MX268102A/302A/702A/
MX860802A/902A
GSM Measurement Software
(For MS2681A/MS2683A/MS2687A/
MS2687B/MS8608A/MS8609A)
Operation Manual

Fourth Edition

- **For safety and warning information, please read these manuals before attempting to use this equipment.**
- **To ensure that the equipment is used safely, read the "For Safety" in the MS8608A/MS8609A Digital Mobile Radio Transmitter Tester Operation Manual or MS2681A/MS2683A/MS2687A/MS2687B Spectrum Analyzer Operation Manual first.**
- **Keep this manual with the equipment.**

ANRITSU CORPORATION

Document No.: M-W1795AE-4.0

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

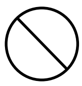
DANGER ⚠ This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

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

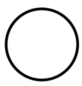
CAUTION ⚠ This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

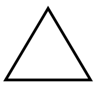
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.



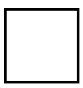
This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.



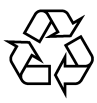
This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

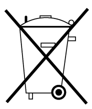


This indicates warning or caution. The contents are indicated symbolically in or near the triangle.



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





These indicate that the marked part should be recycled.

MX268102A/MX268302A/MX268702A/MX860802A/MX860902A
GSM Measurement Software (For MS2681A/MS2683A/MS2687A/MS2687B/MS8608A/MS8609A)
Operation Manual

27 September2000 (First Edition)
6 February 2006 (Fourth Edition)

For Safety

CAUTION ⚠

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.

<u>Anritsu will not be held responsible for lost data.</u>

Pay careful attention to the following points.

- Never remove the memory card from the pulse tester, 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

In the event that this equipment malfunctions, contact an Anritsu Service and Sales office. Contact information can be found on the last page of the printed version of this manual, and is available in a separate file on the CD version.

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.

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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.

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

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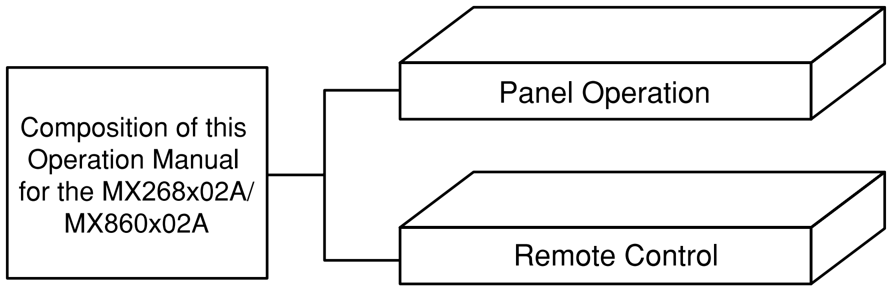
About This Manual

1. The contents of this Operation Manual explain the operation of the MS268xA/MS860xA Digital Mobile Radio Transmitter Tester when the MX268x02A/MX860x02A GSM Measurement Software is installed.

2. Composition of This Operation Manual
   This Operation Manual for the MX268x02A/MX860x02A GSM Measurement Software is composed of the following two volumes.



Panel Operation:

Contains the overview, panel description, operation and performance test for the MX268x02A/MX860x02A.

Remote Control:

Describes the RS-232C remote control and GPIB remote control for the MX268x02A/MX860x02A.

MX268102A/302A/702A/
MX860802A/902A
GSM Measurement Software
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Operation Manual
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Section 1 General

This section describes the overview, product configuration of the MX268102A/MX268302A/MX268702A/MX860802A/MX860902A GSM Measuring Software.

1.1 Product Overview 1-3
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1.1 Overview

The MS2681A/MS2683A/MS2687A/MS2687B Spectrum Analyzer and The MS8608A/MS8609A Digital Mobile Radio Transmitter Tester (hereinafter referred to as “Transmitter Tester”) is an instrument to quickly, accuracy and also easy measure the transmitter characteristics of base/mobile stations status for various types of mobile communications.
In addition to the RF-IF signal evaluation function, it has an IQ (base band) signal analysis function for evaluation of devise.
This Transmitter Tester incorporates a high performance spectrum analyzer and a power meter as standard composition.
Installation of measurement software provides a high performance spectrum analysis function for various types of digital modulation system.
High-speed digital signal processing technology allows quick and highly accurate measurement.

By installing the MX268102A/MX268302A/MX268702A/MX860802A/MX860902A GSM Measurement Software (hereinafter referred to as “GSM software”), this Transmitter Tester can be a comprehensive measuring instrument to easily measure the functions and performance of radio equipment for the GSM (including Edge*1) system digital cellular portable telephone.

A Transmitter Tester installed with the GSM software has the following measuring functions:

- Modulation accuracy analysis, Carrier frequency measurement
- Transmission power measurement, Power measurement at carrier Off, On/Off ratio measurement
- Power vs. time template judgment
- Output RF spectrum measurement
- Spurious measurement, etc.

*1: The EDGE system is an expanded system for GSM system whose modulation system is changed form GSMK to 8PSK.

1.2 Configuration

The combination between GSM Software and each the product configurations are as follows:

- For MS2681A Spectrum Analyzer

	Item	Qty	Model name, Ordering No.	Remarks
Software	GSM measurement software	1	MX268102A	Supplied by memory card
Accessories	Operation manual	1	W1795AE	

- For MS2683A Spectrum Analyzer

	Item	Qty	Model name, Ordering No.	Remarks
Software	GSM measurement software	1	MX268302A	Supplied by memory card
Accessories	Operation manual	1	W1795AE	

- For MS2687A/MS2687B Spectrum Analyzer

	Item	Qty	Model name, Ordering No.	Remarks
Software	GSM measurement software	1	MX268702A	Supplied by memory card
Accessories	Operation manual	1	W1795AE	

- For MS8608A Transmitter Tester

	Item	Qty	Model name, Ordering No.	Remarks
Software	GSM measurement software	1	MX860802A	Supplied by memory card
Accessories	Operation manual	1	W1795AE	

- For MS8609A Transmitter Tester

	Item	Qty	Model/ Ordering No.	Remarks
Software	GSM measurement software	1	MX860902A	Supplied by memory card
Accessories	Operation manual	1	W1795AE	

1.3 Specifications

MX860802A GSM Measurement Software Specification for MS8608A

Item	Specifications	Remarks
Model name, Item name	MX860802A GSM Measuring Software (for MS8608A)	
Use	Mesurement of transmission characteristics for the GSM system mobile ratio equipment	
Erectric performance (RF Input)	The following specifications are guaranteed after the level optimization of the MS8608A is performed. (automatically performed by pressing a key). *1:Pre-amplifier On can be set when the MS8608-08 (Option 08) is installed	
Modulation/Frequency measurement		
Mesured frequency range	50MHz to 2.7GHz	
Measurement level rabge	−20 to +40dBm (Average power during burst-on): High Power input −40 to +20dBm (Average power during burst-on):Low Power input −60 to +10dBm (Average power during burst-on): Low Power input, when Pre-amplifier is ON*1	
Carrier frequency accuracy	Input level(Average power during burst-on): ≥−10dBm(High Power Input), ≥−30dBm(Average power during burst-on),≥−40dBm(Average power during burst-on,with Pre-amplefier On*1) ±(Refer crystal oscillator accuracy +10Hz)	
Modulation accuracy	Input level(Average power during burst-on): ≥−10dBm(High Power Input), ≥−30dBm(Average power during burst-on),≥−40dBm(Average power during burst-on,with Pre-amplefier On*1)	
Residial phase error (GMSK modulation)	<0.5degree(rms) <2.0degree(peak)	
Residial EVM (8PSK modulation)	<1.0%(rms)	
Waveform display	Trellis display (for GMSK modulation) Eye pattarn display EVM vs. symble number display (for 8PSK modulaton) Phase error vs. symbol number display Ampletude error vs. symbol number display IQ diagram display	

Item	Specifications	Remarks
Amplitude measurement		
Frequency range	50 MHz to 2.7 GHz	
Mesurement level range	−20 to +40 dBm (Average power during burst-on): High Power input −40 to +20 dBm (Average power during burst-on): Low Power input −60 to +10 dBm (Average power during burst-on): Low Power input, When Pre-amplifier is ON*1	
Transmission power measurement	After level calibration using the built-in power meter (automatically calibrated by pressing a key).	
Measurement range	+10 to +40 dBm (Average power during burst-on): High Power input −10 to +20 dBm (Average power during burst-on): Low Power input −10 to +10 dBm (Average power during burst-on): Low Power input, When Pre-amplifier is ON*1	
Accuracy	±0.4 dB	
Power measurement linearity	Input level (Average power during burst-on): ≥+10 dBm (High Power input), ≥−10 dBm (Low Power input), ≥−20 dBm(Low Power input, When pre-amplefier is ON*1), Without changing the reference level setting after range optimization ±0.2dB (0 to −30 dB)	
Power measurement at carrier Off	Input level (Average power during burst-on): ≥+10 dBm (High Power input), ≥−10 dBm (Low Power input), ≥−20 dBm(Low Power input, When pre-amplefier is ON*1)	
Measurement range in Normal mode	≥60 dB (Compared with average power during burst-on)	
Measurement range in Wide dynamic range mode	Average power during burst-on: 1 W (High Power input), Compared with 10 mW (Low Power input) ≥80 dB Measurement lower limit depends on the average noise level: −50 dBm (High Power input, 50 MHz to 2.7 GHz)	
Rise/fall characteristics	Displays waveform synchronized with measured signal data Can display specification line (measured at 1 MHz bandwidth), Pass/Fail judgment available	
Output RF Spectrum measurement		
Frequency range	100 MHz to 2.7 GHz	
Input level range	+10 to +40 dBm (Average power during burst-on): High Power input −10 to +20 dBm (Average power during burst-on): Low Power input −20 to +10 dBm (Average power during burst-on): Low Power input, When Pre-amplifier is ON*1	
Modulation-part measurement range (Spectrum due to modulation)	At CW signal input: ≥60 dB (≥200 dB kHz Detuning) ≥68 dB (≥250 dB kHz Dutuning) (For <1.8 MHz detuning, RBW: 30 kHz. For 1.8MHz detuning, RBW: 100 kHz)	
Transient-part measurement range (Switching transients)	At CW signal input: ≥63 dB (≥400 kHz Detuning)	

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	100 kHz to 7.8 GHz, Excluding range within carrier frequency ±50 MHz	
Input level range (Transmission power)	+20 to +40 dBm (Average power during burst-on): High Power input 0 to +20 dBm (Average power during burst on): Low Power input	
Measuring method		
Sweep method	After sweeping the specified frequency range with spectrum analyzer, detects and displays the peak value. For power ratio, calculates and displays the ratio to Tx Power value..	
Spot method	After sweeping the specified frequency range in time domain mode with spectrum analyzer, displays the average value. For power ratio, calculates and displays the ratio to Tx Power value.	
Search method	After sweeping the specified frequency range with spectrum analyzer, detects the peak value and measure the frequency in time domain mode and displays the average mode. For power ratio, calculates the ratio to Tx Power value and displays it..	
Measurement range	When carrier frequency is between 800 MHz and 1 GHz, and 1.8 GHz and 2 GHz,Detection mode: Average ≥72 dB (RBW:10 kHz) (100 kHz to 50 MHz, band 0) ≥72 dB (RBW 100kHz) (50 to 500 MHz, band 0) In Normal mode ≥66−f [GHz]dB (RBW: 3 MHz) (500 to 3150 MHz, band 0 Excluding harmonic frequencies) ≥66 dB (RBW: 3 MHz) (3150 to 7800 MHz, band 1)	
Option of MS8608A /MS8609A When MS8608A-03 is installed	In Sprious mode 66 dB (RBW: 3MHz) (1600 to 7800 MHz, band 1)	
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (with parallel capacity < 100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differental voltage range: 0.1 to 1 Vpp (At input connector) Common-phase voltage range: ±2.5V (At input connector)	
Unbalance input	0.1 to 1 Vpp (At input connector) DC/AC coupling can be switched.	
Measurement item	Modulation accuracy measurement, Amplitude measurement, IQ level measurement	
Modulation accuracy measurement	Input level: ≥0.1 V (rms), Temperatude range: 18 to 28℃	
Residual phase error	<0.5 degree (rms), DC coupling	
Residual EVM	<1.0 % (rms)	
IQ level measurement		
Level measurement	Measures and displays I and Q input voltage (rms value and peak-to-peak value).	
IQ phase difference measurement	When a CW signal is input to I and Q input connectors, measures and displays the phase difference between I-phase signal and Q-phase signal.	

MX860902A GSM Measurement Software Specification for MS8609A

Item	Specifications	Remarks
Model name, Item name	MX860902A GSM Measuring Software (for MS8609A)	
Use	Mesurement of transmission characteristics for the GSM system mobile ratio equipment	
Erectric performance (RF Input)	The following specifications are guaranteed after the level optimization of the MS8609A is performed. (automatically performed by pressing a key). *1:Pre-amplifier On can be set when the MS8609-08 (Option 08) is installed	
Modulation/Frequency measurement		
Mesured frequency range	50MHz to 2.7GHz	
Measurement level rabge	−40 to +20dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Carrier frequency accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1) ±(Refer crystal oscillator accuracy +10Hz)	
Modulation accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1)	
Residial phase error (GMSK modulation)	<0.5degree(rms) <2.0degree(peak)	
Residial EVM (8PSK modulation)	<1.0%(rms)	
Waveform display	Trellis display (for GMSK modulation) Eye pattern display EVM vs. symble number display (for 8PSK modulaton) Phase error vs. symbol number display Ampletude error vs. symbol number display IQ diagram display	
Amplitude measurement		
Frequency range	50 MHz to 2.7 GHz	
Mesurement level range	−40 to +20dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Transmission power measurement	After level calibration using the built-in power meter (automatically calibrated by pressing a key).	
Measurement range	−10 to +20dBm (Average power during burst-on): When Pre-amprifier is Off. −10 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Accuracy	±0.4 dB	
Power measurement linearity	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1), Without changing the reference level setting after range optimization ±0.2dB (0 to −30 dB)	

Item	Specifications	Remarks
Power measurement at carrier Off	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1)	
Measurement range in Normal mode	≥60 dB (Compared with average power during burst-on)	
Measurement range in Wide dynamic range mode	Average power during burst-on: Compared with 10 mW ≥80 dB Measurement lower limit depends on the average noise level: −70 dBm (50 MHz to 2.7 GHz)	
Rise/fall characteristics	Displays waveform synchronized with measured signal data Can display specification line (measured with 1 MHz bandwidth), Pass/Fail judgment available	
Output RF Spectrum measurement		
Frequency range	100 MHz to 2.7 GHz	
Input level range	−10 to +20dBm (Average power during burst-on): When Pre-amprifier is Off. −10 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Modulation-part measurement range (Spectrum due to modulation)	At CW signal input: ≥60 dB (≥200 dB kHz Detuning) ≥68 dB (≥250 dB kHz Dutuning) (For <1.8 MHz detuning, RBW: 30 kHz. For 1.8MHz detuning, RBW: 100 kHz)	
Transient-part measurement range (Switching transients)	At CW signal input: ≥63 dB (≥400 kHz Detuning)	
Spurious measurement		
Measurement frequency range	100 kHz to 12.75 GHz, Excluding range within carrier frequency ±50 MHz	
Input level range (Transmission power)	0 to +20 dBm (Average power during burst on): When Pre-Amplefre is OFF.	
Measuring method		
Sweep method	After sweeping the specified frequency range with spectrum analyzer, detects and displays the peak value. For power ratio, calculates and displays the ratio to Tx Power value..	
Spot method	After sweeping the specified frequency range in time domain mode with spectrum analyzer, displays the average value. For power ratio, calculates and displays the ratio to Tx Power value.	
Search method	After sweeping the specified frequency range with spectrum analyzer, detects the peak value and measure the frequency in time domain mode and displays the average mode. For power ratio, calculates the ratio to Tx Power value and displays it..	
Measurement range	When carrier frequency is between 800 MHz and 1 GHz, and 1.8 GHz and 2 GHz, Detection mode: Average ≥72 dB (RBW:10 kHz) (100 kHz to 50 MHz, band 0) ≥72 dB (RBW 100kHz) (50 to 500 MHz, band 0) ≥66−f [GHz]dB (RBW: 3 MHz) (500 to 3150 MHz, band 0 Excluding harmonic frequencies) ≥66 dB (RBW: 3 MHz) (3150 to 7800 MHz, band 1)	

Item	Specifications	Remarks
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (with parallel capacity < 100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differental voltage range: 0.1 to 1 Vpp (At input connector) Common-phase voltage range: ±2.5V (At input connector)	
Unbalance input	0.1 to 1 Vpp (At input connector) DC/AC coupling can be switched.	
Measurement item	Modulation accuracy measurement, Amplitude measurement, IQ level measurement	
Modulation accuracy measurement	Input level: ≥0.1 V (rms), Temperatude range: 18 to 28℃	
Residual phase error	<0.5 degree (rms), DC coupling	
Residual EVM	<1.0 % (rms)	
IQ level measurement		
Level measurement	Measures and displays I and Q input voltage (rms value and peak-to-peak value).	
IQ phase difference measurement	When a CW signal is input to I and Q input connectors, measures and displays the phase difference between I-phase signal and Q-phase signal.	

MX268102A GSM Measurement Software Specification for MS2681A

Item	Specifications	Remarks
Model name, Item name	MX268102A GSM Measuring Software (for MS2681A)	
Use	Mesurement of transmission characteristics for the GSM system mobile ratio equipment	
Erectric performance (RF Input)	The following specifications are guaranteed after the level optimization of the MS2681A is performed. (automatically performed by pressing a key). *1:Pre-amplifier On can be set when the MS2681-08 (Option 08) is installed	
Modulation/Frequency measurement		
Mesured frequency range	50MHz to 2.7GHz	
Measurement level rabge	−40 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Carrier frequency accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1) ±(Refer crystal oscillator accuracy +10Hz)	
Modulation accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1)	
Residial phase error (GMSK modulation)	<0.5degree(rms) <2.0degree(peak)	
Residial EVM (8PSK modulation)	<1.0%(rms)	
Waveform display	Trellis display (for GMSK modulation) Eye pattern display EVM vs. symble number display (for 8PSK modulaton) Phase error vs. symbol number display Ampletude error vs. symbol number display IQ diagram display	
Amplitude measurement		
Frequency range	50 MHz to 2.7 GHz	
Mesurement level range	−40 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Transmission power measurement	After level calibration in the spectrum analyzer mode.	
Measurement range	−10 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −10 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Accuracy	±2.0dB typical	
Power measurement linearity	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1), Without changing the reference level setting after range optimization ±0.2dB (0 to −30 dB)	

Item	Specifications	Remarks
Power measurement at carrier Off	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1)	
Measurement range in Normal mode	≥60 dB (Compared with average power during burst-on)	
Measurement range in Wide dynamic range mode	Average power during burst-on: Compared with 10 mW ≥80 dB Measurement lower limit depends on the average noise level: −70 dBm (50 MHz to 2.7 GHz)	
Rise/fall characteristics	Displays waveform synchronized with measured signal data Can display specification line (measured with 1 MHz bandwidth), Pass/Fail judgment available	
Output RF Spectrum measurement		
Frequency range	100 MHz to 2.7 GHz	
Input level range	−10 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −20 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Modulation-part measurement range (Spectrum due to modulation)	At CW signal input: ≥60 dB (≥200 dB kHz Detuning) ≥68 dB (≥250 dB kHz Detuning) (For <1.8 MHz detuning, RBW: 30 kHz. For 1.8MHz detuning, RBW: 100 kHz)	
Transient-part measurement range (Switching transients)	At CW signal input: ≥63 dB (≥400 kHz Detuning)	
Spurious measurement		
Measurement frequency range	100 kHz to 3 GHz, Excluding range within carrier frequency ±50 MHz	
Input level range (Transmission power)	0 to +30 dBm (Average power during burst on): When Pre-Amplefre is OFF.	
Measuring method		
Sweep method	After sweeping the specified frequency range with spectrum analyzer, detects and displays the peak value. For power ratio, calculates and displays the ratio to Tx Power value.	
Spot method	After sweeping the specified frequency range in time domain mode with spectrum analyzer, displays the average value. For power ratio, calculates and displays the ratio to Tx Power value.	
Search method	After sweeping the specified frequency range with spectrum analyzer, detects the peak value and measure the frequency in time domain mode and displays the average mode. For power ratio, calculates the ratio to Tx Power value and displays it.	
Measurement range	When carrier frequency is between 800 MHz and 1 GHz, and 1.8 GHz and 2 GHz, Detection mode: Average ≥72 dB typical (RBW:10 kHz) (100 kHz to 50 MHz, band 0) ≥72 dB typical (RBW 100kHz) (50 to 500 MHz, band 0) ≥66−f [GHz]dB typical (RBW: 3 MHz) (500 to 3000 MHz, band 0 Excluding harmonic frequencies)	

Item	Specifications	Remarks
Electric performance (IQ input)	This function is available when MS2681A-17 or MS2681A-18 option is installed.	
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (with parallel capacity < 100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	This function is available when MS2681A-17 option is installed. Differential voltage range: 0.1 to 1 Vpp (At input connector) Common-phase voltage range: ±2.5V (At input connector)	
Unbalance input	This function is available when MS2681A-17 or MS2681A-18 option is installed. 0.1 to 1 Vpp (At input connector) DC/AC coupling can be switched.	
Measurement item	Modulation accuracy measurement, Amplitude measurement, IQ level measurement	
Modulation accuracy measurement	Input level: ≥0.1 V (rms), Temperatude range: 18 to 28℃	
Residual phase error	<0.5 degree (rms), DC coupling	
Residual EVM	<1.0 % (rms)	
IQ level measurement		
Level measurement	Measures and displays I and Q input voltage (rms value and peak-to-peak value).	
IQ phase difference measurement	When a CW signal is input to I and Q input connectors, measures and displays the phase difference between I-phase signal and Q-phase signal.	

MX268302A GSM Measurement Software Specification for MS2683A

Item	Specifications	Remarks
Model name, Item name	MX268302A GSM Measuring Software (for MS2683A)	
Use	Mesurement of transmission characteristics for the GSM system mobile ratio equipment	
Erectric performance (RF Input)	The following specifications are guaranteed after the level optimization of the MS2683A is performed. (automatically performed by pressing a key). *1:Pre-amplifier On can be set when the MS2683-08 (Option 08) is installed	
Modulation/Frequency measurement		
Mesured frequency range	50MHz to 2.7GHz	
Measurement level rabge	−40 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Carrier frequency accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1) ±(Refer crystal oscillator accuracy +10Hz)	
Modulation accuracy	Input level(Average power during burst-on): ≥−30dBm(When Pre-amplifier is Off.),≥−40dBm(When Pre-amplefier is On.*1)	
Residial phase error (GMSK modulation)	<0.5degree(rms) <2.0degree(peak)	
Residial EVM (8PSK modulation)	<1.0%(rms)	
Waveform display	Trellis display (for GMSK modulation) Eye pattern display EVM vs. symble number display (for 8PSK modulaton) Phase error vs. symbol number display Ampletude error vs. symbol number display IQ diagram display	
Amplitude measurement		
Frequency range	50 MHz to 2.7 GHz	
Mesurement level range	−40 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −60 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Transmission power measurement	After level calibration in the spectrum analyzer mode.	
Measurement range	−10 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −10 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Accuracy	±2.0dB typical	
Power measurement linearity	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1), Without changing the reference level setting after range optimization ±0.2dB (0 to −30 dB)	

Item	Specifications	Remarks
Power measurement at carrier Off	Input level (Average power during burst-on): ≥−10 dBm (When Pre-amplifier is Off.), ≥−20 dBm(When Pre-amplefier is ON. *1)	
Measurement range in Normal mode	≥60 dB (Compared with average power during burst-on)	
Measurement range in Wide dynamic range mode	Average power during burst-on: Compared with 10 mW ≥80 dB Measurement lower limit depends on the average noise level: −70 dBm (50 MHz to 2.7 GHz)	
Rise/fall characteristics	Displays waveform synchronized with measured signal data Can display specification line (measured with 1 MHz bandwidth), Pass/Fail judgment available	
Output RF Spectrum measurement		
Frequency range	100 MHz to 2.7 GHz	
Input level range	−10 to +30dBm (Average power during burst-on): When Pre-amprifier is Off. −20 to +10dBm (Average power during burst-on): When Pre-amplifier is ON*1	
Modulation-part measurement range (Spectrum due to modulation)	At CW signal input: ≥60 dB (≥200 dB kHz Detuning) ≥68 dB (≥250 dB kHz Detuning) (For <1.8 MHz detuning, RBW: 30 kHz. For 1.8MHz detuning, RBW: 100 kHz)	
Transient-part measurement range (Switching transients)	At CW signal input: ≥63 dB (≥400 kHz Detuning)	

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	100 kHz to 7.8 GHz, Excluding range within carrier frequency ±50 MHz	
Input level range (Transmission power)	0 to +30 dBm (Average power during burst on): When Pre-Amplefre is OFF.	
Measuring method		
Sweep method	After sweeping the specified frequency range with spectrum analyzer, detects and displays the peak value. For power ratio, calculates and displays the ratio to Tx Power value..	
Spot method	After sweeping the specified frequency range in time domain mode with spectrum analyzer, displays the average value. For power ratio, calculates and displays the ratio to Tx Power value.	
Search method	After sweeping the specified frequency range with spectrum analyzer, detects the peak value and measure the frequency in time domain mode and displays the average mode. For power ratio, calculates the ratio to Tx Power value and displays it..	
Measurement range	When carrier frequency is between 800 MHz and 1 GHz, and 1.8 GHz and 2 GHz, Detection mode: Average ≥72 dB (RBW:10 kHz) (100 kHz to 50 MHz, band 0) ≥72 dB (RBW 100kHz) (50 to 500 MHz, band 0) In Normal mode ≥66−f [GHz]dB (RBW: 3 MHz) (500 to 3150 MHz, band 0 Excluding harmonic frequencies) ≥66 dB (RBW: 3 MHz) (3150 to 7800 MHz, band 1)	
Option of MS2683A When MS8608A-03 is installed	In Sprious mode ≥66 dB (RBW: 3MHz) (1600 to 7800 MHz, band 1)	

Item	Specifications	Remarks
Electric performance (IQ input)	This function is available when MS2683A-17 or MS2683A-18 option is installed.	
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (with parallel capacity < 100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	This function is available when MS2683A-17 option is installed.	
	Differential voltage range: 0.1 to 1 Vpp (At input connector)	
	Common-phase voltage range: ±2.5V (At input connector)	
Unbalance input	This function is available when MS2683A-17 or MS2683A-18 option is installed.	
	0.1 to 1 Vpp (At input connector)	
	DC/AC coupling can be switched.	
Measurement item	Modulation accuracy measurement, Amplitude measurement, IQ level measurement	
Modulation accuracy measurement	Input level: ≥0.1 V (rms), Temperatude range: 18 to 28℃	
Residual phase error	<0.5 degree (rms), DC coupling	
Residual EVM	<1.0 % (rms)	
IQ level measurement		
Level measurement	Measures and displays I and Q input voltage (rms value and peak-to-peak value).	
IQ phase difference measurement	When a CW signal is input to I and Q input connectors, measures and displays the phase difference between I-phase signal and Q-phase signal.	

MX268702A GSM Measurement Software Specification for MS2687A

Item	Specifications	Remarks
Model name, Item name	MX268702A GSM Measuring Software (for MS2687A)	
Use	Mesurement of transmission characteristics for the GSM system mobile ratio equipment	
Erectric performance (RF Input)	The following specifications are guaranteed after the level optimization of the MS2687A is performed. (automatically performed by pressing a key).	
Modulation/Frequency measurement Mesured frequency range Measurement level rabge Carrier frequency accuracy Modulation accuracy Residial phase error (GMSK modulation) Residial EVM (8PSK modulation) Waveform display	50MHz to 2.7GHz −40 to +30dBm (Average power during burst-on) Input level(Average power during burst-on): ≥−30dBm ±(Refer crystal oscillator accuracy +10Hz) Input level(Average power during burst-on): ≥−30dBm <0.5degree(rms) <2.0degree(peak) <1.0%(rms) Trellis display (for GMSK modulation) Eye pattarn display EVM vs. symble number display (for 8PSK modulaton) Phase error vs. symbol number display Ampletude error vs. symbol number display IQ diagram display	
Amplitude measurement Frequency range Mesurement level range Transmission power measurement Measurement range Accuracy Power measurement linearity	50 MHz to 2.7 GHz −40 to +30dBm (Average power during burst-on) After level calibration in the spectrum analyzer mode. −10 to +30dBm (Average power during burst-on) ±2.0dB typical Input level (Average power during burst-on): ≥−10 dBm,Without changing the reference level setting after range optimization ±0.2dB (0 to −30 dB)	

Item	Specifications	Remarks
Power measurement at carrier Off	Input level (Average power during burst-on): ≥−10 dBm	
Measurement range in Normal mode	≥60 dB (Compared with average power during burst-on)	
Measurement range in Wide dynamic range mode	Average power during burst-on: Compared with 10 mW ≥80 dB Measurement lower limit depends on the average noise level: −70 dBm (50 MHz to 2.7 GHz)	
Rise/fall characteristics	Displays waveform synchronized with measured signal data Can display specification line (measured with 1 MHz bandwidth), Pass/Fail judgment available	
Output RF Spectrum measurement		
Frequency range	100 MHz to 2.7 GHz	
Input level range	−10 to +30dBm (Average power during burst-on)	
Modulation-part measurement range (Spectrum due to modulation)	At CW signal input: ≥60 dB (≥200 dB kHz Detuning) ≥68 dB (≥250 dB kHz Detuning) (For <1.8 MHz detuning, RBW: 30 kHz. For 1.8MHz detuning, RBW: 100 kHz)	
Transient-part measurement range (Switching transients)	At CW signal input: ≥63 dB (≥400 kHz Detuning)	

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	100 kHz to 12.75 GHz, Excluding range within carrier frequency ±50 MHz	
Input level range (Transmission power)	0 to +30 dBm (Average power during burst on)	
Measuring method		
Sweep method	After sweeping the specified frequency range with spectrum analyzer, detects and displays the peak value. For power ratio, calculates and displays the ratio to Tx Power value.	
Spot method	After sweeping the specified frequency range in time domain mode with spectrum analyzer, displays the average value. For power ratio, calculates and displays the ratio to Tx Power value.	
Search method	After sweeping the specified frequency range with spectrum analyzer, detects the peak value and measure the frequency in time domain mode and displays the average mode. For power ratio, calculates the ratio to Tx Power value and displays it.	
Measurement range	When carrier frequency is between 800 MHz and 1 GHz, and 1.8 GHz and 2 GHz, Detection mode: Average ≥72 dB typical(RBW:10 kHz) (100 kHz to 50 MHz, band 0) ≥72 dB typical (RBW 100kHz) (50 to 500 MHz, band 0) ≥66−f [GHz]dB typical (RBW: 3 MHz) (500 to 3150 MHz, band 0 Excluding harmonic frequencies) ≥66 dB typical (RBW: 3 MHz) (3150 to 7900 MHz, band 1)	
Electric performance (IQ input)	This function is available when MS2683A-18 option is installed.	
Input method	Unbalanced input.	
Input impedance	1 MΩ (with parallel capacity < 100 pF) or 50 Ω can be selected.	
Input level range		
Unbalance input	This function is available MS2687A-18 option is installed. 0.1 to 1 Vpp (At input connector) DC/AC coupling can be switched.	
Measurement item	Modulation accuracy measurement, Amplitude measurement, IQ level measurement	
Modulation accuracy measurement	Input level: ≥0.1 V (rms), Temperatude range: 18 to 28℃	
Residual phase error	<0.5 degree (rms), DC coupling	
Residual EVM	<1.0 % (rms)	
IQ level measurement		
Level measurement	Measures and displays I and Q input voltage (rms value and peak-to-peak value).	
IQ phase difference measurement	When a CW signal is input to I and Q input connectors, measures and displays the phase difference between I-phase signal and Q-phase signal.	

Section 2 Panel Layout and Operation Overview

This section explains the panel layout and its basic operation of the MS268xA Spectrum Analyzar/MS860xA Digital Mobile Ratio Transmitter Tester.

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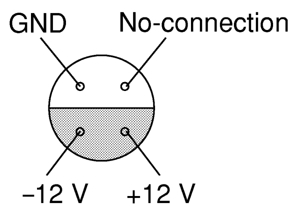
2.1 Table of Front and Rear Panel Features

No.	Panel Marking	Explanation of Function
1	(LCD)	This is a 6.5" Type color TFT liquid crystal display (LCD). It displays the trace waveforms, the parameter settings, the values of marker, and the soft menu keys, etc.
2	Spectrum	This sets the MS268xA/MS860xA to the spectrum analyzer mode.
3	Signal Analysis Tx Tester	This sets the MS268xA/MS860xA to the transmitter (TX) tester mode in which the measurement software operates.
4	Config	This displays the setup menu for GPIB interface or printer, etc.
5	F1 - F6	These are the soft keys for selecting the soft-key menus linked to the panel key operation. [More]　This displays the next page of soft-key menus.
6	Freq/Ampl	This is the frequency and level parameter data input section. [Freq/Channel]　Sets frequency. [Span]　Sets frequency span. [Amplitude]　Sets reference level. [–> CF]　Sets peak level signal frequency on screen to center frequency. [–> RLV]　Sets peak level on screen to reference level.
7	Marker	This section is related to operation of marker functions. [Marker]　Sets marker. [Multi Mkr]　Sets multimarkers. Press this key after pressing the [Shift] key. [Peak Search]　Moves marker to currently-displayed peak level. [Marker –>]　Sets parameter according to marker value. Press this key after pressing the [Shift] key.
8	System	This switches the measurement system in Tx tester mode.
9	Single	This sets the sweep mode. [Single]　Executes single sweep. [Continuous]　Executes continuous sweeping. Press this key after pressing the [Shift] key. The initial default is continuous sweeping.
10	Recall	This executes recall/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.

No.	Panel Marking	Explanation of Function
11	Measure	This menu is for performing the various application measurements including frequency measurement, noise measurement, adjacent-channel leakage power measurement, etc.
12	Display	This section is for selecting the trace waveform. Normally, in the frequency domain, up to two trace waveforms can be displayed. The zero-span (Time Domain) mode is selected simply by pressing the [Time] key. [A, B] Displays trace A or B waveform in frequency domain. [A/B, A/BG] Displays trace A and B waveforms simultaneously, or displays trace A and BG (background frequency spectrum including trace A) simultaneously. [Time] Switches to zero span (Time domain) mode to display time domain waveforms. [A/Time] Displays trace A and the time domain waveform simultaneously.
13	Trig/Gate	This sets the trigger/gate functions. [Trig/Gate] Sets the sweep-start trigger and gate (to control waveform-data write timing) functions.
14	Coupled Function	This sets the RBW, VBW, sweep time and input attenuator.
15	Entry	These keys set the numeric data, units and special functions. [Rotary knob] Used for moving marker and inputting data. [∨, ∧] Increments and decrements input data. [Shift] To execute panel functions indicated by blue letters, press this key and then press the blue-lettered key. [BS] Backspace key for correcting input mistakes. [0-9, . , +/–] Numeric-data setting keys. [GHz, MHz, kHz, Hz] Units keys for frequency, level, time, etc. [set] Key for setting parameters. [Cancel] This cancels the entry that be able to set with [set] key.

No.	Panel Marking	Explanation of Function
16	Preset	This sets the measurement parameters to the default values.
17	Local	This changes the remote status to the local status.
18	Disp On/Off	This sets the liquid crystal display On/Off.
19	Copy	This outputs a hard copy of the screen to a printer or memory Card.
20	Stby/On	This is the power switch. It can be used when the back-panel power switch is on. The power-on condition is fetched from the Stby condition when the key is pressed for about 1 second. The equipment is returned to the Stby condition from the power-on condition when the key is pressed again for about 1 seconds.
21	RF Input	This is the RF input connector. High power input connector in MS8608A.
22	I/Q Input	This is the I/Q Input connector. (Input I and Q for Unbalance, and $I/\overline{I}$ and $Q/\overline{Q}$ for Balance.) These connectors are mounted when MS268xA-17 or MS268xA-18 is installed.
23	Probe Power	This is the connector that supplies ±12 V for a FET probe. Pin allocation is shown below. 
24	Memory Card	This is the slot to set memory cards which save/load the wave-form data and measurement parameters etc.
25	Hi power	This sets the RF input connectors. The MS268xA/MS8609A have not this key [Hi Power] Enable the High power input connector. [Low Power] Enable the Low power input connector.
26	Low power input	This is the RF input connector. Low power input connector in MS8608A.

No.	Panel Marking	Explanation of Function
50	(Fan)	This is the cooling fan for ventilating internally-generated heat. Leave a clearance of at least 10 cm around the fan.
51	10 MHz STD	They are the input connector for an external reference crystal oscillator and the output connector of the 10 MHz Reference signal. When an external reference signal is input, the equipment switches automatically from the internal signal to the external signal. If an external signal is input, the heater of the internal OCXO is switched off.
52	IF Output	This is the IF output connector. This signal is bandwidth controlled by the RBW setting.
53	Wideband IF OUT	This is the wideband IF output connector. This signal is not bandwidth controlled by the RBW setting.
54	Sweep (X)	This is a output connector for sweep signal (X).
55	Video (Y)	This connector output a Y-axis signal that is proportional to the video detection signal output and is logarithmically compressed at log scale.
56	Sweep Status (Z)	This is a output connector for sweep status signal (Z).
57	Trig/Gate In (±10 V)	This is an input connector for external trigger/gate signal.
58	Off/On	This is the AC line power switch.
59	(Inlet)	This is the fused AC power inlet to which the supplied power cord is connected. It contains a time-lag fuse.
60	(Ground Terminal)	Connect this frame ground terminal to ground to prevent risk of an accidental electric shock.
61	Parallel	This is the Parallel connector. Connect it to a printer.
62	VGA Out	This is the VGA signal output connector.
63	GPIB	This connector is for use with a GPIB interface. It is connected to an external system controller.
64	RS-232C	This is the RS-232C connector. Connect it to an external system controller.
65	Ethernet	This is the 10 Base-T connector for Ethernet. Connect this to the external system controller.
66	Name plate	This shows a production number and options.

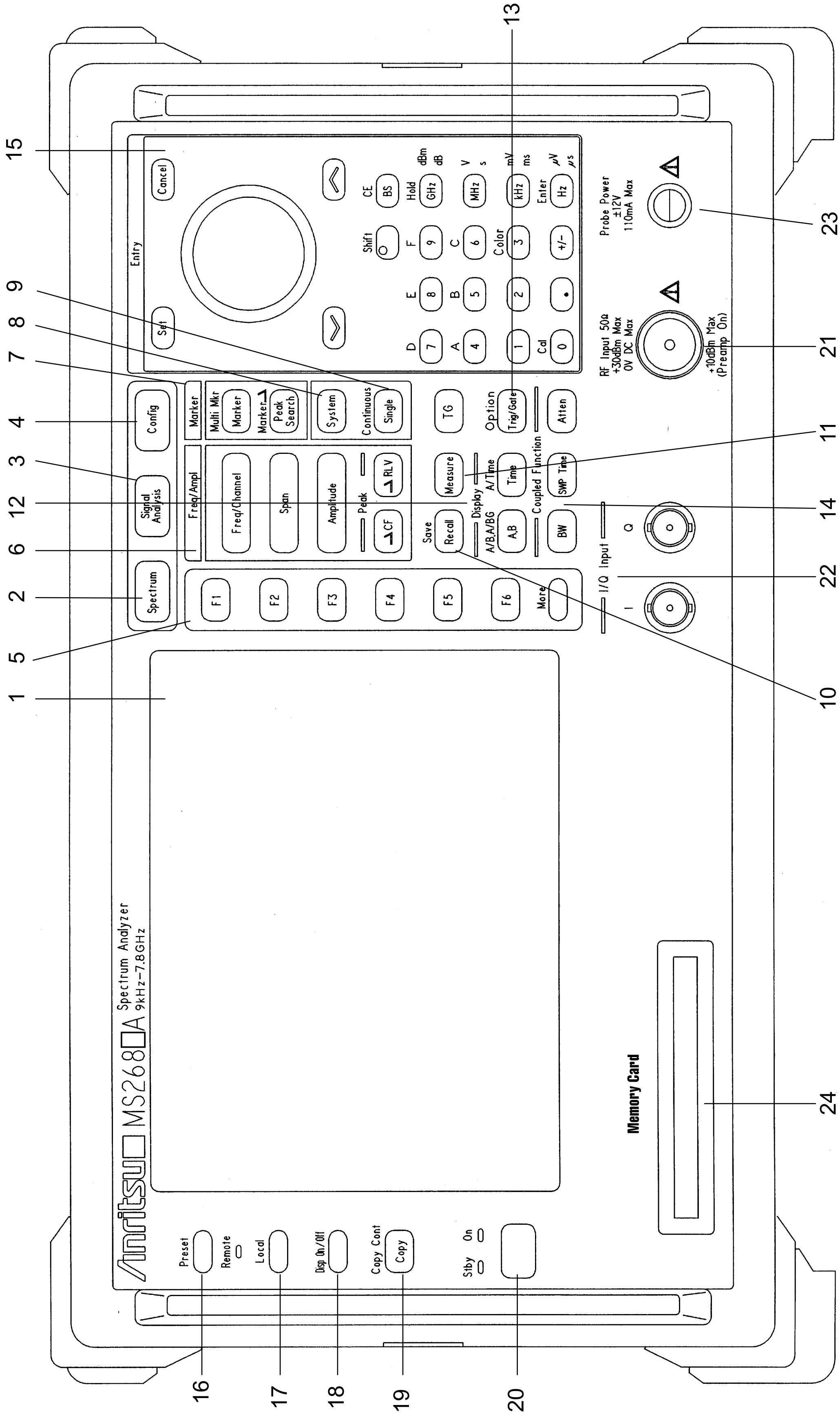


Fig. 2-1 Front Panel of MS268xA

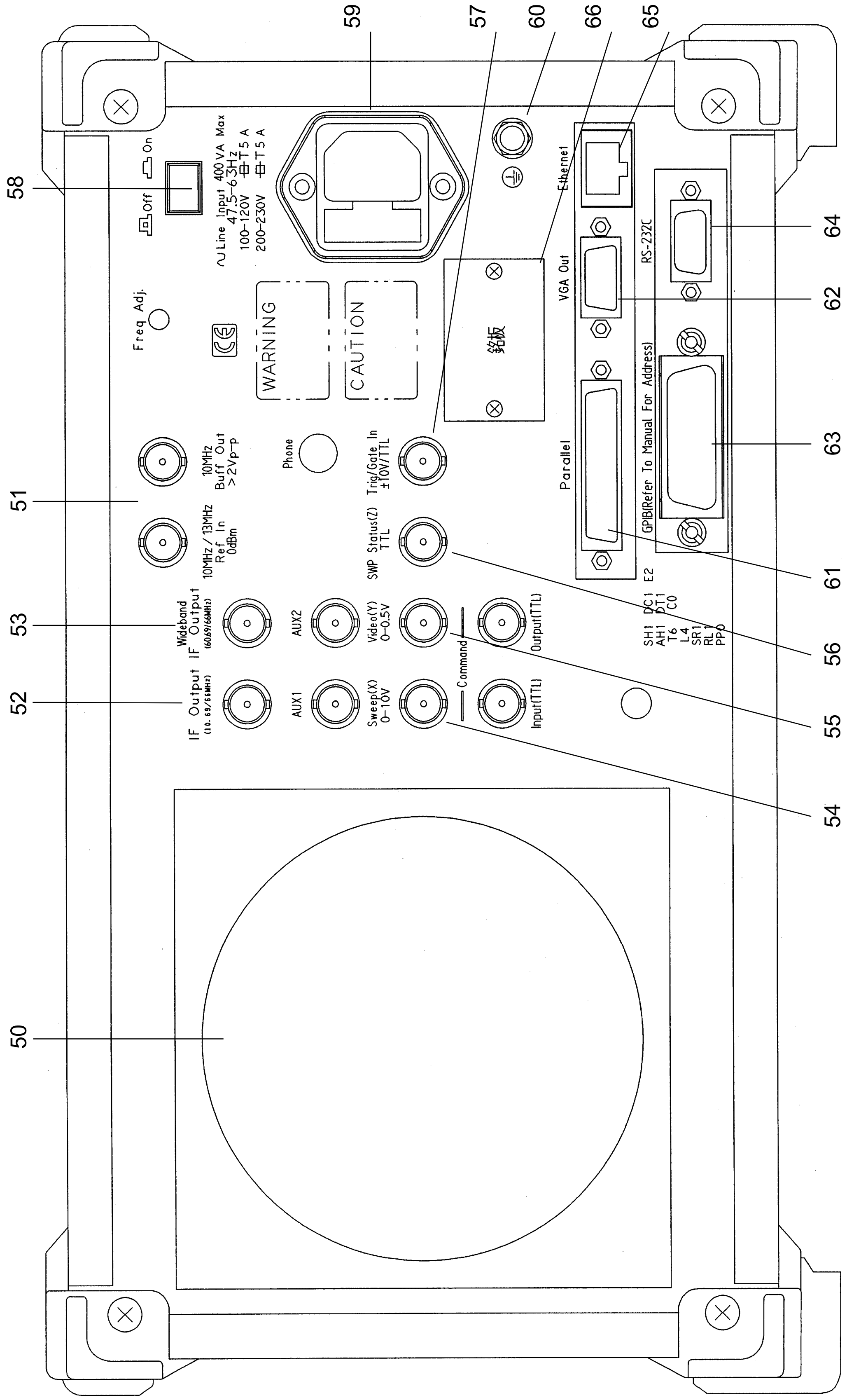


Fig. 2-4 Rear Panel of MS268xA

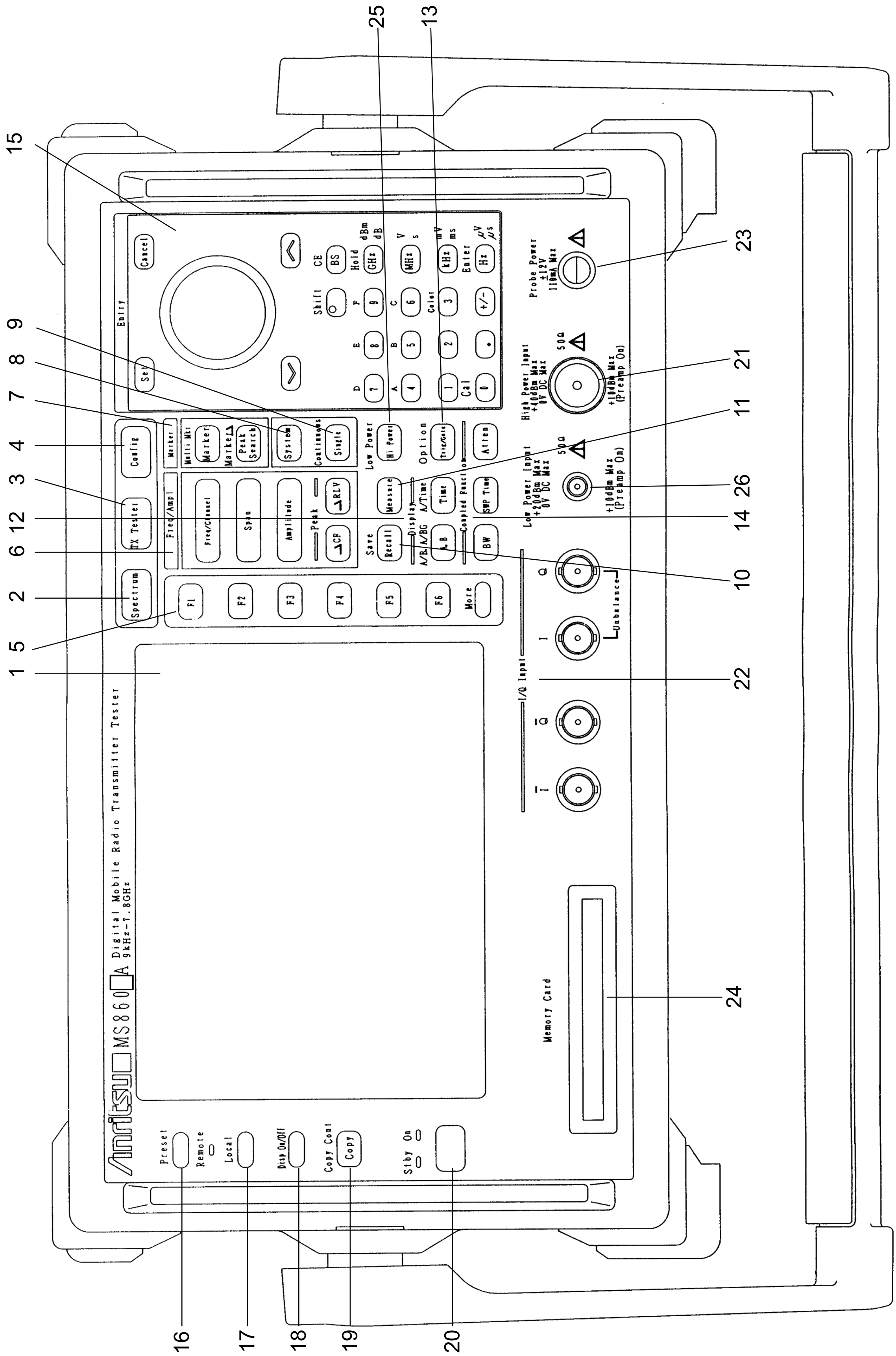


Fig. 2-3 Front Panel of MS8608A

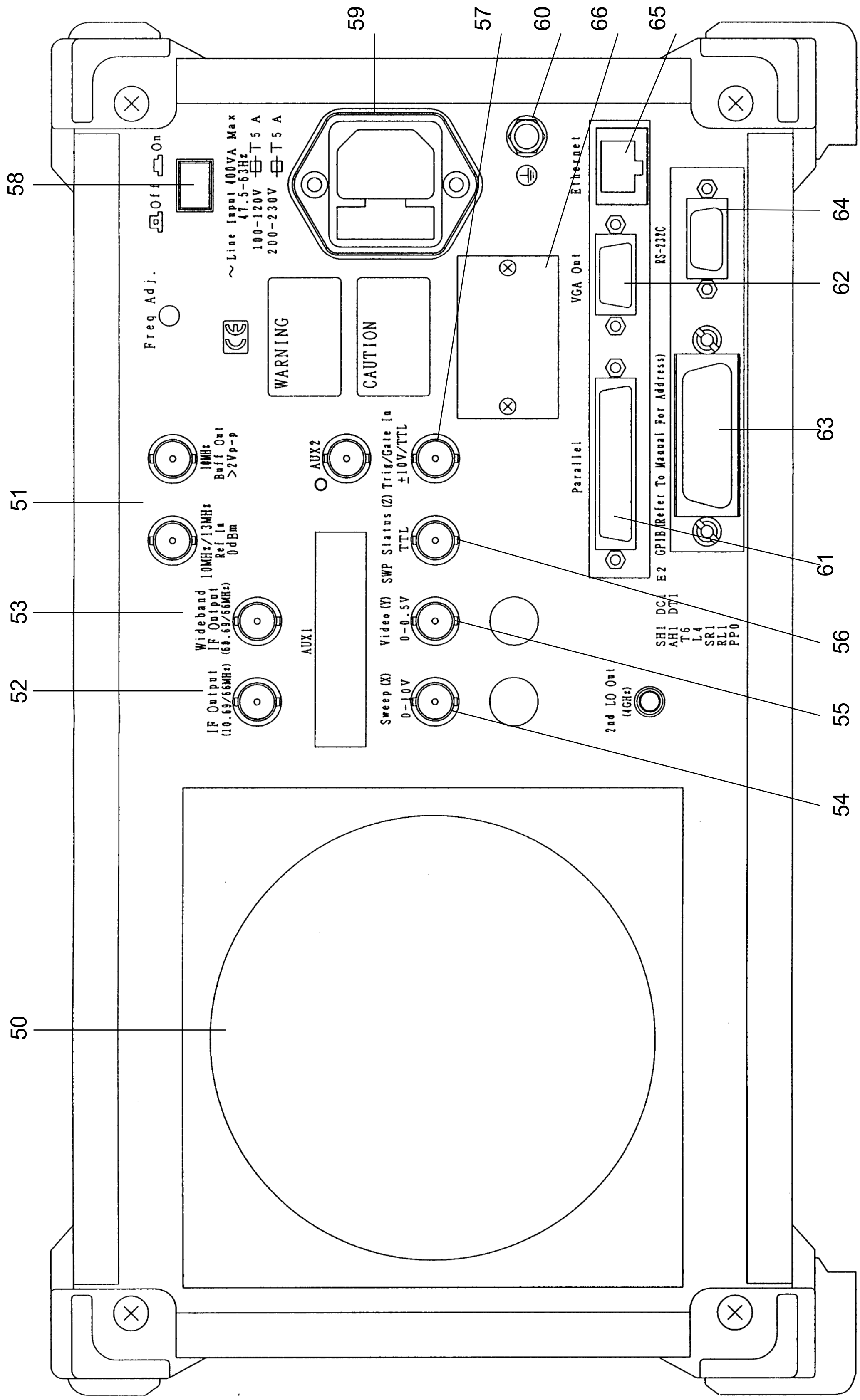


Fig. 2-4 Rear Panel of MS8608A

2.2 Basic Operation

This section describes the basic operation and typical parameter setting method.

2.2.1 Turn the power on

Press the standby button on the rear panel, then press the power switch on the front panel. In this case, continue pressing the power switch for one second or more.

> The power is turned on/off only when the power switch on the front panel is pressed for one second or more. This prevents the power from being turned on/off easily by mistake.

To make full use of this equipment, turn the Line Input power switch to On at least 30 minutes before use (this turns on the Stby (power) lamp on the front panel). The internal reference frequency oscillator is pre-heated and results in stable operation.

2.2.2 Selecting item

The item with a cursor on the screen indicates that the parameter can be changed, as below.
Some parameters can be set after pressing the corresponding function key, as below.

Setting item with cursor

Move the cursor at the item to be selected using [∧] and [∨] Entry keys and the rotary knob.
Then, press [Set] Entry key to confirm the item, and the parameter setting window is open.

Setting item with function key

Press the function key (any of [F1] to [F6] key) to open the parameter setting window.
Some parameters are set only by pressing a function key.

2.2.3 Setting parameter on parameter setting window

Setting parameter on the parameter setting window has two types of procedures.

(1) Select one of the parameters shown in the window.

(2) Input a value.

Selecting one of the parameters shown in the window

Move the cursor at the parameter to be selected using [∧] and [∨] Entry keys the rotary knob.
Then, press [Set] Entry key to confirm the parameter.
The window closes.

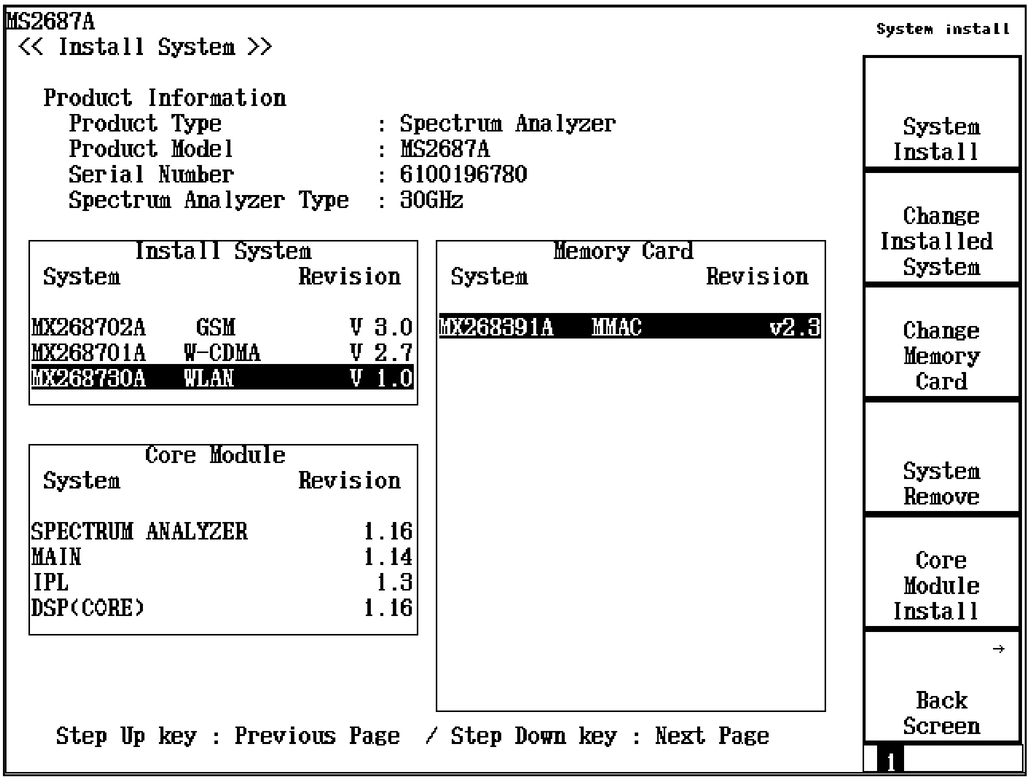
Inputting value

Input a value using the ten-key pad or the rotary knob.
Then, press a unit key or [Set] Entry key to confirm the parameter.
The window closes.

2.3 Installing Measurement Software

Install the desired measurement software (sold separately) of the MS268xA/MS860xA in the Transmitter Tester mode, as follows:

Step	Procedure
1	Insert a memory card on which the measurement software is saved into the memory card slot on the panel.
2	Press [Config] key to display the Config screen.
3	Press [F4] (System Install) to display the Install System screen (shown below).



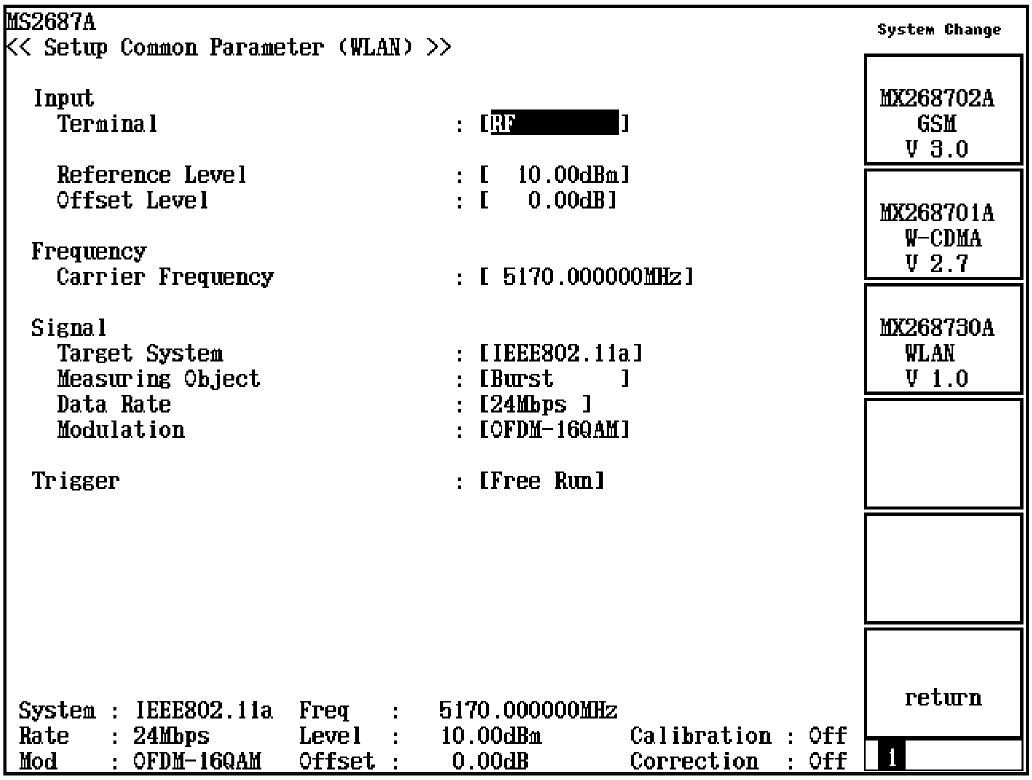
Step	Procedure
4	Press [F2] (Change Installed System) to make the Install System box active.
5	Select the install destination for the new measurement system using the rotary knob.
6	Press [F3] (Change Memory Card) to make the Memory Card box active.

Step	Procedure
7	Select the new measurement system using the rotary knob.
8	Press F1 (System Install) to install the new system.
9	The confirmation window opens. Move the cursor to “Yes” using the rotary knob.
10	Press Set (Entry key) to start installation.
11	After installation is completed, the new measurement system screen appears.

2.4 Changing Measurement System

To use the MS268xA/MS860xA with multiple measurement software (sold separately) installed, in the Signal Analysis mode; change the measurement system to the desired system, as follows:

Step	Procedure
1	Press [Tx Tester] to display the measurement system screen.
2	Press [System] to display the System Change function label (shown below).



Step	Procedure
3	All the installed measurement systems are displayed at function labels.
4	Press the function key for the measurement system to be set.
5	The measurement system is changed over.
6	After the setting is completed, a new system screen appears.

A measurement system not displayed in the function labels cannot be set. See “Installing Measurement Software” to install a new measurement system.

2.5 Setting Screen Colors

The method for setting the screen display colors are explained here.
The screen colors can be selected from four preset color patterns and one user-defined color pattern.

- Pressing the [Shift] + [3] (Color) displays the function labels shown below. Select one to be used:
  - [F1] (Color Pattern 1): Sets the Color Pattern 1 (default at shipment)
  - [F2] (Color Pattern 2): Sets the Color Pattern 2
  - [F3] (Color Pattern 3): Sets the Color Pattern 3
  - [F4] (Color Pattern 4): Sets the Color Pattern 4
  - [F5] (Define User Color): Sets the user-defined color pattern

Setting the user-defined color pattern

- Pressing [F5] (Define User Color) changes the display color pattern to the userdefined one and displays the function labels shown below:
  - [F1] (Copy Color Ptn from): Displays the function labels to select from Color Pattern 1 to 4 as the base color for setting the user-defined color pattern.
  - [F2] (Select Item): Selects 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 explains the parameters set on each screen and how to set item. Displayed as [ ] in this section is the panel key.

3.1 Setting Measurement Parameters 3-5
3.1.1 Setting Signal Input Connector (Terminal) 3-6
3.1.2 Setting RF Input Level (Reference Level) 3-7
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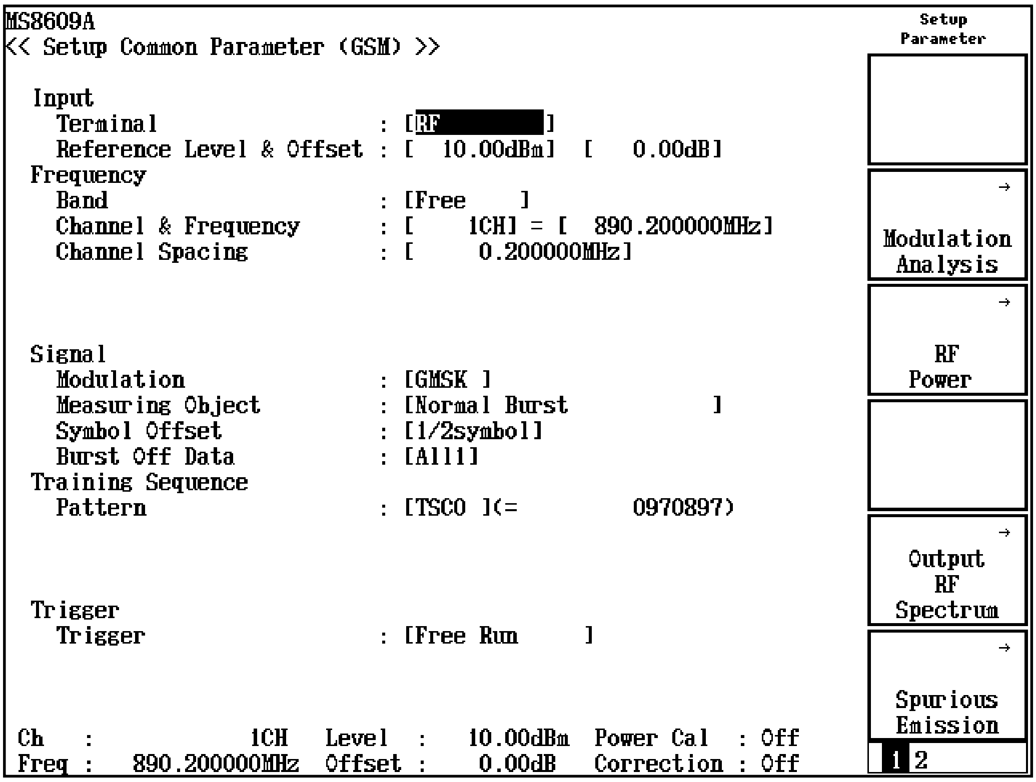
3.1 Setting Measurement Parameters

This Section explains the setting of measurement parameters, including input connectors and frequencies that are required for measurement.

Set the measurement parameters on the Setup Common Parameter screen.

Press the Tx Tester (MS860x)/ Signal Analysis (MS268x) key to display this screen.

The Setup Common Parameter screen is shown below:



3.1.1 Setting Signal Input Connector (Terminal)

Select a connector to input signals from the DUT (Device Under Test) to be measured.

Step	Procedure
1	Move the cursor to Terminal item with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to the desired item with [∧] and [∨] keys or with the rotary knob.
5	Press [Set] key.

When setting is completed, the set terminal in [ ] for Terminal.
The setting below can be selected.

- RF: RF input connecter is selected.
  For MS8608A, High Power input or Low Power input is selected. Switch of High Power input and Low Power input is executed as shown below.
    For High Power input: Press [Hi Power] key.
    For Low Power input: Press [Shift] key, and then [Hi Power] key.
  The input setting that is selected is shown to the display area of bottom of screen.
- IQ-DC: IQ input connector is selected.
  Uses the connector that is assigned to the group of Unbalance expression among IQ input connector.
  In this case, connection with internal circuit is DC connector.
- IQ-AC: AC input connector is selected.
  Uses the connector that is assigned to the group of Unbalance expression among AC input connector.
  In this case, connection with internal circuit is AC connector.
- IQ-Balance: IQ input connector is selected.
  Inputs the differential signal by using I and $\overline{I}$, and by using Q and $\overline{Q}$.

If you select IQ input, Impedance is displayed at the right, and impedance between 50 Ω and 1 MΩ can be selected. Selects it depends on output impedance of DUT.

If instrument is the MS268x, inputs of IQ-DC, IQ-AC and IQ-Balance are effective, only when option 17 and 18 are on-board.

3.1.2 Setting RF Input Level (Reference Level)

Set the input level for the RF signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Reference Level item with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key or enter desired numeric value from the numeric keypad.
3	The window for selection opens.
4	Input the numeric value with [∧] and [∨] keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set level is displayed in [ ] for Reference Level.
When IQ connector is selected, this item will not displayed.
This setting will be changed to optimum value by using the Adjust Range function on the measurement screen.

3.1.3 Setting Level Offset Factor (Level Offset)

Set the user-defined level offset factor.

Step	Procedure
1	Move the cursor to Offset item with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key or enter desired numeric value from the numeric keypad.
3	The window for selection opens.
4	Input the numeric value with [∧] and [∨] keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set level is displayed in [ ] for offset.
Examples:
–20 dB for the offset factor of 20-dB amplifier
+10 dB for the offset factor of 10-dB attenuator
Measurement result of RF level displays the value calculated by the formula below.

Displayed value of measurement result = Measured value + Offset

3.1.4 Setting Frequency Band (Band)

Set the frequency band for the signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Band item with ∧ and ∨ Entry keys or with the rotary knob.
2	Press Set key.
3	The window for selection opens.
4	Move the cursor to the desired item with ∧ and ∨ keys or with the rotary knob.
5	Press Set key.

When setting is completed, the specified value is displayed in [ ] of specified item.
The setting below can be selected.

- Free : Frequency, Channel and Channel spacing can be set up freely. It is same way as the setting method used before.
- P-GSM900 : Specifies the frequency by the channel number of P-GSM900 band determined by 3GPP standard.
- E-GSM900 : Specifies the frequency by the channel number of E-GSM900 band determined by 3GPP standard.
- R-GSM900 : Specifies the frequency by the channel number of R-GSM900 band determined by 3GPP standard.
- T-GSM380 : Specifies the frequency by the channel number of T-GSM380 band determined by 3GPP standard.
- T-GSM410 : Specifies the frequency by the channel number of T-GSM410 band determined by 3GPP standard.
- T-GSM900 : Specifies the frequency by the channel number of T-GSM900 band determined by 3GPP standard.
- DCS1800 : Specifies the frequency by the channel number of DCS1800 band determined by 3GPP standard.
- PCS1900 : Specifies the frequency by the channel number of PCS1900 band determined by 3GPP standard.
- GSM450 : Specifies the frequency by the channel number of GSM450 band determined by 3GPP standard.
- GSM480 : Specifies the frequency by the channel number of GSM480 band determined by 3GPP standard.
- GSM750 : Specifies the frequency by the channel number of GSM750 band determined by 3GPP standard.

• GSM850 : Specifies the frequency by the channel number of GSM850 band determined by 3GPP standard.

When the Band is selected other than the Free, the item that selects DUT is displayed on the right side. For the detail, refer to “3.1.5 Setting DUT to be Measured”. When the Band is selected other than the Free, specifies the frequency by the channel number of each Band determined by 3GPP standard. The frequency spacing will be 0.2MHz fixed and frequency that corresponds to channel number set is set automatically. Therefor, frequency and channel spacing are display only.

Moreover, among the frequency band above, when T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900 and GSM750 are selected, channel number can be set in more details. For more detail, refer to “3.1.6 Setting Channel Number in Details (ARFCN)”.

When IQ input connector is selected, this item will not displayed.

3.1.5 Setting DUT to be Measured (Band)

Set the DUT that to be measured.

Step	Procedure
1	Move the cursor to the right side item of Band with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to the desired item with (∧) and (∨) keys or with the rotary knob.
5	Press [Set] key.

When setting is completed, the set value is displayed in [ ] of specified item.
The setting below can be selected.

• MS : Measures the Mobile Station.
• BTS : Measures the Base Transceiver Station.
• Micro BTS : Measures the Micro Vase Transceiver Station.
• Pico BTS : Measures the Pico Base Transceiver Station.

When the Free is selected at the Band, this item will not displayed.

3.1.6 Setting Channel Number in Details (ARFCN)

Set the channel number of the frequency band selected in details.

Step	Procedure
1	Move the cursor to item of ARFCN_FIRST(x), BAND_OFFSET(y) or ARFCN_RANGE(z) with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Input the numeric value with [∧] and [∨] keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set value is displayed in [ ] of specified item.
This item can be set only when T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900 and GSM750 are selected at the Band. The setting below can be selected.

- ARFCN_FIRST(x) : Sets the top value of channel number.
- BAND_OFFSET(y) : Sets the offset value of channel number. For the channel number (n) specified, the frequency that corresponds to the channel number calculated by the formula (n-x+y) is set actually.
- ARFCN_RANGE(z) : Sets the range of channel number.

The relation of each item and frequency that at the time of each band was selected are shown below.
n will be the frequency that is at the time of channel number Fu(n), and Fl(n) will be the frequency that is at the time of channel number n.

The relation of ARFCN, channel range and value of frequency

Band	MS	Channl	BTS,Micro BTS
T-GSM 380	Fl(n) = 380.2 + 0.2*(n-x+y)	x ≤ n ≤ x+z	Fu(n)=F(n) + 10
T-GSM 410	Fl(n) = 410.2 + 0.2*(n-x+y)	x ≤ n ≤ x+z	Fu(n)=F(n) + 10
T-GSM 900	Fl(n) = 870.4 + 0.2*(n-x+y)	x ≤ n ≤ x+z	Fu(n)=F(n) + 45
GSM 750	Fu(n) = F(n) + 30	x ≤ n ≤ x+z	Fl(n) = 747.2 + 0.2*(n-x+y)
DCS 1800	Fl(n) = 1710.2 + 0.2*(n-x+y)	x ≤ n ≤ x+z	Fu(n) = F(n) + 95
PCS 1900	Fl(n) = 1850.2 + 0.2*(n-x+y)	x ≤ n ≤ x+z	Fu(n) = F(n) + 80

When other than T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900 and GSM750 are selected at the Band, this item will not displayed.

3.1.7 Setting Channel (Channel)

Set the frequency channel of the signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Channel item with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key or enter desired numeric value from the numeric keypad.
3	The window for selection opens.
4	Input the numeric value with [∧] and [∨] keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set value is displayed in [ ] of specified item. If channel is changed, frequency will be changed in response to frequency spacing. But, even if frequency is changed, channel is not changed. Therefor, when making the relation between channel and frequency, sets the channel first, then sets frequency.
When IQ input connector is selected, this item will not displayed.

3.1.8 Setting Frequency (Frequency)

Set the frequency of the signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Frequency item with [∧] and [∨] Entry keys or with the rotary knob.
2	Press [Set] key or enter desired numeric value from the numeric keypad.
3	The window for selection opens.
4	Input the numeric value with [∧] and [∨] keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set value is displayed in [ ] of specified item. As it was explained at "3.1.7 Setting Channel", if channel is changed, frequency will be changed but even if frequency is changed, channel is not changed. Therefor, when making the relation between channel and frequency, sets the channel first, then sets frequency.
When IQ input connector is selected, this item will not displayed.

3.1.9 Setting Channel Spacing (Channel Spacing)

Set the frequency spacing for the signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Channel Spacing item with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key or enter desired numeric value from the numeric keypad.
3	The window for selection opens.
4	Input the numeric value with (∧) and (∨) keys or with the rotary knob or numeric keypad.
5	Press [Set] key.

When setting is completed, the set value is displayed in [ ] of specified item.
When IQ input connector is selected, this item will not displayed.

3.1.10 Setting Modulation System (Modulation)

Set the modulation system for the signal from the DUT to be measured.

Step	Procedure
1	Move the cursor to Modulation item with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to desired item with (∧) and (∨) keys or with the rotary knob.
5	Press [Set] key.

When setting is completed, GMSK or 8-PSK is displayed in [ ] for Modulation.
If you set to GMSK, the mode will be analysis mode to the GSM signal of GMSK modulation.
If you set to 8-QPSK, the mode will be analysis mode to the EDGE signal of 8-QPSK modulation.

3.1.11 Setting Burst Format (Measuring Object)

Set the Burst format, as below.

Step	Procedure
1	Move the cursor to Symbol Offset item with ∧ and ∨ Entry keys or with the rotary knob.
2	Press Set Entry key.
3	The window for selection opens.
4	Move the cursor to the desired item with ∧ and ∨ keys or with the rotary knob..
5	Press the Set key.

When setting is completed, the set burst format is displayed in [ ] for Measuring Object.
The setting below can be selected.

- Normal Burst
- Normal Burst(Multislot)
- Access Burst (only for GMSK)
- Synchronization Burst (only for GMSK)
- Continuous

In Continuous mode, the continuous wave of GMSK or 8-PSK modulation is analyzed.
When Normal Burst (Multislot) is selected, please always set each Time Slot that is in the frame of Multislot Parameter Setup screen.
For the detail, refer to “3.1.18 Setting Multislot Parameter (Multislot Parameter Setup)”.

3.1.12 Setting Symbol Offset (Symbol Offset)

Set the symbol offset.

Step	Procedure
1	Move the cursor to Symbol Offset item with ∧ and ∨ Entry keys or with the rotary knob.
2	Press Set key.
3	The window for selection opens.
4	Move the cursor to the desired item with ∧ and ∨ keys or with the rotary knob.
5	Press Set key.

When setting is completed, the set value is displayed in [ ] of Symbol Offset item.
The setting below can be selected.

- 0 Symbol : Sets the symbol of reference point to the 0 Symbol.
- 1/2 Symbol : Shifts the symbol reference point by 0.5 Symbol.

3.1.13 Setting Data in Burst Off interval (Burst Off Data)

Sets the data in Burst Off interval, of signals to be measured.

Step	Procedure
1	Move the cursor to Burst Off Data item with ∧ and ∨ Entry keys or with the rotary knob.
2	Press Set key.
3	The window for selection opens.
4	Move the cursor to the desired item with ∧ and ∨ keys or with the rotary knob.
5	Press Set key.

When setting is completed, the set value is displayed in [ ] of Burst Off Data set item.
The setting below can be selected.

- All1: Sets the data in Burst Off interval to ALL1.
- All0: Sets the data in Burst Off interval to ALL0.
- Auto: Auto-detects the data in Burst Off interval.

3.1.14 Setting Training Sequence (Training Sequence)

Select one of them that using Training Sequence Code, using change of amplitude or using any pattern of user's original, for detection/position-alignment of the signal from DUT to be measured.

Setting pattern

Step	Procedure
1	Move the cursor to Pattern item with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to the desired item with (∧) and (∨) keys or with the rotary knob.
5	Select the value with the numeric key pad or the rorary knob.
6	Press [Set] key.

When setting is completed, the set pattern is displayed in [ ] for Pattern item.

The setting below can be selected.

- TSC0 to 7 : Available only for Normal Burst. Performs the measured signal detection/position-alignment with the set pattern.
- ETSC : Available only for Access Burst. Performs the measured signal detection/position-alignment with the set pattern.
- SYNC : Available only for Synchronization Burst. Performs the measured signal detection/position-alignment with the set pattern.
- No : Performs the measured signal detection/position-alignment by change of amplitude.
- User : Performs the measured signal detection/position-alignment by any pattern defined by the user.

Setting pattern by user

(1) Set the pattern data length by user's definition.

- Set the pattern data length by user's definition in User Pattern Length item.
- The unit of the pattern data length is Symbol.
- You can set the pattern length from 1 to 64 symbol for GMSK, and from 1 to 26 symbol for 8-PSK.

(2) Set the pattern data for user's definition.

- Set the pattern data for user's definition in User Bit Pattern item.
- Enter a hexadecimal number for GMSK and an octal number for 8-PSK.

(3) Set the pattern start point for user's definition.

- Set the pattern start point for user's definition in Start Point item.

Example: If TSCO is set by user's definition

- User Pattern Length : 26 symbol
- User Bit Pattern : 0970897
- Start Point : 61 symbol

Caution:

When Normal Burst (Multislot) is selected at the Measuring Object, sets each Training Sequence on the Multislot Parameter Setup screen.

3.1.15 Setting Trigger (Trigger)

Set the Trigger.

Step	Procedure
1	Move the cursor to Trigger item with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to Free Run or External with (∧) and (∨) keys or with the rotary knob.
5	Press [Set] key.

When setting is completed, Free Run or External is displayed in [ ] for Trigger item.

- Free Run : Detects and measures the burst with the internal timing.
- External : From the time that trigger signal from Trig/Gate In on the rear panel is received, the first burst detected is measured.

If External is selected, you need set up the edge and delay of the trigger signal.

Setting Trigger Edge

Step	Procedure
1	Move the cursor to Trigger Edge item with (∧) and (∨) Entry keys or with the rotary knob.
2	Press [Set] key.
3	The window for selection opens.
4	Move the cursor to Rise or Fail with (∧) and (∨) keys or with the rotary knob.
5	Press [Set] key.

When setting is completed, Rise or Fail is displayed in [ ] for Trigger Edge item.

- Rise : Synchronizes with the rise edge.
- Fall : Synchronizes with the fall edge

Setting Trigger Delay

Step	Procedure
1	Move the cursor to Trigger Delay item with ∧ and ∨ Entry keys or with the rotary knob.
2	Set the delay time with numeric key.

When the setting is completed, the set delay time is displayed in [ ] for Trigger Delay item.

3.1.16 Setting Frequency Characteristic Correction (Correction)

If you wish to correct the frequency characteristics loss of the cable connecting a measured with the transmitter tester, save the correction factor for the measuring system in the internal memory of the transmitter tester. The correction factor is then added to the measured value to display the corrected value.
This function allows you to directly read a required measured value by the transmitter tester.

To save the measuring system correction factor in the internal memory of the transmitter tester, see the Operation Manual of the MS8608A/MS8609A Digital Mobile Radio Transmitter Tester, Vol.2 (on Spectrum Analyzer Function) or Operation Manual of the MS268X Spectrum Analyzer, Vol.2 (on Panel Operation Detail).

The internal memory can save 5 types of correction factor tables.
When using this software, select from among 5 types of correction factor tables saved in the internal memory, as follows:

Selecting correction factor table

Step	Procedure
1	Press Amplitude key to display the Amplitude function label.
2	Press F4 (Correction) key to open the window for selection of correction factor table.
3	Move the cursor to the desired correction factor table with ∧ and ∨ keys or with the rotary knob.
4	Press Set key.

When the setting is completed, the selected correction factor table is displayed in the Correction item lower right of the screen.

3.1.17 Setting Pre-amplifier (Pre Ampl.)

This function is available only when the MS8608A-08, MS8609A-08, MS2681A-08 and MS2683A-08 is installed.

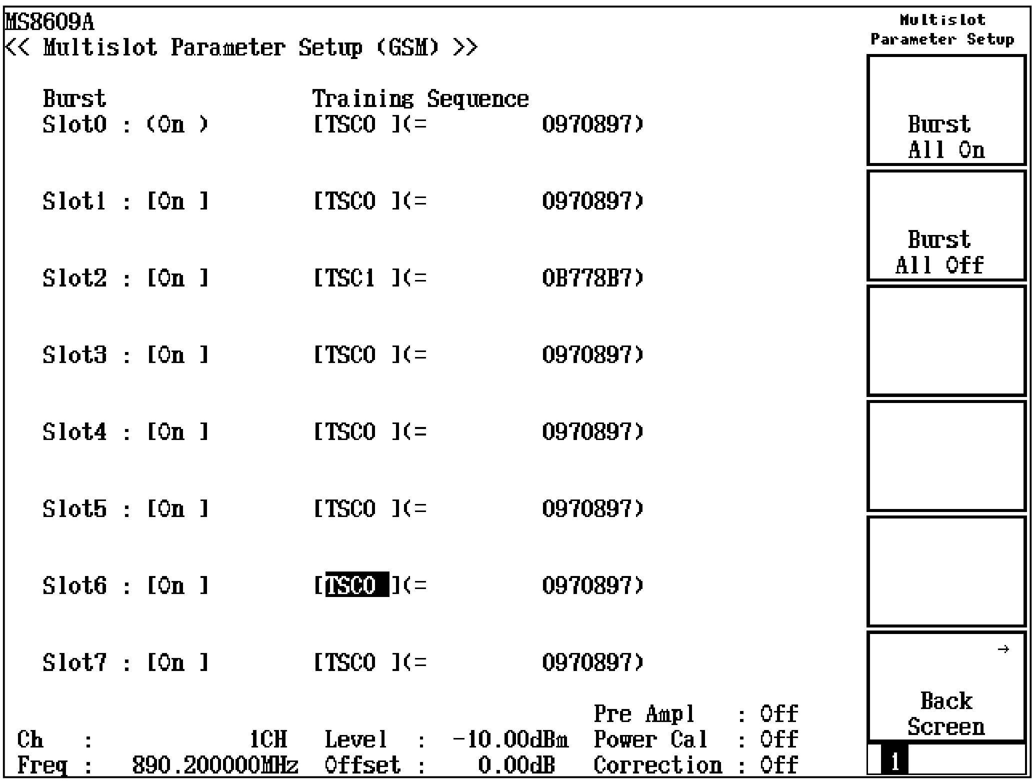
Setting Pre-Amplifier

Step	Procedure
1	Press [Amplitude] key to display the Amplitude function label.
2	Press [F5] (Pre Ampl.) key to switch On and Off, alternatery.

When the setting is completed, On or Off is displayed in the Pre Ampl. item lower right of the screen.

3.1.18 Setting Multislot Parameter (Multislot Parameter Setup)

On this screen, only when Normal Burst (Multislot) is selected at Measuring Object, sets On/Off and Training Sequence of Burst at each Time Slot of measured signal. Press [F4] (Multislot Parameter Setup) to shift to this screen.



- Slot 0 to 7 : Sets the specified slot.
- Burst : Sets the On/Off of Burst at the specified Slot spacing.
- Training sequence : Selects one of them that using Training Sequence Code, using change of amplitude or using any pattern of user's original, for detection/position-alignment of the signal from DUT to be measured. For more detail, refer to "3.1.14 Setting Training Sequence".
- Burst All On/Off : Sets all Slots except Slot 0 to On or Off.

Caution:

When Normal Burst (Multislot) is selected, detects the top of Slot0 of the Frame using by Pattern. It may not be detected when the Pattern of Slot0 is No and when the Bursts of Pattern exists more than one on the frame of measured signal.

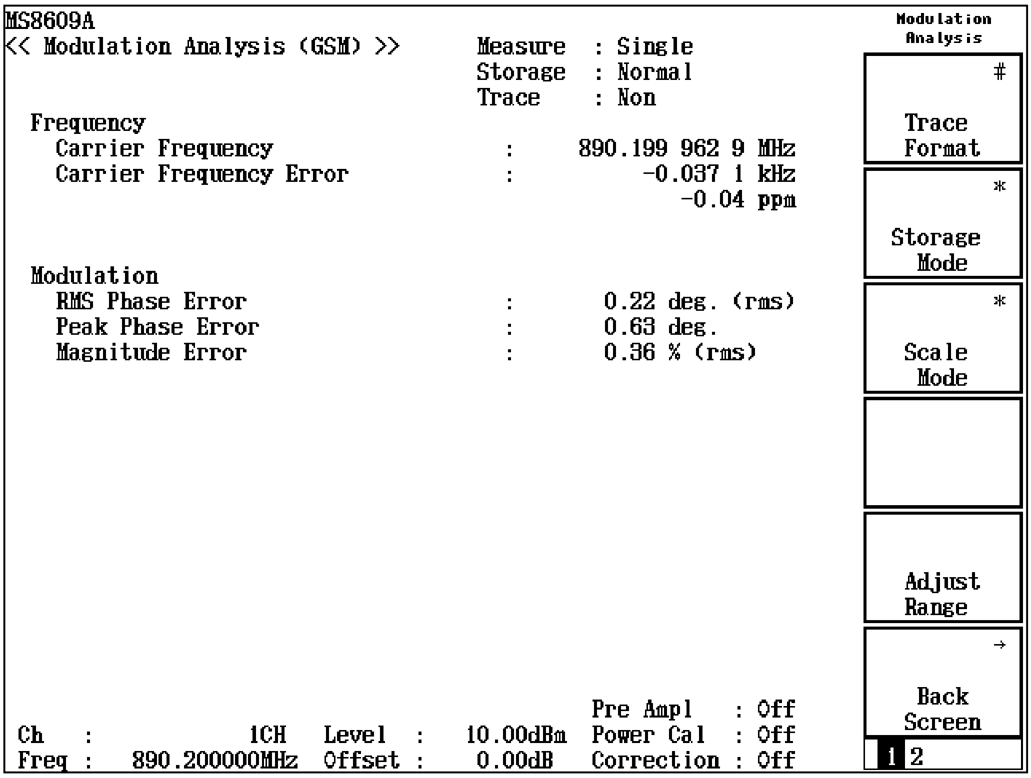
3.2 Measuring Modulation Accuracy

This section explains the measured results and setting parameters set up on the Modulation Analysis screen.

3.2.1 Describing Measurement Result

Description of the screen.

When the modulation of Setup Common Parameter is GMSK:



Frequency

(1) Carrier Frequency

Frequency of the measured signal obtained by phase-locus method displayed in MHz unit.

(2) Carrier Frequency Error

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

Modulation

(1) RMS Phase Error (RMS)

RMS value of phase error for measure signal in degree unit

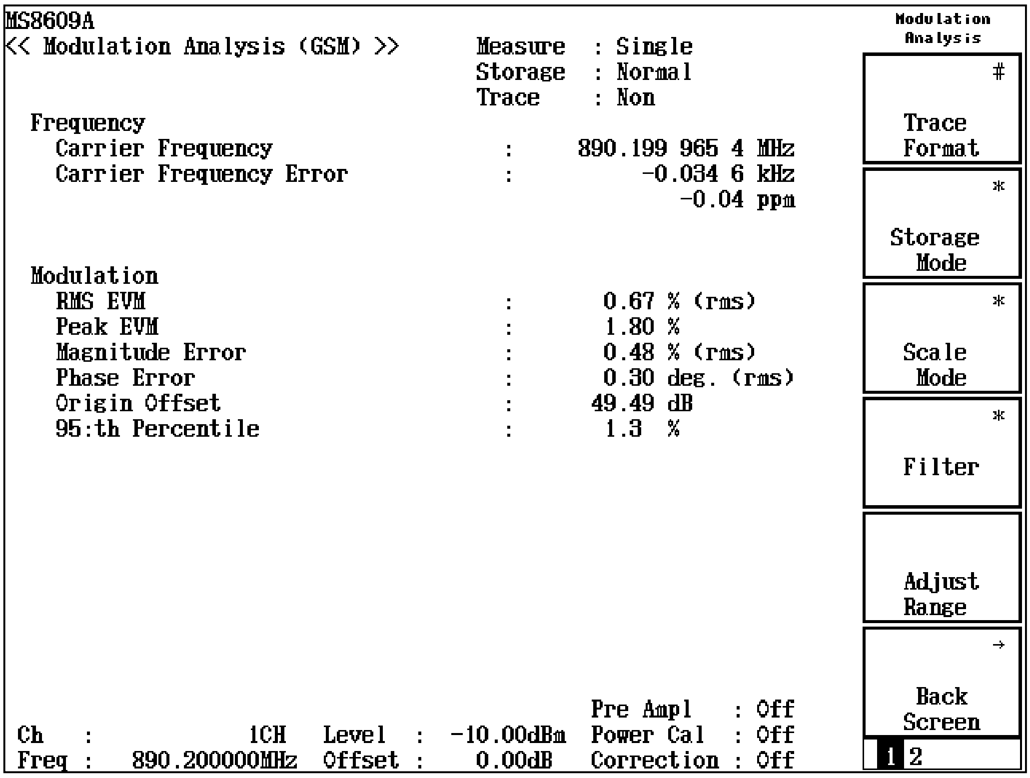
(2) Peak Phase Error

Peak value of phase error for measured signal in degree unit

(3) Magnitude Error (RMS)

RMS value of magnitude error of measured signal in % unit

When the modulation of Setup Common Parameter is 8-PSK:



Frequency

(1) Carrier Frequency

Frequency of the measured signal obtained by phase-locus method in MHz unit.

(2) Carrier Frequency Error

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

Modulation

(1) RMS EVM (RMS)

RMS value of vector error for measure signal in % unit

(2) Peak EVM

Peak value of phase error for measured signal in % unit

(3) Magnitude Error (RMS)

RMS value of magnitude error of measured signal in % unit

(4) Phase Error (RMS)
Peak value of phase error for measure signal in degree unit

(5) Origin Offset
Origin offset (carrier leak component) of measured signal in dB unit

(6) 95-th Percentile
EVM value in % unit, obtained when relative probability distribution of EVM of measured signal becomes 95 %

3.2.2 Setting Waveform Display Format (Trace Format)

Set the waveform display format on the screen by selecting one of the following:

- Non :Numeric value display only.
- Constellation :Constellation display.
- Eye Diagram :Eye diagram display.
- EVM vs. Symbol :EVM vs. Symbol display (when Modulation of Setup Common Parameter is 8-PSK).
- Phase Error :Phase error vs. Symbol display.
- Magnitude Error :Magnitude error vs. Symbol display.
- Trellis :Phase vs. Symbol display (when Mmodulation of Setup Common Parameter is GMSK)

3.2.3 Setting Storage Mode (Storage Mode)

Set the storage mode for measured results, as follows.

Storage Mode : Select one of the following storage modes.
- Normal :Measure result is updated and displayed at each measurement end.
- Average :Average of measured result is calculated and displayed at each measurement end.
- Overwrite :Measured value is treated as if in Normal mode, but the waveform display is overwritten.

Average Count : Set the number of average counts.
Refresh Interval : Set the interval for updating the average value, as follows.
- Every: Updated at each measurement end.
- Once: Updated at the measurement end over the number of the averaged counts.

3.2.4 Setting Interpolation Method for Constellation Waveform Display (interpolation)

Set the interpolation method for constellation waveform display, as follows:

(1) Press the F5 key (Scale Mode) to display the function labels below.

- F1 (Interpolation)
- F4 (Vertical Scale)

(2) Press the F1 (Interpolation) key to display the function labels below. Select the interpolation method.

- F1 (Non) :Displays only symbol point.
- F2 (Linear) :Displays symbol points interpolated with linear lines between two symbol points.
- F3 (10 points) :Displays symbol points interpolated with ten points between two symbol points.
- F4 (Linear & Symbol Position): Combination (Non and Linear) display.
- F5 (10 points & Symbol Position): Combination (Non and 10 points) display.
- F6 (return) :

3.2.5 Setting Scale of EVM, Phase Error and Magnitude Error (Vertical Scale)

Set the vertical-axis scale for EVM, phase error and magnitude error waveform displays, as follows:

(1) Press the F3 (Scale Mode) key to display the function labels below.

- F1 (Interpolation)
- F4 (Vertical Scale)

(2) Press the F4 (Vertical Scale) key to display the function labels below. Select the interpolation method.

For EVM and magnitude error:

- F1 (5%): Sets the vertical-axis full scale to 5 %.
- F2 (10%): Sets the vertical-axis full scale to 10 %.
- F3 (20%): Sets the vertical-axis full scale to 20 %.
- F4 (50%): Sets the vertical-axis full scale to 50 %.
- F5 (100%): Sets the vertical-axis full scale to 100 %.

For phase error:

- F1 (5 deg): Sets the vertical-axis full scale to 5 deg.
- F2 (10 deg): Sets the vertical-axis full scale to 10 deg.
- F3 (20 deg): Sets the vertical-axis full scale to 20 deg.
- F4 (50 deg): Sets the vertical-axis full scale to 50 deg.
- F5 (100 deg): Sets the vertical-axis full scale to 100 deg.

3.2.6 Setting Filter (Filter)

The following filters can be input before analyze for signal input from the transmitter to be measured (for 8-PSK modulation).

- F1 (Non): The input signal is analyzed without any filtering processing.
  This filter is used when the signal (which is the GSM 8-PSK modulation signal that passed through the inverse filter to Pules Shaping Filter, and then made to Nyquist state) is input.
- F2 (Nyquist): The input signal to this instrument will be analyzed after passed through the Nyquist filter ($\alpha = 0.25$).
  This filter is used when the signal (which is the GSM 8-PSK modulation signal that passed through the inverse filter to Pulse Shaping Filter, at the state of 3/8 π rotation 8-PSK) is input.
- F3 (Nyquist & Inverse): The input signal to this instrument will be analyzed after passed through the Nyquist filter ($\alpha = 0.25$) and the inverse filter to the filger (described on GSM 05.04 3.5 Pluse Shaping).
  This filter is used to return the signal to the state before the processing of the Pluse Shaping filter (namely, the state of 3/8 π rotation 8-PSK) before analysis. In other word, analyzes with condition of demodulation.
- F4 (Spec): The input signal to this instrument will be analyzed after passed through the measurement filter (described on GSM 05.05 4.6.2 8-PSK modulation) before analysis.
  This filter is selected for the measurement based on the GSM standard.

3.2.7 Displaying Marker (Marker)

Display a marker on each waveform when Trace Format is set to other than Non.

Displaying marker

Step	Procedure
1	Press Marker key to display the Marker function labels.
2	Press F1 (Marker) key to switch the marker between Normal and Off, alternately.

If set to Normal, a diamond (◆) marker is displayed on the waveform.

3.2.8 Selecting Modulation Analysis Range (Analysis Range)

Select the modulation analysis range that measures 1Slot or average of all Slots in a Frame. This is valid only when Normal Burst (Multislot) at Measuring Object is selected.

Step	Procedure
1	Press [ ] (More) key to display the second page of function label of Modulation Analysis.
2	Press [F4] (Analysis Range) key to switch between Slot and Frame alternately, and then executes measurement.

- Slot : Executes modulation analysis of 1Slot.
- Frame : Executes modulation analysis of Slot that set Burst to On on the Multislot Parameter Setup screen, and outputs the average of that.

3.2.9 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, 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.

3.2.10 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 calibrators 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 MX268x main body, perform the level calibration using Spectrum Analyzer mode for level measurement. For the detail, refer to additional volume “MS268x Spectrum Analyzer Operation Manual Vol.2 (Panel Operation in detail)”.

3.2.11 Power Calibration Function (Multi Carr. Power Calibration)

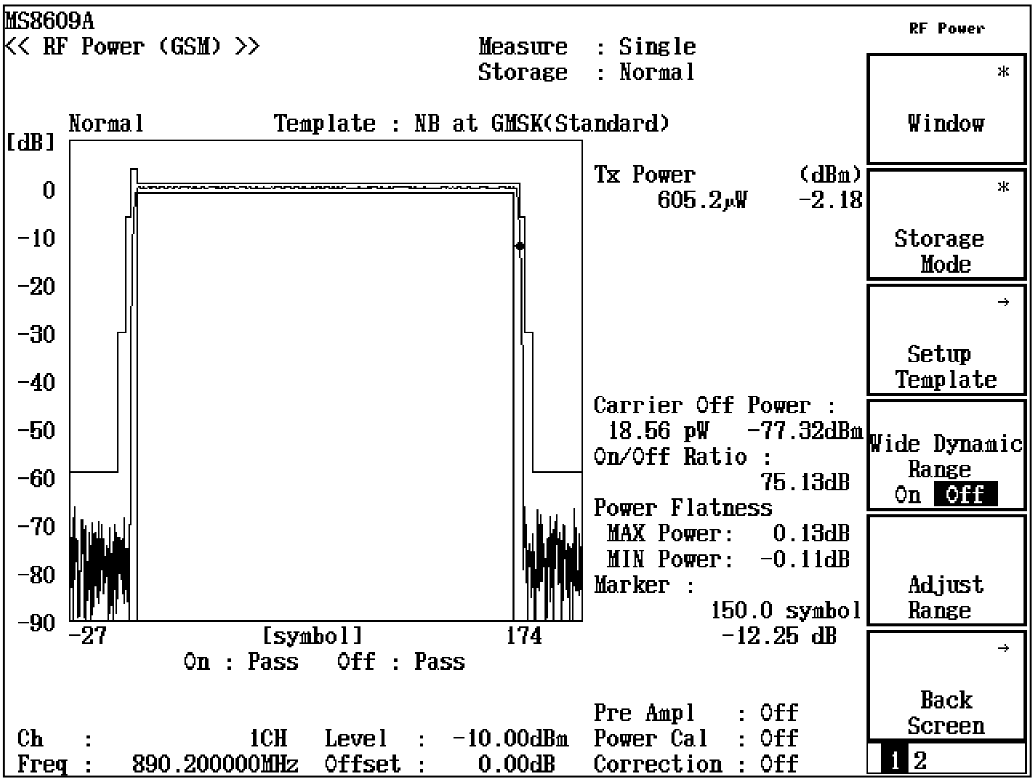
Since calibrating internal signal depends on build-in calibration signal for this function, level measurement can be performed without using internal power meter.

This function should be used when the input signal is Multi carrier. 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.

3.3 Measuring Transmit Power

This section explains measured results and the parameters set up displayed on the RF Power screen.

Screen description



Waveform display

Displays the magnitude measured waveform with Symbol on the horizontal axis and level on the vertical axis.

Displays template (magnitude specification line) when relative level is displayed for magnitude measurement waveform.

TX Power

Displays average power of measure signal during burst-on.

Carrier OFF Power

Displays average power during transmission Off.

On/Off Ratio

Displays the power ratio of Tx Power to Carrier Off Power.

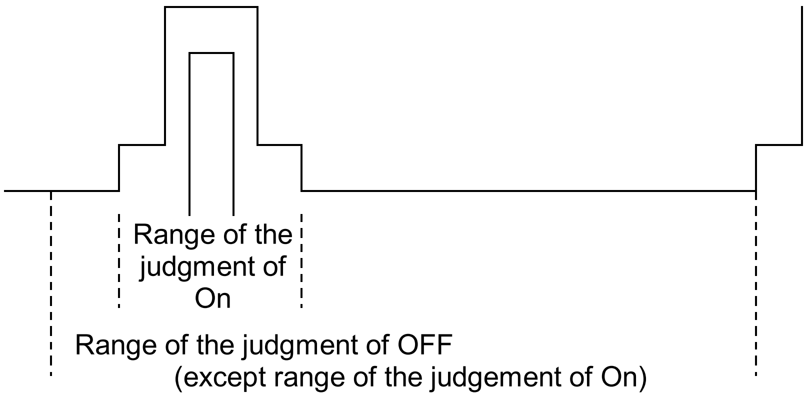
Power Flatness

Displays the maximum and minimum powers in power On interval.

On

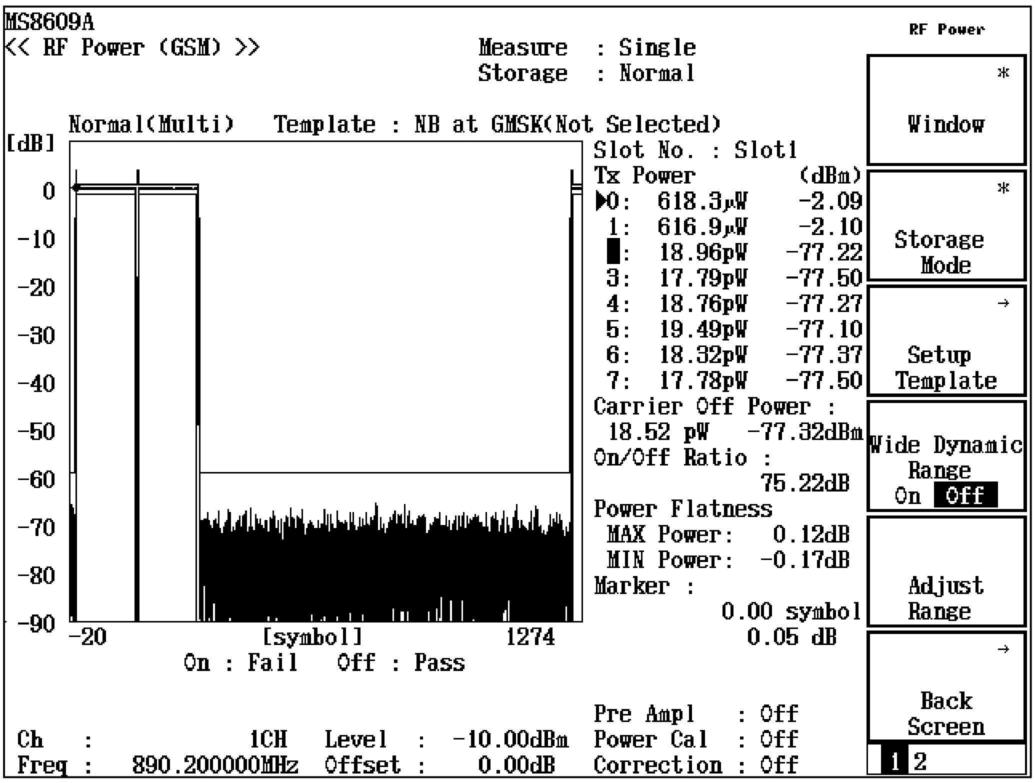
Off

Displays Pass/Fail judgment of magnitude measurement waveform by Template.



Screen Description

If selects Normal Burst (Multislot) at the measuring Object.



Waveform display

Displays the magnitude measured waveform with Symbol on the horizontal axis and level on the vertical axis.

Displays template (magnitude specification line) when relative level is displayed for magnitude measurement waveform. 0 dB of displayed relative level is referring to maximum TX Power in Frame.

Slot No.

Displays result of displayed slot.

TX Power (slot 0 to 7)

Displays average power of measure signal during burst-on.

▶

Displays slot of maximum TX Power.

Carrier OFF Power

Displays average power during transmission Off.

Not displays when all bursts are turned On at the Multislot Parameter Setup screen.

On/Off Ratio

Displays the power ratio of Tx Power to Carrier Off Power of specified slot.

Not displays when all bursts are turned On at the Multislot Parameter Setup screen.

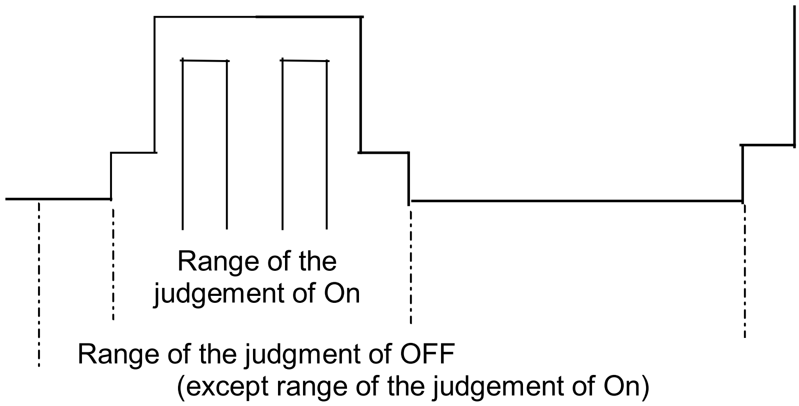
Power Flatness

Displays the maximum and minimum powers in power On interval of specified Slot.

On

Off

Displays Pass/Fail judgment of magnitude measurement waveform by Template of specified Slot. When selects the Frame-display on the Window, displays Pass/Fail judgement of whole Frame. The Slot No. of Slot that was judged as Fail will be highlighted with red, on the left of TxPower.



3.3.1 Setting Waveform Display Range (Window)

Set the display range for the waveform window, as follows:

- Press [F1] (Window) key to display the following function labels. Select the display range for the waveform window.
  - [F1] (Slot): Displays the waveform for 1 slot.
  - [F2] (On Portion): Enlarges the waveform for On portion.
  - [F3] (Frame): Displays the waveform for 1 frame.
  - [F4] (Leading): Displays the waveform for burst rise-edge portion.
  - [F5] (Trailing): Displays the waveform for burst fall-edge portion.

3.3.2 Setting Storage Mode (Storage Mode)

Set the storage mode for measured results, as follows.

Storage mode: Select one of the following storage modes;

- Normal: Measure result is updated and displayed at each measurement end.
- Average: Average of measured result is calculated and displayed at each measurement end.

Average Count: Set the number of average counts.

Refresh Interval: Set the interval for updating the average value, as follows

- Every: Updated at each measurement end.
- Once: Updated at the measurement end over the number of the averaged counts.

3.3.3 Enlarging Measurement Dynamic Range (Wide Dynamic Range)

Press [F4] (Wide Dynamic Range) key to switch "Wide Dynamic Range" between On and Off.

When the Wide Dynamic Range is set to On, you can enlarge the measurement dynamic range by measuring with different RF attenuator setting in burst-on and burst-off portions. This measurement is performed in single measurement mode.

Caution ⚠

When the Wide Dynamic Range is set to On, the RF attenuator setting is switched in burst-on and burst-off portions for the measurement. So, the RF attenuator is switched more frequency than in ordinary measurement mode.

The life time of RF attenuator switching is 5 million times.

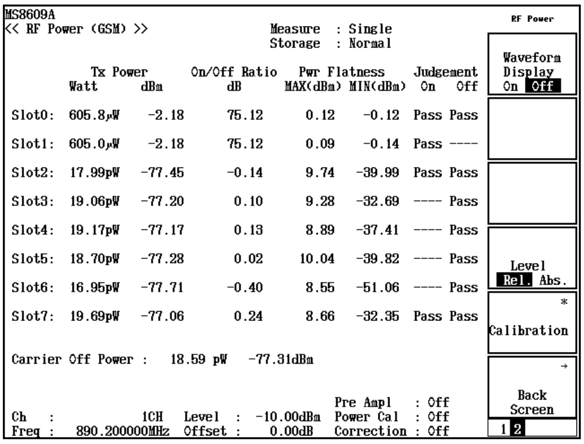
3.3.4 Setting Waveform Relative/Absolute Display (Level Rel./Abs.)

Set the Relative display/Absolute display of waveform, as follows:

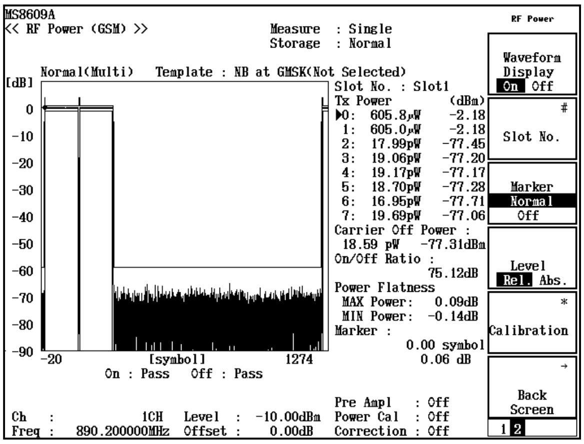
Step	Procedure
1	Press [ ] (More) key to display the second page of function label of RF Power.
2	Press [F4] (Level Rel./Abs.) key to switch between the Relative and the Absolute level display mode, alternately.

3.3.5 Changing Display of Measurement Result (Waveform Display)

If Normal Burst (Multislot) is selected at the Measuring Object, pressing [F1] (Waveform Display) of second page of the function label can change the display of numeric screen and waveform screen. Displays the result of all slots by undisplaying the waveform.



Screen of Waveform Display Off



Screen of Waveform Display On

3.3.6 Selecting Measurement Result of Slot (Slot No.)

Display the measurement result of specified slot.

Step	Procedure
1	Press [ ] (More) key to display the second page of the function lavel of RF Power.
2	Press [F2] (Slot No) key to open window.
3	Select from slot0 to 7. Display the measurement result of specified slot.

3.3.7 Setting Marker (Marker)

On RF Power screen, you can display a marker on the waveform.

Setting marker

Step	Procedure
1	Press [Marker] key to display the Marker function labels.
2	Press the [F1] (Marker) key to switch the marker between Normal and Off, alternately.

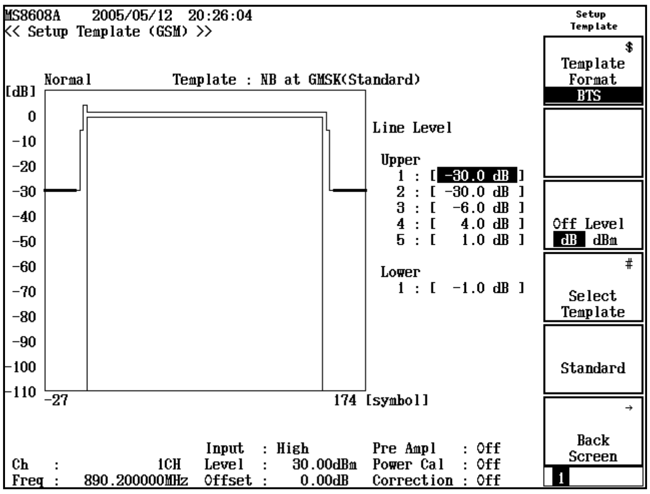
If set to Normal, a diamond (◆) marker is displayed on the waveform.

3.3.8 Setting Template (Setup Template)

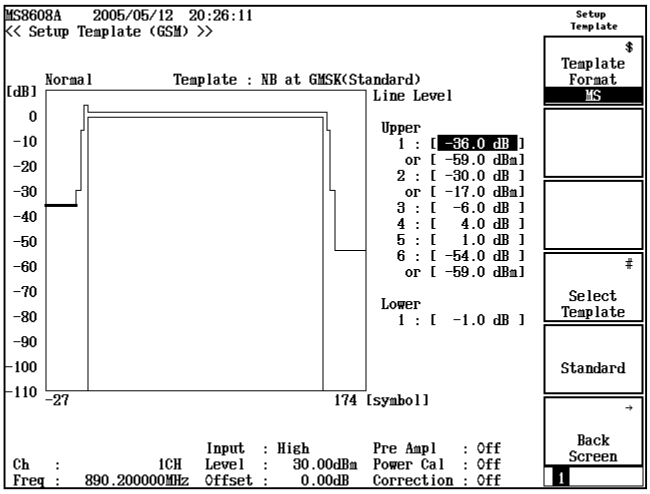
When measuring the burst signal in relative level mode, a template can be displayed, as follows.

Displaying Setup Template screen

Step	Procedure
1	On the RF power screen , press F3 (Setup Template) key on the first page of RF Power Function label.
2	The Setup Template screen appear.



Template Format is BTS



Template Format is MS

Setting template

Step	Procedure
1	Select the desired specification line with ∧ and ∨ Entry keys or with the rotary knob.
2	Set the specification-line level with the numeric key pad. Or, press Set Entry key. If Set key pressed above, move on to the following steps.
3	The specification changing line is displayed.
4	Set the changing line to the desired level with ∧ and ∨ Entry keys or with the rotary knob.
5	Press Set key.

When setting is completed, the specification-line level is changed to the set level.

Setting the template format

- Press F1 (Template Format) keys to switch the BTS and MS alternately. The level and unit of the specification-line are separately saved in BTS and MS.

Setting Off level (Upper-1) unit

- Press F3 (Off Level) key to switch the unit between dB and dBm, alternately.

Setting the template type

When you press the F4 (Select Template) key, you can select template from among the four types below.

- NB at GMSK : Normal Burst modulated by GMSK
- AB : Access Burst
- NB at 8PSK : Normal Burst modulated by 8PSK
- BTS1900 at GMSK : Burst signal of PCS1900 or MXM1900 band modulated by GMSK

Auto-Determination for the level of Template line

When the Trace Format is selected for MS, the specification-line Upper-1, Upper-2, and Upper-6(For NB at 8-PSK, Upper-7) set both values, dB and dBm. During a measurement, dB or dBm shall be automatically selected, whichever is higher.

When performing Pass/Fail judgment by means of the Template, the power value in A to J can be derived from complementing a line from the adjacent 1/10 symbol point.

Returning values of template to default values

If you press F5 (Standard) key, the template returns to above default values.

Each template is as follows:

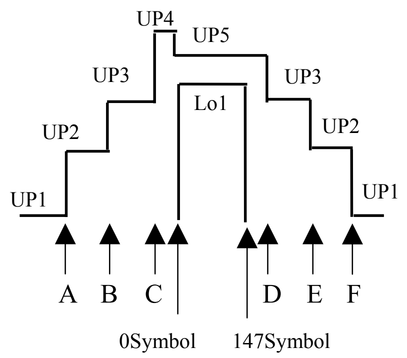
Template Format: BTS

NB at GMSK

Upper −1 : −30dB
Upper −2 : −30dB
Upper −3 : −6dB
Upper −4 : 4dB
Upper −5 : 1dB

Lower −1 : −1dB

A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D : 147 symbol +10 μs
E : 147 symbol +18 μs
F : 147 symbol +28 μs



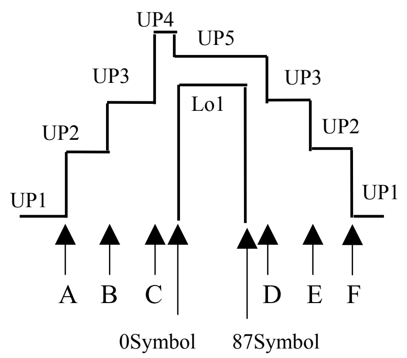
Template Format: BTS

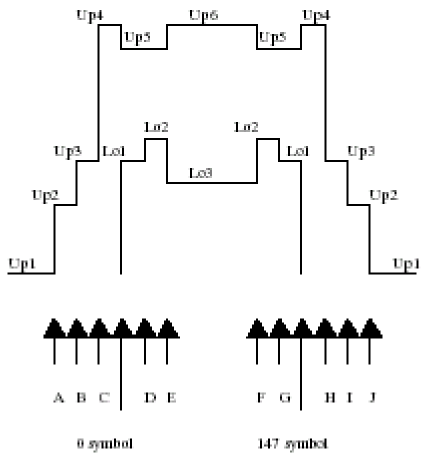
NB at GMSK

Upper −1 : −30dB
Upper −2 : −30dB
Upper −3 : −6dB
Upper −4 : 4dB
Upper −5 : 1dB

Lower −1 : −1dB

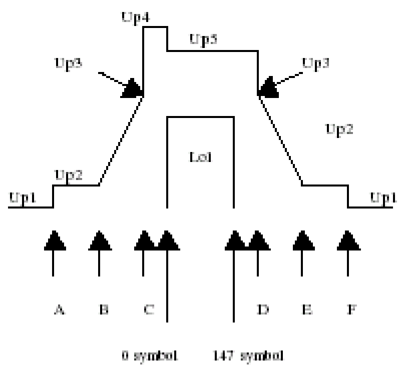
A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D : 87 symbol +10 μs
E : 87 symbol +18 μs
F : 87 symbol +28 μs



<table>
<tr><td>Template Format:BTS</td><td rowspan="2">


</td></tr>
<tr><td>NB at 8PSK
Upper －1 :－30dB
Upper －2 :－30dB
Upper －3 : －6dB
Upper －4 : 4dB
Upper －5 : 2.4dB
Upper －6 : 4dB

Lower －1 : －2dB
Lower －2 : 0dB
Lower －3 : －15dB

A : 0 symbol －28μs
B : 0 symbol －18μs
C : 0 symbol －10μs
D ; 0Symbol ＋2μs
E : 0Symbol ＋4μs
F : 147 symbol －4μs
G : 147 symbol －2μs
H : 147 symbol ＋10μs
I : 147 symbol ＋18μs
J : 147 symbol ＋28μs</td></tr>
<tr><td>Template Format:BTS</td><td rowspan="2">


</td></tr>
<tr><td>NB at GMSK
Upper －1 :－30dB
Upper －2 :－30dB
Upper －3 : －0dB
Upper －4 : 4dB
Upper －5 : 1dB

Lower －1 : －1dB

A : 0 symbol －28μs
B : 0 symbol －18μs
C : 0 symbol －10μs
D : 87 symbol ＋10μs
E : 87 symbol ＋18μs
F : 87 symbol ＋28μs</td></tr>
</table>

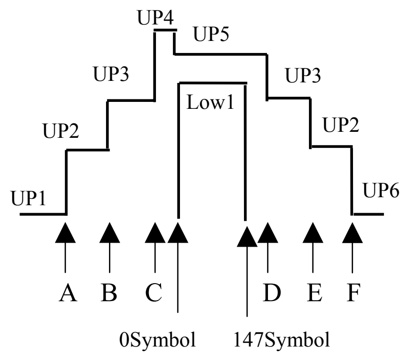
Template Format:MS

NB at GMSK

Upper −1 : −36dB or −59dBm
Upper −2 : −30dB or −17dBm
Upper −3 : −6dB
Upper −4 : 4dB
Upper −5 : 1dB
Upper −6 : −54dB or −59dBm

Lower −1 : −1dB

A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D : 147 symbol +10 μs
E : 147 symbol +18 μs
F : 147 symbol +28 μs



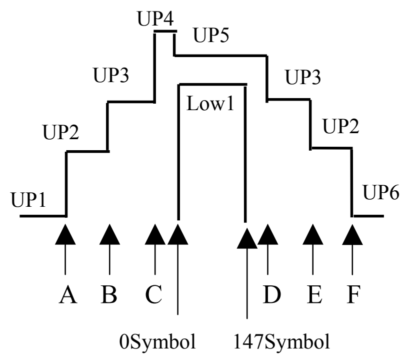
Template Format:MS

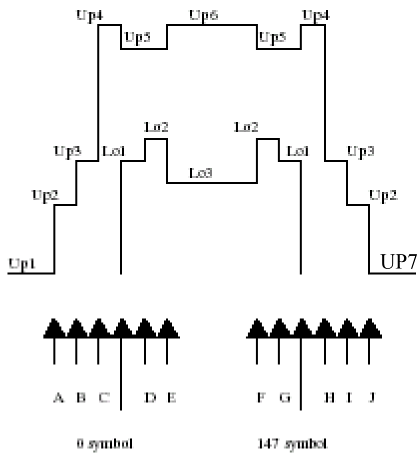
NB at GMSK

Upper −1 : −36dB or −59dBm
Upper −2 : −30dB or −17dBm
Upper −3 : −6dB
Upper −4 : 4dB
Upper −5 : 1dB
Upper −6 : −54dB or −59dBm

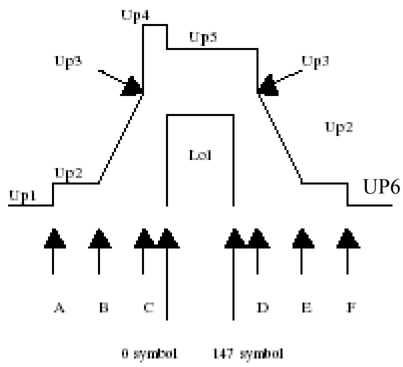
Lower −1 : −1dB

A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D : 147 symbol +10 μs
E : 147 symbol +18 μs
F : 147 symbol +28 μs



<table>
<tr><td>Template Format:MS</td><td rowspan="2">
</td></tr>
<tr><td>NB at 8PSK
Upper −1 :−36dB or−59dBm
Upper −2 :−30dB or−17dBm
Upper −3 : −6dB
Upper −4 : 4dB
Upper −5 : 2.4dB
Upper −6 : 4dB
Upper −7 :−54dB or−59dBm

Lower −1 : −2dB
Lower −2 : 0dB
Lower −3 : −15dB

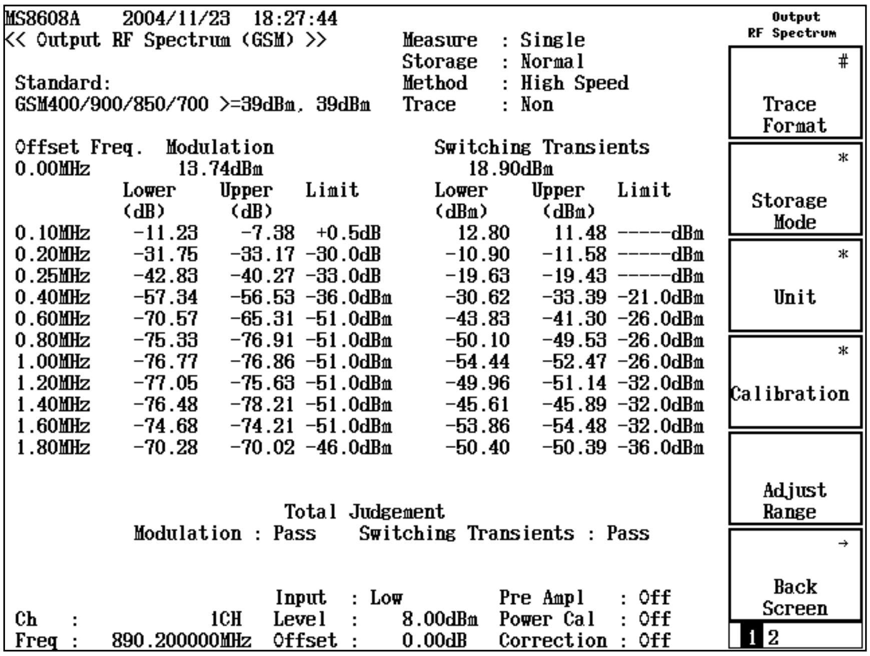
A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D ; 0Symbol +2 μs
E : 0Symbol +4 μs
F : 147 symbol −4 μs
G : 147 symbol −2 μs
H : 147 symbol +10 μs
I : 147 symbol +18 μs
J : 147 symbol +28 μs</td></tr>
<tr><td>Template Format:MS</td><td rowspan="2">
</td></tr>
<tr><td>NB at GMSK
Upper −1 :−36dB or−59dBm
Upper −2 :−30dB or−17dBm
Upper −3 : −0dB
Upper −4 : 4dB
Upper −5 : 1dB
Upper −6 :−54dB or−59dBm

Lower −1 : −1dB

A : 0 symbol −28 μs
B : 0 symbol −18 μs
C : 0 symbol −10 μs
D : 87 symbol +10 μs
E : 87 symbol +18 μs
F : 87 symbol +28 μs</td></tr>
</table>

3.4 Measuring Output RF Spectrum

Describe the measurement result displayed on the Output RF Spurious screen, or the parameter set.



Modulation

Display the average power of interval from 50 to 90%, at the frequency that moved away from carrier frequency per each offset except Training Sequence Code.

Switching Transients

Display the peak power at the frequency that moved away from carrier frequency per each offset.

When the Offset Frequency is from 100kHz to 1.6MHz, measure with RBW30kHz. When that is 1.8MHz, measure with RBW 100kHz.

Standard

Display the Standard that is currently selected.

Limit

Display the standard value used for standard of the Pass/Fail judgement. There are Relative value and Absolute value for Limit value. the value will be determined depends on the Setup Output RF Spectrum Table Screen.

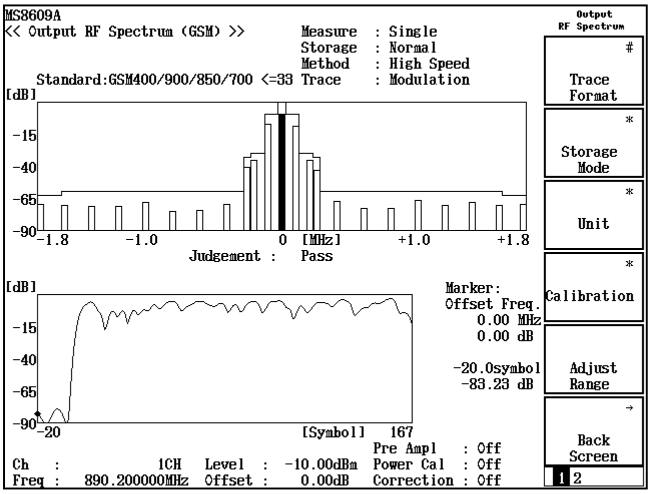
Judgement

Display the Pass/Fail judgement at Limit value.

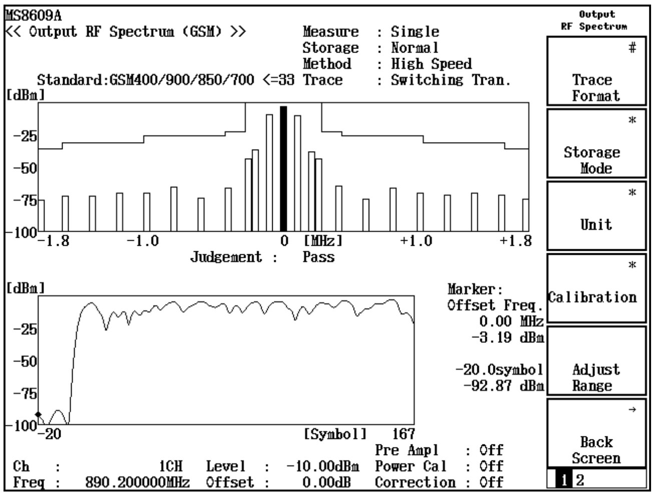
3.4.1 Setting Waveform Display Format (Trace Format)

Set the waveform display format displayed on the Display, as follows.
Select one of the following.

- Non : Display only the numeric result.
- Modulation : Display the Modulation.
- Switching Transients : Display the Switching Transients.



When Trace Format is Modulation



When Trace Format is Switching Transients

Waveform display

The above graph displays the graph which value is Offset Frequency for horizon axis, and each Modulation and Switching Transients for vertical axis.

3.4.2 Setting Storage Mode (Storage Mode)

Set the storage mode for measured results, as follows.

Storage mode: Select one of the following storage modes;

- Normal: Measure result is updated and displayed at each measurement end.
- Average: Average of measured result is calculated and displayed at each measurement end.

Average Count: Set the number of average counts.

Refresh Interval: Set the interval for updating the average value, as follows

- Every: Updated at each measurement end.
- Once: Updated at the measurement end over the number of the averaged counts.

3.4.3 Selecting View of Limit Value (View Select)

- Press [F3] (View Select) key to be able to switch the view from the displayed Limit Value to the Lower / Upper Value.

3.4.4 Setting Measuring Range (Analysis Range)

Set the Switching Transient range to 1Slot or 1Frame. This is valid only when Normal Burst (Multislot) at Measuring Object is selected.

1. Press [ ] (More) key to display the second page of the function labels.
2. Press [F1] (Analysis Range) key to set the Switching Transient range to 1Slot or 1Frame.

3.4.5 Setting Unit of Switching Transients (Unit)

1. Press [ ] (More) key to display the second page of the function labels.
2. Press [F2] (Unit) key to display the function labels below. Select the unit.
   - [F1] (dBm): Sets the unit to dBm.
   - [F2] (dB): Sets the unit to dB.

3.4.6 Changing Marker Operation Trace (Operation Trace)

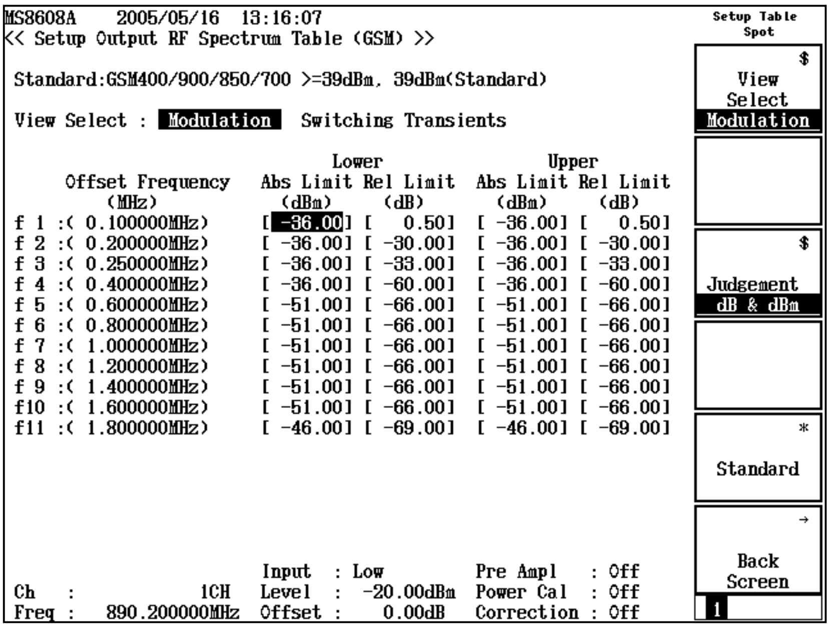
1. Press [ ] (More) key to display the second page of function labels.

2. Press [F4] (Operation Trace) key to switch between Spectrum (top of graph) and Spot (below of waveform), and select operation trace.

3.4.7 Setting Specification Value (Setup Output RF Spectrum Table)

In the Output RF Spectrum measurement, the specification value used for Pass/Fail criteria can be set.

Press F5 (Setup ORS Table) key on the second page of the function labels on the Output RF Spectrum screen to move to the screen for setting a measurement parameter of the Spot method.



Set the Limit value for each Lower and Upper in the predetermined frequency points. The highlighted value is available to be input. The cursor is movable with ∧ ∨ Entry keys or the rotary knob.

The following four specification values per one frequency table can be set for both Lower and Upper .

- Absolute specification value of Modulation; dBm (Abs Limit)
- Relative specification value of Modulation; dB (Rel Limit)
- Absolute specification value of Switching Transients; dBm (Abs Limit)
- Relative specification value of Switching Transients; dB (Rel Limit)

By pressing F1 (View Select) key of the function labels, items of Modulation and Switching Transients can be selected to be displayed.

By pressing [F3] (Judgement) key, the set judgment method can be selected.

dBm: Performs Pass/Fail judgment with the value set for Abs Limit of the Limit(dB).

dB: Performs Pass/Fail judgment with the value set for Rel Limit of the Limit(dB).

dB & dBm: Performs Pass/Fail judgment with the value set for Abs Limit or Rel Limit of Limit(dB), whichever is higher.

By pressing [F5] (Standard) key of the function labels, the specification defined by 3GPP can be set.
Select the frequency band measuring in the Band. Please refer to "3.1.4 Setting Frequency Band" for details."
Select the DUT to be measure in the DUT Select. Please refer to "3.1.5 Setting DUT to be measured" for details. Likewise, select the In Band and Out Band in the Band Select. In addition, Band and DUT Select can be set only if the Free is selected in the Band on the Setup Common Parameter screen.

3.5 Measuring Spurious

On the Setup Common Parameter screen, press F6 (Spurious Emission) key to move to measurement screen of Spurious.
This section explains the measured results, the set parameters displayed on the Spurious Emission screen and the caution for use.

When measuring the Spurious, adjusts the RF input level for optimizing the level setup of internal instrument. For adjusting method of RF input level, refer to “3.2.9 Optimizing Measurement Range”.

3.5.1 Setting Measurement Method (Spurious Mode)

There are 3 types of measurement method, Spot, Sweep and Search for the Spurious. Each have both merits and demerits, so please use properly according to a situation.

- Spot: Measures the Spurious by using 0Hz (zero span) of sweep frequency for specified frequency. This method is used if the frequency of Spurious that will be generated is predicted. Due to measures the decided frequency without sweep, compare with other method, measurement time will be shorter.

Measures the amplitude of carrier wave by the parameter set on the Setup Reference Power screen.

Measures the Spurious by using 0Hz (zero span) of sweep frequency for specified frequency set on the Setup Spot Table screen.

- Sweep: Sweeps the specified frequency range and detects the maximum level of spurious among them. This measurement is used when the frequency that the spurious generates can not be specified.

Measures the amplitude of carrier wave by the parameter set on the Setup Reference Power screen.

Executes the frequency-sweep to the range of the Start Frequency and the Stop Frequency set on the Setup Sweep Table screen, and measures the Spurious frequency and the amplitude that has the maximum amplitude among them.

- Search: Sweeps the specified frequency range by same way as the Sweep described above, and search the signal of the maximum level. Moreover, at center of the frequency of the signal, measures more accurate signal using sweep frequency 0Hz (zero span). This can measure the spurious level that cannot specify the frequency with more accuracy. Compares to other method, it will take long measurement time.

Measures the amplitude of carrier wave by the parameter set on the Setup Reference Power screen.

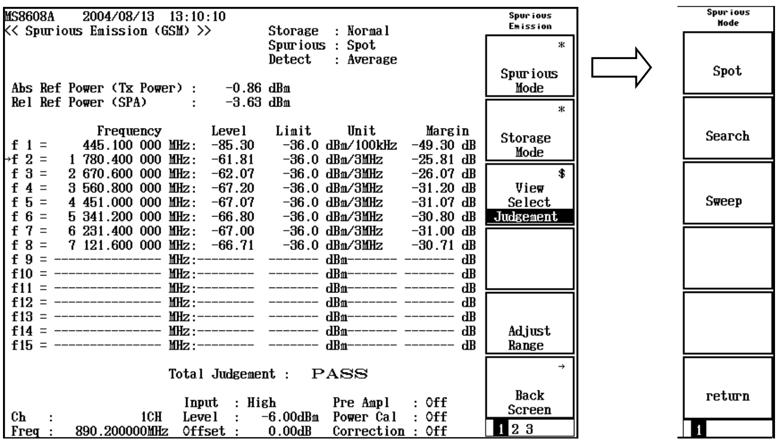
↓

Executes the frequency-sweep to the range of the Start Frequency and the Stop Frequency set on the Setup Sweep Table screen, and measures the Spurious frequency and the amplitude that has the maximum amplitude among them.

↓

Converts the spurious amplitude searched at frequency axis into time axis, and measures it.

Press F1 (Spurious Mode) key to change the contents of the function label to the measurement method, on the spurious Emission Screen. Selects the measurement method from there.

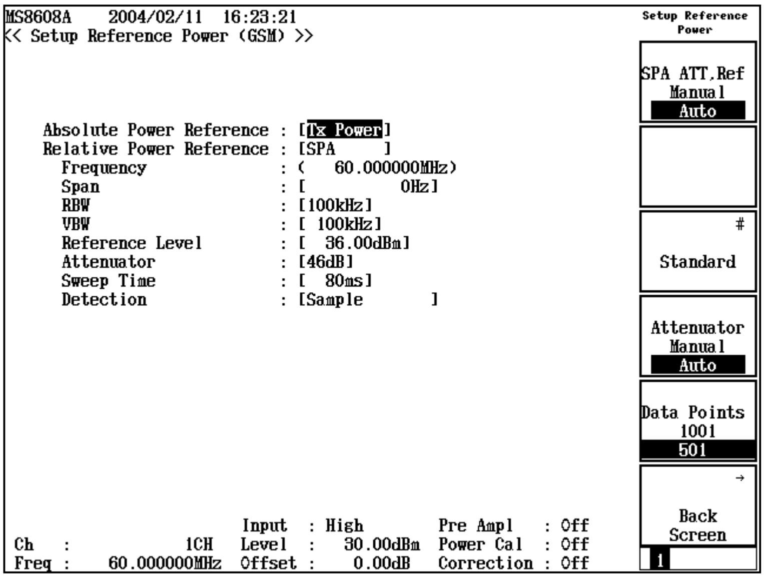


3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Set-up Reference Power)

The parameter setup method at the time of measuring the amplitude of the carrier wave is shown below.

1. Press [ ] (more) key on the Spurious Emission screen to display the second page of the function labels.
2. Press [F5] (Setup Reference Power) to display the Setup Reference Power screen.

Setup Reference Power screen



3. Sets each measurement parameters as needed.

The relation of the absolute values of the spurious amplitude by setup of the Absolute Power Reference and the Relative Power Reference are shown, as follows.
The measurement result of the spurious amplitude is shown in x(dBm).

		Absolute Power Reference (dBm)		
		None	Tx Power (a)	Set (b)
Relative Power Reference (dBm)	SPA (c)	x	a + x - c	b + x - c
	Tx Power(a)	x	x	b + x - a
	Set (d)	x	a + x - d	b + x –d

Moreover, the relation of relative value of the spurious is shown, as follows.

Relative Power Reference (dBm)	**SPA (c)**	x – c
	Tx Power(a)	x – a
	Set(d)	x – d

Each parameter is described as follows.

(1) Absolute Power Reference

The measurement method of the carrier wave amplitude that is used as the reference when displays the spurious amplitude as absolute value, is set. There are three types of the setup contents, None, Tx Power and Set.

- None: Not specifies the measurement method of the carrier wave amplitude. In this case, for the measurement result of the spurious amplitude, the value measured at Spectrum Analyzer is displayed as it is.
- Tx Power: Measures the value of the carrier wave amplitude by same way as Tx Power on the RF Power screen (Transmit power measurement). Finds the difference between this value and the value of the carrier wave amplitude measured by the way set on the Relative Power Reference. Calibrates that difference to the measurement result of the spurious amplitude measured on the Spectrum Analyzer.

  If executes the Power Calibration to MS860xA, the measurement value of Power Meter will be the reference of displaying the spurious amplitude displayed in absolute value. Usually, sets this Tx Power. It cannot be selected at MS268x.
- Set: Sets the value of the carrier wave amplitude randomly. Finds the difference between this value and the value of the carrier wave amplitude measured by the way set on the Relative Power Reference. Calibrates that difference to the measurement result of the spurious amplitude measured on the Spectrum Analyzer. This is used when the power of measurement signal is found from the beginning.

(2) Relative Power Reference

The measurement method of the carrier wave amplitude that is used as the reference when displays the spurious amplitude as relative value, is set. There are three types of the setup contents, SPA, Tx Power and Set.

- SPA: Measures the value of the carrier wave amplitude, on the Spectrum Analyzer. Finds the difference between this value and the value of the carrier wave amplitude measured by the way set on the Absolute Power Reference. Calibrates that difference to the measurement result of the spurious amplitude measured on the Spectrum Analyzer. Usually, sets this SPA.
- Tx Power: Measures the value of the carrier wave amplitude by same way as Tx Power on the RF Power screen (Transmit power measurement). Finds the difference between this value and the value of the carrier wave amplitude measured by the way set on the Absolute Power Reference. Calibrates that difference to the measurement result of the spurious amplitude measured on the Spectrum Analyzer.

  If executes the Power Calibration to MS860xA, the measurement value of Power Meter will be the absolute level of displaying the spurious amplitude displayed in absolute value.
- Set: Sets the value of the carrier wave amplitude randomly. Finds the difference between this value and the value of the carrier wave amplitude measured by the way set on the Absolute Power Reference. Calibrates that difference to the measurement result of the spurious amplitude measured on the Spectrum Analyzer. This is used when the power of measurement signal is found from the beginning.

(3) Frequency

Displays the frequency set on the Setup Common Parameter.

(4) Reference Level

Sets the Reference Level of the Spectrum Analyzer. If optimizing the measurement range (Adjust Range), that result will be set automatically.

(5) Attenuator

Sets the Attenuator of the Spectrum Analyzer. If optimizing the measurement range (Adjust Range), that result will be set automatically.

Next, describes about the function labels.

(1) SPA ATT, Ref

Manual: Sets the Reference Level setting of the Spectrum Analyzer to Manual. When setup of Attenuator was selected to Manual, this setup also will be Manual automatically. In addition, if this setup is selected to Manual, the result will not be reflected even if the measurement range was adjusted.

Auto: Sets the Reference Level setting of the Spectrum Analyzer to Auto. When this setup was selected to Auto, setup of Attenuator also will be Auto automatically. In addition, if this setup is selected to Auto, the result will be reflected when the measurement range was adjusted.

(2) Standard

Abs & Rel : Tx Power

Both setup of the Absolute and the Relative Power Reference are set up as Tx Power.

Abs & Rel : Set

Both setup of the Absolute and the Relative Power Reference are set up as Set.

(3) Attenuator

Manual: Sets the Attenuator setting of the Spectrum Analyzer to Manual. When this setup was selected to Manual, setup of SPA, ATT and Ref also will be Manual automatically.

Auto: Sets the Attenuator setting of the Spectrum Analyzer to Auto. When setup of SPA, ATT and Ref were selected to Auto, this setup also will be Auto automatically.

(4) Data Points

1001: Set the data point of the Spectrum Analyzer to 1001 points.

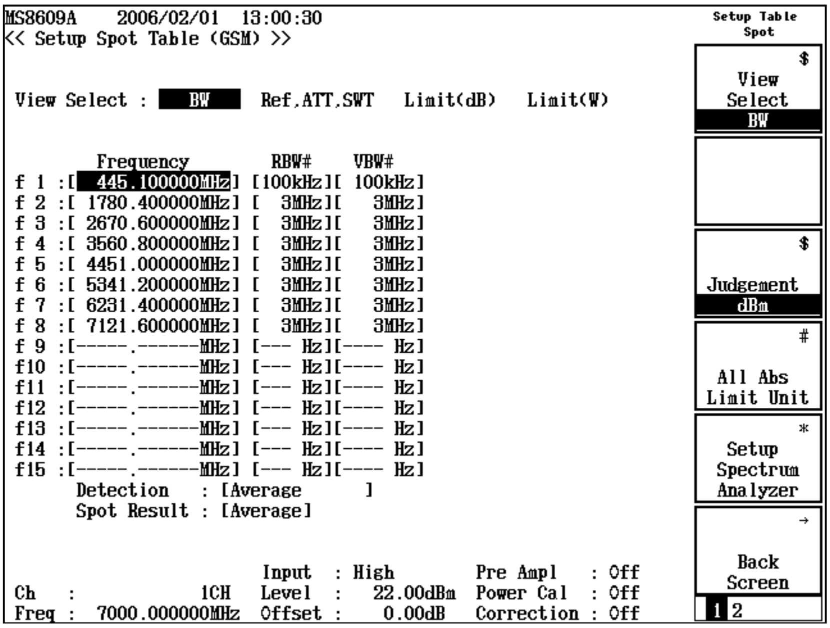
501: Set the data point of the Spectrum Analyzer to 501 points.

3.5.3 Setting Measurement Parameter of Spot Method (Setup Spot Table)

Frequency for spurious measurement must be specified for Spot measurement.

Press [F1] (Setup Spot Table) on the second page of the function label on the Spurious Emission screen to move to the parameter setup screen of the Spot method.

Setup Spot Table screen



Up to 15 frequency tables can be defined. The highlighting point indicates input-able parts. For moving, use cursor and [∧] [∨] (Entry keys) or rotary knob.

For define a frequency table, set the items shown below.

- Measurement frequency (Frequency)
- Resolution bandwidth for spectrum analyzer (RBW)
- Video bandwidth for spectrum analyzer (VBW)
- Reference level for spectrum analyzer (Ref Level)
- Attenuator for spectrum analyzer (ATT)
- Sweep time for spectrum analyzer (SWT)
- Absolute standard value for pass/fail judgment in dBm units (Abs Limit)
- Relative standard value for pass/fail judgment in dB units (Rel Limit)
- Absolute standard value for pass/fail judgment in W units (Abs Limit)
- Absolute standard value for pass/fail judgment in auxiliary unit of W (Unit)

Press [F1] (View Select) to switch the items except Frequency. Relation between the View Select and the setup item is shown below.

- When View Select is BW

  It is enabled to set up Resolution bandwidth(RBW) and Video bandwidth(VBW) of spectrum analyzer.

- When View Select are Ref, ATT and SWT

  It is enabled to set up Reference level(Ref Level), Attenuator(ATT) and Sweep time(SWT) of spectrum analyzer.

- When View Select is Limit(dB)

  It is enabled to set up the level of pass/fail judgement by log unit (dBm(Abs Limit) and dB(Rel Limit)).

- When View Select is Limit(W)

  It is enabled to set up the level of pass/fail judgement by Watt unit. Press [F4] (All Abs Limit Unit) to set up all units of from f1 to f15 into one of mW, μW and nW. It is enabled to set up unit individually by using [∧] [∨] (Entry keys) or rotary knob.

Detection

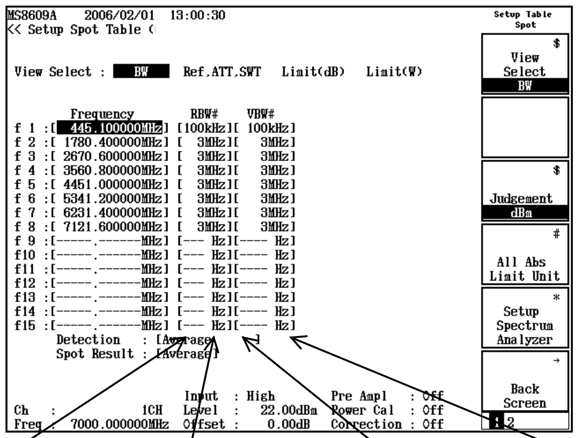
Sets the Detection mode

- Positive Peak — Sets the Detection mode to Positive Peak.
  Sets the maximum value that is in one sampling time as data of the point
- Negative Peak — Sets the Detection mode to Negative Peak.
  Sets the minimum value that is in one sampling time as data of the point
- Sample — Sets the Detection mode to Sample.
  Sets the data of instant as data of the point when hard ware performs sampling process.
- Average — Sets the Detection mode to Average.
  Sets the average value that is in between sample point as data of the point.
- RMS — Sets the Detection mode to RMS.
  Sets the RMS value that is in between sample point as data of the point.

Spot Result

Sets the method of calculating the result of the measured Spurious Level.

- Average — Calculats the average value of the measured Spurious Level.
- Maximum — Calculats the maximum value of the measured Spurious Level.

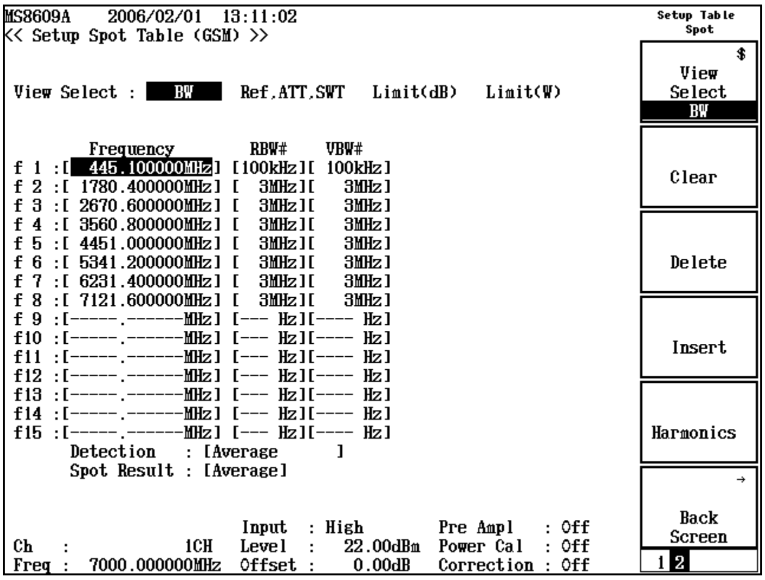


1		2			3		4	
RBW	VBW	Ref Level#	ATT	SWT	Abs Limit	Rel Limit	Abs Limit	Unit
[100kHz]	[100kHz]	[30.00dBm]	[50dB]	[80ms]	0.00dBm]	[0.00dB]	[0.001]	[μW/MHz]
[100kHz]	[100kHz]	[30.00dBm]	[50dB]	[80ms]	0.00dBm]	[0.00dB]	[0.001]	[μW/MHz]
[100kHz]	[100kHz]	[30.00dBm]	[50dB]	[80ms]	0.00dBm]	[0.00dB]	[0.001]	[μW/MHz]
[100kHz]	[100kHz]	[30.00dBm]	[50dB]	[80ms]	0.00dBm]	[0.00dB]	[0.001]	[μW/MHz]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]
[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	----.--dBm]	[----.--dB]	[----.---]	[------]

Press F3 (Judgement) on the function label and it is enabled to select the Judgement method. Refer to “3.5.7 Selecting Judgement Unit (Judgement)”.

Press F5 (Setup Spectrum Analyzer) on the function label and it is enabled to set up the measurement parameter of Spectrum Analyzer randomly. Refer to “3.5.8 Setting Spectrum Analyzer” for setup.

Use Menu keys on second page of the function label for add or delete on existing frequency table.

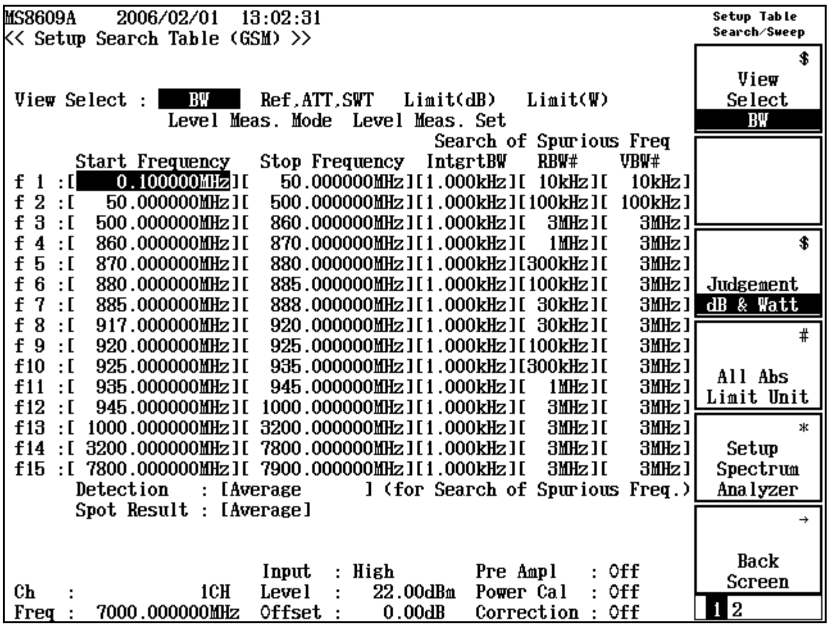


- [F2] (Clear): Deletes all frequency tables.
- [F3] (Delete): Deletes the line highlighted. The deleted line will be moved up.
- [F4] (Insert): Adds a new line above the line highlighted.
- [F5] (Harmonics): Sets frequency that is the multiplier of the set frequency from f1 to f15.
- [F6] (Back Screen): Switches the screen from the current screen to the upper-layer screen by one rank.

3.5.4 Setting Measurement Parameter of Search Method (Setup Search Table)

Press [F2] (Setup Search Table) on the second page of the function label on the Spurious Emission screen to move to the parameter setup screen of the Search method. The value for spurious search in the measurement parameter of search method is shared with the value of the measurement parameter of Sweep method.

Setup Search Table Screen



Up to 15 frequency tables can be defined. The highlighting point indicates input-able parts. For moving, use cursor and [∧] [∨] (Entry keys) or rotary knob.

For define a frequency table, set the items shown below.

- Sweep start frequency (Start Frequency)
- Sweep stop frequency (Stop Frequency)
- Bandwidth during spurious calculation (IntgrtBW)
- Resolution bandwidth for spectrum analyzer during spurious search (RBW)
- Video bandwidth for spectrum analyzer during spurious search (VBW)
- Reference level for spectrum analyzer during spurious search and spurious measurement (0 span) (Ref Level)
- Attenuator for spectrum analyzer during spurious search and spurious measurement (0 span) (ATT)
- Sweep time for spectrum analyzer during spurious search (SWT)

- Absolute standard value for pass/fail judgment in dBm units（Abs Limit）
- Relative standard value for pass/fail judgment in dB units（Rel Limit）
- Absolute standard value for pass/fail judgment in W units（Abs Limit）
- Absolute standard value for pass/fail judgment in auxiliary unit of W（Unit）
- Spurious measurements is performed or not by 0 span（Meas Mode）
- Resolution bandwidth for spectrum analyzer during spurious measurement (0 span)（RBW）
- Video bandwidth for spectrum analyzer during spurious measurement (0 span)（VBW）
- Sweep time for spectrum analyzer during spurious measurement (o span)（SWT）

Complement:
Describes about bandwidth (IntgrtBW)of during spurious calculation. This converts level from the spurious measurement result as below for RBW, Span, and Data Points that were set up.

The calculation procedure of the integration range
(1) Calculates frequency interval per 1 point.

Frequency interval per 1 point ＝Span ÷ Data Point
(Span＝Stop Freq – Start Freq)

(2) Calculates the number of integration points to be IntgrtBW＝(RBW ×Frequency interval per 1 point)

If RBW≧IntBW:
It will be Sweep waveform＝Integration waveform, it does not depend on Frequency interval per 1 point. That is, a measurement result is displayed as it is.

Calculation is shown below.

The number of integration points＝

$$\frac{\text{IntgrtBW}-\text{RBW}}{\text{Frequency interval per 1 point}} + 1$$

Example of the calculation is shown below.
When RBW:100 kHz, IntBW:200 kHz and Span:50 kHz

The number of integration points =(200 kHz-100 kHz)÷50kHz +1=3

Therefore, the number of addition points becomes three points, and serves as a Spurious level with the final value integrated by three point to the measurement result.

Since, all setting items cannot be displayed within one screen, they are displayed by switching sequentially except for sweep start frequency (Start Frequency) and sweep stop frequency (Stop Frequency).
Press F1 (View Select) on the function label to switch display. Relation between the View Select and the setup item is shown below.

- When View Select is BW

  It is enabled to set up Bandwidth(IntgrtBW) of when spurious calculation, Resolution bandwidth(RBW) of spectrum analyzer of when spurious search and Video bandwidth(VBW).

- When View Select are Rer, ATT and SWT

  It is enabled to set up Reference level(Ref Level) and Attenuator(ATT) of when spurious search and spurious measurement, and enabled to set up Sweep time(SWT) of spectrum analyzer of when spurious search.

- When View Select is Limit(dB)

  It is enabled to set up the level of pass/fail judgement by log unit (dBm(Abs Limit) and dB(Rel Limit)).

- When View Select is Limit(W)

  It is enabled to set up the level of pass/fail judgement by Watt unit. Press F4 (All Abs Limit Unit) to set up all units of from f1 to f15 into one of mW, μW and nW. It is enabled to set up unit individually by using ∧ ∨ (Entry keys) or rotary knob.

- When View Select is Level Meas. Mode

  It is enabled to set up perform the spurious measurement or not by the 0 span. If "Spot" is set up, measure the spurious measurement by 0 span. If "Sweep Only" is set up, do not measure the spurious measurement by 0 span (the measurement result in this case is same as “Sweep” that was set up at Spurious Mode.).

- When View Select is Level Meas. Set

  It is enabled to set up Resolution bandwidth(RBW), Video bandwidth(VBW) and Sweep time(SWT) of spectrum analyzer at the time of spurious measurement(0 span). It is not enabled to set up these values in the frequency range that was set "Sweep Only" at the Level Meas. Mode (in addition, the value that was set up already will be ignored).

Detection

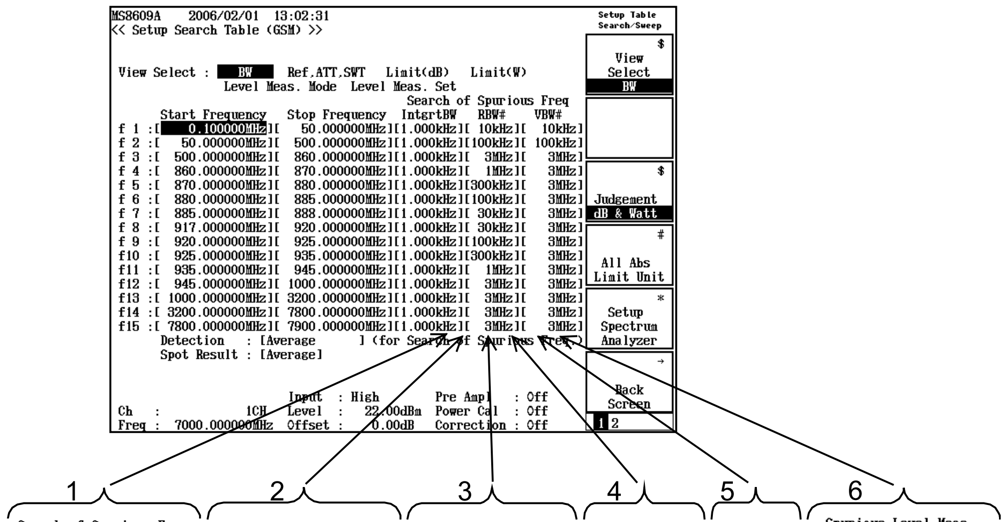
Sets the Detection mode

- Positive Peak — Sets the Detection mode to Positive Peak.
  Sets the maximum value that is in one sampling time as data of the point
- Negative Peak — Sets the Detection mode to Negative Peak.
  Sets the minimum value that is in one sampling time as data of the point
- Sample — Sets the Detection mode to Sample.
  Sets the data of instant as data of the point when hard ware performs sampling process.
- Average — Sets the Detection mode to Average.
  Sets the average value that is in between sample point as data of the point.
- RMS — Sets the Detection mode to RMS.
  Sets the RMS value that is in between sample point as data of the point.

Spot Result

Sets the method of calculating the result of the measured Spurious Level.

- Average — Calculats the average value of the measured Spurious Level.
- Maximum — Calculats the maximum value of the measured Spurious Level.



1			2			3		4		5	6		
Search of Spurious Freq											Spurious Level Meas.		
IntgrtBW	RBW#	VBW#	Ref Level	ATT	SWT#	Abs Limit	Rel Limit	Abs Limit	Unit	Meas Mode	RBW#	VBW#	SWT#
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[10kHz]	[100kHz]	[80ms]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[3.000kHz]	[3kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Sweep Only]	(--- Hz)	(---- Hz)	(----ms)
[3.000kHz]	[3kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Sweep Only]	(--- Hz)	(---- Hz)	(----ms)
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]	[Spot]	[100kHz]	[100kHz]	[80ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]	[----------]	[--- Hz]	[---- Hz]	[----ms]

Notes on settings

- Set sweep frequency bandwidth (Sweep stop frequency − Sweep start frequency) to 10 GHz or lower.

- Sweep frequency of Spectrum Analyzer contains frequency uncertainty. Spectrum Analyzer of MS860x/MS268x series adopt start-lock sweep method. This method locks frequency at sweep start time, and then varies voltage controller oscillator frequency by using ramp voltage to perform sweep. Thus while sweep start frequency is accurate, the sweep stop frequency contains uncertainty. Normally, the uncertainty is defined by span accuracy.
  Set sweep stop frequency in view of set span accuracy.
  For example, when measuring spurious for a range from 100 MHz to 1000 MHz while span accuracy is set to ±1%, uncertainty of ±0.01 × (1 GHz − 100 MHz) = ±9 MHz appears at sweep stop frequency. The actual sweep frequency range should be set to 1000 MHz + 9 MHz = 1009 MHz.

- Internal LO signal leakage called as zero-beat when analyzer frequency is 0 Hz. The zero-beat is misidentified as spurious when relationship between sweep start frequency (fs) and RBW during

Sweep and Search measurements are as shown below:

fs < RBW (rule of thumb)

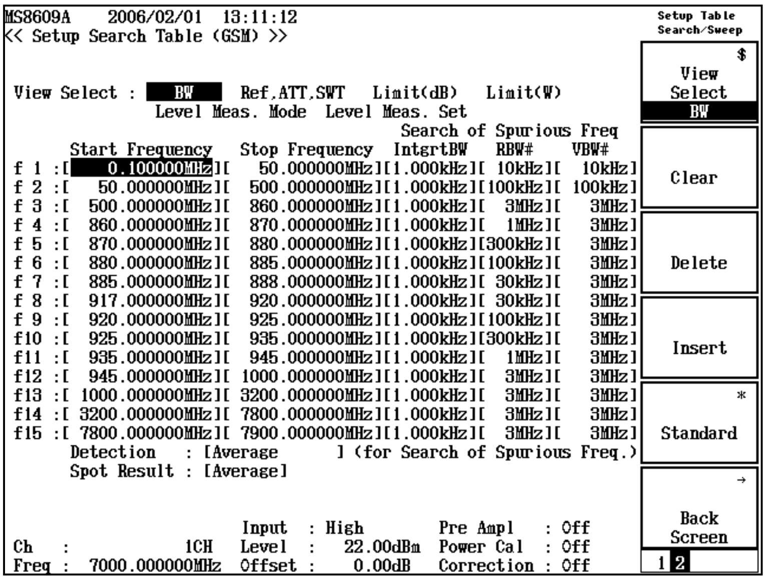
Decrease RBW value in this event.

Press F3 (Judgement) on the function label to enable user-defined Judgement method.

Refer to “3.5.7n Selecting Judgement Unit Method (Judgement)” for details.

Press F5 (Setup Spectrum Analyzer) on the function label to enable to set up the measurement parameter of Spectrum analyzer randomly. Refer to “3.5.8 Setting Spectrum Analyzer” for details.

Use menu keys on second page of the function label for additions or deletions on existing frequency table.



- F2 (Clear): Deletes all frequency tables
- F3 (Delete): Deletes the line highlighted. The deleted line will be moved up.
- F4 (Insert): Adds a new line above the line highlighted.

- F5 (Standard): Sets the standard stipulated by 3GPP. Selects frequency band measured at the Band. For more detail, refere to “3.1.4 Setting Frequency Band (Band)”. Selects DUT that will be measured at the DUT Select. For more detail, refere to “3.1.5 Setting Measured DUT (Band)”. Moreover, selects the In Band and the Out Band at the Band Select. Inaddition, only when the Free is selected at the Band of the Setup Common Parameter, it is enabled to select the Band and the DUT.

***Note*:**

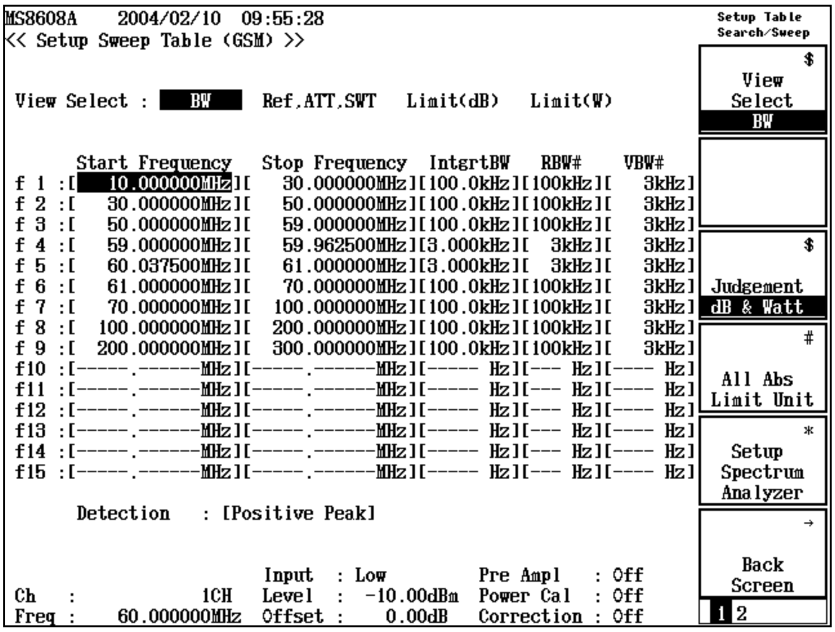
When Detection is set to RMS, selecting Standard disabbles RBW above 3MHz to be set. Columns with RBW above 3MHz will appear empty,where any desired value can be reset.

- F6 (Back Screen): Switches the screen from the current screen to the upper-layer screen by one rank.

3.5.5 Setting Measurement Parameter of Sweep Method (Setup Sweep Table)

Press [F3] (Setup Sweep Table) on the second page of the function label on the Spurious Emission screen to move to the parameter setup screen of the Sweep method. The value for spurious search in the measurement parameter of Sweep method is shared with the value of the measurement parameter of Search method.

Setup Sweep Table Screen



Up to 15 frequency tables can be defined. The highlighting point indicates input-able parts. For moving, use cursor and [∧] [∨] (Entry keys) or rotary knob.

For define a frequency table, set the items shown below.

- Sweep start frequency (Start Frequency)
- Sweep stop frequency (Stop Frequency)
- Bandwidth during spurious calculation (IntgrtBW)
- Resolution bandwidth for spectrum analyzer during spurious search (RBW)
- Video bandwidth for spectrum analyzer during spurious search (VBW)
- Reference level for spectrum analyzer during spurious search and spurious measurement (0 span) (Ref Level)
- Attenuator for spectrum analyzer during spurious search (ATT)
- Sweep time for spectrum analyzer during spurious search (SWT)
- Absolute standard value for pass/fail judgment in dBm units (Abs Limit)

- Relative standard value for pass/fail judgment in dB units（Rel Limit）
- Absolute standard value for pass/fail judgment in W units（Abs Limit）
- Absolute standard value for pass/fail judgment in auxiliary unit of W（Unit）

Since, all setting items cannot be displayed within one screen, they are displayed by switching sequentially except for sweep start frequency (Start Frequency) and sweep stop frequency (Stop Frequency).
Press F1 (View Select) on the function label to switch display. Relation between the View Select and the setup item is shown below.

- When View Select is BW

  It is enabled to set up Bandwidth(IntgrtBW) of when spurious calculation, Resolution bandwidth(RBW) of spectrum analyzer of when spurious search and Video bandwidth(VBW).

- When View Select are Rer, ATT and SWT

  It is enabled to set up Reference level(Ref Level) and Attenuator(ATT) of when spurious search and spurious measurement, and enabled to set up Sweep time(SWT) of spectrum analyzer of when spurious search.

- Whrn View Select is Limit(dB)

  It is enabled to set up the level of pass/fail judgement by log unit (dBm(Abs Limit) and dB(Rel Limit)).

- Whrn View Select is Limit(W)

  It is enabled to set up the level of pass/fail judgement by Watt unit. Press F4 (All Abs Limit Unit) to set up all units of from f1 to f15 into one of mW, μW and nW. It is enabled to set up unit individually by using ∧ ∨ (Entry keys) or rotary knob.

Detection

Sets the Detection mode

- Positive Peak — Sets the Detection mode to Positive Peak.

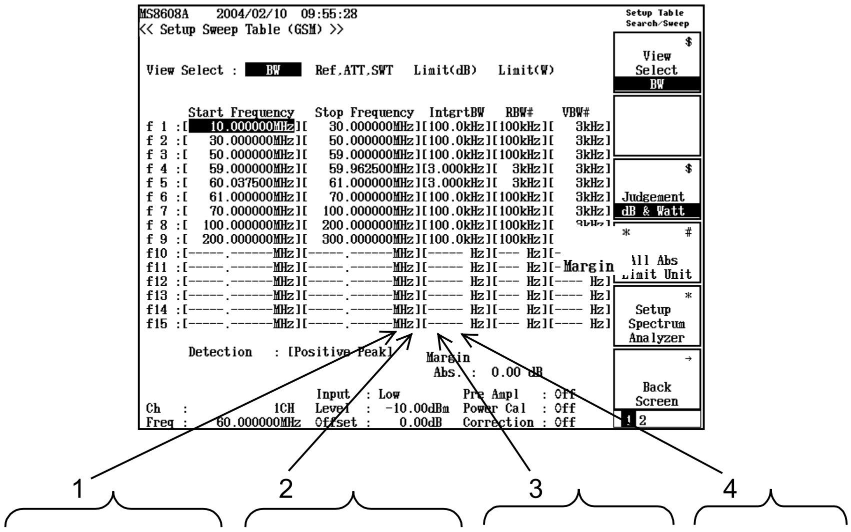
  Sets the maximum value that is in one sampling time as data of the point
- Negative Peak — Sets the Detection mode to Negative Peak.

  Sets the minimum value that is in one sampling time as data of the point
- Sample — Sets the Detection mode to Sample.

  Sets the data of instant as data of the point when hard ware performs sampling process.
- Average — Sets the Detection mode to Average.

  Sets the average value that is in between sample point as data of the point.
- RMS — Sets the Detection mode to RMS.

  Sets the RMS value that is in between sample point as data of the point.



IntgrtBW	RBW#	VBW#	Ref Level	ATT	SWT#	Abs Limit	Rel Limit	Abs Limit	Unit
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[3.000kHz]	[3kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[3.000kHz]	[3kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[100.0kHz]	[100kHz]	[3kHz]	[-10.00dBm]	[10dB]	[40.0s]	[-26.02dBm]	[-60.00dB]	[2.500]	[μW]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]
[----- Hz]	[--- Hz]	[---- Hz]	[----.--dBm]	[--dB]	[----ms]	[----.--dBm]	[----.--dB]	[----.---]	[--]

Notes on settings

- Set sweep frequency bandwidth (Sweep stop frequency − Sweep start frequency) to 10 GHz or lower.

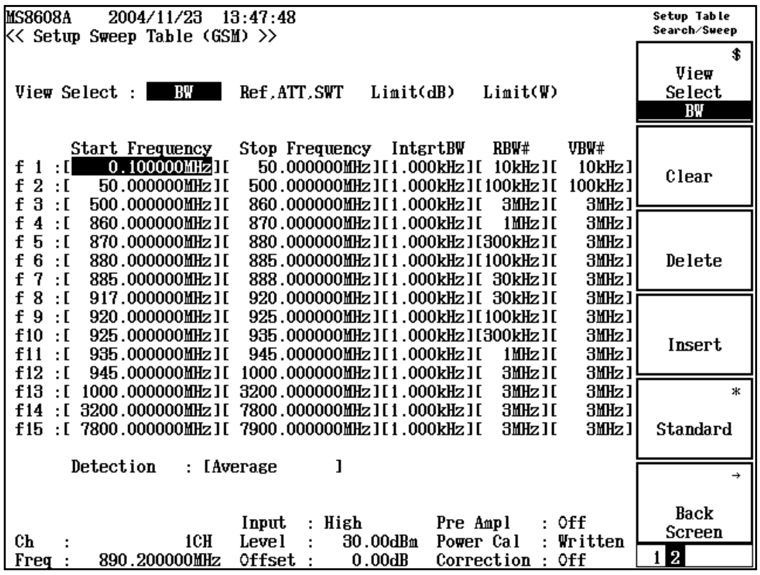
- Sweep frequency of analyzer contains frequency uncertainty. MS860xA/MS268xA series Spectrum Analyzers adopts start-lock sweep method. This method locks frequency at sweep start time, and then varies voltage controller oscillator frequency by using ramp voltage to perform sweep. Thus while sweep start frequency is accurate, the sweep stop frequency contains uncertainty. Normally, the uncertainty is defined by span accuracy.
  Sets the sweep stop frequency in view of this set span accuracy.
  For example, when measuring spurious for a range from 100 MHz to 1000 MHz while span accuracy is set to ±1%, uncertainty of ±0.01 × (1 GHz − 100 MHz) = ±9 MHz appears at sweep stop frequency. The actual sweep frequency range should be set to 1000 MHz + 9 MHz = 1009 MHz.

- Internal LO signal leakage called as zero-beat when analyzer frequency is 0 Hz. The zero-beat is misidentified as spurious when relationship between sweep start frequency (fs) and RBW during Sweep and Search measurements are as shown below:
  fs < RBW (rule of thumb)
  Decrease RBW value in this event.

Press F3 (Judgement) on the function label to enable user-defined Judgement method. Refer to “3.5.7 Selecting Judgement Unit (Judgement)” for details.

Press F5 (Setup Spectrum Analyzer) on the function label to enable to set up the measurement parameter of Spectrum analyzer randomly. Refer to “3.5.8 Setting Spectrum Analyzer” for details.

Use menu keys on second-page of the function label for additions or deletions to the existing frequency table.



- F2 (Clear): Clears all frequency tables
- F3 (Delete): Deletes the line highlighted. The deleted line will be moved up.
- F4 (Insert): Adds a new line above the line highlighted.

• F5 (Standard): Sets the standard stipulated by 3GPP. Selects frequency band measured at the Band. For more detail, refere to “3.1.4 Setting Frequency Band (Band)”. Selects DUT that will be measured at the DUT Select. For more detail, refere to “3.1.5 Setting Measured DUT (Band)”. Moreover, selects the In Band and the Out Band at the Band Select. Inaddition, only when the Free is selected at the Band of the Setup Common Parameter, it is enabled to select the Band and the DUT.

***Note*:**

When Detection is set to RMS, selecting Standard disabbles RBW above 3MHz to be set. Columns with RBW above 3MHz will appear empty,where any desired value can be reset.

• F6 (Back Screen): Switches the screen from the current screen to the upper-layer screen by one rank.

3.5.6 Setting preselector mode (Preselector)

This function is available only when main unit option MS8608A-03/MS2683A-03 is installed.
(This option can be installed on MS8608A/MS2683A.)
Use this function to select Band 0 (Normal) or Band 1 for preselector (Spurious) for measurement of 1.6 GHz to 3 GHz.
Measurement in Spurious mode sweeps 1.6 GHz to 3 GHz with preselector band, allows measurement of 800 MHz band signals without considering harmonic wave due to internal distortion of the spectrum analyzer.

Setting mode

1. Move the Setup Spot Table/ Setup Search Table / Setup Sweep Table screen.
2. Move the cursor to the Preselecter item and press Set key.
3. Nomal and Preserector are displayed. When Preserecter is made effective, Spurious is selected

This function becomes common set regardless of set Spurious Mode.

3.5.7 Selecting Judgement Unit (Judgement)

Absolute and relative standard values are used as pass/fail judgment criteria. Absolute standard value can be set in dBm and W (mW, μW or nW). Select one to be used from these standard values at Setup Spot Table, Setup Search Table and Setup Sweep Table by F3 (Judgment) in the function label. In addition, Setup Search Table and Setup Sweep tables share the setup.

dBm: Performs pass/fail judgment with the value set as Abs Limit of Limit (dBm).

dB: Performs pass/fail judgment with the value set as Rel Limit of Limit (dB).

dB & dBm: Performs pass/fail judgment with the value that has less margin from the value that was set as Abs Limit and Rel Limit of Limit (dB).

Watt: Performs pass/fail judgment with the value set as Abs Limit of Limit (W).

dB & Watt: Performs pass/fail judgment with the value that has less margin from the value that was set as Abs Limit of Limit(W) and Rel Limit of Limit (dB).

3.5.8 Setting Spectrum Analyzer (Setup Spectrum Analyzer)

Measurement of the Spurious Emission is measured by the spectrum analyzer function. Therefore, the measured value for spurious emission varies depending on the parameter values set for the spectrum analyzer.

The setting method of Spectrum Analyzer

1. Press [ ] (More) on the Spurious Emission screen to display the second page of the function label.
2. Press [F1] (Setup Spot Table), [F2] (Setup Search Table) or [F3] (Setup Sweep Table), and press [F5] (Setup Spectrum Analyzer).

The setup of measured parameter is displayed for 2 pages on functional label. Refer to the Spectrum Analyzer Operation Manual for more information.

The measurement parameters that are enabled to set up are shown below.

First page of the function label

- [F2] (RBW Manual/Auto)
  Selects the RBW setting that is set arbitrary interlocked without VBW or that is set automatically interlocked with frequency.
  Manual: RBW is set up arbitrary without interlocked with frequency
  Auto: RBW is interlocked with frequency. If RBW is set directly, it will change to Manual automatically. RBW that will be set up are shown below.

Frequency	9kHz or more to less than 100kHz	: 1kHz
	100kHz or more to less than 50MHz	: 10kHz
	50MHz or more to less than 500MHz	: 100kHz
	500MHz or more to	: 3MHz

- [F3] (VBW Manual/Auto)
  Selects the VBW setting that is set arbitrary interlocked without RBW or that is set automatically interlocked with RBW.
  Manual: The value of VBW is set up arbitrary without interlocked with RBW.
  Auto: The value of VBW is interlocked with RBW. If RBW is changed, VBW will be changed automatically. If VBW is set directly, it will change to Manual automatically.

- [F4] (VBW/RBW Ratio)
  The rate for determining VBW when setting a setup of VBW to Auto is set up.

- F5 (Sweep Time Manual/Auto)

Selects the Sweep Time setting that is set arbitrary interlocked without Data Point or that is set automatically interlocked with Data Point.

Manual: The value of Sweep Time is set up arbitrary without interlocked with Data Point.

Auto: The value of Sweep Time is interlocked with Data Point. If Sweep Time is set directly, it will change to Manual automatically. For Seach/Sweep method, when Data Point is 501, it will be set to 2.5sec. And when that is 1001, it will be set to 5sec. For Spot method, when Data Point is 501, it will be set to 10msec. And when that is 1001,it will be set to 20msec.

- F6 (return): Returns to the upper-layer screen.

Second page of the function label

- F1 (SPA ATT Ref Manual/Auto)

Manual: The reference level and attenuator of spectrum analyzer are set up independently from the value that is set by signal analysis.

Auto: The reference level and attenuator of spectrum analyzer are set up as same as the value that is set by signal analysis.

- F4 (Attenuator Manual/Auto)

Manual: The attenuator of spectrum analyzer is set up independently from the reference level that is set.

Auto: The attenuator of spectrum analyzer is set up automatically from the reference level that is set.

- F5 (Data Points)

1001: Sets the number of data points of spectrum analyzer to 1001.

501: Sets the number of data points of spectrum analyzer to 501.

- F6 (return): Returns to the upper-layer screen.

3.5.9 Describing Measurement Result

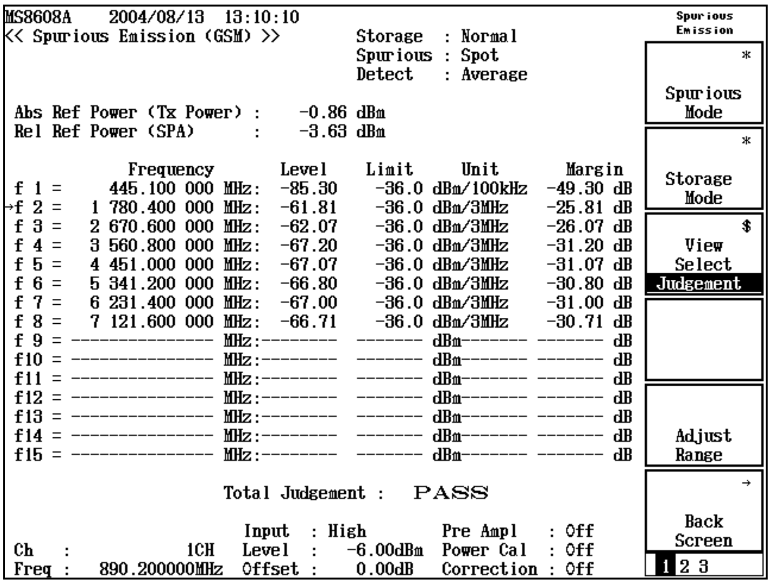
Two types of measurement results display are available.

- Numeric value screen: Displays list of frequency and level for measured spurious.
- Waveform screen: Displays waveform for sweep range and measured results of spurious. Available for all measurements

If the measurement results of both screens are excessive to the setup level, it will be highlighted with a red.

Refer to “3.5.11 Changing Measurement Result Display (Waveform Display)” for switching between numeric value and waveform screens.

1. Numeric value screen



(1) Abs Ref Power

The Power value measured by the method that was set up at Absolute Power Reference on Setup Reference Power screen. This value will be reference for spurious power to absolute value display. The measurement method is shown in ( ). Refer to “3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)” for detail.

(2) Rel Ref Power

The Power value measured by the method that was set up at Relative Power Reference on Setup Reference Power screen. This value will be reference for spurious power to relative value display. The measurement method is shown in ( ). Refer to "3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)" for detail.

(3) Frequency

Measurement frequency.

(4) Level

The measurement result of spurious amplitude that is specified frequency in (3) above.

(5) [F3] (View Select) :

Since results and conditions for spurious measurement cannot be displayed in one screen, pressing this key toggles results and conditions for measurement in the order.

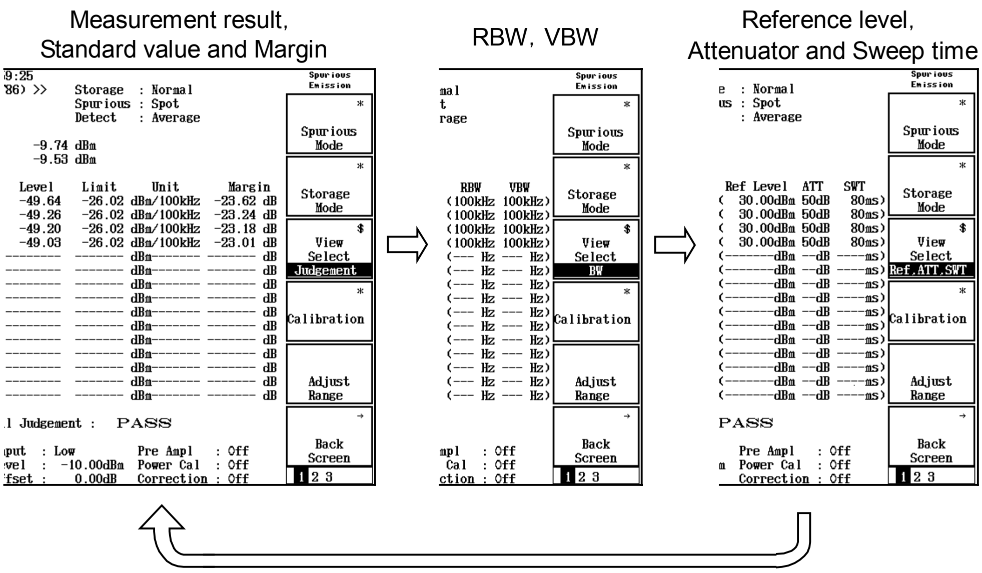
Judgement: Displays the measurement result, standard value and margin.

BW: Displays the RBW and VBW.

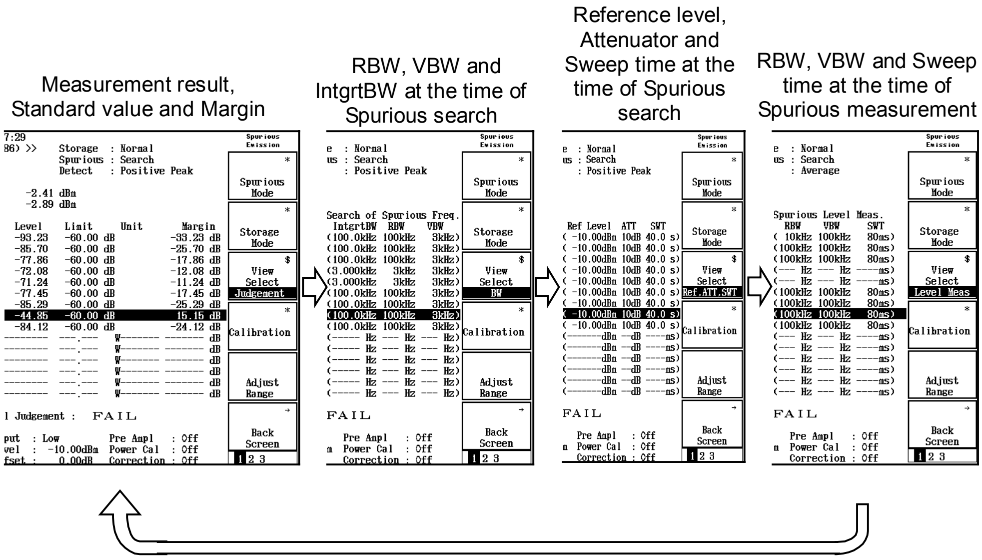
Ref,ATT,SWT: Displays the reference level, attenuator and sweep time.

Level Meas.: Displays the RBW, VBW and sweep time of when level measurement.

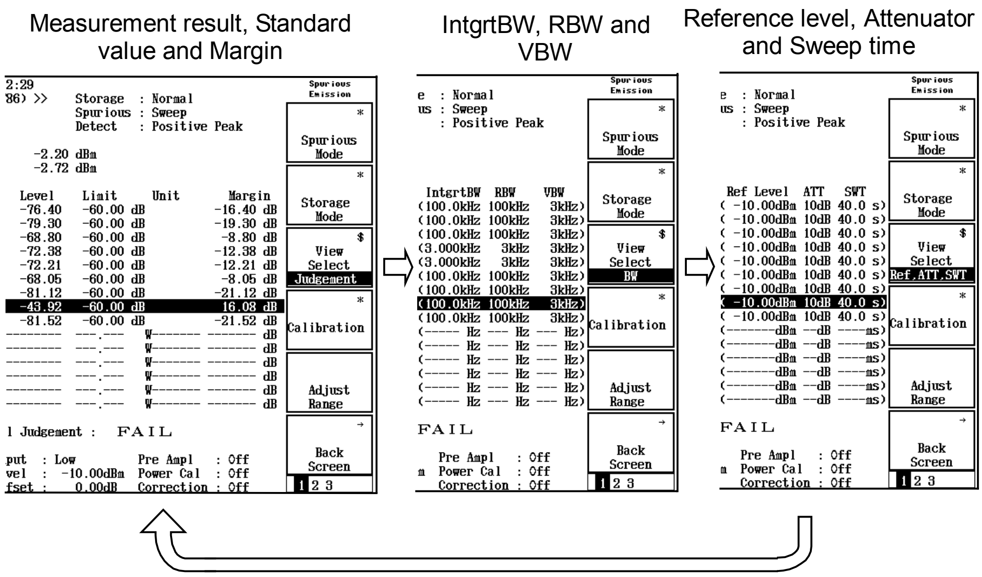
- Measurement result screen of the Spot method



- Measurement result screen of the Search method



- Measurement result screen of the Sweep method



(6) Total Judgement

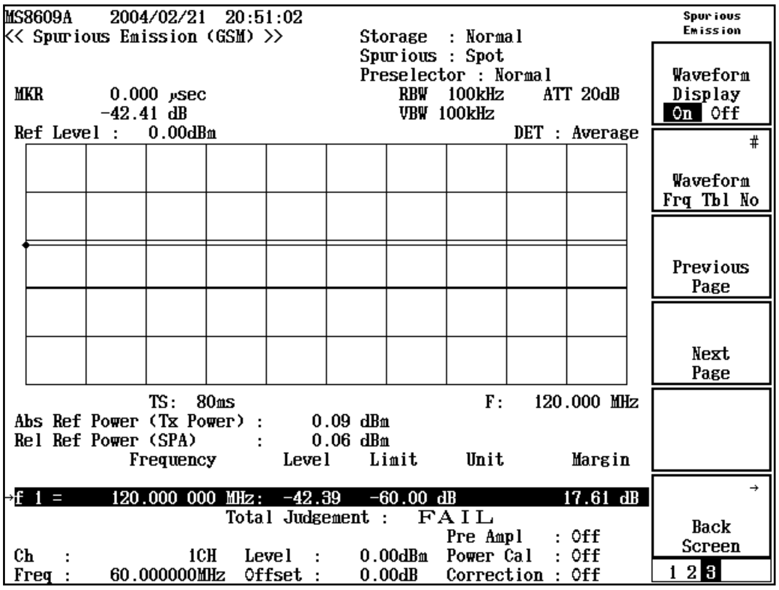
Judgment result for all frequencies (range). In all the set-up frequency (range), if the judgment level is cleared, PASS is displayed and if at least one is not clearable, FAIL is displayed.

2. Waveform Screen

On a waveform screen, the displays of the measurement result in the Spot method, the Search method, or the Sweep method differ delicately. Describes it individually.

・Spot Method

Measurement result of the Spot method



(1) MKR

Frequency and level at marker point (red diamond mark) in the waveform screen. Move the marker using ∧ and ∨ (Entry keys) or rotary knob.

(2) RBW, VBW, ATT, DET

Setting value for spectrum analyzer when measuring spurious.

・RBW: Resolution bandwidth

・VBW: Video bandwidth

・ATT: Input attenuator

・DET: Detection mode

(3) Ref Level

Level at the top of the waveform graph. The vertical axis of the waveform graph is 10 dB/div.

(4) TS

Sweep time.

(5) F

Measurement frequency.

(6) Abs Ref Power

The Power value measured by the method that was set up at Absolute Power Reference on Setup Reference Power screen. This value will be reference for spurious power to absolute value display. The measurement method is shown in ( ). Refer to “3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)” for detail.

(7) Rel Ref Power

The Power value measured by the method that was set up at Relative Power Reference on Setup Reference Power screen. This value will be reference for spurious power to relative value display. The measurement method is shown in ( ). Refer to “3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)” for detail.

(8) Frequency

Measurement frequency on the Setup Spot Table Screen. Refer to “3.5.3 Setting Measurement Parameter of Spot Method (Setup Spot Table)” for details.

(9) Level

Measurement result of spurious amplitude that is specified frequency in (8) above.

(10) Limit

The Limit value that was set up at Setup Spot Table screen. Refer to “3.5.3 Setting Measurement Parameter of Spot Method (Setup Spot Table)” for details.

(11) Unit

It is unit over the Limit value set up on the Setup Spot Table screen. Refer to “3.5.3 Setting Measurement Parameter of Spot Method (Setup Spot Table)” for details.

(12) Margin

It is difference between the measurement result (Level) of actual and the Limit value (Limit) that was set at Setup Spot Table screen.

(13) →

Indicates the No. in frequency table of current displayed waveform.

No. in Frequency Table　　Spurious Level　　Unit

→f1 = 15.154 296 MHz : -98.83 -76.00 dBm/100kHz -22.83dB

Spurious Frequency　　Limit　　Margin

(14) Total Judgement
Judgment result for all frequencies (range). In all the set-up frequency (range), if the judgment level is cleared, PASS is displayed and if at least one is not clearable, FAIL is displayed.

(15) [F2] (Waveform Frq Tbl No):
Specify the frequency table with this key. Press this key to open a list of frequency table No's. Select a number using [∧] and [∨] (Entry keys) or rotary knob, then press [Set].
This item cannot be set when [F1] (Waveform Display) is set to Off.

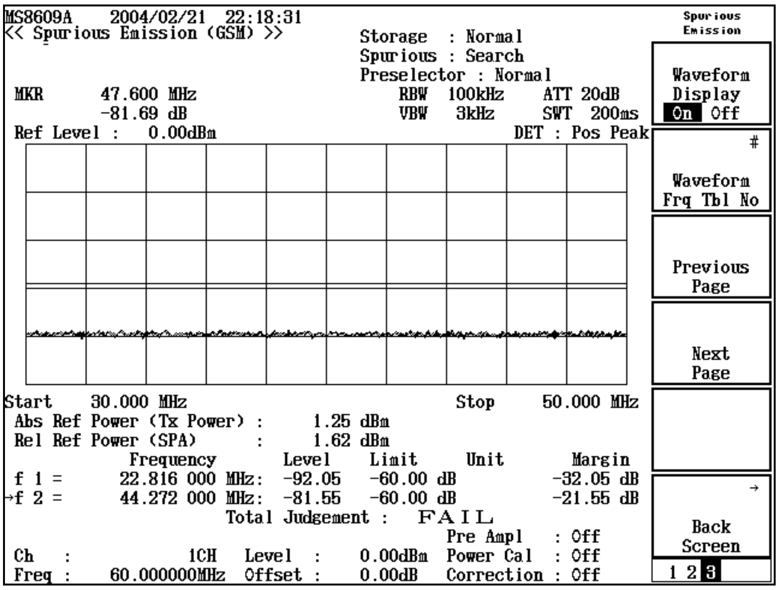
(16) [F3] (Previous Page):
Pressing this key decreases the frequency table Number that displays waveform by 1.
This item cannot be set when [F1] (Waveform Display) is set to Off.

(17) [F4] (Next Page):
Pressing this key increases the frequency table Number that displays waveform by 1.
This item cannot be set when [F1] (Waveform Display) is set to Off.

(18) [F6] (Back Screen):
Switches the screen from the current screen to the upper-layer screen by one rank.

・Search Method (while spurious search: frequency sweep) and Sweep Method

Measurement result of Search method
(While spurious search)



(1) MKR
Frequency and level at marker point (red diamond mark) in the waveform screen. Move the marker using (∧) and (∨) (Entry keys) or rotary knob.

(2) RBW, VBW, ATT, DET
Setting value for spectrum analyzer when measuring spurious.
・RBW: Resolution bandwidth
・VBW: Video bandwidth
・ATT: Input attenuator
・DET: Detection mode

(3) Ref Level
Level at the top of the waveform graph. The vertical axis of the waveform graph is 10 dB/div.

(4) Start
Sweep start frequency.

(5) Stop
Sweep stop frequency.

(6) Abs Ref Power
The Power value measured by the method that was set up at Absolute Power Reference on Setup Reference Power screen. This value will be reference for spurious power to absolute value display. The measurement method is shown in ( ). Refer to "3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)" for detail.

(7) Rel Ref Power
The Power value measured by the method that was set up at Relative Power Reference on Setup Reference Power screen. This value will be reference for spurious power to relative value display. The measurement method is shown in ( ). Refer to "3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)" for detail.

(8) Frequency
The frequency that has maximum spurious amplitude in the sweep frequency.

(9) Level
Measurement result of spurious amplitude that is specified frequency in (8) above.

(10) Limit
The Limit value that was set up at Setup Search Table screen. Refer to "3.5.4 Setting Measurement Parameter of Search Method (Setup Search Table)" for details.

(11) Unit

It is unit over the Limit value set up on the Setup Search Table screen. Refer to "3.5.4 Setting Measurement Parameter of Search Method (Setup Search Table)" for details.

(12) Margin

It is difference between the measurement result (Level) of actual and the Limit value (Limit) that was set at Setup Search Table screen.

(13) →

Indicates the No. in frequency table of current displayed waveform.

No. in Frequency Table   Spurious Level   Unit

→f1 =   15.154 296 MHz :   -98.83   -76.00 dBm/100kHz   -22.83dB

Spurious Frequency   Limit   Margin

(14) Total Judgement

Judgment result for all frequencies (range). In all the set-up frequency (range), if the judgment level is cleared, PASS is displayed and if at least one is not clearable, FAIL is displayed.

(15) F2 (Waveform Frq Tbl No) :

Specify the frequency table with this key. Press this key to open a list of frequency table No's. Select a number using ∧ and ∨ (Entry keys) or rotary knob, then press Set.

This item cannot be set when F1 (Waveform Display) is set to Off.

(16) F3 (Previous Page) :

Pressing this key decreases the frequency table Number that displays waveform by 1. The measurement result display at the time of spurious search (frequency axis sweep) and the measurement result display at the time of Spurious measurement (time-axis sweep) are expressed by turns at the Search method.

This item cannot be set when F1 (Waveform Display) is set to Off.

(17) F4 (Next Page) :

Pressing this key increases the frequency table Number that displays waveform by 1. The measurement result display at the time of spurious search (frequency axis sweep) and the measurement result display at the time of Spurious measurement (time-axis sweep) are expressed by turns at the Search method .

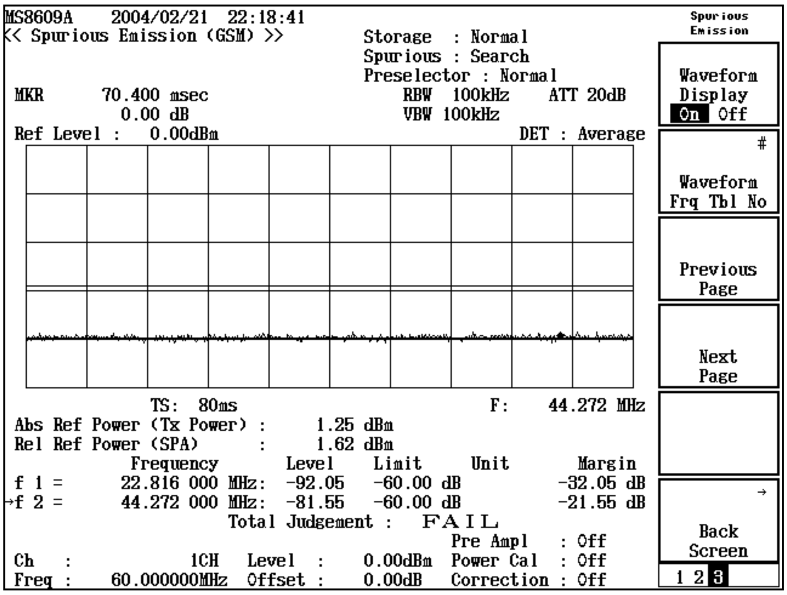
This item cannot be set when F1 (Waveform Display) is set to Off.

(18) F6 (Back Screen) :

Switches the screen from the current screen to the upper-layer screen by one rank.

・Search Method（while Spurious calculating: Time axis sweep）

Measurement result of Search method
（while Spurious calculating）



(1) MKR

Frequency and level at marker point (red diamond mark) in the waveform screen. Move the marker using ∧ and ∨ (Entry keys) or rotary knob.

(2) RBW, VBW, ATT, DET

Setting value for spectrum analyzer when measuring spurious.

・RBW: Resolution bandwidth

・VBW: Video bandwidth

・ATT: Input attenuator

・DET: Detection mode

(3) Ref Level

Level at the top of the waveform graph. The vertical axis of the waveform graph is 10 dB/div.

(4) TS

Sweep time.

(5) F

Measurement frequency.

(6) Abs Ref Power

The Power value measured by the method that was set up at Absolute Power Reference on Setup Reference Power screen. This value will be reference for spurious power to absolute value display. The measurement method is shown in ( ). Refer to "3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)" for detail.

(7) Rel Ref Power

The Power value measured by the method that was set up at Relative Power Reference on Setup Reference Power screen. This value will be reference for spurious power to relative value display. The measurement method is shown in ( ). Refer to "3.5.2 Setting Amplitude Measurement Parameter of Carrier Wave (Setup Reference Power)" for detail.

(8) Frequency

The frequency that has maximum spurious amplitude in the sweep frequency.

(9) Level

Measurement result of spurious amplitude that is specified frequency in (8) above.

(10) Limit

The Limit value that was set up at Setup Sweep Table screen. Refer to "3.5.5 Setting Measurement Parameter of Sweep Method (Setup Sweep Table)" for details.

(11) Unit

It is unit over the Limit value set up on the Setup Sweep Table screen. Refer to "3.5.5 Setting Measurement Parameter of Sweep Method (Setup Sweep Table)" for details.

(12) Margin

It is difference between the measurement result (Level) of actual and the Limit value (Limit) that was set at Setup Sweep Table screen.

(13) →

Indicates the No. in frequency table of current displayed waveform.

No. in Frequency Table   Spurious Level   Unit

→f1 = 15.154 296 MHz : -98.83 -76.00 dBm/100kHz -22.83dB

Spurious Frequency   Limit   Margin

(14) Total Judgement

Judgment result for all frequencies (range). In all the set-up frequency (range), if the judgment level is cleared, PASS is displayed and if at least one is not clearable, FAIL is displayed.

(15) F2 (Waveform Frq Tbl No) :

Specify the frequency table with this key. Press this key to open a list of frequency table No's. Select a number using ∧ and ∨ (Entry keys) or rotary knob, then press Set.

This item cannot be set when F1 (Waveform Display) is set to Off.

(16) F3 (Previous Page) :

Pressing this key decreases the frequency table Number that displays waveform by 1. The measurement result display at the time of spurious search (frequency axis sweep) and the measurement result display at the time of Spurious measurement (time-axis sweep) are expressed by turns at the Search method.

This item cannot be set when F1 (Waveform Display) is set to Off.

(17) F4 (Next Page) :

Pressing this key increases the frequency table Number that displays waveform by 1. The measurement result display at the time of spurious search (frequency axis sweep) and the measurement result display at the time of Spurious measurement (time-axis sweep) are expressed by turns at the Search method .

This item cannot be set when F1 (Waveform Display) is set to Off.

(18) F6 (Back Screen) :

Switches the screen from the current screen to the upper-layer screen by one rank.

3.5.10 Changing Unit of Measurement Result (Unit)

It is enabled to change the unit of Spurious measurement result.

1. Press ▭ (more) on the Spurious Emission screen to display the second page of the function label. Press F4 (Unit) on second page. Since a sub menu is displayed, chooses from these.

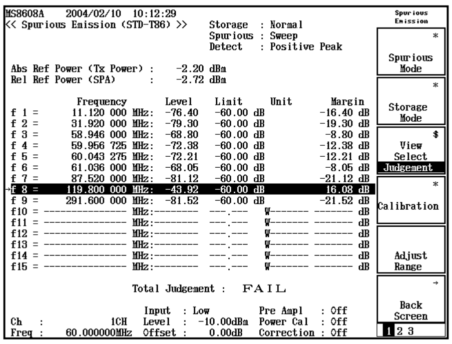
- F1 (Auto) : Displays in the unit that was set by Judgement of each Setup Table.
- F2 (dBm) : Displays in dBm unit.
- F3 (W) : Displays in W unit (mW, μW or nW).
- F4 (dB) : Displays in dB unit.
- F6 (return) : Returns to upper-layer function label display by one rank.

3.5.11 Changing Display of Measurement Result (Waveform Display)

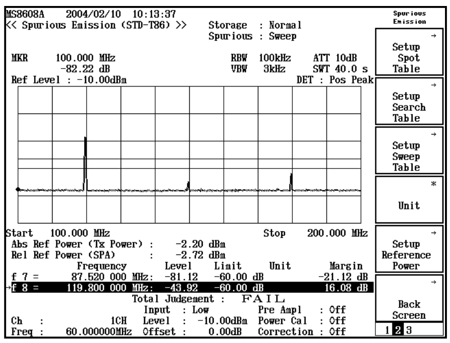
Sweep waveform can be displayed for all measurement. Therefor, states can be checked except measured spurious.

Press F1 (Waveform Display) of third page of function label on Spurious Emission screen to switch the numeric screen and the waveform screen. When Waveform Display is On, Marker is displayed automatically.

Screen of Waveform Display is Off



Screen of Waveform Display is On

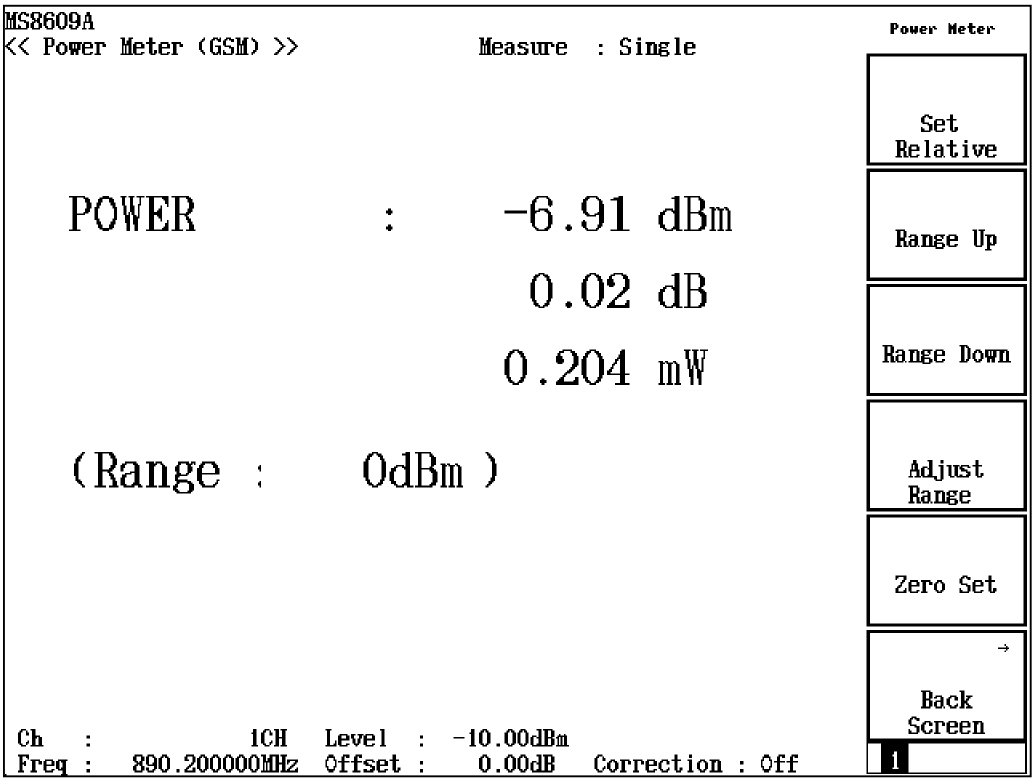


3.6 Power Meter

The measurement results displayed in the Power Meter screen and the parameters to be set in the screen are explained here.

When IQ-input, this measurement cannot be executed. For MS268xA, this function cannot be used.

Screen Description



(1)POWER

Displays the power measured by the internal power sensor in dBm, relative level and W-unit.

For the relative level, the value at the time of pressing F1 (Set Relative) key is the reference value.

(2)Range

Displays current measurement range.

3.6.1 Calibration Zero-Point (Zero Set)

For high-precision measurement, perform the zero point calibration.
Turn off the input power to the RF input connector, and then press F5 (Zero Set) to calibrated zero-input power point.

3.6.2 Using Relative Value Display (Set Relative)

Sets the reference value for relative value display.

- Pressing F1 (Set Relative) sets the measured power at this time as the reference value.

3.6.3 Setting Measurement Range (Range Up/Range Down)

Sets the measurement range for the power meter.

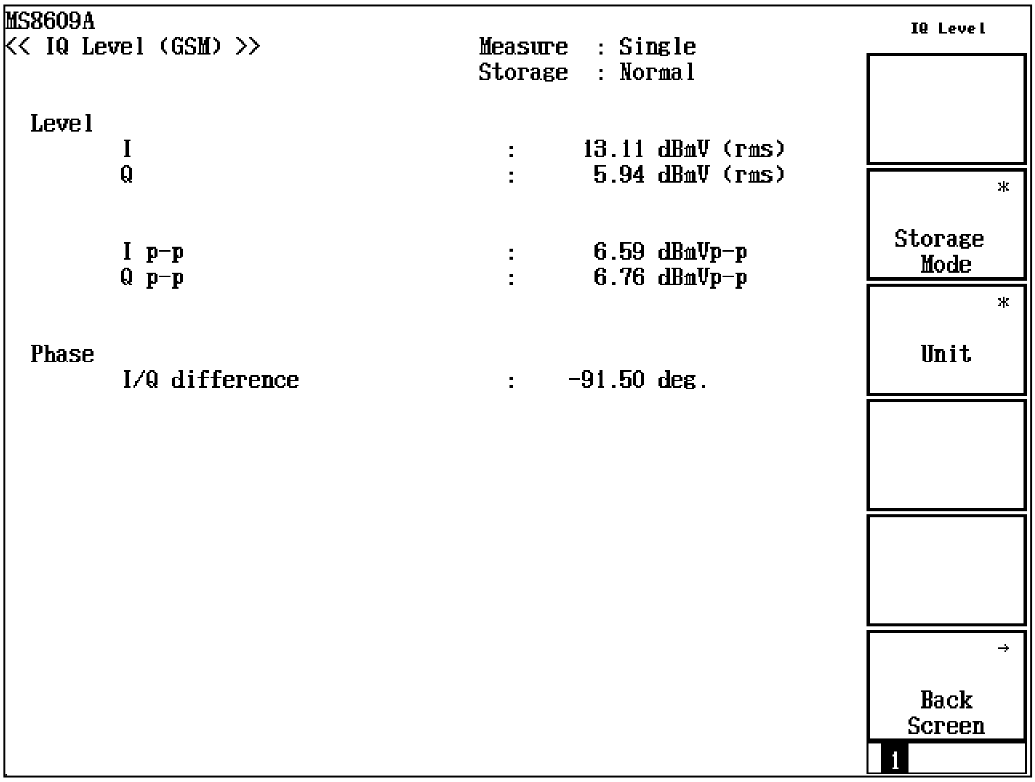
- Pressing F2 (Range Up) shift up the measurement range.
- Pressing F3 (Range Down) shift down the measurement range.
- Pressing F4 (Adjust Range) optimizes the measurement range according to the input power. At the same time, reference level on Setup Common Parameter screen is set to the optimal value.

3.7 Measuring IQ Level

The measurement result displayed in the IQ Level screen and the parameters to be set in the screen are explained here.

For main frame of MS268xA, this function is available only when MS2681A-17, MS2681A-18, MS2683A-17, MS2683A-18 or MS2687A/B-18 are loaded.

Screen Description



(1)Level (I and Q)

Displays the effective value levels of the I- and Q-phase signals.

(2)Level (Ip-p and Qp-p)

Displays the peak-to-peak levels of the I- and Q-phase signals.

(3)Phase (I/Q difference)

Displays the phase difference between the I- and Q-phase signals when CW signal is input to the I and Q input connector.

3.7.1 Setting Storage Mode (Storage Mode)

Sets the storage mode for the measured results.

Storage Mode: Storage mode can be selected from the items below.

- Normal: Updates the result and displays it after each measurement.
- Average: Averages result and displays the averaged value after each measurement.

Average Count: Sets the number of average times.

Refresh Interval: Sets the interval for refreshing the averaged value display.

- Every: Refreshes after each measurement.
- Once: Refreshes after the measurement, until the Averaging Count.

3.7.2 Changing Unit of Level (Unit)

- Press F3 (Unit) to display the function labels shown below, and selects the unit.
- F1 (mV): Sets the unit to mV.
- F2 (dBmV): Sets the unit to dBmV.

3.8 Saving and Recalling of Set Parameters

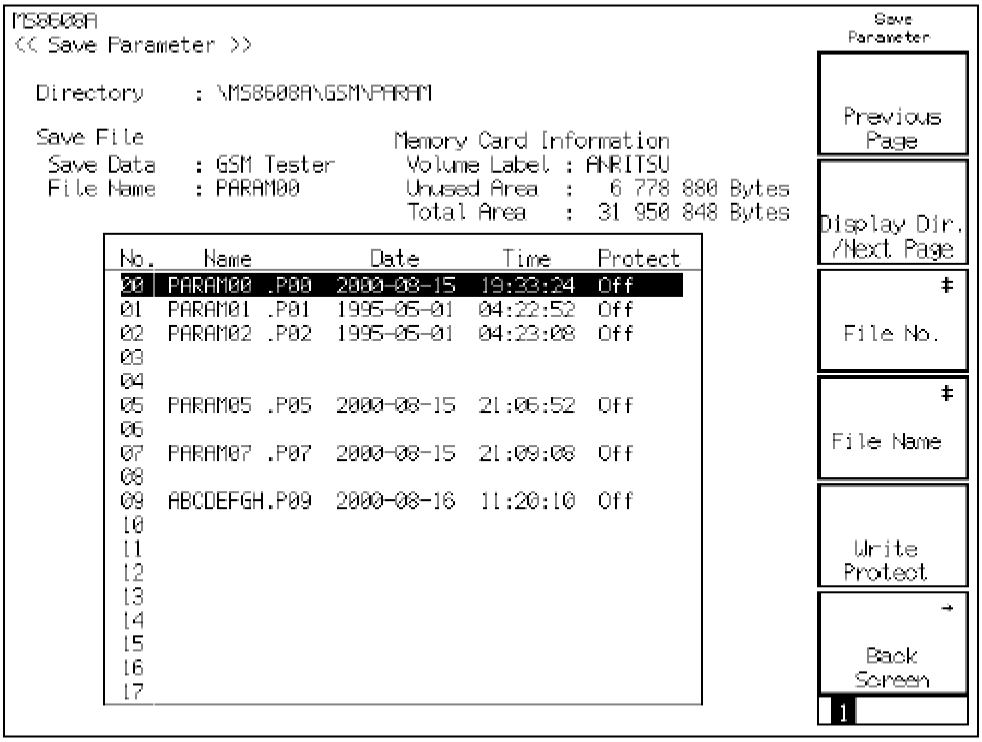
How to save/recall the set parameter values on/from the memory card is explained here.
First, insert the memory card into the memory card slot. The memory card must be inserted/removed while the main unit power is on. However, do not insert/remove the memory card during saving/recalling process.

100 setting files can be saved on one memory card. The files are saved with the number from 0 to 99. Alphanumeric filenames or the write protect can be used for them.
Name the files according to the MS-DOS filename format. Up to 8 characters can be used but not case-sensitive.

3.8.1 Saving Parameters (Save)

To save the parameters, displays the Save Parameter screen by following steps below.

Step	Procedure
1	Inserts a memory card into the memory-card insertion slot.
2	Press Shift and then press Recall.
3	Press F2 (Display Dir.)

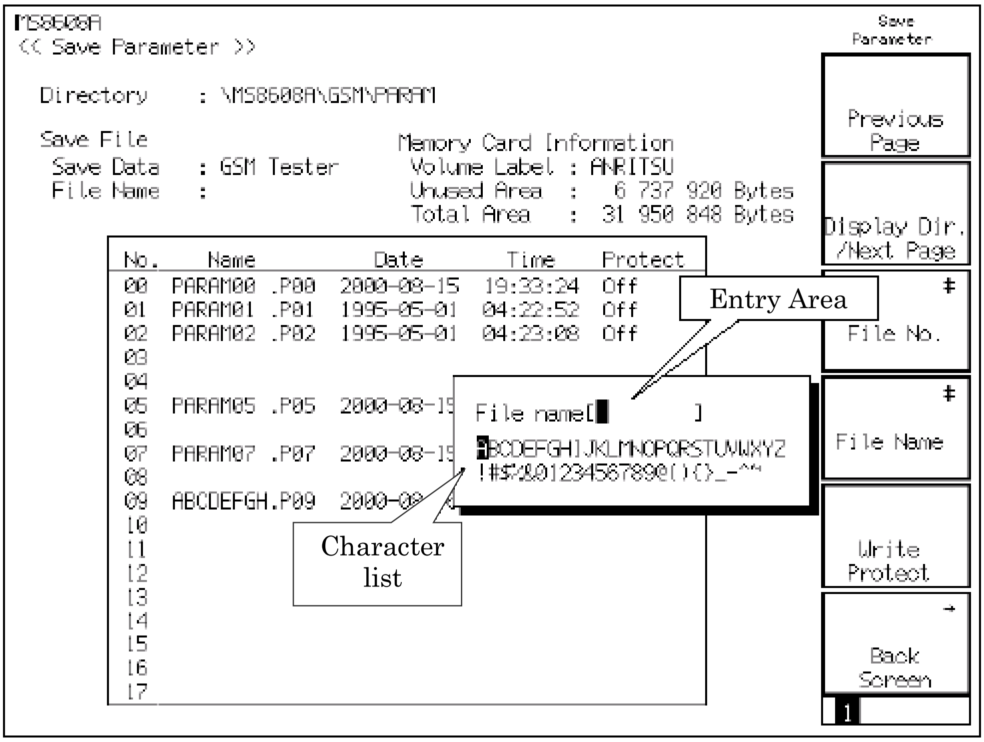


Step	Procedure
	100 setting forms (states) can be saved on one memory card. The files are saved with the numbers from 0 to 99.
4	Move the cursor using ∧ and ∨ of Entry keys or the rotary knob to select the file number. Or, press F3 (File No.) to open a setting window, and input a file number using numeric key.
5	Press Set Entry key.
6	The confirmation window opens. Selects “Yes” and press Set Entry key.

This saves the set value for each parameter on the memory card.
When a file is saved for a new number, it is automatically named as “PARAM**.P**” (**equal to the file number). If a file is saved for an existing file number, the file is overwritten but the filename is not changed.

3.8.2 Saving File with New Name (File Name)

In Step 4 in [Saving Parameter], pressing F4 (File Name) enables saving a file with a new name.
This section explains how to input the file name by pressing F4 (File Name) when the filename-input window displayed.



Step	Procedure
1	Moves the cursor of character list using the rotary knob, and selects the desired character.
2	Press Enter key. The selected character is written on the entry area.
3	Enter the filename by repeating Step 1 and 2. The characters from A to F and the number from 0 to 9 can be enterd using the numeric keypad. Up to 8 characters can be used in a filename. Only the characters displayed in the character list can be used. Other characters cannot be used.
4	After entering the filename, press Set Entry key.
5	A confirmation window opens, selects “Yes” and press Set .

Then, the file is saved with a new name.

- Rotary knob: Moves the cursor in the list of characters.
- ∧ ∨ : Moves the cursor in the entry area.
- BS : Deletes a character on the left of the cursor in the entry area.
- Enter : The characters on the cursor position in the character list are overwritten to the character on the cursor position of entry area.
- Set : Sets the character string in the entry area as the file name.

3.8.3 Write-protecting File (Write Protect)

The setting method for write-protect of a file is explained here.

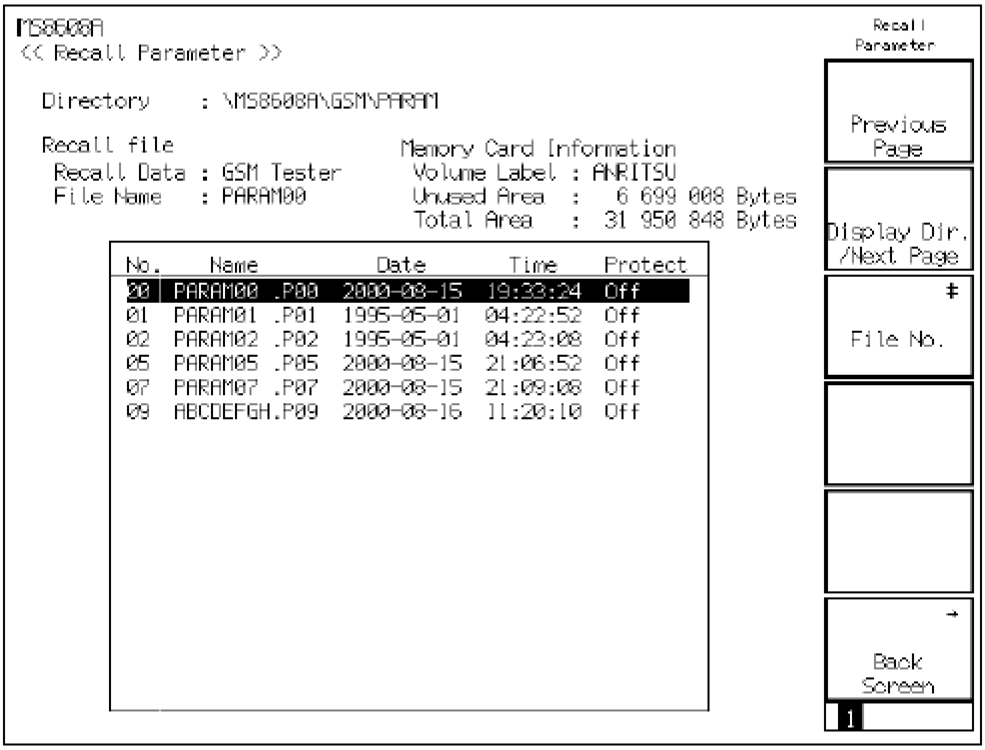
Step	Procedure
1	Move the cursor to the file number of desired position of write-protect using the ∧ and ∨ Entry keys or the rotary knob.
2	Press F5 (Write Protect).

Pressing F5 (Write Protect) switches write-protect On/Off.

3.8.4 Recalling Parameters (Recall)

To recall the saved parameters, displays the Recall Parameter screen following the steps below:

Step	Procedure
1	Inserts a memory card into the memory-card insertion slot.
2	Press [Recall] key.
3	Press [F2] (Display Dir.)



Step	Procedure
4	Move the cursor using [∧] and [∨] Entry keys or the rotary knob to select the file number. Or press [F3] (File No.) key to open a setting window, and input the file number using the numeric keypad.
5	Press [Set] Entry key.
6	The confirmation window opens. Selects “Yes” and press [Set] Entry key.

After recalling the parameters, the screen moves to the Setup Common Parameter screen.

Section 4 Performance Test

This section describes measuring instrument, how to set up then and operation details to conduct the performance test for GSM measurement by installing the MX860x02A/MX268x02A in the MS860xA/MS268xA.

in this section means a panel key.

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4.1 When Performance Test Is Required

The performance test described here is conducted as pert of preventive maintenance against performance deterioration during the MX860x02A/ MX268x02A in the MS860xA/MS268xA.
Use the performance test on the MS860xA/MS268xA with the MX860x02A/ MX268x02A when it is needed for the receive inspection, periodic inspection or post-repair performance check.
The items that are determined to be critical should be periodically tested (once or twice a year or so desirable) as preventive maintenance.
Perform the following performance tests for receiving inspection, periodic inspection and post-repair performance check when the MS860xA/MS268xA is used for GSM measurement.

- Modulation/frequency measurement
- Transmission power measurement accuracy
- Power measurement at carrier off
- Linearity
- Output spectrum measurement
- Spurious measurement
- IQ input modulation accuracy
- Power meter accuracy*

*) For MS268x, this test is not performed.

If any item that does not satisfy specifications is found by the performance test, contact Anritsu or our agency.

4.2 List of Equipment for Performance Test

Recommended instrument name (model name)	Required performance	Test item
Synthesized signal generator (MG3633A)	• Frequency range: 100 kHz to 2,700 MHz 1 Hz of resolution available • Output level range: −20 to +10 dBm 0.1 dB of resolution available • SSB phase noise: −130 dBc/Hz or less (for 10 kHz offset) • Second harmonic: −30 dBc or less • External reference input: possible (10 MHz)	Modulation/frequency analysis Transmitter power measurement accuracy Linearity Output spectrum measurement Spurious measurement Power meter accuracy
Digital modulation signal generator (MG8672A +MS0302A + MG0303B)	• Frequency range: 100 kHz to 2,700 MHz 1 Hz of resolution available • Output level range: Non-modulation: −10 to +10 dBm Modulation: −20 to +4 dBm 0.1 dB of resolution available • External reference input: possible (10 MHz)	Power measurement range at carrier off IQ input modulation accuracy (GMSK modulation)
Digital modulation signal generator	• IQ output possible • EDGE signal output possible • Output level: 0.1 to 1.0 V (rms) • S/N: 50 dB or more • External reference input: possible (10 MHz)	IQ input modulation accuracy (8PSK modulation)
Calibration received (ML2530A)	• Frequency range: 100 kHz to 2,700 MHz 1 Hz of resolution available • Measuring power range: −140 to 20 dB • Measurement accuracy: ±0.04 dB • External reference input: possible (10 MHz)	Linearity Power meter accuracy
Power meter (ML4803A) Power sensor (MA4601)	• Main unit accuracy: ±0.02 dB • Frequency range: 100 kHz to 8.5 GHz (depending on power sensor in use) Power Meter accuracy • Frequency range: 10 MHz to 3 GHz • Measuring power range: −30 to +20 dBm • Input connector: N type	Modulation/frequency analysis Transmitter power measurement accuracy Linearity Power meter accuracy
Fixed attenuator (MP721A)	• Attenuator: 3 dB • VSWR: 1.2 or less	Power meter accuracy

Recommended instrument name (model name)	Required performance	Test item
Programmable attenuator (MN72A)	• Frequency range: DC to 18 GHz • Attenuation accuracy: 0.9 dB • VSWR: 1.2 or less Power meter accuracy	Modulation/frequency analysis Transmitter power measurement accuracy Linearity Power meter accuracy
LPF switching unit	• Facility to cut off the second harmonic component of 850 MHz and to pass through filter	Spurious measurement
2G LPF	• Facility to cut off the higher harmonics (more than 2 GHz) generated by the signal generator	Spurious measurement

Performance requirement are excerpted from a part of the performance that covers the measurement range of test items.

4.3 Performance Test

Warm up the device to be tested and measuring instruments for at least 30 minutes unless otherwise specified. After the device are stabilized, execute the performance test.

To obtain measurement accuracy, in addition to the above instruction, the test should be conducted at room temperature (25±5℃) and there must be little fluctuation in the AC power voltage and no problem with noise, vibration, dust, humidity, etc.

4.3.1 Modulation/Frequency Measurement<MS860xA>

(1) Specifications to be tested

- Frequency measurement accuracy: ±(accuracy of the standard crystal oscillator + 10 MHz)

  Input level (average power within burst):

  ≥−10 dBm (High Power input)

  ≥−30 dBm (Low Power input)

  ≥−30 dBm (Low Power input, Pre-amplifier On *1)
- Residual phase error (GSMK modulation): < 0.5 degrees (rms)

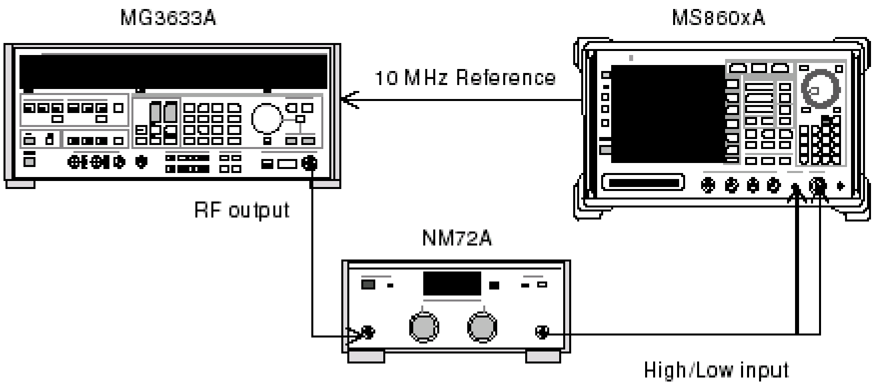
  < 2.0 degrees (peak)
- Residual phase error (8PSK modulation): < 1.0 % (rms)

*1: Pre-amplifier can be set to On when the main unit Option 08 is installed.

(2) Measuring instrument for test

- Synthesized signal generator (SG1): MG3633A
- Programmable attenuator: MN72A

(3) Setup



(4) Test procedure

Step	Operation
1	With SG1 in non-modulation state, set the frequency to be measured. Set the programmable attenuator (MN72A) to 0 dB. Frequencies to be measured and measurement levels are shown in the following table:

Frequency	Level (input level to the MS860xA)		
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A	High Power input of MS8608A
50 MHz	−40dBm±0.1dB	−30dBm±0.1dB	−10dBm±0.1dB
850 MHz	−40dBm±0.1dB	−30dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−40dBm±0.1dB	−30dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−40dBm±0.1dB	−30dBm±0.1dB	−10dBm±0.1dB

Step	Operation
2	Set the MS8608A/MS8609A as follows: • Input Terminal: RF (High/Low Power Input) • Reference Level: −10 dBm • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
3	Press [ ] (More) to display the second page of the function label.
4	Press [F6] (Power Meter) to move to the Power Meter screen.
5	Set the output of SG1 to off and execute [F5] (Zero Set).

Step	Operation
6	Set the output of SG1 to −10 dBm and execute [F4] (Adjust Range). Adjust the level of SG1 so that the Power Meter reads −10 dBm±0.1 dB (Adjust Range must always be executed after the SG1 level is varied). When the level calibration is completed, press [F6] (Back Screen).
7	Set the Programmable attenuator (MN72), as follows • At Pre-amplifier On: 30 dB • At MS8609A and Low Power input of MS8608A: 20 dB • At High Power input of MS8608: 0 dB
8	Set the SG1 setting frequency to the sum of 67.70833 kHz (a quarter of the bit Rate) plus the value in the above table.
9	Press [F2] (Modulation Analysis) of the MS8608A/MS8609A to move to the Modulation Analysis screen. Press [F6] (Adjust Range) to perform Adjust Range.
10	Check that the frequency error value and the residual phase error value satisfy the specifications.
11	Set the SG1 setting frequency to the sum of 50.78125 kHz plus the value in the table on the previous page.
12	Set Modulation of the MS8608A/MS8609A to 8PSK. (Set the programmable attenuator, the same as Step 7 above.)
13	Execute Step 9 in the same manner and then check that the residual EVM satisfies the specifications.
14	Repeat Steps 1 thru 13, after changing the frequency.

4.3.2 Modulation/Frequency Measurement<MS268xA>

(1) Specifications to be tested

- Frequency measurement accuracy: ±(accuracy of the standard crystal oscillator + 10 MHz)

  Input level (average power within burst):

  ≥−30 dBm (Pre-amplifier Off)

  ≥−30 dBm (Pre-amplifier On *1)

- Residual phase error (GSMK modulation): < 0.5 degrees (rms)

  < 2.0 degrees (peak)

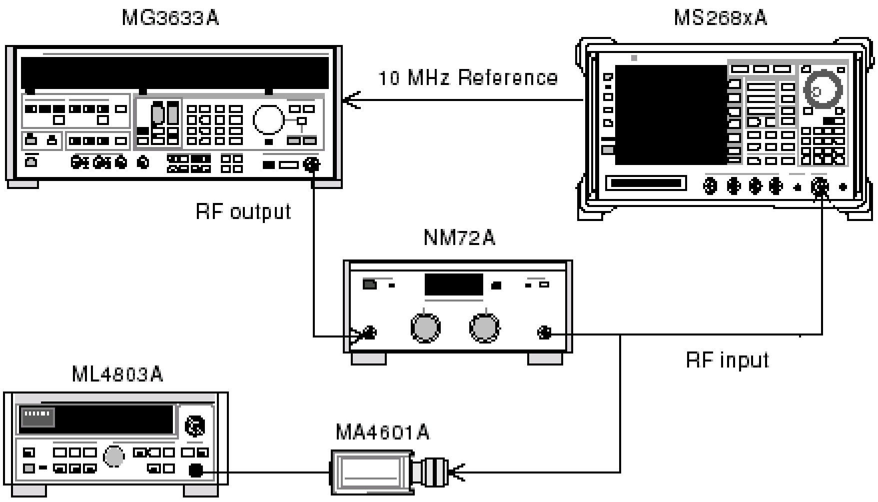
- Residual phase error (8PSK modulation): < 1.0 % (rms)

*1: Pre-amplifier can be set to On when the main unit Option 08 is installed.

(2) Measuring instrument for test

- Synthesized signal generator (SG1): MG3633A
- Programmable attenuator: MN72A
- Power Meter: ML4803A
- Power Sensor: MA4601A

(3) Setup



(4) Test procedure

Step	Operation
1	With SG1 in non-modulation state, set the frequency to be measured. Set the programmable attenuator (MN72A) to 0 dB. Frequencies to be measured and measurement levels are shown in the following table:

Frequency	Level (input level to the MS268xA)	
	Pre-amplifier On	Pre-amplifier Off
50 MHz	−40dBm±0.1dB	−30dBm±0.1dB
850 MHz	−40dBm±0.1dB	−30dBm±0.1dB
1800 MHz	−40dBm±0.1dB	−30dBm±0.1dB
2700 MHz	−40dBm±0.1dB	−30dBm±0.1dB

Step	Operation
2	Set the MS8608A/MS8609A as follows: • Input Terminal: RF • Reference Level: −10 dBm • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
3	Connect the attenuator output to the power sensor (MA4601A) and switch SG1 output to ON.
4	Adjust the SG1 level so that the power meter indicates a value of –10 dBm ±0.1 dB.
5	Connect the attenuator output to RF input of the spectrum analyzer.
6	Set the Programmable attenuator (MN72), as follows • At Pre-amplifier On: 30 dB • At MS8609A and Low Power input of MS8608A: 20 dB • At High Power input of MS8608: 0 dB
7	Set the SG1 setting frequency to the sum of 67.70833 kHz (a quarter of the bit Rate) plus the value in the above table.

Step	Operation
8	Press F2 (Modulation Analysis) of the MS860xA/MS268xA to move to the Modulation Analysis screen. Press F5 (Adjust Range) to perform Adjust Range.
9	Check that the frequency error value and the residual phase error value satisfy the specifications.
10	Set the SG1 setting frequency to the sum of 50.78125 kHz plus the value in the table on the previous page.
11	Set Modulation of the MS860xA/MS268xA to 8PSK. (Set the programmable attenuator, the same as Step 6 above.)
12	Execute Step 8 in the same manner and then check that the residual EVM satisfies the specifications.
13	Repeat Steps 1 thru 12, after changing the frequency.

4.3.3 Transmitter Power Measurement Accuracy<MS860xA>

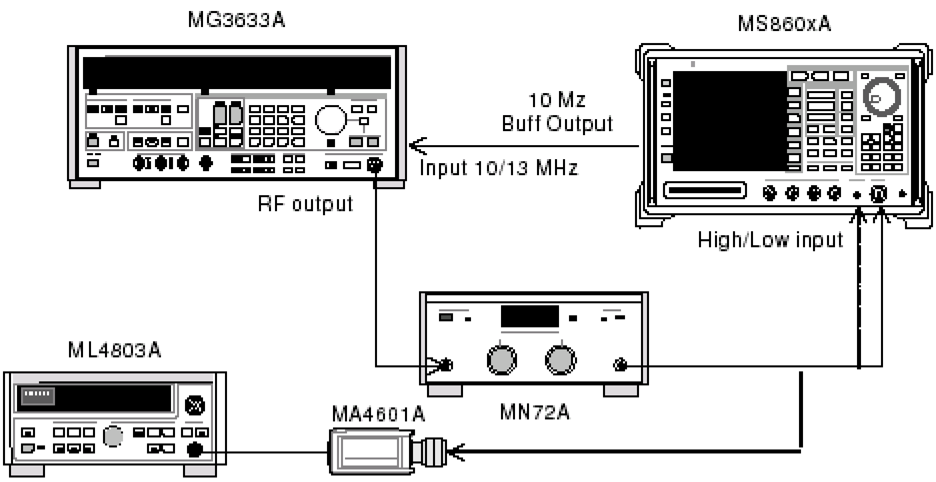
(1) Specifications to be tested

±0.4 dB (after calibration using the built-in power meter)

(2) Measuring instrument for test

- Synthesized signal generator (SG1): MG3633A
- Power meter: ML4803A
- Power sensor: MA4601A
- Programmable attenuator: MN72

(3) Setup



(4) Test procedure

Step	Operation
1	Connect the power sensor (MA4601) to Cal Output of the power meter (ML4803A), and execute Zero Adjust.
2	Set the Sensor Input to On, and execute ADJ (Cal Adjust).
3	Connect SG1 (MN72 input) to the power sensor (MA4681).

Step	Operation
4	Set the frequency and the output level of SG1, as follows. Adjust the SG1 level so that the power meter (ML4830A) reads +10 dBm±0.1 dB, and record the measured results. Then, with the programmable attenuator (MN72) set to 20 dB, measure and record the attenuator amount for every frequencies. Calibration of frequencies to be measured and measurement level are shown in the following table.

Frequency	Level (input level to the MS860xA)		
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A	High Power input of MS8608A
50 MHz	−10dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
850 MHz	−10dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−10dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−10dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB

Step	Operation
5	Connect SG1 (MN72A output) to the MS8608A/MS8609A.
6	Set the MS8608A/MS8609A as follws: • Input Terminal: RF (High/Low Power Input) • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
7	Set the programmable attenuator (MN72A), as follows. • At Pre-amplifier On: 20 dB • At MS8609A and Low Power input of MS8608A: 20 dB • At High Power input of MS8608A: 0 dB
8	Press [F3] (RF Power) to move to the RF Power screen.
9	Press [F5] (Adjust Range).
10	Press [ ] (More) to display the second page of the function label.
11	Press [F5] (Calibration) and execute [F1] (Power Calibration).
12	Record the TX Power value (dBm), as follows. • For High Power input of MS8608A Measurement accuracy [dB] = TX Power value − the value obtained from the power meter • At Pre-amplifier On, and Low Power input of MS860xA Measurement accuracy [dB] = TX Power value − (the value obtained from the power meter − turn attenuation when MN72A ATT is set to 20 dB)
13	Repeat Steps 3 thru 12, after changing the frequency.

4.3.4 Power Measurement at Carrier Off<MS860xA>

(1) Specifications to be tested

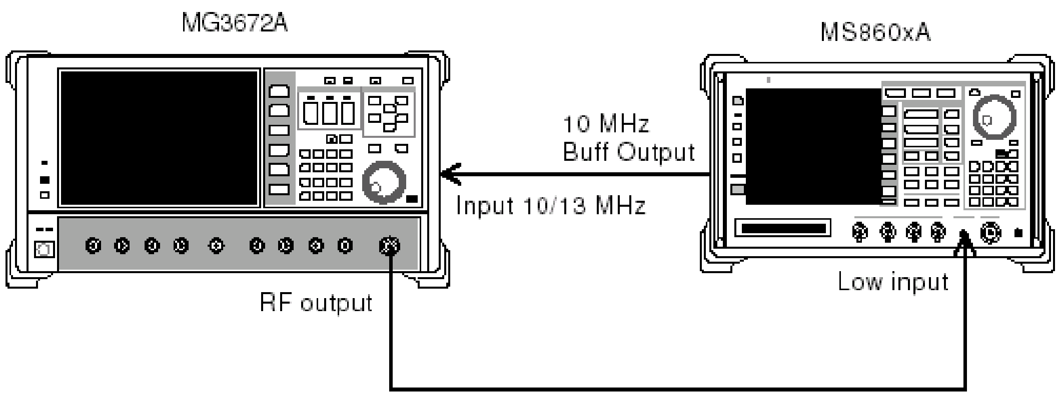
- Input level (average power within burst):
  ≥+ 10 dBm (High Power input)
  ≥−10 dBm (Low Power input)
  ≥−20 dBm (Low Power input, Pre-amplifier On *1)
- Measurement range in the normal mode: (60 dB (compared to the average power within burst.
- Measurement range in the normal mode:
  Average power within burst: Compared to 1 W (High Power input) and 10 mW (Low Power input)
  ≥70 dB (the measurement lower limit is determined by the average noise level: ≤50 dBm (High Power input , 50 MHz to 2.7 GHz))

*1: Pre-amplifier can be set to On when the main unit Option 08 is installed.

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B

(3) Setup



(4) Test procedure

Step	Operation
1	Set SG2 as follows: • System: GSM • Differential Encode: On • Phase Polarity: Normal • Burst: On • Pattern: TCH • Trigger: Int
2	Set the SG2 frequency, as shown on the table below. Set the SG2 output level to −10 dBm The input level to the MS8608A/MS8609A is measured by the TX Power value of the RF Power screen (set Wide Dynamic Range to off). Combinations of frequencies and levels to be measured are shown in the following table:

Frequency	Level (input level to the MS860xA)	
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
3	Set the MS8608A/MS8609A as follows: • Input Terminal: RF (Low Power input only for MS 8608A) • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Normal Burst • Trigger: Free Run
4	Press [F3] (RF Power) to move to the RF Power screen.
5	Press [F5] (Adjust Range).
6	Press [ ] (More) to display the second page of the function label.
7	Press [F5] (Calibration) and execute [F1] (Power Calibration).
8	Press [Single] and adjust the level of SG2 so that the TX Power value reads −10dBm±0.1dB.(Never execute Adjust Range operation after the level is varied.) * When Pre-amplifier is set On, Calibrate the SG2 level so that the TX Power reads −20dBm±0.1dB (at this time, execute Adjust Range)

Step	Operation
9	Chack that On/Off Ration satisfies the specifications.
10	Thrn back the function label to the first page, and press [ ] (Wide Dynamic Range) to set it On (at both the times of Low Power input and Pre-amplifier On).
11	Adjust the SG2 output level so that the input level to the MS8608A/MS8609A becomes 0 dBm by reading the TX Power on the RF Power screen, and execute [F5] (Adjust Range)
12	Press [ ] (More) to display the second page of the function label.
13	Press [F5] (Calibration) and execute [F1] (Power Calibration).
14	Measure Carrier OFF power and check that the absolute value of OFF power does not exceed the specified average noise level ≤ -71 dBm at Low Power input.
15	Repeat Steps 2 thru 14, after changing the frequency.

4.3.5 Power Measurement at Carrier Off<MS268xA>

(1) Specifications to be tested

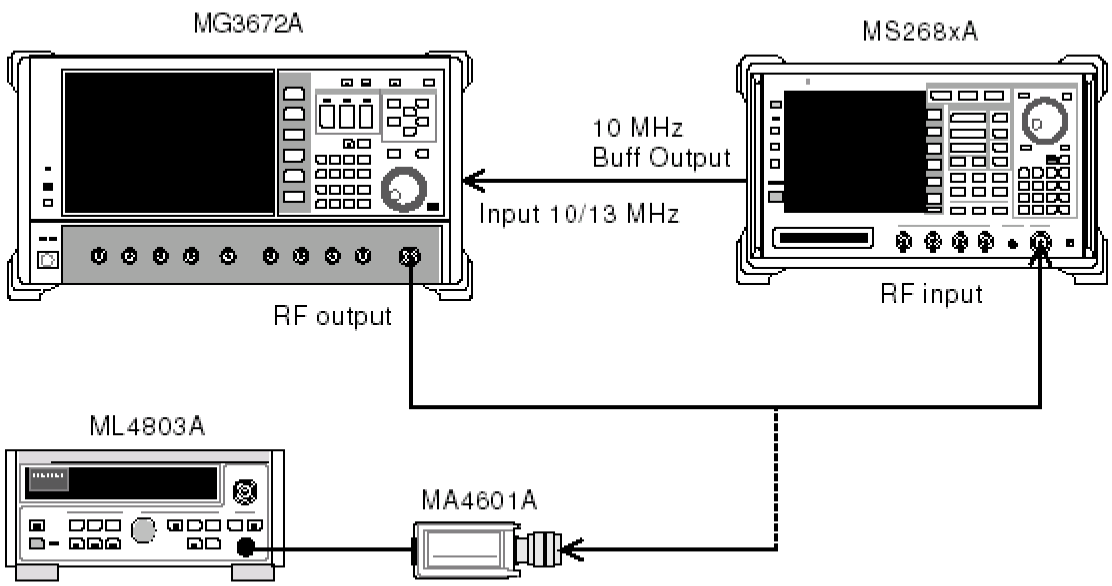
- Input level (average power within burst):
  ≥−10 dBm (Pre-amplifier Off)
  ≥−20 dBm (Pre-amplifier On *1)
- Measurement range in the normal mode: (60 dB (compared to the average power within burst.
- Measurement range in the normal mode:
  Average power within burst: Compared to 1 W (High Power input) and 10 mW (Low Power input)
  ≥70 dB (the measurement lower limit is determined by the average noise level: ≤50 dBm (High Power input , 50 MHz to 2.7 GHz))

*1: Pre-amplifier can be set to On when the main unit Option 08 is installed.

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B
- Power Meter: ML4803A
- Power Sensor: MA4601A

(3) Setup



(4) Test procedure

Step	Operation
1	Set SG2 as follows: • System: GSM • Differential Encode: On • Phase Polarity: Normal • Burst: On • Pattern: TCH • Trigger: Int
2	Set the SG2 frequency, as shown on the table below. Set the SG2 output level to −10 dBm The input level to the MS8608A/MS8609A is measured by the TX Power value of the RF Power screen (set Wide Dynamic Range to off). Combinations of frequencies and levels to be measured are shown in the following table:

Frequency	Level (input level to the MS268xA)	
	Pre-amplifier On	Pre-amplifier Off
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
3	Set the MS8608A/MS8609A as follows: • Input Terminal: RF • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Normal Burst • Trigger: Free Run
4	Press [F3] (RF Power) to move to the RF Power screen.
5	Press [F5] (Adjust Range).
6	Connect SG1 output to the power sensor (MA4601A) and switch SG1 output to ON.
7	Adjust the SG1 level so that the power meter indicates a value of –10 dBm ±0.1 dB. * When Pre-amplifier is set to On, calibrate the SG2 level so that the TX Power reads –20 dBm ±0.1 dB (at this time, execute Adjust Range).

Step	Operation
8	Connect SG1 output to RF input of the spectrum analyzer.
9	Chack that On/Off Ration satisfies the specifications.
10	Thrn back the function label to the first page, and press $\boxed{}$ (Wide Dynamic Range) to set it On (at both the times of Low Power input and Pre-amplifier On).
11	Adjust the SG2 output level so that the input level to the MS268xA becomes 0 dBm by reading the TX Power on the RF Power screen, and execute $\boxed{\text{F5}}$ (Adjust Range)
12	Measure Carrier OFF power and check that the absolute value of OFF power does not exceed the specified average noise level ≤−71 dBm at Low Power input.
13	Repeat Steps 2 thru 12, after changing the frequency.

4.3.6　Linearity<MS860xA>

(1)　Specifications to be tested

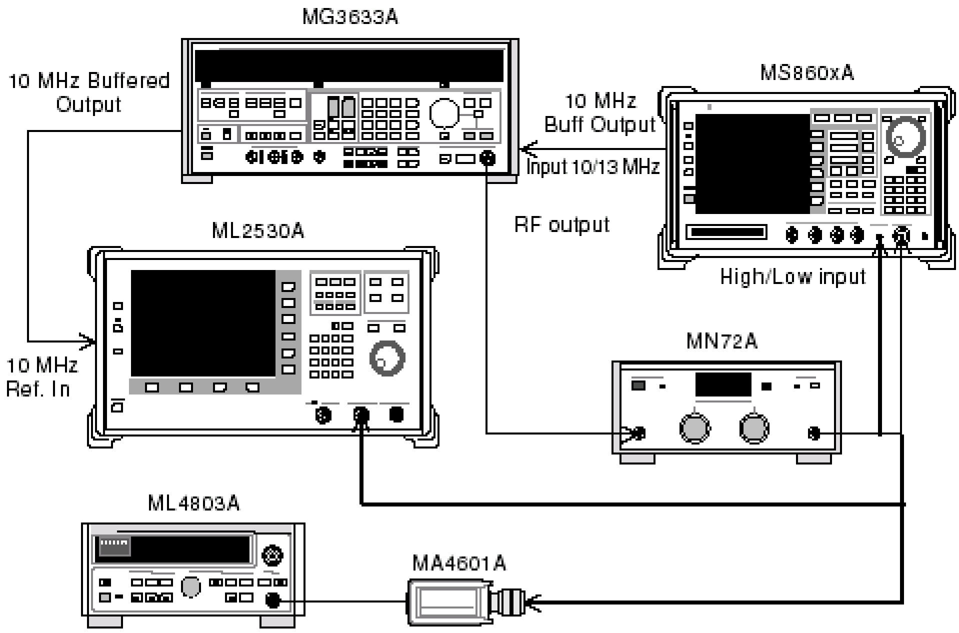
±0.2 dB (0 to −30 dB)

In the state of not changing the reference level setting after performing Adjust Range operation.

(2)　Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B

(3)　Setup



(4) Test procedure

Step	Operation
1	Connect the power sensor (MA4601) to Cal Output of the power meter (ML4803A), and execute Zero Adjust.
2	Set the Sensor Input to On, and execute ADJ (Cal Adjust).
3	Connect SG1 (MN72 input) to the power sensor (MA4681).
4	Set the SG1 frequency as shown on the table below, and set the programmable attenuator (MN72A) to 0 dB. Adjust the SG1 level so that the power meter (ML4803A) reads +10dBm±0.1dB, and record the set value (using Set_Ref). Combinations of the frequencies and levels to be measured are shown in the folloing table:

Frequency	Level (input level to the MS860xA)		
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A	High Power input of MS8608A
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB	−10dBm±0.1dB

Step	Operation
5	Connect SG1 (MN72A output) to the calibration receiver (ML2530A), and set BW to 100 Hz and Relative mode (fix the range to 1)
6	Decrease the SG1 output level −30 dBc (compard to Set_Ref) in 10 dB decrements, recording each measured value (ML2530A reading) by the calibration receiver (ML2530A).
7	Set the MS8608A/MS8609A as follws: • Input Terminal: RF (High/Low Power Input) • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
8	Set the programmable attenuator (MN72A), as follows. • At Pre-amplifier On: 30 dB • At MS8609A and Low Power input of MS8608A: 20 dB • At High Power input of MS8608A: 0 dB
9	Connect SG1 (MN72A output) to the MS8608A.MS8609A, and set the output level of the single generator to Set_Ref.
10	Press [F3] (RF Power) to move to the RF Power screen.
11	Press [F5] (Adjust Range).

Step	Operation
12	Press [ ] (More) to display the second page of the function label.
13	Press [F5] (Calibration) and execute [F1] (Power Calibration).
14	Record the TX Power value (dBm) (Measure_Ref).
15	Decrease the SG1 output level to −30 dBc (compared to Set_Ref) in 10 dB decrements, recording the TX Power value each time. ***Note:*** Vary the SG1 level by 10 dB decrement. Don’t vary the setting of the programmable attenuator (MN72A).
16	Check that the liniarity error (shown below) satisfies the specifications. Lenearity error [dB] = TX Power value − (Measure_Ref − ML2530A reading)
17	Repeat Steps 3 thru 16, after changing the frequency.

4.3.7 Linearity<MS268xA>

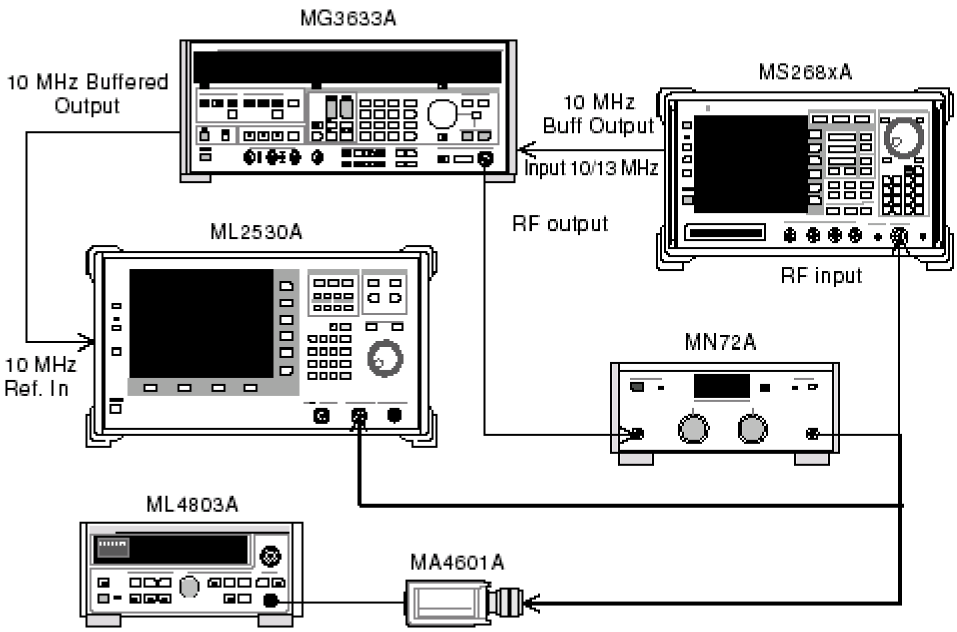
(1) Specifications to be tested

±0.2 dB (0 to −30 dB)
In the state of not changing the reference level setting after performing Adjust Range operation.

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B
- Power Meter: ML4803A
- Power Sensor: MA4601A

(3) Setup



(4) Test procedure

Step	Operation
1	Connect the power sensor (MA4601) to Cal Output of the power meter (ML4803A), and execute Zero Adjust.
2	Set the Sensor Input to On, and execute ADJ (Cal Adjust).
3	Connect SG1 (MN72 input) to the power sensor (MA4681).
4	Set the SG1 frequency as shown on the table below, and set the programmable attenuator (MN72A) to 0 dB. Adjust the SG1 level so that the power meter (ML4803A) reads +10dBm±0.1dB, and record the set value (using Set_Ref). Combinations of the frequencies and levels to be measured are shown in the folloing table:

Frequency	Level (input level to the MS268xA)	
	Pre-amplifier On	Pre-amplifier O
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
5	Connect SG1 (MN72A output) to the calibration receiver (ML2530A), and set BW to 100 Hz and Relative mode (fix the range to 1)
6	Decrease the SG1 output level −30 dBc (compard to Set_Ref) in 10 dB decrements, recording each measured value (ML2530A reading) by the calibration receiver (ML2530A).
7	Set the MS8608A/MS8609A as follws: • Input Terminal: RF • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
8	Set the programmable attenuator (MN72A), as follows. • At Pre-amplifier On: 30 dB • At Pre-amplifier Off: 20 dB
9	Connect SG1 (MN72A output) to the MS8608A.MS8609A, and set the output level of the single generator to Set_Ref.
10	Press F3 (RF Power) to move to the RF Power screen.
11	Press F5 (Adjust Range).

Step	Operation
12	Record the TX Power value (dBm) (Measure_Ref).
13	Decrease the SG1 output level to −30 dBc (compared to Set_Ref) in 10 dB decrements, recording the TX Power value each time. ***Note:*** Vary the SG1 level by 10 dB decrement. Don't vary the setting of the programmable attenuator (MN72A).
14	Check that the liniarity error (shown below) satisfies the specifications. Lenearity error [dB] = TX Power value − (Measure_Ref − ML2530A reading)
15	Repeat Steps 3 thru 14, after changing the frequency.

4.3.8 Output Spectrum Measurement<MS860xA>

(1) Specifications to be tested

- For CW signal input

  Measurement range of the modulation section

  ≥60 dB (≥200 kHz of detuning)

  ≥68 dB (≥250 kHz of detuning)

  (at < 1.8 MHz of detuning, RBW: 30 kHz)

  (at < 1.8 MHz of detuning, RBW 100 kHz)

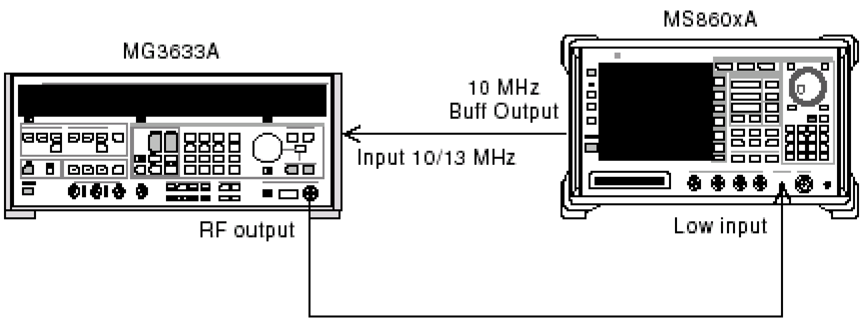
  Measurement range of the transient section

  ≥63 dB (≥400 kHz of detuning)

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B

(3) Setup



(4) Test procedure

Step	Operation
1	With SG1 in non-modulation state, set the frequency and the output level as shown below. The input level is measured with the built-in power meter of the MS8608A/MS8609A. Combinations of the frequencies and levels to be measured are shown in the following table:

Frequency	Level (input level to the MS860xA)	
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
2	Set the MS8608A/MS8609A as follows: • Input Terminal: RF (Low Power input only for MS 8608A) • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Normal Burst • Trigger: Free Run
3	Press [ ] (More) to display the second page of the function label.
4	Press [F6] (Power Meter) to move to the Power Meter screen.
5	Set the SG1 output to Off, and execute [F5] (Zero Set).
6	Set the SG1 output level to the level in the above table, and execute [F4] (Adjust range), as below. Adjust the SG1 level so that the Power Meter reads the level in the above table (Adjust Range must always be executed after the SG1 level is varied).
7	When the level calibration is completed, press [F6] (Back screen).
8	Return the function label to the first page; press [F5] (Output RF Spectrum) to move to the Output RF Spectrum screen.
9	Press [F3] (Unit) and then [F2] (dB) to change the unit display to dB.
10	Press [F6] (return) and then execute [F5] (Adjust Range)
11	Press [F4] (Calibration) and execute [F1] (Power Calibration)
12	Check that the modulation and transient section measurement ranges satisfy the specification.
13	Repeat Steps 1 thru 12, after changing the frequency.

4.3.9 Output Spectrum Measurement<MS268xA>

(1) Specifications to be tested

- For CW signal input

    Measurement range of the modulation section

    ≥60 dB (≥200 kHz of detuning)
    ≥68 dB (≥250 kHz of detuning)
    (at < 1.8 MHz of detuning, RBW: 30 kHz)
    (at < 1.8 MHz of detuning, RBW 100 kHz)

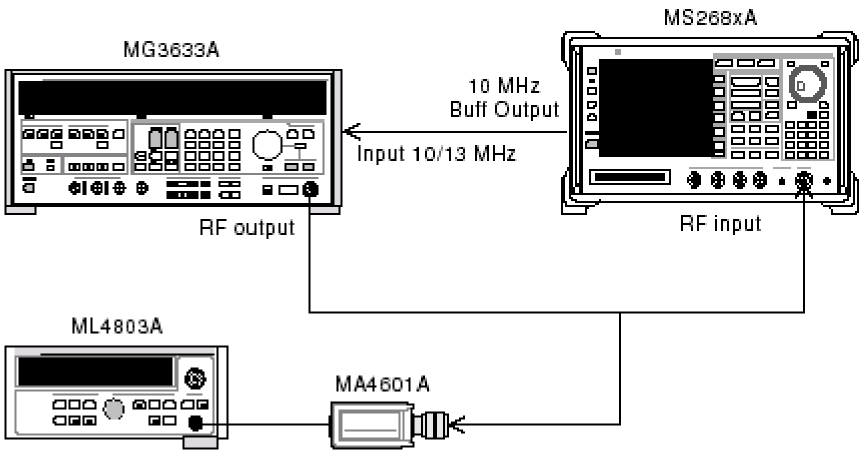
    Measurement range of the transient section

    ≥63 dB (≥400 kHz of detuning)

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B
- Power Meter: ML4803A
- Power Sensor: MA4601A

(3) Setup



(4) Test procedure

Step	Operation
1	With SG1 in non-modulation state, set the frequency and the output level, as shown below. Combinations of the frequencies and levels to be measured are shown in the following table:

Frequency	Level (input level to the MS2687xA)	
	Pre-amplifier On	Pre-amplifier Off
50 MHz	−20dBm±0.1dB	−10dBm±0.1dB
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB
2700 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
2	Set the MS268xA as follows: • Input Terminal: RF • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Normal Burst • Trigger: Free Run
3	Connect SG1 output to the power sensor (MA4601A) and switch SG1 output to ON.
4	Adjust the SG1 level so that the power meter indicates a value of table above.
5	When the level calibration is completed, press [F6] (Back screen).
6	Return the function label to the first page; press [F5] (Output RF Spectrum) to move to the Output RF Spectrum screen.
7	Press [F3] (Unit) and then [F2] (dB) to change the unit display to dB.
8	Press [F6] (return) and then execute [F5] (Adjust Range)
9	Check that the modulation and transient section measurement ranges satisfy the specification.
10	Repeat Steps 1 thru 9, after changing the frequency.

4.3.10 Spurious Measurement<MS860xA>

(1) Specifications to be tested

- Measurement range

  At 800 MHz to 1 GHz and 1.8 to 2.0 GHz of carrier frequencies

  ≥72 dB (RBW: 10 kHz)

  (1 to 50 MHz, band 0)

  ≥72 dB (RBW: 100 kHz)

  (50 to 500 MHz, band 0

  ≥67−f [GH] dB (RBW: 3 MHz)

  (500 MHz to 3.15 GHz, band 0, normal mode, excluding higher harmonic frequencies)

  ≥66 dB (RBW: 3 MHz)

  (3.15 to 7.8 GHz, band 1, normal mode)

  At Option 03 installed

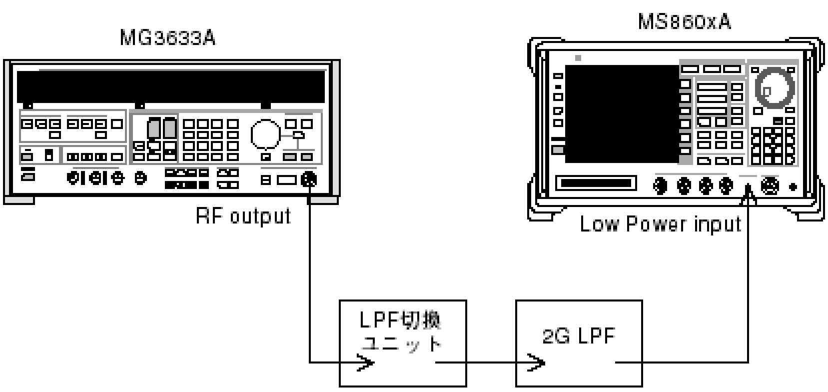
  ≥66 dB (RBW: 3 MHz)

  (3.15 to 7.8 GHz, band 1, Spurious mode)

(2) Measuring instrument for test

- Synthesized signal generator (SG1): MG3633A
- LPF sitching unit (able to cut off the secend harmonic component of 850 MHz and to pass through filter)
- 2G LPF

(3) Setup



(4) Test procedure

Step	Operation
1	Set the frequency and output level of SG1, as bellow. The input level to the MS8608A/MS8609A is measured with the built-in power meter. Combinations of the frequencies and levels to be measured are shown in the following table:

Frequency	Level (input level to the MS860xA)	
	MS860xA Pre-amplifier On	MS8609A and Low Power input of MS8608A
850 MHz	−20dBm±0.1dB	−10dBm±0.1dB
1800 MHz	−20dBm±0.1dB	−10dBm±0.1dB

Step	Operation
2	Set the MS8608A/MS8609A as follows: • Input Terminal: RF (Low Power input only for MS 8608A) • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
3	Press [ ] (More) to display the second page of the function label.
4	Press [F6] (Power Meter) to move to the Power Meter screen.
5	Set the SG1 output to Off, and execute [F5] (Zero Set).
6	Set the SG1 output level to the level in the above table, and execute [F4] (Adjust range). Adjust the level of the signal generator (SG1) so that the Power Meter reads the level in the above table (Adjust Range must always be executed after the SG1 level is varied).
7	When the level calibration is completed, press [F6] (Back screen).
8	Set the LPF switching unit as follows: a) Carrier Frequency: 850 MHz • Set LPF to 1.1 GHz. b) Carrier Frequency: 1800 MHz • Set LPF to Filter Pass (no Filter)
9	Turn back the function label to the first page, and press [F6] (Spurious Emission) to move to the Spurious Emission screen.
10	Press [F1] (Spurious Mode) and set [F1] (Sweep). When setting is competed, press [F6] (return)

Step	Operation
11	Press [F3] (Setup Search/Sweep Table) and set the frequency table as shown below: a) For Carrier Frequency: 850 MHz • Set Table 4.3.10-1 b) For Carrier Frequency: 1800 MHz • Set Table 4.3.10-3 When setting is completed, pass [F6] (Back Screen)
12	Press [ ] (More) to display the second page of the function label. Press [F4] (Preselector) and set Normal mode.
13	Returm the funciton label to the first page: ***Note:*** Setting Steps 12 thru 13 are possible only when Option 03 is installed.
14	Execute [F5] (Adjust Range).
15	Press [F4] (Calibration) and execute [F1] (Power Calibration).
16	Check that the masurement range satisfies the specifications.
17	When Option 03 is installed, mark the following Step 18 to 24, as well. When Option 03 is not installed., repeat Steps 1 thru 16, after changing the ferquency.
18	Press [F3] (Setup Search/Sweep Table) and than [ ] (More) to display the second page.
19	Press [F2] (Clear) to clear the frequency table.
20	Set the frequency table as shown below: a) For Carrier Frequency: 850 MHz • Set Table 4.3.10-2. b) For Carrier Frequency: 1800 MHz • Set Table 4.3.10-4.
21	Press [ ] (More) to display the second page of the function label. Press [F4] (Preselector) and set to Spurious mode.
22	Return the function label to the fir st page.
23	Execute Step 14 thru 16 in the same mannaer.
24	Repeat Steps 1 thru 23, after the frequency.

Table 4.3.10-1

	Start Frequency	Stop Frequency	RBW
f1	100 kHz	50 MHz	10 kHz
f2	50 MHz	500 MHz	100 kHz
f3	500 MHz	800 MHz	3 MHz
f4	900 MHz	1650 MHz	3 MHz
f5	1750 MHz	2500 MHz	3 MHz
f6	2600 MHz	3200 MHz	3 MHz
f7	3200 MHz	7800 MHz	3 MHz

Table 4.3.10-2

	Start Frequency	Stop Frequency	RBW
f1	1600 kHz	3150 MHz	3 MHz

Table 4.3.10-3

	Start Frequency	Stop Frequency	RBW
f1	100 kHz	50 MHz	10 kHz
f2	50 MHz	500 MHz	100 kHz
f3	500 MHz	850 MHz	3 MHz
f4	950 MHz	1750 MHz	3 MHz
f5	1850 MHz	3200 MHz	3 MHz
f6	3200 MHz	7800 MHz	3 MHz

Table 4.3.10-4

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	1750 MHz	3 MHz
f2	1850 MHz	3150 MHz	3 MHz

4.3.11 Spurious Measurement<MS268xA>

(1) Specifications to be tested

- Measurement range

  At 800 MHz to 1 GHz and 1.8 to 2.0 GHz of carrier frequencies

  ≥72 dB (RBW: 10 kHz)

  (1 to 50 MHz, band 0)

  ≥72 dB (RBW: 100 kHz)

  (50 to 500 MHz, band 0

  ≥67−f [GH] dB (RBW: 3 MHz)

  (500 MHz to 3.15 GHz, band 0, normal mode, excluding higher harmonic frequencies)

  ≥66 dB (RBW: 3 MHz)

  (3.15 to 7.8 GHz, band 1, normal mode)

  At Option 03 installed

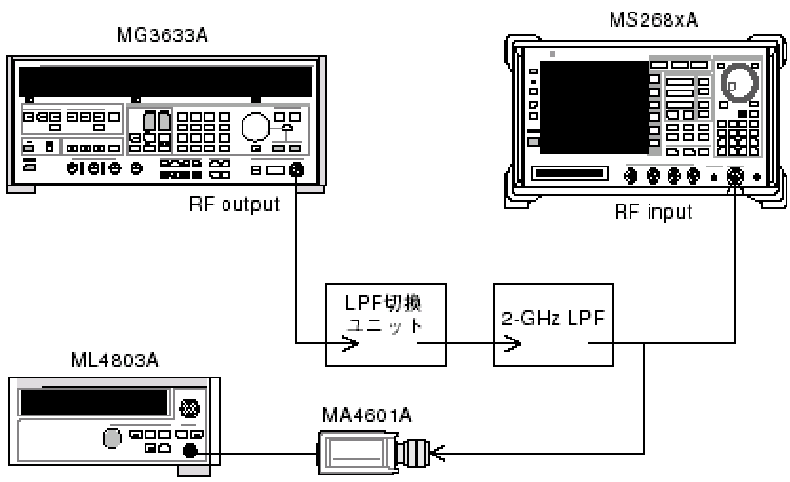
  ≥66 dB (RBW: 3 MHz)

  (3.15 to 7.8 GHz, band 1, Spurious mode)

(2) Measuring instrument for test

- Synthesized signal generator (SG1): MG3633A
- LPF sitching unit (able to cut off the second harmonic component of 850 MHz and to pass through filter)
- 2G LPF
- Power Meter: ML4803A
- Power Sensor: MA4601A

(3) Setup



(4) Test procedure

Step	Operation
1	Set the frequency and output level of SG1, as below. Combinations of the frequencies and levels to be measured are shown in the following table:
2	Set the MS268xA as follows: • Input Terminal: RF • Reference Level: (Level in the above table) • Frequency: (Frequency in the above table) • Modulation: GMSK • Measuring Object: Continuous • Trigger: Free Run
3	Connect SG1 output to the power sensor (MA4601A) and switch SG1 output to ON.
4	Adjust the SG1 level so that the power meter indicates a value of table above.
5	Connect SG1 output to RF input of the spectrum analyzer.
6	Set the LPF switching unit as follows: a) Carrier Frequency: 850 MHz • Set LPF to 1.1 GHz. b) Carrier Frequency: 1800 MHz • Set LPF to Filter Pass (no Filter)
7	Turn back the function label to the first page, and press F6 (Spurious Emission) to move to the Spurious Emission screen.
8	Press F1 (Spurious Mode) and set F1 (Sweep). When setting is competed, press F6 (return)

Frequency	Level (input level to the MS268xA)
	Pre-amplifier Off
850 MHz	0dBm±0.1dB
1800 MHz	0dBm±0.1dB

Step	Operation
9	Press [F3] (Setup Search/Sweep Table) and set the frequency table as shown below: a) For Carrier Frequency: 850 MHz • Set Table 4.3.11-1 b) For Carrier Frequency: 1800 MHz • Set Table 4.3.11-3 When setting is completed, pass [F6] (Back Screen)
10	Press [ ] (More) to display the second page of the function label. Press [F4] (Preselector) and set Normal mode.
11	Returm the funciton label to the first page: ***Note:*** Setting Steps 10 thru 11 are possible only when Option 03 is installed.
12	Execute [F5] (Adjust Range).
13	Check that the masurement range satisfies the specifications.
14	When Option 03 is installed, make the following Steps 15 to 21, as well. When Option 03 is not installed, repeat Steps 1 thru 13, after changing the frequency.
15	Press [F3] (Setup Search/Sweep Table) and than [ ] (More) to display the second page.
16	Press [F2] (Clear) to clear the frequency table.
17	Set the frequency table as shown below: a) For Carrier Frequency: 850 MHz • Set Table 4.3.11-2 b) For Carrier Frequency: 1800 MHz • Set Table 4.3.11-4.
18	Press [ ] (More) to display the second page of the function label. Press [F4] (Preselector) and set to Spurious mode.
19	Return the function label to the fir st page.
23	Execute Step 14 thru 16 in the same mannaer.
20	Repeat Steps 1 thru 19, after the frequency.

Table 4.3.11-1

	Start Frequency	Stop Frequency	RBW
f1	100 kHz	50 MHz	10 kHz
f2	50 MHz	500 MHz	100 kHz
f3	500 MHz	800 MHz	3 MHz
f4	900 MHz	1650 MHz	3 MHz
f5	1750 MHz	2500 MHz	3 MHz
f6	2600 MHz	3200 MHz	3 MHz
f7	3200 MHz	7800 MHz	3 MHz

Table 4.3.11-2

	Start Frequency	Stop Frequency	RBW
f1	1600 kHz	3150 MHz	3 MHz

Table 4.3.11-3

	Start Frequency	Stop Frequency	RBW
f1	100 kHz	50 MHz	10 kHz
f2	50 MHz	500 MHz	100 kHz
f3	500 MHz	850 MHz	3 MHz
f4	950 MHz	1750 MHz	3 MHz
f5	1850 MHz	3200 MHz	3 MHz
f6	3200 MHz	7800 MHz	3 MHz

Table 4.3.11-4

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	1750 MHz	3 MHz
f2	1850 MHz	3150 MHz	3 MHz

4.3.12 IQ Input Modulation accuracy<MS860xA/MS268xA>

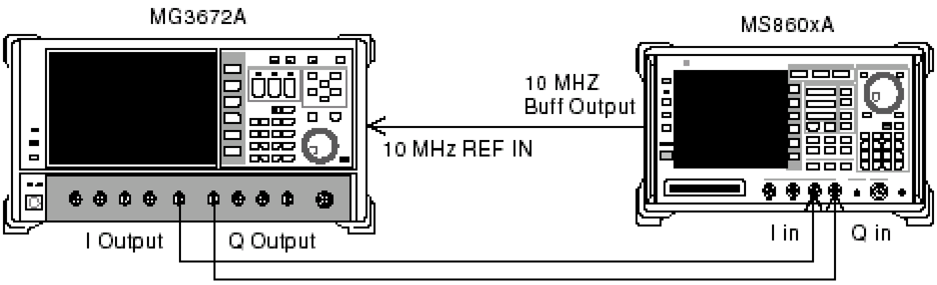
(1) Specifications to be tested

- Residual phase error (GMSK modulation)
  < 0.5 degree (rms) (DC coupling)
- Residual EVM (8PSK modulation)
  < 1.0 % (rms) (DC coupling)

(2) Measuring instrument for test

- Digital signal generator (SG2): MG3672A with MG0302A & MG0303B

(3) Setup



(4) Test procedure

Step	Operation
1	Set the MG3672A as follows: • System: GSM • Difference Encode: On • Phase Polarity: Normal • Burst: On • Pattern TCH • Trigger: Int
2	Set the MS860xA/MS268xA as follows: • Input Terminal: RF (Low Power input only for MS 8608A) • Impedance: 50 Ω • Modulation: GMSK • Measuring Object: Normal Burst • Pattern: TSC1 • Trigger: Free Run
3	Press [ ] (More) to display the second page of the function label.
4	Check that the residual phase error (RMS phase error) satisfies specification.
5	Set the signal data of the digital signal generator to EDGE.
6	Set the MS860xA/MS268xA as follows: • Modulation: 8PSK • Measuring Object: Normal burst • Pattern: (modulation the signal source)
7	Press [ ] (Modulation Analysis) to move to the Modulation Analysis screen.
8	Press [F4] (Filter) and set [F3] (Nyquist & inverse)
9	Check that the risidual EVM value (EVM) satisfies specifications.

4.3.13 Power meter accuracy<MS860xA>

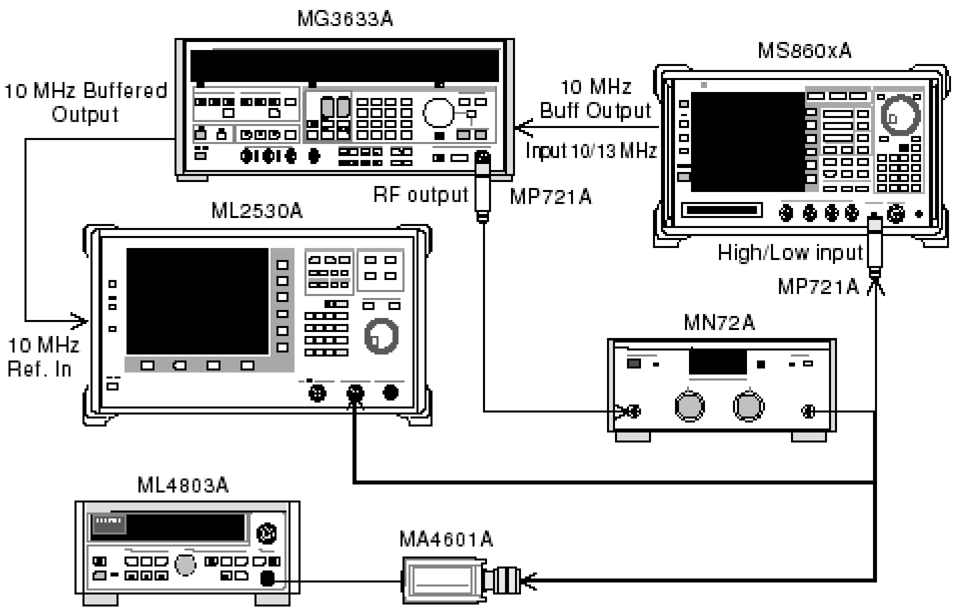
(1) Specifications to be tested

- Modulation level accuracy
  ±10%(after zero-point calibration)

(2) Measuring instrument for test

- Single generator (SG1): MG3633A
- Calibration receiver: ML2530
- Power meter: ML4803A
- Power sensor: MA4601A
- Programmable Ateneteeeeee: 72A
- 3 dB TAA × 2 piece: pieces

(3) Setup



(4) Test procedure

Step	Operation
1	Connect the power sensor (MA4601) to Cal Output of the power meter (ML4803A), and execute Zero Adjust.
2	Set Sencor Input to On, and execute ADJ (Cal Adjust).
3	Connect the SG1 (through MP721A and MN72A) to the power sensor (MA4601A).
4	Set the SG1 frequency, as below. Measurement frequencies: 50 MHz, 2000 MHz, 3000 MHz
5	Adjust the SG1 level so that the power meter (ML4803A) at each the set frequency reads +10 dBm ±0.1dB, and record the set value of SG1 (Set_Ref) and the power meter reading (Read_Ref).
6	Connect the SG1 (through MP721 and MN72A) to the calibration receiver (ML2530A) and set the SG1 level to the pervious (Set_Ref) value.
7	Set the calibration receiver (ML2530A) to the Relative mode (fix the range 1). Decrease the programmable attenetor (MN72A) to −30 dB in 10 dB decrements, while recording the measured value of the ML2530A for each attenuator amount (ATT_n). When recording is completed, return the MN72A to 0 dB.
8	Press (More) of the MS8608A/MS8609A to display the second page of the function label.
9	Press (Power meter) to move to the Power Meter screen.
10	While no signal is being input to the MS8608A/MS8609A, execute (Zero set)
11	Connect SG1 (through MP721A and MN72A) to the MS8608A/MS8609A (through MP721A).
12	Set the MS8608A/MS8609A's frequency to that set in Step 4.
13	Decrease the programmable attenuator (MN72A) to −30 dB in 10 dB decrements, while recording the measured value of the MS8608A /MS8609A (Tester) for each attenuator amount (measured value of Tester). Calculate the power-meter measurement accuracy (shown below) with the 3 measured values of the power meter reading (Read_Ref), measured value of ML2530A (ATT_n), and this measured value of Tester. Note that (Adjust Range) must be executed every time the programmable attenuator must be executed every time the programmable attenuator is varid. $Power-meter\,measurement\,accuracy[\%] = \left[\dfrac{10^{(Measured\,value\,of\,Tester/10)}}{10^{(Read\_Ref + ATT\_n)/10}} - 1 \right] \times 100$
14	Repeat Step 4 thru 13, after changing the frequency.

4.4 Example of Entry From for Performance Test Results

This is an example of entry from that can be filled out with the test results when conducting the performance test for the MS8608A/MS8609A Digital Mobile Radio Transmitter Tester.
Copy this entry form to use for the performance test.

Test location: ______________________ Report No.: ____________________
______________________ Date: ____________________
______________________ Tested by: ____________________

Tested instrument name: MS8608A/MS8609A Digital Mobile Radio Transmitter Tester
MX860802A/MX860902A GSM Measurement Software

Serial number: ______________________ Ambient temperature: ____________________
Power Frequency: ______________________ Relative humidity: ____________________

Remarks: ____
____
____

4.4.1 Modulation/Frequency Measurement

Frequency/modulation measurement accuracy (High Power input)

		50 MHz	850 MHz	1800 MHz	2700 MHz
Residual Phase error (rms)	Mininum value	0 deg. (rms)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	0.45 deg. (rms)			
	Measurement uncertainty	0.05 deg. (rms)			
Residual Phase error (peak)	Mininum value	0 deg. (peak)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	1.8 deg. (peak)			
	Measurement uncertainty	0.2 deg. (peak)			
Residual EVM	Mininum value	0 % (rms)			
	Actual measured vaule	____ % (rms)	____ % (rms)	____ % (rms)	____ % (rms)
	Maximum value	0.8 % (rms)			
	Measurement uncertainty	0.2 % (rms)			
Carrier frequency accuracy	Mininum value	−9.9 Hz			
	Actual measured vaule	____ 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	1800 MHz	2700 MHz
Residual Phase error (rms)	Mininum value	0 deg. (rms)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	0.45 deg. (rms)			
	Measurement uncertainty	0.05 deg. (rms)			
Residual Phase error (peak)	Mininum value	0 deg. (peak)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	1.8 deg. (peak)			
	Measurement uncertainty	0.2 deg. (peak)			
Residual EVM	Mininum value	0 % (rms)			
	Actual measured vaule	____ % (rms)	____ % (rms)	____ % (rms)	____ % (rms)
	Maximum value	0.8 % (rms)			
	Measurement uncertainty	0.2 % (rms)			
Carrier frequency accuracy	Mininum value	−9.9 Hz			
	Actual measured vaule	____ Hz.	____ Hz.	____ Hz.	____ Hz.
	Maximum value	+ 9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (Low Power input, Pre-amplifier On)

		50 MHz	850 MHz	1800 MHz	2700 MHz
Residual Phase error (rms)	Mininum value	0 deg. (rms)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	0.45 deg. (rms)			
	Measurement uncertainty	0.05 deg. (rms)			
Residual Phase error (peak)	Mininum value	0 deg. (peak)			
	Actual measured vaule	____ deg(rms)	____ deg(rms)	____ deg(rms)	____ deg(rms)
	Maximum value	1.8 deg. (peak)			
	Measurement uncertainty	0.2 deg. (peak)			
Residual EVM	Mininum value	0 % (rms)			
	Actual measured vaule	____ % (rms)	____ % (rms)	____ % (rms)	____ % (rms)
	Maximum value	0.8 % (rms)			
	Measurement uncertainty	0.2 % (rms)			
Carrier frequency accuracy	Mininum value	−9.9 Hz			
	Actual measured vaule	____ Hz.	____ Hz.	____ Hz.	____ Hz.
	Maximum value	+ 9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

4.4.2 Transmission Power Measurement Accuracy

Power meter reading

		50 MHz	850 MHz	1800 MHz	2700 MHz
Power meter reading	Upper limit	+10.1 dBm			
	Reading	______ dBm	______ dBm	______ dBm	______ dBm
	Lower limit	−9.9 dBm			

True attenuator amound of MN72A Programmable Attenuator (attenuation from +10dBm)

ATT set value	50 MHz	850 MHz	1800 MHz	2700 MHz
20	______ dB	______ dB	______ dB	______ dB

Transmission power measurement accuracy (High Power input)

		50 MHz	850 MHz	1800 MHz	2700 MHz
Measurement accuracy	Maxmum value	+0.23 dB			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Minimum value	−0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = TX Power value − Power meter reading

Transmission power measurement accuracy (High Power input)

		50 MHz	850 MHz	1800 MHz	2700 MHz
Measurement accuracy	Maxmum value	+0.23 dB			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Minimum value	−0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = TX Power value − (Power meter reading − True attenuation amount of MN72A ATT when set to 20 dB)

Transmission power measurement accuracy (High Power input)

		50 MHz	850 MHz	1800 MHz	2700 MHz
Measurement accuracy	Maxmum value	+0.23 dB			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Minimum value	−0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = TX Power value − Power meter reading − (True attenuation amount of MN72A ATT when set to 20 dB)

4.4.3 Accuracy of the Power Measurement at Carrier Off

Power measurement accuracy (Low Power input)

		50 MHz	850 MHz	1800 MHz	2700 MHz
On/Off Ratio (WDR_Off)	Upper limit	-----			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Lower limit	60 dB			
	Measurement uncertainty	2 dB			
Off Power (WDR On)	Upper limit	−72 dBm			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Lower limit	-----			
	Measurement uncertainty	2 dB			

Power measurement accuracy (Low Power input, Pre-amplifier On)

		50 MHz	850 MHz	1800 MHz	2700 MHz
On/Off Ratio (WDR_Off)	Upper limit	-----			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Lower limit	60 dB			
	Measurement uncertainty	2 dB			
Off Power (WDR On)	Upper limit	−72 dBm			
	Actual measured vaule	______ dB	______ dB	______ dB	______ dB
	Lower limit	-----			
	Measurement uncertainty	2 dB			

4.4.4 Linearity

SG1 set value at +10 dBm calibration on each frequency

		50 MHz	850 MHz	1800 MHz	2700 MHz
SG1 set value	Set_Ref	______ dBm	______ dBm	______ dBm	______ dBm

Lenearity accuracy (High Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver reading	Tester measured value (dBm)	Linearity caluculated value	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
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
1800	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
2700	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

Lenearity accuracy (Low Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver reading	Tester measured value (dBm)	Linearity caluculated value	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
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
1800	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
2700	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

Lenearity accuracy (Low Power input, Pre-amplifier On)

Frequency (MHz)	SG level (dBm)	Calibration receiver reading	Tester measured value (dBm)	Linearity caluculated value	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
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
1800	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
2700	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	−10	______ dB	______ dBm	______ dB	±0.16 dB
	−20	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

*1: Measure_Ref

*2: Calibration method of the linearity value:

Linearity calculated value (dB) = Tester measured value (dBm)−{Measured_Ref (dBm)−Calibration receiver measured value(dB)}

4.4.5 Output Spectrum Measurement

Measurement range of modulation section (Low Power input)

	Detuning frequency	100 MHz	850 MHz	1800 MHz	2700 MHz	Measurement uncertainry	Effective lower limit
f1	100 kHz	______ dB	______ dB	______ dB	______ dB	1 dB	61 dB
f2	200 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f3	250 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f4	400 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f5	600 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f6	800 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f7	1 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f8	1.2 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f9	1.4 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f10	1.6 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f11	1.8 MHz	______ dB	______ dB	______ dB	______ dB		69 dB

Measurement range of transient section (Low Power input)

	Detuning frequency	100 MHz	850 MHz	1800 MHz	2700 MHz	Measurement uncertainry	Effective lower limit
f4	400 kHz	______ dB	______ dB	______ dB	______ dB	1 dB	64 dB
f5	600 kHz	______ dB	______ dB	______ dB	______ dB		64 dB
f6	800 kHz	______ dB	______ dB	______ dB	______ dB		64 dB
f7	1 MHz	______ dB	______ dB	______ dB	______ dB		64 dB
f8	1.2 MHz	______ dB	______ dB	______ dB	______ dB		64 dB
f9	1.4 MHz	______ dB	______ dB	______ dB	______ dB		64 dB
f10	1.6 MHz	______ dB	______ dB	______ dB	______ dB		64 dB
f11	1.8 MHz	______ dB	______ dB	______ dB	______ dB		64 dB

Measurement range of modulation section (Low Power input, Pre-amplifier On)

	Detuning frequency	100 MHz	850 MHz	1800 MHz	2700 MHz	Measurement uncertainry	Effective lower limit
f1	100 kHz	______ dB	______ dB	______ dB	______ dB	1 dB	61 dB
f2	200 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f3	250 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f4	400 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f5	600 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f6	800 kHz	______ dB	______ dB	______ dB	______ dB		69 dB
f7	1 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f8	1.2 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f9	1.4 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f10	1.6 MHz	______ dB	______ dB	______ dB	______ dB		69 dB
f11	1.8 MHz	______ dB	______ dB	______ dB	______ dB		69 dB

Measurement range of transient section (Low Power input)

	Detuning frequency	100 MHz	850 MHz	1800 MHz	2700 MHz	Measurement uncertainry	Effective lower limit
f4	400 kHz	______dB	______dB	______dB	______dB	1 dB	64 dB
f5	600 kHz	______dB	______dB	______dB	______dB		64 dB
f6	800 kHz	______dB	______dB	______dB	______dB		64 dB
f7	1 MHz	______dB	______dB	______dB	______dB		64 dB
f8	1.2 MHz	______dB	______dB	______dB	______dB		64 dB
f9	1.4 MHz	______dB	______dB	______dB	______dB		64 dB
f10	1.6 MHz	______dB	______dB	______dB	______dB		64 dB
f11	1.8 MHz	______dB	______dB	______dB	______dB		64 dB

4.4.6 Spurious Measurement

Measurement range [Carrier Frequency: 850 MHz] (Low Power input)

	Measurement frequency range	Measurement frequency	Measured value (dB)	Measurement uncertainry	Effective lower limit
f1	100 k to 50 MHz	______Hz	______dB	1 dB	73 dB
f2	50 M to 500 MHz	______Hz	______dB		73 dB
f3	500 M to 800 MHz	______Hz	______dB		73 dB
f4	900 MHz to 1.65 GHz	______Hz	______dB		(67-f) dB
f5	1.75 GHz to 2.5 GHz	______Hz	______dB		(67-f) dB
f6	2.6 GHz to 3.2 GHz	______Hz	______dB		(67-f) dB
f7	3.2 GHz to 7.8 GHz	______Hz	______dB		67 dB
f1*1	1.6GHz to7.8 GHz	______Hz	______dB		67 dB

Measurement range [Carrier Frequency: 1800 MHz] (Low Power input)

	Measurement frequency range	Measurement frequency	Measured value (dB)	Measurement uncertainry	Effective lower limit
f1	100 k to 50 MHz	______Hz	______dB	1 dB	73 dB
f2	50 M to 500 MHz	______Hz	______dB		73 dB
f3	500 M to 850 MHz	______Hz	______dB		73 dB
f4	950 MHz to 1.75 GHz	______Hz	______dB		(67-f) dB
f5	1.85 GHz to 3.2 GHz	______Hz	______dB		(67-f) dB
f6	3.2 GHz to 7.8 GHz	______Hz	______dB		(67-f) dB
f1*1	1.6 GHz to 1.75 GHz	______Hz	______dB		67 dB
f2*1	1.85 GHz to 7.8 GHz	______Hz	______dB		67 dB

Measurement range [Carrier Frequency: 850 MHz] (Low Power input, Pre-amplifier On)

	Measurement frequency range	Measurement frequency	Measured value (dB)	Measurement uncertainry	Effective lower limit
f1	100 k to 50 MHz	______Hz	______dB	1 dB	73 dB
f2	50 M to 500 MHz	______Hz	______dB		73 dB
f3	500 M to 800 MHz	______Hz	______dB		73 dB
f4	900 MHz to 1.65 GHz	______Hz	______dB		(67-f) dB
f5	1.75 GHz to 2.5 GHz	______Hz	______dB		(67-f) dB
f6	2.6 GHz to 3.2 GHz	______Hz	______dB		(67-f) dB
f7	3.2 GHz to 7.8 GHz	______Hz	______dB		67 dB
f1*1	1.6GHz to 7.8 GHz	______Hz	______dB		67 dB

Measurement range [Carrier Frequency: 1500 MHz] (Low Power input, Pre-amplifier On)

	Measurement frequency range	Measurement frequency	Measured value (dB)	Measurement uncertainry	Effective lower limit
f1	100 k to 50 MHz	______Hz	______dB	1 dB	73 dB
f2	50 M to 500 MHz	______Hz	______dB		73 dB
f3	500 M to 850 MHz	______Hz	______dB		73 dB
f4	950 MHz to 1.75 GHz	______Hz	______dB		(67-f) dB
f5	1.85 GHz to 3.2 GHz	______Hz	______dB		(67-f) dB
f6	3.2 GHz to 7.8 GHz	______Hz	______dB		(67-f) dB
f1*1	1.6 GHz to 1.75 GHz	______Hz	______dB		67 dB
f2*1	1.85 GHz to 7.8 GHz	______Hz	______dB		67 dB

*1: When Option 03 is installed

4.4.7 IQ Input Modulation Accuracy

Modulation measurement accuracy (IQ input)

Residual phase error (GMSK modulation)	Minimum value	0 deg. (rms)
	Actual measured value	______deg. (rms)
	Maximum value	0.45 deg. (rms)
	Measurement uncertainry	0.05 deg. (rms)
Residual EVM (8PSK modulation)	Minimum value	0 % (rms)
	Actual measured value	______% (rms)
	Maximum value	0.8 % (rms)
	Measurement uncertainry	0.2 % (rms)

4.4.8 Power Meter Accuracy

Power meter reading (Set_Ref)

		50 MHz	2000 MHz	3000 MHz
SG set value (Set_Ref)		______ dBm	______ dBm	______ dBm
Power Meter reading (Read_Ref)	Upper limit	+10.1 dBm		
	Reading	______ dBm	______ dBm	______ dBm
	Lower limit	−9.9 dBm		

ML2530A measured value when MN72A programmable attenuator ATT is varied (ATT_n)*1

ATT set value	ATT_n	50 MHz	2000 MHz	3000 MHz
10 dBm	ATT_10	______ dBm	______ dBm	______ dBm
20 dBm	ATT_20	______ dBm	______ dBm	______ dBm
30 dBm	ATT_30	______ dBm	______ dBm	______ dBm

Measurement accuracy (Low Power input)

Frequency (MHz)	Input level (dBm)	SG&ATT set level	Tester measured value (dBm)	Measurement accuracy (%) *2	Effective range (dB)
50	+10	Set_Ref	______ dBm	______ dB	± 5.8 %
	0	Set_Ref +ATT(10 dB)	______ dBm	______ dB	± 5.8 %
	−10	Set_Ref +ATT(20 dB)	______ dBm	______ dB	± 5.8 %
	−20	Set_Ref + ATT(30 dB)	______ dBm	______ dB	± 5.8 %
2000	+10	Set_Ref	______ dBm	______ dB	± 5.8 %
	0	Set_Ref +ATT(10 dB)	______ dBm	______ dB	± 5.8 %
	−10	Set_Ref +ATT(20 dB)	______ dBm	______ dB	± 5.8 %
	−20	Set_Ref + ATT(30 dB)	______ dBm	______ dB	± 5.8 %
3000	+10	Set_Ref	______ dBm	______ dB	± 5.8 %
	0	Set_Ref +ATT(10 dB)	______ dBm	______ dB	± 5.8 %
	−10	Set_Ref +ATT(20 dB)	______ dBm	______ dB	± 5.8 %
	−20	Set_Ref + ATT(30 dB)	______ dBm	______ dB	± 5.8 %
Measurement uncertainry			± 4.2 %		

*1: ATT_n is a minus value.

*2: Calculation method of measurement accuracy

$$Measurement\,accuracy[\%] = \left[\frac{10^{(Tester\,measured\,value\,/\,10)}}{10^{(Read\_Ref + ATT\_n)}} - 1 \right] \times 100$$

MX268102A/302A/702A/
MX860802A/902A
GSM Measurement Software
(For MS2681A/MS2683A/MS2687A/
MS2687B/MS8608A/MS8609A)
Operation Manual
(Remote Control)

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Section 1 General

This section outlines the remote control and gives examples of system upgrades.

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1.1 General

The MS860xA/MS268xA, when combined with an external controller (host computer, personal computer, etc.), can automate your measurement system. For this purpose, the MS860xA/MS268xA 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.

1.1.1 Remote control functions

The remote control functions of the MS860xA/MS268xA are used to do the following:

(1) Control all functions except a few like the power switch and [LOCAL] 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.

1.1.2 Interface port selection functions

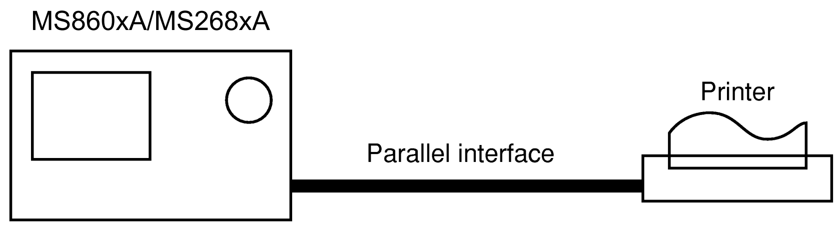
The MS860xA/MS268xA Spectrum Analyzer function has the standard RS-232C interface, GPIB interface bus and parallel (Centronics) interface. It can also have Ethernet interface as an option. Use the panel to select the interface port to be used to connect external devices as shown below.

Port for the external controller: Select RS-232C, GPIB or Ethernet (Option).
Port for the printer: Parallel interface.

1.1.3 Examples of system upgrades using RS-232C and GPIB

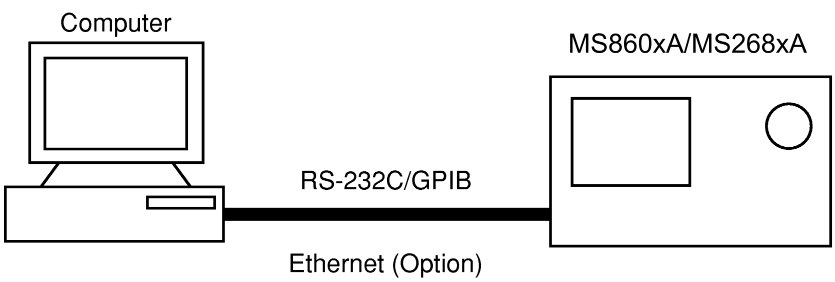
(1) Stand-alone type 1

Waveforms measured with MS860xA/MS268xA are output to the printer.



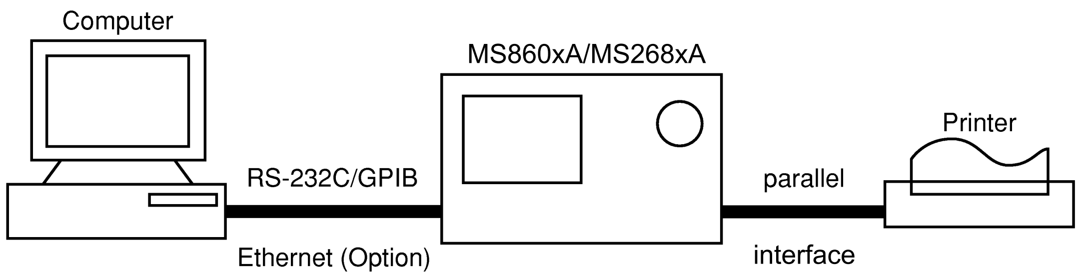
(2) Control by the host computer (1)

The spectrum analyzer is controlled automatically or remotely from the computer.



(3) Control by the host computer (2)

The waveforms measured by controlling analyzer automatically or remotely are output to the printer.



1.1.4 Specifications of RS-232C

The table below lists the specifications of the RS-232C provided as standard in MS860xA/MS268xA.

Item	Specification
Function	Control 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

1.1.5 Specifications of GPIB

The table below lists the specifications of the GPIB provided for MS2681A/MS2683A/MS2687A/MS2687B/MS860XA/MS268XA.

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 with RS-232C and GPIB cables. This section also describes how to setup the interfaces of the analyzer function.

2.1 Connecting an External Device with an RS-232C Cable 2-3

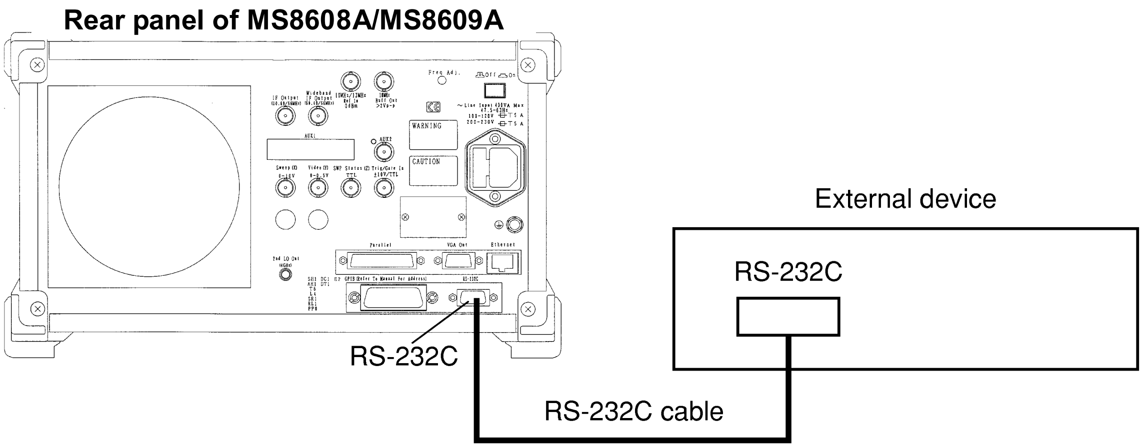
2.2 Connection Diagram of RS-232C Interface Signals .. 2-4

2.3 Connecting a Device with a GPIB Cable 2-5

2.4 Setting the GPIB Address 2-6

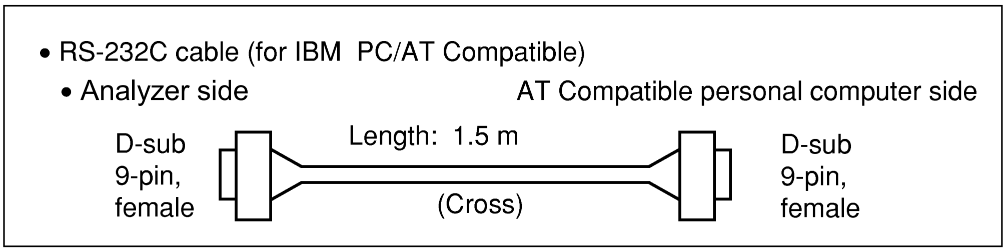
2.1 Connecting an External Device with an RS-232C Cable

Connect the RS-232C connector (D-sub 9-pin, male) on the rear panel of the spectrum analyzer to the RS-232C connector of the external device with an RS-232C cable.



Notes:

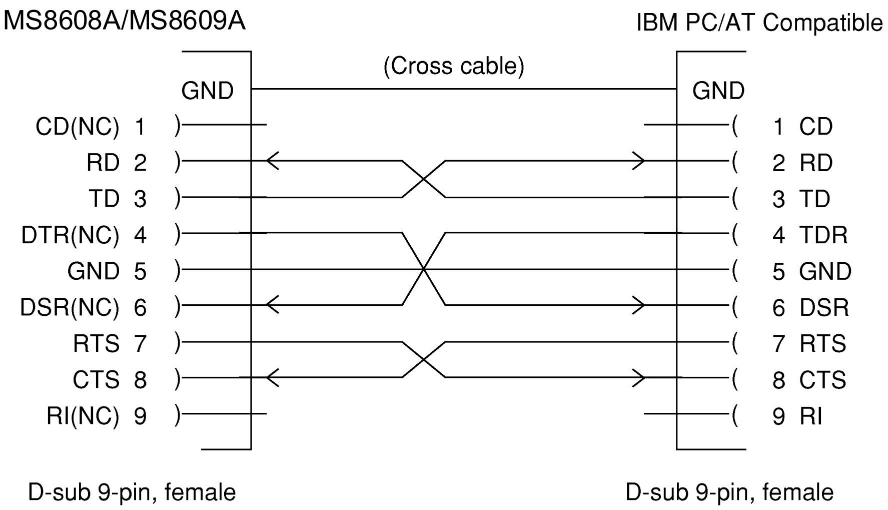
RS-232C connectors with 9 pins and 25 pins are available. When purchasing the RS-232C cable, check the number of pins on the RS-232C connector of the external device. Also, the following RS-232C cable is provided as peripheral parts of the Analyzer.



2.2 Connection Diagram of RS-232C Interface Signals

The diagram below shows the RS-232C interface signal connections between the spectrum analyzer and devices such as a personal computer.

• Connection with IBM PC/AT Compatible personal computer



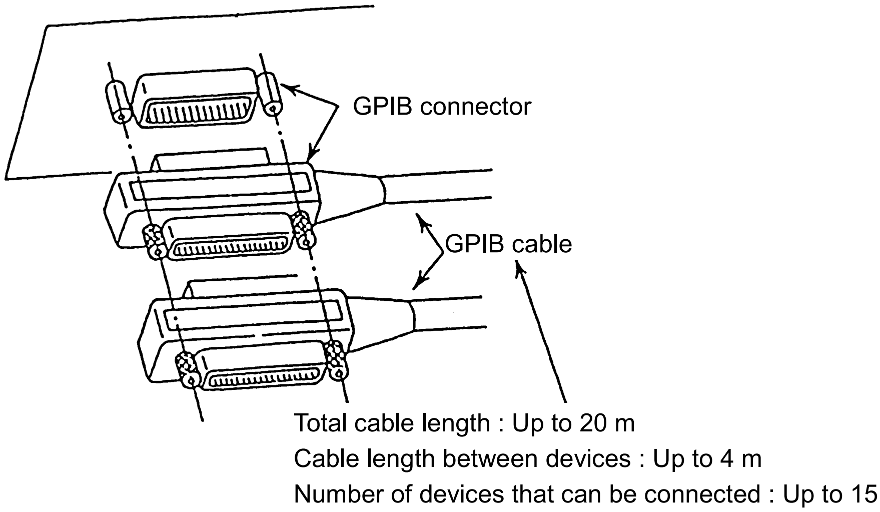
2.3 Connecting a Device with a GPIB Cable

Connect the GPIB connector on the rear panel of this equipment to the GPIB connector of an external device with a GPIB cable.

Note:

Be sure to connect the GPIB cable before turning the equipment power on.

Up to 15 devices, including the controller, can be connected to one system. Connect devices as shown below:



2.4 Setting the GPIB Address

Set the GPIB address of this instrument as follows.

Config → Interface → (move cursor) My Address 1 → set

Use the 10-ker pad to enter the GPIB address of this instrument, next push set key 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 the device MS860xA/ MS268xA via the RS-232C GPIB or Ethernet system.

3.1 General Description 3-3

3.1.1 Program Message Format............................ 3-3

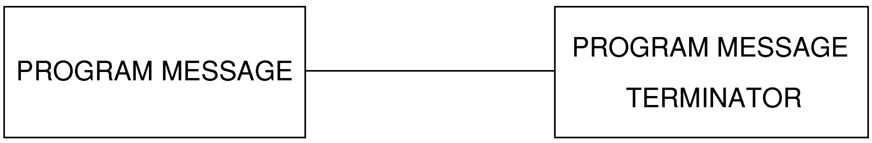
3.1.2 Response Message Format 3-8

3.1 General Description

The device messages are data messages transmitted between the controller and devices, program messages transferred from the controller to this instrument (device), and response messages input from this instrument (device) 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 instrument's parameters and to instruct it to execute processing. The program query is used to query the values of parameters and measured results.

3.1.1 Program Message Format

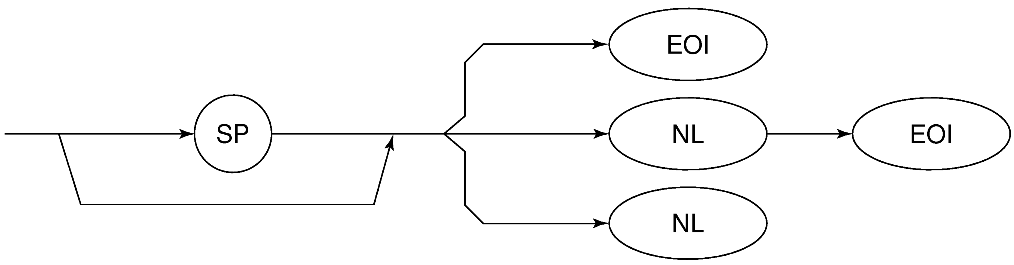
To transfer a program message from the controller program to this instrument using the WRITE statement, the program message formats are defined as follows.




```
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.

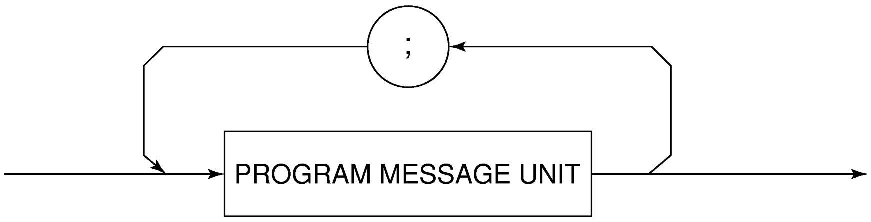
(1) PROGRAM MESSAGE TERMINATOR



NL: Called New line or LF (Line Feed)

Carriage Return (CR) is ignored and is not processed as a terminator.

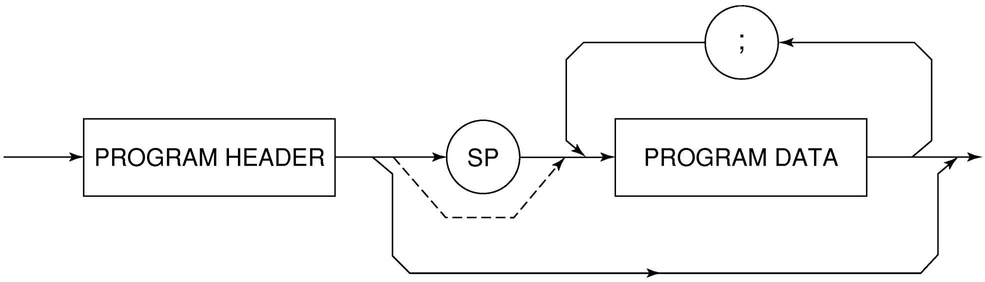
(2) PROGRAM MESSAGE



Multiple program message units can be output sequentially by separating them with a semicolon.

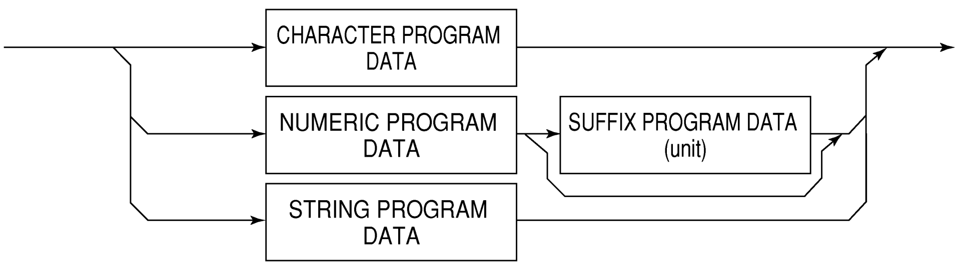
<Example> WRITE #1;"CF 1GHZ;SP 5ØØKHZ

(3) PROGRAM MESSAGE UNIT



- The program header of an IEEE488.2 common command always begins with an asterisk.
- For numeric program data, the SP 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 DATA

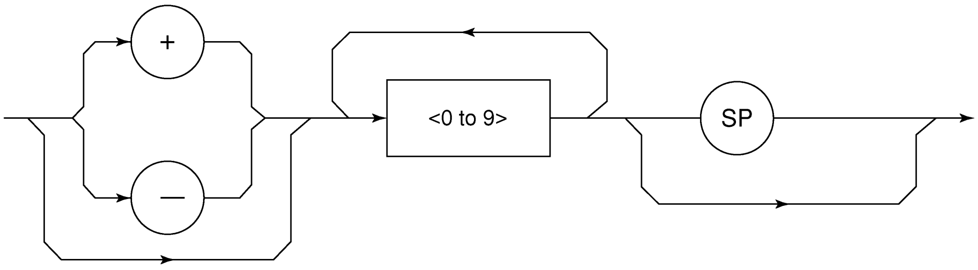
Character program data is specific character string data consisting of the uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, numbers 0 to 9, and underline (_).

<Example> `WRITE #1;"ST AUTO"` ....Sets Sweep Time to AUTO.

(6) NUMERIC PROGRAM DATA

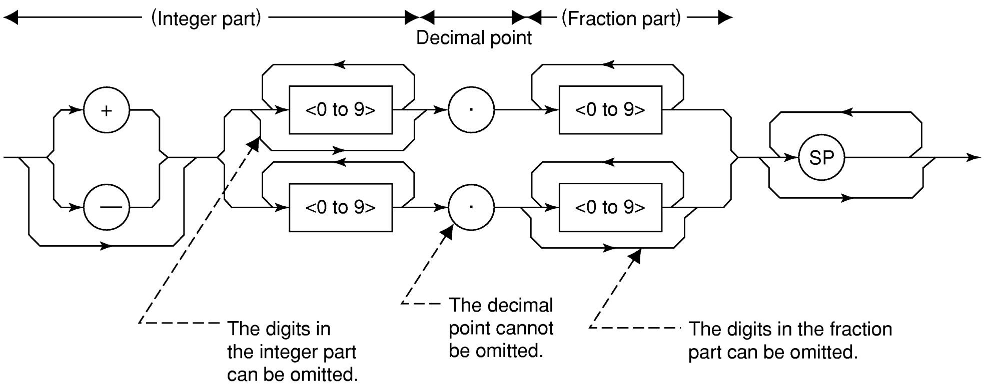
Numeric program data has two types of formats: integer format (NR1) and fixed-point format (NR2).

< Integer 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△△△
- The + sign is optional → +5, 5
- Commas cannot be used to separate digits → 1,234,567 (×)

< Fixed-point format (NR2) >



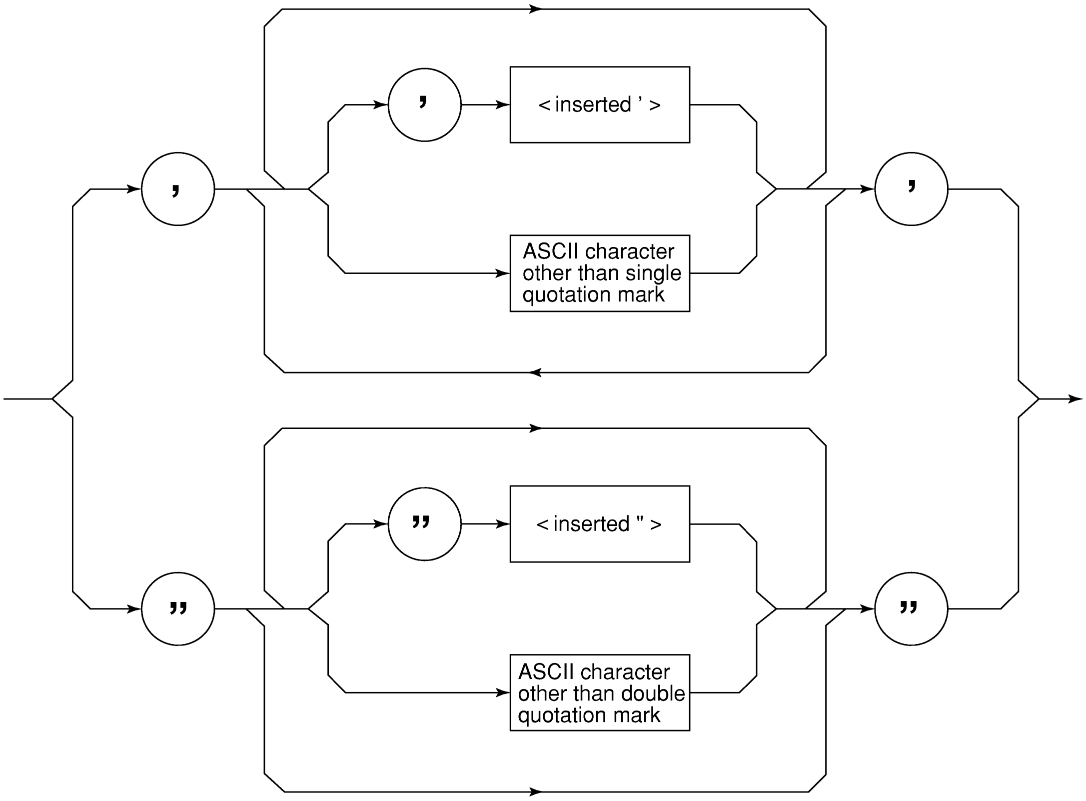
- The numeric expression of the integer format applies to the integer part.
- There must be no spaces between numbers and the decimal point → +753△ .123 (×)
- Spaces can be inserted after the digits in the fraction part → +753.123△△△
- A number need not be placed before the decimal point → .05
- A + or − sign ca 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 MS860xA/ MS268xA.

Classification	Unit	Specification
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`
	dBμV/m	`DBUVM`
	Default	Determined in conformance with the set scale unit
Level (V system)	V	`V`
	mV	`MW`
	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'MS2683A'"
```

A single quotation mark used within a character string must be repeated as shown in the double quotation marks.

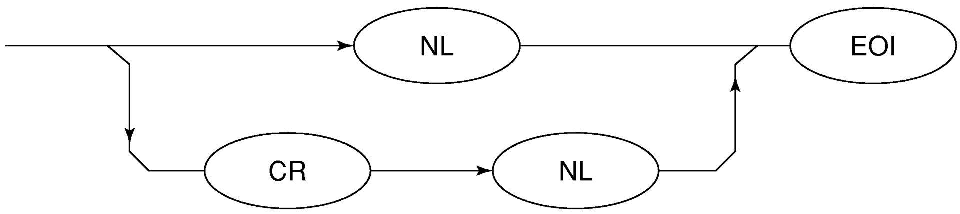
```
WRITE #1;"TITLE'MS2683A''NOISE MEAS'''"
```

MS8608A 'NOISE MEAS' is set as the title.

3.1.2 Response Message Format

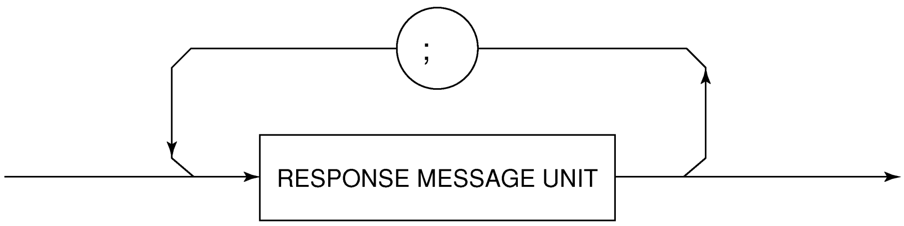
To transfer the response messages from this instrument to the controller using the READ statement, the response message formats are defined as follows:

(1) RESPONSE MESSAGE TERMINATOR



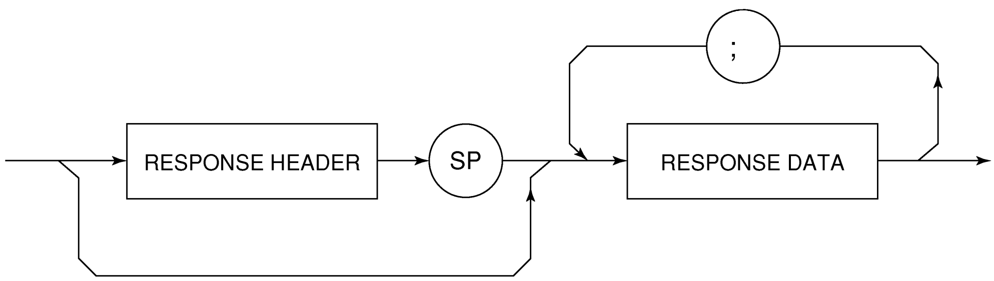
The response message terminator to be used depends on the TRM command specification.

(2) RESPONSE MESSAGE

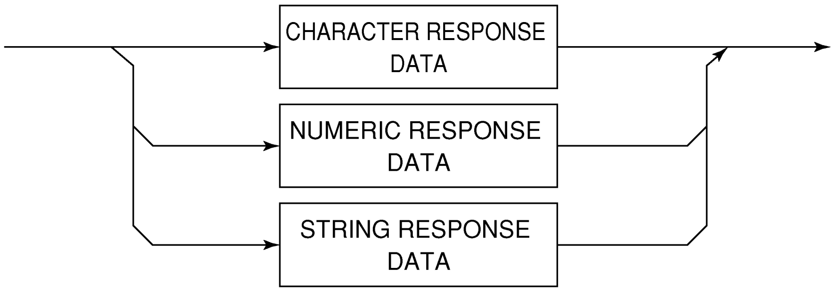


When a query is sent by the WRITE statement with one or more program queries, the response message also consists of one or more response message units.

(3) Usual RESPONSE MESSAGE UNIT



(4) RESPONSE DATA

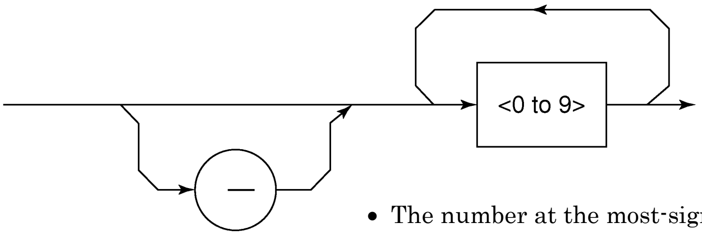


(5) CHARACTER RESPONSE DATA

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

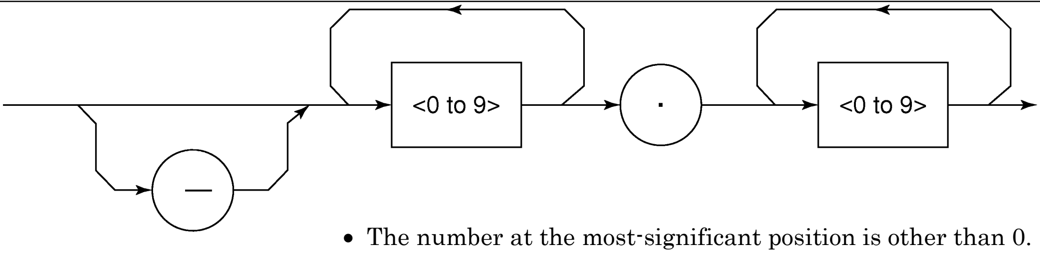
<Integer format (NR1) >



< Example >
123
−1234

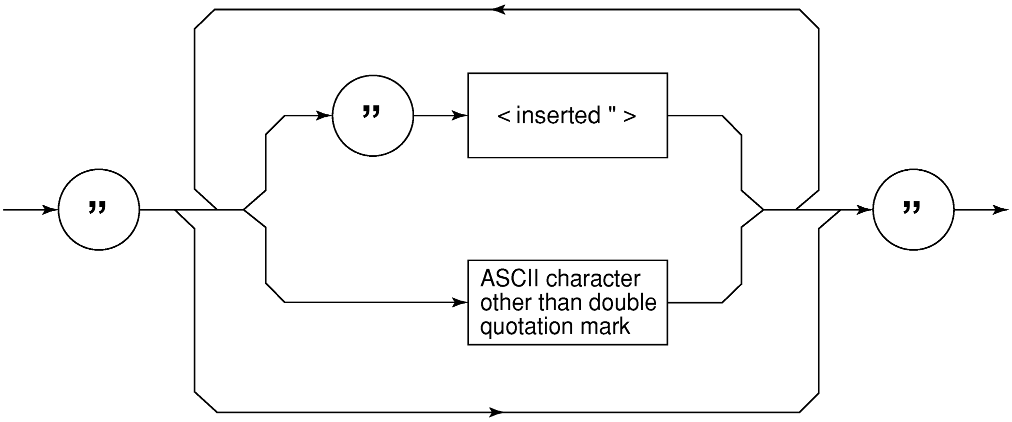
- The number at the most-significant position is other than 0.
- A + sign need not be placed before a positive number.

<Fixed-point 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



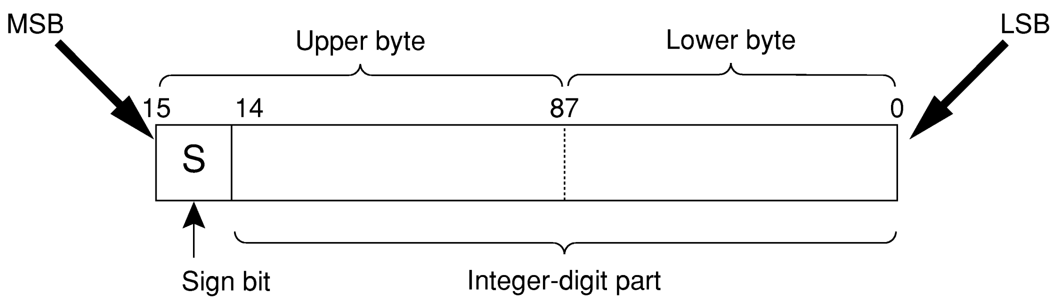
String response data is transmitted as an ASCII character enclosed with double quotation marks.

(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
1000000000000000	–32767	32769
1000000000000000	–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.

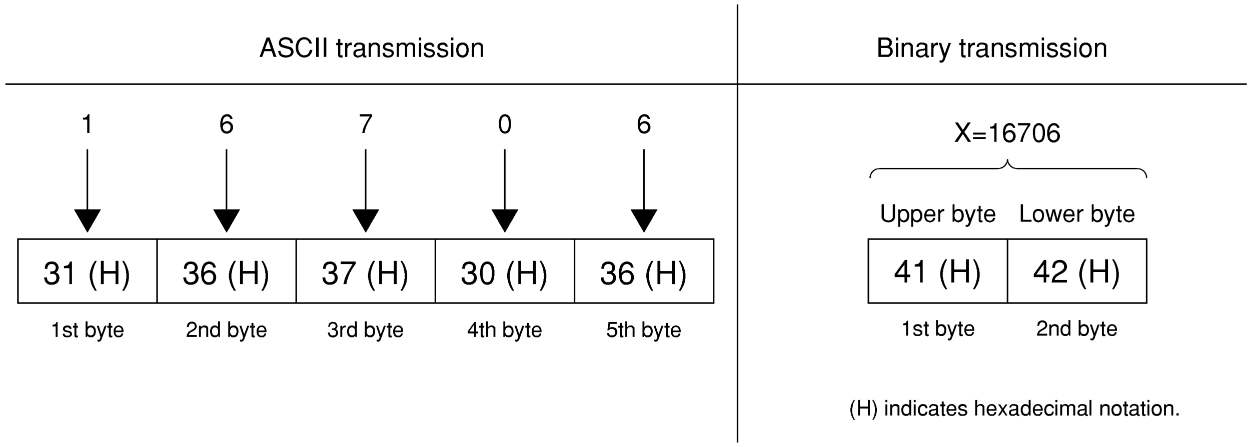


Internal Representation of 2-byte Bynary Data

† 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 an 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.



$$16706\ (D) = 4 \times 16^3 + 1 \times 16^2 + 4 \times 16^1 + 2 \times 16^0$$

Binary notation

	Upper byte								Lower byte							
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) × 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.

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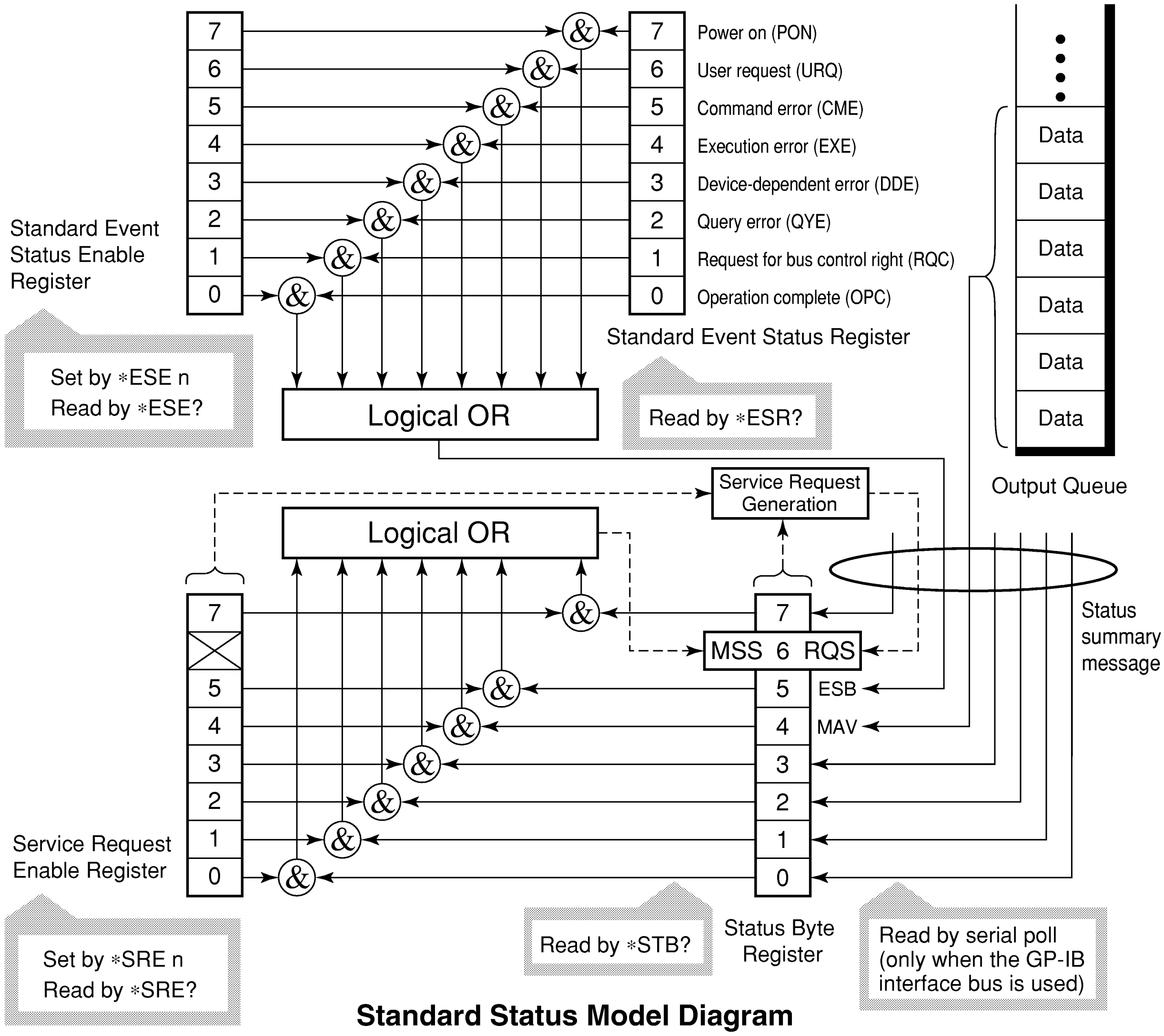
The Status Byte (STB) sent to the controller is based on the IEEE488.1 standard. The bits comprising the STB are called status summary messages because they represent a summary of the current data in registers and queues.

4.1 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 two types 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 ult 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
[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.

4.2 Status Byte (STB) Register

The STB register consists of the STB and RQS (or MSS) messages of the device.

4.2.1 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.

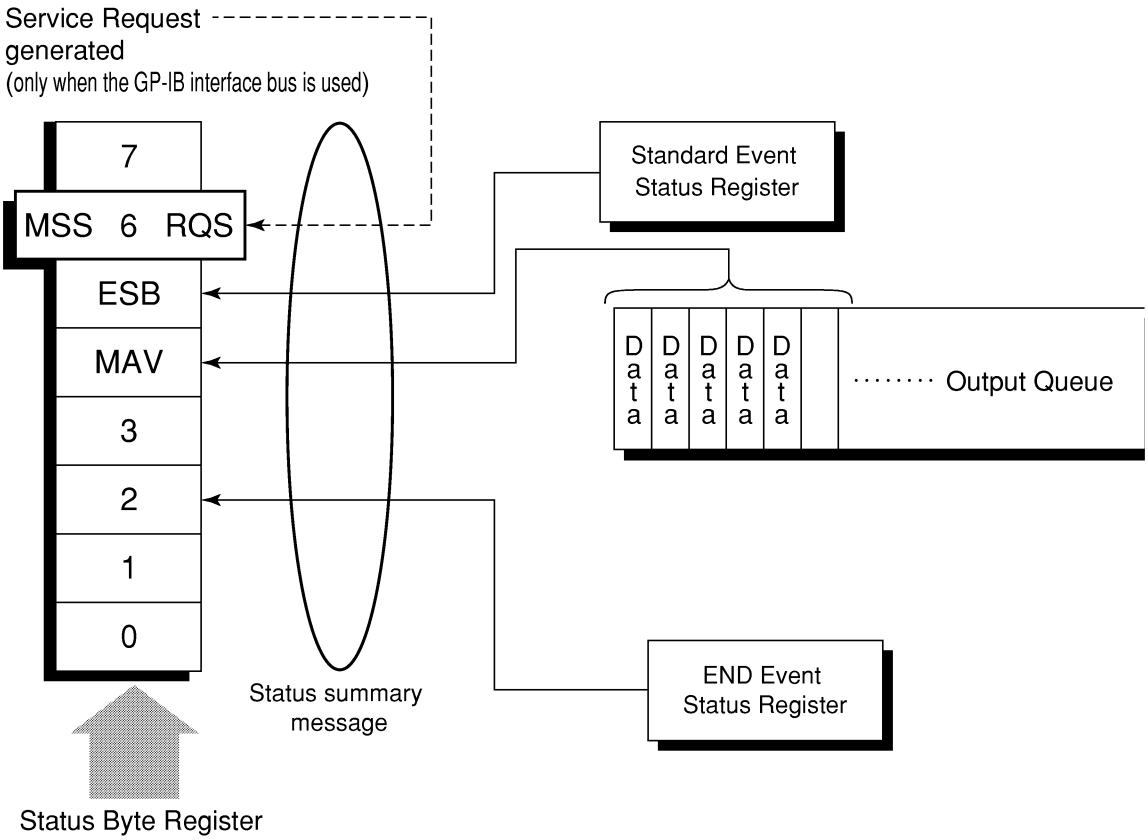
This bit becomes 0 when the ESR register is read by the ∗ESR? query or when it is cleared by the ∗CLS command.

(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.

4.2.2 Device-dependent summary messages

As shown in the diagram below, the spectrum analyzer does not use bits 0, 1, 3, and 7, and it uses bit 2 as the summary bit of the Event Status Register.



4.2.3 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 Message)

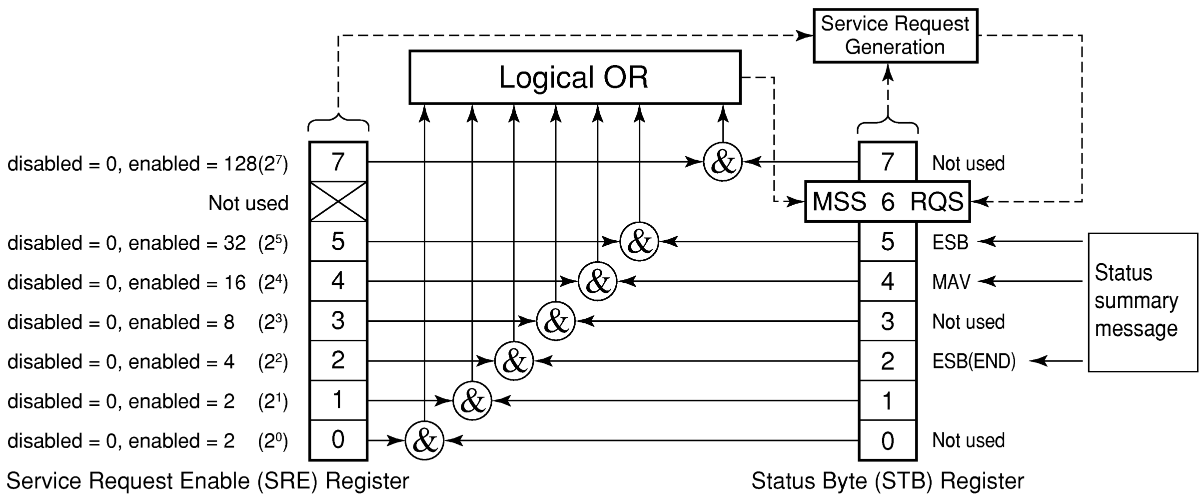
MSS indicates that there is at least one cause for a service request. The MSS message is represented at bit 6 response to an ∗STB? query, but it is not produced as a response to serial polling. It should not be taken as part of the status byte specified by IEEE488.1. MSS is configured by the overall 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.

4.3 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.

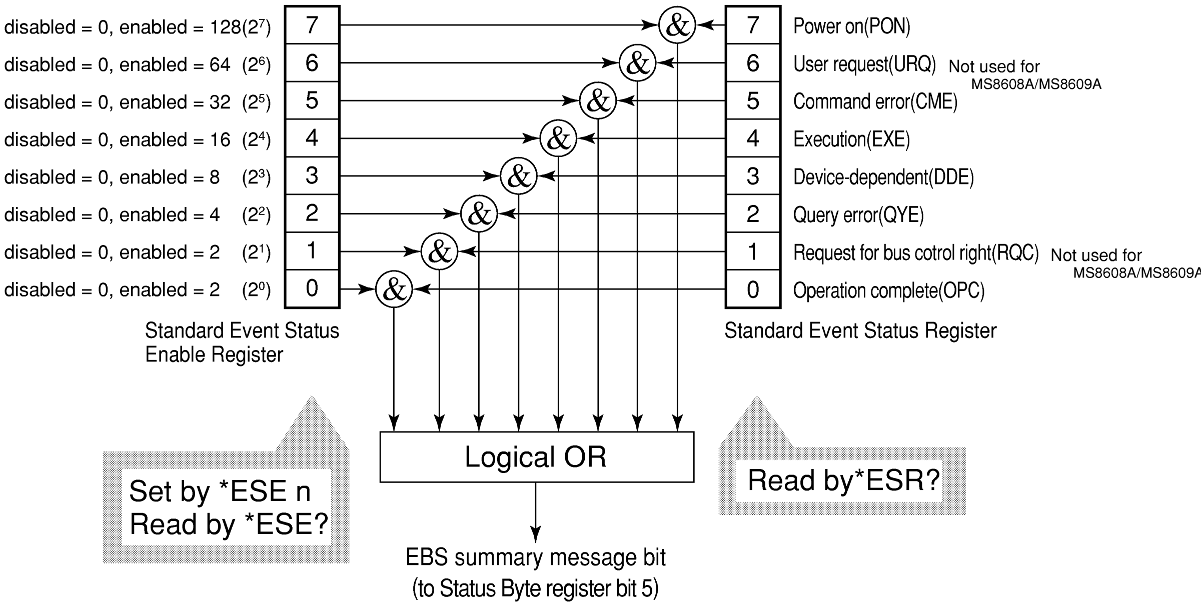
(2) Updating the SRE register

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.

4.4 Standard Event Status Register

4.4.1 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.

4.4.2 Reading, writing, and clearing the Standard Event Status Register

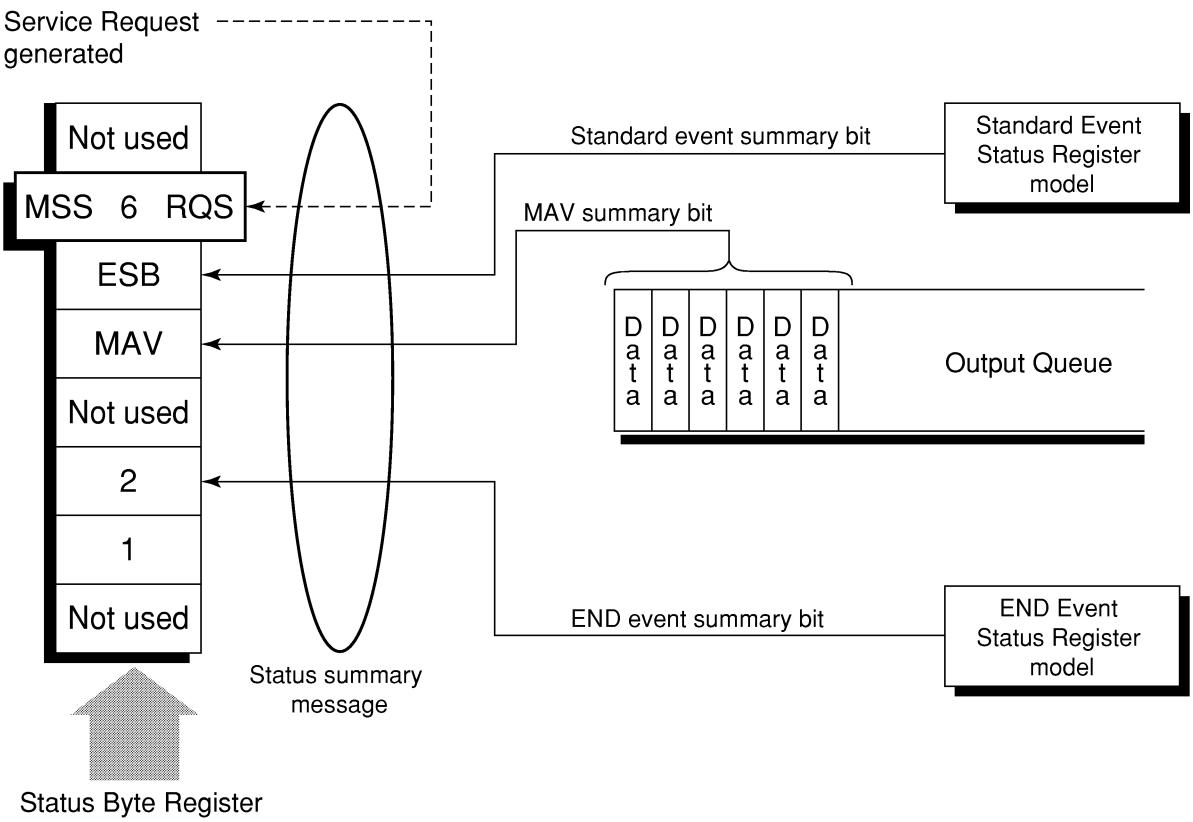
Reading	The register is read using the *ESR? command query. The register is cleared after being read. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	With the exception of clearing, data cannot be written to the register 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

4.4.3 Reading, writing, and clearing the Standard Event Status Enable Register

Reading	The register 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

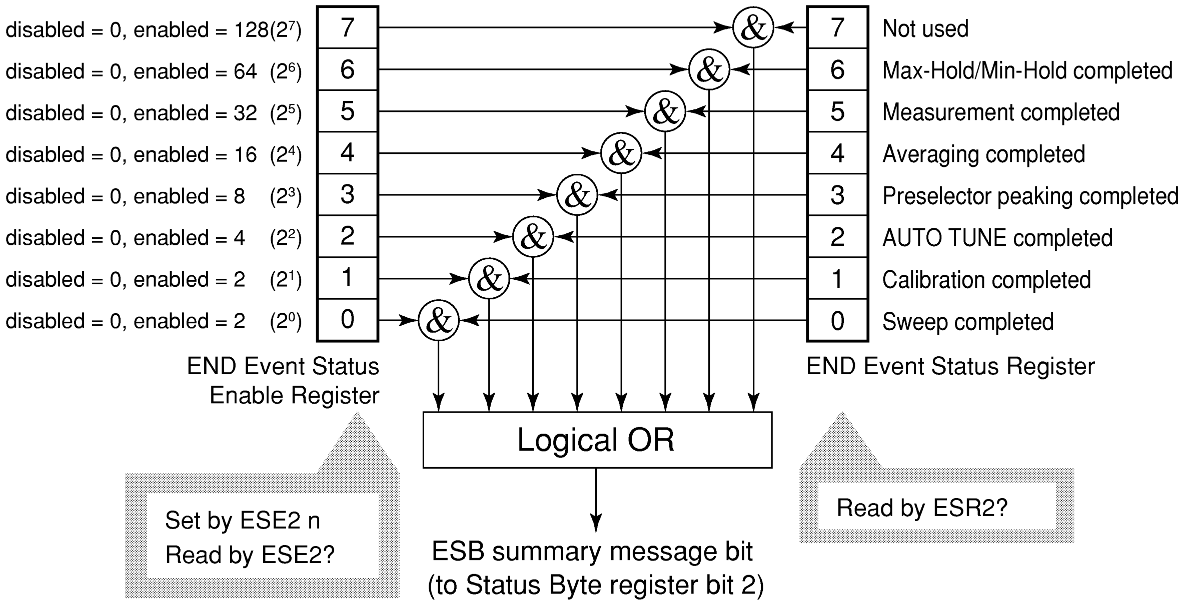
4.5 Extended Event Status Register

For MS860xA/MS268xA, 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.



4.5.1 Bit definition of END Event Status Register

The diagram below shows the operation and event-bit names of the END Event Status Register.



The END Event Status Enable 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	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.

4.5.2 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

4.5.3 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

4.6 Synchronizing MS860xA/M268xA with a Controller

MS860xA/M268xA usually 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 MS860xA/M268xA and the controller.

If the controller controls and synchronizes with one or more devices, after all the commands specified for MS860xA/M268xA have been processed, the next commands must be sent to other devices.

There are two ways of synchronizing MS860xA/M268xA with the controller:

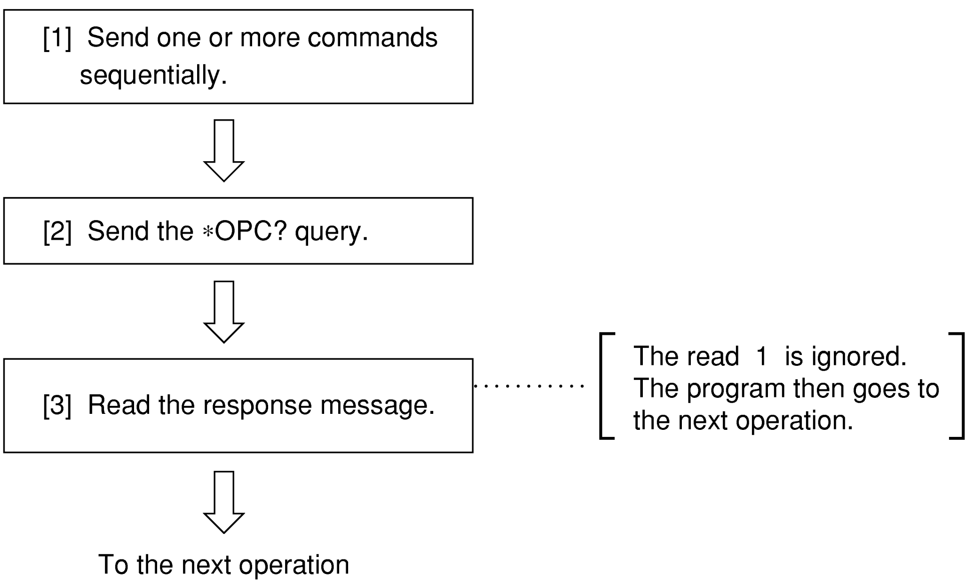
[1] Wait for a response after the ∗OPC? query is sent.

[2] Wait for SRQ after ∗OPC is sent.

4.6.1 Wait for a response after the ∗OPC? query is sent.

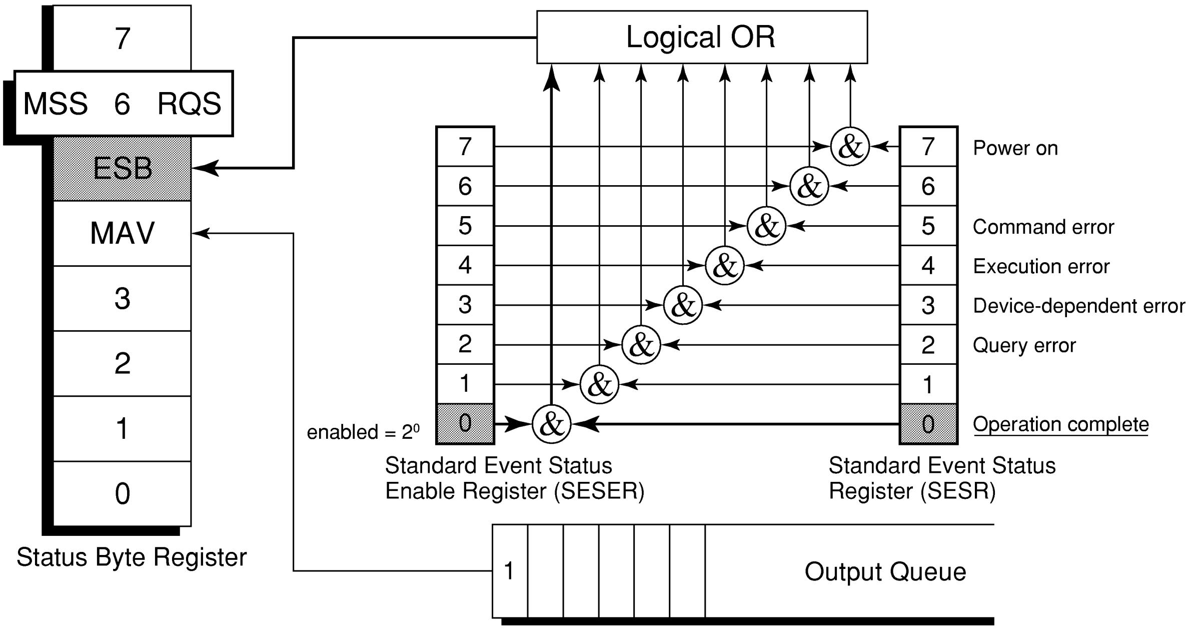
MS860xA/M268xA outputs "1" as the response message when executing the ∗OPC? query command. The controller is synchronized with MS860xA/M268xA by waiting for the response message to be entered.

< Controller program >



4.6.2 Wait for a service request after ∗OPC is sent (only when the GPIB interface bus is used).

The MS2681A/MS2683A/MS2687A/MS2687B/MS8608A/MS8609A sets the operation-complete bit (bit 0) to 1 when executing the ∗OPC command. The controller is synchronized with the Spectrum Analyzer for SRQ when the operation-complete bit is set for SRQ.



■ < 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

The MS860xA/MS268xA initializes the GPIB interface system at three levels in accordance with the IEEE488.2 specifications. This section describes how these three levels of initialization are processed, and how to instruct initialization from the controller.

5.1	Bus Initialization Using the IFC Statement	5-4
5.2	Initialization for Message Exchange by DCL and SDC Bus Commands..	5-5
5.3	Device Initialization Using the ∗RST Command	5-7
5.4	Device Initialization Using the INI/IP Command	5-8
5.5	Device Status at Power-on	5-8

In the IEEE488.2 standard, there are 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 it 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 the MS860xA/MS268xA from the controller, the level-3 device initialization function of can be used, and the level-2 initialization function cannot be used. When using the GPIB (Standard) interface bus to control the MS860xA/MS268xA from the controller, the initialization functions of levels 1, 2, and 3 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 that is set when the power is turned on.

5.1 Bus Initialization Using the IFC Statement

■ Example

```
board% = 0
CALL SendIFC (board%)
```

■ Explanation

This function can be using when using the GPIB interface bus is used to control the spectrum analyzer function from the controller.

The IFC statement initializes the interface functions of all devices connected to the GPIB bus line.

The initialization of interface functions involves clearing the interface function states of devices set by the controller, and resetting them to their initial states. In the table below, ○ indicates the functions that are initialized, and Δ indicates the functions that are 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 lestener	L or LT	○
5	Service request	SR	△
6	Remort/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.).

5.2 Initialization for Message Exchange by DCL and SDC Bus Commands

■ Example

Initializes all devices on the bus for message exchange (sending DCL).

```
board% = 0
addresslist% = NOADDR
CALL DevClearList(board%, addresslist%)
```

Initializes only the device at address 3 for message exchange (sending SDC).

```
board% = 0
address% = 3
CALL DevClear (board%, address%)
```

■ Explanation

This function is available when the GPIB interface is used to control the spectrum analyzer 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 the Spectrum Analyzer 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 messagefrom 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

5.3 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 resets a device at level 3.
The *RST (Reset) command is used to reset a device (spectrum analyzer function) 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 the spectrum analyzer after initialization, see Appendix A.

5.4 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 the analyzer device-dependent messages that initialize a device at level 3.

5.5 Device Status at Power-on

When the power is turned on:

[1] The device is set to the status it was in 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 the spectrum analyzer is powered on for the first time after delivery, the spectrum analyzer settings are those listed in the Initial Settings Table (□Appendix A).

Section 6 Command List

This section lists the device messages that can be used for this software according to the function following the contents shown below.
For the details of each command, see Section 7 Command Detail.

6.1 How To Read the Device Message List 6-3
6.2 Common to All Screens 6-5
6.3 Setup Common Parameter 6-8
6.4 Modulation Analysis 6-12
6.5 RF Power 6-19
6.6 Output RF Spectrum 6-25
6.7 Spurious Emission 6-34
6.8 Power Meter 6-50
6.9 IQ Level 6-51
6.10 Multi Slot Parameter Setup 6-53

6.1 How To Read the Device Message List

- Program message and Query message

(a) Upper-case letters: Reserved word

(b) Numeric value: Reserved word (Numerical code)

(c) Lower-case letters: Parameter

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	Non or specified
o	Non-Unit integer	Octal integer	None
h	Non-Unit integer	Hexadecimal integer	None
r	Non-unit real num ber or unit-specified real number	Real number	Non or specified

- Response message

(a) Upper-case letters: Reserved word

(b) Numeric value: Reserved word (Numerical code)

(c) Lower-case letters: Parameter

Argument	Meaning (Unit)	Type	Unit/ Suffix code
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	Octail 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 chaned. (Real number in effective digits are output.)	None or Specified
j	Value judgment		None
u	Specified unit	DB, DBM, DM, DBMV, DBUV, DBUVE, V, MV, UV, W, MW, UW, NW	None

6.2 Common to All Screens

<table>
<tr><th>Function</th><th colspan="3">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td colspan="8">Initialization</td></tr>
<tr><td colspan="4" rowspan="3">Preset</td><td>PRE</td><td>---</td><td>---</td><td></td></tr>
<tr><td>INI</td><td>---</td><td>---</td><td></td></tr>
<tr><td>IP</td><td>---</td><td>---</td><td></td></tr>
<tr><td colspan="8">Switching Screen Layer</td></tr>
<tr><td rowspan="16">Switch Screen</td><td colspan="3">Setup Common Parameter</td><td>DSPL SETCOM</td><td rowspan="16">DSPL?</td><td>SETCOM</td><td></td></tr>
<tr><td colspan="3">Modulation Analysis</td><td>DSPL MODANAL</td><td>MODANAL</td><td></td></tr>
<tr><td rowspan="3">RF Power</td><td colspan="2">RF Power</td><td>DSPL RFPWR</td><td>RFPWR</td><td></td></tr>
<tr><td colspan="2" rowspan="2">Setup Template</td><td>DSPL SETTEMP_RFPWR</td><td>SETTEMP_RFPWR</td><td></td></tr>
<tr><td>DSPL SETTEMP</td><td>SETTEMP_RFPWR</td><td></td></tr>
<tr><td rowspan="2">Output RF Spectrum</td><td colspan="2">High Speed</td><td>DSPL ADJ,HIGH</td><td>ADJ,HIGH</td><td></td></tr>
<tr><td colspan="2">Setup Output RF Spectrum</td><td>DSPL SETTBL_ACP</td><td>SETTBL_ACP</td><td></td></tr>
<tr><td colspan="3">Multi Slot Parameter Setup</td><td>DSPL MSPS</td><td>MSPS</td><td></td></tr>
<tr><td rowspan="6">Spurious Emission</td><td colspan="2">Spot</td><td>DSPL SPURIOUS, SPOT</td><td>SPURIOUS,SPOT</td><td></td></tr>
<tr><td colspan="2">Search</td><td>DSPLSPURIOUS, SEARCH</td><td>SPURIOUS,SEARCH</td><td></td></tr>
<tr><td colspan="2">Sweep</td><td>DSPL SPURIOUS, SWEEP</td><td>SPURIOUS,SWEEP</td><td></td></tr>
<tr><td rowspan="2">Setup Frequency Table</td><td>Spot</td><td>DSPL SETTBL_SPU, SPOT</td><td>SETTBL_SPU,SPOT</td><td></td></tr>
<tr><td>Search & Sweep</td><td>DSPL SETTBL_SPU, SWEEP</td><td>SETTBL_SPU,SWEEP</td><td></td></tr>
<tr><td colspan="2">Setup Reference Power</td><td>DSPL RELPWRREF</td><td>RELPWRREF</td><td></td></tr>
<tr><td colspan="3">Power Meter</td><td>DSPL PWRMTR</td><td>PWRMTR</td><td></td></tr>
<tr><td colspan="3">IQ Level</td><td>DSPL IQLVL</td><td>IQLVL</td><td></td></tr>
<tr><td colspan="4">Back Screen</td><td>BS</td><td>---</td><td>---</td><td></td></tr>
</table>

Common to All Screens (cont.)

<table>
<tr><th>Function</th><th colspan="3">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td colspan="8">Starting Measurement</td></tr>
<tr><td rowspan="6">Sweep/ Measure</td><td rowspan="4" colspan="2">Single</td><td rowspan="2">No Sync</td><td>SNGLS</td><td>---</td><td>---</td><td></td></tr>
<tr><td>S2</td><td>---</td><td>---</td><td></td></tr>
<tr><td rowspan="2">Sync</td><td>SWP</td><td>---</td><td>---</td><td></td></tr>
<tr><td>TS</td><td>---</td><td>---</td><td></td></tr>
<tr><td rowspan="2" colspan="3">Continuous</td><td>CONTS</td><td>---</td><td>---</td><td></td></tr>
<tr><td>S1</td><td>---</td><td>---</td><td></td></tr>
<tr><td rowspan="2">Sweep/ Measure Status</td><td colspan="3">Measure/Sweep End</td><td>---</td><td rowspan="2">SWP?</td><td>SWP 0</td><td></td></tr>
<tr><td colspan="3">During Measure/Sweep</td><td>---</td><td>SWP 1</td><td></td></tr>
<tr><td rowspan="20">Switch Screen and Measure Start</td><td colspan="3">Setup Common Parameter</td><td>MEAS SETCOM</td><td rowspan="20">MEAS?</td><td>SETCOM</td><td></td></tr>
<tr><td colspan="3">Modulation Analysis</td><td>MEAS MODANAL</td><td>MODANAL</td><td></td></tr>
<tr><td rowspan="3" colspan="2">RF Power</td><td>RF Power</td><td>MEAS RFPWR</td><td>RFPWR</td><td></td></tr>
<tr><td rowspan="2">Setup Template</td><td>MEAS SETTEMP_RFPWR</td><td>SETTEMP_RFPWR</td><td></td></tr>
<tr><td>MEAS SETTEMP</td><td>SETTEMP_RFPWR</td><td></td></tr>
<tr><td rowspan="2" colspan="2">Output RF Spectrum</td><td>High Speed</td><td>MEAS ADJ,HIGH</td><td>ADJ,HIGH</td><td></td></tr>
<tr><td>Setup Output RF Spectrum</td><td>MEAS SETTBL_ACP</td><td>SETTBL_ACP</td><td></td></tr>
<tr><td colspan="3">Multi Slot Parameter Setup</td><td>MEAS MSPS</td><td>MSPS</td><td></td></tr>
<tr><td rowspan="6">SpuriousEmission</td><td colspan="2">Spot</td><td>MEAS SPURIOUS,SPOT</td><td>SPURIOUS,SPOT</td><td></td></tr>
<tr><td colspan="2">Search</td><td>MEAS SPURIOUS,SEARCH</td><td>SPURIOUS,SEARCH</td><td></td></tr>
<tr><td colspan="2">Sweep</td><td>MEAS SPRIOUS,SWEEP</td><td>SPURIOUS,SWEEP</td><td></td></tr>
<tr><td rowspan="2">Setup Frequency Table</td><td>Spot</td><td>MEAS SETTBL_SPU,SPOT</td><td>SETTBL_SPU,SPOT</td><td></td></tr>
<tr><td>Search & Sweep</td><td>MEAS SETTBL_SPU, SWEEP</td><td>SETTBL_SPU,SWEEP</td><td></td></tr>
<tr><td colspan="2">Setup Reference Power</td><td>MEAS RELPWRREF</td><td>RELPWRREF</td><td></td></tr>
<tr><td colspan="3">Power Meter</td><td>MEAS PWRMTR</td><td>PWRMTR</td><td></td></tr>
<tr><td colspan="3">IQ Level</td><td>MEAS IQLVL</td><td>IQLVL</td><td></td></tr>
</table>

Common to All Screens (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Switching RF Signal Input Connectors					
Switch RF Input Connector	High	RFINPUT HIGH	RFINPUT?	HIGH	Effective only for MS8608 A
	Low	RFINPUT LOW		LOW	Effective only for MS8608 A
Pre-amplifier					
Pre Ampl	On	PREAMP ON	PREAMP?	ON	Effective only when the option is installed.
	Off	PREAMP OFF		OFF	Effective only when the option is installed.
Correcting Level					
Correction	Off	CORR 0	CORR?	0	
	Table 1	CORR 1		1	
	Table 2	CORR 2		2	
	Table 3	CORR 3		3	
	Table 4	CORR 4		4	
	Table 5	CORR 5		5	

6.3 Setup Common Parameter

Function	Item	Program Message	Query Message	Response Message	Remarks
Input					
Terminal	RF	TERM RF	TERM?	RF	
	IQ-DC	TERM IQDC		IQDC	
	IQ-AC	TERM IQAC		IQAC	
	IQ-Balance	TERM IQBAL		IQBAL	
Impedance	50 Ω	IQINZ 50	IQINZ?	50	
	1 MΩ	IQINZ 1M		1M	
Reference Level		RFLVL l	RFLVL?	l	l: <High>(–10.00+offset)dBm to (42.00+offset)dBm <Low>(–30.00dBm+offset) to (22.00dBm+offset) The range above are for the case of the pre-amplifier is off. For MS8609A/MS268xA, only Low Power input can be set.
Reference Level Offset		RFLVLOFS l	RFLVLOFS?	l	l: –99.99～99.99 dB
Frequency					
Band	Free	FREQBAND FREE	FREQBAND?	FREE	
	P-GSM900	FREQBAND PGSM900		PGSM900	
	E-GSM900	FREQBAND EGSM900		EGSM900	
	R-GSM900	FREQBAND RGSM900		RGSM900	
	T-GSM380	FREQBAND TGSM380		TGSM380	
	T-GSM410	FREQBAND TGSM410		TGSM410	
	T-GSM900	FREQBAND TGSM900		TGSM900	
	DCS1800	FREQBAND DCS1800		DCS1800	
	PCS1900	FREQBAND PCS1900		PCS1900	

Setup Common Parameter (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Band	GSM450	FREQBAND GSM450	FREQBAND ?	GSM450	
	GSM480	FREQBAND GSM480		GSM480	
	GSM750	FREQBAND GSM750		GSM750	
	GSM850	FREQBAND GSM850		GSM850	
Select Station	MS	BANDTRGT MS	BANDTRGT?	MS	
	BTS	BANDTRGT BTS		BTS	
	Micro BTS	BANDTRGT MCRBTS		MCRBTS	
	Pico BTS	BANDTRGT PCBTS		PCBTS	
Channel		CHAN n	CHAN?	n	n: 0 to 20000
Frequency		FREQ f	FREQ?	f	f:100 Hz to 3.0 GHz (For MS2681A) f:100 Hz to 7.8 GHz (For MS8608A/2683A) f:100 Hz to 13.2 GHz (For MS8609A) f:100 Hz to 30.0 GHz (For MS2687A/B)
Channel & Frequency		CHFREQ n,f	---	---	n: 0 to 20000 f:100 Hz to 3.0 GHz (For MS2687A/B) f:100 Hz to 7.8 GHz (For MS8608A/2683A) f:100 Hz to 13.2 GHz (For MS8609A) f:100 Hz to 30.0 GHz (For MS2687A/B)
Channel Spring		CHSPC f	CHSPC?	f	f: 0 Hz to 7.8 GHz
ARFCN_FIRST(x)		ARFCNFIRST n	ARFCNFIRST?	n	n:0 to 1023
BAND_OFFSET(y)		BANDOFFSET n	BANDOFFSET?	n	n:0 to (Max) Max: Bandwidth/200kHz T-GSM380:Max=48 T-GSM410: Max=48 T-GSM900: Max=28 DCS1800: Max=373 PCS1900: Max=298 GSM750: Max=73

Setup Common Parameter (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
ARFCN_RANGE(z)		ARFCNRANGE n	ARFCNRANGE?	n	n:0 to (Max-BAND_OFFSET) Max: Bandwidth/200kHz T-GSM380:Max=48 T-GSM410: Max=48 T-GSM900: Max=28 DCS1800: Max=373 PCS1900: Max=298 GSM750: Max=73
Signal					
Modulation Type	GMSK	MODTYPE GMSK	MODTYPE?	GMSK	
	8PSK	MODTYPE 8PSK		8PSK	
Measuring Object	Normal Burst	MEASOBJ NB	MEASOBJ?	NB	
	Normal Burst (Multi Slot)	MEASOBJ NBMS		NBMS	
	Access Burst	MEASOBJ AB		AB	
	Synchronization Burst	MEASOBJ SB		SB	
	Continuous	MEASOBJ CONT		CONT	
Burst Off Data	All 0	BRSTOFFDAT ALL0	BRSTOFFDAT?	ALL0	
	All 1	BRSTOFFDAT ALL1		ALL1	
	Auto	BRSTOFFDAT AUTO		AUTO	
Training Sequence					
Pattern	TSC 0	PATT TSC0	PATT?	TSC0	
	TSC 1	PATT TSC1		TSC1	
	TSC 2	PATT TSC2		TSC2	
	TSC 3	PATT TSC3		TSC3	
	TSC 4	PATT TSC4		TSC4	
	TSC 5	PATT TSC5		TSC5	
	TSC 6	PATT TSC6		TSC6	
	TSC 7	PATT TSC7		TSC7	
	ETSC	PATT ETSC		ETSC	
	SYNCH	PATT SYNCH		SYNCH	
	NO	PATT NO		NO	
	USER	PATT USER		USER	

Setup Common Parameter (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
User Pattern Length		PATT_ULEN	PATT_ULEN?	n	n: (GMSK) 1 to 64symbol (8-PSK) 1 to 26symbol
User Bit Pattern	GMSK	PATT_UBIT h	PATT_UBIT?	h	h: 0 to FFFFFFFFFFFFFFFF
	8-PSK	PATT_UBIT o		o	o: 0 to 7777777777777777777777777
Start Point		PATT_USTART n	RTPATT_USTART?	n	n: <<GMSK>> <NB,SB> 0 to (147 – User Pattern Length) symbol <AB> 0 to (87 – User Pattern Length) symbol <<8-PSK>> 0 to (147 – User Pattern Length) symbol
Trigger					
Trigger	Free Run	TRG FREE	TRG?	FREE	
	External	TRG EXT		EXT	
Trigger Edge	Rise	TRGEDGE RISE	TRGEDGE?	RISE	
	Fall	TRGEDGE FALL		FALL	
Trigger Delay		TRGDLY t	TRGDLY?	t	t: –120.000 to 120.000 ms
Trigger Timeout (Remote Only)		TRGWAIT n	TRGWAIT?	n	n: 0 to 2147483647 s
Symbol align offset (Remote Only)					
Symbol align offset	Normal	SYMOFS NRM	SYMOFS?	NRM	
	Half	SYMOFS HALF		HALF	

6.4 Modulation Analysis

<table>
<tr><th>Function</th><th>Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td colspan="6">Trace Format</td></tr>
<tr><td rowspan="7">Trace Format</td><td>None</td><td>TRFORM NON</td><td rowspan="7">TRFORM?</td><td>NON</td><td></td></tr>
<tr><td>Trellis</td><td>TRFORM TRLIS</td><td>TRLIS</td><td></td></tr>
<tr><td>Constellation</td><td>TRFORM CONSTEL</td><td>CONSTEL</td><td></td></tr>
<tr><td>EVM</td><td>TRFORM VECT</td><td>VECT</td><td></td></tr>
<tr><td>Eye Diagram</td><td>TRFORM EYE</td><td>EYE</td><td></td></tr>
<tr><td>Phase Error</td><td>TRFORM PHASE</td><td>PHASE</td><td></td></tr>
<tr><td>Magnitude Error</td><td>TRFORM MAGTD</td><td>MAGTD</td><td></td></tr>
<tr><td colspan="6">Storage Mode</td></tr>
<tr><td rowspan="3">Storage Mode</td><td>Normal</td><td>STRG_MOD NRM</td><td rowspan="3">STRG_MOD?</td><td>NRM</td><td></td></tr>
<tr><td>Average</td><td>STRG_MOD AVG</td><td>AVG</td><td></td></tr>
<tr><td>Overwrite</td><td>STRG_MOD OVER</td><td>OVER</td><td></td></tr>
<tr><td colspan="2">Average Count</td><td>AVR_MOD n</td><td>AVR_MOD?</td><td>n</td><td>n: 2 to 9999</td></tr>
<tr><td rowspan="2">Refresh Interval</td><td>Every</td><td>INTVAL_MOD EVERY</td><td rowspan="2">INTVAL_MOD?</td><td>EVERY</td><td></td></tr>
<tr><td>Once</td><td>INTVAL_MOD ONCE</td><td>ONCE</td><td></td></tr>
<tr><td colspan="6">Filter</td></tr>
<tr><td rowspan="4">Filter</td><td>Non</td><td>FILTER NON</td><td rowspan="4">FILTER?</td><td>NON</td><td></td></tr>
<tr><td>Nyquist</td><td>FILTER NYQST</td><td>NYQST</td><td></td></tr>
<tr><td>Nyquist & Inverse</td><td>FILTER NYQSTINVS</td><td>NYQSTINVS</td><td></td></tr>
<tr><td>Specification</td><td>FILTER SPEC</td><td>SPEC</td><td></td></tr>
<tr><td colspan="6">Scale Mode</td></tr>
<tr><td rowspan="5">Interpolation (Constellation)</td><td>Non</td><td>INTPOL NON</td><td rowspan="5">INTPOL?</td><td>NON</td><td></td></tr>
<tr><td>Linear</td><td>INTPOL LIN</td><td>LIN</td><td></td></tr>
<tr><td>10points</td><td>INTPOL POINT10</td><td>POINT10</td><td></td></tr>
<tr><td>Linear & Symbol Position</td><td>INTPOL LINSYM</td><td>LINSYM</td><td></td></tr>
<tr><td>10points & Symbol Position</td><td>INTPOL P10SYM</td><td>P10SYM</td><td></td></tr>
<tr><td rowspan="5">Vertical Scale (EVM, Phase Error, Magnitude Error)</td><td>5% or 5deg</td><td>VSCALE 5</td><td rowspan="5">VSCALE?</td><td>5</td><td></td></tr>
<tr><td>10% or 10deg</td><td>VSCALE 10</td><td>10</td><td></td></tr>
<tr><td>20% or 20deg</td><td>VSCALE 20</td><td>20</td><td></td></tr>
<tr><td>50% or 50deg</td><td>VSCALE 50</td><td>50</td><td></td></tr>
<tr><td>100% or 100deg</td><td>VSCALE 100</td><td>100</td><td></td></tr>
</table>

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Analysis Range					
Analysis Range	Slot	MODSWTCH_MOD SLOT	MODSWTCH_MOD?	SLOT	
	Frame	MODSWTCH_MOD FRAME		FRAME	
Marker Mode					
Marker Mode	Normal	MKR_MOD NRM	MKR_MOD?	NRM	
	Off	MKR_MOD OFF		OFF	
Marker Position	Trellis, Constellation, EVM, Eye Diagram, Phase Error, Magnitude Error	MKP_MOD r	MKP_MOD?	r	r: 0.0 to 147.0 symbol (GMSK) 3.0 to 144.0symbol (8PSK)
Marker Level	Trellis, Eye Diagram, Phase Error, Magnitude Error	---	MKL_MOD?	r	
	I (Constellation Eye Diagram)	---	MKL_MOD? I	r	
	Q (Constellation Eye Diagram)	---	MKL_MOD? Q	r	
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB
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 , 3: Multi carrier calibration) l: –10.00 to 10.00 dB

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Measure Result					
Carrier Frequency		---	CARRF?	f	
Carrier Frequency Error	Hz	---	CARRFERR?	f	
		---	CARRFERR? HZ	f	
	ppm	---	CARRFERR? PPM	r	unit: ppm
RMS Phase Error		---	PHASEERR?	r	unit: deg
Peak Phase Error		---	PPHASEERR?	r	unit: deg
	+	---	PPHASEERR? +	r	unit: deg
	–	---	PPHASEERR? –	r	unit: deg
Peak Phase Error Symbol		---	PPHASESYM?	r	unit: symbol
	+	---	PPHASESYM? +	r	unit: symbol
	–	---	PPHASESYM? –	r	unit: symbol
RMS Magnitude Error		---	MAGTDERR?	r	unit: %
Peak Magnitude Error	+	---	PMAGTDERR? +	r	unit: %
	–	---	PMAGTDERR? –	r	unit: %
Peak Magnitude Error Symbol	+	---	PMAGTDSYM? +	r	unit: symbol
	–	---	PMAGTDSYM? –	r	unit: symbol
RMS EVM		---	VECTERR?	r	unit: %
Peak EVM		---	PVECTERR?	r	unit: %
Origin Offset		---	ORGNOFS?	l	
95:th percerntile EVM		---	EVM95PCT?	r	

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data / Data Modify	I Data (Constellation, Eye Diagram)	XMC 0,na,nb	XMC? 0,nc,nd	ne(1),ne(2),…,ne(nd)	na: 0 to 1470 <GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 1410 <8-PSK> (Data writing address) nb: –32786 to 32767(Written data) nc: 0 to 1470<GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 1410 <8-PSK> (Data reading address) nd: 1 to 1471<GMSK-NB,AB,SB>, 1 to 1551 <GMSK-Cont>, 1 to 1441 <8-PSK> (Number of the reading points) ne: –32768 to 32767 (Ideal signal for reading data " 1 " =10000)

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data / Data Modify	Q Data (Constellation, Eye Diagram)	XMC 1,na,nb	XMC? 1,nc,nd	ne(1),ne(2),...,ne(nd)	na: 0 to 1470 <GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 1410 <8-PSK> (Data writing address) nb: –32786 to 32767(Written data) nc: 0 to 1470<GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 1410 <8-PSK> (Data reading address) nd: 1 to 1471<GMSK-NB,AB,SB>, 1 to 1551 <GMSK-Cont>, 1 to 1441 <8-PSK> (Number of reading points) ne: –32768 to 32767 (Ideal signal for reading data " 1 " =10000)

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data /Data Modify	EVM	XMV na,nb	XMV? nc,nd	ne(1),ne(2),… ,ne(nd)	na: 0 to 141 (Data writing address) nb: –32768 to 32767 (Written data) nc: 0 to 141 (Data Reasing address) nd: 1 to 142 (Number of reading points) ne: –32768 to 32767 (Read data 1% = 100)
	Phase Error	XMP na,nb	XMP? nc,nd	ne(1),ne(2),… ,ne(nd)	na: 0 to 1470 <GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 141 <8-PSK> (Data writing address) nb: –32786 to 32767(Written data) nc: 0 to 1470<GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 141 <8-PSK> (Data Reading address) nd: 1 to 1471<GMSK-NB,AB,SB>, 1 to 1551 <GMSK-Cont>, 1 to 142 <8-PSK> (Number of reading points) ne: –32768 to 32767 (Read data 1 deg = 100)

Modulation Analysis (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data /Data Modify	Magnitude Error	XMN na,nb	XMN? nc,nd	ne(1),ne(2),…,ne(nd)	na: 0 to 1470 <GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 141 <8-PSK> (Data writing address) nb: –32786 to 32767(Written data) nc: 0 to 1470<GMSK-NB,AB,SB>, 0 to 1550 <GMSK-Cont>, 0 to 141 <8-PSK> (Data reading address) nd: 1 to 1471<GMSK-NB,AB,SB>, 1 to 1551 <GMSK-Cont>, 1 to 142 <8-PSK> (Number of reading points) ne: –32768 to 32767 (Read data1 % = 100)

6.5 RF Power

Function	Item	Program Message	Query Message	Respons e Message	Remarks
Window					
Window	Slot	WINDOW SLOT	WINDOW?	SLOT	
	On Portion	WINDOW ONPORT		ONPOR T	
	Frame	WINDOW FRAME		FRAME	
	Leading	WINDOW LEAD		LEAD	
	Trailing	WINDOW TRAIL		TRAIL	
Storage Mode					
Storage Mode	Normal	STRG_RFPWR NRM	STRG_RFPWR?	NRM	
	Average	STRG_RFPWR AVG		AVG	
Average Count		AVR_RFPWR n	AVR_RFPWR?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_RFPWR EVERY	INTVAL_RFPW R?	EVERY	
	Once	INTVAL_RFPWR ONCE		ONCE	
Marker					
Marker Mode	Normal	MKR_RFPWR NRM	MKR_RFPWR?	NRM	
	Off	MKR_RFPWR OFF		OFF	
Marker Position		MKP_RFPWR r	MKP_RFPWR?	r	r: (Slot, On Portion) –27.0 to 174.0 symbol, (Frame) –20.00 to 127.4symbol, (Leading) –13.0 to 8.0symbol. (Trailing) 139.0 to 161.0symbol
Marker Level		---	MKL_RFPWR?	l	

RF Power (cont.)

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
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 , 3: Multi carrier calibration) l: –10.00 to 10.00 dB
Level					
Level	Absolute Level	LVLREL OFF	LVLREL?	OFF	
	Relative Level	LVLREL ON	LVLREL?	ON	
Wide Dynamic Range	On	WIDE_RFPWR ON	WIDE_RFPWR ?	ON	
	Off	WIDE_RFPWR OFF		OFF	
Slot Number					
Slot Number	Slot 0	SLTNO_RFPWR SLOT0	SLTNO_RFPWR?	SLOT0	
	Slot 1	SLTNO_RFPWR SLOT1		SLOT1	
	Slot 2	SLTNO_RFPWR SLOT2		SLOT2	
	Slot 3	SLTNO_RFPWR SLOT3		SLOT3	
	Slot 4	SLTNO_RFPWR SLOT4		SLOT4	
	Slot 5	SLTNO_RFPWR SLOT5		SLOT5	
	Slot 6	SLTNO_RFPWR SLOT6		SLOT6	
	Slot 7	SLTNO_RFPWR SLOT7		SLOT7	

RF Power (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Waveform Display					
Waveform Display	On	WAVEFORM_RFPWR ON	WAVEFORM_RFPWR?	ON	
	Off	WAVEFORM_RFPWR OFF		OFF	
Setup Template					
Setup Template		DSPL SETTEMP_RFPWR	DSPL?	SETTEMP_RFPWR	
		DSPL SETTEMP		SETTEMP_RFPWR	
Format Type	BTS	TEMPFORM BTS	TEMPFORM?	BTS	
	MS	TEMPFORM MS		MS	
Recall Template	Standard	SLCTTEMP_RFPWR STD	SLCTTEMP_RFPWR?	STD	
		SLCTEMP STD	SLCTTEMP?	STD	
	Not Standard	---	SLCTTEMP_RFPWR?	NOT	
		---	SLCTTEMP?	NOT	
Template Type	NB at GMSK	TEMPTYPE_RFPWR NBGMSK	TEMPTYPE_RFPWR?	NBGMSK	
	AB	TEMPTYPE_RFPWR AB		AB	
	NB at 8-PSK	TEMPTYPE_RFPWR NB8PSK		NB8PSK	
	BTS1900 at GMSK	TEMPTYPE_RFPWR B19GMSK		B19GMSK	
Off Level	dBm	TEMPOFFLVL DBM	TEMPOFFLVL?	DBM	
	dB	TEMPOFFLVL DB		DB	
Level Modify (for BTS)	Upper	TEMPLVL_RFPWR UP.n,l	TEMPLVL_RFPWR? UP,n	l	n: 1 to 6
	Lower	TEMPLVL_RFPWR LOW,n,l	TEMPLVL_RFPWR? LOW,n	l	n: 1 to 3
Level Modify (for MS)	Upper	TEMPLVLMS_RFPWR UP.n,l	TEMPLVLMS_RFPWR? UP,n	l	n: 1 to 7
	Lower	TEMPLVLMS_RFPWR LOW,n,l	TEMPLVLMS_RFPWR? LOW,n	l	n: 1 to 3

RF Power (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Measure Result					
Tx Power	dBm (Normal Burst)	---	TXPWR? DBM	1	
	W (Normal Burst)	---	TXPWR? WATT	1	
	dBm (Multi Burst)	---	TXPWR? DBM,n	1	n: 0 to 7
	W (Multi Burst)	---	TXPWR? WATT,n	1	n: 0 to 7
Carrier Off Power	dBm (Normal Burst)	---	OFFPWR? DBM	1	
	W (Normal Burst)	---	OFFPWR? WATT	1	
	dBm (Multi Burst)	---	OFFPWR? DBM,n	1	n: 0 to 7
	W (Multi Burst)	---	OFFPWR? WATT,n	1	n: 0 to 7
On/Off Ratio	Normal Burst	---	RATIO?	1	
	Multi Burst	---	RATIO? n	1	n: 0 to 7
Power Flatness	Maximum Power (Normal Burst)	---	MAXPWR?	1	
	Minimum Power (Normal Burst)	---	MINPWR?	1	
	Maximum Power (Multi Burst)	---	MAXPWR? n	1	n: 0 to 7
	Minimum Power (Multi Burst)	---	MINPWR? n	1	n: 0 to 7

RF Power (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Template Judgment	Template On (Normal Burst)	---	TEMPPASS_RFPWR? ON	j	
		---	TEMPPASS? ON	j	
	Template Off (Normal Burst)	---	TEMPPASS_RFPWR? OFF	j	
		---	TEMPPASS? OFF	j	
	Template On (Multi Burst)	---	TEMPPASS_RFPWR? ON,n	j	n: 0 to 7
		---	TEMPPASS? ON,n	j	n: 0 to 7
	Template Off (Multi Burst)	---	TEMPPASS_RFPWR? OFF,n	j	n: 0 to 7
		---	TEMPPASS? OFF,n	j	n: 0 to 7
	Template On-All (Multi Burst)	---	TEMPPASS_RFPWR? ON,ALL	j(0),j(1)...j(7)	
		---	TEMPPASS? ON,ALL	j(0),j(1)...j(7)	
	Template Off-All (Multi Burst)	---	TEMPPASS_RFPWR? OFF,ALL	j(0),j(1)...j(7)	
		---	TEMPPASS? OFF,ALL	j(0),j(1)...j(7)	

RF Power (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data / Modify	Normal Burst	XMD na,nb	XMD? nc,nd	ne(1),ne(2) …,ne(nd)	na: 0 to 13010 (Data writing address) nb: –32768 to 32767 (Written data 1dBm = 100) nc: 0 to 13010 (Start address for reading data) nd: 1 to 13011 (Number of read data) ne: –32768 to 32767 (Read data 1dBm = 100)
	Multi Burst	XMD na,nb	XMD? nc,nd	ne(1),ne(2) …,ne(nd)	na: 0 to 26020 (Data writing address) nb: –32768 to 32767 (Written data 1dBm = 100) nc: 0 to 26020 (Start address for reading data) nd: 1 to 26021 (Number of read data) ne: –32768 to 32767 (Read data 1dBm = 100)
Slot Power (Remote Only)		---	SLOTPWR? n	1	n: 0 to 7 (slot number)
Reference Power for Template (Remote Only)		---	TEMPRPWR?	1	

6.6 Output RF Spectrum

Function	Item	Program Message	Query Message	Response Message	Remarks
Measuring Method					
Measuring Method	High Speed	DSPL ADJ,HIGH	DSPL?	ADJ,HIGH	
Measuring Method & Measuring Start	High Speed	MEAS ADJ,HIGH	MEAS?	ADJ,HIGH	
Storage Mode					
Storage Mode	Normal	STRG_ADJ	STRG_ADJ?	NRM	
	Average	STRG_ADJ		AVG	
Average Count		AVR_ADJ n	AVG_ADJ?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_ADJ EVERY	INTVAL_ADJ?	EVERY	
	Once	INTVAL_ADJ ONCE		ONCE	
Unit					
Unit	dBm	UNIT_ADJ DBM	UNIT_ADJ?	DBM	
	dB	UNIT_ADJ DB		DB	
Calibration					
Adjust Range		ADJRNG	----	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB
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 , 3: Multi carrier calibration) l: –10.00 to 10.00 dB

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Trace Format					
Trace Format	Non	TRFORM_ACP NON	TRFORM_ACP?	NON	
	Modulation	TRFORM_ACP MOD		MOD	
	Switching Tran.	TRFORM_ACP SWTCH		SWTCH	
View Select	Low	VIEW_ACP LOW	VIEW_ACP?	LOW	
	Up	VIEW_ACP UP		UP	
Analysis Range					
Analysis Range	Slot	MODSWTCH_ADJ SLOT	MODSWTCH_ADJ?	SLOT	
	Frame	MODSWTCH_ADJ FRAME		FRAME	
Operation Trace					
Operation Trace	Spectrum	OPRTT_ACP SPECT	OPRTT_ACP?	SPECT	
	Spot	OPRTT_ACP SPOT		SPOT	

Output RF Spectrum (cont.)

<table>
<tr><th colspan="3">Function / Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td colspan="7">Setup Template</td></tr>
<tr><td colspan="3">Setup Template</td><td>DSPL SETTBL_ACP</td><td>DSPL?</td><td>SETTEMP_ RFPWR</td><td></td></tr>
<tr><td rowspan="4">Due to Modulation</td><td rowspan="2">Low</td><td>dB</td><td>TBLLMT_ACP MOD,LOW,REL,Fna,nb</td><td>TBLLMT_ACP? MOD,LOW,REL,Fna</td><td rowspan="8">nb</td><td rowspan="8">na: 1 to 11
nb: -100.00 to 100.00</td></tr>
<tr><td>dBm</td><td>TBLLMT_ACP MOD,LOW,ABS,Fna,nb</td><td>TBLLMT_ACP ?MOD,LOW,ABS,Fna</td></tr>
<tr><td rowspan="2">Upper</td><td>dB</td><td>TBLLMT_ACP MOD,UP,REL,Fna,nb</td><td>TBLLMT_ACP? MOD,UP,REL,Fna</td></tr>
<tr><td>dBm</td><td>TBLLMT_ACP MOD,UP,ABS,Fna,nb</td><td>TBLLMT_ACP? MOD,UP,ABS,Fna</td></tr>
<tr><td rowspan="4">Switching Transients</td><td rowspan="2">Low</td><td>dB</td><td>TBLLMT_ACP SWTCH,LOW,REL,Fna,nb</td><td>TBLLMT_ACP? SWTCH,LOW,REL,Fna</td></tr>
<tr><td>dBm</td><td>TBLLMT_ACP SWTCH,LOW,ABS,Fna,nb</td><td>TBLLMT_ACP? SWTCH,LOW,ABS,Fna</td></tr>
<tr><td rowspan="2">Upper</td><td>dB</td><td>TBLLMT_ACP SWTCH,UP,REL,Fna,nb</td><td>TBLLMT_ACP? SWTCH,UP,REL,Fna</td></tr>
<tr><td>dBm</td><td>TBLLMT_ACP SWTCH,UP,ABS,Fna,nb</td><td>TBLLMT_ACP? SWTCH,UP,ABS,Fna</td></tr>
<tr><td rowspan="2">View</td><td colspan="2">Modulation</td><td>TBLVIEW_ACP MOD</td><td rowspan="2">TBLVIEW_ACP</td><td>MOD</td><td></td></tr>
<tr><td colspan="2">Switching Transients</td><td>TBLVIEW_ACP SWTCH</td><td>SWTCH</td><td></td></tr>
<tr><td rowspan="5">Judge Unit</td><td colspan="2" rowspan="2">dBm</td><td>JUDGUNIT_ACP ON</td><td rowspan="5">JUDGUNIT_ACP?</td><td rowspan="2">ABS</td><td rowspan="2"></td></tr>
<tr><td>JUDGUNIT_ACP ABS</td></tr>
<tr><td colspan="2" rowspan="2">dB</td><td>JUDGUNIT_ACP OFF</td><td rowspan="2">REL</td><td rowspan="2"></td></tr>
<tr><td>JUDGUNIT_ACP REL</td></tr>
<tr><td colspan="2">dB & dBm</td><td>JUDGUNIT_ACP RELABS</td><td>RELABS</td><td></td></tr>
</table>

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard					
Band	P-GSM900	FREQBAND_ACP PGSM900	FREQBAND_ACP?	PGSM900	
	E-GSM900	FREQBAND_ACP EGSM900		EGSM900	
	R-GSM900	FREQBAND_ACP RGSM900		RGSM900	
	T-GSM380	FREQBAND_ACP TGSM380		TGSM380	
	T-GSM410	FREQBAND_ACP TGSM410		TGSM410	
	T-GSM900	FREQBAND_ACP TGSM900		TGSM900	
	DCS1800	FREQBAND_ACP DCS1800		DCS1800	
	PCS1900	FREQBAND_ACP PCS1900		PCS1900	
	GSM450	FREQBAND_ACP GSM450		GSM450	
	GSM480	FREQBAND_ACP GSM480		GSM480	
	GSM750	FREQBAND_ACP GSM750		GSM750	
	GSM850	FREQBAND_ACP GSM850		GSM850	

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
DUT Select	MS	BANDTRGT_ACP MS	BANDTRGT_ACP?	MS	
	BTS	BANDTRGT_ACP BTS		BTS	
	Micro BTS	BANDTRGT_ACP MCRBTS		MCRBTS	
	Pico BTS	BANDTRGT_ACP PCBTS		PCBTS	
Select Template	GSM400/900/850/700 >=39 (MS)	STANDARD_ACP GSM900MS39	STANDARD_ACP?	GSM900MS39	
	GSM400/900/850/700 37 (MS)	STANDARD_ACP GSM900MS37		GSM900MS37	
	GSM400/900/850/700 35 (MS)	STANDARD_ACP GSM900MS35		GSM900MS35	
	GSM400/900/850/700 <=33 (MS)	STANDARD_ACP GSM900MS33		GSM900MS33	
	GSM400/900/850/700 >=43 (BTS)	STANDARD_ACP GSM900BTS43		GSM900BTS43	
	GSM400/900/850/700 41 (BTS)	STANDARD_ACP GSM900BTS41		GSM900BTS41	
	GSM400/900/850/700 39 (BTS)	STANDARD_ACP GSM900BTS39		GSM900BTS39	
	GSM400/900/850/700 37 (BTS)	STANDARD_ACP GSM900BTS37		GSM900BTS37	
	GSM400/900/850/700 35 (BTS)	STANDARD_ACP GSM900BTS35		GSM900BTS35	
	GSM400/900/850/700 <=33 (BTS)	STANDARD_ACP GSM900BTS33		GSM900BTS33	

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Select Template	GSM400/900/850/700 <=33 (Micro BTS)	STANDARD_ACP GSM900MBTS33	STANDARD_ACP?	GSM900MBTS33	
	DCS1800 >=36 (MS)	STANDARD_ACP DCS1800MS36		DCS1800MS36	
	DCS1800 34 (MS)	STANDARD_ACP DCS1800MS34		DCS1800MS34	
	DCS1800 32 (MS)	STANDARD_ACP DCS1800MS32		DCS1800MS32	
	DCS1800 30 (MS)	STANDARD_ACP DCS1800MS30		DCS1800MS30	
	DCS1800 28 (MS)	STANDARD_ACP DCS1800MS28		DCS1800MS28	
	DCS1800 26 (MS)	STANDARD_ACP DCS1800MS26		DCS1800MS26	
	DCS1800 <=24 (MS)	STANDARD_ACP DCS1800MS24		DCS1800MS24	
	DCS1800 >=43 (BTS)	STANDARD_ACP DCS1800BTS43		DCS1800BTS43	
	DCS1800 41 (BTS)	STANDARD_ACP DCS1800BTS41		DCS1800BTS41	
	DCS1800 39 (BTS)	STANDARD_ACP DCS1800BTS39		DCS1800BTS39	
	DCS1800 37 (BTS)	STANDARD_ACP DCS1800BTS37		DCS1800BTS37	
	DCS1800 35 (BTS)	STANDARD_ACP DCS1800BTS35		DCS1800BTS35	
	DCS1800 <=33 (BTS)	STANDARD_ACP DCS1800BTS33		DCS1800BTS33	

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Select Template	DCS1800 35 (Micro BTS)	STANDARD_ACP DCS1800MBTS35	STANDARD_ACP?	DCS1800MBTS35	
	DCS1800 <=33 (Micro BTS)	STANDARD_ACP DCS1800MBTS33		DCS1800MBTS33	
	PCS1900 >=33 (MS)	STANDARD_ACP PCS1900MS33		PCS1900MS33	
	PCS1900 32 (MS)	STANDARD_ACP PCS1900MS32		PCS1900MS32	
	PCS1900 30 (MS)	STANDARD_ACP PCS1900MS30		PCS1900MS30	
	PCS1900 28 (MS)	STANDARD_ACP PCS1900MS28		PCS1900MS28	
	PCS1900 26 (MS)	STANDARD_ACP PCS1900MS26		PCS1900MS26	
	PCS1900 <=24 (MS)	STANDARD_ACP PCS1900MS24		PCS1900MS24	
	PCS1900 >=43 (BTS)	STANDARD_ACP PCS1900BTS43		PCS1900BTS43	
	PCS1900 41 (BTS)	STANDARD_ACP PCS1900BTS41		PCS1900BTS41	
	PCS1900 39 (BTS)	STANDARD_ACP PCS1900BTS39		PCS1900BTS39	
	PCS1900 37 (BTS)	STANDARD_ACP PCS1900BTS37		PCS1900BTS37	
	PCS1900 35 (BTS)	STANDARD_ACP PCS1900BTS35		PCS1900BTS35	

Output RF Spectrum (cont.)

Function	Item		Program Message	Query Message	Response Message	Remarks
Select Template	PCS1900 <=33 (BTS)		STANDARD_ACP PCS1900BTS33	STANDARD_ACP?	PCS1900 BTS33	
	PCS1900 35 (Micro BTS)		STANDARD_ACP PCS1900MBTS35		PCS1900 MBTS35	
	PCS1900 <=33 (Micro BTS)		STANDARD_ACP PCS1900MBTS33		PCS1900 MBTS33	
Marker						
Marker Position	Spectrum		MKP_ACP f	MKP_ACP?	f	f: -1.8M to +1.8MHz
	Spot		MKP_ACP n	MKP_ACP?	n	n: 0.0 to 167.0
Marker Level			---	MKL_ACP?	l	
Measuring Result						
Due to Modulation	Carrier Frequency		---	MODPWR?	l	
	Lower	current unit	---	MODPWR? Fn,LOW	l	n: 1 to 11
		designate unit	---	MODPWR? Fn,LOW ,u	l	n: 1 to 11 u: dB or dBm
	Upper	current unit	---	MODPWR? Fn,UP	l	n: 1 to 11
		designate unit	---	MODPWR? Fn,UP,u	l	n: 1 to 11 u: dB or dBm
Switching Transients	Carrier Frequency		---	SWPWR?	l	
	Lower	current unit	---	SWPWR? Fn,LOW	l	n: 1 to 11
		designate unit	---	SWPWR? Fn,LOW,u	l	n: 1 to 11 u: dB or dBm
	Upper	current unit	---	SWPWR? Fn,UP	l	n: 1 to 11
		designate unit	---	SWPWR? Fn,UP,u	l	n: 1 to 11 u: dB or dBm

Output RF Spectrum (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Judgment	Modulation	---	TEMPPASS_ACP? MOD	j(1),j(2)...j(n)	n: 1 to 11
	Switching Trans.	---	TEMPPASS_ACP? SWTCH	j(1),j(2)...j(n)	n: 1 to 11
	All	---	TEMPPASS_ACP? ALL	j(a),j(b)	j(a):Modulation Total Judgment j(b):Switching Trans. Total Judgment
Limit	Modulation	---	ACPLMT? MOD	l(1),u(1),l(2),u(2)...l(n),u(n)	n: 1 to 11 u:DB、DBC、DBM
	Switching Trans.	---	ACPLMT? SWTCH	l(1),u(1),l(2),u(2)...l(n),u(n)	n: 1 to 11 u:DB、DBC、DBM
Wave Data / Data Modify		XMB na,nb,nc,nd	XMB? na,nb,nc,ne	nf(1),nf(2),…,nf(ne)	na: 0 to 2 nb: 0 to 12 nc: 0 to 374 nd: –32786 to 32767 ne: 1 to 375 nf: –32786 to 32767

6.7 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	
Storage Mode	Normal	STRG_SPU NRM	STRG_SPU?	NRM	
	Average	STRG_SPU AVG		AVG	
Average Count		AVR_SPU n	AVR_SPU?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_SPU EVERY	INTVAL_SPU?	EVERY	
	Once	INTVAL_SPU ONCE		ONCE	
Preselector	Normal	BAND 0	BAND?	0	Effective only when the option MS8608A-03 /MS2683-03 is installed.
	Spurious	BAND 1		1	
Unit	Auto	UNIT_SPU AUTO	UNIT_SPU?	AUTO	
	dBm	UNIT_SPU DBM		DBM	
	dB	UNIT_SPU DB		DB	
	W	UNIT_SPU WATT		WATT	
View	Judgement	VIEW_SPU JDG	VIEW_SPU?	JDG	a: JDG, BW, REFATTSWT, LVLMEAS *:Spurious Mode: Only when Search
	BW	VIEW_SPU BW		BW	
	Ref,ATT,SWT	VIEW_SPU REFATTSWT		REFATTSWT	
	Level Meas.	VIEW_SPU LVLMEAS (*)		LVLMEAS	
	Change	VIEW_SPU		a	
Waveform Display	Off	WAVEFORM_SPU OFF	WAVEFORM_SPU?	OFF	
	On	WAVEFORM_SPU ON		ON	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Display Table Number	Waveform	WAVETBLNO_SPU Fn	WAVETBLNO_SPU?	Fn	n:1 to 15
		WAVETBLNO_SPU Fn,FREQ			
		WAVETBLNO_SPU Fn,TIME			
Data Point	501	DPTS_SPU 501	DPTS_SPU?	501	
	1001	DPTS_SPU 1001		1001	
Setup Spot Table					
Setup Frequency Table		DSPL SETTBL_SPU,SPOT	DSPL?	SETTBL_SPU,SPOT	
Harmonics		TBLFREQ_SPU SPOT,HRM	---	---	
Frequency		TBLFREQ_SPU SPOT,Fn,f	TBLFREQ_SPU? SPOT,Fn	f	n: 1 to 15 f:(MS2681A) 100Hz to 3.0GHz (MS8608A/MS2683A) 100Hz to7.9GHz (MS8609A) 100Hz to 13.2GHz (MS2687A/B) 100Hz to 30.0GHz
Frequency Cancel		TBLFREQ_SPU SPOT,Fn,0	TBLFREQ_SPU? SPOT,Fn	0	n: 1 to 15
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
Limit		TBLLMT_SPU SPOT,Fn,l,u	TBLLMT_SPU? SPOT,Fn,u	l	n: 1 to 15 u: DBM, MW, UW, NW or DB

Spurious Emission（cont.）

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW		TBLRBW_SPU SPOT,Fn,f	TBLRBW_SPU? SPOT,Fn	f	n: 1 to 15 Detection: When Positive,Negative,Sample, Average f: 300Hz, 1kHz,3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1MHz,3MHz,5 MHz, 10MHz, 20MHz Detection: When RMS f:10Hz,30Hz, 100Hz,300Hz, 1kHz,3kHz, 10kHz,30kHz 100kHz, 300kHz,1MHz
RBW Mode	Auto	TBLRBWMD_SPU SPOT,AUTO	TBLRBWMD_SPU? SPOT	AUTO	
	Manual	TBLRBWMD_SPU SPOT,MAN		MAN	
VBW		TBLVBW_SPU SPOT,Fn,f	TBLVBW_SPU? SPOT,Fn	f	n: 1 to 15 f: 1Hz to 3MHz (1-3 sequence), Off
VBW Mode	Auto	TBLVBWMD_SPU SPOT,AUTO	TBLVBWMD_SPU? SPOT	AUTO	
	Manual	TBLVBWMD_SPU SPOT,MAN		MAN	
RBW/VBW Ratio		TBLVBWRT_SPU SPOT,r	TBLVBWRT_SPU? SPOT	r	r:0.001 to 100

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
SWT		TBLSWT_SPU SPOT,Fn,ta	TBLSWT_SPU? SPOT,Fn	tb	unit:msec(ta) unit: μ sec(tb)
SWT Mode	Auto	TBLSWTMD_SPU SPOT,AUTO	TBLSWTMD_SPU ? SPOT	AUTO	
	Manual	TBLSWTMD_SPU SPOT,MAN		MAN	
Detection	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	
Spot Result	Average	SPOTRSLT_SPU SPOT,AVG	SPOTRSLT_SPU? SPOT	AVG	
	Max	SPOTRSLT_SPU SPOT,MAX		MAX	
Limit	DB	SPULMT SPOT,Fn,l,DB	SPULMT? SPOT,Fn,DB	l	n:1 to 15 l:-100 to 100 (dB,dBm) : 0.001 to 999.999 (MW,UW,NW)
	DBM	SPULMT SPOT,Fn,l,DBM	SPULMT? SPOT,Fn,DBM		
	MW	SPULMT SPOT,Fn,l,MW	SPULMT? SPOT,Fn,MW		
	UM	SPULMT SPOT,Fn,l,UW	SPULMT? SPOT,Fn,UW		
	NM	SPULMT SPOT,Fn,l,NW	SPULMT? SPOT,Fn,NW		
Judge Unit	dBm	JUDGUNIT_SPTBL ON	JUDGUNIT_SPTBL?	ABS	
		JUDGUNIT_SPTBL ABS			
	dB	JUDGUNIT_SPTBL OFF		REL	
		JUDGUNIT_SPTBL REL			
	dB & dBm	JUDGUNIT_SPTBL RELABS		RELABS	
	Watt	JUDGUNIT_SPTBL WATT		WATT	
	dB & Watt	JUDGUNIT_SPTBL RELWATT		RELWATT	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
All Abs Limit Unit	mW	ALL_LMTUNIT_SPU SPOT,MW	---	---	
	μW	ALL_LMTUNIT_SPU SPOT,UW			
	nW	ALL_LMTUNIT_SPU SPOT,NW			
View	BW	TBLVIEW_SPU SPOT,BW	TBLVIEW_SPU? SPOT	BW	a:BW,REFATTSWT,LMTDB, LMTW
	Ref,ATT,SWT	TBLVIEW_SPU SPOT,REFATTSWT		REFATTSWT	
	Limit(dB)	TBLVIEW_SPU SPOT,LMTDB		LMTDB	
	Limit(W)	TBLVIEW_SPU SPOT,LMTW		LMTW	
	Change	TBLVIEW_SPU SPOT		a	
Setup Sweep/Search Table (common setup)					
Setup Sweep Table		DSPL SETTBL_SPU,SWEEP	DSPL?	SETTBL_SPU,SWEEP	
Setup Search Table		DSPL SETTBL_SPU,SEARCH	DSPL?	SETTBL_SPU, SEARCH	
Start Frequency		TBLFREQ_SPU START,Fn,f	TBLFREQ_SPU? START,Fn	f	n: 1 to 15 f: (MS2681A) 1kHz to 2999.999MHz (MS8608A/MS2683A) 1kHz to 7899.999MHz (MS8609A) 1kHz to 13199.999MHz (MS2687A/B) 1kHz to 29999.999MHz

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Start Frequency Cancel		TBLFREQ_SPU START,Fn,0	TBLFREQ_SPU? START,Fn	0	n: 1 to 15
Stop Frequency		TBLFREQ_SPU STOP,Fn,f	TBLFREQ_SPU? STOP,Fn	f	n: 1 to 15 f: (MS2681A) 2MHz to 3000.000MHz (MS8608A/MS2683A) 2kHz to 7900.000MHz (MS8609A) 2MHz to 13200.000MHz (MS2687A/B) 2MHz to 30000.000MHz
Stop Frequency Cancel		TBLFREQ_SPU STOP,Fn,0	TBLFREQ_SPU? STOP,Fn	0	n: 1 to 15
Attenuator Ref Level Mode	Auto	TBLATTRLMD_SPU SWEEP,AUTO	TBLATTRLMD_SPU? SWEEP	AUTO	
	Manual	TBLATTRLMD_SPU SWEEP,MAN		MAN	
Attenuator Mode	Auto	TBLATTMD_SPU SWEEP,AUTO	TBLATTMD_SPU? SWEEP	AUTO	
	Manual	TBLATTMD_SPU SWEEP,MAN		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
Integrated RBW		TBLINTRBW_SPU Fn,f	TBLINTRBW_SPU? Fn	f	n:1 to 15

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW		TBLRBW_SPU SWEEP,Fn,f	TBLRBW_SPU? SWEEP,Fn	f	n: 1 to 15 Detection: when Positive, Negative, Sample, Average f: 300Hz, 1kHz,3kHz, 10kHz, 30kHz, 100kHz, 300kHz, 1MHz,3MHz, 5MHz, 10MHz, 20MHz Detection: When RMS f:10Hz,30Hz, 100Hz,300Hz, 1kHz,3kHz, 10kHz,30kHz 100kHz,300kHz ,1MHz

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW (for Level Measurement)		TBLRBWLM_SPU Fn,f	TBLRBWLM_SPU? Fn	f	n: 1 to 15 Detection: When Positive, Negative, Sample, Average f: 300Hz, 1kHz,3kHz, 10kHz,30kHz, 100kHz, 300kHz, 1MHz,3MHz, 5MHz, 10MHz, 20MHz Detection: When RMS f:10Hz,30Hz, 100Hz,300Hz, 1kHz,3kHz, 10kHz,30kHz 100kHz, 300kHz,1MHz
RBW Mode	Auto	TBLRBWMD_SPU SWEEP,AUTO	TBLRBWMD_SPU? SWEEP	AUTO	
	Manual	TBLRBWMD_SPU SWEEP,MAN		MAN	
VBW		TBLVBW_SPU SWEEP,Fn,f	TBLVBW_SPU? SWEEP,Fn	f	n: 1 to 15 f: 1Hz to 3MHz (1-3 sequence), Off
VBW(for Level Measurement)		TBLVBWLM_SPU Fn,la	TBLVBWLM_SPU? Fn	la	n:1 to 15
VBW Mode	Auto	TBLVBWMD_SPU SWEEP,AUTO	TBLVBWMD_SPU? SWEEP	AUTO	
	Manual	TBLVBWMD_SPU SWEEP,MAN		MAN	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW/VBW Ratio		TBLVBWRT_SPU SWEEP,r	TBLVBWRT_SPU? SWEEP	r	r:0.0001 to 100
SWT		TBLSWT_SPU SWEEP,Fn,ta	TBLSWT_SPU? SWEEP,Fn	tb	unit:m sec(ta) unit: μ sec(tb)
SWT(for Level Measurement)		TBLSWTLM_SPU Fn,ta	TBLSWTLM_SPU? Fn	tb	n:1 to 15 ta:10 to 1000000 (msec) unit: μ sec(tb)
SWT Mode	Auto	TBLSWTMD_SPU SWEEP,AUTO	TBLSWTMD_SPU ? SWEEP	AUTO	
	Manual	TBLSWTMD_SPU SWEEP,MAN		MAN	
Meas. Mode (for Level Measurement)	Sweep Only	TBLLMMD_SPU Fn,OFF	TBLLMMD_SPU? Fn	OFF	n:1 to 15
	Spot	TBLLMMD_SPU Fn,SPOT		SPOT	
Detection/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	
Detection/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	
Spot Result/Serch	Average	SPOTRSLT_SPU SEARCH,AVG	SPOTRSLT_SPU? SEARCH	AVG	
	Max	SPOTRSLT_SPU SEARCH,MAX		MAX	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Limit	dB	SPULMT SWEEP,Fn,l,DB	SPULMT? SWEEP,Fn,DB	l	n:1 to 15 l:-100 to 100 (dB,dBm) : 0.001 to 999.999 (MW,UW,NW)
	dBm	SPULMT SWEEP,Fn,l,DBM	SPULMT? SWEEP,Fn,DBM		
	mW	SPULMT SWEEP,Fn,l,MW	SPULMT? SWEEP,Fn,MW		
	μW	SPULMT SWEEP,Fn,l,UW	SPULMT? SWEEP,Fn,UW		
	nW	SPULMT SWEEP,Fn,l,NW	SPULMT? SWEEP,Fn,NW		
Judge Unit	dBm	JUDGUNIT_SWTBL ON JUDGUNIT_SWTBL ABS	JUDGUNIT_SWTBL?	ABS	
	dB	JUDGUNIT_SWTBL OFF JUDGUNIT_SWTBL REL		REL	
	dB & dBm	JUDGUNIT_SWTBL RELABS		RELABS	
	Watt	JUDGUNIT_SWTBL WATT		WATT	
	dB & Watt	JUDGUNIT_SWTBL RELWATT		RELWATT	
View / Sweep	BW	TBLVIEW_SPU SWEEP,BW	TBLVIEW_SPU? SWEEP	BW	a:BW, REFATTSWT, LMTDB, LMTW
	Ref, ATT, SWT	TBLVIEW_SPU SWEEP,REFATTSWT		REFATTSWT	
	Limit(dB)	TBLVIEW_SPU SWEEP,LMTDB		LMTDB	
	Limit(W)	TBLVIEW_SPU SWEEP,LMTW		LMTW	
	Change	TBLVIEW_SPU SWEEP		a	
Detection (for Level Measurement)	Positive Peak	DETLM_SPU POS	DETLM_SPU?	POS	
	Sample	DETLM_SPU SMP		SMP	
	Negative Peak	DETLM_SPU NEG		NEG	
	Average	DETLM_SPU AVG		AVG	
	RMS	DETLM_SPU RMS		RMS	
Limit		TBLLMT_SPU SWEEP,Fn,l,u	TBLLMT_SPU? SWEEP,Fn,u	l	n: 1 to 15 u: DBM, MW, UW, NW or DB

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
View / Search	RB	TBLVIEW_SPU SEARCH,BW	TBLVIEW_SPU ? SEARCH	BW	a:BW, REFATTSWT, LMTDB, LMTW, LVLMEASMD, LVLMEASSET
	Ref, ATT, SWT	TBLVIEW_SPU SEARCH,REFATTSWT		REFATTSWT	
	Limit(dB)	TBLVIEW_SPU SEARCH,LMTDB		LMTDB	
	Limit(W)	TBLVIEW_SPU SEARCH,LMTW		LMTW	
	Level Meas.Mode	TBLVIEW_SPU SEARCH,LVLMEASMD		LVLMEASMD	
	Level Meas. Set	TBLVIEW_SPU SEARCH,LVLMEASSET		LVLMEASSET	
	Change	TBLVIEW_SPU SEARCH		a	
Standard					
Band	P-GSM900	FREQBAND_SPU PGSM900	FREQBAND_ SPU?	PGSM900	
	E-GSM900	FREQBAND_ SPU EGSM900		EGSM900	
	R-GSM900	FREQBAND_ SPU RGSM900		RGSM900	
	T-GSM380	FREQBAND_SPU TGSM380		TGSM380	
	T-GSM410	FREQBAND_SPU TGSM410		TGSM410	
	T-GSM900	FREQBAND_SPU TGSM900		TGSM900	
	DCS1800	FREQBAND_ SPU DCS1800		DCS1800	
	PCS1900	FREQBAND_ SPU PCS1900		PCS1900	
	GSM450	FREQBAND_ SPU GSM450		GSM450	
	GSM480	FREQBAND_ SPU GSM480		GSM480	
	GSM750	FREQBAND_SPU GSM750		GSM750	
	GSM850	FREQBAND_ SPU GSM850		GSM850	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Select DUT	MS	BANDTRGT_ SPU MS	BANDTRGT_ SPU?	MS	
	BTS	BANDTRGT_ SPU BTS		BTS	
	Micro BTS	BANDTRGT_ SPU MCRBTS		MCRBTS	
	Pico BTS	BANDTRGT_ SPU PCRBTS		PCRBTS	
Select Band	In Band	BNDSTD_SPU IN	BNDSTD_SPU?	IN	
	Out Band	BNDSTD_SPU OUT		OUT	
Absolute Power Reference	None	PWRREFABS_SPU NONE	PWRREFABS_SPU?	NONE	
	Tx Power	PWRREFABS_SPU TXPWR		TXPWR	
	Set	PWRREFABS_SPU SET		SET	
Absolute Power Set Value		PWRVALABS_SPU l	PWRVALABS_SPU?	l	l:-99.99 to 99.99(dBm)
Relative Power Reference	SPA	PWRREFREL_SPU SPA	PWRREFREL_SPU?	SPA	
	Tx Power	PWRREFREL_SPU TXPWR		TXPWR	
	Set	PWRREFREL_SPU SET		SET	
Relative Power Set Value		PWRVALREL_SPU l	PWRVALREL_SPU?	l	l:-99.99 to 99.99(dBm)
Select Setup Reference Power Table	Abs & Rel : Tx Power	TBLREFSTD_SPU 0	TBLREFSTD_SPU?	0	
	Abs & Rel : Set	TBLREFSTD_SPU 1		1	
Span		FSPAN_SETREF_SPU f	FSPAN_SETREF_SPU?	f	(MS2681A) 0 to 2999999000Hz (MS2687B) 0 to 30000000000Hz (MS8608A/MS2683A) 0 to 7899999000Hz (MS8609A) 0 to 13199999000Hz

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW		RBW_SETREF_SPU f	RBW_SETREF_SPU?	f	Detection: When Positive, Negative, Sample, Average f:300Hz,1kHz, 3kHz,10kHz, 30kHz,100kHz, 300kHz, 1MHz,3MHz, 5MHz,10MHz, 20MHz Detection: when RMS f:10Hz,30Hz, 100Hz,300Hz, 1kHz,3kHz, 10kHz,30kHz 100kHz, 300kHz,1MHz
VBW		VBW_SETREF_SPU f	VBW_SETREF_SPU?	f	f: 1Hz to 3MHz (1-3 sequence), Off
Reference Level		RL_SETREF_SPU l	RL_SETREF_SPU?	l	unit: dBm
Attenuator		ATT_SETREF_SPU l	ATT_SETREF_SPU ?	l	l:0 to 62 (2 step)
Attenuator Mode	Auto	ATTMD_SETREF_SPU AUTO	ATTMD_SETREF_SPU?	AUTO	
	Manual	ATTMD_SETREF_SPU MAN		MAN	
Attenuator & Reference Level Mode	Auto	ATTRLMD_SETREF_SPU AUTO	ATTRLMD_SETREF_SPU?	AUTO	
	Manual	ATTRLMD_SETREF_SPU MAN		MAN	

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Sweep Time		SWT_SETREF_SPU ta	SWT_SETREF_SPU?	tb	unit:msec(ta), μ sec(tb)
Detection	Positive Peak	DET_SETREF_SPU POS	DET_SETREF_SPU?	POS	
	Negative Peak	DET_SETREF_SPU NEG		NEG	
	Sample	DET_SETREF_SPU SMP		SMP	
	Average	DET_SETREF_SPU AVG		AVG	
	RMS	DET_SETREF_SPU RMS		RMS	
Data Point	501	DPTS_SETREF_SPU 501	DPTS_SETREF_SPU?	501	
	1001	DPTS_SETREF_SPU 1001		1001	
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: -10.00dB to 10.00dB
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 , 3: Multi carrier calibration) l: –10.00 to 10.00 dB
Results					
Marker Position		MKP_SPU n	MKP_SPU?	n	n: 0 to 500 (DataPoint:501) 0 to 1000 (DataPoint:1001)
Marker Level		---	MKL_SPU? u	l	u: DB,DBM,WATT
Absolute Reference Power		---	SPUPWRABS? u	l	u:DBM,WATT

Spurious Emission（cont.）

Function	Item	Program Message	Query Message	Response Message	Remarks
Relative Reference Power			SPUPWRREL? u	l	u:DBM,WATT
Tx Power		---	TXPWR? u		u:DBM or WATT
Frequency		---	SPUFREQ? Fna,nb	f1,f2,...,fnb	na: 1 to 15 nb: 1 to 15
Level		---	SPULVL? Fna,nb	l1,l2,...,lnb	na: 1 to 15 nb: 1 to 15 u: DBM, DB, WATT
		---	SPULVL? Fna,nb,u	l1,l2,...,lnb	
Frequency and Level		---	SPUFREQLVL? Fna,nb	f1,l1,f2,l2,...,fnb,lnb	na: 1 to 15 nb: 1 to 15 u: DBM, DB, WATT
		---	SPUFREQLVL? Fna,nb,u	f1,l1,f2,l2,...,fnb,lnb	
All		---	SPUALL? Fna,nb,u	fa(1),la(1),j(1), lb(1),lc(1),ld(1), le(1),fb(1),fc(1), t(1),.... ,fa(nb),la(nb), j(nb),lb(nb), lc(nb),ld(nb), le(nb),fb(nb), fc(nb),t(nb)	na: 1 to 15 nb: 1 to 15 u:DBM,DB, WATT
Limit Value for Judgement		---	SPULMTJDG? Fna,nb	l1,l2,…,lnb	na: 1 to 15 nb: 1 to 15
Level Margin		---	SPUMARGIN? Fna,nb	l1,l2,…,lnb	na: 1 to 15 nb: 1 to 15
Judgement	Each	---	SPUPASS? Fn	jn	n:1 to 15
	All		SPUPASS? ALL	j1,j2,j3,...,j15	
Total Judgement		---	SPUJDG?	j	j:PASS,FAIL, OFF

Spurious Emission (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data	Time Domain	---	SPECT_SPUT? Fna,nb,nc	nd(1),nd(2), ...,nd(nc)	na: 1 to 15 nb: (Data Point:501) 0 to 500, (Data Points:1001) 0 to 1000 nc: (Data Point:501) 1 to 501, (Data Points:1001) 1 to 1001 nd: -2147483648 to 2147483647
	Frequency Domain	---	SPECT_SPUF? Fna,nb,ne	nd(1),nd(2), ...,nd(nc)	
	Integral	---	SPECT_SPUI? Fna,nb,ne	nd(1),nd(2), ...,nd(nc)	

6.8 Power Meter

These commands are valid only when this unit is MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Zero Set		ZEROSET	---	---	
		ZAJ	---	---	
Range					
Range Up		RNG UP	---	---	
Range Down		RNG DN	---	---	
Adjust Range		ADJRNG	---	---	
Range1		RNG1	---	---	
Range2		RNG2	---	---	
Range3		RNG3	---	---	
Range4		RNG4	---	---	
Range5		RNG5	---	---	
Set Relative		SETREL	---	---	
Measure result					
Power	dBm	---	POWER? DBM	l	
	W	---	POWER? WATT	l	
	DB	---	POWER? DB	l	

6.9 IQ Level

For MS268x, these commands are available when Option-17, 18 is installed.

Function	Item	Program Message	Query Message	Response Message	Remarks
Storage Mode					
Storage Mode	Normal	STRG_IQL NOR	STRG_IQL?	NRM	
	Average	STRG_IQL AVG		AVG	
Average Count		AVR_IQL Na	AVG_IQL?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_IQL EVERY	INTVAL_IQL?	EVERY	
	Once	INTVAL_IQL ONCE		ONCE	
Unit					
Unit	mV	UNIT_IQL MV	UNIT_IQL?	MV	
	dBmV	UNIT_IQL DBMV		DBMV	

IQ Level (cont.)

Function	Item		Program Message	Query Message	Response Message	Remarks
Result						
Level	All	current unit	---	IQLVL?	la,lb,lc,lb	la: I level lb: Q level lc: Ip-p ld: Qp-p
		mV	---	IQLVL? MV	la,lb,lc,lb	la: I level lb: Q level lc: Ip-p ld: Qp-p
		dBmV	---	IQLVL? DBMV	la,lb,lc,lb	la: I level lb: Q level lc: Ip-p ld: Qp-p
	I	current unit	---	ILVL?	l	
		mV	---	ILVL? MV	l	
		dBm	---	ILVL? DBMV	l	
	Q	current unit	---	QLVL?	l	
		mV	---	QLVL? MV	l	
		dBm	---	QLVL? DBMV	l	
	I p-p	current unit	---	IPPLVL?	l	
		mV	---	IPPLVL? MV	l	
		dBmV	---	IPPLVL? DBMV	l	
	Q p-p	current unit	---	QPPLVL?	l	
		mV	---	QPPLVL? MV	l	
		dBmV	---	QPPLVL? DBMV	l	
Phase	I/Q difference		---	IQPHASE?	r	unit: deg

6.10 Multi Slot Parameter Setup

Function	Item	Program Message	Query Message	Response Message	Remarks
Burst					
Burst	On	BRST_MSPS ON,n	BRST_MSPS? n	ON	n:0 to 7
	Off	BRST_MSPS OFF,n		OFF	n:0 to 7
	All	---	BRST_MSPS? ALL	Sw(1),Sw(2)...Sw(7)	Sw: ON or OFF
	All On	BRSTALLON_MSPS	---	---	
	All Off	BRSTALLOFF_MSPS	---	---	
Training Sequence					
Pattern	TSC 0	PATT_MSPS TSC0,n	PATT_MSPS? n	TSC0	n:0 to 7
	TSC 1	PATT_MSPS TSC1,n		TSC1	
	TSC 2	PATT_MSPS TSC2,n		TSC2	
	TSC 3	PATT_MSPS TSC3,n		TSC3	
	TSC 4	PATT_MSPS TSC4,n		TSC4	
	TSC 5	PATT_MSPS TSC5,n		TSC5	
	TSC 6	PATT_MSPS TSC6,n		TSC6	
	TSC 7	PATT_MSPS TSC7,n		TSC7	
	NO	PATT_MSPS NO,n		NO	
	USER	PATT_MSPS USER,n		USER	
	ALL	---	PATT_MSPS? ALL	Pt(1), Pt (2)... Pt (7)	Pt: Pattern

Multi Slot Parameter Setup (cont.)

Function	Item	Program Message	Query Message	Response Message	Remarks
User Pattern Length	Normal	ULEN_MSPS Sy,n	ULEN_MSPS? n	Sy	Sy: (GMSK) 1symbol to 64symbol (8-PSK) 1symbol to 26symbol n:0 to 7
	All	---	ULEN_MSPS? ALL	Sy1,Sy2...Sy7	Sy: Symbol (GMSK) 1symbol to 64symbol (8-PSK) 1symbol to 26symbol
User Bit Pattern	GMSK	UBIT_MSPS h,n	UBIT_MSPS? n	h	h: 0 to FFFFFFFFFFFFFFFF n:0 to 7
	8-PSK	UBIT_MSPS o,n		o	o: 0 to 7777777777777777777777777 n:0 to 7
	ALL GMSK	---	UBIT_MSPS? ALL	h1,h2...h7	h: 0 to FFFFFFFFFFFFFFFF
	ALL 8-PSK	---	UBIT_MSPS? ALL	o1,o2...o7	o: 0 to 7777777777777777777777777
Start Point	Normal	USTART_MSPS St,n	USTART_MSPS? n	St	St: <<GMSK>> <NB,SB>0 symbol to (147 –User Pattern Length) symbol <AB>0 symbol to (87 – User Pattern Length) symbol <<8-PSK>> 0 symbol to (147– User Pattern Length) symbol n:0 to 7
	ALL	---	USTART_MSPS? ALL	St1,St2...St7	St: <<GMSK>> <NB,SB>0 symbol to (147 –User Pattern Length) symbol <AB>0 symbol to (87 – User Pattern Length) symbol <<8-PSK>> 0 symbol to (147– User Pattern Length) symbol

Section 7 Command Detail

This Section the details of device messages and response messages used in the MX268*02A/MX860*02A GSM Measurement Software in alphabetical order.For the list of these messages, see Section 6 Command List.

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7.1 How To Read the Detailed Description of Commands

Example: Setting impedance

IQ INZ [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 a [5]

Impedance

a	Impedance	Initial value
50	50 Ω	*
1 M	1 MΩ	

■ Constraints [6]

Can not be set when Terminal is other than IQ-AC, IQ-DC or IQ-Balance.

■ Initialization of setting [7]

*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 time

[4] Outline of Setup/Recall function in Program Message and Query message.

[5] Description of lower-case letters in table [3].

In case of set value; each argument includes the meaning of set item, initial value, range, resolution and constraints.

In case of Response Message, each argument include the meaning of output data, resolution, unit, etc.

[6] Description of constraints and precautions in using the command. The command is not properly set or recalled if these constraints are not met.

[7] A Program Message that initialized the items set by this command.

[8] An example of command use. The example of <Program> is given here only to show the example 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.

ACPLMT

Limit Level for Output RF Spectrum

Program Message	Query Message	Response Message
---	ACPLMT? *a*	*b(1),c(1),b(2)c(2),…,b(n),c(n)*

■Function

Executes the package acquisition of a Limit value and its unit on the Output RF Spectrum screen.

■Value *a*

Selects the measure method

a	Measure Method
MOD	The package acquisition of a Limit value of Modulation is executed.
SWTCH	The package acquisition of a Limit value of Switching Trans is executed.

■Value *b(n)*

Resolution	Unit
0.01	dB,dBc or dBm

■Value *c(n)*

c	Unit
DB	dB
DBC	dBc
DBM	dBm

■Constraints

・The output data will change by change of Measure Range in the Output RF Spectrum screen.

・The data of frequency band without Limit is output as ”------”.

■Application Example

"For PCS1900-BTS at 1.8MHz measurement, read out the Limit value of Switching Trans. "

<Program>

TERM RF
FREQBAND PCS1900
BANDTRGT BTS
DSPL ADJ,HIGH
STANDARD_ACP PCS1900BTS43
ACPLMT? SWTCH

<Response>

------,DB,------,DB,------,DB,-21.00,DBM,-26.00,DBM,-26.00,DBM,-26.00,DBM,-32.00,DBM,-32.00,DBM,-32.00,DBM,-36.00,DBM,-36.00,DBM-36.00,DBM

ADJRNG

Adjust Range

Program Message	Query Message	Response Message
ADJRNG	---	---

■ Function

Optimizes internal ATT and A/D levels

■ Application Example

“Optimized internal the measurement range.”

<Program>
ADJRNG

ALL_LMTUNIT_SPU

Unit of all Limit(W) for Spurious Emission

Program Message	Query Message	Response Message
ALL_LMTUNIT_SPU a,b	ALL_LMTUNIT_SPU? *a*	b

■Function
Unit of all Limit(W) for Spurious Emission
Sets the unit of Limit(W) for all measurement points on the Spurious Emission measurement.

■Value a
Selects the measure method

a	Measure Method
SPOT	Unit of Limit(W) of all the measurement points in Spot measurement
SWEEP	Unit of Limit(W) of all the measurement points in Search or Sweep measurement

■Value b
Unit of Limit(W)

b	Unit	Initial Value
MW	mW	∗
UW	μW	
NW	nW	

■Initialization command
PRE,INI,IP,∗RST

■Application Example
Sets the Unit of Limit(W) of all the measurement points in Spot measurement to μW.

<Program>
DSPL SPURIOUS,SPOT
ALL_LMTUNIT_SPU SPOT,UW

ARFCNFIRST

ARFCN_FIRST

Program Message	Query Message	Response Message
ARFCNFIRST *a*	ARFCNFIRST?	*a*

■Function

Sets the ARFCN_FIRST(x).

■Value *a*

ARFCN_FIRST(x)

Range	Resolution	Initial value
0 to 1023	1	0

■Initialization command

PRE,INI,IP,＊RST

■Constraints

・Cannot be set when Terminal is other than RF.

・Can be set when Band is T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900, GSM750.

■Application Example

"Sets the ARFCN_FIRST(x) to 1."

<Program>

DSPL SETCOM

TERM RF

FREQBAND TGSM380

ARFCNFIRST 1

ARFCNFIRST?

<Response>

1

ARFCNRANGE

ARFCN_RANGE

Program Message	Query Message	Response Message
ARFCNRANGE *a*	ARFCNRANGE?	*a*

■Function
Sets the ARFCN_RANGE(z).

■Value *a*

Band	Range	Resolution	Initial value
T-GSM380	0 to (48-BAND_OFFSET)	1	48
T-GSM410	0 to (48-BAND_OFFSET)		48
T-GSM900	0 to (28-BAND_OFFSET)		28
DCS1800	0 to (373-BAND_OFFSET)		373
PCS1900	0 to (298-BAND_OFFSET)		298
GSM750	0 to (73-BAND_OFFSET)		73

Refer to the BAND_OFFSET:BANDOFFSET

■Initialization command
PRE,INI,IP,＊RST

■Constraints
・Cannot be set when the Terminal is other than RF.
・Can be set when Band is T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900, GSM750.

■Application Example
"Sets the ARFCN_RANGE(z) to 1."

<Program>
DSPL SETCOM
TERM RF
FREQBAND TGSM380
BANDOFFSET 0
ARFCNRANGE 1
ARFCNRANGE?

<Response>
1

ATT_SETREF_SPU

Attenuator for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
ATT_SETREF_SPU a	ATT_SETREF_SPU?	a

■Function
Sets the Attenuator at the time of measuring the Reference Power of Spurious Emission by the Spectrum method.

■Value a
Attenuator

Range	Resolution	Unit
0 to 62（Note1）	2	dB

Note1:Setup Range of Attenuator is changed based on the Reference Level (refer to RL_SETREF_SPU)
□Suffix code
None:dB
DB :dB

■Initialization command
PRE,INI,IP,＊RST

■Constraints
・ Relative Power Reference is set to SPA only（refer to PWRREFREL_SPU）

■Application Example
Sets the Attenuator to 20dB

<Program>
PWRREFREL_SPU SPA
ATTMD_SETREF_SPU AUTO
RL_SETREF_SPU -30DBM
ATT_SETREF_SPU 20DB
ATT_SETREF_SPU?

<Response>
20

ATTMD_SETREF_SPU

Attenuator Mode: Manual/Auto for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
ATTMD_SETREF_SPU a	ATTMD_SETREF_SPU?	a

■Function

Sets whether the Attenuator for Spectrum Analyzer is set automatically or manually on the Setup Reference Power screen. The value of Attenuator is automatically set when the setting mode is Auto.

■Value a

Attenuator setting mode

a	Mode	Initial Value
MAN	Sets the Attenuator setting mode to Manual mode	
AUTO	Sets the Attenuator setting mode to Automatic mode	*

■Initialization command

PRE,INI,IP,*RST

■Constraints

- If Attenuator is changed when the setting mode is set to Auto, the setting is forcibly switched to Manual.

■Application Example

Sets the Attenuator setting mode to Auto mode

<Program>
ATTMD_SETREF_SPU AUTO
ATTMD_SETREF_SPU?

<Response>
AUTO

ATTRLMD_SETREF_SPU

Attenuator, Ref Level Mode: Manual/Auto for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
ATTRLMD_SETREF_SPU a	ATTRLMD_SETREF_SPU?	a

■Function

Sets whether the Attenuator for Spectrum Analyzer is set Automatically or Manually on the Setup Reference Power screen. Ref Level and the value of Attenuator are automatically set when the setting mode is Auto.

■Value a

Attenuator and Ref Level setting mode

a	Mode	Initial Value
MAN	Sets the Attenuator and Ref Level setting mode to Manual mode	
AUTO	Sets the Attenuator and Ref Level setting mode to Automatic mode	*

■Initialization command

PRE, INI, IP, *RST

■Constraints

- If Attenuator or Ref Level is changed when the setting mode is set to Auto, the setting is forcibly switched to Manual.

■Application Example

Sets the Attenuator or Ref Level setting mode to Auto mode

<Program>
ATTRLMD_SETREF_SPU AUTO
ATTRLMD_SETREF_SPU?

<Response>
AUTO

AVR_ADJ

Average count for Output RF Spectrum

Program Message	Query Message	Response Message
AVR_ADJ *a*	AVR_ADJ?	*a*

■ Function

Sets the average (measurement) count on the Output RF Spectrum screen obtained when the Storage Mode is set to Average.

■ Value a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting Average Count at 500."

<Program>
MEAS ADJ, HIGH
AVR_ADJ 500
AVR_ADJ?

<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 obtain when the Storage Mode is set to Average.

■ Value a

Measuring (average) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting Average Count at 50."

<Program>
DSPL IQLVL
STRG_IQL AVG
AVR_IQL 50
AVR_IQL?
SNGLS

<Response>
50

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 obtained when Storage Mode is set to Average.

■ Value a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

" Sets Average Count at 500."

<Program>
MEAS MODANAL
AVR_MOD 500
AVR_MOD?

<Response>
500

AVR_RFPWR

Average Count for Modulation analysis

Program Message	Query Message	Response Message
AVR_RFPWR *a*	AVR_RFPWR?	*a*

■ Function

Sets the average (measurement) count on the RF Power screen obtained when the Storage Mode is Average at RF Power measurement.

■ Value a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Setting of initialization

PR, INI, IP, *RST

■ Application Example

"Sets Average Count at 500."

<Program>
MEAS RFPWR
AVR_RFPWR 500
AVR_RFPWR?

<Response>
500

AVR_SPU

Average Count for Spurious Emission

Program Message	Query Message	Response Message
AVR_SPU a	AVR_SPU?	a

■Function

Sets the average (measurement) count (number of averaging processes) when Storage mode is set to Average at spurious emission measurement.

■Value a

Average (measurement) count

Range	Resolution	Initial Value
2to9999	1	10

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

“Set Average Count to 500."

<Program>
DSPL SPURIOUS,SPOT
STRG_ SPU AVG
AVR_SPU 500
AVR_SPU?

<Response>
500

BAND

Preselector for Spurious Emission

Program Message	Query Message	Response Message
BAND a	BAND?	a

■Function

Sets whether the signal path for Preselector is used or not at Spurious Emission measurement.

■Value of a

Path selection

a	Path selection	Initial Value
0	Path of Preselector is not used（Normal）	＊
1	Path of Preselector is used（Spurious）	

■Initialization command

PRE,INI,IP,＊RST

■Application Example

"Uses path of Preselector."

<Program>
BAND 1
BAND?

<Response>
1

■Note

This function is option.
It is not enabled to use when Preselector low limit extended option of MS8608A-03 or MS2683A-03 is not effective.

BANDOFFSET

BAND_OFFSET

Program Message	Query Message	Response Message
BANDOFFSET *a*	BANDOFFSET?	*a*

■Function

Sets the BAND_OFFSET(y).

■Value *a*

Band	Range	Resolution	Initial value
T-GSM380	0 to 48	1	0
T-GSM410	0 to 48		
T-GSM900	0 to 28		
DCS1800	0 to 373		
PCS1900	0 to 298		
GSM750	0 to 73		

Max: Bandwidth ÷ 200kHz

■Initialization command

PRE,INI,IP,＊RST

■Constraints

・Cannot be set when the Terminal is other than RF.

・Can be set when Band is T-GSM380, T-GSM410, T-GSM900, DCS1800, PCS1900, GSM750.

■Application Example

"Sets the BAND_OFFSET(y) to 1."

<Program>

```
DSPL SETCOM
TERM RF
FREQBAND TGSM380
BANDOFFSET 1
BANDOFFSET?
```

<Response>

1

BANDTRGT

Select DUT

Program Message	Query Message	Response Message
BANDTRGT *a*	BANDTRGT?	*a*

■Function

Sets the target DUT on the Setup Common Parameter screen.

■Value *a*

Type of Station

a	Type of Station	Initial value
MS	Sets the MS.	*
BTS	Sets the BTS.	
MCRBTS	Sets the Micro BTS.	
PCBTS	Sets the Pico BTS.	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Cannot be set when the Terminal is other than RF.
- Cannot be set when the Band is Free.

■Application Example

"Sets the target DUT to BTS."

<Program>
TERM RF
FREQBAND RGSM900
BANDTRGT BTS
BANDTRGT?

<Response>
BTS

BANDTRGT_ACP

Select DUT for Output RF Spectrum

Program Message	Query Message	Response Message
BANDTRGT_ACP *a*	BANDTRGT_ACP?	*a*

■Function

When the Band at the Setup Common Parameter screen is set to the Free, sets the target DUT of Output RF Spectrum-specific.

■Value *a*

Type of Station

a	Type of Station	Initial value
MS	Sets the MS.	∗
BTS	Sets the BTS.	
MCRBTS	Sets the Micro BTS.	
PCBTS	Sets the Pico BTS.	

■Initialization command

PRE, INI, IP, ∗RST

■Constraints

・ Cannot be set when the Band at the Setup Common Parameter screen is other than Free.

■Application Example

"Sets the target DUT of Output RF Spectrum-specific to the BTS."

```
<Program>
TERM RF
FREQBAND FREE
DSPL ADJ,HIGH
BANDTRGT_ACP BTS
BANDTRGT_ACP?

<Response>
BTS
```

BANDTRGT_SPU

Select DUT for Setup Search/Sweep Table

Program Message	Query Message	Response Message
BANDTRGT_SPU *a*	BANDTRGT_SPU?	*a*

■Function

When the Band at the Setup Common Parameter screen is set to the Free, sets the target DUT of Setup Search/Sweep Table-specific.

■Value *a*

Type of Station

a	Type of Station	Initial value
MS	Sets the MS.	＊
BTS	Sets the BTS.	
MCRBTS	Sets the Micro BTS.	
PCBTS	Sets the Pico BTS.	

■Initialization command

PRE, INI, IP, ＊RST

■Constraints

・ Cannot be set when the Band at the Setup Common Parameter screen is other than the Free.

■Application Example

"Sets the target DUT of the Setup Search/Sweep Table-specific to the BTS."

<Program>
TERM RF
FREQBAND FREE
DSPL SETTBL_SPU,SWEEP
BANDTRGT_SPU BTS
BANDTRGT_SPU?

<Response>
BTS

BRSTALLOFF_MSPS

Burst switch all off

Program Message	Query Message	Response Message
BRSTALLOFF_MSPS	---	---

■Function

Sets all the Burst Switch other than Slot0 at the Multi Slot Parameter Setup screen to OFF.

■Application Example

“Sets all the Burst other than Slot0 to OFF.”

<Program>
MEASOBJ NBMS
DSPL MSPS
BRSTALLOFF_MSPS

BRSTALLON_MSPS

Burst switch all on

Program Message	Query Message	Response Message
BRSTALLON_MSPS	---	---

■Function

Sets all the Burst Switch of the Multi Slot Parameter Setup screen to ON.

■Application Example

“Sets all the Burst to ON.”

<Program>
MEASOBJ NBMS
DSPL MSPS
BRSTALLON_MSPS

BRST_MSPS

Burst Switch

Program Message	Query Message	Response Message
BRST_MSPS *a,b*	BRST_MSPS? *b*	*a*

■Function

Sets the Burst Switch of specified Slot on the Multi Slot Parameter Setup screen.

■Value *a*

a	On/Off of Burst	Initial value
ON	Sets the Burst of specified Slot to ON.	*
OFF	Sets the Burst of specified Slot to OFF.	

■Value *b*

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets the Burst of Slot2 to ON."

<Program>
MEASOBJ NBMS
DSPL MSPS
BRST_MSPS ON,2
BRST_MSPS? 2

<Response>
ON

BRSTOFFDAT

Burst Off Data

Program Message	Query Message	Response Message
BRSTOFFDAT *a*	BRSTOFFDAT?	*a*

■Function

Sets the data in Burst Off intervals on the Setup Common Parameter screen.

■Value *a*

Burst Off Data

A	Burst Off Data	Initial Value
ALL0	Sets the data in Burst Off intervals to All0.	
ALL1	Sets the data in Burst Off intervals to All1.	*
AUTO	Auto-detects the data in Burst Off intervals.	

■Constraints

- Can be set only when the Modulation Type is set to GMSK.
- Can be set except when the Measuring Object is Continuous.

■Setting initialization

PRE, INI, IP, *RST

■Application Example

"Setting a value of Burst Off Data to Auto."

<Program>
TERM RF
MODTYPE GMSK
MEASOBJ NB
BRSTOFFDAT AUTO
BRSTOFFDAT?

<Response>
AUTO

BS

Back Screen

Program Message	Query Message	Response Message
BS	---	---

■ Function

Switches the current displayed screen to the previous one.

■ Application Example

“Shifting to the upper screen.”

<Program>
BS

CALCANCEL

Power Calibration Cancel

Program Message	Query Message	Response Message
CALVAL *a*	---	---

■ Function

Cancels Power Calibration and resets the calibration value to 0.00.

■ Application Example

"Canceling Power Calibration"

<Program>
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 by the Power Calibration.

■ Value 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 b

Type of calibration

Value	Type of calibration	Initial value
0	Yet to be calibration	*
1	Internal calibration	
2	External calibration	
3	Multi carrier calibration	

■ Setting initialization

<Preset + Power On>

■ Application Example

"Setting the calibration value at 5 dB."

<Program>
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 a

Carrier frequency

Resolution	Unit
0.1	Hz

■ Application Example

"Reading out the carrier frequency."

<Program>
MEAS MODANAL
CARRF?

<Response>
890199998.8

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 a

Output unit

a	Output Unit
None	Hz
HZ	Hz
PPM	ppm

■ Value b

Frequency error

Resolution	Unit (Depends on an alternative selected in a.)
0.1	Hz
0.001	ppm

■ Application Example

"Reading out the carrier frequency error."

<Program>
MEAS MODANAL
CARRFERR? HZ

<Response>
–14.5

CHAN

Channel

Program Message	Query Message	Response Message
CHAN *a*	CHAN?	*a*

■ Function

Sets the channel on the Setup Common Parameter screen.

■ Value a

Channel

Range	Resolution	Initial value
0 to 20000	1	1

■ Constraints

- No setting is allowed when the terminal is other than RF.
- When the value representing Channel Spacing causes the frequency to go beyond the setting range, the channel cannot be changed even within the setting range of the channel.

■ Setting initialization

*RST

■ Application Example

"Setting the channel to 5."

<Program>
TERM RF
CHAN 5
CHAN?

<Response>
5

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

Range	Resolution	Initial value
0 to 20000	1	1

■ Value b

Carrier frequency

Range	Resolution	Initial value	Unit	Remarks
100 to 7800000000	1	890200000	Hz	For MS8608A
100 to 13200000000	1	890200000	Hz	For MS8609A
100 to 3000000000	1	890200000	Hz	For MS2681A
100 to 13200000000	1	890200000	Hz	For MS2683A
100 to 30000000000	1	890200000	Hz	For MS2687A/B

□Suffix code

None : Hz
DB : Hz
KHZ,KZ : kHz
MHZ,MZ: MHz
GHZ,GZ : GHz

■ Constraints

- No setting is allowed when the terminal is one other than RF.
- Cannot be set when the Band is other than the Free.

■ Setting initialization

*RST

■ Application Example

"Setting carrier frequency of Channel 2 to 1 GHz"

<Program>

```
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 inter-channel frequency band on the Setup Common Parameter screen.

■ Value a

Inter-channel frequency band

Range	Resolution	Initial value	Unit
-10000000000 to 10000000000	1	1	Hz

□Suffix code

None : Hz
DB : Hz
KHZ,KZ : kHz
MHZ,MZ: MHz
GHZ,GZ : GHz

■ Constraints

- Cannot be set when the terminal is other than RF.

■ Setting initialization

*RST

■ Application Example

"Setting the inter-channel frequency band to 300 kHz."

<Program>
TERM RF
CHAN 1
FREQ 400MHZ
CHSPC 300KHZ
CHSPC?
CHAN 2
FREQ?

<Response>
300000
400300000

CONTS

Continuous Sweep

Program Message	Query Message	Response Message
CONTS	---	---

■ Function

Executing continuous sweep.

■ Application Example

“Executing continuous 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 a

Correction data table

Value	Correction Data Table	Initial value
0	No data correction is carried out.	*
1	Table 1	
2	Table 2	
3	Table 3	
4	Table 4	
5	Table 5	

■ Setting initialization

*RST

■ Application Example

“Selecting Correction Data Table 3.”

<Program>

CORR 3

CORR?

<Response>

3

DET_SPU

Detection Mode

Program Message	Query Message	Response Message
DET_SPU a,b	DET_SPU? a	b

■Function

Sets the Detection mode at Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	Detection mode for use at Spot measurement
SEARCH	Detection mode for use at Search measurement
SWEEP	Detection mode for use at Sweep measurement

■Value b

Detection Mode

b	Detection Mode	Initial Value
POS	Sets the Detection mode to Positive Peak Sets the maximum value that is in one sampling time as data of the point	
NEG	Sets the Detection mode to Negative Peak Sets the minimum value that is in one sampling time as data of the point	
SMP	Sets the Detection mode to Sample Sets the data of instant as data of the point when hard ware performs sampling process	
AVG	Sets the Detection mode to Average Sets the average value that is in between sample point as data of the point	*
RMS	Sets the Detection mode to RMS Sets the RMS value that is in between sample point as data of the point	

■Initialization command

PRE, INI, IP, *RST

■Application Example

Sets the Detection mode of Sweep method to Positive Peak

<Program>

DET_SPU SWEEP,POS

DET_SPU? SWEEP

<Response>

POS

■Note

RMS is option.

DETLM_SPU

Detection Mode (Level Measure)

Program Message	Query Message	Response Message
DETLM_SPU a	DETLM_SPU?	a

■Function

Spurious Mode of Spurious Emission Measurement: Sets the Detection mode for Spurious amplitude measurement at the time of Search.

■Value a

Detection Mode

a	Detection Mode	Initial Value
POS	Sets the Detection mode to Positive Peak Sets the maximum value that is in one sampling time as data of the point	
NEG	Sets the Detection mode to Negative Peak Sets the minimum value that is in one sampling time as data of the point	
SMP	Sets the Detection mode to Sample Sets the data of instant as data of the point when hard ware performs sampling process	
AVG	Sets the Detection mode to Average Sets the average value that is in between sample point as data of the point	*
RMS	Sets the Detection mode to RMS Sets the RMS value that is in between sample point as data of the point	

■Initialization command

PRE, INI, IP, *RST

■Application Example

“Sets the Detection mode of Sweep method to Positive Peak.”

<Program>
DETLM_SPU POS
DETLM_SPU?

<Response>
POS

■Note

RMS is option.

DET_SETREF_SPU

Detection Mode (Setup Reference Power)

Program Message	Query Message	Response Message
DET_SETREF_SPU a	DET_SETREF_SPU?	a

■Function

Sets the Detection mode at the time of measuring the Reference Power of Spurious Emission measurement by the Spectrum method.

■Value a

Detection Mode

a	Detection Mode	Initial Value
POS	Sets the Detection mode to Positive Peak Sets the maximum value that is in one sampling time as data of the point	
NEG	Sets the Detection mode to Negative Peak Sets the minimum value that is in one sampling time as data of the point	
SMP	Sets the Detection mode to Sample Sets the data of instant as data of the point when hard ware performs sampling process	
AVG	Sets the Detection mode to Average Sets the average value that is in between sample point as data of the point	*
RMS	Sets the Detection mode to RMS Sets the RMS value that is in between sample point as data of the point	

■Initialization command

PRE,INI,IP,*RST

■Application Example

"Sets the Detection mode of Reference Power measurement to Positive Peak."

<Program>
DET_SETREF_SPU POS
DET_SETREF_SPU?

<Response>
POS

■Note

RMS is option.

DPTS_SETREF_SPU

Data Points (Setup Reference Power)

Program Message	Query Message	Response Message
DPTS_SETREF_SPU a	DPTS_SETREF_SPU?	a

■Function

Sets and reads out the number of Sweep data at the time of measuring the Reference Power of Spurious Emission by the Spectrum method.

■Value a

Number of Data

a	Number of Data	Initial value
501	Sets the number of the Sweep data to 501 point	*
1001	Sets the number of the Sweep data to 1001 point	

■Initialization command

PRE,INI,IP,*RST

■Application Example

“Read out the number of Sweep data of Reference Power measurement.”

<Program>
DPTS_SETREF_SPU 501
DPTS_SETREF_SPU?

<Response>
501

DPTS_SPU

Data Points

Program Message	Query Message	Response Message
DPTS_SPU a	DPTS_SPU?	a

■Function
Sets and reads out the number of Sweep data of Spectrum Analyzer on the Spurious Emission screen.

■Value a
Number of Data

a	Number of Data	Initial Value
501	Sets the number of the Sweep data to 501 point	*
1001	Sets the number of the Sweep data to 1001 point	

■Initialization command
PRE, INI, IP, *RST

■Application Example
"Read out the number of Sweep data of Spectrum Analyzer."

<Program>
DSPL SETTBL_SPU,SPOT
DPTS_SPU SPOT 501
DPTS_SPU? SPOT

<Response>
501

DSPL

Switch Screen

Program Message	Query Message	Response Message
DSPL *a,b* DSPL *a*	DSPL?	*a,b*

■ Function

Sets the measurement screen and measurement method, but does not start a measurement.

■ Values a and b

a: Name of the measurement screen

b: Measuring method/Type of template

a	b	Name of the measurement screen	Measuring method/ Type of template	Initial value	Input Terminal
SETCOM	---	Setup Common Parameter	---	*	RF IQ-DC IQ-AC IQ-Balance
MODANAL	---	Modulation Analysis	---		
RFPWR	---	RF Power	---		
SETTMP_RFPWR	---	Setup Template for RF Power			
SETTEMP*					
MSPS	---	Multi Slot Parameter Setup	---		
ADJ	HIGH	Output RF Spectrum	High Speed		RF
SETTBL_ACP	---	Setup Output RF Spectrum	---		
SPURIOUS	SPOT	Spurious Emission	Spot		
	SEARCH		Search		
	SWEEP		Sweep		
SETTBL_SPU	SPOT	Setup Frequency Table for Spurious Emisstion	Spot		
	SWEEP		Sweep		
	SEARCH		Search		
RELPWRREF	---	Setup Reference Power	---		
PWRMTR	---	Power Meter	---		
IQLVL	---	IQ Level	---		IQ-DC,IQ-AC IQ-Balance

* The response message to the program message “DSPL SETTEMP” is “SETTEMP_RFPWR.”

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

[1] “Shifting to the Modulation Analysis screen.”

<Program>
DSPL MODANAL
DSPL?

<Response>
MODANAL

[2] “Shifting to sweep measurement on the Spurious Emission screen.”

<Program>
DSPL SPURIOUS, SWEEP
DSPL?

<Response>
SPURIOUS, SWEEP

EVM95PCT

95:th percentile EVM

Program Message	Query Message	Response Message
----	EVM95PCT?	*a*

■ Function

Outputs the measured results of 95:th percentile EVM on the Modulation Analysis screen.

■ Value a

95:th percentile EVM

Resolution	Unit
1	1

■ Application Example

"Reading out the measurement of 95:th percentile EVM"

<Program>
DSPL MODANAL
SWP
EVM95PCT?

<Response>
−34.33

FILTER

Filter

Program Message	Query Message	Response Message
FILTER *type*	FILTER?	*type*

■ Function

Sets filter processing on the Modulation Analysis screen performed when the modulation type is set to 8-PSK.

■ Value a

Filter processing and type

Value	Filter processing and Type	Initial Value
NON	No filter processing is carried out.	
NYQST	Root Nyquist filter.	
NYQSTINVS	Root Nyquist filter and inverse filter.	
SPEC	GSM filter processing using a measurement filter for 90 kHz	*

■ Setting initialization

PRE, INI, IP, *RST

■ Constraints

- Setting is allowed only when the modulation type is set at 8-PSK.

■ Application Example

"Carrying out filter processing using the root Nyquist filter."

<Program>
MODTYPE 8PSK
MEAS MODANAL
FILTER NYQST
FILTER?

<Response>
NYQST

FREQ

Frequency

Program Message	Query Message	Response Message
FREQ *a*	FREQ?	*a*

■ Function

Sets the carrier frequency for the frequency to be measured on the Setup Common Parameter screen.

■ Value a

Carrier frequency

Range	Resolution	Initial value	Unit	Remarks
100 to 7800000000	1	890200000	Hz	For MS8608A
100 to 13200000000	1	890200000	Hz	For MS8609A
100 to 3000000000	1	890200000	Hz	For MS2681A
100 to 13200000000	1	890200000	Hz	For MS2683A
100 to 30000000000	1	890200000	Hz	For MS2687A/B

□Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHz, GZ: GHz

■ Constraints

- Cannot be set when the terminal is one other than RF.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

“Setting the carrier frequency to 1 GHz.”

<Program>

TERM RF

FREQ 1GHZ

FREQ?

<Response>

1000000000

FREQBAND

Band

Program Message	Query Message	Response Message
FREQBAND *a*	FREQBAND?	*a*

■Function

Sets the Band on the Setup Common Parameter screen.

■Value *a*

Type of Band

a	Type of Band	Initial value
FREE	Sets the Band Free.	*
PGSM900	Sets the P-GSM900.	
EGSM900	Sets the E-GSM900.	
RGSM900	Sets the R-GSM900.	
TGSM380	Sets the T-GSM380.	
TGSM410	Sets the T-GSM410.	
TGSM900	Sets the T-GSM900.	
DCS1800	Sets the DCS1800.	
PCS1900	Sets the PCS1900.	
GSM450	Sets the GSM450.	
GSM480	Sets the GSM480.	
GSM750	Sets the GSM750.	
GSM850	Sets the GSM850.	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Cannot be set when the Terminal is other than RF.

■Application Example

"Sets the Band to R-GSM900. "

<Program>
TERM RF
FREQBAND RGSM900
FREQBAND?

<Response>
RGSM900

FREQBAND_ACP

Band

Program Message	Query Message	Response Message
FREQBAND_ACP *a*	FREQBAND_ACP?	*a*

■Function

Sets the Band on the Output RF Spectrum screen.

■Value *a*

Type of Band

a	Type of Band	Initial value
PGSM900	Sets the P-GSM900.	*
EGSM900	Sets the E-GSM900.	
RGSM900	Sets the R-GSM900.	
TGSM380	Sets the T-GSM380.	
TGSM410	Sets the T-GSM410.	
TGSM900	Sets the T-GSM900.	
DCS1800	Sets the DCS1800.	
PCS1900	Sets the PCS1900.	
GSM450	Sets the GSM450.	
GSM480	Sets the GSM480.	
GSM750	Sets the GSM750.	
GSM850	Sets the GSM850.	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Cannot be set when the Terminal is other than RF.
- Cannot be set when the Band on the Setup Common Parameter screen is other than the Free.

■Application Example

"Sets the Band on the Output RF Spectrum screen to R-GSM900."

<Program>
TERM RF
FREQBAND FREE
DSPL ADJ,HIGH
FREQBAND_ACP RGSM900
FREQBAND_ACP?

<Response>
RGSM900

FREQBAND_SPU

Band

Program Message	Query Message	Response Message
FREQBAND_SPU *a*	FREQBAND_SPU?	*a*

■Function

Sets the Band on the Setup Search/Sweep Table screen.

■Value *a*

Type of Band

a	Type of Band	Initial value
PGSM900	Sets the P-GSM900.	*
EGSM900	Sets the E-GSM900.	
RGSM900	Sets the R-GSM900.	
TGSM380	Sets the T-GSM380.	
TGSM410	Sets the T-GSM410.	
TGSM900	Sets the T-GSM900.	
DCS1800	Sets the DCS1800.	
PCS1900	Sets the PCS1900.	
GSM450	Sets the GSM450.	
GSM480	Sets the GSM480.	
GSM750	Sets the GSM750.	
GSM850	Sets the GSM850.	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Cannot be set when the Terminal is other than RF.
- Cannot be set when the Band on the Setup Common Parameter screen is other than the Free.

■Application Example

"Sets the Band on the Setup Search Table screen to R-GSM900."

```
<Program>
TERM RF
FREQBAND FREE
DSPL SETTBL_SPU,SEARCH
FREQBAND_SPU RGSM900
FREQBAND_SPU?

<Response>
RGSM900
```

FSPAN_SETREF_SPU

Frequency Span for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
FSPAN_SETREF_SPU a	FSPAN_SETREF_SPU?	a

■Function

Sets the Frequency span at the time of measuring the Reference Power of Spurious Emission by the Spectrum method.

■Value a

Sweep Frequency Span

Range	Resolution	Initial Value	Unit	Remarks
0to7899999000	1	0	Hz	When MS8608A/MS2683
0to13199999000				When MS8609A
0to2999999000				When MS2681A
0to29999999000				When MS2687B

□Suffix code

None : Hz
HZ : Hz
KHZ,KZ : kHz
MHZ,MZ : MHz
GHZ,GZ : GHz

■Initialization command

PRE, INI, IP, *RST

■Application Example

“Sets the Span at Reference Power of Spurious Emission to 10MHz.”

<Program>
FSPAN_SETREF_SPU 10MHZ
FSPAN_SETREF_SPU?

<Response>
10000000

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 a

Readout unit

a	Readout unit
None	Existing setting unit
MV	mV
DBMV	dBmV

■ Value b

RMS value of Signal I

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

“Reading out the RMS value of Level I.”

<Program>
MEAS IQLVL
ILVL? MV

<Response>
1.42

INI

Initialize

Program Message	Query Message	Response Message
INI	---	---

■ Function

Initializes all the measurement control parameters that need to be initialization. This function has the same effect as the PRE and IP commands.

■ Application Example

"Initializes the parameters that need to be initialization."

<Program>
INI

INTPOL

Interpolation for Constellation

Program Message	Query Message	Response Message
INTPOL *a*	INTPOL?	*a*

■ Function

Sets the interpolation display on the Modulation Analysis screen obtained when Trace Format is set at Constellation.

■ Value a

Interpolation display

a	Interpolation mode	Initial value
NON	Non: Displays only the symbol point.	*
LIN	Linear: Displays the linearly interpolated symbol point.	
POINT10	10points: Displays the interval between the symbol points among 10 segments.	
LINSYM	Linear & Symbol Position: Displays the symbol point and the linearly interpolated symbol point.	
P10SYM	10points & Symbol Position: Displays the symbol point and the interval between symbol points interpolated among 10 segments.	

■ Constraints

- No setting is allowed when the terminal is other than RF.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Linearly interpolating the symbol point."

<Program>
MEAS MODANAL
TRFORM CONSTEL
INTPOL LIN
INTPOL?

<Response>
LIN

INTVAL_ADJ

Refresh Interval for Output RF Spectrum

Program Message	Query Message	Response Message
INTVAL_ADJ *a*	INTVAL_ADJ?	*a*

■ Function

Sets the display updating interval on the Output RF Spectrum screen obtained when the Storage Mode is set to Average.

■ Value a

Updating interval

Value	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the frequency of measurements conducted.	*
ONCE	Updated the after every averaging. An average is obtain based on the frequency specified by Average Count.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the updating interval to Once."

<Program>
MEAS ADJ, HIGH
INTVAL_ADJ ONCE
INTVAL_ADJ?

<Response>
ONCE

INTVAL_IQL

Refresh Interval for IQ Level

Program Message	Query Message	Response Message
INTVAL_IQL *a*	INTVAL_IQL?	*a*

■ Function

Sets the method for updating the measured results on the IQ Level screen when the Storage Mode is set to Average.

■ Value a

Updating method

Value	Updating interval	Initial value
EVERY	Displays the average value of the measured obtain after every measurement.	*
ONCE	Displays the average value of the measurement results after measurement of Average Count is completed.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Updating the display after every averaging."

<Program>
DSPL IQAC
STRG_IQL AVG
INTVAL_IQL ONCE
INTVAL_IQL?
SNGLS

<Response>
ONCE

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 obtained when Storage Mode is set to Average.

■ Value a

Updating interval

Value	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the frequency of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the frequency specified by Average Count.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the updating interval to Once."

<Program>
MEAS MODANAL
STRG_MOD AVG
INTVAL_MOD ONCE
INTVAL_MOD?

<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 Storage Mode is set to Average.

■ Value a

Updating interval

Value	Updating Interval	Initial Value
EVERY	Updated after every sweep. An average is obtained based on the frequency of measurements.	*
ONCE	Updated after every averaging. An average is obtained based on the frequency specified by Average Count.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the updating interval to Once."

<Program>
MEAS RFPWR
INTVAL_RFPWR ONCE
INTVAL_RFPWR?

<Response>
ONCE

INTVAL_SPU

Refresh Interval for Spurious Emission

Program Message	Query Message	Response Message
INTVAL_SPU a	INTVAL_SPU?	a

■Function

Sets the display updating interval when Storage mode is set to Average on the Spurious Emission screen.

■Value a

Updating interval

a	Updating Interval	Initial Value
EVERY	Updates the display after every sweep. Calculates and displays the average value by the umber of measurements repeated by that sweep.	*
ONCE	Updates the display once after averaging. Calculates the average value by the time specified with Average Count.	

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets the updating interval in Once."

<Program>
INTVAL_SPU ONCE
INTVAL_SPU?

<Response>
ONCE

IP

Preset

Program Message	Query Message	Response Message
IP	---	---

■ Function

Initializes all the measurement control parameters that need to be initialized. This functions the same effect as the PRE and INI commands.

■ Application Example

"Initializing the parameters that need 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 a

Readout unit

a	Readout unit
None	Existing setting unit
MV	mV
DBMV	dBmV

■ Value b

Peak to Peak value of Signal I

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

"Reading out the Peak to Peak value of Level I."

<Program>
MEAS IQLVL
IPPLVL? MV

<Response>
4.07

IQINZ

IQ Impedance

Program Message	Query Message	Response Message
IQINZ *a*	IQINZ?	*a*

■ Function

Sets the input impedance of Signal IQ on the Setup Common Parameter screen.

■ Value a

Impedance

a	Impedance	Initial Value
50	50 Ω	*
1 M	1 MΩ	

■ Constraints

- No setting is allowed when the terminal is one other than IQ-AC, IQ-DC, or IQ-Balance.

■ Setting initialization

*RST

■ Application Example

"Setting the impedance value at 50 Ω.

<Program>

TERM IQAC

IQINZ 50

IQINZ?

<Response>

50

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 value of Signal I and Signal Q on the IQ Level screen.

■ Value a

Readout unit

Value	Readout unit
None	Existing setting unit
MV	mV
DBMV	dBmV

■ Value b, c, d, e

b: RMS value of Signal I

c: RMS value of Signal Q

d: Peak to Peak value of Signal I

e: Peak to Peak value of Signal Q

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

“Reads out the IQ Level value.”

<Program>
MEAS IQLVL
IQLVL? MV

<Response>
1.42, 0.53, 4.07, 3.55

IQPHASE

IQ Phase difference

Program Message	Query Message	Response Message
---	IQPHASE?	*a*

■ Function

Reads out the measurement results of the RMS and Peak to Peak value of Signal I and Signal Q on the IQ Level screen.

■ Value a

Phase difference of IQ

Resolution	Unit
0.01	deg

■ Application Example

"Reading out the phase difference for IQ."

<Program>
MEAS IQLVL
IQPHASE?

<Response>
99.97

JUDGUNIT_ACP

Judgement Unit for Output RF Spectrum

Program Message	Query Message	Response Message
JUDGUNIT_ACP *a*	JUDGUNIT_ACP?	*a*

■Function

On the Setup Output RF Spectrum screen, sets the type of limit value used for the judgment on the Output RF Spectrum screen.

■Value *a*

Types used for the judgment

a	Display Item	Initial Value
REL	dB. Sets to judge in Relative value.	
ABS	dBm. Sets to judge in Absolute value.	＊
OFF	dB. Sets to judge in Relative value.	
ON	dBm. Sets to judge in Absolute value.	
RELABS	dB&dBm. Compares between a Relative value and an Absolute value and sets to judge in a higher value.	

・Judgment shall not be performed without being set(the setting is dashed).

・If either of dB or dBm setting is not performed, the set value will be a limit value.

■Setting Initialization

PRE, INI, IP, ＊RST

■Application Example

“Setting the judgment object to dB&dBm.”

<Program>
TERM RF
DSPL SETTBL_ACP
JUDGUNIT_ACP RELABS
JUDGUNIT_ACP?

<Response>
RELABS

JUDGUNIT_SPTBL

Judgement Unit for Spurious Spot Method

Program Message	Query Message	Response Message
JUDGUNIT_SPTBL a	JUDGUNIT_SPTBL?	a

■Function

Switches the judgement unit by Spot method of Spurious measurement.

■Value a

Relative/Absolute

a	Judge Unit	Initial Value
ON *1	Use absolute value（dBm）	＊
ABS		
OFF *2	Use relative value（dB）	
REL		
RELABS	Perform judgement at severe condition among absolute (dBm), relative value	
WATT	Use absolute value（W）	
RELWATT	Perform judgement at severe condition among absolute (W), relative value	

*1 Response is ABS.

*2 Response is REL.

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

“Sets the Unit Judge to Relative.”

<Program>

DSPL SETTBL_SPU,SPOT

JUDGUNIT_SPTBL ON

JUDGUNIT_SPTBL?

<Response>

ABS

JUDGUNIT_SWTBL

Judgement Unit for Spurious Sweep/Search Method

Program Message	Query Message	Response Message
JUDGUNIT_SWTBL a	JUDGUNIT_SWTBL?	a

■Function

Switches the judgement unit by Sweep/Serch method of Spurious measurement.

■Value a

Relative/Absolute

<table>
<tr><th>a</th><th>Judge Unit</th><th>Initial Value</th></tr>
<tr><td>ON *1</td><td rowspan="2">Use absolute value (dBm)</td><td rowspan="2">*</td></tr>
<tr><td>ABS</td></tr>
<tr><td>OFF *2</td><td rowspan="2">Use relative value (dB)</td><td rowspan="2"></td></tr>
<tr><td>REL</td></tr>
<tr><td>RELABS</td><td>Perform judgement at severe condition among absolute (dBm), relative value</td><td></td></tr>
<tr><td>WATT</td><td>Use absolute value (W)</td><td></td></tr>
<tr><td>RELWATT</td><td>Perform judgement at severe condition among absolute (W), relative value</td><td>*</td></tr>
</table>

*1 Response is ABS.

*2 Response is REL.

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets the Unit Judge to Relative."

<Program>

DSPL SPURIOUS,SWEEP

JUDGUNIT_SWTBL ON

JUDGUNIT_SWTBL?

<Response>

ABS

LVLREL

Refresh Level

Program Message	Query Message	Response Message
LVLLREL *a*	LVLLREL?	*a*

■ Function

Sets the relative display of the waveform on the RF Power screen. When the relative value display is on, average intra-burst power forms the reference value. In addition, when the relative value display is on, no template is on, no template can be displayed.

■ Value a

Updating interval

Value	Updating interval	Initial value
ON	Relative Level: Displays the vertical scale of the waveform using the relative value (unit of dB).	*
OFF	Absolute Level: Displays the vertical scale of the waveform using the absolute value (unit of dBm)	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

“Displaying the waveform using the absolute value.”

<Program>
MEAS RFPWR
LVLREL OFF
LVLREL?

<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 a

RMS value of Magnitude Error

Resolution	Unit
0.01	%

■ Application Example

"Reading out the measurement results of Magnitude Error."

<Program>
DSPL MODANAL
SWP
MAGTDERR?

<Response>
12.34

MAXPWR

Maximum Power

Program Message	Query Message	Response Message
---	MAXPWR? (a)	*b*

■ Function

Outputs maximum intra-burst power in a single frame in the average intra-burst power on the RF Power screen.
When there is no argument, outputs the value of Normal Burst. And when the number of Slot is specified, outputs the value of that Slot.

■ Value a

Range	Resolution	Initial value
0～7	1	1

■ Value b

Maximum intra-burst power

Resolution	Unit
0.01	dB

■ Application Example

“Reading out maximum power.”

<Program>
DSPL RFPWR
SWP
MAXPWR?

<Response>
0.06

MEAS

Switch Screen and Measure Start

Program Message	Query Message	Response Message
MEAS *a,b* MEAS *a*	MEAS?	*a,b*

■ Function

Shifts the measurement screen and execute sweep in Single mode.

■ Value a and b

a: Name of the measurement screen

b: Measuring method/Type of template

a	b	Name of the measurement screen	Measuring method/ Type of template	Initial value	Input Terminal
SETCOM	---	Setup Common Parameter	---	*	RF, IQ-DC IQ-AC IQ-Balance
MODANAL	---	Modulation Analysis	---		
RFPWR	---	RF Power	---		
SETTEMP_RFPWR	---	Setup Template for RF Power	---		
SETTEMP*			---		
MSPS	---	Multi Slot Parameter Setup	---		
ADJ	HIGH	Output RF Spectrum	High Speed		RF
SETTBL_ACP	---	Setup Output RF Spectrum	---		
SPURIOUS	SPOT	Spurious Emission	Spot		
	SEARCH		Search		
	SWEEP		Sweep		
SETTBL_SPU	SPOT	Setup Table for Spurious	Spot		
	SWEEP		Sweep		
RELPWRREF	---	Setup Reference Power	---		
PWRMTR	---	Power Meter	---		
IQLVL	---	IQ Level	---		IQ-DC,IQ-AC IQ-Balance

*1: The response message to the program message, “MEAS SETTEMP”, is “SETTEMP_RFPWE.”

■ Application Example

[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 type of burst signal to be analyzed on the Setup Common Parameter screen.

■ Value a

Type of burst signal

Value	Measuring Object	Initial value
NB	Normal Burst	*
NBMS	Normal Burst (Multi Slot)	
AB	Access Burst	
SB	Synchronization Burst	
CONT	Continuous	

■ Constraints

- No setting is allowed for Access Burst and Synchronization Burst when the modulation type in set at 8-PSK.

■ Setting initialization

*RST

■ Application Example

"Setting Access Burst as the analysis target."

<Program>
MODTYPE GMSK
MEASOBJ AB
MEASOBJ?

<Response>
AB

MINPWR

Minimum Power

Program Message	Query Message	Response Message
---	MINPWR? (a)	*b*

■ Function

Outputs intra-burst minimum power in a single frame in the form of the relative of average intra-burst power on the RF Power screen. When the argument is not exist, outputs the value of Normal Burst. And when the number of Slot is specified, outputs the value of that Slot.

■ Value a

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■ Value b

Intra-burst minimum power

Resolution	Unit
0.01	dB

■ Application Example

"Reading out intra-burst minimum power."

<Program>
DSPL MODANAL
SWP
MINPWR?

<Response>
−0.12

MKL_ACP

Marker Level for Output RF Spectrum

Program Message	Query Message	Response Message
---	MKL_ACP?	*a*

■Function

Reading out the Power value of the Spot Marker point on the Output RF Spectrum screen.

■Value a

Power

Resolution	Unit
0.01	dB or dBm

■Application Example

"Reading out the Power level of 0.0symbol on +100kHz."

<Program>
TERM RF
DSPL ADJ,HIGH
SWP
TRFORM_ACP MOD
MKP_ACP 100KZ
OPRTT_ACP SPOT
MKP_ACP 0
MKL_ACP?

<Response>
−10.32

MKL_MOD

Marker Level for Modulation Analysis

Program Message	Query Message	Response Message
---	MKL_MOD? *a*	*b*

■ Function

Read out the measured value at each marker position on the Modulation Analysis screen.

■ Value a

Type of output signal

Value	Trace Format (*cf.* TRFORM)
None	Outputs previously set Trace Format for among Trellis, Eye Diagram, Phase Error, and Magnitude Error.
I	Signal I (Setting is allowed only when the Trace Format is set to Constellation or Eye Diagram.)
Q	Signal Q (Setting is allowed only when the Trace Format is set to Constellation or Eye Diagram.)

■ Value b

Marker Level

Trace Format	Resolution	Unit
Constellation	0.0001	None
Trellis	0.1	%
Eye Diagram	0.0001	None
Phase Error	0.01	deg
Magnitude Error	0.01	%

■ Constraints

- When the Trace Format is set to other than Constellation, Eye Diagram, Phase Error or Magnitude Error, *** is output.
- When marker mode is set to off, *** is output.

■ Application Example

"Reading out the phase error at 128.0 symbol."

<Program>

MEAS MODANAL
TRFORM PHASE
MKR_MOD NRM
MKP_MOD 128.0
MKL_MOD?

<Response>

-0.289

MKL_RFPWR

Marker Level for RF Power

Program Message	Query Message	Response Message
---	MKL_RFPWR?	*a*

■ Function

Reads out the Power value at the marker position on the RF Power screen.

■ Value a

Power

Resolution	Unit
0.01	dB

■ Restraint

- When marker mode for RF power is off, *** is output

■ Application Example

"Reading out the Power level at 80.0 symbol of the frame window."

<Program>
DSPL RFPWR
WINDOW FRAME
MKR_RFPWR NRM
MKP_RFPWR 80.0
SWP
MKL_RFPWR?

<Response>
−10.62

MKL_SPU

Marker Level for Spurious Emission

Program Message	Query Message	Response Message
—	MKL_SPU? a	b

■Function
Outputs the measurement value of Marker level for Spurious Emission screen.

■Value a
Output Unit

a	Unit
None	dBm
DBM	dBm
DB	dB
WATT	W

■Value b
Marker Level

Resolution	Unit
0.01	dB
0.01	dBm
4 significant digits (floating type)	W

■Constraints
・ Outputs *** if waveform is not exist.

■Application Example
Reads out the power at the level of 80 points

<Program>
DSPL SPURIOUS,SWEEP
SWP
WAVEFORM_SPU ON
MKP_SPU 80
MKL_SPU?

<Response>
−10.62

MKP_ACP

Marker Position for Output RF Spectrum

Program Message	Query Message	Response Message
MKP_ACP *a*	MKP_ACP?	*a*
MKP_ACP *b*	MKP_ACP?	*b*

■Function

Specifies the Marker point on the Output RF Spectrum screen.

■Value *a*

Marker point (Spectrum Marker)

Range	Measure Range	Initial value	Unit
-1800000 to +1800000	1.8MHz	0	Hz

Remarks

Only following setup value can be selected.

±100kHz, ±200kHz, ±250kHz, ±400kHz, ±600kHz, ±800kHz, ±1MHz, ±1.2MHz, ±1.4MHz, ±1.6MHz, ±1.8MHz

□Suffix code

None : Hz
HZ : Hz
KHZ, KZ : kHz
MHZ, MZ : MHz
GHz, GZ : GHz

■Value *b*

Marker point (Spot Marker)

Range	Initial value	Resolution	Unit
0.0 to 167.0	0.0	0.1	Symbol

■Constraints

・The target Marker is the Marker selected by the Operation Trace on the same screen.

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Displays the marker on the place of +1MHz, on Marker of the Spectrum waveform. "

<Program>

```
DSPL ADJ,HIGH
TRFORM_ACP MOD
MKP_ACP 1MHZ
MKP_ACP?
```

<Response>

```
1000000
```

MKP_MOD

Marker Position for Modulation Analysis

Program Message	Query Message	Response Message
MKP_MOD *a*	MKP_MOD?	*a*

■ Function

Specifies the marker position on the Modulation Analysis screen.

■ Value a

Marker position

Range	Modulation Type	Trace Format	Resolution	Initial Value	Unit
0.0 to 147.0	GMSK	Constellation	1.0	73.0	symbol
		Eye Diagram, Phase error, Magnitude Error, Trellis	0.1	73.5	
3.0 to 144.0	8-PSK	Constellation, EVM, Phase Error, Magnitude Error	1.0	73.0	
		Eye Diagram	0.1	73.5	

■ Constraints

- No setting is allowed when the Trace Format is set to None.
- No setting is allowed when marker mode is set to off.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displaying a marker at 128bit on the Phase Error display."

<Program>
MEAS MODANAL
TRFORM PHASE
MKR_MOD NRM
MKP_MOD 128.0
MKP_MOD?

<Response>
128.0

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 a

Marker position

Range	Window	Resolution	Initial Value	Unit
−27.0 to 174.0	Slot, On Portion	0.1	73.5	Symbol
−20.0 to 1274.0	Frame	0.1	73.5	Symbol
−13.0 to 8.0	Leading	0.1	−2.5	Symbol
139.0 to 161.0	Trailing	0.1	150.0	Symbol

■ Constraints

- No setting is allowed when marker mode for RF Power is off.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Marking 80.0 symbol of the frame window."

<Program>
MEAS RFPWR
WINDOW FRAME
MKR_RFPWR NRM
MKP_RFPWR 80.0
MKP_RFPWR?

<Response>
80.0

MKP_SPU

Marker Position for Spurious Emission

Program Message	Query Message	Response Message
MKP_SPU a	MKP_SPU?	a

■Function

Specifies the Marker position at Spurious Emission screen.

■Value a

Point position

Data Points	Range	Resolution	Initial Value
501	0to500	1	Point where Marker Level is greatest
1001	0to1000	1	

■Initialization command

PRE,INI,IP,＊RST

■Application Example

"Sets the marker to 50th point."

<Program>

DSPL SPURIOUS,SPOT
WAVEFORM_SPU ON
MKP_SPU 50
MKP_SPU?

<Response>

50

MKR_MOD

Marker Mode

Program Message	Query Message	Response Message
MKR_MOD *a*	MKR_MOD?	*a*

■ Function

Sets the marker on/off on the Modulation Analysis screen.

■ Value a

Marker setting

Value	Marker setting	Initial value
NRM	Normal: Displays the marker, and sets the marker position to the entry state.	
OFF	Off: Delete the marker display and cancels the entry state of the marker position.	*

■ Constraints

- No setting is allowed when the Trace Format is set to Non.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displaying the marker."

<Program>
MEAS MODANAL
TRFORM PHASE
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 a

Marker setting

Value	Marker setting	Initial Value
NRM	Normal: Displays the marker and sets the marker position to the entry state.	
OFF	Off: Delete the marker display and cancels the entry state of the marker position.	*

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting marker to on."

<Program>
MEAS RFPWR
MKR_RFPWR NRM
MKR_RFPWR?

<Response>
NRM

MLTCARRCAL

Multi Carrier Power Calibration

Program Message	Query Message	Response Message
MLTCARRCAL	---	---

■Function

Calibrates the internal Cal signal as absolute value reference.

■Constraints

The screen can be executed is shown below.(refer to DSPL).

■Modulation Analysis
■RF Power
■Output RF Spectrum
■Spurious Emission

Cannot be executed when the Terminal is other than RF.

■Application Example

"Executes the calibration of the internal Cal signal as absolute value reference."

<Program>

DSPL MODANAL

MLTCARRCAL

MODPWR

Due to Modulation

Program Message	Query Message	Response Message
---	MINPWR? *Fa,b,c*	*d*

■ Function

Reads out the Due to Modulation value on the Output RF Spectrum screen.

■ Value a

Frequency table

Range	Resolution
1 to 11	0.01

■ Value b

Lower/Upper

b	Lower/Upper
UP	Upper
LOW	Lower

■ Value c

Output unit

c	Output Unit
DB	dB
DBM	dBm

■ Constraints

- When no value a, b or c is set, the carrier frequency level is read out in dBm units.
- When only the value c is not set, readout takes place in the unit set by Unit for Output RF Spectrum.

■ Application Example

[1] “Reading out Due to Modulation of the carrier frequency.”

<Program>
DSPL ADJ,HIGH
SWP
MODPWR?

<Response>
−39.56

[2] “Reading out Due to Modulation on the Upper side of Frequency Table f6 in dB.”

<Program>
DSPL ADJ,HIGH
SWP
MODPWR? F6,UP,DB

<Response>
−42.99

MODSWTCH_ADJ

Analysis Range for Output RF Spectrum.

Program Message	Query Message	Response Message
MODSWTCH_ADJ *a*	MODSWTCH_ADJ?	*a*

■Function

Selects the measurement range on the Output RF Spectrum.

■Value *a*

Type of measurement range

a	Type of measurement range	Initial value
SLOT	Sets the measurement range as Slot to use.	*
FRAME	Sets the measurement range as Frame to use.	

■Initialization command

PRE, INI, IP, ＊RST

■Constraints

・Cannot be set when the Measurement Object of the Setup Common Parameter screen is other than Normal Burst (Multi Slot).

■Application Example

"Sets the measurement range to FRAME"

```
<Program>
MEASOBJ NBMS
DSPL ADJ,HIGH
MODSWTCH_ADJ FRAME
MODSWTCH_ADJ?

<Response>
FRAME
```

MODSWTCH_MOD

Analysis Range for Modulation Analysis

Program Message	Query Message	Response Message
MODSWTCH_MOD *a*	MODSWTCH_MOD?	*a*

■Function

Selects the measurement range on the Modulation Analysis screen.

■Value *a*

Type of measurement range

a	Type of measurement range	Initial value
SLOT	Sets the measurement range as Slot to use.	＊
FRAME	Sets the measurement range as Frame to use.	

■Initialization command

PRE, INI, IP, ＊RST

■Constraints

・Cannot be set when the Measurement Object of the Setup Common Parameter screen is other than Normal Burst (Multi Slot).

■Application Example

"Sets the measurement range to FRAME"

<Program>
MEASOBJ NBMS
DSPL MODANAL
MODSWTCH_MOD FRAME
MODSWTCH_MOD?

<Response>
FRAME

MODTYPE

Modulation Type

Program Message	Query Message	Response Message
MODTYPE *a*	MODTYPE?	*a*

■ Function

Sets the modulation system that needs to be measured on the Setup Common Parameter screen.

■ Value a

Modulation system

a	Modulation system	Initial value
GMSK	GMSK	*
8PSK	8-PSK	

■ Setting initialization

*RST

■ Application Example

"Setting the modulation system to be measured to 8-PSK."

<Program>
DSPL SETCOM
MODTYPE 8PSK
MODTYPE?

<Response>
8PSK

OFFPWR

Carrier Off Power

Program Message	Query Message	Response Message
---	OFFPWR? a *(,b)*	*c*

■ Function

Displays average power when single-frame transmission is set to off on the RF Power screen.
When the Slot is not specified, outputs the value of Normal Burst. And when the number of the Slot is specified, outputs the value of that Slot.
Moreover, when the setup of Measuring Object is other than Normal Burst (Multi Slot) and outputs the measurement result of Multi Slot that Slot number is specified, asterisk will return.

■ Value a

Output unit

a	Output Unit
DBM	dBm
WATT	W

■ Value b

Slot number

Range	Resolution
0 to 7	1

■ Value c

Average power when transmission is set to off.

Resolution	Unit
0.01	Depend on the value a.

■ Application Example

"Reading out average power when transmission is set to off."

<Program>
DSPL RFPWR
SWP
OFFPWR? DBM

<Response>
−47.63

ORGOFS

Origin Offset

Program Message	Query Message	Response Message
---	ORGOFS?	*a*

■ Function

Outputs the measurement results for zero-set (carrier leak component) of the signal to be measured on the Modulation Analysis screen.

■ Value a

Origin offset

Resolution	Unit
0.01	dB

■ Application Example

"Reading out the Origin Offset value."

<Program>
DSPL MODANAL
SWP
ORGOFS?

<Response>
−34.33

OPRTT_ACP

Operation Trace

Program Message	Query Message	Response Message
OPRTT_ACP *a*	OPRTT_ACP?	*a*

■Function

Sets the Operation Trace on the Output RF Spectrum screen.

■Value *a*

Operation Trace

a	Operation Trace	Initial value
SPECT	Spectrum	*
SPOT	Spot	

■Constraints

・ Cannot be set when the Trace Format is Non.

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets the Operation Trace to Spot."

<Program>
TERM RF
DSPL ADJ,HIGH
TRFORM_ACP MOD
OPRTT_ACP SPOT
OPRTT_ACP?

<Response>
SPOT

PATT

Training Sequence Pattern

Program Message	Query Message	Response Message
PATT *a*	PATT?	*a*

■ Function

Reads out the Due to Modulation value on the Output RF Spectrum screen.

■ Value a

Frequency table

a	Training Sequence	Initial value	Measuring Object
TSC0	TSC0	*	Normal Burst
TSC1	TSC1		
TSC2	TSC2		
TSC3	TSC3		
TSC4	TSC4		
TSC5	TSC5		
TSC6	TSC6		
TSC7	TSC7		
ETSC	096FF335476	*	Access Burst
SYNCH	B962040F2D45761B	*	Synchronization Burst
NO	No Training Sequence is carried out.		Normal Burst Access Burst Synchronization Burst
USER	The user sets the Training Sequence.		Normal Burst Access Burst Synchronization Burst

■ Constraints

- No setting is allowed when the Modulation Object is set to Continuous.

■ Setting initialization

*RST

■ Application Example

"Setting the Training Sequence to TSC1."

<Program>
MEASOBJ NB
PATT TSC1
PATT?

<Response>
TSC1

PATT_MSPS

Training Sequence Pattern

Program Message	Query Message	Response Message
PATT_MSPS *a,b*	PATT_MSPS? *b*	*a*

■Function

Sets the type of Training Sequence of Slot0 to Slot7 on the Multi Slot Parameter Setup screen.

■Value *a*

Training Sequence

a	Training Sequence	Initial value	Measuring Object
TSC0	TSC0	*	Normal Burst (Multi Slot)
TSC1	TSC1		
TSC2	TSC2		
TSC3	TSC3		
TSC4	TSC4		
TSC5	TSC5		
TSC6	TSC6		
TSC7	TSC7		
ETSC	096FF335478	*	Access Burst
SYNCH	B962040F2D45761B	*	Synchronization Burst
NO	Do not execute the Training Sequence		Normal Burst (Multi Slot) Access Burst Synchronization Burst
USER	User sets the Training Sequence		Normal Burst (Multi Slot) Access Burst Synchronization Burst

■Value *b*

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■Initialization command

PRE, INI, IP, *RST

■ Application Example

"Setting the Training Sequence1 in Multi Slot Parameter Setup screen to TSC1."

<Program>

MEASOBJ NBMS
DSPL MSPS
PATT_MSPS TSC1,1
PATT_MSPS? 1

<Response>

TSC1

PATT_UBIT

Training Sequence Pattern

Program Message	Query Message	Response Message
PATT *a*	PATT?	*a*

■ Function

Reads out the Due to Modulation value on the Output RF Spectrum screen.

■ Value a

Frequency table

Range*	Modulation system	Resolution	Initial value	Unit
0 to FFFFFFFFFFFFFFFF	GMSK	1	0000000	bit
0 to 777777777777777777777777	8-PSK	1	000000000	bit

* The setting range is determined with the value representing the User Pattern Length.

■ Constraints

- No setting is allowed when the Modulation Object is set to Continuous.
- No setting is allowed when the Training Sequence Bit Pattern is set by other than User.

■ Setting initialization

*RST

■ Application Example

"Setting the user defined Training Sequence bit pattern to FFFF."

<Program>
MODTYPE GMSK
MEASOBJ NB
PATT USER
PATT_ULEN 16
PATT_UBIT FFFF
PATT_UBIT?

<Response>
FFFF

PATT_ULEN

Training Sequence Length by User setting

Program Message	Query Message	Response Message
PATT_ULEN *a*	PATT_ULEN?	*a*

■ Function

Reads out the Due to Modulation value on the Output RF Spectrum screen.

■ Value a

Frequency table

Range	Modulation system	Resolution	Initial value	Unit
1 to 64	GMSK	1	26	symbol
1 to 26	8-PSK	1	26	symbol

■ Constraints

- No setting is allowed when the Modulation Object is set to Continuous.
- No setting is allowed when the Training Sequence Pattern is set by other than User.

■ Setting initialization

*RST

■ Application Example

"Setting the Training Sequence length of the normal burst to 64 symbol."

<Program>
MODTYPE GMSK
MEASOBJ NB
PATT USER
PATT_ULEN 64
PATT_ULEN?

<Response>
64

PATT_USTART

Start Point of Training Sequence by user setting

Program Message	Query Message	Response Message
PATT_USTART *a*	PATT_USTART?	*a*

■ Function

Sets a position in a single burst as the starting position of the Training Sequence on the Setup Common Parameter screen when the Training Sequence is set by the user.

■ Value a

Frequency table

<table>
<tr><th>Range</th><th>Modulation system</th><th>Measuring Object</th><th>Resolution</th><th>Initial value</th><th>Unit</th></tr>
<tr><td>0 to (87—User Pattern Length)</td><td rowspan="2">GMSK</td><td>AB</td><td rowspan="3">1</td><td rowspan="3">61</td><td rowspan="2">bit</td></tr>
<tr><td>0 to (147—User Pattern Length)</td><td>Other than AB</td></tr>
<tr><td>0 to (147—User Pattern Length)</td><td>8-PSK</td><td>NB</td><td>symbol</td></tr>
</table>

■ Constraints

- No setting is allowed when the Modulation Object is set to Continuous.
- No setting is allowed when the Training Sequence Pattern is set by other than User.

■ Setting initialization

*RST

■ Application Example

"Setting the starting bit of the Training Sequence Pattern to bit 0."

<Program>
MODTYPE GMSK
MEASOBJ NB
PATT USER
PATT_USTART 0
PATT_USTART?

<Response>
0

PHASEERR

RMS Phase Error

Program Message	Query Message	Response Message
---	PHASEERR?	*a*

■ Function

Outputs the RMS value of the phase error in a single burst on the Modulation Analysis screen.

■ Value a

RMS value of the phase error in a single burst

Resolution	Unit
0.01	deg

■ Application Example

"Reading out the RMS value of the phase error."

<Program>
MEAS MODANAL
PHASEERR?

<Response>
2.71

PMAGTDERR

Peak Magnitude Error

Program Message	Query Message	Response Message
---	PMAGTDERR? *a*	*b*

■ Function

Outputs the maximum instantaneous for Magnitude Error on the Modulation Analysis screen.

■ Value a

Magnitude Error positive/negative sign

a	Positive/Negative sign
None	Peak value
+	Positive peak value
—	Negative peak value

■ Value b

Maximum Magnitude Error value of the sign specified in a

Resolution	Unit
0.01	%

■ Application Example

"Reading out the maximum Magnitude Error value."

<Program>
DSPL MODANAL
SWP
PMAGTDERR?

<Response>
16.67

PMAGTSYM

Symbol at Peak Magnitude Error

Program Message	Query Message	Response Message
---	PMAGTDERR? *a*	*b*

■ Function

Outputs the symbol value obtained when Magnitude Error reaches the maximum instantaneous value on the Modulation Analysis screen.

■ Value a

Magnitude Error positive/negative sign

a	Positive/Negative sign
None	Peak value
+	Positive peak value
—	Negative peak value

■ Value b

Symbol value

Resolution	Unit
0.1	symbol

■ Application Example

"Reading out the symbol value obtained when Magnitude Error reaches the maximum value."

<Program>
DSPL MODANAL
PMAGTDSYM?

<Response>
13.1

POWER

Power

Program Message	Query Message	Response Message
---	POWER? *a*	*b*

■ Function

Outputs the absolute or relative value of RF average power measured by the power meter.

■ Value a

Readout unit

Value	Unit
DBM	dBm
WATT	W
DB	dB

■ Value b

Absolute value or relative value of RF average power

Resolution	Resolution
0.01 (dBm, dB)	In accordance with the value a
0.001 (W)	

■ Application Example

"Reading out RF average power in dBm units."

<Program>
POWER? DBM

<Response>
–1.43

PPHASEERR

Symbol at Peak Magnitude Error

Program Message	Query Message	Response Message
---	PPHASEERR? *a*	*b*

■ Function

Output the maximum instantaneous value of the phase error on the Modulation Analysis screen.

■ Value a

Phase error sign

a	Positive/Negative sign
None	Peak value
+	Positive peak value
—	Negative peak value

■ Value b

Maximum phase error value of the sign specified in a

Resolution	Unit
0.01	deg

■ Application Example

“Reading out the maximum absolute value of the phase error.”

<Program>
MEAS MODANAL
PPHASEERR?

<Response>
7.21

PPHASESYM

Symbol at Peak Phase Error

Program Message	Query Message	Response Message
---	PPHASESYM? *a*	*b*

■ Function

Outputs the symbol value obtained when Phase Error reaches the maximum instantaneous value on the Modulation Analysis screen.

■ Value a

Phase Error positive/negative sign

a	Positive/Negative sign
None	Peak value
+	Positive peak value
—	Negative peak value

■ Value b

Symbol value

Resolution	Unit
0.1	symbol

■ Application Example

"Reading out the symbol value obtained when Phase Error reaches the maximum value."

<Program>
DSPL MODANAL
PPHASESYM?

<Response>
83.1

PRE

Preset

Program Message	Query Message	Response Message
PRE	---	---

■ Function

Initializes all the measurement control parameters that need to be initialized. This function has the same effect as the INI and IP commands.

■ Application Example

"Initializing the parameters that need to be initialized."

<Program>
PRE

PREAMP

Pre Ampl

Program Message	Query Message	Response Message
PERAMP *a*	PREAMP?	*a*

■ Function

Sets Pre Ampl On/Off.

■ Value a

On/off setting of Pre Ampl

Value	Pre Ampl	Initial Value
ON	Sets Pre Ampl to On.	
OFF	Sets Pre Ampl to Off.	*

■ Setting Initialization

*RST

■ Application Example

"Setting Pre Ampl to on."

<Program>
PREAMP ON
PREAMP?

<Response>
ON

■ Note

* This function is optional.

PVECTERR

Peak EVM

Program Message	Query Message	Response Message
---	PVECTERR?	*a*

■ Function

Outputs the measured result of the peak EVM value on the Modulation Analysis screen.

■ Value a

Peak EVM

Resolution	Unit
0.01	%

■ Application Example

“Reading 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 read out the calibration value with “PWRCAL?”. The calibration value can be set only control with “CALVAL”.

■ Value a

Calibration value

Range	Resolution	Initial value	Unit
−10.00 to 10.00	0.01	0.00	dBm

■ Application Example

“Performing calibration during the power measurement.”

<Program>
CALVAL 2.33
PWRCAL?
PWRCAL

<Response>
2.33

PWRREFABS_SPU

Absolute Power Reference for Spurious Emission

Program Message	Query Message	Response Message
PWRREFABS_SPU a	PWRREFABS_SPU?	a

■Function

Sets the absolute power reference for Spurious Emission.

■Value a

Absolute Power Reference

a	Absolute Power Reference		Initial Value
NONE	None	The measurement value of a spectrum analyzer itself	
TXPWR	Tx Power	Uses the Tx Power as reference	*
SET	Set	Uses the setting value of Absolute Power Set Value (PWRVALABS_SPU) as reference	

Due to the setup of Absolute Power Reference and Relative Power Reference, Absolute value relationship of Spurious is shown below. Sets the sweep data of spectrum analyzer as x (dBm).

		Absolute Power Reference (dBm)		
		None	Tx Power (a)	Set (b)
Relative Power Reference (dBm)	SPA (c)	x	a + x - c	b + x - c
	Tx Power (a)	x	x	b + x - a
	Set (d)	x	a + x - d	b + x -d

In addition, relationship of Spurious relative value is shown below.

Relative Power Reference (dBm)	SPA (c)	x – c
	Tx Power (a)	x – a
	Set (d)	x – d

■Application Example

Sets the reference of absolute value of power to Tx Power

<Program>
DSPL RELPWRREF
PWRREFABS_SPU TX
PWRREFABS_SPU?

<Response>
TX

PWRVALABS_SPU

Absolute Power Set Value for Spurious Emission

Program Message	Query Message	Response Message
PWRVALABS_SPU a	PWRVALABS_SPU?	a

■Function

Sets the reference power of when the reference of absolute value of power was set at Setup Ref Power screen of Spurious Emission.

■Value a

Reference of absolute value of power

Range	Resolution	Initial Value	Unit
-99.99to99.99	0.01	0.00	DBm

■Constraints

・ It is enabled to set only when the setup of Absolute Power Reference is "set".

■Application Example

Sets the reference power to 10dBm

<Program>

DSPL RELPWRREF
PWRREFABS_SPU SET
PWRVALABS_SPU 10
PWRVALABS_SPU?

<Response>

10.00

PWRREFREL_SPU

Relative Power Reference for Spurious Emission

Program Message	Query Message	Response Message
PWRREFREL_SPU a	PWRREFREL_SPU?	a

■Function

Sets the relative power reference for Spurious Emission.

■Value a

Absolute Power Reference

a	Absolute Power Reference		Initial Value
SPA	SPA	Uses the power gained from sweep of spectrum analyzer set-up that was set up at Setup Reference Power, as reference	*
TXPWR	Tx Power	Uses the Tx Power as reference	
SET	Set	Uses the setting value of Relative Power Set Value (PWRVALREL_SPU) as reference	

Due to the setup of Absolute Power Reference and Relative Power Reference, Absolute value relationship of Spurious is shown below. Sets the sweep data of spectrum analyzer as x (dBm).

		Absolute Power Reference (dBm)		
		None	Tx Power (a)	Set (b)
Relative Power Reference (dBm)	SPA (c)	x	a + x - c	b + x - c
	Tx Power (a)	x	x	b + x - a
	Set (d)	x	a + x - d	b + x - d

In addition, relationship of Spurious relative value is shown below.

Relative Power Reference (dBm)	SPA (c)	x – c
	Tx Power (a)	x – a
	Set (d)	x – d

■Application Example

Sets the reference of relative value of power to Tx Power

<Program>
DSPL RELPWRREF
PWRREFREL_SPU TXPWR
PWRREFREL_SPU?

<Response>
TXPWR

PWRVALREL_SPU

Relative Power Set Value for Spurious Emission

Program Message	Query Message	Response Message
PWRVALREL_SPU a	PWRVALREL_SPU?	a

■Function

Sets the reference power of when the reference of relative value of power was set at Setup Ref Power screen of Spurious Emission.

■Value a

Reference of relative value of power

Range	Resolu-tion	Initial Value	Unit
-99.99to99.99	0.01	0.00	dBm

■Constraints

It is enabled to set only when the setup of Relative Power Reference is "set".

■Application Example

Sets the reference power to 10dBm

<Program>
DSPL RELPWRREF
PWRREFREL_SPU SET
PWRVALREL_SPU 10
PWRVALREL_SPU?

<Response>
10.00

QLVL

Q Level (RMS)

Program Message	Query Message	Response Message
---	QLVL? *a*	*b*

■ Function

Reads out the measured results of the RMS value for the Q signal on the IQ Level screen.

■ Value a

Readout unit

a	Readout unit
None	Existing setting unit
MV	mV
DBMV	dBmV

■ Value b

RMS value for Signal Q

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

"Reading out the RMS value for Level Q."

<Program>
MEAS IQLVL
QLVL? MV

<Response>
0.53

QPPLVL

Q Level (Peak to Peak)

Program Message	Query Message	Response Message
---	QPPLVL? *unit*	*pp*

■ Function

Reads out the measurement results of the Peak to Peak value for the Signal Q on the IQ Level screen.

■ Value a

Readout unit

a	Readout unit
None	Existing setting unit
MV	mV
DBMV	dBmV

■ Value b

Peak to Peak value for Signal Q

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

"Reading out the Peak to Peak value for Level Q."

<Program>
MEAS IQLVL
QPPLVL? MV

<Response>
3.55

RATIO

On/Off Ratio

Program Message	Query Message	Response Message
---	RATIO? (a)	*b*

■ 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 measurement.

If the argument does not exist, outputs the value of the Normal Burst. And if Slot number is specified, outputs the value of that Slot.

Moreover, when the setup of Measuring Object is other than Normal Burst (Multi Slot) and outputs the measurement result of Multi Slot that Slot number is specified, asterisk will return.

■ Value a

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■ Value b

On/Off ratio

Resolution	Unit
0.01	dB

■ Application Example

“Reading out the On/Off Ratio.”

<Program>
DSPL RFPWR
SWP
RATIO?

<Response>
72.66

RBW_SETREF_SPU

Resolution Bandwidth for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
RBW_SETREF_SPU a	RBW_SETREF_SPU?	a

■Function

Sets the RBW (Resolution Bandwidth) at the time of measuring the Reference Power of Spurious Emission by the Spectrum method.

■Value a

RBW

Setup Range will be changed by Detection（refer to DET_SETREF_SPU）

<table>
<tr><th>Detection</th><th colspan="4">Range</th><th>Resolution</th><th>Initial Value</th><th>Unit</th></tr>
<tr><td rowspan="3">Positive
Negative
Sample
Average</td><td>300</td><td>1000</td><td>3000</td><td>10000</td><td rowspan="6">1</td><td rowspan="6">1MHz</td><td rowspan="6">Hz</td></tr>
<tr><td>30000</td><td>100000</td><td>300000</td><td>1000000</td></tr>
<tr><td>3000000</td><td>5000000</td><td>10000000</td><td>20000000</td></tr>
<tr><td rowspan="3">RMS</td><td>10</td><td>30</td><td>100</td><td>300</td></tr>
<tr><td>1000</td><td>3000</td><td>10000</td><td>30000</td></tr>
<tr><td>100000</td><td>300000</td><td>10000000</td><td></td></tr>
</table>

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

Sets the RBW to 3kHz

<Program>

RBW_SETREF_SPU 3000

RBW_SETREF_SPU?

<Response>

3000

RFINPUT

RF input

Program Message	Query Message	Response Message
RFINPUT *a*	RFINPUT?	*a*

■ Function

Sets the connector of the RF signal to be input.

■ Parameter

RF signal level

a	RF signal level	Initial value
HIGH	High Power	*
LOW	Low Power	

■ Setting initialization

*RST

■ Application Example

"Setting the RF signal level to High Power."

<Program>
RFINPUT HIGH
RFINPUT?

<Response>
HIGH

RFLVL

Reference Level

Program Message	Query Message	Response Message
RFLVL *a*	RFLVL?	*a*

■ Function

Sets the Reference Level on the Setup Common Parameter screen.

■ Value a

Reference Level

Range	RF Input	Initial value	Resolution	Unit
−(10.00+Reference Level Offset) to (42.00+Reference Level Offset)	High Power	10	0.01	dBm
−(30.00+Reference Level Offset) to (22.00+Reference Level Offset)	Low Power		0.01	dBm

□ Suffix code

None: dBm

DBM: dBm

■ Constraints

- No setting is allowed when the terminal is one other than RF.

■ Setting initialization

*RST

■ Application Example

"Setting the Reference Level to −10 dBm."

<Program>
TERM RF
RFINPUT HIGH
RFLVLOFS 0
RFLVL −10
RFLVL?

<Response>
−10.00

RFLVLOFS

Reference Level Offset

Program Message	Query Message	Response Message
RFLVLOFS *a*	RFLVLOFS?	*a*

■ Function

Sets the Offset value for the Reference Level on the Setup Common Parameter screen.

■ Value 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

■ Constraints

- No setting is allowed when the terminal is one other than RF.

■ Setting initialization

*RST

■ Application Example

"Setting the Reference Level Offset to 0.00 dB."

<Program>
TERM RF
RFLVLOFS 0.00
RFLVLOFS?

<Response>
0.00

RL_SETREF_SPU

Reference Level for Setup Reference Power

Program Message	Query Message	Response Message
RL_SETREF_SPU *a*	RL_SETREF_SPU?	*a*

■Function
Sets the Reference Level at the Spurious Emission measurement.

■Value *a*
Ref Level

Range	Resolution	Initial value	Unit
Refer to the constraints	0.01	Depends on frequency	dBm

☐Suffix code
None : dBm
DBM : dBm

■Setting initialization
PRE, INI, IP, ＊RST

■Constraints
- The setup range of reference level is shown below depends on RF Input:High/Low (*cf.* RFINPUT), Per Ampl:On/Off (*cf.* PREAMP). For RefLevelOffset, refer to RFLVLOFS.

Pre Ampl	RF Input	
	High	Low
Off	(－100.00+RefLevelOffset) to (50.00+RefLevelOffset)	(－120.00+RefLevelOffset) to (40.00+RefLevelOffset)
On	(－120.00+RefLevelOffset) to (30.00+RefLevelOffset)	(－140.00+RefLevelOffset) to (20.00+RefLevelOffset)

- By changing the RF Input or the Per Ampl, and when the reference level will be out of setup range, the it will be made to closest value.

■Application Example
"Sets the Ref Level on the Setup Reference Power screen to －30 dBm."

<Program>
DSPL RELPWRREF
PWRREFREL_SPU SPA

RL_SETREF_SPU –30

<Response>
−30.00

RNG

Range

Program Message	Query Message	Response Message
RNG *a*	---	---

■ Function

Increases and decreases the power meter measurement range.

■ Value a

Operation of the power meter range

a	Operation of Power Meter Range
UP	Increases the measurement range by one step.
DN	Decreases the measurement range by one step.

■ Application Example

<Program>
DSPL PWRMTR
RNG UP

RNG1

Range1

Program Message	Query Message	Response Message
RNG1	---	---

■ Function

Sets the power meter measurement range to the lowest level.
When the Input RF level is set to High power, the lowest range value is 0 dBm. At Low power, it is −20 dBm.

■ Application Example

"Setting the power meter measurement range to the lowest level."

<Program>
DSPL PWRMTR
RNG1

RNG2

Range2

Program Message	Query Message	Response Message
RNG2	---	---

■ Function

Sets the power meter measurement range to the second lowest level.
When the Input RF level is set to High power, the second lowest range value is 10 dBm. At Low power, it is −10 dBm.

■ Application Example

“Setting the power meter measurement range to the second lowest level.”

<Program>
DSPL PWRMTR
RNG2

RNG3

Range3

Program Message	Query Message	Response Message
RNG3	---	---

■ Function

Sets the power meter measurement range to the intermediate level.
When the Input RF level is set to High power, the intermediate range value is +20 dBm. At Low power, it is 0 dBm.

■ Application Example

“Setting the power meter measurement range to the intermediate level.”

<Program>
DSPL PWRMTR
RNG3

RNG4

Range4

Program Message	Query Message	Response Message
RNG4	---	---

■ Function

Sets the power meter measurement range to the fourth lowest level.
When the Input RF level is set to High Power, the fourth lowest level range is +30 dBm. At Low Power, it is 0 dBm.

■ Application Example

"Setting the power meter measurement range to the fourth lowest level."

<Program>
DSPL PWRMTR
RNG4

RNG5

Range5

Program Message	Query Message	Response Message
RNG5	---	---

■ Function

Sets the power meter measurement range to the highest level.
When the Input RF level is set to High power, the highest range value is +40 dBm. At Low power, it is +20 dBm.

■ Application Example

"Setting the power meter measurement range to the highest level."

<Program>
DSPL PWRMTR
RNG5

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.

■ Application Example

"Setting the currently displayed power value to the reference value for relative value display."

<Program>
DSPL PWRMTR
SETREL

SLCTTEMP

Select Template for RF Power

Program Message	Query Message	Response Message
SLCTTEMP *a*	SLCTTEMP?	*a*
---	SLCTTEMP?	*NOT*

■ Function

Initialized the currently displayed standard template on the RF Power screen. When a template other than the standard template is displayed because of changes made to the template settings, NOT is returned as a response. This function has the same effect as the SLCTTEMP_RFPWR command.

■ Value a

Template

a	Template	Initial value
STD	Initializes the currently displayed standard template.	*

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Bringing the value back to the standard template."

<Program>
DSPL SETTEMP_RFPWR
SLCTTEMP STD
SLCTTEMP?

<Response>
STD

SLCTTEMP_RFPWR

Recall Template for RF Power

Program Message	Query Message	Response Message
SLCTTEMP_RFPWR *a*	SLCTTEMP_RFPWR?	*a*
---	SLCTTEMP_RFPWR?	*NOT*

■ Function

Initialized the currently displayed standard template on the RF Power screen. When a template other than the standard template is displayed because of changes made to the template settings, NOT is returned as a response.

■ Value a

Template

a	Template	Initial value
STD	Initializes the currently displayed standard template.	*

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Bringing the value back to the standard template."

<Program>
DSPL SETTEMP_RFPWR
SLCTTEMP_RFPWR STD
SLCTTEMP_RFPWR?

<Response>
STD

SLOTPWR

Slot Power

Program Message	Query Message	Response Message
---	SLOTPWR? *a*	*b*

■ Function

Outputs average power for each slot in a single frame on the RF Power screen.

■ Value a

Parts of Slot

Range	Resolution
0 to 7	1

■ Value b

Resolution	Unit
1	dBm

■ Application Example

“Reading out average power for the 6th slot.”

<Program>
DSPL RFPWR
SWP
SLOTPWR? 6

<Response>
7.21

SNGLS

Single Sweep

Program Message	Query Message	Response Message
SNGLS	---	---

■ Function

Executes sweep/measurement. Receive the next message even when the sweep/measurement is not yet completed.

■ Application Example

"Executing sweep/measurement."

<Program>
SNGLS

SLTNO_RFPWR

Slot Number

Program Message	Query Message	Response Message
SLTNO_RFPWR *a*	SLTNO_RFPWR?	*a*

■Function

Sets the Slot number on the RF Power screen.

■Value *a*

Slot number

Range
SLOT0, SLOT1, SLOT2, ..., SLOT7

■Constraints

Cannot be set when the Measuring Object on the Setup Common Parameter screen is other than Normal Burst (Multi Slot).

Alike cannot be set when the Waveform Display on the RF Power screen is Off.

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Selects the Slot2 on the RF Power screen."

<Program>
TERM RF
MEASOBJ NBMS
DSPL RFPWR
SLTNO_RFPWR SLOT2
SLTNO_RFPWR?

<Response>
SLOT2

SPECT_SPUF

Wave Data (Frequency Domain) for Spurious Emission

Program Message	Query Message	Response Message
—	SPECT_SPUF? a,b,c	d(b),d(b+1),...,d(c)

■Function

Outputs the measurement result of frequency axis at Spurious Emission screen.
It is enabled to output for frequency table that has set at the time of Spurious Mode is Sweep and Search.

■Value a

Frequency table

Range
F1,F2,F3,...,F14,F15

■Value b

Read Out Starting Position

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■Value c

Read out count

Data Points	Range	Resolution
501	1 to 501	1
1001	1 to 1001	1

■Value d (b)

b-th wave data in frequency table a

Range	Resolution
−2147483648 to 2147483647	1

- Unit is 0.01 dBm integer (1dB = 100)

■Constraints

- It is not enabled to output when Spurious Mode is Spot

■Application Example

"Reads out five data from 0 of sweep waveform in frequency table F2 at sweep measurement."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPECT_SPUF? F2,0,5

<Response>
-2345,-2346,-2347,-2346,-2345

SPECT_SPUI

Wave Data (Integral) for Spurious Emission

Program Message	Query Message	Response Message
—	SPECT_SPUI? a,b,c	d(b),d(b+1),...,d(c)

■Function

Outputs the waveform data result that was integrated by Integral BW at Spurious Emission screen.
It is enabled to output for frequency table that has set at the time of Spurious Mode is Sweep and Search.

■Value a

Frequency table

Range
F1,F2,F3,...,F14,F15

■Value b

Read Out Starting Position

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■Value c

Read out count

Data Points	Range	Resolution
501	1 to 501	1
1001	1 to 1001	1

■Value d (b)

b-th wave data in frequency table a

Range	Resolution
−2147483648 to 2147483647	1

- Unit is 0.01 dBm integer (1dB = 100)

■Constraints

- Due to operation processing, there is invalid data in part. "-2147483648" is outputted when data is invalid.

■Application Example

“Reads out five data from 0 of integrated data in frequency table F2 at sweep measurement.”

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPECT_SPUI? F2,0,5

<Response>
-2345,-2346,-2347,-2346,-2345

SPECT_SPUT

Wave Data (Time Domain) for Spurious Emission

Program Message	Query Message	Response Message
—	SPECT_SPUT? a,b,c	d(b),d(b+1),...,d(c)

■Function

Outputs the measurement result of time axis sweep at Spurious Emission screen.
It is enabled to output only for the frequency table that the Spot set at Level Measure Mode at the time of Spurious Mode is Spot and Search.

■Value a

Frequency table

Range
F1,F2,F3,...,F14,F15

■Value b

Read Out Starting Position

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■Value c

Read out count

Data Points	Range	Resolution
501	1 to 501	1
1001	1 to 1001	1

■Value d (b)

b-th wave data in frequency table a

Range	Resolution
−2147483648 to 2147483647	1

- Unit is 0.01 dBm integer (1dB = 100)

■Constraints

- It is not enabled to output when Spurious Mode is Sweep.

■Application Example

"Reads out five data from 0 of sweep waveform in frequency table F2 at spot measurement."

<Program>

```
DSPL SPURIOUS,SPOT
SWP
SPECT_SPUT? F2,0,5
```

<Response>

-2345,-2346,-2347,-2346,-2345

SPOTRSLT_SPU

Spot Result for Spurious

Program Message	Query Message	Response Message
SPOTRSLT_SPU a,b	SPOTRSLT_SPU? a	b

■Function

Sets the method of calculating the result of the Spot method at Spurious measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For Spurious Level at the Spot method measurement
SEARCH	For Spurious Level at the Search method measurement

■Value b

Calculation method selection

b	Calculation method
AVG	Displays the average value of the measured Spurious Level.
MAX	Displays the maximum value of the measured Spurious Level.

■Application Example

Sets up Spot Result to Max.

<Program>
DSPL Spurious,Spot
SWP
SPOTRSLT_SPU SPOT,MAX
SPOTRSLT_SPU? SPOT

<Response>
MAX

SPUALL

Frequency, Level, Judgement, Limit, Margin, Ref Level, Attenuator, RBW, VBW, Sweep Time

Program Message	Query Message	Response Message
—	SPUALL? a,b,c	d(a),e(a),f(a),...,l(a),m(a), d(a+1),e(a+1),f(a+1),...,l(a+1),m(a+1), ..., d(a+b-1),e(a+b-1),f(a+b-1),...,l(a+b-1),m(a+b-1)

■Function

Outputs measurement result of Frequency, Level, Judgement, Limit, Margin, Ref Level, Attenuator, RBW, VBW and Sweep Time, at Spurious Emission screen at the same time.

■Value a

Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value b

Read out count

Range	Resolution
1 to 15	1

■Value c

Output unit

c	Unit
None	Follows Unit that was setup by Unit (refer to UNIT_SPU)
DBM	dBm
DB	dB
WATT	W

■Value d: Measurement result of frequency

It is same as c at SPUFREQ.

■Value e: Measurement result of Level

It is same as d at SPULVL.

■Value f: Judgement result

It is same as b at SPUPASS.

■Value g: Limit

It is same as c at SPULMTJDG.

■Value h: Margin
It is same as c at SPUMARGIN.

■Value i: Ref Level
It is same as c at SPURL.

■Value j: Attenuator
It is same as c at SPUATT.

■Value k: RBW
It is same as c at SPURBW.

■Value l: VBW
It is same as c at SPUVBW.

■Value m: Sweep Time
It is same as c at SPUSWT.

■Application Example
Reads out all result from f1 to f2

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUALL?F1,2

<Response>
2463264,1.06E-11,PASS,2.50E-19,-43.71,30.00,50,10000,10000,10000,166802000,
4.35E-10,PASS,2.50E-19,-27.59,30.00,50,100000,100000,10000

SPUFREQ

Frequency Result for Spurious Emission

Program Message	Query Message	Response Message
—	SPUFREQ? a,b	c(a),c(a+1),...,c(b)

■Function

Outputs measurement result of Frequency at Spurious Emission screen.

■Value a

Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value b

Read out count

Range	Resolution
1 to 15	1

■Value c

Measurement result of frequency

Resolution	Unit
1	Hz

■Constraints

- If Spurious Mode is Spot, the outputted result is always consistent with Frequency that was set up at Setup Spot Table screen (refer to DSPL).

■Application Example

"Reads out Frequency from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUFREQ? F1,3

<Response>
1775300000,2162950000,2550600000

SPUFREQLVL

Frequency and Level

Program Message	Query Message	Response Message
—	SPUFREQLVL? a,b,c	d(a),e(a),d(a+1),e(a+1),...,d(b),e(b)

■Function

Outputs measurement result of Frequency and Level at Spurious Emission screen at the same time.

■Value a

Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value b

Read out count

Range	Resolution
1 to 15	1

■Value c

Output unit of level

C	Unit
None	Follows Unit that was setup by Unit（refer to UNIT_SPU）
DBM	dBm
DB	dB
WATT	W

■Value d

Measurement result of frequency

Resolution	Unit
1	Hz

■Value e

Measurement result of level

Resolution	Unit
0.01	dBm
0.01	dB
4 significant digits (floating type)	W

■Application Example

Reads out Frequency and Level from f1 to f3

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUFREQLVL?F1,3,DB

<Response>
1775300000,−33.97,2162950000,−37.87,2550600000,−68.69

SPUJDG

Total Judgement

Program Message	Query Message	Response Message
—	SPUJDG?	a

■Function

Reads out general result of level judgement by Limit value at Spurious Emission screen.
If Spurious Mode is Spot, it is judged by using the Limit value that was set up at Setup Spot Table screen as reference. And if Spurious Mode is Search or Sweep, it is judged by using the limit value that was set up at Setup Search/Sweep Table screen.

■Value a

Judgement Result

a	Judgement Result
PASS	Pass
FAIL	Fail
OFF	Not judged

■Constraints

- It will be Pass when all effective measurement from f1 to f15 was completed and all Judgement Result of each point was Pass.
- It will be Fail when Judgement Result is Fail at the point of any effective measurement from f1 to f15.

■Application Example

Reads out general judgement result at spot measurement

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUJDG?

<Response>
PASS

SPULMTJDG

Limit Value for Spurious Emission Judgement

Program Message	Query Message	Response Message
—	SPULMTJDG? a,b	c(a),c(a+1),...,c(b)

■Function

Reads out Limit value used for judgement at Spurious Emission screen.
If Judgement (refer to JUDGUNIT_SPTBL,JUDGUNITSWTBL) is set to Absolute or Relative, setup value is outputted. And if Rel & Abs is set, Limit value used for the judgment among Absolute or Relative is read out.

■Value a

Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value b

Read out count

Range	Resolution
1 to 15	1

■Value c

Limit Value

Resolution	Unit
0.01	dBm
0.01	dB
4 significant digits (floating type)	W

■Application Example

"Reads out Limit from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
JUDGUNIT_SWTBL REL
SWP
SPULMTJDG? F1,3

<Response>
−33.97,−37.87,−68.69

SPUMARGIN

Level Margin for Spurious Emission

Program Message	Query Message	Response Message
—	SPUMARGIN? a,b	c(a),C(a+1),...,c(b)

■Function
Outputs Spurious margin for Limit value used for judgement at Spurious Emission measurement.

■Value a
Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value b
Read out count

Range	Resolution
1 to 15	1

■Value c
Measurement Result of Level

Resolution	Unit
0.01	dB

■Application Example
"Reads out margin of f3 in Search method."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUMARGIN? F3,1

<Response>
3.05

SPULVL

Spurious Level Result for Spurious Emission

Program Message	Query Message	Response Message
—	SPULVL? a,b,c	d(a),d(a+1),…,d(b)

■Function
Outputs measurement result of Level at Spurious Emission screen.

■Value a
Read out start frequency point

Range
F1,F2,F3,…,F14,F15

■Value b
Read out count

Range	Resolution
1 to 15	1

■Value c
Output unit

C	Unit
None	Follows Unit that was setup by Unit（refer to UNIT_SPU）
DBM	DBm
DB	dB
WATT	W

■Value d
Measurement Result of Level

Resolution	Unit
0.01	dBm
0.01	dB
4 significant digits (floating type)	W

■Application Example
"Reads out Level from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPULVL? F1,3,DB

<Response>
−33.97,−37.87,−68.69

SPUPASS

Judgement Result for Spurious Emission

Program Message	Query Message	Response Message
—	SPUPASS? a	b

■Function

Reads out judgement result of level by Limit value at Spurious Emission screen.
If Spurious Mode is Spot, it is judged by using the Limit value that was set up at Setup Spot Table screen as reference. And if Spurious Mode is Search or Sweep, it is judged by using the limit value that was set up at Setup Search/Sweep Table screen.

■Value a

Frequency Point

a	Frequency Point
Fn	Reads out result of specific frequency point（n： 1,2,3,...,14,15）
ALL	Reads out result of all Frequency Point at the same time

■Value b

Judgement Result

b	Judgement Result
PASS	Pass
FAIL	Fail
OFF	Not judged

■Application Example

Reads out judgement result of f3

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUPASS? F3

<Response>
PASS

SPUPWRABS

Absolute Reference Power for Spurious Emission

Program Message	Query Message	Response Message
—	SPUPWRABS? a	b

■Function
Reads out Absolute Reference Power at Spurious Emission screen.

■Value a
Specify the Output Unit

a	Unit
DBM	dBm
WATT	W

■Value b
Tx Power

Resolution	Unit
0.01	dBm
4 significant digits (floating type)	W

■Application Example
"Reads out absolute power of relative value by dBm."

<Program>
DSPL SPURIOUS, SPOT
SWP
SPUPWRABS? DBM

<Response>
–1.23

SPUPWRREL

Relative Reference Power for Spurious Emission

Program Message	Query Message	Response Message
—	SPUPWRREL? a	b

■Function

Reads out Relative Reference Power at Spurious Emission screen.

■Value a

Specify the Output Unit

a	Unit
DBM	dBm
WATT	W

■Value b

Tx Power

Resolution	Unit
0.01	dBm
4 significant digits (floating type)	W

■Application Example

"Reads out reference power of relative value by dBm."

<Program>

DSPL SPURIOUS, SPOT

SWP

SPUPWRREL? DBM

<Response>

–1.23

STANDARD_ACP

Select Template

Program Message	Query Message	Response Message
STANDARD_ACP *a*	STANDARD_ACP?	*a*

■Function

Sets the template on the Output RF Spectrum screen.

■Value *a*

Type of template

a	Band	Station	Type of template	Initial value
GSM900MS39	GSM400 GSM900 GSM850 GSM700	MS	GSM400/900/850 MS 39dB or more	*
GSM900MS37			GSM400/900/850 MS 37dB	
GSM900MS35			GSM400/900/850 MS 35dB	
GSM900MS33			GSM400/900/850 MS 33dB or less	
GSM900BTS43		BTS	GSM400/900/850 BTS 43dB or more	
GSM900BTS41			GSM400/900/850 BTS 41dB	
GSM900BTS39			GSM400/900/850 BTS 39dB	
GSM900BTS37			GSM400/900/850 BTS 37dB	
GSM900BTS35			GSM400/900/850 BTS 35dB	
GSM900BTS33			GSM400/900/850 BTS 33dB or less	
GSM900MBTS33		Micro BTS	GSM400/900/850 Micro BTS 33dB or less	
DCS1800MS36	DCS1800	MS	DCS1800 MS 36dB or more	
DCS1800MS34			DCS1800 MS 34dB	
DCS1800MS32			DCS1800 MS 32dB	
DCS1800MS30			DCS1800 MS 30dB	
DCS1800MS28			DCS1800 MS 28dB	
DCS1800MS26			DCS1800 MS 26dB	
DCS1800MS24			DCS1800 MS 24dB or less	

a	Band	Station	Type of template	Initial value
DCS1800BTS43	DCS1800	BTS	DCS1800 BTS 43dB or more	
DCS1800BTS41			DCS1800 BTS 41dB	
DCS1800BTS39			DCS1800 BTS 39dB	
DCS1800BTS37			DCS1800 BTS 37dB	
DCS1800BTS35			DCS1800 BTS 35dB	
DCS1800BTS33			DCS1800 BTS 33dB or less	
DCS1800MBTS35		Micro BTS	DCS1800 Micro BTS 35dB	
DCS1800MBTS33			DCS1800 Micro BTS 33dB or less	
PCS1900MS33	PCS1900	MS	PCS1900 MS 33dB or more	
PCS1900MS32			PCS1900 MS 32dB	
PCS1900MS30			PCS1900 MS 30dB	
PCS1900MS28			PCS1900 MS 28dB	
PCS1900MS26			PCS1900 MS 26dB	
PCS1900MS24			PCS1900 MS 24dB or less	
PCS1900BTS43		BTS	PCS1900 BTS 43dB or more	
PCS1900BTS41			PCS1900 BTS 41dB	
PCS1900BTS39			PCS1900 BTS 39dB	
PCS1900BTS37			PCS1900 BTS 37dB	
PCS1900BTS35			PCS1900 BTS 35dB	
PCS1900BTS33			PCS1900 BTS 33dB or less	
PCS1900MBTS35		Micro BTS	PCS1900 Micro BTS 35dB	
PCS1900MBTS33			PCS1900 Micro BTS 33dB or less	

■Initialization command

PRE, INI, IP, ＊RST

■Constraints

・ When the Band of the Setup Common Parameter screen is Free, refers to the Band and Select Station of the Output RF Spectrum screen. If it is selected other than the Free , refer to the Band and Select Station of the Setup Common Parameter.

■Application Example

"Sets the template to 34dB of DCS1800(MS)."

<Program>
TERM RF
FREQBAND DCS1800
BANDTRGT MS
DSPL ADJ,HIGH
STANDARD_ACP DCS1800MS34
STANDARD_ACP?

<Response>
DCS1800MS34

STRG_ADJ

Storage Mode for Output RF Spectrum

Program Message	Query Message	Response Message
STRG_ADJ *a*	STRG_ADJ?	*a*

■ Function

Sets the display mode on the Output RF Spectrum screen.

■ Parameter

Display mode

Value	Description	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.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displays the average value."

<Program>
MEAS ADJ,HIGH
STRG_ADJ AVG
STRG_ADJ?

<Response>
AVG

STRG_IQL

Storage Mode for IQ Level

Program Message	Query Message	Response Message
STRG_IQL *a*	STRG_IQL?	*a*

■ Function

Sets the method for displaying the measured results on the IQ Level screen.

■ Value a

Display method

Value	Display Method	Initial Value
NRM	Normal: Perform a single measurement and display the results.	*
AVG	Average: Measures the number of times specified by Average Count, and then displays the average value as the results.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displaying the average value."

<Program>
DSPL IQLVL
STRG_IQL AVG
STRG_IQL?
SNGLS

<Response>
AVG

STRG_MOD

Storage Mode

Program Message	Query Message	Response Message
STRG_MOD *a*	STRG_MOD?	*a*

■ Function

Sets the display mode on the Modulation Analysis measurement.

■ Value a

Display mode

Value	Display Method	Initial Value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures the number of times specified by Average Count, and then displays the average value of the results.	
OVER	Overwrite: Displays the plotted of measurement results to be overwritten during continuous measurement.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displaying the average value."

<Program>
DSPL MODANAL
STRG_MOD AVG
STRG_MOD?

<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 a

Display method

Value	Display Method	Initial Value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures the number of times specified by Average Count, and displays the average value of the results.	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Displaying the average value."

<Program>
MEAS RFPWR
STRG_RFPWR AVG
STRG_RFPWR?

<Response>
AVG

STRG_SPU

Storage Mode for Spurious Emission

Program Message	Query Message	Response Message
STRG_SPU a	STRG_SPU?	a

■Function

Sets the method for displaying the measured results at Spurious Emission measurement.

■Value a

Display Form

a	Display Form	Initial Value
NRM	Normal: Normal display (single measurement)	*
AVG	Average: Repeats measurement the number of times specified by average count, and displays the average value as the result	

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets as an average value display."

<Program>
DSPL SPURIOUS,SPOT
STRG_SPU AVG
STRG_SPU?

<Response>
AVG

SWP

Single Sweep of Sweep Status

Program Message	Query Message	Response Message
SWP	SWP?	*a*

■ Function

Executes sweep once. Switches the sweep mode to "SNGLS" and executes sweep when the SWP program command is received. Processing of the next command is suspended until the sweep is completed. The SWP? command (whether sweep has been completed or is underway).

■ Value a

Sweep state

a	Sweep state
0	Sweep completed
1	Sweep underway

■ Application Example

"Executing sweep once and checking sweep mode.""

<Program>
SWP
SWP?

<Response>
1

SWPWR

Switching Transients

Program Message	Query Message	Response Message
---	SWPWR? *Fa,b,c*	*d*

■ Function

Reads out the Switching Transients value on the Output RF Spectrum screen.

■ Value a

Frequency table

Range	Resolution
1 to 11	1

■ Value b

Lower/Upper

b	Lower/Upper
UP	Upper
LOW	Lower

■ Value c

Output unit

c	Output unit
DB	dB
DBM	dBm

■Value *d*

Switch Transients

Resolution	Unit
0.01	Depends on the value of c

■ Constraints

- When a, b or c is not set, the carrier frequency level is read out in dBm units.
- When only the value c is not set, readout takes place in the unit set by Unit for Output RF Spectrum.

■ Application Example

[1] “Reading out Switching Transients for the Carrier Frequency.”

<Program>
DSPL ADJ,HIGH
SWP
SWPWR?

<Response>
−39.56

[2] “Reading out Switching Transients on the Upper side of Frequency Table f6 in dB.”
<Program>
DSPL ADJ,HIGH
SWP
SWPWR? F6,UP,DB

<Response>
−42.99

SWT_SETREF_SPU

Sweep Time for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
SWT_SETREF_SPU a	SWT_SETREF_SPU?	b

■Function

Sets the Sweep Time of when Reference Power at Spurious Emission is measured by Spectrum method.

■Value a

Sweep time

Range	Resolution	Initial Value	Unit
10 to 1000000	5		msec

□Suffix code

None : msec

S : sec

MS : msec

US : μsec

■Value b

Sweep time

Resolution	Unit
1	μ sec

■Initialization command

PRE,INI,IP,＊RST

■Application Example

Sets the Sweep time to 10s

<Program>

DSPL RELPWRREF

SWT_SETREF_SPU 10S

SWT_SETREF_SPU?

<Response>

10000000

SYMOFS

Symbol align offset

Program Message	Query Message	Response Message
SYMOFS *a*	SYMOFS?	*a*

■ Function

Either sets the symbol reference point to the standard or shifts it by 0.5 symbol on the Setup Common Parameter screen.

■ Value a

Symbol align offset

a	Symbol align offset	Initial value
NRM	Normal	
HALF	Half	*

■ Setting initialization

*RST

■ Application Example

“Setting the symbol align offset to Half.”

<Program>
SYMOFS HALF
SYMOFS?

<Response>
HALF

TBLATT_SPU

Attenuator for Spurious Emission

Program Message	Query Message	Response Message
TBLATT_SPU a,b,c	TBLATT_SPU? a,b	c

■Function

Sets the Attenuator at Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For Attenuator used at the Spot method measurement
SWEEP	For Attenuator used at the Search or Sweep method measurement

■Value b

Frequency table

Range	Object Frequency Point
F1,F2,F3,...,F14,F15	Frequency table from f1 to f15

■Value c

Attenuator

Range	Resolution	Unit
0 to 62 (Note1)	2	dB

Note1: Setup Range of Attenuator is changed based on the Reference Level (refer to TBLRL_SPU).

□Suffix code

None: dB

DB : dB

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Sets the Attenuator of Frequency Point10 at Spot method measurement to 20 dB."

<Program>

TBLATTMD_SPU SPOT,AUTO

TBLRL_SPU SPOT,F10,- 30DBM

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

Sets whether the Attenuator setup of Spectrum Analyzer is set Automatically or Manually at Spurious Emission measurement. The value of Attenuator is automatically set when the setting mode is Auto.

■Value a

Measure method selection

a	Measure Method
SPOT	For Attenuator used at the Spot method measurement
SWEEP	For Attenuator used at the Search or Sweep method measurement

■Value b

Attenuator setting Mode

b	Mode	Initial Value
MAN	Sets the Attenuator setting mode to Manual mode	
AUTO	Sets the Attenuator setting mode to Automatic mode	*

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Setting is forcibly switched to Manual if Attenuator is changed when setting mode is set to Auto.

■Application Example

"Sets the Attenuator in Spot measurement into Automatic setting 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

Sets whether the Attenuator Ref Level setup of Spectrum Analyzer is set Automatically or Manually at Spurious Emission screen. The value of Ref Level and Attenuator are automatically set when the setting mode is Auto.

■Value a

Measure method selection

a	Measure Method
SPOT	For Attenuator and Ref Level used at the Spot method measurement
SWEEP	For Attenuator and Ref Level used at the Search or Sweep method measurement

■Value b

Attenuator and Ref Level setting mode

b	Mode	Initial Value
MAN	Sets the Attenuator and Ref Level setting mode to Manual mode	
AUTO	Sets the Attenuator and Ref Level setting mode to Automatic mode	*

■Initialization command

PRE, INI, IP, *RST

■Constraints

- Setting is forcibly switched to Manual if Attenuator or Ref Level is changed when setting mode is set to Auto.

■Application Example

“Sets the Attenuator and Ref Level in Spot measurement into Automatic setting 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,a,b	TBLFREQ_SPU? SPOT,a	b	Sets the Frequency of Spot method measurement
TBLFREQ_SPU SPOT,HRM	—	—	Sets the Frequency of Spot method measurement to Harmonics
TBLFREQ_SPU START,a,c	TBLFREQ_SPU? START,a	c	Sets the Sweep Start Frequency of Search or Sweep method measurement
TBLFREQ_SPU STOP,a,d	TBLFREQ_SPU? STOP,a	d	Sets the Sweep Stop Frequency of Search or Sweep method measurement

■Function

Sets the frequency of each frequency table for Setup Spot Table or Setup Search Table or Setup Sweep Table. When the 2nd argument is set to HRM, it is Function which sets up automatically frequency n times (n: 2, 3, 4, ...) the frequency of a career until it reaches the maximum value of frequency. Please refer to Spurious Mode about Measure method.

■Value a

Frequency table

Range
F1,F2,F3,...,F14,F15

■Value b

Frequency

Range	Resolution	Initial Value	Unit
Note 1	1	Note 2	Hz

- Note1 : It is same as FREQ. However, Pre Ampl does not affect upper limit value.
- Note2 : It will be a same value in the case of Harmonics is performed for Initial Value of FREQ. Please refer to Initial Value field for detail.
- If 0Hz is set, no value will be set.

□Suffix code
None : Hz
HZ : Hz
KHZ,KZ : kHz
MHZ,MZ : MHz
GHZ,GZ : GHz

■Value c
Start Frequency (Search/Sweep)

Range	Resolution	Initial Value	Unit
Note3	1	Refer to Initial Value field	Hz

- Setup Search Table and Setup Sweep Table shares the value.
- Note3 : Limit value is 1 kHz and upper limit value is −1 kHz that is upper limit value of FREQ. In addition, Pre Ampl does not affect upper limit value.
- By setup of Start Frequency, when relation for "Stop Frequency< (Start Frequency+1 kHz)" is realized, Stop Frequency that becomes "Stop Frequency = (Start Frequency+1 kHz)" is set up automatically. That is, the width of the sweep frequency surely becomes more than 1 kHz.
- If 0Hz is set, no value will be set.

□Suffix code
None : Hz
HZ : Hz
KHZ,KZ : kHz
MHZ,MZ : MHz
GHZ,GZ : GHz

■Value d
Stop Frequency (Search/Sweep)

Range	Resolution	Initial Value	Unit
Note4	1	Refer to Initial Value field	Hz

- Setup Search Table and Setup Sweep Table shares the value.
- Note4 : It is same as FREQ, but lower limit value will be 2 kHz. In addition, Pre Ampl does not affect upper limit value.
- By setup of Stop Frequency, when relation for "Start Frequency＞(Stop Frequency−1 kHz)" is realized, Start Frequency that becomes "Start Frequency ＝(Stop Frequency−1 kHz)" is set up automatically. That is, the width of the sweep frequency surely becomes more than 1 kHz.
- If 0Hz is set, no value will be set.

□Suffix code
None : Hz
HZ : Hz
KHZ,KZ : kHz
MHZ,MZ : MHz
GHZ,GZ : GHz

■Initialization command
PRE, INI, IP, ＊RST

■Application Example
“Sets the sweep interval of f1 of search method measurement to 846 MHz to 860 MHz.”

<Program>
```
TBLFREQ_SPU START,F1,846 MHZ
TBLFREQ_SPU STOP,F1,860 MHZ
TBLFREQ_SPU? START,F1
TBLFREQ_SPU? STOP,F1
```

<Response>
```
846000000 860000000
```

TBLINTRBW_SPU

Integrated RBW for Spurious Emission

Program Message	Query Message	Response Message
TBLINTRBW_SPU a,b	TBLINTRBW_SPU? a	b

■Function
Sets the Bandwidth used for judgement at Search or Sweep method of Spurious Emission.

■Value a
Frequency Point

Range
F1,F2,F3,...,F14,F15

■Value b
Bandwidth used for Judgement

Range	Resolution	Initial Value	Unit
(Span frequency/(the number of data point—1)) to (The smaller one of Span frequency or 100000000)	1	Setup RBW (refer to TBLRBW_SPU)	Hz

□Suffix code
None:Hz
HZ :Hz
KHZ,KZ :kHz
MHZ,MZ :MHz
GHZ,GZ :GHz

■Initialization command
PRE, INI, IP, ＊RST

■Application Example
"Sets the RBW of f2 at Search method measurement to 30kHz."

<Program>
DSPL SETTBL_SPU,SWEEP
TBLINTRBW_SPU F2,30KHZ
TBLINTRBW_SPU? F2

<Response>
30000

TBLLMMD_SPU

Level Measure Mode for Spurious Emission

Program Message	Query Message	Response Message
TBLLMMD_SPU a,b	TBLLMMD_SPU? a	b

■Function

Spurious Mode of Spurious Emission measurement: Sets the Spurious Amplitude measurement method of at the time of Search.

■Value a

Frequency Point

Range
F1,F2,F3,...,F14,F15

■Value b

Measure method selection

b	Measure Method	Initial Value
OFF	No measuring (result of frequency axis sweep is final result)	Note1
SPOT	Amplitude measurement is performed by 0 span sweep	
−1	Un-setting up（only Query）	

Note1 ： Refer to Initial Value field of TBLFREQ SPU

■Constraints

- It is effective only when Spurious Mode is Search and parameter (frequency, RBW etc) for Spurious Search is set up.

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Spurious amplitude measurement of f3 is not processed."

<Program>

```
DSPL SETTBL_SPU,SEARCH
TBLLMMD_SPU F3,OFF
TBLLMMD_SPU? F3
```

<Response>

```
OFF
```

TBLLMT_ACP

Limit for Output RF Spectrum

Program Message	Query Message	Response Message
TBLLMT_ACP *a,b,c,d,e*	TBLLMT_ACP? *a,b,c,d*	*e*

■Function

On the Setup Output RF Spectrum screen, sets the specified object of a limit value.

■Value *a*

Waveform Format Object

a	Object
MOD	Specifies a limit value on the Modulation side.
SWTCH	Specifies a limit value on the Switching Transients side.

■Value b

Upper/Lower Object

B	Object
LOW	Specifies a limit value on the Lower side.
UP	Specifies a limit value on the Upper side.

■Value c

Unit Object

C	Object
REL	dB. Specifies a limit value on the Relative side.
ABS	dBm. Specifies a limit value on the Absolute side.

■Value d

Frequency Table

Range	Object Frequency Point
F1,F2,F3,...,F10,F11	Frequency table from f1 to f11.

■Value e

Limit value

Range	Resolution
-100.00 ～ 100.00	0.01

□Suffix Code
・ None : dB or dBm
・ DB : dB
・ dBm : dBm

However, when the Relative/Absolute specification and the Suffix code specification contradict the parameter, the parameter should be prior. Therefore, when the Absolute value has been specified with the parameter, the Absolute value should be set in dBm even if the Suffix code was specified in dB.

■Setting Initialization
PRE, INI, IP, ＊RST

■Application Example
“ Sets the F7(1MHz) Absolute value on the Upper side of Switching Transients to -50.00dBm.”

<Program>
```
TERM RF
DSPL SETTBL_ACP
TBLVIEW_ACP SWTCH
TBLLMT_ACP SWTCH,UP,ABS,F7,-50.00
TBLLMT_ACP?
```

<Response>
```
-50.00
```

TBLLMT_SPU

Limit for Spurious Emission

Program Message	Query Message	Response Message
TBLLMT_SPU a,b,c,d	TBLLMT_SPU? a,b,d	c

■Function

Sets the Limit value at the time of judgement at Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For Limit value used at the Spot method measurement
SWEEP	For Limit value used at the Search or Sweep method measurement

■Value b

Read out start frequency point

Range
F1,F2,F3,...,F14,F15

■Value c

Limit Value

Range	Resolution	Initial Value	Unit
−100.00 to 100.00	0.01	Refer to Initial Value field of TBLFREQ_SPU	dB
−100.00 to 100.00	0.01		dBm
0.001 to 999.999	0.0001		mW,μW,nW

■Value d

Unit of Limit Value used for Judgement

Value	Unit
DBM	dBm
MW	mW
UW	μW
NW	nW
DB	dB

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Sets the Limit value of f1 at Search method measurement to −13.00 dBm."

<Program>

TBLLMT_SPU SWEEP,F1,-13.00,DBM

TBLLMT_SPU? SWEEP,F1,DBM

<Response>
−13.00

TBLRBW_SPU

RBW for Spurious Emission

Program Message	Query Message	Response Message
TBLRBW_SPU a,b,c	TBLRBW_SPU? a,b	c

■Function

Sets the RBW in Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For RBW used at the Spot method measurement
SWEEP	For RBW used at the Search or Sweep method measurement

■Value b

Frequency table

Range	Object Frequency Point
F1,F2,F3,...,F14,F15	Frequency table from f1 to f15

■Value c

RBW

Setup Range is changed based on the Detection (refer to DET_SPU)

<table>
<tr><th>Detection</th><th colspan="4">Range</th><th>Resolution</th><th>Initial Value</th><th>Unit</th></tr>
<tr><td rowspan="3">Positive
Negative
Sample
Average</td><td>300</td><td>1000</td><td>3000</td><td>10000</td><td rowspan="6">1</td><td rowspan="6"></td><td rowspan="6">Hz</td></tr>
<tr><td>30000</td><td>100000</td><td>300000</td><td>1000000</td></tr>
<tr><td>3000000</td><td>5000000</td><td>10000000</td><td>20000000</td></tr>
<tr><td rowspan="3">RMS</td><td>10</td><td>30</td><td>100</td><td>300</td></tr>
<tr><td>1000</td><td>3000</td><td>10000</td><td>30000</td></tr>
<tr><td>100000</td><td>300000</td><td>10000000</td><td></td></tr>
</table>

□Suffix code

None:Hz

HZ :Hz

KHZ,KZ :kHz

MHZ,MZ :MHz

GHZ,GZ :GHz

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Sets the RBW of f2 at Search method measurement to 30 kHz."

<Program>

```
DSPL SETTBL_SPU,SWEEP
TBLRBW_SPU SWEEP,F2,30KHZ
TBLRBW_SPU? SWEEP,F2
```

<Response>

```
30000
```

TBLRBWLM_SPU

RBW for Spurious Emission (Level Measure)

Program Message	Query Message	Response Message
TBLRBWLM_SPU a,b	TBLRBWLM_SPU? a	b

■Function

Spurious Mode of Spurious Emission measurement: Sets the RBW used for Spurious Amplitude measurement at the time of Search

■Value a

Frequency Point

Range
F1,F2,F3,...,F14,F15

■Value b

RBW

Setup Range is changed based on the Detection（refer to DETLM_SPU）

Detection	Range				Resolution	Initial Value	Unit
Positive Negative Sample Average	300	1000	3000	10000	1	1000000	Hz
	30000	100000	300000	1000000			
	3000000	5000000	10000000	20000000			
RMS	10	30	100	300			
	1000	3000	10000	30000			
	100000	300000	10000000				

□Suffix code

None : Hz

HZ : Hz

KHZ,KZ : kHz

MHZ,MZ : MHz

GHZ,GZ : GHz

■Initialization command

PRE,INI,IP,＊RST

■Application Example

"Sets the RBW of f2 at Search method measurement to 30 kHz."

<Program>
DSPL SETTBL_SPU,SWEEP
TBLRBWLM_SPU F2,30KHZ
TBLRBWLM_SPU? 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 whether the RBW is set automatically or manually at Spurious Emission screen.

■Value a

Measure method selection

a	Measure Method
SPOT	For RBW used at the Spot method measurement
SWEEP	For RBW used at the Search or Sweep method measurement

■Value b

RBW setting mode

b	Mode	Initial Value
MAN	Sets the RBW setting mode to Manual mode	*
AUTO	Sets the RBW setting mode to Automatic mode	

When RBW setting mode is Auto, setup is shown below

Frequency	RBW
0.1 kHz ≦ f < 100 kHz	1 kHz
100 kHz ≦ f < 50 MHz	10 kHz
50 MHz≦ f < 500 MHz	100 kHz
500 MHz ≦ f	3 MHz

■Initialization command

PRE, INI, IP, *RST

■Constraints

- If RBW is changed when the setting mode is set to Auto, the setting is forcibly switched to Manual.

■Application Example

“Sets the RBW setting mode at Spot method measurement to Auto mode.”

<Program>

TBLRBWMD_SPU SPOT,AUTO

TBLRBWMD_SPU? SPOT

<Response>

AUTO

TBLREFSTD_SPU

Select Setup Reference Power Table for Spurious Emission

Program Message	Query Message	Response Message
TBLREFSTD_SPU a	TBLREFSTD_SPU?	a

■Function

Sets the Measurement method of Reference Power in Setup Reference Power screen of Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method		Initial Value
0	Abs & Rel: Tx Power	Sets the reference of Absolute and Relative value to Tx Power	*
1	Abs & Rel: Set	Sets the reference of Absolute and Relative value to Set. In this case, reference power setting of Absolute value and Relative value is needed. (*cf.* ABSPWRVAL_SPU,RELPWRVAL_SPU)	

■Application Example

"Sets the Measure method of Reference Power to Abs & Rel: Set."

<Program>
DSPL RELPWRREF
TBLREFSTD_SPU 1
TBLREFSTD_SPU?

<Response>
1

TBLRL_SPU

Reference Level for Spurious Emission

Program Message	Query Message	Response Message
TBLRL_SPU a,b,c	TBLRL_SPU?a,b	c

■Function

Sets the Reference level at Spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For Attenuator used at the Spot method measurement
SWEEP	For Attenuator used at the Search or Sweep method measurement

■Value b

Frequency table

Range	Object Frequency Point
F1,F2,F3,...,F14,F15	Frequency table from f1 to f15

■Value c

Ref Level

Range	Resolution	Initial Value	Unit
Refer to Constraints	0.01	Based on frequency	dBm

□Suffix code

None: dBm

DBM : dBm

■Initialization command

PRE, INI, IP, ＊RST

■Constraints

- Setup Range of Reference Level is shown below based on RF Input:High/Low (*cf.* RFINPUT), Per Ampl:On/Off (*cf.* PREAMP). In addition for RefLevelOffset, refer to RFLVLOFS.

Pre Ampl	RF Input	
	High	Low
Off	(－100.00+RefLevelOffset) to (50.00+RefLevelOffset)	(－120.00+RefLevelOffset) to (40.00+RefLevelOffset)
On	(－120.00+RefLevelOffset) to (30.00+RefLevelOffset)	(－140.00+RefLevelOffset) to (20.00+RefLevelOffset)

- When Reference Level is out of Range due to changing of RF Input or Per Ampl, it will be set to closest value.

■Application Example

“Sets the Ref Level of Frequency Point 10 at Sweep method measurement to －30 dBm.”

<Program>
DSPL SETTBL_SPU,SPOT
TBLATTMD_SPU SPOT,AUTO
TBLRL_SPU SPOT,F10,－30 DBM
TBLRL_SPU? SPOT,F10

<Response>
－30.00

TBLSWT_SPU

Sweep Time for Spurious Emission

Program Message	Query Message	Response Message
TBLSWT_SPU a,b,c	TBLSWT_SPU? a,b	d

■Function
Sets the Sweep Time in Spurious Emission measurement.

■Value a
Measure method selection

a	Measure Method
SPOT	For Sweep Time used at the Spot method measurement
SWEEP	For Sweep Time used by the Search or Sweep method measurement

■Value b
Frequency table

Range	Object Frequency Point
F1,F2,F3,...,F14,F15	Frequency table from f1 to f15

■Value c
Sweep time

Range	Resolution	Initial Value	Unit
10 to 1000000	5	Refer to Initial Value field of TBLFREQ SPU	msec

□Suffix code
None: msec
S : sec
MS : msec
US : µsec

■Value d
Sweep time

Resolution	Unit
1	µsec

■Initialization command
PRE, INI, IP, *RST

■Application Example
"Sets the Sweep Time of f3 at Sweep method measurement to 100 msec."

<Program>
TBLSWT_SPU SWEEP,F3,100MS
TBLSWT_SPU? SWEEP,F3

<Response>
100000

TBLSWTLM_SPU

Sweep Time for Spurious Emission (Level Measure)

Program Message	Query Message	Response Message
TBLSWTLM_SPU a,b	TBLSWTLM_SPU? *a*	c

■Function
Spurious Mode of Spurious Emission measurement: Sets the Sweep Time used for Spurious Amplitude measurement at the time of Search

■Value a
Frequency point

Range
F1,F2,F3,...,F14,F15

■Value b
Sweep time

Range	Resolution	Initial Value	Unit
10 to 1000000	5	Refer to Initial Value field of TBLFREQ_SPU	msec

□Suffix code
None : msec
S : sec
MS : msec
US : µsec

■Value c
Sweep time

Resolution	Unit
1	µsec

■Initialization command
PRE, INI, IP, *RST

■Application Example
"Sets the Sweep Time of f3 at Sweep method measurement to 100 msec."

<Program>
TBLSWTLM_SPU F3,100MS
TBLSWTLM_SPU? F3

<Response>
100000

TBLSWTMD_SPU

Sweep Time Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLSWTMD_SPU a,b	TBLSWTMD_SPU? a	b

■Function

Sets whether the Sweep Time is set automatically or manually at Spurious Emission screen.

■Value a

Measure method selection

a	Measure Method
SPOT	For Sweep Time used at the Spot method measurement
SWEEP	For Sweep Time used by the Search or Sweep method measurement

■Value b

Sweep time setting mode

b	Sweep Time Setting Mode	Initial Value
MAN	Sets the Sweep Time setting mode to Manual mode	*
AUTO	Sets the Sweep Time setting mode to Automatic mode	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- If Sweep Time is changed when the setting mode is set to Auto, the setting is forcibly switched to Manual.

■Application Example

"Sets the Sweep Time setting mode at Spot method measurement to Manual 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,b,c	TBLVBW_SPU? a,b	c

■Function

Sets the VBW in spurious Emission measurement.

■Value a

Measure method selection

a	Measure Method
SPOT	For VBW used at the Spot method measurement
SWEEP	For VBW used by the Search or Sweep method measurement

■Value b

Frequency table

Range	Object Frequency Point
F1,F2,F3,...,F14,F15	Frequency table from f1 to f15

■Value c

VBW

Range								Resolution	Initial Value	Unit
0(OFF)	1	3	10	30	100	300	1000	1	Note1	Hz
3000	10000	30000	100000	300000	1000000	3000000				

Note1 : Refer to Initial Value field of TBLFREQ SPU

□Suffix code

None:Hz

HZ :Hz

KHZ,KZ :kHz

MHZ,MZ :MHz

GHZ,GZ :GHz

■Initialization command

PRE,INI,IP,*RST

■Application Example

"Sets the VBW of f2 at Search method measurement to 30 kHz."

<Program>
TBLVBW_SPU SWEEP,F2,30KHZ
TBLVBW_SPU? SWEEP,F2

<Response>
30000

TBLVBWLM_SPU

VBW for Spurious Emission (Level Measure)

Program Message	Query Message	Response Message
TBLVBWLM_SPU a,b	TBLVBWLM_SPU? a	b

■Function
Spurious Mode of Spurious Emission measurement: Sets the VBW used for Spurious Amplitude measurement at the time of Search.

■Value a
Frequency point

Range
F1,F2,F3,...,F14,F15

■Value b
VBW

Range								Resolution	Initial Value	Unit
0(OFF)	1	3	10	30	100	300	1000	1	3000000	Hz
3000	10000	30000	100000	300000	1000000	3000000				

□Suffix code
None : Hz
HZ : Hz
KHZ,KZ : kHz
MHZ,MZ : MHz
GHZ,GZ : GHz

■Initialization command
PRE,INI,IP,*RST

■Application Example
Sets the VBW of f2 at Search method measurement to 30 kHz

<Program>
TBLVBWLM_SPU F2,30KHZ
TBLVBWLM_SPU? F2

<Response>
30000

TBLVBWMD_SPU

VBW Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLVBWMD_SPU a,b	TBLVBWMD_SPU? a	b

■Function

Sets whether the VBW is set automatically or manually at Spurious Emission screen.

■Value a

Measure method selection

a	Measure Method
SPOT	For VBW used at the Spot method measurement
SWEEP	For VBW used by the Search or Sweep method measurement

■Value b

VBW setting mode

b	Mode	Initial Value
MAN	Sets the VBW setting mode to Manual mode	*
AUTO	Sets the VBW setting mode to Automatic mode	

■Initialization command

PRE, INI, IP, *RST

■Constraints

- If VBW is changed when the setting mode is set to Auto, the setting is forcibly switched to Manual.
- The value of VBW is automatically set based on value of RBW and VBW/RBW Ratio when the setting mode is Auto.

■Application Example

"Sets the VBW setting mode of Spot method measurement to Auto 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 the ratio of the VBW and RBW that is used at the automatic setup of VBW on the Spurious Emission screen.

■Value a

Measure method selection

a	Measure Method
SPOT	For VBW/RBW Ratio used at the Spot method measurement
SWEEP	For VBW/RBW Ratio used by the Search or Sweep method measurement

■Value b

VBW/RBW ratio

Range							Initial Value
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	Refer to Initial Value field of TBLFREQ_SPU
0.3	1	3	10	30	100		

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Sets the VBW/RBW Ratio at Search method measurement to 3."

<Program>
TBLVBWRT_SPU SWEEP,3
TBLVBWRT_SPU? SWEEP

<Response>
3

TBLVIEW_ACP

View Select for Setup Output RF Spectrum

Program Message	Query Message	Response Message
TBLVIEW_ACP *a*	TBLVIEW_ACP?	*a*

■Function

On the Setup Output RF Spectrum screen, sets the object to be displayed

■Value *a*

Types of Display Item

a	Display Item	Initial Value
MOD	Displays the set value of Modulation.	*
SWTCH	Displays the set value of Switching Transients.	

■Setting Initialization

PRE, INI, IP, *RST

■Application Example

"Setting the display object to Switching Transients."

<Program>
TERM RF
DSPL SETTBL_ACP
TBLVIEW_ACP SWTCH
TBLVIEW_ACP?

<Response>
SWTCH

TBLVIEW_SPU

View for Setup Spot, Sweep, Search Table

Program Message	Query Message	Response Message
TBLVIEW_SPU a,b	TBLVIEW_SPU? a	b

■Function

Selects RBW and VBW, Ref Level, ATT and SWT, or Limit to display on screen right-hand side, at Setup Spot, Search and Sweep Table screen. In addition, it is enabled to select Measure Mode and Spurious Level Meas.

■Value a

Measure method selection

a	Measure Method
SPOT	For Setup screen used at the Spot method measurement
SWEEP	For Setup screen used at the Sweep method measurement
SEARCH	For Setup screen used at the Search method measurement

■Value b

View items

b	Description	Initial Value
None	It changes in order of “BW →Ref,ATT,SWT →Limit(dB) →Limit(W) → Level Meas. Mode →Level Meas. Set →BW” and displays	
BW	Displays the BW	*
REFATTSWT	Displays the Ref, ATT and SWT	
LMTDB	Displays the Limit(dB)	
LMTW	Displays the Limit(W)	
LVLMEASMD	Displays the Level Meas. Mode	
LVLMEASSET	Displays the Level Meas. Set	

■Constraints

- Level Meas.Mode and Level Meas.Set can be displayed only at Setup Search Table screen.

■Initialization command

PRE, INI, IP, *RST

■Application Example

Displays the Setup Sweep table by Limit(dB)

<Program>

```
DSPL SETTBL_SPU,SWEEP
TBLVIEW_SPU SWEEP,LMTDB
TBLVIEW_SPU? SWEEP
```

<Response>

```
LMTDB
```

TEMPFORM

Format Type for RF Power Template

Program Message	Query Message	Response Message
TEMPFORM *a*	TEMPFORM?	*a*

■Function

Sets the Template format used for the RF Power measurement. Level and Unit setting for each Template line shall be separately saved in BTS/MS.

■Value *a*

Selection of Template format

a	Selection method for the judging Level Unit	Initial Value
BTS	Sets in the Template format of BTS.	*
MS	Sets in the Template format of MS.	

■Setting Initialization

PRE, INI, IP, ＊RST

■Application Example

"Setting the Judgment Type to MS."

<Program>
DSPL SETTEMP_RFPWR
TEMPFORM MS
TEMPFORM?

<Response>
MS

TEMPLVLMS_RFPWR

Level Modify for RF Power Template

■Function

On the Setup Template for RF screen, customizes the currently displayed Template when the Template Format is set to MS. When the Judgment Unit is BS, please set, using TEMPLVL_RFPWR (cf. TEMPLVL_RFPWR)

Program Message	Query Message	Response Message
TEMPLVL_RFPWR *a,b,c,d*	TEMPLVL_RFPWR? *a,b,d*	*c*

■Value *a*

Selection of Upper frame/Lower frame on Templates

a	Selection of Upper frame/Lower frame on Templates
UP	Upper: Setting chage of Upper frame.
LOW	Lowerr: Setting change of Lower frame.

■Value *b*

Template Position

Range	Value *a* (Upper frame／Lower frame)	Template Type
1～6	Upper	NB at GMSK, AB, BTS1900 at GMSK
1	Lower	
1～7	Upper	NB at 8-PSK
1～3	Lower	

■Value *c*

Power

Range	Resolution	Unit	Template Type
−110.0 ～ 10.0	0.1	dB	---
		dBm(*a* = Upper *b* = 1,2,6 only)	NB at GMSK, AB, BTS1900 at GMSK
		dBm(*a* = Upper *b* = 1,2,7 only)	NB at 8-PSK

1.□ Value *d*

Template Unit

d	Unit	Template Type
None	dB	---
DB		
DBM	dBm(a = Upper b = 1,2,6 only)	NB at GMSK, AB, BTS1900 at GMSK
	dBm(a = Upper b = 1,2,7 only)	NB at 8-PSK

DBM is invalid except when *a* = Upper, *b* = 1,2,6(For NB at 8-PSK, *a* = Upper *b* = 1,2,7)

1.□ Initial Value (Standard)

Template Type	Template Format	Value *a* (Upper frame／Lower frame)	Value *b* (Position)	c Initial Value (Standard)	Band
NB at GMSK, AB	BTS	Upper	1	−30.0 dB	Free, all BTS
			2	−30.0 dB	
			3	−6.0 dB	
			4	4.0 dB	
			5	1.0 dB	
		Lower	1	−1.0 dB	
	MS	Upper	1	−36.0 dB	GSM400,GSM850,GSM700 and GSM900MS
				−59.0 dBm	
			2	−30.0 dB	
				−17.0dBm	
			3	−6.0 dB	
			4	4.0 dB	
			5	1.0 dB	
			6	−54.0dB	
				−59.0dBm	
		Lower	1	−1.0 dB	
		Upper	1	−48.0 dB	DCS1800MS,PCS1900MS
				−48.0 dBm	
			2	−30.0 dB	
				−20.0dBm	
			3	−6.0 dB	
			4	4.0 dB	
			5	1.0 dB	
			6	−48.0dB	
				−48.0dBm	
		Lower	1	−1.0 dB	

Template Type	Template Format	Value *a* (Upper frame／Lower frame)	Value *b* (Position)	c Initial Value (Standard)	Band
NB at 8-PSK	BTS	Upper	1	−30.0 dB	Free, all BTS
			2	−30.0 dB	
			3	−6.0 dB	
			4	4.0 dB	
			5	2.4 dB	
			6	4.0 dB	
		Lower	1	−2.0 dB	
			2	0.0 dB	
			3	−15.0 dB	
	MS	Upper	1	−36.0 dB	GSM400,GSM850,GSM700 and GSM900MS
				−59.0 dBm	
			2	−30.0 dB	
				−17.0dBm	
			3	−6.0 dB	
			4	4.0 dB	
			5	2.4 dB	
			6	4.0 dB	
			7	−54.0dB	
				−59.0dBm	
		Lower	1	−2.0 dB	
			2	0.0 dB	
			3	−15.0 dB	
		Upper	1	−48.0 dB	DCS1800MS,PCS1900MS
				−48.0 dBm	
			2	−30.0 dB	
				−20.0dBm	
			3	−6.0 dB	
			4	4.0 dB	
			5	2.4 dB	
			6	4.0 dB	
			7	−48.0 dB	
				−48.0 dBm	
		Lower	1	−2.0 dB	
			2	0.0 dB	
			3	−15.0 dB	
BTS1900 at GMSK	BTS	Upper	1	−30.0 dB	Free, all BTS
			2	−30.0 dB	
			3	0.0 dB	
			4	4.0 dB	
			5	1.0 dB	

Template Type	Template Format	Value *a* (Upper frame／Lower frame)	Value *b* (Position)	c Initial Value (Standard)	Band
BTS1900 at GMSK	BTS	Lower	1	－1.0 dB	
	MS	Upper	1	－36.0 dB	GSM400,GSM 850,GSM700 and GSM900MS
				－59.0 dBm	
			2	－30.0 dB	
				－17.0dBm	
			3	0.0 dB	
			4	4.0 dB	
			5	1.0 dB	
			6	－54.0dB	
				－59.0dBm	
		Lower	1	－1.0 dB	
	MS	Upper	1	－48.0 dB	DCS1800MS,PCS1900MS
				－48.0 dBm	
			2	－30.0 dB	
				－20.0dBm	
			3	0.0 dB	
			4	4.0 dB	
			5	1.0 dB	
			6	－48.0 dB	
				－48.0 dBm	
		Lower	1	－1.0 dB	

■Setting Initialization

PRE, INI, IP, ＊RST

■Constraints

・Cannot be set when the Template Format is set to BS (Cf. TEMPFORM)

■Application Example

Change the Upper1 level of NB at 8-PSK Template type to －49.5 dB.”

DSPL SETTEMP_RFPWR
TEMPFORM MS
TEMPTYPE_RFPWR NB8PSK
TEMPLVL_RFPWR UP,1,-49.5
TEMPLVL_RFPWR? UP,1

<Response>
－49.5

TEMPLVL_RFPWR

Level Modify for RF Power Template

Program Message	Query Message	Response Message
TEMPLVL_RFPWR *a,b,c*	TEMPLVL_RFPWR? *a,b*	*c*

■ Function

Customizes the currently displayed template on the Setup Template for RF Power screen. When the Template Format is MS, please set, using TEMPLVLMS_RFPWR (cf. TEMPLVLMS_RFPWR).

■ Value a

Selection of the upper frame or lower frame of the template

a	Selection of the upper frame or lower frame of the template
UP	Upper: Changes the setting of the upper frame
LOW	Lower: Changes the setting of the lower frame

■ Value b

Template position

Range	Value a (Upper frame/Lower frame)	Template Type
1 to 5	Upper	NB at GMSK, AB, BTS1900 at GMSK
1	Lower	
1 to 6	Upper	NB at 8-PSK
1 to 3	Lower	

■ Value c

Power

Range	Resolution	Unit
−110.0 to 10.0	0.1	dB
		dBm (a=Upper b=1,2 only)

☐ Suffix code

None: dB

DB: dB

DBM: DBM

■ Setting initialization

PRE, INI, IP, *RST

■Constraints

・Cannot be set when the Template Format is MS (Cf. TEMPFPRM).

■ Application Example

“Changing the level of Upper 1 for the NB at 8-PSK template-type to −49.5 dB.”

<Program>
DSPL SETTEMP_RFPWR
TEMPFORM BTS
TEMPTYPE_RFPWR NB8PSK
TEMPLVL_RFPWR UP,1,−49.5
TEMPLVL_RFPWR? UP,1

<Response>
−49.5

TEMPOFFLVL

Setup Off Level

Program Message	Query Message	Response Message
TEMPOFFLVL *a*	TEMPOFFLVL?	*a*

■ Function

Sets the unit of template Upper Level 1 (power when transmission is set to off) on the Setup Template for RF Power screen.

■ Value a

Unit of Upper Level 1 of the template

a	Unit of template Upper Level1	Initial value
DBM	dBm	
DB	dB	*

■ Setting initialization

PRE, INI, IP, *RST

■Constraints

・Cannot be set when the Template Format is MS (Cf. TEMPFPRM).

■ Application Example

"Setting the unit of template Upper Level 1 to dB."

<Program>
DSPL SETTEMP_RFPWR
TEMPFORM MS
TEMPOFFLVL DB
TEMPOFFLVL?

<Response>
DB

TEMPPASS

Template Pass

Program Message	Query Message	Response Message
---	TEMPPASS? *a(b)*	*c*

■ Function

Judges waveform passes and failures measured using a template on the RF Power measurement screen. Outputs the value of Normal Burst when Slot does not exist. And when the Slot is specifies, outputs the value of that Slot.

■ Value a

Selection of Burst On interval/Off interval

a	Selection of Burst On interval/Off interval
ON	On interval
OFF	Off interval

■Value b

Slot number

b	Slot
0	Slot0
1	Slot1
2	Slot2
3	Slot3
4	Slot4
5	Slot5
6	Slot6
7	Slot7
ALL	Judgement result of all Slot

■ Value c

Pass and failure judgement

c	Pass and failure jugment
PASS	Pass: Passed
FAIL	Fail: Not passed
OFF	Un measuring

■ Application Example
“Judging passed and failures of the measured RF Power waveform.”

<Program>
DSPL RFPWR
WINDOW SLOT
TEMPTYPE_RFPWR NBGMSK
SWP
TEMPPASS? ON

<Response>
PASS

TEMPPASS_ACP

Template Pass for Output RF spectrum

Program Message	Query Message	Response Message
---	TEMPPASS_ACP? *a*	*b(1),b(2)...b(n)*

■Function

Judges measurement waveform passes and failures using a template on the Output RF Spectrum screen.. As for the criteria, if a waveform is found to have been contained within all points of a template, the waveform is judged passes (Pass). On the other hand, if a waveform is found to have gone beyond the template even at a single point, the waveform fails (FAIL).
When the Modulation or the Switching Trans. is selected, outputs all judgement results of each from -1.8MHz to +1.8MHz range (This is the case of the Measure Range is 1.8MHz on the same screen. If 6MHz is specified, the range is from -6.0MHz to +6.0MHz).
If the All is specified, outputs the total judgement results of the Modulation and Switching Trans.

■Value a

Selection of the judgement waveform

a	Selection of the judgement waveform
MOD	Modulation
SWTCH	Switching Trans.
ALL	The total judgement results of each Modulation and Switching Trans.

■Value b

passes and failures judgement

b	Judgement results
PASS	Pass
FAIL	Fail

■Application Example

"Gets the total judgement results of the Modulation and Switching Trans by the specified All."

<Program>
TERM RF
DSPL ADJ,HIGH
SWP
TEMPPASS_ACP? ALL

<Response>
PASS,FAIL

TEMPPASS_RFPWR

Template Pass

Program Message	Query Message	Response Message
---	TEMPPASS_RFPWR? *a(b)*	*c*

■ Function

Judges waveform passes and failures measured using a template on the RF Power screen. As for the criteria, if a waveform is found to have been contained within all points of a template, the waveform is judged passes (Pass). On the other hand, if a waveform is found to have gone beyond the template even at a single point, the waveform fails (FAIL).
This Function has the same effect as the TEMPPASS command.

■ Value a

Selection of Burst On interval/Off interval

a	Selection of Burst On interval/Off interval
ON	On interval
OFF	Off interval

■Value b

Slot number

b	Slot
0	Slot0
1	Slot1
2	Slot2
3	Slot3
4	Slot4
5	Slot5
6	Slot6
7	Slot7
ALL	Judgement result of all Slot

■Value *c*

Pass and failure judgement

c	Pass and failure judgement
PASS	Pass
FAIL	Fail
OFF	Un measuring

■ Application Example

"Judging passed and failures of the measured RF Power waveform."

<Program>
DSPL RFPWR
WINDOW SLOT
TEMPTYPE_RFPWR NBGMSK
SWP
TEMPPASS_RFPWR? ON

<Response>
PASS

TEMPRPWR

Reference Power for Template

Program Message	Query Message	Response Message
---	TEMPRPWR?	*a*

■ Function

Outputs power (template level 1) specified by the template when transmission is off when transmission is off in the relative value of the average intra-burst on the RF Power screen.

■ Value a

Specified power when transmission is set to off

Resolution	Unit
0.01	dB

■ Application Example

“Outputting specified power when transmission is set to off.”

<Program>
DSPL PFPWR
SWP
TEMPRPWR?

<Response>
−59.0

TEMPTYPE_RFPWR

Reference Power for Template

Program Message	Query Message	Response Message
TEMPTYPE_RFPWR *a*	TEMPTYPE_RFPWR?	*a*

■ Function

Sets the frame for the standard template on the RF Power screen.

■ Value a

Template type

a	Template	Initial value
NBGMSK	NB at GMSK	*
AB	AB	
NB8PSK	NB at 8PSK	
B19GMSK	BTS1900 at GMSK	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the template-type to NB at 8PSK."

<Program>
DSPL SETTEMP_RFPWR
TEMPTYPE_RFPWR NB8PSK
TEMPTYPE_RFPWR?

<Response>
NB8PSK

TERM

Trace Format

Program Message	Query Message	Response Message
TERM *a*	TERM?	*a*

■ Function

Sets the connector for the input signal to be measured on the Setup Common Parameter screen.

■ Value a

Connector type

a	Connector	Initial Value
RF	RF.	*
IQDC	IQ-DC.	
IQAC	IQ-AC.	
IQBAL	IQ-Balance.	

■ Setting initialization

*RST

■ Application Example

"Setting the input signal to IQ-DC."

<Program>
DSPL SETCOM
TERM IQDC
TERM?

<Response>
IQDC

TRFORM

Trace Format

Program Message	Query Message	Response Message
TRFORM *a*	TRFORM?	*a*

■ Function

Sets the format for waveform display on the Modulation Analysis screen.

■ Value a

Waveform format

a	Waveform format	Modulation analysis	Initial value
NON	None: Displays the results in the form of numeric only, with no waveform display.	GMSK, 8-PSK	*
TRLIS	Trellis: Displays changes in phase with the passage of time.	GMSK	
CONSTEL	Constellation: Displays IQ diagram.	GMSK, 8-PSK	
VECT	EVM: Displays the size of the vector error.	8-PSK	
EYE	Eye Diagram: Displays the changes in Signal IQ with the passage of time.	GMSK, 8-PSK	
PHASE	Phase Error: Displays the phase error.	GMSK, 8-PSK	
MAGTD	Magnitude: Displays the amplitude error.	GMSK, 8-PSK	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the format for waveform display to Phase Error."

<Program>
MEAS MODANAL
TRFORM PHASE
TRFORM?

<Response>
PHASE

TRFORM_ACP

Trace Format

Program Message	Query Message	Response Message
TRFORM *a*	TRFORM_ACP?	*a*

■Function

Sets the format of the waveform display on the Output RF Spectrum screen.

■Value *a*

Waveform format

a	Waveform format	Initial value
NON	None: Displays only numeric result. Waveform is not displayed.	＊
MOD	Modulation: Displays measurement result of Modulation.	
SWTCH	Switching Tran: Diaplays measurement reslt of Switching Tran.	

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Sets the waveform format of Output RF Spectrum to the Modulation."

<Program>
TERM RF
MEAS ADJ,HIGH
TRFORM_ACP MOD
TRFORM_ACP??

<Response>
MOD

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 a

Trigger setting

a	Trigger Setting	Initial value
FREE	Free Run	*
EXT	External	

■ Setting Initialization

*RST

■ Application Example

"When inputting a trigger from the outside."

<Program>
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 a

Trigger delay value

Range	Resolution	Initial Value	Unit
−120.00 to 120.00	0.001	0.000	ms

□ Suffix code

None: ms
US: μs
MS: ms
S: s

■ Constraints

- No setting is allowed when Trigger is set to Free Run.

■ Setting initialization

*RST

■ Application Example

"Setting the trigger delay value to 50.000 ms."

<Program>
TRG EXT
TRGDLY 50.000
TRGDLY?

<Response>
50.000

TRGEDGE

Trigger Edge

Program Message	Query Message	Response Message
TRGEDGE *a*	TRGEDGE?	*a*

■ Function

Sets either the leading or trailing edge as the standard trigger timing on the Setup Common Parameter screen.

■ Value a

Trigger standard

a	Trigger standard	Initial value
RISE	Sets the leading edge as the trigger standard.	*
FALL	Sets the trailing edge as the trigger standard.	

■ Constraints

- No setting is allowed when Trigger is set to Free Run.

■ Setting initialization

*RST

■ Application Example

"Setting leading edge as the trigger standard."

<Program>
TRG EXT
TRGEDGE RISE
TRGEDGE?

<Response>
RISE

TXPWR

Transmitter Power

Program Message	Query Message	Response Message
---	TXPWR? *a(b)*	*c*

■ Function

Outputs the average intra-burst power on the RF Power and Spurious Emission screen.
When the argument does not exist, outputs the value of Normal Burst. And when Slot number is specified, outputs the value of that Slot.

■ Value a

Output unit

a	Unit
DBM	dBm
WATT	W

■ Value b

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■ Value c

Average intra-burst power

Resolution	Unit
0.01	Depends on the value a.

■ Application Example

"Reading out the measurement results of TX Power of Normal Burst."

<Program>
DSPL SPURIOUS,SPOT
SWP
TXPWR? DBM

<Response>
25.03

UBIT_MSPS

Training Sequence Bit Pattern by user setting for Multi Slot Parameter Setup

Program Message	Query Message	Response Message
UBIT_MSPS *a,b*	UBIT_MSPS? *b*	*a*

■Function

Sets the Training Sequence Bit Pattern of when the Training Sequence of this screen and this Slot is set to user setting, on the Multi Slot Parameter Setup screen.

■Value *a*

Training Sequence Bit Pattern

Range※	Modulation method	Resolution	Initial value	Unit
0 to FFFFFFFFFFFFFFFF	GMSK	1	0000000	bit
0 to 7777777777777777777777777	8-PSK	1	000000000	bit

※Setup range is determined depends on the value of the User Pattern Length of this Slot.

■Value *b*

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■Constraints

- Cannot be set when the Training Sequence Bit Pattern of this Slot is other than User setting.

■Initialization command

＊RST

■Application Example
"Sets the Training Sequence Bit Pattern of User definition of Slot1 on the Multi Slot Parameter Setup screen to FFFF."

<Program>
```
MODTYPE GMSK
MEASOBJ NBMS
DSPL MSPS
PATT_MSPS USER,1
ULEN_MSPS 16,1
UBIT_MSPS FFFF,1
UBIT_MSPS? 1
```

<Response>
```
FFFF
```

ULEN_MSPS

Training Sequence Length by user setting for Multi Slot Parameter Setup

Program Message	Query Message	Response Message
ULEN_MSPS *a,b*	ULEN_MSPS? *b*	*a*

■Function

Sets the Training Sequence Length of when the Training Sequence of this screen and this Slot is set to user setting, on the Multi Slot Parameter Setup screen.

■Value *a*

Training Sequence Bit Pattern

Range	Modulation method	Resolution	Initial value	Unit
1 to 64	GMSK	1	26	symbol
1 to 26	8-PSK	1	26	symbol

■Value *b*

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■Constraints

・Cannot be set when the Training Sequence Bit Pattern of this slot is other than the User setting.

■Initialization command

PRE,INI,IP,＊RST

■Application Example

"Sets the Training Sequence length of Slot1 on the Multi Slot Parameter Setup screen to 64symbol."

<Program>
MODTYPE GMSK
MEASOBJ NBMS
DSPL MSPS
PATT_MSPS USER,1
ULEN_MSPS 64,1
ULEN_MSPS? 1

<Response>
64

UNIT_ADJ

Unit for Output RF Spectrum

Program Message	Query Message	Response Message
UNIT_ ADJ *a*	UNIT_ ADJ?	*a*

■ Function

Sets the unit of display/readout for the measurement results on the Output RF Spectrum screen.

■ Value a

Unit of display/readout

a	Unit of display/readout	Initial value
DBM	dBm	*
DB	dB	

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the unit of Output RF Spectrum to dB."

<Program>
MEAS ADJ,HIGH
UNIT_ADJ DB
UNIT_ADJ?

<Response>
DB

UNIT_IQL

Unit for IQ Level

Program Message	Query Message	Response Message
UNIT_IQL *a*	UNIT_IQL?	*a*

■ Function

Sets the measurement results unit for the IQ Level on the IQ Level screen.

■ Value a

Unit of the IQ Level

a	Unit of the IQ Level	Initial value
MV	mV	
DBMV	dBmV	*

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the IQ Level unit to mV."

<Program>
TERM IQAC
MEAS IQLVL
UNIT_IQL MV
UNIT_IQL?

<Response>
MV

UNIT_SPU

Unit for Spurious Emission

Program Message	Query Message	Response Message
UNIT_SPU a	UNIT_SPU?	a

■Function
Sets the Unit of level (measurement result) from f1 to f15 at Spurious Emission screen.

■Value a
Unit of each level

a	Unit	Initial Value
AUTO	Unit used for judgement	*
DB	dB	
DBM	dBm	
WATT	W	

■Initialization command
PRE, INI, IP, *RST

■Application Example
"Sets the Unit of each level from f1 to f15 to dB."

<Program>
UNIT_SPU DB
UNIT_SPU?

<Response>
DB

USTART_MSPS

Start Point of Training Sequence by user setting for Multi Slot Parameter Setup

Program Message	Query Message	Response Message
USTART_MSPS *a,b*	USTART_MSPS? *b*	*a*

■Function

When the Training Sequence of this screen and this Slot is set to user setting, sets up which position in 1 burst is made into the start point of Training Sequence on the Multi Slot Parameter Setup screen.

■Value *a*

Start point of Training Sequence

Range	Modulation method	Measuring Object	Resolution	Initial value	Unit
0 to (87 − User Pattern Length)	GMSK	AB	1	61	bit
0 to (147 − User Pattern Length)	GMSK	Other than AB	1	61	bit
0 to (147 − User Pattern Length)	8-PSK	NB	1	61	symbol

■Value *b*

Slot number

Range	Resolution	Initial value
0 to 7	1	1

■Constraints

・Cannot be set when the Training Sequence Bit Pattern of this Slot is other than User setting.

■Initialization command

＊RST

■Application Example
"Sets the Training Sequence start point of Slot1 to 0bit on the Multi Slot Parameter Setup screen."

<Program>
MODTYPE GMSK
MEASOBJ NBMS
DSPL MSPS
PATT_MSPS USER,1
USTART_MSPS 0,1
USTART_MSPS? 1

<Response>
0

VBW_SETREF_SPU

Video Bandwidth for Reference Power of Spurious Emission

Program Message	Query Message	Response Message
VBW_SETREF_SPU a	VBW_SETREF_SPU?	a

■Function
Sets the VBW (Video Bandwidth) at the time of measuring the Reference Power of Spurious Emission by the Spectrum method.

■Value a
VBW

Range								Resolution	Initial Value	Unit
0(OFF)	1	3	10	30	100	300	1000	1	1MHz	Hz
3000	10000	30000	100000	300000	1000000	3000000				

□Suffix code
None:Hz
HZ :Hz
KHZ,KZ :kHz
MHZ,MZ :MHz
GHZ,GZ :GHz

■Initialization command
PRE,INI,IP,∗RST

■Application Example
Sets the VBW to 30 kHz

<Program>
VBW_SETREF_SPU 30KHZ
VBW_SETREF_SPU?

<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.

■ Parameter

RMS EVM

Resolution	Unit
0.01	%

■ Application Example

"Reading out the RMS EVM value."

<Program>
DSPL MODANAL
SWP
VECTERR? DB

<Response>
23.48

VIEW_ACP

View Select for Output RF Spectrum

Program Message	Query Message	Response Message
VIEW_ACP *a*	VIEW_ACP?	*a*

■Function

On the Output RF Spectrum screen, sets the object displayed by a limit value when in Non display .

■Value *a*

Types of Display Item

a	Display Item	Initial Value
LOW	Displays a limit value on the Lower side.	*
UP	Dispplays a limit value on the Upper side.	

■Constraints

・Can be set only when the Trace Format is set to Non on the Output RF Spectrum screen.

■Setting Initialization

PRE, INI, IP, ＊RST

■Application Example

“Sets the display item onto the Upper side.”

<Program>
TERM RF
DSPL ADJ,HIGH
VIEW_ACP UP
VIEW_ACP?

<Response>
UP

VIEW_SPU

View for Sprious Emission

Program Message	Query Message	Response Message
VIEW_SPU a	VIEW_SPU?	a

■Function
Selects result of Judgement, RBW and VBW, Ref Level, or ATT and SWT to display on screen right-hand side, at Spurious Emission screen.

■Value a
View items
Spurious emission screen

a	Description		Initial Value
None	---	It changes in order of "Judgement → RBW, VBW → Ref Level, ATT, SWT → Level Meas.(*note*) → Judgement" and displays	
JDG	Judgement	Displays the Judgement	*
BW	BW	Displays the RBW and VBW	
REFATTSWT	Ref,ATT,SWT	Displays the Ref Level, ATT and Sweep Time	
LVLMEAS	Level Meas.	Displays the measurement condition at the time of Spurious Amplitude measurement(*note*)	

note: Spurious Mode: Only for Search

■Constraints
- It is not enabled to set when Waveform Display is ON (*cf.* WAVEFORM_SPU)

■Initialization command
PRE, INI, IP, *RST

■Application Example
"Displays the RBW and VBW."

<Program>
DSPL SPURIOUS,SPOT
WAVEFORM_SPU OFF
VIEW_SPU BW
VIEW_SPU?

<Response>
BW

VSCALE

Vertical Scale for EVM, Phase Error and Magnitude Error

Program Message	Query Message	Response Message
VSCALE *a*	VSCALE?	*a*

■ Function

Outputs the upper limit value of the vertical scale on the coordinate on the Modulation Analysis screen when the Trace Format is set to EVM, Phase Error or Magnitude Error.

■ Parameter

Upper limit value of vertical scale

a	Upper limit of vertical scale	Initial value
5	5 [deg] or [%]	
10	10 [deg] or [%]	
20	20 [deg] or [%]	*
50	50 [deg] or [%]	
100	100[deg] or [%]	

■ Constraints

- No setting is allowed when the Trace Format is set to other than EVM, Phase Error or Magnitude Error.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the upper limit value of the vertical scale for Phase Error to 50 [deg]."

<Program>
MEAS MODANAL
TRFORM PHASE
VSCALE 50
VSCALE?

<Response>
50

WAVEFORM_RFPWR

Waveform Display for RF Power

Program Message	Query Message	Response Message
WAVEFORM_RFPWR *a*	WAVEFORM_RFPWR?	*a*

■Function

Sets the decision of the waveform display on the RF Power screen.

■Value *a*

Decision of waveform display

a	Decision of waveform display	Initial value
ON	Displays the waveform.	*
OFF	Not displays the waveform.	

■Constraints

・ Cannot be set when the Measuring Object is other than the Normal Burst (Multi Slot).

■Initialization command

PRE, INI, IP, *RST

■Application Example

"Sets the waveform display of the RF Power to Off."

<Program>
TERM RF
MEASOBJ NBMS
DSPL RFPWR
WAVEFORM_RFPWR OFF
WAVEFORM_RFPWR?

<Response>
OFF

WAVEFORM_SPU

Waveform Display for Spurious Emission

Program Message	Query Message	Response Message
WAVEFORM_SPU a	WAVEFORM_SPU?	a

■Function

Sets On/Off of the Waveform Display at Spurious Emission screen.

■Value a

On/Off of waveform display

a	On/Off of Waveform Display	Initial Value
ON	Displays the waveform	＊
OFF	Do not display the waveform	

■Constraints

・ It is not enabled to switch the display until all measurements of frequency table are finished.

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

“Displays the waveform.”

<Program>

DSPL SPURIOUS,SWEEP
WAVEFORM_SPU ON
WAVEFORM_SPU?

<Response>

ON

WAVETBLNO_SPU

Display Waveform for Spurious Emission

Program Message	Query Message	Response Message
WAVETBLNO_SPU Fa,b	WAVETBLNO_SPU?	Fa

■Function

Displays the Sweep waveform of specified frequency table number at Spurious Emission screen.

■Value a

Frequency table number

Range	Resolution	Initial Value
1 to 15	1	1

■Value b

Waveform display

b	Waveform Display
None	Frequency: Displays the Frequency sweep waveform
FREQ	
TIME	TIME: Displays the Time axis sweep waveform

■Constraints

- It is not enabled to set when Waveform Display is OFF. (*cf.* WAVEFORM_SPU)
- Value b can be input only when Search method is selected. (*cf.* DSPL)

■Initialization command

PRE, INI, IP, ＊RST

■Application Example

"Displays the sweep waveform of frequency table number 10."

<Program>
DSPL SPURIOUS,SWEEP
WAVEFORM_SPU ON
SWP
WAVETBLNO_SPU F10
WAVETBLNO_SPU?

<Response>
F10

WIDE_RFPWR

Wide Dynamic Range

Program Message	Query Message	Response Message
WIDE_RFPWR *a*	WIDE_RFPWR?	*a*

■ Function

Sets the Wide Dynamic Range on/off on the RF Power screen.

■Value a

Setting on/off of the Wide Dynamic Range

Value	Switching on/off of the Wide Dynamic Range	Initial Value
ON	On: Enable the Wide Dynamic Range.	
OFF	Off: Disables the Wide Dynamic Range.	*

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Enabling the Wide Dynamic Range."

<Program>
MEAS RFPWR
WIDE_RFPWR ON
WIDE_RFPWR?

<Response>
ON

WINDOW

Wave Window

Program Message	Query Message	Response Message
WINDOW *a*	WINDOW?	*a*

■ Function

Sets the waveform window on the RF Power screen.

■Value a

Type of waveform window

a	Type of waveform window	Modulation Type	Initial Value
SLOT	Slot: Displays the waveform for a single slot.	GMSK, 8-PSK	*
ONPORT	On Portion: Displays the enlarged waveform of the burst-on section.	GMSK	
FRAME	Frame: Displays the waveform for a single frame (8 slots).	GMSK, 8-PSK	
LEAD	Leading: Displays the waveform for the leading section of the burst.	GMSK, 8-PSK	
TRAIL	Trailing: Displays the waveform for the trailing section of the burst.	GMSK, 8-PSK	

■ Constraints

- The waveform window cannot be set to On Portion when the modulation-type is set at 8-PSK.
- Also, when Measuring Object is Normal Burst(Multi Slot) and the Waveform Display on the same screen is set to Off, it cannot be set.

■ Setting initialization

PRE, INI, IP, *RST

■ Application Example

"Setting the waveform window to On Portion."

<Program>
MEAS RFPWR
WINDOW ONPORT
WINDOW?

<Response>
ONPORT

XMB

Wave Data for Output RF Spectrum

Program Message	Query Message	Response Message
XMB *a,b,c,d*	XMB? *a,b,c, e*	*f(1),f(2),…,f(d)*

■Function

Read-out and Process the Spot waveform data on the Output RF Spectrum screen.

■Value *a*

Specifies the domain

Range	Object domain
0	Carrier
1	Upper (+100kHz to +1.8MHz)
2	Lower (-100kHz to -1.8MHz)

■Value *b*

Specifies the frequency band

Range	Object domain
0	±100kHz
1	±200kHz
2	±250kHz
3	±400kHz
4	±60kHz
5	±800kHz
6	±1MHz
7	±1.2MHz
8	±1.4MHz
9	±1.6MHz
10	±1.8MHz

■Value *c*

Write data / Address of read start

Range	Resolution
0 to 374	1

<About relation of the Marker Position and the data storage address. >

For the data in the range from -20.0symbol to 167.00Symbol of the Marker Position, the data from 0 to 376 of storage address is assigned.

Marker Position [symbol]	−20.0	−19.5	0.0	167.0
Data storage address	0	1	40	374

■Value *d*

Writes the 16bit waveform data.

Range	Resolution
−32768 to 32767	1

・ Sets by the integer by 0.01dB unit that consider 1dB as 100.

■Value *e*

The number of read-out data（this is the number of data reads-out from the read-out data start address in order.

Range	Resolution
1 to 375	1

If it is more than maximum value 376 that is total value with read-out start address specified before, it cannot be read-out.

■Value *f*（*n*）

The 16bit waveform data that was read-out.

Range	Resolution
−32768 to 32767	1

・ Sets by the integer by 0.01dB unit that consider 1dB as 100.

■Application Example

"Reads the 5 wave data of Carrier of Output RF Spectrum from memory address 0."

<Program>
TERM RF
DSPL ADJ,HIGH
SWP
XMB? 0,0,0,5

<Response>
−1012, −1743, −1823, −1272, −1055

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 a

Selection of IQ

a	Selection of IQ
0	Signal I
1	Signal Q

■ Value b

Data writing address

Range	Measuring Object	Modulation Type	Resolution
0 to 1470	NA, NB, SB	GMSK	1
0 to 1550	Continuous		
0 to 1410	NB, Continuous	8-PSK	1

<Relation between the marker position and data storage address>

*1: Addresses 0 to 1470 are assigned to the Eye Diagram Marker Positions 0.0 symbol to 147.0 symbol (resolution: 0.1 symbol). Since the resolution of the Constellation marker position is 1.0 symbol, address 0, 10 … 1470 are assigned to marker positions 0.0 symbol, 1.0 symbol … 1470.0 symbol.

*2: When the modulation-type is set 8-PSK, addresses 0 to 1410 are assigned to the Eye Diagram Marker Position 3.0 symbol to 144.0 symbol (resolution: 0.1 symbol). As the resolution of the Constellation marker position is 1.0 symbol, addresses 0, 10… 1410 are assigned to marker positions, 3.0 symbol, 4.0 symbol … 1410.0 symbol.

■ Value 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 d

Selection of IQ

d	Selection of IQ
0	Signal I
1	Signal Q

■ Value e

Address from which to start data readout:

Range	Measuring Object	Modulation Type	Resolution
0 to 1470	NA, NB, SB	GMSK	1
0 to 1550	Continuous		
0 to 1410	NB, Continuous	8-PSK	1

<Relation between the marker position and data storage address>

*1:Addresses to 1470 are assigned to the Eye Diagram Marker Positions 0.0 symbol to 147.0 symbol (resolution: 0.1 symbol). Since the resolution of the Constellation marker position is 1.0 symbol, addresses, 0, 10 … 1470, are assigned to marker positions 0.0 symbol, 1.0 symbol … 147.0 symbol.

*2:When the modulation type is set to 8-PSK, addresses 0 to 1410 are assigned to the Eye Diagram Marker Positions 3.0 symbol to 144.0 symbol (resolution: 0.1 symbol). As the resolution of the Constellation marker position is 1.0 symbol, addressed 0, 10 … 1410 are assigned to marker positions 3.0 symbol, 4.0 symbol … 144.0 symbol.

■ Value f

Number of data readouts (meaning the number of data readouts in order from the address from which data readout is started).

Range	Measuring Object	Modulation Type	Resolution
1 to 1471	NA, NB, SB	GMSK	1
1 to 1551	Continuous		
1 to 1411	NB, Continuous	8-PSK	1

■ Value g (n)

16-bit waveform data to be read out

Range	Resolution
−32768 to 32767	1

- Data are read out by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Application Example

"Making five readout of the waveform data for Signal IQ from memory address 0."

<Program>
DSPL MODANAL
SWP
XMC? 0,0,5

<Response>
0, −1, 0, −1, 0

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 waveform display on the RF Power screen.

■ Value a

Data writing address

Range	Measuring Object	Resolution
0 to 13010	Normal Burst (other than Multi Slot)	1
0 to 26020	Nomal Burst (Multi Slot)	1

<Relation between the marker position and data storage address>

Data storage addressed 0 to 13010 are assigned when the marker position ranges from the minimum value of the horizontal scale −27.0 symbol, when the window is set to Slot, to the maximum value of the horizontal scale 1274.0 symbol, when the window is set to Frame (resolution: 0.1 symbol). (See the table below.)

Marker Position [symbol]	−27.0	−26.9	0.0	1247.0
Data storage address	0	1	270	13010
Data storage address	0	2	540	26020

■ Value 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 dBm set at 100.

■ Value c

Addressed from which to start data readout:

Range	Measuring Object	Resolution
0 to 13010	Normal Burst (other than Multi Slot)	1
0 to 26020	Nomal Burst (Multi Slot)	1

■ Value d

Number of data readouts

Range	Measuring Object	Resolution
1 to 13011	Normal Burst (other than Multi Slot)	1
0 to 26021	Nomal Burst (Multi Slot)	1

■ Value e (n)

16-bit waveform data to be read out

Range	Resolution
−32768 to 32767	1

- Data are read out by using an integer in the unit of 0.01 dBm with 1 dBm set at 100.

■ Application Example

"Making five readouts of the waveform data of RF Power from memory address 0."

<Program>
DSPL RFPWR
SWP
XMD? 0,5

<Response>
−1012, −1743, −1823, −1272, −1055

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 for Magnitude Error on the Modulation Analysis screen.

■ Value a

Data writing address

Range	Measuring Object	Modulation Type	Resolution
0 to 1470	NA, NB, SB	GMSK	1
0 to 1550	Continuous		
0 to 141	NB, Continuous	8-PSK	

<Relation between the marker position and data storage address>

*1:When the modulation type is set to GMSK, addresses 0 to 1410 are assigned to marker positions 0.0 symbol to 147.0 symbol (resolution: 0.1).

*2:When the modulation type is set to 8-PSK, addressed 0 to 141 are assigned to marker positions 3.0 symbol to144.0 symbol (resolution: 1.0).

- Setting is made by using an integer the unit of 0.01 % with 1 % set at 100.

■ Value 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 % with 1 % set at 100.

■ Value c

Address from which to data readout:

Range	Measuring Object	Modulation Type	Resolution
0 to 1470	NA, NB, SB	GMSK	1
0 to 1550	Continuous		
0 to 141	NB, Continuous	8-PSK	

<Relation between the marker position and data storage address>

*1:When the modulation type is set to GMSK, addresses 0 to 1410 are assigned to marker positions 0.0 symbol to 147.0 symbol (resolution: 0.1)

*2:When the modulation type is set 8-PSK, addresses 0 to 141 are assigned to marker positions 3.0 symbol to 144.0 symbol (relation: 1.0).

■ Value d

Number of data readouts (meaning the number of data readouts in order from the address from which data readout is started.)

Range	Measuring Object	Modulation Type	Resolution
1 to 1471	NA, NB, SB	GMSK	1
1 to 1551	Continuous		
1 to 142	NB, Continuous	8-PSK	

■ Value e (n)

16-bit waveform data to be read out

Range	Resolution
−32768 to 32767	1

- Data are read out by using an integer in the unit of 0.01 % with 1 % set at 100.

■ Application Example

"Making five readouts of the waveform data for Magnitude Error from memory address 0."

<Program>
DSPL MODANL
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 for Phase Error on the Modulation Analysis screen.

■ Value a

Data writing address

<table>
<tr><th>Range</th><th>Measuring Object</th><th>Modulation Type</th><th>Resolution</th></tr>
<tr><td>0 to 1470</td><td>NA, NB, SB</td><td rowspan="2">GMSK</td><td rowspan="3">1</td></tr>
<tr><td>0 to 1550</td><td>Continuous</td></tr>
<tr><td>0 to 141</td><td>NB, Continuous</td><td>8-PSK</td></tr>
</table>

<Relation between the marker position and data storage address>

*1:When the modulation type is set to GMSK, addresses 0 to 1410 are assigned to marker positions 0.0 symbol to 147.0 symbol (resolution: 0.1).

*2:When the modulation type is set to 8-PSK, addresses 0 to 141 are assigned to marker positions 3.0 symbol to 144.0 symbol (resolution: 1.0).

■ Value 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 deg with set at 100.

■ Value c

Address from which to start data readout:

Range	Measuring Object	Modulation Type	Resolution
0 to 1470	NA, NB, SB	GMSK	1
0 to 1550	Continuous		
0 to 141	NB, Continuous	8-PSK	

<Relation between the marker position and data storage address>

*1:When the modulation type is set to GMSK, addresses 0 to 1410 are assigned to marker positions 0.0 symbol to 147. 0 symbol (resolution: 0.1).

*2:When the modulation type is set to 8-PSK, addresses 0 to 141 are assigned to marker positions 3.0 symbol to 144.0 symbol (resolution: 1.0).

■ Value d

Number of data readouts (meaning the number of data readouts in order from the address from which data readout is started)

Range	Measuring Object	Modulation Type	Resolution
1 to 1471	NA, NB, SB	GMSK	1
1 to 1551	Continuous		
1 to 142	NB, Continuous	8-PSK	

■ Value e (n)

16-bit waveform data to be readout

Range	Resolution
−32768 to 32767	1

- Data are read out by using an integer in the unit of 0.01 deg with 1 deg at set to 100.

■ Application Example

"Making five readout of the waveform data for Phase Error 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 for EVM on the Modulation Analysis screen.

■ Value a

Data writing address

Range	Resolution
0 to 141	1

<Relation between the marker position and data storage address>
Addresses 0 to 141 are assigned to marker positions 3.0 symbol to 144.0 symbol (resolution: 1.0 symbol)

■ Value 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 % with 1.0 % set at 100.

■ Value c

Address from which to start data readout:

Range	Resolution
0 to 141	1

<Relation between the marker position and data storage address>
Addresses 0 to 141 are assigned to marker positions 3.0 symbol to 144 symbol (resolution: 1.0 symbol).

■ Value d

Number of data readouts (meaning the number of data readouts in order from the address from which data readout is started)

Range	Resolution
−32768 to 32767	1

■ Value e (n)

16-bit waveform data to be read out

Range	Resolution
−32768 to 32767	1

- Data are read out by using an integer in the unit of 0.01 % with 1 % set at 100.

■ Application Example

“Making five readouts of the waveform data for EVM from memory address 0.”

<Program>
DSPL MODANAL
SWP
XMV? 0, 5

<Response>
0, 3743, 0, 9272, 0

ZAJ

Zero Set

Program Message	Query Message	Response Message
ZAJ	---	---

■ Function

Executes zero-point calibration for the power meter. This function has the same effect as the ZEROSET command.

■ Application Example

<Program>
DSPL PWRMTR
ZAJ

ZEROSET

Zero Set

Program Message	Query Message	Response Message
ZEROSET	---	---

■ Function

Executes zero-point calibration of the power meter. This function has the same effect as the ZAJ command.

■ Application Example

<Program>
DSPL PWRMTR
ZEROSET