ADVANTEST

ADVANTEST CORPORATION

R3681 Series OPT52
cdma2000
Modulation Analysis Software
User's Guide

MANUAL NUMBER FOE-8440168D00

Applicable Models
R3681
R3671

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1. INTRODUCTION

This chapter describes the outline of this manual and the product overview of the R3681 series signal analyzer option 52 cdma2000 Modulation Analysis.

1.1 Outline of This Manual

The outline of each chapter is shown below:

For basic operating methods, functions and the remote programming method of the signal analyzer, refer to "1.3 Other Manuals Relating to This Instrument."

Chapter 1. INTRODUCTION	Describes the outline of this manual and the product overview.
Chapter 2. BEFORE OPERATING	Provides preliminary tips on using this instrument. Read this chapter before using this instrument.
Chapter 3. SETUP	Describes how to set up this instrument. After installing this instrument in position, switch it on to make sure that it starts successfully.
Chapter 4. MEASUREMENT EXAMPLES (Downlink)	Describes example measurements (Downlink).
Chapter 5. MENU MAP, FUNCTIONAL EXPLANATION (Downlink)	Describes the menu configuration and functions of the soft keys (Downlink).
Chapter 6. SCPI COMMAND REFERENCE (Downlink)	SCPI command reference (Downlink). The command reference describes the commands in order of function. The following items are described: • Command format • Function description • Parameters • Query response
Chapter 7. PERFORMANCE VERIFICATION (Downlink)	Describes the performance verification test procedures for option 52 (Downlink).
Chapter 8. SPECIFICATIONS (Downlink)	Shows the specifications of option 52 (Downlink).
Chapter 9. MEASUREMENT EXAMPLES (Uplink)	Describes example measurements (Uplink).
Chapter 10. MENU MAP, FUNCTIONAL EXPLANATION (Uplink)	Describes the menu configuration and functions of the soft keys (Uplink).
Chapter 11. SCPI COMMAND REFERENCE (Uplink)	SCPI command reference (Uplink). The command reference describes the commands in order of function. The following items are described: • Command format • Function description • Parameters • Query response

Chapter 12. PERFORMANCE VERIFICATION (Uplink)	Describes the performance verification test procedures for option 52 (Uplink).
Chapter 13. SPECIFICATIONS (Uplink)	Shows the specifications of option 52 (Uplink).
APPENDIX	Describes operation principles and the error code table.

1.2 Product Overview

The cdma2000 modulation analysis option is software that performs the modulation analysis of the cdma2000 base station signal and mobile station signal.

This option has the following features.

- Displays the numerical results such as Error Vector Magnitude and the frequency error as well as graphs such as the Code Domain Power graph. The results of multiple measurements can be evaluated at the same time because up to four result windows can be displayed.

1.3 Other Manuals Relating to This Instrument

Manuals which relate to this instrument include:

- User's Guide (Part Code: {ER3681SERIES/U}, English)

  Describes how to setup the R3681 Series Signal Analyzer, how to perform procedures such as, basic operations, applied measurements, and maintenance, and describes the functions, specifications of the R3681 Series Signal Analyzer.

- Programming Guide (Part Code: {ER3681SERIES/P}, English)

  Describes how to program the R3681 Series Signal Analyzer to automate measurement sequences and includes a remote control overview, SCPI command references, and sample application programs.

- Performance Test Guide (Part Code: {ER3681SERIES/T}, English)

  Describes how to check the performance of the R3681 Series Signal Analyzer and includes performance test procedures and specifications of the R3681 Series Signal Analyzer.

1.4 Conventions of Notation Used in This Document

In this document, hard keys, touch-screen buttons and menus are represented by the following symbols:

Hard keys
"Hard keys" are hardware keys which are on the panel.

Sample	Indicates a hard key labeled "Sample." Example: **START**, **STOP**

Touch-screen system menus

[Sample]	Indicates a touch-screen menu, tab, button or dialog box that is labeled "Sample" and that is selected or executed when touched. Example: **[File]** menu, **[Normal]** tab, **[Option]** button

Touch-screen function buttons

{Sample}	Indicates a touch-screen button labeled "Sample." Example: **{FREQ}** button, **{SWEEP}** button

Touch-screen side menu

Sample	Indicates a touch-screen side menu labeled "Sample." Example: **Center** key, **Span** key

Touch-screen system menu key operation

[File]→[Save As...]	Indicates that you need to touch the **[File]** menu and then select **[Save As...]**.

Sequential key operation

{FREQ}, **Center**	Indicates that you need to touch the **{FREQ}** button and then touch the **Center** key.

Toggle key operation

ΔMarker On/Off (On)	Indicates that you need to touch the **ΔMarker On/Off** key to turn on the ΔMarker.

NOTE: Screen displays and diagrams such as external view of the main unit in this manual are those of the R3681 in the R3681 series.

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2. BEFORE OPERATING

This chapter describes important information on using this instrument. Read this chapter before using this instrument.

2.1 If a Fault Should Occur

If smoke, strange smells, or strange noises are detected, switch off the power, disconnect the power cable and contact either your dealer or Advantest immediately.

2.2 Removing the Case

The case should not be opened except by qualified Advantest service personnel.

WARNING: ***This instrument contains high-voltage and high-temperature parts. Electrical shocks or burns may result if handled incorrectly.***

2.3 Overcurrent Protection

This instrument is protected from overcurrent flow by a power breaker. Located on the rear panel, the power breaker automatically interrupts the power supply when an overcurrent flows through this instrument. When the power breaker has turned off, turn off the power supply and disconnect the power cable from the AC power. Then, call upon your dealer or us for repair services to fix a possible fault that has occurred in this instrument.

2.4 Hard Disk Drive

This instrument has a built-in hard disk drive. When handling the hard disk drive, take notice of these instructions.

- Do not cause impact or vibration damage to the hard disk drive.
  Damaging the disk increasing the chances of the disk malfunctioning or failing during operation.
- Do not switch off this instrument while the HDD access lamp is lit.
  The data being accessed may become corrupt.

CAUTION: ***We do not assume any responsibility for the loss or corruption of data stored on the hard disk drive that might result from the disk becoming damaged.***

2.5 Handling the Touch Screen

This instrument has a touch screen. When handling the touch screen, take notice of these instructions.

- Do not give apply excessive force to the screen. The screen is made from glass and may crack.
- Use the stylus pen included with this instrument to operate the screen. Using a tool with a hard-point (such as a mechanical pencil or ballpoint) may scratch the screen surface.

2.6 Getting the Software Running with Stability

The R3681 Series Signal Analyzer has Microsoft Windows XP pre-installed.

The measuring function of this instrument is dependent on the Windows environment. Do not alter the Windows operating environment in any way other than as described in this manual.
This instrument is not a data processor. Operate it only as described in this manual.

1. Prohibited actions
   - Installing other application programs.
   - Changing or deleting items in the control panel (except as described in "A.2 Installing the Printer Driver" and "A.3 Setting up the Network" of R3681 Series User's Guide).
   - Creating new files or editing existing files on the C drive.
   - Operating other application programs during the measurement.
   - Upgrading the Windows operating system.
   - If this instrument functions incorrectly because of any of the above, re-install the system using the system recovery disk.
     For more information on the system recovery procedure, refer to section 8.7, "System Recovery Procedure" in the R3681 Series User's Guide.
2. Computer viruses

   Depending on the operating environment, the system may become infected by a computer virus. To protect the system, we recommended taking the following countermeasures:
   - Perform a virus check before loading any file or inserting any media from an outside source.
   - Make sure that any network used has safety measures against computer viruses before connecting this instrument.

   [If infected with a computer virus:]
   - Delete all files on the D drive. Re-install the system using the recovery disk.
     For more information on the system recovery procedure, refer to section 8.7, "System Recovery Procedure" of R3681 Series User's Guide.

2.7 Transporting

Extreme care as described below must be taken when carrying this instrument.

- This instrument is heavy and must be carried by two or more persons, or on a transportation cart.
- If using a cart to move this instrument, ensure the instrument is secure.

2.8 Electromagnetic Interference

This instrument may cause electromagnetic interference and affect television and radio reception.
If the electromagnetic interference is reduced when this instrument's is turned off, then this instrument is the cause of the problem.
Electromagnetic interference may be prevented by doing the following:

- Changing the direction of the antenna of the television or radio.
- Placing this instrument on the other side of the television or radio.
- Placing this instrument away from the television or radio.
- Using different lines power outlets for this instrument and the television or radio.

2.9 Before Turning On

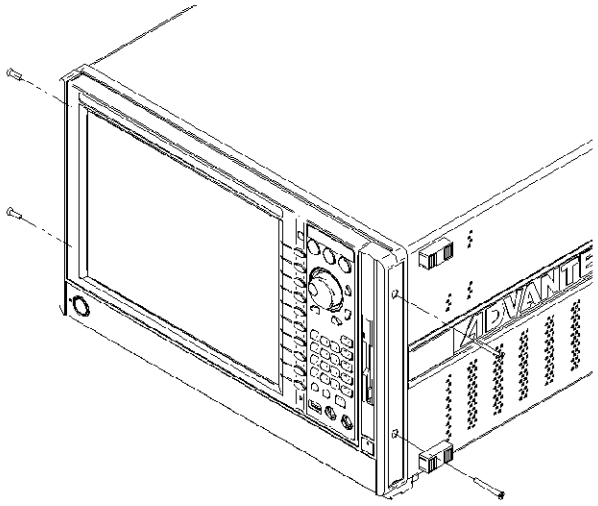
Do not connect a DUT to this instrument when turning on.

2.10 Removing and Attaching the Front Panel

This instrument can be used separately after removing the panel.
When removing the panel, take notice of these instructions.

MEMO: ***To use this instrument after removing the panel, a connecting cable is required (sold separately).***

- If this instrument's power is turned on, make sure that this instrument has stopped operating, turn off the power, and remove the power cable.
- When removing or attaching the panel, take care not to catch your fingers.
- Place this instrument on a flat and steady table when removing or attaching the panel.
- Remove the four screws that are exposed on the side of the front panel of this instrument.
- When removing the screws, steady the panel so that it will not fall.
- After all four screws have been removed, pull the panel forward.
- Remove the cable connecting the panel to the instrument.
- Replace the cable with an appropriate cable.
- If any screws become lost, use the following types of screw.
  - For the 2 screws on the key side: flat-head Phillips screws M4X35 (steel or stainless steel)
  - For the 2 screws on the liquid-crystal display: flat-head Phillips screws M4X14 (steel or stainless steel)



2.11 Limitations Imposed when Using Windows XP

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3. SETUP

This chapter describes how to set up this instrument. Topics included in this chapter are:

3.1 Unpacking Inspection

When the product is delivered, check the condition of it and its accessories included by following these steps:

1. Check that the box and the padding in which the product was shipped has not been damaged during transit.

   IMPORTANT: ***If the box or the padding is damaged, leave them in their original condition until the inspection described below is complete.***

2. Check the product surfaces for any damage.

   WARNING: ***Do not supply any power to this instrument if the cover, panels (front and rear), LCD display, power switch, connector or any other key component are damaged. Electrical shocks may result from using damaged components.***

3. Referring to the standard accessory list of the OPT52 in Table 3-1, check that all standard accessories have been supplied and that no accessories are damaged.

   Contact your dealer or Advantest in any of the following situations:

   - The box or the padding in which the product was shipped was damaged during transit.
   - The product surfaces are damaged.
   - Any of the standard accessories are missing or damaged.
   - Faults are detected in any subsequent product verification test.

Table 3-1 Standard Accessories

Name	Model	Quantity	Remarks
R3681 Series OPT52 User's Guide	ER3681OPT52	1	English version

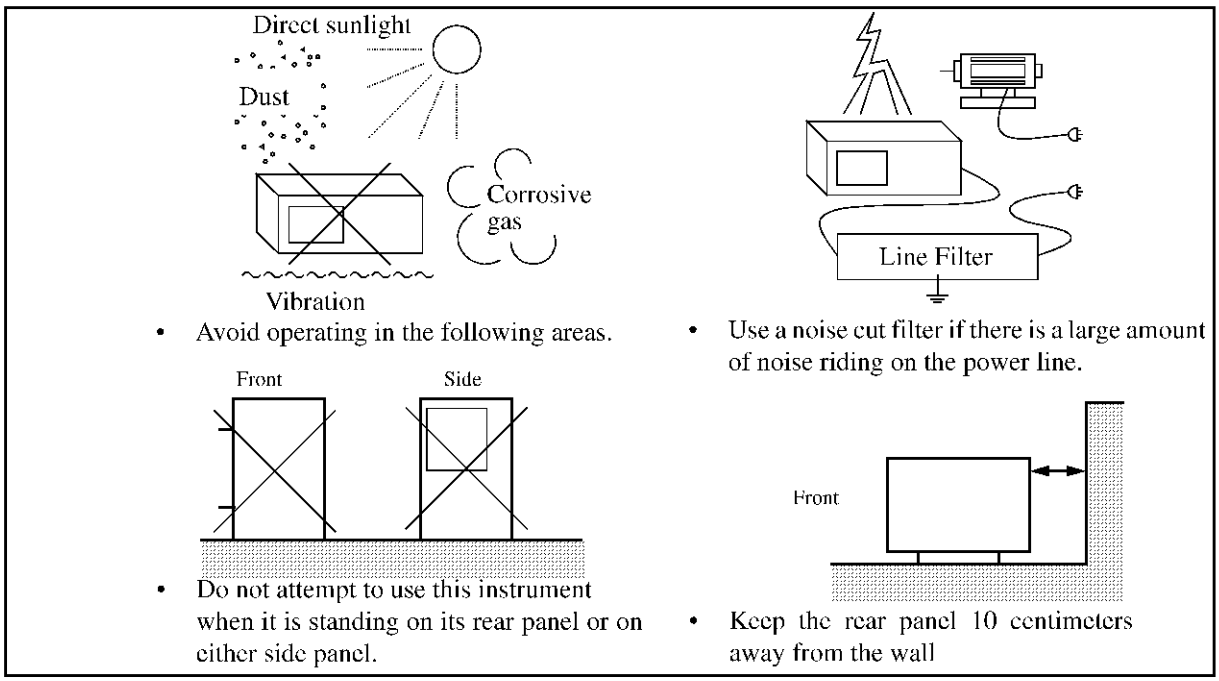
3.2 Locating This Instrument

This section describes the environment in which this instrument should be installed.

3.2.1 Operating Environment

This instrument should only be used in an environment that satisfies the following conditions:

- Ambient temperature: +5 °C to +40 °C (operating temperature)
  -20 °C to +60 °C (Storage temperature range)
- Relative humidity: RH80% or less (no condensation)
- An area free from corrosive gas
- An area away from direct sunlight
- A area free from dust
- An area free from vibrations
- A low noise area
  Although this instrument has been designed to withstand a certain amount of noise riding on the AC power line, it should be used in an area of low noise. Use a noise filter if ambient noise is unavoidable.
- An area allowing unobstructed airflow
  There is an exhaust-cooling fan on the rear panel and exhaust vents on both sides and the bottom (toward the front) of this instrument. Do not block these vents. The resulting internal temperature rise will affect measurement accuracy. Keep the rear panel 10 centimeters away from the wall. In addition, do not attempt to use this instrument when it is standing on its rear panel or lying on either side.



- Avoid operating in the following areas.
- Use a noise cut filter if there is a large amount of noise riding on the power line.
- Do not attempt to use this instrument when it is standing on its rear panel or on either side panel.
- Keep the rear panel 10 centimeters away from the wall

Figure 3-1 Operating Environment

3.2.2 Prevention of Electrostatic Buildup

To prevent electrostatic discharge (ESD) from damaging components in this instrument, the precautions described below should be taken. We recommend that two or more countermeasures are combined to provide adequate protection from ESD.
(Static electricity can easily be generated when a person moves or an insulator is rubbed.)

Table 3-2 ESD Countermeasures

Operator	Use a wrist strap (see Figure 3-2).
Floor in the work area	Install a conductive mat, use conductive shoes, and connect both to ground (see Figure 3-3).
Workbench	Install a conductive mat and connect it to ground (see Figure 3-4).

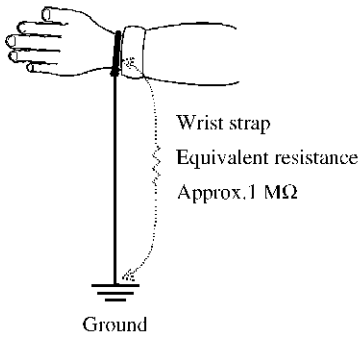


Figure 3-2 Countermeasures against Static Electricity from the Human Body

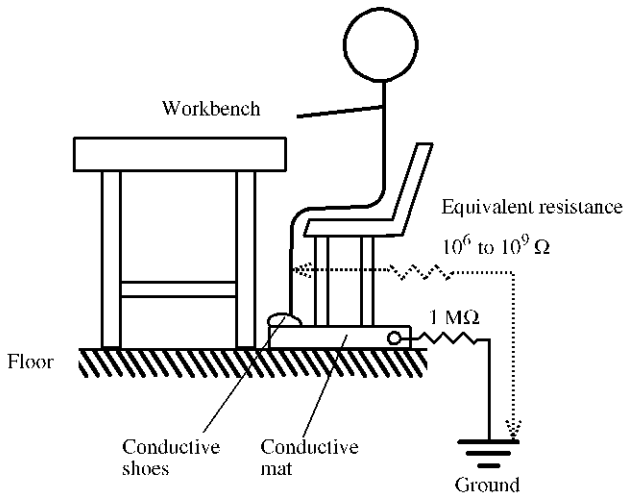


Figure 3-3 Countermeasures against Static Electricity from the Work Floor

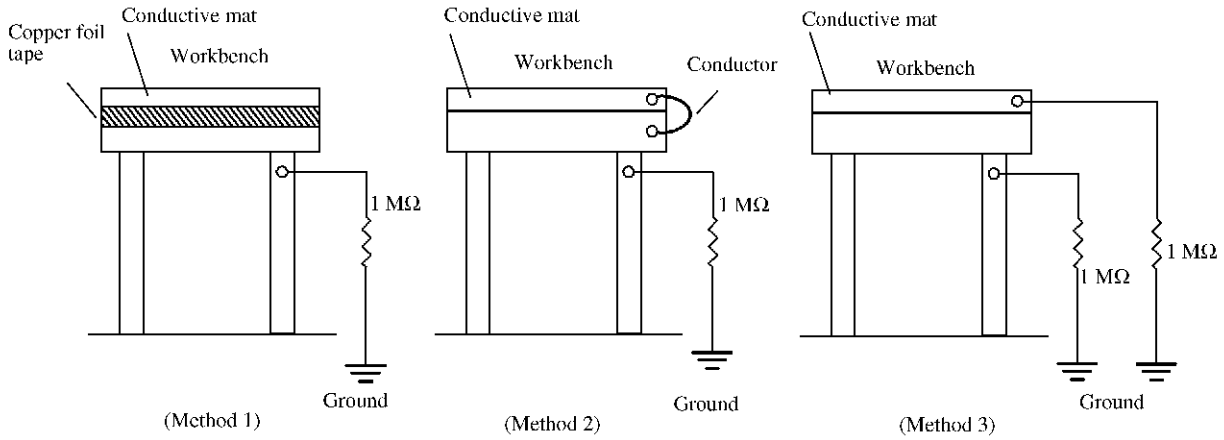


Figure 3-4 Countermeasures against Static Electricity from the Workbench

3.3 Connecting Accessories

This section describes how to connect accessories to this instrument and run it.

3.3.1 Connecting the Keyboard and Mouse

Plug the keyboard and mouse into their respective front-panel connectors before turning on this instrument.

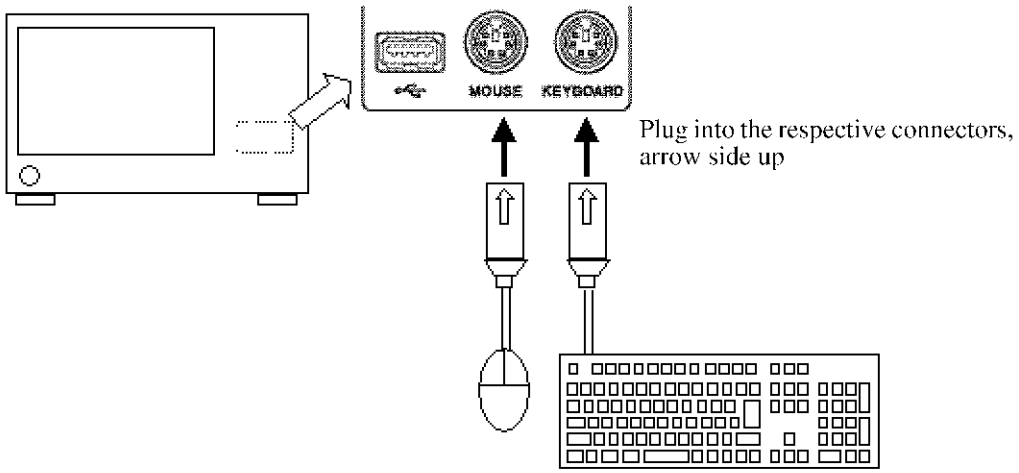


Figure 3-5 Connecting the Keyboard and Mouse

3.4 Supply Description

This section describes how to check the power supply specifications and connect the power cable.

3.4.1 Check the Supply Power

Table 3-3 summarizes the power supply specifications for this instrument. Make sure that the power supply available to this instrument meets these specifications.

Table 3-3 Power Supply Specifications

	100 V AC Operation	200 V AC Operation	Remarks
Input voltage range	90 V to 132 V	198 V to 250 V	Automatically switches between input levels of 100 V AC and 200 V AC.
Frequency range	47 Hz to 63 Hz		
Power consumption	450 VA or below		

WARNING: ***Be sure to provide a power supply that meets the specified power supply specifications for this instrument. Failure to meet the specifications could cause damage to this instrument.***

3.4.2 Connecting the Power Cable

This instrument comes with a three-core power cable with a ground conductor. To prevent electrical shock hazards, ground this instrument by plugging the power cable into a three-pole power outlet.

1. Check the power cable included with this instrument for any damage.

   WARNING: ***Never use a damaged power cable. Electrical shock could result.***

2. Plug one end of the power cable included with this instrument into the AC power connector on this instrument rear panel and the other into a three-pin power outlet that has a ground pin (see Figure 3-6).

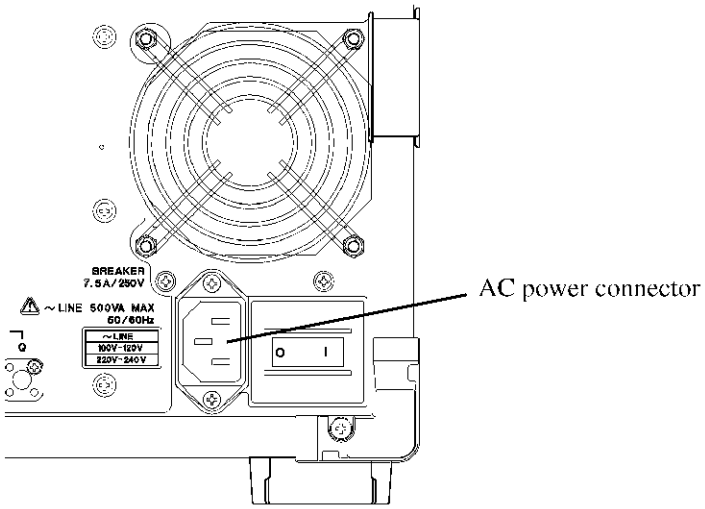


Figure 3-6 Connecting the Power Cable

WARNING:

1. ***Use a power cable rated for the voltage being used. Be sure, however, to use a power cable that conforms to the safety standards of your country when using this instrument (Refer to "Safety Summary").***
2. ***Plug the power cable into a three-pin power outlet that has a ground pin to prevent electrical shocks. Using an extension cable that has no ground pin would negate having a ground.***

3.5 Operation Check

This section describes how to make a simple operation check on this instrument by using its built-in autocalibration feature. To verify that this instrument runs correctly, follow these steps:

Starting up this instrument

1. Connect the power cable as instructed in 3.4.2 "Connecting the Power Cable."
2. Switch on the power breaker on the rear panel and wait for 3 seconds or more.
3. Press the **POWER** switch to switch on the power.

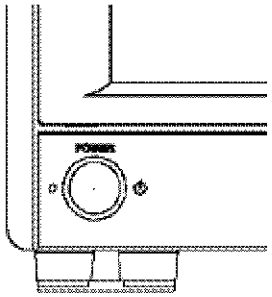


Figure 3-7 **POWER** Switch

CAUTION:

1. ***If the power to this instrument is suddenly interrupted while the unit is in operation, such as is the power cable is disconnected, the hard disk drive could be damaged. Even if the hard disk drive does not fail, Scandisk launches to check for possible data corruption the next time this instrument starts up.***
2. ***About Scandisk***
   If this instrument has been switched off without being shut down, Scandisk will automatically launch to check for any corrupt data. Do not abort Scandisk while it is running. If Scandisk locates any corrupt data, take appropriate action by following the displayed messages. The software in this instrument resumes automatically when Scandisk ends.

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4. The power-on diagnostic program launches to carry out self-diagnostics.
   The self-diagnostic program take about 1 minute to complete.
5. The initial screen shown in Figure 3-8 is displayed unless this instrument is faulty. The initial screen may give look differently from Figure 3-8, depending on the settings in effect the last time this instrument was switched off.

NOTE: ***Refer to Chapter 8, "MAINTENANCE" of R3681 Series User's Guide if any error messages are displayed as a result of the self-diagnostic program.***

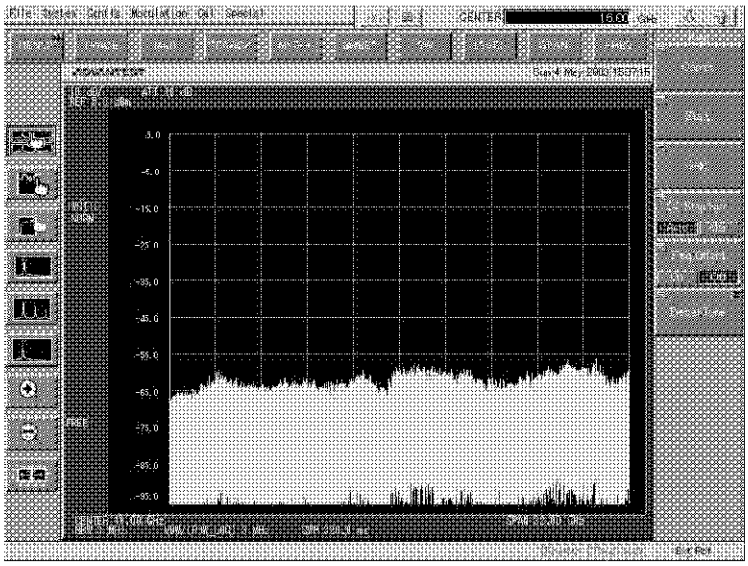


Figure 3-8 Initial Setup Screen

Running autocalibration

6. <R3681>
Install this instrument as shown in Figure 3-9 by using the SMA (f)-SMA (f) adapter, SMA (m)-BNC (f) adapter, and input cable (A01261-30) that come with this instrument as standard.

<R3671>
Hook up this instrument as shown in Figure 3-9 by using the N (m)-BNC (f) adapter, and input cable (A01261-30) that come with this instrument as standard.

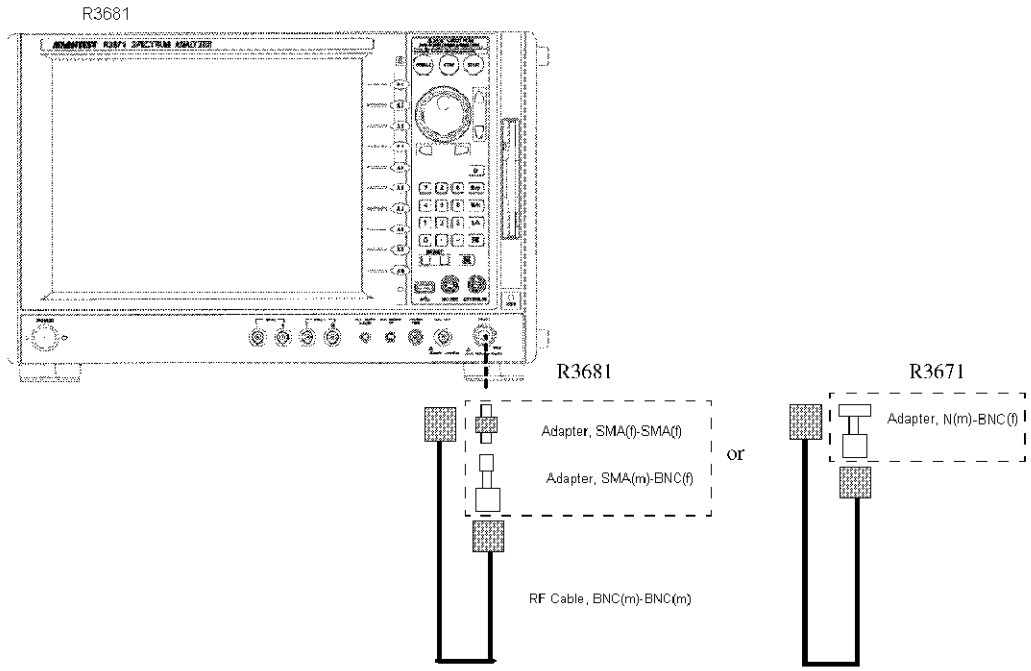


Figure 3-9 Autocalibration

IMPORTANT: ***Allow this instrument to warm up for at least 30 minutes before running the autocalibration. For more information on how to use the autocalibration, refer to Section 4.3.1, "Autocalibration" of the R3681 Series User's Guide.***

---

7. Touch the **[Cal]** button on this instrument's menu bar to select **[SA Cal]** from the dropdown menu.

8. Autocalibration runs.
   The autocalibration takes about 1 minute to complete.

9. Make sure that no error messages are displayed as a result of the autocalibration.

MEMO: ***Refer to Chapter 8, "MAINTENANCE" of the R3681 Series User's Guide if error messages are displayed as a result of the autocalibration.***

Switching off power

10. Press **POWER** to switch off this instrument.
    The final procedure is complete and the power is automatically turned off.

4. MEASUREMENT EXAMPLES (Downlink)

This chapter describes how to use this option by using specific measurement examples.

4.1 Code Domain Power Measurement of the Base Station Signal

Specifications of signal to be measured

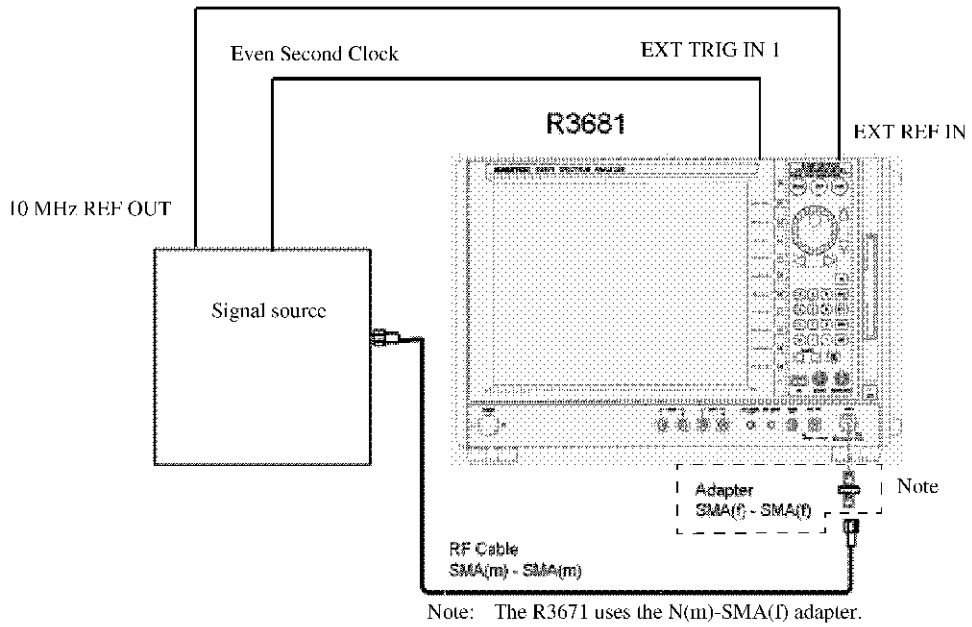
The target signal is the signal based on the IS-97 Base Station Test Model, Nominal, with a frequency of 870.03 MHz and an output level of -10 dBm. The specifications assume that the Even Second Clock, the 10-MHz reference signal, and the signal to be measured are output from the base station.

Table 4-1 Signal Specifications

RC1, Walsh Code Length 64, PN Offset 0

Channel	Walsh Code No.
Pilot	0
Paging	1
Traffic	6
Traffic	17
Traffic	20
Sync	32
Traffic	41
Traffic	49
Traffic	58

Device connection



Note: The R3671 uses the N(m)-SMA(f) adapter.

Figure 4-1 Connection Diagram of Base-Station Code-Domain-Power Measurement

[Setting the measuring conditions]

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[cdma2000 DL]**.
3. Touch the **{FREQ}** button on the function bar.
4. Touch the **Center** key on the soft menu bar.
5. Touch **8**, **7**, **0**, **.**, **0**, **3**, and **M/n** in this order on the keypad.
   The center frequency is set to 870.03 MHz.
6. Touch the **{LEVEL}** button on the function bar.
7. Touch the **Auto Level Set** key on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
8. Touch the **{TRIGGER}** button on the function bar.
9. Touch the **Trigger Source** key on the soft menu bar.
10. Touch the **Ext1** key on the soft menu bar.
    The trigger source is set to the external trigger.
11. Touch the **{INPUT}** button on the function bar.

12. Touch the **Input Setup** key on the soft menu bar.
    The **[Input Setup]** dialog box appears.
13. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The Input mode is set to RF.
14. Touch the close button ✕ in the **[Input Setup]** dialog box to close the dialog box.

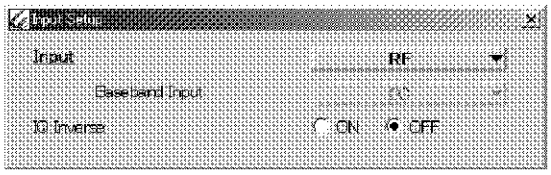


Figure 4-2 **[Input Setup]** Dialog Box

15. Touch the **{MEAS SETUP}** button on the function bar.
16. Touch the **Meas Parameters** key on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box appears.
17. Set the **[Meas Mode]** option button to **[cdma2000]**.
    The measurement mode is set to cdma2000.
18. Set the **[User Table]** option button to **[NOT USE]**.
    If this is set, the user table is not used.
19. Touch the **[Meas Length]** text box and press **2** and **ENT** on the keypad.
    The measurement length is set to the length of two power control groups (PCG).
20. Touch the **[τ Offset]** text box and press **0** and **ENT** on the keypad.
    The offset value of the Time Alignment Error is set to 0.
21. Set the **[Phase Equalizing Filter]** option button to **[ON]**.
    The phase characteristics of the complimentary filter are set to the inverse characteristics of the phase equalizer.
22. Set the **[PN Offset Search]** option button to **[OFF]**.
    The PN Offset search is set to OFF.
23. Touch the **[PN Offset]** text box and press **0** and **ENT** on the keypad.
    The PN Offset is set to 0.
24. Touch the **[Threshold Level]** text box and press **-**, **2**, **7**, and **ENT** on the keypad.
    The threshold value that is used for the transmission channel (active channel) judgment is set to -27 dB.

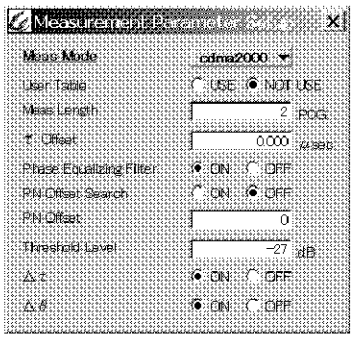


Figure 4-3 **[Measurement Parameter Setup]** Dialog Box

25. Set the [Δτ] option button to **[ON]**.
    Δτ is added to the measuring items.

26. Set the [Δθ] option button to **[ON]**.
    Δθ is added to the measuring items.

27. Touch the close button ⊠ in the **[Measurement Parameter Setup]** dialog box to close the dialog box.

28. Press the **SINGLE** button on the front panel.
    The Single measurement is executed, and the measurement results are displayed.

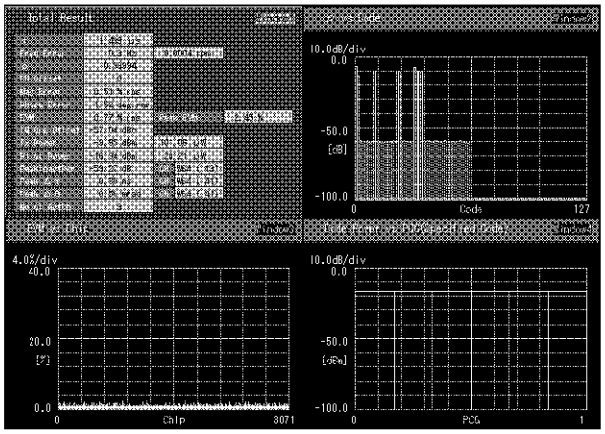


Figure 4-4 Measurement Results of the cdma2000 Base Station Signal

Upper left window

τ	Delay from the trigger (μs)
Freq Error	Carrier frequency error (Hz, ppm)
ρ	Waveform quality of the multiplex signal (If the measured signal is the pilot channel signal only, the value of the waveform quality factor, which is defined by the cdma2000 standard, is used.)

PN Offset		PN Offset of the base station signal
Mag Error		Magnitude error of the multiplex signal (%rms)
Phase Error		Phase error of the multiplex signal (deg.rms)
EVM		Error Vector Magnitude of the multiplex signal (%rms)
Peak EVM		Peak Error Vector Magnitude of the multiplex signal (%)
IQ Org Offset		IQ origin offset (dBc)
Tx Power		Transmission power (dBm, W)
Pilot Power		Power of the pilot channel (dBm, W)
Peak Inact Pwr	CH	The maximum logarithmic value of the Code Domain Power coefficient of the inactive channel, the walsh code length, and the walsh code number of the inactive channel
Peak $\Delta\tau$	CH	The maximum value of the relative Walsh code domain time offset to the pilot channel, the Walsh code length, and the Walsh code number of the peak $\Delta\tau$ channel
Peak $\Delta\theta$	CH	The maximum value of the relative Walsh code domain phase offset to the pilot channel, the Walsh code length, and the Walsh code number of the peak $\Delta\theta$ channel
No of ActCh		Number of transmission channels

Upper right window

Horizontal axis: Code
Vertical axis: ρ (dB)

Lower left window

Horizontal axis: Chip
Vertical axis: Error Vector Magnitude (%)

Lower right window

Horizontal axis: Power control group
Vertical axis: Transmission power (dBm)

Marker display

29. Touch **[Window2]** and then touch the **{MKR}** button on the function bar.
30. Touch the **Active CH. Marker** key on the soft menu bar.
    The transmission channel (active channel) marker is displayed.

Walsh Code No.	Walsh Code number
Walsh Code Len	Walsh Code length (number of chips)

Rate	Symbol Rate (ksps)
Mod	Modulation format
ρ	Logarithmic value of the Code Domain Power coefficient (dB)
Power	Code Domain Power (dBm, W)
Δτ	Relative walsh code domain time offset to the pilot channel (ns)
Δθ	Relative walsh code domain phase offset to the pilot channel (mrad)

5. MENU MAP, FUNCTIONAL EXPLANATION (Downlink)

This chapter describes the configurations and functions of the soft keys displayed on the touch screen of the cdma2000 modulation analysis software.

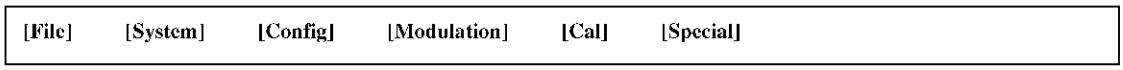
MEMO:

- [.....] *Used to enclose a menu name, key name, item name in the dialog box, button name, or the name of selected items in lists and menus.*
- {....} *Shows a function button on the function bar.*
- ▒▒▒▒▒ *Shows a soft key on the soft menu bar.*
- *A dialog box is surrounded by a broken line.*
- *Operations are supposed to be made through the touch screen and "touch" means to press a button or a key.*

5.1 Menu Index

5.2 Switching Communication Systems

The menu bar of this option is arranged as follows:



The menu bar consists of the same items as those of Spectrum Analyzer.

Select **[Modulation Analyzer]** from **[Config]** on the menu bar to select a modulation analysis function.

Select **[cdma2000 DL]** from **[Modulation]** on the menu bar to select the cdma2000Downlink modulation analysis function.

5.3 Function Bar

This section describes the functions of each function button displayed on the function bar. The configuration of the function buttons of this option is as follows:

When you click a function button on the function bar, the associated soft keys are displayed on the soft menu bar.

5.4 Soft Menu Bar

The area located on the right-hand side of the screen and in which soft keys are displayed is called the soft menu bar.

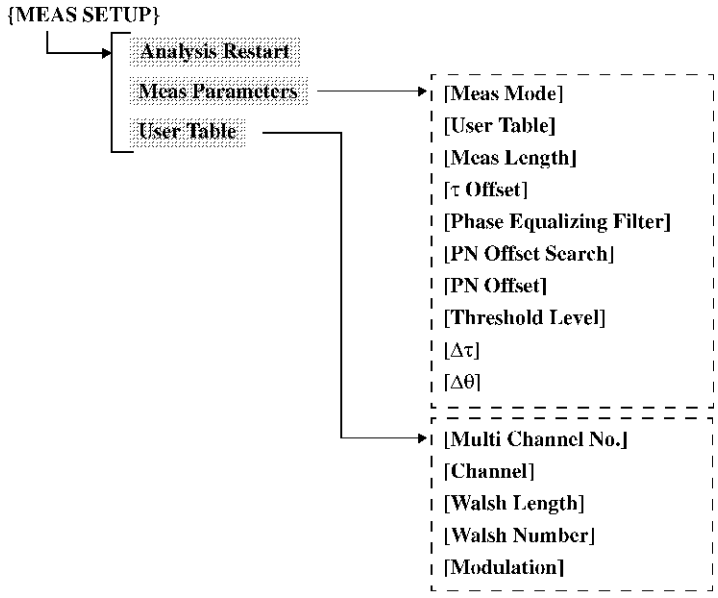
When you touch a button on the function bar, the associated soft keys are displayed on the soft menu bar.

5.5 Description of the Function of Each Key

This section describes the function of each key.

5.5.1 {MEAS SETUP}

When you touch the **{MEAS SETUP}** button, the soft keys related to the analysis parameter setting are displayed on the soft menu bar.



Analysis Restart — The measurement of the AD data, which has already been obtained, re-starts.

Meas Parameters — The dialog box used to set the measurement conditions appears.

[Meas Mode] — Sets the measurement method.

cdma2000:
Select this mode when measuring the cdma2000 signal. The order, in which the Walsh Code is displayed, is the Bit Reversal order.

cdmaOne:
Select this mode when measuring the cdmaOne signal. The order, in which the Walsh Code is displayed, is the Hadamard order.

[User Table] — Selects whether to perform analysis during the measurement by referring to the channel set by the user. Some channels are difficult to be determined as transmission channels by using the internal auto judgment function. Also, the function may determine incorrect transmission channels. By setting the channels in the user table, transmission channel determination errors can be reduced.

USE: Performs analysis according to the user table. The internal auto judgment function determines whether the channels, which are not defined in the user table, are used as transmission channels.

NOT USE: Automatically checks all channels and determines which channels are used as transmission channels.

[Meas Length] Sets the measurement length in units of PCG (power control group). 1 PCG is equivalent to 1536 chips.

MEMO:

1. ***If the measurement length in the x axis, which shows PCG or Chip in the graph, is shortened, the displayed area narrows. However, even if lengthened, the displayed area does not expand further than the set X scale.***
2. ***If the following is set,* [Meas Length] *can be set to only 4, 8, 12, or 16.***
   [User Table]: ***USE***
   User Table [Channel]: ***ACKCH***

[τ Offset] Sets the offset value of the τ (Time Alignment Error).

[Phase Equalizing Filter] Sets the phase equalizing filter to ON and OFF. If the output phase characteristics of the base station pass a phase equalizer that complies with IS-95, set this function to ON.

ON: Sets the phase equalizing filter to ON.

OFF: Sets the phase equalizing filter to OFF.

[PN Offset Search] Sets the PN Offset search to ON and OFF. If the signal has 64 of the maximum value of the Walsh length of the transmission channel and the PN Offset value of the base station is unknown, set this function to ON.

ON: Sets the PN Offset search to ON.

OFF: Sets the PN Offset search to OFF. The PN Offset of the measured signal must be set.

[PN Offset] Sets the PN Offset value of the base station. A value from 0 to 511 can be set.

[Threshold Level] Sets the threshold level to determine the transmission channel (active channel).

MEMO:

1. ***If the set threshold level is too high, an active channel is incorrectly determined as a non-active channel. Accordingly, the ρ and modulation accuracy values are less accurate than the actual values, and the measurement cannot be performed correctly.***
2. ***The transmission channel, which cannot be automatically determined as the transmission channel, is determined as an inactive channel even if its level is larger than Threshold Level. In this case, use the User Table function.***

[Δτ] Measures the delay time of each channel. The delay time for each channel is displayed as positive if the channel is delayed in rela-

tion to the pilot channel.

ON: Sets the Δτ measurement to ON.

OFF: Sets the Δτ measurement to OFF.

[Δθ] Measures the phase difference between each channel and the pilot channel.

ON: Sets the Δθ measurement to ON.

OFF: Sets the Δθ measurement to OFF.

User Table The User Table dialog box appears. The channels defined here are valid if **[User Table]** is set to USE.

[Multi Channel No.] Sets the number of channels to be defined.

[Channel] Sets a transmission channel name

The channels that can be set are CPCCH, QPCH, PDCCH, PDCH, GCH, RCCH, and ACKCH.

CPCCH: Common Power Control Channel

QPCH: Quick Paging Channel

PDCCH: Packet Data Control Channel

PDCH: Packet Data Channel

GCH: Grant Channel

RCCH: Rate Control Channel

ACKCH: Acknowledgemenet Channel

MEMO: ***Because the CPCCH, QPCH, GCH, RCCH, and ACKCH channels are not automatically determined as transmission channels, use the User Table function when measuring the signals which includes the channels mentioned above.***

[Walsh Length] Displays the Walsh Code length that corresponds to the transmission channel.

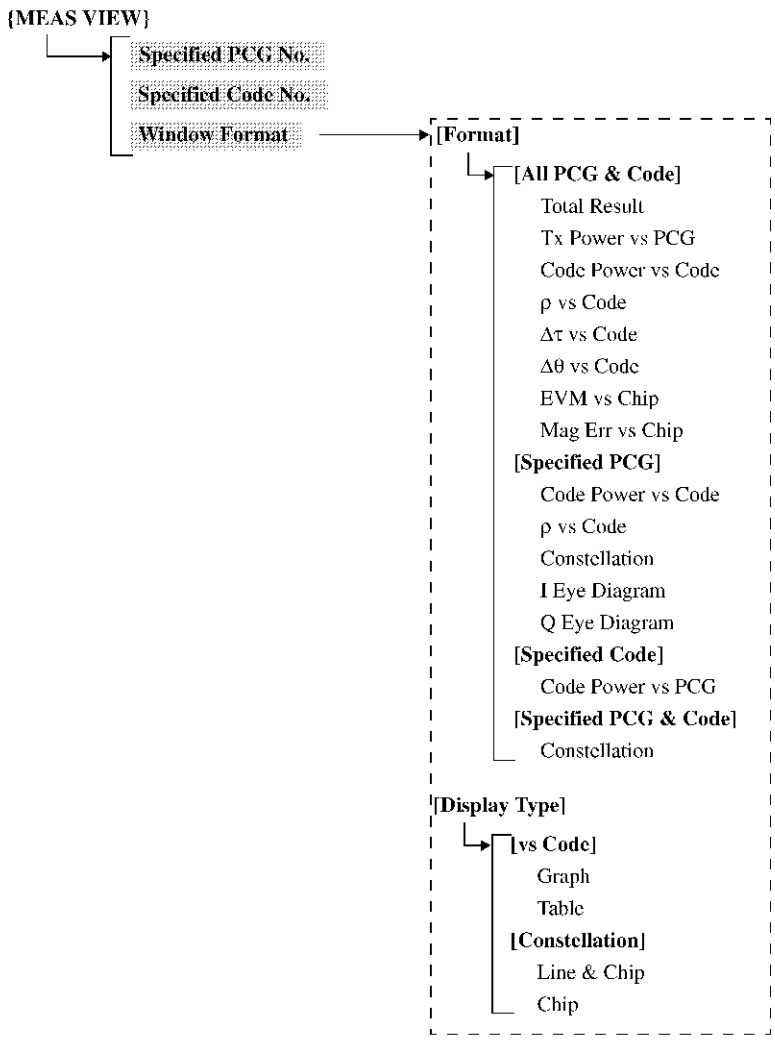
[Walsh Number] Sets the Walsh Code number.

[Modulation] Sets the modulation format. Valid only when **[Channel]** is set to PDCH.

MEMO: ***If the Walsh Code number is set to not satisfy the orthogonality between the different channels, a measurement error occurs.***

5.5.2 {MEAS VIEW}

When you touch the **{MEAS VIEW}** button, the soft keys related to the display screen setup are displayed on the soft menu bar.



Specified PCG No. Sets the PCG (power control group) number to display a graph.

Specified Code No. Sets the code number to display a graph.

Window Format Displays the dialog box to set the measurement result window.

[Format] Selects the measurement result window to be displayed.

[All PCG & Code] Performs the measurement on all PCG and all codes.

[Total Result] Displays the numerical results of the analyzed multiplex signal.

[Tx Power vs PCG]
Displays the power for each PCG (power control group).

[Code Power vs Code]
Displays the Code Domain Power of each code on a graph.

[ρ vs Code] Displays the ρ of each code on a graph.

[Δτ vs Code] Displays the amount of the delay of each code on a graph. Based on the pilot channel, the direction of the delay of each channel is displayed as the positive direction.

[Δθ vs Code] Displays the phase difference between each channel on a graph, based on the phase of the pilot channel.

[EVM vs Chip] Displays the EVM of each chip on a graph.

[Mag Err vs Chip]
Displays the magnitude error of each chip on a graph.

[Specified PCG] Performs measurement on the specified PCG only.

[Code Power vs Code]
Displays the Code Domain Power of each code on a graph.

[ρ vs Code] Displays the ρ of each code on a graph.

[Constellation] Displays the constellation.

[I Eye Diagram]
Displays the EYE pattern of the I signal.

[Q Eye Diagram]
Displays the EYE pattern of the Q signal.

[Specified Code] Performs measurement on the specified code only.

[Code Power vs PCG]
Displays the power for each PCG (power control group).

[Specified PCG & Code]
Performs the measurement on the specified PCG and code.

[Constellation] Displays the constellation.

[Display Type] Sets the display method of the graph, which is selected in **[Format]**.

[vs Code] Select whether to display each vs Code result of Code Power ρ, Δτ, and Δθ on graphs or in lists.

[Graph] Displays the results on graphs.

[Table] Displays the results in lists.

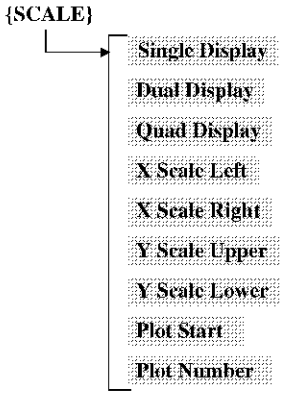
[Constellation] Selects whether to display the chip positions or to display both the chip positions and the transition from one chip position to another, when the **[Specified PCG]** Constellation on a graph is displayed.

[Line & Chip] Displays both the chip positions and the transition positions.

[Chip] Displays the chip positions only.

5.5.3 {SCALE}

When you touch the **{SCALE}** button, the soft keys related to the setup of the X-axis and Y-axis scales in the active display window are displayed on the soft menu bar.



Single Display — Displays a single window. When the 4-window display mode is set, the upper left window is zoomed.

Dual Display — Displays two windows. When the 4-window display mode is set, the upper two windows are zoomed.

Quad Display — Displays four windows.

X Scale Left — Sets the minimum value on the X axis.

X Scale Right — Sets the maximum value on the X axis.

Y Scale Upper — Sets the maximum value on the Y axis.

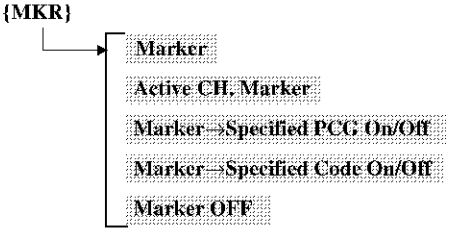
Y Scale Lower — Sets the minimum value on the Y axis.

Plot Start — Sets the position to start drawing when the Constellation and Eye Diagram are displayed.

Plot Number — Sets the drawing range when the Constellation and Eye Diagram are displayed.

5.5.4 {MKR}

When you touch the **{MKR}** button, the soft keys related to the marker setup are displayed on the soft menu bar.



Marker

Sets the X-axis position of the normal marker.

Active CH. Marker

Sets the code number of the transmission channel. Valid only when the graph, in which the X-axis is set to the code, is displayed.

Marker→Specified PCG On/Off

When the graph, which is selected by **[Specified PCG]** or **[Specified PCG & Code]**, is displayed, this function sets whether to couple the marker-indicated PCG, which is located on the Tx Power vs PCG graph or the Code Power vs PCG graph, and the PCG number, which is specified in the Specified PCG, together.

On: Turns on the coupling function.

Off: Turns off the coupling function.

Marker→Specified Code On/Off

When the graph, which is selected by **[Specified Code]** or **[Specified PCG & Code]**, is displayed, this function sets whether to couple the Active CH. Marker-indicated code number, which is located on the graph of Code Power vs Code, ρ vs Code, Δτ vs Code, and Δθ vs Code, and the code number, which is specified in the Specified Code, together.

On: Turns on the coupling function.

Off: Turns off the coupling function.

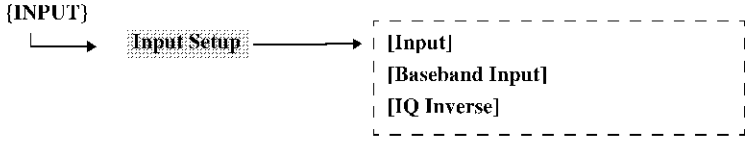
MEMO: ***For more information on how to use*** **Marker→Specified PCG On/Off** ***and*** **Marker→Specified Code On/Off** ***, refer to How to specify the PCG and Code by using the marker on the graph in A.1, "Technical Data."***

Marker OFF

Hides the marker.

5.5.5 {INPUT}

When you touch the **{INPUT}** key, the soft keys related to the setting up of the input format for the measuring instrument are displayed on the soft menu bar.



Input Setup

When you touch the **Input Setup** button, the dialog box for setting up the input format for the measuring instrument is displayed. Set up in accordance with the measurement signal.

[Input]

Sets the input channel for the signal.

RF: Sets the RF signal input.

Baseband (I&Q):
Sets the IQ signal (baseband) input.

[Baseband Input]

Sets the coupling for the IQ signal input.

AC: Selects the AC coupling.

DC: Selects the DC coupling.

[IQ Inverse]

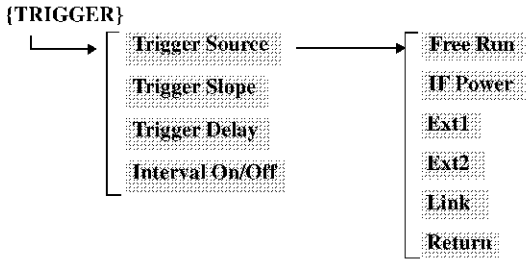
Selects whether or not to invert the phase of the signal to be measured.

ON: Inverts the signal.

OFF: Does not invert the signal.

5.5.6 {TRIGGER}

When you touch the **{TRIGGER}** button, the soft keys related to the trigger setup are displayed on the soft menu bar.



Trigger Source

When you touch the **Trigger Source** button, the soft keys related to the trigger setup are displayed on the soft menu bar.

Free Run

Obtains and analyzes data according to the internal timing of the measuring instrument.

IF Power

Obtains and analyzes data synchronized with the IF signal.

Ext1

Synchronizes the data reading with the external signal and analyzes the data entered into the EXT TRIG IN 1 connector. The threshold level for Ext1 is fixed to the TTL level.

Ext2

Synchronizes the data reading with the external signal and analyzes the data entered into the EXT TRIG IN 2 connector. The threshold level for Ext2 can be set.

Link

Obtains and analyzes data synchronizing with the trigger of an optional function.

MEMO: ***For information on how to use the link trigger, refer to the manual of the option in which the link trigger is used.***

Return

Returns to the previous soft key array on the soft menu bar.

Trigger Slope

Switches the polarity of the trigger slope.
Available only for IF Power, Ext1, and Ext2.

+: Starts sweeping at the rise of a trigger.

-: Starts sweeping at the fall of a trigger.

Trigger Delay

Sets the delay time from the trigger point. Is available only for IF Power, Ext1, and Ext2. When analyzing, the start position of AD data acquisition is shifted to the delay time.

Interval On/Off

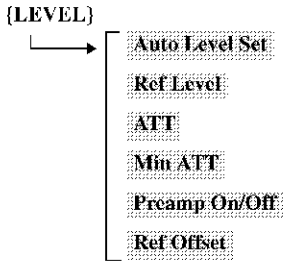
Sets whether to synchronize the trigger and the built-in counter, whose period is set to 80 ms.

On: Synchronizes them.

Off: Does not synchronize them.

5.5.7 {LEVEL}

When you touch the **{LEVEL}** button, the soft keys related to the setup of the attenuator and reference level are displayed on the soft menu bar.



Auto Level Set

Sets the reference level to the optimum value in accordance with the signal to be measured. When the key is pressed, Auto Level Set is executed.

CAUTION: ***While Auto Level Set is being executed, the level of the signal measured must remain constant.***

Ref Level

Sets the reference level.

ATT

Sets the attenuator.

Auto: Automatically sets the attenuator value based on the reference level.

Man: Sets the attenuator value.

Min ATT

Sets the Min ATT function ON and OFF.

On: Sets the minimum attenuator value and implements control regardless of whether ATT is Auto or Manual.

Off: Cancels the Min ATT limitation.

Preamp On/Off

Sets the preamplifier function ON and OFF.

Ref Offset

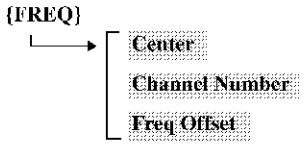
Switches the reference level offset function ON and OFF.

On: Sets the offset value and changes only the displayed reference level by the offset value.
(Displayed reference level = Set value + Offset value)

Off: Cancels the offset function.

5.5.8 {FREQ}

When you touch the **{FREQ}** button, the soft keys related to the measurement frequency setup are displayed on the soft menu bar.



Center

Sets the center frequency of the measurement signal.

CAUTION: ***Set the center frequency correctly. If it is set incorrectly, an error may occur in the center frequency error measurement and the measurement may be incorrect.***

Channel Number

When the channel number is set, the center frequency is automatically set by using the following formula.

(Center frequency) = (Channel interval) × (Channel number + Channel offset) + (Start frequency)

The parameters such as the channel interval and the channel number setting range depend on the Standard selected by **[Special]** → **[STD...]**. For more information, refer to the R3681 Series User's Guide.

Freq Offset

Switches the center frequency offset function ON and OFF.

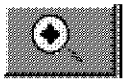
On: Sets the offset value and changes only the displayed center frequency by the offset value.
(Displayed center frequency = Set value + Offset value)

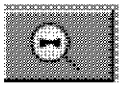
Off: Cancels the offset function.

5.5.9 Measurement Tool Bar

The functions of waveform range selection, active window selection, and so on are displayed as icons.

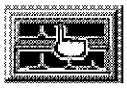
The following functions can be used by touching the icons:


: Zoom in icon: Used to zoom in on the waveform displayed in the window. The range specified by the range specification icon is zoomed in on by touching on the range.


: Zoom out icon: Used to zoom out from the waveform displayed in the window.


: Range specification icon (X-axis mode):
Used to specify a range in the window in which the waveform is displayed. After touching the icon, specify the range by touching two points on the graph.


: Range specification icon (range mode):
Used to specify a range in the window in which the waveform is displayed. Specify the upper-left and lower-right corners of the range by touching the display.


: Active window switching icon:
Used to make one of the split windows active.


: Range shift icon: Used to shift the display position without changing the display range. After touching the icon, touch the inside of the graph frame in the direction to be shifted.

6. SCPI COMMAND REFERENCE (Downlink)

This chapter describes the SCPI command reference for this instrument.

6.1 Command Reference Format

This section describes the format and layout used to describe commands in this chapter.

Each description includes the following items:

Function description

SCPI command

Parameter

Query reply

- [Function description]

  The usage of commands and operations in this instrument.

- [SCPI command]

  The SCPI command displays the syntax of a command sent from the external controller to this instrument. The syntax consists of a command and a number of parameters. The command and the parameters are separated by a space.

  If a command has multiple parameters, they are separated by commas (,). The three points (...) displayed between commas represent the parameter(s) omitted at that position.

  For example, the description <numeric value 1>,..., <numeric value 4> shows that four parameters, <numeric value 1>, <numeric value 2>, <numeric value 3>, and <numeric value 4>, are required.

  If the parameter is a character string type such as <character string>,<character string 1>, the parameter must be enclosed in double quotation marks (" "). If the parameter is <block>, it shows the block format data.

  Text written in lowercase alphabetic characters in the syntax can be omitted.

  For example, ":CALibration:CABLe" can be abbreviated to ":CAL:CABL."

  The marks used in the syntax are defined as follows:

< >:	Shows a parameter required for sending a command
[ ] :	Shows that the command is optional It can be omitted
{ }:	Shows that only one item is required to be selected from multiple items
|:	Used as a delimiter for multiple items written in curly brackets {..}
<ch>:	Written in the command header and shows the target input channel number of the command The channel number can be omitted. However, when it is written, channel number 1 is selected
<screen>:	Written in the command header and shows the target screen number of the command The screen number can be omitted. However, when it is written, a value from 1 to 4 can be selected [{1|2|3|4}]

For example: If the syntax below is specified, :CALC:CORR:EDEL:TIME 0.1 and : CALCULATE1:SELECTED:CORR:EDEL:TIME 25E-3 are valid.

Syntax: CALCulate{[1]|2|3|4}[:SELected]:CORRection:EDELay:TIME <numeric value>

- [Parameter]

  Describes a parameter required for sending a command.

  If the parameter is numeric type or alphabetic, it is enclosed in angle brackets (< >).

  If the parameter is optional, it is enclosed in curly brackets ({ }).

  In this manual, parameter types are described in the following formats:

  < int >: A numeric value that can be input in the format NR1, NR2, or NR3 and rounded to an integer in this instrument

  < real >: A numeric value that can be input in the format NR1, NR2, or NR3 and rounded to a valid-digit real number in this instrument

  < bool >: Either OFF or ON can be entered.

  < str >: A character string enclosed in quotation (' ') or double quotation (" ") marks.

  <block>: Block data type
  The data content is an 8-bit binary data array

  < type >: Character data selected from multiple types

- [Query reply]

  When there is a query reply to the command, the data format used for reading the query is described.

  Each parameter to be read is enclosed in curly brackets ({ }). If multiple items, which are delimited by a vertical bar (|), exist in curly brackets ({ }), only one of those items is read out. If parameters are delimited by commas (,) multiple parameters can be read out. The three points (...) displayed between commas represent data omitted from that position. For example, the description {numeric value 1},..., {numeric value 4} shows that four parameters {numeric value 1}, {numeric value 2}, {numeric value 3}, and {numeric value 4} are read.

  If the parameter to be read is enclosed in square brackets ([ ]), the parameter may be omitted, depending on the measurement result, etc.

  If the parameter to be read is a value in a unit, a description such as "Unit: dBm" is added to display the unit of the parameter value. However, only when the parameter is described in a level unit "dBm", the level unit selected at that time will be applied to the parameter.

6.2 Common Commands

This section describes common IEEE commands.

Function description	SCPI Command	Parameter	Query reply	Remarks
Clears the status byte and related data	*CLS	-	-	
Macro definition for GET	*DDT	<block>	<block>	*1
Sets the standard event status enable register	*ESE	<int>	<int>	
Reads the standard event status register	*ESR?	-	<int>	
Device inquiry	*IDN?	-	<str>	*2
Notifies when all running operations are complete	*OPC	-	1	
Loads the device settings	*RCL	<int> | POFF	-	*3
Resets the device	*RST	-	-	
Saves the device settings	*SAV	<int>	<int>	
Sets the service request enable register	*SRE	<int>	<int>	
Reads the status byte register	*STB?	-	<int>	
Triggers the device	*TRG	-	-	
Waits until all running operations are complete	*WAI	-	-	

*1: If the *DDT? command is executed when the macro is undefined, a zero-length block data (#10) is returned.
*2: <str> is output in the following format: maker name, model name, serial number and version number.
*3: POFF indicates the parameter settings when the power was last switched off.

6.3 List of Commands

6.3.1 Subsystem-SYSTem

Function description	SCPI command	Parameter	Query reply	Remarks
Config				
Measurement system selection	:SYSTem:SELect	SANalyzer|MANalyzer	SAN|MAN	
Modulation				
Modulation analysis system selection	:SYSTem:SELect:MODulation	CDMA2KDL	CDMA2KDL	
Preset				
Each measurement system parameter initialization	:SYSTem:PRESet	–	–	
All measurement systems initialization	:SYSTem:PRESet:ALL	–	–	
Log				
Inquiry about the error that occurred last	:SYSTem:ERRor?	–	<int>,<str>	
Inquiry about the details of the error log	:SYSTem:ERRor:ALL?	–	<int>,<str>	

6.3.2 Subsystem-INPut

Function description	SCPI command	Parameter	Query reply	Remarks
ATT/Preamp				
ATT setting (Manual)	:INPut:ATTenuation	<real>	<real>	
ATT (Auto/Manual)	:INPut:ATTenuation:AUTO	OFF|ON	OFF|ON	
Min ATT setting	:INPut:ATTenuation:MINimum	<real>	<real>	
Min ATT ON/OFF	:INPut:ATTenuation:MINimum:STATe	OFF|ON	OFF|ON	
Preamp ON/OFF	:INPut:GAIN:STATe	OFF|ON	OFF|ON	
Input Setup				
Input Signal RF/Baseband	:INPut:SIGNal	RF|BASeband	RF|BAS	
Baseband Input AC/DC	:INPut:BASeband	AC|DC	AC|DC	
IQ Inverse ON/OFF	:INPut:IQ:INVerse	OFF|ON	OFF|ON	

6.3.3 Subsystem-SENSe

Function description	SCPI command	Parameter	Query reply	Remarks
FREQuency				
Center Freq setting	[:SENSe]:FREQuency:CENTer	<real>	<real>	
Freq Offset setting	[:SENSe]:FREQuency:OFFSet	<real>	<real>	
Freq Offset ON/OFF	[:SENSe]:FREQuency:OFFSet:STATe	OFF|ON	OFF|ON	
Channel Number setting	[:SENSe]:FREQuency:CHANnel:NUMBer	<int>	<int>	
Auto Level Set				
Auto Level Set execution	[:SENSe]:POWer:LEVel:AUTO	–	–	
Meas Parameters				
Measurement mode setting	[:SENSe]:CONDition:MMODe	CDMA2K| CDMAONE	CDMA2K| CDMAONE	
User Table NOT USE/USE	[:SENSe]:CONDition:UTABle	NOT|USE	NOT|USE	
Meas Length setting	[:SENSe]:CONDition:MLENgth	<int>	<int>	
τ (Time Alignment Error) offset setting	[:SENSe]:CONDition:TOFFset	<real>	<real>	
Phase Equalizing Filter ON/OFF	[:SENSe]:CONDition:PFILter	OFF|ON	OFF|ON	
PN Offset Search ON/OFF	[:SENSe]:CONDition:PNSearch	OFF|ON	OFF|ON	
PN Offset value setting	[:SENSe]:CONDition:PNOFfset	<int>	<int>	
Threshold Level setting	[:SENSe]:CONDition:THReshold	<real>	<real>	
Δτ ON/OFF	[:SENSe]:CONDition:DTAU	OFF|ON	OFF|ON	
Δθ ON/OFF	[:SENSe]:CONDition:DTHeta	OFF|ON	OFF|ON	
User Table				
Multi Channel Number setting	[:SENSe]:CONDition:UTABle:MCNumber	<int>	<int>	
Channel setting	[:SENSe]:CONDition:UTABle:CHANnel <utbl=1 to 48>	CPCCH|QPCH| PDCCH|PDCH| GCH|RCCH| ACKCH	CPCCH|QPCH| PDCCH|PDCH| GCH|RCCH| ACKCH	
Walsh Number setting	[:SENSe]:CONDition:UTABle:WCNumber <utbl=1 to 48>	<int>	<int>	
Modulation setting	[:SENSe]:CONDition:UTABle:MODulation <utbl=1 to 48>	QPSK|PSK8| QAM16| QPSKPSK8| QPSKQAM16| PSK8QAM16| QPSKPSK8QAM16	QPSK|PSK8| QAM16| QPSKPSK8| QPSKQAM16| PSK8QAM16| QPSKPSK8QAM16	

6.3.4 Subsystem-TRIGger

Function description	SCPI command	Parameter	Query reply	Remarks
SEQuence				
Trigger Source	:TRIGger[:SEQuence]:SOURce	IMMediate|IF| EXTernal1| EXTernal2|LINK	IMM|IF|EXT1| EXT2|LINK	
Trigger Slope	:TRIGger[:SEQuence]:SLOPe	POSitive| NEGative	POS|NEG	
IF Power setting	:TRIGger[:SEQuence]:LEVel:IF	<real>	<real>	
Ext2 Trigger Level setting	:TRIGger[:SEQuence]:LEVel:EXTernal	<real>	<real>	
Trigger Delay setting	:TRIGger[:SEQuence]:DELay	<real>	<real>	
Interval Trigger setting	:TRIGger[:SEQuence]:INTerval:STATe	OFF|ON	OFF|ON	

6.3.5 Subsystem-INITiate

Function description	SCPI command	Parameter	Query reply	Remarks
INITiate				
Single measurement execution	:INITiate:MEASure:SINGle	–	–	
Repeat measurement execution	:INITiate:MEASure:REPeat	–	–	
Analysis Restart execution	:INITiate:RESTart	–	–	
Stop execution (measurement stop)	:INITiate:ABORt	–	–	

6.3.6 Subsystem-CALCulate

Function description	SCPI command	Parameter	Query reply	Remarks
MARKer				
Marker ON/OFF	:CALCulate:MARKer<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Marker X setting	:CALCulate:MARKer<scrn=1|2|3|4>:X	<real>	<real>	
Marker Y reading	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	
Constellation Marker Plot setting	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP :CALCulate:MARKer<scrn=1|2|3|4>:SYMBol	<int>	<int>	
Constellation I reading	:CALCulate:MARKer<scrn=1|2|3|4>:I	–	<real>	
Constellation Q reading	:CALCulate:MARKer<scrn=1|2|3|4>:Q	–	<real>	
Specified PCG coupling ON/OFF	:CALCulate:MARKer:SET:PCG[:STATe]	OFF|ON	OFF|ON	
Specified Code coupling ON/OFF	:CALCulate:MARKer:SET:CODE[:STATe]	OFF|ON	OFF|ON	
Active CH Marker ON/OFF	:CALCulate:ACMarker<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Active CH Marker X setting	:CALCulate:ACMarker<scrn=1|2|3|4>:X	<real>	<real>	
Active CH Marker Y reading	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<real>	

6.3.7 Subsystem-DISPlay

Function description	SCPI command	Parameter	Query reply	Remarks
WINDow				
Ref Level setting	:DISPlay:TRACe:Y[:SCALe]:RLEVel	<real>	<real>	
Level Offset setting	:DISPlay:TRACe:Y[:SCALe]:RLEVel:OFFSet	<real>	<real>	
Level Offset ON/OFF	:DISPlay:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe	OFF|ON	OFF|ON	
MEAS VIEW				
Analysis format selection	:DISPlay:WINDow<scrn=1|2|3|4>:FORMat	TRESult|POWer|CPOWer|RHO|DTAU|DTHeta|EVM|MERRor|SPCPOWer|SPRHO|CONStellation|IEYE|QEYE|SCCPOWer|SPCCONStellation	TRES|POW|CPOW|RHO|DTAU|DTH|EVM|MERR|SPCPOW|SPRHO|CONS|IEYE|QEYE|SCCPOW|SPCCONS	
Display format setting: Graph/Table List	:DISPlay:WINDow<scrn=1|2|3|4>:VSCode:TYPE	GRAPh|TABLe	GRAP|TABL	
Display setting for the constellation: Line&Chip/Chip	:DISPlay:WINDow<scrn=1|2|3|4> :CONStellation:TYPE	LCHip|CHIP	LCH|CHIP	
Specified PCG Number setting	:DISPlay:PCG	<int>	<int>	

Function description	SCPI command	Parameter	Query reply	Remarks
Specified Code Number setting	:DISPlay:CODE	<int>	<int>	
SCALe				
Multi Screen setting	:DISPlay	SINGle|DUAL|QUAD	SING|DUAL|QUAD	
X Scale Left setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:X[:SCALe]:LEFT	<real>	<real>	
X Scale Right setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:X[:SCALe]:RIGHt	<real>	<real>	
Y Scale Upper setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:Y[:SCALe]:UPPer	<real>	<real>	
Y Scale Lower setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:Y[:SCALe]:LOWer	<real>	<real>	
Constellation Plot Start setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:CONStellation:CHIP:STARt :DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:CONStellation:SYMBol:STARt	<int>	<int>	
Constellation Plot Number setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:CONStellation:CHIP:NUMBer :DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:CONStellation:SYMBol:NUMBer	<int>	<int>	
I Eye Diagram Plot Start setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:IEYE:CHIP:STARt	<int>	<int>	
I Eye Diagram Plot Number setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:IEYE:CHIP:NUMBer	<int>	<int>	
Q Eye Diagram Plot Start setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:QEYE:CHIP:STARt	<int>	<int>	
Q Eye Diagram Plot Number setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:QEYE:CHIP:NUMBer	<int>	<int>	

6.3.8 Subsystem-MMEMory

Function description	SCPI command	Parameter	Query reply	Remarks
Save/Recall				
Saving the settings of this instrument	:MMEMory:STORe:STATe	<int>	–	*1
Loading the settings of this instrument	:MMEMory:LOAD:STATe	<int>	–	*1
Measurement condition Save selection	:MMEMory:SELect:ITEM:CDMA2KDL:SETup	OFF|ON	OFF|ON	

*1: A number, which is a maximum of 4-digit and is added to the file name of the data to be saved or loaded, must be specified in <int>.

6.3.9 Subsystem-MEASure

Function description	SCPI command	Parameter	Query reply	Remarks
MEASure				
τ (Time Alignment Offset) reading	:MEASure:TRESult:TAU	–	<real>	
Frequency Error reading	:MEASure:TRESult:FERRor	–	<real>,<real>	*2
ρ reading	:MEASure:TRESult:RHO	–	<real>	
PN Offset reading	:MEASure:TRESult:PNOFfset	–	<int>	
Mag Error reading	:MEASure:TRESult:MERRor	–	<real>	
Phase Error reading	:MEASure:TRESult:PERRor	–	<real>	
EVM reading	:MEASure:TRESult:EVM	–	<real>	
Peak EVM reading	:MEASure:TRESult:PEVM	–	<real>	
IQ Origin Offset reading	:MEASure:TRESult:IQOFfset	–	<real>	
Tx Power reading	:MEASure:TRESult:POWer	–	<real>,<real>	*3
Pilot Power reading	:MEASure:TRESult:PILot	–	<real>,<real>	*7
Peak Inactive CH Power reading	:MEASure:TRESult:PICPower	–	<real>,<int>,<int>	*4
Peak Δτ reading	:MEASure:TRESult:PDTau	–	<real>,<int>,<int>	*5
Peak Δθ reading	:MEASure:TRESult:PDTHeta	–	<real>,<int>,<int>	*6
Active CH Number reading	:MEASure:TRESult:ACHannel	–	<int>	

*2: Outputs the frequency error in order of [Hz] and [ppm].
*3: Outputs the Tx Power in order of [dBm] and [W].
*4: Outputs the peak of the Inactive CH Power and its data point in order of Power[dBm], Walsh Code No., and Walsh Code Length.
*5: Outputs the peak of Δτ and its data point in order of Δτ[sec], Walsh Code No., and Walsh Code Length.
*6: Outputs the peak of Δθ and its data point in order of Δθ[rad], Walsh Code No., and Walsh Code Length.
*7: Outputs the Pilot Power in order of [dBm] and [W].

6.3.10 Subsystem-READ

Function description	SCPI command	Parameter	Query reply	Remarks
READ				
τ (Time Alignment Offset) reading	:READ:TRESult:TAU	–	<real>	
Frequency Error reading	:READ:TRESult:FERRor	–	<real>,<real>	*2
ρ reading	:READ:TRESult:RHO	–	<real>	
PN Offset reading	:READ:TRESult:PNOFfset	–	<int>	
Mag Error reading	:READ:TRESult:MERRor	–	<real>	
Phase Error reading	:READ:TRESult:PERRor	–	<real>	
EVM reading	:READ:TRESult:EVM	–	<real>	
Peak EVM reading	:READ:TRESult:PEVM	–	<real>	
IQ Origin Offset reading	:READ:TRESult:IQOFfset	–	<real>	
Tx Power reading	:READ:TRESult:POWer	–	<real>,<real>	*3
Pilot Power reading	:READ:TRESult:PILot	–	<real>,<real>	*7
Peak Inactive CH Power reading	:READ:TRESult:PICPower	–	<real>,<int>,<int>	*4
Peak Δτ reading	:READ:TRESult:PDTau	–	<real>,<int>,<int>	*5
Peak Δθ reading	:READ:TRESult:PDTHeta	–	<real>,<int>,<int>	*6
Active CH Number reading	:READ:TRESult:ACHannel	–	<int>	

*2: Outputs the frequency error in order of [Hz] and [ppm].
*3: Outputs the Tx Power in order of [dBm] and [W].
*4: Outputs the peak of the Inactive CH Power and its data point in order of Power[dBm], Walsh Code No., and Walsh Code Length.
*5: Outputs the peak of Δτ and its data point in order of Δτ[sec], Walsh Code No., and Walsh Code Length.
*6: Outputs the peak of Δθ and its data point in order of Δθ[rad], Walsh Code No., and Walsh Code Length.
*7: Outputs the Pilot Power in order of [dBm] and [W].

6.3.11 Subsystem-FETCh

Function description	SCPI command	Parameter	Query reply	Remarks
FETCh				
τ (Time Alignment Offset) reading	:FETCh:TRESult:TAU	–	<real>	
Frequency Error reading	:FETCh:TRESult:FERRor	–	<real>,<real>	*2
ρ reading	:FETCh:TRESult:RHO	–	<real>	
PN Offset reading	:FETCh:TRESult:PNOFfset	–	<int>	
Mag Error reading	:FETCh:TRESult:MERRor	–	<real>	
Phase Error reading	:FETCh:TRESult:PERRor	–	<real>	
EVM reading	:FETCh:TRESult:EVM	–	<real>	
Peak EVM reading	:FETCh:TRESult:PEVM	–	<real>	
IQ Origin Offset reading	:FETCh:TRESult:IQOFfset	–	<real>	
Tx Power reading	:FETCh:TRESult:POWer	–	<real>,<real>	*3
Pilot Power reading	:FETCh:TRESult:PILot	–	<real>,<real>	*7
Peak Inactive CH Power reading	:FETCh:TRESult:PICPower	–	<real>,<int>,<int>	*4
Peak Δτ reading	:FETCh:TRESult:PDTau	–	<real>,<int>,<int>	*5
Peak Δθ reading	:FETCh:TRESult:PDTHeta	–	<real>,<int>,<int>	*6
Active CH Number reading	:FETCh:TRESult:ACHannel	–	<int>	

*2: Outputs the frequency error in order of [Hz] and [ppm].
*3: Outputs the Tx Power in order of [dBm] and [W].
*4: Outputs the peak of the Inactive CH Power and its data point in order of Power[dBm], Walsh Code No., and Walsh Code Length.
*5: Outputs the peak of Δτ and its data point in order of Δτ[sec], Walsh Code No., and Walsh Code Length.
*6: Outputs the peak of Δθ and its data point in order of Δθ[rad], Walsh Code No., and Walsh Code Length.
*7: Outputs the Pilot Power in order of [dBm] and [W].

6.4 Status Register

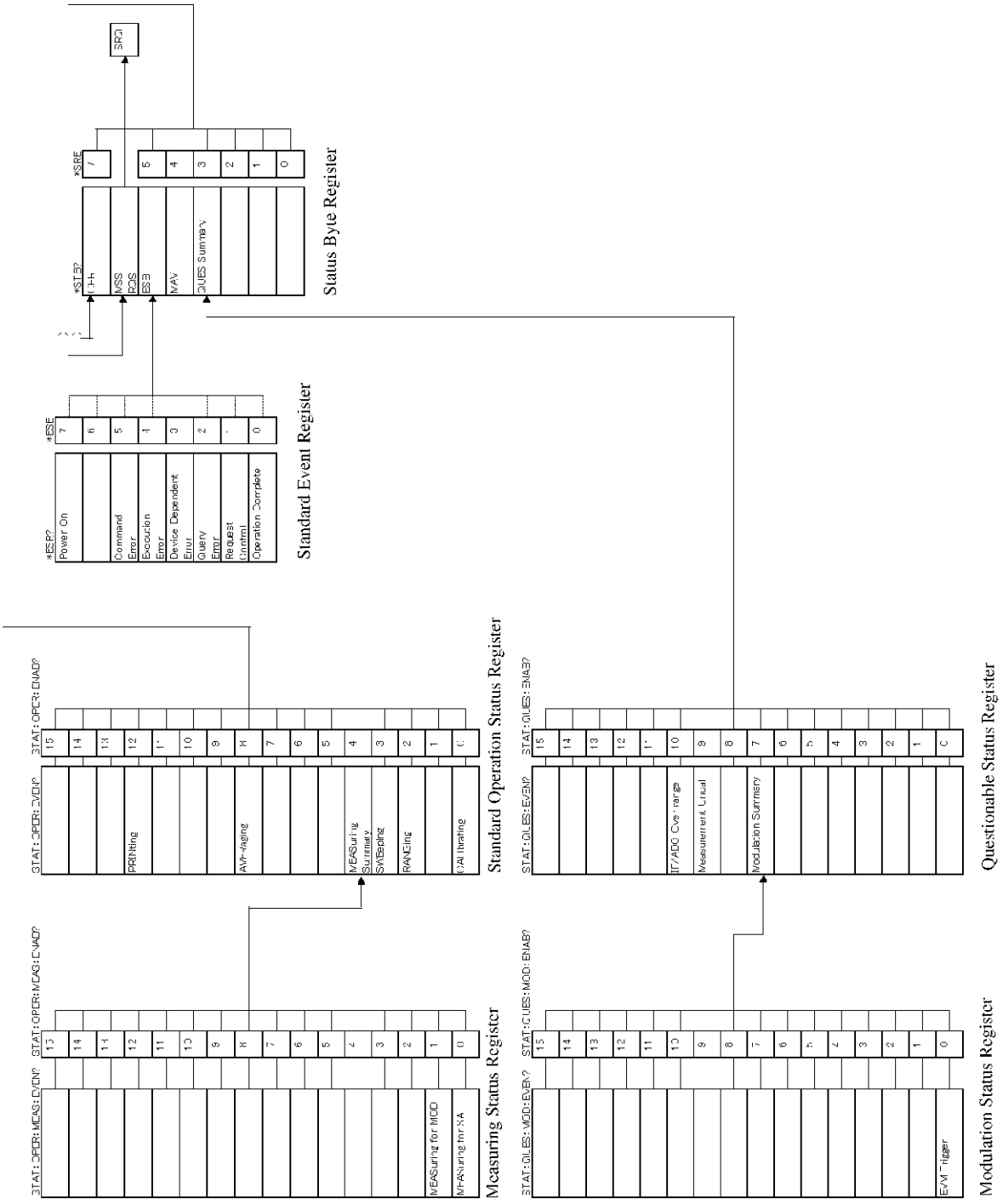


Figure 6-1 Status Registers

7. PERFORMANCE VERIFICATION (Downlink)

This chapter describes how to check whether the performance of this instrument meets the specifications.

It is recommended that you copy the test data record sheet included at the end of this chapter and save it as a record of the performance test.

IMPORTANT: Before verifying the performance, warm-up and completely calibrate the instrument.

7.1 Test Signal Specifications

The test signals used for verifying the performance are shown below:

Table 7-1 List of Test Signal Specifications

No.	Test signal name	Signal specifications		Test item
		Channel No.	Amplitude	
1	Base station signal	0 (Pilot)	-6.99 dB	Downlink measurement (RF, IQ input)
		1 (Paging)	-7.25 dB	
		6 (Traffic)	-10.26 dB	
		17 (Traffic)	-10.26 dB	
		20 (Traffic)	-10.26 dB	
		32 (Sync)	-13.27 dB	
		41 (Traffic)	-10.26 dB	
		49 (Traffic)	-10.26 dB	
		58 (Traffic)	-10.26 dB	
		(Based on the IS-97 Base Station Test Model, Nominal)		

7.2 Test Procedures

This section describes each test procedure.

7.2.1 RF Input Base Station Signal Measurement

Connect the signal source as shown below:

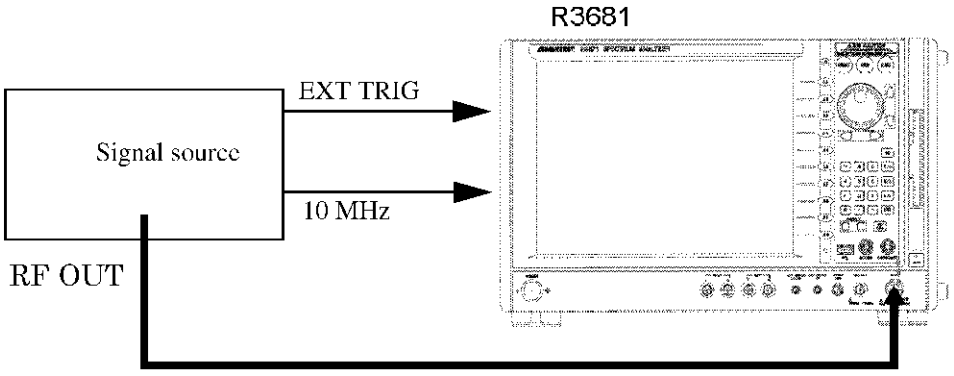


Figure 7-1 Connecting the Test Signal (RF Input)

1. The base station signal, which has a carrier frequency of 870.03 MHz and a level of -10 dBm, is output from the signal source.
2. Set this unit as follows:

{MEAS SETUP}:	**Meas Parameters**		
	[Meas Mode]:		cdma2000
	[User Table]:		NOT USE
	[Meas Length]:		2 PCG
	[τ Offset]:		0.000 µsec
	[Phase Equalizing Filter]:		ON
	[PN Offset Search]:		OFF
	[PN Offset]:		0
	[Threshold Level]:		-27 dB
	[Δτ]:		ON
	[Δθ]:		ON
{INPUT}:	**Input**	RF	
{TRIGGER}:	**Trigger Source**	Ext1	
{FREQ}:	**Center**	870.03 MHz	
{LEVEL}:	Execute **Auto Level Set**		

3. Press the **SINGLE** button on this unit to perform measurements.
4. Write the measurement results in the test data record sheet.

7.2.2 IQ Input Base Station Signal Measurement

Connect the signal source as shown below:

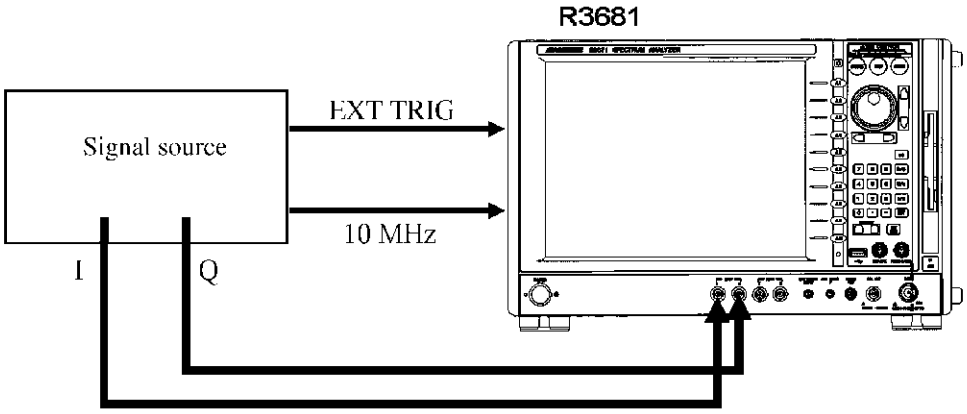


Figure 7-2 Connecting the Test Signal (IQ Input)

1. Output the base station signal (Baseband signal) from the signal source.
2. Set this unit as follows:

{MEAS SETUP}:	**Meas Parameters**		
	[Meas Mode]:		cdma2000
	[User Table]:		NOT USE
	[Meas Length]:		2 PCG
	[τ Offset]:		0.000 µsec
	[Phase Equalizing Filter]:		ON
	[PN Offset Search]:		OFF
	[PN Offset]:		0
	[Threshold Level]:		-27 dB
	[Δτ]:		ON
	[Δθ]:		ON
{INPUT}:	**Input**		Baseband(I&Q)
	Baseband Input		DC
{TRIGGER}:	**Trigger Source**		Ext1

3. Press the **SINGLE** button on this unit to perform measurements.
4. Write the measurement results in the test data record sheet.

7.3 Test Data Record Sheet

Test data record sheet

Model name:

Serial number:

1. RF input measurement

Test item		Specifications			Pass / Fail
		Minimum value	Measured value	Maximum value	
Carrier frequency error		-10 Hz		+10 Hz	
Code Domain power [dB]	Ch No.				
	0	-7.09 dB		-6.89 dB	
	1	-7.35 dB		-7.15 dB	
	6	-10.36 dB		-10.16 dB	
	17	-10.36 dB		-10.16 dB	
	20	-10.36 dB		-10.16 dB	
	32	-13.37 dB		-13.17 dB	
	41	-10.36 dB		-10.16 dB	
	49	-10.36 dB		-10.16 dB	
	58	-10.36 dB		-10.16 dB	
Transmission power		-10.8 dBm		-9.2 dBm	

2. IQ input measurement

Test item		Specifications			Pass / Fail
	Ch No.	Minimum value	Measured value	Maximum value	
Code Domain power [dB]	0	-7.09 dB		-6.89 dB	
	1	-7.35 dB		-7.15 dB	
	6	-10.36 dB		-10.16 dB	
	17	-10.36 dB		-10.16 dB	
	20	-10.36 dB		-10.16 dB	
	32	-13.37 dB		-13.17 dB	
	41	-10.36 dB		-10.16 dB	
	49	-10.36 dB		-10.16 dB	
	58	-10.36 dB		-10.16 dB	

8. SPECIFICATIONS (Downlink)

8.1 cdma2000 Modulation Analysis Compliance System

Compliance with
3rd Generation Partnership Project 2 (3GPP2)
TSG-C Specifications
C.S0002-D v1.0 (IS-2000.2)

8.2 cdma2000 Modulation Analysis Performance

Item	Specifications
Carrier frequency error	
Measurement range	< ±2 kHz
Measurement accuracy	< ± (Reference frequency accuracy × Carrier frequency + 10 Hz)
ρi measurement accuracy	< ±0.1 dB
Δτi measurement accuracy	< ±10 ns
Δθi measurement accuracy	< ±10 mrad
Transmission power measurement accuracy	< ± (0.2 + Frequency response + Calibration signal level accuracy) dB Frequency response 50 MHz to 2.5 GHz < ±0.4 dB Calibration signal level accuracy < ±0.2 dB

Note: For more information on the measurement condition, refer to the next page.

Measurement conditions

<table>
<tr><th>Item</th><th>Conditions</th></tr>
<tr><td>Temperature range</td><td>+20°C to +30°C</td></tr>
<tr><td>Base station signal</td><td>Walsh Length 64
<table><tr><th>Channel No.</th><th>Amplitude</th></tr><tr><td>0 (Pilot)</td><td>-6.99 dB</td></tr><tr><td>1 (Paging)</td><td>-7.25 dB</td></tr><tr><td>6 (Traffic)</td><td>-10.26 dB</td></tr><tr><td>17 (Traffic)</td><td>-10.26 dB</td></tr><tr><td>20 (Traffic)</td><td>-10.26 dB</td></tr><tr><td>32 (Sync)</td><td>-13.27 dB</td></tr><tr><td>41 (Traffic)</td><td>-10.26 dB</td></tr><tr><td>49 (Traffic)</td><td>-10.26 dB</td></tr><tr><td>58 (Traffic)</td><td>-10.26 dB</td></tr></table>(Based on the IS-97 Base Station Test Model, Nominal)</td></tr>
<tr><td>Center frequency</td><td>800 MHz/2 GHz</td></tr>
<tr><td>Input level</td><td>-10 dBm (RF Input)
0.8 V_{P-P} (IQ Input)</td></tr>
<tr><td>ρ</td><td>>0.9999</td></tr>
<tr><td>$\Delta\tau i$</td><td>0 ns</td></tr>
<tr><td>$\Delta\theta i$</td><td>0 mrad</td></tr>
<tr><td>Meas Length</td><td>2 PCG</td></tr>
</table>

9. MEASUREMENT EXAMPLES (Uplink)

This chapter describes how to use this option by using specific measurement examples.

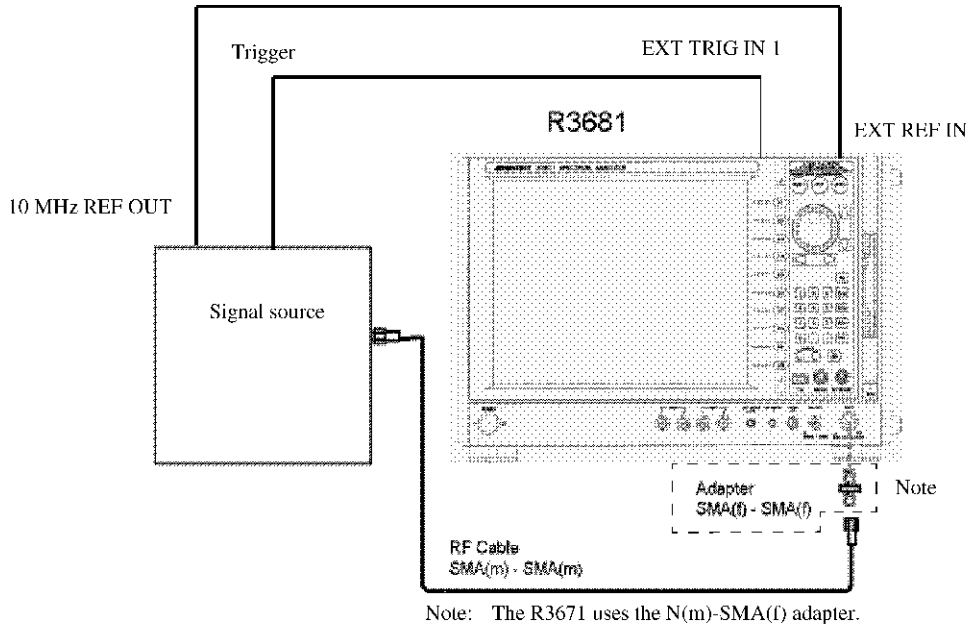
9.1 Analysis of the Mobile Station Offset QPSK Signal in the cdmaOne MODE

Specifications of the signal to be measured

The target mobile station signal, whose frequency is 825.03 MHz and level is -10 dBm, is compliant with IS-2000.

Signal specifications: Offset QPSK signal

Device connection



Note: The R3671 uses the N(m)-SMA(f) adapter.

Figure 9-1 Connection Diagram for the Mobile Station Offset QPSK Measurement

Setting the measuring conditions

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[cdma2000 UL]**.
3. Touch the **{FREQ}** button on the function bar.
4. Touch the **Center** key on the soft menu bar.

5. Touch [8], [2], [5], [.], [0], [3], and [M/n] in this order on the keypad.
   The center frequency is set to 825.03 MHz.
6. Touch the **{LEVEL}** button on the function bar.
7. Touch the **Auto Level Set** key on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
8. Touch the **{TRIGGER}** button on the function bar.
9. Touch the **Trigger Source** key on the soft menu bar.
10. Touch the **Ext1** key on the soft menu bar.
    The trigger source is set to the external trigger.
11. Touch the **{INPUT}** button on the function bar.
12. Touch the **Input Setup** key on the soft menu bar.
    The **[Input Setup]** dialog box appears.
13. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The Input mode is set to RF.
14. Touch the close button [×] in the **[Input Setup]** dialog box to close the dialog box.

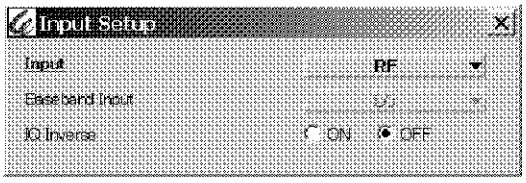


Figure 9-2 **[Input Setup]** Dialog Box

15. Touch the **{MEAS MODE}** button on the function bar.
16. Touch the **cdmaOne** key on the soft menu bar.
    The measurement mode is set to cdmaOne.
17. Touch the **{MEAS SETUP}** button on the function bar.
18. Touch the **Meas Parameters** key on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box appears.
19. Touch the **[Meas Length]** text box and press [6], [1], [5], and [ENT] on the keypad.
    The measurement length is set to 615 chips.
20. Set the **[Freq Meas Range]** option button to **[NORMAL]**.
    The frequency error measurement range is set to the NORMAL mode.

21. Set the **[IQ Origin Offset]** option button to **[INCLUDE]**.
    The mode, in which the analysis is performed including the IQ origin offset, is set.

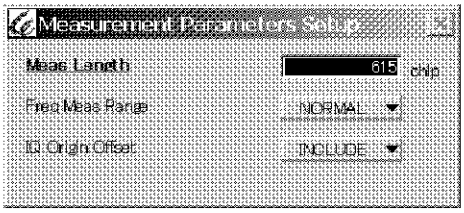


Figure 9-3 **[Measurement Parameters Setup]** Dialog Box of cdmaOne Mode

22. Touch **Return** on the soft menu bar to close the **[Measurement Parameters Setup]** dialog box.

23. Press the **SINGLE** button on the front panel.
    The Single measurement is performed and the measurement results are displayed.

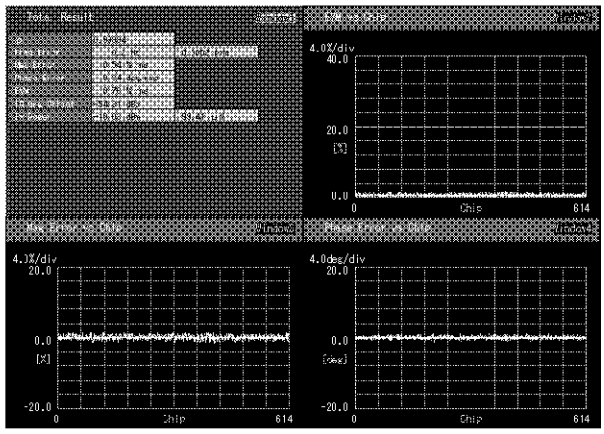


Figure 9-4 Results from the Mobile Station Offset QPSK Signal Measured in the cdmaOne MODE

Upper left window

ρ	Waveform quality
Freq Error	Carrier frequency error (Hz, ppm)
Mag Error	Magnitude error (%rms)
Phase Error	Phase error (deg.rms)
EVM	Error vector magnitude (%rms)
IQ Org Offset	IQ origin offset (dBc)
Tx Power	Transmission power (dBm, W)

Upper right window

Horizontal axis: Chip
Vertical axis: Error vector magnitude (%)

Lower left window

Horizontal axis: Chip
Vertical axis: Magnitude error (%)

Lower right window

Horizontal axis: Chip
Vertical axis: Phase error (deg)

9.2 Code Domain Power Measurement of the Mobile Station Signal in the cdma2000 MODE

The target mobile station signal, whose frequency is 825.03 MHz and level is -10 dBm, is compliant with IS-2000.

Signal specifications

Long Code Mask: ALL 0

Reverse Traffic Channel Operation signal (PICH, DCCH, SCH2, FCH, and SCH1 are multiplexed)

Walsh function of SCH1: W_1^2 (M=1)

Walsh function of SCH2: W_2^4 (M=1)

PICH: Reverse Pilot Channel

DCCH: Reverse Dedicated Control Channel

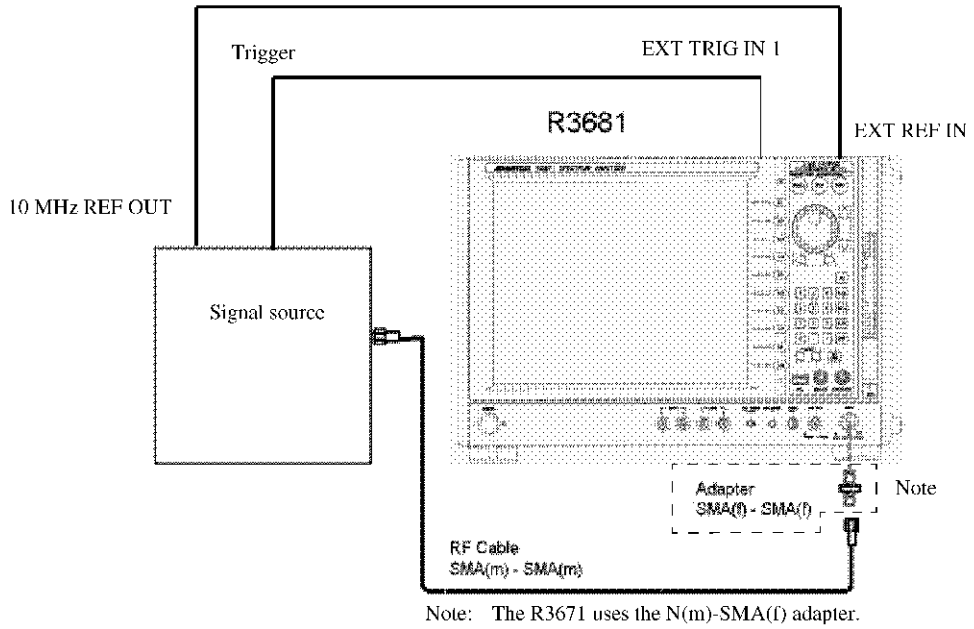
SCH2: Reverse Supplemental Channel 2

FCH: Reverse Fundamental Channel

SCH1: Reverse Supplemental Channel 1

M: Walsh Function Repetition Factor

Device connection



Note: The R3671 uses the N(m)-SMA(f) adapter.

Figure 9-5 Connection Diagram for the Mobile Station Code Domain Power Measurement

Setting the measuring conditions

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[cdma2000 UL]**.
3. Touch the **{FREQ}** button on the function bar.
4. Touch the **Center** key on the soft menu bar.
5. Touch **8**, **2**, **5**, **.**, **0**, **3**, and **M/n** in this order on the keypad.
   The center frequency is set to 825.03 MHz.
6. Touch the **{LEVEL}** button on the function bar.
7. Touch the **Auto Level Set** key on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
8. Touch the **{TRIGGER}** button on the function bar.
9. Touch the **Trigger Source** key on the soft menu bar.
10. Touch the **Ext1** key on the soft menu bar.
    The trigger source is set to the external trigger.
11. Touch the **{INPUT}** button on the function bar.
12. Touch the **Input Setup** key on the soft menu bar.
    The **[Input Setup]** dialog box appears.
13. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The Input mode is set to RF.
14. Touch the close button **×** in the **[Input Setup]** dialog box to close the dialog box.

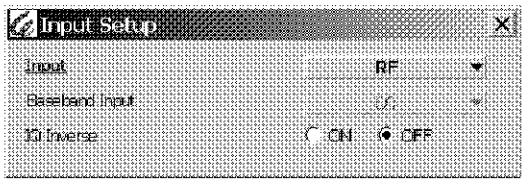


Figure 9-6 **[Input Setup]** Dialog Box

15. Touch the **{MEAS MODE}** button on the function bar.
16. Touch the **cdma2000** key on the soft menu bar.
    The measurement mode is set to cdma2000.
17. Touch the **{MEAS SETUP}** button on the function bar.
18. Touch the **Meas Parameters** key on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box appears.

19. Set the **[User Table]** option button to **[NOT USE]**.
    If this is set, the user table is not used.

20. Touch the **[Meas Length]** text box and press [1], [5], [3], [6], and [ENT] on the keypad.
    The measurement length is set to 1536 chips.

21. Set the **[PN Delay Search]** option button to **[ON]**.
    The PN Delay Search function is set to ON.

22. Set the **[Freq Meas Range]** option button to **[NORMAL]**.
    The frequency error measurement range is set to the NORMAL mode.

23. Touch the **[Threshold Level]** text box and press [-], [2], [3], and [ENT] on the keypad.
    The threshold value that is used for the transmission channel (active channel) judgment is set to -23 dB.

24. Set the **[IQ Origin Offset]** option button to **[INCLUDE]**.
    The mode, in which the analysis is performed including the IQ origin offset, is set.

25. Set the **[Peak Inact CH Component]** option button to **[Both Inact]**.
    The Peak value of ρ is acquired in channels in which both I and Q signals are inactive.

26. Set the [$\Delta\tau$] option button to **[ON]**.
    $\Delta\tau$ is added to the measuring items.

27. Set the [$\Delta\theta$] option button to **[ON]**.
    $\Delta\theta$ is added to the measuring items.

28. Set the **[Chip Rate Error]** option button to **[ON]**.
    Chip Rate Error is added to the measurement items.

29. Set the **[Quadrature Error]** option button to **[ON]**.
    Quadrature Error is added to the measurement items.

30. Set the **[Walsh Code Length]** option button to **[64]**.
    The length of the Walsh code to be analyzed is set to 64.

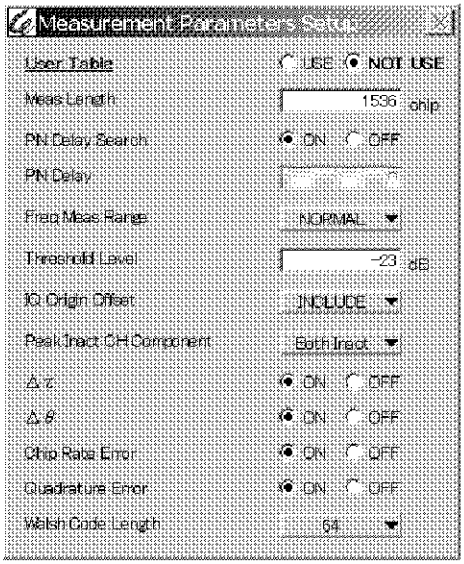


Figure 9-7 **[Measurement Parameters Setup]** Dialog Box of cdma2000 MODE

31. Touch **Return** on the soft menu bar to close the **[Measurement Parameters Setup]** dialog box.

32. Press the **SINGLE** button on the front panel.

    The Single measurement is performed and the measurement results are displayed.

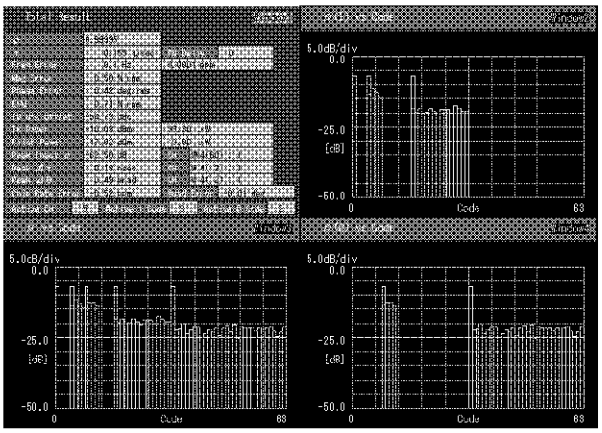


Figure 9-8 Results from the Mobile Station Code Multiplex Signal Measured in the cdma2000 MODE

IMPORTANT: ***If*** **[User Table]** ***is not used, the transmission channel is automatically detected in this instrument. An error may occur in the detection of the transmission channel depending on the influence of data patterns and noise. In such a case, the transmission channel can be determined by using*** **[User Table].**
For more information on how to use **[User Table],** ***refer to A.1, "Technical Data."***

Upper left window

ρ		Waveform quality of the multiplex signal
τ		Delay from the trigger (μs)
PN Delay		Delay time from the head of Pilot PN Sequence and is a multiple of 64 chips from 0 to 511
Freq Error		Carrier frequency error (Hz, ppm)
Mag Error		Magnitude error of the multiplex signal (%rms)
Phase Error		Phase error of the multiplex signal (deg.rms)
EVM		Error Vector Magnitude of the multiplex signal (%rms)
IQ Org Offset		IQ origin offset (dBc)
Tx Power		Transmission power (dBm, W)
Pilot Power		Power of the pilot channel (dBm, W)
Peak Inact ρ	CH	The maximum logarithmic value of the Code Domain Power coefficient of the inactive channel, the Walsh code length, the Walsh code number, and components of the peak inactive ρ channel
Peak Δτ	CH	The maximum value of the relative Walsh code domain time offset in relation to the Pilot channel, the Walsh code length, the Walsh code number, and components of the peak Δτ channel
Peak Δθ	CH	The maximum value of the relative Walsh code domain phase offset in relation to the Pilot channel, the Walsh code length, the Walsh code number, and components of the peak Δθ channel
Chip Rate Error		Chip rate error (ppm) in relation to 1.2288 Mcps
Quad Error		Q-axis quadrature error (deg) in relation to the I-axis
Active CH		Number of transmission channels
Active I Code		Number of active codes in the I-component
Active Q Code		Number of active codes in the Q-component

Upper right window

Horizontal axis: Code
Vertical axis: ρ(I) (dB)

Lower left window

Horizontal axis: Code
Vertical axis: ρ(dB)

Lower right window

Horizontal axis: Code
Vertical axis: ρ(Q) (dB)

10. MENU MAP, FUNCTIONAL EXPLANATION (Uplink)

This chapter describes the configurations and functions of the soft keys displayed on the touch screen of the cdma2000 modulation analysis software.

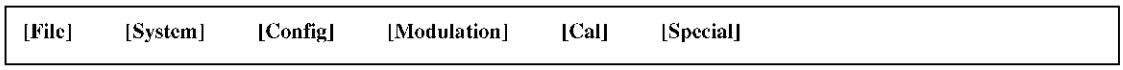
MEMO:

- [.....] *Used to enclose a menu name, key name, item name in the dialog box, button name, or the name of selected items in lists and menus.*
- {....} *Shows a function button on the function bar.*
- ▒▒▒▒▒ *Shows a soft key on the soft menu bar.*
- *A dialog box is surrounded by a broken line.*
- *Operations are supposed to be made through the touch screen and "touch" means to press a button or a key.*

10.1 Menu Index

10.2 Switching Communication Systems

The menu bar of this option is arranged as follows:



The menu bar consists of the same items as those of Spectrum Analyzer.

Select **[Modulation Analyzer]** from **[Config]** on the menu bar to select a modulation analysis function.

Select **[cdma2000 UL]** from **[Modulation]** on the menu bar to select the cdma2000Uplink modulation analysis function.

10.3 Function Bar

This section describes the functions of each function button displayed on the function bar. The configuration of the function buttons of this option is as follows:

When you click a function button on the function bar, the associated soft keys are displayed on the soft menu bar.

10.4 Soft Menu Bar

The area located on the right-hand side of the screen and in which soft keys are displayed is called the soft menu bar.

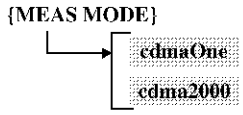
When you touch a button on the function bar, the associated soft keys are displayed on the soft menu bar.

10.5 Description of the Function of Each Key

This section describes the function of each key.

10.5.1 {MEAS MODE}

When you touch the **{MEAS SETUP}** button, the soft keys related to the selection of the measurement mode are displayed on the soft menu bar.



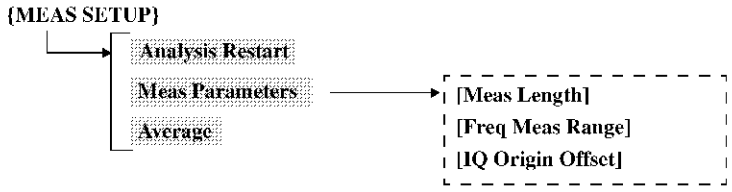
cdmaOne — If **cdmaOne** is touched, the cdmaOne mode is selected. In the cdmaOne mode, the Offset QPSK signal, which is not a code multiplex signal and is compliant with RC1 and RC2 (Radio Configuration) standards, is analyzed.

cdma2000 — If **cdma2000** is touched, the cdma2000 mode is selected. In the cdma2000 mode, the code domain analysis of the code multiplex signal, which is compliant with RC3, RC4, and RC7 standards, is performed.

10.5.2 {MEAS SETUP}

When you touch the **{MEAS SETUP}** button, the soft keys related to the analysis parameter setting are displayed on the soft menu bar.

When **cdmaOne** is selected from **{MEAS MODE}**.



Analysis Restart

The measurement of the AD data, which has already been obtained, re-starts.

Meas Parameters

The dialog box used to set the measurement conditions appears.

[Meas Length]

Used to enter the measurement range in chips.

[Freq Meas Range]

Sets whether to expand a frequency error measurement range when the measurement is performed.

NORMAL:
Does not expand a frequency error measurement range.

MEMO: ***Use this mode when signals exist in an adjacent channel or measuring a noisy signal.***

EXPAND:Expands a frequency error measurement range.

[IQ Origin Offset]

Selects whether to include the IQ origin offset when the analysis is performed.

INCLUDE:
Includes the IQ origin offset when the analysis is performed.

EXCLUDE:
Excludes the IQ origin offset when the analysis is performed.

Return

When **Return** is touched, the dialog box closes and the soft key array on the soft menu bar returns to the previous menu.

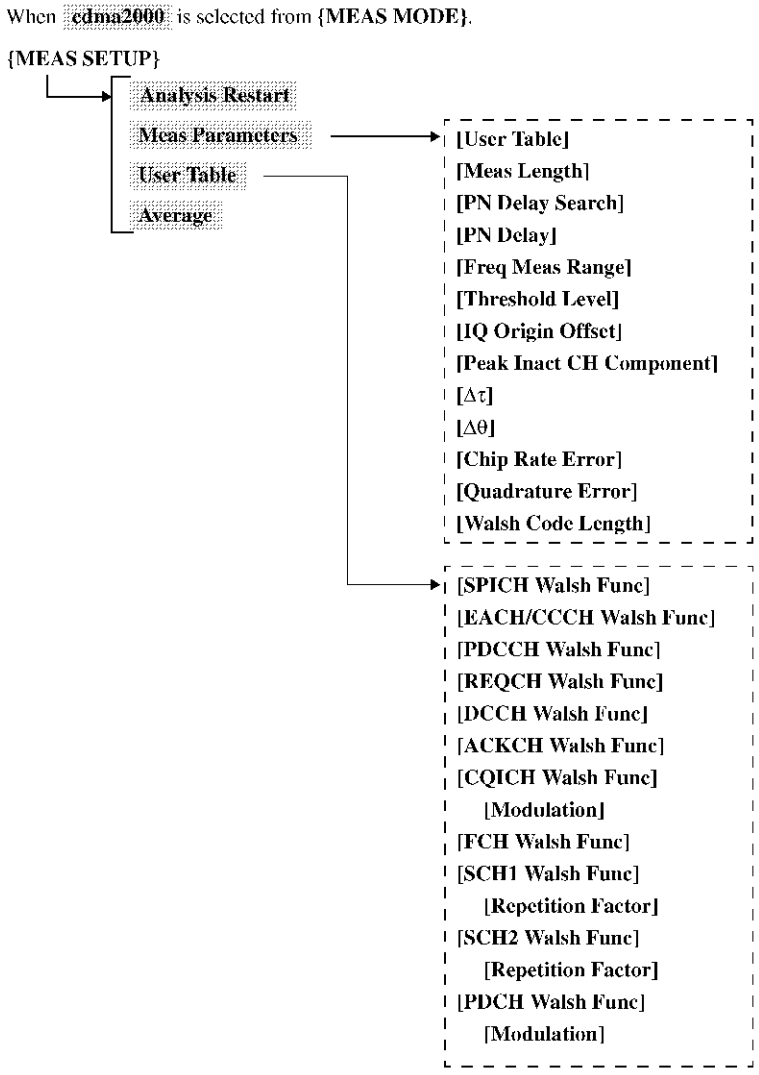
Average

Selects the averaging process.

On: Performs the averaging process a set number of times for the measurement items in **[Total Result]**.

Off: Does not perform the averaging process.

10.5.2 {MEAS SETUP}



Analysis Restart — The measurement of the AD data, which has already been obtained, re-starts.

Meas Parameters — The dialog box used to set the measurement conditions appears.

[User Table] — Selects whether to refer to a channel set by the user and to perform the analysis when the measurement is performed. If a transmission channel is known, the transmission channel can be determined by using the user table.

USE: Determines the transmission channel according to the user table.

NOT USE: The transmission channel is automatically determined.

[Meas Length] — Sets the measurement length in chips.

[PN Delay Search] — Sets the PN Delay search to ON or OFF.

ON: Searches the acquired signal for PN Delay if the relationship between the external trigger and PN Delay of the input signal is unknown.

OFF: Set to OFF and set PN Delay if the relationship between the external trigger and PN Delay of the input signal is known.

[PN Delay] Sets the Pilot PN Sequence synchronization position to a multiple of 64 chips from 0 to 511.

[Freq Meas Range] Sets whether to expand the frequency error measurement range when the measurement is performed.

NORMAL:
Does not expand the frequency error measurement range.

EXPAND:
Expands the frequency error measurement range.

[Threshold Level] Sets the threshold level to determine the transmission channel (active channel). Set the threshold level to a value which is higher than the noise floor and lower than the signal.

MEMO: ***If the set threshold level is too high, an active channel is incorrectly determined as an inactive channel. Accordingly, the ρ and modulation accuracy values are less accurate than the actual values, and the measurement cannot be performed correctly.***

[IQ Origin Offset] Selects whether to include the IQ origin offset when the analysis is performed.

INCLUDE:
Includes the IQ origin offset when the analysis is performed.

EXCLUDE:
Excludes the IQ origin offset when the analysis is performed.

MEMO: ***The IQ origin offset is always excluded when Δτ, Δθ, Chip Rate Error, and Quad Error are analyzed.***

[Peak Inact CH Component] Selects the definition of an inactive channel.

Both Inact:
A channel, in which both I and Q signals are inactive, is defined as the inactive channel and the maximum ρ in the I and Q signals is defined as Peak Inact ρ.

Either Inact:
A channel, in which at least either I or Q signal is inactive, is defined as the inactive channel and the maximum ρ in the I and Q signals is defined as Peak Inact ρ.

[Δτ]

Selects whether to measure the delay time for each channel in relation to the pilot channel. The delay time for each channel is displayed as positive if the channel is delayed in relation to the pilot channel.

ON: Measures the delay time.

OFF: Does not measure the delay time.

[Δθ]

Selects whether to measure the phase difference for each channel in relation to the pilot channel.

ON: Measures the phase difference.

OFF: Does not measure the phase difference.

[Chip Rate Error]

Selects whether to measure the chip rate error in relation to 1.2288 Mcps.

ON: Measures the chip rate error.

OFF: Does not measure the chip rate error.

[Quadrature Error]

Selects whether to measure the difference of an angle between I-axis and Q-axis in relation to the angle of 90 degrees.

ON: Measures the angle difference from the angle of 90 degrees.

OFF: Does not measure the angle difference from the angle of 90 degrees.

[Walsh Code Length]

Sets the Walsh code length in the code domain analysis.

16: Sets the Walsh code length to 16 and performs the code domain analysis.

32: Sets the Walsh code length to 32 and performs the code domain analysis.

64: Sets the Walsh code length to 64 and performs the code domain analysis.

Return

When **Return** is touched, the dialog box closes and the soft key array on the soft menu bar returns to the previous menu.

User Table

The User Table dialog box is displayed. The channels defined here are enabled when **[User Table]** is set to USE.

The abbreviation of each channel name is as follows:

SPICH: Secondary Pilot Channel

EACH: Enhanced Access Channel

CCCH: Common Control Channel

PDCCH: Packet Data Control Channel

REQCH: Request Channel

DCCH: Dedicated Control Channel

ACKCH: Acknowledgment Channel

CQICH: Channel Quality Indicator Channel

FCH: Fundamental Channel

SCH1: Supplemental Channel 1

SCH2: Supplemental Channel 2

PDCH: Packet Data Channel

[SPICH Walsh Func] Sets SPICH.

OFF: Sets the condition in which no SPICH is transmitted.

W64(32): Sets the Walsh function of SPICH to W_{32}^{64} and sets the condition in which SPICH is transmitted.

[EACH/CCCH Walsh Func] Sets EACH or CCCH.

OFF: Sets the condition in which no EACH or CCCH is transmitted.

W8(2): Sets the Walsh function of EACH or CCCH to W_2^8 and sets the condition in which EACH or CCCH is transmitted.

[PDCCH Walsh Func] Sets PDCCH.

OFF: Sets the condition in which no PDCCH is transmitted.

W64(48): Sets the Walsh function of PDCCH to W_{48}^{64} and sets the condition in which PDCCH is transmitted.

[REQCH Walsh Func] Sets REQCH.

OFF: Sets the condition in which no REQCH is transmitted.

W16(8): Sets the Walsh function of REQCH to W_8^{16} and sets the condition in which REQCH is transmitted.

[DCCH Walsh Func] Sets DCCH.

OFF: Sets the condition in which no DCCH is transmitted.

W16(8): Sets the Walsh function of DCCH to W_8^{16} and sets the condition in which DCCH is transmitted.

[ACKCH Walsh Func] Sets ACKCH.

OFF: Sets the condition in which no ACKCH is transmitted.

W64(16): Sets the Walsh function of ACKCH to W_{16}^{64} and sets the condition in which ACKCH is transmitted.

[CQICH Walsh Func] Sets CQICH.

OFF: Sets the condition in which no CQICH is transmitted.

W16(12): Sets the Walsh function of CQICH to W_{12}^{16} and sets the condition in which CQICH is transmitted.

[Modulation] Sets the modulation format of CQICH.

BPSK(I): Allocates the channel to the I-side and sets the modulation format to BPSK.

BPSK(Q): Allocates the channel to the Q-side and sets the modulation format to BPSK.

[FCH Walsh Func] Sets FCH.

OFF: Sets the condition in which no FCH is transmitted.

W16(4): Sets the Walsh function of FCH to W_4^{16} and sets the condition in which FCH is transmitted.

[SCH1 Walsh Func] Sets SCH1.

OFF: Sets the condition in which no SCH1 is transmitted.

W2(1): Sets the Walsh function of SCH1 to W_1^2 and sets the condition in which SCH1 is transmitted.

W4(2): Sets the Walsh function of SCH1 to W_2^4 and sets the condition in which SCH1 is transmitted.

[Repetition Factor] Sets the number of times the Walsh function of SCH1 is repeated.

[SCH2 Walsh Func] Sets SCH2.

OFF: Sets the condition in which no SCH2 is transmitted.

W4(2): Sets the Walsh function of SCH2 to W_2^4 and sets the condition in which SCH2 is transmitted.

W8(6): Sets the Walsh function of SCH2 to W_6^8 and sets the condition in which SCH2 is transmitted.

[Repetition Factor] Sets the number of times the Walsh function of SCH2 is repeated.

[PDCH Walsh Func] Sets PDCH.

OFF: Sets the condition in which no PDCH is transmitted.

W2(1): Sets the Walsh function of PDCH to W_1^2 and sets the condition in which PDCH is transmitted.

W4(2): Sets the Walsh function of PDCH to W_2^4 and sets the condition in which PDCH is transmitted.

W2(1)&W4(2): Sets the Walsh function of PDCH to W_1^2 and W_2^4 and sets the condition in which PDCH is transmitted.

[Modulation] Sets the modulation format of PDCH.

BPSK(I): Allocates the channel to the I-side and sets the modulation format to BPSK.

QPSK: Sets the modulation format to QPSK.

8PSK: Sets the modulation format to 8PSK.

MEMO: ***The same Walsh function number as the number, which has been already set, cannot be set because the orthogonality of the code is not satisfied.***

Return When **Return** is touched, the dialog box closes and the soft key array on the soft menu bar returns to the previous menu.

Average

Selects the averaging process.

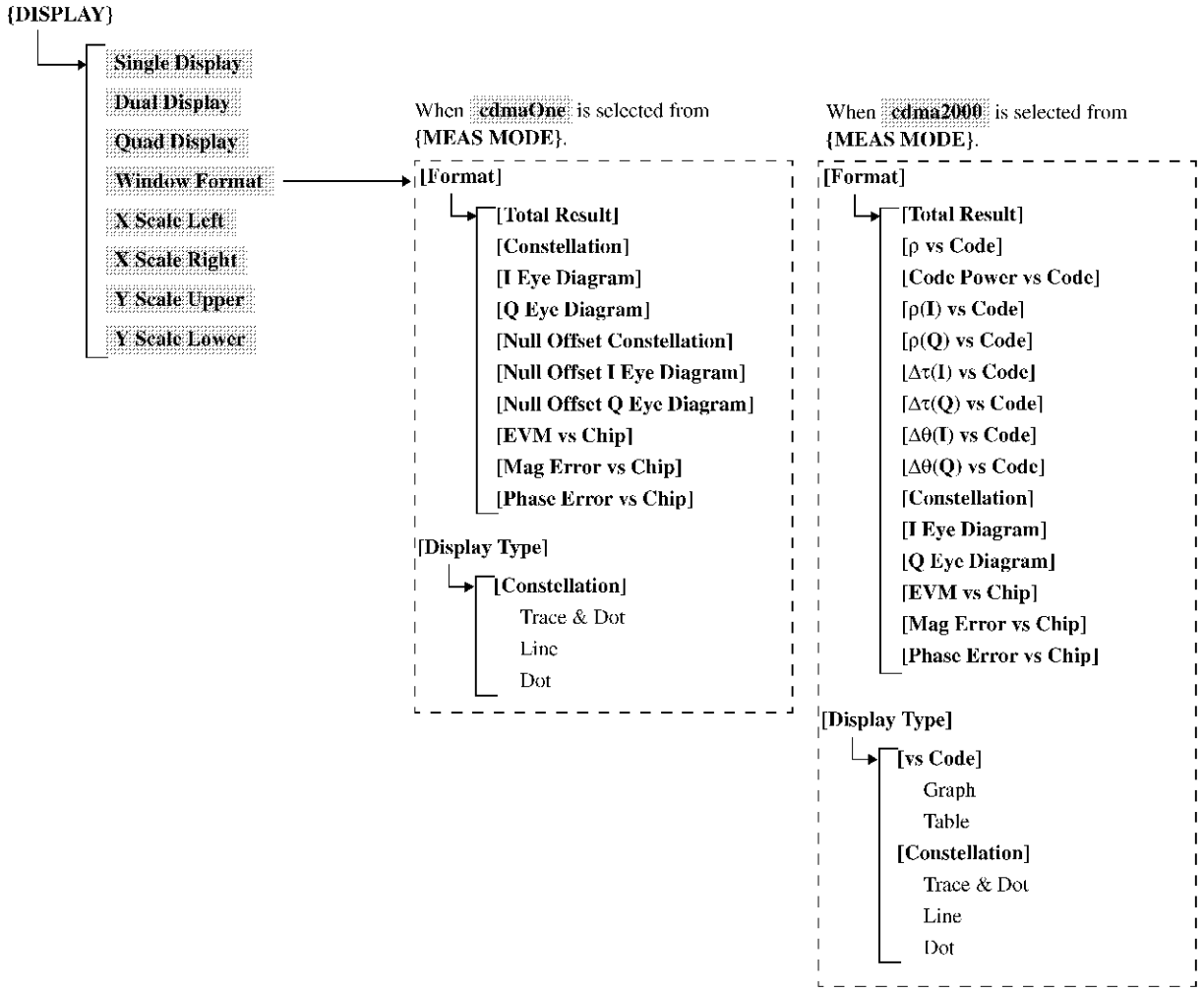
On: Performs the averaging process a set number of times for the measurement items in **[Total Result]**.

Off: Does not perform the averaging process.

MEMO: ***The value displayed in each peak display item is either the maximum value or maximum deviation from zero in each measurement result.***

10.5.3 {DISPLAY}

When you touch the **{DISPLAY}** button, the soft keys related to the display screen setup are displayed on the soft menu bar.



Single Display Displays a single window. Zooms in the upper left window when the 4-window display mode is set.

Dual Display Displays two windows. Zooms in the upper two windows when the 4-window display mode is set.

Quad Display Displays four windows.

When **cdmaOne** is selected from **{MEAS MODE}**.

Window Format If **Window Format** is touched, the dialog box that is used to set the measurement result window is displayed.

[Format] Selects the measurement result window to be displayed.

[Total Result] Displays the analyzed numerical result.

[Constellation] Displays the constellation.

[I Eye Diagram] Displays the EYE pattern of the I signal.

[Q Eye Diagram] Displays the EYE pattern of the Q signal.

[Null Offset Constellation] Displays a constellation, in which the filtering process is performed so that the I and Q offsets are canceled and chip positions converge.

[Null Offset I Eye Diagram] Displays an EYE pattern of the I signal, in which the filtering process is performed so that the I and Q offsets are canceled and chip positions converge.

[Null Offset Q Eye Diagram] Displays an EYE pattern of the Q signal, in which the filtering process is performed so that the I and Q offsets are canceled and chip positions converge.

[EVM vs Chip] Displays the EVM for each one-half chip on a graph.

[Mag Error vs Chip] Displays the magnitude error for each one-half chip on a graph.

[Phase Error vs Chip] Displays the phase error for each one-half chip on a graph.

[Display Type] Sets the display type of a graph which is selected in **[Format]**.

[Constellation] Selects whether to display either one-half chip positions or one-half chip positions and transition lines between one-half chip positions, when the constellation is displayed on a graph.

[Trace & Dot] Displays both one-half chip positions and transition lines.

[Line] Displays transition lines that connect between one-half chip positions by a straight line.

[Dot] Displays one-half chip positions only.

When **cdma2000** is selected from **{MEAS MODE}**.

Window Format Displays the dialog box to set the measurement result window.

[Format] Selects the measurement result window to be displayed.

[Total Result] Displays the numerical results that are analyzed as a multiplex signal.

[ρ vs Code] Displays the ρ for each code on a graph.

[Code Power vs Code] Displays the code domain power for each code on a graph.

[ρ(I) vs Code] Displays the ρ for each code of the I signal on a graph.

[ρ(Q) vs Code] Displays the ρ for each code of the Q signal on a graph.

[Δτ(I) vs Code] Displays the delay time for each code of the I signal on a graph. The delay time for each channel is displayed as positive if the channel is delayed in relation to the pilot channel.

[Δτ(Q) vs Code] Displays the delay time for each code of the Q signal on a graph. The delay time for each channel is displayed as positive if the channel is delayed in relation to the pilot channel.

[Δθ(I) vs Code] Displays the phase difference for each channel of the I signal to the pilot channel on a graph.

[Δθ(Q) vs Code] Displays the phase difference for each channel of the Q signal to the pilot channel on a graph.

[Constellation] Displays the constellation.

[I Eye Diagram] Displays the EYE pattern of the I signal.

[Q Eye Diagram] Displays the EYE pattern of the Q signal.

[EVM vs Chip] Displays the EVM for each chip on a graph.

[Mag Error vs Chip] Displays the magnitude error for each chip on a graph.

[Phase Error vs Chip] Displays the phase error for each chip on a graph.

[Display Type] Sets the display type of a graph which is selected in **[Format]**.

[vs Code] Selects whether to display the results for each **[vs Code]** either on graphs or in lists.

[Graph] Displays the results on graphs.

[Table] Displays the results in lists.

[Constellation] Selects whether to display either chip positions or chip positions and the transition lines between the chip positions, when the constellation is displayed on a graph.

[Trace & Dot] Displays both chip positions and transition lines.

[Line] Displays transition lines that connect between chip positions by a straight line.

[Dot] Displays chip positions only.

Return When **Return** is touched, the dialog box closes and the soft key array on the soft menu bar returns to the previous menu.

X Scale Left Sets the minimum value on the X-axis.

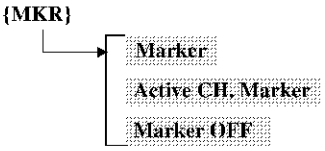
X Scale Right Sets the maximum value on the X-axis.

Y Scale Upper Sets the maximum value on the Y-axis.

Y Scale Lower Sets the minimum value on the Y-axis.

10.5.4 {MKR}

When you touch the **{MKR}** button, the soft keys related to the marker setup are displayed on the soft menu bar.



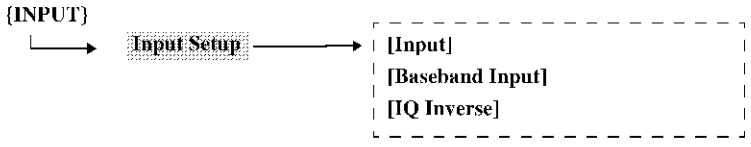
Marker — Sets the X-axis position of the normal marker.

Active CH. Marker — Sets the code number of the transmission channel. Valid only when the graph, in which the X-axis is set to the code, is displayed.

Marker OFF — Hides the marker.

10.5.5 {INPUT}

When you touch the **{INPUT}** key, the soft keys related to the setting up of the input format for the measuring instrument are displayed on the soft menu bar.



Input Setup

When you touch the **Input Setup** button, the dialog box for setting up the input format for the measuring instrument is displayed. Set up in accordance with the measurement signal.

[Input]

Sets the input channel for the signal.

RF: Sets the RF signal input.

Baseband (I&Q):
Sets the IQ signal (baseband) input.

[Baseband Input]

Sets the coupling for the IQ signal input.

AC: Selects the AC coupling.

DC: Selects the DC coupling.

[IQ Inverse]

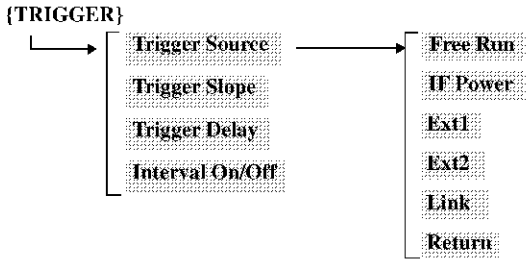
Selects whether or not to invert the phase of the signal to be measured.

ON: Inverts the signal.

OFF: Does not invert the signal.

10.5.6 {TRIGGER}

When you touch the **{TRIGGER}** button, the soft keys related to the trigger setup are displayed on the soft menu bar.



Trigger Source

When you touch the **Trigger Source** button, the soft keys related to the trigger setup are displayed on the soft menu bar.

Free Run

Obtains and analyzes data according to the internal timing of the measuring instrument.

IF Power

Obtains and analyzes data synchronized with the IF signal.

Ext1

Synchronizes the data reading with the external signal and analyzes the data entered into the EXT TRIG IN 1 connector. The threshold level for Ext1 is fixed to the TTL level.

Ext2

Synchronizes the data reading with the external signal and analyzes the data entered into the EXT TRIG IN 2 connector. The threshold level for Ext2 can be set.

Link

Obtains and analyzes data synchronizing with the trigger of an optional function.

MEMO: ***For information on how to use the link trigger, refer to the manual of the option in which the link trigger is used.***

Return

Returns to the previous soft key array on the soft menu bar.

Trigger Slope

Switches the polarity of the trigger slope.
Available only for IF Power, Ext1, and Ext2.

+: Starts sweeping at the rise of a trigger.

-: Starts sweeping at the fall of a trigger.

Trigger Delay

Sets the delay time from the trigger point. Is available only for IF Power, Ext1, and Ext2. When analyzing, the start position of AD data acquisition is shifted to the delay time.

Interval On/Off

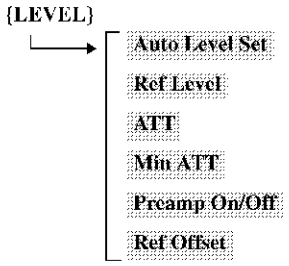
Sets whether to synchronize the trigger and the built-in counter, whose period is set to 80 ms.

On: Synchronizes them.

Off: Does not synchronize them.

10.5.7 {LEVEL}

When you touch the **{LEVEL}** button, the soft keys related to the setup of the attenuator and reference level are displayed on the soft menu bar.



Auto Level Set

Sets the reference level to the optimum value in accordance with the signal to be measured. When the key is pressed, Auto Level Set is executed.

CAUTION: ***While Auto Level Set is being executed, the level of the signal measured must remain constant.***

Ref Level

Sets the reference level.

ATT

Sets the attenuator.

Auto: Automatically sets the attenuator value based on the reference level.

Man: Sets the attenuator value.

Min ATT

Sets the Min ATT function ON and OFF.

On: Sets the minimum attenuator value and implements control regardless of whether ATT is Auto or Manual.

Off: Cancels the Min ATT limitation.

Preamp On/Off

Sets the preamplifier function ON and OFF.

Ref Offset

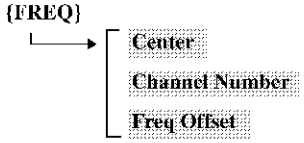
Switches the reference level offset function ON and OFF.

On: Sets the offset value and changes only the displayed reference level by the offset value.
(Displayed reference level = Set value + Offset value)

Off: Cancels the offset function.

10.5.8 {FREQ}

When you touch the **{FREQ}** button, the soft keys related to the measurement frequency setup are displayed on the soft menu bar.



Center

Sets the center frequency of the measurement signal.

CAUTION: ***Set the center frequency correctly. If it is set incorrectly, an error may occur in the center frequency error measurement and the measurement may be incorrect.***

Channel Number

When the channel number is set, the center frequency is automatically set by using the following formula.

(Center frequency) = (Channel interval) × (Channel number + Channel offset) + (Start frequency)

The parameters such as the channel interval and the channel number setting range depend on the Standard selected by **[Special]** → **[STD...]**. For more information, refer to the R3681 Series User's Guide.

Freq Offset

Switches the center frequency offset function ON and OFF.

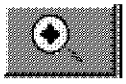
On: Sets the offset value and changes only the displayed center frequency by the offset value.
(Displayed center frequency = Set value + Offset value)

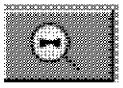
Off: Cancels the offset function.

10.5.9 Measurement Tool Bar

The functions of waveform range selection, active window selection, and so on are displayed as icons.

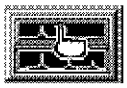
The following functions can be used by touching the icons:


: Zoom in icon: Used to zoom in on the waveform displayed in the window. The range specified by the range specification icon is zoomed in on by touching on the range.


: Zoom out icon: Used to zoom out from the waveform displayed in the window.


: Range specification icon (X-axis mode):
Used to specify a range in the window in which the waveform is displayed. After touching the icon, specify the range by touching two points on the graph.


: Range specification icon (range mode):
Used to specify a range in the window in which the waveform is displayed. Specify the upper-left and lower-right corners of the range by touching the display.


: Active window switching icon:
Used to make one of the split windows active.


: Range shift icon: Used to shift the display position without changing the display range. After touching the icon, touch the inside of the graph frame in the direction to be shifted.

11. SCPI COMMAND REFERENCE (Uplink)

This chapter describes the SCPI command reference for this instrument.

11.1 Command Reference Format

This section describes the format and layout used to describe commands in this chapter.

Each description includes the following items:

Function description

SCPI command

Parameter

Query reply

- [Function description]

  The usage of commands and operations in this instrument.

- [SCPI command]

  The SCPI command displays the syntax of a command sent from the external controller to this instrument. The syntax consists of a command and a number of parameters. The command and the parameters are separated by a space.

  If a command has multiple parameters, they are separated by commas (,). The three points (...) displayed between commas represent the parameter(s) omitted at that position.

  For example, the description <numeric value 1>,..., <numeric value 4> shows that four parameters, <numeric value 1>, <numeric value 2>, <numeric value 3>, and <numeric value 4>, are required.

  If the parameter is a character string type such as <character string>,<character string 1>, the parameter must be enclosed in double quotation marks (" "). If the parameter is <block>, it shows the block format data.

  Text written in lowercase alphabetic characters in the syntax can be omitted.

  For example, ":CALibration:CABLe" can be abbreviated to ":CAL:CABL."

  The marks used in the syntax are defined as follows:

< >:	Shows a parameter required for sending a command
[ ] :	Shows that the command is optional It can be omitted
{ }:	Shows that only one item is required to be selected from multiple items
|:	Used as a delimiter for multiple items written in curly brackets {..}
<ch>:	Written in the command header and shows the target input channel number of the command The channel number can be omitted. However, when it is written, channel number 1 is selected
<screen>:	Written in the command header and shows the target screen number of the command The screen number can be omitted. However, when it is written, a value from 1 to 4 can be selected [{1|2|3|4}]

For example: If the syntax below is specified, :CALC:CORR:EDEL:TIME 0.1 and : CALCULATE1:SELECTED:CORR:EDEL:TIME 25E-3 are valid.

Syntax: CALCulate{[1]|2|3|4}[:SELected]:CORRection:EDELay:TIME <numeric value>

- [Parameter]

  Describes a parameter required for sending a command.

  If the parameter is numeric type or alphabetic, it is enclosed in angle brackets (< >).

  If the parameter is optional, it is enclosed in curly brackets ({ }).

  In this manual, parameter types are described in the following formats:

  < int >: A numeric value that can be input in the format NR1, NR2, or NR3 and rounded to an integer in this instrument

  < real >: A numeric value that can be input in the format NR1, NR2, or NR3 and rounded to a valid-digit real number in this instrument

  < bool >: Either OFF or ON can be entered.

  < str >: A character string enclosed in quotation (' ') or double quotation (" ") marks.

  <block>: Block data type
  The data content is an 8-bit binary data array

  < type >: Character data selected from multiple types

- [Query reply]

  When there is a query reply to the command, the data format used for reading the query is described.

  Each parameter to be read is enclosed in curly brackets ({ }). If multiple items, which are delimited by a vertical bar (|), exist in curly brackets ({ }), only one of those items is read out. If parameters are delimited by commas (,) multiple parameters can be read out. The three points (...) displayed between commas represent data omitted from that position. For example, the description {numeric value 1},..., {numeric value 4} shows that four parameters {numeric value 1}, {numeric value 2}, {numeric value 3}, and {numeric value 4} are read.

  If the parameter to be read is enclosed in square brackets ([ ]), the parameter may be omitted, depending on the measurement result, etc.

  If the parameter to be read is a value in a unit, a description such as "Unit: dBm" is added to display the unit of the parameter value. However, only when the parameter is described in a level unit "dBm", the level unit selected at that time will be applied to the parameter.

11.2 Common Commands

This section describes common IEEE commands.

Function description	SCPI Command	Parameter	Query reply	Remarks
Clears the status byte and related data	*CLS	-	-	
Macro definition for GET	*DDT	<block>	<block>	*1
Sets the standard event status enable register	*ESE	<int>	<int>	
Reads the standard event status register	*ESR?	-	<int>	
Device inquiry	*IDN?	-	<str>	*2
Notifies when all running operations are complete	*OPC	-	1	
Loads the device settings	*RCL	<int>|POFF	-	*3
Resets the device	*RST	-	-	
Saves the device settings	*SAV	<int>	<int>	
Sets the service request enable register	*SRE	<int>	<int>	
Reads the status byte register	*STB?	-	<int>	
Triggers the device	*TRG	-	-	
Waits until all running operations are complete	*WAI	-	-	

*1: If the *DDT? command is executed when the macro is undefined, a zero-length block data (#10) is returned.
*2: <str> is output in the following format: maker name, model name, serial number and version number.
*3: POFF indicates the parameter settings when the power was last switched off.

11.3 List of Commands

11.3.1 Subsystem-SYSTem

Function description	SCPI command	Parameter	Query reply	Remarks
Config				
Measurement system selection	:SYSTem:SELect	SANalyzer|MANalyzer	SAN|MAN	
Modulation				
Modulation analysis system selection	:SYSTem:SELect:MODulation	CDMA2KUL	CDMA2KUL	
Preset				
Each measurement system parameter initialization	:SYSTem:PRESet	–	–	
All measurement systems initialization	:SYSTem:PRESet:ALL	–	–	
Log				
Inquiry about the error that occurred last	:SYSTem:ERRor?	–	<int>,<str>	
Inquiry about the details of the error log	:SYSTem:ERRor:ALL?	–	<int>,<str>	

11.3.2 Subsystem-INPut

Function description	SCPI command	Parameter	Query reply	Remarks
ATT/Preamp				
ATT setting	:INPut:ATTenuation	<real>	<real>	
ATT Auto/Manual	:INPut:ATTenuation:AUTO	OFF|ON	OFF|ON	
Min ATT setting	:INPut:ATTenuation:MINimum	<real>	<real>	
Min ATT ON/OFF	:INPut:ATTenuation:MINimum:STATe	OFF|ON	OFF|ON	
Preamp ON/OFF	:INPut:GAIN:STATe	OFF|ON	OFF|ON	
Input Setup				
Input Signal RF/Baseband	:INPut:SIGNal	RF|BASeband	RF|BAS	
Baseband Input AC/DC	:INPut:BASeband	AC|DC	AC|DC	
IQ Inverse ON/OFF	:INPut:IQ:INVerse	OFF|ON	OFF|ON	

11.3.3 Subsystem-CONFigure

Function description	SCPI command	Parameter	Query reply	Remarks
Meas Mode				
Switching the mode to cdmaOne	:CONFigure:CDMAONE	–	–	
Switching the mode to cdma2000	:CONFigure:CDMA2K	–	–	

11.3.4 Subsystem-SENSe

Function description	SCPI command	Parameter	Query reply	Remarks
Frequency				
Center Freq setting	[:SENSe]:FREQuency:CENTer	<real>	<real>	
Freq Offset setting	[:SENSe]:FREQuency:OFFSet	<real>	<real>	
Freq Offset ON/OFF	[:SENSe]:FREQuency:OFFSet:STATe	OFF|ON	OFF|ON	
Channel Number setting	[:SENSe]:FREQuency:CHANnel:NUMBer	<int>	<int>	
Auto Level Set				
Auto Level Set execution	[:SENSe]:POWer:LEVel:AUTO	–	–	
Meas Parameters (cdmaOne mode)				
Meas Length setting	[:SENSe]:CONDition:CDMAONE:MLENgth	<int>	<int>	
Freq Meas Range setting	[:SENSe]:CONDition:CDMAONE:FMRange	NORMal|EXPand	NORM|EXP	
IQ Origin Offset setting	[:SENSe]:CONDition:CDMAONE:IQOoffset	INCLude|EXCLude	INCL|EXCL	
Average (cdmaOne mode)				
Average ON/OFF	[:SENSe]:CONDition:CDMAONE:AVERage[:STATe]	OFF|ON	OFF|ON	
Average setting	[:SENSe]:CONDition:CDMAONE:AVERage:COUNt	<int>	<int>	
Meas Parameters (cdma2000 mode)				
User Table setting	[:SENSe]:CONDition:UTABle	NOT|USE	NOT|USE	
Meas Length setting	[:SENSe]:CONDition:MLENgth	<int>	<int>	
PN Delay Search ON/OFF	[:SENSe]:CONDition:PNDSearch	OFF|ON	OFF|ON	
PN Delay setting	[:SENSe]:CONDition:PNDelay	<int>	<int>	
Freq Meas Range setting	[:SENSe]:CONDition:FMRange	NORMal|EXPand	NORM|EXP	
Threshold Level setting	[:SENSe]:CONDition:THReashold	<int>	<int>	
IQ Origin Offset setting	[:SENSe]:CONDition:IQOoffset	INCLude|EXCLude	INCL|EXCL	
Peak Inact CH Component setting	[:SENSe]:CONDition:PICComponent	BOTH|EITHer	BOTH|EITH	
Δτ ON/OFF	[:SENSe]:CONDition:DTAU	OFF|ON	OFF|ON	
Δθ ON/OFF	[:SENSe]:CONDition:DTHeta	OFF|ON	OFF|ON	

11.3.4 Subsystem-SENSe

Function description	SCPI command	Parameter	Query reply	Remarks
Chip Rate Error ON/OFF	[:SENSe]:CONDition:CRERror	OFF|ON	OFF|ON	
Quadrature Error ON/OFF	[:SENSe]:CONDition:QERRor	OFF|ON	OFF|ON	
Walsh Code Length setting	[:SENSe]:CONDition:WCLength	<int>	<int>	
User Table (cdma2000 mode)				
SPICH Walsh Function setting	[:SENSe]:CONDition:UTABle:SPICH:WFUNCtion	OFF|W32C64	OFF|W32C64	
EACH/CCCH Walsh Function setting	[:SENSe]:CONDition:UTABle:EACCCH:WFUNCtion	OFF|W2C8	OFF|W2C8	
PDCCH Walsh Function setting	[:SENSe]:CONDition:UTABle:PDCCH:WFUNCtion	OFF|W48C64	OFF|W48C64	
REQCH Walsh Function setting	[:SENSe]:CONDition:UTABle:REQCH:WFUNCtion	OFF|W8C16	OFF|W8C16	
DCCH Walsh Function setting	[:SENSe]:CONDition:UTABle:DCCH:WFUNCtion	OFF|W8C16	OFF|W8C16	
ACKCH Walsh Function setting	[:SENSe]:CONDition:UTABle:ACKCH:WFUNCtion	OFF|W16C64	OFF|W16C64	
CQICH Walsh Function setting	[:SENSe]:CONDition:UTABle:CQICH:WFUNCtion	OFF|W12C16	OFF|W12C16	
CQICH Modulation setting	[:SENSe]:CONDition:UTABle:CQICH:MODulation	BPSKI| BPSKQ	BPSKI| BPSKQ	
FCH Walsh Function setting	[:SENSe]:CONDition:UTABle:FCH:WFUNCtion	OFF|W4C16	OFF|W4C16	
SCH1 Walsh Function setting	[:SENSe]:CONDition:UTABle:SCH1:WFUNCtion	OFF|W1C2| W2C4	OFF|W1C2| W2C4	
SCH1 Repetition Factor setting	[:SENSe]:CONDition:UTABle:SCH1:RFACtor	<int>	<int>	
SCH2 Walsh Function setting	[:SENSe]:CONDition:UTABle:SCH2:WFUNCtion	OFF|W2C4| W6C8	OFF|W2C4| W6C8	
SCH2 Repetition Factor setting	[:SENSe]:CONDition:UTABle:SCH2:RFACtor	<int>	<int>	
PDCH Walsh Function setting	[:SENSe]:CONDition:UTABle:PDCH:WFUNCtion	OFF|W1C2| W2C4| W1C2W2C4	OFF|W1C2| W2C4| W1C2W2C4	
PDCH Modulation setting	[:SENSe]:CONDition:UTABle:PDCH:MODulation	BPSKI|QPSK| PSK8	BPSKI|QPSK| PSK8	
Average (cdma2000 mode)				
Average ON/OFF	[:SENSe]:CONDition:AVERage[:STATe]	OFF|ON	OFF|ON	
Average setting	[:SENSe]:CONDition:AVERage:COUNt	<int>	<int>	

11.3.5 Subsystem-TRIGger

Function description	SCPI command	Parameter	Query reply	Remarks
Trigger				
Trigger Source setting	:TRIGger[:SEQuence]:SOURce	IMMediate|IF|EXTernal1|EXTernal2|LINK	IMM|IF|EXT1|EXT2|LINK	
IF Power setting	:TRIGger[:SEQuence]:LEVel:IF	<real>	<real>	
Ext2 Trigger Level setting	:TRIGger[:SEQuence]:LEVel:EXTernal	<real>	<real>	
Trigger Slope +/-	:TRIGger[:SEQuence]:SLOPe	POSitive|NEGative	POS|NEG	
Trigger Delay setting	:TRIGger[:SEQuence]:DELay	<real>	<real>	
Interval ON/OFF	:TRIGger[:SEQuence]:INTerval:STATe	OFF|ON	OFF|ON	

11.3.6 Subsystem-INITiate

Function description	SCPI command	Parameter	Query reply	Remarks
INITiate				
Single measurement execution	:INITiate:MEASure:SINGle	–	–	
Repeat measurement execution	:INITiate:MEASure:REPeat	–	–	
Analysis Restart execution	:INITiate:RESTart	–	–	
Stop execution	:INITiate:ABORt	–	–	

11.3.7 Subsystem-CALCulate

Function description	SCPI command	Parameter	Query reply	Remarks
Marker				
Marker ON/OFF	:CALCulate:MARKer<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Active CH Marker ON/OFF	:CALCulate:ACMarker<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Marker position setting Constellation I Eye Diagram Q Eye Diagram Null Offset Constellation Null Offset I Eye Diagram Null Offset Q Eye Diagram	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>	<int>	<Chip No.>
Marker I reading Constellation I Eye Diagram Null Offset Constellation Null Offset I Eye Diagram	:CALCulate:MARKer<scrn=1|2|3|4>:I	–	<real>	<I>
Marker Q reading Constellation Q Eye Diagram Null Offset Constellation Null Offset Q Eye Diagram	:CALCulate:MARKer<scrn=1|2|3|4>:Q	–	<real>	<Q>
Marker X setting EVM vs Chip Mag Error vs Chip Phase Error vs Chip	:CALCulate:MARKer<scrn=1|2|3|4>:X	<real>	<real>	<Chip No.>
Marker Y reading EVM vs Chip	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<EVM>
Marker Y reading Mag Error vs Chip	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Mag Error>
Marker Y reading Phase Error vs Chip	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Phase Error>
Marker X setting ρ(I) vs Code ρ(Q) vs Code ρ vs Code Code Power vs Code	:CALCulate:MARKer<scrn=1|2|3|4>:X	<real>	<real>	<Marker Pos>
Marker Y reading ρ(I) vs Code ρ(Q) vs Code	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>, <int>, <real>, <real>	<Walsh Len>, <Walsh Code>, <Rate>, <ρ>
Marker Y reading ρ vs Code Code Power vs Code	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>, <int>, <real>, <real>, <real>, <real>	<Walsh Len>, <Walsh Code>, <Rate>, <ρ>, <Power[dB]>, <Power[W]>

Function description	SCPI command	Parameter	Query reply	Remarks
Active CH. Marker X setting ρ(I) vs Code ρ(Q) vs Code Δτ(I) vs Code Δτ(Q) vs Code Δθ(I) vs Code Δθ(Q) vs Code ρ vs Code Code Power vs Code	:CALCulate:ACMarker<scrn=1|2|3|4>:X	<real>	<real>	<Marker Pos>
Active CH. Marker Y reading ρ(I) vs Code ρ(Q) vs Code Δτ(I) vs Code Δτ(Q) vs Code Δθ(I) vs Code Δθ(Q) vs Code	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>, <int>, <real>, <real>, <string>, <real>, <real>	<Walsh Len>, <Walsh Code>, <Rate>, <ρ>, <"BPSK"| "QPSK"| "8PSK">, <Δτ>, <Δθ>
Active CH. Marker Y reading ρ vs Code Code Power vs Code	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>, <int>, <real>, <real>, <real>, <real>, <string>	<Walsh Len>, <Walsh Code>, <Rate>, <ρ>, <Power[dB]>, <Power[W]>, <"BPSK"| "QPSK"| "8PSK">

11.3.8 Subsystem-DISPlay

Function description	SCPI command	Parameter	Query reply	Remarks
Level				
Ref Level setting	:DISPlay:TRACe:Y[:SCALe]:RLEVel	<real>	<real>	
Ref Offset setting	:DISPlay:TRACe:Y[:SCALe]:RLEVel:OFFSet	<real>	<real>	
Ref Offset ON/OFF	:DISPlay:TRACe:Y[:SCALe]:RLEVel:OFFSet:STATe	OFF|ON	OFF|ON	
Display				
Screen division setting	:DISPlay	SINGle| DUAL|QUAD	SING|DUAL| QUAD	
Window Format (cdmaOne mode)				
Results display format selection	:DISPlay:CDMAONE:WINDow<scrn=1|2|3|4> :FORMat	TRESult| CONStellation| IEYE|QEYE| NOConstella- tion| NOIEye| NOQEye| EVM| MERRor| PERRor	TRES|CONS| IEYE|QEYE| NOC|NOIE| NOQE|EVM| MERR|PERR	
Constellation Display Type selection	:DISPlay:CDMAONE:WINDow<scrn=1|2|3|4> :CONStellation:TYPE	TDOT|LINE| DOT	TDOT|LINE| DOT	
Window Format (cdma2000 mode)				
Constellation display type selection	:DISPlay:WINDow<scrn=1|2|3|4>:FORMat	TRESult| RHO|CPOWer| IRHO|QRHO| IDTau|QDTau| IDTHeta| QDTHeta| CONStellation| IEYE|QEYE| EVM| MERRor| PERRor	TRES|RHO| CPOW|IRHO| QRHO|IDT| QDT|IDTH| QDTH|CONS| IEYE|QEYE| EVM|MERR| PERR	
vs Code Display Type selection	:DISPlay:WINDow<scrn=1|2|3|4>:VSCode:TYPE	GRAPh| TABLe	GRAP|TABL	
Constellation Display Type selection	:DISPlay:WINDow<scrn=1|2|3|4>:CONStellation :TYPE	TDOT|LINE| DOT	TDOT|LINE| DOT	
Scale				
X Scale Left setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :X[:SCALe]:LEFT	<real>	<real>	
X Scale Right setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :X[:SCALe]:RIGHt	<real>	<real>	
Y Scale Upper setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :Y[:SCALe]:UPPer	<real>	<real>	
Y Scale Lower setting	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :Y[:SCALe]:LOWer	<real>	<real>	

11.3.9 Subsystem-MMEMory

Function description	SCPI command	Parameter	Query reply	Remarks
Save/Load				
Saving the settings of this instrument	:MMEMory:STORe:STATe	<int>	–	*1
Loading the settings of this instrument	:MMEMory:LOAD:STATe	<int>	–	*1
Measurement condition Save selection	:MMEMory:SELect:ITEM:CDMA2KUL:SETup	OFF|ON	OFF|ON	

*1: A number, which is a maximum of 4-digit and is added to the file name of the data to be saved or loaded, must be specified in <int>.

11.3.10 Subsystem-MEASure

Function description	SCPI command	Parameter	Query reply	Remarks
Measure/Read				
ρ reading	:MEASure:TRESult:RHO	–	<real>	
Frequency Error reading	:MEASure:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Magnitude Error reading	:MEASure:TRESult:MERRor	–	<real>	
Phase Error reading	:MEASure:TRESult:PERRor	–	<real>	
EVM reading	:MEASure:TRESult:EVM	–	<real>	
I/Q Origin Offset reading	:MEASure:TRESult:IQOFfset	–	<real>	
Tx Power reading	:MEASure:TRESult:POWer	–	<real>,<real>	<dBm>,<W>
Pilot Power reading	:MEASure:TRESult:PPOWer	–	<real>,<real>	<dBm>,<W>
τ reading	:MEASure:TRESult:TAU	–	<real>	
PN Delay reading	:MEASure:TRESult:PNDelay	–	<int>	
Peak Inactive ρ reading	:MEASure:TRESult:PIRHo	–	<real>, <int>, <int>, <string>	<ρ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δτ reading	:MEASure:TRESult:PDTau	–	<real>, <int>, <int>, <string>	<Δτ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δθ reading	:MEASure:TRESult:PDTHeta	–	<real>, <int>, <int>, <string>	<Δθ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Chip Rate Error reading	:MEASure:TRESult:CRERror	–	<real>	
Quadrature Error reading	:MEASure:TRESult:QERRor	–	<real>	

Function description	SCPI command	Parameter	Query reply	Remarks
Active Channel reading	:MEASure:TRESult:ACHannel	–	<int>	
Active I Code reading	:MEASure:TRESult:ACI	–	<int>	
Active Q Code reading	:MEASure:TRESult:ACQ	–	<int>	

11.3.11 Subsystem-READ

Function description	SCPI command	Parameter	Query reply	Remarks
Measure/Read				
ρ reading	:READ:TRESult:RHO	–	<real>	
Frequency Error reading	:READ:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Magnitude Error reading	:READ:TRESult:MERRor	–	<real>	
Phase Error reading	:READ:TRESult:PERRor	–	<real>	
EVM reading	:READ:TRESult:EVM	–	<real>	
I/Q Origin Offset reading	:READ:TRESult:IQOFfset	–	<real>	
Tx Power reading	:READ:TRESult:POWer	–	<real>,<real>	<dBm>,<W>
Pilot Power reading	:READ:TRESult:PPOWer	–	<real>,<real>	<dBm>,<W>
τ reading	:READ:TRESult:TAU	–	<real>	
PN Delay reading	:READ:TRESult:PNDelay	–	<int>	
Peak Inactive ρ reading	:READ:TRESult:PIRHo	–	<real>, <int>, <int>, <string>	<ρ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δτ reading	:READ:TRESult:PDTau	–	<real>, <int>, <int>, <string>	<Δτ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δθ reading	:READ:TRESult:PDTHeta	–	<real>, <int>, <int>, <string>	<Δθ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Chip Rate Error reading	:READ:TRESult:CRERror	–	<real>	
Quadrature Error reading	:READ:TRESult:QERRor	–	<real>	
Active Channel reading	:READ:TRESult:ACHannel	–	<int>	
Active I Code reading	:READ:TRESult:ACI	–	<int>	
Active Q Code reading	:READ:TRESult:ACQ	–	<int>	

11.3.12 Subsystem-FETCh

Function description	SCPI command	Parameter	Query reply	Remarks
Read				
ρ reading	:FETCh:TRESult:RHO	–	<real>	
Frequency Error reading	:FETCh:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Magnitude Error reading	:FETCh:TRESult:MERRor	–	<real>	
Phase Error reading	:FETCh:TRESult:PERRor	–	<real>	
EVM reading	:FETCh:TRESult:EVM	–	<real>	
I/Q Origin Offset reading	:FETCh:TRESult:IQOFfset	–	<real>	
Tx Power reading	:FETCh:TRESult:POWer	–	<real>,<real>	<dBm>,<W>
Pilot Power reading	:FETCh:TRESult:PPOWer	–	<real>,<real>	<dBm>,<W>
τ reading	:FETCh:TRESult:TAU	–	<real>	
PN Delay reading	:FETCh:TRESult:PNDelay	–	<int>	
Peak Inactive ρ reading	:FETCh:TRESult:PIRHo	–	<real>, <int>, <int>, <string>	<ρ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δτ reading	:FETCh:TRESult:PDTau	–	<real>, <int>, <int>, <string>	<Δτ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Peak Δθ reading	:FETCh:TRESult:PDTHeta	–	<real>, <int>, <int>, <string>	<Δθ>, <Walsh Code>, <Walsh Len>, <"I","Q"or"I&Q">
Chip Rate Error reading	:FETCh:TRESult:CRERror	–	<real>	
Quadrature Error reading	:FETCh:TRESult:QERRor	–	<real>	
Active Channel reading	:FETCh:TRESult:ACHannel	–	<int>	
Active I Code reading	:FETCh:TRESult:ACI	–	<int>	
Active Q Code reading	:FETCh:TRESult:ACQ	–	<int>	

11.3.13 Subsystem-STATus

Function description	SCPI command	Parameter	Query reply	Remarks
STATus				
Standard Operation Enable Register setting	:STATus:OPERation:ENABle	<int>	<int>	
Standard Operation Event Register reading	:STATus:OPERation:EVENt	–	<int>	
Questionable Enable Register setting	:STATus:QUEStionable:ENABle	<int>	<int>	
Questionable Event Register reading	:STATus:QUEStionable:EVENt	–	<int>	
Measuring Enable Register setting	:STATus:OPERation:MEASure:ENABle	<int>	<int>	
Measuring Event Register reading	:STATus:OPERation:MEASure:EVENt	–	<int>	

11.3.14 Subsystem-HCOPy

Function description	SCPI command	Parameter	Query reply	Remarks
HCOPy				
Copy output to the file or printer	:HCOPy[:IMMediate]	–	–	
Specification of the output destination (file or printer)	:HCOPy:DESTination	MMEMory|PRINt	MMEM|PRIN	
Specification of the output file number	:HCOPy:MMEMory:FILE:NUMBer	<int>	<int>	
Specification of the output file type	:HCOPy:MMEMory:FILE:TYPE	BITMap|PNGraphic	BITM|PNG	

11.4 Status Register

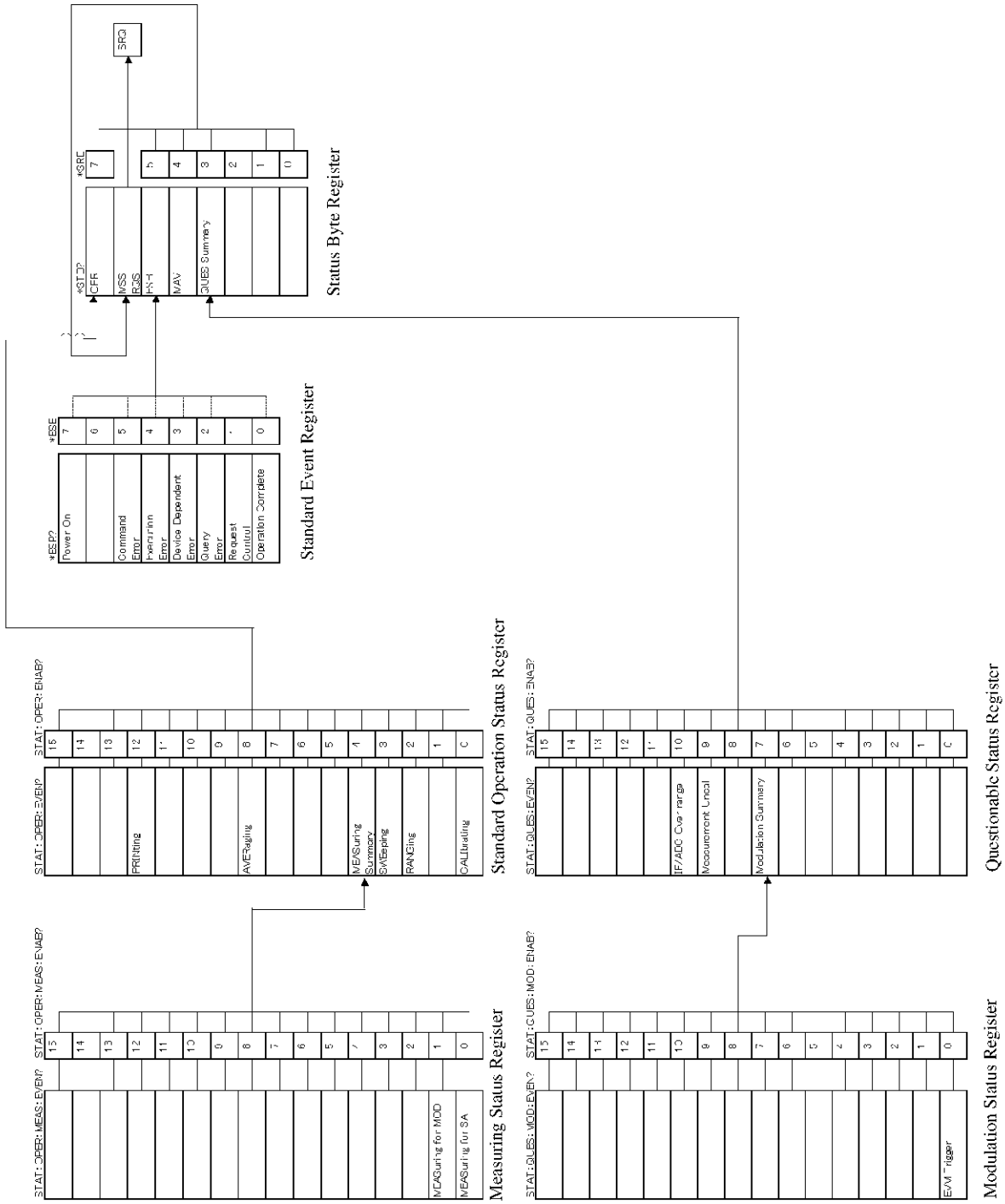


Figure 11-1 Status Registers

12. PERFORMANCE VERIFICATION (Uplink)

This chapter describes how to check whether the performance of this instrument meets the specifications.

It is recommended that you copy the test data record sheet included at the end of this chapter and save it as a record of the performance test.

IMPORTANT: Before verifying the performance, warm-up and completely calibrate the instrument.

12.1 Test Signal Specifications

The test signals used for verifying the performance are shown below:

Table 12-1 List of Test Signal Specifications

<table>
<tr><th>No.</th><th>Test signal name</th><th>Signal specifications</th><th>Test item</th></tr>
<tr><td>1</td><td>Offset QPSK signal</td><td>Compliant with IS-98.
Modulation format: Offset QPSK</td><td>Uplink measurement
cdmaOne mode</td></tr>
<tr><td>2</td><td>Code multiplex signal</td><td>Compliant with IS-98.
Long Code Mask: ALL 0
Reverse Traffic Channel
<table>
<tr><th>Channel</th><th>Walsh function</th><th>Amplitude</th></tr>
<tr><td>PICH</td><td>W_0^{64}</td><td>-6.99 dB</td></tr>
<tr><td>DCCH</td><td>W_8^{16}</td><td>-6.99 dB</td></tr>
<tr><td>SCH2</td><td>W_6^{8}(M=2)</td><td>-6.99 dB</td></tr>
<tr><td>FCH</td><td>W_4^{16}</td><td>-6.99 dB</td></tr>
<tr><td>SCH1</td><td>W_2^{4}(M=4)</td><td>-6.99 dB</td></tr>
</table>
M: Walsh Function Repetition Factor</td><td>Uplink measurement
cdma2000 mode</td></tr>
</table>

12.2 Test Procedures

This section describes each test procedure.

12.2.1 Offset QPSK Signal Measurement in RF Input

Connect the signal source as shown below:

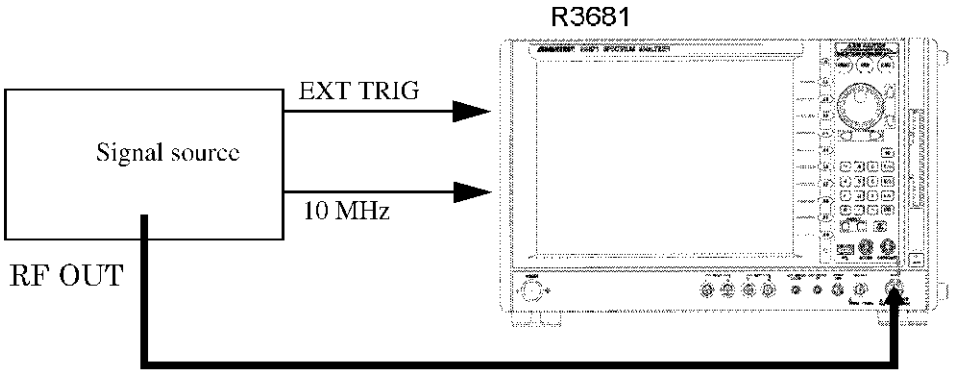


Figure 12-1 Connecting the Test Signal (RF Input)

1. Output the Offset QPSK signal, which has a carrier frequency of 825.03 MHz and a level of -10 dBm, from the signal source.
2. Set this unit as follows:

{MEAS MODE}:	**cdmaOne**		
{MEAS SETUP}:	**Meas Parameters**		
	[Meas Length]:		800 chip
	[Freq Meas Range]:		EXPAND
	[IQ Origin Offset]:		INCLUDE
{INPUT}:	**Input**	RF	
{TRIGGER}:	**Trigger Source**	Ext1	
{FREQ}:	**Center**	825.03 MHz	
{LEVEL}:	Execute **Auto Level Set**		

3. Press the **SINGLE** button on this unit to perform measurements.
4. Write the measurement results in the test data record sheet.

12.2.2 Code Multiplex Signal Measurement in RF Input

Connect the signal source as shown below:

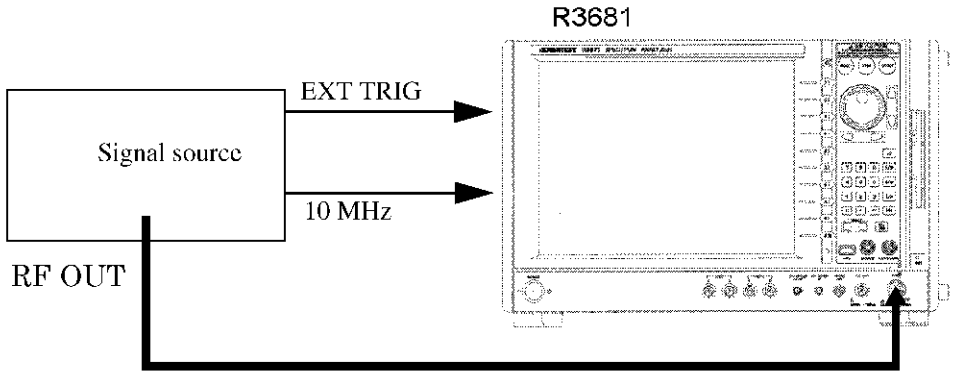


Figure 12-2 Connecting the Test Signal (RF Input)

1. Output the code multiplex signal, which has a carrier frequency of 825.03 MHz and a level of -10 dBm, from the signal source.
2. Set this unit as follows:

{MEAS MODE}: **cdma2000**

{MEAS SETUP}: **Meas Parameters**

[User Table]:	USE
[Meas Length]:	1536 chip
[PN Delay Search]:	ON
[Freq Meas Range]:	EXPAND
[Threshold Level]:	-23 dB
[IQ Origin Offset]:	INCLUDE
[Peak Inact CH Component]:	Both Inact
[Δτ]:	ON
[Δθ]:	ON
[Chip Rate Error]:	ON
[Quadrature Error]:	ON
[Walsh Code Length]:	64

User Table

[SPICH Walsh Func]:	OFF
[EACH/CCCH Walsh Func]:	OFF
[PDCCH Walsh Func]:	OFF
[REQCH Walsh Func]:	OFF
[DCCH Walsh Func]:	W16(8)
[ACKCH Walsh Func]:	OFF
[CQICH Walsh Func]:	OFF

	[FCH Walsh Func]:	W16(4)
	[SCH1 Walsh Func]:	W4(2)
	[Repetition Factor]:	4
	[SCH2 Walsh Func]:	W8(6)
	[Repetition Factor]:	2
	[PDCH Walsh Func]:	OFF
{INPUT}:	**Input**	RF
{TRIGGER}:	**Trigger Source**	Ext1
{FREQ}:	**Center**	825.03 MHz
{LEVEL}:	Execute **Auto Level Set**	

3. Press the **SINGLE** button on this unit to perform measurements.
4. Write the measurement results in the test data record sheet.

12.2.3 Code Multiplex Signal Measurement in IQ Input

Connect the signal source as shown below:

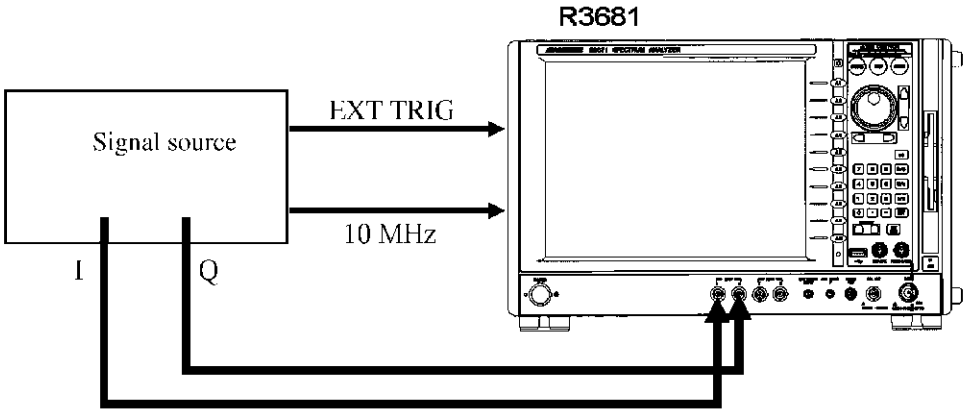


Figure 12-3 Connecting the Test Signal (IQ Input)

1. Output the code multiplex signal (Baseband signal) from the signal source.
2. Set this unit as follows:

{MEAS MODE}: **cdma2000**

{MEAS SETUP}: **Meas Parameters**

[User Table]:	USE
[Meas Length]:	1536 chip
[PN Delay Search]:	ON
[Freq Meas Range]:	EXPAND
[Threshold Level]:	-23 dB
[IQ Origin Offset]:	INCLUDE
[Peak Inact CH Component]:	Both Inact
[Δτ]:	ON
[Δθ]:	ON
[Chip Rate Error]:	ON
[Quadrature Error]:	ON
[Walsh Code Length]:	64

User Table

[SPICH Walsh Func]:	OFF
[EACH/CCCH Walsh Func]:	OFF
[PDCCH Walsh Func]:	OFF
[REQCH Walsh Func]:	OFF
[DCCH Walsh Func]:	W16(8)
[ACKCH Walsh Func]:	OFF
[CQICH Walsh Func]:	OFF

	[FCH Walsh Func]:	W16(4)
	[SCH1 Walsh Func]:	W4(2)
	[Repetition Factor]:	4
	[SCH2 Walsh Func]:	W8(6)
	[Repetition Factor]:	2
	[PDCH Walsh Func]:	OFF
{INPUT}:	**Input**	Baseband(I&Q)
	Baseband Input	DC
{TRIGGER}:	**Trigger Source**	Ext1

3. Press the **SINGLE** button on this unit to perform measurements.
4. Write the measurement results in the test data record sheet.

12.3 Test Data Record Sheet

Test data record sheet

Model name:

Serial number:

1. Offset QPSK Signal Measurement in RF Input

Test item	Specifications			Pass / Fail
	Minimum value	Measured value	Maximum value	
Carrier frequency error	-10 Hz		+10 Hz	
Transmission power	-10.9 dBm		-9.1 dBm	

2. Code Multiplex Signal Measurement in RF Input

Test item		Specifications			Pass / Fail
		Minimum value	Measured value	Maximum value	
Carrier frequency error		-10 Hz		+10 Hz	
ρ_i	Channel				
	PICH: W_0^{64}	-7.09 dB		-6.89 dB	
	DCCH: W_8^{16}	-7.09 dB		-6.89 dB	
	FCH: W_4^{16}	-7.09 dB		-6.89 dB	
	SCH1: W_2^{16}	-7.09 dB		-6.89 dB	
	SCH2: W_6^{16}	-7.09 dB		-6.89 dB	
$\Delta\tau_i$	Channel				
	DCCH: W_8^{16}	-10 ns		+10 ns	
	SCH2: W_6^{16}	-10 ns		+10 ns	
	FCH: W_4^{16}	-10 ns		+10 ns	
	SCH1: W_2^{16}	-10 ns		+10 ns	
$\Delta\theta_i$	Channel				
	DCCH: W_8^{16}	-10 mrad		+10 mrad	
	SCH2: W_6^{16}	-10 mrad		+10 mrad	
	FCH: W_4^{16}	-10 mrad		+10 mrad	
	SCH1: W_2^{16}	-10 mrad		+10 mrad	
Transmission power		-10.9 dBm		-9.1 dBm	

12.3 Test Data Record Sheet

or

Test item		Specifications			Pass / Fail
		Minimum value	Measured value	Maximum value	
Carrier frequency error		-10 Hz		+10 Hz	
ρ_i	Channel				
	PICH: W_0^{64}	-7.09 dB		-6.89 dB	
	DCCH: W_8^{16}	-7.09 dB		-6.89 dB	
	FCH: W_4^{16}	-7.09 dB		-6.89 dB	
	SCH1: W_2^{16}	-7.09 dB		-6.89 dB	
	SCH2: W_6^{16}	-7.09 dB		-6.89 dB	
Peak $\Delta\tau$		-10 ns		+10 ns	
Peak $\Delta\theta$		-10 mrad		+10 mrad	
Transmission power		-10.9 dBm		-9.1 dBm	

3. Code Multiplex Signal Measurement in IQ Input

Test item		Specifications			Pass / Fail
		Minimum value	Measured value	Maximum value	
ρ_i	Channel				
	PICH: W_0^{64}	-7.09 dB		-6.89 dB	
	DCCH: W_8^{16}	-7.09 dB		-6.89 dB	
	FCH: W_4^{16}	-7.09 dB		-6.89 dB	
	SCH1: W_2^{16}	-7.09 dB		-6.89 dB	
	SCH2: W_6^{16}	-7.09 dB		-6.89 dB	
$\Delta\tau_i$	Channel				
	DCCH: W_8^{16}	-10 ns		+10 ns	
	SCH2: W_6^{16}	-10 ns		+10 ns	
	FCH: W_4^{16}	-10 ns		+10 ns	
	SCH1: W_2^{16}	-10 ns		+10 ns	
$\Delta\theta_i$	Channel				
	DCCH: W_8^{16}	-10 mrad		+10 mrad	
	SCH2: W_6^{16}	-10 mrad		+10 mrad	
	FCH: W_4^{16}	-10 mrad		+10 mrad	
	SCH1: W_2^{16}	-10 mrad		+10 mrad	

or

Test item		Specifications			Pass / Fail
		Minimum value	Measured value	Maximum value	
ρ_i	Channel				
	PICH: W_0^{64}	-7.09 dB		-6.89 dB	
	DCCH: W_8^{16}	-7.09 dB		-6.89 dB	
	FCH: W_4^{16}	-7.09 dB		-6.89 dB	
	SCH1: W_2^{16}	-7.09 dB		-6.89 dB	
	SCH2: W_6^{16}	-7.09 dB		-6.89 dB	
Peak $\Delta\tau$		-10 ns		+10 ns	
Peak $\Delta\theta$		-10 mrad		+10 mrad	

13. SPECIFICATIONS (Uplink)

13.1 cdma2000 Modulation Analysis Compliance System

Compliance with
3rd Generation Partnership Project 2 (3GPP2)
TSG-C Specifications
C.S0002-D v1.0(IS-2000.2)

13.2 cdma2000 Modulation Analysis Performance

13.2.1 cdmaOne Mode

Item	Specifications
Carrier frequency error	
Measurement range	<±10 kHz
Measurement accuracy	<±(Reference frequency accuracy × Carrier frequency + 10 Hz)
Transmission power measurement accuracy	±(0.3 + Frequency response + Calibration signal level accuracy) dB Frequency response 50 MHz to 2.5 GHz <±0.4 dB Calibration signal level accuracy <±0.2 dB

Measurement conditions

Item	Conditions
Temperature range	+20°C to +30°C
Signal	Compliant with IS-98.
Modulation format	Offset QPSK
Center frequency	800 MHz/2 GHz
Input level	-10 dBm (RF Input) 0.8 V_{P-P} (IQ Input)
ρ	>0.9999
Meas Length	800 chip
Freq Meas Range	EXPAND

13.2.2 cdma2000 Mode

Item	Specifications
Carrier frequency error	
Measurement range	<±4 kHz
Measurement accuracy	<±(Reference frequency accuracy × Carrier frequency + 10 Hz)
ρ_i measurement accuracy (ρ vs Code)	<±0.1 dB
$\Delta\tau_i$ measurement accuracy	<±10 ns
$\Delta\theta_i$ measurement accuracy	<±10 mrad
Transmission power measurement accuracy	±(0.3 + Frequency response + Calibration signal level accuracy) dB Frequency response 50 MHz to 2.5 GHz <±0.4 dB Calibration signal level accuracy <±0.2 dB

Measurement conditions

Item	Conditions
Temperature range	+20°C to +30°C
Signal	Compliant with IS-98. Long Code Mask: ALL 0 Reverse Traffic Channel

Channel	Walsh function	Amplitude
PICH	W_0^{64}	-6.99 dB
DCCH	W_8^{16}	-6.99 dB
SCH2	W_6^{8}(M=2)	-6.99 dB
FCH	W_4^{16}	-6.99 dB
SCH1	W_2^{4}(M=4)	-6.99 dB

M: Walsh Function Repetition Factor

Center frequency	800 MHz/2 GHz
Input level	-10 dBm (RF Input) 0.8 V_{P-P} (IQ Input)
ρ	>0.9999
$\Delta\tau_i$	0 ns
$\Delta\theta_i$	0 mrad
Meas Length	1536 chip
Freq Meas Range	EXPAND

APPENDIX

This section describes the following supplemental information:

A.1 Technical Data

A.2 Error Message List

A.1 Technical Data

Bit Reversal (Paley) Order

The order of the Walsh Code numbers, which is used in the cdma2000, is called the Hadamard order.

There is also an order called the Bit Reversal (Paley) order, which is different from the Hadamard order.

If the Walsh Codes are placed in the order of the Bit Reversal order, the tree-layered Walsh Code structure can be displayed according to the Walsh Code length.

The following example shows the comparison between the Hadamard order and the Bit Reversal order when the Walsh Code length is 8:

	8 × 8 matrix	Walsh Code number
The Walsh Code Hadamard order of the cdma2000	00000000	0
	01010101	1
	00110011	2
	01100110	3
	00001111	4
	01011010	5
	00111100	6
	01101001	7
Bit Reversal (Paley) Order	00000000	0
	00001111	4
	00110011	2
	00111100	6
	01010101	1
	01011010	5
	01100110	3
	01101001	7

The following lists show the Walsh Code Numbers which are placed in the order of the Bit Reversal (Paley) order when the Walsh Code Lengths are 4, 8, 16, 32, 64, and 128:

W4	W8	W16	W32	W64	W128
0	0	0	0	0	0
					64
				32	32
					96
			16	16	16
					80
				48	48
					112
		8	8	8	8
					72
				40	40
					104
			24	24	24
					88
				56	56
					120
	4	4	4	4	4
					68
				36	36
					100
			20	20	20
					84
				52	52
					116
		12	12	12	12
					76
				44	44
					108
			28	28	28
					92
				60	60
					124

W4	W8	W16	W32	W64	W128
2	2	2	2	2	2
					66
				34	34
					98
			18	18	18
					82
				50	50
					114
		10	10	10	10
					74
				42	42
					106
			26	26	26
					90
				58	58
					122
	6	6	6	6	6
					70
				38	38
					102
			22	22	22
					86
				54	54
					118
		14	14	14	14
					78
				46	46
					110
			30	30	30
					94
				62	62
					126

W4	W8	W16	W32	W64	W128
1	1	1	1	1	1
					65
				33	33
					97
			17	17	17
					81
				49	49
					113
		9	9	9	9
					73
				41	41
					105
			25	25	25
					89
				57	57
					121
	5	5	5	5	5
					69
				37	37
					101
			21	21	21
					85
				53	53
					117
		13	13	13	13
					77
				45	45
					109
			29	29	29
					93
				61	61
					125

W4	W8	W16	W32	W64	W128
3	3	3	3	3	3
					67
				35	35
					99
			19	19	19
					83
				51	51
					115
		11	11	11	11
					75
				43	43
					107
			27	27	27
					91
				59	59
					123
	7	7	7	7	7
					71
				39	39
					103
			23	23	23
					87
				55	55
					119
		15	15	15	15
					79
				47	47
					111
			31	31	31
					95
				63	63
					127

Bibliography

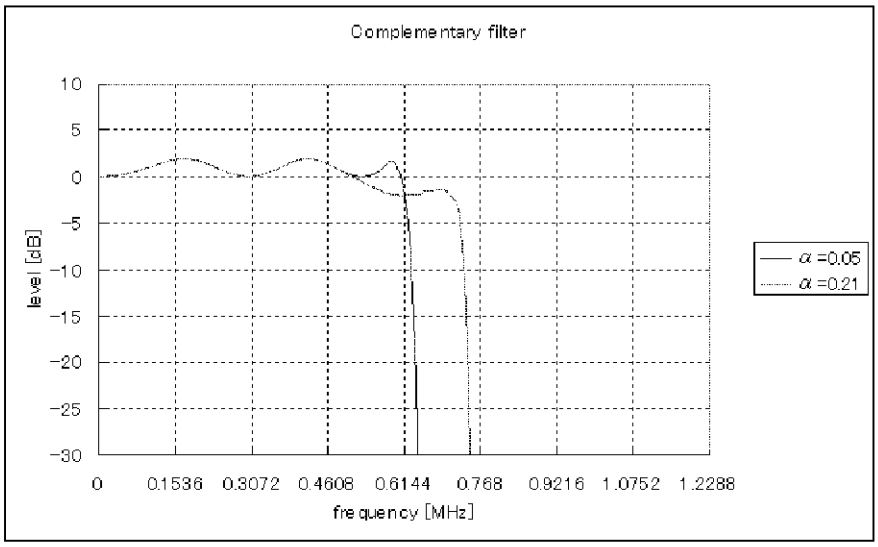
Endo, Yasushi. Walsh kaiseki [Walsh analysis]. Tokyo Denki University Press

Kiyasu, Zenichi. Hadamard gyouretsu to sono ouyou [The Hadamard matrix and its application]. The Institute of Electronics, Information and Communication Engineers.

Complementary Filter

The Complementary Filter is defined by the IS-97 and IS-98 (Waveform Quality Measurement Equipment) and is used to measure the waveform quality and code domain.

The Complementary Filter generates a signal that is equivalent to a signal that passed through the Nyquist filter. The IS-97 and IS-98 contain no regulations concerning the roll-off factor (α) of the Nyquist filter. In this instrument, α is defined as 0.05 in Downlink and 0.21 in Uplink.



Phase Equalizing Filter (Downlink)

The base station equalizes the phase of the signal, which travels down the transmission signal path, according to the IS-95 standard phase characteristics. The equalization filter is defined by the following formula:

$$H(\omega) = k \frac{\omega^2 + j\alpha\omega\omega_0 - \omega_0{}^2}{\omega^2 - j\alpha\omega\omega_0 - \omega_0{}^2}$$

k: Arbitrary gain

j: $\sqrt{-1}$

α: 1.36

ω_0: $2\pi*3.15*10^5$

ω: Angular frequency

If the phase equalizing filter is used in the base station, this instrument analyzes waveforms through a filter that has the inverse characteristics of the equalizing filter.

To analyze the waveforms, set **[Phase Equalizing Filter]** of **Meas Parameters** to ON.

Also, to analyze signals which have not been through the phase equalizing filter, set **[Phase Equalizing Filter]** of **Meas Parameters** to OFF.

How to specify the PCG and Code by using the marker on the graph (Downlink)

Four formats are included in the Format tab in the Window Format dialog box as follows:

1. **[All PCG & Code]** This format is used to measure all PCGs and codes.
2. **[Specified PCG]** This format is used to measure a PCG selected from all the PCGs in **[All PCG & Code]**.
3. **[Specified Code]** This format is used to measure a code selected from all the codes in **[All PCG & Code]**.
4. **[Specified PCG & Code]** This format is used to measure a specified PCG and code.

A PCG or code, which is specified by **[Specified PCG]**, **[Specified Code]**, or **[Specified PCG & Code]** can also be specified by using the marker on the **[All PCG & Code]**, **[Specified PCG],** and **[Specified Code]** graphs that are set in the **[Window Format]** dialog box in Figure A-1.

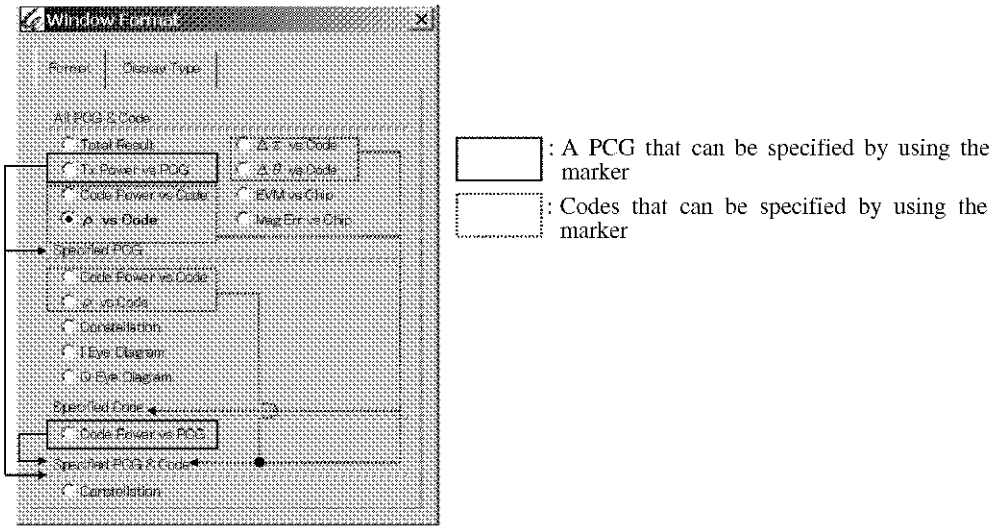


Figure A-1 **[Window Format]** Dialog Box

- How to specify the PCG by using the marker

  The PCG (power control group) graph can be switched by moving the marker in the **[Tx Power vs PCG]** graph, which was selected from **[All PCG & Code]**, and in the **[Code Power vs PCG]** graph, which was selected from **[Specified Code]**. (See Figure A-1).

  Figure A-2 shows that the **[Tx Power vs PCG]** graph is displayed in the upper window **[Window1]** and **[ρ vs Code]** selected from **[Specified PCG]** is displayed in the lower window **[Window2]**.

  If **Marker→Specified PCG** is set to "On" after **[Window1]** is activated and **Marker** on the side bar is displayed, the **[ρ vs Code]** graph of the PCG that is specified by using **Marker** is displayed on **[Window2]**, coupling with the marker position that changes in **[Window1]**.

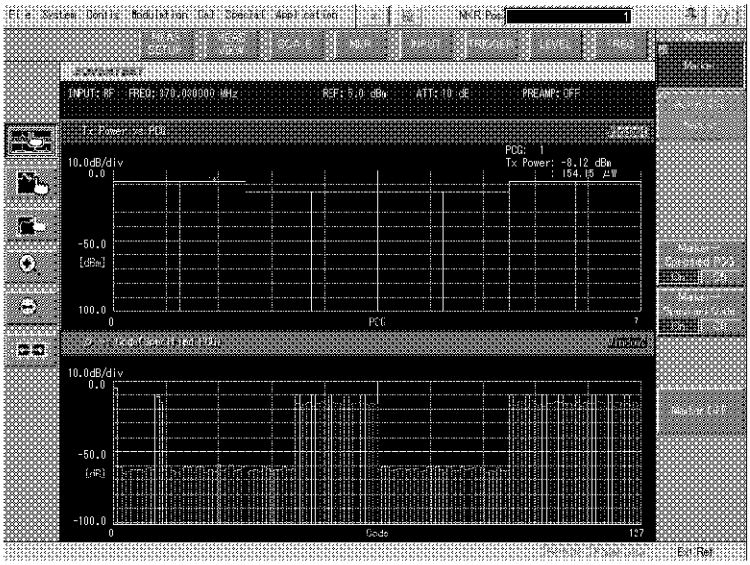


Figure A-2 Marker→Specified PCG On Usage Example

- How to specify the Code by using the marker

  If **[Code Power vs Code]**, **[ρ vs Code]**, **[Δτ vs Code]**, or **[Δθ vs Code]** is selected, the **[Code Power vs PCG (power control group)]** graph and the **[Constellation]** graph, in which the PCG and the code are specified, can be switched by coupling the marker (See Figure A-1).

  Figure A-3 shows that the **[ρ vs Code]** graph selected from **[All PCG & Code]** is displayed in **[Window1]** and **[Code Power vs PCG]** selected from **[Specified Code]** is displayed in **[Window2]**.

  If **Marker→Specified Code** is set to "On" after **[Window1]** is activated and **Active CH. Marker** on the side bar is displayed, the **[Code Power vs PCG]** graph of the code that is specified by using **Active CH. Marker** is displayed on **[Window2]**, coupling with the active channel marker that changes in **[Window1]**.

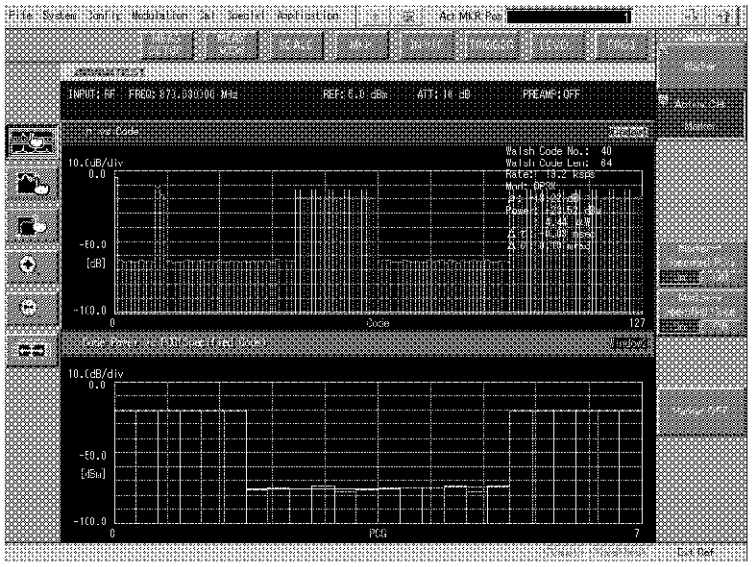


Figure A-3 Marker→Specified Code On Usage Example

Null Offset Graph (Uplink)

The display functions of Null Offset Constellation, Null Offset I Eye Diagram, and Null Offset Q Eye Diagram can be used when MEAS MODE is set to cdmaOne and graphs are displayed.

The constellation does not converge because the Offset QPSK modulation is used in cdmaOne.

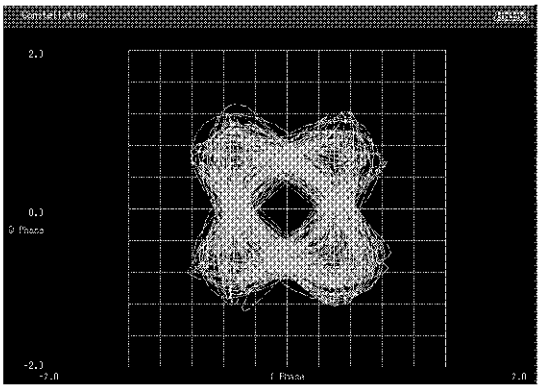


Figure A-4 Constellation

The QPSK constellation, in which symbol points converge on a point as shown in Figure A-5, is acquired by canceling the I and Q offsets of Offset QPSK and using the inverse characteristic filter against the baseband filter that is compliant with IS-2000. This graph is called a Null Offset Constellation graph.

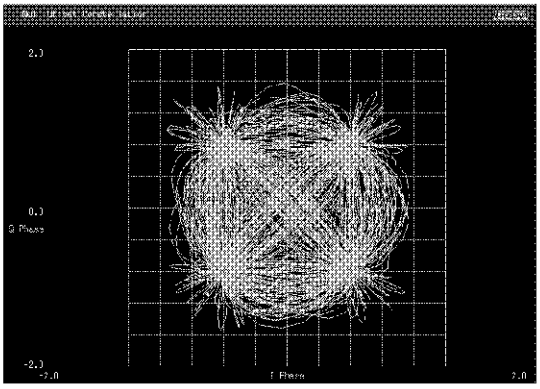


Figure A-5 Null Offset Constellation

*NOTE: **Even if the I and Q offsets of Offset QPSK are canceled, a graph, in which symbol points converge on a point, cannot be acquired because of the interference between symbols in the baseband filter that is compliant with IS-2000.***

Example of how User Table is used (Uplink)

How to set this instrument when measuring a signal, which is shown in 9.2, by using User Table is described below.

Signal specifications

Channel	Walsh function
PICH	W_0^{64}
DCCH	W_8^{16}
SCH2	W_2^4(M=1)
FCH	W_4^{16}
SCH1	W_1^2(M=1)

M: Walsh Function Repetition Factor

1. Set the **[User Table]** dialog box as Figure A-6. (The PICH settings are not required because PICH is always set in this instrument.)

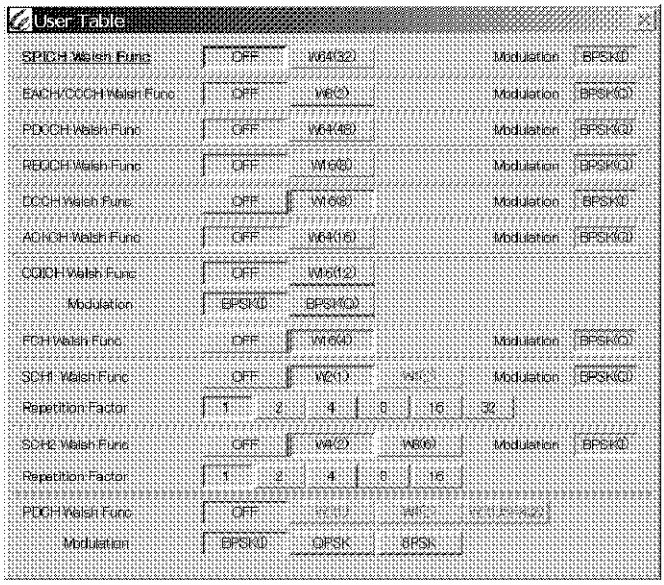


Figure A-6 Setting Example of the **[User Table]** Dialog Box

2. Set **[USE]** of the **[User Table]** option button in the **[Measurement Parameters Setup]** dialog box. This instrument is set so that User Table set in previous step 1 is used. (See Figure A-7)

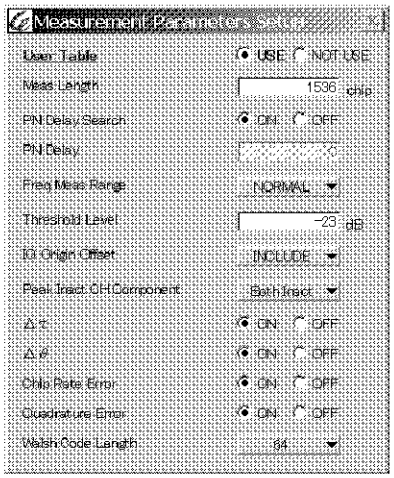


Figure A-7 **[Measurement Parameters Setup]** Dialog Box when Using **[User Table]**

A.2 Error Message List

This section describes the error messages displayed on this instrument.

The following information is included.

- Error number
- Displayed message
- Cause of generation and cancellation method

Table A-1 Error Message List (1 of 2)

Error number	Displayed message	Description
-1250	No such file or directory.	The file or directory does not exist. Check the file name or directory name.
-1251	Permission denied.	The file operation is prohibited. Check the drive name, file, or directory name.
-1252	Not enough space on the disk.	Not enough free space. Delete all unnecessary files.
-1253	File read/write error.	An error occurred during file I/O. Check if there is sufficient disk space or the disk is write-protected.
-1300	Device is not ready.	No disk is inserted.
-1400	There is no data in the effective state.	The requested data is not defined.
-1500	Option required.	The specified option function is required.
-3210	Input Level is out of range. Check the Ref. Level.	The input signal level is outside the permitted range. Check the reference level or input signal level.
-3211	Auto Level Set cannot be succeed. Signal level is not stable.	Auto Level Set is not complete. Check to see if the input signal level is not constant or if the attenuator is set to manual.
-3238	Incorrect User Table setting. Check the User Table.	The combination of data in the user table is incorrect and measurements cannot be performed. Check the user table setting.
-3239	Cannot execute measurement. Because ρ is too low.	ρ is too low to analyze. Check the input signal.
-3240	Frequency Error is out of Meas. Range.	The frequency error exceeds the measurement range. Check the frequency deviance of the input signal.
-3241	Parameter Estimation Error. Check the input signal.	The parameter cannot be estimated. Check the input signal.
-3245	Meas Length was changed in order to measure ACKCH.	The setting value of Meas Length has been changed to measure ACKCH.
-3247	Cannot synchronize to PICH. Adjust Threshold Level.	The Pilot channel cannot be synchronized. Re-set Threshold Level.

Table A-1 Error Message List (2 of 2)

Error number	Displayed message	Description
-3248	[Peak Inact Pwr] is larger than Threshold Level. Adjust Threshold Level or check User Table.	The value of [Peak Inact Pwr] is larger than Threshold Level. If the channel of [Peak Inact Pwr] is noise, set Threshold Level to the higher value. If the channel of [Peak Inact Pwr] is a transmission channel, set Threshold Level to the lower value or check the User Table setting.
-3254	Cannot synchronize to PICH. Adjust PN Delay.	The Pilot channel cannot be synchronized. Re-set PN Delay.

ALPHABETICAL INDEX

[Symbol]

[A]

[B]

[C]

[D]

[E]

[F]

[G]

[H]

[I]

[L]

[M]

[O]

[P]

[Q]

[R]

[S]

[T]

[U]

[W]

[X]

[Y]

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