ADVANTEST

ADVANTEST CORPORATION

R3267 Series OPT62

3GPP Measurement Option

Operation Manual

MANUAL NUMBER FOE-8370669G00

Applicable Models

R3264
R3267
R3273

First printing December 20, 1999
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.
  - Be sure to plug the power cable into an electrical outlet which has a safety ground terminal. Grounding will be defeated if you use an extension cord which does not include a safety 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 objects on top of this 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 after their expected lifespan has expired.
  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.

  There is a possibility that each product uses different parts with limited life. For more information, refer to Chapter 1.

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

- **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 sol der).

  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

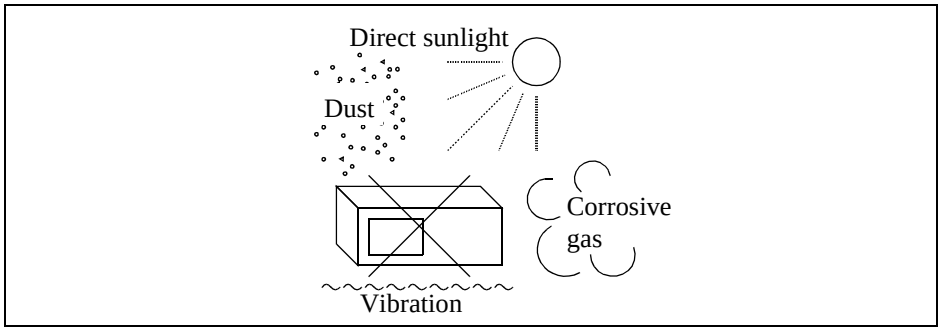

Figure-1 Environmental Conditions

- Operating position

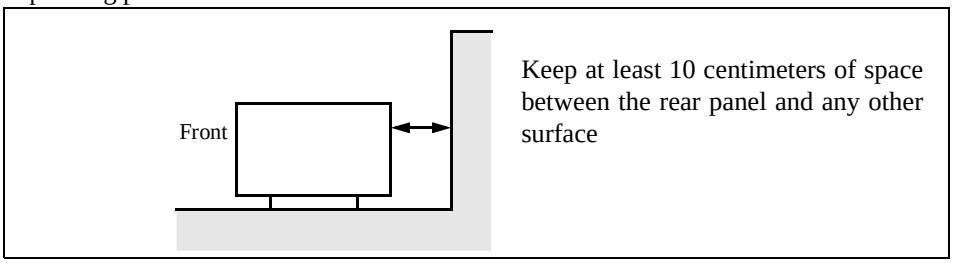

Figure-2 Operating Position

- Storage position

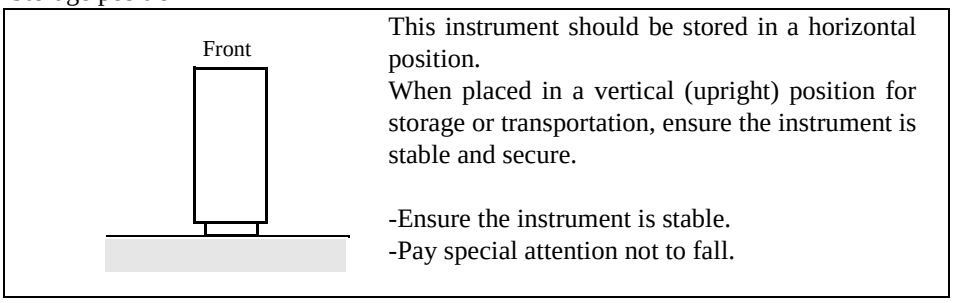

Figure-3 Storage Position

This instrument can be used safely under the following conditions:

- Altitude of up to 2000 m
- Installation Categories II
- Pollution Degree 2

PREFACE

This manual provides the information necessary to check functionality, operate and program the R3267 Series Option 62, 3GPP 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 Description (Option) • Standard Accessories • Self Test Error • Connectors on the rear panel	Includes a description of the option and its' parts and a self test error.
2. Operation	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	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 • Mag Error (Magnitude Error) • Phase Error • E.V.M. (Error Vector Magnitude) • About a ρ • About a Code Domain Power coefficient • About the Carrier Frequency Error of QPSK • Block Diagram	Describes the principle of operation necessary for taking measurements more accurately.
6. Performance Verification Test	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

This 3GPP analysis option software allows you to measure the waveform quality and resolution accuracy of a 3GPP signal.

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

This option includes the following features:

- Can measure the modulation accuracy, waveform quality, frequency error, and magnitude error of the base station (BS) and mobile station (UE) signals.
- Can measure the code domain power of the BS and UE signals.
- 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 OPT62 Operation manual	ER3267/73OPT62-3GPP	1	English

1.3 Self Test Function

The self test also checks the Option 62 for correct operation when the spectrum analyzer power is turned on. The message shown below will be displayed when an error related to Option 62 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	One 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. I channel terminal Connector for inputting the I channel signal (Baseband).
3. Q channel terminal Connector for inputting the Q channel signal (Baseband).

2 MEASUREMENT EXAMPLES

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

2.1 Measuring the BTS 3GPP Signals

By measuring the BS signals in 3GPP mode, it is possible to measure code domain powers for the Primary CPICH, Primary CCPCH, SCH and speech channels separately.

Measurement conditions:

The signal to be measured is as follows:

the output signal of a unit to be measured in the 3GPP mode with a frequency of 2112.5 MHz and a level of -10 dBm.

Signal specifications are as follows:

Scrambling code number 0

Channel	Spreading Factor	Code Number
Primary CPICH	256 (15 ksps)	0
Primary CCPCH	256 (15 ksps)	1
SCH	256 (15 ksps)	-
Channel 1	128 (30 ksps)	2
Channel 2	128 (30 ksps)	3
Channel 3	128 (30 ksps)	4

2.1.1 Measuring the Slot

Setup

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

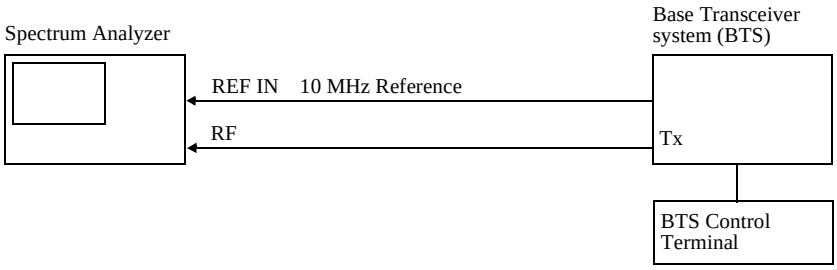

Figure 2-1 Setup for the measurement of the 3GPP signal

Setting the measurement conditions

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

2. Press **FREQ, 2, 1, 1, 2, ., 5** and **MHz**.

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

4. Press **COUPLE,** ***RBW AUTO/MNL***(MNL), **3, 0** and **kHz**.

5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.

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

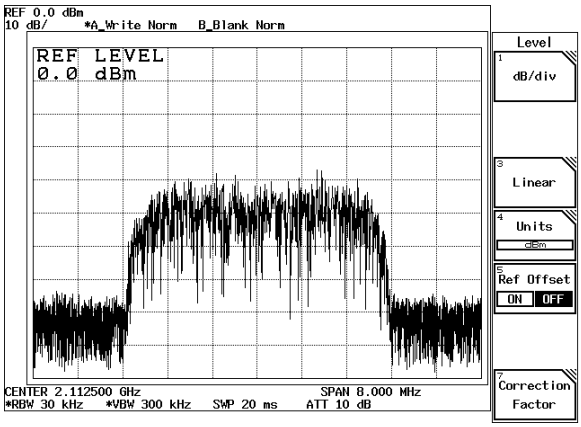

Figure 2-2 3GPP Signal's Spectrum

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

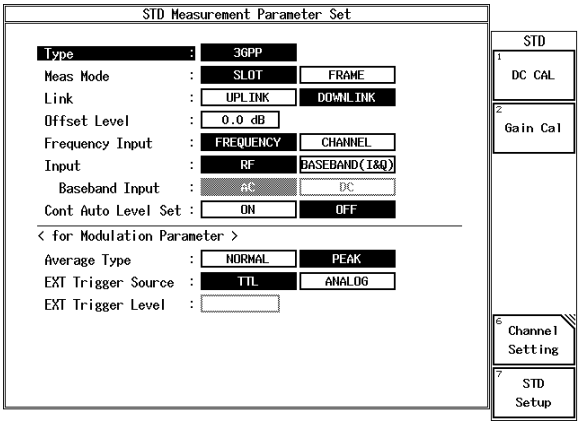

Figure 2-3 STD-Measurement parameter set Dialog Box

8. Press the ▽ key.
   The cursor moves to the item Meas Mode.

9. Select ***SLOT*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to SLOT.

10. Select ***DOWNLINK*** from ***Link*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode is set to the BTS measurement.

    The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

11. Press **RETURN**, ***Modulation, 3GPP*** and ***Parameter Setup***.
    The Parameter Setup [SLOT/DOWNLINK] dialog box is displayed.

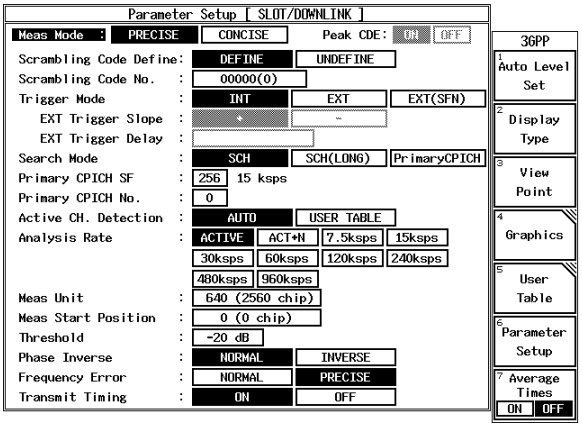

Figure 2-4 Parameter Setup [SLOT/DOWNLINK] Dialog Box

12. Select ***PRECISE*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
    The detailed measurement mode is set.

13. Select ***DEFINE*** from ***Scrambling Code Define*** using the data knob, and press **Hz(ENTR)**.
    A Scrambling code number becomes active.

14. Press **0** and **Hz(ENTR)** to set ***Scrambling Code No.***
    The Scrambling code No. is set to 0.

15. Select ***INT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The trigger is set to the internal trigger.

16. Select ***SCH*** from ***Search Mode*** using the data knob, and press **Hz(ENTR)**.
    A synchronization mode using a SCH is set.

17. Enter ***256*** for ***Primary CPICH SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the Primary CPICH is set to 256 (the rate is set to 15 ksps).

18. Enter ***0*** for ***Primary CPICH No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the Primary CPICH is set to 0.

19. Select ***Auto*** from ***Active CH. Detection*** using the data knob, and press **Hz(ENTR)**.
    The automatic rate judgement mode is set.

20. Select ***ACTIVE*** from ***Analysis Rate*** using the data knob, and press **Hz(ENTR)**.
    The rates of the channels currently transmitting data are set for measurement.

21. Enter ***640 (2560 chips)*** for ***Meas Unit*** using the data knob, and press **Hz(ENTR)**.
    The measurement with the range of 640 (2560 chips:1 slot) is set.

22. Enter ***0*** for ***Meas Start Position*** using the data knob, and press **Hz(ENTR)**.
    The measurement start position is set to the head of the slot (0 chip).

23. Press **-, 2, 0** and **GHz(dB)** to set the ***threshold***.
    The threshold value of an active channel is set to -20 dB.

24. Select ***NORMAL*** from ***Phase Inverse*** using the data knob, and press **Hz(ENTR)**.
    The IQ phase is set to a normal phase.

25. Select ***PRECISE*** from ***Frequency Error*** using the data knob, and press **Hz(ENTR)**.
    The carrier frequency Error Precise Measurement mode is set.

26. Select ***ON*** from ***Transmit Timing*** using the data knob, and press **Hz(ENTR)**.

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

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

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

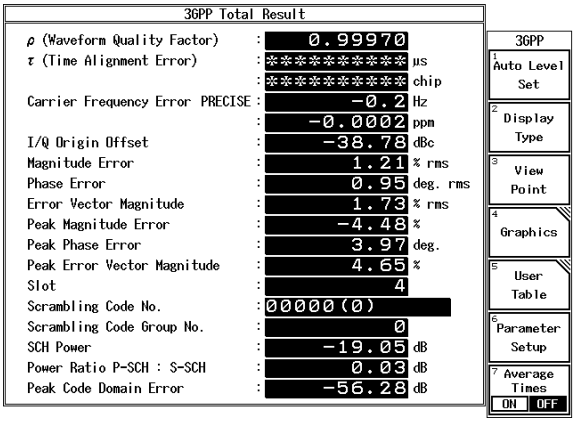

Figure 2-5 Measurement Result of 3GPP Signal

ρ (Waveform Quality Factor): The waveform quality of the signal to be measured The maximum measurement length is 2560 chips.

τ (Time Alignment Error): A delay time (µs or chip)

NOTE: ***When the Trigger Mode is set to INT, the τ (Time Alignment Error) cannot be measured.***

Carrier Frequency Error: A carrier frequency error (Hz, ppm)
I/Q Origin Offset: An I or Q origin offset (dBc)
Magnitude Error: A magnitude error (% rms)
Phase Error: A phase error (deg.rms)
Error Vector Magnitude: A modulation accuracy (% rms)
Peak Magnitude Error: Maximum magnitude error (%)
Peak Phase Error: Maximum phase error (%)
Peak Error Vector Magnitude: Maximum modulation accuracy (%)
Slot: A measurement slot number
Scrambling Code No.: A Scrambling code number
Scrambling Code Group No.: A Scrambling code group number
SCH Power: SCH power (dB)
Power Ratio P-SCH:S-SCH: Power ratio of P-SCH to S-SCH (dB)
Peak Code Domain Error: Maximum code domain error (dB)

2.1.2 Measuring the Frame

Setup

1. Connect the unit under test as shown in Figure 2-6.

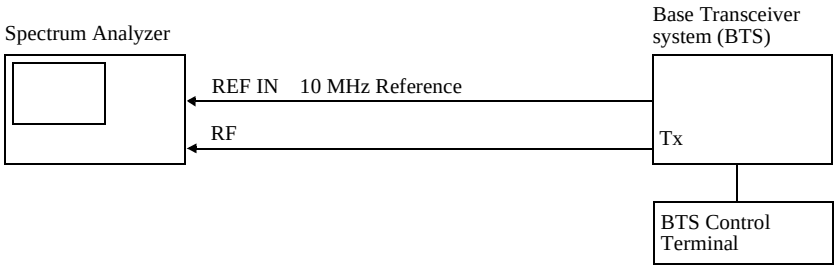

Figure 2-6 Setup for the measurement of the 3GPP signal

Setting the measurement conditions

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

2. Press **FREQ, 2, 1, 1, 2, ., 5** and **MHz**.
3. Press **SPAN, 8** and **MHz**.
4. Press **COUPLE,** ***RBW AUTO/MNL***(MNL), **3, 0** and **kHz**.
5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.
6. Press **LEVEL, 0** and **GHz(+dBm)**.

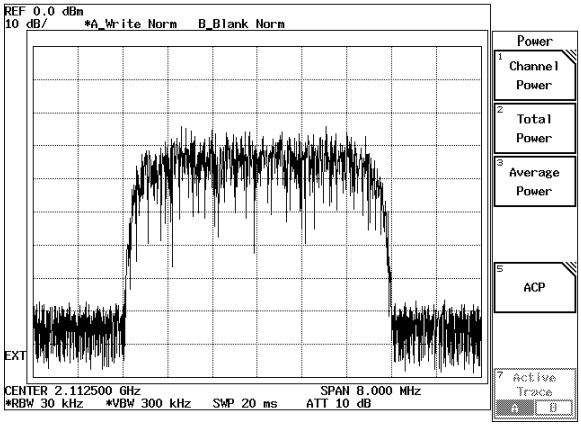

Figure 2-7 3GPP Signal's Spectrum

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

8. Press the ▽ key.
   The cursor moves to the item Meas Mode.

9. Select ***FRAME*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to FRAME.

10. Select ***DOWNLINK*** from ***Link*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode is set to the BTS measurement.

    The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

11. Press **RETURN,** ***Modulation, 3GPP*** and ***Parameter Setup***.
    The Parameter Setup [FRAME/DOWNLINK] dialog box is displayed.

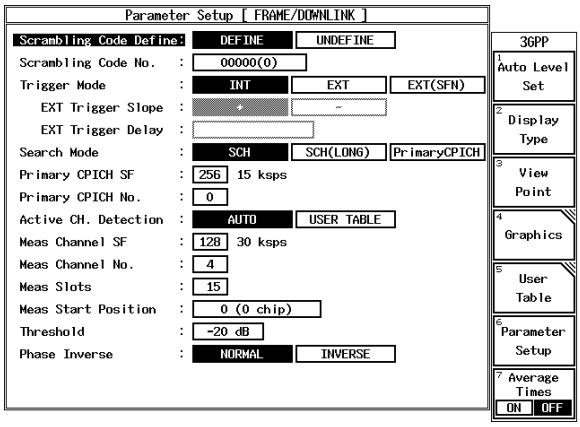

Figure 2-8 Parameter Setup [FRAME/DOWNLINK] Dialog Box

12. Select ***DEFINE*** from ***Scrambling Code Define*** using the data knob, and press **Hz(ENTR)**.
    A Scrambling code number becomes active.

13. Press **0** and **Hz(ENTR)** to set ***Scrambling Code No.***
    The Scrambling code No. is set to 0.

14. Select ***INT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The trigger is set to the internal trigger.

15. Select ***SCH*** from ***Search Mode*** using the data knob, and press **Hz(ENTR)**.
    A synchronization mode using a SCH is set.

16. Enter ***256*** for ***Primary CPICH SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the Primary CPICH is set to 256 (the rate is set to 15 ksps).

17. Enter ***0*** for ***Primary CPICH No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the Primary CPICH is set to 0.

18. Select ***Auto*** from ***Active CH. Detection*** using the data knob, and press **Hz(ENTR)**.
    The automatic rate judgment mode is set.

19. Enter ***128*** for ***Meas Channel SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the channel under measurement is set to 128 (the rate is set to 30 ksps).

20. Enter ***4*** for ***Meas Channel No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the channel under measurement is set to 4.

21. Enter ***15*** for ***Meas Slots*** using the data knob, and press **Hz(ENTR)**.
    The measurement range is set to 15 slot.

22. Enter ***0*** for ***Meas Start Position*** using the data knob, and press **Hz(ENTR)**.
    The measurement start position is set to the head of the slot(0 chip).

23. Press **-, 2, 0** and **GHz(dB)** to set the ***threshold***.
    The threshold value of an active channel is set to -20 dB.

24. Select ***NORMAL*** from ***Phase Inverse*** using the data knob, and press **Hz(ENTR)**.
    The IQ phase is set to a normal phase.

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

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

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

2.2 Measuring the MS 3GPP Signal

The waveform quality of the mobile unit can be measured.

Measurement conditions:

The signal to be measured is as follows: the output signal of a unit to be measured in the 3GPP mode with a frequency of 1922.5 MHz and a level of -10 dBm.

Signal specifications are as follows:

Scrambling Code Number 1

Channel	Spreading Factor	Code number	I or Q
DPDCH	64 (60 ksps)	16	I
DPCCH	256 (15ksps)	0	Q

2.2.1 Measuring the Slot

Setup

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

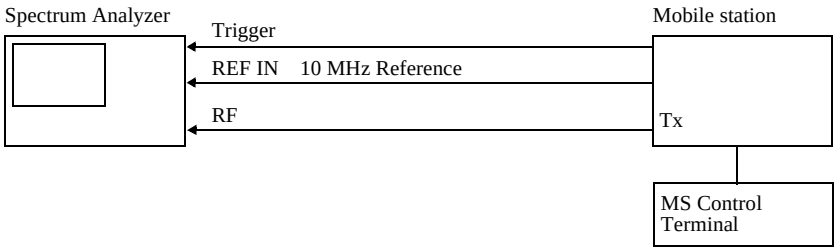

Figure 2-9 Setup for the measurement of the 3GPP signal

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.
3. Press **SPAN, 8** and **MHz**.
4. Press **COUPLE, *RBW AUTO/MNL***(MNL), **3, 0,** and **kHz**.
5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.

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

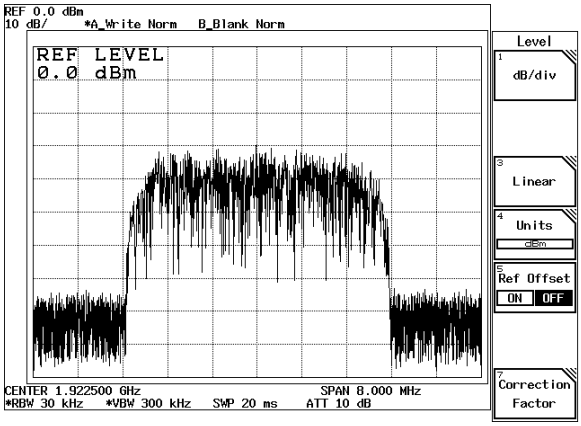

Figure 2-10 3GPP Signal's Spectrum

7. Press **TRANSIENT,** ***STD*** and ***STD Setup.***
   The STD Measurement parameter set dialog box is displayed.

8. Press the ▽ key.
   The cursor moves to the item Meas Mode.

9. Select ***SLOT*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to SLOT.

10. Select ***UPLINK*** from ***Link*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode is set to the mobile unit signal measurement.

    The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

11. Press **RETURN**, ***Modulation, 3GPP*** and ***Parameter Setup.***
    The Parameter Setup [SLOT/UPLINK] dialog box is displayed.

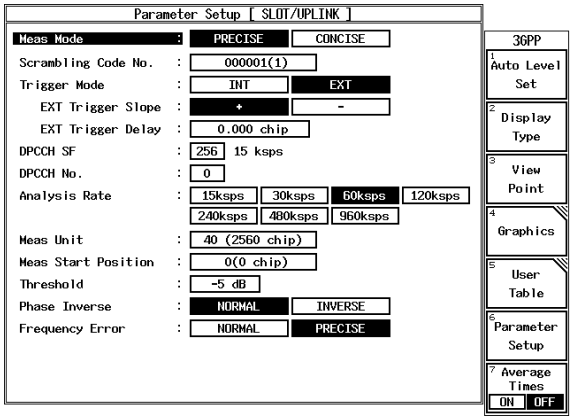

Figure 2-11 Parameter Setup [SLOT/UPLINK] Dialog Box

12. Select ***PRECISE*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
    The detailed measurement mode is set.

13. Press **1** and **Hz(ENTR)** to set ***Scrambling Code No.***
    The Scrambling Code No. is set to 1.

14. Select ***EXT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode using the external BS standard reset signal as a trigger signal is set.

15. Select **+** from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.
    The trigger slope is set to a trailing edge.

16. Press **0, ., 0** and **Hz(ENTR)** to set ***EXT Trigger Delay.***
    The trigger delay is set to 0 chip.

17. Enter ***256*** for ***DPCCH SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the DPCCH is set to 256.

18. Enter ***0*** for ***DPCCH No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the DPCCH is set to 0.

19. Select ***60 ksps*** for ***Analysis Rate*** using the data knob, and press **Hz(ENTR)**.
    The instrument is set to measure a signal with a rate of 60 ksps.

20. Enter ***40 (2560 chips)*** for ***Meas Unit*** using the data knob, and press **Hz(ENTR)**.
    The measurement with the range of 40 symbols (2560 chips:1 slot) is set.

21. Press **-, 5** and **GHz(dB)** to set the ***Threshold***.
    The threshold value of an active channel is set to -5 dB.

22. Select ***NORMAL*** from ***Phase Inverse*** using the data knob, and press **Hz(ENTR)**.
    The IQ phase is set to a normal phase.

23. Select ***PRECISE*** from ***Frequency Error*** using the data knob, and press **Hz(ENTR)**.
    The carrier frequency error precise measurement mode is set.

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

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

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

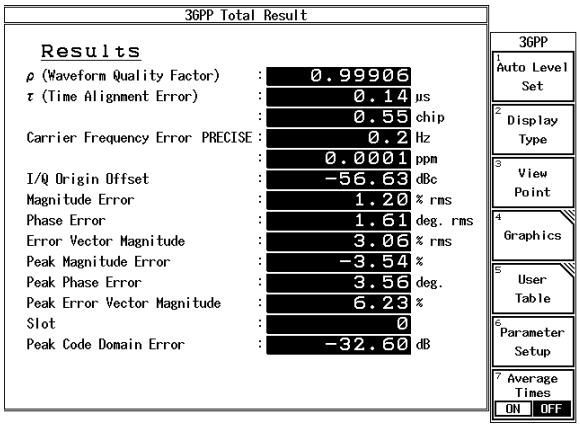

Figure 2-12 Measurement Result of 3GPP Signal (UPLINK mode)

ρ (Waveform Quality Factor):	The waveform quality of the signal to be measured. The maximum measurement length is 2560 chips.
τ (Time Alignment Error):	A delay time (µs or chip)
Carrier Frequency Error:	A carrier frequency error (Hz, ppm)
I/Q Origin Offset:	An I or Q origin offset (dBc)
Magnitude Error:	A magnitude error (% rms)
Phase Error:	A phase error (deg.rms)
Error Vector Magnitude:	A modulation accuracy (% rms)
Peak Magnitude Error:	Maximum magnitude error (%)
Peak Phase Error:	Maximum phase error (%)
Peak Error Vector Magnitude:	Maximum modulation accuracy (%)
Slot:	Measurement slot number
Peak Code Domain Error:	Maximum code domain error (dB)

2.2.2 Measuring of the Frame

Setup

1. Connect the unit under test as shown in Figure 2-13.

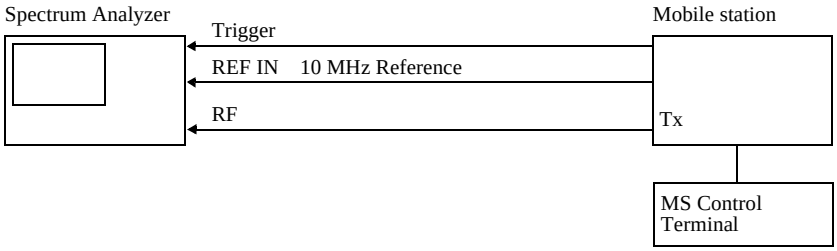

Figure 2-13 Setup for the measurement of the 3GPP signal

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.

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

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

5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.
The VBW is set to 300 kHz.

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

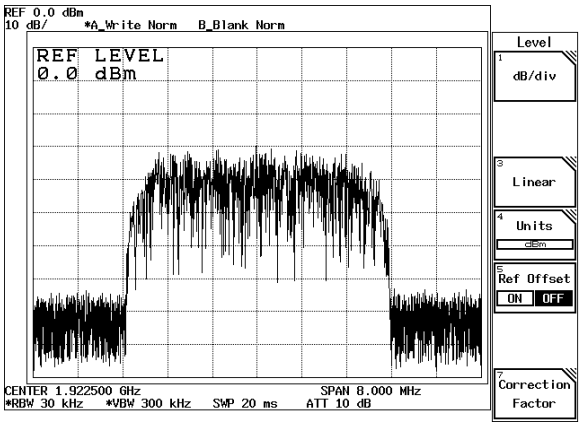

Figure 2-14 3GPP Signal's Spectrum

7. Press **TRANSIENT, *STD*** and ***STD Setup.***
   The STD Measurement parameter set dialog box is displayed.

8. Press the ▽ key.
   The cursor moves to the item Meas Mode.

9. Select ***FRAME*** from ***Meas Mode*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to FRAME.

10. Select ***UPLINK*** from ***Link*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode is set to the mobile unit signal measurement.

    The following parameters are default settings.

Offset Level:	0.0 dB
Frequency Input:	FREQUENCY
Input:	RF
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

11. Press **RETURN**, ***Modulation, 3GPP*** and ***Parameter Setup.***
    The Parameter Setup [FRAME/UPLINK] dialog box is displayed.

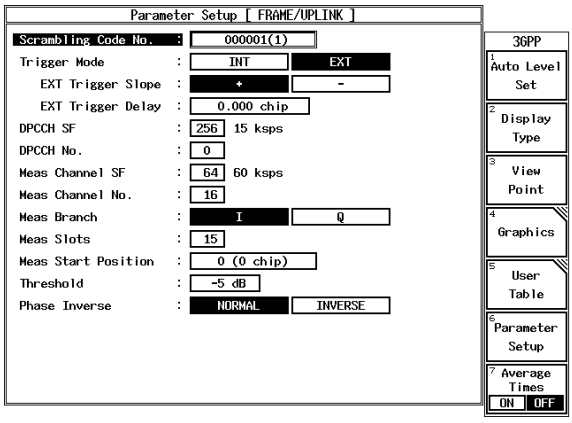

Figure 2-15 Parameter Setup [FRAME/UPLINK] Dialog Box

12. Press **1** and **Hz(ENTR)** to set ***Scrambling Code No.***
    The Scrambling code No. is set to 1.

13. Select ***EXT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode using the external BS standard reset signal as a trigger signal is set.

14. Select **+** from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.
    The trigger slope is set to a leading edge.

15. Enter **0, ., 0** for ***EXT Trigger Delay*** using the data knob, and press **Hz(ENTR)**.
    The trigger delay is set to 0 chip.

16. Enter ***256*** for ***DPCCH SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the DPCCH is set to 256.

17. Enter ***0*** for ***DPCCH No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the DPCCH is set to 0.

18. Enter ***64*** for ***Meas Channel SF*** using the data knob, and press **Hz(ENTR)**.
    The spreading factor of the channel under measurement is set to 64.

19. Enter ***16*** for ***Meas Channel No.*** using the data knob, and press **Hz(ENTR)**.
    The code number of the channel under measurement is set to 16.

20. Select ***I*** from ***Meas Branch*** using the data knob, and press **Hz(ENTR)**.
    The branch of the channel under measurement is set to I.

21. Enter ***15*** for ***Meas Slots*** using the data knob, and press **Hz(ENTR)**.
    The measurement with the range of 15 is set.

22. Enter ***0*** for ***Meas Start Position*** using the data knob, and press **Hz(ENTR)**.
    The measurement start position is set to the head of a slot (0 chip).

23. Press **-**,**5** and **GHz(dB)** to set the ***Threshold***.
    The threshold value of an active channel is set to -5 dB.

24. Select ***NORMAL*** from ***Phase Inverse*** using the data knob, and press **Hz(ENTR)**.
    The IQ phase is set to a normal phase.

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

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

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

2.3 Graphical Display of 3GPP Measurements

The resultant graphs can be displayed. This chapter describes how to display the graphs.

Displaying a Graph for the Code Domain Power Coefficient

1. Press ***Display Type.***
   The Display Type dialog box is displayed.

2. Select ***GRAPH*** from ***Format*** using the data knob, and press **Hz(ENTR)**.
   The Graphic Type of Analysis dialog box is displayed.

3. Select **ρ** from ***Y Scale*** using the data knob, and press **Hz(ENTR)**.
   The vertical axis is set to the code domain power coefficient.

4. Press ***Display Type.***
   The dialog box is closed. Code domain power coefficient is displayed.

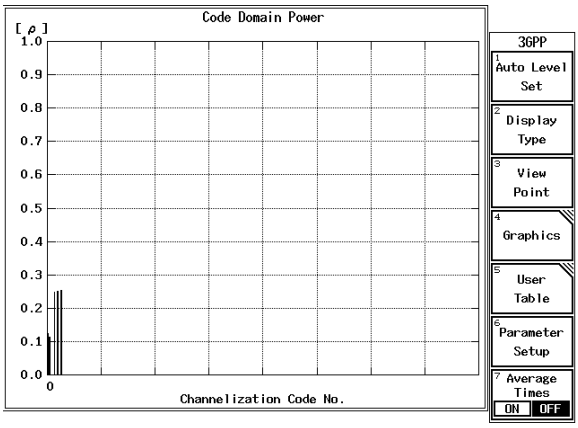

Figure 2-16 Graph Display (When Meas Mode Set to SLOT and Link Set to DOWNLINK)

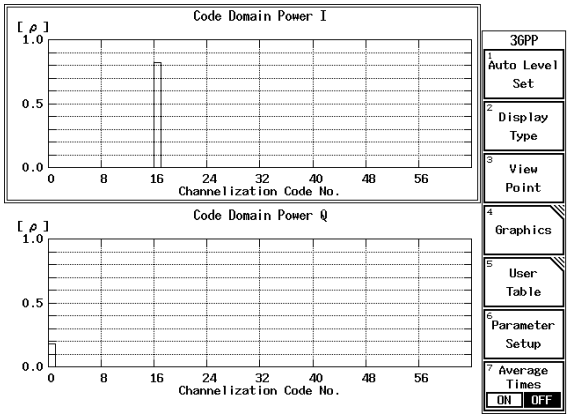

Figure 2-17 Graph Display (When Meas Mode Set to SLOT and Link Set to UPLINK)

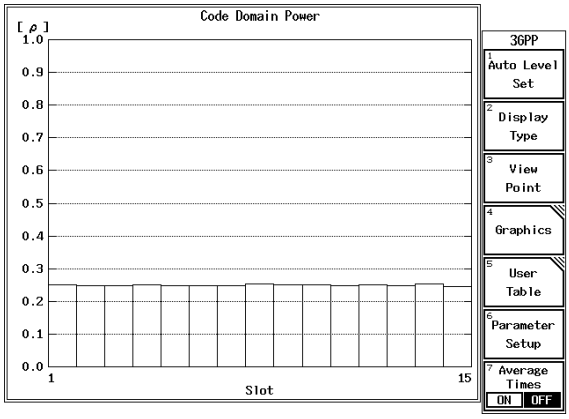

Figure 2-18 Graph Display (When Meas Mode Set to FRAME and Link Set to DOWNLINK)

Measuring the Code Domain Power Coefficients for Each Symbol
(When Link Set to DOWNLINK and Rate Set to 15 ksps)

5. Press ***Parameter Setup***.
   The Parameter Setup [SLOT/DOWNLINK] dialog box is displayed.

6. Enter ***64 (256 chips)*** for ***Meas Unit*** using the data knob, and press **Hz(ENTR)**.
   The measurement with the range of 1 symbols (256 chips) is set.

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

8. Press **SINGLE**.
   The measurement mode is set to Single and the measured result is displayed.

9. Press ***View Point***.
   The screen for setting Short Code No. in a time-axis direction is displayed.

10. Select a value using the data knob.
    The power of each Short Code No. in an arbitrary time-axis is displayed.

Displaying Variation over Time in the Code Domain Power Coefficient in the Primary CCPCH.

11. Press ***Display type.***
    The Display Type dialog box is displayed.

12. Select ***TIME*** from ***X Scale*** using the data knob, and press **Hz(ENTR)**.
    Time Code Domain Power is displayed.

13. Press **1** and **Hz(ENTR)** to set ***View Point***.
    The power of Primary CCPCH (code number 1) is set for the measurement.

14. Press ***View Point***.
    The Display Type dialog box disappears and the code domain power coefficient is displayed in the time domain.

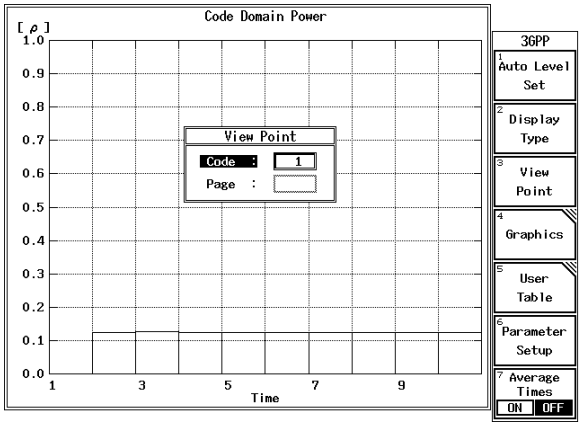

Figure 2-19 Variation over Time in the Code Domain Power Coefficient

Displaying a Graph for a Constellation

15. Press ***Graphics.***
    The Graphic menu is displayed.

16. Press ***Select type.***
    The Graphic Type of Analysis dialog box is displayed.

17. Select ***Constellation*** using the data knob, and press **Hz(ENTR)**.
    The constellation screen is displayed.

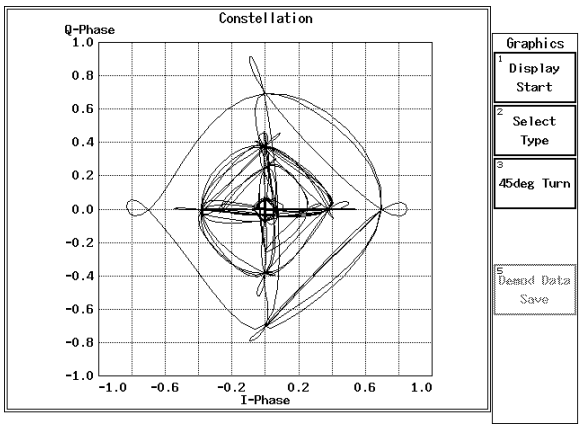

Figure 2-20 Constellation

Displaying the I channel Eye Diagram

18. Press ***Graphics.***
    The graphic menu is displayed.

19. Press ***Select type.***
    The Graphic Type of Analysis dialog box is displayed.

20. Select ***I EYE Diagram*** using the data knob, and press **Hz(ENTR)**.
    The eye diagram of I channel is displayed.

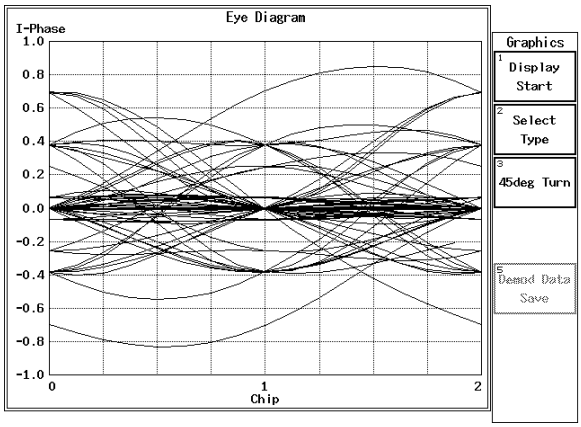

Figure 2-21 Eye Pattern

Displaying Diagrams of I channel and Q channel

21. Press ***Graphics.***
    The Graphic menu is displayed.

22. Press ***Select type***.
    The Graphic Type of Analysis dialog box is displayed.

23. Select ***I/Q EYE Diagram*** using the data knob, and press **Hz(ENTR)**.
    The eye diagrams of Ich and Qch are displayed.

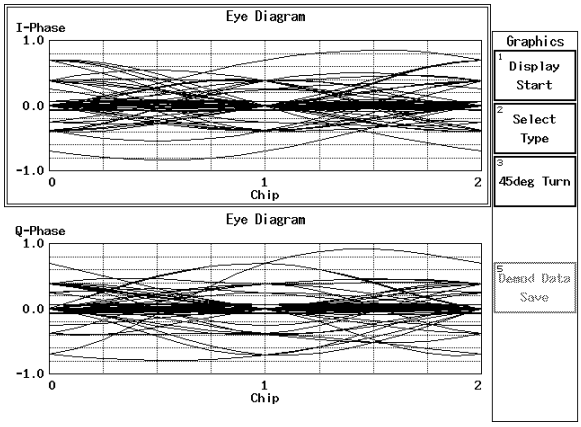

Figure 2-22 Eye Pattern (Dual Screen Display)

2.4 Measuring a QPSK Signal

Use the Root Nyquist filter to measure the QPSK for a measurement length of 320 chips, beginning with the 256.25th chip from the leading edge of the external trigger signal.

Setup

1. Connect the unit under test as shown in Figure 2-23.

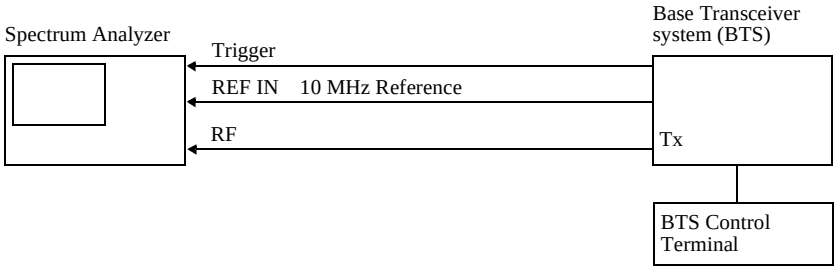

Figure 2-23 Setup for the measurement of the QPSK signal

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.
3. Press **SPAN, 8** and **MHz**.
4. Press **COUPLE,** ***RBW AUTO/MNL***(MNL), **3, 0** and **kHz**.
5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.
6. Press **LEVEL, 0** and **GHz(+dBm)**.

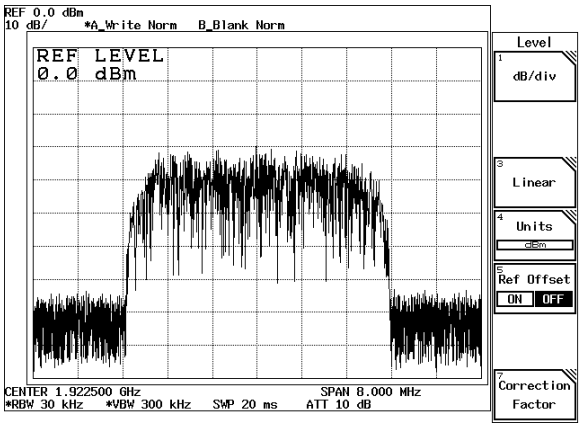

Figure 2-24 QPSK Signal's Spectrum

7. Press **TRANSIENT, *STD*** and ***STD Setup.***
   The STD Measurement parameter set dialog box is displayed.

8. Select ***RF*** from ***Input*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to the RF signal input.

   The following parameters are default settings.

Link:	DOWNLINK
Offset Level:	0.0dB
Frequency Input:	FREQUENCY
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

   NOTE: It is unnecessary to set Meas Mode.

9. Press **RETURN**, ***Modulation, QPSK*** and ***Parameter Setup.***
   The Parameter Setup dialog box is displayed.

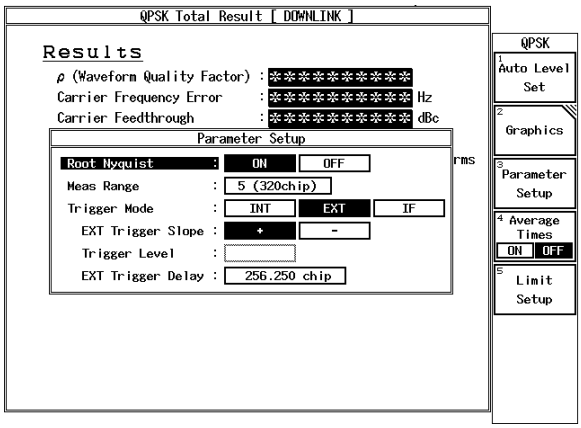

Figure 2-25 Parameter Setup Dialog Box

10. Select ***ON*** from ***Root Nyquist*** using the data knob, and press **Hz(ENTR)**.
    The root Nyquist filter becomes active.

11. Press **5** and **Hz(ENTR)** to set ***Meas Range***.
    The Meas Range is set to 5 (320 chips).

12. Select ***EXT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode using an external trigger signal is set.

13. Select **+** from ***EXT Trigger Slope*** using the data knob, and press **Hz(ENTR)**.
    The trigger slope is set to a leading edge.

14. Press **2, 5, 6, ., 2, 5** and **Hz(ENTR)** to set ***EXT Trigger Delay***.
    The trigger delay is set to 256.25 chips.

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 the single mode and starts.

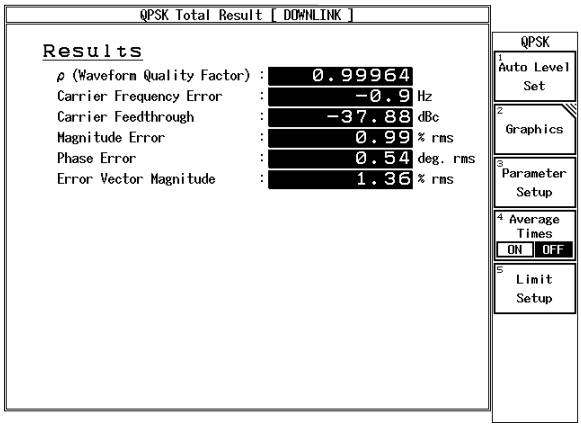

Figure 2-26 QPSK Signal Measurement Result

ρ (Waveform Quality Factor): The waveform quality of the signal to be measured.
Carrier Frequency Error: A carrier frequency error (Hz)
Carrier Feedthrough: An I or Q origin offset (dBc)
Magnitude Error: A magnitude error (% rms)
Phase Error: A phase error (deg. rms)
Error Vector Magnitude: A modulation accuracy (% rms)

2.5 Power vs Time

The power can be measured for each slot (666.66μs).

Measurement conditions:

The signal is the output signal from a 3GPP type unit and has the following characteristics: a frequency of 1922.5 MHz and a level between -20 dBm and -10 dBm under control of transmission power.

Signal specifications are as follows:

Scrambling code number 1

Channel	Spreading Factor	Code Number	I or Q
DPDCH	64 (60 ksps)	16	I
DPCCH	256 (15 ksps)	0	Q

2.5.1 Measuring Power Variations Using the External Trigger

Setup

1. Connect the unit under test as shown in Figure 2-27.

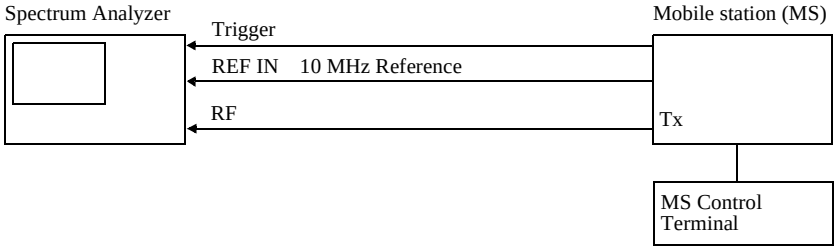

Figure 2-27 Setup for the measurement of the Power vs Time

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.
   A center frequency of 1922.5 MHz is set.

3. Press **SPAN, 8** and **MHz**.
   A frequency span of 8 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)**, 3, 0, 0** and **kHz**.
   A VBW of 300 kHz is set.

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

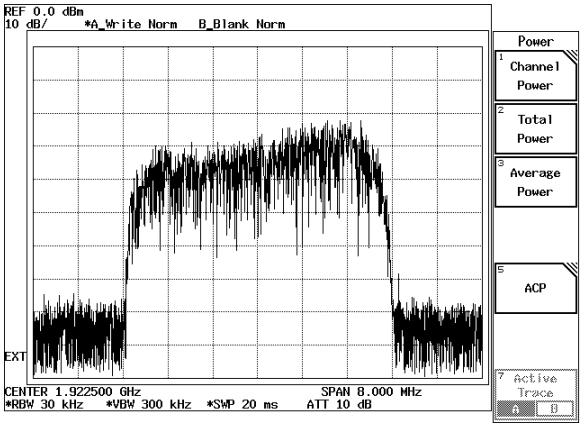

Figure 2-28 3GPP Signal Spectrum under Control of Transmission Power

Measuring Power Variations Using One External Trigger

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

8. Set the ***Meas Mode*** to ***PRECISE*** using the data knob, and press **Hz(ENTR)**.
   The detailed measurement mode is set.

9. Select ***OFF*** from ***Root Nyquist*** using the data knob, and press **Hz(ENTR)**.
   The Root Nyquist filter is disabled.

10. Select ***EXT*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode using the external trigger signal is set.

11. Select **+** from ***Trigger Slope*** using the data knob, and press **Hz(ENTR)**.
    The trigger slope is set to a leading edge.

12. Press **0, .,0** and **Hz(ENTR)** to set ***Trigger Delay***.
    The trigger delay is set to 0 µs.

13. Press **3, 0** and **Hz(ENTR)** to set ***Meas Length***.
    The measurement range is set to Slot 30.

14. Select ***AVERAGE*** from ***Graph Plot Type*** using the data knob, and press **Hz(ENTR)**.
    A graph for the average is displayed.

15. Select ***OFF*** from ***Omit Transient Section for AVG Power*** using the data knob, and press **Hz(ENTR)**.
    The power is measured every 666.66 µs.

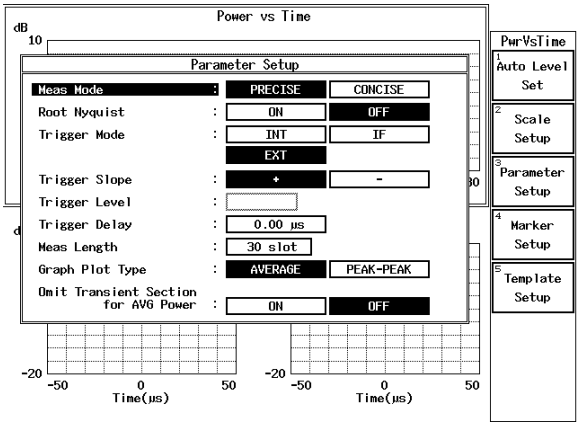

Figure 2-29 Power vs Time Parameter Setup Dialog Box

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

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

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

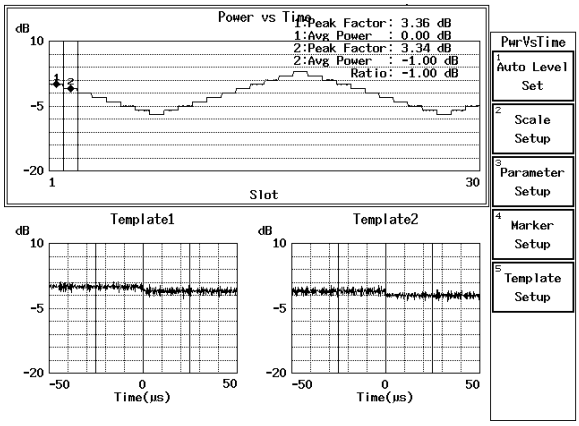

Figure 2-30 Measurement Result of Power vs Time

1: Peak Factor Peak factor of the slot specified by Power Marker 1

1: Avg Power Average power of the slot specified by Power Marker 1

2: Peak Factor	Peak factor of the slot specified by Power Marker 2
2: Avg Power	Average power of the slot specified by Power Marker 2
Ratio	(2:Avg Power) - (1:Avg Power)
Upper screen	Graph representing power varies within the measurement range
Lower left screen	Magnified view of the slot boundary (±50 μs) specified by Template 1
Lower right screen	Magnified view of the slot boundary (±50 μs) specified by Template 2

2.5.2 Measuring Power Variations Using the IF Trigger

Setup

1. Connect the unit under test as shown in Figure 2-31.

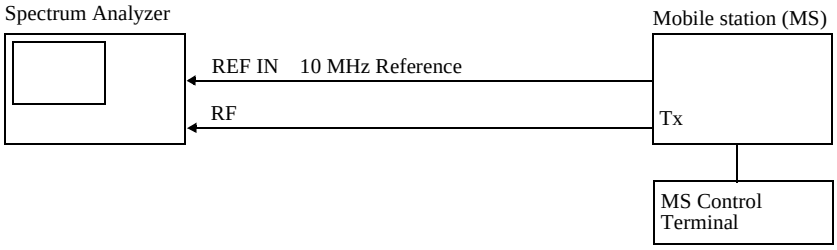

Figure 2-31 Setup for the measurement of the Power vs Time

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.
   A center frequency of 1922.5 MHz is set.

3. Press **SPAN, 8** and **MHz**.
   A frequency span of 8 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)**, 3, 0, 0** and **kHz**.
   A VBW of 300 kHz is set.

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

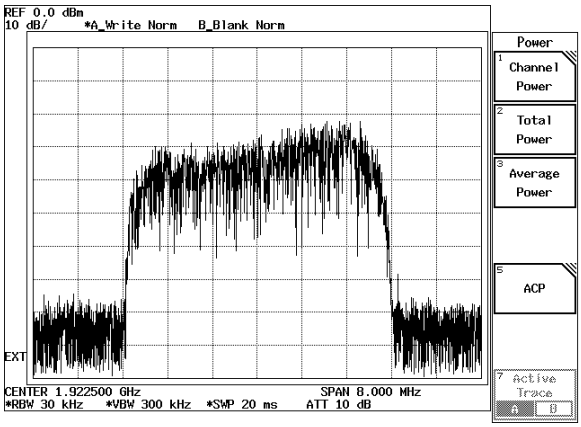

Figure 2-32 3GPP Signal Spectrum under Control of Transmission Power

Measuring Power Variations Using the IF Trigger

7. Press **TRANSIENT**, ***Modulation, Time & FFT*** and ***Parameter Setup***.
   The parameter Setup dialog box is displayed.

8. Select ***IF*** from ***Trigger Source*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode using the IF trigger signal is set.

9. Press **1, 0, 0** and **Hz(ENTR)** to set ***Trigger Level***.
   The trigger level is set to 100%.

10. Press **0, .,0** and **Hz(ENTR)** to set ***Trigger Delay***.
    The trigger delay is set to 0 chip.

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

12. Press **REPEAT**.
    The measurement mode is set to the repeat mode, and measurement result is displayed.

13. Lower the ***Trigger level*** in steps of 1% using the data knob until a continuous trace is displayed (be aware that no errors occur when a continuous trace is obtained, and that time out errors may occur while the trigger level is being lowered).
    The trigger has just been set.

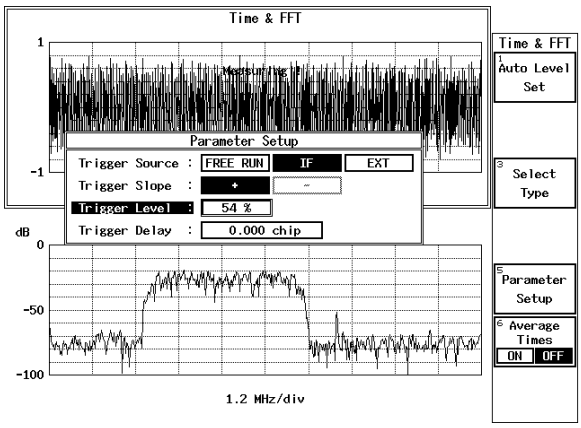

Figure 2-33 Time & FFT Parameter Setup Dialog Box

14. Press **RETURN, *Power, Power vs Time*** and ***Parameter Setup***.
    The Parameter Setup dialog box is displayed.

15. Set the ***Meas Mode*** to ***PRECISE*** using the data knob, and press **Hz(ENTR)**.
    The detailed measurement mode is set.

16. Select ***OFF*** from ***Root Nyquist*** using the data knob, and press **Hz(ENTR)**.
    The Root Nyquist filter is disabled.

17. Select ***IF*** from ***Trigger Mode*** using the data knob, and press **Hz(ENTR)**.
    The measurement mode using the IF trigger signal is set.

18. Set the ***Trigger level*** to the level obtained for ***Time & FFT***, and press **Hz(ENTR)**.
    The trigger level is set.

19. Press **0, .,0** and **Hz(ENTR)** to set ***Trigger Delay***.
    The trigger delay is set to 0 µs.

20. Press **3, 0** and **Hz(ENTR)** to set ***Meas Length***.
    The measurement range is set to Slot 30.

21. Select ***AVERAGE*** from ***Graph Plot Type*** using the data knob, and press **Hz(ENTR)**.
    A graph for the average is displayed.

22. Select ***OFF*** from ***Omit Transient Section for AVG Power*** using the data knob, and press **Hz(ENTR)**.
    The power is measured every 666.66 µs.

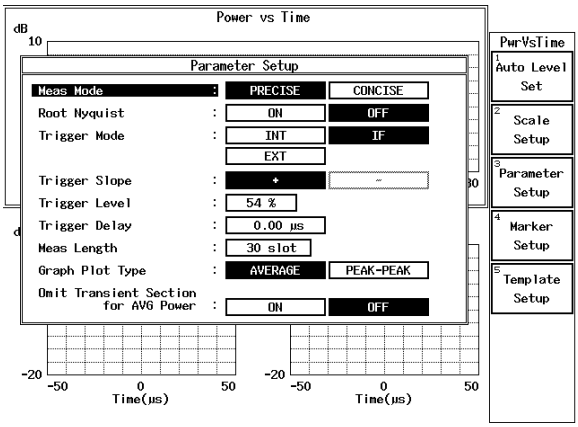

Figure 2-34 Power vs Time Parameter Setup Dialog Box

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

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

2.6 CCDF Measurement

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

Setup

1. Connect the unit under test as shown in Figure 2-35.

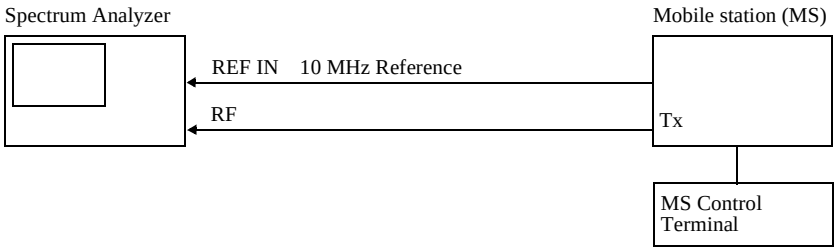

Figure 2-35 Setup for CCDF Measurement

Setting the measurement conditions

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

2. Press **FREQ, 1, 9, 2, 2, ., 5** and **MHz**.
   A center frequency of 1922.5 MHz is set.

3. Press **SPAN, 8** and **MHz**.
   A frequency span of 8 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)**, 3, 0, 0** and **kHz**.
   A VBW of 300 kHz is set.

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

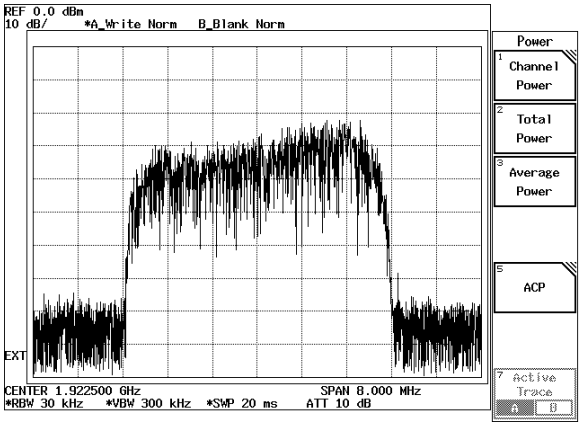

Figure 2-36 3GPP Signal Spectrum under Control of Transmission Power

CCDF Measurement

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

8. Select ***OFF*** from ***Root Nyquist*** using the data knob, and press **Hz(ENTR)**. The Root Nyquist filter is disabled.

9. 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.

10. Press **1, 0, kHz(ENTR)** to set ***Meas Length***. The number of measurement samples is set to 10k.

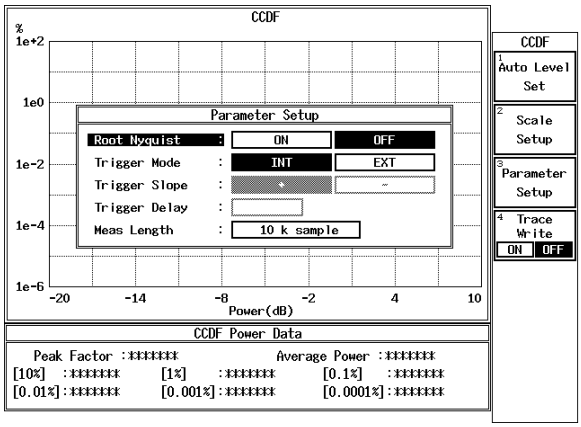

Figure 2-37 CCDF Parameter Setup Dialog Box

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

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

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

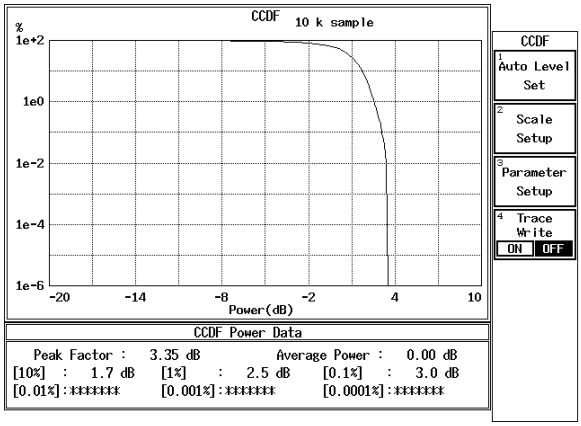

Figure 2-38 CCDF Measurement Result

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

14. Press ***Trace Write***(ON).
    The signal waveform is held.

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

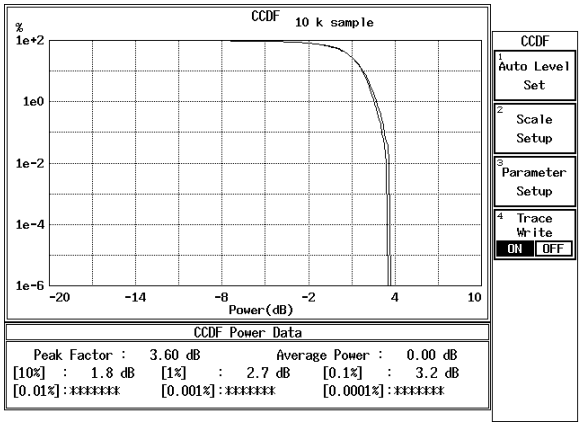

Figure 2-39 CCDF Measurement Result (Trace Write ON)

2.7 Measuring Primary CPICH Power

Primary CPICH power and carrier frequency error composite for the BTS signals can be measured.

Measurement conditions:

The measurement target is a unit which uses 3GPP mode with a frequency of 2112.5 MHz and a level of -10 dBm.

Signal specifications: Scrambling code number 0

Channel	Spreading Factor	Code Number
Primary CPICH	256 (15 ksps)	0
Primary CCPCH	256 (15 ksps)	1
SCH	256 (15 ksps)	-
Channel 1	128 (30 ksps)	2
Channel 2	128 (30 ksps)	3
Channel 3	128 (30 ksps)	4

Setup

1. Connect the unit under test as shown in Figure 2-40.

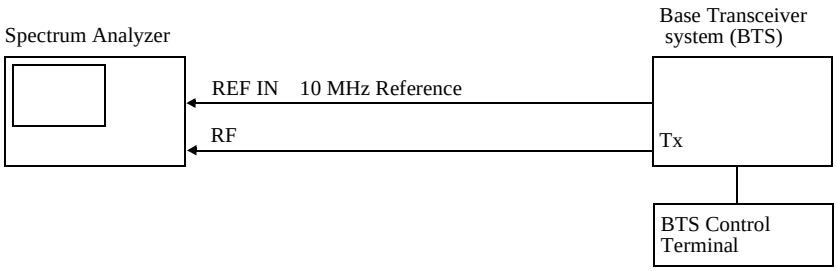

Figure 2-40 Setup for Primary CPICH Power Measurement

Setting the measurement conditions

Set the measurement conditions in order to easily observe the input signal.

2. Press **FREQ, 2, 1, 1**, **2, ., 5** and **MHz**.
   The center frequency is set to 2112.5 MHz.

3. Press **SPAN, 8** and **MHz**.
   The frequency span is set to 8 MHz.

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

5. Press ***VBW AUTO/MNL***(MNL), **3, 0, 0** and **kHz**.
   VBW is set to 300 kHz.

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

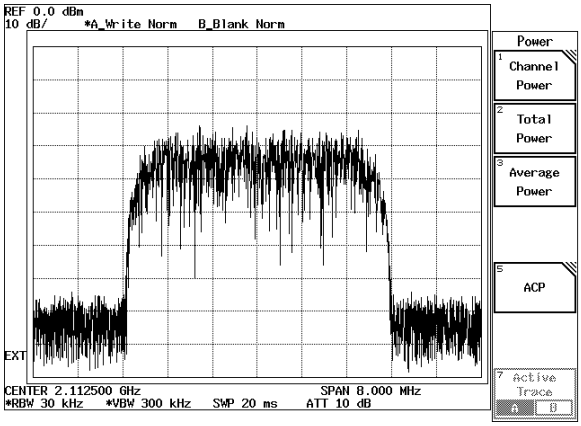

Figure 2-41 3GPP Signal Spectrum

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

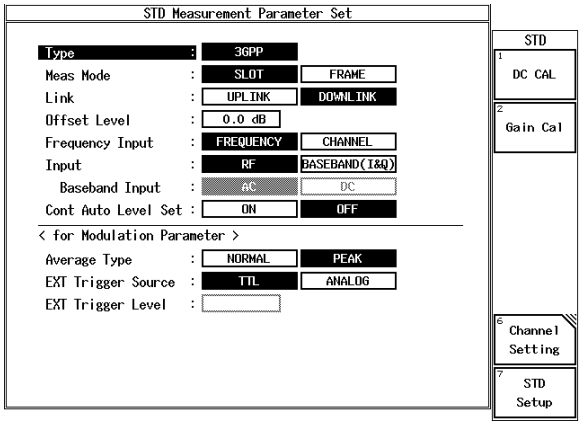

Figure 2-42 STD Measurement Parameter Set Dialog Box

8. Select ***DOWNLINK*** for ***Link*** using the data knob, and press **Hz(ENTR)**.
   The measurement mode is set to the BTS measurement.

   The other parameters are being set to the following settings as defaults:

Meas Mode:	SLOT
Offset Level:	0.0dB
Frequency Input:	FREQUENCY
Input:	RF
Cont Auto Level Set:	OFF
Average Type:	PEAK
EXT Trigger Source:	TTL

9. Press **RETURN**, ***Modulation***, ***Power***, ***P-CPICH Power*** and ***Parameter Setup***.
   The Parameter Setup dialog box is displayed.

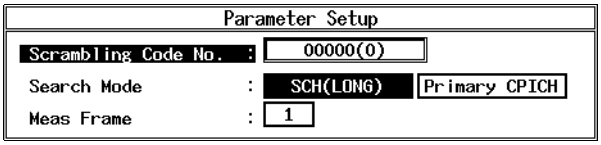

Figure 2-43 Parameter Setup Dialog Box

10. Press **0** and **Hz(ENTR)** to set the ***Scrambling Code No.***
    The Scrambling Code No. is set to 0.

11. Select ***SCH(LONG)*** for ***Search Mode*** using the data knob, and press **Hz(ENTR)**.
    The synchronization mode using SCH is set.

12. Press **1** and **Hz(ENTR)** to set ***Meas Frame***.
    The Meas Frame is set to 1.

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

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

15. Press **SINGLE**.
    The measurement mode is set to single and the measurement results are displayed.

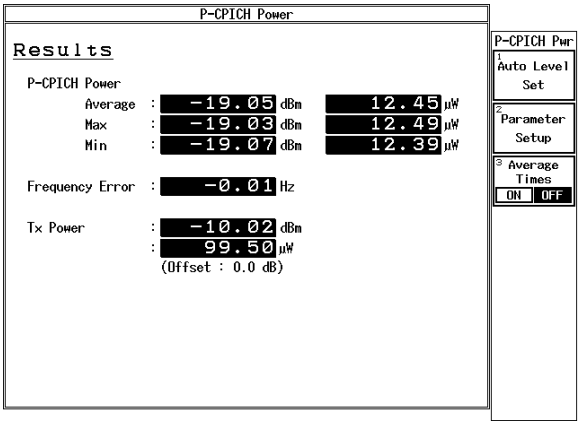

Figure 2-44 P-CPICH Power Measurement Results

P-CPICH Power

Avarage	Average power of P-CPICH (dBm, W)
Max	Maximum power of P-CPICH (dBm, W)
Min	Minimum power of P-CPICH (dBm, W)

Frequency Error	A carrier frequency error (Hz)
Tx Power	Signal power (dBm, W)

3 REFERENCE

This chapter describes the functions of the panel and soft keys for option 62 software.

3.1 Menu Index

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

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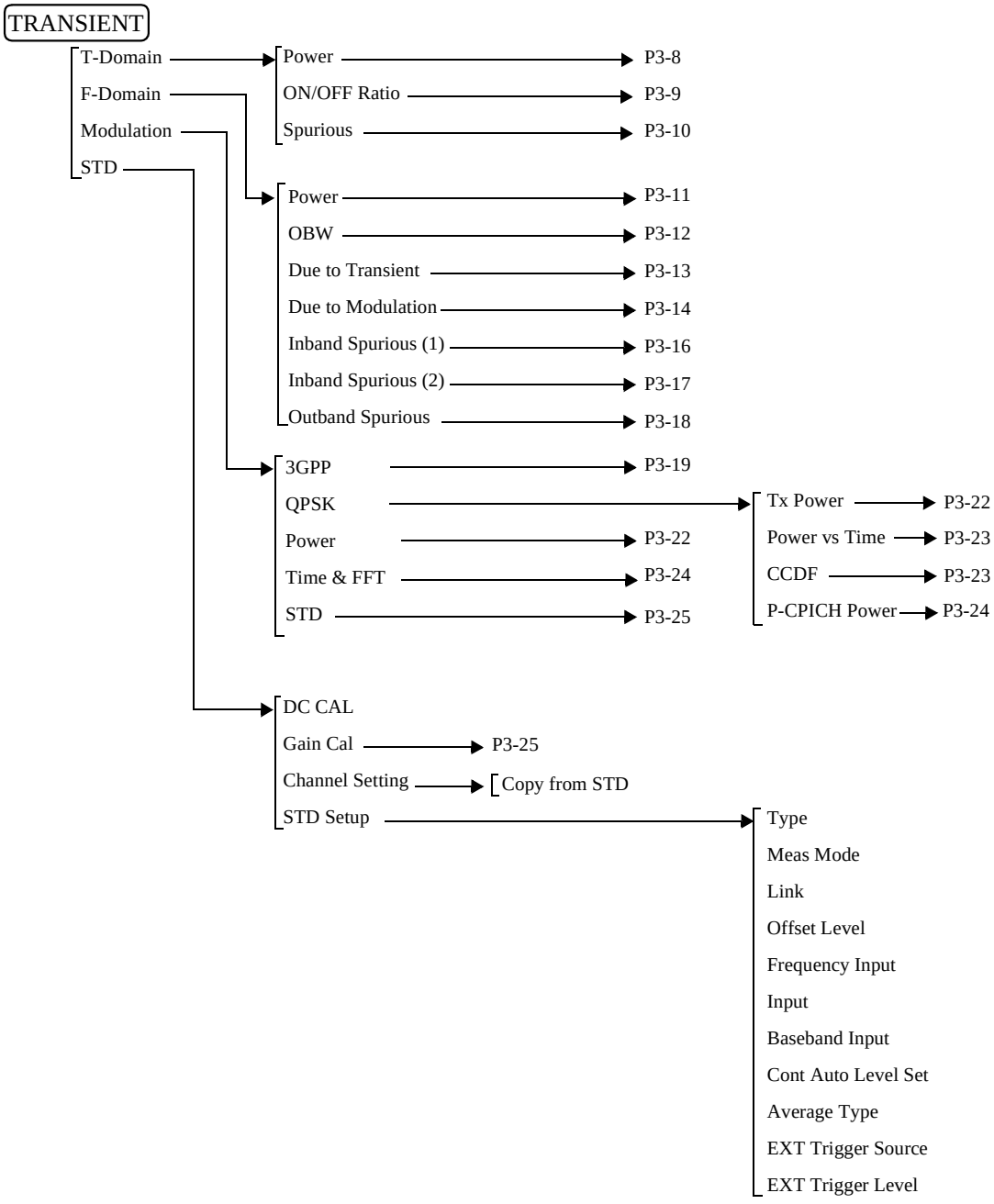
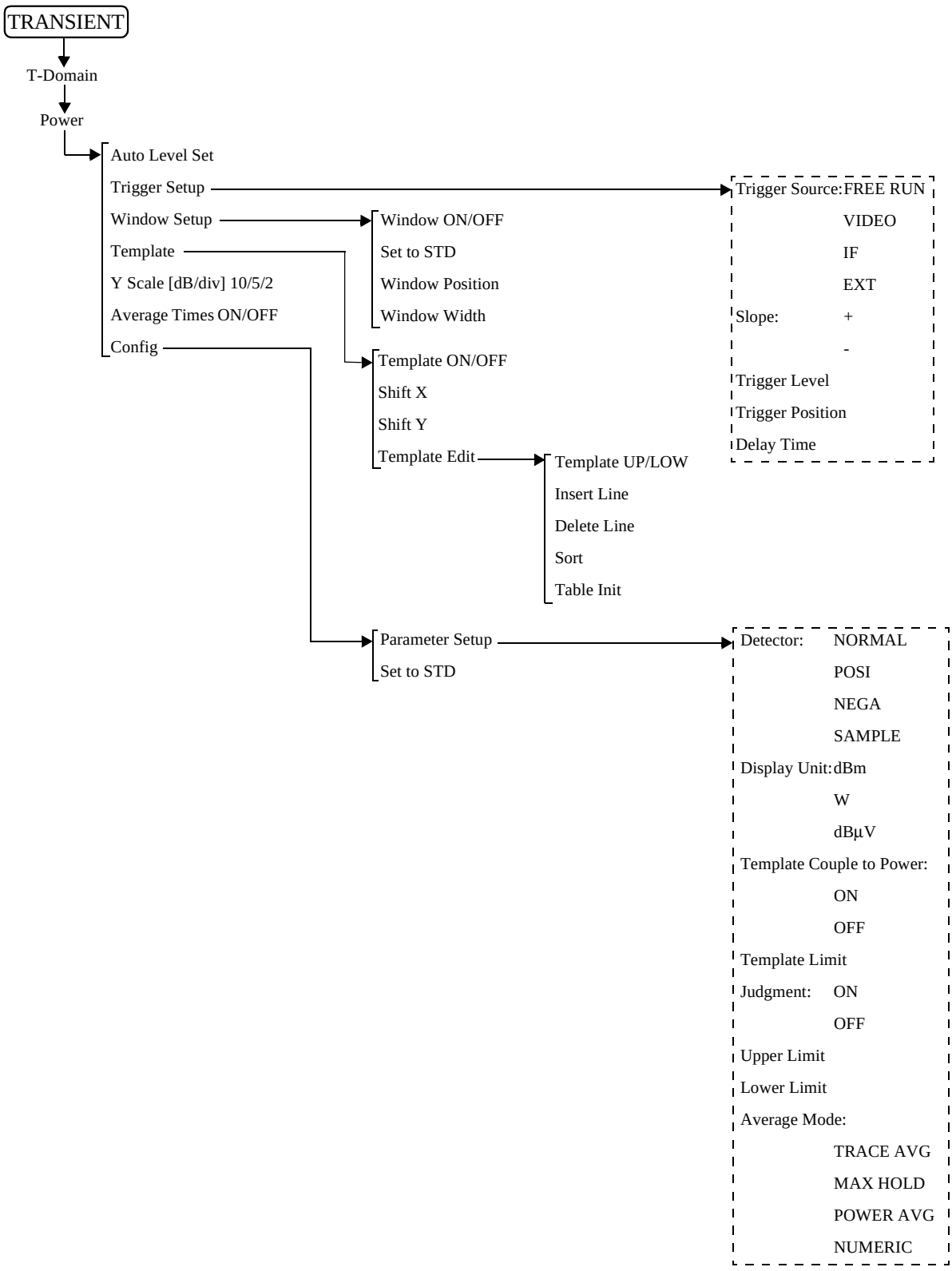
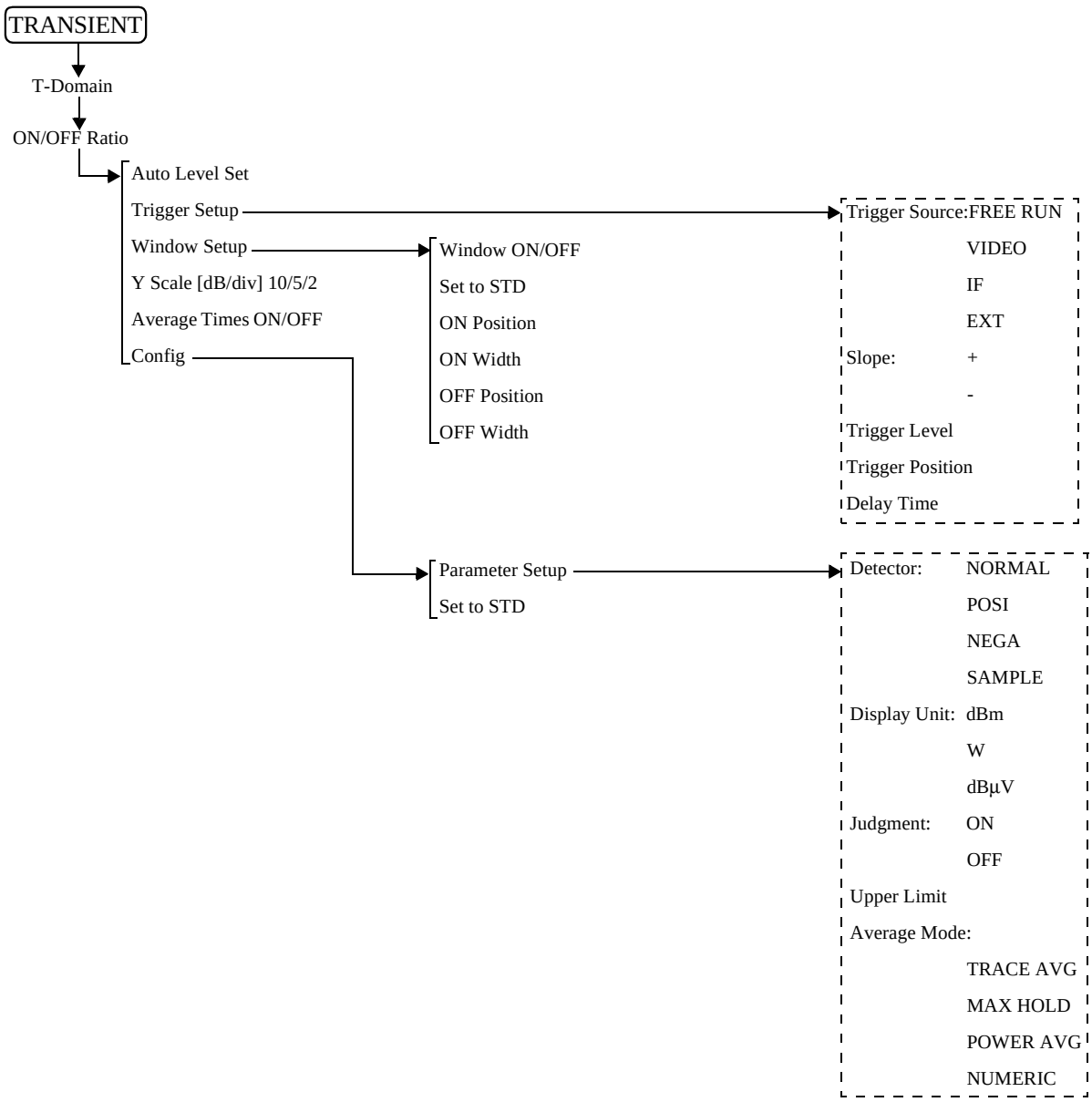
3.2 Menu Map

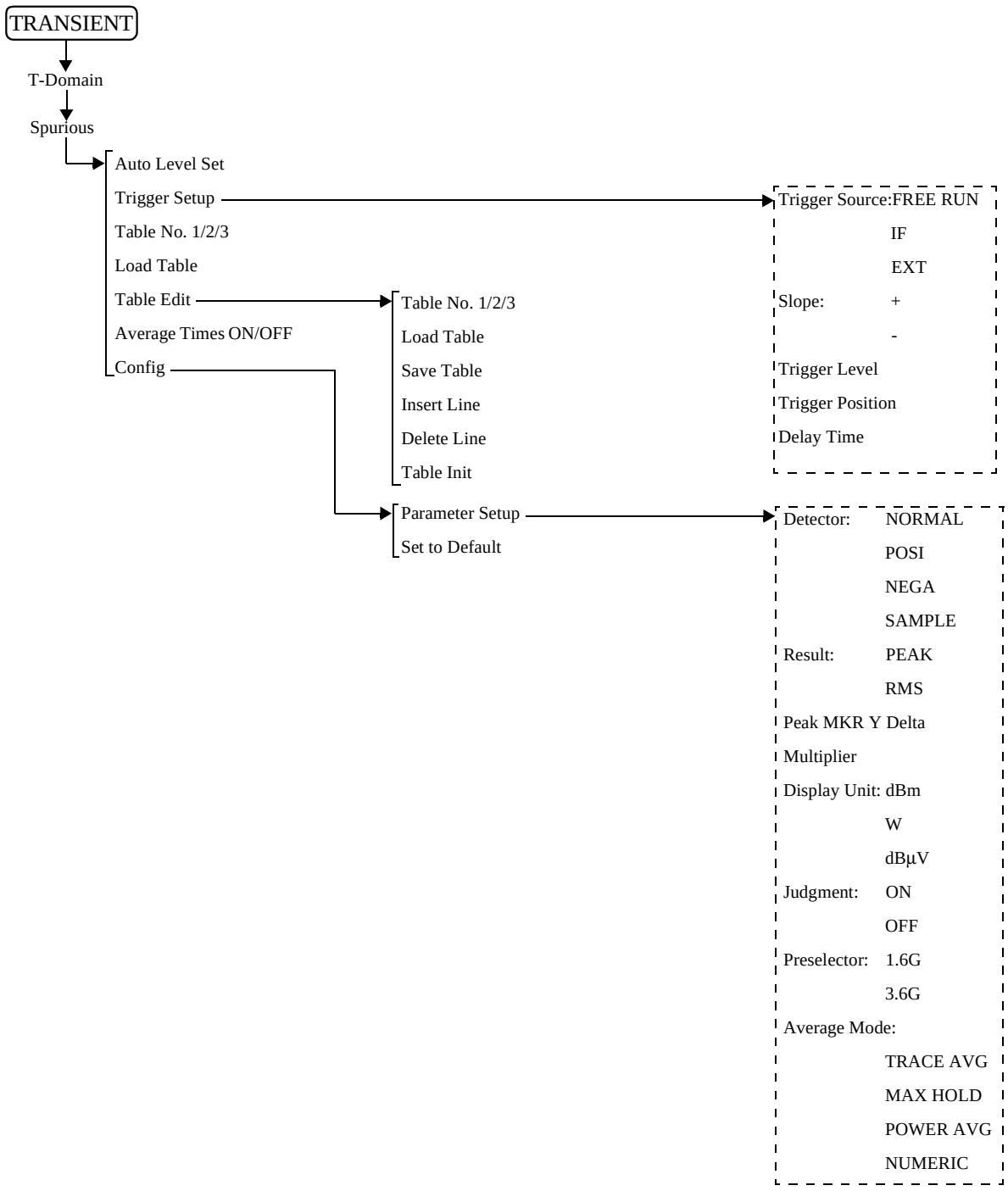
This section shows the hierarchical menu configuration on a panel key basis.

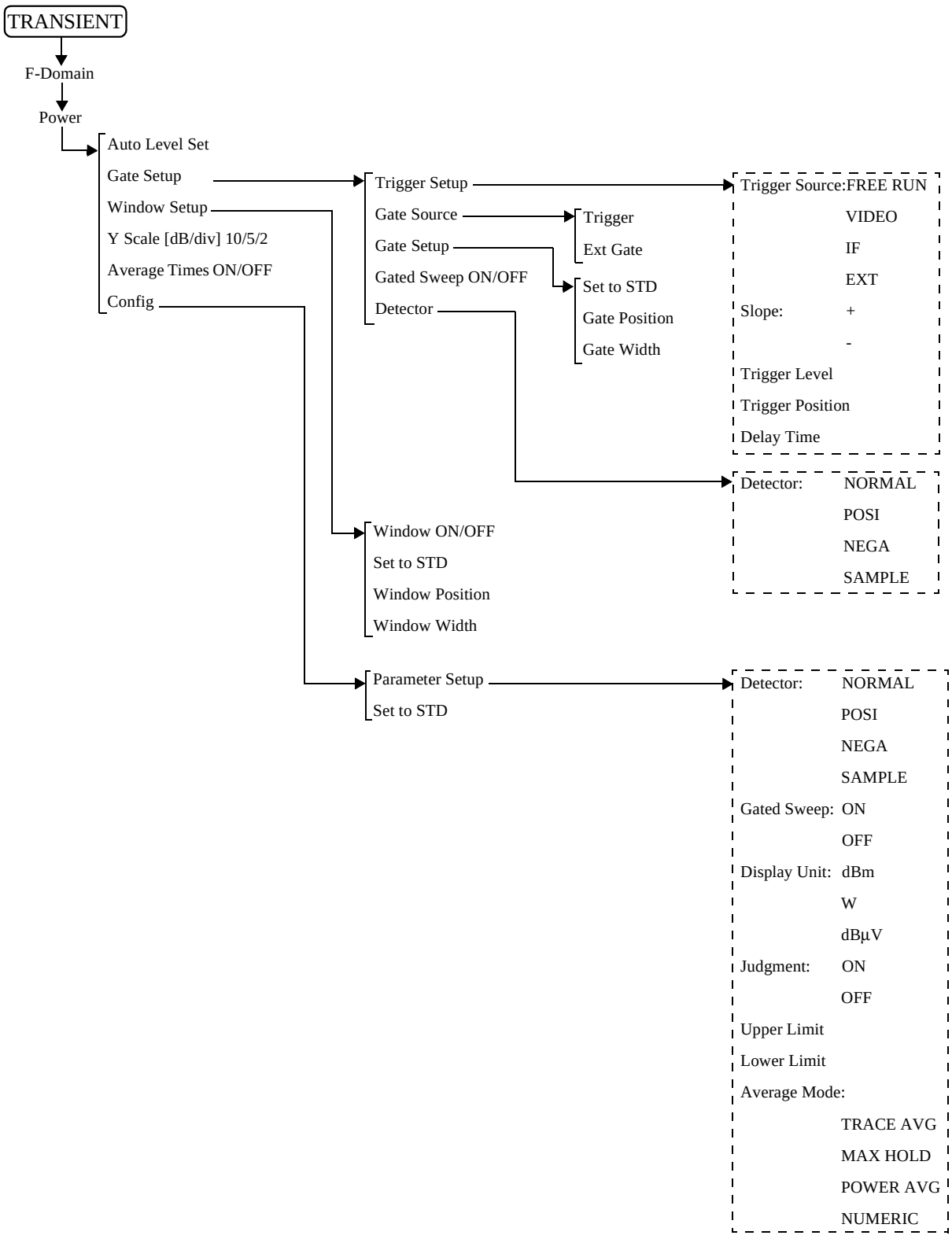


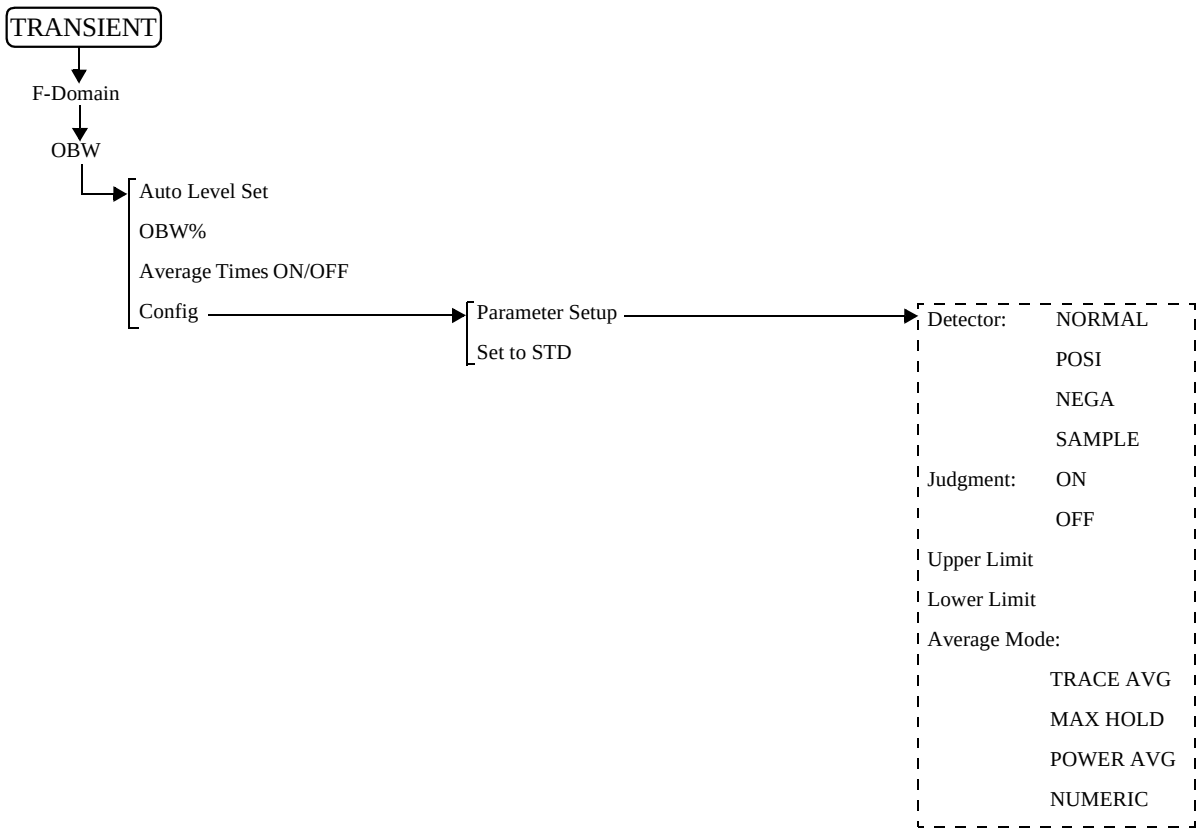

TRANSIENT
T-Domain
Power
Auto Level Set
Trigger Setup
Window Setup
Template
Y Scale [dB/div] 10/5/2
Average Times ON/OFF
Config
Window ON/OFF
Set to STD
Window Position
Window Width
Template ON/OFF
Shift X
Shift Y
Template Edit
Template UP/LOW
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set 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

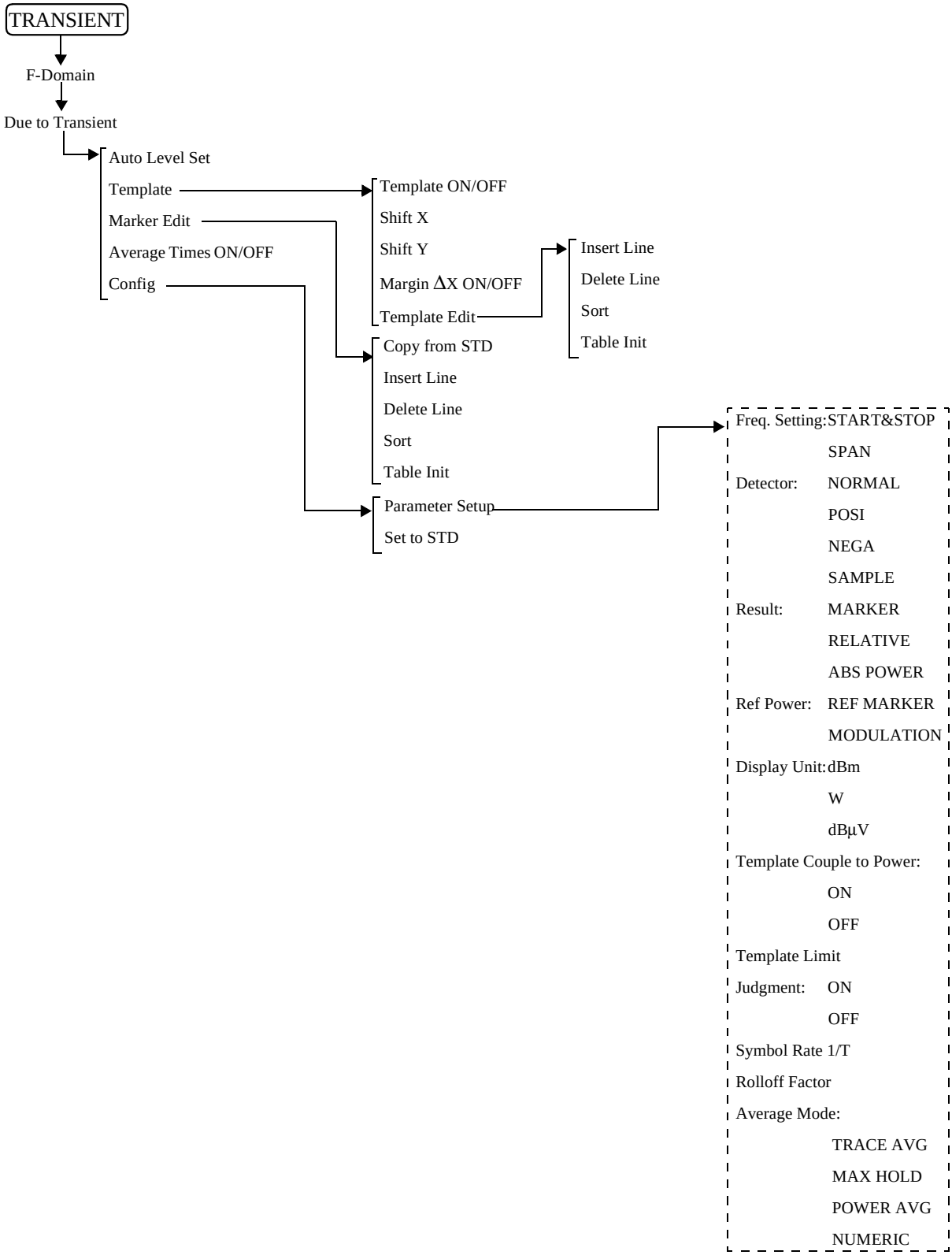

TRANSIENT
T-Domain
ON/OFF Ratio
Auto Level Set
Trigger Setup
Window Setup
Y Scale [dB/div] 10/5/2
Average Times ON/OFF
Config
Window ON/OFF
Set to STD
ON Position
ON Width
OFF Position
OFF Width
Parameter Setup
Set to STD
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position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

3.2 Menu Map

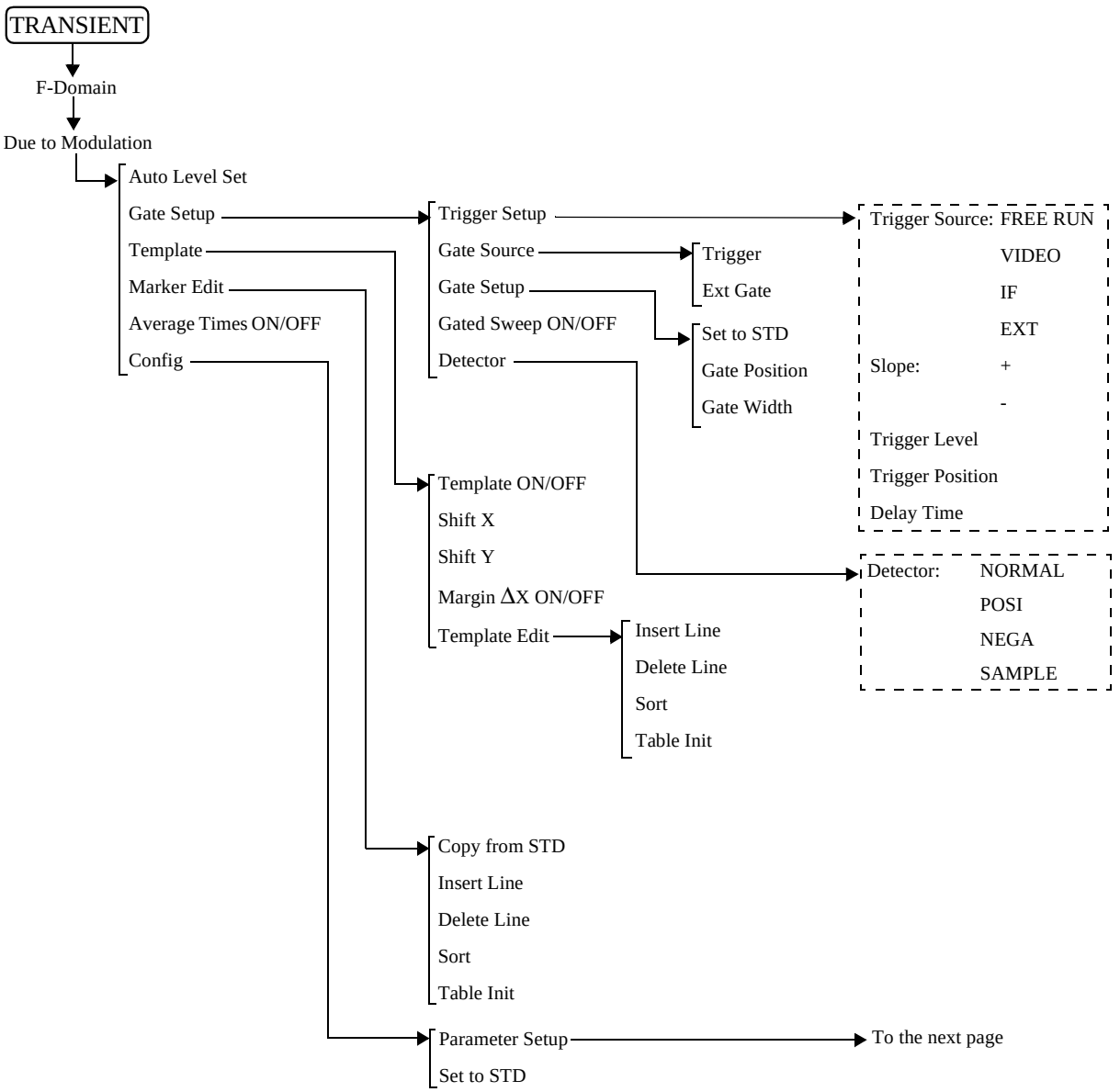

TRANSIENT
T-Domain
Spurious
Auto Level Set
Trigger Setup
Table No. 1/2/3
Load Table
Table Edit
Average Times ON/OFF
Config
Table No. 1/2/3
Load Table
Save Table
Insert Line
Delete Line
Table Init
Parameter Setup
Set to Default
Trigger Source: FREE RUN
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
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


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


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
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

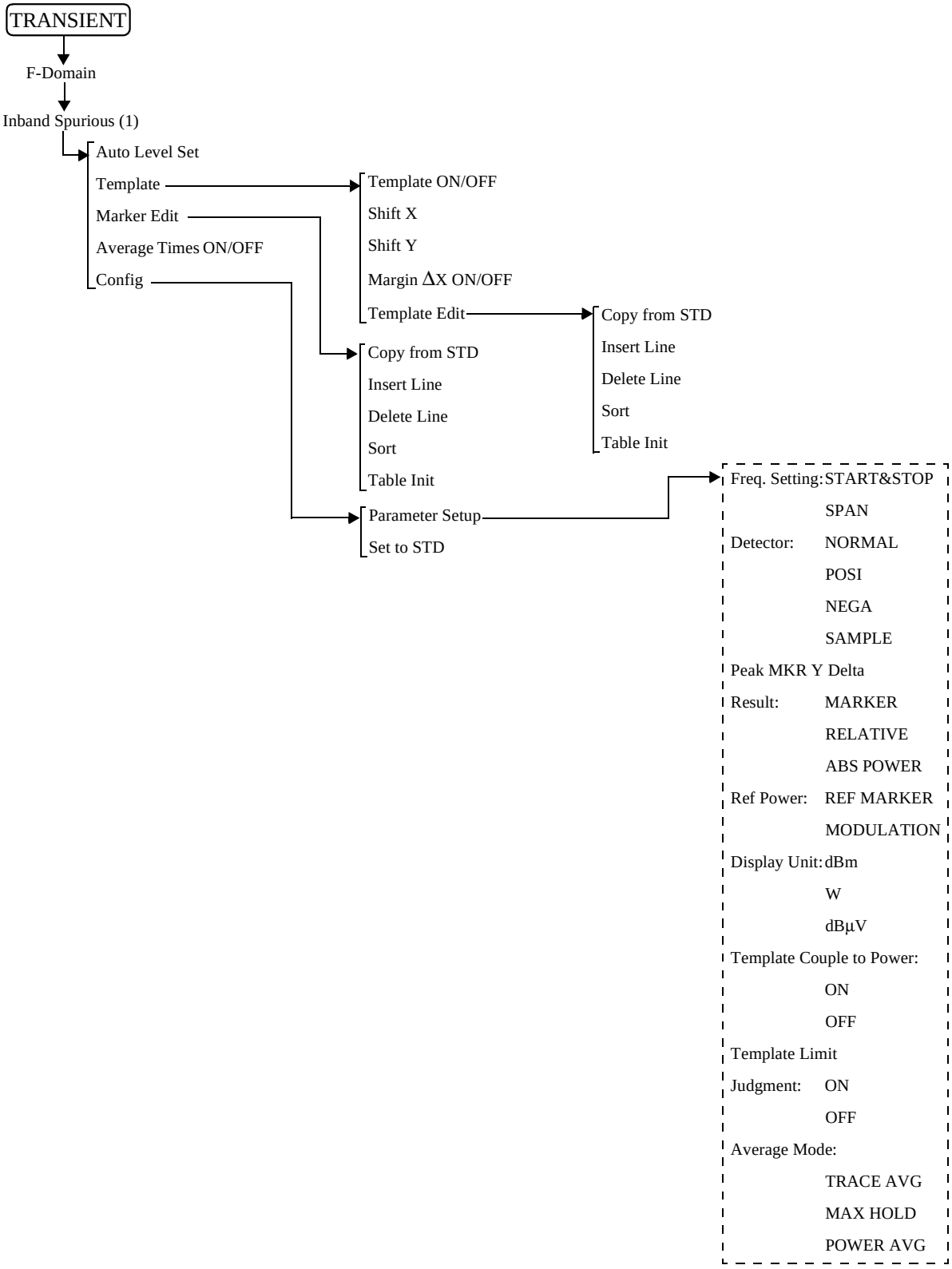
3.2 Menu Map

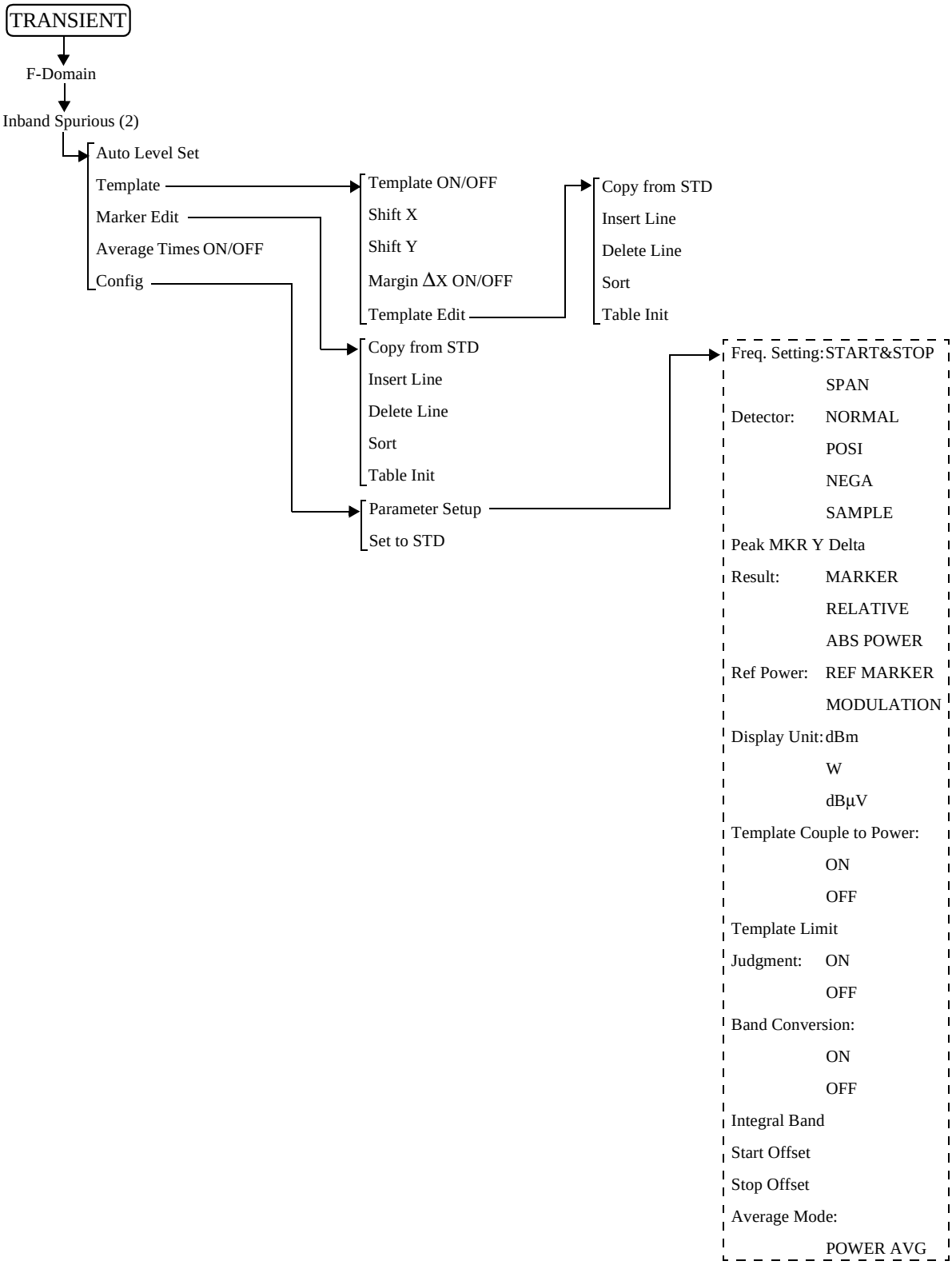

TRANSIENT
F-Domain
Due to Modulation
Auto Level Set
Gate Setup
Template
Marker Edit
Average Times ON/OFF
Config
Trigger Setup
Gate Source
Gate Setup
Gated Sweep ON/OFF
Detector
Trigger
Ext Gate
Set to STD
Gate Position
Gate Width
Trigger Source: FREE RUN
VIDEO
IF
EXT
Slope: +
-
Trigger Level
Trigger Position
Delay Time
Detector: NORMAL
POSI
NEGA
SAMPLE
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Insert Line
Delete Line
Sort
Table Init
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
To the next page

From the previous page →

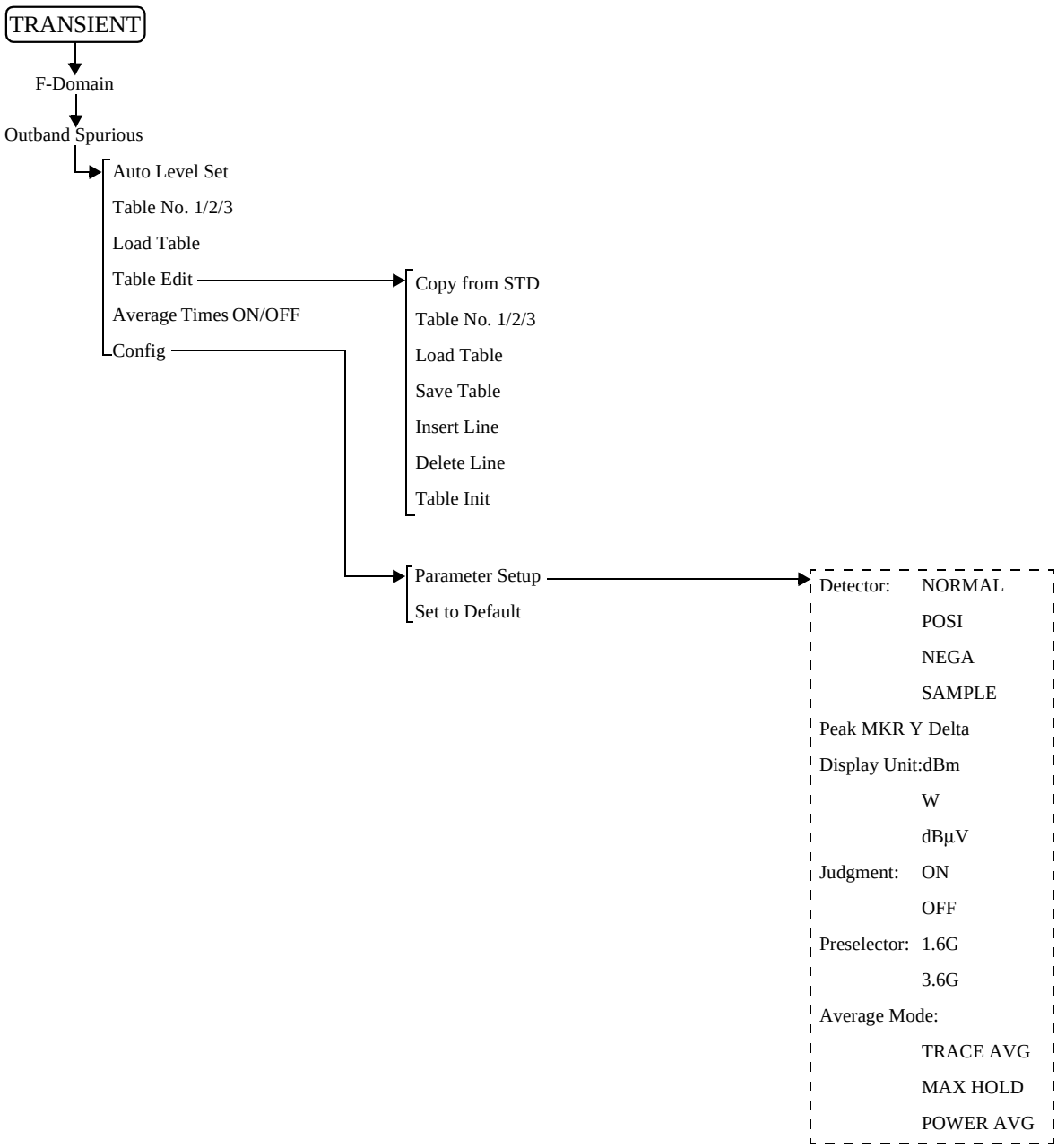
- Freq. Setting: START&STOP
  - SPAN
- Detector: NORMAL
  - POSI
  - NEGA
  - SAMPLE
- Result: MARKER
  - RELATIVE
  - ABS POWER
- Ref Power: REF MARKER
  - MODULA-TION
- Display Unit: dBm
  - W
  - dBµV
- Template Couple to Power:
  - ON
  - OFF
- Template Limit
- Judgment: ON
  - OFF
- Symbol Rate 1/T
- Rolloff Factor
- Average Mode:
  - TRACE AVG
  - MAX HOLD
  - POWER AVG
  - NUMERIC

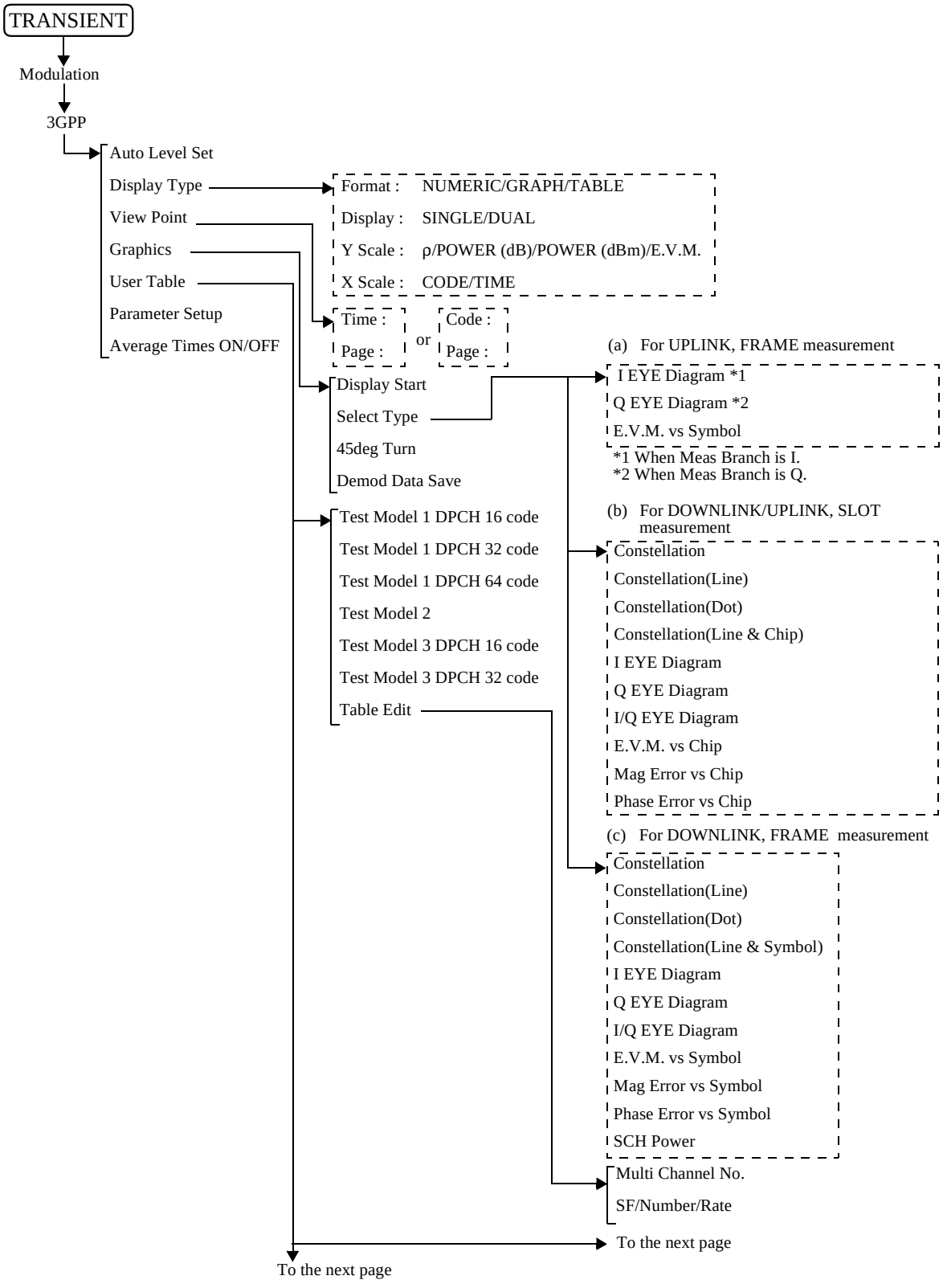
3.2 Menu Map

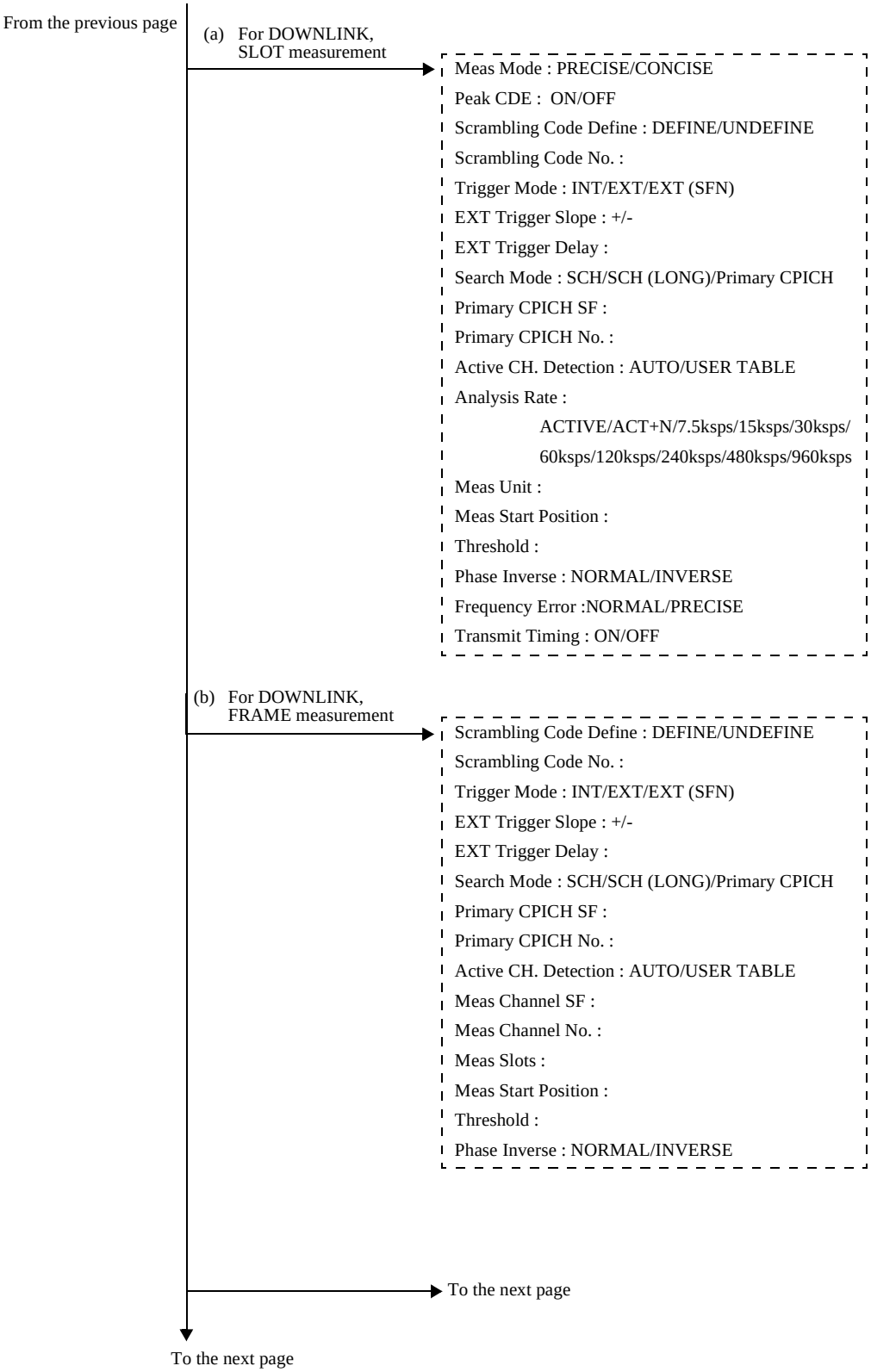

TRANSIENT
F-Domain
Inband Spurious (1)
Auto Level Set
Template
Marker Edit
Average Times ON/OFF
Config
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
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

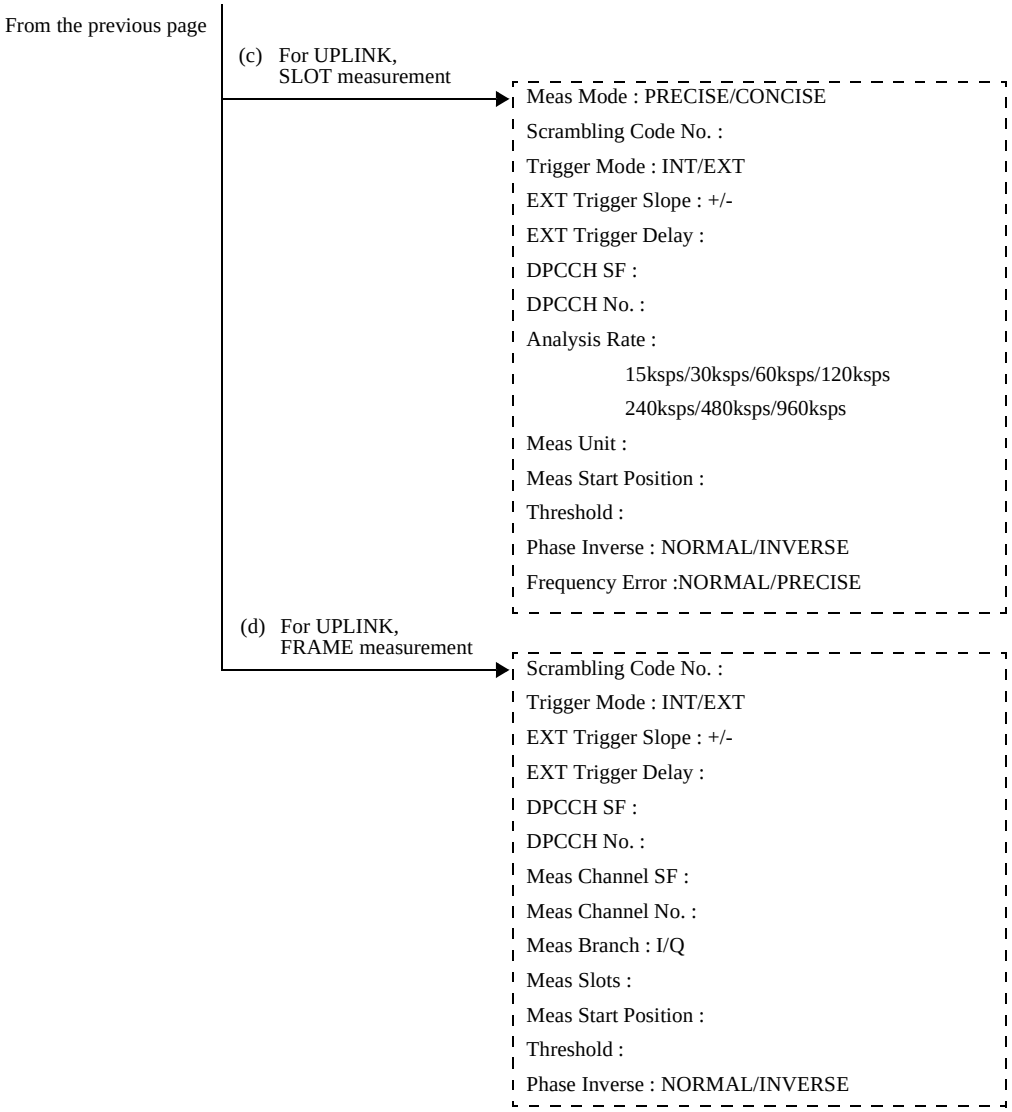

TRANSIENT
F-Domain
Inband Spurious (2)
Auto Level Set
Template
Marker Edit
Average Times ON/OFF
Config
Template ON/OFF
Shift X
Shift Y
Margin ΔX ON/OFF
Template Edit
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Copy from STD
Insert Line
Delete Line
Sort
Table Init
Parameter Setup
Set to STD
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
Band Conversion:
ON
OFF
Integral Band
Start Offset
Stop Offset
Average Mode:
POWER AVG

3.2 Menu Map

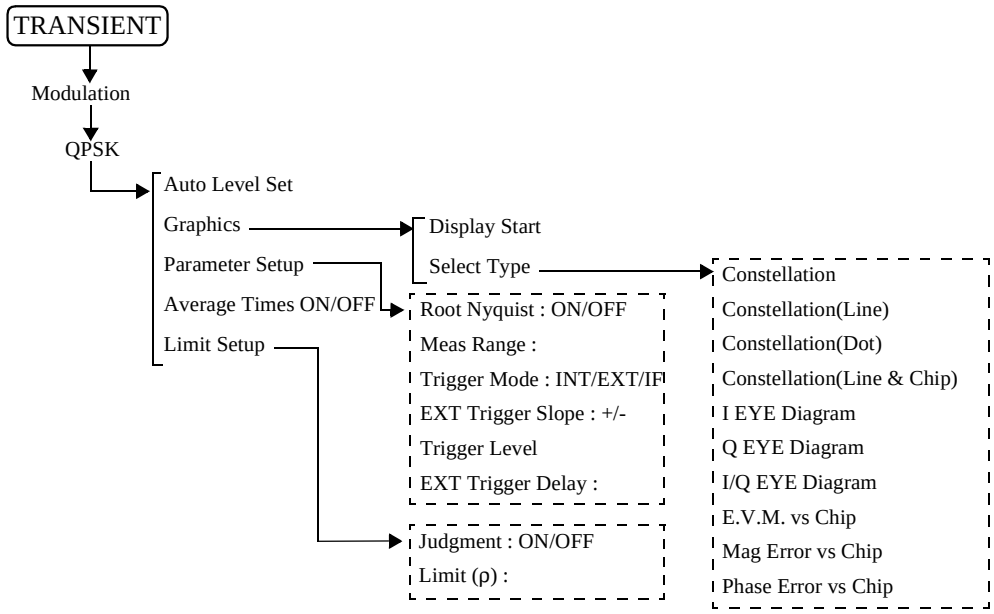

TRANSIENT
F-Domain
Outband Spurious
Auto Level Set
Table No. 1/2/3
Load Table
Table Edit
Average Times ON/OFF
Config
Copy from STD
Table No. 1/2/3
Load Table
Save Table
Insert Line
Delete Line
Table Init
Parameter Setup
Set to Default
Detector: NORMAL
POSI
NEGA
SAMPLE
Peak MKR Y Delta
Display Unit:dBm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

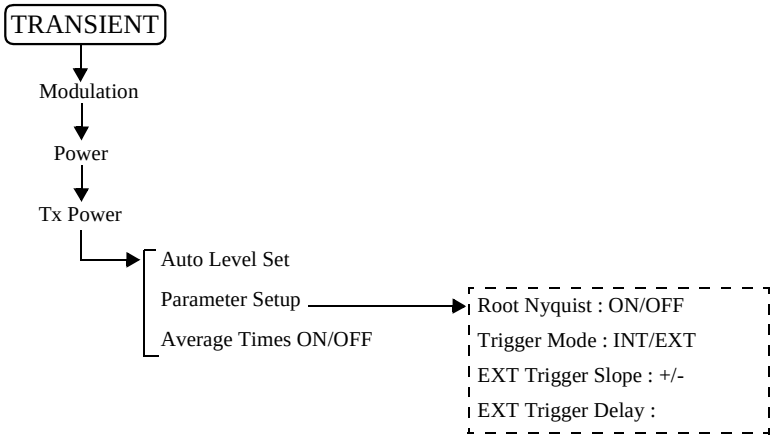

TRANSIENT
Modulation
3GPP
Auto Level Set
Display Type
View Point
Graphics
User Table
Parameter Setup
Average Times ON/OFF
Format : NUMERIC/GRAPH/TABLE
Display : SINGLE/DUAL
Y Scale : ρ/POWER (dB)/POWER (dBm)/E.V.M.
X Scale : CODE/TIME
Time :
Page :
or
Code :
Page :
Display Start
Select Type
45deg Turn
Demod Data Save
Test Model 1 DPCH 16 code
Test Model 1 DPCH 32 code
Test Model 1 DPCH 64 code
Test Model 2
Test Model 3 DPCH 16 code
Test Model 3 DPCH 32 code
Table Edit
(a) For UPLINK, FRAME measurement
I EYE Diagram *1
Q EYE Diagram *2
E.V.M. vs Symbol
*1 When Meas Branch is I.
*2 When Meas Branch is Q.
(b) For DOWNLINK/UPLINK, SLOT measurement
Constellation
Constellation(Line)
Constellation(Dot)
Constellation(Line & Chip)
I EYE Diagram
Q EYE Diagram
I/Q EYE Diagram
E.V.M. vs Chip
Mag Error vs Chip
Phase Error vs Chip
(c) For DOWNLINK, FRAME measurement
Constellation
Constellation(Line)
Constellation(Dot)
Constellation(Line & Symbol)
I EYE Diagram
Q EYE Diagram
I/Q EYE Diagram
E.V.M. vs Symbol
Mag Error vs Symbol
Phase Error vs Symbol
SCH Power
Multi Channel No.
SF/Number/Rate
To the next page
To the next page

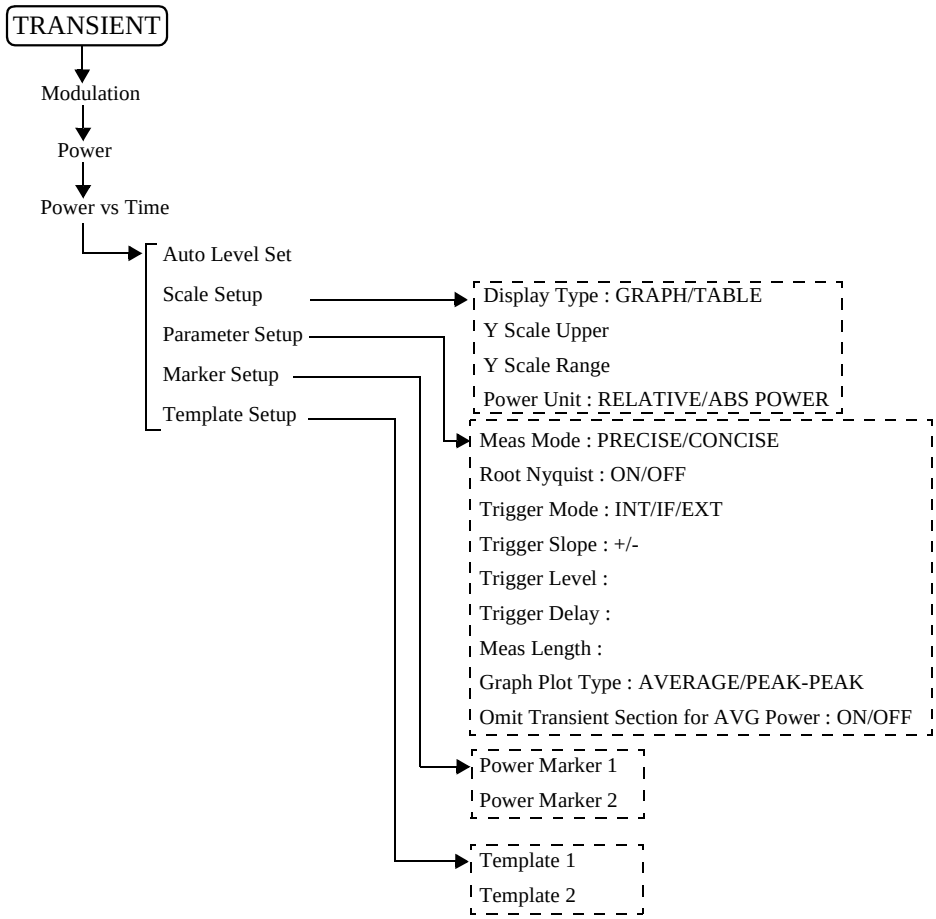

From the previous page
(a) For DOWNLINK, SLOT measurement
Meas Mode : PRECISE/CONCISE
Peak CDE : ON/OFF
Scrambling Code Define : DEFINE/UNDEFINE
Scrambling Code No. :
Trigger Mode : INT/EXT/EXT (SFN)
EXT Trigger Slope : +/-
EXT Trigger Delay :
Search Mode : SCH/SCH (LONG)/Primary CPICH
Primary CPICH SF :
Primary CPICH No. :
Active CH. Detection : AUTO/USER TABLE
Analysis Rate :
ACTIVE/ACT+N/7.5ksps/15ksps/30ksps/
60ksps/120ksps/240ksps/480ksps/960ksps
Meas Unit :
Meas Start Position :
Threshold :
Phase Inverse : NORMAL/INVERSE
Frequency Error :NORMAL/PRECISE
Transmit Timing : ON/OFF
(b) For DOWNLINK, FRAME measurement
Scrambling Code Define : DEFINE/UNDEFINE
Scrambling Code No. :
Trigger Mode : INT/EXT/EXT (SFN)
EXT Trigger Slope : +/-
EXT Trigger Delay :
Search Mode : SCH/SCH (LONG)/Primary CPICH
Primary CPICH SF :
Primary CPICH No. :
Active CH. Detection : AUTO/USER TABLE
Meas Channel SF :
Meas Channel No. :
Meas Slots :
Meas Start Position :
Threshold :
Phase Inverse : NORMAL/INVERSE
To the next page
To the next page

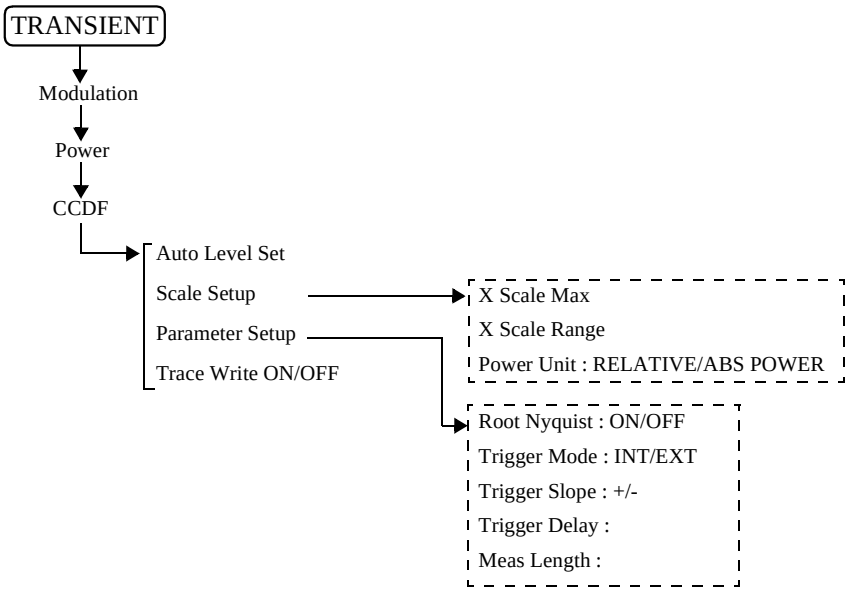

From the previous page
(c) For UPLINK, SLOT measurement
Meas Mode : PRECISE/CONCISE
Scrambling Code No. :
Trigger Mode : INT/EXT
EXT Trigger Slope : +/-
EXT Trigger Delay :
DPCCH SF :
DPCCH No. :
Analysis Rate :
15ksps/30ksps/60ksps/120ksps
240ksps/480ksps/960ksps
Meas Unit :
Meas Start Position :
Threshold :
Phase Inverse : NORMAL/INVERSE
Frequency Error :NORMAL/PRECISE
(d) For UPLINK, FRAME measurement
Scrambling Code No. :
Trigger Mode : INT/EXT
EXT Trigger Slope : +/-
EXT Trigger Delay :
DPCCH SF :
DPCCH No. :
Meas Channel SF :
Meas Channel No. :
Meas Branch : I/Q
Meas Slots :
Meas Start Position :
Threshold :
Phase Inverse : NORMAL/INVERSE

3.2 Menu Map

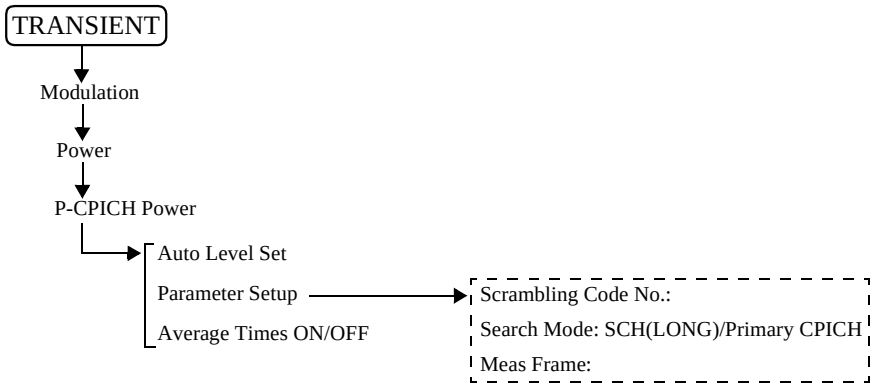

TRANSIENT
Modulation
QPSK
Auto Level Set
Graphics
Parameter Setup
Average Times ON/OFF
Limit Setup
Display Start
Select Type
Root Nyquist : ON/OFF
Meas Range :
Trigger Mode : INT/EXT/IF
EXT Trigger Slope : +/-
Trigger Level
EXT Trigger Delay :
Judgment : ON/OFF
Limit (ρ) :
Constellation
Constellation(Line)
Constellation(Dot)
Constellation(Line & Chip)
I EYE Diagram
Q EYE Diagram
I/Q EYE Diagram
E.V.M. vs Chip
Mag Error vs Chip
Phase Error vs Chip

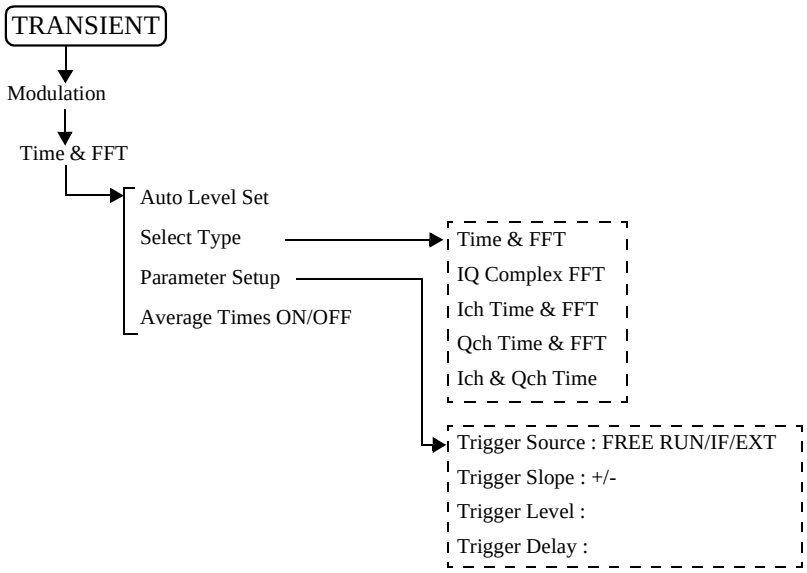

TRANSIENT
Modulation
Power
Tx Power
Auto Level Set
Parameter Setup
Average Times ON/OFF
Root Nyquist : ON/OFF
Trigger Mode : INT/EXT
EXT Trigger Slope : +/-
EXT Trigger Delay :

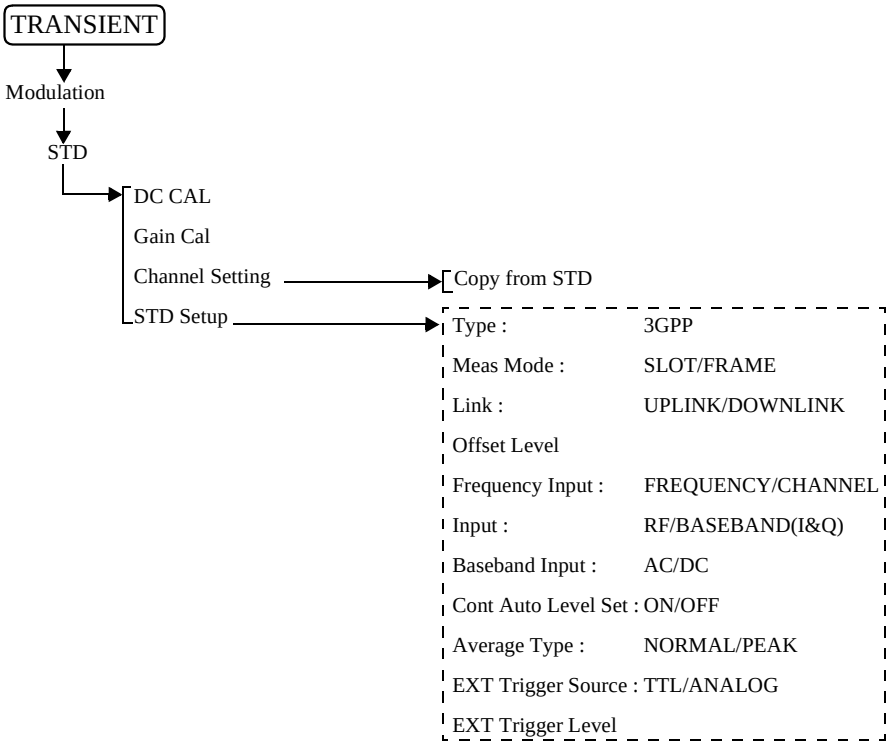

TRANSIENT
Modulation
Power
Power vs Time
Auto Level Set
Scale Setup
Parameter Setup
Marker Setup
Template Setup
Display Type : GRAPH/TABLE
Y Scale Upper
Y Scale Range
Power Unit : RELATIVE/ABS POWER
Meas Mode : PRECISE/CONCISE
Root Nyquist : ON/OFF
Trigger Mode : INT/IF/EXT
Trigger Slope : +/-
Trigger Level :
Trigger Delay :
Meas Length :
Graph Plot Type : AVERAGE/PEAK-PEAK
Omit Transient Section for AVG Power : ON/OFF
Power Marker 1
Power Marker 2
Template 1
Template 2


TRANSIENT
Modulation
Power
CCDF
Auto Level Set
Scale Setup
Parameter Setup
Trace Write ON/OFF
X Scale Max
X Scale Range
Power Unit : RELATIVE/ABS POWER
Root Nyquist : ON/OFF
Trigger Mode : INT/EXT
Trigger Slope : +/-
Trigger Delay :
Meas Length :

3.2 Menu Map

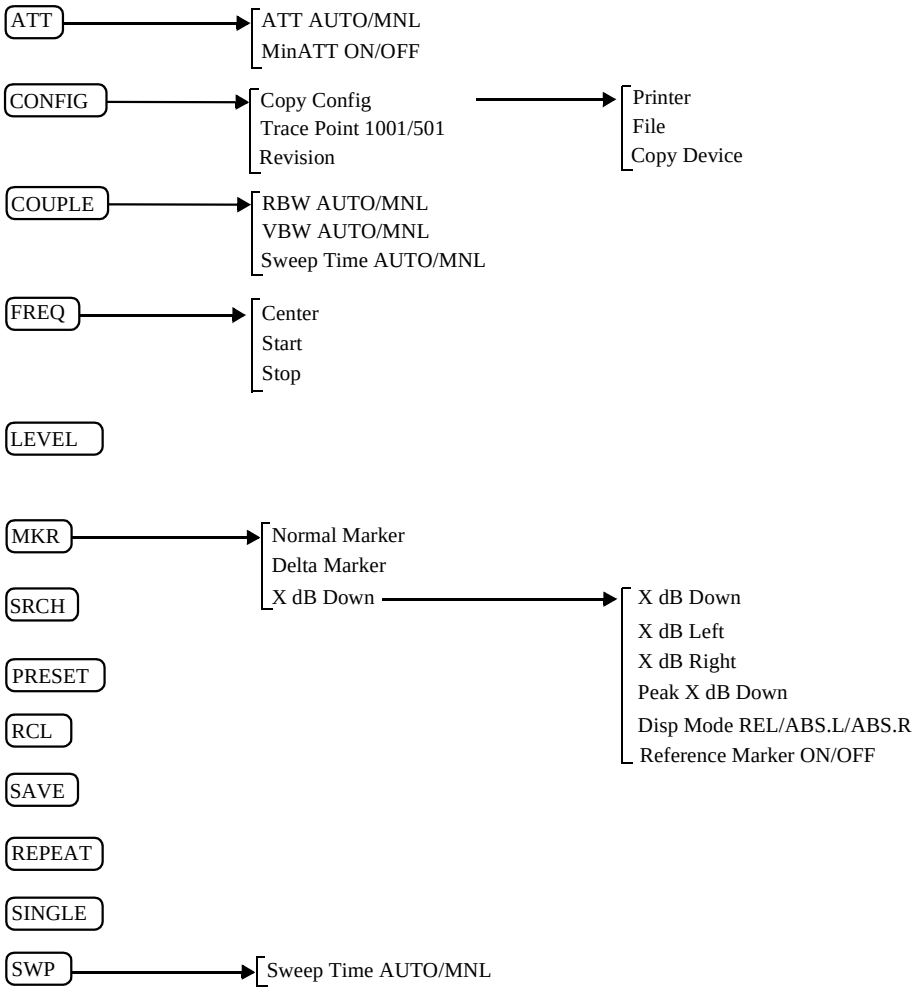

TRANSIENT
Modulation
Power
P-CPICH Power
Auto Level Set
Parameter Setup
Average Times ON/OFF
Scrambling Code No.:
Search Mode: SCH(LONG)/Primary CPICH
Meas Frame:


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
Gain Cal
Channel Setting
STD Setup
Copy from STD
Type : 3GPP
Meas Mode : SLOT/FRAME
Link : UPLINK/DOWNLINK
Offset Level
Frequency Input : FREQUENCY/CHANNEL
Input : RF/BASEBAND(I&Q)
Baseband Input : AC/DC
Cont Auto Level Set : ON/OFF
Average Type : NORMAL/PEAK
EXT Trigger Source : TTL/ANALOG
EXT Trigger Level

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.

---

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**).

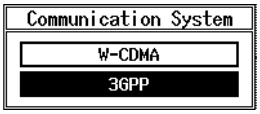


Figure 3-1 Communication Systems Dialog Box

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.

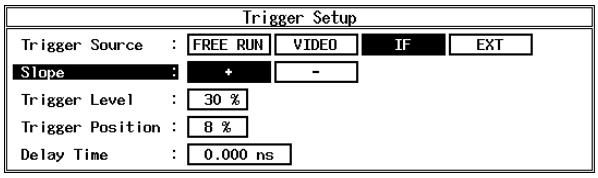


Figure 3-2 Trigger Setup Dialog Box

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 (the leading edge of the burst).

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.

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.

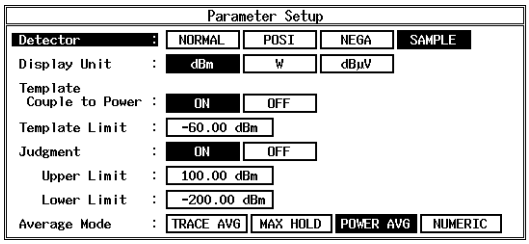


Figure 3-3 Parameter Setup Dialog Box

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

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

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.

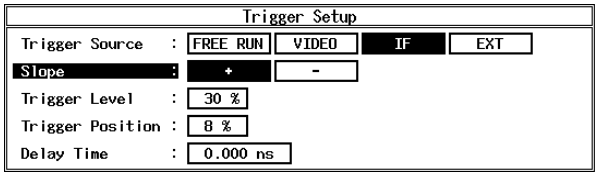


Figure 3-4 Trigger Setup Dialog Box

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 (the leading edge of the burst).

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.

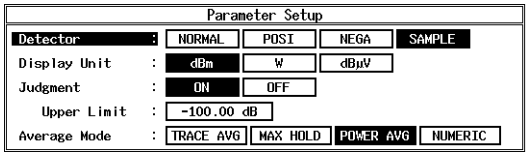


Figure 3-5 Parameter Setup Dialog Box

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.

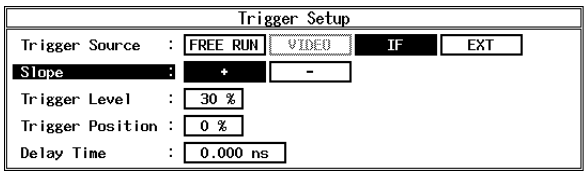


Figure 3-6 Trigger Setup Dialog Box

Trigger Source — Selects a trigger

FREE RUN: Captures data using the internal measurement timing.

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

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.

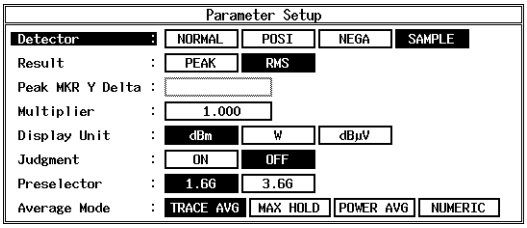


Figure 3-7 Parameter Setup Dialog Box

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.

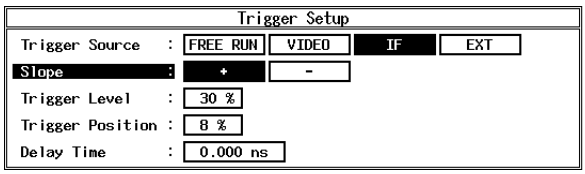


Figure 3-8 Trigger Setup Dialog Box

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 (the leading edge of the burst).

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.

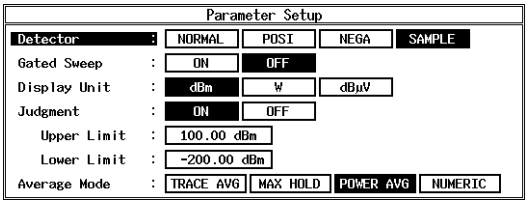


Figure 3-10 Parameter Setup Dialog Box

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.

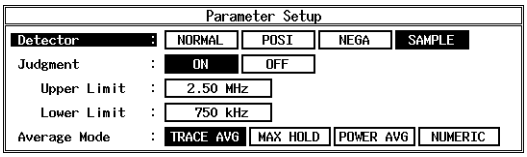


Figure 3-11 Parameter Setup Dialog Box

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.
  - ***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.

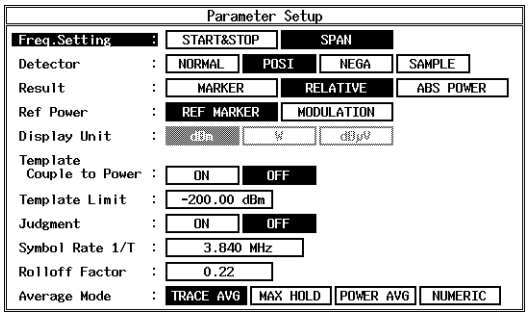


Figure 3-12 Parameter Setup Dialog Box

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.

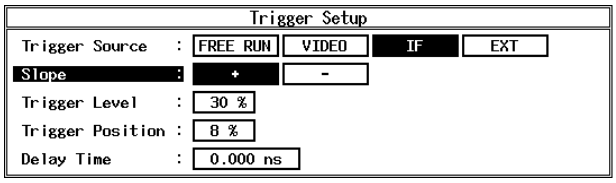


Figure 3-13 Trigger Setup Dialog Box

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 (the leading edge of the burst).

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.

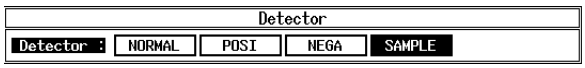


Figure 3-14 Detector Dialog Box

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

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.

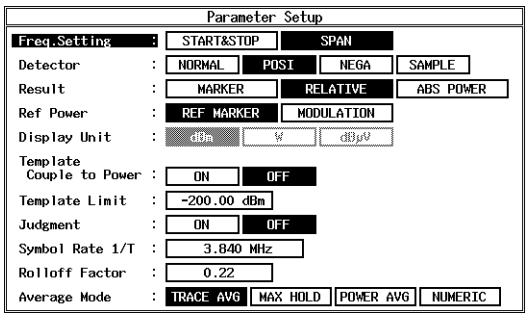


Figure 3-15 Parameter Setup Dialog Box

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

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.
For the method of average processing, refer to "Average Mode" in the Config → Parameter Setup.

Config

Parameter Setup Sets measurement conditions and so on.

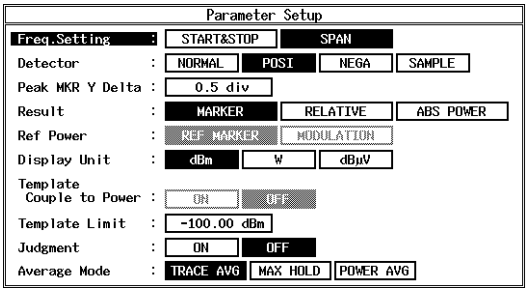


Figure 3-16 Parameter Setup Dialog Box

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.

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 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.

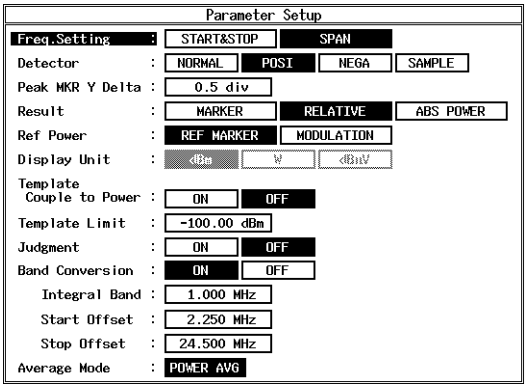


Figure 3-17 Parameter Setup Dialog Box

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.

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 the 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.

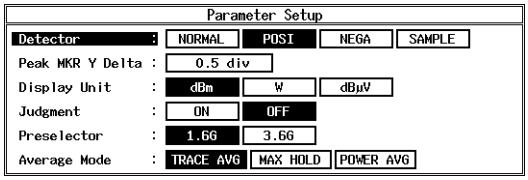


Figure 3-18 Parameter Setup Dialog Box

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: 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.

Set to Default Returns the set value to the default.

3.3.4 Modulation

Performs the modulation analysis using a DSP.

3.3.4.1 3GPP

Perform measurements by inversely spreading the measurement signal as a 3GPP signal.
Can measure the code domain power coefficient.

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.

Display Type Switches the result display.

Format Format dialog box is displayed.

NUMERIC: Displays the measurement result.

GRAPH: Displays a graph for the code domain power coefficient and the power.

TABLE: Displays the code domain power coefficient, power (relative and absolute values) and EVM.

Display Toggles the display mode between Single and Dual.

SINGLE: Displays data on a one-screen.

DUAL: Displays data on a dual-screen; displays the graph on the upper screen and the measurement result on the lower screen. (Only for DOWNLINK)

Y Scale Sets the Y scale unit.

ρ: Displays the vertical axis of the graph in the code domain power coefficients.
When selecting any items other than ACTIVE, the sum total of the code domain power coefficients for each channel is 1.

POWER [dB]:
Displays the power (relative value) along the Y axis. The power of the signal to be measured per slot is 0 dB.

POWER [dBm]:
Displays the power (absolute value) as a list.
Can be selected when Format is set to TABLE.

E.V.M.: Displays Error Vector Magnitude as a list.
Can be selected when Format is set to TABLE.

X Scale Sets the X scale unit.

CODE: Displays the horizontal axis of the graph in channel numbers (codes).
A ρ for each channel with an arbitrary time or a graph for the power is displayed. Set the time to be displayed using View Point.

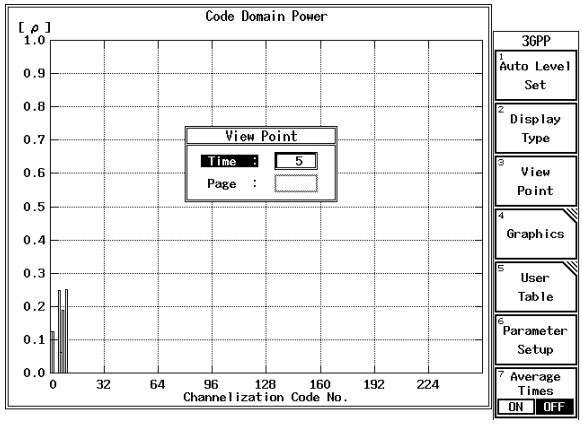


Figure 3-19 Selecting the Unit of the Graph Horizontal Axis (for Channel Number)

TIME: Displays the horizontal axis of the graph in units of time. Displays a ρ in a specific Code or a graph for a variation over time of the power. Set the Code to be displayed using View Point. One division of time is the number of symbols specified by Meas Unit of Parameter Setup and the maximum measurement length is 2560 chips.

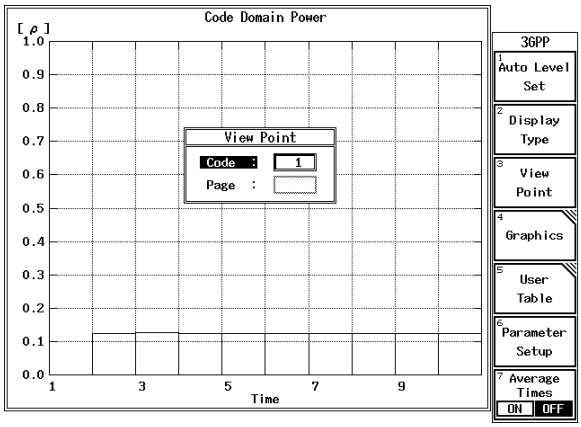


Figure 3-20 Selecting the Unit of the Graph Horizontal Axis (for Time)

View Point

Time (Code) Selects the X scale for a graphical display.
TIME: Sets the X scale to time.
CODE: Sets the X scale to codes.

Page Switches the screen if the data cannot be displayed on a one-screen when TABLE is selected in Display Type.

Graphics Displays a constellation or an eye diagram.

Display Start Sets the display starting position. Setting values, 0 through 2432 chips, are available.

Select Type Sets the 3 GPP display format.
The 3GPP display format differs according to whether Meas Mode is SLOT or FRAME.
When Meas Mode is set to FRAME and LINK is set to UPLINK, refer to (a) for more information.
When Meas Mode is set to SLOT and LINK is set to DOWN-LINK or UPLINK, refer to (b) for more information.
When Meas mode is set to FRAME and LINK is set to DOWN-LINK, refer to (c) for more information.

(a) When Meas Mode is set to FRAME and LINK is set to UPLINK

I EYE Diagram:
Displays the eye pattern of the I channel. (When Meas Branch is I.)

Q EYE Diagram:
Displays the eye pattern of the Q channel. (When Meas Branch is Q.)

E.V.M. vs Symbol:
Displays EVM for 1 symbol.

(b) When Meas Mode is set to SLOT and LINK is set to DOWNLINK or UPLINK

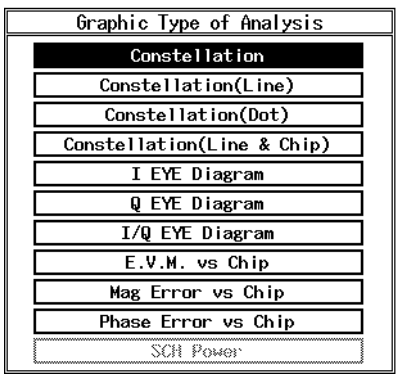


Figure 3-21 Graph Type of Analysis Dialog Box

Constellation:
Displays a constellation graph.

Constellation(Line):
Displays the transition between chips with connected lines.

Constellation(Dot):
Display the transition between chips with dots.

Constellation(Line & Chip):
Displays the transition between chips with connected lines and dots.

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 the Q channel eye pattern in the lower part of the screen.

E.V.M. vs Chip:
Displays EVM for 1 chip.

Mag Error vs Chip:
Displays the magnitude error for 1 chip.

Phase Error vs Chip:
Displays the phase error for 1 chip.

(c) When Meas Mode is set to FRAME and LINK is set to DOWNLINK

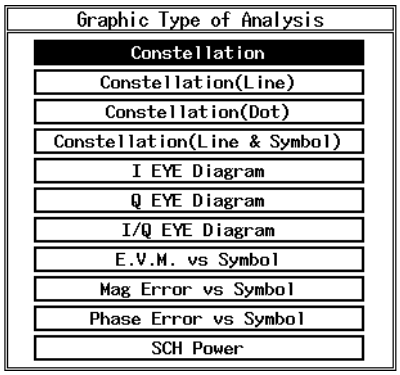


Figure 3-22 Graph Type of Analysis Dialog Box

Constellation:
Displays a graph for a constellation.

Constellation(Line):
Displays the transition between symbol points connected with lines.

Constellation(Dot):
Displays the transition between symbol points with dots.

Constellation(Line & Symbol):
Displays the transition between symbol points connected with lines and with dots.

I EYE Diagram:
Displays the eye pattern for I channel.

Q EYE Diagram:
Displays the eye pattern for Q channel.

I/Q EYE Diagram:
Displays the eye patterns for I and Q simultaneously.

E.V.M. vs Symbol:
Displays EVM for each symbol.

Mag Error vs Symbol:
Displays the magnitude error for each symbol.

Phase Error vs Symbol:
Displays the phase error for each symbol.

SCH Power:
Display the SCH power for each slot.

45deg Turn Displays the I and Q patterns turned by 45°.

Demod Data Save Saves the demodulated data to a floppy disk.
(Only for FRAME)

User Table Sets the spreading factor and code number for the transmission channel to be used when ***USER TABLE*** is selected as Active CH. Detection of DOWNLINK,.

Test Model 1 DPCH 16 code The spreading factor and code number of the multiplexed channel is automatically set to Test Model1 (DPCH 16 codes) compliant with TS25.141 V3.5.0.

Test Model 1 DPCH 32 code The spreading factor and code number of the multiplexed channel is automatically set to Test Model1 (DPCH 32 codes) compliant with TS25.141 V3.5.0.

Test Model 1 DPCH 64 code The spreading factor and code number of the multiplexed channel is automatically set to Test Model1 (DPCH 64 codes) compliant with TS25.141 V3.5.0.

Test Model 2 The spreading factor and code number of the multiplexed channel is automatically set to Test Model2 compliant with TS25.141 V3.5.0.

Test Model 3 DPCH 16 code The spreading factor and code number of the multiplexed channel is automatically set to Test Model3 (DPCH 16 codes) compliant with TS25.141 V3.5.0.

Test Model 3 DPCH 32 code The spreading factor and code number of the multiplexed channel is automatically set to Test Model3 (DPCH 32 codes) compliant with TS25.141 V3.5.0.

Table Edit Sets the spreading factor and code number of the transmission channels manually.

Multi Channel No. Sets the number of channels multiplexed on the signal under measurement.
The number of channels 1 to 32 can be set. However, the number does not include SCH.

SF/Number/Rate Sets the channel numbers and spreading factors (rates) for the channels set as Multi Channel No.

Primary CPICH:
Sets the spreading factor (rate) and code number for Primary CPICH.

Ch N: Sets the spreading factor (rate) and code number for the channel N.
Where, N is 1 through (the number of channels set as Multi Channel No. - 1).

NOTE: If a code number which does not meet orthogonality between different channels is set, a measurement error occurs.

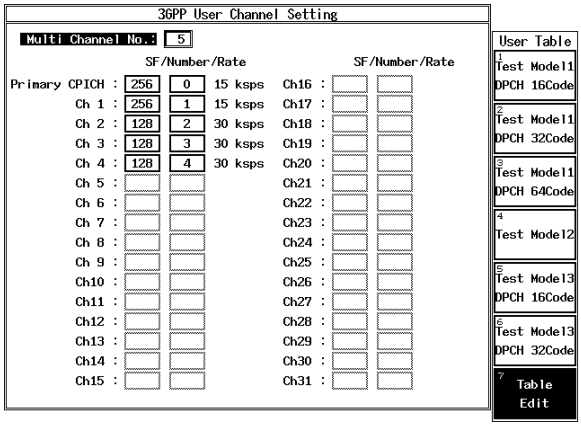


Figure 3-23 3GPP User Channel Setting Dialog Box

Parameter Setup

Sets the measurement parameter.
The measurement parameter setup screen varies whether Meas Mode is SLOT or Frame and whether LINK is DOWNLINK or UPLINK.
When Meas Mode is set to SLOT and LINK is set to DOWNLINK, refer to (a) for more information.
When Meas Mode is set to FRAME and LINK is set to DOWNLINK, refer to (b) for more information.
When Meas Mode is set to SLOT and LINK is set to UPLINK, refer to (c) for more information.
When Meas Mode is set to FRAME and LINK is set to UPLINK, refer to (d) for more information.

(a) When Meas Mode is set to SLOT and LINK is set to DOWNLINK

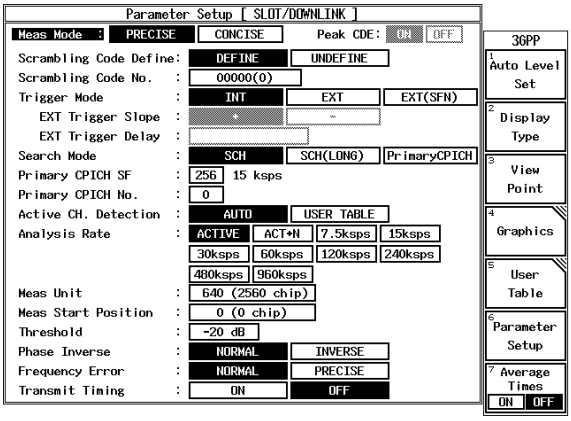


Figure 3-24 Parameter Setup [SLOT/DOWNLINK] Dialog Box

Meas Mode

Selects whether all items or some of the items are measured.

PRECISE: Measures all items.

CONCISE: Measures only the ρ, carrier frequency error, Error Vector Magnitude and Peak Code Domain Error.

NOTE: Graphic display is not available for CONCISE.

Peak CDE

Selects whether Peak Code Domain Error is measured when Meas Mode is set to CONCISE.

ON: Measures Peak Code Domain Error.

OFF: Does not measure Peak Code Domain Error.

Scrambling Code Define

Selects whether to use the scrambling code set to perform the measurement or to search S-SCH for the scrambling code number to perform the measurement.

DEFINE: Uses the scrambling code set to perform the measurement.

UNDEFINE:
Searches for a Scrambling code number from the S-SCH to perform measurements. This function is used when the Scrambling code number cannot be determined.

Scrambling Code No.

Sets Scrambling codes used when measuring to hexadecimal format. Codes can be set in the range 0 to 3FFFE by using the following keys:

A: **SHIFT**, **0**

B: **SHIFT**, **1**

C: **SHIFT**, **2**

D: **SHIFT**, **3**

E: **SHIFT**, **4**

F: **SHIFT**, **5**

Trigger Mode

Selects the timing at which data is stored.

INT: Stores data at the timing of the internal trigger.

EXT: Stores data at the timing of the external trigger.
Time Out occurs after approximately five seconds.

EXT (SFN):
Stores data at the timing of the external trigger.
Time Out occurs after approximately two minutes.

EXT Trigger Slope

Selects the slope of timing at which data is stored.

+: Stores data at the leading edge.

-: Stores data at the trailing edge.

EXT Trigger Delay

Sets a delay to the timing of the external trigger.
Delay times -5120.0 through 38400.0 (chips) can be set.

Search Mode

Selects the mode of acquiring synchronization.

SCH: Searches for a SCH to acquire synchronization.

SCH (LONG):
Searches SCH to acquire synchronization.
While it has greater efficiency of synchronization compared to Search Mode SCH, it requires a longer measurement time.

Primary CPICH:
Searches Primary CPICH to acquire synchronization.
When Trigger Mode is INT, searches one period of Primary CPICH.
When Trigger Mode is EXT, searches the first frame of Primary CPICH within the range of 100 chips both prior to and subsequent to the trigger.

Primary CPICH SF

Sets the spreading factor (rate) of Primary CPICH. The factors 4 through 512 can be set.

Primary CPICH No.

Sets the code number of Primary CPICH.

Active CH. Detection

Selects the mode in which the channels currently transmitting data are detected.

AUTO: Automatically detects the rates and code numbers of the channels currently transmitting data.

USER TABLE: Sets the data rate and code number of the transmission channel according to the user table.

Analysis Rate

Selects the rates used for the code domain analysis.

ACTIVE: Uses the rates of the channels currently transmitting data for measurement.

ACT+N: Uses the rates of the channels currently transmitting data for measurement.
Uses 7.5 ksps as the rate for noise measurement.

7.5 ksps: Uses 7.5 ksps as the rate for measurement.

15 ksps: Uses 15 ksps as the rate for measurement.

30 ksps: Uses 30 ksps as the rate for measurement.

60 ksps:	Uses 60 ksps as the rate for measurement.
120 ksps:	Uses 120 ksps as the rate for measurement.
240 ksps:	Uses 240 ksps as the rate for measurement.
480 ksps:	Uses 480 ksps as the rate for measurement.
960 ksps:	Uses 960 ksps as the rate for measurement.

Meas Unit

The measurement unit used to measure a code domain power coefficient and code domain power is set. Then the code domain power coefficient and code domain power are measured for each measurement unit. The range for the measurement unit is within the range of 1 to 640 (4 chips and 2560 chips) when Analysis Rate is set to ACTIVE, or within the range of 1 symbol to (2560/S) symbols when Analysis Rate is set to any positions other than ACTIVE. “S” means the code length (in chips) of the rate selected in Analysis Rate.

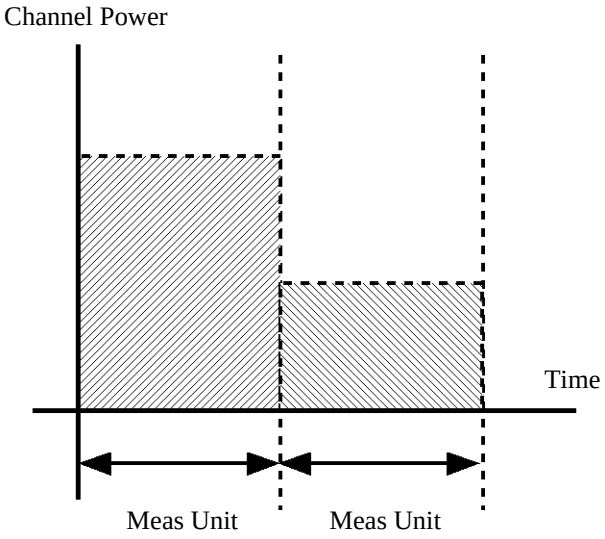


Figure 3-25 Explanation Diagram of MEAS Unit

Meas Start Position

Sets the position to start the measurement.
The set range is 0 through 140 (0 chip through 35840 chips).

Threshold

Sets a threshold value to judge whether or not the channel is active. A reference value is the mean power of the Primary CPICH. The judgement of the active channel is made for each symbol. As a result, the symbol having the mean power equal to or greater than (the mean power of the Primary CPICH) + (CDP threshold) is judged as active.
The setting range of a threshold value is between -5 dB and -40 dB.

NOTE: When a large threshold value is set, an active channel is judged as passive. As a result, ρ and modulation accuracy become worse than actual values, causing incorrect measurements. On the other hand when a small threshold value is set, a passive channel is judged as active. As a result, ρ and modulation accuracy become better than actual values, causing incorrect measurements.

Phase Inverse Selects whether or not to invert the phase of IQ signals.

NORMAL: Does not invert the sign of IQ signals.

INVERSE: Inverts the sign of IQ signals.

Frequency Error Switches the estimated accuracy for the carrier frequency error.

NORMAL: Estimates the error with normal accuracy.

PRECISE: Estimates the error with high accuracy.

Transmit Timing Switches between on and off of the transmission timing measurement between channels.

ON: Measures the transmission timing of each channel for Primary CPICH.

OFF: Does not measure the above transmission timing of each channel for Primary CPICH.

(b) When Meas Mode is set to FRAME and LINK is set to DOWNLINK

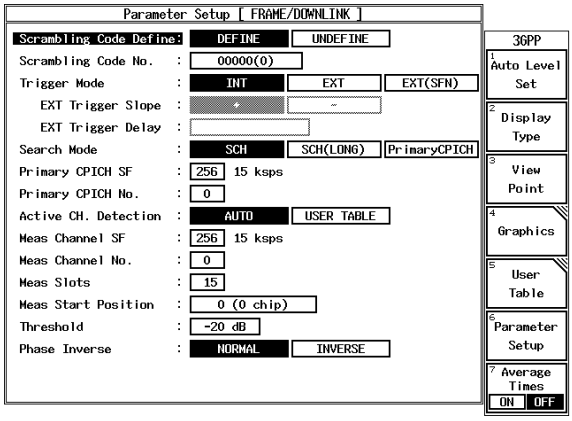


Figure 3-26 Parameter Setup [FRAME/DOWNLINK] Dialog Box

Scrambling Code Define Selects whether to use the scrambling code set to perform the measurement or to search S-SCH for the scrabbling code number to perform the measurement.

DEFINE: Uses the scrambling code set to perform the measurement.

UNDEFINE: Searches for a scrambling code number from the S-SCH to perform measurements. This function is used when the scrambling code number cannot be determined.

Scrambling Code No. Sets Scrambling codes used when measuring to hexadecimal format. Codes can be set in the range 0 to 3FFFE by using the following keys:

A: **SHIFT**, **0**
B: **SHIFT**, **1**
C: **SHIFT**, **2**
D: **SHIFT**, **3**
E: **SHIFT**, **4**
F: **SHIFT**, **5**

Trigger Mode Selects the timing at which data is stored.

INT: Stores data at the timing of the internal trigger.

EXT: Stores data at the timing of the external trigger.
Time Out occurs after approximately five seconds.

EXT (SFN):
Stores data at the timing of the external trigger.
Time Out occurs after approximately two minutes.

EXT Trigger Slope Selects the slope of timing at which data is stored.

+: Stores data at the leading edge.

-: Stores data at the trailing edge.

EXT Trigger Delay Sets a delay to the timing of the external trigger.
Delay times -5120.0 through 38400.0 (chips) can be set.

Search Mode Selects the mode of acquiring synchronization.

SCH: Searches for a SCH to acquire synchronization.

SCH (LONG):
Searches SCH to acquire synchronization.
While it has greater efficiency of synchronization compared to Search Mode SCH, it requires a longer measurement time.

Primary CPICH:
Searches Primary CPICH to acquire synchronization.
When Trigger Mode is INT, searches the one period of Primary CPICH.
When Trigger Mode is EXT, searches the first frame of Primary CPICH within the range of 100 chips both prior to and subsequent to the trigger.

Primary CPICH SF

Sets the spreading factor (rate) of Primary CPICH. The factors 4 through 512 can be set.

Primary CPICH No.

Sets the code number of Primary CPICH.

Active CH. Detection

Selects the mode of detecting the transmission channel.

AUTO: Automatically detects the data rate and code number of the transmission channel.

USER TABLE:
Sets the data rate and code number of the transmission channel according to the user table.

Meas Channel SF

Sets the spreading factor of the channel under measurement.

Meas Channel No.

Sets the code number of the channel under measurement.

Meas Slots

Sets the code domain power coefficient and the range (number of slots) for power measurement.
Separates the signal under measurement into each one slot and measures the code domain power coefficient and power for each slot.
The set range of slots is 1 through 30.

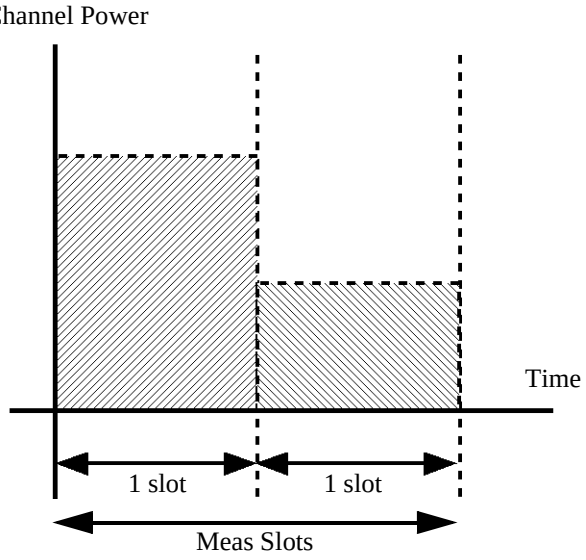


Figure 3-27 Explanation Diagram of MEAS Slots

Meas Start Position

Sets the measurement start position (the number of symbols from the head of a slot).
The setting range is 0 through (2560/S-1) symbols. Where, S is Meas Channel SF.

Threshold Sets a threshold value to judge whether or not the channel is active. A reference value is the mean power of the Primary CPICH. The judgement of the active channel is made for each symbol. As a result, the symbol having the mean power equal to or greater than (the mean power of the Primary CPICH) + (CDP threshold) is judged as active.
The setting range of a threshold value is between -5 dB and -40 dB.

NOTE: When a large threshold value is set, an active channel is judged as passive. As a result, ρ and modulation accuracy become worse than actual values, causing incorrect measurements. On the other hand when a small threshold value is set, a passive channel is judged as active. As a result, ρ and modulation accuracy become better than actual values, causing incorrect measurements.

Phase Inverse Selects whether or not to invert the phase of IQ signals.

NORMAL: Does not invert the sigh of IQ signals.

INVERSE: Inverts the sigh of IQ signals.

(c) When Meas Mode is set to SLOT and LINK is set to UPLINK

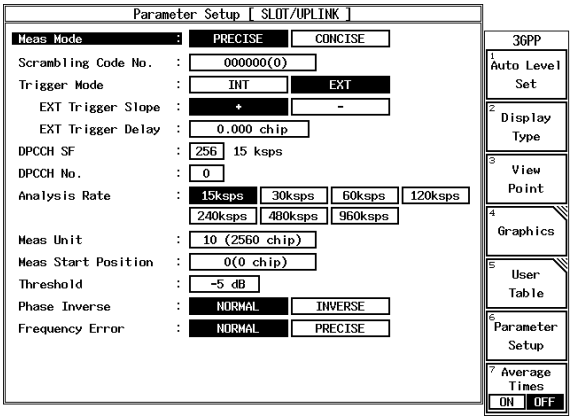


Figure 3-28 Parameter Setup [SLOT/UPLINK] Dialog Box

Meas Mode: Selects whether all items or some of the items are measured.

PRECISE: Measures all items.

CONCISE: Measures only the ρ, carrier frequency error, Error Vector Magnitude and Peak Code Domain Error.

NOTE: Graphic display is not available for CONCISE.

Scrambling Code No. Sets Scrambling codes to hexadecimal format. Codes can be set in the range 0 to FFFFFF by using the following keys:

A: **SHIFT**, **0**
B: **SHIFT**, **1**
C: **SHIFT**, **2**
D: **SHIFT**, **3**
E: **SHIFT**, **4**
F: **SHIFT**, **5**

Trigger Mode Selects the timing at which data is stored.

INT: Stores data at the timing of the internal trigger.
EXT: Stores data at the timing of the external trigger.

EXT Trigger Slope Selects the slope of timing at which data is stored.

+: Stores data at the leading edge.
-: Stores data at the trailing edge.

EXT Trigger Delay Sets a delay to the timing of the external trigger.
Delay times -5120.0 through 38400.0 (chips) can be set.

DPCCH SF Sets the spreading factor (rate) of the DPCCH. The factors 4 through 256 can be set.

DPCCH No. Sets the DPCCH code number.

Analysis Rate Selects the rates used for the code domain analysis.

15 ksps: Uses the rate as 15 ksps for measurement.
30 ksps: Uses the rate as 30 ksps for measurement.
60 ksps: Uses the rate as 60 ksps for measurement.
120 ksps: Uses the rate as 120 ksps for measurement.
240 ksps: Uses the rate as 240 ksps for measurement.
480 ksps: Uses the rate as 480 ksps for measurement.
960 ksps: Uses the rate as 960 ksps for measurement.

Meas Unit Sets the range (number of symbols) in which the code domain power coefficient and the power will be measured. The signal to be measured is divided into lengths of the set number of symbols. The code domain power coefficient and the power are measured for each time range. A value of between 1 and (2560/S) can be set. However, S is a short record length (number of chips) selected as Analysis Rate.

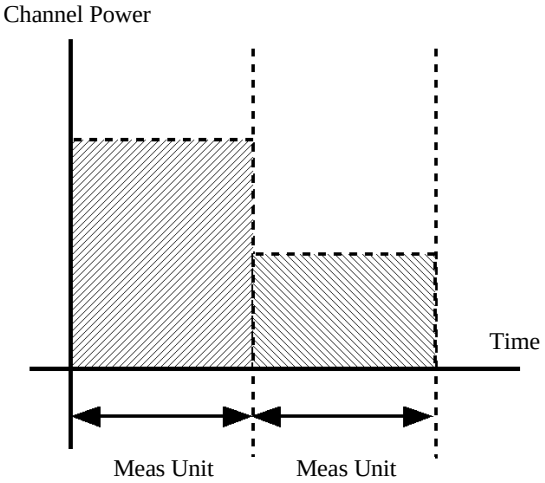


Figure 3-29 Explanation Diagram of MEAS Unit

Meas Start Position

Set the position where the measurement has started. The set range is from 0 to 140 (0 to 35840 chips).

Threshold

Sets a threshold value to judge whether or not the channel is active. A reference value is the mean power of the DPCCH. The judgement of the active channel is made for each symbol. As a result, the symbol having the mean power equal to or greater than (the mean power of the DPCCH) + (CDP threshold) is judged as active.
The setting range of a threshold value is between -5 dB and -40 dB.

NOTE: When a large threshold value is set, an active channel is judged as passive. As a result, ρ and modulation accuracy become worse than actual values, causing incorrect measurements. On the other hand when a small threshold value is set, a passive channel is judged as active. As a result, ρ and modulation accuracy become better than actual values, causing incorrect measurements.

Phase Inverse

Selects whether or not to invert the phase of IQ signals.

NORMAL:	Does not invert the phase of Q signals.
INVERSE:	Inverts the phase of Q signals.

Frequency Error

Switches the estimated accuracy for the carrier frequency error.

NORMAL:	Estimates the error with normal accuracy.
PRECISE:	Estimates the error with high accuracy.

(d) When Meas Mode is set to FRAME and LINK is set to UPLINK

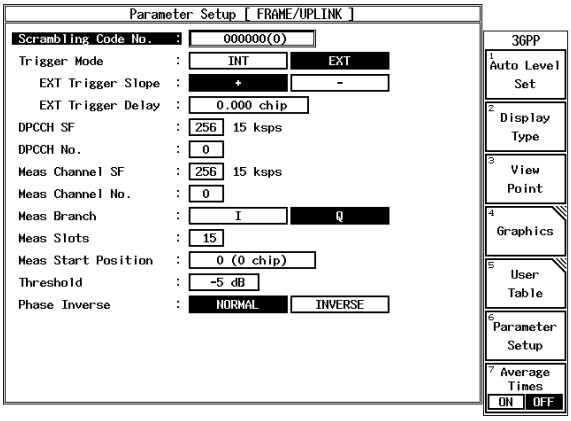


Figure 3-30 Parameter Setup [FRAME/UPLINK] Dialog Box

Scrambling Code No. Sets Scrambling codes to hexadecimal format. Codes can be set in the range 0 to FFFFFF by using the following keys:

A: **SHIFT**, **0**
B: **SHIFT**, **1**
C: **SHIFT**, **2**
D: **SHIFT**, **3**
E: **SHIFT**, **4**
F: **SHIFT**, **5**

Trigger Mode Switches the trigger mode between the internal and external trigger.

INT: Captures data using the internal trigger.
EXT: Captures data using the external trigger.

EXT Trigger Slope Switches the polarity of the external trigger slope.

+: Captures data at the leading edge.
-: Captures data at the trailing edge.

EXT Trigger Delay Sets a delay to the external trigger timing.
The delay times -5120.0 through 38400.0 (chips) can be set.

DPCCH SF Sets the spreading factor (rate) of the DPCCH.
The factors 4 through 256 can be set.

DPCCH No. Sets the DPCCH code number.

Meas Channel SF Sets the spreading factor of the channel to be measured.

Meas Channel No. Sets the code number for the channel under measurement.

Meas Branch

Selects the measurement branch of the channel to be measured from I or Q.

I: Measures the I side.

Q: Measures the Q side.

Meas Slots

Sets the code domain power coefficient and the range (the number of slots) for power measurement.
Separates the signal under measurement into each one slot and measures the code domain power coefficient and power for each slot. The set range of slots is 1 through 30.

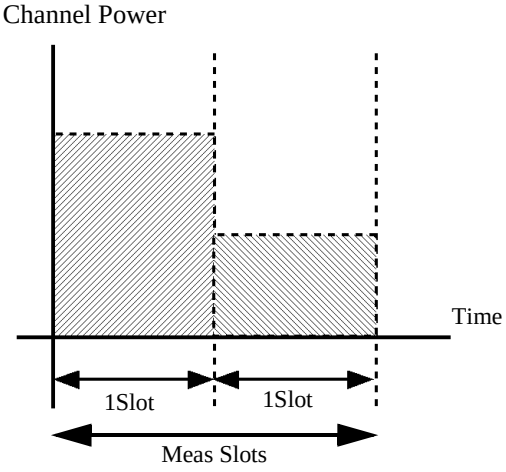


Figure 3-31 Examination Diagram of Meas Slots

Meas Start Position

Sets the measurement start position (the number of symbols from the head of a slot).
The measurement range is 0 through (2560/S-1) symbols. Where, S is Meas Channel SF.

Threshold

Sets a threshold value to judge whether or not the channel is active.
A reference level is the mean power of DPCCH. In addition, the judgment of the active channel is made for each symbol. As a result, the symbol having the mean power equal to or greater than (the mean power of DPCCH) + (CDP threshold) is judged as active. The set range for a threshold value is -5 dB through -40 dB.

NOTE: When a large threshold level is set, an active channel is judged as inactive. As a result, ρ and modulation accuracy become worse than actual values, causing incorrect measurements. On the other hand, when a small threshold level is set, an inactive channel is judged as active. As a result, ρ and modulation accuracy become better than actual values, causing incorrect measurements.

Phase Inverse

Selects whether or not to invert the IQ signal phases.

NORMAL: Does not invert the sign of the Q signal.

INVERSE: Inverts the sign of the Q signal.

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: Although the averaging of the power is performed, the average is not shown on the Code Domain Power Graph display.

3.3.4.2 QPSK

Assumes the measurement signal as a QPSK signal to perform measurement.

NOTE: The instrument supports the chip rate of 3.84 Mcps.

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.

Graphics

Displays a constellation or an eye diagram.

Display Start

Sets the display starting position.

Select Type

Graphic Type of Analysis dialog box is displayed.

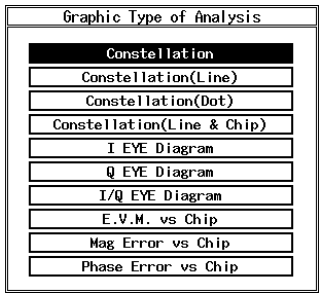


Figure 3-32 Graphic Type of Analysis Dialog Box

Constellation:
Displays a graph for a constellation.

Constellation(Line):
Displays the transition between symbol points connected with lines.

Constellation(Dot):
Displays the transition between symbol points with dots.

Constellation(Line & Chip):
Displays the transition between symbol points connected with lines and with dots.

I EYE Diagram:
Displays the eye pattern for I channel.

Q EYE Diagram:
Displays the eye pattern for Q channel.

I/Q EYE Diagram:
Displays the eye patterns for I and Q simultaneously.

E.V.M. vs Chip:
Displays a graph of the magnitude of error vectors for each symbol.

Mag Error vs Chip:
Displays a graph of magnitude errors for each symbol.

Phase Error vs Chip:
Displays a graph of phase errors for each symbol.

Parameter Setup

Sets the measurement parameter.

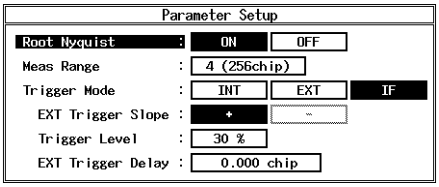


Figure 3-33 QPSK Measurement parameter set Dialog Box

Root Nyquist

Switches the Root Nyquist filter between ON and OFF.

ON: Enables the Root Nyquist filter.

OFF: Does not use the Root Nyquist filter.

Meas Range

Sets the measurement length for modulation accuracy and so on. The range is 4 through 20. One measurement length is 64 chips.

Trigger Mode

Selects the timing at which the data is stored.

INT: Stores data at the timing of the internal trigger.

EXT: Stores data at the leading edge of the external trigger. At this moment, a trigger delay can be set.

IF: Stores data at the signal level.

EXT Trigger Slope

Selects the slope of timing at which data is stored.

+: Stores data at the leading edge.

-: Stores data at the trailing edge.

Trigger Level

Sets the trigger level (which is relative to the reference level and is used as the initial level when retrieving data in the IF trigger mode).
Can be set between 0% and 100% in steps of 1%.

EXT Trigger Delay Sets a delay time from the trigger point in units of chip.

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.

Limit Setup Sets the limit values.

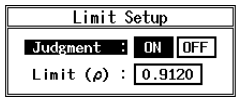


Figure 3-34 Limit Setup Dialog Box

Judgment Toggles the judgment ON and OFF.

ON: Makes judgment.

OFF: Does not make judgment.

Limit (ρ) Enter a numeric value used for judgement.

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.

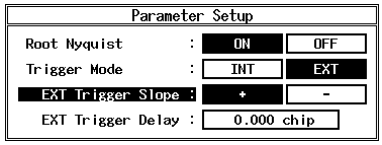


Figure 3-35 Parameter Setup Dialog Box

Root Nyquist

Toggles a Root Nyquist filter between on and off.

ON: Enables the Root Nyquist filter.

OFF: Disables the Root Nyquist filter.

Trigger Mode

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.

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.

EXT Trigger Delay

Sets a delay time from the trigger point in units of chip.

NOTE: Although the averaging of the power is performed, the average is not shown on the trace display.

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: The peak factor is expressed as the peak power devided by the average power.

3.3.4.3.2 Power vs Time

Waveforms of measured powers can be displayed as well as average power and peak factor for each slot (666.66 μs).

Auto Level Set Automatically adjusts the reference level.

Scale Setup Switches between measurement results.

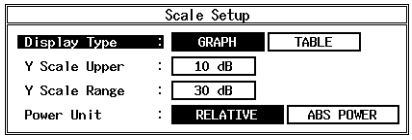


Figure 3-36 Scale Setup Dialog Box

Display Type Selects the display type of the measurement values.
It is used only when CONCISE from the Meas mode is selected.

GRAPH: Displays the measurement value graphically.

TABLE: Displays the measurement value in table.

Y Scale Upper Sets the maximum value along the vertical axis between -20 dB(m) and 70 dB(m) in steps of 10 dB.

Y Scale Range Sets the display range along the vertical axis between 10 dB(m) and 50 dB(m) in steps of 10 dB.

Power Unit Sets the unit that is displayed.

RELATIVE:
Displays the power relative to the average power of the slot head.

ABS POWER:
Displays the power in absolute value.

Parameter Setup

Sets the parameters used for measurements.

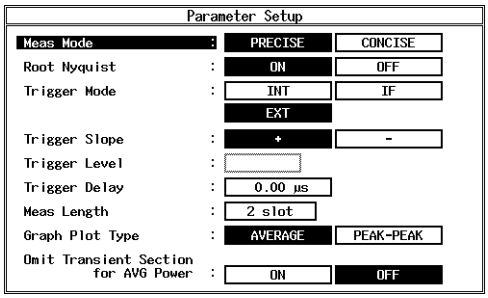


Figure 3-37 Parameter Setup Dialog Box

Meas Mode

Selects the measurement mode.

PRECISE:

Calculates the electric power by sample to display them. This is used when checking the detailed peak factor.

CONCISE:

Calculates the electrical power by slot. It is used when reducing the measurement time.

Root Nyquist

Sets whether or not the Root Nyquist filter (with a chip rate of 3.84 Mcps and a rolloff of 0.22) is used.

ON: The Root Nyquist filter is used for the measurement.

OFF: The Root Nyquist filter is not used for the measurement.

Trigger Mode

Selects the timing for retrieving data.

INT: Captures data using the internal trigger.

IF: Captures data using the signal level.

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 Level

Sets the trigger level (which is relative to the reference level and is used as the initial level when retrieving data in the IF trigger mode).
Can be set between 0% and 100% in steps of 1%.

Trigger Delay Delays the IF or external triggers.

For the IF trigger:

Can be set between -40 ms and 666.66 µs in steps of 0.01 µs.

For the external trigger:

Can be set between -40 ms and 666.66 µs in steps of 0.01 µs.

Meas Length Sets the slot length of the power measurement.
Can be set between Slot 2 and Slot 62.

Graph Plot Type Selects the graph display format.

AVERAGE:

Displays the graph with the average value.

PEAK-PEAK:

Displays the graph with the maximum and minimum values.

Omit Transient Section for AVG Power

Sets whether or not the transient period (slot boundary ±25 µs) is included when measuring the average power.

ON: Excludes the transient period.

OFF: Includes the transient period.

Marker Setup Two slot numbers which are used to display the power are set. Any slot numbers between 1 and the one specified by Meas Length can be set.

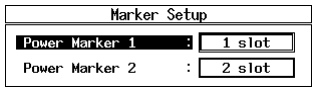


Figure 3-38 Marker Setup Dialog Box

Power Marker 1 The average power and the peak factor are displayed in the upper part.

Power Marker 2 The average power and the peak factor are displayed in the lower part.

NOTE: The ratio is calculated from: (Average power of Power Marker 2) - (Average power of Power Marker 1).

Template Setup Sets the boundary around which a magnified view can be displayed.
Any value between 1 and the one specified by Meas Length can be set.

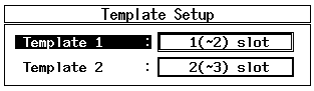


Figure 3-39 Template Setup Dialog Box

Template 1 Displayed in the lower left side of the screen.

Template 2 Displayed in the lower right side of the screen.

NOTE: The slot numbers used for Power Marker 1 and Template Marker 1must be less than the numbers used for Power Marker 2 and Template Marker 2, respectively.

3.3.4.3.3 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.

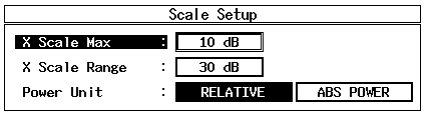


Figure 3-40 Scale Setup Dialog Box

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.

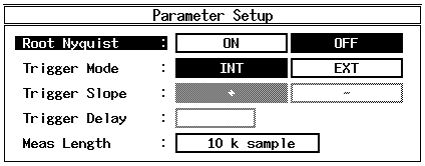


Figure 3-41 Parameter Setup Dialog Box

Root Nyquist Sets whether or not the Root Nyquist filter (with a chip rate of 3.84 Mcps and a rolloff of 0.22) is used.

ON: The Root Nyquist filter is used for the measurement.

OFF: The Root Nyquist filter is not used for the measurement.

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.

3.3.4.3.4 P-CPICH Power

Measures the P-CPICH power and frequency error using composite signals.
This is suitable for monitoring the P-CPICH power for Base Transmitter Stations in service.

This function is available only when DOWNLINK is selected for LINK in the STD Setup.

Auto Level Set Automatically adjusts the reference level.

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

Parameter Setup Sets the measurement parameter.

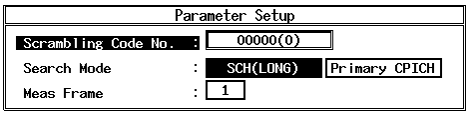


Figure 3-42 Parameter Setup Dialog Box

Scrambling Code No.

Sets Scrambling codes to hexadecimal format. Codes can be set in the range 0 to 3FFFE by using the following keys:

A: **SHIFT**, **0**

B: **SHIFT**, **1**

C: **SHIFT**, **2**

D: **SHIFT**, **3**

E: **SHIFT**, **4**

F: **SHIFT**, **5**

Search Mode

Selects the mode for acquiring synchronization.

SCH(LONG):
Searches SCH to acquire synchronization.

Primary CPICH:
Searches Primary CPICH to acquire synchronization.

Meas Frame

Sets the number of frames to be measured.
Numbers 1 to 4 can be set.

Average Times ON/OFF

Sets the averaging process to on or off.

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

OFF: Does not perform an averaging process.

3.3.4.4 Time & FFT

An IF or base-band signal waveform in time domain and FFT waveform are displayed. This function is used to verify input signals.

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 a graph to be displayed.

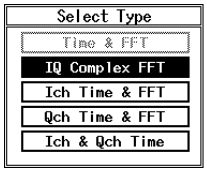


Figure 3-43 Select Type Dialog Box

Parameter Setup

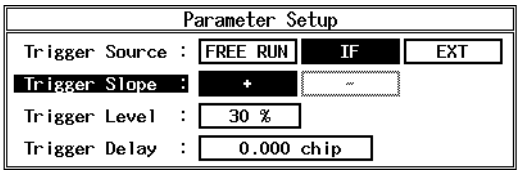


Figure 3-44 Parameter Setup Dialog Box

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 delay time from the trigger point to the moment data is captured in units of chip.

Average Times ON/OFF Sets the averaging count.

3.3.4.5 STD

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

DC CAL Compensates for direct current components inside the circuit.

Gain Cal Performs a gain calibration used in the modulation analysis section.

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.

UpLink: Sets the channel number of the mobile station (UE).

DownLink: Sets the channel number of the base station (BTS).

STD Setup Sets the parameters for measurement.

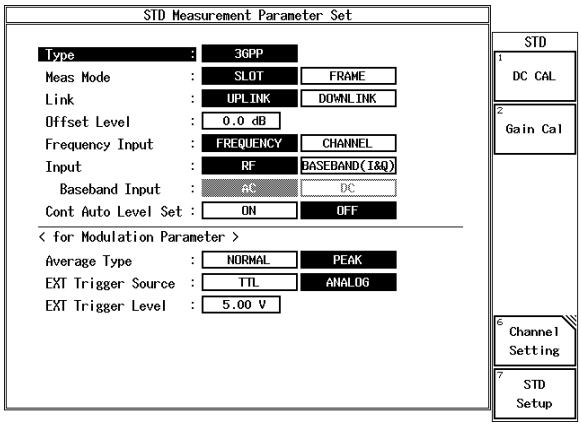


Figure 3-45 STD Measurement parameter Setup Dialog Box

Type Selects the communication standard. Here, 3GPP is fixed.

Meas Mode Selects the measurement modes.

SLOT: Performs the code domain analysis for the signal of one slot length.

FRAME: Performs the code domain analysis up to two frames for the specified one channel.

Link

Sets the direction of the signal.

UPLINK: Measures the mobile unit signal.

DOWNLINK: Measure the base station signal.

Offset Level

Sets reference level's offset value within a range of -100 dB to +100 dB.

Frequency Input

Sets the method of entering the center frequency to the instrument.

FREQUENCY: Enters a frequency.

CHANNEL: Enters a channel number.

Input

Sets an input signal route.

NOTE: When entering BASEBAND and Tx Power are displayed in relative power.

RF: The RF input route is set.

BASEBAND (I&Q):
The IQ input route is set.

Baseband Input

Selects the coupling of signals.

AC: Sets an alternate current coupling. (A cutoff frequency is approx. 15 Hz)

DC: Sets a direct current coupling.

Cont Auto Level Set

Sets whether to carry out the auto ranging.

ON: The auto ranging is carried out on a measurement basis.

OFF: The auto ranging is not carried out.

NOTE: When RF is selected for Input, Cont Auto Level Set takes effect only for 3GPP, QPSK, Tx power, Power vs Time and CCDF. Use the soft key Auto Level Set when adjusting the reference level.

Average Type

Sets the average processing of both the 3GPP measurement function and the Tx Power measurement function.

NORMAL:
displays the arithmetic average when Average Times is set to ON.

PEAK: When Average Times is set to ON, it displays the maximum value within the Average Times counts for the Peak Magnitude Error, Peak Phase Error, Peak Error Vector Magnitude, Peak Code Domain Error of the 3GPP measurement function, and for the Peak Factor of the Tx Power measurement. For other items, arithmetic averages are displayed.

EXT Trigger Source

Selects the external trigger signal path.
It is used only for the 3GPP, QPSK, Tx Power, Power vs Time, CCDF and Time & FFT measurement functions.

TTL: Selects the TTL input path.

ANALOG:
Selects the analog input path. In the analog input path, a threshold level from zero to five volts can be set.

EXT Trigger Level

When ANALOG is selected from the EXT Trigger source, a threshold level from zero to five volts can be set.

4 REMOTE CONTROL

4.1 GPIB Command Index

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

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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	
Communi-cation sys-tem	3GPP mode	COMMSYS 3GPP	COMMSYS?	9:3GPP	*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	Communication system 3GPP	 MODTYP 3GPP	 MODTYP?	 0: 3GPP	
	Meas Mode SLOT FRAME	 MEASMD SLOT MEASMD FRAME	 MEASMD?	 0: SLOT 1: FRAME	
	LINK UPLINK DOWNLINK	 LINK UP LINK DOWN	 LINK?	 0: UPLINK 1: DOWNLINK	
	Offset Level	RO *	RO?	Level	
	Frequency setting mode Frequency input mode Channel input mode	 FINPMD FREQ FINPMD CHL	 FINPMD?	 0: Frequency input 1: Channel input	
	Channel Setting	CH *	CH?	Integer (channel number)	
	Channel Editing Input #1 (UPLINK) Input #2 (UPLINK) Input #3 (UPLINK) Input #1 (DOWNLINK) Input #2 (DOWNLINK) Input #3 (DOWNLINK)	 CHEDUP1 *,*,*,*,* CHEDUP2 *,*,*,*,* CHEDUP3 *,*,*,*,* CHEDDN1 *,*,*,*,* CHEDDN2 *,*,*,*,* CHEDDN3 *,*,*,*,*	 CHEDUP1? CHEDUP2? CHEDUP3? CHEDDN1? CHEDDN2? CHEDDN3?	 ch1,ch2,f1,f2,chof ch1,ch2,f1,f2,chof ch1,ch2,f1,f2,chof ch1,ch2,f1,f2,chof ch1,ch2,f1,f2,chof 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.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
STD Setup	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	
	Channel				
	Copy from STD	CHSETSTD	-	-	
	Input				
	RF	INPUT RF	INPUT?	0:RF	
	BASEBAND(I&Q)	INPUT IQ		1:IQ	
	BaseBand Input				
	AC	BBINPUT AC	BBINPUT?	0:AC	
	DC	BBINPUT DC		1:DC	
	Auto Level Setting				
	Auto Level OFF	ALS OFF	ALS?	0:OFF	
	Auto Level ON	ALS ON		1:ON	
	Average Type				
	NORMAL	AVGTYP NORM	AVGTYP?	0:NORMAL	
	PEAK	AVGTYP PEAK		1:PEAK	
	EXT Trigger Source				
	TTL	STDTRGSRC TTL	STDTRGSRC?	0:TTL	
	ANALOG	STDTRGSRC ANLG		1:ANALOG	
	EXT Trigger Level	STDTRGLVL *	STDTRGLVL?	Level (0.00 to 5.00V)	
	DC CAL	CLDC	-	-	
	Gain Cal	CLMODGAIN	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Power	Auto Level Set	AUTOWFL TDPAUTOLVL	-	-	
	Trigger Setup				
	TriggerSource				
	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	TDPWDO?	0:OFF	
	OFF	TDPWDO OFF		1:ON	
	Window Position	TDPWPOS *	TDPWPOS?	Time	
	Window Width	TDPWWID *	TDPWWID?	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
	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	
	OFF	TDPTMPL OFF		1:ON	
	Template Shift				
	Shift X	TDPTMPLSX *	TDPTMPLSX?	Time	
	Shift Y	TDPTMPLSY *	TDPTMPLSY?	Level	
	Template Edit				
	Template UP/LOW Selection	TDPTMPLSEL UP	TDPTMPLSEL?	0:UP	
		TDPTMPLSEL LOW		1:LOW	
	Template Data Input	TDPTMPLED *,*	-	t1,l1 t1:Time l1:Level (dBm/W/dBµV)	
	Init Table	TDPTMPLCLR	-	-	
	Parameter Setup				
	Detector				
	Normal	TDPDET NRM	TDPDET?	0:Normal	
	Posi	TDPDET POS		1:Posi	
	Nega	TDPDET NEG		2:Nega	
	Sample	TDPDET SMP		3:Sample	
	Display Unit				
	dBm	TDPUNIT DBM	TDPUNIT?	0:dBm	
	W	TDPUNIT W		1:W	
	dBµV	TDPUNIT DBUV		2:dBµV	

*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	Template Couple to Power				
	ON	TDPTMPLPW ON	TDPTMPLPW?	0:OFF	
	OFF	TDPTMPLPW OFF		1:ON	
	Template Limit	TDPTMPLBTM *	TDPTMPLBTM?	Level (dBm/W/dBµV)	
	Judgement				
	ON	TDPJDG ON	TDPJDG?	0:OFF	
	OFF	TDPJDG OFF		1:ON	
	Upper Limit	TDPJDGUP *	TDPJDGUP?	Level	
	Lower Limit	TDPJDGLOW *	TDPJDGLOW?	Level	
	Set to STD	TDPSETSTD	-	-	
	Starts measurement				
	T-Domain Power	WAVEFM TDPMEAS	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	T-Domain Power	-	TDPMEAS?	l1, j1 l1:Level (dBm/W/dBµV) j1:Integer (0:FAIL,1:PASS, -1:Judgement OFF)	

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	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
ON/OFF Ratio	Average Times	OORAVGCNT *	OORAVGCNT?	Integer (1:OFF, 2 to 999)	
		OORAVG *	OORAVG?	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	
	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	
	Judgement				
	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	-	-	
	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:Judgement OFF)	

*1: Average Mode is set to NUMERIC.

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	TDSTRGSRC?	0:FREERUN	
		TRSPMD FREE	TRSPMD?	2:IF	
	IF	TDSTRGSRC IF		3:EXT	
		TRSPMD IF			
	EXT	TDSTRGSRC EXT			
		TRSPMD EXT			
	Trigger Slope				
	+	TDSTRGSLP RISE	TDSTRGSLP?	0: -	
		TRSPSLP RISE	TRSPSLP?	1: +	
	-	TDSTRGSLP FALL			
		TRSPSLP FALL			
	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	TDSTBLF ABS	TDSTBLF?	0:ABS	
	REL	TDSTBLF REL		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?	0:dBm	
	W	TDSUNIT W		1:W	
	dBµV	TDSUNIT DBUV		2:dBµV	
	Judgement				
	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 MKR 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	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
T-Domain Spurious	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) jn:Integer (0:FAIL,1:PASS, -1:Judgement OFF)	
			SPULVL?	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 OFF	TGTSETUP ON TGTSETUP OFF	TGTSETUP?	0:OFF 1:ON	
	Trigger Source FREERUN VIDEO IF EXT	TGTTRG FREE TGTTRG VIDEO TGTTRG IF TGTTRG EXT	TGTTRG?	0:FREERUN 1:VIDEO 2:IF 3:EXT	
	Trigger Slope - +	TGTTRGSLP FALL TGTTRGSLP RISE	TGTTRGSLP?	0:- 1:+	
	Trigger Level	TGTTRGLVL *	TGTTRGLVL?	Integer (0 to 100)	
	Trigger Position	TGTTRGPOS *	TGTTRGPOS?	Integer (0 to 100)	
	Delay Time	TGTTRGDT *	TGTTRGDT?	Time	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
F-Domain Power	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	
	Window Setup				
	Window				
	ON	FDPWDO ON	FDPWDO?	0:OFF	
	OFF	FDPWDO OFF		1:ON	
	Window Position	FDPWPOS *	FDPWPOS?	Frequency	
	Window Width	FDPWWID *	FDPWWID?	Frequency	
	Y Scale				
	10dB/div	FDPDIV P10DB	FDPDIV?	0:10dB/div	
	5dB/div	FDPDIV P5DB		1: 5dB/div	
	2dB/div	FDPDIV P2DB		2: 2dB/div	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
F-Domain Power	Average Times	FDPAVGCNT *	FDPAVGCNT?	Integer (1:OFF, 2 to 999)	
		FDPAVG *	FDPAVG?	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	
	Judgement				
	ON	FDPJDG ON	FDPJDG?	0:OFF	
	OFF	FDPJDG OFF		1:ON	
	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	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	F-Domain Power	-	FDPMEAS?	l1, j1 l1:Level (dBm/W/dBµV) j1:Integer (0:FAIL,1:PASS, -1:Judgement OFF)	

*1: Average Mode is set to POWER AVG.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
OBW	Auto Level Set	OBWAUTOLVL	-	-	
	OBW%	OBWPER *	OBWPER?	Real Number (0.5 to 99.5)	
	Average Times	OBWAVGCNT *	OBWAVGCNT?	Integer (1:OFF, 2 to 999)	
		OBWAVG *	OBWAVG?	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	
	Parameter Setup				
	Detector				
	Normal	OBWDET NRM	OBWDET?	0:Normal	
	Posi	OBWDET POS		1:Pos	
	Nega	OBWDET NEG		2:Nega	
	Sample	OBWDET SMP		3:Sample	
	Judgement				
	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	-	-	
	Starts measurement in the same mode	SI	-	-	

*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	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: Judgement OFF)	
Due to Transient	Auto Level Set	DTSAUTOLVL	-	-	
	Template Template ON OFF	 DTSTMPL ON DTSTMPL OFF	 DTSTMPL?	 0: OFF 1: ON	
	Template Shift Shift X Shift Y	 DTSTMPLSX * DTSTMPLSY *	 DTSTMPLSX? DTSTMPLSY?	 Frequency Level	
	Margin delta X	DTSTMPLDX *	DTSTMPLDX?	Frequency (0:OFF)	
	Data Input	DTSTMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBμV)	
	Init Table	DTSTMPLCLR	-	-	
	Marker Edit Copy from STD	 DTSMKRCP	 -	 -	
	Data Input	DTSMKRED *,*,*,*	-	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	DTSMKRCLR	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Transient	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	
	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)	
	Judgement				
	ON	DTSJDG ON	DTSJDG?	0: OFF	
	OFF	DTSJDG OFF		1: ON	

*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	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	-	-	
	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: Judgement OFF)	
	Ref. Power	-	DTSREFPWR?	Level	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Modulation	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	
	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)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Due to Modulation	Data Input	DTMTMPLED *,*	-	f1,l1 f1: frequency l1: Level (dBm/W/dBμV)	
	Init Table	DTMTMPLCLR	-	-	
	Marker Edit Copy from STD	DTMMKRCP	-	-	
	Data Input	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
	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	

*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	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)	
	Judgement				
	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	
	Ref Power				
	MKR	DTMREF MKR	DTMREF?	0: Reference Marker	
	MOD	DTMREF MOD		1:Modulation	
	Symbol Rate 1/T	DTMSYMRT *	DTMSYMRT?	Frequency	
	Rolloff Factor	DTMRFACT *	DTMRFACT?	Real Number	
	Set to STD	DTMSETSTD	-	-	
	Start 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: Judgement OFF)	
	Ref. Power	-	DTMREFPWR?	Level	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (1)	Auto Level Set	SPRAUTOLVL	-	-	
	Template				
	Template				
	ON	SPRTMPL ON	SPRTMPL?	0: OFF	
	OFF	SPRTMPL OFF		1: ON	
	Template Shift				
	Shift X	SPRTMPLSX *	SPRTMPLSX?	Frequency	
	Shift Y	SPRTMPLSY *	SPRTMPLSY?	Level	
	Margin delta X	SPRTMPLDX *	SPRTMPLDX?	Frequency (0:OFF)	
	Copy from STD	SPRTMPLCP	-	-	
	Data Input	SPRTMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBµV)	
	Init Table	SPRTMPLCLR	-	-	
	Marker Edit				
	Copy from STD	SPRMKRCP	-	-	
	Data Input	SPRMKRED *,*,*,*	-	d1, f1,f2,l1 d1: (0: Peak, 1: Integral) f1: Start Frequency f2: Stop Frequency l1: Limit Level	Set the reference band-width to f2, after initializ-ing the table.
	Init Table	SPRMKRCLR	-	-	
	Average Times	SPRAVGCNT *	SPRAVGCNT?	Integer (1:OFF, 2 to 999)	
		SPRAVG *	SPRAVG?	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	
Inband Spurious (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)	
	Judgement				
	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	
	Result				
	ABS	SPRRES ABS	SPRRES?	0: Absolute	
	REL	SPRRES REL		1: Relative	
	MKR	SPRRES MKR		2: Marker	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (1)	Ref Power				
	MKR	SPRREF MKR	SPRREF?	0: Reference Marker	
	MOD	SPRREF MOD		1: Modulation	
	Peak MKR Y-Delta	SPRPKMKY *	SPRPKMKY?	Real Number	
	Set to STD	SPRSETSTD	-	-	
	Starts measurement				
	Inband Spurious	SPRMEAS	-	-	
	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: Judgement OFF)	
	Ref. Power	-	SPRREFPWR?	Level	
Inband Spurious (2)	Auto Level Set	SPR2AUTOLVL	-	-	
	Template				
	Template				
	ON	SPR2TMPL ON	SPR2TMPL?	0: OFF	
	OFF	SPR2TMPL OFF		1: ON	
	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 Input	SPR2TMPLED *,*	-	f1,l1 f1: Frequency l1: Level (dBm/W/dBµV)	
	Init Table	SPR2TMPLCLR	-	-	
	Marker Edit				
	Copy from STD	SPR2MKRCP	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (2)	Data Input	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	
	Template Couple to Power				
	ON	SPR2TMPLPW ON	SPR2TMPLPW?	0: OFF	
	OFF	SPR2TMPLPW OFF		1: ON	
	Template Limit	SPR2TMPLBTM *	SPR2TMPLBTM?	Level (dBm/W/dBµV)	
	Judgement				
	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	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Inband Spurious (2)	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: Judgement 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	

*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	Judgement				
	ON	FDSJDG ON	FDSJDG?	0: OFF	
	OFF	FDSJDG OFF		1: ON	
	Peak MKR 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	-	-	
	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/dBμV) jn: Integer (0: FAIL, 1: PASS, -1: Judgement OFF)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Auto Level Set	AUTOLVL	-	-	
	Display Type				
	Format				
	NUMERIC	3GPFMT NUM	3GPFMT?	0: GRAPH	
	GRAPH	3GPFMT GRP		1: TABLE	
	TABLE	3GPFMT TBL		2: NUMERIC	
	Display				
	SINGLE	3GPDISP SNGL	3GPDISP?	0: SINGLE	
	DUAL	3GPDISP DUAL		1: DUAL	
	Y Scale				
	ρ	3GPYSCL RHO	3GPYSCL?	0: ρ	
	POWER (dB)	3GPYSCL POW		1: POWER (dB)	
	POWER (dBm)	3GPYSCL POWABS		2: POWER (dBm)	
	EVM	3GPYSCL EVM		3: EVM	
	X Scale				
	CODE	3GPXSCL CODE	3GPXSCL?	0: CODE	
	TIME	3GPXSCL TIME		1: TIME	
	View Point				
	Code/Time	3GPVWPT *	3GPVWPT?	Integer	
	Page	3GPPAGE *	3GPPAGE?	Integer	
	Graphics				
	Display Start	3GPDSPST *	3GPDSPST?	Integer	
	Select Type				
	Constellation	3GPGTYP CON	3GPGTYP?	0: Constellation	
	Constellation(Line)	3GPGTYP CONLIN		1: Constellation (Line)	
	Constellation(Dot)	3GPGTYP CONDOT		2: Constellation (Dot)	
	Constellation (Line&Chip) (Line&Symbol)	3GPGTYP CONLINDOT		3: Constellation (Line&Chip) (Line&Symbol)	
	I EYE Diagram	3GPGTYP ICHEYE		4: I EYE Diagram	
	Q EYE Diagram	3GPGTYP QCHEYE		5: Q EYE Diagram	
	I/Q EYE Diagram	3GPGTYP IQCHEYE		6: I/Q EYE Diagram	
	E.V.M. vs Chip/Symbol	3GPGTYP EVM		7: E.V.M. vs Chip/ Symbol	
	Mag Error vs Chip/ Symbol	3GPGTYP MAGERR		8: Mag Error vs Chip/ Symbol	
	Phase Error vs Chip/Symbol	3GPGTYP PHAERR		9: Phase Error vs Chip/ Symbol	
	SCH Power	3GPGTYP SCHPWR		10: SCH Power	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	45deg Turn				
	ON	3GPTURN ON	3GPTURN?	0: OFF	
	OFF	3GPTURN OFF		1: ON	
	Demod Data Save	3GPDEMODSV	-		
	Parameter Setup				
	(When set to DOWN-LINK and One Slot.)				
	Meas Mode				
	PRECISE	3GPDNMEASMD PREC	3GPDNMEASMD?	0: PRECISE	
	CONCISE	3GPDNMEASMD CONC		1: CONCISE	
	Peak CDE				
	ON	3GPDNPKCDE ON	3GPDNPKCDE?	0: OFF	
	OFF	3GPDNPKCDE OFF		1: ON	
	Scrambling Code Define				
	DEFINE	3GPSCDEF DEF	3GPSCDEF?	0: DEFINE	
	UNDEFINE	3GPSCDEF UNDEF		1: UNDEFINE	
	Scrambling Code No.	3GPDNSCNO *	3GPDNSCNO?	Integer (0 to 262142)	
		3GPDNSCNOHEX *	3GPDNSCNOHEX?	Hexadecimal number (0 to 3FFFE)	
	Trigger Mode				
	INT	3GPDNTRG INT	3GPDNTRG?	0: INT	
	EXT	3GPDNTRG EXT		1: EXT	
	EXT (SFN)	3GPDNTRG SFN		2:EXT(SFN)	
	EXT Trigger Slope				
	+	3GPDNTRGSLP RISE	3GPDNTRGSLP?	0: -	
	-	3GPDNTRGSLP FALL		1: +	
	EXT Trigger Delay	3GPDNTRGDLY *	3GPDNTRGDLY?	Real number (-5120.00 to 38400.00)	
	Search Mode				
	SCH	3GPSRCH SCH	3GPSRCH?	0: SCH	
	Primary CPICH	3GPSRCH PCPICH		1: Primary CPICH	
	SCH (LONG)	3GPSRCH SCHLONG		2:SCH(LONG)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Primary CPICH SF	3GPCPICHSF *	3GPCPICHSF?	Integer (4/8/16/32/64/128/256/512)	
	Primary CPICH No.	3GPCPICHNO *	3GPCPICHNO?	Integer (0 to 511)	
	Active CH. Detection				
	AUTO	3GPACTCH AUTO	3GPACTCH?	0: AUTO	
	USER TABLE	3GPACTCH USER		1: USER TABLE	
	Test Model 1 DPCH 16 Code	3GPACTCH T1DP16		2: Test Model 1 DPCH 16Code	
	Test Model 1 DPCH 32 Code	3GPACTCH T1DP32		3: Test Model 1 DPCH 32Code	
	Test Model 1 DPCH 64 Code	3GPACTCH T1DP64		4: Test Model 1 DPCH 64Code	
	Test Model 2	3GPACTCH T2		5: Test Model 2	
	Test Model 3 DPCH 16 Code	3GPACTCH T3DP16		6: Test Model 3 DPCH 16Code	
	Test Model 3 DPCH 32 Code	3GPACTCH T3DP32		7: Test Model 3 DPCH 32Code	
	Analysis Rate				
	ACTIVE	3GPDNRATE ACT	3GPDNRATE?	0: ACTIVE	
	7.5ksps	3GPDNRATE 7K5		1: 7.5ksps	
	15ksps	3GPDNRATE 15K		2: 15ksps	
	30ksps	3GPDNRATE 30K		3: 30ksps	
	60ksps	3GPDNRATE 60K		4: 60ksps	
	120ksps	3GPDNRATE 120K		5: 120ksps	
	240ksps	3GPDNRATE 240K		6: 240ksps	
	480ksps	3GPDNRATE 480K		7: 480ksps	
	960ksps	3GPDNRATE 960K		8: 960ksps	
	ACT+N	3GPDNRATE ACTN		9: ACT+N	
	Meas Unit	3GPDNMUNIT *	3GPDNMUNIT?	Integer (1 to 640)	
	Meas Start Position	3GPDNMSTSLT *	3GPDNMSTSLT?	Integer (0 to 140)	
	Threshold	3GPDNTHRSH *	3GPDNTHRSH?	Integer (-40 to -5dB)	
	Phase Inverse				
	NORMAL	3GPDNPHASE NORM	3GPDNPHASE?	0: NORMAL	
	INVERSE	3GPDNPHASE INV		1: INVERSE	
	Frequency Error				
	NORMAL	3GPDNFERR NORM	3GPDNFERR?	0: NORMAL	
	PRECISE	3GPDNFERR PREC		1: PRECISE	
	Transmit Timing				
	ON	3GPTRNSTM ON	3GPTRNSTM?	0: OFF	
	OFF	3GPTRNSTM OFF		1: ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	(When set to DOWN-LINK and FRAME)				
	Scrambling Code Define				
	DEFINE	3GPSCDEF DEF	3GPSCDEF?	0: DEFINE	
	UNDEFINE	3GPSCDEF UNDEF		1: UNDEFINE	
	Scrambling Code No.	3GPDNSCNO *	3GPDNSCNO?	Integer (0 to 262142)	
		3GPDNSCNOHEX *	3GPDNSCNOHEX?	Hexadecimal number (0 to 3FFFE)	
	Trigger Mode				
	INT	3GPDNTRG INT	3GPDNTRG?	0: INT	
	EXT	3GPDNTRG EXT		1: EXT	
	EXT (SFN)	3GPDNTRG SFN		2: EXT (SFN)	
	EXT Trigger Slope				
	+	3GPDNTRGSLP RISE	3GPDNTRGSLP?	0: -	
	-	3GPDNTRGSLP FALL		1: +	
	EXT Trigger Delay	3GPDNTRGDLY *	3GPDNTRGDLY?	Real number (-5120.00 to 38400.00)	
	Search Mode				
	SCH	3GPSRCH SCH	3GPSRCH?	0: SCH	
	Primary CPICH	3GPSRCH PCPICH		1: Primary CPICH	
	SCH (LONG)	3GPSRCH SCHLONG		2:SCH (LONG)	
	Primary CPICH SF	3GPCPICHSF *	3GPCPICHSF?	Integer (4/8/16/32/64/128/256/512)	
	Primary CPICH No.	3GPCPICHNO *	3GPCPICHNO?	Integer (0 to 511)	
	Active CH. Detection				
	AUTO	3GPACTCH AUTO	3GPACTCH?	0: AUTO	
	USER TABLE	3GPACTCH USER		1: USER TABLE	
	Test Model 1 DPCH 16Code	3GPACTCH T1DP16		2: Test Model 1 DPCH 16Code	
	Test Model 1 DPCH 32Code	3GPACTCH T1DP32		3: Test Model 1 DPCH 32Code	
	Test Model 1 DPCH 64Code	3GPACTCH T1DP64		4: Test Model 1 DPCH 64Code	
	Test Model 2	3GPACTCH T2		5: Test Model 2	
	Test Model 3 DPCH 16Code	3GPACTCH T3DP16		6: Test Model 3 DPCH 16Code	
	Test Model 3 DPCH 32Code	3GPACTCH T3DP32		7: Test Model 3 DPCH 32Code	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Meas Channel SF	3GPDNMCHSF *	3GPDNMCHSF?	Integer (4/8/16/32/64/128/256/512)	
	Meas Channel No.	3GPDNMCHNO *	3GPDNMCHNO?	Integer (0 to 511)	
	Meas Slots	3GPDNMSLOT *	3GPDNMSLOT?	Integer (1 to 30)	
	Meas Start Position	3GPDNMSTFRM *	3GPDNMSTFRM?	Integer (0 to 639)	
	Threshold	3GPDNTHRSH *	3GPDNTHRSH?	Integer (-40 to -5dB)	
	Phase Inverse				
	NORMAL	3GPDNPHASE NORM	3GPDNPHASE?	0: NORMAL	
	INVERSE	3GPDNPHASE INV		1: INVERSE	
	(When set to UPLINK and One Slot)				
	Meas Mode				
	PRECISE	3GPUPMEASMD PREC	3GPUPMEASMD?	0: PRECISE	
	CONCISE	3GPUPMEASMD CONC		1: CONCISE	
	Scrambling Code No.	3GPUPSCNO *	3GPUPSCNO?	Integer (0 to 16777215)	
		3GPUPSCNOHEX *	3GPUPSCNOHEX?	Hexadecimal number (0 to FFFFFF)	
	Trigger Mode				
	INT	3GPUPTRG INT	3GPUPTRG?	0: INT	
	EXT	3GPUPTRG EXT		1: EXT	
	EXT Trigger Slope				
	+	3GPUPTRGSLP RISE	3GPUPTRGSLP?	0: -	
	-	3GPUPTRGSLP FALL		1: +	
	EXT Trigger Delay	3GPUPTRGDLY *	3GPUPTRGDLY?	Real number (-5120.00 to 38400.00)	
	DPCCH SF	3GPDPCCHSF *	3GPDPCCHSF?	Integer (4/8/16/32/64/128/256)	
	DPCCH No.	3GPDPCCHNO *	3GPDPCCHNO?	Integer (0 to 255)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Analysis Rate				
	15ksps	3GPUPRATE 15K	3GPUPRATE?	2: 15ksps	
	30ksps	3GPUPRATE 30K		3: 30ksps	
	60ksps	3GPUPRATE 60K		4: 60ksps	
	120ksps	3GPUPRATE 120K		5: 120ksps	
	240ksps	3GPUPRATE 240K		6: 240ksps	
	480ksps	3GPUPRATE 480K		7: 480ksps	
	960ksps	3GPUPRATE 960K		8: 960ksps	
	Meas Unit	3GPUPMUNIT *	3GPUPMUNIT?	Integer (1 to 640)	
	Meas Start Position	3GPUPMSTSLT *	3GPUPMSTSLT?	Integer (0 to 140)	
	Threshold	3GPUPTHRSH *	3GPUPTHRSH?	Integer (-40 to -5dB)	
	Phase Inverse				
	NORMAL	3GPUPPHASE NORM	3GPUPPHASE?	0: NORMAL	
	INVERSE	3GPUPPHASE INV		1: INVERSE	
	Frequency Error				
	NORMAL	3GPUPFERR NORM	3GPUPFERR?	0: NORMAL	
	PRECISE	3GPUPFERR PREC		1: PRECISE	
	(When set to UPLINK and FRAME)				
	Scrambling Code No.	3GPUPSCNO *	3GPUPSCNO?	Integer (0 to 16777215)	
		3GPUPSCNOHEX *	3GPUPSCNOHEX?	Hexadecimal number (0 to FFFFFF)	
	Trigger Mode				
	INT	3GPUPTRG INT	3GPUPTRG?	0: INT	
	EXT	3GPUPTRG EXT		1: EXT	
	EXT Trigger Slope				
	+	3GPUPTRGSLP RISE	3GPUPTRGSLP?	0: -	
	-	3GPUPTRGSLP FALL		1: +	
	EXT Trigger Delay	3GPUPTRGDLY *	3GPUPTRGDLY?	Real number (-5120.00 to 38400.00)	
	DPCCH SF	3GPDPCCHSF *	3GPDPCCHSF?	Integer (4/8/16/32/64/128/256)	
	DPCCH No.	3GPDPCCHNO *	3GPDPCCHNO?	Integer (0 to 255)	
	Meas Channel SF	3GPUPMCHSF *	3GPUPMCHSF?	Integer (4/8/16/32/64/128/256)	
	Meas Channel No.	3GPUPMCHNO *	3GPUPMCHNO?	Integer (0 to 255)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Meas Branch				
	I	3GPMBRCH I	3GPMBRCH?	0: I	
	Q	3GPMBRCH Q		1: Q	
	Meas Slots	3GPUPMSLOT *	3GPUPMSLOT?	Integer (1 to 30)	
	Meas Start Position	3GPUPMSTFRM *	3GPUPMSTFRM?	Integer (0 to 639)	
	Threshold	3GPUPTHRSH *	3GPUPTHRSH?	Integer (-40 to -5dB)	
	Phase Inverse				
	NORMAL	3GPUPPHASE NORM	3GPUPPHASE?	0: NORMAL	
	INVERSE	3GPUPPHASE INV		1: INVERSE	
	Table Edit				
	Multi Channel No.	3GPMLTNUM *	3GPMLTNUM?	Integer (1 to 32)	
	Ch1 SF	3GPCH1SF *	3GPCH1SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch1 Number	3GPCH1NUM *	3GPCH1NUM?	Integer (0 to 511)	
	Ch2 SF	3GPCH2SF *	3GPCH2SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch2 Number	3GPCH2NUM *	3GPCH2NUM?	Integer (0 to 511)	
	Ch3 SF	3GPCH3SF *	3GPCH3SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch3 Number	3GPCH3NUM *	3GPCH3NUM?	Integer (0 to 511)	
	Ch4 SF	3GPCH4SF *	3GPCH4SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch4 Number	3GPCH4NUM *	3GPCH4NUM?	Integer (0 to 511)	
	Ch5 SF	3GPCH5SF *	3GPCH5SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch5 Number	3GPCH5NUM *	3GPCH5NUM?	Integer (0 to 511)	
	Ch6 SF	3GPCH6SF *	3GPCH6SF?	Integer (4/8/16/32/64/ 128/256/512)	
	Ch6 Number	3GPCH6NUM *	3GPCH6NUM?	Integer (0 to 511)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Ch7 SF	3GPCH7SF *	3GPCH7SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch7 Number	3GPCH7NUM *	3GPCH7NUM?	Integer (0 to 511)	
	Ch8 SF	3GPCH8SF *	3GPCH8SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch8 Number	3GPCH8NUM *	3GPCH8NUM?	Integer (0 to 511)	
	Ch9 SF	3GPCH9SF *	3GPCH9SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch9 Number	3GPCH9NUM *	3GPCH9NUM?	Integer (0 to 511)	
	Ch10 SF	3GPCH10SF *	3GPCH10SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch10 Number	3GPCH10NUM *	3GPCH10NUM?	Integer (0 to 511)	
	Ch11 SF	3GPCH11SF *	3GPCH11SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch11 Number	3GPCH11NUM *	3GPCH11NUM?	Integer (0 to 511)	
	Ch12 SF	3GPCH12SF *	3GPCH12SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch12 Number	3GPCH12NUM *	3GPCH12NUM?	Integer (0 to 511)	
	Ch13 SF	3GPCH13SF *	3GPCH13SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch13 Number	3GPCH13NUM *	3GPCH13NUM?	Integer (0 to 511)	
	Ch14 SF	3GPCH14SF *	3GPCH14SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch14 Number	3GPCH14NUM *	3GPCH14NUM?	Integer (0 to 511)	
	Ch15 SF	3GPCH15SF *	3GPCH15SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch15 Number	3GPCH15NUM *	3GPCH15NUM?	Integer (0 to 511)	
	Ch16 SF	3GPCH16SF *	3GPCH16SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch16 Number	3GPCH16NUM *	3GPCH16NUM?	Integer (0 to 511)	
	Ch17 SF	3GPCH17SF *	3GPCH17SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch17 Number	3GPCH17NUM *	3GPCH17NUM?	Integer (0 to 511)	
	Ch18 SF	3GPCH18SF *	3GPCH18SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch18 Number	3GPCH18NUM *	3GPCH18NUM?	Integer (0 to 511)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Ch19 SF	3GPCH19SF *	3GPCH19SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch19 Number	3GPCH19NUM *	3GPCH19NUM?	Integer (0 to 511)	
	Ch20 SF	3GPCH20SF *	3GPCH20SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch20 Number	3GPCH20NUM *	3GPCH20NUM?	Integer (0 to 511)	
	Ch21 SF	3GPCH21SF *	3GPCH21SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch21 Number	3GPCH21NUM *	3GPCH21NUM?	Integer (0 to 511)	
	Ch22 SF	3GPCH22SF *	3GPCH22SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch22 Number	3GPCH22NUM *	3GPCH22NUM?	Integer (0 to 511)	
	Ch23 SF	3GPCH23SF *	3GPCH23SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch23 Number	3GPCH23NUM *	3GPCH23NUM?	Integer (0 to 511)	
	Ch24 SF	3GPCH24SF *	3GPCH24SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch24 Number	3GPCH24NUM *	3GPCH24NUM?	Integer (0 to 511)	
	Ch25 SF	3GPCH25SF *	3GPCH25SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch25 Number	3GPCH25NUM *	3GPCH25NUM?	Integer (0 to 511)	
	Ch26 SF	3GPCH26SF *	3GPCH26SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch26 Number	3GPCH26NUM *	3GPCH26NUM?	Integer (0 to 511)	
	Ch27 SF	3GPCH27SF *	3GPCH27SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch27 Number	3GPCH27NUM *	3GPCH27NUM?	Integer (0 to 511)	
	Ch28 SF	3GPCH28SF *	3GPCH28SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch28 Number	3GPCH28NUM *	3GPCH28NUM?	Integer (0 to 511)	
	Ch29 SF	3GPCH29SF *	3GPCH29SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch29 Number	3GPCH29NUM *	3GPCH29NUM?	Integer (0 to 511)	
	Ch30 SF	3GPCH30SF *	3GPCH30SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch30 Number	3GPCH30NUM *	3GPCH30NUM?	Integer (0 to 511)	
	Ch31 SF	3GPCH31SF *	3GPCH31SF?	Integer (4/8/16/32/64/128/256/512)	
	Ch31 Number	3GPCH31NUM *	3GPCH31NUM?	Integer (0 to 511)	
	Average Times	3GPAVG *	3GPAVG?	Integer (1: OFF, 2 to 32)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Starts measurement				
	3GPP	3GPP	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results (When measuring DOWN-LINK and One Slot)				
	ρ	-	3GPRHO?	Real number	
	τ (Time)	-	3GPTAU?	Time (sec)	
	τ (Chip)	-	3GPTAUCHIP?	Real number (chip)	
	Carrier Frequency Error (Hz)	-	3GPCFER?	Frequency(Hz)	
	Carrier Frequency Error (ppm)	-	3GPCFERPPM?	ppm	
	I/Q Origin Offset	-	3GPIQOFS?	Level (dBc)	
	Magnitude Error	-	3GPMAG?	% rms	
	Phase Error	-	3GPPHSE?	deg. rms	
	Error Vector Magnitude	-	3GPMOD?	% rms	
	Peak Magnitude Error	-	3GPPKMAG?	%	
	Peak Phase Error	-	3GPPKPHSE?	deg.	
	Peak Error Vector Magnitude	-	3GPPKMOD?	%	
	Slot	-	3GPSLOT?	Integer	
	Scrambling Code No.	-	3GPSCCD?	Integer	
	Scrambling Code Group No.	-	3GPSCGRP?	Integer	
	SCH Power	-	3GPSCHPWR?	Level (dB)	
	Power Ratio P-SCH:S-SCH	-	3GPPRATIO?	Level (dB)	
	Peak Code Domain Error	-	3GPPKCDE?	Level (dB)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Code Domain Power Marker Marker Position	3GPMK *	-	Integer (Code/Time)	The marker position can be specified from the left (0, 1. 2 and so on) when Analysis Rate is set to ACTIVE.
	Code No.	-	3GPMKCODE?	Integer	
	Time	-	3GPMKTIME?	Integer	
	Code Power (dB)	-	3GPMKPOW?	Level (dB)	
	Code Power (dBm)	-	3GPMKPOWABS?	Level (dBm)	
	ρ	-	3GPMKRHO?	Real number	
	E.V.M.	-	3GPMKEVM?	% rms	
	Toffset	-	3GPMKTING?	Integer (chip)	Parameters can be read only when Transmit Timing is ON.
	Toffset x256 chip	-	3GPMKTX256?	Integer (x256 chip)	
	τ	-	3GPMKTAU?	Time (sec)	
	Phase	-	3GPMKPHSE?	Real number (deg.)	
	(When DOWNLINK and FRAME) τ (Time)	-	3GPTAU?	Time (sec)	
	τ (Chip)	-	3GPTAUCHIP?	Real number (chip)	
	Carrier Frequency Error (Hz)	-	3GPCFER?	Frequency(Hz)	
	Carrier Frequency Error (ppm)	-	3GPCFERPPM?	ppm	
	I/Q Origin Offset	-	3GPIQOFS?	Level (dBc)	
	Magnitude Error	-	3GPMAG?	% rms	
	Phase Error	-	3GPPHSE?	deg. rms	
	Error Vector Magnitude	-	3GPMOD?	% rms	
	Peak Magnitude Error	-	3GPPKMAG?	%	
	Peak Phase Error	-	3GPPKPHSE?	deg.	
	Peak Error Vector Magnitude	-	3GPPKMOD?	%	
	Slot	-	3GPSLOT?	Integer	
	Scrambling Code No.	-	3GPSCCD?	Integer	
	Scrambling Code Group No.	-	3GPSCGRP?	Integer	
	Power Ratio P-SCH:S-SCH	-	3GPPRATIO?	Level (dB)	
	Average Ch. Power	-	3GPAVGCHPWR?	Level (dBm)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Code Domain Power Marker				
	Marker Position	3GPMK *	-	Integer (Slot position)	
	Slot No.	-	3GPMKCODE?	Integer	
	Code Power (dB)	-	3GPMKPOW?	Level (dB)	
	Code Power (dBm)	-	3GPMKPOWABS?	Level (dBm)	
	ρ	-	3GPMKRHO?	Real number	
	E.V.M.	-	3GPMKEVM?	Real number (% rms)	
	Demod Data output	3GPDEMOD	3GPDEMOD?	1/0 Character	*1
	(When UPLINK and One Slot)				
	ρ	-	3GPRHO?		
	τ (Time)	-	3GPTAU?	Time (sec)	
	τ (Chip)	-	3GPTAUCHIP?	Real number (chip)	
	Carrier Frequency Error (Hz)	-	3GPCFER?	Frequency(Hz)	
	Carrier Frequency Error (ppm)	-	3GPCFERPPM?	ppm	
	I/Q Origin Offset	-	3GPIQOFS?	Level (dBc)	
	Magnitude Error	-	3GPMAG?	% rms	
	Phase Error	-	3GPPHSE?	deg. rms	
	Error Vector Magnitude	-	3GPMOD?	% rms	
	Peak Magnitude Error	-	3GPPKMAG?	%	
	Peak Phase Error	-	3GPPKPHSE?	deg.	
	Peak Error Vector Magnitude	-	3GPPKMOD?	%	

*1: After the measurement, the Demodulated data is generated by using the 3G DEMOD command and then it can be read by using the 3GPDEMOD? command.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Slot	-	3GPSLOT?	Integer	
	Peak Code Domain Error	-	3GPPKCDE?	Level (dB)	
	Code Domain Power Marker				
	Marker Position	3GPMK *	-	Integer (Code/Time)	
	Code No.	-	3GPMKCODE?	Integer	
	Time	-	3GPMKTIME?	Integer	
	I Phase Code Power (dB)	-	3GPMKPOW?	Level (dB)	
	I Phase Code Power (dBm)	-	3GPMKPOWABS?	Level (dBm)	
	I Phase ρ	-	3GPMKRHO?	Real number	
	I Phase E.V.M.	-	3GPMKEVM?	% rms	
	I Phase Timing	-	3GPMKTING?	Integer (chip)	
	Q Phase Code Power (dB)	-	3GPMKPOWQ?	Level (dB)	
	Q Phase Code Power (dBm)	-	3GPMKPOWABSQ?	Level (dBm)	
	Q Phase ρ	-	3GPMKRHOQ?	Real number	
	Q Phase E.V.M.	-	3GPMKEVMQ?	% rms	
	Q Phase Timing	-	3GPMKTINGQ?	Integer (chip)	
	(When UPLINK and FRAME)				
	τ (Time)	-	3GPTAU?	Time (sec)	
	τ (Chip)	-	3GPTAUCHIP?	Real number (chip)	
	Carrier Frequency Error (Hz)	-	3GPCFER?	Frequency(Hz)	
	Carrier Frequency Error (ppm)	-	3GPCFERPPM?	ppm	
	I/Q Origin Offset	-	3GPIQOFS?	Level (dBc)	
	Error Vector Magnitude	-	3GPMOD?	% rms	
	Peak Error Vector Magnitude	-	3GPPKMOD?	%	
	Slot	-	3GPSLOT?	Integer	
	Average Ch. Power		3GPAVGCHPWR?	Level (dBm)	
	Code Domain Power Marker				
	Marker Position	3GPMK *	-	Integer (Slot position)	
	Slot No.	-	3GPMKCODE?	Integer	
	Code Power (dB)	-	3GPMKPOW?	Level (dB)	
	Code Power (dBm)	-	3GPMKPOWABS?	Level (dBm)	
	ρ	-	3GPMKRHO?	Real number	
	E.V.M.	-	3GPMKEVM?	Real number (% rms)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
3GPP	Demod Data output	3GPDEMOD	3GPDEMOD?	1/0 Character	*1
	Graphics Marker Constellation Constellation(Line) Constellation(Dot) Constellation (Line&Chip) (Line&Symbol) I EYE Diagram Q EYE Diagram I/Q EYE Diagram				
	Chip/Symbol number	3GPMKCHIP *	3GPMKCHIP?	Integer	
	I data	-	3GPMKI?	Phase	
	Q data	-	3GPMKQ?	Phase	
	E.V.M. vs Chip/Symbol Mag Error vs Chip/Symbol Chip/Symbol number	3GPMKCHIP *	3GPMKCHIP?	Integer	
	Marker Y data	-	3GPMKERR?	%	
	Phase Error vs Chip/Symbol Chip/Symbol number	3GPMKCHIP *	3GPMKCHIP?	Integer	
	Marker Y data	-	3GPMKDEG?	degree	
	SCH Power Slot Position	3GPMKSCH *	3GPMKSCH?	Integer (Slot No.)	
	SCH Power (dB)	-	3GPMKSCHPOW?	Level (dB)	
	SCH Power (dBm)	-	3GPMKSCHPOWABS?	Level (dBm)	

*1: After the measurement, the Demodulated data is generated by using the 3G DEMOD command and then it can be read by using the 3GPDEMOD? command.

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Graphics Data output Constellation Constellation (Line) Constellation (Dot) Constellation (Line&Chip) (Line&Symbol) I EYE Diagram Q EYE Diagram I/Q EYE Diagram	I-Phase Data	-	GPHI?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: I-phase data (real number)	
	Q-Phase Data	-	GPHQ?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Q-phase data (real number)	
I EYE Diagram Q EYE Diagram I/Q EYE Diagram	X-axis data (Chip/Symbol)	-	GPHCHIP? GPHX?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Chip/Symbol data (integer)	
E.V.M. vs Chip/Symbol Mag Error vs Chip/ Symbol Phase Error vs Chip/ Symbol	X-axis data (Chip/Symbol)	-	GPHCHIP? GPHX?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Chip/Symbol data (integer)	
	Y-axis data	-	GPHY?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Data (real number)	
QPSK	Auto Level Set	AUTOLVL	-	-	
	Graphics Display Start	QPDSPST *	QPDSPST?	Integer	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
QPSK	Select Type				
	Constellation	QPGTYP CON	QPGTYP?	0:Constellation	
	Constellation(Line)	QPGTYP CONLIN		1:Constellation (Line)	
	Constellation(Dot)	QPGTYP CONDOT		2:Constellation (Dot)	
	Constellation (Line & Chip)	QPGTYP CONLINCHP		3:Constellation (Line & Chip)	
	I EYE Diagram	QPGTYP ICHEYE		4:I EYE Diagram	
	Q EYE Diagram	QPGTYP QCHEYE		5:Q EYE Diagram	
	I/Q EYE Diagram	QPGTYP IQCHEYE		6:I/Q EYE Diagram	
	E.V.M. vs Chip	QPGTYP EVM		7:E.V.M. vs Chip	
	Mag Error vs Chip	QPGTYP MAGERR		8:Mag Error vs Chip	
	Phase Error vs Chip	QPGTYP PHAERR		9:Phase Error vs Chip	
	Parameter Setup				
	Root Nyquist				
	ON	QPRNYQ ON	QPRNYQ?	0:OFF	
	OFF	QPRNYQ OFF		1:ON	
	Meas Range	QPMRNG *	QPMRNG?	Integer	
	Trigger Mode				
	INT	QPTRG INT	QPTRG?	0:INT	
	EXT	QPTRG EXT		1:EXT	
	IF	QPTRG IF		2:IF	
	EXT Trigger Slope				
	+	QPTRGSLP RISE	QPTRGSLP?	0:-	
	-	QPTRGSLP FALL		1:+	
	Trigger Level	QPTRGLVL *	QPTRGLVL?	Integer (0 to 100%)	
	EXT Trigger Delay	QPTRGDLY *	QPTRGDLY?	Real number (-512.000 to 512.000)	
	Average Times	QPAVG *	QPAVG?	Integer (1:OFF, 2 to 32)	
	Limit Setup				
	Judgment				
	ON	QPLMJDG ON	QPLMJDG?	0:OFF	
	OFF	QPLMJDG OFF		1:ON	
	Limit(ρ)	QPLMRHO *	QPLMRHO?	Real number (0.0001 to 1.0000)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
QPSK	Starting Measurement				
	QPSK	QPSK	-	-	
	Starting the Measurement on the same mode	SI	-	-	
	Results				
	Total Result				
	ρ	-	QPRHO?	ρ	
	Carrier Frequency Error	-	QPFER?	Frequency (Hz)	
	Carrier Feedthrough	-	QPIQOFS?	Level (dBc)	
	Magnitude Error	-	QPMAG?	% rms	
	Phase Error	-	QPPHSE?	degree rms	
	Error Vector Magnitude	-	QPMOD?	% rms	
	Judgment result	-	QPJDG?	0: FAIL 1: PASS	
	Readout the results of graphics Constellation Constellation(Line) Constellation(Dot) Constellation (Line & Chip) I EYE Diagram Q EYE Diagram I/Q EYE Diagram				
	Chip No.	QPMKCHIP *	QPMKCHIP?	DispStart to +255	
	I data	-	QPMKI?	Phase	
	Q data	-	QPMKQ?	Phase	
	E.V.M. vs Chip Mag Error vs Chip				
	Chip No.	QPMKCHIP *	QPMKCHIP?	DispStart to +255	
	Marker Y data	-	QPMKERR?	%	
	Phase Error vs Chip				
	Chip No.	QPMKCHIP *	QPMKCHIP?	DispStart to +255	
	Marker Y data	-	QPMKDEG?	degree	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Graphics Data output Constellation Constellation (Line)	I-Phase Data	-	GPHI?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: I-phase data (real number)	
Constellation (Dot) Constellation (Line&Chip) I EYE Diagram Q EYE Diagram I/Q EYE Diagram	Q-Phase Data	-	GPHQ?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Q-phase data (real number)	
I EYE Diagram Q EYE Diagram I/Q EYE Diagram	X-axis data (Chip)	-	GPHCHIP? GPHX?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Chip data (integer)	
E.V.M. vs Chip Mag Error vs Chip Phase Error vs Chip	X-axis data (Chip)	-	GPHCHIP? GPHX?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Data (integer)	
	Y-axis data	-	GPHY?	n<CR+LF>+d1<CR+LF>+.....+dn<CR+LF> n: Number of output data items (integer) dn: Data (real number)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Tx Power	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup Root Nyquist ON OFF	 TXRNYQ ON TXRNYQ OFF	TXRNYQ?	 0: OFF 1: ON	
	Trigger Mode INT EXT	 TXTRG INT TXTRG EXT	TXTRG?	 0:INT 1:EXT	
	EXT Trigger Slope + -	 TXTRGSLP RISE TXTRGSLP FALL	TXTRGSLP?	 0:- 1:+	
	EXT Trigger Delay	TXTRGDLY *	TXTRGDLY?	Real number (-5120.000 to 5120.000)	
	Average Times	TXAVG *	TXAVG?	Integer (1:OFF to 32)	
	Starting the Measurement Tx Power	 TXPWR	-	-	
	Starting the Measurement on the same mode	SI	-	-	
	Results Tx Power	 -	TXPWR?	d1,d2,d3 d1:Tx Power (dBm) d2:Tx Power (W) d3:Peak Factor (dB)	
Power vs Time	Auto Level Set	AUTOLVL	-	-	
	Scale Setup Display Type GRAPH TABLE	 3GPPTDISP GRP 3GPPTDISP TBL	3GPPTDISP?	 0:GRAPH 1:TABLE	
	Y Scale Upper	3GPPTYUPR *	3GPPTYUPR?	Integer (-20 to 70 dB/ dBm)	
	Y Scale Range	3GPPTYRNG *	3GPPTYRNG?	Integer (10 to 50 dB/ dBm)	
	Power Unit RELATIVE ABS POWER	 3GPPTUNIT REL 3GPPTUNIT ABS	3GPPTUNIT?	 0:ABS POWER 1:RELATIVE	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Power vs Time	Parameter Setup				
	Meas Mode				
	PRECISE	3GPPTMEASMD PREC	3GPPTMEASMD?	0:PRECISE	
	CONCISE	3GPPTMEASMD CONC		1:CONCISE	
	Root Nyquist				
	ON	3GPPTRNYQ ON	3GPPTRNYQ?	0:OFF	
	OFF	3GPPTRNYQ OFF		1:ON	
	Trigger Mode				
	INT	3GPPTTRG INT	3GPPTTRG?	0:INT	
	IF	3GPPTTRG IF		1:IF	
	EXT	3GPPTTRG EXT		2:EXT	
	Trigger Slope				
	+	3GPPTTRGSLP RISE	3GPPTTRGSLP?	0:-	
	-	3GPPTTRGSLP FALL		1:+	
	Trigger Level	3GPPTTRGLVL *	3GPPTTRGLVL?	Integer (0 to 100)	
	Trigger Delay	3GPPTTRGDLY *	3GPPTTRGDLY?	Time	
	Meas Length	3GPPTMLEN *	3GPPTMLEN?	Integer (2 to 62)	
	Graph Plot Type				
	AVERAGE	3GPPTGTYP AVG	3GPPTGTYP?	0:AVERAGE	
	PEAK-PEAK	3GPPTGTYP PK		1:PEAK-PEAK	
	Omit Transient Section for AVG Power				
	ON	3GPPTOMIT ON	3GPPTOMIT?	0:OFF	
	OFF	3GPPTOMIT OFF		1:ON	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Power vs Time	Marker Setup				
	Power Marker 1	3GPPTMKR1 *	3GPPTMKR1?	Integer	
	Power Marker 2	3GPPTMKR2 *	3GPPTMKR2?	Integer	
	Template Setup				
	Template 1	3GPPTTMP1 *	3GPPTTMP1?	Integer	
	Template 2	3GPPTTMP2 *	3GPPTTMP2?	Integer	
	Starts measurement				
	Power vs Time	3GPPT	-	-	
	Starts measurement in the same mode	SI	-	-	
	Measurement results				
	Power Marker 1				
	Peak Factor	-	3GPPTMK1PKF?	Level	
	Average Power	-	3GPPTMK1AVG?	Level	
	Power Marker 2				
	Peak Factor	-	3GPPTMK2PKF?	Level	
	Average Power	-	3GPPTMK2AVG?	Level	
	Power Marker Ratio	-	3GPPTMKRATIO?	Level	
	Read Table Data (When Meas Mode is CONCISE.)	-	3GPPTTABLE1?	n,d1,d2,...,dn n: The number of output data (integer) d1 to dn: Power values (dBm/dB)	
		-	3GPPTTABLE2?	n<CR+LF>+d1 <CR+LF>+.....+dn <CR+LF> n: The number of output data (integer) dn: Power values (dBm/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	3GPCCDFXMAX *	3GPCCDFXMAX?	Integer (-20 to 70 dB/dBm)	
	X Scale Range	3GPCCDFXRNG *	3GPCCDFXRNG?	Integer (10 to 50 dB/dBm)	
	Power Unit				
	RELATIVE	3GPCCDFUNIT REL	3GPCCDFUNIT?	0:ABS POWER	
	ABS POWER	3GPCCDFUNIT ABS		1:RELATIVE	
	Parameter Setup				
	Root Nyquist				
	ON	3GPCCDFRNYQ ON	3GPCCDFRNYQ?	0:OFF	
	OFF	3GPCCDFRNYQ OFF		1:ON	
	Trigger Mode				
	INT	3GPCCDFTRG INT	3GPCCDFTRG?	0:INT	
	EXT	3GPCCDFTRG EXT		1:EXT	
	Trigger Slope				
	+	3GPCCDFTRGSLP RISE	3GPCCDFTRGSLP?	0:-	
	-	3GPCCDFTRGSLP FALL		1:+	
	Trigger Delay	3GPCCDFTRGDLY *	3GPCCDFTRGDLY?	Time	
	Meas Length	3GPCCDFMLEN *	3GPCCDFMLEN?	Integer (10000 to 100000000)	
	Trace Write				
	ON	3GPCCDFTRC ON	3GPCCDFTRC?	0:OFF	
	OFF	3GPCCDFTRC OFF		1:ON	
	Starts measurement				
	CCDF	3GPCCDF	-	-	
	Measurement results	SI	-	-	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
CCDF	Measurement results CCDF	-	3GPCCDF?	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	3GPCCDFMK *	-	Level	
	Destribution/Power	-	3GPCCDFMK?	d1,d2 d1:Destribution d2:Power	
P-CPICH Power	Auto Level Set	AUTOLVL	-	-	
	Parameter Setup Scrambling Code No.	PCPICHSCN* PCPICHSCNHEX*	PCPICHSCN? PCPICHSCNHEX?	Integer (0 to 262142) Hexadecimal number (0 to 3FFFE)	
	Search Mode Primary CPICH SCH(LONG)	PCPICHSRCHMD PCPICH PCPICHSRCHMD SCHLONG	PCPICHSRCHMD?	1: Primary CPICH 2: SCH(LONG)	
	Meas Frame	PCPICHMSFRM*	PCPICHMSFRM?	Integer (1 to 4)	
	Average Times	PCPICHAVG*	PCPICHAVG?	Integer (1:OFF, 2 to 32)	
	Starts measurement P-CPICH Power	PCPICH			
	Starts measurement in the same mode	SI			
	Measurement results P-CPICH Power Average	-	PCPICHPWAVG?	d1, d2 d1: P-CPICH Power Average (dBm) d2: P-CPICH Power Average (W)	

Table 4-12 TRANSIENT Key

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
P-CPICH Power	P-CPICH Power Max	-	PCPICHPWMAX?	d1, d2 d1: P-CPICH Power Max (dBm) d2: P-CPICH Power Max (W)	
	P-CPICH Power Min	-	PCPICHPWMIN?	d1, d2 d1: P-CPICH Power Min (dBm) d2: P-CPICH Power Min (W)	
	Frequency Error	-	PCPICHFRERR?	Frequency	
	Tx Power	-	PCPICHTXPWR?	d1, d2 d1: Tx Power (dBm) d2: Tx Power (W)	

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>	DL0	-	-	
	LF	DL1	-	-	
	<EOI>	DL2	-	-	
	CR LF	DL3	-	-	
	LF <EOI>	DL4	-	-	
	Service request interruption ON	S0	-	-	
	OFF	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	

Table 4-14 Miscellaneous

Function		Listener Code	Talker Request		Remarks
			Code	Output Format	
Miscella-neous	Accessing the operation status enable register	OPR *	OPR?	Decimal number corre-sponding to the register bits	
	Reading or clearing the operation status register	-	OPREVT?	Decimal number corre-sponding 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.

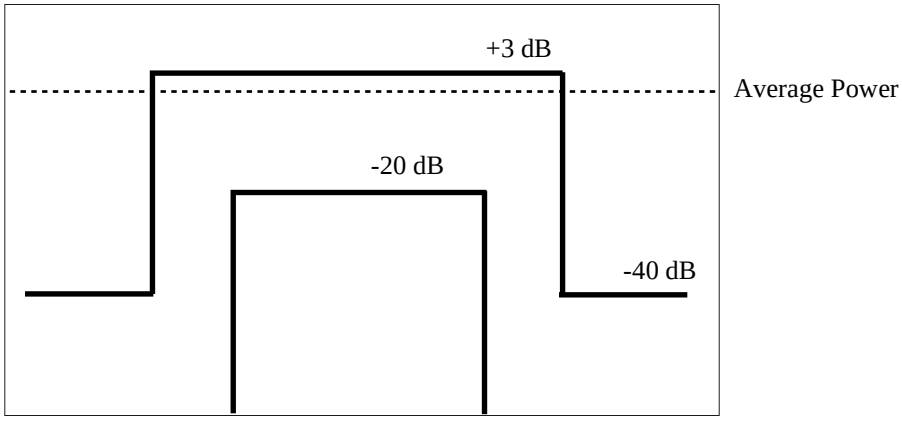


Figure 5-1 Template to Be Set

For example, see Figure 5-2 for setting the upper template used to define the power within the burst period as +3 dB and -40 dB.

Set the template using the relative value to the average power.

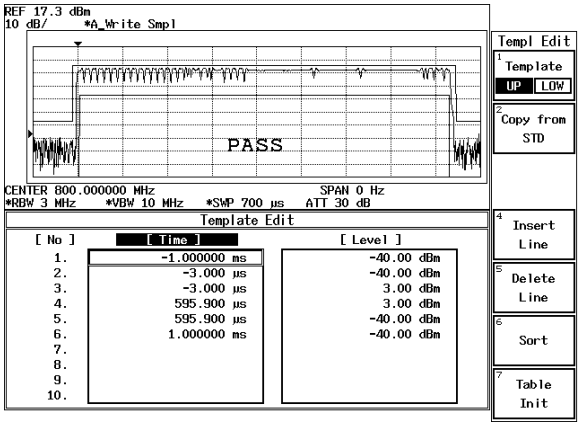


Figure 5-2 Template Settings

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.

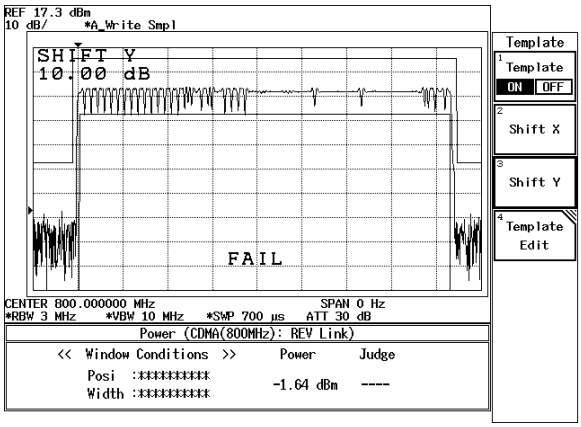


Figure 5-3 Template Shifted Using the Shift Y Function

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 current center frequency to the X value in the template table.

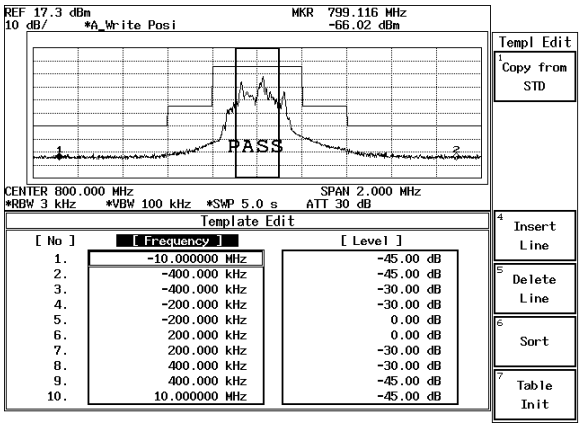


Figure 5-4 Template with the Set Values

In addition, Margin ΔX is used to widen the template data by ΔX/2 to both sides in the plus and minus frequency directions in reference to the 0 Hz on the template.

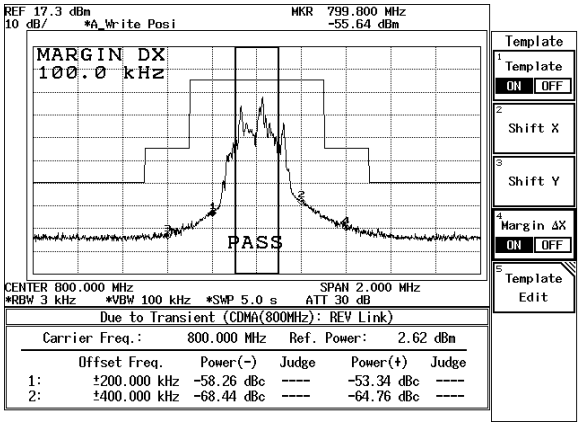


Figure 5-5 Template with Margin Delta X

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 Inband 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.

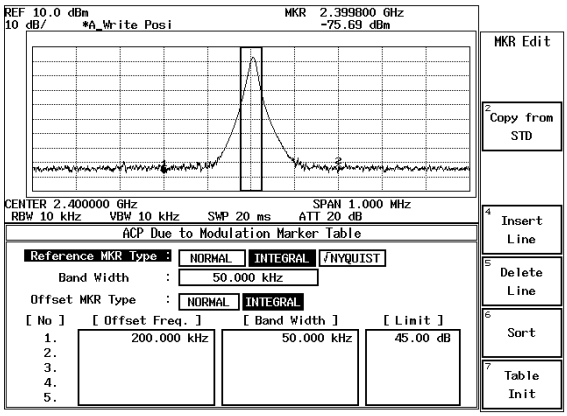


Figure 5-6 Example of Marker Edit Setting (1)

(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.

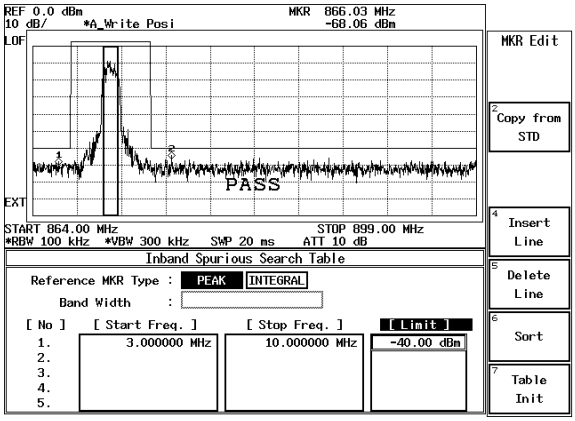
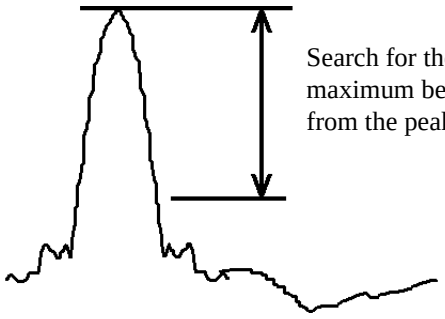


Figure 5-7 Example of Marker Edit Setting (2)

Peak marker is set using the Peak Marker Y Delta soft key in the Config menu.



Search for the peak level of whose level is the maximum below the point Y Delta down down from the peak.

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 or INTEGRAL 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 or INTEGRAL. 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 three 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 Mag Error (Magnitude Error)

Mag Error is defined as shown in Figure 5-9, and the value is calculated using the following formula.

$$\text{Magnitude Error} = \sqrt{\frac{\sum_{i}^{K} \left(\sqrt{Im(i)^2 + Qm(i)^2} - \sqrt{Ir(i)^2 + Qr(i)^2} \right)^2}{\sum_{i}^{K} (Ir(i)^2 + Qr(i)^2)}} \times 100$$

Im (i), Qm (i):	Measured values
Ir (i), Qr (i):	Reference values
i:	Chip number
K:	Wavelength to be measured

5.4 Phase Error

Phase Error is defined as shown in Figure 5-9, and the value is calculated using the following formula.

$$\text{Phase Error} = \sqrt{\frac{\sum_{i}^{K} \left\{ \tan^{-1}(Qm(i) / Im(i)) - \tan^{-1}(Qr(i) / Ir(i)) \right\}^2}{K}}$$

Im (i), Qm (i):	Measured values
Ir (i), Qr (i):	Reference values
i:	Chip number
K:	Wavelength to be measured

5.5 E.V.M. (Error Vector Magnitude)

E.V.M. is defined as shown in Figure 5-9, and the value is calculated using the following formula.

$$\text{Error Vector Magnitude} = \sqrt{\frac{\sum_{i}^{K} \{ (Im(i) - Ir(i))^2 + (Qm(i) - Qr(i))^2 \}}{\sum_{i}^{K} \{ Ir(i)^2 + Qr(i)^2 \}}} \times 100$$

Im (i), Qm (i):	Measured values
Ir (i), Qr (i):	Reference values
i:	Chip number
K:	Wavelength to be measured

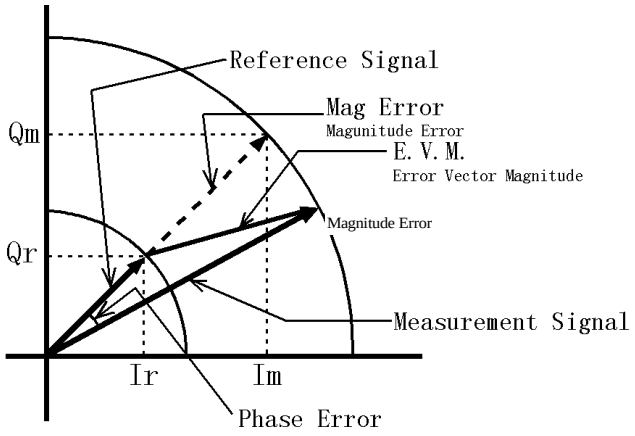


Figure 5-9 Mag Error, Phase Error, E.V.M.

5.6 Waveform Quality

Waveform Quality (ρ) can be obtained using the following calculation expression.

$$\rho = \frac{\left| \sum_{i}^{K} \left(Im(i) + jQm(i) \right) \cdot \left(Ir(i) - jQr(i) \right) \right|^2}{\sum_{i}^{K} \left(Ir(i)^2 + Qr(i)^2 \right) \sum_{i}^{K} \left(Im(i)^2 + Qm(i)^2 \right)}$$

Im (i), Qm (i):	Measured values
Ir (i), Qr (i):	Reference values
i:	Chip number
K:	Wavelength to be measured

5.7 About a Code Domain Power coefficient

The code domain power coefficient for the channel A can be obtained using the following calculation expression.

$$\frac{\sum_{k}^{N} \left| \sum_{i}^{M} \left(Im(k \cdot M + i) + jQm(k \cdot M + i) \right) \cdot \left(Ir(k \cdot M + i) - jQr(k \cdot M + i) \right) \right|^2}{\sum_{i}^{M} \left(Ir(i)^2 + Qr(i)^2 \right) \sum_{k}^{N} \sum_{i}^{M} \left(Im(k \cdot M + i)^2 + Qm(k \cdot M + i)^2 \right)}$$

Im (i), Qm (i):	Measured values
Ir (i), Qr (i):	Reference values
i:	Chip number
k:	Symbol number
M:	One symbol length of channel A (number of chips)
N:	Number of symbols to be measured

5.8 About the Carrier Frequency Error of QPSK

This section describes the carrier frequency error of QPSK.

When LINK is set to UPLINK in STD Setup, the carrier frequency measurement range is limited for the purpose of measuring a special HPSK signal (when the levels of I and Q are the same and the signal is equivalent to the QPSK signal).

This measurement uses a range of 2560 chips away from the trigger for the carrier frequency measurement in addition to the modulation accuracy calculation range specified by Meas range.

As a result, this measurement includes the following features as compared with the measurement with LINL set to DOWNLINK.

1. The carrier frequency measurement range is limited.
2. Since this measurement uses a period other than the modulation accuracy calculation period for the carrier frequency measurement, the carrier frequency error may become large when an application is used to measure the modulation accuracy only for the period where the burst signal is turned on.

5.9 Block Diagram

This section shows the block diagram for the modulation analysis hardware.

The Figure 5-10 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.

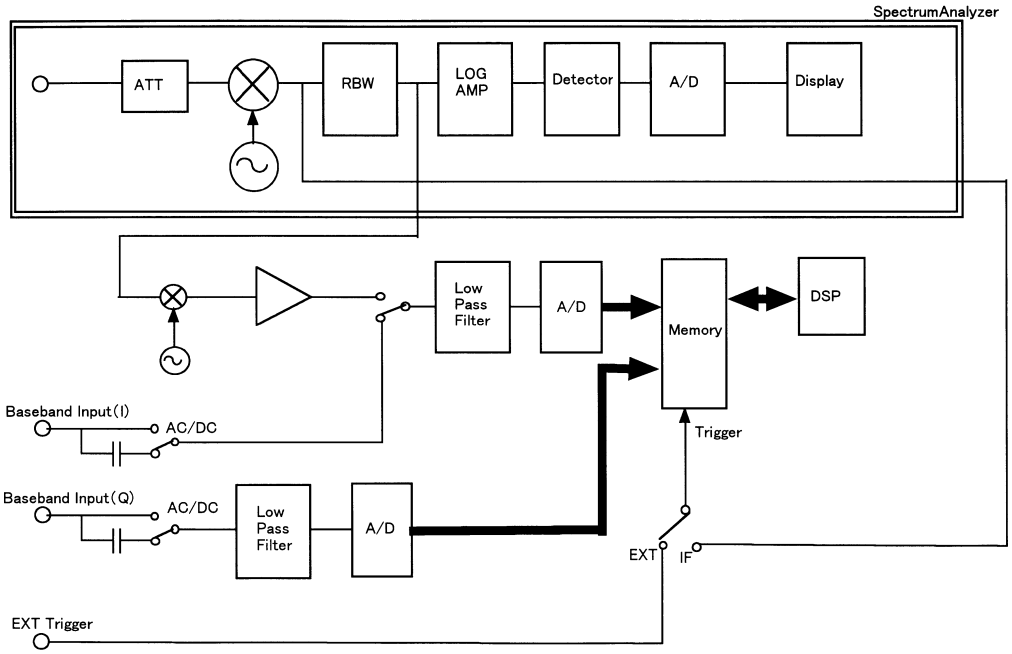


Figure 5-10 Block Diagram

6 PERFORMANCE VERIFICATION TEST(3GPP)

6.1 General

6.1.1 Introduction

This chapter provides R3267 Series OPT62 performance verification test procedures complied with 3GPP standards, 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	Down Link Measurement in RF Input	Waveform Quality Accuracy (ρ)
		Carrier Frequency Accuracy
		Code Domain Power
		Modulation Accuracy
6.2.2	Up Link Measurement in RF Input	Waveform Quality Accuracy (ρ)
		Carrier Frequency Accuracy
		Modulation Accuracy
6.2.3	QPSK Measurement in RF Input	Waveform Quality Accuracy (ρ)
		Carrier Frequency Accuracy
		Modulation Accuracy
6.2.4	Down Link Measurement in IQ Input	Modulation Accuracy
6.2.5	Up Link Measurement in IQ Input	Modulation Accuracy
6.2.6	QPSK Measurement in IQ Input	Modulation Accuracy
6.2.7	Simplified Performance Check	Waveform Quality Accuracy (ρ)
		Carrier Frequency Accuracy
		Modulation Accuracy

6.1.2 Test Equipment

The Table 6-2 lists recommended test equipment.

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 OPT62 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.***

Table 6-2 Equipment List

1	Arbitrary Waveform Generator	No. of Output Channels: 3 ch required Capable to assign; I CH Signal Output at CH1 Q CH Signal Output at CH2 Trigger Signal at CH3	AWG2021	Tektronix	SG1
2	IQ Modulation Signal Generator	Frequency Range: 30MHz to 3GHz IQ Modulation Bandwidth: >5 MHz ρ:>0.999	SMIQ03	Rohde & Schwartz	SG2
3	RF Cable	BNC(m)-BNC(m), 50W	MI-09	Advantest	-
4	Adapter	Type N(m)-BNC(f), 50W	JUG-201-U	Advantest	-

NOTE:
****The IQ level and DC offset of both SG1 and SG2 must be matched.***

Total performance of SG1 with SG2 must cover the R3267 Series tested specification.

6.1.3 Specifications Required for Test Signals

Table 6-3 provides the specifications required for performance verification test signals based on the TS 25.211 V3.6.0 and TS 25.213 V3.5.0 of the 3GPP Standards.

Table 6-3 Specifications Required for Test Signals

No.	Test Signal	Critical Specification				Usage
1	Base Station	Scrambling Code No.0, Level takes 0 dB for Total Power				In Section 6.2.1 & Section 6.2.4
		Channel Name	Transfer Rate	Channelization No.	Level	
		Primary CPICH	15ksps	0	-9.03dB	
		P-CCPCH	15ksps	1	-9.49dB	
		SCH	15ksps	-	-19.03dB	
		DPCH	30ksps	2	-6.02dB	
		DPCH	30ksps	3	-6.02dB	
		DPCH	30ksps	4	-6.02dB	
2	Mobile Station	Scrambling Code No.1, Level takes 0 dB for Total Power				In Section 6.2.2 & Section 6.2.5
		Channel Name	Transfer Rate	Channelization No.	Level	
		DPDCH(I-ch)	60ksps	16	-0.85dB	
		DPCCH(Q-ch)	15ksps	0	-7.47dB	
3	Mobile Station	Modulation:QPSK Symbol rate:3.84Msymbol/sec. Filter Type:Root Nyquist Roll Off:α=0.22				In Section 6.2.3 & Section 6.2.6
4	QPSK Signal Comply with 3GPP Standard	Modulation:QPSK Symbol rate:3.84Msymbol/sec. Filter Type:Root Nyquist Roll Off:α=0.22				In Section 6.2.7

Figure 6-1 shows the timing chart of trigger signal with No.1, N0.2 and No.3 listed in Table 6-3.

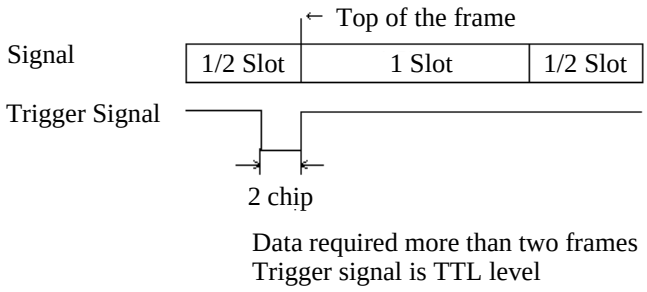


Figure 6-1 Timing Chart

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 Sheets

The performance verification test record sheets and performance check record sheets are 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 type style 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 Down Link Measurement in RF Input

(1) Description

Test waveform quality accuracy, carrier frequency accuracy, modulation accuracy and code domain power accuracy in Down Link measurement mode of RF input.

(2) Specification

Waveform Quality Accuracy (ρ):	≥ 0.998
Carrier Frequency Accuracy:	≤ ± 10 Hz
Modulation Accuracy:	≤ 3%
Code Domain Power Accuracy:	± 0.1 dB

(3) Equipment used

Arbitrary Waveform Generator:	SG1
IQ Modulation Signal Generator:	SG2
RF Cable:	BNC (m)-BNC (m)
Adapter:	N (m)-BNC (f)

(4) Setup

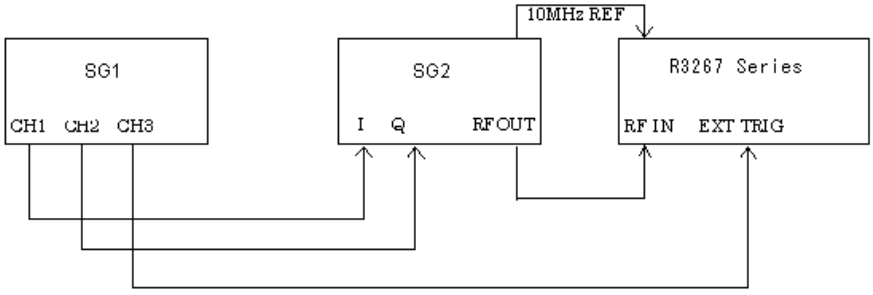


Figure 6-2 Setup of Down Link Measurement (RF Input)

(5) Procedure

1. Connect equipment as shown in Figure 6-2.
2. On the SG1, set controls to generate the signal complied with No.1 (Base Station) signal listed in Table 6-3 at CH1 and CH2.
3. On the SG1, set controls to generate trigger signal at CH3.

4. On the SG2, set controls as follows;

   Modulation: External IQ Modulation
   Frequency: 2 GHz
   Output Level: 0 dBm

5. On the R3267 Series, set controls as follows;

   Center Frequency: 2 GHz
   Input: RF
   Measurement: Down Link

6. On the R3267 Series, set the measurement parameters as shown in Figure 6-3.

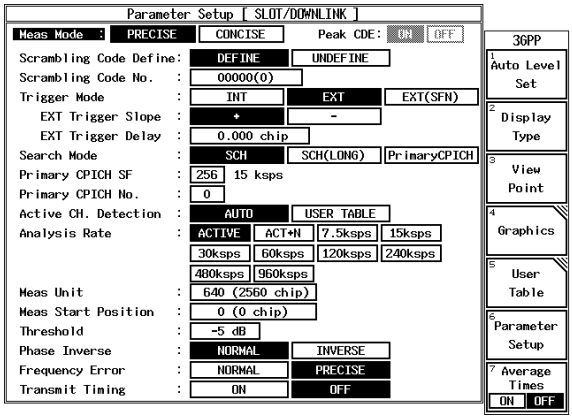


Figure 6-3 Setting of Measurement Parameters for Down Link (RF Input)

7. On the R3267 Series, press ***DC CAL*** and ***AUTO LEVEL*** to perform dc calibration and auto level.

8. On the R3267 Series, press **SINGLE** for single sweep.

9. After single sweep has completed, record the measurement result in the performance verification test record sheets.

6.2.2 Up Link Measurement in RF Input

(1) Description

Test waveform quality accuracy, carrier frequency accuracy and modulation accuracy in Up Link measurement of RF input.

(2) Specification

Waveform Quality Accuracy (ρ): ≥ 0.999

Carrier Frequency Accuracy: ≤ ± 10 Hz

Modulation Accuracy: ≤ 3%

(3) Equipment used

Arbitrary Waveform Generator:	SG1
IQ Modulation Signal Generator:	SG2
RF Cable:	BNC (m)-BNC (m)
Adapter:	N (m)-BNC (f)

(4) Setup

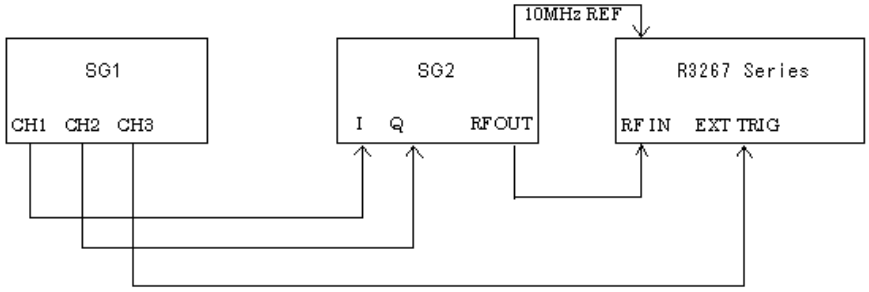


Figure 6-4 Setup of Up Link Measurement (RF Input)

(5) Procedure

1. Connect equipment as shown in Figure 6-4.

2. On the SG1, set controls to generate the signal complied with No.2 (Mobile Station) signal listed in Table 6-3 at CH1 and CH2.

3. On the SG1, set controls to generate trigger signal at CH3.

4. On the SG2, set controls as follows;

Modulation:	External IQ Modulation
Frequency:	2 GHz
Output Level:	0 dBm

5. On the R3267 Series, set controls as follows;

Center Frequency:	2 GHz
Input:	RF
Measurement:	Up Link

6. On the R3267 Series, set the measurement parameters as shown in Figure 6-5.

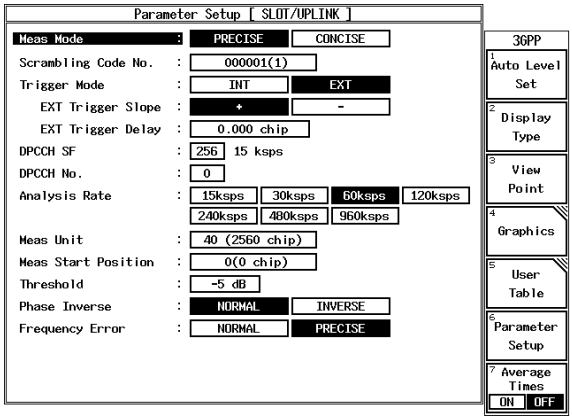


Figure 6-5 Setting of Measurement Parameters for Up Link (RF Input)

7. On the R3267 Series, press ***DC CAL*** and ***AUTO LEVEL*** to perform dc calibration and auto level.

8. On the R3267 Series, press **SINGLE** for single sweep.

9. After single sweep has completed, record the measurement result in the performance verification test record sheets.

6.2.3 QPSK Measurement in RF Input

(1) Description

Test waveform quality accuracy, carrier frequency accuracy and modulation accuracy in QPSK measurement of RF input.

(2) Specification

Waveform Quality Accuracy (ρ): ≥ 0.999

Carrier Frequency Accuracy: ≤ ± 30 Hz

Modulation Accuracy: ≤ 3%

(3) Equipment used

Arbitrary Waveform Generator: SG1

IQ Modulation Signal Generator: SG2

RF Cable: BNC (m)-BNC (m)

Adapter: N (m)-BNC (f)

(4) Setup

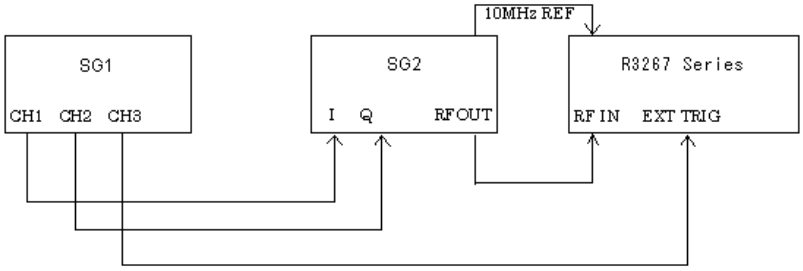


Figure 6-6 Setup of QPSK Measurement (RF Input)

(5) Procedure

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

2. On the SG1, set controls to generate the signal complied with No.3 (Mobile Station) signal listed in Table 6-3.

3. On the SG1, set controls to generate trigger signal at CH3.

4. On the SG2, set controls as follows;

   Modulation: External IQ Modulation
   Frequency: 2 GHz
   Output Level: 0 dBm

5. On the R3267 Series, set controls as follows;

   Center Frequency: 2 GHz
   Input: RF
   Measurement: QPSK

6. On the R3267 Series, set the measurement parameters as shown in Figure 6-7.

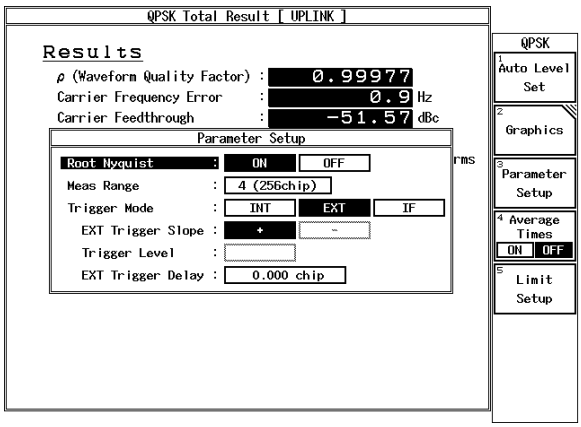


Figure 6-7 Setting of Measurement Parameters for QPSK (RF Input)

7. On the R3267 Series, press ***DC CAL*** and ***AUTO LEVEL*** to perform dc calibration and auto level.

8. On the R3267 Series, press **SINGLE** for single sweep.

9. After single sweep has completed, record the measurement result in the performance verification test record sheets.

6.2.4 Down Link Measurement in IQ Input

(1) Description

Test modulation accuracy in Down Link measurement of IQ input.

(2) Specification

Modulation Accuracy: ≤ 3%

(3) Equipment used

Arbitrary Waveform Generator: SG1
RF Cable: BNC(m)-BNC(m)
Adapter: N(m)-BNC(f)

(4) Setup

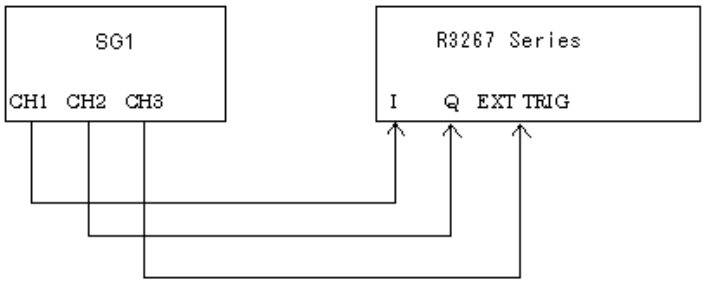


Figure 6-8 Setup of Down Link Measurement (IQ Input)

(5) Procedure

1. Connect equipment as shown in Figure 6-8.

2. On the SG1, set controls to generate the signal complied with No.1 (Base Station) signal listed in Table 6-3.
   Set output level to 0.8 Vp-p for CH1 and CH2, both signals must be balanced.

3. On the R3267 Series, set controls as follows;

   Input: IQ
   Measurement: Down Link

4. On the R3267 Series, set the measurement parameters as shown in Figure 6-9.

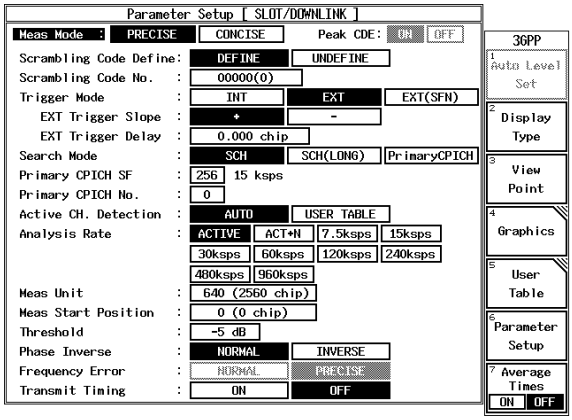


Figure 6-9 Setting of Measurement Parameters for Down Link (IQ Input)

5. On the R3267 Series, press ***DC CAL*** to perform dc calibration.

6. On the R3267 Series, press **SINGLE** for single sweep.

7. After single sweep has completed, record the result in the performance check record sheets.

6.2.5 Up Link Measurement in IQ Input

(1) Description

Test modulation accuracy in Up Link measurement of IQ input.

(2) Specification

Modulation Accuracy: ≤ 3%

(3) Equipment used

Arbitrary Waveform Generator: SG1

RF Cable: BNC(m)-BNC(m)

Adapter: N(m)-BNC(f)

(4) Setup

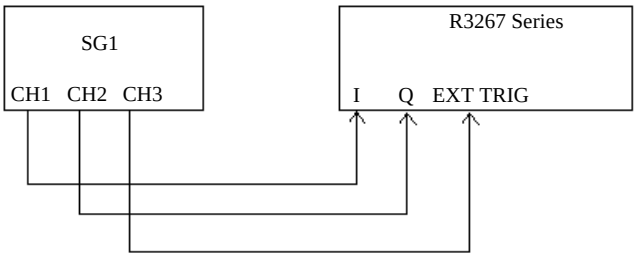


Figure 6-10 Setup of Up Link Measurement (IQ Input)

(5) Procedure

1. Connect equipment as shown in Figure 6-10.

2. On the SG1, set controls to generate the signal complied with No.2 (Mobile Station) signal listed in Table 6-3.
   Set output level to 0.8 Vp-p for CH1 and CH2, both signals must be balanced.

3. On the R3267 Series, set controls as follows;

   Input: IQ
   Measurement: Up Link

4. On the R3267 Series, set the measurement parameters as shown in Figure 6-11.

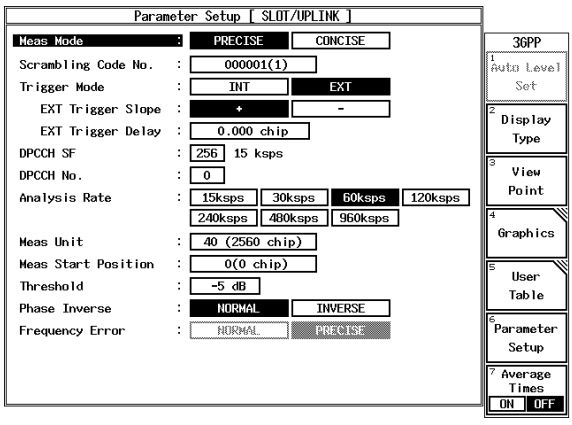


Figure 6-11 Setting of Measurement Parameters for Up Link (IQ Input)

5. On the R3267 Series, press ***DC CAL*** to perform dc calibration.

6. On the R3267 Series, press **SINGLE** for single sweep.

7. After single sweep has completed, record the result in the performance check record sheets.

6.2.6 QPSK Measurement in IQ Input

(1) Description

Test modulation accuracy in QPSK measurement of IQ input.

(2) Specification

Modulation Accuracy: ≤ 3%

(3) Equipment used

Arbitrary Waveform Generator: SG1

RF Cable: BNC(m)-BNC(m)

Adapter: N(m)-BNC(f)

(4) Setup

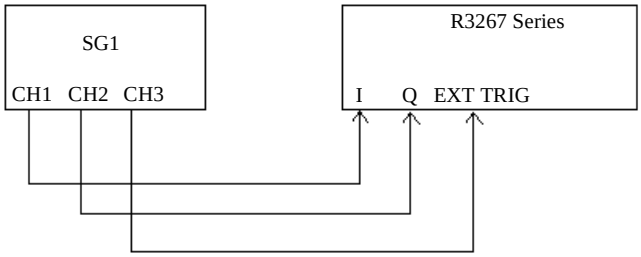


Figure 6-12 Setup of QPSK Measurement (IQ Input)

(5) Procedure

1. Connect equipment as shown in Figure 6-12.

2. On the SG1, set controls to generate the signal complied with No.3 (Mobile Station) signal listed in Table 6-3.
   Set output level to 0.8 Vp-p for CH1 and CH2, both signals must be balanced.

3. On the R3267 Series, set controls as follows;

   Input: IQ
   Measurement: QPSK

4. On the R3267 Series, set the measurement parameters as shown in Figure 6-13.

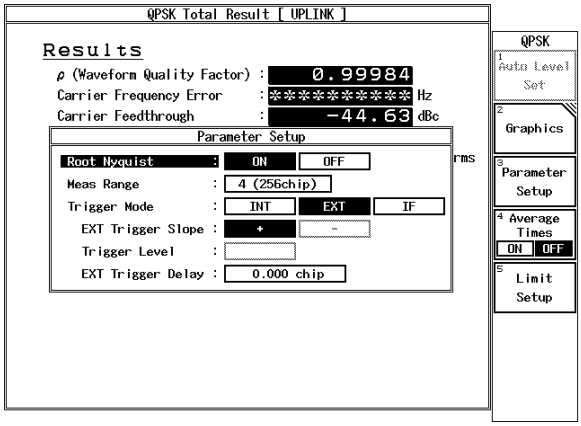


Figure 6-13 Setting of Measurement Parameters for QPSK (IQ Input)

5. On the R3267 Series, press ***DC CAL*** to perform dc calibration.

6. On the R3267 Series, press **SINGLE** for single sweep.

7. After single sweep has completed, record the result in the performance check record sheets.

6.2.7 Simplified Performance Check

(1) Description

This section provides performance check procedure for OPT62 complied with 3GPP standards by using QPSK signal.

Check waveform quality, carrier frequency accuracy and modulation accuracy.

(2) Specification

Waveform Quality Accuracy (ρ):	≥ 0.999
Carrier Frequency Accuracy:	≤ ± 30 Hz
Modulation Accuracy:	≤ 3%

(3) Equipment used

Arbitrary Waveform Generator:	SG1
RF Cable:	BNC(m)-BNC(m)
Adapter:	N(m)-BNC(f)

(4) Setup

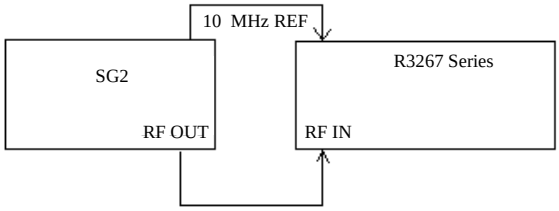


Figure 6-14 Setup of Simplified Performance Check

(5) Procedure

1. Connect equipment as shown in Figure 6-14.

2. On the SG2, set controls complied with No.4 signal listed in Table 6-3.

3. On the SG2, set controls as follows;

   Frequency: 2 GHz
   Output Level: 0 dBm

4. On the R3267 Series, set controls as follows;

   Center Frequency: 2 GHz
   Input: RF
   Measurement: QPSK

5. On the R3267 Series, set measurement parameters as shown in Figure 6-15.

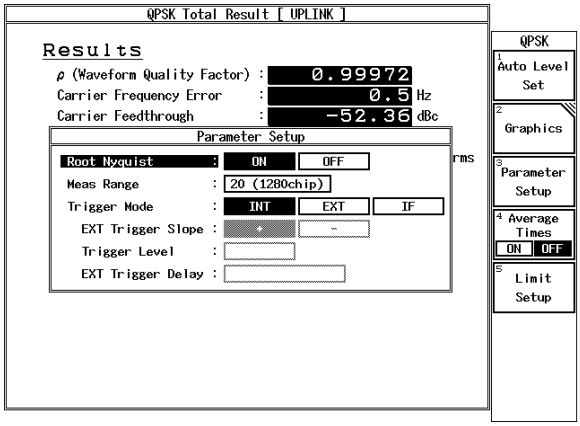


Figure 6-15 Setting of Measurement Parameters for QPSK (RF Input)

6. On the R3267 Series, press **SINGLE** for single sweep.

7. After single sweep has completed, record the result in the performance check record sheets.

6.3 Performance Verification Test Record Sheet

Model: OPT3264/67/73+62

S/N:

(1) Down Link Measurement in RF Input

Test Items		Specification			Result
		Min.	Measured Value	Max.	Pass/Fail
Waveform Quality(ρ)		0.998		NA	
Carrier Frequency Accuracy		-10 Hz		+10 Hz	
Modulation Accuracy		NA		3%	
Code Domain Power Measurement Accuracy	Ch No.				
	0	-9.13dB		-8.93dB	
	1	-9.59dB		-9.39dB	
	2	-6.12dB		-5.92dB	
	3	-6.12dB		-5.92dB	
	4	-6.12dB		-5.92dB	

(2) Up Link Measurement in RF Input

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Waveform Quality(ρ)	0.999		NA	
Carrier Frequency Accuracy	-10 Hz		+10 Hz	
Modulation Accuracy	NA		3%	

(3) QPSK Measurement in RF Input

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Waveform Quality(ρ)	0.999		NA	
Carrier Frequency Accuracy	-30 Hz		+30 Hz	
Modulation Accuracy	NA		3%	

(4) Down Link Measurement in IQ Input

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Modulation Accuracy	NA		3%	

(5) Up Link Measurement in IQ Input

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Modulation Accuracy	NA		3%	

(6) QPSK Measurement in IQ Input

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Modulation Accuracy	NA		3%	

6.4 Performance Check Record Sheet

Model: OPT3264/67/73+62

S/N:

Test Items	Specification			Result
	Min.	Measured Value	Max.	Pass/Fail
Waveform Quality(ρ)	0.999		NA	
Carrier Frequency Accuracy	-30 Hz		+30 Hz	
Modulation Accuracy	NA		3%	

7 SPECIFICATIONS

(1) Modulation Analysis Compliance

Third Generation Partnership Project (3GPP)

The applicable system conforms to the following specifications.

TS 25.101 V 3.6.0

25.104 V 3.6.0

25.211 V 3.6.0

25.213 V 3.5.0

(2) System Parameters

Characteristics	Specification
Measurement frequency range	30 MHz to 3.0 GHz
Input level range	-30 dBm to +30 dBm (Total power in ATT AUTO) -40 dBm to +30 dBm (Total power in ATT MNL)
Carrier frequency accuracy	±(Reference accuracy x Carrier frequency + 30 Hz) QPSK modulation analysis mode (Within Carrier frequency ±1 kHz)
	±(Reference accuracy x Carrier frequency + 10 Hz) 3GPP modulation analysis mode (Within Carrier frequency ±1 kHz, in PRECISE mode)
Modulation accuracy	Residual vector error: < 3% Measurement range: 0% to 17.5% Accuracy: ±2%
Chip rate	3.84 Mcps
Rolloff factor	0.22
Available level offset setting	0 to 100.0 dB
Channel power measurement	Integrating power over the set window zone

- QPSK modulation analysis mode

Characteristics	Specification
Waveform quality	Measurement accuracy: < 0.001
Result display	ρ (Waveform Quality Factor) Carrier Frequency Error Carrier Feedthrough Magnitude Error Phase Error Error Vector Magnitude
Waveform display	Constellation display (Line, Dot or Line & Chip) EYE Diagram (I, Q or I&Q) Vector error, magnitude error, Phase error vs. Chip number display

- 3GPP modulation analysis mode (DOWNLINK)

Characteristics	Specification
Waveform quality	Measurement accuracy: < 0.002
Code domain power	Measurement accuracy: < ± 0.1 dB
Result display	ρ (Waveform Quality Factor) τ (Time Alignment Error) Carrier Frequency Error I/Q Origin Offset Magnitude Error Phase Error Modulation Accuracy Code Domain Power
Waveform display	Constellation display (Line, Dot, Line & Chip or Line & Symbol) EYE Diagram (I, Q or I&Q), SCH Power Displays the vector error and magnitude error or phase error vs. chip or symbol number. Constellation and EYE Diagram turned by 45°
Display of others	slot, Scrambling Code No., Scrambling Code Group No., SCH Power, Power Ratio R-SCH:S-SCH

(For the signals with the following ratio of levels:
Primary CPICH: P-CCPCH: SCH: DCP *3 channels = 1: 0.9: 0.1: 2: 2: 2)

- 3GPP modulation analysis mode (UPLINK)

Characteristics	Specification
Waveform quality	Measurement accuracy: <0.001
Result display	ρ (Waveform Quality Factor) τ (Time Alignment Error) Carrier Frequency Error I/Q Origin Offset Magnitude Error Phase Error Modulation Accuracy Code Domain Power
Woreform display	Constellation display (Line, Dot, or Line & Chip) EYE Diagram (I, Q or I&Q) Displays the vector error, magnitude error or phase error vs. chip number and vector error vs. symbol number. Constellation and EYE Diagram turned by 45°
Display of others	slot

(For the signals with the following ratio of levels:
I-channel (DPDCH) : Q-channel (DPCCH) = 0.82 : 0.18)

- I/Q input

Characteristics	Specification
Connectors	BNC female (rear panel)
Input Impedance	50Ω (nominal)
Coupling	DC or AC coupling
Input level range	0.25V - 0.9Vp-p (± 0.47V or less)
Modulation accuracy	Residual vector error:< 3%
Result display and waveform display	Both comply with the modulation analysis

APPENDIX

A.1 Messages

In this section, the messages that are displayed while the analyzer is being used are described.

Code	Messages	Description
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.	-
721	Modulation Gain CAL error!(#100) Check 30 MHz CAL signal for connection.	-

Code	Messages	Description
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.	-
738	Cannot execute measurement. Because Meas Unit is too small.	-
739	Incorrect channel settings. Reset the channel SF and number.	-
740	Cannot measurement baseband signal. This function is available to RF input only.	
742	This function is available to DOWNLINK only. Set Link to DOWNLINK.	
743	Cannot allocate sufficient memory. Set Power Unit to RELATIVE.	-
750	Handshake error occurred to DSP. Contact qualified engineer.	-

Code	Messages	Description
751	Cannot Detect Mod. DSP board. Contact qualified engineer.	-
795	System Error. Memory test failed. (#0)	A memory error was detected. Contact a sales representative.
796	System Error. Memory test failed. (#1)	A memory error was detected. Contact a sales representative.
797	System Error. Memory test failed. (#2)	A memory error was detected. Contact a sales representative.
798	System Error. Memory test failed. (#3)	A memory error was detected. Contact a sales representative.

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