MX860803A/MX860903A/
MX268103A/MX268303A/MX268703A
cdma Measurement Software
(For MS8608A/MS8609A/
MS2681A/MS2683A/MS2687A/B)
Operation Manual

Fourth Edition

> **Read this manual before using the equipment.**
> **Keep this manual with the equipment.**

ANRITSU CORPORATION

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment. Some or all of the following five symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.

Symbols used in manual

DANGER ⚠ This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

WARNING ⚠ This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

CAUTION ⚠ This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

MX860803A/MX860903A/MX268103A/MX268303A/MX268703A
cdma Measurement Software (For MS8608A/MS8609A/MS2681A/MS2683A/MS2687A/B)
Operation Manual

13   July   2001   (First Edition)
16   May   2005   (Fourth Edition)

For Safety

WARNING ⚠️

1. ALWAYS refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.

   Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.

2. Measurement Categories

   This instrument is designed for Measurement category I (CAT I). Don't use this instrument at the locations of measurement categories from CAT II to CAT IV.

   In order to secure the safety of the user making measurements, IEC 61010 clarifies the range of use of instruments by classifying the location of measurement into measurement categories from I to IV.

   The category outline is as follows:

   Measurement category I (CAT I):

   Secondary circuits of a device connected to an outlet via a power transformer etc.

   Measurement category II (CAT II):

   Primary circuits of a device with a power cord (portable tools, home appliance etc.) connected to an outlet.

   Measurement category III (CAT III):

   Primary circuits of a device (fixed equipment) to which power is directly supplied from the power distribution panel, and circuits from the distribution panel to outlets.

   Measurement category IV (CAT IV):

   All building service-line entrance circuits through the integrating wattmeter and primary circuit breaker (power distribution panel).

For Safety

WARNING ⚠

or
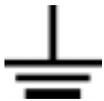
Repair

WARNING ⚠

Falling Over

3. When supplying power to this equipment, connect the accessory 3-pin power cord to a grounded outlet. If a grounded outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.

4. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment. There are high-voltage parts in this equipment presenting a risk of severe injury or fatal electric shock to untrained personnel. In addition, there is a risk of damage to precision parts.

5. This equipment should be used in the correct position. If the cabinet is turned on its side, etc., it will be unstable and may be damaged if it falls over as a result of receiving a slight mechanical shock.
And also DO NOT use this equipment in the position where the power switch operation is difficult.

For Safety

WARNING ⚠

Battery Fluid

6. DO NOT short the battery terminals and never attempt to disassemble it or dispose of it in a fire.   If the battery is damaged by any of these actions, the battery fluid may leak.
This fluid is poisonous.
DO NOT touch it, ingest it, or get in your eyes.   If it is accidentally ingested, spit it out immediately, rinse your mouth with water and seek medical help.   If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help.   If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

7. This instrument uses a Liquid Crystal Display (LCD); DO NOT subject the instrument to excessive force or drop it.   If the LCD is subjected to strong mechanical shock, it may break and liquid may leak.
This liquid is very caustic and poisonous.
DO NOT touch it, ingest it, or get in your eyes.   If it is ingested accidentally, spit it out immediately, rinse your mouth with water and seek medical help.   If it enters your eyes accidentally, do not rub your eyes, irrigate them with clean running water and seek medical help.   If the liquid gets on your skin or clothes, wash it off carefully and thoroughly.

For Safety

CAUTION ⚠

Replacing Fuse

CAUTION ⚠

1. Before Replacing the fuses, ALWAYS remove the power cord from the poweroutlet and replace the blown fuses. ALWAYS use new fuses of the type and rating specified on the fuse marking on the rear panel of the cabinet.

   T5A indicates a time-lag fuse.

   There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

Cleaning

2. Keep the power supply and cooling fan free of dust.
   - Clean the power inlet regularly. If dust accumulates around the power pins, there is a risk of fire.
   - Keep the cooling fan clean so that the ventilation holes are not obstructed. If the ventilation is obstructed, the cabinet may overheat and catch fire.

Check Terminal

⚠

3. Maximum DC voltage ratings:
   High Power Input and Low Power Input connectors: $\pm$DC 0 V
   Maximum AC power (continuous wave) ratings:
   For MS8608A
   High Power Input connector: $+$40 dBm
   Low Power Input connector: $+$20 dBm
   For MS8609A
   $+$20 dBm
   For MS2681A/MS2683A/MS2687A/B
   $+$30 dBm

   NEVER input a over maximum ratings to RF Input, excessive power may damage the internal circuits.

For Safety

CAUTION ⚠

Replacing memory back-up battery

This equipment uses a Poly-carbomonofluoride lithium battery to back-up the memory. This battery must be replaced by a service engineer when it has reached the end of its useful life; contact the Anritsu sales section or your nearest representative.

Note: The battery used in this equipment has a maximum useful life of 7 years.   It should be replaced before this period has elapsed.

External storage media

This equipment uses memory cards as external storage media for storing data and programs.

If this media is mishandled or becomes faulty, important data may be lost. To prevent this chance occurrence, all important data and programs should be backed-up.

Anritsu will not be held responsible for lost data.

Pay careful attention to the following points.
- ever remove the memory card from the driver, while it is being accessed.
- Memory card may be damaged by static electric charges.

Equipment Certificate

Anritsu guarantees that this equipment was inspected at shipment and meets the published specifications.

Anritsu Warranty

- During the warranty period, Anritsu will repair or exchange this software free-of-charge at the company's own discretion if it proves defective when used as described in the operation manual.
- The warranty period is 1 year from the purchase date.
- The warranty period after repair or exchange will remain 1 year from the original purchase date, or 30 days from the date of repair or exchange, depending on whichever is longer.
- This warranty does not cover damage to this software caused by Acts of God, natural disasters, and misuse or mishandling by the customer.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation will not accept liability for equipment faults due to unforeseen and unusual circumstances, nor for faults due to mishandling by the customer.

Anritsu Corporation Contact

If this equipment develops a fault, contact Anritsu Service and Sales offices at the address at the end of paper-edition manual or the separate file of CD-edition manual.

Notes On Export Management

This product and its manuals may require an Export License/Approval by the Government of the product's country of origin for re-export from your country.

Before re-exporting the product or manuals, please contact us to confirm whether they are export-controlled items or not.

When you dispose of export-controlled items, the products/manuals are needed to be broken/shredded so as not to be unlawfully used for military purpose.

Front Panel Power Switch

To prevent malfunction caused by accidental touching, the front power switch of this equipment turns on the power if it is pressed continuously for about one second in the standby state. If the switch is pressed continuously for one second in the power-on state, the equipment enters the standby state.

In the power-on state, if the power plug is removed from the outlet, then reinserted into it, the power will not be turned on. Also, if the lines is disconnected due to momentary power supply interruption or power failure, the power will not be turned on (enters the standby state) even if the line is recovered.

This is because this equipment enters the standby state and prevents incorrect data from being acquired when the line has to be disconnected and reconnected.

For example, if the sweep time is 1,000 seconds and data acquisition requires a long time, momentary power supply interruption (power failure) might occur during measurement and the line could be recovered automatically to power-on. In such a case, the equipment may mistake incorrect data for correct data without recognizing the momentary power supply interruption.

If this equipment enters the standby state due to momentary power supply interruption or power failure, check the state of the measuring system and press the front power switch to restore power to this equipment.

Further, if this equipment is built into a system and the system power has to be disconnected then reconnected, the power for this equipment must also be restored by pressing the front power switch.
Consequently, if this equipment is built into remote monitoring systems that use MODEMs, please install option 46 "Auto Power Recovery" to equipment.

Software License Agreement

Please read this Software License Agreement before using the accompanying software program (hereafter this software).

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By opening the sealed package containing this software, you are agreeing to be bound by the terms of this License.

If you do not agree to these terms, return the unopened software package to Anritsu Corporation (hereafter Anritsu).

1. License

(1) This License gives you the right to use this software on one MS8608A/
MS8609A/MS2681A/MS2683A/MS2687A/B (hereafter computer system).

(2) To use this software on one computer system, this License allows you to make one copy of this software on the storage device of your computer system.

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About This Manual

1. The contents of this Operation Manual explain the operation of the MS8608A/09A Digital Mobile Radio Transmitter Tester and the MS2681A/83A/87A/B Spectrum Analyzer when the MX860803A/ MX860903A/MX268103A/MX268303A/MX268703A cdma Measurement Software is installed.

    In this manual, MX860x03A means MX860803A or MX860903A, MX268x03A means MX268103A or MX268303A or MX268703A.
    MS860x means MS8608A or MS8609A, MS268x means MS2681A or MS2683A or MS2687A or MS2687B.

2. Manual configuration:
    The MX860x03A/MX268x03A cdma measurement software operation manual consists of the following two documents.

    MX860x03A/MX268x03A
    Operation Manual
    configuration
    ┤
    Panel Operation
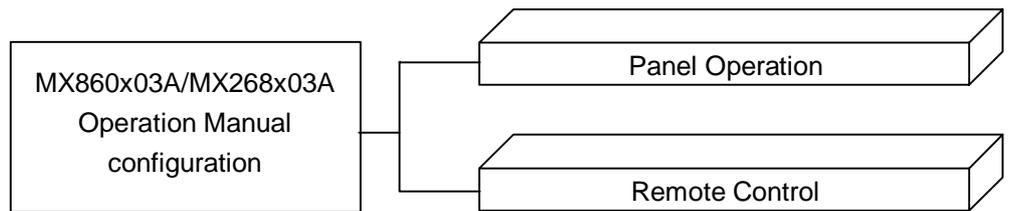
    Remote Control

    Panel Operation:
        Explains overview, panel description, operation and performance test of the MX860x03A/MX268x03A.

    Remote Control:
        Explains remote control of the MX860x03A/MX268x03A via RS-232C/GPIB interface.

II.

MX860803A/MX860903A/
MX268103A/MX268303A/MX268703A
cdma Measurement Software
(For MS8608A/MS8609A/
MS2681A/MS2683A/MS2687A/B)
Operation Manual
(Panel Operation)

Table of Contents

Section 1   General

This Section describes the overview and product configuration of this software.

Overview

The MS8608A/MS8609A Digital Mobile Radio Transmitter Tester and the MS2681A/MS2683A/MS2687A/B Spectrum Analyzer (hereinafter, collectively referred to as "this measurement unit") are unit that allows speedy, accurate and easy measurement of the transmitter characteristics of base/mobile stations for various mobile communications. In addition to the RF/IF signal evaluation function, this measurement unit has an IQ (base band) signal analysis function for evaluation of devices. With measurement software installed, this measurement unit provides a modulation analysis function corresponding to various digital modulation modes. It also employs high-speed digital signal processing technology, enabling fast and accurate measurement.

The MS2681A/MS2683A/MS2687A/B Spectrum Analyzer (hereinafter, referred to as "spectrum analyzer") is a unit that allows speedy, accurate and easy measurement of the transmitter characteristics of base/mobile stations for various mobile communications. In addition to the RF/IF signal evaluation function, it has an IQ (base band) signal analysis function to evaluate devices. With measurement software installed, the Spectrum Analyzer provides a modulation analysis function that supports various digital modulation modes. In addition, employment of high-speed digital signal processing technology enables fast and accurate measurement.

With the MX860803A/MX860903A/MX268103A/MX268303A/MX268703A cdma2000 measurement software (hereinafter, referred to as "cdma software") installed, this measurement unit becomes universal measurement equipment that allows easy measurement of the functions and performance of radio units for a digital mobile phone regulated by IS-95 and IS-2000 Standards.

The measurement unit with the cdma software installed provides the following major measurement functions:

- Modulation accuracy analysis and carrier frequency measurement
- Code domain analysis
- Transmission power measurement
- Occupied bandwidth measurement
- Nearby spurious measurement
- Spurious measurement, etc.

Configuration

Combinations of this measurement unit and cdma software and product configurations are given below.

- For measurement unit MS8608A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	cdma measurement software	1	MX860803A	Supplied with ATA card
Accessory	Operation manual	1	W1865AE	

- For measurement unit MS8609A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	cdma measurement software	1	MX860903A	Supplied with ATA card
Accessory	Operation manual	1	W1865AE	

- For measurement unit MS2681A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	cdma measurement software	1	MX268103A	Supplied with ATA card
Accessory	Operation manual	1	W1865AE	

- For measurement unit MS2683A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	cdma measurement software	1	MX268303A	Supplied with ATA card
Accessory	Operation manual	1	W1865AE	

- For measurement unit MS2687A/B

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	cdma measurement software	1	MX268703A	Supplied with ATA card
Accessory	Operation manual	1	W1865AE	

Specifications

MX860803A cdma measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX860803A cdma measurement software (MS8608A)	
Purpose	To measure transmission characteristics of cdma-type mobile radio units	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS8608A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−20 to +40 dBm (average power during burst): High-power input −40 to +20 dBm (average power during burst): Low-power input −60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input: level ≥−10 dBm (high-power input), ≥−30 dBm (low-power input), ≥−40 dBm (low-power input, with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0%(rms) when input: level ≥−10 dBm (high-power input), ≥−30 dBm (low-power input), ≥−40 dBm (low-power input, with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.5 dB when input: level ≥−10 dBm (high-power input), ≥−30 dBm (low-power input), ≥−40 dBm (low-power input, with preamplifier On*1), using only code channel 1 CH, for signal with origin offset −30 dBc	

Waveform display	For single- to multi-channel input signals, displays the following items:
	
	    Constellation
	    Eye diagram
	    Vector error vs. chip number
	    Phase error vs. chip number
	    Amplitude error vs. chip number	

*1: The preamplifier can be set On when main unit option MS8608A-08 is installed.

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−20 to +40 dBm (average power during burst): High-power input**	
	−40 to +20 dBm (average power during burst): Low-power input	
	−60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Code domain power accuracy	**±0.1 dB (code power ≥−10 dBc) or ±0.3 dB (code power ≥−25 dBc) when input level: ≥+10 dBm (high-power input), ≥−10 dBm (low-power input), ≥−20 dBm (low-power input, with preamplifier On*1)**	
Display function	Display code domain power, code domain timing offset, and code domain phase offset values	
	Available spread ratios:	
	2 to 32 (reverse link < radio configuration 3 and 4 >)	
	64 (forward link < radio configuration 1 and 2 >)	
	4 to 128 (forward link < radio configuration 3 to 5 >)	
	Spread ratio automatic detection function provided, IQ separated display for reverse link (radio configuration 3 and 4)	
Amplitude measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−20 to +40 dBm (average power during burst): High-power input**	
	−40 to +20 dBm (average power during burst): Low-power input	
	−60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Transmission power measurement	**After level calibration using built-in power meter (automatically calibrated by pressing a key)**	
Measurement range	**0 to +40 dBm (average power during burst): High-power input**	
	−20 to +20 dBm (average power during burst): Low-power input	
	−20 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Accuracy	**±0.4 dB**	
Power measurement linearity	**±0.20 dB (0 to −40 dB) when input level (average power during burst): ≥+10 dBm (high-power input), ≥-10 dBm (low-power input), ≥−20 dBm (low-power input, with preamplifier On*1), without changing the reference level settings after range optimization**	
Burst signal analysis	**Rise/fall characteristics and On/Off-ratio analysis function provided**	

*1: The preamplifier can be set On when main unit option MS8608A-08 is installed.

Item	Specifications	Remarks
Occupied frequency bandwidth measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−20 to +40 dBm (average power during burst): High-power input**	
	−40 to +20 dBm (average power during burst): Low-power input	
	−60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Measurement method		
Sweeping method	**Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.**	
FFT method	**Analyzes the signal with FFT and displays the calculated result.**	
Nearby spurious measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Input level range	**+10 to +40 dBm (average power during burst): High-power input**	
	−10 to +20 dBm (average power during burst): Low-power input	
Measurement method	**Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer**	
Transmission power measurement		
Tx Power method	**Carrier power measured at 1.23 MHz bandwidth**	
SPA method	**Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz**	
Measurement range	**900 kHz detuning: ≥50 dBc**	
	1.98 MHz detuning: ≥60 dBc	
	When input level (average power during burst) ≥+20 dBm (high-power input), ≥0 dBm (low-power input), RBW: 30 kHz, VBW: 300 kHz, Detection: Positive	

*1:The preamplifier can be set On when main unit option MS8608A-08 is installed.

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 7.8 GHz, except carrier frequency ±50 MHz range	
Input level range (Transmission power)	+20 to +40 dBm (average power during burst): High-power input	
	0 to +20 dBm (average power during burst): Low-power input	
Measurement method		
Sweep method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode ids Average.	
Spot method	Measures at the specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detiction mode is Average.	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At CW carrier frequency 800 MHz to 1000 MHz or 1800 MHz to 2200 MHz, power ratio reference value is Tx power (except the spurious given in note below)	
	≥79 dB typical (RBW: 100 kHz) (10 to 1000 MHz, band 0)	
	In normal mode	
	≥76–f [GHz] dB typical (RBW: 1 MHz)	
	(1000 to 3150 MHz, band 0)	
	≥76 dB typical RBW: 1 MHz (3150 to 7800 MHz, band 1)	
Main unit option	**In spurious mode**	
With MS8608A-03 installed	≥76 dB typical RBW: 1 MHz (1600 to 7800 MHz, band 1)	
	Note:	
	When the carrier frequency is 2030.354 to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector)	
	Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector)	
	DC/AC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

MX860903A cdma measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX860903A cdma measurement software (MS8609A)	
Purpose	To measure transmission characteristics of cdma-type mobile radio unit	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS8609A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +20 dBm (average power during burst): With preamplifier Off −60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.5 dB when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset −30 dBc	

Waveform display	For single- to multi-channel input signals, displays the following items:
	
	    Constellation
	    Eye diagram
	    Vector error vs. chip number
	    Phase error vs. chip number
	    Amplitude error vs. chip number	

*1:The preamplifier can be set On when main unit option MS8609A-08 is installed.

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−40 to +20 dBm (average power during burst): With preamplifier Off**	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	**When input level: ≥−10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1)**	
	±0.1 dB (code power ≥−10 dBc)	
	±0.3 dB (code power ≥−25 dBc)	
Display function	**Display code domain power, code domain timing offset, and code domain phase offset values**	
	Available spread ratios:	
	2 to 32 (reverse link < radio configuration 3 and 4 >)	
	64 (forward link < radio configuration 1 and 2 >)	
	4 to 128 (forward link < radio configuration 3 to 5 >)	
	Spread ratio automatic detection function provided, IQ separated display for reverse link (radio configuration 3 and 4)	
Amplitude measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−40 to +20 dBm (average power during burst): With preamplifier Off**	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement	**After level calibration using built-in power meter (automatically calibrated by pressing a key)**	
Measurement range	**−20 to +20 dBm (average power during burst): With preamplifier Off**	
	−20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	**±0.4 dB**	
Power measurement linearity	**±0.2 dB (0 to −40 dB) when input level (average power during burst): ≥-10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization**	
Burst signal analysis	**Rise/fall characteristics and On/Off-ratio analysis function provided**	

*1:The preamplifier can be set On when main unit option MS8609A-08 is installed

Item	Specifications	Remarks
Occupied frequency bandwidth measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−40 to +20 dBm (average power during burst): With preamplifier Off**	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	**Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.**	
FFT method	**Analyzes the signal with FFT and displays the calculated result.**	
Nearby spurious measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Input level range	**−10 to +20 dBm (average power during burst): With preamplifier Off**	
Measurement method	**Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer**	
Transmission power measurement		
Tx Power method	**Carrier power measured at 1.23 MHz bandwidth**	
SPA method	**Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz**	
Measurement range	**900 kHz detuning: $\geq$ 50 dBc**	
	1.98 MHz detuning: $\geq$60 dBc	
	When input level (average power during burst) $\geq$0 dBm (preamplifier input), RBW: 30 kHz, VBW: 300 kHz, Detection: Positive	

*1:The preamplifier can be set On when main unit option MS8609A-08 is installed.

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 12.75 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +20 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. Detiction mode is Average.	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detiction mode is Average.	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detiction mode is Average.	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1000 MHz or 1800 to 2200 MHz, power-ratio reference value is Tx power (except the spurious given in note below)	
	≥79 dB typical (RBW: 100 kHz) (10 to 1000 MHz, band 0)	
	In normal mode	
	≥76–f [GHz] dB typical (RBW: 1 MHz)	
	(1000 to 3150MHz, band 0)	
	≥76 dB typical (RBW: 1 MHz) (3150 to 7800 MHz. Band 1)	
Main unit option MS8609A-03 installed	In spurious mode	
	≥76 dB typical (RBW: 1 MHz) (1600 to 7800 MHz, band 1)	
	Note:	
	When the carrier frequency is 2030.354 MHz to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector)	
	Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

MX268103A cdma measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268103A cdma measurement software (MS2681A)	
Purpose	To measure transmission characteristics of cdma-type mobile radio unit	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2681A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.5 dB when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset −30 dBc	

Waveform display	For single- to multi-channel input signals, displays the following items:
	    Constellation
	    Eye diagram
	    Vector error vs. chip number
	    Phase error vs. chip number
	    Amplitude error vs. chip number	

*1:The preamplifier can be set On when main unit option MS2681A-08 is installed.

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	When input level: ≥−10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1)	
	±0.1 dB (code power ≥−10 dBc)	
	±0.3dB (code power ≥−25 dBc)	
Display function	Displays code domain power, code domain timing offset, and code domain phase offset values	
	Available spread ratios:	

	2 to 32 (reverse link < radio configuration 3 and 4 >)
	    64 (forward link < radio configuration 1 and 2 >)
	    4 to 128 (forward link < radio configuration 3 to 5 >)
	    Spread ratio automatic detection function provided, IQ separated display for reverse link (radio configuration 3 and 4)	

Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement		
Measurement range	−20 to +30 dBm (average power during burst): With preamplifier Off	
	−20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	±2.0 dB typical	
Power measurement linearity	±0.2 dB (0 to −40 dB) when input level (average power during burst): ≥-10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization	
Burst signal analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

*1: The preamplifier can be set On when main unit option MS2681A-08 is installed.

Item	Specifications	Remarks
Occupied frequency bandwidth measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−40 to +30 dBm (average power during burst): With preamplifier Off**	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	**Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.**	
FFT method	**Analyzes the signal with FFT and displays the calculated result.**	
Nearby suuprious measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Input level range	**−10 to +30 dBm (average power during burst): With preamplifier Off**	
Measurement method	**Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer**	
Transmission power measurement		
Tx Power method	**Carrier power measured at 1.23 MHz bandwidth**	
SPA method	**Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz**	
Measurement range	**900 kHz detuning: ≥ 50 dBc**	
	1.98 MHz detuning: ≥60 dBc	
	When input level (average power during burst) ≥0 dBm, RBW: 30 kHz, VBW: 300 kHz, Detection: Positive	

*1:The preamplifier can be set On when main unit option MS2681A-08 is installed.

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 3.0 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1000 MHz or 1800 to 2200 MHz, power-ratio reference value is Tx power (except the spurious given in note below) $\geq$79 dB typical (RBW: 10 kHz)　　　(10 to 30 MHz) $\geq$79 dB typical (RBW: 100 kHz)　　(30 to 1000 MHz) $\geq$76–f [GHz] dB typical (RBW: 1 MHz)　(1000 to 3000 MHz) ***Note:*** 　　When the carrier frequency is 2030.354 MHz to 2200 MHz, spurious will occur at the following frequency: 　　f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
Electric performance (IQ input)	This function is available only when MS2681A-17 or 18 option is installed.	
Input method	When MS2681A-17 is installed: Either Balanced or Unbalanced	
	When MS2681A-18 is installed: Unbalanced	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector)	
	Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector)	
	AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

MX268303A cdma measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268303A cdma measurement software (MS2683A)	
Purpose	To measure transmission characteristics of coma-type mobile radio unit	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2683A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off −60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.5 dB when input level ≥−30 dBm (with preamplifier Off), ≥−40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset −30 dBc	

Waveform display	For single- to multi-channel input signals, displays the following items:
	    Constellation
	    Eye diagram
	    Vector error vs. chip number
	    Phase error vs. chip number
	    Amplitude error vs. chip number	

*1: The preamplifier can be set On when main unit option MS2683A-08 is installed.

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	When input level: ≥−10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1)	
	±0.1 dB (code power ≥−10 dBc)	
	±0.3 dB (code power ≥−25 dBc)	
Display function	Display code domain power, code domain timing offset, and code domain phase offset values	
	Available spread ratios:	
	2 to 32 (reverse link < radio configuration 3 and 4 >) 64 (forward link < radio configuration 1 and 2 >) 4 to 128 (forward link < radio configuration 3 to 5 >) Spread ratio automatic detection function provided, IQ separated display for reverse link (radio configuration 3 and 4)	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement		
Measurement range	−20 to +30 dBm (average power during burst): With preamplifier Off	
	−20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	±2.0 dB typical	
Power measurement linearity	±0.2 dB (0 to −40 dB) when input level (average power during burst): ≥-10 dBm (with preamplifier Off), ≥−20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization	
Burst signal analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

*1:The preamplifier can be set On when main unit option MS2683A-08 is installed.

Item	Specifications	Remarks
Occupied frequency bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	−40 to +30 dBm (average power during burst): With preamplifier Off	
	−60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Nearby supurious measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	−10 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	900 kHz detuning: ≥ 50 dBc	
	1.98 MHz detuning: ≥60 dBc	
	When input level (average power during burst) ≥0 dBm, RBW: 30 kHz, VBW: 300 kHz, Detection: Positive	

*1:The preamplifier can be set On when main unit option
MS2683A-08 is installed.

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 7.8 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	

Measurement range	At carrier frequency 800 to 1000 MHz or 1800 to 2200 MHz, power-ratio reference value is Tx power (except the spurious given in note below)
	  ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0)
	  ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0)
	In normal mode
	  ≥76–f [GHz] dB typical (RBW: 1 MHz)
	
	                               (1000 to 3150 MHz, band 0)
	  ≥76 dB typical (RBW: 1 MHz) (3150 to 7800 MHz, band 1)	

Main unit option MS2683A-03 installed	In spurious mode
	≥76 dB typical (RBW: 1 MHz) (1600 to 7800 MHz, band 1)
	
	Note:
	
	    When the carrier frequency is 2030.354 to 2200 MHz, spurious will occur at the following frequency:
	    f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
Electric performance (IQ input)	This function is available only when MS2683A-17 or 18 option is installed.	
Input method	When MS2683A-17 is installed: Either Balanced or Unbalanced	
	When MS2683A-18 is installed: Unbalanced	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector)	
	Common-mode voltage range: $\pm$2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: $\geq$0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

MX268703A cdma measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268703A cdma measurement software (MS2687A/B)	
Purpose	To measure transmission characteristics of coma-type mobile radio unit	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2687A/B level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	-30 to $+30$ dBm (average power during burst)	
Carrier frequency accuracy	$\pm$ (reference crystal oscillator accuracy $+10$ Hz) when input level ≥ -30 dBm, using code channel 1 CH	
Modulation accuracy		
Residual vector error	$<2.0\%$ (rms) when input level ≥ -30 dBm, using code channel 1 CH	
Origin offset accuracy	± 0.5 dB when input level ≥ -30 dBm, using only code channel 1 CH, for signal with origin offset -30 dBc	
Waveform display	For single- to multi-channel input signals, displays the following items: Constellation Eye diagrams Vector error vs. chip number Phase error vs. chip number Amplitude error vs. chip number	

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−30 to +30 dBm (average power during burst)**	
Code domain power accuracy	**When input level: ≥−10 dBm** **±0.1 dB (code power ≥−10 dBc)** **±0.3 dB (code power ≥−25 dBc)**	
Display function	**Display code domainpower, code domain timing offset, and code domain phase offset values** **Available spread ratios:** **2 to 32 (reverse link < radio configuration 3 and 4 >)** **64 (forward link < radio configuration 1 and 2 >)** **4 to 128 (forward link < radio configuration 3 to 5 >)** **Spread ratio automatic detection function provided, IQ separated display for reverse link (radio configuration 3 and 4)**	
Amplitude measurement		
Frequency range	**50 MHz to 2.3 GHz**	
Measurement level range	**−30 to +30 dBm (average power during burst)**	
Transmission power measurement		
Measurement range	**−20 to +30 dBm (average power during burst)**	
Accuracy	**±2.0 dB typical**	
Power measurement linearity	**±0.2 dB (0 to −40 dB) when input level (average power during burst): ≥-10 dBm, without changing the reference level settings after range optimization**	
Burst signal analysis	**Rise/fall characteristics and On/Off-ratio analysis function provided**	

Item	Specifications	Remarks
Occupied frequency bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	−30 to +30 dBm (average power during burst)	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Nearby spurious measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	−10 to +30 dBm (average power during burst)	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	900 kHz detuning: $\geq$ 50 dBc	
	1.98 MHz detuning: $\geq$60 dBc	
	When input level (average power during burst) $\geq$0 dBm, RBW: 30 kHz, VBW: 300 kHz, Detection: Positive	

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 12.75 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst)	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. Detection mode is Average.	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	

Measurement range	At carrier frequency 800 MHz to 1000 MHz or 1800 to 2200 MHz, power-ratio reference value is Tx power (except the spurious given in note below)
	 $\geq$79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0)
	 $\geq$79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0)
	 $\geq$76–f [GHz] dB typical (RBW: 1 MHz)
	                                 (1000 to 3150 MHz, band 0)
	 $\geq$76 dB typical (RBW: 1 MHz) (3150 to 7900 MHz, band 1)
	 With MS2687A
	 $\geq$68 dB typical (RBW: 1 MHz) (7900 to 127500 MHz, band 2)
	 With MS2687B
	 $\geq$74 dB typical (RBW: 1 MHz) (7900 to 127500 MHz, band 2)
	 Note:
	         When the carrier frequency is 2030.354 to 2200 MHz, spurious will occur at the following frequency:
	 f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
Electric performance (IQ input)	This function is available only when MS2687A/B-18 option is installed.	
Input method	Unbalanced	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Unbalance input	When MS2687A/B-18 is installed: 0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

Section 2   Panel Layout and Operation Overview

This section describes the front and rear panels, basic operations, how to install the measurement software, change the measurement system and set the screen colors.

List of Controls on Front and Rear Panels

List of Controls on Front and Rear Panels for MS860x

No.	Panel Marking	Description
1	(LCD)	6.5" color TFT liquid crystal display (LCD). Displays scales, trace waveforms, parameter settings, measurement values at marker points, soft-key menus, etc.
2	Spectrum	Key to set this measurement unit in the ordinary spectrum analyzer mode.
3	Tx Tester	Key to set this measurement unit in the transmitter tester mode for measurement software execution.
4	Config	The Key to set the interface to GPIB, printer, etc.
5	F1 to F6	Soft keys to select soft-key menus displayed by pressing a panel key.
		[More] Key to display the next soft-key menu page.
6	Freq/Ampl	Section to input data for the frequency and level parameters.
		[Freq/Channel] Sets the frequency.
		[Span] Sets the frequency span.
		[Amplitude] Sets the reference level, etc
		[->CF] Sets the peak-level signal frequency displayed on the screen as the center frequency.
		[->RLV] Sets the peak-level value displayed on the screen as the reference level.
7	Marker	Section to operate the marker function.
		[Marker] Sets a marker.
		[Multi Mkr] Sets multi-markers. Press this key after pressing the [Shift] key.
		[Peak Search] Moves the marker to the peak-level point on the screen.
		[Marker->] Sets a parameter using the marker value. Press this key after pressing the [Shift] key.
8	System	Key used in transmitter tester mode to switch the measurement system.
9	Single	Sets the sweep mode.
		[Single] Executes single sweep.
		[Continuous] Executes continuous sweep. Press this key after pressing the [Shift] key. The continuous mode is set by default.
10	Recall	Key to execute recall or save.
		[Recall] Reads measurement parameters and waveform data from internal memory or memory card.
		[Save] Saves measurement parameters and waveform data to internal memory or memory card.
11	Measure	Key to measure various items such as frequency, noise, adjacent channel leakage power, etc. depending on the applications.

No.	Panel Marking	Description
12	Hi Power	Key to set the input connectors. This key is not provided on MS8609A.
		[Hi Power] Enables High Power input connector.
		[Low Power] Enables Low Power input connector.
13	Display	Section to select the trace waveform. An ordinary frequency domain allows displaying of up to two trace waveforms.
		[A, B] Displays the trace-A or trace-B waveform of frequency domain.
		[A/B, A/BG] Displays two waveforms at a time; trace-A and trace-B waveforms, or trace-A and trace-BG (background frequency including trace A) waveforms.
		[Time] Switches to zero-span mode displaying the time-domain waveform.
		[A/Time] Displays trace-A and time-domain waveforms simultaneously.
14	Trig/Gate	Key to execute the trigger and gate functions.
		[Trig/Gate] Sets the sweep starting trigger and gate (controlling waveform data write timings) functions.
15	Coupled Function	Keys to set the RBW, VBW, sweep time and input attenuator.
16	Entry	Section to set numeric data, units and special functions.
		[Rotary knob] Used to move the marker and input data.
		[∨, ∧] Used to step up or down the input data.
		[Shift] Used to execute a panel function indicated with blue letters. First press this key, and then press the key indicated with blue letters.
		[BS] Backspace key to correct input errors.
		[0 to 9, +/–] Keys to enter numeric data.
		[GHz, MHz, kHz, Hz]
		Keys to set units of frequency, level, time, etc.
		[Set] Key to set parameters.
		[Cancel] Key to cancel an entry before setting with the [Set] key.
17	Preset	Key to reset measurement parameters to their default values.
18	Local	Key to place this unit from remote to local mode.
19	Disp On/Off	Key to set the LCD On/Off.
20	Copy	Key to output the screen hardcopy to the printer or memory card.
21	Stby/On	Power switch that is enabled when the Off/On power switch (58) on the rear panel is On. In Stby mode, pressing and holding this key approximately 1 second turns the power ON. In power On mode, pressing this key approximately 1 second turns the power Off.
22	RF Input	RF input connector.
23	I/Q Input	IQ input connectors (I/Q inputs for Unbalance and I, I/Q or Q input for Balance).

No.	Panel Marking	Description
24	Prove Power	Connector to supply ±12V for FET probe. The pin assignments are shown below.
25	Memory Card	Slot for a memory card that saves or loads the waveform data, measurement parameters, etc.
50	(Fan)	Cooling fan to ventilate the internal heat. Leave at least 10 cm clearance around the fan.
51	10 MHz STD	Input and output connectors for an external 10 MHz reference crystal oscillator. Inputting an external Ref In signal automatically switches the measurement unit from the internal to external signal mode. (When an external signal is input, the internal OCXO heater is switched OFF.)
52	IF OUT	IF output connector to output band-limited IF signals.
53	Wideband IF Out	IF output connector to output band-unlimited IF signals.
54	Sweep (X)	Connector for sweep output (X).
55	Video (Y)	Connector to output Y-axis signal in proportion to the video detection signal output. This signal is band-limited by the RBW set value and logarithmically compressed at log scaling.
56	Sweep Status (Z)	Connector to output sweep status (Z).
57	Trig/Gate In (±10 V)	
		Connector to input external trigger/gate signal.
58	Off/On	Power switch
59	(Inlet)	AC power inlet to connect the attached power cord. It contains a time-lag fuse.
60	(Ground terminal)	Protective ground terminal. To prevent electric shocks, connect this terminal to ground.
61	Parallel	Printer connector
62	VGA Out	VGA signal output connector
63	GPIB	GPIB interface connector for an external system controller
64	RS-232C	RS-232C connector for an external system controller.
65	Ethernet	Ethernet 10 Base-T connector for an external system controller.
66	Name plate	Indicates the serial number and options of this unit.

Fig. 2-1　MS8608A front panel

Fig. 2-2   MS8608A rear panel

List of Controls on Front and Rear Panels for MS268x

| No.	Panel Marking	Description
1	(LCD)	6.5" color TFT liquid crystal display (LCD). Displays scales, trace waveforms, parameter settings, measurement values at marker points, soft-key menus, etc.
2	Spectrum	Key to set this unit in the ordinary spectrum analyzer mode.
3	Signal Analysis	Key to set this measurement unit in the signal anaylsis mode for measurement software execution.
4	Config	Key to set the interface to GPIB, printer, etc.
5	F1 to F6	Soft keys to select soft-key menus displayed by pressing a panel key. [More] Key to display the next soft-key menu page.
6	Freq/Ampl	Section to input data for the frequency and level parameters. [Freq/Channel] Sets the frequency. [Span] Sets the frequency span. [Amplitude] Sets the reference level, etc [->CF] Sets the peak-level signal frequency displayed on the screen as the center frequency. [->RLV] Sets the peak-level value displayed on the screen as the reference level.
7	Marker	Section to operate the marker function. [Marker] Sets a marker. [Multi Mkr] Sets multi-markers. Press this key after pressing the [Shift] key. [Peak Search] Moves the marker to the peak-level point on the screen. [Marker->] Sets a parameter using the marker value. Press this key after pressing the [Shift] key.
8	System	Key used in transmitter tester mode to switch the measurement system.
9	Single	Sets the sweep mode. [Single] Executes single sweep. [Continuous] Executes continuous sweep. Press this key after pressing the [Shift] key. The continuous mode is set by deault..
10	Recall	Key to execute recall or save. [Recall] Reads measurement parameters and waveform data from internal memory or memory card. [Save] Saves measurement parameters and waveform data to internal memory or memory card.
11	Measure	Key to measure various items such as frequency, noise, adjacent channel leakage power, etc. depending on the applications.

No.	Panel Marking	Description
12	Display	Section to select the trace waveform. An ordinary frequency domain allows displaying of up to two trace waveforms.
		[A, B] Displays the trace-A or trace-B waveform of frequency domain.
		[A/B, A/BG] Displays two waveforms at a time; trace-A and trace-B waveforms, or trace-A and trace-BG (background frequency including trace A) waveforms.
		[Time] Switches to zero-span mode displaying the time-domain waveform.
		[A/Time] Displays trace-A and time-domain waveforms simultaneously.
13	Trig/Gate	Key to execute the trigger and gate functions.
		[Trig/Gate] Sets the sweep starting trigger and gate (controlling waveform data write timings) functions.
14	Coupled Function	Keys to set the RBW, VBW, sweep time and input attenuator.
15	Entry	Section to set numeric data, units and special functions.
		[Rotary knob] Used to move the marker and input data.
		[∨, ∧] Used to step up or down the input data.
		[Shift] Used to execute a panel function indicated with blue letters. First press this key, and then press the key indicated with blue letters.
		[BS] Backspace key to correct input errors.
		[0 to 9, +/–] Keys to enter numeric data.
		[GHz, MHz, kHz, Hz] Keys to set units of frequency, level, time, etc.
		[Set] Key to set parameters.
		[Cancel] Key to cancel an entry before setting with the [Set] key.
16	Preset	Key to reset measurement parameters to their default values.
17	Local	Key to place this unit from remote to local mode.
18	Disp On/Off	Key to set the LCD On/Off.
19	Copy	Key to output the screen hardcopy to the printer or memory card.
20	Stby/On	Power switch that is enabled when the Off/On power switch (58) on the rear panel is On. In Stby mode, pressing and holding this key approximately 1 second turns the power ON. In power On mode, pressing this key approximately 1 second turns the power Off.
21	RF Input	RF input connector.
22	I/Q Input	IQ input connectors (I/Q inputs for Unbalance and $I/\overline{I}$ and $Q/\overline{Q}$ input for Balance). These connectors are mounted when MS2681A/MS2683A-17 or 18, MS2687A/B-18 option is installed.

No.	Panel Marking	Description
23	Prove Power	Connector to supply ±12V for FET probe. The pin assignments are shown below.
24	Memory Card	Slot for a memory card that saves or loads the waveform data, measurement parameters, etc.
50	(Fan)	Cooling fan to ventilate the internal heat. Leave at least 10-cm clearance around the fan.
51	10 MHz STD	Input and output connectors for an external 10 MHz reference crystal oscillator. Inputting an external Ref In signal automatically switches the measurement unit from the internal to external signal mode. (When an external signal is input, the internal OCXO heater is switched OFF.)
52	IF OUT	IF output connector to output band-limited IF signals.
53	Wideband IF Out	IF output connector to output band-unlimited IF signals.
54	Sweep (X)	Connector for sweep output (X).
55	Video (Y)	Connector to output Y-axis signal in proportion to the video detection signal output. This signal is band-limited by the RBW set value and logarithmically compressed at log scaling.
56	Sweep Status (Z)	Connector to output sweep status (Z).
57	Trig/Gate In (±10 V)	Connector to input external trigger/gate signal.
58	Off/On	Power switch
59	(Inlet)	AC power inlet to connect the attached power cord. It contains a time-lag fuse.
60	(Ground terminal)	Protective ground terminal. To prevent electric shocks, connect this terminal to ground.
61	Parallel	Printer connector
62	VGA Out	VGA signal output connector
63	GPIB	GPIB interface connector for an external system controller
64	RS-232C	RS-232C connector for an external system controller.
65	Ethernet	Ethernet 10 Base-T connector for an external system controller.
66	Name plate	Indicates the serial number and options of this unit.

Fig. 2-3 MS2681A/MS2683A/MS2687A/B front panel
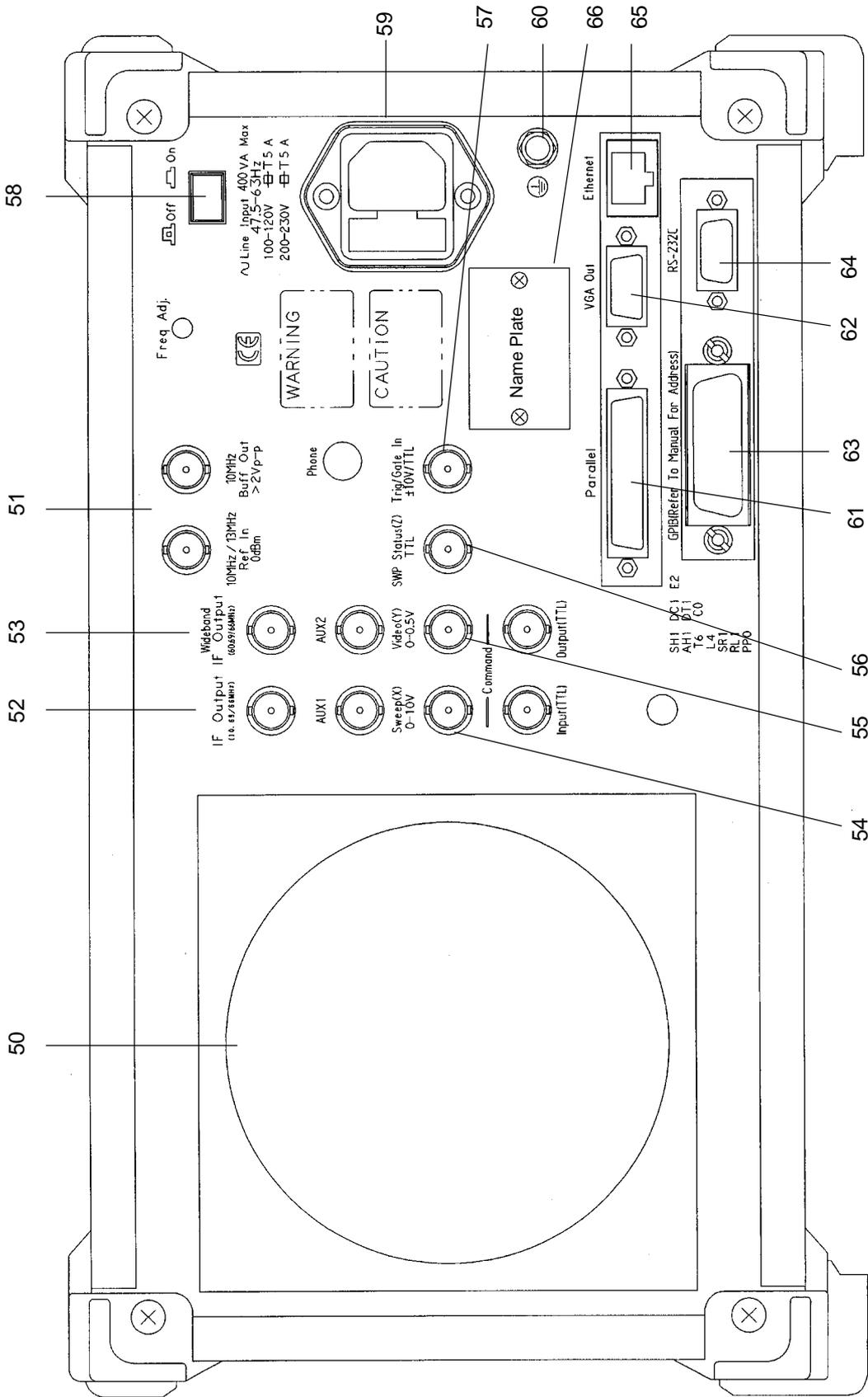
Fig. 2-4   MS2681A/MS2683A/MS2687A/B rear panel

Basic Operation

This section describes basic operations and typical parameter settings.

Turning the power ON

Press the Off/On switch on the rear panel and then press the Stby/On switch on the front panel for 1 second or more.

> To prevent the power from being turned On/Off by mistake, the power is turned On/Off only after pressing the Stby/On switch for 1 second or more.

To make full use of the performance of this unit, turn On the Off/On switch on the rear panel at least 30 minutes before using it (the "Stby" power LED on the front panel goes On). It pre-heats the internal reference frequency oscillator for stable unit operation.

Selecting items

Parameters for items indicated by the cursor can be changed.
Some parameters can be set after pressing the related function keys.

Setting an item indicated by the cursor
Move the cursor to the target item using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob in the Entry section.
Press $\boxed{\text{Set}}$ in the Entry section to confirm the item selected.
The parameter setup window opens.

Setting an item indicated by a function label
Press one of the F1 to F6 function keys and the parameter setup window opens.
Some parameters can be set just by pressing the function key.

Setting parameters

After selecting an item, the parameters can be set in two ways:

(1)   **Selecting a parameter from those listed in the window.**

(2)   **Entering a numeric value.**

Selecting a parameter from those listed in the window.
Using $\boxed{\wedge}$ and $\boxed{\vee}$ **or the rotary knob in the Entry section, move the cursor to the parameter to be selected.**
Press $\boxed{\text{Set}}$ **in the Entry section to confirm selection.**

Entering a numeric value
Using the ten-key pad or rotary knob, enter a numeric value.
Press the Unit key or $\boxed{\text{Set}}$ **key in the Entry section to confirm the parameter.**
The window closes.

Registering the Installation Key

To install new measurement software in this measurement unit, the installation key for the measurement system must be registered. This section explains how to register the installation key.

1. Insert the memory card containing the installation key into the memory card slot.

2. Press [Config] to display the Configuration screen.

3. Press [F2] (Maintenance Parameter) to display the Maintenance Parameter screen.

4. Press [F3] (Installation Permission) to display the Installation Permission screen shown below.
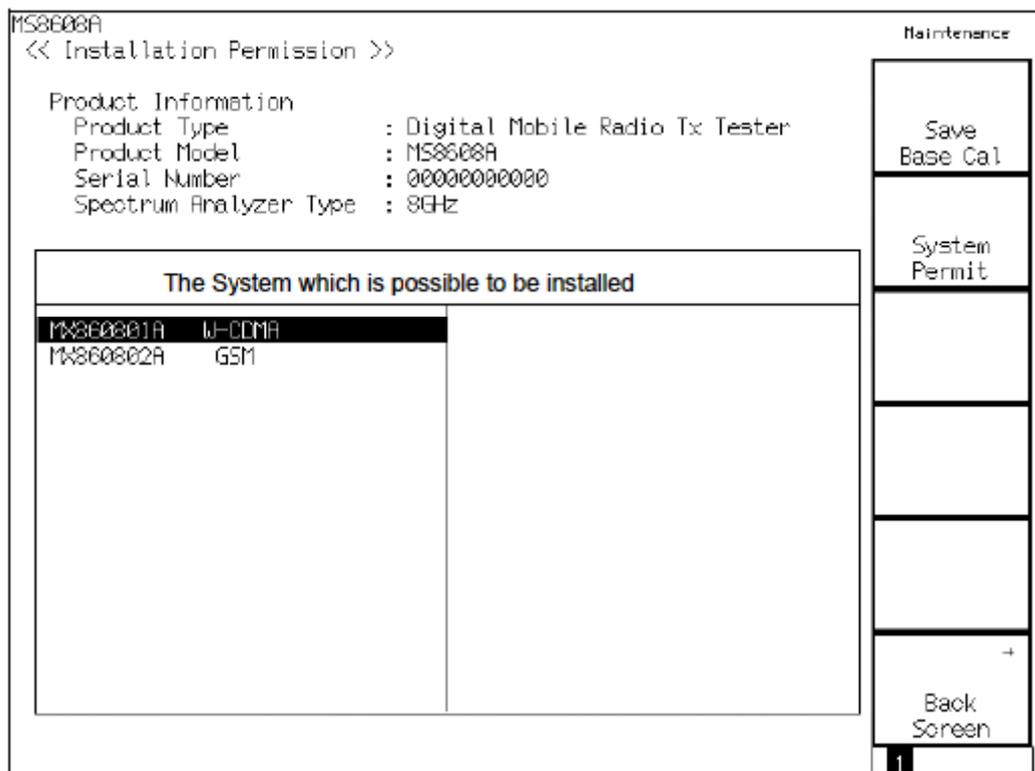
5. Press [F2] (System Permit).

6. The new measurement software is registered in the Permission table.

7. Press [F1] (Save Base Cal).

Note:

Performing Step 5 causes the installation key to be registered in the table, but it is not recorded in internal memory before performing Step 7.   The installation key becomes active only after it is recorded in internal memory.

Installing Core Module Software

This section describes how to install new Core Module software in this unit.

1. Insert the memory card containing the new Core Module software into the memory card slot.

2. Press ⎡Config⎤ to display the Configuration screen.

3. Press ⎡F4⎤ (System Install) to display the Install System screen shown below.

```
MS8608A                                              System install
<< Install System >>
                                                    ┌──────────────┐
   Product Information                              │              │
     Product Type        : Digital Mobile Radio Tx Tester  System
     Product Model       : MS8608A                 │   Install    │
     Serial Number       : 00000000000             ├──────────────┤
     Spectrum Analyzer Type  : 8GHz                │    Change    │
                                                    │   Installed  │
   ┌─────Install System─────┐  ┌─────Memory Card─────┐ System      │
   │ System       Revision  │  │ System       Revision│─────────────┤
   │                        │  │                      │   Change    │
   │MX860801A  W-CDMA  V 2.0 │  │MX860802A  GSM   V 1.0│   Memory    │
   │MX860802A  GSM     V 1.0 │  │MX860801A  W-CDMA V 2.0│   Card     │
   │MX860802A  GSM     V 1.0 │  │                      │─────────────┤
   └────────────────────────┘  │                      │            │
                                │                      │            │
   ┌──────Core Module──────┐    │                      │            │
   │ System       Revision  │   │                      ├─────────────┤
   │                        │   │                      │   Core     │
   │SPECTRUM ANALYZER   1.7  │   │                      │   Module    │
   │MAIN               1.7   │   │                      │   Install   │
   │IPL                1.3   │   │                      │─────────────┤
   │DSP(CORE)          1.7   │   │                      │          → │
   └────────────────────────┘   └──────────────────────┤   Back     │
                                                         │   Screen   │
   Step Up key : Previous Page  / Step Down key : Next Page  ───────┤
                                                         │  1         │
                                                         └────────────┘
```

4. Press ⎡F5⎤ (Core Module Install).

5. The confirmation window opens. Using the rotary knob, move the cursor to Yes.

6. Press ⎡Set⎤ in the Entry section to start installation.

7. After installation, turn the power OFF according to the message displayed.

8. Turn the power ON while pressing ⎡Preset⎤. Continue pressing ⎡Preset⎤ until beeping starts, that is, approximately 5 seconds

Installing Measurement Software

This section describes how to install the measurement software required to use this measurement unit in transmitter tester mode (MS860x) or signal analysis mode (MS268x).

1. Insert the memory card containing the measurement software to the memory card slot.

2. Press ⌐Config⌐ to display the Configuration screen.

3. Press ⌐F4⌐ (System Install) to display the Install System screen shown below.

```
MS8608A                                          System install
<< Install System >>
                                                ┌──────────────┐
   Product Information                          │              │
      Product Type        : Digital Mobile Radio Tx Tester  │   System    │
      Product Model       : MS8608A             │   Install    │
      Serial Number       : 00000000000         │              │
      Spectrum Analyzer Type  : 8GHz            ├──────────────┤
                                                │   Change     │
   ┌─────Install System─────┐  ┌─────Memory Card─────┐  │  Installed   │
   │ System        Revision │  │ System        Revision │  │   System    │
   │                        │  │                        │  ├──────────────┤
   │MX860801A  W-CDMA   V 2.0│  │MX860802A   GSM    V 1.0│  │   Change     │
   │MX860802A  GSM     V 1.0│  │MX860801A  W-CDMA  V 2.0│  │   Memory     │
   │MX860802A  GSM     V 1.0│  │                        │  │    Card      │
   └────────────────────────┘  │                        │  ├──────────────┤
                                │                        │  │              │
   ┌──────Core Module───────┐   │                        │  │              │
   │ System        Revision │   │                        │  ├──────────────┤
   │                        │   │                        │  │   Core       │
   │SPECTRUM ANALYZER   1.7  │   │                        │  │   Module     │
   │MAIN               1.7   │   │                        │  │   Install    │
   │IPL                1.3   │   │                        │  ├──────────────┤
   │DSP(CORE)          1.7   │   │                        │  │           →  │
   └────────────────────────┘   └────────────────────────┘  │   Back       │
                                                             │   Screen     │
   Step Up key : Previous Page  / Step Down key : Next Page  ├───────────┤1 │
                                                             └──────────────┘
```

4. Press ⌐F2⌐ (Change Installed System) to activate the Install System box.

5. Using the rotary knob, select the installation destination for the new measurement software.

6. Press ⌐F3⌐ (Change Memory Card) to activate the Memory Card box.

7. Using the rotary knob, select the new measurement system.

8. Press ⌐F1⌐ (System Install) to install the new system.

9. The confirmation window opens. Using the rotary knob, move the cursor to Yes.

10. Press ⌐Set⌐ in the Entry section to start installation.

Changing the Measurement System

When there are multiple measurement software systems (optional) registered to use this measurement unit in transmitter tester mode (MS860x) or signal analysis mode (MS268x), select the measurement system to be used in the procedure described in this section.

When there is only one measurement software registered, the procedure described in this section cannot be performed.

1. Press ⌷Tx Tester⌷ (MS860x) / ⌷ Signal Analysis ⌷ (MS268x) to display the measurement system screen.

2. Press ⌷ System ⌷ to display System Change function labels shown below.

```
MS8608A                                              System Change
<< Setup Common Parameter (W-CDMA) >>
                                                     ┌──────────┐
  Input                                              │ MX860803A│
    Terminal                   : [RF         ]       │   cdma   │
    Reference Level & Offset   : [  30.00dBm] [    0.00dB] │  V 1.0 │
  Frequency                                          └──────────┘
    Channel & Frequency        : [ 9600CH] = [ 1920.000000MHz]
    Channel Spacing            : [    0.200000MHz]  ┌──────────┐
  Signal                                            │ MX860802A│
    Measuring Object           : [Up Link  ]        │   GSM    │
    Filter                     : [Filtering]        │  V 1.0   │
                                                     └──────────┘
  Synchronization                                    ┌──────────┐
    Scrambling Code Sync. & Number : [Long ] = [000000] │ MX860802A│
    Spreading Factor           : [DPCCH] = (256)    │   GSM    │
    Channelization Codes Number    : (  0)          │  V 1.0   │
    Spreading Factor for DPDCH : [ 64]              └──────────┘
                                                     ┌──────────┐
                                                     │          │
                                                     └──────────┘
                                                     ┌──────────┐
  Trigger                      : [Free Run    ]      │          │
                                                     └──────────┘
                                                     ┌──────────┐
                                                     │  return  │
                Input  : High      Pre Ampl  : Off   │          │
  Ch  :        9600CH  Level  :   30.00dBm Power Cal : Off  │ 1│
  Freq : 1920.000000MHz Offset :    0.00dB Correction : Off
```

3. The installed measurement systems are listed at the function labels.

4. Press the function key to set the desired measurement system.

5. Changing of the measurement system is started.

6. When the measurement system is changed, a new system screen appears.

Measurement systems not listed at function labels cannot be selected. For procedures in installing a new measurement system, refer to "Installing Measurement Software

Setting Screen Colors

This section explains how to set screen colors.

Screen colors can be selected from the four predetermined color patterns or a user-defined one.

Pressing [Shift] + [3] (Color) causes the following function labels to appear.   Select the desired color pattern.

- [F1] (Color Pattern 1):   Sets Color Pattern 1 (default color pattern set before shipment).
- [F2] (Color Pattern 2):   Sets Color Pattern 2.
- [F3] (Color Pattern 3):   Sets Color Pattern 3.
- [F4] (Color Pattern 4):   Sets Color Pattern 4.
- [F5] (Define User Color):   Sets the user-defined color pattern.

Setting a user-defined color pattern

Pressing [F5] (Define User Color) changes the screen colors to the user-defined color pattern and displays the function labels shown below.

- [F1] (Copy Color Ptn from): Displays the function labels to select Color Patterns 1 to 4 as the base colors for setting the user-defined color pattern.
- [F2] (Select Item): Selects the item for which the display color is to be set.
- [F3] (Red): Sets the intensity of red for the item selected by Select Item.
- [F4] (Green): Sets the intensity of green for the item selected by Select Item.
- [F5] (Blue): Sets the intensity of blue for the item selected by Select Item.

Section 3   Measurement

This Section describes the parameters set on each screen and how to set them.

Setting Measurement Parameters

This section describes how to set measurement parameters such as input terminals and frequencies necessary for measurement.

Set the measurement parameters from the Setup Common Parameter screen.

To display this screen, press [Tx Tester](MS860x)/[Signal Analysis](MS268x)

(If a measurement screen has appeared, press [Preset].)

The Setup Common Parameter screen is shown below.

```
MS8608A                                                          Setup
<< Setup Common Parameter (cdma) >>                              Parameter

  Input
     Terminal                       : [RF          ]
     Reference Level & Offset       : [  30.00dBm]  [   0.00dB]
                                                                        →
  Frequency
     Channel & Frequency            : [ 1092CH] = [  887.650000MHz]    Modulation
     Channel Spacing                : [     1.250000MHz]               Analysis

  Signal                                                                →
     Measuring Object               : [Reverse(RC1-2)] [Burst     ]
     Filter                         : [Filtering]                       RF
                                                                        Power
  Trigger                           : [Free Run      ]
                                                                        →

                                                                     Occupied
                                                                     Bandwidth

                                                                        →
                                                                     Spurious
                                                                   close to the
                                                                     Carrier

                                                                        →
                    Input  : High         Pre Ampl   : Off         Spurious
  Ch  :         1092CH     Level  :   30.00dBm  Power Cal  : Off    Emission
  Freq :   887.650000MHz   Offset :    0.00dB   Correction : Off    1 2
```

Signal input terminals (Terminal)

Select the terminals for inputting signals from the device under test (DUT).

1. In the Entry section, move the cursor to the Terminal item using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob.

2. Press $\boxed{\text{Set}}$ in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob.

5. Press $\boxed{\text{Set}}$.

When setup is completed, the set terminal appears in the Terminal item [ ].
Available terminals are given below.

*   RF: Selects the RF input terminal.
    For MS8608A, High Power or Low Power input is selected. High Power or Low Power input can be switched as follows:
    Setting High Power input: Press $\boxed{\text{Hi Power}}$.
    Setting Low Power input: Press $\boxed{\text{Shift}}$ and then $\boxed{\text{Hi Power}}$ press .

*   IQ-DC: Selects the IQ input terminal.
    Of the IQ input terminals, the one grouped and marked as Unbalance is used.
    In this case, this terminal is connected to the internal circuit by DC coupling.

*   IQ-AC: Selects the IQ input terminal.
    Of the IQ input terminals, the one grouped and marked as Unbalance is used.
    In this case, this terminal is connected to the internal circuit by AC coupling.

*   IQ-Balance: Selects the IQ input terminal.
    I/$\overline{\text{I}}$ and Q/$\overline{\text{Q}}$ are used to input differential signals.

When IQ input is selected, the Impedance item is displayed on the right, allowing selection of 50 Ω or 1 MΩ as the input impedance. Select the appropriate impedance according to the DUT output impedance.

For MS268x, IQ-DC, IQ-AC and IQ-balance inputs are available only when option 17 or 18 is installed.

RF input level (Reference Level)

Set the RF signal level input from the DUT.

1.   In the Entry section, move the cursor to the Reference Level item using ⎡∧⎤ and ⎡∨⎤ or the rotary knob.

2.   Press ⎡Set⎤ or enter the level correction factor using the ten-key pad.

3.   The setup window opens.

4.   In the Entry section, enter a numeric value using ⎡∧⎤ and ⎡∨⎤, the rotary knob or ten-key pad.

5.   Press ⎡Set⎤.

When setup is completed, the set level appears in the Reference Level item [ ].

When the IQ input terminal has been selected, this item will not appear. This value is changed to the optimum value by using the Adjust Range function from the measurement screen.

Level offset factor (Level Offset)

Set the user-defined level correction factor.

1. In the Entry section, move the cursor to the Offset item using [∧] and [∨] or the rotary knob.

2. Press [Set] or enter the level correction factor using the ten-key pad.

3. The setup window opens.

4. In the Entry section, enter a numeric value using [∧] and [∨], the rotary knob or ten-key pad.

5. Press [Set].

When setup is completed, the set level correction factor appears in the Offset item [ ].

The displayed RF level measurement results are calculated using the following expression:

    Measurement value displayed = Measurement value + Offset

Example:

When a 20 dB amplifier is inserted between the DUT and this measurement unit, the correction factor for obtaining the measurement result at the DUT output terminal is –20 dB.

When a 10 dB attenuator is inserted between the DUT and this measurement unit, the correction factor for obtaining the measurement result at the DUT output terminal is +10 dB.

When the IQ input terminal has been selected, this item will not appear.

Channel and frequency (Channel & Frequency)

Set the frequency of the signal from the DUT.

1. In the Entry section, move the cursor to the Channel or Frequency item using ⌈ ∧ ⌋ and ⌈ ∨ ⌋ or the rotary knob.

2. Press ⌈ Set ⌋ or enter the desired numeric value using the ten-key pad.

3. The setup window opens.

4. In the Entry section, enter a numeric value using ⌈ ∧ ⌋ and ⌈ ∨ ⌋, the rotary knob or ten-key pad.

5. Press ⌈ Set ⌋.

When setup is completed, the set value appears in the set item [ ].
In the Channel Spacing item, set the frequency interval for the channel. The setup procedure is the same as that for frequency.

When the channel is changed, the frequency also changes depending on the frequency interval. But, note that changing the frequency does not cause the channel to be changed. Therefore, when associating a frequency to a channel, first set the channel and then set the frequency.

When the IQ input terminal has been selected, this item will not appear.

Measurement signals (Measuring Object)

Set the signal to e measured.

1. In the Entry section, move the cursor to the Measuring Object item using ⌐∧⌐ and ⌐∨⌐ or the rotary knob.
2. Press ⌐Set⌐ in the Entry section.
3. The setup window opens.
4. Move the cursor to the item to be selected using ⌐∧⌐ and ⌐∨⌐ or the rotary knob.
5. Press ⌐Set⌐.

When the setup is completed, the signal to be measured appears in the Measuring Object item [ ].
Available selections are given below.

- Forward (RC1-2): Selects spread signals transmitted by base stations based on IS-95 or IS-2000 Standard Radio configurations 1 and 2. Code-multiplexed signals can also be measured.
- Forward (RC3-5): Selects spread signals transmitted by base stations based on IS-2000 Standard Radio Configurations 3, 4 and 5. Code-multiplexed signals can also be measured.
- Reverse (RC1-2): Selects spread signals transmitted by base stations based on IS-95 or IS-2000 Standard Radio Configurations 1 and 2.
- Reverse (RC3-4): Selects spread signals transmitted by base stations based on IS-2000 Standard Radio Configurations 3, 4 and 5. Code-multiplexed signals can also be measured. Signals should be set so that long-code patterns are all 0's.
- QPSK: Selects 1.2288Mcps QPSK modulation signals. Code-multiplexed signals cannot be measured.
- OQPSK: Selects 1.2288Mcps OQPSK modulation signals. Code-multiplexed signals cannot be measured.

When Reverse, QPSK or OPQSK is selected, set Continuous or Burst depending on the measurement signal.

- To measure a burst wave, select Burst.
- To measure a continuous wave, select Continuous.

Filter (Filter)

Set whether or not to pass a signal from the DUT through the filter.

1.   In the Entry section, move the cursor to the Filter item using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob.

2.   Press $\boxed{Set}$ in the Entry section.

3.   The selection window opens.

4.   Move the cursor to the item to be selected using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob.

5.   Press $\boxed{Set}$.

When setup is completed, the set result appears in the Filter item [ ].

This setting is valid only for modulation analysis and code domain analysis.

The available selections are given below.

• Filter + EQ: Assumes and analyzes signals passed through the baseband and equalizing filters defined in IS-95 or IS-2000 Standard.
• Filtering: Assumes and analyzes signals passed through the baseband filter defined in IS-95 or IS-2000 Standard.
• No Filter: Analyzes the signal without filtering.

Trigger (Trigger)

Set the trigger mode.

Setting trigger mode

1. In the Entry section, move the cursor to the Trigger item using ⌃ and ⌄ or the rotary knob.

2. Press [Set] in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected, using ⌃ and ⌄ or the rotary knob.

5. Press [Set].

When setup is completed, the set trigger mode appears in the Trigger item [ ].

- **Free Run:** Measures the signal detected in the internal timing.
- **External:** Measures the first signal detected after receiving a trigger signal from Trig/Gate In on the rear panel.

When External is selected, the trigger signal edge and delay must be set.

Setting trigger edge

1. In the Entry section, move the cursor to the Trigger Edge item using ⌃ and ⌄ or the rotary knob.

2. Press [Set] in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected, using ⌃ and ⌄ or the rotary knob.

5. Press [Set].

When setup is completed, the set trigger mode appears in the Trigger Edge item [ ].

- **Rise: Synchronizing with the trigger signal (pulse signal) rising edge.**
- **Fall: Synchronizing with the trigger signal (pulse signal) falling edge.**

Setting trigger delay

1. In the Entry section move the cursor to the Trigger Delay item using ⌃ and ⌄ or the rotary knob.

2. Press [Set] in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected, using ⌃ and ⌄ or the rotary knob.

5. Press [Set].

When setup is completed, the set trigger delay value appears in the Trigger Delay item [ ].

PN synchronization (PN Synchronization)

Select the PN Synchronization mode to correlate all short-code patterns in the short-code synchronizing period or the Ext Trigger mode to correlate only in the short-code period for 384 chips around the trigger timing. When Ext Trigger is selected, the correct value must be set in the PN Offset (see "PN Offset (PN Offset)"), because only a specific short-code period is correlated to reduce the analyzing time.

This parameter appears only when the Measuring Object is neither QPSK nor OQPSK and Trigger is set to External.

1. In the Entry section, move the cursor to the PN Synchronization item using $\wedge$ and $\vee$ or the rotary knob.

2. Press Set in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected using $\wedge$ and $\vee$ or the rotary knob.

5. Press Set.

When setup is completed, the set result appears in the PN Synchronization item [ ].

PN Offset (PN Offset)

Input the PN Offset for the signal from the DUT to be measured in the N × 64 PN chips format.

This parameter appears only when the Measuring Object is neither QPSK nor OQPSK and Trigger is set to External.

1. In the Entry section, move the cursor to the PN Offset item using $\wedge$ and $\vee$ or the rotary knob.

2. Press Set in the Entry section.

3. The selection window opens.

4. Move the cursor to the item to be selected using $\wedge$ and $\vee$ or the rotary knob.

5. Press Set.

When setup is completed, the set result appears in the PN Offset item [ ].

Frequency characteristics correction data table (Correction)

When correcting frequency-dependent values such as the characteristics or losses of the cable connecting the DUT and transmitter tester, it may be convenient to save the correction factors to the transmitter tester internal memory, which can be added to the measurement values before they are displayed.

By using this function, the required measurement values can be displayed directly on the transmitter tester.

For the procedure to save the frequency characteristics correction factors in transmitter tester internal memory/spectrum analyzer, refer to "MS8608A/MS8609A Digital Mobile Radio Transmitter Tester Operation Manual, Vol. 2 (on Spectrum Analyzer Functions)" or "MS268x Spectrum Analyzer Operation Manual, Vol.2 (Detailed Operation Instruction)".

The transmitter tester/spectrum analyzer internal memory can store five correction factor tables.

The procedure to select the five correction factor tables stored internally is given below.

Selecting correction factor table

1. Press ⎡Amplitude⎤ to display the Amplitude function label.

2. Press ⎡F4⎤ (Correction) to open the correction factor table selection window.

3. In the Entry section, move the cursor to the correction factor table to be selected using ⎡∧⎤ and ⎡∨⎤ or the rotary knob.

4. Press ⎡Set⎤.

When setup is completed, the selected correction factor table appears in the Correction display area at the lower-right part of the screen.

Preamplifier (Pre Ampl.)

This function is available when the main unit option MS8608A-08/MS8609A-08/MS2681A-08/MS2683A-08 is installed.

Setting preamplifier

1. Press ⎡Amplitude⎤ to display the Amplitude function label.

2. Press ⎡F5⎤ (Pre Ampl.) to switch alternately between On and Off.

When setup is completed, On or Off appears in the Pre Ampl display area in the lower-right part of the screen.

Analyzing Modulation Accuracy and Code Domain

On the Setup Common Parameter screen, pressing F2 (Modulation Analysis) causes the modulation accuracy/code-domain analysis measurement screen to appear.

This section describes the measurement results displayed on the Modulation Analysis screen (modulation accuracy/code domain analysis), parameter settings and operation precautions.

Description of measurement results

This section describes the measurement results displayed on the Modulation Analysis screen (modulation accuracy/code domain analysis). To start measurement, press F5 (Adjust Range) to optimize the level settings inside the measurement unit. For range optimization (Adjust Range), see "Optimizing Measurement Range (Adjust Range)."

Modulation accuracy measurement results (when the measured signal is Forward (RC1-2, 3-5))
The screen given below appears when Non is selected for Trace Format. For Trace Format setting, see "Changing Waveform Display Format (Trace Format)."

```
MS8608A                                                    Modulation
<< Modulation Analysis (cdma) >>      Measure  : Single     Analysis
                                      Storage  : Normal              #
                                      Trace    : Non
   Frequency                                                     Trace
      Carrier Frequency      :      887.649 943 1 MHz          Format
      Carrier Frequency Error :          -56.9 Hz      -0.064 ppm
                                                                     *
   Waveform Quality
      ρ multi-code           :       0.99948                   Storage
                                                                Mode

   Modulation                                                       *
      RMS & Peak EVM         :       1.70 % (rms)       4.49 %   Scale
      Phase Error            :       0.69 deg. (rms)            Mode
      Magnitude Error        :       1.19 % (rms)
      Origin Offset(CFT)     :      -36.38 dB                       *

   Code Domain               Total      Average       Max      Analysis
      Active CH (  9CH)      :   0.00 dB   -9.54 dB   -6.97 dB   Mode

      Inactive CH           : -33.41 dB  -53.90 dB  -50.71 dB
                                                                Adjust
                                                                Range
      Tx Power & Pilot.Sync CH:  1.40 dBm  -6.97 dB  -13.30 dB
   Measured PNchip :   640/  640 PNchip                             →
   Analy Start:   OPNchip  Analy Length:  640PNchip
                      Input  : Low       Pre Ampl  : Off        Back
   Ch   :        1092CH  Level  :   -8.00dBm  Power Cal : Off   Screen
   Freq :   887.650000MHz  Offset :    0.00dB  Correction : Off  1 2 3
```

Frequency

(1) **Carrier Frequency**

Shows the measured signal frequency derived by the phase locus method in MHz.

(2) **Carrier Frequency Error**

Shows errors in the above carrier frequency against the set frequency in Hz and ppm units.

Waveform Quality

(1) ρ **multi-code (Waveform Quality Factor)**

Shows the measured signal waveform quality factor for all active channels. The waveform quality factor is obtained based on the definitions in the IS-95 (cdmaOne) Standard.

(2) τ **(Timing Error)**

Shows the difference between the short-code starting timing and external trigger (including trigger delay) in 64PN Chips and its fraction in μsec. When Even Second Timing Trigger is input to the external trigger, the measurement results for Pilot Time Tolerance are shown. The measurement resolution is 32 nsec. This measurement is available only when the Measuring Object is set to Forward or Reverse on the Setup Common Parameter screen and Trigger is set as External.

Modulation

(1) **RMS EVM**

Shows the root mean square (RMS) value for the vector error (Error Vector Magnitude in %) at the measured signal chip judgment point.

(2) **Peak EVM**

Shows the maximum vector error value (in %) at the measured signal chip judgment point.

(3) **Phase Error**

Shows the RMS value for phase error (in degree) at the measured signal chip judgment point.

(4) **Magnitude Error**

Shows the RMS value for amplitude error (in %) at the measured signal chip judgment point.

(5) **Origin Offset (CFT: Carrier Feed Through)**

Shows the measured signal origin offset (carrier leakage component) in dB.

Code Domain

(1) **Active Channel**

Shows the number of active channels, and their total, average and maximum values in dB.

(2)   Inactive Channel
Show the number of inactive channels, and their total, average and maximum values in dB.

(3)   Tx Power &Pilot, Sync Channel
Shows the Tx Power and the code domain power of the pilot and Sync channels in dB. For Tx Power, the measured signal average power for one slot, band limited at 1.23 MHz is shown, which is the same as the value shown on the RF Power screen.

Modulation accuracy measurement results (when the measured signal is Reverse (RC 3-4))

The screen shown below appears when Non is selected for Trace Format. For Trace Format setting, see "Changing Waveform Display Format (Trace Format)."

```
MS8608A                                                       Modulation
<< Modulation Analysis (cdma) >>      Measure  : Single       Analysis
                                      Storage  : Normal                 #
                                      Trace    : Non
 Frequency                                                    Trace
   Carrier Frequency        :     887.649 945 4 MHz           Format
   Carrier Frequency Error :            -54.6 Hz       -0.061 ppm        *

 Waveform Quality
   ρ multi-code                  :   0.99960                  Storage
                                                              Mode
                                                                        *

 Modulation
   RMS & Peak EVM           :     1.37 % (rms)        3.32 %   Scale
   Phase Error              :     0.55 deg. (rms)              Mode
   Magnitude Error          :     0.97 % (rms)                         *
   Origin Offset(CFT)       :    -36.72 dB

 Code Domain                    Total       Average       Max  Analysis
   Active CH   I( 3CH)     :   -1.61 dB     -6.38 dB   -5.36 dB  Mode
              Q( 2CH)     :   -5.09 dB     -8.10 dB   -5.36 dB
   Inactive CH I           :  -38.38 dB    -51.81 dB  -49.74 dB
              Q           :  -40.60 dB    -52.06 dB  -49.78 dB  Adjust
                                                              Range
   Tx Power & Pilot CH     :    1.39 dBm    -7.02 dB
                                                                        →
 Analy Start:    0PNchip  Analy Length:   640PNchip          Back
                         Input  : Low        Pre Ampl  : Off  Screen
 Ch   :         1092CH  Level  :   -8.00dBm Power Cal : Off
 Freq :   887.650000MHz Offset :    0.00dB  Correction : Off  1 2 3
```

Frequency
(1)   Carrier Frequency
Shows the measured signal frequency derived by the phase locus method in MHz.

(2)   Carrier Frequency Error
Shows errors in the above carrier frequency against the set frequency in Hz and ppm units.

Waveform Quality

(1) ρ multi-code (Waveform Quality Factor)

Shows the measured signal waveform quality factor for al   active channels. The waveform quality factor is obtained based on the definitions in the IS-95 (cdmaOne) Standard.

(2) τ (Time Error)

Shows the difference between the short-code starting timing and external trigger (including trigger delay) in 64PN Chips and its fraction in μsec. When Even Second Timing Trigger is input to the external trigger, the measurement results for Pilot Time Tolerance are shown. The measurement resolution is 32 nsec. This measurement is available only when the Measuring Object is set to Forward or Reverse on the Setup Common Parameter screen and Trigger is set as External.

Modulation

(1) RMS EVM

Shows the root mean square (RMS) value for the vector error (Error Vector Magnitude in %) at the measured signal chip judgment point.

(2) Peak EVM

Shows the maximum vector error value (in %) at the measured signal chip judgment point.

(3) Phase Error

Shows the RMS value for phase error (in degree) at the measured signal chip judgment point.

(4) Magnitude Error

Shows the RMS value for amplitude error (in %) at the measured signal chip judgment point.

(5) Origin Offset (CFT: Carrier Feed Through)

Shows the measured signal origin offset (carrier leakage component) in dB.

Code Domain

(1) Active Channel I, Q

Shows the total, average and maximum values of I- and Q-phase active channels in dB.

(2) Inactive Channel I, Q

Shows the total, average and maximum values of I- and Q-phase inactive channels in dB.

(3) Tx Power & Pilot Channel

Shows the Tx Power (measured signal average power in dBm for one slot, band limited at 1.23 MHz, which is the same as the value shown on the RF Power screen) and the pilot channel code domain power in dB.

The channel is judged to be active or inactive depending on the set threshold and code domain power. For the threshold for judgment, see "Changing Active Channel Threshold (Threshold)."

The described measurement results are obtained by analyzing for the range set in Analysis Mode. For Analysis Mode setting, see "Setting Analysis Range (Analysis Mode)."

Code domain measurement results (when the measured signal is Forward (RC1-2, RC3-5))

The screen given below appears when the signal to be measured (Measuring Object) is set to Forward (RC3-5) and Trace Format is set to Code Domain.
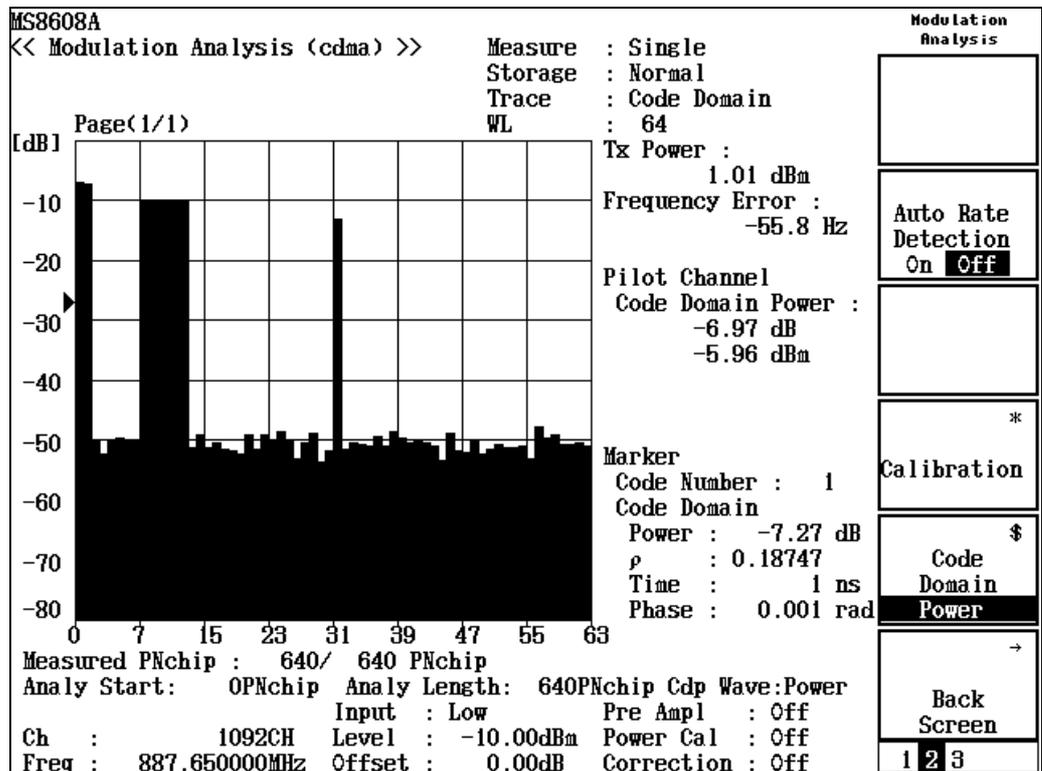
Code domain power waveform display:

> Shows the relative power of each code component to the total transmission power with code numbers on the abscissa and relative power on the ordinate. For details on operation, see "Changing Code Domain Result Display."

Tx Power

> Shows the measured signal average power in dBm for one slot, band limited at 1.23 MHz, which is the same as the value shown on the RF Power screen.

Frequency Error

>	Shows the measured signal frequency derived by the phase locus method in Hz, as an error to the set frequency.

Pilot Channel Code Domain Power

>	Shows the absolute and relative values of the pilot channel code domain power. The relative value is the same as Code Domain Power when the Code Number for Marker is 0. The pilot channel code domain power absolute value is the Tx power plus the relative value.

τ (Time Error)

>	Shows the difference between the short-code starting timing and the reference timing, similar to τ in the modulation accuracy measurement result.

Marker

(1)	Signal

>	Shows On if the marker on the code domain power waveform points to active channel code and Off if not. On (BPSK) is for the IS-95 signal format and On (QPSK) is for IS-2000 Radio Configuration 3, 4 or 5.

(2)	Walsh Length

>	Shows Walsh Length where the marker on the code domain power waveform pints to diffused code.

(3)	Code Number

>	Shows the number of the code pointed to by the marker on the code domain power waveform.

(4)	Code Domain Power

>	Shows the relative power value of the code pointed to by the marker on the code domain power waveform in dB.

(5)	Waveform Quality

>	Shows the waveform quality factor (ρ) of the code pointed to by the marker on the code domain power waveform. This value is obtained based on the definition in the IS-95 (cdmaOne) Standard.

(6)	Time Offset

>	Shows the time-axis offset for each code from the pilot channel (Code Number: 0).

(7)	Phase Offset

>	Shows the phase offset for each code from the pilot channel (Code Number: 0).

When Measuring Object is Forward (3-5) and Auto Rate Detection is On, Appears (1) signal and (2) Walsh Length.

Code domain measurement results (when the measured signal is Reverse (RC3-4))

The screen shown below appears when the measured signal (Measuring Object) is set to Reverse (RC3-4) and Trace Format is set to Code Domain.


```
MS8608A                                                        Modulation
<< Modulation Analysis (cdma) >>     Measure  : Single         Analysis
                                     Storage  : Normal                    #
                                     Trace    : Code Domain
[dB]                  [dB]                                      Trace
                                     Tx Power :                 Format
 -10                   -10                     1.33 dBm                   *
                                     Frequency Error :
                                               -55.5 Hz
 -20                   -20                                      Storage
                                     Pilot Channel             Mode
 -30                   -30             Code Domain Power :                *
                                               -7.02 dB
                                               -5.69 dBm
 -40                   -40                                      Scale
                                                              Mode
 -50                   -50           Marker I :    0                     *
                                       Signal   : On
 -60                   -60             Walsh Length :  32       Analysis
                                       Code Number  :   0      Mode
                                     Code Domain
 -70                   -70             Power :   -7.02 dB
                                       ρ     : 0.19883          Adjust
 -80                   -80                                      Range
    0          31         0          31
           I                    Q                                        →
Analy Start:    0PNchip  Analy Length:   640PNchip Cdp Wave:Power
                         Input  : Low        Pre Ampl   : Off  Back
Ch   :        1092CH     Level  :   -8.00dBm Power Cal  : Off  Screen
Freq :    887.650000MHz  Offset :    0.00dB  Correction : Off  1 2 3
```

Code domain power waveform display:

    As with Forward, shows the relative power of each code component to the total transmission power with code numbers on the abscissa and relative power on the ordinate. The right graph is for the Q-component measurement results and the left graph is for the I-component measurement results. The markers for the I- and Q-components can be handled independently of each other. For details on operation, see "Changing Code Domain Result Display."

Tx Power

    Shows the measured signal average power in dBm for one slot, band limited at 1.23 MHz, which is the same as the value shown on the RF Power screen.

Marker

(1) Signal

    Shows On if the marker on the code domain power waveform points to active channel code and Off if not.

(2) **Walsh Length**

Shows Walsh Length where the marker on the code domain power waveform points to diffused code.

(3) **Code Number**

Shows the number of the code pointed to by the marker on the code domain power waveform.

(4) **Code Domain Power**

Shows the relative power value of the code pointed to by the marker on the code domain power waveform in dB.

(5) **Waveform Quality**

Shows the waveform quality factor (ρ) of the code pointed to by the marker on the code domain power waveform. This value is obtained based on the definitions in the IS-95 (cdmaOne) Standard.

(6) **Time Offset**

Shows the time-axis offset for each code from the pilot channel (Code Number: 0).

(7) **Phase Offset**

Shows the phase offset for each code from the pilot channel (Code Number: 0).

Changing waveform display format (Trace Format)

This section describes how to change the waveform display format.

Selecting display format

1. Press $\boxed{\text{F1}}$ (Trace Format) on the Modulation Analysis screen.

2. The format selection window opens.

3. Using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob, move the cursor to the item to be selected.

4. Press $\boxed{\text{Set}}$.

When setup is completed, the displayed waveform changes and the selected format appears in the Trace display area in the upper-right part of the screen. Available formats are listed below.

- Non: Shows only numeric results.
- Constellation: Shows the constellation. (below)
- Eye Diagram: Shows the eye diagram. (below)
- EVM: Shows EVM vs. chips. (below)
- Phase Errors: Shows phase errors vs. chips. (below)
- Magnitude Error: Shows amplitude errors vs. chips.
- Code Domain: Shows code domain power or code domain error.
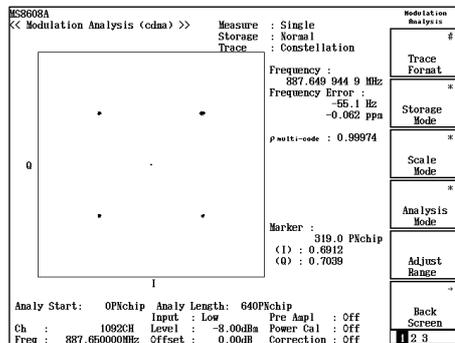
Constellation
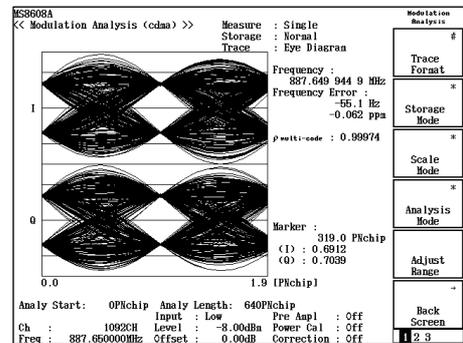
Eye Diagram
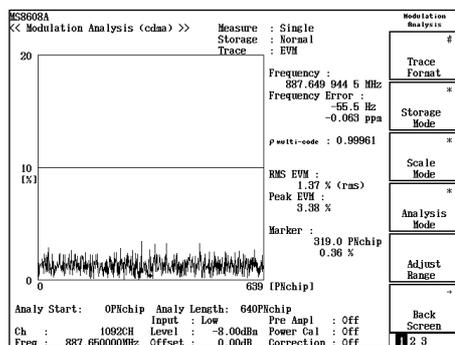
EVM
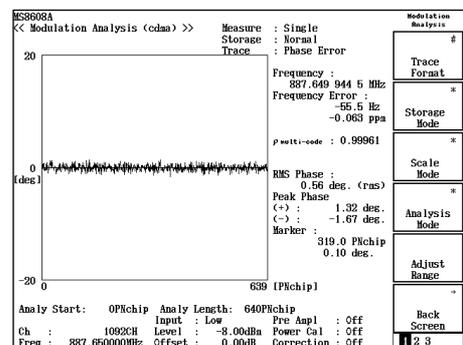
Phase Error

Setting analysis range (Analysis Mode)

Set the waveform analysis range.

Setting analysis starting position

1. On the Modulation Analysis screen, press ⎡F4⎤ (Analysis Mode) to display the Analysis Mode function label.

2. Press ⎡F1⎤.(Analysis Start) to open the setup window.

3. In the Entry section, enter the analysis starting position using ⎡∧⎤ and ⎡∨⎤ , the rotary knob or ten-key pad..

4. Press ⎡Set⎤.

The set value appears in the Anly Start area in the lower part of the screen.

Setting analysis length

3. On the Modulation Analysis screen, press ⎡F4⎤ (Analysis Mode) to display the Analysis Mode function label.

4. Press ⎡F2⎤.(Analysis Length) to open the setup window.

3. In the Entry section, enter the analysis length using ⎡∧⎤ and ⎡∨⎤ , the rotary knob or ten-key pad..

4. Press ⎡Set⎤.

The set value appears in the Anly Length area in the lower part of the screen.

In any case, completing the setup restarts the measurement. If the values are not changed or changing is canceled, the measurement is not restarted.

Averaging (Storage Mode)

This section describes the storage mode through the measurement result averaging process.

Setting averaging process

1. On the Modulation Analysis screen, press ⌐F2⌐ (Storage Mode) to display the Storage Mode function label.

2. Press ⌐F2⌐ (Average Count) to open the setup window.

3. In the Entry section, enter the averaging count using ⌐∧⌐ and ⌐∨⌐, the rotary knob or ten-key pad.

4. Press ⌐Set⌐.

5. On the Storage Mode menu, press ⌐F1⌐ (Storage Mode).

6. The selection window opens.

7. In the Entry section, select Average using ⌐∧⌐ and ⌐∨⌐ or the rotary knob.

8. Press ⌐Set⌐.

When setup is completed, measurement restarts.
Also when the averaging count is changed with Storage Mode set to Average, the measurement restarts upon completion of setup. If the values are not changed or changing is canceled, measurement is not restarted.

Refresh Interval: Set the interval to update the average display.

- Every: Updates the display at every measurement.
- Once: Updates the display after measurement of the specified averaging count is completed.

Available storage modes are listed below.

- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.
- Overwrite: Updates the measurement results and overwrites the waveform at every measurement without averaging. The waveform is not overwritten if the waveform displayformat is Non or Code Domain.

Changing constellation display (Scale Mode)

This section describes how to change the constellation waveform display.

Setting waveform interpolation display

1. **On the Modulation Analysis screen, press $\boxed{\text{F}}$ (Scale Mode) to display the Scale Mode function label.**

2. **Press (Interpolation) to display the function labels shown below, permitting selection of the interpolation type.**

    * $\boxed{\text{F1}}$ **(Non): Shows a chip point with a dot.**
    * $\boxed{\text{F2}}$ **(Linear): Shows a straight line between two adjacent chip points.**
    * $\boxed{\text{F3}}$ **(10 points): Interpolates between two chip points with nine dots (interpolating by ten times) and shows a straight line between two adjacent dots.**
    * $\boxed{\text{F4}}$ **(Linear & Symbol Position): Shows a chip point with a dot and a straight line between two adjacent chip points.**
    * $\boxed{\text{F5}}$ **(10 points & Symbol Position): Shows a chip point with a dot and interpolates between two adjacent chip points with a straght line by ten times.**
    * $\boxed{\text{F6}}$ **(return): Returns to the preceding function label display.**

    When Measuring Object is Forward(RC1-2) or Forward(RC3-5), $\boxed{\text{F3}}$ (10 points) and $\boxed{\text{F5}}$ (10 points & Symbol Position) are not available.
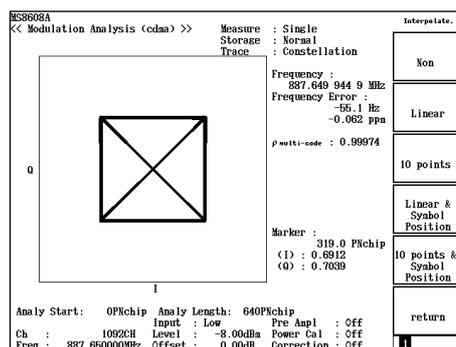
Linear display
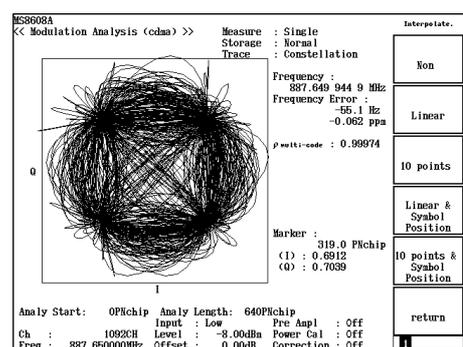
10-point display

Setting error scale display

1.   **On the Modulation Analysis screen, press $\boxed{\text{F3}}$ (Scale Mode) to display the Scale Mode function label.**

2.   **Press $\boxed{\text{F2}}$ (Error Scale) to display the function labels given below, permitting selection of the error scale.**

- $\boxed{\text{F1}}$ **(5%): Draws a circle with 5% error.**
- $\boxed{\text{F2}}$ **(10%): Draws a circle with 10% error.**
- $\boxed{\text{F3}}$ **(20%): Draws a circle with 20% error.**
- $\boxed{\text{F4}}$ **(OFF): Erases the error circle.**
- $\boxed{\text{F6}}$ **(return): Returns to the preceding function label display.**
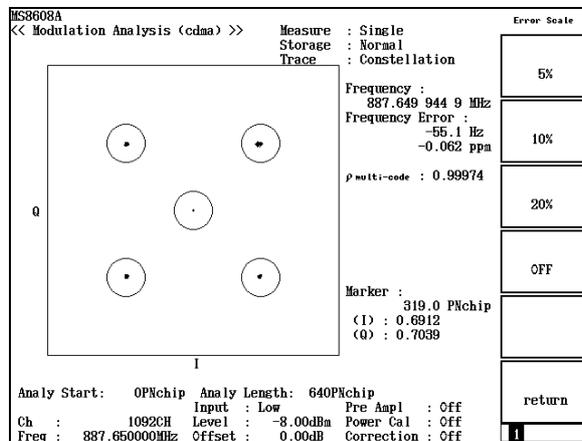
Displaying waveform in Nyquist diagram (Filter to Nyquist)

Setting error scale display

1.   **Press $\boxed{}$ (More) to display the second function label page.**

2.   **Press $\boxed{\text{F5}}$ (Filter to Nyquist) to switch alternately between On and Off.**

This function is available only when the Measuring Object is set to Reverse (RC1-2) or OQPSK.
No setting is allowed when Trace Format is other than Constellation and Eye Diagram.
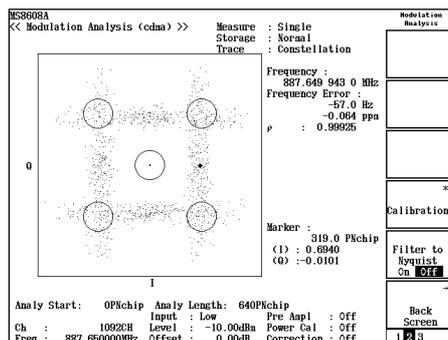
When Filter to Nyquist is Off
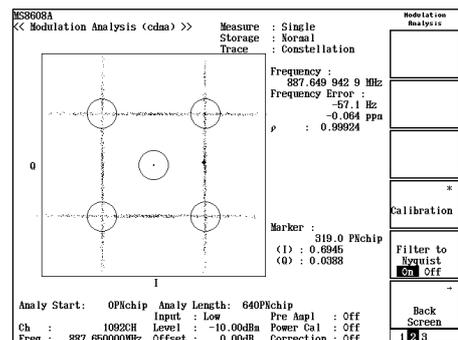
When Filter to Nyquist is On

Changing waveform display scale (Vertical Scale)

Change the ordinate scale for the waveform display. This function permits changing of the EVM error, phase error, amplitude error and code domain waveform ordinates.

1. On the Modulation Analysis screen, press $\boxed{\text{F3}}$ (Scale Mode) to display the Scale Mode function label.

2. Press $\boxed{\text{F4}}$ (Vertical Scale) to display the function labels shown below, permitting selection of the scale. For EVM error and amplitude error waveforms, the function labels given below are available.

    * $\boxed{\text{F1}}$ (5%): Sets the ordinate scale maximum value to 5%.
    * $\boxed{\text{F2}}$ (10%): Sets the ordinate scale maximum value to 10%.
    * $\boxed{\text{F3}}$ (20%): Sets the ordinate scale maximum value to 20%.
    * $\boxed{\text{F4}}$ (50%): Sets the ordinate scale maximum value to 50%.
    * $\boxed{\text{F5}}$ (100%): Sets the ordinate scale maximum value to 100%.
    * $\boxed{\text{F6}}$ (return): Returns to the preceding function label display.

For phase error, the function labels are the same except that the unit is degree.

On the Code Domain Power screen, the function labels above change to 20, 40, 60, and 80 dB.

On the Code Domain Timing screen, the function labels above change to 20, 40, 60, 801, and 100 nsec.

On the Code Domain Phase screen, the function labels above change to 0.02, 0.04, 0.06, 0.08, and 0.10 rad.

Changing active channel threshold (Threshold)

Change the threshold in order to recognize the active channel. Channels with numbers equal to or greater than the set thresholds are recognized as active channels. These are used for modulation accuracy and code domain analysis.

1. On the Modulation Analysis screen, press $\boxed{\text{F3}}$ (Scale Mode) to display the Scale Mode function label.

2. Press $\boxed{\text{F5}}$ (Threshold) to open the setup window.

3. In the Entry section, enter the threshold using $\boxed{\wedge}$ and $\boxed{\vee}$, the rotary knob or ten-key pad.

The set threshold is pointed to by the marker on the ordinate of the graph on the code domain power screen.

The threshold should be set based on:
   Walsh Length 64 when Measuring Object is Forward (RC1-2)
   Max Walsh Length set value when Measuring Objet is Forward (RC3-5)
   Walsh Length 32 when Measuring Object is Reverse (RC3-4)

The threshold is obtained through analysis at each Walsh Length.

Changing code domain result display

This section describes how to change the code domain result display.
The description is given assuming that Code Domain has been selected as the waveform display format. For the procedure to set the waveform display format, see "Changing Waveform Display Format (Trace Format)."

When Measuring Object is Reverse (RC3-4), two graphs (I- and Q-phases) are displayed. The items given below can be set individually for I- and Q-phase. Therefore, the procedure to select the graph that enables the settings is described first.

Selecting operation trace

1. Press ⬚ (More) to display the second or third function label page.

2. Press ⎣F1⎦ (Operation Trace) to activate the I- or Q-graph alternately.

This function is available only when the Measuring Object for Setup Common Parameter is set to Reverse (RC3-4).

Selecting code domain power timing phase

1. Press ⬚ (More) to display the second function label page.

2. Press ⎣F5⎦ (Code Domain) to switch as Power → Timing → Phase → Power. Set the desired display format.

When setup is completed, the set display format appears in the Cdp Wave area in the lower-right part of the screen.
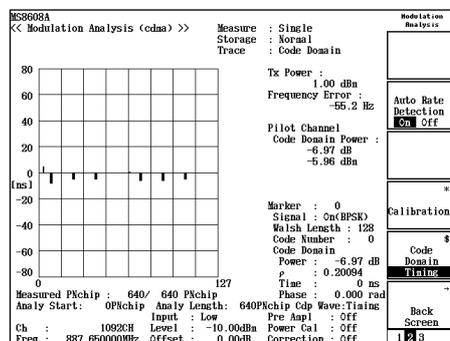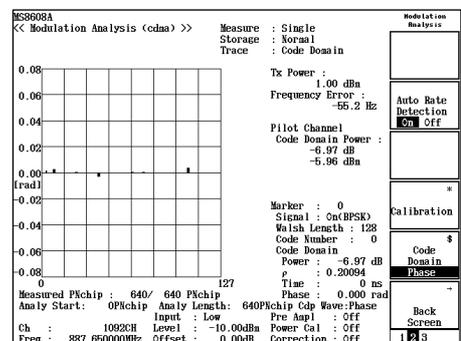
Code Domain Timing   **Code Domain Phase**

Selecting display spread rate

1.   **Press** ☐ **(More) to display the third function label page.**

2.   **Press** ⎡F4⎤ **(Walsh Length) to open the selection window.**

3.   **In the Entry section, select Walsh Length using** ⎡∧⎤ **and** ⎡∨⎤**, the rotary knob.**

When setup is completed, the set spread rate appears in the WL area in the upper right part of the graph.

This function is available only when the Measuring Object for Setup Common Parameter is set to Forward (RC3-5) and Auto Rate Detection is Off.

Selecting graph page

1.   **Press** ☐ **(More) to display the third function label page.**

4.   **Press** ⎡F2⎤ **(Previous Page) or** ⎡F3⎤ **(Next Page) to change the graph page.**

   •   **Previous Page: Displays the page with the previous code number. When this key is pressed at the first page, the last page appears.**

   •   **Next Page: Displays the page with the next code number. When this key is pressed at the last page, the first page appears.**

The number of the page currently displayed appears in the upper-left part of the graph in a function format.

This function is available only when the Measuring Object for Setup Common Parameter is set to Forward (RC3-5) and Auto Rate Detection is Off.

Spread rate automatic detection function (Auto Rate Detection)

This section describes the spread rate automatic detection function (Auto Rate Detection).

This function helps to immediately understand the code domain power measurement for a signal multiplexed in multi-rate; in addition, it enables accurate modulation analysis on multi-rate signals.

This function is available only when the Measuring Object is set to Forward (RC3-5) or Reverse (RC3-4).

The modulation accuracy is obtained by comparing the measured signal with an ideal signal generated by reverse-diffusing and demodulating the measured signal. Therefore, generating the ideal signal of a multi-rate multiplexed signal requires obtaining the rate of each multiplexing signal and then reverse-diffusing at the obtained rate and demodulating. The diffusion rate automatic detection function allows obtaining the rate of each multiplexing signal, assuring the appropriate modulation accuracy.

Execution spread rate automatic detection function

1. On the Modulation Analysis screen, press ☐ (More) to display the second function label page.

2. Press ⬚ F2 (Auto Rate detection) to switch alternately between On and Off.

```
MS8608A                                              Modulation
<< Modulation Analysis (cdma) >>   Measure  : Single    Analysis
                                   Storage  : Normal
                                   Trace    : Code Domain
[dB]
                                   Tx Power :
 -10                                      1.34 dBm
                                   Frequency Error :       Auto Rate
                                          -56.2 Hz         Detection
 -20                                                       On  Off
                                   Pilot Channel
 -30                                Code Domain Power :
                                          -6.97 dB         Display
                                          -5.63 dBm        Mode
 -40                                                       Walsh OVSF

 -50                               Marker  :     0                *
                                    Signal : On(BPSK)     Calibration
 -60                                Walsh Length : 128
                                    Code Number  :    0            $
 -70                                Code Domain               Code
                                     Power :    -6.97 dB      Domain
 -80                                 ρ     : 0.20100          Power
   0                        127      Time  :      0 ns            →
Measured PNchip :  640/ 640 PNchip   Phase :  0.000 rad
Analy Start:    OPNchip  Analy Length:  640PNchip Cdp Wave:Power  Back
                Input  : Low      Pre Ampl    : Off            Screen
Ch   :      1092CH  Level  :   -8.00dBm Power Cal   : Off
Freq :  887.650000MHz Offset :    0.00dB Correction  : Off     1 2 3
```

Measurement results of executing the spread rate automatic detection function

Code domain power waveform display:

> This graph shows the relative power of each code component to the total transmission power, with the abscissa representing the code number of the spread rate (128 or 64) set in Max Walsh Length and the ordinate representing the relative power. Areas assumed to have no signals are indicated with the spread rate code numbers set in Max Walsh Length and those assumed to have signals are indicated with the number of elements depending on the spread rate.

Changing the display mode (Display Mode)

This section describes the code domain power display mode.
This function permits the setting of the Walsh mode to display the multiplexed signal code domain power in Walsh series or the Orthogonal Variable Spreading Factor (OVSF) mode in orthogonal hierarchical series.
When Walsh is selected and Max Walsh Length is 128, a signal with spread rate 16 and code number 3 contains elements eight times those of a signal with spread rate 128, and, therefore, is represented with code numbers 3, 19, 35, 51, 67, 83, 99 and 115.
This function is available only when the Measuring Object is set to Forward (RC3-5) or Reverse (RC3-4)

Changing Display Mode

1. On the Modulation Analysis screen, press ☐ **(More) to display the second function label page.**

2. Press F3 **(Display Mode) to switch alternately between Walsh and OVSF.**

Changing maximum Walsh Length (Max Walsh Length)

This section describes how to change the maximum Walsh Length (Max Walsh Length).
The Analysis Start and Analysis Length resolutions of Analysis Mode vary depending on the Max Walsh Length. This function is available only when the Measuring Object is set to Forward (RC3-5).

Changing Max Walsh Length

1. On the Modulation Analysis screen, press ☐ **(More) to display the third function label page.**

2. Press F5 **(Max Walsh Length) to switch alternately between 128 and 64.**

Displaying the marker

When the waveform display format is other than Non, a marker can be displayed on the waveform.

Displaying marker

1.   Press ⌞Marker⌟ to display the Marker function label.

2.   Press ⌞F1⌟ (Marker) to switch alternately between Normal and Off.

When Normal is set, a diamond marker (♦) appears on the waveform.
For a code domain waveform, the color of the code pointed to by the marker changes.

Measuring timing errors

Measure the delay of the short-code (including Pilot PN Sequence Offset) starting position from the External Trigger (including Trigger Delay). The relationships among the parameters are as shown below.
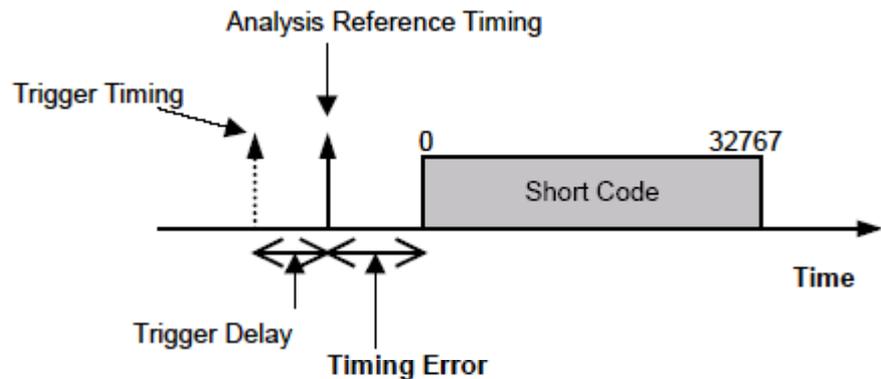
The analysis reference timing is the triggering timing with External Trigger plus the Trigger Delay. The short-code starting position is searched for by internal analysis and the difference between this position and the reference timing is represented in 64*N (chips) and the fraction is represented in time resolution (0.01 μsec).

When the short-code starting position contains the Pilot PN Sequence Offset, the relationships among the parameters are as shown below.
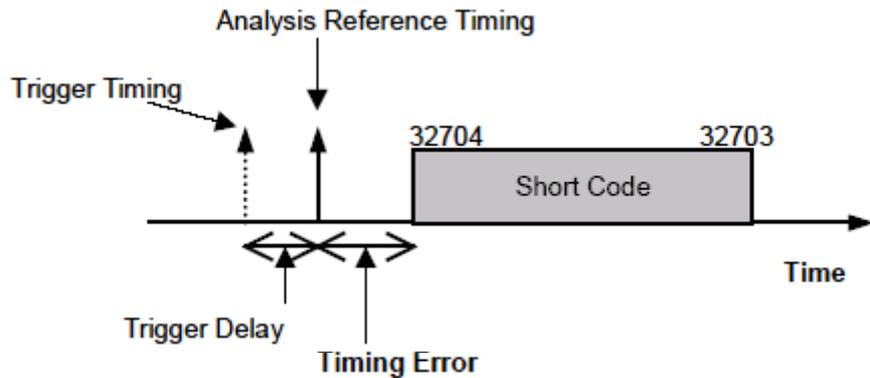
If Pilot PN Sequence Offset is 64 chips, the short-code starting position is shifted 64 chips; that is, it has a pattern starting at 32704, passing 0, and ending at 32703. In this case, for Pilot PN Sequence Offset of the transmitter tester, set Analysis Start to 64 chips. Thus, Timing Error is calculated assuming that Pilot PN Sequence Offset is 64 chips.

If PN Offset is unknown, set the PN Synchronization item for the Setup Common Parameter to PN Search. If PN Offset is known, set the above item to Ext Trigger to reduce the analysis time.

Defining modulation accuracy

This section describes definitions of modulation accuracy and code domain errors.

Modulation accuracy

The modulation accuracy indicates the errors that the digitally modulated measured signal have compared to the ideal signal. The measurement items are EVM, amplitude error, phase error, origin offset, etc., which are defined as described below.
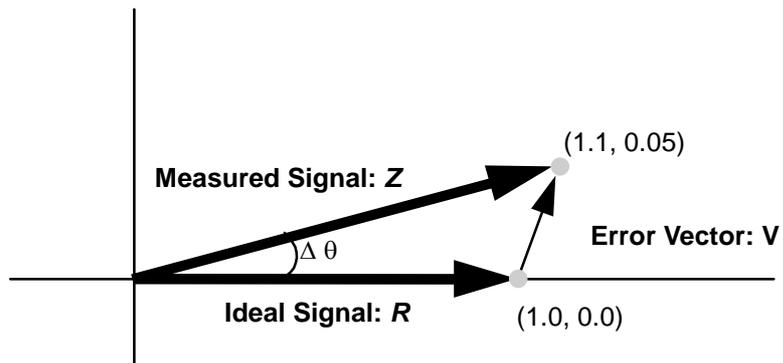
The modulation accuracy is described simply using the diagram above.

When the ideal signal is R(1.0, 0.0) and the measured signal is Z(1.1, 0.05), EVM, amplitude error, phase error and origin offset are represented by the following expressions:

EVM:

$$V = \frac{|Z - R|}{|R|} = \frac{\sqrt{(1.1 - 1.0)^2 + (0.05 - 0.0)^2}}{\sqrt{(1.0)^2 + (0.0)^2}} = 0.112 = 11.2\%$$

Amplitude error:

$$M = \frac{|Z| - |R|}{|R|} = \frac{\sqrt{(1.1)^2 + (0.05)^2} - \sqrt{(1.0)^2 + (0.0)^2}}{\sqrt{(1.0)^2 + (0.0)^2}} = 0.101 = 10.1\%$$

Phase error:
$$\Delta\theta = \theta - \theta_i = \tan^{-1}(0.05/1.1) - \tan^{-1}(0.0/1.0) = 2.60\,\text{deg}$$

These values are those for one point. The root mean square (RMS) value is obtained by calculating the square root of the average of the sum of squares for all point values.

The origin offset shows the carrier leakage component, with the amplitude represented in dB.

Waveform quality factor (ρ) and code domain power

The waveform quality factor represents the correlation between waveforms for the ideal and measured signals. The waveform quality factors obtained for all orthogonal codes and represented with codes on the abscissa and power ratio on the ordinate are referred to as the code domain power. For this unit, the code domain power is obtained based on the definitions in the IS-95 Standard (ARIBT53 Standard, cdmaOne). The definition expression is given below.

$$\rho_1 = \frac{\sum_j \left| \sum_k Z_{jk} R \right|^2}{\sum_k |R_{ijk}|^2 \sum_j \sum_k |Z_{jk}|^2}$$

Z_{jk} is data for the k'th chip for symbol j in the measured signal and R_{ijk} is data for the k'th chip for symbol j for code number i in the ideal signal.

A specific example of spread with four chips is given for description.   In this case, the cdmaOne Channel Codes are as follows:

Code number 0: –1, –1,   –1,   –1
Code number 1: –1,   1,   –1,   1
Code number 2: –1, –1,   1,   –1
Code number 3: –1,   1,   –1,   –1

When the measured signal contains only signals diffused with code number 1, the ideal signal is "–1, 1, –1, 1." If this signal is changed to "–1.05, 0.9, –0.99, 1.1" because of noise and other factors, the numerator and denominator of the signal reverse-diffused with code number 1 would be:

Numerator:

$$\{(-1.05)\times(-1)+(0.9\times1)+(-0.99\times1)+(1.1\times1)\}^2 = 16.3216$$

Denominator:

$$\{(-1)^2+(1)^2+(-1)^2+(1)^2\}\times\{(-1.05)^2+(0.9)^2+(0.9)^2+(1.1)^2\}=16.4104$$

Thus, the waveform quality factor is determined as 0.9946.

Optimizing measurement range (Adjust Range)

Performing measurement range optimization (Adjust Range) is recommended before starting measurement. While inputting signals of mostly the same level, it is not necessary to execute Adjust Range frequently.

Adjust Range automatically modifies the internal level diagram so that the internal AD converter for analysis can be used in the optimum conditions. That is, it adjusts the internal circuit so that the AD converter has the maximum dynamic range (S/N). At the same time, it also adjusts the power meter range.
Because the internal level diagram is modified depending on the measured signal level, the measured signal should be input during measurement range optimization. If the signal has a large fluctuation, Adjust Range may not correctly function.

Adjust Range is not available for IQ input.

Power calibration function (Power Calibration)

MS860x is equipped with the Power Calibration function using the internal power meter, which allows accurate level measurement. Executing the Power Calibration function is recommended for level measurement. When the temperature condition is stable, it is not necessary to execute the Power Calibration function frequently. If the frequency is significantly changed, it is better to restart Power Calibration.

The Power Calibration function compares the signal measurement value in tester mode with the value measured with the built-in power meter and calibrates the measurement value in tester mode using the power meter measurement value. Therefore, this function can only be executed with the measured signal being input. Before starting Power Calibration, the power meter must be zero-calibrated.

The power meter measurement range is 30 MHz to 3 GHz. For frequencies outside of this range, Power Calibration does not function correctly. This function is not available for IQ input.

For MS268x main body, the power meter is not provided, so this function cannot be used. At level measurement, perform the level calibration using Multi Carr. Power Calibration.

Power calibration function (Multi Carr. Power Calibration)

This function corrects an internal signal trace based on the internal calibration signal, enabling level measurement without using an internal power meter.

This function should be used when the input signal is Multi Carrie. Due to the difference between the measurement band of the tester mode and that of the power meter, calibration may not be performed properly when power calibration is performed using a power meter while the input signal is Multi Carrier. When the input signal is Single Carrier, perform power calibration using a power meter on account of high accurate calibration.

Measuring Transmission Power

On the Setup Common Parameter screen, pressing $\boxed{\text{F3}}$ (RF Power) causes the transmission power measurement screen to be displayed.

Here, the measurement results displayed on the RF Power screen (transmission power measurement), parameter settings and operation precautions are discussed.

Description of measurement results

This section describes the measurement results displayed on the RF Power screen (transmission power measurement).

When starting measurement, press $\boxed{\text{F5}}$ (Adjust Range) to optimize the measurement unit level setting. To raise the level measurement accuracy, press $\boxed{\text{F4}}$ (Calibration) on the second page and then press $\boxed{\text{F1}}$ (Power Calibration) or $\boxed{\text{F3}}$ (Multi Carr. Power Calibration).

See "Optimizing measurement range (Adjust Range)" for range optimization, and, see "Power calibration function (Power Calibration)" or "Power calibration function (Multi Carr. Power Calibration)" for power calibration.

Measurement results:

The screen below appears when measuring burst wave.
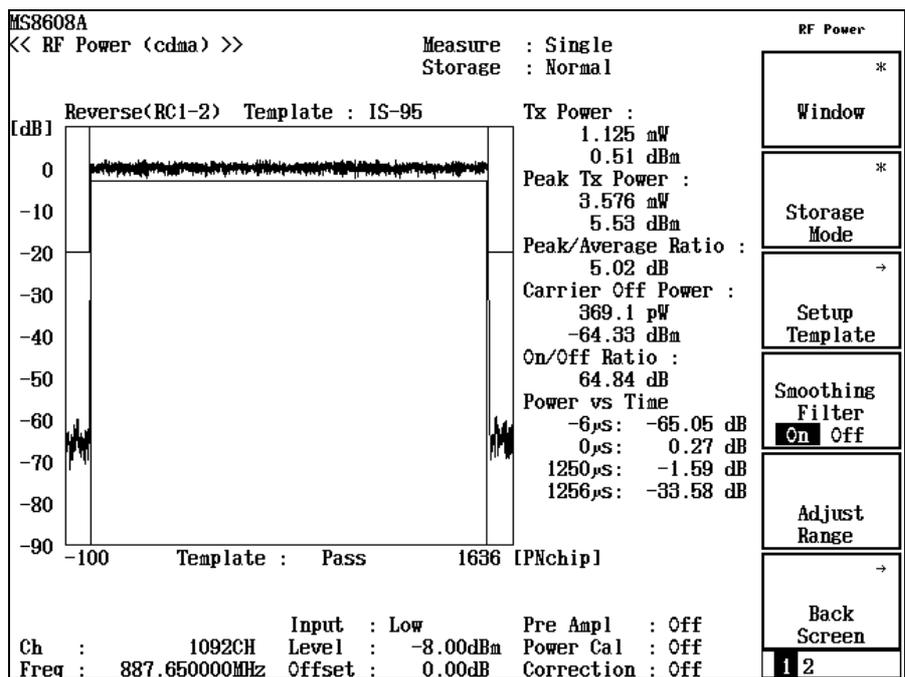
Waveform display:

The screen shows the level measurement waveform with the abscissa representing the time and the ordinate representing the level.

Press [F4] (Smoothing Filter) to alternately switch the waveform smoothing filter On or Off.

Press [F3] (Level Rel./Abs.) on the second function label page to switch the waveform display alternately between relative and absolute mode.

Tx Power

shows the measured signal average power for one slot, band-limited at 1.23MHz in dBm and W.

Peak Tx power

Shows the maximum value of the above Tx power in dBm and W.

Peak/Average Ratio

Shows the ratio of Peak Tx Power to Tx Power in dB.

Carrier Off Power

Shows the measured signal average power in the Off period in dBm and W.

On/Off Ratio

Shows the ratio of Tx Power to Carrier Off Power in dB.

Power vs Time

Shows the power at -6μ sec and 1256μ sec in dB or dBm.

Of the measurement results above, only Tx Power, Peak Tx Power and Peak/average Ratio are displayed when Measuring Object is Continuous.

Changing waveform display range (Window)

This section explains how to change the waveform window display range.

Setting display range

On the RF Power screen, press [F1] (Window) to display the function labels listed below and then select the desired range.

- [F1] (Slot): Shows the waveform for one slot.
- [F4] (Leading): Shows the waveform for the burst rising edge
- [F5] (Trailing): Shows the waveform for the burst trailing edge.
- [F6] (return): Returns to the preceding function label display.

Displaying the marker

When the waveform display is set On, a marker can be displayed on the waveform.

Procedure 1
1.   Press [Marker] to display the Marker function label.
2.   Press [F1] (Marker) to alternately switch between Normal and Off.

Procedure 2
1.   Press [   ] (More) to display the second function label page.
2.   Press [F2] (Marker) to alternately switch between Normal and Off.

When Normal is set, a diamond marker (♦) appears on the waveform.

Setting the trigger mode

Set trigger mode.

On the RF Power screen, press [F5] (Trigger Mode) to display the function labels listed below.

- [F1] (Code Sync): When On is selected, measures the power for one slot at the short-code synchronized timing. When Off is selected and continuous wave is to be measured, measures the power for one slo fetched at an arbitary timing. When Off is selected and burst wave is to be measured, measures thepower for one slot fetched at the timing synchronized with the waveform amplitude.
- [F2] (Video Trigger Edge): This function label is available when Measuring Object is set to Burst.
- [F3] (Video Trigger Level): This function label is available when Measuring Object is set to Burst.
- [F4] (Video Trigger Delay): This function label is available when Measuring Object is set to Burst.

Setting analysis starting position

When Code Sync is set to On in the trigger mode, analysis can be initiated at the position offset the set analysis position.

1. Press ☐ (More) to display the second function label page.
2. Press ⌈F1⌉ (Analysis Start) to open the setup window.
3. In the Entry section, enter the analysis starting position using ⌈∧⌉ and ⌈∨⌉, the rotary knob or ten-key pad.

Averaging (Storage Mode)

This section describes the storage mode through measurement result averaging.

Setting averaging process

1. On the RF Power screen, press ⌈F2⌉ (Storage Mode) to display the Storage Mode function label.
2. Press ⌈F2⌉ (Average Count) to open the setup window.
3. In the Entry section, enter the average count using ⌈∧⌉ and ⌈∨⌉, the rotary knob or ten-key pad.
4. Press ⌈Set⌉.
5. On the Storage Mode menu, press ⌈F1⌉ (Storage Mode).
6. The selection window opens.
7. In the Entry section, select Average using ⌈∧⌉ and ⌈∨⌉, the rotary knob.
8. Press ⌈Set⌉.

When setup is completed, measurement restarts.

Also when the averaging count is changed with Storage Mode set to Average, the measurement restarts upon completion of setup. If the values are not changed or changing is canceled, the measurement is not restarted.

Refresh Interval: Set the interval to update the average display.

- Every: Updates the display at every measurement.
- Once: Updates the display after measurement of the specified averaging count is completed.

Available storage modes are listed below.

- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.

- Overwrite: On the Continuous measurement, overwites and displays the waveform with a broken line.
- Cumulative: On the Continuous measurement, overwrites and displays the waveform with points.

Measuring Occupied Frequency Bandwidth

On the Setup Common Parameter screen, pressing [F4] (Occupied Bandwidth) causes the occupied bandwidth measurement screen to be displayed.

This section describes the measurement results displayed on the Occupied Bandwidth screen (occupied bandwidth measurement), parameter settings and operation precautions.

Description of measurement results

This section describes the measurement results displayed on the Occupied Bandwidth screen (occupied frequency bandwidth measurement).

When starting measurement, press [F5] (Adjust Range) to optimize the measurement unit level setting. For range optimization, see "Optimizing Measurement Range (Adjust Range)."

Measurement results:

The screen shown below appears when Spectrum is selected for Measure Method.
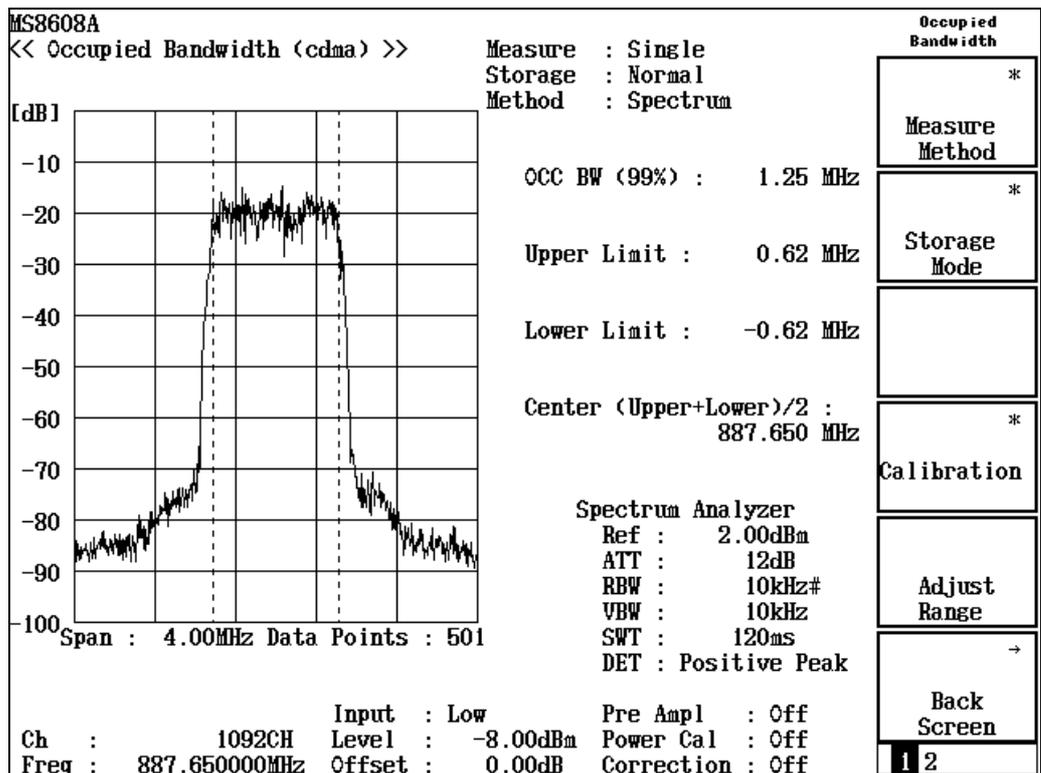
Waveform display:

The screen shows the spectrum waveform with the abscissa representing the frequency and the ordinate representing the level. When Method is set to Spectrum, measurement is carried out in spectrum analyzer mode and the waveform is displayed. The spectrum analyzer mode setting status appears in the lower-right area. When Method is set to FFT, the waveform obtained by FFT operation is displayed. When the input signal is IQ, Method cannot be set to Spectrum, permitting measurement only in FFT mode.

OCC BW (99%)

Shows the occupied frequency bandwidth of the signal measured in the 99% method in MHz.

The 99% method is the method to obtain the frequency bandwidth where 99% of the measured signal total power (by measurement) exists. It is calculated using Upper Limit and Lower Limit (noted below) with the following expression:

OCC BW = (Upper Limit) − (Lower Limit)

Upper Limit

Obtains the frequency that provides 0.5% the total power from the measured waveform upper limit and displays the difference between it and the center frequency (set frequency) in MHz.

Lower Limit

Obtains the frequency that provides 0.5% the total power from the measured waveform lower limit and displays the difference between it and the center frequency (set frequency) in MHz.

Center (Upper   Lower)/2

As the expression shows, this obtains the center frequency from the upper- and lower-limit frequencies and displays it in MHz.

Selecting result display

On the Occupied Bandwidth screen, press $\boxed{\text{F1}}$ (Measure Method) to display the function labels listed below and then select the result display.

- $\boxed{\text{F1}}$ (Spectrum): Measures in spectrum analyzer mode.
- $\boxed{\text{F2}}$ (FFT): Performs operation in FFT method.
- $\boxed{\text{F6}}$ (return): Returns to the preceding function label display.

Measurement time in the FFT method is shorter than that in the Spectrum method.

Setting SPA parameters by the Spectrum method

When Measure Method is set to Spectrum, the SPA sweep parameters listed below can be changed.

- ATT, Ref Level Mode Auto/Manual

  Auto: Sets the attenuator and reference levels to their optimum values inside the measurement unit, depending on the RF input level (Reference Level) for Setup Common Parameter.

  Manual: Permits manual setting of the attenuator and reference levels.

- Ref Level

  Set the reference level for SPA sweep.

- Attenuator

  Set the attenuator for SPA sweep.

- Attenuator Auto/Manual

  Auto   Automatically sets the attenuator for SPA sweep depending on the reference level.

  Manual Permits manual setting of the attenuator for SPA sweep.

- Span

  Set the sweep span for SPA sweep.

- RBW

  Set RBW for SPA sweep.

- VBW

  Set VBW for SPA sweep.

- VBW Auto/Manual

  Set VBW for SPA sweep automatically (Auto) or manually (Manual) depending on RBW.

- VBW/RBW Ratio

  Set VBW for VBW Auto using this parameter.

- Sweep Time

  Set the sweep time for SPA sweep.

- Sweep Time Auto/Manual

  Set the sweep time for SPA sweep automatically (Auto) or manually (Manual) depending on the related parameter.

- Detection

  Set the detection mode for SPA sweep.

- Data Points

  Set the data count for SPA sweep (501/1001).

- RBW Mode (available only when Opt04 is installed)

  Set RBW to digital or analog filter. When digital filter is selected, RMS detection is added to detection mode.

ATT, Ref Level mode, Setting 1

1.   **Press** Amplitude **or** Att.

2.   **Press** ☐ **(More) to display the third function label page.**

3.   **Press** F1 **(SPA ATT, Ref Level) to switch between Auto and Manual.**

When setup is completed, measurement restarts.

ATT, Ref Level mode, Setting 2

1.   **Press** ☐ **(More) to display the second function label page.**

2.   **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** F1 **(SPA ATT, Ref Level) to switch between Auto and Manual.**

When setup is completed, measurement restarts.

Ref Level, Setting 1

1.   **Press** Amplitude **or** Att.

2.   **Press** ☐ **(More) to display the third function label page.**

3.   **Press** F2 **(Ref Level (SPA)).**

4.   **The selection window opens.**

5.   **In the Entry section, enter a numeric value using** ∧ **and** ∨, **the rotary knob or ten-key pad.**

6.   **Press** Set.

When setup is completed, measurement restarts.

Ref Level, Setting 2

1.   **Press** ☐ **(More) to display the second function label page.**

2.   **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** F2 **(Ref Level (SPA)).**

4.   **The selection window opens.**

5.   **In the Entry section, enter a numeric value using** ∧ **and** ∨, **the rotary knob or ten-key pad.**

6.   **Press** Set.

When setup is completed, measurement restarts.

Attenuator, Setting 1

1. **Press** Amplitude **or** Att **.**

2. **Press** ☐ **(More) to display the third function label page.**

3. **Press** F3 **(Attenuator (SPA)).**

4. **The selection window opens.**

5. **In the Entry section, enter a numeric value using** ∧ **and** ∨ **, the rotary knob or ten-key pad.**

6. **Press** Set **.**

When setup is completed, measurement restarts.

Attenuator, Setting 2

1. **Press** ☐ **(More) to display the second function label page.**

2. **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3. **Press** F3 **(Attenuator (SPA)).**

4. **The selection window opens.**

5. **In the Entry section, enter a numeric value using** ∧ **and** ∨ **, the rotary knob or ten-key pad.**

6. **Press** Set **.**

When setup is completed, measurement restarts.

Attenuator mode, Setting 1

1. **Press** Amplitude **or** Att **.**

2. **Press** ☐ **(More) to display the third function label page.**

3. **Press** F4 **(Attenuator) to switch between Auto and Manual.**

When setup is completed, measurement restarts.

Attenuator mode, Setting 2

1. **Press** ☐ **(More) to display the second function label page.**

2. **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3. **Press** F4 **(Attenuator) to alternately switch between Auto and Manual.**

When setup is completed, measurement restarts.

Span, Setting 1

1.   **Press** $\boxed{\text{Span}}$ **.**

2.   **The selection window opens.**

3.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$ **, the rotary knob or ten-key pad.**

4.   **Press** $\boxed{\text{Set}}$ **.**

When setup is completed, measurement restarts.

Span, Setting 2

1.   **Press** $\boxed{}$ **(More) to display the second function label page.**

2.   **Press** $\boxed{\text{F1}}$ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** $\boxed{}$ **(More) to display the third function label page.**

4.   **Press** $\boxed{\text{F3}}$ **(Span).**

5.   **The selection window opens.**

6.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$ **, the rotary knob or ten-key pad.**

7.   **Press** $\boxed{\text{Set}}$ **.**

When setup is completed, measurement restarts.

RBW, Setting 1

1.   **Press** $\boxed{\text{BW}}$ **.**

2.   **The selection window opens.**

3.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$ **, the rotary knob or ten-key pad.**

4.   **Press** $\boxed{\text{Set}}$ **.**

When setup is completed, measurement restarts.

RBW, Setting 2

1.   **Press** $\boxed{}$ **(More) to display the second function label page.**

2.   **Press** $\boxed{\text{F1}}$ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** $\boxed{}$ **(More) to display the second function label page.**

4.   **Press** $\boxed{\text{F1}}$ **(RBW).**

5.   **The selection window opens.**

6.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$ **, the rotary knob or ten-key pad.**

7.   **Press** $\boxed{\text{Set}}$ **.**

When setup is completed, measurement restarts.

VBW, Setting 1

1. **Press** BW.

2. **The selection window opens.**

3. **Press** F3 **(VBW).**

4. **The selection window opens.**

5. **In the Entry section, enter a numeric value using** ∧ **and** ∨ **, the rotary knob or ten-key pad.**

6. **Press** Set.

When setup is completed, measurement restarts.

VBW, Setting 2

1. **Press** ___ **(More) to display the second function label page.**

2. **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3. **Press** ___ **(More) to display the second function label page.**

4. **Press** F3 **(VBW).**

5. **The selection window opens.**

6. **In the Entry section, enter a numeric value using** ∧ **and** ∨ **, the rotary knob or ten-key pad.**

7. **Press** Set.

When setup is completed, measurement restarts.

VBW automatic, Setting 1

1. **Press** BW.

2. **The selection window opens.**

3. **Press** F4 **(VBW) to alternately switch between Auto and Manual.**

4. **When Manual is selected, the mark "#" is added to the VBW set value in the result display area.**

VBW automatic, Setting 2

1. **Press** ___ **(More) to display the second function label page.**

2. **Press** F1 **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3. **Press** ___ **(More) to display the second function label page.**

4. **Press** F4 **(VBW) to alternately switch between Auto and Manual.**

5. **When Manual is selected, the mark "#" is added to the VBW set value in the result display area.**

VBW/RBW Ratio, Setting 1

1.   **Press** $\boxed{\text{BW}}$.

2.   **The selection window opens.**

3.   **Press** $\boxed{\text{F5}}$ **(VBW/RBW Ratio).**

4.   **The selection window opens.**

5.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$**, the rotary knob or ten-key pad.**

6.   **Press** $\boxed{\text{Set}}$.

VBW/RBW Ratio, Setting 2

1.   **Press** $\boxed{}$ **(More) to display the second function label page.**

2.   **Press** $\boxed{\text{F1}}$ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** $\boxed{}$ **(More) to display the second function label page.**

4.   **Press** $\boxed{\text{F5}}$ **(VBW/RBW Ratio).**

5.   **The selection window opens.**

6.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$**, the rotary knob or ten-key pad.**

7.   **Press** $\boxed{\text{Set}}$.

Sweep Time, Setting 1

1.   **Press** $\boxed{\text{Sweep Time}}$.

2.   **The selection window opens.**

3.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$**, the rotary knob or ten-key pad.**

4.   **Press** $\boxed{\text{Set}}$.

When setup is completed, measurement restarts.

Sweep Time, Setting 2

1.   **Press** $\boxed{}$ **(More) to display the second function label page.**

2.   **Press** $\boxed{\text{F2}}$ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   **Press** $\boxed{}$ **(More) to display the third function label page.**

4.   **Press** $\boxed{\text{F1}}$ **(Sweep Time).**

5.   **The selection window opens.**

6.   **In the Entry section, enter a numeric value using** $\boxed{\wedge}$ **and** $\boxed{\vee}$**, the rotary knob or ten-key pad.**

7.   **Press** $\boxed{\text{Set}}$.

When setup is completed, measurement restarts.

Sweep Time automatic, Setting 1

1. Press ⎡Sweep Time⎤.

2. Press ⎡F2⎤ (Sweep Time) to switch between Auto and Manual alternately.

Sweep Time automatic, Setting 2

1. Press ⎡ ⎤ (More) to display the second function label page.

2. Press ⎡F1⎤ (Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.

3. Press ⎡ ⎤ (More) to display the third function label page.

4. Press ⎡F2⎤ (Sweep Time) to alternately switch between Auto and Manual.

Detection, Setting 1

1. Press ⎡A,B⎤.

2. The selection window opens.

3. Press ⎡F5⎤ (Detection).

4. The selection window opens.

5. In the Entry section, enter the Detection Mode to be set using ⎡∧⎤ and ⎡∨⎤, the rotary knob.

6. Press ⎡Set⎤.

When setup is completed, measurement restarts.

Detection, Setting 2

1. Press ⎡ ⎤ (More) to display the second function label page.

2. Press ⎡F1⎤ (Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.

3. Press ⎡ ⎤ (More) to display the third function label page.

4. Press ⎡F5⎤ (Detection).

5. The selection window opens.

6. In the Entry section, enter the Detection Mode to be set using ⎡∧⎤ and ⎡∨⎤, the rotary knob.

7. Press ⎡Set⎤.

When setup is completed, measurement restarts.

Data Points, Setting 1

1. Press ⎡A,B⎤.

2. The selection window opens.

3. Press ⎡F4⎤ (Data Points) and select the number of sweep points.

When setup is completed, measurement restarts.

Data Points, Setting 2

1.   Press ☐ **(More) to display the second function label page.**

2.   Press ⌷F1⌷ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   Press ☐ **(More) to display the third function label page.**

4.   Press ⌷F4⌷ **(Data Points) and select the number of sweep points.**

When setup is completed, measurement restarts.

RBW mode, Setting 1

1.   Press ⌷BW⌷.

2.   **The selection window opens.**

3.   Press ⌷F2⌷ **(RBW Mode) to switch RBW mode between Digital and Normal alternately.**

When setup is completed, measurement restarts.

RBW mode, Setting 2

1.   Press ☐ **(More) to display the second function label page.**

2.   Press ⌷F1⌷ **(Setup Spectrum Analyzer) to display parameter setting keys. Set the parameters.**

3.   Press ☐ **(More) to display the second function label page.**

4.   Press ⌷F2⌷ **(RBW Mode) to switch RBW mode between Digital and Normal alternately.**

When setup is completed, measurement restarts.

Averaging (Storage Mode)

This section describes the storage mode through the measurement result averaging process.

Unlike other measurement screens, averaging is performed only on the waveform for the occupied frequency bandwidth measurement. The measurement results are calculated based on the averaged waveform. Note that the numeric results are not averaged.

Setting averaging processing

1. On the Occupied Bandwidth screen, press ⌊F2⌋ (Storage Mode) to display the Storage Mode function label.

2. Press ⌊F2⌋ (Average Count) to open the setup window.

3. In the Entry section, enter the averaging count using ⌊∧⌋ and ⌊∨⌋, the rotary knob or ten-key pad.

4. Press ⌊Set⌋.

5. On the Storage Mode menu, press ⌊F1⌋ (Storage Mode).

6. The selection window opens.

7. In the Entry section, select Average using ⌊∧⌋ and ⌊∨⌋ or the rotary knob.

8. Press ⌊Set⌋.

When setup is completed, measurement restarts.

Also when the averaging count is changed when the Storage Mode is set to Average, measurement restarts upon completion of setup. If the values are not changed or changing is canceled, measurement is not restarted.

Refresh Interval: Set the interval for updating the average display.

- Every: Updates the display at every measurement.
- Once: Updates the display after measurement of the specified averaging count is completed.

Available storage modes are listed below.

- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.

Measuring Nearby Spurious

On the Setup Common Parameter screen, pressing F5 (Spurious close to the Carrier) causes the nearby spurious measurement screen to be displayed.

This section describes the measurement results displayed on the Spurious close to the Carrier screen (nearby spurious measurement), parameter settings and operation precautions.

This measurement is not available for IQ input.

Description of measurement results

This section describes the measurement results displayed on the Spurious close to the Carrier screen (nearby spurious measurement).

When starting measurement, press F5 (Adjust Range) to optimize the measurement unit level setting. To raise the level measurement accuracy, press F4 (Calibration) on the second page and then press F1 (Power Calibration) or F3 (Multi Carr. Power Calibration).

See "Optimizing Measurement Range (Adjust Range)" for range optimization, and see "Power calibration function (Power Calibration)" or "Power calibration function (Multi Carr. Power Calibration)" for power calibration.

Measurement results:

The Screen shown below appears when Normal is selected for Measure Method.
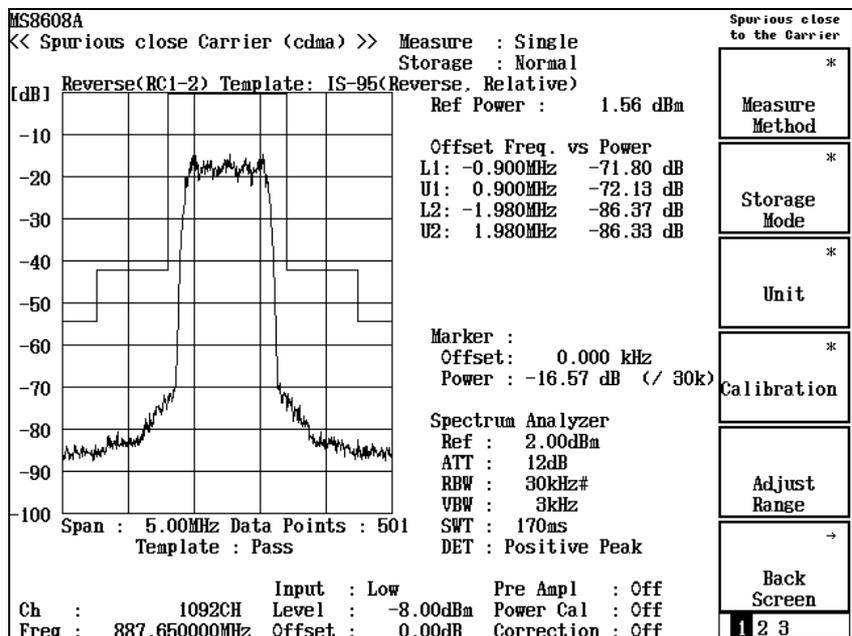
Waveform display

> The waveform display area displays the waveform obtained by sweeping with the spectrum analyzer. In addition, a template appears showing the Pass/Fail judgement results.

Ref Power

> Shows the signal power used as the reference for the relative values in dBm.

Offset Freq. vs Power

> Shows the leakage power at each offset frequency in dBm, W or as the ratio to the carrier power in dB.

Peak (Power), Peak (Margin)

> Displays Power/Margin of measured point of minimum margin at each frequency band of the template. When the measured waveform exceeds the template, each Template is indicated by reversing the value. Select Power/Margin in Display Data Type.

Marker

> Shows the leakage power at each offset frequency in the unit selected in Unit. This is the value of the waveform swept with the spectrum analyzer set in Power. Displays RBW value of spectrum analyzer at the right of the value.

Selecting result display (Measure Method)

This section describes how to set a measure method.

1. On the Spurious close to the Carrier screen, press $\boxed{\text{F1}}$ (Measure Method) to display the function labels listed below and below and then select the result display.

- $\boxed{\text{F1}}$ (Normal): Displays the waveform obtained by sweeping with the spectrum analyzer.
- $\boxed{\text{F2}}$ (3GPP2 FWD Band Class 0, 2, 3, 5, 9): In case Forward Band Class 0, 2, 3, 5, and 9 is measured, it measures near the Carrier with high precision.
- $\boxed{\text{F3}}$ (3GPP2 FWD Band Class 1, 4, 6, 8): In case Forward Band Class 1, 4, 6, 8 is measured, it measures near the Carrier with high precision.
- $\boxed{\text{F6}}$ (return): Returns to the preceding function label display.

When setup is completed, measurement restarts.

Setting spurious level unit (Unit)

1.   Press ⎡F3⎤ (Unit) and select the unit to be used for display.

dB: It displays by dB.
dBm: It displays by dBm.
mW: It displays by mW.
μ W: It displays by μ W.
nW: It displays by nW.
dB/dBm(Template):   It displays by dB or dBm, which is set up
                          for each Line level.

Selecting Ref Power (Ref Power)

Select the measurement method to give the reference level for relative values. The absolute value reference level is Tx Power (same as Tx Power of RF Power) regardless of the measurement method.

1.   Press ⎡   ⎤ (More) to display the second function label page.
2.   Press ⎡F3⎤ (Ref Power) and select SPA or Tx Power.

SPA: Average power of the waveform swept with zero-span at
            RBW = 3 MHz, VBW = 3 kHz and Detect = Sample.
Tx Power: Average power of the measured signal for one slot,
            band-limited at 1.23 MHz. This value is the same as Tx
            Power for RF Power.

Displaying integral waveform (Integral Waveform)

1.   Press ⎡   ⎤ (More) to display the third function label page.
2.   Press ⎡F4⎤ (Integral Waveform) and select On to display a wave-
     form converted at 1.23 MHz.

This function is available only when the Measure Method is Normal.

Selecting measurement result display type (Display Data Type)

Select the measurement result display type.

Setting averaging processing
1. Press ☐ (More) to display the second function label page.
2. Press ⎣F4⎦ (Display Data Type).
3. The selection window opens.
4. In the Entry section, enter the Display Data Type to be using ⎣∧⎦ and ⎣∨⎦, the rotary knob.
5. Press ⎣Set⎦.

Setting SPA parameters (Setup Spectrum Analyzer)

The SPA parameters listed below can be changed.
- **ATT, Ref Level Mode Auto/Manual**
  Auto: Sets the attenuator and reference levels to their optimum values inside the measurement unit, depending on the RF input level (Reference Level) for Setup Common Parameter.
  Manual:Permits manual setting of the attenuator and reference levels.
- **Ref Level**
  Set the reference level for SPA sweep.
- **Attenuator**
  Set the attenuator for SPA sweep.
- **Attenuator Auto/Manual**
  Auto: Automatically sets the attenuator depending on the reference level for SPA sweep.
  Manual:Permits manual setting of the attenuator for SPA sweep.
- **Span**
  Set the sweep span for SPA sweep. When Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9 and 3GPP2 FWD Band Class 1, 4, 6, 8, sweep span is fixed at 8MHz. SPA sweep span setting is available only when the Measure Method is Normal.
- **RBW**
  Set RBW for SPA sweep.
- **VBW**
  Set VBW for SPA sweep.
- **VBW Auto/Manual**
  Set VBW for SPA sweep automatically (Auto) or manually (Manual) depending on RBW.

- **VBW/RBW Ratio**
  Set VBW for VBW Auto using this parameter.

- **Sweep Time**
  Set the sweep time for SPA sweep. When Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9 and 3GPP2 FWD Band Class 1, 4, 6, 8, total sweep time is displayed at the right of the sweep time.

- **Sweep Time Auto/Manual**
  Set the sweep time for SPA sweep automatically (Auto) or manually (Manual) depending on the related parameter.

- **Detection**
  Set the detection mode for SPA sweep.

- **Data Points**
  Set the data count for SPA sweep (501/1001). When Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9 and 3GPP2 FWD Band Class 1, 4, 6, 8, a setting value and a display value change with differences in the sweep method.

- **RBW Mode (available only when Opt 04 is installed)**
  Set RBW filter to digital or analog filter. When digital filter is selected, RMS detection is added to detection mode.

To setup, see "Setting SPA Parameters in Spectrum Method" in "Measuring Occupied Frequency Bandwidth."

RBW, VBW, VBW Auto/Manual and VBW/RBW Ratio cannot be changed when the Measure Method is 3GPP2 FWD Band Class 1, 4, 6, 8 and Template is Class 6.

Setting a template (Setup Spurious Template)

When measuring the burst signal, a template can be used for relative level display. This section describes how to set a template.

Displaying Setup Spurious Template

1. While the Spurious close to the Carrier screen is being displayed, press [F2] (Setup Spurious Template) on the second page of the Spurious close to the Carrier function label.

2. The Setup Spurious Template screen shown below appears.

The figure below is the screen when Measurement Method is Normal.

```
MS8608A                                                    Setup Spurious
<< Setup Spurious Template (cdma) >>                          Template

[dB]  Reverse(RC1-2) Template: IS-95(Reverse, Relative)
                                                           Line Level1
 -10                     Line Level                          Rel. Abs.
                            1) [ -42.00dB ]
 -20                        2) [ -54.00dB ]
                                                           Line Level2
 -30                                                         Rel. Abs.
                         Offset Frequency
 -40                        a) [ 0.900 MHz]
                            b) [ 1.980 MHz]
 -50

 -60

 -70

 -80                     Spectrum Analyzer                        *
                           Ref :    2.00dBm
 -90                       ATT :    12dB                     Standard
                           RBW :    30kHz#                   Template
                           VBW :     3kHz
-100 Span :  5.00MHz Data Points : 501   SWT :   170ms           →
                           DET : Positive Peak
                                                            Back
                 Input  : Low       Pre Ampl   : Off        Screen
 Ch   :     1092CH  Level  :   -8.00dBm  Power Cal  : Off   ┌──┐
 Freq :  887.650000MHz  Offset :    0.00dB   Correction : Off │1│ 2
```

Setting templates

1. In the Entry section, select the standard line to be set using [∧] and [∨] or the rotary knob.

2. In the Entry section, set the standard line level using the ten-key pad or press [Set].

When [Set] is pressed:

3. The standard line modification line appears.

4. In the Entry section, set the standard line modification line to the desired level using [∧] and [∨] or the rotary knob.

5. Press [Set].

When setup is completed, the standard line changes to the set level.

Setting level unit
- [F1] (Line Level1), [F2] (Line Level2), [F3] (Line Level3), or [F4] (Line Level4) to alternately switch between Relative (dB) and Absolute (dBm).

Standard template automatic setting
- Press [F5] (Standard Template) to display various standards. Selecting a standard displays a template selection window. The selected template is automatically set.

Averaging (Storage Mode)

This section describes the storage mode through the measurement result averaging process.

Setting averaging processing
1. On the Spurious close to the Carrier screen, press [F2] (Storage Mode) to display the Storage Mode function label.
2. Press [F2] (Average Count) to open the setup window.
3. In the Entry section, enter the average count using [∧] and [∨], the rotary knob or ten-key pad.
4. Press [Set].
5. On the Storage Mode menu, press [F1] (Storage Mode).
6. The selection window opens.
7. In the Entry section, select Average using [∧] and [∨] or the rotary knob.
8. Press [Set].

When setup is completed, measurement restarts.
Also when the averaging count is changed when the Storage Mode is set to Average, measurement restarts on completion of setup. If the values are not changed or changing is canceled, measurement is not restarted.

Refresh Interval: Set the interval to update the average display.
- Every: Updates the display at every measurement.
- Once: Updates the display after measurement of the specified averaging count is completed.

Available storage modes are listed below.
- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.

Measuring Spurious

This section describes the measurement results displayed on the Spurious Emission screen and the parameter settings.

Description of measurement results

```
MS8608A                                                    Spurious
<< Spurious Emission (cdma) >>                             Emission
                                    Spurious : Spot                    *
                                    Detect   : Average
                                                          Spurious
                                                          Mode
  Ref Power              :      1.57 dBm

           Frequency           Level      Judgement(Relative)
  f 1 =    1 775.300 000 MHz:   -44.17 dBm      Pass                   $
  f 2 =    2 662.950 000 MHz:   -57.50 dBm      Pass           View
  f 3 =    3 550.600 000 MHz:   -75.35 dBm      Pass           Select
  f 4 =    4 438.250 000 MHz:   -80.48 dBm      Pass          Judgement
  f 5 =    5 325.900 000 MHz:   -81.23 dBm      Pass
  f 6 =    6 213.550 000 MHz:   -81.82 dBm      Pass                   *
  f 7 =    7 101.200 000 MHz:   -82.87 dBm      Pass
  f 8 = -------------- MHz: -------- dBm      ----         Calibration
  f 9 = -------------- MHz: -------- dBm      ----
  f10 = -------------- MHz: -------- dBm      ----
  f11 = -------------- MHz: -------- dBm      ----
  f12 = -------------- MHz: -------- dBm      ----
  f13 = -------------- MHz: -------- dBm      ----          Adjust
  f14 = -------------- MHz: -------- dBm      ----          Range
  f15 = -------------- MHz: -------- dBm      ----
                                                                     →
                     Total Judgement : Pass
                                                           Back
                 Input : Low        Pre Ampl   : Off      Screen
  Ch   :      1092CH  Level :   -8.00dBm  Power Cal  : Off
  Freq :  887.650000MHz  Offset :    0.00dB  Correction : Off   1 2 3
```

Ref Power

Shows the measurement signal average power for one slot in dBm.

Frequency

Shows the spurious frequency.

Level

Shows the spurious level.

Judgment, Limit

Displays the result of judgement based on the upper limit level set in the Setup Spot o Table or Setup Sweep/Search Table.

This item appears only when Judgment is selected using $\boxed{\text{F3}}$ (View Select).

RBW, VBW, SWT

Shows the spectrum analyzer RBW, VBW and Sweep Time measurement conditions.

This item appears only when BW or SWT has been selected using ⌊F3⌋ (View Select).

Ref.Level,ATT

Shows the spectrum analyzer Ref.Level, ATT measurement conditions.

This item appears only when RefLvl,ATT has been selected using ⌊F3⌋ (View Select).

Spurious, Detect, Preselector

These items appear in the upper-right area of the screen.

(1)   Spurious

Shows the measurement method selected in Spurious Mode.

(2)   Detect

Shows the spectrum analyzer detection mode.

(3)   Preselector

Shows the preselector operation mode. This item appears only when the MS8608A-03 option is installed. See "Setting preselector mode (Preselector)."

Setting spurious measurement method (Spurious Mode)

Press ⌊F1⌋ (Spurious Mode) to display the function labels shown below and then select the measurement method.

- ⌊F1⌋ (Spot): Measures the frequency set in Setup Spot Table using time domain and obtains the average.
- ⌊F2⌋ (Search): Sweeps the frequency range set in Setup Search/Sweep Table and measures the spot at the peak-searched frequency.
- ⌊F3⌋ (Sweep): Sweeps the frequency range set in Setup Search/Sweep Table and obtains the frequency and level of the peak point.

Setting spurious level unit (Unit)

Sets a measurement value display unit and judges the standard value in the set unit.

1. Press ⬜ (More) to display the second Spurious function label page.
2. Press ⎡F4⎤ (Unit) to alternately switch between dBm and dB. Select the unit.
    The reference level for dB display is the value obtained in the measurement method set in Ref Power.

Selecting Ref Power (Ref Power)

Select the measurement method to give the reference level for relative values. The absolute value reference level is Tx Power (same as Tx Power for RF Power) regardless of the measurement method.

1. Press ⬜ (More) to display the third function label page.
2. Press ⎡F4⎤ (Ref Power) and select SPA or Tx Power.

    SPA: Average power of a waveform swept with zero-span at RBW = 3 MHz, VBW = 3 kHz and Detect = Sample.

    Tx Power: Average power of the measured signal for one slot, band-limited at 1.23 MHz. This value is the same as Tx Power for RF Power.

Setting preselector mode (Preselector)

This function is available only when the main unit option MS8608A-03/MS2683A03 is installed. (This option can be installed on MS8608A/MS2683A only).

Use this function to select Band 0 (Normal) or Band 1 (Spurious) for measurement of 1.6 to 3 GHz.

Measurement in Spurious mode sweeps 1.6 to 3 GHz with Band 1, and is not effected by harmonic waves from the spectrum analyzer itself.

Setting mode

1.   Press ☐ (More) to display the second Spurious function label page.

2.   Press $\boxed{\text{F5}}$ (Setup Spectrum Analyzer).

3.   Press $\boxed{\text{F4}}$ (Preselector) to alternately switch between Normal and Spurious. Select Spurious to activate the preselector.

This function is set commonly regardless of the Spurious Mode settings.

Setting detection mode (Detection)

Setting mode

1.   Press ☐ (More) to display the second Spurious function label page.

2.   Press $\boxed{\text{F5}}$ (Setup Spectrum Analyzer).

3.   Press $\boxed{\text{F5}}$ (Detection).

4.   The selection window opens.

5.   In the Entry section, input the Detection Mode to be set using $\boxed{\wedge}$ and $\boxed{\vee}$ or the rotary knob.

6.   Press $\boxed{\text{Set}}$.

This function is set commonly for each of the set Spurious Mode.

Setting measurement frequency for spot method (Setup Spot Table)

This section describes how to set items such as measurement frequency for measurement in the spot method.

Use the Setup Spot Table screen for the setting.

Displaying Setup Spot Table screen

1. While the **Spurious Emission screen is being displayed, press** `F1` **(Setup Spot Table) on the second Spurious function label page.**

2. **The Setup Spot Table screen shown below appears.**
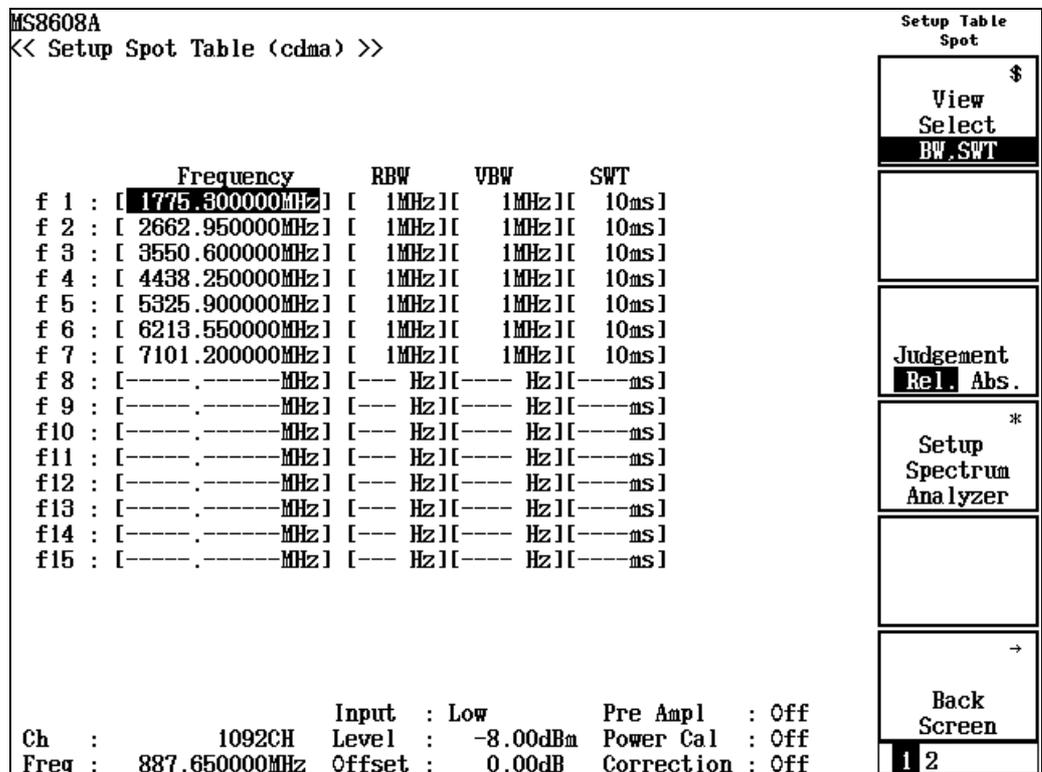
```
MS8608A                                                    Setup Table
<< Setup Spot Table (cdma) >>                                  Spot
                                                                    $
                                                               View
                                                              Select
               Frequency       RBW      VBW      SWT         BW.SWT
   f 1 : [ 1775.300000MHz] [   1MHz][    1MHz][   10ms]
   f 2 : [ 2662.950000MHz] [   1MHz][    1MHz][   10ms]
   f 3 : [ 3550.600000MHz] [   1MHz][    1MHz][   10ms]
   f 4 : [ 4438.250000MHz] [   1MHz][    1MHz][   10ms]
   f 5 : [ 5325.900000MHz] [   1MHz][    1MHz][   10ms]
   f 6 : [ 6213.550000MHz] [   1MHz][    1MHz][   10ms]
   f 7 : [ 7101.200000MHz] [   1MHz][    1MHz][   10ms]     Judgement
   f 8 : [-----.------MHz] [--- Hz][---- Hz][----ms]        Rel. Abs.
   f 9 : [-----.------MHz] [--- Hz][---- Hz][----ms]
   f10 : [-----.------MHz] [--- Hz][---- Hz][----ms]              *
   f11 : [-----.------MHz] [--- Hz][---- Hz][----ms]         Setup
   f12 : [-----.------MHz] [--- Hz][---- Hz][----ms]        Spectrum
   f13 : [-----.------MHz] [--- Hz][---- Hz][----ms]        Analyzer
   f14 : [-----.------MHz] [--- Hz][---- Hz][----ms]
   f15 : [-----.------MHz] [--- Hz][---- Hz][----ms]

                                                                    →
                      Input  : Low      Pre Ampl   : Off     Back
   Ch   :      1092CH  Level  :   -8.00dBm  Power Cal  : Off   Screen
   Freq :   887.650000MHz  Offset :    0.00dB  Correction : Off  1 2
```

Setting measurement frequency, RBW, VBW, Sweep Time and Limit Level

1. **In the Entry section, move the cursor to the item to be set using** `∧` **and** `∨` **or the rotary knob.**

2. **Press** `Set` **in the Entry section.**

3. **The setup window opens.**

4. **Move the cursor to the item to be set using** `∧` **and** `∨`.

5. **Press** `Set`.

When setup is completed, the set result appears in the set item [ ].

Setting unit of Limit Level

Press ☐F3☐ **(Judgment) to switch unit of Limit Level.**

Setting harmonic wave

1. **Press** ☐ **(More) to display the second Setup Table Spot function label page.**

2. **Press** ☐F5☐ **(Harmonics) to open a confirmation window. When Yes is selected, harmonic wave with frequency set in Setup Common Parameter is automatically set. All frequencies and RBW set previously are deleted.**

Deleting all settings

1. **Press** ☐F2☐ **(Clear) to open a confirmation window asking whether to delete the set values.**

2. **Using the rotary knob, move the cursor to Yes.**

3. **Press** ☐Set☐ **in the Entry section to delete all set values.**

Deleting cursor line

1. **Press** ☐F3☐ **(Delete) to delete the line where the cursor is positioned and move all lines below the cursor upward one line.**

Inserting empty line at cursor

1. **Press** ☐F4☐ **(Insert) to move all lines below the cursor downward one line and place a blank line (---) at the line where the cursor is positioned. When f15 has been set, no blank lines can be inserted.**

Setting sweep range for search/sweep method (Setup Search/Sweep Table)

This section describes how to set the sweep range for measurement in the search or sweep method.
Set in the Setup Search/Sweep Table screen.

Displaying Setup Search/Sweep Table screen

1. While the Spurious Emission screen is being displayed, press [F2] (Setup Search/Sweep Table) on the second Spurious function label page.

2. The Setup Search/Sweep Table screen shown below appears.

```
MS8608A                                                          Setup Table
<< Setup Search/Sweep Table (cdma) >>                          Search/Sweep
                                                                         $
                                                                      View
                                                                      Select
                                                                      BW.SWT
           Start Frequency    Stop Frequency    RBW      VBW     SWT
  f 1 : [     0.009000MHz][     0.050000MHz][   1kHz][    1kHz][ 1.00s]
  f 2 : [     0.050000MHz][     0.150000MHz][   1kHz][    1kHz][ 1.00s]
  f 3 : [     0.150000MHz][    10.000000MHz][  10kHz][   10kHz][ 500ms]
  f 4 : [    10.000000MHz][    30.000000MHz][  10kHz][   10kHz][ 600ms]
  f 5 : [    30.000000MHz][   883.650000MHz][ 100kHz][  100kHz][ 260ms]
  f 6 : [   891.650000MHz][  1000.000000MHz][ 100kHz][  100kHz][ 200ms]
  f 7 : [  1000.000000MHz][  3200.000000MHz][   1MHz][    1MHz][ 200ms]   Judgement
  f 8 : [  3200.000000MHz][  5000.000000MHz][   1MHz][    1MHz][ 200ms]   Rel. Abs.
  f 9 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]
  f10 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]                *
  f11 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]       Setup
  f12 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]       Spectrum
  f13 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]       Analyzer
  f14 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]
  f15 : [-----.------MHz][-----.------MHz][--- Hz][---- Hz][----ms]
                                                                               →
                    Input  : Low      Pre Ampl   : Off              Back
  Ch   :      1092CH  Level  :   -8.00dBm  Power Cal  : Off          Screen
  Freq :  887.650000MHz  Offset :    0.00dB   Correction : Off         1 2
```

Setting start and stop frequencies

1. In the Entry section, move the cursor to the Start Frequency or Stop Frequency item using [∧] and [∨] or the rotary knob.

2. Set the frequency using the ten-key pad.

When setup is completed, the set frequency appears in the set item [ ]. The start and stop frequencies are forcibly set at least 1 kHz away from each other. For example, when both of the start and stop frequencies are set to 100 kHz, the start frequency is automatically changed to 99 kHz.

Setting measurement frequency, RBW, VBW, Sweep Time and Limit Level

1. **In the Entry section, move the cursor to the item to be set using**
   ⊡ ∧ **and** ⊡ ∨ **or the rotary knob.**

2. **Press** ⊡ Set **in the Entry section.**

3. **The setup window opens.**

4. **Press** ⊡ ∧ **and** ⊡ ∨ **to move the cursor to the item to be set.**

5. **Press** ⊡ Set **.**

When setup is completed, the set result appears in the set item [ ].

Setting unit of Limit Level

Press ⊡ F3 **(Judgment) to switch the unit of Limit Level.**

Deleting all settings

1. **Press** ⊡ **(More) to display the second Setup Search/Sweep Table function label page.**

2. **Press** ⊡ F2 **(Clear) to open a confirmation window asking whether to delete the set values.**

3. **Using the rotary knob, move the cursor to Yes.**

4. **Press** ⊡ Set **in the Entry section to delete all set values.**

Deleting cursor line

1. **Press** ⊡ **(More) to display the second Setup Search/Sweep Table function label page.**

2. **Press** ⊡ F3 **(Delete) to delete the line where the cursor is positioned and move all lines below the cursor upward one line.**

Inserting empty line at cursor

1. **Press** ⊡ **(More) to display the second Setup Search/Sweep Table function label page.**

2. **Press** ⊡ F4 **(Insert) to move all lines below the cursor downward one line and place a blank line (---) at the line where the cursor is positioned. When f15 has been set, no blank lines can be inserted.**

Setting standard value

1. **Press** ⊡ **(More) to display the second Setup Search/Sweep Table function label page.**

2. **Press** ⊡ F5 **(Standard) and select the standard.**

Setting frequency and sweep tables in details

This section explains in detail how to set the frequency and sweep tables. While the Setup Spot Table or Setup Search/Sweep Table screen is being displayed, press ⌈ F4 ⌉ (Setup Spectrum Analyzer) on the first function label page to display the related setup parameter screen.

RBW automatic setting

1. Press ⌈ F2 ⌉ (RBW Auto/Manual) to alternately switch between Auto and Manual.

When Auto is selected, RBW is set as shown below depending on the start frequency setting.

- 1 kHz when the frequency is 1 to 150 kHz (150 kHz not included)
- 10 kHz when the frequency is 150 kHz to 30 MHz (30 MHz not included)
- 100 kHz when the frequency is 30 to 1000 MHz (1000 MHz not included)
- 1 MHz when the frequency is 1000 MHz or more

VBW automatic setting

1. Press ⌈ F3 ⌉ (VBW) to switch between Auto and Manual alternately and then select Auto.

When Auto is selected, VBW is set depending on the VBW/RBW Ratio and RBW settings.

Setting VBW/RBW Ratio

1. Press ⌈ F4 ⌉ (VBW/RBW Ratio) to open the selection window.

2. In the Entry section, enter a numeric value using ⌈ ∧ ⌉ and ⌈ ∨ ⌉, the rotary knob or numeric keypad.

3. Press ⌈ Set ⌉.

Sweep Time automatic setting

1. Press ⌈ F5 ⌉ (Sweep Time) to alternately switch between Auto and Manual and then select Auto.

3. When Auto is selected, values are automatically set for all Sweep Times in the set frequency table.

Setting RBW mode

This function is available when the main unit option MS860xA-04 or MS268xA/B-04 is installed.

1.   **Press** ⌷F1⌷ **(RBW) to alternately switch between Digital and Normal. Select one. When Digital is selected, RMS instead of Average is added to Detection.**

When neither MS860xA-04 nor MS268xA/B-04 option is installed, the RBW mode menu does not appear.

Setting ATT, Ref Level mode

1.   **Press** ⌷ ⌷ **(More) to display the second function label page.**

2.   **Press** ⌷F1⌷ **(SPA ATT, Ref Level) to alternately switch between Auto and Manual.**

Setting Attenuator mode

1.   **Press** ⌷ ⌷ **(More) to display the second function label page.**

2.   **Press** ⌷F4⌷ **(Attenuator) to alternately switch between Auto and Manual.**

Power Meter

For MS860x, on the Setup Common Parameter screen, pressing $\boxed{F6}$ (Power Meter) causes the Power Meter screen to be displayed.

This section describes the measurement results displayed on the Power Meter screen (power meter), parameter settings and operation precautions.

This measurement is not available for IQ input.

For MS268x, this function is not available.

Explanation of measurement results

This section describes the measurement results displayed on the Power Meter screen (power meter). When starting the measurement, press $\boxed{F5}$ (Adjust Range) to optimize the measurement unit level settings. For range optimization, see "Optimizing measurement range (Adjust Range)."

Measurement results
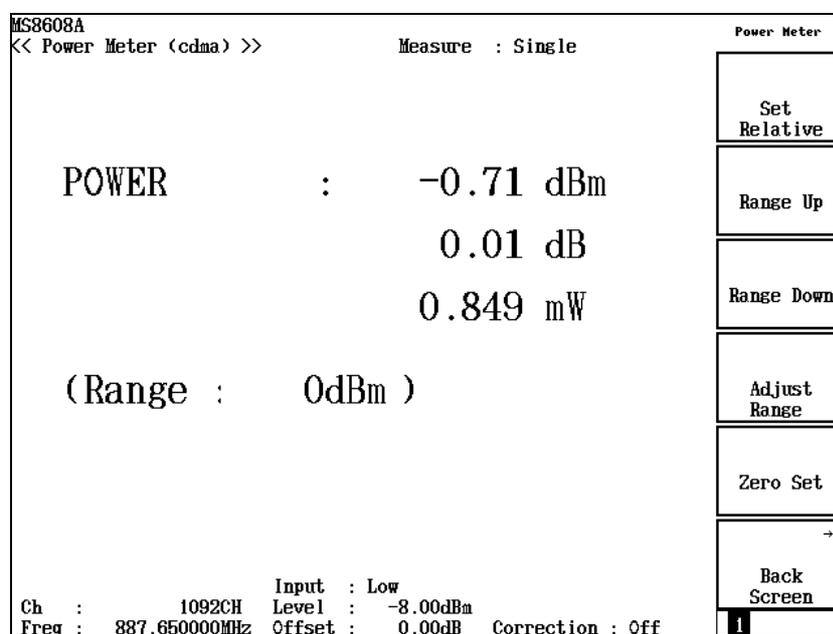
POWER

Shows the power measured with the built-in power sensor in units of dBm, relative level and W.

For the relative level, the measurement value obtained when pressing $\boxed{F1}$ (Set Relative) is set as the reference level (0 dB).

Range

Shows the current measurement range.

Calibrating zero-point (Zero Set)

Be sure to calibrate the zero-point before using the power meter.
To perform zero-point calibration, place the RF input terminal in no-input state and press ⌐F5⌐ (Zero Set).
If zero-point calibration is not performed in advance, the power meter may not show correct measurement values.

Using relative-value display (Set Relative)

This section describes how to use the relative-value display.
Pressing ⌐F1⌐ (Set Relative) causes the current power value to be set as the reference value (0 dB), permitting display of the relative values.

Setting measurement range (Range Up/Range Down)

Set the power meter measurement range.

Measurement range
Available measurement ranges are listed below.

For MS8608A high-power input:
     0 dBm, +10 dBm, +20 dBm, +30 dBm, +40 dBm

For MS8608A low-power input or MS8609A
     −20 dBm, −10 dBm, 0 dBm, +10 dBm, +20 dBm

Setting the range
Press ⌐F2⌐ (Range Up) to raise the measurement range.
Press ⌐F3⌐ (Range Down) to lower the measurement range.
Press ⌐F4⌐ (Adjust Range) to optimize the measurement range depending on the input signal. For details, see "Optimizing Measurement Range (Adjust Range)."

Measuring the IQ Level

On the Setup Common Parameter screen, pressing ⌷F2⌷ (IQ Level) causes the IQ level measurement screen to be displayed.

This section describes the measurement results displayed on the IQ Level screen (IQ level measurement), parameter settings and operation precautions.

This measurement is not available for RF input.

For MS268x, this function is available only when MS2681A/MS2683A-17, -18 or MS2687A/B-18 is installed.

Explanation of measurement results

This section described the measurement results displayed on the IQ Level screen (IQ level measurement).

Measurement results

```
MS8608A                                                            IQ Level
<< IQ Level (cdma) >>               Measure  : Single
                                    Storage  : Normal

  Level
        I                           :      42.83 dBmV (rms)
        Q                           :      43.06 dBmV (rms)
                                                                        *
        I p-p                       :      54.07 dBmVp-p
        Q p-p                       :      54.13 dBmVp-p          Storage
                                                                  Mode
                                                                        *
  Phase
        I/Q difference              :      71.40 deg.              Unit



                                                                        →
                                                                  Back
                                                                  Screen
                                                                  1
```

Level (I and Q)

Shows the RMS levels for the I- and Q-phase signal in mV or dBmV.

Level (I p-p and Q p-p)

Shows the peak-to-peak levels for the I- and Q-phase signal in mV or dBmV.

Phase (I/Q difference)

Shows the phase difference in degrees between the I- and Q-phase signals obtained by inputting CW signals with the same frequency to the I- and Q-phase inputs. This function is available in orthogonal and other measurements of an orthogonal demodulator.

Averaging (Storage Mode)

This section describes the storage mode through the measurement result averaging process.

Setting averaging process

1.   On the IQ Level screen, press ⎡F2⎤ (Storage Mode) to display the Storage Mode function label.

2.   Press ⎡F2⎤ (Average Count) to open the setup window.

3.   In the Entry section, enter the average count using ⎡∧⎤ and ⎡∨⎤, the rotary knob or ten-key pad.

4.   Press ⎡Set⎤.

5.   On the Storage Mode menu, press ⎡F1⎤ (Storage Mode).

6.   The selection window opens.

7.   In the Entry section, select Average using ⎡∧⎤ and ⎡∨⎤ or the rotary knob.

8.   Press ⎡Set⎤.

When setup is completed, measurement restarts.

Also when the averaging count is changed when the Storage Mode is set to Average, measurement restarts upon completion of setup. If the values are not changed or changing is canceled, measurement is not restarted.

Refresh Interval: Set the interval for updating the average display.

•   Every: Updates the display at every measurement.

•   Once: Updates the display after measurement of the specified averaging count is completed.

Available storage modes are listed below.

•   Normal: Updates and displays the measurement results at every measurement.

•   Average: Averages and displays the measurement results at every measurement.

Changing measurement value unit (Unit)

This section describes how to change the IQ level measurement value unit.

Setting display unit

On the IQ Level screen, press ⌊ F3 ⌋ (Unit) to display the function labels listed below and then select the unit to be used.

- ⌊ F1 ⌋ (mV): Shows the measurement value in mV.
- ⌊ F2 ⌋ (dBmV): Shows the measurement value in dBmV.
- ⌊ F6 ⌋ (return): Returns to the preceding function label display.

Saving and Reading Setup Parameters

This section describes how to save and read parameter settings from the memory card.

Before saving or reading parameter settings, insert the memory card into the memory card slot. The memory card can be inserted or removed while the unit power is ON. Do not remove the memory card while saving or reading.

One memory card can save a maximum of 100 parameter setup files. Save a file under one of the file numbers (0 to 99). If necessary, a file may be assigned a file name consisting of letters and/or numerals and a file may be write-protected.

A file name is in the MS-DOS format; that is, it may contain a maximum of eight characters, which are not case-sensitive.

Saving parameters (Save)

To save parameters, display the Save Parameter screen in the procedure given below.

1. Insert a memory card into the memory card slot.

2. Press ⌊ Shift ⌋ and then press ⌊ Recall ⌋ .

3. ⌊ F2 ⌋ Press (Display Dir.)
   One memory card can save a maximum of 100 parameter setup files. Save a file under a file number (0 to 99).

4. In the Entry section, move the cursor and select the file number using ⌊ ∧ ⌋ and ⌊ ∨ ⌋ or the rotary knob. Or press ⌊ F3 ⌋ (File No.) to open a setup window and enter the file number using the ten-key pad.

5. Press ⌊ Set ⌋ in the Entry section.

6. The confirmation window opens. Select Yes and press ⌊ Set ⌋.

Thus, the parameter settings are saved on the memory card.

When the file is saved under a new number, it is automatically assigned file name "PARAM**.P**" (where, "**" is a file number). When the file is saved under a file number already assigned to an existing file, the parameter settings are overwritten to the file and the file name remains unchanged.

```
MS8608A    2002/12/16   16:38:23                           Save
<< Save Parameter >>                                     Parameter

  Directory     : \MS8608A\CDMA\PARAM
                                                         ┌──────────┐
  Save File              Memory Card Information         │ Previous │
   Save Data    : CDMA Tester    Volume Label :          │   Page   │
   File Name    : PARAM00        Unused Area  :  16 117 760 Bytes
                                 Total Area   :  20 414 464 Bytes ┤
                                                         │Display Dir.
      No.   Name        Date         Time     Protect    │/Next Page │
      00   PARAM00 .P00  2002-12-16  16:33:34  Off       ├──────────┤
      01   PARAM01 .P01  2002-12-16  16:33:48  Off       │        # │
      02   PARAM02 .P02  2002-12-16  16:33:56  Off       │          │
      03                                                 │ File No. │
      04                                                 ├──────────┤
      05   PARAM05 .P05  2002-12-16  16:34:02  Off       │        # │
      06                                                 │          │
      07                                                 │ File Name│
      08                                                 ├──────────┤
      09
      10
      11                                                 │  Write   │
      12                                                 │ Protect  │
      13                                                 ├──────────┤
      14                                                 │        → │
      15                                                 │  Back    │
      16                                                 │  Screen  │
      17                                                 └──────────┘
```

Saving under a new name (File Name)

A file can be saved under a new name by pressing [F4] (File Name) in Step 4 in "Saving Parameters (Save)."

This section describes how to enter a file name after displaying the file name input window by pressing [F4] (File Name).
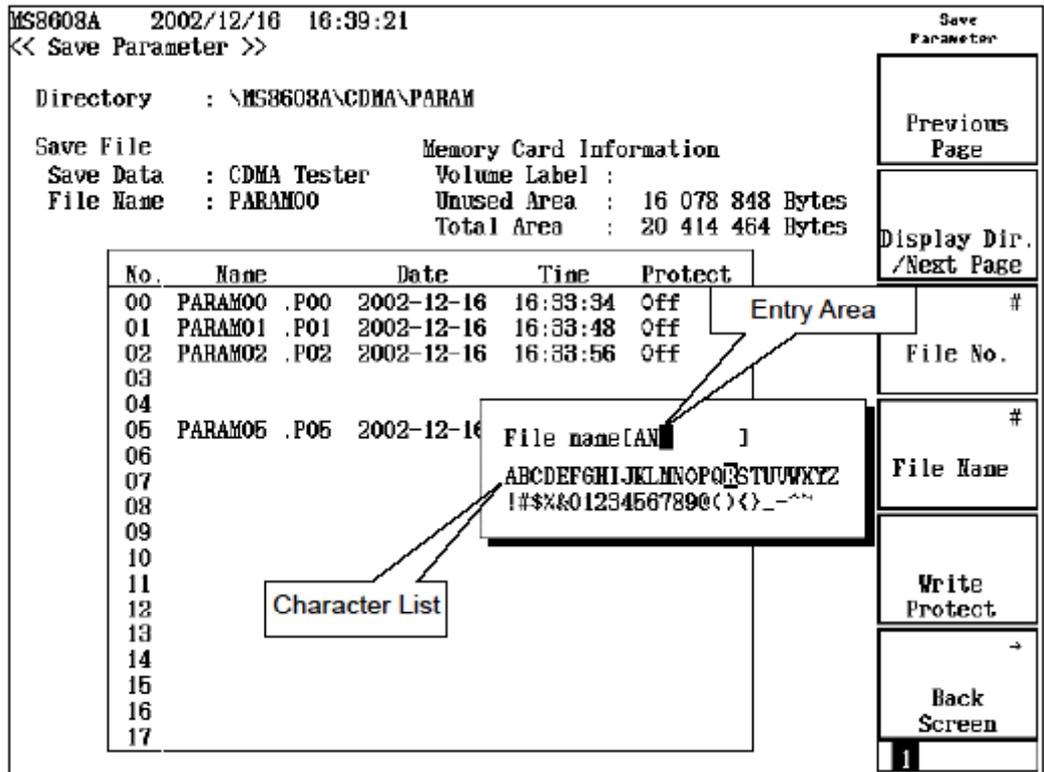
1. Using the rotary knob, move the cursor inside the list of characters and select the character to be entered.

2. Press [Enter]. The character selected appears in the entry area.

3. Repeat Step 2 above to enter the file name. Characters A to F and 0 to 9 can also be entered from the ten-key pad. A file name may contain a maximum of eight characters. Only those characters given in the list are available; other characters cannot be used.

4. After entering the file name, press [Set].

5. A confirmation window opens. Select Yes and press [Set].

Thus, the file is saved under the new name.

- Rotary knob: Moves the cursor inside the list of characters.
- $\wedge$ and $\vee$: Moves the cursor inside the entry area.
- BS : Deletes the character preceding the cursor in the entry area.
- Enter : Overwrites the character pointed to by the cursor in the list of characters to the cursor position in the entry area.
- Set : Determines the character string in the entry area as the file name.

Write-protecting file (Write Protect)

This section describes how to write-protect a file.

1. In the Entry section, move the cursor to the file to be write-protected using $\wedge$ and $\vee$ or the rotary knob.
2. Press F5 (Write Protect).

Each time F5 (Write Protect) is pressed, it is alternately switched On and Off.

Reading parameters (Recall)

To read saved parameters, display the Recall Parameter screen in the procedure given below.

1. Insert the memory card into the memory card slot.

2. Press [Recall].

3. Press [F2] (Display Dir.)

```
MS8608A     2002/12/16   13:17:49                        Recall
<< Recall Parameter >>                                  Parameter

  Directory    : \MS8608A\CDMA\PARAM

  Recall file                    Memory Card Information      Previous
   Recall Data : CDMA Tester      Volume Label :               Page
   File Name   : PARAM05          Unused Area  :  16 039 936 Bytes
                                  Total Area   :  20 414 464 Bytes
                                                             Display Dir.
       No.    Name       Date       Time     Protect         /Next Page
       00   PARAM00 .P00  2002-12-16  16:33:34  Off
       01   PARAM01 .P01  2002-12-16  16:33:48  Off              ↕
       02   PARAM02 .P02  2002-12-16  16:33:56  Off
       05   PARAM05 .P05  2002-12-16  16:34:02  Off           File No.




                                                               →

                                                              Back
                                                             Screen
                                                              1
```

4. In the Entry section, move the cursor and select a file number using [∧] and [∨] or the rotary knob, or press [F3] (File No.) to open the setup window and enter a file number from the ten-key pad.

5. Press [Set] in the Entry section.

6. A confirmation window opens.   Select Yes and press [Set].

When parameter reading is completed, the Setup Common Parameter screen appears.

Section 4   Performance Test

This Section describes the measurement units, and their connections and operations when the performance test is conducted for cdma measurements after installing MX860x03A in MS860x or MX268x03A in MS268x.

In this section, ☐ represents a panel key.

About the Performance Test

The performance test described in this section should be carried out as a part of preventive maintenance to check for performance deterioration during cdma measurement with MX860x03A installed in MS860x or MX268x03A in MS268x.

Carry out the performance test on the measurement unit when it is required for acceptance inspection, periodic maintenance or a post-repair performance check.

As preventive maintenance, the items considered to be important should be periodically (one or twice a year) tested.

The performance test should contain the test items listed below when it is carried out on the measurement unit for acceptance inspection, periodic maintenance or post-repair performance check.

- Modulation/frequency measurement
- Code domain measurement
- Transmission power measurement accuracy*
- Linearity
- Occupied frequency bandwidth measurement
- Nearby spurious measurement
- Spurious measurement*
- IQ input modulation accuracy
- Power meter accuracy*

* For MS268x this test is not performed.

If the performance test detects any items that do not satisfy requirements, contact Anritsu or its agency.

Equipment Required for Performance Test <MS860x>

The measurement equipment required for the performance test is listed below.

Recommended unit name (model)	Required performance	Test items
Digital modulation signal generator (MG3681A/ MX368042A) Two units used	• Frequency range: 10 MHz to 3 GHz Resolution 1 Hz available • Output level range No modulation: –10 to 12 dBm Modulation: –10 to 4 dBm Resolution 0.1 dB available • External reference input: (10 MHz) available • Residual vector error: 2.5% or less	Modulation/frequency measurement Code domain measurement Transmission power measurement accuracy Linearity Occupied frequency bandwidth measurement Nearby spurious measurement Spurious measurement IQ input modulation accuracy Power meter accuracy
Calibration receiver (ML2530A)	• Frequency range: 100 kHz to 3 GHz Resolution 1 Hz available • Measurement power range: –140 to 20 dBm • Measurement accuracy: ±0.04 dB • External reference input: (10 MHz) available	Modulation/frequency measurement Linearity Power meter accuracy
Power meter (ML4803A) Power sensor (MA4601A)	• Main unit accuracy: ±0.02 dB • Frequency range: 100 kHz to 8.5 GHz (depending on power sensor used) • Frequency range: 10 MHz to 3 GHz • Measurement power range: –30 to +20 dBm • Input connector: N type	Transmission power measurement accuracy Linearity Power meter accuracy
Fixed attenuator (MP721A)	• Attenuation: 3 dB • VSWR: 1.2 or less	Power meter accuracy
Fixed attenuator (MP721D)	• Attenuation: 20 dB • VSWR: 1.2 or less	Transmission power measurement accuracy
Programmable attenuator (MN72A)	• Frequency range: DC to 18 GHz • Attenuation accuracy: 0.9 dB • VSWR: 1.2 or less	Modulation/frequency measurement Power meter accuracy Linearity
Power divider	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
Power splitter	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
2GHz LPF	• Available for cutting off harmonic wave of 2 GHz or more generated by signal generator	Spurious measurement

The "Required Performance" column shows excerpts from the perform-ance covering the measurement range of the test items.

Performance Test <MS860x>

Before starting the performance test, warm up the devices to be tested and measurement units at least 30 minutes or more unless otherwise specified and make sure that they are stabilized.

To exert the highest measurement accuracy, measurement should be performed at room temperature (25 ±5°C), with little AC power voltage fluctuation, and in an environment free from noise, vibration, dust, humidity and other problems.

Modulation/frequency measurement <MS860x>

This section describes the tests on the following items:

* Carrier frequency accuracy
* Residual vector error
* Origin offset accuracy

(1)   Test specifications

* Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)

  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only
* Residual vector error: <2.0% (rms)

  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only
* Origin offset accuracy: ±0.5 dB

  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only, for a signal with origin offset –30 dBc

(2)   Measurement units for test

* Digital modulation signal generator (SG1): MG3681A
* Digital modulation signal generator (SG2): MG3681A
* Calibration receiver: ML2530A
* Programmable attenuator: MN72A
* 2-signal pad
* Power splitter

(3)   Setup
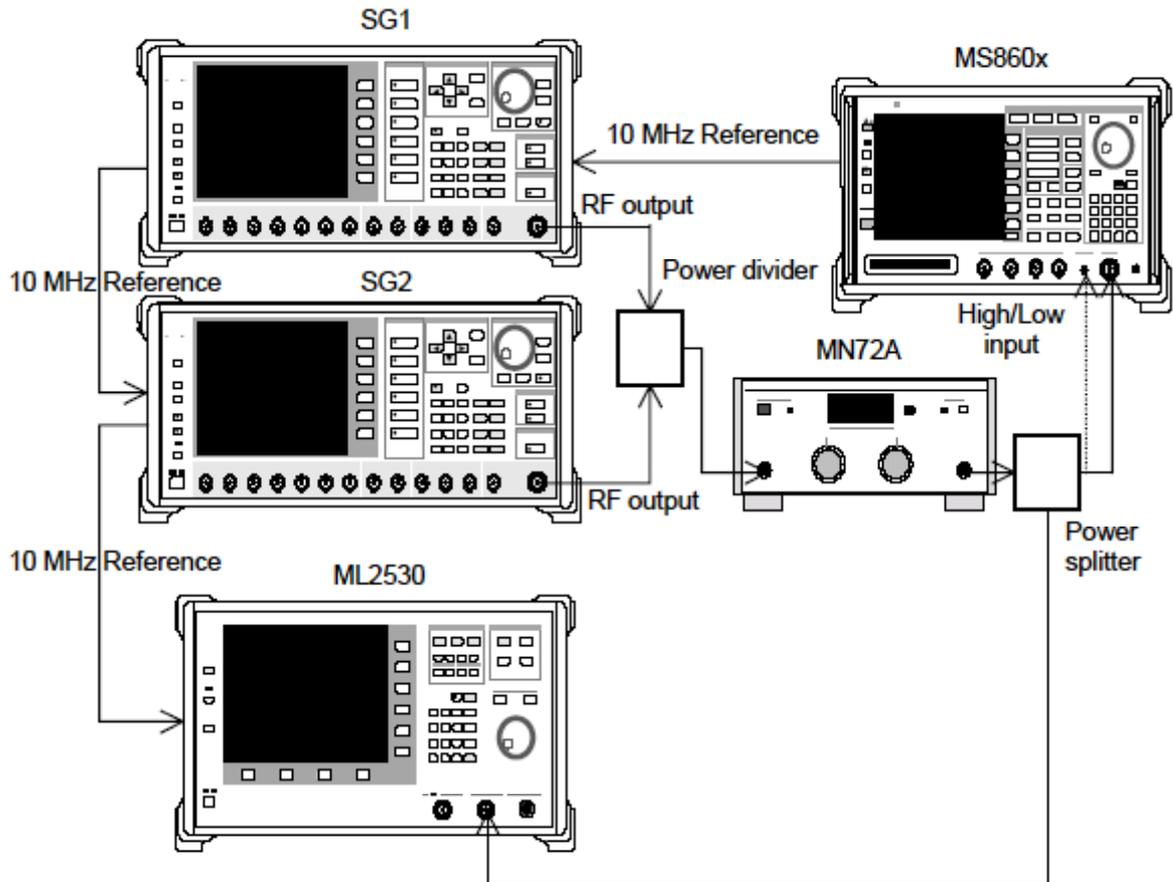
(4)   Test Procedures

1.   **Set the programmable attenuator (MN72A) to 0 dB.**

2.   **Set SG1 as follows:**

   • **Frequency: (Frequency in following table +307.2 kHz)**
     307.2 kHz is a quarter of the chip rate.
   • **Level: –10 dBm**
   • **Modulation: No modulation**

3.   **Set SG2 as follows (RF Output is Off):**

   • **Frequency: (Frequency in Table at step 17)**
   • **Level: SG1 Level –40 dBm**
   • **Modulation: No modulation**

4.   **Set the MS860xA as follows:**

   • **Input Terminal: RF (High Power input)**
   • **Reference Level: –10 dBm**
   • **Frequency: (Frequency in Table at step 17)**
   • **Measuring Object: QPSK & Continuous**
   • **Filter: Filtering**
   • **Trigger: Free Run**

5. Press ☐ (More) to display the second function label page.

6. Press ☐F6☐ (Power Meter) to display the Power Meter screen.

7. Set the calibration receiver (ML2530A) frequency to the frequency given in the table below +307.2 kHz and set BW to 100 Hz, Absolute mode.

8. Set SG2 RF Output to Off, set SG1 RF Output to On, change the ML2530A frequency to the frequency given in the table below, and adjust the SG1 level so that the indicated value matches the one given in the table below.

9. Set SG1 RF Output to Off, SG2 RF Output to On, and ML2530A to Relative mode. Adjust the SG2 level so that the indicated value matches –30 ±0.1 dB and record the results (origin offset expected value).

10. Set the programmable attenuator (MN72A).

    For Pre-Ampl On: 30 dB
    For MS8609A and MS8608A Low input: 20 dB
    For MS8608A High input: 0 dB

11. Return the function label to the first page, and press ☐F2☐ (Modulation Analysis) on the measurement unit to display the Modulation Analysis screen.

12. Execute ☐F5☐ (Adjust Range).

13. Press ☐F4☐ (Analysis Mode) and then ☐F2☐ (Analysis Length) and set Analysis Length to 1536 chips.

14. Read the measurement results displayed on the screen and check that the origin offset satisfies the Standard.

    Origin offset accuracy [dB] = Measurement result – Origin offset expected value

15. Set the SG2 output to Off.

16. Read the measurement results displayed on the screen and check that the frequency error and residual vector error satisfy the Standard.

17. Change the frequency as shown in the table below and repeat Steps 1 to 16.

Frequency	Level (input level to MS860x)		
	MS860x Pre-Ampl On	MS8609A and MS8608A Low input	MS8608A High input
50 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
850 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
2000 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
2300 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB

Code domain measurement <MS860x>

This section describes the tests on the following items:

- Code domain power measurement accuracy

This measurement is not completely the same as the shipment inspection done by Anritsu.

(1) Test specifications

- Code domain power measurement accuracy:

$\pm$0.2 dB (Code power$\geq$ $-$10 dBc)

$\pm$0.4 dB (Code power$\geq$ $-$25 dBc)

Input level: $\geq$ +10 dBm (High Power input)

$\geq$ $-$10 dBm (Low Power input)

$\geq$ $-$20 dBm (Low Power input, preamplifier On)

(2) Measurement units for test
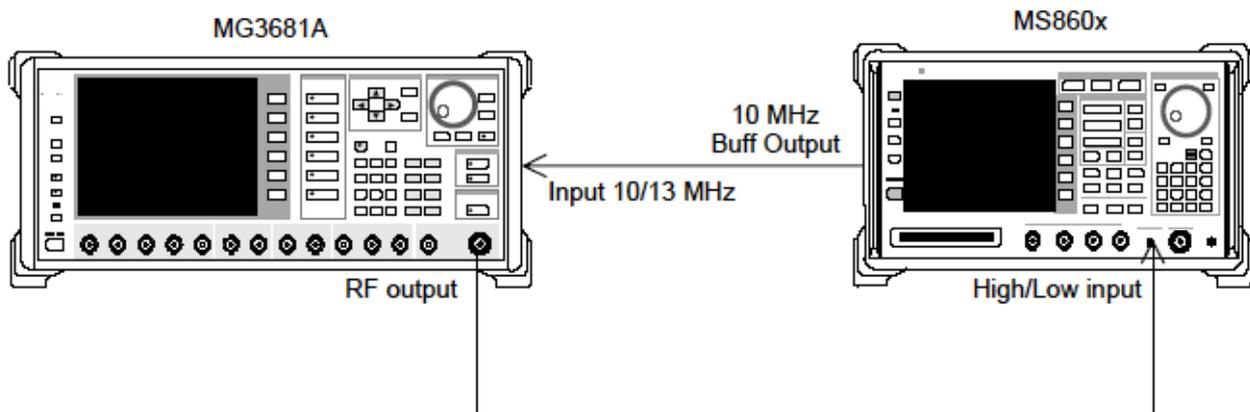
- Digital modulation signal generator (SG1): MG3681A

(3) Setup

(4)   Test Procedures

1.   Set the evaluation signal data in the digital modulation signal gen-
     erator (SG1).
     For details on the evaluation signal, refer to "Evaluation Signal."

2.   Set SG1 as follows:
     • Frequency: 50 MHz
     • Level: –10 dBm

3.   Set the measurement unit as follows:
     • Input Terminal: RF (Low Power input)
     • Reference Level: –10 dBm
     • Frequency: 50 MHz
     • Measuring Object: Forward (RC1-2)
     • Filter: Filtering + EQ
     • Trigger: Free Run

4.   Press ⬚ (More) to display the second function label page.

5.   Press [F6] (Power Meter) to display the Power Meter screen.

6.   Set SG1 output to Off and execute [F5] (Zero Set).

7.   Set SG1 output to On and execute [F4] (Adjust Range).
     Adjust the SG1 level so that the Power Meter indicates –10 dBm
     ±0.1 dB. (Be sure to execute Adjust Range after changing the SG1
     level.) After level calibration, press [F6] (Back Screen).

8.   Return the function label to the first page, and press [F2] (Modu-
     lation Analysis) on the measurement unit to display the Modulation
     Analysis screen.

9.   Execute [F5] (Adjust Range).

10. Press [F4] (Analysis Mode) and then [F1] (Analysis Start) and
     set Analysis Start to 0. Press [F2] (Analysis Length) and set
     Analysis Length to 1536 chips.

11. Press [F6] (Return) and then [F1] (Trace Format) and set Code
     Domain.

12. Press ⬚ (More) once to display the second function label page.

13. Press [F2] (Auto Rate Detection) to set it Off.

14. Press [Single] and wait until measuring is completed.

15. Check that the power of the codes satisfies the Standard. The codes
     and their expected power values are listed below.
     Code 0   : –10.0 dB
     Code 7   : –0.68 dB
     Code 15   : –15.0 dB
     Code 31   : –20.0 dB
     Code 63   : –25.0 dB

16. Change the frequency of SG1 and the measurement unit to 850 MHz,
     2 GHz, and 2.3 GHz and repeat Steps 1 to 15 above.

Transmission power measurement accuracy <MS860x>

(1)   Test specifications

±0.4 dB (after calibration using the built-in power meter)

(2)   Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Power meter: ML4803A
- Power sensor: MA4601A
- 20 dB attenuator: MP721D

(3)   Setup
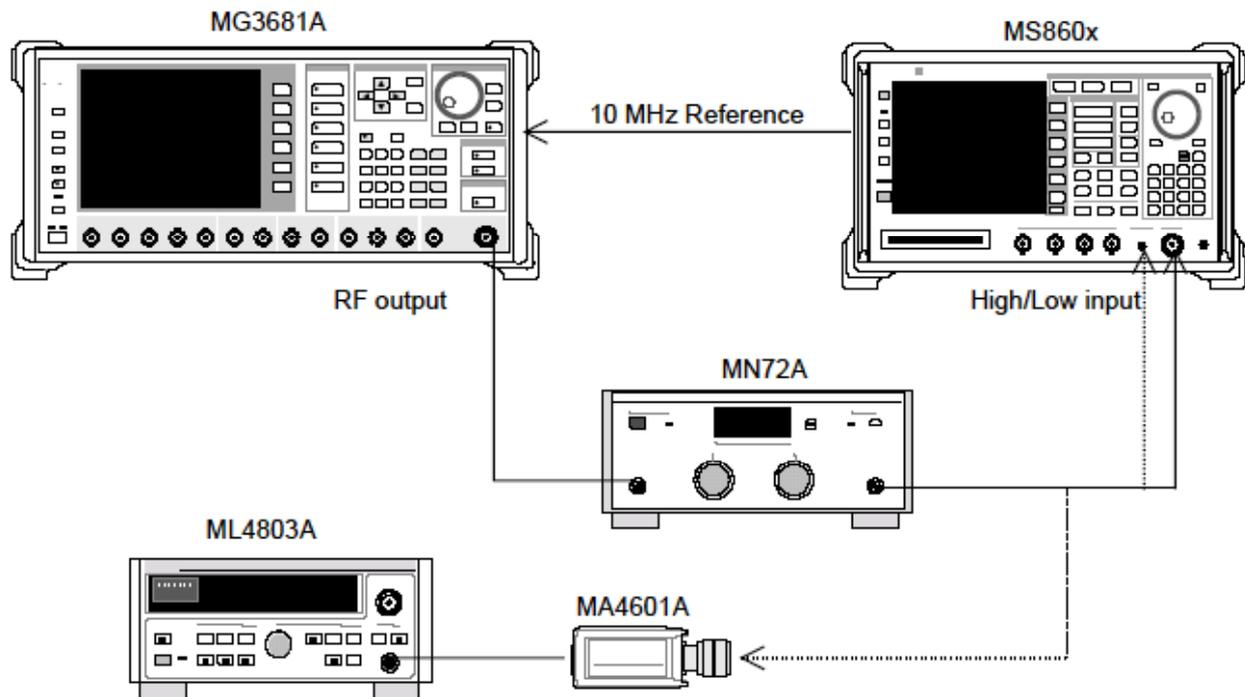
(4)   Test Procedures

1.   Set the evaluation signal data in the digital modulation signal generator (SG1).
      For details on the evaluation signal, refer to "Evaluation Signal."

2.   Set SG1 as follows:
      - Frequency: 50 MHz
      - Level: +0.5 dBm

3.   Connect power sensor (MA4601A) to Cal Output on power meter (ML4803A) and execute Zero Adjust.

4.   Set Sensor Input to On and execute ADJ (Cal Adjust).

5.   Connect SG1 to power sensor (MA4601A).

6.   Adjust the SG1 output level so that the power meter (ML4803A) indicates +0.5dBm ±0.1 dB and record the measurement results (power meter measurement value).

7.   Connect the SG1 output to the measurement unit.

8.   Set the measurement unit as follows:

   - Input Terminal: RF (High Power input)
   - Reference Level: +0.5 dBm
   - Frequency: 50 MHz
   - Measuring Object: QPSK & Continuous

9.   Return the function label to the first page and press ⌈F3⌉ (RF Power) to display the RF Power screen.

10. Execute ⌈F5⌉ (Adjust Range).

11. Press ⌈F4⌉ (Calibration) and execute ⌈F1⌉ (Power Calibration).

12. Read the TX Power value in the measurement results (RF Power measurement value).

13. Change the frequency of SG1 and the measurement unit to 850 MHz, 2 GHz, and 2.3 GHz and repeat Steps 2 to 13. After measurement at these frequencies is completed, go to Step 13.

14. Press ⌈ Shift ⌉ and then ⌈ Hi Power ⌉ to set Low Power Input mode. Insert the calibrated MP721D 20dB ATT (measure the MP721D attenuation at each measurement frequency in advance) into the input.

15. Connect the SG1 output to Low Power Input and repeat Steps 2 to 13 above. The result is the Low Power Input result.

   - For MS8608A High input
     Measurement accuracy [dB] = RF Power measurement value – Power meter measurement value

   - For Pre-Ampl On and MS860xA Low input
     Measurement accuracy [dB] = RF Power measurement value – (Power meter measurement value – MP721D actual attenuation)

Linearity <MS860x>

(1)   Test specifications

± 0.2 dB (0 to -40 dB)

Without changing the reference level setting after range optimization

(2)   Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Calibration receiver: ML2530A
- Programmable attenuator: MN72A
- Power meter: ML4803A
- Power sensor: MA4601A

(3)   Setup
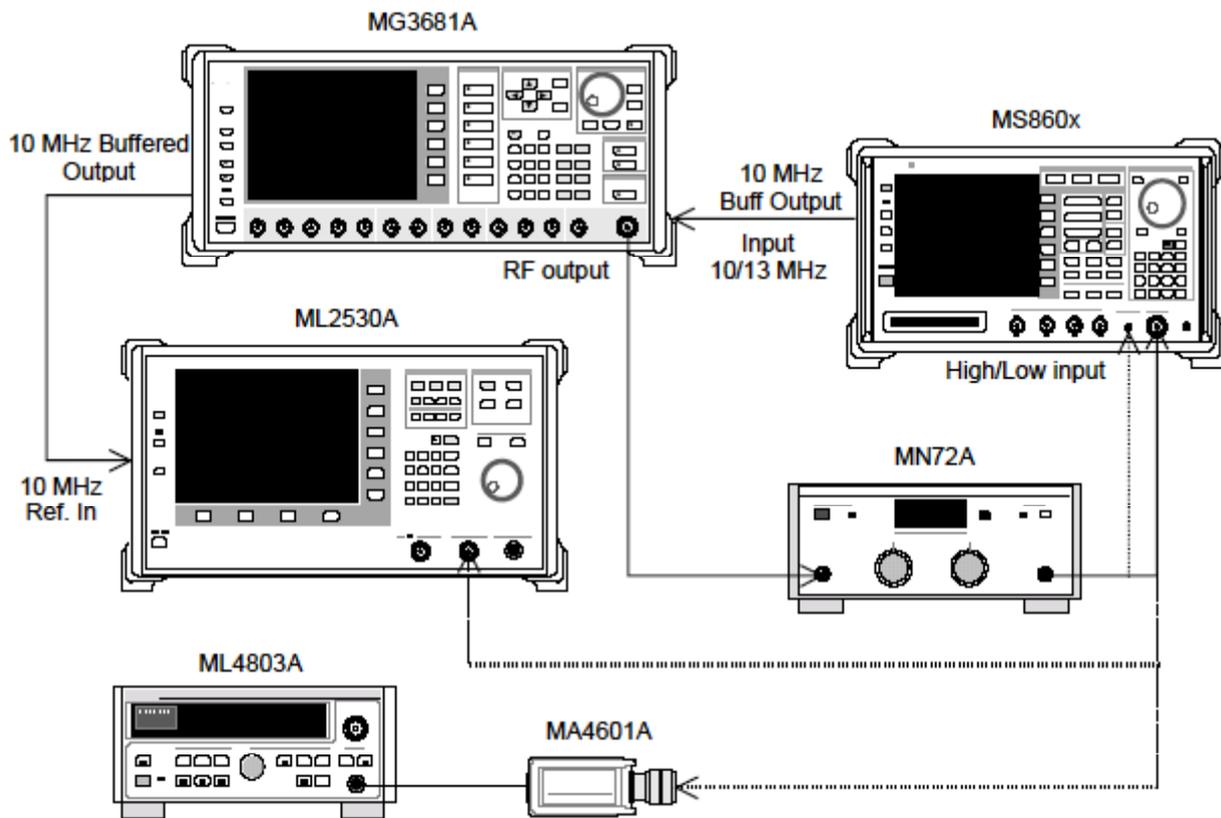
(4)   Test Procedures

1.   Connect power sensor (MA4601A) to Cal Output on power meter (ML4803A) and execute Zero Adjust.

2.   Set Sensor Input to On and execute ADJ (Cal Adjust).

3.   Connect SG1 (MN27A output) to power sensor (MA4601A).

4.   Set the SG1 frequency and then set the programmable attenuator (MN72A) to 0 dB. Adjust the SG1 level so that the power meter (ML4803A) indicates +10 dBm $\pm$0.1 dB. Record the measurement results (Set_Ref). See the table below for the measured frequencies and levels.

Frequency	Level (input level to MS860x)		
	MS860x Pre-Ampl On	MS8609A and MS8608A Low input	MS8608A High input
50 MHz	−20 dBm $\pm$0.1 dB	−10 dBm $\pm$0.1 dB	+10 dBm $\pm$0.1 dB
850 MHz	−20 dBm $\pm$0.1 dB	−10 dBm $\pm$0.1 dB	+10 dBm $\pm$0.1 dB
2000 MHz	−20 dBm $\pm$0.1 dB	−10 dBm $\pm$0.1 dB	+10 dBm $\pm$0.1 dB
2300 MHz	−20 dBm $\pm$0.1 dB	−10 dBm $\pm$0.1 dB	+10 dBm $\pm$0.1 dB

5.   Connect SG1 (MN72A output) to calibration receiver (ML2530A) and set BW to 100Hz, Relative mode (with the range fixed to 1).

6.   Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is −40 dBc and record the measurement value (ML2530A reading) at the calibration receiver (ML2530A) for each step.

7.   Set measurement unit as follows:
   • Input Terminal: RF (High/Low Power Input)
   • Reference Level: (Level indicated in the table above)
   • Frequency: (Frequency indicated in the table above)
   • Measuring Object: QPSK & Continuous
   • Filter: Filtering
   • Trigger: Free Run

8.   Set the programmable attenuator (MN72A) as follows:
   • For Pre-Ampl On: 30 dB
   • For MS8609A and MS8608A Low input: 20 dB
   • For MS8608A High input: 0 dB

9.   Connect SG1 (MN72A output) to the measurement unit and set the SG1 level to Set_Ref.

10.   Press ⌑F3⌑ (RF Power) to display the RF Power screen.

11.   Execute ⌑F5⌑ (Adjust Range).

12.   Press ⌑F4⌑ (Calibration) and execute ⌑F1⌑ (Power Calibration).

13. Record the Tx Power value (dBm) (Measure_Ref).

14. Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is –40 dBc and record the Tx Power value at each step.

    * Note that the SG1 level should be lowered in steps of 10 dB; do not adjust the programmable attenuator (MN72A).

15. Check that the linearity error (shown below) satisfies the Standard.
    Linearity error [dB] = Tx Power value – (Measure_Ref – ML2530A reading)

16. Change the frequency and repeat Steps 3 to 15 above.

Occupied frequency bandwidth measurement <MS860x>

(1) Test specifications

This test is a functional test and therefore has no test specifications.

(2) Measurement units for test

- Digital modulation signal generator: MG3681A

(3) Setup

(4) Test procedures

1. Set the evaluation signal data in the digital modulation signal generator (SG1).
   For details on the evaluation signal, refer to "Evaluation Signal."

2. Set SG1 as follows:

   - Frequency: (Given in Table at step 8.)
   - Level: (Given in Table at step 8)

3. Set the measurement unit as follows:

   - Input Terminal: RF (High/Low Power Input)
   - Reference Level: 0 dBm (Level given in Table at step 8)

- Frequency: 50 MHz (Frequency given in Table at step 8)
- Measuring Object: QPSK & Continuous

4.   Press $\boxed{\text{F4}}$ (Occupied Bandwidth) and display the Occupied Bandwidth screen.

5.   Execute $\boxed{\text{F5}}$ (Adjust Range).

6.   Press $\boxed{\text{F1}}$ (Measure Method) and set the measurement method to FFT.

7.   Check that the occupied frequency bandwidth measurement value is 1.26 ±0.1 MHz.

8.   Change the frequency and repeat Steps 2 to 7 above.

Frequency	Level (SG1 set value)		
	MS860x Pre-Ampl On	MS8609A and MS8608A Low input	MS8608A High input
50 MHz	−30 dBm	−20 dBm	0 dBm
850 MHz	−30 dBm	−20 dBm	0 dBm
2000 MHz	−30 dBm	−20 dBm	0 dBm
2300 MHz	−30 dBm	−20 dBm	0 dBm

Nearby spurious measurement <MS860x>

(1)   Test specifications

Input level ≥+20 dBm (High Power input), ≥0 dBm (Low Power input)

900 kHz detuning: ≥51 dBc

1.98 MHz detuning: ≥61 dBc

(2)   Measurement units for test

- Digital modulation signal generator (SG1): MG3681A

(3)   Setup
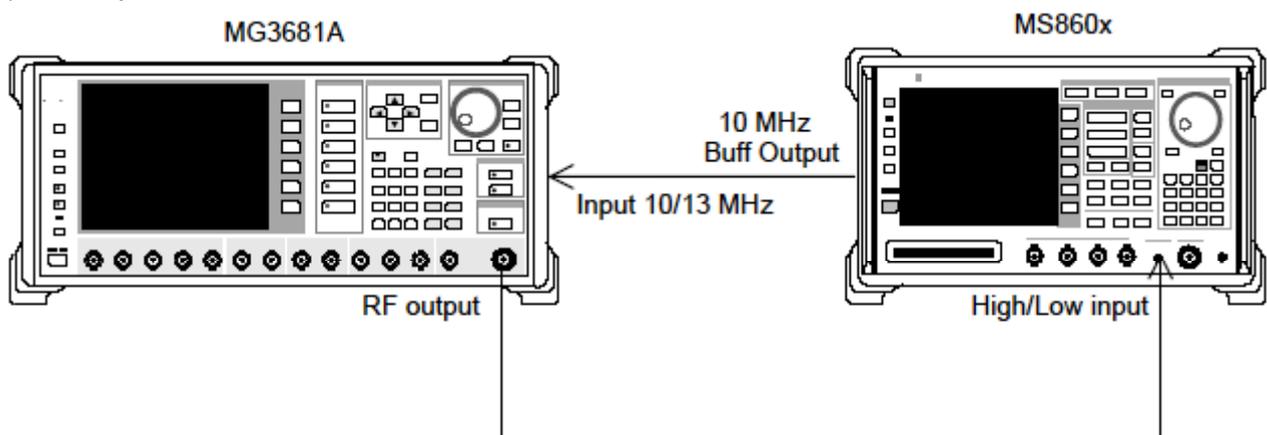
(4) Test Procedures

1. Set the digital modulation signal generator (SG1) as follows:

    - Frequency: (Given in table below)
    - Level: (Given in table below)
    - System: IS-95
    - Link: Forward
    - Filter: SPEC + EQ
    - Pat. Number: 9

2. Set the measurement unit as follows:

    - Input Terminal: RF (Low Power Input)
    - Reference Level: 0 dBm (Level given in table below)
    - Frequency: (Given in table below)
    - Measuring Object: QPSK & Continuous
    - Trigger: Free Run

3. Press ⬚ (More) to display the second function label page.

4. Press ⎡F6⎤ (Power Meter) to display the Power Meter screen.

5. Set the SG1 output to Off and execute ⎡F5⎤ (Zero Set).

6. Set SG1 to the level given in the table below and execute ⎡F4⎤ (Adjust Range). Adjust the SG1 level so that the Power Meter indicates the level given in the table below. (Be sure to execute Adjust Range after changing the SG1 level.)

7. After level calibration, press ⎡F6⎤ (Back Screen).

8. Return the function label to the first page, and press ⎡F5⎤ (Spurious Close to the Carrier) to display the Spurious Close to the Carrier screen.

9. Execute ⎡F5⎤ (Adjust Range).

10. Read the measurement results and check that the measurement range satisfies the Standard.

Frequency	Level (input level to MS860x)	
	MS8609A and MS8608A Low input	When MS860x Pre-Ampl installed*
50 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
850 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

Spurious measurement <MS860x>

(1)   Test specifications

- **Measurement range**
  At CW carrier frequency 800 MHz to 1 GHz or 1.8 to 2.2 GHz
  ≥79 dB typical (RBW: 10 kHz)
     (10 to 30 MHz, band 0)
  ≥79 dB typical (RBW: 100 kHz)
     (30 MHz to 1 GHz, band 0)
  ≥76 – f [GHz] dB typical (RBW: 1 MHz)
     (1 to 3.15 GHz, band 0, normal mode)
  ≥76 dB typical (RBW: 1 MHz)
     (3.15 to 7.8 GHz, band 1, normal mode)
  When option 03 is installed
  ≥76 dB typical (RBW: 1 MHz)
     (1.6 to 7.8 GHz, band 1, spurious mode)
- *   **For carrier frequency 2030.354 to 2200 MHz, spurious occurs at the following frequency:**
       f (Spurious) = f (in) – 2030.345 MHz

(2)   Measurement units for test

- **Digital modulation signal generator (SG1): MG3681A**
- **LPF switching unit (available for cutting off secondary harmonic wave of 850 MHz and for filter through operation)**
- **2 GHz LPF**

(3)   Setup
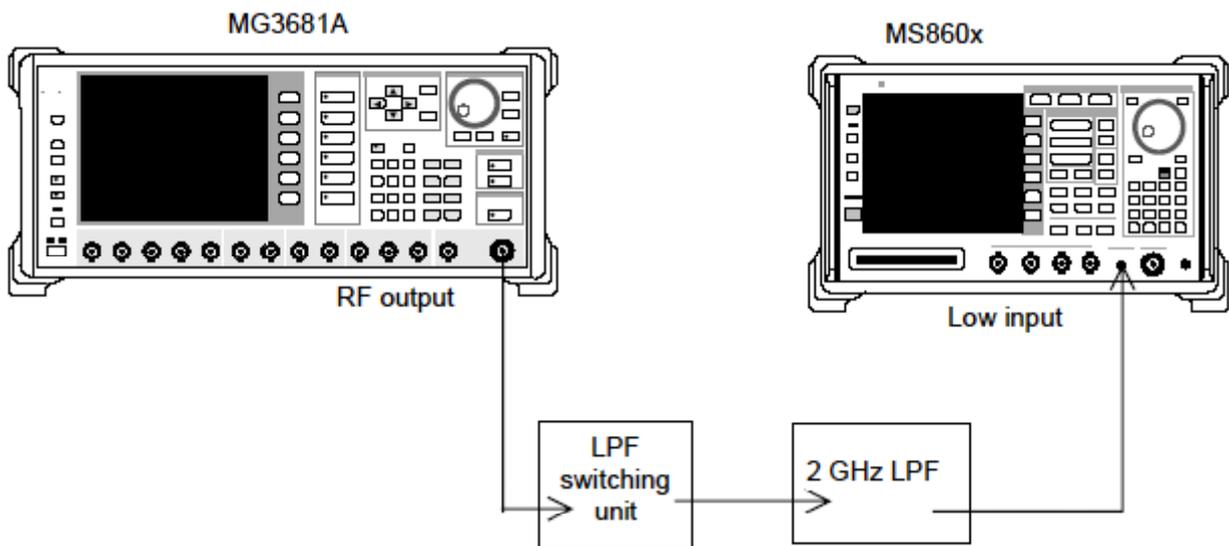
(4) Test Procedures

1. Set the digital modulation signal generator (SG1) frequency and output level. Measure the input level to the measurement unit using the built-in power meter. See the table below for the measured frequencies and levels.

Frequency	Level (power meter reading)	
	MS860xA with Pre-Ampl *	**MS8609A and MS8608A Low input**
850 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: With option 08 installed and Pre-Ampl set to Off

2. Set the measurement unit as follows:
    - Input Terminal: RF (Low input only for MS8608A)
    - Reference Level: 0 dBm
    - Frequency: 2000 MHz
    - Measuring Object: QPSK & Continuous
    - Filter: Filtering
    - Trigger: Free Run

3. Press ☐ (More) to display the second function label page.

4. Press ⌊F6⌋ (Power Meter) to display the Power Meter screen

5. Set the SG1 output to Off and execute ⌊F5⌋ (Zero Set).

6. Set SG1 to the level given in the table above and execute ⌊F4⌋ (Adjust Range). Adjust the SG1 level so that the power meter indicates 0 dBm ±0.1 dB. (Be sure to execute Adjust Range after changing the SG1 level.)

7. After level calibration, press ⌊F6⌋ (Back Screen).

8. Return the function label to the first page and press ⌊F6⌋ (Spurious Emission) to display the Spurious Emission screen.

9. Press ☐ (More) to display the third function label page.

10. Press ⌊F1⌋ (Ref Power) to set Tx Power.

11. Press ☐ (More) to display the first function label page.

12. Press ⌊F1⌋ (Spurious Mode) and set ⌊F3⌋ (Sweep). After setting, press ⌊F6⌋ (return).

13. Press ⌊F3⌋ (Setup Search/Sweep Table) and set Table 4-1-1. After setting, press ⌊F6⌋ (Back Screen).

14. Press ☐ (More) to display the second function label page. Press ⌊F4⌋ (Preselector) to set Normal mode.

15. Return the function label to the first page.

    * Steps 11 and 12 are available only when option 03 is installed.

16. Execute [F5] (Adjust Range).

17. Press [F4] (Calibration) and execute [F1] (Power Calibration).

18. Check that the measurement range satisfies the Standard.

19. When option 03 is installed, set the following.

20. Press [F3] (Setup Search/Sweep Table) and press [ ] (More) to display the second function label page.

21. Press [F2] to clear the frequency table.

22. Set Table 4-1-1 and press [F6] (Back Screen).

23. Press [ ] (More) to display the second function label page.   Press [F4] (Preselector) to set Spurious mode.

24. Return the function label to the first page.

25. Repeat Steps 13 to 15 above.

Table 4-1-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	800 MHz	100 kHz
f3	900 MHz	1000 MHz	100 kHz
f4	1000 MHz	1650 MHz	1 MHz
f5	1750 MHz	2500 MHz	1 MHz
f6	2600 MHz	3200 MHz	1 MHz
f7	3200 MHz	7800 MHz	1 MHz

Table 4-1-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	3150 MHz	1 MHz

Table 4-2-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	950 MHz	100 kHz
f3	1050 MHz	1950 MHz	1 MHz
f4	2050 MHz	3200 MHz	1 MHz
f5	3200 MHz	7800 MHz	1 MHz

Table 4-2-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	1950 MHz	1 MHz
f2	2050 MHz	3150 MHz	1 MHz

IQ input modulation accuracy <MS860x>

(1) Test specifications

- **Resisual vector error: <2% (rms), DC coupling**

(2) Measurement units for test
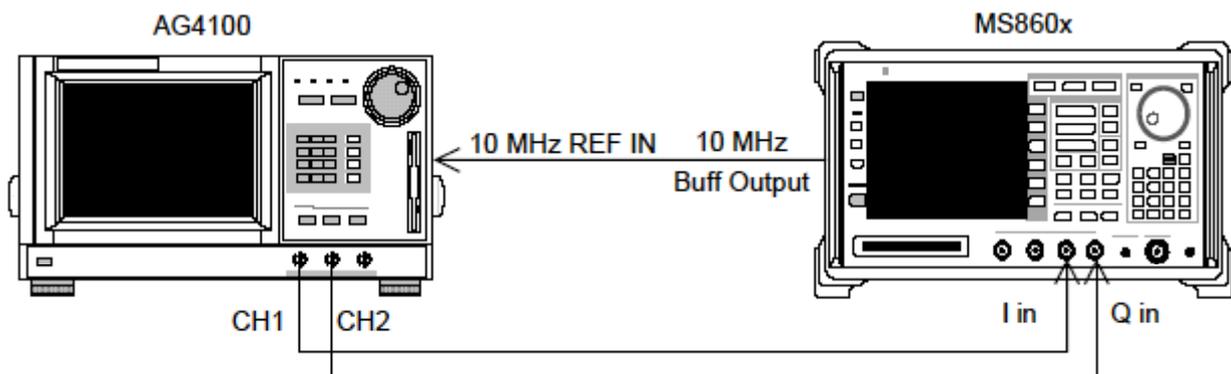
- **Digital modulation signal generator: MG3681A**

(3) Setup

(4) Test Procedures

1. Set the signal data for an arbitrary waveform generator as the evaluation signal.
   For details on the evaluation signal, refer to "Evaluation Signal."

2. Set the measurement unit as follows:
   - Input Terminal: IQ-DC
   - Impedance: 50 Ω
   - Measuring Object: Forward (RC1-2)
   - Filter: Filtering
   - Trigger: Free Run

3. Press ⎡F2⎤ (Modulation Analysis) to display the Modulation Analysis screen.

4. Press ⎡F4⎤ (Analysis Mode) and then ⎡F1⎤ (Analysis Start) and set Analysis Start to 0. Press ⎡F2⎤ (Analysis Length) and set Analysis Length to 1536 chips.

5. Check that the residual vector value satisfies the Standard.

Power meter accuracy <MS860x>

(1)   Test specifications

- **Measurement level accuracy**
  ±10% (after zero-point calibration)

(2)   Measurement units for test

- **Digital modulation signal generator (SG1):MG3681A**
- **Calibration receiver: ML2530A**
- **Power meter: ML4803A**
- **Power sensor: MA4601A**
- **Programmable attenuator: MN72A**
- **3 dB ATT × 2: MP721A**

(3)   Setup
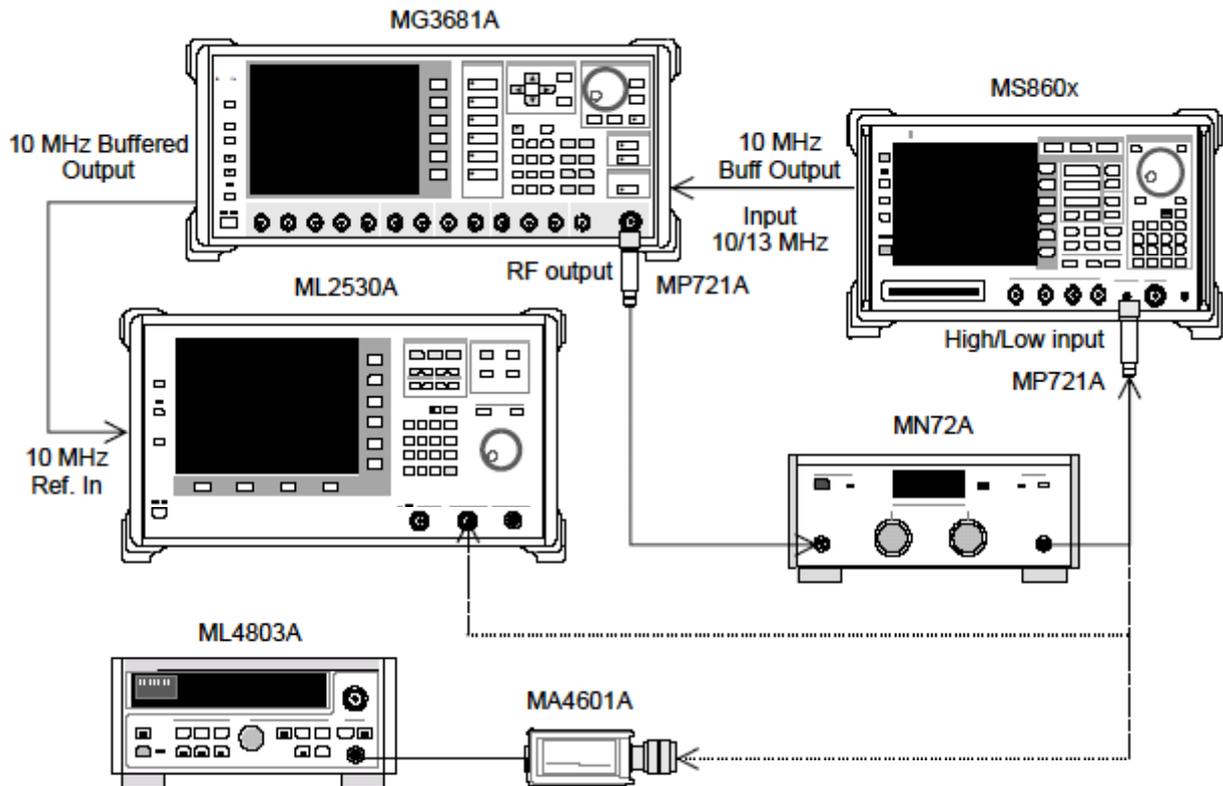
(4) Test Procedures

1. **Connect power sensor (MA4601A) to the Cal Output for power meter (ML4803A) and execute Zero Adjust.**

2. **Set Sensor Input to On and execute ADJ (Cal Adjust).**

3. **Connect SG1 (MN72A output) to the power sensor (MA4601A) with MP721A.**

4. **Set the SG1 frequency.**
    Measurement frequencies: 50 MHz, 2000 MHz, 3000 MHz

5. **Adjust the SG1 level so that the power meter (ML4803A) indicates +10 dBm ±0.1 dB at the set frequency. Record the SG1 set value (Set_Ref) and the power meter reading (Read_Ref).**

6. **Connect the SG1 (MN72A output) to the calibration receiver (ML2530A) with MP721A and set the SG1 level to the Set_Ref value above.**

7. **Set the calibration receiver (ML2530A) to Relative mode (with range fixed to 1), lower the programmable attenuator (MN72A) in steps of 10 dB until it is −30 dB, and record the measurement value of MS2530A at each step (ATT_n). After recording, reset the MN72A to 0 dB.**

8. **Press ☐ (More) on the measurement unit to display the second function label page.**

9. **Press ⌷F6⌷ (Power Meter) to display the Power Meter screen.**

10. **With no signals input to the measurement unit, execute ⌷F5⌷ (Zero Set).**

11. **Connect SG1 (MN72A output) to the measurement unit with MP721A.**

12. **Set the frequency for the measurement unit to the value set in Step 4 above.**

13. **Lower the programmable attenuator (MN72A) in steps of 10 dB until it is −30 dB. Calculate the measurement accuracy from the measurement value for the measurement unit (tester measurement value) at each attenuation step and the Power meter reading (Read_Ref) − ML2530A measurement value (ATT_n) (see the expression below). When changing the programmable attenuator settings, execute ⌷F4⌷ (Adjust Range) at each step.**

$$Measurement\ accuracy[\%] = \left(\frac{10^{(Tester\ measurement\ value/10)}}{10^{(\mathrm{Re}ad\_\mathrm{Re}f+ATT\_n)/10}} - 1 \right) \times 100$$

    * ATT_n is a minus value.

14. **Change the frequency and repeat Steps 3 to 13 above.**

Evaluation signal <MS860x>

Here, the evaluation signal settings are explained. The user will need the evaluation signal to perform the performance test. Based on these settings, set the Digital modulation signal generator.

Outline of evaluation signal
- **Walsh Length = 64**
- **Channelization Code = Multiplexing of five codes: 0, 7, 15, 31, 63**
- **The power ratio is as follows:**

Power ratio of each code

Power ratio

Code 0	**: –10.0 dB**
Code 7	**: –0.68 dB**
Code 15	**: –15.0 dB**
Code 31	**: –20.0 dB**
Code 63	**: –25.0 dB**

Equipment Required for Performance Test <MS268x>

The measurement equipment required for the performance test is listed below.

Recommended unit name (model)	Required performance	Test items
Digital modulation signal generator (MG3681A/ MX368042A) Two units used	• Frequency range: 10 MHz to 3 GHz Resolution 1 Hz available • Output level range No modulation: –10 to 12 dBm Modulation: –10 to 4 dBm Resolution 0.1 dB available • External reference input: (10 MHz) available • Residual vector error: 2.5% or less	Modulation/frequency measurement Code domain measurement Transmission power measurement accuracy Linearity Occupied frequency bandwidth measurement Nearby spurious measurement Spurious measurement IQ input modulation accuracy
Calibration receiver (ML2530A)	• Frequency range: 100 kHz to 3 GHz Resolution 1 Hz available • Measurement power range: –140 to 20 dBm • Measurement accuracy: ±0.04 dB • External reference input: (10 MHz) available	Modulation/frequency measurement Linearity
Power meter (ML4803A) Power sensor (MA4601A)	• Main unit accuracy: ±0.02 dB • Frequency range: 100 kHz to 8.5 GHz (depending on power sensor used) • Frequency range: 10 MHz to 3 GHz • Measurement power range: –30 to +20 dBm • Input connector: N type	Modulation/frequency measurement Code domain measurement Transmission power measurement accuracy Linearity Nearby spurious measurement Spurious measurement
Fixed attenuator (MP721D)	• Attenuation: 20 dB • VSWR: 1.2 or less	Transmission power measurement accuracy
Programmable attenuator (MN72A)	• Frequency range: DC to 18 GHz • Attenuation accuracy: 0.9 dB • VSWR: 1.2 or less	Modulation/frequency measurement Linearity
Power divider	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
Power splitter	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
2GHz LPF	• Available for cutting off harmonic wave of 2 GHz or more generated by signal generator	Spurious measurement

The "Required Performance" column shows excerpts from the performance covering the measurement range of the test items.

Performance Test <MS268x>

Before starting the performance test, warm up the devices to be tested and measurement units at least 30 minutes or more unless otherwise specified and make sure that they are stabilized.

To exert the highest measurement accuracy, measurement should be performed at room temperature (25 ±5°C), with little AC power voltage fluctuation, and in an environment free from noise, vibration, dust, humidity and other problems.

Modulation/frequency measurement <MS268x>

This section describes the tests on the following items:

- Carrier frequency accuracy
- Residual vector error
- Origin offset accuracy

(1)   Test specifications

<MS2681A/MS2683A>
- Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)
  Input: Level ≥ –30 dBm (preamplifier Off), –40 dBm (preamplifier On*), with code channel 1 CH only
- Residual vector error: <2.0% (rms)
  Input: Level ≥ –30 dBm (preamplifier Off), –40 dBm (preamplifier On*), with code channel 1 CH only
- Origin offset accuracy: ±0.5 dB
  Input: Level ≥ –30 dBm (preamplifier Off), –40 dBm (preamplifier On*), with code channel 1 CH only, for a signal with origin offset –30 dBc

*Preamplifier On is available when Main unit option -08 is installed.

<MS2687A/B>
- Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)
  Input: Level ≥ –30 dBm, with code channel 1 CH only
- Residual vector error: <2.0% (rms)
  Input: Level ≥ –30 dBm, with code channel 1 CH only
- Origin offset accuracy: ±0.5 dB
  Input: Level ≥ –30 dBm, with code channel 1 CH only, for a signal with origin offset –30 dBc

(2)   Measurement units for test

- **Digital modulation signal generator (SG1): MG3681A**
- **Digital modulation signal generator (SG2): MG3681A**
- **Calibration receiver: ML2530A**
- **Programmable attenuator: MN72A**
- **Power divider**
- **Power splitter**
- **Power meter: ML4803A**
- **Power sensor: MA4601A**
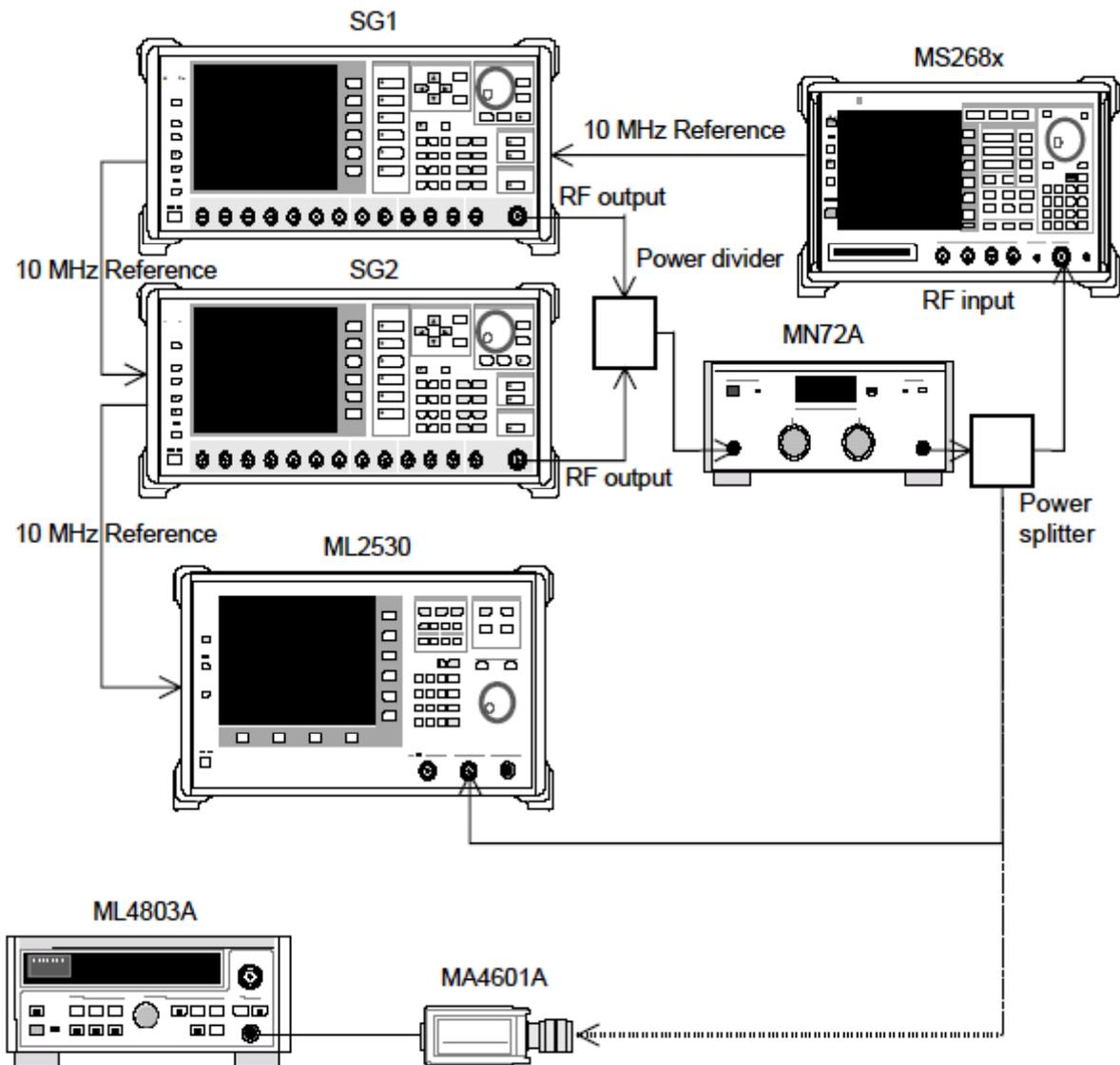
(3)   Setup

(4)   Test Procedures

1. Set the programmable attenuator (MN72A) to 0 dB.

2. Set SG1 as follows:
    - Frequency: (Frequency in Table at step 18 +307.2 kHz)
      307.2 kHz is a quarter of the chip rate.
    - Level: –10 dBm
    - Modulation: No modulation

3. Set SG2 as follows (RF Output is OFF):
    - Frequency: (Frequency in Table at step 18)
    - Level: SG1 Level –40 dBm
    - Modulation: No modulation

4. Set the measurement unit as follows:
    - Input Terminal: RF
    - Reference Level: –10 dBm
    - Frequency: (Frequency in Table at step 18)
    - Measuring Object: QPSK & Continuous
    - Filter: Filtering
    - Trigger: Free Run

5. Connect the splitter output to the power sensor (MA4601A) and switch SG1 output to ON.

6. Adjust the SG1 level so that power meter (ML4803A) indicates a value of –10 dBm ±0.1dB.

7. Connect the splitter output to RF input of the measurement unit.

8. Set the calibration receiver (ML2530A) frequency to the frequency given in Table at step 18 +307.2 kHz and set BW to 100 Hz, Absolute mode

9. Set SG2 RF Output to Off, set SG1 RF Output to On, change the ML2530A frequency to the frequency given in Table at step 18, and adjust the SG1 level so that the indicated value matches the one given in Table at step 18.

10. Set SG1 RF Output to Off, SG2 RF Output to On, and ML2530A to Relative mode. Adjust the SG2 level so that the indicated value matches –30 ±0.1dB and record the results (origin offset expected value).

11. Set the programmable attenuator (MN72A).
    - For Pre-Ampl On: 30dB
    - For Pre-Ampl Off: 20 dB

12. Press ⎡F2⎤ (Modulation Analysis) on the measurement unit to display the Modulation Analysis screen.

13. Execute ⎡F5⎤ (Adjust Range).

14. Press $\boxed{\text{F4}}$ (Analysis Mode) and then $\boxed{\text{F2}}$ (Analysis Length) and set Analysis Length to 1536 chips.

15. Read measurement results displayed on the screen and check that the origin offset satisfies the Standard.
    Origin offset accuracy [dB] = Measurement result – Origin offset expected value.

16. Set the SG2 output to Off.

17. Read measurement results displayed on the screen and check that the frequency error and residual vector error satisfy the Standard.

18. Change the frequency as shown in the table below and repeat Steps 1 to 17.

Frequency	Level (input level to MS268x)		
	MS2681A/3A Pre-Ampl On	MS2681A/3A Pre-Ampl Off	MS2687A/B
50 MHz	−40 dBm ±0.1 dB	−30 dBm ±0.1 dB	−30 dBm ±0.1 dB
850 MHz	−40 dBm ±0.1 dB	−30 dBm ±0.1 dB	−30 dBm ±0.1 dB
2000 MHz	−40 dBm ±0.1 dB	−30 dBm ±0.1 dB	−30 dBm ±0.1 dB
2300 MHz	−40 dBm ±0.1 dB	−30 dBm ±0.1 dB	−30 dBm ±0.1 dB

Code domain measurement <MS268x>

This section describes the tests on the following items:

- **Code domain power measurement accuracy**

This measurement is not completely the same as the shipment inspection done by Anritsu.

(1)   Test specifications

<MS2681A/MS2683A>

- **Code domain power measurement accuracy:**

$$\pm \textbf{0.1 dB (Code power} \geq -\textbf{10 dBc)}$$
$$\pm \textbf{0.3 dB (Code power} \geq -\textbf{25 dBc)}$$

Input level: $\geq -$10 dBm (preamplifire Off)
$$\geq -\textbf{20 dBm (preamplifire On)}$$

<MS2687A/B>

- **Code domain power measurement accuracy:**

$$\pm \textbf{0.1 dB (Code power} \geq -\textbf{10 dBc)}$$
$$\pm \textbf{0.3 dB (Code power} \geq -\textbf{25 dBc)}$$

Input level: $\geq -$10

(2)   Measurement units for test

- **Digital modulation signal generator (SG1): MG3681A**
- **Power Meter: ML4803A**
- **Power Sensor: MA4601A**

(3)   Setup
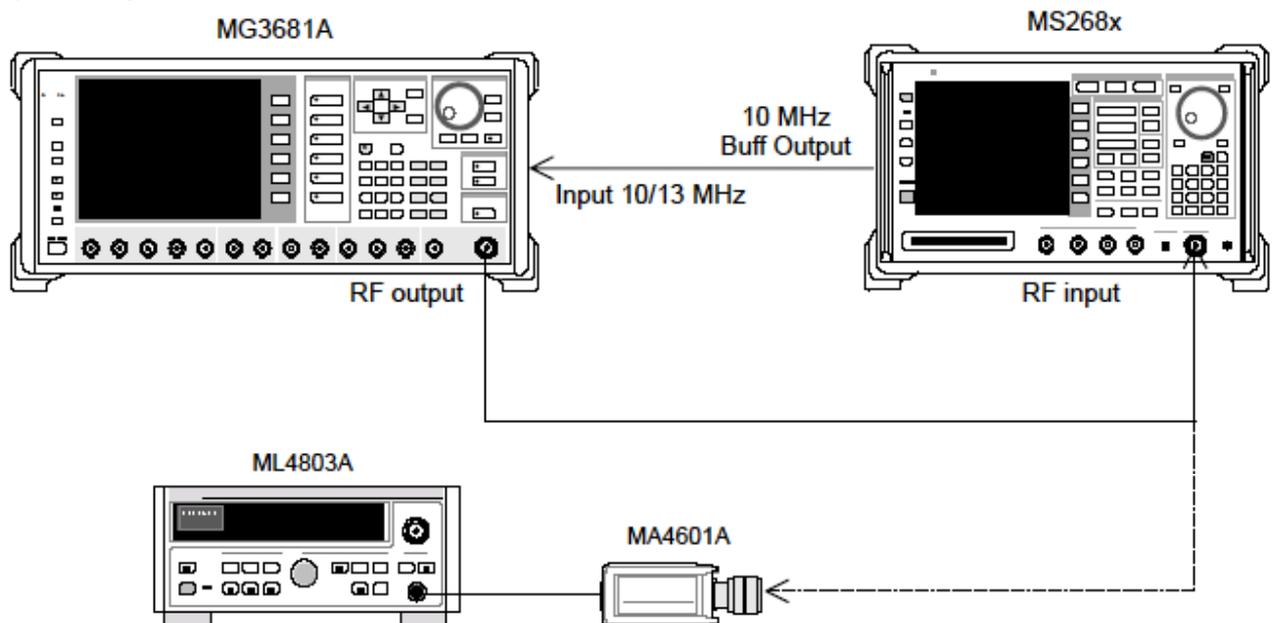
(4)   Test Procedures

1.   Set the evaluation signal data in the digital modulation signal gen-erator (SG1). For details on the evaluation signal, refer to "Evalua-tion Signal."

2.   Set SG1 as follows:
   • Frequency: 50 MHz
   • Level: −10 dBm

3.   Set the measurement unit as follows:
   • Input Terminal: RF
   • Reference Level: −10 dBm
   • Frequency: 50 MHz
   • Measuring Object: Forward (RC1−2)
   • Filter: Filtering
   • Trigger: Free Run

4.   Connect the SG1 output to the power sensor (MA4601A) and switch SG1 output to ON.

5.   Adjust the SG1 level so that the power meter (ML4803A) indicates a value of −10 dBm ±0.1 dB.

6.   Connect the SG1 output to RF input of the measurement unit.

7.   Press $\boxed{\text{F2}}$ (Modulation Analysis) on the measurement unit to dis-play the Modulation Analysis screen

8.   Execute $\boxed{\text{F5}}$ (Adjust Range).

9.   Press $\boxed{\text{F4}}$ (Analysis Mode) and then $\boxed{\text{F1}}$ (Analysis Start) and set Analysis Start to 0. Press $\boxed{\text{F2}}$ (Analysis Length) and set Analysis Length to 1536 chips.

10. Press $\boxed{\text{F6}}$ (Return) and then $\boxed{\text{F1}}$ (Trace Format) and set Code Domain.

11. Press $\boxed{}$ (More) once to display the second function lavel page.

12. Press $\boxed{\text{F2}}$ (Auto Rate detection) to set it Off.

13. Press $\boxed{\text{Single}}$ and wait unit measuring is completed.

14. Check that the power of the codes satisfies the Standard. The codes and their expected power values are listed below.

   Code 0   : −10.0 dB
   Code 7   : −0.68 dB
   Code 15   : −15.0 dB
   Code 31   : −20.0 dB
   Code 63   : −25.0 dB

15. Change the frequency of SG1 and the measurement unit to 850 MHz, 2 GHz, and 2.3 GHz and repeat Steps 1 to 14 above.

Linearity <MS268x>

(1)   Test specifications

<MS2681A/MS2683A>

±0.2 dB (0 to –40 dB)

<MS2687A/B>

±0.2 dB (0 to –30 dB)

Without changing the reference level setting after range optimization

(2)   Measurement units for test

- **Digital modulation signal generator (SG1): MG3681A**
- **Calibration receiver: ML2530A**
- **Programmable attenuator: MN72A**
- **Power meter: ML4803A**
- **Power sensor: MA4601A**

(3)   Setup
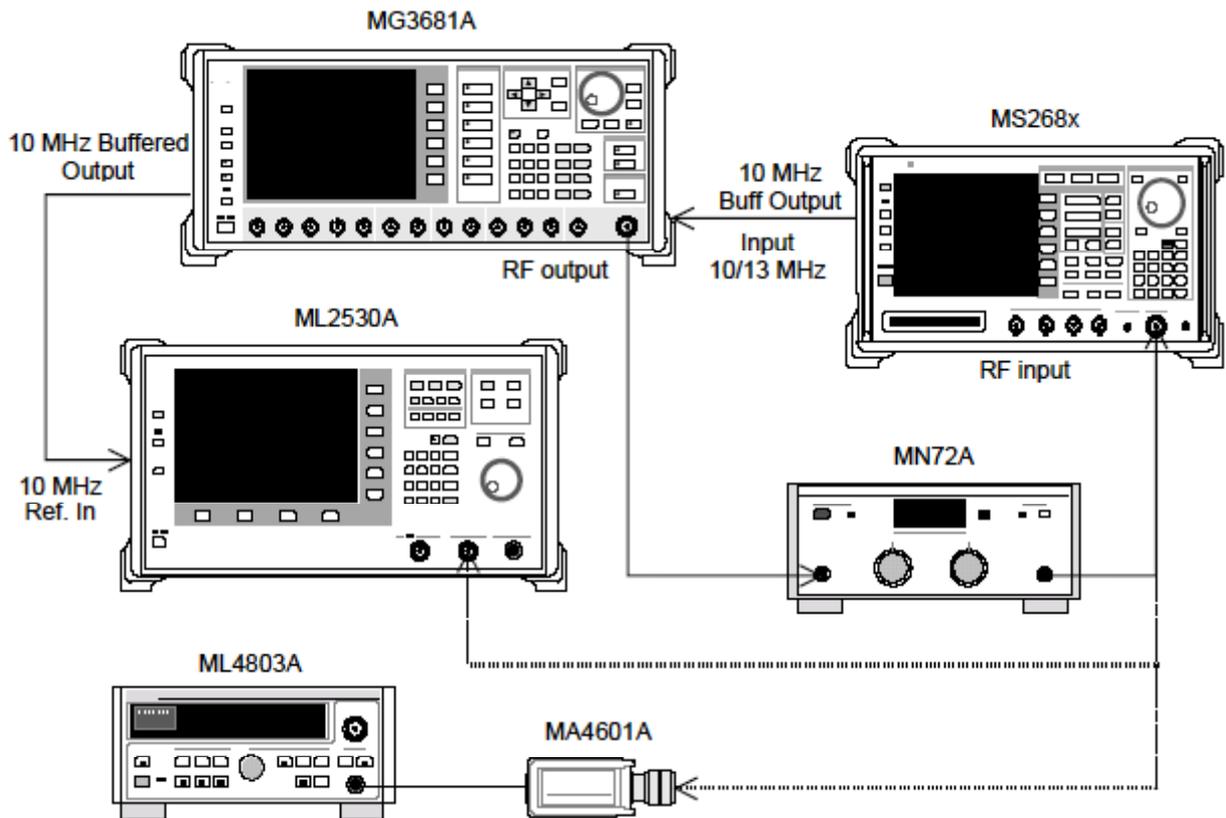
(4)   Test Procedures

1.   Connect power sensor (MA4601A) to Cal Output on power meter (ML4803A) and execute Zero Cal.

2.   Connect SG1 (MN72A output) to power sensor (MA4601A).

3.   Set the SG1 frequency and then set the programmable attenuator (MN72A) to 0 dB. Adjust the SG1 level so that the power meter (ML4803A) indicates +10 dBm ±0.1 dB. Record the measurement results (Set_Ref). See the table below for the measured frequency and levels.

Frequency	Level (input level to MS268x)		
	MS2681A/3A Pre-Ampl On	MS2681A/3A Pre-Ampl Off	MS2687A/B
50 MHz	−20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
850 MHz	−20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	−20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	−20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB

4.   Connect SG1 (MN72A output) to calibration receiver (ML2530A) and set BW to 100Hz, Relative mode (with the range fixed to 1).

5.   Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is −40 dBc and record the measurement value (ML2530A reading) at the calibration receiver (ML2530A) for each step.

6.   Set the measurement unit as follows:
    • Input Terminal: RF
    • Reference Level: (Level indicated in Table at step 3)
    • Frequency: (Frequency indicated in Table at step 3)
    • Measuring Object : QPSK & Continuous
    • Filter: Filtering
    • Trigger: Free Run

7.   Set the programmable attenuator (MN72A) as follows:
    • When Pre-Ampl is ON: 30 dB
    • When Pre-Ampl is OFF: 20 dB

8.   Connect SG1 (MN72A) to the measurement unit and set the SG1 level to Set Ref.

9.   Press F3 (RF Power) to display the RF power screen.

10.   Execute F5 (Adjust Range).

11.   Record the Tx Power value (dBm) (Measure_Ref).

12. Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is −40 dBc and record the Tx Power value at each step.
    *Note that the SG1 level should be lowered in steps of 10 dB; do not adjust the programmable attenuator (MN72A).

13. Check that the linearity error (shown below) satisfies the Standard.
    Linearity error [dB] = Tx Power value − (Measure_Ref − ML2530A reading)

14. Change the frequency and repeat Steps 2 t 13 above.

Occupied frequency bandwidth measurement <MS268x>

(1)   Test specifications

- This test is a functional test and therefore has no test specifications.

(2)   Measurement units for test

- Digital modulation signal generator: MG3681A

(3)   Setup

(4)   Test procedures

1. Set the evaluation signal data in the digital modulation signal generator (SG1). For details on the evaluation signal, refer to "Evaluation signal.

2. Set SG1 as follows:
    - Frequency: (Given in Table at step 8)
    - Level: (Given in Table at step 8)

3. Set the measurement unit as follows:
    - Input Terminal: RF
    - Reference Level: 0 dBm (Level given in Table at step 8)
    - Frequency: 50 MHz (Frequency given in Table at step 8)
    - Measuring Object: QPSK & Continuous

4. Press ⌊F4⌋ (Occupied Bandwidth) and display the Occupied Band-width screen.

5. Execute ⌊F5⌋ (Adjust Range).

6. Press ⌊F1⌋ (Measure Method) and set the measurement method to FFT.

7. Check that the occupied frequency bandwidth measurement value is 1.26 ±0.1 MHz.

8. Change the frequency and repeat Steps 2 to 7 above.

Frequency	Level (SG1 set value)		
	MS2681A/3A Pre-Ampl On	MS2681A/3A Pre-Ampl Off	MS2687A/B
50 MHz	−30 dBm	−20 dBm	−20 dBm
850 MHz	−30 dBm	−20 dBm	−20 dBm
2000 MHz	−30 dBm	−20 dBm	−20 dBm
2300 MHz	−30 dBm	−20 dBm	−20 dBm

Nearby spurious measurement <MS268x>

(1) Test specifications

Input level ≥0 dBm (preamplifier Off)

900 kHz detuning: ≥51 dBc

1.98 MHz detuning: ≥61 dBc

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Power meter: ML4803A
- Power sensor: MA4601A

(3)   Setup
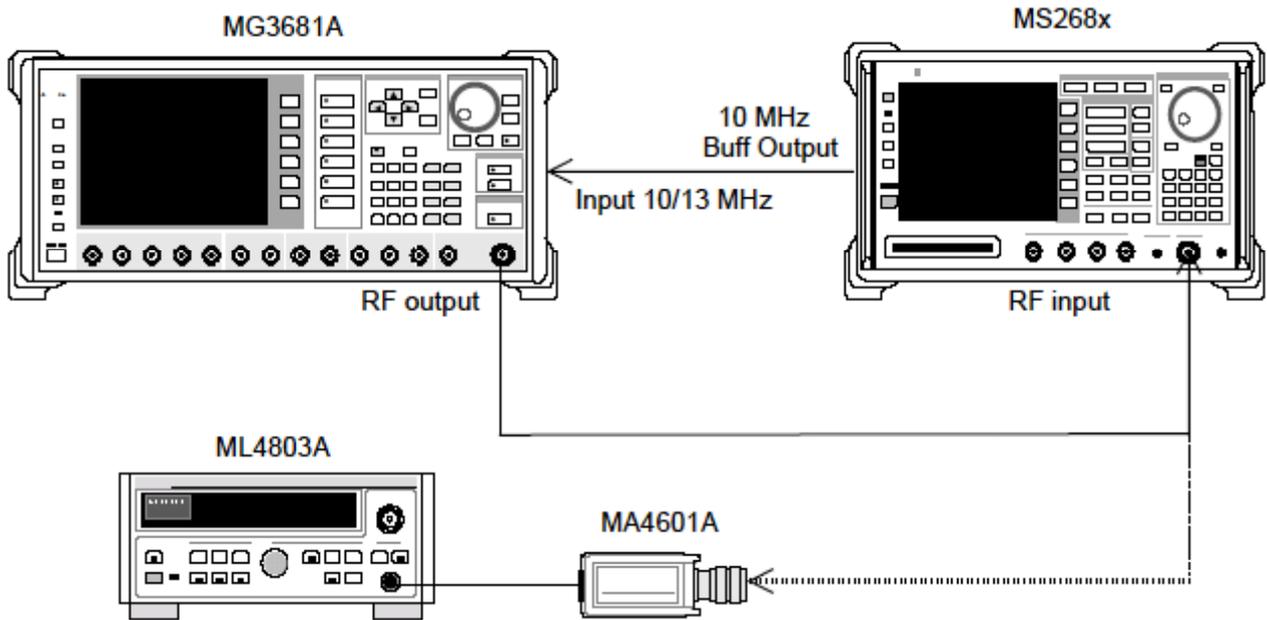
(4)   Test Procedures

1.   **Set the digital modulation signal generator (SG1) as follows:**

   - **Frequency: (Given in Table at step 8)**
   - **Level: (Given in Table at step 8)**
   - **System: IS-95**
   - **Link: Forward**
   - **Filter: SPEC + EQ**
   - **Pat. Number: 9**

2.   **Set the measurement unit as follows:**

   - **Input Terminal: RF**
   - **Reference Level: 0 dBm (Level given in Table at step 8)**
   - **Frequency: (Given in Table at step 8)**
   - **Measuring Object: QPSK & Continuous**
   - **Trigger: Free Run**

3.   **Connect the SG1 output to the power sensor (MA4601A).**

4.   **Adjust the SG1 level so that the power meter (ML4803A) indicates a value of Table at step 8**

5.   **Connect the SG1 output to RF input of the measurement unit.**

6. Press ⌞F5⌟ (Spurious close to the Carrier) to display the Spurious close to the Carrier screen.

7. Execute ⌞F4⌟ (Adjust Range).

8. Read the measurement results and check that the measurement range satisfies the Standard.

Frequency	Level (input level to MS268x)	
	MS268x	When MS268x Pre-Ampl installed*
50 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
850 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

Spurious measurement <MS268x>

This test is a functional test and test specifications are typical.

(1)   Test specifications

<MS2681A>

- **Measurement range**

    At Cw carrie frequency 800MHz to 1 GHz or 1.8 to 2.2 GHz

    ≥79dB typical (RBW: 10 kHz)

        (10 to 30 MHz)

    ≥79dB typical (RBW: 100 kHz)

        (30 MHz to 1 GHz)

    ≥76 $-$f [GHz] dB typical (RBW: 1 MHz)

        (1 to 3.0 GHz)

    *For carrier frequency 2030.354 to 2200 MHz, spurious occurs at the following frequency:

        f(Sprious) = f (in) $-$2030.345 MHz

<MS2683A/MS2687A/B>

- **Measurement range**

    At Cw carrie frequency 800MHz to 1 GHz or 1.8 to 2.2 GHz

    ≥79dB typical l (RBW: 10 kHz)

        (10 to 30 MHz, band 0)

    ≥79dB typical   (RBW: 100 kHz)

        (30 MHz to 1 GHz, band 0)

    ≥76 $-$f [GHz] dB typical (RBW: 1 MHz)

        (1 to 3.15 GHz, band 0, in normal mode)

    ≥76 dB typical (RBW: 1 MHz)

        (3.15 to 7.9 GHz, band 1, in normal mode)

    ≥68 dB typical (RBW: 1 MHz)

        (7.9 to 12.75 GHz, band 2, in MS2687A)

    ≥74 dB typical (RBW: 1 MHz)

        (7.9 to 12.75 GHz, band 2, in MS2687B)

    *For carrier frequency 2030.354 to 2200 MHz, spurious occurs at the following frequency:

        f(Sprious) = f (in) $-$2030.345 MHz

(2)   Measurement units for test

- **Digital modulation signal generator (SG1): MG3681A**
- LPF switching unit (available for cutting off secondary harmonic wave of 850 MHz and for filter through operation)
- 2 GHz LPF
- **Power meter: ML4803A**
- **Power sensor: MA4601A**

(2)   Setup
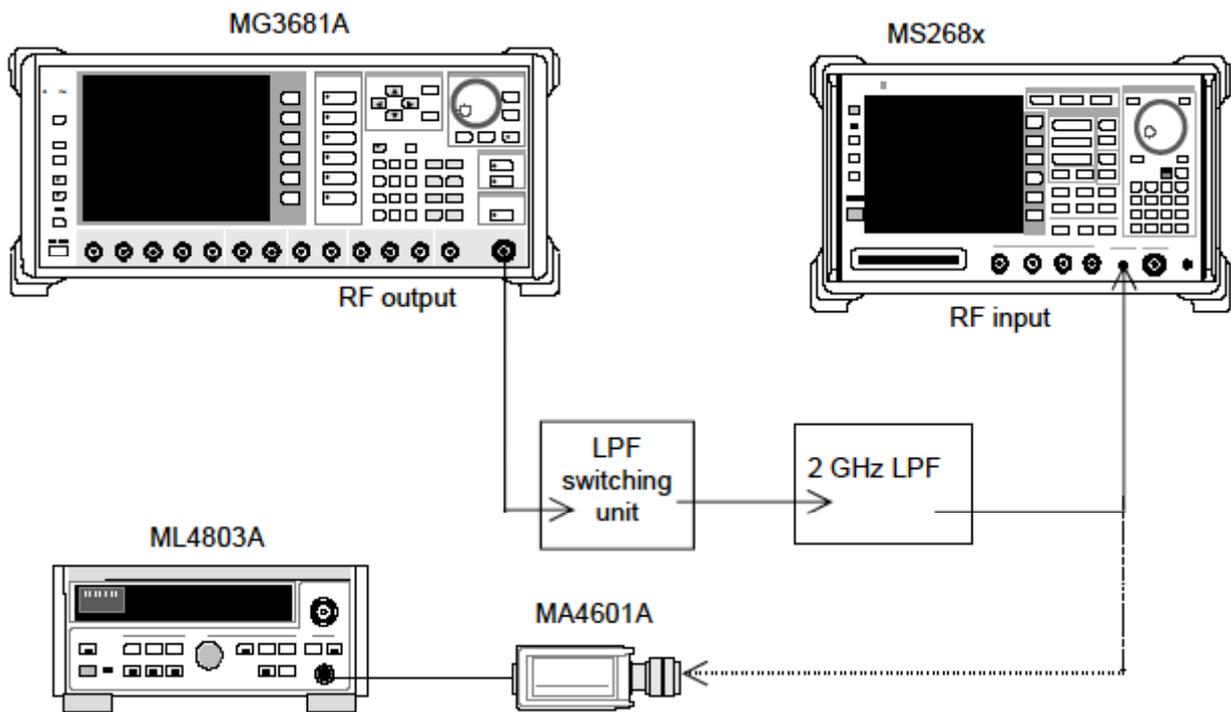
(4)   Test Procedures

1. **Set the digital modulation signal generator (SG1) frequency and output level. Measure the input level to the measurement unit using the power meter See the table below for the measured frequencies and levels.**

Frequency	Level (power meter reading)	
	MS268x	**When MS268x Pre-Ampl installed***
850 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: With option 08 installed and Pre-Ampl set to Off

2. Set the measurement unit as follows:
    - Input Terminal: RF
    - Reference Level: 0 dBm
    - Frequency: 2000 MHz
    - Measuring Object: QPSK & Countinuous
    - Filter: Filtering
    - Trigger: Free Run

3. Connect the 2 GHz LPF output to the power sensor (MA4601A).

4. Adjust the SG1 level so that the power meter (ML4803A) indicates a value of table at step 1.

5. Connect the 2 GHz LPF output to RF input of the measurement unit.

6. Press ⌊F6⌋ (Spurious Emission) to display the Spurious Emission screen.

7. Press ⌊ ⌋ (More) to display the third function label page.

8. Press ⌊F1⌋ (Ref Power) to set Tx Power.

9. Press ⌊ ⌋ (More) to display the first function label page.

10. Press ⌊F1⌋ (Sprious Mode) and set ⌊F3⌋ (Sweep). After setting, press ⌊F6⌋ (Return).

11. Press ⌊F3⌋ (Setup Search/Sweep Table) and set Table 4-3-1. Agter setting, press ⌊F6⌋ (Back Screen).

12. Press ⌊ ⌋ (More) to display the second function label page. Press ⌊F4⌋ (preselector) to set Nomal mode.

13. Return the function label to the first page.
    * Steps 9 and 10 are available only when option 03 is installed.

14. Execute ⌊F5⌋ (Adjust Range).

15. Check that the measurement range satisfies the Standard.

16. When option 03 is installed, set the following.

17. Press ⌊F3⌋ (Setup Search/Sweep Table) and press ⌊ ⌋ (More) to display the second function label page.

18. Press ⌊F2⌋ to clear the frequency table.

19. Set Table 4-3-2 and press ⌊F6⌋ (Back Screen).

20. Press ⌊ ⌋ (More) to display the second function label page. Press ⌊F4⌋ (preselector) and set Spurious mode.

21. Return the function label to the first page.

22. Repeat Steps 11 to 13 above.

Table 4-3-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	800 MHz	100 kHz
f3	900 MHz	1000 MHz	100 kHz
f4	1000 MHz	1650 MHz	1 MHz
f5	1750 MHz	2500 MHz	1 MHz
f6	2600 MHz	3200 MHz	1 MHz
f7	3200 MHz	7800 MHz	1 MHz

Table 4-3-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	3150 MHz	1 MHz

Table 4-4-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	950 MHz	100 kHz
f3	1050 MHz	1950 MHz	1 MHz
f4	2050 MHz	3200 MHz	1 MHz
f5	3200 MHz	7800 MHz	1 MHz

Table 4-4-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	1950 MHz	1 MHz
f2	2050 MHz	3150 MHz	1 MHz

IQ input modulation accuracy <MS268x>

(1)   Test specifications

- **Resisual vector error: <2% (rms), DC coupling**
  (When MS2681A-17, MS2681A-18, MS2683A-17, MS2683A-18 or MS2687A/B is installed)

(2)   Measurement units for test

- **Digital modulation signal generator: MG3681A**

(3)   Setup

(4)   Test Procedures

1.   Set the signal data for an arbitrary waveform generator as the evaluation signal. For details on the evaluation signal, refer to "Evaluation Signal."

2.   Set the measurement unit as follows:
   - Input Terminal: IQ-DC
   - Impedance: 50 Ω
   - Measuring Object: Forward (RC1-2)
   - Filter: Filtering
   - Trigger: Free Run

3.   Press ⎡F2⎤ (Modulation Analysis) to display the Modulation Analysis screen.

4.   Press ⎡F4⎤ (Analysis Mode) and then ⎡F1⎤ (Analysis Start) and set Analysis Start to 0.   Press ⎡F2⎤ (Analysis Length) and set Analysis Length to 1536 chips.

5.   Check that the residual vector value satisfies the Standard.

Evaluation signal <MS268x>

Here, the evaluation signal settings are explained. The user will need the evaluation signal to perform the performance test. Based on these settings, set the Digital modulation signal generator.

Outline of evaluation signal

- **Walsh Length = 64**
- **Channelization Code = Multiplexing of five codes: 0, 7, 15, 31, 63**
- **The power ratio is as follows:**

Power ratio of each code

Power ratio

    Code 0   : –10.0 dB
    Code 7   : –0.68 dB
    Code 15 : –15.0 dB
    Code 31 : –20.0 dB
    Code 63 : –25.0 dB

Sample of Entry Forms for Performance Test Results <MS860x>

This section offers sample forms for entering the results of the MS8608A digital mobile radio transmitter tester performance test.
Copy these entry forms and use them.

Test location: _____   Report No.: _____

_____   Date: _____

_____   Tested by: _____

Unit name: MS8608A Digital Mobile Radio Transmitter Tester
MX860803A cdma measurement software

Serial No.: _____   Ambient temperature: _____ °C

Power frequency: _____ Hz   Relative humidity: _____ %

Remarks: _____

_____

_____

Modulation/Frequency measurement <MS860x>

Frequency/modulation measurement accuracy (High Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	____ %	____ %	____ %	____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	−9.9 Hz			
	Measurement value	____ Hz	____ Hz	____ Hz	____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (Low Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	_____ %	_____ %	_____ %	_____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	−9.9 Hz			
	Measurement value	_____ Hz	_____ Hz	_____ Hz	_____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (for Low Power input and Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	_____ %	_____ %	_____ %	_____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	−9.9 Hz			
	Measurement value	_____ Hz	_____ Hz	_____ Hz	_____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Origin offset expected value

	50 MHz	850 MHz	2000 MHz	2300 MHz
Expected value	_____ dB	_____ dB	_____ dB	_____ dB

Origin offset (High Power input)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	_____ dB	_____ dB	_____ dB	_____ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	_____ dB	_____ dB	_____ dB	_____ dB
Lower limit	−0.46 dB			
Measurement uncertainty	±0.04 dB			

Origin offset (Low Power input)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	____ dB	____ dB	____ dB	____ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	____ dB	____ dB	____ dB	____ dB
Lower limit	−0.46 dB			
Measurement uncertainty	±0.04 dB			

Origin offset (Low Power input and Pre-Ampl On)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	____ dB	____ dB	____ dB	____ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	____ dB	____ dB	____ dB	____ dB
Lower limit	−0.46 dB			
Measurement uncertainty	±0.04 dB			

*: Origin offset accuracy [dB] = Measurement result − Origin offset expected value

Code domain measurement <MS860x>

Code domain power measurement accuracy (Low Power input)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−2.36 dB			
	Measurement value	____ dB	____ dB	____ dB	____ dB
	Lower limit	−2.52 dB			
7	Upper limit	−4.92 dB			
	Measurement value	____ dB	____ dB	____ dB	____ dB
	Lower limit	−5.08 dB			
15	Upper limit	−9.92 dB			
	Measurement value	____ dB	____ dB	____ dB	____ dB
	Lower limit	−10.08 dB			
31	Upper limit	−19.72 dB			
	Measurement value	____ dB	____ dB	____ dB	____ dB
	Lower limit	−20.28 dB			
63	Upper limit	−24.72 dB			
	Measurement value	____ dB	____ dB	____ dB	____ dB
	Lower limit	−25.28 dB			
Measurement uncertainty		±0.02 dB			

Code domain power measurement accuracy (Low Power input and Pre-Ampl On)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	—2.36 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	—2.52 dB			
7	Upper limit	—4.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	—5.08 dB			
15	Upper limit	—9.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	—10.08 dB			
31	Upper limit	—19.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	—20.28 dB			
63	Upper limit	—24.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	—25.28 dB			
Measurement uncertainty		±0.02 dB			

Transmission power measurement accuracy <MS860x>

Power meter reading

		50 MHz	850 MHz	2000 MHz	2300 MHz
Power meter reading	Upper limit	+10.1 dBm			
	Reading	dB	dB	dB	dB
	Lower limit	+9.9 dBm			

Actual attenuation of programmable attenuator (attenuation from +10 dBm)

ATT set value	50 MHz	850 MHz	2000 MHz	2300 MHz
20	dB	dB	dB	dB

Transmission power measurement accuracy (High Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	dB	dB	dB	dB
	Maximum value	—0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value - Power meter reading

Transmission power measurement accuracy (Low Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	dB	dB	dB	dB
	Maximum value	−0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value – (Power meter reading – Actual attenuation for MN72A ATT: 20 dB)

Transmission power measurement accuracy (Low Power input and Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	dB	dB	dB	dB
	Maximum value	−0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value – (Power meter reading – Actual attenuation for MN72A ATT: 20 dB)

Linearity <MS860x>

SG1 set value for +0.5 dBm calibration at each frequency

		50 MHz	850 MHz	2000 MHz	2300 MHz
SG1 set value	Set_Ref	_____ dBm	_____ dBm	_____ dBm	_____ dBm

Linearity accuracy (High Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
850	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
2000	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
2300	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
Measurement uncertainty	±0.04 dB				

Linearity accuracy (Low Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
850	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
2000	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
2300	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
Measurement uncertainty	±0.04 dB				

Linearity accuracy (Low Power input and Pre-Ampl On)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	−20	-----	_____ dBm*1		
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−60	_____ dB	_____ dBm	_____ dB	±0.16 dB
850	−20	-----	_____ dBm*1		
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−60	_____ dB	_____ dBm	_____ dB	±0.16 dB
2000	−20	-----	_____ dBm*1		
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−60	_____ dB	_____ dBm	_____ dB	±0.16 dB
2300	−20	-----	_____ dBm*1		
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−60	_____ dB	_____ dBm	_____ dB	±0.16 dB
Measurement uncertainty	±0.04 dB				

*1: Measure_Ref

*2: Linearity calculation

Linearity calculation value (dB) = Tester measurement value (dBm) − {Measure_Ref (dBm) − Calibration receiver measurement value (dB)}

Nearby spurious measurement <MS860x>

Adjacent channel leakage power measurement range (Low Power input)

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
−10 MHz	____ dB	____ dB	____ dB		60 dB
−5 MHz	____ dB	____ dB	____ dB	1 dB	50 dB
+5 MHz	____ dB	____ dB	____ dB		50 dB
+10 MHz	____ dB	____ dB	____ dB		60 dB

Adjacent channel leakage power measurement range

(Low Power input and option 08 installed)*1

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
−10 MHz	____ dB	____ dB	____ dB		60 dB
−5 MHz	____ dB	____ dB	____ dB	1 dB	50 dB
+5 MHz	____ dB	____ dB	____ dB		50 dB
+10 MHz	____ dB	____ dB	____ dB		60 dB

*1: Measurement with option 08 installed (Pre-Ampl: Off)

Spurious measurement <MS860x>

Measurement range [Carrier Frequency: 850 MHz] (Low Power input)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	_____ Hz	_____ dB		73 dB
f2	30 to 800 MHz	_____ Hz	_____ dB		73 dB
f3	900 MHz to 1 GHz	_____ Hz	_____ dB		73 dB
f4	1 to 1.65 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.75 to 2.5 GHz	_____ Hz	_____ dB		(67-f) dB
f6	2.6 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f7	3.2 to 7.8 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Low Power input)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	_____ Hz	_____ dB		73 dB
f2	30 to 950 MHz	_____ Hz	_____ dB		73 dB
f3	1.05 to 1.95 GHz	_____ Hz	_____ dB		73 dB
f4	2.05 to 3.2 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	3.2 to 7.8 GHz	_____ Hz	_____ dB		(67-f) dB
f1*1	1.6 to 1.95 GHz	_____ Hz	_____ dB		67 dB
f2*1	2.05 to 3.15 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 850 MHz] (Low Power input and Pre-Ampl On)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	_____ Hz	_____ dB		73 dB
f2	50 to 500 MHz	_____ Hz	_____ dB		73 dB
f3	500 to 800 MHz	_____ Hz	_____ dB		73 dB
f4	900 MHz to 1.65 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.75 to 2.5 GHz	_____ Hz	_____ dB		(67-f)dB
f6	2.6 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f7	3.2 to 7.8 GHz	_____ Hz	_____ dB		67 dB
f1*1	1.6 to 7.8 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Low Power input and Pre-Ampl On)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	_____ Hz	_____ dB		73 dB
f2	50 to 500 MHz	_____ Hz	_____ dB		73 dB
f3	500 to 850 MHz	_____ Hz	_____ dB		73 dB
f4	950 MHz to 1.75 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.85 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f6	3.2 to 7.8 GHz	_____ Hz	_____ dB		(67-f) dB
f1*1	1.6 to 1.75 GHz	_____ Hz	_____ dB		67 dB
f2*1	1.85 to 7.8 GHz	_____ Hz	_____ dB		67 dB

*1: Option 03 installed

IQ input modulation accuracy <MS860x>

Modulation measurement accuracy (IQ input)

Residual vector error	Minimum value	0%
	Measurement value	_____ %
	Maximum value	1.8%
	Measurement uncertainty	0.2%

Power meter accuracy <MS860x>

Power meter reading (Set_Ref)

		50 MHz	850 MHz	2000 MHz	3000 MHz
SG set value (Set_Ref)	-----	_____ dBm	_____ dBm	_____ dBm	_____ dBm
Power meter reading (Read_Ref)	Upper limit	+10.1 dBm			
	Reading	_____ dBm	_____ dBm	_____ dBm	_____ dBm
	Lower limit	−9.9 dBm			

ML2530A measurement value (ATT_n)*1 with programmable attenuator varied

ATT set value	ATT_n	50 MHz	850 MHz	2000 MHz	3000 MHz
10 dB	ATT_10	_____ dB	_____ dB	_____ dB	_____ dB
20 dB	ATT_20	_____ dB	_____ dB	_____ dB	_____ dB
30 dB	ATT_30	_____ dB	_____ dB	_____ dB	_____ dB

Sample of Entry Forms for Performance Test Results <MS268x>

This section offers sample forms for entering the results of the MS268x spectrum analyzer performance test.
Copy these entry forms and use them.

Test location: _____   Report No.: _____
_____   Date:
_____   Tested by:

Unit name: MS268xA Spectrum Analyzer
       MX268x03A cdma measurement software

Serial No.: _____   Ambient temperature: _____ °C

Power frequency: _____ Hz   Relative humidity: _____ %

Remarks: _____
_____
_____

Modulation/Frequency measurement <MS268x>

Frequency/modulation measurement accuracy (Pre-Ampl Off)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	____ %	____ %	____ %	____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	−9.9 Hz			
	Measurement value	____ Hz	____ Hz	____ Hz	____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (for Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	**Minimum value**	0%			
	Measurement value	___ %	___ %	___ %	___ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	**Minimum value**	−9.9 Hz			
	Measurement value	___ Hz	___ Hz	___ Hz	___ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Origin offset expected value

	50 MHz	850 MHz	2000 MHz	2300 MHz
Expected value	___ dB	___ dB	___ dB	___ dB

Origin offset (Pre-Ampl Off)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	___ dB	___ DB	___ dB	___ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	___ dB	___ DB	___ dB	___ dB
Lower limit	−0.46 dB			
Measurement uncertainty	±0.04 dB			

Origin offset (Pre-Ampl On)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	___ dB	___ dB	___ dB	___ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	___ dB	___ dB	___ dB	___ dB
Lower limit	−0.46 dB			
Measurement uncertainty	±0.04 dB			

*: Origin offset accuracy [dB] = Measurement result − Origin offset expected value

Code domain measurement <MS268x>

Code domain power measurement accuracy (Pre-Ampl Off)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−2.36 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−2.52 dB			
7	Upper limit	−4.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−5.08 dB			
15	Upper limit	−9.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−10.08 dB			
31	Upper limit	−19.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−20.28 dB			
63	Upper limit	−24.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−25.28 dB			
Measurement uncertainty		±0.02 dB			

Code domain power measurement accuracy (Pre-Ampl On)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−2.36 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−2.52 dB			
7	Upper limit	−4.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−5.08 dB			
15	Upper limit	−9.92 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−10.08 dB			
31	Upper limit	−19.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−20.28 dB			
63	Upper limit	−24.72 dB			
	Measurement value	dB	dB	dB	dB
	Lower limit	−25.28 dB			
Measurement uncertainty		±0.02 dB			

Linearity <MS268x>

SG1 set value for +0.5 dBm calibration at each frequency

		50 MHz	850 MHz	2000 MHz	2300 MHz
SG1 set value	Set_Ref	_____ dBm	_____ dBm	_____ dBm	_____ dBm

Linearity accuracy (Pre-Ampl Off)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
850	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
2000	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
2300	+10	-----	_____ dBm*1		
	0	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−10	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
Measurement uncertainty	±0.04 dB				

Linearity accuracy (Pre-Ampl On)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
850	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
2000	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
2300	−10	-----	_____ dBm*1		
	−20	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−30	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−40	_____ dB	_____ dBm	_____ dB	±0.16 dB
	−50	_____ dB	_____ dBm	_____ dB	±0.16 dB
Measurement uncertainty	±0.04 dB				

*1: Measure_Ref

*2: Linearity calculation

Linearity calculation value (dB) = Tester measurement value (dBm) − {Measure_Ref (dBm) − Calibration receiver measurement value (dB)}

Nearby spurious measurement <MS268x>

Adjacent channel leakage power measurement range (Pre-Ampl Off)

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
−10 MHz	_____ dB	_____ dB	_____ dB		60 dB
−5 MHz	_____ dB	_____ dB	_____ dB	1 dB	50 dB
+5 MHz	_____ dB	_____ dB	_____ dB		50 dB
+10 MHz	_____ dB	_____ dB	_____ dB		60 dB

Adjacent channel leakage power measurement range
(option 08 installed)*1

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
−10 MHz	_____ dB	_____ dB	_____ dB		60 dB
−5 MHz	_____ dB	_____ dB	_____ dB	1 dB	50 dB
+5 MHz	_____ dB	_____ dB	_____ dB		50 dB
+10 MHz	_____ dB	_____ dB	_____ dB		60 dB

*1: Measurement with option 08 installed (Pre-Ampl: Off)

Spurious measurement <MS268x>

Measurement range [Carrier Frequency: 850 MHz] (Pre-Ampl Off)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	_____ Hz	_____ dB		73 dB
f2	30 to 800 MHz	_____ Hz	_____ dB		73 dB
f3	900 MHz to 1 GHz	_____ Hz	_____ dB		73 dB
f4	1 to 1.65 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.75 to 2.5 GHz	_____ Hz	_____ dB		(67-f) dB
f6	2.6 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f7	3.2 to 7.8 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Pre-Ampl Off)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	_____ Hz	_____ dB		73 dB
f2	30 to 950 MHz	_____ Hz	_____ dB		73 dB
f3	1.05 to 1.95 GHz	_____ Hz	_____ dB		73 dB
f4	2.05 to 3.2 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	3.2 to 7.8 GHz	_____ Hz	_____ dB		(67-f) dB
f1*1	1.6 to 1.95 GHz	_____ Hz	_____ dB		67 dB
f2*1	2.05 to 3.15 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 850 MHz] (Pre-Ampl On)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	_____ Hz	_____ dB		73 dB
f2	50 to 500 MHz	_____ Hz	_____ dB		73 dB
f3	500 to 800 MHz	_____ Hz	_____ dB		73 dB
f4	900 MHz to 1.65 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.75 to 2.5 GHz	_____ Hz	_____ dB		(67-f)dB
f6	2.6 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f7	3.2 to 7.8 GHz	_____ Hz	_____ dB		67 dB
f1*1	1.6 to 7.8 GHz	_____ Hz	_____ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Pre-Ampl On)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	_____ Hz	_____ dB		73 dB
f2	50 to 500 MHz	_____ Hz	_____ dB		73 dB
f3	500 to 850 MHz	_____ Hz	_____ dB		73 dB
f4	950 MHz to 1.75 GHz	_____ Hz	_____ dB	1 dB	(67-f) dB
f5	1.85 to 3.2 GHz	_____ Hz	_____ dB		(67-f) dB
f6	3.2 to 7.8 GHz	_____ Hz	_____ dB		(67-f) dB
f1*1	1.6 to 1.75 GHz	_____ Hz	_____ dB		67 dB
f2*1	1.85 to 7.8 GHz	_____ Hz	_____ dB		67 dB

*1: Option 03 installed

IQ input modulation accuracy <MS268x>

Modulation measurement accuracy (IQ input)

Residual vector error	Minimum value	0%
	Measurement value	_____ %
	Maximum value	1.8%
	Measurement uncertainty	0.2%

* When MS268xA/B-7 or −18 is installed.

**MX860803A/MX860903A/
MX268103A/MX268303A/MX268703A
cdma Measurement Software
(For MS8608A/MS8609A/
MS2681A/MS2683A/MS2687A/B)
Operation Manual
(Remote Control)**

Table of Contents

IV.

Section 1   General

This section outlines the remote control and gives examples of system upgrades.

General

This measurement unit, when combined with an external controller (host computer, personal computer, etc.), can automate your measurement system. For this purpose, This measurement unit is equipped with an RS-232C interface port, and GPIB interface bus (IEEE std 488.2-1987) as standard compositions. Ethernet interface can be also installed as an option.

Remote control functions

The remote control functions of this measurement unit are used to do the following:

(1) Control all functions except a few like the power switch and [LO-CAL] key.

(2) Read all parameter settings.

(3) Set the RS-232C interface settings from the panel.

(4) Set the GPIB address from the panel.

(5) Set the IP address for Ethernet interface from the panel (Optional).

(6) Select the interface port from the panel.

(7) Configure the automatic measurement system when the spectrum analyzer function is combined with a personal computer and other measuring instruments.

Interface port selection functions

This measurement unit has the standard RS-232C interface, GPIB interface bus and parallel (Centronics) interface. It can also have Ethernet interface as an option. Use the panel to select the interface port to be used to connect external devices as shown below.

Port for the external controller: Select RS-232C, GPIB or Ethernet (Option).

Port for the printer: Parallel interface.

Examples of system upgrades using RS-232C and GPIB

(1)   Stand-alone type 1

Waveforms measured with this measurement unit are output to the printer.
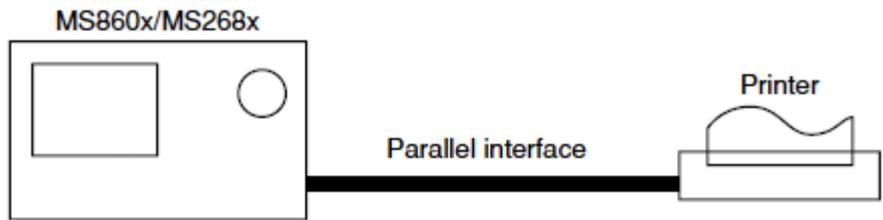
(2)   Control by the host computer (1)

This measurement unit is controlled automatically or remotely from the computer.
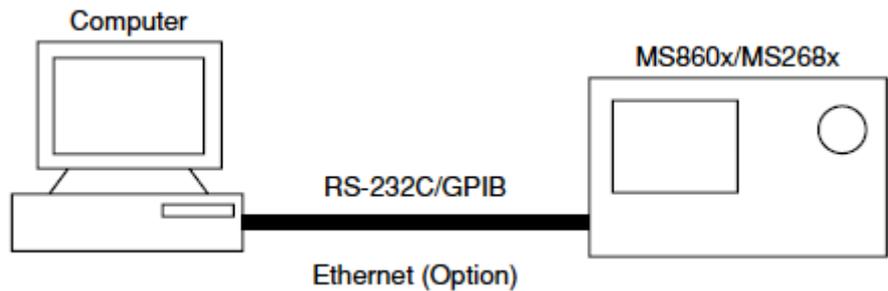
(3)   Control by the host computer (2)

The waveforms measured by controlling this measurement unit automatically or remotely are output to the printer.
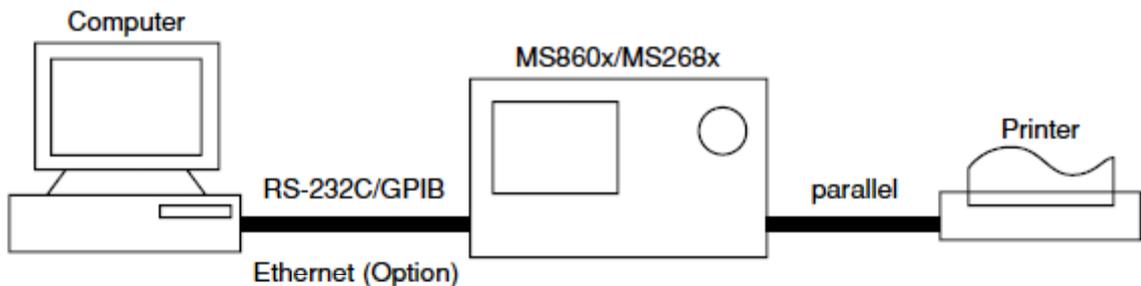
Specifications of RS-232C

The table below lists the specifications of the RS-232C equipped as standard in this measurement unit.

Item	Specification
Function	Controls from the external controller (except for power-ON/OFF)
Communication system	Asynchronous (start-stop synchronous system), half-duplex
Communication control system	X-ON/OFF control
Baud rate	1200, 2400, 4800, 9600, 19.2 k, 38.4 k, 56 k, 115 k (bps)
Data bits	7 or 8 bits
Parity	Odd number (ODD), even number (EVEN), none (NON)
Start bit	1 bit
Stop bit (bits)	1 or 2 bits
Connector	D-sub 9-pin, male

Specifications of GPIB

The table below lists the specifications of the GPIB provided for this measurement unit.

Item	Specification and supplementary explanation
Function	Conforms to IEEE488.2 The spectrum analyzer is controlled from the external controller (except for power-on/off).
Interface function (*1)	SH1: All source handshake functions are provided. Synchronizes the timing of data transmission. AH1: All acceptor handshake functions are provided. Synchronizes the timing of data reception. T6: The basic talker functions and serial poll function are provided. The talk only function is not provided. The talker can be canceled by MLA. L4: The basic listener functions are provided. The listen only function is not provided. The listener can be canceled by MTA. SR1: All service request and status byte functions are provided. RL1: All remote/local functions are provided. The local lockout function is provided. PP0: The parallel poll functions are not provided. DC1: All device clear functions are provided. DT1: Device trigger functions are provided. C0: System controller functions are not provided. E2: Output is tri-state.

Section 2   Connecting Device

This section describes how to connect external devices such as the host computer, personal computer, and printer to this measurement unit with RS-232C and GPIB cables. This section also describes how to setup the interfaces of this measurement unit.

Connecting an External Device with an RS-232C Cable

Connect the RS-232C connector (D-sub 9-pin, female) on the rear panel of this measurement unit to the RS-232C connector of the external device with an RS-232C cable.
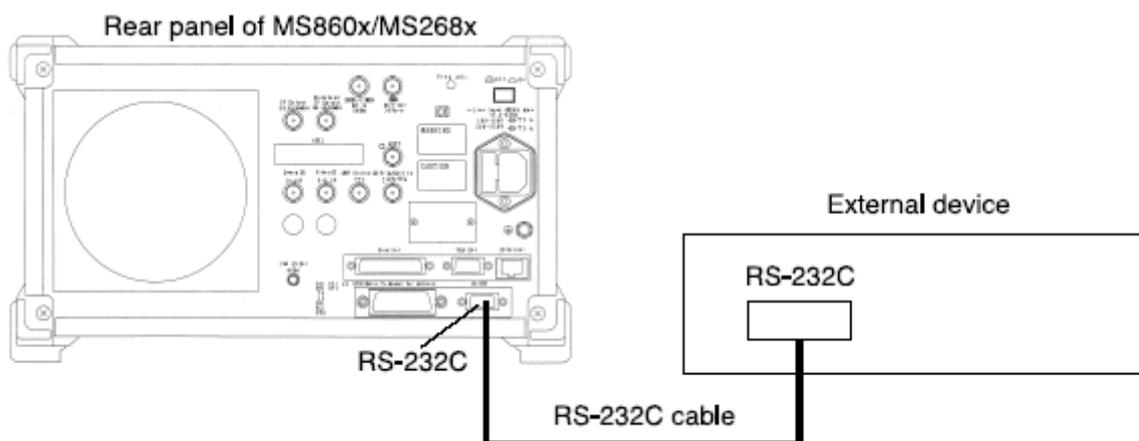
Notes:

RS-232C connectors with 9 pins and 25 pins are available. When purchasing the RS-232C cable, check the number of pins on the RS-232C connector of the external device. Also, the following RS232C cable is provided as peripheral parts of this measurement unit.

Connection Diagram of RS-232C Interface Signals

The diagram below shows the RS-232C interface signal connections between this measurement unit and devices such as a personal computer.

• Connection with IBM PC/AT Compatible personal computer
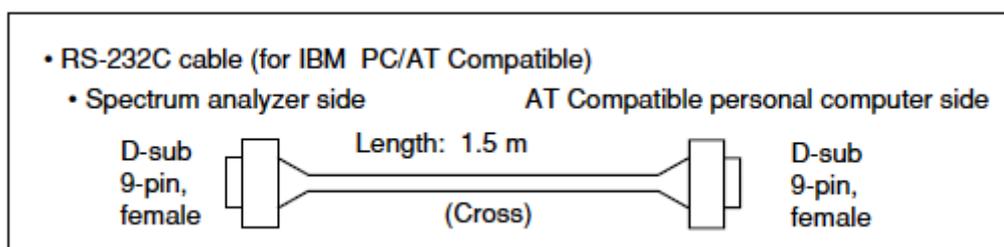
Connecting a Device with a GPIB Cable

Connect the GPIB connector on the rear panel of this measurement unit to the GPIB connector of an external device with a GPIB cable.

Note:

Be sure to connect the GPIB cable before turning this measurement unit power on.

Up to 15 devices, including the controller, can be connected to one system. Connect devices as shown below.

GPIB connector

GPIB cable
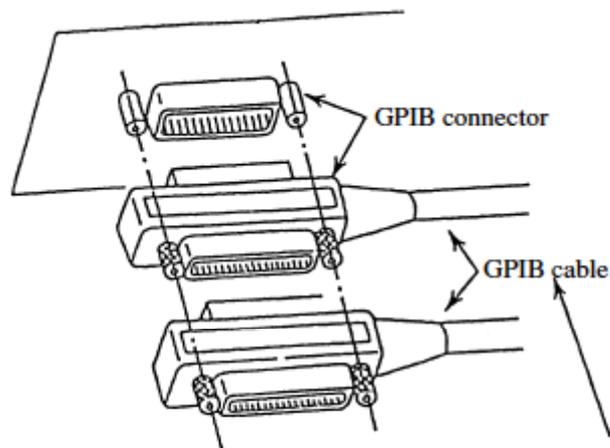
Total cable length: Up to 20 m
Cable length between devices: Up to 4 m
Number of devices that can be connected: Up to 15

Setting the GPIB Address

Set the GPIB address of this measurement unit as follows.

| Config | → | Interface | → | (move cursor) My Address 1 | → | Set |
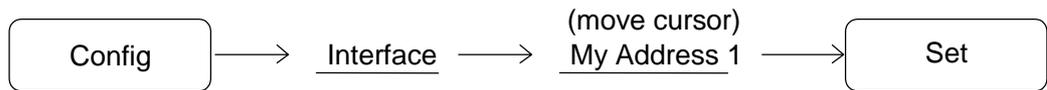
Use the 10-key pad to enter the GPIB address of This measurement unit, next push ⌐set⌐ to confirm address.
The initial value is 1.

Section 3   Device Message Format

This section describes the format of the device messages transmitted on the bus between a controller (host computer) and this measurement unit via the RS-232C GPIB or Ethernet system.

General Description

The device messages are data messages transmitted between the controller and this measurement unit. It consists of program messages transferred from the controller to this measurement unit, and response messages input from this measurement unit to the controller. There are also two types of program commands and program queries in the program message. The program command is used to set this measurement unit parameters and to instruct it to execute processing. The program query is used to query the values of parameters and measured results.

Program Message Format

To transfer a program message from the controller program to this instrument using the WRITE statement, the program message formats are defined as follows.

```
┌──────────────────┐            ┌──────────────────┐
│                  │            │ PROGRAM MESSAGE  │
│ PROGRAM MESSAGE  │────────────│                  │
│                  │            │   TERMINATOR     │
└──────────────────┘            └──────────────────┘
```

```
WRITE  #1,"CF_1GHZ"
              │
              └── PROGRAM MESSAGE: When the program message is
                                   transmitted from the controller to this
                                   instrument, the specified terminator is
                                   attached to the end of the program
                                   message to terminate its transmission.
```
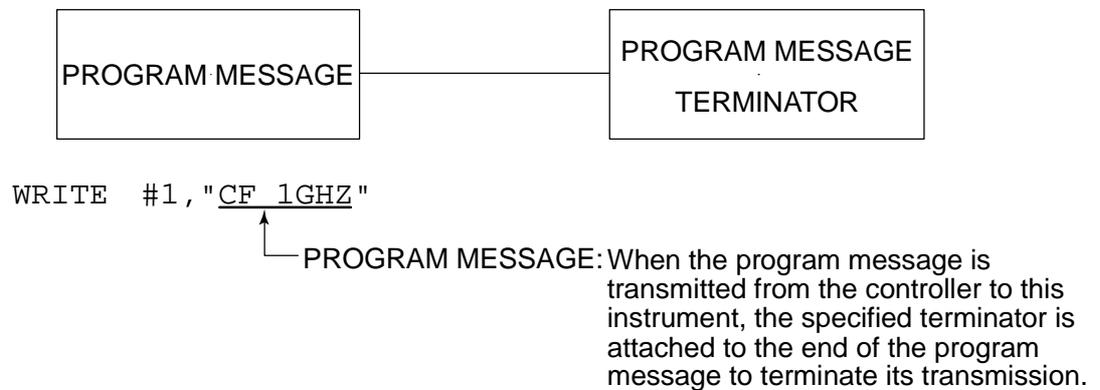
(1)   PROGRAM MESSAGE TERMINATOR
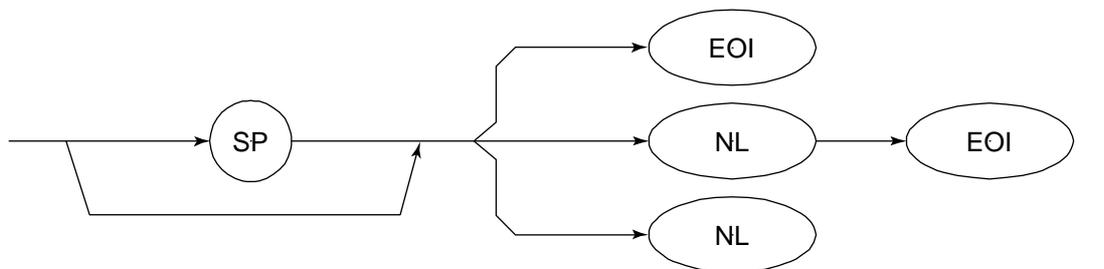
NL: Called New line or
     LF (Line Feed)

Carriage Return (CR) is ignored and is not processed as a terminator.

(2)   PROGRAM MESSAGE

Multiple program message units van be output sequentially by separating them with a semicolon.

<Example> WRITE #1;"CF 1GHZ;SP 5ØØKHZ"

(3)   PROGRAM MESSAGE UNIT
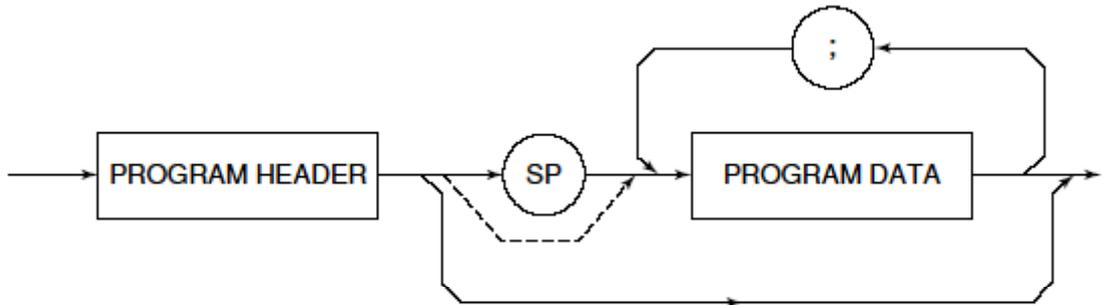
- The program header of an IEEE488.2 common command always begins with an asterisk.
- For numeric program data, the ⓢⓅ between the header and data can be omitted.
- The program header of a program query always ends with a question mark.

(4)   PROGRAM DATA
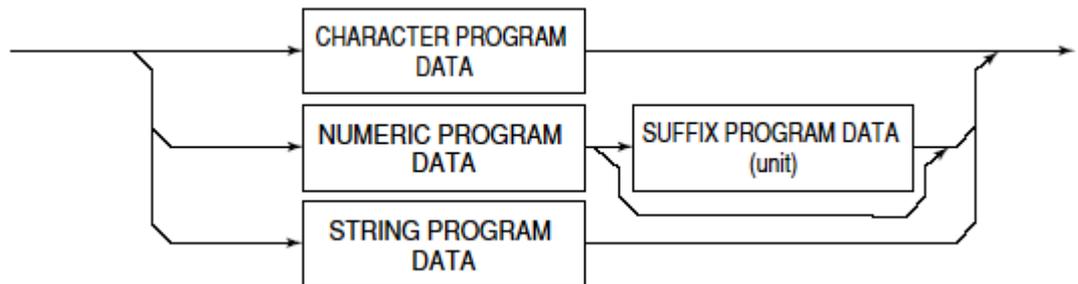
(5)   CHARACTER PROGRAM

Character program data is specific character string data consisting of the uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, numbers 0 to 9, and underline (_).

<Example> WRITE #1;"ST AUTO".............. Sets Sweep Time to AUTO.

(6) NUMERIC PROGRAM DATA

Numeric program data has two types of formats: integer format (NR1) and fixed-point format (NR2).

<Fixed-Point format (NR1)>

- Zeros can be inserted at the beginning → 005, +000045
- There must be no spaces between a + or - sign and a number → +5, +△5 (×)
- Spaces can be inserted after a number → +5△△△
- A + sign is optional → +5, 5
- Commas cannot be used to separate digits → 1,234,567 (×)

<Fixed-Point format (NR2)>

- The numeric expression of the integer format applies to the integer part.
- There must be no spaces between numbers and the decimal point → +753△.123 (×)
- Spaces can be inserted after the digits in the fraction part → +753.123△△△
- A number need not be placed before the decimal point → .05
- A + or - sign can be placed before the decimal point → +.05, −.05
- A number can end with a decimal point → 12.

(7)   SUFFIX PROGRAM DATA (unit)

The table below lists the suffixes used for this measurement unit.

Table of Suffix Codes

Classification	Unit	Suffix code
Frequency	GHz	GHZ, GZ
	MHz	MHZ, MZ
	kHz	KHZ, KZ
	Hz	HZ
	Default	HZ
Time	second	S
	m second	MS
	μ second	US
	Default	MS
Level (dB system)	dB	DB
	dBm	DBM, DM
	dBμV	DBUV
	dBmV	DBMV
	dBμV(emf)	DBUVE
	Default	Determined in conformance with the set scale unit
Level (V system)	V	V
	mV	MV
	μV	UV
	Default	UV
Level (W system)	W	W
	mW	MW
	μW	UW
	nW	NW
	pW	PW
	fW	FW
	Default	UW

(8)   STRING PROGRAM DATA
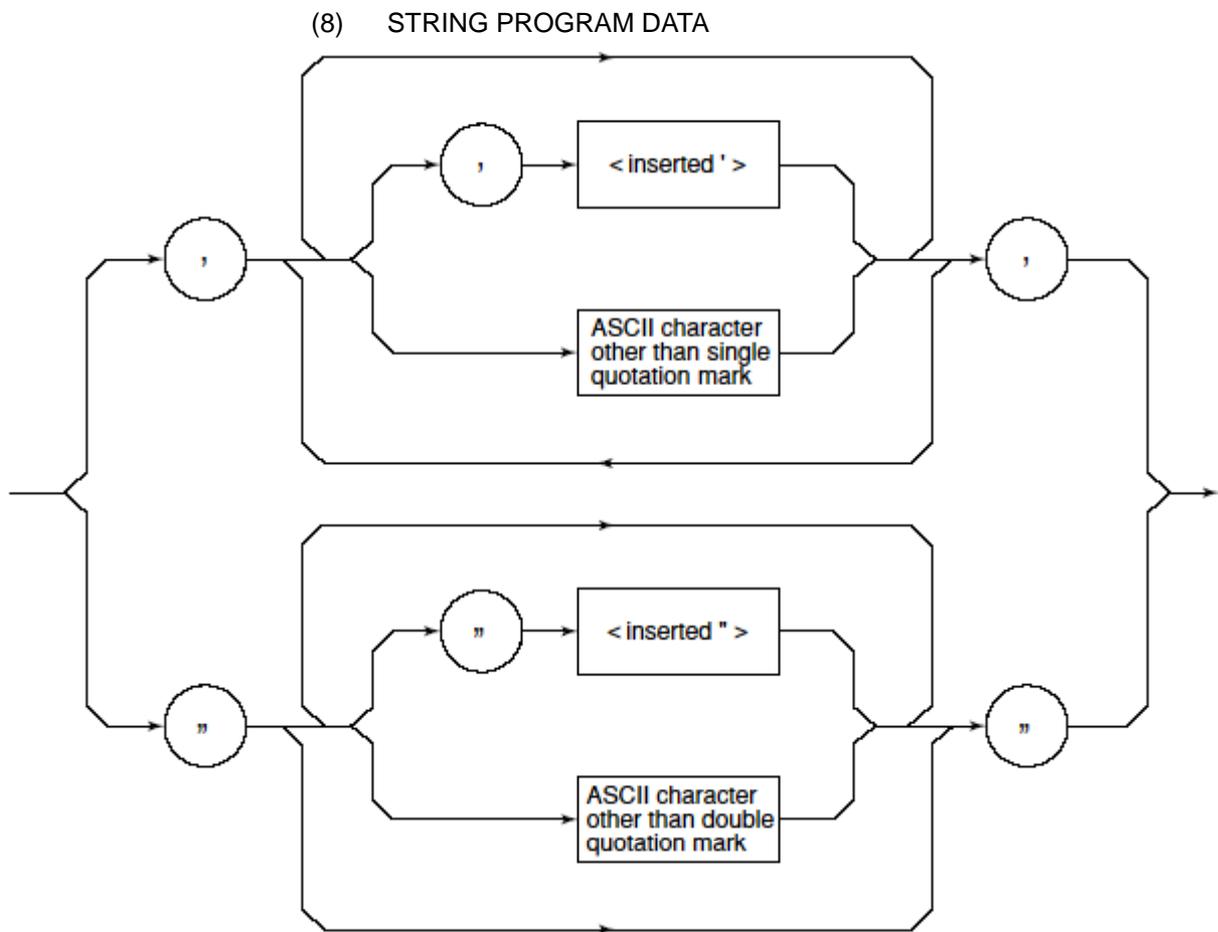
- String program data must be enclosed with single quotation marks ('...').

```
WRITE #1:"TITLE'MS8608A'"
```

A single quotation mark used within a character string must be enclosed with double quotation marks.

```
WRITE #1;"TITLE'MS8608A''NOISE MEAS'''"
```

MS8608A 'NOISE MEAS' is set as the title.

Response Message Format

To transfer the response messages from this measurement unit to the controller using the READ statement, the response message formats are defined as follows.

```
┌─────────────────────┐        ┌─────────────────────┐
│  RESPONSE MESSAGE   │────────│  RESPONSE MESSAGE   │
│                     │        │     TERMINATOR      │
└─────────────────────┘        └─────────────────────┘
```

(1)   RESPONSE MESSAGE TERMINATOR

```
──────────────────────►( NL )──────────────────►( EOI )
        │                                    ↑
        ▼                                    │
     ( CR )──────────►( NL )─────────────────┘
```
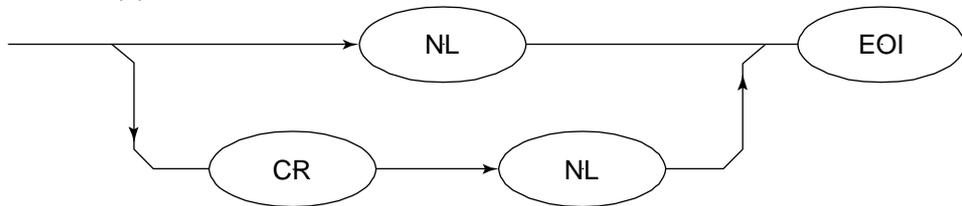
The response message terminator to be used depends on the TRM command specification.

(2)   RESPONSE MESSAGE

```
        ┌──────────────( ; )──────────────┐
        │                                  │
        ▼        ┌──────────────────────┐  │
────────────────►│ RESPONSE MESSAGE UNIT│──────────────────►
                 └──────────────────────┘
```
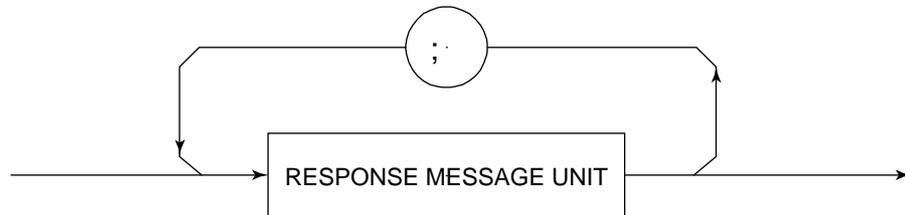
When a query is sent by the WRITE statement with one or more program queries, the response message also consists of one or more response message units.

(3)   Usual RESPONSE MESSAGE UNIT

```
                                        ┌──────( ; )──────┐
                                        │                 │
    ┌──────────────────┐   ( SP )       ▼  ┌────────────┐ │
───►│ RESPONSE HEADER  │──►( SP )──────────►│RESPONSE DATA│─────►
    └──────────────────┘        │          └────────────┘
        │                       ↑
        └───────────────────────┘
```
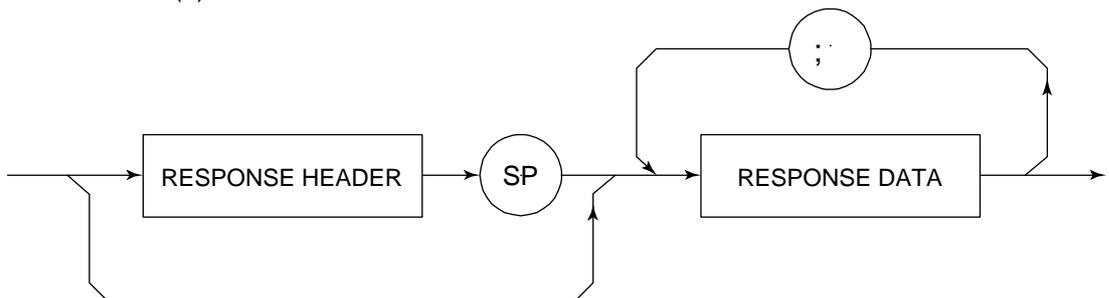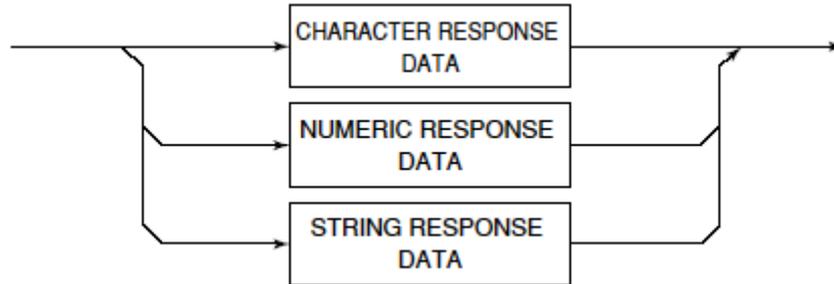
(4)　RESPONSE DATA

(5)　CHARACTER RESPONSE DATA

Character response data is specific character string data consisting of the uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, numbers 0 to 9, and underline (_).

(6)　NUMERIC RESPONSE DATA

< Integer format (NR1) >

< Example >
123
−1234

• The number at the most-significant position is other than 0.
• A + sign need not be placed before a positive number.

< Integer format (NR2) >

• The number at the most-significant position is other than 0.
• A + sign need not be placed before a positive number.
• If there are zeros after the decimal point, the numeric data is transmitted in the integer format.
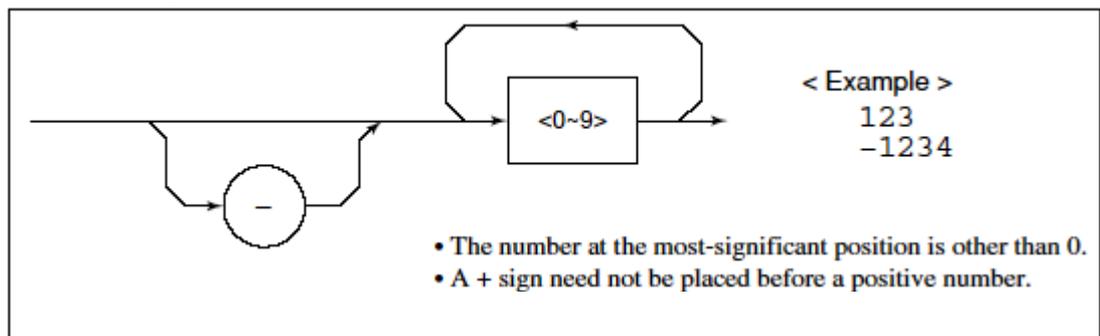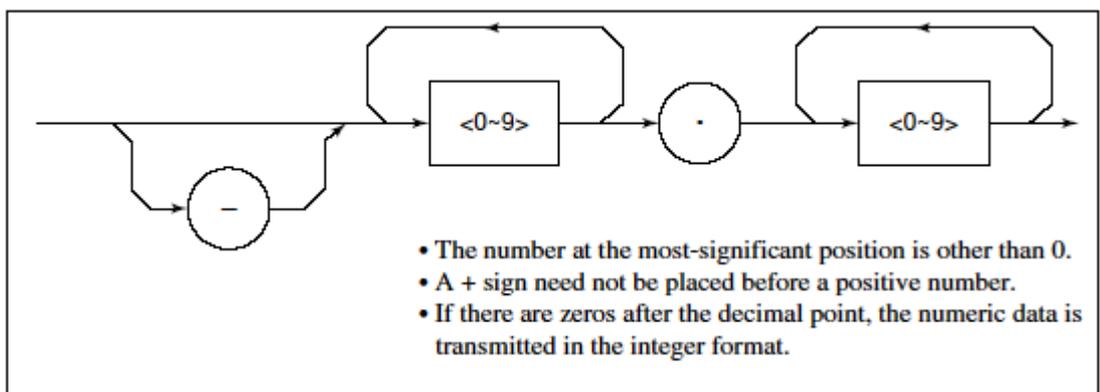
(7)   CHARACTER RESPONSE DATA
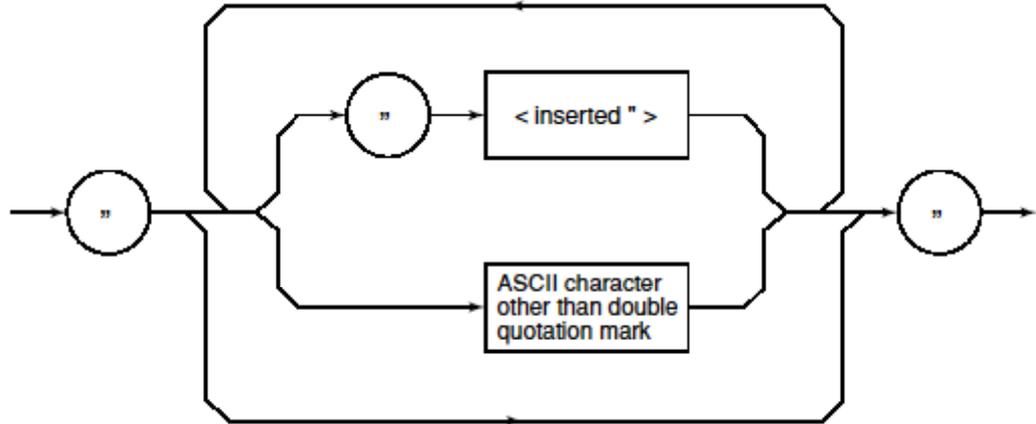
String response data is transmitted as an ASCII character enclosed with double quotation marks.

(8)   Response message for input of waveform data using binary data

The waveform binary data is two-byte 65536 integer data from -32768 to 32767, as shown below; and sent in the sequence of upper byte and lower byte.

16-Bit Binary	With Sign	No Sign
1000000000000000	-32768	32768
1000000000000001	-32767	32769
1000000000000010	-32766	32770
1111111111111101	-3	65533
1111111111111110	-2	65534
1111111111111111	-1	65535
0000000000000000	0	0
0000000000000001	1	1
0000000000000010	2	2
0000000000000011	3	3
0111111111111101	32765	32765
0111111111111110	32766	32766
0111111111111111	32767	32767

Sign bit: Bit 15(MSB) is used.
Integer-digit part: Bits 0 to 14 are used.
                     So, 16 bits(two bytes) are used.

MSB   Upper byte   Lower byte   LSB

15   14   87   0

S

† Sign bit   Integer-digit part

Internal Representation of 2-byte Bynary Data

---
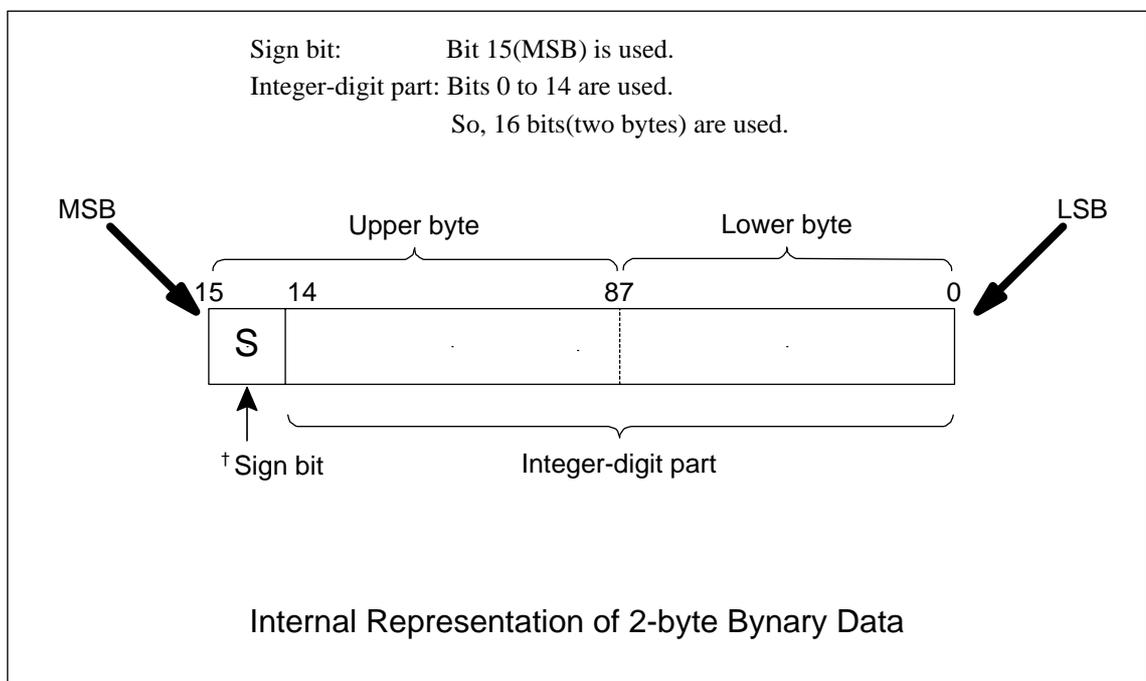
† **When a negative number is stored in a numeric variable, the sign bit 1 is set in the MSB to indicate the negative value. The value is stored in a numeric variable in a 2's complement format.**

For example, to transmit an integer of 16706, the ASCII format is compared with the Binary format, below.

The ASCII format requires 5 bytes. Whereas, the Binary format requires only 2 bytes, and does not need the data format transformation. So, The Binary format is used for a high-speed transmission.

| ASCII transmission | | | | | Binary transmission | |

ASCII transmission

1	6	7	0	6
31 (H)	36 (H)	37 (H)	30 (H)	36 (H)
1st byte	2nd byte	3rd byte	4th byte	5th byte

Binary transmission

X=16706

Upper byte	Lower byte
41 (H)	42 (H)
1st byte	2nd byte

(H) indicates hexadecimal notation.
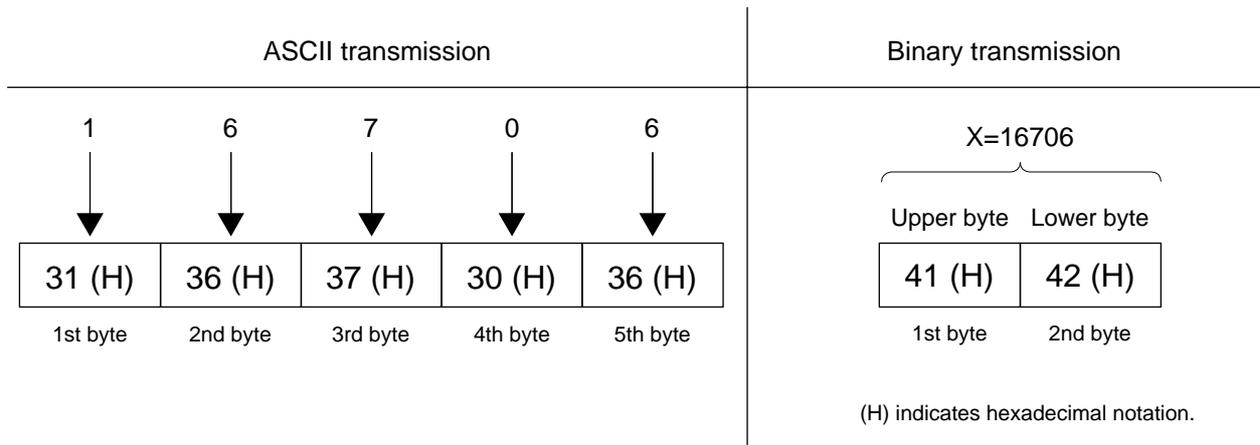
$$16706 \ (D) = 4 \times 16^3 + 1 \times 16^2 + 4 \times 16^1 + 2 \times 16^0$$

Upper byte / Lower byte

Binary notation

bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
X=16706	0	1	0	0	0	0	0	1	0	1	0	0	0	0	1	0

1st byte   2nd byte (Transmission order)

bit	7	6	5	4	3	2	1	0		
1st byte	0	1	0	0	0	0	0	1	(Upper byte)	41 (H)
2nd byte	0	1	0	0	0	0	1	0	(Lower byte)	42 (H)
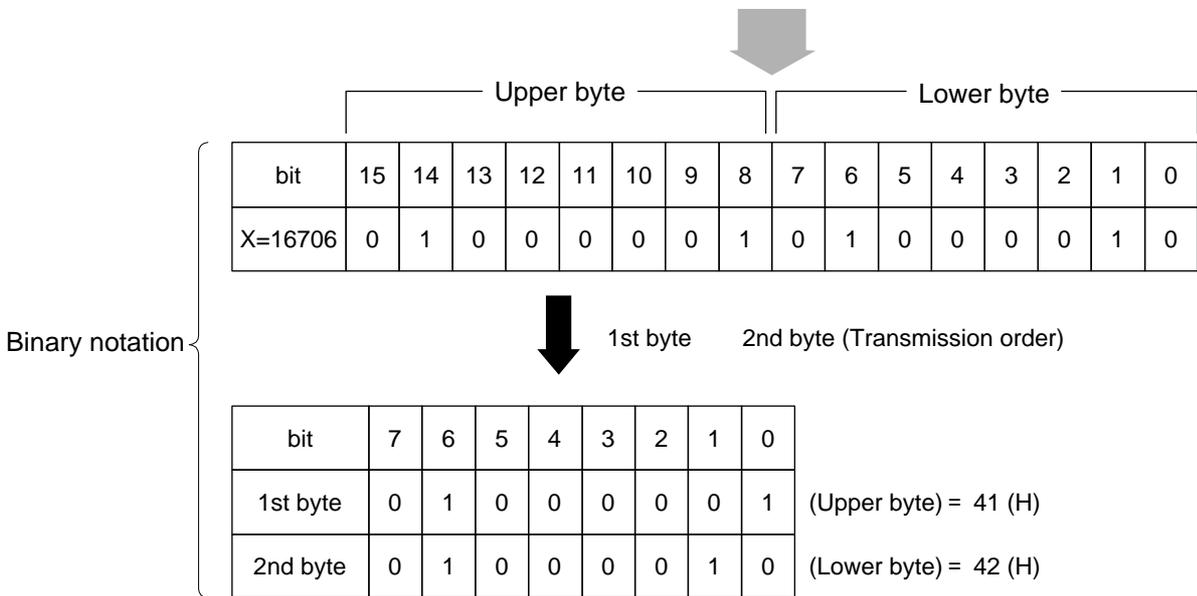
The waveform binary data has a number of bytes for

(Number of points to be specified) X 2 bytes + termination code.

Where, termination code is specified by the TRM command, and is LF(0D(H): 1 byte) or CR+LF(0A0D(H): 2 bytes).

Section 4   Status Structure

This section describes the device-status reporting and its data structure defined by the IEEE488.2 when the GPIB interface bus is used. This section also describes the synchronization techniques between a controller and device.

These functions are used to control a device from an external controller using the GPIB interface bus. Most of these functions can also be used to control a device from an external controller using the RS-232C or Ethernet interface.

The Status Byte (STB) sent to the controller is based on the IEEE488.1 standard. The bits comprising the STB are called status summary messages because they represent a summary of the current data in registers and queues.

IEEE488.2 Standard Status Model

The diagram below shows the standard model for the status data structures stipulated in the IEEE488.2 standard.

Standard Status Model Diagram

In the status model, IEEE488.1 status bytes are used for the lowest grade status. This status byte is composed of seven summary message bits from the higher grade status structure. To create these summary message bits, the status data structure is composed of register and queue models.

Register model	Queue model
The register model consists of two registers used for recording events and conditions encountered by a device. These two registers are the Event Status Register and Event Status Enable Register. When the results of the AND operation of both register contents are other than 0, the corresponding bit of the status bit becomes 1. In other cases, the corresponding bit becomes 0. When the result of their Logical OR is 1, the summary message bit also becomes 1. If the Logical OR result is 0, the summary message bit also becomes 0.	The queue in the queue model is used to sequentially record the waiting status values or information. If the queue is not empty, the queue structure summary message becomes 1. If the queue is empty, the message becomes 0.

In IEEE488.2, there are three standard models for the status data structure. Two are register models and one is a queue model based on the register model and queue model described above. The three standard models are:

[1] Standard Event Status Register and Standard Event Status Enable Register

[2] Status Byte Register and Service Request Enable Register Output Queue

[3] Output Queue

Standard Event Status Register	Status Byte Register	Output Queue
The Standard Event Status Register has the same structure as the previously described register model. In this register, the bits for eight types of standard events encountered by a device are set as follows: [1] Power on [2] User request [3] Command error [4] Execution error [5] Device-dependent error [6] Query error [7] Request for bus control right [8] Operation complete The Logical OR output bit is represented by Status Byte Register bit 5 (DIO6) as a summary message for the Event Status Bit (ESB).	The Status Byte Register is a register in which the RQS bit and the seven summary message bits from the status data structure can be set. This register is used together with the Service Request Enable Register. When the results of the OR operation of both register contents are other than 0, SRQ becomes ON. To indicate this, bit 6 of the Status Byte Register (DIO7) is reserved by the system as the RQS bit. The RQS bit is used to indicate that there is a service request for the external controller. The mechanism of SRQ conforms to the IEEE488.1 standard.	The Output Queue has the structure of the queue model described above. Status Byte Register bit 4 (DIO5) is set as a summary message for Message Available (MAV) to indicate that there is data in the output buffer.

Status Byte (STB) Register

The STB register consists of the STB and RQS (or MSS) messages of the device.

ESB and MAV summary messages

This paragraph describes the ESB and MAV summary messages.

(1)   ESB summary message

The ESB (Event Summary Bit) is a message defined by IEEE488.2 which uses bit 5 of the STB register.   When the setting permits events to occur, the ESB summary message bit becomes 1 if any one of the events recorded in the Standard Status Register becomes 1. Conversely, the ESB summary message bit becomes 0 if one of the recorded events occurs, even if events are set to occur.

This bit becomes 0 when the ESR register is read by the ∗ESR? query or when it is cleared by the ∗CLS command.

(2)   MAV summary message

The MAV (Message Available) summary bit is a message defined by IEEE488.2 which uses bit 4 of the STB register. This bit indicates whether the output queue is empty. The MAV summary message bit is set to 1 when a device is ready to receive a request for a response message from the controller. When the output queue is empty, this bit is set to 0. This message is used to synchronize the information exchange with the controller. For example, this message is available when, after the controller sends a query command to a device, the controller waits until MAV becomes 1. While the controller is waiting for a response from the device, other jobs can be processed. Reading the Output Queue without first checking MAV will cause all system bus operations to be delayed until the device responds.

Unique summary messages of this measurement unit

As shown in the diagram below, this measurement unit does not use bits 0, 1, 3, and 7, and it uses bit 2 as the summary bit of the Event Status Register.
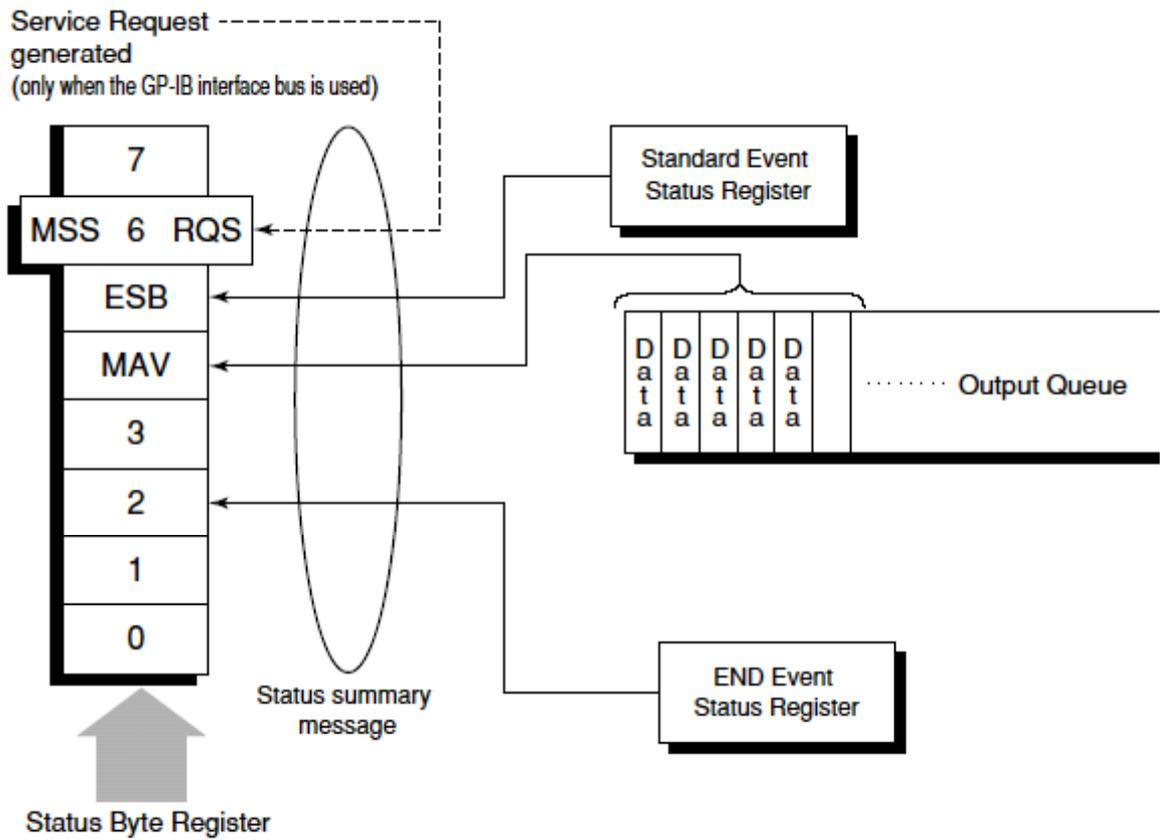
Reading and clearing the STB register

The STB register can be read using serial polling or the ∗STB? common query. The IEEE488.1 STB message can be read by either method, but the value sent to bit 6 (position) is different for each method.
The STB register contents can be cleared using the ∗CLS command.

(1)   Reading by serial polling (only when the GPIB interface bus is used)
The IEEE488.1 serial polling allows the device to return a 7-bit status byte and an RQS message bit which conforms to IEEE488.1. The value of the status byte is not changed by serial polling. The device sets the RQS message to 0 immediately after being polled.

(2)   Reading by the ∗STB? common query
The ∗STB? common query requires the devices to send the contents of the STB register and the integer format response messages, including the MSS (Master Summary Status) summary message. Therefore, except for bit 6, which represents the MSS summary message, the response to ∗STB? is identical to that of serial polling.

(3)   Definition of MSS (Master Summary Status)
MSS indicates that there is at least one cause for a service request. The MSS message is represented at bit 6 response to an ∗STB? query, but it is not produced as a response to serial polling. It should not be taken as part of the status byte specified by IEEE488.1. MSS is configured by the overall logical OR in which the STB register and SRQ enable (SRE) register are combined.

(4)   Clearing the STB register using the ∗CLS common command
The ∗CLS common command clears all status data structures as well as the summary messages corresponding to them.

The ∗CLS command does not affect the settings in the Enable Register.

Service Request (SRQ) Enabling Operation

Bits 0 to 7 of the Service Request Enable Register (SRE) determine which bit of the corresponding STB register can generate SRQ.

The bits in the Service Request Enable Register correspond to the bits in the Status Byte Register. If a bit in the Status Byte Register corresponding to an enabled bit in the Service Request Enable Register is set to 1, the device makes a service request to the controller with the RQS bit set to 1.
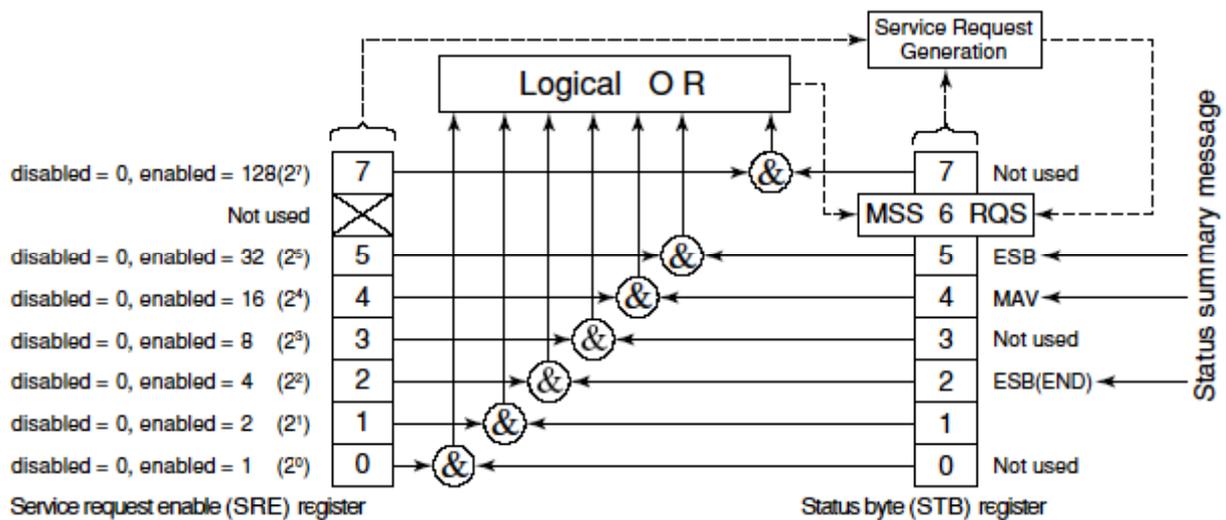
(1)	Reading the SRE register

The contents of the SRE register are read using the ∗SRE? common query. The response message to this query is an integer from 0 to 255 which is the sum of the bit digit weighted values in the SRE register.

(2)	Updating the SRE register

The SRE register is written using the ∗SRE common command. An integer from 0 to 255 is assigned as a parameter to set the SRE register bit to 0 or 1. The value of bit 6 is ignored.

Standard Event Status Register

Bit definition of Standard Event Status Register

The diagram below shows the operation of the Standard Event Status Register.
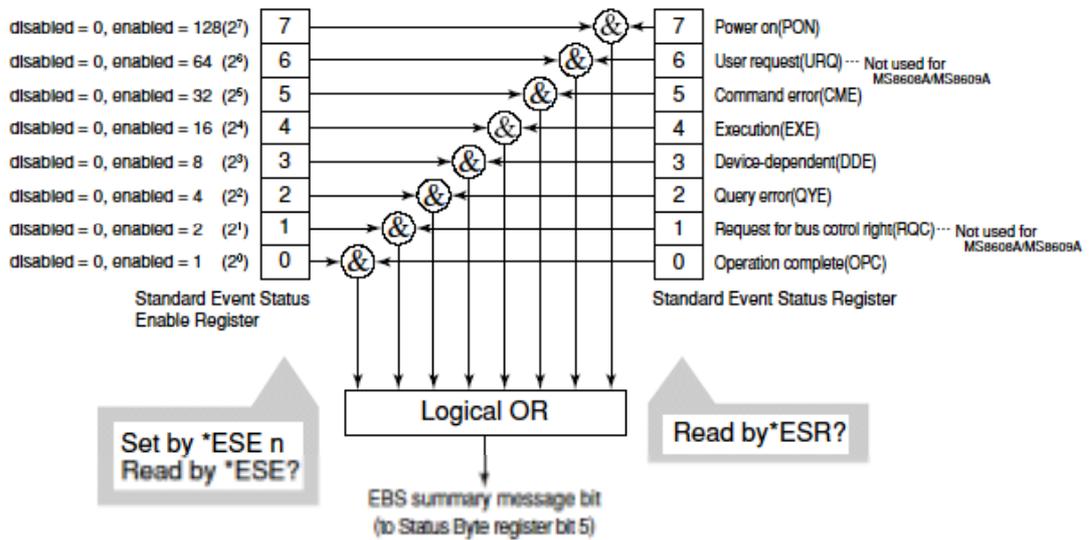
The Standard Event Status Enable (ESE) Register on the left is used to select which bits in the corresponding Event Register will cause a TRUE summary message when set.

Bit	Event name	Description
7	Power on (PON-Power on)	A transition from power-off to power-on occurred during the power-up procedure.
6	Not used	
5	Command error (CME-Command Error)	An illegal program message or a misspelled command was received.
4	Execution error (EXE-Execution Error)	A legal but unexecutable program message was received.
3	Device-dependent error (DDE-Device-dependent Error)	An error not caused by CME, EXE, or QYE occurred (parameter error, etc.).
2	Query error (QYE-Query Error)	An attempt was made to read data in the Output Queue when it was empty. Or, the data in the Output Queue was lost before it was read.
1	Not used	
0	Operation complete (OPC-Operation Complete)	This bit becomes 1 when this instrument has processed the ∗OPC command.

Reading, writing, and clearing the Standard Event Status Register

Reading	The register is read using the *ESR? command query. The register is cleared after being read. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	With the exception of clearing, data cannot be written to the register from outside.
Clearing	The register is cleared when: [1] A *CLS command is received [2] The power is turned on (Bit 7 is set to ON and the other bits are cleared to 0). [3] An event is read for the *ESR? query command

Reading, writing, and clearing the Standard Event Status Enable Register

Reading	The registers is read using the *ESE? command. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	The register is written using the *ESE common command.
Clearing	The register is cleared when: [1] An *EXE command with a data value of 0 is received [2] The power is turned on The Standard Event Enable Register is not affected when: [1] The device clear function status of IEEE488.1 is changed [2] An *RST common command is received [3] A *CLS common command is received

Extended Event Status Register

For this measurement unit, bits 7, 3, 1, and 0 are unused. Bit 2 is assigned to the END summary bit as the status-summary bit supplied by the extended register model as shown below.
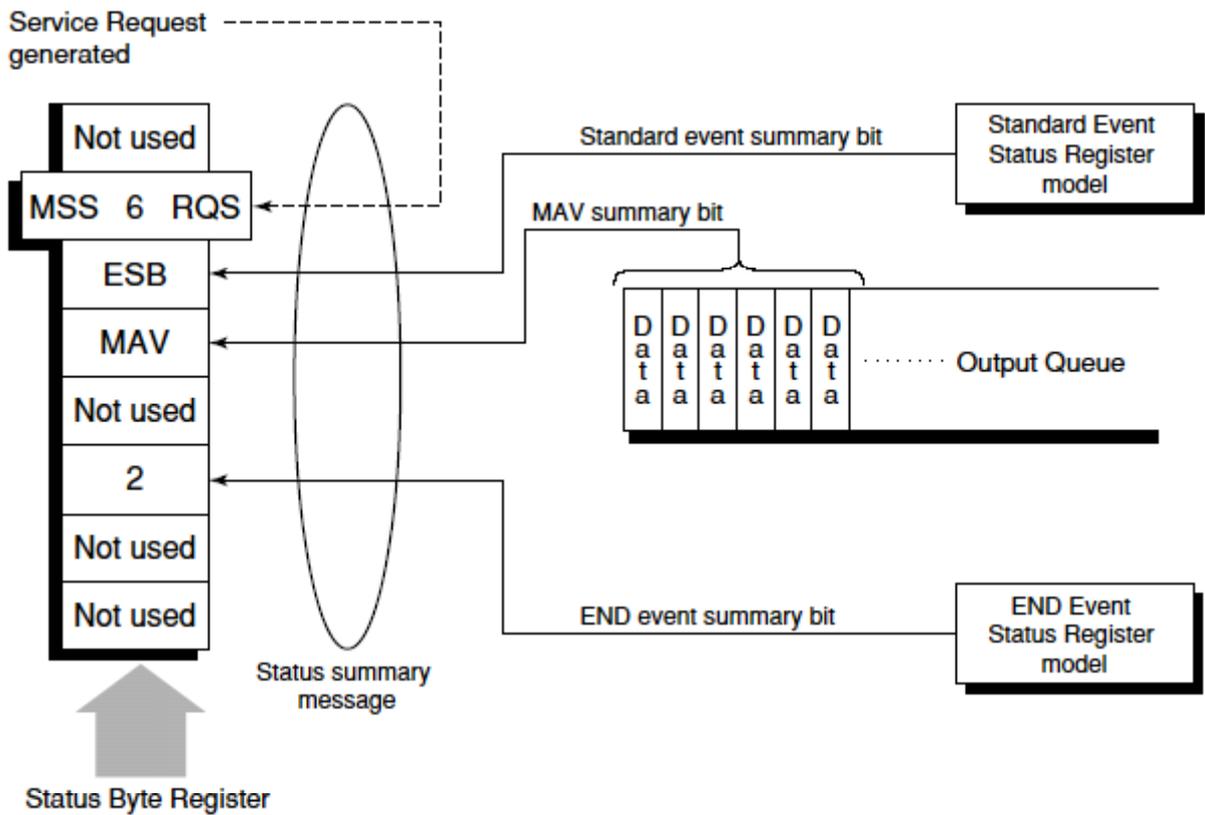
Bit definition of END Event Status Register

The diagram below shows the operation and event-bit names of the END Event Status Register.

disabled = 0, enabled = 128(2^7) 7
disabled = 0, enabled = 64 (2^6) 6
disabled = 0, enabled = 32 (2^5) 5
disabled = 0, enabled = 16 (2^4) 4
disabled = 0, enabled = 8 (2^3) 3
disabled = 0, enabled = 4 (2^2) 2
disabled = 0, enabled = 2 (2^1) 1
disabled = 0, enabled = 1 (2^0) 0

END Event Status Enable Register

Set by ESE2 n
Read by ESE2?

ESB summary message bit
(to Status Byte register bit 2)

Logical OR

7 Not used
6 Max-Hold/Min-Hold completed
5 Measurement completed
4 Averaging completed
3 Preselector peaking completed
2 AUTO TUNE completed
1 Calibration completed
0 Sweep completed

END Event Status Register

Read by ESR2?

The END Event Status Enable Register is used to select which bits in the corresponding Event Register will cause a TRUE summary message when set.

Bit	Event name	Description
7	Not used	Not used
6	Max Hold/Min Hold	Sweeping according to the specified HOLD number has been completed.
5	Measurement completed	Calculation processing for measurements (frequency count, noise, etc.) has been completed.
4	Averaging completed	Sweeping according to the specified AVERAGE number has been completed.
3	Preselector peaking completed	Preselector peaking has been completed
2	AUTO TUNE completed	AUTO TUNE has been completed.
1	Calibration completed	ALL CAL, LEVEL CAL, or FREQ CAL has been completed.
0	Sweep completed	A single sweep has been completed or is in standby.

Reading, writing, and clearing the Extended Event Status Register

Reading	The ESR? common query is used to read the register. The register is cleared after being read. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	With the exception of clearing, data cannot be written to the register from outside.
Clearing	The register is cleared when: [1] A *CLS command is received [2] The power is turned on [3] An event is read for the ESR2? query command

Reading, writing, and clearing the Extended Status Enable Register

Reading	The ESE2? query is used to read the register. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimals.
Writing	The ESE2 program command is used to write the register. Because bits 0 to 7 of the registers are weighted with values 1, 2, 4, 8, 16, 32, 64, and 128, respectively, the write data is transmitted as integer-format data that is the sum of the required bit digits selected from the weighted value.
Clearing	The register is cleared when: [1] An ESE2 program command with a data value of 0 is received [2] The power is turned on The Extended Event Status Enable register is not affected when: [1] The device clear function status of IEEE488.1 is changed [2] An *RST common command is received [3] A *CLS common command is received

Synchronizing This Measurement Unit with a Controller

This measurement unit treats program messages as sequential commands that do not process newly-received commands until they complete the processing of the previous command. Therefore, no special consideration is necessary for pair-synchronization between this measurement unit and the controller.

If the controller controls and synchronizes with one or more devices, after all the commands specified for this measurement unit have been processed, the next commands must be sent to other devices.

There are two ways of synchronizing this measurement unit with the controller:

[1]   Wait for a response after the *OPC? query is sent.

[2]   Wait for SRQ after *OPC is sent.

Wait for a response after the *OPC? query is sent

This measurement unit outputs "1" as the response message when executing the *OPC? query command. The controller is synchronized with this measurement unit by waiting for the response message to be entered.

< Controller program >

[1] Send one or more commands
    sequentially.

⬇

[2] Send the *OPC? query.

⬇

[3] Read the response message. ·········· [The read "1" is ignored.]

⬇

To the next operation
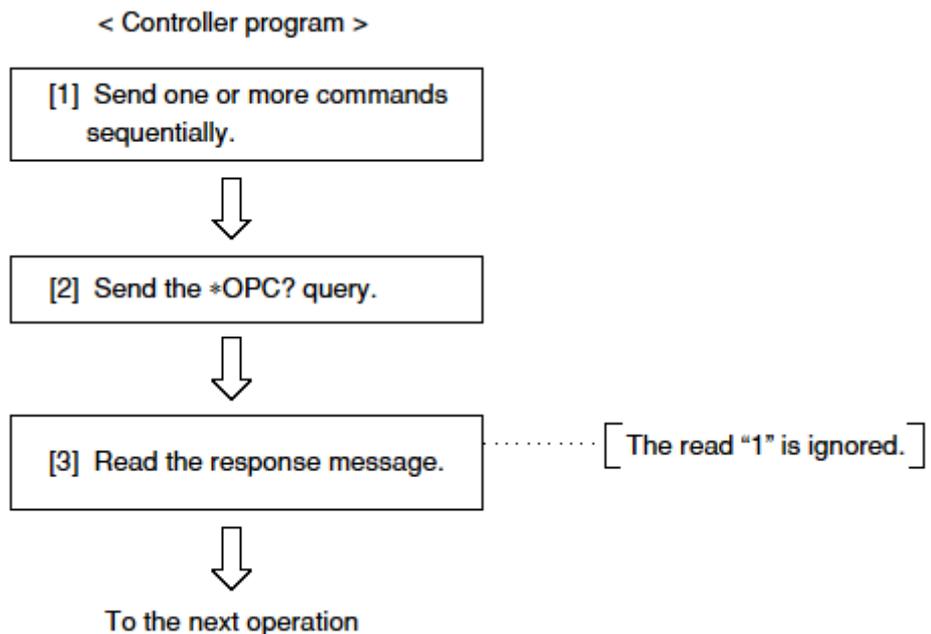
Wait for a service request after ∗OPC is sent (only when the GPIB interface bus is used)

This measurement unit sets the operation-complete bit (bit 0) to 1 when executing the ∗OPC command. The controller is synchronized with this measurement unit for SRQ when the operation-complete bit is set for SRQ.

Status Byte Register

Standard Event Status Enable Register (SESER)

Standard Event Status Register (SESR)

Output Queue
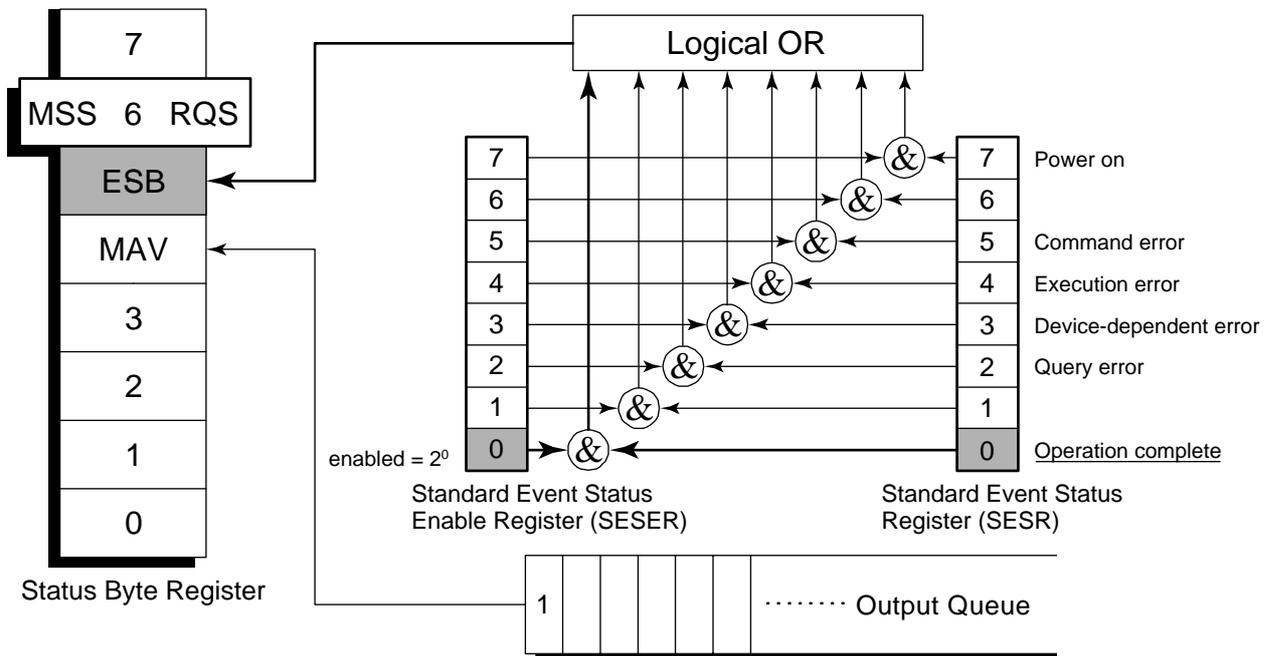
■ < Controller program >

[1] Enable the 2^0 bit of the Standard Event Status Enable Register.	PRINT @1;"∗ESE 1"

[2] Enable the 2^5 bit of the Service Request Enable Register.	PRINT @1;"∗SRE 32"

[3] Make the device execute the specified operation.

[4] Send the ∗OPC command.	PRINT @1;"∗OPC"

[5] Wait for the SRQ interrupt (ESB summary message).	······ Value of status byte: $2^6 + 2^5 = 96$

Section 5   Initial Settings

This measurement unit initializes the GPIB interface system at three levels by the IEEE488.2 specifications. This section describes how these three levels of initialization are processed, and how to instruct initialization from the controller.

The IEEE488.2 standard has three levels of initialization. The first level is "bus initialization," the second level is "initialization for message exchange," and the third level is "device initialization." This standard also stipulates that a device must be set to a known state when the power is turned on.

Level	Initialization type	Description	Level combination and sequence
1	Bus initialization	The IFC message from the controller initializes all interface functions connected to the bus.	Level 1 can be combined with other levels, but must be executed before level 2.
2	Initialization for message exchange	Message exchanges of all devices and specified devices on the GP-IB are initialized using the SDC and DCL GP-IB bus commands, respectively. These commands also nullify the function that reports operation completion to the controller.	Level 2 can be combined with other levels, but must be executed before level 3.
3	Device initialization	The ∗RST or INI/IP command returns a specified device to a known device-specific state, regardless of the conditions under which was being used.	Level 3 can be combined with other levels, but must be executed after levels 1 and 2.

When using the RS-232C (standard)/Ethernet (Option) interface port to control this measurement unit from the controller, the level-3 device initialization function can be used but the level-2 initialization function. When using the GPIB (Standard) interface bus to control this measurement unit from the controller, all the initialization functions can be used.

The following paragraph describes the commands for initialization at levels 1, 2, and 3 and the items that are initialized. This paragraph also describes the known state which is set when the power is turned on.

Bus Initialization Using the IFC Statement

■ Example

```
board% = 0
CALL SendIFC (board%)
```

■ Explanation

This function is available when using the GPIB interface bus to control this measurement unit from the controller.

The IFC statement initializes the interface functions of all devices connected to the GPIB bus line.

The initialization of interface functions clears the interface function states of devices set by the controller to their initial states. In the table below, the circles indicate the functions which are initialized, and the triangle indicates the function which is partially initialized.

No	Function	Symbol	Initialization by IFC
1	Source handshake	SH	○
2	Acceptor handshake	AH	○
3	Talker or extended talker	T or TE	○
4	Listener or extended listener	L or LT	○
5	Service request	SR	△
6	Remote/local	RL	
7	Parallel poll	PP	
8	Device clear	DC	
9	Device trigger	DT	
10	Controller	C	○

Bus initialization by the IFC statement does not affect the device operating state (frequency settings, LED on/off, etc.).

Initialization for Message Exchange by DCL and SDC Bus Commands

■ Example

Initialize all devices on the bus for message exchange (sending DCL).

```
board% = 0
addresslist% = NOADDR
CALL DevClearList(board%, addresslist%)
```

Initialize only the device at address 3 for message exchange (sending SDC).

```
board% = 0
address% = 3
CALL DevClear(board%, address%)
```

■ Explanation

This function can be used when the GPIB interface is used to control this measurement unit from the controller.

This statement executes initialization for message exchange of all devices or a specified device on the GPIB having the specified select code.

■ Items to be initialized for message exchange

When this measurement unit accepts the DCL or SDC bus command, it does the following:

[1]	Input Buffer and Output Queue:	Clears them and also clears the MAV bit.
[2]	Parser, Execution Controller, and Response Formatter:	Resets them.
[3]	Device commands including *RST:	Clears all commands that prevent these commands from being executed.
[4]	Processing of the *OPC? command:	Puts a device in OCIS (Operation Complete Command Idle State). As a result, the operation complete bit cannot be set in the Standard Event Status Register.
[5]	Processing of the *OPC? query:	Puts a device in OQIS (Operation Complete Query Idle State). As a result, the operation complete bit 1 cannot be set in the Output Queue.
[6]	Device functions:	Puts all functions associated with message exchange in the idle state. The device continues to wait for a message from the controller.

CAUTION ⚠

The following are not affected even if the DCL and SDC commands are processed.

[1]   Current data set or stored in the device

[2]   Front panel settings

[3]   Status of status byte other than MAV bit

[4]   A device operation in progress

Device Initialization Using the *RST Command

■ Syntax

`*RST`

■ Example

For RS-232C/Ethernet

> `WRITE #1,"*RST"`........................ Initializes the spectrum analyzer function
> at address 1 at level 3.

For GPIB

> ```
> SPA%=1
> CALL Send(0,SPA,"*RST",NLend)
> ```

■ Explanation

The *RST (Reset) command is an IEEE488.2 common command that initialize a device at level 3.

The *RST (Reset) command is used to initialize a device (this measurement unit) to a specific initial state.

Note:

> **The *RST command does not affect the following.**

[1]   **IEEE488.1 interface state**

[2]   **Device address**

[3]   **Output Queue**

[4]   **Service Request Enable register**

[5]   **Standard Event Status Enable register**

[6]   **Power-on-status-clear flag setting**

[7]   **Calibration data affecting device specifications**

[8]   **Parameters preset for control of external device, etc.**

☞ **For details of the settings of this measurement unit after initialization, see Appendix A.**

Device Initialization Using the INI/IP Command

■ Syntax
```
INI
IP
```

■ Example (program message)

For RS-232C/Ethernet

```
WRITE #1,"INI"
```
.... Initializes the device (spectrum analyzer function) at address 1 at level 3.

For GPIB

```
SPA%=1
CALL Send(0,SPA%,"INI",NLend)
```

■ Explanation

The INI and IP commands are this measurement unit device-dependent messages that initialize a device at level 3.

Device Status at Power-on

When the power is turned on:

[1]   The device is set to the status at power-off.

[2]   The Input Buffer and Output Queue are cleared.

[3]   The Parser, Execution Controller, and Response Formatter are initialized.

[4]   The device is put into OCIS (Operation Complete Command Idle State).

[5]   The device is put into OQIS (Operation Complete Query Idle State).

[6]   The Standard Event Status and Standard Event Status Enable Registers are cleared. Events can be recorded after the registers have been cleared.

As the special case of [1], when this measurement unit is powered on for the first time after delivery, this measurement unit settings are those listed in the Initial Settings Table (☞ Appendix A).

Section 6   Device Message List

This section describes the device message list of the MX860x03A/
MX268x03A cdma Measurement Software.
For the details of these messages, refer to Section 7 Command Details.

How to Read the Device Message List

- Program message and Query message

(a) Upper-case letters: Reserved word

(b) Numeric values: Reserved word (Numeric value code)

(c) Lower-case letters in argument

Argument	Meaning	Type	Unit/Suffix code
f	frequency	Real number with decimal point or integer	GHZ, MHZ, KHZ, HZ, GZ, MZ, KZ, None (HZ)
t	time	Real number with decimal point or integer	S, SC, MS, US, None (MS)
l	level	Real number with decimal point or integer	DB, DBM, DM, DBMV, DBUV, DBUVE, V, MV, UV, W, MW, UW, NW, None (Fixed unit)
n	Non-unit integer or unit-specified integer	Decimal integer	None or specified
o	Non-unit integer	Octal integer	None
h	Non-unit integer	Hexadecimal integer	None
r	Non-unit real number or unit-specified real number	Real number	None or specified

- Response message

(a) Upper-case letters: Reserved word

(b) Numeric values: Reserved word (Numeric value code)

(c) Lower-case letters in argument

Argument	Meaning (Unit)	Type	Unit
f	frequency	Real number with decimal point or integer	Hz
t	time	Real number with decimal point or integer	ms
l	level	Real number with decimal point or integer	Fixed or specified
n	Non-unit integer or unit-specified integer	Decimal integer, number of digits can be changed. (Integers in effective digits are output.)	None or specified
o	Non-unit integer	Octal integer	None
h	Non-unit integer	Hexadecimal integer	None
r	Non-unit real number or unit-specified real number	Real number with decimal point, number of digits can be changed. (Real numbers in effective digits are output.)	None or specified
j	Value judgment	PASS (Unit specification) or FAIL (Out of specification)	None
u	Specified unit	DB, DBM, DM, DBMV, DBUV, DBUVE, V, MV, UV, W, MW, UW, NW	None

Commands Commonly Used on All Measurement Screens

This section lists the commands used on all the measurement screens.
For more information on external control commands commonly used in all the measurement modes for this measurement unit, refer to the separate MS860x/MS268x operation manual.

Function	Item	Program Message	Query Message	Response Message	Remarks
Measurement mode change					
Spectrum Analyzer		PNDMD SPECT	PNLMD?	SPECT	
Tx Tester		PNDMD SYSTEM	PNLMD?	SYSTEM	
Config		PNDMD CONFIG	PNLMD?	CONFIG	
Measurement system change					
System-1(F1)		SYS 1	SYS?	1	
System-2(F2)		SYS 2	SYS?	2	
System-3(F3)		SYS 3	SYS?	3	
Output data format					
Binary code		BIN ON	BIN?	ON	
		BIN 1	BIN?	ON	
ASCII character string		BIN OFF	BIN?	OFF	
		BIN 0	BIN?	OFF	
Input connector switching					
RF Input	High	RFINPUT HIGH	RFINPUT?	HIGH	*1)
	Low	RFINPUT LOW	RFINPUT?	LOW	
Initialization					
Preset		PRE	---	---	
		INI	---	---	
		IP	---	---	
Switch Screen Layer					
Setup Common Parameter		DSPL SETCOM	DSPL?	SETCOM	
Modulation Analysis		DSPL MODANAL	DSPL?	MODANAL	
RF Power		DSPL RFPWR	DSPL?	RFPWR	
Setup Template (RF Power)		DSPL SETTEMP_RFPWR	DSPL?	SETTEMP_RFPWR	
Occupied Bandwidth	Spectrum	DSPL OBW,SPECT	DSPL?	OBW,SPECT	
	FFT	DSPL OBW,FFT	DSPL?	OBW,FFT	

*1: Valid only when this unit is MS8608A.

Function	Item		Program Message	Query Message	Response Message	Remarks
Spurious close to the Carrier	Normal		DSPL ACP	DSPL?	ACP,NRM	
			DSPL ACP,NRM	DSPL?		
	3GPP2 FWD Band Class0,2,3,5,9		DSPL ACP,PRECISE1	DSPL?	ACP,PRECISE1	
	3GPP2 FWD Band Class 1,4,6,8		DSPL ACP,PRECISE2	DSPL?	ACP,PRECISE2	
Setup Spurious Template (Spurious close to the Carrier)			DSPL SETTEMP_ACP	DSPL?	SETTEMP_ACP	
Spurious Emission	Spot		DSPL SETTEMP_SPOT	DSPL?	SPURIOUS,SPOT	
	Search		DSPL SETTEMP_SEARCH	DSPL?	SPURIOUS,SEARCH	
	Sweep		DSPL SETTEMP_SWEEP	DSPL?	SPURIOUS,SWEEP	
Setup Spot Table (Spurious Emission)			DSPL SETTBL_SPU, SPOT	DSPL?	SETTBL_SPU,SPOT	
Setup Search/Sweep Table (Spurious Emission)			DSPL SETTBL_SPU, SWEEP	DSPL?	SETTBL_SPU, SWEEP	
IQ Level			DSPL IQLVL	DSPL?	IQLVL	*1)
Power Meter			DSPL PWRMTR	DSPL?	PWRMTR	*2)
Back Screen			BS	---	---	
Start Measurement						
Sweep/ Measure	Single	No Sync	SNGLS	---	---	
		Sync	SWP	---	---	
	Continous	No Sync	CONTS	---	---	
Sweep/ Measure status	Status of result		---	MSTAT?	0	Normal
					1	RF Level Limit
					2	Level Over
					3	Level Under
					6	Trigger Timeout
					9	No Measure
	During Measurement/ sweep		---	SWP?	SWP 1	
	Measurement/ Sweep End		---	SWP?	SWP 0	

*1: For MS268x, this Command is available when Option–17 or –18 I/Q Input is installed.

*2: Valid only when this unit is MS860x.

Function	Item		Program Message	Query Message	Response Message	Remarks
Switch Screen and Measure Start	Setup Common Parameter		MEAS SETCOM	MEAS?	SETCOM	
	Modulation Analysis		MEAS MODANAL	MEAS?	MODANAL	
	RF Power		MEAS RFPWR	MEAS?	RFPWR	
	Setup Template (RF Power)		MEAS SETTEMP_RFPWR	MEAS?	SETTEMP_RFPWR	
	Occupied Bandwidth	Spectrum	MEAS OBW,SPECT	MEAS?	OBW,SPECT	
		FFT	MEAS OBW,FFT	MEAS?	OBW,FFT	
Switch Screen and Measure Start	Spurious close to the Carrier	Normal	MEAS ACP	MEAS?	ACP,NRM	
			MEAS ACP,NRM	MEAS?		
		3GPP2 FWD Band Class 0,2,3,5,9	MEAS ACP,PRECISE1	MEAS?	ACP,PRECISE1	
		3GPP2 FWD Band Class 1,4,6,8	MEAS ACP,PRECISE2	MEAS?	ACP,PRECISE2	
	Setup Spurious Template (Spurious close to the Carrier)		MEAS SETTEMP_ACP	MEAS?	SETTEMP_ACP	
	Spurious Emission	Spot	MEAS SPURIOUS,SPOT	MEAS?	SPURIOUS,SPOT	
		Search	MEASU SPURIOUS,SEARCH	MEAS?	SPURIOUS,SEARCH	
		Sweep	MEAS SPURIOUS,SWEEP	MEAS?	SPURIOUS,SWEEP	
	Setup Spot Table (Spurious Emission)		MEAS SETTBL_SPU,SPOT	MEAS?	SETTBL_SPU,SPOT	
	Setup Search/ Sweep Table (Spurious Emission)		MEAS SETTBL_SPU,SWEEP	MEAS?	SETTBL_SPU,SWEEP	
	IQ Level		MEAS IQLVL	MEAS?	IQLVL	*1)
	Power Meter		MEAS PWRMTR	MEAS?	PWRMTR	*2)

*1: For MS268x, this Command is available when option −17 or −18 I/Q Input is installed.

*2: Valid only when this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Pre Ampl (option)					
Pre Ampl	On	PREAMP ON	PREAMP?	ON	*1)
	Off	PREAMP OFF		OFF	
Correction					
Correction	Off	CORR 0	CORR?	0	
	Table1	CORR 1		1	
	Table2	CORR 2		2	
	Table3	CORR 3		3	
	Table4	CORR 4		4	
	Table5	CORR 5		5	

*1: This command is available when main unit option MS8608A-08/MS8609A-08/MS2681A-08/MS2683A-08 is installed.

Setup Common Parameter

Function	Item	Program Message	Query Message	Response Message	Remarks
Input					
Terminal	RF	TERM RF	TERM?	RF	
	IQ-DC	TERM IQDC	TERM?	IQDC	
	IQ-AC	TERM IQAC	TERM?	IQAC	
	IQ-Balance	TERM IQBAL	TERM?	IQBAL	
Impedance	50Ω	IQINZ 50	IQINZ?	50	
	1MΩ	IQINZ 1M	IQINZ?	1M	*1)
Reference Level		RFLVL l	RFLVL?	l	l: \<High\> (–10.00+offset) dBm to (42.00+offset) dBm \<Low\> (–30.00 dBm +offset) to (22.00 dBm + offset) The ranges above are for the case of the MS8608A when the pre-amplifier is off. For MS8608A, the setting range for the Low Power input can be set. \<MS268x\> (–30.00 dBm + offset) to (32.00 dBm + offset)
Reference Level Offset		RFLVLOFS?	RFLVLOFS?	l	l: –99.99 to 99.99 dB
Frequency					
Channel		CHAN n	CHAN?	n	n: 0 to 20000
Frequency		FREQ f	FREQ?	f	f: \<MS2681A\> 100 Hz to 3 GHz \<MS8608A\> \<MS2683A\> 100 Hz to 7.8 GHz \<MS8609A\> 100 Hz to 13.2 GHz \<MS2687A/B\> 100 Hz to 30 GHz
Channel & Frequency		CHFREQ n,f	---	---	n: 1 to 20000 f: \<MS2681A\> 100 Hz to 3 GHz \<MS8608A\> \<MS2683A\> 100 Hz to 7.8 GHz \<MS8609A\> 100 Hz to 13.2 GHz \<MS2687A/B\> 100 Hz to 30 GHz
Channel Spreading		CHSPC f	CHSPC?	f	f: 0 Hz to 7.8 GHz

Function	Item	Program Message	Query Message	Response Message	Remarks
Signal					
Measuring Object	Reverse (RC1-2)	MEASOBJ REVERSE	MEASOBJ?	REVERSE	
	Reverse (RC3-4)	MEASOBJ REVERSE3	MEASOBJ?	REVERSE3	
	Forward (RC1-2)	MEASOBJ FORWARD	MEASOBJ?	FORWARD	
	Forward (RC3-5)	MEASOBJ FORWARD3	MEASOBJ?	FORWARD3	
	QPSK	MEASOBJ QPSK	MEASOBJ?	QPSK	
	OQPSK	MEASOBJ OQPSK	MEASOBJ?	OQPSK	
Wave Type	Continuous	WAVETYPE CONT	WAVETYPE?	CONT	
	Burst	WAVETYPE BURST	WAVETYPE?	BURST	
Filter	No Filter	FILTER OFF	FILTER?	OFF	
	Filtering	FILTER ON	FILTER?	ON	
	Filter+EQ	FILTER EQ	FILTER?	EQ	
Trigger					
Trigger	Free Run	TRG FREE	TRG?	FREE	
	External	TRG EXT	TRG?	EXT	
Trigger Edge	Rise	TRGEDGE RISE	TRGEDGE?	RISE	
	Fall	TRGEDGE FALL	TRGEDGE?	FALL	
Trigger Delay		TRGDLY r	TRGDLY?	r	r: −16384.0 to 16384.0 PNchip
PN Synchronization	PN Search	PNSYNC SEARCH	PNSYNC?	SEARCH	
	Ext Trigger	PNSYNC EXTTRG	PNSYNC?	EXTTRG	
PN offset		PNOFFSET n	PNOFFSET?	n	n:0 to 511

Modulation Analysis

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Trace Format	Non	TRFORM NON	TRFORM?	NON	
	Constellation	TRFORM CONSTL	TRFORM?	CONSTEL	
	Eye Diagram	TRFORM EYE	TRFORM?	EYE	
	EVM	TRFORM VECT	TRFORM?	VECT	
	Phase Error	TRFORM PHASE	TRFORM?	PHASE	
	Magnitude Error	TRFORM MAGTD	TRFORM?	MAGTD	
	Code Domain	TRFORM CODE	TRFORM?	CODE	
Operation Trace	I	OPRTTR I	OPRTTR?	I	
	Q	OPRTTR Q	OPRTTR?	Q	
Analysis Start		ANLYSTA_MOD n	ANLYSTA_MOD?	n	n: 0 to 32768 PNchip Resolution 64 (Forward (RC1-2)), 32 (Reverse (RC3-4)), 1 (Reverse (RC1-2), QPSK, OQPSK), 128/64 (Forwaard (RC3-5) Max Depends on Walsh Length.)
Analysis Length		ANALYLEN_MOD n	ANLYLEN_MOD?	n	n: 320 to 24576 PNchip Resolution 128 (Forward and n is under 1536 and Max walsh length is 128), 64 (Forward and n is under 1536 and Max walsh length is 64) 1536 (Forward and n is over 1536), 32 (Reverse(RC1-2)), 1 (Reverse(RC3-4)), 64 (QPSK), 1 (OQPSK)
Max Walsh Length	64	MAXWL 64	MAXWL?	64	
	128	MAXWL 128	MAXWL?	128	
Walsh Length		WLSHLEN n	WLSHLEN?	n	
Auto Rate Detection	On	AUTODET ON	AUTODET?	ON	
	Off	AUTODET OFF	AUTODET?	OFF	

Function	Item	Program Message	Query Message	Response Message	Remarks
Display Mode	OVSF	ARDDSPL OVSF	ARDDSPL?	OVSF	
	Walsh	ARDDSPL WALSH	ARDDSPL?	WALSH	
Interpolation	Non	INTPOL NON	INTPOL?	NON	
	Linear	INTPOL LIN	INTPOL?	LIN	
	10points	INTPOL POINT10	INTPOL?	POINT10	
	Linear & Symbol Position	INTPOL LINSYM	INTPOL?	LINSYM	
	10point & Symbol position	INTPOL P10SYM	INTPOL?	P10SYM	
Error Scale	5%	ERRSC 5	ERRSC?	5	
	10%	ERRSC 10	ERRSC?	10	
	20%	ERRSC 20	ERRSC?	20	
	Off	ERRSC OFF	ERRSC?	OFF	
Vertical Scale	5% or 5°	VSCALE 5	VSCALE?	5	
	10% or 10°	VSCALE 10	VSCALE?	10	
	20% or 20°	VSCALE 20	VSCALE?	20	
	50% or 50°	VSCALE 50	VSCALE?	50	
	100% or 100°	VSCALE 100	VSCALE?	100	
	20 dB 20 ns	VSCALE_CDP 20	VSCALE_CDP?	20	Wave Class: Power or Timing Offset
	40 dB 40 ns	VSCALE_CDP 40	VSCALE_CDP?	40	
	60 dB 60 ns	VSCALE_CDP 60	VSCALE_CDP?	60	
	80 dB 80 ns	VSCALE_CDP 80	VSCALE_CDP?	80	
	100 ns	VSCALE_CDP 100	VSCALE_CDP?	100	Wave Class: Timing Offset
	0.02 rad	VSCALE_CDP 0.02	VSCALE_CDP?	0.02	
	0.04 rad	VSCALE_CDP 0.04	VSCALE_CDP?	0.04	
	0.06 rad	VSCALE_CDP 0.06	VSCALE_CDP?	0.06	
	0.08 rad	VSCALE_CDP 0.08	VSCALE_CDP?	0.08	
	0.10 rad	VSCALE_CDP 0.10	VSCALE_CDP?	0.10	
Filter to Nyquist	On	WAVFLT ON	WAVFLT?	ON	
	Off	WAVFLT OFF	WAVFLT?	OFF	
Threshold		THRESH_MOD l	THRESH_MOD?	l	l: −50.00 to −10.00
Code Domain Wave Class	Power	WAVECLASS_CDP PWR	WAVECLASS_CDP?	PWR	
	Timing	WAVECLASS_CDP TIME	WAVECLASS_CDP?	TIME	
	Phase	WAVECLASS_CDP PHASE	WAVECLASS_CDP?	PHASE	

Function	Item	Program Message	Query Message	Response Message	Remarks
Storage Mode	Normal	STRG_MOD NRM	STRG_MOD?	NRM	
	Average	STRG_MOD AVG	STRG_MOD?	AVG	
	Overwrite	STRG_MOD OVER	STRG_MOD?	OVER	
Average Count		AVG_MOD n	AVR_MOD?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_MOD EVERY	INTVAL_MOD?	EVERY	
	Once	INTVAL_MOD ONCE	INTVAL_MOD?	ONCE	
Marker Mode	Normal	MKR_MOD NRM	MKR_MOD?	NRM	
	Off	MKR_MOD OFF	MKR_MOD?	OFF	
Marker Position	Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error	MKR_CDP r	MKP_MOD?	r	r: 0 to 1535 (Forward, QPSK, Reverse (RC3-4)) 0 to 1535.5 (Reverse (RC1-2), OQPSK)
	Code Domain	MKP_CDP n	MKP_CDP?	n	
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: −10.00 to 10.00 dB *1)
Calibration Cancel		CALCANCEL	---	---	
Multi Carrier Calibration		MLTCARRCAL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n: mode (0: Not calibrated, 1: Internal calibration, 2: Externally input calibration) l: −10.00 to 10.00 dB
Results					
Tx Power		---	TXPWR? u	l	
Carrier Frequency		---	CARREF?	f	
Carrier Frequency Error	Hz	---	CARRFERR?	f	
		---	CARRFERR? HZ	f	
	ppm	---	CARRFERR? PPM	r	unit: ppm
Waveforn Quality		---	WAVQUAL?	r	
Timing Error		---	TAU?	n,t	n: unit: 64 PNchip t: unit: μsec
RMS EVM		---	VECTERR?	r	unit: %

*1:Valid only when this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Peak EVM		---	PVECTERR?	r	unit: %
Phase Errir		---	PHASEERR?	r	unit: deg
Peak Phase Error		---	PPHASEERR?	r	
Magnitude Error		---	MAGTDERR?	r	unit: %
Peak Magnitude Error		---	PMAGTDERR?	r	
Origin Offset		---	ORGNOFS?	l	
Pilot Channel code Domain Power	dB	---	PLTCDP? DB	l	
	dBm	---	PLTCDP? DBM	l	
Sync Channel Power		---	SYNC_CDP?	l	unit: dB
Active Channel Power	Total	---	ACTCH_CDP? TOTAL	l	unit: dB
		---	ACTCH_CDP? TOTAL,I	l	unit: dB
		---	ACTCH_CDP? TOTAL,Q	l	unit: dB
	Number	---	ACTCH_CDP? NUM	l	unit: CH
		---	ACTCH_CDP? NUM,I	l	unit: CH
		---	ACTCH_CDP? NUM,Q	l	unit: CH
	Average	---	ACTCH_CDP? AVERAGE	l	unit: dB
		---	ACTCH_CDP? AVERAGE,I	l	unit: dB
		---	ACTCH_CDP? AVERAGE,Q	l	unit: dB
	Max	---	ACTCH_CDP? MAX	l	unit: dB
		---	ACTCH_CDP? MAX,I	l	unit: dB
		---	ACTCH_CDP? MAX,Q	l	unit: dB
	Min	---	ACTCH_CDP? MIN	l	unit: dB
		---	ACTCH_CDP? MIN,I	l	unit: dB
		---	ACTCH_CDP? MIN,Q	l	unit: dB
Inactive Channel Power	Total	---	INACTCH_CDP? TOTAL	l	unit: dB
		---	INACTCH_CDP? TOTAL,I	l	unit: dB
		---	INACTCH_CDP? TOTAL,Q	l	unit: dB
	Number	---	INACTCH_CDP? NUM	l	unit: CH
		---	INACTCH_CDP? NUM,I	l	unit: CH
		---	INACTCH_CDP? NUM,Q	l	unit: CH
	Average	---	INACTCH_CDP? AVERAGE	l	unit: dB
		---	INACTCH_CDP? AVERAGE,I	l	unit: dB
		---	INACTCH_CDP? AVERAGE,Q	l	unit: dB
	Max	---	INACTCH_CDP? MAX	l	unit: dB
		---	INACTCH_CDP? MAX,I	l	unit: dB
		---	INACTCH_CDP? MAX,Q	l	unit: dB
	Min	---	INACTCH_CDP? MIN	l	unit: dB
		---	INACTCH_CDP? MIN,I	l	unit: dB
		---	INACTCH_CDP? MIN,Q	l	unit: dB

Function	Item		Program Message	Query Message	Response Message	Remarks
Marker Level	Constella-tion, Eye Diagram	I	---	MKL_MOD? I	r	
		Q		MKL_MOD? Q	r	
	EVM, Phase Error, Magnitude Error		---	MKL_MOD	r	
	Code Domain	Max Marker Position	---	MKPMAX_CDP?	n	
			---	MKPMAX_CDP? I	n	
			---	MKPMAX_CDP? Q	n	
		Signal Status	---	MKSGNL?	n	n: NOISE, BPSK, QPSK
			---	MKSGNL? I	n	
			---	MKSGNL? Q	n	
		Walsh Length	---	MKWL?	r	
			---	MKWL? I	r	
			---	MKWL? Q	r	
		Code Number	---	MKSCNO?	r	
			---	MKSCNO? I	r	
			---	MKSCNO? Q	r	
		Code Domain Power	---	MKCDP?	r	
			---	MKCDP? I	r	
			---	MKCDP? Q	r	
		Waveform Quality	---	MKWAV?	r	
			---	MKWAV? I	r	
			---	MKWAV? Q	r	
		Time Offset	---	MKTIM?	r	
		Phase Offset		MKPHASE?	r	

Function	Item		Program Message	Query Message	Response Message	Remarks
Wave Data	Constellation,	I	XMC 0,na,nb	XMC? 0,nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 24575 (write address for data) nb: –32768 to 32767 (write data) nc: 0 to 24575 (read address for data) nd: 1 to 24576 (number of reading points) ne: –2147483648 to 2147483647 (read-data idal signal "1" = 10000)
		Q	XMC 1,na,nb	XMC? 1,nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 24575 (write address for data) nb: –32768 to 32767 (write data) nc: 0 to 24575 (read address for data) nd: 1 to 24576 (number of reading points) ne: –2147483648 to 2147483647 (read-data idal signal "1" = 10000)
		Origin	OXMC na,nb	OXMC? na	nb	na: 0 (I), I (Q) nb: –32768 to 32767

Function	Item		Program Message	Query Message	Response Message	Remarks
	Eye Diagram	I	XMEYE 0,na,nb	XMEYE? 0,nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 15359 (write address for data) nb: –32768 to 32767 (write data) nc: 0 to 15359 (read address for data) nd: 1 to 15360 (number of reading points) ne: –2147483648 to 2147483647 (read-data idal signal "1" = 10000)
		Q	XMC 1,na,nb	XMC? 1,nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 15359 (write address for data) nb: –32768 to 32767 (write data) nc: 0 to 15359 (read address for data) nd: 1 to 15360 (number of reading points) ne: –2147483648 to 2147483647 (read-data idal signal "1" = 10000)
	EVM		XMV na,nb	XMV? nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 24575 (write address for data) nb: –32768 to 32767 (write data) nc: 0 to 24575 (read address for data) nd: 1 to 24576 (number of reading point) ne: –2147483648 to 2147483647 (read-data 1 % = 100)

Function	Item		Program Message	Query Message	Response Message	Remarks
	Phase Error		XMP na,nb	XMP? nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 24575 (write address for data) nb: −32768 to 32767 (write data) nc: 0 to 24575 (read address for data) nd: 1 to 24576 (number of reading point) ne: −2147483648 to 2147483647 (read-data 1 deg = 100)
	Magnitude Error		XMN na,nb	XMN? nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 24575 (write address for data) nb: −32768 to 32767 (write data) nc: 0 to 24575 (read address for data) nd: 1 to 24576 (number of reading point) ne: −2147483648 to 2147483647 (read-data 1 % = 100)
	Code Domain	Each channel	---	CODANAL? r	r0,r1,r2,...,r(n − 1)	AutoRateDetection: On
				CODANAL? r,I	r0,r1,r2,...,r(n − 1)	AutoRateDetection: On
				CODANAL? r,Q	r0,r1,r2,...,r(n − 1)	AutoRateDetection: On
			---	CODANAL? na,nb	r1,r2,r3,r4	AutoRateDetection: Off
				CODANAL? na,nb,I	r1,r2,r3,r4	AutoRateDetection: Off
				CODANAL? na,nb,Q	r1,r2,r3,r4	AutoRateDetection: Off
			---	CDPANLY? na,nb	r1,r2,r3,r4	
				CDPANLY? na,nb,I	r1,r2,r3,r4	
				CDPANLY? na,nb,Q	r1,r2,r3,r4	
		Each item	---	CDALLCH? r,n	r0,r1,r2,...,r(n − 1)	
				CDALLCH? r,n,I	r0,r1,r2,...,r(n − 1)	
				CDALLCH? r,n,Q	r0,r1,r2,...,r(n − 1)	

RF Power

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Window	Slot	WINDOW SLOT	WINDOW?	SLOT	
	Leading	WINDOW LEAD	WINDOW?	LEAD	
	Trailing	WINDOW TRAIL	WINDOW?	TRAIL	
Storage Mode	Normal	STRG_RFPWR NRM	STRG_RFPWR?	NRM	
	Average	STRG_RFPWR AVG	STRG_RFPWR?	AVG	
	Cumulative	STRG_RFPWR CUM	STRG_RFPWR?	CUM	
	Overwrite	STRF_RFPWR OVER	STRG_RFPWR?	OVER	
Average Count		AVG_RFPWR n	AVR_RFPWR?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_RFPWR EVERY	INTVAL_RFPWR?	EVERY	
	Once	INTVAL_RFPWR ONCE	INTVAL_RFPWR?	ONCE	
Analysis Start		ANLYSTA_RFPWR n	ANLYSTA_RFPWR?	n	
Smoothing Filter	On	SMOFLT ON	SMOFLT?	ON	
	Off	SMOFLT OFF	SMOFLT?	OFF	
Level	Relative	LVLREL_RFPWR ON	LVLREL_RFPWR?	ON	
	Absolute	LVLREL_RFPWR OFF	LVLREL_RFPWR	OFF	
Code Sync	On	CODESYNC ON	CODESYNC?	ON	
	Off	CODESYNC OFF	CODESYNC?	OFF	
Video Trigger Edge	Rise	VTEDGE RISE	VTEDGE?	RISE	
	Fall	VTEDGE FALL	VTEDGE?	FALL	
Video Trigger Level		VTLVL? u	VTLVL? u	l	
Video Trigger Delay		RISE,l	VTDLY? RISE	l	l: −10.00 to 10.00 PNchip
		FALL,l	VTDLY? FALL	l	l: −10.00 to 10.00 PNchip
Marker Mode	Normal	MKR_RFPWR ON	MKR_RFPWR?	NRM	
	Off	MKR_RFPWR OFF	MRR_RFPWR?	OFF	
Marker Position		MKR_RFPWR r	MKP_RFPWR?	r	r: −100.00 to 1636.00 PNchip
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL?	PWRCAL?	l	l: −10.00 to 10.00 dB *1)
Calibration Cancel		CALCANCEL	---	---	
Multi Carrier Calibration		MLTCARRCAL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n: mode (0: Not calibrated, 1: Internal calibration, 2: Externally input calibration) 1: −10.00 to 10.00 dB

*1:Valid only when this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Setup Template					
Line Level		TEMPLVL_RFPWR n,l	TEMPLVL_RFPWR? n	l	
Template Condition	IS-95	SLCTTEMP_RFPWR IS95	SLCTTEMP_RFPWR?	IS95	
	3GPP2	SLCTTEMP_RFPWR 3GPP2	SLCTTEMP_RFPWR?	3GPP2	
	Not Selected	---	SLCTTEMP_RFPWR?	NOT	
Results					
Tx Power		---	TXPWR? u	l	
Peak Tx Power		---	PKTXPWR? u	l	
Peak/Average Ratio		---	PEAKRATIO?	l	
Carrier Off Power		---	OFFPWR?	l	
On/Off Ratio		---	RATIO?	l	
Power vs Time	IS-95	---	PWRVSTIME? n,IS95,u	l	n: 1: –6 µs 2: 0 µs 3: 1250 µs 4: 1256 µs
	3GPP2	---	PWRVSTIME? n,3GPP2,u	l	n: 1: –5.5 µs 2: 1.5 µs 3: 1248.5 µs 4: 1255.5 µs
Template Judgement		---	TEMPPASS_RFPWR?	j	
Marker Level		---	MKL_RFPWR?	l	
Wave Data		XMD na,nb	XMD nc,nd	ne(1),,ne(2),…,ne(nd)	na: 0 to 6944 (Data writing address) nb: –32768 to 32767 (Write data 1 dBm = 100) nc: 0 to 6944 (Start address for reding Data) nd: 1 to 6945 (Number of read data) ne: –21473648 to 2147483647 (Read data 1 dBm = 100)

Occupied Bandwidth

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Measure Method	Spectrum	DSPL OBW,SPECT	DSPL?	OBW,SPECT	
	FFT	DSPL OBW,FFT	DSPL?	OBW,FFT	
Storage Mode	Normal	STRG_OBW NRM	STRG_OBW?	NRM	
	Average	STRG_OWB AVG	STRG_OBW?	AVG	
Average Count		AVG_OBW n	AVR_OBW?	n	n:2 to 9999
Refresh Interval	Every	INTVAL_OBW EVERY	INTVAL_OBW?	EVERY	
	Once	INTVAL_OBW ONCE	INTVAL_OBW?	ONCE	
Span		FSPAN_OBW f	FSPAN_OBW?	f	
Ref Level		RL_OBW n	RL_OBW?	n	
Attenuator Ref Level Mode	Auto	ATTRLMD_OBW AUTO	ATTRLMD_OBW?	AUTO	
	Manual	ATTRLMD_OBW MAN	ATTRLMD_OBW?	MAN	
Attenuator		ATT_OBW n	ATT_OBW?	n	
Attenuator Mode	Auto	ATTMD_OBW AUTO	ATTMD_OBW?	AUTO	
	Manual	ATTMD_OBW MAN	ATTMD_OBW?	MAN	
RBW		RBW_OBW n	RBW_OBW?	n	
RBW Type	Normal	RBD_OBW NRM	RBD_OBW?	NRM	
	Digital	RBD_OBW DGTL	RBD_OBW?	DGTL	
VBW		VBW_OBW n	VBW_OBW?	n	
VBW Mode	Auto	VBM_OBW AUTO	VBM_OBW?	AUTO	
	Manual	VBM_OBW MAN	VBM_OBW?	MAN	
VBW/RBW Ratio		VBR_OBW n	VBR_OBW?	n	
Sweep Time		SWT_OBW n	SWT_OBW?	n	
Sweep Time Mode	Auto	STM_OBW AUTO	SWM_OBW?	AUTO	
	Manual	STM_OBW MAN	SWM_OBW?	MAN	
Detection	Positive	DET_OBW POS	DET_OBW?	POS	
	Sample	DET_OBW SMP	DET_OBW?	SMP	
	Negative	DET_OBW NEG	DET_OBW?	NEG	
	Average	DET_OBW AVG	DET_OBW?	AVG	
	RMS	DET_OBW RMS	DET_OBW?	RMS	
Data Points	501	DPTS_OBW 501	DPTS_OBW?	501	
	1001	DPTS_OBW 1001	DETS_OBW?	1001	

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB *1)
Calibration Cancel		CALCANCEL	---	---	
Multi Carrier Caliblation		MLTCARRCAL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode (0: Uncalibrated, 1: Internally calibrated, 2: External writing) l: 10.00 to 10.00 dB
Results					
Occupied Bandwidth (99%)		---	OBW?	f	
Upper Limit		---	OBWFREQ? UPPER	f	
Lower Limit		---	OBWFREQ? LOWER	f	
Center (Upper+Lower)/2		---	OBWFREQ? CENTER	f	
Wave Data		XME na,nb	XME? nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 500 (when Data Points = 500), 0 to 1000 (when Data Points = 1000) (write address for data) nb: –32768 to 32767 (Written Data 1 dB = 100) nc: 0 to 500 (when Data Points = 500), 0 to 1000 (when Data Points = 1000) (address for reading Data) nd: 1 to 501 (when Data Points = 501), 1 to 1001 (when Data Points = 1001) (Number of read points) ne: –21473648 to 21473647 (read-data Ideal signal 1 dB = 100)

*1:Valid only when this unit is MS860x.

Spurious close to the Carrier

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Unit	dB	UNIT_ACP DB	UNIT_ACP?	DB	
	dBm	UNIT_ACP DBM	UNIT_ACP?	DBM	
	mW	UNIT_ACP MW	UNIT_ACP?	MW	
	μW	UNIT_ACP UW	UNIT_ACP?	UW	
	nW	UNIT_ACP NW	UNIT_ACP?	NW	
	dB/dBm (Template)	UNIT_ACP TEMP	UNIT_ACP?	TEMP	
Storage Mode	Normal	STRG_ACP NRM	STRG_ACP?	NRM	
	Average	STRG_ACP AVG	STRG_ACP?	AVG	
Average Count		AVR_ACP n	AVR_ACP?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_ACP EVERY	INTVAL_ACP?	EVERY	
	Once	INTVAL_ACP ONCE	INTVAL_ACP	ONCE	
Ref Power Mode	SPA	REFPWRMD_ACP SPA	REFPWRMD_ACP?	SPA	
	Tx Power	REFPWRMD_ACP TXPWR	REFPWRMD_ACP?	TXPWR	
Integral Waveform	On	INTEGRAL_ACP ON	INTEGRAL_ACP?	ON	• Can be set when Measure Method is set to Normal
	Off	INTEGRAL_ACP OFF	INTEGRAL_ACP	OFF	
Display Data Type	Freq. vs Power	DISPTYPE_ACP FREQVSPWR	DISPTYPE_ACP?	FREQVSPWR	
	Peak (Power)	DISPTYPE_ACP PEAKPWR	DISPTYPE_ACP?	PEAKPWR	
	Peak (Margin)	DISPTYPE_ACP PEAKMARGIN	DISPTYPE_ACP?	PEAKMARGIN	
Ref Level		RL_ACP? n	RL_ACP?	n	
Span		FSPAN_ACP f	FSPAN_OBW?	f	• Can be set when Measure Method is set to Normal
Attenuator Ref Level Mode	Auto	ATTRLMD_ACP AUTO	ATTRLMD_ACP?	AUTO	
	Manual	ATTRLMD_ACP MAN	ATTRLMD_ACP?	MAN	
Attenuator		ATT_ACP	ATT_ACP?	n	
Attenuator Mode	Auto	ATTMD_ACP AUTO	ATTMD_ACP?	AUTO	
	Manual	ATTMD_ACP MAN		MAN	
RBW		RBW_ACP n	RBW_ACP?	n	• Can be set when Standard Template is set to Class 6
RBW Type	Normal	RBW_ACP NRM	RBD_ACP?	NRM	
	Digital	RBD_ACP DGTL		DGTL	

Function	Item	Program Message	Query Message	Response Message	Remarks
VBW		VBW_ACP n	VBW_ACP?	n	• Can not be set when Standard Template is set to Class 6.
VBW Mode	Auto	VBM_ACP AUTO	VBM_ACP?	AUTO	
	Manual	VBM_ACP MAN	VBM_ACP?	MAN	
VBW/RBW Ratio		VBR_ACP n	VBR_ACP?	n	
Sweep Time		SWT_ACP n	SWT_ACP?	n	
Sweep Time Mode	Auto	STM_ACP AUTO	STM_ACP?	AUTO	
	Manual	STM_ACP MAN	STM_ACP?	MAN	
Detection	Positive	DET_ACP POS	DET_ACP?	POS	
	Sample	DET_ACP SMP	DET_ACP?	SMP	
	Negative	DET_ACP NEG	DET_ACP?	NEG	
	Average	DET_ACP AVG	DET_ACP?	AVG	
	RMS	DET_ACP RMS	DET_ACP?	RMS	
Data Points	501	DPTS_ACP 501	DPTS_ACP?	501	
	1001	DPTS_ACP 1001	DPTS_ACP?	1001	
Marker Position	Point	MKP_ACP n	MKP_ACP?	n	n: 0 to 500 (when Measure Method is set to Normal) 0 to 1500 (when Measure Method is set to 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 2000 (when Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8) (when Data Points = 501) n: 0 to 1000 (when Mesure Method is set to Normal) 0 to 3000 (when Mesure Method is set to 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 3500 (when Mesure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8) (when Data Points = 1001)
	Frequency	MKN_ACP n	MKN_ACP?	f	f: –(Span/2) to (Span/2)

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l:–10.00 to 10.00 dB *1)
Calibration Cancel		CALCANCEL	---	---	
Multi Carrier Calibration		MLTCARRCAL			
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode (0: Uncalibrated, 1: Internally calibrated, 2: External writing) l:–10.00 to 10.00 dB
Setup Template					
Level	Relative	LVLREL_ACP ON	LVLREL_ACP?	s1,s2,s3,s4	s: On or Off
		LVLREL_ACP ON,1	LVLREL_ACP? 1	s	
		LVLREL_ACP ON,2	LVLREL_ACP? 2		
		LVLREL_ACP ON,3	LVLREL_ACP? 3		
		LVLREL_ACP ON,4	LVLREL_ACP? 4		
	Absolute	LVLREL_ACP OFF	LVLREL_ACP?	s1,s2,s3,s4	s: On or Off
		LVLREL_ACP OFF,1	LVLREL_ACP? 1	s	
		LVLREL_ACP OFF,2	LVLREL_ACP? 2		
		LVLREL_ACP OFF,3	LVLREL_ACP? 3		
		LVLREL_ACP OFF,4	LVLREL_ACP? 4		
Line Level	Limit-1	TEMPLVL_ACP 1,l	TEMPLVL_ACP? 1	l	l: 0 to –100.00
	Limit-2	TEMPLVL_ACP 2,l	TEMPLVL_ACP? 2		
	Limit-3	TEMPLVL_ACP 3,l	TEMPLVL_ACP? 3		
	Limit-4	TEMPLVL_ACP 4,l	TEMPLVL_ACP? 4		
Offset Frequency	Limit-a	TEMPFREQ_ACP A,f	TEMPFREQ_ACP? A	f	f: –(Span/2) to (Span/2)
	Limit-b	TEMPFREQ_ACP B,f	TEMPFREQ_ACP? B		
	Limit-c	TEMPFREQ_ACP C,f	TEMPFREQ_ACP? C		
	Limit-d	TEMPFREQ_ACP D,f	TEMPFREQ_ACP? D		

*1:Valid only when this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	IS-95 Forward Relative	SLCTTEMP_ACP IS95,FWDREL	SLCTTEMP_ACP?	IS95,FWDREL	• Can be set when Measure Method is set to Normal.
	IS-95 Forward Relative f < 1 MHz	SLCTTEMP_ACP IS95,FWDREL2	SLCTTEMP_ACP?	IS95,FWDREL2	
	IS-95 Forward Relative f ≥ 1 MHz	SLCTTEMP_ACP IS95,FWDREL3	SLCTTEMP_ACP?	IS95,FWDREL3	
	IS-95 Reverse Relative	SLCTTEMP_ACP IS95,RVSREL	SLCTTEMP_ACP?	IS95,RVSREL	
	IS-95 Reverse Absolute	SLCTTEMP_ACP IS95,RVSABS	SLCTTEMP_ACP?	IS95,RVSABS	
	ARIB Forward Relative	SLCTTEMP_ACP ARIB,FWDREL	SLCTTEMP_ACP?	ARIB,FWDREL	
	ARIB Forward Relative	SLCTTEMP_ACP ARIB,FWDREL2	SLCTTEMP_ACP?	ARIB,FWDREL2	
	ARIB Forward Relative f < 1 MHz	SLCTTEMP_ACP ARIB,FWDREL3	SLCTTEMP_ACP?	ARIB,FWDREL3	
	ARIB Reverse Relative f ≥ 1 MHz	SLCTTEMP_ACP ARIB,RVSREL	SLCTTEMP_ACP?	ARIB,RVSREL	
	ARIB Reverse Absolute	SLCTTEMP_ACP ARIB,ABSREL	SLCTTEMP_ACP?	ARIB,RVSABS	
	TELEC Forward Relative	SLCTTEMP_ACP TELEC,FWDREL	SLCTTEMP_ACP?	TELEC,FWDREL	
	TELEC Forward Relative f < 1 MHz	SLCTTEMP_ACP TELEC,FWDREL2	SLCTTEMP_ACP?	TELEC,FWDREL2	
	TELEC Forward Relative f ≥ 1 MHz	SLCTTEMP_ACP TELEC,FWDREL3	SLCTTEMP_ACP?	TELEC,FWDREL3	
	TELEC Reverse Relative	SLCTTEMP_ACP TELEC,RVSREL	SLCTTEMP_ACP?	TELEC,RVSREL	
	TELEC Reverse Absolute	SLCTTEMP_ACP TELEC,RVSABS	SLCTTEMP_ACP?	TELEC,RVSABS	
	IS-95B Forward Relative1	SLCTTEMP_ACP IS95B,FWDREL1	SLCTTEMP_ACP?	IS95B,FWDREL1	
	IS-95B Forward Relative1 f < 1 MHz	SLCTTEMP_ACP IS95B,FWDREL4	SLCTTEMP_ACP?	IS95B,FWDREL4	
	IS-95B Forward Relative1 f ≥ 1 MHz	SLCTTEMP_ACP IS95B,FWDREL5	SLCTTEMP_ACP?	IS95B,FWDREL5	
	IS-95B Forward Relative2	SLCTTEMP_ACP IS95B,FWDREL2	SLCTTEMP_ACP?	IS95B,FWDREL2	
	IS-95B Forward Relative2 f < 1 MHz	SLCTTEMP_ACP IS95B,FWDREL6	SLCTTEMP_ACP?	IS95B,FWDREL6	
	IS-95B Forward Relative2 f ≥ 1 MHz	SLCTTEMP_ACP IS95B,FWDREL7	SLCTTEMP_ACP?	IS95B,FWDREL7	

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	IS-95B Forward Relative3	SLCTTEMP_ACP IS95B,FWDREL3	SLCTTEMP_ACP?	IS95B,FWDREL3	• Can be set when Measure Method is set to Normal.
	IS-95B Forward Relative3 f < 1 MHz	SLCTTEMP_ACP IS95B,FWDREL8	SLCTTEMP_ACP?	IS95B,FWDREL8	
	IS-95B Forward Relative3 f ≥ 1 MHz	SLCTTEMP_ACP IS95B,FWDREL9	SLCTTEMP_ACP?	IS95B,FWDREL9	
	IS-95B Reverse Relative1	SLCTTEMP_ACP IS95B,RVSREL1	SLCTTEMP_ACP?	IS95B,RVSREL1	
	IS-95B Reverse Relative2	SLCTTEMP_ACP IS95B,RVSREL2	SLCTTEMP_ACP?	IS95B,RVSREL2	
	IS-95B Relative Absolute1	SLCTTEMP_ACP IS95B,RVSABS1	SLCTTEMP_ACP?	IS95B,RVSABS1	
	IS-95B Relative Absolute2	SLCTTEMP_ACP IS95B,RVSABS1	SLCTTEMP_ACP?	IS95B,RVSABS1	
	J-STD-008 Forward Relative	SLCTTEMP_ACP JSTD8,FWDREL	SLCTTEMP_ACP?	JSTD8,FWDREL	
	J-STD-008 Reverse Relative	SLCTTEMP_ACP JSTD8,RVSREL	SLCTTEMP_ACP?	JSTD8,RVSREL	
	J-STD-008 Reverse Absolute	SLCTTEMP_ACP JSTD8,RVSABS	SLCTTEMP_ACP?	JSTD8,RVSABS	
	3GPP2 Forward Link Band Class 0, 2, 3, 5, 7 Power ≥ 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP1	SLCTTEMP_ACP?	3GPP2,FWDTMP1	
	3GPP2 Forward Link Band Class 0 ,2, 3, 5, 7 28dBm ≤ Power < 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP2	SLCTTEMP_ACP?	3GPP2,FWDTMP2	
	3GPP2 Forward Link Band Class 0, 2, 3, 5, 7 Power < 28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP3	SLCTTEMP_ACP?	3GPP2,FWDTMP3	
	3GPP2 Forward Link Band Class 1, 4, 6 Power ≥ 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP4	SLCTTEMP_ACP?	3GPP2,FWDTMP4	
	3GPP2 Forward Link Band Class 1, 4, 6 28dBm ≤ Power < 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP5	SLCTTEMP_ACP?	3GPP2,FWDTMP5	

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	3GPP2 Reverse Link Band Class 0, 2, 3, 5, 7	SLCTTEMP_ACP 3GPP2,RVSTMP1	SLCTTEMP_ACP?	3GPP2,RVSTMP1	• Can be set when Measure Method is set to Normal
	3GPP2 Forward Link Band Class 1, 4, 6	SLCTTEMP_ACP 3GPP2,RVSTMP2	SLCTTEMP_ACP?	3GPP2,RVSTMP2	
	3GPP2 Forward Link Band Class 0, 2, 3, 5, 9 Power ≥ 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 30	SLCTTEMP_ACP?	3GPP2,FWDTMP 30	• Can be set when Measure Method is set to 3GPP FWD Band Class 0, 2, 3, 5, 9
	3GPP2 Forward Link Band Class 0 ,2, 3, 5, 9 28dBm ≤ Power < 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 31	SLCTTEMP_ACP?	3GPP2,FWDTMP 31	
	3GPP2 Forward Link Band Class 0, 2, 3, 5, 9 Power < 28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 32	SLCTTEMP_ACP?	3GPP2,FWDTMP 32	
	3GPP2 Forward Link Band Class 6	SLCTTEMP_ACP 3GPP2,FWDTMP 60	SLCTTEMP_ACP?	3GPP2,FWDTMP 60	• Can be set when Measure Method is set to 3GPP2 FWD Banc Class 1, 4, 6, 8
	3GPP2 Forward Link Band Class 1,4,8 Power ≥ 36 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 61	SLCTTEMP_ACP?	3GPP2,FWDTMP 61	
	3GPP2 Forward Link Band Class 1,4,8 33dBm ≤ Power < 36 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 62	SLCTTEMP_ACP?	3GPP2,FWDTMP 62	
	3GPP2 Forward Link Band Class 1,4,8 28dBm ≤ Power ≤ 33 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 63	SLCTTEMP_ACP?	3GPP2,FWDTMP 63	
	3GPP2 Forward Link Band Class 1,4,8 Power ≤ 28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP 64	SLCTTEMP_ACP?	3GPP2,FWDTMP 64	

Function	Item			Program Message	Query Message	Response Message	Remarks
Results							
Ref Power	dBm			---	REFPWR_ACP? DBM	l	
	Watt			---	REFPWR_ACP? WATT		
Adjacent Channel Power	Lower4	Unit	dBm	---	ADJCH? LOW4,DBM	l	
			dB	---	ADJCH? LOW4,DB		
			Watt (mW,uW,nW)	---	ADJCH? LOW4,WATT		
			Current Value	---	ADJCH? LOW4		
	Lower3	Unit	dBm	---	ADJCH? LOW3,DBM	l	
			dB	---	ADJCH? LOW3,DB		
			Watt (mW,uW,nW)	---	ADJCH? LOW3,WATT		
			Current Value	---	ADJCH? LOW3		
	Lower2	Unit	dBm	---	ADJCH? LOW2,DBM	l	
			dB	---	ADJCH? LOW2,DB		
			Watt (mW,uW,nW)	---	ADJCH? LOW2,WATT		
			Current Value	---	ADJCH? LOW2		
	Lower1	Unit	dBm	---	ADJCH? LOW1,DBM	l	
			dB	---	ADJCH? LOW1,DB		
			Watt (mW,uW,nW)	---	ADJCH? LOW1,WATT		
			Current Value	---	ADJCH? LOW1		
	Upper1	Unit	dBm	---	ADJCH? UP1,DBM	l	
			dB	---	ADJCH? UP1,DB		
			Watt (mW,uW,nW)	---	ADJCH? UP1,WATT		
			Current Value	---	ADJCH? UP1		

Function	Item			Program Message	Query Message	Response Message	Remarks
Adjacent Channel Power	Upper2	Unit	dBm	---	ADJCH? UP2,DBM	l	
			dB		ADJCH? UP2,DB		
			Watt (mW,uW,nW)		ADJCH? UP2,WATT		
			Current Value		ADJCH? UP2		
	Upper 3	Unit	dBm	---	ADJCH? UP3,DBM	l	
			dB		ADJCH? UP3,DB		
			Watt (mW,uW,nW)		ADJCH? UP3,WATT		
			Current Value		ADJCH? UP3		
	Upper 4	Unit	dBm	---	ADJCH? UP4,DBM	l	
			dB		ADJCH? UP4,DB		
			Watt (mW,uW,nW)		ADJCH? UP4,WATT		
			Current Value		ADJCH? UP4		

Function	Item			Program Message	Query Message	Response Message	Remarks
Peak Power	All	Unit	dBm	---	PEAK_ACP? ALL,DBM	f,l,a,f,l,a,f,l,a,f, l,a,f,l,a,f,l,a,f,l, a,f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? ALL,DB		
			Watt (mW,uW,nW)		PEAK_ACP? ALL,WATT		
			Current Value		PEAK_ACP? ALL		
	Peak	Unit	dBm	---	PEAK_ACP? PEAK,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? PEAK,DB		
			Watt (mW,uW,nW)		PEAK_ACP? PEAK,WATT		
			Current Value		PEAK_ACP? PEAK		
	Lower4	Unit	dBm	---	PEAK_ACP? LOW4,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW4,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW4,WATT		
			Current Value		PEAK_ACP? LOW4		
	Lower3	Unit	dBm	---	PEAK_ACP? LOW3,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW3,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW3,WATT		
			Current Value		PEAK_ACP? LOW3		
	Lower2	Unit	dBm	---	PEAK_ACP? LOW2,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW2,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW2,WATT		
			Current Value		PEAK_ACP? LOW2		
	Lower1	Unit	dBm	---	PEAK_ACP? LOW1,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW1,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW1,WATT		
			Current Value		PEAK_ACP? LOW1		

Function	Item			Program Message	Query Message	Response Message	Remarks
Peak Power	Upper1	Unit	dBm	---	PEAK_ACP? UP1,DBM	f,l,a	a: PASS or FAIL or OFF
			dB	---	PEAK_ACP? UP1,DB		
			Watt (mW,uW,nW)	---	PEAK_ACP? UP1,WATT		
			Current Value	---	PEAK_ACP? UP1		
	Upper2	Unit	dBm	---	PEAK_ACP? UP2,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP2,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP2,WATT		
			Current Value		PEAK_ACP? UP2		
	Upper3	Unit	dBm	---	PEAK_ACP? UP3,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP UP3,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP3,WATT		
			Current Value		PEAK_ACP? UP3		
	Upper4	Unit	dBm	---	PEAK_ACP? UP4,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP4,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP4,WATT		
			Current Value		ADJCH? UP4		
Peak Margin	All			---	PEAK_ACP? ALL,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Peak			---	PEAK_ACP? PEAK,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower4			---	PEAK_ACP? LOW4,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower3			---	PEAK_ACP? LOW3,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower2			---	PEAK_ACP? LOW2,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower1			---	PEAK_ACP? LOW1,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper1			---	PEAK_ACP? UP1,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper2			---	PEAK_ACP? UP2,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper3			---	PEAK_ACP? UP3,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper4			---	PEAK_ACP? UP4,MARGIN	f,l,a	a: PASS or FAIL or OFF

Function	Item		Program Message	Query Message	Response Message	Remarks
Marker Level	Unit	dBm	---	MKL_ACP DBM	l	
		dB		MKL_ACP DB		
		Watt (mW,uW,nW)		MKL_ACP DBM		
		Current Value		MKL_ACP DBM		
Template Judgement			---	TEMPPASS_ACP?	j	j: PASS or FAIL or OFF
Wave Data	SPA data		XMB na,nb	XMB? nc,nd	ne(1),ne(2),...,ne(nd)	When Data Points = 500 na: 0 to 500 (when Measure Method = Normal) 0 to 1500 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 2000 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8) When Data Point = 1000 na: 0 to 1000 (when Measure Method = Normal) 0 to 3000 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 3500 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8) (Data write address) nb: –32768 to 32767 (1 dB = 100) (Written Data) nc: When Data Points = 500 0 to 500 (when Measure Method = Normal) 0 to 1500 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 2000 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8)
	1.23 MHz Integrated data		XMBI na,nb	XMBI? nc,nd	ne(1),ne(2),...,ne(nd)	

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data	SPA data	XMB na,nb	XMB? nc,nd	ne(1),ne(2),...,ne (nd)	When Data Point = 1000
	1.23 MHz Integrated data	XMBI na,nb	XMBI? nc,nd	ne(1),ne(2),...,ne (nd)	nc: 0 to 1000 (when Measure Method = Normal) 0 to 3000 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 3500 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8) (Address for reading Data) nd: When Data Points = 500 1 to 501 (when Measure Method = Normal) 0 to 1501 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 0 to 2001 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8) When Data Point = 1000 nd: 1 to 1001 (when Measure Method = Normal) 1 to 3001 (when Measure Method = 3GPP2 FWD Band Class 0, 2, 3, 5, 9) 1 to 3501 (when Measure Method = 3GPP2 FWD Band Class 1, 4, 6, 8) (Number of read points) ne: −2147483648 to 2147483647 (Ideal signal 1 dB = 100) (Initial Value: −2147483648)

Spurious Emission

Function	Item		Program Message	Query Message	Response Message	Remarks
Parameters						
Spurious Mode	Spot		DSPL SPURIOUS,SPOT	DSPL?	SPURIOUS,SPOT	
	Search		DSPL SPURIOUS,SEARCH		SPURIOUS, SEARCH	
	Sweep		DSPL SPURIOUS,SWEEP		SPURIOUS,SWEEP	
Ref Power Mode	SPA		REFPWRMD_SPU SPA	REFPWRMD_SPU?	SPA	
	Tx Power		REFPWRMD_SPU TXPWR		TXPWR	
Detect Mode	Spot	Positive Peak	DET_SPU SPOT,POS	DET_SPU? SPOT	POS	
		Sample	DET_SPU SPOT,SMP		SMP	
		Negative Peak	DET_SPU SPOT,NEG		NEG	
		Average	DET_SPU SPOT,AVG		AVG	
		RMS	DET_SPU SPOT,RMS		RMS	
	Search	Positive Peak	DET_SPU SEARCH,POS	DET_SPU? SEARCH	POS	
		Sample	DET_SPU SEARCH,SMP		SMP	
		Negative Peak	DET_SPU SEARCH,NEG		NEG	
		Average	DET_SPU SEARCH,AVG		AVG	
		RMS	DET_SPU SEARCH,RMS		RMS	
	Sweep	Positive Peak	DET_SPU SWEEP,POS	DET_SPU? SWEEP	POS	
		Sample	DET_SPU SWEEP,SMP		SMP	
		Negative Peak	DET_SPU SWEEP,NEG		NEG	
		Average	DET_SPU SWEEP,AVG		AVG	
		RMS	DET_SPU SWEEP,RMS		RMS	
Preselector	Normal		BAND 0	BAND?	0	*1)
	Spurious		BAND 1		1	
Unit	dBm		UNIT_SPU DBM	UNIT_SPU?	DBM	
	dB		UNIT_SPU DB		DB	
View	Judgement		VIEW_SPU JDG	VIEW_SPU?	JDG	
	BW,SWT		VIEW_SPU BWSET		BWSWT	
	Ref Level,ATT		VIEW_SPU RFATT		REFATT	

*1: This Command is available only when main unit option MS8608A–03/MS2683A–03 Preselector Lower-Limit Expansion is installed.

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l:–10.00 to 10.00 dB *1)
Calibration Cancel		CALCANCEL	---	---	
Multi Carrier Calibration		MLTCARRCAL			
Calibration Value		CALVAL	CALVAL?	n,l	n:mode (0: Not calibrated, 1: Internally calibrated, 2: External writing) l: –10.00 to 10.00 dB
Setup Spot Table					
Frequency		TBLFREQ_SPU SPOP,Fn,f	TBLFREQ_SPU? SPOT,Fn	f	n: 1 to 15 < MS2681A > f: 100 Hz to 3GHz < MS8608A/MS2683A > f: 100 Hz to 7.8 GHz < MS8609A > f: 100 Hz to 13.2 GHz < MS2687A/B > f: 100Hz to 30GHz
Harmonics		TBLFREQ_SPU SPOT,HRM	---	---	n: 1 to 15 < MS2681A > f: 100 Hz to 3GHz < MS8608A/MS2683A > f: 100 Hz to 7.8 GHz < MS8609A > f: 100 Hz to 13.2 GHz < MS2687A/B > f: 100Hz to 30GHz
Attenuator Ref Level Mode	Auto	TBLATTRLMD_SPU SPOT,AUTO	TBLATTRLMD_SPU? SPOT	AUTO	
	Manual	TBLATTRLMD_SPU SPOT,MAN		MAN	
Attenuator Mode	Auto	TBLATTMD_SPU SPOT,AUTO	TBLATTMD_SPU? SPOT	AUTO	
	Manual	TBLATTMD_SPU SPOT,MAN		MAN	
Ref Level		TBLRL_SPU SPOT,Fn,l	TBLRL_SPU? SPOT,Fn	l	n: 1 to 15
Attenuator		TBLATT_SPU SPOT,Fn,l	TBLATT_SPU? SPOT,Fn	l	n: 1 to 15

*1:Valid only this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW		TBLRBW_SPU SPOT,Fn,l	TBLRBW_SPU? SPOT,Fn	f	n: 1 to 15 f: 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 5 MHz, 10 MHz, 20 MHz
RBW Mode	Auto	TBLRBWMD_SPU SPOT,AUTO	TBLRBWMD_SPU? SPOT	AUTO	
	Manual	TBLRBWMD_SPU SPOT,MAN	TBLRBWMD_SPU? SPOT	MAN	
RBW Type	Normal	TBLRBWTP_SPU SPOT,NRM	TBLRBWTP_SPU? SPOT	NRM	
	Digital	TBLRBWTP_SPU SPOT,DGTL	TBLRBWTP_SPU SPOT	DGTL	
VBW		TBLVBW_SPU SPOT,Fn,fa	TBLVBW_SPU? SPOT,Fn	fb	
VBW Mode	Auto	TBLVBW_SPU SPOT,AUTO	TBLVBWMD_SPU? SPOT	AUTO	
	Manual	TBLVBW_SPU SPOT,MAN	TBLVBWMD_SPU? SPOT	MAN	
RBW/VBW Ratio		TBLVBWRT_SPU SPOT,r	TBLVBWRT_SPU? SPOT	r	
SWT		TBLSWP_SPU SPOT,Fn,ta	TBLSWT_SPU? SPOT,Fn	tb	
SWT Mode	Auto	TBLSWTMD_SPU SPOT,AUTO	TBLSWTMD_SPU? SPOT	AUTO	
	Manual	TBLSWTMD_SPU SPOT,MAN	TBLSWTMD_SPU? SPOT	MAN	
Limit		SPULMT SPOT,Fn,l	SPULMT? SPOT,Fn	l	
View	RBW,VBW ,SWT	TBLVIEW_SPU SPOT,BWSWT	TBLVIEW_SPU? SPOT	BWSWT	
	Ref Level, Attenuator	TBLVIEW_SPU SPOT,REFATT	TBLVIEW_SPU? SPOT	REFATT	
	Limit	TBLVIEW_SPU SPOT,LMT	TBLVIEW_SPU? SPOT	LMT	
Judgement Unit (Rel/Abs)		JUDGUNIT_SPTBL ON	JUDGUNIT_SPTBL?	ON	
		JUDGUNIT_SPTBL OFF	JUDGUNIT_SPTBL?	OFF	

Function	Item	Program Message	Query Message	Response Message	Remarks
Setup Search/Sweep Table					
Start Frequency		TBLFREQ_SPU START,Fn,f	TBLFREQ_SPU? START,Fn	f	n: 1 to 15 < MS2681A > f: 1 kHz to 2999.999 MHz < MS8608A/MS2683A > f: 1 kHz to 7799.999 MHz < MS8609A > f: 1kHz to 13999.999 MHz < For MS2687A/B > f: 1 kHz to 29999.999 MHz
Stop Frequency		TBLFREQ_SPU STOP,Fn,f	TBLFREQ_SPU? STOP,Fn	f	n:1 to 15 < MS2681A > f: 1 kHz to 3.0 GHz < MS8608A/MS2683A > f: 1 kHz to 7.8 GHz < MS8609A > f: 1 kHz to 13.2 GHz < MS2687A/B > f: 1 kHz to 30.0 GHz
Attenuator Ref Level Mode	Auto	TBLATTRLMD_SPU SWEEP,AUTO	TBLATTRLMD_SPU? SWEEP	AUTO	
	Manual	TBLATTRLMD_SPU SWEEP,MAN	TBLATTRLMD_SPU? SWEEP	MAN	
Attenuator Mode	Auto	TBLATTMD_SPU SWEEP,AUTO	TBLATTMD_SPU? SWEEP	AUTO	
	Manual	TBLATTMD_SPU SWEEP,MAN	TBLATTMD_SPU? SWEEP	MAN	
Ref Level		TBLRL_SPU SWEEP,Fn,l	TBLRL_SPU? SWEEP,Fn	l	n: 1 to 15
Attenuator		TBLATT_SPU SWEEP,Fn,l	TBLATT_SPU? SWEEP,Fn	l	n: 1 to 15
RBW		TBLRBW_SPU SWEEP,Fn,f	TBLRBW_SPU? SWEEP,Fn	f	n: 1 to 15 f: 300 Hz, 1 kHz, 3 kHz, 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, 3 MHz, 5 MHz, 10 MHz, 20 MHz
RBW Mode	Auto	TBLRBWMD_SPU SWEEP,AUTO	TBLRBWMD_SPU? SWEEP	AUTO	
	Manual	TBLRBWMD_SPU SWEEP,MAN	TBLRBWMD_SPU? SWEEP	MAN	
RBW Type	Normal	TBLRBWTP_SPU SWEEP,NRM	TBLRBWTP_SPU? SWEEP	NRM	
	Digital	TBLRBWTP_SPU SWEEP,DGTL	TBLRBWTP_SPU? SWEEP	DGTL	

Function	Item	Program Message	Query Message	Response Message	Remarks
VBW		TBLVBW_SPU SWEEP,Fn,fa	TBLVBW_SPU? SWEEP,Fn	f	
VBW Mode	Auto	TBLVBW_SPU SWEEP,AUTO	TBLVBWMD_SPU? SWEEP	AUTO	
	Manual	TBLVBW_SPU SWEEP,MAN	TBLVBWMD_SPU? SWEEP	MAN	
RBW/VBW Ratio		TBLVBWRT_SPU SWEEP,r	TBLVBWRT_SPU? SWEEP	r	
SWT		TBLVBWRT_SPU SWEEP,Fn,ta	TBLSWT_SPU? SWEEP,Fn	tb	
SWT Mode	Auto	TBLSWTMD_SPU SWEEP,AUTO	TBLSWTMD_SPU? SWEEP	AUTO	
	Manual	TBLSWTMD_SPU SWEEP,MAN	TBLSWTMD_SPU? SWEEP	MAN	
Limit		SPULMT SWEEP,Fn,l	SPULMT? SWEEP,Fn		
View	RBW,VBW ,SWT	TBLVIEW_SPU SWEEP,BWSWT	TBLVIEW_SPU? SWEEP	BWSWT	
	Ref Level, Attenuator	TBLVIEW_SPU SWEEP,REFATT	TBLVIEW_SPU? SWEEP	REFATT	
	Limit	TBLVIEW_SPU SWEEP,BWSWT	TBLVIEW_SPU? SWEEP	LMT	
Judgement Unit (Rel/Abs)		JUDGUNIT_SWTBL ON	JUDGUNIT_SWTBL?	ON	
		JUDGUNIT_SWTBL OFF	JUDGUNIT_SWTBL?	OFF	
Standard		3GPP2FWD_SPU n	---	---	n: 0 to 5
		3GPP2RVS_SPU n	---	---	n: 0 to 4
		TELECFWD_SPU n	---	---	n: 0 to 4
		TELECRVS_SPU n	---	---	n: 0 to 2
Results					
Ref Power		---	RFPWR_SPU? u	l	
Frequency		---	SPUFREQ? Fna,nb	fa(na),fa(na+1) ,...,fa(na+nb)	
Level		---	SPULVL? Fna,nb,u	la(na),la(na+1) ,...,la(na+nb)	

Function	Item	Program Message	Query Message	Response Message	Remarks
Frequency and Level		---	SPUFREQLVL? Fna,nb,u	f(na),l(na),f(na+1),l(na+1),...,f(na+nb), l(na+nb)	
Ref Level		---	SPURL? Fna,nb	l(na),l(na+1),...,l(na+nb)	
Attenuator		---	SPUATT? Fna,nb	l(na),l(na+1),...,l(na+nb)	
RBW		---	SPURBW? Fna,nb	f(na),f(na+1),...,f(na+nb)	
VBW		---	SPUVBW? Fna,nb	f(na),f(na+1),...,f(na+nb)	
Sweep Time		---	SPUSWT? Fna,nb	t(na),t(na+1),...,t(na+nb)	
All result		---	SPUALL? Fna,nb	fa(na),la(na),fb(na),fc(na),t(na),...,fa(na+nb),la(na+nb),fb(na+nb),fc(na+nb),t(na+nb)	
Judgement		---	SPUPASS? Fn	j(n)	
	All		SPUPASS? ALL	j1,j2,j3,...,j15	
Total Judgement		---	SPUJDG?	j	

Power Meter

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Set Relative		SETREL	---	---	
Range	Up	RNG UP	---	---	
	Down	RNG DN	---	---	
	Range 1	RNG1	---	---	
	Range 2	RNG2	---	---	
	Range 3	RNG3	---	---	
	Range 4	RNG4	---	---	
	Range 5	RNG5	---	---	
Calibration					
Adjust Range		ADJRNG	---	---	
Zero Set		ZEROSET	---	---	
Results					
Power	dBm	---	POWER? DBM	l	
	dB	---	POWER? DB	l	
	Watt	---	POWER? WATT	l	

IQ Level

For MS268x, these Commands are available when Option −17, 18 I/Q Input installed.

Function	Item		Program Message	Query Message	Response Message	Remarks
Parameters						
Storage Mode	Normal		STRG_IQL NRM	STRG_IQL?	NRM	
	Average		STRG_IQL AVG		AVG	
Average Count			AVG_IQL n	AVR_IQL?	n	n:2 to 9999
Refresh Interval	Every		INTVAL_IQL EVERY	INTVAL_IQL?	EVERY	
	Once		INTVAL_IQL ONSE		ONCE	
Unit	mV		UNIT_INQ MV	UNIT_IQL?	MV	
	dBmV		UNIT_INQ DBMV		DBMV	
Results						
Level	I		---	ILVL? u	l	
	Q		---	QLVL u	l	
	I p-p		---	IPPLVL? u	l	
	Q p-p		---	QPPLVL? u	l	
	All	current unit	---	IQLVL?	la,lb,lc,ld	la: I Level lb: Q Level lc: I-pp ld: Q-pp
		mV	---	IQLVL? MV	la,lb,lc,ld	la: I Level lb: Q Level lc: I-pp ld: Q-pp
		dBmV	---	IQLVL? DBMV	la,lb,lc,ld	la: I Level lb: Q Level lc: I-pp ld: Q-pp
Phase	I/Q Difference		---	IQPHASE?	r	unit: deg

Section 7   Command Details

This Section explains the details of device messages and response messages used in the MX860803A/MX860903A/MX268103A/MX268303A/MX268703A cdma Measurement Software in alphabetical order.

For the list of these messages, see Section 6 Device Message List.

How to Read the Detailed Description of Commands

Example: Setting impedance

IQINZ [1]

IQ Impedance   [2]

[3]

Program Message	Query Message	Response Message
IQINZ a	IQINZ?	a

■ Function   [4]

Sets the IQ signal input impedance on the Setup Common Parameter screen.

■ Value of a   [5]

Impedance

a	Impedance	Initial value
50	50 Ω	*
1 M	1 M Ω	

■ Restriction   [6]

• No setting is allowed when the Terminal is other than IQ-AC, IQ-DC or IQ-Balance.

■ Initialization of setting   [7]

PRE, INI, IP, *RST

■ Example of use   [8]

"Sets the impedance to 50 Ω."

<Program>

TERM IQAC

IQINZ 50

IQINZ?

<Response>

50

[1] Message header for Program Message and Query Message
[2] Name of Setup/Recall item (Note: This is not always the same as that on the screen of measuring equipment.)
[3] Syntax for Program Message, Query Message and Response Message.
   Upper-case letters represent the reserved words. Lower-case letters represent the argument for the device message described in [5] or the response data.
[4] Outline of Setup/Recall function in Program Message and Query Message
[5] Description of lower-case letters in table of [3].
   In case of set value; each argument includes the meaning of set item, initial value, range, resolution and restrictions.
   In case of Response Message, each argument includes the meaning of output data, resolution, unit, etc.
[6] Description of restrictions and precautions in using the command. The command is not properly set or recalled if these restrictions are not met.
[7] A Program Message that initializes the items set by this command.
[8] An example of command use. The example of <Program> is given here only to show the examples of Program Message, Query Message and their order. It is not an actual program code. (Program code depends on the environment.) The values in <Response> differ from the actual measured values.

3GPP2FWD_SPU

3GGP2 Standard (Forward Link)

Program Message	Query Message	Response Message
3GPP2FWD_SPU a	–	–

■ Function

Sets the Forward Link setting specification to 3GGP2 standard for spurious measurement.

■ Value of a

Specification selection

a	Selected specification	Band	Maximum level	RBW
0	ITU Category A	9 to 150 kHz	13 dBm	1 kHz
		150 kHz to 30 MHz		10 kHz
		30 MHz to 1 GHz		100 kHz
		1 to 5 GHz		1 MHz
1	ITU Category A	9 to 150 kHz	36 dBm	1 kHz
		150 kHz to 30 MHz		10 kHz
		30 MHz to 1 GHz		100 kHz
		1 to 5 GHz	30 dBm	1MHz
2	PHS	1893.5 to 1919.6 MHz	41 dBm	300 kHz
3	GSM 900	921 to 960 MHz	57 dBm	100 kHz
		876 to 915 MHz	98 dBm	100 kHz
4	DCS 1800	1805 to 1880 MHz	47 dBm	100 kHz
		1710 to 1785 MHz	98 dBm	100 kHz
5	UTRA-TDD	2010 to 2025 MHz	52 dBm	1 MHz
		1900 to 1920 MHz	86 dBm	1 MHz

■ Example of use

"Setting ITU Category A."

\<Program\>
3GGP2FWD_SPU 0

3GPP2RVS_SPU

3GGP2 Standard (Forward Link)

Program Message	Query Message	Response Message
3GPP2RVS_SPU a	–	–

■ Function

Sets the Reverse Link setting specification to 3GGP2 standard for spurious measurement.

■ Value of a

Specification selection

a	Selected specification	Band	Maximum level	RBW
0	ITU Category A	9 to 150 kHz	13 dBm	1 kHz
		150 kHz to 30 MHz		10 kHz
		30 MHz to 1 GHz		100 kHz
		1 to 5 GHz		1 MHz
1	ITU Category A	9 to 150 kHz	36 dBm	1 kHz
		150 kHz to 30 MHz		10 kHz
		30 MHz to 1 GHz		100 kHz
		1 to 5 GHz	30 dBm	1MHz
2	PHS setting value	1893.5 to 1919.6 MHz	41 dBm	300 kHz
3	GSM 900	935 to 960 MHz	57 dBm	100 kHz
		925 to 935 MHz	98 dBm	100 kHz
4	DCS 1800	1805 to 1880 MHz	47 dBm	100 kHz

■ Example of use

"Setting ITU Category A."

<Program>
3GGP2RVS_SPU 0

ACTCH_CDP

Active Channel Power

Program Message	Query Message	Response Message
–	ACTCH_CDP? a,b	c

■ Function

Outputs the number of channels, total power, averaged power, maximum power, and minimum power of the channels which have the averaged of code-domain power more than the threshold.

■ Value of a

Output type specification

a	Output type
NUM	Outputs the number of channels.
TOTAL	Outputs by the total relative power to Tx Power.
AVG	Outputs the average power by the relative power to Tx Power.
MAX	Outputs the maximum power by the relative power to Tx Power.
MIN	Outputs the minimum power by the relative power to Tx Power.

■ Value of b

Measuring Object: Relative (RC3-4) only can specify b.

a	Type of marker signal
None	Signal specified by Operation Trace.
I	I signal
Q	Q signal

■ Value of c

Active Channel

a	Resolution	Unit
NUM	1	CH
TOTAL	0.01	DB
AVG		
MAX		
MIN		

■ Resolution

• Measuring Object: Reverse (RC1-2), QPSK, and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Reading out the total power of Active Channel Power of Measuring Object: Forward (RC 232-C)."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
SWP
ACTCH_CDP? NUM

<Response
123

ADJCH

Offset freq. vs Power

Program Message	Query Message	Response Message
–	ADJCH? a, b	c

■ Function
Outputs electric power at inflection point of template.

■ Value of a
Frequency position

a	Frequency position
LOW4 LOW3 LOW2 LOW1 UP1 UP2 UP3 UP4	
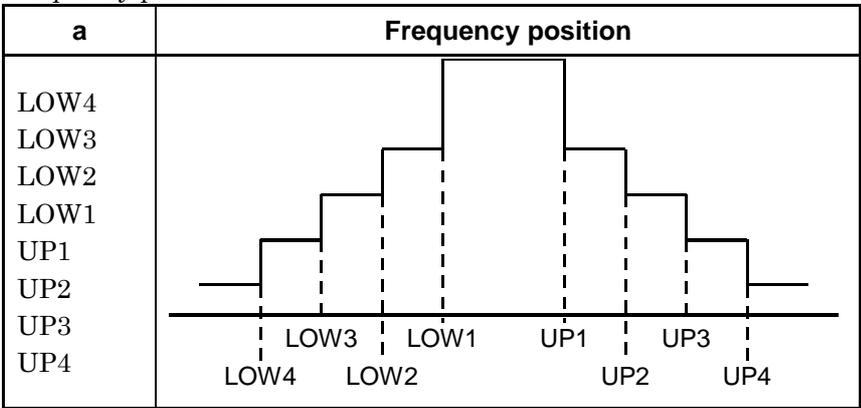
■ Value of b
Read out unit

b	Unit
None	In accordance with unit set by "Unit" (*cf.* UNIT_ACP)
DBM	dBm
DB	dB
WATT	W

■ Value of c
Electric power at each inflection point of template

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating point type)	W

■ Example of use
"Read out LOW1 electric power on dB unit basis"
<Program>
ADJCH? LOW1, DB

<Response>
–43.8

ADJRNG

Adjust Range

Program Message	Query Message	Response Message
ADJRNG	–	–

■ Function
Performs optimization of internal ATT and A/D levels, etc.

■ Restriction
• The following are executable screens (*cf.* DSPL).
   • Modulation Analysis
   • RF Power
   • Occupied Bandwidth
   • Spurious close to the Carrier
   • Spurious Emission
   • Power Meter
   • CCDF
• Where the Terminal is other than RF, execution cannot be performed (*cf.* TERM).
• Where the Frequency is less than 20 MHz, execution cannot be performed (*cf.* FREQ).

■ Example of use
"Perform optimization of internal ATT and A/D levels, etc."

<Program>
DSPL MODANAL
ADJRNG

<Response>
None

ANLYLEN_MOD

Analysis Length

Program Message	Query Message	Response Message
ANLYLEN_MOD a	ANLYLEN_MOD?	a

■ Function

Sets the analysis length of the modulation signal on the Modulation Analysis screen.

■ Value of a

Analysis length

Measuring Object	Range	Resolution	Initial value	Unit
Forward (RC3-5)	384 to 24576	1536/128/64 *1 *2	640	PNchip
Forward (RC1-2)		1536/64 *2		
Reverse (RC-3-4)	384 to 1536	32		
Reverse (RC1-2), OQPSK		1		
QPSK		64		

*1 When Max Walsh Length is 128 or 64, the relative becomes 128 or 64, respectively.

*2 When value of a is 1536 or more, resolution is 1536.

□ Suffix code

None

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the analysis length to 1536 PNchip when performing modulation analysis of Forward (RC1-2)."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
ANLYLEN_MOD 1536
ANLYLEN_MOD?

<Response>
1536

ANLYSTA_MOD

Analysis Start

Program Message	Query Message	Response Message
ANLYSTA_MOD a	ANLYSTA_MOD?	a

■ Function

Sets the position for starting analysis on the Modulation Analysis screen.

■ Value of a

Position for starting analysis

Measuring Object	Range	Resolution	Initial value	Unit
Forward (RC3-5)		128/64*		
Forward (RC1-2)	0 to 32640	64	0	PNchip
Reverse (RC-3-4)		32		
Reverse (RC1-2), OQPSK, QPSK		1		

* When Max Walsh Length is 128 or 64, the relative becomes 128 or 64, respectively.

□ Suffix code

None

■ Restriction

• No setting is allowed when Wave Type is Burst (*cf.* WAVETYPE).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the position for starting analysis to 512 PNchip when performing modulation analysis of Forward (RC1-2). "

<Program>
DSPL SETCOM
MEASOBJ FORWARD
ANLYSTA_MOD 512
ANLYSTA_MOD?

<Response>
512

ANLYSTA_RFPWR

Analysis Start RF Power

Program Message	Query Message	Response Message
ANLYSTA_RFPWR a	ANLYSTA_RFPWR?	a

■ Function

Sets analysis start position on the RF Power screen.

■ Value of a

Analysis start position

Range	Resolution			Initial value	Unit
	Forward (RC1-2),RC(3-5)	Reverse(RC1-2),RC,QPSK, OQPSK	Reverse (RC1-2)		
0 to 32768	64	1	32	0	PNchip

□ Suffix code

None

■ Restriction

• No setting is allowed when Wave Type is Burst (*cf.* WAVETYPE).

• No setting is allowed when Code Sync is Off (*cf.* CODESYNC).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the analysis start position to 32640 slots."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
DSPL RFPWR
TRG EXT
CODESYNC ON
ANLYSTA_RFPWR 32640
ANLYSTA_RFPWR?

<Response>
32640

ARDDSPL

Display Mode: Walsh/OVSF

Program Message	Query Message	Response Message
ARDDSPL a	ARDDSPL?	a

■ Function

Switched the Walsh/OVSF display in Code Domain on the Modulation Analysis screen.

■ Value of a

Walsh/OVSF of Display Mode

a	On/Off of Display Mode	Initial value
WALSH	Set Display Mode to Walsh	∗
OVSF	Set Display Mode to OVSF	

■ Restriction

• No setting is allowed when Measuring Object is other than Forward (RC3-5) or Reverse (RC3-4) (*cf.* MEASOBJ).

• No setting is allowed when Trace Format is other than Code Domain (*cf.* TRFORM)

• No setting is allowed when Auto Rate Detection is Off (*cf.* AUTODET).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Display Mode to WALSH."

<Program>
DSPL SETCOM
DSPL MEASOBJ
TRFORM CODE
ARDDSPL WALSH
ARDDSPL?

<Response>
WALSH

ATT_ACP

Attenuator for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATT_ACP a	ATT_ACP?	a

■ Function

Sets the attenuator for Spurious close to the Carrier measurement.

■ Value of a

Attenuator

Range	Resolution	Initial value	Unit	RF Input
20 to 82	2	50	dB	High
0 to 62	2	30	dB	Low

□ Suffix code

None: dB

DB: dB

■ Restriction

• Attenuator setting range depends on Ref Level (*cf.* RL_ACP).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting Attenuator to 20 dB."

<Program>

DSPL ACP,NRM

RL_ACP –30DBM

ATT_ACP 20DB

ATT_ACP?

<Response>

20

ATT_OBW

Attenuator for Occupied Bandwidth

Program Message	Query Message	Response Message
ATT_OBW a	ATT_OBW?	a

■ Function

Sets the attenuator for occupied bandwidth measurement with spectrum analyzer.

■ Value of a

Attenuator range	Resolution	Initial value	Unit	RF Input
20 to 82	2	50	dB	High
0 to 62	2	30	dB	Low

□ Suffix code

x code

None: dB

DB: dB

■ Restriction

- Attenuator setting range depends on Ref Level (*cf.* RL_OBW).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting Attenuator to 20 dB."

<Program>

RL_OBW –30DBM

ATT_OBW 20DB

ATT_OBW?

<Response>

20

ATTMD_ACP

Attenuator Mode: Manual/Auto for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATTMD_ACP a	ATTMD_ACP?	a

■ Function
Selects manual or automatic attenuator setting of spectrum analyzer for Spurious close to the Carrier screen.

■ Value of a
Attenuator setting mode

a	Mode	Initial value
MAN	Attenuator manual setting mode	
AUTO	Attenuator automatic setting mode	∗

■ Restriction
• When attenuator is changed in Auto, the mode becomes Manual, forcibly.
• When Auto, attenuator is set automatically.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting attenuator to Auto mode."

<Program>
ATTMD_ACP AUTO
ATTMD_ACP?

<Response>
AUTO

ATTMD_OBW

Attenuator Mode: Manual/Auto for Occupied Bandwidth

Program Message	Query Message	Response Message
ATTMD_OBW a	ATTMD_OBW?	a

■ Function

Selects manual or automatic attenuator setting of spectrum analyzer for Occupied Bandwidth screen.

■ Value of a

Attenuator setting mode

a	On/Off of Display Mode	Initial value
MAN	Sets Attenuator setting mode to manual.	
AUTO	Sets Attenuator setting mode to auto.	∗

■ Restriction

• When attenuator is changed in Auto, the mode becomes Manual, forcibly.

• When Auto, attenuator is set automatically.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting attenuator to Auto mode."

<Program>
ATTMD_OBW AUTO
ATTMD_OBW?

<Response>
AUTO

ATTRLMD_ACP

Attenuator Ref Level Mode: Manual/Auto for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATTRLMD_ACP a	ATTRLMD_ACP?	a

■ Function
Selects manual or automatic Attenuator/Ref-level settings of spectrum analyzer for Spurious close to the Carrier screen.

■ Value of a
Attenuator/Ref-level setting mode

a	Mode	Initial value
MAN	Attenuator/Ref-level manual setting mode	
AUTO	Attenuator/Ref-level automatic setting mode	∗

■ Restriction
• When attenuator or Ref level is changed in Auto, the mode becomes Manual, forcibly.
• When Auto, attenuator and Ref level are set automatically.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting attenuator/Ref-level to Auto mode."

<Program>
ATTRLMD_ACP AUTO
ATTRLMD_ACP?

<Response>
AUTO

ATTRLMD_OBW

Attenuator Ref Level Mode: Manual/Auto for Occupied Bandwidth

Program Message	Query Message	Response Message
ATTRLMD_OBW a	ATTRLMD_OBW?	a

■ Function

Selects manual or automatic attenuator/Ref-level setting of spectrum analyzer for Occupied Bandwidth screen.

■ Value of a

Attenuator/Ref-level setting mode

a	On/Off of Display Mode	Initial value
MAN	Sets Attenuator/Ref-level setting mode to manual.	
AUTO	Sets Attenuator/Ref-level setting mode to Auto.	*

■ Restriction

- When attenuator or Ref level is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator and Ref level are set automatically.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting attenuator and Ref level to Auto mode."

<Program>
ATTRLMD_OBW AUTO
ATTRLMD_OBW?

<Response>
AUTO

AUTODET

Auto Rate Detection: On/Off

Program Message	Query Message	Response Message
AUTODET a	AUTODET?	a

■ Function

Sets the Auto Rate Detection function to On or Off at Code Domain of Modulation Analysis measurement.

■ Value of a

Setting Auto Rate Detection to On or Off

a	On/Off of Display Mode	Initial value
ON	Sets Auto Rate Detection to On.	∗
OFF	Sets Auto Rate Detection to Off.	

■ Resolution

- No setting is allowed when Measuring Object is other than Forward (RC3-5) or Reverse (RC3-4) (*cf.* MEASOBJ).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Auto Rate Detection to On."

<Program>
DSPL SETCOM
MEASOBJ REVERSERC3
DSPL MODANAL
AUTODET ON
AUTODET?

<Response>
ON

AVR_ACP

Average Count for Spurious close to the Carrier

Program Message	Query Message	Response Message
AVR_ACP a	AVR_ACP?	a

■ Function

On the Spurious close to the Carrier screen, sets the average (measurement) count when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Average Count at 500."

<Program>
AVR_ACP 500
AVR_ACP?

<Response>
500

AVR_IQL

Average Count for IQ Level

Program Message	Query Message	Response Message
AVR_IQL a	AVR_IQL?	a

■ Function
Sets the measuring (average) count on the IQ Level screen when the Storage Mode is set to Average.

■ Value of a
Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting Average Count at 500."

\<Program\>
AVR_IQL 500
AVR_IQL?

\<Response\>
500

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

AVR_MOD

Average Count for Modulation Analysis

Program Message	Query Message	Response Message
AVR_MOD a	AVR_MOD?	a

■ Function

Sets the average (measurement) count on the Modulation Analysis screen when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting Average Count at 500."

<Program>

AVR_MOD 500

AVR_MOD?

<Response>

500

AVR_OBW

Average Count for Occupied Bandwidth

Program Message	Query Message	Response Message
AVR_OBW a	AVR_OBW?	a

■ Function

Sets the average (measurement) count (number of averaging processes) when Storage Mode is set to Average at Occupied Bandwidth measurement.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Sets Average Count to 500."

<Program>
AVR_OBW 500
AVR_OBW?

<Response>
500

AVR_RFPWR

Average Count for RF Power

Program Message	Query Message	Response Message
AVR_RFPWR a	AVR_RFPWR?	a

■ Function

Sets the average (measurement) count on the RF Power screen when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Sets Average Count to 500."

<Program>

AVR_RFPWR 500

AVR_RFPWR?

<Response>

500

BAND

Preselector for Spurious Emission

Program Message	Query Message	Response Message
BAND a	BAND?	a

■ Function

On the Spurious Emission Measurement, set the Preselector route for use or non-use.

■ Value of a

Route selection

a	Route selection	Initial value
0	No use of Preselector route (Normal)	*
1	Use of Preselector route (Spurious)	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Use Preselector route."

<Program>
BAND 1
BAND?

<Response>
1

■ Restrictions according to model type and options

This command is valid when main unit is MS8608A/MS2683A.

If Option MS8608A-03/MS2683A-03 Preselector Lower-Limit Expansion is not installed, this command is invalid.

BIN

Binary/ASCII mode

Program Message	Query Message	Response Message
BIN a	BIN?	a

■ Function

Sets ASCII or binary format to read the waveform data.

Value of a

Specification of ASCII or binary format

Value	ASCII Binary	Initial Value
ON	Binary format	*
1		
OFF	ASCII format	
0		

Use example

"Read the waveform data in binary format."

<Program>
BIN ON
BIN?

<Response>
ON

BS

Back Screen

Program Message	Query Message	Response Message
BS	–	–

■ Function

Switches to the upper screen of the currently displayed screen. The relationship among each of the screens is as follows:

```
Setup Common Parameter
     ├── Modulation Analysis
     ├── RF Power
     │        └── Setup Template
     ├── Occupied Bandwidth
     ├── Spurious close to the Carrier
     │        └── Setup Spurious Template
     ├── Spurious Emission
     │        ├── Setup Spot Table
     │        └── Setup Search/Sweep Table
     ├── IQ Level
     └── Power Meter
```
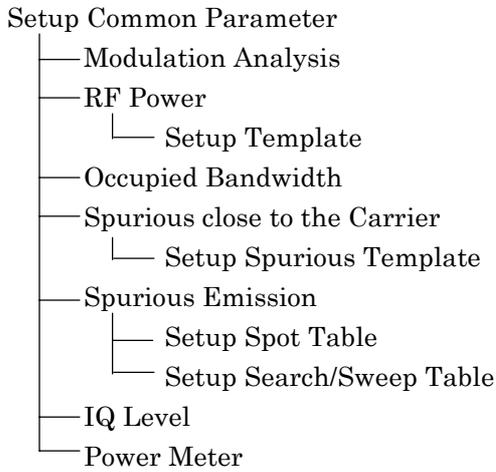
■ Example of use

"Shifting to the upper screen."

<Program>
BS

CALCANCEL

Power Calibration Cancel

Program Message	Query Message	Response Message
CALCANCEL	–	–

■ Function

Cancels Power Calibration and resets the calibration value to 0.00.

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
  - Modulation Analysis
  - RF Power
  - Occupied Bandwidth
  - Spurious close to the Carrier
  - Spurious Emission
- When the Terminal is other than RF, execution cannot be performed (*cf.* TERM).

■ Example of use

"Canceling Power Calibration."

<Program>
DSPL SETCOM
TERM RF
DSPL MODANAL
CALVAL 10.00DB
CALVAL?
CALCANCEL
CALVAL?

<Response>
2,10.00
0,0.00

CALVAL

Power Calibration Value

Program Message	Query Message	Response Message
CALVAL a	CALVAL?	b, a

■ Function

Sets the calibration value for Power Calibration.

■ Value of a

Calibration value

Range	Resolution	Initial value	Unit
−10.00 to 10.00	0.01	0.00	dB

□ Suffix code

None: dB

DB: dB

■ Value of b

Type of calibration

b	Type of calibration	Initial value
0	Yet to be calibration	∗
1	Internal calibration	
2	External calibration	

■ Restriction

• No setting is allowed when Terminal is other than RF (*cf.* TERM).

■ Example of use

"Setting the calibration value at 5 dB."

\<Program\>
DSPL SETCOM
CALVAL 5.00
CALVAL?

\<Response\>
2,5.00

CARRF

Carrier Frequency

Program Message	Query Message	Response Message
–	CARRF?	a

■ Function

Outputs the carrier frequency on the Modulation Analysis screen.

■ Value of a

Carrier frequency

Resolution	Unit
0.1	Hz

■ Restriction

• When the Terminal is other than RF, measurement is not performed (*cf.* TERM).

■ Example of use

"Reading out the carrier frequency."

<Program>
MEAS MODANAL
CARRF?

<Response>
1922499857.2

CARRFERR

Carrier Frequency Error

Program Message	Query Message	Response Message
–	CARRFERR? a	b

■ Function

Outputs the carrier frequency error on the Modulation Analysis screen.

■ Value of a

Output unit

a	Output unit
None	Hz
HZ	Hz
PPM	ppm

■ Value of b

Frequency error

Resolution	Unit
0.1	Hz
0.001	ppm

■ Restriction

- No setting is allowed when the Terminal is other than RF (*cf.* TERM).

■ Example of use

"Read out the carrier frequency error."

<Program>
MEAS MODANAL
CARRFERR? HZ

<Response>
−14.5

CDALLCH

Code Domain Results

Program Message	Query Message	Response Message
–	CDALLCH? a,b,c	d1,d2,d3,...,dn

■ Function

On the Modulation Analysis screen, outputs all of the measurement results of Code Domain Power, Waveform Quality, Time Offset or Phase Offset at one time.

■ Value of a

Measurement result to be output

a	Measurement result to be output
PWR	Code Domain Power
WAVE	Waveform Quality
TO	Time Offset
PH	Phase Offset

■ Value of b

Walsh Length

Range	Measuring Object
Fixed at 64 (No setting permitted)	Forward (RC1-2)
4, 8, 16, 32, 64, 128	Forward (RC3-5)
2, 4, 8, 16, 32	Reverse (RC3-4)

■ Value of c

Operation Trace

c	Signal type
I	I signal
Q	Q signal
None	

■ Value of d

Code Domain Power

Range	Resolution
2147483648 to 2147483647	1

• Read out as integer of 0.01 dB unit, with 1 dB at 100.

Waveform Quality

Range	Resolution
2147483648 to 2147483647	1

- Read out as integer of 0.0001 unit, with 1 unit for 100000.

Time Offset

Range	Resolution
2147483648 to 2147483647	1

- Read out as integer of 0.000000001 sec (1 nsec) unit, with 1 sec at 100000000.

Phase Offset

Range	Resolution
2147483648 to 2147483647	1

- Read out as integer of 0.001 radian unit, with 1 radian at 1000.

■ Restriction
- Enable only when the measuring object is Forward (RC1-2), Forward (RC3-5), and Reverse (RC3-4).
- Walsh Length or Operation Phase cannot be set when Measuring Object is Forward(RC1-2).
- Input for Operation Phase can be omitted.
- Output results follow the current Operation Phase when Reverse (RC3-4) is set and Operation Phase is omitted.
- The value of Operation Phase Q for Reverse (RC3-4) is output when other than Reverse (RC3-4) is specified in Operation Phase.

■ Example of use
"Read out the measurement result of Code Domain Power from Channelization Code Number of 0 to 63."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
SWP
CDALLCH? PWR, 64

<Response>
−18.58, −7.86, −8.49,…, −0.28, −13.40

CDANAL

Code Domain Results

When Auto Rate Detection is set to Off

Program Message	Query Message	Response Message
–	CDANAL? a,b,c	d,e,f,g

When Measuring Object is set to Reverse Link

Program Message	Query Message	Response Message
–	CDANAL? h,c	i1,i2,i3,…,in

■ Function

Outputs the measurement results of Code Domain Power, Waveform Quality Time Offset, or Phase Offset in specified Walsh Length, Code Number or Operation Phase on the Modulation Analysis screen.

■ Value of a

Walsh Length

Range	Measuring Object
Fixed at 64 (No setting permitted)	Forward (RC1-2)
4, 8, 16, 32, 64, 128	Forward (RC3-5)
2, 4, 8, 16, 32	Reverse (RC3-4)

■ Value of b

Channelization Code Number

b	Resolution
0 to (a 1)	1

■ Value of c

Operation Phase

c	Resolution
I	I signal
Q	Q signal
None	Depends on Operation Trace setting

■ Value of d

Code Domain Power

Resolution	Unit
0.01	dB

■ Value of e

Waveform Quality

Resolution	Unit
0.00001	None

■ Value of f

Time offset

Resolution	Unit
1	nsec

■ Value of g

Phase offset

Resolution	Unit
0.001	radian

■ Value of h

Selection readout data

H	Measured results to be outputted
PWR	Code Domain Power
WAVE	Waveform Code Number
TO	Time Offset
PO	Phase Offset
ALL	Code Domain Power, Waveform Code Number, Time Offset, Phase Offset

■ Value of i

Code Domain Power

Resolution	Unit
0.01	dB

Waveform Quality

Resolution	Unit
0.00001	None

Time Offset

Resolution	Unit
0.01	nsec

Phase Offset

Resolution	Unit
0.001	radian

■ Restriction
- Input for Operation Phase can be omitted.
- Output results follow the current Operation Phase when Reverse (RC3-4) is set and Operation is omitted.
- The value of Operation Phase Q for Reverse (RC3-4) is output when other than Reverse(RC3-4) is specified is Operation Phase.

■ Example of use
"Output the measurement results of Code Domain Power, Waveform Quality, Time Offset or Phase Offset when Walsh Length is 16, Code Number is 3 and Operation Trace is Q."

<Program>
DSPL SETCOM
MEASOBJ REVERSERC3
DSPL MODANAL
AUTODET OFF
SWP
CDANAL? 16,3,Q

<Response>
–12.75, 0.88991, 0.762

CDPANLY

Code Domain Results

Program Message	Query Message	Response Message
–	CDPANLY? a,b,c	d,e,f,g

■ Function

Outputs the measurement results of Code Domain Power, Waveform Quality, Time Offset or Phase Offset in specified Channelization Code Number, Walsh Length or Operation Trace on the Modulation Analysis screen.

■ Value of a

Channelization Code Number

a	Resolution
0 to (b 1)	1

■ Value of b

Walsh Length

Range	Measuring Object
No setting permitted (Fixed at 64)	Forward (RC1-2)
4, 8, 16, 32, 64, 128	Forward (RC3-5)
2, 4, 8, 16, 32	Reverse (RC3-4)

■ Value of c

Operation Trace

c	Signal type
I	I signal
Q	Q signal
None	

■ Value of d

Code Domain Power

Resolution	Unit
0.01	dB

■ Value of e

Waveform Quality

Resolution	Unit
0.00001	None

■ Value of f

Time Offset

Resolution	Unit
0.01	dB

■ Value of g

Phase Offset

Resolution	Unit
0.01	dB

■ Restriction

- Enable only when the measuring object is Forward (RC1-2), Forward (RC3-5), and Reverse (RC3-4).
- Walsh Length or Operation Phase cannot be set when Measuring Object is Forward (RC1-2).
- Output results follow the current Operation Phase when Reverse (RC3-4) is set and Operation Phase is omitted.
- The value of Operation Phase Q for Reverse (RC3-4) is output when other than Reverse (RC3-4) is set and Q is specified in Operation Phase.

■ Example of use

"Output the measurement results of Code Domain Power, Waveform Quality, Time Offset or Phase Offset when Channelization Code Number is 3, Walsh Length is 16 and Operation Phase is Q."

<Program>
DSPL SETCOM
MEASOBJ REVERSERC3
DSPL MODANAL
SWP
CDPANLY? 3,16,Q

<Response>
−12.75, 0.88991, 0.762

CHAN

Channel

Program Message	Query Message	Response Message
CHAN a	CHAN?	a

■ Function
Setting of channel number.

■ Value of a
Channel

Value	Resolution	Initial value
0 to 20000 (See Restrictions)	1	1092

■ Restriction
• The terminal must be set to RF (*cf.* TERM).
• If the frequency goes beyond the setting range when changing the channel, the channel cannot be changed even within the setting range (*cf.* FREQ). For example, the channel cannot be changed when channel = 0, frequency = 7.8 GHz and Channel Spacing = 0.2 MHz.

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Setting the channel to 500."

<Program>
DSPL SETCOM
TERM RF
CHAN 500
CHAN?

<Response>
500

CHFREQ

Channel and Frequency

Program Message	Query Message	Response Message
CHFREQ a, b	–	–

■ Function
Sets the channel and the frequency of the channel concurrently on the Setup Common Parameter screen.

■ Value a
Channel
Same as "CHANa" (*cf.* CHAN).

■ Value b : Carrier frequency
Same as "FREQb" (*cf.* FREQ).

■ Restriction
• No setting is allowed when the terminal is one other than RF (*cf.* TERM).

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting the carrier frequency of Channel 2 to 1 GHz."

<Program>
DSPL SETCOM
TERM RF
CHFREQ 2,1 GHZ
CHAN?
FREQ?

<Response>
2
1000000000

CHSPC

Channel Spacing

Program Message	Query Message	Response Message
CHSPC a	CHSPC?	a

■ Function

Sets the one-channel frequency band on the Setup Common Parameter screen.

■ Value of a

One-channel Frequency Band.

Range	Resolution	Initial value	Unit
−10000000000 to 10000000000	1	1250000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

• No setting is allowed when the terminal is other than RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the inter-channel frequency band to 300 kHz."

<Program>

DSPL SETCOM

TERM RF

CHAN 501

FREQ 400MHZ

CHSPC 300KHZ

CHSPC?

CHAN 502

FREQ?

<Response>

300000

400300000

CODESYNC

Code Sync

Program Message	Query Message	Response Message
CODESYNC a	CODESYNC?	a

■ Function

Sets the RF power screen so that the Measuring Object does or does not indicate the position of the waveform by means of code synchronization, in the case of Forward (RC1-2), Forward (RC3-5), Reverse (RC3-4).

■ Value of a

On/Off of Code Synchronization

a	On/Off of Code Synchronization	Initial value
ON	Performs synchronization by code.	
OFF	Does not perform synchronization by code.	*

■ Restriction

* No setting is allowed where the Measuring Object is QPSK or OQPSK (*cf.* MEASOBJ).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set so that the position of the waveform is indicated by means of synchronization."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
DSPL RFPWR
CODESYNC ON
CODESYNC?

<Response>
ON

CONTS

Continuous Sweep

Program Message	Query Message	Response Message
CONTS	–	–

■ Function

Executes continuous measurement (sweep).

■ Restriction

• Executable screens are as follow (*cf.* DSPL).

Executable screen	Remarks
Modulation Analysis	–
RF Power	–
Occupied Bandwidth	–
Spurious close to the Carrier	at Average, Single operation
Spurious Emission	Single operation
IQ Level	–
Power Meter	–

■ Example of use

"Execute continuous measurement (sweep)".

<Program>
CONTS

CORR

Correction

Program Message	Query Message	Response Message
CORR a	CORR?	a

■ Function

Selects the Correction data table for level correction.

■ Value of a

Correction data table

a	Correction data table	Initial value
0	No data correction is carried out.	*
1	Use Table 1 for performing data correction.	
2	Use Table 2 for performing data correction.	
3	Use Table 3 for performing data correction.	
4	Use Table 4 for performing data correction.	
5	Use Table 5 for performing data correction	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Selecting Correction Data Table 3."

<Program>

CORR 3

CORR?

<Response>

3

DET_ACP

Detection Mode

Program Message	Query Message	Response Message
DET_ACP a	DET_ACP?	a

■ Function
Sets the wave-detection mode in Spurious Close to the Carrier measurement.

■ Value of a
Wave-detection mode

a	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	*
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction
• RMS can be set when Digital is set for RBW Mode. (*cf.* RBD_ACP)
• If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* RBD_ACP)

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set the wave-detection mode to Average."

<Program>
DET_ACP AVG
DET_ACP?

<Response>
AVG

■ Notes
RMS is an option.

DET_OBW

Detection Mode

Program Message	Query Message	Response Message
DET_OBW a	DET_OBW?	a

■ Function

Sets the wave-detection mode respective of Occupied Bandwidth measurement using a spectrum analyzer.

■ Value of a

Wave-detection mode

a	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	*
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction

• RMS can be set when Digital is set for RBW Mode. (*cf.* RBD_OBW)

• If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* RBD_OBW)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the wave-detection mode to Average."

<Program>
DET_OBW AVG
DET_OBW?

<Response>
AVG

■ Notes

RMS is an option.

DET_SPU

Detection Mode

Program Message	Query Message	Response Message
DET_SPU a,b	DET_SPU? a	b

■ Function

Sets the wave-detection mode of Spurious Emission measurement.

■ Value of a

Detection Mode

a	Detection Mode
SPOT	The wave-detection mode used in the Spot measurement method is the object hereof.
SEARCH	The wave-detection mode used in the Search measurement method is the object hereof.
SWEEP	The wave-detection mode used in the Sweep measurement method is the object hereof.

■ Value of b

Wave-detection mode

b	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	*
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction

• RMS can be set when Digital is set for RBW Mode. (*cf.* TBLRBWTP_SPU)

• If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* TBLRBWTP_SPU)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the wave-detection mode of the Sweep method to Positive Peak. "

<Program>
DET_SPU SWEEP,POS
DET_SPU? SWEEP

<Response>
POS

■ Notes

RMS is an option.

DISPTYPE_ACP

Display Data Type for Spurious close to the Carrier

Program Message	Query Message	Response Message
DISPTYPE_ACP a	DISPTYPE_ACP?	a

■ Function

Sets the display type of measurement result in the Spurious close to the Carrier screen.

■ Value of a

Measurement result type selection

a	Display format	Initial value
FREQVSPWR	Shows the leakage power at each offset frequency.	
PEAKPWR	Displays level of measured point of minimum margin at each frequency band of the template.	*
PEAKMARGIN	Displays margin of measured point of minimum margin at each frequency band of the template.	

■ Initialization command

PRE, INI, IP, ∗RST

■ Example of use

"Sets the display type of measurement result to Freq. vs Power."

\<Program\>
DSPL ACP,NRM
SWP
DISPTYPE_ACP FREQVSPWR
DISPTYPE_ACP?

\<Response\>
FREQVSPWR

DPTS_ACP

Data Points:1001/501

Program Message	Query Message	Response Message
DPTS_ACP a	DPTS_ACP?	a

■ Function

Sets the number of data points received from Spectrum-Analyzer sweeping on the Spurious Close to the Carrier screen.

■ Value of a

Data number

a	Data number	Initial value
1001	Sets so that 1001 data points are received.	*
501	Sets so that 501 data points are received.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Spectrum Analyzer sweeping data to 1001 points."

<Program>
DPTS_ACP 1001
DPTS_ACP?

<Response>
1001

■ Notes

A setting value differs from a display value when Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9 or 3GPP2 FWD Band Class 1, 4, 6, 8.

display value

Measure Method	setting value	
	501	1001
Normal	501	1001
3GPP2 FWD Band Class 0,2,3,5,9	1501	3001
3GPP2 FWD Band Class 1,4,6,8	2001	3501

DPTS_OBW

Data Points:1001/501

Program Message	Query Message	Response Message
DPTS_OBW a	DPTS_OBW?	a

■ Function

On the Occupied Bandwidth screen, set the number of data points received from Spectrum Analyzer sweeping.

■ Value of a

Data number

a	Data number	Initial value
1001	Sets so that 1001 data points are received.	
501	Sets so that 501 data points are received.	∗

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Spectrum Analyzer sweeping data to 1001 points."

<Program>
DPTS_OBW 1001
DPTS_OBW?

<Response>
1001

DSPL

Change Screen

Program Message	Query Message	Response Message
DSPL a	DSPL?	a
DSPL a,b	DSPL?	a,b

■ Function

Changes the screen. Measurement is not performed even if the screen to which one is changing is a measurement screen.

■ Value of a, b

a: Name of screen

b: Measurement method or table selection

a	b	Name of screen	Measurement method or table selection	Initial value	Change condition
SETCOM	–	Setup Common Parameter	–	*	
MODANAL	–	Modulation Analysis	–		
RFPWR	–	RF Power	–		
SET-TEMP_RFPWR	–	Setup Template (for RF Power)	–		
OBW	SPECT	Occupied Bandwidth	Spectrum		A
	FFT		FFT		
ACP	NRM	Spurious close to the Carrier	Normal		A
	None				
	PRECISE1		3GPP2 FWD Band Class0,2,3,5,9		
	PRECISE2		3GPP2 FWD Band Class 1,4,6,8		
SETTEMP_ACP	–	Setup Spurious Template (for Spurious close to the Carrier)	–		A,C
SPURIOUS	SPOT	Spurious Emission	Spot		A
	SEARCH		Search		A
	SWEEP		Sweep		A
SETTBL_SPU	SPOT	Setup Table (for Spurious Emission)	Spot		A
	SWEEP		Search & Sweep		A
IQLVL	–	IQ Level	–		B
PWRMTR	–	Power Meter	–		A

Change conditions
A: Change is not allowed when the Terminal is other than RF.
B: Change is not allowed when the Terminal is RF.
C: Change is not allowed when Measure Method is 3GPP2 FWD Band Class 1, 4, 6, 8 and than Template is Band Class 6 (*cf.* SLCTEMP_ACP).

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
[1] "Changing to the Modulation Analysis screen."

<Program>
DSPL MODANAL
DSPL?

<Response>
MODANAL

[2] "Changing to sweep measurement on the Spurious Emission screen."

<Program>
DSPL SPURIOUS,SWEEP
DSPL?

<Response>
SPURIOUS, SWEEP

■ Restrictions according to model type and options
• For MS268x, changing to IQ Level Screen is not allowed when Option–17 or –18 I/Q Input is not installed.
• For MS268x, changing to Power Meter Screen is not allowed.

ERRSC

Error Scale for Constellation

Program Message	Query Message	Response Message
ERRSC a	ERRSC?	a

■ Function

Sets a circle indicating the error range of each symbol on the constellation display of the Modulation Analysis screen.

■ Value of a

Error Range

a	Error Range	Initial value
5	5 %	
10	10 %	
20	20 %	
OFF	Off	*

■ Restriction

• No setting is allowed when the Trace Format is other than Constellation (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the error scale to 20%."

<Program>
TRFORM CONSTEL
ERRSC 20
ERRSC?

<Response>
20

FILTER

Filter

Program Message	Query Message	Response Message
FILTER a	FILTER?	a

■ Function

Set up on the Setup Common Parameter screen to indicate whether filter processing has been performed on the signal subject to analysis.

■ Value of a

Specification of filtering On/Off

a	Specification of filtering On/Off	Initial value
OFF	Analyzes without filter processing.	
ON	Analyzes with filter processing.	*
EQ	Analyzes with filter processing and equalizing processing.	

■ Restriction

- This setting is disabled when the displayed measurement screen is other than the Setup Common Parameter screen.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Performing filter processing for analysis."

<Program>
DSPL SETCOM
FILTER ON
FILTER?

<Response>
ON

FREQ

Frequency

Program Message	Query Message	Response Message
FREQ a	FREQ?	a

■ Function

Sets the carrier frequency to be measured on the Setup Common Parameter screen.

■ Value of a

Carrier frequency

Range	Resolution	Initial value	Unit	Remarks
100 to 7800000000	1	887650000	Hz	For MS8608A
100 to 13200000000	1	887650000	Hz	For MS8609A
100 to 3000000000	1	887650000	Hz	For MS2681A
100 to 7800000000	1	887650000	Hz	For MS2683A
100 to 30000000000	1	887650000	Hz	For MS2687A/B

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- No setting is allowed when the terminal is one other than RF (*cf.* TERM).
- When the channel value changes only by ΔCh, carrier frequency Fnew after changing is found by Fnew = Fold + {(Channel Spacing) × ΔCh}, where Fold is carrier frequency before changing(*cf.* CHAN).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the carrier frequency to 1 GHz."

<Program>

DSPL SETCOM

TERM RF

FREQ 1GHZ

<Response>

1000000000

FSPAN_ACP

Frequency Span for Spurious close to the Carrier

Program Message	Query Message	Response Message
FSPAN_ACP a	FSPAN_ACP?	a

■ Function
Sets the measurement frequency bandwidth on the Spurious Close to the Carrier screen.

■ Value of a
Frequency bandwidth

Range	Resolution	Initial value	Unit
1000000 to 10000000	1	8000000	Hz

□ Suffix code
None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction
- No setting is allowed when the Measure Method is other than Normal. (*cf.* DSPL)
- 8 MHz is returned always when Measure Method is one other than Normal. The setting cannot be changed when Measure Method is one other than Normal.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting the measurement frequency bandwidth to 3 MHz on the Spurious close to the Carrier screen."

<Program>
DSPL ACP,NRM
FSPAN_ACP 3MHZ
FSPAN_ACP?

<Response>
3000000

FSPAN_OBW

Frequency Span for Occupied Bandwidth

Program Message	Query Message	Response Message
FSPAN_OBW a	FSPAN_OBW?	a

■ Function

Sets the measurement frequency bandwidth on the Occupied Bandwidth screen.

■ Value of a

Frequency bandwidth

Range	Resolution	Initial value	Unit
1000000 to 10000000	1	4000000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- When the method is FFT, fixed 3.91 MHz is set. Namely, when the bandwidth is read out during FFT method, "3,910,000" is read out always.
- Regardless of the method, setting is performed depending on Span during Spectrum method. Moreover, there is no relation of dependence between Span of Spectrum and Span of FFT.

■ Example of use

"Set Span on the Occupied Bandwidth screen."

<Program>

DSPL OBW,SPECT

FSPAN_OBW 2MHZ

FSPAN_OBW?

DSPL OBW,FFT

FSPAN_OBW 5MHZ

FSPAN_OBW?

DSPL OBW,SPECT

FSPAN_OBW?

<Response>

2000000

3910000

5000000

ILVL

I Level (RMS)

Program Message	Query Message	Response Message
–	ILVL? a	b

■ Function

Reads out the measured results of the RMS value of Signal I on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	Conforms to the unit set by the Unit *(cf.* UNIT_IQL*)*.
MV	mV
DBMV	dBmV

■ Value of b

RMS value of Signal I

Resolution	Unit
0.01	mV
	dBmV

■ Example of use

"Reading out the RMS value of Level I."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
ILVL? MV

<Response>
1.42

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

INACTCH_CDP

Inactive Channel Power

Program Message	Query Message	Response Message
	INACTCH_CDP? a,b	c

■ Function

Outputs the number of channels, averaged power, maximum power, and minimum power of the channels which have the averaged power of code-domain power less then the threshold

■ Value of a

Output type specification

a	Output type
NUM	Outputs the number of channels.
TOTAL	Outputs the total power relative power to Tx Power.
AVG	Outputs the averaged power by the relative power to Tx Power.
MAX	Outputs the maximum power by the relative power to Tx Power.
MIN	Outputs the minimum power by the relative power to Tx Power.

■ Value of b

Measuring Object: Reverse (RC3-4) only can specify b.

b	Output type
None	Signal specified by Operation Trace.
I	I signal.
Q	Q Signal

■ Value of c

Output type specification

a	Resolution	Unit
NUM	1	CH
TOTAL	0.01	dB
AVG		
MAX		
MIN		

■ Restriction

• Measuring Object: Reverse (RC1-2), QPSK, and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Reading out the total power of Inactive Channel Power of Measuring Object: Forward (RC1-2).

<Program>
DSPL SETCOM
MEASOBJ FOWARD
DSPL MODANAL
SWP
INACTCH_CDP? NUM

<Response>
123

INI

Initialize

Program Message	Query Message	Response Message
INI	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the PRE and IP commands (*cf.* PRE, IP).

■ Example of use

"Initializing the parameters to be initialized."

<Program>
INI

INTEGRAL_ACP

Integral Waveform

Program Message	Query Message	Response Message
INTEGRAL_ACP a	INTEGRAL_ACP?	a

■ Function

Sets the integral waveform display On/Off.

■ Value of a

On/Off for the integral waveform display

a	Initial value
ON	
OFF	*

■ Restriction

- No setting is allowed when the Measure Method is other than Normal. (*cf.* DSPL)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the integral waveform display to On."

<Program>
DSPL ACP,NRM
SWP
INTEGRAL_ACP ON
INTEGRAL_ACP?

<Response>
ON

INTPOL

Interpolation for Constellation

Program Message	Query Message	Response Message
INTPOL a	INTPOL?	a

■ Function

Sets the interpolation display on the Modulation Analysis screen when Trace Format is set at Constellation.

■ Value of a

Interpolation display

a	Interpolation mode	Initial value
NON	Non: Displays only the symbol points.	*
LIN	Linear: Displays the linearly interpolated symbol points.	
POINT10	10points: Display the interval between the 2 symbol points interpolated by 10 segments.	
LINSYM	Linear & Symbol Position: Displays the symbol points and the linearly interpolated symbol points.	
P10SYM	10points & Symbol Position: Displays the symbol points and the interval between 2 symbol interpolated by 10 segments.	

■ Restriction

• No setting is allowed when Trace Format is set to other than Constellation (*cf.* TRFORM).

• No setting is allowed when Measuring Object is set to other than Forward(RC1-2) or Forward(RC3-5) (*cf.* MEASOBJ).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Linearly interpolating the symbol points."

<Program>
TRFORM CONSTEL
INTPOL LIN
INTPOL?

<Response>
LIN

INTVAL_ACP

Refresh Interval for Spurious close to the Carrier

Program Message	Query Message	Response Message
INTVAL_ACP a	INTVAL_ACP?	a

■ Function

Sets the display renewal interval on the Spurious close to the Carrier screen when the storage mode is Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the updating interval to Once."

<Program>
INTVAL_ACP ONCE
INTVAL_ACP?

<Response>
ONCE

INTVAL_IQL

Refresh Interval for IQ Level

Program Message	Query Message	Response Message
INTVAL_IQL a	INTVAL_IQL?	a

■ Function

Sets the display renewal interval on the IQ Level screen when the Storage Mode is Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Displays the average value of the measured results obtained after every measurement.	*
ONCE	Displays the average value of the measurement results after measurement of Average Count is completed.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the updating interval to Once."

<Program>
INTVAL_IQL ONCE
INTVAL_IQL?

<Response>
ONCE

■ Restrictions according to model type and options

For MS268x, if Option −17 or −18 I/Q Input is not installed, this command is invalid.

INTVAL_MOD

Refresh Interval for Modulation Analysis

Program Message	Query Message	Response Message
INTVAL_MOD a	INTVAL_MOD?	a

■ Function

Sets the display updating interval on the Modulation Analysis screen when the Storage Mode is set to Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the updating interval to Once."

<Program>
INTVAL_MOD ONCE
INTVAL_MOD?

<Response>
ONCE

INTVAL_OBW

Refresh Interval for Occupied Bandwidth

Program Message	Query Message	Response Message
INTVAL_OBW a	INTVAL_OBW?	a

■ Function

Sets the display updating interval when Storage Mode is set to Average at Occupied Bandwidth measurement.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updates the display after every one sweep. Calculates and displays the average value by the number of measurements repeated by that sweep.	*
ONCE	Updates the display once after completion of averaging. Calculates the average value by the times specified with Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the updating interval to Once."

<Program>
INTVAL_OBW ONCE
INTVAL_OBW?

<Response>
ONCE

INTVAL_RFPWR

Refresh Interval for RF Power

Program Message	Query Message	Response Message
INTVAL_RFPWR a	INTVAL_RFPWR?	a

■ Function

Sets the display updating interval on the RF Power screen obtained when the Storage Mode is set to Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	∗
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the updating interval to Once."

\<Program\>
INTVAL_RFPWR ONCE
INTVAL_RFPWR?

\<Response\>
ONCE

IP

Preset

Program Message	Query Message	Response Message
IP	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the PRE and INI commands (*cf.* PRE, INI).

■ Example of use

"Initializing the parameters to be initialized."

\<Program\>
IP

IPPLVL

I Level(Peak to Peak)

Program Message	Query Message	Response Message
–	IPPLVL? a	b

■ Function
Reads out the measured results of the Peak to Peak value of Signal I on the IQ Level screen.

■ Value of a
Readout unit

a	Readout unit
None	Conforms to the unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b
Peak to Peak value of Signal I

Resolution	Unit
0.01	mV
	dBmV

■ Example of use
"Reading out the Peak to Peak value of Level I."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IPPLVL? MV

<Response>
4.07

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQINZ

Impedance

Program Message	Query Message	Response Message
IQINZ a	IQINZ?	a

■ Function
Sets the input impedance of Signals I/Q on the Setup Common Parameter screen.

■ Value of a
Impedance

a	Impedance	Initial value
50	Sets input impedance to 50 Ω.	∗
1 M	Sets input impedance to 1 MΩ.	

■ Restriction
• The measurement screen must be set to Setup Common Parameter (*cf.* DSPL).
• The Terminal must be set to IQ-AC, IQ-DC or IQ-Balance (*cf.* TERM).

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting the impedance value at 50 Ω."

<Program>
DSPL SETCOM
TERM IQAC
IQINZ 50
IQINZ?

<Response>
50

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQLVL

IQ Level

Program Message	Query Message	Response Message
–	IQLVL? a	b, c, d, e

■ Function
Reads out the measured results of the RMS values and Peak to Peak values of Signal I and Signal Q on the IQ Level screen.

■ Value of a
Readout unit

a	Readout unit
None	Conforms to the unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b
Same as result of "ILVL? a" (*cf.* ILVL).

■ Value of c
Same as result of "QLVL? a" (*cf.* QLVL).

■ Value of d
Same as result of "IPPLVL? a" (*cf.* IPPLVL).

■ Value of e
Same as result of "QPPLVL? a" (*cf.* QPPLVL).

■ Example of use
"Read out all IQ Level values"
<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IQLVL? MV

<Response>
1.42, 0.53, 4.07, 3.55

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQPHASE

IQ Phase Difference

Program Message	Query Message	Response Message
–	IQPHASE?	a

■ Function

Reads out the measurement results of phase difference of Signals I/Q on the IQ Level screen.

■ Value of a

Phase difference of I/Q

Resolution	Unit
0.01	°

■ Example of use

"Reading out the phase difference of I/Q."

\<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IQPHASE?

\<Response>
99.97

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

JUDGUNIT_SPTBL

Judge Unit

Program Message	Query Message	Response Message
JUDGUNIT_SPTBL a	JUDGUNIT_SPTBL?	a

■ Function

Switches the judgment unit for Spot method of Spurious Measurement.

■ Value of a

Relative/Absolute

a	Judge Unit Relative/Absolute	Initial value
ON	Relative: Judge in dBm	*
OFF	Absolute: Judge in dB	

□ Suffix code

None

■ Restriction

None

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Unit Judge to Relative."

<Program>
DSPL SPURIOUS,SPOT
JUDGUNIT_SPTBL ON
JUDGUNIT_SPTBL?

<Response>
ON

JUDGUNIT_SWTBL

Judge Unit

Program Message	Query Message	Response Message
JUDGUNIT_SWTBL a	JUDGUNIT_SWTBL?	a

■ Function

Switches the judgment item.

■ Value of a

Relative/Absolute

a	Judge Unit Relative/Absolute	Initial value
ON	Relative: Judge in dBm	*
OFF	Absolute: Judge in dB	

□ Suffix code

None

■ Restriction

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Unit Judge to Relative."

<Program>
DSPL SPURIOUS,SWEEP
JUDGUNIT_SWTBL ON
JUDGUNIT_SWTBL?

<Response>
ON

LVLREL_ACP

Relative Level

Program Message	Query Message	Response Message
LVLREL_ACP a	LVLREL_ACP?	a,a,a,a
LVLREL_ACP a,1	LVLREL_ACP? 1	a
LVLREL_ACP a,2	LVLREL_ACP? 2	
LVLREL_ACP a,3	LVLREL_ACP? 3	
LVLREL_ACP a,4	LVLREL_ACP? 4	

■ Function

Sets the units that will serve as reference, based on the template judgment of the Spurious Close to the Carrier measurement. In the event of relative value, the average power of the carrier is the reference value.

■ Value of a

Judgment Criteria

a	Judgment reference
ON	Relative: Judges with the average power of the carrier as the reference (dB unit).
OFF	Absolute: Judges with absolute value (dBm Unit).

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set dBm unit system."

<Program>
LVLREL_ACP OFF
LVLREL_ACP?

<Response>
OFF,OFF

LVLREL_RFPWR

Relative Level

Program Message	Query Message	Response Message
LVLREL_RFPWR a	LVLREL_RFPWR?	a

■ Function

Sets the relative display of the waveform on the RF Power screen. When displaying the relative value, burst average power becomes the reference value. When displaying the absolute value, template indication and Pass/Fail judgment is not performed.

■ Value of a

On/Off of Relative Value Display

a	On/Off of relative value display	Initial value
ON	Relative Level: Displays the relative value (dB unit) of the vertical axis graduation of the waveform.	*
OFF	Absolute Level: Displays the absolute value (dBm unit) of the vertical axis graduation of the waveform.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display the absolute value of the waveform."

<Program>
LVLREL_RFPWR OFF
LVLREL_RFPWR?

<Response>
OFF

MAGTDERR

RMS Magnitude Error

Program Message	Query Message	Response Message
–	MAGTDERR?	a

■ Function

Outputs the measurement results of the RMS value of Magnitude Error on the Modulation Analysis screen.

■ Value of a

RMS value of Magnitude Error

Resolution	Unit
0.01	%

■ Example of use

"Reading out the measurement results of Magnitude Error."

<Program>
DSPL MODANAL
SWP
MAGTDERR?

<Response>
16.67

MAXWL

Maximum Walsh Length

Program Message	Query Message	Response Message
MAXWL a	MAXWL?	a

■ Function
Switch Max Walsh Length.

■ Value of a

Waveform range specification

a	Max Walsh Length 64/128	Initial Value
64	Walsh Length: 128 cannot be selected.	*
128	Walsh Length: 128 can be selected.	

□ Suffix Code
None

■ Restriction
• Setting is allowed only when Measuring Object is Forward (RC3-5) (*cf.* MEASOBJ).
• Setting is allowed only when Trace Format is Code Domain (*cf.* TRFORM)

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set Max Walsh Length to 64."

<Program>
DSPL SETCOM
MEASOBJ FORWARDRC3
TRFORM CODE
MAXWL 64
MAXWL?

<Response>
64

MEAS

Change screen and measure

Program Message	Query Message	Response Message
MEAS a	MEAS?	a
MEAS a,b		a,b

■ Function

Switches the screen. Measurement is started when the screen to be transferred to is the measurement screen.

■ Value of a, b

Same as DSPL command (*cf.* DSPL).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

[1] "Executing a measurement on the Modulation Analysis screen."

<Program>
MEAS MODANAL
MEAS?

<Response>
MODANAL

[2] "Executing sweep measurement on the Spurious Emission screen."

<Program>
MEAS SPURIOUS,SWEEP
MEAS?

<Response>
SPURIOUS,SWEEP

MEASOBJ

Measuring Object

Program Message	Query Message	Response Message
MEASOBJ a	MEASOBJ?	a

■ Function
Sets the signal type of the object for analysis on the Setup Common Parameter screen.

■ Value of a
Type of burst signal

a	On/Off of Display Mode	Initial value
REVERSE	Reverse (RC1-2): IS95 equivalent	*
REVERSERC3	Reverse (RC3-4): IS95 equivalent	
FORWARD	Forward (RC1-2): IS95 equivalent	
FORWARDRC3	Forward (RC3-5): 1xRRT equivalent	
QPSK	QPSK	
OQPSK	Offset QPSK	

■ Restriction
• No setting is allowed when the measurement screen is other than Setup Common Parameter.

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set the object of analysis to Forward (RC1-2)."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
MEASOBJ?

<Response>
FORWARD

MKCDP

Marker Level (Code Domain Power)

Program Message	Query Message	Response Message
–	MKCDP? a	b

■ Function

Reads out the Code Domain Power at the marker position when Trace Format is set to Code Domain at Modulation Analysis measurement.

■ Value of a

Measuring Object: Relative (RC3-4) only can be specified.

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Code Domain Power

Resolution	Unit
0.01	dB

■ Restriction

• Measuring Object: Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Read Code Domain Power of 35 CH when the Measuring Object is Forward (RC1-2)."

<Program>
DSPL SETCOM
MEASOBJ FOWARD
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 35
SWP
MKCDP?

<Response>
–22.08

MKL_ACP

Marker Level for Spurious close to the Carrier

Program Message	Query Message	Response Message
–	MKL_ACP? a	b,c

■ Function

Outputs the measurement value of the marker position of the Spurious close to the Carrier screen.

■ Value of a

Output unit

a	Readout unit
None	Conforms to the Unit setting (*cf.* UNIT_ACP).
DB	dB
DBM	dBm
WATT	W

■ Value of b

Marker Level (Level value of specified RBW)

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Value of c

Marker level (RBW: 1.23 MHz equivalent level value)

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- In RBW: 1.23 MHz data, some data is invalid due to arithmetic computation. In the case of invalid data, the following values are output.

Resolution	Output value
dBm	–2147483648
dB	
W	0.00E-12

■ Example of use
"Read out the level at offset frequency 1.25 MHz."

<Program>
DSPL ACP
MKN_ACP 1.25MHZ
SWP
MKL_ACP? DB

<Response>
–34.08, –22.77

MKL_MOD

Marker Level for Modulation Analysis

Program Message	Query Message	Response Message
–	MKL_MOD? a	b

■ Function

On the Modulation Analysis screen, outputs each measurement value of marker positions when Trace Format is Constellation, Eye Diagram, EVM, Phase Error, or Magnitude Error.

■ Value of a

Type of marked signal

Trace Format	a	Marked signal
Constellation, Eye Diagram	I	I signal
	Q	Q signal
EVM, Phase Error, Magnitude Error	None	–

■ Value of b

Marker Level

Trace Format	Resolution	Unit
Constellation, Eye Diagram	0.0001	None
EVM, Magnitude Error	0.01	%
Phase Error		deg.

■ Restriction

- In the following cases, ∗∗∗∗ is output.
  - Where Trace Format is other than Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error (*cf.* TRFORM).
  - Where Marker Mode is Off (*cf.* MKR_MOD).
- In the following cases, Insufficient data error results.
- Where Parameter (a) has not been specified, when Trace Format is Constellation or Eye Diagram.
- Where Parameter (a) has been specified, when Trace Format is EVM, Phase Error, or Magnitude Error.

■ Example of use

"Read out the value at the 320.0 chip point at the Constellation I signal."

<Program>
DSPL MODANAL
TRFORM CONSTEL
MKR_MOD NRM
MKP_MOD 320.0
SWP
MKL_MOD? I

<Response>
–0.2889

MKL_RFPWR

Marker Level for RF Power

Program Message	Query Message	Response Message
–	MKL_RFPWR? a	b

■ Function

Outputs the measurement value of the Marker position on the RF Power screen.

■ Value of a

Output unit

a	Output unit
None	When the Relative Level is On (Relative), it is deemed that dB has been specified, and in the event of Off (Absolute) it is deemed that dBm has been specified (*cf.* LVLREL_RFPWR).
DB	dB
DBM	dBm

■ Value of b

Marker Level

Resolution	Unit
0.1	dB
	dBm

■ Restriction

- ✱✱✱ is output when the Marker Mode is off (*cf.* MKR_RFPWR).

■ Example of use

"Read out power at position of 80.00 PNchip."

\<Program\>
DSPL RFPWR
WINDOW SLOT
MKR_RFPWR NRM
MKP_RFPWR 80.00
SWP
MKL_RFPWR?

\<Response\>
–10.62

MKN_ACP

Marker Position for Spurious close to the Carrier (in frequency)

Program Message	Query Message	Response Message
MKN_ACP a	MKN_ACP?	a

■ Function

Uses the frequency to specify the Marker position of the Spurious close to the Carrier screen. The function is the same as that of MKP_ACP.

■ Value of a

Frequency position

Range	Initial value	Unit
–(Span/2) to (Span/2)	0	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

• When the Data Points are changed from 1001 to 501, the value of resolution is rounded down to 10 kHz (*cf.* DPTS_ACP).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the marker position to 1 MHz."

<Program>

DSPL ACP,NRM

MKN_ACP 1MHZ

MKN_ACP?

DPTS_ACP 501

DPTS_ACP?

<Response>

885000

880000

MKP_ACP

Marker Position for Spurious close to the Carrier (in points)

Program Message	Query Message	Response Message
MKP_ACP a	MKP_ACP?	a

■ Function

Specifies the Marker position of the Spurious Close to the Carrier screen with the point number. The function is the same as that of MKN_ACP.

■ Value of a

Point position

When Measure Method is set to Normal

Data Points	Range	Resolution	Initial value
501	0 to 500	1	250
1001	0 to 1000		500

When Measure Method is set to 3GPP2 FWD Band Class 0, 2, 3, 5, 9

Data Points	Range	Resolution	Initial value
501	0 to 1500	1	750
1001	0 to 3000		1500

When Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8

Data Points	Range	Resolution	Initial value
501	0 to 2000	1	1000
1001	0 to 3500		1750

□ Suffix code

None

■ Restriction

• When the Data Points are changed, the number of points equivalent to the Marker position (frequency) is set.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the marker position to 250 points."

<Program>
DPTS_ACP 501
MKP_ACP 250
MKP_ACP?
DPTS_ACP 1001
MKP_ACP?

<Response>
250
500

MKP_CDP

Marker Position for Modulation Analysis (Code Domain)

Program Message	Query Message	Response Message
MKP_CDP a,b	MKP_CDP? b	a

■ Function

On the Modulation Analysis screen, specifies the Marker position when the Trace Format is Code Domain.

■ Value of a

Number of bars counted from the origin of the Code Domain bar graph.

Range	Resolution	Initial value	Range
0 to (Walsh Length 1)	1	1	At Auto Rate Detection: Off or Auto Rate Detection: On, Display Mode: Walsh
0 to (Depends on measured results)			At Auto Rate Detection: On, Display Mode: OVSF.

■ Value of b

Signal of operation object

b	Type of marked signal
None	Signal specified by Operation Trace
I	I Signal
Q	Q Signal

■ Restriction

• When the Marker position goes out of range due to a change of the Walsh Length the Marker position goes to the center of the setting range (*cf.* WLSHLEN).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set marker on the 6th bar."

<Program>
DSPL SETCOM
MEASOBJ FOWARDRC3
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
SWP
MKP_CDP 6
MKP_CDP?

<Response>
6

MKP_MOD

Marker Position for Modulation Analysis (Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error)

Program Message	Query Message	Response Message
MKP_MOD a	MKP_MOD?	a

■ Function

On the Modulation Analysis screen, specifies Marker position when Trace Format is Constellation, Eye Diagram, EVM, Phase Error, or Magnitude Error.

■ Value of a

Position of PNchip

Trace Format		Range	Resolution	Initial value	Unit
Non					
EVM					
Phase Error					
Magnitude Error			See Table below		
Constellation	Non	0.0 to (Analysis Length Resolution)		Screen center	PNchip
	Linear				
	Linear & Symbol Position				
	10 points				
	10 points & Symbol Position		0.1		
Eye Diagram					

Measuring object and resolution

Measuring Object	Resolution
Reverce (RC3-4)	1.0
Forward (RC1-2)	
Forward (RC3-5)	
QPSK	
Reverse (RC3-4)	0.5
OQPSK	

□ Suffix Code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the Marker position at 600 PNchip on the EVM display of Forward (RC1-2)."

<Program>

DSPL SETCOM

MEASOBJ FORWARD

DSPL MODANAL

TRFORM EVM

MKR_MOD NRM

MKP_MOD 600

MKP_MOD?

<Response>

600

MKP_RFPWR

Marker Position for RF Power

Program Message	Query Message	Response Message
MKP_RFPWR a	MKP_RFPWR?	a

■ Function

Specifies the Marker position on the RF Power Screen.

■ Value of a

PNchip position

Window	Range	Resolution	Initial Value	Unit
Slot	100.00 to 1636.00			
Leading	20.00 to 15.00	0.25	Screen center	PNchip
Trailing	1521.00 to 1556.00			

□ Suffix Code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the marker on the 1530.25 PNchip of the Slot display."

<Program>
DSPL RFPWR
WINDOW SLOT
MKR_RFPWR NRM
MKP_RFPWR 1530.25
MKP_RFPWR?

<Response>
1530.25

MKPHASE

Marker Level for Phase Offset

Program Message	Query Message	Response Message
	MKPHASE?	a

■ Function
On the Modulation Analysis screen, reads out the Phase Offset at the Marker position when the Trace Format is Code Domain

■ Value of a
Phase Offset

Resolution	Unit
0.001	radian

■ Restriction
- Measuring Object: Reverse (RC1-2), Reverse (RC3-4), QPSK, and OPQSK cannot use this command (*cf.* MEASOBJ).

■ Example of use
"Reads out Phase Offset of 35 CH when the Measuring Object is Forward (RC1-2)."

\<Program\>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 35
SWP
MKPHASE?

\<Response\>
3.169

MKPMAX_CDP

Max Marker Position for Code Domain

Program Message	Query Message	Response Message
–	MKPMAX_CDP? a	b

■ Function

Reads out the maximum possible value of Marker Position when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

Measuring Object: Reverse (RC3-4) only can be specify a.

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Maximum value of Marker Position + 1

Resolution	Unit
1	None

■ Restriction

- Measuring Object: Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Read out the Max Marker Position value of I signal when Measuring Object is Reverse (RC3-4)."

<Program>
MEASOBJ REVERSERC3
DSPL MODANAL
TRFORM CODE
AUTODET ON
MKR_MOD NRM
SWP
MKPMAX_CDP? I

<Response>
31

MKR_MOD

Marker Mode for Modulation Analysis

Program Message	Query Message	Response Message
MKR_MOD a	MKR_MOD?	a

■ Function

Sets the marker on/off of each Trace on the Modulation Analysis screen.

■ Value of a

On/Off of Marker

a	On/Off of Marker	Initial value
NRM	Normal (On): Displays the marker and sets the marker position to the entry state.	
OFF	Off: Deletes the marker display and cancels the entry state of the marker position.	*

■ Restriction

• No setting is allowed when the Trace Format is set to Non *(cf.* TRFORM)*.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display the marker on the EVM display of the Modulation Analysis screen."

<Program>
DSPL MODANAL
TRFORM EVM
MKR_MOD NRM
MKR_MOD?

<Response>
NRM

MKR_RFPWR

Marker Mode for RF Power

Program Message	Query Message	Response Message
MKR_RFPWR a	MKR_RFPWR?	a

■ Function

Sets the marker on/off on the RF Power screen.

■ Value of a

On/Off of Marker

a	On/Off of Marker	Initial value
NRM	Normal (On): Displays the marker and sets the marker position to the entry state.	
OFF	Off: Deletes the marker display and cancels the entry state of the marker position.	*

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Display of marker on the RF Power Screen."

<Program>
DSPL RFPWR
MKR_RFPWR NRM
MKR_RFPWR?

<Response>
NRM

MKSCNO

Code Number of Marker Position

Program Message	Query Message	Response Message
–	MKSCNO? a	b

■ Function

Reads out the Channelization Code at Marker Position when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

Measuring Object: Reverse (RC3-4) only can be specify a.

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Channelization Code Number

Trace Format	Resolution	Unit
0 to (Walsh Length 1)	1	None

■ Restriction

- Measuring Object: Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* MEASOBJ)

■ Example of use

"Read out the Channelization Code at 20th I signal when Measuring Object is Reverse (RC3-4)."

<Program>
MEASOBJ REVERSERC3
DSPL MODANAL
TRFORM CODE
AUTODET ON
MKR_MOD NRM
MKP_CDP 20,I
SWP
MKSCNO? I

<Response>
17

MKSGNL

Signal Status of Marker Position

Program Message	Query Message	Response Message
–	MKSGNL? a	b

■ Function

Reads out whether the signal at Marker Position is noise when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Signal

b	Signal
BPSK	BPS
QPSK	QPSK
NOISE	Noise

■ Restriction

• Measuring Object: Forward (RC1-2), Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* AUTODET)

• Auto Rate Detection: Off cannot use this command (*cf.* AUTODET).

■ Example of use

"Read out the Signal status at 10th I signal when Measuring Object is Reverse (RC3-4)."

<Program>
MEASOBJ REVERSE3
DSPL MODANAL
TRFORM CODE
AUTODET ON
MKR_MOD NRM
MKP_CDP 10,I
SWP
MKSGNL? I

<Response>
SIGNAL

MKTIM

Marker Level for Time Offset

Program Message	Query Message	Response Message
	MKTIM?	a

■ Function

Reads out the Time Offset at the Marker position on the Modulation Analysis screen, when the Trace Format is Code Domain.

■ Value of a

Time Offset

Resolution	Unit
1	ns

■ Restriction

• Measuring Object: Reverse (RC1-2), Reverse (RC3-4), QPSK, and OPQSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Reads out Time Offset of 35 CH when the Measuring Object is Forward (RC1-2)."

\<Program>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 35
SWP
MKTIM?

\<Response>
515

MKWAV

Waveform Quality (ρ) of Marker Position

Program Message	Query Message	Response Message
–	MKWAV? a	b

■ Function

Reads out Waveform Quality (ρ) at Marker position on Modulation Analysis screen when Trace Format is Code Domain.

■ Value of a

Measuring Object: Reverse (RC3-4) only can be specify a.

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Waveform Quality (ρ)

Resolution	Unit
0.00001	None

■ Restriction

- Measuring Object: Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Read out of Waveform Quality (ρ) of 35 CH when the Measuring Object is Forward (RC1-2)."

\<Program\>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 35
SWP
MKWAV?

\<Response\>
0.00355

MKWL

Walsh Length of Marker Position

Program Message	Query Message	Response Message
–	MKWL? a	b

■ Function

Reads out the Walsh Length at Marker Position when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

Measuring Object: Reverse (RC3-4) only can be specify a.

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Walsh Length

Range	Measuring Object
64	Forward (RC1-2)
4, 8, 16, 32, 64, 128	Reverse (RC3-5)
2, 4, 8, 16, 32	Reverse (RC3-4)

■ Restriction

- Measuring Object: Reverse (RC1-2), QPSK and OQPSK cannot use this command (*cf.* MEASOBJ).

■ Example of use

"Read out the Walsh Length at 76th I signal when Measuring Object is Forward (RC3-5)."

\<Program\>
MEASOBJ FORWARDRC3
DSPL MODANAL
TRFORM CODE
AUTODET ON
MKR_MOD NRM
MKP_CDP 76
SWP
MKWL?

\<Response\>
16

MLTCARRCAL

Multi Carrier Power Calibration

Program Message	Query Message	Response Message
MLTCARRCAL	–	–

■ Function
Multi Carrier Power Calibration
Executes multi carrier calibration.

■ Restriction
- This command is enabled only when the measurement screen is set to
  Modulation Analysis,
  RF Power
  Occupied Bandwidth
  Spurious close to the Carrier
  Spurious Emission
- Terminal must be set to RF. (*cf.* TERM)

■ Example of use
"Executes Multi Carrier Calibration."

<Program>
DSPL MODANAL
MLTCARRCAL

MSTAT

Status of Result

Program Message	Query Message	Response Message
–	MSTAT?	a

■ Function

Queries about status of measurement just performed.

■ Value of a

Measurement Status

a	Measurement Status
0	Normal
1	RF Level Limit
2	Level Over
3	Level Under
6	Trigger Timeout
9	No Measure

■ Example of use

"Execute Modulation Analysis measurement and reads out measurement status."

<Program>
DSPL MODANAL
SWP
MSTAT?

<Response>
0

OBW

Occupied Bandwidth

Program Message	Query Message	Response Message
–	OBW?	a

■ Function

On the Occupied Bandwidth screen, reads out the range of frequency that remains 99 % of the total power of carrier frequency.

■ Value of a

99 % occupied bandwidth

Resolution	Unit
1	Hz

■ Example of use

"Reads out the 99 % occupied bandwidth."

<Program>
DSPL OBW,SPECT
SWP
OBW?

<Response>
1152750

OBWFREQ

Occupied Bandwidth Limit and Center

Program Message	Query Message	Response Message
–	OBWFREQ? a	b

■ Function

On the Occupied Bandwidth screen, reads out upper and lower frequency bands from the center frequency.

■ Value of a

Frequency bands from center

a	Frequency bands from center
UPPER	Upper Limit: Displays the bandwidth accounting for 49.5 % of the total power in the upper frequency area from the displayed waveform center frequency in MHz unit.
LOWER	Lower Limit: Displays the bandwidth accounting for 49.5 % of the total power in the lower frequency area from the displayed waveform center frequency in MHz unit.
CENTER	(Upper + Lower)/2: Displays the half-value of the sum of the upper-limit frequency and lower-limit frequency.

■ Value of b

Bandwidth

Resolution	Unit
1	Hz

■ Example of use

"Reads out the Upper Limit of the occupied bandwidth."

<Program>
DSPL OBW,FFT
SWP
OBWFREQ? UPPER

<Response>
807124

OFFPWR

Carrier Off Power

Program Message	Query Message	Response Message
–	OFFPWR? a	b

■ Function

Displays average power when transmission is set to Off on the RF Power screen.

■ Value of a

Output unit

a	Output unit
DBM	dBm
WATT	W

■ Value of b

Average power when transmission is set to off.

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- Setting is valid only when Wave Type is set to Burst (*cf.* WAVETYPE).

■ Example of use

"Reading out average power when transmission is set to off."

\<Program\>
DSPL RFPWR
SWP
OFFPWR? DBM

\<Response\>
−4.89

OPRTTR

Operation Trace

Program Message	Query Message	Response Message
OPRTTR a	OPRTTR?	a

■ Function

On the Code Domain of the Modulation Analysis screen, selects the I/Q signal for the marker, page change and Walsh Length operation.

■ Value of a

Signal targeted for operation

a	Signal Targeted for Operation	Initial value
I	I signal	*
Q	Q signal	

■ Restriction

- No setting is allowed when the Measuring Object is other than Reverse (RC3-4) (*cf.* MEASOBJ).
- No setting is allowed when the Trace Format is other then Code Domain (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Make the Q Signal the object of operation."

<Program>
DSPL SETCOM
MEASOBJ REVERSERC3
DSPL MODANAL
TRFORM CODE
OPRTTR Q
OPRTTR?

<Response>
Q

ORGNOFS

Origin Offset

Program Message	Query Message	Response Message
–	ORGNOFS?	a

■ Function

Outputs the measurement results for Origin-offset (carrier leak component) of the signal to be measured on the Modulation Analysis screen.

■ Value of a

Origin Offset value

Resolution	Unit
0.01	dB

■ Example of use

"Read out the measurement result of Origin Offset."

<Program>
DSPL MODANAL
SWP
ORGNOFS?

<Response>
–34.33

OXMC

Wave Data for Origin I-Q Signal

Program Message	Query Message	Response Message
OXMC a,b	OXMC? c	d

■ Function

Reads out and processes IQ signal at origin on the Modulation Analysis screen.

■ Value of a

Selection of IQ

a	Selection of IQ
0	I signal
1	Q signal

■ Value of b

16 bit data for input

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in 0.0001 units so that ideal signal "1" is shown as 10,000.

■ Value of c

Selection of IQ

c	Trace Slot
SYMBOL	Symbol
None	Current Trace Slot

■ Value of d

Read out 32 bit waveform data

Range	Resolution
−2147483648 to 2147483647	1

• Reading out is made by using an integer in 0.0001 units so that ideal signal "1" is shown as 10,000.

■ Example of use

"Read out I and Q signals at origin point."

<Program>
DSPL MODANAL
SWP
OXMC? 0
OXMC? 1

<Response>
0
0

PEAK_ACP

Peak Data for Spurious close to the Carrier

Program Message	Query Message	Response Message
–	PEAK_ACP? a,b,c	d,e,f

■ Function

Outputs the peak value and the results of pass/fail judgment at specified template on Spurious close to the Carrier screen.

■ Value of a

Selection of readout data

a	Display Format
ALL	Reads out value at the point of minimum margin for the template of each frequency band.
PEAK	Reads out value at the point of minimum margin among the template of all frequency bands.
LOW1, LOW2, LOW3, LOW4, UP1, UP2, UP3, UP4	Reads out value at the point of minimum margin for the specified template among the template of frequency band.

■ Value of b

Data type of readout data

b	Data Type
PWR	Reads out level at the point of minimum margin.
MARGIN	Reads out margin at the point of minimum margin.

■ Value of c

Unit setting of readout data

c	Unit of Leakage Power
None	Set value of unit (*cf.* UNIT_ACP)
DB	dB
DBM	dBm
WATT	W

When display type is set to MARGIN, value of c is fixed to dB.

■ Value of d

Frequency at the point of minimum margin

Resolution	Unit
0.01	kHz

■ Value of e

Measuring Result

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits: 4 digits (floating point format)	W

■ Value of f

Judgment result

f	Judgment result
PASS	Pass: Passed
FAIL	Fail: Failed
OFF	No judge

■ Restriction

- Valid of c is fixed to DB when Display Type is set to Margin (*cf.* DSPLTYPE_ACP)

■ Example of use

"Reads out the peak value at the point of minimum margin."

<Program>
DSPL ACP,NRM
SWP
PEAK_ACP? PEAK PWR,DBM

<Response>
   13.08.75,   65.78, PASS

PEAKRATIO

Peak/Average Ratio

Program Message	Query Message	Response Message
	PEAKRATIO?	a

■ Function

Outputs the ratio of the instantaneous peak power in one slot (Peak Tx Power) to in-burst average power in one slot (Tx Power) on RF Power screen.

■ Value of a

Peak/Average Ratio

Resolution	Unit
0.01	dB

■ Example of use

"Reading out Peak/Average Ratio"

\<Program\>
DSPL RFPWR
SWP
PEAKRATIO

\<Response\>
77.26

PHASEERR

RMS Phase Error

Program Message	Query Message	Response Message
–	PHASEERR? a	b

■ Function

Outputs the measurement result of the RMS value of the Phase Error on the Modulation Analysis screen.

■ Value of a

RMS value of Phase Error

Resolution	Unit
0.01	deg

■ Example of use

"Read out of result of measurement of Phase Error."

<Program>
DSPL MODANAL
SWP
PHASEERR?

<Response>
11.58

PKTXPWR

Peak Tx Power

Program Message	Query Message	Response Message
	PKTXPWR? a	b

■ Function

Reads out the maximum value of instantaneous power in one slot.

■ Value of a

Specification of output unit

Unit	Resolution
DBM	DBm
WATT	W

■ Value of b

Peak Tx Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal)	W

■ Example of use

"Reading out the measurement result of Peak Tx Power"

<Program>
DSPL RFPWR
SWP
PKTXPWR? DBM

<Response>
   18.53

PLTCDP

Pilot Channel Code Domain Power

Program Message	Query Message	Response Message
–	PLTCDP? a	b

■ Function

Outputs the result of measurement for code domain power in pilot channel (0 CH), on the Modulation Analysis screen.

■ Value of a

Output unit specification

a	Output unit
DB	dB
DBM	dBm

■ Value of b

Pilot Channel Code Domain Power value

Resolution	Unit
0.01	dB, dBm

■ Example of use

"Read out the measurement result of Pilot Channel Code Domain Power."

<Program>
DSPL MODANAL
SWP
PLTCDP? DB

<Response>
–25.81

PMAGTDERR

Peak Magnitude Error

Program Message	Query Message	Response Message
–	PMAGTDERR? a	b

■ Function

Outputs maximum instantaneous value of Magnitude Error on Modulation Analysis screen.

■ Value of a

Positive and negative code of Magnitude Error

a	Positive and negative code
None	Absolute value at peak value
+	Positive peak value
–	Negative peak value

■ Value of b

The maximum value of Magnitude Error for the code specified in "a."

b	Unit
0.01	%

■ Example of use

"Read out the maximum value of Magnitude Error."

<Program>
DSPL MODANAL
SWP
PMAGTDERR?

<Response>
7.05

PNLMD

Panel Mode

Program Message	Query Message	Response Message
PNLMD a	PNLMD?	a

Function
Switches the measurement mode for the Tx Tester.

Value of a
Measurement mode

Value	Measurement mode
SPECT	Spectrum Analyzer mode
SYSTEM	Tx Tester mode
CONFIG	Config mode

Example of use
"Switches to the Tx Tester mode."

<Program>
PNLMD SYSTEM
PNLMD?

<Response>
SYSTEM

PNOFFSET

Offset Index

Program Message	Query Message	Response Message
PNOFFSET a	PNOFFSET?	a

■ Function

Sets offset of PN Sequence

■ Value of a

PN Sequence Offset

Range	Resolution	Initial value	Unit
0 to 511	1	0	None (∗64 PNchip)

□ Suffix Code

None

■ Restriction

- No setting is allowed when the Measuring Object is QPSK or OQPSK (*cf.* MEASOBJ).
- No setting is allowed when Trigger is Free Run(*cf.* TRG)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set PN Sequence offset to 511∗64PNchip."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
TRG EXT
PNOFFSET 511
PNOFFSET?

<Response>
511

PNSYNC

PN Synchronization

Program Message	Query Message	Response Message
PNSYNC	PNSYNC?	a

■ Function

Sets the search range for PN synchronization at Ext Trigger.

■ Value of a

Search range for PN synchronization

a	Search range for PN synchronization	Initial value
SEARCH	Searches all 32768 PNchips regardless of Trigger.	
EXTTRG	Searches 384 PNchips before and after Trigger.	*

■ Restrictions
- No setting is allowed when Trigger is Free Run (*cf.* TRG).
- No setting is allowed when Measuring Object is QPSK *cf.* MEASOBJ .

■ Initialization of setting

PRE, INI, IP,∗RST

■ Example of use

"Set PN search range to all sections."

<Program>
DSPL SETCOM
TRG EXT
PNSYNC SEARCH
PNSYNC?

<Response>
SEARCH

POWER

Power

Program Message	Query Message	Response Message
–	POWER? a	b

■ Function

Outputs the absolute value or relative value of RF average power measured by the power meter.

■ Value of a

Readout unit

a	Unit
DBM	dBm
DB	dB
WATT	W

■ Value of b

Absolute value or relative value of RF average power

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Example of use

"Reading out RF average power in dBm units."

<Program>
DSPL PWRMTR
SWP
POWER? DBM

<Response>
−1.43

■ Restrictions according to model type and options

For MS268x, this command is not available.

PPHASEERR

Peak Phase Error

Program Message	Query Message	Response Message
–	PPHASEERR? a	b

■ Function

Outputs the maximum instantaneous value of phase error on the Modulation Analysis screen.

■ Value of a

Positive and negative codes for phase error

a	Positive and negative codes
None	Absolute value of peak value
+	Positive peak value
–	Negative peak value

■ Value of b

The maximum value of phase error for the code specified in "a."

Resolution	Unit
0.01	deg

■ Example of use

"Read out the maximum value of phase error."

<Program>
MEAS MODANAL
PPHASEERR? +

<Response>
4.18

PRE

Preset

Program Message	Query Message	Response Message
PRE	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the INI and IP commands (*cf.* INI, IP).

■ Example of use

"Initializing the parameters to be initialized."

<Program>
PRE

PREAMP

Pre Amplifier

Program Message	Query Message	Response Message
PREAMP a	PREAMP?	a

■ Function
Sets Pre Ampl On/Off.

■ Value of a
On/Off setting of Pre Ampl

a	Pre Ampl	Initial value
ON	Sets Pre Ampl to On.	
OFF	Sets Pre Ampl to Off.	*

■ Restriction
- No setting is allowed when a value in excess of 3 GHz is set for the frequency (*cf.* FREQ).
- Setting is allowed when Terminal is set to RF (*cf.* TERM).

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Setting Pre Ampl to On."

<Program>
PREAMP ON
PREAMP?

<Response>
ON

■ Restrictions according to model type and options
This command is available when main unit option MS8608A-08/MS8609A-08/MS2681A-08/MS2683A-08
Pre-amplifier is installed.

PVECTERR

Peak EVM

Program Message	Query Message	Response Message
–	PVECTERR?	a

■ Function

Outputs the result of measurement for the EVM maximum instantaneous value on the Modulation Analysis screen.

■ Value of a

Peak EVM

Resolution	Unit
0.01	%

■ Example of use

"Reads out the peak EVM value."

<Program>
DSPL MODANAL
SWP
PVECTERR?

<Response>
45.23

PWRCAL

Power Calibration

Program Message	Query Message	Response Message
PWRCAL	PWRCAL?	a

■ Function
Performs calibration during the power measurement with "PWRCAL" and reads out the calibration value with "PWRCAL?". The calibration value can be set only by external control with "CALVAL" (*cf.* CALVAL).

■ Value of a
Calibration value

Range	Resolution	Initial value	Unit
−10.00 to 10.00	0.01	0.00	dB

■ Restriction
- Executable screens are as follows (*cf.* DSPL):
  - Modulation Analysis
  - RF Power
  - Occupied Bandwidth
  - Spurious close to the Carrier
  - Spurious Emission
- Where the Terminal is other than RF, execution cannot be performed (*cf.* TERM).
- Where the Frequency is less than 50 MHz, execution cannot be performed (*cf.* FREQ).

■ Example of use
"Performing calibration during the power measurement."

<Program>
DSPL SETCOM
TERM RF
FREQ 1920MHZ
DSPL RFPWR
CALVAL 2.33
PWRCAL?
PWRCAL

<Response>
2.33

■ Restrictions according to model type and options
For MS268x, this command is not available.

PWRVSTIME

Power vs Time for RF Power

Program Message	Query Message	Response Message
–	PWRVSTIME? a, b ,c	d

Function

Reads burst signal power at rise or fall time on RF Power screen.

The top of the burst signal depends on Code Sync (*cf.* CODESYNC), Video Trigger Edge (*cf.* VTEDGE), Video Trigger Level (*cf.* VTLVL), Video Trigger Delay (*cf.* VTDLY) etc. settings.

Value of a

Readout position

b	a	Readout position
IS 95	1	6 µs
	2	0 µs
	3	1250 µs
	4	1256 µs
3GPP2	1	5.5 µs
	2	1.5 µs
	3	1248.5 µs
	4	1255.5 µs

Value of b

Standard

b	Output unit
None	Reads out value depends on the current selected standard.
IS95	Read out value at the template position of IS-95 standard.
3GPP2	Read out value at the template position of 3GPP2 standard.

Value of c

Unit for output level

c	Output unit
None	dB at Relative Level On (Relative), dB at Relative Level Off (Absolute) (*cf.* LVLREL_RFPWR).
DB	dB
DBM	dBm

■ Value of d

Power at the specified time.

Resolution	Unit
0.01	dB
	dBm

■ Restriction

- Measuring Object is performed only when Wave Type is Burst (*cf.* WAVETYPE).

Example of use

"Read the power at +1256 µs apart from burst signal top."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
DSPL RFPWR
SWP
PWRVSTIME? IS95,3,DBM

<Response>
  38.31

QLVL

Q Level (RMS)

Program Message	Query Message	Response Message
–	QLVL? a	b

■ Function
Reads out the measurement results of the RMS value for Signal Q on the IQ Level screen.

■ Value of a
Readout unit

a	Readout unit
None	In accordance with unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b
RMS value for Signal Q

Resolution	Unit
0.01	mV
	dBmV

■ Example of use
"Reading out the RMS value for Level Q."

\<Program\>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
QLVL? MV

\<Response\>
0.53

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

QPPLVL

Q Level (Peak to Peak)

Program Message	Query Message	Response Message
–	QPPLVL? a	b

■ Function
Reads out the measurement results of the Peak to Peak value for Signal Q on the IQ Level screen.

■ Value of a
Readout unit

a	Readout unit
None	In accordance with unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b
Peak to Peak value for Signal Q

Resolution	Unit
0.01	mV
	dBmV

■ Example of use
"Reading out the Peak to Peak value for Level Q."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
QPPLVL? MV

<Response>
3.55

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

RATIO

On/Off Ratio

Program Message	Query Message	Response Message
	RATIO?	a

■ Function

Outputs the ratio of average intra-burst power (Tx Power) to average power (Carrier Off Power) when transmission is set to off on the RF Power screen.

■ Value of a

On/Off Ratio

Resolution	Unit
0.01	dB

■ Example of use

"Reading out Peak/Average Ratio"

\<Program\>
DSPL RFPWR
SWP
PKTXPWR

\<Response\>
77.26

RBD_ACP

RBW Mode: Digital/Normal

Program Message	Query Message	Response Message
RBD_ACP a	RBD_ACP?	a

■ Function

Makes setting to or not to digital filter sweeping mode, for the Spurious Close to the Carrier measurement.

■ Value of a

Sweeping Mode

a	Sweeping Mode	Initial value
DGTL	Set to digital filter sweeping mode (Digital).	
NRM	Set to normal sweeping mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set to digital filter sweeping mode."

<Program>
RBD_ACP DGTL
RBD_ACP?

<Response>
DGTL

■ Note

This function is an option. If the option is invalid, it is deemed that Normal has been set.

RBD_OBW

RBW Mode: Digital/Normal

Program Message	Query Message	Response Message
RBD_OBW a	RBD_OBW?	a

■ Function

Make setting to or not to digital filter sweeping mode, for the Occupied Bandwidth measurement using Spectrum Analyzer.

■ Value of a

Sweeping Mode

a	Sweeping Mode	Initial value
DGTL	Set to digital filter sweeping mode (Digital).	
NRM	Set to normal sweeping mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to digital filter sweeping mode."

<Program>
RBD_OBW DGTL
RBD_OBW?

<Response>
DGTL

■ Note

This function is an option. If the option is invalid, it is deemed that Normal has been set.

RBW_ACP

Resolution Bandwidth for Spurious close to the Carrier

Program Message	Query Message	Response Message
RBW_ACP a	RBW_ACP?	a

■ Function

Sets the RBW (Resolution Bandwidth) in the Spurious close to the Carrier measurement.

■ Value of a

RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	30000	Hz	For RBW Mode: Digital
300 to 20000000	1	30000	Hz	For RBW Mode: Analog

□ Suffix code
None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

- Any value may be input into the setting range. However, the value that is actually set is the value, as shown in the Table below.

Set value	Remarks
10, 30, 100, 300, 1000, 3000, 10000, 100000, 300000, 1000000	For RBW Mode: Digital
300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000, 5000000, 10000000, 20000000	For RBW Mode: Analog

- No setting is allowed when Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8 and Template is set to Band Class 6.(*cf.* DSPL)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use
"Set RBW to 30 kHz."

<Program>
RBW_ACP 30KHZ
RBW_ACP?

<Response>
30000

RBW_OBW

Resolution Bandwidth for Occupied Bandwidth

Program Message	Query Message	Response Message
RBW_OBW a	RBW_OBW?	a

■ Function

Sets RBW (Resolution Bandwidth) in Occupied Bandwidth measurement using a Spectrum Analyzer.

■ Value of a

RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	10000	Hz	For RBW Mode: Digital
300 to 20000000	1	10000	Hz	For RBW Mode: Analog

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

• Any value may be input into the setting range. However, the value that is actually set is the value, as shown in the Table below.

Set value	Remarks
10, 30, 100, 300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000	For RBW Mode: Digital
300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000, 5000000, 10000000, 20000000	For RBW Mode: Analog

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set RBW to 30 kHz."

<Program>
RBW_OBW 30KHZ
RBW_OBW?

<Response>
30000

REFPWR_ACP

Ref Power

Program Message	Query Message	Response Message
–	REFPWR_ACP? a	b

■ Function

Reads out the average power in one slot.

■ Value of a

Specification of output unit

a	Output unit
DBM	dBm
WATT	W

■ Value of b

Ref Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal)	W

■ Example of use

"Read out the Ref Power measurement result."

<Program>
DSPL ACP
SWP
REFPWR_ACP? DBM

<Response>
–18.53

REFPWR_SPU

Ref Power

Program Message	Query Message	Response Message
–	REFPWR_SPU? a	b

■ Function

Reads out the average power in one slot.

■ Value of a

Specification of output unit

a	Output unit
DBM	dBm
WATT	W

■ Value of b

Ref Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal)	W

■ Example of use

"Read out the Ref Power measurement result."

<Program>
DSPL SPURIOUS,SPOT
SWP
REFPWR_SPU? DBM

<Response>
–18.53

REFPWRMD_ACP

Ref Power Mode for Spurious close to the Carrier

Program Message	Query Message	Response Message
REFPWRMD_ACP a	REFPWRMD_ACP?	a

■ Function

Sets the measurement method for Reference Power to calculate the relative value on the Spurious close to the Carrier screen.

■ Value of a

Measurement method

a	Measurement method	Initial value
SPA	Measurement method that sets Ref Power to be a Power at the zero span for RBW = 3MHz.	
TXPWR	Measurement method that sets Ref Power to be a Total Power.	∗

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the measurement method that sets Ref Power to be a Total Power."

<Program>
REFPWRMD_ACP TXPWR
REFPWRMD_ACP?

<Response>
TXPWR

REFPWRMD_SPU

Ref Power Mode for Spurious Emission

Program Message	Query Message	Response Message
REFPWRMD_SPU a	REFPWRMD_SPU?	a

■ Function

Set the measurement method for Reference Power to calculate the relative value on the Spurious Emission screen.

■ Value of a

Measurement method

a	Measurement method	Initial value
SPA	Measurement method that sets Ref Power to be a Power at the zero span for RBW = 3MHz.	*
TXPWR	Measurement method that sets Ref Power to be a Total Power.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the measurement method that sets Ref Power to be a Total Power."

<Program>
REFPWRMD_SPU TXPWR
REFPWRMD_SPU?

<Response>
TXPWR

RFINPUT

RF Input Connector

Program Message	Query Message	Response Message
RFINPUT a	RFINPUT?	a

■ Function

Sets the connector of the RF signal to be input.

■ Value of a

RF signal level

a	RF signal level	Initial value
HIGH	High Power	∗
LOW	Low Power	

■ Restriction

- The terminal must be set to RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the RF signal level to High Power."

<Program>
RFINPUT HIGH
RFINPUT?

<Response>
HIGH

■ Restrictions according to model type and options

This command is available only when main unit is MS8608A.

RFLVL

Reference Level

Program Message	Query Message	Response Message
RFLVL a	RFLVL?	a

■ Function

Sets the Reference Level.

■ Value of a

Reference Level

a	Initial value	Resolution	Unit	RF Input
See Restrictions	30.00	0.01	dBm	High
	10.00			Low

□ Suffix code

None: dBm

DBM: dBm

■ Restriction

• The terminal must be set to RF (*cf.* TERM).

• The setting range of the reference level becomes as follows depending on the status of RF Input: High/Low (*cf.* RFINPUT) and Pre Ampl: On/Off (*cf.* PREAMP). Please see RFLVLOFS regarding RefLevelOffset.

			RF Input	
			High	Low
Pre Ampl	On		(−30.00 + RefLevelOffset) to (32.00 + RefLevelOffset)	(−50.00 + RefLevelOffset) to (12.00 + RefLevelOffset)
	Off	With Power Sensor	(−10.00 + RefLevelOffset) to (42.00 + RefLevelOffset)	(−30.00 + RefLevelOffset) to (22.00 + RefLevelOffset)
		Without Power Sensor	(−10.00 + RefLevelOffset) to (52.00 + RefLevelOffset)	(−30.00 + RefLevelOffset) to (32.00 + RefLevelOffset)

• When the reference level goes out of the setting range due to a change of the RF Input or the Pre Ampl, round off to the nearest value.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use
"Setting the Reference Level to –10.00 dBm."

<Program>
DSPL SETCOM
TERM RF
RFINPUT HIGH
RFLVLOFS 0
RFLVL –10.00
RFLVL?

<Response>
–10.00

RFLVLOFS

Reference Level Offset

Program Message	Query Message	Response Message
RFLVLOFS a	RFLVLOFS?	a

■ Function

Sets Offset value of the Reference Level. The Reference Level setting range expands only for the portion of the offset value.

■ Value of a

Reference Level Offset

Range	Resolution	Initial value	Unit
−99.99 to 99.99	0.01	0.00	dB

□ Suffix code

None: dB

DB: dB

■ Restriction

• The Terminal must be set to RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the Reference Offset Level to 0.00 dB."

<Program>

DSPL SETCOM

TERM RF

RFLVLOFS 0.00

RFLVLOFS?

<Response>

0.00

RL_ACP

Ref Level for Spurious close to the Carrier

Program Message	Query Message	Response Message
RL_ACP a	RL_ACP?	a

■ Function
Sets the Ref Level for Spurious close to the Carrier measurement.

■ Value of a
Ref Level

Range	Resolution	Initial value	Unit	RF Input
See Restriction.	0.01	40.00	dBm	High
See Restriction.	0.01	20.00	dBm	Low

□ Suffix code
None: dBm
DBM: dBm

■ Restriction
- Reference level setting range depends on RF Input: High/Low (*cf.* RFINPUT), Pre Ampl: On/Off (*cf.* PREAMP), as follows. Refer to RFLVLOFS for RefLevelOffset.

		RF Input	
		High	Low
Attenuator Mode: Auto	Pre Ampl:On	(−120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)	(−140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)
	Pre Ampl:Off	(−100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)	(−120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)

If the reference level will become out of range due to RF Input or Pre Ampl. change, the level is rounded to the nearest value within the range.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting Ref Level to –30 dBm."

<Program>
ATTMD_ACP AUTO
RL_ACP –30DBM
RL_ACP?

<Response>
–30.00

RL_OBW

Ref Level for Occupied Bandwidth

Program Message	Query Message	Response Message
RL_OBW a	RL_OBW?	a

■ Function
Sets the Ref Level for Occupied Bandwidth measurement using spectrum analyzer.

■ Value of a
Ref Level

Range	Resolution	Initial value	Unit	RF input
Refer to Restriction.	0.01	40.00	dBm	High
Refer to Restriction.	0.01	20.00	dBm	Low

□ Suffix code
None: dBm
DBM: dBm

■ Restriction
- Reference level setting range depends on RF Input: High/Low (*cf.* RFINPUT), Pre Ampl: On/Off (*cf.* PREAMP), as follows. Refer to RFLVLOFS for RefLevelOffset.

		RF Input	
		High	Low
Attenuator Mode: Auto	Pre Ampl:On	(-120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)	(-140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)
	Pre Ampl:Off	(-100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)	(-120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)

If the reference level will become out of range due to RF Input or Pre Ampl. change, the level is rounded to the nearest value within the range.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting Ref Level to –30 dBm."

<Program>
ATTMD_OBW AUTO
RL_OBW -30DBM
RL_OBW?

<Response>
–30.00

RNG

Range

Program Message	Query Message	Response Message
RNG a	–	–

■ Function

Increases and decreases the power meter measurement range.

■ Value of a

Operation of the power meter range

a	Operation of the power meter range
UP	Increases the measurement range by one step.
DN	Decreases the measurement range by one step.

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
  - Power Meter

■ Example of use

"Increasing the power meter measurement range by one step."

<Program>
DSPL PWRMTR
RNG UP

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG1

Range1

Program Message	Query Message	Response Message
RNG1	–	–

■ Function

Sets the power meter measurement range to the lowest level.

For MS8608A, the range value is 0 dBm when the RF Input is High, and –20 dBm when Low (*cf.* RFINPUT).

For MS8609A, the range value is 20 dBm.

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
    - Power Meter

■ Example of use

"Setting the power meter measurement range to the lowest level."

<Program>
DSPL PWRMTR
RNG1

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG2

Range2

Program Message	Query Message	Response Message
RNG2	–	–

■ Function

Sets the power meter measurement range to the second lowest level.

For MS8608A, the range value is +10 dBm when RF Input is High, and –10 dBm when Low (*cf.* RFIN-PUT).

For ME8609A, the range value is   10 dBm

■ Restriction

• Executable screen is as follows (*cf.* DSPL).

• Power Meter

■ Example of use

"Setting the power meter measurement range to the second lowest level."

<Program>

DSPL PWRMTR

RNG2

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG3

Range3

Program Message	Query Message	Response Message
RNG3	–	–

■ Function

Sets the power meter measurement range to the intermediate level.

For MS8608A, the range value is +20 dBm when the RF Input is High, and 0 dBm when Low (*cf.* RFINPUT).

For MS8609A, the range value is 0 dBm.

■ Restriction

• Executable screen is as follows (*cf.* DSPL).

    • Power Meter

■ Example of use

"Setting the power meter measurement range to the intermediate level."

\<Program>

DSPL PWRMTR

RNG3

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG4

Range4

Program Message	Query Message	Response Message
RNG4	–	–

■ Function

Sets the power meter measurement range to the fourth lowest level.

For MS8608A, the range value is +30 dBm when the RF Input is High, and +10 dBm when Low (*cf.* RFINPUT).

For MS8609A, the range value is +10 dBm.

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
  - Power Meter

■ Example of use

"Setting the power meter measurement range to the fourth lowest level."

<Program>

DSPL PWRMTR

RNG4

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG5

Range5

Program Message	Query Message	Response Message
RNG5	–	–

■ Function

The measurement range of the power meter is set at the highest level.

For MS8608A, the range value is +40 dBm when the RF Input in High, and +20 dBm when Low (*cf.* RFINPUT).

For MS8609A, the range value is +20 dBm.

■ Restriction

• Executable screen is as follows (*cf.* DSPL).

   • Power Meter

■ Example of use

"Setting the power meter measurement range to the highest level."

<Program>

DSPL PWRMTR

RNG5

■ Restrictions according to model type and options

For MS268x, this command is not available.

S1

Continuous Measure/Sweep

Program Message	Query Message	Response Message
S1		

■ Function

Executes a measurement and sweeping continuously.

Accepts a command even during measurement.

This command functions the same as the CONTS command.

Stops the current measurement and starts with a new measurement when a measurement execution command, such as CONTS command, is received during measurement.

When an operation command not related to the measurement, for an example, the INTPOL command or query message, is received during measurement; the current measurement is continued while responding to the received command.

However, when a measurement-related command is received during measurement, the current measurement is stopped and the command is executed.

■ Example of use

"Continuously executes a measurement and sweeping."

\<Program>
S1

S2

Single Measure/Sweep

Program Message	Query Message	Response Message
S2		

■ Function

Executes a measurement and sweeping once.

Accepts a command even during measurement.

This command functions the same as the SNGLS command.

Stops the current measurement and starts with a new measurement when a measurement execution command, such as SNGLS command, is received for the second time during measurement.

When an operation command not related to the measurement, for example, the INTPOL command or query message, is received during measurement; the current measurement is continued while responding to the command.

However, when a measurement-related command is received during measurement, the current measurement is stopped and command is executed.

■ Example of use

"Executes a measurement and sweeping once."

<Program>

S2

SETREL

Set Relative level

Program Message	Query Message	Response Message
SETREL	–	–

■ Function

Sets the power value displayed on the Power Meter screen to the reference value for relative value display.

■ Restriction

• Executed screen is as follows. (*cf.* DSPL)

  • Power Meter

■ Example of use

"Setting the currently displayed power value to the reference value for relative value display."

<Program>
MEAS PWRMTR
SETREL

■ Restrictions according to model type and options

For MS268x, this command is not available.

SLCTTEMP_ACP

Standard Template

Program Message	Query Message	Response Message
SLCTTEMP_ACP a,b	SLCTTEMP_ACP?	a,b

■ Function

Set the specified template for standard.

■ Value of a and b

Standard and type specifications

When Measure Method is set to Normal

a	b	Standard	Type	Set Offset Frequency A	Set Offset Frequency B	Set Line Level 1	Set Line Level 2	Remarks
IS95	FWDREL	IS-95	Forward Relative	0.750 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	FWDREL 2		Forward Relative F<1 MHz	0.750 MHz		−45.00 dB		
	FWDREL 3		Forward Relative F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	RVSREL		Reverse Relative	0.900 MHz	1.980 MHz	−42.00 dB	−54.00 dB	
	RVSABS		Reverse Absolute	0.900 MHz		−60.00 dB		
ARIB	FWDREL	ARIB	Forward Relative	0.750 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	FWDREL 2		Forward Relative F<1 MHz	0.750 MHz		−45.00 dB		
	FWDREL 3		Forward Relative F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	RVSREL		Reverse Relative	0.900 MHz	1.980 MHz	−42.00 dB	−54.00 dB	
	RVSABS		Reverse Absolute	0.900 MHz		−60.00 dBm		
TELEC	FWDREL	TELEC	Forward Relative	0.750 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	FWDREL 2		Forward Relative F<1 MHz	0.750 MHz		−45.00 dB		

a	b	Standard	Type	Set Offset Frequency A	Set Offset Frequency B	Set Line Level 1	Set Line Level 2	Remarks
TELEC	FWDREL 3	TELEC	Forward Relative F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	RVSREL		Reverse Relative	0.900 MHz	1.980 MHz	−42.00 dB	−54.00 dB	
	RVSABS		Reverse Absolute	0.900 MHz		−60.00 dBm		
IS95	FWDREL 1	IS-95	Forward Relative1	0.750 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	FWDREL 4		Forward Relative1 F<1 MHz	0.750 MHz		−45.00 dB		
	FWDREL 5		Forward Relative1 F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−60.00 dB	
	FWDREL 2		Forward Relative2	0.750 MHz	1.980 MHz	−45.00 dB	−55.00 dB	
	FWDREL 6		Forward Relative2 F<1 MHz	0.750 MHz		−45.00 dB		
	FWDREL 7		Forward Relative2 F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−55.00 dB	
	FWDREL 3		Forward Relative3	0.750 MHz	1.980 MHz	−45.00 dB	−50.00 dB	
	FWDREL 8		Forward Relative3 F<1 MHz	0.750 MHz		−45.00 dB		
	FWDREL 9		Forward Relative3 F≥1 MHz	1.000 MHz	1.980 MHz	−45.00 dB	−50.00 dB	
	RVSREL1		Reverse Relative1	0.885 MHz	1.980 MHz	−42.00 dB	−54.00 dB	
	RVSREL2		Reverse Absolute1	1.250 MHz	1.980 MHz		−50.00 dB	
	RVSABS1		Reverse Relative2	0.885 MHz		−54.00 dBm		
	RVSABS2		Reverse Absolute2	1.250 MHz				
JSTD8	FWDREL	J-STD-008	Forward Relative	0.885 MHz		−45.00 dB		
	RVSREL		Reverse Relative	1.250 MHz		−54.00 dB		

a	b	Standard	Type	Set Offset Frequency A	Set Offset Frequency B	Set Line Level 1	Set Line Level 2	Remarks
JSTD8	RVSABS	J-STD-008	Reverse Absolute	1.250 MHz		−60.00 dB		
3GPP2	FWDTMP1	3GPP2 (Forward Link)	Class 0,2,3,5,7 Power ≥ 33 dBm	0.750 MHz	1980 MHz	−45.00 dB	−60.00 dB	
	FWDTMP		Class 0,2,3,5,7 28 dBm ≤ Power < 33 dBm				−27.00 dBm	
	FWDTMP		Class 0,2,3,5,7 Power < 28 dBm				−55.00 dB	
	FWDTMP		Class 1,4,6 Power ≥ 33 dBm	0.885 MHz			−55.00 dB	
	FWDTMP		Class 1,4,6 28 dBm ≤ Power < 33 dBm				−22.00 dBm	
	FWDTMP		Class 1,4,6 Power < 28 dBm				−50.00 dB	
	RVSTMP1	3GPP2 (Reverse Link)	Class 0,2,3,5,7			−42.00 dB	−54.00 dB	
	RVSTMP2		Class 1,4,6	1250 MHz		−42.00 dB	−50.00 dB	
NOT		Not Selected						Query Only

When Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9

a	b	Stan-dard	Type	Set Offset Fre-quency A	Set Offset Fre-quency B	Set Offset Fre-quency C	Set Line Level 1	Set Line Level 2	Set Line Level 3	Re-marks
3GPP2	FWDTMP30	3GPP2 (Forward Link)	Class 0,2,3,5,9 Power ≥ 33dBm	0.750 MHz	1.980MHz		−45.00 dB		−60.00dB	
	FWDTMP31		Class 0,2,3,5,9 28dBm ≤ Power< 33dBm					−27.00dBm		
	FWDTMP32		Class 0,2,3,5,9 Power< 28dBm						−55.00dB	
NOT			Not Selected							Query only

When Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8

a	b	Standard	Type	Set Offset Frequency A	Set Offset Frequency B	Set Offset Frequency C	Set Offset Frequency D	Set Line Level 1	Set Line Level 2	Set Line Level 3	Set Line Level 4	Remarks
3GPP2	FWDTMP60	3GPP2 (Forward Link)	Class6	0.885 MHz	1.250 MHz	1.450 MHz	2.250 MHz	45.00 dB	13.00 dBm	26.60 dBm	13.00 dBm	
	FWDTMP61		Class 1,4,8 Power≥ 36dBm	0.885 MHz	1.250 MHz	1.980 MHz	2.250 MHz	45.00 dB	9.00 dBm	55.00 dB	13.00 dBm	
	FWDTMP62		Class 1,4,8 33dBm ≤Power < 36dBm						45.00 dB	55.00 dB		
	FWDTMP63		Class 1,4,8 28dBm ≤Power < 33dBm							22.00 dBm		
	FWDTMP64		Class 1,4,8 Power< 28dBm							50.00 dB		
NOT			Not Selected									Query only

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Set 3GPP2 Forward Link Band Class0,2,3,5,9 f ≥ 1MHz Power ≥ 33dBm."

<Program>
DSPL ACP,NRM
SLCTTEMP_ACP 3GPP2,FWDTMP2
SLCTTEMP_ACP?

<Response>
3GPP2,FWDTMP2

SLCTTEMP_RFPWR

Select Template for RF Power

Program Message	Query Message	Response Message
SLCTTEMP_RFPWR a	SLCTTEMP_RFPWR?	a

■ Function

Sets the template used on the RF Power screen to the value prescribed by the standard IS-95 or 3GPP2.

■ Value of a

Status of Template

a	Status of template	Initial value
NOT	Level value has been changed	
IS95	Value prescribed by IS95 standard	*
3GPP2	Value prescribed by 3GPP2 standard	

- When the Line Level is changed, the status becomes "NOT," and "NOT" is retained until "SLCTTEMP_RFPWR STD" is executed.

■ Restriction

- Setting is valid only when Wave Type is set to Burst (*cf.* WAVETYPE).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Return of template to standard value."

<Program>
SLCTTEMP_RFPWR IS95
SLCTTEMP_RFPWR?

<Response>
IS95

SMOFLT

Smoothing Filter

Program Message	Query Message	Response Message
SMOFLT a	SMOFLT?	a

■ Function

On the RF Power screen, sets whether or not to smoothen the waveform.

■ Value of a

On/Off of smoothing of waveform

a	On/Off of smoothing of waveform	Initial value
ON	Smoothing of waveform	
OFF	No smoothing of waveform	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Smooth the waveform."

<Program>
DSPL RFPWR
SMOFLT ON
SMOFLT?
SWP

<Response>
ON

SNGLS

Single Sweep

Program Message	Query Message	Response Message
SNGLS	–	–

■ Function

Performs measurement one time. The subsequent command is processed without waiting for the completion of measurement.

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
    - Modulation Analysis
    - RF Power
    - Occupied Bandwidth
    - Spurious close to the Carrier
    - Spurious Emission
    - IQ Level
    - Power Meter

■ Example of use

"Perform measurement one time."

<Program>
SNGLS

SPUALL

Frequency, Level, RBW, VBW, Sweep Time

Program Message	Query Message	Response Message
–	SPUALL? Fa,b,c	d(a),e(a),f(a),g(a),h(a), d(a+1),e(a+1),f(a+1),g(a+1),h(a+1),..., d(a+b),e(a+b),f(a+b),g(a+b),h(a+b)

■ Function

Outputs simultaneously the measurement result of Frequency, Level, RBW, VBW and Sweep Time, on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Output unit

c	Unit
None	Conforms to unit set by Unit. (*cf.* UNIT_SPU)
DBM	dBm
DB	dB

■ Value of d: Frequency measurement result

Same as c of SPUFREQ

■ Value of e: Level measurement result

Same as d of SPULVL

■ Value of f: RBW

Same as c of SPURBW

■ Value of g: VBW
Same as c of SPUVBW

■ Value of h: Sweep Time
Same as c of SPUSWT

■ Example of use:
"Read out all results of f1 to f2."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUALL? F1,2

<Response>
1775300000, −33.97, 1000, 3000, 200000, 2162950000, −37.87, 10000, 30000, 600000

SPUATT

Attenuator for Spurious Emission

Program Message	Query Message	Response Message
–	SPUATT? Fa,b	c

■ Function

Outputs Attenuator during measurement at Spurious Emission measurement.

In Spurious Mode of Spot, outputs Attenuator set on Setup Spot Table screen.

In Spurious Mode of Search or Sweep, outputs Attenuator set on Setup Search/Sweep Table screen (*cf.* TBLATT_SPU).

■ Value of a

Frequency point of readout start

Range	Resolution
1 to 15	1

■ Value of b

Number of frequency points of readout start

Range	Resolution
1 to 15	1

■ Value of c

Attenuator

Resolution	unit
1	dB

□ Suffix Code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Reading out Attenuator from f1 to f3."

<Program>
SPUATT? F1,3

<Response>
60, 61 ,62

SPUFREQ

Frequency

Program Message	Query Message	Response Message
–	SPUFREQ? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the measurement result for Frequency on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Result of Frequency Measurement

Resolution	Unit
1	Hz

■ Restriction

- When the Spurious Mode is Spot, the result of output always matches the Frequency set up on the Setup Spot Table screen (*cf.* DSPL).

■ Example of use

"Read out of frequencies of f1 to f3."

<Program>
DSPL SPURIOUS,SPOT
SWP
SPUFREQ? F1,3

<Response>
1775300000, 2162950000, 2550600000

SPUFREQLVL

Frequency and Level

Program Message	Query Message	Response Message
–	SPUFREQLVL? Fa,b,c	d(a),e(a),d(a+1),e(a+1),...,d(b),e(b)

■ Function

Simultaneously outputs the measurement results of Frequency and Level, on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Level output unit

c	Unit
None	Conforms to unit set by Unit. (*cf.* UNIT_SPU)
DBM	dBm
DB	dB

■ Value of d

Result of Frequency Measurement

Resolution	Unit
1	Hz

■ Value of e

Result of Level Measurement

Resolution	Unit
0.01	dB or dBm

■ Example of use

"Read out of Frequency and Level at f1 to f3"

<Program>
DSPL SPURIOUS,SPOT
SWP
SPUFREQLVL? F1,3,DB

<Response>
1775300000, −33.97, 2162950000, −37.87, 2550600000, −68.69

SPUJDG

Total Judgment

Program Message	Query Message	Response Message
–	SPUJDG?	a

■ Function

Reads out the total result of Level pass/fail judgment by means of the Limit value on the Spurious Emission screen. If the Spurious Mode is Spot, judge with the Limit value set on the Setup Spot Table screen as the reference, and if Search or Sweep, use the Limit value set on the Setup Search / Sweep Table screen.

■ Value of a

Judgment result

a	Pass/fail judgment
PASS	Pass
FAIL	Fail
OFF	Unmeasured

■ Restriction

- In order to pass, all valid measurements from f1 to f15 must be completed, and the result of judgment of each point must be Pass.
- Fail would result if the judgment result is Fail on any voluntary valid measurement from f1 to f15.

■ Example of use

"Read out of total result of pass/fail judgment."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUJDG?

<Response>
PASS

SPULMT

Limit for Spurious Emission

Program Message	Query Message	Response Message
SPULMT a,Fb,c	SPULMT? a,Fb	c

■ Function

Sets the Limit value on the Pass/Fail judgment during Spurious Emission measurement.

■ Value of a

Selection of means of measurement

a	Means of measurement
SPOT	The Limit value used in the Spot method measurement is subjected.
SWEEP	The Limit value used in the Search or Sweep method measurement is subjected.

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

Limit value

Range	Resolution	Initial value	Unit
−100.00 to 100.00	0.01	Refer to initial value column of TBLFREQ_SPU.	dBm

□ Suffix code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Limit value of f1 of Search method measurement to –13.00 dBm."

<Program>
SPULMT SWEEP,F1, –13.00
SPULMT? SWEEP,F1

<Response>
–13.00

SPULVL

Level

Program Message	Query Message	Response Message
–	SPULVL? Fa,b,c	d(a),d(a+1),...,d(b)

■ Function

Outputs the result of Level measurement on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Output unit

c	Unit
None	Conforms to unit set by Unit (*cf.* UNIT_SPU).
DBM	dBm
DB	dB

■ Value of d

Result of Level measurement

Resolution	Unit
0.01	dB or dBm

■ Example of use

"Read out of Levels from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPULVL? F1,3,DB

<Response>
–33.97, –37.87, –68.69

SPUPASS

Judgment

Program Message	Query Message	Response Message
–	SPUPASS? a	b

■ Function

On the Spurious Emission screen, reads out the pass/fail judgment result of Level by means of Limit value. When the Spurious Mode is Spot, the Limit value set on the Setup Spot Table screen is used as the reference for judgment, and when the Search or Sweep, the Limit value set on the Setup Search/Sweep Table screen is used.

■ Value of a

Frequency point

a	Frequency point
Fn	Reads out result of certain frequency point (n: 1-15).
ALL	Reads out the result of all frequency points at one time.

■ Value of b

Judgment Result

b	Pass/Fail Judgment
PASS	Pass
FAIL	Fail
OFF	Unmeasured

■ Example of use

"Read out the result of Pass/Fail judgment of f3."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUPASS? F3

<Response>
PASS

SPURBW

RBW

Program Message	Query Message	Response Message
–	SPURBW? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the RBW value at the measurement on the Spurious Emission screen.

When the Spurious Mode is Spot, the RBW set on the Setup Spot Table screen is output, and when the Search or Sweep, the RBW set on the Setup Search/Sweep Table screen is output (*cf.* TBLRBW_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

RBW

Resolution	Unit
1	Hz

■ Example of use

"Read out of RBW from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPURBW? F1,3

<Response>
1000, 10000, 100000

SPURL

Ref Level for Spurious Emission

Program Message	Query Message	Response Message
–	SPURL? Fa,b	c

■ Function

Outputs Ref Level during measurement at Spurious Emission measurement.

In Spurious Mode of Spot, outputs Ref Level set on Setup Spot Table screen.

In Spurious Mode of Search or Sweep, outputs Ref Level set on Setup Search/Sweep Table screen (*cf.* TBLARL_SPU).

■ Value of a

Frequency point of readout start

Range	Resolution
1 to 15	1

■ Value of b

Number of frequency points of readout

Range	Resolution
1 to 15	1

■ Value of c

Ref Level

Resolution	Unit
0.01	dBm

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Reading out Ref Level from f1 to f3."

\<Program\>
SPURL? F1,3

\<Response\>
50.00,51.00,52.00

SPUSWT

Sweep Time

Program Message	Query Message	Response Message
–	SPUSWT? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the Sweep Time value at the time of measurement on the Spurious Emission screen. When the Spurious Mode is Spot, the Sweep Time set on the Setup Spot Table screen is output, and when Search or Sweep, the Sweep Time set on the Setup Search/Sweep Table screen is output (*cf.* TBLSWT_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Sweep Time

Resolution	Unit
1	μs

■ Example of use

"Read out Sweep Time from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUSWT? F1,3

<Response>
200000, 600000, 500000

SPUVBW

VBW

Program Message	Query Message	Response Message
–	SPUVBW? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the VBW value at the measurement on the Spurious Emission screen.

When the Spurious Mode is Spot, outputs VBW set on the Setup Spot Table screen, and when Search or Sweep, outputs VBW set on the Setup Search/Sweep Table screen (*cf.* TBLVBW_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

VBW

Resolution	Unit
1	Hz

■ Example of use

"Read out VBW from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUVBW? F1,3

<Response>
3000, 30000, 300000

STM_ACP

Sweep Time: Manual/Auto

Program Message	Query Message	Response Message
STM_ACP a	STM_ACP?	a

■ Function

On the Spurious Close to the Carrier screen, sets either manual or automatic operation for the Sweep Time setting.

■ Value of a

Sweep Time setting mode

a	Mode	Initial value
MAN	Putting Sweep Time on manual setting mode.	
AUTO	Putting Sweep Time on automatic setting mode.	*

■ Restriction

• When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
• In the Auto, the value of Sweep Time is automatically set from the values of RBW, VBW and others.
• With the automatic setting where the Slot Type is Idle, the value more than the value from the table below is set, automatically (*cf.* SLOTTYPE).

Data Points (*cf.* DPTS_ACP)	Sweep Time
501	10 s
1001	20 s

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the Sweep Time to automatic setting mode."

<Program>
STM_ACP AUTO
STM_ACP?

<Response>
AUTO

STM_OBW

Sweep Time: Manual/Auto

Program Message	Query Message	Response Message
STM_OBW a	STM_OBW?	a

■ Function

On the Occupied Bandwidth screen, sets either manual or automatic operation for the Sweep Time setting.

■ Value of a

Sweep Time setting mode

a	Mode	Initial value
MAN	Putting Sweep Time on manual setting mode.	
AUTO	Putting Sweep Time on automatic setting mode.	*

■ Restriction

- When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
- In the Auto, the value of Sweep Time is automatically set from the values of RBW, VBW and others.
- With the automatic setting where the Slot Type is idle, the value more than the value from the table below is set, automatically (*cf.* SLOTTYPE).

Data Point (*cf.* DPTS_OBW)	Sweep Time
501	10 s
1001	20 s

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the Sweep Time to automatic setting mode."

<Program>
STM_OBW AUTO
STM_OBW?

<Response>
AUTO

STRG_ACP

Storage Mode for Spurious close to the Carrier

Program Message	Query Message	Response Message
STRG_ACP a	STRG_ACP?	a

■ Function

Sets the display mode on the Spurious Close to the Carrier screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Performs Normal display (single measurement).	∗
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set to the average value display."

<Program>
STRG_ACP AVG
STRG_ACP?

<Response>
AVG

STRG_IQL

Storage Mode for IQ Level

Program Message	Query Message	Response Message
STRG_IQL a	STRG_IQL?	a

■ Function
Sets the display mode on the IQ Level screen.

■ Value of a
Display mode

a	Display mode	Initial value
NRM	Normal: Performs Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set to the average value display."

<Program>
STRG_IQL AVG
STRG_IQL?

<Response>
AVG

■ Restrictions according to model type and options
For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

STRG_MOD

Storage Mode for Modulation Analysis

Program Message	Query Message	Response Message
STRG_MOD a	STRG_MOD?	a

■ Function

Sets the display mode on the Modulation Analysis screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	
OVER	Overwrite: Displays the plotted measurement results to be overwritten successively during continuous measurement.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to the average value display."

<Program>
STRG_MOD AVG
STRG_MOD?

<Response>
AVG

STRG_OBW

Storage Mode for Occupied Bandwidth

Program Message	Query Message	Response Message
STRG_OBW a	STRG_OBW?	a

■ Function

Sets the mode of display on the Occupied Bandwidth screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Gives an ordinary display (single measurement).	*
AVG	Average: Repeats a measurement by the number of times specified by Average Count, and displays the average value as the result.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to average value display."

<Program>
STRG_OBW AVG
STRG_OBW?

<Response>
AVG

STRG_RFPWR

Storage Mode for RF Power

Program Message	Query Message	Response Message
STRG_RFPWR a	STRG_RFPWR?	a

■ Function

Sets the display mode on the RF Power screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	
OVER	Overwrite: On the Continuous measurement, overwrites and displays the waveform with a broken line.	
CUM	Cumulative: On the Continuous measurement, overwrites and displays the waveform with points.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to average value display."

<Program>
STRG_RFPWR AVG
STRG_RFPWR?

<Response>
AVG

SWP

Single Sweep or Sweep Status

Program Message	Query Message	Response Message
SWP	SWP?	SWP a

■ Function

The "SWP" command performs measurement one time. Processing of the subsequent command must wait until measurement is completed.

The "SWP?" command makes an inquiry about the current measurement status (i.e. measurement completion/measurement in process).

■ Value of a

Measurement status

a	measurement status
0	measurement completion
1	measurement in process

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
  - Modulation Analysis
  - RF Power
  - Occupied Bandwidth
  - Spurious close to the Carrier
  - Spurious Emission
  - IQ Level
  - Power Meter

■ Example of use

"Perform measurement once. "

<Program>
SWP

■ Note

Even if the "SWP?" command is sent immediately after the "SWP" command, processing thereof must wait until measurement is completed, therefore response is always 0.

SWT_ACP

Sweep Time for Spurious close to the Carrier

Program Message	Query Message	Response Message
SWT_ACP a	SWT_ACP?	b

■ Function

Sets the Sweep Time of the Spurious Close to the Carrier measurement.

■ Value of a

Sweep Time

Range	Resolution	Initial value	Unit
10 to 1000000	1	70	ms

☐ Suffix code

None: ms

S: s

MS: ms

US: µs

■ Value of b

Sweep Time

Resolution	Unit
1	µs

■ Restriction

• Any value may be input within the set range. However, please see the table below for the actually set value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Sweep Time to 100 ms."

<Program>
SWT_ACP 100MS
SWT_ACP?

<Response>
100000

SWT_OBW

Sweep Time for Occupied Bandwidth

Program Message	Query Message	Response Message
SWT_OBW a	SWT_OBW?	b

■ Function

Sets Sweep Time of Occupied Bandwidth measurement using a Spectrum Analyzer.

■ Value of a

Sweep Time

Range	Resolution	Initial value	Unit
10 to 1000000	1	120	ms

□ Suffix code

None: ms
S: s
MS: ms
US: μs

■ Value of b

Sweep Time

Resolution	Unit
1	μs

■ Restriction

- Any value may be input within the set range. However, please see the table below for the actually set value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Sweep Time to 100 ms."

<Program>
SWT_OBW 100MS
SWT_OBW?

<Response>
100000

SYNC_CDP

Sync Channel Power

Program Message	Query Message	Response Message
	SYNC_CDP?	a

■ Function

Outputs the Sync-channel average power as the relative power to all-code channel power.

■ Value of a

Sync Channel Power value

Resolution	Unit
0.01	dB

■ Example of use

"Reading out the measured results of Sync Channel Power."

\<Program\>
DSPL MODANAL
SWP
SYNC_CDP?

\<Response\>
−25.81

SYS

System Change

Program Message	Query Message	Response Message
SYS a	SYS?	a

■ Function
Switches the measurement software in the TX tester mode.

 Value of a

Storage area for measurement software

a	Storage Area for Measurement Software
1	area1 (F1 key)
2	area2 (F2 key)
3	area3 (F3 key)

■ Example of use
"Switches to the software stored in Area 1."

<Program>
SYS 1
SYS?

<Response>
1

TAU

Timing Error

Program Message	Query Message	Response Message
–	TAU?	a,b

■ Function

Outputs measurement result of Timing Error of Modulation Analysis screen.

■ Value of a

Timing Error of 64 PNchip resolution

Resolution	Unit
1	64 PNchip

■ Value of b

Timing Error of less than 64 PNchip resolution

Resolution	Unit
0.01	μs

■ Restriction

• Where trigger is other than External, measurement is not performed (*cf.* TRG).

■ Example of use

"Read out of measurement result of Timing Error."

<Program>
DSPL SETCOM
TRG EXT
DSPL MODANAL
SWP
TAU?

<Response>
12, 27.5

TBLATT_SPU

Attenuator for Spurious Emission

Program Message	Query Message	Response Message
TBLATT_SPU a,Fb,c	TBLATT_SPU? a,Fb	c

■ Function

Sets attenuator for Spurious Emission measurement.

■ Value of a

Measurement method selection

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

Attenuator

Range	Resolution	Initial value	Unit	RF Input
20 to 82	1	44	dB	High
0 to 62	1	24	dB	Low

□ Suffix code

None: dB

DB: dB

■ Restriction

• Attenuator setting range depends on Ref Level (*cf.* TBLRL_SPU).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the f10 attenuator of Spot method measurement to 20 dB."

<Program>

TBLATT_SPU SPOT,F10,20DB

TBLATT_SPU? SPOT,F10

<Response>

20

TBLATTMD_SPU

Attenuator Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLATTMD_SPU a,b	TBLATTMD_SPU? a	b

■ Function

Selects manual or automatic attenuator setting of spectrum analyzer for Spurious Emission screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Attenuator setting mode

b	Mode	Initial value
MAN	Sets Attenuator setting mode to manual.	
AUTO	Sets Attenuator setting mode to auto.	∗

■ Restriction

• When attenuator is changed in Auto, the mode becomes Manual, forcibly.

• When Auto, attenuator is set automatically.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting attenuator of Spot method measurement to Auto mode."

<Program>
TBLATTMD_SPU SPOT,AUTO
TBLATTMD_SPU? SPOT

<Response>
AUTO

TBLATTRLMD_SPU

Attenuator Ref Level Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLATTRLMD_SPU a,b	TBLATTRLMD_SPU? a	b

■ Function

Selects manual or automatic Attenuator and Ref-Level settings of spectrum analyzer for Spurious Emission screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Attenuator and Ref-Level setting mode

b	Mode	Initial value
MAN	Sets Attenuator and Ref-Level setting mode to manual.	
AUTO	Sets Attenuator and Ref-Level setting mode to auto.	*

■ Restriction

- When attenuator or Ref Level is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator or Ref Level is set automatically.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting attenuator or Ref Level of Spot method measurement to Auto mode."

<Program>
TBLATTRLMD_SPU SPOT,AUTO
TBLATTRLMD_SPU? SPOT

<Response>
AUTO

TBLFREQ_SPU

Frequency for Spurious Emission

Program Message	Query Message	Response Message	Function
TBLFREQ_SPU SPOT,Fa,b	TBLFREQ_SPU? SPOT,Fa	b	Sets the frequency of Spot method measurement.
TBLFREQ_SPU SPOT,HRM	–	–	Sets the frequency of Spot method measurement to Harmonics.
TBLFREQ_SPU START,Fa,c	TBLFREQ_SPU? START,Fa	c	Sets the sweep starting frequency of Search or Sweep method.
TBLFREQ_SPU STOP,Fa,d	TBLFREQ_SPU? STOP,Fa	d	Sets the sweep ending frequency of Search or Sweep method.

■ Function

Sets frequency of Spurious Emission Measurement.

Harmonics is a function that automatically sets the nth (n:2,3,4...) frequency of carrier frequency until the frequency reaches the maximum value. See Spurious Mode for the means of measurement.

■ Value of a

Frequency point

Range	Resolution
1 to 15	1

■ Value of b

Frequency (Spot)

Range	Resolution	Initial value	Unit
Note 1:	1	Note 2:	Hz

- Note 1: Same as FREQ. However, the maximum value is not affected by Pre Ampl.
- Note 2: Respective of the initial value of FREQ, the same value as in the case of Harmonics operation. For details please see the column of initial values.
- If the Frequency is set to 0 Hz, it becomes not-set state.

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Value of c

Start Frequency (Search/Sweep)

Range	Resolution	Initial value	Unit
Note 3:	1	See the initial value column.	Hz

- Note 3: The lower limit is 1 kHz, and upper limit is (upper limit of FREQ −1 kHz). The upper limit is not affected by the Pre Ampl.
- If the Stop Frequency < (Start Frequency +1 kHz), the Stop Frequency is automatically changed to (Start Frequency + 1 kHz). So, the frequency sweep span always becomes 1 kHz or more.
- If the Start Frequency is set to 0 Hz, it becomes not-set state.

☐ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Value of d

Stop Frequency (Search/Sweep)

Range	Resolution	Initial value	Unit
Note 4:	1	See the initial value column.	Hz

- Note 4: The same as FREQ, the lower limit is 2 kHz. The upper limit is not affected by the Pre Ampl.
- If the Start Frequency > (Stop Frequency −1 kHz), the Start Frequency is automatically changed to (Stop Frequency −1 kHz). So, the frequency sweep span always becomes 1 kHz or more.
- If the Stop Frequency is set to 0 Hz, it becomes not-set state.

☐ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the f1 sweep interval of Search method measurement from 846 to 860 MHz."

<Program>
TBLFREQ_SPU START,F1,846MHZ
TBLFREQ_SPU STOP,F1,860MHZ
TBLFREQ_SPU? START,F1
TBLFREQ_SPU? STOP,F1

<Response>
846000000
860000000

■ Initial value

The initial values of each parameter are as follows. "---" indicates not-set status.

For Spot of Spurious mode

	Frequency	RBW	VBW	SWT	Ref Level	ATT	Limit
f1	1775.300000 MHz	1 MHz	1 MHz	20 ms	*cf.* TBLRL_SPU	*cf.* TBLATT_SPU	0.00 dBm
f2	2662.950000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f3	3550.600000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f4	4438.250000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f5	5532.590000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f6	6213.550000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f7	7101.200000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f8	7988.850000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f9	8876.500000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f10	9764.150000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f11	10651.800000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f12	11539.450000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f13	12427.100000 MHz	1 MHz	1 MHz	20 ms			0.00 dBm
f14	-----.------ MHz	--- Hz	--- Hz	--- ms			0.00 dBm
f15	-----.------ MHz	--- Hz	--- Hz	--- ms			0.00 dBm

For Search/Sweep of Spurious mode

	Start Frequency	Stop Frequency	RBW	VBW	SWT	Ref Level	ATT	Limit
f1	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f2	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f3	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f4	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f5	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f6	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f7	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f8	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f9	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f10	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f11	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f12	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f13	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f14	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm
f15	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm

TBLRBW_SPU

RBW for Spurious Emission

Program Message	Query Message	Response Message
TBLRBW_SPU a,Fb,c	TBLRBW_SPU? a,Fb	c

■ Function

Sets RBW of the Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	RBW used in Spot method measurement is subjected.
SWEEP	RBW used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency points

Range	Resolution
1 to 15	1

■ Value of c

RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	1000000	Hz	For RBW Mode: Digital
300 to 20000000	1	1000000	Hz	For RBW Mode: Analog

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the f2 RBW of Search method Measurement to 30 kHz."

<Program>

TBLRBW_SPU SWEEP,F2,30KHZ

TBLRBW_SPU? SWEEP,F2

<Response>

30000

TBLRBWMD_SPU

RBW: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLRBWMD_SPU a,b	TBLRBWMD_SPU? a	b

■ Function
Sets either the manual or automatic operation of the RBW setting of the Spurious Emission screen.

■ Value of a
Selection of measurement method

a	Measurement method
SPOT	RBW of Spot method measurement is subjected.
SWEEP	RBW of Search or Sweep method measurement is subjected.

■ Value of b
RBW setting mode

b	Mode	Initial value
MAN	Sets RBW to manual setting mode.	
AUTO	Sets RBW to automatic setting mode.	*

■ Restriction
- When RBW is changed during Auto, the system compulsorily goes to Manual.
- In the Auto, the value of RBW is automatically set from the frequency value, as shown in the table below.

Frequency	RBW
$9 \text{ kHz} \leq f < 150 \text{ kHz}$	1 kHz
$150 \text{ kHz} \leq f < 30 \text{ MHz}$	10 kHz
$30 \text{ MHz} \leq f < 1 \text{ GHz}$	100 kHz
$1 \text{ GHz} \leq f$	1 MHz

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set RBW of Spot method measurement to automatic setting mode."

<Program>
TBLRBWMD_SPU SPOT,AUTO
TBLRBWMD_SPU? SPOT

<Response>
AUTO

TBLRBWTP_SPU

RBW Mode: Digital/Normal for Spurious Emission

Program Message	Query Message	Response Message
TBLRBWTP_SPU a,b	TBLRBWTP_SPU? a	b

■ Function

Sets to or not to digital filter Sweeping mode for Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweeping mode of Spot method measurement is subjected.
SWEEP	The Sweeping mode of Search or Sweep method measurement is subjected.

■ Value of b

Sweeping Mode

b	Sweeping Mode	Initial value
DGTL	Sets to digital filter Sweeping Mode (Digital).	
NRM	Sets to ordinary Sweeping Mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Sweep method measurement to digital filter Sweeping mode."

<Program>
TBLRBWTP_SPU SWEEP,DGTL
TBLRBWTP_SPU? SWEEP

<Response>
DGTL

■ Note

This function is an option

TBLRL_SPU

Ref Level for Spurious Emission

Program Message	Query Message	Response Message
TBLRL_SPU a,Fb,c	TBLRL_SPU? a,Fb	c

■ Function
Sets Ref Level for Spurious Emission measurement.

■ Value of a
Selection of measurement method

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b
Frequency point

Range	Resolution
1 to 15	1

■ Value of c
Ref Level

Range	Resolution	Initial value	Unit	RF Input
Refer to Restriction.	0.01	14.00	dBm	High
Refer to Restriction.	0.01	6.00	dBm	Low

□ Suffix code
None: dBm
DBM: dBm

■ Restriction
• Ref Level setting range depends on RF Input: High/Low (*cf.* RFINPUT) and Pre Ampl: On/Off (*cf.* PREAMP), as follows. For RefLevelOffset, refer to RFLVLOFS.

		RF Input	
		High	Low
Attenuator Mode: Auto	Pre Ampl:On	(−120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)	(−140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)
	Pre Ampl:Off	(−100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)	(−120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)

• If the reference level will become out of range due to RF Input or Pre Ampl. change, it is rounded to the nearest value within range.

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Set the f10 Ref Level of Spot method measurement to 30dBm."

<Program>
TBLRL_SPU SPOT,F10,-30DBM
TBLRL_SPU? SPOT,F10

<Response>
30.00

TBLSWT_SPU

Sweep Time for Spurious Emission

Program Message	Query Message	Response Message
TBLSWT_SPU a,Fb,c	TBLSWT_SPU? a,Fb	c

■ Function

Sets Sweep Time of the Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweep Time used in Spot method measurement is subjected.
SWEEP	The Sweep Time used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency Points

Range	Resolution
1 to 15	1

■ Value of c

Sweep Time

Resolution	Unit
1	µs

□ Suffix code

None: ms
S: s
MS: ms
US: µs

■ Restriction

- Any value may be input within the setting range. However, see the table below for the actually set values. See the initial value column of TBLFREQ_SPU for the initial value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting f3 Sweep Time of Search method measurement to 100 msec."

<Program>

TBLSWT_SPU SWEEP,F3,100MS

TBLSWT_SPU? SWEEP,F3

<Response>

100000

TBLSWTMD_SPU

Sweep Time: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLSWTMD_SPU a,b	TBLSWTMD_SPU? a	b

■ Function

On the Spurious Emission Screen, sets either the manual or automatic operation of Sweep Time setting.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweep Time of Spot method measurement is subjected.
SWEEP	The Sweep Time of Search or Sweep method measurement is subjected.

■ Value of b

Sweep Time setting mode

b	Mode	Initial value
MAN	Sets Sweep Time to Manual setting mode.	
AUTO	Sets Sweep Time to Automatic setting mode.	*

■ Restriction

- When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
- In the Auto, Sweep Time has the following value.

		Wave Type (*cf*. WAVETYPE)	
		Burst	Continuous
Measurement method	Spot	20 ms (Note 1)	10 ms (Note 1)
	Search Sweep	Automatic setting at more than 10 s.	Automatic setting at more than 5 s.

Note 1: When the RBW Mode is Digital, the value is the larger of this value hereof or the smallest value of Table below.

■ Initialization of setting

PRE, INI, IP, *RST

Minimum value and setting resolution in RBW Mode: Digital

For 501 Data Points

RBW	Sweep Time (in ms unit)	
	Minimum value	Setting resolution
10 Hz	50	50
30 Hz	50	50
100 Hz	50	50
300 Hz	10	10
1 kHz	10	10
3 kHz	10	5
10 kHz	10	5
30 kHz	10	5
100 kHz	10	5
300 kHz	10	5
1 MHz	10	5

For 1001 Data Points

RBW	Sweep Time (in ms unit)	
	Minimum value	Setting resolution
10 Hz	100	100
30 Hz	100	100
100 Hz	100	100
300 Hz	20	20
1 kHz	20	20
3 kHz	10	10
10 kHz	10	5
30 kHz	10	5
100 kHz	10	5
300 kHz	10	5
1 MHz	10	5

■ Example of use

"Setting Sweep Time of Spot method measurement to Manual setting mode."

<Program>
TBLSWTMD_SPU SPOT,MAN
TBLSWTMD_SPU? SPOT

<Response>
MAN

TBLVBW_SPU

VBW for Spurious Emission

Program Message	Query Message	Response Message
TBLVBW_SPU a,Fb,c	TBLVBW_SPU? a,Fb	c

■ Function

Sets the VBW of Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The VBW used in Spot method measurement is subjected.
SWEEP	The VBW used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

VBW

Range	Resolution	Initial value	Unit
0, 1, 3, 10, 30, 100, 300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000	1	See TBLFREQ_SPU initial value column.	Hz

□ Suffix code
None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Set f2 VBW of Search method measurement to 30 kHz."

<Program>
TBLVBW_SPU SWEEP,F2,30KHZ
TBLVBW_SPU? SWEEP,F2

<Response>
30000

TBLVBWMD_SPU

VBW: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLVBWMD_SPU a,b	TBLVBWMD_SPU? a	b

■ Function

On the Spurious Emission screen, sets manual or automatic setting for VBW setting.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The VBW of Spot method measurement is subjected
SWEEP	The VBW of Search or Sweep method measurement is subjected

■ Value of b

VBW setting mode

b	Mode	Initial value
MAN	Sets VBW to manual setting mode.	
AUTO	Sets VBW to automatic setting mode.	∗

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Restriction

- When VBW is changed during Auto, the system compulsorily changes to Manual.
- In the Auto, VBW value is set automatically from the RBW value and the VBW/RBW Ratio value.

■ Example of use

"Set VBW of Spot method measurement to automatic setting mode."

<Program>
TBLVBWMD_SPU SPOT,AUTO
TBLVBWMD_SPU? SPOT

<Response>
AUTO

TBLVBWRT_SPU

VBW/RBW Ratio for Spurious Emission

Program Message	Query Message	Response Message
TBLVBWRT_SPU a,b	TBLVBWRT_SPU? a	b

■ Function

Sets VBW and RBW ratio used in VBW automatic setting on the Spurious Emission screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	VBW of Spot method measurement is subjected.
SWEEP	VBW of Search or Sweep method measurement is subjected.

■ Value of b

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	1

■ Restriction

- Any value may be input within setting range. However, actually set values are as shown in Table below.

Setting value												
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the Search method measurement VBW/RBW Ratio to 3."

\<Program\>
TBLVBWRT_SPU SWEEP,3
TBLVBWRT_SPU? SWEEP

\<Response\>
3

TBLVIEW_SPU

View for Setup Search/Sweep Table

Program Message	Query Message	Response Message
TBLVIEW_SPU a,b	TBLVIEW_SPU?	b

■ Function

On the Setup Search/Sweep Table screen, selects whether to display RBW/VBW/SWT, Ref-Level/ATT, or Limit on the right side of the screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	VBW of Spot method measurement is subjected.
SWEEP	VBW of Search or Sweep method measurement is subjected.

■ Value of b

Display items

b	Display items	Initial value
None	Displays RBW, VBW, SWT → Ref Level, ATT → Limit → RBW, VBW, SWT in this sequence.	
BWSWT	Displays RBW, VBW, and SWT.	*
REFATT	Displays Ref Level and ATT.	
LMT	Displays Limit.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Displays Limit."

\<Program\>
DSPL SETTBL_SPU,SWEEP
TBLVIEW_SPU SWEEP,LMT
TBLVIEW_SPU?

\<Response\>
LMT

TELECFWD_SPU

TELEC standard (Forward Link)

Program Message	Query Message	Response Message
TELECFWD_SPU a	–	–

■ Function

Sets the Forward Link setting specification to TELEC standard spurious measurement.

■ Value of a

Specification selection

a	Selected Specification	Band	Maximum level	RBW
0	In Band 1 Relative	810 to 885 MHz	−60 dB	30 kHz
1	In Band 2 Absolute	810 to 832 MHz	−16 dBm	30 kHz
		834 to 838 MHz		
		846 to 860 MHz		
		870 to 885 MHz		
2	Out Band 3 Absolute	10 to 30 MHz	−16 dBm	10 kHz
		30 to 810 MHz		100 kHz
		885 to 1000 MHz		100 kHz
		1000 to 3000 MHz		1 MHz
3	Out Band 4 Relative	10 to 30 MHz	−60 dB	10 kHz
		30 to 810 MHz		100 kHz
		885 to 1000 MHz		100 kHz
		1000 to 3000 MHz		1 MHz
4	Out Band 5 Absolute	10 to 30 MHz	13 dBm	10 kHz
		30 to 810 MHz		100 kHz
		885 to 1000 MHz		100 kHz
		1000 to 3000 MHz		1 MHz

■ Execution of use

"Setting In Band 1 Relative."

<Program>
TELECFWD_SPU 0

TELECRVS_SPU

TELEC standard (Reverse Link)

Program Message	Query Message	Response Message
TELECRVS_SPU a	–	–

■ Function

Sets the Reverse Link setting specification to TELEC standard spurious measurement.

■ Value of a

Specification selection

a	Selected Specification	Band	Maximum level	RBW
0	In Band 1 Relative	893 to 901 MHz	−54 dB	30 kHz
		915 to 925 MHz		
1	In Band 2 Absolute	885 to 887 MHz	−16 dBm	30 kHz
		889 to 893 MHz		
		901 to 915 MHz		
		925 to 958 MHz		
2	Out Band 3 Absolute	10 to 30 MHz	−16 dBm	10 kHz
		30 to 885 MHz		100 kHz
		955 to 1000 MHz		100 kHz
		1000 to 3000 MHz		1 MHz

■ Execution of use

"Setting In Band 1 Relative."

\<Program\>
TELECRVS_SPU 0

TEMPFREQ_ACP

Offset Frequency for Spurious Template

Program Message	Query Message	Response Message
TEMPFREQ_ACP a,b	TEMPFREQ_ACP? a	b

■ Function

Sets offset frequency for template lines (Offset Frequencies a, b, c and d in the following diagram) on the Setup Spurious Template screen.
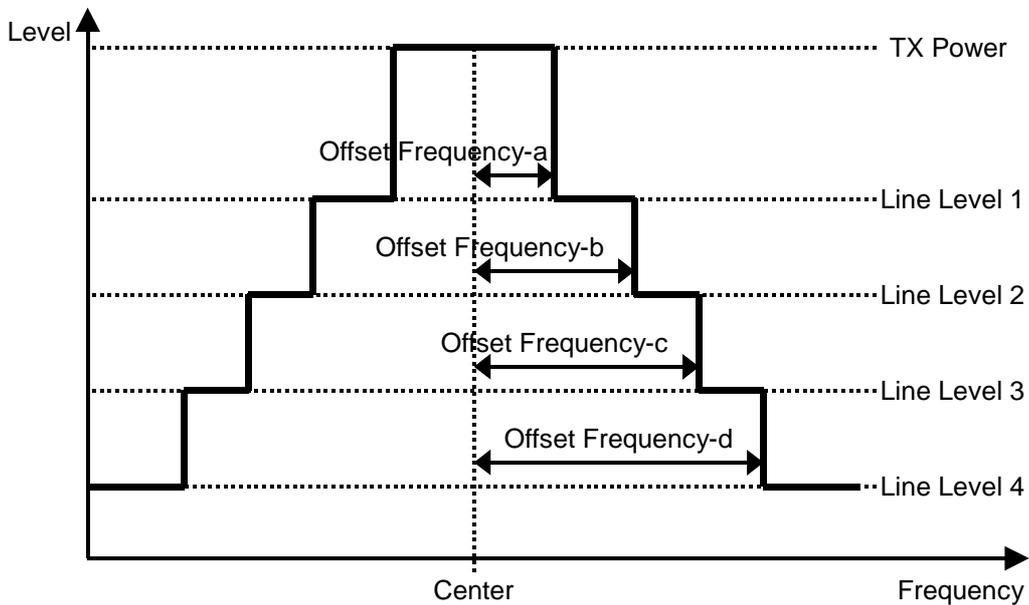
■ Value of a

Selection of template line subjected to operation

a	Selection of template line subjected to operation
A	Offset Frequency-a is subjected.
B	Offset Frequency-b is subjected.
C	Offset Frequency-c is subjected.
D	Offset Frequency-d is subjected.

■ Value of b

Offset frequency

Range	Resolution	Unit
0 to (Span/2)	1000	Hz

☐ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- Offset Frequency is set to Frequency-a ≤ Frequency-b ≤ Frequency-c ≤ Frequency-d all the time.
- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Offset Frequency-a to 1 MHz."

<Program>

TEMPFREQ_ACP A,1MHZ

TEMPFREQ_ACP? A

<Response>

1000000

TEMPLVL_ACP

Level Modify for Spurious Template

Program Message	Query Message	Response Message
TEMPLVL_ACP a,b	TEMPLVL_ACP? a	b

■ Function

Sets levels of template lines (Line Levels 1, 2, 3 and 4 in the following diagram) on the Setup Spurious Template screen.
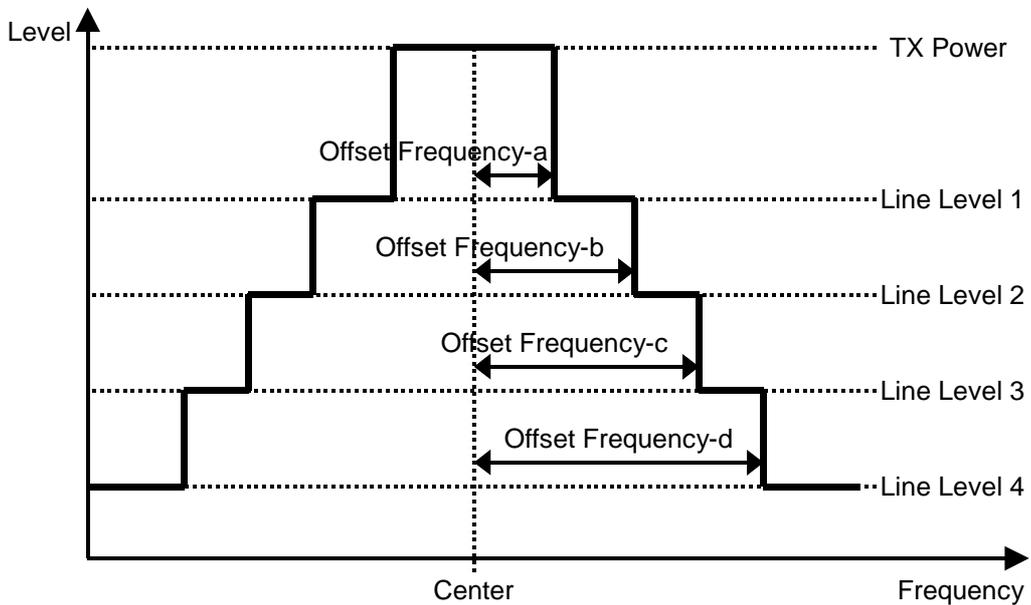
■ Value of a

Selection for level of template line

a	Selection for level of template line
1	Line Level 1 is subjected
2	Line Level 2 is subjected
3	Line Level 3 is subjected
4	Line Level 4 is subjected

■ Value of b

Level value based on Tx Power as reference

Range	Resolution	Unit
−100.0 to 0.0	0.1	dB or dBm

■ Restriction

- The display unit is dB and dBm at Line level: Relative and Absolute, respectively.
  When the Line level is changed between Relative and Absolute; the display unit is changed, but the actual data is not changed. (*cf.* LVLREL_ACP)
- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Line Level 1 to –49.5 dB."

<Program>
TEMPLVL_ACP 1, –49.5
TEMPLVL_ACP? 1

<Response>
–49.5

TEMPLVL_RFPWR

Level Modify for RF Power Template

Program Message	Query Message	Response Message
TEMPLVL_RFPWR a,b	TEMPLVL_RFPWR? a	b

■ Function

Sets levels of template lines (Line Levels 1 and 2 in the following diagram) on the Setup Template screen.
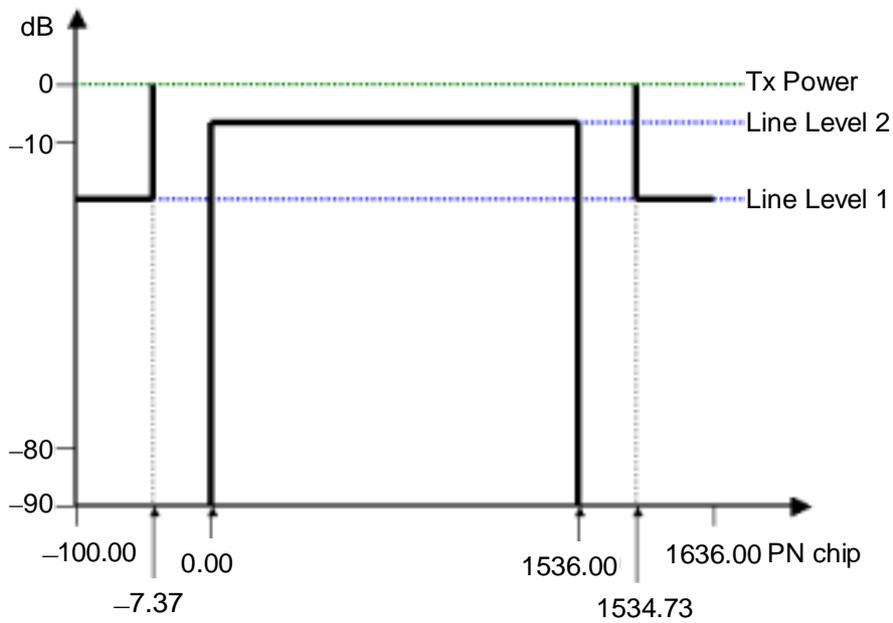
■ Value of a

Selection for level of template line

a	Selection for level of template line
1	Line Level 1 is subjected
2	Line Level 2 is subjected

■ Value of b

Level value based on Tx Power as reference

Range	Resolution	Unit
−90.0 to 10.0	0.1	dB

☐ Suffix code

None: dB

DB: dB

☐ Initial value (Standard)

Level of template line	Initial value (Standard)
Line Level 1	−20.0 dB
Line Level 2	−3.0 dB

■ Restriction

• No setting is allowed when Wave Type is Continuous (*cf.* WAVETYPE).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set Line Level 1 to -49.5 dB."

\<Program>

TEMPLVL_RFPWR 1, −49.5

TEMPLVL_RFPWR? 1

\<Response>

−49.5

TEMPPASS_ACP

Template Pass

Program Message	Query Message	Response Message
–	TEMPPASS_ACP?	a

■ Function

Reads out the pass/fail evaluation result for measurement waveform by Template on the Spurious close to the Carrier screen. Evaluation criteria is as follows: it passes if it is within Template at all the points, and fails if it misses Template even at 1 point.

■ Value of a

Evaluation result

a	Pass/fail evaluation
PASS	Pass: Pass
FAIL	Fail: Fail
OFF	Off: Not judged.

■ Restriction

- When integral waveform is displayed, reads out the pass/fail evaluation result for integration measurement waveform by Template.

■ Example of use

"Read out the pass/fail evaluation result for Spurious close to the Carrier measurement waveform."

\<Program\>
DSPL ACP
SWP
TEMPPASS_ACP?

\<Response\>
PASS

TEMPPASS_RFPWR

Template Pass

Program Message	Query Message	Response Message
–	TEMPPASS_RFPWR?	a

■ Function

Reads out the pass/fail evaluation result for measurement waveform by Template on the RF Power screen.

Evaluation criteria follows: it passes; if it is within Template at all the points, and fails if it misses Template even at 1 point.

■ Value of a

Pass/fail evaluation

a	Pass and fail judgment
PASS	Pass: Passed
FAIL	Fail: Not passed
OFF	Off: Not judged.

■ Restriction

- Evaluation is performed only when Wave Type (*cf.* WAVETYPE) is Burst and Relative Level (*cf.* LVLRFPWR) is On (Relative).

■ Example of use

"Read out the pass/fail evaluation result for RF Power measurement waveform."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
DSPL RFPWR
LVLREL_RFPWR ON
SWP
TEMPPASS_RFPWR?

<Response>
PASS

TERM

Terminal

Program Message	Query Message	Response Message
TERM a	TERM?	a

■ Function

Sets connector for input signal to be measured.

■ Value of a

Connector for input signal to be measured

a	Meaning	Initial value
RF	Set to RF.	*
IQDC	Set to IQ-DC.	
IQAC	Set to IQ-AC.	
IQBAL	Set to IQ-Balance.	

■ Restriction

- Measurement screen must be set to Setup Common Parameter (*cf.* DSPL).
- Following restrictions are applied depending on validity/invalidity of IQ Balance and IQ Unbalance options.
  - When IQ Balance option is valid, all items can be selected regardless of validity/invalidity of IQ Unbalance option.
  - When IQ Unbalance option is valid, IQ Balance cannot be selected.
  - When both IQ Balance and IQ Unbalance options are invalid, no items except RF can be selected.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the input signal to IQ-DC."

<Program>
DSPL SETCOM
TERM IQDC
TERM?

<Response>
IQDC

■ Restrictions according to model type and options

- For MS268x, IQ input is Option.
- For MS2687A/B, IQ-Balance can not be installed.

THRESH_MOD

Threshold Level for Modulation Analysis

Program Message	Query Message	Response Message
THRESH_MOD a	THRESH_MOD?	a

■ Function
Sets the Threshold Level to discriminate the active channel for modulation analysis.

■ Value of a
Threshold level

Measuring Object	Max Walsh Length	Range	Resolution	Initial value	Unit
Forward (RC1-2)	–	−50.0 to −10.0	0.1	−27.0	dB
Forward (RC3-5)	64				
	128			−30.0	
Reverse (RC3-4)	–			−23.0	

■ Restriction
- Valid only when the Measuring Object is set to Forward (RC1-2), Forward (RC3-5) and Reverse (RC3-4) (*cf.* MEASOBJ)

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Setting the Threshold Level for Measuring Object: Reverse(RC1-2) to −20.0 dB"

<Program>
MEASOBJ REVERSE
THRESH_MOD -20.0
THRESH_MOD?

<Response>
−20.0

TRFORM

Trace Format

Program Message	Query Message	Response Message
TRFORM a	TRFORM?	a

■ Function

Sets waveform display format on the Modulation Analysis screen.

■ Value of a

Waveform Format

a	Waveform Format	Initial Value
NON	None: Displays the numeric results only. Does not display a waveform.	*
CONSTEL	Constellation: Displays the IQ diagram.	
EYE	Eye Diagram: Displays the change in the IQ signals via the elapse of time.	
VECT	EVM: Displays the EVM.	
PHASE	Phase Error: Displays the phase error.	
MAGTD	Magnitude: Displays the amplitude error.	
CODE	Code Domain: Displays the code domain.	

■ Restriction

- When the Measuring Object is Reverse (RC1-2), QPSK or OQPSK, Code domain cannot be set (*cf.* MEASOBJ)
- If Measuring Object is changed to Reverse (RC1-2), QPSK or OQPSK while Code Domain is selected, a is forcibly set to Non.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the waveform display format to Phase Error."

<Program>
TRFORM PHASE
TRFORM?

<Response>
PHASE

TRG

Trigger

Program Message	Query Message	Response Message
TRG a	TRG?	a

■ Function

Selects whether to start measurement with internal timing or with an external trigger on the Setup Common Parameter screen.

■ Value of a

Trigger setting

a	Trigger setting	Initial value
FREE	Free Run	*
EXT	External	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Inputting a trigger from the outside."

<Program>
DSPL SETCOM
TRG EXT
TRG?

<Response>
EXT

TRGDLY

Trigger Delay

Program Message	Query Message	Response Message
TRGDLY a	TRGDLY?	a

■ Function

Sets the time difference from when a trigger is input to when timing is actually set, on the Setup Common Parameter screen.

■ Value of a

Trigger delay value

Range	Resolution	Initial value	Unit
−16384.0 to 16384.0	0.1	0.0	PNchip

■ Restriction

- No setting is allowed when Trigger is set to Free Run (*cf.* TRG).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the trigger delay value to 50.0 PNchip."

\<Program>
DSPL SETCOM
TRG EXT
TRGDLY 50.0
TRGDLY?

\<Response>
50.0

TRGEDGE

Trigger Edge

Program Message	Query Message	Response Message
TRGEDGE a	TRGEDGE?	a

■ Function
Sets either the rising or falling edge as reference trigger timing, on the Setup Common Parameter screen.

■ Value of a
Trigger reference

a	Trigger reference	Initial value
RISE	Sets the rising edge as the trigger reference.	*
FALL	Sets the falling edge as the trigger reference.	

■ Restriction
- No setting is allowed when Trigger is set to Free Run (*cf.* TRG).

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set the rising edge as the trigger reference."

<Program>
DSPL SETCOM
TRG EXT
TRGEDGE RISE
TRGEDGE?

<Response>
RISE

TS

Single Measure/Sweep

Program Message	Query Message	Response Message
TS		

■ Function

Executes a measurement and sweeping once.

This command functions the same as the SWP command.

Unlink the SNGLS command, when the Tx Tester accepts a command during measurement, the command is not processed immediately but is queued until the current measurement is completed.

Since the command following the TS command is processed after the current measurement is completed, this means that the synchronization (between the Tx Tester operation and the program to send the command) is ensured.

■ Example of use

"Executes a measurement and sweeping once."

<Program>

TS

TXPWR

Tx Power

Program Message	Query Message	Response Message
–	TXPWR? a	b

■ Function

Reads out the average power of 1 slot (PCG).

■ Value of a

Specification for output unit

a	Output unit
DBM	dBm
WATT	W

   Value of b

Tx Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- Tx Power measurement result can be obtained from the measurement in the next screen (*cf.* MEAS).
    - Modulation Analysis
    - RF Power

■ Example of use

"Reading out the measurement results of Tx Power."

<Program>
DSPL RFPWR
SWP
TXPWR? DBM

<Response>
−18.53

UNIT_ACP

Unit for Spurious close to the Carrier

Program Message	Query Message	Response Message
UNIT_ACP a	UNIT_ACP?	a

■ Function

Sets the unit of measurement result for Offset frequency vs Power on the Spurious close to the Carrier screen.

■ Value of a

Unit for Offset frequency vs Power

a	Unit for Offset frequency vs Power	Initial value
DB	dB	
DBM	dBm	
MW	mW	
UW	μW	
NW	nW	
TEMP	dB/dBm (Template) (Note)	*

Note: Unit is displayed by dB or dBm, set for every Line Level.   *cf.* LVLREL_ACP

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the unit for Offset frequency vs Power to mW."

\<Program\>
UNIT_ACP MW
UNIT_ACP?

\<Response\>
MW

UNIT_IQL

Unit for IQ Level

Program Message	Query Message	Response Message
UNIT_IQL a	UNIT_IQL?	a

■ Function

Sets the measured results unit for the IQ Level on the IQ Level screen.

■ Value of a

Unit of the IQ Level

a	Unit of the IQ Level	Initial value
MV	mV	
DBMV	dBmV	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the IQ Level unit to mV."

<Program>
UNIT_IQL MV
UNIT_IQL?

<Response>
MV

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

UNIT_SPU

Unit for Spurious Emission

Program Message	Query Message	Response Message
UNIT_SPU a	UNIT_SPU?	a

■ Function

Sets the unit for each measurement result of level at f1 to f15 on the Spurious Emission screen.

■ Value of a

Unit for each level

a	Unit for each level	Initial value
DB	dB	
DBM	dBm	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set dB for the unit for each level at f1 to f15."

<Program>
UNIT_SPU DB
UNIT_SPU?

<Response>
DB

VBM_ACP

VBW: Manual/Auto

Program Message	Query Message	Response Message
VBM_ACP a	VBM_ACP?	a

■ Function

Sets either manual or automatic for setting VBW on the Spurious close to the Carrier screen.

■ Value of a

VBW setting mode

a	Mode	Initial value
MAN	Sets VBW to the manual setting mode.	
AUTO	Sets VBW to the automatic setting mode.	∗

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Restriction

• When VBW is changed while Auto is set, the setting is forcibly set to Manual.

• When Auto is set, the VBW value is automatically set from the values of RBW and VBW/RBW Ratio.

• No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Example of use

"Set VBW to the automatic setting mode."

<Program>
VBM_ACP AUTO
VBM_ACP?

<Response>
AUTO

VBM_OBW

VBW: Manual/Auto

Program Message	Query Message	Response Message
VBM_OBW a	VBM_OBW?	a

■ Function

Sets either manual or automatic for setting VBW on the Occupied Bandwidth screen.

■ Value of a

VBW setting mode

a	Mode	Initial value
MAN	Sets VBW to the manual setting mode.	
AUTO	Sets VBW to the automatic setting mode.	∗

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Restriction

- When VBW is changed while Auto is set, the setting is forcibly set to Manual.
- When Auto is set, the VBW value is automatically set from the values of RBW and VBW/RBW Ratio.

■ Example of use

"Set VBW to the automatic setting mode."

<Program>
VBM_OBW AUTO
VBM_OBW?

<Response>
AUTO

VBR_ACP

VBW/RBW Ratio for Spurious close to the Carrier

Program Message	Query Message	Response Message
VBR_ACP a	VBR_ACP?	a

■ Function

Sets the ratio of VBW to RBW use in VBW automatic setting on Spurious close to the Carrier measurement.

■ Value of a

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	0.1

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value												
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set VBW/RBW Ratio to 3."

<Program>
VBR_ACP 3
VBR_ACP?

<Response>
3

VBR_OBW

VBW/RBW Ratio for Occupied Bandwidth

Program Message	Query Message	Response Message
VBR_OBW a	VBR_OBW?	a

■ Function

Sets the ratio of VBW to RBW used in VBW automatic setting on Occupied Bandwidth measurement.

■ Value of a

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	1

■ Restriction

- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value												
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set VBW/RBW Ratio to 3."

\<Program\>
VBR_OBW 3
VBR_OBW?

\<Response\>
3

VBW_ACP

Video Bandwidth for Spurious close to the Carrier

Program Message	Query Message	Response Message
VBW_ACP a	VBW_ACP?	a

■ Function

Sets VBW (Video Bandwidth) of Spurious close to the Carrier measurement.

■ Value of a

VBW

Range	Resolution	Initial value	Unit
0 (OFF) to 3000000	1	3000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)
- No setting is allowed when RBW Mode is Digital (*cf.* RBD_ACP).
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value														
0 Hz (OFF)	1 Hz	3 Hz	10 Hz	30 Hz	100 Hz	300 Hz	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set VBW to 30 kHz."

<Program>

VBW_ACP 30KHZ

VBW_ACP?

<Response>

30000

VBW_OBW

Video Bandwidth for Occupied Bandwidth

Program Message	Query Message	Response Message
VBW_OBW a	VBW_OBW?	a

■ Function

Sets VBW (Video Bandwidth) of Occupied Bandwidth measurement using a spectrum analyzer.

■ Value of a

VBW

Range	Resolution	Initial value	Unit
0 (OFF) to 3000000	1	10000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- No setting is allowed when RBW Mode is Digital (*cf.* RBD_OBW).
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value														
0 Hz (OFF)	1 Hz	3 Hz	10 Hz	30 Hz	100 Hz	300 Hz	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set VBW to 30 kHz."

<Program>

VBW_OBW 30KHZ

VBW_OBW?

<Response>

30000

VECTERR

RMS EVM

Program Message	Query Message	Response Message
–	VECTERR?	a

■ Function

Outputs the RMS value measurement results for EVM on the Modulation Analysis screen.

■ Value of a

RMS EVM

Resolution	Unit
0.01	%

■ Example of use

"Read measurement result for RMS EVM."

\<Program\>
DSPL MODANAL
SWP
VECTERR?

\<Response\>
23.48

VIEW_SPU

View for Spurious Emission

Program Message	Query Message	Response Message
VIEW_SPU a	VIEW_SPU?	a

■ Function

Selects RBW/VBW/SWT, Ref-Level/ATT, or Judgment result to display on the right of the Spurious Emission screen.

■ Value of a

Display item

a	Display item	Initial value
None	Displays judgment → RBW, VBW, SWT → Rel Level, ATT → Judgment, in this sequence.	
JDG	Displays Judgment.	*
BWSWT	Displays RBW, VBW and SWT.	
REFATT	Displays Ref Level and ATT.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display RBW, VBW and SWT."

<Program>
DSPL SPURIOUS,SPOT
VIEW_SPU BWSWT
VIEW_SPU?

<Response>
BWSWT

VSCALE

Vertical Scale for EVM, Phase Error and Magnitude Error

Program Message	Query Message	Response Message
VSCALE a	VSCALE?	a

■ Function

Sets the upper limit value of the vertical scale on the coordinate displayed on the Modulation Analysis screen when the Trace Format is set to EVM, Phase Error or Magnitude Error.

■ Value of a

Upper limit value of the vertical scale

a	Upper limit value of the vertical scale	Initial value
5	5% (EVM, Magnitude Error), 5˚ (Phase Error)	
10	10% (EVM, Magnitude Error), 10˚ (Phase Error)	
20	20% (EVM, Magnitude Error), 20˚ (Phase Error)	*
50	50% (EVM, Magnitude Error), 50˚ (Phase Error)	
100	100% (EVM, Magnitude Error), 100˚ (Phase Error)	

■ Restriction

- No setting is allowed when the Trace Format is set to other than EVM, Phase Error and Magnitude Error (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the upper limit value of the vertical scale for Phase Error to 50˚."

<Program>
TRFORM PHASE
VSCALE 50
VSCALE?

<Response>
50

VSCALE_CDP

Vertical Scale for Code Domain

Program Message	Query Message	Response Message
VSCALE_CDP a	VSCALE_CDP?	a

■ Function

Sets the vertical scale range when Trace Format is set to Code Domain on the Modulation Analysis screen.

■ Value of a

Vertical scale range

Code Domain Display	Command	Vertical Scale Range	Initial Value
Power	20	−20 to 0 dB	
	40	−40 to 0 dB	
	60	−60 to 0 dB	
	80	−80 to 0 dB	*
Timing Offset	20	−20 to 20 ns	
	40	−40 to 40 ns	
	60	−60 to 60 ns	
	80	−80 to 80 ns	*
	100	−100 to 100 ns	
Phase Offset	0.02	−0.02 to 0.02 rad	
	0.04	−0.04 to 0.04 rad	
	0.06	−0.06 to 0.06 rad	
	0.08	−0.08 to 0.08 rad	*
	0.10	−0.10 to 0.10 rad	

■ Restriction

• No setting is allowed when Trace Format is other than Code Domain (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Sets the Code Domain display range to 0 dB through 40 dB."

<Program>
DSPL SETCOM
MEASOBJ FORWARD
DSPL MODANAL
TRFORM CODE
VSCALE_CDP 40
VSCALE_CDP?

<Response>
40

VTDLY

Vertical Scale (Code Domain of Data)

Program Message	Query Message	Response Message
VTDLY a	VTDLY? a	b

■ Function

Sets the time difference between the waveform position (decided by Video Trigger Edge and Video Trigger Level) and actual timing on the RF Power screen.

■ Value of a

Display mode of code domain power

a	Time difference reference
None	Conforms to the unit set in Video Trigger Edge (cf. VTEDGE)
RISE	Sets the rising edge as the reference
FALL	Sets the falling edge as the reference

■ Value of b

Time difference

Range	Resolution	Initial Value	Unit
−10.00 to 10.00	0.25	0.00	PNchip

□ Suffix Code

None

■ Restriction

• No setting is allowed when Wave Type is Continuous (cf. WAVETYPE).

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Sets the time difference at the rising edge to −10.00 PNchip."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
VTDLY RISE,-10.00
VTDLY? RISE

<Response>
−10.00

VTEDGE

Video Trigger Edge

Program Message	Query Message	Response Message
VTEDGE a	VTEDGE?	a

■ Function

Sets either the rising or falling edge as reference for the burst waveform positioning on the RF Power screen.

■ Value of a

Waveform positioning reference

a	Waveform positioning reference	Initial Value
RISE	Sets the rising edge as the reference.	*
FALL	Sets the falling edge as the reference.	

■ Restriction

• No setting is allowed when Wave Type is Continuous (*cf.* WAVETYPE).

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Set the falling edge as the reference of burst wave."

\<Program\>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
DSPL RFPWR
VTEDGE FALL
VTEDGE?

\<Response\>
FALL

VTLVL

Video Trigger Edge

Program Message	Query Message	Response Message
VTLVL a	VTLVL? b	c

■ Function

Sets threshold for the burst waveform positioning on the RF Power screen.

■ Value of a

Threshold

Range	Resolution	Initial Value	Unit
−60 to 0	1	−15	dB, dBm

• Unit can be omitted. In this case, the unit conforming to the Relative Level is deemed to be specified (*cf.* LVLREL_RFPWR). See RFLVL for RefLevel.

■ Value of b

Threshold unit

b	Threshold unit
None	Deemed as dB is specified when Relative Level is On (Relative) and dBm when it is Off (Absolute).
DB	DB: Deemed as a relative value setting average power inside the burst as a reference.
DBM	DBM: Deemed as an absolute value.

■ Value of c

Threshold

Resolution	Unit
1	dB
	dBm

■ Restriction

• No setting is allowed when Wave Type is Continuous (*cf.* WAVETYPE).

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Sets the video trigger level to −30 dB."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
DSPL RFPWR
VTLVL −30DB
VTLVL?

<Response>
−30

WAVECLASS_CDP

Code Domain Display

Program Message	Query Message	Response Message
WAVECLASS_CDP a	WAVECLASS_CDP?	a

■ Function

Selects the code domain display among Power, Timing Offset, and Phase Offset on Modulation Analysis screen.

■ Value of a

Code domain display

a	Code Domain display	Initial Value
None	Displays Power $\rightarrow$ Timing Offset $\rightarrow$ Phase Offset $\rightarrow$ Power, in this sequence.	*
PWR	Displays Code Domain screen with Power.	
TIME	Displays Code Domain screen with Timing Offset.	
PHASE	Displays Code Domain screen with Phase Offset.	

■ Restriction

• Measuring Object: Forward (RC1-2) and Forward (RC3-5) only can use this command.

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Displaying Code Domain screen with Power"

<Program>
DSPL SETCOM
MEASOBJ REVERSE3
DSPL MODANAL
TRFORM CODE
WAVECLASS_CDP PWR
WAVECLASS_CDP?

<Response>
PWR

WAVETYPE

Wave Type

Program Message	Query Message	Response Message
WAVETYPE a	WAVETYPE?	a

■ Function

Sets the type of waveform to be analysis on the Setup Common Parameter.

■ Value of a

Waveform type

a	Waveform type	Initial Value
CONT	Continuous	
BURST	Burst	*

■ Restriction

• No setting is allowed when the measurement screen is other than Setup Common Parameter.

• When measuring object is Forward (RC1-2) or Forward (RC3-5), the setting is fixed to Continuous and cannot be changed to Burst (*cf.* MEASOBJ).

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Set Signal to be Burst."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
WAVETYPE BURST
WAVETYPE?

<Response>
BURST

WAVEFLT

Filter to Nyquist

Program Message	Query Message	Response Message
WAVEFLT a	WAVEFLT?	a

■ Function

Sets whether Nyquist status is set for Constellation and Eye Diagram on the Modulation Analysis screen.

■ Value of a

On/Off of Nyquist status

a	On/Off of Nyquist status	Initial Value
ON	Set Nyquist status to On.	
OFF	Set Nyquist status to Off.	*

■ Restriction

- No setting is allowed when Measuring Object is other than Reverse (RC1-2) or OQPSK (*cf.* MEASOBJ).
- No setting is allowed when Trace Format is other than Constellation and Eye Diagram (*cf.* TRFORM).

■ Initialization of setting

PRE,INI,IP,*RST

■ Example of use

"Set Nyquist Status to On."

\<Program\>
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CONSTEL
WAVEFLT ON
WAVEFLT?

\<Response\>
ON

WAVQUAL

Waveform Quality Factor

Program Message	Query Message	Response Message
–	WAVQUAL?	a

■ Function

Outputs the measurement result for Waveform Quality Factor on Modulation Analysis screen.

■ Value of a

Waveform Quality Factor

Resolution	Unit
0.00001	None

■ Example of use

"Reads out the measured results for Waveform Quality Factor."

\<Program\>
DSPL MODANAL
SWP
WAVQUAL?

\<Response\>
0.98801

WINDOW

Window

Program Message	Query Message	Response Message
WINDOW a	WINDOW?	a

■ Function
Sets the interval to display the waveform on the RF Power screen.

■ Value of a
Interval to display the waveform

a	Interval to display the waveform	Initial value
SLOT	Slot: Displays the waveform for the interval of one slot.	∗
LEAD	Leading: Displays the waveform of burst rising edge.	
TRAIL	Trailing: Displays the waveform of burst falling edge.	

■ Initialization of setting
PRE, INI, IP, ∗RST

■ Example of use
"Display the waveform of the burst rising edge."

<Program>
DSPL RFPWR
WINDOW LEAD
WINDOW?
SWP

<Response>
LEAD

WLSHLEN

Walsh Length

Program Message	Query Message	Response Message
WLSHLEN a	WLSHLEN?	a

■ Function

Sets Walsh Length displayed when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

Walsh Length

Range	Walsh Length	Initial Value
4, 8, 16, 32, 64, 128	Forward (RC3-5)	64
2, 4, 8, 16, 32	Reverse (RC3-4)	32

■ Restriction

- No setting is allowed when Measuring Object is other than Forward (RC3-5) and Reverse (RC3-4) (*cf.* MEASOBJ).
- No setting is allowed when Trace Format is other than Code Domain (*cf.* TRFORM).
- No setting is allowed when Auto Rate Detection is On (*cf.* AUTODET).

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Set Walsh Length to 16 when Reverse (RC3-4) is set."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CONSTEL
WAVEFLT ON
WAVEFLT?

<Response>
ON

XMB

Wave Data for Spurious close to the Carrier (Spectrum Analyzer)

Program Message	Query Message	Response Message
XMB a,b	XMB? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data by spectrum analyzer on the Spurious close to the Carrier screen.

Use XMBI to access to the digital signal processed data (RBW: 1.23 MHz).

■ Value of a

Data writing address

Measure Method	Data Point	Range	Resolution
Normal	501	0 to 500	1
	1001	0 to 1000	
3GPP2 FWD Band Class 0,2,3,5,9	501	0 to 1500	
	1001	0 to 3000	
3GPP2 FWD Band Class 1,4,6,8	501	0 to 2000	
	1001	0 to 3500	

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

- Setting is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Value of c

Start address for reading out the data

Measure Method	Data Point	Range	Resolution
Normal	501	0 to 500	1
	1001	0 to 1000	
3GPP2 FWD Band Class 0,2,3,5,9	501	0 to 1500	
	1001	0 to 3000	
3GPP2 FWD Band Class 1,4,6,8	501	0 to 2000	
	1001	0 to 3500	

■ Value of d

Number of data read out

Measure Method	Data Point	Range	Resolution
Normal	501	1 to 501	1
	1001	1 to 1001	
3GPP2 FWD Band Class 0,2,3,5,9	501	1 to 1501	
	1001	1 to 3001	
3GPP2 FWD Band Class 1,4,6,8	501	1 to 2001	
	1001	1 to 3501	

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Reading out is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Example of use

"Read out the 10 waveform data of Spurious close to the Carrier, starting from the memory address 0."

<Program>
DSPL ACP
SWP
XMB? 0,10

<Response>
−8829, −8925, −8776, −8771, −8735, −8636, −8882, −8806, −8700, −8846

XMBI

Wave Data for Spurious close to the Carrier (RBW: 1.23 MHz)

Program Message	Query Message	Response Message
XMBI a,b	XMBI? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data (RBW: 1.23 MHz) by digital signal process on the Spurious close to the Carrier screen.

Use XMB to access to the processed data of spectrum analyzer.

■ Value of a

Data writing address

Range	Resolution
0 to 1000	1

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Value of c

Start address for reading out the data

Range	Resolution
0 to 1000	1

■ Value of d

Number of data read out

Range	Resolution
1 to 1001	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

• Reading out is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Restriction

- In relation to the calculation, some part of the data is invalid. −2147483648 is output if the data is invalid.
- Enable when Normal is set for Measure Method. (*cf.* DSPL)

■ Example of use

"Read out the 10 waveform data of Spurious close to the Carrier, starting from the memory address 0."

<Program>
DSPL ACP,NRM
SWP
XMBI? 0,10

<Response>
−8829, −8925, −8776, −8771, −8735, −8636, −8882, −8806, −8700, −8846

XMC

Wave Data for I-Q Signal

Program Message	Query Message	Response Message
XMC a,b,c	XMC? d,e,f	g(1),g(2),...,g(f)

■ Function

Reads out and processes the waveform data for Signal IQ on the Modulation Analysis screen.

■ Value of a

Selection of IQ

a	Selection of IQ
0	Signal I
1	Signal Q

■ Value of b

Data writing address

Range	Resolution
0 to 24575	1

■ Value of c

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Value of d

Selection of IQ

d	Selection of IQ
0	Signal I
1	Signal Q

■ Value of e

Address from which to start data readout

Range	Resolution
0 to 24575	1

■ Value of f

Number of data readouts

Range	Resolution
1 to 24576	1

■ Value g (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Data are read out by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Example of use

"Making five readouts of the waveform data for Signal IQ starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMC? 0,0,5

<Response>
0, −10000, 0, −10000, 10000

XMD

Wave Data for RF Power

Program Message	Query Message	Response Message
XMD a,b	XMD? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data on the RF Power screen.

■ Value of a

Data writing address

Range	Resolution
0 to 6944	1

• Relation between data storage address and Marker Position is shown below.

Data storage address	0	1	2		399	400	401		6943	6944
Marker Position [PNchip]	−100.00	−99.75	−99.50		−0.25	0.00	0.25		1635.75	1636.00

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in the unit of 0.01 dBm with 1 dB set at 100.

■ Value of c

Address from which to start data readout

Range	Resolution
0 to 6944	1

■ Value of d

Number of data readouts

Range	Resolution
1 to 6945	1

■ Value e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

• Data are read out by using an integer in the unit of 0.01 dB with 1 dB set at 100.

■ Example of use

"Making five readouts of the waveform data of RF Power starting from memory address 0."

<Program>

DSPL RFPWR

SWP

XMD? 0,5

<Response>

−1012, −1746, −1823, −1272, −1055

XME

Wave Data for Occupied Bandwidth

Program Message	Query Message	Response Message
XME a,b	XME? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data at Occupied Bandwidth screen.

■ Value of a

Write address for data

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

- Data are set using integers in 0.01 dB units, where 1 dB becomes 100.

■ Value of c

Read start address for data

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■ Value of d

Number of read-out data

Data Points	Range	Resolution
501	1 to 501	1
1001	1 to 1001	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Data are read out using integers in 0.01 dB units, where 1 dB becomes 100.

■ Restriction

- When Measure Method is Spectrum, waveform data by Spectrum method is operated; and When Measure Method is FFT, waveform data by FFT method is operated.

■ Example of use

"Reads out ten waveform data of Occupied Bandwidth starting from memory address 0."

<Program>
DSPL OBW,FFT
SWP
XME? 0,10

<Response>
–8829, –8925, –8776, –8771, –8735, –8636, –8882, –8806, –8700, –8846

XMEYE

Wave Data for Eye Diagram

Program Message	Query Message	Response Message
XMEYE a,b,c	XMEYE? a,d,e	f(1),f(2),...,f(e)

■ Function

Reads out and processes the waveform data for eye diagram on the Modulation Analysis screen.

■ Value of a

Selection of IQ

a	Selection of IQ
0	Signal I
1	Signal Q

■ Value of b

Data writing address

Range	Resolution
0 to 15359	1

■ Value of c

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

•   Setting is made by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Value of d

Address from which to start data readout

Range	Resolution
0 to 15359	1

■ Value of e

Number of data readouts

Range	Resolution
1 to 15360	1

■ Value of f(n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Data are read out by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Example of use

"Making five readouts of the waveform data for Signal IQ starting from memory address 0."

<Program>

DSPL MODANAL

SWP

XMEYE? 0,0,5

<Response>

0, −10000, 0, −10000, 10000

XMN

Wave Data for Magnitude Error

Program Message	Query Message	Response Message
XMN a,b	XMN? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of Magnitude Error on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 24575	1

• Relation between data storage address and Marker Position is shown below

Data Storage address		0	1		1535	1536		3071	3072		24575
Marker Position [PNchip]	When Measuring Object is Forward(RC1-2), Forward(RC3-5)	0.0	1.0		1535.0	1536.0		3071.0	3072.0		24575.0
	When Measuring Object is Reverse(RC3-4) or QPSK	0.0	1.0		1535.0	---		---	---		---
	When Measuring Object is Reverse(RC1-2) or OQPSK	0.0	0.5		767.5	768.0		1535.5	---		---

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in 0.01% units so that 1% is shown as 100.

■ Value of c

Start address for reading out the data

Range	Resolution
0 to 24575	1

■ Value of d

Number of data read out

Range	Resolution
1 to 24576	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Data are read out using integers in 0.01% units, where 1% becomes 100.

■ Example of use

"Reads out five waveform data of Magnitude Error starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMN? 0,5

<Response>
0, 1413, −1, −7415, −1

XMP

Wave Data for Phase Error

Program Message	Query Message	Response Message
XMP a,b	XMP? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of Phase Error on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 24575	1

• Relation between data storage address and Marker Position is shown below

Data Storage address		0	1		1535	1536		3071	3072		24575
Marker Position [PNchip]	When Measuring Object is Forward(RC1-2), Forward(RC3-5)	0.0	1.0		1535.0	1536.0		3071.0	3072.0		24575.0
	When Measuring Object is Reverse(RC3-4) or QPSK	0.0	1.0		1535.0	---		---	---		---
	When Measuring Object is Reverse(RC1-2) or OQPSK	0.0	0.5		767.5	768.0		1535.5	---		---

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in 0.01 deg units so that 1 deg is shown as 100.

■ Value of c

Start address for reading out the data

Range	Resolution
0 to 24575	1

■ Value of d

Number of data read out

Range	Resolution
1 to 24576	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

- Data are read out using integers in 0.01 deg units, where 1 deg becomes 100.

■ Example of use

"Reads out five waveform data of Phase Error starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMP? 0,5

<Response>
−1, −1660, 0, 8679, 0

XMV

Wave Data for EVM

Program Message	Query Message	Response Message
XMV a,b	XMV? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of EVM on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 24575	1

• Relation between data storage address and Marker Position is shown below

Data Storage address		0	1		1535	1536		3071	3072		24575
Marker Position [PNchip]	When Measuring Object is Forward(RC1-2), Forward(RC3-5)	0.0	1.0		1535.0	1536.0		3071.0	3072.0		24575.0
	When Measuring Object is Reverse(RC3-4) or QPSK	0.0	1.0		1535.0	---		---	---		---
	When Measuring Object is Reverse(RC1-2) or OQPSK	0.0	0.5		767.5	768.0		1535.5	---		---

■ Value of b

16-bit waveform data to be written

Range	Resolution
−32768 to 32767	1

• Setting is made by using an integer in 0.01% units so that 1% is shown as 100.

■ Value of c

Start address for reading out the data

Range	Resolution
0 to 24575	1

■ Value of d

Number of data read outs

Range	Resolution
1 to 24576	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
−2147483648 to 2147483647	1

• Data are read out using integers in 0.01% units, where 1% becomes 100.

■ Example of use

"Reads out five waveform data of EVM starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMV? 0,5

<Response>
10, 3743, 20, 9272, 30

ZEROSET

Zero Set

Program Message	Query Message	Response Message
ZEROSET	–	–

■ Function

Executes zero-point calibration of the power meter.

■ Restriction

• Executable screen is as follows (*cf.* DSPL).

  • Power meter

■ Example of use

<Program>

DSPL PWRMTR

ZEROSET

■ Restrictions according to model type and options

For MS268x, this command is not available.