ADVANTEST

ADVANTEST CORPORATION

R3267 Series OPT67/OPT69
1xEV-DO(HDR)
Measurement Option
Operation Manual

MANUAL NUMBER FOE-8440023E00

Applicable models

R3264
R3267
R3273

First printing December 25, 2001
Printed in Japan

Safety Summary

To ensure thorough understanding of all functions and to ensure efficient use of this instrument, please read the manual carefully before using. Note that Advantest bears absolutely no responsibility for the result of operations caused due to incorrect or inappropriate use of this instrument.

If the equipment is used in a manner not specified by Advantest, the protection provided by the equipment may be impaired.

- **Warning Labels**

  Warning labels are applied to Advantest products in locations where specific dangers exist. Pay careful attention to these labels during handling. Do not remove or tear these labels. If you have any questions regarding warning labels, please ask your nearest Advantest dealer. Our address and phone number are listed at the end of this manual.

  Symbols of those warning labels are shown below together with their meaning.

  DANGER: Indicates an imminently hazardous situation which will result in death or serious personal injury.

  WARNING: Indicates a potentially hazardous situation which will result in death or serious personal injury.

  CAUTION: Indicates a potentially hazardous situation which will result in personal injury or a damage to property including the product.

- **Basic Precautions**

  Please observe the following precautions to prevent fire, burn, electric shock, and personal injury.

  - Use a power cable rated for the voltage in question. Be sure however to use a power cable conforming to safety standards of your nation when using a product overseas.
  - When inserting the plug into the electrical outlet, first turn the power switch OFF and then insert the plug as far as it will go.
  - When removing the plug from the electrical outlet, first turn the power switch OFF and then pull it out by gripping the plug. Do not pull on the power cable itself. Make sure your hands are dry at this time.
  - Before turning on the power, be sure to check that the supply voltage matches the voltage requirements of the instrument.
  - Connect the power cable to a power outlet that is connected to a protected ground terminal. Grounding will be defeated if you use an extension cord which does not include a protected ground terminal.
  - Be sure to use fuses rated for the voltage in question.
  - Do not use this instrument with the case open.
  - Do not place anything on the product and do not apply excessive pressure to the product. Also, do not place flower pots or other containers containing liquid such as chemicals near this

product.

- When the product has ventilation outlets, do not stick or drop metal or easily flammable objects into the ventilation outlets.
- When using the product on a cart, fix it with belts to avoid its drop.
- When connecting the product to peripheral equipment, turn the power off.

- **Caution Symbols Used Within this Manual**

Symbols indicating items requiring caution which are used in this manual are shown below together with their meaning.

DANGER: Indicates an item where there is a danger of serious personal injury (death or serious injury).

WARNING: Indicates an item relating to personal safety or health.

CAUTION: Indicates an item relating to possible damage to the product or instrument or relating to a restriction on operation.

- **Safety Marks on the Product**

The following safety marks can be found on Advantest products.

 : ATTENTION - Refer to manual.

 : Protective ground (earth) terminal.

 : DANGER - High voltage.

 : CAUTION - Risk of electric shock.

- **Replacing Parts with Limited Life**

The following parts used in the instrument are main parts with limited life.
Replace the parts listed below before their expected lifespan has expired to maintain the performance and function of the instrument.
Note that the estimated lifespan for the parts listed below may be shortened by factors such as the environment where the instrument is stored or used, and how often the instrument is used.
The parts inside are not user-replaceable. For a part replacement, please contact the Advantest sales office for servicing.

Each product may use parts with limited life.
For more information, refer to the section in this document where the parts with limited life are described.

Main Parts with Limited Life

Part name	Life
Unit power supply	5 years
Fan motor	5 years
Electrolytic capacitor	5 years
LCD display	6 years
LCD backlight	2.5 years
Floppy disk drive	5 years
Memory backup battery	5 years

- **Hard Disk Mounted Products**

The operational warnings are listed below.

- Do not move, shock and vibrate the product while the power is turned on.
  Reading or writing data in the hard disk unit is performed with the memory disk turning at a high speed. It is a very delicate process.

- Store and operate the products under the following environmental conditions.
  An area with no sudden temperature changes.
  An area away from shock or vibrations.
  An area free from moisture, dirt, or dust.
  An area away from magnets or an instrument which generates a magnetic field.

- Make back-ups of important data.
  The data stored in the disk may become damaged if the product is mishandled. The hard disc has a limited life span which depends on the operational conditions. Note that there is no guarantee for any loss of data.

- **Precautions when Disposing of this Instrument**

When disposing of harmful substances, be sure dispose of them properly with abiding by the state-provided law.

Harmful substances: (1) PCB (polycarbon biphenyl)
(2) Mercury
(3) Ni-Cd (nickel cadmium)
(4) Other
Items possessing cyan, organic phosphorous and hexadic chromium and items which may leak cadmium or arsenic (excluding lead in solder).

Example: fluorescent tubes, batteries

Environmental Conditions

This instrument should be only be used in an area which satisfies the following conditions:

- An area free from corrosive gas
- An area away from direct sunlight
- A dust-free area
- An area free from vibrations
- Altitude of up to 2000 m

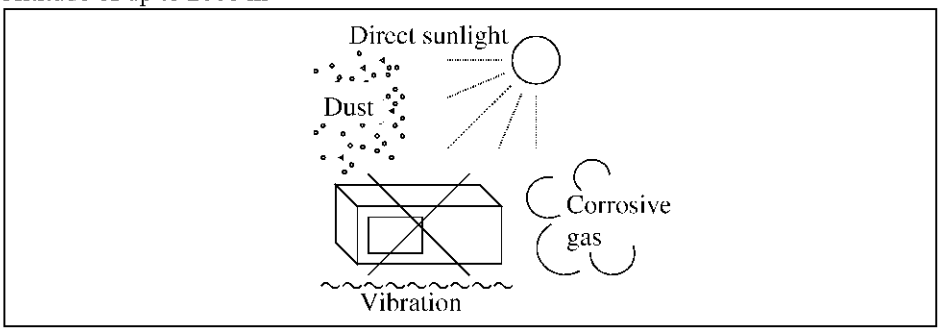


Figure-1 Environmental Conditions

- Operating position

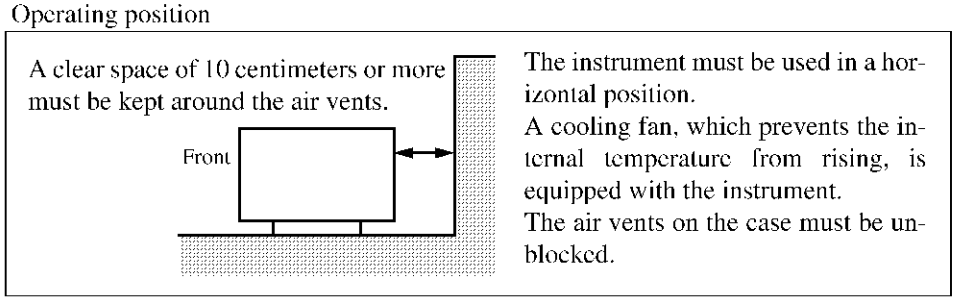


Figure-2 Operating Position

- Storage position

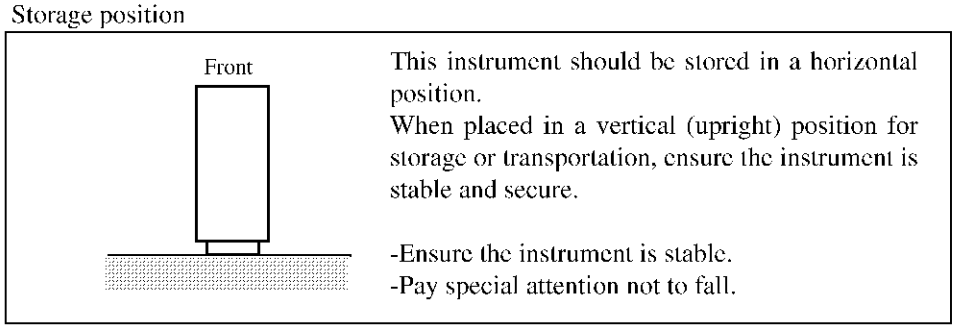


Figure-3 Storage Position

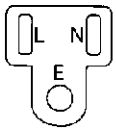
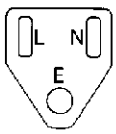
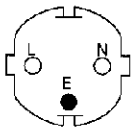
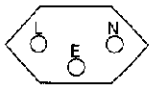
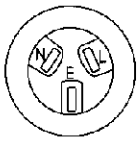
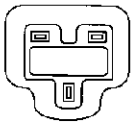
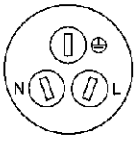
- The classification of the transient over-voltage, which exists typically in the main power supply, and the pollution degree is defined by IEC61010-1 and described below.

  Impulse withstand voltage (over-voltage) category II defined by IEC60364-4-443

  Pollution Degree 2

Types of Power Cable

Replace any references to the power cable type, according to the following table, with the appropriate power cable type for your country.

Plug configuration	Standards	Rating, color and length	Model number (Option number)
	PSE: Japan Electrical Appliance and Material Safety Law	125 V at 7 A Black 2 m (6 ft)	Straight: A01402 Angled: A01412
	UL: United States of America CSA: Canada	125 V at 7 A Black 2 m (6 ft)	Straight: A01403 (Option 95) Angled: A01413
	CEE: Europe DEMKO: Denmark NEMKO: Norway VDE: Germany KEMA: The Netherlands CEBEC: Belgium OVE: Austria FIMKO: Finland SEMKO: Sweden	250 V at 6 A Gray 2 m (6 ft)	Straight: A01404 (Option 96) Angled: A01414
	SEV: Switzerland	250 V at 6 A Gray 2 m (6 ft)	Straight: A01405 (Option 97) Angled: A01415
	SAA: Australia, New Zealand	250 V at 6 A Gray 2 m (6 ft)	Straight: A01406 (Option 98) Angled: ---------
	BS: United Kingdom	250 V at 6 A Black 2 m (6 ft)	Straight: A01407 (Option 99) Angled: A01417
	CCC:China	250 V at 10 A Black 2 m (6 ft)	Straight: A114009 (Option 94) Angled: A114109

PREFACE

This manual provides the information necessary to check functionality, operate and program the R3267 Series Option 67 and Option 69, HDR measurement.

(1) Organization of this manual

This manual consists of the following chapters:

Safety Summary	To use the analyzer safely, be sure to read this manual first.
1. INTRODUCTION • Product Overview • Accessories • Self Test Function • About Calibration • Explanation of the Connectors	Includes a description of the option and its accessories and a self test error messages.
2. MEASUREMENT EXAMPLES • Measuring the Code Domain of Access Network Signals • Measuring the Frame Analysis of Access Network Signals • CCDF Measurement • Measuring the Pilot/MAC Channel Power of Access Network Signals • Measuring the Total Power of Access Network Signals	You can learn the basic operations of the option through the examples shown in this chapter.
3. REFERENCE • Menu Index • Menu Map • Functional Description	Shows a list of operation keys, and describes the function of each key.
4. REMOTE CONTROL • GPIB Command Index • GPIB Command Codes	Included are a list of commands necessary for programming.
5. TECHNICAL INFORMATION • Template Edit Function • Measurement Parameter Settings in Due to Transient, Due to Modulation and Inband Spurious • Peak Factor of Tx Power • Trigger Source INTRVL (EXT) and INTRVL • About Complementary Filter • About Equalizing Filter • Block Diagram	Describes the principle of operation necessary for taking measurements more accurately.
6. PERFORMANCE VERIFICATION TEST • General • Performance Verification Test Procedure • Performance Verification Test Record Sheet	Describes how to test performance.

7. SPECIFICATIONS	Shows the specifications of the option.
APPENDIX • Messages	If an error occurs during operation, an error number and its corresponding error message are displayed. The meaning of each error is explained in this section.

(2) Typeface conventions used in this manual

- Panel keys and soft keys are printed in a contrasting typeface to make them stand out from the text as follows:

  Panel keys: Boldface type — Example: **TRANSIENT**
  Soft keys: Boldface and italic type — Example: ***T-Domain, Detector***

- When a series of key operations are described using a comma between two keys.
- There are various soft menus used to switch between two states such as ON/OFF and AUTO/MNL. For example, when turning off the ***Window ON/OFF*** function, the annotation "***Window ON/OFF***(OFF)" is used.

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1 INTRODUCTION

1.1 Product Overview

The HDR modulation analysis options (OPT67 and OPT69) software allows you to measure and evaluate the modulation accuracy specified by IS-856. The OPT67 analyzes the modulation of the Access Network signal. The OPT69 includes the OPT67 function and the Access Terminal signal modulation analysis function.

This option is a factory option which is incorporated into the R3267 Series Spectrum Analyzer prior to shipment.

This option includes the following features:

- Measures the frequency error, code domain power and so on.
- Can be used to measure OBW or ACP due to Transient specified by the communication standard with a simple key operation.

1.2 Accessories

Name of accessories	Type of name	Quantity	Remarks
R3267 Series option 67 Operation manual	ER3267/73OPT67	1	

1.3 Self Test Function

The self test also checks the Option 67 and Option 69 for correct operation when the spectrum analyzer power is turned on. The message shown below will be displayed when an error related to Option 67 and Option 69 occurs.
Contact ADVANTEST Corp. for repair.

Error Message
Handshake error occurred to DSP

1.4 About Calibration

When you want to calibrate the R3267 Series, please contact a sales representative.

Desirable Period	1 year

1.5 Explanation of the Connectors

Connectors used for this option are described as follows:

1. EXT TRIG terminal Connector for inputting the external trigger signal.

2 MEASUREMENT EXAMPLES

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

2.1 Measuring the Code Domain of Access Network Signals

This section provides measurement examples for the code domain when it is used to analyze the Accecss Network signal.

Measurement conditions:

Measured signals have an output signal with a frequency of 870.03 MHz and a level of -10 dBm based on IS-856.
It is assumed that the Even Second clock, 10 MHz reference signal and measurement signals are output.

Signal specifications:

Slot Structure

Active slot

Modulation Parameters

Data Rate: 614.4 kbps

Modulation Type: QPSK

RA channel

MACIndex: 4

Connecting the equipment

1. Connect the equipment as shown in Figure 2-1.

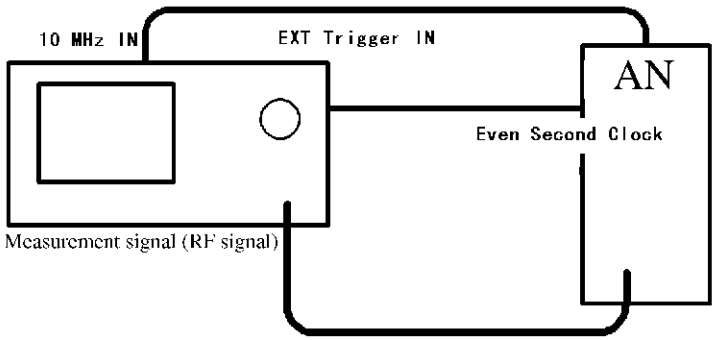


Figure 2-1 Connection for Code Domain Measurements of the Access Network Signals

Setting the measurement conditions

This changes the analyzer setting so that the input signal displayed more clearly.

2. Press **FREQ, 8, 7, 0, ., 0, 3** and **MHz**.

3. Press **SPAN, 8** and **MHz**.

4. Press **LEVEL, 0** and **GHz(+dBm)**.

5. Press **TRANSIENT,** ***STD*** and ***STD Setup***.
The STD Measurement Parameter Set dialog box is displayed.

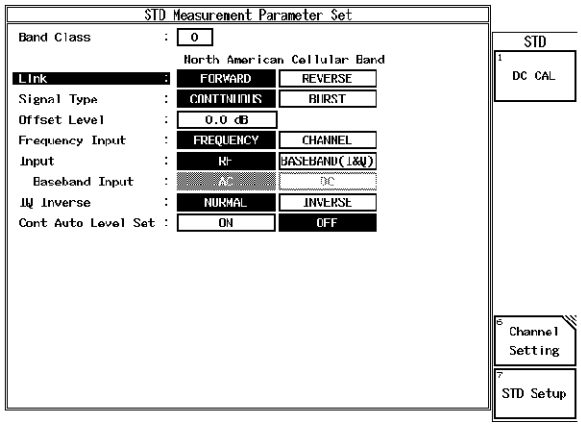


Figure 2-2 STD-Measurement parameter set Dialog Box

6. Press the ▽ key.
The cursor moves to the item Link.
Select ***FORWARD*** from ***Link*** using the data knob, and press **Hz(ENTR)**.

7. Select ***CONTINUOUS*** from ***Signal Type*** using the data knob, and press **Hz(ENTR)**.

The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
IQ Inverse:	NORMAL
Cont Auto Level Set:	OFF

8. Press **RETURN**, ***Modulation, Code Domain*** and ***Parameter Setup***.
The Parameter Setup dialog box is displayed.

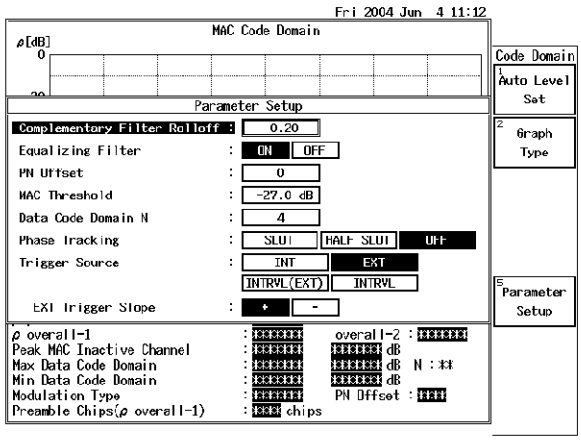


Figure 2-3 Parameter Setup Dialog Box

9. Press **0**, **.**, **2**, and **Hz(ENTR)** to set ***Complementary Filter Rolloff***.
The roll-off coefficient after passing through the complementary filter is set to 0.2.

10. Select ***ON*** from ***Equalizing Filter*** using the data knob, and press **Hz(ENTR)**.
The phase characteristics of the complimentary filter are set to the inverse characteristics of the phase equalizer.

11. Press **0** and **Hz(ENTR)** to set ***PN Offset***.
The PN offset is set to 0.

12. Press **-**, **2**, **7**, and **GHz(dB)** to set ***MAC Threshold***.

13. Press **4** and **Hz(ENTR)** to set ***Data Code Domain N***.
A time interval of N is set to 4 to measure the Data Code Domain.

14. Select ***OFF*** from ***Phase Tracking*** using the data knob, and press **Hz(ENTR)**.

15. Select ***EXT*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.
The trigger is set to the external trigger.

16. Select + from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.

17. Press ***Parameter Setup***.
The dialog box is closed.

18. Press ***Auto Level Set***.
The measurement range is set to the optimum range.

19. Press **SINGLE**.
The sweep is set to a single mode and starts.

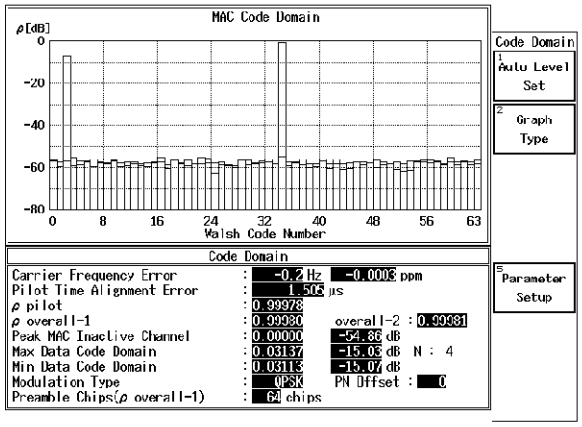


Figure 2-4 Measurement Results of the HDR Access Network Signal

Carrier Frequency Error

The carrier frequency error from the center frequency which has been set (Hz, ppm)

The value collected is for 10 Pilot Channel slots.

Pilot Time Alignment Error

Time delay from the trigger (µs) to the head of the frame

The value collected is for 10 Pilot Channel slots.
If an Even Second signal is entered as the external trigger signal, the pilot time alignment error, which is the Minimum Standard for Pilot Channel Tolerance is collected.

ρ pilot Waveform quality of the Pilot Channel

The value collected is for 10 Pilot Channel slots.
(N = 20 : 20 half slots)
ρ pilot, one of the Minimum Standards for the Waveform Quality is collected.

ρ overall-1 Waveform quality in the Pilot Channel, MAC Channel and Traffic or Control Channel

The value collected is for one Pilot Channel slot.
(N = 2 : 2 half slots)
First, an automatic scan is done to check if the slot is idle or active. Then, the slot is checked for an existence of the pre-amble and the modulation type is decided from QPSK, 8-PSK, or 16-QAM.
ρ overall-1, one of the Minimum Standards for the Waveform Quality is collected.

overall-2 Waveform quality in the Pilot Channel, MAC Channel, and Traffic or Control Channel with all of them shifted 512 chips from those of the ρ overall-1

The value collected is for one Pilot Channel slot.
(N = 2 : 2 half slots)
It runs the same decision making processes as in ρ overall-1.
ρ overall-2, one of the Minimum Standards for the Waveform Quality is collected.

Peak MAC Inactive Channel

The maximum and logarithmic values of 8-slot code domain power $\rho_{MAC,\ real\ (i)}$ and $\rho_{MAC,\ imag\ (i)}$ of the MAC Channels which are determined as inactive (dB).
(N = 16 : 16 half slots)

MAC Channels are determined as inactive when one of the following conditions is met:

1. The $\rho_{MAC,\ real\ (i)}$ and $\rho_{MAC,\ imag\ (i)}$ values are less than the MAC threshold value.
2. The MAC Channel is not for MACIndex.

Therefore, even though the $\rho_{MAC,\ real\ (i)}$ and $\rho_{MAC,\ imag\ (i)}$ values exceed the MAC threshold value, MAC Channels of $\rho_{MAC,\ real\ (i)}$ with the Walsh Code 32 to 63 are determined as inactive because these channels are not for MACIndex. In the same manner, MAC Channels of $\rho_{MAC,\ imag\ (i)}$ with the Walsh Code 0 to 31 are determined as inactive because these channels are not for MACIndex.

The logarithmic value set in the Parameter Setup dialog box is used as the MAC threshold value.
The Minimum Standard value for Code Domain Power of MAC channel can be obtained.

Max Data Code Domain

The maximum and logarithmic values of code domain power $\rho_{Data,\ real\ (i)}$ and $\rho_{Data,\ imag\ (i)}$ of the 16 orthogonal code channels (dB). Preambles of Control and Forward Traffic Channels are excluded.
"*" indicates an idle slot.
The Minimum Standard for the Code Domain Power of Forward Traffic and Control Channel is collected.

N — Number of half slots when Max Data Code Domain, Min Data Code Domain, and Data Code Domain values in the graphs are obtained.

Min Data Code Domain

The minimum and logarithmic values of code domain power $\rho_{Data,\ real\ (i)}$ and $\rho_{DATA,\ imag\ (i)}$ of the 16 orthogonal code channels (dB). Preambles of Control and Forward Traffic Channels are excluded.

Modulation Type

Modulation type for the Control Channel or Forward Traffic Channel of the slot which the ρ overall-1 was collected for (QPSK, 8-PSK, 16-QAM)

"idle" indicates an idle slot.

PN Offset — PN offset value for the Pilot PN Sequence

The offset value assigned with the Parameter Setup in the dialog box is displayed. However, if a signal other than the one assigned with the Parameter Setup is entered, the trigger will assume that the even second time reference signal is being assigned and will search for a PN offset.

Preamble Chips(ρ overall-1)

Chip number that is equivalent to the number of pre-ambles in the slots which the ρ overall-1 was collected for.

20. Press **MKR**.
The maker is displayed.

21. Select **2** from ***MKR POSI.*** using the data knob.

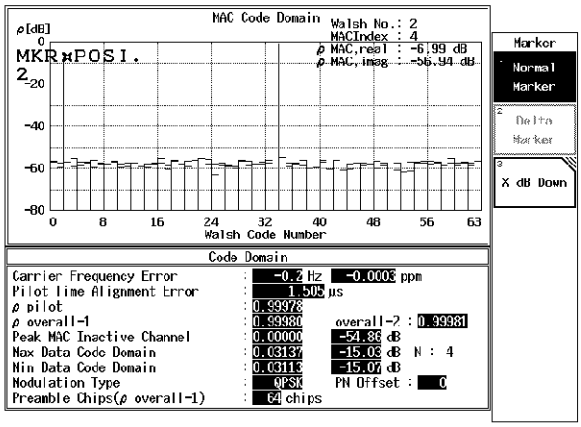


Figure 2-5 Example of the Marker Display of MAC Code Domain Graph

Walsh No. Number of the Walsh Code of the channel specified by the marker.

MACIndex MACIndex number of the channel specified by the marker.

$\rho_{MAC, real}$ Logarithmic value of code domain power $\rho_{MAC, real (i)}$ of the channel specified by the marker (dB).

$\rho_{MAC, imag}$ Logarithmic value of code domain power $\rho_{MAC, imag (i)}$ of the channel specified by the marker (dB).

2.2 Measuring the Frame Analysis of Access Network Signals

This section provides measurement examples for the Frame Analysis when it is used to analyze the Accecss Network signal.

Measurement conditions:

Measured signals have an output signal with a frequency of 870.03 MHz and a level of -10 dBm based on IS-856.
It is assumed that the Even Second clock, 10 MHz reference signal and measurement signals are output.

Signal specifications:

Slot Structure

Active slot

Modulation Parameters

Data Rate: 614.4 kbps

Modulation Type: QPSK

RA channel

MACIndex: 4

Connecting the equipment

1. Connect the equipment as shown in Figure 2-6.

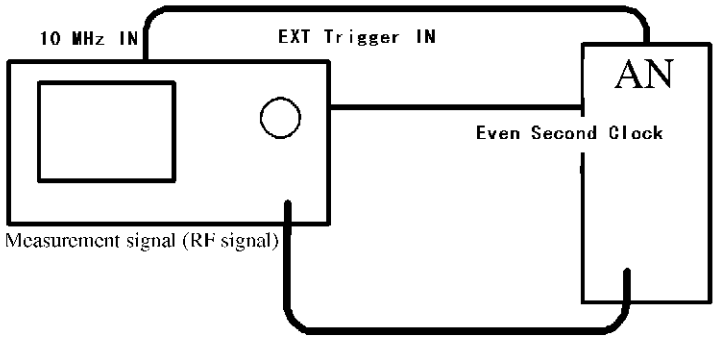


Figure 2-6 Connection for Frame Analysis Measurements of the Access Network Signals

Setting the measurement conditions

This changes the analyzer setting so that the input signal displayed more clearly.

2. Press **FREQ, 8, 7, 0, ., 0, 3** and **MHz**.

3. Press **SPAN, 8** and **MHz**.

4. Press **LEVEL, 0** and **GHz(+dBm)**.

5. Press **TRANSIENT,** ***STD*** and ***STD Setup***.
The STD Measurement Parameter Set dialog box is displayed.

6. Press the ▽ key.
The cursor moves to the item Link.
Select ***FORWARD*** from ***Link*** using the data knob, and press **Hz(ENTR)**.

7. Select ***CONTINUOUS*** from ***Signal Type*** using the data knob, and press **Hz(ENTR)**.

   The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
IQ Inverse:	NORMAL
Cont Auto Level Set:	OFF

8. Press **RETURN**, ***Modulation, Frame Analysis*** and ***Parameter Setup***.
The Parameter Setup dialog box is displayed.

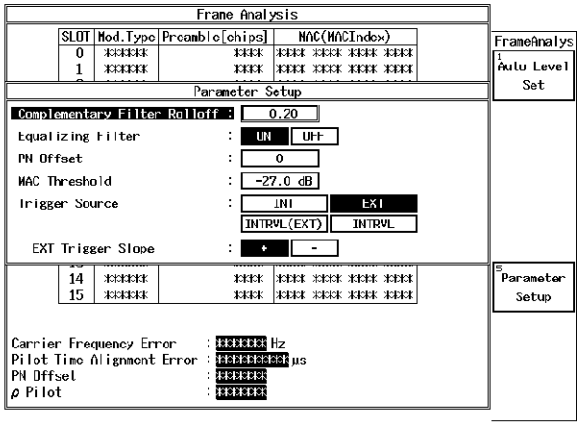


Figure 2-7 Parameter Setup Dialog Box

9. Press **0**, **.**, **2**, and **Hz(ENTR)** to set ***Complementary Filter Rolloff***.
The roll-off coefficient after passing through the complementary filter is set to 0.2.

10. Select ***ON*** from ***Equalizing Filter*** using the data knob, and press **Hz(ENTR)**.
The phase characteristics of the complimentary filter are set to the inverse characteristics of the phase equalizer.

11. Press **0** and **Hz(ENTR)** to set ***PN Offset***.
The PN offset is set to 0.

12. Press **-**, **2**, **7**, and **GHz(dB)** to set ***MAC Threshold***.

13. Select ***EXT*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.
The trigger is set to the external trigger.

14. Select **+** from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.

15. Press ***Parameter Setup***.
The dialog box is closed.

16. Press ***Auto Level Set***.
The measurement range is set to the optimum range.

17. Press **SINGLE**.
The sweep is set to a single mode and starts.

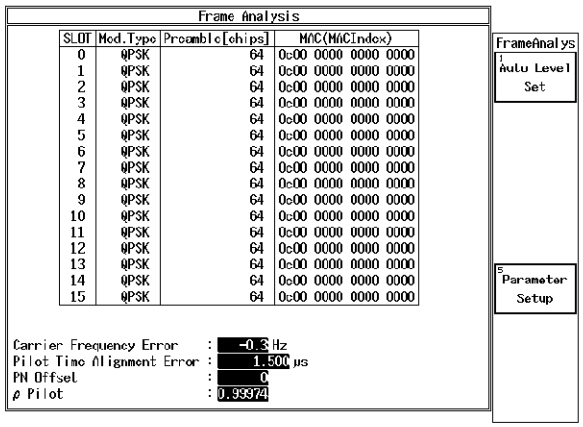


Figure 2-8 Measurement Results of the HDR Access Network Signal

Mod. Type Modulation types for the Control or Forward Traffic Channel for each slot. (QPSK, 8-PSK, and 16-QAM)

"idle" indicates an idle slot.

Preamble [chips]

Chip number that is equivalent to the number of pre-ambles in each slots.

MAC(MACIndex)

Indicates active MAC Channels for each slot using 64-bit values in hexadecimal code.

Displays these values according to the MACIndex order.
A bit set to 1 indicates that the MAC channel is active.
Values 0c00 0000 0000 0000 indicate that MAC channels for the MACIndex number 4 and 5 are active.

Carrier Frequency Error

The carrier frequency error from the center frequency which has been set (Hz)

The value collected is for 10 Pilot Channel slots.

Pilot Time Alignment Error

Time delay from the trigger (μs) to the head of the frame

The value collected is for 10 Pilot Channel slots.
If an Even Second signal is entered as the external trigger signal, the pilot time alignment error, which is the Minimum Standard for Pilot Channel Tolerance is collected.

PN Offset PN offset value for the Pilot PN Sequence

The offset value assigned with the Parameter Setup in the dialog box is displayed. However, if a signal other than the one assigned with the Parameter Setup is entered, the trigger will assume that the even second time reference signal is being assigned and will search for a PN offset.

ρ pilot Waveform quality of the Pilot Channel

The value collected is for 10 Pilot Channel slots.
(N = 20 : 20 half slots)
ρ pilot, one of the Minimum Standards for the Waveform Quality is collected.

2.3 CCDF Measurement

The CCDF (Complementary Cumulative Distribution Function) can be measured.

Setup

1. Connect the unit under test as shown in Figure 2-9.

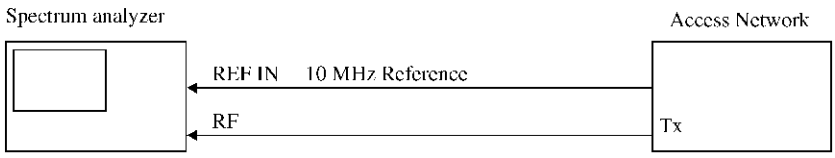


Figure 2-9 Setup for CCDF Measurement

Setting the measurement conditions

This changes the analyzer setting so that the input signal may be displayed more clearly.

2. Press **FREQ, 8, 7, 0, ., 0, 3** and **MHz**.
   A center frequency of 870.03 MHz is set.

3. Press **SPAN, 2** and **MHz**.
   A frequency span of 2 MHz is set.

4. Press **COUPLE,** ***RBW AUTO/MNL***(MNL)**, 3, 0** and **kHz**.
   An RBW of 30 kHz is set.

5. Press ***VBW AUTO/MNL***(MNL)**, 1, 0, 0** and **kHz**.
   A VBW of 100 kHz is set.

6. Press **LEVEL, 0** and **GHz(+dBm)**.
   The reference level is set to 0 dBm.

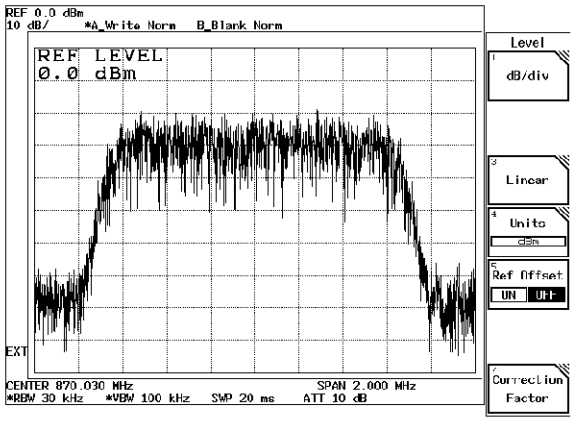


Figure 2-10 Spectrum of the Access Network Signal

CCDF Measurement

7. Press **TRANSIENT**, ***Modulation***, ***Power***, ***CCDF*** and ***Parameter Setup***.
   The Parameter Setup dialog box is displayed.

8. Select ***INT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to a mode that uses the internal trigger.

9. Press **1**, **0** and **kHz** to set ***Meas Length***.
   The number of measurement samples is set to 10k.

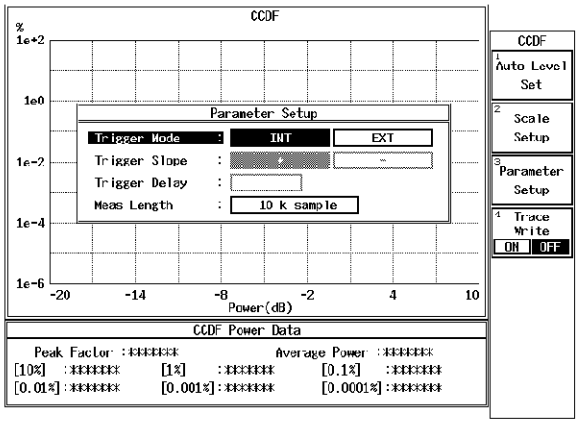


Figure 2-11 CCDF Parameter Setup Dialog Box

10. Press ***Parameter Setup***.
    The dialog box is removed.

11. Press ***Auto Level Set***.
    The measurement range is optimally set.

12. Press **SINGLE**.
The measurement mode is set to the single mode and the measurement mode is displayed.

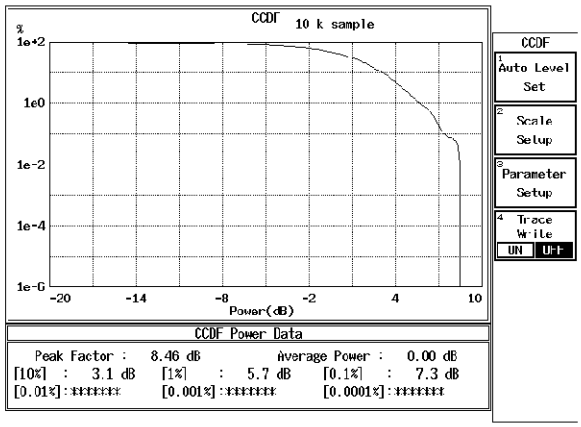


Figure 2-12 CCDF Measurement Result

Peak Factor	Peak factor
Average Power	Average power
[10%]	Power whose distribution is 10%
[1%]	Power whose distribution is 1%
[0.1%]	Power whose distribution is 0.1%
[0.01%]	Power whose distribution is 0.01%
[0.001%]	Power whose distribution is 0.001%
[0.0001%]	Power whose distribution is 0.0001%

Holding waveform

13. Press ***Trace Write ON/OFF***(ON).
The signal waveform is held.

14. Press **SINGLE**.
The measurement mode is set to SINGLE mode so that both the stored and current waveforms are displayed.

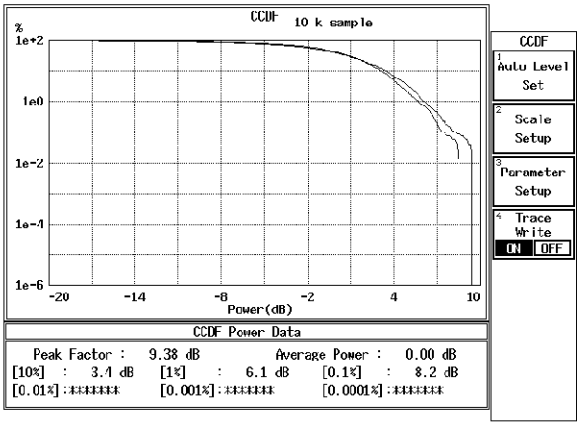


Figure 2-13 CCDF Measurement Result (Trace Write ON)

2.4 Measuring the Pilot/MAC Channel Power of Access Network Signals

This section provides measurement examples for the Pilot/MAC Channel Power when it is used to analyze the Accecss Network signal.

Measurement conditions:

Measured signals have an output signal with a frequency of 870.03 MHz and a level of -10 dBm based on IS-856.
It is assumed that the Even Second clock, 10 MHz reference signal and measurement signals are output.

Signal specifications:

Slot Structure

Idle slot

Connecting the equipment

1. Connect the equipment as shown in Figure 2-14.

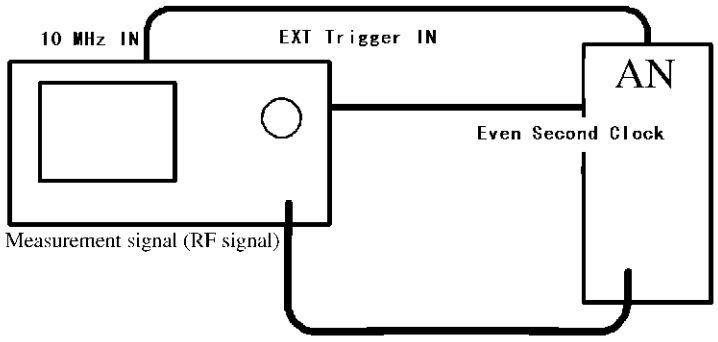


Figure 2-14 Connection for Pilot/MAC Channel Power Measurements of the Access Network Signals

Setting the measurement conditions

This changes the analyzer setting so that the input signal displayed more clearly.

2. Press **FREQ, 8, 7, 0, ., 0, 3** and **MHz**.

3. Press **SPAN, 8** and **MHz**.

4. Press **LEVEL, 0** and **GHz(+dBm)**.

5. Press **TRANSIENT,** ***STD*** and ***STD Setup***.
The STD Measurement Parameter Set dialog box is displayed.

6. Press the ▽ key.
The cursor moves to the item Link.
Select ***FORWARD*** from ***Link*** using the data knob, and press **Hz(ENTR)**.

7. Select ***CONTINUOUS*** from ***Signal Type*** using the data knob, and press **Hz(ENTR)**.

   The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
IQ Inverse:	NORMAL
Cont Auto Level Set:	OFF

8. Press **RETURN**, ***Modulation, Power, Pilot/MAC Channel Power, Template Entry*** and ***STD Template***.
   The Template value is set to the standard value.

9. Press **RETURN** and ***Parameter Setup***.

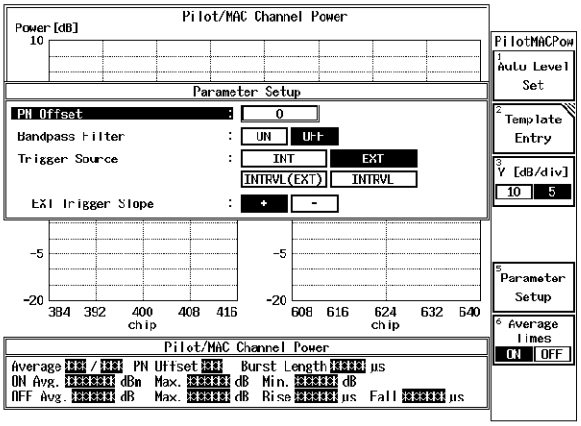


Figure 2-15 Parameter Setup Dialog Box

10. Press **0** and **Hz(ENTR)** to set ***PN Offset***.
    The PN offset is set to 0.

11. Set ***Bandpass Filter*** to ***OFF*** using the data knob, and press **Hz(ENTR)**.

12. Select ***EXT*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.
    The trigger is set to the external trigger.

13. Select + from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.

14. Press ***Parameter Setup***.
    The dialog box is closed.

15. Press ***Auto Level Set***.
The measurement range is set to the optimum range.

16. Press **SINGLE**.
The sweep is set to a single mode and starts.

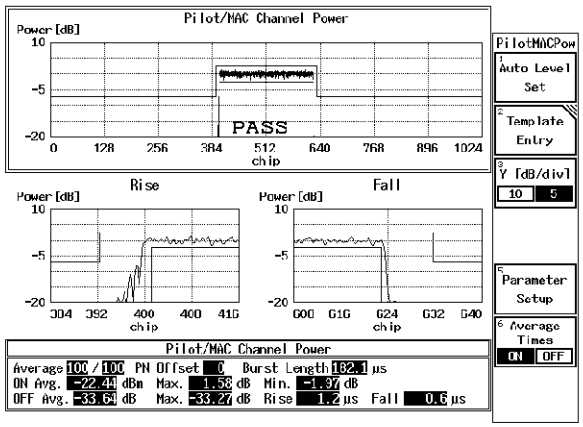


Figure 2-16 Measurement Results of the HDR Access Network Signal

Average / Average count

The numerator indicates the average count of the displayed waveforms.

PN Offset PN offset value for the Pilot PN Sequence

The offset value assigned with the Parameter Setup in the dialog box is displayed. However, if a signal other than the one assigned with the Parameter Setup is entered, the trigger will assume that the even second time reference signal is being assigned and will search for a PN offset.

Burst Length The burst-on length (µs)

Obtains the burst length within the template levels Y0 and Y1. The length indicates between the center of the template and the point where the burst exceeds the Y0 and Y1 levels.

ON Avg. Average power within the burst-on (222 chips) period (dBm).

Obtains sampled average power within the burst-on (222 chips) period of the ensemble average waveform.

(ON) Max. The maximum value within the burst-on (7 µs + 222 chips + 7 µs) period (dB).

The value is expressed as relative power (dB) when ON Avg. (average power) is set to 0 dB.

(ON) Min. The minimum value within the burst-on (222 chips) period (dB).

OFF Avg. Relative average power within the burst-off (other than 7 µs + 222 chips + 7 µs within the burst-on period) period (dB).

(OFF) Max. The maximum value within the burst-off (other than 7 µs + 222 chips + 7 µs within the burst-on period) period (dB).
To judge PASS or FAIL, Y0, Y1, and Y2 template levels can be compared with (ON) Min., (ON) Max., and (OFF) Max.

Rise The rise time length of the burst. (µs)

Obtains the time length between the rising edge of the burst-on (222 chips) period and the point where the burst waveform is below the Y2 level.

Fall The fall time length of the burst. (µs)

Obtains the time length between the falling edge of the burst-on (222 chips) period and the point where the burst waveform is below the Y2 level.

2.5 Measuring the Total Power of Access Network Signals

This section provides measurement examples for the Total Power when it is used to analyze the Acceess Network signal.

Measurement conditions:

Measured signals have an output signal with a frequency of 870.03 MHz and a level of -10 dBm based on IS-856.
It is assumed that the Even Second clock, 10 MHz reference signal and measurement signals are output.

Signal specifications:

Slot Structure

Active slot

Connecting the equipment

1. Connect the equipment as shown in Figure 2-17.

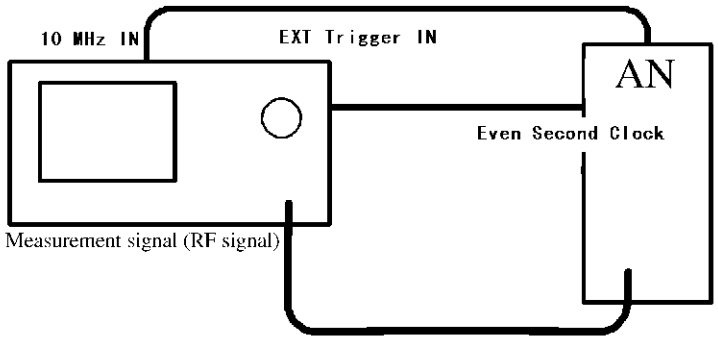


Figure 2-17 Connection for Total Power Measurements of the Access Network Signals

Setting the measurement conditions

This changes the analyzer setting so that the input signal displayed more clearly.

2. Press **FREQ, 8, 7, 0, ., 0, 3** and **MHz**.

3. Press **SPAN, 8** and **MHz**.

4. Press **LEVEL, 0** and **GHz(+dBm)**.

5. Press **TRANSIENT**, ***STD*** and ***STD Setup***.
The STD Measurement Parameter Set dialog box is displayed.

6. Press the ▽ key.
The cursor moves to the item Link.
Select ***FORWARD*** from ***Link*** using the data knob, and press **Hz(ENTR)**.

7. Select ***CONTINUOUS*** from ***Signal Type*** using the data knob, and press **Hz(ENTR)**.

   The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
IQ Inverse:	NORMAL
Cont Auto Level Set:	OFF

8. Press **RETURN**, ***Modulation, Power, Total Power, Template Entry*** and ***STD Template***.
   The Template value is set to the standard value.

9. Press **RETURN** and ***Parameter Setup***.

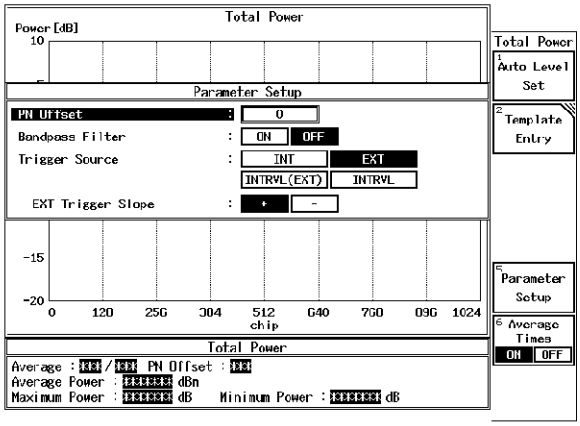


Figure 2-18 Parameter Setup Dialog Box

10. Press **0** and **Hz(ENTR)** to set ***PN Offset***.
    The PN offset is set to 0.

11. Set ***Bandpass Filter*** to ***OFF*** using the data knob, and press **Hz(ENTR)**.

12. Select ***EXT*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.
    The trigger is set to the external trigger.

13. Select + from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.

14. Press ***Parameter Setup***.
    The dialog box is closed.

15. Press ***Auto Level Set***.
    The measurement range is set to the optimum range.

16. Press **SINGLE**.
    The sweep is set to a single mode and starts.

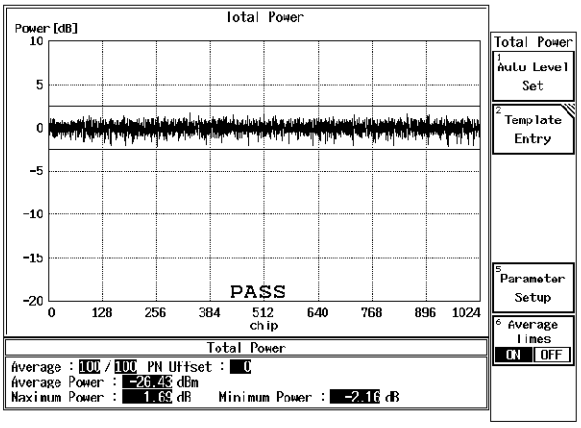


Figure 2-19 Measurement Results of the HDR Access Network Signal

Average /
: Average count

The numerator indicates the average count of the displayed waveforms.
The denominator indicates the final average count set for Average Times.

PN Offset
: PN offset value for the Pilot PN Sequence

The offset value assigned with the Parameter Setup in the dialog box is displayed. However, if a signal other than the one assigned with the Parameter Setup is entered, the trigger will assume that the even second time reference signal is being assigned and will search for a PN offset.

Average Power

Average power of the entire waveform (dBm).

Maximum Power

The maximum power of the entire waveform (dB).
The value is expressed as relative power (dB) when average power is set to 0 dB.

Minimum Power

The minimum power of the entire waveform (dB).

2.6 Measuring the Code Domain of Access Terminal Signals

This section provides measurement examples for the code domain to analyze Access Terminal signals.

Measurement conditions:

Measured signals have an output signal with a frequency of 825.03 MHz and a level of -10 dBm based on IS-856.

Signal specifications:

Long Code Mask I : 33333333333
Long Code Mask Q : 26666666667
Reverse Traffic Channel signal which is multiplexed by the following channels.

Pilot Channel (Pilot/Reverse Rate Indicator (RRI) Channel)
ACK Channel (Acknowledgement Channel)
DRC Channel (Data Rate Control Channel)
Data Channel

Connecting the equipment

1. Connect the equipment as shown in Figure 2-20.

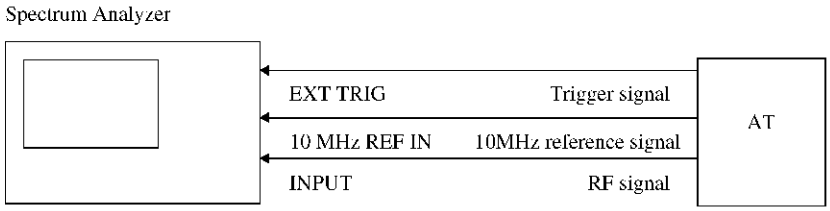


Figure 2-20 Connection for Code Domain Power Measurements of the Access Terminal Signals

Setting the measurement conditions

This sets the measurement frequency to the center frequency of the spectrum analyzer.

2. Press **FREQ, 8, 2, 5, ., 0, 3** and **MHz**.

3. Press **TRANSIENT,** ***STD*** and ***STD Setup***.
The STD Measurement Parameter Set dialog box is displayed.

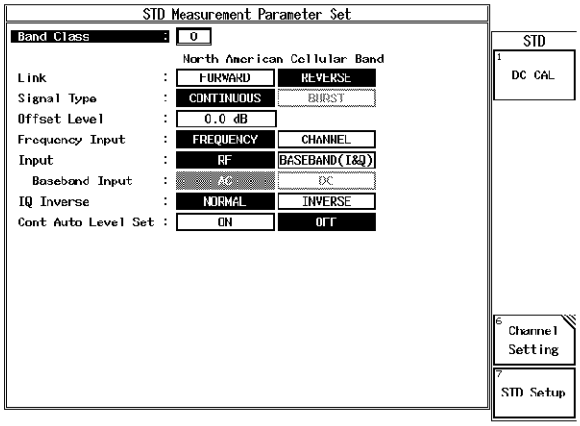


Figure 2-21 STD Measurement Parameter Set Dialog Box

4. Select ***0*** from ***Band Class*** using the data knob, and press **Hz(ENTR)**.

5. Select ***REVERSE*** from ***Link*** using the data knob, and press **Hz(ENTR)**.

6. Press the ▽ key.

7. Press **0, ., 0** and **GHz(dB)** to set ***Offset Level***.

8. Select ***Frequency*** from ***Frequency Input*** using the data knob, and press **Hz(ENTR)**.

9. Select ***RF*** from ***Input*** using the data knob, and press **Hz(ENTR)**.

10. Select ***NORMAL*** from ***IQ Inverse*** using the data knob, and press **Hz(ENTR)**.

11. Select ***OFF*** from ***Cont Auto Level Set*** using the data knob, and press **Hz(ENTR)**.

12. Press **RETURN**, ***Modulation***, ***Code Domain Power*** and ***Parameter Setup***.
The Parameter Setup dialog box is displayed.

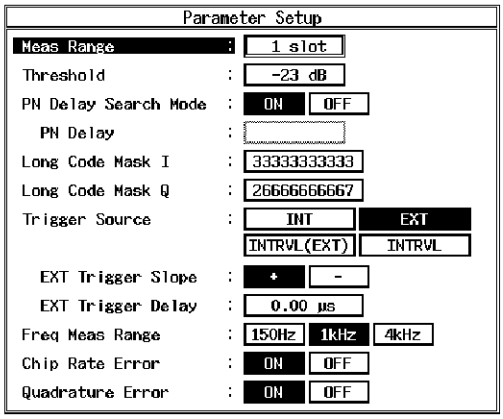


Figure 2-22 Parameter Setup Dialog Box

13. Select ***1 slot*** from ***Meas Range*** using the data knob, and press **Hz(ENTR)**.

14. Press **-, 2, 3** and **GHz(dB)** to set ***Threshold***.

15. Select ***ON*** from ***PN Delay Search Mode*** using the data knob, and press **Hz(ENTR)**.

16. Press **3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3** and **Hz(ENTR)** to set ***Long Code Mask I***.

17. Press **2, 6, 6, 6, 6, 6, 6, 6, 6, 6, 7** and **Hz(ENTR)** to set ***Long Code Mask Q***.

18. Select ***EXT*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.

19. Select + from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.

20. Press **0, ., 0** and **Hz(ENTR)** to set ***EXT Trigger Delay***.

21. Select ***1kHz*** from ***Freq Meas Range*** using the data knob, and press **Hz(ENTR)**.

22. Select ***ON*** from ***Chip Rate Error*** using the data knob, and press **Hz(ENTR)**.

23. Select ***ON*** from ***Quadrature Error*** using the data knob, and press **Hz(ENTR)**.

24. Press ***Parameter Setup***.
    The dialog box is closed.

25. Press ***View Setup***.
The View Setup dialog box is displayed.

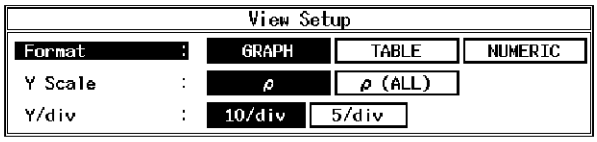


Figure 2-23 View Setup Dialog Box

26. Select ***NUMERIC*** from ***Format*** using the data knob, and press **Hz(ENTR)**.

27. Press ***View Setup***.
The dialog box is closed.

28. Press ***Auto Level Set***.
The measurement range is set to the optimum range.

29. Press **SINGLE**.
The measurement is executed in the single mode and the result is displayed.

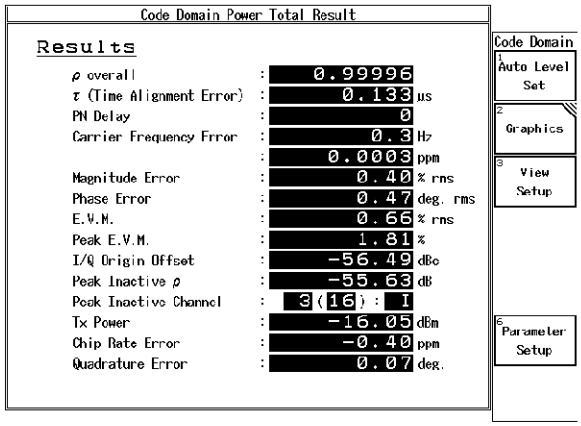


Figure 2-24 Measurement Results of the HDR Access Terminal (NUMERIC)

ρ overall — Waveform quality in the Pilot Channel, DRC Channel, ACK Channel, and Data Channel.

τ (Time Alignment Error)
Time delay from the trigger (µs) to the head of the frame.

PN Delay — Time delay from the beginning of Pilot PN Sequence. A value from 0 to 511 for every 64 chips.

Carrier Frequency Error
The carrier frequency error (Hz, ppm) from the center frequency set.

Magnitude Error
Magnitude error (% rms) of the multiplexed signal.

Phase Error Phase error (deg. rms) of the multiplexed signal.

E.V.M. Error vector magnitude (% rms) of the multiplexed signal.

Peak E.V.M. The maximum error vector magnitude (%) in the measurement range.

I/Q Origin Offset
Offset (dBc) of the I/Q origin.

Peak Inactive ρ
The maximum inactive channel value in the logarithmic values of each of the I channel and Q channel code domain power coefficient.

Peak Inactive Channel
The walsh code number, length, and components of the peak inactive ρ.

Tx Power Average power (dBm) of the transmitted signals.

Chip Rate Error
Chip rate error (ppm) relative to 1.2288 Mcps.

Quadrature Error
Q-axis quadrature error (deg.) relative to the I-axis.

30. Press ***View Setup***.
The View Setup dialog box is displayed.

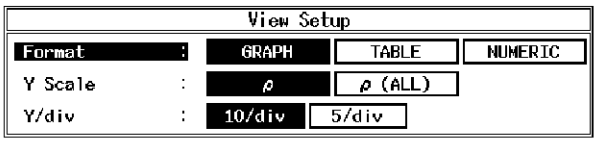


Figure 2-25 View Setup Dialog Box

31. Select ***GRAPH*** from ***Format*** using the data knob, and press **Hz(ENTR)**.

32. Select ***ρ*** from ***Y Scale*** using the data knob, and press **Hz(ENTR)**.

33. Select ***10/div*** from ***Y/div*** using the data knob, and press **Hz(ENTR)**.

34. Press ***View Setup***.
The dialog box is closed.

35. Press **MKR**.
The marker is displayed.

36. Select ***0*** from ***MKR POSI.*** using the data knob.
The marker moves only between the active channels.

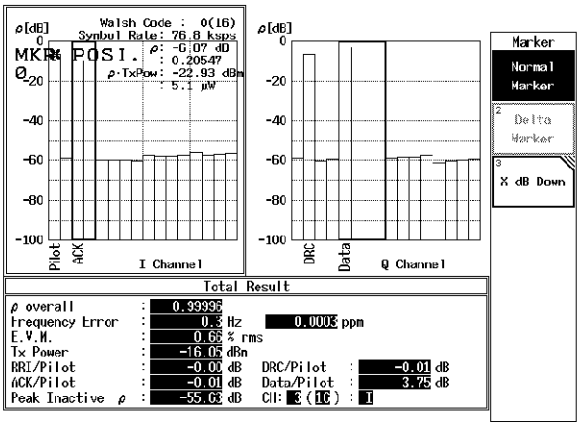


Figure 2-26 HDR Access Terminal Signal Measurement Result (GRAPH)

RRI/Pilot — Logarithmic value (dB) of the power ratio between the RRI channel and the Pilot channel*.

ACK/Pilot — Logarithmic value (dB) of the power ratio between the ACK channel and the Pilot channel.

DRC/Pilot — Logarithmic value (dB) of the power ratio between the DRC channel and the Pilot channel.

Data/Pilot — Logarithmic value (dB) of the power ratio between the Data channel and the Pilot channel.

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

Walsh Code — Walsh Code number and length of the channel specified by the marker.

Symbol Rate — Modulation symbol rate (ksps) of the channel specified by the marker.

ρ — Code domain power coefficient (dB, linear) of the channel specified by the marker.

ρ•TxPow	The product of Tx Power and ρ of the channel specified by the marker (dBm, W).

3 REFERENCE

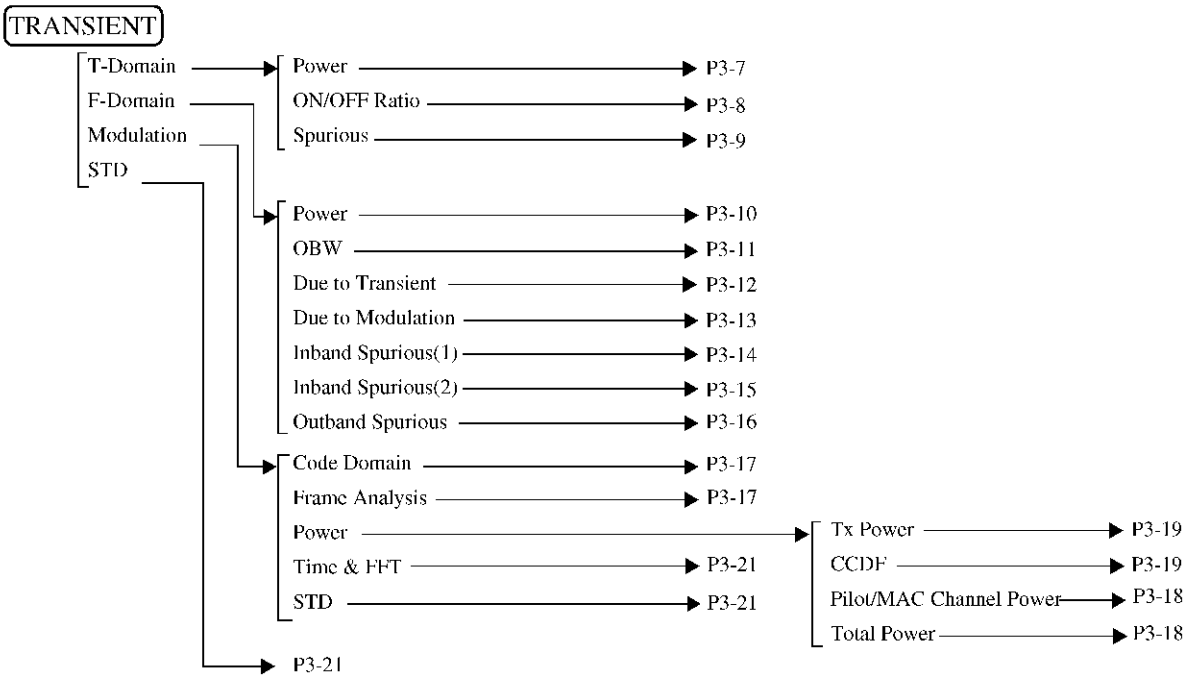
This chapter describes the functions of the panel and soft keys for option 67 and option 69 software.

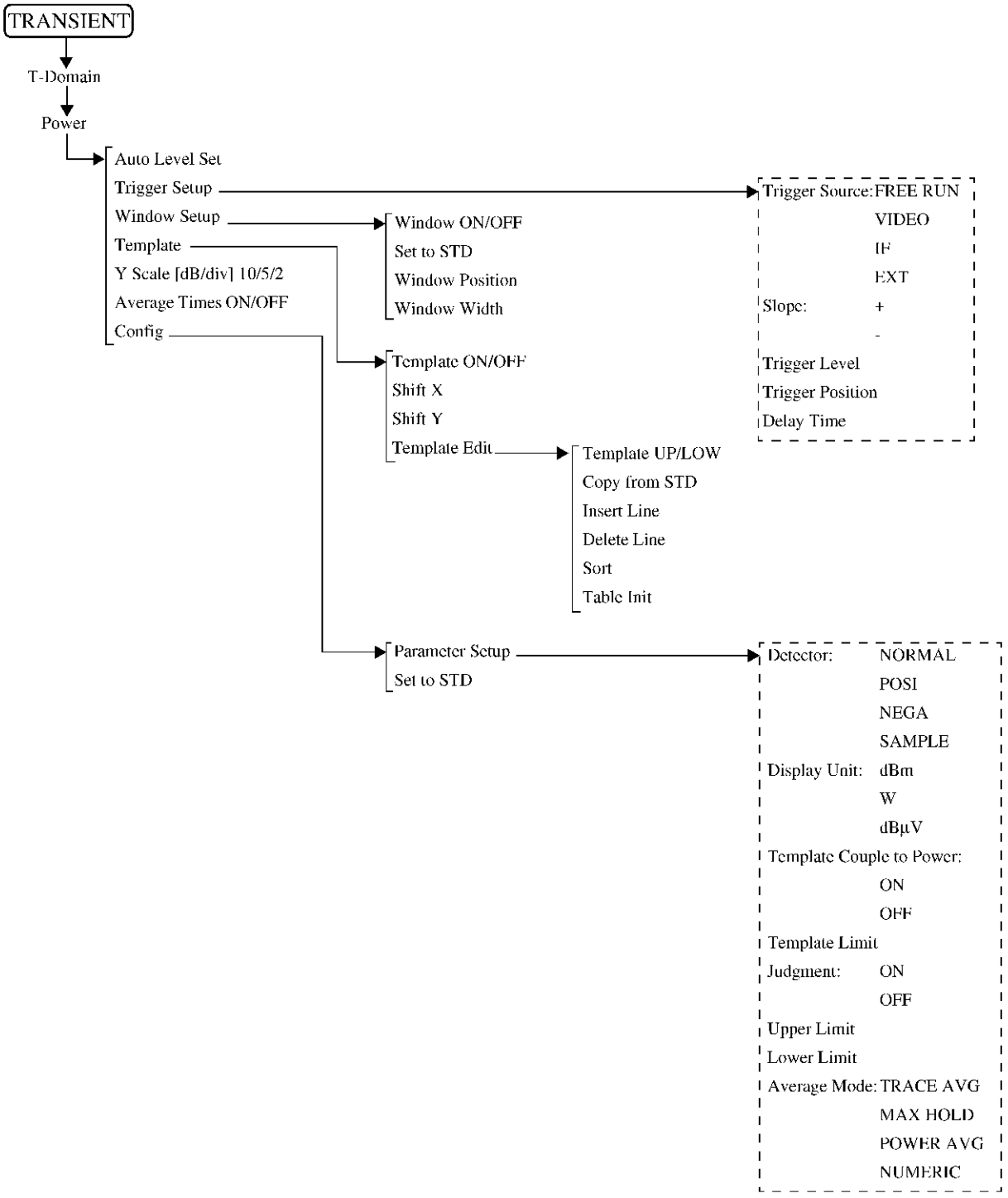
3.1 Menu Index

This menu index is used to easily find the keys described in Chapter 3.

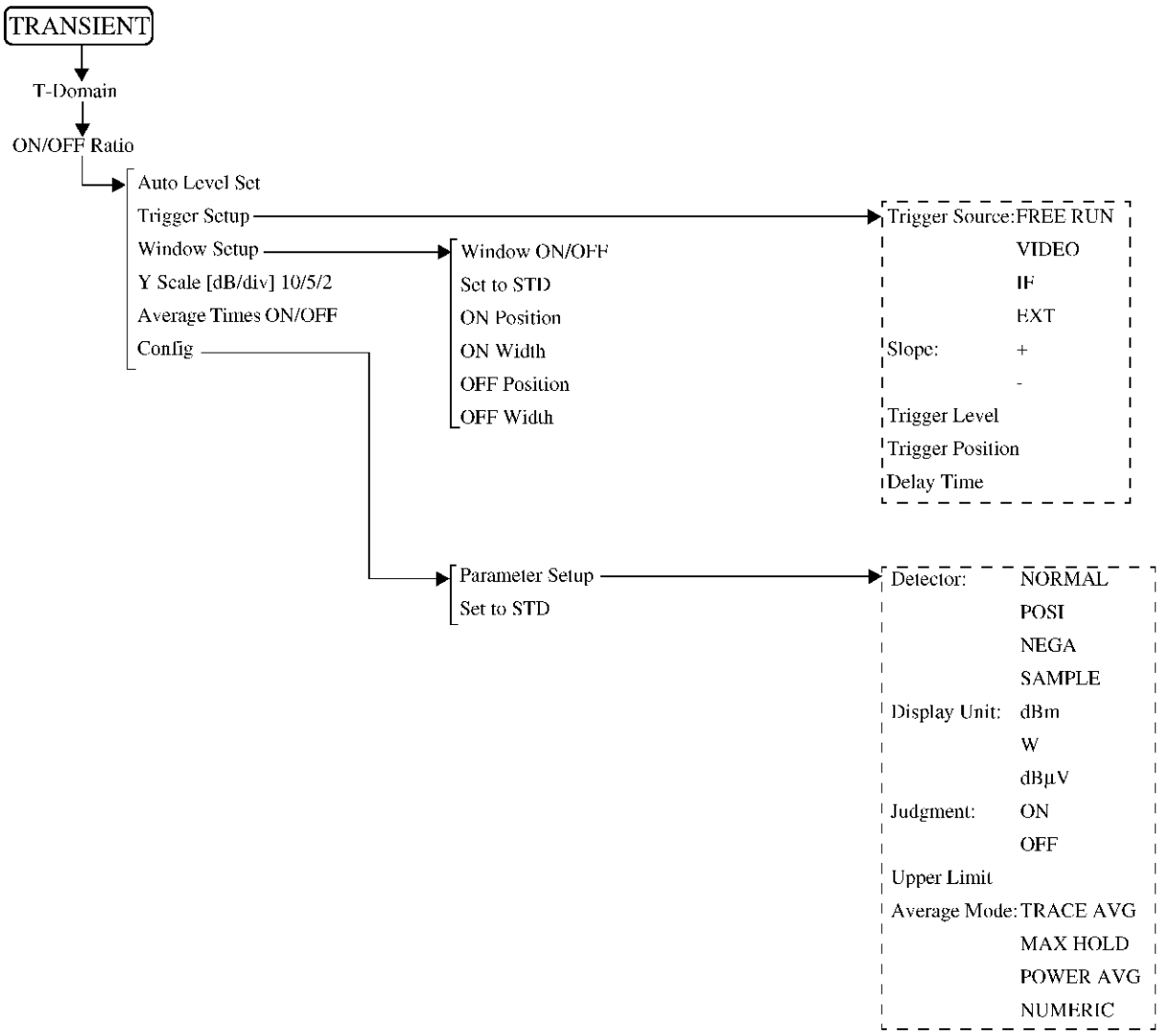
3.2 Menu Map

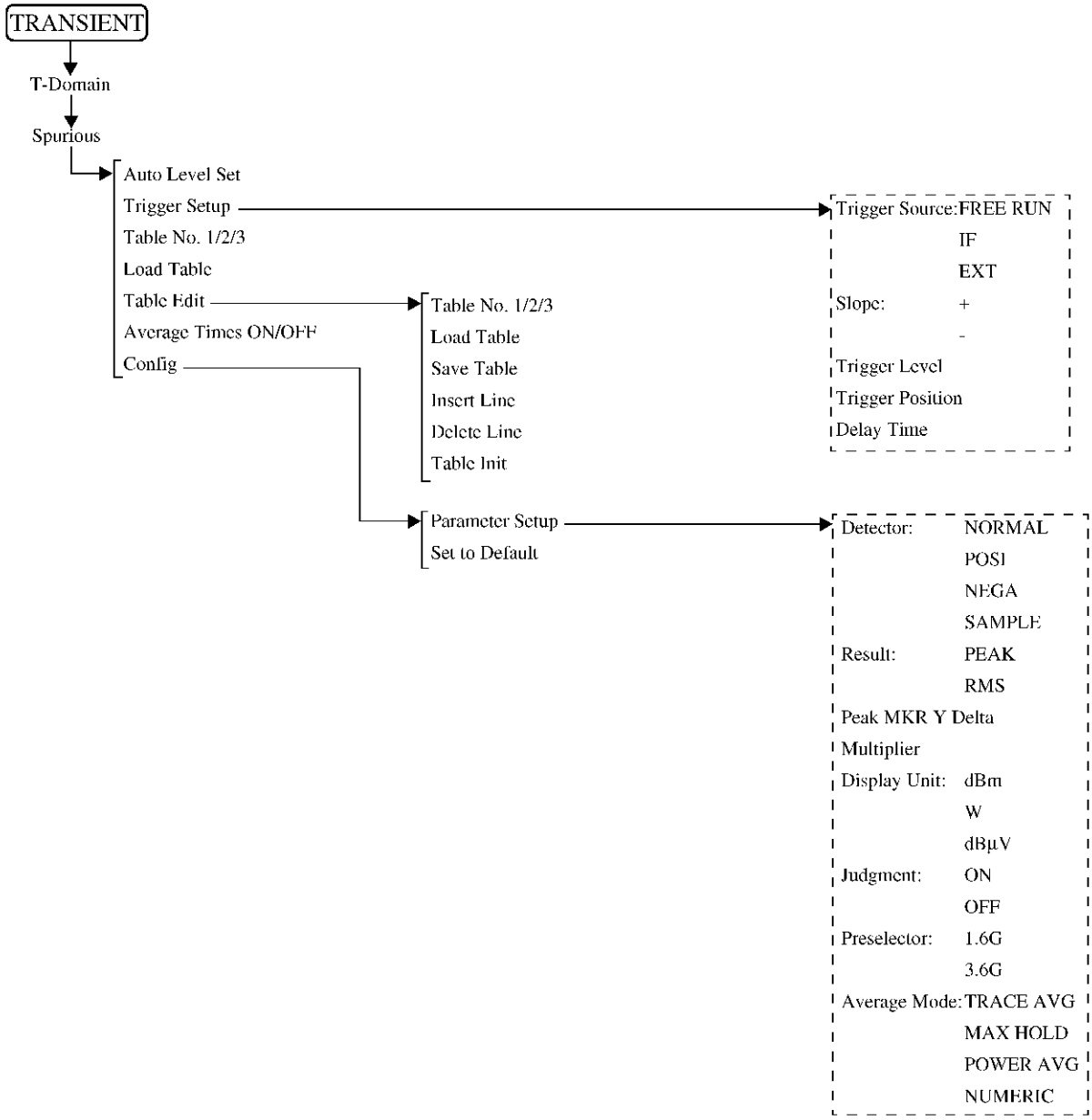
This section shows the hierarchical menu configuration on a panel key basis



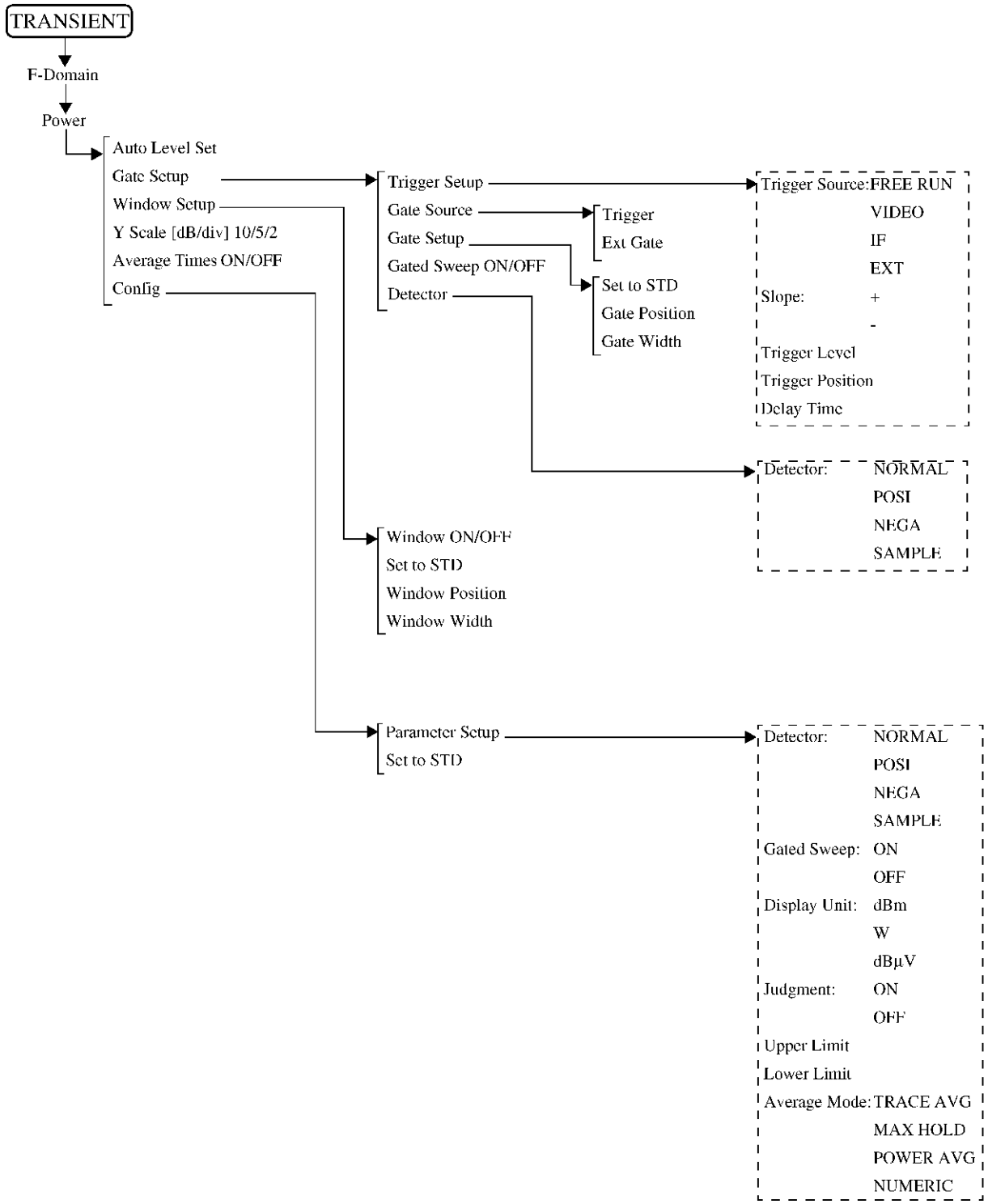

TRANSIENT
T-Domain
Power
Auto Level Set
Trigger Setup
Window Setup
Template
Y Scale [dB/div] 10/5/2
Average Times ON/OFF
Config
Window ON/OFF
Set to STD
Window Position
Window Width
Template ON/OFF
Shift X
Shift Y
Template Edit
Template UP/LOW
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Detector: NORMAL
POSI
NEGA
SAMPLE
Display Unit: dBm
W
dBµV
Template Couple to Power:
ON
OFF
Template Limit
Judgment: ON
OFF
Upper Limit
Lower Limit
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

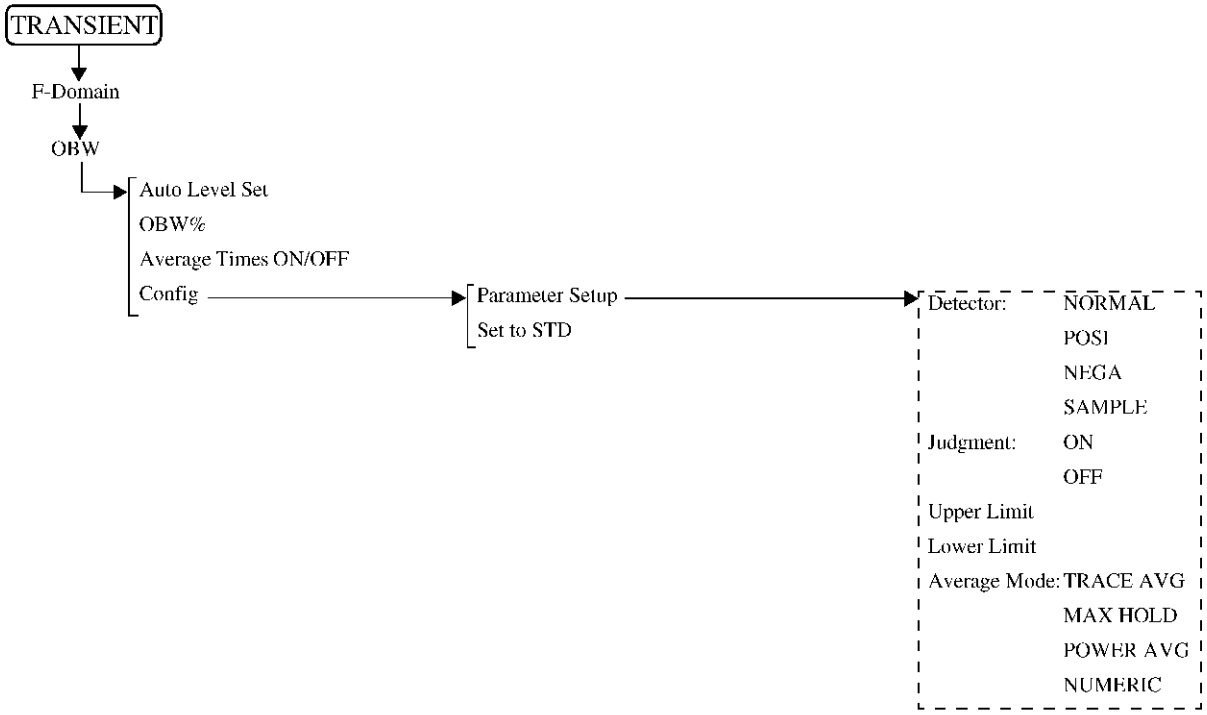
3.2 Menu Map


TRANSIENT
T-Domain
ON/OFF Ratio
Auto Level Set
Trigger Setup
Window Setup
Y Scale [dB/div] 10/5/2
Average Times ON/OFF
Config
Window ON/OFF
Set to STD
ON Position
ON Width
OFF Position
OFF Width
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Parameter Setup
Set to STD
Detector: NORMAL
POSI
NEGA
SAMPLE
Display Unit: dBm
W
dBµV
Judgment: ON
OFF
Upper Limit
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

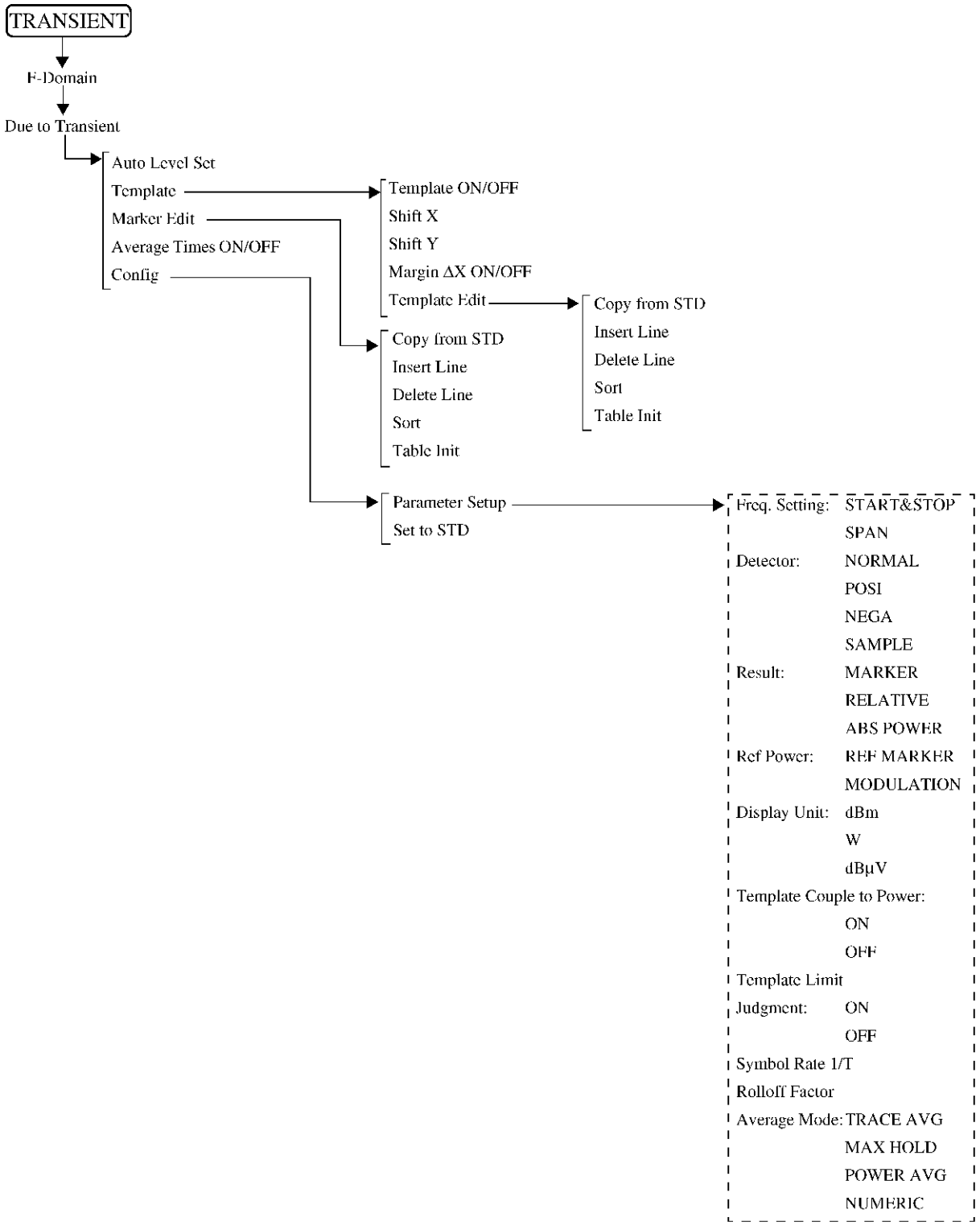

TRANSIENT
T-Domain
Spurious
Auto Level Set
Trigger Setup
Table No. 1/2/3
Load Table
Table Edit
Average Times ON/OFF
Config
Trigger Source: FREE RUN
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Table No. 1/2/3
Load Table
Save Table
Insert Line
Delete Line
Table Init
Parameter Setup
Set to Default
Detector: NORMAL
POSI
NEGA
SAMPLE
Result: PEAK
RMS
Peak MKR Y Delta
Multiplier
Display Unit: dBm
W
dBµV
Judgment: ON
OFF
Preselector: 1.6G
3.6G
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

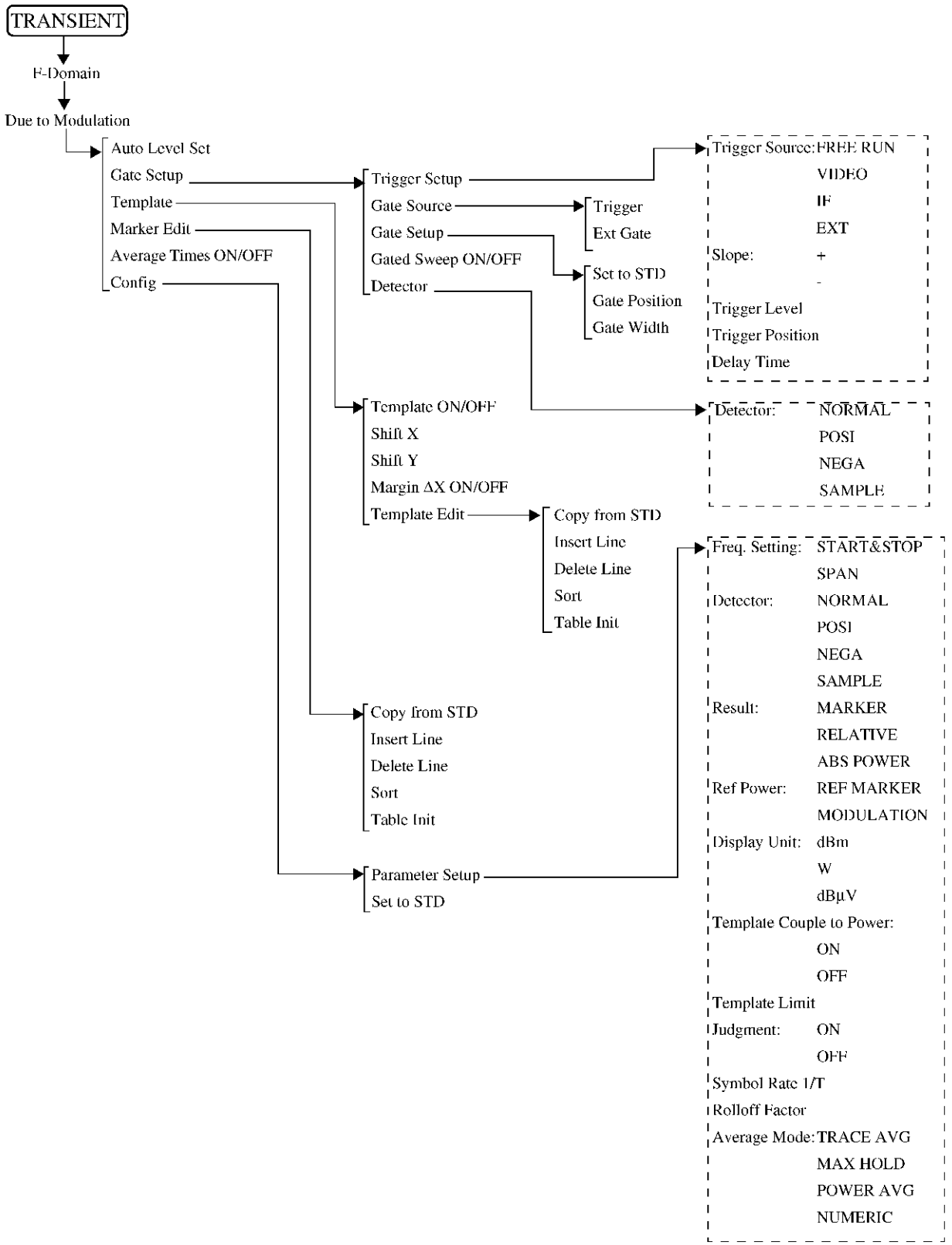
3.2 Menu Map


TRANSIENT
F-Domain
Power
Auto Level Set
Gate Setup
Window Setup
Y Scale [dB/div] 10/5/2
Average Times ON/OFF
Config
Trigger Setup
Gate Source
Gate Setup
Gated Sweep ON/OFF
Detector
Trigger
Ext Gate
Set to STD
Gate Position
Gate Width
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Detector: NORMAL
POSI
NEGA
SAMPLE
Window ON/OFF
Set to STD
Window Position
Window Width
Parameter Setup
Set to STD
Detector: NORMAL
POSI
NEGA
SAMPLE
Gated Sweep: ON
OFF
Display Unit: dBm
W
dBµV
Judgment: ON
OFF
Upper Limit
Lower Limit
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

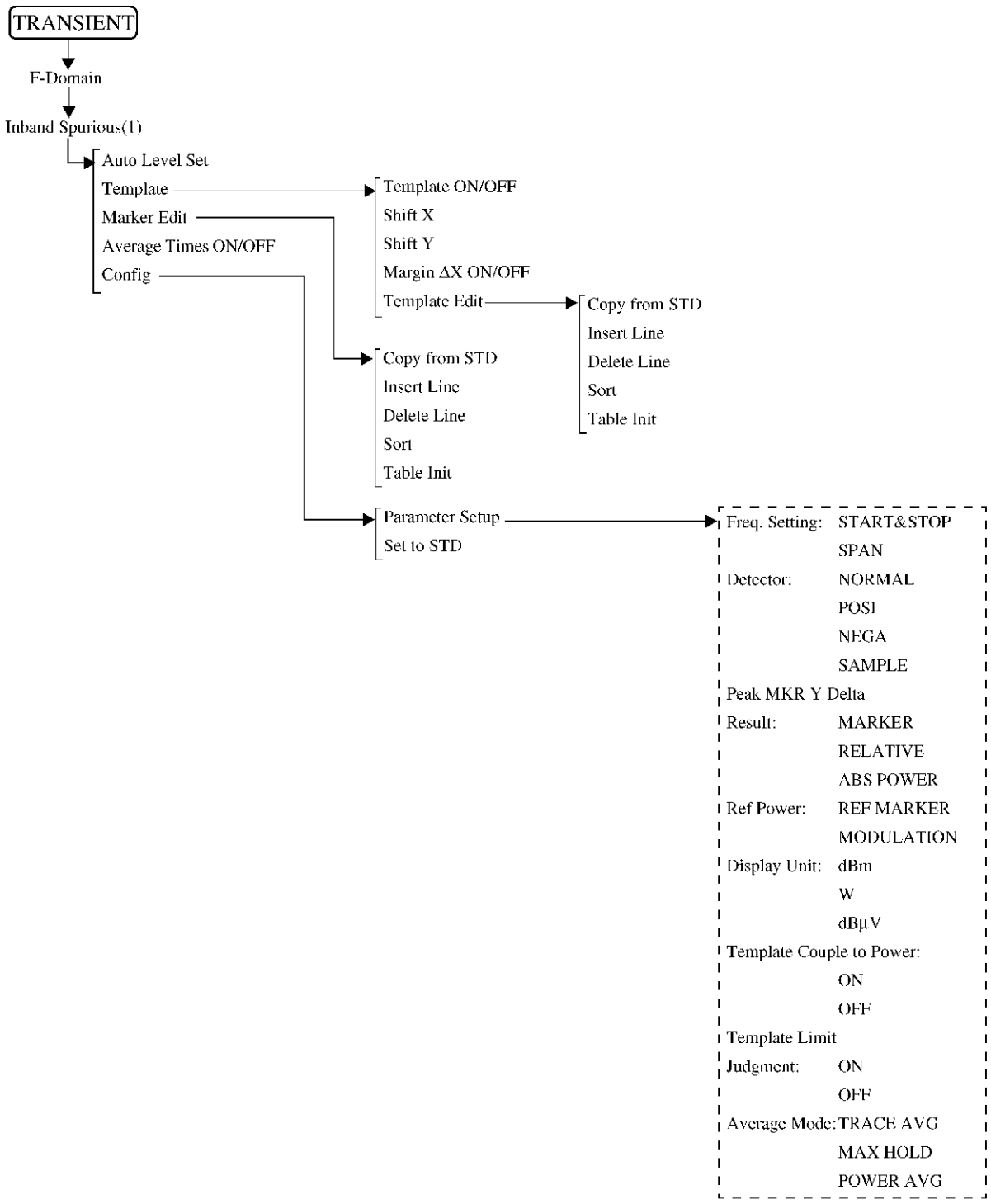

TRANSIENT
F-Domain
OBW
Auto Level Set
OBW%
Average Times ON/OFF
Config
Parameter Setup
Set to STD
Detector:
NORMAL
POSI
NEGA
SAMPLE
Judgment:
ON
OFF
Upper Limit
Lower Limit
Average Mode:
TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

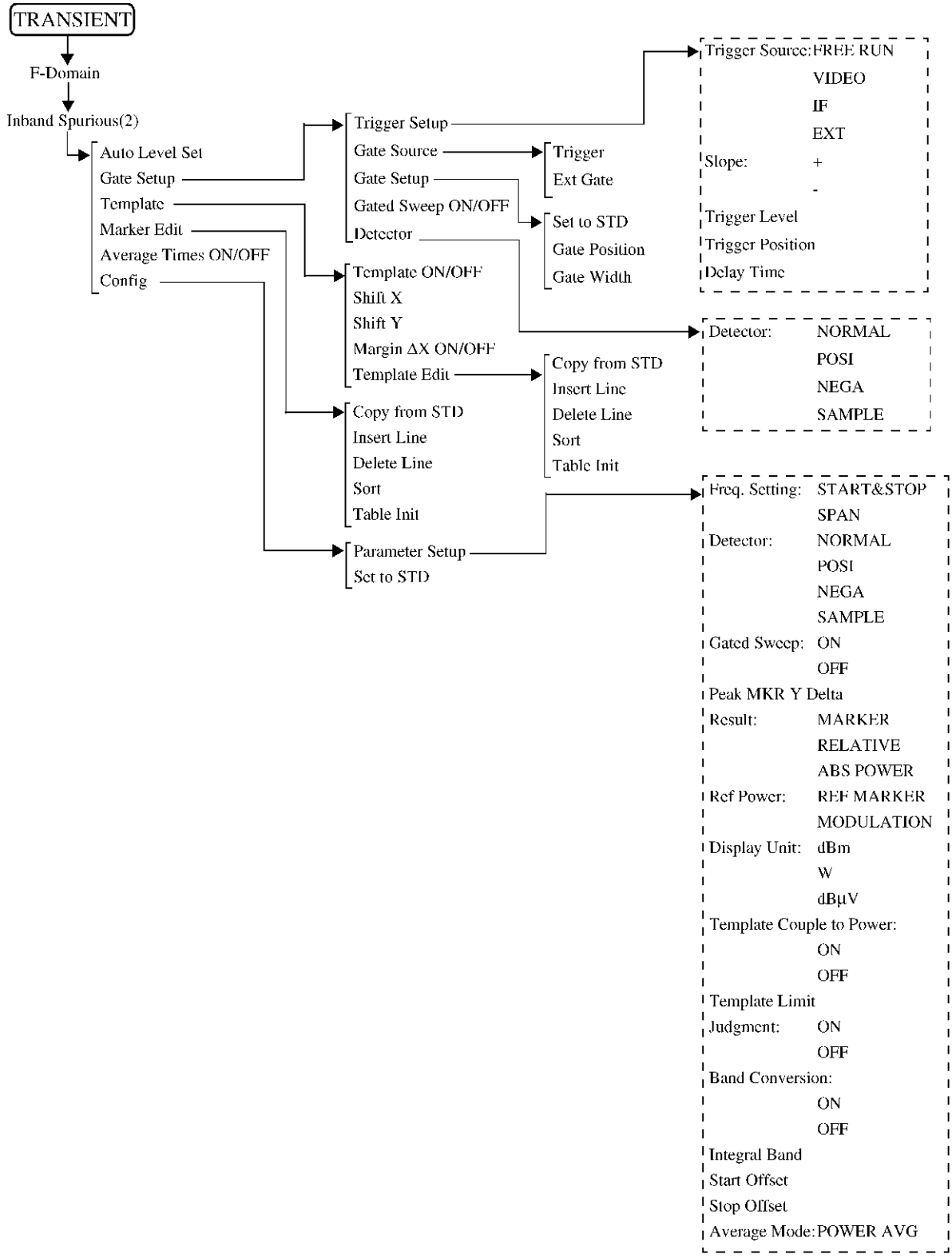
3.2 Menu Map


TRANSIENT
F-Domain
Due to Transient
Auto Level Set
Template
Marker Edit
Average Times ON/OFF
Config
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
Freq. Setting: START&STOP
SPAN
Detector: NORMAL
POSI
NEGA
SAMPLE
Result: MARKER
RELATIVE
ABS POWER
Ref Power: REF MARKER
MODULATION
Display Unit: dBm
W
dBμV
Template Couple to Power:
ON
OFF
Template Limit
Judgment: ON
OFF
Symbol Rate 1/T
Rolloff Factor
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

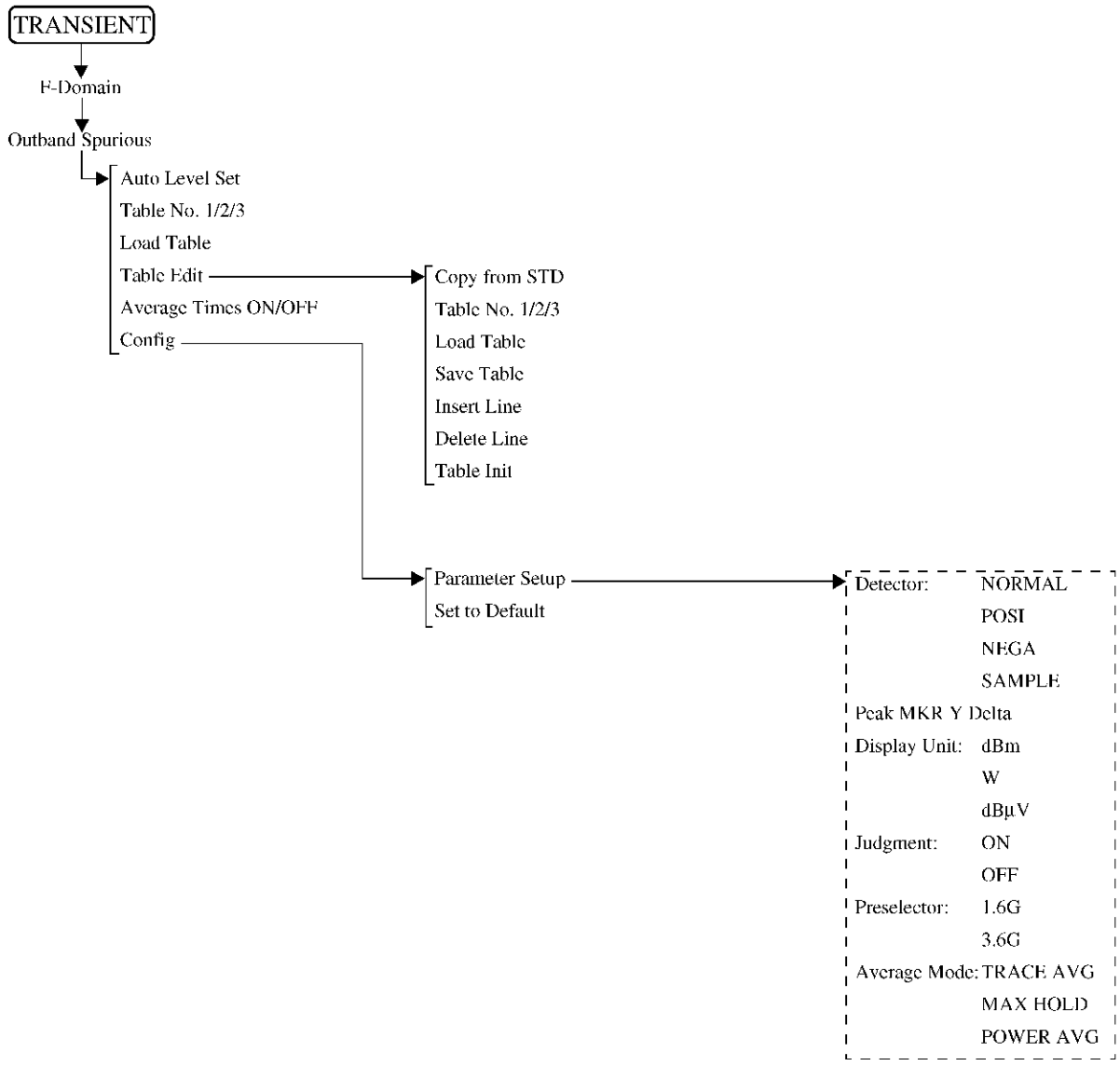

TRANSIENT
F-Domain
Due to Modulation
Auto Level Set
Gate Setup
Template
Marker Edit
Average Times ON/OFF
Config
Trigger Setup
Gate Source
Gate Setup
Gated Sweep ON/OFF
Detector
Trigger
Ext Gate
Set to STD
Gate Position
Gate Width
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Detector: NORMAL
POSI
NEGA
SAMPLE
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
Freq. Setting: START&STOP
SPAN
Detector: NORMAL
POSI
NEGA
SAMPLE
Result: MARKER
RELATIVE
ABS POWER
Ref Power: REF MARKER
MODULATION
Display Unit: dBm
W
dBμV
Template Couple to Power:
ON
OFF
Template Limit
Judgment: ON
OFF
Symbol Rate 1/T
Rolloff Factor
Average Mode: TRACE AVG
MAX HOLD
POWER AVG
NUMERIC

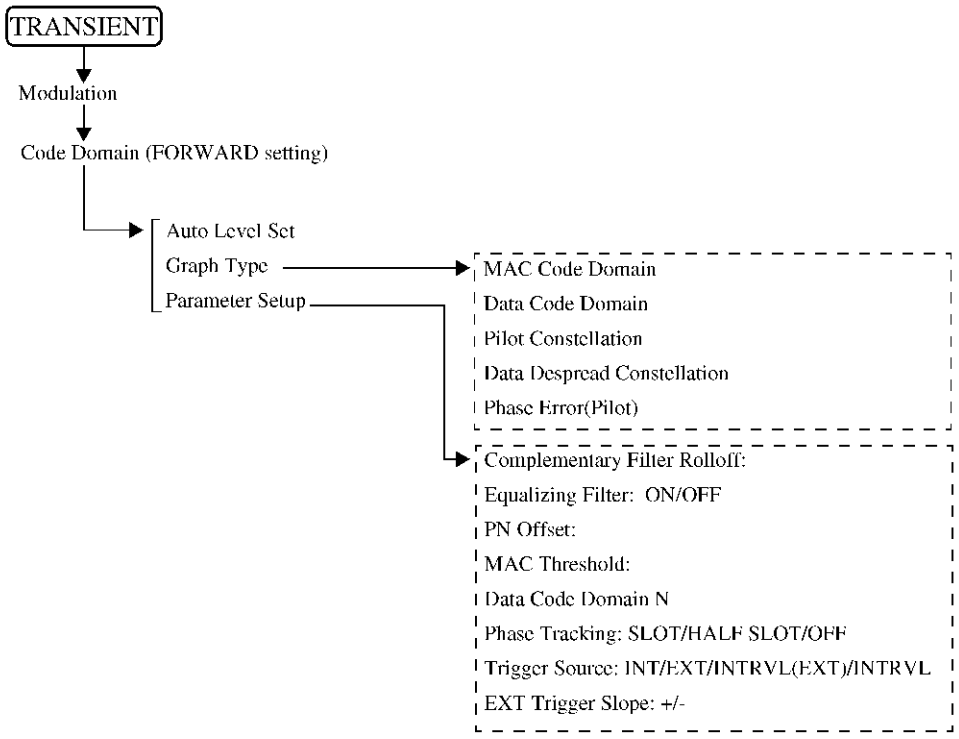
3.2 Menu Map

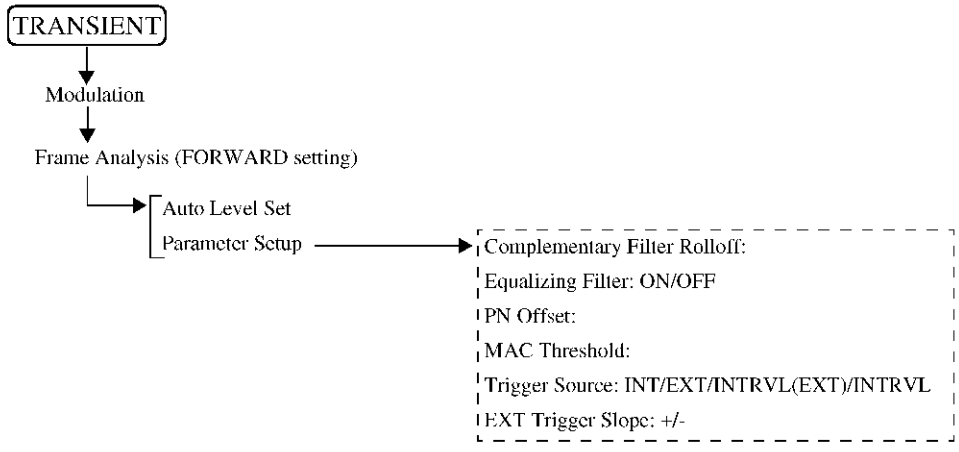

TRANSIENT
F-Domain
Inband Spurious(1)
Auto Level Set
Template
Marker Edit
Average Times ON/OFF
Config
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
Freq. Setting: START&STOP
SPAN
Detector: NORMAL
POSI
NEGA
SAMPLE
Peak MKR Y Delta
Result: MARKER
RELATIVE
ABS POWER
Ref Power: REF MARKER
MODULATION
Display Unit: dBm
W
dBμV
Template Couple to Power:
ON
OFF
Template Limit
Judgment: ON
OFF
Average Mode: TRACE AVG
MAX HOLD
POWER AVG


TRANSIENT
F-Domain
Inband Spurious(2)
Auto Level Set
Gate Setup
Template
Marker Edit
Average Times ON/OFF
Config
Trigger Setup
Gate Source
Gate Setup
Gated Sweep ON/OFF
Detector
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
Trigger
Ext Gate
Set to STD
Gate Position
Gate Width
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Detector: NORMAL
POSI
NEGA
SAMPLE
Freq. Setting: START&STOP
SPAN
Detector: NORMAL
POSI
NEGA
SAMPLE
Gated Sweep: ON
OFF
Peak MKR Y Delta
Result: MARKER
RELATIVE
ABS POWER
Ref Power: REF MARKER
MODULATION
Display Unit: dBm
W
dBμV
Template Couple to Power:
ON
OFF
Template Limit
Judgment: ON
OFF
Band Conversion:
ON
OFF
Integral Band
Start Offset
Stop Offset
Average Mode: POWER AVG

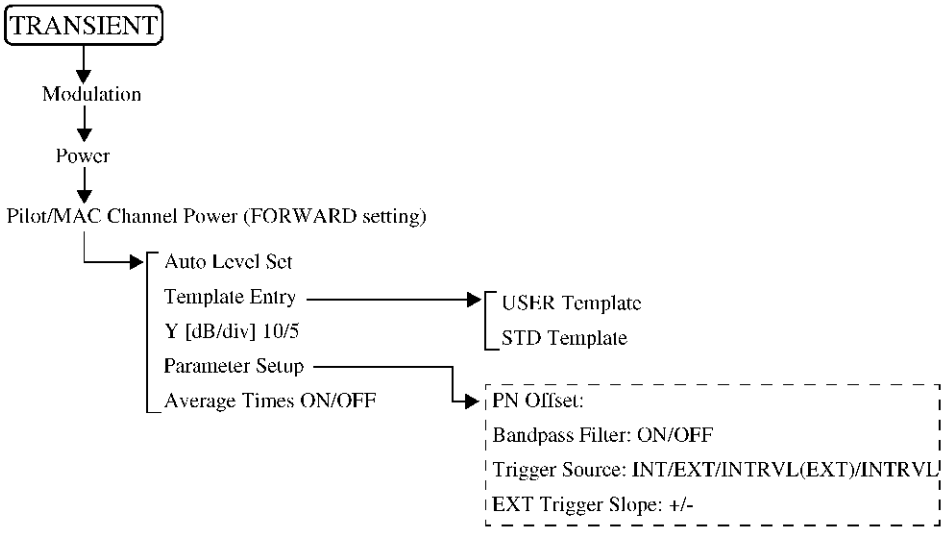
3.2 Menu Map

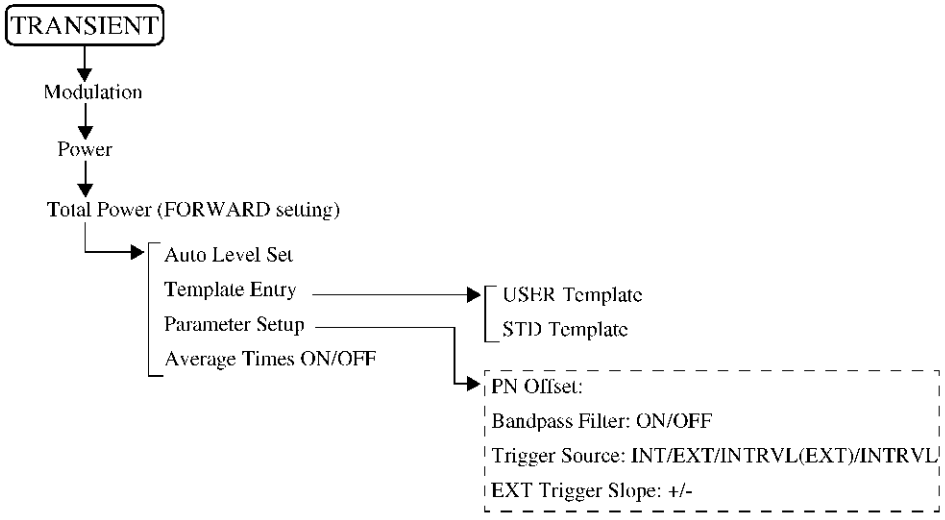

TRANSIENT
F-Domain
Outband Spurious
Auto Level Set
Table No. 1/2/3
Load Table
Table Edit
Average Times ON/OFF
Config
Copy from STD
Table No. 1/2/3
Load Table
Save Table
Insert Line
Delete Line
Table Init
Parameter Setup
Set to Default
Detector: NORMAL
POSI
NEGA
SAMPLE
Peak MKR Y Delta
Display Unit: dBm
W
dBµV
Judgment: ON
OFF
Preselector: 1.6G
3.6G
Average Mode: TRACE AVG
MAX HOLD
POWER AVG

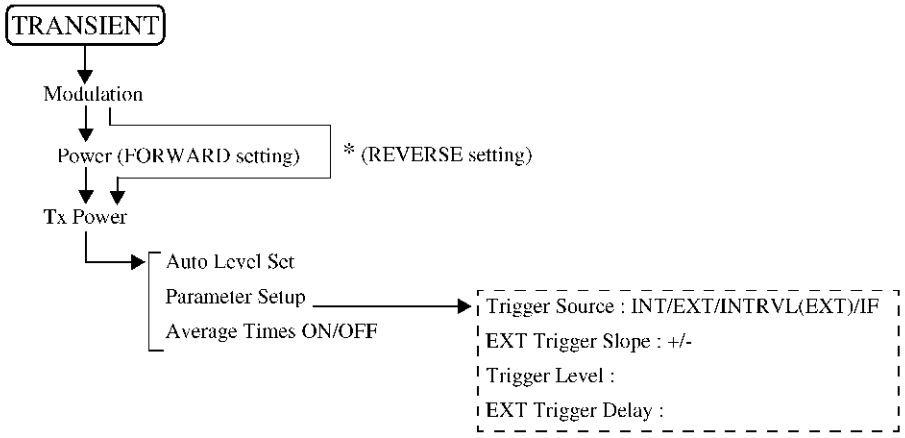

TRANSIENT
Modulation
Code Domain (FORWARD setting)
Auto Level Set
Graph Type
Parameter Setup
MAC Code Domain
Data Code Domain
Pilot Constellation
Data Despread Constellation
Phase Error(Pilot)
Complementary Filter Rolloff:
Equalizing Filter: ON/OFF
PN Offset:
MAC Threshold:
Data Code Domain N
Phase Tracking: SLOT/HALF SLOT/OFF
Trigger Source: INT/EXT/INTRVL(EXT)/INTRVL
EXT Trigger Slope: +/-

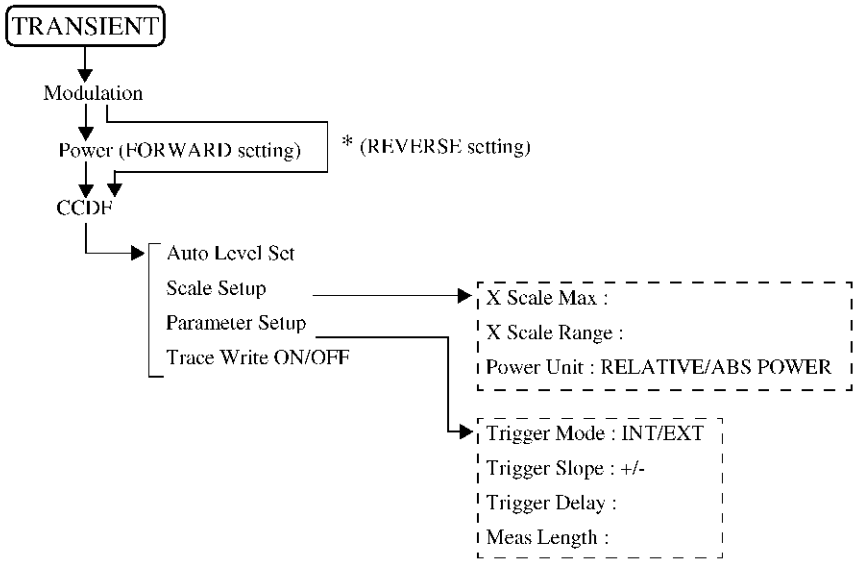

TRANSIENT
Modulation
Frame Analysis (FORWARD setting)
Auto Level Set
Parameter Setup
Complementary Filter Rolloff:
Equalizing Filter: ON/OFF
PN Offset:
MAC Threshold:
Trigger Source: INT/EXT/INTRVL(EXT)/INTRVL
EXT Trigger Slope: +/-

3.2 Menu Map


TRANSIENT
Modulation
Power
Pilot/MAC Channel Power (FORWARD setting)
Auto Level Set
Template Entry
Y [dB/div] 10/5
Parameter Setup
Average Times ON/OFF
USER Template
STD Template
PN Offset:
Bandpass Filter: ON/OFF
Trigger Source: INT/EXT/INTRVL(EXT)/INTRVL
EXT Trigger Slope: +/-

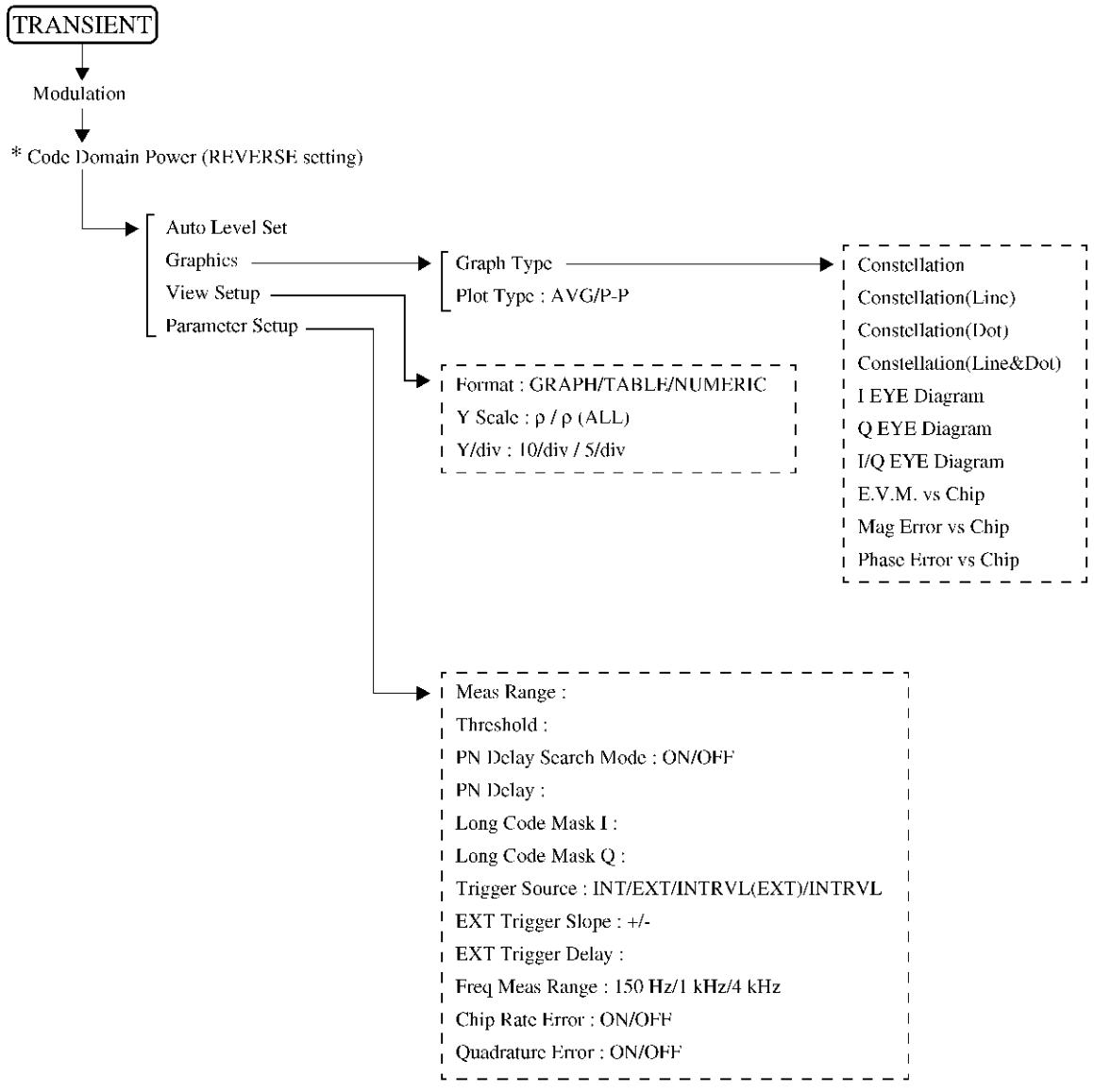

TRANSIENT
Modulation
Power
Total Power (FORWARD setting)
Auto Level Set
Template Entry
Parameter Setup
Average Times ON/OFF
USER Template
STD Template
PN Offset:
Bandpass Filter: ON/OFF
Trigger Source: INT/EXT/INTRVL(EXT)/INTRVL
EXT Trigger Slope: +/-



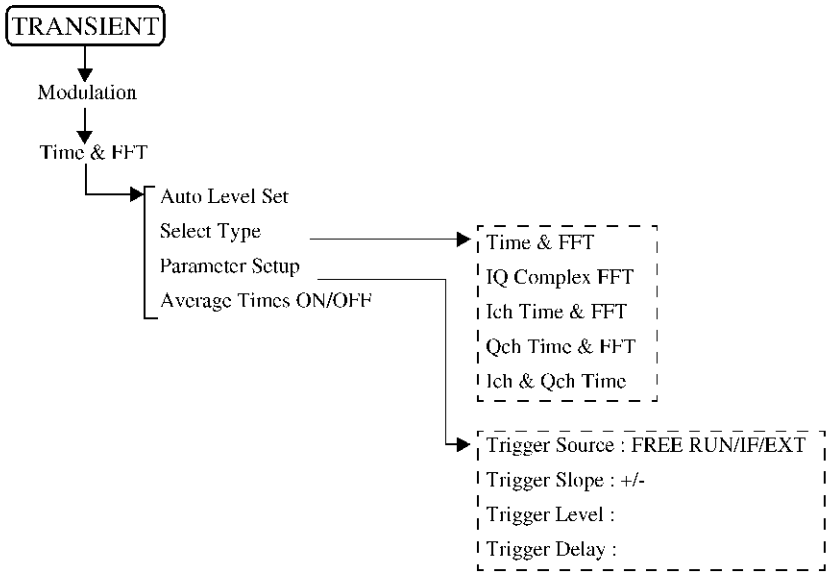


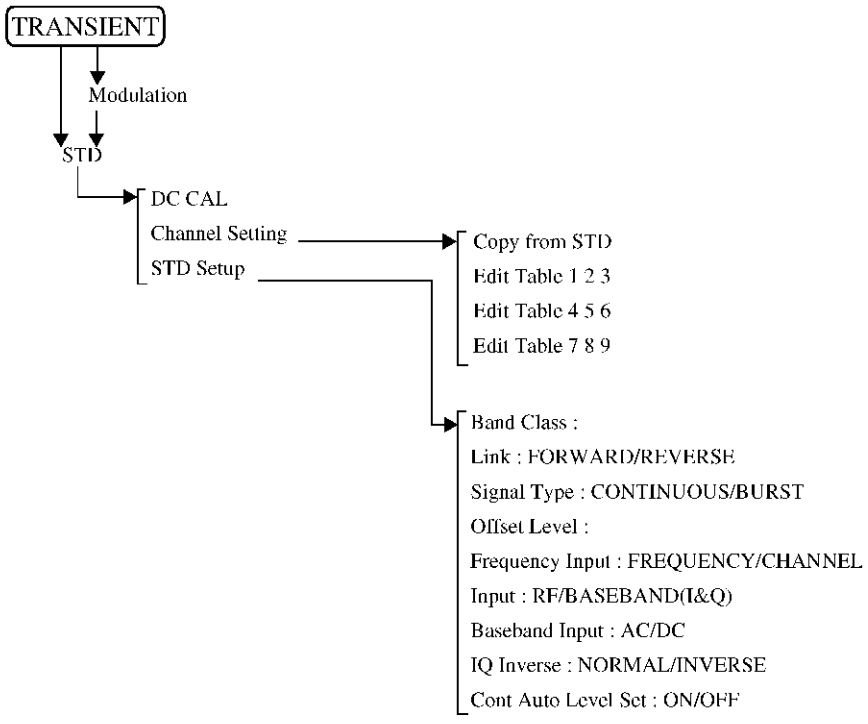
*: OPT69 is necessary.

3.2 Menu Map



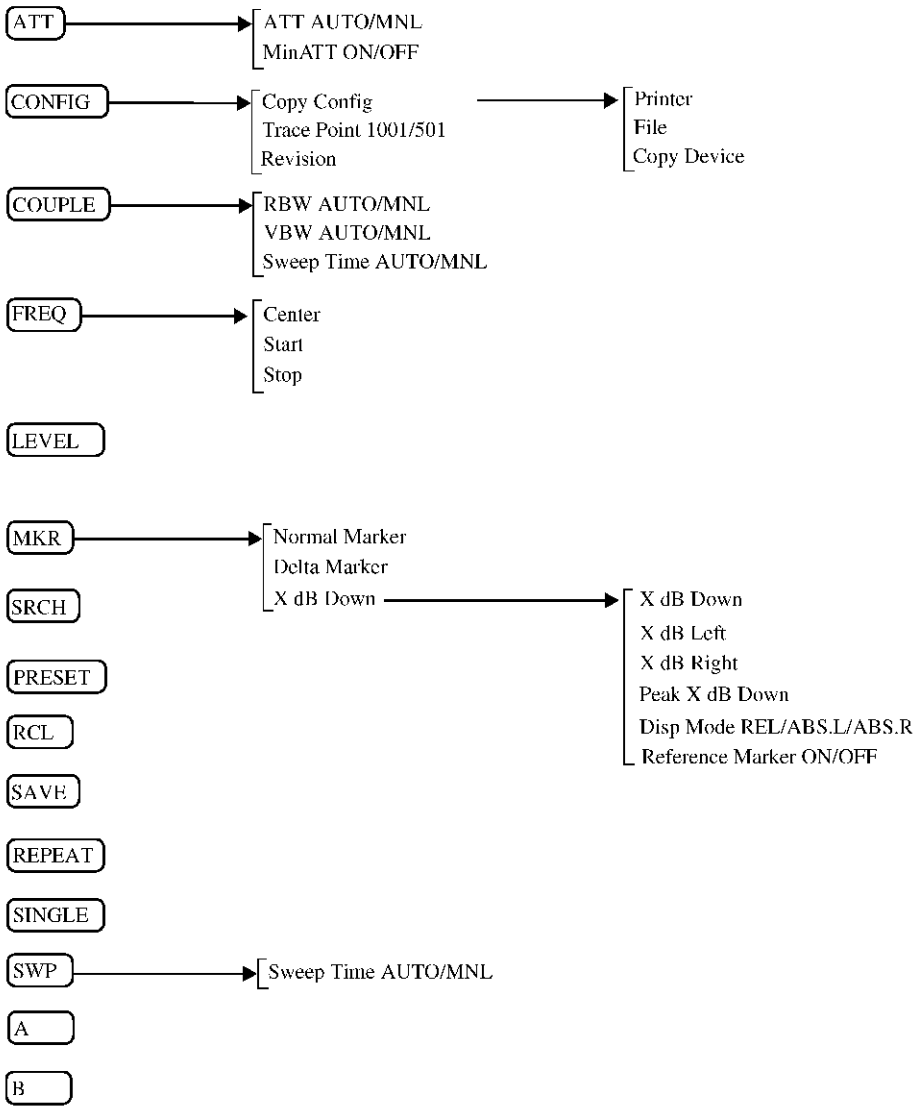
* : OPT69 is necessary.


TRANSIENT
Modulation
Time & FFT
Auto Level Set
Select Type
Parameter Setup
Average Times ON/OFF
Time & FFT
IQ Complex FFT
Ich Time & FFT
Qch Time & FFT
Ich & Qch Time
Trigger Source : FREE RUN/IF/EXT
Trigger Slope : +/-
Trigger Level :
Trigger Delay :


TRANSIENT
Modulation
STD
DC CAL
Channel Setting
STD Setup
Copy from STD
Edit Table 1 2 3
Edit Table 4 5 6
Edit Table 7 8 9
Band Class :
Link : FORWARD/REVERSE
Signal Type : CONTINUOUS/BURST
Offset Level :
Frequency Input : FREQUENCY/CHANNEL
Input : RF/BASEBAND(I&Q)
Baseband Input : AC/DC
IQ Inverse : NORMAL/INVERSE
Cont Auto Level Set : ON/OFF

3.3 Functional Description

When modulation analysis hardware and software are installed, the following menus are assigned to the **TRANSIENT** key.



3.3.1 Switching Communication Systems

This section describes how to switch the communication systems. The analyzer must be set to the SPA mode to switch between the communication systems.

NOTE: ***After the communication system has been switched, the parameters previously set for the former communication system will be cleared.***
If necessary, save the old parameters, before switching the communication system to another.

Switching communication systems

1. Press the **POWER** to enter the SPA mode.
2. Press **CONFIG**.
3. Press ***more 1/2***.
   If there are other communication systems installed, with which this instrument can analyze, "Comm.System" is displayed in the soft menu.
4. Press ***Comm.System.***
   Select the communication system you wish using the data knob, and press the knob (or **ENTR**).

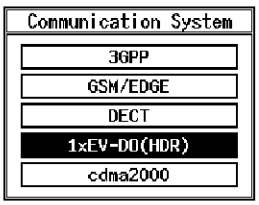


Figure 3-1 Communication Systems Dialog Box

5. When the data knob (or **ENTR**) is pressed, the message "LOADING" is displayed. After the message disappears, the switchover to another system is complete.
6. Press the **TRANSIENT** to confirm that the menu has been changed.

Saving set conditions

1. To save the parameters, press **SHIFT** and **RCL**.
2. Set the SAVE FILE number and press ***Save***.

3.3.2 T-Domain

Carries out a measurement according to the standard using the zero span of the spectrum analyzer. Measurement items include power, ON/OFF ratio of a burst signal, and spurious measurements in the time domain with a specified frequency.

In the T-Domain measurement, the setting for the RBW, VBW, Sweep Time, or Detector is saved when exiting from each measurement and recalled when entering each measurement again. To return the setting to the value specified by the standard, press ***Config*** and ***Set to STD***.

3.3.2.1 Power (T-Domain)

This is a function to measure power in the time domain (zero span).

There are two Pass/Fail judgment functions: a judgment function for the template and a judgment function for power.

NOTE: The RBW must be set wider than the modulation band.

Auto Level Set

Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The input signal level must be constant while Auto Level Set is being carried out.

Trigger Setup

Sets a trigger.

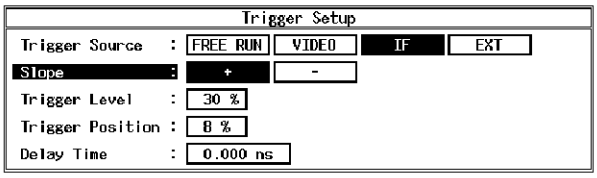


Figure 3-2 Trigger Setup Dialog Box

Trigger Source

Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

VIDEO: Captures the signal in sync with the VIDEO signal.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope

Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level Sets the level to trigger.

Trigger Position Sets the trigger position where it is displayed on the screen.

Delay Time Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Window Setup Sets the window used for power measurement.

Window ON/OFF Displays a window showing the range for power measurement. When OFF is set, the power measurement range covers all points on the display screen.

Set to STD Sets the window specified by the communication standard.

Window Position Sets the position of the window.

Window Width Sets the width of the window.

NOTE: When the window is partially outside the display, an arrow is shown next to Pose, Width or both in the area indicating the window conditions.

Template Sets the template.
For more information, refer to Section 5.1.1, "Template Setting in the T-Domain Measuring Mode."

Template ON/OFF Sets whether to display the template and to toggles the Pass/Fail judgment function on or off.

Shift X Sets the amount of template movement in the X-axis direction.

Shift Y Sets the amount of template movement in the Y-axis direction.

Template Edit Edits the template.

Template UP/LOW Selects the upper template or the lower template.

Copy from STD Initializes the template.

Insert Line Inserts a line.

Delete Line Deletes a line.

Sort Sorts template data in ascending order.

Table Init Initializes the table.

Y Scale [dB/div] 10/5/2 Switches the display screen scale to 10, 5 or 2 dB/div.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets the method of measurement, edits the template, and so forth.

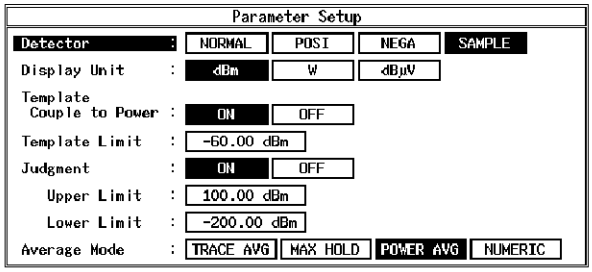


Figure 3-3 Parameter Setup Dialog Box

Detector NORMAL/POSI/NEGA/SAMPLE
Sets the detector.

Display Unit dBm/W/dBµV
Sets the display unit.

Template Couple to Power
Displays the template that is connected to the measured power.

ON: Displays the template that is connected to the measured power.
On the template edit screen, set the template level to the portion linked with the power value set to 0 dB.

OFF: Displays the template regarding the Y-axis value edited by the template as an absolute value.

Template Limit If the absolute value of the template is smaller than this value when Template Couple to Power is set to ON, clip the template at this value.

Judgment Sets ON/OFF for Pass/Fail judgments.

Upper Limit Sets the upper limit value of power.

Lower Limit Sets the lower limit value of power.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to STD

Returns measurement parameters to the values specified by the communication standard.

3.3.2.2 ON/OFF Ratio

Measures the power during the burst-on period and the one during the burst-off period, and calculate the ratio of the powers.
Captures the signal with a trigger and calculates the ratio in reference to the burst on and burst off periods (the former is defined as the period immediately before the trigger point; the latter, immediately after the trigger point).

Auto Level Set

Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must remain constant while Auto Level Set is being carried out.

Trigger Setup

Sets a trigger.

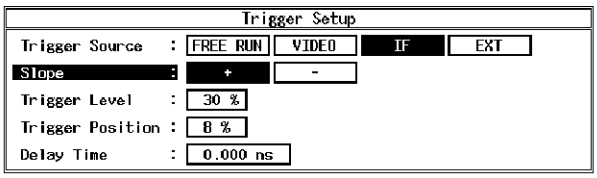


Figure 3-4 Trigger Setup Dialog Box

Trigger Source

Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

VIDEO: Captures the signal in sync with the VIDEO signal.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope — Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level — Sets the level to trigger.

Trigger Position — Sets where the trigger position is displayed on the screen.

Delay Time — Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Window Setup — Sets the burst ON and OFF periods.

Window ON/OFF — Displays a window showing the range for power measurement.

Set to STD — Sets the value that is specified by or complies with the communication standard.

ON Position — Sets the desired position during the burst-on period.

ON Width — Sets the desired width during the burst-on period.

OFF Position — Sets the position during the burst-off period.

OFF Width — Sets the width during the burst-off period.

NOTE: When the window is partially outside the display, an arrow is shown next to Pose, Width or both in the area indicating the window conditions.

Y Scale [dB/div] 10/5/2 — Selects the display screen scale to 10, 5 or 2 dB/div.

Average Times ON/OFF — Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement parameters and so on.

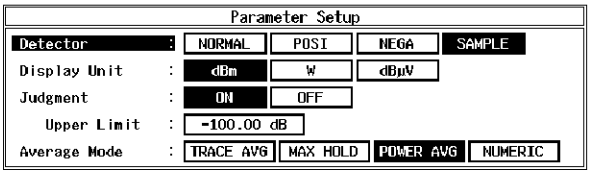


Figure 3-5 Parameter Setup Dialog Box

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Display Unit dBm/W/dBµV
Sets the display unit of power.

NOTE: The ON/OFF ratio is displayed in units of dB (fixed).

Judgment Sets ON/OFF of the Pass/Fail judgment for the ON/OFF ratio.

Upper Limit Enters the upper limit value.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to STD Sets measurement parameters to the values specified by the communication standard.

3.3.2.3 Spurious (T-Domain)

This is a function to measure power (or peak power) according to the frequency specified in the table by sweeping in the zero span mode.

Auto Level Set

Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Trigger Setup

Sets a trigger.

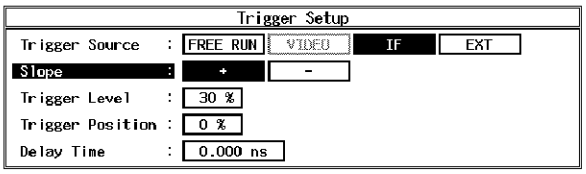


Figure 3-6 Trigger Setup Dialog Box

Trigger Source

Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope

Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level

Sets the level to trigger.

Trigger Position

Sets where the trigger position is displayed on the screen.

Delay Time

Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Table No. 1/2/3

Selects the measurement table.

Load Table Loads the measurement table.

Table Edit Edits the measurement table.

Table No. 1/2/3 Selects the table to be edited.

Load Table Loads the measurement table.

Save Table Saves the measurement table.

Insert Line Inserts additional frequency data before the selected frequency number.

Delete Line Deletes the selected line.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

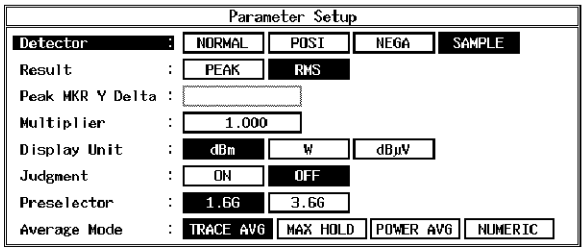


Figure 3-7 Parameter Setup Dialog Box

Detector NORMAL/POSI/NEGA/SAMPLE
Sets the detector.

Result PEAK/RMS
Sets whether to display the result using average power or peak power.

Peak MKR Y Delta
Sets the Y delta of the peak marker.

Multiplier Multiplies the measurement result by the set value, then displays the resultant value.

Display Unit dBm/W/dBµV
Sets the display units.

Judgment Sets ON/OFF of the Pass/Fail judgment for the limit value.

Preselector Sets the preselector.

NOTE: This menu is displayed on R3267 only.

1.6G: Used to measure harmonics of more than 1.6 GHz or spurious signals when the carrier frequency is lower than 1.6 GHz.

3.6G: Used to set this parameter for cases other than that above.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to Default Returns the set value to the default.

3.3.3 F-Domain

Carries out a measurement according to the communication standard using the spectrum analyzer's sweep measurement method. Measurement items include power, occupied bandwidth, ACP Due To Transient, ACP Due to Modulation, Inband Spurious, and Outband Spurious measurements is the frequency domain.

In F-Domain measurement, the setting for the RBW, VBW, Sweep Time, or Detector is saved when exiting each measurement and recalled when entering each measurement again. To return the setting to the value specified by the standard, press ***Config*** and ***Set to STD***.

3.3.3.1 Power (F-Domain)

This is a function to measure power in the frequency domain using the spectrum analyzer.

Auto Level Set Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Gate Setup Sets the gated sweep.
This setting is required when the input signal is a bursted signal and Sample Detector is used.

Trigger Setup Sets a trigger.

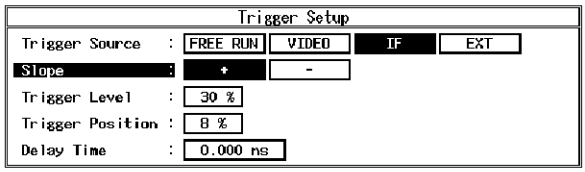


Figure 3-8 Trigger Setup Dialog Box

Trigger Source Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

VIDEO: Captures the signal in sync with the VIDEO signal.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level Sets the level to trigger.

Trigger Position Sets where the trigger position is displayed on the screen.

Delay Time Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Gate Source

Trigger Sets Trigger Source specified by Trigger Setup as Gate Source.

NOTE: When Trigger Source is set to IF and SPAN is set to a frequency higher than 6 MHz, the sweeping seems to be stopped, because the IF trigger bandwidth is approximately 6 MHz and the gate trigger is failing.

Ext Gate Sets the gated sweep mode using the gate signal input from the EXT GATE terminal on the rear panel.

Gate Setup Sets the gated sweep range when Trigger is selected for Gate Source.

Set to STD Sets the gate position and width to the values specified by the communication standard.

Gate Position Sets the gate position.

Gate Width Sets the gate width.

Gated Sweep ON/OFF Starts the gated sweep.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

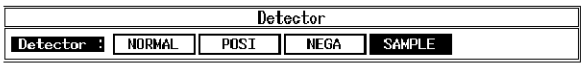


Figure 3-9 Detector Dialog Box

Window Setup Sets the frequency range used for power measurement.

Window ON/OFF Sets the window to ON or OFF. When the window is set to OFF, the power measurement range becomes a sweep band.

Set to STD Sets the value determined by the communication standard.

Window Position Sets the position of the window.

Window Width Sets the width of the window.

NOTE: When the window is partially outside the display, an arrow is shown next to Pose, Width or both in the area indicating the window conditions.

Y Scale [dB/div] 10/5/2 Sets the display scale.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

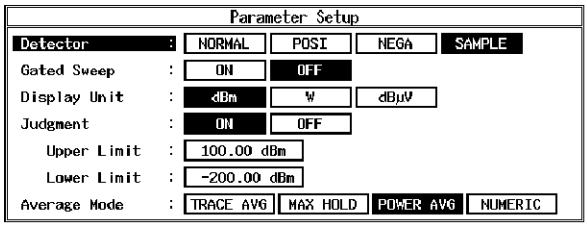


Figure 3-10 Parameter Setup Dialog Box

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Gated Sweep Sets the gated sweep to ON or OFF.

Display Unit dBm/W/dBµV
Selects the display unit.

Judgment Sets ON/OFF of the Pass/Fail judgment for measured power.

Upper Limit Sets the upper limit for Pass/Fail judgment.

Lower Limit Sets the lower limit for Pass/Fail judgment.

Average Mode selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to STD — Sets the measurement parameters to the values specified by the communication standard.

3.3.3.2 OBW

Measure an occupied bandwidth.

Auto Level Set — Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

OBW% — Sets the frequency, including the percentage of the total power as an occupied bandwidth, when calculating the occupied bandwidth.

Average Times ON/OFF — Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup — Sets measurement conditions and so on.

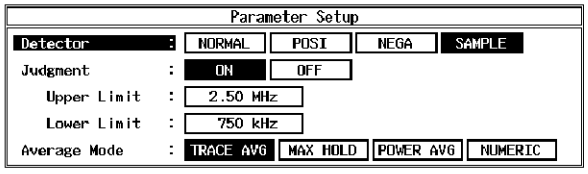


Figure 3-11 Parameter Setup Dialog Box

Detector — NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Judgment — Sets ON/OFF of the Pass/Fail judgment for the occupied bandwidth.

Upper Limit Sets the upper limit for Pass/Fail judgment.

Lower Limit Sets the lower limit for Pass/Fail judgment.

Average Mode selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates OBW based on the waveforms, which were generated as a result of arithmetic average of the measured data (Log data) in the log mode.

MAX HOLD:
Calculates OBW based on the waveform with the maximum value within the average counts of the measured data.

POWER AVG:
Calculates OBW based on the waveforms, which were calculated as a result of the conversion of the measured data (Log data) to the linear data to take the room mean square.

NUMERIC:
Calculates OBW by sweep and calculates arithmetic average to display the result. The displayed waveforms are not averaged.

Set to STD Sets the measurement parameters to the values specified by the communication standard.

3.3.3.3 Due to Transient

This is a function to measure the spectrum, including the rise and fall times of the burst.

Auto Level Set Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Template Sets and edits the template.
For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."

Template ON/OFF Sets ON/OFF of the template display.
When Template is set to ON, the Pass/Fail judgment for the template is displayed under the sweep screen.

Shift X Shifts the set template in the frequency direction (X-axis).

Shift Y Shifts the set template in the level direction (Y-axis).

Margin ΔX ON/OFF Magnifies the template in the X-axis direction with a set template frequency 0 as the center.

Template Edit Opens the template edit menu.

Copy from STD Copies the template defined in the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts the tables in order of frequency.

Table Init Initializes the table.

Marker Edit Sets the measurement frequency (frequency offset) and measurement band.
For more information, refer to Section 5.2.1, "Marker Edit Function."

Copy from STD Sets to the parameters specified by the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts data in order of frequency.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

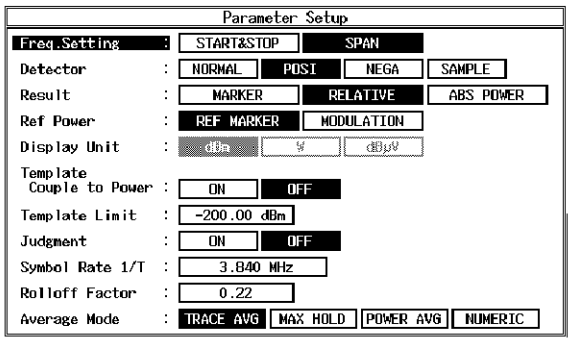


Figure 3-12 Parameter Setup Dialog Box

Freq. Setting START&STOP/SPAN
Selects the measurement mode.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Result Specifies how to display the result.
For more information, refer to Section 5.2.2, "Measurement results Using Due to Modulation, Due to Transient and Inband Spurious Modes."

MARKER:
Displays the marker read value. The position of the marker is set by Marker Edit.

RELATIVE:
Displays the marker read value using a relative value.

ABS POWER:
Converts the value displayed by RELATIVE into the absolute value using carrier power and displays it.

Ref Power When RELATIVE is selected for Result, this selects which relative value to use to display the marker read value.

REF MARKER:
Displays a relative value to Ref Marker set by Marker Edit.

MODULATION:
Displays a relative value to the measurement result of Tx power in Modulation.

Display Unit dBm/W/dBμV
Specifies the unit of the result displayed.

NOTE: When RELATIVE is selected for Result, the unit is dB.

Template Couple to Power
Sets whether to raise or lower the template with the power set by Ref Power.

Template Limit If the absolute value of the template is smaller than this value when Template Couple to Power is set to ON, clip the template at this value.

Judgment Used to make the Pass/fail judgment for the limit value set by Marker edit. The Pass/Fail judgment result is displayed under the display screen together with the marker list.

Symbol Rate 1/T Sets the symbol rate of the Root Nyquist filter.

Rolloff Factor Sets the roll-off of the Root Nyquist filter.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to STD Returns the measurement parameters to the values specified by the standard.

3.3.3.4 Due to Modulation

Measure the modulation spectrum excluding the rise and fall of the burst.

Auto Level Set Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Gate Setup Sets the gated sweep.

Trigger Setup Sets a trigger.

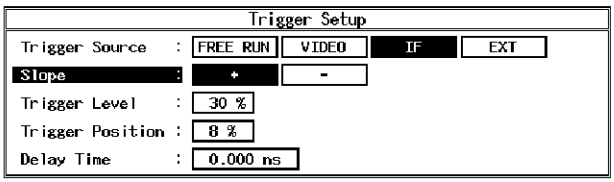


Figure 3-13 Trigger Setup Dialog Box

Trigger Source Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

VIDEO: Captures the signal in sync with the VIDEO signal.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level Sets the level to trigger.

Trigger Position Sets where the trigger position is displayed on the screen.

Delay Time Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Gate Source

Trigger Sets Trigger Source specified by Trigger Setup as Gate Source.

NOTE: When Trigger Source is set to IF and SPAN is set to a frequency higher than 6 MHz, the sweeping seems to be stopped, because the IF trigger bandwidth is approximately 6 MHz and the gate trigger is failing.

Ext Gate Performs the gated sweep using the gate signal input from the EXT Gate terminal on the rear panel.

Gate Setup Sets the gated sweep range when Trigger is selected for Gate Source.

Set to STD Sets the gate position and width to the values specified by the communication standard.

Gate Position Sets the gate position.

Gate Width Sets the gate width.

Gated Sweep ON/OFF Starts the gated sweep.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

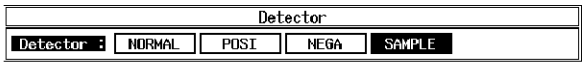


Figure 3-14 Detector Dialog Box

Template Sets and edits the template.
For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."

Template ON/OFF Sets the template display to ON or OFF.
When Template is set to ON, the Pass/Fail judgment for the template is displayed under the sweep screen.

Shift X Shifts the set template in the frequency direction (X-axis).

Shift Y Shifts the set template in the level direction (Y-axis).

Margin ΔX ON/OFF Magnifies the template in the X-axis direction with a set template frequency 0 as the center.

Template Edit

Copy from STD Copies the template defined in the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts the tables in frequency order.

Table Init Initializes the table.

Marker Edit For more information, refer to Section 5.2.1, "Marker Edit Function."

Copy from STD Sets to the parameters specified by the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts data in order of frequency.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup

Sets measurement conditions and so on.

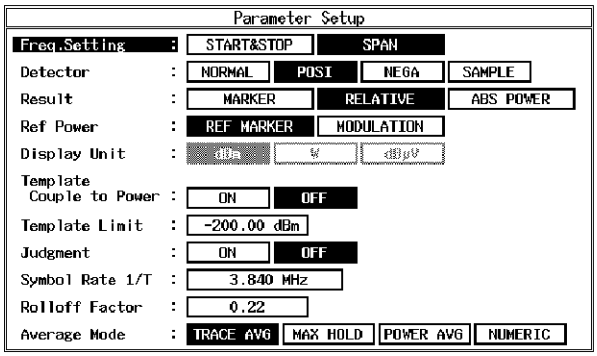


Figure 3-15 Parameter Setup Dialog Box

Freq. Setting

START&STOP/SPAN
Selects the measurement mode.

Detector

NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Result

Specifies how to display the results.
For more information, refer to Section 5.2.2, "Measurement results Using Due to Modulation, Due to Transient and Inband Spurious Modes."

MARKER:
Displays the marker read value. The position of the marker is set by Marker Edit.

RELATIVE:
Displays the marker read value using a relative value.

ABS POWER:
Converts the value displayed by RELATIVE into the absolute value using carrier power and displays it.

Ref Power

When RELATIVE is selected for Result, this selects which relative value to use to display the marker read value.

REF MARKER:
Displays a relative value to Ref Marker set by Marker Edit.

MODULATION:
Displays a relative value to the measurement result of Tx power in Modulation.

Display Unit

dBm/W/dBµV
Selects the display unit.

NOTE: When RELATIVE is selected for Result, the unit is dB.

Template Couple to Power
Sets whether or not to raise or lower the template with the power set by Ref Power.

Template Limit If the absolute value of the template is smaller than this value when Template Couple to Power is set to ON, clip the template at this value.

Judgment Used to make the Pass/Fail judgment for the limit value set by Marker edit. The Pass/Fail judgment result is displayed under the display screen together with the marker list.

Symbol Rate 1/T Sets the symbol rate of the Root Nyquist filter.

Rolloff Factor Sets the roll-off of the Root Nyquist filter.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

NUMERIC:
Converts the measured data (Log data) to the linear data to take the root mean square value.
Using POWER AVG displays the average waveforms, using NUMERIC displays the swept waveforms and takes an average of the measurement results only.

Set to STD Returns the measurement parameters to the values specified by the standard.

3.3.3.5 Inband Spurious(1)

This is a function to search for a peak by sweeping the set frequency.

Auto Level Set — Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Template — For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."

- ***Template ON/OFF*** — Sets the template display to ON or OFF. When Template is set to ON, the Pass/Fail judgment for the template is displayed under the sweep screen.
- ***Shift X*** — Shifts the set template in the frequency direction (X-axis).
- ***Shift Y*** — Shifts the set template in the level direction (Y-axis).
- ***Margin ΔX ON/OFF*** — Magnifies the template in the X-axis direction with a set template frequency 0 as the center.
- ***Template Edit*** — For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."
  - ***Copy from STD*** — Copies the template defined in the communication standard.
  - ***Insert Line*** — Inserts a line before the selected line.
  - ***Delete Line*** — Deletes the selected line.
  - ***Sort*** — Sorts the tables in frequency order.
  - ***Table Init*** — Initializes the table.

Marker Edit — For more information, refer to Section 5.2.1, "Marker Edit Function."

- ***Copy from STD*** — Sets to the parameters specified by the communication standard.
- ***Insert Line*** — Inserts a line before the selected line.
- ***Delete Line*** — Deletes the selected line.
- ***Sort*** — Sorts data in order of frequency.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

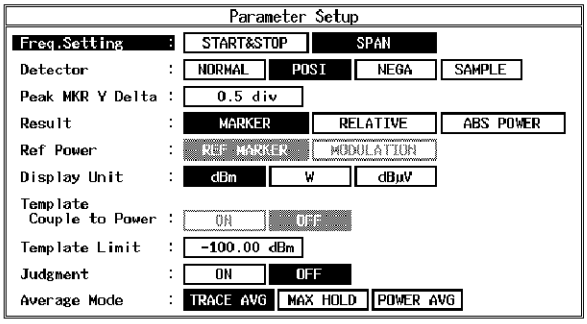


Figure 3-16 Parameter Setup Dialog Box

Freq. Setting START&STOP/SPAN
Selects the measurement mode.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Peak MKR Y Delta
Sets the Y delta of the peak marker.

Result Specifies how to display the results.
For more information, refer to Section 5.2.3, "Measurement Result of Inband Spurious."

MARKER:
Displays the marker read value. The position of the marker is set by Marker Edit.

RELATIVE:
Displays the marker read value using a relative value.

ABS POWER:
Converts the value displayed by RELATIVE into the absolute value using carrier power and displays it.

Ref Power When RELATIVE is selected for Result, this selects which relative value is used to display the marker read value.

REF MARKER:
Displays a relative value to Ref Marker set by Marker Edit.

MODULATION:
Displays a relative value to the measurement result of Tx power in Modulation.

Display Unit dBm/W/dBμV
Selects the display unit.

NOTE: When RELATIVE is selected for Result, the unit is dB.

Template Couple to Power
Sets whether or not to raise or lower the template with the power set by Ref Power.

Template Limit If the absolute value of the template is smaller than this value when Template Couple to Power is set to ON, clip the template at this value.

Judgment Used to make the Pass/Fail judgment for the limit value set by Marker edit. The Pass/Fail judgment result is displayed under the display screen together with the marker list.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

Set to STD Returns the measurement parameters to the values specified by the standard.

3.3.3.6 Inband Spurious(2)

Converts resolution bandwidth (RBW) to search spurious signal.
When the spurious is swept with broadband RBW near the career frequency, the career signal cannot be separated, which makes the spurious search impossible. In this situation, the sweep with narrow RBW is required to calculate the bandwidth in order to search spurious signal.

Auto Level Set Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Gate Setup Sets the gated sweep.

Trigger Setup Sets a trigger.

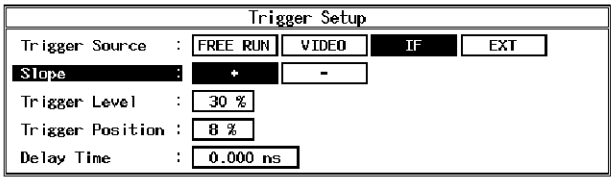


Figure 3-17 Trigger Setup Dialog Box

Trigger Source Selects a trigger.

FREE RUN:
Captures data using the internal measurement timing.

VIDEO: Captures the signal in sync with the VIDEO signal.

IF: Captures the signal in sync with the IF signal (approximately 6 MHz band).

EXT: Captures the signal in sync with the external trigger signal.

Slope Selects the edge when triggering.

+: Triggers at the leading edge.

-: Triggers at the trailing edge.

Trigger Level Sets the level to trigger.

Trigger Position Sets where the trigger position is displayed on the screen.

Delay Time Sets a delay time from the time a trigger signal is detected to the time the signal is captured.

NOTE: When Delay Time is a negative value, signals before the trigger can be captured.

Gate Source

Trigger Sets Trigger Source specified by Trigger Setup as Gate Source.

NOTE: When Trigger Source is set to IF and SPAN is set to a frequency higher than 6 MHz, the sweeping seems to be stopped, because the IF trigger bandwidth is approximately 6 MHz and the gate trigger is failing.

Ext Gate Performs the gated sweep using the gate signal input from the EXT Gate terminal on the rear panel.

Gate Setup Sets the gated sweep range when Trigger is selected for Gate Source.

Set to STD Sets the gate position and width to the values specified by the communication standard.

Gate Position Sets the gate position.

Gate Width Sets the gate width.

Gated Sweep ON/OFF Starts the gated sweep.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Figure 3-18 Detector Dialog Box

Template For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."

Template ON/OFF Sets the template display to ON or OFF.
When Template is set to ON, the Pass/Fail judgment for the template is displayed under the sweep screen.

Shift X Shifts the set template in the frequency direction (X-axis).

Shift Y Shifts the set template in the level direction (Y-axis).

Margin ΔX ON/OFF Magnifies the template in the X-axis direction with a set template frequency 0 as the center.

Template Edit For more information, refer to Section 5.1.2, "Template Setting in the F-Domain Measuring Mode."

Copy from STD Copies the template specified by the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts the tables in frequency order.

Table Init Initializes the table.

Marker Edit For more information, refer to Section 5.2.1, "Marker Edit Function."

Copy from STD Sets the measurement parameters specified by the communication standard.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Sort Sorts data in order of frequency.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.

Config

Parameter Setup Sets measurement conditions and so on.

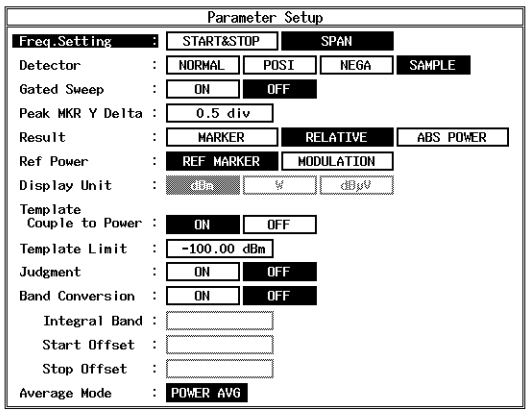


Figure 3-19 Parameter Setup Dialog Box

Freq. Setting START&STOP/SPAN
Selects the measurement mode.

Detector NORMAL/POSI/NEGA/SAMPLE
Selects the detector.

Gated Sweep Sets the gated sweep to ON or OFF.

Peak MKR Y Delta
Sets the Y delta of the peak marker.

Result Specifies how to display the results.
For more information, refer to Section 5.2.3, "Measurement Result of Inband Spurious."

MARKER:
Displays the marker read value. The position of the marker is set by Marker Edit.

RELATIVE:
Displays the marker read value using a relative value.

ABS POWER:
Converts the value displayed by RELATIVE into the absolute value using carrier power and displays it.

Ref Power When RELATIVE is selected for Result, this selects which relative value is used to display the marker read value.

REF MARKER:
Displays a relative value to Ref Marker set by Marker Edit.

MODULATION:
Displays a relative value to the measurement result of Tx power in Modulation.

Display Unit dBm/W/dBμV
Selects the display unit.

NOTE: When RELATIVE is selected for Result, the unit is dB.

Template Couple to Power
Sets whether or not to raise or lower the template with the power set by Ref Power.

Template Limit If the absolute value of the template is smaller than this value when Template Couple to Power is set to ON, clip the template at this value.

Judgment Used to make the Pass/Fail judgment for the limit value set by Marker edit. The Pass/Fail judgment result is displayed under the display screen together with the marker list.

Band Conversion This function is used to calculate the resolution bandwidth using the swept waveforms.

ON: Calculates resolution bandwidth using the measured data.

OFF: Does not calculate resolution bandwidth using the measured data.

Integral Band Sets resolution bandwidth that conducts the bandwidth calculation.

Start Offset Sets the starting frequency that conducts the bandwidth calculation, using the offset frequency from the center frequency.

Stop Offset Sets the ending frequency that conducts the band calculation, using the offset frequency from the center frequency.

NOTE: Even when the Start Offset and Stop Offset values have been set beyond the frequency display range, data is calculated within the frequency display range.

Average Mode Sets the processing when Average Times is set to ON.
POWER AVG is fixed.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square

Set to STD Returns the measurement parameters to the values specified by the standard.

3.3.3.7 Outband Spurious

This is a function to search for a peak by sweeping the frequency according to the table.

Auto Level Set Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must be constant while Auto Level Set is being carried out.

Table No. 1/2/3 Selects the table number.

Load Table Loads the table.

Table Edit Edits the table.

Copy from STD Sets measurement parameters to the communication standard.

Table No. 1/2/3 Selects the table number.

Load Table Loads the table.

Save Table Saves the table.

Insert Line Inserts a line before the selected line.

Delete Line Deletes the selected line.

Table Init Initializes the table.

Average Times ON/OFF Sets the averaging count.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

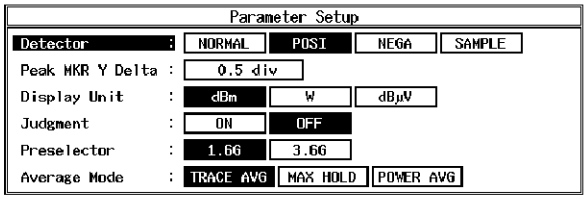


Figure 3-20 Parameter Setup Dialog Box

Detector NORMAL/POSI/NEGA/SAMPLE
Sets the detector.

Peak MKR Y Delta
Sets the Y delta of a peak marker.

Display Unit dBm/W/dBµV
Sets the display unit.

Judgment Makes the Pass/Fail judgment using the limit values set by Table Edit.

Preselector Sets the preselector.

NOTE: This menu is displayed on R3267 only.

1.6G: The preselector is activated for frequencies of 1.6 GHz or higher only.
If the carrier frequency is less than 1.6 GHz, selecting this item allows you to measure harmonics of 1.6 GHz or higher.

3.6G: Used to set this parameter for cases other than that above.

Average Mode Selects the processing method when Average Times is set to ON.

TRACE AVG:
Calculates arithmetic average of the measured data (Log data) in the mode LOG.

MAX HOLD:
Displays the maximum value within the average counts of the swept waveforms.

POWER AVG:
Converts the measured data (Log data) to the linear data to take the root mean square value.

Set to Default Returns the set value to the default.

3.3.4 Modulation

The modulation analysis is performed.

3.3.4.1 Code Domain

The code domain analysis of the HDR Access Network output signal is performed.

Auto Level Set — Automatically adjusts the reference level.

NOTE: While the auto level set is in process, maintain the level of the input signal.

Graph Type — Changes Graph Types.

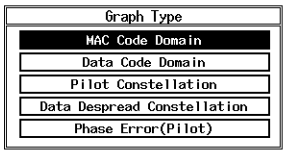


Figure 3-21 Graph Type Setting Examples

MAC Code Domain — Selecting MAC Code Domain displays the code domain of MAC channels.
The horizontal axis indicates the Walsh Code Numbers.
The vertical axis indicates logarithmic values ($10 \times \mathrm{Log}_{10}\,\rho$ [dB]) of ρ.
$\rho_{\mathrm{MAC,\ real\ (i)}}$ (Code Domain Power of MAC Channels) is displayed in yellow.
$\rho_{\mathrm{MAC,\ imag\ (i)}}$ (Code Domain Power of MAC Channels) is displayed in green.
These values indicate 8-slot code domain values.
(N = 16 : 16 half slots)

Data Code Domain — Selecting Data Code Domain displays the data code domain without preambles.
The horizontal axis indicates the Walsh Code Numbers.
The vertical axis indicates logarithmic values ($10 \times \mathrm{Log}_{10}\,\rho$ [dB]) of ρ.
$\rho_{\mathrm{Data,\ real\ (i)}}$ (Code Domain Power of Traffic or Control Channel) is displayed in yellow.
$\rho_{\mathrm{Data,\ imag\ (i)}}$ (Code Domain Power of Traffic or Control Channel) is displayed in green.

Pilot Constellation

Selecting Pilot Constellation displays the constellation of the Pilot Channel.
Each chip point is displayed in a yellow dot and these points are connected by green lines.
This indicates a 10-slot constellation of the Pilot Channel.
(N = 20 : 20 half slots)
The marker indicates a half slot number as well as a chip number for the half slot in order.

Data Despread Constellation

Selecting Data Despread Constellation displays the constellation after the despred with the data Walsh Codes without preambles.
Symbol data is despread using the Walsh Codes. These symbol points are displayed in yellow dots and are connected by green lines.
This indicates a 2-slot data constellation.
(N = 4 : 4 half slots)
One symbol data (16 chips) is despread using 16 Walsh Codes. Accordingly, 16 dots are displayed in order of the Walsh Code number. Likewise, 16 dots are displayed for the next symbol in order of the Walsh Code numbers.
A symbol for the preamble indicates 0.
The marker indicates a symbol number as well as the Walsh Code number for the symbol in order.

Phase Error(Pilot)

Selecting Phase Error (Pilot) displays phase errors of the Pilot Channel.
This indicates 10-slot phase errors for each chip point of the Pilot Channel.
(N = 20 : 20 half slots)
The marker indicates a half slot number as well as the chip number for the half slot in order.

Parameter Setup

Sets the measurement parameters.

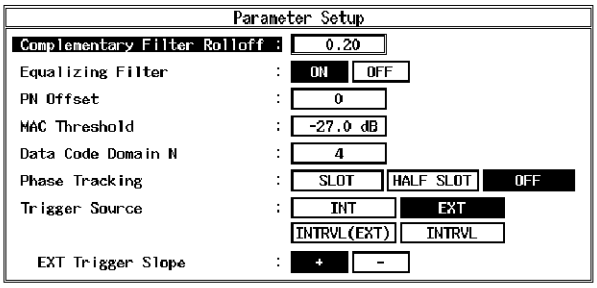


Figure 3-22 Parameter Setting Examples

Complementary Filter Rolloff

Sets the Rolloff coefficient to decide the characteristics of a complementary filter.
The setting range: 0.05 to 0.2

Equalizing Filter

Sets ON or OFF for the equalizing filter.
When the output of the access network passes through the equalizing filter, sets to the ON position.

PN Offset

Sets the PN Offset.
Setting range: 0 to 511

MAC Threshold

Sets the threshold used to decide the inactive channels from the MAC channels.
Setting range: -100 dB to 0 dB

Data Code Domain N

Sets the number of half slots, N, when the Max Data Code Domain, Min Data Code Domain, and the Data Code Domain values in the graphs are obtained.
4 through 32 can be set.

Phase Tracking

Sets the phase tracking function.

SLOT: Measures by tracking the phase of the pilot channel for each slot.

HALF SLOT:
Measures by tracking the phase of the pilot channel for each half slot.

OFF: Measures without phase tracking.

If phase tracking is performed, "Phase Tracking" is displayed in the measurement results.

Trigger Source

Sets the trigger. Input the even second time reference signal to the external trigger connector.

INT: Use to capture data by generating the trigger using the internal timing.

EXT: Used to capture data in sync with the external trigger.

INTRVL (EXT):
Causes the internal counter to generate a trigger signal every 26.6̇ ms.
The internal counter operates in sync with the external trigger signal.

INTRVL: Causes the internal counter to generate a trigger signal every 26.6̇ ms.
The internal counter does not operate in sync with the external trigger signal.

EXT Trigger Slope

Used to set the rise and fall times of the external trigger.

3.3.4.2 Frame Analysis

Each slot in a frame of the HDR Access Network output signal can be analyzed.

Auto Level Set Automatically adjusts the reference level.

NOTE: While the auto level set is in process, maintain the level of the input signal.

Parameter Setup Sets the measurement parameters.

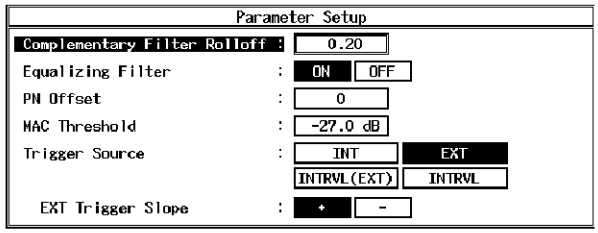


Figure 3-23 Parameter Setting Examples

Complementary Filter Rolloff Sets the Rolloff coefficient to decide the characteristics of a complementary filter.
The setting range: 0.05 to 0.2

Equalizing Filter Sets ON or OFF for the equalizing filter.
When the output of the access network passes through the equalizing filter, sets to the ON position.

PN Offset Sets the PN Offset.
Setting range: 0 to 511

MAC Threshold Sets the threshold used to decide the inactive channels from the MAC channels.
Setting range: -100 dB to 0 dB

Trigger Source Sets the trigger. Input the even second time reference signal to the external trigger connector.

INT: Use to capture data by generating the trigger using the internal timing.

EXT: Used to capture data in sync with the external trigger.

INTRVL (EXT):
Causes the internal counter to generate a trigger signal every 26.6̇ ms.
The internal counter operates in sync with the external trigger signal.

INTRVL: Causes the internal counter to generate a trigger signal every 26.6 ms.
The internal counter does not operate in sync with the external trigger signal.

EXT Trigger Slope Used to set the rise and fall times of the external trigger.

3.3.4.3 Power

3.3.4.3.1 Tx Power

Measures the power of a modulation signal.

Auto Level Set Sets an internal reference level (REF LEVEL) to the optimum value in agreement with the measurement signal.

NOTE: The level of an input signal must be constant during the execution of Auto Level Set.

Parameter Setup Sets measurement conditions and so on.

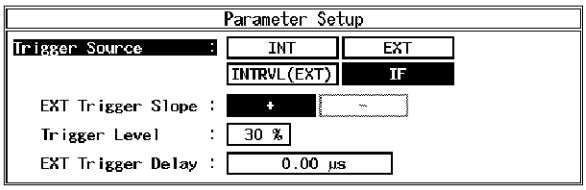


Figure 3-24 Parameter Setup Dialog Box

Trigger Source Selects a trigger signal.

INT: Sweeps in synchronization with an internal trigger signal.

EXT: Sweeps in synchronization with an external trigger signal, which is input from the Ext Trigger connector on the rear panel.

INTRVL (EXT):
The built-in counter generates triggers every 26.6 milliseconds. The built-in counter is in sync with the external trigger.

IF: Captures data in synchronization with the IF signal (the leading edge of the burst).

EXT Trigger Slope Changes the polarity of the trigger slope.

+: Starts sweeping at the leading edge of the trigger.

-: Starts sweeping at the trailing edge of the trigger.

Trigger Level Sets the trigger level.

EXT Trigger Delay Corrects the delay time when the signal (the head of PN) lags behind the external trigger.

NOTE: When a negative value is set, a signal before the trigger can be observed.

Average Times ON/OFF Selects an averaging process.

ON: Activates the number of times of averaging and performs averaging the specified number of times.

OFF: Does not perform an averaging process.

NOTE: Peak Factor obtained as a result of a power measurement calculates the peak power and average power within the measurement counts.

3.3.4.3.2 CCDF

The CCDF (Complementary Cumulative Distribution Function), average power and peak factor of the signal under measurement can be measured.

Auto Level Set Automatically adjusts the reference level.

Scale Setup Switches between measurement results.

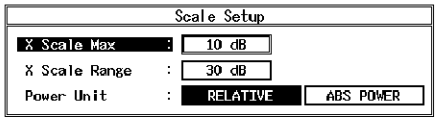


Figure 3-25 Scale Setup Dialog Box

X Scale Max Sets the maximum value along the horizontal axis between -20 dB(m) and 70 dB(m) in steps of 10 dB.

X Scale Range Sets the display range along the horizontal axis between 10 dB and 50 dB in steps of 10 dB.

Power Unit Sets the unit to be displayed.

RELATIVE:
Displays the power relative to the average power.

ABS POWER:
Displays the power in absolute value.

NOTE: If the signal power is 70 dBm or more, the power cannot be displayed in an absolute value.

Parameter Setup Sets the parameters used for measurements.

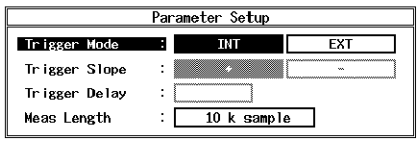


Figure 3-26 Parameter Setup Dialog Box

Trigger Mode Selects the timing for retrieving data.

INT: Captures data using the internal trigger.

EXT: Captures data using the external trigger.

Trigger Slope Toggles the external trigger slope between + and -.

+: Captures data at the rising edge.

-: Captures data at the falling edge.

Trigger Delay Delays the external trigger timing.
Can be set between -250 µs and 250 µs in steps of 1 µs.

Meas Length The number of measurement samples is set.
Can be set between 10k sample and 100M sample in steps of 10k sample.

Trace Write ON/OFF Sets whether or not the waveform is held.

ON: Holds the waveform.

OFF: Does not hold the waveform.

3.3.4.3.3 Pilot/MAC Channel Power

Idle Slot signal power of the HDR Access Network output can be measured.

Auto Level Set Automatically adjusts the reference level.

NOTE: While the auto level set is in process, maintain the level of the input signal.

Template Entry Displays the template setting menu.

USER Template Selects USER Template (which can be set by a user).
Values from -50 dB to 10 dB can be entered for Y0, Y1, and Y2.

STD Template Selects STD (standard) Template.
Y0 indicates the lower limit value for the burst-on.
Y1 indicates the upper limit value for the burst-on.
Y2 indicates the upper limit value for the burst-off.

Y [dB/div] 10/5 Switches the vertical axis scale between 5 dB/div and 10 dB/div.

Parameter Setup Sets the measurement parameters.

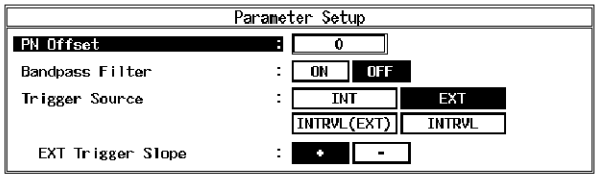


Figure 3-27 Parameter Setting Examples

PN Offset Sets the PN Offset.
Setting range: 0 to 511

Bandpass Filter Sets Bandpass Filter ON or OFF.
When disturbing waves exist next to the bandwidth to be measured, set Bandpass Filter to on.
Pass a band-pass filter with a bandwidth of ±625 kHz that deviates from the carrier frequency.

Trigger Source Sets the trigger. Input the even second time reference signal to the external trigger connector.

INT: Use to capture data by generating the trigger using the internal timing.

EXT: Used to capture data in sync with the external trigger.

INTRVL (EXT):
Causes the internal counter to generate a trigger signal every 26.6̇ ms.
The internal counter operates in sync with the external trigger signal.

INTRVL:Causes the internal counter to generate a trigger signal every 26.6̇ ms.
The internal counter does not operate in sync with the external trigger signal.

EXT Trigger Slope Used to set the rise and fall times of the external trigger.

Average Times ON/OFF Sets the averaging count.
When ON is set, up to 512 can be entered.

3.3.4.3.4 Total Power

Active Slot signal power of the HDR Access Network output can be measured.

Auto Level Set

Automatically adjusts the reference level.

NOTE: While the auto level set is in process, maintain the level of the input signal.

Template Entry

Displays the template setting menu.

USER Template

Selects USER Template (which can be set by a user).
Values from -50 dB to 10 dB can be entered for Y0 and Y1.

STD Template

Selects STD (standard) template.
Y0 indicates the lower limit value.
Y1 indicates the upper limit value.

Parameter Setup

Sets the measurement parameters.

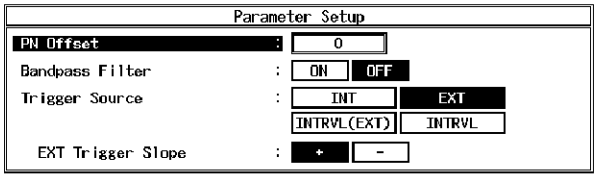


Figure 3-28 Parameter Setting Examples

PN Offset

Sets the PN Offset.
Setting range: 0 to 511

Bandpass Filter

Sets Bandpass Filter ON or OFF.
When disturbing waves exist next to the bandwidth to be measured, set Bandpass Filter to on.
Pass a band-pass filter with a bandwidth of ± 625 kHz that deviates from the carrier frequency.

Trigger Source

Sets the trigger. Input the even second time reference signal to the external trigger connector.

INT: Use to capture data by generating the trigger using the internal timing.

EXT: Used to capture data in sync with the external trigger.

INTRVL (EXT):
Causes the internal counter to generate a trigger signal every 26.6 ms.
The internal counter operates in sync with the external trigger signal.

INTRVL: Causes the internal counter to generate a trigger signal every 26.6 ms.
The internal counter does not operate in sync with the external trigger signal.

EXT Trigger Slope Used to set the rise and fall times of the external trigger.

Average Times ON/OFF Sets the averaging count.
When ON is set, up to 512 can be entered.

3.3.4.4 Code Domain Power

The code domain of the HDR Access Terminal output signals can be analyzed.

NOTE: This function can be used only in the OPT69. The menu is not displayed in the OPT67.

Auto Level Set Automatically adjusts the reference level.

NOTE: The input signal level must stay constant while Auto Level Set is being carried out.

Graphics Displays the constellation or eye diagram.

Graph Type Selects a graph type.

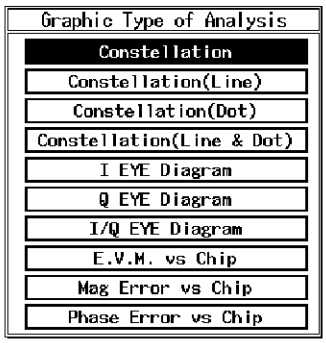


Figure 3-29 Graphic Type of Analysis Dialog Box

Constellation Displays the constellation graph.

Constellation(Line) Displays state transitions as a graph by using a line which connects transition points between chips.

Constellation(Dot) Displays state transitions as a graph by using dots which show transition points between chips.

Constellation(Line&Dot)
Displays state transitions as a graph by using a line and dots which show transition points between chips.

I EYE Diagram Displays the eye pattern of the I channel.

Q EYE Diagram Displays the eye pattern of the Q channel.

I/Q EYE Diagram Displays the I channel eye pattern in the upper part of the screen and displays the Q channel eye pattern in the lower part of the screen.

E.V.M. vs Chip Displays E.V.M. of each chip.

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

Phase Error vs Chip
Displays phase error of each chip.

Plot Type
Displays the result of averaging or peak search processing in the E.V.M. vs Chip, Mag Error vs Chip, or Phase Error vs Chip mode.

AVG: Performs averaging.

P-P: Performs peak search.

View Setup
Sets up the display.

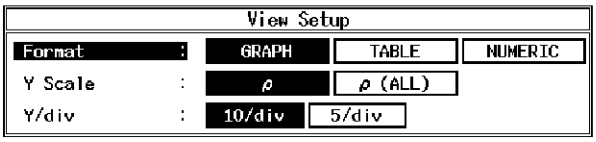


Figure 3-30 View Setup Dialog Box

Format
Sets the display form.

GRAPH: Displays the code domain power coefficients as a graph.

TABLE: Displays the code domain power coefficients as a list.

NUMERIC:
Displays the numerical results of multiplexed signals.

Y Scale
Sets the vertical axis unit of the graph.

ρ: Displays the vertical axis of the graph in logarithmic values of the code domain power coefficient.

ρ (ALL): Displays the vertical axis of the graph in logarithmic values of the code domain power coefficient. All the channels can be specified by using the marker.

NOTE: When ρ(ALL) is selected, in the TABLE display, active channels and inactive channels are displayed in different colors. In addition, the inactive channel maximum value is underlined.

Y/div Selects a vertical axis scale of the graph.

Parameter Setup Sets measurement parameters.

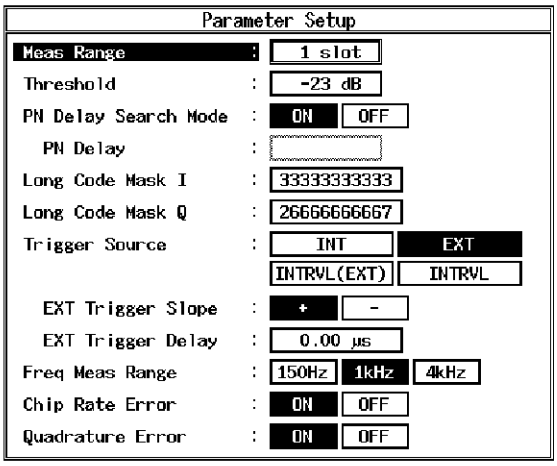


Figure 3-31 Parameter Setup Dialog Box

Meas Range Sets the number of measurement slots.

Threshold Sets the threshold value used to determine whether or not the channel is an active channel.

PN Delay Search Mode

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

OFF: Sets the PN delay when the relationship between the external trigger and the input signal PN delay is known.

PN Delay Sets a value of 0 through 511 as a PN sequence synchronization position for every 64 chips.

Long Code Mask I Sets the I channel Long Code Mask (42 bits) in hexadecimal.

Long Code Mask Q Sets the Q channel Long Code Mask (42 bits) in hexadecimal.

NOTE: A to F in hexadecimal can be entered by pressing SHIFT + 0 through 5.

Trigger Source

INT: Captures data by using the internal measurement unit timing.

EXT: Captures data by using the external trigger.

INTRVL(EXT): Generates triggers at 26.6 ms intervals by using the internal counter. The internal counter operates synchronously with the external trigger.

INTRVL: Generates triggers at 26.6 ms intervals by using the internal counter. The internal counter operates asynchronously with the external trigger.

EXT Trigger Slope

Sets the leading or trailing slope of the external trigger.

EXT Trigger Delay

Delays the external trigger timing.

Freq Meas Range

Sets the carrier frequency search range. A search range can be selected from ±150 Hz, ± 1 kHz, and ± 4kHz.

NOTE: The available search range varies depending on the multiplexed signal level ratios and noise components.

Chip Rate Error

Measures chip rate error (ppm) relative to 1.2288 Mcps.

Quadrature Error

Measures Q-axis quadrature error (degree) relative to the I-axis.

3.3.4.5 Time & FFT

Displays a time-domain IF signal or FFT trace to confirm the input signal.

Auto Level Set

Sets the internal reference level to an optimum value in accordance with the measurement signal. The reference level is automatically adjusted when this key is pressed.

NOTE: The signal level must stay constant while Auto Level Set is being carried out.

Select Type

Selects the graph to be displayed.

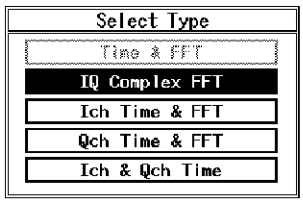


Figure 3-32 Select Type Dialog Box

Parameter Setup

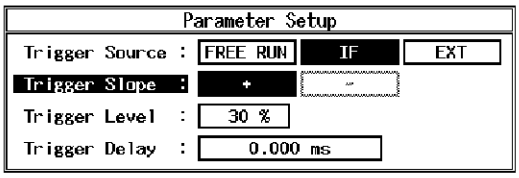


Figure 3-33 Parameter Setup Dialog Box

Trigger Source Sets the trigger signal.

FREE RUN:
Captures data using the internal measurement timing.

IF: Captures the signal in sync with the IF signal (the leading edge of the burst).

EXT: Captures the signal in sync with the external trigger signal.

NOTE: The external trigger signal is input to the EXT TRIG connector on the rear panel.

Trigger Slope Selects the polarity (leading or trailing edge) of a trigger signal.

Trigger Level Sets the trigger level.

Trigger Delay Sets a time period between the trigger and the data being captured.

Average Times ON/OFF Sets the averaging count.

3.3.4.6 STD

Sets parameters used for measurement and relationship between the channel number and frequency.

DC CAL Compensates for direct current components inside the circuit.

Channel Setting Sets the relationship between the channel number and frequency.

Copy from STD Sets the relationship between the channel number and frequency specified by the communication standard.

Edit Table 1 2 3 Displays tables 1 through 3.

Edit Table 4 5 6 Displays tables 4 through 6.

Edit Table 7 8 9 Displays tables 7 through 9.

STD Setup Sets the parameters for measurement.

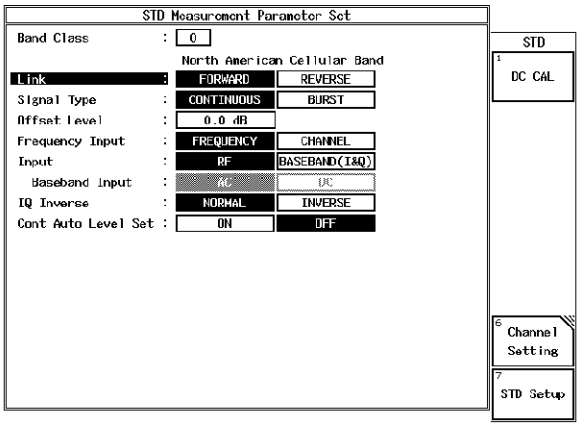


Figure 3-34 STD Measurement Parameter Set Dialog Box

Band Class Selects the frequency bandwidth of the signal to be measured. It is used to calculate the frequency from the channel number.

Link Sets the direction of the signal.

FORWARD: Measure the base station signal.

REVERSE: Measure the mobile unit signal.

Signal Type Sets whether or not the measuring signal is a burst.

CONTINUOUS: Select when measured signal is a Non-idle slot signal.

BURST: Select when measured signal is an idle slot. For the F-Domain Power measurement, the gate sweep is set as a default.

Offset Level The offset value of the reference level can be set in the range of ±100 dB.

Frequency Input Sets the input method of the center frequency value to the measuring instrument.

FREQUENCY: Input by the frequency value.

CHANNEL: Input by the channel number.

Input Sets the signal path for the input signal.

RF: Sets to the RF input path.

BASEBAND (I&Q): Sets to the IQ input path.
The amplitude range for the input signal.
0.25 V_{P-P} to 0.9 V_{P-P} (± 0.47 V or less).

NOTE: Tx Power indicates the relative power, if the BASEBAND is entered.

Baseband Input

AC: Allows you to select AC coupling.

DC: Allows you to select DC coupling.

IQ Inverse

Selects the inverse of the input signal phase.

NORMAL: Q signal code does not inverse

INVERSE: Q signal inverses

Cont Auto Level Set

Sets whether or not the auto ranging is used for the signal input.

ON: Auto range for every measurement is used.

OFF: No auto range is used.

NOTE: The setting of the Cont Auto Level Set is valid when the entry is for RF selection, Code Domain, Frame Analysis, Tx Power, CCDF, Pilot/MAC Channel Power, or Total Power. For the reference level adjustment, use the Auto Level Set of the soft key.

4 REMOTE CONTROL

4.1 GPIB Command Index

This GPIB command index can be used as the index for Chapter 4.

4.2 GPIB Command Codes

The following table list the GPIB commands by function.

Table 4-1 Operating Mode

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Operating mode	Spectrum analyzer mode TRANSIENT mode	SETFUNC CW SETFUNC TRAN	SETFUNC?	0:Spectrum analyzer 1:TRANSIENT	
Communication system	HDR mode	COMMSYS HDR	COMMSYS?	14:HDR	*1

*1: Listener code is available only when the analyzer is set to the CW mode. The codes within the talker request are available for both the CW and TRANSIENT modes.

Table 4-2 ATT Key (Attenuator)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Attenuator	AT	AT *	AT?	Level	
	ATT AUTO	AA	AA?	0: Manual 1: AUTO	
	Min. ATT	ATMIN *	ATMIN?	Level	
	Min. ATT ON OFF	ATMIN ON [*] ATMIN OFF	ATMINON?	0: OFF 1: ON	

Table 4-3 COPY Key (Hard copy)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Printer output File output	Execution of the command	HCOPY	-	-	

Table 4-4 COUPLE Key (Couple function)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Couple function	RBW	RB *	RB?	Frequency	
	RBW AUTO	BA	BA?	0:Manual 1:AUTO	
	VBW	VB *	VB?	Frequency	
	VBW AUTO	VA	VA?	0:Manual 1:AUTO	
	Sweep Time	SW * ST *	SW? ST?	Time	
	Sweep Time Auto	AS	AS?	0:Manual 1:AUTO	

Table 4-5 FREQ Key (Frequency)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Frequency	Center frequency	CF *	CF?	Frequency	
	Start frequency	FA *	FA?	Frequency	
	Stop frequency	FB *	FB?	Frequency	

Table 4-6 LEVEL Key (Reference Level)

Function	Listener Code	Talker Request		Remarks
		Code	Output Format	
Reference level	RL *	RL?	Level	

Table 4-7 MKR Key (Marker)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Marker	ΔMarker ON	MKD [*]	-	Frequency(Time)	
	OFF	MKOFF MO	-	-	
	Reading marker frequency (time)	-	MF?	Frequency(Time)	
	Reading marker level	-	ML?	Level	
	Reading marker frequency (time) and marker level	-	MFL?	Frequency(Time), Level	
	Normal marker	MK [*] MKN [*]	-	Frequency(Time)	
	Peak search	PS	-	-	
	X-dB Down				
	X-dB Down width	MKBW *	MKBW?	Level	
	X-dB Down	XDB	-	-	
	X-dB Down Left	XDL	-	-	
	X-dB Down Right	XDR	-	-	
	Display mode REL.	DC0	DC?	0: Relative mode	
	ABS.L.	DC1		1: Absolute mode (Left side)	
	ABS.R.	DC2		2: Absolute mode (Right side)	

Table 4-8 PRESET Key (Initialization)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Preset	Instrument preset	IP	-	-	

Table 4-9 RCL Key (Recall)

Function	Listener Code	Talker Request		Remarks
		Code	Output Format	
Recall	RC REG_nn RC file name	- -	nn: 01 to 10 File name: Max.8 character	

Table 4-10 SAVE Key (Save)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Save	Save	SV REG_nn SV file name	- -	nn: 01 to 10 File name: Max.8 character	
	Deletion	DEL REG_nn DEL file name	- -	nn: 01 to 10 File name: Max.8 character	

Table 4-11 SPAN Key (Frequency span)

Function	Listener Code	Talker Request		Remarks
		Code	Output Format	
Frequency span	SP *	SP?	Frequency	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
STD Setup	Band Class				
	0 (North American Cellular)	BNDCLS 0	BNDCLS?	0: North American Cellular	
	1 (North American PCS)	BNDCLS 1		1: North American PCS	
	2 (TACS)	BNDCLS 2		2: TACS	
	3 (JTACS)	BNDCLS 3		3: JTACS	
	4 (Korean PCS)	BNDCLS 4		4: Korean PCS	
	5 (NMT-450)	BNDCLS 5		5: NMT-450	
	6 (IMT-2000)	BNDCLS 6		6: IMT-2000	
	7 (North American 700MHz Cellular)	BNDCLS 7		7: North American 700MHz Cellular	
	8 (1800MHz Band)	BNDCLS 8		8: 1800MHz	
	9 (900MHz Band)	BNDCLS 9		9: 900MHz	
	Link				
	FORWARD	LINK FWD	LINK?	0: FORWARD	
	REVERSE	LINK REV		1: REVERSE	
	Signal Type				
	CONTINUOUS	SIGTYP CONT	SIGTYP?	0:CONTINUOUS	
	BURST	SIGTYP BURST		1:BURST	
	Offset Level	RO *	RO?	Level	
	Frequency setting mode				
	Frequency input mode	FINPMD FREQ	FINPMD?	0: Frequency input	
	Channel input mode	FINPMD CHL		1: Channel input	
	Channel number setting	CH *	CH?	Integer (Channel number)	
	Channel edition				
	Input #1 (FORWARD)	CHEDFR1 *,*,*,*,*	CHEDFR1?	ch1,ch2,f1,f2,chof	
	Input #2 (FORWARD)	CHEDFR2 *,*,*,*,*	CHEDFR2?	ch1,ch2,f1,f2,chof	
	Input #3 (FORWARD)	CHEDFR3 *,*,*,*,*	CHEDFR3?	ch1,ch2,f1,f2,chof	
	Input #4 (FORWARD)	CHEDFR4 *,*,*,*,*	CHEDFR4?	ch1,ch2,f1,f2,chof	
	Input #5 (FORWARD)	CHEDFR5 *,*,*,*,*	CHEDFR5?	ch1,ch2,f1,f2,chof	
	Input #6 (FORWARD)	CHEDFR6 *,*,*,*,*	CHEDFR6?	ch1,ch2,f1,f2,chof	
	Input #7 (FORWARD)	CHEDFR7 *,*,*,*,*	CHEDFR7?	ch1,ch2,f1,f2,chof	
	Input #8 (FORWARD)	CHEDFR8 *,*,*,*,*	CHEDFR8?	ch1,ch2,f1,f2,chof	
	Input #9 (FORWARD)	CHEDFR9 *,*,*,*,*	CHEDFR9?	ch1,ch2,f1,f2,chof	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
STD Setup	Input #1 (REVERSE)	CHEDRV1 *,*,*,*,*	CHEDRV1?	ch1,ch2,f1,f2,chof	
	Input #2 (REVERSE)	CHEDRV2 *,*,*,*,*	CHEDRV2?	ch1,ch2,f1,f2,chof	
	Input #3 (REVERSE)	CHEDRV3 *,*,*,*,*	CHEDRV3?	ch1,ch2,f1,f2,chof	
	Input #4 (REVERSE)	CHEDRV4 *,*,*,*,*	CHEDRV4?	ch1,ch2,f1,f2,chof	
	Input #5 (REVERSE)	CHEDRV5 *,*,*,*,*	CHEDRV5?	ch1,ch2,f1,f2,chof	
	Input #6 (REVERSE)	CHEDRV6 *,*,*,*,*	CHEDRV6?	ch1,ch2,f1,f2,chof	
	Input #7 (REVERSE)	CHEDRV7 *,*,*,*,*	CHEDRV7?	ch1,ch2,f1,f2,chof	
	Input #8 (REVERSE)	CHEDRV8 *,*,*,*,*	CHEDRV8?	ch1,ch2,f1,f2,chof	
	Input #9 (REVERSE)	CHEDRV9 *,*,*,*,*	CHEDRV9?	ch1,ch2,f1,f2,chof	
				ch1: Start channel no. ch2: Stop channel no. f1: Base frequency (Hz) f2: Channel space (Hz) chof: Channel Offset	Units of frequency are necessary for f1 and f2.
	Channel table ENABLE/DISABLE selection				
	#1 ENABLE	CHTBL1 ENBL	CHTBL1?	0: Disable	
	DISABLE	CHTBL1 DSBL		1: Enable	
	#2 ENABLE	CHTBL2 ENBL	CHTBL2?	0: Disable	
	DISABLE	CHTBL2 DSBL		1: Enable	
	#3 ENABLE	CHTBL3 ENBL	CHTBL3?	0: Disable	
	DISABLE	CHTBL3 DSBL		1: Enable	
	#4 ENABLE	CHTBL4 ENBL	CHTBL4?	0: Disable	
	DISABLE	CHTBL4 DSBL		1: Enable	
	#5 ENABLE	CHTBL5 ENBL	CHTBL5?	0: Disable	
	DISABLE	CHTBL5 DSBL		1: Enable	
	#6 ENABLE	CHTBL6 ENBL	CHTBL6?	0: Disable	
	DISABLE	CHTBL6 DSBL		1: Enable	
	#7 ENABLE	CHTBL7 ENBL	CHTBL7?	0: Disable	
	DISABLE	CHTBL7 DSBL		1: Enable	
	#8 ENABLE	CHTBL8 ENBL	CHTBL8?	0: Disable	
	DISABLE	CHTBL8 DSBL		1: Enable	
	#9 ENABLE	CHTBL9 ENBL	CHTBL9?	0: Disable	
	DISABLE	CHTBL9 DSBL		1: Enable	
	Channel				
	Copy from STD	CHSETSTD	-	-	
	Input				
	RF	INPUT RF	INPUT?	0: RF	
	BASEBAND(I&Q)	INPUT IQ		1: Baseband (I&Q)	

Table 4-12 TRANsIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
STD Setup	Baseband Input				
	AC	BBINPUT AC	BBINPUT?	0: AC	
	DC	BBINPUT DC		1: DC	
	IQ Inverse				
	NORMAL	IQMD NORM	IQMD?	0:NORMAL	
	INVERSE	IQMD INV		1:INVERSE	
	Auto Level setting				
	Auto Level OFF	ALS OFF	ALS?	0: OFF	
	Auto Level ON	ALS ON		1: ON	
	DC CAL	CLDC	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Power	Auto Level Set	AUTOWFL TDPAUTOLVL	-	-	
	Trigger Setup				
	Trigger Source				
	FREERUN	TRGSRC FREE TDPTRGSRC FREE	TRGSRC? TDPTRGSRC?	0:FREERUN 1:VIDEO	
	VIDEO	TRGSRC VIDEO TDPTRGSRC VIDEO		2:IF 3:EXT	
	IF	TRGSRC IF TDPTRGSRC IF			
	EXT	TRGSRC EXT TDPTRGSRC EXT			
	Trigger Slope				
	+	TRGSLP RISE TDPTRGSLP RISE	TRGSLP? TDPTRGSLP?	0:- 1:+	
	-	TRGSLP FALL TDPTRGSLP FALL			
	Trigger Level	TRGLVL * TDPTRGLVL *	TRGLVL? TDPTRGLVL?	Integer (0 to 100)	
	Trigger Position	TRGPOS * TDPTRGPOS *	TRGPOS? TDPTRGPOS?	Integer (0 to 100)	
	Delay Time	TRGDT * TDPTRGDT *	TRGDT? TDPTRGDT?	Time	
	Window Setup				
	Window				
	ON	TDPWDO ON TWDO ON	TDPWDO? TWDO?	0:OFF 1:ON	
	OFF	TDPWDO OFF TWDO OFF			
	Window Position	TDPWPOS * TWLX *	TDPWPOS? TWLX?	Time	
	Window Width	TDPWWID * TWDX *	TDPWWID? TWDX?	Time	
	Y Scale				
	10dB/div	TDPDIV P10DB	TDPDIV?	0:10dB/div	
	5dB/div	TDPDIV P5DB		1: 5dB/div	
	2dB/div	TDPDIV P2DB		2: 2dB/div	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Power	Average Times	TDPAVGCNT *	TDPAVGCNT?	Integer (1:OFF, 2 to 999)	
		TDPAVG *	TDPAVG?	Integer (1:OFF, 2 to 999)	*1
		CAVGAT *	CAVGAT?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	TDPAVGMD TRACE	TDPAVGMD?	0: Trace Avg	
	MAX HOLD	TDPAVGMD MAX		1: Max Hold	
	POWER AVG	TDPAVGMD POWER		2: Power Avg	
	NUMERIC	TDPAVGMD NUMERIC		3: Numeric	
	Template				
	Template				
	ON	TDPTMPL ON	TDPTMPL?	0:OFF	
		TLMT ON	TLMT?	1:ON	
	OFF	TDPTMPL OFF			
		TLMT OFF			
	Template Shift				
	Shift X	TDPTMPLSX *	TDPTMPLSX?	Time	
		TLMSFT *	TLMSFT?	Time	
	Shift Y	TDPTMPLSY *	TDPTMPLSY?	Level	
		TLMASFT *	TLMASFT?	Level	
	Template Edit				
	Template UP/LOW select	TDPTMPLSEL UP	TDPTMPLSEL?	0:UP	
		TDPTMPLSEL LOW		1:LOW	
	Copy from STD	TDPTMPLCP	-	-	
		LMCPSL STD			
	Data entry	TDPTMPLED *,*	-	t1,l1	
		TLMIN *,*		t1:Time	
				l1:Level (dBm/W/dBμV)	
	Init Table	TDPTMPLCLR	-	-	
		TLMDEL			
	Parameter Setup				
	Detector				
	Normal	TDPDET NRM	TDPDET?	0:Normal	
	Posi	TDPDET POS		1:Posi	
	Nega	TDPDET NEG		2:Nega	
	Sample	TDPDET SMP		3:Sample	

*1: Average Mode is set to POWER AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Power	Display Unit dBm W dBμV	 TDPUNIT DBM TDPUNIT W TDPUNIT DBUV	TDPUNIT?	 0:dBm 1:W 2:dBμV	
	Template Couple to Power ON OFF	 TDPTMPLPW ON TDPTMPLPW OFF	TDPTMPLPW?	 0:OFF 1:ON	
	Template Limit	TDPTMPLBTM *	TDPTMPLBTM?	Level (dBm/W/dBμV)	
	Judgment ON OFF	 TDPJDG ON TDPJDG OFF	TDPJDG?	 0:OFF 1:ON	
	Upper Limit	TDPJDGUP *	TDPJDGUP?	Level	
	Lower Limit	TDPJDGLOW *	TDPJDGLOW?	Level	
	Set to STD	TDPSETSTD	-	-	
	Starts measurement T-Domain Power	 GATEPOW TDPMEAS	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results T-Domain Power	 -	 TDPMEAS? GATEPOW?	 l1,j1 l1:Level (dBm/W/dBmV) j1:Integer (0:FAIL,1:PASS, -1:Judgment OFF) l1:Level (dBm)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
ON/OFF Ratio	Auto Level Set	OORAUTOLVL	-	-	
	Trigger Setup				
	Trigger Source				
	FREERUN	OORTRGSRC FREE	OORTRGSRC?	0:FREERUN	
	VIDEO	OORTRGSRC VIDEO		1:VIDEO	
	IF	OORTRGSRC IF		2:IF	
	EXT	OORTRGSRC EXT		3:EXT	
	Trigger Slope				
	+	OORTRGSLP RISE	OORTRGSLP?	0:-	
	-	OORTRGSLP FALL		1:+	
	Trigger Level	OORTRGLVL *	OORTRGLVL?	Integer (0 to 100)	
	Trigger Position	OORTRGPOS *	OORTRGPOS?	Integer (0 to 100)	
	Delay Time	OORTRGDT *	OORTRGDT?	Time	
	Window Setup				
	Window				
	ON	OORWDO ON	OORWDO?	0:OFF	
	OFF	OORWDO OFF		1:ON	
	ON Position	OORWONPOS *	OORWONPOS?	Time	
	ON Width	OORWONWID *	OORWONWID?	Time	
	OFF Position	OORWOFPOS *	OORWOFPOS?	Time	
	OFF Width	OORWOFWID *	OORWOFWID?	Time	
	Y Scale				
	10dB/div	OORDIV P10DB	OORDIV?	0:10dB/div	
	5dB/div	OORDIV P5DB		1:5dB/div	
	2dB/div	OORDIV P2DB		2:2dB/div	
	Average Times	OORAVGCNT *	OORAVGCNT?	Integer (1:OFF,2 to 999)	
		OORAVG *	OORAVG?	Integer (1:OFF,2 to 999)	*1
		CAVGRAT *	CAVGRAT?	Integer (1:OFF,2 to 999)	*1
	Average Mode				
	TRACE AVG	OORAVGMD TRACE	OORAVGMD?	0: Trace Avg	
	MAX HOLD	OORAVGMD MAX		1: Max Hold	
	POWER AVG	OORAVGMD POWER		2: Power Avg	
	NUMERIC	OORAVGMD NUMERIC		3: Numeric	

*1: Average Mode is set to NUMERIC.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
ON/OFF Ratio	Parameter Setup				
	Detector				
	Normal	OORDET NRM	OORDET?	0:Normal	
	Posi	OORDET POS		1:Posi	
	Nega	OORDET NEG		2:Nega	
	Sample	OORDET SMP		3:Sample	
	Display Unit				
	dBm	OORUNIT DBM	OORUNIT?	0:dBm	
	W	OORUNIT W		1:W	
	dBμV	OORUNIT DBUV		2:dBμV	
	Judgment				
	ON	OORJDG ON	OORJDG?	0:OFF	
	OFF	OORJDG OFF		1:ON	
	Upper Limit	OORJDGUP *	OORJDGUP?	Level	
	Set to STD	OORSETSTD	-	-	
	Starts measurement				
	ON/OFF Ratio	OORMEAS RATIO	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	ON/OFF Ratio	-	OORMEAS?	l1,l2,d1,j1	
				l1:ON Level (dBm/W/dBμV)	
				l2:OFF Level (dBm/W/dBμV)	
				d1:ON/OFF Ratio (dB)	
				j1:Integer (0:FAIL,1:PASS, -1:Judgment OFF)	
			RATIO?	d1,l1	
				d1:ON/OFF Ratio (dB)	
				l1:Gated Power (dBm)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Spurious	Auto Level Set	TDSAUTOLVL	-	-	
	Trigger Setup				
	Trigger Source				
	FREERUN	TDSTRGSRC FREE TRSPMD FREE	TDSTRGSRC? TRSPMD?	0:FREERUN 2:IF	
	IF	TDSTRGSRC IF TRSPMD IF		3:EXT	
	EXT	TDSTRGSRC EXT TRSPMD EXT			
	Trigger Slope				
	+	TDSTRGSLP RISE TRSPSLP RISE	TDSTRGSLP?	0:- 1:+	
	-	TDSTRGSLP FALL TRSPSLP FALL	TRSPSLP?		
	Trigger Level	TDSTRGLVL *	TDSTRGLVL?	Integer (0 to 100)	
	Trigger Position	TDSTRGPOS *	TDSTRGPOS?	Integer (0 to 100)	
	Delay Time	TDSTRGDT *	TDSTRGDT?	Time	
	Table				
	Table No. 1/2/3	TDSTBL *	TDSTBL?	Integer (1 to 3)	
	Table Edit	TDSTBLED *,*	-	f1,l1 f1:Frequency l1:Limit Level	
	Load Table	TDSLD	-	-	
	Load Table 1/2/3	RCLTBL *	-	Integer (1 to 3)	
	Save Table	TDSSV	-	-	
	Save Table 1/2/3	SVSTBL *	-	Integer (1 to 3)	
	Init Table	TDSCLR DELSTBL	-	-	
	Table Freq. Input ABS REL	 TDSTBLF ABS TDSTBLF REL	 TDSTBLF?	 0:ABS 1:REL	
	Average Times	TDSAVGCNT *	TDSAVGCNT?	Integer (1:OFF,2 to 999)	
		TDSAVG *	TDSAVG?	Integer (1:OFF,2 to 999)	*1

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Spurious	Average Mode				
	TRACE AVG	TDSAVGMD TRACE	TDSAVGMD?	0: Trace Avg	
	MAX HOLD	TDSAVGMD MAX		1: Max Hold	
	POWER AVG	TDSAVGMD POWER		2: Power Avg	
	NUMERIC	TDSAVGMD NUMERIC		3: Numeric	
	Parameter Setup				
	Detector				
	Normal	TDSDET NRM	TDSDET?	0:Normal	
	Posi	TDSDET POS		1:Posi	
	Nega	TDSDET NEG		2:Nega	
	Sample	TDSDET SMP		3:Sample	
	Display Unit				
	dBm	TDSUNIT DBM	TDSUNIT?	-	
	W	TDSUNIT W			
	dBμV	TDSUNIT DBUV			
	Judgment				
	ON	TDSJDG ON	TDSJDG?	0:OFF	
	OFF	TDSJDG OFF		1:ON	
	Result				
	Peak	TDSRES PK	TDSRES?	0:Peak	
	RMS	TDSRES RMS		1:RMS	
	Multiplier	TDSMULTI *	TDSMULTI?	Real number	
	Peak Marker Y-Delta	TDSPKMKY *	TDSPKMKY?	Real number	
	Preselector 1.6G	TDSPRE 16G	TDSPRE?	0:1.6G	
	3.6G	TDSPRE 36G		1:3.6G	
	Set to Default	TDSSETSTD	-	-	
	Starts measurement				
	Spurious	TDSMEAS SPUR	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	Spurious	-	TDSMEAS?	n<CR+LF> +f1,l1,j1<CR+LF> ..... +fn,ln,jn<CR+LF> n:Amount (Integer) fn:Frequency ln:Level (dBm/W/dBμV)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Spurious			SPULVL?	jn:Integer (0:FAIL,1:PASS, -1:Judgment OFF) n<CR+LF> +f1,l1<CR+LF> ..... +fn,ln<CR+LF> n:Amount (Integer) fn:Frequency ln:Level (dBm)	
F-Domain Power	Auto Level Set	FDPAUTOLVL	-	-	
	Gate Setup				
	ON	TGTSETUP ON	TGTSETUP?	0:OFF	
	OFF	TGTSETUP OFF		1:ON	
	Trigger Source				
	FREERUN	TGTTRG FREE	TGTTRG?	0:FREERUN	
	VIDEO	TGTTRG VIDEO		1:VIDEO	
	IF	TGTTRG IF		2:IF	
	EXT	TGTTRG EXT		3:EXT	
	Trigger Slope				
	-	TGTTRGSLP FALL	TGTTRGSLP?	0:-	
	+	TGTTRGSLP RISE		1:+	
	Trigger Level	TGTTRGLVL *	TGTTRGLVL?	Integer (0 to 100)	
	Trigger Position	TGTTRGPOS *	TGTTRGPOS?	Integer (0 to 100)	
	Delay Time	TGTTRGDT *	TGTTRGDT?	Time	
	Gate Source				
	Trigger	TGTSRC TRG	TGTSRC?	0:Trigger	
	Ext Gate	TGTSRC EXT		1:EXT	
	Gate Position	TGTPOS *	TGTPOS?	Time	
	Gate Width	TGTWID *	TGTWID?	Time	
	Detector				
	Normal	TGTDET NRM	TGTDET?	0:Normal	
	Posi	TGTDET POS		1:Posi	
	Nega	TGTDET NEG		2:Nega	
	Sample	TGTDET SMP		3:Sample	
	Gated Sweep ON/OFF				
	ON	TGTSWP ON	TGTSWP?	0:OFF	
	OFF	TGTSWP OFF		1:ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
F-Domain Power	Window Setup				
	Window				
	ON	FDPWDO ON	FDPWDO?	0:OFF	
	OFF	FDPWDO OFF		1:ON	
	Window Position	FDPWPOS *	FDPWPOS?	Frequency	
		CPWLX *	CPWLX?		
	Window Width	FDPWWID *	FDPWWID?	Frequency	
		CPWIDX *	CPWIDX?		
	Y Scale				
	10dB/div	FDPDIV P10DB	FDPDIV?	0:10dB/div	
		CPWDIV P10DB	CPWDIV?	1:5dB/div	
	5dB/div	FDPDIV P5DB		2:2dB/div	
		CPWDIV P5DB			
	2dB/div	FDPDIV P2DB			
		CPWDIV P2DB			
	Average Times	FDPAVGCNT *	FDPAVGCNT?	Integer (1:OFF, 2 to 999)	
		FDPAVG *	FDPAVG?	Integer (1:OFF, 2 to 999)	*1
		CAVGCHP *	CAVGCHP?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	FDPAVGMD TRACE	FDPAVGMD?	0: Trace Avg	
	MAX HOLD	FDPAVGMD MAX		1: Max Hold	
	POWER AVG	FDPAVGMD POWER		2: Power Avg	
	NUMERIC	FDPAVGMD NUMERIC		3: Numeric	
	Parameter Setup				
	Detector				
	Normal	FDPDET NRM	FDPDET?	0:Normal	
	Posi	FDPDET POS		1:Posi	
	Nega	FDPDET NEG		2:Nega	
	Sample	FDPDET SMP		3:Sample	
	Display Unit				
	dBm	FDPUNIT DBM	FDPUNIT?	0:dBm	
	W	FDPUNIT W		1:W	
	dBμV	FDPUNIT DBUV		2:dBμV	
	Judgment				
	ON	FDPJDG ON	FDPJDG?	0:OFF	
	OFF	FDPJDG OFF		1:ON	

*1: Average Mode is set to POWER AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
F-Domain Power	Upper Limit	FDPJDGUP *	FDPJDGUP?	Level (dBm/W/dBμV)	
	Lower Limit	FDPJDGLOW *	FDPJDGLOW?	Level (dBm/W/dBμV)	
	Set to STD	FDPSETSTD	-	-	
	Starts measurement F-Domain Power	FDPMEAS CCHPOW	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results F-Domain Power	-	FDPMEAS?	l1,j1 l1:Level (dBm/W/dBmV) j1:Integer (0:FAIL,1:PASS, -1:Judgment OFF)	
			CCHPOW?	l1,l2 l1:Level (dBm) l2:Level (dBm/Hz)	
OBW	Auto Level Set	OBWAUTOLVL	-	-	
	OBW%	OBWPER *	OBWPER?	Real number (0.5 to 99.5)	
		COBWPER *	COBWPER?		
	Average Times	OBWAVGCNT *	OBWAVGCNT?	Integer (1:OFF, 2 to 999)	
		OBWAVG *	OBWAVG?	Integer (1:OFF, 2 to 999)	*1
		CAVGOBW *	CAVGOBW?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	OBWAVGMD TRACE	OBWAVGMD?	0: Trace Avg	
	MAX HOLD	OBWAVGMD MAX		1: Max Hold	
	POWER AVG	OBWAVGMD POWER		2: Power Avg	
	NUMERIC	OBWAVGMD NUMERIC		3: Numeric	

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
OBW	Parameter Setup				
	Detector				
	Normal	OBWDET NRM	OBWDET?	0:Normal	
		COBWDET NRM	COBWDET?	1:Posi	
	Posi	OBWDET POS		2:Nega	
		COBWDET POS		3:Sample	
	Nega	OBWDET NEG			
		COBWDET NEG			
	Sample	OBWDET SMP			
		COBWDET SMP			
	Judgment				
	ON	OBWJDG ON	OBWJDG?	0:OFF	
	OFF	OBWJDG OFF		1:ON	
	Upper Limit	OBWJDGUP *	OBWJDGUP?	Frequency	
	Lower Limit	OBWJDGLOW *	OBWJDGLOW?	Frequency	
	Set to STD	OBWSETSTD	-	-	
	Starts measurement				
	OBW	OBWMEAS	-	-	
		COBW			
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	OBW	-	OBWMEAS?	f1,f2,f3,j1 f1:OBW Frequency f2:Lower side frequency f3:Higher side frequency j1: Integer (0: FAIL, 1: PASS, -1: Judgment OFF)	
			COBW?	f1,f2,f3 f1:OBW Frequency f2:Lower side frequency f3:Higher side frequency	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Transient	Auto Level Set	DTSAUTOLVL	-	-	
	Template				
	Template				
	ON	DTSTMPL ON	DTSTMPL?	0: OFF	
	OFF	DTSTMPL OFF		1: ON	
	Template Shift				
	Shift X	DTSTMPLSX *	DTSTMPLSX?	Frequency	
	Shift Y	DTSTMPLSY *	DTSTMPLSY?	Level	
	Margin delta X	DTSTMPLDX *	DTSTMPLDX?	Frequency (0:OFF)	
	Copy from STD	DTSTMPLCP	-	-	
	Data entry	DTSTMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBμV)	
	Init Table	DTSTMPLCLR	-	-	
	Marker Edit				
	Copy from STD	DTSMKRCP	-	-	
	Data entry	DTSMKRED *,*,*,*	-	d1,f1,f2,l1 d1: (0:Normal 1: Integral 2: √Nyquist) f1: Offset Frequency f2: Band width l1: Limit level	Set the reference bandwidth to f2, after initializing the table.
	Init Table	DTSMKRCLR	-	-	
	Average Times	DTSAVGCNT *	DTSAVGCNT?	Integer (1:OFF, 2 to 999)	
		DTSAVG *	DTSAVG?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	DTSAVGMD TRACE	DTSAVGMD?	0: Trace Avg	
	MAX HOLD	DTSAVGMD MAX		1: Max Hold	
	POWER AVG	DTSAVGMD POWER		2: Power Avg	
	NUMERIC	DTSAVGMD NUMERIC		3: Numeric	

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Transient	Parameter Setup				
	Detector				
	Normal	DTSDET NRM	DTSDET?	0: Normal	
	Posi	DTSDET POS		1: Posi	
	Nega	DTSDET NEG		2: Nega	
	Sample	DTSDET SMP		3: Sample	
	Display Unit				
	dBm	DTSUNIT DBM	DTSUNIT?	0: dBm	
	W	DTSUNIT W		1: W	
	dBμV	DTSUNIT DBUV		2: dBμV	
	Template Couple to Power				
	ON	DTSTMPLPW ON	DTSTMPLPW?	0: OFF	
	OFF	DTSTMPLPW OFF		1: ON	
	Template Limit	DTSTMPLBTM *	DTSTMPLBTM?	Level (dBm/W/dBμV)	
	Judgment				
	ON	DTSJDG ON	DTSJDG?	0: OFF	
	OFF	DTSJDG OFF		1: ON	
	Freq. Setting				
	CFSP	DTSFRMD CFSP	DTSFRMD?	0: Center/Span mode	
	STSP	DTSFRMD STSP		1: Start/Stop mode	
	Result				
	ABS	DTSRES ABS	DTSRES?	0: Absolute	
	REL	DTSRES REL		1: Relative	
	MKR	DTSRES MKR		2: Marker	
	Ref Power				
	MKR	DTSREF MKR	DTSREF?	0: Reference Marker	
	MOD	DTSREF MOD		1: Modulation	
	Symbol Rate 1/T	DTSSYMRT *	DTSSYMRT?	Frequency	
	Rolloff Factor	DTSRFACT *	DTSRFACT?	Real number	
	Set to STD	DTSSETSTD	-	-	
	Starts measurement				
	Due to Transient	DTSMEAS	-	-	
	Starts measurement in the same mode	SI	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Transient	Measurement results				
	Due to Transient	-	DTSMEAS?	n<CR+LF> +d1,j1<CR+LF> ..... +dn,jn<CR+LF> n:Amount (Integer) dn: Power jn: Integer (0: FAIL, 1: PASS, -1: Judgment OFF)	
			COBWCP?	l1,l2,d1,d2,d3,d4 l1: Level (dBm: Reference power) l2: Level (W: Reference power) d1: -1st ACP(dBc) d2: +1st ACP(dBc) d3: -2nd ACP(dBc) d4: +2nd ACP(dBc)	
	Ref. Power	-	DTSREFPWR?	Level	
Due to Modula-tion	Auto Level Set	DTMAUTOLVL	-	-	
	Gate Setup				
	ON	TGTSETUP ON	TGTSETUP?	0: OFF	
	OFF	TGTSETUP OFF		1: ON	
	Trigger Source				
	FREERUN	TGTTRG FREE	TGTTRG?	0: FREERUN	
	VIDEO	TGTTRG VIDEO		1: VIDEO	
	IF	TGTTRG IF		2: IF	
	EXT	TGTTRG EXT		3: EXT	
	Trigger Slope				
	-	TGTTRGSLP FALL	TGTTRGSLP?	0: -	
	+	TGTTRGSLP RISE		1: +	
	Trigger Level	TGTTRGLVL *	TGTTRGLVL?	Integer (0 to 100)	
	Trigger Position	TGTTRGPOS *	TGTTRGPOS?	Integer (0 to 100)	
	Delay Time	TGTTRGDT *	TGTTRGDT?	Time	
	Gate Source				
	Trigger	TGTSRC TRG	TGTSRC?	0: Trigger	
	Ext Gate	TGTSRC EXT		1: EXT	
	Gate Position	TGTPOS *	TGTPOS?	Time	
	Gate Width	TGTWID *	TGTWID?	Time	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Modulation	Detector				
	Normal	TGTDET NRM	TGTDET?	0: Normal	
	Posi	TGTDET POS		1: Posi	
	Nega	TGTDET NEG		2: Nega	
	Sample	TGTDET SMP		3: Sample	
	Gated Sweep ON/OFF				
	ON	TGTSWP ON	TGTSWP?	0: OFF	
	OFF	TGTSWP OFF		1: ON	
	Template				
	Template				
	ON	DTMTMPL ON	DTMTMPL?	0: OFF	
	OFF	DTMTMPL OFF		1: ON	
	Template Shift				
	Shift X	DTMTMPLSX *	DTMTMPLSX?	Frequency	
	Shift Y	DTMTMPLSY *	DTMTMPLSY?	Level	
	Margin delta X	DTMTMPLDX *	DTMTMPLDX?	Frequency (0:OFF)	
	Copy from STD	DTMTMPLCP	-	-	
	Data entry	DTMTMPLED *,*	-	f1,l1 f1: frequency l1: Level (dBm/W/dBμV)	
	Init Table	DTMTMPLCLR	-	-	
	Marker Edit				
	Copy from STD	DTMMKRCP	-	-	
	Data entry	DTMMKRED *,*,*,*	-	d1,f1,f2,l1 d1: (0:Normal 1: Integral 2: √Nyquist) f1: Offset Frequency f2: Bandwidth l1: Limit Level	Set the reference bandwidth to f2, after initializing the table.
	Init Table	DTMMKRCLR	-	-	
	Average Times	DTMAVGCNT *	DTMAVGCNT?	Integer (1:OFF, 2 to 999)	
		DTMAVG *	DTMAVG?	Integer (1:OFF, 2 to 999)	*1

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Modulation	Average Mode				
	TRACE AVG	DTMAVGMD TRACE	DTMAVGMD?	0: Trace Avg	
	MAX HOLD	DTMAVGMD MAX		1: Max Hold	
	POWER AVG	DTMAVGMD POWER		2: Power Avg	
	NUMERIC	DTMAVGMD NUMERIC		3: Numeric	
	Parameter Setup				
	Detector				
	Normal	DTMDET NRM	DTMDET?	0: Normal	
	Posi	DTMDET POS		1: Posi	
	Nega	DTMDET NEG		2: Nega	
	Sample	DTMDET SMP		3: Sample	
	Display Unit				
	dBm	DTMUNIT DBM	DTMUNIT?	0: dBm	
	W	DTMUNIT W		1: W	
	dBµV	DTMUNIT DBUV		2: dBµV	
	Template Couple to Power				
	ON	DTMTMPLPW ON	DTMTMPLPW?	0: OFF	
	OFF	DTMTMPLPW OFF		1: ON	
	Template Limit	DTMTMPLBTM *	DTMTMPLBTM?	Level (dBm/W/dBµV)	
	Judgment				
	ON	DTMJDG ON	DTMJDG?	0: OFF	
	OFF	DTMJDG OFF		1: ON	
	Freq. Setting				
	CFSP	DTMFRMD CFSP	DTMFRMD?	0: Center/Span mode	
	STSP	DTMFRMD STSP		1: Start/Stop mode	
	Result				
	ABS	DTMRES ABS	DTMRES?	0: Absolute	
	REL	DTMRES REL		1: Relative	
	MKR	DTMRES MKR		2: Marker	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Modulation	Ref Power MKR MOD	 DTMREF MKR DTMREF MOD	DTMREF MKR?	0: Reference Marker 1: Modulation	
	Symbol Rate 1/T	DTMSYMRT *	DTMSYMRT?	Frequency	
	Rolloff Factor	DTMRFACT *	DTMRFACT?	Real number	
	Set to STD	DTMSETSTD	-	-	
	Starts measurement Due to Modulation	 DTMMEAS	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results Due to Modulation	 -	 DTMMEAS?	 n<CR+LF>+d1, j1<CR+LF> .....+dn,jn<CR+LF> n: Amount (Integer) dn: Power jn: Integer (0: FAIL, 1: PASS, -1: Judgment OFF)	
	Ref. Power	-	DTMREFPWR?	Level	
Inband Spurious (1)	Auto Level Set	SPRAUTOLVL	-	-	
	Template Template ON OFF	 SPRTMPL ON SPRTMPL OFF	 SPRTMPL?	 0: OFF 1: ON	
	Template Shift Shift X Shift Y	 SPRTMPLSX * SPRTMPLSY *	 SPRTMPLSX? SPRTMPLSY?	 Frequency Level	
	Margin delta X	SPRTMPLDX *	SPRTMPLDX?	Frequency (0:OFF)	
	Copy from STD	SPRTMPLCP	-	-	
	Data entry	SPRTMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBµV)	
	Init Table	SPRTMPLCLR	-	-	
	Marker Edit Copy from STD	 SPRMKRCP	 -	 -	
	Data entry	SPRMKRED *,*,*,*	-	d1,f1,f2,l1 d1:(0:Peak, 1:Integral) f1: Start Frequency f2: Stop Frequency l1: Limit Level	Set the reference bandwidth to f2, after initializing the table.
	Init Table	SPRMKRCLR	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (1)	Average Times	SPRAVGCNT *	SPRAVGCNT?	Integer (1:OFF, 2 to 999)	
		SPRAVG *	SPRAVG?	Integer (1:OFF, 2 to 999)	*1
		CAVGSPR *	CAVGSPR?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	SPRAVGMD TRACE	SPRAVGMD?	0: Trace Avg	
	MAX HOLD	SPRAVGMD MAX		1: Max Hold	
	POWER AVG	SPRAVGMD POWER		2: Power Avg	
	Parameter Setup				
	Detector				
	Normal	SPRDET NRM	SPRDET?	0: Normal	
	Posi	SPRDET POS		1: Posi	
	Nega	SPRDET NEG		2: Nega	
	Sample	SPRDET SMP		3: Sample	
	Display Unit				
	dBm	SPRUNIT DBM	SPRUNIT?	0: dBm	
	W	SPRUNIT W		1: W	
	dBµV	SPRUNIT DBUV		2: dBµV	
	Template Couple to Power				
	ON	SPRTMPLPW ON	SPRTMPLPW?	0: OFF	
	OFF	SPRTMPLPW OFF		1: ON	
	Template Limit	SPRTMPLBTM *	SPRTMPLBTM?	Level (dBm/W/dBµV)	
	Judgment				
	ON	SPRJDG ON	SPRJDG?	0: OFF	
	OFF	SPRJDG OFF		1: ON	
	Freq. Setting				
	CFSP	SPRFRMD CFSP	SPRFRMD?	0: Center/Span mode	
	STSP	SPRFRMD STSP		1: Start/Stop mode	

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (1)	Result ABS REL MKR	 SPRRES ABS SPRMOD ABS SPRRES REL SPRMOD REL SPRRES MKR SPRMOD MKR	 SPRRES? SPRMOD?	 0: Absolute 1: Relative 2: Marker	
	Ref Power MKR MOD	 SPRREF MKR SPRREF SWP SPRREF MOD SPRREF DSP	 SPRREF?	 0: Reference Marker 1: Modulation	
	Peak Marker Y-Delta	SPRPKMKY *	SPRPKMKY?	Real number	
	Set to STD	SPRSETSTD	-	-	
	Starts measurement Inband Spurious	 SPRMEAS CINBSPR	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results Inband Spurious	 -	 SPRMEAS?	 n<CR+LF> +f1,l1,j1<CR+LF> ..... +fn,ln,jn<CR+LF> n:Amount (Integer) fn: Frequency ln: Level (dBm/W/dBμV) jn: Integer (0: FAIL, 1: PASS, -1: Judgment OFF)	
	max.value output on the each period	-	CINBMAX?	n1,f1,l1....n4,f4,l4 (4set output) nn: 0;Disable (Without data) 1; Enable (With data) fn: Frequency ln: Level (dBm)	
	Ref. Power	-	SPRREFPWR?	Level	
Inband Spurious (2)	Auto Level Set	SPR2AUTOLVL	-	-	
	Gate Setup ON OFF	 TGTSETUP ON TGTSETUP OFF	 TGTSETUP?	 0: OFF 1: ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (2)	Trigger Source				
	FREERUN	TGTTRG FREE	TGTTRG?	0: FREERUN	
	VIDEO	TGTTRG VIDEO		1: VIDEO	
	IF	TGTTRG IF		2: IF	
	EXT	TGTTRG EXT		3: EXT	
	Trigger Slope				
	-	TGTTRGSLP FALL	TGTTRGSLP?	0: -	
	+	TGTTRGSLP RISE		1: +	
	Trigger Level	TGTTRGLVL *	TGTTRGLVL?	Integer (0 to 100)	
	Trigger Position	TGTTRGPOS *	TGTTRGPOS?	Integer (0 to 100)	
	Delay Time	TGTTRGDT *	TGTTRGDT?	Time	
	Gate Source				
	Trigger	TGTSRC TRG	TGTSRC?	0: Trigger	
	Ext Gate	TGTSRC EXT		1: EXT	
	Gate Position	TGTPOS *	TGTPOS?	Time	
	Gate Width	TGTWID *	TGTWID?	Time	
	Detector				
	Normal	TGTDET NRM	TGTDET?	0: Normal	
	Posi	TGTDET POS		1: Posi	
	Nega	TGTDET NEG		2: Nega	
	Sample	TGTDET SMP		3: Sample	
	Gated Sweep ON/OFF				
	ON	TGTSWP ON	TGTSWP?	0: OFF	
	OFF	TGTSWP OFF		1: ON	
	Template				
	Template				
	ON	SPR2TMPL ON	SPR2TMPL?	0: OFF	
	OFF	SPR2TMPL OFF		1: ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (2)	Template Shift				
	Shift X	SPR2TMPLSX *	SPR2TMPLSX?	Frequency	
	Shift Y	SPR2TMPLSY *	SPR2TMPLSY?	Level	
	Margin delta X	SPR2TMPLDX *	SPR2TMPLDX?	Frequency (0:OFF)	
	Copy from STD	SPR2TMPLCP	-	-	
	Data entry	SPR2TMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBµV)	
	Init Table	SPR2TMPLCLR	-	-	
	Marker Edit				
	Copy from STD	SPR2MKRCP	-	-	
	Data entry	SPR2MKRED *,*,*,*	-	d1,f1,f2,l1 d1:(0:Peak, 1:Integral) f1: Start Frequency f2: Stop Frequency l1: Limit Level	Set the reference bandwidth to f2, after initializing the table.
	Init Table	SPR2MKRCLR	-	-	
	Average Times	SPR2AVGCNT *	SPR2AVGCNT?	Integer (1:OFF, 2 to 999)	
		SPR2AVG *	SPR2AVG?	Integer (1:OFF, 2 to 999)	
	Average Mode				
	POWER AVG	SPR2AVGMD POWER	SPR2AVGMD?	2: Power Avg	
	Parameter Setup				
	Detector				
	Normal	SPR2DET NRM	SPR2DET?	0: Normal	
	Posi	SPR2DET POS		1: Posi	
	Nega	SPR2DET NEG		2: Nega	
	Sample	SPR2DET SMP		3: Sample	
	Display Unit				
	dBm	SPR2UNIT DBM	SPR2UNIT?	0: dBm	
	W	SPR2UNIT W		1: W	
	dBµV	SPR2UNIT DBUV		2: dBµV	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (2)	Template Couple to Power				
	ON	SPR2TMPLPW ON	SPR2TMPLPW?	0: OFF	
	OFF	SPR2TMPLPW OFF		1: ON	
	Template Limit	SPR2TMPLBTM *	SPR2TMPLBTM?	Level (dBm/W/dBμV)	
	Judgment				
	ON	SPR2JDG ON	SPR2JDG?	0: OFF	
	OFF	SPR2JDG OFF		1: ON	
	Freq. Setting				
	CFSP	SPR2FRMD CFSP	SPR2FRMD?	0: Center/Span mode	
	STSP	SPR2FRMD STSP		1: Start/Stop mode	
	Result				
	ABS	SPR2RES ABS	SPR2RES?	0: Absolute	
	REL	SPR2RES REL		1: Relative	
	MKR	SPR2RES MKR		2: Marker	
	Ref Power				
	MKR	SPR2REF MKR	SPR2REF?	0: Reference Marker	
	MOD	SPR2REF MOD		1: Modulation	
	Peak MKR Y-Delta	SPR2PKMKY *	SPR2PKMKY?	Real number	
	Band Conversion				
	ON	SPR2CONV ON	SPR2CONV?	0: OFF	
	OFF	SPR2CONV OFF		1: ON	
	Integral Band	SPR2INTE *	SPR2INTE?	Frequency	
	Start Offset	SPR2OFSST *	SPR2OFSST?	Frequency	
	Stop Offset	SPR2OFSSP *	SPR2OFSSP?	Frequency	
	Set to STD	SPR2SETSTD	-	-	
	Starts measurement				
	Inband Spurious	SPR2MEAS	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	Inband Spurious	-	SPR2MEAS?	n<CR+LF> +f1,l1,j1<CR+LF> ..... +fn,ln,jn<CR+LF> n:Amount (Integer) fn: Frequency ln: Level (dBm/W/dBμV) jn: Integer (0: FAIL, 1: PASS, -1: Judgment OFF)	
	Ref. Power	-	SPR2REFPWR?	Level	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Outband Spurious	Auto Level Set	FDSAUTOLVL	-	-	
	Table				
	Copy from STD	FDSCP			
	Table No.1/2/3	FDSTBL *	FDSTBL?	Integer (1 to 3)	
	Table Edit	FDSTBLED *,*,*,*,*,*	-	f1,f2,f3,f4,d1,l1 f1: Start frequency f2: Stop frequency f3: RBW f4: VBW d1: Sweep time l1: Limit Level	
	Load Table	FDSLD	-	-	
	Save Table	FDSSV	-	-	
	Init Table	FDSCLR	-	-	
	Average Times	FDSAVGCNT *	FDSAVGCNT?	Integer (1:OFF, 2 to 999)	
		FDSAVG *	FDSAVG?	Integer (1:OFF, 2 to 999)	*1
	Average Mode				
	TRACE AVG	FDSAVGMD TRACE	FDSAVGMD?	0: Trace Avg	
	MAX HOLD	FDSAVGMD MAX		1: Max Hold	
	POWER AVG	FDSAVGMD POWER		2: Power Avg	
	Parameter Setup				
	Detector				
	Normal	FDSDET NRM	FDSDET?	0: Normal	
	Posi	FDSDET POS		1: Posi	
	Nega	FDSDET NEG		2: Nega	
	Sample	FDSDET SMP		3: Sample	
	Display Unit				
	dBm	FDSUNIT DBM	FDSUNIT?	0: dBm	
	W	FDSUNIT W		1: W	
	dBµV	FDSUNIT DBUV		2: dBµV	
	Judgment				
	ON	FDSJDG ON	FDSJDG?	0: OFF	
	OFF	FDSJDG OFF		1: ON	
	Peak Marker Y-Delta	FDSPKMKY *	FDSPKMKY?	Real number	
	Preselector 1.6G	FDSPRE 16G	FDSPRE?	0: 1.6G	
	3.6G	FDSPRE 36G		1: 3.6G	
	Set to Default	FDSSETSTD	-	-	

*1: When Detector is set to Positive, Average Mode is set to MAX HOLD. When Detector is set to something other than Positive, Average Mode is set to TRACE AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Outband Spurious	Starts measurement Outband Spurious	FDSMEAS	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results Outband Spurious	-	FDSMEAS?	n<CR+LF> +f1,l1,j1<CR+LF> ..... +fn,ln,jn<CR+LF> n:Amount (Integer) fn: Frequency ln: Level (dBm/W/dBmV) jn: Integer(0: FAIL, 1: PASS,-1: Judgment OFF)	
Code Domain	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup Complementary Filter Rolloff	CDFROF *	CDFROF?	Real number (0.05 to 0.20)	
	Equalizing Filter ON OFF	CDEQFLT ON CDEQFLT OFF	CDEQFLT?	0:OFF 1:ON	
	PN Offset	CDPNOFS *	CDPNOFS?	Integer (0 to 511)	
	MAC Threshold	CDMACTHRSH *	CDMACTHRSH?	Level (-100 to 0 dB)	
	Data Code Domain N	CDDCDN *	CDDCDN?	Integer (4 to 32)	
	Phase Tracking SLOT HALF SLOT OFF	CDPHATRK SLOT CDPHATRK HALFSLOT CDPHATRK OFF	CDPHATRK?	0:OFF 1:SLOT 2:HALF SLOT	
	Trigger Source INT EXT INTRVL(EXT) INTRVL	CDTRG INT CDTRG EXT CDTRG INTRVL1 CDTRG INTRVL2	CDTRG?	0:INT 1:EXT 2:INTRVL(EXT) 3:INTRVL	
	EXT Trigger Slope + -	CDTRGSLP RISE CDTRGSLP FALL	CDTRGSLP?	0:- 1:+	
	Graph Type MAC Code Domain Data Code Domain Pilot Constellation Data Despread Constellation Phase Error(Pilot)	CDGTYP MACCD CDGTYP DATCD CDGTYP PILCON CDGTYP DDCON CDGTYP PHAERR	CDGTYP?	0:MAC Code Domain 1:Data Code Domain 2:Pilot Constellation 3:Data Despread Constellation 4:Phase Error(Pilot)	*1

*1: When Graph Type is changed after the measurement, the Measuring bit in the operation status register is set to 1.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain	Starts measurement Code Domain	CDMEAS			
	Starts measurement in the same mode	SI			
	Measurement results				
	Carrier Frequency Error		CDCFERR?	d1,d2 d1:Frequency(Hz) d2:Real number(ppm)	
	Pilot Time Alignment Error		CDPTAERR?	Time(sec)	
	ρ pilot		CDRHOP?	Real number	
	ρ overall-1		CDRHO1?	Real number	
	ρ overall-2		CDRHO2?	Real number	
	Peak MAC Inactive Channel		CDPKINACT?	Level(dB)	
			CDPKINACTL?	d1,d2 d1:Real number(ρ) d2:Level(dB)	
	Max Data Code Domain		CDMAXCDP?	d1,d2 d1:Real number(ρ) d2:Level(dB)	
	Min Data Code Domain		CDMINCDP?	d1,d2 d1:Real number(ρ) d2:Level(dB)	
	Modulation Type		CDMODTYP?	0:idle 1:QPSK 2:8-PSK 3:16-QAM	
	PN Offset		CDPNOFSR?	Integer (0 to 511)	
	Preamble Chips(ρ overall-1)		CDPRCHIP?	Integer (chips)	
	Marker Position	CDMK *	CDMK?	Integer	
	Walsh Code Number		CDMKWNUM?	Integer	
	ρMAC,real		CDMKRHOMRE?	Real number	
	ρMAC,imag		CDMKRHOMIM?	Real number	
	ρData,real		CDMKRHODRE?	Real number	
	ρData,imag		CDMKRHODIM?	Real number	
	MACIndex		CDMKMACIDX?	Integer	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain	Marker Position				
	Chip number		CDMKCHIP?	d1,d2 Pilot Constellation d1:Chip number d2:Sample number Phase Error (Pilot) d1:Half Slot number d2:Chip number	
	Symbol number		CDMKSYM?	d1,d2 d1:Symbol number d2:Walsh Code No.	
	I-Phase data		CDMKI?	Phase	
	Q-Phase data		CDMKQ?	Phase	
	Phase error		CDMKPHAERR?	Real number(degree)	
	Read All Marker Data				
	Walsh Code Number		CDMKGPHWNUM?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Walsh Code Number(Integer)	
	ρMAC,real		CDMKGPHRHOMRE?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:ρMAC,real (Real number)	
	ρMAC,imag		CDMKGPHRHOMIM?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:ρMAC,imag (Real number)	
	ρData,real		CDMKGPHRHODRE?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:ρData,real (Real number)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain	ρData,imag		CDMKGPHRHODIM?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:ρData,imag (Real number)	
	MACIndex		CDMKGPHMACIDX?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:MACIndex(Integer)	
	Chip number		CDMKGPHCHIP?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Chip number (Integer)	
	Symbol number		CDMKGPHSYM?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Symbol number (Integer)	
	I-Phase data		CDMKGPHI?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Phase (Real number)	
	Q-Phase data		CDMKGPHQ?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Phase (Real number)	
	Phase Error(Pilot)		CDMKGPHPHAERR?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Phase Error(degree)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Frame Analysis	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup				
	Complementary Filter Rolloff	FALFROF *	FALFROF?	Real number (0.05 to 0.20)	
	Equalizing Filter				
	ON	FALEQFLT ON	FALEQFLT?	0:OFF	
	OFF	FALEQFLT OFF		1:ON	
	PN Offset	FALPNOFS *	FALPNOFS?	Integer (0 to 511)	
	MAC Threshold	FALMACTHRSH *	FALMACTHRSH?	Level (-100 to 0 dB)	
	Trigger Source				
	INT	FALTRG INT	FALTRG?	0:INT	
	EXT	FALTRG EXT		1:EXT	
	INTRVL(EXT)	FALTRG INTRVL1		2:INTRVL(EXT)	
	INTRVL	FALTRG INTRVL2		3:INTRVL	
	EXT Trigger Slope				
	+	FALTRGSLP RISE	FALTRGSLP?	0:-	
	-	FALTRGSLP FALL		1:+	
	Starts measurement				
	Frame Analysis	FALMEAS			
	Starts measurement in the same mode	SI			
	Measurement results				
	Frame Analysis		FALMEAS?	n<CR+LF>+s1,t1,p1,m1 <CR+LF>....+s1,tn,pn,mn <CR+LF> n:Data amount (Integer) sn:Slot number (Integer) tn:Modulation Type (0:Idle, 1:QPSK, 2:8-PSK, 3:16-QAM) pn:Preamble(Integer) mn:MACIndex (0000000000000000 to FFFFFFFFFFFFFFFF)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Frame Analysis	Measurement results				
	Carrier Frequency Error		FALCFERR?	Frequency(Hz)	
	Pilot Time Alignment Error		FALPTAERR?	Time(sec)	
	PN Offset		FALPNOFSR?	Integer (0 to 511)	
	ρPilot		FALRHOP?	Real number (0.0 to 1.0)	
Tx Power	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup				
	Trigger Source				
	INT	TXTRG INT	TXTRG?	0:INT	
	EXT	TXTRG EXT		1:EXT	
	INTRVL(EXT)	TXTRG INTRVL1		2:INTRVL(EXT)	
	IF	TXTRG IF		3:IF	
	EXT Trigger Slope				
	+	TXTRGSLP RISE	TXTRGSLP?	0:-	
	-	TXTRGSLP FALL		1:+	
	Trigger Level	TXTRLVL *	TXTRLVL?	Integer (0 to 100)	
	EXT Trigger Delay	TXTRGDLY *	TXTRGDLY?	Time	
	Average Times	TXAVG *	TXAVG?	Integer (1:OFF, 2 to 32)	
	Starts measurement				
	Tx Power	TXPWR	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	Tx Power	-	TXPWR?	d1,d2,d3 d1: Tx Power(dBm/dB) d2: Tx Power(W) d3: Peak Factor(dB)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
CCDF	Auto Level Set	AUTOLVL	-	-	
	Scale Setup				
	X Scale Max	C2CCDFXMAX *	C2CCDFXMAX?	Integer (-20 to 70 dB/dBm)	
	X Scale Range	C2CCDFXRNG *	C2CCDFXRNG?	Integer (10 to 50 dB/dBm)	
	Power Unit				
	RELATIVE	C2CCDFUNIT REL	C2CCDFUNIT?	0:ABS POWER	
	ABS POWER	C2CCDFUNIT ABS		1:RELATIVE	
	Parameter Setup				
	Trigger Mode				
	INT	C2CCDFTRG INT	C2CCDFTRG?	0:INT	
	EXT	C2CCDFTRG EXT		1:EXT	
	Trigger Slope				
	+	C2CCDFTRGSLP RISE	C2CCDFTRGSLP?	0:-	
	-	C2CCDFTRGSLP FALL		1:+	
	Trigger Delay	C2CCDFTRGDLY *	C2CCDFTRGDLY?	Time	
	Meas Length	C2CCDFMLEN *	C2CCDFMLEN?	Integer (10000 to 100000000)	
	Trace Write				
	ON	C2CCDFTRC ON	C2CCDFTRC?	0:OFF	
	OFF	C2CCDFTRC OFF		1:ON	
	Starts measurement				
	CCDF	C2CCDF	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	CCDF	-	C2CCDF?	d1,d2,d3,d4,d5,d6,d7,d8 d1:Peak Factor d2:Average Power d3:10% d4:1% d5:0.1% d6:0.01% d7:0.001% d8:0.0001%	
	Marker Position	C2CCDFMK *	-	Level	
	Distribution/Power	-	C2CCDFMK?	d1,d2 d1:Distribution d2:Power	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Pilot/ MAC Channel Power	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup				
	PN Offset	PCPPNOFS *	PCPPNOFS?	Integer (0 to 511)	
	Bandpass Filter				
	ON	PCPBNDFLT ON	PCPBNDFLT?	0:OFF	
	OFF	PCPBNDFLT OFF		1:ON	
	Trigger Source				
	INT	PCPTRG INT	PCPTRG?	0:INT	
	EXT	PCPTRG EXT		1:EXT	
	INTRVL(EXT)	PCPTRG INTRVL1		2:INTRVL(EXT)	
	INTRVL	PCPTRG INTRVL2		3:INTRVL	
	EXT Trigger Slope				
	+	PCPTRGSLP RISE	PCPTRGSLP?	0:-	
	-	PCPTRGSLP FALL		1:+	
	Y Scale				
	10dB/div	PCPDIV P10DB	PCPDIV?	0:10dB/div	
	5dB/div	PCPDIV P5DB		1:5dB/div	
	Template				
	Selecting Template				
	User Template	PCPTEMP USER	PCPTEMP?	0: User Template	
	STD Template	PCPTEMP STD		1: STD Template	
	Editing Template	PCPTENT d1,d2,d3	PCPTENT?	d1,d2,d3 d1:Template level Y0(dB) d2:Template level Y1(dB) d3:Template level Y2(dB)	
	Average Times	PCPAVG *	PCPAVG?	Integer (1:OFF, 2 to 512)	
	Starts measurement				
	Pilot/MAC Channel Power	PCPMEAS			
	Starts measurement in the same mode	SI			
	Measurement results				
	Average		PCPAVGR?	Integer (1 to 512)	
	PN Offset		PCPPNOFSR?	Integer (0 to 511)	
	Burst Length		PCPBRSTLEN?	Time(sec)	
	ON Avg.		PCPONAVGPW?	Level(dBm)	
	ON Max.		PCPONMAXPW?	Level(dB)	
	ON Min.		PCPONMINPW?	Level(dB)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Pilot/ MAC Channel Power	Measurement results				
	OFF Avg.		PCPOFFAVGPW?	Level(dB)	
	OFF Max.		PCPOFFMAXPW?	Level(dB)	
	Rise Up TIme		PCPRISEUP?	Time(sec)	
	Fall Down Time		PCPFALLDN?	Time(sec)	
	PASS/FAIL judgment		PCPJDG?	0: FAIL 1: PASS	
	Marker Position	PCPMK *	PCPMK?	Integer (0 to 4096)	
			PCPMKCHIP?	d1,d2 d1:Chip number d2:Sample number	
	Power		PCPMKPW?	Level(dB)	
	Read All Marker Data				
	X-axis data		PCPMKGPHX?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Data(Integer)	
	Y-axis data		PCPMKGPHY?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Data(Level)	
Total Power	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup				
	PN Offset	TPWPNOFS *	TPWPNOFS?	Integer (0 to 511)	
	Bandpass Filter				
	ON	TPWBNDFLT ON	TPWBNDFLT?	0:OFF	
	OFF	TPWBNDFLT OFF		1:ON	
	Trigger Source				
	INT	TPWTRG INT	TPWTRG?	0:INT	
	EXT	TPWTRG EXT		1:EXT	
	INTRVL(EXT)	TPWTRG INTRVL1		2:INTRVL(EXT)	
	INTRVL	TPWTRG INTRVL2		3:INTRVL	
	EXT Trigger Slope				
	+	TPWTRGSLP RISE	TPWTRGSLP?	0:-	
	-	TPWTRGSLP FALL		1:+	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Total Power	Template				
	Selecting Template				
	User Template	TPWTEMP USER	TPWTEMP?	0: User Template	
	STD Template	TPWTEMP STD		1: STD Template	
	Editing Template	TPWTENT d1,d2	TPWTENT?	d1,d2 d1:Template level Y0(dB) d2:Template level Y1(dB)	
	Average Times	TPWAVG *	TPWAVG?	Integer (1:OFF, 2 to 512)	
	Starts measurement Total Power	TPWMEAS			
	Starts measurement in the same mode	SI			
	Measurement results				
	Average		TPWAVGR?	Integer (1 to 512)	
	PN Offset		TPWPNOFSR?	Integer (0 to 511)	
	Average Power		TPWAVGPW?	Level(dBm)	
	Maximum Power		TPWMAXPW?	Level(dB)	
	Minimum Power		TPWMINPW?	Level(dB)	
	PASS/FAIL judgment		TPWJDG?	0: FAIL 1: PASS	
	Marker Position	TPWMK *	TPWMK?	Integer (0 to 4096)	
			TPWMKCHIP?	d1,d2 d1:Chip number d2:Sample number	
	Power		TPWMKPW?	Level(dB)	
	Read All Marker Data				
	X-axis data		TPWMKGPHX?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Data(Integer)	
	Y-axis data		TPWMKGPHY?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Data(Real number)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	Auto Level Set	AUTOLVL	-	-	
	Graphics				
	Select Type				
	Constellation	MSCDPGTYP CON	MSCDPGTYP?	0: Constellation	
	Constellation(Line)	MSCDPGTYP CONLIN		1: Constellation(Line)	
	Constellation(Dot)	MSCDPGTYP CONDOT		2: Constellation(Dot)	
	Constellation (Line&Dot)	MSCDPGTYP CONLINDOT		3: Constellation (Line&Dot)	
	I EYE Diagram	MSCDPGTYP ICHEYE		4: I EYE Diagram	
	Q EYE Diagram	MSCDPGTYP QCHEYE		5: Q EYE Diagram	
	I/Q EYE Diagram	MSCDPGTYP IQCHEYE		6: I/Q EYE Diagram	
	E.V.M vs Chip	MSCDPGTYP EVM		7: E.V.M vs Chip	
	Mag Error vs Chip	MSCDPGTYP MAGERR		8: Mag Error vs Chip	
	Phase Error vs Chip	MSCDPGTYP PHAERR		9: Phase Error vs Chip	
	Plot Type				
	AVG	MSCDPGPLOT AVG	MSCDPGPLOT?	0: AVG	
	P-P	MSCDPGPLOT PP		1: P-P	
	View Setup				
	Format				
	GRAPH	MSCDPFMT GRP	MSCDPFMT?	0: GRAPH	
	TABLE	MSCDPFMT TBL		1: TABLE	
	NUMERIC	MSCDPFMT NUM		2: NUMERIC	
	Y Scale				
	ρ	MSCDPYSCL RHO	MSCDPYSCL?	0: ρ	
	ρ (ALL)	MSCDPYSCL RHOALL		1: ρ(ALL)	
	Y/div				
	10/div	MSCDPPDIV P10	MSCDPPDIV?	0: 10/div	
	5/div	MSCDPPDIV P5		1: 5/div	
	Parameter Setup				
	Meas Range	MSCDPMRNG *	MSCDPMRNG?	Integer (1 to 8)	
	Threshold	MSCDPTHRSH *	MSCDPTHRSH?	Level (-50 to 0 dB)	
	PN Offset Search Mode				
	ON	MSCDPPNMOD ON	MSCDPPNMOD?	0: OFF	
	OFF	MSCDPPNMOD OFF		1: ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	PN Delay	MSCDPPNDLY *	MSCDPPNDLY?	Integer(0 to 511)	
	Long Code Mask I	MSCDPLCMI *	MSCDPLCMI?	Hexadecimal number (0 to 3FFFFFFFFF)	
	Long Code Mask Q	MSCDPLCMQ *	MSCDPLCMQ?	Hexadecimal number (0 to 3FFFFFFFFF)	
	Trigger Source				
	INT	MSCDPTRG INT	MSCDPTRG?	0: INT	
	EXT	MSCDPTRG EXT		1: EXT	
	INTRVL(EXT)	MSCDPTRG INTRVL1		2: INTRVL(EXT)	
	INTRVL	MSCDPTRG INTRVL2		3: INTRVL	
	EXT Trigger Slope				
	+	MSCDPTRGSLP RISE	MSCDPTRGSLP?	0: -	
	-	MSCDPTRGSLP FALL		1: +	
	EXT Trigger Delay	MSCDPTRGDLY *	MSCDPTRGDLY?	Time (-5000.0 to 5000 µsec)	
	Freq Meas Range				
	150Hz	MSCDPFRRNG 150HZ	MSCDPFRRNG?	0: 150Hz	
	1kHz	MSCDPFRRNG 1KHZ		1: 1kHz	
	4kHz	MSCDPFRRNG 4KHZ		2: 4kHz	
	Chip Rate Error				
	ON	MSCDPCHIPERR ON	MSCDPCHIPERR?	0: OFF	
	OFF	MSCDPCHIPERR OFF		1: ON	
	Quadrature Error				
	ON	MSCDPQUADERR ON	MSCDPQUADERR?	0: OFF	
	OFF	MSCDPQUADERR OFF		1: ON	
	Starts measurement Code Domain Power	MSCDPMEAS			
	Starts measurement in the same mode	SI			
	Measurement results Format: GRAPH				
	ρ overall		MSCDPRHO?	Real number	
	Carrier Frequency Error		MSCDPCFER?	d1,d2 d1: Frequency (Hz) d2: Real number (ppm)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	Measurement results				
	Format: GRAPH				
	EVM		MSCDPEVM?	Real number(%rms)	
	Tx Power		MSCDPTXPOW?	Level (dBm)	
	RRI/Pilot		MSCDPRRIPLT?	Level (dB)	
	ACK/Pilot		MSCDPACKPLT?	Level (dB)	
	DRC/Pilot		MSCDPDRCPLT?	Level (dB)	
	Data/Pilot		MSCDPDATPLT?	Level (dB)	
	Peak Inactive ρ		MSCDPINACTRHO?	d1,d2,d3,d4 d1:Level (dB) d2:Channel number d3:Walsh Length d4:Phase (0:re, 1:im)	
	Graph Marker				
	Marker display switch				
	Left screen (I channel)	MSCDPACTTRC A	MSCDPACTTRC?	0:I Channel	
	Right screen (Q channel)	MSCDPACTTRC B		1:Q Channel	
	Marker Position	MSCDPMK *	MSCDPMK?	Integer	
	Walsh Code Number		MSCDPMKWNUM?	Integer	
	Walsh Code Length		MSCDPMKWLEN?	Integer	
	ρ (dB)		MSCDPMKRHOLOG?	Level (dB)	
	ρ (Linear)		MSCDPMKRHO?	Real number	
	Symbol Rate		MSCDPMKSYMRT?	Real number (ksps)	
	ρ• TxPow		MSCDPMKABSPOW?	d1,d2 d1:Level(dBm) d2:Level(W)	
	Read All Marker Data				
	Walsh Code Number		MSCDPGPHWNUM?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Walsh Code Number (Integer)	
	Walsh Code Length		MSCDPGPHWLEN?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Walsh Code Length (Integer)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	ρ (dB)		MSCDPGPHRHOLOG?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn:Level(dB)	
	ρ (Linear)		MSCDPGPHRHO?	n<CR+LF>+d1<CR+LF>+...+dn<CR+LF> n:Number of output data (Integer) dn: ρ (Real number)	
	Symbol Rate		MSCDPGPHSYMRT?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn:Symbol Rate (ksps)	
	ρ•TxPow		MSCDPGPHABSPOW?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn:Level(dBm)	
			MSCDPGPHABSPOWW?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn:Level (W)	
	Format: Table				
	I Channel		MSCDPTBLICH?	n<CR+LF>+w1,l1,r1,a1<CR+LF>....+wn,ln,rn,an<CR+LF> n:Data amount(Integer) wn:Walsh Code Number (Integer) ln:Walsh Code Length (Integer) rn:ρ(Real number) an:0:Inactive, 1:Active	
	Q Channel		MSCDPTBLQCH?	n<CR+LF>+w1,l1,r1,a1<CR+LF>....+wn,ln,rn,an<CR+LF> n:Data amount(Integer) wn:Walsh Code Number (Integer) ln:Walsh Code Length (Integer) rn:ρ(Real number) an:0:Inactive, 1:Active	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	Format: NUMERIC				
	ρ overall		MSCDPRHO?	Real number	
	τ (Time Aligmrnt Error)		MSCDPTAU?	Time(sec)	
	PN Delay		MSCDPPNDLYRES?	Integer	
	Carrier Frequency Error		MSCDPCFER?	d1,d2 d1:Frequency (Hz) d2:Real number (ppm)	
	Magnitude Error		MSCDPMAG?	Real number (%rms)	
	Phase Error		MSCDPPHE?	Real number (deg. rms)	
	EVM		MSCDPEVM?	Real number (%rms)	
	Peak EVM		MSCDPPKEVM?	Real number (%)	
	I/Q Origin Offset		MSCDPIQOFS?	Level (dBc)	
	Peak Inactive ρ		MSCDPINACTRHO?	d1,d2,d3,d4 d1:Level (dB) d2:Channel number d3:Walsh Length d4:Phase (0:rc, 1:im)	
	Tx Power		MSCDPTXPOW?	Level(dBm)	
	Chip Rate Error		MSCDPCHIPERRRES?	Real number(ppm)	
	Quadrature Error		MSCDPQUADERRRES?	Real number(deg.)	
	Graphics				
	Tx Power		MSCDPTXPOW?	Level (dBm)	
	EVM		MSCDPEVM?	Real number (%rms)	
	Magnitude Error		MSCDPMAG?	Real number (%rms)	
	Carrier Frequency Error		MSCDPCFER?	d1,d2 d1: Frequency (Hz) d2: Real number (ppm)	
	Phase Error		MSCDPPHE?	Real number (deg. rms)	
	I/Q Origin Offset		MSCDPIQOFS?	Level(dBc)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	Graph Marker				
	Constellation				
	Constellation(Line)				
	Constellation(Dot)				
	Constellation(Line&Dot)				
	I EYE Diagram				
	Q EYE Diagram				
	I/Q EYE Diagram				
	Chip number	MSCDPGMKCHIP *	MSCDPGMKCHIP?	Integer	
	I-Phase data		MSCDPGMKI?	Phase	
	Q-Phase data		MSCDPGMKQ?	Phase	
	E.V.M. vs Chip				
	Mag Error vs Chip				
	Marker Position	MSCDPGMK *	MSCDPGMK?	Integer	
	Chip number		MSCDPGMKCHIPNO?	Integer	
			MSCDPGMKERR?	%	
	Phase Error vs Chip				
	Marker Position	MSCDPGMK *	MSCDPGMK?	Integer	
	Chip number		MSCDPGMKCHIPNO?	Integer	
			MSCDPGMKDEG?	degree	
	Read All Marker Data				
	Constellation				
	Constellation (Line)				
	Constellation(Dot)				
	Constellation(Line&Dot)				
	I EYE Diagram				
	Q EYE Diagram				

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Code Domain Power	I/Q EYE Diagram Chip number	MSCDPGGPHCHIP *	MSCDPGGPHCHIP?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn:Chip number(Integer)	
	I-Phase data		MSCDPGGPHI?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: Phase	
	Q-Phase data		MSCDPGGPHQ?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: Phase	
	E.V.M. vs Chip Mag Error vs Chip Chip number		MSCDPGGPHCHIPNO?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: Chip number(Integer)	
			MSCDPGGPHERR?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: %	
	Phase Error vs Chip Chip number		MSCDPGGPHCHIPNO?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: Chip number(Integer)	
			MSCDPGGPHDEG?	n<CR+LF>+d1<CR+LF>+...+dn<CR+CF> n: Number of output data (Integer) dn: degree	

Table 4-13 Numeric Keys/Step Keys/Data Knob/Unit Keys (Entering Data)

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Entering data	0 to 9	0 to 9	-	-	
	. (Decimal point)	.	-	-	
	GHz	GZ	-	-	
	MHz	MZ	-	-	
	kHz	KZ	-	-	
	Hz	HZ	-	-	
	mV	MV	-	-	
	mW	MW	-	-	
	dB	DB	-	-	
	mA	MA	-	-	
	sec	SC	-	-	
	ms	MS	-	-	
	μs	US	-	-	
	ENTER	ENT	-	-	

Table 4-14 Miscellaneous

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Miscella-neous	Judgment result reading	-	OPF?	0: PASS 1: FAIL(Upper) 2: FAIL(Lower) 3: FAIL(Upper&Lower) 4: Error	
	Outputting error number	-	ERRNO?	Integer	
	Local	LC	-	-	
	Reading GPIB address	-	AD?	Integer (0 to 30)	
	Specification of the delimiter CR LF <EOI> LF <EOI> CR LF LF <EOI>	 DL0 DL1 DL2 DL3 DL4	-	-	
	Service request interruption ON OFF	 S0 S1	-	-	
	Status clear	S2	-	-	
	Service request mask	RQS *	RQS?	Decimal number corresponding to the SRQ bit	
	Outputting ID of the instrument	-	*IDN?	Manufacturer name (character string), instrument type (character string), 0 and revision (character string)	
	Initializing the instrument	*RST	-	-	
	Clearing the queues related to the status byte	*CLS	-	-	
	Accessing the standard event enable register	*ESE *	*ESE?	Decimal number corresponding to the register bits	
	Reading or clearing the standard event enable register	-	*ESR?	Decimal number corresponding to the register bits	
	Accessing the service request enable register	*SRE *	*SRE?	Decimal number corresponding to the register bits	
	Reading the status byte and MSS bit	-	*STB?	Decimal number corresponding to the status byte	
	Accessing the operation status enable register	OPR *	OPR?	Decimal number corresponding to the register bits	
	Reading or clearing the operation status register	-	OPREVT?	Decimal number corresponding to the register bits	

5 TECHNICAL INFORMATION

5.1 Template Edit Function

In TRANSIENT mode, the user can change template. It is necessary to pay attention when entering template, because the data can be interpreted as a relative or absolute value, depending on the setting of Template Couple to Power ON/OFF in the Config menu.

The PASS/FAIL judgment is performed and then the result is displayed on the screen, when Template ON/OFF in the Template menu is set to ON.
The setting values are retained even if a preset is executed.

5.1.1 Template Setting in the T-Domain Measuring Mode

When Template Couple to Power is set to OFF, template (Y axis data) is interpreted as an absolute value. As a result, the template consists of the data you entered.

Use the Shift X/Y keys to adjust the template position over the measured value.

When Template Couple to Power is set to ON, template (Y axis data) is interpreted as a relative value to the average power.

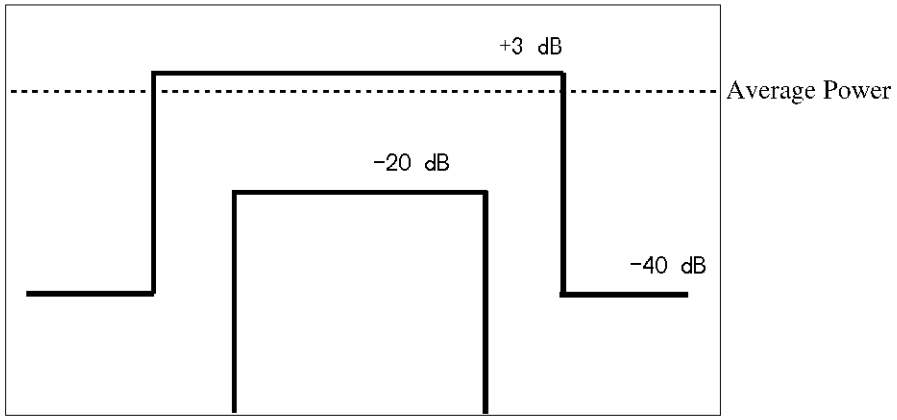


Figure 5-1 Template to Be Set

For example, the upper template defines the power of the signal during the burst period as +3 dB and -40 dB. To set this power to the template, use the settings shown in Figure 5-2.
Set the template using the relative values with reference to the average power.

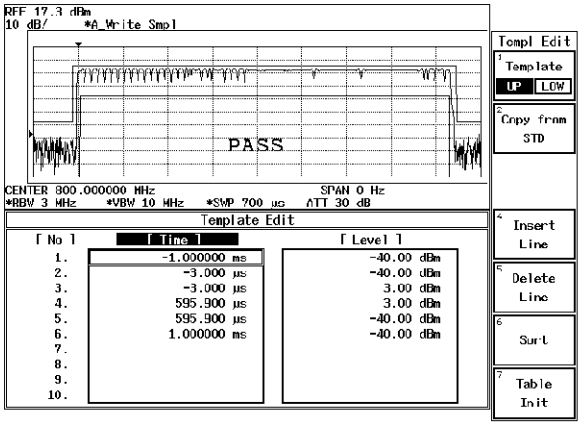


Figure 5-2 Template Settings

When you shift the template to the direction of Y axis using Shift X/Y function while the Template Couple to Power is set to ON, the relative value to the average power is: Relative value (set on the template) + Shifted data on Y axis.

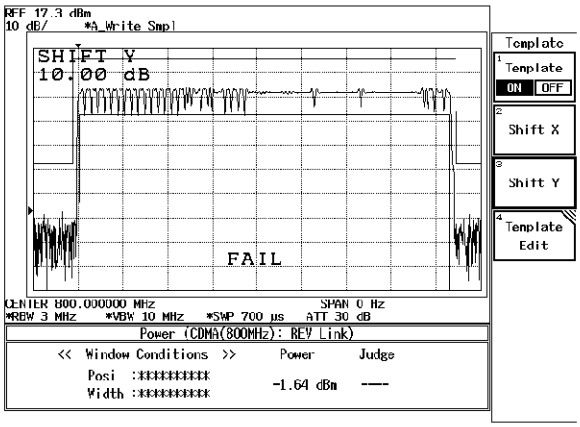


Figure 5-3 Template Shifted Using the Shift Y Function

5.1.2 Template Setting in the F-Domain Measuring Mode

In F-Domain measurement mode, the carrier frequencies depend on the channel numbers. As a result, use the offset frequency from the carrier frequency for template's X axis data.

Set the carrier frequency on the template to 0 Hz so that you can use plus or minus values for the offset frequencies.

The analyzer sets the template by adding the center frequency currently used to X value in the Shift X menu.

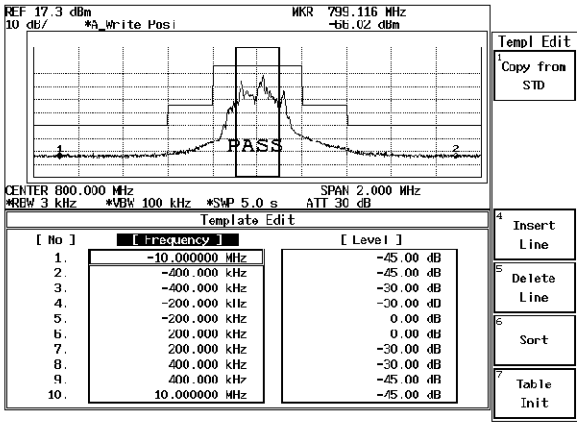


Figure 5-4 Template with the Set Values

Soft menu Margin delta X expands the template frequency by (X/2 to both sides toward plus and minus frequency directions) from the 0 Hz on the template.

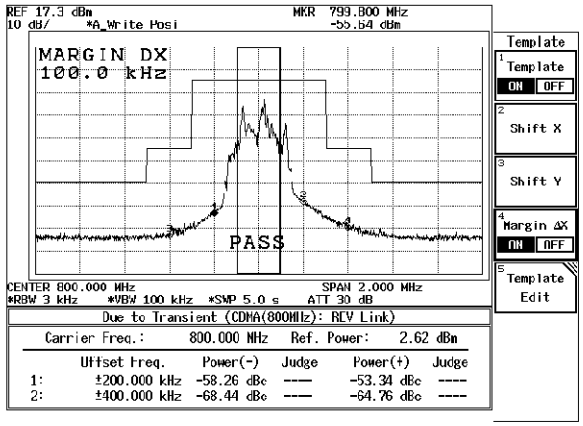


Figure 5-5 Template with Margin Delta X

When Template Couple to Power is set to OFF, template (Y axis data) is interpreted as an absolute value. As a result, the template is made up of the data you entered.

Use the Shift X/Y keys to adjust the template position over the measured value.

When Template Couple to Power is set to ON, template (Y axis data) is interpreted as a relative value to the average power.

When the template is shifted on Y axis using the Shift X/Y function, the relative value to the average power is: Relative value (set on the template) + Shifted data on Y axis.

5.2 Measurement Parameter Settings in Due to Transient, Due to Modulation and In-band Spurious

In TRANSIENT mode, any parameters are compliant with the communication standard when you specify the communication standard. You can also change the measuring frequency and the secondary processing of the measured results.
For the method of changing these, refer to the following

5.2.1 Marker Edit Function

Measurement frequency can be set using Marker Edit in Due to Transient, Due to Modulation or Inband Spurious function (these three functions are found within the Transient mode). In addition, each limit level can be set using Marker Edit.
The setting values are retained even if a preset is executed.

(1) Marker Edit used in the Due to Transient and Due to Modulation

The measuring frequency is set using the offset frequency from a carrier frequency. If you set the offset frequency to 200 kHz, the offset frequencies (+200 kHz and -200 kHz) can be measured. The Normal marker, Integral marker and Root Nyquist marker are available.

Normal marker is used to read the level of the frequency previously set, and the Integral marker is used to calculate the power of the bandwidth whose center frequency is specified by Marker Edit.

When Root Nyquist is selected, calculates the power of the bandwidth to which the Root Nyquist filter is applied. Set the Root Nyquist filter at Config in Parameter Setup.

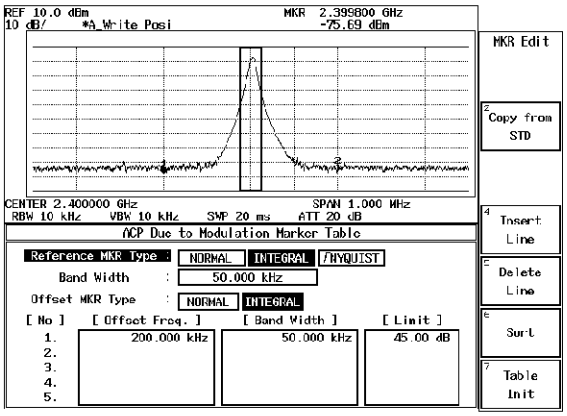


Figure 5-6 Example of Marker Edit Setting (1)

(2) Marker Edit used in the Inband Spurious

Measuring frequency range is set using the offset frequency form the carrier frequency. If you set 3 MHz and 10 MHz, the peak search is performed for two ranges: one of the two offset frequency range is between -3 MHz and -10 MHz; another range is between +3 MHz and +10 MHz.

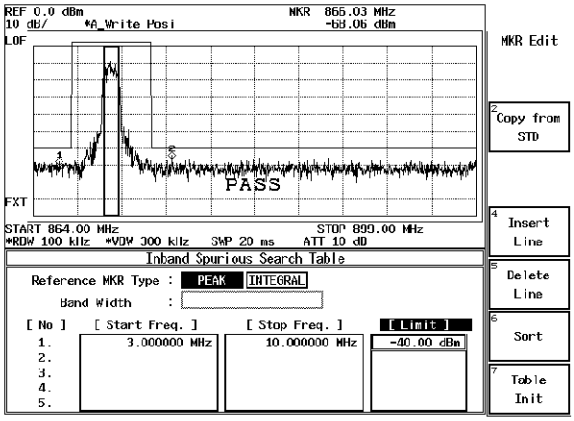


Figure 5-7 Example of Marker Edit Setting (2)

Peak marker is set using the Peak Marker Y Delta soft key in the Config menu.

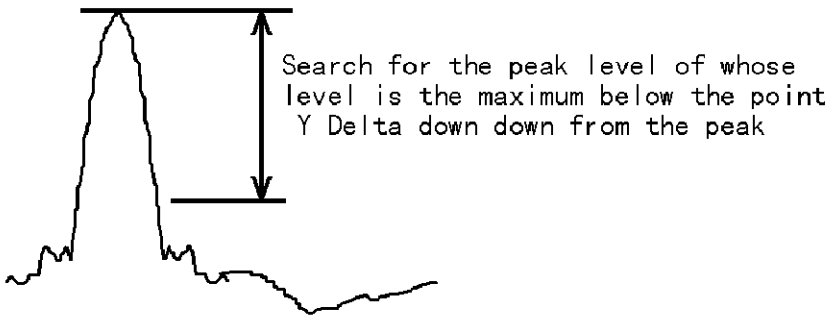


Figure 5-8 Example of Peak Marker Y Delta

5.2.2 Measurement results Using Due to Modulation, Due to Transient and Inband Spurious Modes

In spectrum measurements, there are three methods for displaying results of adjacent or alternate adjacent channel leakage power measurements.

(1) The measured value displays the absolute level of the marker, which is located at an offset frequency from the carrier frequency.

(2) The ratio of the absolute level of the marker to the absolute level of the carrier is displayed. The marker point is located at an offset frequency from the carrier frequency.

(3) The value obtained in (2) is multiplied by the level by the power meter. The calculated value is then displayed.

This method is used when the absolute value of the adjacent channel power cannot be measured. The ratio of the adjacent channel power to the carrier power can be measured only when Detector is set to Posi. However, the absolute level cannot be measured.

To display a measured value in (1), select MARKER on the Result: MARKER/RELATIVE/ABS POWER menu in the Parameter Setup dialog box.

To display the measured value in (2), select RELATIVE.

To display a measured value in (3), select ABS POWER. In addition, use the Marker Edit menu to set up measurement conditions for the carrier power. Set the MKR Type to NORMAL, INTEGRAL or √NYQUIST in the Reference Marker in order to measure the carrier power.

To measure the power of the bandwidth by integration, Reference MKR Type must be set to INTEGRAL.

To measure a point level (marker reading), Reference MKR Type must be set to NORMAL.

To measure adjacent channel power, set Offset MKR Type to NORMAL, INTEGRAL or √NYQUIST. To measure the carrier power in (2) or (3), there are two methods: one is by setting the Marker Edit to the Reference MKR type (set the Ref Power to REF MARKER. Ref Power is in the Parameter Setup dialog box on the config menu); another is to measure power using the DSP (set the Ref Power to MODULATION. Ref Power is in the Parameter Setup dialog box on the config menu).

When REF MARKER is selected, the carrier power is measured by setting Reference MKR Type in the Marker Edit menu.

When MODULATION is selected, the carrier power is measured by Tx Power (Modulation, Tx Power).

When ABS POWER of the Result is selected from the Parameter Setup dialog box in the Config Menu, the ratio of Offset MKR to Reference MKR is calculated, the measurement value from Tx Power is multiplied by this ratio. Then, the result will be displayed.

5.2.3 Measurement Result of Inband Spurious

In Spurious measurements, there are two methods:

(1) After searching for the peak on the trace, the frequency and level at the marker are displayed.

(2) After searching for the peak on the trace, the ratio of the marker level to the carrier level is displayed.

(3) The calculated level, which is calculated using the result obtained in (2) and the level on the power meter is displayed.

To display the measured value in (1), select MARKER on the Result: MARKER/RELATIVE/ABS POWER menu in the Parameter Setup dialog box. And also, to display the measured value in (2), select RELATIVE; for the (3), select ABS POWER. The measurement conditions for the carrier power is set up using the Marker Edit menu. To measure the carrier power, set Reference MKR Type to PEAK or NORMAL.

To measure the carrier power at the specified frequency, NORMAL is set; and to measure the carrier power at the peak on the trace, PEAK is set.

To measure the carrier power in (2) or (3), there are two methods: one is by setting the instrument to the Reference MKR type in the Marker Edit menu; another is by the DSP.

When Ref Power is set to REF MARKER, the carrier power is measured by Reference MKR Type in the Marker Edit menu.

When Ref Power is set to MODULATION, the carrier power is measured by the Tx Power (Modulation, Tx Power).

5.3 Peak Factor of Tx Power

The calculation of a peak factor is made using the following equation:

Peak Factor = Peak power/Average power.

The peak power and average power are obtained from the envelope after down-converting the input signal into the base band.

Make sure the RF status of the input signal is not the peak power of IF.

5.4 Trigger Source INTRVL (EXT) and INTRVL

The instrument has the internal trigger generated every 26.6 milliseconds (PN Sequence repetition rate). For this internal trigger, there are two modes: one sets the trigger to Free Run state and the other makes the signal synchronize with the external trigger.

In the code domain measurement, the even second signal produced every two seconds is normally used as an external trigger.

Even when there is no external trigger, the measurement is made possible by measuring the delay using the INTRVL trigger and setting this delay value. In this case, however, the drift of the delay occurs due to the frequency reference error due to a measurement for a long time. Applying the 10 MHz reference signal in synch with the DUT signal to the instrument allows you to prevent this drift from occurring.

5.5 About Complementary Filter

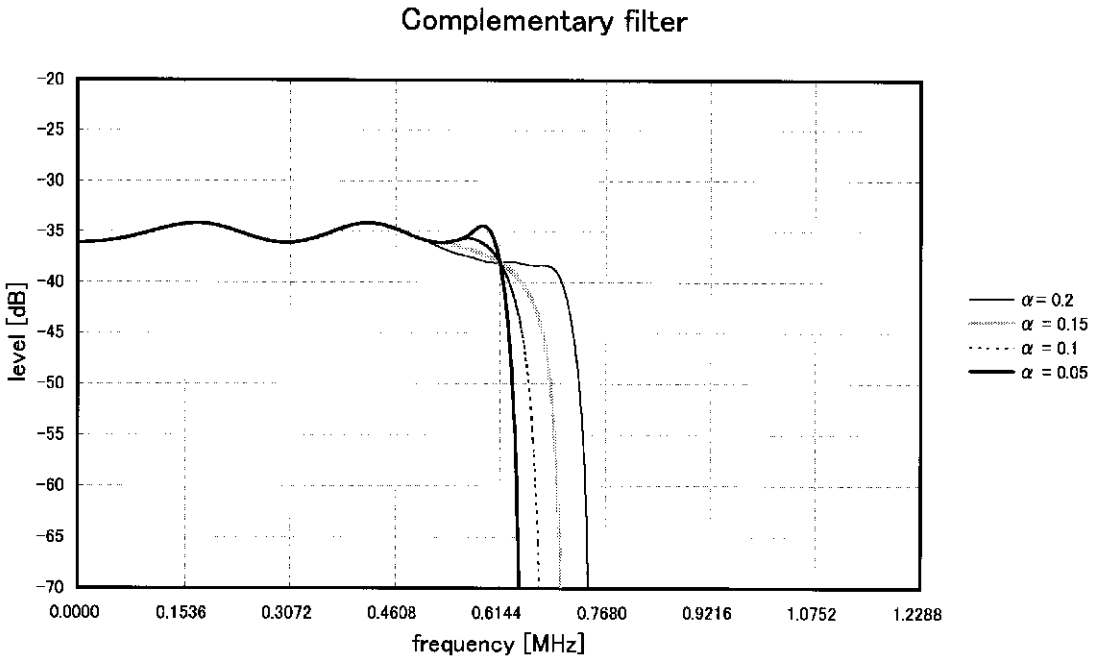
The complementary Filter is a filter used to measure the code domain.

This complementary filter is used to generate a signal which is equivalent to the signal that passed through the Nyquist filter.

Since there is no standard specification available for the roll-off coefficient of the Nyquist filter, this device can be set with a coefficient in the range of 0.05 to 0.20.

When the roll-off coefficient is changed, the bandwidth of the complementary filter is changed accordingly.

The following graph shows an example of the complementary filter bandwidth when the roll-off coefficient is changed.



5.6 About Equalizing Filter

For the IS-856 Phase Characteristics, it is specified that the Access Network shall equalize the phase of a signal to be transmitted through the path. The equalizing filter is defined by the following expression.

$$H(W) = k\frac{W^2 + j\alpha WW_0 - W_0^2}{W^2 - j\alpha WW_0 - W_0^2}$$

k : Arbitrary gain
j : $\sqrt{-1}$
α : 1.36
W_0 : $2\pi \times 3.15 \times 10^5$
W : Radian frequency

When a signal sent from the Access Network passes through the Equalizing Filter, the R3267 Series can analyze the waveform using a filter with the inverted characteristics of the Equalizing Filter.

To do this, set the Equalizing Filter setting in the Parameter Setup soft menu to ON.

To analyze a signal which is not passing through the Equaling Filter, set the Filter to OFF.

NOTE: ***Because of the interference between symbols due to baseband filter specified by IS-2000, the constellation does not converge to a point, even if the offset value is shifted using the Offset QPSK function.***

5.7 Block Diagram

This section shows the block diagram for the modulation analysis hardware.

The Figure 5-9 shows the modulation analysis part. Therefore the spectrum analyzer part is simplified. The area inside the double lines is the block diagram for the spectrum analyzer, and the part outside that area represents the modulation analysis hardware.

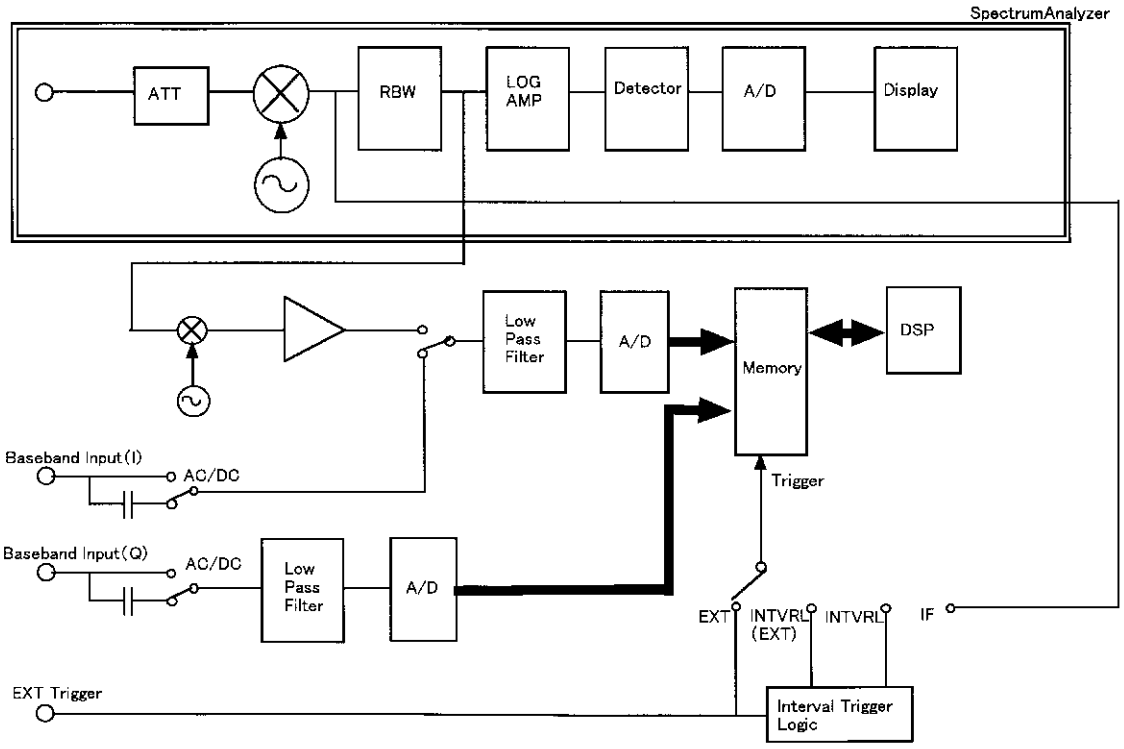


Figure 5-9 Block Diagram

6 PERFORMANCE VERIFICATION TEST

6.1 General

6.1.1 Introduction

This chapter provides R3267 Series OPT67/OPT69 performance verification test procedures, item by item as listed in Table 6-1.

Performance verification test will be carried out under following condition.

Temperature range: 20 °C to 30 °C

Relative Humidity: 85 % or less

Table 6-1 Performance Verification Items

No.	Mode	Test Items
6.2.1	Code Domain Measurement in RF Input (Forward Link Setting)	Carrier Frequency Accuracy
		Waveform Quality Accuracy (ρ pilot, ρ overall-1, ρ overall-2)
6.2.2	Code Domain Measurement in IQ Input (Forward Link Setting)	Waveform Quality Accuracy (ρ pilot, ρ overall-1, ρ overall-2)
6.2.3	Code Domain Power Measurement in RF Input (Reverse Link Setting)	Carrier Frequency Accuracy
		Waveform Quality Accuracy (ρ overall)
6.2.4	Code Domain Power Measurement in IQ Input (Reverse Link Setting)	Waveform Quality Accuracy (ρ overall)

6.1.2 Test Equipment

The Table 6-2 lists recommended test equipment.
In the usage column, the PV is abbreviation of performance verification.
The equipment needed to perform all of the performance test.
Equipment lists for individual tests are provided in each performance verification test.

NOTE:

1. ***The R3267 Series with OPT67/OPT69 to be tested should be warm up for at least 30 minutes before starting test.***
2. ***Make sure that the test equipment used meets its own published specifications.***
3. ***Any equipment that meets the critical specifications given in the table can be substituted for recommended models.***
4. ***The IQ level and DC offset of both SG1 and SG2 must be matched.***
5. ***The total performance of SG1 and SG2 must cover the R3267 Series tested specifications.***
6. ***When SMIQ03 is used as IQ modulation signal generator, set SMIQ03 controls as follows;***
   VECTOR MOD: STATE ON
   IQ SWAP: ON

Table 6-2 Equipment List

No.	Description	Critical Specification	Recommended Model	Manufacturer	Usage	Notes
1	Arbitrary Signal Generator	Output Channels: 4 channel required Capable to assign the output signal I-CH signal at CH1 Q-CH signal at CH2 Trigger signal (TTL) at CH3 Clock signal at CH4	AWG2021	Tektronix	PV	SG1
2	I/Q Modulation Signal Generator	Frequency Range: 30 MHz to 3 GHz IQ Modulation Bandwidth: > 5 MHz ρ: > 0.999	SMIQ03	Rohde&Schwarz	PV	SG2
3	Signal Generator	Frequency Range: ≤ 10 MHz Output Level: ≥ 0.5 V 50Ω	SMIQ03	Rohde&Schwarz	PV	SG3
4	RF Cable	BNC(m)-BNC(m), 50Ω	A01036-1500	Advantest	PV	-
5	Adapter	Type N(m)-BNC(f)	JUG-201-U	Advantest	PV	-

6.1.3 Specifications Required for Test Signals

Table 6-3 provides the specifications required for performance verification test signals based on the requirements.

Table 6-3 Specifications Required for Test Signals

<table>
<tr><th>No.</th><th>Test Signal</th><th>Specification Required</th><th>Usage</th></tr>
<tr><td>1</td><td>Forward Traffic signal</td><td>Complied with 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: The one-slot version of 614.4 kbps
Required continuous transmission
RA channel: MAC Index 4</td><td>Carrier Frequency Accuracy (RF Input)
Waveform Quality Accuracy (RF Input, and IQ Input)</td></tr>
<tr><td>2</td><td>Reverse Traffic signal</td><td>Complied with IS-856 Reverse Link Signal
Long Code Mask I: 33333333333
Long Code Mask Q: 26666666667
Pilot, ACK, DRC and Data Channel Multiplexed signals
<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: Transmits data in all slots
DRC channel: Continuously transmits data</td><td>Code Domain Power measurement (RF Input, and IQ Input)</td></tr>
</table>

Figure 6-1 shows the timing chart of the trigger signal and the Traffic signal listed in Table 6-3.

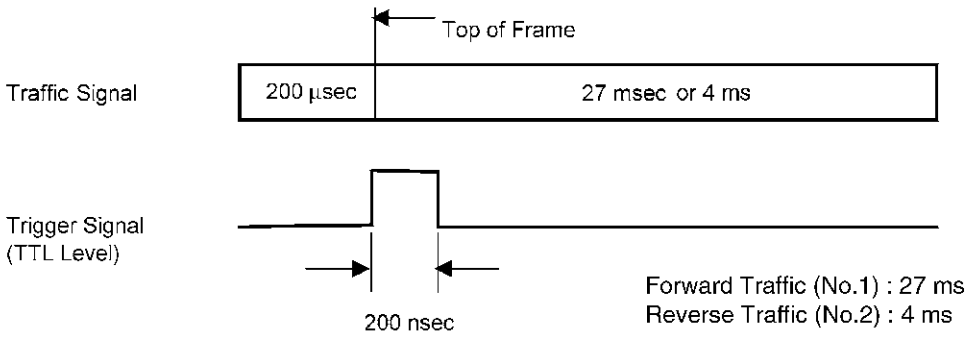


Figure 6-1 Timing Chart of the Trigger Signal, and the Test Signals 1 and 2 in Table 6-3

6.1.4 Calibration Cycle

The performance verifications test should be used to check the spectrum analyzer against its specifications once a year recommended.

6.1.5 Performance Verification Test Record Sheet

The performance verification test record sheet and performance check record sheet is provided at the end of this chapter.
The test record lists test specification and acceptable limits.
Recommend that make a copy of this table, record the complete test results on the copy, and keep the copy for calibration test record.
This record could prove invaluable in tracking gradual changes in test result over long periods of the time.

6.1.6 Performance Verification Procedure

Typeface conventions used in this manual.

*Panel keys and soft keys are printed in a contrasting typestyle to make them stand out form the text as follows:

Panel keys: Boldface type	Example: **FREQ, FORMAT**
Soft keys: Boldface and Italic	Example: ***Center, Trace Detector***

*When a series of key operations are described using a comma between two keys.
*There are various soft menus used to switch between two states such as ON/OFF and AUTO/MNL.
For example, when turning off the ***Display ON/OFF*** function, the annotation "***Display ON/OFF (OFF)***" is used.
When switching the RBW AUTO/MNL function to MNL, the annotation "***RBW AUTO/MNL(MNL)***" is used.

6.2 Performance Verification Test Procedure

6.2.1 Code Domain Measurement in RF Input Mode (Forward Link Setting)

Description

Test a carrier frequency accuracy, and waveform quality in RF input measurement mode.

Specification

Carrier Frequency Accuracy:	±5 Hz
Waveform Quality (ρ pilot, ρ overall-1, ρ overall-2):	±0.005

Equipment used

Arbitrary Waveform Generator:	SG1
IQ Modulation Signal Generator:	SG2
Signal Generator:	SG3
RF Cable:	BNC (m)-BNC (m)
Adapter:	Type N (m)-BNC (f)

Setup

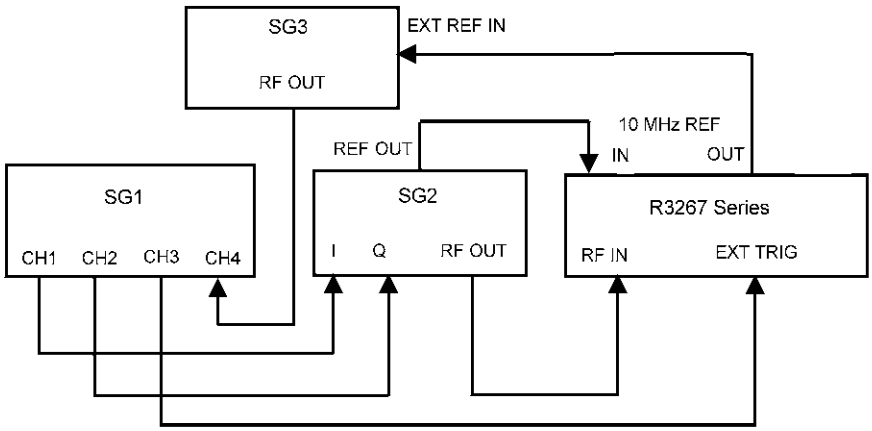


Figure 6-2 Setup of Code Domain Measurement (in RF Input) (Forward Link)

Procedure

1. Connect the R3267 series equipment to the signal generator as shown in Figure 6-2.

2. On the SG1, set controls to generate the baseband Forward Traffic signal (described in No.1 of Table 6-3) from CH1 and CH2 and generate the trigger signal from CH3.

3. Set the SG2 in the external IQ modulation operation mode and output 870.03 MHz frequency at 0 dBm level.

4. On the SG3, set controls to generate clock signal for the SG1-CH4.

5. Set up the R3267 series equipment for 870.03 MHz center frequency and RF input signal measurement. Set parameters as shown in Figure 6-3 and execute ***DC CAL*** and ***AUTO LEVEL***.

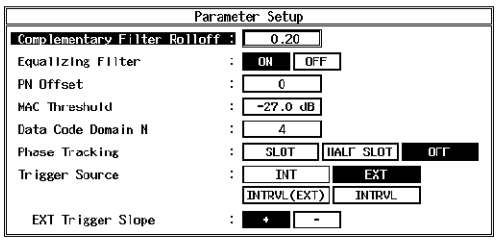


Figure 6-3 Measurement Parameters for Code Domain (RF Input) (Forward Link)

6. Press **SINGLE** to start the measurement.

7. Recorded the measurement result in the performance verification test record sheet.

6.2.2 Code Domain Measurement in IQ Input Mode (Forward Link Setting)

Description

Test a waveform quality in IQ input measurement mode.

Specification

Waveform Quality

(ρ pilot, ρ overall-1, ρ overall-2): ±0.005

Equipment used

Arbitrary Waveform Generator: SG1

Signal Generator: SG3

RF Cable: BNC (m)-BNC (m)

Adapter: Type N (m)-BNC (f)

Setup

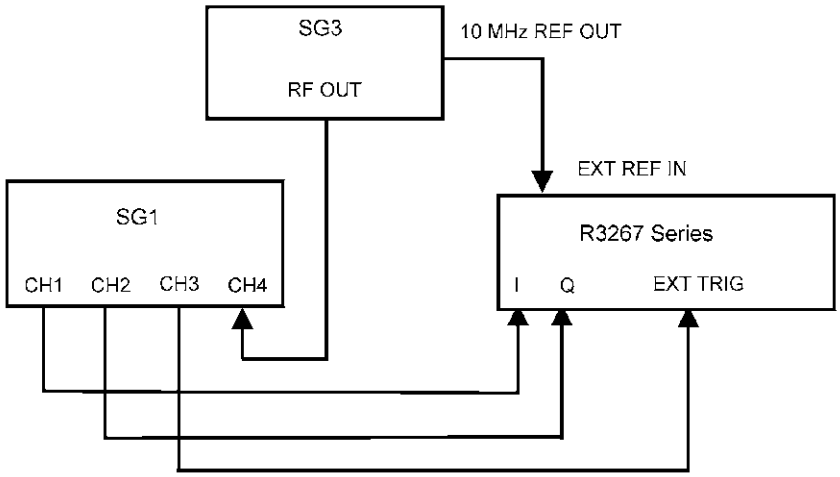


Figure 6-4 Setup of Code Domain Measurement (in IQ Input) (Forward Link)

Procedure

1. Connect the R3267 series equipment to the signal generator as shown in Figure 6-4.

2. On the SG1, set controls to generate the baseband Forward Traffic signal (described in No.1 of Table 6-3) from CH1 and CH2 and generate the trigger signal from CH3.

3. On the SG1, set output level to 0.8 Vp-p for CH1 and CH2.
Both output signals must be balanced.

4. Set up the R3267 series equipment for BASEBAND(I&Q) input signal measurement. Set parameters as shown in Figure 6-5 and execute ***DC CAL***.

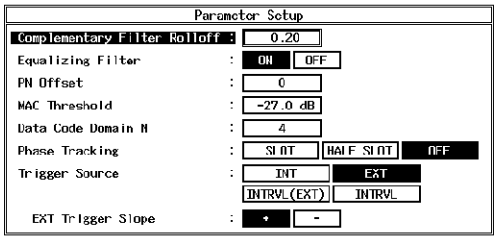


Figure 6-5 Measurement Parameters for Code Domain (IQ Input) (Forward Link)

5. Press **SINGLE** to start the measurement.

6. Recorded the measurement result in the performance verification test record sheet.

6.2.3 Code Domain Power Measurement in RF Input Mode (Reverse Link Setting)

1. Connect the R3267 series equipment to the signal generator as shown in Figure 6-6.

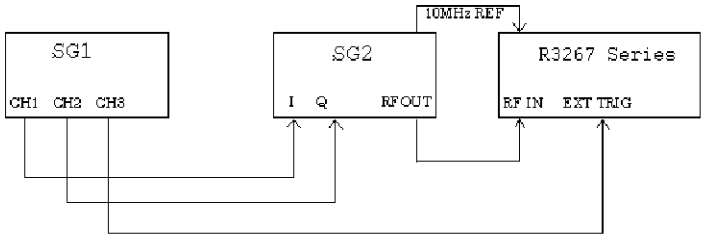


Figure 6-6 Setup for RF Signal Measurement (Reverse Link)

2. On the SG1, set controls to generate the baseband Reverse Traffic signal (described in No.2 of Table 6-3) from CH1 and CH2 and generate the trigger signal from CH3.

3. Set the SG2 in the external IQ modulation operation mode and output 825.03 MHz frequency at 0 dBm level.

4. Set up the R3267 series equipment for 825.03 MHz center frequency and RF input signal measurement. Set parameters as shown in Figure 6-7 and execute ***DC CAL*** and ***AUTO LEVEL***.

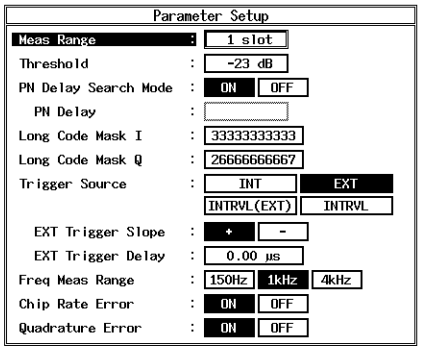


Figure 6-7 Parameter Setup (Reverse Link)

5. Press **SINGLE** to start the measurement.

6. Recorded the measurement result in the performance verification test record sheet.

6.2.4 Code Domain Power Measurement in IQ Input Mode (Reverse Link Setting)

1. Connect the R3267 series equipment to the signal generator as shown in Figure 6-8.

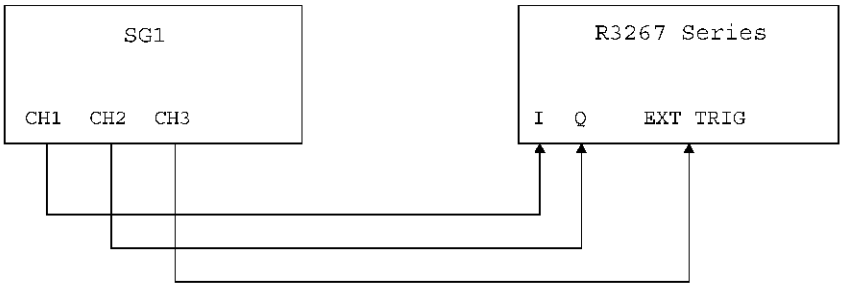


Figure 6-8 Setup for Baseband Signal Measurement (Reverse Link)

2. On the SG1, set controls to generate the baseband Reverse Traffic signal (described in No.2 of Table 6-3) from CH1 and CH2 and generate the trigger signal from CH3.

3. On the SG1, set output level to 0.8 Vp-p for CH1 and CH2.
Both output signals must be balanced.

4. Set up the R3267 series equipment for BASEBAND(I&Q) input signal measurement. Set parameters as shown in Figure 6-7 and execute ***DC CAL***.

5. Press **SINGLE** to start the measurement.

6. Recorded the measurement result in the performance verification test record sheet.

6.3 Performance Verification Test Record Sheet

Performance Verification Test Record Sheet

Model:OPT3264/3267/3273+67/69 Date:
Serial Number:

(1) Code Domain Measurement in RF Input Mode (Forward Link Setting)

Items		Specification			Result
		Min.	Measured Value	Max.	Pass/Fail
Carrier Frequency Accuracy		-5 Hz		+5 Hz	
Waveform Quality Accuracy	ρ pilot	0.995		Unspecified	
	ρ overall-1	0.995		Unspecified	
	ρ overall-2	0.995		Unspecified	

(2) Code Domain Measurement in IQ Input Mode (Forward Link Setting)

Items		Specification			Result
		Min.	Measured Value	Max.	Pass/Fail
Waveform Quality Accuracy	ρ pilot	0.995		Unspecified	
	ρ overall-1	0.995		Unspecified	
	ρ overall-2	0.995		Unspecified	

(3) RF Signal Code Domain Power Measurement (Reverse Link Setting)

Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Carrier Frequency Error	-10 Hz		+10 Hz	
ρ overall	0.995		Unspecified	

(4) Baseband Signal Code Domain Power Measurement (Reverse Link Setting)

Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
ρ overall	0.995		Unspecified	

7 SPECIFICATIONS

Code Domain measurement (Forward Link setting)

When the following conditional signals (Forward Link) described in IS-856 are measured:

Pilot channel

+ MAC : RA 1ch + RPC 1ch

+ Traffic: Rate 614.4 kbps continuous transmission

- RF input

Characteristics	Specification
Measurement frequency range	30 MHz to 3 GHz
Input level range	-30dBm to +30 dBm (Total power at ATT:AUTO)
Carrier Frequency Error [Hz]	Measurement accuracy : < ±(Reference frequency accuracy × Carrier frequency + 5 Hz) (Carrier frequency is within a range of ± 500 Hz.)
ρ pilot	Residual error: < ± 0.005
ρ overall-1	Residual error: < ± 0.005
ρ overall-2	Residual error: < ± 0.005

- IQ input

Characteristics	Specification
Input level range	0.25 V_{P-P} to 0.9 V_{P-P} (± 0.47 V or less)
Input impedance	50 Ω (Nominal), DC coupling, AC coupling
ρ pilot	Residual error: < ± 0.005
ρ overall-1	Residual error: < ± 0.005
ρ overall-2	Residual error: < ± 0.005

Code Domain Power measurement (Reverse Link setting)

When signals described in the No. 2 column of Table 6-1 are measured:

- RF input

Characteristics	Specification
Measurement frequency range	30 MHz to 3 GHz
Input level range	-30dBm to +30 dBm (Total power at ATT:AUTO)
Carrier Frequency Error [Hz]	Measurement accuracy : < ±(Reference frequency accuracy × Carrier frequency + 10 Hz) (Carrier frequency is within a range of ± 1 kHz, Freq Meas Range is 1 kHz, 1 slot measurement)
ρ overall	Residual error: < ± 0.005 (1 slot measurement)

- IQ input

Characteristics	Specification
Input level range	0.25 V_{P-P} to 0.9 V_{P-P} (± 0.47 V or less)
Input impedance	50 Ω (Nominal), DC coupling, AC coupling
ρ overall	Residual error: < ± 0.005 (1 slot measurement)

APPENDIX

A.1 Messages

In this section, the messages that are displayed while the analyzer is being used are described.

Code	Messages	Remarks
700	System Error. Cannot allocate the required memory.	Fatal Error occurred. Data area for the calculation is insufficient on the memory. Contact a sales representative.
701	System Error. Clock is not operational.	Fatal Error occurred. System clock is not in operation. Contact a sales representative.
702	Modulation Gain CAL error. Check 30 MHz CAL signal for connection.	-
703	Modulation DC CAL error. Remove input signals and try again.	-
704	Time Out! No Trigger Detected.	Time out error on the trigger signal occurred. Check the trigger settings.
705	Input Level is out of Range. Check the Ref. level.	-
706	No graph data. Execute measurement.	-
707	Input level is too low. Adjust the Ref. level.	-
708	System Error. Contact qualified engineer.	-
710	Auto Level completed !	-
711	Auto Level Set can not be succeed. Signal level is not stable.	-
712	Cannot execute measurement. Because ρ is too low.	-
715	Frequency Error is out of Meas. Range.	-
719	Burst signal is not detected. Check Burst length or Ref. level.	-

Code	Messages	Remarks
721	Modulation Gain CAL error!(#100) Check 30 MHz CAL signal for connection.	-
722	Modulation Gain CAL error!(#200) Check 30 MHz CAL signal for connection.	-
723	Modulation Gain CAL error!(#300) Check 30 MHz CAL signal for connection.	-
724	Modulation Gain CAL error!(#110) Check 30 MHz CAL signal for connection.	-
725	Modulation Gain CAL error!(#120) Check 30 MHz CAL signal for connection.	-
726	Modulation Gain CAL error!(#210) Check 30 MHz CAL signal for connection.	-
727	Modulation Gain CAL error!(#220) Check 30 MHz CAL signal for connection.	-
728	Modulation Gain CAL error!(#310) Check 30 MHz CAL signal for connection.	-
729	Modulation Gain CAL error!(#320) Check 30 MHz CAL signal for connection.	-
744	No Idle Slot within a frame. Check the input signal.	No Idle Slot exists in a frame.
745	No Active Slot within a frame. Check the input signal.	No Active Slot exists in a frame.

Code	Messages	Remarks
746	Cannot find out active Channel. Down the MAC Threshold.	No active MAC channel exists. Lower the threshold.
743	Cannot allocate sufficient memory. Set Power Unit to RELATIVE.	-
750	Handshake error occurred to DSP. Contact qualified engineer.	-
751	Cannot Detect Mod. DSP board. Contact qualified engineer.	-
760	Level of MAC channel is too low. Check MAC channel.	-
782	Cannot synchronize to PICH. Adjust Threshold.	Cannot be synchronized with the pilot channel signal. Change the threshold setting.
783	Cannot synchronize to PICH. Adjust PN Delay.	Cannot be synchronized with the pilot channel signal. Change the PN delay setting.

ALPHABETICAL INDEX

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[X]

[Y]

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   (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

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