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ADVANTEST CORPORATION

R3681 Series OPT54
cdma2000 1xEV-DO
Modulation Analysis Software
User's Guide

MANUAL NUMBER FOE-8440205B00

Applicable Models
R3681
R3671

First printing April 15, 2005
Printed in Japan

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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 54 cdma2000 1xEV-DO 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 54 (Downlink).
Chapter 8. SPECIFICATIONS (Downlink)	Shows the specifications of option 54 (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 54 (Uplink).
Chapter 13. SPECIFICATIONS (Uplink)	Shows the specifications of option 54 (Uplink).
APPENDIX	Describes operation principles and the error code table.

1.2 Product Overview

The cdma2000 1xEV-DO modulation analysis option is software that performs the modulation analysis of the cdma2000 1xEV-DO base station signal and mobile station signal.

This option includes the following features.

- Performing modulation analysis in the BTS Code Domain mode after whether the measurement signal includes only the Idle slot or only the Active slot has been automatically judged.
- Displaying a power envelope with template in the BTS Pilot/MAC Channel Power measurement. Measuring the Pilot Channel and MAC Channel power of a real signal.
- Analyzing the code domains of MS.

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.

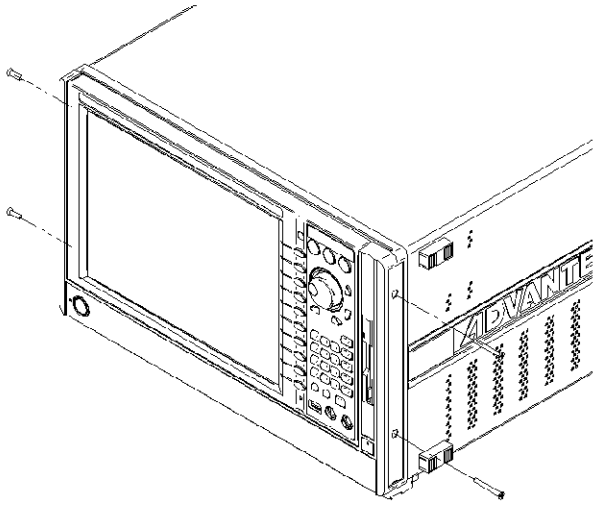
2.10 Removing and Attaching the Front Panel

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)

2.10 Removing and Attaching the Front Panel



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 OPT54 in Table 3-1, check that a standard accessory has been supplied and that no accessory is 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 Accessory

Name	Model	Quantity	Remarks
R3681 Series OPT54 User's Guide	ER3681OPT54	1	English version

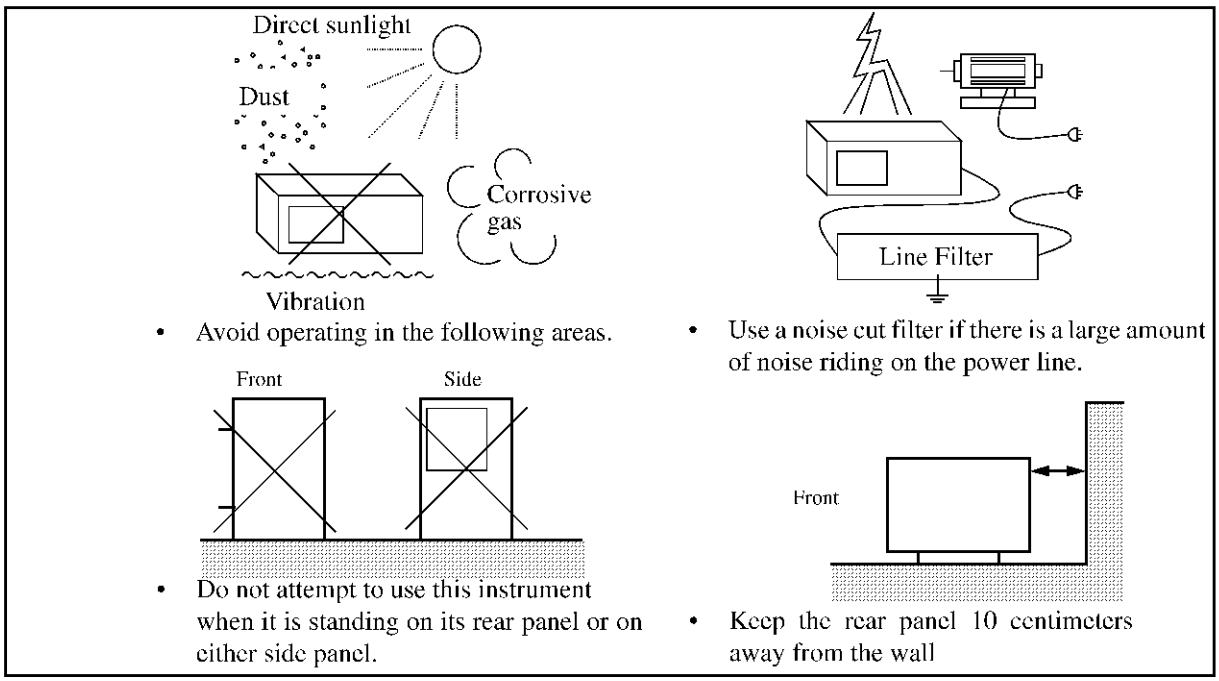
3.2 Locating This Instrument

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).

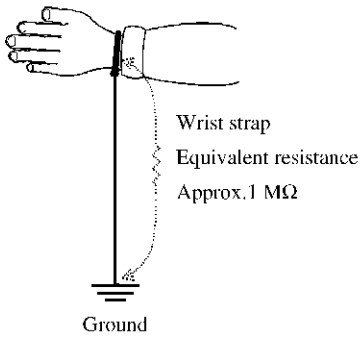


Figure 3-2 Countermeasures against Static Electricity from the Human Body

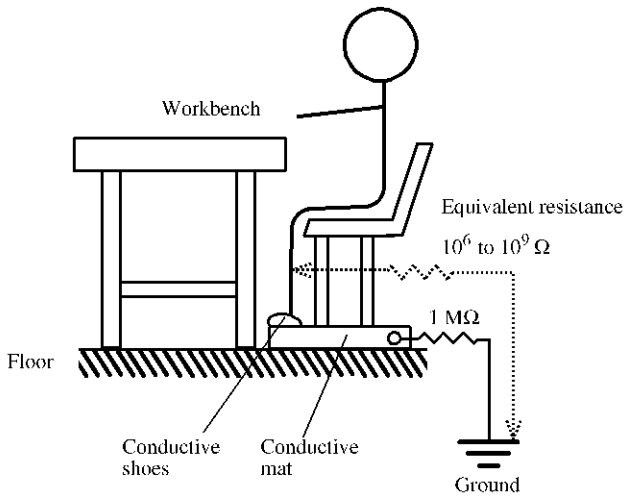


Figure 3-3 Countermeasures against Static Electricity from the Work Floor

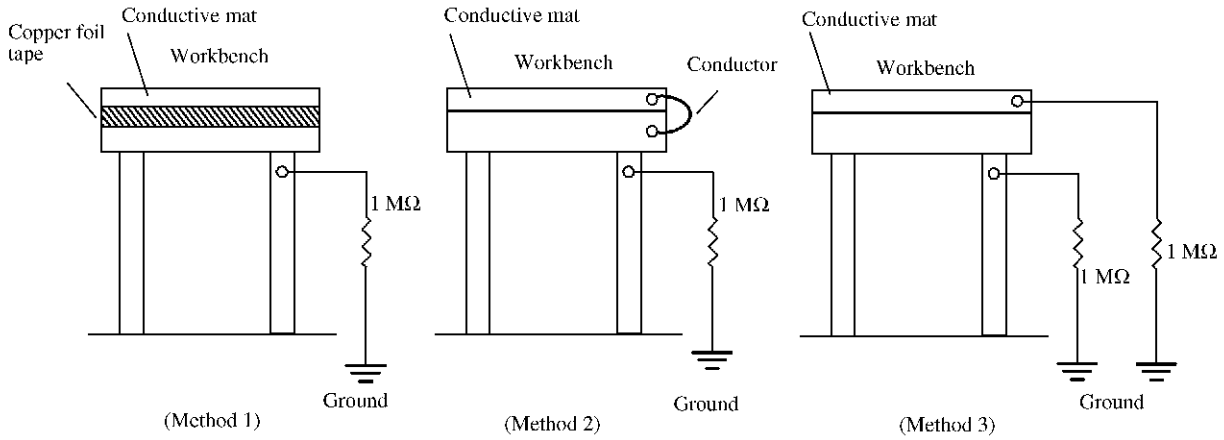


Figure 3-4 Countermeasures against Static Electricity from the Workbench

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.

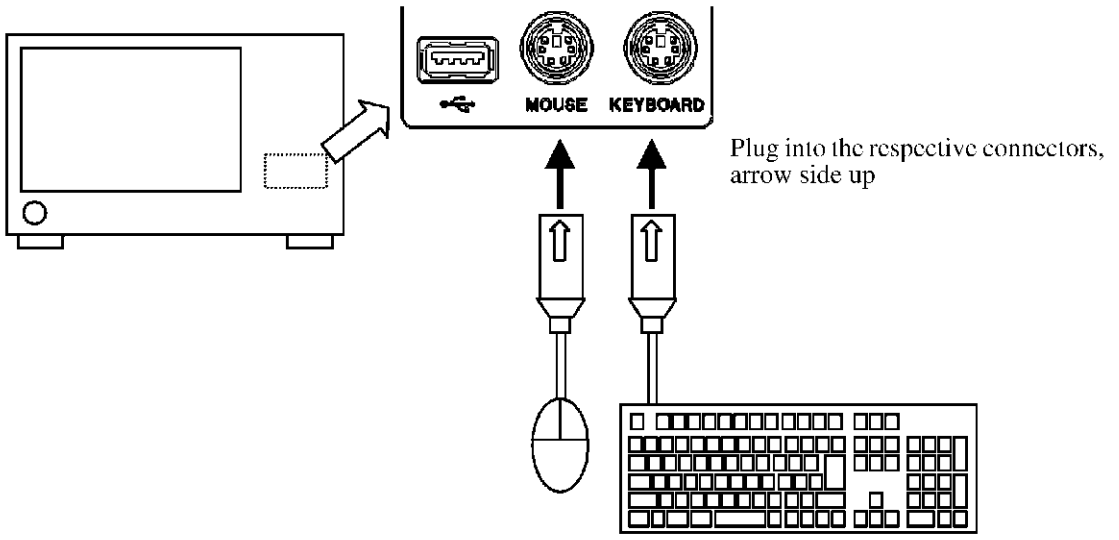


Figure 3-5 Connecting the Keyboard and Mouse

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).

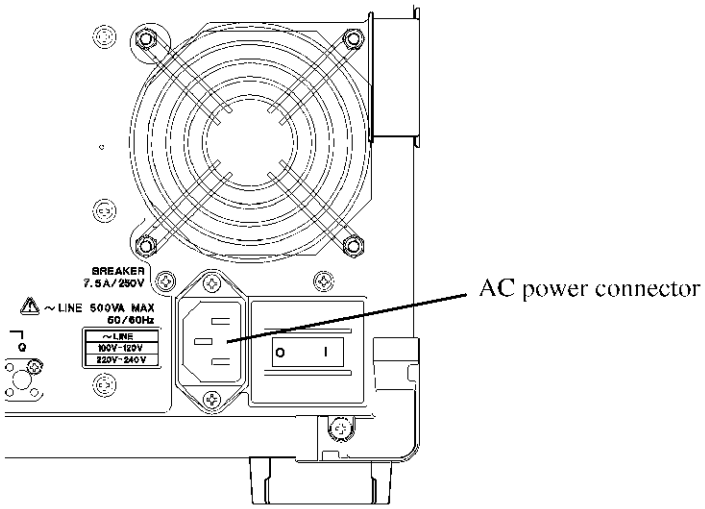


Figure 3-6 Connecting the Power Cable

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.

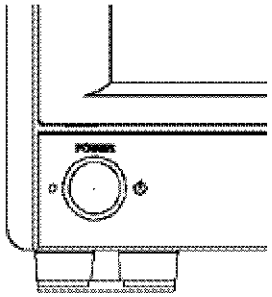


Figure 3-7 **POWER** Switch

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.***

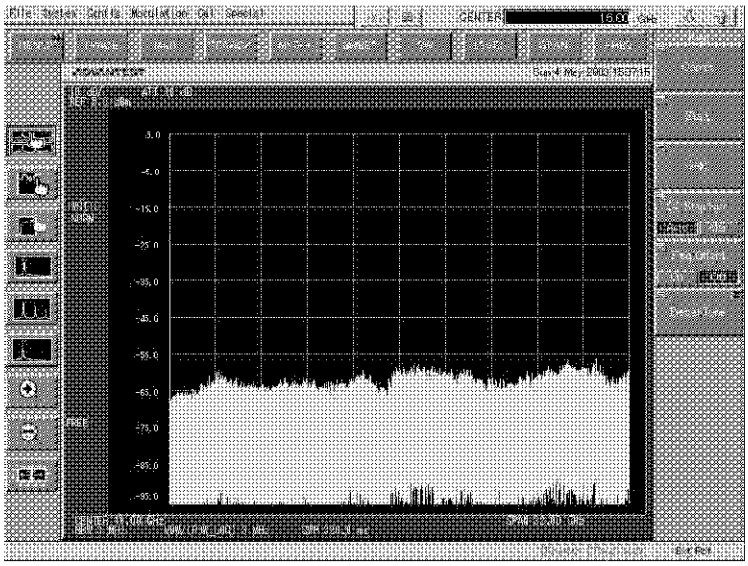


Figure 3-8 Initial Setup Screen

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.

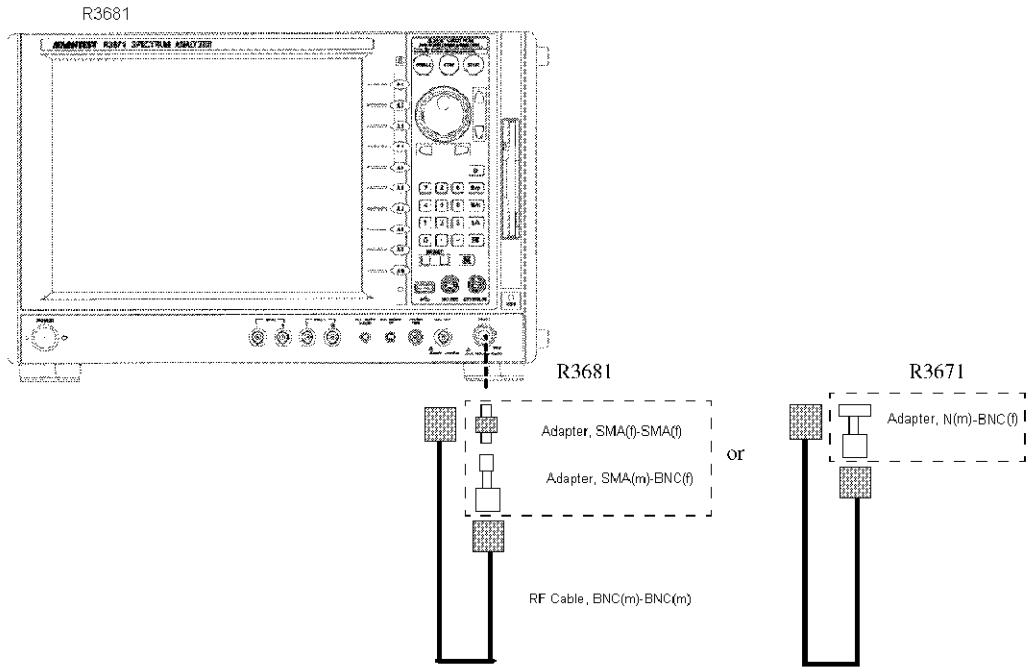


Figure 3-9 Autocalibration

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

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 Access Network Signals (Subtype 0&1)

[Specifications of the signal to be measured]

The target signal, whose frequency is 870.03 MHz and level is -10 dBm, is compliant with IS-856.

It is assumed that the Even Second Clock, the 10-MHz reference signal, and the signal are output from the Access Network.

Signal specifications:

Slot Structure

Active Slot

Modulation Parameters

Data Rate: 614.4 kbps

Modulation Type: QPSK

RA channel

MAC Index: 4

[Connections]

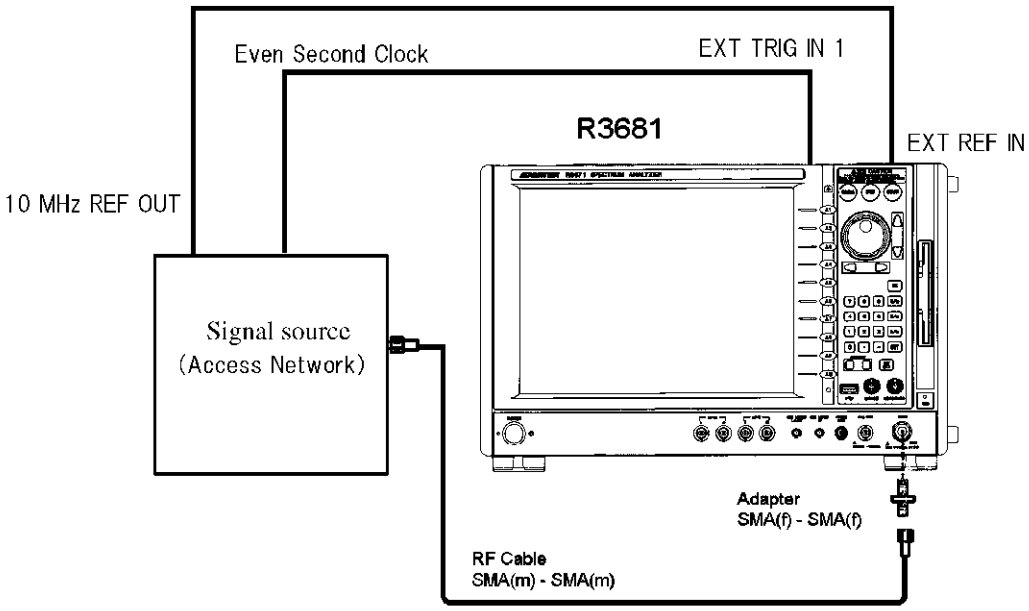


Figure 4-1 Connection Diagram for Code Domain Power Measurement of Access Network Signals

[Measurement condition settings]

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[1xEV-DO DL]**.
3. Touch **{MEAS MODE}** on the function bar.
4. Touch **Code Domain** on the soft menu bar.
   The Code Domain measurement mode is selected.
5. Touch **{FREQ}** on the function bar.
6. Touch **Center** on the soft menu bar.
7. Press **8**, **7**, **0**, **.**, **0**, **3**, and **M/n** in this order on the keypad.
   The center frequency is set to 870.03 MHz.
8. Touch **{LEVEL}** on the function bar.
9. Touch **Auto Level Set** on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
10. Touch **{TRIGGER}** on the function bar.
11. Touch **Trigger Source** on the soft menu bar.
12. Touch **Ext1** on the soft menu bar.
    The trigger source is set to the external trigger.
13. Touch **{INPUT}** on the function bar.
14. Touch **Input Setup** on the soft menu bar.
    The **[Input Setup]** dialog box is displayed.
15. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The RF Input mode is set.
16. Touch the close button **×** in the **[Input Setup]** dialog box to close the dialog box.

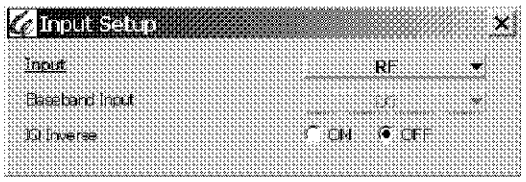


Figure 4-2 **[Input Setup]** Dialog Box

17. Touch **{MEAS SETUP}** on the function bar.

18. Touch **Meas Parameters** on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box is displayed.
19. Set the **[Physical Layer]** option button to **[Subtype 0&1]**.
20. Touch the **[Complementary Filter Rolloff]** text box and press **0**, **.**, **2**, and **ENT** on the keypad.
    The roll-off factor of the complementary filter is set to 0.2.
21. Set the **[Equalizing Filter]** option button to **[ON]**.
22. Touch the **[PN Offset]** text box and press **0** and **ENT** on the keypad.
    The value of PN Offset is set to 0.
23. Touch the **[MAC Threshold]** text box and press **-**, **2**, **7**, and **ENT** on the keypad.
24. Touch the **[Data Code Domain N]** text box and press **4** and **ENT** on the keypad.
    The measurement length N, in which Data Code Domain is measured, is set to 4.
25. Set the **[Phase Tracking]** option button to **[OFF]**.
    The Phase Tracking function is set to OFF.

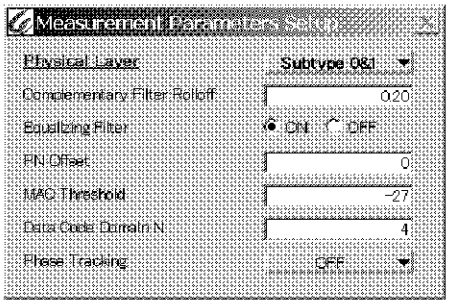


Figure 4-3 **[Measurement Parameters Setup]** Dialog Box

26. Touch **Return** on the soft menu bar to close the dialog box.
27. Press the **SINGLE** button on the front panel.
    The Single measurement is performed, and the measurement results are displayed.

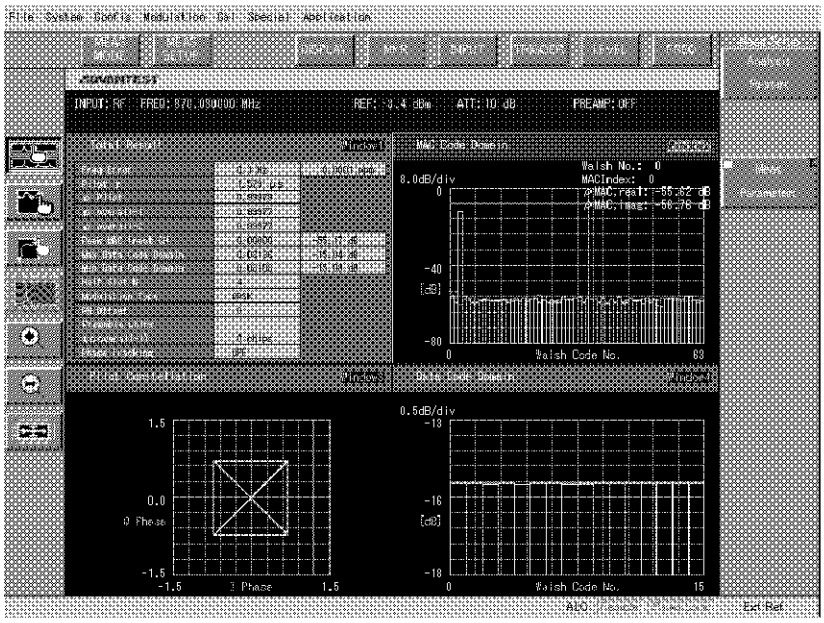


Figure 4-4 Code Domain Measurement Results of 1xEV-DO Access Network Signal (Subtype 0&1)

Upper left window

Freq Error	The carrier frequency error (Hz, ppm) from the set center frequency This value is acquired in 10-slot Pilot channels.
τ(Pilot Time Alignment Error)	Delay time (μs) from a trigger point to the head of a frame This value is acquired in 10-slot Pilot channels. If the Even Second signal is entered as the external trigger signal, the Pilot Time Alignment Error, which is the Minimum Standard value of Pilot Channel Time Tolerance, is acquired.
ρ_{pilot}	Waveform quality in Pilot Channel This value is acquired in 10-slot Pilot channels. (N=20: 20 half slot) ρ_{pilot}, which is one of the Minimum Standard value in Waveform Quality, is acquired.
$\rho_{overall-1}$	Waveform quality in Pilot Channel, MAC Channel, and either Forward Traffic or Control Channel This value is acquired in one slot.(N=2: 2 half slot) Whether the slot is idle or active is automatically checked. Whether the preamble is included in a slot is checked. Whether the modulation type is QPSK, 8PSK, or 16QAM is judged. $\rho_{overall-1}$, which is one of the Minimum Standard value in Waveform Quality, is acquired.

$\rho_{overall-2}$	Waveform quality in the Pilot channel, MAC channel, and either Forward Traffic channel or Control channel which are shifted to 512 chips from those of $\rho_{overall-2}$. $\rho_{overall-2}$, which is one of the Minimum Standard value in Waveform Quality, is acquired.
Peak MAC Inact CH	The maximum and logarithmic values of the Code Domain Power $\rho_{MAC, real(i)}$, and $\rho_{MAC, imag(i)}$ of the MAC channels which are judged as the inactive channel. This value is acquired in 8 slots.(N=16: 16half slot) Whether a MAC channel is active or inactive is judged according to the following conditions: the $\rho_{MAC, real(i)}$, and $\rho_{MAC, imag(i)}$ values exceed the MAC threshold value and the MAC channel is specified by MAC Index. If the $\rho_{MAC, real(i)}$ and $\rho_{MAC, imag(i)}$ values do not exceed the MAC threshold value, the channel is judged as an inactive channel. However, the MAC channel in the following conditions is judged as an inactive channel even if the code domain power of the MAC channel exceeds the MAC Threshold value. When **[Physical Layer]** is set to Subtype 0&1, and the Walsh Code number (i) is 32 to 63 in $\rho_{MAC, real(i)}$, the Walsh Code number (i) is 0 to 31 in $\rho_{MAC, imag(i)}$. The logarithmic MAC threshold value is set in the Measurement Parameters Setup dialog box. The Minimum Standard value of Code Domain Power of MAC channel is acquired.
Max Data Code Domain	The maximum and logarithmic values (dB) of the Code domain power $\rho_{Data, real(i)}$ and $\rho_{Data, imag(i)}$ of the 16 orthogonal code channels in which the preambles of Control Channel and Forward Traffic Channel are excluded. Regarding the Idle slot, "*" is displayed. The Minimum Standard value of Code Domain Power of Forward Traffic and Control Channel is acquired.
Min Data Code Domain	The minimum and logarithmic values (dB) of the Code domain power $\rho_{Data, real(i)}$ and $\rho_{Data, imag(i)}$ of the 16 orthogonal code channels in which the preambles of Control Channel and Forward Traffic Channel are excluded. Regarding the Idle slot, "*" is displayed. The Minimum Standard value of Code Domain Power of Forward Traffic and Control Channel is acquired.
Half Slot N	The number of half slots when the values on the Max Data Code Domain, Min Data Code Domain, and Data Code Domain graphs were acquired.
Modulation Type	The modulation format of Control Channel or Forward Traffic Channel in slots in which $\rho_{overall-1}$ was acquired. (QPSK, 8-PSK, 16-QAM) Regarding the Idle slot, "Idle" is displayed.

PN Offset	PN Offset value used in Pilot PN Sequence The PN Offset value, which is set in the Measurement Parameters Setup dialog box, is displayed. If any signal except for set PN Offset is entered, the PN Offset value is acquired assuming that the trigger is the even second time reference signal.
Preamble Chips($\rho_{overall-1}$)	The number of chips that is equivalent to the number of preambles in slots in which $\rho_{overall-1}$ was acquired
Phase Tracking	Displays a tracking method which is selected in the Measurement Parameters Setup dialog box.

28. Touch **[Window2]** and then touch **{MKR}** on the function bar.

29. Touch **Marker** on the soft menu bar.

    The marker is displayed.

Walsh No.	The Walsh Code number of a channel which is specified by the marker
MAC Index	The MAC Index number of a channel which is specified by the marker
$\rho_{MAC, real}$	The logarithmic value (dB) of Code Domain Power $\rho_{MAC, real(i)}$ of a channel which is specified by the marker
$\rho_{MAC, imag}$	The logarithmic value (dB) of Code Domain Power $\rho_{MAC, imag(i)}$ of a channel which is specified by the marker

    When **[Physical Layer]** is set to Subtype 2, the 128-code horizontal axis is displayed on the MAC Code Domain graph shown in Figure 4-5.

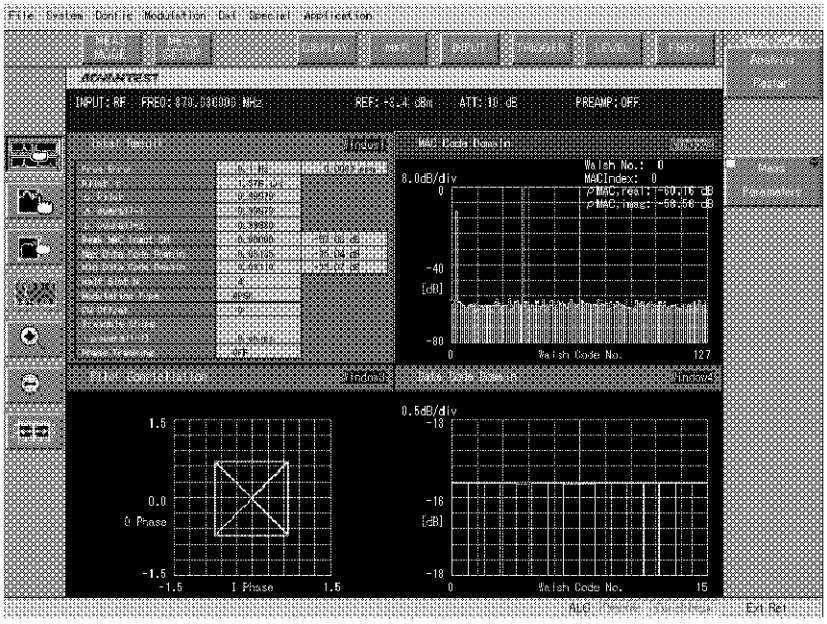


Figure 4-5 MAC Code Domain Display when Setting **[Physical Layer]** to Subtype 2

4.2 Pilot/MAC Channel Power Measurement of Access Network Signals

[Specifications of the signal to be measured]

The target signal, whose frequency is 870.03 MHz and level is -10 dBm, is compliant with IS-856.

It is assumed that the Even Second Clock, the 10-MHz reference signal, and the signal are output from the Access Network.

Signal specifications:

Slot Structure

Active Slot

[Connections]

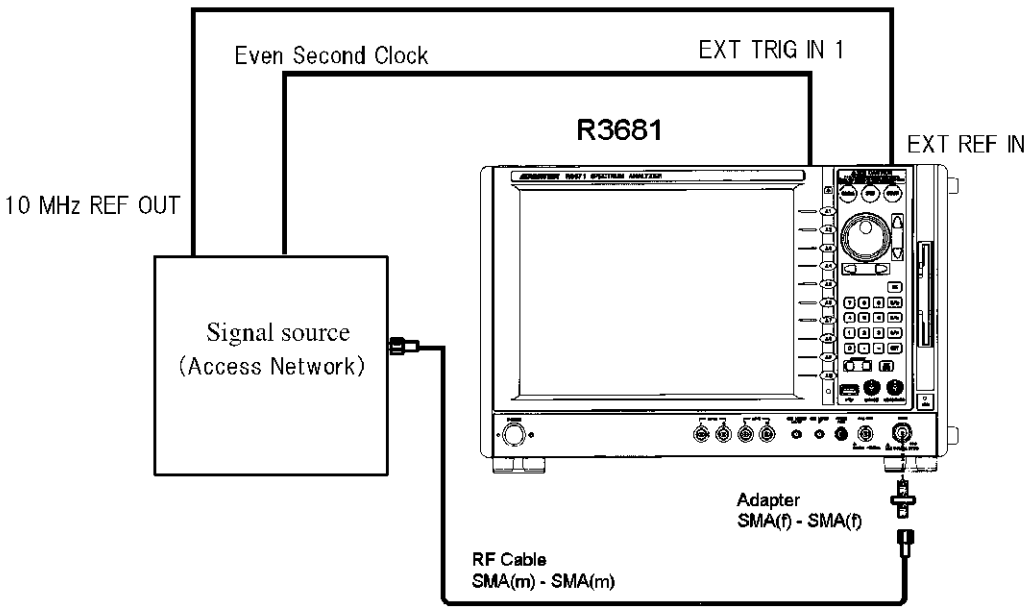


Figure 4-6 Connection Diagram for Code Domain Power Measurement of Access Network Signals

[Measurement condition settings]

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[1xEV-DO DL]**.
3. Touch **{MEAS MODE}** on the function bar.
4. Touch **Pilot/MAC Channel Power** on the soft menu bar.
   The Pilot/MAC Channel Power measurement mode is selected.
5. Touch **{FREQ}** on the function bar.

6. Touch **Center** on the soft menu bar.
7. Press [8], [7], [0], [.], [0], [3], and [M/n] in this order on the keypad.
   The center frequency is set to 870.03 MHz.
8. Touch **{LEVEL}** on the function bar.
9. Touch **Auto Level Set** on the soft menu bar.
   The Ref level is automatically set to the optimum value.
10. Touch **{TRIGGER}** on the function bar.
11. Touch **Trigger Source** on the soft menu bar.
12. Touch **Ext1** on the soft menu bar.
    The trigger source is set to the external trigger.
13. Touch **{INPUT}** on the function bar.
14. Touch **Input Setup** on the soft menu bar.
    The **[Input Setup]** dialog box is displayed.
15. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The RF Input mode is set.
16. Touch the close button [X] in the **[Input Setup]** dialog box to close the dialog box.

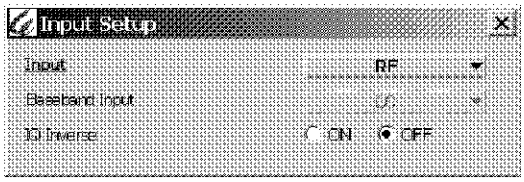


Figure 4-7 **[Input Setup]** Dialog Box

17. Touch **{MEAS SETUP}** on the function bar.
18. Touch **Meas Parameters** on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box is displayed.
19. Touch the **[PN Offset]** text box and press [0] and [ENT] on the keypad.
    The value of PN Offset is set to 0.
20. Set the **[Bandpass Filter]** option button to **[OFF]**.

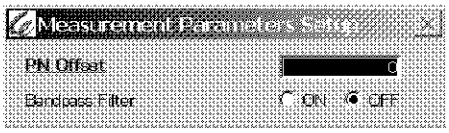


Figure 4-8 **[Measurement Parameters Setup]** Dialog Box

21. Touch **Return** on the soft menu bar to close the dialog box.

22. Touch **Template Entry** on the soft menu bar.
    The **[Template Entry]** dialog box is displayed.

23. Touch the Y0 text box and press [-], [2], [.], [5], and [ENT] on the keypad.
    Template Y0 is set to -2.5 dB.

24. Touch the Y1 text box and press [2], [.], [5], and [ENT] on the keypad.
    Template Y1 is set to 2.5 dB.

25. Touch the Y2 text box and press [-], [7], and [ENT] on the keypad.
    Template Y2 is set to -7 dB.

26. Touch **Return** on the soft menu bar to close the dialog box.

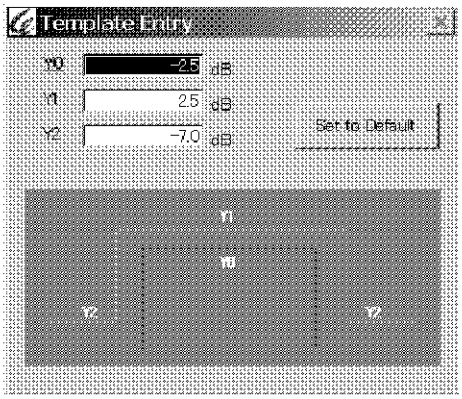


Figure 4-9 **[Template Entry]** Dialog Box

27. Touch **Average** on the soft menu bar and set the average to On or Off and the averaging count.
    Press [1], [0], [0], and [ENT] on the keypad to set the averaging count to 100.

28. Press the [SINGLE] button on the front panel.
    The Single measurement is performed, and the measurement results are displayed.

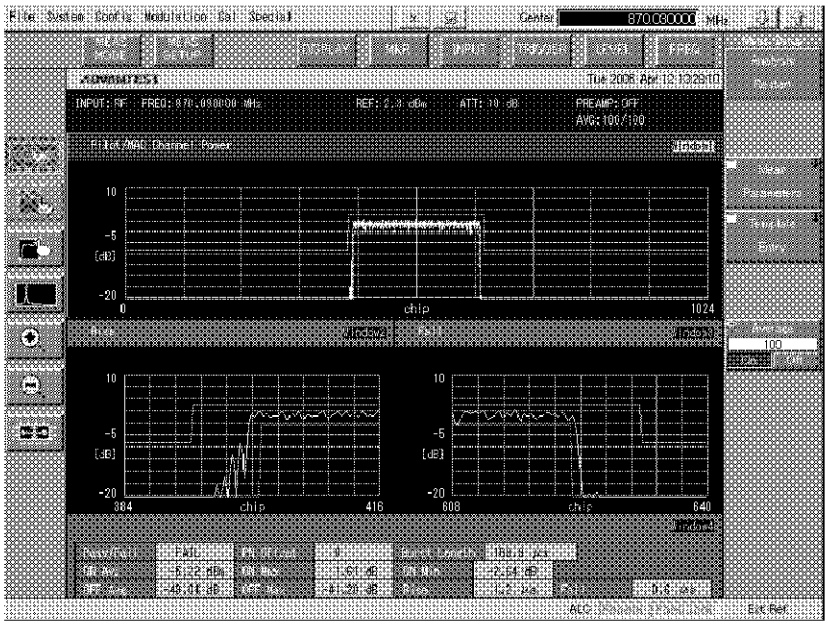


Figure 4-10 Pilot/MAC Channel Power Measurement Results

Pass/Fail	Pass or Fail judgment on the template
PN Offset	PN Offset value used in Pilot PN Sequence The PN Offset value, which is set in the Measurement Parameters Setup dialog box, is displayed. If any signal except for set PN Offset is entered, the PN Offset value is acquired assuming that the trigger is the even second time reference signal.
Burst Length	ON period of the burst (μs) The period of the burst, whose level is within Template Y0 and Y1, is acquired. Indicates a period from the center of the template to a point where the burst level exceeds the range of Template Y0 and Y1.
ON Avg	Average power (dBm) in the ON period (222 chips) of the burst The average power in the ON period (222 chips) of the burst, which is a part of the ensemble average waveform, is acquired.
ON Max	Maximum value (dB) in the ON period (7 μs + 222 chips + 7 μs) of the burst Indicates the relative power (dB) to ON Avg (average power) which is normalized to 0 dB.
ON Min	Minimum value in the ON period (222 chips) of the burst
OFF Avg	Relative average power (dB) in the OFF period of the burst (all periods except for the ON period: 7 μs + 222 chips + 7 μs)
OFF Max	Maximum value (dB) in the OFF period of the burst (all periods except for the ON period: 7 μs + 222 chips + 7 μs)

Rise	Rise time of the burst (µs) Time from the rising edge of the ON period (222 chips) of the burst to the point where the burst waveform crosses down the Y2 level
Fall	Fall time of the burst (µs) Time from the falling edge of the ON period (222 chips) of the burst to the point where the burst waveform crosses down the Y2 level

29. Touch **{MKR}** on the function bar.

30. Touch **Marker** on the soft menu bar.

    A marker is displayed. Another marker appears on the lower left window by specifying the marker position to 384.

5. MENU MAP, FUNCTIONAL EXPLANATION (Downlink)

This chapter describes the configurations and functions of the soft keys displayed on the touch screen of the 1xEV-DO modulation analysis option.

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:

[File]	[System]	[Config]	[Modulation]	[Cal]	[Special]

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 **[1xEV-DO DL]** from **[Modulation]** on the menu bar to select the cdma2000 1xEV-DO Downlink 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.

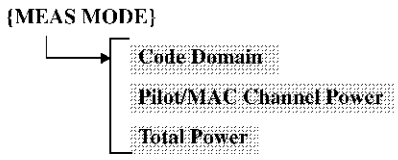
When you touch a button on the function bar, the associated soft keys are displayed on the soft menu bar.

5.5 Description of the Function of Each Key

This section describes the function of each key.

5.5.1 {MEAS MODE}

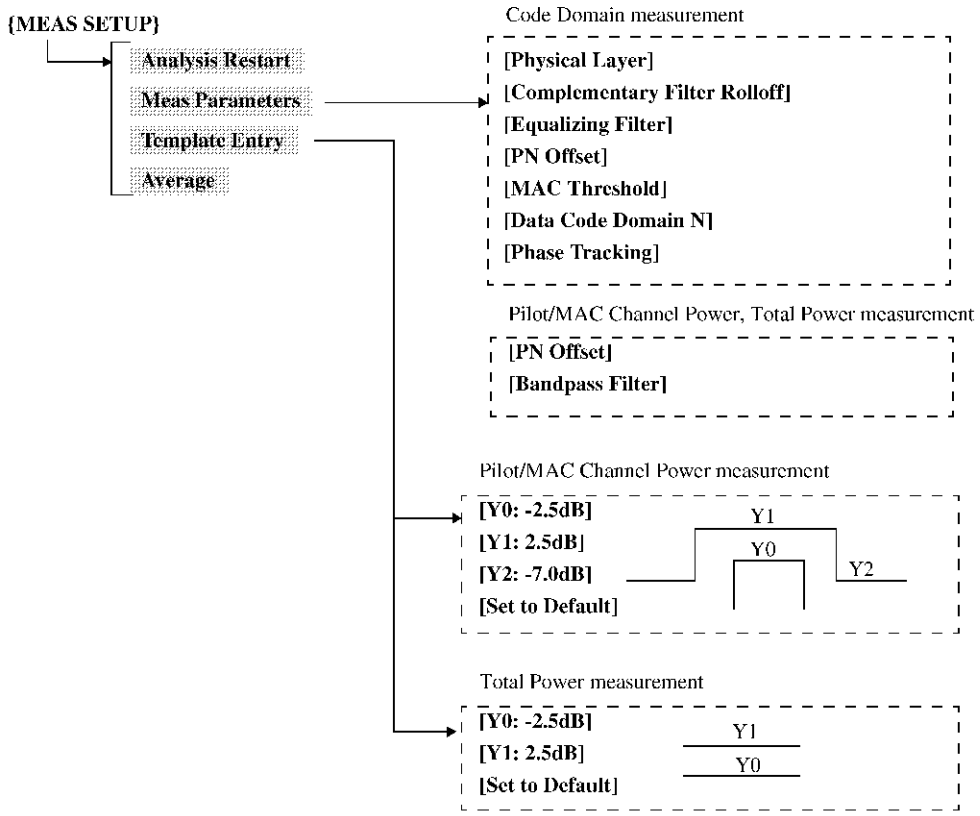
If **{MEAS MODE}** is touched, soft keys, which relate to measurement functions, are displayed on the soft menu bar.



Code Domain	The measurement mode enters into the Code Domain measurement mode by touching **Code Domain**.
Pilot/MAC Channel Power	The measurement mode enters into the Pilot/MAC Channel Power measurement mode by touching **Pilot/MAC Channel Power**.
Total Power	The measurement mode enters into the Total Power measurement mode by touching **Total Power**.

5.5.2 {MEAS SETUP}

If **{MEAS SETUP}** is touched, soft keys, which relate to analysis parameter settings, are displayed on the soft menu bar.



Analysis Restart — The measurement of AD data, which has already been acquired, restarts by touching **Analysis Restart**.

Meas Parameters — The dialog box, which is used to set the measurement conditions, is displayed by touching **Meas Parameters**.

Code Domain measurement

[Physical Layer] — Sets Subtype of the physical layer.

[Complementary Filter Rolloff] — Sets the roll-off factor that determines the characteristics of the complementary filter. A value from 0.05 to 0.2 can be set.

[Equalizing Filter] — Sets the Equalizing filter to ON or OFF. Set to ON if the output of Access Network passes through the equalizing filter.

[PN Offset] — Sets the PN Offset number. A number from 0 to 511 can be set.

[MAC Threshold] — Sets the logarithmic threshold value that is used to judge whether the MAC channel is active or inactive. A value from -100 dB to 0 dB can be set.

[Data Code Domain N] Sets the number of half slots N that is used to acquire the values on the Max Data Code Domain, Min Data Code Domain, and Data Code Domain graphs. A number from 4 to 32 can be set.

[Phase Tracking] Sets the Phase Tracking function.

Slot: The measurement is performed while tracking the phase of the Pilot channel in each Slot.

Half Slot: The measurement is performed while tracking the phase of the Pilot channel in each Half Slot.

OFF: The measurement is performed without phase tracking.

Pilot/MAC Channel Power and Total Power Measurement

[PN Offset] Sets the PN offset number. A number from 0 to 511 can be set.

[Bandpass Filter] Sets the bandpass filter to ON or OFF. Set to ON if the spurious emissions exist in the bandwidth that is adjacent to the measurement bandwidth. The signal passes through the bandpass filter whose bandwidth is ±625 kHz from the carrier frequency.

Template Entry Selects a template.

[Set to Default] Selects the standard template.

Default template of Pilot/MAC Channel Power

Y0	-2.5 dB
Y1	2.5 dB
Y2	-7.0 dB

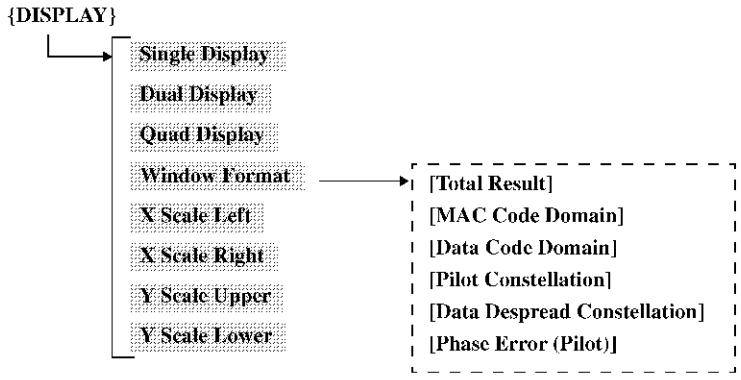
Default template of Total Power

Y0	-2.5 dB
Y1	2.5 dB

Average This function is enabled in the Pilot/MAC Channel Power and Total Power measurements.
Sets an averaging count. Up to 512 counts can be set if the average is set to ON.

5.5.3 {DISPLAY}

If **{DISPLAY}** is touched, soft keys, which relate to the display screen settings, are displayed on the soft menu bar. This function is enabled only in the Code Domain mode.



Single Display Zooms into the upper left window when in the four-window display mode.

Dual Display Zooms into the two upper windows when in the four-window display mode.

Quad Display Splits the screen into four windows.

Window Format The dialog box, which is used to set the measurement result window, is displayed by touching **Window Format**.

[Total Result] Displays the analyzed numerical result.

[MAC Code Domain] Selects the code domain display of MAC Channel. On the graph, the horizontal axis indicates Walsh Code Number and the vertical axis indicates the logarithmic ρ (10 × Log10[ρ] dB). The Code Domain power of MAC Channel $\rho_{MAC,\ real(i)}$ and $\rho_{MAC,\ imag(i)}$ are displayed by yellow and green respectively. These values are acquired in 8 slots.(N=16:16half slot)

MEMO: The number of codes on the horizontal axis is 64 when [Physical Layer] is set to Subtype 0&1, and 128 when [Physical Layer] is set to Subtype 2.

[Data Code Domain] Selects the code domain display of all Data except for preambles. On the graph, the horizontal axis indicates Walsh Code Number and the vertical axis indicates the logarithmic ρ (10 × Log10[ρ] dB). The Code Domain power of Traffic Channel or Control Channel $\rho_{Data,\ real(i)}$ and $\rho_{Data,\ imag(i)}$ are displayed by yellow and green respectively.

[Pilot Constellation] Selects the constellation display of Pilot Channel. Constellations of 10-slot Pilot channels are displayed.(N=20: 20half slot)

[Data Despread Constellation]

Selects the constellation display of all Data except for preambles which have been already despread by using Walsh Code. Constellations of 2-slot Data are displayed.(N=4: 4half slot)
16 dots are displayed in each symbol in order of the Walsh Code number because the symbol (16 chips) is despread by using 16 Walsh Code numbers

[Phase Error (Pilot)]

Selects the Phase Error graph display of Pilot Channel.
Phase errors at each chip in 10-slot Pilot channels are displayed.(N=20: 20 half slot)

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

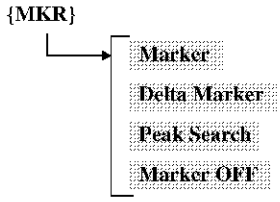
Sets the maximum value on the Y-axis.

Y Scale Lower

Sets the minimum value on the Y-axis.

5.5.4 {MKR}

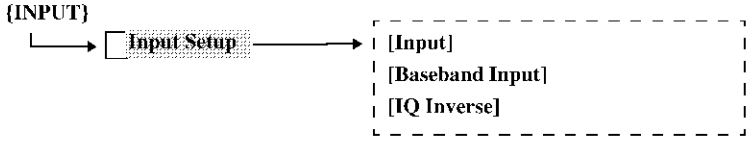
If **{MKR}** is touched, soft keys, which relate to the marker settings, are displayed on the soft menu bar.



Marker	Sets the X-axis position of the normal marker.
Delta Marker	Sets the delta marker.
Peak Search	Sets the peak search marker.
Marker OFF	Hides marker display.

5.5.5 {INPUT}

If **{INPUT}** key is touched, soft keys, which relate 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**, 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.

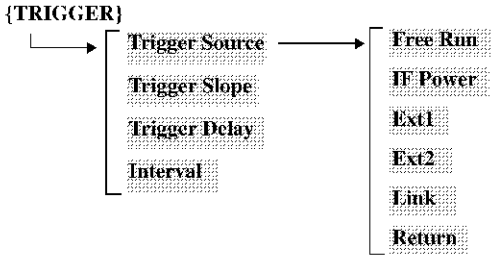
[IQ Inverse] Selects whether or not to invert the phase of the signal to be measured.

ON: Inverts the signal.

OFF: Does not invert the signal.

5.5.6 {TRIGGER}

If **{TRIGGER}** is touched, soft keys, which relate to the trigger setup, are displayed on the soft menu bar.



Trigger Source

When you touch the **Trigger Source**, 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

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

Ext2

Acquires and analyzes data in synchronization with the external signal 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 the directions for use of 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

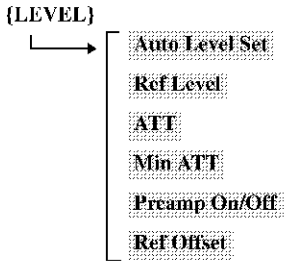
Sets whether to synchronize the trigger with the built-in counter whose period is set to 80 ms.

On: Synchronizes them.

Off: Does not synchronize them.

5.5.7 {LEVEL}

If **{LEVEL}** is touched, soft keys, which relate 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.

IMPORTANT: 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

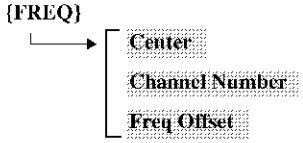
Switches the reference level offset function ON and OFF.

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}

If **{FREQ}** is touched, soft keys, which relate to the measurement frequency setup, are displayed on the soft menu bar.



Center

Sets the center frequency of the measurement signal.

IMPORTANT: 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)

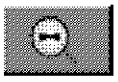
Off: Cancels the offset function.

5.5.9 Measurement Tool Bar

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

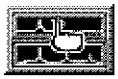
The following functions can be used by touching the icons:

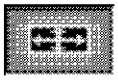
 : Zoom in icon: Used to zoom in on the waveform displayed in the window. The range specified by the range specification icon is zoomed in on by touching on the range.

 : 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: 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	EVDODL	EVDODL	
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	: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-CONFigure

Function description	SCPI command	Parameter	Query reply	Remarks
Meas Mode				
Switching the mode to Code Domain	:CONFigure:CDOMain	–	–	
Switching the mode to Pilot/ MAC Channel Power	:CONFigure:PMCPower	–	–	
Switching the mode to Total Power	:CONFigure:TPOWer	–	–	

6.3.4 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 (Code Doamin)				
Physical Layer setting	[:SENSe]:CONDition:PLAYer	STYP01|STYP2	STYP01|STYP2	
Complementary Filter Rolloff setting	[:SENSe]:CONDition:CFRolloff	<real>	<real>	
Equalizing Filter ON/OFF	[:SENSe]:CONDition:EFILter	OFF|ON	OFF|ON	
PN Offset setting	[:SENSe]:CONDition:PNOFfset	<int>	<int>	
MAC Threshold setting	[:SENSe]:CONDition:MTHReshold	<int>	<int>	
Data Code Domain N setting	[:SENSe]:CONDition:DCDN	<int>	<int>	
Phase Tracking setting	[:SENSe]:CONDition:PTRacking	OFF|HALF|SLOT	OFF|HALF|SLOT	
Meas Parameters (Pilot/MAC Channel Power)				
PN Offset setting	[:SENSe]:CONDition:PMCPower:PNOFfset	<int>	<int>	
Bandpass Filter ON/OFF	[:SENSe]:CONDition:PMCPower:BFILter	OFF|ON	OFF|ON	
Template Entry (Pilot/MAC Channel Power)				
Y0, Y1, Y2 setting	[:SENSe]:CONDition:PMCPower:TEMPlate	<real>,<real>,<real>	<real>,<real>,<real>	<Y0>,<Y1>,<Y2>
Set to Default execution	[:SENSe]:CONDition:PMCPower:TEMPlate:DEFault	–	–	
Average (Pilot/MAC Channel Power)				
Average ON/OFF	[:SENSe]:CONDition:PMCPower:AVERage[:STATe]	OFF|ON	OFF|ON	
Average setting	[:SENSe]:CONDition:PMCPower:AVERage:COUNt	<int>	<int>	
Meas Parameters (Total Power)				
PN Offset setting	[:SENSe]:CONDition:TPOWer:PNOFfset	<int>	<int>	
Bandpass Filter ON/OFF	[:SENSe]:CONDition:TPOWer:BFILter	OFF|ON	OFF|ON	
Template Entry (Total Power)				
Y0, Y1 setting	[:SENSe]:CONDition:TPOWer:TEMPlate	<real>,<real>	<real>,<real>	<Y0>,<Y1>
Set to Default execution	[:SENSe]:CONDition:TPOWer:TEMPlate:DEFault	–	–	
Average (Total Power)				
Average ON/OFF	[:SENSe]:CONDition:TPOWer:AVERage[:STATe]	OFF|ON	OFF|ON	
Average setting	[:SENSe]:CONDition:TPOWer:AVERage:COUNt	<int>	<int>	

6.3.5 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	

6.3.6 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	–	–	

6.3.7 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	
Delta Marker ON/OFF	:CALCulate:DELTamarker<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Peak Search execution	:CALCulate:MARKer<scrn=1|2|3|4>:MAXimum	–	–	
Marker X setting MAC Code Domain graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	<Walsh No.>
Reading Marker Y MAC Code Domain graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>,<real>, <real>	<MACIndex>, <$\rho_{MAC, real}$>, <$\rho_{MAC, imag}$>
Marker X setting Data Code Domain graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	<Walsh No.>
Reading Marker Y Data Code Domain graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>,<real>	<$\rho_{Data, real}$>, <$\rho_{Data, imag}$>
Marker position setting Pilot Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>,<int>	<int>,<int>	<Half Slot No.>, <Chip No.>
Reading Marker I Pilot Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:I	–	<real>	<I>
Reading Marker Q Pilot Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:Q	–	<real>	<Q>
Marker position setting Data Despread Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:SYMBol	<int>,<int>	<int>,<int>	<Symbol>, <Walsh Code>
Reading Marker I Data Despread Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:I	–	<real>	<I>
Reading Marker Q Data Despread Constellation graph	:CALCulate:MARKer<scrn=1|2|3|4>:Q	–	<real>	<Q>
Marker X setting Phase Error (Pilot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>,<int>	<int>,<int>	<Half Slot No.>, <Chip No.>
Reading Marker Y Phase Error (Pilot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Phase Error>
Marker X setting Pilot/MAC Channel Power mode graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>,<int>	<int>,<int>	<Chip>, <Sample>
Reading Marker Y Pilot/MAC Channel Power mode graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Power>
Marker X setting Total Power mode graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>,<int>	<int>,<int>	<Chip>, <Sample>
Reading Marker Y Total Power mode graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Power>

6.3.8 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				
Result display format selection	:DISPlay:WINDow<scrn=1|2|3|4>:FORMat	TRESult| MCODe| DCODe| PCONstellation| DCONstellation| PPERror	TRES|MCOD| DCOD|PCON| DCON|PPER	
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>	

6.3.9 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:EVDODL: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>.

6.3.10 Subsystem-MEASure

Function description	SCPI command	Parameter	Query reply	Remarks
Code Domain measurement and reading results				
Reading Frequency Error result	:MEASure:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Pilot τ	:MEASure:TRESult:PTAU	–	<real>	
Reading ρ_{Pilot}	:MEASure:TRESult:RPILot	–	<real>	
Reading $\rho_{overall}$	:MEASure:TRESult:ROVer	–	<real>,<real>	<$\rho_{overall-1}$>, <$\rho_{overall-2}$>
Reading Peak MAC Inactive Channel	:MEASure:TRESult:PMINAct	–	<real>,<real>	<Linear value>, <dB>
Reading Max Data Code Domain	:MEASure:TRESult:DCDomain:MAX	–	<real>,<real>	<Linear value>, <dB>
Reading Min Data Code Domain	:MEASure:TRESult:DCDomain:MIN	–	<real>,<real>	<Linear value>, <dB>
Reading Half Slot N	:MEASure:TRESult:HSN	–	<int>	
Reading Modulation Type	:MEASure:TRESult:MTYPe	–	IDLE|QPSK|PSK8|QAM16	
Reading PN Offset	:MEASure:TRESult:PNOFfset	–	<int>	
Reading Preamble Chips	:MEASure:TRESult:PCHips	–	<int>	
Reading Phase Tracking	:MEASure:TRESult:PTRacking	–	OFF|HALF|SLOT	
Pilot/MAC Channel Power measurement and reading results				
Reading Pass/Fail	:MEASure:PMCPower:FAIL	–	PASS|FAIL	
Reading PN Offset	:MEASure:PMCPower:PNOFfset	–	<int>	
Reading Burst Length	:MEASure:PMCPower:BLENgth	–	<real>	
Reading ON Avg	:MEASure:PMCPower:ONAVG	–	<real>	
Reading ON Max	:MEASure:PMCPower:ONMAX	–	<real>	
Reading ON Min	:MEASure:PMCPower:ONMIN	–	<real>	
Reading OFF Avg	:MEASure:PMCPower:OFFAVG	–	<real>	
Reading OFF Max	:MEASure:PMCPower:OFFMAX	–	<real>	
Reading Rise	:MEASure:PMCPower:RISE	–	<real>	
Reading Fall	:MEASure:PMCPower:FALL	–	<real>	
Total Power measurement and reading results				
Reading Pass/Fail	:MEASure:TPOWer:FAIL	–	PASS|FAIL	
Reading PN Offset	:MEASure:TPOWer:PNOFfset	–	<int>	
Reading Avg	:MEASure:TPOWer:AVG	–	<real>	
Reading Max	:MEASure:TPOWer:MAX	–	<real>	
Reading Min	:MEASure:TPOWer:MIN	–	<real>	

6.3.11 Subsystem-READ

Function description	SCPI command	Parameter	Query reply	Remarks
Code Domain measurement and reading results				
Reading Frequency Error	:READ:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Pilot τ	:READ:TRESult:PTAU	–	<real>	
Reading ρ_{Pilot}	:READ:TRESult:RPILot	–	<real>	
Reading $\rho_{overall}$	:READ:TRESult:ROVer	–	<real>,<real>	<$\rho_{overall-1}$>, <$\rho_{overall-2}$>
Reading Peak MAC Inactive Channel	:READ:TRESult:PMINAct	–	<real>,<real>	<Linear value>, <dB>
Reading Max Data Code Domain	:READ:TRESult:DCDomain:MAX	–	<real>,<real>	<Linear value>, <dB>
Reading Min Data Code Domain	:READ:TRESult:DCDomain:MIN	–	<real>,<real>	<Linear value>, <dB>
Reading Half Slot N	:READ:TRESult:HSN	–	<int>	
Reading Modulation Type	:READ:TRESult:MTYPe	–	IDLE|QPSK|PSK8|QAM16	
Reading PN Offset	:READ:TRESult:PNOFfset	–	<int>	
Reading Preamble Chips	:READ:TRESult:PCHips	–	<int>	
Reading Phase Tracking	:READ:TRESult:PTRacking	–	OFF|HALF|SLOT	
Pilot/MAC Channel Power measurement and reading results				
Reading Pass/Fail	:READ:PMCPower:FAIL	–	PASS|FAIL	
Reading PN Offset	:READ:PMCPower:PNOFfset	–	<real>	
Reading Burst Length	:READ:PMCPower:BLENgth	–	<real>	
Reading ON Avg	:READ:PMCPower:ONAVG	–	<real>	
Reading ON Max	:READ:PMCPower:ONMAX	–	<real>	
Reading ON Min	:READ:PMCPower:ONMIN	–	<real>	
Reading OFF Avg	:READ:PMCPower:OFFAVG	–	<real>	
Reading OFF Max	:READ:PMCPower:OFFMAX	–	<real>	
Reading Rise	:READ:PMCPower:RISE	–	<real>	
Reading Fall	:READ:PMCPower:FALL	–	<real>	
Total Power measurement and reading results				
Reading Pass/Fail	:READ:TPOWer:FAIL	–	PASS|FAIL	
Reading PN Offset	:READ:TPOWer:PNOFfset	–	<real>	
Reading Avg	:READ:TPOWer:AVG	–	<real>	
Reading Max	:READ:TPOWer:MAX	–	<real>	
Reading Min	:READ:TPOWer:MIN	–	<real>	

6.3.12 Subsystem-FETCh

Function description	SCPI command	Parameter	Query reply	Remarks
Code Domain reading results				
Reading Frequency Error	:FETCh:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Pilot τ	:FETCh:TRESult:PTAU	–	<real>	
Reading ρ_{Pilot}	:FETCh:TRESult:RPILot	–	<real>	
Reading $\rho_{overall}$	:FETCh:TRESult:ROVer	–	<real>,<real>	<ρ overall-1>, <$\rho_{overall-2}$>
Reading Peak MAC Inactive Channel	:FETCh:TRESult:PMINAct	–	<real>,<real>	<Linear value>, <dB>
Reading Max Data Code Domain	:FETCh:TRESult:DCDomain:MAX	–	<real>,<real>	<Linear value>, <dB>
Reading Min Data Code Domain	:FETCh:TRESult:DCDomain:MIN	–	<real>,<real>	<Linear value>, <dB>
Reading Half Slot N	:FETCh:TRESult:HSN	–	<int>	
Reading Modulation Type	:FETCh:TRESult:MTYPe	–	IDLE|QPSK|PSK8|QAM16	
Reading PN Offset	:FETCh:TRESult:PNOFfset	–	<int>	
Reading Preamble Chips	:FETCh:TRESult:PCHips	–	<int>	
Reading Phase Tracking	:FETCh:TRESult:PTRacking	–	OFF|HALF|SLOT	
Pilot/MAC Channel Power reading results				
Reading Pass/Fail	:FETCh:PMCPower:FAIL	–	PASS|FAIL	
Reading PN Offset	:FETCh:PMCPower:PNOFfset	–	<real>	
Reading Burst Length	:FETCh:PMCPower:BLENgth	–	<real>	
Reading ON Avg	:FETCh:PMCPower:ONAVG	–	<real>	
Reading ON Max	:FETCh:PMCPower:ONMAX	–	<real>	
Reading ON Min	:FETCh:PMCPower:ONMIN	–	<real>	
Reading OFF Avg	:FETCh:PMCPower:OFFAVG	–	<real>	
Reading OFF Max	:FETCh:PMCPower:OFFMAX	–	<real>	
Reading Rise	:FETCh:PMCPower:RISE	–	<real>	
Reading Fall	:FETCh:PMCPower:FALL	–	<real>	
Total Power reading results				
Reading Pass/Fail	:FETCh:TPOWer:FAIL	–	PASS|FAIL	
Reading PN Offset	:FETCh:TPOWer:PNOFfset	–	<real>	
Reading Avg	:FETCh:TPOWer:AVG	–	<real>	
Reading Max	:FETCh:TPOWer:MAX	–	<real>	
Reading Min	:FETCh:TPOWer:MIN	–	<real>	

6.3.13 Subsystem-STATus

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

6.3.14 Subsystem-HCOPy

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

6.4 Status Register

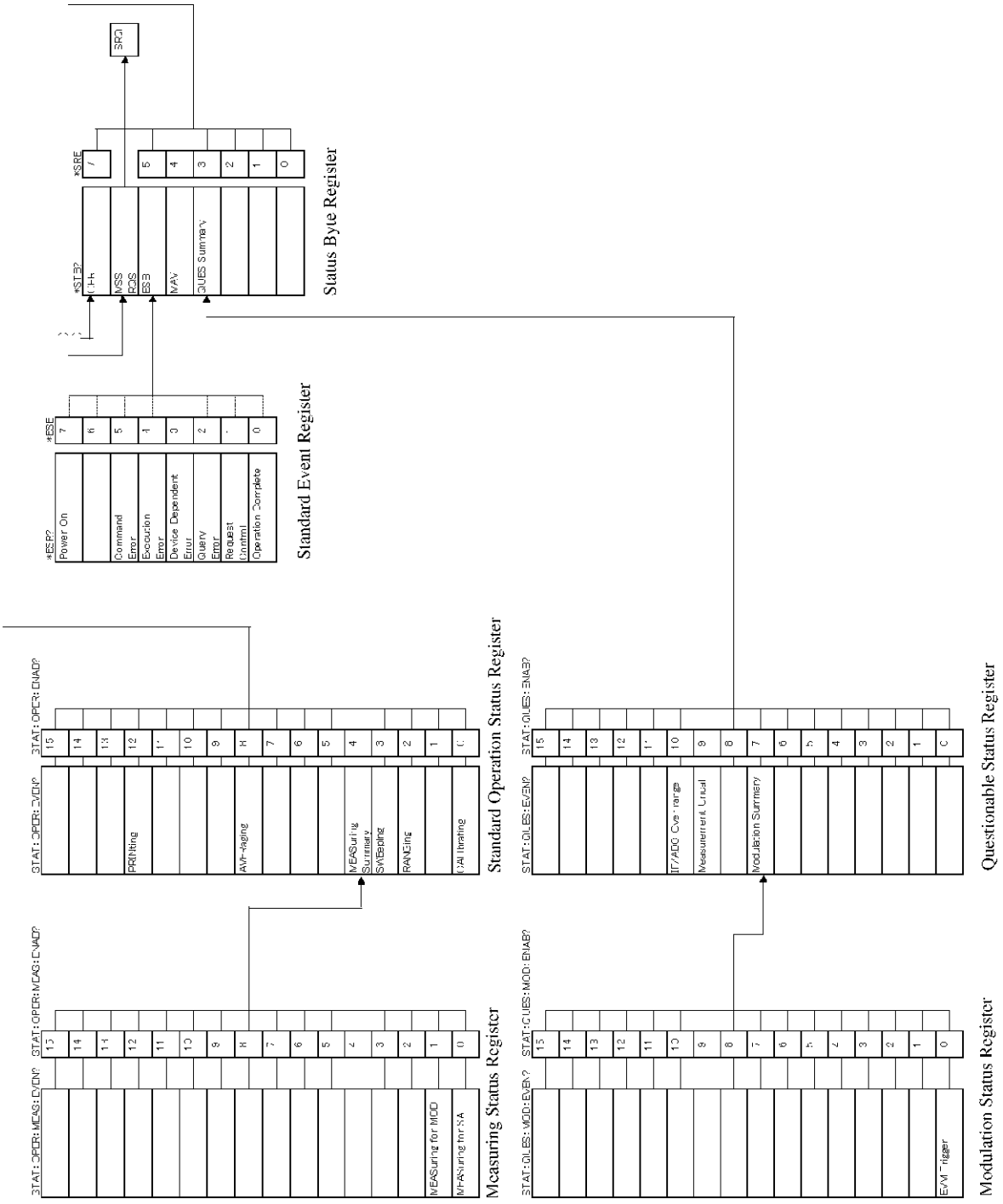


Figure 6-1 Status Registers

7. PERFORMANCE VERIFICATION (Downlink)

This chapter describes how to verify whether this instrument meets the specified performance.

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

IMPORTANT: Before executing the performance verification, execute warm-up and all calibrations.

7.1 Test Signal Specifications

The test signals used for performance verification are shown below:

Table 7-1 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>Base station signal</td><td>IS-856 Forward Link signal
<table><tr><th>Channel</th><th>Power ratio</th></tr><tr><td>Pilot</td><td>1</td></tr><tr><td>MAC
RA
RPC</td><td>
1/16
15/16</td></tr><tr><td>Traffic</td><td>1/16×16ch</td></tr></table>Traffic channel: 1-slot continuous transmission signal whose data rare is 614.4 kbps
RA channel: MAC Index 4</td><td>Code Domain measurement
(RF input, IQ input)</td></tr>
</table>

7.2 Test Procedures

This section describes the procedures of each test item.

7.2.1 RF Input Base Station Signal Measurement

Connect the signal source as shown below:

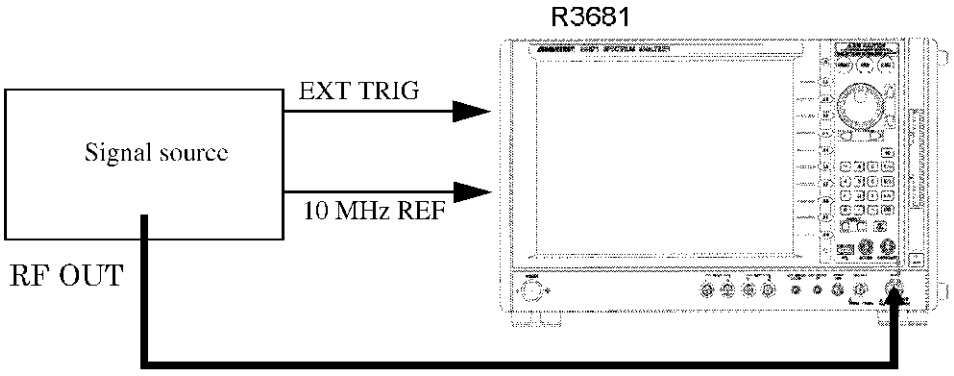


Figure 7-1 Test Signal Connection (RF Input)

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

{MEAS MODE}: **Code Domain**

{MEAS SETUP}: **Meas Parameters**

<When the Subtype 0 or Subtype 1 signal is measured.>

[Physical Layer]: Subtype 0&1

<When the Subtype 2 signal is measured.>

[Physical Layer]: Subtype 2

[Complementary Filter Rolloff]: 0.2
[Equalizing Filter]: ON
[PN Offset]: 0
[MAC Threshold]: -27.0 dB
[Data Code Domain N]: 4
[Phase Tracking]: OFF

{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.
5. To measure the power, change to the measurement mode as follows:

   {MEAS MODE}: **Total Power**
   {MEAS SETUP}: **[PN Offset]**: 0
   [Bandpass Filter]: OFF

6. Press the **SINGLE** button on this unit to perform measurements.
7. 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:

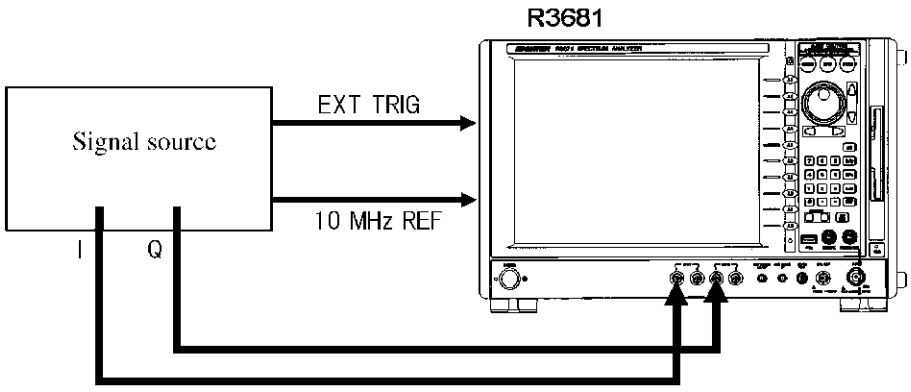


Figure 7-2 Test Signal Connection (IQ Input)

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

{MEAS SETUP}: **Meas Parameters**

<When the Subtype 0 or Subtype 1 signal is measured.>

[Physical Layer]: Subtype 0&1

<When the Subtype 2 signal is measured.>

[Physical Layer]: Subtype 2

[Complementary Filter Rolloff]: 0.2
[Equalizing Filter]: ON
[PN Offset]: 0
[MAC Threshold]: -27.0 dB
[Data Code Domain N]: 4
[Phase Tracking]: 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.

7.3 Test Data Record Sheet

Test data record sheet

Model name:

Serial number:

1. RF Input Measurement

Test item	Specifications			Determination Pass/Fail
	Minimum value	Measured value	Maximum value	
Carrier Frequency Error	-5 Hz		+5 Hz	
ρ_{pilot}	0.995		None	
$\rho_{overall-1}$	0.995		None	
$\rho_{overall-2}$	0.995		None	
Power	-10.9 dBm		-9.1 dBm	

2. IQ Input Measurement

Test item	Specifications			Determination Pass/Fail
	Minimum value	Measured value	Maximum value	
ρ_{pilot}	0.995		None	
$\rho_{overall-1}$	0.995		None	
$\rho_{overall-2}$	0.995		None	

8. SPECIFICATIONS (Downlink)

8.1 cdma2000 1xEV-DO Modulation Analysis Compliance System

In compliance with
3rd Generation Partnership Project 2 (3GPP2),
TSG-C Specifications,
and C.S0024-A Version 1.0 (IS-856)

8.2 cdma2000 1xEV-DO Modulation Analysis Performance

Code Domain measurement (When 1xEV-DO Downlink is selected)

- RF Input

Item	Specifications
Carrier Frequency Error	
Measurement range	<±500 Hz
Measurement accuracy	<±(Reference frequency accuracy × Carrier frequency + 5 Hz)
ρ_{pilot}	Residual response: <±0.005
$\rho_{overall-1}$	Residual response: <±0.005
$\rho_{overall-2}$	Residual response: <±0.005
Power measurement	
Accuracy (When -10 dBm is input)	<±(0.3 + Frequency response + Calibration signal level accuracy) dB
Frequency response	
50 MHz to 2.5 GHz	<±0.4 dB

- IQ Input

Item	Specifications
ρ_{pilot}	Residual response: <±0.005
$\rho_{overall-1}$	Residual response: <±0.005
$\rho_{overall-2}$	Residual response: <±0.005

Conditions

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Temperature range</td><td>+20°C to +30°C</td></tr>
<tr><td>Signal</td><td>IS-856 Base station
<table><tr><th>Channel</th><th>Power ratio</th></tr><tr><td>Pilot</td><td>1</td></tr><tr><td>MAC
RA
RPC</td><td>
1/16
15/16</td></tr><tr><td>Traffic</td><td>1/16 × 16 ch</td></tr></table>Traffic channel: 614.4kbps Data rate
RA channel: MAC Index 4</td></tr>
<tr><td>Center frequency</td><td>800 MHz, 2 GHz, or IQ input</td></tr>
<tr><td>Transmission power</td><td></td></tr>
<tr><td>(RF input)</td><td>-10 dBm, -20 dBm</td></tr>
<tr><td>(IQ input)</td><td>0.8 V_{P-P}</td></tr>
<tr><td>ρ</td><td>>0.9999</td></tr>
<tr><td>Measurement mode</td><td>Code Domain</td></tr>
</table>

9. MEASUREMENT EXAMPLES (Uplink)

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

9.1 Code Domain Power Measurement of Access Terminal Signal (Subtype 0&1)

[Specifications of signal to be measured]

The target signal, whose frequency is 825.03 MHz and level is -10 dBm, is compliant with IS-856.

Long Code Mask I: 33333333333

Long Code Mask Q: 26666666667

Reverse Traffic Channel signal in which the following channels are multiplexed

Pilot Channel (Pilot/Reverse Rate Indicator (RRI) Channel)

ACK Channel (Acknowledgment Channel)

DRC Channel (Data Rate Control Channel)

Data Channel

[Connections]

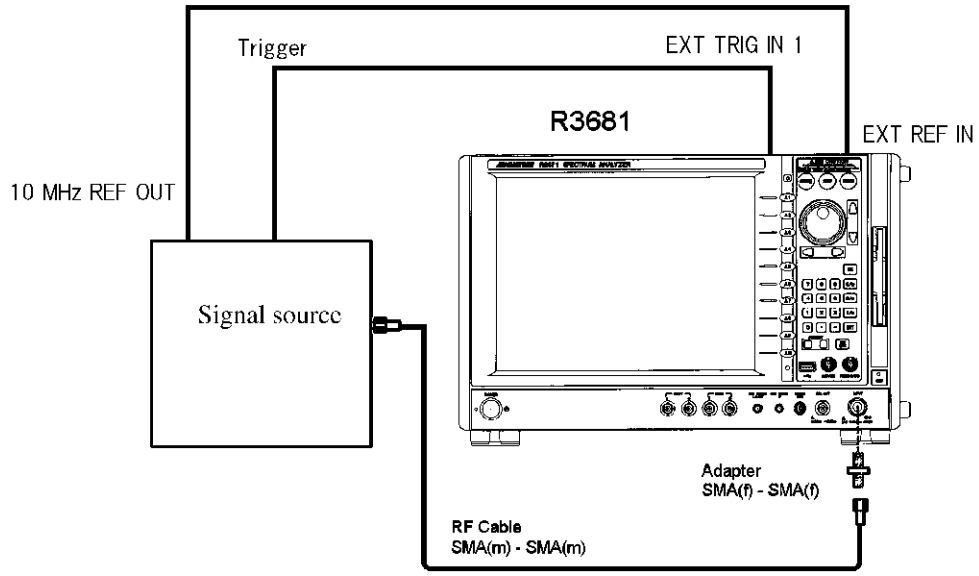


Figure 9-1 Connection Diagram for Code Domain Power Measurement of Access Terminal Signal

[Measurement condition settings]

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[1xEV-DO UL]**.
3. Touch **{FREQ}** on the function bar.
4. Touch **Center** on the soft menu bar.
5. Press [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 **{LEVEL}** on the function bar.
7. Touch **Auto Level Set** on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
8. Touch **{TRIGGER}** on the function bar.
9. Touch **Trigger Source** on the soft menu bar.
10. Touch **Ext1** on the soft menu bar.
    The trigger source is set to the external trigger.
11. Touch **{INPUT}** on the function bar.
12. Touch **Input Setup** on the soft menu bar.
    The **[Input Setup]** dialog box is displayed.
13. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The RF Input mode is set.
14. Touch the close button [X] in the **[Input Setup]** dialog box to close the dialog box.

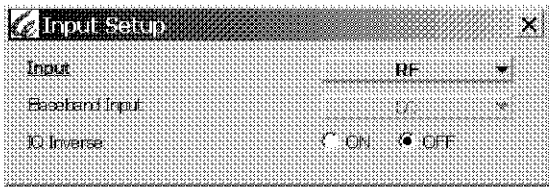


Figure 9-2 **[Input Setup]** Dialog Box

15. Touch **{MEAS MODE}** on the function bar.
16. Touch **Subtype 0&1** on the soft menu bar.
    The measurement mode is set to Subtype 0&1.
17. Touch **{MEAS SETUP}** on the function bar.

18. Touch **Meas Parameters** on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box is displayed.

19. Touch the **[Meas Range]** text box and press [1] and [ENT] on the keypad.
    The measurement length is set to 1 slot.

20. Touch the **[Threshold]** text box and press [-], [2], [3], and [ENT] on the keypad.
    The threshold level is set to -23 dB.

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

22. Touch the **[Long Code Mask I]** text box and press [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], and [ENT] on the keypad.

23. Touch the **[Long Code Mask Q]** text box and press [2], [6], [6], [6], [6], [6], [6], [6], [6], [6], [6], [7], and [ENT] on the keypad.

24. Set the **[Freq Meas Range]** option button to **[±1 kHz]**.
    The frequency error measurement range is set to ±1 kHz.

25. Set the **[Chip Rate Error]** option button to **[ON]**.
    Chip Rate Error can be measured.

26. Set the **[Quadrature Error]** option button to **[ON]**.
    Quadrature Error can be measured.

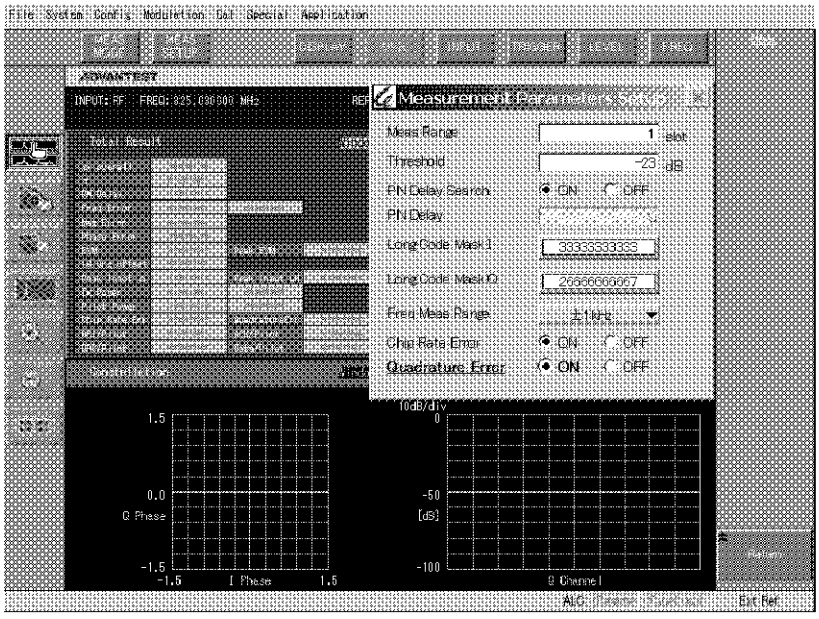


Figure 9-3 **[Measurement Parameters Setup]** Dialog Box (Subtype 0&1)

27. Touch **Return** on the soft menu bar to close the dialog box.

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

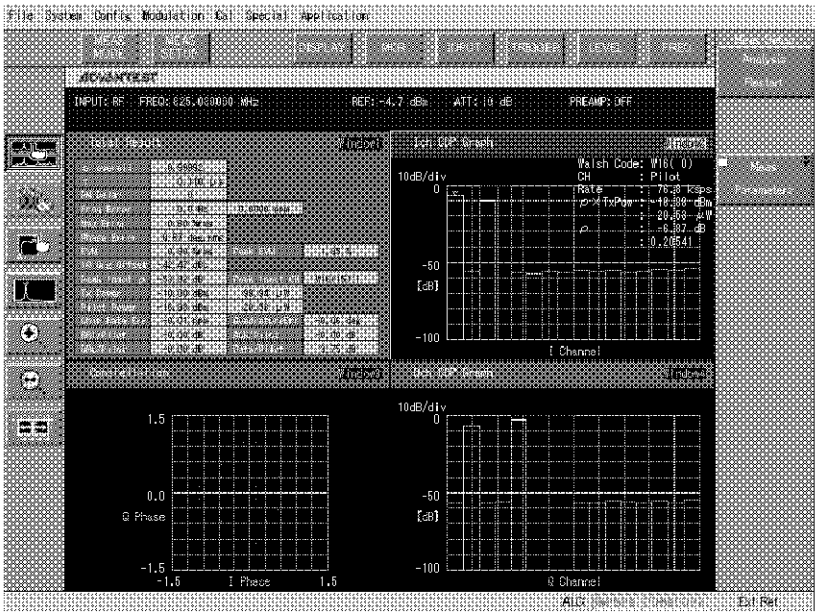


Figure 9-4 Measurement Results of 1xEV-DO Access Terminal Signal (Subtype 0&1)

Upper left window

$\rho_{overall}$	Waveform quality in Pilot Channel, DRC Channel, ACK Channel, and Data Channel
τ(Time Alignment Error)	Delay time (μs) from a trigger point to the head of a frame
PN Delay	Delay time from the head of Pilot PN Sequence and that is a value of 0 to 511 in units of 64 chips
Freq Error	The carrier frequency error (Hz, ppm) from the set center frequency
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)
Peak Inact ρ	The maximum logarithmic coefficient for each I and Q channels Code Domain power in inactive channels
Peak Inact CH	Walsh Code number, length, and components of Peak Inact ρ
Tx Power	Transmission power (dBm, W)

Pilot Power	Power of the pilot channel (dBm, W)
Chip Rate Err	Chip rate error (ppm) in relation to 1.2288 Mcps as a reference
Quadrature Err	Q-axis quadrature error (deg) in relation to the I-axis
RRI/Pilot	Logarithmic power ratio (dB) of the RRI channel to the Pilot channel*
ACK/Pilot	Logarithmic power ratio (dB) of the ACK channel to the Pilot channel
DRC/Pilot	Logarithmic power ratio (dB) of the DRC channel to the Pilot channel
Data/Pilot	Logarithmic power ratio (dB) of the Data channel to the Pilot channel

MEMO: ***The Pilot channel* indicates the Pilot channel from which the RRI channel is excluded.***

Marker display

29. Touch **[Window2]** and then touch **{MKR}** on the function bar.

30. Touch **Marker** on the soft menu bar.

    The transmission channel marker is displayed.

Walsh Code	The Walsh Code number and length of a channel which is specified by the marker
CH	The name for the Pilot, ACK, DRC, and Data channels (Active channel names are displayed.)
Rate	The modulation symbol rate of a channel which is specified by the marker
ρ × TxPow	The product of ρ and TxPower of a channel which is specified by the marker (dBm, W)
ρ	The Code Domain power coefficient of a channel which is specified by the marker (dB, linear)

9.2 Code Domain Power Measurement of Access Terminal Signal (Subtype 2)

[Specifications of signal to be measured]

The target signal, whose frequency is 825.03 MHz and level is -10 dBm, is compliant with IS-856.

Long Code Mask I: 33333333333

Long Code Mask Q: 26666666667

Reverse Traffic Channel signal in which the following channels are multiplexed

- Pilot Channel
- Reverse Rate Indicator (RRI) Channel
- Data Source Control (DSC) Channel
- Data Rate Control (DRC) Channel
- ACK Channel
- Data Channel
- Auxiliary Pilot Channel

[Connections]

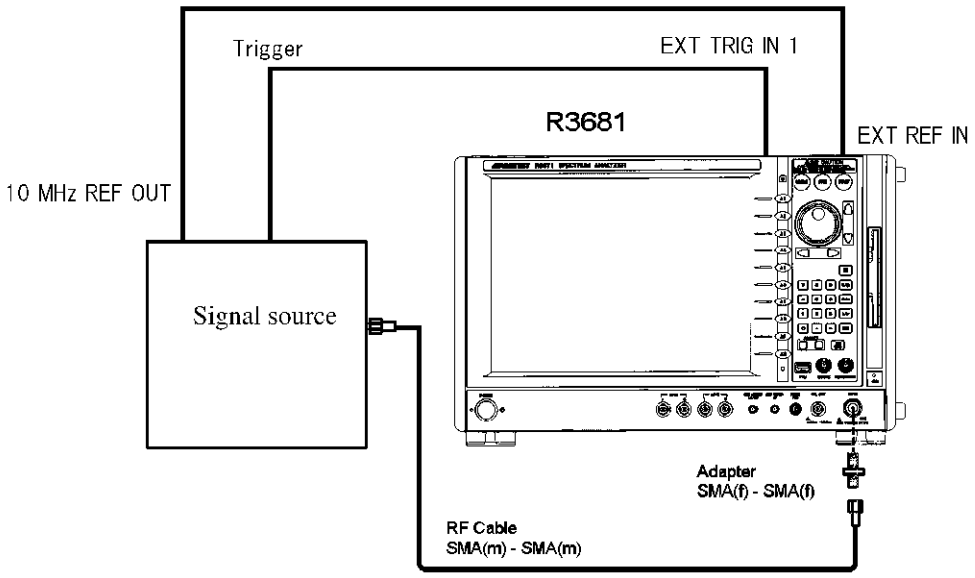


Figure 9-5 Connection Diagram for Code Domain Power Measurement of Access Terminal Signal

[Measurement condition settings]

1. Touch **[Config]** on the menu bar and select **[Modulation Analyzer]**.
2. Touch **[Modulation]** on the menu bar and select **[1xEV-DO UL]**.
3. Touch **{FREQ}** on the function bar.
4. Touch **Center** on the soft menu bar.
5. Press **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 **{LEVEL}** on the function bar.
7. Touch **Auto Level Set** on the soft menu bar.
   The Ref Level is automatically set to the optimum value.
8. Touch **{TRIGGER}** on the function bar.
9. Touch **Trigger Source** on the soft menu bar.
10. Touch **Ext1** on the soft menu bar.
    The trigger source is set to the external trigger.
11. Touch **{INPUT}** on the function bar.
12. Touch **Input Setup** on the soft menu bar.
    The **[Input Setup]** dialog box is displayed.
13. Set **[Input]** in the **[Input Setup]** dialog box to **[RF]**.
    The RF Input mode is set.
14. Touch the close button **X** in the **[Input Setup]** dialog box to close the dialog box.

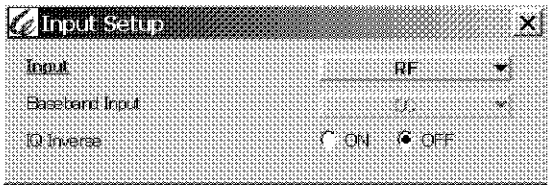


Figure 9-6 **[Input Setup]** Dialog Box

15. Touch **{MEAS MODE}** on the function bar.
16. Touch **Subtype 2** on the soft menu bar.
    The Subtype 2 measurement mode is set.
17. Touch **{MEAS SETUP}** on the function bar.

18. Touch **Meas Parameters** on the soft menu bar.
    The **[Measurement Parameters Setup]** dialog box is displayed.
19. Set the **[User Table]** option button to **[NOT USE]**.
    The user table cannot be used.
20. Set the **[Data Channel Detection]** option button to **[RRI]**.
    The Data channel is analyzed according to the RRI channel information.
21. Touch the **[Meas Range]** text box and press [2] and [ENT] on the keypad.
    The measurement length is set to 2 half slot.
22. Touch the **[Threshold]** text box and press [-], [2], [3], and [ENT] on the keypad.
    The threshold level is set to -23 dB.
23. Set the **[PN Delay Search]** option button to **[ON]**.
    The PN Delay search is set to ON.
24. Touch the **[Long Code Mask I]** text box and press [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], [3], and [ENT] on the keypad.
25. Touch the **[Long Code Mask Q]** text box and press [2], [6], [6], [6], [6], [6], [6], [6], [6], [6], [7], and [ENT] on the keypad.
26. Set the **[Freq Meas Range]** option button to **[±1 kHz]**.
    The frequency error measurement range is set to ±1 kHz.
27. Set the **[Chip Rate Error]** option button to **[ON]**.
    Chip Rate Error can be measured.
28. Set the **[Quadrature Error]** option button to **[ON]**.
    Quadrature Error can be measured.
29. Set the **[Half Slot Timing Adjust]** option button to **[ON]**.
    The time correction at the data position can be performed in each half slot timing.

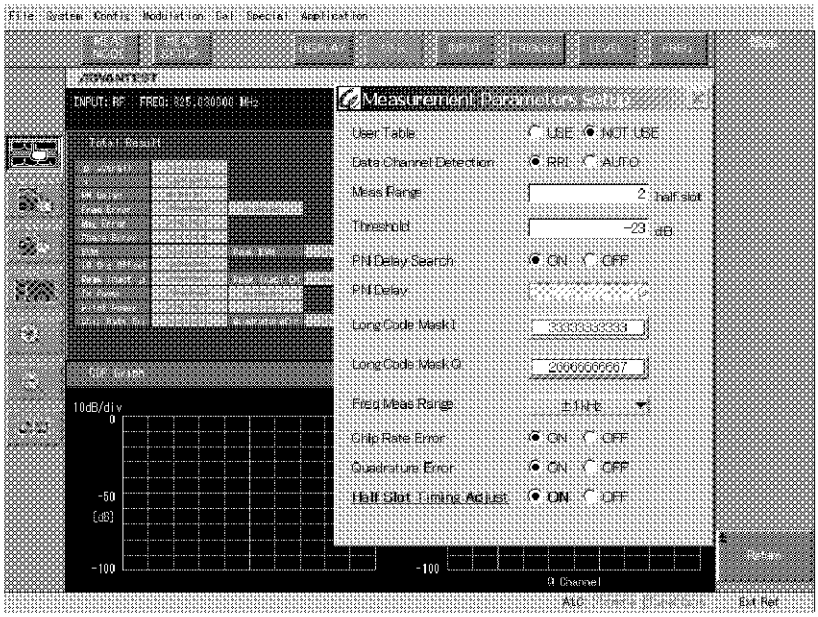


Figure 9-7 **[Measurement Parameters Setup]** Dialog Box (Subtype 2)

30. Touch **Return** on the soft menu bar to close the dialog box.

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

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

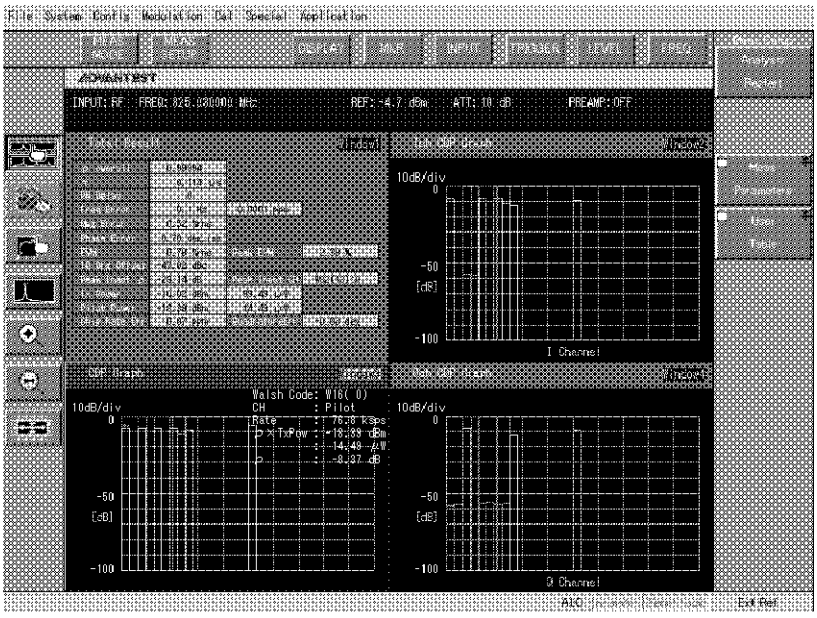


Figure 9-8 Measurement Results of 1xEV-DO Access Terminal Signal (Subtype 2)

Upper left window

$\rho_{overall}$	Waveform quality in Pilot Channel, RRI Channel, DSC Channel, DRC Channel, ACK Channel, Data Channel, and Auxiliary Pilot Channel
τ(Time Alignment Error)	Delay time (μs) from a trigger point to the head of a frame
PN Delay	Delay time from the head of Pilot PN Sequence and that is a value of 0 to 511 in units of 64 chips
Freq Error	The carrier frequency error (Hz, ppm) from the set center frequency
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)
Peak Inact ρ	The maximum logarithmic coefficient for each I and Q channels Code Domain power in inactive channels
Peak Inact CH	Walsh Code number, length, and components of Peak Inact ρ
Tx Power	Transmission power (dBm, W)
Pilot Power	Power of the pilot channel (dBm, W)
Chip Rate Err	Chip rate error (ppm) in relation to 1.2288 Mcps as a reference
Quadrature Err	Q-axis quadrature error (deg) in relation to the I-axis

Marker display

32. Touch **[Window3]** and then touch **{MKR}** on the function bar.

33. Touch **Active CH. Marker** on the soft menu bar.

    The transmission channel marker is displayed.

Walsh Code	The Walsh Code number and length of a channel which is specified by the marker
CH	Channel name
Rate	The modulation symbol rate (ksps) of a channel which is specified by the marker
ρ × TxPow	The product of ρ and TxPower of a channel which is specified by the marker (dBm, W)
ρ	The Code Domain power coefficient of a channel which is specified by the marker (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 1xEV-DO modulation analysis option.

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:

[File]	[System]	[Config]	[Modulation]	[Cal]	[Special]

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 **[1xEV-DO UL]** from **[Modulation]** on the menu bar to select the cdma2000 1xEV-DO Uplink 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.

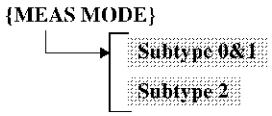
When you touch a button on the function bar, the associated soft keys are displayed on the soft menu bar.

10.5 Description of the Function of Each Key

This section describes the function of each key.

10.5.1 {MEAS MODE}

If the **{MEAS MODE}** button is touched, soft keys, which relate to the selection of the measurement mode, are displayed on the soft menu bar.



Subtype 0&1

If the **Subtype 0&1** key is touched, the Subtype 0&1 mode is selected. In the Subtype 0&1 mode, the analysis of the Subtype 0 or Subtype 1 signal, which is compliant with the physical layer standards, is performed.

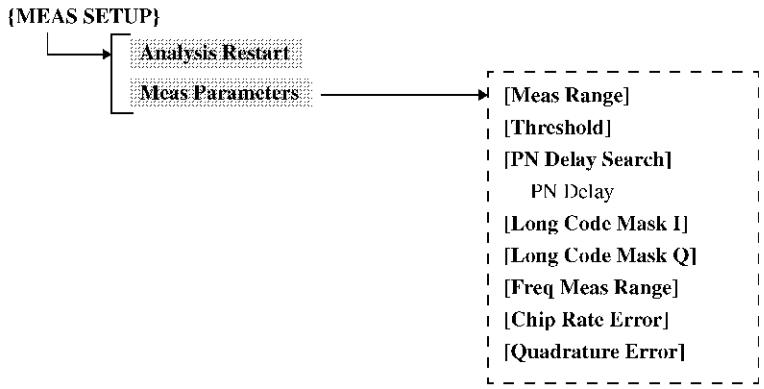
Subtype 2

If the **Subtype 2** key is touched, the Subtype 2 mode is selected. In the Subtype 2 mode, the analysis of the Subtype 2 signal, which is compliant with the physical layer standards, is performed.

10.5.2 {MEAS SETUP}

If **{MEAS SETUP}** is touched, soft keys, which relate to analysis parameter settings, are displayed on the soft menu bar.

- When **{MEAS MODE}** is set to **Subtype 0&1**.



Analysis Restart — When you touch the **Analysis Restart** key, the measurement of the AD data, which has already been obtained, re-starts.

Meas Parameters — When you touch the **Meas Parameters** key, the dialog box used to set the measurement conditions appears.

[Meas Range] — Sets the measurement length in units of Slot.

[Threshold] — Sets a threshold value that is used to judge whether the channel is active.

[PN Delay Search]

ON: Searches for a PN sequence position of the signal.

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

[PN Delay] — Sets a PN sequence synchronization position to a value of 0 to 511 in units of 64 chips.

[Long Code Mask I] — Sets Long Code Mask (42 bit) of the I channel in hexadecimal.

[Long Code Mask Q] — Sets Long Code Mask (42 bit) of the Q channel in hexadecimal.

[Freq Meas Range] — Sets a search range of a carrier frequency.
±150 Hz, ±1 kHz, and ±4 kHz can be selected as a search range.

MEMO: ***The available search range varies depending on the multiplex signal level ratios and noise components.***

[Chip Rate Error] — Selects whether to measure a chip rate error (ppm) in relation to 1.2288 Mcps as a reference.

ON: Measures a chip rate error.

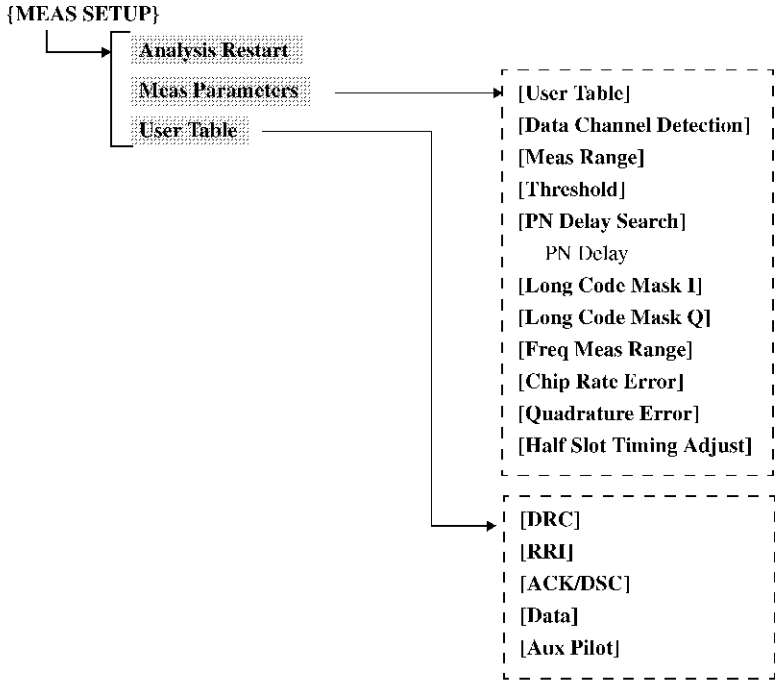
OFF: Does not measure a chip rate error.

[Quadrature Error] Selects whether to measure a Q-axis quadrature error (degree) in relation to the I-axis as a reference.

ON: Measures a quadrature error.

OFF: Does not measure a quadrature error.

- When **{MEAS MODE}** is set to **Subtype 2**.



Analysis Restart When you touch the **Analysis Restart** key, the measurement of the AD data, which has already been obtained, re-starts.

Meas Parameters When you touch the **Meas Parameters** key, 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 judged.

[Data Channel Detection] Selects a detection method of the data channel when **[User Table]** is set to NOT USE.

RRI: Determines the modulation format and Walsh Code of the data channel according to the RRI channel information.

AUTO: The modulation format and Walsh Code of the data channel are automatically judged according to the signal form.

[Meas Range] Sets the measurement length in units of half slot.

[Threshold] Sets a threshold value that is used to judge whether the channel is active.

[PN Delay Search]
ON: Searches for a PN sequence position of the signal.
OFF: Set **[PN Delay Search]** to OFF and set PN delay if the relationship between the external trigger and the PN delay of the input signal is known.

[PN Delay] Sets a PN sequence synchronization position to a value of 0 to 511 in units of 64 chips.

[Long Code Mask I] Sets Long Code Mask (42 bit) of the I channel in hexadecimal.

[Long Code Mask Q] Sets Long Code Mask (42 bit) of the Q channel in hexadecimal.

[Freq Meas Range] Sets a search range of a carrier frequency.
±150 Hz, ±1 kHz, and ±4 kHz can be selected as a search range.

MEMO: ***The available search range varies depending on the multiplex signal level ratios and noise components.***

[Chip Rate Error] Selects whether to measure a chip rate error (ppm) in relation to 1.2288 Mcps as a reference.
ON: Measures a chip rate error.
OFF: Does not measure a chip rate error.

[Quadrature Error] Selects whether to measure a Q-axis quadrature error (degree) in relation to the I-axis as a reference.
ON: Measures a quadrature error.
OFF: Does not measure a quadrature error.

[Half Slot Timing Adjust] Selects whether to perform the time correction at the data position in each half slot timing.
ON: Performs the time correction.
OFF: Does not perform the time correction.

User Table The User Table dialog box is displayed.
The channels defined here are valid if **[User Table]** is set to USE.
Abbreviation for each channel is as follows:
DRC: Data Rate Control Channel
RRI: Reverse Rate Indicator Channel
ACK: ACK Channel
DSC: Data Source Control Channel
Data: Data Channel
Aux Pilot: Auxiliary Pilot Channel

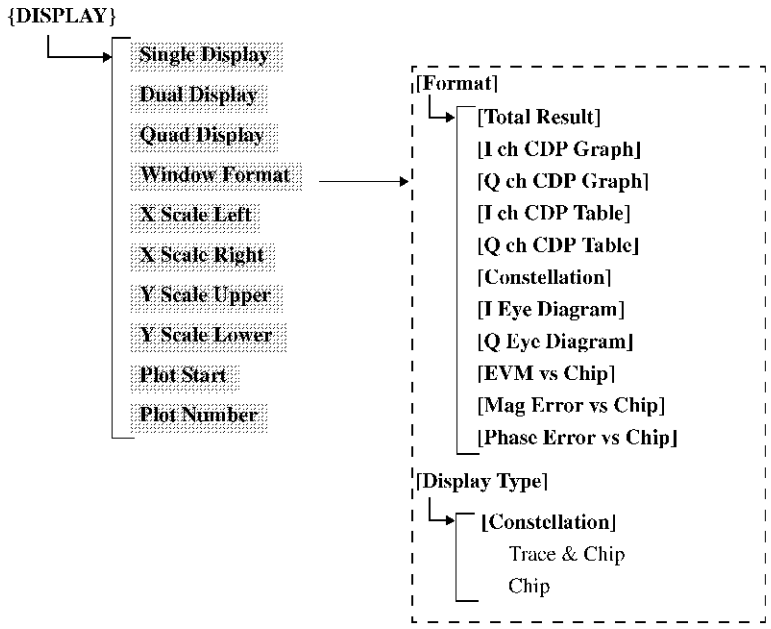
[DRC]
OFF: Sets the condition in which no DRC is transmitted.
ON: Sets the Walsh function of DRC to W16 (8), the modulation format to Q-component BPSK, and then sets the condition in which DRC is transmitted.

[RRI]	OFF:	Sets the condition in which no RRI is transmitted.
	ON:	Sets the Walsh function of RRI to W16 (4), the modulation format to I-component BPSK, and then sets the condition in which RRI is transmitted.
[ACK/DSC]	OFF:	Sets the condition in which ACK and DSC are not transmitted.
	ON:	Sets the Walsh function of ACK and DSC to W32 (12), the modulation format to I-component BPSK, and then sets the condition in which ACK and DSC are transmitted.
[Data]	OFF:	Sets the condition in which no Data is transmitted.
	B4:	Sets the Walsh function of Data to W4 (2), the modulation format to Q-component BPSK, and then sets the condition in which Data is transmitted.
	Q4:	Sets the Walsh function of Data to W4 (2), the modulation format to QPSK, and then sets the condition in which Data is transmitted.
	Q2:	Sets the Walsh function of Data to W2 (1), the modulation format to QPSK, and then sets the condition in which Data is transmitted.
	Q4Q2:	Sets the Walsh function of Data to W4 (2) and W2 (1), the modulation format to QPSK, and then sets the condition in which Data is transmitted.
	E4E2:	Sets the Walsh function of Data to W4 (2) and W2 (1), the modulation format to 8PSK, and then sets the condition in which Data is transmitted.
[Aux Pilot]	OFF:	Sets the condition in which no Aux Pilot is transmitted.
	ON:	Sets the Walsh function of Aux Pilot to W32 (28), the modulation format to I-component BPSK, and then sets the condition in which Aux Pilot is transmitted.

10.5.3 {DISPLAY}

If **{DISPLAY}** is touched, soft keys, which relate to the display screen settings, are displayed on the soft menu bar.

- When **{MEAS MODE}** is set to **Subtype 0&1**.



Single Display — Zooms into the upper left window when in the four-window display mode.

Dual Display — Zooms into the two upper windows when in the four-window display mode.

Quad Display — Splits the screen into four windows.

Window Format — The dialog box, which is used to set the measurement result window, is displayed by touching **Window Format**.

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

[Total Result] — Displays numerical measurement results.

[I ch CDP Graph] — Displays the code domain power of the I channel.

[Q ch CDP Graph] — Displays the code domain power of the Q channel.

[I ch CDP Table] — Displays the code domain power of the I channel in table format.

[Q ch CDP Table] — Displays the code domain power of the Q channel in table format.

[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 EVM (Error Vector Magnitude) of each chip.

[Mag Error vs Chip] Displays the magnitude error of each chip.

[Phase Error vs Chip] Displays the phase error of each chip.

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

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

Trace & Chip:
Displays both chip positions and transition lines.

Chip: Displays chip positions only.

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

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

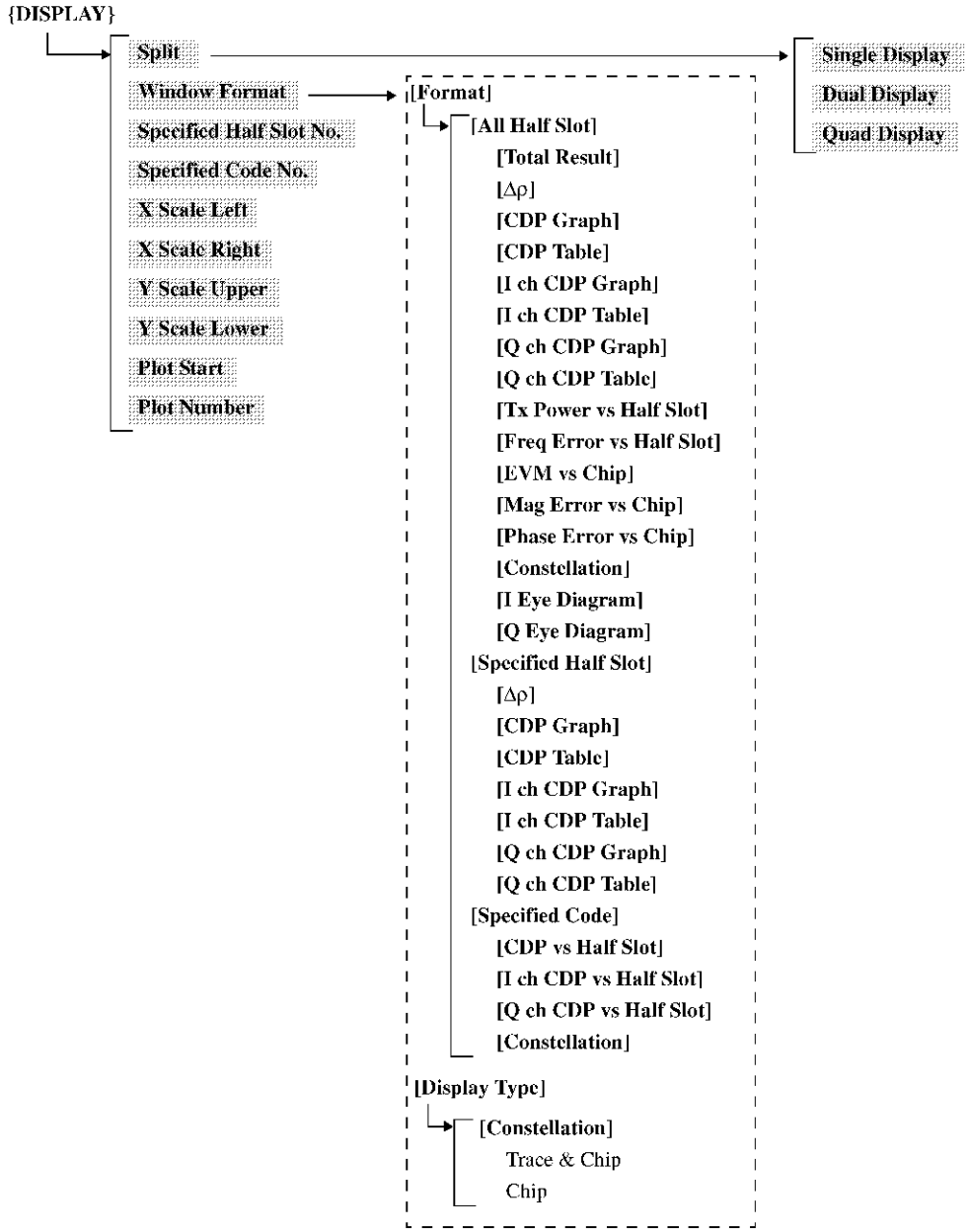
Y Scale Upper Sets the maximum value on the Y-axis.

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

Plot Start Sets a drawing start point when a Constellation diagram and Eye diagram are displayed.

Plot Number Sets the drawing length by using the number of chips when a Constellation diagram and Eye diagram are displayed.

- When **{MEAS MODE}** is set to **Subtype 2**.



Split — Sets the screen division.

Single Display — Zooms into the upper left window when in the four-window display mode.

Dual Display — Zooms into the two upper windows when in the four-window display mode.

Quad Display — Splits the screen into four windows.

Window Format The dialog box, which is used to set the measurement result window, is displayed by touching **Window Format**.

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

[All Half Slot] Measures all codes in all Half Slots.

[Total Result] Displays numerical measurement results.

[Δρ] Displays the relative ρ value of each channel based on ρ of the pilot channel.

[CDP Graph] Displays the code domain power.

[CDP Table] Displays the code domain power in table format.

[I ch CDP Graph]
Displays the code domain power of the I channel.

[I ch CDP Table]
Displays the code domain power of the I channel in table format.

[Q ch CDP Graph]
Displays the code domain power of the Q channel.

[Q ch CDP Table]
Displays the code domain power of the Q channel in table format.

[Tx Power vs Half Slot]
Displays the power of each Half Slot.

[Freq Error vs Half Slot]
Displays the frequency error in each Half Slot.

[EVM vs Chip] Displays EVM (Error Vector Magnitude) of each chip.

[Mag Error vs Chip]
Displays the magnitude error of each chip.

[Phase Error vs Chip]
Displays the phase error of each chip.

[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 Half Slot] Measures the specified Half Slot only.

[Δρ] Displays the relative ρ value of each channel based on ρ of the pilot channel.

[CDP Graph] Displays the code domain power.

[CDP Table] Displays the code domain power in table format.

[I ch CDP Graph]
Displays the code domain power of the I channel.

[I ch CDP Table]
Displays the code domain power of the I channel in table format.

[Q ch CDP Graph]
Displays the code domain power of the Q channel.

[Q ch CDP Table]
Displays the code domain power of the Q channel in table format.

[Specified Code] Measures the specified code only.

[CDP vs Half Slot]
Displays the power of the specified code in each Half Slot.

[I ch CDP vs Half Slot]
Displays the I-component power of the specified code in each Half Slot.

[Q ch CDP vs Half Slot]
Displays the Q-component power of the specified code in each Half Slot.

[Constellation] Displays the constellation of the specified code.

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

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

Trace & Chip:
Displays both chip positions and transition lines.

Chip: Displays chip positions only.

Specified Half Slot No. Sets the Half Slot number to display its graph.

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

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 a drawing start point when a Constellation diagram and Eye diagram are displayed.

Plot Number Sets the drawing length by using the number of chips when a Constellation diagram and Eye diagram are displayed.

10.5.4 {MKR}

If **{MKR}** is touched, soft keys, which relate to the marker settings, are displayed on the soft menu bar.

- When **{MEAS MODE}** is set to **Subtype 0&1**.

{MKR}

- **Marker**
- **Delta Marker**
- **Peak Search**
- **Marker OFF**

Marker	Sets the X-axis position of the normal marker.
Delta Marker	Sets the delta marker.
Peak Search	Sets the peak search marker.
Marker OFF	Hides marker display.

- When **{MEAS MODE}** is set to **Subtype 2**.

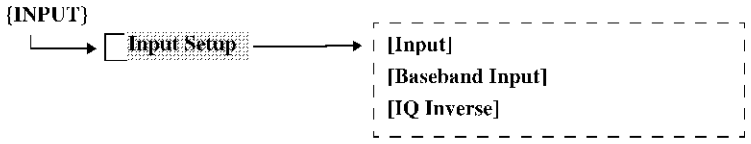
{MKR}

- **Marker**
- **Active CH. Marker**
- **Delta Marker**
- **Peak Search**
- **Marker OFF**

Marker	Sets the X-axis position of the normal marker.
Active CH. Marker	Sets the code number of the transmission channel. This setting can be used only when the graph, in which the X-axis is set to the code, is displayed.
Delta Marker	Sets the delta marker.
Peak Search	Sets the peak search marker.
Marker OFF	Hides marker display.

10.5.5 {INPUT}

If **{INPUT}** key is touched, soft keys, which relate 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**, 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.

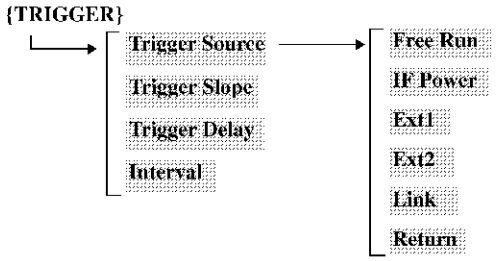
[IQ Inverse] Selects whether or not to invert the phase of the signal to be measured.

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**, 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

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

Ext2

Acquires and analyzes data in synchronization with the external signal 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 the directions for use of 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

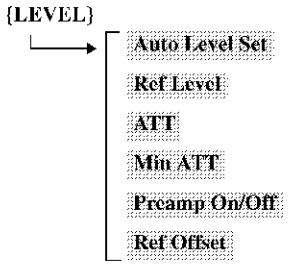
Sets whether to synchronize the trigger with the built-in counter whose period is set to 80 ms.

On: Synchronizes them.

Off: Does not synchronize them.

10.5.7 {LEVEL}

If **{LEVEL}** is touched, soft keys, which relate 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.

IMPORTANT: 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

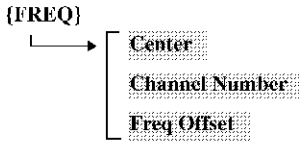
Switches the reference level offset function ON and OFF.

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}

If **{FREQ}** is touched, soft keys, which relate to the measurement frequency setup, are displayed on the soft menu bar.



Center

Sets the center frequency of the measurement signal.

IMPORTANT: ***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:

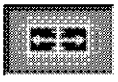

: Zoom in icon: Used to zoom in on the waveform displayed in the window. The range specified by the range specification icon is zoomed in on by touching on the range.


: 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: 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-CONFigure

Function description	SCPI command	Parameter	Query reply	Remarks
Meas Mode				
Switching to the Subtype 0&1 mode	:CONFigure:STYPe<0>	–	–	
Switching to the Subtype 0&1 mode	:CONFigure:STYPe<1>	–	–	
Switching to the Subtype 2 mode	:CONFigure:STYPe<2>	–	–	

11.3.2 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	EVDOUL	EVDOUL	
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>	

11.3.3 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	

11.3.4 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 (Subtype 0&1 mode)				
Meas Range setting	[:SENSe]:CONDition:MRANge	<int>	<int>	
Threshold setting	[:SENSe]:CONDition:THReshold	<int>	<int>	
PN Delay Search ON/OFF	[:SENSe]:CONDition:PNDSearch	OFF|ON	OFF|ON	
PN Delay setting	[:SENSe]:CONDition:PNDelay	<int>	<int>	
Long Code Mask I setting	[:SENSe]:CONDition:LCMI	<str>	<str>	Hexadecimal
Long Code Mask Q setting	[:SENSe]:CONDition:LCMQ	<str>	<str>	Hexadecimal
Freq Meas Range setting	[:SENSe]:CONDition:FMRange	HZ150| HZ1000| HZ4000	HZ150| HZ1000| HZ4000	
Chip Rate Error setting	[:SENSe]:CONDition:CRERror	OFF|ON	OFF|ON	
Quadrature Error setting	[:SENSe]:CONDition:QERRor	OFF|ON	OFF|ON	

Function description	SCPI command	Parameter	Query reply	Remarks
Meas Parameters (Subtype 2 mode)				
User Table setting	[:SENSe]:CONDition:STYPe<2>:UTABle	NOT|USE	NOT|USE	
Data Channel Detection setting	[:SENSe]:CONDition:STYPe<2>:DCDetection	RRI|AUTO	RRI|AUTO	
Meas Range setting	[:SENSe]:CONDition:STYPe<2>:MRANge	<int>	<int>	
Threshold setting	[:SENSe]:CONDition:STYPe<2>:THReshold	<int>	<int>	
PN Delay Search ON/OFF	[:SENSe]:CONDition:STYPe<2>:PNDSearch	OFF|ON	OFF|ON	
PN Delay setting	[:SENSe]:CONDition:STYPe<2>:PNDelay	<int>	<int>	
Long Code Mask I setting	[:SENSe]:CONDition:STYPe<2>:LCMI	<str>	<str>	Hexadecimal
Long Code Mask Q setting	[:SENSe]:CONDition:STYPe<2>:LCMQ	<str>	<str>	Hexadecimal
Freq Meas Range setting	[:SENSe]:CONDition:STYPe<2>:FMRange	HZ150| HZ1000| HZ4000	HZ150| HZ1000| HZ4000	
Chip Rate Error setting	[:SENSe]:CONDition:STYPe<2>:CRERror	OFF|ON	OFF|ON	
Quadrature Error setting	[:SENSe]:CONDition:STYPe<2>:QERRor	OFF|ON	OFF|ON	
Half Slot Timing Adjust setting	[:SENSe]:CONDition:STYPe<2>:HSTAdjust	OFF|ON	OFF|ON	
User Table (Subtype 2 mode)				
DRC channel setting	[:SENSe]:CONDition:STYPe<2>:UTABle:DRC	OFF|ON	OFF|ON	
RRI channel setting	[:SENSe]:CONDition:STYPe<2>:UTABle:RRI	OFF|ON	OFF|ON	
ACK/DSC channel setting	[:SENSe]:CONDition:STYPe<2>:UTABle:ACKDSC	OFF|ON	OFF|ON	
Data channel setting	[:SENSe]:CONDition:STYPe<2>:UTABle:DATA	OFF|B4|Q4| Q2|Q4Q2| E4E2	OFF|B4|Q4| Q2|Q4Q2| E4E2	
Aux Pilot channel setting	[:SENSe]:CONDition:STYPe<2>:UTABle:AUXPilot	OFF|ON	OFF|ON	

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
Measurement execution				
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 (Subtype 0&1 mode)				
Marker ON/OFF	:CALCulate:MARKer<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Delta Marker ON/OFF	:CALCulate:DELTamarker<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Peak Search execution	:CALCulate:MARKer<scrn=1|2|3|4>:MAXimum	–	–	
Marker X setting Ich CDP graph Qch CDP graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	
Reading Marker Y Ich CDP graph Qch CDP graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>,<int>, <str>,<real>, <real>,<real>, <real>,<real>	<Walsh Len>, <Walsh Code>, <CH>,<Rate>, <ρxTxPow[dB]>, <ρxTxPow[W]>, <ρ[dB]>,<ρ>
Marker position setting Constellation graph I Eye Diagram graph Q Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>	<int>	<Chip>
Reading Marker I Constellation graph I Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:I	–	<real>	<I>
Reading Marker Q Constellation graph Q Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:Q	–	<real>	<Q>
Marker X setting EVM vs Chip graph Mag Error vs Chip graph Phase Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	<Chip>
Reading Marker Y EVM vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<EVM>
Reading Marker Y Mag Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Mag Err>
Reading Marker Y Phase Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<real>	<Phase Err>

11.3.7 Subsystem-CALCulate

Function description	SCPI command	Parameter	Query reply	Remarks
Marker (Subtype 2 mode)				
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	
Delta Marker ON/OFF	:CALCulate:DELTamarker<scrn=1|2|3|4>[:STATe]	OFF|ON	OFF|ON	
Peak Search execution	:CALCulate:MARKer<scrn=1|2|3|4>:MAXimum	–	–	
Marker X setting CDP graph CDP (Specified Half Slot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	
Reading Marker Y CDP graph CDP (Specified Half Slot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>,<int>, <real>,<real>, <real>,<real>	<Walsh Len>, <Walsh Code>, <Rate>, <ρxTxPow[dBm]>, <ρxTxPow[W]>, <ρ[dB]>
Active CH. Marker X setting CDP graph CDP (Specified Half Slot) graph	:CALCulate:ACMarker<scrn=1|2|3|4>:X	<int>	<int>	
Reading Active CH. Marker Y CDP graph	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>,<int>, <string>, <real>,<real>, <real>,<real>	<Walsh Len>, <Walsh Code>, <"Pilot"|"DRC"| "RRI"| "ACK/DSC"| "Aux Pilot"| "Data">,<Rate>, <ρxTxPow[dBm]>, <ρxTxPow[W]>, <ρ[dB]>
Reading Active CH. Marker Y CDP (Specified Half Slot) graph	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>,<int>, <string>, <string>, <real>,<real>, <real>,<real>	<Walsh Len>, <Walsh Code>, <"Pilot"|"DRC"| "RRI"| "ACK/DSC"| "Aux Pilot"| "Data">,<"BPSK"| "QPSK"|"8PSK">, <Rate>, <ρxTxPow[dBm]>, <ρxTxPow[W]>, <ρ[dB]>
Marker X setting Ich CDP graph Qch CDP graph Ich CDP (Specified Half Slot) graph Qch CDP (Specified Half Slot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	

Function description	SCPI command	Parameter	Query reply	Remarks
Reading Marker Y Ich CDP graph Qch CDP graph Ich CDP (Specified Half Slot) graph Qch CDP (Specified Half Slot) graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<int>,<int>,<real>,<real>	<Walsh Len>,<Walsh Code>,<Rate>,<ρ[dB]>
Reading Active CH. Marker Y Ich CDP graph Qch CDP graph	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>,<int>,<string>,<string>,<real>,<real>	<Walsh Len>,<Walsh Code>,<"Pilot"|"DRC"|"RRI"|"ACK/DSC"|"Aux Pilot"|"Data">,<Rate>,<ρ[dB]>
Reading Active CH. Marker Y Ich CDP (Specified Half Slot) graph Qch CDP (Specified Half Slot) graph	:CALCulate:ACMarker<scrn=1|2|3|4>:Y	–	<int>,<int>,<string>,<string>,<real>,<real>	<Walsh Len>,<Walsh Code>,<"Pilot"|"DRC"|"RRI"|"ACK/DSC"|"Aux Pilot"|"Data">,<"BPSK"|"QPSK"|"8PSK">,<Rate>,<ρ[dB]>
Marker X setting Tx Power vs Half Slot graph Freq Error vs Half Slot graph CDP vs Half Slot graph Ich CDP vs Half Slot graph Qch CDP vs Half Slot graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	
Reading Marker Y Tx Power vs Half Slot graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	-	<real>,<real>	<Power[dBm]>,<Power[W]>
Reading Marker Y Freq Error vs Half Slot graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	-	<real>	<Freq Error>
Reading Marker Y CDP vs Half Slot graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<string>,<real>,<real>,<real>	<"BPSK"|"QPSK"|"8PSK"|"BPSK+QPSK"|"BPSK+8PSK"|"QPSK+8PSK"|"BPSK+QPSK+8PSK">,<ρ>,<ρ×TxPow[dBm]>,<ρ×TxPow[W]>
Reading Marker Y Ich CDP vs Half Slot graph Qch CDP vs Half Slot graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	–	<string>,<real>	<"BPSK"|"QPSK"|"8PSK"|"BPSK+QPSK"|"BPSK+8PSK"|"QPSK+8PSK"|"BPSK+QPSK+8PSK">,<ρ>

Function description	SCPI command	Parameter	Query reply	Remarks
Marker position setting Constellation graph I Eye Diagram graph Q Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:CHIP	<int>	<int>	<Chip>
Marker position setting Constellation (Specified Code) graph	:CALCulate:MARKer<scrn=1|2|3|4>:SYMBol	<int>	<int>	<Symbol>
Reading Marker I Constellation graph I Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:I	-	<real>	<I>
Reading Marker Q Constellation graph Q Eye Diagram graph	:CALCulate:MARKer<scrn=1|2|3|4>:Q	-	<real>	<Q>
Marker X setting EVM vs Chip graph Mag Error vs Chip graph Phase Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:X	<int>	<int>	<Chip>
Reading Marker Y EVM vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	-	<real>	<EVM>
Reading Marker Y Mag Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	-	<real>	<Mag Err>
Reading Marker Y Phase Error vs Chip graph	:CALCulate:MARKer<scrn=1|2|3|4>:Y	-	<real>	<Phase Err>

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 (Subtype 0&1 mode)				
Result display format selection	:DISPlay:WINDow<scrn=1|2|3|4>:FORMat	TRESult| ICDGraph| QCDGraph| ICDTable| QCDTable| CONStellation| IEYE|QEYE| EVM| MERRor| PERRor	TRES|ICDG| QCDG|ICDT| QCDT|CONS| IEYE|QEYE| EVM|MERR| PERR	
Constellation display Trace & Chip/Chip setting	:DISPlay:WINDow<scrn=1|2|3|4>:CONStellation:TYPE	TCHip|CHIP	TCH|CHIP	

Function description	SCPI command	Parameter	Query reply	Remarks
Window Format (Subtype 2 mode)				
Result display format selection	:DISPlay:WINDow<scrn=1|2|3|4>:FORMat	TRESult| DRHO| CDGRaph| CDTable| ICDGraph| ICDTable| QCDGraph| QCDTable| POWer|FERRor| EVM|MERRor| PERRor| CONStellation| IEYE|QEYE| SHDRho| SHCDGraph| SHCDTable| SHICDGraph| SHICDTable| SHQCDGraph| SHQCDTable| SCCDGraph| SCICDGraph| SCQCDGraph| SCCONStellation	TRES|DRHO| CDGR|CDT| ICDG|ICDT| QCDG|QCDT| POW|FERR| EVM|MERR| PERR|CONS| IEYE|QEYE| SHDR| SHCDG| SHCDT| SHICDG| SHICDT| SHQCDG| SHQCDT| SCCDG| SCICDG| SCQCDG| SCCONS	
Constellation display Trace & Chip/Chip setting	:DISPlay:WINDow<scrn=1|2|3|4>:CONStellation :TYPE	TCHip|CHIP	TCH|CHIP	
Specified Half Slot No.setting	:DISPlay:HSLot	<int>	<int>	
Specified Code No. setting	:DISPlay:CODE	<int>	<int>	
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>	
Plot Start setting on Constellation	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :CONStellation:CHIP:STARt	<int>	<int>	
Plot Start setting on I Eye Diagram	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :IEYE:CHIP:STARt	<int>	<int>	
Plot Start setting on Q Eye Diagram	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :QEYE:CHIP:STARt	<int>	<int>	
Plot Number setting on Constellation	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe :CONStellation:CHIP:NUMBer	<int>	<int>	
Plot Number setting on I Eye Diagram	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:IEYE :CHIP:NUMBer	<int>	<int>	
Plot Number setting on Q Eye Diagram	:DISPlay[:WINDow<scrn=1|2|3|4>]:TRACe:QEYE :CHIP:NUMBer	<int>	<int>	

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:EVDOUL: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
Measuring and reading results				
Reading $\rho_{overall}$	:MEASure:TRESult:ROVer	–	<real>	
Reading τ	:MEASure:TRESult:TAU	–	<real>	
Reading PN Delay	:MEASure:TRESult:PNDelay	–	<int>	
Reading Frequency Error	:MEASure:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Magnitude Error	:MEASure:TRESult:MERRor	–	<real>	
Reading Phase Error	:MEASure:TRESult:PERRor	–	<real>	
Reading EVM	:MEASure:TRESult:EVM	–	<real>	
Reading Peak EVM	:MEASure:TRESult:PEVM	–	<real>	
Reading I/Q Origin Offset	:MEASure:TRESult:IQOFfset	–	<real>	
Reading Peak Inactive ρ	:MEASure:TRESult:PIRHo	–	<real>	
Reading Peak Inactive CH	:MEASure:TRESult:PICHannel	–	<int>,<int>, <str>	<Walsh Code>, <Walsh Len>, <"I"|"Q">
Reading Tx Power	:MEASure:TRESult:POWer	–	<real>,<real>	<dBm>,<W>
Reading Pilot Power	:MEASure:TRESult:PILot?	–	<real>,<real>	<dBm>,<W>
Reading Chip Rate Error	:MEASure:TRESult:CRERror	–	<real>	
Reading Quadrature Error	:MEASure:TRESult:QERRor	–	<real>	
Reading RRI/Pilot	:MEASure:TRESult:PPILot:RRI	–	<real>	
Reading ACK/Pilot	:MEASure:TRESult:PPILot:ACK	–	<real>	
Reading DRC/Pilot	:MEASure:TRESult:PPILot:DRC	–	<real>	
Reading Data/Pilot	:MEASure:TRESult:PPILot:DATA	–	<real>	

Function description	SCPI command	Parameter	Query reply	Remarks
Δρ (All Half Slot)				
Reading Pilot	:MEASure:DRHO:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:MEASure:DRHO:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:MEASure:DRHO:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:MEASure:DRHO:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:MEASure:DRHO:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:MEASure:DRHO:DATA	–	<string>, <real>,<real>, <string>, <real>,<real>, <string>, <real>,<real>	<"B4","Q4", "E4","W4">, <ρ>,<Δρ>, <"Q2","E2", "W2">, <ρ>,<Δρ>, <"ALL">, <ρ>,<Δρ>
Δρ (Specified Half Slot)		–		
Reading Pilot	:MEASure:SHDRho:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:MEASure:SHDRho:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:MEASure:SHDRho:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:MEASure:SHDRho:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:MEASure:SHDRho:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:MEASure:SHDRho:DATA	–	<string>, <real>,<real>, <string>, <real>,<real>, <string>, <real>,<real>	<"B4","Q4", "E4">, <ρ>,<Δρ>, <"Q2","E2">, <ρ>,<Δρ>, <"ALL">, <ρ>,<Δρ>

11.3.11 Subsystem-READ

Function description	SCPI command	Parameter	Query reply	Remarks
Measuring and reading results				
Reading $\rho_{overall}$	:READ:TRESult:ROVer	–	<real>	
Reading τ	:READ:TRESult:TAU	–	<real>	
Reading PN Delay	:READ:TRESult:PNDelay	–	<int>	
Reading Frequency Error	:READ:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Magnitude Error	:READ:TRESult:MERRor	–	<real>	
Reading Phase Error	:READ:TRESult:PERRor	–	<real>	
Reading EVM	:READ:TRESult:EVM	–	<real>	
Reading Peak EVM	:READ:TRESult:PEVM	–	<real>	
Reading I/Q Origin Offset	:READ:TRESult:IQOFfset	–	<real>	
Reading Peak Inactive ρ	:READ:TRESult:PIRHo	–	<real>	
Reading Peak Inactive CH	:READ:TRESult:PICHannel	–	<int>,<int>,<str>	<Walsh Code>,<Walsh Len>,<"I"|"Q">
Reading Tx Power	:READ:TRESult:POWer	–	<real>,<real>	
Reading Pilot Power	:READ:TRESult:PILot?	–	<real>,<real>	<dBm>,<W>
Reading Chip Rate Error	:READ:TRESult:CRERror	–	<real>	
Reading Quadrature Error	:READ:TRESult:QERRor	–	<real>	
Reading RRI/Pilot	:READ:TRESult:PPILot:RRI	–	<real>	
Reading ACK/Pilot	:READ:TRESult:PPILot:ACK	–	<real>	
Reading DRC/Pilot	:READ:TRESult:PPILot:DRC	–	<real>	
Reading Data/Pilot	:READ:TRESult:PPILot:DATA	–	<real>	
Δρ (All Half Slot)				
Reading Pilot	:READ:DRHO:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:READ:DRHO:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:READ:DRHO:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:READ:DRHO:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:READ:DRHO:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:READ:DRHO:DATA	–	<string>,<real>,<real>,<string>,<real>,<real>,<string>,<real>,<real>	<"B4","Q4","E4","W4">,<ρ>,<Δρ>,<"Q2","E2","W2">,<ρ>,<Δρ>,<"ALL">,<ρ>,<Δρ>

Function description	SCPI command	Parameter	Query reply	Remarks
Δρ (Specified Half Slot)		–		
Reading Pilot	:READ:SHDRho:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:READ:SHDRho:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:READ:SHDRho:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:READ:SHDRho:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:READ:SHDRho:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:READ:SHDRho:DATA	–	<string>, <real>,<real>, <string>, <real>,<real>, <string>, <real>,<real>	<"B4","Q4", "E4">, <ρ>,<Δρ>, <"Q2","E2">, <ρ>,<Δρ>, <"ALL">, <ρ>,<Δρ>

11.3.12 Subsystem-FETCh

Function description	SCPI command	Parameter	Query reply	Remarks
Reading results				
Reading $\rho_{overall}$	:FETCh:TRESult:ROVer	–	<real>	
Reading τ	:FETCh:TRESult:TAU	–	<real>	
Reading PN Delay	:FETCh:TRESult:PNDelay	–	<int>	
Reading Frequency Error	:FETCh:TRESult:FERRor	–	<real>,<real>	<Hz>,<ppm>
Reading Magnitude Error	:FETCh:TRESult:MERRor	–	<real>	
Reading Phase Error	:FETCh:TRESult:PERRor	–	<real>	
Reading EVM	:FETCh:TRESult:EVM	–	<real>	
Reading Peak EVM	:FETCh:TRESult:PEVM	–	<real>	
Reading I/Q Origin Offset	:FETCh:TRESult:IQOFfset	–	<real>	
Reading Peak Inactive ρ	:FETCh:TRESult:PIRHo	–	<real>	
Reading Peak Inactive CH	:FETCh:TRESult:PICHannel	–	<int>,<int>, <str>	<Walsh Code>, <Walsh Len>, <"I"|"Q">
Reading Tx Power	:FETCh:TRESult:POWer	–	<real>,<real>	
Reading Pilot Power	:FETCh:TRESult:PILot?	–	<real>,<real>	<dBm>,<W>
Reading Chip Rate Error	:FETCh:TRESult:CRERror	–	<real>	
Reading Quadrature Error	:FETCh:TRESult:QERRor	–	<real>	
Reading RRI/Pilot	:FETCh:TRESult:PPILot:RRI	–	<real>	
Reading ACK/Pilot	:FETCh:TRESult:PPILot:ACK	–	<real>	
Reading DRC/Pilot	:FETCh:TRESult:PPILot:DRC	–	<real>	
Reading Data/Pilot	:FETCh:TRESult:PPILot:DATA	–	<real>	

Function description	SCPI command	Parameter	Query reply	Remarks
Δρ (All Half Slot)				
Reading Pilot	:FETCh:DRHO:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:FETCh:DRHO:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:FETCh:DRHO:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:FETCh:DRHO:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:FETCh:DRHO:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:FETCh:DRHO:DATA	–	<string>, <real>,<real>, <string>, <real>,<real>, <string>, <real>,<real>	<"B4","Q4", "E4","W4">, <ρ>,<Δρ>, <"Q2","E2", "W2">, <ρ>,<Δρ>, <"ALL">, <ρ>,<Δρ>
Δρ (Specified Half Slot)		–		
Reading Pilot	:FETCh:SHDRho:PILot	–	<real>,<real>	<ρ>,<Δρ>
Reading DRC	:FETCh:SHDRho:DRC	–	<real>,<real>	<ρ>,<Δρ>
Reading RRI	:FETCh:SHDRho:RRI	–	<real>,<real>	<ρ>,<Δρ>
Reading ACK/DSC	:FETCh:SHDRho:ADSC	–	<real>,<real>	<ρ>,<Δρ>
Reading Aux Pilot	:FETCh:SHDRho:APILot	–	<real>,<real>	<ρ>,<Δρ>
Reading Data	:FETCh:SHDRho:DATA	–	<string>, <real>,<real>, <string>, <real>,<real>, <string>, <real>,<real>	<"B4","Q4", "E4">, <ρ>,<Δρ>, <"Q2","E2">, <ρ>,<Δρ>, <"ALL">, <ρ>,<Δρ>

11.3.13 Subsystem-STATus

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

11.3.14 Subsystem-HCOPy

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

11.4 Status Register

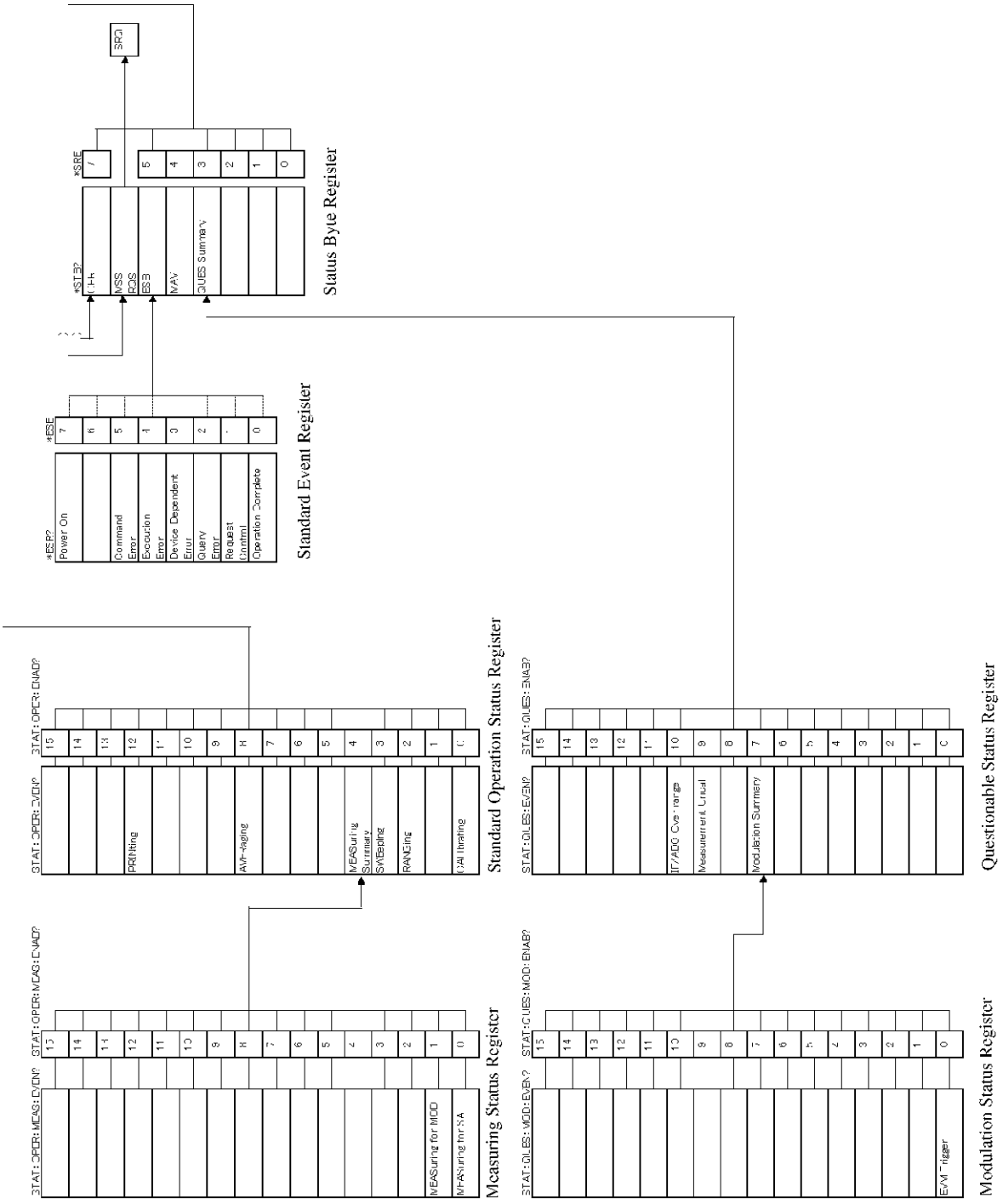


Figure 11-1 Status Registers

12. PERFORMANCE VERIFICATION (Uplink)

This chapter describes how to verify whether this instrument meets the specified performance.

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

IMPORTANT: Before executing the performance verification, execute warm-up and all calibrations.

12.1 Test Signal Specifications

The test signals used for performance verification are shown below:

Table 12-1 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>Mobile station signal
(Subtype 0&1)</td><td>IS-856 Reverse Link signal
Long Code Mask I: 33333333333
Long Code Mask Q: 26666666667
Signal in which Pilot, ACK, DRC, and Data Channel are multiplexed
<table><tr><th>Channel</th><th>Pilot Channel ratio</th></tr><tr><td>ACK</td><td>0 dB</td></tr><tr><td>DRC</td><td>0 dB</td></tr><tr><td>Data</td><td>3.75 dB</td></tr></table>ACK channel: Transmitting in all slots
DRC channel: Transmitting continuously</td><td>Code Domain Power measurement
(RF input, IQ input)</td></tr>
<tr><td>2</td><td>Mobile station signal
(Subtype 2)</td><td>IS-856 Reverse Link signal
Long Code Mask I: 33333333333
Long Code Mask Q: 26666666667
Signal in which Pilot, RRI, ACK, DSC, DRC, Data, and Aux Pilot Channel are multiplexed
<table><tr><th>Channel</th><th>Pilot Channel ratio</th></tr><tr><td>RRI</td><td>0 dB</td></tr><tr><td>ACK</td><td>0 dB</td></tr><tr><td>DSC</td><td>0 dB</td></tr><tr><td>DRC</td><td>0 dB</td></tr><tr><td>Data (E4E2)</td><td>3.75 dB</td></tr><tr><td>Aux Pilot</td><td>0 dB</td></tr></table>ACK channel: Transmitting in all slots
DSC channel: Transmitting in all slots
DRC channel: Transmitting continuously
Aux Pilot channel: Transmitting for half a slot in every 4 slots.</td><td>Code Domain Power measurement
(RF input, IQ input)</td></tr>
</table>

12.2 Test Procedures

This section describes the procedures of each test item.

12.2.1 RF Input Mobile Station Signal Measurement (Subtype 0&1)

Connect the signal source as shown below:

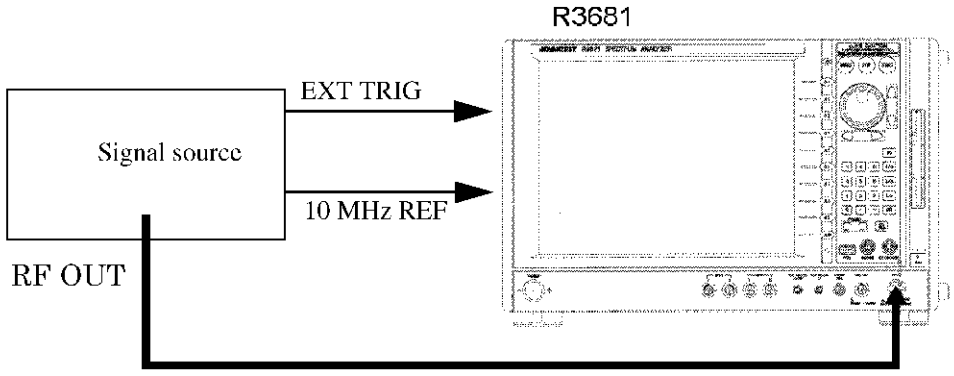


Figure 12-1 Test Signal Connection (RF Input)

1. Output the mobile station 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}: **Subtype 0&1**

{MEAS SETUP}: **Meas Parameters**

[Meas Range]:	1 slot
[Threshold]:	-23 dB
[PN Delay Search Mode]:	ON
[Long Code Mask I]:	33333333333
[Long Code Mask Q]:	26666666667
[Freq Meas Range]:	±1 kHz
[Chip Rate Error]:	ON
[Quadrature Error]:	ON

{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 IQ Input Mobile Station Signal Measurement (Subtype 0&1)

Connect the signal source as shown below:

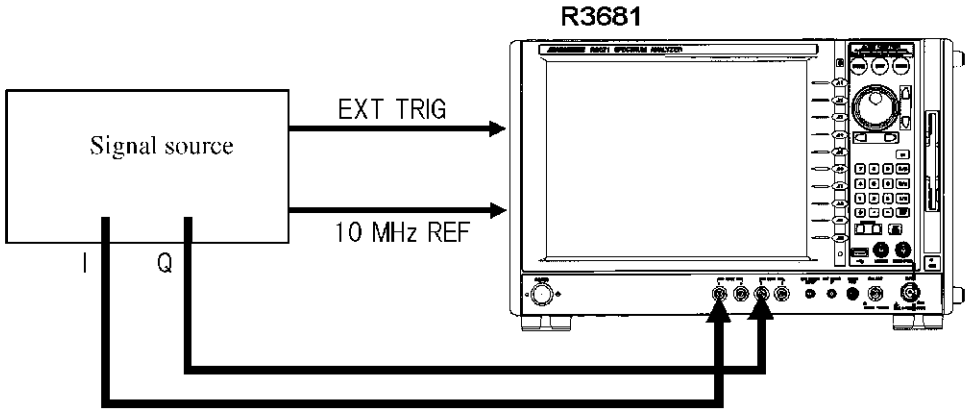


Figure 12-2 Test Signal Connection (IQ Input)

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

{MEAS MODE}: **Subtype 0&1**

{MEAS SETUP}: **Meas Parameters**

[Meas Range]:	1 slot
[Threshold]:	-23 dB
[PN Delay Search Mode]:	ON
[Long Code Mask I]:	33333333333
[Long Code Mask Q]:	26666666667
[Freq Meas Range]:	±1 kHz
[Chip Rate Error]:	ON
[Quadrature Error]:	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.

12.2.3 RF Input Mobile Station Signal Measurement (Subtype 2)

Connect the signal source as shown below:

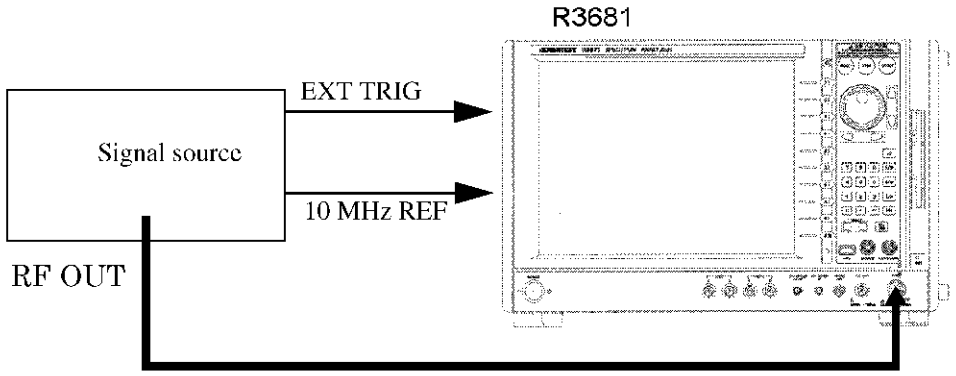


Figure 12-3 Test Signal Connection (RF Input)

1. Output the mobile station 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}: **Subtype 2**

{MEAS SETUP}: **Meas Parameters**

[User Table]:	NOT USE
[Data Channel Detection]:	RRI
[Meas Range]:	2 half slot
[Threshold]:	-23 dB
[PN Delay Search Mode]:	ON
[Long Code Mask I]:	33333333333
[Long Code Mask Q]:	26666666667
[Freq Meas Range]:	±1 kHz
[Chip Rate Error]:	ON
[Quadrature Error]:	ON
[Half Slot Timing Adjust]:	ON

{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.

12.2.4 IQ Input Mobile Station Signal Measurement (Subtype 2)

Connect the signal source as shown below:

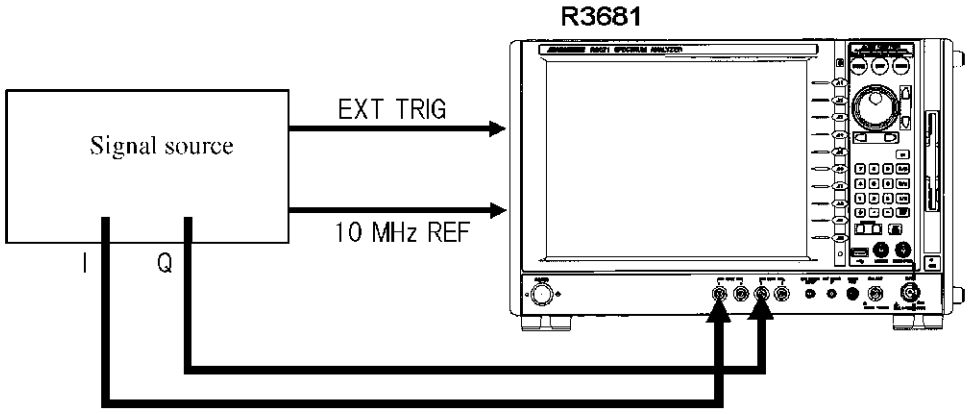


Figure 12-4 Test Signal Connection (IQ Input)

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

{MEAS MODE}: **Subtype 2**

{MEAS SETUP}: **Meas Parameters**

[User Table]:	NOT USE
[Data Channel Detection]:	RRI
[Meas Range]:	2 half slot
[Threshold]:	-23 dB
[PN Delay Search Mode]:	ON
[Long Code Mask I]:	33333333333
[Long Code Mask Q]:	26666666667
[Freq Meas Range]:	±1 kHz
[Chip Rate Error]:	ON
[Quadrature Error]:	ON
[Half Slot Timing Adjust]:	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.

12.3 Test Data Record Sheet

Test data record sheet

Model name:

Serial number:

1. RF Input Measurement

Test item	Specifications			Determination Pass/Fail
	Minimum value	Measured value	Maximum value	
Carrier Frequency Error	-10 Hz		+10 Hz	
$\rho_{overall}$	0.995		None	
Power	-10.9 dBm		-9.1 dBm	

2. IQ Input Measurement

Test item	Specifications			Determination Pass/Fail
	Minimum value	Measured value	Maximum value	
$\rho_{overall}$	0.995		None	

13. SPECIFICATIONS (Uplink)

13.1 cdma2000 1xEV-DO Modulation Analysis Compliance System

In compliance with
3rd Generation Partnership Project 2 (3GPP2),
TSG-C Specifications,
and C.S0024-A Version 1.0 (IS-856)

13.2 cdma2000 1xEV-DO Modulation Analysis Performance

- RF Input

Item	Specifications
Carrier Frequency Error	When Freq Meas Range is set to 1 kHz.
Measurement range	<±1 kHz
Measurement accuracy	<±(Reference frequency accuracy × Carrier frequency + 10 Hz)
$\rho_{overall}$	Residual response: <±0.005
Power measurement	
Accuracy (When -10 dBm is input)	<±(0.3 +Frequency response+Calibration level accuracy) dB
Frequency response	
50 MHz to 2.5 GHz	<±0.4 dB

- IQ Input

Item	Specifications
$\rho_{overall}$	Residual respons: <±0.005

Conditions (Subtype 0&1)

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Temperature range</td><td>+20°C to +30°C</td></tr>
<tr><td>Signal</td><td>IS-856 Mobile station
Long Code Mask I: 33333333333
Long Code Mask Q: 26666666667
Signal in which Pilot, ACK, DRC, and Data Channel are multiplexed
<table><tr><th>Channel</th><th>Pilot Channel ratio</th></tr><tr><td>ACK</td><td>0 dB</td></tr><tr><td>DRC</td><td>0 dB</td></tr><tr><td>Data</td><td>3.75 dB</td></tr></table>ACK channel: Transmitting in all slots
DRC channel: Transmitting continuously</td></tr>
<tr><td>Center frequency</td><td>800 MHz, 2 GHz, or IQ input</td></tr>
<tr><td>Transmission power</td><td></td></tr>
<tr><td>(RF input)</td><td>-10 dBm, -20 dBm</td></tr>
<tr><td>(IQ input)</td><td>0.8 V_{P-P}</td></tr>
<tr><td>ρ</td><td>>0.9999</td></tr>
<tr><td>Meas Range</td><td>1 slot</td></tr>
<tr><td>Freq Meas Range</td><td>±1 kHz</td></tr>
</table>

Conditions (Subtype 2)

<table>
<tr><th>Item</th><th>Specifications</th></tr>
<tr><td>Temperature range</td><td>+20°C to +30°C</td></tr>
<tr><td>Signal</td><td>IS-856 Mobile station
Long Code Mask I: 33333333333
Long Code Mask Q: 26666666667
Signal in which Pilot, RRI, ACK, DSC, DRC, Data, and Aux Pilot Channel are multiplexed
<table><tr><th>Channel</th><th>Pilot Channel ratio</th></tr><tr><td>RRI</td><td>0 dB</td></tr><tr><td>ACK</td><td>0 dB</td></tr><tr><td>DSC</td><td>0 dB</td></tr><tr><td>DRC</td><td>0 dB</td></tr><tr><td>Data (E4E2)</td><td>3.75 dB</td></tr><tr><td>Aux Pilot</td><td>0 dB</td></tr></table>
ACK channel: Transmitting in all slots
DSC channel: Transmitting in all slots
DRC channel: Transmitting continuously
Aux Pilot channel: Transmitting for half a slot in every 4 slots.</td></tr>
<tr><td>Center frequency</td><td>800 MHz, 2 GHz, or IQ input</td></tr>
<tr><td>Transmission power</td><td></td></tr>
<tr><td>(RF input)</td><td>-10 dBm, -20 dBm</td></tr>
<tr><td>(IQ input)</td><td>0.8 V_{P-P}</td></tr>
<tr><td>ρ</td><td>>0.9999</td></tr>
<tr><td>Meas Range</td><td>2 half slot</td></tr>
<tr><td>Freq Meas Range</td><td>±1 kHz</td></tr>
</table>

APPENDIX

This section describes the following supplemental information:

A.1 Technical Data

A.2 Error Message List

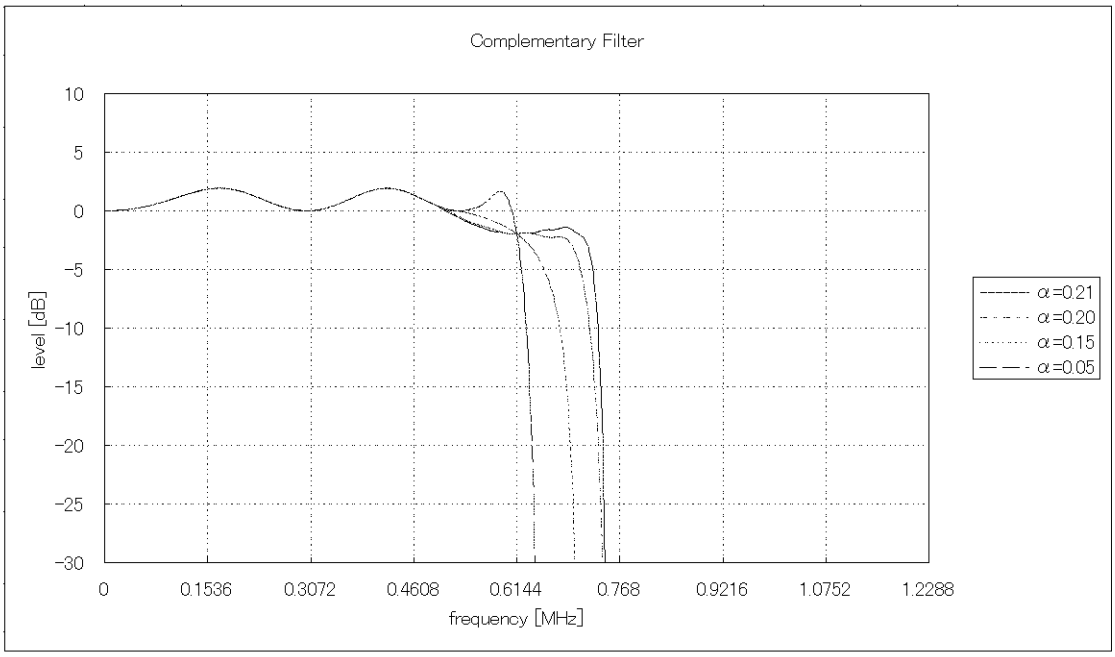
A.1 Technical Data

Complementary Filter

The Complementary Filter 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 standards contain no regulations concerning the roll-off factor (α) of the Nyquist filter. In this instrument, α can be set between 0.05 and 0.20 in Downlink and is set to 0.21 in Uplink.



Phase Equalizing Filter

The base station equalizes the phase of the signal, which travels down the transmission signal path, according to the IS-856 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 **[Equalizing Filter]** of **Meas Parameters** to ON.

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

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.
-3220	Cannot find out signal, Input level may be too low.	The input signal level is too low to analyze.
-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.	No measurements can be performed. Check the input signal.
-3247	Cannot synchronize to PICH. Adjust Threshold Level.	The Pilot channel cannot be synchronized. Re-set Threshold.
-3251	Cannot find out active Channel. Down the MAC Threshold.	No active MAC channel exists. Lower the threshold level.
-3252	No Active Slot within a frame. Check the input signal.	No Active Slot exists in the frame.

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

Error number	Displayed message	Description
-3253	Level of MAC channel is too low. Check MAC channel.	The level of the MAC channel is too low to measure.
-3254	Cannot synchronize to PICH. Adjust PN Delay	The Pilot channel cannot be synchronized. Re-set PN Delay.
-3267	Level of RRICH is too low. Cannot judge DCH modulation and Walsh Code.	The level of RRI Channel is too low to identify the modulation format and Walsh Code of Data Channel. Check the input signal.

ALPHABETICAL INDEX

[Symbol]

[A]

[B]

[C]

[D]

[E]

[F]

[G]

[H]

[I]

[L]

[M]

[O]

[P]

[Q]

[R]

[S]

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   (c) use of the Product under operating conditions or environments different than those specified in the Operation Manual or recommended by Advantest, including, without limitation, (i) instances where the Product has been subjected to physical stress or electrical voltage exceeding the permissible range and (ii) instances where the corrosion of electrical circuits or other deterioration was accelerated by exposure to corrosive gases or dusty environments;

   (d) use of the Product in connection with software, interfaces, products or parts other than software, interfaces, products or parts supplied or recommended by Advantest;

   (e) incorporation in the Product of any parts or components (i) provided by Purchaser or (ii) provided by a third party at the request or direction of Purchaser or due to specifications or designs supplied by Purchaser (including, without limitation, any degradation in performance of such parts or components);

   (f) Advantest's incorporation or use of any specifications or designs supplied by Purchaser;

   (g) the occurrence of an event of force majeure, including, without limitation, fire, explosion, geological change, storm, flood, earthquake, tidal wave, lightning or act of war; or

   (h) any negligent act or omission of the Purchaser or any third party other than Advantest.

5. **EXCEPT TO THE EXTENT EXPRESSLY PROVIDED HEREIN, ADVANTEST HEREBY EXPRESSLY DISCLAIMS, AND THE PURCHASER HEREBY WAIVES, ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, (A) ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND (B) ANY WARRANTY OR REPRESENTATION AS TO THE VALIDITY, SCOPE, EFFECTIVENESS OR USEFULNESS OF ANY TECHNOLOGY OR ANY INVENTION.**

6. **THE REMEDY SET FORTH HEREIN SHALL BE THE SOLE AND EXCLUSIVE REMEDY OF THE PURCHASER FOR BREACH OF WARRANTY WITH RESPECT TO THE PRODUCT.**

7. **ADVANTEST WILL NOT HAVE ANY LIABILITY TO THE PURCHASER FOR ANY INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, WITHOUT LIMITATION, LOSS OF ANTICIPATED PROFITS OR REVENUES, IN ANY AND ALL CIRCUMSTANCES, EVEN IF ADVANTEST HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES AND WHETHER ARISING OUT OF BREACH OF CONTRACT, WARRANTY, TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE. TORT (INCLUDING, WITHOUT LIMITATION, NEGLIGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

8. **OTHER THAN THE REMEDY FOR THE BREACH OF WARRANTY SET FORTH HEREIN, ADVANTEST SHALL NOT BE LIABLE FOR, AND HEREBY DISCLAIMS TO THE FULLEST EXTENT PERMITTED BY LAW ANY LIABILITY FOR, DAMAGES FOR PRODUCT FAILURE OR DEFECT, WHETHER ARISING OUT OF BREACH OF CONTRACT, TORT (INCLUDING, WITHOUT LIMITATION, NEGLEGENCE), STRICT LIABILITY, INDEMNITY, CONTRIBUTION OR OTHERWISE.**

CUSTOMER SERVICE DESCRIPTION

In order to maintain safe and trouble-free operation of the Product and to prevent the incurrence of unnecessary costs and expenses, Advantest recommends a regular preventive maintenance program under its maintenance agreement.

Advantest's maintenance agreement provides the Purchaser on-site and off-site maintenance, parts, maintenance machinery, regular inspections, and telephone support and will last a maximum of ten years from the date the delivery of the Product. For specific details of the services provided under the maintenance agreement, please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest 's sales representatives.

Some of the components and parts of this Product have a limited operating life (such as, electrical and mechanical parts, fan motors, unit power supply, etc.). Accordingly, these components and parts will have to be replaced on a periodic basis. If the operating life of a component or part has expired and such component or part has not been replaced, there is a possibility that the Product will not perform properly. Additionally, if the operating life of a component or part has expired and continued use of such component or part damages the Product, the Product may not be repairable. Please contact the nearest Advantest office listed at the end of this Operation Manual or Advantest's sales representatives to determine the operating life of a specific component or part, as the operating life may vary depending on various factors such as operating condition and usage environment.

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