Agilent Technologies 8960 Series 10 Wireless Communications Test Set
Agilent Technologies E1962B cdma2000/IS-95/AMPS Mobile Test Application

Manual Operation Guide

Making TIA/EIA-98-E Tests Manually

cdma2000/IS-95/AMPS Mobile Test Application E1962B Revision: B.06

1000-1872 (not orderable)

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Introduction

The intent of this guide is to help you quickly learn how to use the E1962B cdma2000 Test Application to manually make mobile station receiver and transmitter tests as specified in the TIA/EIA-98-E standard.

• See "Making TIA/EIA-98-E Tests" on page 9.

The "Appendix" includes additional information to help you perform the TIA/EIA-98-E tests:

- Test Adherence to Standards table that shows which tests are supported by the test set
- Parameters Adherence to Standard table which provides the mapping of the parameters as specified in the standard to the settings on the test set's front panel
- General procedures that are required to setup the measurements
- Calibration procedures that must be performed periodically when testing mobile stations with the test set

The scope of this guide does not cover the numerous features and capabilities of the test set. For details, refer to the E1962B Online User's Guide which is available at:

- http://www.agilent.com/find/e1962b, or
- User Documentation CD-ROM shipped with your application.

1 Making TIA/EIA-98-E Tests

This chapter demonstrates the step-by-step procedures for making the tests specified in the TIA/EIA-98-E standard. The procedures for each test are based on one set of settings as specified for the test. However, the general setup procedures are the same for other sets of settings. To learn more about which tests are supported by the test set, see "Test Adherence to Standards" .

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Measuring Access Probe Power

General Procedure

NOTE Channel power calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the access probe power measurement. See "Calibrating the Test Set" for details.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Initialize the access probe power measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Access Probe Power` measurement and press the knob.
4. Press the `Access Probe Power Setup` (**F1**) to access the `Access Probe Power Setup` menu. Use the knob and DATA ENTRY keys to set the measurement parameters as needed for your measurement situation. (Some parameters can also be set from the Access Parameters menu in step 3).

Access Probe Power Setup	Value
Power Step	3 dB
Number of Steps	3
Maximum Response Sequence	1
Trigger Arm	Single
Measurement Timeout	Off

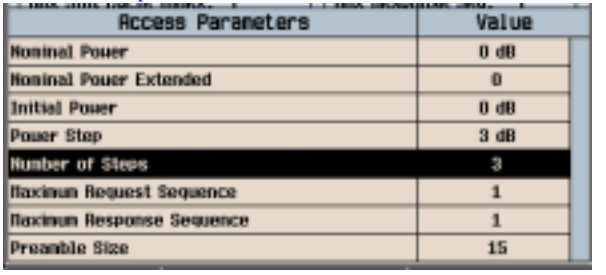
NOTE If you wish to only capture the first access probe, set `Trigger Arm` to `Single` and press the **START SINGLE** key to start the measurement. When the `Trigger Arm` is set to `Continuous`, the test set will display the power level of the most recently measured access probe.

5. Press the `Close Menu` (**F6**) key.
6. Set the test set to ignore all access attempts by setting `Call Limit Mode` to `On` (**F10** on the `Call Parms 2 of 3` menu). See "How Do I Change Call Parameters?" for details.

NOTE It is recommended that you always turn the call limit mode on when measuring access probe power. The easiest way to induce access probes from the mobile station is to page the mobile station. If you do not have call limit mode set to on, when you page the mobile station, the connection will complete, which clears the access probe power result from the measurement screen.

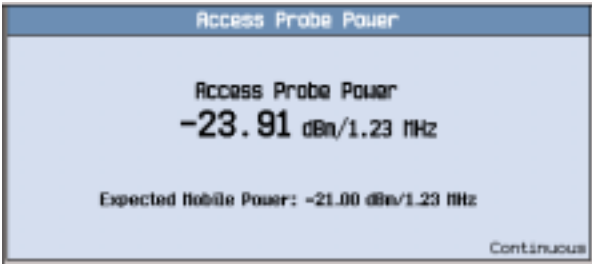
Set call limit mode back to off when you have finished measuring access probe power.

7. Set the `Timer Based Registration State` to `Off` (see "C. Set registration parameters."). It is to prevent an access probe power measurement from being triggered by the unexpected mobile station registration.
8. Set the access parameters (such as power step, number of steps, etc.) as needed for your test situation. See "B. Set access parameters." for details.



Access Parameters	Value
Nominal Power	0 dB
Nominal Power Extended	0
Initial Power	0 dB
Power Step	3 dB
Number of Steps	3
Maximum Request Sequence	1
Maximum Response Sequence	1
Preamble Size	15

9. Press the **START SINGLE** key if you set `Trigger Arm` to `Single` in step 4.
10. Press the **CALL SETUP** key, then press the `Originate Call` (**F3**) key.
11. Press the **MEASUREMENT** key, observe the measurement results. A typical display is shown below.



12.After finishing the measurements:

- Press the `End Call` (**F3** on the `Call Control 1 of 2` menu).
- Turn the `Call Limit Mode` back to `Off`.
- Turn the `Timer Based Registration State` back to `On`.
- Turn the access probe power measurement off by pressing the **Measurement selection** key, selecting `Access Probe Power`, then `Close Measurement` (**F4**).

IMPORTANT If the access probe power measurement is on and waiting to measure a probe, all other measurements (except digital average power) will not be able to execute. It is therefore recommended that you turn off the access probe power measurement before attempting any other measurements.

Testing 4.4.1 Range of Open Loop Output Power

Definition: This test measures the range of the estimated open loop output power. The mobile station estimates its open loop mean output power from its mean input power.

The test set does not support the Enhanced Access Channel tests. The following test procedure assumes that the mobile station is Class II and supports Band Class 1 (US PCS). You should change the settings as specified for other configurations. Unless otherwise stated, set all parameter settings to their defaults. For details on performing the steps below, see the "General Procedure" on page 11 above.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Initialize the access probe power measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Access Probe Power` measurement and press the knob.

4. Press the Access Probe Power Setup (**F1**) to access the Access Probe Power Setup menu. Use the knob and DATA ENTRY keys to set the measurement parameters as specified for the test.

Access Probe Power Setup	Value
Power Step	3 dB
Number of Steps	3
Maximum Response Sequence	1
Trigger Arm	Single
Measurement Timeout	Off

NOTE If you wish to only capture the first access probe, set Trigger Arm to Single and press the **START SINGLE** key to start the measurement. When the Trigger Arm is set to Continuous, the test set will display the power level of the most recently measured access probe. Observe the display changes.

5. Press the Close Menu (**F6**) key.
6. Press the **CALL SETUP** key, set the Cell Band (**F8**) to US PCS.
7. Set the test set to ignore all access attempts by setting Call Limit Mode to On (**F10** on the Call Parms 2 of 3 menu).
8. Set the Timer Based Registration State to Off (see "C. Set registration parameters.") to prevent an access probe power measurement from being triggered by the unexpected mobile station registration.
9. Set the access parameters as specified (see "B. Set access parameters." for details).
   - Set Preamble Size (PAM_SZ) to 15.
   - Set Maximum Response Sequence (MAX_RSP_SEQ) to 1.

Access Parameters	Value
Nominal Power	0 dB
Nominal Power Extended	0
Initial Power	0 dB
Power Step	3 dB
Number of Steps	3
Maximum Request Sequence	1
Maximum Response Sequence	1
Preamble Size	15

10. Set `Cell Power` ($\hat{I}_{or}$) (**F7** on the `Call Parms 1 of 3`) as specified:
    - Test 1: `-25 dBm/1.23 MH`
    - Test 2: `-65 dBm/1.23 MH`
    - Test 3: `-97 dBm/1.23 MH` (depending on Band Class)
11. If you set the `Trigger Arm` to `Single` in step 4, press the **START SINGLE** key. If you set the `Trigger Arm` to `Continuous`, skip this step.
12. Press the **CALL SETUP** key, then press the `Originate Call` (**F3**) key.
13. Press the **MEASUREMENT** key, observe the measurement results. A typical display is shown below.
14. After finishing the measurements, press the **CALL SETUP** key, then press the `End Call` (**F3**).
15. Repeat the steps 10-14 for test 2 and test 3.
16. After finishing all measurements:
    - Turn the `Call Limit Mode` back to `Off`.
    - Turn the `Timer Based Registration State` back to `On`.
    - Turn the access probe power measurement off by pressing the **Measurement selection** key, selecting `Access Probe Power`, then `Close Measurement` (**F4**).

IMPORTANT If the access probe power measurement is on and waiting to measure a probe, all other measurements (except digital average power) will not be able to execute. It is therefore recommended that you turn off the access probe power measurement before attempting any other measurements.

Testing 4.4.3 Access Probe Output Power

Definition: This test verifies the following Access Channel and Enhanced Access Channel parameters: nominal power offset, initial power offset, power increment between consecutive probes, number of access probes in one probe sequence, and the number of probe sequences in one mobile station page response access attempt.

The test set does not support the Enhanced Access Channel test. The following procedure is for Access Channel test and assumes that the mobile station is Class II and supports Band Class 1 (US PCS). You should change the settings as specified for other types of mobile station. Unless otherwise stated, leave all parameter settings to the defaults. For details on performing the steps below, see the "General Procedure" on page 11 above.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Initialize the access probe power measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Access Probe Power` measurement and press the knob.
4. Press the `Access Probe Power Setup` (**F1**) to access the `Access Probe Power Setup` menu. Use the knob and DATA ENTRY keys to set the measurement parameters as specified for the test.

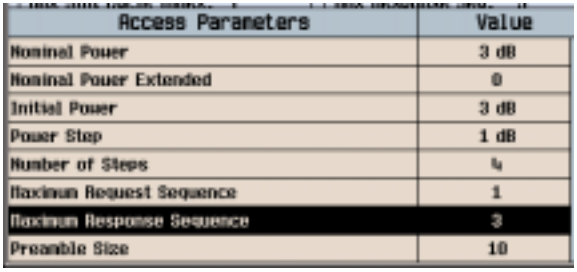
Access Probe Power Setup	Value
Power Step	3 dB
Number of Steps	3
Maximum Response Sequence	1
Trigger Arm	Single
Measurement Timeout	Off

NOTE If you wish to only capture the first access probe, set `Trigger Arm` to `Single` and press the **START SINGLE** key to start the measurement. When the `Trigger Arm` is set to `Continuous`, the test set will display the power level of the most recently measured access probe. Observe the display changes.

5. Press the `Close Menu` (**F6**) key.
6. Press the **CALL SETUP** key, set the `Cell Band` (**F8**) to `US PCS`.
7. Set `Cell Power` ($\hat{I}_{or}$) to `-75 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
8. Set the test set to ignore all access attempts by setting `Call Limit Mode` to `On` (**F10** on the `Call Parms 2 of 3` menu).
9. Set the `Timer Based Registration State` to `Off` (see "C. Set registration parameters.") to prevent an access probe power measurement from being triggered by the unexpected mobile station registration.

10. Set the access parameters (such as initial power, power step, number of steps, etc.) as specified for the test (see "B. Set access parameters." for details).

    - Test 1: Set all parameters to the defaults.
    - Test 2: Set `Nominal Power` (NOM_PWR) to 3 dB, `Initial Power` (INIT_PWR) to 3 dB, `Power Step` (PWR_STEP) to 1 dB, `Number of Steps` (NUM_STEP) to 4, `Maximum Response Sequence` (MAX_RSP_SEQ) to 3.



Access Parameters	Value
Nominal Power	3 dB
Nominal Power Extended	0
Initial Power	3 dB
Power Step	1 dB
Number of Steps	4
Maximum Request Sequence	1
Maximum Response Sequence	3
Preamble Size	10

11. If you set the `Trigger Arm` to `Single` in step 4, press the **START SINGLE** key. If you set the `Trigger Arm` to `Continuous`, skip this step.
12. Press the **CALL SETUP** key, then press the `Originate Call` (**F3**) key.
13. Press the **MEASUREMENT** key, observe the measurement results.
14. After finishing the measurement, press the **CALL SETUP** key, then press the `End Call` (**F3**).
15. Repeat the above steps 10-14 for Test 2.
16. After finishing all measurements:

    - Turn the `Call Limit Mode` back to `Off`.
    - Turn the `Timer Based Registration State` back to `On`.
    - Turn the access probe power measurement off by pressing the **Measurement selection** key, selecting `Access Probe Power`, then `Close Measurement` (**F4**).

IMPORTANT If the access probe power measurement is on and waiting to measure a probe, all other measurements (except digital average power) will not be able to execute. It is therefore recommended that you turn off the access probe power measurement before attempting any other measurements.

Measuring Code Channel Time/Phase Error

General Procedure

NOTE Channel power calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the Code Channel Time/Phase Error measurement. See "Calibrating the Test Set" for details.

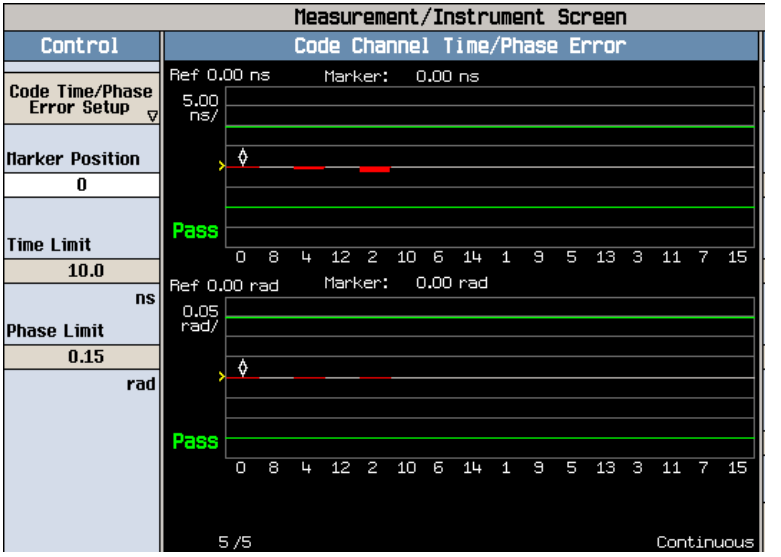
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station with Radio Configuration ((Fwd3, Rvs3), or above) selected. (see "How Do I Set Up an IS-2000 Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Code Channel Time/Phase Error` measurement and press the knob.
5. Press the `Code Time/Phase Error Setup` (**F1**) key to access the `Code Time/Phase Error Setup` menu and set the measurement parameters as needed for your testing situations.

Code Time/Phase Error Setup	Value
Multi-Measurement Count	Off
Trigger Arm	Continuous
Measurement Timeout	Off

NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the **ON** key (the number of averages will default to 10) or directly enter the value as desired.

NOTE If the Trigger Arm is set to Continuous the measurement began executing as soon as you initialize the measurement in step 4. If single is selected in the Trigger Arm field, press the **START SINGLE** key to trigger each measurement.

6. A typical display is shown below, observe the pass/fail result.
7. You can change the time and phase limit settings as needed for your testing situations by using the Time Limit (**F3**) and Phase Limit (**F4**) keys.
8. To display the numeric results for a code channel, press the Marker Position (**F2**) and turn the knob to position the marker to the bar.



9. After finishing the measurements:
   - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting Code Channel Time/Phase Error, then Close Measurement (**F4**).

Testing 4.3.2 Reverse Pilot Channel to Code Channel Time Tolerance

Definition: This test measures the permissible error in timing between the radiated Reverse Pilot Channel and the other code channels when operating with Radio Configurations 3 through 6.

Testing 4.3.3 Reverse Pilot Channel to Code Channel Phase Tolerance

Definition: This test measures the permissible error in RF phase between the radiated Reverse Pilot Channel and the other code channels when operating with Radio Configurations 3 through 6.

You can perform the above two tests with the following test procedure. It assumes that the mobile station supports Band Class 1 (US PCS) and Radio Configuration 3 or above. Unless otherwise stated, leave all parameter settings to the defaults. For details on performing the steps below, see the "General Procedure" on page 19 above.

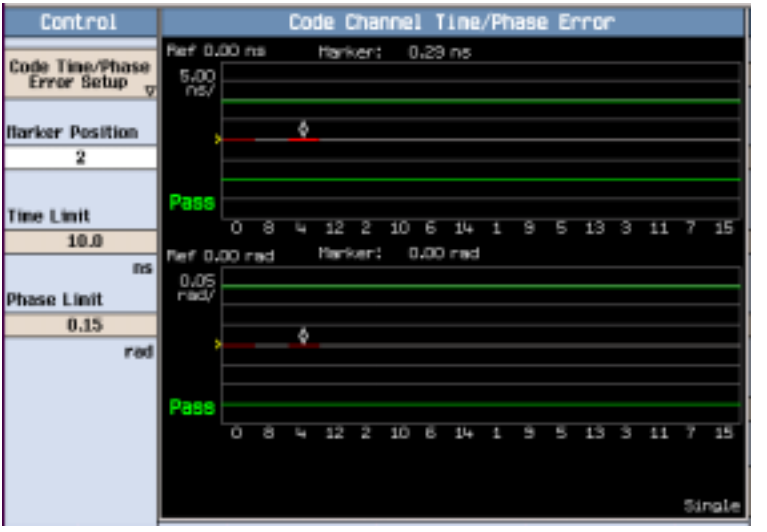
NOTE Both tests can be made only when the call is established with radio configuration ((Fwd3, Rvs3), or above) selected.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings need change as specified for other tests).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd3, Rvs3)`.
   - Select `FCH Service Option Setup` (**F12**) `(Call Parms 1 of 3)`, set `Service Option for Fwd3, Rvs3` to `SO2`.
   - Set `Cell Power` ($\hat{I}_{or}$) to `-55 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
4. Press the **Measurement selection** key, select the `Code Channel Time/Phase Error` measurement.
5. Press the `Code Time/Phase Error Setup` (**F1**) key to access the `Code Time/Phase Error Setup` menu and set the measurement parameters as needed, then press the `Close Menu` (**F6**) key.

Code Time/Phase Error Setup	Value
Multi-Measurement Count	Off
Trigger Arm	Continuous
Measurement Timeout	Off

6. Set the `Time Limit` (**F3**) to 10 ns, or as needed.
7. Set the `Phase Limit` (**F4**) to 0.05 rad, or as needed.

8. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous`, you can skip this step.
9. A typical display is shown below. Observe the pass/fail result.



10. To display the numeric results for a code channel, press the `Marker Position` (**F2**) and turn the knob to position the marker to the bar.
11. If desired, after finishing the measurements, turn the measurement off by pressing the **Measurement selection** key, selecting `Code Channel Time/Phase Error`, then `Close Measurement` (**F4**).

Measuring Channel Power

General Procedure

NOTE Channel power calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. See "Calibrating the Test Set" for details.

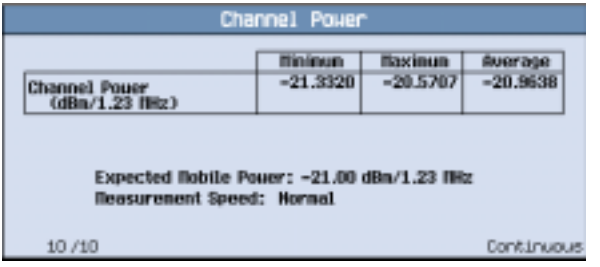
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Channel Power` measurement and press the knob.
5. Press the `Channel Power Setup` (**F1**) key to access the `Channel Power Setup` menu.
6. Set the measurement parameters as needed for your measurement situation by using the knob and DATA ENTRY keys. Press the `Close Menu` (**F6**) key to close the Setup window.

Channel Power Setup	Value
Multi-Measurement Count	10
Trigger Arm	Single
Measurement Speed	Normal
Measurement Timeout	Off

NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the **ON** key or enter the number of the measurements. The number of averages will default to 10.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

7. A typical display is shown below.



8. After finishing the measurements:

   - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Channel Power`, then `Close Measurement` (**F4**).

Testing 4.4.6 Minimum Controlled Output Power

Definition: The minimum controlled output power of the mobile station is the output power, measured at the mobile station antenna connector, when both closed loop and open loop power control indicate minimum output.

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS). You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

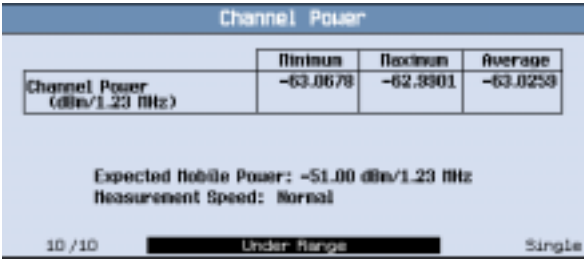
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (you need to change some settings as needed).

   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd1, Rvs1)`.
   - Select `FCH Service Option Setup` (**F12**) `(Call Parms 1 of 3)`, set `Service Option for Fwd1, Rvs1` to `SO2 (Loopback)`.
   - Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Full`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.

4. Press the **Measurement selection** key, select the `Channel Power` measurement.
5. Press the `Channel Power Setup` (**F1**) key to access the `Channel Power Setup` menu. Set the measurement parameters as needed. Press the `Close Menu` (**F6**) key.

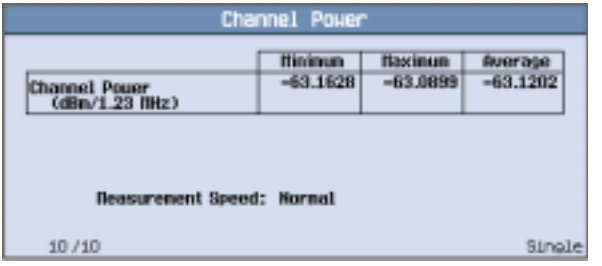
Channel Power Setup	Value
Multi-Measurement Count	10
Trigger Arm	Single
Measurement Speed	Normal
Measurement Timeout	Off

6. Set the `Call Drop Timer` to `Off` (**F9** on the `Call Parms 2 of 3` menu) to keep the test set from drop the connection based on the very low output power level of the mobile station.
7. Set `Cell Power` ($\hat{I}_{or}$) to `-25 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`) to force the open loop power control estimate to the minimum output.
8. Set the `F-Pilot Level` to -7.00 dB, and set the `F-FCH/Traffic Level` to -7.4 dB (see "How Do I Change Code Channel Levels and Walsh Codes?").
9. Set `Rvs Power Ctrl` (**F7** on the `Call Parms 2 of 3` menu) to `All Down bits`, which makes test set to transmit continuous '1' power control bits to the mobile station to force the closed loop power control to the minimum output.
10. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 8.
11. Press the **MEASUREMENT** key, observe the measurement results.



12. If Under Range is displayed, it indicates that the mobile station output power is below -61 dBm or is less than -9 dB below the expected power level of the receiver. To get the correct result, we recommend you manually control the test set's receiver and then observe the measurement results.
    - Press the `Rcvr Power Ctrl` (**F8**) key (on Call Parms 3 of 3) and select `Manual` to manually set the receiver's expected power.

- Press the Receiver Power (**F9**) key (on Call Parms 3 of 3) and enter -61dBm (or as needed) by using the knob or numeric keys.
- Repeat the steps 10-11. A typical display is shown below.



13.After finishing the measurements:

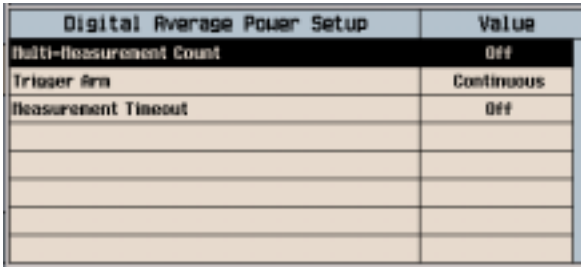
- Turn the Call Drop Timer back to On.
- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting Channel Power, then Close Measurement (**F4**).

Measuring Digital Average Power

General Procedure

NOTE Digital Average Power Calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. See "Calibrating the Test Set" for details.

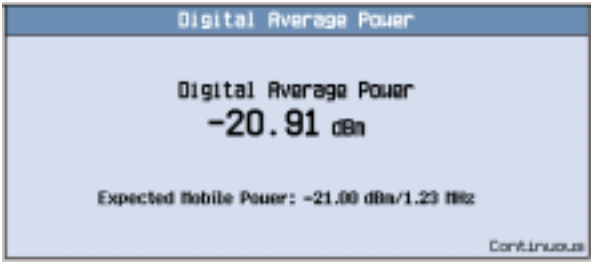
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Digital Average Power` measurement and press the knob.
5. Press the `Digital Average Power Setup` (**F1**) key to access the `Digital Average Power Setup` menu.
6. Set the measurement parameters as needed for your test situation by using the knob and DATA ENTRY keys. Press the `Close Menu` (**F6**) key to close the Setup window.



NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the **ON** key or enter the number of the measurements to be averaged. The number of averages will default to 10.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

7. A typical display is shown below.



8. After finishing the measurements:
   - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Digital Average Power`, then `Close Measurement` (**F4**).

Testing 4.4.5 Maximum RF Output Power

Definition: This test measures the maximum power that the mobile station transmits as measured at the mobile station antenna connector.

The test set does not support the Enhanced Access Channel test. The following procedure is for Access Channel test and assumes that the mobile station supports Band Class 1 (US PCS) and Spreading Rate 1. You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Set all of the access parameters (open loop parameters) to their maximum settings (see "B. Set access parameters."):
   - Set `Nominal Power` (NOM_PWR) to 3 dB.
   - Set `Initial Power` (INIT_PWR) to 3 dB.
   - Set `Power Step` (PWR_STEP) to 7 dB/step.
   - Set `Number of Steps` (NUM_STEP) to 15 (16 probes/sequence).

- Set Maximum Response Sequence (MAX_RSP_PWR) to 15 sequences.

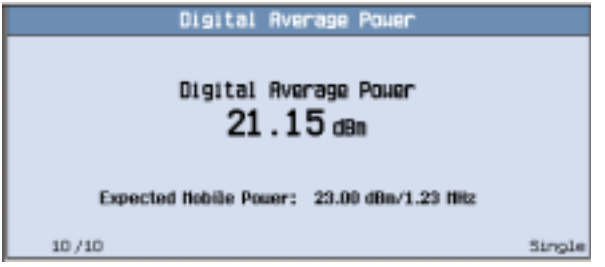
Access Parameters	Value
Nominal Power	3 dB
Nominal Power Extended	0
Initial Power	3 dB
Power Step	7 dB
Number of Steps	15
Maximum Request Sequence	1
Maximum Response Sequence	15
Preamble Size	10

4. Establish a call with the following parameter settings (you could change some settings as needed).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set Cell Band (**F8** on the Call Parms 1 of 3) to US PCS.
   - Set Radio Config (**F11** on the Call Parms 1 of 3) to (Fwd1, Rvs1).
   - Select FCH Service Option Setup (**F12**) (Call Parms 1 of 3), set Service Option for Fwd1, Rvs1 to SO2 (Loopback).
   - Set Traffic Data Rate (**F12** on the Call Parms 2 of 3) to Full.
   - Press Originate Call (**F3**) to initiate a call. Verify that the Connected is in the Active Cell status field.
5. Set Cell Power ($\hat{I}_{or}$) to -104 dBm/1.23 MHz (**F7** on the Call Parms 1 of 3).
6. Set the F-Pilot Level to -7.00 dB, and set the F-FCH/Traffic Level to -7.4 dB (see "How Do I Change Code Channel Levels and Walsh Codes?").
7. Set Rvs Power Ctrl to All Up bits (**F7** on the Call Parms 2 of 3 menu) to transmit continuous '0' power control bits.
8. Press the **Measurement selection** key, select the Digital Average Power measurement.
9. Press the Digital Average Power Setup (**F1**) key to access the Digital Average Power Setup menu. Set the measurement parameters as needed, then press the Close Menu (**F6**) key.

Digital Average Power Setup	Value
Multi-Measurement Count	10
Trigger Arm	Single
Measurement Timeout	Off

10. If single is selected in the Trigger Arm field, press the **START SINGLE** key to trigger each measurement. If the Trigger Arm is set to Continuous, you can skip this step.

11. Press **MEASUREMENT** key, a typical display is shown below.



12. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Digital Average Power`, then `Close Measurement` (**F4**).

Measuring Frame Error Rate (FER)

- "General Procedure"
- "Testing 3.4.1 Demodulation of Forward Traffic Channel in AWGN" (for forward fundamental channel test)
- "Testing 3.5.1 Receiver Sensitivity and Dynamic Range"

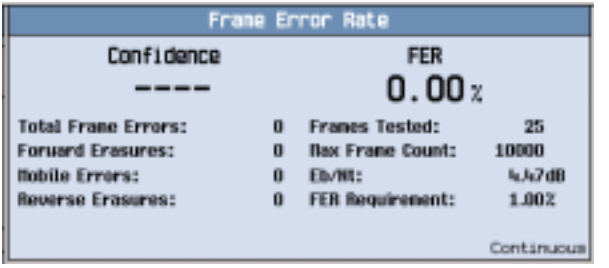
General Procedure

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station with a loopback service option (SO2, SO9 or SO55) selected (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Frame Error Rate` measurement and press the knob.
5. Press `AWGN Power` (**F3**), use the knob and DATA ENTRY keys to enter `-54 dBm/1.23 MHz`, or as needed.
6. Press the `Frame Error Rate Setup` (**F1**) key to access the `Frame Error Rate Setup` menu.
7. Use the knob and DATA ENTRY keys to set the measurement parameters as needed for your measurement situation. Press the `Close Menu` (**F6**) key to close the settings.

Frame Error Rate Setup	Value
Confidence Level	95.00 %
FER Requirement	1.00 %
Maximum Frame Count	10000
F-FCH/Traffic Level	-15.60 dB
Trigger Arm	Continuous
Measurement Timeout	Off

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

8. A typical display is shown below.



9. After finishing the measurements, turn the measurement off if desired. Press the **Measurement selection** key, selecting `Frame Error Rate`, then `Close Measurement` (**F4**).

Testing 3.4.1 Demodulation of Forward Traffic Channel in AWGN

Definition: This test evaluates how well the mobile station demodulates the Forward Traffic Channel in the presence of noise (simulated by AWGN). The performance of the demodulation of Forward Traffic Channel in an AWGN (no fading or multipath) environment is determined by the frame error rate (FER).

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS) and only demonstrates the Test 1. You should change the settings as specified for other tests. Unless otherwise stated, leave all parameter settings to the defaults.

NOTE The FER measurement is used for testing the *forward fundamental channel*. You can use TDSO FER measurement to perform the tests for *forward supplemental channel*. See "Measuring TDSO (Test Data Service Option) Frame Error Rate (FER)" on page 47.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to (`Fwd1, Rvs1`).
   - Select `FCH Service Option Setup` (**F12**) (`Call Parms 1 of 3`), set `Service Option for Fwd1, Rvs1` to `SO2 (Loopback)`.
   - Set `Cell Power` ($\hat{I}_{or}$) to `-55 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
   - Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Full`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.

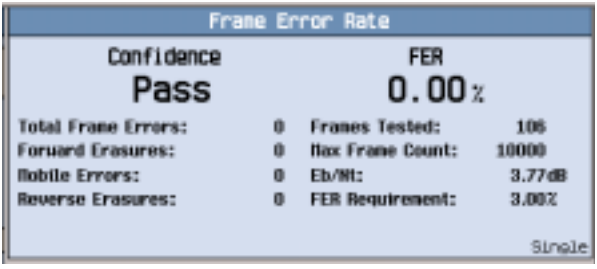
4. Press the **Measurement selection** key, select the `Frame Error Rate` measurement.
5. Press **F3**, set `AWGN Power` (I_{oc}) to `-54 dBm/1.23 MHz`.
6. Press **F1** to access the `Frame Error Rate Setup` menu (some settings may change as specified for each test).
   - Set FER Requirement to 3.00%.
   - Set F-FCH/Traffic Level to -16.3 dB.
   - Set Trigger Arm to Single.
   - Press `Close Menu` (**F6**).

Frame Error Rate Setup	Value
Confidence Level	95.00 %
FER Requirement	3.00 %
Maximum Frame Count	10000
F-FCH/Traffic Level	-16.30 dB
Trigger Arm	Single
Measurement Timeout	Off

7. Press the **START SINGLE** key to begin the measurement.

NOTE If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement.

8. A typical display is shown below.



9. Repeat the steps 3-8 with the settings as specified for each test.
10. After finishing all of the tests, turn the measurement off if desired. Press the **Measurement selection** key, selecting `Frame Error Rate`, then `Close Measurement` (**F4**).

Testing 3.5.1 Receiver Sensitivity and Dynamic Range

Definition: The RF sensitivity of the mobile station receiver is the minimum received power, measured at the mobile station antenna connector, at which the frame error rate (FER) does not exceed a specified value. The receiver dynamic range is the input power range at the mobile station antenna connector over which the FER does not exceed a specific value.

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS). All settings for the Receiver Sensitivity test and the Dynamic Range test could be the same, except the cell power ($\hat{I}_{or}$) settings as shown below. Unless otherwise stated, leave all parameter settings to the defaults.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fw1, Rvs1)`.
   - Select `FCH Service Option Setup` (**F12**) (`Call Parms 1 of 3`), set `Service Option for Fw1, Rvs 1` to `SO2 (Loopback)`.
   - Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Full`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
4. For Test 1: *Receiver Sensitivity* test, set `Cell Power` ($\hat{I}_{or}$) to `-104 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
   For Test 2: *Dynamic Range* test, set `Cell Power` ($\hat{I}_{or}$) to `-25 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`)
5. Press the **Measurement selection** key, select the `Frame Error Rate` measurement.
6. Verify that `AWGN Power` (I_{oc}) (**F3**) is `OFF`.
7. Press **F1** to access the `Frame Error Rate Setup` menu (some settings may change as specified for each test).
   - Set FER Requirement to 5.00%.
   - Set F-FCH/Traffic Level to -15.6 dB.
   - Set Trigger Arm to Single.

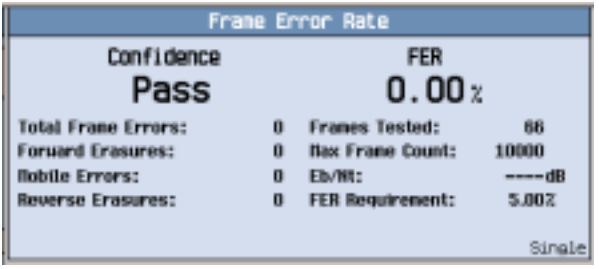
- Press Close Menu (**F6**).

Frame Error Rate Setup	Value
Confidence Level	95.00 %
FER Requirement	5.00 %
Maximum Frame Count	10000
F-FCH/Traffic Level	-15.60 dB
Trigger Arm	Single
Measurement Timeout	Off

8. Press the **START SINGLE** key to begin the measurement.

NOTE If the Trigger Arm is set to Continuous the measurement began executing as soon as you initialize the measurement in step 4. If single is selected in the Trigger Arm field, press the **START SINGLE** key to trigger each measurement.

9. A typical display is shown below.



10. Repeat the steps 4-9 for test 2.

11. After finishing all of the tests, turn the measurement off if desired. Press the **Measurement selection** key, selecting Frame Error Rate, then Close Measurement (**F4**).

Measuring Frame Error Rate (FER)

Measuring Gated Power

General Procedure

NOTE Channel power calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the gated power measurement. See "Calibrating the Test Set" for details.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station (see "How Do I Set Up a Call?" on page 81).
   - For IS-95 call, make sure the call is connected with a loopback service option (SO2 or SO9) selected before making the following measurements.
   - For IS-2000 call, make sure the call is connected with Radio Config set to (Fwd1, Rvs1) or (Fwd2, Rvs2), and FCH Service Option Setup set to a loopback service option (SO2 or SO9).
4. Press the **More** key on the lower right side of the display (Call Parms) until 2 of 3 is displayed. Press the `Traffic Data Rate` key (**F12**) key, then select **`Eighth`**.
5. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Gated Power` measurement and press the knob.
6. Press the `Gated Power Setup` (**F1**) key to access the `Gated Power Setup` menu.
7. Set the measurement parameters as needed for your test situation by using the knob and DATA ENTRY keys. Press the `Close Menu` (**F6**) key to close the Setup window.

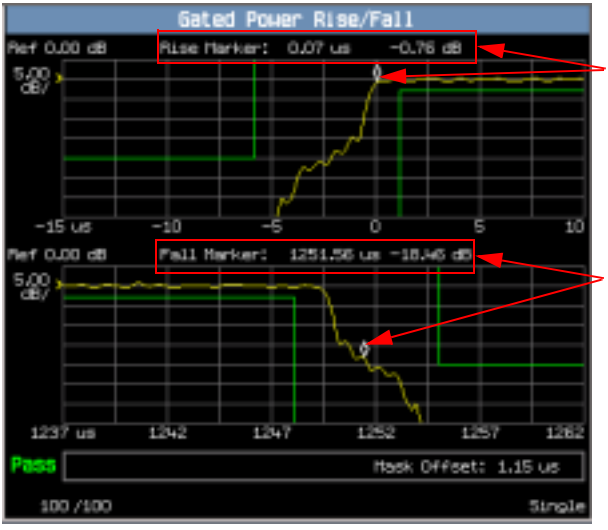
Gated Power Setup	Value
Multi-Measurement Count	100
F-FCH/Traffic Level	-15.60 dB
Trigger Arm	Continuous
Measurement Timeout	Off

NOTE The default settings for gated power measurements include multi-measurement on with a 100 measurement count.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

8. Two types of the power versus time graph view are available after the test set analyzes measurement data. By default, the Rise/Fall View is displayed.The rise trace zooms in on the rising edge of the burst and the fall trace zooms in on the falling edge of the burst.

   - Observe the Pass/Fail results.
   - If you want to display the power level at a point along the Rise Trace, press the Rise Marker (**F3**) key and turn the knob to select the desired points.
   - If you want to display the power level at a point along the Fall Trace, press the `Fall Marker` (**F4**) key and turn the knob to select the desired points.



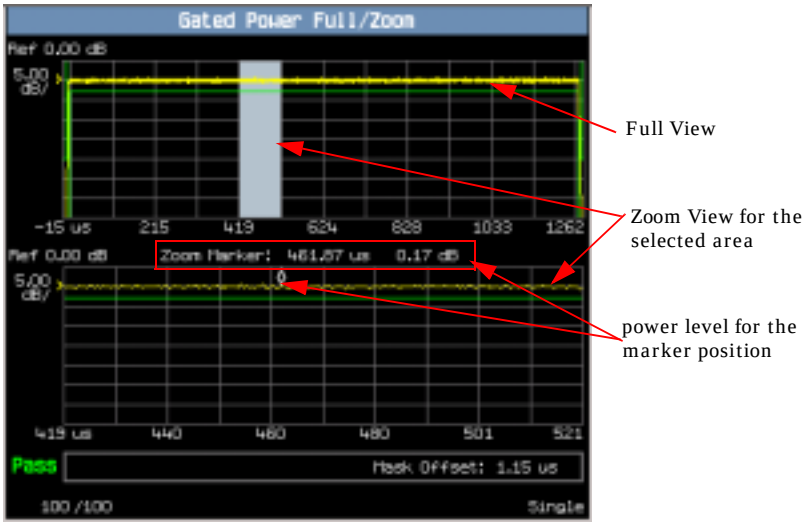
Rise Marker Position and relative power level.

Fall Marker Position and relative power level.

9. If you want to display the full trace, press the `Full/Zoom` key (**F2**). A typical display is shown below (The extreme left and right zoom positions equate to the rise and fall views.).

   - Press the `Zoom Position` (**F3**) key, then turn the knob to select an area highlighted by a vertical bar on the full trace (the top graph) to zoom in. The zoom trace details the selected area on the low graph.
   - If you want to display the power level at a point along the zoom trace, press the `Zoom Marker` (**F4**) key and turn the knob to select the desired points.

- Press the `Rise/Fall View` (**F2**) key if you want to return to Rise/Fall View.



10.After finishing the measurements:

- Turn the measurement off by pressing the **Measurement selection** key, selecting `Gated Power`, then `Close Measurement` (**F4**).

Testing 4.4.7 Standby Output Power and Gated Output Power

The test set does not support the Standby Output Power test and only supports the Gated Output Power test for Radio Configuration 1 or 2.

Definition: The Gated Output Power test measures the time response of the mean output power for a gated-on power control group (1.25 ms).

The following procedure assumes that the mobile station supports Band Class 1 (US PCS). You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

NOTE This test can be made only when the call is established with radio configuration ((Fwd1, Rvs1), or (Fwd2, Rvs2)) and with 1/8 Data Rate selected.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for other tests).

- Press **CALL SETUP** to access Call Parms and Call Control menus.
- Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
- Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to (`Fwd1, Rvs1`).
- Select `FCH Service Option Setup` (**F12**) (`Call Parms 1 of 3`), set `Service Option for Fwd1, Rvs1` to `SO2`.
- Press `Originate Call` (**F3** on the `Call Control 1 of 3`) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.

4. Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Eighth`.
5. Set `Cell Power` ($\hat{I}_{or}$) to `-75 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
6. Set `Rvs Power Ctrl` to `Alternating bits` (**F7** on the `Call Parms 2 of 3` menu) to send alternating '0' and '1' power control bits on the Forward Traffic Channel.
7. Press the **Measurement selection** key, select the `Gated Power` measurement.
8. Press the `Gated Power Setup` (**F1**) key to access the `Gated Power Setup` menu. You could Set the measurement parameters as needed for your measurement situation.
   - Set Multi-Measurement Count to 100.
   - Set F-FCH/Traffic Level to -7.40 dB.
   - Set Trigger Arm to Single.
   - Press `Close Menu` (**F6**).

Multi-Measurement Count	100
F-FCH/Traffic Level	-7.40 dB
Trigger Arm	Single
Measurement Timeout	Off

9. Press the **START SINGLE** key to trigger the measurement if `single` is selected in the `Trigger Arm` field. If the `Trigger Arm` is set to `Continuous`, skip this step.
10. Press the **MEASUREMENT** key, observe the Pass/Fail results.Two types of the power versus time graph view are available after the test set analyzes measurement data (see steps 8-9 of the "General Procedure" on page 37 for details).
11. After finishing the measurements:
    - Turn the measurement off by pressing the **Measurement selection** key, selecting `Gated Power`, then `Close Measurement` (**F4**).

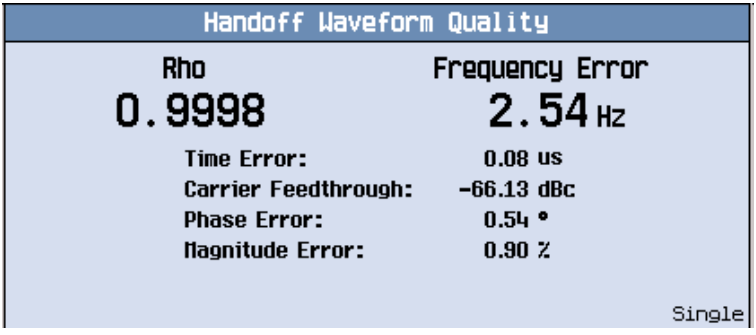
Measuring Handoff Waveform Quality

The reverse channel of cdma2000 differs from IS-95's because there are multiple channels transmitted on the reverse link due to its new introduced radio configurations (radio configuration 3 and above). To measure IS-95 style waveform quality of the pilot signal (single-coded rho), there is one very short period of time, (during a handoff) when only the pilot channel is transmitting. This measurement can be used to perform the tests as described in the TIA/EIA-98-E standard.

We recommend to use the Agilent's multi-coded rho measurement to perform the tests as specified in TIA/EIA-98-E standard (see "Measuring Waveform Quality/Code Domain Power") since it offers the best measure of performance for cdma2000 systems while multiple code channels are active and restores the ability to test the whole signal.

General Procedure

1. Establish a call with the mobile station with Radio Config set to (Fwd3, Rvs3) or above (see "How Do I Set Up an IS-2000 Call?" on page 81).
2. Press the **Measurement selection** key.
3. Turn the knob to highlight the `Handoff Waveform Quality` measurement and press the knob.
4. Press the `Handoff Waveform Quality Setup` (**F1**) key to access the `Handoff Waveform Quality Setup` menu.
5. Set the measurement parameters as needed for your measurement situation.
6. Press the `Close Menu` (**F6**) key.
7. Press the **START SINGLE** key. A typical display is shown below.



Each waveform quality measurement returns a number of measurements which includes numeric rho. In addition to rho, it also provides the following measurements, calculated from the same data:

- Time Error
- Carrier Feedthrough

Measuring Handoff Waveform Quality

- Phase Error
- Magnitude Error

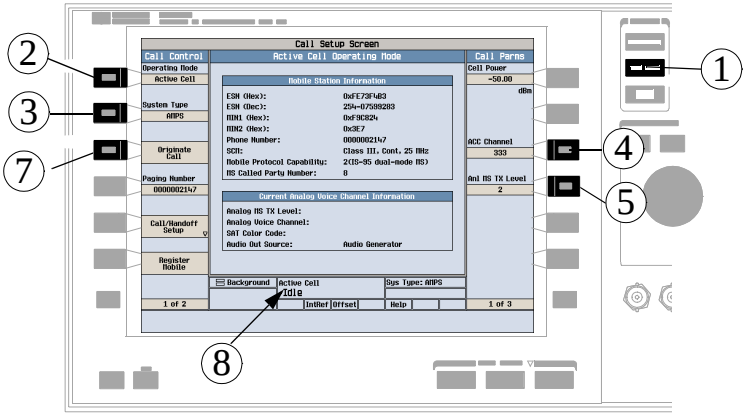
Measuring SINAD Sensitivity

The following procedure provides an example of how to manually make an SINAD sensitivity measurement.

The example procedure is assumed that the mobile's audio output is connected to the test set's front-panel AUDIO IN connectors and the mobile is on an analog voice channel (AVC) that is being modulated with a 1004 Hz tone at ± 8 kHz peak deviation. It is also assumed that the Cell Power from the test set is set to a minimum usable level (typically about -117 dBm).

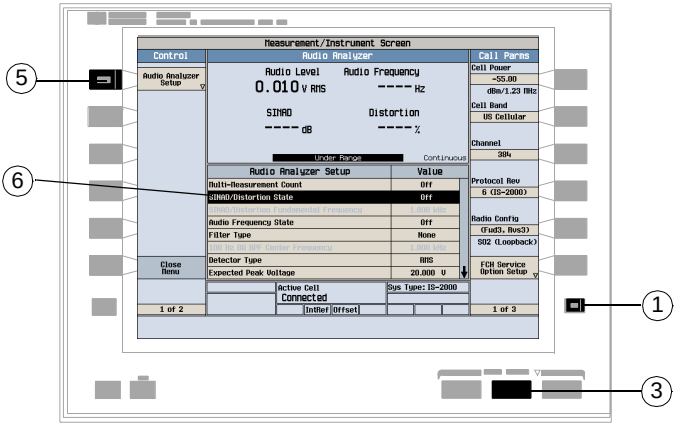
General Procedure

A. Establish an AMPS call.



1. Press the **CALL SETUP** key.
2. Press the `Operating Mode` (**F1**) key and set the operating mode to `Active Cell`.
3. Press the `System Type` (**F2**) key and select AMPS.
4. Press the `ACC Channel` (**F9**) key and set the appropriate RF channel number if necessary. *(the default analog control channel is 333.)*
5. Press the `Anl MS TX Level` (**F10**) key and set the mobile power level if necessary.
6. Turn on power to the mobile station and wait for an indication that it has found analog service. (*It may be necessary to force the mobile station into Analog mode if it is a dual mode CDMA/AMPS phone.*)
7. Make a mobile station originated call (by entering a phone number and pressing SEND on the mobile station), or make a test set originated call (wait for the mobile station to perform a power up registration or press the `Register Mobile` (**F6**) key to ask mobile station to register with test set, then press the `Originate Call` (**F3**) key).
8. Check for `Connected` in the `Active Cell` status field.

B. Set up the Audio Analyzer Instrument.



1. Press the **More** key on the lower right side of the display (Call Parms) until `2 of 3` is displayed.
2. Press the `Int FM Dev` (**F7**) key and enter 8 KHz using the knob and DATA ENTRY keys.
3. Press the **Instrument Selection** key.
4. Turn the knob to highlight the `Audio Analyzer` from the list and press the knob.
5. Press the `Audio Analyzer Setup` (**F1**) key to access `Audio Analyzer Setup` menu.
6. Make the following settings by using the knob and DATA ENTRY keys:
   - Set the `SINAD/Distortion State` to `On`
   - Set the `Audio Frequency State` to `On`
   - Set the `Filter Type` to `C-Message`
   - Set the `Detector Type` to `RMS`
   - Set the `Expected Peak Voltage` to meet your testing needs
   - Set the `De-Emphasis State` to `Off`

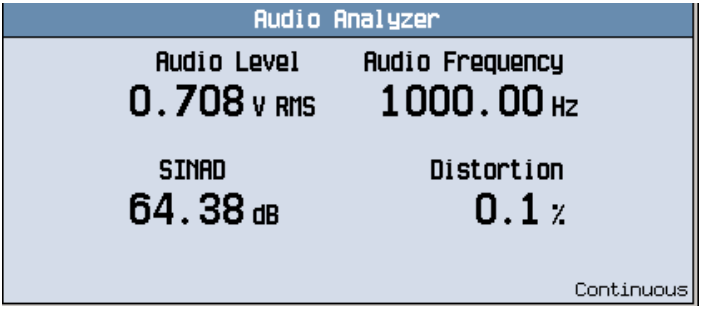
NOTE You can also change all above settings as needed for your measurement situation.

NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the ON key. The number of averages will default to 10.

7. Press the `Close Menu` (**F6**) key.

C. Observe the measurements results.

1. Press the **More** key on the lower right side of the display (Call Parms) until `1 of 3` is displayed.
2. Press the `Cell Power` (**F7**) key and enter a minimum usable level (typically about -117 dBm) by using DATA ENTRY keys.
3. Observe the SINAD measurement. It should be greater than 12 dB. A typical display is shown below.



The measurement results include:

- Audio Level
- Audio Frequency
- SINAD
- Distortion

Measuring TDSO (Test Data Service Option) Frame Error Rate (FER)

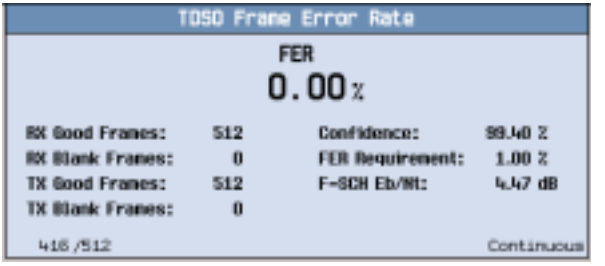
General Procedure

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station with the following settings (see "How Do I Set Up a Call?" on page 81).
   - Press the `Radio Config` (**F11**) key and select the radio configuration: `(Fwd3, Rvs3)`, or above.
   - Press the `FCH Service Option Setup` (**F12**), select the service option for the selected radio configuration: `SO32 (+F-SCH)` or `SO32 (+ SCH)`, then press the `Close Menu` (**F6**) key.
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `TDSO Frame Error Rate` measurement and press the knob.
5. Press `AWGN Power` (**F3**), use the knob and DATA ENTRY keys to enter `-54 dBm/1.23 MHz`, or as needed.
6. Press the `TDSO FER Setup` (**F1**) key to access the `TDSO FER Setup` menu.
7. Use the knob and DATA ENTRY keys to set the measurement parameters as needed for your measurement situation. Press the `Close Menu` (**F6**) key to close the settings.

TDSO FER Setup	Value
Frame Count	512
FER Requirement	1.00 %
Data Rate	9.6 kbps
Encoder Type	Convolutional
F-FCH/Traffic Level	-15.60 dB
F-SCH Level	-15.60 dB
Trigger Arm	Continuous
Measurement Timeout	Off

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

8. A typical display is shown below.



Testing 3.4.1 Demodulation of Forward Traffic Channel in AWGN

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS) and only demonstrates the Test 82. You should change the settings as specified for other tests. Unless otherwise stated, leave all parameter settings to the defaults.

NOTE The TDSO FER measurement is used for testing the *forward supplemental channel*. You can use FER measurement to perform the tests for *forward fundamental channel*. See "Measuring Frame Error Rate (FER)" on page 31.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fw3, Rvs3)`.
   - Select `FCH Service Option Setup` (**F12**) `(Call Parms 1 of 3)`, set `Service Option for Fw3, Rvs 3` to `SO32 (+ F-SCH)`.
   - Set `Cell Power` ($\hat{I}_{or}$) to `-55 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
   - Set F-SCH Data Rate to 19.2 kbps
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected + Data` is in the `Active Cell` status field.
4. Press the **Measurement selection** key, select the `Frame Error Rate` measurement.
5. Press **F3**, set `AWGN Power` (I_{oc}) to `-54 dBm/1.23 MHz`.
6. Press **F1** to access the `TDSO FER Setup` menu (some settings may change as specified for each test).
   - Set FER Requirement to 1.00%.

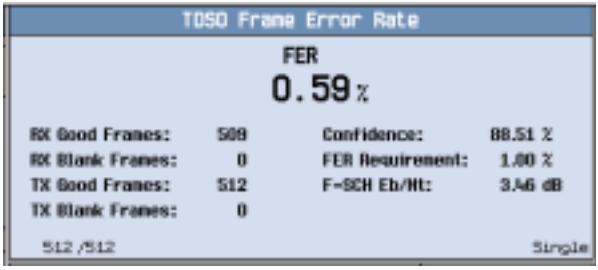
- Set F-FCH/Traffic Level to -7.00 dB.
- Set F-SCH Level to -13.6 dB.
- Set Trigger Arm to Single.
- Press `Close Menu` (**F6**).

TDSO FER Setup	Value
Frame Count	512
FER Requirement	1.00 %
Data Rate	19.2 kbps
Encoder Type	Convolutional
F-FCH/Traffic Level	-7.00 dB
F-SCH Level	-13.60 dB
Trigger Arm	Single
Measurement Timeout	Off

7. Press the **START SINGLE** key to begin the measurement.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

8. A typical display is shown below.



9. Repeat the steps 3-8 with the settings as specified for each test.

Measuring TDSO (Test Data Service Option) Frame Error Rate (FER)

Measuring Time Response of Open Loop Power Control (TROLPC)

General Procedure

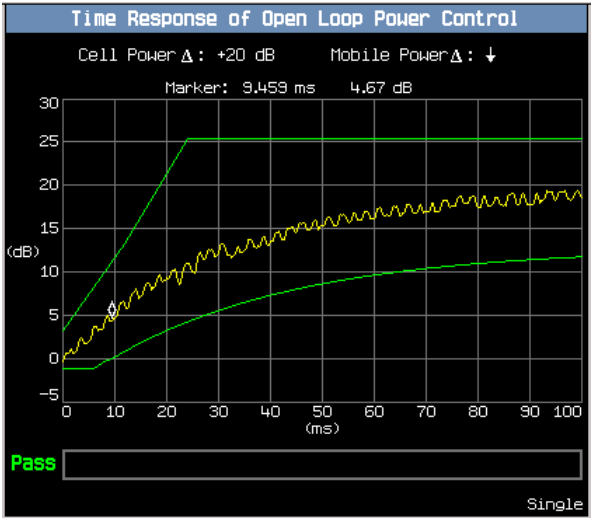
NOTE Channel power calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the access probe power measurement. See "Calibrating the Test Set" for details.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station with a loopback service option (SO2, SO9, or SO55) and full data rated selected (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Time Response of Open Loop Power Control` measurement and press the knob.

NOTE If any measurements are open during initiation of a TROLPC, the test set will automatically close them and display an error message indicating the last measurement that was closed.

5. Press the `Time Response of OLPC Setup` (**F1**) key to access the `Time Response of OLPC Setup` menu.
6. Set the measurement parameters as needed for your measurement situation by using the knob and DATA ENTRY keys. Press the `Close Menu` (**F6**) key to close the Setup window.
7. Measuring TROLPC:
   - Select `Start Meas Up` (**F2**), which automatically increases `Cell Power` by 20 dB and captures the resulting mobile station output power for 100 ms, or
   - Select `Start Meas Down` (**F3**) which automatically decreases `Cell Power` by 20 dB and captures the resulting mobile station output power for 100 ms.
   - You may also select **START SINGLE** to start the measurement. The cell power will increase by 20 dB if `Start Meas Up` (**F2**) was last performed (or if the test set is in a preset state), or decrease by 20 dB if `Start Meas Down` (**F3**) was last performed.

- Select `Marker` (**F4**) and turn the knob to display power at points along the mobile station output power trace. If the test failed, next to the word "Fail," the first data point at which the test failed is displayed.



NOTE As specified by TIA/EIA 98-E test standards, mobile station power level change is expressed in absolute terms. The delta expressions above the display indicate the direction of power changes.

8. After finishing the measurements:

   - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Time Response of Open Loop Power Control`, then `Close Measurement` (**F4**).

Testing 4.4.2 Time Response of Open Loop Power Control

Definition: Following a step change in the mean input power, the mean output power of the mobile station changes as a result of the open loop power control. This test measures the open loop power control time response to a step change in the mean input power.

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS) and only demonstrates the Test 1. You should change the settings as specified for other tests. Unless otherwise stated, leave all parameter settings to the defaults.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).

   - Press **CALL SETUP** to access Call Parms and Call Control menus.

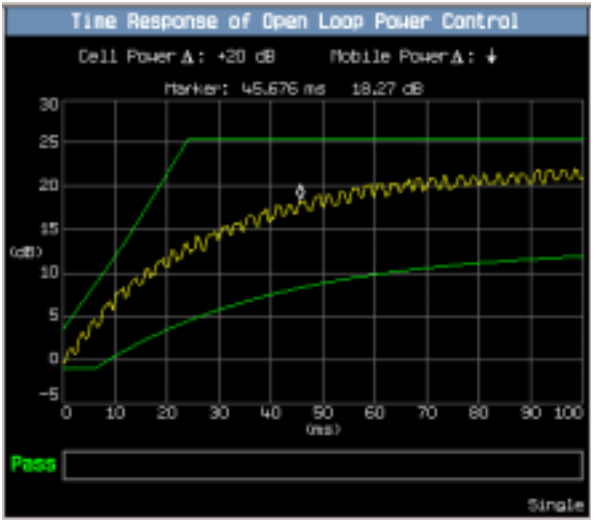
- Set Cell Band (**F8** on the Call Parms 1 of 3) to US PCS.
- Set Radio Config (**F11** on the Call Parms 1 of 3) to (Fwd1, Rvs1).
- Select FCH Service Option Setup (**F12**) (Call Parms 1 of 3), set Service Option for Fwd1, Rvs1 to SO2 (Loopback).
- Set Traffic Data Rate (**F12** on the Call Parms 2 of 3) to Full.
- Press Originate Call (**F3**) to initiate a call. Verify that the Connected is in the Active Cell status field.

4. Set Cell Power ($\hat{I}_{or}$) to -60 dBm/1.23 MHz (**F7** on the Call Parms 1 of 3).
5. Set Rvs Power Ctrl to Alternating bits (**F7** on the Call Parms 2 of 3 menu) to send alternating '0' and '1' power control bits on the Forward Traffic Channel.
6. Press the **Measurement selection** key and select the Time Response of Open Loop Power Control measurement.
7. Press the Time Response of OLPC Setup (**F1**) key to access the Time Response of OLPC Setup menu.
   - Set F-FCH/Traffic Level to -7.4 dB.
   - Press Close Menu (**F6**).

Time Response of OLPC Setup	Value
F-FCH/Traffic Level	-7.40 dB
Measurement Timeout	Off

8. Measure the TROLPC and observe the Pass/Fail result:
   - Select Start Meas Up (**F2**) which automatically increases Cell Power by 20 dB and captures the resulting mobile station output power for 100 ms, observe that the cell power transitions to -40 dBm/1.23 MHz and note the pass/fail result.
   - Select Start Meas Down (**F3**) which automatically decreases Cell Power by 20 dB and captures the resulting mobile station output power for 100 ms, observe that the cell power transitions to -60 dBm/1.23 MHz and note the pass/fail result.
   - Select Start Meas Down (**F3**) which automatically decreases Cell Power by 20 dB and captures the resulting mobile station output power for 100 ms, observe that the cell power transitions to -80 dBm/1.23 MHz and note the pass/fail result.

- Select `Start Meas Up` (**F2**) which automatically increases `Cell Power` by 20 dB and captures the resulting mobile station output power for 100 ms, observe that the cell power transitions to -60 dBm/1.23 MHz), and note the pass/fail result.



9. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Time Response of Open Loop Power Control`, then `Close Measurement` (**F4**).

Measuring TX Spurious Emissions

General Procedure

NOTE Channel Power Calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the TX spurious emissions measurement. See "Calibrating the Test Set" for details.

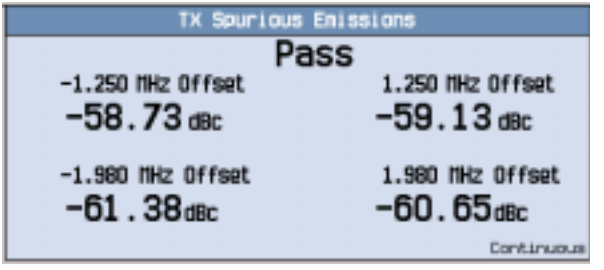
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Tx Spurious Emissions` measurement and press the knob.
5. Press the `Tx Spurious Setup` (**F1**) key to access the `Tx Spurious Emissions Setup` menu.
6. Set the measurement parameters as needed for your test situation by using the knob and DATA ENTRY keys. (The parameters such as `Adjacent Limit` and `Alternate Limit` which are available when `Mask Control` is set to `Manual`.)

TX Spurious Emissions Setup	Value
Multi-Measurement Count	Off
F-FCH/Traffic Level	-7.40 dB
Mask Control	Auto
Adjacent Limit	-42.00 dB
Alternate Limit	-50.00 dB
Trigger Arm	Continuous
Measurement Timeout	Off

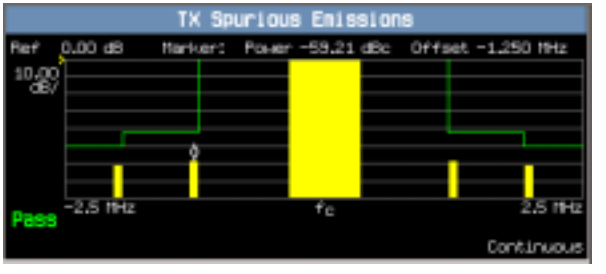
NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the **ON** key or directly enter the number of measurement counts. The number of averages will default to 10.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

7. Press the `Close Menu` (**F6**) key. The numeric results will display by default.



8. Press the `Graph` (**F3**) key to display a graphical measurement results.



- When viewing the graphical display, you can select `Marker Position` (**F4**) and turn the knob to display the spurious emissions levels at each of the frequency offsets.
- You can also press the Numeric (**F2**) key to display the numeric results anytime.

9. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `TX Spurious Emissions`, then `Close Measurement` (**F4**).

Testing 4.5.1 Conducted Spurious Emissions

Definition: Conducted spurious emissions are emissions at frequencies that are outside the assigned CDMA Channel, measured at the mobile station antenna connector. This test measures the spurious emissions during continuous transmission.

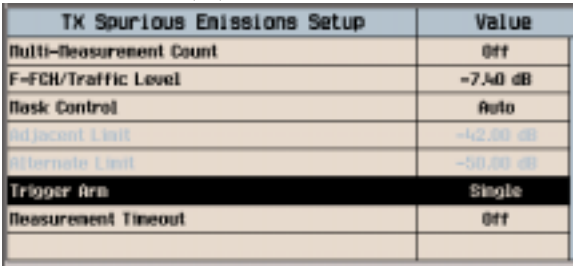
The test set does not support the Enhanced Access Channel tests. The following test procedure is for Access Channel and assumes that the mobile station supports Band Class 1 (US PCS). You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** and then the green **Preset** key to full reset the test set.
3. Set the following access parameters (see "B. Set access parameters."):
   - Set `Nominal Power` (NOM_PWR) to 7 dB.
   - Set `Initial Power` (INIT_PWR) to 15 dB.
   - Set `Power Step` (PWR_STEP) to 7 dB/step.
   - Set `Number of Steps` (NUM_STEP) to 15 (16 probes/sequence).
   - Set `Maximum Response Sequence` (MAX_RSP_PWR) to 15 sequences.

Access Parameters	Value
Nominal Power	7 dB
Nominal Power Extended	0
Initial Power	15 dB
Power Step	7 dB
Number of Steps	15
Maximum Request Sequence	1
Maximum Response Sequence	15
Preamble Size	10

4. Establish a call with the following parameter settings (some settings may change as needed).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd1, Rvs1)`.
   - Select `FCH Service Option Setup` (**F12**) `(Call Parms 1 of 3)`, set `Service Option for Fwd1, Rvs1` to `SO2 (Loopback)`.
   - Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Full`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
5. Set `Cell Power` ($\hat{I}_{or}$) to `-104 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
6. Set `Rvs Power Ctrl` to `All Up bits` (**F7** on the `Call Parms 2 of 3` menu) to transmit continuous '0' power control bits.
7. Press the **Measurement selection** key, select the `Tx Spurious Emissions` measurement.
8. Press the `Tx Spurious Setup` (**F1**) key to access the `Tx Spurious Emissions Setup` menu. Set the measurement parameters as needed.
   - The `Adjacent Limit` and `Alternate Limit` settings default to -42 dB and -50 dB. You can change the value when `Mask Control` is set to `Manual`.
   - Set F-FCH/Traffic Level to -7.4 dB.

- Set Trigger Arm to Single.
- Press `Close Menu` (**F6**).



TX Spurious Emissions Setup	Value
Multi-Measurement Count	Off
F-FCH/Traffic Level	-7.40 dB
Mask Control	Auto
Adjacent Limit	-42.00 dB
Alternate Limit	-50.00 dB
Trigger Arm	Single
Measurement Timeout	Off

9. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous`, skip this step.
10. Press **MEASUREMENT** key, observe the measurement results (see "General Procedure" for details). The numeric results will be displayed by default. To display a graphical measurement results, press the `Graph` (**F3**) key. When viewing the graphical display, you can select `Marker Position` (**F4**) and turn the knob to display the spurious emissions levels at each of the frequency offsets.
11. After finishing the measurements:
    - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Tx Spurious Emissions`, then `Close Measurement` (**F4**).

Measuring Waveform Quality/Code Domain Power

NOTE Channel Power Calibration should be performed if the test set is being used for the first time or the operating environment has changed significantly since the last calibration was performed. The channel power calibration also calibrates the Waveform Quality/Code Domain Power measurement. See "Calibrating the Test Set" for details.

General Procedure for Measuring Waveform Quality

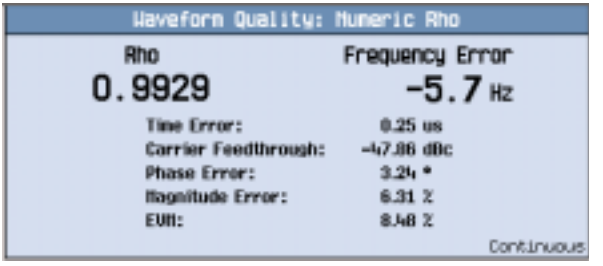
1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the mobile station (see "How Do I Set Up a Call?" on page 81).
4. Initialize the measurement:
   - Press the **Measurement selection** key.
   - Turn the knob to highlight the `Waveform Quality + Code Domain` measurement and press the knob.
5. Press the `Waveform Quality Setup` (**F1**) key to access the `Waveform Quality Setup` menu.
6. Set the measurement parameters as needed for your measurement situation by using the knob and DATA ENTRY keys. Press the `Close Menu` (**F6**) key to close the Setup window.

Waveform Quality Setup	Value
Multi-Measurement Count	Off
Trigger Arm	Continuous
Measurement Timeout	Off

NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the **ON** key or directly enter the number of the measurements. The number of averages will default to 10.

NOTE If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement. If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4.

7. A typical display for the Waveform Quality measurement results is shown below.



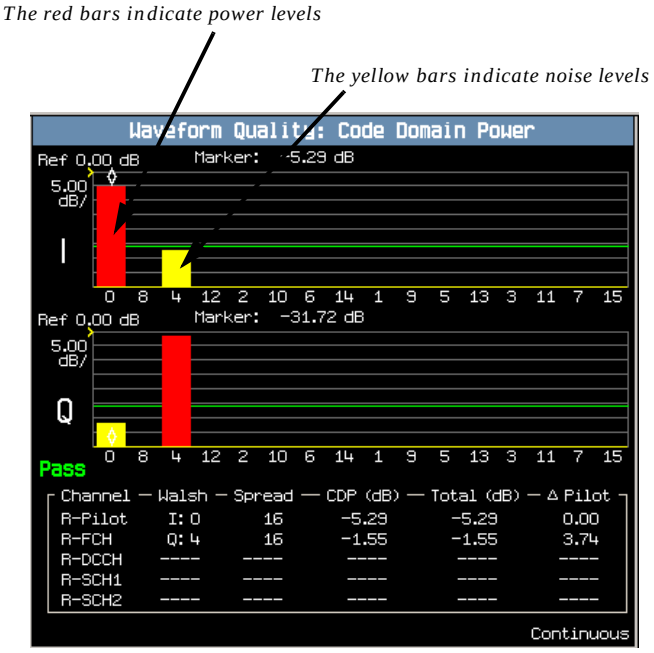
8. There are graphical measurement results available as a result of performing this measurement if the call is established with radio configuration (Fwd3, Rvs3) or above. Continue to perform the steps 4-8 in the following section "General Procedure for Measuring Code Domain Power and Code Domain Power + Noise"

General Procedure for Measuring Code Domain Power and Code Domain Power + Noise

NOTE These measurements can be made only when the call is established with the radio configuration (Fwd3, Rvs3), or above selected.

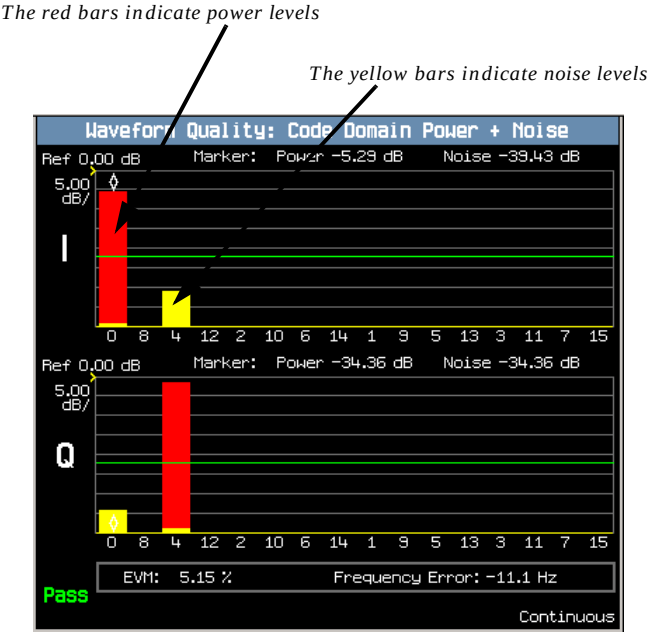
1. Establish a call with the mobile station with Radio Configuration ((Fwd3, Rvs3), or above) selected. (see "How Do I Set Up an IS-2000 Call?" on page 81).
2. Press the **Measurement selection** key.
3. Turn the knob to highlight the `Waveform Quality + Code Domain` measurement and press the knob.

4. Press the `Code Domain Power` (**F3**) key. A typical display is shown below.



5. Press the `Graph Control` key (**F6**). Change the value in the `Limit` field. Note that both green lines, indicating the I and Q channel noise limits, move together.
6. Press the `Return` key (**F6**).

7. Press the Code Domain Power + Noise (**F4**) key. A typical display is shown below.



8. Return to the numeric Rho display at any time by pressing the Numeric Rho key (**F2**).
9. After finishing the measurements:
   - If desired, turn the measurement off by pressing the **Measurement selection** key, selecting Waveform Quality + Code Domain, then Close Measurement (**F4**).

Testing 4.1 Frequency Accuracy

Definition: Frequency accuracy is the ability of a mobile station transmitter to transmit at an assigned carrier frequency.

You can use the "Testing 4.3.4 Waveform Quality and Frequency Accuracy" to perform this test.

Testing 4.3.1 Time Reference

Definition: This test checks the accuracy of the mobile station time reference in static conditions as well as the mobile station time reference slew rate in dynamic conditions.

You can use the "Testing 4.3.4 Waveform Quality and Frequency Accuracy" to test the accuracy of the mobile station time reference in static conditions. But testing the mobile station time reference slew rate in dynamic conditions requires an external channel simulator.

Testing 4.3.4 Waveform Quality and Frequency Accuracy

Definition: The waveform quality factor, rho, is measured in this test. This test also encompasses the *4.1 Frequency Accuracy* and *4.3.1 Time Reference* (static only) tests.

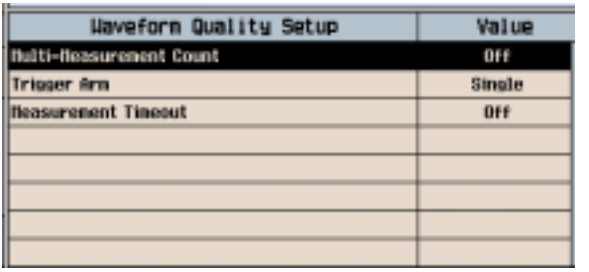
The Waveform Quality measurement provided by the test set measures multi-coded waveform quality. It is much useful than the single-coded waveform quality as specified in standard. We recommend you use this measurement to perform the test. If you do want to perform the single-coded waveform quality, use the Handoff Waveform Quality measurement.

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS). You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

NOTE This test measures rho, and also encompasses the *4.1 Frequency Accuracy* and *4.3.1 Time Reference* tests. You need change some settings as specified for the tests.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd3, Rvs3)`.
   - Select `FCH Service Option Setup` (**F12**) (`Call Parms 1 of 3`), set `Service Option for Fwd3, Rvs3` to `SO2`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
4. Set `Cell Power` ($\hat{I}_{or}$) to `-101 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
5. Set the `F-Pilot Level` to -7.00 dB, and set the `F-FCH/Traffic Level` to -7.4 dB (see "How Do I Change Code Channel Levels and Walsh Codes?").
6. Set `Rvs Power Ctrl` to `Alternating bits` (**F7** on the `Call Parms 2 of 3` menu) to transmit alternating '0' and '1' power control bits on the Forward Traffic Channel.
7. Press the **Measurement selection** key, select the `Waveform Quality + Code Domain` measurement.
8. Press the `Waveform Quality Setup` (**F1**) key to access the `Waveform Quality Setup` menu.
   - Set Trigger Arm to Single.

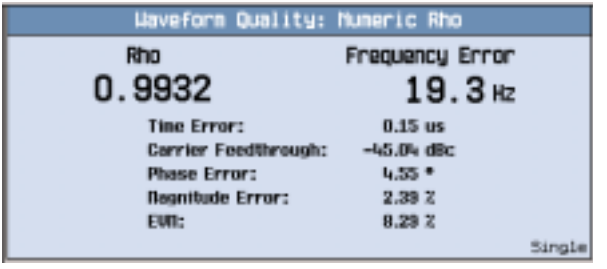
- Press `Close Menu` (**F6**).



9. Press the **START SINGLE** key to begin the measurement.

NOTE If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement.

10. A typical display is shown below.



11. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Waveform Quality + Code Domain`, then `Close Measurement` (**F4**).

Testing 4.3.5 Code Domain Power

Definition: Code domain power is the power in each code channel of a CDMA Channel. The CDMA time reference used in the code domain power test is derived from the Pilot Channel and is used as the reference for demodulation of all other code channels.

The following test procedure assumes that the mobile station supports Band Class 1 (US PCS). Unless otherwise stated, leave all parameter settings to the defaults.

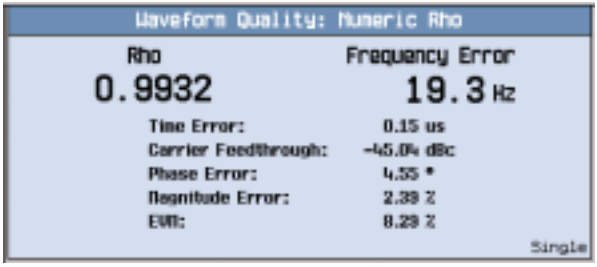
NOTE This test can be made only when the call is established with radio configuration ((Fwd3, Rvs3), or above) selected.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd3, Rvs3)`.
   - Select `FCH Service Option Setup` (**F12**) (`Call Parms 1 of 3`), set `Service Option for Fwd3, Rvs3` to `SO2`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
4. Set `Cell Power` ($\hat{I}_{or}$) to `-101 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
5. Set the `F-Pilot Level` to -7.00 dB, and set the `F-FCH/Traffic Level` to -7.4 dB (see "How Do I Change Code Channel Levels and Walsh Codes?").
6. Press the **Measurement selection** key, select the `Waveform Quality + Code Domain` measurement.
7. Press the `Waveform Quality Setup` (**F1**) key to access the `Waveform Quality Setup` menu.
   - Set Trigger Arm to Single.
   - Press `Close Menu` (**F6**).
8. Press the **START SINGLE** key to begin the measurement.

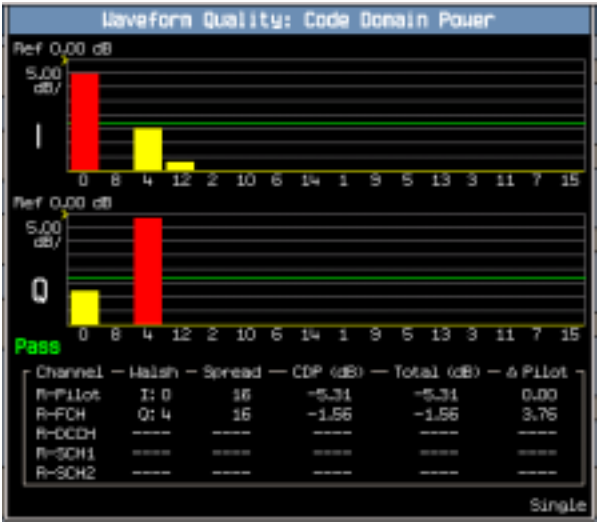
NOTE If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement.

---

9. Press the `Numeric Rho` (**F2**) key, a typical display for numeric rho is shown below.



10. Press the `Code Domain Power` (**F3**) key, a typical graphic display is shown below and note the Pass/Fail result (see "General Procedure for Measuring Code Domain Power and Code Domain Power + Noise" for details).



11. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Waveform Quality + Code Domain`, then `Close Measurement` (**F4**).

Testing 4.4.9 Code Channel to Reverse Pilot Output Power Accuracy

Definition: Code channel to Reverse Pilot Channel output power accuracy is the permissible error in mobile station mean output power between each of the radiated code channels and the Reverse Pilot Channel during steady state operation.

The test set does not support the Enhanced Access Channel test (as specified in 4.4.9.2.1). The following procedure is for the Code Channel Output Power for the Reverse Traffic Channel test (as specified in 4.4.9.2.2).

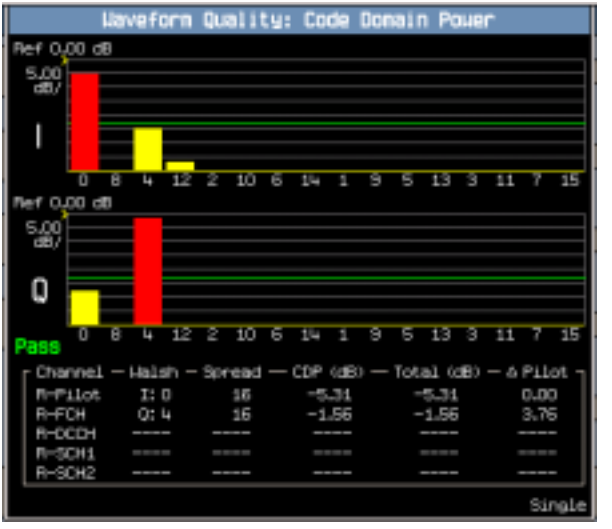
The test shall be performed for mobile stations that support the Reverse Pilot Channel. It assumes that the mobile station supports Band Class 1 (US PCS) and operation on the Reverse Fundamental Channel. You should change the settings as specified for other configurations. Unless otherwise stated, leave all parameter settings to the defaults.

NOTE This test can be made only when the call is established with radio configuration ((Fwd3, Rvs3), or above) selected.

1. Connect the mobile station's antenna output to the test set's front panel RF IN/OUT connector and power them on.
2. Press the blue **SHIFT** key and then the green **Preset** key to full reset the test set.
3. Establish a call with the following parameter settings (some settings may change as specified for each test).
   - Press **CALL SETUP** to access Call Parms and Call Control menus.
   - Set `Cell Band` (**F8** on the `Call Parms 1 of 3`) to `US PCS`.
   - Set `Radio Config` (**F11** on the `Call Parms 1 of 3`) to `(Fwd3, Rvs3)`.
   - Select `FCH Service Option Setup` (**F12**) `(Call Parms 1 of 3)`, set `Service Option for Fwd3, Rvs 3` to `SO2`.
   - Set `Traffic Data Rate` (**F12** on the `Call Parms 2 of 3`) to `Full`.
   - Press `Originate Call` (**F3**) to initiate a call. Verify that the `Connected` is in the `Active Cell` status field.
4. Set `Cell Power` ($\hat{I}_{or}$) to `-75 dBm/1.23 MHz` (**F7** on the `Call Parms 1 of 3`).
5. Set the `F-Pilot Level` to -7.00 dB, and set the `F-FCH/Traffic Level` to -7.4 dB (see "How Do I Change Code Channel Levels and Walsh Codes?").
6. Set `Rvs Power Ctrl` to `Alternating bits` (**F7** on the `Call Parms 2 of 3` menu) to transmit alternating '0' and '1' power control bits on the Forward Traffic Channel.
7. Press the **Measurement selection** key, select the `Waveform Quality + Code Domain` measurement.
8. Press the `Waveform Quality Setup` (**F1**) key to access the `Waveform Quality Setup` menu.
   - Set Trigger Arm to Single.
   - Press `Close Menu` (**F6**).
9. Press the **START SINGLE** key to begin the measurement.

NOTE If the `Trigger Arm` is set to `Continuous` the measurement began executing as soon as you initialize the measurement in step 4. If `single` is selected in the `Trigger Arm` field, press the **START SINGLE** key to trigger each measurement.

10. Press the `Code Domain Power` (**F3**) key, observe the measurement results and note the Pass/Fail result (see "General Procedure for Measuring Code Domain Power and Code Domain Power + Noise" on page 60 for details).



11. After finishing the measurements:

- If desired, turn the measurement off by pressing the **Measurement selection** key, selecting `Waveform Quality + Code Domain`, then `Close Measurement` (**F4**).

2 Appendix

This Appendix includes some general setup procedures that are required to perform the tests, and other helpful information.

The contents are:

Test Adherence to Standards

Standards Table

Unless specially indicated, the capabilities shown in the tables apply to both the E1962B (with the release revision of B.06.00 and above) and the E6702A (with the release revision of A.02.00 and above) applications. Table 1. shows the standard CDMA requirements as given in TIA/EIA-98-E standard. Table 2. shows the standard AMPS requirements as given in TIA/EIA-690 standard.

Table 1. Support of TIA/EIA-98-E Standards (for IS-95/IS-2000)

TIA/EIA-98-E	Supported by E1962B/E6702A
1.3 Fundamental Channel Test Mode 1 (F/R RC1)	Yes. Supports SO2 and SO55 on Traffic Channel.
1.3 Fundamental Channel Test Mode 2 (F/R RC2)	Yes. Supports SO9 and SO55 on Traffic Channel.
1.3 Fundamental Channel Test Mode 3 (F/R RC3)	Yes. Supports SO2 and SO55 on F-FCH & R-FCH.
1.3 Supplemental Channel Test Mode 3 (Forward RC3)	Yes. Supports SO32 (TDSO) on F-SCH.
1.3 Supplemental Channel Test Mode 4 (F-RC4 & R-RC3)	Yes. Supports SO2 and SO55 on F-FCH & R-FCH.
1.3 Supplemental Channel Test Mode 4 (Forward RC4)	Yes. Supports SO32 (TDSO) on F-SCH.
1.3 Fundamental Channel Test Mode 5 (F-RC5 & R-RC4)	Yes. Supports SO9 and SO55 on F-FCH & R-FCH.
1.3 Supplemental Channel Test Mode 5 (Forward RC5)	Yes. Supports SO32 (TDSO) on F-SCH.
3.1 Frequency Requirements	Yes. Supports Band Class 0, 1, 3, 4, 5, 6 & 10.
3.2.1.1 Idle Handoff in Non-slotted Mode (Test 1)	No.
3.2.1.1 Idle Handoff in Non-slotted Mode (Test 2)	No.
3.2.1.2 Idle Handoff in Slotted Mode on Paging Channel	No.
3.2.1.3 Idle Handoff in Slotted Mode on Forward Common Control Channel	No.
3.2.1.4 Idle Handoff to another frequency	No.
3.2.2.1 Neighbor Set Pilot Detection & Incorrect Detection in Soft Handoff	Yes. Only available with the E6702A lab application. Requires automation to achieve proper timing. .
3.2.2.2 Candidate Set Pilot Detection & Incorrect Detection in Soft Handoff	Yes. Only available with the E6702A lab application. Requires automation to achieve proper timing.
3.2.2.3 Active Set Pilot Loss Detection in Soft Handoff	Yes. Only available with the E6702A lab application. Requires automation to achieve proper timing.
3.2.3.1 Access Probe Handoff	No.

Table 1. Support of TIA/EIA-98-E Standards (for IS-95/IS-2000)

TIA/EIA-98-E	Supported by E1962B/E6702A
3.2.3.2 Access Handoff	No.
3.3.1 Demodulation of Non-Slotted Paging Channel with AWGN	No. The test set can set up the proper forward channel conditions, but cannot retrieve the mobile accumulated statistics parameters.
3.3.2 Demodulation of slotted Paging Channel with AWGN	No. The test set cannot send an Audit Order.
3.3.2.2.1 Spreading Rate 1 Paging Channel	No. The test set supports only IS-2000 rev.0 channels. It does not support enhanced access, F-CCCH, BCCH, CPCCH channels.
3.3.2.2.2 Spreading Rate 3 Paging Channel	No. Possible future enhancement.
3.3.3 Demodulation of Broadcast Control Channel in AWGN	No. Possible future enhancement.
3.3.3.2.1 Spreading Rate 1 BCC	No. Possible future enhancement.
3.3.3.2.2 Spreading Rate 3 BCC	No. Possible future enhancement.
3.3.4 Demodulation of Broadcast Control Channel in Multipath Fading Channel.	No. Possible future enhancement.
3.3.4.2.1 Spreading Rate 1 BCC	No. Possible future enhancement.
3.3.4.2.2 Spreading Rate 3 BCC	No. Possible future enhancement.
3.3.5 Demodulation of forward Common Control Channel	No. Possible future enhancement.
3.3.5.2.1 Spreading Rate 1 F-CCCH	No. Possible future enhancement.
3.3.5.2.2 Spreading Rate 3 F-CCCH	No. Possible future enhancement.
3.3.6 Reception of Common Power Control Channel and Common Assignment Channel	No. Possible future enhancement.
3.3.6.2.1 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/4	No. Possible future enhancement.
3.3.6.2.2 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/2	No. Possible future enhancement.
3.3.6.2.3 Spreading Rate 1 Forward Common Power Control Channel and Common Assignment Channel with Rate = 1/2	No. Possible future enhancement.

Table 1. Support of TIA/EIA-98-E Standards (for IS-95/IS-2000)

TIA/EIA-98-E	Supported by E1962B/E6702A
3.4.1 Demodulation of Forward Fundamental Channel with AWGN	Yes. For F-FCH, the test set uses loopback Service Options 002, 009, or 055. For F-SCH, the test set uses SO32 (TDSO - Test Data Service Option).
3.4.2 Demodulation of Forward Fundamental Channel with Fading	Yes. Requires external fader and AWGN generator to perform the test. F-SCH uses SO32 (TDSO).
3.4.3 Demodulation of Forward Fundamental Channel During Soft Handoff	Yes. Only available with the E6702A lab application. Only supports the static test.
3.4.4 Decision of Power Control Bit for Channels Belonging to Different Power Control Sets During Soft Handoff - Test 1 and Test 2	Yes. Only available with the E6702A lab application. The test can be functionally performed.
3.4.5 Decision of Power Control Bit for Channels Belonging to the Same Power Control Set	Yes. Only available with the E6702A lab application. The test can be functionally performed.
3.4.6 Demodulation of Power Control Subchannel During Soft Handoff	Yes. Only available with the E6702A lab application. The test can be functionally performed.
3.4.7 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000)	No. Possible future enhancement.
3.4.8 Demodulation of Forward Traffic Channel During Soft Handoff with Closed Loop Power Control (FPC_MODE=000)	No. Possible future enhancement.
3.4.9 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000 or 100)	No. Possible future enhancement.
3.4.10 Demodulation of Forward Traffic Channel in Multipath Fading Channel with Closed Loop Power Control (FPC_MODE=000) and Transmit Diversity (OTD or STS)	No. Possible future enhancement.
3.4.11 Demodulation of Power Control Subchannel During Reverse Pilot Channel Gating	No. Possible future enhancement.
3.4.12 Demodulation of Power Control Subchannel During Reverse Fundamental Channel Gating	No. Possible future enhancement.
3.4.13 Behavior of the Quality Indicator Bit of the Forward Dedicated Control Channel	No. Possible future enhancement.
3.5.1 Receiver Sensitivity and Dynamic Range	Yes
3.5.2 Single Tone Desensitization Tests 1 and 2	Yes. Requires an external CW signal generator.

Table 1. Support of TIA/EIA-98-E Standards (for IS-95/IS-2000)

TIA/EIA-98-E	Supported by E1962B/E6702A
3.5.3 Intermodulation Spurious Response Attenuation Tests 1 and 2	Yes. Requires two external CW signal generators.
3.5.4 Adjacent Channel Selectivity	Yes. Requires external CDMA signal generator.
3.5.5 Receiver Blocking Characteristics (Band Class 6)	Yes. Requires external RF signal generator.
3.6.1 Conducted Spurious Emissions	No. Use external spectrum analyzer to make the measurement.
3.6.2 Radiated Spurious Emissions	No. Use external spectrum analyzer to make the measurement.
3.7.1 Supervision Paging Channel	Partially. The test set does not provide timing measurements.
3.7.2 Supervision Forward Channel - Test 1 and Test 2	No. The test set has no provision for sending corrupted frames as required in this measurement.
4.1 Transmit Frequency Accuracy	Yes, uses the rho or EVM measurement method.
4.2.1 CDMA to CDMA Hard Handoff	Partially. The test set performs F1 to F2 Hard handoffs, but cannot make the required timing measurement.
4.2.2 Transmit Power after Hard Handoff	No.
4.2.3 Candidate Frequency Single Search	No.
4.3.1 Time Reference	Yes, uses the rho or EVM measurement method.
4.3.1 Time Reference Slew Rate	Partially, requires an external fader & external timing measurement device.
4.3.2 Reverse Pilot Channel to Code Channel Time Tolerance	Yes
4.3.3 Reverse Pilot Channel to Code Channel Phase Tolerance	Yes
4.3.4 Waveform Quality and Frequency Accuracy	Yes, uses the rho or EVM measurement method. The test set also measures multi-coded waveform quality, a non-standard but more useful measurement.
4.3.5 Code Domain Power	Yes.
4.4.1 Range of Open Loop Output Power	Yes. Enhanced Access Channel is a possible future enhancement.
4.4.2 Time Response of Open Loop Power Control	Yes.

Table 1. Support of TIA/EIA-98-E Standards (for IS-95/IS-2000)

TIA/EIA-98-E	Supported by E1962B/E6702A
4.4.3 Access Probe Output Power	Yes. Enhanced Access Channel is a possible future enhancement.
4.4.4 Range of Closed Loop Power Control	Partially. The test set can verify the control range in dB, but can not make timing measurements. Test 2 not supported.
4.4.5 Maximum RF Output Power	Yes
4.4.6 Minimum Controlled Output Power	Yes
4.4.7 Standby Output Power and Gated Output Power	Partially. Supports graphical Gated Power measurement but can not measure standby output power.
4.4.8 Power up Function Output Power	No.
4.4.9 Code Channel to Reverse Pilot Output Power Accuracy	Yes, except Enhanced Access Channel Header, Enhanced Access Channel Data and Reverse Common Control Channel Data.
4.4.10 Reverse Pilot Channel Phase Discontinuity	No. The test set provides call setup. Use external spectrum analyzer to make the measurement.
4.4.11 Reverse Traffic Channel Output Power During Changes in Data Rate	No.
4.5.1 Conducted Spurious Emissions	Yes.
4.5.2 Radiated Spurious Emissions	Yes, requires external spectrum analyzer.
4.5.3 Occupied Bandwidth (Band classes 3 & 6 only)	Yes, requires external spectrum analyzer.

Table 2. Support of TIA/EIA-690 Standards (for AMPS)

TIA/EIA-690	Supported by E1962B/E6702A
AMPS RECEIVER TESTS	
2.1.1 Frequency Coverage	Yes
2.1.1 Type of Modulation	Yes
2.2.2.1 Electrical Audio Frequency Response	Yes
2.2.2.2 Audio Muting	Yes
2.2.2.3 Expandor	Yes
2.2.2.4 Hum and Noise	Yes
2.2.2.5 Audio Distortion	Yes

Table 2. Support of TIA/EIA-690 Standards (for AMPS)

TIA/EIA-690	Supported by E1962B/E6702A
2.2.2.6 Receive Audio Frequency Response	Yes, but requires an external "artificial ear" acoustic coupler to measure mobile speaker sound pressure level. The test set can set up the call and provide proper signal to the mobile station.
2.2.3 Demodulated Data and Control Signals	No.
2.2.3.1 Manchester Decoding	No.
2.2.3.2 Supervisory Audio Tone (SAT) Decoding	No.
2.3.1 RF Sensitivity	Yes.
2.3.2 Adjacent and Alternate Channel Desensitization	Yes. The test set can perform the necessary call processing and SINAD measurements, but requires a single external CW signal generator to perform per the standard.
2.3.3 Intermodulation Spurious Response Attenuation	Yes. The test set can perform the necessary call processing and SINAD measurements, but requires two external CW signal generator to perform per the standard.
2.3.4 Protection Against Spurious Response Interference	Yes. The test set can perform the necessary call processing and SINAD measurements, but requires a single external CW signal generator to perform per the standard.
2.3.5 Bit Error Rate	No.
2.4 Conducted Spurious Emissions	No, requires an external spectrum analyzer.
2.5 Radiated Spurious Emissions	No, requires an external spectrum analyzer.
2.6 Received Signal Strength Indicator (RSSI)	Partially, requires access to the RSSI signal in the mobile station.
AMPS TRANSMITTER TESTS	
3.1.1 Frequency Coverage	Yes. 500 MHz to 1000 MHz frequency coverage.
3.1.2 Frequency Stability	Yes. Standard timebase is accurate to 0.1 ppm per year.
3.1.3 Carrier Switching Time	No, requires an external spectrum analyzer with zero span capability.
3.1.3 Carrier Switching Time	No, requires an external spectrum analyzer with zero span capability.
3.1.4 Channel Switching Time	No, requires an external spectrum analyzer with zero span capability.
3.2.1 RF Power Output	Yes. Uses Internal Power Meter down to -10 dBm.
3.2.2 RF Power Transition Time	No, requires an external spectrum analyzer with zero span capability.
3.2.3 Carrier-On State	No.

Table 2. Support of TIA/EIA-690 Standards (for AMPS)

TIA/EIA-690	Supported by E1962B/E6702A
3.3.1 Modulation Type and Modulation Stability	Yes.
3.3.2.1 Compressor	Yes.
3.3.2.2 Transmit Electrical Audio Response	Yes.
3.3.2.3 Modulation Deviation Limiting	Partially. The test set can perform the steady state measurement, but cannot perform the instantaneous peak measurement.
3.3.2.4 Audio Voice Path Muting	Yes.
3.3.2.5 Transmit Audio Frequency Response	Yes, but requires an acoustic coupler.
3.3.2.6 Transmit Audio Sensitivity	Yes, but requires an acoustic coupler.
3.3.3 Wideband Data	No.
3.3.4 Supervisory Audio Tone (SAT)	Yes.
3.3.5 Signaling Tone (ST)	Partially, requires an automated control program to capture ST deviation.
3.3.6 FM Hum and Noise	Yes.
3.3.7 Residual Amplitude Modulation (AM)	No.
3.3.8 Modulation Distortion and Noise	Yes.
3.4.1 Spectrum Noise Suppression - Broadband	No.
3.4.2 Harmonic and Spurious Emissions (Conducted) - Discrete	No, requires an external spectrum analyzer.
3.4.3 Harmonic and Spurious Emissions (Radiated) - Discrete	No, requires an external spectrum analyzer.

Settings on the Test Set Adherence to Standard

This table lists the parameters required to be set in most standard tests. It is to help you quickly find the menus/softkeys on the test set's front panel to configure the parameters as specified in the standard.

Table 3. Test Parameters for Candidate Set Pilot Detection

Parameters in Standard	Equivalent Settings on the Test Set
I_{oc} (dBm/1.23 MHz)	AWGN Power (see "How Do I Change AWGN Power Levels?")
$\hat{I}_{or}$ (dBm/1.23 MHz)	Cell Power (**F7** on the `Call Parms 1 of 3`) (see "How Do I Change Call Parameters?")
I_{or}/I_{oc} (dB)	I_{or}/I_{oc} is the ratio of Cell Power to AWGN. It is not directly settable. Normally, the I_{oc} has been specified. You need to set Cell Power to the value of (I_{oc} + I_{or}/I_{oc}) to achieve this setting.
Pilot E_c/I_{or} (dB)	Cell F-Pilot Level (see "How Do I Change Code Channel Levels and Walsh Codes?")
Traffic E_c/I_{or} (dB)	Cell F-FCH/Traffic Level (see "How Do I Change Code Channel Levels and Walsh Codes?")
E_b/N_t (dB)	It is not directly settable. It is calculated from the other parameters you have specified.

Example Settings

The following table is an example settings as specified in the standard. It also shows how to set on the test set to achieve the specified values. The I_{oc}, Traffic E_c/I_{or}, and Pilot E_c/I_{or} are all directly settable on the test set. For I_{or}/I_{oc}, which is the ratio of cell power to AWGN, you need to adjust Cell 1 Power (for Channel 1) and Cell 2 Power (for Channel 2) to achieve the correct levels relative to AWGN.

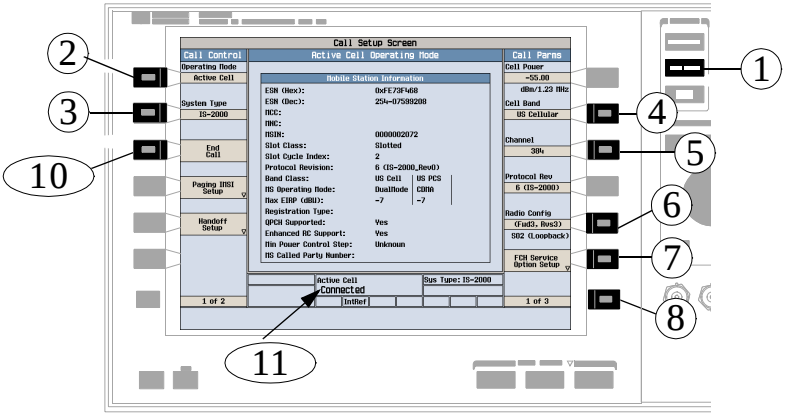
Table 4. Test Parameters for Candidate Set Pilot Detection

Parameters in Standard	Units	Test 1	Equivalent Settings on the Test Set
I_{or}/I_{oc}	dB	-3.1	Set Cell Power to - 58.1 dBm/1.23 MHz (I_{oc} + I_{or}/I_{oc})
Pilot E_c/I_{or}	dB	-7	Set Cell F-Pilot Level to -7 dB
Traffic E_c/I_{or}	dB	-7	Set Cell F-FCH/Traffic Level to -7 dB
I_{oc}	dBm/1.23 MHz	-55	Set AWGN Power to -55 dBm/1.23 MHz.

How Do I Set Up a Call?

How Do I Set Up an IS-2000 Call?

The Call Parms keys and Call Control keys provide access to the parameters needed to set up a call.



1. Press the **CALL SETUP** key.
2. Press the `Operating Mode` (**F1**) key and set the operating mode to `Active Cell`.
3. Press the `System Type` (**F2**) key and select IS-2000.
4. Press the `Cell Band` (**F8**) key and select the band in which you would like to bring up the call.
5. Press the `Channel` (**F9**) key and set the RF channel number.
6. Press the `Radio Config` (**F11**) key and select the radio configuration in which you would like to bring up the call.
7. Press the `FCH Service Option Setup` (**F12**) key and set the service option for the radio configurations you plan on testing.

NOTE SO55 (Service Option 55) is not supported by some mobile stations. If your mobile station does not support SO55 calls cannot be connected, and you will need to select a service option supported by the mobile station.

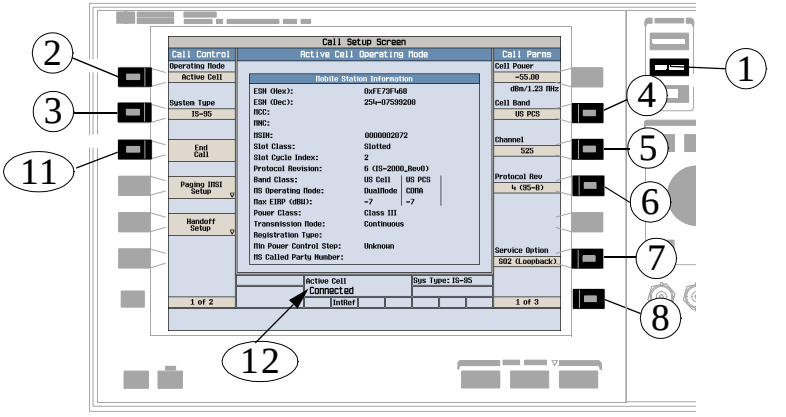
8. Check the rest of the Call Parms settings by pressing the **More** key to display the 2 of 3 and 3 of 3 menus.

You may also need to change cell settings such as SID (System Identification) to allow the mobile station to find service. See "How Do I Change Cell Information?" on page 89.

9. Turn on power to the mobile station and wait for an indication that it has found service.
10. Make a mobile station originated call (by entering a phone number and pressing SEND on the mobile station handset); or, wait for the mobile station to perform a power up registration and press the `Originate Call` (**F3**) key.
11. Check for `Connected` in the `Active Cell` status field.

How Do I Set Up an IS-95 Call?

The Call Parms keys and Call Control keys provide access to the parameters needed to set up a call.



1. Press the **CALL SETUP** key.
2. Press the `Operating Mode` (**F1**) key and set the operating mode to `Active Cell`.
3. Press the `System Type` (**F2**) key and select IS-95.
4. Press the `Cell Band` (**F8**) key and select the band in which you would like to bring up the call.
5. Press the `Channel` (**F9**) key and set the RF channel number.
6. Press the `Protocol Rev` (**F10**) key and set the protocol revision supported by the mobile station.
7. Press the `Service Option` (**F12**) key and select a service option for the call.
8. Check the rest of the Call Parms settings by pressing the **More** key to display the 2 of 3 and 3 of 3 menus.
9. You may need to change cell settings such as SID (System Identification) to allow the mobile station to find service. See "How Do I Change Cell Information?" on page 89.
10. Turn on power to the mobile station and wait for an indication that it has found service.

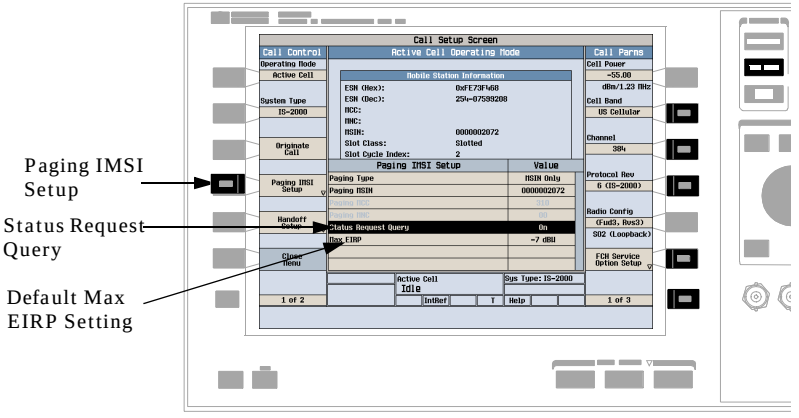
11. Make a mobile station originated call (by entering a phone number and pressing SEND on the mobile station handset), or wait for the mobile station to perform a power up registration and press the `Originate Call` (**F3**) key.

12. Check for `Connected` in the `Active Cell` status field.

Repeat Calls

If the mobile station has been connected on a call, has successfully registered with the test set, or the Paging IMSI information has been entered directly into the Paging IMSI Setup field, it is not necessary to wait for the power-up registration before originating a call from the test set.

To enter Paging IMSI information, press the `Paging IMSI Setup` (**F4**) key and set the parameters required by the mobile station paging type.



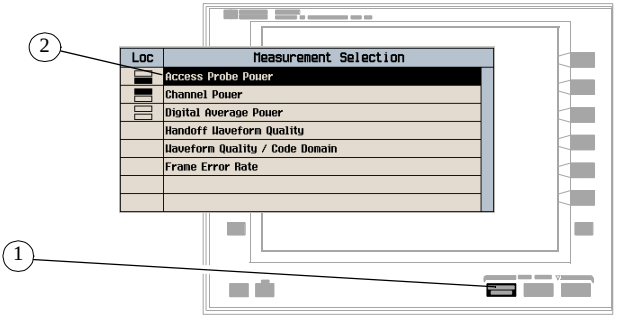
NOTE The test set needs to know the maximum EIRP (effective isotropic radiated power) of the mobile station to perform receiver ranging properly. When the Status Request Query state is set to Off and the MS Database is cleared, then the default Max EIRP setting will be used for connections in any band class.

NOTE When the mobile station registers or is connected on a call, the Paging IMSI information is automatically entered into the Paging IMSI Setup fields. This information is retained through test set presets but not retained through power up cycles.

How Do I Set Up a Call?

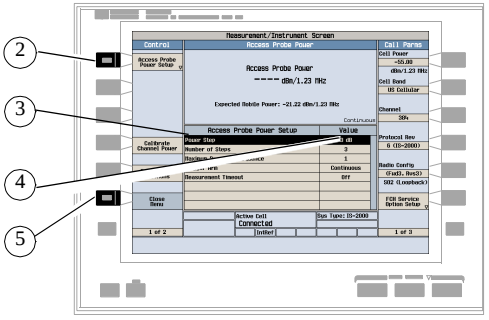
How Do I Change the Measurement Setup?

A. Select a measurement.



1. Press the **Measurement selection** key.
2. Highlight a measurement to set up and press the knob.

B. Set up the measurement.

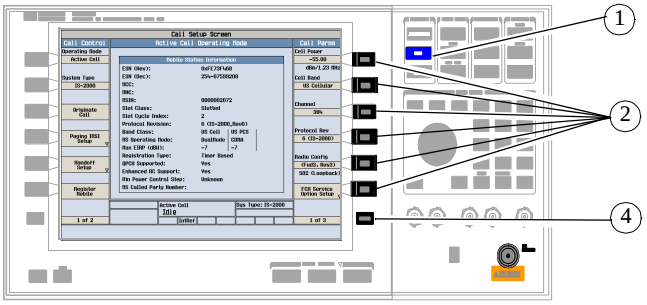


1. Press the **MEASUREMENT** key.
2. Press the `Control` (**F1**) key to display the measurement's setup menu.
3. Highlight a parameter and press the knob.
4. Enter a value or selection and press the knob.

NOTE For statistical measurement results, highlight the `Multi-Measurement Count` parameter and press the ON key. The number of averages will default to 10.

5. Press the Close Menu (**F6**) key.

How Do I Change Call Parameters?



1. Press the **CALL SETUP** key.
2. On the Call Parms menu (1 of 3) press any key.
3. Highlight a selection and press the knob. Enter a value.
4. Press the **More** key for additional call parameters.

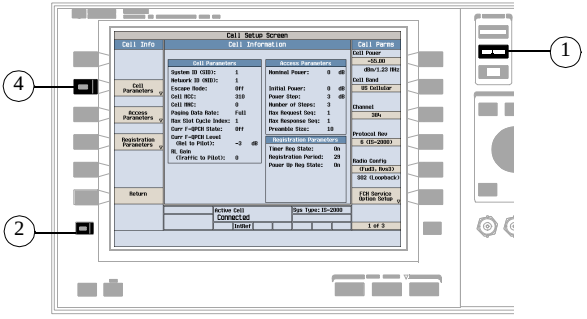
How Do I Change Call Parameters?

How Do I Change Cell Information?

There are three types of cell information: cell parameters, access parameters, and registration parameters.

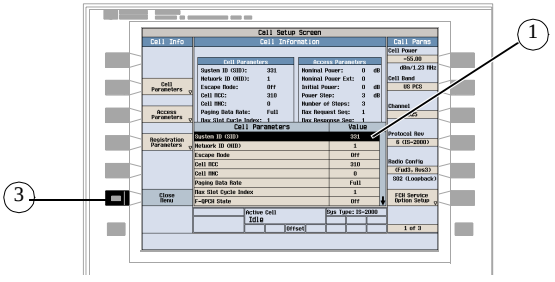
A. Set cell parameters.

1. Select the Cell Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Cell Parameters` (**F2**) key.

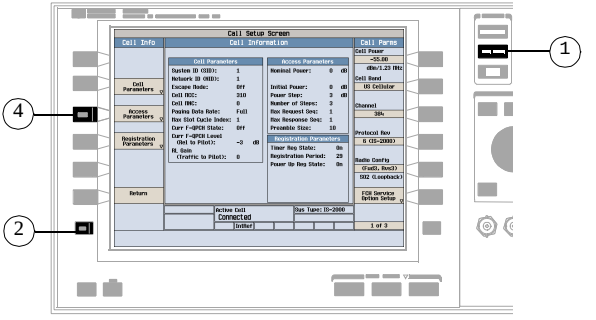
2. Set a cell parameter.



1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.
4. Press the `Return` (**F6**) key.

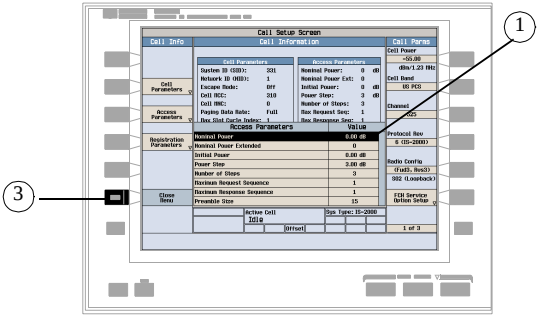
B. Set access parameters.

1. Select the Access Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Access Parameters` (**F3**) key.

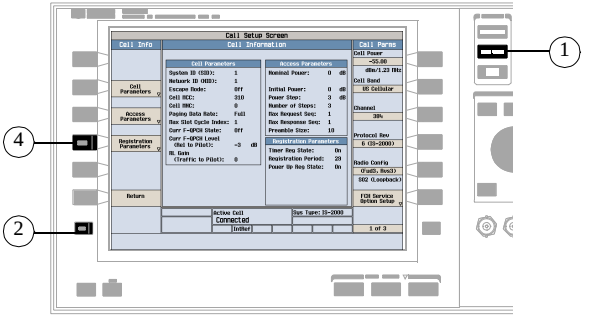
2. Set an access parameter.



1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.
4. Press the `Return` (**F6**) key.

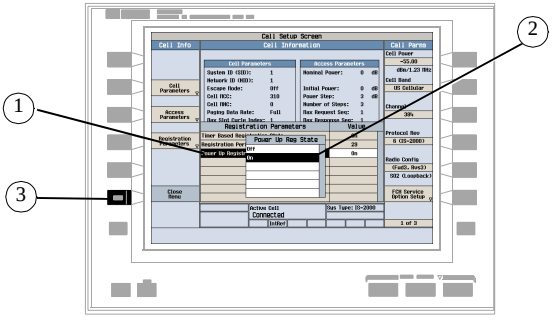
C. Set registration parameters.

1. Select the Registration Parameters menu.



1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the `Cell Info` (**F2**) key.
4. Press the `Registration Parameters` (**F4**) key.

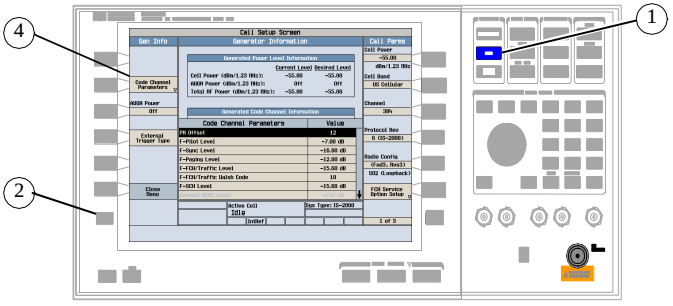
2. Set a registration parameter.



1. Turn the knob to highlight a parameter and then press the knob.
2. Enter a value or selection and press the knob.
3. Press the `Close Menu` (**F6**) key.
4. Press the `Return` (**F6**) key.

How Do I Change Cell Information?

How Do I Change Code Channel Levels and Walsh Codes?

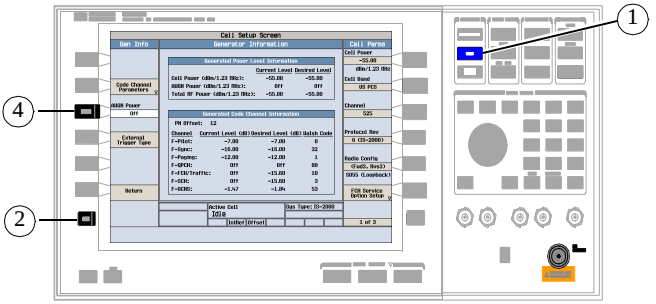


1. Press the **CALL SETUP** key.
2. Press the **More** key.
3. Press the Generator Info (**F3**) key.
4. Press the `Code Channel Parameters` **(F2**) key.
5. Set the level of the desired channel by using the knob and numeric keys.

How Do I Change Code Channel Levels and Walsh Codes?

How Do I Change AWGN Power Levels?

To access the AWGN power parameter and display the Generated Power Level Information table:



1. Press the **CALL SETUP** key.
2. Press the **More** key on the left side of the display.
3. Press the `Generator Info` (**F3**) key.
4. Press the `AWGN Power` (**F3**) key.
5. Set the desired AWGN levels by using the knob and numeric keys.

How Do I Change AWGN Power Levels?

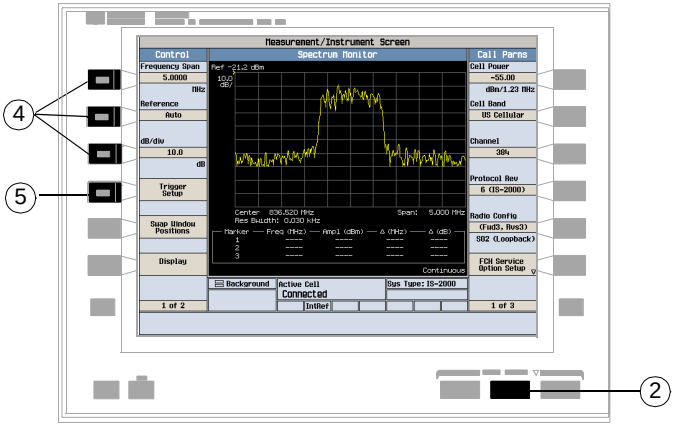
How Do I Use the Spectrum Monitor?

The following procedure shows a typical usage of the spectrum monitor in each of its two modes of operation; Swept Mode and Zero Span mode.

1. Establish a call with the mobile.

NOTE The spectrum monitor can also be used with any of the test set's test mode operating modes.

2. Press the **Instrument selection** key.
3. Select `Spectrum Monitor`.

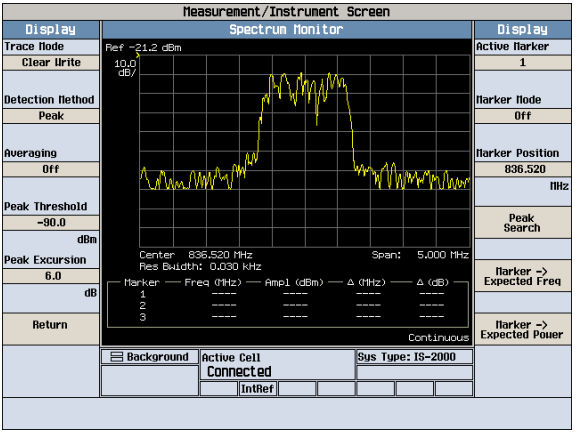


The spectrum monitor is displayed with the default settings as shown above. The center frequency is initially set at the expected frequency maintained by the test set's base station emulator. The `Swap Window Positions` (**F5**)key is only displayed when other measurements are active at the same time as the spectrum monitor.

4. Set the axis control as needed for your testing situation using the `Frequency Span` (**F1**), `Reference` (**F2**), and `dB/div` (**F3**) keys. For example, if you want to set the reference level manually (`Auto` is the default), press the `Reference` (**F2**) key then use the DATA ENTRY keys to enter the value you want.
5. Press the `Trigger Setup` (**F4**)key to access the `Trigger Setup` menu.
6. Set the trigger settings to meet your testing needs. For example:
   - If you want the Spectrum Monitor to sweep immediately and continuously, ensure that `Trigger Arm` (**F3**)is set to `Continuous`.
   - If you want to use external triggering, so that the Spectrum Monitor is triggered from a signal applied to the TRIG IN connector on the test set's rear panel, set `Trigger Source` (**F1**)to `External`.

- `Trigger Delay` (**F2**) allows you to specify the point, relative to the trigger event where samples are taken (a negative trigger delay value collects pre-trigger samples). The same trigger delay setting is used for swept mode and zero span mode.

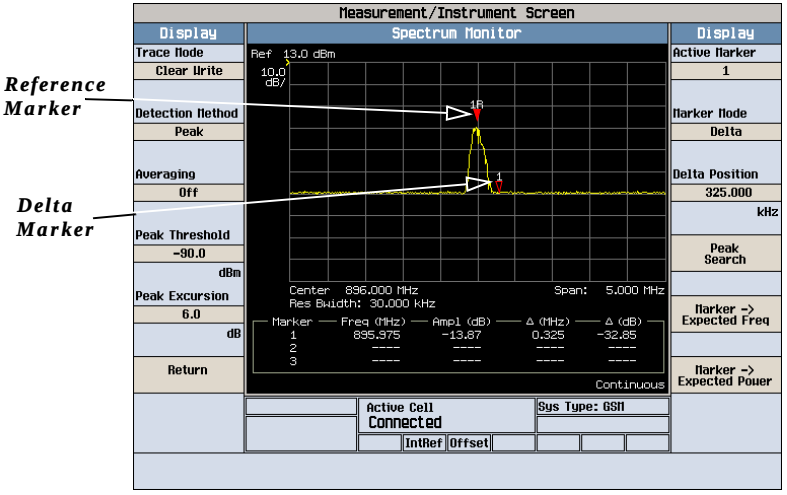
7. Press the `Return` (**F6**) key to exit the `Trigger Setup` menu.
8. Press the `Display` (**F6**) key to access the display settings.



A typical spectrum monitor trace display is shown above. In this case, the `Display` menu is open allowing you to access all of the display control settings using the (**F1**) through (**F12**) keys.

The following list provides examples of some of the settings you may want to adjust:

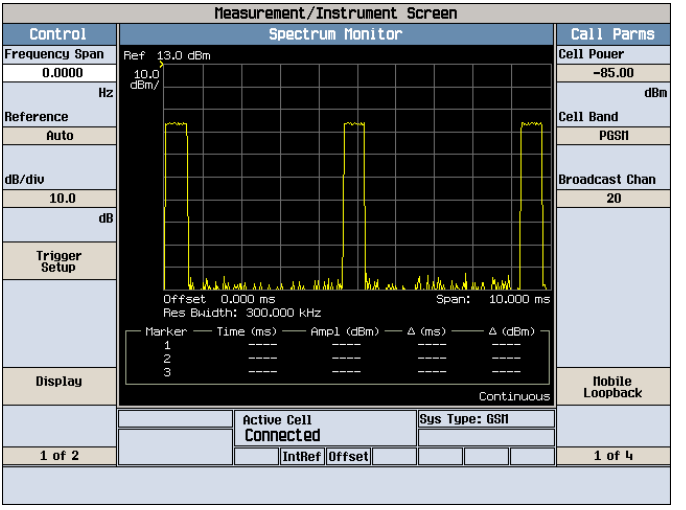
- `Peak Threshold` (**F4**) and `Peak Excursion` (**F5**) set the peak threshold and peak excursion levels respectively. A peak is identified by using the peak threshold and peak excursion value. A point is only marked as a peak if it rises and falls more than the peak excursion value from the peak threshold value.
- `Marker Mode` (**F8**) sets the mode of the active marker. `Position` mode activates a single frequency marker at the center frequency. (Note that the center frequency can be changed by setting the `Receiver Control` to `Manual`, and changing the `Manual Freq` setting.) `Delta` mode freezes the active marker at its current location and uses it as a reference marker. A second marker is created at the position of the reference marker and is used as a delta marker, reporting any change in amplitude or frequency from that of the reference marker.
- `Peak Search` (**F10**) moves the active marker to the highest peak on the spectrum monitor display, returning the numeric amplitude and frequency values.
- `Marker -> Expected Freq` (**F11**) sets the base station emulator's expected frequency to the frequency of the active marker.
- `Marker -> Expected Power` (**F12**) sets the base station emulator's expected power level to the amplitude of the active marker.



A typical swept mode spectrum monitor display is shown above. In this case, the active marker is marker 1, which is set to Delta mode.

9. Press the Return (**F6**) key to exit the Display menu.

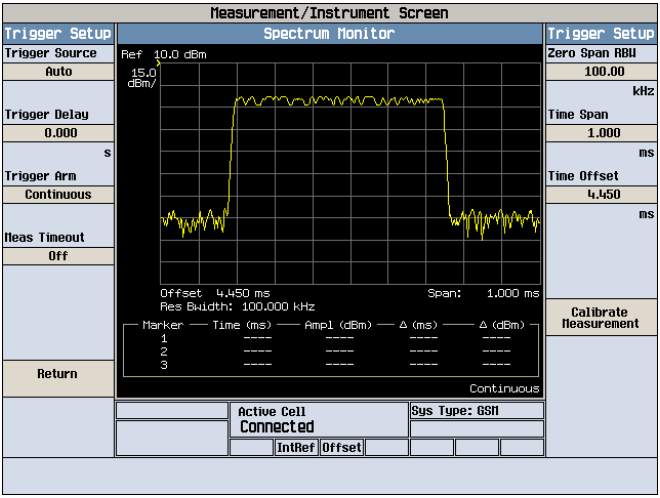
10. To set the spectrum monitor to zero span mode, press the Frequency Span (**F1**) key and use the numeric DATA ENTRY keys to enter a value of 0 MHz, or use the down-arrow key to reduce the span to zero.



A typical zero span mode spectrum monitor display is shown above. Like swept mode, the Y-axis represents absolute amplitude. However, the X-axis now represents time rather than frequency.

11. Press the `Trigger Setup (F6)` key. In zero span mode, additional trigger setup controls are available to you:

    - If you want to change the view window over which you are looking at the signal, use the `Time Span (F8)` and `Time Offset (F9)` keys. The measurement is made for the duration of the time span, beginning at the time defined by the trigger event plus the trigger delay plus the time offset.
    - If you want to change the resolution bandwidth, press the `Zero Span RBW (F7)` key and select a value. (To measure the total power of a signal you must select a resolution bandwidth greater than or equal to the signal bandwidth.) Note that changing the zero span resolution bandwidth does not modify the swept mode resolution bandwidth.



A typical zero span mode spectrum monitor display showing a bursted signal. The viewing window has been adjusted to zoom in on a single burst.

If the temperature of the test set drifts outside the calibrated temperature range of the spectrum monitor, a `Measurement Uncalibrated` message is displayed. To calibrate the spectrum monitor for the current temperature, press the `Calibrate Measurement` (**F11**) key on the `Trigger Setup` menu.

Calibrating the Test Set

Calibration Strategy

Various calibration routines must be run to ensure measurement accuracy. The type of calibration and appropriate intervals for performing calibrations vary with each test application.

Description

There are four calibrations that can be performed on the test set:

- "Channel Power Calibration" on page 103
- "Digital Average Power Calibration" on page 104
- "I/Q Calibration" on page 104
- "Spectrum Monitor Calibration" on page 104

Calibration Procedures

- Channel Power Calibration

  To perform the channel power calibration from the front panel, select the Channel Power measurement and press the Calibrate Channel Power softkey. To perform a channel power calibration from a remote program, use the "CALibration CPOWer?" command. During Channel Power calibration no power should be applied to the front panel.

  Channel Power calibration takes about two minutes.

  This calibration generates calibration data for the following measurements:

  — "Access Power Probe Measurement Description"

  — "Channel Power Measurement Description"

  — "Code Channel Time/Phase Measurement Description"

  — "Gated Power Measurement Description"

  — "Graphical Access Probe POwer Measurement Description" (*Lab Application Only*)

  — "Handoff Waveform Quality Measurement Description"

  — "Time Response of Open Loop Power Control (TROLPC) Measurement Description"

  — "Tx Spurious Emissions Measurement Description"

  — "Waveform Quality/Code Domain Measurement Description"

  — Spectrum Monitor

  During calibration the internal temperature of the test set will be measured and calibration data will be generated that covers the measurement amplitude range of the available frequency bands. During channel power measurements, the test set will once again measure the internal temperature and calibrate the temperature measurement that was made when calibration data was generated.

An integrity bit is set true and is returned with Channel Power measurement results when the measurement is uncalibrated due to temperature drift.

- Digital Average Power Calibration

  To perform the digital average power calibration from the front panel, select the Digital Average Power measurement and press the Calibrate Digital Avg Pwr softkey. To perform a digital average power calibration from a remote program, use the "CALibration: CPOWer?" command. During Digital Average Power calibration no power should be applied to the front panel RF IN/OUT connector.

  Digital average power measurement calibration loops back a CDMA signal from within the test set to the average power meter to generate a table of calibration values.

  Digital Average Power measurement calibration takes about ten minutes.

  Power must be cycled off then back on after the Digital Average Power calibration routine has completed.

- I/Q Calibration

  This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

  Manually initiating the IQ calibration routines requires pressing the **SYSTEM CONFIG** hardkey, then pressing the **More** key on the right side of the screen, then pressing the `Service` (**F7**) key.

- Spectrum Monitor Calibration

  The spectrum monitor must be calibrated for each test application or lab application in your test set, as well as for each format within in a fast switching test application or lab application. For example, if you calibrate the spectrum monitor while the GSM format of the GSM_AMPS/136_GPRS_W-CDMA fast switching test application is active, you must also calibrate the spectrum monitor while the AMPS/136, GPRS, and W-CDMA formats are active, individually.

  The spectrum monitor is automatically calibrated when performing a channel power calibration. Similarly, the channel power calibration is run as part of the spectrum monitor calibration.

  To perform the spectrum monitor calibration from the front panel, initiate the spectrum monitor by pressing **Instrument selection**, and then selecting `Spectrum Monitor` from the menu. Next, select `Trigger Setup` (**F4**), then Calibrate Measurement (F11). To perform this calibration from a remote program, use the "CALibration:CPOWer" command. During spectrum monitor calibration, no power should be applied to the front panel RF IN/OUT connector.

  The spectrum monitor calibration takes less than 5 minutes.

Remotely initiating any of the calibration routines is accomplished through the use of single query-only header. The test set returns a numeric value indicating the outcome of the calibration attempt.

Recommended Calibration Intervals

Table 5.

Condition:	Calibrating Channel Power Measurements	Calibrating Digital Average Power Measurements	I/Q Calibration	Spectrum Monitor Calibration
When Test Set is being used for the first time (allow 30-minute warmup period).	✓			✓
After firmware is upgrade or after switching between revisions of the application	✓	✓		✓
If the ambient temperature changes more than 10 degrees C since latest calibration	✓			✓
Once every month	✓			✓
Once every year	✓	✓		✓
If Baseband Generator or Vector Output modules are serviced			✓	

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