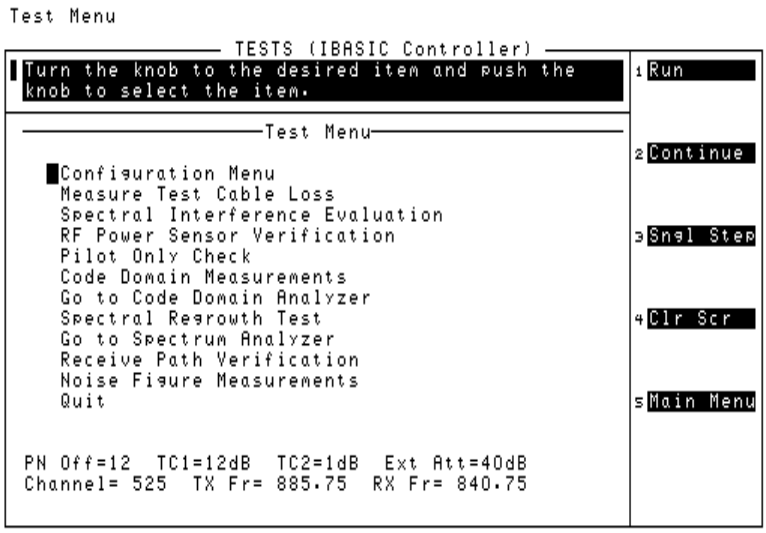


Figure 4 **Typical Legacy Test Menu Screen.**

For a list of the TESTs for each Base Station type, see the **"Test Suite Descriptions" on page 144**.

You may invoke any TEST, or you may invoke a sequence of TESTs (one at a time, in any order).

Using the Metro Cell Test Menu Screen

If you select a Test Suite to test a Metro Cell Base Station, the Test Software will display a somewhat different and much shorter Test Menu.

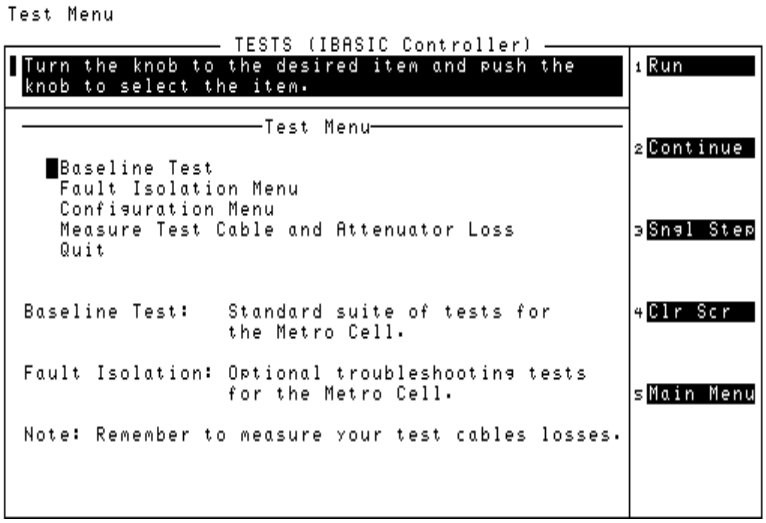


Figure 5 **Typical Metro Cell Test Menu Screen.**

As shown in **figure 5**, this menu offers a **`Measure Test Cable Loss`** TEST and two selections of performance TESTs.

1 **`Baseline Test`** – If you select this field, this will invoke a group of TESTs that run in a particular sequence for Base Station commissioning.

2 **`Fault Isolation Menu`** – If you select this field, the Test Software will display another screen, the Fault Isolation Menu screen.

For a description of the Baseline Test, see **"Baseline Test" on page 118**.

For a description of the Metro Cell Base Station Fault Isolation Menu, see **"Using the Metro Cell Fault Isolation Menu Screen" on page 44**.

Using the Metro Cell Fault Isolation Menu Screen

If you select a Test Suite to test a Metro Cell Base Station, and then you select the **`Fault Isolation Menu`** field in the Test Menu screen, the Test Software will display the Fault Isolation Menu screen.

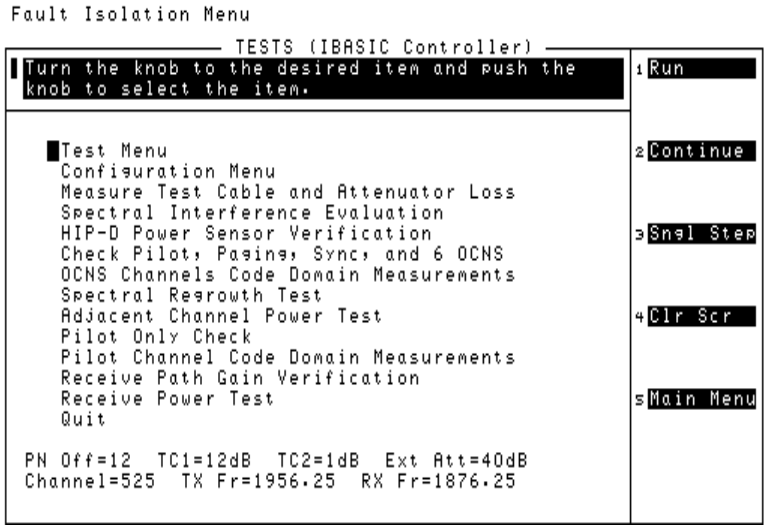


Figure 6 **Typical Metro Cell Fault Isolation Menu Screen.**

The list of the TESTs is the same for both 1900-MHz and 800-MHz Metro Cell Base Stations.

You may invoke any TEST, or you may invoke a sequence of TESTs (one at a time, in any order).

Initiating Testing

After setting all relevant fields on the Configuration Menu screen to appropriate values and settings, prepare to select the TESTs by either selecting the **`Test Menu`** field or pressing the k1 (**`Test Menu`**) key. Select the TEST from the Test Menu or, in the case of a Metro Cell Base Station, call for the Fault Isolation Menu screen and select the TEST from that screen.

3

Connections

This chapter provides information on equipment required for Base Station testing, and connections for cell site equipment, serial port, and printer.

Equipment Required

The following equipment is required for testing:

- Cellular Site Base Station to test.

HP 8935 Series E6380A CDMA Base Station Test Set.

HP 8935 Nortel Base Station Connection Kit. (Recommended, but not required.)

Accessory Kit Cables, Connectors, and Small Accessories

The cables, connectors, and small accessories listed in **table 1** may be purchased together in the HP 8935 Nortel Base Station Connection Kit (HP Part Number: E8302-61001) or separately through a local vendor.

The Test Set and other equipment in this test system are susceptible to damage by transient RF power, continuous RF power, high voltage, electrostatic discharge from cables and other sources, and transients caused by lightning. Connections to equipment, switch settings, and power-on conditions must be selected and accomplished carefully to reduce the risk of damage to the equipment.

Table 1 Cables and Adapters in Connection Kit

Description	Purpose	Quantity	Part Number
Cable, DB25(m)-to-DB9(f), 15 ft	Accessory.	1	E8302-61005
Cable, BNC(m)-to-BNC(m), RG400, 20 ft	Connects 10-MHz Reference and Even Second Clock signals between Base Station and Test Set.	2	E8302-61003
Cable, N(m)-to-N(m), RG214, 20 ft	Connects Test Set's RF IN/OUT connector to Base Station's TX output connector. Connects Test Set's DUPLEX OUT connector to Base Station's RX input connector.	2	08921-61056
Cable, N(m)-to-N(m), RG214, 2 ft	Jumper cable for remote RFFE testing.	1	E8300-61005

Table 1 Cables and Adapters in Connection Kit (Continued)

Description	Purpose	Quantity	Part Number
Cable, DB25(f)-to-Bantam	Accessory.	1	08921-61034
Cable, BNC(m)-to-Bantam	Accessory.	2	8120-8745
Cable, RJ45(m)-to-RJ45(m), 4 ft	Accessory.	1	8120-6343
Cable, DB9(f)-to-DB9(f), null, 10 ft	Connects Test Set to PC.	1	5182-4794
Cable, SMA(m)-to-SMA(m)	Accessory.	2	83204-61011
Attenuator, N(m)-to-N(f), 6 dB	Accessory, cable loss test.	2	0955-0819
Adapter, N(f)-to-BNC(m)	Adapts N-to-N cable to Base Station connectors.	1	1250-0077
Adapter, N(f)-to-N(f)	Connects reference cable to cable or device under test in cable loss test.	2	1250-0777
Adapter, N(f)-to-SMA(f)	Adapts N to N cable to the FCP base station.	2	1250-1404
Adapter, BNC(m)-to-Banana(f), single	Accessory.	2	1250-2164
Adapter, N(f)-to-TNC(m)	Adapts N to N cable to Base Station connectors.	1	1250-2361
Adapter, N(f)-to-TNC(f)	Adapts N to N cable to Base Station connectors.	1	1250-2362
Adapter, BNC(m)-to-Dual Banana(m)	Accessory.	1	1251-2277
Adapter, DB25(f)-to-RJ45(f)	Accessory.	1	08921-61027

Cell Site to Test Set Connections

Many arrangements of test equipment and cell site equipment are possible. After you set up the system, you must calibrate some system components before initiating testing. After calibration, tests must be performed with the equipment connected in the same way that it was connected when calibrated.

As aids to understanding the connection diagrams shown on the screen of the Test Set, see **figure 7** through **figure 15** starting on the next page for connection diagrams for the various typical Base Station configurations. Note that, because of the many configurations of Metro Cell Base Stations, no Metro Cell connection diagram is shown. Instead, **figure 7** shows Metro Cell modules to assist in identifying connection locations.

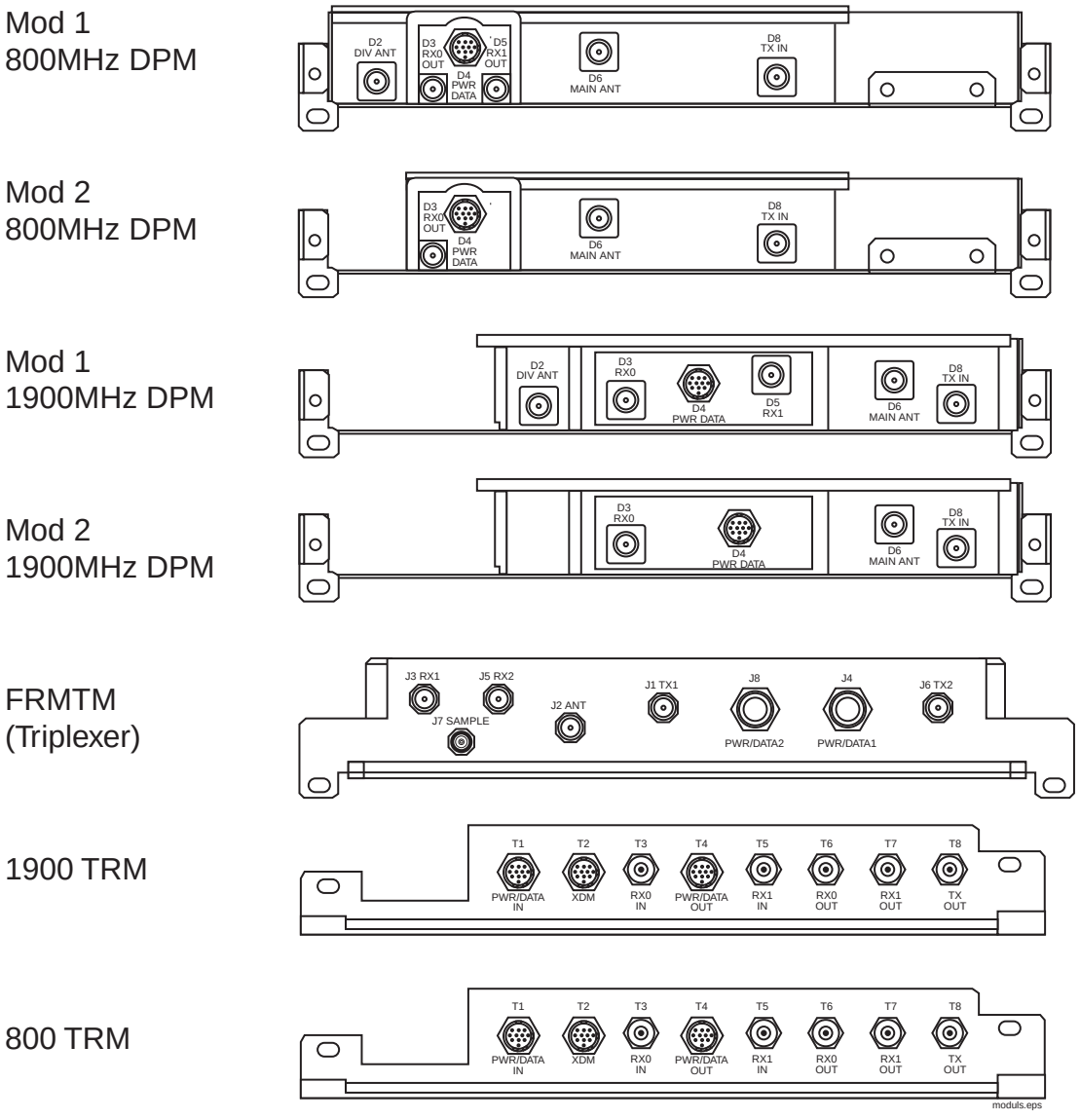


Figure 7 **Metro Cell 1900/800-MHz Base Station Connection Locations**

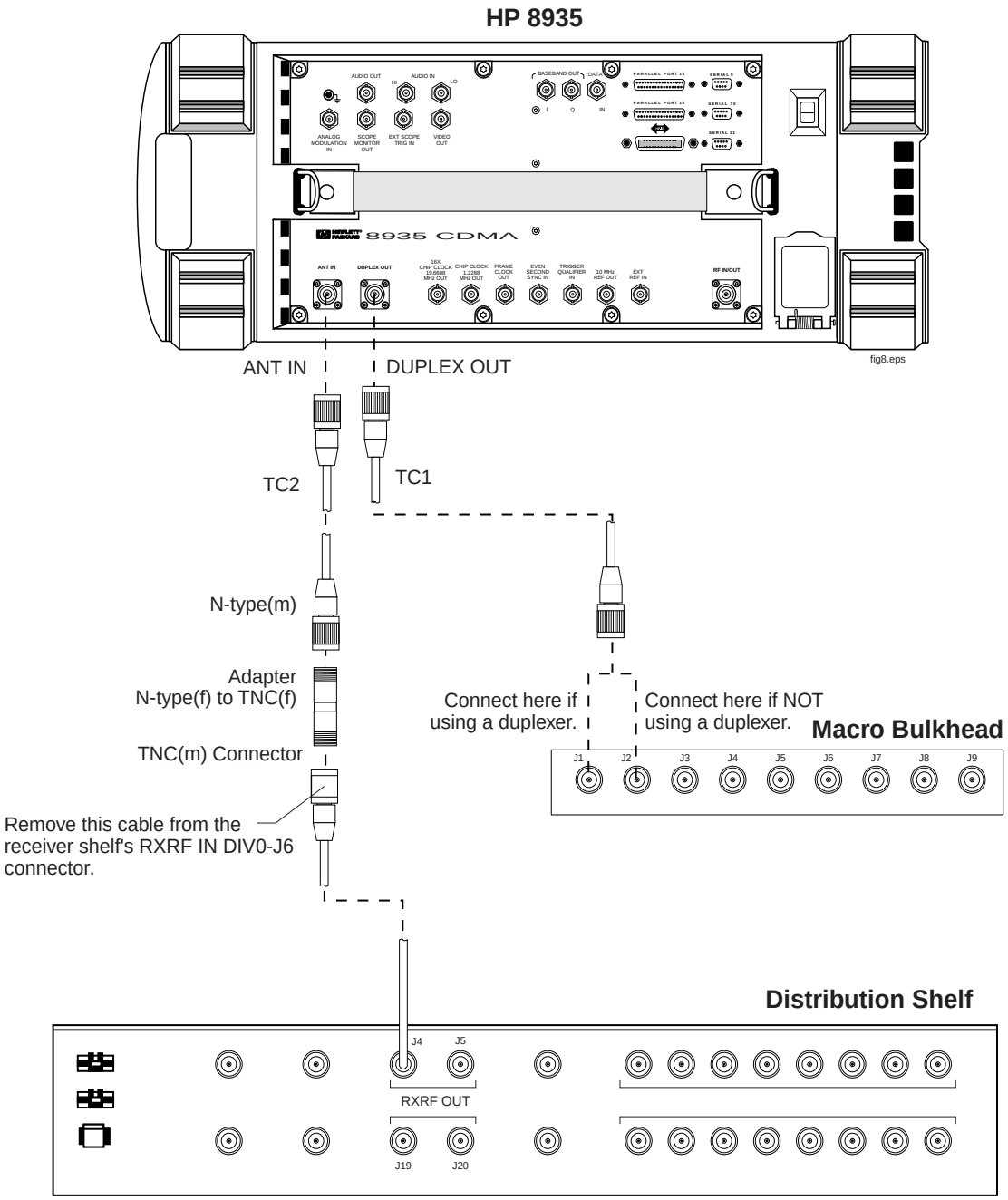


Figure 8 **CDMA Macro Base Station RX0 Receive Path Connection Diagram**

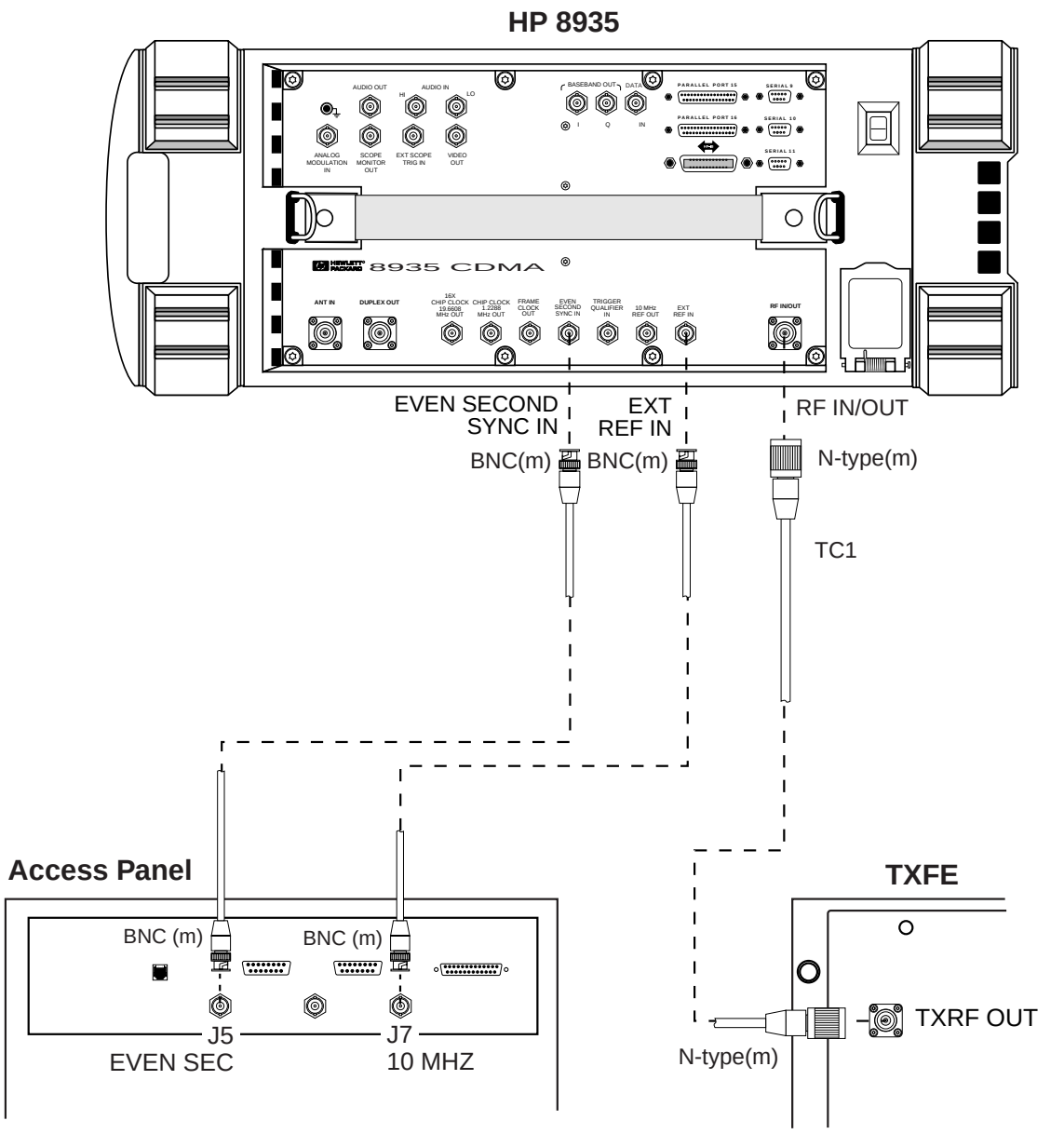


Figure 9 **CDMA Macro Base Station TX Connection Diagram**

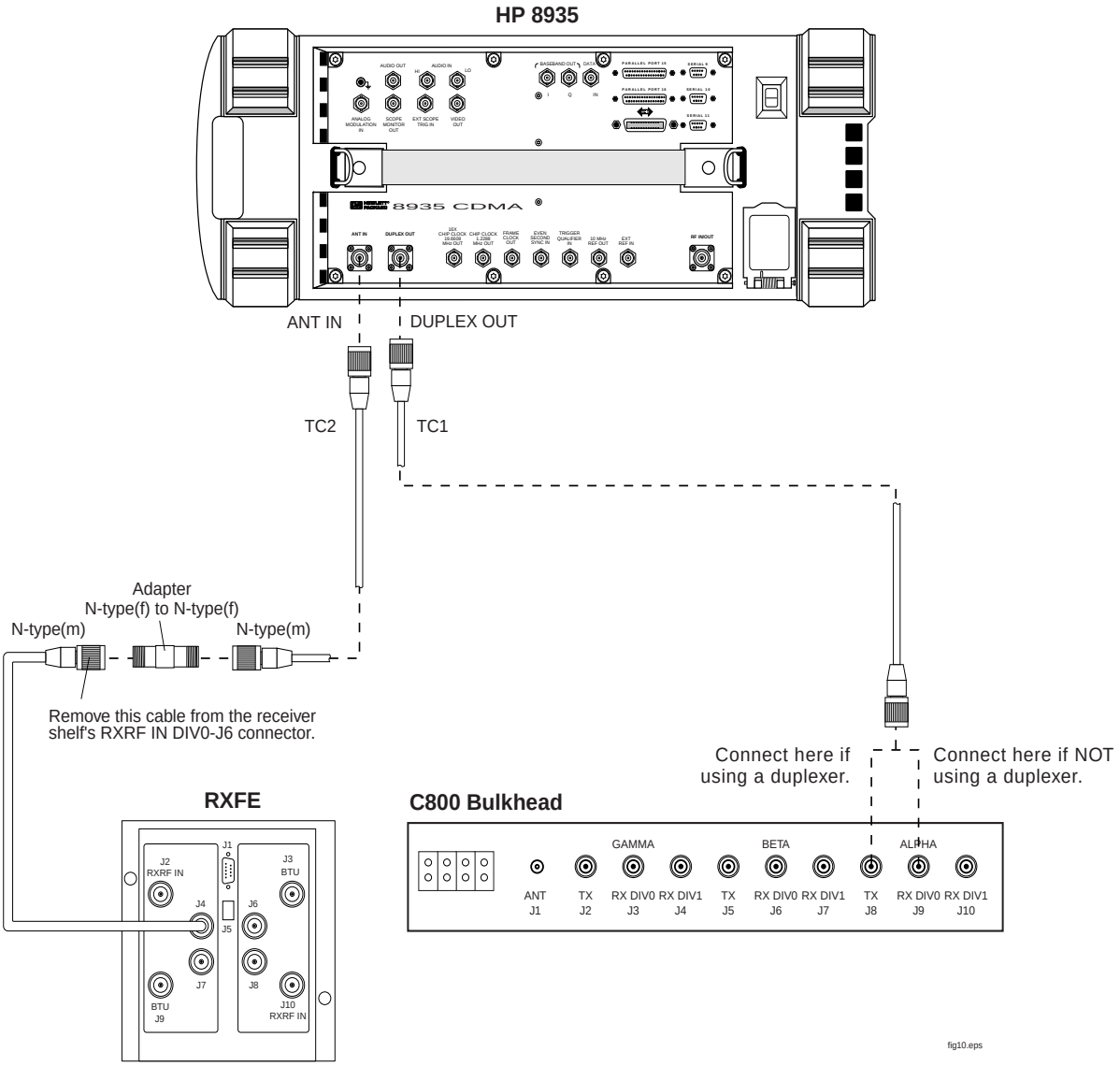


Figure 10 **CDMA C800 Base Station RX0 Receive Path Connection Diagram**

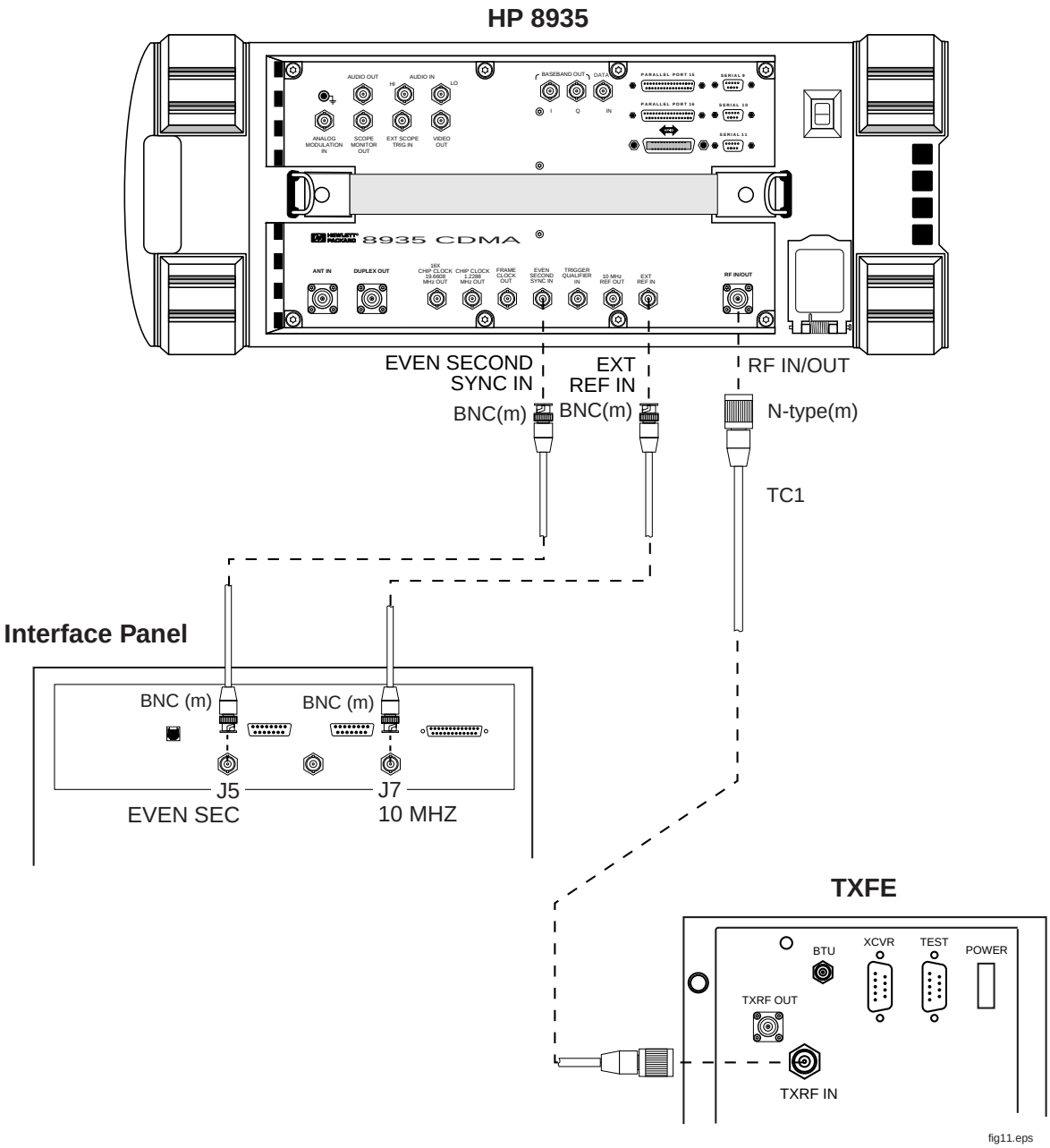


Figure 11 **CDMA C800 Base Station TX Connection Diagram**

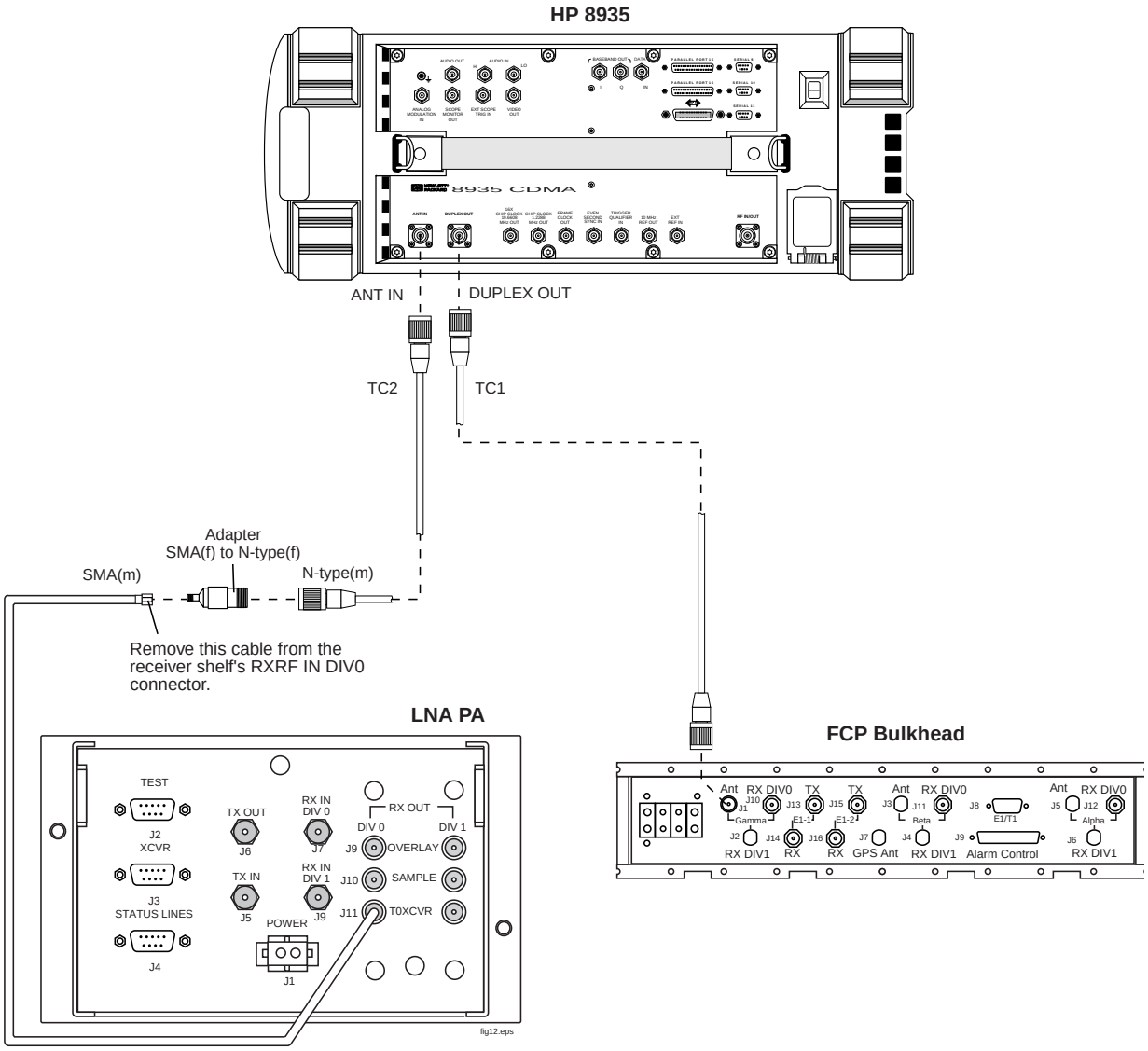


Figure 12 **CDMA FCP800 Base Station RX0 Receive Path Connection Diagram**

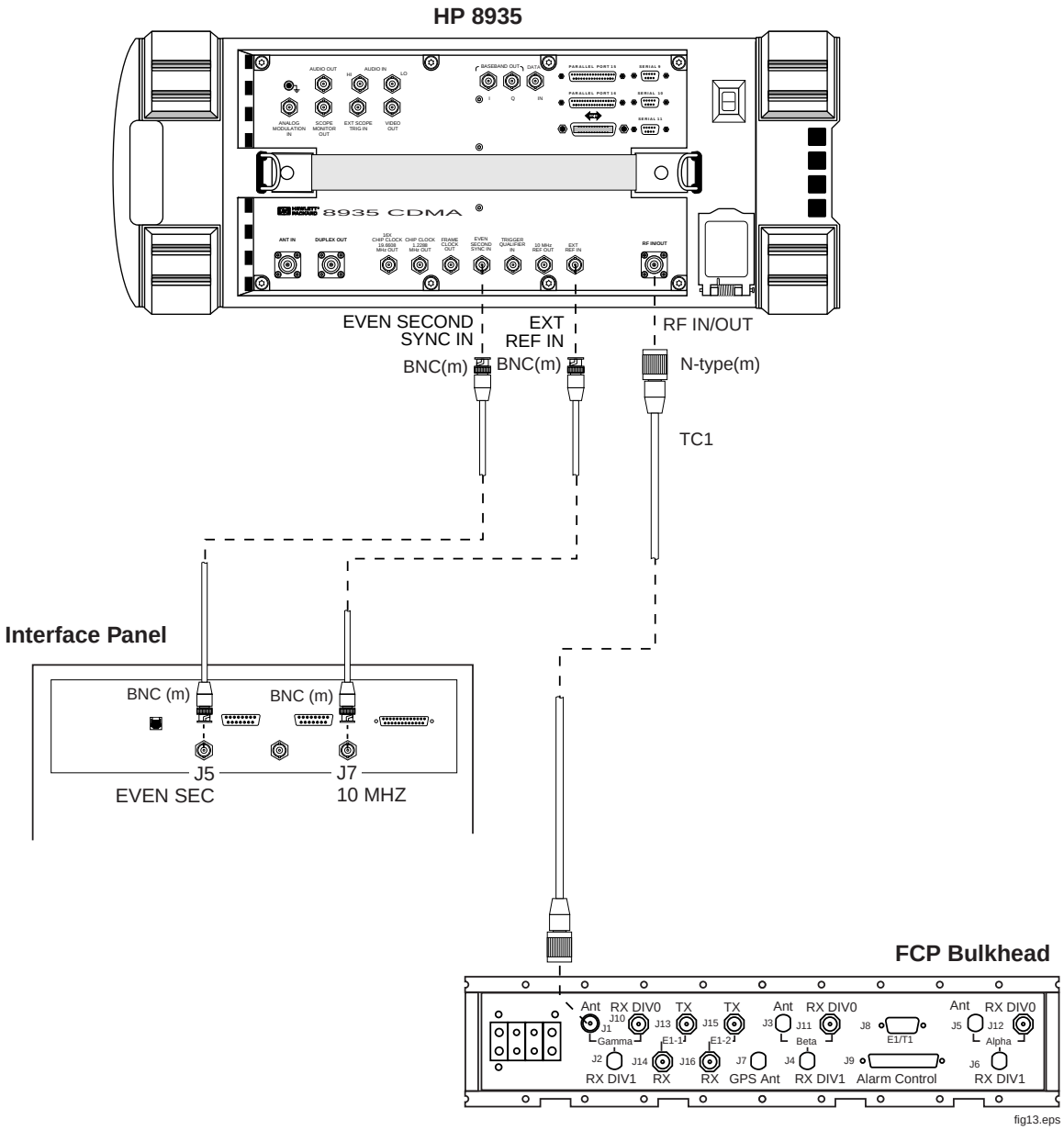


Figure 13 **CDMA FCP800 Base Station TX Connection Diagram**

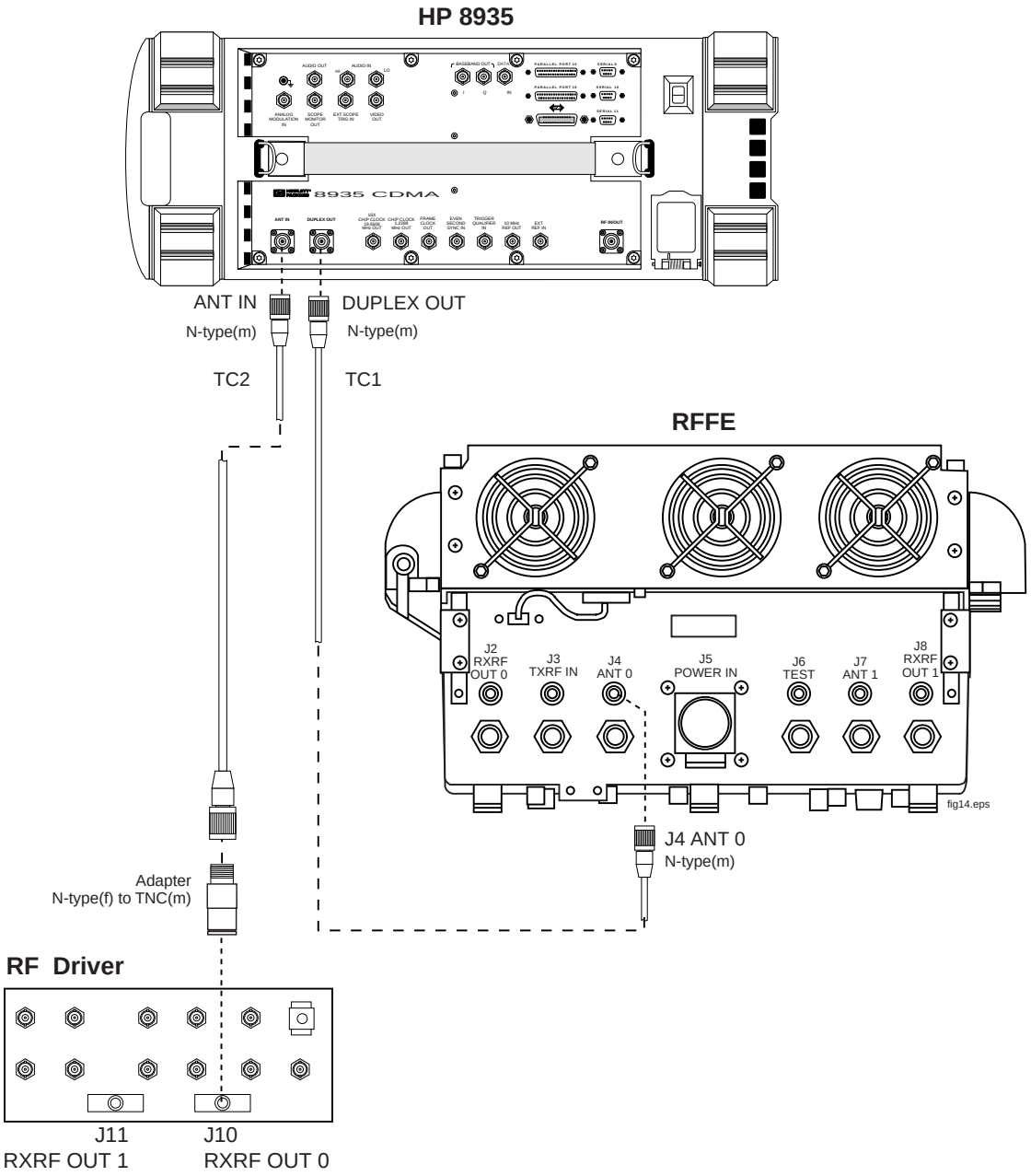


Figure 14 **CDMA 1900-MHz Base Station RX0 Receive Path Connection Diagram**

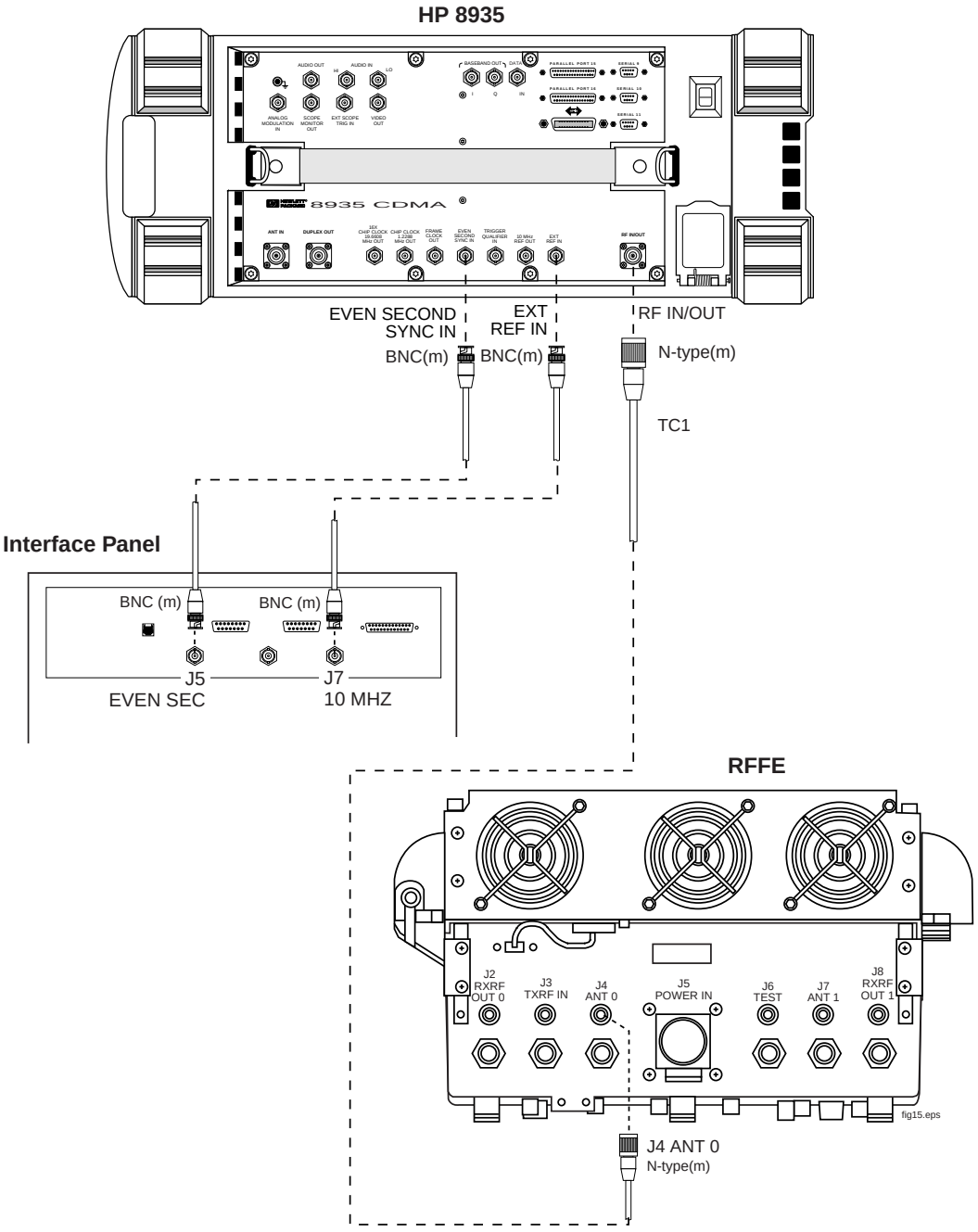


Figure 15 **CDMA 1900-MHz Base Station TX Connection Diagram**

PC and Printer Connections

This section provides information on PC and printer connections for data collecting and recording.

PC

The Test Software includes the capability to transfer test results to an external PC. This may be done quickly and easily by running the BTS Laptop Utility on a laptop or other computer to save the information.

Connect the Test Set's SERIAL 9 port to the PC's serial port using a DB9-to-DB9 null modem cable (see **figure 16**).

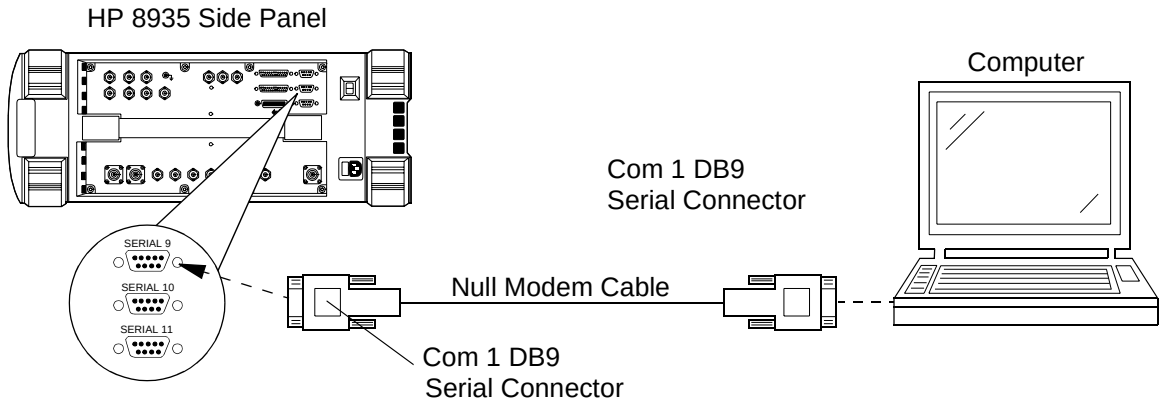


Figure 16 Test Set to PC Serial Connection

Serial Printer

Connect the Test Set's SERIAL 9 port to the serial printer using a standard serial (DB9-to-DB9) cable (see **figure 17**).

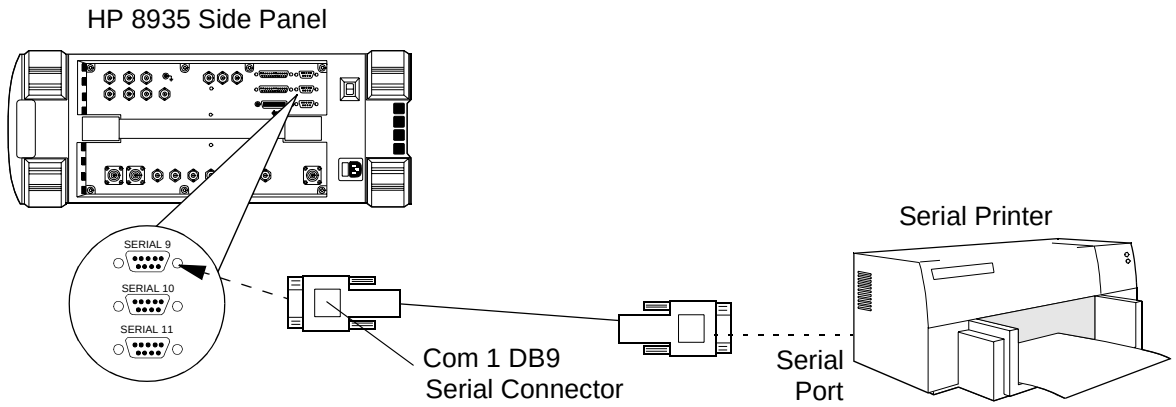


Figure 17 **Test Set to Serial Printer Connection**

Parallel Printer

Connect the Test Set's PARALLEL 15 port to the printer using a standard parallel printer cable (see **figure 18**).

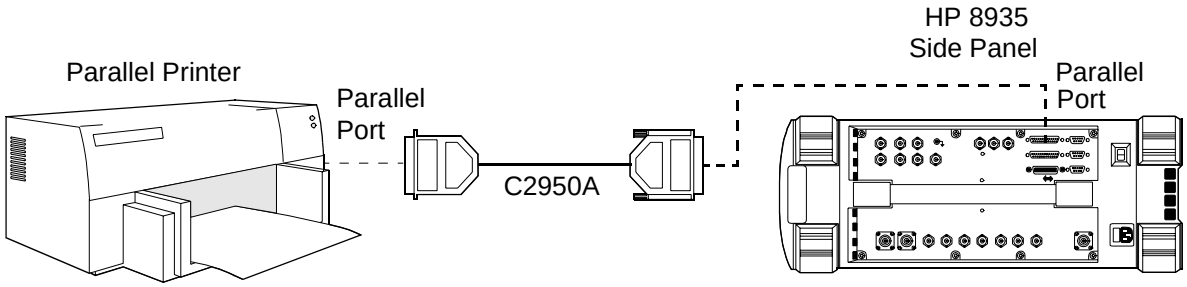


Figure 18 **Test Set to Parallel Printer Connection**

HP-IB Printer

Connect the Test Set's HP-IB port to the printer using a standard HP-IB printer cable (see **figure 19**).

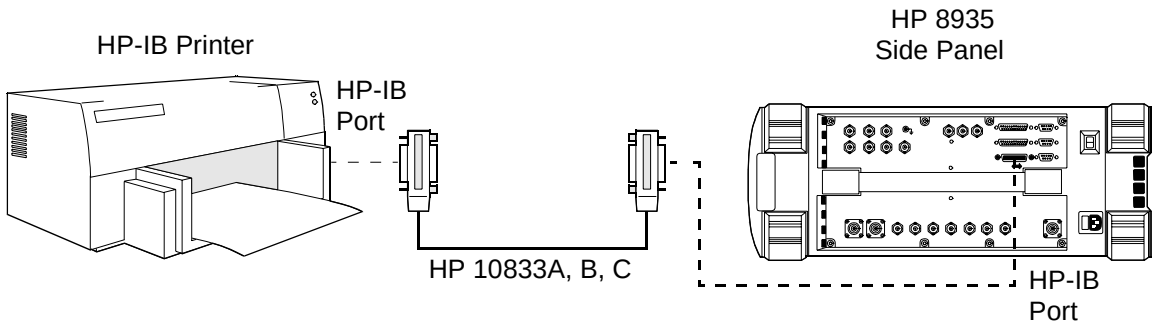


Figure 19 Test Set to HP-IB Printer Connection

4

Reference

This chapter provides detailed descriptions of the general features and functions of the Test Software. Topics are arranged alphabetically for quick and easy reference.

Customizing Test Procedures

Customizing test procedures is accomplished from the SOFTWARE MENU screen (see **figure 20**).

The fields listed under CUSTOMIZE TEST PROCEDURE: are used to customize the software for various testing needs.

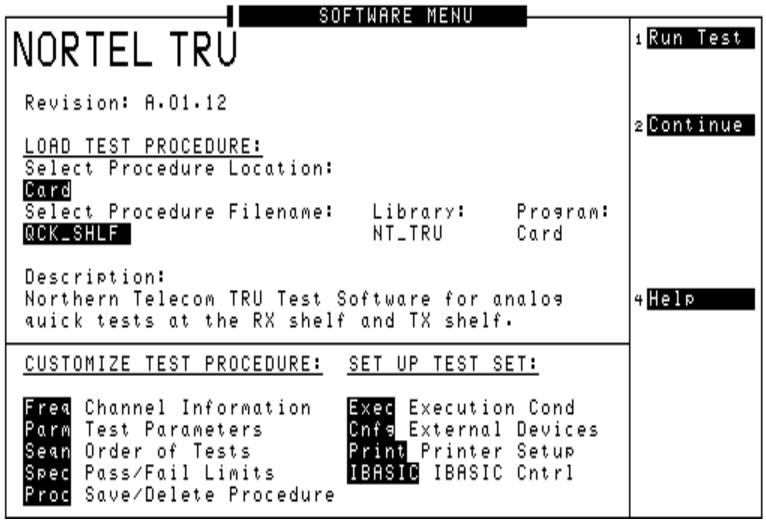


Figure 20 **SOFTWARE MENU Screen**

Test Procedures have been designed so that changes may be made easily from the Test Set's front panel. For example, tests may be inserted or deleted and, after running the tests, you may change the pass/fail limits or test different channels. You may store your customized procedure on an SRAM card so that you may use it in the future (see **"Saving/Deleting Procedures to/from a Card" on page 71**).

Changing Pass/Fail Limits

Changing pass/fail limits is accomplished from the TESTS (Pass/Fail Limits) screen (see **figure 21**).

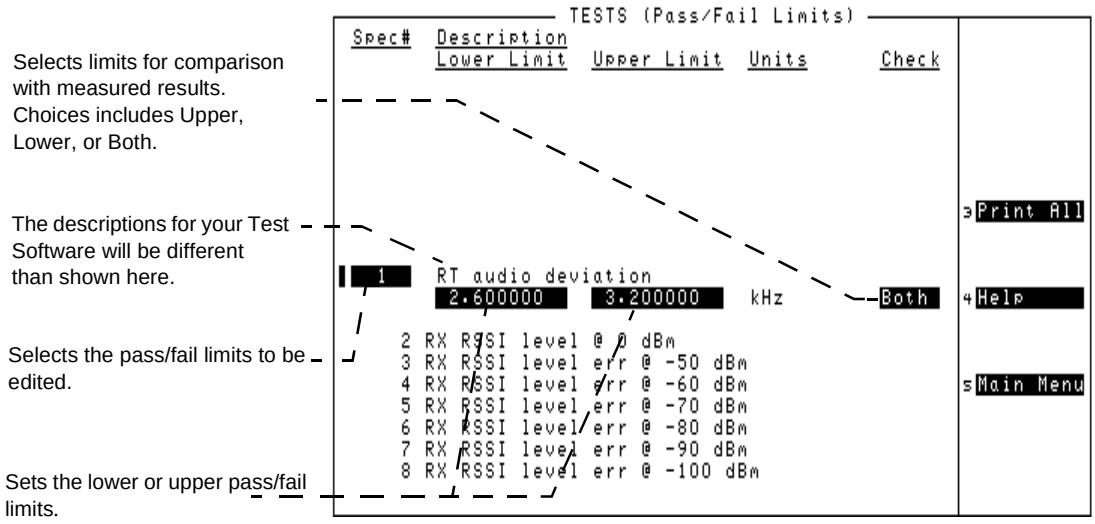
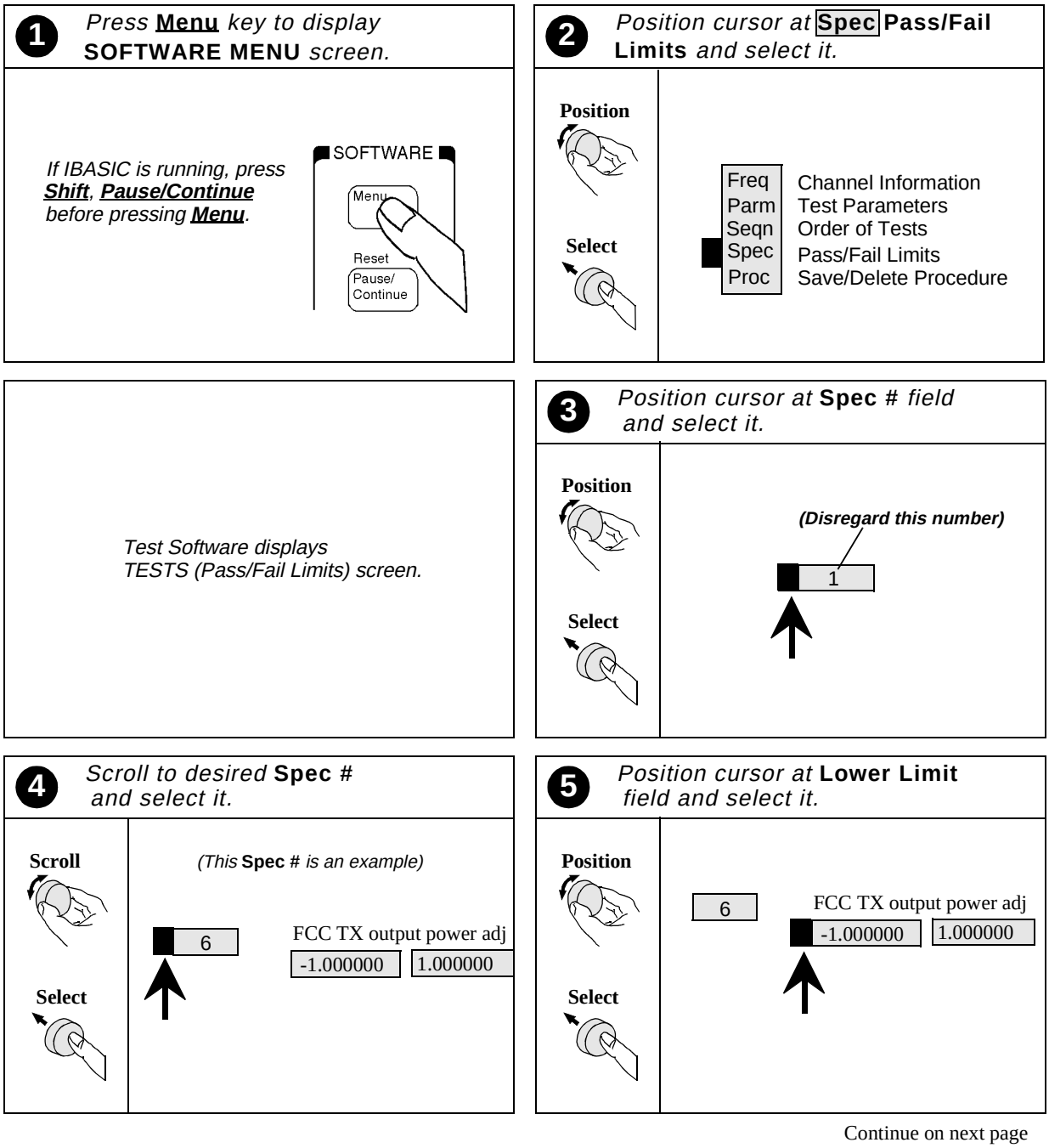


Figure 21 **Changing Pass/Fail Limits**

Pass/Fail limits define the values a measurement result is compared against to determine if the system under test meets specified standards. Default values are set in the Test Software. These default values may be changed to meet the requirements of the particular application.

The procedure shown in **figure 22** and **figure 23** describes the process for changing pass/fail limits through the TESTS (Pass/Fail Limits) screen to optimize your testing conditions. For information on saving customized pass/fail limits, see **"Saving/Deleting Procedures to/from a Card" on page 71**.



Continue on next page

Figure 22 Changing Pass/Fail Limits Specifications

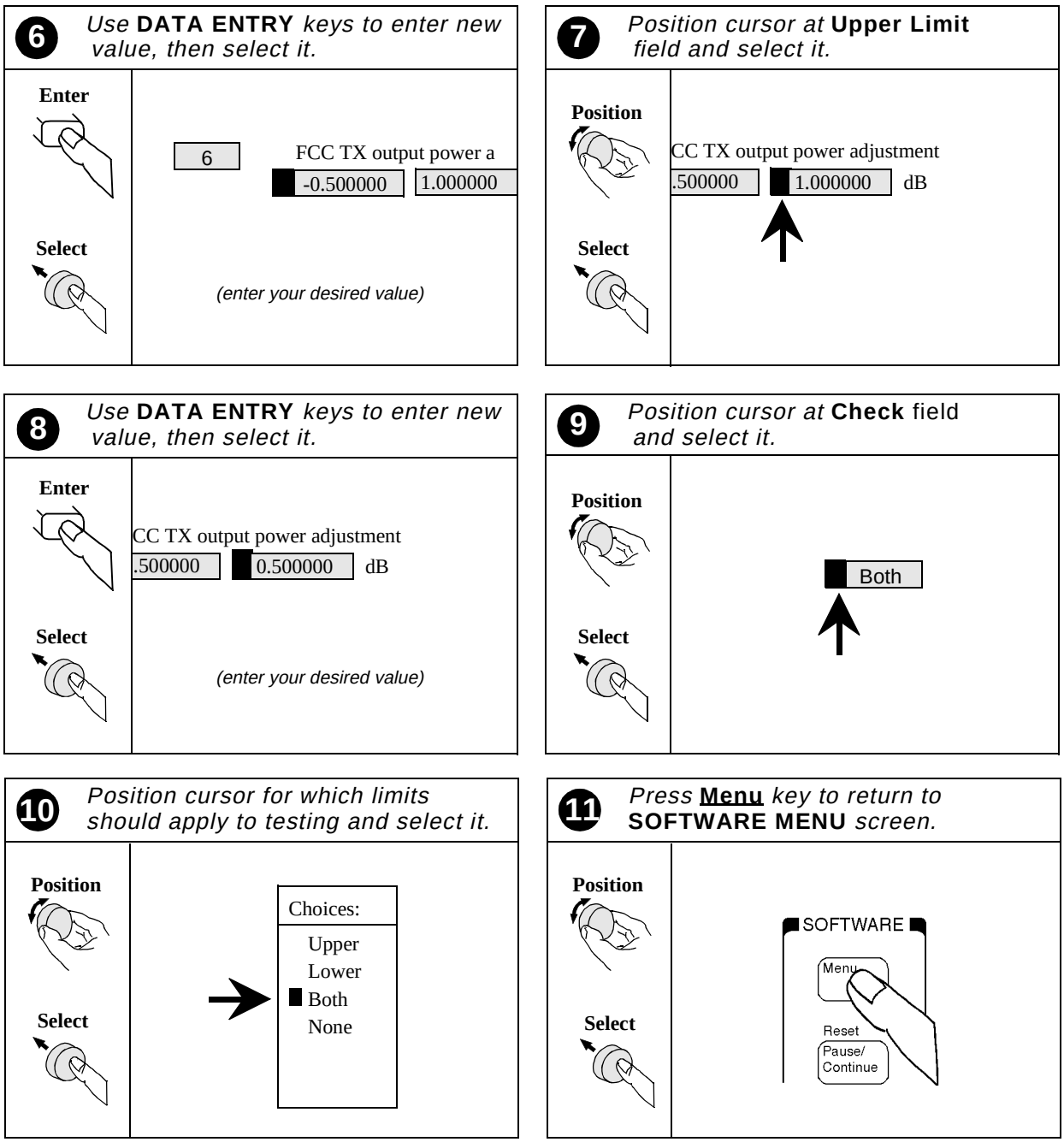


Figure 23 **Changing Pass/Fail Limits Specifications (continued)**

Changing Test Parameters

Changing test parameters is accomplished from the TESTS (Test Parameters) screen (see **figure 24**).

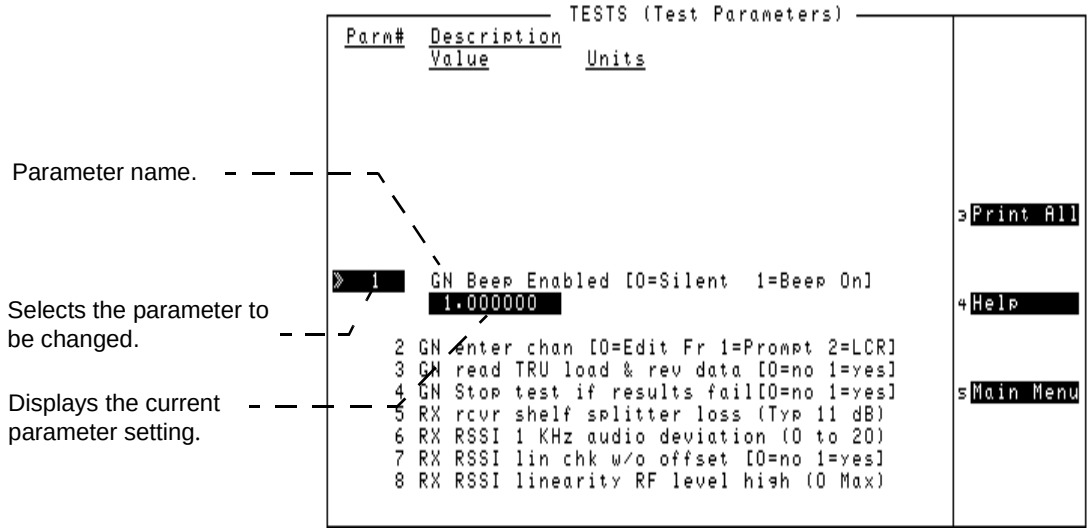
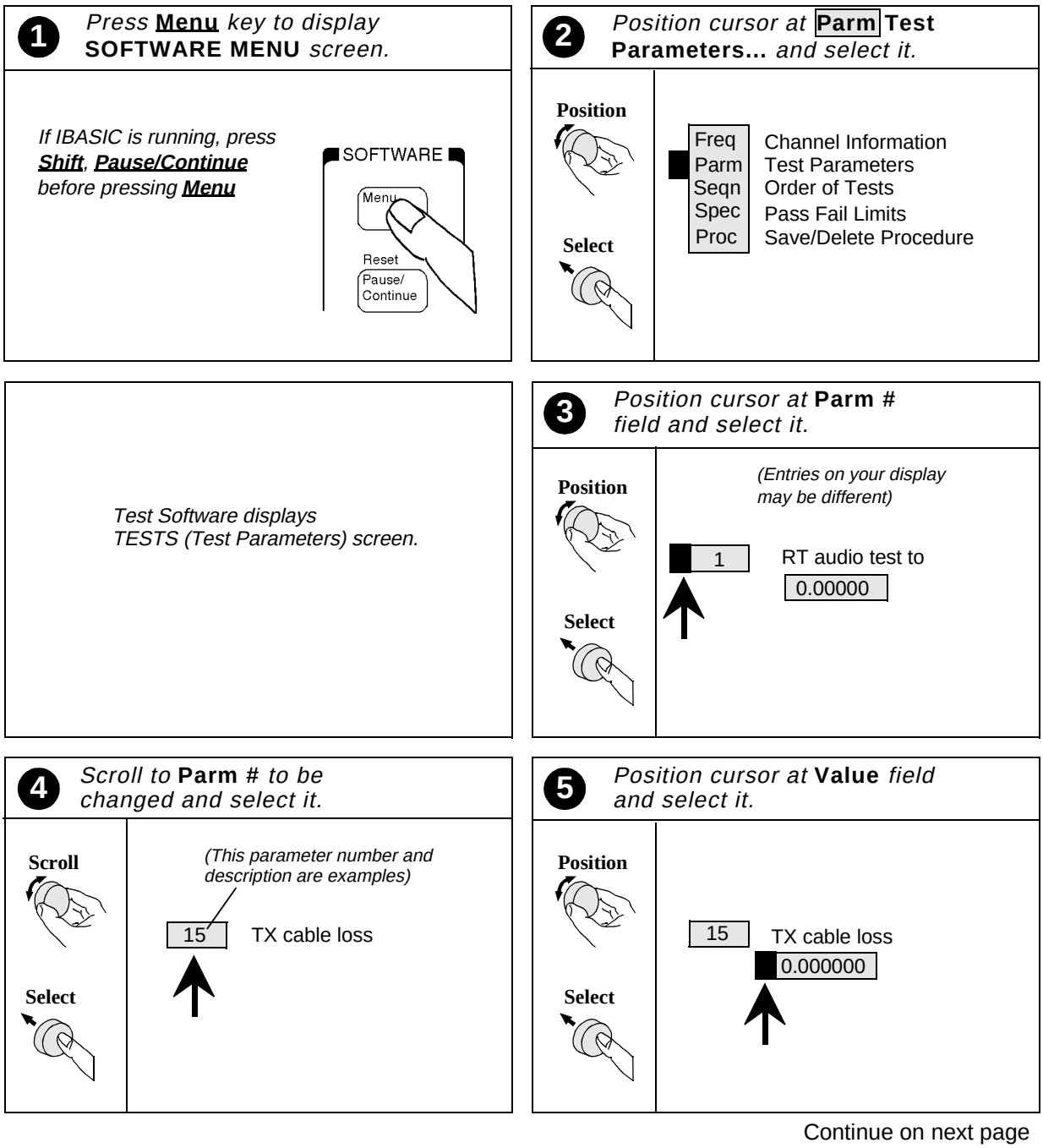


Figure 24 **TESTS (Test Parameters) Screen**

The Software uses parameters to optimize the test environment and conditions for the testing application. The default test parameters were determined by examining test requirements and specifications from the equipment manufacturer. The Test Software comes with default settings for all test parameters.

The procedure shown in **figure 25** and **figure 26** describes the process for changing test parameters through the TESTS (Test Parameters) screen to optimize your testing conditions. For information on saving customized test parameters, see **"Saving/Deleting Procedures to/from a Card" on page 71**.



Continue on next page

Figure 25 **Changing Test Parameters**

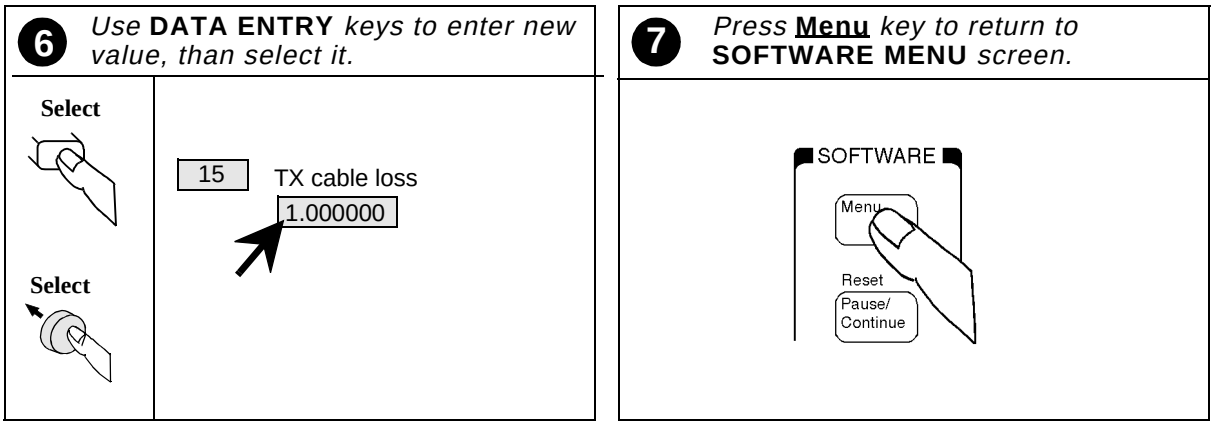


Figure 26 Changing Test Parameters (continued)

Saving/Deleting Procedures to/from a Card

Saving procedures to an SRAM card and deleting procedures from a card are accomplished from the TESTS (Save/Delete Procedure) screen (see **figure 27**).

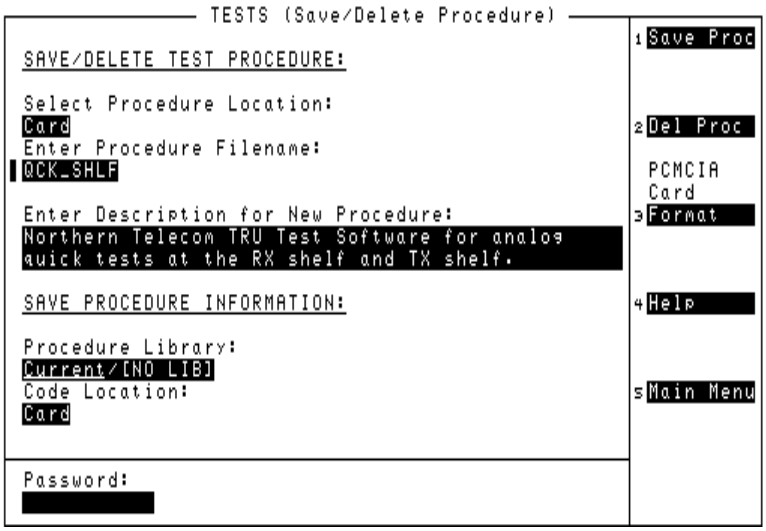


Figure 27 **TESTS (Save/Delete Procedure) Screen**

A test procedure is a collection of channel information, test parameters, testing order, and pass/fail limits saved in a file. This file might be one of the default procedures that is supplied on the Test Software PC card, or it might be an application specific procedure that customizes the Test Software to a specific application. Ordinarily, custom procedures are saved on an SRAM card.

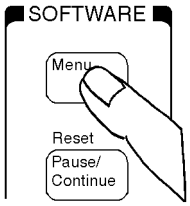
When you save a custom procedure, it consists of channel information, test parameters, pass/fail limits, and testing order, plus a library that contains the names of all test parameters, pass/fail limits, and tests that are resident in the Test Software. The library file comes from the Test Software and cannot be modified. The library file is saved automatically on the SRAM card that is used to store the new test procedure.

The procedure shown in **figure 28**, **figure 29**, and **figure 30** describes the process for saving or deleting a procedure through the TESTS (Save/Delete Procedure) screen.

Delete a procedure using the same process, except for step 13. To delete a procedure, select the **`Del Proc`** field or press the k2 (**`Del Proc`**) key.

1 *Press* **Menu** *key to display* **SOFTWARE MENU** *screen.*

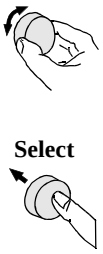
If IBASIC is running, press ***Shift***, ***Pause/Continue*** *before pressing* ***Menu*****.**



2 *Position cursor at* **Proc** **Save/Delete Procedure** *and select it.*

Position

Select



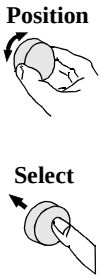
Freq	Channel Information
Parm	Test Parameters
Seqn	Order of Tests
Spec	Pass Fall Limits
Proc	Save/Delete Procedure

Test Software displays TESTS (Save/Delete Procedure) screen.

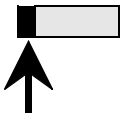
3 *Position cursor at* **Select Procedure Location:** *and select it.*

Position

Select

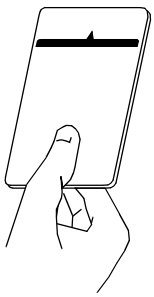


Select Procedure Location:



4 *Insert initialized SRAM* ***card.***

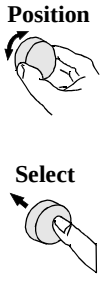
To initialize an SRAM card, press the **k3** (**Format**) key and follow the prompts on the TESTS (Save/Delete Procedure) screen.



5 *Position cursor at* **Card** *and select it.*

Position

Select

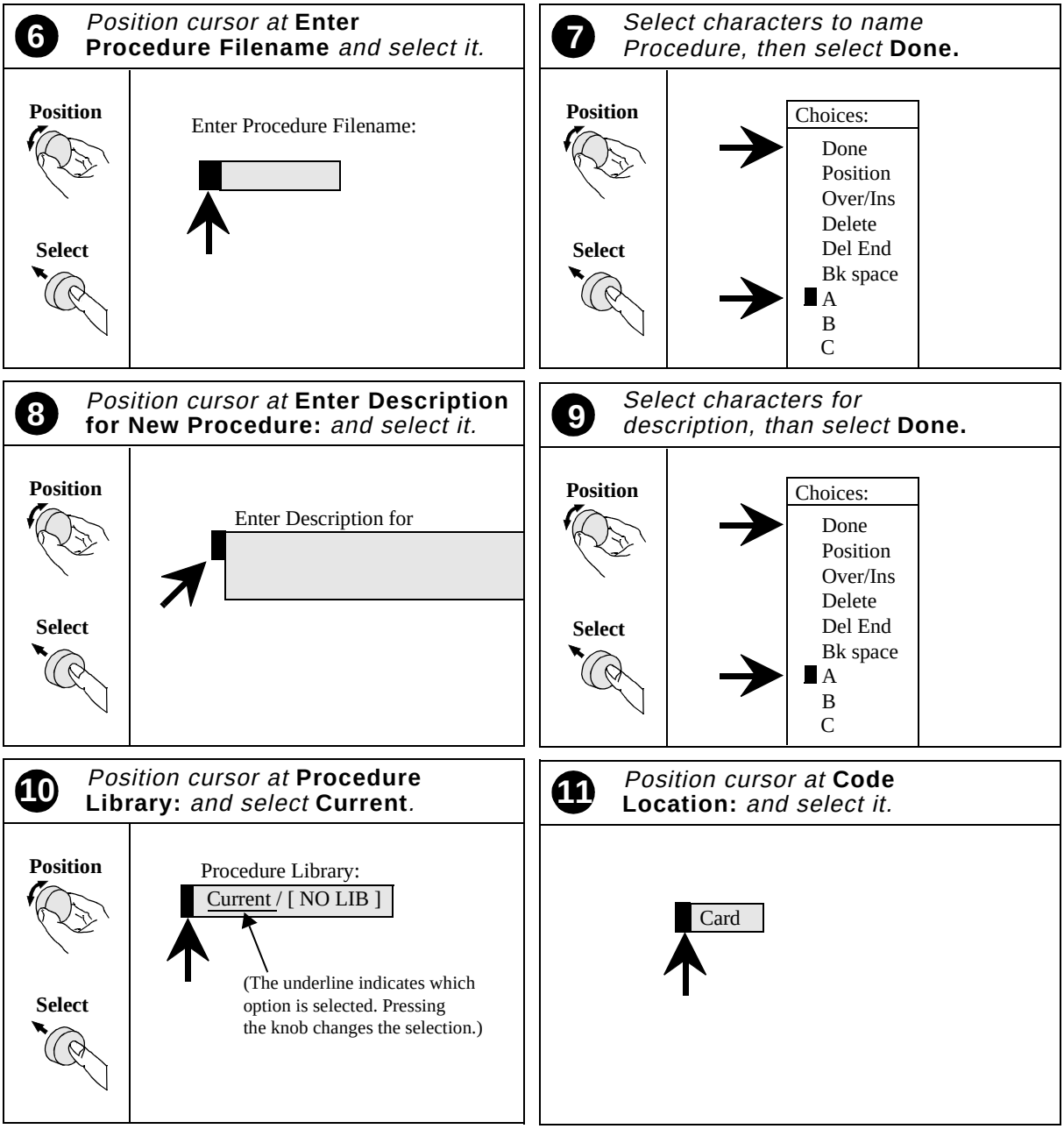


Choices:
- Card
- RAM

(You may also save procedures to an internal RAM disk).

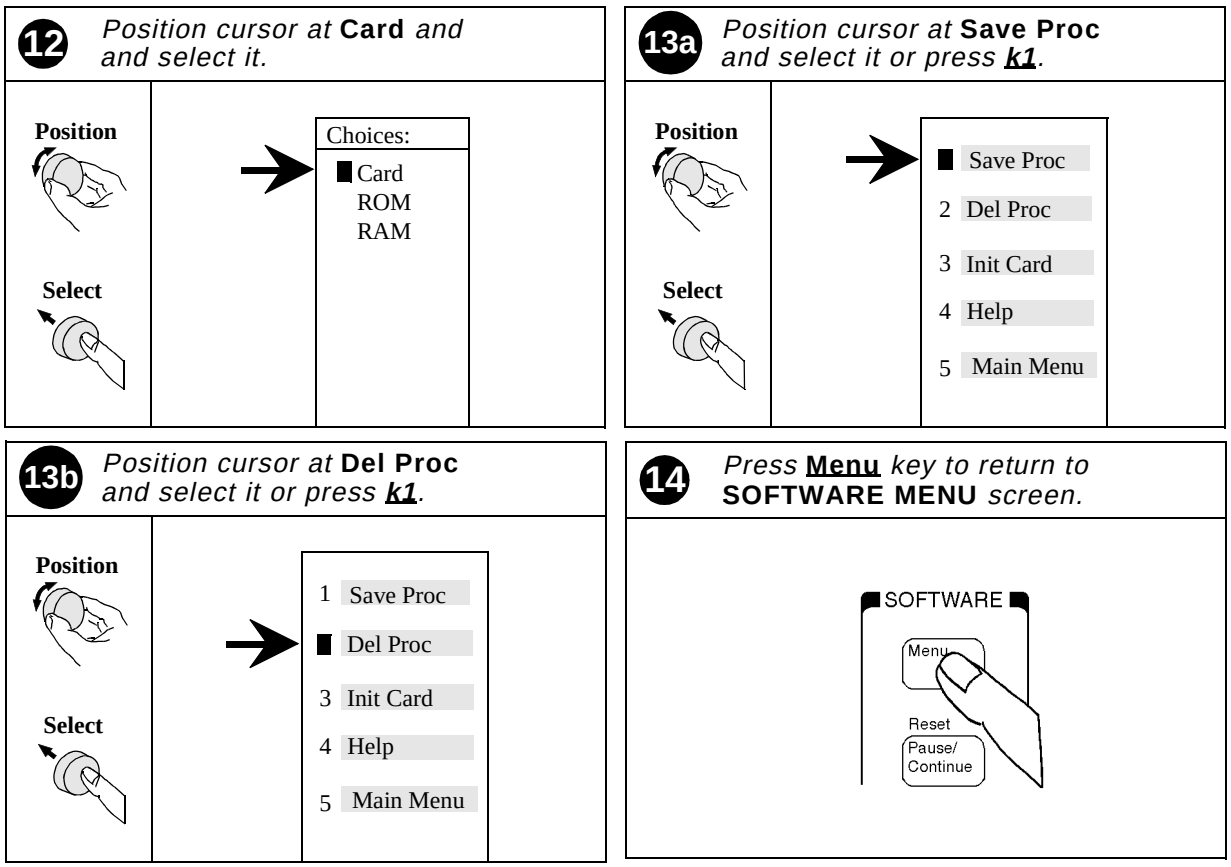
Continue on next page

Figure 28 Saving or Deleting a Procedure



Continue on next page

Figure 29 **Saving or Deleting a Procedure (continued)**



15 *Run saved procedure as follows:*

1) Insert the SRAM Card with your saved procedure.

2) On the SOFTWARE MENU screen, a) select Select Procedure Location: then select Card, b) select Select Procedure Filename:, then select your saved file name.
3) Remove the SRAM Card, then insert the original Test Software PC card.
4) Press Run Test.

The original card contains the full program required to run your procedure.

Figure 30 Saving or Deleting a Procedure (continued)

Saving/Deleting Procedures to/from Internal RAM

Saving procedures to Test Set's internal RAM and deleting procedures from internal RAM are accomplished from the TESTS (Save/Delete Procedure) screen (see **figure 27 on page 71** much as shown in **figure 28**, **figure 29**, and **figure 30**, except for the following:

1. In **figure 28**, step 4, initialize the RAM disk as outlined in **"Initializing a RAM Disk" on page 97**.
2. In **figure 28**, step 5, select **RAM** instead of **Card**.
3. In **figure 30**, step 15, sub-step 1 is not applicable.
4. In step 15, sub-step 2, select **RAM** instead of **Card**.
5. In step 15, sub-step 3, if the Test Software PC card is not inserted in the Test Set's front panel card slot, do so.

Handling Test Results

It is often desirable to record test results for future reference or evaluation. The Test Software provides the capability to save test results to a variety of destination devices. These are:

- A PC
- An SRAM card
- A serial printer
- A parallel printer
- An HP-IB printer

The capability to save test results remains on until you turn it off.

The following printers are supported by the Test Software:

- HP ThinkJet printer
- HP QuietJet printer
- HP PaintJet printer
- HP LaserJet printer
- HP DeskJet printer
- Epson FX-80
- Epson LQ-850

Sending Test Results to a PC Using the BTS Laptop Utility

Test results can be supplied directly to a PC through the Test Set's SERIAL 9 port (see **figure 31 on page 77**) using a laptop computer running the HP BTS Laptop Utility.

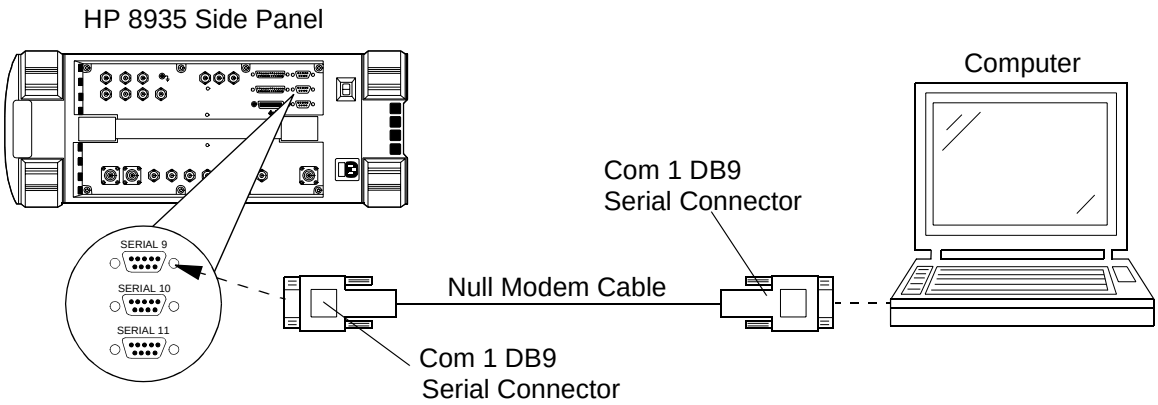


Figure 31 **Test Set to PC Serial Connection**

The requirements to save test results to a PC are as follows:

- The Test Set's SERIAL 9 port must be connected to the PC using a null modem cable.
- The configured BTS Laptop Utility must be running on the PC.
- The **`Use BTS Laptop Utility`** field in the Test Results/Laptop Util/Printer/ Serial Setup menu must be set to **`Yes`**.
- The Test Set's SERIAL 9 port communications parameters must be configured to match the communications parameters of the PC.

Configuring the PC Terminal Program.

Sending test results to a PC requires starting the BTS Laptop Utility on the PC, then setting the Test Software to use the utility.

Perform the setup as follows:

1. From the PC, start the BTS Laptop Utility program (see **figure 32**).

Figure 32 **Starting the BTS Laptop Utility Program**

2. On the PC screen, click on the **TR** button to display the window in which the test results will be displayed (see **figure 33**).

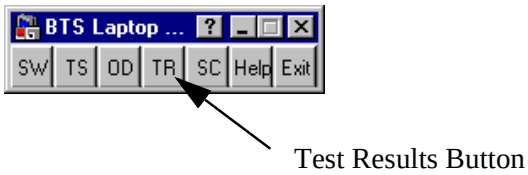


Figure 33 **Selecting the Test Results Window**

NOTE: The Test Software does not use communications with the Switch for testing purposes. Thus, you might find it advantageous to turn off the SW button in the BTS Laptop Utility tool bar. To do this, select the File Properties window in the BTS Utility, then add **-NoSwitch** at the end of the Shortcut Tab in the Target field.

3. On the PC screen, click on the **Preferences** field, then click on the **Comm Parameters** field to display the Comm Port Setup screen (see **figure 34**).

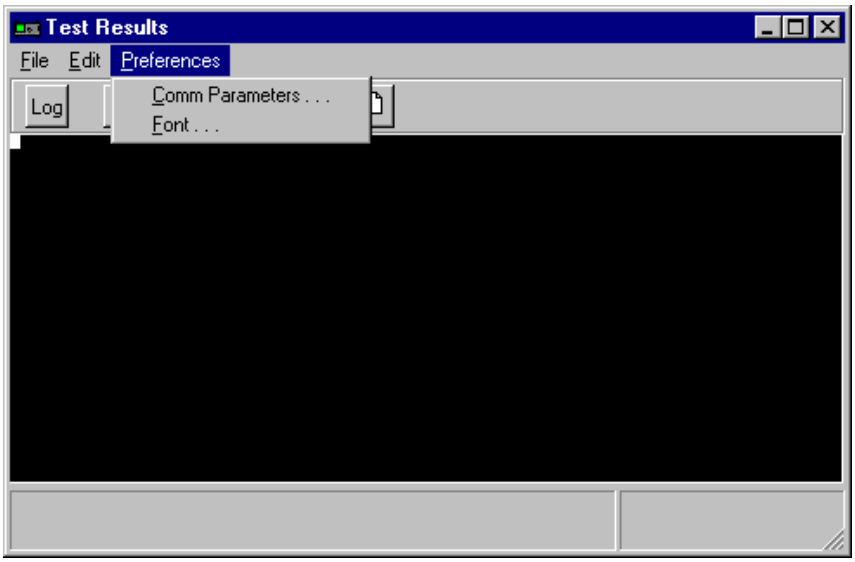


Figure 34 **Comm Port Setup Screen**

4. On the Comm Port Screen, set the Test Set's port to the serial port to which the null modem cable is connected on the Test Set (SERIAL 9).
5. On the Comm Port Setup screen, set the Test Set's baud rate to match the baud rate of the PC.

NOTE: If the rate is higher than 19200 baud, the Test Set's SERIAL 9 port flow control must be set to **Hardware**.

6. On the Comm Port Setup screen, set the Switch Port to **No Port**.

NOTE: The Test Software does not use communications with the Switch for testing. If you have already set the Shortcut Tab as shown in the note in step 2, step 6 will not be required. The **No Port** selection will not appear.

7. On the Comm Port screen, click on the **OK** button.

Sending the Results

To send test results to a PC, you must enable sending test results within the software. Do this as follows:

1. Connect the PC to the Test Set's SERIAL 9 port using a null modem cable.
2. On the Test Set, press the Menu key. The Test Set will display the SOFTWARE MENU screen.
3. On the Test Set, press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
4. On the Test Set, select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
5. On the Test Set, select the **`BTS Laptop Utility`** field so that the choice field toggles to **`Yes`**.

NOTE: If the Test Software does not change the field to **`Yes`**, see the BTS Laptop Utility help tool for hardware flow control. Also, make certain that you have completed all steps of this procedure correctly.

6. On the PC, start the BTS Laptop Utility program.
7. On the Test Set, select the **`Serial 9 Port Settings`** field. Verify that the communications parameters match those of the BTS Laptop Utility program.

The Test Set will send test results to the PC using the BTS Laptop Utility until you set the **`Use BTS Laptop Utility`** field to **`No`** in the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.

Sending Test Results to a PC

Test results can be supplied directly to a PC (with a communications program) through the Test Set's SERIAL 9 port (see **figure 35**). A variety of devices may be used to receive the data. An HP Palmtop computer, PC, laptop, or terminal may be used. A terminal emulator may be used to write the test results directly to a file. Examples of terminal emulator programs are Microsoft Windows Terminal and ProComm (a product of DataStorm Technologies, Inc.).

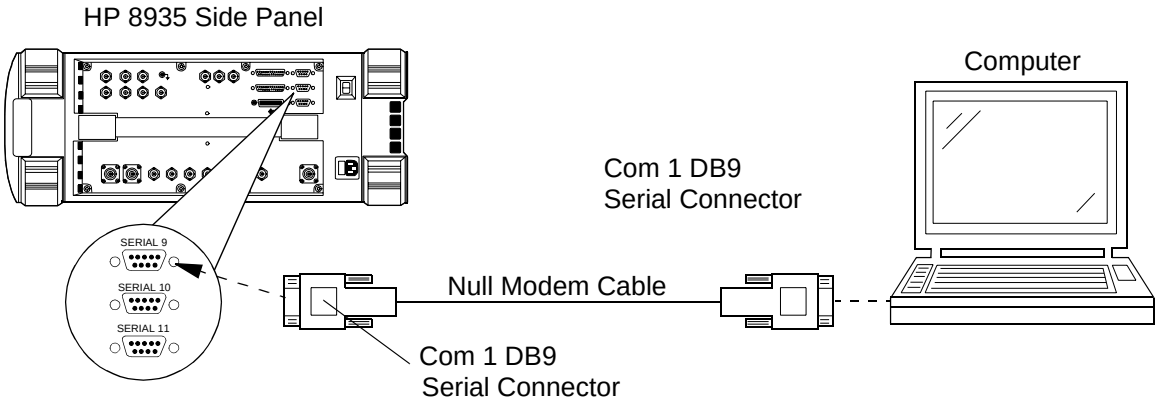


Figure 35 **Test Set to PC Serial Connection**

The requirements to save test results to a PC are as follows:

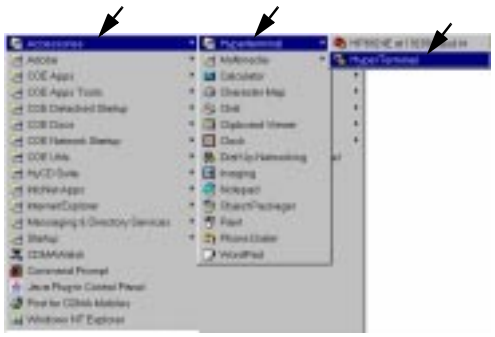
- The Test Set's SERIAL 9 port must be connected to the PC.
- A configured terminal program must be running on the PC.
- The Send Test Results to Serial 9 function must be activated in the Software.
- The Test Set's SERIAL 9 port communications parameters must be configured to match the communications parameters of the PC.

Configuring the PC Terminal Program

Sending test results to a PC requires that a configured terminal emulator be running while sending test results is enabled. See **figure 36** and **figure 37** for the detailed procedures required to configure a terminal program for saving test results to a PC.

1 *From* **Start** *on your PC, select* **Programs**

2 *From* **Programs** *select,* **Accessories**, **Hyperterminal**, **Hyperterminal**.



3 *In the* **Connection Description** *menu, enter a* **Name** *in the name field.*

4 *Select an icon, then press* **OK**

5 *In the* **Connect To** *menu, select* **COM1** *or* **COM2**, *then select* **OK**.

6 *When the* **Properties** *menu opens, enter your port settings and select* **OK**.

Default Settings:
Baud: 9600
Data bits: 8
Parity: None
Stop bits: 1
Flow Control:
Xon/Xoff

Continue on next page

Figure 36 **Configuring a Terminal Program for Sending Test Results to a PC**

7 *After port settings are entered, select* **File** *then* **Properties**.

8 *From the* **Properties** *menu, select the* **Settings'** tab**.**

9 *On the* **Settings** *menu, enter* **VT 100** *in the* **Emulation** *field, then select* **OK**.

10 *On the* **ASCII Setup** *menu, check* **Echo typed chara....**, *then select* **OK**.

11 *Select OK to close the* **Properties** *menu, then save the file for future use.*

After configuring the personal computer to receive the measured data, you must turn on data collection in the Test Set and verify that the Serial Port 9 Settings match those of the Windows terminal.

Figure 37 **Configuring a Terminal Program for Sending Test Results to a PC (continued)**

Sending the Results

To send test results to a PC, you must enable sending test results within the software. Do this as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**Run Test**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **Test Results/Laptop Util/Printer/Serial Setup** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Verify that the **Use BTS Laptop Utility** field is toggled to **No**.
5. Select the **Send Test Results to** field, then select **Serial 9** from the **Choices:** list.
6. Start the terminal program.
7. Select the **Serial 9 Port Settings** field. Verify that the communications parameters match those of the terminal program.

NOTE: When you have configured the Test Set to send the data to a PC, you must remember to activate the communication package and specify a file in which to save the data. The Test Set will not issue an error message if the PC communications application is not running or configured properly.

The Test Set will send test results to the PC until you turn off the **Send Test Results to** field in the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.

Sending Test Results to an SRAM Card

To send test results to an SRAM card, you must enable the Sending Test Results to a PC Card function within the software. The Test Set will create test result files on the SRAM card automatically, based on the name that you enter at the start of testing. The Test Software will append ".txt" to your file name so that the files will be recognized on the SRAM card.

NOTE: Do not remove the card or stop the test during testing operations while sending test results to an SRAM card. If you do so, the files will not be closed properly and the test results will be lost.

Once testing is complete and the test results are in files on the SRAM card, perform the procedure outlined in **"Retrieving Data from an SRAM Card" on page 86** to transfer the data to a PC or printer.

NOTE: Before attempting to send test results to an SRAM card, verify that the card is not write-protected. The write-protect switch should not be set toward the edge of the card.

Send test results to an SRAM card as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Insert an SRAM card into the front panel card slot. If the card is uninitialized, see **"Initializing a PC Card" on page 98**.
5. Select the **`Send Test Results to`** field, then select **`PC Card`** from the **`Choices:`** list. The Test Set will display a message asking for a file name under which to store the test results.
6. Enter a name using the characters from the **`Choices:`** list. Select **`Done`** when finished.

The Test Set will send test results to the SRAM card until you turn off the **`Send Results to`** field in the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.

When the test is completed, the Test Set will close the file on the SRAM card and will change the Send Test Results to field in the Test Results/Laptop Util/Printer/ Serial Setup menu screen from PC Card to Off. Thus, each time you run the test and wish to record the results to the SRAM card, you must open the Test Results/ Laptop Util/Printer/Serial Setup menu and enter a new file name as outlined above.

Retrieving Data from an SRAM Card

Use the software utility (FILE_XFER), which is included in the Test Set to transfer data files from the memory card to a serial printer, an HP-IB printer, or a PC.

NOTE: Loading and running the utility to perform these procedures will replace any software and procedures in the Test Set's internal RAM. Thus, the Test Software must be reloaded when this procedure is complete. This requires that you have the Test Software PC card with you on-site.

Transferring Data to a Printer Via the SERIAL 9 Port or the HP-IB Port

Transfer data to a printer via the SERIAL 9 port or HP-IB port as follows:

1. If the Test Software is running, exit it from the Configuration Menu screen by pressing the Shift and Pause/Continue (Reset) keys, then the k5 (**`Main Menu`**) key.
2. Make certain that the printer is turned on and set up to print when the data is sent to the Test Set's SERIAL 9 port or HP-IB port.
3. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
4. Select the **`Select Procedure Location:`** field. The Test Set will display a **`Choices:`** list containing the following items: **`Card`**, **`ROM`**, and **`RAM`**.
5. Select **`ROM`**. This allows the loading of various utility programs resident in the Test Set.

NOTE: In the following step, the items in the **`Choices:`** list are as shown on the printing date of this manual. However, this list could change in later versions of the Test Software.

6. Select the **`Select Procedure Filename:`** field. The Test Set will display a **`Choices:`** list containing the following items: **`SERVICE4`**, **`RFTOOLS`**, **`IB_UTIL`**, **`LISTOPTS`**, **`ST_PLT`**, and **`DEMO`**.
7. Select **`IB_UTIL`**.
8. Press the k1 (**`Run Test`**) key to run the utility software. The Test Set will display a the IB_UTIL menu on the TESTS (IBASIC Controller) screen.
9. Select the **`FILE_XFER`** field. The Test Set will prompt you to insert the SRAM card that contains the test result files.
10. Insert the card and select the **`Continue`** field. The Test Set will display the file transfer menu.
11. If using a serial printer, select the **`Output Port`** field and press the knob to select **`Serial Port, 9600 baud`**. This configures the Test Set to send the data via the SERIAL 9 port at 9600 baud.

    If using an HP_IB printer, select the **`Output Port`** field and press the knob to select **`HPIB, Addr 7xx`**. This configures the Test Set to send the data via the HP_IB port.
12. Scroll down the list of file names to the file that you wish to transfer and select it. An asterisk (*) will appear next to the name. You may send more than one file at a time. Scroll to and select any other files that you wish to transfer.

NOTE: All files on the SRAM card are displayed, not just the test result files. If you attempt to transfer files that are not test result data, unexpected results at the printer might occur. Also, transferring code files can result in many pages of code being printed. Look for files with ".txt" appended to the name, which indicates test result files.

13. When all files to be transferred have been selected, select the **`Start Transfer`** field. The data will be sent to the printer via the SERIAL 9 or HP-IB port.
14. When printing is complete, you may select other files to transfer or exit the software utility by selecting the **`Exit Data-Collection-File-Transfer`** field.
15. To return to the Test Software again, press the k1 (**`Run Test`**) key from the SOFTWARE MENU screen.

Transferring Data to a PC Via the SERIAL 9 Port

Transfer data to a PC via the SERIAL 9 port as follows:

1. If the Test Software is running, exit it from the Configuration Menu screen by pressing the Shift and Pause/Continue (Reset) keys, then the k5 (**Main Menu**) key.
2. Connect the Test Set to your PC using the SERIAL 9 port and a null modem cable.
3. Load a PC software utility for communicating on the PC's serial port such as Microsoft Windows Terminal.
4. Configure the PC software to prepare the PC to receive a text file via the serial port.
5. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
6. Select the **Select Procedure Location:** field. The Test Set will display a **Choices:** list containing the following items: **Card**, **ROM**, and **RAM**.
7. Select **ROM**. This allows the loading of various utility programs resident in the Test Set.
8. Select the **Select Procedure Filename:** field. The Test Set will display a **Choices:** list containing the following items: **SERVICE4**, **RFTOOLS**, **IB_UTIL**, **LISTOPTS**, **ST_PLT**, and **DEMO**.
9. Select **IB_UTIL**.
10. Press the k1 (**Run Test**) key to run the utility software. The Test Set will display a the IB_UTIL menu on the TESTS (IBASIC Controller) screen.
11. Select the **FILE_XFER** field. The Test Set will display a prompt to insert the SRAM card that contains the test result files.
12. Insert the card and select the **Continue** field. The Test Set will display the file transfer menu.
13. Select the **Output Port** field and press the knob to select **Serial Port, 9600 baud**. This configures the Test Set to send the data via the SERIAL 9 port at 9600 baud.

14. Scroll down the list of file names to the file that you wish to transfer and select it. An asterisk (*) will appear next to the name. You may send more than one file at a time. Scroll to and select any other files that you wish to transfer.

NOTE: All files on the SRAM card are displayed, not just the test result files. If you attempt to transfer files that are not test result data, unexpected results at the printer might occur. Also, transferring code files can result in many pages of code being printed. Look for files with ".txt" appended to the name, which indicates test result files.

15. When all files to be transferred have been selected, select the **`Start Transfer`** field. The data will be sent to the PC via the serial port.

16. When data transfer is complete, you may select other files to transfer or exit the software utility by selecting the **`Exit Data-Collection-File-Transfer`** field.

17. To return to the Test Software again, press the k1 (**`Run Test`**) key from the SOFTWARE MENU screen.

Stop Sending Test Results to a PC or an SRAM Card

Stop sending test results to a PC or SRAM card as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Select the **`Send Test Results to`** field, then select **`Off`** from the **`Choices:`** list.

Sending Test Results to a Serial Printer

Test results may be sent directly to a printer through the Test Set's SERIAL 9 port. To do so, you must enable sending test results to the printer within the software.

Send test results to a serial printer as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Select the **`Send Test Results to Printer at`** field, then select **`Serial 9`** from the **`Choices:`** list.
5. Connect the serial printer to the Test Set's SERIAL 9 port (see **figure 38**).

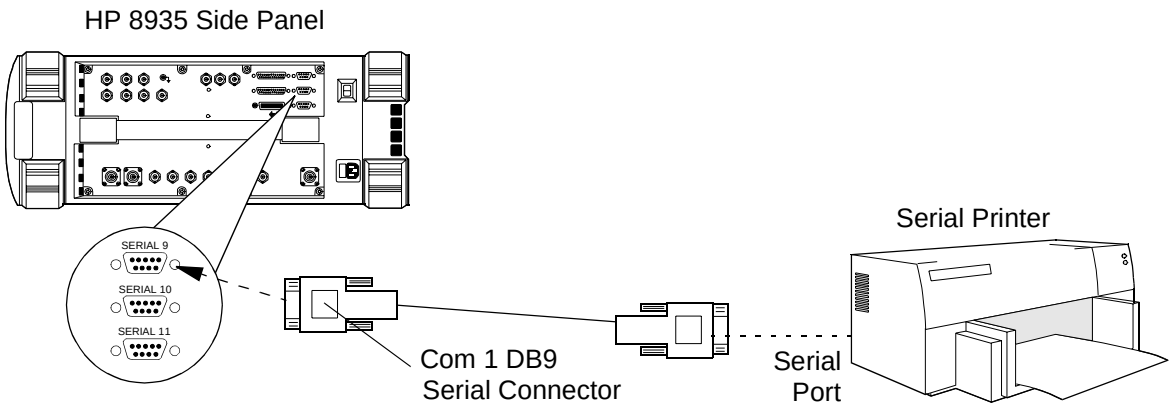


Figure 38 **Test Set to Serial Printer Connection**

6. Select the **`Print Setup`** field. The Test Software will display the Print Setup menu on the TESTS (IBASIC Controller) screen.

7. Set the following parameters:
   - Lines/Page
   - Form Feed (Start and End)
   - Printer Model

The Test Set will send test results to the serial printer connected to the SERIAL 9 port until you turn off the **`Send Test Results to Printer at`** field in the Test Results/Laptop Util/Printer/Serial Setup menu of the TESTS (IBASIC Controller) screen.

Sending Test Results to a Parallel Printer

Test results may be sent to a parallel printer through the Test Set's PARALLEL 15 port. To do so, you must enable sending test results to the printer within the software.

Send test results to a parallel printer as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Select the **`Send Test Results to Printer at`** field, then select **`Parallel 15`** from the **`Choices:`** list.
5. Connect the parallel printer to the Test Set's PARALLEL 15 port (see **figure 39**).

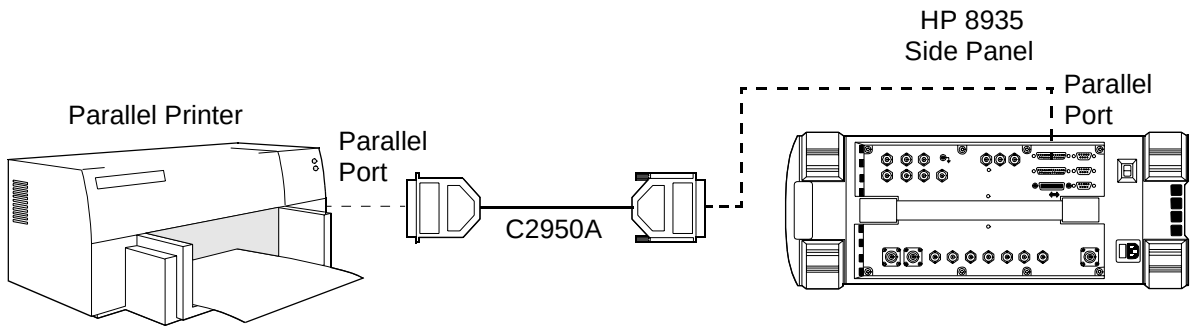


Figure 39 **Test Set to Parallel Printer Connection**

6. Select the **`Print Setup`** field. The Test Software will display the Print Setup menu on the TESTS (IBASIC Controller) screen.
7. Set the following parameters:
   - Lines/Page
   - Form Feed (Start and End)
   - Printer Model

The Test Set will send test results to the parallel printer connected to the PARALLEL 15 port until you turn off the **`Send Test Results to Printer at`** field in the Test Results/Laptop Util/Printer/Serial Setup menu of the TESTS (IBASIC Controller) screen.

Sending Test Results to an HP-IB Printer

Test results may be sent to an HP-IB printer through the Test Set's HP-IB port. To do so, you must enable sending test results to the printer within the software.

Send test results to an HP-IB printer as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Select the **`Send Test Results to Printer at`** field, then select **`HP-IB 701`** from the **`Choices:`** list. Edit the three-digit HP-IB address (the default is 701) in the address field at the right of **`HP-IB`**.
5. Connect your HP-IB printer to the Test Set's HP-IB port (see **figure 40**).

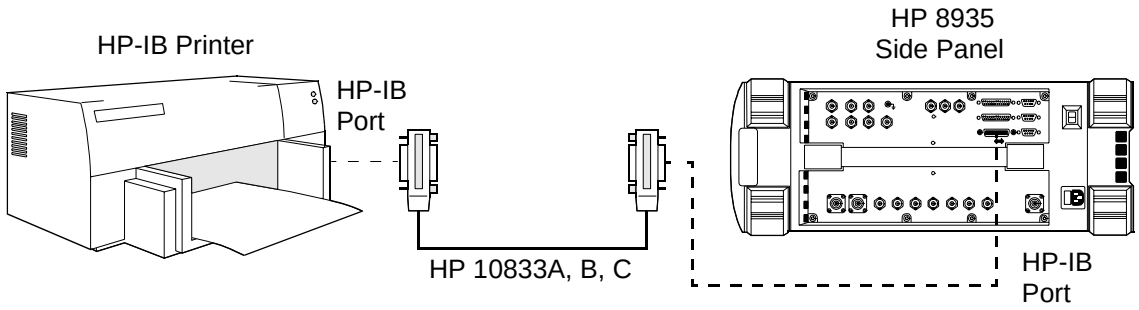


Figure 40 **Test Set to an HP-IB Printer Connection**

6. Select the **`Print Setup`** field. The Test Software will display the Print Setup menu on the TESTS (IBASIC Controller) screen.

7. Set the following parameters:
   - Lines/Page
   - Form Feed (Start and End)
   - Printer Model

The Test Set will send test results to the HP-IB printer connected to the HP-IB port until you turn off the **`Send Test Results to Printer at`** field in the Test Results/Laptop Util/Printer/Serial Setup menu of the TESTS (IBASIC Controller) screen.

Stop Sending Test Results to a Printer

Stop sending test results to a printer as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Press the k1 (**`Run Test`**) key to start the Test Software. The Test Software will display the Configuration Menu screen.
3. Select the **`Test Results/Laptop Util/Printer/Serial Setup`** field. The Test Software will display the Test Results/Laptop Util/Printer/Serial Setup menu on the TESTS (IBASIC Controller) screen.
4. Select the **`Send Test Results to Printer at`** field, then select **`Off`** from the **`Choices:`** list.

Initializing a RAM Disk

RAM disk is a section of Test Set's internal memory that acts much like a flexible disk. Programs in this area of memory may be stored, re-stored, erased, and retrieved.

The RAM disk is partitioned into four separate volumes; 0-3. Each volume is treated as a separate 'disk'. You may also specify the size of each disk in 256-byte increments.

The four RAM disk volumes are designated :MEMORY,0,0 to :MEMORY,0,3. For example, to catalogue the contents of RAM disk volume '0' from the TESTS (IBASIC Controller) screen, enter the following:

```
CAT ":MEMORY,0,0"
```

NOTE: Any existing programs or formatting on RAM is erased if you use the RAM_MANAGER program to initialize a RAM disk. Therefore, you should use RAM disks only for short-term storage of files.

Each RAM disk volume must be initialized before it can be used. Volume 0 can be initialized using the RAM_MANAGER program from the IB_UTIL menu. Volumes 1, 2, and 3 must be initialized from the TESTS (IBASIC Controller) screen.

NOTE: Use only Volume 0 for storing procedures.

The optional 'volume size' in the following procedure allows you specify the memory area to be set aside for each disk in 256 byte blocks.

Initialize volumes 1, 2, or 3 as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Select the **`IBASIC IBASIC Cntrl`** field from the **`SET UP TEST SET:`** list.
3. Position the cursor to the data entry field at the top of the screen and select it.
4. From the list of characters in the **`Choices:`** list, enter the following command:

   ```
   INITIALIZE ":MEMORY,0,<volume number 1-3>",<volume size>
      or
   INITIALIZE ":MEMORY,0,1",50
   ```

   Select **`Done`** when finished.
5. Press the k1 (**`Run`**) key.

Initializing a PC Card

A new PC card or a card from which the battery has been removed and replaced must be initialized before it may be used. This section provides information on the initialization procedure.

Initialize a card as follows:

1. Insert the card into the Test Set's card slot.
2. Press the Shift key then the Inst Config (I/O Config) key. The Test Software will display the I/O CONFIGURE screen.
3. Select the **`Format Card`** field. The Test Software will display the message: **`Erase and format the PCMCIA Card? (YES/NO)`**.
4. If you wish to format the card, press the DATA ENTRY Yes On/Off key. The Test Set will format the card. Formatting is complete when the cursor stops blinking.

   If you do not wish to format the card, press the DATA ENTRY No ppm W key.

Operating the Test Set

This section provides information that will help you to operate the Test Set easily and efficiently. It includes a basic overview of the functions of groups of the more commonly used functions. It does not include detailed operation information on those functions. For detailed information on the operation of the display and the various keys and other controls, see the *HP 8935 Series E6380A CDMA Base Station Test Set Reference Guide*, as appropriate.

NOTE: Some Test Set's keys include a second title printed in blue above the key. This indicates a *shift* function. Press the blue Shift key, then the subject key to activate the title function. For instance, the title "Reset" appears above the Pause/Continue key. To reset the Test Software, press the Shift key, then the Pause/Continue (Reset) key.

Screens

The various operation screens of the Test Software are accessible through several methods, as described in the following paragraphs.

Access the screens to modify test procedures from the **`CUSTOMIZE TEST PROCEDURE:`** list in the lower section of the SOFTWARE MENU screen. These screens are:

- TESTS (Channel Information) – Access this screen to verify or change the information in the frequency table. (The frequency table is not used in this application. Therefore, this screen is not used in this application.)
- TESTS (Test Parameters) – Access this screen to verify or change the values of parameters used in the TESTs.
- TESTS (Order of Tests) – Access this screen to verify or change the TESTs complement or order in which TESTs will be performed. (Tests are performed individually in this application. Therefore, this screen is not used in this application.)
- TESTS (Pass/Fail Limits) – Access this screen to verify or change the values of pass/fail limits used in the TESTs.
- TESTS (Save/Delete Procedure) – Access this screen to save procedures to the Test Set's internal RAM or an SRAM card, or delete procedures from those same locations.

NOTE: Four additional screens are ordinarily used to configure and set up the Test Set for operation from the **`SET UP TEST SET:`** list in the lower section of the SOFTWARE MENU screen. These screens are:

TESTS (Execution Conditions)
TESTS (External Devices)
TESTS (Printer Setup)
and
TESTS (IBASIC Controller)

These screens **are not used** in the Test Software. All relevant functions in these screens are set by other means, such as parameters, in the Test Software.

Access the Configuration Menu screen, from which all operations inside the Test Software are invoked, from the SOFTWARE MENU screen by selecting the **`Run Test`** field or pressing the k1 (**`Run Test`**) key. For detailed information on this screen, see **"Using the Configuration Menu Screen to Set up the Test Software" on page 28**.

NOTE: If you select the screen title bar at the top of the SOFTWARE MENU screen the Test Software will display a menu listing the ancillary operation screens. These screens are not used by the Test Software.

SOFTWARE Keys

The SOFTWARE keys (see **figure 41**), Menu and Pause/Continue (Reset), control the basic start/pause/stop functions of the Test Set and Test Software.

Press the Menu key to display the SOFTWARE MENU screen, which is the screen from which all Test Set operations start.

Press the Pause/Continue key to pause the Test Set's or Test Software's operation, then press it again to re-start the operation at the same place.

Press the Shift key, then the Pause/Continue (Reset) key to reset the Test Set or Test Software.

NOTE: The Test Software cannot be "continued" after the Shift and Pause/Continue (Reset) keys have been pressed. Press these keys only if the Test Software must be stopped and pressing the Pause/Continue key does not do so.

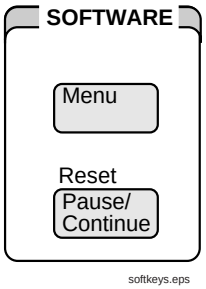


Figure 41 SOFTWARE Keys

USER Keys

The five USER keys, k1 through k5 (see **figure 42**), are programmable and control various functions according to current activities in the Test Software. The keys are listed along with the programmed functions in the right-hand section of appropriate screens. Only appropriate keys are shown in each screen instance. You may use these keys for more efficient operation instead of positioning the cursor to an item and pressing the knob.

NOTE: Each USER key includes a second title printed in blue above the key. This *shifted* function is part of the key programmability. However, currently, no USER key *shifted* functions are used in the Test Software.

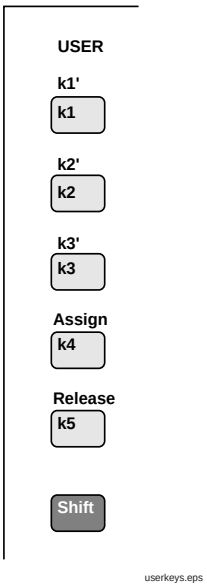


Figure 42 USER Keys

DATA ENTRY Keys

The DATA ENTRY keys include the 0 through 9 number keys plus the associated keys required for entering number values and the various characteristics of those values (see **figure 43**). (Note that a number of the DATA ENTRY keys are *shifted* keys.)

Although it is obviously not a key, the cursor control/entry knob is also located in the DATA ENTRY section of the Test Set's front panel for convenience. Turn the knob to position the cursor, then press the knob to select the item indicated by the cursor.

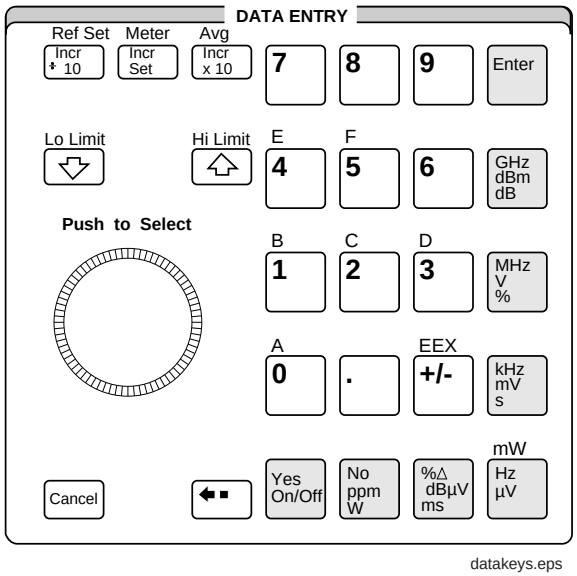


Figure 43 **DATA ENTRY Keys**

GENERATOR/ANALYZER Keys

The GENERATOR/ANALYZER keys invoke the various testing tools, and are not used by the Test Software.

NOTE: Make certain that you do not inadvertently press one of these keys while the Test Software is running. Unpredictable test results could occur.

STATE Keys

The STATE keys allow user control over certain Test Set operational states, and are not used by the Test Software.

NOTE: Make certain that you do not inadvertently press one of these keys while the Test Software is running. Unpredictable test results could occur.

UTILS Keys

The UTILS keys provide the means to reach certain functions that control utilitarian aspects of Test Set operation, and are not used by the Test Software.

NOTE: Make certain that you do not inadvertently press one of these keys while the Test Software is running. Unpredictable test results could occur.

Securing/Unsecuring Procedures

This section describes the processes for securing and un-securing a procedure.

NOTE: If a procedure is located in the Test Set's RAM, securing that procedure will result in initializing a section of the RAM. See **"Initializing a RAM Disk" on page 97**.

NOTE: Loading and running the utility to perform these procedures will replace any software and procedures in the Test Set's internal RAM. Thus, the Test Software must be reloaded when this procedure is complete. This requires that you have the Test Software PC card with you on-site.

Securing a Procedure

After you have set up your Test Software with a testing order, channel information, test parameters, and pass/fail limits, thereby creating a procedure, you may wish to secure it. This will prevent the viewing and changing of those functions. In this process, you may select the items that you wish to secure. Use the IBASIC SECURE_IT program in the Test Set's ROM to do this.

You might wish to secure the procedure that is supplied with the Test Software. It is shipped unsecured.

Secure a Procedure as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Select the **Select Procedure Location:** field. The Test Set will display a **Choices:** list.
3. Select **ROM**.
4. Select the **Select Procedure Filename:** field. The Test Set will display a **Choices:** list.
5. Select **IB_UTIL**.
6. Press the k1 (**Run Test**) key. The Test Set will display the IB_UTIL menu.
7. Select the **SECURE_IT** field. The Test Set will display a menu containing two possible locations (**Card** or **RAM**).
8. Select the location of the procedure that you wish to secure.

NOTE: RAM refers to the RAM disk memory within the Test Set. Before selecting RAM, you must initialize the RAM as a disk. See **"Initializing a RAM Disk" on page 97**.

9. Proceed with the on-line instructions. You might wish to secure only one of the items, such as pass/fail limits.
10. When prompted to enter the pass number (password), enter any sequence of 9 or less numerals using the DATA ENTRY keys. The numerals may be 0 through 9 in any order.

Unsecuring a Procedure

After you have secured a procedure, you may unsecure it. In this process, you may select the items that you wish to unsecure. Use the IBASIC SECURE_IT program in the Test Set's ROM to do this. To unsecure a procedure, you must know the pass number.

Unsecure a procedure as follows:

1. Press the Menu key. The Test Set will display the SOFTWARE MENU screen.
2. Select the **`Select Procedure Location:`** field. The Test Set will display a **`Choices:`** list.
3. Select **`ROM`**.
4. Select the **`Select Procedure Filename:`** field. The Test Set will display a **`Choices:`** list.
5. Select **`IB_UTIL`**.
6. Press the k1 (**`Run Test`**) key. The Test Set will display the IB_UTIL menu screen.
7. Select the **`SECURE_IT`** field. The Test Set will display a menu containing two possible locations (**`Card`** or **`RAM`**).
8. Select the location of the procedure that you wish to unsecure.
9. Enter the name of the procedure that you wish to unsecure.

NOTE: If the procedure includes any item that is secured, you will be prompted for the **`pass number`**.

10. Proceed with the on-line instructions. Select the items that you wish to unsecure.
11. When prompted, enter the pass number using the DATA ENTRY keys.

Utilities

The Test Software contains utilities that are useful to both general testing and advanced testing operations. These utilities are described in this section.

RF Tools

For information on using the RF Tools Utilities, see the *HP 8935 Series E6380A CDMA Base Station Test Set Reference Guide.*

5

Test, Parameter, and Pass/Fail Limit Descriptions

This chapter provides descriptions of each of the procedures, tests, test suites, parameters, and pass/fail limits contained in the Test Software.

Procedures Supplied

The Test Software is supplied on a PC card. Also on the same card are ten preprogrammed procedures. Each procedure selects a suite of TESTs, and includes the parameters and specifications (pass/fail limits) used in those TESTs. All of the parameters and pass/fail limits are set to default values.

You may customize a procedure and save it by another name for a particular application, or you may construct your own procedure, perhaps using one of those procedures as a model.

The following sections describe the procedures.

PROCEDURE 1 MET_1900

This procedure is used for installation of the Nortel Metro Cell 1900-MHz Base Station.

The procedure selects *Test Suite 8 – Nortel Metro Cell 1900 MHz Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 8.

This Test Suite contains two test groups for commissioning Base Stations: Baseline, and Fault Isolation. The Baseline group includes the standard TESTs required for Base Station installation. The Fault Isolation group includes TESTs that may be used for troubleshooting during Base Station installation.

In both Test Suites, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 2 MET_800

This procedure is used for installation of the Nortel Metro Cell 800-MHz Base Station.

The procedure selects *Test Suite 9 – Nortel Metro Cell 800 MHz Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 9.

This Test Suite contains two TEST groups for commissioning Base Stations: Baseline, and Fault Isolation. The Baseline group includes the standard TESTs required for Base Station installation. The Fault Isolation group includes TESTs that may be used for troubleshooting during Base Station installation.

In both Test Suites, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 3 NT_1900

This procedure is used for installation of the Nortel Legacy 1900-MHz Base Station.

The procedure selects *Test Suite 0 – Nortel CDMA 1900 MHz Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 0.

This Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

In this Test Suite, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 4 NT_C800

This procedure is used for installation of the Nortel Legacy 800-MHz Base Station.

The procedure selects *Test Suite 2 – Nortel CDMA C800 Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 2.

This Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

In this Test Suite, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 5 NT_FCP

This procedure is used for installation of the Nortel Legacy FCP 800-MHz Base Station.

The procedure selects *Test Suite 6 – Nortel CDMA FCP800 Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 6.

This Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

In this Test Suite, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 6 NT_MACRO

This procedure is used for installation of the Nortel Legacy Macro Base Station.

The procedure selects *Test Suite 4 – Nortel CDMA Macro Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 4.

This Test Suite contains one TEST group for commissioning Base Stations. It includes the standard TESTs required for Base Station installation.

In both Test Suites, the Spectral Interference Evaluation test is done without an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 0.

PROCEDURE 7 _1900

This procedure is used for installation and troubleshooting of the Nortel Legacy 1900-MHz Base Station.

The procedure selects *Test Suite 1 – CDMA 1900 MHz Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 1.

This Test Suite contains one TEST group that includes the standard TESTs required for Base Station installation, plus additional TESTs that may be used for installation.

In this Test Suite, the Spectral Interference Evaluation test is done with an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 1.

PROCEDURE 8 _C800

This procedure is used for installation and troubleshooting of the Nortel Legacy C800-MHz Base Station.

The procedure selects *Test Suite 3 – CDMA C800 Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 3.

This Test Suite contains one TEST group that includes the standard TESTs required for Base Station installation, plus additional TESTs that may be used for installation.

In this Test Suite, the Spectral Interference Evaluation test is done with an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 1.

PROCEDURE 9 _FCP800

This procedure is used for installation and troubleshooting of the Nortel Legacy FCP 800-MHz Base Station.

The procedure selects *Test Suite 7 – CDMA FCP800 Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 7.

This Test Suite contains one TEST group that includes the standard TESTs required for Base Station installation, plus additional TESTs that may be used for installation.

In this Test Suite, the Spectral Interference Evaluation test is done with an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 1.

PROCEDURE 10 _MACRO

This procedure is used for installation of the Nortel Legacy Macro Base Station.

The procedure selects *Test Suite 5 – CDMA Macro Install* as the default on the Configuration Menu screen. The default is set by setting **PARAMETER 6 GN Test Type [Enter number on Conf Menu]** to 5.

This Test Suite contains one TEST group that includes the standard TESTs required for Base Station installation, plus additional TESTs that may be used for installation.

In this Test Suite, the Spectral Interference Evaluation test is done with an external low-noise amplifier (LNA). This is selected by setting **PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]** to 1.

Test Descriptions

Each TEST consists of one measurement or more. One TEST or more can constitute a Test Suite. While, in most instances, you may change the values of the parameters and specifications (pass/fail limits) that are used in a TEST, you may not change the measurements that the TEST will perform. Generally, the order in which you perform the TESTs is not important.

The TESTs are derived from the Northern Telecom Cellular Handbook and include the following, in alphabetical order:

- Adjacent Channel Power Test
- Baseline Test
- Check Pilot, Paging, Sync, and 6 OCNS
- Determine Cable Loss Insertion Factors
- Go to Code Domain Analyzer
- Go to Spectrum Analyzer
- Measure Test Cable Loss
- Noise Figure Measurements
- OCNS Channels Code Domain Measurements
- (Pilot Channel) Code Domain Measurements
- Pilot Only Check
- Receive Power Test
- Receiver Path (Gain) Verification
- RF (or HIP-D) Power Sensor Verification
- Spectral Interference Evaluation
- Spectral Regrowth Test

These TESTs are described in the following sections.

NOTE: It is important to remember that, of the specifications listed in each TEST description, not all are necessarily used for each Base Station type.

Adjacent Channel Power Test

NOTE: This TEST is applicable to Metro Cell Base Stations only.

This TEST verifies power in a 30-KHz adjacent channel relative to the 1.23-MHz channel of the carrier. The offset is 885 kHz for 1900-MHz Base Stations and 750 kHz for 800-MHz Base Stations. The Test Software examines the 30-kHz channels at 885 (or 750) kHz above and below the center frequency.

In more detail, it verifies that the 1.23 -MHz transmit signal is adequately filtered (reduced) at the adjacent channel frequencies.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 16 TX Adjacent Channel Pow at 750 kHz Offsets (dB)**
- **PASS/FAIL LIMIT 17 TX Adjacent Channel Pow at 885 kHz Offsets (dB)**

NOTE: Active pilot, paging, sync, and 6 OCNS channels are required during this test.

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`Adjacent Channel Power Test`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

Baseline Test

NOTE: This TEST is applicable to Metro Cell Base Stations only.

The Baseline TEST is a sequence of tests required for commissioning Metro Cell Base Stations. The TEST runs the individual tests sequentially to reduce overall testing time. The TEST will pause occasionally to allow you to record the test results. If you wish for the TEST to continue without pausing, set **PARAMETER 3 GN Pause during Baseline [0=no 1=yes]** to 0.

The TEST will also pause if any individual measurement exceeds the pass/fail limits for that measurement. If you wish for the TEST to continue without pausing, set **PARAMETER 5 GN Stop Test if Results Fail [0=no 1=yes]** to 0.

The following measurements make up the Baseline sequence:

- HIP-D Power Sensor Verification
- Adjacent Channel Power Test
- Verify Pilot, Paging, Sync, and 6 OCNS Channels
- Highest Inactive Code Domain Measurements
- OCNS Code Domain Measurements
- Receive Power Test

The Parameters values used in this TEST are:

- **PARAMETER 3 GN Pause during Baseline [0=no 1=yes]**
- **PARAMETER 5 GN Stop Test if Results Fail [0=no 1=yes]**
- **PARAMETER 8 RX RF Level for RX Power Test**

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 15 RX Power Gain Metro Cell (dB)**
- **PASS/FAIL LIMIT 16 TX Adjacent Channel Pow at 750 kHz Offsets (dB)**
- **PASS/FAIL LIMIT 17 TX Adjacent Channel Pow at 885 kHz Offsets (dB)**
- **PASS/FAIL LIMIT 19 TX Code Domain Carrier Feedthru Metro (dB)**
- **PASS/FAIL LIMIT 21 TX Code Domain Frequency Error Metro (Hz)**
- **PASS/FAIL LIMIT 23 RX Code Domain Rho Metro Cell**
- **PASS/FAIL LIMIT 25 TX Code Domain Time Offset Metro Cell (msec)**
- **PASS/FAIL LIMIT 28 TX Pilot Only Maximum Unused Walsh Codes (dB)**
- **PASS/FAIL LIMIT 33 RX Power Error Macro (dB)**
- **PASS/FAIL LIMIT 35 TX Power Error Metro Cell 800 MHz (dB)**
- **PASS/FAIL LIMIT 36 TX Power Loss Combiner Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 37 TX Power Loss IMF Metro Cell 800 MHz (dB)**
- **PASS/FAIL LIMIT 38 TX Power Loss LPP & Cable Metro 1900 MHz (dB)**
- **PASS/FAIL LIMIT 39 TX Power Loss LPP & Cable Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 40 TX Power Loss PAM to DPM Metro 1900 MHz (dB)**
- **PASS/FAIL LIMIT 41 TX Power Loss PAM to DPM Metro 800 MHz (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Baseline Test`** field from the Test Menu screen.
3. Follow the on-screen directions.

Check Pilot, Paging, Sync, and 6 OCNS

NOTE: This TEST is applicable to Metro Cell Base Stations only.

This TEST invokes the code domain analyzer built into the Test Set so that a user can verify that the Pilot, Paging, and Sync channels (Walsh codes 0, 1, and 32, respectively) and 6 OCNS channels are being transmitted by the Base Station.

NOTE: The Code Domain Analyzer Test Function of the Test Set operates outside the Test Software. Invoking the analyzer pauses the Test Software in its current state.

No Parameters are used in this TEST.

No Pass/Fail Limits are used in this TEST.

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`Check Pilot, Paging, Sync, and 6OCNS`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

Determine Cable Loss Insertion Factors

NOTE: This TEST determines the losses through the Base Station cables only, and is applicable to Legacy 1900-MHz Base Stations only.

The cables connecting the 1900-MHz RFFE to the Base Station must be measured for insertion loss before the start of testing. These cables include the TX, RX0, RX1, and Test cables for each sector. The insertion loss of each cable must be entered into the configuration program of the Base Station Maintenance Unit (BMU) and configuration scripts must be downloaded into the Base Station.

There are three methods for performing this TEST. These are as follows:

Method 1 (typical)

Method 1 measures the loss of each RFFE cable independently by connecting two test cables, TC1 and TC2, to the cable under test (one on each end). If the test cables in the Nortel E8302A Cable Kit can span the distance from the Test Set to both ends of the cables under test, use this Method.

Method 2 (for Remote RFFE)

Method 2 calculates the loss of each RFFE cable by jumpering the TX and RX cables together (one set at a time) at the remote RFFE, measuring the combination of the RX and TX cables, and calculating the loss of each cable. In this method, the test cables (TC1 and TC2) will be connected to the RX and the TX cables at the Base Station. (The RFFE end of the TX and RX cables must be connected together using a jumper cable.) Use this procedure when the RFFE is located some distance from the Base Station and the test cables cannot reach from the Test Set to the RFFE and back to the Test Set.

Method 3 (for Remote RFFE)

Method 3 uses an external power meter to measure the loss of the cables. The Test Set will provide a signal from its DUPLEX OUT port for the power meter. Use this procedure when the RFFE is located some distance from the Base Station and the test cables cannot reach from the Test Set to the RFFE and back to the Test Set. This procedure uses a separate HP 437 Power Meter at the RFFE to measure the cable insertion loss factors.

No Parameters are used in this TEST.

No Pass/Fail Limits are used in this TEST.

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Determine Cable Insertion Loss Factors`** field from the Test Menu screen. The Test Software will display a screen that provides for selection among the three methods of testing the cables between the RFFE and the Base Station.
3. Select the method for performing the TEST by pressing the k1 (**`Method 1`**) key, the k2 (**`Method 2`**) key, or the k3 (**`Method 3`**) key, as appropriate, from that screen.
4. Follow the on-screen directions.

Go to Code Domain Analyzer

NOTE: The Code Domain Analyzer Test Function of the Test Set operates outside the Test Software. Invoking the analyzer pauses the Test Software in its current state.

This Test Function allows you to use the Code Domain Analyzer built into the Test Set. While the Code Domain Analyzer is operating, the state of the Software is saved. This allows you to use the analyzer, then return to software control.

No Parameters are used in this Test Function.

No Pass/Fail Limits are used in this Test Function.

After selecting the Test Suite, invoke and perform this Test Function from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Go to Code Domain Analyzer`** field from the Test Menu screen.
3. After following the on-screen directions to operate the Test Function, press the Pause/Continue key to return to the Test Software at the Test Menu screen.

Go to Spectrum Analyzer

NOTE: The Spectrum Analyzer Test Function of the Test Set operates outside the Test Software. Invoking the analyzer pauses the Test Software in its current state.

This function allows you to use the Spectrum Analyzer built into the Test Set. While the Spectrum Analyzer is operating, the state of the Software is saved. This allows you to use the analyzer, then return to software control.

No Parameters are used in this Test Function.

No Pass/Fail Limits are used in this Test Function.

After selecting the Test Suite, invoke this Test Function from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Go to Spectrum Analyzer`** field from the Test Menu screen.
3. After following the on-screen directions to operate the Test Function, press the Pause/ Continue key to return to the Test Software at the Test Menu screen.

Measure Test Cable (and Attenuator) Loss

Test cable loss and attenuator loss factors must be determined each time testing is started to verify that no cable damage or attenuator has occurred since the last testing procedure. These values allow the software to provide accurate, repeatable measurements for installing and maintaining a Base Station. Measuring cable loss also allows you to determine when it is necessary to replace worn or faulty cables that could be damaged internally but show no signs of wear or damage. Measuring attenuator loss allows you to determine when it is necessary to replace an attenuator for the same reasons.

NOTE: All losses must be saved by pressing the k3 (**`Save Data`**) key after each measurement is completed so as to enter the loss automatically on the Configuration Screen menu.

No Parameters are used in this TEST.

No Pass/Fail Limits are used in this TEST.

After selecting the Test Suite, invoke and operate this TEST from the Configuration Menu screen as follows:

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Measure Test Cable Loss`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Measure Test Cable and Attenuator Loss`** field from the Test Menu screen.

NOTE: Because tests on Metro Cell Base Stations are performed at 20 watts, which exceeds the maximum level of 15 watts for the RF IN/OUT port of the Test Set, an attenuator is required for Metro Cell Base Station testing. Thus, this field provides for measuring attenuator loss.

3. Follow the on-screen directions.

Noise Figure Measurements

NOTE: This TEST is applicable to Legacy 800-MHz Base Stations only.

This TEST measures the noise figure of the receiver sections. If **PARAMETER 7 RX Noise Figure [0=RFU & FE 1=RFU]** is set to 0, the Test Software will measure the noise figure for both the receiver radio frequency unit (RFU) and the receiver front end (FE). If Parameter 7 is set to 1, the Test Software will measure the noise figure for the receiver RFU only.

One Parameter is used in this TEST. It is:

- **PARAMETER 7 RX Noise Figure [0=RFU & FE 1=RFU]**

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 13 RX Noise Figure FE (dB)**
- **PASS/FAIL LIMIT 14 RX Noise Figure RFU (dBm)**

After selecting the Test Suite, invoke and perform this Test Function from the Configuration Menu screen as follows:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Noise Figure Measurement`** field from the Test Menu screen. The Test Software will display the Noise Figure Measurements Menu screen.
3. Select the **`Perform RX0 Noise Figure Measurement`** field or the **`Perform RX1 Noise Figure Measurement`** field, as appropriate, from the Noise Figure Measurements Menu screen.
4. Follow the on-screen directions.

OCNS Channels Code Domain Measurements

NOTE: This TEST is applicable to Metro Cell Base Stations only.

This TEST verifies that the estimated rho, frequency error, time offset, and carrier feedthrough values of the transmitted RF signal from the Base Station are within the prescribed limits.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 19 TX Code Domain Carrier Feedthru Metro (dB)**
- **PASS/FAIL LIMIT 21 TX Code Domain Frequency Error Metro (Hz)**
- **PASS/FAIL LIMIT 23 RX Code Domain Rho Metro Cell**
- **PASS/FAIL LIMIT 25 TX Code Domain Time Offset Metro Cell (msec)**
- **PASS/FAIL LIMIT 26 TX Code Domain Time Offset w/IMF or Comb (msec)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`OCNS Channels Code Domain Measurements`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

NOTE: Active pilot, paging, sync, and 6 OCNS channels are required during this test.

(Pilot Channel) Code Domain Measurements

NOTE: When the words “Pilot Channel” are included in the TEST title, the TEST is applicable to Metro Cell Base Stations only. When those words are not included in the title, the TEST is applicable to all Legacy Base Stations.

This TEST verifies that the rho, frequency error, time offset, and carrier feedthrough values of the transmitted RF signal from the Base Station are within the prescribed limits.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 18 TX Code Domain Carrier Feedthru (dB)**
- **PASS/FAIL LIMIT 19 TX Code Domain Carrier Feedthru Metro (dB)**
- **PASS/FAIL LIMIT 20 TX Code Domain Frequency Error (Hz)**
- **PASS/FAIL LIMIT 21 TX Code Domain Frequency Error Metro (Hz)**
- **PASS/FAIL LIMIT 22 RX Code Domain Rho**
- **PASS/FAIL LIMIT 23 RX Code Domain Rho Metro Cell**
- **PASS/FAIL LIMIT 24 TX Code Domain Time Offset (msec)**
- **PASS/FAIL LIMIT 25 TX Code Domain Time Offset Metro Cell (msec)**
- **PASS/FAIL LIMIT 26 TX Code Domain Time Offset w/IMF or Comb (msec)**
- **PASS/FAIL LIMIT 27 TX Inactive Code Channel Maximum Level (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Code Domain Measurements`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1 Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.

2 Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.

3 Select the **`Pilot Channel Code Domain Measurements`** field from the Fault Isolation Menu screen.

4 Follow the on-screen directions.

NOTE: An active pilot only channel is required during this TEST on all Base Stations.

Pilot Only Check

NOTE: This TEST is applicable to the CDMA 1900 MHz Install, CDMA C800 Install, CDMA Macro Install, CDMA FCP800 Install, Nortel Metro Cell 1900 MHz Install, and Nortel Metro Cell 800 MHz Install Test Suites only.

This TEST verifies that the Base Station is transmitting on Walsh code channel 0. All other code channels should be below the threshold line on the display.

No Parameters are used in this TEST.

One Pass/Fail Limits is used in this TEST. It is:

- **PASS/FAIL LIMIT 27 TX Inactive Code Channel Maximum Level (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

NOTE: An active pilot only channel is required during this TEST.

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Pilot Only Check`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`Pilot Only Check`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

Receive Power Test

NOTE: This TEST is applicable to Metro Cell Base Stations only.

This TEST verifies that the receive power reported by the Base Station Maintenance Unit (BMU) with no signal present increases when a signal is injected into the receiver. The measurement, which is a measure of the increase in receive power, is compared with the setting of **PASS/FAIL LIMIT 15 RX Power Gain Metro Cell (dB)**.

One Parameter is used in this TEST. It is:

- **PARAMETER 8 RX RF Level for RX Power Test**

One Pass/Fail Limit is used in this TEST. It is:

- **PASS/FAIL LIMIT 15 RX Power Gain Metro Cell (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`Receive Power Test`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

Receive Path (Gain) Verification

NOTE: When the word "Gain" is included in the TEST title, the TEST is applicable to Metro Cell Base Stations only. When that word is not included in the title, the TEST is applicable to all Legacy Base Stations.

This TEST verifies that all components in the receive path are operating within prescribed limits for amplification and attenuation.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 1 RX Gain 1900 MHz (dB)**
- **PASS/FAIL LIMIT 2 RX Gain C800 (dB)**
- **PASS/FAIL LIMIT 3 RX Gain FCP800 (dB)**
- **PASS/FAIL LIMIT 4 RX Gain Macro (dB)**
- **PASS/FAIL LIMIT 5 RX Gain Metro 1900 MHz thru One TRM (dB)**
- **PASS/FAIL LIMIT 6 RX Gain Metro 1900 MHz thru Three TRMs (dB)**
- **PASS/FAIL LIMIT 7 RX Gain Metro 1900 MHz thru Two TRMs (dB)**
- **PASS/FAIL LIMIT 8 RX Gain Metro 800 MHz Div thru One TRM (dB)**
- **PASS/FAIL LIMIT 9 RX Gain Metro 800 MHz Div thru No TRM (dB)**
- **PASS/FAIL LIMIT 10 RX Loss 1:4 Splitter Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 11 RX Loss 1:6 Splitter Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 12 RX LPP and Cable Metro 800/1900 MHz (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Receiver Path Verification`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1 Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.

2 Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.

3 Select the **`Receive Path Gain Verification`** field from the Fault Isolation Menu screen.

4 Follow the on-screen directions.

The following paragraphs provide the upper and lower limit equations for the various types of Base Stations. The definitions for terms used in those equations are as follows:

- **UL** = Upper pass/fail limit
- **LL** = Lower pass/fail limit.
- **UL or LL Spec (5)** = The upper or lower limit for 1900-MHz Metro Cell Base Station gain from the DPM input through one TRM to the RX0/RX1 output of the TRM.
- **UL or LL Spec (6)** = The upper or lower limit for 1900-MHz Metro Cell Base Station gain from the DPM input through two TRMs to the RX0/RX1 output of the second TRM.
- **UL or LL Spec (7)** = The upper or lower limit for 1900-MHz Metro Cell Base Station gain from the DPM input through three TRMs to the RX0/RX1 output of the third TRM.
- **UL or LL Spec (8)** = The upper or lower limit for 800-MHz Metro Cell Base Station gain from the DPM input thorough one TRM to the RX0/RX1 output of the TRM.
- **UL or LL Spec (9)** = The upper or lower limit for 800-MHz Metro Cell Base Station gain from the DPM input through the cable connected to the RX0/RX1 input of the TRM.
- **UL or LL Spec (10)** = The upper or lower limit for losses through the 1:4 external splitter for 800-MHz Metro Cell Base Stations.
- **UL or LL Spec (11)** = The upper or lower limit for losses through the 1:6 external splitter for 800-MHz Metro Cell Base Stations.
- **UL or LL Spec (12)** = The upper or lower limit for losses of the LPP and cables for 800-MHz and 1900-MHz Metro Cell Base Stations.

For Legacy Base Stations, the upper and lower pass/fail limits are contained in one specification for each type of Base Station as follows:

- **1900-MHz Base Stations:**

  UL = UL Spec (1)

  LL = LL Spec (1)

- **C800 Base Stations:**

  UL = UL Spec (2)

  LL = LL Spec (2)

- **FCP800 Base Stations:**

  UL = UL Spec (3)

  LL = LL Spec (3)

- **Macro Base Stations:**

  UL = UL Spec (4)

  LL = LL Spec (4)

For indoor Metro Cell 800-MHz Base Stations, the upper and lower limit equations for gain in dB from the DPM to the cable connected to the TRM RX0/RX1 input are as follows:

- **No External Splitter (1 Carrier):**

  UL = UL Spec (9)

  LL = LL Spec (9)

- **No External Splitter (2 Carriers):**

  UL = UL Spec (8)

  LL = LL Spec (8)

- **1:4 External Splitter (All Carriers):**

  UL = UL Spec (9) – LL Spec (10)

  LL = LL Spec (9) – UL Spec (10)

- **1:6 External Splitter (All Carriers):**

  UL = UL Spec (9) – LL spec (11)

  LL = LL Spec (9) – UL spec (11)

For outdoor Metro Cell 800-MHz Base Stations, the upper and lower limit equations for gain in dB from the LPP to the cable connected to the TRM RX0/ RX1 input are as follows:

- **No External Splitter (1 Carrier):**

  UL = UL Spec (9) – LL Spec (12)

  LL = LL Spec (9) – UL Spec (12)

- **No External Splitter (2 Carriers):**

  UL = UL Spec (8) – LL Spec (12)

  LL = LL Spec (8) – UL Spec (12)

- **1:4 External Splitter (All Carriers):**

  UL = UL Spec (9) – LL Spec (10) – LL Spec (12)

  LL = LL Spec (9) – UL Spec (10) – UL Spec (12)

- **1:6 External Splitter (All Carriers):**

  UL = UL Spec (9) – LL spec (11) – LL Spec (12)

  LL = LL Spec (9) – UL spec (11) – UL Spec (12)

For indoor 1900-MHz Metro Cell Base Stations, the upper and lower limit equations for RX0 gain in dB from the DPM to the TRM splitter RX0 output are as follows:

- **All Carriers:**

  UL = UL Spec (5)

  LL = LL Spec (5)

For outdoor 1900-MHz Metro Cell Base Stations, the upper and lower limit equations for RX0 gain in dB from the LPP to the TRM splitter RX0 output are as follows:

- **All Carriers:**

  UL = UL Spec (5) – LL Spec (12)

  LL = LL Spec (5) – UL Spec (12)

For indoor 1900-MHz Metro Cell Base Stations, the upper and lower limit equations for RX1 gain in dB from the DPM to the TRM splitter RX1 output are as follows:

- **1 Carrier:**

  UL = UL Spec (5)

  LL = LL Spec (5)

- **2 Carriers, 3 Carriers (1st and 2nd), or 4 Carriers (1st and 2nd):**

  UL = UL Spec (7)

  LL = LL Spec (7)

- **3 Carriers (3rd), or 4 Carriers (3rd and 4th):**

  UL = UL Spec (6)

  LL = LL Spec (6)

For outdoor 1900-MHz Metro Cell Base Stations, the upper and lower limit equations for RX1 gain in dB from the LPP to the TRM splitter RX1 output are as follows:

- **1 Carrier:**

  UL = UL Spec (5) – LL Spec (12)

  LL = LL Spec (5) – UL Spec (12)

- **2 Carriers, 3 Carriers (1st and 2nd), or 4 Carriers (1st and 2nd):**

  UL = UL Spec (7)– LL Spec (12)

  LL = LL Spec (7) – UL Spec (12)

- **3 Carriers (3rd), or 4 Carriers (3rd and 4th):**

  UL = UL Spec (6)– LL Spec (12)

  LL = LL Spec (6) – UL Spec (12)

RF Power Sensor Verification or HIP-D Power Sensor Verification

NOTE: For Legacy Base Stations, this TEST is called RF Power Sensor Verification. For Metro Cell Base Stations, this TEST is called HIP-D Power Sensor Verification.

This TEST verifies that the accuracy of the Base Station RF power sensor is within specified limits.

- For Legacy Base Stations, the output is 4 watts with only the pilot Walsh code active.
- For Metro Cell 1900-MHz Base Stations, the power is 41.5 dBm with pilot, paging, sync, and 6 0CNS channels active.
- For Metro Cell 800-MHz Base Stations, the power is 43 dBm with pilot, paging, sync, and 6 OCNS channels active.

NOTE: The calibration of the Legacy 1900-MHz Base Stations is influenced by the ambient temperature of the Base Station, RFFE, PSC drivers, and the upconverters. Thus, the ambient temperature **MUST** be recorded as part of this procedure if you are testing a Legacy 1900-MHz Base Station. (The temperature must be set so as to use the correct specification limits by selecting the k5 (**More**) key on the power display screen and entering the temperature.)

The Test Set is also affected by temperature. If the Test Set is moved from a sheltered environment to an exposed one, it must be allowed to reach thermal equilibrium (even if it has not been unplugged from the power source). This will require 30 minutes.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 29 TX Power Error 1900 MHz (dB)**
- **PASS/FAIL LIMIT 30 TX Power Error at Temp Extremes 1900 MHz (dB)**
- **PASS/FAIL LIMIT 31 TX Power Error C800 (dB)**
- **PASS/FAIL LIMIT 32 TX Power Error FCP800 (dB)**
- **PASS/FAIL LIMIT 33 RX Power Error Macro (dB)**
- **PASS/FAIL LIMIT 34 TX Power Error Metro Cell 1900 MHz (dB)**
- **PASS/FAIL LIMIT 35 TX Power Error Metro Cell 800 MHz (dB)**
- **PASS/FAIL LIMIT 36 TX Power Loss Combiner Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 37 TX Power Loss IMF Metro Cell 800 MHz (dB)**
- **PASS/FAIL LIMIT 38 TX Power Loss LPP & Cable Metro 1900 MHz (dB)**
- **PASS/FAIL LIMIT 39 TX Power Loss LPP & Cable Metro 800 MHz (dB)**
- **PASS/FAIL LIMIT 40 TX Power Loss PAM to DPM Metro 1900 MHz (dB)**
- **PASS/FAIL LIMIT 41 TX Power Loss PAM to DPM Metro 800 MHz (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`RF Power Sensor Path Verification`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`HIP-D Power Sensor Verification`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

The following paragraphs provide the upper and lower limit equations for the various types of Base Stations. The definitions for terms used in those equations are as follows:

- **UL** = Upper pass/fail limit.
- **LL** = Lower pass/fail limit.
- **Power** = The setting of the **`Base Station Power Out`** field on the Configuration Menu screen. This is the basic figure shown on the power meter. It is always present in the equation.
- **UL or LL Spec (29)** = The basic upper or lower limit for 1900-MHz Base Stations at temperatures between 50° F and 85° F. Its presence in the equation is determined by the temperature setting recorded after selecting the k5 (**`More`**) key on the power display screen and entering the temperature.
- **UL or LL Spec (30)** = The basic upper or lower limit for 1900-MHz Base Stations at temperatures below 50° F or above 85° F. Its presence in the equation is determined by the temperature setting recorded after selecting the k5 (**`More`**) key on the power display screen and entering the temperature.
- **UL or LL Spec (31)** = The basic upper or lower limit for C800-MHz Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (32)** = The basic upper or lower limit for FCP800-MHz Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (33)** = The basic upper or lower limit for Macro Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (34)** = The basic upper or lower limit for Metro Cell 1900-MHz Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (35)** = The basic upper or lower limit for Metro Cell 800-MHz Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (36)** = The losses associated with an 800-MHz Base Station with a Combiner. It is present for that configuration only. Its presence is determined by the setting of the **`TX Conf`** field on the Configuration Menu screen.)
- The item above and the item below allow for four combinations of Combiner and IMF. These are: neither, IMF, Combiner, both. Dependent upon the setting of the **`TX Conf`** field on the Configuration Menu screen, these items will appear singly, in combination, or not at all.
- **UL or LL Spec (37)** = The losses associated with an 800-MHz Base Station with an IMF. It is present for that configuration only. Its presence is determined by the Base Station type and the setting of the **`TX Conf`** field on the Configuration Menu screen.)

- **UL or LL Spec (38)** = The loss associated with an LPP and the cables for Metro Cell 1900-MHz Base Stations. It is present in the equation only if the Base Station is an outdoor type. Its presence is determined by the setting of the **`Cabinet`** field on the Configuration Menu screen.
- **UL or LL Spec (39)** = The loss associated with an LPP and the cables for Metro Cell 800-MHz Base Stations. It is present in the equation only if the Base Station is an outdoor type. Its presence is determined by the setting of the **`Cabinet`** field on the Configuration Menu screen.
- **UL or LL Spec (40)** = Inherent loss among the components for Metro Cell 1900-MHz Base Stations. It is always present in the equation for those Base Stations.
- **UL or LL Spec (41)** = Inherent loss among the components for Metro Cell 800-MHz Base Stations. It is always present in the equation for those Base Stations.

For indoor Metro Cell 1900-MHz Base Stations, the upper limit equations are as follows:

UL = Power + UL Spec (34) – LL Spec (40)

LL = Power + LL Spec (34) – LL Spec (40)

For outdoor Metro Cell 1900-MHz Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (34) – LL Spec (40) – LL Spec (38)

LL = Power + LL Spec (34) – UL Spec (40) – UL Spec (38)

NOTE: For Metro Cell 800-MHz Base Stations, the specifications shown in italics in the next two paragraphs are optional.

For indoor Metro Cell 800-MHz Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (35) – LL Spec (41) – *LL Spec (37) – LL Spec (36)*

LL = Power + LL Spec (35) – UL Spec (41) – *UL Spec (37) – UL Spec (36)*

For outdoor Metro Cell 800-MHz Base Stations, the upper and lower limit equations are as follows:

LL = Power + LL Spec (35) – UL Spec (41)
– UL Spec (39) – *UL Spec (37) – UL Spec (36)*

UL = Power + UL Spec (35) – LL Spec (41)
– LL Spec (39) – *LL Spec (37) – LL Spec (36)*

For Legacy 1900-MHz Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (29 or 39)

LL = Power + LL Spec (29 or 30)

For Legacy C800-MHz Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (31)

LL = Power + LL Spec (31)

For Legacy FCP800-MHz Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (32)

LL = Power + LL Spec (32)

For Legacy Macro Base Stations, the upper and lower limit equations are as follows:

UL = Power + UL Spec (33)

LL = Power + LL Spec (33)

Spectral Interference Evaluation

This TEST verifies that there are no interfering signals on either the forward or reverse link channels.

This TEST provides for the use of an optional LNA for evaluating low-level signals that might interfere with the CDMA channel. To set the Test Software to use an external LNA, from the Configuration Menu screen, select the **`More Configuration Menu`** field, then select the **`Use LNA for Spec Interfer`** on the More Configuration screen. Following that selection, the Test Software will include the LNA in each appropriate connection diagram. Press the k5 (**`Return`**) key to return to the Configuration Menu screen.

NOTE: The Code Domain Analyzer Test Function of the Test Set operates outside the Test Software. Invoking the analyzer pauses the Test Software in its current state.

No Parameters are used in this TEST.

No Pass/Fail Limits are used in this TEST.

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Spectral Interference Evaluation`** field from the Test Menu screen. The Test Software will display the Spectral Interference Evaluation Menu screen.
3. Select the **`Analyze Forward Link Channel`** field, the **`Analyze Reverse Link Channel`** field, or the **`Analyze Diversity Reverse Link Channel`** field, as appropriate, from the Spectral Interference Evaluation Menu screen.
4. Follow the on-screen directions.

Spectral Regrowth Test

This TEST verifies that the Base Station is within its 1.23-MHz bandwidth and is not generating any undesired out-of-channel power.

No Parameters are used in this TEST.

The Pass/Fail Limits used in this TEST are:

- **PASS/FAIL LIMIT 16 TX Adjacent Channel Pow at 750 kHz Offsets (dB)**
- **PASS/FAIL LIMIT 17 TX Adjacent Channel Pow at 885 kHz Offsets (dB)**

After selecting the Test Suite, invoke and perform this TEST from the Configuration Menu screen as follows:

CAUTION: Before disconnecting any Base Station cables, verify that the site is wilted and is not producing RF power.

If the Test Suite selected is that of a Legacy Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Spectral Regrowth Test`** field from the Test Menu screen.
3. Follow the on-screen directions.

If the Test Suite selected is that of a Metro Cell Base Station:

1. Press the k1 (**`Test Menu`**) key. The Test Software will display the Test Menu screen.
2. Select the **`Fault Isolation Menu`** field from the Test Menu screen. The Test Software will display the Fault Isolation Menu screen.
3. Select the **`Spectral Regrowth Test`** field from the Fault Isolation Menu screen.
4. Follow the on-screen directions.

Test Suite Descriptions

Each Test Suite is a group of TESTs. Each TEST may include one measurement or a series of measurements, and each TEST is performed singly.

The Test Software offers the following Test Suites. The TESTs in these suites are derived from the Nortel Installation Methods.

- Test Suite 0 – Nortel CDMA 1900 MHz Install
- Test Suite 1 – CDMA 1900 MHz Install
- Test Suite 2 – Nortel CDMA C800 Install
- Test Suite 3 – CDMA C800 Install
- Test Suite 4 – Nortel CDMA Macro Install
- Test Suite 5 – CDMA Macro Install
- Test Suite 6 – Nortel CDMA FCP800 Install
- Test Suite 7 – CDMA FCP800 Install
- Test Suite 8 – Nortel Metro Cell 1900 MHz Install
- Test Suite 9 – Nortel Metro Cell 800 MHz Install

Test Suites 1, 3, 5, and 7 are similar to Test Suites 0, 2, 4, and 6, but each includes additional TESTs for more rigorous and varied testing required in troubleshooting.

In some instances in the Test Suites, it is recommended that you record the test data using a PC. See **"Handling Test Results" on page 76** for information on setting up and using a PC for recording data. So as to keep all data together for later use, it is recommended that you create a directory for each Base Station on the PC hard disk. Store all data files and screen captures for a particular Base Station in this directory for printing reports and reviewing test data.

However, if you would rather record test results on a service provider's form, ignore any steps that direct you to press the k3 (**`Save Data`**) key. Instead, hand-write the data on the form.

These Test Suites are described briefly in the following sections. For more detailed information, refer to the Nortel Installation Methods.

Test Suite 0 – Nortel CDMA 1900 MHz Install

This Test Suite is used for installation of Nortel Legacy 1900-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard TESTs required for Base Station installation.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Determine Cable Insertion Loss Factors
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Code Domain Measurements
- Receiver Path Verification

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 1 – CDMA 1900 MHz Install

This Test Suite is used for installation and troubleshooting of Nortel Legacy 1900-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard tests required for Base Station installation, plus additional TESTs that may be used for installation troubleshooting.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Determine Cable Insertion Loss Factors
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Pilot Only Check
- Code Domain Measurements
- Go to Code Domain Analyzer
- Spectral Regrowth Test
- Go to Spectrum Analyzer
- Receiver Path Verification

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 2 – Nortel CDMA C800 Install

This Test Suite is used for installation of Nortel Legacy 800-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard TESTs required for Base Station installation.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Code Domain Measurements
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 3 – CDMA C800 Install

This Test Suite is used for installation and troubleshooting of Nortel Legacy 800-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard tests required for Base Station installation, plus additional TESTs that may be used for installation troubleshooting.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Pilot Only Check
- Code Domain Measurements
- Go to Code Domain Analyzer
- Spectral Regrowth Test
- Go to Spectrum Analyzer
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 4 – Nortel CDMA Macro Install

This Test Suite is used for installation of Nortel Legacy Macro Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard TESTs required for Base Station installation.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Code Domain Measurements
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 5 – CDMA Macro Install

This Test Suite is used for installation and troubleshooting of Nortel Legacy Macro Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard tests required for Base Station installation, plus additional TESTs that may be used for installation troubleshooting.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Pilot Only Check
- Code Domain Measurements
- Go to Code Domain Analyzer
- Spectral Regrowth Test
- Go to Spectrum Analyzer
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 6 – Nortel CDMA FCP800 Install

This Test Suite is used for installation of Nortel Legacy FCP 00-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard TESTs required for Base Station installation.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Code Domain Measurements
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 7 – CDMA FCP800 Install

This Test Suite is used for installation and troubleshooting of Legacy FCP 800-MHz Base Stations. It functions as a comprehensive Test Suite for commissioning the subject Base Stations, and includes the standard tests required for Base Station installation, plus additional TESTs that may be used for installation troubleshooting.

The suite includes the following TESTs:

- Measure Test Cable Loss
- Spectral Interference Evaluation
- RF Power Sensor Verification
- Pilot Only Check
- Code Domain Measurements
- Go to Code Domain Analyzer
- Spectral Regrowth Test
- Go to Spectrum Analyzer
- Receiver Path Verification
- Noise Figure Measurements

All of these TESTs are listed on the Test Menu screen, and may be invoked from that screen one at a time, in any order.

Test Suite 8 – Nortel Metro Cell 1900 MHz Install

This Test Suite is used for installation of Nortel Metro Cell 1900-MHz Base Stations. It contains two groups of TESTs for commissioning the subject Base Stations: Baseline, and Fault Isolation.

The Baseline group includes standard TESTs required for Base Station installation. These TESTs are not listed individually on the Test Menu screen, but are performed sequentially. The Baseline group may be invoked from the Test Menu screen by selecting the **`Baseline Test`** field. It includes the following TESTs:

- HIP-D Power Sensor Verification
- Adjacent Channel Power Test
- Verify Pilot, Paging, Sync, and 6 OCNS Channels
- Highest Inactive Code Domain Channel Test
- OCNS Code Domain Measurements
- Receive Power Test

In addition, the Measure Test Cable and Attenuator Loss TEST may be invoked from the Test Menu screen.

The Fault Isolation group includes more comprehensive TESTs for troubleshooting during Base Station Installation, and includes the following TESTs:

- Measure Test Cable and Attenuator Loss
- Spectral Interference Evaluation
- HIP-D Power Sensor Verification
- Check Pilot, Paging, Sync, and 6 OCNS
- OCNS Channels Code Domain Measurements
- Spectral Regrowth Test
- Adjacent Channel Power Test
- Pilot Only Check
- Pilot Channel Code Domain Measurements
- Receive Path Gain Verification
- Receive Power Test

All of these TESTs are listed on the Fault Isolation Menu screen, and may be invoked from that screen one at a time, in any order. The Fault Isolation Menu screen is called from the Test Menu screen.

Test Suite 9 – Nortel Metro Cell 800 MHz Install

This Test Suite is used for installation of Nortel Metro Cell 800-MHz Base Stations. It contains two groups of TESTs for commissioning the subject Base Stations: Baseline, and Fault Isolation.

The Baseline group includes standard TESTs required for Base Station installation. These TESTs are not listed individually on the Test Menu screen, but are performed sequentially. The Baseline group may be invoked from the Test Menu screen by selecting the **`Baseline Test`** field. It includes the following TESTs:

- HIP-D Power Sensor Verification
- Adjacent Channel Power Test
- Verify Pilot, Paging, Sync, and 6 OCNS Channels
- Highest Inactive Code Domain Channel Test
- OCNS Code Domain Measurements
- Receive Power Test

In addition, the Measure Test Cable and Attenuator Loss TEST may be invoked from the Test Menu screen.

The Fault Isolation group includes more comprehensive TESTs for troubleshooting during Base Station Installation, and includes the following TESTs:

- Measure Test Cable and Attenuator Loss
- Spectral Interference Evaluation
- HIP-D Power Sensor Verification
- Check Pilot, Paging, Sync, and 6 OCNS
- OCNS Channels Code Domain Measurements
- Spectral Regrowth Test
- Adjacent Channel Power Test
- Pilot Only Check
- Pilot Channel Code Domain Measurements
- Receive Path Gain Verification
- Receive Power Test

All of these TESTs are listed on the Fault Isolation Menu screen, and may be invoked from that screen one at a time, in any order. The Fault Isolation Menu screen is called from the Test Menu screen.

Parameters Descriptions

Parameters are used to define the conditions under which a TEST will run. You may edit parameters to change default values or to meet specific test requirements and conditions. Each parameter may be used in one TEST or more. For information on editing parameters, see **"Customizing Test Procedures" on page 64**.

The list of parameters is arranged alphabetically. The first two letters in the title of each parameter indicate its classification. The classifications are:

GN - General

RX - Receiver

ZZ - Demonstration mode

PARAMETER 1 GN Band [0=North Amer 1-Korean]

Enter the desired control choice to determine the frequency band. Select 0 for the North American band; select 1 for the Korean band.

NOTE: This parameter operates as the default setting to automatically set the **Channel Standard** field on the Configuration Menu screen to the same setting when any procedure is initiated. If you change the **Channel Standard** field to the other setting while running a particular procedure, the Test Software will operate with that new setting until you initiate another procedure.

PARAMETER 2 GN Display Drawings [0=no 1=yes]

Enter the desired control choice to determine whether connection drawings will be displayed at appropriate points in the testing process. Select 0 for no drawing display; select 1 for drawing display.

NOTE: This parameter operates as the default setting to automatically set the **Show Drawings with Tests** field on the (More) Configuration Menu screen to the same setting when any procedure is initiated. If you change the **Show Drawings with Tests** field to the other setting while running a particular procedure, the Test Software will operate with that new setting until you initiate another procedure.

PARAMETER 3 GN Pause during Baseline [0=no 1=yes]

Enter the desired control choice to determine whether the Test Software will pause at appropriate points during the Baseline test sequence to allow recording the test results from the screen. Select 0 for operation without pausing; select 1 for operation with pausing.

NOTE: If data collection is to a PC or printer, no pause is required.

PARAMETER 4 GN Spectrum Check with LNA [0=no 1=yes]

Enter the desired control choice to determine whether the Test Software will perform a spectrum check using an external low-noise amplifier for evaluating low-level signals. Select 0 if you do not wish to use an external LNA; select 1 if you wish to use an external LNA.

NOTE: This parameter operates as the default setting to automatically set the **`Use LNA for Spec Interfer`** field on the (More) Configuration Menu screen to the same setting when any procedure is initiated. If you change the **`Use LNA for Spec Interfer`** field to the other setting while running a particular procedure, the Test Software will operate with that new setting until you initiate another procedure.

PARAMETER 5 GN Stop Test if Results Fail [0=no 1=yes]

Enter the desired control choice to determine the testing status in the event that a TEST fails during the Baseline test sequence. Select 0 to continue testing on failure; select 1 to stop on a failure.

If you select 1, stop on failure when testing, the USER keys on the Test Set will provide choices on how to proceed. Press the associated keys for the following:

- **`Proceed`** - The Test Software will proceed with testing despite the failed data point. The next test of the sequence will be performed.
- **`Repeat`** - The Test Set will perform the same TEST again and post the results. If the test fails again, the Test Software will again offer these three options.
- **`Abort`** - The Test Software will stop the Baseline testing. If tests remain in the Baseline test sequence, those will not be performed. A summary of the number of passed and failed tests will be printed.

PARAMETER 6 GN Test Type [Enter number on Conf Menu]

Enter the desired control choice for the test sequence that is to be used for testing the Base Station. The numbers to be entered correspond to the those on the **`Choices:`** list that appears when you select the **`Test Type`** field on the Configuration Menu screen.

NOTE: This parameter operates as the default setting to automatically set the **`Test Type`** field on the Configuration Menu screen to the same setting when any procedure is initiated. If you change the **`Test Type`** field to another setting while running a particular procedure, the Test Software will operate with that new setting until you initiate another procedure.

PARAMETER 7 RX Noise Figure [0=RFU & FE 1=RFU]

NOTE: This parameter is applicable to C800, FCP800, and Macro Base Stations only.

Enter the desired control choice to determine the point or points at which the noise figure will be measured during the Noise Figure Measurements TEST. Select 0 to measure the noise figure at the radio frequency unit (RFU) and the front end (FE); select 1 to measure the noise figure at the RFU only.

PARAMETER 8 RX RF Level for RX Power Test

NOTE: This parameter is applicable to Metro Cell Base Stations only.

Enter the level at which RF is to be injected into the Metro Cell receiver during the RX power test.

PARAMETER 9 ZZ Demo Mode [0=no 1=yes]

Enter the desired control choice to determine whether the Test Software will operate in normal mode or demonstration mode. Select 0 for operation in normal mode; select 1 for operation in demonstration mode. If you select 1, the Test Software will not actually perform measurements, but will display simulated data on the screen. This mode is useful if you are working in a training or practice situation without a Base Station attached to the Test Set.

As an operational safety feature, the Test Software will display the following message in large type on the TESTS (IBASIC Controller) screen when you select the **`Run Test`** field or press the k1 (**`Run Test`**) key after selecting demo mode:

```
THE SOFTWARE IS IN DEMO MODE.
```

Pass/Fail Limits Descriptions

Pass/fail limits define the values with which measurement results are compared to determine if the system under test meets specified standards.

For information on editing Pass/Fail Limits, see **"Customizing Test Procedures" on page 64**.

All pass/fail limits have lower and upper limits that can be entered or modified. The column labeled **Check** on the TESTS (Pass/Fail Limits) screen allows you to specify whether the lower limit, the upper limit, or both of the limits will be used when compared with measurements. Some of the default pass/fail limits provided in the Test Software include only one of the limits. If you enter the other limit, make certain that you change the **Check** column to **Both**.

Pass/fail limits remain in battery-backed-up memory until you select a procedure to run. If you wish to prevent pass/fail limits from being lost when a new procedure is selected, save those in a procedure. See **"Saving/Deleting Procedures to/from a Card" on page 71**.

Pass/fail limits may be secured (see **"Securing a Procedure" on page 105** and **"Unsecuring a Procedure" on page 107**).

The list of pass/fail limits is arranged alphabetically. The first two letters in the title of each pass/fail limit indicate its classification. The classifications are:

RX = Receiver

TX = Transmitter

PASS/FAIL LIMIT 1 RX Gain 1900 MHz (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receiver Path Verification TEST for the Legacy 1900-MHz Base Station.

PASS/FAIL LIMIT 2 RX Gain C800 (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receiver Path Verification TEST for the Legacy C800-MHz Base Station.

PASS/FAIL LIMIT 3 RX Gain FCP800 (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receiver Path Verification TEST for the Legacy FCP 800-MHz Base Station.

PASS/FAIL LIMIT 4 RX Gain Macro (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receiver Path Verification TEST for the Legacy Macro Base Station.

PASS/FAIL LIMIT 5 RX Gain Metro 1900 MHz thru One TRM (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receive Path Gain Verification TEST for the Metro Cell 1900-MHz Base Station. This gain is from the DPM input through one TRM to the RX0/RX1 output of the TRM.

PASS/FAIL LIMIT 6 RX Gain Metro 1900 MHz thru Three TRMs (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receive Path Gain Verification TEST for the Metro Cell 1900-MHz Base Station. This gain is from the DPM input through three TRMs to the RX0/RX1 output of the TRM.

PASS/FAIL LIMIT 7 RX Gain Metro 1900 MHz thru Two TRMs (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receive Path Gain Verification TEST for the Metro Cell 1900-MHz Base Station. This gain is from the DPM input through two TRMs to the RX0/RX1 output of the TRM.

PASS/FAIL LIMIT 8 RX Gain Metro 800 MHz Div thru One TRM (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receive Path Gain Verification TEST for the Metro Cell 800-MHz Base Station. This gain is from the DPM input through one TRM to the RX0/RX1 output of the TRM.

PASS/FAIL LIMIT 9 RX Gain Metro 800 MHz Div thru No TRM (dB)

Enter the upper and lower pass/fail limits for the RX gain in the Receive Path Gain Verification TEST for the Metro Cell 800-MHz Base Station. This gain is from the DPM input to the cable connected to the RX0/RX1 output of the TRM.

PASS/FAIL LIMIT 10 RX Loss 1:4 Splitter Metro 800 MHz (dB)

Enter the upper and lower loss limits of the external 1:4 splitter in the 800-MHz Metro Cell Base Station.

PASS/FAIL LIMIT 11 RX Loss 1:6 Splitter Metro 800 MHz (dB)

Enter the upper and lower loss limits of the external 1:6 splitter in the 800-MHz Metro Cell Base Station.

PASS/FAIL LIMIT 12 RX LPP and Cable Metro 800/1900 MHz (dB)

Enter the upper and lower losses of the lightning protection plate (LPP) on the Metro Cell Base Station.

PASS/FAIL LIMIT 13 RX Noise Figure FE (dB)

Enter the upper and lower pass/fail limits for the front end (FE) noise figure for the Legacy 800-MHz Base Station.

PASS/FAIL LIMIT 14 RX Noise Figure RFU (dBm)

Enter the upper and lower pass/fail limits for the radio frequency unit (RFU) noise figure for the Legacy 800-MHz Base Station.

PASS/FAIL LIMIT 15 RX Power Gain Metro Cell (dB)

Enter the lower pass/fail limit for the RX gain in the Receive Power Test for the Metro Cell Base Station.

PASS/FAIL LIMIT 16 TX Adjacent Channel Pow at 750 kHz Offsets (dB)

Enter the upper pass/fail limit for the ratio of the transmitter power in the adjacent channel (at both the + and – 750-kHz offsets) to the power of the desired signal. This specification is used in the Spectral Regrowth Test and the Adjacent Channel Power Test on 800-MHz Metro Cell Base Stations.

PASS/FAIL LIMIT 17 TX Adjacent Channel Pow at 885 kHz Offsets (dB)

Enter the upper pass/fail limit for the ratio of the transmitter power in the adjacent channel (at both the + and – 885-kHz offsets) to the power of the desired signal. This specification is used in the Spectral Regrowth Test and the Adjacent Channel Power Test on 1900-MHz Metro Cell Base Stations.

PASS/FAIL LIMIT 18 TX Code Domain Carrier Feedthru (dB)

Enter the upper pass/fail limit for the carrier feedthrough in Code Domain Measurements in Legacy Base Stations.

PASS/FAIL LIMIT 19 TX Code Domain Carrier Feedthru Metro (dB)

Enter the upper pass/fail limit for the carrier feedthrough in Code Domain Measurements in Metro Cell Base Stations.

PASS/FAIL LIMIT 20 TX Code Domain Frequency Error (Hz)

Enter the upper pass/fail limit for the frequency error in Code Domain Measurements in Legacy Base Stations.

PASS/FAIL LIMIT 21 TX Code Domain Frequency Error Metro (Hz)

Enter the upper pass/fail limit for the frequency error in Code Domain Measurements in Metro Cell Base Stations.

PASS/FAIL LIMIT 22 RX Code Domain Rho

Enter the upper pass/fail limit for the rho in Code Domain Measurements in Legacy Base Stations.

PASS/FAIL LIMIT 23 RX Code Domain Rho Metro Cell

Enter the upper pass/fail limit for the rho in Code Domain Measurements in Metro Cell Base Stations.

PASS/FAIL LIMIT 24 TX Code Domain Time Offset (μsec)

Enter the upper pass/fail limit for the time offset in Code Domain Measurements in Legacy Base Stations.

PASS/FAIL LIMIT 25 TX Code Domain Time Offset Metro Cell (μsec)

Enter the upper pass/fail limit for the time offset in Code Domain Measurements in Metro Cell Base Stations.

PASS/FAIL LIMIT 26 TX Code Domain Time Offset w/IMF or Comb (μsec)

Enter the upper pass/fail limit for time offset in Code Domain Measurements TESTs for 800-MHz Metro Cell Base Stations with an IMF filter or TX combiner.

PASS/FAIL LIMIT 27 TX Inactive Code Channel Maximum Level (dB)

Enter the upper pass/fail limit for the maximum allowable inactive Walsh code level in the Highest Inactive Code Domain Channel Test in the Baseline test group.

PASS/FAIL LIMIT 28 TX Pilot Only Maximum Unused Walsh Codes (dB)

Enter the upper pass/fail limit for the threshold level for determining whether a Walsh code is active or inactive in the Pilot Only Check.

PASS/FAIL LIMIT 29 TX Power Error 1900 MHz (dB)

Enter the upper and lower pass/fail limits for the power error in the RF Power Sensor Verification test for Legacy 1900-MHz Base Stations.

PASS/FAIL LIMIT 30 TX Power Error at Temp Extremes 1900 MHz (dB)

Enter the upper and lower pass/fail limits for the power error at temperatures below 50° F or above 85° F in the RF Power Sensor Verification test for Legacy 1900-MHz Base Stations. This specification is effective only if a temperature outside the normal range is selected in the (More) Configuration Menu screen.

PASS/FAIL LIMIT 31 TX Power Error C800 (dB)

Enter the upper and lower pass/fail limits for the power error in the RF Power Sensor Verification test for Legacy C800 Base Stations.

PASS/FAIL LIMIT 32 TX Power Error FCP800 (dB)

Enter the upper and lower pass/fail limits for the power error in the RF Power Sensor Verification test for Legacy FCP800 Base Stations.

PASS/FAIL LIMIT 33 RX Power Error Macro (dB)

Enter the upper and lower pass/fail limits for the power error in the RF Power Sensor Verification test for Legacy Macro Base Stations.

PASS/FAIL LIMIT 34 TX Power Error Metro Cell 1900 MHz (dB)

Enter the upper and lower pass/fail limits for the power error in the HIP-D Power Sensor Verification test for Metro Cell 1900-MHz Base Stations.

PASS/FAIL LIMIT 35 TX Power Error Metro Cell 800 MHz (dB)

Enter the upper and lower pass/fail limits for the power error in the HIP-D Power Sensor Verification test for Metro Cell 800-MHz Base Stations.

PASS/FAIL LIMIT 36 TX Power Loss Combiner Metro 800 MHz (dB)

Enter the upper and lower loss limits for the 800-MHz Metro Cell Combiner.

PASS/FAIL LIMIT 37 TX Power Loss IMF Metro Cell 800 MHz (dB)

Enter the upper and lower loss limits for the 800-MHz Metro Cell IMF filter.

PASS/FAIL LIMIT 38 TX Power Loss LPP & Cable Metro 1900 MHz (dB)

Enter the upper and lower loss limits for the 1900-MHz Metro Cell lightning protection plate (LPP) and cable.

PASS/FAIL LIMIT 39 TX Power Loss LPP & Cable Metro 800 MHz (dB)

Enter the upper and lower loss limits for the 800-MHz Metro Cell lightning protection plate (LPP) and cable.

PASS/FAIL LIMIT 40 TX Power Loss PAM to DPM Metro 1900 MHz (dB)

Enter the upper and lower pass/fail limits for the 1900-MHz Metro Cell PAM to DPM loss.

PASS/FAIL LIMIT 41 TX Power Loss PAM to DPM Metro 800 MHz (dB)

Enter the upper and lower pass/fail limits for the 800-MHz Metro Cell PAM to DPM loss.

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