User's and Programming Guide

HP ESG-D Series Option 101 Signal Generators CDMA2000 (Revision 8) Personality

HP Part No. E4400-90296

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1 The CDMA2000 (Revision 8) Personality

This guide provides information specific to the Option 101 CDMA2000 (Revision 8) personality.

NOTE This option requires the installation of Option UND, Dual Arbitrary Waveform Generator. Refer to the Option UND user's and programming guide for information (HP part number E4400-90249).

Overview

This section contains an overview of the Option 101 CDMA2000 (Revision 8) personality.

Option 101 CDMA2000 (Revision 8)

The HP ESG-D Series Option 101 signal generator is a multichannel, code division multiple access (CDMA2000) stimulus intended for base station and mobile testing.

Option 101 enables you to generate forward and reverse link signals consistent with the developing CDMA2000 (Revision 8) system specifications. These 1× or 3× chip rate, direct or multicarrier spread signals can be used for base station, mobile, component and subsystem testing. User-defined custom signals can be created using a simple table-based channel editor.

Option 101 includes:

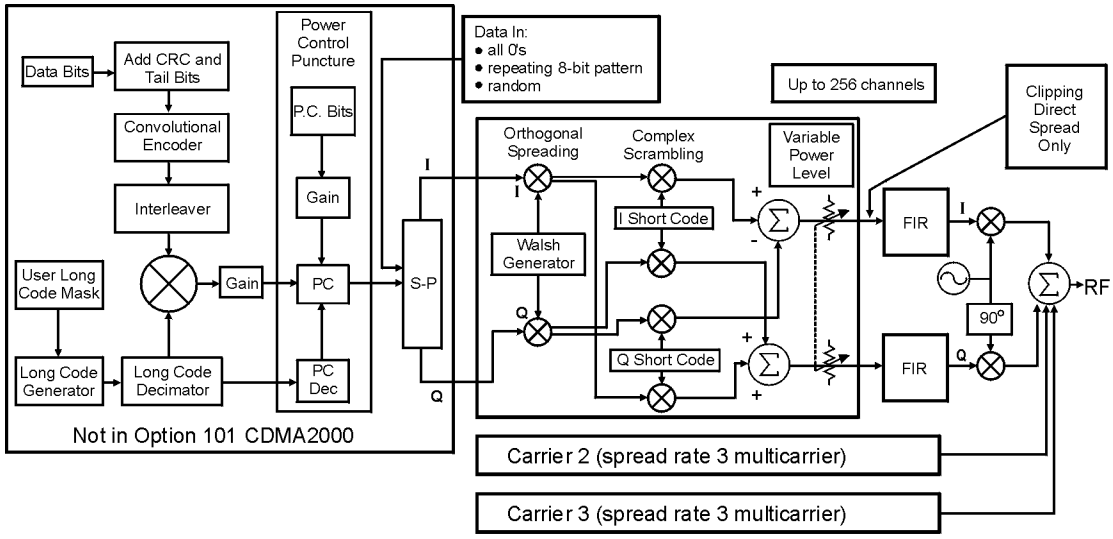
- multichannel CDMA2000 forward and reverse link signals
- spread rates: 1× or 3×
- multicarrier or direct spreading forward link types
- predefined CDMA2000 waveform configurations or use the table editor to fully configure a CDMA2000 waveform per your requirements
- forward link channel types: pilot, paging, sync, dedicated control, fundamental traffic, and supplemental traffic
- user-definable forward link variables: data rate, Walsh code, code domain power, PN offset and data pattern for each channel
- HPSK spreading/modulation for reverse link
- reverse link channel types: pilot, dedicated control, fundamental traffic, and supplemental traffic
- user-definable reverse link variables: data rate, code domain power, and data pattern for each channel
- user-defined FIR filters
- predefined filters including Gaussian, IS-95, IS-95 modified ACP filters, raised cosine (Nyquist) and root raised cosine (root Nyquist)

NOTE Specifications for Option 101 are included in Chapter 8 of the *HP ESG and HP ESG-D Series Signal Generators User's Guide.*

Physical Layer Block Diagrams

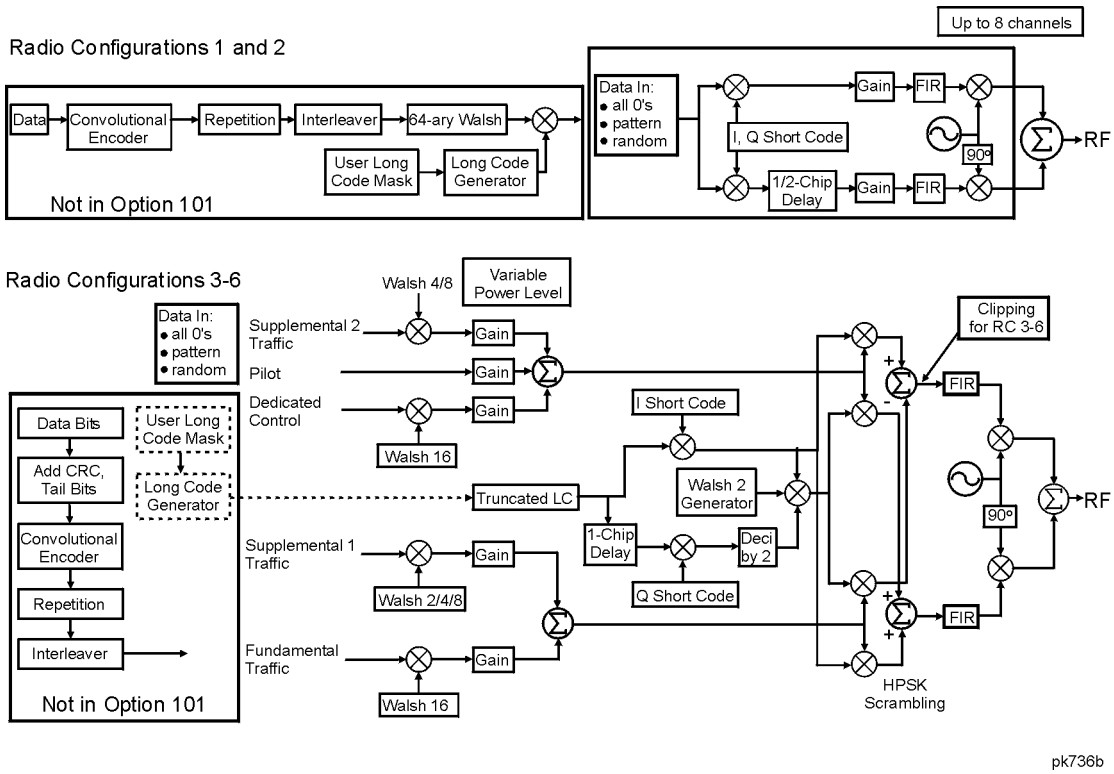
The following diagrams show the portions of the forward and reverse physical layers supported by Option 101.

Figure 1-1 Option 101 Forward Link Channel Structure



pk735b

Figure 1-2 Option 101 Reverse Link Channel Structure



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Revision Numbers

The firmware personality of the Option 101 signal generator is based on continually developing CDMA2000 international standards. Therefore, the firmware must be upgraded periodically to stay current with these standards. For identification purposes, a revision number is assigned to each release of the Option 101 personality. The revision number appears in softkey menus, status displays, and this guide. This guide describes the features associated with *revision 8* of the Option 101 CDMA2000 personality, designed according to Revision 8 CDMA2000 specifications.

2 Using Functions

This chapter contains instructions for using the features associated with the Option 101, CDMA2000 (Revision 8) personality.

Table Editor Basics

Option 101 provides several table editors that enable you to:

- modify CDMA2000 forward link channel configurations (for details, see page 2-8)
- modify CDMA2000 reverse link channel configurations (for details, see page 2-15)
- create a user-defined FIR filter (for details, see page 2-26)
- modify a user-defined FIR filter (for details, see page 2-31)

While each of these table editors performs a different function, they are all used in a similar manner, and most of the table editors have several editing softkeys in common.

Common Edit Functions

Edit Item Enables you to use the front panel knob and arrow keys to edit the value of a selected entry. After highlighting the value you want to edit, press this softkey.

Insert Row Inserts a row for data above the currently selected row.

Delete Row Deletes the currently selected row of data.

Goto Row Displays a new page of softkeys so that you can quickly move to the first, middle, or last row of data. This is especially helpful in a large table, or when using the filter table editor mirror function.

Load Default FIR Enables you to reset factory default values for a FIR filter.

Load/Store Displays a new page of softkeys that enables you to load data from a stored file, save data to a file, or delete a stored file.

Delete All Rows Clears all data from a table.

CAUTION There is no “undo” command. Once you delete data from a table, you cannot retrieve it.

Using CDMA2000 (Revision 8)

This chapter describes how to set up a waveform using predefined and user-defined channels.

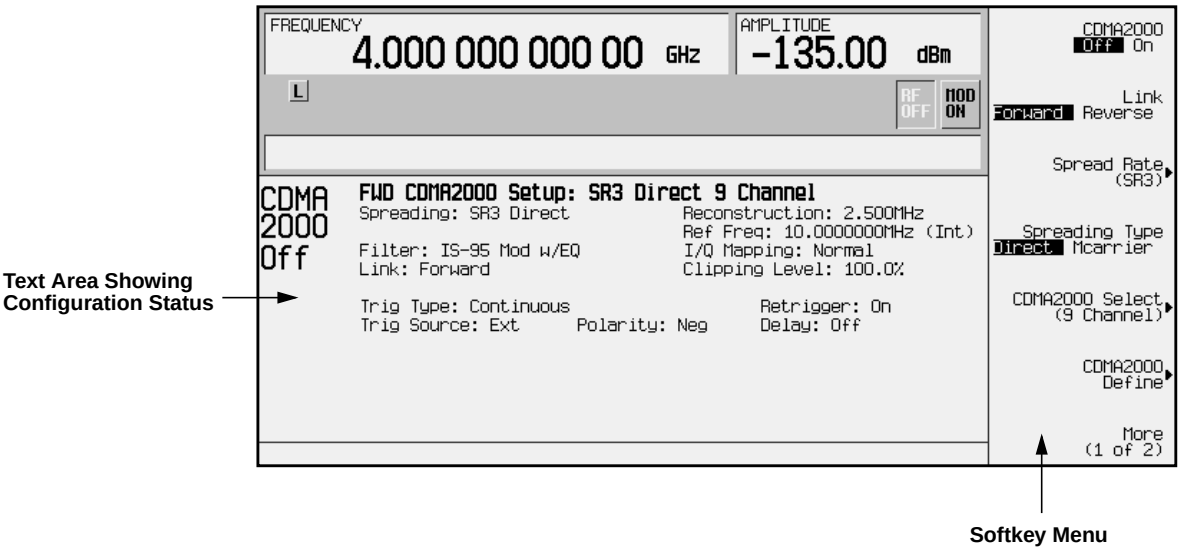
You will learn how to perform the following:

- select channels
- modify channels
- activate the modulation and the RF output
- create filters
- modify filters

Accessing the CDMA2000 Menu

Perform the following procedure to access the CDMA2000 personality.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu. The first page of CDMA2000 softkeys is displayed on the right side of the display. The center text area of the display shows the status of CDMA2000 configuration. These characteristics are immediately updated when you modify them in the softkey menus.



Selecting Predefined Channel Configurations

The HP ESG-D Option 101 signal generator contains predefined channel setups for both forward and reverse link CDMA2000 waveform generation.

Forward Link Predefined Channel Configurations

There are six predefined channel configurations for forward link:

- 1 pilot channel at spread rate 1
- 9 channels at spread rate 1
- 1 direct-spread pilot channel at spread rate 3
- 9 direct-spread channels at spread rate 3
- 1 multicarrier-spread pilot channel at spread rate 3
- 9 multicarrier-spread channels at spread rate 3

Reverse Link Predefined Channel Configurations

There are five predefined channel configurations for forward link:

- 1 pilot channel at spread rate 1
- 1 pilot channel at spread rate 3
- 5 channels at spread rate 1
- 5 channels at spread rate 3
- 8 channels at spread rate 1

CAUTION Unless previously saved to the signal generator's memory catalog, modifications made to predefined channel configurations (additional channels, user-defined channel values, etc.) are lost when changes are made to link direction, spreading type, or spreading rate.

To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

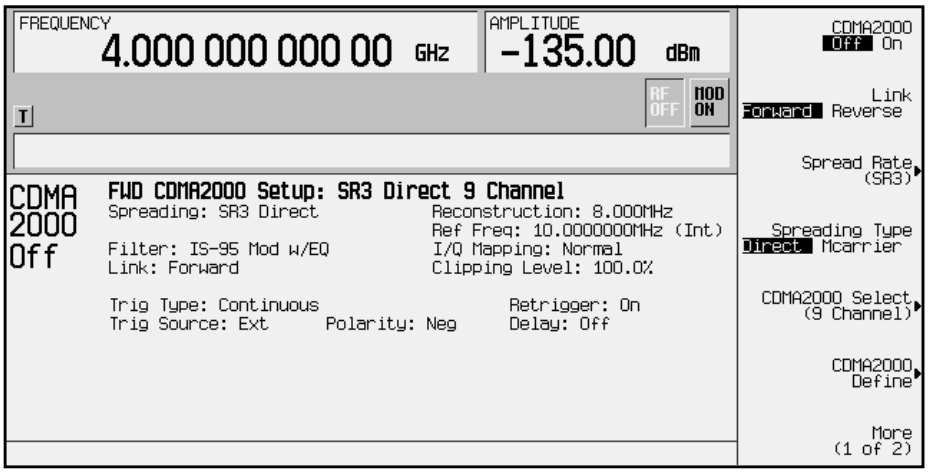
After an instrument preset, the default predefined channel configuration is forward link Spread Rate 3 Direct Spreading 9 Channels. Predefined channel configurations can be used as defined, or modified using the channel table editor. See "Modifying Forward Link Channel Configurations" on page 2-8 for more information.

The following procedures explain how to select predefined channel setups for both forward and reverse link waveform configurations.

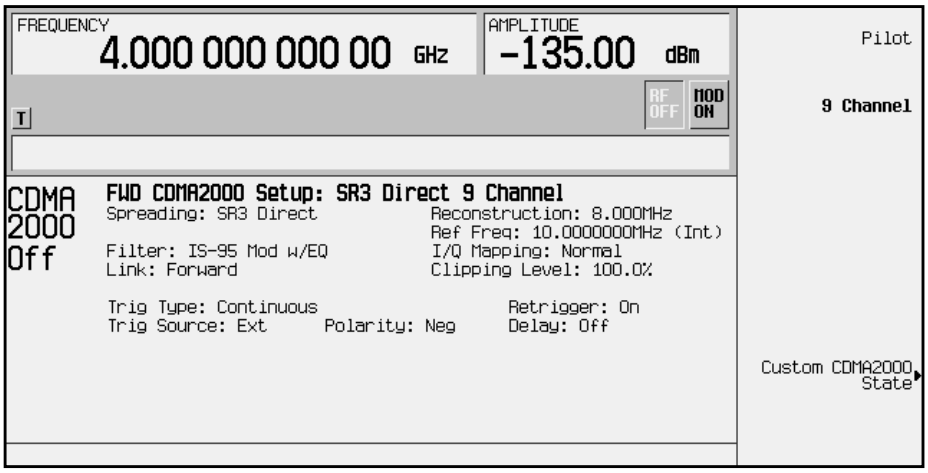
Selecting a Forward Link Predefined Channel Configuration

Perform the following procedure to select forward link predefined channel configurations.

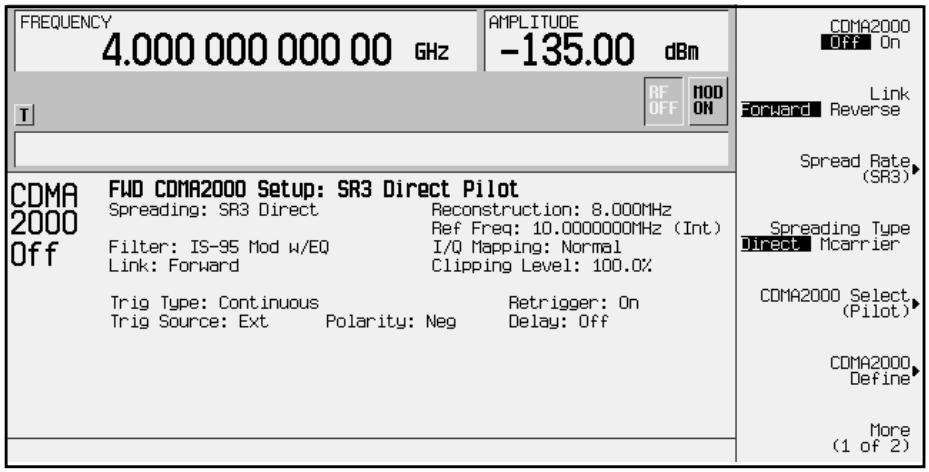
1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu. Notice that the default predefined channel selection for forward link (`9 Channel`) appears underneath **CDMA2000 Select** in the softkey menu. The text area displays `FWD CDMA2000 Setup: SR3 Direct 9 Channel` as the current configuration, as shown.



5. Press **CDMA2000 Select** to display the CDMA2000 Setup selection menu for forward link, as shown.



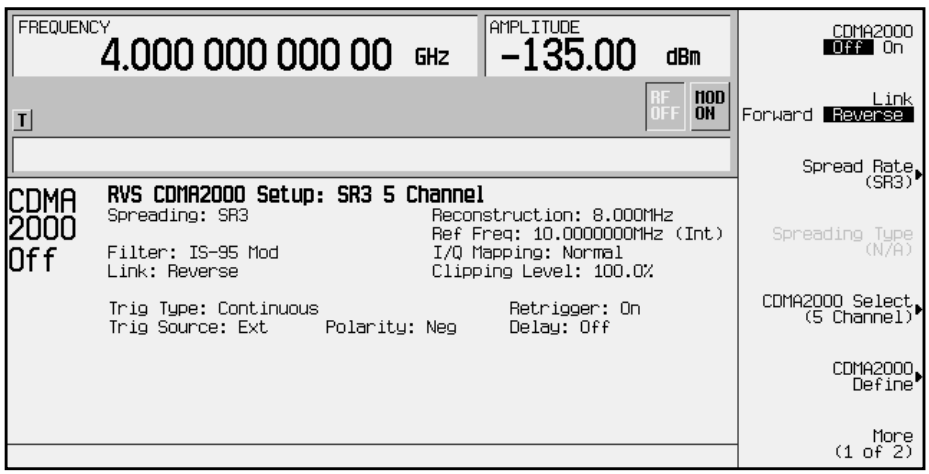
6. Press **Pilot** to select a pilot channel. (`Pilot`) appears under **CDMA2000 Select** in the softkey menu. The text area displays `FWD CDMA2000 Setup: SR3 Direct Pilot` as the current configuration, as shown.



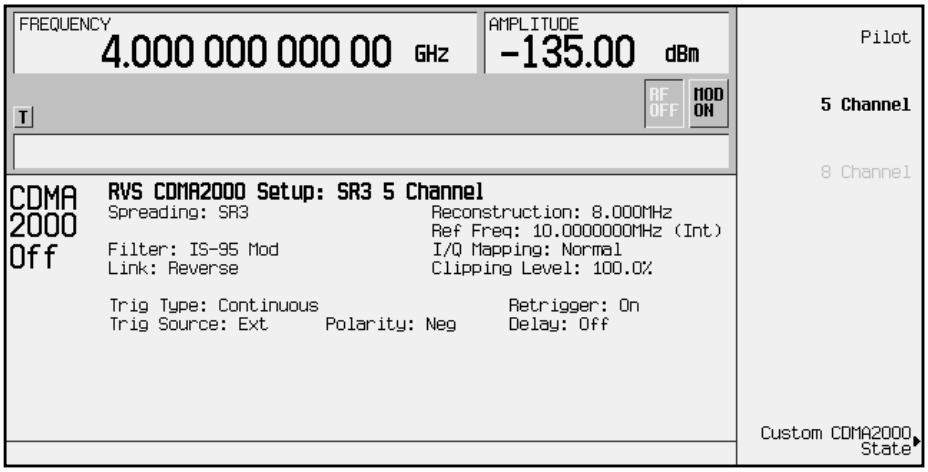
Selecting a Reverse Link Predefined Channel Configuration

Perform the following procedure to select reverse link predefined channel configurations.

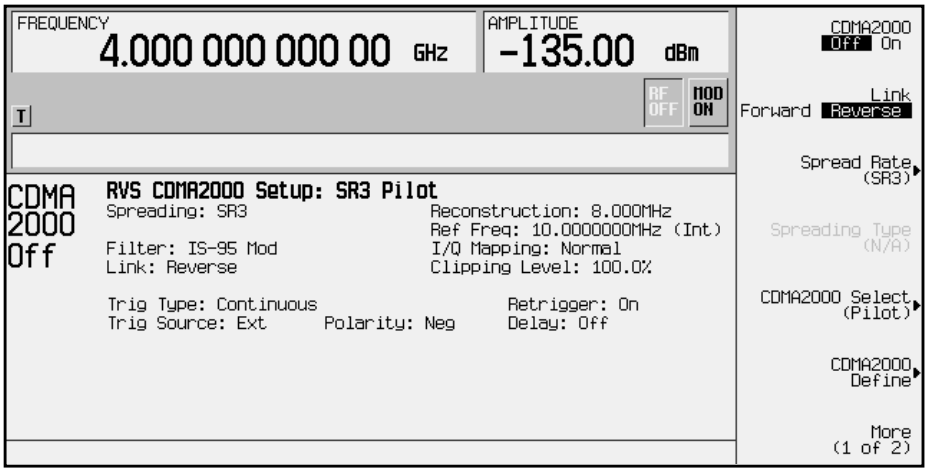
1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000.
5. Press **Link Forward Reverse** until **Reverse** is highlighted. The default predefined channel selection for reverse link (`5 Channel`) appears beneath **CDMA2000 Select** in the softkey menu. The text area displays `RVS CDMA2000 Setup: SR3 5 Channel` as the current configuration, as shown.



6. Press **CDMA2000 Select** to display the CDMA2000 Setup selection menu for reverse link, as shown.



7. Press **Pilot** to select a pilot CDMA2000 reverse link setup. (`Pilot`) appears under **CDMA2000 Select** in the softkey menu. The text area displays `RVS CDMA2000 Setup: SR3 Pilot` as the current configuration, as shown.



Modifying Forward Link Channel Configurations

You can modify forward link channel configurations using the channel setup table editor. The following examples show you how to modify predefined channel setups for forward link waveform configurations. Refer to "Table Editor Basics" on page 2-2 for additional information about table editors.

CAUTION Unless previously saved to the signal generator's memory catalog, modifications made to predefined channel configurations (additional channels, user-defined channel values, etc.) are lost when changes are made to link direction, spreading type, or spreading rate.

To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

Inserting Additional Channels

The default number of forward link channels after a normal instrument preset is nine. Available channel types include paging (radio configurations 1 and 2), pilot, sync, traffic, supplemental1 traffic, and supplemental2 traffic. The maximum number of forward link channels allowed in the table editor is 256.

In the following sections, examples are provided for inserting traffic channels and supplemental traffic channels into the forward link configuration.

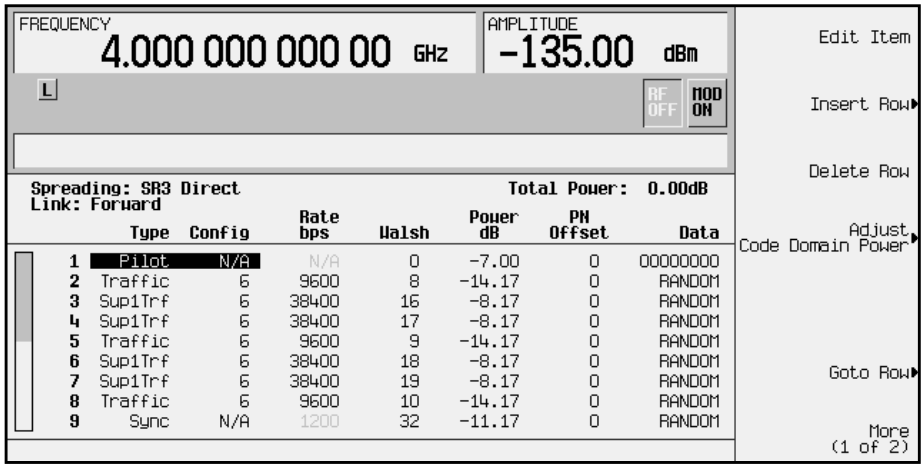
Inserting Additional Traffic Channels

Perform the following procedure to insert additional traffic channels.

In this example, 20 additional traffic channels are inserted into the predefined forward link configuration.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu.

5. Press **CDMA2000 Define**, **Edit Channel Setup** to display the channel table editor, as shown.



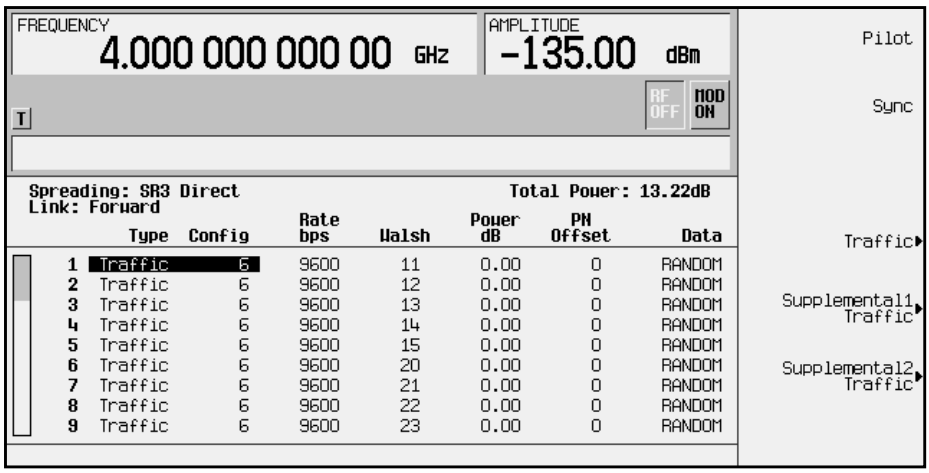
6. Press **Insert Row**, **Traffic**, **Channels** and enter 20. Terminate the entry with the **Enter** softkey.

7. Press **Done** to insert the additional traffic channels. The channel table editor now contains the 20 additional channels, as shown. Notice that the first page displays only channels one through nine. To see the additional channels, press **Return**, **Goto Row**, **Page Down**. In this example, there are four pages of channel listings. Press **Page Down** three times to view the last page.

   The display shows that the total power is now at 13.22 dB. If necessary, you can rescale the total channel power to 0 dB by pressing **Adjust Code Domain Power**, **Scale to 0 dB**.

   Press **Return**. The text area displays `FWD CDMA2000 Setup: SR3 9 Channel (Modified)` as the current configuration.

   To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

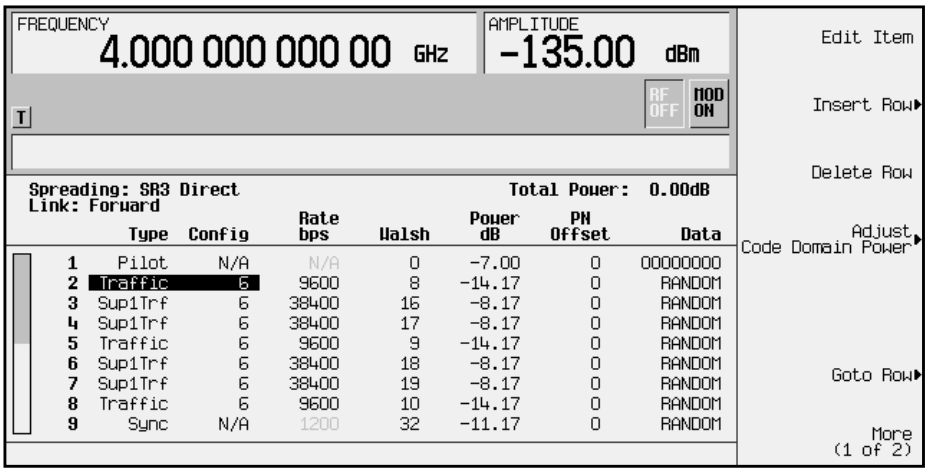


Inserting Supplemental Traffic Channels

Perform the following procedure to insert additional supplemental traffic channels.

After a normal instrument preset, the CDMA2000 default forward link setup consists of one pilot channel, three traffic channels, four supplemental1 traffic channels, and a sync channel. For this example, four supplemental2 traffic channels are inserted after the pilot channel.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu.
5. Press **CDMA2000 Define**, **Edit Channel Setup** to display the channel table editor. Use the front panel knob or arrow keys to move the cursor to table row 2, as shown.

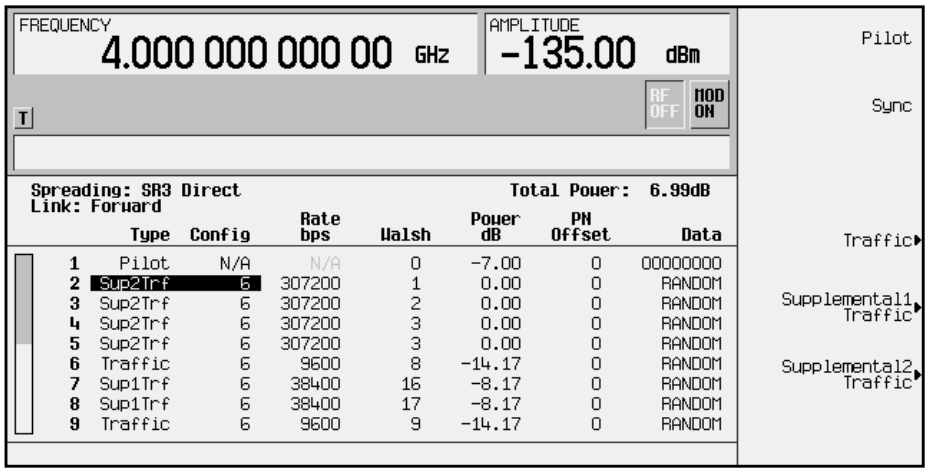


6. Press **Insert Row**, **Supplemental2 Traffic**, **Channels**, **4**, **Enter**, **Done**. Four additional supplemental2 traffic channels are inserted in the channel table editor, as shown.

   The display shows that the total power is now at 6.99 dB. If necessary, you can rescale the total channel power to 0 dB by pressing **Adjust Code Domain Power**, **Scale to 0 dB**.

   Press **Return**. The text area displays `FWD CDMA2000 Setup: SR3 9 Channel (Modified)` as the current configuration.

   To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.



Editing Forward Link Channel Values in the Table Editor

Perform the following procedure to edit forward link channel values in the channel table editor.

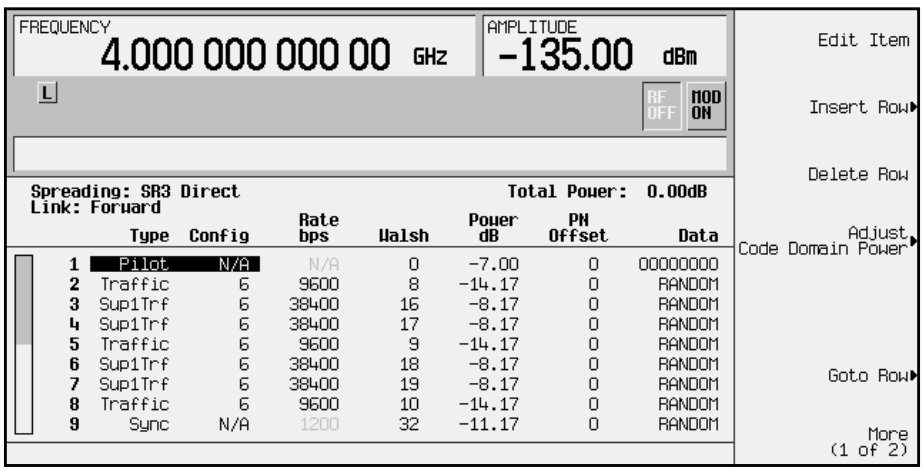
You can use the channel setup table editor to modify forward link configuration values in the following columns:

- `Rate bps` - data rate in bits-per-second
- `Walsh` - Walsh code
- `Power dB` - channel power (gain) in decibels (0 to –40.0 dB)
- `PN Offset` - pseudorandom number offset (0 to 511)
- `Data` - specific 8-bit pattern of 1's and 0's or random data feeding Walsh code

Highlight the value you wish to change using the front panel arrows or knob, then enter the new value using the numeric keypad.

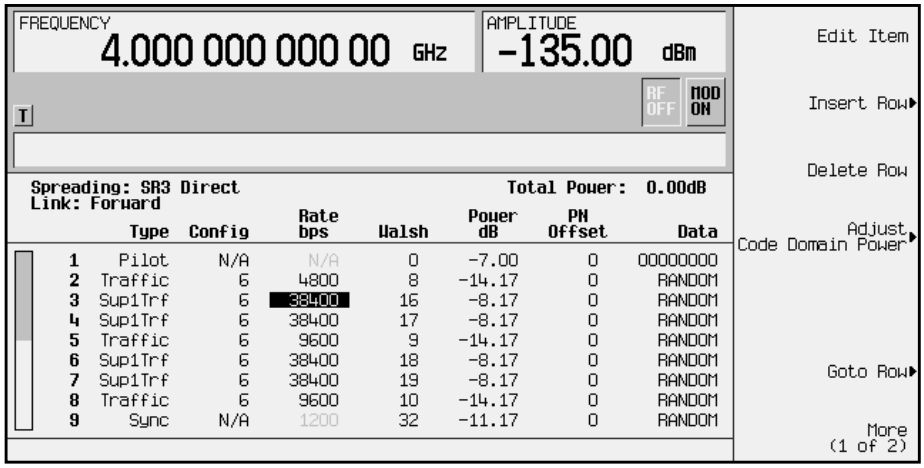
In the following example, you will edit the `Rate bps`, `Walsh`, `Power dB`, and `Data` fields of the traffic channel in table row 2 contained in the default predefined forward link channel setup.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000. Notice that the default predefined channel selection for forward link is SR3 Direct 9 Channel.
5. Press **CDMA2000 Define**, **Edit Channel Setup** to display the channel table editor, as shown.

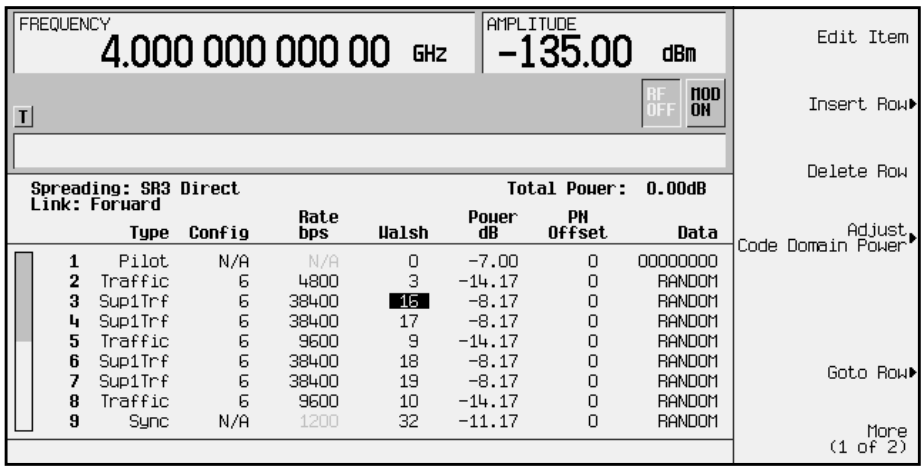


6. Use the arrow keys to move the cursor to the traffic channel located in table row 2.

7. Use the arrow keys to highlight the `Rate bps` value (`9600`).
8. Press **Edit Item**, **4800** to change the data rate of the traffic channel to 4800 bits-per-second. The cursor moves to the next row in the `Rate bps` column, as shown.

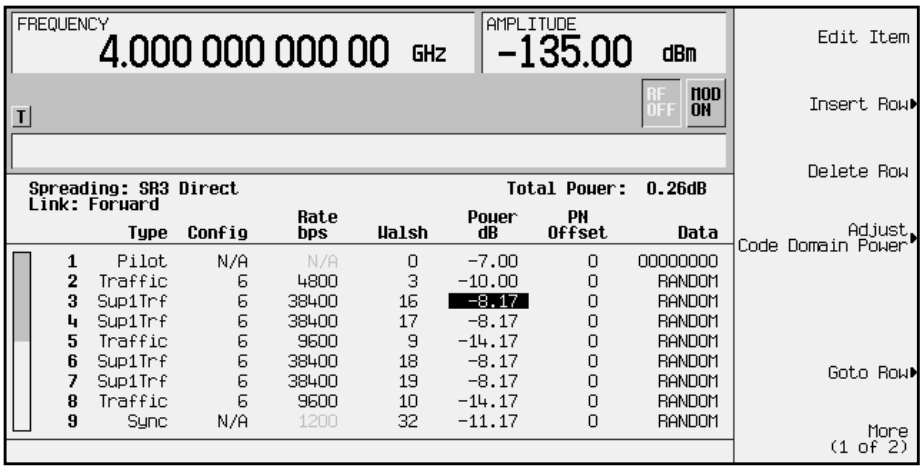


9. Use the arrow keys to highlight the `Walsh` code value (`8`) in table row 2.
10. Press **Edit Item**, **3**, **Enter** to change the Walsh code of the traffic channel to 3. The cursor moves to the next row in the `Walsh` column, as shown.



11. Use the arrow keys to highlight the `Power` value (`–14.17`) in table row 2.

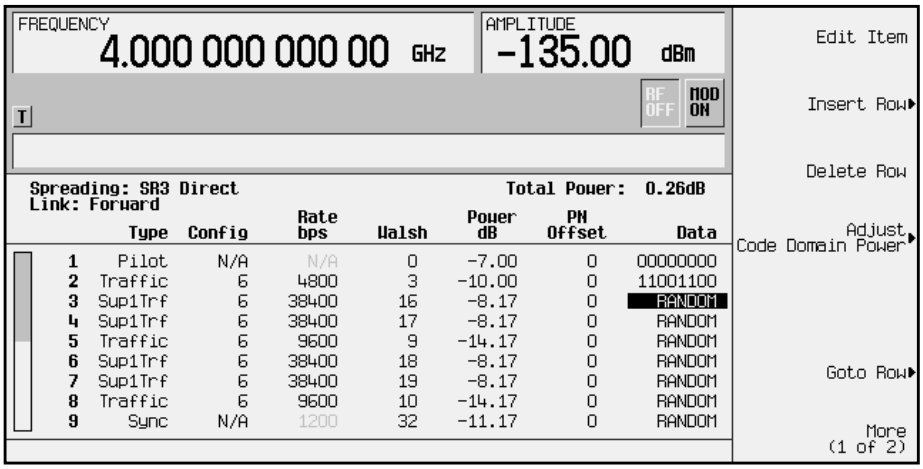
12. Press **Edit Item**, **-10**, **dB** to change the power of the traffic channel to –10.00 dB. The cursor moves to the next row in the Power dB column, as shown.



The display shows that the total power is now at 0.26 dB. If necessary, you can rescale the total channel power to 0 dB by pressing **Adjust Code Domain Power**, **Scale to 0 dB**.

13. Use the arrow keys to highlight the Data value (RANDOM) in table row 2.

14. Press **Edit Item**, **11001100**, **Enter** to change the transmitted data of the traffic channel to 11001100. The cursor moves to the next row in the Data column, as shown.



15. Press **Return**. The text area displays FWD CDMA2000 Setup: SR3 9 Channel (Modified) as the current configuration. You now have a modified traffic channel with a data rate of 4800, a Walsh code of 3, a power level of –10.00 dB, transmitting 11001100.

To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

Modifying Reverse Link Channel Configurations

You can modify reverse link channel configurations using the channel setup table editor. The following examples show you how to modify predefined channel setups for reverse link waveform configurations. Refer to "Table Editor Basics" on page 2-2 for additional information about table editors.

CAUTION Unless previously saved to the signal generator's memory catalog, modifications made to predefined channel configurations (additional channels, user-defined channel values, etc.) are lost when changes are made to link direction, spreading type, or spreading rate.

To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

Inserting Additional Channels

You can insert several different types of channels into a reverse link configuration. These include pilot, dedicated control, traffic, supplemental1 traffic and supplemental2 traffic channels. Up to eight different channels can be transmitted simultaneously in reverse link mode.

The following example explains how to insert a supplemental2 traffic channel into a reverse link channel configuration.

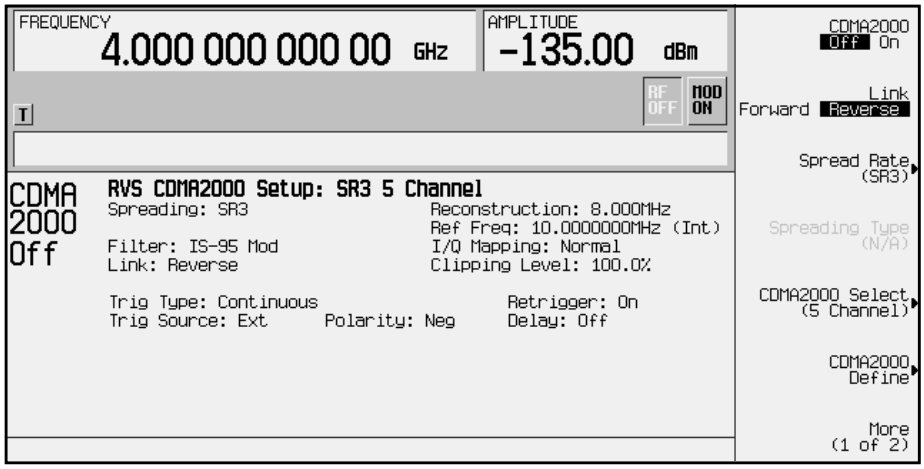
Inserting a Supplemental Traffic Channel

Perform the following procedure to insert a supplemental2 traffic channel.

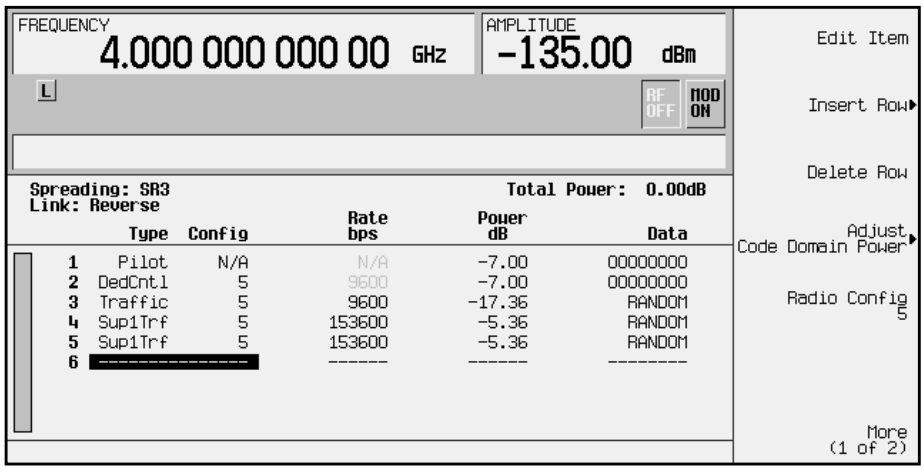
In this example, one supplemental2 traffic channel is inserted in the last row of the table editor.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu.

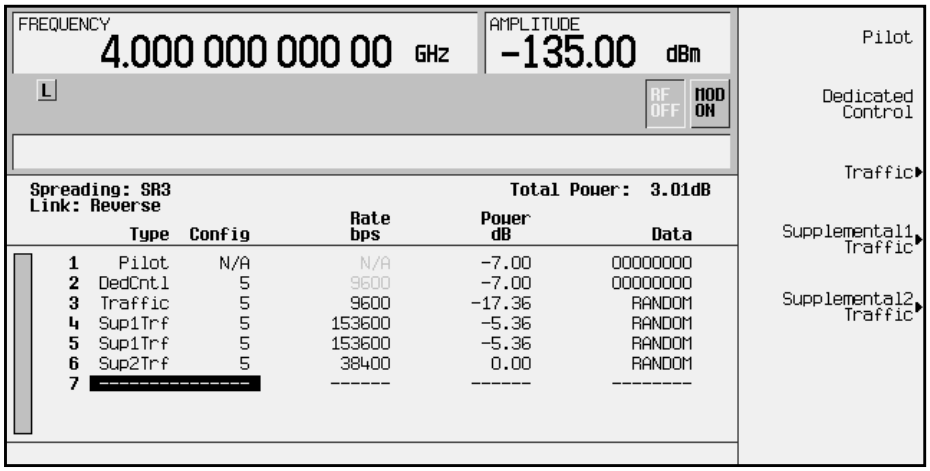
5. Press **Link Forward Reverse** until **Reverse** is highlighted. The display changes to reverse link mode, as shown. The text area displays `RVS CDMA2000 Setup: SR3 5 Channel` as the current configuration.



6. Press **CDMA2000 Define**, **Edit Channel Setup** to display the channel table editor. Use the arrow keys to move the cursor to table row 6, as shown.



7. Press **Insert Row**, **Supplemental2 Traffic**, **Done** to insert a supplemental2 traffic channel into the table editor on table row 6, as shown. Press **Return**. The text area displays `RVS CDMA2000 Setup: SR3 5 Channel (Modified)` as the current configuration.



The display shows that the total power is now at 3.01 dB. If necessary, you can rescale the total channel power to 0 dB by pressing **Adjust Code Domain Power**, **Scale to 0 dB**.

To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

Editing Reverse Link Channel Values in the Table Editor

Perform the following procedure to edit reverse link channel values in the channel table editor.

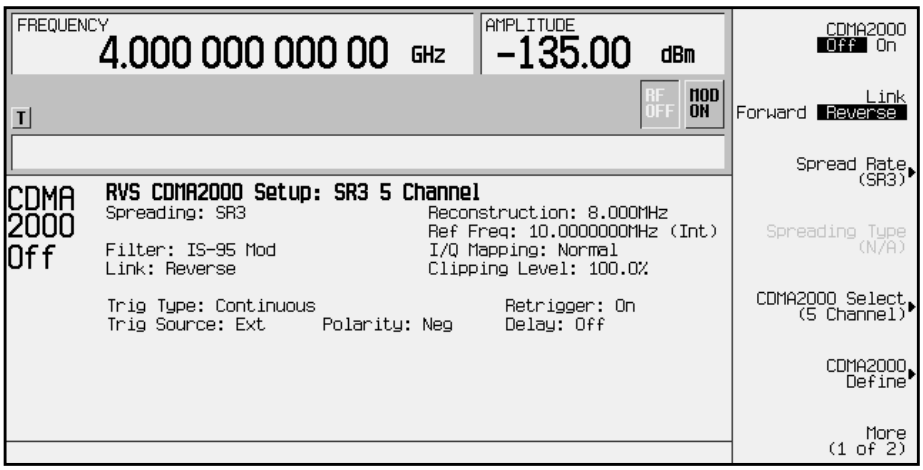
You can use the channel setup table editor to modify reverse link configuration values in the following columns:

- `Rate bps` - data rate in bits-per-second
- `Power dB` - channel power (gain) in decibels (0 to –40.0 dB)
- `Data` - specific 8-bit pattern of 1's and 0's or random data

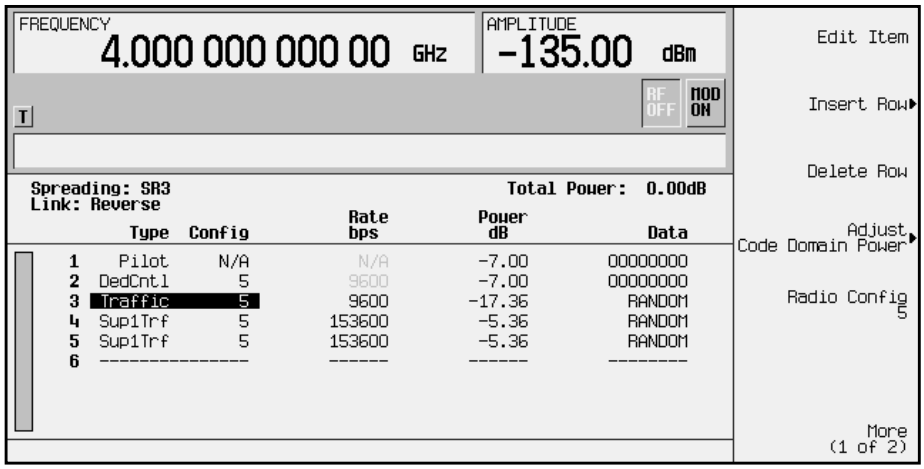
Highlight the value you wish to change using the front panel arrow keys or knob, then enter the new value using the numeric keypad.

In the following example, you will edit the `Rate bps`, `Power dB`, and `Data` fields of the traffic channel in table row 3 of the default predefined reverse link channel configuration.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu.
5. Press **Link Forward Reverse** until **Reverse** is highlighted. The text area displays `RVS CDMA2000 Setup: SR3 5 Channel` as the current configuration, as shown.

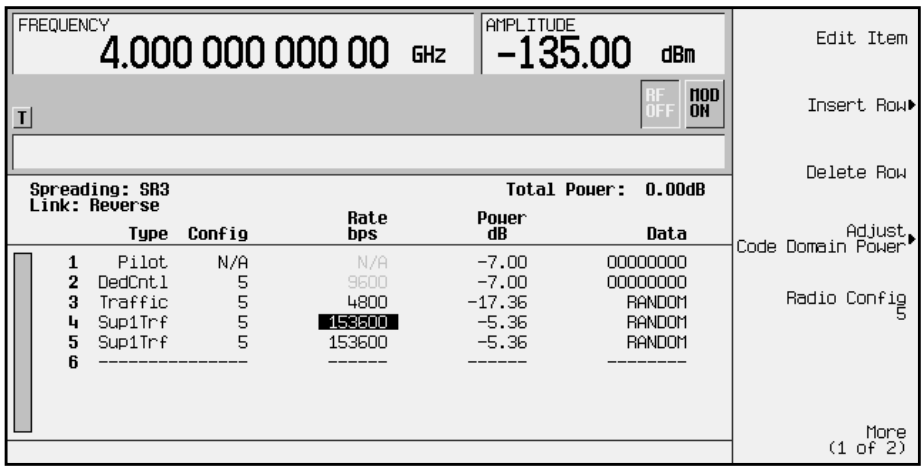


6. Press **CDMA2000 Define**, **Edit Channel Setup** to display the channel table editor. Use the arrow keys to move the cursor to the traffic channel located in table row 3, as shown.



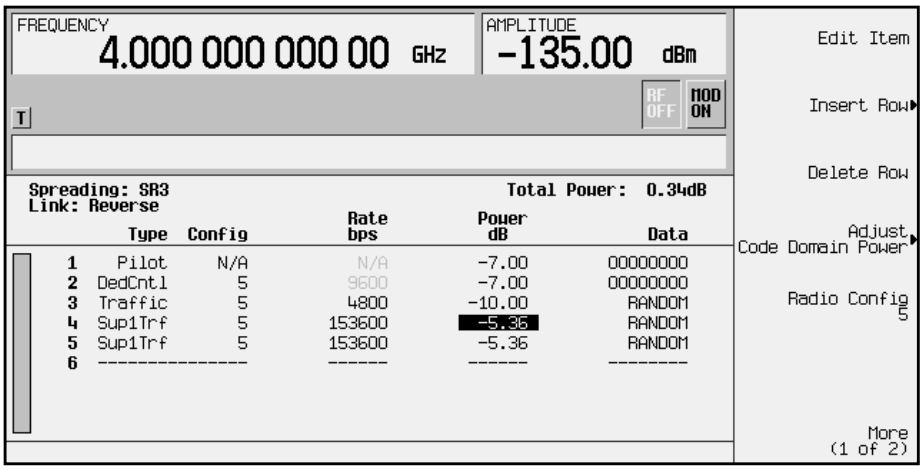
7. Use the arrow keys to highlight the `Rate bps` value (`9600`).

8. Press **Edit Item**, **4800** to change the data rate of the traffic channel to 4800 bits-per-second. The cursor moves to the next row in the `Rate bps` column, as shown.



9. Use the arrow keys to highlight the `Power` value (`–17.36`) in table row 3.

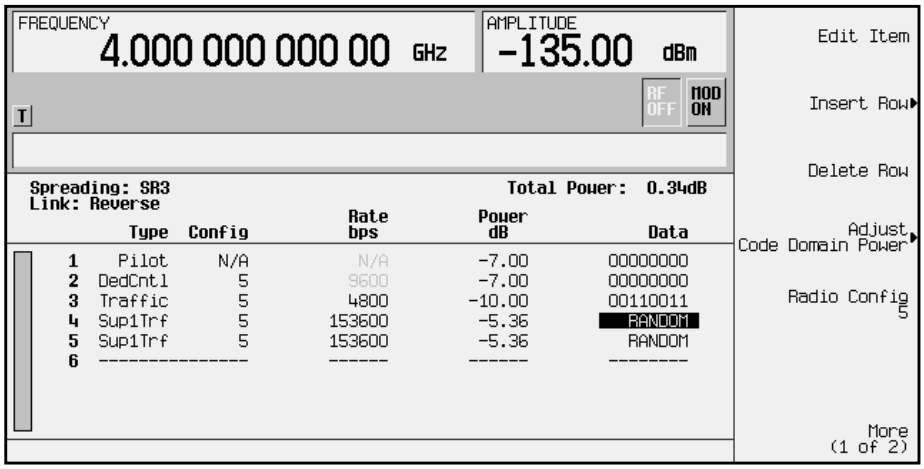
10. Press **Edit Item**, **-10**, **Enter** to change the power of the traffic channel to –10.00 dB. The cursor moves to the next row in the Power dB column, as shown.



The display shows that the total power is now at 0.34 dB. If necessary, you can rescale the total channel power to 0 dB by pressing **Adjust Code Domain Power**, **Scale to 0 dB**.

11. Use the arrow keys to highlight the Data value (RANDOM) in table row 3.

12. Press **Edit Item**, **00110011**, **Enter** to change the transmitted data of the traffic channel to 00110011. The cursor moves to the next row in the Data column, as shown.



You now have a modified traffic channel with a data rate of 4800, a power level of –10.00 dB, transmitting 00110011. Press **Return**. The text area displays RVS CDMA2000 Setup: SR3 5 Channel (Modified) as the current configuration.

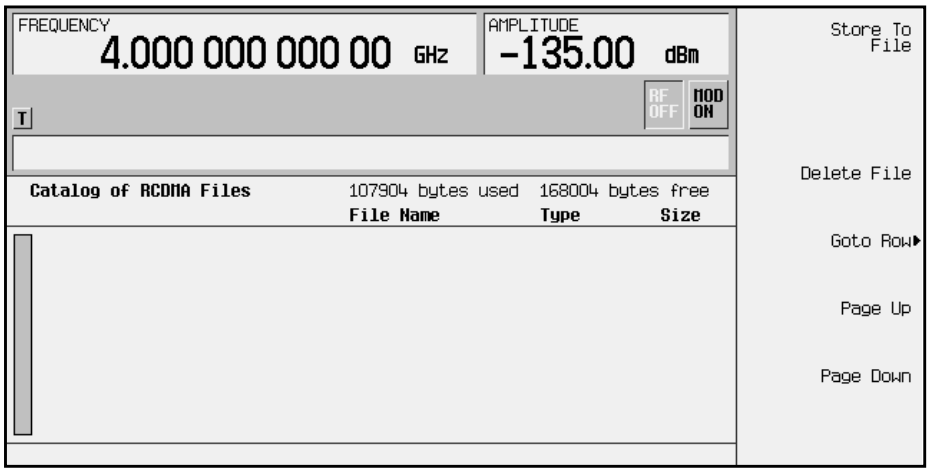
To store a custom CDMA2000 state, see "Storing a Custom CDMA2000 State to Memory" on page 2-21.

Storing a Custom CDMA2000 State to Memory

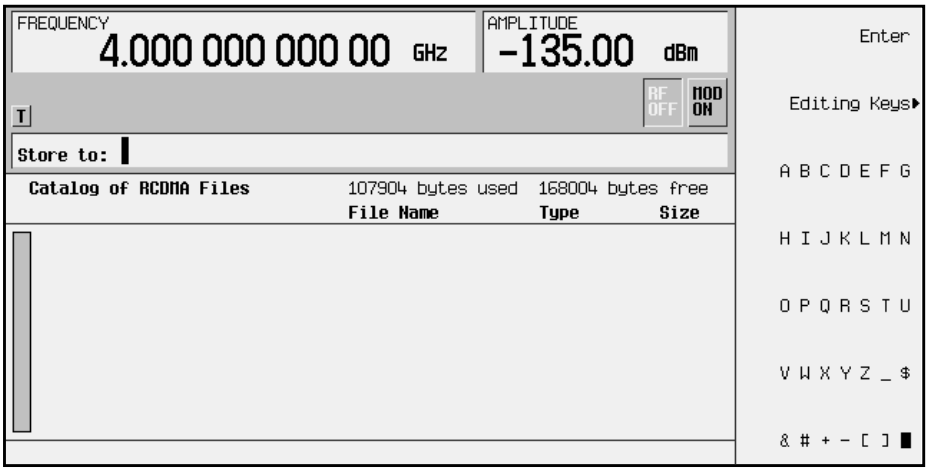
In this procedure, you will store the custom CDMA2000 state created in the previous procedure. If you have not performed the previous procedure, turn to "Editing Reverse Link Channel Values in the Table Editor" on page 2-18 and complete this procedure before continuing.

Perform the following procedure to store the custom CDMA2000 state to the signal generator's memory catalog.

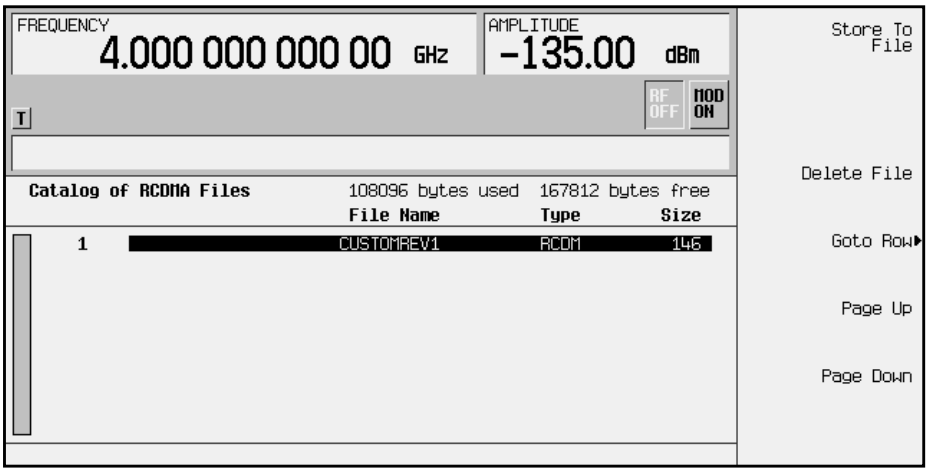
1. To store the custom CDMA2000 state, press **Store Custom CDMA State.** This opens a menu that accesses the signal generator's reverse CDMA2000 (RCDMA) memory catalog, as shown.



2. To name the custom CDMA2000 state, press **Store to File**. This opens a menu that allows you to name the custom CDMA2000 state, as shown.



3. Using the alphabetic menu and the numeric keypad, enter the file name `CUSTOMREV1` and terminate your entry with the **Enter** key. Your custom CDMA2000 state `CUSTOMREV1` is now saved to the reverse CDMA2000 memory catalog, as shown.



Outputting a CDMA2000 Waveform

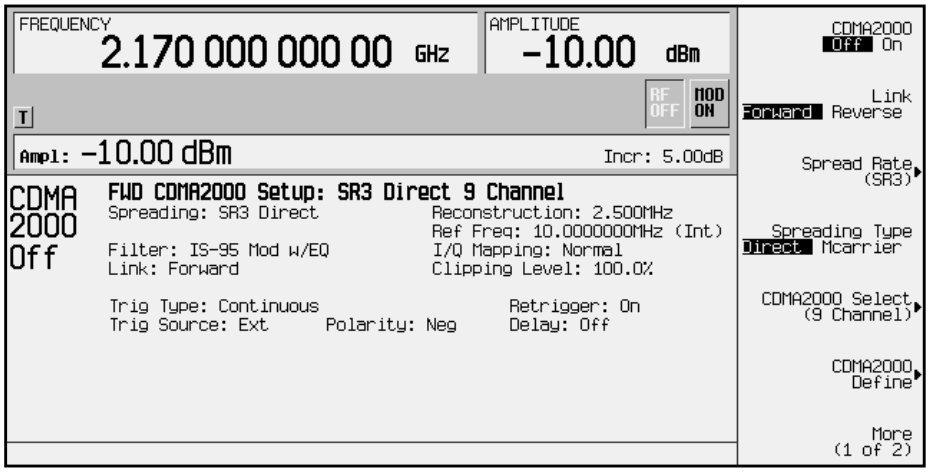
This section explains how to set the carrier frequency and power, generate a CDMA2000 waveform, enable the modulation and the RF output, and adjust the waveform's clipping level.

Setting the Carrier Frequency and Power

Perform the following procedure to set the carrier signal's power and frequency.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)** to display the CDMA2000 menu.
5. For this example, set the RF output frequency to 2.17 GHz by pressing the front panel **Frequency** key. Enter 2.17 GHz by rotating the front panel knob, using the up and down arrow keys, or entering the value using the numeric keypad. (If using the numeric keypad to enter a new value, terminate the entry with the **GHz** softkey.)
6. Set the output power to –10 dBm by pressing the front panel **Amplitude** key. Enter –10 by rotating the front panel knob, using the up and down arrow keys, or entering the value using the numeric keypad. (If using the numeric keypad to enter a new value, terminate the entry with the **GHz** softkey.)

   The carrier frequency and power have now been set. The following illustration shows the display with the current configuration.

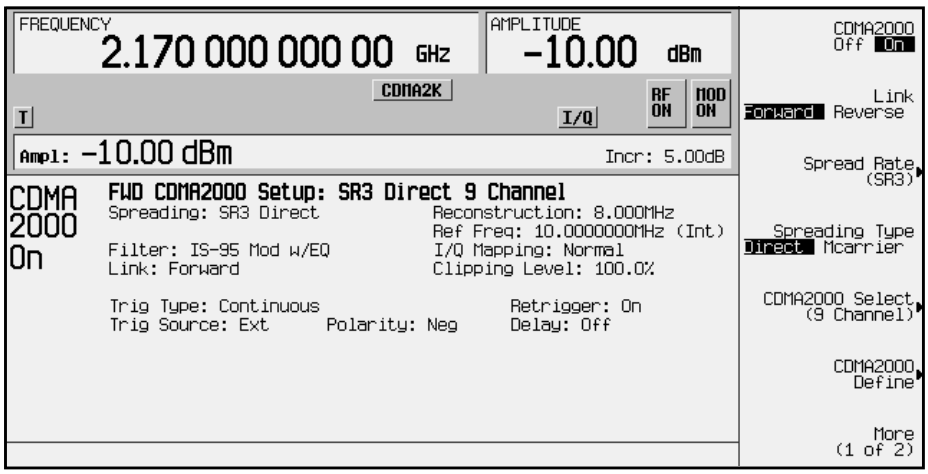


Generating the CDMA2000 Waveform and Enabling the RF Output

Perform the following procedure to generate a CDMA2000 waveform and activate the RF output.

1. Press **CDMA2000 Off On** until **On** is highlighted to generate the CDMA2000 waveform. (The signal generator displays a message while the waveform is being generated.) The CDMA2K and I/Q annunciators turn on.
2. Toggle the front panel **RF On/Off** key until the display annunciator reads RF ON.
3. Modulation should be turned on as a default condition. (The display annunciator shows MOD ON.) If modulation is off, toggle the front panel **Mod On/Off** key.

   The CDMA2000 signal is now present at the front panel RF OUTPUT connector. The following illustration shows the display with the current configuration.



Setting the Clipping Level of the CDMA2000 Signal

Perform the following procedure to set the clipping level of the CDMA2000 waveform.

Notice that in the status area of the screen shown above, the default clipping level is 100 percent. Clipping has not been applied to the signal when the clipping value is set to 100 percent.

NOTE Clipping is not available for multicarrier-spread CDMA2000 waveforms. Only direct-spread CDMA2000 waveforms may be clipped.

1. Press **CDMA2000 Define**, **More (1 of 2)**.

2. Press **Clipping Level** and enter 80 percent by rotating the front panel knob, using the arrow keys, or entering the value using the numeric keypad. (If using the numeric keypad to enter a new value, terminate the entry with the **%** softkey.) The signal generator rebuilds the waveform and the new clipping level is shown in the status area of the screen.

NOTE If you use the front panel knob or arrow keys to adjust the clipping level, the waveform is rebuilt after any pause during the adjustment.

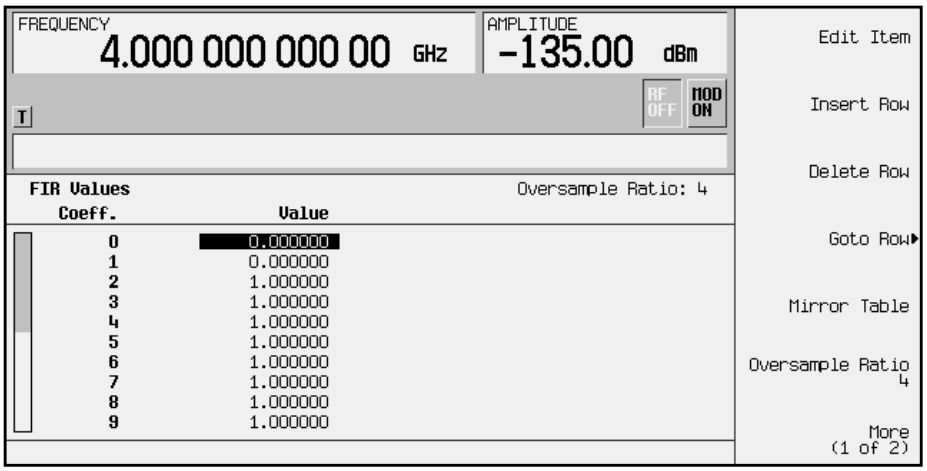
Creating a User-Defined FIR Filter Using the FIR Table Editor

Using this procedure, you will create and store an 8-symbol, windowed sinc function filter with an oversample ratio of 4.

Accessing the Table Editor

Perform the following procedure to access the FIR filter table editor.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**. The FIR table editor is displayed. The following illustration shows the FIR table editor.



Entering the Coefficient Values

Perform the following procedure to enter coefficient values into the FIR filter table editor.

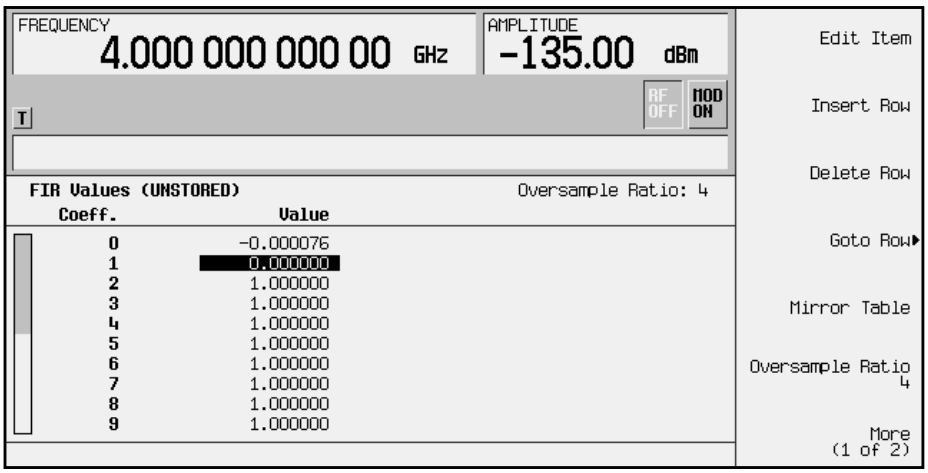
The FIR table editor creates a filter from values that you provide.

1. Use the cursor to highlight the Value field for coefficient 0. Use the numeric keypad to type the first value (–0.000076) from the table below. As you press the numeric keys, the numbers are displayed in the active entry area. (If you make a mistake, you can correct it using the backspace key.)

Coefficient	Value
0	–0.000076
1	–0.001747
2	–0.005144
3	–0.004424
4	0.007745
5	0.029610
6	0.043940
7	0.025852

Coefficient	Value
8	–0.035667
9	–0.116753
10	–0.157348
11	–0.088484
12	0.123414
13	0.442748
14	0.767329
15	0.972149

Terminate your entry by pressing the **Enter** softkey. Notice that the value for coefficient 0 is now displayed in the Value field, and the cursor has moved to the second row in the Value column. The following illustration shows the FIR table editor at this point in the process.



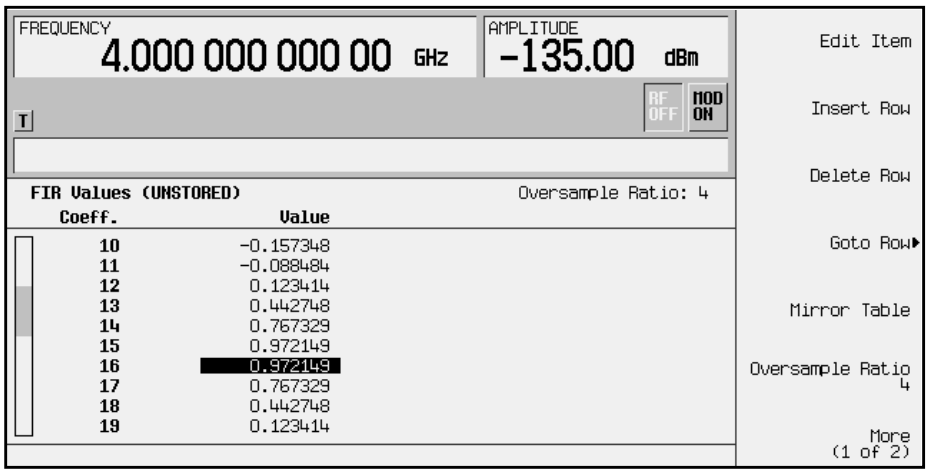
2. Continue entering the coefficient values from the table in step 1 until all 16 values have been entered.

Duplicating the First 16 Coefficients Using Mirror Table

Perform the following procedure to duplicate the first 16 coefficients in the FIR filter table editor.

In a windowed sinc function filter, the second half of the coefficients are identical to the first half in reverse order. The signal generator provides a mirror table function that automatically duplicates the existing coefficient values in the reverse order.

1. Press the **Mirror Table** softkey. The last 16 coefficients (16 through 31) are automatically generated and the first of these coefficients (number 16) is highlighted. The following illustration shows the display at this point in the process.



Setting the Oversample Ratio

The oversample ratio (OSR) is the number of filter taps per symbol. Acceptable values range from 1 through 32; the maximum combination of symbols and oversampling ratio allowed by the table editor is 1024. The instrument hardware, however, is actually limited to 32 symbols, an oversample ratio between 4 and 16, and 256 coefficients. So if you enter more than 32 symbols or 256 coefficients, the instrument will be unable to use the filter. If the oversample ratio is different from the internal, optimally selected one, then the filter will be automatically resampled to an optimal oversample ratio.

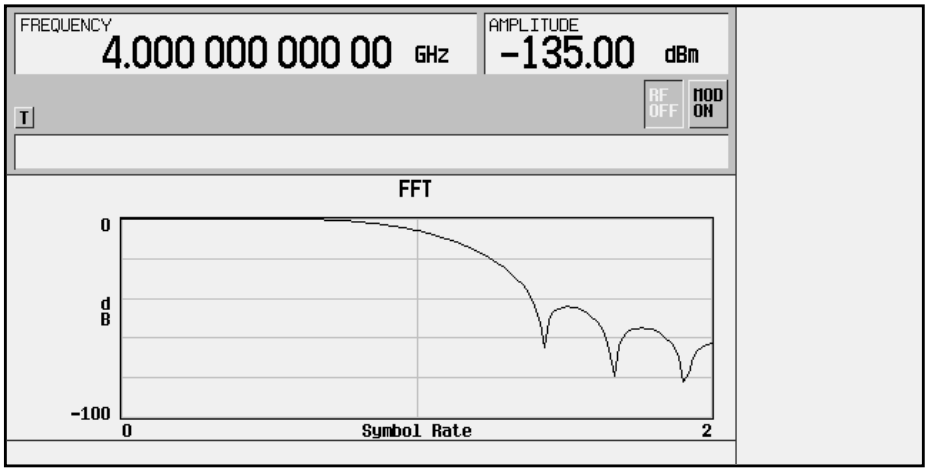
For this example, the desired OSR is 4, which is the default, so no action is necessary.

Displaying a Graphical Representation of the Filter

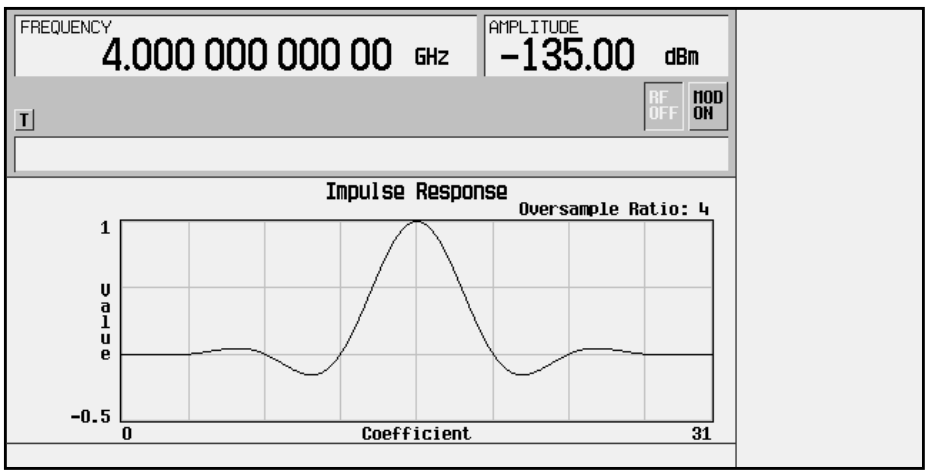
Perform the following procedure to display graphical representations of the active FIR filter.

The signal generator has the capability of graphically displaying the filter in both time and frequency dimensions.

1. To view the filter frequency response (calculated using a fast Fourier transform), press **More (1 of 2)**, **Display FFT**. The following graph is displayed.



2. To return to the menu keys, press **Return**.
3. Display the filter impulse response in time by pressing **Display Impulse Response**. The following graph is displayed.



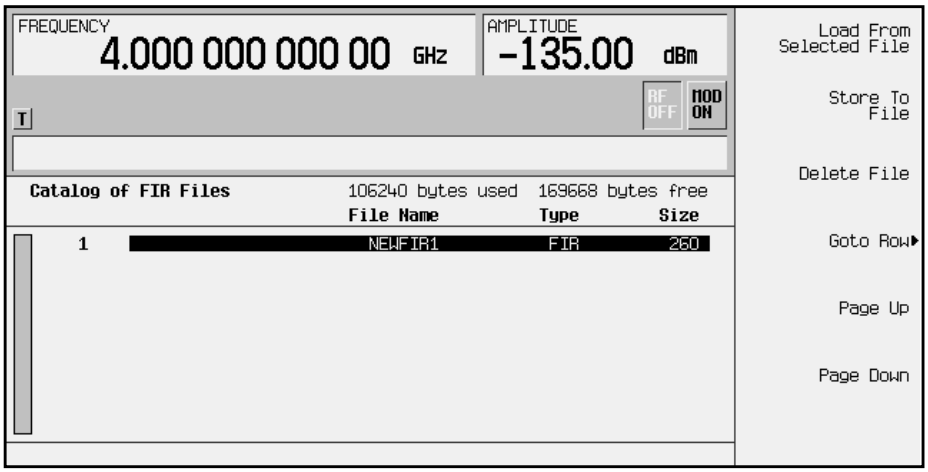
4. To return to the menu keys, press **Return**.

Storing the Filter to Memory

Perform the following procedure to store the FIR filter to the signal generator's memory catalog.

The filter is now complete and can be stored to non-volatile memory for future use. At any time you can check the information at the top of the FIR table editor to determine whether the current table has been stored. Your current table should display the following text: `FIR Values (UNSTORED)`. If you attempt to exit the table editor mode without first storing to a file, the signal generator first prompts you to confirm that you want to exit without storing to a file. If you do *not* want to exit after all, press **Return**. To store the file, perform the following steps.

1. Press **Load/Store**, **Store To File**. The catalog of FIR files is displayed along with the amount of memory available.
2. For this example, title the file NEWFIR1. The file name is created by pressing the softkey containing the desired character, then selecting the softkey with that character from the subsequent menu. For example, press the **HIJKLMN** softkey. Then press the bottom softkey, **N**. `N` is displayed in the active entry area following the `Store to:` text.
3. Continue entering the characters for the file name until `NEWFIR1` is displayed in the active entry area. (Use the numeric keypad to enter the number 1.)
4. Press **Enter** when the file name is complete. The contents of the current FIR table editor are stored to a file in non-volatile memory. The following illustration shows the display.



The NEWFIR1 file is the first file name listed. (If you have previously stored other FIR files, additional file names are listed below NEWFIR1.) The file type is FIR and the size of the file is 260 bytes. The amount of memory used is also displayed. The number of files that can be saved depends on the size of the files and the amount of memory used. Memory is also shared by instrument state files and list sweep files.

This filter can now be used to customize a modulation or it can be used as a basis for a new filter design. (Refer to the additional filter examples in this chapter.)

Modifying an FIR Filter Using the FIR Table Editor

FIR filters stored in signal generator memory can easily be modified using the FIR table editor. You can load the FIR table editor with coefficient values from user-defined FIR files stored in the signal generator's memory or from one of the default FIR filters. Then you can modify the values and store the new files. In this example, you will load the FIR table editor with the values for a default Gaussian filter and then modify it.

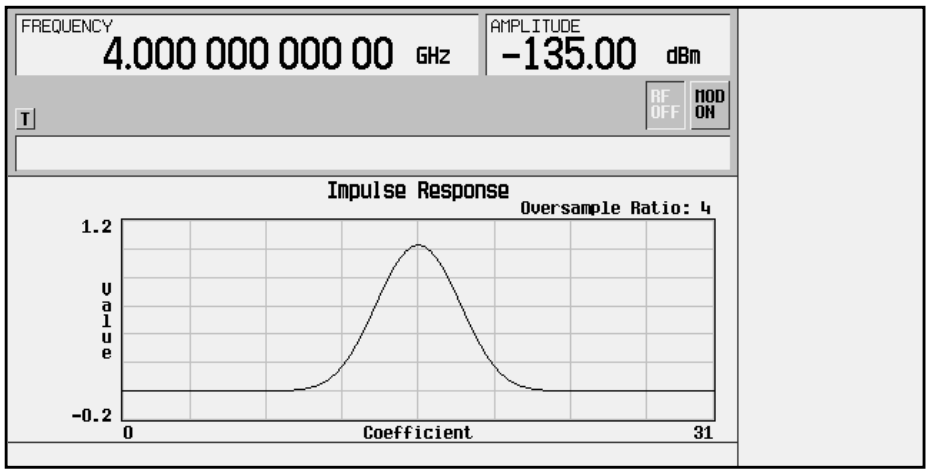
Loading the Default Gaussian FIR File

Perform the following procedure to load the default Gaussian FIR filter into the FIR filter table editor.

1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**.
4. Press **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Gaussian**.
5. Set the filter BbT to 0.300 (if **Filter BbT** is not already set to this value) by pressing **Filter BbT** and rotate the front panel knob until 0.300 is displayed.
6. Set the number of filter symbols to 8 (if **Filter Symbols** is not already set to this value) by pressing **Filter Symbols** and rotating the front panel knob until 8 is displayed.
7. Press **Generate**. The FIR table editor should now contain the coefficient values for the specified Gaussian filter.

NOTE The actual oversample ratio during modulation is automatically selected by the instrument. A value between 4 and 16 is chosen dependent on the symbol rate, the number of bits per symbol of the modulation type, and the number of symbols.

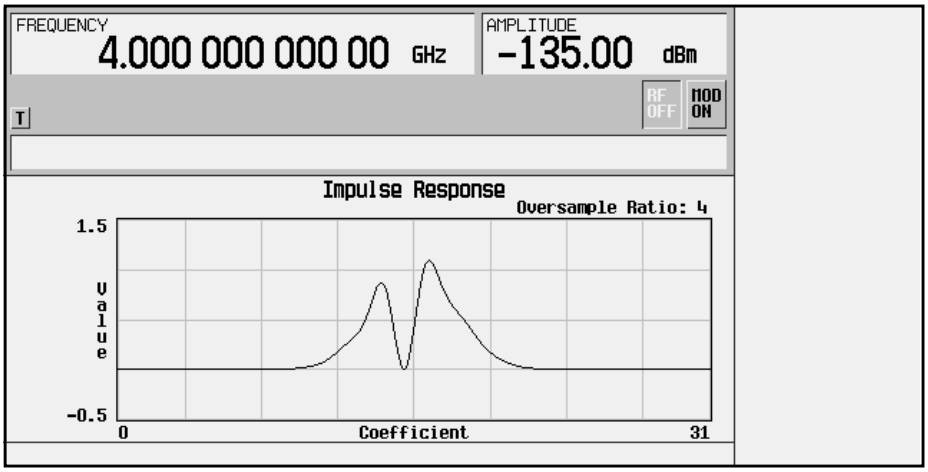
8. Press **Display Impulse Response** for a graphic representation of the filter impulse response as shown in the following illustration.
9. To return to the menu keys, press **Return**.



Modifying the Coefficients

Perform the following procedure to modify the filter coefficients in the FIR filter table editor.

1. Use the front panel knob to scroll until coefficient 15 is highlighted.
2. Press **0**, **Enter** to change the value of the coefficient to 0.
3. Press **Display Impulse Response** to see the effects of the change.



Notice that the graphic display can provide a useful troubleshooting tool (in this case, it indicates that a coefficient value is missing, resulting in an improper Gaussian response).

4. To return to the menu keys, press **Return**.
5. In addition to changing existing values, you can also insert and delete rows of coefficients and change the oversample ratio. (Press **More (2 of 2)** to access these softkeys.)
6. Change coefficient 15 back to its original value by using the front panel knob to highlight row 15, and pressing **1**, **Enter**.

Storing the Filter to Memory

Perform the following procedure to store the modified Gaussian filter to the signal generator's memory catalog.

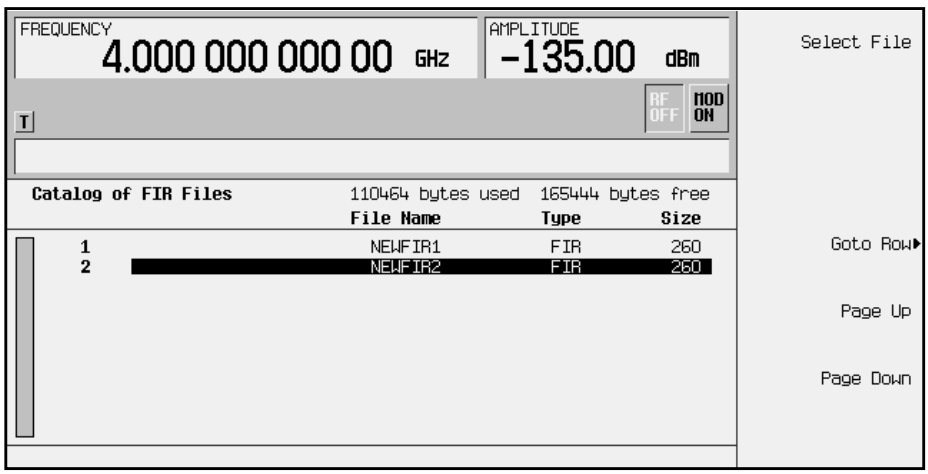
1. Press **Load/Store**, **Store To File**. The catalog of FIR files is displayed along with the amount of memory available.
2. Name the file NEWFIR2.
3. Press **Enter** when the file name is complete. The contents of the current FIR table editor are stored to a file in non-volatile memory and the catalog of FIR files is updated to show the new file.

Applying a User-Defined FIR Filter to a CDMA2000 Waveform

Perform the following procedure to apply a user-defined FIR filter to the CDMA2000 waveform.

Custom FIR filters can be created using the FIR table editor feature or they can be created externally and downloaded into signal generator memory. Once the filter is stored in memory, it can be selected for use with your custom modulation state. This example requires that at least one FIR file be already stored in memory. For an example of creating and storing an FIR filter, see "Creating a User-Defined FIR Filter Using the FIR Table Editor" on page 2-26.

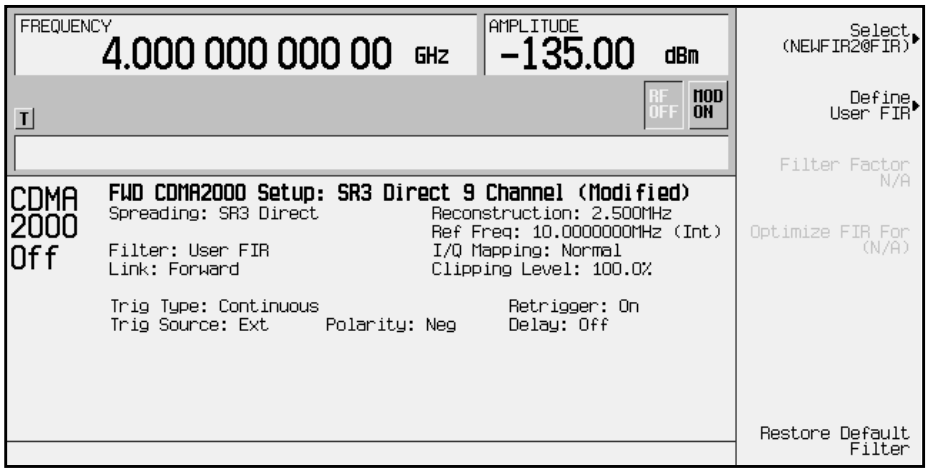
1. Press **Preset** to set the signal generator to normal preset conditions.
2. Press the front panel **Mode** key. If the **Arb Waveform Generator** softkey is visible, press it next.
3. Press **CDMA Formats**.
4. Press **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **User FIR**. The catalog of FIR files should now be displayed. The following illustration shows an example of the catalog.



In this example, there are two FIR files listed: NEWFIR1 and NEWFIR2. (These files were created in the previous examples.)

5. Scroll down in the list until the desired filter is highlighted. In this example, NEWFIR2 is the desired filter. You can use the front panel knob or the arrow keys as well as the GoTo Row function to highlight the filter.

6. Press **Select File**. The highlighted filter is now selected for use in your custom modulation state, as shown.



The filter you selected is NEWFIR2. You can see the name, followed by `@FIR`, displayed below the **Select** softkey. In the Filter field, near the left of the display, `User FIR` is displayed to indicate that a user-defined FIR filter has been selected.

Once you have set the other modulation parameters to your satisfaction, turn on Custom and the RF output and your user-defined filter is in use.

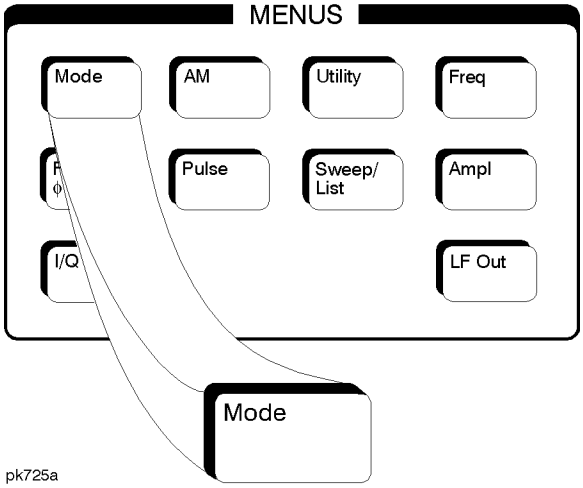
NOTE The actual oversample ratio during modulation is automatically selected by the instrument. A value between 4 and 16 is chosen dependent on the symbol rate, the number of bits per symbol of the modulation type, and the number of symbols.

3 Softkey Reference

This chapter describes the front panel **Mode** key and the associated softkeys that are used to activate functions specific to the dual arbitrary waveform generator Option 101, CDMA2000 (Revision 8).

The softkeys are presented in alphabetical order.

Mode Key



When you press the front panel **Mode** key, the softkeys that appear depend on how many options are included in the instrument. When an instrument has options in addition to Option UND, the softkey **Arb Waveform Generator** provides access to all Dual Arbitrary Waveform Generator softkeys (including the optional personalities).

The softkeys described in this chapter are for CDMA2000 and are located under the **CDMA2000 (Rev 8)** key.

The SCPI commands that remotely duplicate these softkeys are also provided in this section (see also Chapter 5, “Remote Programming.”).

(n) Bps

There are a number of softkeys available for setting the data rate in bits per second (Bps) for a traffic, supplemental1 traffic, or supplemental2 traffic channel. Where ***(n)*** **Bps** can be any of the following data rate softkeys: **1200 Bps**, **1500 Bps**, **1800 Bps**, **2700 Bps**, **3600 Bps**, **4800 Bps**, **7200 Bps**, **9600 Bps**, **14400 Bps**, **19200 Bps**, **28800 Bps**, **38400 Bps**, **57600 Bps**, **76800 Bps**, **115200 Bps**, **153600 Bps**, **230400 Bps**, **307200 Bps**, **460800 Bps**, **614400 Bps**, or **1036800 Bps.**

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic** (or **Supplemental1 Traffic** or **Supplemental2 Traffic**), **Data Rate**, ***(n)*** **Bps** *(See above description of* ***(n)*** **Bps**.*)*

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,
<power>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

1.23 MHz

Use this softkey to set the multicarrier frequency spacing to 1.23 MHz, when a spread rate 3 multicarrier mode signal is generated. Cellular band uses a spacing of 1.23 MHz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Mcarrier Spacing**, **1.23 MHz**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing <1.25MHz>

[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing?
```

1.25 MHz

Use this softkey to set the multicarrier frequency spacing to 1.25 MHz when a spread rate 3 multicarrier mode signal is generated. PCS band uses a spacing of 1.25 Mhz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Mcarrier Spacing**, **1.25 MHz**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing <1.25MHz>
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing?
```

2.500 MHz

Press this softkey to select a reconstruction filter with a cutoff frequency of 2.500 MHz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Reconstruction Filter**, **2.500 MHz**

SCPI Commands:

```
[:SOURce]:RADio:ARB:RFILter 2.5 MHz
```

```
[:SOURce]:RADio:ARB:RFILter?
```

5 Channel

Press this softkey to select a CDMA2000 (Revision 8) reverse link 5 channel setup: pilot, dedicated control, traffic, and two supplemental1 traffic channels.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**, **5 Channel**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:
SETup S15Chan|S35Chan
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

8.000 MHz

Press this softkey to select a reconstruction filter with a cutoff frequency of 8.000 MHz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Reconstruction Filter**, **8.000 MHz**

SCPI Commands:

```
[:SOURce]:RADio:ARB:RFILter 8.0 MHz
[:SOURce]:RADio:ARB:RFILter?
```

8 Channel

Press this softkey to select a CDMA2000 (Revision 8) reverse link 8 channel setup according to IS95-B.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**, **8 Channel**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup S18Chan
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

9 Channel

Press this softkey to select a CDMA2000 (Revision 8) forward link 9 channel setup: pilot, traffic, two supplemental1 traffic, traffic, two supplemental1 traffic, traffic, and sync channels.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**, **9 Channel**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup
S19Chan|S3D9Chan|S3M9Chan
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

250.0 kHz

Press this softkey to select a reconstruction filter with a cutoff frequency of 250.0 kHz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Reconstruction Filter**, **250.0 kHz**

SCPI Commands:

```
[:SOURce]:RADio:ARB:RFILter 250 kHz
```

```
[:SOURce]:RADio:ARB:RFILter?
```

Adjust Code Domain Power

Press this softkey to access a menu that enables you to adjust the code domain power (the relative power in each of the channels) to either equal Powers or scale to 0 dB.

Equal Powers sets all channels to equal power, and the total power to 0 dB.

Scale to 0dB scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Adjust Code Domain Power**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
TABLe:PADJust EQUal|SCALe
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
TABLe:PADJust EQUal|SCALe
```

Apply Channel Setup

Press this softkey to apply the changes made in the channel setup table editor (see "Edit Channel Setup" on page 3-13). If the CDMA2000 mode is set to **On**, then the new channel data is used to generate a new modulation waveform in ARB waveform memory.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Apply Channel Setup**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
APPLy
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
APPLy
```

ARB Reference Ext Int

Press this softkey to select either an internal or an external reference for the waveform clock. If you choose external, you must enter the reference frequency (as described under the **Reference Frequency** softkey, see page 3-30) and apply the signal to the BASEBAND GEN REF IN connector.

Default Value: Int

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **More (1 of 2)**, **ARB Reference Ext Int**

SCPI Commands:

```
[:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce] INTernal|
EXTernal

[:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce]?
```

Bus

Press this softkey to set the trigger source to bus. When the trigger source is set to bus, the signal generator will trigger an event when it receives the appropriate command via HP-IB.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Bus**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] BUS

[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

CDMA2000 Define

Press this softkey to display the CDMA2000 Define menu where you can define a CDMA2000 (Revision 8) signal for the current link.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**

CDMA2000 Off On

Press this softkey to enable the CDMA2000 (Revision 8) signal. Setting **CDMA2000 Off On** to **On** sets up the internal hardware to generate the currently selected CDMA2000 (Revision 8) signal. The CDMA2K and I/Q annunciators turn on in the display. Although the digital modulation is enabled with this softkey, the signal modulates the RF carrier only after you have set modulation on.

Default Value: Off

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Off On**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON|OFF|1|0

[:SOURce]:RADio:CDMA2000:ARB[:STATe]?
```

CDMA2000 (Rev 8)

Pressing this softkey accesses a menu of softkeys for generating data patterns that are formatted into a structure defined by the CDMA2000 Revision 8 standard.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**

CDMA2000 Select

Press this softkey to display the CDMA2000 Select menu for the current link. From this menu you can select a predefined channel setup, or select a stored custom CDMA2000 state.

Default Value: 9 Channel, Spreading Rate 3, Direct Spreading

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup S1Pilot|
S3DPilot|S3MPilot|S19Chan|S3D9chan|S3M9chan|"<file name>"

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup S1Pilot|
S3Pilot|S15Chan|S35Chan|S18Cha|"<file name>"

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

Channels

Press this softkey to enter the number of duplicate channels that you want to set up and insert into the current channel setup table editor. Press the softkey **Enter** to terminate the entry.

After you have set the channel parameters, and how many times you want the channel duplicated, press **Done** to insert the information into the table editor.

Default Value: 1

Range: 0 through 247

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic** (or **Supplemental1 Traffic** or **Supplemental2 Traffic**), **Channels**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,
<power>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Clipping Level

Use this softkey, to clip (limit) the modulation level of the baseband waveform to a percentage of full scale. A level of 100.0% is no clipping.

Default Value: 100.0%

Range: 10.0 through 100.0% in 0.1% increments

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **More (1 of 2)**, **Clipping Level**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping <10.0-100.0%>
```

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping?
```

Continuous

Press this softkey to set the CDMA2000 trigger to continuous. In continuous trigger mode, the waveform repeats itself indefinitely.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Continuous**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONT
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Custom CDMA2000 State

Press this softkey to display the CDMA2000 (Revision 8) catalog where you can choose a previously stored custom CDMA2000 (Revision 8) setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**, **Custom CDMA2000 State**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:
SETup "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:
SETup "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

Data Rate

Press this softkey to access a submenu of data rates for the traffic, supplemental1 traffic, or supplemental2 traffic channel.

Traffic Default Value: 9600 Bps

Supplemental1 Traffic Default Value: 307,200 Bps

Supplemental2 Traffic Default Value: 307,200 Bps

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic** (or **Supplemental1 Traffic** or **Supplemental2 Traffic**), **Data Rate**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,
<power>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Dedicated Control

Press this softkey to insert a reverse link dedicated control channel.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Dedicated Control**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<DCONtrol>,<data_rate>,
<power>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Define User FIR

Press this softkey to access a table editor for creating and modifying FIR filters. The FIR table editor allows a maximum filter length of 1024 taps with a maximum oversampling ratio of 32. An FIR filter selected for use in CDMA2000, however, cannot have more than 256 taps, so the number of symbols and the oversample ratio should be selected accordingly. An example of using the FIR table editor is provided in Chapter 2, “Using Functions”.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**

SCPI Commands:

```
MEMory:DATA:FIR "<file name>",osr,
coefficient{,coefficient}

MEMory:DATA:FIR? "<file name>"
```

Delete All Rows

Press this softkey to delete all rows in the current table editor.

CAUTION Deletions cannot be recovered.

Delete All Rows is located in some table editors.

Delete File

Press this softkey to delete the highlighted file from the displayed catalog. You will be prompted for confirmation.

Delete File is located in catalogs of files.

Delete Row

Press this softkey to delete the highlighted row in the table.

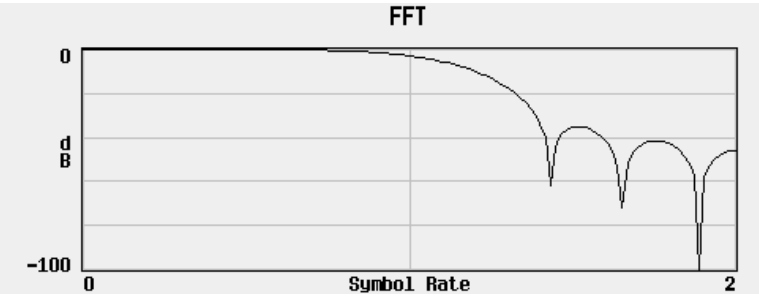
CAUTION Deletions cannot be recovered.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Delete Row**

Or press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **Delete Row**

Display FFT

Press this softkey to display a graphical representation of the frequency response of the filter loaded into the FIR table editor (calculated using a fast Fourier transform). The following is an example of the frequency response of a Root Nyquist filter with an oversample ratio of 4.

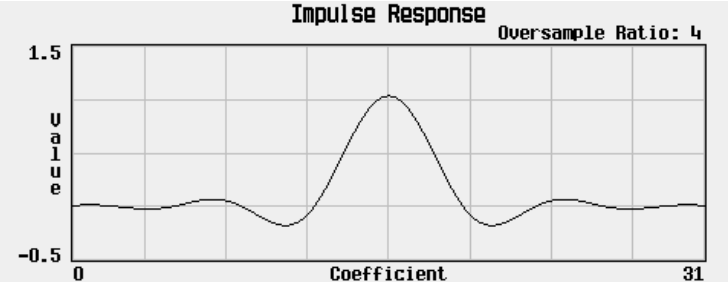


To return to the FIR table editor and the menu keys, press **Return**.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Display FFT**

Display Impulse Response

Press this softkey to display a graphical representation of impulse response in time of the filter loaded into the FIR table editor. The following is an example of the impulse response of a Root Nyquist filter with an oversample ratio of 4.



To return to the FIR table editor and the menu keys, press **Return**.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Display Impulse Response**

Edit Channel Setup

Press this softkey to access a table editor where you can define the channel parameters of the current CDMA2000 (Revision 8) signal.

You can move quickly through a large table using the keys found beneath the **Goto Row** softkey.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,
<power>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Edit Item

Press this softkey to change the highlighted item in the displayed table. Note that some fields are not editable.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Edit Item**

Or press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **Edit Item**

Equal Powers

Press this softkey to set all channel powers to the same value with all channels summed to 0 dB.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Adjust Code Domain Power**, **Equal Powers**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
PADJust EQUal
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
PADJust EQUal
```

Ext

Press this softkey to set the trigger source to external triggering. When the trigger source is set to external, the signal generator will trigger an event when it receives the appropriate signal via the PATTERN TRIG IN connector.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Ext**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] EXT
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

Ext Delay Off On

Press this softkey to arm (On) or disarm (Off) the external trigger delay. To use external trigger delay, press this softkey until **Ext Delay On** is highlighted, and then set the external delay time by pressing the **Ext Delay Time** softkey.

Default Value: Off

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Ext Delay Off On**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
DELay:STATe ON|OFF|1|0
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
DELay:STATe?
```

Ext Delay Time

Press this softkey to set the time for the external trigger delay. External trigger delay may be adjusted to trigger a waveform at a specified length of time after an external trigger signal has been received at the PATTERN TRIG IN connector. Enter a new value and press the **Enter** terminator softkey.

To use external trigger delay, press **Ext Delay Off On** until **On** is highlighted, and then set the external delay time by pressing the **Ext Delay Time** softkey.

Range: 2 microseconds through 3600 seconds

Resolution: 1 microsecond

Default Value: 2.000 milliseconds

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Ext Delay Time**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
DELay <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
DELay?
```

Ext Polarity Neg Pos

Press this softkey to set the external trigger source polarity to either a positive change or a negative change in signal level at the PATTERN TRIG IN connector.

Default Value: Neg

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Ext Polarity Neg Pos**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe POSitive|NEGative
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe?
```

Filter

Press this softkey to access menus for selecting a filter type, restoring the default filter, and for defining a unique FIR filter. The Filter menu also lets you adjust the filter alpha (when Nyquist or Root Nyquist filters are selected) or bandwidth-multiplied-by-bit-time (for Gaussian filters).

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**

Filter Alpha

Press this softkey to change the FIR filter's alpha parameter in either the Filter menu or the Load Default FIR menus.

In the Filter menu

In the Filter menu, the **Filter Alpha** softkey changes the alpha parameter of the selected Root Nyquist or Nyquist filter.

This key appears only *after* choosing a Root Nyquist or Nyquist filter. If a Gaussian filter is in use, you will see **Filter BbT**. If any other filter is in use, you will see a grayed-out softkey: **Filter Factor N/A**.

Range: 0.000 through 1.000.

Default Value: 0.500

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Filter Alpha**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa?
```

In the Load Default FIR Menu

In the Load Default FIR menus, the **Filter Alpha** softkey changes the alpha parameter of the Root Nyquist or Nyquist filter coefficients loaded into the FIR table editor. After entering the alpha value, press **Generate** to modify the filter coefficients in the table editor.

Default Value: 0.350

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Root Nyquist** (or **Nyquist**), **Filter Alpha**

Filter BbT

Press this softkey to change the bandwidth-multiplied-by-bit-time (BbT) filter parameter in either the Filter menu or the Load Default FIR menu.

In the Filter menu

In the Filter menu, the **Filter BbT** softkey changes the BbT parameter of the selected Gaussian filter.

This key only appears *after* choosing a Gaussian filter. If a Root Nyquist or Nyquist filter is in use, you will see **Filter Alpha**. If any other filter is in use, you will see a grayed-out softkey: **Filter Factor N/A**.

Range: 0.000 through 1.000.

Default Value: 0.500

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **Gaussian**, **Filter BbT**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT <value>
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT?
```

In the Load Default FIR Menu

In the Load Default FIR menu, the **Filter BbT** softkey changes the BbT parameter of the Gaussian filter coefficients loaded into the FIR table editor. After entering the BbT value, press **Generate** to modify the filter coefficients in the table editor.

Default Value: 0.300

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Gaussian**, **Filter BbT**

Filter Factor

This grayed-out softkey is displayed when using a filter that does not have an adjustable alpha or BbT parameter (such as the IS-95 filter selections or a user-defined FIR filter). This softkey changes to either **Filter Alpha** or **Filter BbT** if the appropriate Root Nyquist, Nyquist, or Gaussian filter is selected.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Filter Factor**

Filter Symbols

Press this softkey to define the number of symbols for the filter to be loaded into the FIR table editor. The FIR table editor allows a maximum filter length of 1024 coefficients with a maximum oversample ratio of 32 and a maximum of 32 symbols. Because an FIR filter selected for use in CDMA2000 cannot have more than 256 coefficients, select the number of symbols and the oversample ratio accordingly.

Range: 1 through 32.

Default Value: 8

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Root Nyquist** (or **Nyquist**, **Gaussian**, or **Rectangle**), **Filter Symbols**

Gate Active

This softkey remains grayed-out until the trigger is set to Gated. Once the trigger has been set to Gated, press **Gate Active Low High** to toggle the polarity of the “through” or active state of a gated trigger signal. Gate Active Low outputs the signal while the gate is low at the PATTERN TRIG IN connector. Gate Active High has the opposite effect, outputting the signal while the signal level at the PATTERN TRIG IN connector is in a high state.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Gate Active**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:
ACTive LOW|HIGH
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive?
```

Gated

Press this softkey to set the trigger type to gated. Using a gated trigger, you can set the signal to output when a TTL high or low is present at the PATTERN TRIG IN connector. To set the gate to trigger on either high or low, press **Gated** and then press **Trigger Setup**, **Gate Active Low High**.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Gated**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE GATE
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Gaussian

Press this softkey to select the Gaussian pre-modulation filter in either the Select (filter) menu or the Load Default FIR menu.

In the Select (Filter) Menu

Pressing the **Gaussian** softkey selects this FIR filter for use in the filter setup. Use the **Filter BbT** softkey to change the filter bandwidth-multiplied-by-bit time product value.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **Gaussian**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer GAUSsian
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

In the Load Default FIR Menu

Pressing the **Gaussian** softkey followed by **Generate** loads the FIR table editor with the coefficient values for the Gaussian filter. The filter BbT and number of filter symbols are defined with the softkeys in this menu. If you change either parameter after loading the filter coefficients, press the **Generate** softkey again to reload the FIR table.

The **Display Impulse Response** and **Display FFT** softkeys in this menu graphically display the filter as it is currently defined in the FIR table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Gaussian**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer GAUSsian
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Goto Bottom Row

Press this softkey to move the selection bar to the bottom row in the current table editor or list of items.

Goto Bottom Row is located in table editor menus and in catalogs of files.

Goto Middle Row

Press this softkey to move the selection bar to the middle row in the current table editor or list of items.

Goto Middle Row is located in table editor menus and in catalogs of files.

Goto Row

Press this softkey to display softkeys that enable you to select a row or page in a table or list of items.

Goto Row is located in table editor menus and in catalogs of files.

Goto Top Row

Press this softkey to move the selection bar to the top row in the current table or list of items.

Goto Top Row is located in table editor menus and in catalogs of files.

Insert Row

Press this softkey to display a menu that enables you to select the type of row you wish to insert into the current table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**

I/Q Mapping Normal Invert

Press this softkey, to select whether the I/Q outputs will be normal or inverted.

Default Value: Normal

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **More (1 of 2)**, **I/Q Mapping Normal Invert**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:IQMap NORMal|INVert|INVerted

[:SOURce]:RADio:CDMA2000:ARB:IQMap?
```

IS-95

Press this softkey to select the IS-95 filter in either the Select (filter) menu or the IS-95 menu.

In the Select (Filter) Menu

Press the first **IS-95** softkey to open a menu for selecting an IS-95 baseband filter. The choices include the standard IS-95 filter, as well as a modified version of this filter for improved adjacent channel performance. (This modified filter still meets the IS-95 error function.) These two filters are also provided with an equalizer that provides base station phase equalization for the transmit signal path.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **IS-95**

In the IS-95 Menu

Press the second **IS-95** softkey to select the standard CDMA2000 IS-95 baseband filter.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **IS-95**, **IS-95**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

IS-95 Mod

Press this softkey to select a modified version of the standard IS-95 baseband filter. This filter is modified for improved adjacent channel performance. The modification is done in a manner that still meets the IS-95 error function criterion.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **IS-95**, **IS-95 Mod**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_MOD
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

IS-95 Mod w/EQ

Press this softkey to select a modified version of the standard IS-95 baseband filter. This filter is modified for improved adjacent channel performance, and includes the equalizer specified by IS-95. The filter modification is done in a manner that still meets the IS-95 error function criterion.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **IS-95**, **IS-95 Mod w/EQ**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_MOD_EQ

[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

IS-95 w/EQ

Press this softkey to select the standard IS-95 baseband filter with an equalizer provided for phase compensation required by the base station.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **IS-95**, **IS-95 w/EQ**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_EQ

[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Link Forward Reverse

Use this softkey to select the CDMA2000 (revision 8) forward or reverse link channel setup. Forward link is for base to mobile. Reverse link is for mobile to base.

Default Value: Forward

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **Link Forward Reverse**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK FORWard|REVerse

[:SOURce]:RADio:CDMA2000:ARB:LINK?
```

Load Default FIR

Press this softkey to access a menu for automatically filling the FIR table editor with coefficient values from pre-defined filters such as Root Nyquist, Nyquist, Gaussian, and Rectangle. The default filter parameters can also be selected in this menu allowing you to choose the filter alpha or BbT and the number of filter symbols.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**

Load From Selected File

Press this softkey to replace the current information in a table editor with the information stored in the highlighted file.

Load From Selected File is located in catalogs of files.

Load/Store

Press this softkey to access a menu for loading a table editor with values from files previously stored in the signal generator memory, and for saving to memory a user-defined signal from the table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load/Store**

Mcarrier Spacing

Use this softkey to open a submenu of choices for multicarrier frequency spacing. (Cellular band uses 1.23 MHz and PCS band uses 1.25 MHz.)

Default Value: 1.25 MHz

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Mcarrier Spacing**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing <1.23MHz|1.25MHz>
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:
SPACing?
```

Mirror Table

Press this softkey to mirror the FIR table entries such that the table doubles in size, and the values in the top half of the table are duplicated in the bottom half of the table in reverse order.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **Mirror Table**

Nyquist

Press this softkey to select the Nyquist (raised cosine) pre-modulation filter in either the Select (filter) menu or the Load Default FIR menu.

In the Select (Filter) Menu

Press the **Nyquist** softkey to select this FIR filter for the filter setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **Nyquist**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer NYQuist
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

In the Load Default FIR Menu

Press the **Nyquist** softkey followed by **Generate** to load the FIR table editor with the coefficient values for the Nyquist filter. The filter alpha and number of filter symbols are defined with the softkeys in this menu. If you change either parameter after loading the filter coefficients, press the **Generate** softkey again to reload the FIR table.

The **Display Impulse Response** and **Display FFT** softkeys in this menu graphically display the filter as it is currently defined in the FIR table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Nyquist**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer NYQuist
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Optimize FIR For EVM ACP

Press this softkey to optimize the filter for minimized error vector magnitude (select EVM) or to minimized adjacent channel power (select ACP). The EVM selection provides the most ideal passband. The ACP selection improves stopband rejection. This feature applies only to Root Nyquist, Nyquist, and Gaussian filters. The softkey is grayed out when any other filter is selected.

Default Value: EVM

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Optimize For EVM ACP**

SCPI Command:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel EVM|ACP

[:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel?
```

Oversample Ratio

In the Define User FIR menu, use the **Oversample Ratio** softkey to set the oversampling ratio to be applied to a custom FIR filter design. The maximum combination of symbols and oversampling ratio is 1024. Because an FIR filter selected for use in CDMA2000 cannot have more than 256 coefficients, select the number of symbols and the oversample ratio accordingly.

Range: 1 through 32

Default Value: 4

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **Oversample Ratio**

SCPI Command:

```
:MEMory:DATA:FIR "<file name>",osr,
coefficient{,coefficient}

:MEMory:DATA:FIR? "<file name>"
```

Page Down

Press this softkey to view the next page of listings in a table editor or catalog of files.

Page Down is located in table editor menus and in catalogs of files.

Page Up

Press this softkey to view the previous page of listings in a table editor or catalog of files.

Page Down is located in table editor menus and in catalogs of files.

Paging

Press this softkey to insert a Paging channel into the current table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Paging**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel <chan_num>,<PAGing>,<config>,<data_rate>,<walsh>,
<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

Pilot

Press this softkey to select the pilot channel as the current CDMA2000 channel configuration or to insert a pilot channel into the channel setup table editor.

In the CDMA2000 Select Menu

Press this softkey to select a pilot channel as the current CDMA2000 state.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Select**, **Pilot**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:
SETup S1Pilot|S3DPilot|S3MPilot
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

```
:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:
SETup S1Pilot|S3Pilot
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

In the CDMA2000 Edit Channel Setup Menu

Press this softkey to insert a pilot channel into the current table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Pilot**

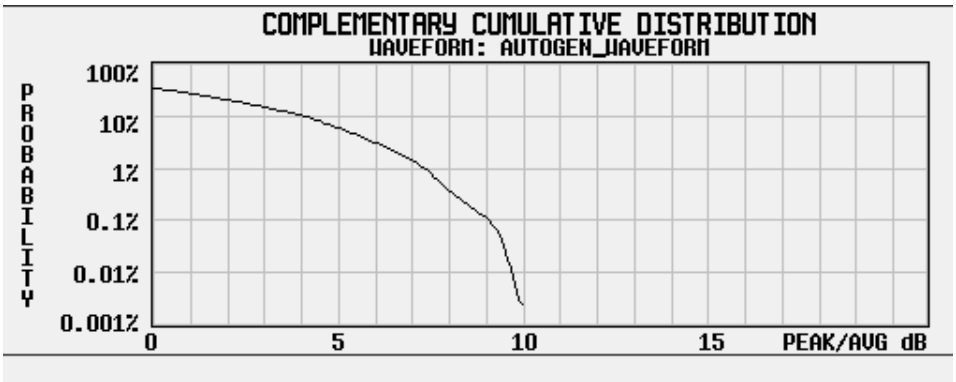
SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel <chan_num>,<PILot>,<config>,<data_rate>,<walsh>,
<power>,<pn_offset>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel <chan_num>,<PILot>,<data_rate>,<power>,
RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Plot CCDF

Press this softkey to display a plot of the Complementary Cumulative Distribution Function for the selected waveform. The plot displays the probability that the instantaneous envelope power is *x* dB above the average power, where *x* is the number on the horizontal axis.

Note that this function is only available after a waveform has been generated.



Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA200 (Rev 8)**, **More (1 of 2)**, **Waveform Statistics**, **Plot CCDF**

Power

This softkey appears in the traffic, supplemental1 traffic and supplemental2 traffic channel insertion menus where you define a forward link traffic or supplemental traffic channel and then insert a single entry or multiple entries of that channel into the current CDMA2000 (Revision 8) Edit Channel Setup table editor.

Press the **Power** softkey, then enter the power level value for the current channel. Press the softkey **Enter** to terminate the entry.

After you have set the channel parameters, and the number of times you want the channel duplicated, press **Done** to insert the information into the table editor.

Default Value: 0.00 dB

Range: –40.00 through 0.00 dB

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic** (or **Supplemental1 Traffic** or **Supplemental2 Traffic**), **Power**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

Radio Config

Press this softkey to set the radio configuration for a new forward link (traffic, supplemental1 traffic, or supplemental2 traffic channel) or the radio configuration for the entire reverse link channel setup. Note that changing the radio configuration results in changes to the channel data rate.

Forward Link Default Value: 6

Forward Link Range: 1to 5 for Spread Rate 1, 6 to 9 for Spread Rate 3

Softkey Location: For forward link, press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic** (or **Supplemental1 Traffic** or **Supplemental2 Traffic**), **Radio Config**

Reverse Link Default Value: 5

Reverse Link Range: 5 or 6

For reverse link, press: **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Radio Config**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig <value>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig?
```

Random

Press this softkey while an item is highlighted in the Data column of the table editor to enter random data as the CDMA2000 channel data. RANDOM will appear in the Data field of the table editor.

Softkey Location: press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, (highlight a value in the data column), **Edit Item**, **Random**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel <chan_num>,<PILot>,<data_rate>,<power>,
RANDom|<data_val>

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Reconstruction Filter

Press this softkey to display a menu for selecting a reconstruction filter. You can choose a filter with a cutoff frequency of 250.0 kHz, 2.500 MHz, 8.000 MHz, or no filter (**Through**).

Default Value: 2.500 MHz

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Reconstruction Filter**

SCPI Commands:

```
[:SOURce]:RADio:ARB:RFILter 250 kHz|2.5 MHz|
8.0 MHz|THRough

[:SOURce]:RADio:ARB:RFILter?
```

Rectangle

Press this softkey to select a rectangle pre-modulation filter in either the Select (filter) menu or the Load Default FIR menu.

In the Select (Filter) Menu

Pressing the **Rectangle** softkey selects this FIR filter for use in your filter setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **More (1 of 2)**, **Rectangle**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RECTangle
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

In the Load Default FIR Menu

Pressing the **Rectangle** softkey followed by **Generate** loads the FIR table editor with the coefficient values for a rectangle filter.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Rectangle**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RECTangle
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Reference Frequency

Press this softkey to set the reference frequency of the external clock. The external clock is only accessible when you are using an external ARB reference applied to the BASEBAND GEN REF IN connector.

Default Value: 10.0000000 MHz

Range: 250.0000 kHz to 20.0000000 MHz.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **More (1 of 2)**, **Reference Freq**

SCPI Commands:

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:
FREQuency <value>
```

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:FREQuency?
```

Restore Default Filter

Press this softkey to replace the current FIR filter with the default filter (IS-95 Mod w/EQ).

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Restore Default Filter**

Retrigger Mode Off On

Press this softkey to toggle the operating state of the retrigger mode. With **Retrigger Mode Off On** set to **On**, if a trigger occurs while a waveform is playing, the waveform will retrigger at the end and play one more time. Retriggers do not accumulate; if several triggers are received during a waveform, it will only be replayed once.

When **Retrigger Mode Off On** is set to **Off**, if a trigger occurs while a waveform is playing, it is ignored.

Default Value: Off

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Retrigger Mode Off On**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:RETRigger ON|OFF|1|0

[:SOURce]:RADio:CDMA2000:ARB:RETRigger?
```

Root Nyquist

Press this softkey to select the Root Nyquist (root raised cosine) pre-modulation filter in either the Select (filter) menu or the Load Default FIR menu.

In the Select (Filter) Menu

Pressing the **Root Nyquist** softkey selects this FIR filter and returns the Filter menu.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **Root Nyquist**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist

[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

In the Load Default FIR Menu

Pressing the **Root Nyquist** softkey followed by **Generate** loads the FIR table editor with the coefficient values for the Root Nyquist filter. The filter alpha and number of filter symbols are defined with the softkeys in this menu. If you change either parameter after loading the filter coefficients, press the **Generate** softkey again to reload the FIR table.

The **Display Impulse Response** (see page 3-13) and **Display FFT** (see page 3-12) softkeys in this menu graphically display the filter as it is currently defined in the FIR table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Define User FIR**, **More (1 of 2)**, **Load Default FIR**, **Root Nyquist**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist

[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Scale To 0dB

Press this softkey to scale all of the current channel powers so that the total power equals 0 dB while keeping the previous power ratios between the individual channels.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Adjust Code Domain Power**, **Scale To 0dB**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
TABLe:PADJust SCALe

[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
TABLe:PADJust SCALe
```

Select

Press this softkey to access a menu for selecting the pre-modulation filter type. You can choose from:

- Pre-defined filters, such as Root Nyquist, Nyquist, Gaussian, several IS-95 baseband filters, WCDMA, and Rectangle.

  The standard IS-95 filter is available as well as a modified version of this filter that meets the IS-95 error function for improved adjacent channel performance. These two filters are also provided with an equalizer for phase compensation required by the base station.

- A catalog of files stored in the signal generator memory. You can select any filter that you have either created externally and downloaded into memory, or that you have created internally in the Define User FIR menu and subsequently stored.

Default Value: IS-95 w/EQ

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist|NYQuist|
GAUSsian|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|RECTangle|
WCDMA|"<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Select File

Press this softkey to select a stored file.

Select File is located in catalogs of files.

SCPI Commands (for selecting a user-defined FIR filter):

```
[:SOURce]:RADio:CDMA2000:ARB:FILter "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILter?
```

SCPI Commands (for selecting a custom CDMA2000 state):

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:
SETup "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:
SETup "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

Single

Press this softkey to set the trigger type to single. After receiving a trigger, the waveform is output once.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Single**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE SINGle
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Spread Rate

Press this softkey open a submenu that provides the available spread rate choices for the CDMA2000 waveform. The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 3 equals a 3.6864 Mcps chip rate. Higher data rates can be achieved using spread rate 3, though offset by greater bandwidth/spectrum usage.

Default Value: SR3

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **Spread Rate**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 1|3
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
```

Spread Rate 1

Press this softkey to select spread rate 1 for the CDMA2000 waveform. The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 1 equals a 1.2288 Mcps chip rate. Lower bandwidth spectrums are used with spread rate 1, but with lower available data rates.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **Spread Rate**, **Spread Rate 1**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 1
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
```

Spread Rate 3

Press this softkey to select spread rate 3 for the CDMA2000 waveform. The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 3 equals a 3.6864 Mcps chip rate. Higher data rates can be achieved using spread rate 3, though offset by greater bandwidth/spectrum usage.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **Spread Rate**, **Spread Rate 3**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 3
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
```

Spreading Type Direct Mcarrier

Press this softkey to select the spreading type for a CDMA2000 waveform. You can choose from either direct or multicarrier for forward link (the spread rate must be 3). Multicarrier is not available in the reverse link setup.

Default Value: Direct

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **Spreading Type Direct Mcarrier**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:
TYPE DIRect|MCARrier
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE?
```

Store Custom CDMA2000 State

Press this softkey to access a menu that enables you to store the current custom CDMA2000 state into the file you enter. Afterward, you can recall this custom state from the signal generator's memory (as described under the softkey **Custom CDMA2000 State**, see page 3-10).

Along with the contents of the CDMA2000 channel table editor, this softkey stores the following signal generator state information to the memory catalog:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type
- spread rate
- ARB reconstruction filter
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Store Custom CDMA2000 State**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
STORe "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
STORe "<file name>"
```

Store To File

Press this softkey to display a menu where you can store the current table editor information for later use.

Store To File is located in catalogs of files.

SCPI Commands for Custom CDMA2000 State:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
STORe "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
STORe "<file name>"
```

SCPI Commands for user-defined FIR:

```
MEMory:DATA:FIR "<file name>"
```

Supplemental1 Traffic

Press this softkey to open a submenu where you can define and insert one or more supplemental1 traffic channels into the CDMA2000 setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Supplemental1 Traffic**

Supplemental2 Traffic

Press this softkey to open a submenu where you can define and insert one or more supplemental2 traffic channels into the CDMA2000 setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Supplemental2 Traffic**

Sync

Press this softkey to insert a synchronization channel into the Edit Channel Setup table editor.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Sync**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel <chan_num>,<SYNC>,<config>,<data_rate>,<walsh>,
<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

Through

Press this softkey to bypass all reconstruction filtering. This is useful for using external reconstruction filters at frequencies different than those supplied internally.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Reconstruction Filter**, **Through**

SCPI Commands:

```
[:SOURce]:RADio:ARB:RFILter THRough
```

```
[:SOURce]:RADio:ARB:RFILter?
```

Traffic

Press this softkey to open a submenu where you can define and insert one or more fundamental traffic channels into the CDMA2000 setup.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Edit Channel Setup**, **Insert Row**, **Traffic**

Trigger

Press this softkey to display the trigger menu, where you can select types of triggering: continuous, single, or gate. The menu also contains a **Trigger Setup** softkey that enables you to adjust the trigger source, the retrigger mode, and the gate active polarity.

Default Value: Continuous

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONT|SINGle|GATE
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Trigger Key

Press this softkey to set the trigger source to the signal generator's front panel **Trigger** key. When the trigger source is set to **Trigger Key**, the signal generator triggers an event when the front panel **Trigger** key is pressed.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**, **Trigger Source**, **Trigger Key**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

Trigger Setup

Press this softkey to display the trigger setup menu where you can adjust the trigger source, the retrigger mode and the gate active polarity.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Setup**

Trigger Source

Press this softkey to display the trigger source menu. This menu enables you to adjust the trigger source between the front panel **Trigger** key, a trigger command sent over the HP-IB bus, or an external trigger applied to the PATTERN TRIG IN connector.

Default Value: Ext

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Trigger**, **Trigger Source**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY|EXT|BUS

[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

User FIR

Press this softkey to display the catalog of FIR filter files stored in the signal generator's memory. You can select a custom filter from this catalog for your pre-modulation filter. Scroll through the listed files, highlight the desired selection, then press the **Select File** softkey. Notice that `User Filter` is shown in the `Filter` field of the display, and the filename is shown in the second line of the **Select** softkey.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **User FIR**

Waveform Statistics

Press this softkey to display the Waveform Statistics Menu. When this softkey is active, statistics are available for the selected waveform.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **More (1 of 2)**, **Waveform Statistics**

WCDMA

Press this softkey to select a WCDMA filter.

Softkey Location: Press **Mode**, **CDMA Formats**, **CDMA2000 (Rev 8)**, **CDMA2000 Define**, **Filter**, **Select**, **More (1 of 2)**, **WCDMA**

SCPI Commands:

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer WCDMA

[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

4 Operation

This chapter contains detailed information that will help you understand the operation of your Option 100 signal generator's CDMA2000 (Revision 8) personality.

Understanding Baseband Clipping

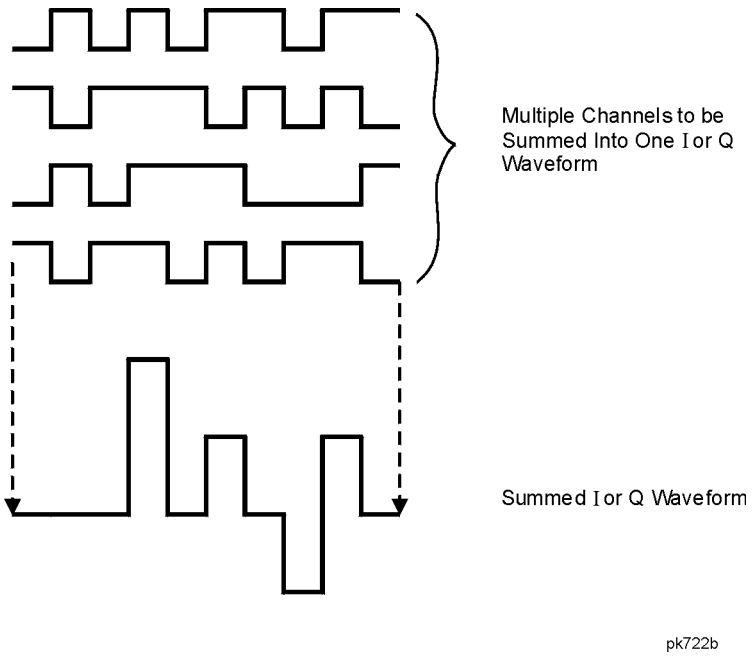
In a CDMA2000 waveform, high power peaks can cause intermodulation distortion, which generates spectral regrowth (a condition that interferes with signals in adjacent frequency bands). The clipping function allows you to reduce high power peaks.

How Power Peaks Develop

To understand how clipping reduces high power peaks in a CDMA2000 signal, it is important to know how the peaks develop as the signal is constructed.

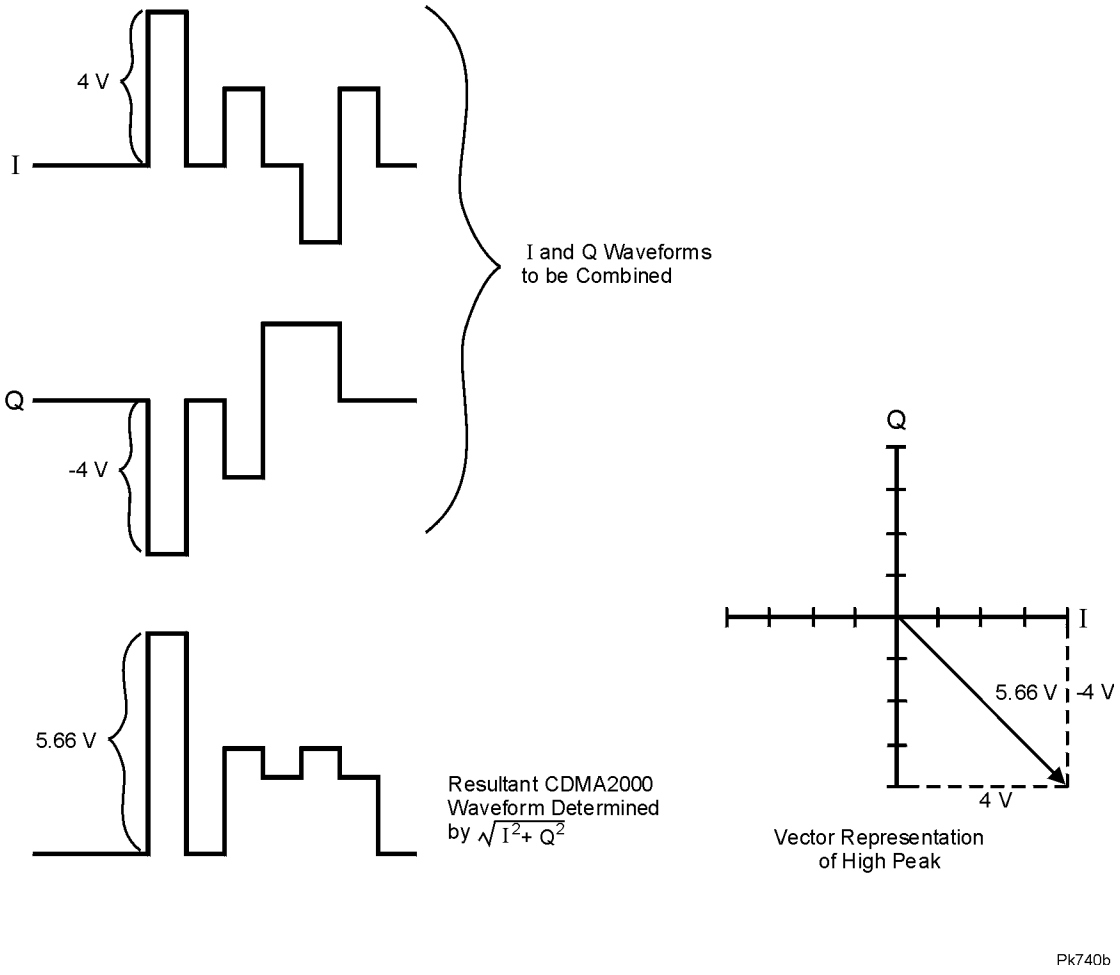
A CDMA2000 waveform is composed of an I waveform and a Q waveform. Often, these waveforms are the summation of multiple channels (refer to Figure 4-1). Whenever most or all of the individual channel waveforms simultaneously contain a bit in the same state (high or low), an unusually high power peak (negative or positive) occurs in the summed waveform. This does *not* happen frequently because the high and low states of the bits on these channel waveforms are random, which causes a cancelling effect.

Figure 4-1 Multiple Channel Summing



The I and Q waveforms are combined in the I/Q modulator to create an RF waveform. The magnitude of the RF envelope is determined by the equation $\sqrt{I^2+Q^2}$, where the squaring of I and Q always results in a positive value. Notice how positive and negative peaks that occurred simultaneously in the I and Q waveforms do not cancel each other, but combine to create an even greater peak (refer to Figure 4-2).

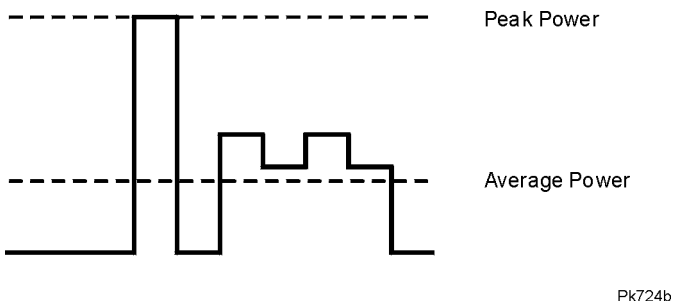
Figure 4-2 Combining the I and Q Waveforms



How Peaks Cause Spectral Regrowth

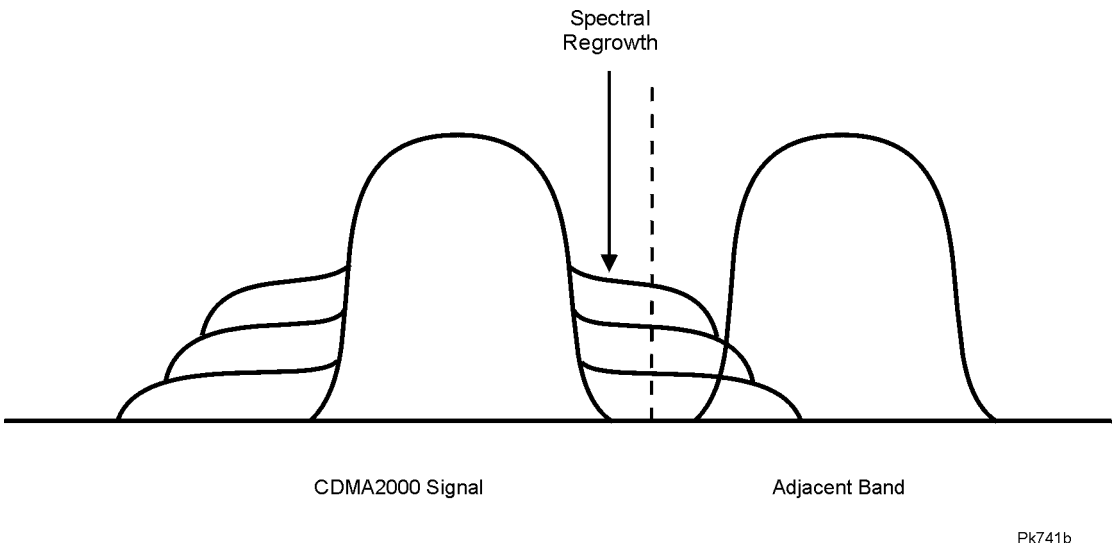
Because of the relative infrequency of high power peaks, a waveform will have a high peak-to-average power ratio (refer to Figure 4-3). Because a transmitter's power amplifier gain is set to provide a specific average power, high peaks can cause the power amplifier to move toward saturation. This causes intermodulation distortion, which generates spectral regrowth.

Figure 4-3 Peak-to-Average Power in the CDMA2000 Waveform



Spectral regrowth is a range of frequencies that develops on each side of the carrier (similar to sidebands) and extends into the adjacent frequency bands (refer to Figure 4-4). Consequently, spectral regrowth interferes with communication in the adjacent bands. Clipping can provide a solution to this problem.

Figure 4-4 Spectral Regrowth Interfering with Adjacent Band



How Clipping Reduces Peak-to-Average Power

You can reduce peak-to-average power, and consequently spectral regrowth, by clipping the waveform to a selected percentage of its peak power (refer to Figure 4-5 and Figure 4-6). The objective is to clip the waveform to a level that effectively reduces spectral regrowth, but does *not* compromise the integrity of the signal.

The lower you set the clipping value, the lower the peak power that is passed (or the more the signal is clipped). Often, the peaks can be clipped successfully without substantially interfering with the rest of the waveform. Data that might be lost in the clipping process is salvaged because of the error correction inherent in the CDMA2000 system. If you clip too much of the waveform, however, lost data will be irrecoverable. You may have to try several clipping settings to find a percentage that works well.

Figure 4-5 Clipping the CDMA2000 Waveform

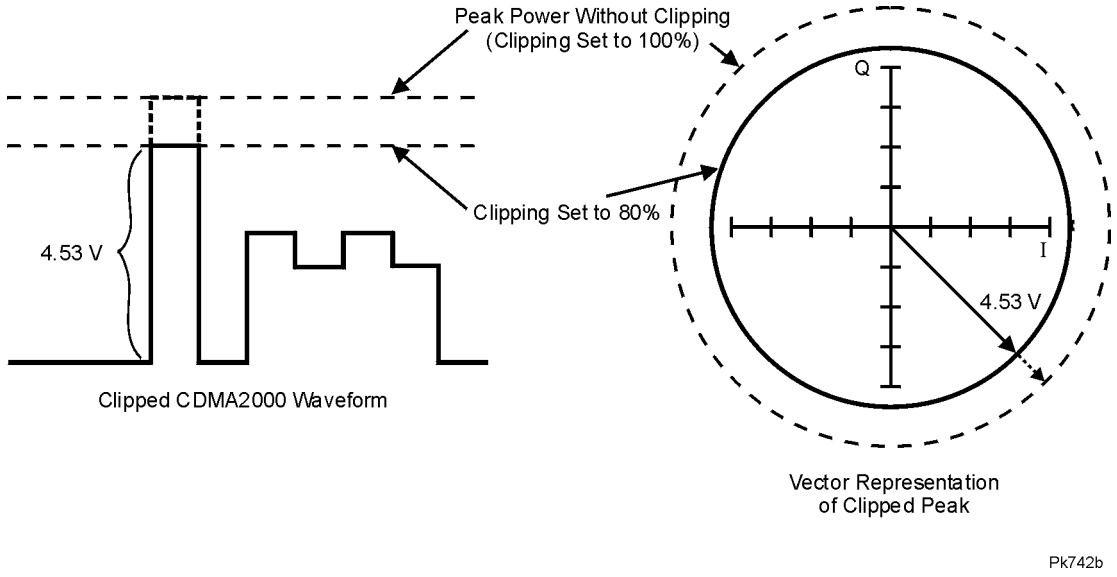
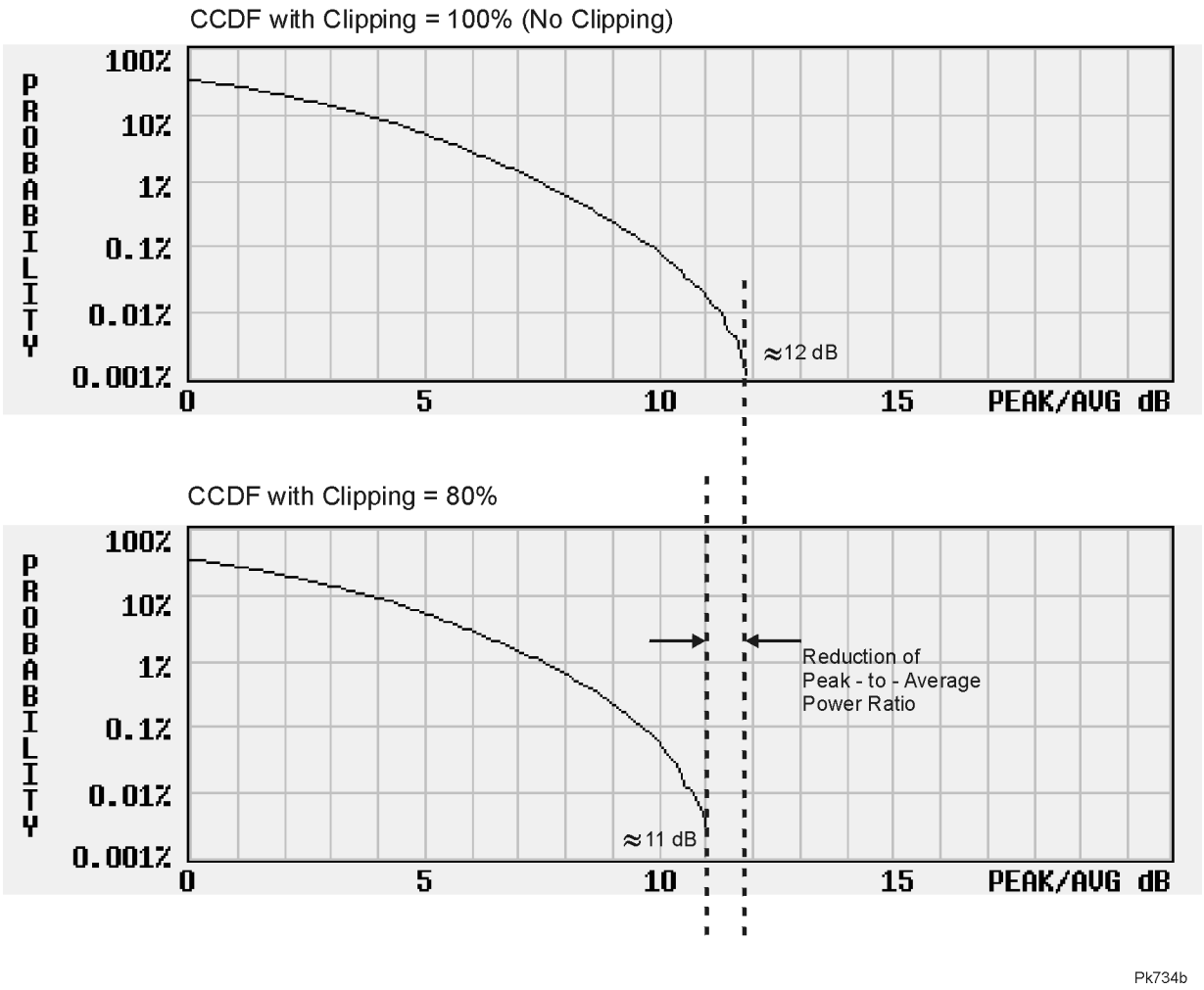


Figure 4-6 Reduction of Peak-to-Average Power



Clipping Occurs Prior to FIR Filtering

Clipped waveforms have abrupt discontinuities which can generate noise. To solve this problem, the clipping function is placed prior to FIR filtering. The FIR filter smooths any discontinuities in the clipped waveform and prevents noise.

5 Remote Programming

This chapter contains a brief overview of the Standard Commands for Programmable Instruments (SCPI) programming language (including a command syntax description) and a listing of all of the CDMA2000 subsystem SCPI commands in alphabetical order. The descriptions include syntax requirements, ranges, restrictions, query responses, and status after a *RST.

Getting Started with SCPI

This section includes some basic reference material for the Standard Commands for Programmable Instruments language (SCPI). For more detailed information, see the programming guide.

Understanding Common Terms

The following terms are used throughout the remainder of this chapter.

Controller	A controller is any computer used to communicate with a SCPI instrument. A controller can be a personal computer, a minicomputer, or a plug-in card in a card cage. Some intelligent instruments can also function as controllers.
Instrument	An instrument is any device that implements SCPI. Most instruments are electronic measurement or stimulus devices, but this is not a requirement. Similarly, most instruments use an HP-IB or RS-232 interface for communication. The same concepts apply regardless of the instrument function or the type of interface used.
Program Message	A program message is a combination of one or more properly formatted SCPI commands. Program messages always go from a controller to an instrument. Program messages tell the instrument how to make measurements and output signals.
Response Message	A response message is a collection of data in specific SCPI formats. Response messages always go from an instrument to a controller or listening instrument. Response messages tell the controller about the internal state of the instrument and about measured values.
Command	A command is an instruction in SCPI. You combine commands to form messages that control instruments. In general, a command consists of mnemonics (keywords), parameters, and punctuation.
Query	A query is a special type of command. Queries instruct the instrument to make response data available to the controller. Query mnemonics always end with a question mark.

Standard Notation

This section uses several forms of notation that have specific meaning:

Command Mnemonics — Many commands have both a long and a short form and you must use either one or the other (SCPI does not accept a combination of the two). Consider the FREQuency command, for example. The short form is FREQ and the long form is FREQUENCY. This notation type is a shorthand to document both the long and short form of commands. SCPI is not case sensitive, so fREquEnCy is just as valid as FREQUENCY, but FREQ and FREQUENCY are the only valid forms of the FREQuency command.

Angle Brackets — Angle brackets indicate that the word or words enclosed represent something other than themselves. For example, <new line> represents the ASCII character with the decimal value 10. Similarly, <END> means that EOI is asserted on the HP-IB interface. Words in angle brackets have much more rigidly defined meaning than words shown in ordinary text. For example, this section uses the word "message" to talk about messages generally. But the bracketed words <program message> indicate a precisely defined element of SCPI. If you need them, you can find the exact definitions of words such as <program message> in a syntax diagram.

More About Commands

Query and Event Commands

You can query any value that you can set. For example, the presence of the signal generator FREQuency:OFFSet command implies that a FREQuency:OFFSet? also exists. If you see a command ending with a question mark, it is a query-only command. Some commands are events and cannot be queried. An event has no corresponding setting if it causes something to happen inside the instrument at a particular instant.

Implied Commands

Implied commands appear in square brackets. If you send a subcommand immediately preceding an implied command, but do not send the implied command, the instrument assumes you intend to use the implied command and behaves just as if you had sent it. Notice that this means that the instrument expects you to include any parameters required by the implied command. The following example illustrates equivalent ways to program the signal generator using explicit and implied commands.

An example signal generator command, FREQuency[:CW], with and without the implied command:

```
FREQuency:CW 500 MHz        using explicit commands
FREQuency 500 MHz           using implied commands
```

Optional Parameters

Optional parameter names are enclosed in square brackets. If you do not send a value for an optional parameter, the instrument chooses a default value. The instrument's command dictionary documents the values used for optional parameters.

Command Syntax

Following the heading for each programming command entry is a syntax statement showing the proper syntax for the command. An example syntax statement is shown here:

```
POWer[:LEVel] MAXimum|MIN
```

Syntax statements read from left to right. In this example, the `[:LEVel]` portion of the statement immediately follows the `POWer` portion of the statement with no separating space. A separating space is legal only between the command and its argument. In this example, the portion following the `[:LEVel]` portion of the statement is the argument. Additional conventions used in the syntax statements are defined as follows:

- Italics are used to symbolize a program code parameter or query response.
- ::= means "is defined as."
- | (vertical bar) indicates a choice of one element from a list. For example, <A>|<B> indicates <A> or <B> but not both.
- {} (braces or curly brackets) indicate that the enclosed items may be included zero or more times.
- [] (square brackets) indicate that the enclosed items are optional.
- Upper-case lettering indicates that the upper-case portion of the command is the minimum required for the command. For example, in the command `FREQuency`, `FREQ` is the minimum requirement.
- Lower-case lettering indicates that the lower-case portion of the command is optional; it can either be included with the upper-case portion of the command or omitted. For example, in the command `FREQuency`, either `FREQ` or `FREQUENCY` is correct.
- ? after a subsystem command indicates that the command is a query.

CDMA2000 Subsystem SCPI Command Reference (Options UND and 101 Required)

The CDMA2000 subsystem SCPI commands are used to set the controls and the parameters associated with CDMA2000 communications standard via a remote controller. These commands are only for signal generators with both Options UND and 101.

Apply Waveform

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:APPLy
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:APPLy
```

Execute this command to generate a CDMA2000 signal based on the current value in the CDMA2000 channel setup table editor.

ARB Reference Internal External

```
[:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce] INTernal|EXTernal
```

```
[:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce]?
```

Execute this command to select either an internal or external reference for the waveform clock. If external is selected, the external frequency *must* be entered (see the Reference Frequency command) and the signal must be applied to the BASEBAND GEN REF IN connector.

At *RST, this value is set to Internal.

CDMA2000 Link Setup

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:
SETup S1Pilot|S3DPilot|S3MPilot|S19Chan|S3D9chan|
S3M9chan|"<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup
S1Pilot|S3Pilot|S15Chan|S35Chan|S18Cha|"<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
```

Execute this command to select a previously defined channel configuration for the CDMA2000 forward or reverse links. You can select a predefined channel setup, or select a stored custom CDMA2000 state.

- `S1Pilot|S3DPilot|S3MPilot|S19Chan|S3D9chan|S3M9chan|"<file name>"` - to select the current forward link

  `S1Pilot` - to select Pilot, Spread Rate 1

  `S3DPilot` - to select Pilot Direct Spreading, Spread Rate 3

  `S3MPilot` - to select Pilot Multicarrier Spreading, Spread Rate 3

  `S19Chan` - to select 9 Channel, Spread Rate 1

  `S3D9Chan` - to select 9 Channel, Direct Spreading, Spread Rate 3

  `S3M9chan` - to select 9 Channel, Multicarrier Spreading, Spread Rate 3

  `"<file name>"` - to select a stored custome CDMA2000 state

  At *RST, this value is set to 9 Channel, Spreading Rate 3, Direct Spreading (`S3D9Chan`)

- `S1Pilot|S3Pilot|S15Chan|S35chan|S18chan|"<file name>"` - to select the current reverse link

  `S1Pilot` - to select Pilot, Spread Rate 1

  `S3Pilot` - to select Pilot, Spread Rate 3

  `S15Chan` - to select 5 channel, Spread Rate 1

  `S35Chan` - to select 5 Channel, Spread Rate 3

  `S18Chan` - to select 8 Channel, Spread Rate 1

  `"<file name>"` - to select a stored custome CDMA2000 state

CDMA2000 State

`[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON|OFF|1|0`

`[:SOURce]:RADio:CDMA2000:ARB[:STATe]?`

Execute this command to enable or disable the CDMA2000 baseband signal. The choices are `ON` (`1`) or `OFF` (`0`). Executing the command `[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON` sets up the internal hardware to generate the currently selected CDMA2000 signal selection. The `CDMA2K` and `I/Q` annunciators are turned on in the display. Although the digital modulation is enabled with this softkey, the enabled modulation is not present on RF carrier until you have activated the modulation by executing the command `:OUTPut:MODulation[:STATe] ON`.

Executing the command `[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON` activates the I/Q state and sets the I/Q source to internal. You can override these selections in the I/Q menu.

At *RST, this value is set to Off.

Channel Setup

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,
<power>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:
CHANnel? <chan_num>
```

Execute this command to define the channel parameters of the CDMA2000 signal. These parameters include:

- `INIT|APPend` - to set up or insert channels

  `INIT` - to clear the current table and create channel 1 using the parameters below

  `APPend` - to insert the next channel with the parameters below

  `<chan_num>` - to modify an existing channel

- `<chan_type>` - the channel type

  `<PAGing>` - a paging channel

  `<Pilot>` - a pilot channel

  `<SYNC>` - a sync channel

  `<TRAFfic>` - a traffic channel

- `<config>` - radio configuration, *RST value: 6 for Forward 5, 5 for Reverse
- `<data_rate>` - the data rate in Bps, *RST value: 9600 Bps
- `<walsh_code>` - the walsh code assigned to the channel (0 to 127 for spread rate 1 or 0 to 255 for spread rate 3), *RST value: 0
- `<power>` - the channel power in dB (-40 to 0 dB), *RST value: 0.00 dB
- `<pn_offset>` - the PN offset value (0 to 511), *RST value: 0
- `RANDom|<data_val>` - the transmitted data

  `RANDom` - random data

  `<data_val>` - user-defined data (0 to 255)

Clipping Level

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping <10.0-100.0%>
```

```
[:SOURce]:RADio:CDMA2000:ARB:CLIPping?
```

Execute this command to clip (limit) the modulation level of the baseband waveform to a percentage of full scale. A level of 100.0% is no clipping.

Range: 10.0 through 100.0% in 0.1% increments

At *RST, this value is set to 100.0%.

Code Domain Power

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
TABLe:PADJust EQUal|SCALe
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
TABLe:PADJust EQUal|SCALe
```

Execute this command to adjust the code domain power (the relative power in each of the channels) to either Equal Powers or Scale to 0 dB.

`EQUal|SCALe` - the relative power

`EQUal` - sets all channels to equal power, and the total power to 0 dB.

`SCALe` - scales all of the current channel powers so that the total power equals 0 dB, keeping the previous power ratios between the individual channels.

Custom CDMA2000 State, Store

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:
STORe "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:
STORe "<file name>"
```

Execute this command to store the current custom CDMA2000 state into a designated file name. Afterward, you can recall this custom state from the signal generator memory by executing the following commands.

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:
SETup "<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:
SETup "<file name>"
```

Along with the contents of the CDMA2000 channel table editor (channel types, Walsh code, power levels, PN offset, and data), this softkey stores the following instrument state information to the memory catalog:

- FIR filter
- FIR filter file name
- FIR filter alpha
- FIR filter BbT
- FIR filter channel (EVM or ACP)
- I/Q mapping
- link
- spread type
- spread rate
- ARB reconstruction filter
- ARB reference clock source (internal or external)
- ARB reference clock frequency
- clipping
- multicarrier spacing
- radio configuration

External Trigger Delay State

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay:
STATe ON|OFF|1|0
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
```

Execute this command to set the operating state for the external trigger delay. The choices are On or Off.

At *RST, this value is set to Off.

External Trigger Delay Time

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay?
```

Execute this command to set the time for the external trigger delay. The range of values allowed for the variable <value> is 2.000 microseconds through 3600 seconds.

At *RST, this value is set to 2.000 msec.

External Trigger Polarity

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:
SLOPe POSitive|NEGative
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?
```

Execute this command to set the polarity of the external trigger. The choices are Positive or Negative.

At *RST, this value is set to Negative.

Filter Alpha

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa?
```

Execute this command to change the Nyquist or root Nyquist filter alpha value. The acceptable range for the variable <value> is 0.000 through 1.000.

This command is effective only *after* choosing a Root Nyquist or Nyquist filter. It does not have an effect on other types of filters.

At *RST, this value is set to 0.500.

Filter BbT

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT?
```

Execute this command to change the bandwidth-multiplied-by-bit-time (BbT) filter parameter. The acceptable range for the variable <value> is 0.000 through 1.000.

This command is effective only *after* choosing a Gaussian filter. It does not have an effect on other types of filters.

At *RST, this value is set to 0.500.

Filter Optimization

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel EVM|ACP
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel?
```

Execute this command to optimize the filter for minimized error vector magnitude (select EVM) or for minimized adjacent channel power (select ACP). The EVM selection provides the most ideal passband. The ACP selection improves stopband rejection.

At *RST, this value is set to EVM.

Filter Selection

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist|NYQuist|GAUSsian|IS95|
IS95_EQ|IS95_MOD|IS95_MOD_EQ|RECTangle|WCDMA|"<file name>"
```

```
[:SOURce]:RADio:CDMA2000:ARB:FILTer?
```

Execute this command to select the pre-modulation filter type. The choices are:

- `RNYQuist` - Root Nyquist filter
- `NYQuist` - Nyquist filter
- `GAUSsian` - Gaussian filter
- `IS95` - Standard IS-95 filter
- `IS95_MOD` - a modified version of an IS-95 filter which meets the IS-95 error function for improved adjacent channel performance.
- `IS95-EQ` - a modified version of an IS95 filter with an equalizer which provides base station phase equalization for the transmit signal path.
- `IS95_MOD_EQ` - a modified version of an IS-95 filter which meets the IS-95 error function for improved adjacent channel performance with an equalizer which provides base station phase equalization for the transmit signal path.
- `RECTangle` - Rectangle filter
- `WCDMA` - WCDMA filter
- `"<file name>"` - any filter file that you have either created externally and downloaded into memory, or that you have created internally in the Define User FIR menu and then subsequently stored.

At *RST, this value is set to IS-95 Modified with Equalization.

Gate Active

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive LOW|HIGH
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive?
```

Execute this command to toggle the polarity of the “through” or active state of a gated trigger signal. The choices are low or high. Gate active low will output the signal while the gate is low at the PATTERN TRIG IN connector. Gate active high has the opposite effect, outputting the signal while the signal level at the PATTERN TRIG IN connector is in a high state.

At *RST, this value is set to N/A.

I/Q Mapping

```
[:SOURce]:RADio:CDMA2000:ARB:IQMap NORMal|INVert|INVerted
```

```
[:SOURce]:RADio:CDMA2000:ARB:IQMap?
```

Execute this command to select whether the I/Q outputs will be normal or inverted.

At *RST, this value is set to Normal.

Link Direction

```
[:SOURce]:RADio:CDMA2000:ARB:LINK FORWard|REVerse
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK?
```

Execute this command to select the CDMA2000 (revision 8) forward or reverse link channel setup. Forward link is for base to mobile. Reverse link is for mobile to base. Note that changing the link will result in the setup changing to a setup for the current link (see “CDMA2000 Link Setup” on page 5-5).

At *RST, this value is set to Forward.

Multicarrier Spacing

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier: SPACing
<1.23MHz|1.25MHz>
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier: SPACing?
```

Execute this command to select the multicarrier frequency spacing. (Cellular band uses 1.23 MHz and PCS band uses 1.25 MHz.)

At *RST, this value is set to 1.25 MHz.

Oversample Ratio

```
:MEMory:DATA:FIR "<file name>", osr, coefficient {,coefficient}
```

```
:MEMory:DATA:FIR? "<file name>"
```

Execute this command to set the oversampling ratio to be applied to a custom FIR filter design. The maximum combination of symbols and oversampling ratio is 1024. Because an FIR filter selected for use in CDMA2000 cannot have more than 256 coefficients, select the number of symbols and the oversample ratio accordingly.

Range: 1 through 32

At *RST, this value is set to 4.

Radio Configuration

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,
<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_val>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:
CHANnel? <chan_num>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig <value>
```

```
[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig?
```

Execute this command to set the radio configuration for a new forward link (traffic, supplemental1 traffic, or supplemental2 traffic channel) or the radio configuration for the entire reverse link channel setup. Note that changing the radio configuration results in changes to the channel data rate.

At *RST, this value is set to the following:

Forward Link: 6

Forward Link Range: 1 to 5 for Spread Rate 1, 6 to 9 for Spread Rate 3

Reverse Link: 5

Reverse Link Range: 5 or 6

Reconstruction Filter

```
[:SOURce]:RADio:ARB:RFILter <value>|THRough
```

```
[:SOURce]:RADio:ARB:RFILter?
```

Execute this command to modify the reconstruction filter. You may choose a filter with a cutoff frequency of 250.0 kHz, 2.500 MHz, 8.000 MHz or no filter (**THRough**). Acceptable values for the variable <value> are `250.0 kHz`, `2.500 MHz`, or `8.000 MHz`.

At *RST, this value is set to 2.500 MHz.

Reference Frequency

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:FREQuency <value>
```

```
[:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:FREQuency?
```

Execute this command to set the reference frequency of the external clock. It is only effective when you are using an external ARB reference applied to the BASEBAND GEN REF IN connector. The acceptable range for the variable <value> is 250.0000 kHz to 20.0000000 MHz.

At *RST, this value is set to 10.0000000 MHz.

Retrigger Mode State

```
[:SOURce]:RADio:CDMA2000:ARB:RETRigger ON|OFF|1|0
```

```
[:SOURce]:RADio:CDMA2000:ARB:RETRigger?
```

Execute this command to set the operating state of the retrigger mode. The choices are On or Off.

At *RST, this value is set to On.

Spread Rate

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 1|3
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
```

Execute this command to open a submenu that provides the available spread rate choices for the CDMA2000 waveform. The spread rate multiplied by 1.2288 MHz is equal to the chip rate. For example, spread rate 3 equals a 3.6864 Mcps chip rate. Higher data rates can be achieved using spread rate 3, though offset by greater bandwidth/spectrum usage. Note that changing the spread rate will result in the setup changing to a setup for the current spread rate (see “CDMA2000 Link Setup” on page 5-5).

At *RST, this value is set to SR3.

Spreading Type

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE DIRect|MCARrier
```

```
[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE?
```

Execute this command to select the spreading type for a CDMA2000 waveform. You can choose from either Direct or Multicarrier for forward link setups. Multicarrier is not available in the reverse link setup. Note that changing the spreading type will result in the setup changing to a setup for the current spreading type (see “CDMA2000 Link Setup” on page 5-5).

At *RST, this value is set to Direct.

Trigger Source

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY|EXT|BUS
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
```

Execute this command to set the trigger source. The choices include the front panel **Trigger** key, a trigger command sent over the HP-IB bus, or an external trigger applied to the PATTERN TRIG IN connector.

At *RST, this value is set to External.

Trigger Type

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONTinuous|SINGle|GATE
```

```
[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
```

Execute this command to set the trigger type. The choices are continuous, single, gated, and when a waveform sequence is active, segment advance.

At *RST, this value is set to Continuous.

User FIR Definition

```
MEMory:DATA:FIR "<file name>",osr,coefficient{,coefficient}
```

```
MEMory:DATA:FIR? "<file name>"
```

Execute this command to define User FIR filters. A maximum filter length of 1024 taps is allowed with a maximum oversampling ratio of 32. An FIR filter selected for use in CDMA, however, cannot have more than 256 taps so the number of symbols and the oversample ratio should be selected accordingly. Examples of using the FIR table editor are provided in Chapter 2, “Using Functions.”

6 Programming Command Cross-Reference

This section lists the CDMA2000 softkeys and their corresponding SCPI commands. For a complete list of the signal generator hardkeys and softkeys and their corresponding SCPI commands, please refer to the programming guide.

Table 6-1 Mode – CDMA2000 Softkeys

Key	SCPI Command
1.23 Mhz	[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing <1.23MHz> [:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing?
1.25 MHz	[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing <1.25MHz> [:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier:SPACing?
2.500 MHz	[:SOURce]:RADio:ARB:RFILter 2.5 MHz [:SOURce]:RADio:ARB:RFILter?
5 Channel	[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup S15Chan|S35Chan [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
8.000 MHz	[:SOURce]:RADio:ARB:RFILter 8.0 MHz [:SOURce]:RADio:ARB:RFILter?
8 Channel	[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup S18Chan [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
9 Channel	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup S19Chan|S3D9Chan|S3M9Chan [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup?
250.0 kHz	[:SOURce]:RADio:ARB:RFILter 250 kHz [:SOURce]:RADio:ARB:RFILter?

Key	SCPI Command
1200 Bps **1500 Bps** **1800 Bps** **2700 Bps** **3600 Bps** **4800 Bps** **7200 Bps** **9600 Bps** **14400 Bps** **19200 Bps** **28800 Bps** **38400 Bps** **57600 Bps** **76800 Bps** **115200 Bps** **153600 Bps** **230400 Bps** **307200 Bps** **460800 Bps** **614400 Bps** **1036800 Bps**	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,<power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel? <chan_num>
Adjust Code Domain Power	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:PADJust EQUal|SCALe [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:PADJust EQUal|SCALe
Apply Channel Setup	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:APPLy [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:APPLy
ARB Reference Ext Int	[:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce] INTernal|EXTernal [:SOURce]:RADio:ARB:CLOCk:REFerence[:SOURce]?
Bus	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] BUS [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
CDMA2000 Off On	[:SOURce]:RADio:CDMA2000:ARB[:STATe] ON|OFF|1|0 [:SOURce]:RADio:CDMA2000:ARB[:STATe]?

Key	SCPI Command
CDMA2000 Select	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard: SETup S1Pilot|S3DPilot|S3MPilot|S19Chan|S3D9chan| S3M9chan|"<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup? [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup S1Pilot|S3Pilot|S15Chan|S35Chan|S18Cha|"<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
Channels	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>, <data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>, <power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel? <chan_num>
Clipping Level	[:SOURce]:RADio:CDMA2000:ARB:CLIPping <10-100%> [:SOURce]:RADio:CDMA2000:ARB:CLIPping?
Continuous	[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONT [:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
Custom CDMA2000 State	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard: SETup "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup? [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse: SETup "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
Data Rate	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>, <data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>, <power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel? <chan_num>

Key	SCPI Command
Dedicated Control	[:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<DCONtrol>,<data_rate>,<power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel? <chan_num>
Define User FIR	MEMory:DATA:FIR "<file name>",osr,coefficient{,coefficient} MEMory:DATA:FIR? "<file name>"
Edit Channel Setup	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,<power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel? <chan_num>
Equal Powers	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:PADJust EQUal [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:PADJust EQUal
Ext	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] EXT [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
Ext Delay Off On	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe ON|OFF|1|0 [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay:STATe?
Ext Delay Time	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay <value> [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:DELay?
Ext Polarity Neg Pos	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:SLOPe POSitive|NEGative [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]:EXTernal:SLOPe?

Key	SCPI Command
Filter Alpha	[:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa <value> [:SOURce]:RADio:CDMA2000:ARB:FILTer:ALPHa?
Filter Bbt	[:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT <value> [:SOURce]:RADio:CDMA2000:ARB:FILTer:BBT?
Gate Active	[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE: ACTive LOW|HIGH [:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE:GATE:ACTive?
Gated	[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE GATE [:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
Gaussian	[:SOURce]:RADio:CDMA2000:ARB:FILTer GAUSsian [:SOURce]:RADio:CDMA2000:ARB:FILTer?
I/Q Mapping Normal Invert	[:SOURce]:RADio:CDMA2000:ARB:IQMap NORMal|INVert|INVerted [:SOURce]:RADio:CDMA2000:ARB:IQMap?
IS-95	[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95 [:SOURce]:RADio:CDMA2000:ARB:FILTer?
IS-95 Mod	[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_MOD [:SOURce]:RADio:CDMA2000:ARB:FILTer?
IS-95 Mod w/EQ	[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_MOD_EQ [:SOURce]:RADio:CDMA2000:ARB:FILTer?
IS-95 w/EQ	[:SOURce]:RADio:CDMA2000:ARB:FILTer IS95_EQ [:SOURce]:RADio:CDMA2000:ARB:FILTer?
Link Forward Reverse	[:SOURce]:RADio:CDMA2000:ARB:LINK FORWard|REVerse [:SOURce]:RADio:CDMA2000:ARB:LINK?
Mcarrier Spacing	[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier: SPACing <1.23MHz|1.25MHz> [:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE:MCARrier: SPACing?
Nyquist	[:SOURce]:RADio:CDMA2000:ARB:FILTer NYQuist [:SOURce]:RADio:CDMA2000:ARB:FILTer?
Optimize FIR For EVM ACP	[:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel EVM|ACP [:SOURce]:RADio:CDMA2000:ARB:FILTer:CHANnel?

Key	SCPI Command
Oversample Ratio	:MEMory:DATA:FIR "<file name>",osr,coefficient {,coefficient} :MEMory:DATA:FIR? "<file name>"
Paging	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel <chan_num>,<PAGing>,<config>,<data_rate>,<walsh>, <power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num>
Pilot	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard: SETup S1Pilot|S3DPilot|S3MPilot [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup? :SOURce]:RADio:CDMA2000:ARB:LINK:REVerse: SETup S1Pilot|S3Pilot [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup? [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel <chan_num>,<PILot>,<config>,<data_rate>,<walsh>, <power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel <chan_num>,<PILot>,<data_rate>,<power>, RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe: CHANnel? <chan_num>
Power	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>, <data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num>
Radio Config	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>, <data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe: CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig <value> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:RCONfig?

Key	SCPI Command
Random	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<config>,<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel? <chan_num> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel INIT|APPend|<chan_num>,<chan_type>,<data_rate>,<power>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:CHANnel? <chan_num>
Reconstruction Filter	[:SOURce]:RADio:ARB:RFILter 250 kHz|2.5 MHz|8.0 MHz|THRough [:SOURce]:RADio:ARB:RFILter?
Rectangle	[:SOURce]:RADio:CDMA2000:ARB:FILTer RECTangle [:SOURce]:RADio:CDMA2000:ARB:FILTer?
Reference Frequency	[:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:FREQuency <value> [:SOURce]:RADio:ARB:CLOCk:REFerence:EXTernal:FREQuency?
Retrigger Mode Off On	[:SOURce]:RADio:CDMA2000:ARB:RETRigger ON|OFF|1|0 [:SOURce]:RADio:CDMA2000:ARB:RETRigger?
Root Nyquist	[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist [:SOURce]:RADio:CDMA2000:ARB:FILTer?
Scale to OdB	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:PADJust SCALe [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:TABLe:PADJust SCALe
Select	[:SOURce]:RADio:CDMA2000:ARB:FILTer RNYQuist|NYQuist|GAUSsian|IS95|IS95_EQ|IS95_MOD|IS95_MOD_EQ|RECTangle|WCDMA|"<file name>" [:SOURce]:RADio:CDMA2000:ARB:FILTer?

Key	SCPI Command
Select File	[:SOURce]:RADio:CDMA:ARB:FILter "<file name>" [:SOURce]:RADio:CDMA:ARB:FILter? [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup? [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup?
Single	[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE SINGle [:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
Spread Rate	[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 1|3 [:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
Spread Rate 1	[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 1 [:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
Spread Rate 3	[:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE 3 [:SOURce]:RADio:CDMA2000:ARB:SPReading:RATE?
Spreading Type	[:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE DIRect|MCARrier [:SOURce]:RADio:CDMA2000:ARB:SPReading:TYPE?
Store Custom CDMA2000 State	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:STORe "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:STORe "<file name>"
Store to File	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:STORe "<file name>" [:SOURce]:RADio:CDMA2000:ARB:LINK:REVerse:SETup:STORe "<file name>" MEMory:DATA:FIR "<file name>"
Sync	[:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel <chan_num>,<SYNC>,<config>,<data_rate>,<walsh>,<power>,<pn_offset>,RANDom|<data_VAL> [:SOURce]:RADio:CDMA2000:ARB:LINK:FORWard:SETup:TABLe:CHANnel? <chan_num>
Through	[:SOURce]:RADio:ARB:RFILter THRough [:SOURce]:RADio:ARB:RFILter?

Key	SCPI Command
Trigger	[:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE CONT|SINGle|GATE [:SOURce]:RADio:CDMA2000:ARB:TRIGger:TYPE?
Trigger Key	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
Trigger Source	[:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce] KEY|EXT|BUS [:SOURce]:RADio:CDMA2000:ARB:TRIGger[:SOURce]?
WCDMA	[:SOURce]:RADio:CDMA2000:ARB:FILTer WCDMA [:SOURce]:RADio:CDMA2000:ARB:FILTer?

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