MX860804A/MX860904A/
MX268104A/MX268304A/MX268704A
CDMA2000 1xEV-DO
Measurement Software
(For MS8608A/MS8609A/
MS2681A/MS2683A/MS2687A/B)

Sixth Edition

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

ANRITSU CORPORATION

Document No.: M-W2090AE-6.0

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

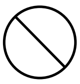
DANGER ⚠ This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.

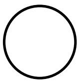
WARNING ⚠ This indicates a hazardous procedure that could result in serious injury or death if not performed properly.

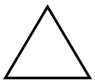
CAUTION ⚠ This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

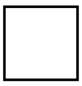
Safety Symbols Used on Equipment and in Manual

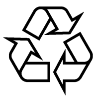
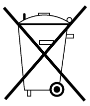
The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.


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.

MX860804A/MX860904A/MX268104A/MX268304A/MX268704A
CDMA2000 1xEV-DO Measurement Software (For MS8608A/MS8609A/MS2681A/MS2683A/MS2687A/B)
Operation Manual

13 July 2001 (First Edition)
12 May 2006 (Sixth Edition)

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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MS8609A/MS2681A/MS2683A/MS2687A/B (hereafter computer system).

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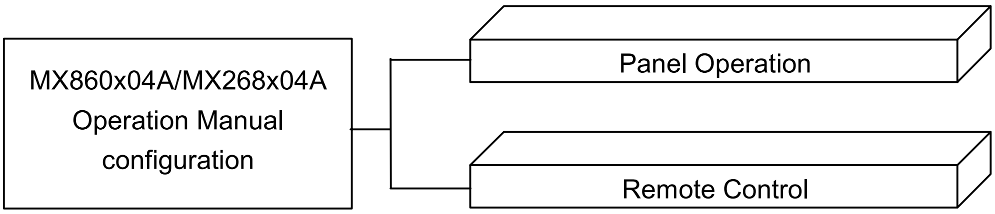
About This Manual

1. The contents of this Operation Manual explain the operation of the MS8608A/09A Degital Mobile Radio Transmitter Tester and the MS2681A/83A/87A/B Spectrum Analyzer when the MX860804A/ MX860904A/MX268104A/MX268304A/MX268704A CDMA2000 1xEV-DO Measurement Software is installed.

   In this manual, MX860x04A means MX860804A or MX860904A, MX268x04A means MX268104A or MX268304A or MX268704A.
   MS860x means MS8608A or MS8609A, MS268x means MS2681A or MS2683A or MS2683A or MS2687A or MS2687B.

2. Manual configuration:
   The MX860x04A/MX268x04A CDMA2000 1xEV-DO measurement software operation manual consists of the following two documents.



Panel Operation:
   Explains overview, panel description, operation and performance test of the MX860x04A/MX268x04A.

Remote Control:
   Explains remote control of the MX860x04A/MX268x04A via RS-232C/GPIB interface.

MX860804A/MX860904A/
MX268104A/MX268304A/MX268704A
CDMA2000 1xEV-DO Measurement Software
(For MS8608A/MS8609A/
MS82681A/MS2683A/MS2687A/B)
Operation Manual
(Panel Operation)

Table of Contents

Section 1 General

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

1.1 Overview

The MS8608A/MS8609A Digital Mobile Radio Transmitter Tester (hereinafter, called the transmitter tester) is a unit that allows speedy, accurate and easy measurement of the transmitter characteristics of base/mobile stations for various mobile communications. In addition to the RF/IF signal evaluation function, it has an IQ (base band) signal analysis function for evaluation of devices. The standard transmitter tester is equipped with a high-performance spectrum analyzer and power meter. With measurement software installed, the transmitter tester provides a modulation analysis function corresponding to various digital modulation modes. In addition, employment of the high-speed digital signal processing technology enables fast and accurate measurement.

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

With the MX860804A/MX860904A/MX268104A/MX268304A/MX268704A CDMA2000 1xEV-DO measurement software (hereinafter, called 1xEV-DO software) installed, this transmitter tester or spectrum analyzer becomes universal measurement equipment that allows easy measurement of the functions and performance of radio units for a digital mobile phone regulated by 3GPP2 cdma2000 High Rate Packet Data Air Interface Standard.

The transmitter tester/spectrum analyzer installed with the 1xEV-DO software provides the major measurement functions given below.

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

1.2 Configuration

Combinations of Transmitter Tester/Spectrum Analyzer, 1xEV-DO software, and product configurations are given below.

- For transmitter tester MS8608A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	CDMA2000 1xEV-DO measurement software	1	MX860804A	Supplied with ATA card
Accessory	Operation manual	1	W2090AE	

- For transmitter tester MS8609A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	CDMA2000 1xEV-DO measurement software	1	MX860904A	Supplied with ATA card
Accessory	Operation manual	1	W2090AE	

- For spectrum analyzer MS2681A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	CDMA2000 1xEV-DO measurement software	1	MX268104A	Supplied with ATA card
Accessory	Operation manual	1	W2090AE	

- For spectrum analyzer MS2683A

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	CDMA2000 1xEV-DO measurement software	1	MX268304A	Supplied with ATA card
Accessory	Operation manual	1	W2090AE	

- For spectrum analyzer MS2687A/B

	Product name	Q'ty	Model name/Ordering No.	Remarks
Software	CDMA2000 1xEV-DO measurement software	1	MX268704A	Supplied with ATA card
Accessory	Operation manual	1	W2090AE	

1.3 Specifications

MX860804A CDMA2000 1xEV-DO measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX860804A CDMA2000 1xEV-DO measurement software (MS8608A)	
Purpose	To measure transmission characteristics of cdma2000 High Rate Packet Data Air Interface-type base station equipments (Access Network) and mobile radio units (Access Terminal)	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS8608A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement Measurement frequency range Measurement level range Carrier frequency accuracy Modulation accuracy Residual vector error Origin offset accuracy Waveform display Forward link	 50 MHz to 2.3 GHz –20 to +40 dBm (average power during burst): High-power input –40 to +20 dBm (average power during burst): Low-power input –60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1 ± (reference crystal oscillator accuracy +10 Hz) when input: level ≥–10 dBm (high-power input), ≥–30 dBm (low-power input), ≥–40 dBm (low-power input, with preamplifier On*1), using code channel 1 CH Input: level ≥–10 dBm (high-power input), ≥–30 dBm (low-power input), ≥–40 dBm (low-power input, with preamplifier On*1), <2.0% (rms) using code channel 1 CH Input: level ≥–10 dBm (high-power input), ≥–30 dBm (low-power input), ≥–40 dBm (low-power input, with preamplifier On*1), ±0.5 dB for signal with origin offset –30 dBc using only code channel 1 CH (1) For each of DATA, MAC, Pilot area or all areas, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number (2) Displays Symbol constallation for DATA area.	

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

Item	Specifications	Remarks
Reverse link	For 1CH to multi-channel input signals, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number	
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–20 to +40 dBm (average power during burst): High-power input –40 to +20 dBm (average power during burst): Low-power input –60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Code domain power accuracy	±0.2 dB (code power ≥–10 dBc) or ±0.4 dB (code power ≥–25 dBc) when input level: ≥+10 dBm (high-power input), ≥–10 dBm (low-power input), ≥–20 dBm (low-power input, with preamplifier On*1)	
Analysis signal	Forward link, Reverse link	
Display function		
Forward link	For DATA and MAC area, displays the followings: • DATA area code domain power Spread ratio: Fixed to 16, IQ separated display • MAC area code domain power Spread ratio: Fixed to 64, IQ separated display	
Reverse link	IQ separated display of code domain power Detects the following channels: • Pilot CH I-CH Walsh16 0CH • ACK CH I-CH Walsh8 4CH • DRC CH Q-CH Walsh16 8CH • DATA CH Q-CH Walsh4 2CH	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–20 to +40 dBm (average power during burst): High-power input –40 to +20 dBm (average power during burst): Low-power input –60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Transmission power measurement	After level calibration using built-in power meter (automatically calibrated by pressing a key)	

Item	Specifications	Remarks
Measurement range	0 to +40 dBm (average power during burst): High-power input –20 to +20 dBm (average power during burst): Low-power input –20 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Accuracy	±0.4 dB	
Power measurement linearity	±0.20 dB (0 to –40 dB) when input level: ≥+20 dBm (high-power input), ≥0 dBm (low-power input), ≥–20 dBm (low-power input, with preamplifier On*1), without changing the reference level settings after range optimization	
Idle slot analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

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

Item	Specifications	Remarks
Occupied bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–20 to +40 dBm (average power during burst): High-power input –40 to +20 dBm (average power during burst): Low-power input –60 to +10 dBm (average power during burst): Low-power input, with preamplifier On*1	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Spurious colse to the Carrier measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	+10 to +40 dBm (average power during burst): High-power input –10 to +20 dBm (average power during burst): Low-power input	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	750 kHz offset: ≥45 dB (at 2 MHz span) 1.98 MHz offset: ≥60 dB When input level (average power during burst) ≥+20 dBm (high-power input), ≥0 dBm (low-power input), RBW: 30 kHz, VBW: 3 kHz, Detection: Positive	

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

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 7.8 GHz, except carrier frequency ±50 MHz range	
Input level range (Transmission power)	+20 to +40 dBm (average power during burst): High-power input 0 to +20 dBm (average power during burst): Low-power input	
Measurement method		
Sweep method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Spot method	Measures at the specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At CW carrier frequency 800 MHz to 1000 MHz or 1800 MHz to 2200 MHz, power ratio reference value is Tx power (except the spurious given in note below) ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0) ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0) In normal mode ≥76–f [GHz] dB typical (RBW: 1 MHz) (1000 to 3150 MHz, band 0) ≥76 dB typical (RBW: 1 MHz) (3150 to 7800 MHz, band 1)	
Main unit option With MS8608A-03 installed	In spurious mode ≥76 dB typical (RBW: 1 MHz) (1600 to 7800 MHz, band 1) ***Note:*** When the carrier frequency is 2030.354 to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
CCDF measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +40 dBm: High Power input –60 to +20 dBm: Low Power input –80 to +10 dBm: Low Power input, with preamplifier On*1	
Measurement method		
CCDF	Displays cumulative distribution of difference between peak and average power.	
APD	Displays distribution of difference between peak and average power.	
Filter selection function	20 MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz	
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector) Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector) DC/AC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

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

MX860904A CDMA2000 1xEV-DO measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX860904A CDMA2000 1xEV-DO measurement software (MS8609A)	
Purpose	To measure transmission characteristics of cdma2000 High Rate Packet Data Air Interface-type base station equipments (Access Network) and mobile radio units (Access Terminal)	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS8609A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +20 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.5 dB when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset –30 dBc	
Waveform display		
Forward link	(1) For each of DATA, MAC, Pilot area or all areas, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number (2) Displays Symbol constallation for DATA area.	
Reverse link	For single- to multi-channel input signals, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number	

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

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +20 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	When input level: ≥–10 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1) ±0.2 dB (code power ≥–10 dB) ±0.4 dB (code power ≥–25 dB)	
Analysis signal	Forward link, Reverse link	
Display function		
Forward link	For DATA and MAC area, displays the followings: • DATA area code domain power • Spread ratio: Fixed to 16, IQ separated display • MAC area code domain power • Spread ratio: Fixed to 64, IQ separated display	
Reverse link	IQ separated display of code domain power Detects the following channels: • Pilot CH I-CH Walsh16 0CH • ACK CH I-CH Walsh8 4CH • DRC CH Q-CH Walsh16 8CH • DATA CH Q-CH Walsh4 2CH	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +20 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement	After level calibration using built-in power meter (automatically calibrated by pressing a key)	
Measurement range	–20 to +20 dBm (average power during burst): With preamplifier Off –20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	±0.4 dB	
Power measurement linearity	±0.2 dB (0 to –40 dB) when input level (average power during burst): ≥0 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization	
Idle slot analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

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

Item	Specifications	Remarks
Occupied bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +20 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Spurious close to the Carrier measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	–10 to +20 dBm (average power during burst): With preamplifier Off	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	750 kHz offset: ≥45 dB (at 2 MHz span) 1.98 MHz offset: ≥60 dB When input level (average power during burst) ≥0 dBm (preamplifier input), RBW: 30 kHz, VBW: 3 kHz, Detection: Positive	

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

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 12.75 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +20 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1000 MHz or 1800 MHz to 2200 MHz, power-ratio reference value is Tx power (except the spurious given in note below) ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0) ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0) In normal mode ≥76–f [GHz] dB typical (RBW: 1 MHz) (1000 to 3150MHz, band 0) ≥76 dB typical (RBW: 1 MHz) (3150 to 7800 MHz. band 1) ***Note:*** When the carrier frequency is 2030.354 MHz to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
CCDF measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–60 to +20 dBm: with preamplifier Off –80 to +10 dBm: with preamplifier On*1	
Measurement method		
CCDF	Displays cumulative distribution of difference between peak and average power.	
APD	Displays distribution of difference between peak and average power.	
Filter selection function	20 MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz	
Electric performance (IQ input)		
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	Differential voltage range: 0.1 to 1 Vpp (at input connector) Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

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

MX268104A CDMA2000 1xEV-DO measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268104A CDMA2000 1xEV-DO measurement software (MS2681A)	
Purpose	To measure transmission characteristics of cdma2000 High Rate Packet Data Air Interface-type base station equipments (Access Network) and mobile radio units (Access Terminal)	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2681A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement	*1: The preamplifier can be set On when main unit option MS8608A-08 is installed.	
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.50 dB when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset –30 dBc	
Waveform display		
Forward link	(1) For each of DATA, MAC, Pilot area or all areas, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number (2) Displays Symbol constallation for DATA area.	
Reverse link	For single- to multi-channel input signals, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number	

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

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	When input level: ≥–10 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1) ±0.2 dB (code power ≥–10 dB) ±0.4 dB (code power ≥–25 dB)	
Analysis signal	Forward link, Reverse link	
Display function		
Forward link	For DATA and MAC area, displays the followings: • DATA area code domain power • Spread ratio: Fixed to 16, IQ separated display • MAC area code domain power • Spread ratio: Fixed to 64, IQ separated display	
Reverse link	IQ separated display of code domain power Detects the following channels: • Pilot CH I-CH Walsh16 0CH • ACK CH I-CH Walsh8 4CH • DRC CH Q-CH Walsh16 8CH • DATA CH Q-CH Walsh4 2CH	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement	After level calibration using built-in power meter (automatically calibrated by pressing a key)	
Measurement range	–20 to +30 dBm (average power during burst): With preamplifier Off –20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	±2.0 dB	
Power measurement linearity	±0.20 dB (0 to –40 dB) when input level (average power during burst): ≥0 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization	
Idle slot analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

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

Item	Specifications	Remarks
Occupied bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Spurious close to the Carrier measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	–10 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	750 kHz offset: ≥45 dB (at 2 MHz span) 1.98 MHz offset: ≥60 dB When input level (average power during burst) ≥0 dBm (preamplifier input), RBW: 30 kHz, VBW: 3 kHz, Detection: Positive	

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

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 3.0 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1 GHz or 1.8 to 2.2 GHz, power-ratio reference value is Tx power (except the spurious given in note below) ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz) ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz) In normal mode ≥76–f [GHz] dB typical (RBW: 1 MHz) (1000 to 3000 GHz) ***Note:*** When the carrier frequency is 2030.354 MHz to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
CCDF measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–60 to +30 dBm: with preamplifier Off –80 to +10 dBm: with preamplifier On*1	
Measurement method		
CCDF	Displays cumulative distribution of difference between peak and average power.	
APD	Displays distribution of difference between peak and average power.	
Filter selection function	20 MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz	
Power accuracy	±1dB	
Electric performance (IQ input)	This function is available when MS2681A-17 or 18 option is installed.	
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	When MS2681A-17 is installed. Differential voltage range: 0.1 to 1 Vpp (at input connector) Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	When MS2681A-18 is installed. 0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

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

MX268304A CDMA2000 1xEV-DO measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268304A CDMA2000 1xEV-DO measurement software (MS2683A)	
Purpose	To measure transmission characteristics of cdma2000 High Rate Packet Data Air Interface-type base station equipments (Access Network) and mobile radio units (Access Terminal)	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2683A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using code channel 1 CH	
Origin offset accuracy	±0.50 dB when input level ≥–30 dBm (with preamplifier Off), ≥–40 dBm (with preamplifier On*1), using only code channel 1 CH, for signal with origin offset –30 dBc	
Waveform display		
Forward link	(1) For each of DATA, MAC, Pilot area or all areas, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number (2) Displays Symbol constallation for DATA area.	
Reverse link	For single- to multi-channel input signals, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number	

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

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Code domain power accuracy	When input level: ≥–10 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1) ±0.2 dB (code power ≥–10 dB) ±0.4 dB (code power ≥–25 dB)	
Analysis signal	Forward link, Reverse link	
Display function		
Forward link	For DATA and MAC area, displays the followings: • DATA area code domain power • Spread ratio: Fixed to 16, IQ separated display • MAC area code domain power • Spread ratio: Fixed to 64, IQ separated display	
Reverse link	IQ separated display of code domain power Detects the following channels: • Pilot CH I-CH Walsh16 0CH • ACK CH I-CH Walsh8 4CH • DRC CH Q-CH Walsh16 8CH • DATA CH Q-CH Walsh4 2CH	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Transmission power measurement	After level calibration using built-in power meter (automatically calibrated by pressing a key)	
Measurement range	–20 to +30 dBm (average power during burst): With preamplifier Off –20 to +10 dBm (average power during burst): With preamplifier On*1	
Accuracy	±2.0 dB	
Power measurement linearity	±0.20 dB (0 to –40 dB) when input level (average power during burst): ≥0 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1), without changing the reference level settings after range optimization	
Idle slot analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

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

Item	Specifications	Remarks
Occupied bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–40 to +30 dBm (average power during burst): With preamplifier Off –60 to +10 dBm (average power during burst): With preamplifier On*1	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Spurious close to the Carrier measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	–10 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	750 kHz offset: ≥45 dB (at 2 MHz span) 1.98 MHz offset: ≥60 dB When input level (average power during burst) ≥0 dBm (preamplifier input), RBW: 30 kHz, VBW: 3 kHz, Detection: Positive	

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

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 7.8 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst): With preamplifier Off	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1 GHz or 1.8 to 2.2 GHz, power-ratio reference value is Tx power (except the spurious given in note below) ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0) ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0) In normal mode ≥76–f [GHz] dB typical (RBW: 1 MHz) (1.0 to 3.0 GHz, band 0) ≥76 dB typical (RBW: 1 MHz) (3.15 to 7.8 GHz, band 1) ***Note:*** When the carrier frequency is 2030.354 MHz to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
CCDF measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–60 to +30 dBm: with preamplifier Off –80 to +10 dBm: with preamplifier On*1	
Measurement method		
CCDF	Displays cumulative distribution of difference between peak and average power.	
APD	Displays distribution of difference between peak and average power.	
Filter selection function	20 MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz	
Power accuracy	±1dB	
Electric performance (IQ input)	This function is available when MS2683A-17 or 18 option is installed.	
Input method	Balance or Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Balance input	When MS2683A-17 is installed. Differential voltage range: 0.1 to 1 Vpp (at input connector) Common-mode voltage range: ±2.5 V (at input connector)	
Unbalance input	When MS2683A-18 is installed. 0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

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

MX268704A CDMA2000 1xEV-DO measurement software specifications

Item	Specifications	Remarks
Model/unit name	MX268704A CDMA2000 1xEV-DO measurement software (MS2687A/MS2687B)	
Purpose	To measure transmission characteristics of cdma2000 High Rate Packet Data Air Interface-type base station equipments (Access Network) and mobile radio units (Access Terminal)	
Electric performance (RF input)	The specifications given below are guaranteed after executing MS2687A level optimization (executed automatically by pressing a key).	
Modulation/frequency measurement		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–30 to +30 dBm (average power during burst)	
Carrier frequency accuracy	± (reference crystal oscillator accuracy +10 Hz) when input level ≥–30 dBm, using code channel 1 CH	
Modulation accuracy		
Residual vector error	<2.0% (rms) when input level ≥–30 dBm, using code channel 1 CH	
Origin offset accuracy	±0.50 dB when input level ≥–30 dBm, using only code channel 1 CH, for signal with origin offset –30 dBc	
Waveform display		
Forward link	(1) For each of DATA, MAC, Pilot area or all areas, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number (2) Displays Symbol constallation for DATA area.	
Reverse link	For single- to multi-channel input signals, displays the following items: • Constellation • Eye pattern • Vector error vs. chip number • Phase error vs. chip number • Amplitude error vs. chip number	

Item	Specifications	Remarks
Code domain analysis		
Measurement frequency range	50 MHz to 2.3 GHz	
Measurement level range	–30 to +30 dBm (average power during burst)	
Code domain power accuracy	When input level: ≥–10 dBm (with preamplifier Off), ≥–20 dBm (with preamplifier On*1) ±0.2 dB (code power ≥–10 dB) ±0.4 dB (code power ≥–25 dB)	
Analysis signal	Forward link, Reverse link	
Display function		
Forward link	For DATA and MAC area, displays the followings: • DATA area code domain power • Spread ratio: Fixed to 16, IQ separated display • MAC area code domain power • Spread ratio: Fixed to 64, IQ separated display	
Reverse link	IQ separated display of code domain power Detects the following channels: • Pilot CH I-CH Walsh16 0CH • ACK CH I-CH Walsh8 4CH • DRC CH Q-CH Walsh16 8CH • DATA CH Q-CH Walsh4 2CH	
Amplitude measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–30 to +30 dBm (average power during burst)	
Transmission power measurement	After level calibration using built-in power meter (automatically calibrated by pressing a key)	
Measurement range	–20 to +30 dBm (average power during burst)	
Accuracy	±2.0 dB	
Power measurement linearity	±0.2 dB (0 to –30 dB) when input level (average power during burst): ≥0 dBm	
Idle slot analysis	Rise/fall characteristics and On/Off-ratio analysis function provided	

Item	Specifications	Remarks
Occupied bandwidth measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–30 to +30 dBm (average power during burst)	
Measurement method		
Sweeping method	Measures the signal with a sweep-type spectrum analyzer and displays the calculated result.	
FFT method	Analyzes the signal with FFT and displays the calculated result.	
Spurious close to the Carrier measurement		
Frequency range	50 MHz to 2.3 GHz	
Input level range	–10 to +30 dBm (average power during burst)	
Measurement method	Displays the calculated ratio of the transmission power to the power measured with the sweep-type spectrum analyzer	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	750 kHz offset: ≥45 dB (at 2 MHz span)	
	1.98 MHz offset: ≥60 dB	
	When input level (average power during burst) ≥0 dBm, RBW: 30 kHz, VBW: 3 kHz, Detection: Positive	

Item	Specifications	Remarks
Spurious measurement		
Measurement frequency range	10 MHz to 12.75 GHz, except carrier frequency ±50 MHz range	
Input level range (transmission power)	0 to +30 dBm (average power during burst)	
Measurement method		
Sweeping method	Sweeps the specified frequency range with a spectrum analyzer and displays the detected peak value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Spot method	Measures at specified frequency with a spectrum analyzer in time domain mode and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Search method	Sweeps the specified frequency range with a spectrum analyzer, detects the peak value, measures at the frequency in time domain, and displays the average value. For the power ratio, displays the calculated ratio to the transmission power. (Specifications are values measured when detection mode is set to Average.).	
Transmission power measurement		
Tx Power method	Carrier power measured at 1.23 MHz bandwidth	
SPA method	Carrier power measured at RBW 3 MHz, VBW 3 kHz, detection mode SAMPLE, frequency span 0 Hz	
Measurement range	At carrier frequency 800 MHz to 1 GHz or 1.8 to 2.2 GHz, power-ratio reference value is Tx power (except the spurious given in note below) ≥79 dB typical (RBW: 10 kHz) (10 to 30 MHz, band 0) ≥79 dB typical (RBW: 100 kHz) (30 to 1000 MHz, band 0) ≥76–f [GHz] dB typical (RBW: 1 MHz) (1.0 to 3.15 GHz, band 0) ≥76 dB typical (RBW: 1 MHz) (3.15 to 7.9 GHz, band 1) For MS2687A ≥68 dB typical (RBW: 1 MHz) (7.9 to 12.75GHz, band 2) For MS2687B ≥74 dB typical (RBW: 1 MHz) (7.9 to 12.75GHz, band 2)	
	Note: When the carrier frequency is 2030.354 to 2200 MHz, spurious will occur at the following frequency: f (spurious) = f (in) –2030.345 MHz	

Item	Specifications	Remarks
CCDF measurement		
Frequency range	50 MHz to 2.3 GHz	
Measurement level range	–50 to +30 dBm	
Measurement method		
CCDF	Displays cumulative distribution of difference between peak and average power.	
APD	Displays distribution of difference between peak and average power.	
Filter selection function	20 MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz	
Power accuracy	±1dB	
Electric performance (IQ input)	This function is available when MS2687A-18 or Ms2687B-18 option is installed.	
Input method	Unbalance can be selected.	
Input impedance	1 MΩ (parallel capacity <100 pF) or 50 Ω can be selected.	
Input level range		
Unbalance input	0.1 to 1 Vpp (at input connector) AC/DC coupling can be switched.	
Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level	
Modulation accuracy measurement		
Residual vector error	<2% (rms), DC coupling at Input level: ≥0.1 V (rms)	
IQ level measurement		
Level measurement	Measures and displays the I and Q input voltages (rms and peak-to-peak values).	
IQ phase difference measurement	When CW signal is input to the I and Q input connectors, measures and displays the phase difference between the I- and Q-phase signals.	

Section 2 Panel Layout and Operation Overview

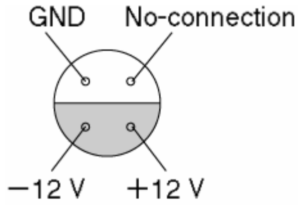
This section describes the front and rear panels, basic operations, how to install the measurement software, change the measurement system and set the screen colors.

2.1 List of Controls on Front and Rear Panels

MS860x Digital Mobile Radio Transmitter Tester

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

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

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

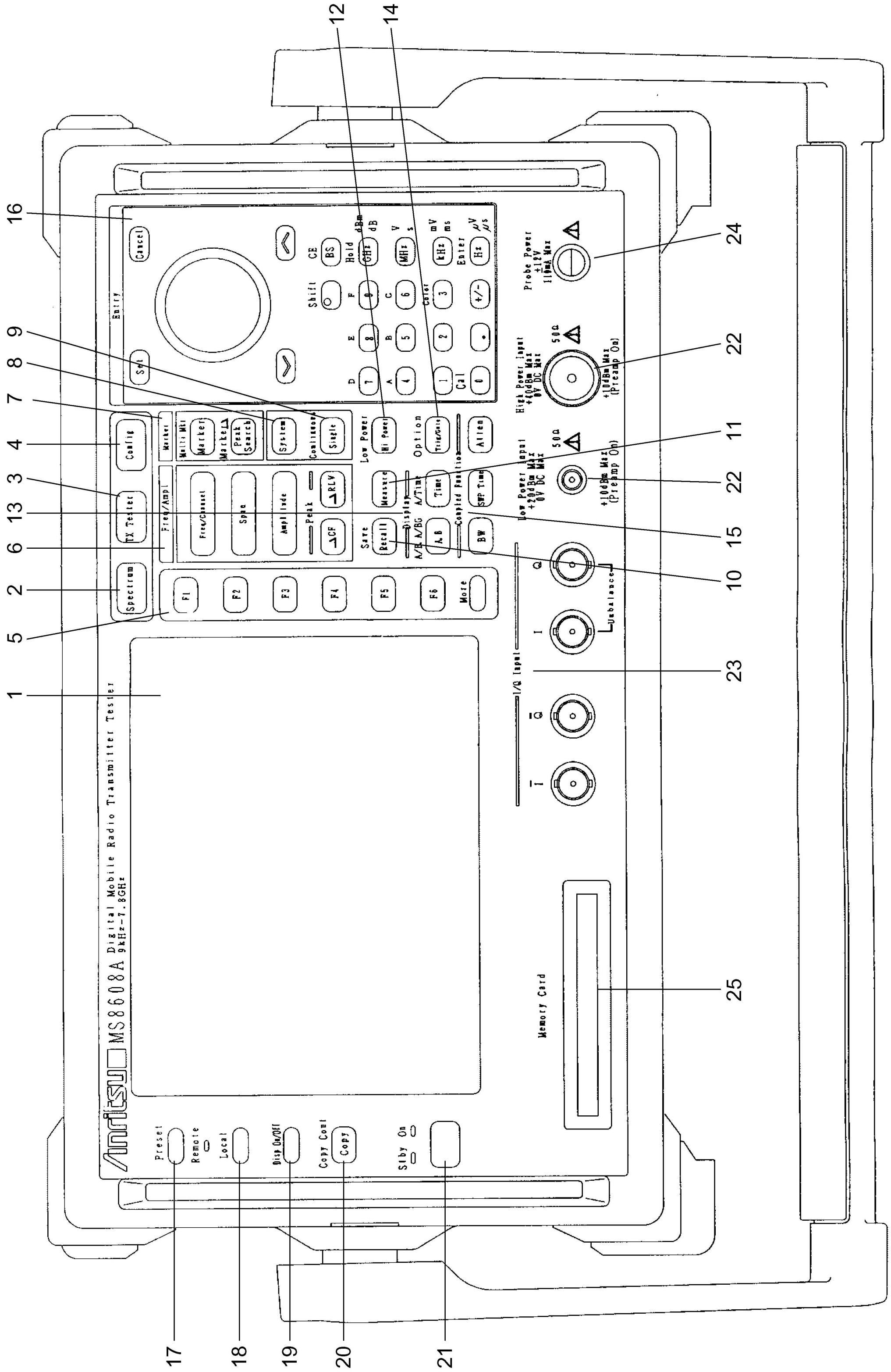


Fig. 2-1 MS8608A front panel

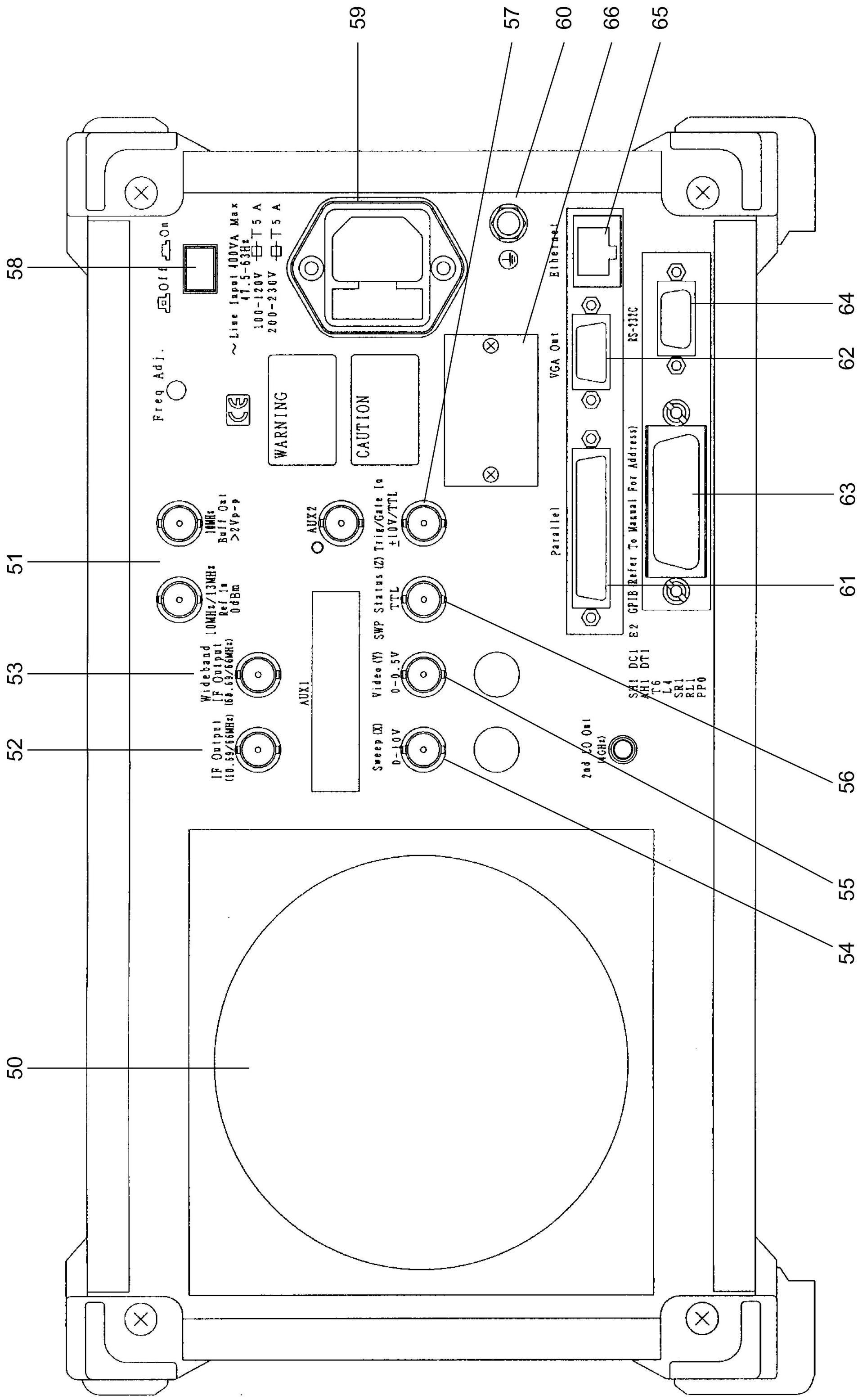
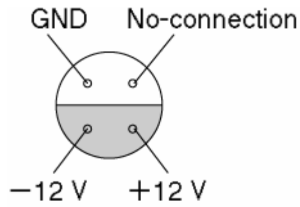


Fig. 2-2 MS8608A rear panel

MS2681A/MS2683A/MS2687A/MS2687B Spectrum Analyzer

No.	Panel Marking	Description	
1	(LCD)	6.5” color TFT liquid crystal display (LCD). Displays scales, trace waveforms, parameter settings, measurement values at marker points, soft-key menus, etc.	
2	Spectrum	The Key to set this unit in the ordinary spectrum analyzer mode.	
3	Signal Analysis	This sets the MS2681A/MS2683A/MS2687A/B to the Signal Analysis mode in which the measurement software operates.	
4	Config	The Key to set the interface to GPIB, printer, etc.	
5	F1 to F6	Soft keys to select soft-key menus displayed by pressing a panel key.	
		[More]	Key to display the next soft-key menu page.
6	Freq/Ampl	Section to input data for the frequency and level parameters.	
		[Freq/Channel]	Sets the frequency.
		[Span]	Sets the frequency span.
		[Amplitude]	Sets the reference level, etc
		[->CF]	Sets the peak-level signal frequency displayed on the screen as the center frequency.
		[->RLV]	Sets the peak-level value displayed on the screen as the reference level.
7	Marker	Section to operate the marker function.	
		[Marker]	Sets a marker.
		[Multi Mkr]	Sets multi-markers. Press this key after pressing the [Shift] key.
		[Peak Search]	Moves the marker to the peak-level point on the screen.
		[Marker->]	Sets a parameter using the marker value. Press this key after pressing the [Shift] key.
8	System	The Key used in transmitter tester mode to switch the measurement system.	
9	Single	Sets the sweep mode.	
		[Single]	Executes single sweep.
		[Continuous]	Executes continuous sweep. Press this key after pressing the [Shift] key. The unit is pre-set to the continuous mode.
10	Recall	The Key to execute recall or save.	
		[Recall]	Reads measurement parameters and waveform data from internal memory or memory card.
		[Save]	Saves measurement parameters and waveform data to internal memory or memory card.
11	Measure	The Key to measure various items such as frequency, noise, adjacent channel leakage power, etc. depending on the applications.	

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

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

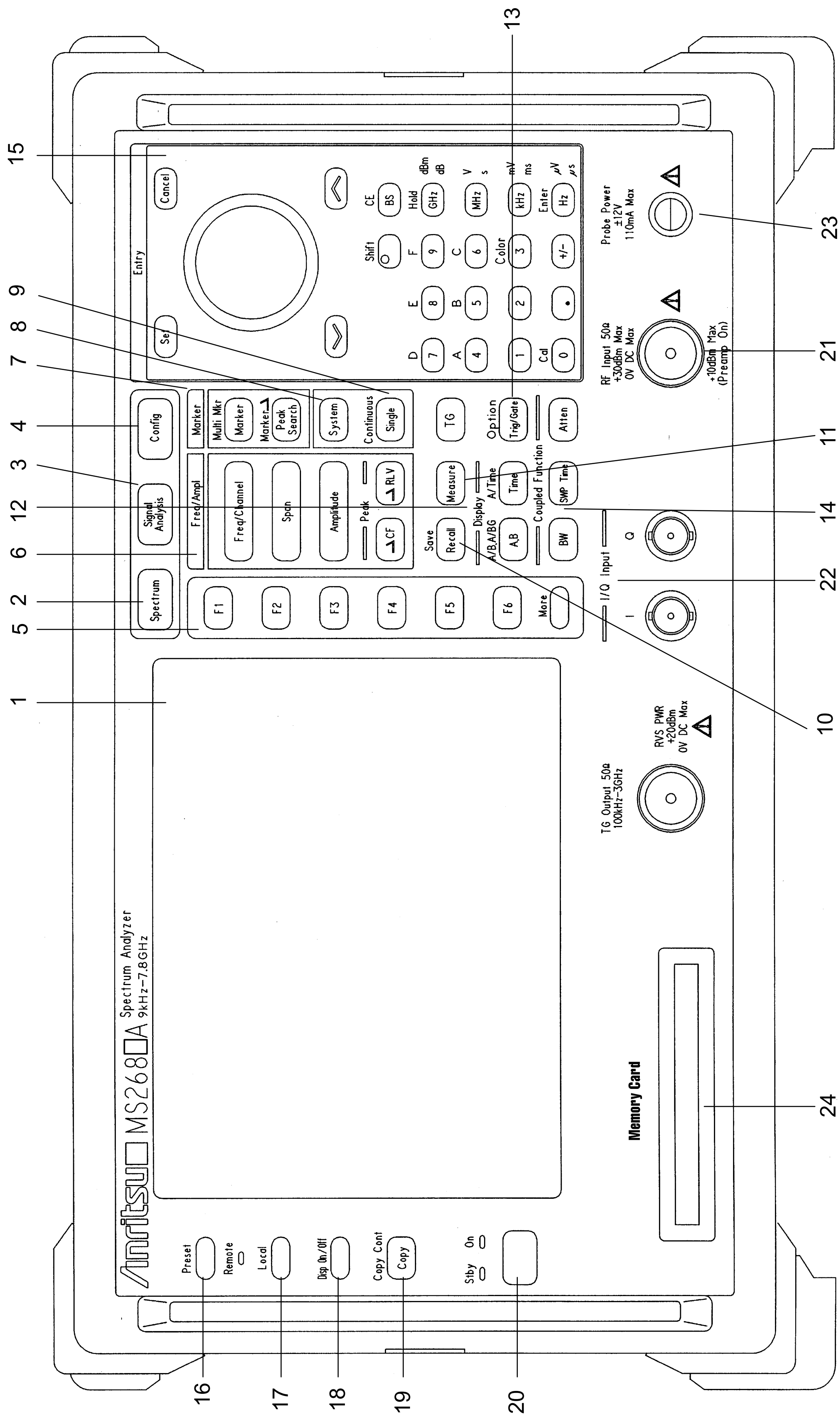


Fig. 2-1 MS2681A/MS2683A/MS2687A/B front panel

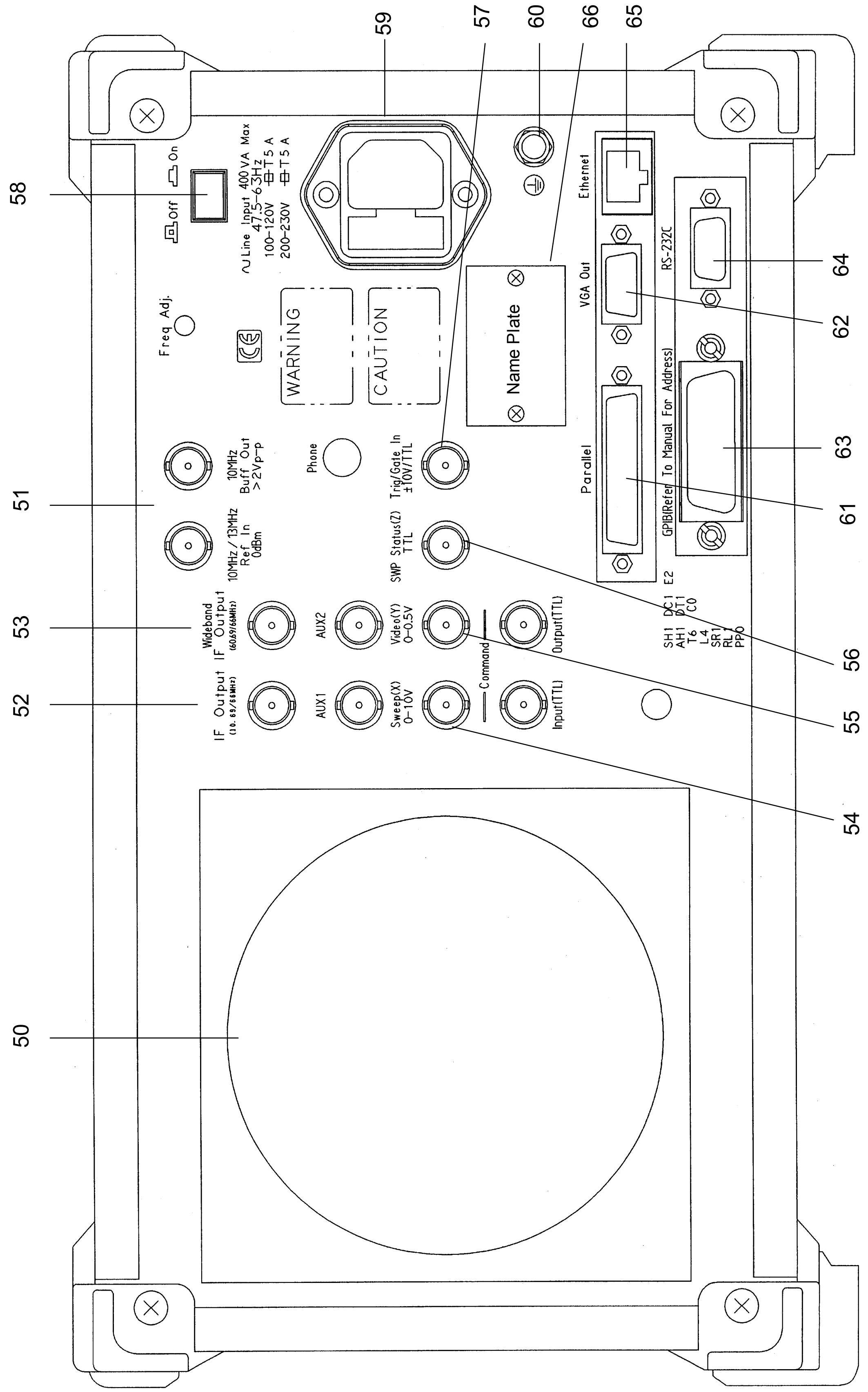


Fig. 2-2 MS2681A/MS2683A/MS2687A/B rear panel

2.2 Basic Operation

This section describes basic operations and typical parameter settings.

2.2.1 Turning the power ON

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

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

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

2.2.2 Selecting items

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

Setting an item indicated by the cursor

Move the cursor to the target item using [∧] and [∨] or the rotary knob in the Entry section.
Press [Set] in the Entry section to confirm the item selected.
The parameter setup window opens.

Setting an item indicated by a function label

Press one of the [F1] to [F6] function keys and the parameter setup window opens.
Some parameters are set only by pressing the function key.

2.2.3 Setting parameters

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

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

(2) Entering a numeric value.

Selecting a parameter from those listed in the window.

Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the parameter to be selected.

Press Set in the Entry section to confirm selection.

Entering a numeric value

Using the numeric keypad or rotary knob, enter a numeric value.

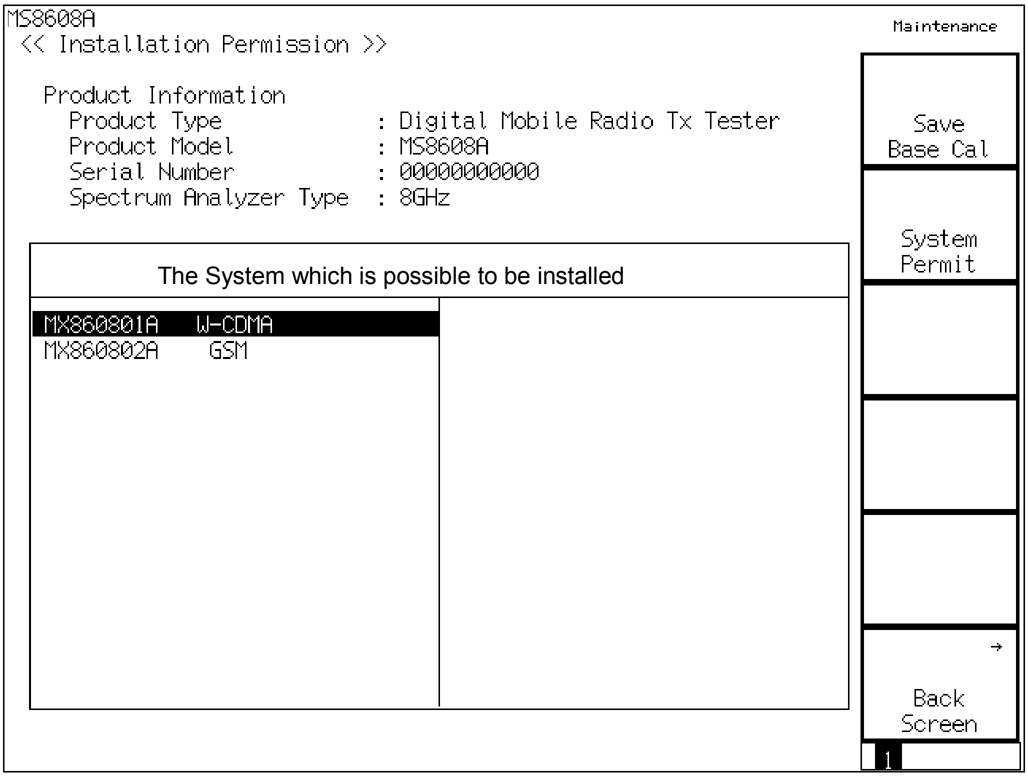
Press the Unit key or Set in the Entry section to confirm the parameter.

The window closes.

2.3 Registering the Installation Key

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

1. Insert the memory card containing the installation key into the memory card slot.
2. Press [Config] to display the Configuration screen.
3. Press [F2] (Maintenance Parameter) to display the Maintenance Parameter screen.
4. Press [F3] (Installation Permission) to display the Installation Permission screen shown below.



5. Press [F2] (System Permit).
6. The new measurement software is registered in the Permission table.
7. Press [F1] (Save Base Cal).

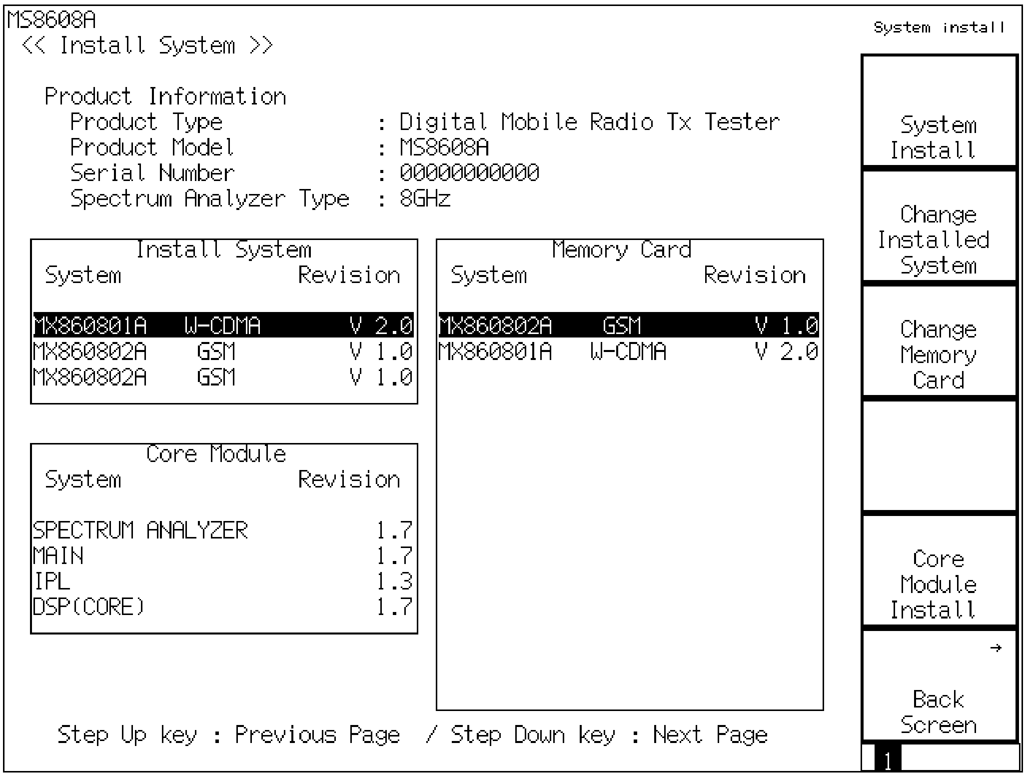
Note:

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

2.4 Installing Core Module Software

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

1. Insert the memory card containing the new Core Module software into the memory card slot.
2. Press Config to display the Configuration screen.
3. Press F4 (System Install) to display the Install System screen shown below.

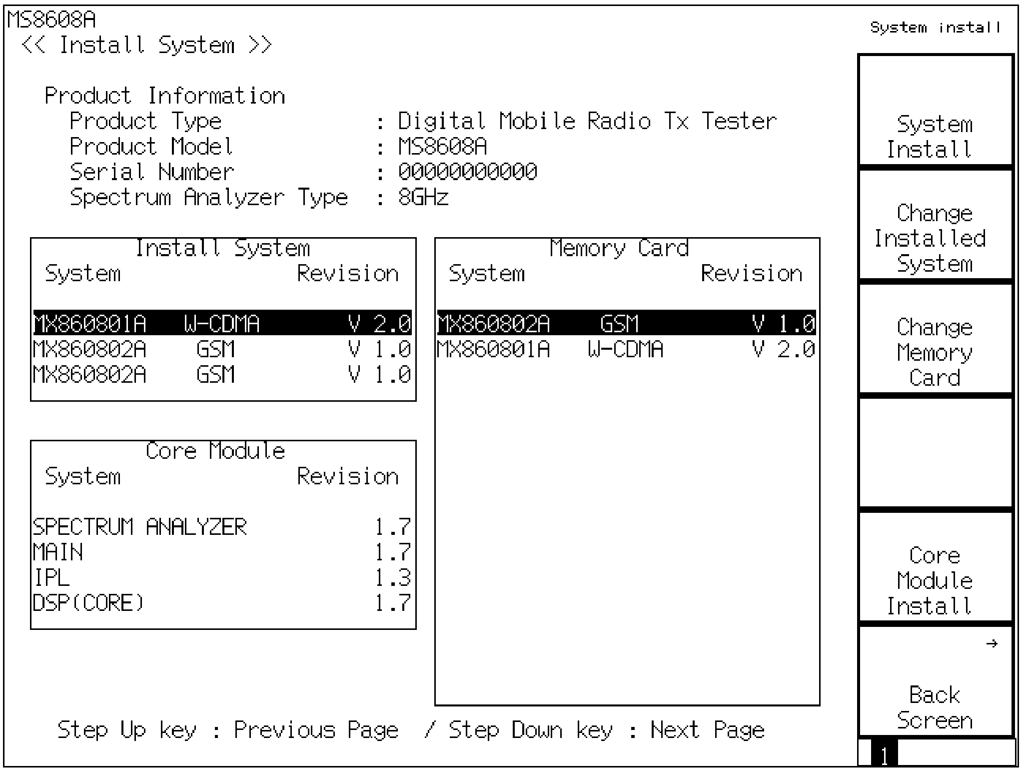


4. Press F5 (Core Module Install).
5. The confirmation window opens. Using the rotary knob, move the cursor to Yes.
6. Press Set in the Entry section to start installation.
7. After installation, turn the power OFF according to the message displayed.
8. Turn the power ON while pressing Preset. Continue pressing Preset until beeping starts, that is, approximately 5 seconds.

2.5 Installing Measurement Software

This section explains how to install the measurement software required to use this unit in transmitter tester mode (MS860x) or spectrum analyzer (MS268x).

1. Insert the memory card containing the measurement software to the memory card slot.
2. Press [Config] to display the Configuration screen.
3. Press [F4] (System Install) to display the Install System screen shown below.

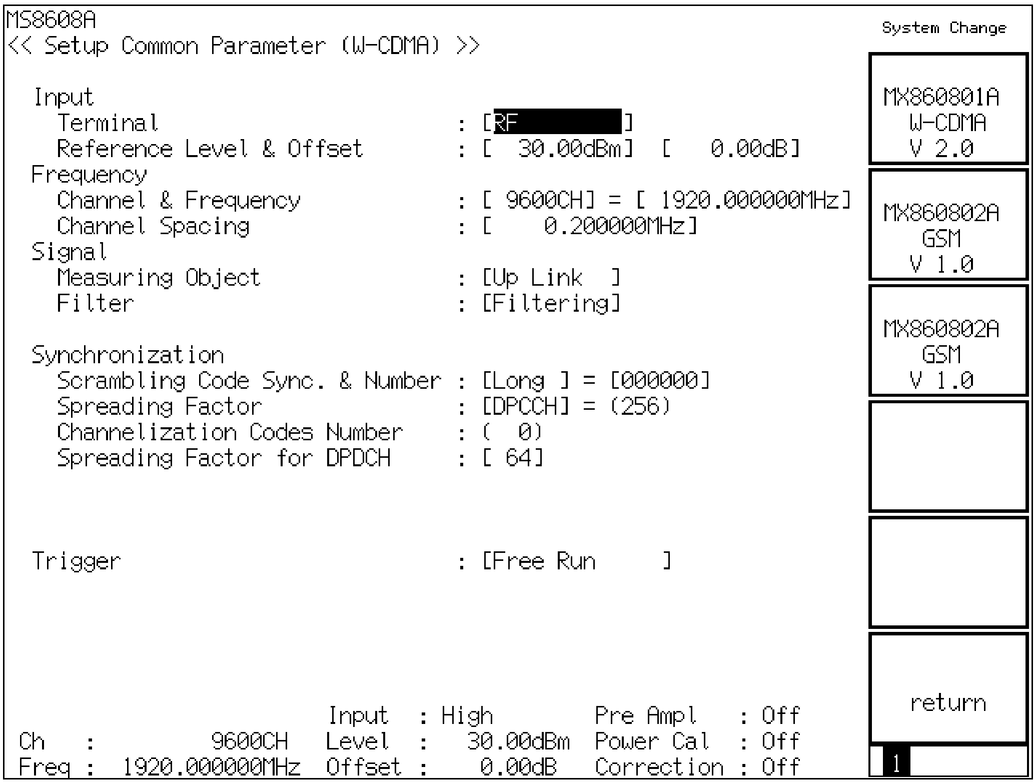


4. Press [F2] (Change Installed System) to activate the Install System box.
5. Using the rotary knob, select the installation destination for the new measurement software.
6. Press [F3] (Change Memory Card) to activate the Memory Card box.
7. Using the rotary knob, select the new measurement system.
8. Press [F1] (System Install) to install the new system.
9. The confirmation window opens. Using the rotary knob, move the cursor to Yes.
10. Press [Set] in the Entry section to start installation.

2.6 Changing the Measurement System

When there are multiple measurement software systems (optional) registered to use this unit in transmitter tester mode, select the measurement system to be used in the procedure described in this section.
When there is only one measurement software registered, the procedure described in this section cannot be performed.

1. Press [Tx Tester] (MS860x) or [Signal Analysis] (MS268x) to display the measurement system screen.
2. Press [System] to display System Change function labels shown below.



3. The installed measurement systems are listed at the function labels.
4. Press the function key to set the desired measurement system.
5. Changing of the measurement system is started.
6. When the measurement system is changed, a new system screen appears.

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

2.7 Setting Screen Colors

This section explains how to set screen colors.
Screen colors can be selected from the four predetermined color patterns or a user-defined one.

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

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

Setting a user-defined color pattern

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

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

Section 3 Measurement

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

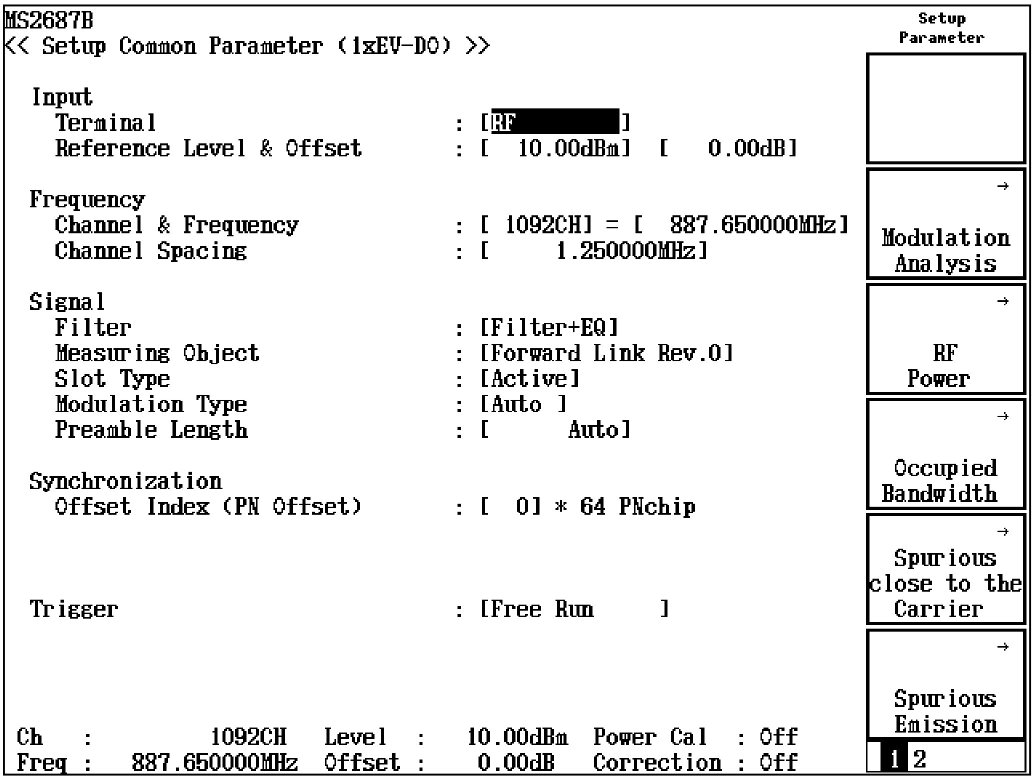
3.1 Setting Measurement Parameters

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

Set the measurement parameters from the Setup Common Parameter screen.

To display this screen,press Tx Tester (MS860x)/Signal Analysis (MS268x)
(If a measurement screen has appeared, press Preset .)

The Setup Common Parameter screen is shown below.



3.1.1 Signal input terminals (Terminal)

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

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Terminal item.
2. Press Set in the Entry section.
3. The selection window opens.
4. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
5. Press Set.

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

- RF: Selects the RF input terminal.
  For MS8608A, High Power or Low Power input is selected. High Power or Low Power input can be switched as follows:
  Setting High Power input: Press Hi Power.
  Setting Low Power input: Press Shift and then Hi Power .
- IQ-DC: Selects the IQ input terminal.
  Of the IQ input terminals, the one grouped and marked as Unbalance is used.
  In this case, this terminal is connected to the internal circuit by DC coupling.
- IQ-AC: Selects the IQ input terminal.
  Of the IQ input terminals, the one grouped and marked as Unbalance is used.
  In this case, this terminal is connected to the internal circuit by AC coupling.
- IQ-Balance: Selects the IQ input terminal.
  $\overline{I}$/I and $\overline{Q}$/Q are used to input differential signals.

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

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

3.1.2 RF input level (Reference Level)

Set the RF signal level input from the DUT.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Reference Level item.
2. Press [Set] or enter the level correction factor using the numeric keypad.
3. The setup window opens.
4. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
5. Press [Set].

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

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

3.1.3 Level offset factor (Level Offset)

Set the user-defined level correction factor.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Offset item.
2. Press [Set] or enter the level correction factor using the numeric keypad.
3. The setup window opens.
4. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
5. Press [Set].

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

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

Measurement value displayed = Measurement value + Offset

Example:

When a 20 dB amplifier is inserted between the DUT and this unit, the correction factor for obtaining the measurement result at the DUT output terminal is –20 dB.
When a 10 dB attenuator is inserted between the DUT and this unit, the correction factor for obtaining the measurement result at the DUT output terminal is +10 dB.

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

3.1.4 Channel and frequency (Channel & Frequency)

Set the frequency of the signal from the DUT.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Channel or Frequency item.
2. Press [Set] or enter the desired numeric value using the numeric keypad.
3. The setup window opens.
4. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
5. Press [Set].

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

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

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

3.1.5 Filter (Filter)

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

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Filter item.
2. Press Set in the Entry section.
3. The selection window opens.
4. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
5. Press Set.

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

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

The available selections are given below.

- Filter + EQ: Assumes and analyzes signals passed through the baseband and equalizing filters defined in 3GPP2 cdma2000 1xEV-DO Standard.
- Filtering: Assumes and analyzes signals passed through the baseband filter defined in 3GPP2 cdma2000 1xEV-DO Standard.
- No Filter: Analyzes the signal without filtering.

3.1.6 Measuring Object (Measuring Object)

Set the measured signal.

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Measuring Object item.
2. Press Set.
3. The setup window opens.
4. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
5. Press Set.

When setup is completed, the set value appears in the set item [ ].
The available selections are given below.

- Forward Link Rev.0: Targets the spread signal, based on 3GPP2 cdma2000 1xEV-DO C.S0024 standards, transmitted from the Aceess Network.
- Forward Link Rev.A: Targets the spread signal, based on 3GGP2 cdma2000 1xEV-DO C.S0024-A SubType2 standards, transmitted from the Access Network.
- Reverse Link Rev.0: Targets the spread signal, based on 3GGP2 cdma2000 1xEV-DO C.S0024 standards, transmitted from the Access Termination.
- QPSK: Targets a QPSK modulation signal of 1.2288 Mcps. Code-multiple signals cannot be measured.

3.1.7 Slot type (Slot Type)

Set the slot type for Forward Link signal measurement.

This parameter appears only when Measuring Object is set to either Forward Link Rev.0 or Forward Link Rev.A.

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Slot Type item.
2. Press Set in the Entry section.
3. The selection window opens.
4. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
5. Press Set.

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

- Active: Performs analysis assuming signals where Forward Traffic Channel or Control Channel is outputted.
- Idle: Performs analysis assuming signals where Forward Traffic Channel and Control Channel are not outputted.

3.1.8 Modulation method (Modulation Type)

Set the data area modulation method for Forward Link signal measurement.

This parameter appears only when Measuring Object is set to to either Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active.

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Modulation Type item.
2. Press Set in the Entry section.
3. The selection window opens.
4. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
5. Press Set.

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

Available settings are listed below:

- Auto: Automatically detects the modulation method from the measured signal. Detection may fail when the measured signal condition is poor. In this case, set the correct modulation method.
- QPSK: Performs analysis assuming that the signal is modulated by QPSK method.
- 8PSK: Performs analysis assuming that the signal is modulated by 8PSK method.
- 16QAM: Performs analysis assuming that the signal is modulated by 16QAM method.

3.1.9 Preamble length (Preamble Length)

Set preamble length within the Forward Link signal.

This parameter appears only when Measuring Object is set to to either Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Preamble Length item.
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
5. Press [Set].

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

- Auto: Automatically detects the preamble length from the measured signal. Detection may fail when the measured signal condition is poor. In this case, set the correct preamble length.
- 0PNchip: Performs analysis assuming that the preamble length is 0 chip.
- 64PNchip: Performs analysis assuming that the preamble length is 64 chips.
- 128PNchip: Performs analysis assuming that the preamble length is 128 chips.
- 256PNchip: Performs analysis assuming that the preamble length is 256 chips.
- 512PNchip: Performs analysis assuming that the preamble length is 512 chips.
- 1024PNchip: Performs analysis assuming that the preamble length is 1024 chips.

3.1.10 Offset index (Offset Index)

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

This parameter appears only when the Measuring Object is set to neither Reverse Link Rev.0 nor QPSK.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Offset Index item.
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
5. Press [Set].

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

3.1.11 Long code mask (Long Code Mask)

Set MI of Long Code Mask on the I-phase side and MQ of Long Code Mask on the Q-phase side of the Reverse Link signal.

This parameter appears only when the Measuring Object is set to Reverse Link Rev.0.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Long Code Mask item (MI or MQ).
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using the numeric key pad, enter a numeric value (hex.) .
5. Press [Set].

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

Setting MI sets MQ automatically based on the 3GPP2 cdma2000 1xEV-DO Standard. To set MI and MQ individually, first set MI and then set MQ.

3.1.12 Trigger (Trigger)

Set the trigger mode.

Setting trigger mode

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Trigger item.
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
5. Press [Set].

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

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

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

Setting trigger edge

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the Trigger Edge item.
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
5. Press [Set].

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

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

When External is selected, setting of trigger signal edge and the delay is needed.

Setting trigger delay

1. Press [∧] [∨] Entry keys or turn the rotary knob to move the cursor to Trigger Delay item.
2. Press [Set] or input the value you wish to set using numeric keypad.
3. A setting window opens.
4. Press [∧] [∨] Entry keys or turn the rotary knob, or use numeric keypad to input the value you wish to set.
5. Press [Set].

When the setting is completed, the set delay value appears in square brackets [ ] on the “Trigger Delay” line.

3.1.13 PN synchronization (PN Synchronization)

Select the PN Synchronization mode to correlate all short-code patterns in the short-code synchronizing period or the Ext Trigger mode to correlate only in the short-code period for 384 chips around the trigger timing. When Ext Trigger is selected, the correct value must be set in the Offset Index, because only a specific short-code period is correlated to reduce the analyzing time.
This parameter appears only when the Measuring Object is QPSK and Trigger is set to External.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the PN Synchronization item.
2. Press [Set] in the Entry section.
3. The selection window opens.
4. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
5. Press [Set].

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

3.1.14 Frequency characteristics correction data table (Correction)

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

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

The transmitter tester internal memory can store five correction factor tables.
The procedure to select the five correction factor tables stored internally is given below.

Selecting correction factor table

1. Press [Amplitude] to display the Amplitude function label.
2. Press [F4] (Correction) to open the correction factor table selection window.
3. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the correction factor table to be selected.
4. Press [Set].

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

3.1.15 Preamplifier (Pre Ampl.)

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

Setting preamplifier

1. Press [Amplitude] to display the Amplitude function label.
2. Press [F5] (Pre Ampl.) to switch alternately between On and Off.

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

3.2 Analyzing Modulation Accuracy and Code Domain

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

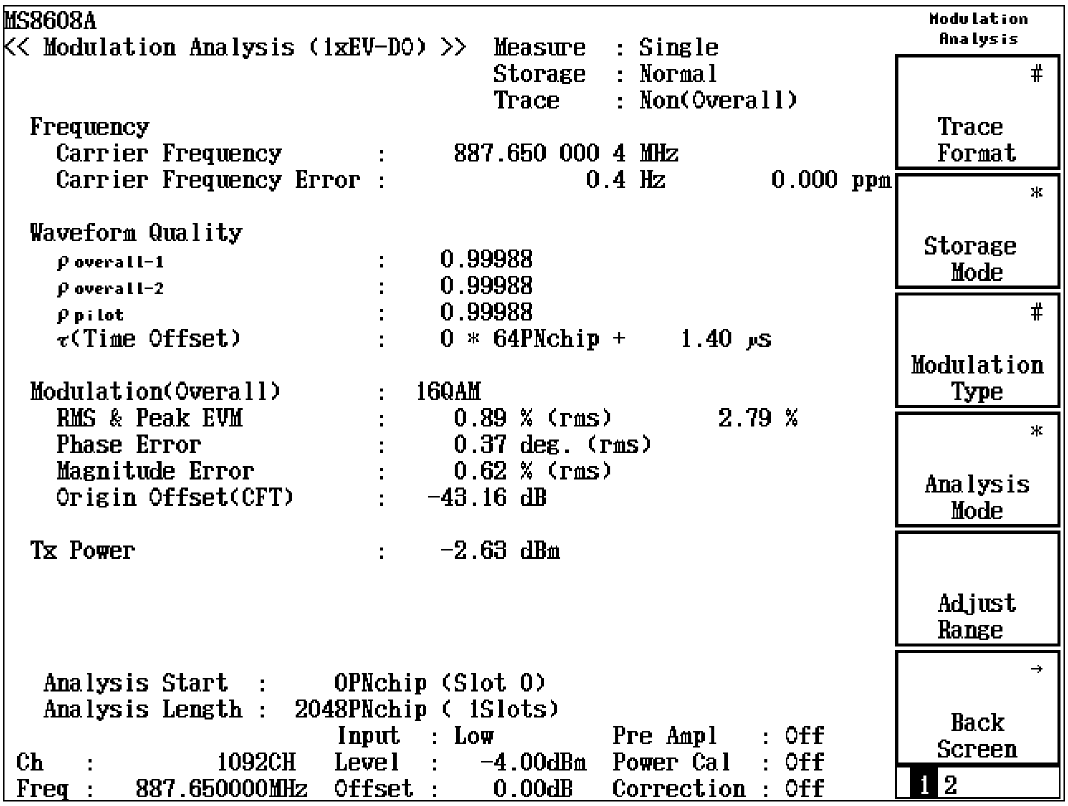
This section describes the measurement results displayed on the Modulation Analysis screen (modulation accuracy/code domain analysis), parameter settings and operation precautions.

3.2.1 Description of measurement results

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

Modulation accuracy measurement results (when the measured signal is Forward Link Rev.0)

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



Frequency

(1) Carrier Frequency

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

(2) Carrier Frequency Error

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

Waveform Quality

(1) $\rho_{overall\text{-}1}$, $\rho_{overall\text{-}2}$, ρ_{pilot} (Waveform Quality Factor)

Shows the measured signal waveform quality factor. The waveform quality factor is obtained based on the definitions in the 3GPP2 cdma2000 1xEV-DO Standard.

Shows $\rho_{overall\text{-}1}$ and $\rho_{overall\text{-}2}$, only when the Slot Type is set to Active.

Also if the Measuring Object is set to Forward Link Rev.A on the screen of Setup Common Parameter, the waveform quality factors are r_{MAC}, r_{data} and r_{pilot} respectively.

r_{data} is shown only when the Slot Type is active.

(2) τ (Time Offset)

Shows the difference between the short-code starting timing and external trigger (including trigger delay) in 64PN Chips and its fraction in μsec. When Even Second Timing Trigger is input to the external trigger, the measurement results for Pilot Time Tolerance are shown. The measurement resolution is 32 nsec. This measurement is available only when the Measuring Object is set to Forward Link Rev.0, Forward Link Rev.A, or Reverse Link Rev.0 and Trigger is set as External on the Setup Common Parameter screen.

Modulation

(1) QPSK, 8PSK, 16QAM

Shows the analyzed modulation method.

(2) RMS EVM

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

(3) Peak EVM

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

(4) Phase Error

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

(5) Magnitude Error

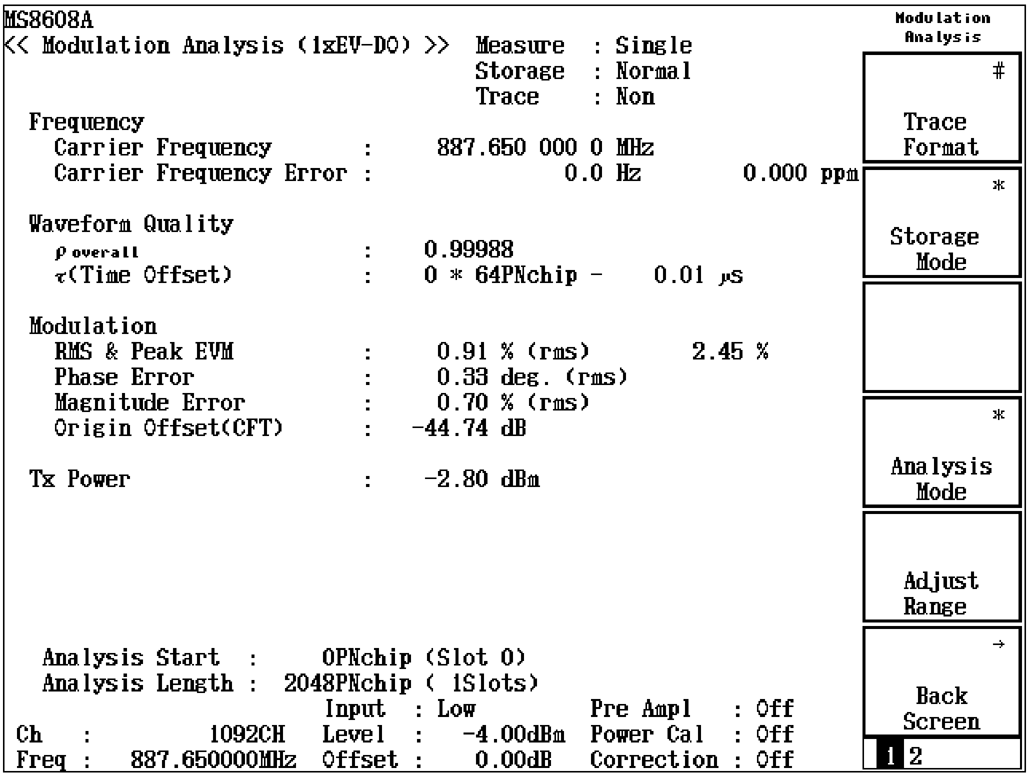
Shows the RMS value for amplitude error (in %) at the measured signal chip judgment point.

(6) Origin Offset (CFT: Carrier Feed Through)
Shows the measured signal origin offset (carrier leakage component) in dB.

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

Modulation accuracy measurement results (when the measured signal is Reverse Link Rev.0, QPSK)

The screen shown below appears when Measuring Object is set to Reverse Link and Trace Format is set to Non. For Trace Format setting, see “Changing Waveform Display Format (Trace Format).”



Frequency

(1) Carrier Frequency

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

(2) Carrier Frequency Error

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

Waveform Quality

(1) ρ overall (Waveform Quality Factor)

Shows the measured signal waveform quality factor. The waveform quality factor is obtained based on the definitions in the 3GPP2 cdma2000 1xEV-DO Standard.

(2) τ (Time Offset)

Shows the difference between the short-code starting timing and external trigger (including trigger delay) in 64PN Chips and its fraction in μsec. When Even Second Timing Trigger is input to the external trigger, the measurement results for Pilot Time Tolerance are shown. The measurement resolution is 32 nsec. This measurement is available only when the Measuring Object is set to Forward Link Rev.0, Forward Link Rev.A, or Reverse Link and Trigger is set as External on the Setup Common Parameter screen.

Modulation

(1) RMS EVM

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

(2) Peak EVM

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

(3) Phase Error

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

(4) Magnitude Error

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

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

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

Tx Power

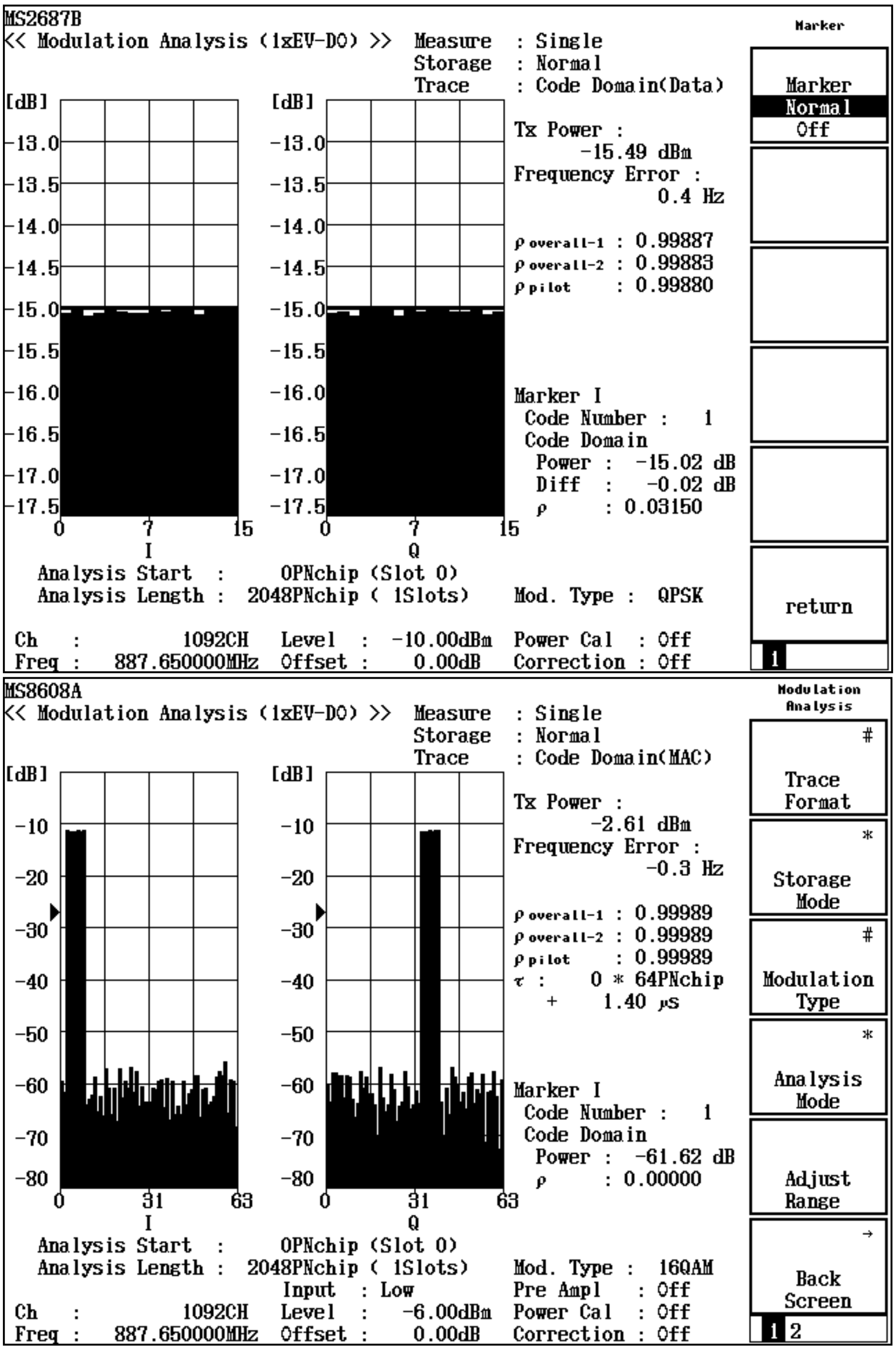
Shows the measured signal average power with band limited at 1.23 MHz in dBm, which is the same as the value shown on the RF Power screen.

The described measurement results are obtained by analyzing for the range set in Analysis Mode. For Analysis Mode setting, see “3.2.4 Setting Analysis Conditions (Analysis Mode).”

Code domain measurement results (when the measured signal is Forward Link)

The screen given below appears when the signal to be measured (Measuring Object) is set to Forward Link Rev.0, Trace Format is set to Code Domain of Data (upper) and Code Domain of MAC (lower), and Marker is set to ON.

Code Domain of Data shows the code domain measurement results in data area. Code Domain of MAC shows the code domain measurement results in MAC area.



Code domain power waveform display:

Shows the relative power of each code component to the total transmission power with code numbers on the abscissa and relative power on the ordinate. The right graph indicates Q-phase component measurement result, and the left graph indicates I-phase component measurement result. Separate markers can be set for each of I and Q results. For details on operation, see "Changing Code Domain Result Display."

Tx Power

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

Frequency Error

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

ρ overall-1, ρ overall-2, ρ pilot

Shows the signal waveform quality factor, similar to ρ in the modulation accuracy measurement result.

τ (Time Offset)

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

Marker

(1) Code Number

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

(2) Code Domain Power

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

(3) Waveform Quality

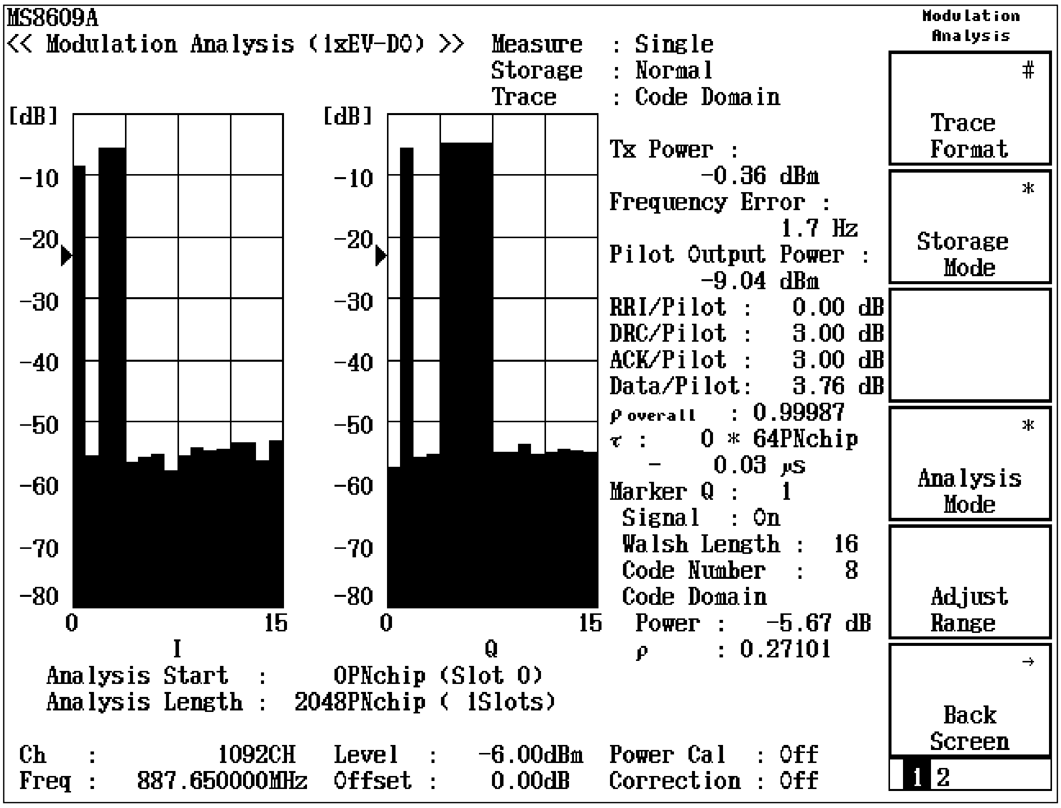
Shows the waveform quality factor (ρ) of the code pointed to by the marker on the code domain power waveform. This value is obtained based on the definition in the 3GPP2 cdma2000 1xEV-DO Standard.

(4) Diff

When Trace Format is set to Code Domain of Data, shows the difference between each code domain power and average code domain power ($10\mathrm{Log}_{10}(1/32) \fallingdotseq -15$ dB) in dB.

Code domain measurement results (when the measured signal is Reverse Link)

The screen shown below appears when the measured signal (Measuring Object) is set to Reverse Link Rev.0, Trace Format is set to Code Domain , and Marker is set to ON.



Code domain power waveform display:

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

Tx Power

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

Pilot Output Power

Shows the code domain power of the pilot channel in absolute value. This value is obtained by adding the code domain power of the pilot channel in relative value (I-phase Code Number is 0) to Tx Power.

RRI/Pilot

Shows the code domain power ratio of RRI channel to Pilot channel in dB.

DRC/Pilot

Shows the code domain power ratio of DRC channel to Pilot channel in dB.

ACK/Pilot

Shows the code domain power ratio of ACK channel to Pilot channel in dB.

Data/Pilot

Shows the code domain power ratio of Data channel to Pilot channel in dB.

ρ overall

Shows the signal waveform quality factor, similar to ρ in the modulation accuracy measurement result.

τ (Time Offset)

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

Marker

(1) Signal

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

(2) Walsh Length

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

(3) Code Number

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

(4) Code Domain Power

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

(5) Waveform Quality

Shows the waveform quality factor (ρ) of the code pointed to by the marker on the code domain power waveform. This value is obtained based on the definitions in the 3GPP2 cdma2000 1xEV-DO Standard.

3.2.2 Changing waveform display format (Trace Format)

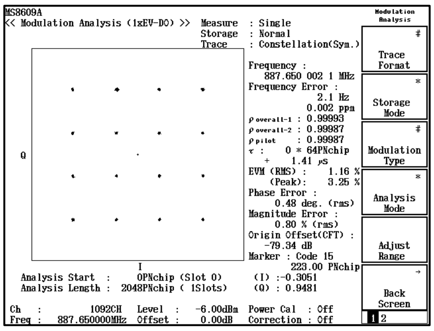
This section describes how to change the waveform display format.

Selecting display format

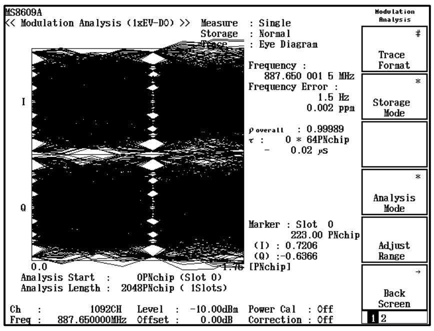
1. Press F1 (Trace Format) on the Modulation Analysis screen.
2. The format selection window opens.
3. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
4. Press Set.

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

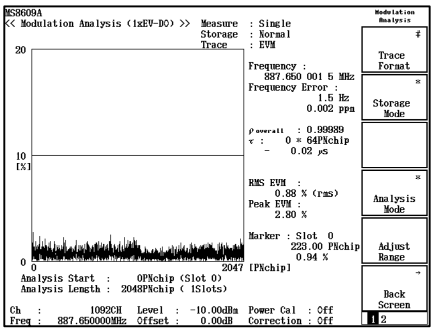
- Non: Shows only numeric results.
- Constellation: Shows the constellation.
- Eye Diagram: Shows the eye diagram.
- EVM: Shows EVM vs. chips.
- Phase Error: Shows phase errors vs. chips.
- Magnitude Error: Shows amplitude errors vs. chips.
- Code Domain of Data/Code Domain of MAC:
  Shows code domain power for Forward Link.
- Code Domain: Shows code domain power for Reverse Link.



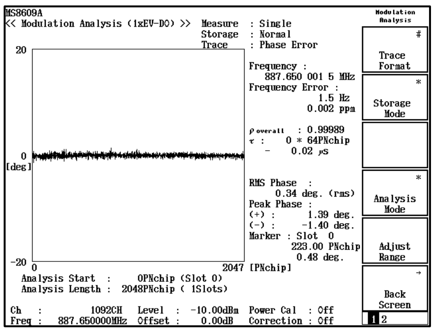
Constellation



Eye diagram



EVM vs. chips



Phase errors vs. chips

3.2.3 Setting modulation method (Modulation Type)

Set the data area modulation method for Forward Link (Active) signal measurement.

This parameter appears only when Measuring Object is set to Forward Link Rev.A or Forward Link Rev.0 while Slot Type is set to Active.

Setting analysis starting position

1. On the Modulation Analysis screen, press F3 (Modulation Type) to display the Analysis Mode function label.
2. The selection window opens.
3. Using ∧ and ∨ or the rotary knob, move the cursor to the item to be selected.
4. Press Set.

When setup is completed, the set value appears in the screen. Measurement restarts.

Available settings are listed below (same as Modulation Type of measurement parameter setting).

- Auto: Automatically detects the modulation method from the measured signal. Detection may fail when the measured signal condition is poor. In this case, set the correct modulation method.
- QPSK: Performs analysis assuming that the signal is modulated by QPSK method.
- 8PSK: Performs analysis assuming that the signal is modulated by 8PSK method.
- 16QAM: Performs analysis assuming that the signal is modulated by 16QAM method.

3.2.4 Setting analysis conditions (Analysis Mode)

Set the waveform analysis conditions.

Setting analysis starting position

1. On the Modulation Analysis screen, press [F4] (Analysis Mode) to display the Analysis Mode function label.
2. Press [F1] (Analysis Start) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the analysis starting position.
4. Press [Set].

The set value appears in the Analysis Start area in the lower part of the screen. Measurement restarts.

Setting analysis length

1. On the Modulation Analysis screen, press [F4] (Analysis Mode) to display the Analysis Mode function label.
2. Press [F2] (Analysis Length) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the analysis length.
4. Press [Set].

The set value appears in the Analysis Start area in the lower part of the screen. Measurement restarts.

Setting analysis channel

This parameter appears only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A.

1. On the Modulation Analysis screen, press [F4] (Analysis Mode) to display the Analysis Mode function label.
2. Press [F3] (Trace Slot) to open the setup window.
3. Using [∧] and [∨] or the rotary knob, move the cursor to the item to be selected.
4. Press [Set].

Available settings are listed below:

- Overall: Performs analysis for all channels.
- Pilot: Performs analysis only for Pilot channel.
- MAC: Performs analysis only for MAC channel.
- Data: Performs analysis only for Data channel.
- Symbol: Only when Trace Format is set to Constellation, performs symbol display of the data area.

Setting channel type

This parameter appears only when Measuring Object is set to Reverse Link Rev.0.

1. On the Modulation Analysis screen, press F4 (Analysis Mode) to display the Analysis Mode function label.
2. Press F4 (Channel Type) to switch between Traffic and Access.

- Traffic: Performs analysis assuming a Traffic channel consists of Pilot, PRI, DRC, ACK and data channels.
- Access: Performs analysis assuming a Access channel consists of Pilot and data channels.

3.2.5 Averaging (Storage Mode)

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

Setting averaging process

1. On the Modulation Analysis screen, press F2 (Storage Mode) to display the Storage Mode function label.
2. Press F2 (Average Count) to open the setup window.
3. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press Set.
5. On the Storage Mode menu, press F1 (Storage Mode).
6. The selection window opens.
7. Using ∧ and ∨ or the rotary knob in the Entry section, select Average.
8. Press Set.

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

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

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

Available storage modes are listed below.

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

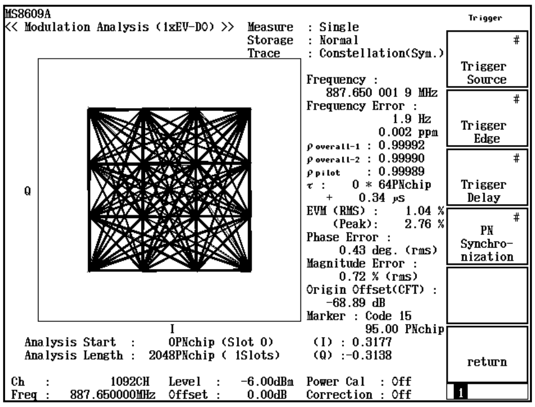
3.2.6 Changing constellation display (Scale Mode)

This section describes how to change the constellation waveform display.

Setting waveform interpolation display

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F2] (Scale Mode) to display the Scale Mode function label.
3. Press [F1] (Interpolation) to display the function labels shown below, permitting selection of the interpolation type.

- [F1] (Non): Shows a chip point with a dot.
- [F2] (Linear): Shows a straight line between two adjacent chip points.
- [F4] (Linear & Symbol Position): Shows a chip point with a dot and a straight line between two adjacent chip points.
- [F6] (return): Returns to the preceding function label display.



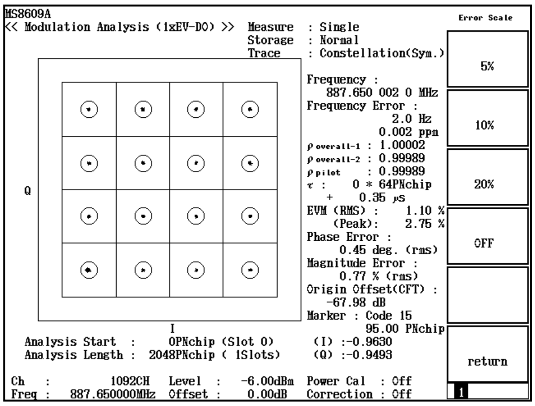
Linear display

Setting error scale display

This parameter appears only when Trace Slot is set to Symbol while Modulation Type is set to other than Auto.

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F2] (Scale Mode) to display the Scale Mode function label.
3. Press [F2] (Error Scale) to display the function labels given below, permitting selection of the error scale.

- [F1] (5%): Draws a circle with 5% error.
- [F2] (10%): Draws a circle with 10% error.
- [F3] (20%): Draws a circle with 20% error.
- [F4] (OFF): Erases the error circle.
- [F6] (return): Returns to the preceding function label display.



3.2.7 Changing waveform display scale (Vertical Scale)

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

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F2] (Scale Mode) to display the Scale Mode function label.
3. Press [F4] (Vertical Scale) to display the function labels shown below, permitting selection of the scale. For EVM error and amplitude error waveforms, the function labels given below are available.

- [F1] (5%): Sets the ordinate scale maximum value to 5%.
- [F2] (10%): Sets the ordinate scale maximum value to 10%.
- [F3] (20%): Sets the ordinate scale maximum value to 20%.
- [F4] (50%): Sets the ordinate scale maximum value to 50%.
- [F5] (100%): Sets the ordinate scale maximum value to 100%.
- [F6] (return): Returns to the preceding function label display.

For phase error, the units change to degree.
On the Code Domain Power screen, the function labels above change to 20, 40, 60, and 80 dB. However, they change to 1, 5, 10, 20 and 80 dB on the Code Domain of Data screen.

3.2.8 Changing waveform display area scale (Square Scale)

Change the scale for the constellation waveform display area.

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F2] (Scale Mode) to display the Scale Mode function label.
3. Press [F4] (Square Scale) to display the function labels shown below, permitting selection of the scale.

- [F1] (1): Displays in normal display area.
- [F2] (2): Displays in x2 scale of normal display area.
- [F3] (5): Displays in x5 scale of normal display area.
- [F4] (10): Displays in x10 scale of normal display area.
- [F6] (return): Returns to the preceding function label display.

3.2.9 Changing active channel threshold (Threshold)

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

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F2] (Scale Mode) to display the Scale Mode function label.
3. Press [F5] (Threshold) to open the setup window.
4. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the threshold.

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

The threshold should be set based on:

Walsh Length 64 when Measuring Object is Forward Link Rev.0 or Forward Link Rev.A (MAC channel);

Walsh Length 16 when Measuring Object is Reverse Link Rev.0.

The threshold is obtained through analysis at each Walsh Length.

3.2.10 Changing code domain result display

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

When Measuring Object is Forward Link Rev.0, Forward Link Rev.A, or Reverse Link Rev.A, two graphs (I- and Q-phases) are displayed. The I- and Q-phase graphs can be set with markers individually. Therefore, the procedure to select the graph that enables the settings is described first.

Selecting code domain power timing phase

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Operation Trace) to activate the I- or Q-graph alternately.

This function is available only when the Measuring Object for Setup Common Parameter is set to Forward Link Rev.0, Forward Link Rev.A, or Reverse Link.

3.2.11 Changing the code order (Code Order)

This section describes the code domain power display mode.

This function permits the setting of the Walsh mode to display the multiplexed signal code domain power in Walsh series, Orthogonal Variable Spreading Factor (OVSF) mode in orthogonal hierarchical series or MAC Index order (MAC Index).

Display can be switched between Walsh and MAC Index for Forward Link MAC area, or between Walsh and OVSF for Reverse Link.

Changing code order

For Forward Link, MAC area:

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F3] (Code Order) to switch alternately between Walsh and MAC Index.

For Reverse Link:

1. On the Modulation Analysis screen, press [ ] (More) to display the second function label page.
2. Press [F3] (Code Order) to switch alternately between Walsh and OVSF.

3.2.12 Displaying the marker

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

Displaying marker

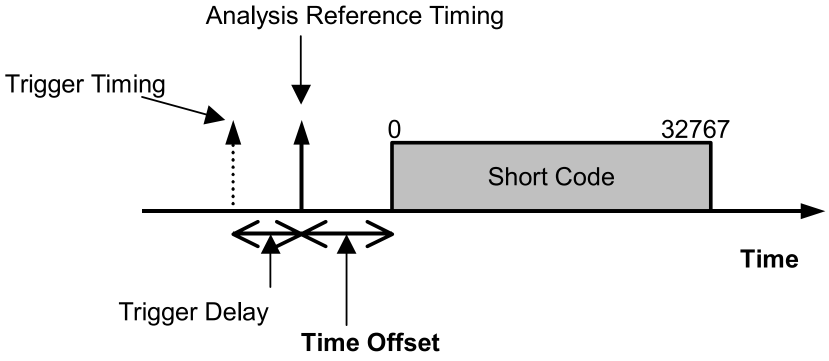
1. Press [Marker] to display the Marker function label.
2. Press [F1] (Marker) to switch alternately between Normal and Off.

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

For a code domain waveform, the color of the code pointed to by the marker changes.

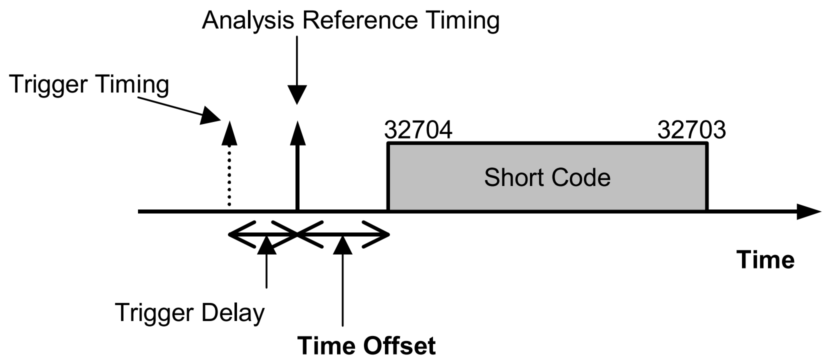
3.2.13 Measuring time offset

Measure the delay of the short-code (including Pilot PN Sequence Offset) starting position from the External Trigger (including Trigger Delay). The relationships among the parameters are as shown below.



The analysis reference timing is the triggering timing with External Trigger plus the Trigger Delay. The short-code starting position is searched for by internal analysis and the difference between this position and the reference timing is represented in 64*N (chips) and the fraction is represented in time resolution (0.01 μsec).

When the short-code starting position contains the Pilot PN Sequence Offset, the relationships among the parameters are as shown below.



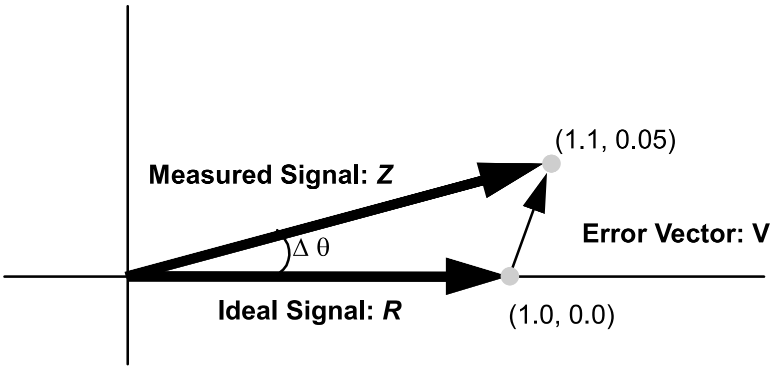
If Pilot PN Sequence Offset is 64 chips, the short-code starting position is shifted 64 chips; that is, it has a pattern starting at 32704, passing 0, and ending at 32703. In this case, for Pilot PN Sequence Offset of the transmitter tester, set Offset Index to 1. Thus, Timing Error is calculated assuming that Pilot PN Sequence Offset is 64 chips.
If PN Offset is unknown, set the PN Synchronization item for the Setup Common Parameter to PN Search. If PN Offset is known, set the above item to Ext Trigger to reduce the analysis time.

3.2.14 Defining modulation accuracy

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

Modulation accuracy

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



The modulation accuracy is described simply using the diagram above.

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

EVM:

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

Amplitude error:

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

Phase error:

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

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

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

Waveform quality factor (ρ) and code domain power

The waveform quality factor represents the correlation between waveforms for the ideal and measured signals. The waveform quality factors obtained for all orthogonal codes and represented with codes on the abscissa and power ratio on the ordinate are referred to as the code domain power. For this unit, the code domain power is obtained based on the definitions in the 3GPP2 cdma2000 1xEV-DO Standard. The definition expression is given below.

$$\rho_i = \frac{\sum_j \left\{ \left| \sum_k Z_{jk} R_{ijk} \right|^2 \bigg/ \sum_k \left| R_{ijk} \right|^2 \right\}}{\sum_j \sum_k \left| Z_{jk} \right|^2}$$

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

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

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

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

Numerator:

$$\{(-1.05)\times(-1)+(0.9\times 1)+(-0.99\times 1)+(1.1\times -1)\}^2 \div \{(-1)^2+(1)^2+(-1)^2+(1)^2\} = 4.0804$$

Denominator:

$$\{(-1.05)^2+(0.9)^2+(0.9)^2+(1.1)^2\} = 4.1026$$

Thus, the waveform quality factor is determined as 0.9946.

3.2.15 Optimizing measurement range (Adjust Range)

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

Adjust Range automatically modifies the internal level diagram so that the internal AD converter for analysis can be used in the optimum conditions. That is, it adjusts the internal circuit so that the AD converter has the maximum dynamic range (S/N). At the same time, it also adjusts the power meter range.
Because the internal level diagram is modified depending on the measured signal level, the measured signal should be continuously 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.

3.2.16 Power calibration function (Power Calibration)

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

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

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

For MS268x, to increase the accuracy of level measurement, execute internal calibration in the spectrum analyzer mode.

3.2.17 Power calibration function (MultiCarr. Power Calibration)

This function enables level measurement without using built-in power meter because correction of internal signal trace is performed using built-in calibration signal.

Use this function when input signal is Multi Carrier. Due to the difference of measurement band between tester mode and power meter, calibration may not be performed properly when attempt of performing power calibration with power meter is made while input signal is Multi Carrier. For single carrier, perform the power calibration with power meter on account of higher accuracy.

3.3 Measuring Transmission Power

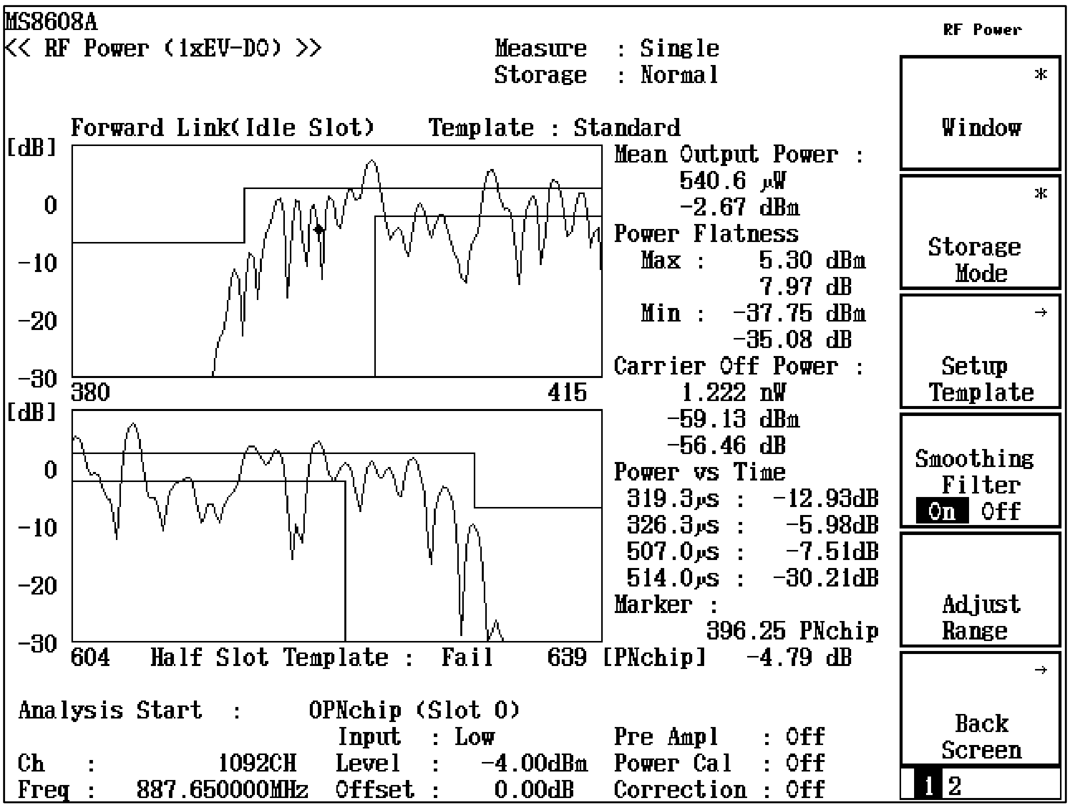
On the Setup Common Parameter screen, pressing F3 (RF Power) causes the transmission power measurement screen to be displayed.
Here, the measurement results displayed on the RF Power screen (transmission power measurement), parameter settings and operation precautions are discussed.

3.3.1 Description of measurement results

This section describes the measurement results displayed on the RF Power screen (transmission power measurement).
When starting measurement, press F5 (Adjust Range) to optimize the measurement unit level setting. To raise the level measurement accuracy, press F4 (Calibration) on the second page and then press F1 (Power Calibration) or F3 (Multi Carr. Power Calibration). See “Optimizing Measurement Range (Adjust Range)” for range optimization. And, see “Power Calibration Function (Power Calibration and Multi Carr. Power Calibration)” for power calibration.

Measurement results:

The screen shown below appears when Window and Marker are set to First Half Slot Transient and ON respectively after the Measureing Object and Slot Type are set to Forward Link Rev.0 and Idle respectively.



Waveform display:

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

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

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

Mean Output Power (Tx Power)

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

Power Flatness

Shows the maximum/minimum power of the measured signal in dBm, and shows the ratio to Tx Power in dB.

Carrier Off Power

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

On/Off Ratio

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

Power vs Time

When measuring Forward Link Idle slot, shows the power at 319.3 μsec, 326.3 μsec, 567.0 μsec and 514.0 μsec for the first half slot, and at 1152.7 μsec, 1179.7 μsec, 1340.3 μsec and 1347.3 μsec for the second half slot, in dB or dBm.

Marker

Shows the measurement value of the Maker position.

For other than Forward Link Idle slot, only Tx Power and Power Flatness are displayed when Measuring Object is Continuous.

3.3.2 Changing waveform display range (Window)

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

Setting display range

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

- [F1] (Slot): Shows the waveform for one slot.
- [F2] (First Half Slot): Shows the waveform for the first half slot.
- [F3] (First Half Slot Transient): Enlarges the transient part of the first half slot. Avairable only for Forward Link Idle slot.
- [F4] (Second Half Slot): Shows the waveform for the second half slot.
- [F5] (Second Half Slot Transient): Enlarges the transient part of the second half slot. Avairable only for Forward Link Idle slot.
- [F6] (return): Returns to the preceding function label display.

Page 2

Press [ ] (More) to display the second function label page.

- [F1] (Slot Expanded Scale): Enlarges the vertical scale of one slot.
- [F2] (First Half Slot Expanded. Scale): Enlarges the vertical scale of the first half slot.
- [F4] (Second Half Slot Expanded Scale): Enlarges the vertical scale of the second half slot.

3.3.3 Displaying the marker

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

Procedure 1

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

Procedure 2

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

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

When the Window is the Transient, the Marker position is set on the rightmost of rise screen if it is intended to set between the rise and fall screens.

3.3.4 Setting the synchronization method (Code Sync)

Set the synchronization method. This parameter appears only when Measuring Object is set to other than QPSK while Trigger is set to External.

1. Press [ ] (More) to display the second function label page.
2. Press [F5] (Code Sync) to alternately switch between On and Off.

- When On is selected, measures the power for one slot at the short-code synchronized timing. When Off is selected, measures the power for one slot fetched at an arbitrary timing. However, when Forward Link Idle slot is to be measured, measures the power for one slot fetched at the timing synchronized with the waveform amplitude.

3.3.5 Setting analyzed slot (Analysis Start)

When Code Sync is set to On, the slot to be analyzed can be specified. This parameter cannot be set when Measuring Object is set to QPSK.

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Analysis Start) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the slot to be analyzed.

3.3.6 Averaging (Storage Mode)

This section describes the storage mode through measurement result averaging.

Setting averaging process

1. On the RF Power screen, press [F2] (Storage Mode) to display the Storage Mode function label.
2. Press [F2] (Average Count) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press [Set].
5. On the Storage Mode menu, press [F1] (Storage Mode).
6. The selection window opens.
7. Using [∧] and [∨] or the rotary knob in the Entry section, select Average.
8. Press [Set].

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

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

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

Average Mode:Set the method of capturing waveforms

- Normal: Captures waveforms and performs averaging for each mesurment.
- Continuous: Captures waveforms up to 256slots, then performs averaging.

Available storage modes are listed below.

- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.
- Cumulative: When measurement mode is continuous, Updates the measurement result at every measurement by overwriting the waveform by the point.

- Overwrite: When measurement mode is continuous, Updates the measurement result at every measurement by overwriting the waveform by the line.

When Measuring Object is set to Forward Link Rev.0/Forward Link Rev.A and Storage mode is set to Average, Slot Type is detected. Only Slot Type selected in Setup Common Parameter screen is measured.

3.3.7 Using Smoothing Filter (Smoothing Filter)

Set the Smoothing Filter.

1. Press [ ] (More) to display the first function label page.
2. Press [F4] (Smoothing Filter) to alternately switch between On and Off.

- When On is selected, measurement result is filtered by moving average.

3.3.8 Setting Smoothing Target (Smoothing Target)

Set the Smoothing Target. This parameter is enable when Smoothing Filter is On.

1. Press [ ] (More) to display the third function label page.
2. Press [F4] (Smoothing Target) to alternately switch between All and Wave.

- When All is selected, all measurement result is filtered by moving average. When Wave is selected, filtered result is only Wave display.

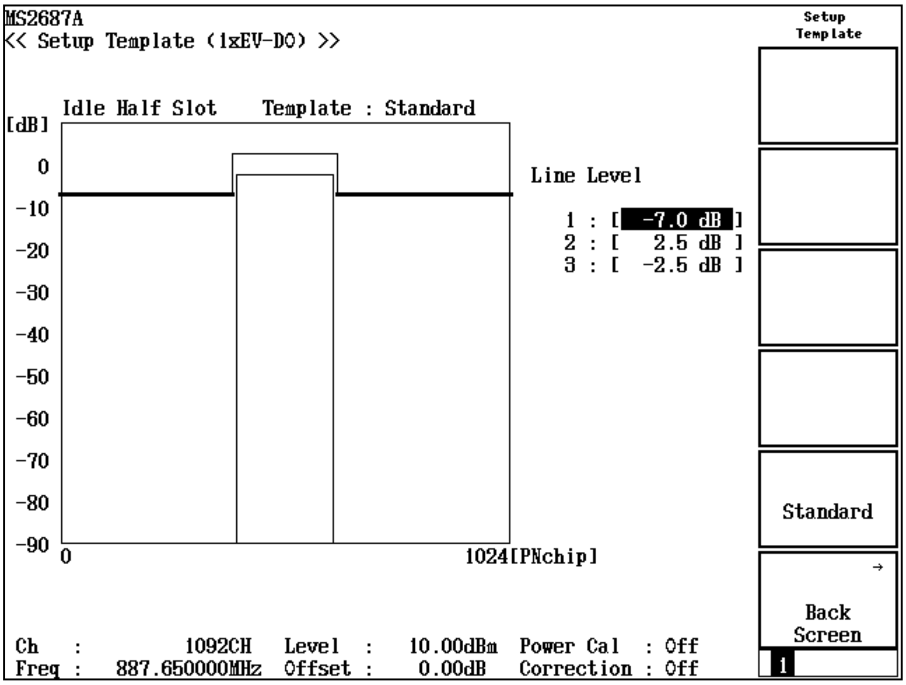
3.3.9 Setting a template (Setup Template)

This section describes how to set a template.

Displaying Setup Template

1. While the RF Power screen is being displayed, press [F3] (Setup Template) on the first page of the RF Power function label.
2. The Setup Template screen shown below appears.

When the Measuring Object is Reverse Link Rev.0 or QPSK, it can not be carried out.



Setting templates

1. Using [∧] and [∨] or the rotary knob in the Entry section, select the standard line to be set.
2. Using the numeric keypad, set the standard line level or press [Set] in the Entry section.

When [Set] is pressed:

3. The standard line modification line appears.
4. Using [∧] and [∨] or the rotary knob in the Entry section, set the standard line modification line to the desired level.
5. Press [Set].

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

Standard template automatic setting

- Press [F5] (Standard) to set default template.

3.4 Measuring Occupied Bandwidth

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

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

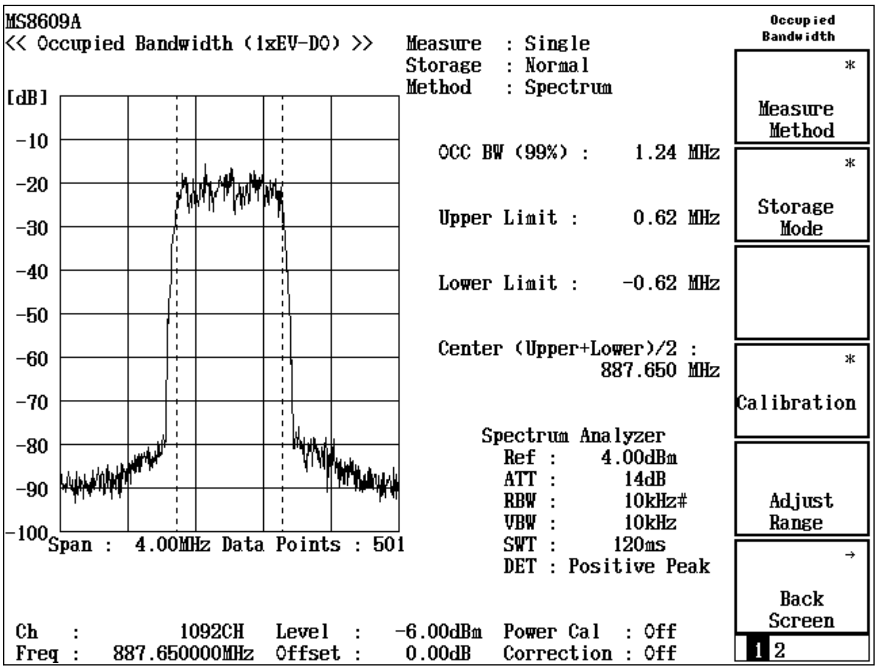
3.4.1 Description of measurement results

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

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

Measurement results:

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



Waveform display:

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

OCC BW (99%)

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

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

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

Upper Limit

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

Lower Limit

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

Center (Upper＋Lower)/2

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

Selecting result display

On the Occupied Bandwidth screen, press F1 (Measure Method) to display the function labels listed below and then select the result display.

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

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

3.4.2 Setting SPA parameters by the Spectrum method

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

- ATT, Ref Level Mode Auto/Manual

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

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

  Set the reference level for SPA sweep.
- Attenuator

  Set the attenuator for SPA sweep.
- Attenuator Auto/Manual

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

  Manual: Permits manual setting of the attenuator for SPA sweep.
- Span

  Set the sweep span for SPA sweep.
- RBW

  Set RBW for SPA sweep.
- VBW

  Set VBW for SPA sweep.
- VBW Auto/Manual

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

  Set VBW for VBW Auto using this parameter.
- Sweep Time

  Set the sweep time for SPA sweep.
- Sweep Time Auto/Manual

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

  Set the detection mode for SPA sweep.
- Data Points

  Set the data count for SPA sweep (501/1001).
- RBW Mode (available only when Opt04 is installed)

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

ATT, Ref Level mode, Setting 1

1. Press [Amplitude].
2. Press [ ] (More) to display the third function label page.
3. Press [F1] (SPA ATT, Ref Level) to switch between Auto and Manual.

When setup is completed, measurement restarts.

ATT, Ref Level mode, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [F1] (SPA ATT, Ref Level) to switch between Auto and Manual.

When setup is completed, measurement restarts.

Ref Level, Setting 1

1. Press [Amplitude].
2. Press [ ] (More) to display the third function label page.
3. Press [F2] (Ref Level (SPA)).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press [Set].

When setup is completed, measurement restarts.

Ref Level, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [F2] (Ref Level (SPA)).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press [Set].

When setup is completed, measurement restarts.

Attenuator, Setting 1

1. Press [Amplitude].
2. Press [ ] (More) to display the third function label page.
3. Press [F3] (Attenuator).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press [Set].

When setup is completed, measurement restarts.

Attenuator, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [F3] (Attenuator).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press [Set].

When setup is completed, measurement restarts.

Attenuator mode, Setting 1

1. Press [Amplitude].
2. Press [ ] (More) to display the third function label page.
3. Press [F4] (Attenuator) to switch between Auto and Manual.

When setup is completed, measurement restarts.

Attenuator mode, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [F4] (Attenuator) to alternately switch between Auto and Manual.

When setup is completed, measurement restarts.

Span, Setting 1

1. Press Span.
2. The selection window opens.
3. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
4. Press Set.

When setup is completed, measurement restarts.

Span, Setting 2

1. Press (More) to display the second function label page.
2. Press F1 (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press (More) to display the third function label page.
4. Press F3 (SPAN).
5. The selection window opens.
6. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
7. Press Set.

When setup is completed, measurement restarts.

RBW, Setting 1

1. Press BW.
2. The selection window opens.
3. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
4. Press Set.

When setup is completed, measurement restarts.

RBW, Setting 2

1. Press (More) to display the second function label page.
2. Press F1 (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press (More) to display the second function label page.
4. Press F1 (RBW).
5. The selection window opens.
6. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
7. Press Set.

When setup is completed, measurement restarts.

VBW, Setting 1

1. Press BW.
2. The selection window opens.
3. Press F3 (VBW).
4. The selection window opens.
5. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press Set.

When setup is completed, measurement restarts.

VBW, Setting 2

1. Press (More) to display the second function label page.
2. Press F1 (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press (More) to display the second function label page.
4. Press F3 (VBW).
5. The selection window opens.
6. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter a numeric value.
7. Press Set.

When setup is completed, measurement restarts.

VBW automatic, Setting 1

1. Press BW.
2. The selection window opens.
3. Press F4 (VBW) to alternately switch between Auto and Manual.
4. When Manual is selected, the mark "#" is added to the VBW set value in the result display area.

VBW automatic, Setting 2

1. Press (More) to display the second function label page.
2. Press F1 (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press (More) to display the second function label page.
4. Press F4 (VBW) to alternately switch between Auto and Manual.
5. When Manual is selected, the mark "#" is added to the VBW set value in the result display area.

VBW/RBW Ratio, Setting 1

1. Press [BW].
2. The selection window opens.
3. Press [F5] (VBW/RBW Ratio).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
6. Press [Set].

VBW/RBW Ratio, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the second function label page.
4. Press [F5] (VBW/RBW Ratio).
5. The selection window opens.
6. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
7. Press [Set].

Sweep Time, Setting 1

1. Press [Sweep Time].
2. The selection window opens.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
4. Press [Set].

When setup is completed, measurement restarts.

Sweep Time, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F2] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the third function label page.
4. Press [F1] (Sweep Time).
5. The selection window opens.
6. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
7. Press [Set].

When setup is completed, measurement restarts.

Sweep Time automatic, Setting 1

1. Press [Sweep Time].
2. Press [F2] (Sweep Time) to switch between Auto and Manual alternately.

Sweep Time automatic, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the third function label page.
4. Press [F2] (Sweep Time) to alternately switch between Auto and Manual.

Detection, Setting 1

1. Press [A,B].
2. The selection window opens.
3. Press [F5] (Detection).
4. The selection window opens.
5. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the Detection Mode to be set.
6. Press [Set].

When setup is completed, measurement restarts.

Detection, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the third function label page.
4. Press [F5] (Detection).
5. The selection window opens.
6. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the Detection Mode to be set.
7. Press [Set].

When setup is completed, measurement restarts.

Data Points, Setting 1

1. Press [A,B].
2. The selection window opens.
3. Press [F4] (Data Points) and select the number of sweep points.

When setup is completed, measurement restarts.

Data Points, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the third function label page.
4. Press [F4] (Data Points) and select the number of sweep points.

When setup is completed, measurement restarts.

RBW mode, Setting 1

1. Press [BW].
2. The selection window opens.
3. Press [F2] (RBW Mode) to switch RBW mode between Digital and Normal alternately.

When setup is completed, measurement restarts.

RBW mode, Setting 2

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (Setup Spectrum Analyzer) to display parameter setting keys and then set the parameters.
3. Press [ ] (More) to display the second function label page.
4. Press [F2] (RBW Mode) to switch RBW mode between Digital and Normal alternately.

When setup is completed, measurement restarts.

3.4.3 Averaging (Storage Mode)

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

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

Setting averaging processing

1. On the Occupied Bandwidth screen, press [F2] (Storage Mode) to display the Storage Mode function label.
2. Press [F2] (Average Count) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press [Set].
5. On the Storage Mode menu, press [F1] (Storage Mode).
6. The selection window opens.
7. Using [∧] and [∨] or the rotary knob in the Entry section, select Average.
8. Press [Set].

When setup is completed, measurement restarts.

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

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

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

Available storage modes are listed below.

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

3.5 Measuring Spurious close to the Carrier

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

Here, the measurement results displayed on the Spurious close to the Carrier screen (Spurious close to the carrier measurement), parameter settings and operation precautions are explained.

This measurement is not available for IQ input.

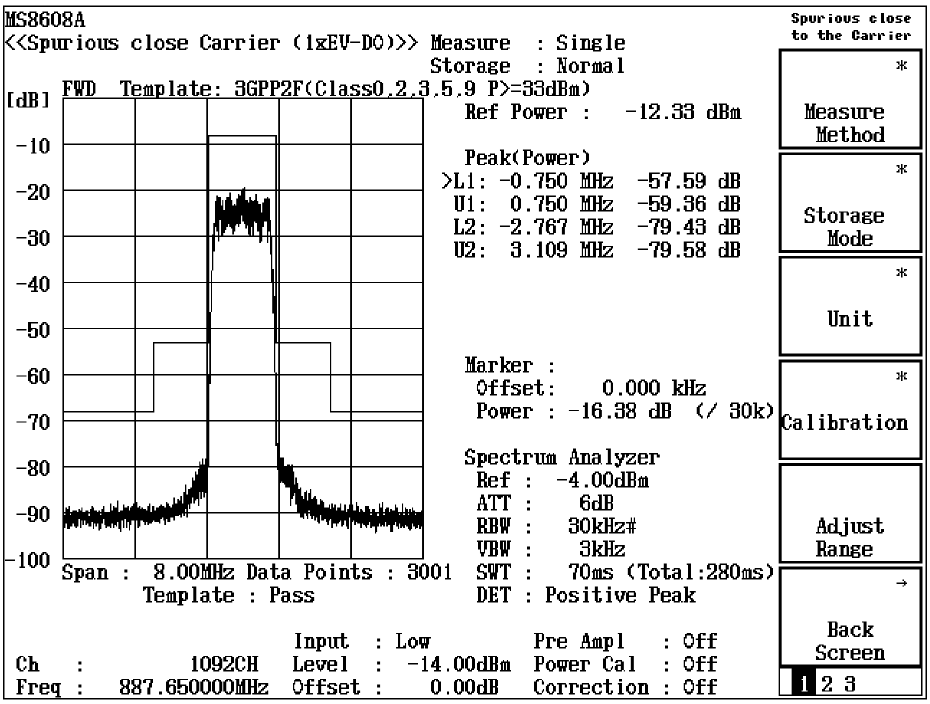
3.5.1 Explanation of measurement results

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

When starting measurement, press F5 (Adjust Range) to optimize the measurement unit level setting. To raise the level measurement accuracy, press F4 (Calibration) on the second page and then press F1 (Power Calibration) or F3 (Multi Carr. Power Calibration). See “Optimizing Measurement Range (Adjust Range)” for range optimization. And, see “Power Calibration Function (Power Calibration and Multi Carr. Power Calibration)” for power calibration.

Measurement results:

The screen shown below appears when Forward Band Class 0,2,3,5,9 is selected for Measure Method.



Waveform display

Displays the spectrum waveform with the horizontal and vertical axes representing the frequency and level, respectively. In addition, a template appears showing the Pass/Fail judgment results.

Ref Power

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

Offset Freq. vs Power

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

Peak (Power), Peak (Margin)

Displays Level/Margin of measured point of minimum margin at each frequency band of the template. When the measured waveform exceeds the template, each Template is indicated by reversing the value.

Marker

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

3.5.2 Selecting result display (Measure Method)

This section describes how to set a measure method.

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

- F1 (Normal): Displays the waveform obtained by sweeping with the spectrum analyzer.
- F2 (3GPP2 FWD Band Class 0, 2, 3, 5, 9):
  Measures near the Carrier with high precision when measuring Forward Band Class 0, 2, 3 (old ver.), 5, 9.
- F3 (3GPP2 FWD Band Class 1, 4, 6, 8):
  Measures near the Carrier with high precision when measuring Forward Band Class 1, 4, 6, 8. For above 2.25 MHz offset, a measurement will be made over 1 MHz RBW.
- F4 (3GPP2 FWD Band Class 3+):
  Measures near the Carrier with high precision when measuring Forward Band Class 3 (new ver.). For above 1.98 MHz offset, a measurement will be made over 100 KHz RBW.
- F6 (return): Returns to the preceding function label display.

When setup is completed, measurement restarts.

3.5.3 Setting spurious level unit (Unit)

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

dB/dBm(Template): It displays by dB or dBm, which is set up for every Line Level.

3.5.4 Selecting Ref Power (Ref Power)

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

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

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

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

3.5.5 Displaying integral waveform (Integral Waveform)

1. Press [ ] (More) to display the third function label page.
2. Press [F4] (Integral Waveform) and select On to display a waveform converted at 1.23 MHz.

Change is not allowed when the Measure Method is other than Normal.

3.5.6 Selecting measurement result display type (Display Data Type)

Select the measurement result display type.

Selecting Display Data Type

1. Press [ ] (More) to display the second function label page.
2. Press [F4] (Display Data Type) to open the setup window.
3. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press [Set].

3.5.7 Setting SPA parameters (Setup Spectrum Analyzer)

The SPA parameters listed below can be changed.

- ATT, Ref Level Mode Auto/Manual

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

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

- Ref Level

  Set the reference level for SPA sweep.

- Attenuator

  Set the attenuator for SPA sweep.

- Attenuator Auto/Manual

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

  Manual: Permits manual setting of the attenuator for SPA sweep.

- Span

  Set the sweep span for SPA sweep. When Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9, 3GPP2 FWD Band Class 1, 4, 6, 8, and 3GPP2 FWD Band Class 3+, sweep span is fixed at 8MHz. Change is not allowed when the Measure Method is other than Normal.

- RBW

  Set RBW for SPA sweep.

- VBW

  Set VBW for SPA sweep.

- VBW Auto/Manual

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

- VBW/RBW Ratio

  Set VBW for VBW Auto using this parameter.

- Sweep Time

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

- Sweep Time Auto/Manual

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

- Detection

  Set the detection mode for SPA sweep.

- Data Points

  Set the data count for SPA sweep (501/1001). When Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9, 3GPP2 FWD Band Class 1, 4, 6, 8, and 3GPP2 FWD Band Class 3+, a setting value differs from a display value due to their differences in the sweep method.
- RBW Mode (available only when Opt 04 is installed)

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

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

RBW, VBW, VBW Auto/Manual and VBW/RBW Ratio are not allowed to change when the Template is Band Class 6 while the Measure Method is 3GPP2 FWD Band Class 1, 4, 6, 8.

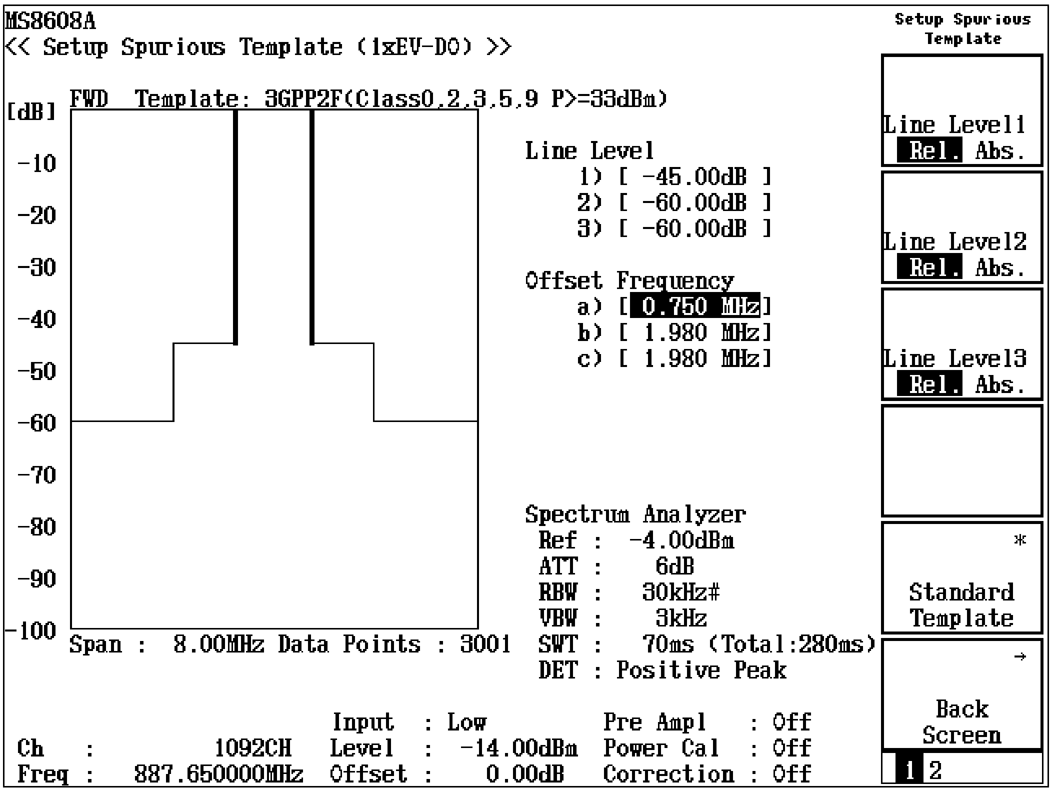
3.5.8 Setting a template (Setup Spurious Template)

This section describes how to set a template.

Displaying Setup Spurious Template

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

When the Template is Band Class 6 while Measure Method is 3GPP2 FWD Band Class 1, 4, 6, 8, it can not be carried out.



Setting templates

1. Using [∧] and [∨] or the rotary knob in the Entry section, select the standard line to be set.
2. Using the numeric keypad, set the standard line level or press [Set] in the Entry section.

When [Set] is pressed:

3. The standard line modification line appears.
4. Using [∧] and [∨] or the rotary knob in the Entry section, set the standard line modification line to the desired level.
5. Press [Set].

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

Setting level unit

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

Standard template automatic setting

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

3.5.9 Averaging (Storage Mode)

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

Setting averaging processing

1. On the Spurious close to the Carrier screen, press F2 (Storage Mode) to display the Storage Mode function label.
2. Press F2 (Average Count) to open the setup window.
3. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press Set.
5. On the Storage Mode menu, press F1 (Storage Mode).
6. The selection window opens.
7. Using ∧ and ∨ or the rotary knob in the Entry section, select Average.
8. Press Set.

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

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

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

Available storage modes are listed below.

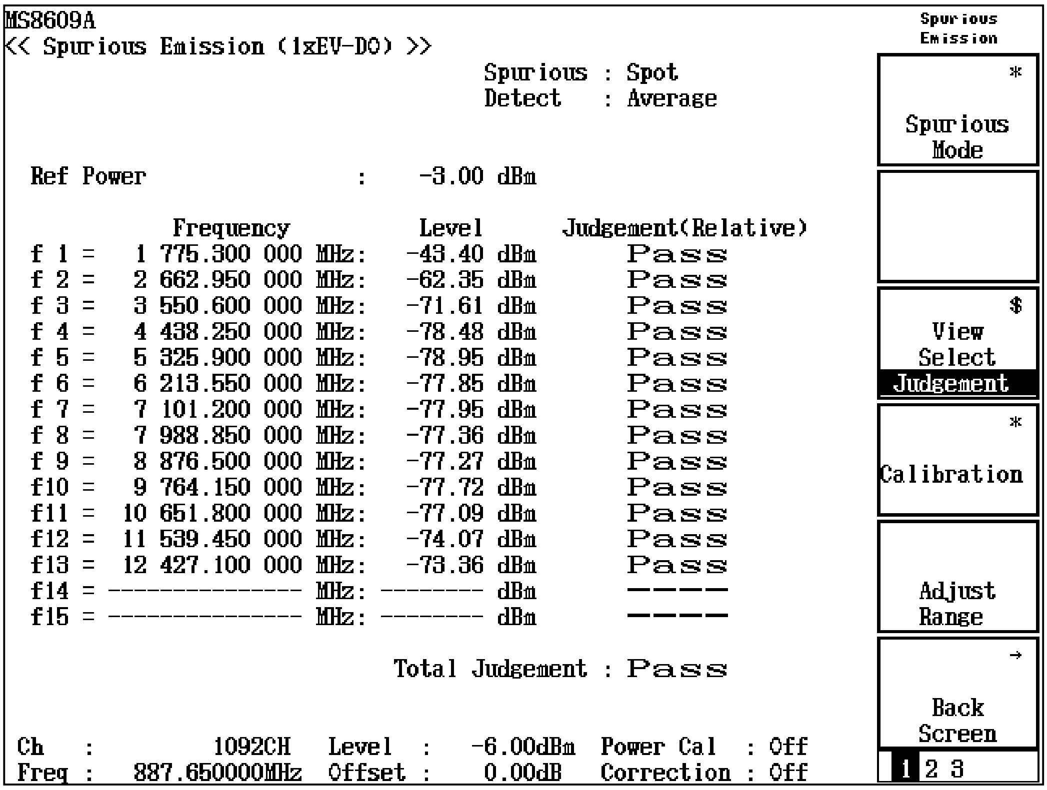
- Normal: Updates and displays the measurement results at every measurement.
- Average: Averages and displays the measurement results at every measurement.

3.6 Measuring Spurious

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

3.6.1 Explanation of measurement results

The screen given below appears when the Spurious Mode is Spot. For Spurious Mode setting, see “Setting spurious measurement method (Spurious Mode).”



Ref Power

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

Frequency

Shows the spurious frequency.

Level

Shows the spurious level.

Judgment, Limit

Passes judgment based on the upper limit level set on the Setup Spot Table or Setup Sweep/Search Table and displays the results.

This item appears only when Judgment has been selected using F3 (View Select).

RBW, VBW, SWT

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

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

RefLevel,ATT

Shows the spectrum analyzer RefLevel, ATT measurement conditions.

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

Spurious, Detect, Preselector

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

(1) Spurious

Shows the measurement method selected in Spurious Mode.

(2) Detect

Shows the spectrum analyzer detection mode.

(3) Preselector

Shows the preselector operation mode. This item appears only when the MS8608A-03 option is installed. See "3.6.5 Setting preselector mode (Preselector)."

3.6.2 Setting spurious measurement method (Spurious Mode)

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

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

3.6.3 Setting spurious level unit (Unit)

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

1. Press [ ] (More) to display the second Spurious function label page.
2. Press F4 (Unit) to alternately switch between dBm and dB. Select the unit.

   The reference level for dB display is the value obtained in the measurement method set in Ref Power.

3.6.4 Selecting Ref Power (Ref Power)

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

1. Press [ ] (More) to display the third function label page.
2. Press [F1] (Ref Power) and select SPA or Tx Power.

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

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

3.6.5 Setting preselector mode (Preselector)

This function is available only when the main unit option MS8608A-03 is installed. (This option cannot be installed on MS8609A/MS2681A/MS2687A/B.)
Use this function to select Band 0 (Normal) or Band 1 for preselector (Spurious) for measurement of 1.6 to 3 GHz.
Measurement in Spurious mode sweeps 1.6 to 3 GHz with Band 1, and is not effected by harmonic waves from the spectrum analyzer itself.

Setting mode

1. Press [ ] (More) to display the second Spurious function label page.
2. Press [F5] (Setup Spectrum Analyzer).
3. Press [F4] (Preselector) to alternately switch between Normal and Spurious. Select Spurious to activate the preselector.

This function is set commonly regardless of the Spurious Mode settings.
When MS8608A-03/MS2683A-03 option is not installed or when the measurement unit is MS8609A/MS2681A/MS2687A/B, the Preselector menu does not appear.

3.6.6 Setting detection mode (Detection)

Setting mode

1. Press [ ] (More) to display the second Spurious function label page.
2. Press [F5] (Setup Spectrum Analyzer).
3. Press [F5] (Detection).
4. The selection window opens.
5. Using [∧] and [∨] or the rotary knob in the Entry section, input the Detection Mode to be set.

6. Press [Set].

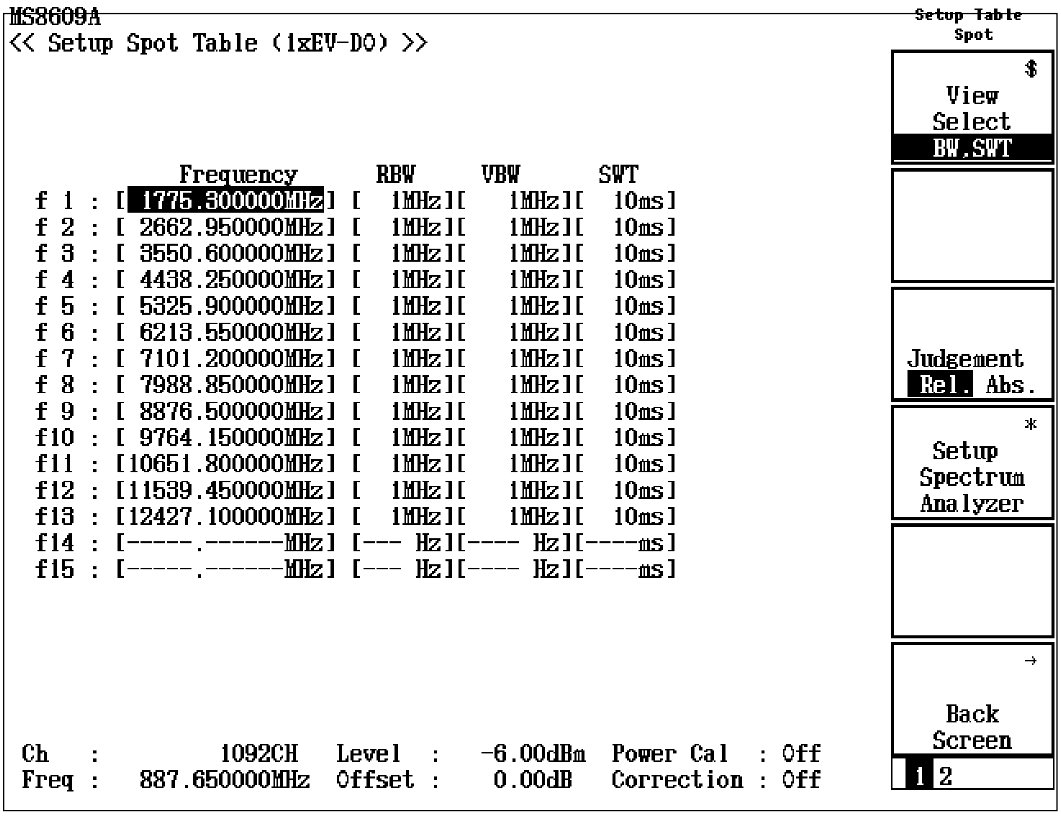
This function is set commonly for each of the set Spurious Mode.

3.6.7 Setting measurement frequency for spot method (Setup Spot Table)

This section describes how to set items such as measurement frequency for measurement in the spot method.
Use the Setup Spot Table screen for the setting.

Displaying Setup Spot Table screen

1. While the Spurious Emission screen is being displayed, press [F1] (Setup Spot Table) on the second Spurious function label page.
2. The Setup Spot Table screen shown below appears.



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

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the item to be set.
2. Press [Set] in the Entry section.
3. The setup window opens.
4. Press [∧] and [∨] to move the cursor to the item to be set.
5. Press [Set].

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

Setting unit of Limit Level

1. Press F3 (Judgment) to switch unit of Limit Level and judges in the set unit.

Setting harmonic wave

1. Press (More) to display the second Setup Table Spot function label page.
2. Press F5 (Harmonics) to open a confirmation window. When Yes is selected, harmonic wave with frequency set in Setup Common Parameter is automatically set. All frequencies and RBW set previously are deleted.

Deleting all settings

1. Press F2 (Clear) to open a confirmation window asking whether to delete the set values.
2. Using the rotary knob, move the cursor to Yes.
3. Press Set in the Entry section to delete all set values.

Deleting cursor line

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

Inserting empty line at cursor

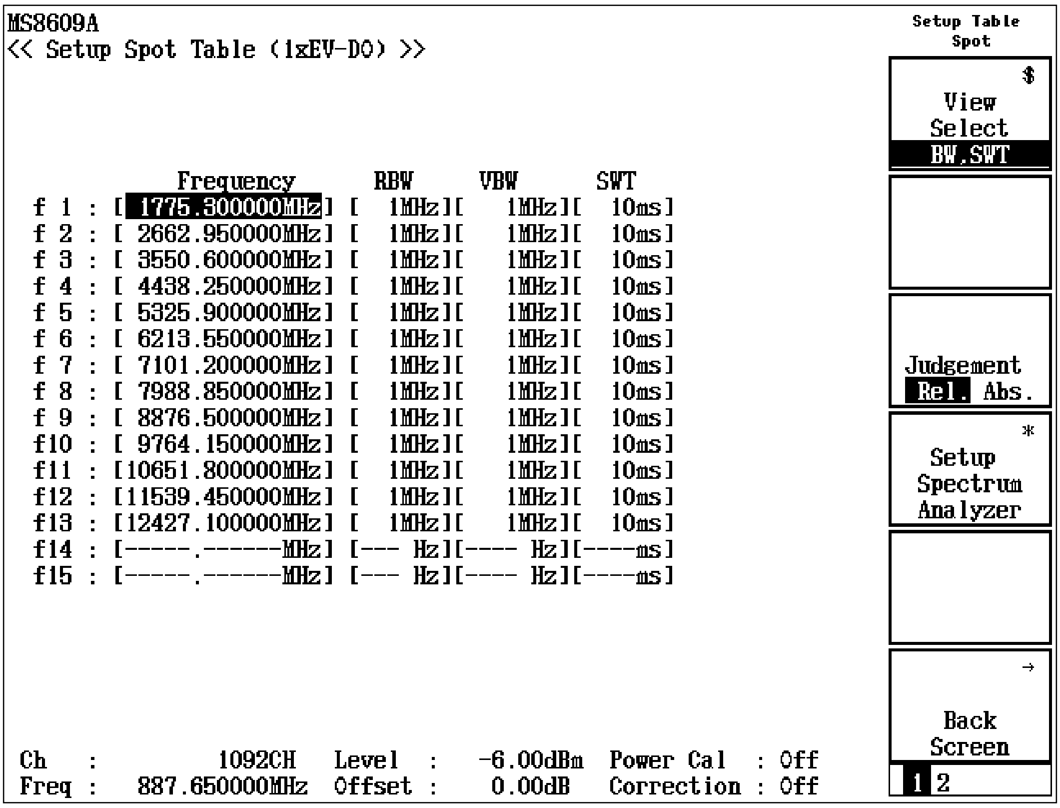
1. Press F4 (Insert) to move all lines below the cursor downward one line and place a blank line (---) at the line where the cursor is positioned. When f15 has been set, no blank lines can be inserted.

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

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

Displaying Setup Search/Sweep Table screen

1. While the Spurious Emission screen is being displayed, press F2 (Setup Search/Sweep Table) on the second Spurious function label page.
2. The Setup Search/Sweep Table screen shown below appears.



Setting start and stop frequencies

1. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the Start Frequency or Stop Frequency item.
2. Using the numeric keypad, set the frequency.

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

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

1. Press F1 (View Select) to display the parameter to be set.
2. Using ∧ and ∨ or the rotary knob in the Entry section, move the cursor to the item to be set.
3. Press Set in the Entry section.
4. The setup window opens.
5. Press ∧ and ∨ to move the cursor to the item to be set.
6. Press Set.

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

Setting unit of Limit Level

Press F3 (Judgement) to switch unit of Limit Level and judges in the set unit.

Deleting all settings

1. Press (More) to display the second Setup Search/Sweep Table function label page.
2. Press F2 (Clear) to open a confirmation window asking whether to delete the set values.
3. Using the rotary knob, move the cursor to Yes.
4. Press Set in the Entry section to delete all set values.

Deleting cursor line

1. Press (More) to display the second Setup Search/Sweep Table function label page.
2. Press F3 (Delete) to delete the line where the cursor is positioned and move all lines below the cursor upward one line.

Inserting empty line at cursor

1. Press (More) to display the second Setup Search/Sweep Table function label page.
2. Press F4 (Insert) to move all lines below the cursor downward one line and place a blank line (---) at the line where the cursor is positioned. When f15 has been set, no blank lines can be inserted.

3.6.9 Setting frequency and sweep tables in details

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

RBW automatic setting

1. Press [F2] (RBW Auto/Manual) to alternately switch between Auto and Manual.

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

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

VBW automatic setting

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

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

Setting VBW/RBW Ratio

1. Press [F4] (VBW/RBW Ratio) to open the selection window.
2. Using [∧] and [∨], the rotary knob or numeric keypad in the Entry section, enter a numeric value.
3. Press [Set].

Sweep Time automatic setting

1. Press [F5] (Sweep Time) to alternately switch between Auto and Manual and then select Auto.
2. When Auto is selected, values are automatically set for all Sweep Times in the set frequency table.

Setting RBW mode

This function is available when the main unit option MS860x-04 or MS268x-04 is installed.

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

When neither MS8608A-04 nor MS8609A-04 option is installed, the RBW mode menu does not appear.

Setting ATT, Ref Level mode

1. Press [ ] (More) to display the second function label page.
2. Press [F1] (SPA ATT, Ref Level) to alternately switch between Auto and Manual.

Setting Attenuator mode

1. Press [ ] (More) to display the second function label page.
2. Press [F4] (Attenuator) to alternately switch between Auto and Manual.

3.7 Power Meter

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

Here, the measurement results displayed on the Power Meter screen (power meter), parameter settings and operation precautions are explained.

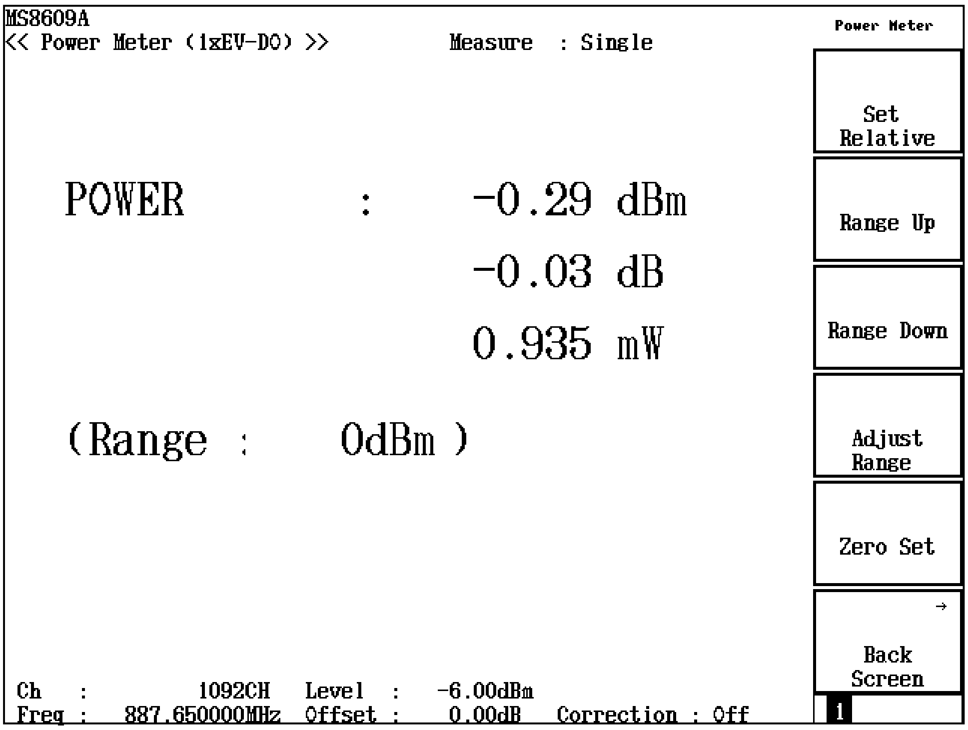
This measurement is not available for IQ input.

For MS268x, this function is not available.

3.7.1 Explanation of measurement results

The measurement results displayed on the Power Meter screen (power meter) are described below. When starting the measurement, press F4 (Adjust Range) to optimize the measurement unit level settings. For range optimization, see “3.2.15 Optimizing measurement range (Adjust Range).”

Measurement results



POWER

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

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

Range

Shows the current measurement range.

3.7.2 Calibrating zero-point (Zero Set)

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

3.7.3 Using relative-value display (Set Relative)

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

3.7.4 Setting measurement range (Range Up/Range Down)

Set the power meter measurement range.

Measurement range

Available measurement ranges are listed below.

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

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

Setting the range

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

3.8 Measuring the IQ Level

For MS860x, on the Setup Common Parameter screen, pressing F2 (IQ Level) causes the IQ level measurement screen to be displayed.

Here, the measurement results displayed on the IQ Level screen (IQ level measurement), parameter settings and operation precautions are explained.

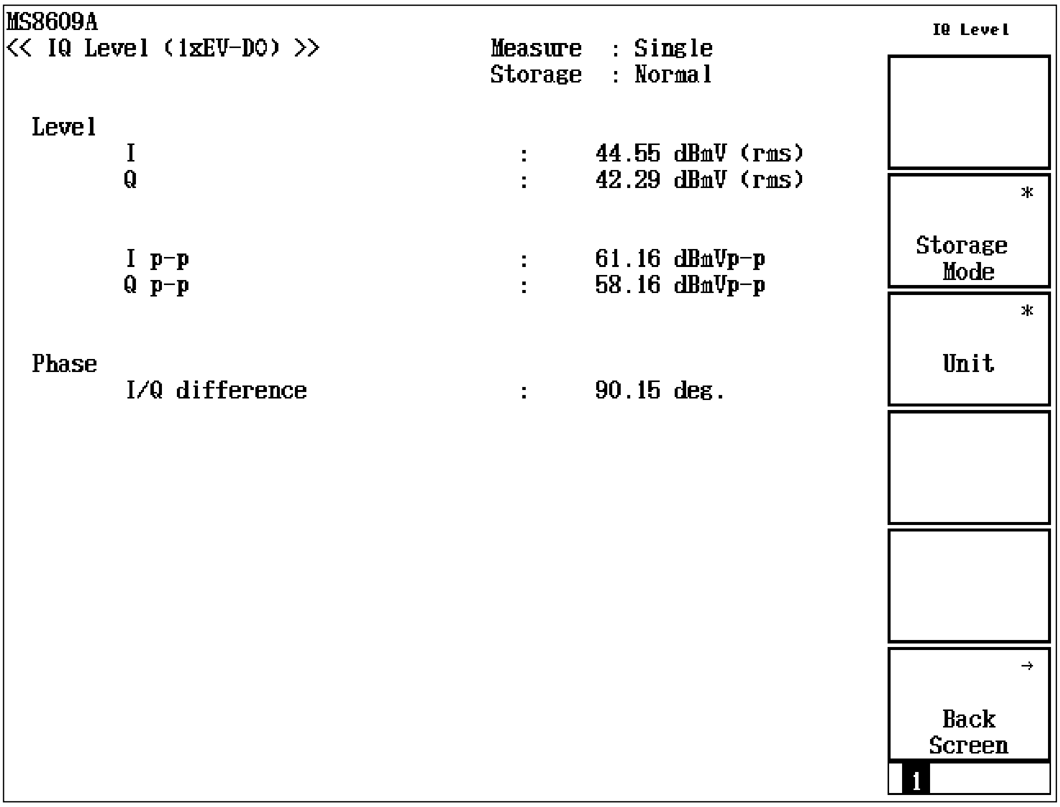
This measurement is not available for RF input.

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

3.8.1 Explanation of measurement results

The measurement results displayed on the IQ Level screen (IQ level measurement) are described below.

Measurement results



Level (I and Q)

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

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

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

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

3.8.2 Averaging (Storage Mode)

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

Setting averaging process

1. On the IQ Level screen, press F2 (Storage Mode) to display the Storage Mode function label.
2. Press F2 (Average Count) to open the setup window.
3. Using ∧ and ∨, the rotary knob or numeric keypad in the Entry section, enter the averaging count.
4. Press Set.
5. On the Storage Mode menu, press F1 (Storage Mode).
6. The selection window opens.
7. Using ∧ and ∨ or the rotary knob in the Entry section, select Average.
8. Press (More).

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

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

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

Available storage modes are listed below.

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

3.8.3 Changing measurement value unit (Unit)

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

Setting display unit

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

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

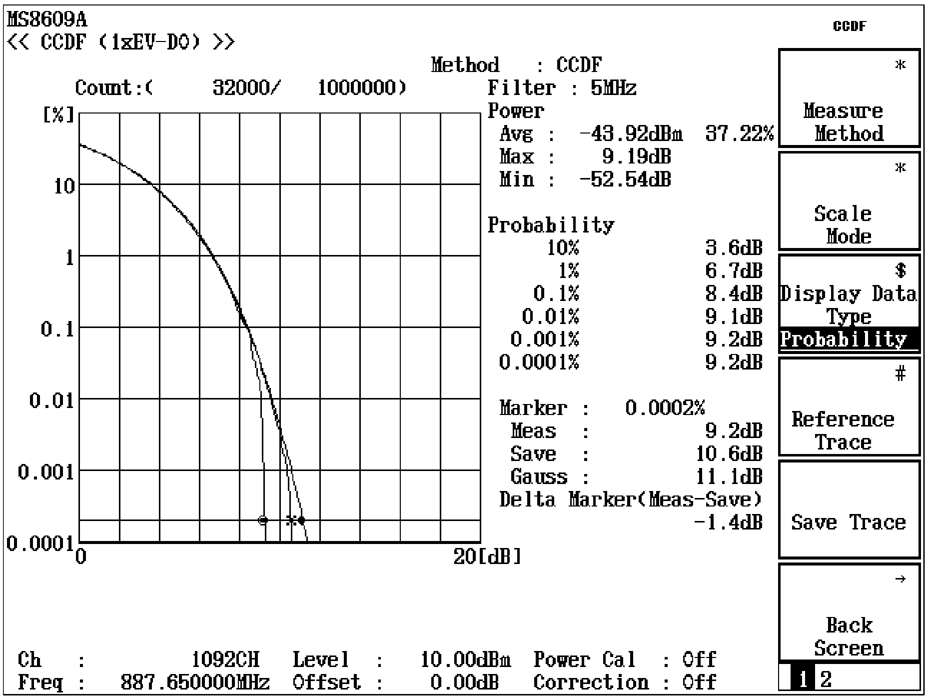
3.9 Measuring CCDF

On the second page of the function lavel on the Setup Common Parameter screen, pressing [F3] (CCDF) causes the CCDF measurement screen to be displayed.

This section describes the measured results and setting parameter related to the CCDF (Complementary Cumulative Distribution Function) screen.

3.9.1 Explanation of Measured Results

The following display appears when CCDF is selected for Measure Method and Reference Trace is set to Save & Gaussian.



Method:

Displays the measurement method selected for Measure Method. Refer to "3.9.2 Selecting Measurement Method" for details on setting.

Waveform:

Displays the cumulative distribution of the average power band-limited by Filter and the instantaneous power. The horizontal axis indicates the difference between the average value and instantaneous power; the vertical axis indicates distribution. Refer to "3.9.3 Setting display method" for details on setting.

Count:

Displays the measurement point as count currently being measured/total count.

Filter:

Displays the band of Filter used for analysis. Refer to "3.9.4 Setting for Measurement" for details on setting.

Power:

Displays the relative values of Average Power, Maximum Power, and Minimum Power of the measurement point. It also displays the cumulative ratio of Average Power (unit: percent).

Distribution, Probability:

Displays the cumulative distribution of which above deviation at the grid. Refer to "Setting the Display Method" for details on setting.

Marker:

Displays the cumulative distribution of which above deviation at the marker. Refer to "Setting the Display Method" for details on setting.

Delta Marker:

Displays the difference between the data saved in Reference Trace and the waveform being measured. Refer to "Setting the Display Method" for details on saving/displaying Reference Trace.

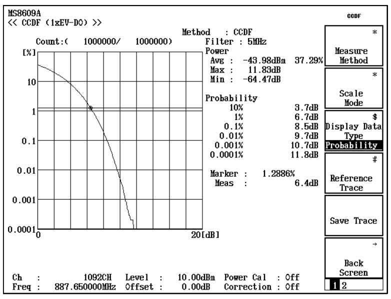
3.9.2 Selecting Measurement Method

This section describes how to select the Measurement Method. The description advances assuming that the first page of function label is being displayed on the CCDF screen.

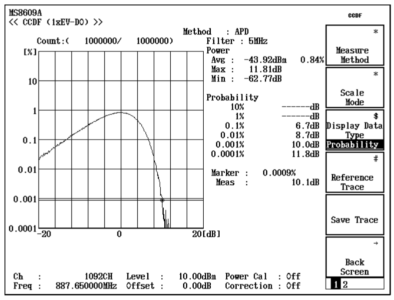
1. Press [F1] (Measure Method) to display the function labels shown below that allows you to select the Measurement Method.

- [F1] (CCDF): Measures and displays CCDF (Complementary Cumulative Distribution Function). In this measurement, the cumulative distribution of the deviation of average power and instantaneous power is to be measured and displayed.
- [F2] (APD): Measures and displays APD (Amplitude Probability Density). In this measurement, the deviation of average power and instantaneous power.
- [F6] (return): Returns to the previous function label.

When Measure Method is changed, re-measurement is to be carried out.



Measure Method : CCDF



Measure Method : APD

3.9.3 Setting Display Method

This section describes the Display Method of the measured results. The description advances assuming that the first page of function label is being displayed on the CCDF screen.

Selecting Trace Format

1. Press [F2] (Scale Mode) to display the function label.
2. Press [F1] (Trace Format) to display the setting window.
3. Select "Trace Format" using [∧] [∨] (Entry keys) or the rotary knob.
4. Press [Set] to confirm.

The following modes are selectable for Trace Format:

- Positive: Displays the distribution of which above Average Power
- Negative: Displays the distribution of which below Average Power
- Pos. & Neg.: Displays all distribution

This function is available only when APD is set for Measure Method.

Selecting Horizontal Scale

1. Press [F2] (Scale Mode) to display the function label.
2. Press [F2] (Horizontal Scale) to display the function labels shown below that allows you to select Scale.

- [F1] (2 dB): Sets the maximum value to 2 dB
- [F2] (5 dB): Sets the maximum value to 5 dB
- [F3] (10 dB): Sets the maximum value to 10 dB
- [F4] (20 dB): Sets the maximum value to 20 dB
- [F5] (50 dB): Sets the maximum value to 50 dB
- [F6] (return): Returns to the previous function label.

Selecting Display Data Type

1. Press [F3] (Display Data Type) to toggle between Probability and Distribution.

Display Data Type is a function to display the value of measured waveform of which the grid locates on either vertical axis or horizontal axis. The following modes are selectable:

- Probability: Displays the distribution of measured waveform at the specified probability (at the grid on the vertical axis). The marker moves along the vertical axis.
- Distribution: Displays the probability of measured waveform at the specified distribution (at the grid on the horizontal axis). The marker moves along the horizontal axis.

Saving the measured waveform

1. Press [F5] (Save Trace).
2. When the confirmation widow appears, select "Yes" and press [Set] to confirm.

This function saves only selected waveform for Measure Method.

Selecting "Reference Trace"

1. Pressing [F4] (Reference Trace) toggles between "Probability" and "Distribution."
2. Select "Reference Trace" by using [∧] [∨] (Entry keys) or the rotary knob.
3. Press [Set] to confirm.

Measured waveform and Gauss distribution saved by selecting "Reference Trace" are available to be displayed simultaneously.

- Off: Displays waveform currently being measured
- Save Trace: Displays waveforms both currently being measured and being saved
- Gaussian Trace: Displays waveform being currently measured and gauss distribution
- Save & Gaussian: Displays waveforms both currently being measured and being saved, and gauss distribution

Gaussian Trace and Save & Gaussian is available only when CCDF is set.

3.9.4 Setting for Measurement

This section describes the settings required for the CCDF measurement. The description advances assuming that the second page of function label is being displayed on the CCDF screen.

Selecting Filter Type

1. Press [F1] (Filter Type) to display the setting window.
2. Select "Filter Type" by using [∧] [∨] (Entry keys) or the rotary knob.
3. Press [Set] to confirm.

The following Filters are selectable for Filter Type:

- 20MHz, 10 MHz, 5 MHz, 3 MHz, 1.23 MHz

Selecting Data Count

1. Press [F2] (Data Count) to display the setting window.
2. Enter the measurement point by using [∧] [∨] (Entry keys), the rotary knob, or the numeric keypad.
3. Press [Set] to confirm.

Selecting Analysis Length

1. Press [F3] (Analysis Length) to display the setting window.
2. Enter the analysis length by using [∧] [∨] (Entry keys), the rotary knob, or the numeric keypad.
3. Press [Set] to confirm.

Analysis Length is a measurement section required for one measurement. The data started from the set Analysis Length is to be measured up to the set Data Count value.

3.10 Saving and Reading Setup Parameters

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

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

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

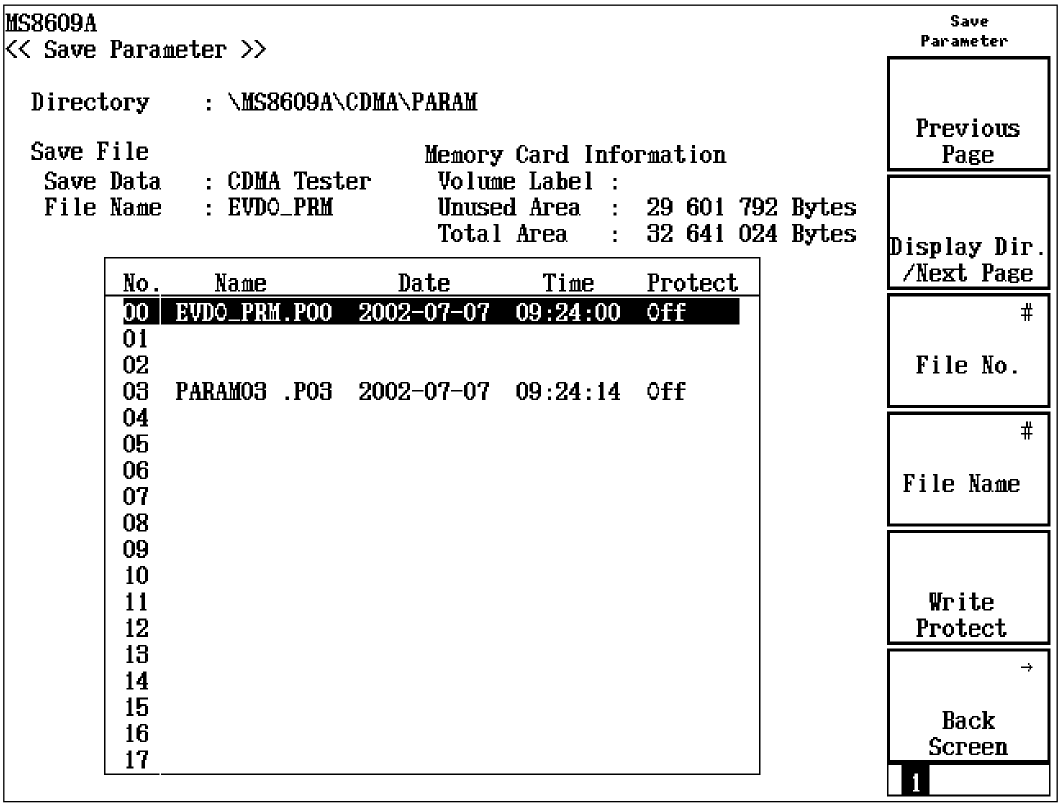
A file name is in the MS-DOS format; that is, it may contain a maximum of eight characters, which are not case-sensitive.

3.10.1 Saving parameters (Save)

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

1. Insert a memory card into the memory card slot.
2. Press [Shift] and [Recall] then press.
3. [F2] Press (Display Dir.)
   One memory card can save a maximum of 100 parameter setup files. Save a file under a file number (0 to 99).
4. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor and select the file number. Or press [F3] (File No.) to open a setup window and enter the file number using the numeric key pad.
5. [Set] Press in the Entry section.
6. The confirmation window opens. Select Yes and press [Set].

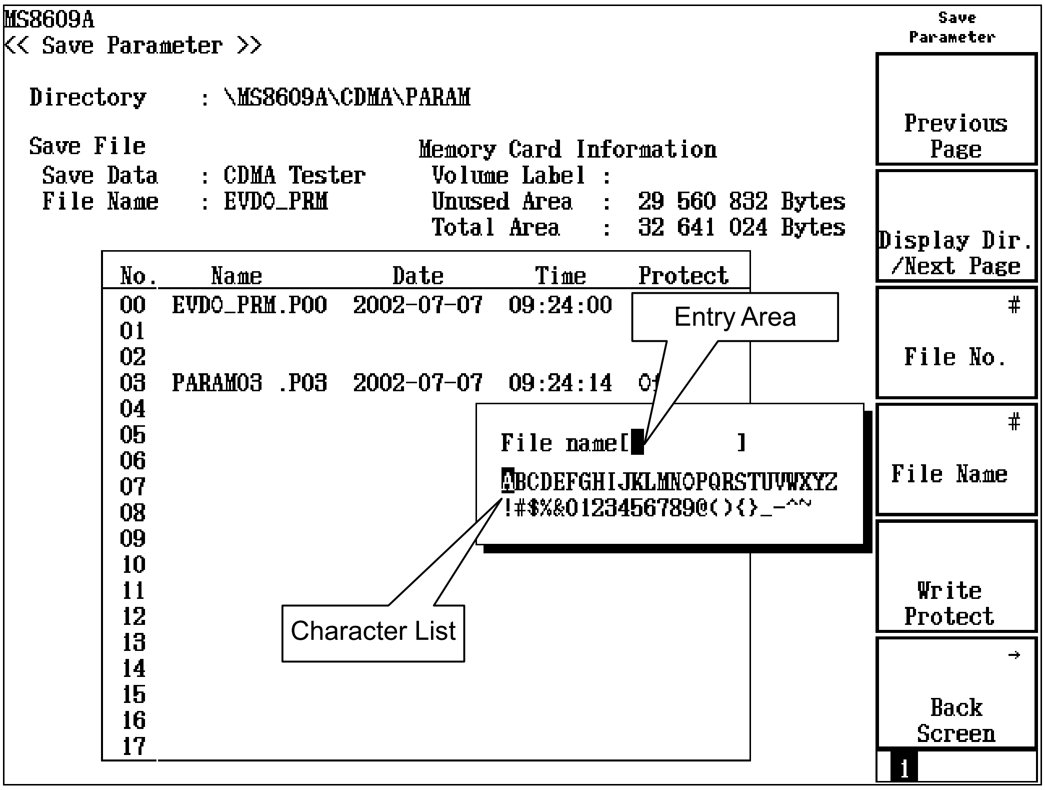
Thus, the parameter settings are saved on the memory card.
When the file is saved under a new number, it is automatically assigned file name “PARAM**.P**” (where, “**” is a file number). When the file is saved under a file number already assigned to an existing file, the parameter settings are overwritten to the file and the file name remains unchanged.



3.10.2 Saving under a new name (File Name)

A file can be saved under a new name by pressing F4 (File Name) in Step 4 in "Saving Parameters (Save)."

This section describes how to enter a file name after displaying the file name input window by pressing F4 (File Name).



1. Using the rotary knob, move the cursor inside the list of characters and select the character to be entered.
2. Press Enter. The character selected appears in the entry area.
3. Repeat Step 2 above to enter the file name. Characters A to F and 0 to 9 can also be entered from the numeric keypad. A file name may contain a maximum of eight characters. Only those characters given in the list are available; other characters cannot be used.
4. After entering the file name, press Set.
5. A confirmation window opens. Select Yes and press Set.

Thus, the file is saved under the new name.

- Rotary knob: Moves the cursor inside the list of characters.
- [∧] and [∨] : Moves the cursor inside the entry area.
- [BS] : Deletes the character preceding the cursor in the entry area.
- [Enter] : Overwrites the character pointed to by the cursor in the list of characters to the cursor position in the entry area.
- [Set] : Determines the character string in the entry area as the file name.

3.10.3 Write-protecting file (Write Protect)

This section describes how to write-protect a file.

1. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor to the file to be write-protected.
2. Press [F5] (Write Protect).

Each time [F5] (Write Protect) is pressed, it is alternately switched On and Off.

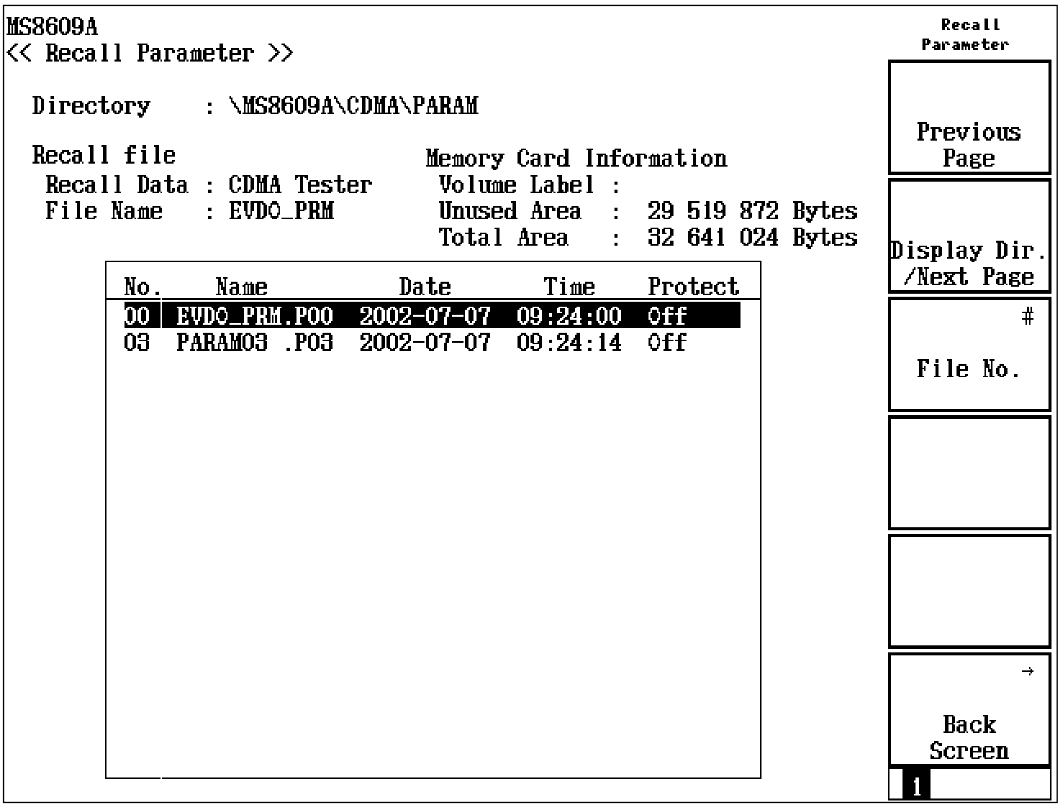
3.10.4 Reading parameters (Recall)

To read saved parameters, display the Recall Parameter screen in the procedure given below.

Insert the memory card into the memory card slot.

1. Press [Recall].
2. Press [F2] (Display Dir.)
3. Using [∧] and [∨] or the rotary knob in the Entry section, move the cursor and select a file number or press [F3] (File No.) to open the setup window and enter a file number from the numeric key pad.
4. Press [Set] in the Entry section.
5. A confirmation window opens. Select Yes and press [Set].

When parameter reading is completed, the Setup Common Parameter screen appears.



Section 4 Performance Test

This Section describes the measurement units, and their connections and operations when the performance test is conducted for cdma2000 1xEV-DO measurements after installing MX860x04A in MS860x or MX268x04A in MS268x.

In this section, [ ] represents a panel key.

4.1 About the Performance Test

The performance test described in this section should be carried out as a part of preventive maintenance to check for performance deterioration during cdma2000 1xEV-DO measurement with MX860x04A installed in MS860x or MX268x04A in MS268x.

Carry out the performance test on the MS860xA/MS268x when it is required for acceptance inspection, periodic maintenance or a post-repair performance check.

As preventive maintenance, the items considered to be important should be periodically (one or twice a year) tested.

The performance test should contain the test items listed below when it is carried out on the MS860xA/MS268x for acceptance inspection, periodic maintenance or post-repair performance check.

- Modulation/frequency measurement
- Code domain measurement
- Transmission power measurement accuracy*
- Linearity
- Occupied frequency bandwidth measurement
- Nearby spurious measurement
- Spurious measurement*
- CCDF measurement
- IQ input modulation accuracy
- Power meter accuracy*

* For MS268x, this test is not performed.

If the performance test detects any items that do not satisfy requirements, contact Anritsu or its agency.

4.2 Equipment Required for Performance Test

The measurement equipment required for the performance test is listed below.

Recommended unit name (model)	Required performance	Test items
Digital modulation signal generator (MG3681A/ MX368042A) Two units used	• Frequency range: 10 MHz to 3 GHz Resolution 1 Hz available • Output level range No modulation: –10 to 12 dBm Modulation: –10 to 4 dBm Resolution 0.1 dB available • External reference input: (10 MHz) available • Residual vector error: 2.5% or less	Modulation/frequency measurement Code domain measurement Transmission power measurement accuracy Linearity Occupied frequency bandwidth measurement Nearby spurious measurement Spurious measurement IQ input modulation accuracy Power meter accuracy
Calibration receiver (ML2530A)	• Frequency range: 100 kHz to 3 GHz Resolution 1 Hz available • Measurement power range: –140 to 20 dBm • Measurement accuracy: ±0.04 dB • External reference input: (10 MHz) available	Modulation/frequency measurement Linearity Power meter accuracy
Power meter (ML4803A) Power sensor (MA4601A)	• Main unit accuracy: ±0.02 dB • Frequency range: 100 kHz to 8.5 GHz (depending on power sensor used) • Frequency range: 10 MHz to 3 GHz • Measurement power range: –30 to +20 dBm • Input connector: N type	Transmission power measurement accuracy Linearity Power meter accuracy
Fixed attenuator (MP721A)	• Attenuation: 3 dB • VSWR: 1.2 or less	Power meter accuracy
Fixed attenuator (MP721D)	• Attenuation: 20 dB • VSWR: 1.2 or less	Transmission power measurement accuracy
Programmable attenuator (MN72A)	• Frequency range: DC to 18 GHz • Attenuation accuracy: 0.9 dB • VSWR: 1.2 or less	Modulation/frequency measurement Power meter accuracy Linearity
2-signal pad	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
Power splitter	• Frequency range: 50 MHz to 3 GHz	Modulation/frequency measurement
2GHz LPF	• Available for cutting off harmonic wave of 2 GHz or more generated by signal generator	Spurious measurement

The "Required Performance" column shows excerpts from the performance covering the measurement range of the test items.

4.3 Performance Test <MS860x>

Before starting the performance test, warm up the devices to be tested and measurement units at least 30 minutes or more unless otherwise specified and make sure that they are stabilized.

To exert the highest measurement accuracy, measurement should be performed at room temperature (25 ±5°C), with little AC power voltage fluctuation, and in an environment free from noise, vibration, dust, humidity and other problems.

4.3.1 Modulation/frequency measurement <MS860x>

This section describes the tests on the following items:

- Carrier frequency accuracy
- Residual vector error
- Origin offset accuracy

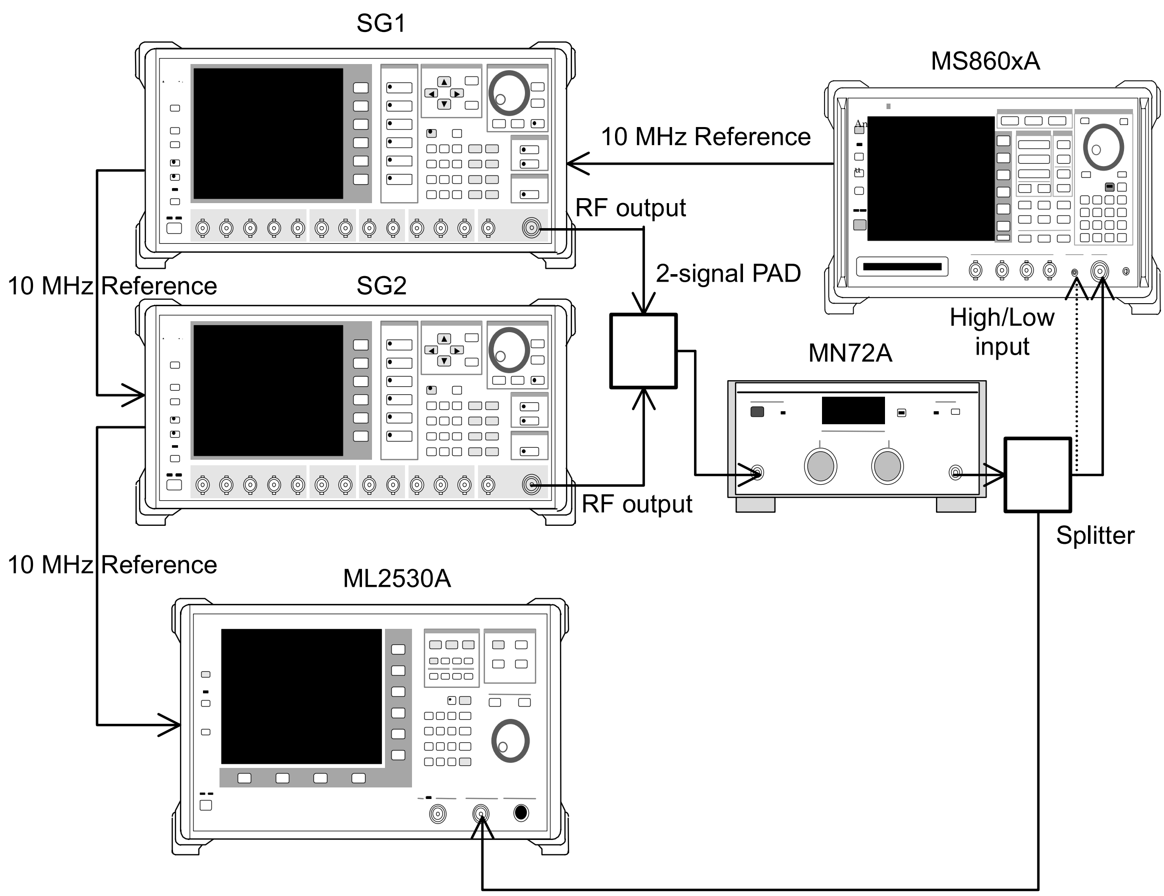
(1) Test specifications

- Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)
  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only
- Residual vector error: <2.0% (rms)
  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only
- Origin offset accuracy: ±0.5 dB
  Input: Level ≥ –10 dBm (High Power input), level ≥ –30 dBm (Low Power input), –40 dBm (Low Power input, preamplifier On), with code channel 1 CH only, for a signal with origin offset –30 dBc

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Digital modulation signal generator (SG2): MG3681A
- Calibration receiver: ML2530A
- Programmable attenuator: MN72A
- 2-signal pad
- Power splitter

(3) Setup



(4) Test Procedures

1. Set the programmable attenuator (MN72A) to 0 dB.
2. Set SG1 as follows:
   - Frequency: (Frequency in the following table +307.2 kHz)
     307.2 kHz is a quarter of the chip rate.
   - Level: –10 dBm
   - Modulation: No modulation
3. Set SG2 as follows (RF Output is Off):
   - Frequency: (Frequency in Table 1)
   - Level: SG1 Level –40 dBm
   - Modulation: No modulation
4. Set the MS860xA as follows:
   - Input Terminal: RF (High Power input)
   - Reference Level: –10 dBm
   - Frequency: (Frequency in Table 1)
   - Measuring Object: QPSK
   - Filter: Filtering
   - Trigger: Free Run

5. Press [ ] (More) to display the second function label page.
6. Press [F6] (Power Meter) to display the Power Meter screen.
7. Set the calibration receiver (ML2530A) frequency to the frequency given in the table below +307.2 kHz and set BW to 100 Hz, Absolute mode.
8. Set SG2 RF Output to Off, set SG1 RF Output to On, change the ML2530A frequency to the frequency given in the table below, and adjust the SG1 level so that the indicated value matches the one given in the table below.
9. Set SG1 RF Output to Off, SG2 RF Output to On, and ML2530A to Relative mode. Adjust the SG2 level so that the indicated value matches –30 ±0.1 dB and record the results (origin offset expected value).
10. Set the programmable attenuator (MN72A).

    For Pre-Ampl On: 30 dB
    For MS8609A and MS8608A Low input: 20 dB
    For MS8608A High input: 0 dB
11. Return the function label to the first page, and press [F2] (Modulation Analysis) to display the Modulation Analysis screen.
12. Execute [F5] (Adjust Range).
13. Press [F4] (Analysis Mode) and then [F2] (Analysis Length) and set Analysis Length to 2048 PNchips.
14. Read the measurement results displayed on the screen and check that the origin offset satisfies the Standard.

    Origin offset accuracy [dB] = Measurement result – Origin offset expected value
15. Set the SG2 output to Off.
16. Read the measurement results displayed on the screen and check that the frequency error and residual vector error satisfy the Standard.
17. Change the frequency as shown in the table below and repeat Steps 1 to 16.

Table 1

Frequency	**Level (input level to MS860xA)**		
	MS860xA Pre-Ampl On	**MS8609A and MS8608A Low input**	**MS8608A High input**
50 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
850 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
2000 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB
2300 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–10 dBm ±0.1 dB

4.3.2 Code domain measurement <MS860x>

This section describes the tests on the following items:

- Code domain power measurement accuracy

This measurement is not completely the same as the shipment inspection done by Anritsu.

(1) Test specifications

- Code domain power measurement accuracy:

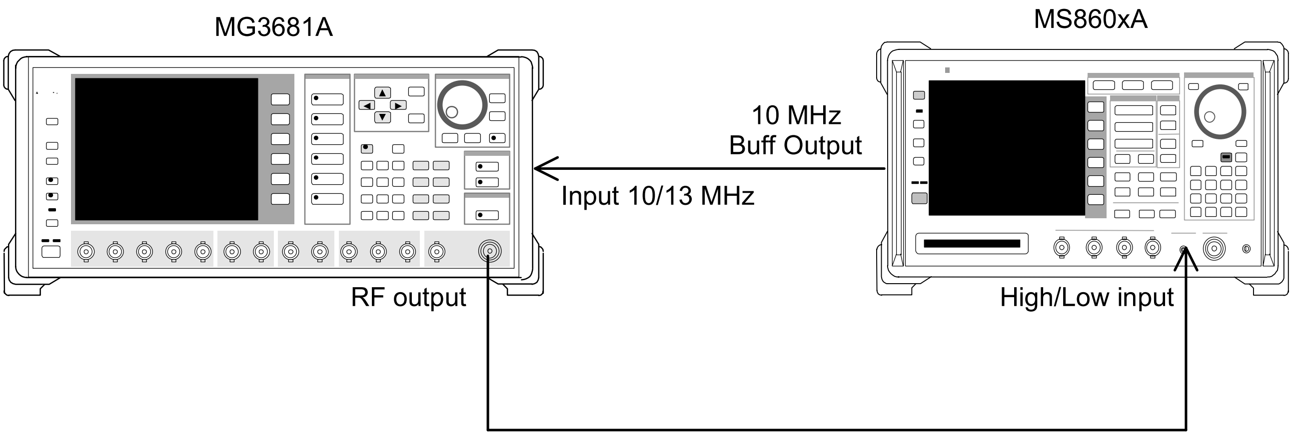
  ±0.2 dB (Code power≥ –10 dBc)
  ±0.4 dB (Code power≥ –25 dBc)

  Input level: ≥ +10 dBm (High Power input)
  ≥ –10 dBm (Low Power input)
  ≥ –20 dBm (Low Power input, preamplifier On)

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A

(3) Setup



(4) Test Procedures

1. Set the data of "Evaluation signal 2" in the digital modulation signal generator (SG1).
   For details on the evaluation signal, refer to "Evaluation Signal."
2. Set SG1 as follows:
   - Frequency: 50 MHz
   - Level: –10 dBm
3. Set the MS860xA as follows:
   - Input Terminal: RF (Low Power input)
   - Reference Level: –10 dBm
   - Frequency: 50 MHz
   - Measuring Object: Forward
   - Filter: Filtering + EQ
   - Trigger: Free Run
4. Press [ ] (More) to display the second function label page.
5. Press [F6] (Power Meter) to display the Power Meter screen.
6. Set SG1 output to Off and execute [F5] (Zero Set).
7. Set SG1 output to On and execute [F4] (Adjust Range).
   Adjust the SG1 level so that the Power Meter indicates –10 dBm ±0.1 dB. (Be sure to execute Adjust Range after changing the SG1 level.) After level calibration, press [F6] (Back Screen).
8. Return the function label to the first page, and press [F2] (Modulation Analysis) to display the Modulation Analysis screen.
9. Execute [F5] (Adjust Range).
10. Press [F4] (Analysis Mode) and then [F1] (Analysis Start) and set Analysis Start to 0. Press [F2] (Analysis Length) and set Analysis Length to 1 slot.
11. Press [F6] (Return) and then [F1] (Trace Format) and set Code Domain of Data.
12. Press [Single] and wait until measuring is completed.
13. Check that the power of the codes satisfies the Standard. The codes and their expected power values are listed below.
    Code 0 : –10.0 dB
    Code 1 : –15.0 dB
    Code 2 : –20.0 dB
    Code 3 : –25.0 dB
14. Change the frequency of SG1 and the MS860xA to 850 MHz, 2 GHz, and 2.3 GHz and repeat Steps 1 to 13 above.

4.3.3 Transmission power measurement accuracy <MS860x>

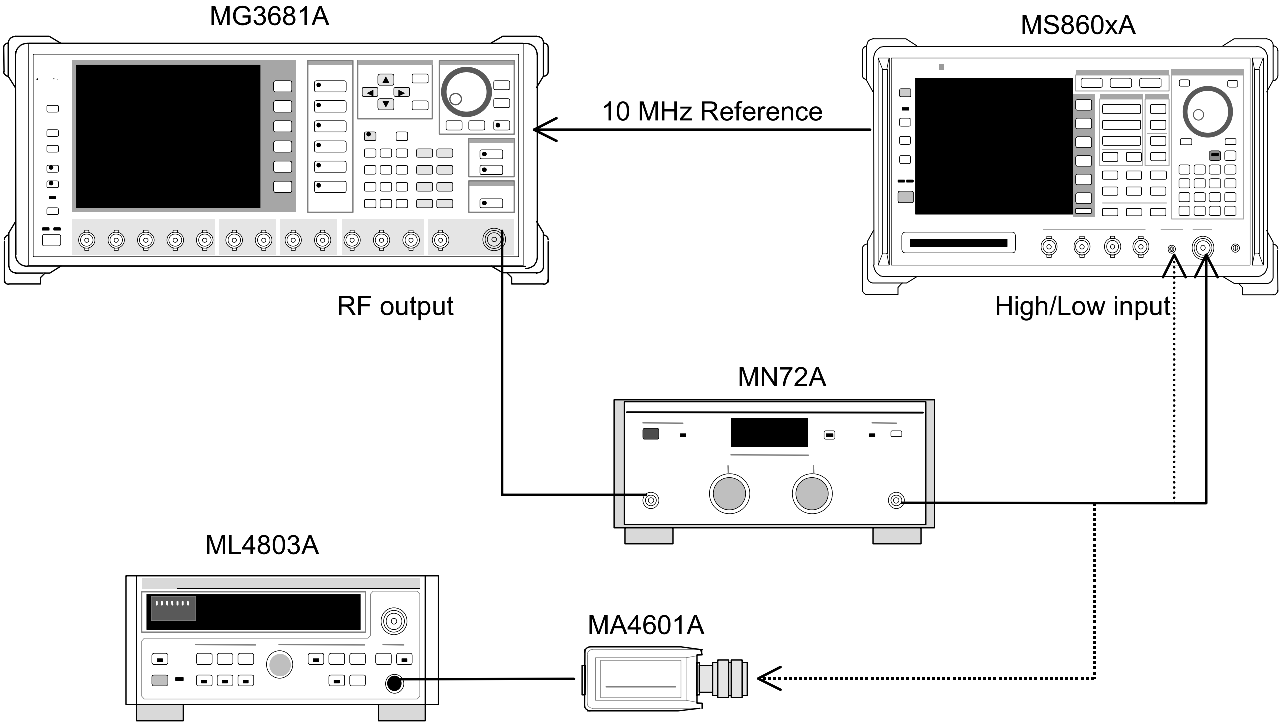
(1) Test specifications

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

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Power meter: ML4803A
- Power sensor: MA4601A
- 20 dB attenuator: MP721D

(3) Setup



(4) Test Procedures

1. Set the data of "Evaluation signal 1" in the digital modulation signal generator (SG1).
   For details on the evaluation signal, refer to "Evaluation Signal."
2. Set SG1 as follows:
   - Frequency: 50 MHz
   - Level: +0.5 dBm
3. Connect power sensor (MA4601A) to Cal Output on power meter (ML4803A) and execute Zero Adjust.
4. Set Sensor Input to On and execute ADJ (Cal Adjust).
5. Connect SG1 to power sensor (MA4601A).

6. Adjust the SG1 output level so that the Power Meter (ML4803A) indicates +0.5dBm ±0.1 dB and record the measurement results (power meter measurement value).
7. Connect the SG1 output to the MS860xA.
8. Set the MS860xA as follows:
   - Input Terminal: RF (High Power input)
   - Reference Level: +0.5 dBm
   - Frequency: 50 MHz
   - Measuring Object: QPSK
9. Return the function label to the first page and press F3 (RF Power) to display the RF Power screen.
10. Execute F5 (Adjust Range).
11. Press (More) to display the second function label page.
12. Press F4 (Calibration) and execute F1 (Power Calibration).
13. Read the TX Power value in the measurement results (RF Power measurement value).
14. Change the frequency of SG1 and the MS860xA to 850 MHz, 2 GHz, and 2.3 GHz and repeat Steps 2 to 13. After measurement at these frequencies is completed, go to Step 15.
15. Press Shift and then Hi Power to set Low Power Input mode. Insert the calibrated MP721D 20dB ATT (measure the MP721D attenuation at each measurement frequency in advance) into the input.
16. Connect the SG1 output to Low Power Input and repeat Steps 2 to 14 above. The result is the Low Power Input result.
    - For MS8608A High input
      Measurement accuracy [dB] = RF Power measurement value – Power meter measurement value
    - For Pre-Ampl On and MS860xA Low input
      Measurement accuracy [dB] = RF Power measurement value – (Power meter measurement value – MP721D actual attenuation)

4.3.4 Linearity <MS860x>

(1) Test specifications

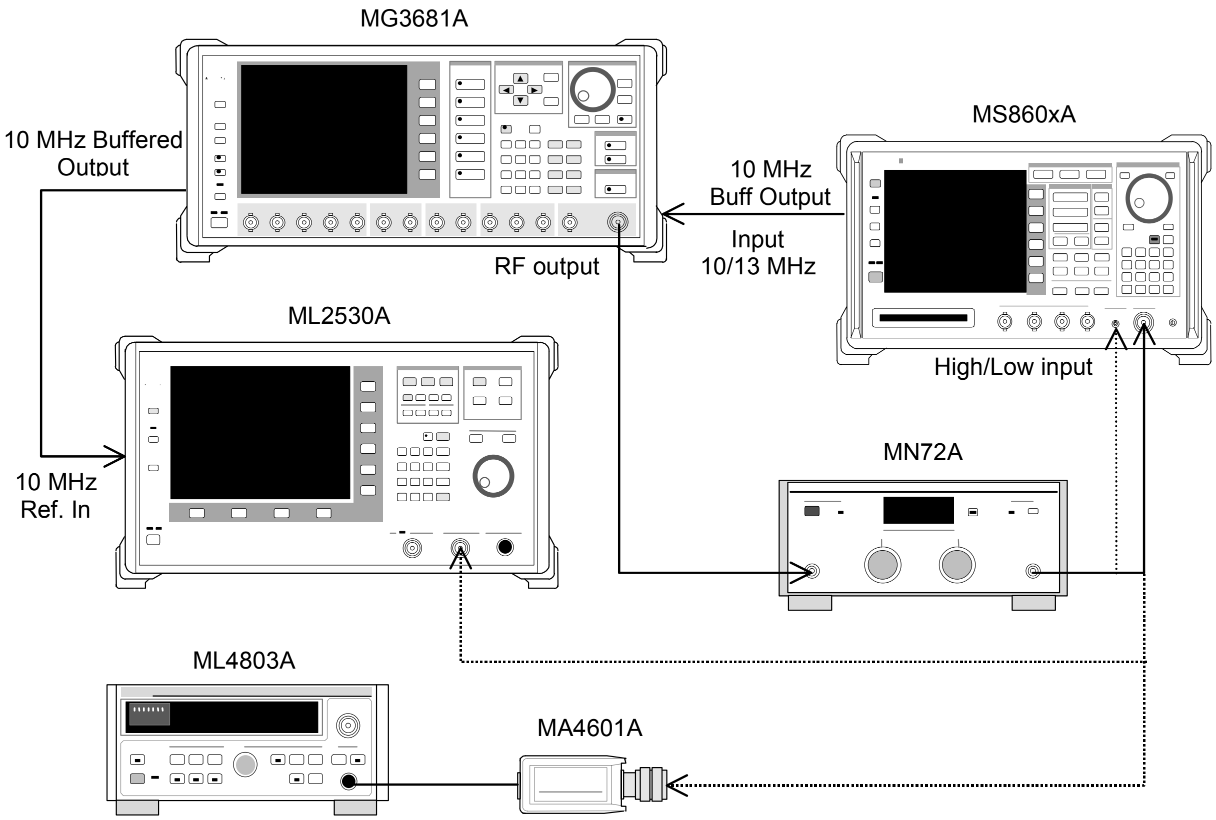
±0.2 dB (0 to −40 dB)

Without changing the reference level setting after range optimization

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Calibration receiver: ML2530A
- Programmable attenuator: MN72A
- Power meter: ML4803A
- Power sensor: MA4601A

(3) Setup



(4) Test Procedures

1. Connect power sensor (MA4601A) to Cal Output on power meter (ML4803A) and execute Zero Adjust.
2. Set Sensor Input to On and execute ADJ (Cal Adjust).
3. Connect SG1 (MN27A output) to power sensor (MA4601A).
4. Set the SG1 frequency and then set the programmable attenuator (MN72A) to 0 dB. Adjust the SG1 level so that the Power Meter (ML4803A) indicates +10 dBm ±0.1 dB. Record the measurement results (Set_Ref). See the table below for the measured frequencies and levels.

Frequency	Level (input level to MS860xA)		
	MS860xA Pre-Ampl On	MS8609A and MS8608A Low input	MS8608A High input
50 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	+20 dBm ±0.1 dB
850 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	+20 dBm ±0.1 dB
2000 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	+20 dBm ±0.1 dB
2300 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	+20 dBm ±0.1 dB

5. Connect SG1 (MN72A output) to calibration receiver (ML2530A) and set BW to 100Hz, Relative mode (with the range fixed to 1).
6. Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is –40 dBc and record the measurement value (ML2530A reading) at the calibration receiver (ML2530A) for each step.
7. Set the MS860xA as follows:
   - Input Terminal: RF (High/Low Power Input)
   - Reference Level: (Level indicated in the Step4)
   - Frequency: (Frequency indicated in the Step4)
   - Measuring Object: QPSK
   - Filter: Filtering
   - Trigger: Free Run
8. Set the programmable attenuator (MN72A) as follows:
   - For Pre-Ampl On: 30 dB
   - For MS8609A and MS8608A Low input: 20 dB
   - For MS8608A High input: 0 dB
9. Connect SG1 (MN72A) to the MS860xA and set the SG1 level to Set Ref.
10. Press [F3] (RF Power) to display the RF Power screen.
11. Execute [F5] (Adjust Range).
12. Press [ ] (More) to display the second function label page.

13. Press F4 (Calibration) and execute F1 (Power Calibration).
14. Record the Tx Power value (dBm) (Measure_Ref).
15. Lower the SG1 output level (for Set_Ref) in steps of 10 dB until it is −40 dBc and record the Tx Power value at each step.
    * Note that the SG1 level should be lowered in steps of 10 dB; do not adjust the programmable attenuator (MN72A).
16. Check that the linearity error (shown below) satisfies the Standard.
    Linearity error [dB] = Tx Power value − (Measure_Ref − ML2530A reading)
17. Change the frequency and repeat Steps 3 to 16 above.

4.3.5 Occupied bandwidth measurement <MS860x>

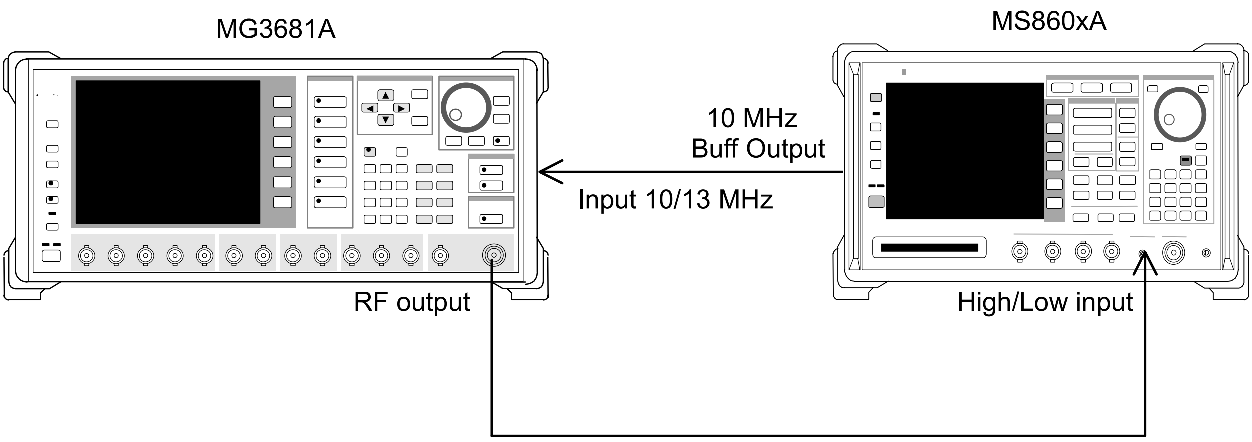
This test is a functional test and therefore has no test specifications.

(1) Test specifications

(2) Measurement units for test

- Digital modulation signal generator: MG3681A

(3) Setup



(4) Test procedures

1. Set the data of "Evaluation signal 1" in the digital modulation signal generator (SG1).
   For details on the evaluation signal, refer to "Evaluation Signal."
2. Set SG1 as follows:
   - Frequency: (Given in the Step 8.)
   - Level: (Given in the Step 8)
3. Set the MS860xA as follows:
   - Input Terminal: RF (High/Low Power Input)
   - Reference Level: (Given in the Step 8.)

- Frequency: (Given in the Step 8)
- Measuring Object: QPSK

4. Press [F4] (Occupied Bandwidth) and display the Occupied Bandwidth screen.
5. Execute [F5] (Adjust Range).
6. Press [F1] (Measure Method) and set the measurement method to FFT.
7. Check that the occupied frequency bandwidth measurement value is 1.26 ±0.1 MHz.
8. Change the frequency and repeat Steps 2 to 7 above.

Frequency	**Level (SG1 set value)**		
	MS860xA Pre-Ampl On	**MS8609A and MS8608A Low input**	**MS8608A High input**
50 MHz	–30 dBm	–20 dBm	0 dBm
850 MHz	–30 dBm	–20 dBm	0 dBm
2000 MHz	–30 dBm	–20 dBm	0 dBm
2300 MHz	–30 dBm	–20 dBm	0 dBm

4.3.6 Spurious close to the carrier <MS860x>

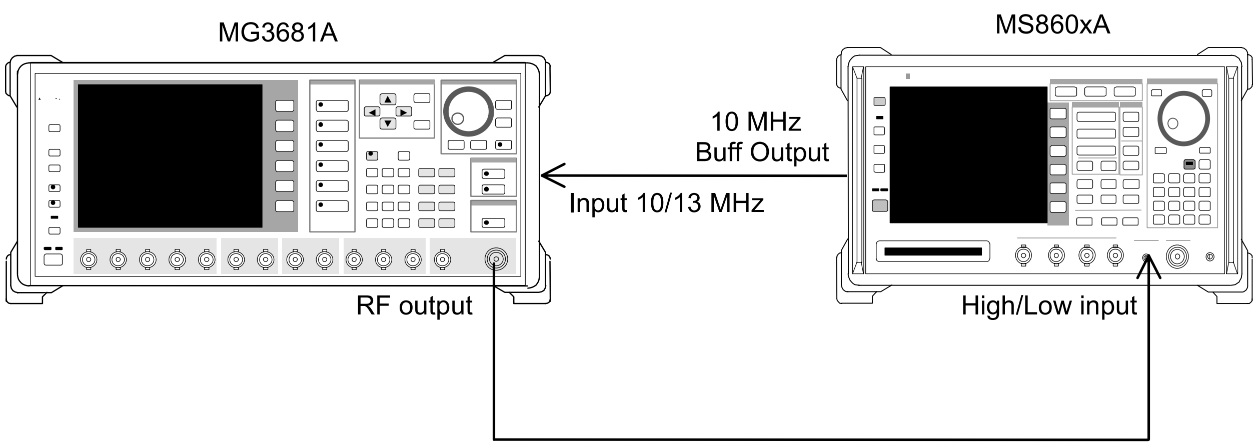
(1) Test specifications

Input level ≥+20 dBm (High Power input), ≥0 dBm (Low Power input)
900 kHz detuning: ≥50 dBc
1.98 MHz detuning: ≥60 dBc

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A

(3) Setup



(4) Test Procedures

1. Set the digital modulation signal generator (SG1) as follows:
   - Frequency: (Given in table below)
   - Level: (Given in table below)
   - System: 1xEV-DO
   - Link: Forward
   - Filter: SPEC + EQ
   - Pat. Number: 9
2. Set the MS860xA as follows:
   - Input Terminal: RF (Low Power Input)
   - Reference Level: 0 dBm (Level given in table below)
   - Frequency: (Given in table below)
   - Measuring Object: QPSK
   - Trigger: Free Run
3. Press [ ] (More) to display the second function label page.
4. Press [F6] (Power Meter) to display the Power Meter screen.
5. Set the SG1 output to Off and execute [F5] (Zero Set).
6. Set SG1 to the level given in the table below and execute [F4] (Adjust Range). Adjust the SG1 level so that the Power Meter indicates the level given in the table below. (Be sure to execute Adjust Range after changing the SG1 level.)
7. After level calibration, press [F6] (Back Screen).
8. Return the function label to the first page, and press [F5] (Spurious Close to the Carrier) to display the Spurious Close to the Carrier screen.
9. Execute [F5] (Adjust Range).
10. Read the measurement results and check that the measurement range satisfies the Standard.

Frequency	Level (input level to MS860xA)	
	MS8609A and MS8608A Low input	When MS860xA Pre-Ampl installed*
50 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
850 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

4.3.7 CCDF measurement <MS860x>

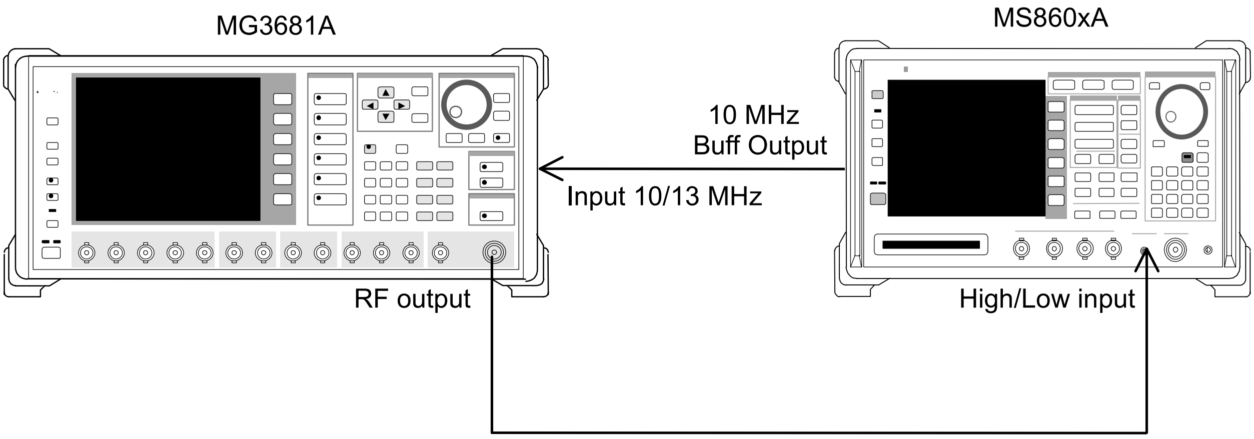
(1) Test specifications

This test is a functional test and therefore has no test specifications.

(2) Measurement units for test

- Digital modulation signal generator: MG3681A

(3) Setup



(4) Test Procedures

1. Set the digital modulation signal generator (SG1) as follows:
   - System: 1xEV-DO
   - Pattern: FWD_2457.6 kbps_1

2. Set the MS860xA as follows:
   - Input Terminal: RF (Low input only for MS8608A)
   - Reference Level: 0 dBm (Level given in the Step 8)
   - Frequency: 2000 MHz (Given in the Step8)
   - Measuring Object: QPSK
   - Filter: Filtering
   - Trigger: Free Run

3. Press (More) to display the second function label page.
4. Press F3 (CCDF) to display the CCDF screen.
5. Press (More) to display the second function label page. Execute F4 (Adjust Range).
6. Return the function label to the first page and press F1 (Measure Method) to set the measurement method to CCDF. After setting, press F6 (return).
7. Press (More) to display the second function label page. Press F1 (Filter Type) to set 1.23 MHz.

8. Press the Single key to check that the value for 0.0001% is 10 dB ±1 dB.

Frequency	Level (power meter reading)		
	When MS860xA Pre-Ampl installed*	MS8609A and MS8608A Low input	MS8608A High input
50 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	0 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

4.3.8 Spurious measurement <MS860x>

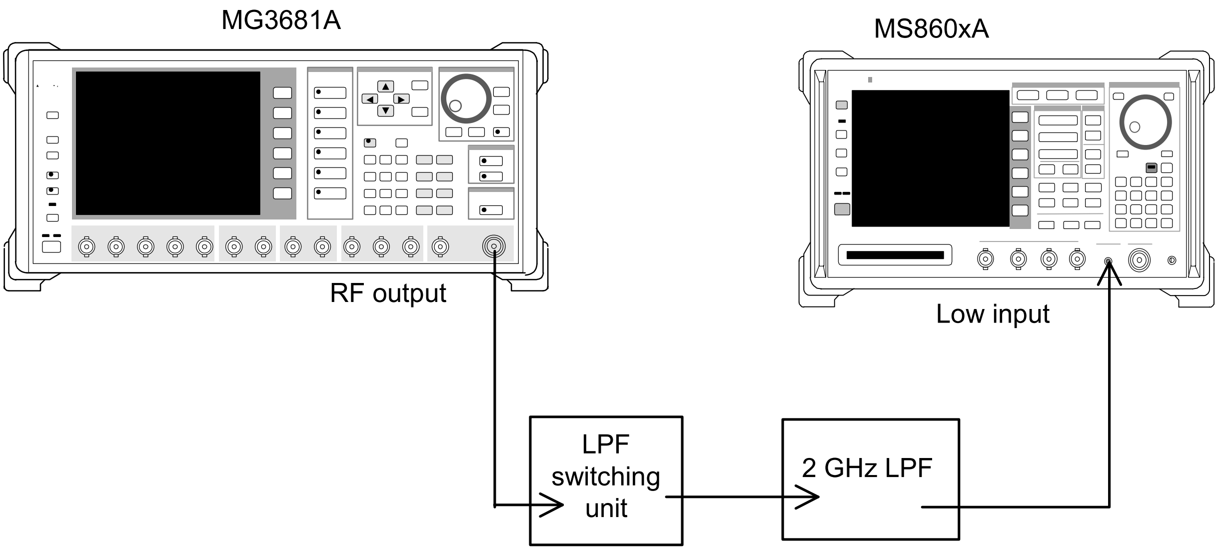
(1) Test specifications

- Measurement range
  At CW carrier frequency 800 MHz to 1 GHz or 1.8 to 2.2 GHz
  ≥79 dB typical (RBW: 10 kHz)
  (10 to 30 MHz, band 0)
  ≥79 dB typical (RBW: 100 kHz)
  (30 MHz to 1 GHz, band 0)
  ≥76 – f [GHz] dB typical (RBW: 1 MHz)
  (1 to 3.15 GHz, band 0, normal mode)
  ≥76 dB typical (RBW: 1 MHz)
  (3.15 to 7.8 GHz, band 1, normal mode)
  When option 03 is installed
  ≥76 dB typical (RBW: 1 MHz)
  (1.6 to 7.8 GHz, band 1, spurious mode)
  * For carrier frequency 2030.354 to 2200 MHz, spurious occurs at the following frequency:
  f (Spurious) = f (in) – 2030.345 MHz

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- LPF switching unit (available for cutting off secondary harmonic wave of 850 MHz and for filter through operation)
- 2 GHz LPF

(3) Setup



(4) Test Procedures

1. Set SG1 to non-modulation, and set frequency and output level. Measure the input level to the MS860xA using the built-in power meter. See the table below for the measured frequencies and levels.

Frequency	Level (power meter reading)	
	MS860xA with Pre-Ampl *	**MS8609A and MS8608A Low input**
850 MHz	–10 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	–10 dBm ±0.1 dB	0 dBm ±0.1 dB

*: With option 08 installed and Pre-Ampl set to Off

2. Set the MS860xA as follows:
   - Input Terminal: RF (Low input only for MS8608A)
   - Reference Level: 0 dBm
   - Frequency: 850 MHz (or 2000 MHz)
   - Measuring Object: QPSK
   - Filter: Filtering
   - Trigger: Free Run
3. Press [ ] (More) to display the second function label page.
4. Press [F6] (Power Meter) to display the Power Meter screen
5. Set the SG1 output to Off and execute [F5] (Zero Set).
6. Set SG1 to the level given in the table above and execute [F4] (Adjust Range). Adjust the SG1 level so that the Power Meter indicates 0 dBm ±0.1 dB. (Be sure to execute Adjust Range after changing the SG1 level.)

7. After level calibration, press [F6] (Back Screen).
8. Return the function label to the first page and press [F6] (Spurious Emission) to display the Spurious Emission screen.
9. Press [ ] (More) to display the third function label page.
10. Press [F1] (Ref Power) to set Tx Power.
11. Press [ ] (More) to display the first function label page.
12. Press [F1] (Spurious Mode) and set [F3] (Sweep). After setting, press [F6] (return).
13. Press [ ] (More) to display the second function label page.
14. Press [F2] (Setup Search/Sweep Table) and set Table 4-1-0 (or 4-2-1). After setting, press [F6] (Back Screen).
15. Press [F5] (Setup Spectrum Analyzer).
16. Press [F4] (Preselector) to set Normal mode. After setting, press [F6] (return).
17. Return the function label to the first page.

   * Steps 11 and 12 are available only when option 03 is installed.
18. Execute [F5] (Adjust Range).
19. Press [F4] (Calibration) and execute [F1] (Power Calibration).
20. Check that the measurement range satisfies the Standard.
21. When option 03 is installed, set the following.
22. Press [F3] (Setup Search/Sweep Table) and press [ ] (More) to display the second function label page.
23. Press [F2] to clear the frequency table.
24. Set Table 4-1-2 (or 4-2-2) and press [F6] (Back Screen).
25. Press [ ] (More) to display the second function label page.
26. Press [F5] (Setup Spectrum Analyzer).
27. Press [F4] (Preselector) to set Spurious mode. After setting, press [F6] (Return).
28. Return the function label to the first page.
29. Repeat Steps 18 to 20 above.

Table 4-1-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	800 MHz	100 kHz
f3	900 MHz	1000 MHz	100 kHz
f4	1000 MHz	1650 MHz	1 MHz
f5	1750 MHz	2500 MHz	1 MHz
f6	2600 MHz	3200 MHz	1 MHz
f7	3200 MHz	7800 MHz	1 MHz

Table 4-1-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	3150 MHz	1 MHz

Table 4-2-1

	Start Frequency	Stop Frequency	RBW
f1	10 MHz	30 MHz	100 kHz
f2	30 MHz	950 MHz	100 kHz
f3	1050 MHz	1950 MHz	1 MHz
f4	2050 MHz	3200 MHz	1 MHz
f5	3200 MHz	7800 MHz	1 MHz

Table 4-2-2

	Start Frequency	Stop Frequency	RBW
f1	1600 MHz	1950 MHz	1 MHz
f2	2050 MHz	3150 MHz	1 MHz

4.3.9 IQ input modulation accuracy <MS860x>

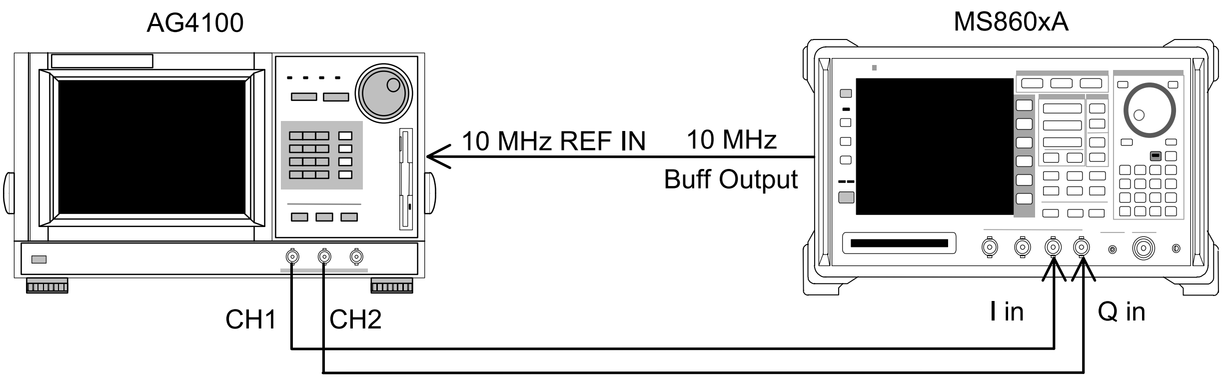
(1) Test specifications

- Resisual vector error: <2% (rms), DC coupling

(2) Measurement units for test

- Digital modulation signal generator: MG3681A

(3) Setup



(4) Test Procedures

1. Set the signal data for an arbitrary waveform generator as the evaluation signal.
   For details on the evaluation signal, refer to "Evaluation Signal."
2. Set the MS860xA as follows:
   - Input Terminal: IQ-DC
   - Impedance: 50 Ω
   - Measuring Object: Forward
   - Filter: Filtering
   - Trigger: Free Run
3. Press F2 (Modulation Analysis) to display the Modulation Analysis screen.
4. Press F4 (Analysis Mode) and then F1 (Analysis Start) and set Analysis Start to 0. Press F2 (Analysis Length) and set Analysis Length to 1 slot.
5. Check that the residual vector value satisfies the Standard.

4.3.10 Power meter accuracy <MS860x>

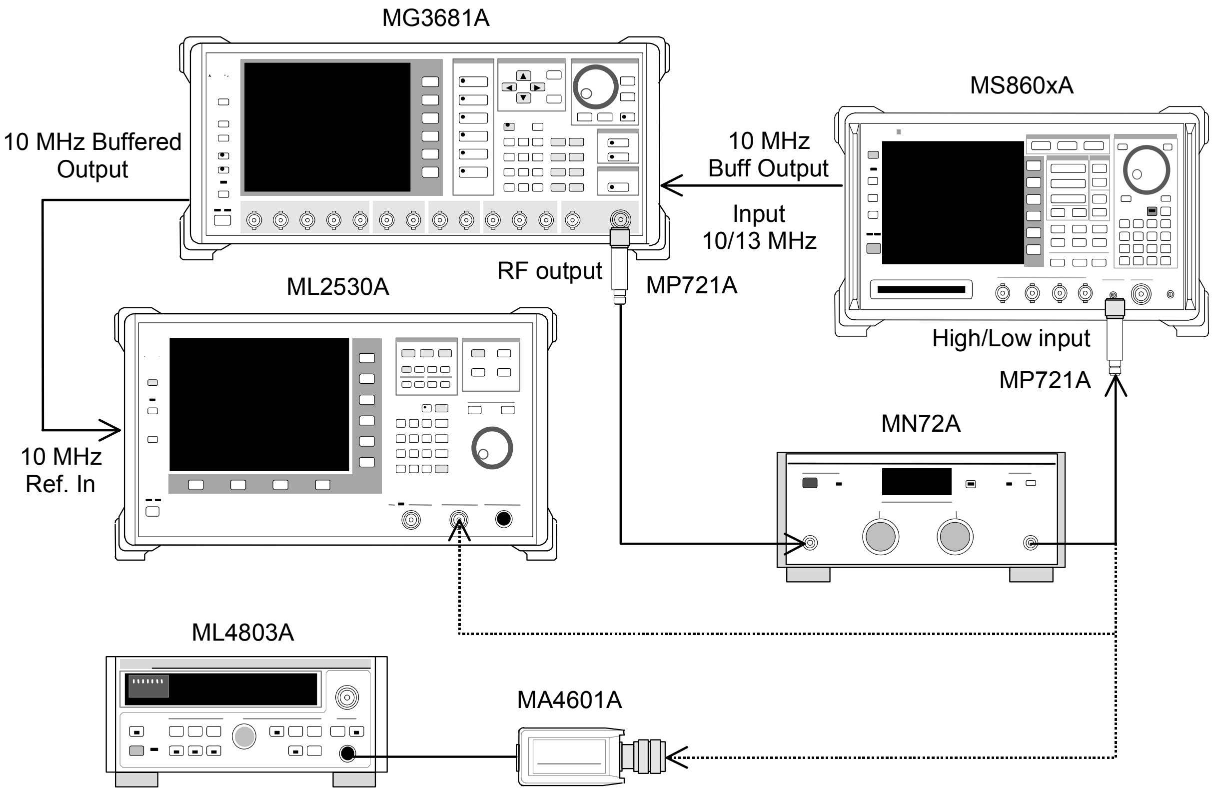
(1) Test specifications

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

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Calibration receiver: ML2530A
- Power meter: ML4803A
- Power sensor: MA4601A
- Programmable attenuator: MN72A
- 3 dB ATT × 2: MP721A

(3) Setup



(4) Test Procedures

1. Connect power sensor (MA4601A) to the Cal Output for power meter (ML4803A) and execute Zero Adjust.
2. Set Sensor Input to On and execute ADJ (Cal Adjust).
3. Connect SG1 (MN72A output) to the power sensor (MA4601A) with MP721A.
4. Set the SG1 frequency.
   Measurement frequencies: 50 MHz, 2000 MHz, 3000 MHz
5. Adjust the SG1 level so that the power meter (ML4803A) indicates +10 dBm ±0.1 dB at the set frequency. Record the SG1 set value (Set_Ref) and the power meter reading (Read_Ref).
6. Connect the SG1 (MN72A output) to the calibration receiver (ML2530A) with MP721A and set the SG1 level to the Set_Ref value above.
7. Set the calibration receiver (ML2530A) to Relative mode (with range fixed to 1), lower the programmable attenuator (MN72A) in steps of 10 dB until it is –30 dB, and record the measurement value of MS2530A at each step (ATT_n). After recording, reset the MN72A to 0 dB.
8. Press [ ] (More) on the MS860xA to display the second function label page.
9. Press [F6] (Power Meter) to display the Power Meter screen.
10. With no signals input to the MS860xA, execute [F5] (Zero Set).
11. Connect SG1 (MN72A output) to the MS860xA with MP721A.
12. Set the frequency for the MS860xA to the value set in Step 4 above.
13. Lower the programmable attenuator (MN72A) in steps of 10 dB until it is –30 dB. Calculate the measurement accuracy from the measurement value for the MS860xA (tester measurement value) at each attenuation step and the Power meter reading (Read_Ref) – ML2530A measurement value (ATT_n) (see the expression below). When changing the programmable attenuator settings, execute [F4] (Adjust Range) at each step.

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

* ATT_n is a minus value.

14. Change the frequency and repeat Steps 3 to 13 above.

4.3.11 Evaluation signal <MS860x>

Here, the evaluation signal settings are explained. The user will need the evaluation signal to perform the performance test. Based on these settings, set the Digital modulation signal generator.

Outline of evaluation signal 1

- Walsh Length = 128
- Walsh Code = Multiplexing of five codes: 0, 15, 31, 63 and 127
- Set all data to 0 for Walsh Code = 0 with Walsh Length = 128 to generate a pilot signal.
- Repeat at 26.67 ms.
- The power ratio is as follows:

Power ratio of each code

Power ratio

Code 0 : –10.0 dB
Code 15 : –15.0 dB
Code 31 : –20.0 dB
Code 63 : –25.0 dB
Code 127 : –0.68 dB

Outline of evaluation signal 2

- Walsh Length = 16 (for traffic channel), 64 (for MAC channel)
- Repeat at 26.67 ms.
- The power ratio is as follows:

Power ratio of each code

Power ratio

Code 0 : –10.0 dB
Code 1 : –15.0 dB
Code 2 : –20.0 dB
Code 3 : –25.0 dB

4.4 Performance Test <MS268x>

Before starting the performance test, warm up the devices to be tested and measurement units at least 30 minutes or more unless otherwise specified and make sure that they are stabilized.

To exert the highest measurement accuracy, measurement should be performed at room temperature (25 ±5°C), with little AC power voltage fluctuation, and in an environment free from noise, vibration, dust, humidity and other problems.

4.4.1 Modulation/frequency measurement <MS268x>

This section describes the tests on the following items:

- Carrier frequency accuracy
- Residual vector error
- Origin offset accuracy

(1) Test specifications

<MS2681A/MS2683A>

- Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)
  Input: Level ≥ –30 dBm (preamplifier Off)
  ≥ –40 dBm (preamplifier On *1)
- Residual vector error: <2.0% (rms)
  Input: Level ≥ –30 dBm (preamplifier Off),
  ≥ –40 dBm (preamplifier On *1),
- Origin offset accuracy: ±0.5 dB
  Input: Level ≥ –30 dBm (preamplifier Off),
  ≥ –40 dBm (preamplifier On *1),
  for a signal with origin offset –30 dBc

*1The preamplifier can be tuned on when main unit option 08 is installed.

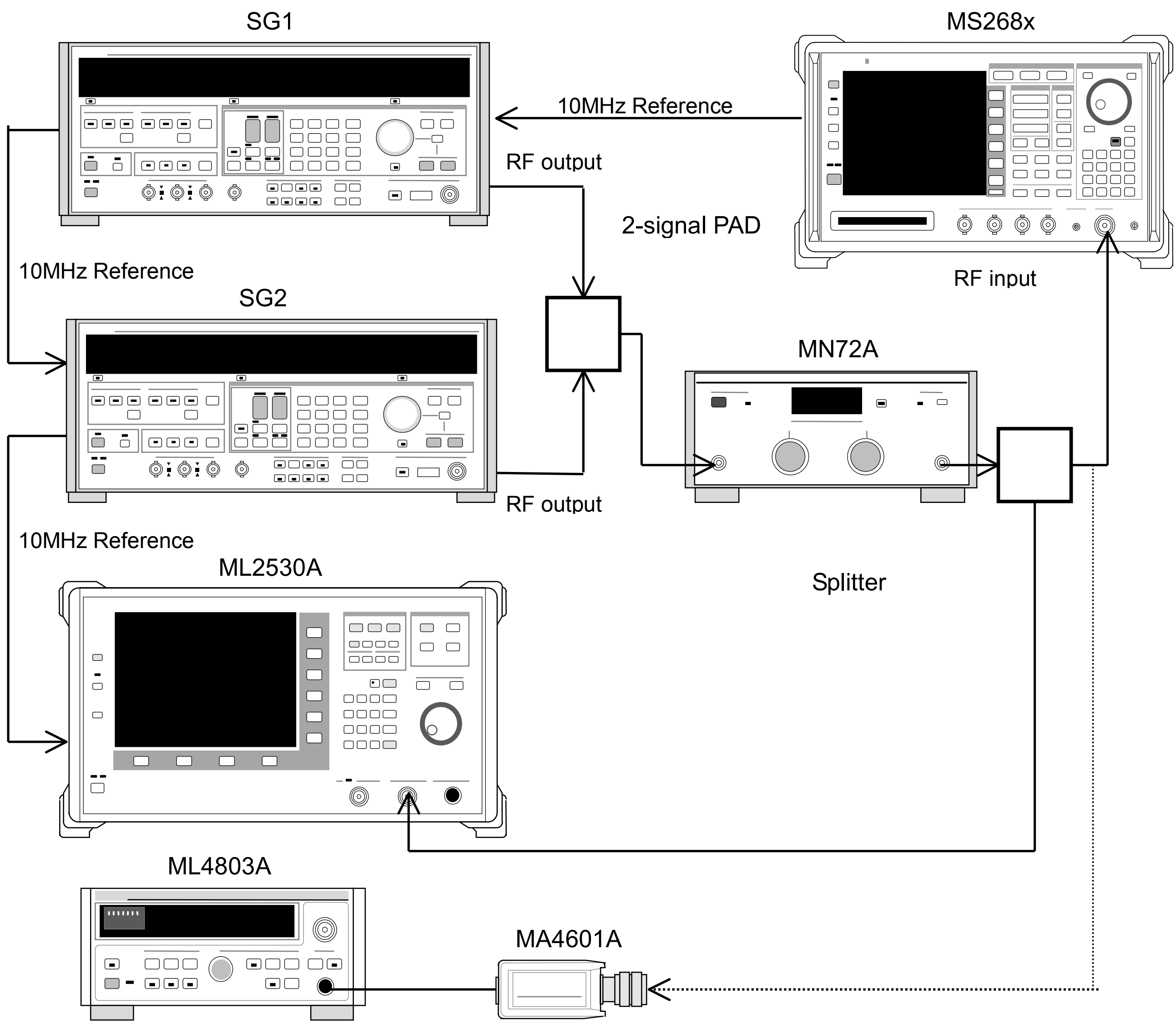
<MS2687A/B>

- Carrier frequency accuracy: ± (Reference crystal oscillator accuracy +10 Hz)
  Input: Level ≥ –30 dBm (preamplifier Off)
- Residual vector error: <2.0% (rms)
  Input: Level ≥ –30 dBm (preamplifier Off),
- Origin offset accuracy: ±0.5 dB
  Input: Level ≥ –30 dBm (preamplifier Off),
  for a signal with origin offset –30 dBc

(2) Measurement units for test

- Digital modulation signal generator (SG1): MG3681A
- Digital modulation signal generator (SG2): MG3681A
- Calibration receiver: ML2530A
- Programmable attenuator: MN72A
- 2-signal pad
- Power splitter
- Power meter: ML4803A
- Power sensor: MA4601A

(3) Setup



(4) Test Procedures

1. Set the programmable attenuator (MN72A) to 0 dB.
2. Set SG1 as follows:
   - Frequency : (Frequency in the following table +307.2 kHz) 307.2 kHz is a quarter of the chip rate.
   - Level : –10 dBm
   - Modulation : No modulation
3. Set SG2 as follows:
   - Frequency : (Frequency in following in Step 11)
   - Level : –30 dBc relative to SG1 levels
   - Modulation : No modulation
4. Set the MS268x as follows:
   - Input Terminal : RF (High Power input)
   - Reference Level : –10 dBm
   - Frequency : (Frequency in the following in Step11)
   - Measuring Object: QPSK
   - Filter : Filtering
   - Trigger : Free Run
   - Analysis Length : 1 slot
5. Set SG1 RF Output to ON, set SG2 RF Output to OFF, adjust the SG1 Level with Power meter.
6. Press F2 (Modulation Analysis) to display the Modulation Analysis screen.
7. Execute F5 (Adjust Range).
8. Read the measurement results displayed on the screen and check the frequency error and residual vector error satisfy the Standard.
9. Set SG1 RF Output and SG2 RF Output to ON, adjust the Level with Power meter.
10. Execute F5 (Adjust Range).
11. Read the measurement results displayed on the screen and check the residual vector error and origin offset satisfy the Standard.(Origin offset expected value is –30dB.)

Frequency	Level (input level to MS268x)		
	MS268x Pre-Ampl On	MS268x Pre-Ampl Off	MS2687A/B
50 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–30 dBm ±0.1 dB
850 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–30 dBm ±0.1 dB
2000 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–30 dBm ±0.1 dB
2300 MHz	–40 dBm ±0.1 dB	–30 dBm ±0.1 dB	–30 dBm ±0.1 dB

4.4.2 Code domain measurement <MS268x>

This section describes the tests on the following items:

- Code domain power measurement accuracy

This measurement is not completely the same as the shipment inspection done by Anritsu.

(1) Test specifications

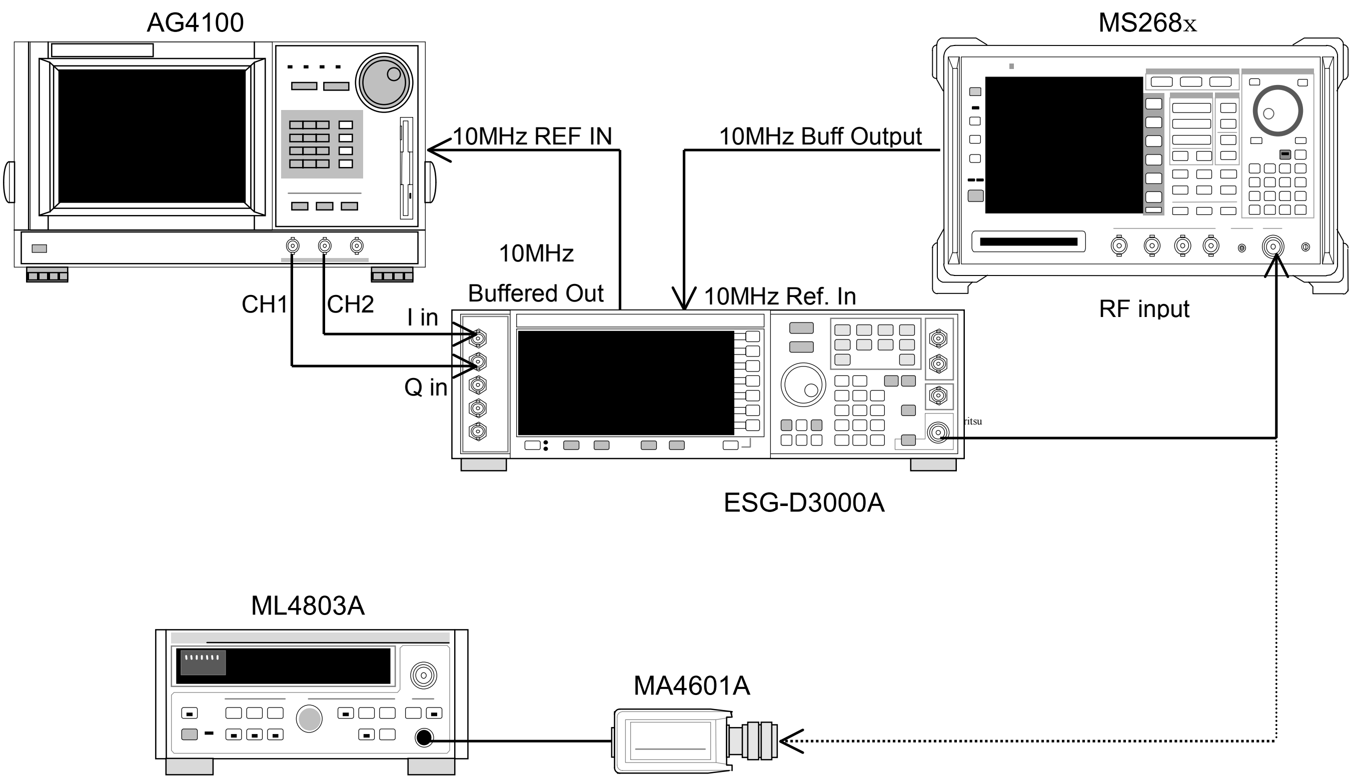
- Code domain power measurement accuracy:

±0.2 dB(Code power≥ –10 dBc)
±0.4 dB(Code power≥ –25 dBc)

(2) Measurement units for test

- Arbitrary siganal generator : AG4100
- Vector signal generator : ESG-D3000A
- Power Meter : ML4803A
- Power Sensor : MA4601A

(3) Setup



(4) Test Procedures

1. Set the data of "Evaluation signal 2" in the Arbitrary signal generator. For details on the evaluation signal, refer to "Evaluation Signal."
2. Set Vector SG as following table:

Frequency	Level (input level to MS268x)		
	MS268x Pre-Ampl On	MS268x Pre-Ampl Off	MS2687A/B
50 MHz	–20 dBm ±0.1 dB	–10 dBm ±0.1 dB	–10 dBm ±0.1 dB
850 MHz	–20 dBm ±0.1 dB	–10 dBm ±0.1 dB	–10 dBm ±0.1 dB
2000 MHz	–20 dBm ±0.1 dB	–10 dBm ±0.1 dB	–10 dBm ±0.1 dB
2300 MHz	–20 dBm ±0.1 dB	–10 dBm ±0.1 dB	–10 dBm ±0.1 dB

3. Set the MS268x as follows:
   - Input Terminal : RF
   - Reference Level : (Level given in the table above)
   - Frequency : (Frequency given in the table above)
   - Measuring Object : Forward
   - Filter : Filtering + EQ
   - Trigger : Free Run
   - Analysis Start : 0 chip
   - Analysis Length : 1 slot

4. Press [F2] (Modulation Analysis) to display the Modulation Analysis screen
5. Execute [F5] (Adjust Range).
6. Press [F1] (Trace Format) and set to "code domain".
7. Read the measurement results displayed on the screen and check the code power and residual error satisfy the Standard. Code Power expected value is as follows:
   - code 0 : –10.0 dB
   - code 1 : –15.0 dB
   - code 2 : –20.0 dB
   - code 3 : –25.0 dB

   Press [F1] (Trace Format) and set to "non" and Read the measurement results displayed on the screen and check the frequency error and residual error satisfy the Standard.

4.4.3 Linearity <MS268x>

(1) Test specifications

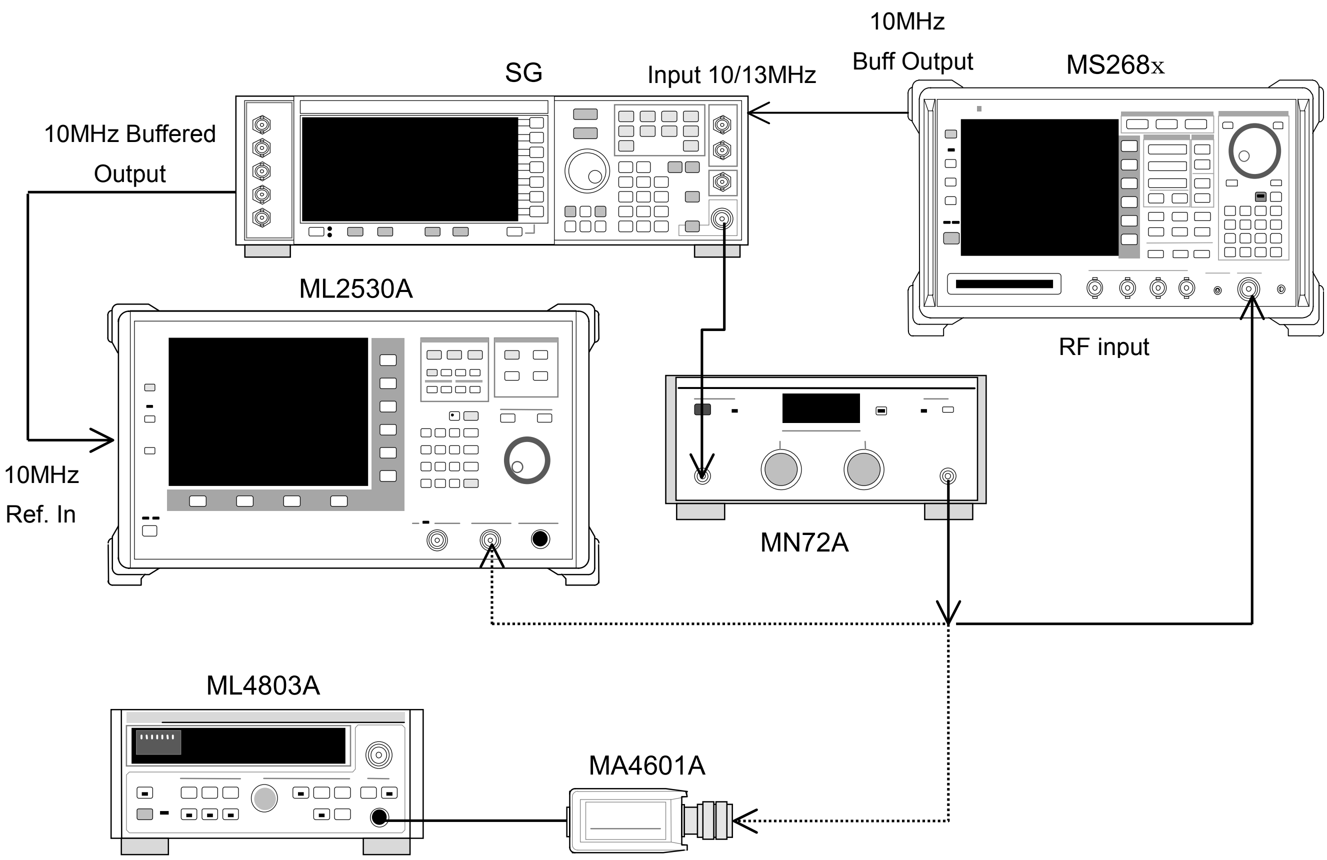
±0.2 dB (0 to –40 dB)

Without changing the reference level setting after range optimization

(2) Measurement units for test

- Signal Generator: ESG-D3000A
- Calibration receiver: ML2530A
- Programmable attenuator: MN72A
- Power meter: ML4803A
- Power sensor: MA4601A

(3) Setup



(4) Test Procedures

1. Connect SG (MN72A output) to power sensor (MA4601A).
2. Set the programmable attenuator (MN72A) to 0 dB. Adjust the SG level so that the Power Meter (ML4803A) indicates +10 dBm ±0.1 dB. Record the measurement results (Set_Ref). See the table below for the measured frequency and levels.

3. Connect SG(MN72A output) to calibration receiver (ML2530A) and set BW to 100Hz, Relative mode (with the range fixed to 1).
4. Lower the SG output level (for Set_Ref) in steps of 10 dB until it is –40 dBc and record the measurement value (ML2530A reading) at the calibration receiver (ML2530A) for each step.
5. Set the MS268xA as follows
   - Input Terminal : RF (High/Low Power Input)
   - Reference Level : (Level indicated in the table below)
   - Frequency : (Frequency indicated in the table below)
   - Measuring Object : QPSK
   - Filter : Filtering
   - Trigger : Free Run

Frequency	Level (input level to MS268x)		
	MS268x Pre-Ampl On	**MS268x Pre-Ampl Off**	**MS2687A/B**
50 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
850 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	–20 dBm ±0.1 dB	0 dBm ±0.1 dB	0 dBm ±0.1 dB

6. Set the MN72A as follows:
   - When Pre-Ampl is ON : 30 dB
   - When Pre-Ampl is OFF : 20 dB
7. Connect SG to the MS268x and set the SG level to Set Ref.
8. Press F3 (RF Power) and execute F5 (Adjust Range).
8. Record the Tx Power value (dBm) (Measure_Ref).
9. Lower the SG output level (for Set_Ref) in steps of 10 dB until it is –40 dB and record the Tx Power value at each step.
10. Check that the linearity error (shown below) satisfies the Standard.
    Linearity error [dB] = Tx Power value – (Measure_Ref – ML2530A reading)

4.4.4 Occupied bandwidth measurement <MS268x>

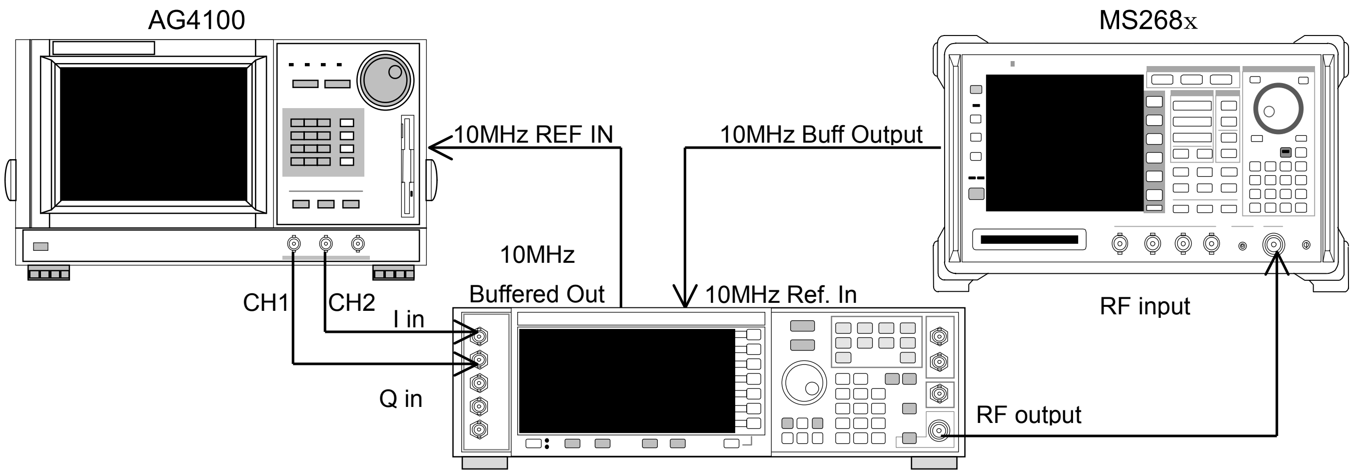
(1) Test specifications

- This test is a functional test and therefore has no test specifications.

(2) Measurement units for test

- Arbitrary signal generator : AG4100
- Vector signal generator : ESG-D3000A
- Power Meter : ML4803A
- Power Sensor : MA4601A

(3) Setup



(4) Test procedures

1. Set the data of "Evaluation signal 1" in the arbitrary signal generator. For details on the evaluation signal, refer to "Evaluation Signal."
2. Set Vector SG(ESG-D3000A) as follows:
   - Frequency: (Given in the step 8.)
   - Level: (Given in the step 8.)
3. Measure Input Level to MS268x.
4. Set the MS268x as follows:
   - Input Terminal : RF
   - Reference Level : (Given in the step 8.)
   - Frequency : (Given in the step 8.)
5. Press F4 (Occupied Bandwidth) and display the Occupied Bandwidth screen.
6. Execute F5 (Adjust Range).
7. Press F1 (Measure Method) and set the measurement method to FFT.

8. Check that the occupied frequency bandwidth measurement value is 1.26 ±0.1 MHz.

Frequency	Level (SG set value)		
	MS268x Pre-Ampl On	MS268x Pre-Ampl Off	MS2687A/B
50 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB
850 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB
2000 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB
2300 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB

4.4.5 Spurious close to the carrier <MS268x>

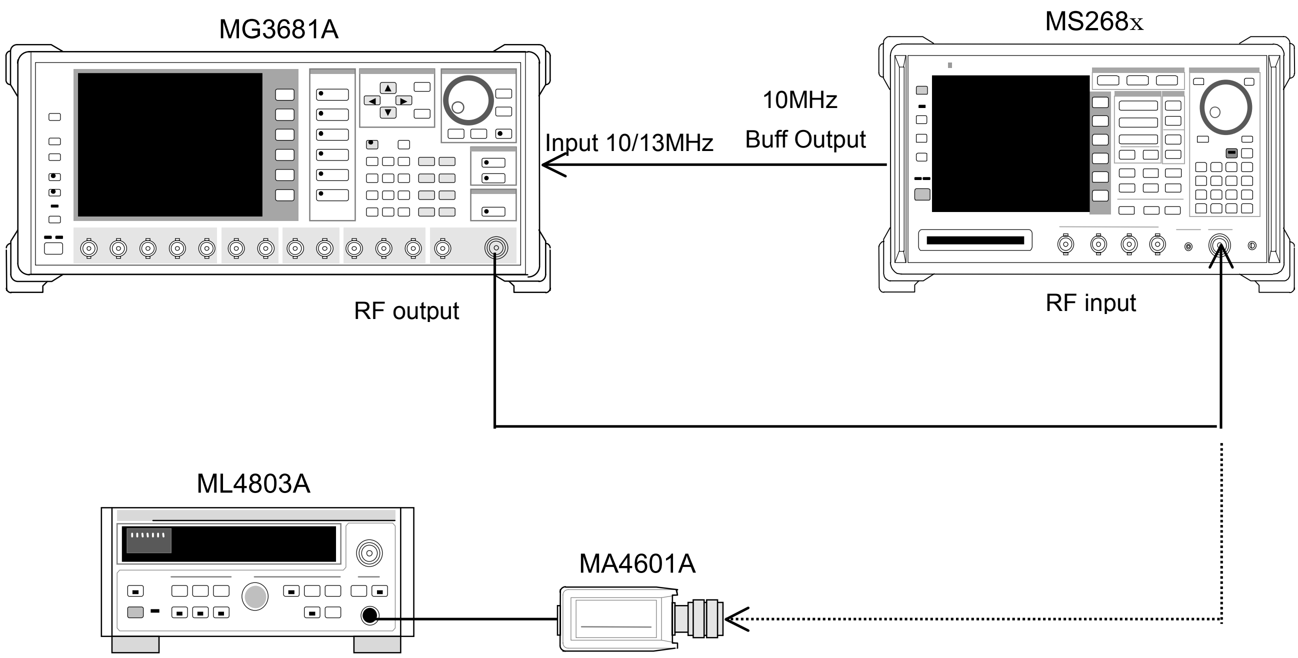
(1) Test specifications

Input level ≥0 dBm (Pre-Ampl Off)
750 kHz detuning: ≥45 dBc(Span: 2MHz)
1.98 MHz detuning: ≥60 dBc

(2) Measurement units for test

- Digital modulation signal generator: MG3681A
- Power meter : ML4803A
- Power sensor : MA4601A

(3) Setup



(4) Test Procedures

1. Set the digital modulation signal generator as follows:
   - Frequency: (Given in the table below)
   - Level: (Given in the table below)
   - System: IS-95
   - Link: Forward
   - Filter: SPEC + EQ
   - Pat. Number: 9
2. Adjust Input Level to MS268x with Power meter (ML4803A).
3. Set the MS268x as follows:
   - Input Terminal : RF
   - Reference Level : (Given in the table below)
   - Frequency : (Given in the table below)
   - Measuring Object: QPSK
   - Filter : Filtering
   - Trigger : Free Run
4. Press F5 (Spurious close to the Carrier) to display the Spurious close to the Carrier screen.
5. Press (More) to display the second function label page, and press F3 (Ref Power) to set to "SPA".
6. Return the function label to the first page, execute F5 (Adjust Range).
7. Read the measurement results and check that the measurement range satisfies the Standard.

Frequency	**Level (input level to MS268x)**	
	MS268x	**When MS268x Pre-Ampl installed***
200 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2000 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB
2300 MHz	0 dBm ±0.1 dB	0 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

4.4.6 CCDF measurement <MS268x>

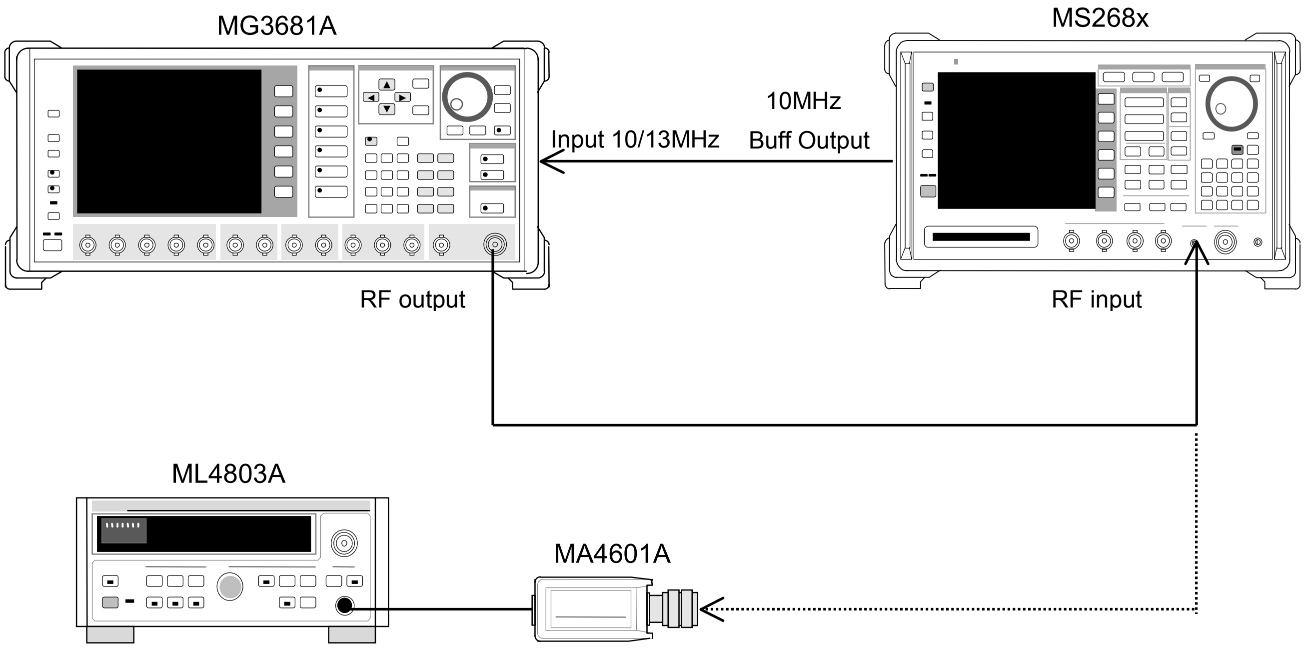
(1) Test specifications

- This test is a functional test and therefore has no test specifications.

(2) Measurement units for test

- Digital modulation signal generator: MG3681A
- Power meter : ML4803A
- Power sensor : MA4601A

(2) Setup



(4) Test Procedures

1. Set the digital modulation signal generator as follows:
   - System : 1xEV-DO
   - Pattern : FWD_2457.6 kbps_1
   - Frequency : (Given in the table below)
   - Level : (Given in the table below)
2. Set the MS268x as follows:
   - Input Terminal : RF
   - Reference Level : (Given in the table below)
   - Frequency : (Given in the table below)
   - Measuring Object : Forward
   - Filter : Filtering + EQ
   - Trigger : Free Run
3. Adjust Input Level to MS268x with Power meter(ML4803A).

4. Press [ ] (More) to display the second function label page.
5. Press [F3] (CCDF) to display the CCDF screen.
6. Press [F1] (Measure Method), and set to "CCDF".
7. Press [F6] (return), and press [ ] (More) to display the second function label page.
8. Execute [F5] (Adjust Range).
9. Press [F1] (Filter Type), and set Filter Type to "1.23MHz".
10. Press [Single] key. Check that the 0.0001% value is 10dB ±1 dB.

Frequency	Level (power meter reading)		
	When MS268x Pre-Ampl On installed*	MS268x Pre-Ampl Off	MS2687A/B
50 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB
2000 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB
2300 MHz	–30 dBm ±0.1 dB	–20 dBm ±0.1 dB	–20 dBm ±0.1 dB

*: Measurement with option 08 installed and Pre-Ampl set to Off

4.4.7 IQ input modulation accuracy

Available only when Option MS2681A-17 or –18, MS2683A-17 or –18, MS2687A-18 or MS2687B-18.

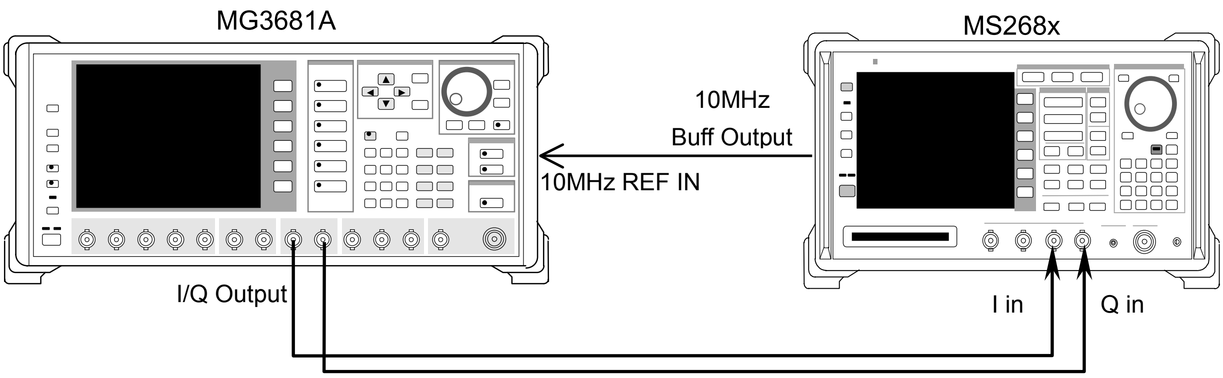
(1) Test specifications

- Resisual vector error: <2% (rms), DC coupling

(2) Measurement units for test

- Digital modulation signal generator: MG3681A

(3) Setup



(4) Test Procedures

1. Set the digital modulation signal generator as follows:
   - System : 1xEV-DO
   - Pattern : FWD_2457.6 kbps_1

2. Set the MS268x as follows:
   - Input Terminal : IQ-DC
   - Impedance : 50 Ω
   - Measuring Object : Forward
   - Filter : Filter + EQ
   - Trigger : Free Run
   - Analysis Start : 0 chip
   - Analysis Length : 1 slot

3. Press F2 (Modulation Analysis) to display the Modulation Analysis screen.
4. Press F4 (Analysis Mode) and then F1 (Analysis Start) and set Analysis Start to 0. Press F2 (Analysis Length) and set Analysis Length to 1 slot.
5. Check that the residual vector value satisfies the Standard.

4.4.8 Evaluation signal <MS268x>

Here, the evaluation signal settings are explained. The user will need the evaluation signal to perform the performance test. Based on these settings, set the Digital modulation signal generator.

Outline of evaluation signal 1

- Walsh Length = 128
- Walsh Code = Multiplexing of five codes: 0, 15, 31, 63 and 127
- Set all data to 0 for Walsh Code = 0 with Walsh Length = 128 to generate a pilot signal.
- Repeat at 26.67 ms.
- The power ratio is as follows:

Power ratio of each code

Power ratio

Code 0 : –10.0 dB
Code 15 : –15.0 dB
Code 31 : –20.0 dB
Code 63 : –25.0 dB
Code 127 : –0.68 dB

Outline of evaluation signal 2

- Walsh Length = 16 (for traffic channel), 64 (for MAC channel)
- Repeat at 26.67 ms.
- The power ratio is as follows:

Power ratio of each code

Power ratio

Code 0 : –10.0 dB
Code 1 : –15.0 dB
Code 2 : –20.0 dB
Code 3 : –25.0 dB

4.5 Sample of Entry Forms for Performance Test Results <MS860x>

This section offers sample forms for entering the results of the MS8608A digital mobile radio transmitter tester performance test.
Copy these entry forms and use them.

Test location: ____________________

Report No.: ____________________
Date: ____________________
Tested by: ____________________

Unit name: MS860x Digital Mobile Radio Transmitter Tester
MX860x04A cdma2000 1xEV-DO measurement software

Serial No.: ____________________

Ambient temperature: __________ °C

Power frequency: __________ Hz

Relative humidity: __________ %

Remarks: ____________________

4.5.1 Modulation/Frequency measurement <MS860x>

Frequency/modulation measurement accuracy (High Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	____ %	____ %	____ %	____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	−9.9 Hz			
	Measurement value	____ Hz	____ Hz	____ Hz	____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (Low Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	______%	______%	______%	______%
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	–9.9 Hz			
	Measurement value	______Hz	______Hz	______Hz	______Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (for Low Power input and Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	______%	______%	______%	______%
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	–9.9 Hz			
	Measurement value	______Hz	______Hz	______Hz	______Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Origin offset expected value

	50 MHz	850 MHz	2000 MHz	2300 MHz
Expected value	______dB	______dB	______dB	______dB

Origin offset (High Power input)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	______dB	______dB	______dB	______dB
Upper limit	+0.46 dB			
Origin offset accuracy*	______dB	______dB	______dB	______dB
Lower limit	–0.46 dB			
Measurement uncertainty	±0.04 dB			

*: Origin offset accuracy [dB] = Measurement result – Origin offset expected value

Origin offset (Low Power input)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	______ dB	______ dB	______ dB	______ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	______ dB	______ dB	______ dB	______ dB
Lower limit	–0.46 dB			
Measurement uncertainty	±0.04 dB			

Origin offset (Low Power input and Pre-Ampl On)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	______ dB	______ dB	______ dB	______ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	______ dB	______ dB	______ dB	______ dB
Lower limit	–0.46 dB			
Measurement uncertainty	±0.04 dB			

*: Origin offset accuracy [dB] = Measurement result – Origin offset expected value

4.5.2 Code domain measurement <MS860x>

Code domain power measurement accuracy (Low Power input)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−9.82 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−10.18 dB			
Measurement uncertainty		±0.02 dB			
1	Upper limit	−14.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−15.35 dB			
2	Upper limit	−19.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−20.35 dB			
3	Upper limit	−24.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−25.35 dB			
Measurement uncertainty		±0.05 dB			

Code domain power measurement accuracy (Low Power input and Pre-Ampl On)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−9.82 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−10.18 dB			
Measurement uncertainty		±0.02 dB			
1	Upper limit	−14.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−15.35 dB			
2	Upper limit	−19.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−20.35 dB			
3	Upper limit	−24.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−25.35 dB			
Measurement uncertainty		±0.05 dB			

4.5.3 Transmission power measurement accuracy <MS860x>

Power meter reading

		50 MHz	850 MHz	2000 MHz	2300 MHz
Power meter reading	Upper limit	+10.1 dBm			
	Reading	_______ dB	_______ dB	_______ dB	_______ dB
	Lower limit	–9.9 dBm			

Actual attenuation of programmable attenuator (attenuation from +10 dBm)

ATT set value	50 MHz	850 MHz	2000 MHz	2300 MHz
20	_______ dB	_______ dB	_______ dB	_______ dB

Transmission power measurement accuracy (High Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Maximum value	–0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value - Power meter reading

Transmission power measurement accuracy (Low Power input)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Maximum value	–0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value – (Power meter reading – Actual attenuation for MN72A ATT: 20 dB)

Transmission power measurement accuracy (Low Power input and Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement accuracy	Minimum value	+0.23 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Maximum value	–0.23 dB			
	Measurement uncertainty	±0.17 dB			

Measurement accuracy [dB] = Tx Power value – (Power meter reading – Actual attenuation for MN72A ATT: 20 dB)

4.5.4 Linearity <MS860x>

SG1 set value for +0.5 dBm calibration at each frequency

		50 MHz	850 MHz	2000 MHz	2300 MHz
SG1 set value	Set_Ref	______ dBm	______ dBm	______ dBm	______ dBm

Linearity accuracy (High Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
850	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
2000	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
2300	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

Linearity accuracy (Low Power input)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*1	Effective range (dB)
50	–10	-----	______ dBm*1		
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
850	–10	-----	______ dBm*1		
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
2000	–10	-----	______ dBm*1		
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
2300	–10	-----	______ dBm*1		
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

Linearity accuracy (Low Power input and Pre-Ampl On)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*1	Effective range (dB)
50	–20	-----	______ dBm*1		
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
	–60	______ dB	______ dBm	______ dB	±0.16 dB
850	–20	-----	______ dBm*1		
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
	–60	______ dB	______ dBm	______ dB	±0.16 dB
2000	–20	-----	______ dBm*1		
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
	–60	______ dB	______ dBm	______ dB	±0.16 dB
2300	–20	-----	______ dBm*1		
	–30	______ dB	______ dBm	______ dB	±0.16 dB
	–40	______ dB	______ dBm	______ dB	±0.16 dB
	–50	______ dB	______ dBm	______ dB	±0.16 dB
	–60	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

*1: Measure_Ref

*2: Linearity calculation

Linearity calculation value (dB) = Tester measurement value (dBm) – {Measure_Ref (dBm) – Calibration receiver measurement value (dB)}

4.5.5 Nearby spurious measurement <MS860x>

Adjacent channel leakage power measurement range (Low Power input)

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
–10 MHz	______dB	______dB	______dB	1 dB	60 dB
–5 MHz	______dB	______dB	______dB		50 dB
+5 MHz	______dB	______dB	______dB		50 dB
+10 MHz	______dB	______dB	______dB		60 dB

Adjacent channel leakage power measurement range (Low Power input and option 08 installed)*1

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
–10 MHz	______dB	______dB	______dB	1 dB	60 dB
–5 MHz	______dB	______dB	______dB		50 dB
+5 MHz	______dB	______dB	______dB		50 dB
+10 MHz	______dB	______dB	______dB		60 dB

*1: Measurement with option 08 installed (Pre-Ampl: Off)

4.5.6 Spurious measurement <MS860x>

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

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	______ Hz	______ dB	1 dB	73 dB
f2	30 to 800 MHz	______ Hz	______ dB		73 dB
f3	900 MHz to 1 GHz	______ Hz	______ dB		73 dB
f4	1 to 1.65 GHz	______ Hz	______ dB		(67-f) dB
f5	1.75 to 2.5 GHz	______ Hz	______ dB		(67-f) dB
f6	2.6 to 3.2 GHz	______ Hz	______ dB		(67-f) dB
f7	3.2 to 7.8 GHz	______ Hz	______ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Low Power input)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 30 MHz	______ Hz	______ dB	1 dB	73 dB
f2	30 to 950 MHz	______ Hz	______ dB		73 dB
f3	1.05 to 1.95 GHz	______ Hz	______ dB		73 dB
f4	2.05 to 3.2 GHz	______ Hz	______ dB		(67-f) dB
f5	3.2 to 7.8 GHz	______ Hz	______ dB		(67-f) dB
f1*1	1.6 to 1.95 GHz	______ Hz	______ dB		67 dB
f2*1	2.05 to 3.15 GHz	______ Hz	______ dB		67 dB

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

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	______ Hz	______ dB	1 dB	73 dB
f2	50 to 500 MHz	______ Hz	______ dB		73 dB
f3	500 to 800 MHz	______ Hz	______ dB		73 dB
f4	900 MHz to 1.65 GHz	______ Hz	______ dB		(67-f) dB
f5	1.75 to 2.5 GHz	______ Hz	______ dB		(67-f)dB
f6	2.6 to 3.2 GHz	______ Hz	______ dB		(67-f) dB
f7	3.2 to 7.8 GHz	______ Hz	______ dB		67 dB
f1*1	1.6 to 7.8 GHz	______ Hz	______ dB		67 dB

Measurement range [Carrier Frequency: 2000 MHz] (Low Power input and Pre-Ampl On)

	Measurement frequency range	Measurement frequency	Measurement value (dB)	Measurement uncertainty	Effective lower limit
f1	10 to 50 MHz	______ Hz	______ dB	1 dB	73 dB
f2	50 to 500 MHz	______ Hz	______ dB		73 dB
f3	500 to 850 MHz	______ Hz	______ dB		73 dB
f4	950 MHz to 1.75 GHz	______ Hz	______ dB		(67-f) dB
f5	1.85 to 3.2 GHz	______ Hz	______ dB		(67-f) dB
f6	3.2 to 7.8 GHz	______ Hz	______ dB		(67-f) dB
f1*1	1.6 to 1.75 GHz	______ Hz	______ dB		67 dB
f2*1	1.85 to 7.8 GHz	______ Hz	______ dB		67 dB

*1: Option 03 installed

4.5.7 IQ input modulation accuracy <MS860x>

Modulation measurement accuracy (IQ input)

Residual vector error	Minimum value	0%
	Measurement value	______ %
	Maximum value	1.8%
	Measurement uncertainty	0.2%

4.5.8 Power meter accuracy <MS860x>

Power meter reading (Set_Ref)

		50 MHz	850 MHz	2000 MHz	3000 MHz
SG set value (Set_Ref)	-----	______ dBm	______ dBm	______ dBm	______ dBm
Power meter reading (Read_Ref)	Upper limit	+10.1 dBm			
	Reading	______ dBm	______ dBm	______ dBm	______ dBm
	Lower limit	–9.9 dBm			

ML2530A measurement value (ATT_n)*1 with programmable attenuator varied

ATT set value	ATT_n	50 MHz	850 MHz	2000 MHz	3000 MHz
10 dB	ATT_10	______ dB	______ dB	______ dB	______ dB
20 dB	ATT_20	______ dB	______ dB	______ dB	______ dB
30 dB	ATT_30	______ dB	______ dB	______ dB	______ dB

Measurement accuracy (Low Power input)

Frequency (MHz)	Input level (dBm)	SG&ATT set level	Tester measurement 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%
850	+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 uncertainty			±4.2%		

*1: ATT_n is a minus value.

*2: Measurement accuracy calculation

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

4.6 Sample of Entry Forms for Performance Test Results <MS268x>

This section offers sample forms for entering the results of the MS268x digital mobile radio transmitter tester performance test.
Copy these entry forms and use them.

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

Unit name: MS268xA Spectrum Analyzer
MX268x04A cdma2000 1xEV-DO measurement software

Serial No.: ____________________ Ambient temperature: ______________ °C

Power frequency: ______________ Hz Relative humidity: ______________ %

Remarks: ____

4.6.1 Modulation/Frequency measurement <MS268x>

Frequency/modulation measurement accuracy

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	____ %	____ %	____ %	____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	–9.9 Hz			
	Measurement value	____ Hz	____ Hz	____ Hz	____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Frequency/modulation measurement accuracy (for Pre-Ampl On)

		50 MHz	850 MHz	2000 MHz	2300 MHz
Residual vector error	Minimum value	0%			
	Measurement value	____ %	____ %	____ %	____ %
	Maximum value	1.8%			
	Measurement uncertainty	0.2%			
Carrier frequency	Minimum value	–9.9 Hz			
	Measurement value	____ Hz	____ Hz	____ Hz	____ Hz
	Maximum value	+9.9 Hz			
	Measurement uncertainty	±0.1 Hz			

Origin offset expected value

	50 MHz	850 MHz	2000 MHz	2300 MHz
Expected value	____ dB	____ dB	____ dB	____ dB

Origin offset

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	____ dB	____ DB	____ dB	____ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	____ dB	____ DB	____ dB	____ dB
Lower limit	–0.46 dB			
Measurement uncertainty	±0.04 dB			

Origin offset (Pre-Ampl On)

	50 MHz	850 MHz	2000 MHz	2300 MHz
Measurement result	____ dB	____ dB	____ dB	____ dB
Upper limit	+0.46 dB			
Origin offset accuracy*	____ dB	____ dB	____ dB	____ dB
Lower limit	–0.46 dB			
Measurement uncertainty	±0.04 dB			

*: Origin offset accuracy [dB] = Measurement result – Origin offset expected value

4.6.2 Code domain measurement <MS268x>

Code domain power measurement accuracy

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−9.82 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−10.18 dB			
Measurement uncertainty		±0.02 dB			
1	Upper limit	−14.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−15.35 dB			
2	Upper limit	−19.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−20.35 dB			
3	Upper limit	−24.65 dB			
	Measurement value	______ dB	______ dB	______ dB	______ dB
	Lower limit	−25.35 dB			
Measurement uncertainty		±0.05 dB			

Code domain power measurement accuracy (Pre-Ampl On)

Code No.		5 MHz	850 MHz	2000 MHz	2300 MHz
0	Upper limit	−9.82 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Lower limit	−10.18 dB			
Measurement uncertainty		±0.02 dB			
1	Upper limit	−14.65 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Lower limit	−15.35 dB			
2	Upper limit	−19.65 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Lower limit	−20.35 dB			
3	Upper limit	−24.65 dB			
	Measurement value	_______ dB	_______ dB	_______ dB	_______ dB
	Lower limit	−25.35 dB			
Measurement uncertainty		±0.05 dB			

4.6.3 Linearity <MS268x>

SG1 set value for +0.5 dBm calibration at each frequency

		50 MHz	850 MHz	2000 MHz	2300 MHz
SG1 set value	Set_Ref	______ dBm	______ dBm	______ dBm	______ dBm

Linearity accuracy

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*2	Effective range (dB)
50	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
850	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
2000	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
2300	+10	-----	______ dBm*1		
	0	______ dB	______ dBm	______ dB	±0.16 dB
	–10	______ dB	______ dBm	______ dB	±0.16 dB
	–20	______ dB	______ dBm	______ dB	±0.16 dB
	–30	______ dB	______ dBm	______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

Linearity accuracy (Pre-Ampl On)

Frequency (MHz)	SG level (dBm)	Calibration receiver measurement value (dB)	Tester measurement value (dBm)	Linearity calculation value (dB)*1	Effective range (dB)
50	–20	-----	_______ dBm*1		
	–30	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–40	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–50	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–60	_______ dB	_______ dBm	_______ dB	±0.16 dB
850	–20	-----	_______ dBm*1		
	–30	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–40	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–50	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–60	_______ dB	_______ dBm	_______ dB	±0.16 dB
2000	–20	-----	_______ dBm*1		
	–30	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–40	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–50	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–60	_______ dB	_______ dBm	_______ dB	±0.16 dB
2300	–20	-----	_______ dBm*1		
	–30	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–40	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–50	_______ dB	_______ dBm	_______ dB	±0.16 dB
	–60	_______ dB	_______ dBm	_______ dB	±0.16 dB
Measurement uncertainty		±0.04 dB			

*1: Measure_Ref

*2: Linearity calculation

Linearity calculation value (dB) = Tester measurement value (dBm) – {Measure_Ref (dBm) – Calibration receiver measurement value (dB)}

4.6.4 Nearby spurious measurement <MS268x>

Adjacent channel leakage power measurement range

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
–10 MHz	_____dB	_____dB	_____dB	1 dB	60 dB
–5 MHz	_____dB	_____dB	_____dB		50 dB
+5 MHz	_____dB	_____dB	_____dB		50 dB
+10 MHz	_____dB	_____dB	_____dB		60 dB

Adjacent channel leakage power measurement range (option 08 installed)*1

Detuning frequency	200 MHz	2000 MHz	2300 MHz	Measurement uncertainty	Effective lower limit
–10 MHz	_____dB	_____dB	_____dB	1 dB	60 dB
–5 MHz	_____dB	_____dB	_____dB		50 dB
+5 MHz	_____dB	_____dB	_____dB		50 dB
+10 MHz	_____dB	_____dB	_____dB		60 dB

*1: Measurement with option 08 installed (Pre-Ampl: Off)

4.6.5 IQ input modulation accuracy <MS268x>

Modulation measurement accuracy (IQ input)

Residual vector error	Minimum value	0%
	Measurement value	__________%
	Maximum value	1.8%
	Measurement uncertainty	0.2%

MX860804A/MX860904A/
MX268104A/MX268304A/MX268704A
CDMA2000 1xEV-DO Measurement Software
(For MS8608A/MS8609A/
MS82681A/MS2683A/MS2687A/B)
Operation Manual
(Remote Control)

Table of Contents

Section 1 General

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

1.1 General

The MS860x/MS268x, when combined with an external controller (host computer, personal computer, etc.), can automate your measurement system. For this purpose, the MS860x/MS268x 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 MS860x/MS268x 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 MS860x/MS268x 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.

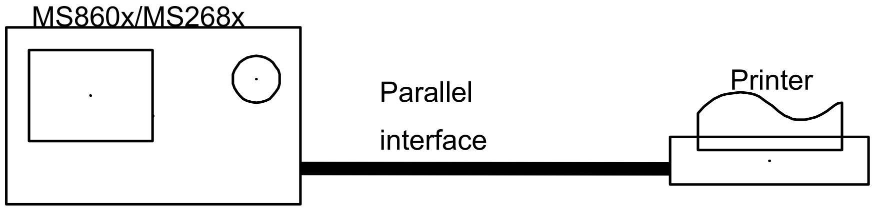
Port for the external controller: Select RS-232C, GPIB or Ethernet (Option).

Port for the printer: Parallel interface.

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

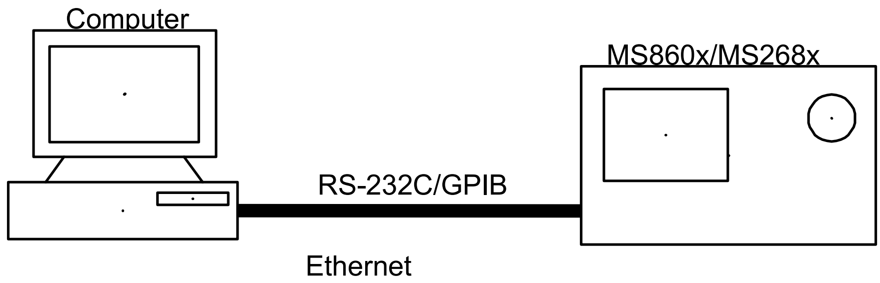
(1) Stand-alone type 1

Waveforms measured with MS860x/MS268x are output to the printer.



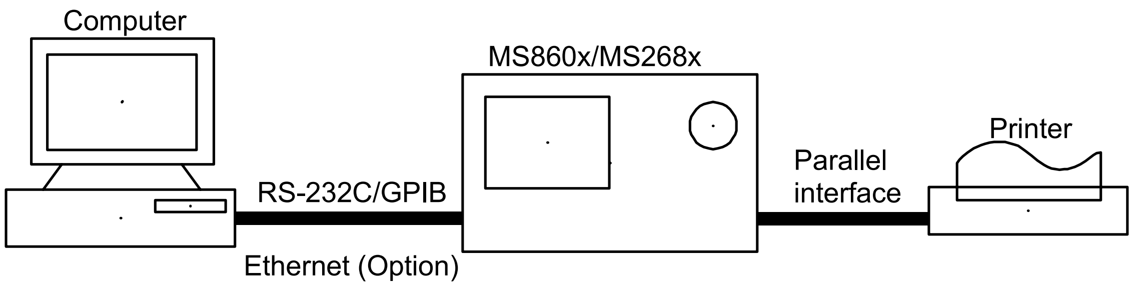
(2) Control by the host computer (1)

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



(3) Control by the host computer (2)

The waveforms measured by controlling spectrum 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 equipped as standard in MS860x/MS268x.

Item	Specification
Function	Controls from the external controller (except for power-ON/OFF)
Communication system	Asynchronous (start-stop synchronous system), half-duplex
Communication control system	X-ON/OFF control
Baud rate	1200, 2400, 4800, 9600, 19.2 k, 38.4 k, 56 k, 115 k (bps)
Data bits	7 or 8 bits
Parity	Odd number (ODD), even number (EVEN), none (NON)
Start bit	1 bit
Stop bit (bits)	1 or 2 bits
Connector	D-sub 9-pin, male

1.1.5 Specifications of GPIB

The table below lists the specifications of the GPIB provided for MS860x/MS268x.

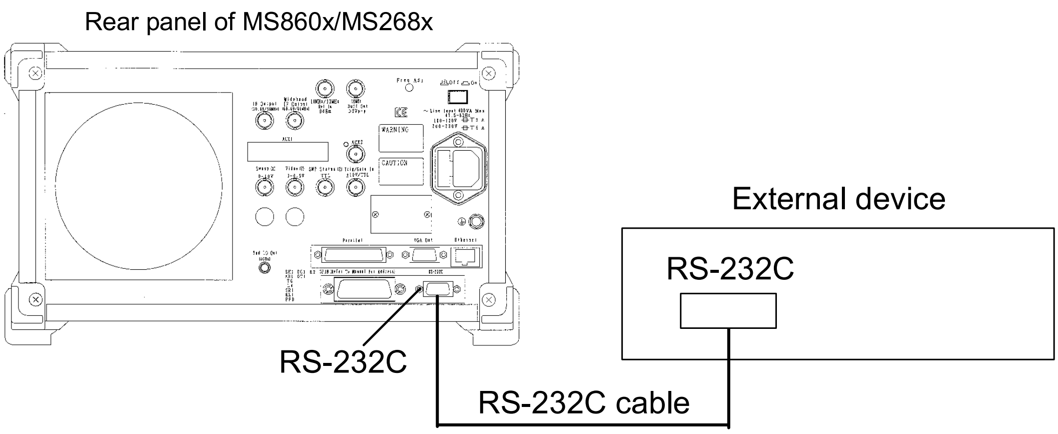
Item	Specification and supplementary explanation
Function	Conforms to IEEE488.2 The spectrum analyzer is controlled from the external controller (except for power-on/off).
Interface function	SH1: All source handshake functions are provided. Synchronizes the timing of data transmission. AH1: All acceptor handshake functions are provided. Synchronizes the timing of data reception. T6: The basic talker functions and serial poll function are provided. The talk only function is not provided. The talker can be canceled by MLA. L4: The basic listener functions are provided. The listen only function is not provided. The listener can be canceled by MTA. SR1: All service request and status byte functions are provided. RL1: All remote/local functions are provided. The local lockout function is provided. PP0: The parallel poll functions are not provided. DC1: All device clear functions are provided. DT1: Device trigger functions are provided. C0: System controller functions are not provided. E2: Output is tri-state.

Section 2 Connecting Device

This section describes how to connect external devices such as the host computer, personal computer, and printer to the MS860x/MS268x with RS-232C and GPIB cables. This section also describes how to setup the interfaces of the spectrum analyzer function.

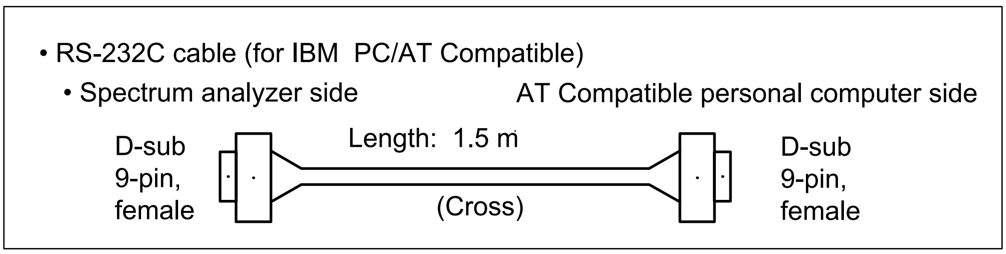
2.1 Connecting an External Device with an RS-232C Cable

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



Notes:

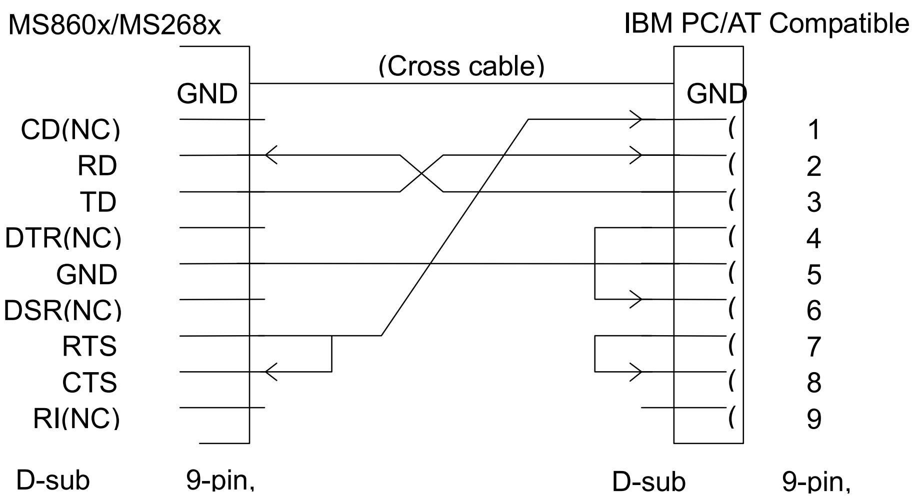
RS-232C connectors with 9 pins and 25 pins are available. When purchasing the RS-232C cable, check the number of pins on the RS-232C connector of the external device. Also, the following RS-232C cable is provided as peripheral parts of the spectrum analyzer.



2.2 Connection Diagram of RS-232C Interface Signals

The diagram below shows the RS-232C interface signal connections between the MS860x/MS268x and devices such as a personal computer.

- Connection with IBM PC/AT Compatible personal computer



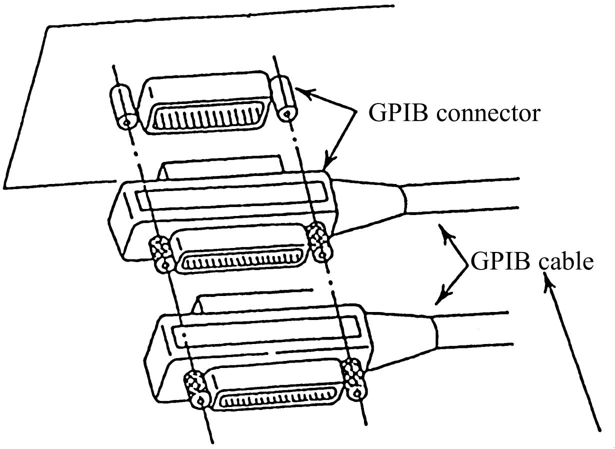
2.3 Connecting a Device with a GPIB Cable

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.



Total cable length: Up to 20 m
Cable length between devices: Up to 4 m
Number of devices that can be connected: Up to 15

2.3.1 Setting the GPIB Address

Set the GPIB address of this equipment as follows.

[Config] → Interface → (move cursor) My Address 1 → [Set]

Use the numeric key pad to enter the GPIB address of this equipment, next push [set] to confirm address. The initial value is 1.

Section 3 Device Message Format

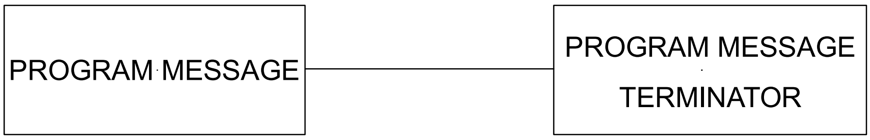
This section describes the format of the device messages transmitted on the bus between a controller (host computer) and the device MS860x/MS268x via the RS-232C GPIB or Ethernet system.

3.1 General Description

The device messages are data messages transmitted between the controller and the MS860x/MS268x. It consists of program messages transferred from the controller to the MS860x/MS268x, and response messages input from the MS860x/MS268x 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 the MS860x/MS268x 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

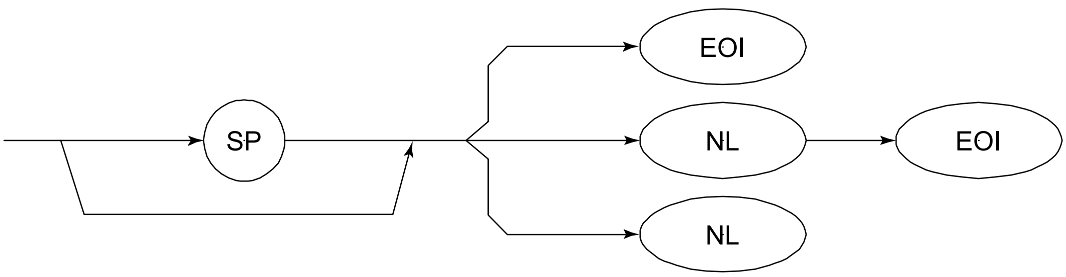
To transfer a program message from the controller program to this instrument using the WRITE statement, the program message formats are defined as follows.




```
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.

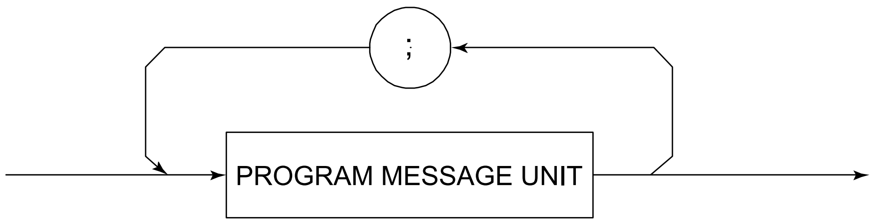
(1) PROGRAM MESSAGE TERMINATOR



NL: Called New line or LF (Line Feed)

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

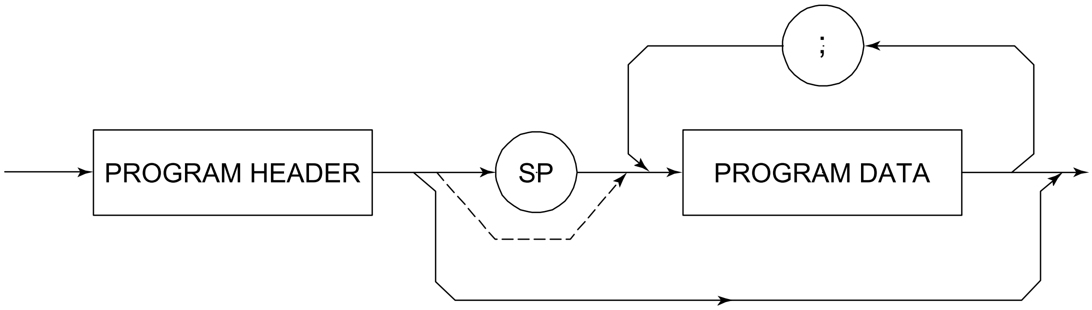
(2) PROGRAM MESSAGE



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

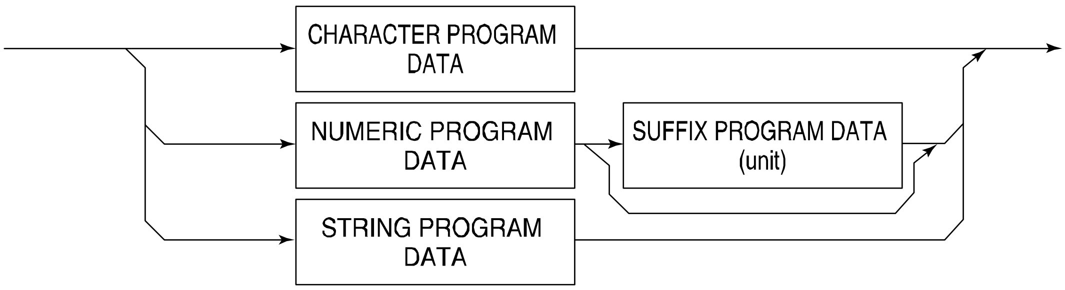
<Example> `WRITE #1;"CF 1GHZ;SP 5ØØKHZ"`

(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

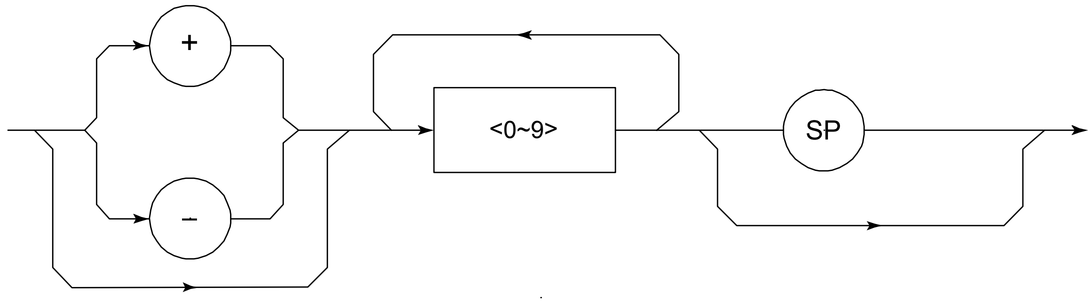
Character program data is specific character string data consisting of the uppercase alphabetic characters from A to Z, lowercase alphabetic characters from a to z, numbers 0 to 9, and underline (_).

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

(6) NUMERIC PROGRAM DATA

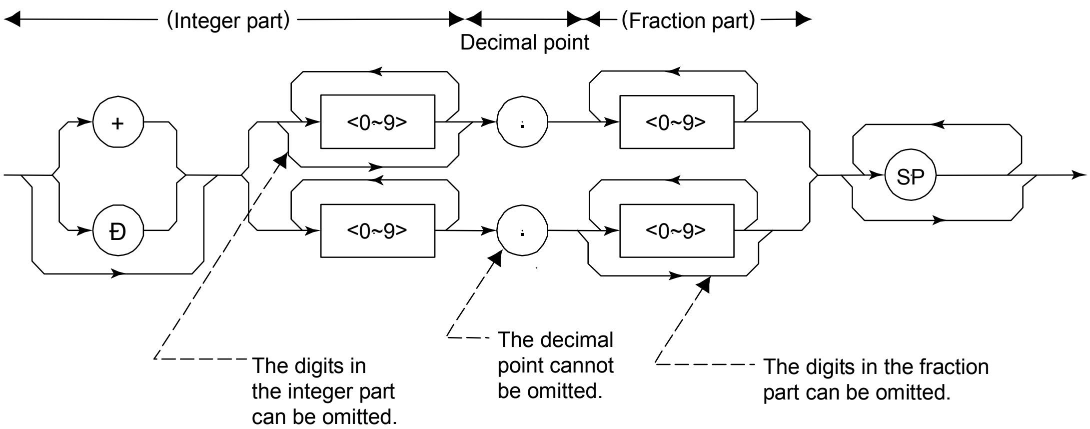
Numeric program data has two types of formats: integer format (NR1) and fixed-point format (NR2).

< 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, +Δ5 (×)
- Spaces can be inserted after a number → +5ΔΔΔ
- A + sign is optional → +5, 5
- Commas cannot be used to separate digits → 1,234,567 (×)

<Fixed-point format (NR2)>



- The numeric expression of the integer format applies to the integer part.
- There must be no spaces between numbers and the decimal point → +753Δ .123 (×)
- Spaces can be inserted after the digits in the fraction part → +753.123ΔΔΔΔ
- A number need not be placed before the decimal point → .05
- A + or - sign can be placed before the decimal point → +.05, − .05
- A number can end with a decimal point → 12.

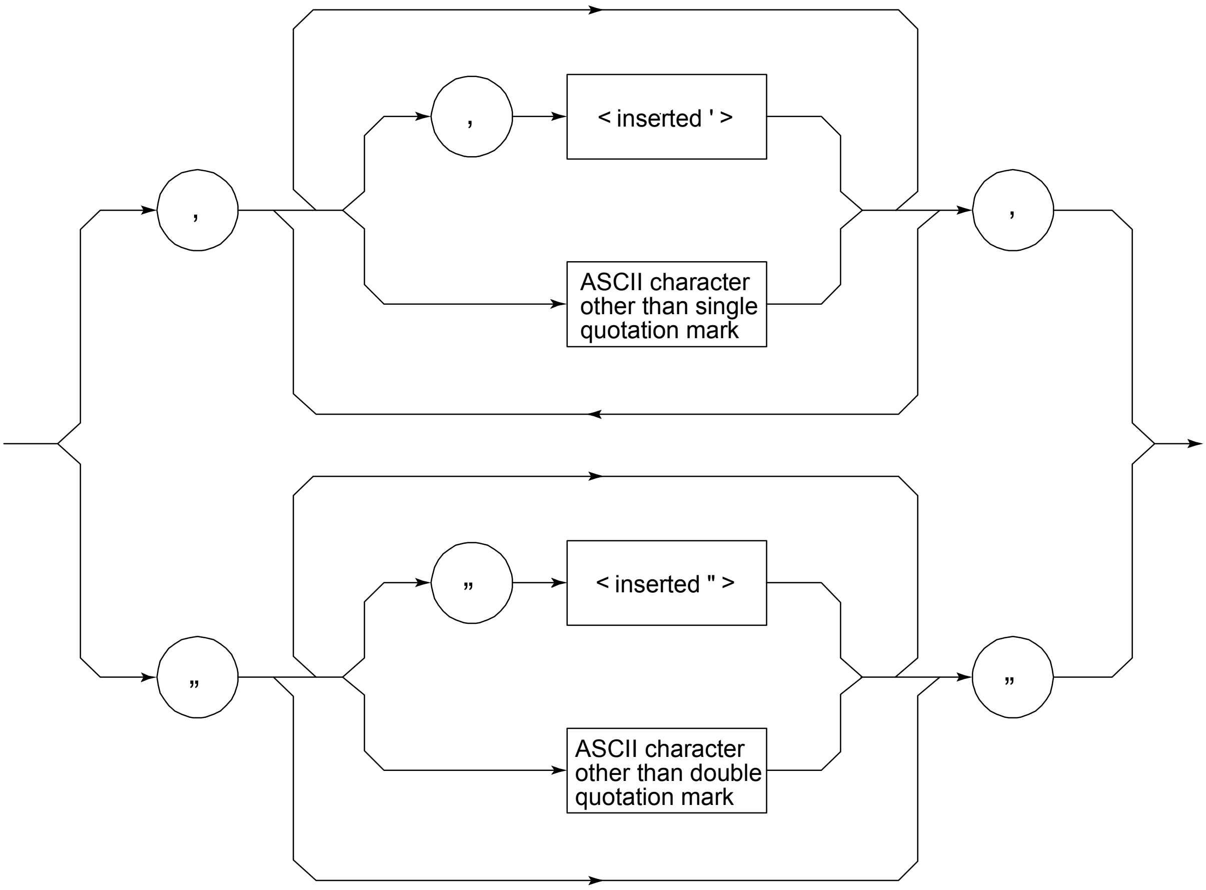
(7) SUFFIX PROGRAM DATA (unit)

The table below lists the suffixes used for MS860x/MS268x.

Table of Suffix Codes

Classification	Unit	Suffix code
Frequency	GHz	GHZ, GZ
	MHz	MHZ, MZ
	KHz	KHZ, KZ
	Hz	HZ
	Default	HZ
Time	second	S
	m second	MS
	μ second	US
	Default	MS
Level (dB system)	dB	DB
	dBm	DBM, DM
	dBμV	DBUV
	dBmV	DBMV
	dBμV (emf)	DBUVE
	dBμV/m	DBUVM
	Default	Determined in conformance with the set scale unit
Level (V system)	V	V
	mV	MV
	μV	UV
	Default	UV
Level (W system)	W	W
	mW	MW
	μW	UW
	nW	NW
	pW	PW
	fW	FW
	Default	UW

(8) STRING PROGRAM DATA



- String program data must be enclosed with single quotation marks ('...').

```
WRITE #1:"TITLE'MS8608A'"
```

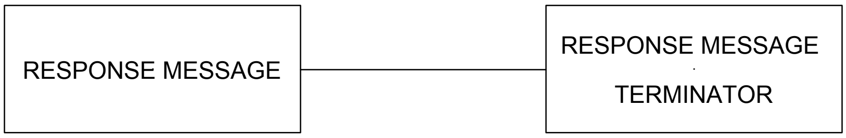
A single quotation mark used within a character string must be enclosed with double quotation marks.

```
WRITE #1;"TITLE'MS8608A''NOISE MEAS'''"
```

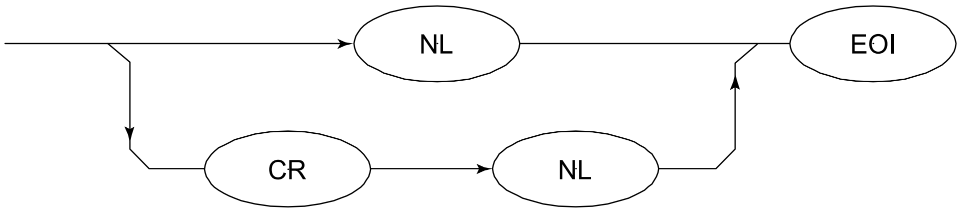
MS8608A 'NOISE MEAS' is set as the title.

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.

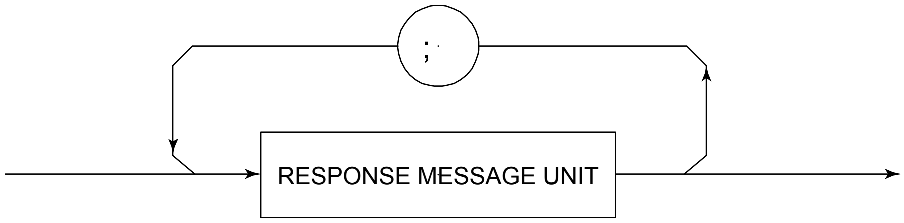


(1) RESPONSE MESSAGE TERMINATOR



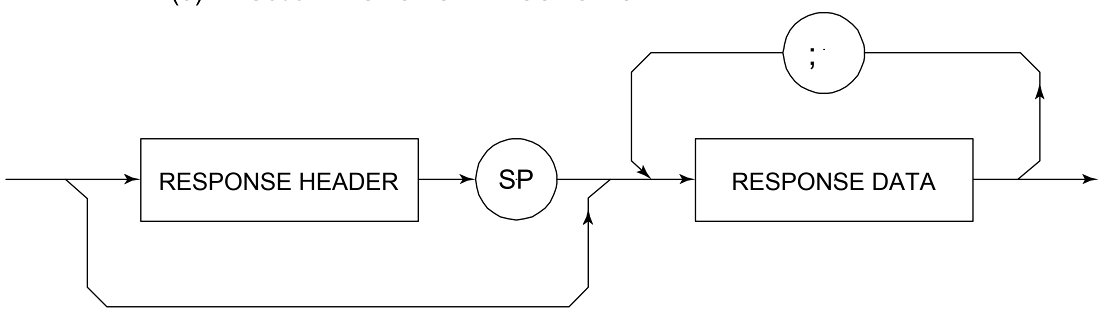
The response message terminator to be used depends on the TRM command specification.

(2) RESPONSE MESSAGE

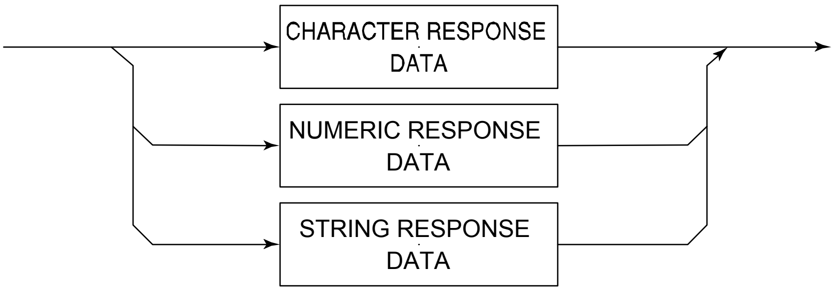


When a query is sent by the WRITE statement with one or more program queries, the response message also consists of one or more response message units.

(3) Usual RESPONSE MESSAGE UNIT



(4) RESPONSE DATA

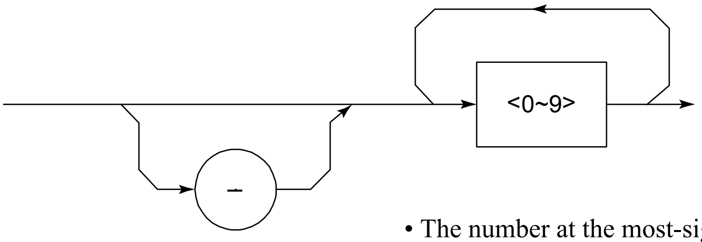


(5) CHARACTER RESPONSE DATA

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) >

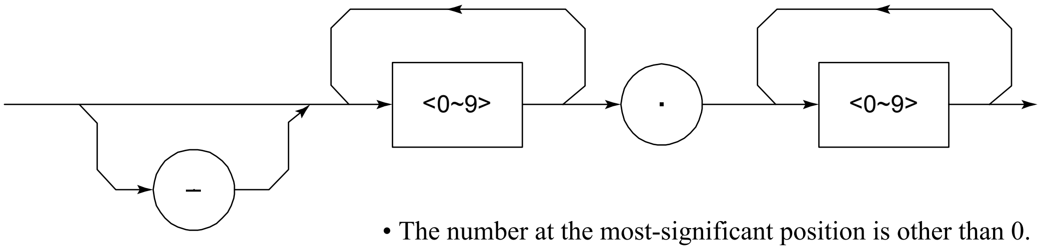


< Example >

```
123
-1234
```

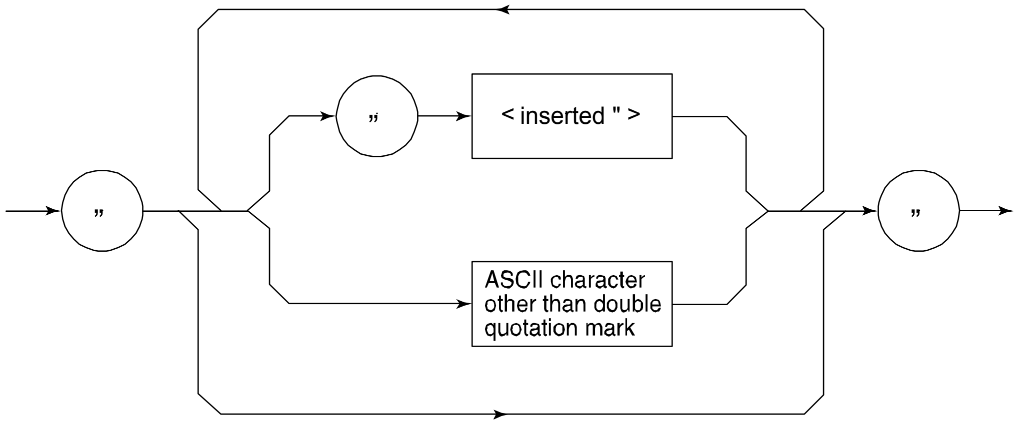
- The number at the most-significant position is other than 0.
- A + sign need not be placed before a positive number.

< 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



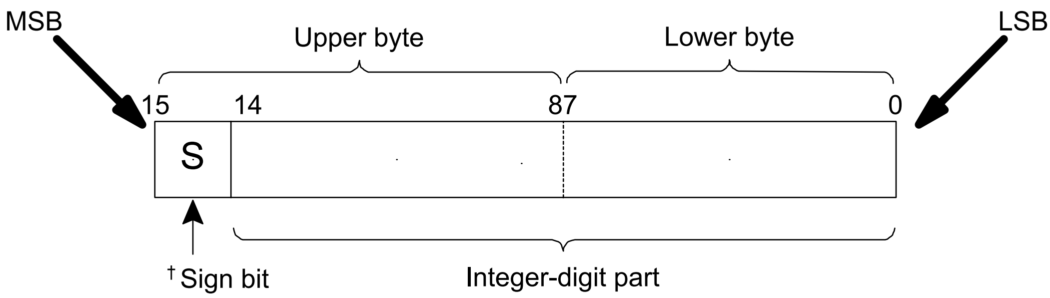
String response data is transmitted as an ASCII character enclosed with double quotation marks.

(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
1000000000000001	-32767	32769
1000000000000010	-32766	32770
1111111111111101	-3	65533
1111111111111110	-2	65534
1111111111111111	-1	65535
0000000000000000	0	0
0000000000000001	1	1
0000000000000010	2	2
0000000000000011	3	3
0111111111111101	32765	32765
0111111111111110	32766	32766
0111111111111111	32767	32767

Sign bit: Bit 15(MSB) is used.
Integer-digit part: Bits 0 to 14 are used.
So, 16 bits(two bytes) are used.

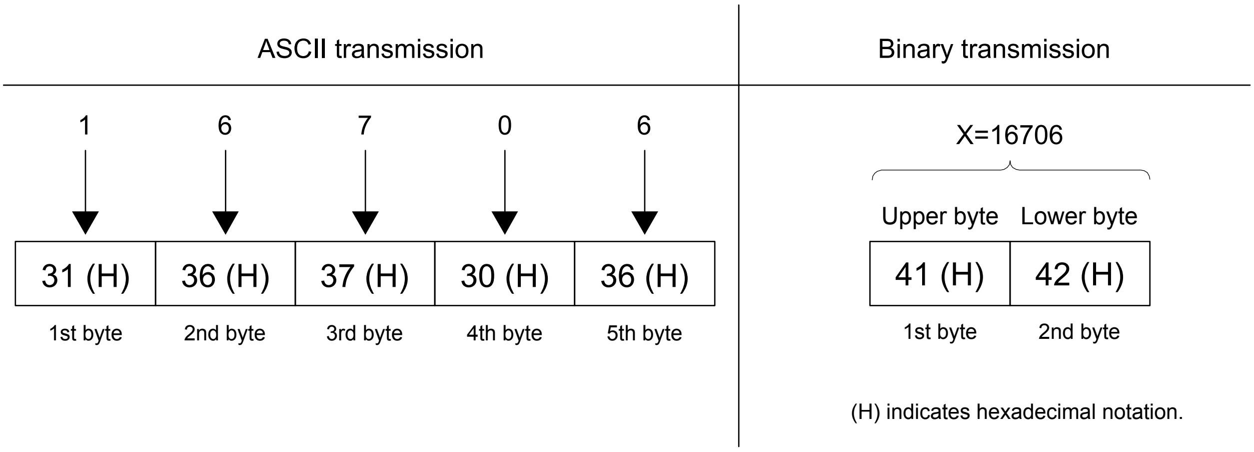


Internal Representation of 2-byte Bynary Data

† When a negative number is stored in a numeric variable, the sign bit 1 is set in the MSB to indicate the negative value. The value is stored in a numeric variable in a 2's complement format.

For example, to transmit an integer of 16706, the ASCII format is compared with the Binary format, below.

The ASCII format requires 5 bytes. Whereas, the Binary format requires only 2 bytes, and does not need the data format transformation. So, The Binary format is used for a high-speed transmission.



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

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) X 2 bytes + termination code.

Where, termination code is specified by the TRM command, and is LF(0D(H): 1 byte) or CR+LF(0A0D(H): 2 bytes).

Section 4 Status Structure

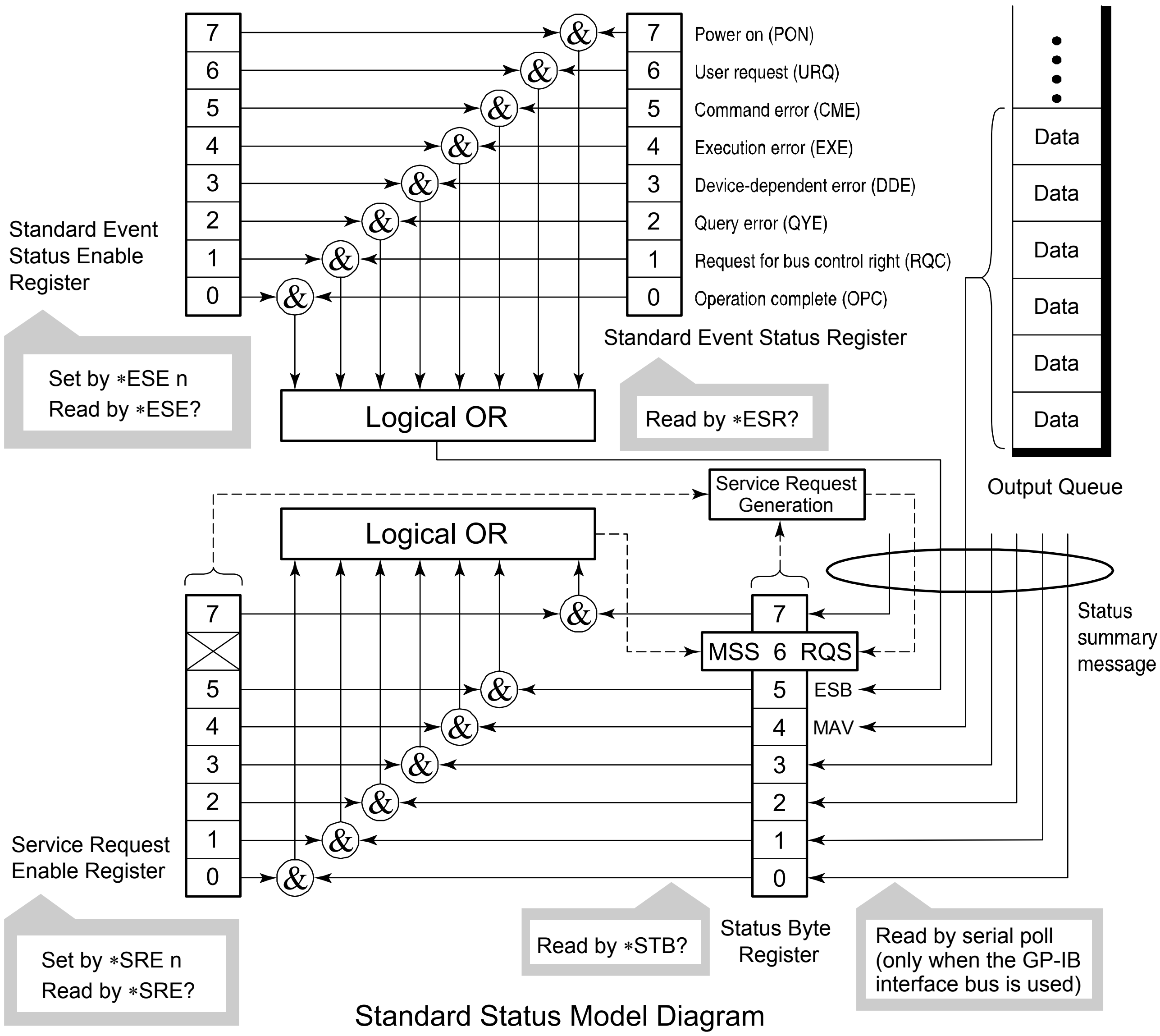
This section describes the device-status reporting and its data structure defined by the IEEE488.2 when the GPIB interface bus is used. This section also describes the synchronization techniques between a controller and device.

These functions are used to control a device from an external controller using the GPIB interface bus. Most of these functions can also be used to control a device from an external controller using the RS-232C or Ethernet interface.

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

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 register and queue models.

Register model	Queue model
The register model consists of two registers used for recording events and conditions encountered by a device. These two registers are the Event Status Register and Event Status Enable Register. When the results of the AND operation of both register contents are other than 0, the corresponding bit of the status bit becomes 1. In other cases, the corresponding bit becomes 0. When the result of their Logical OR is 1, the summary message bit also becomes 1. If the Logical OR result is 0, the summary message bit also becomes 0.	The queue in the queue model is used to sequentially record the waiting status values or information. If the queue is not empty, the queue structure summary message becomes 1. If the queue is empty, the message becomes 0.

In IEEE488.2, there are three standard models for the status data structure. Two are register models and one is a queue model based on the register model and queue model described above. The three standard models are:

[1] Standard Event Status Register and Standard Event Status Enable Register

[2] Status Byte Register and Service Request Enable Register

[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.

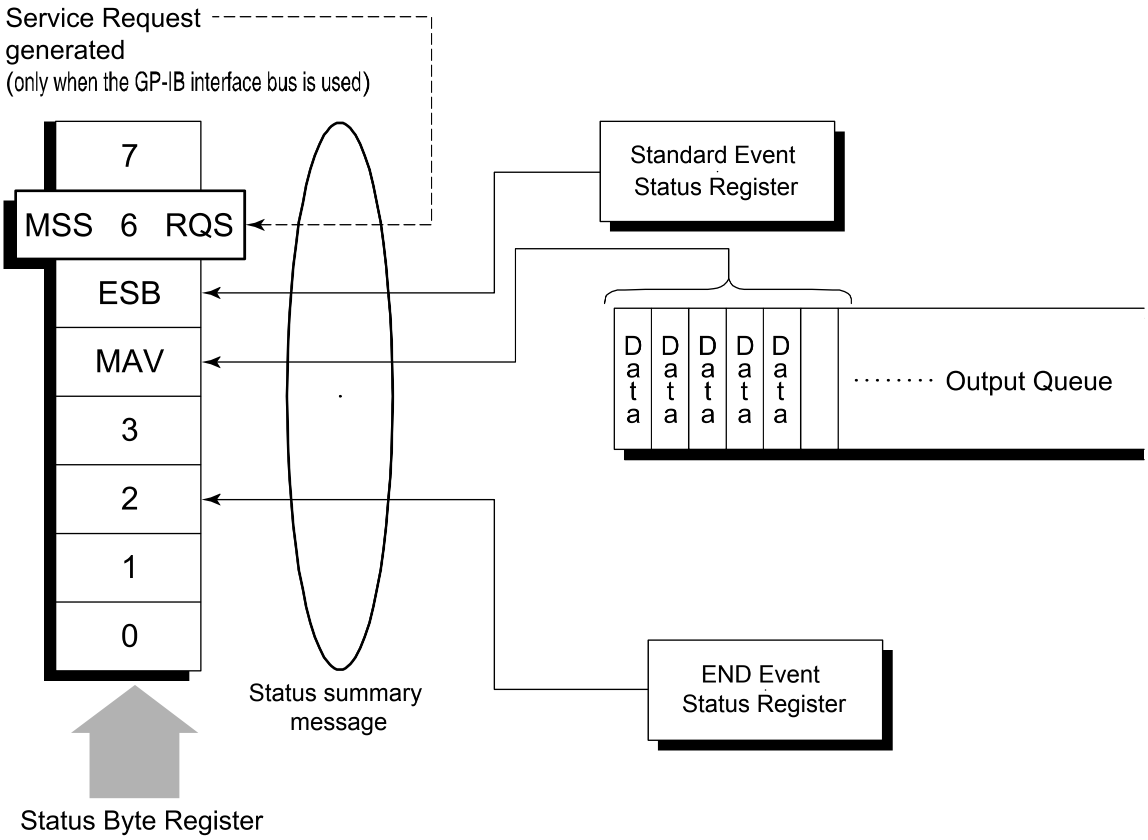
This bit becomes 0 when the ESR register is read by the ∗ESR? query or when it is cleared by the ∗CLS command.

(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 MS860x/MS268x unique 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 Status)

MSS indicates that there is at least one cause for a service request. The MSS message is represented at bit 6 response to an *STB? query, but it is not produced as a response to serial polling. It should not be taken as part of the status byte specified by IEEE488.1. MSS is configured by the overall logical OR in which the STB register and SRQ enable (SRE) register are combined.

(4) Clearing the STB register using the *CLS common command

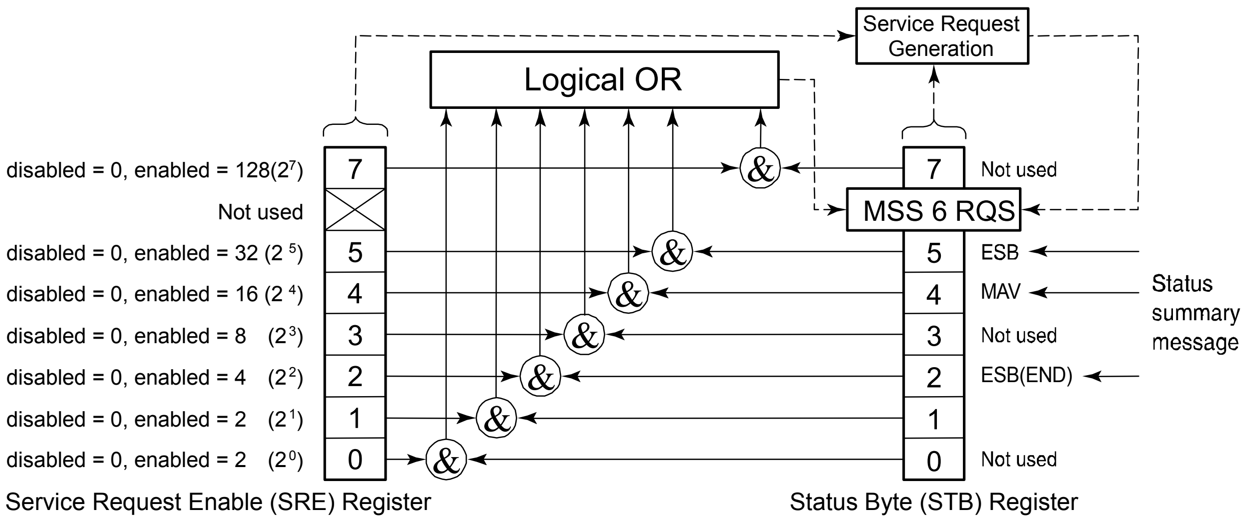
The *CLS common command clears all status data structures as well as the summary messages corresponding to them.

The *CLS command does not affect the settings in the Enable Register.

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.

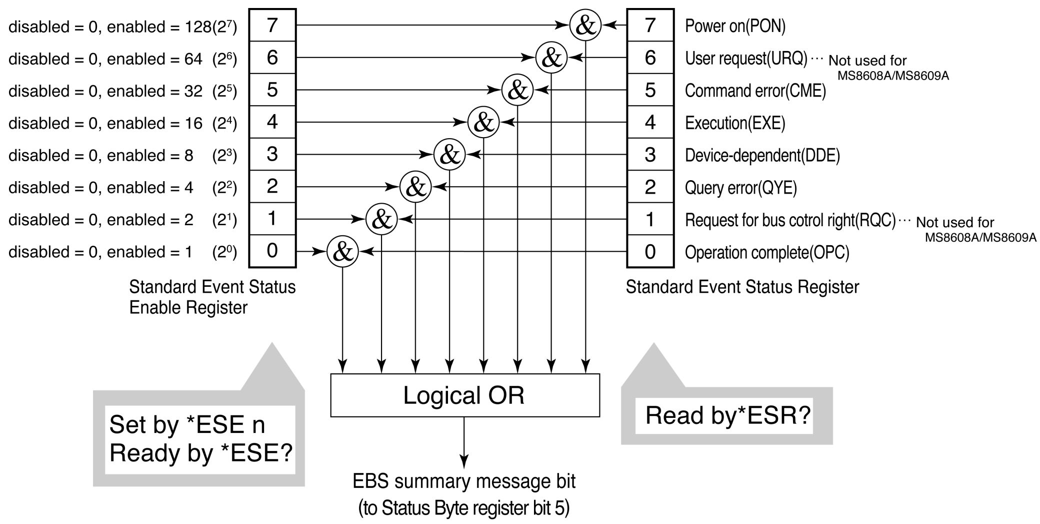
(2) Updating the SRE register

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

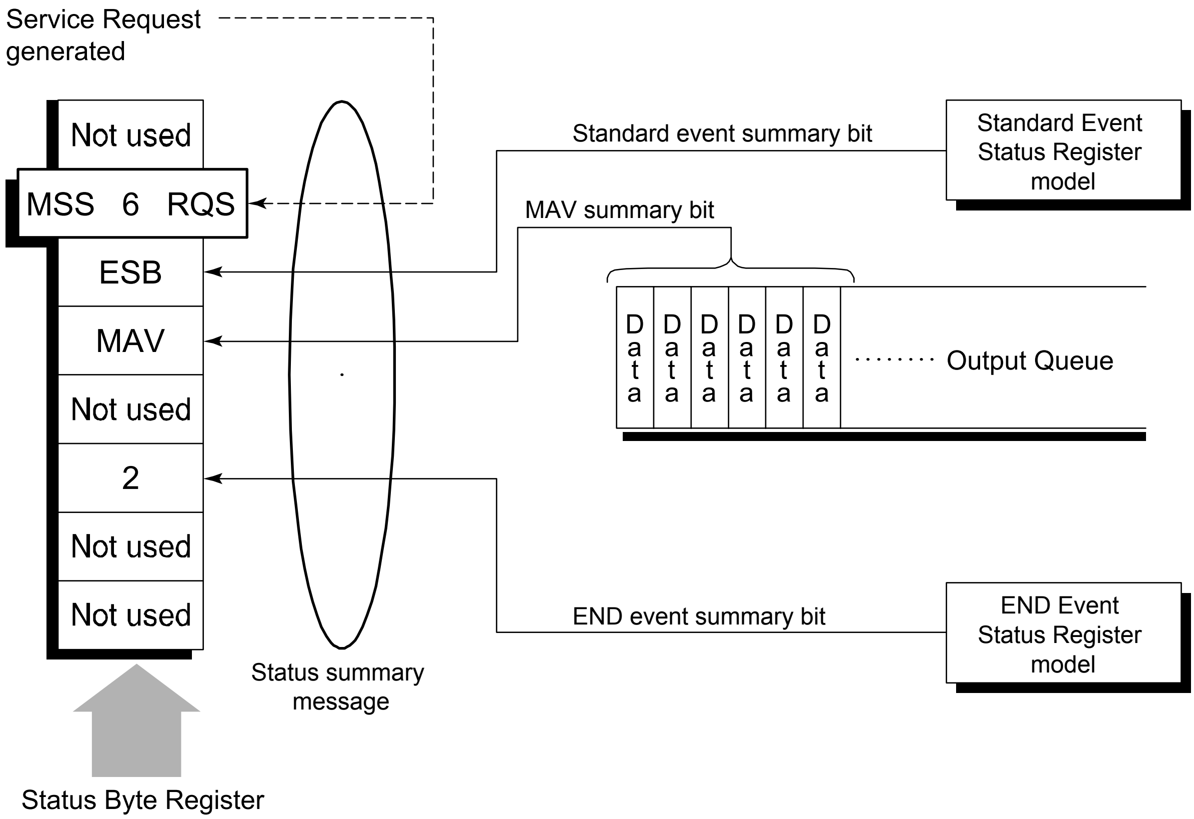
Reading	The register is read using the ∗ESR? command query. The register is cleared after being read. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	With the exception of clearing, data cannot be written to the register 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 registers is read using the ∗ESE? command. The response message is integer-format data with the binary weight added to the event bit and the sum converted to decimal.
Writing	The register is written using the ∗ESE common command.
Clearing	The register is cleared when: [1] An ∗EXE command with a data value of 0 is received [2] The power is turned on The Standard Event Enable Register is not affected when: [1] The device clear function status of IEEE488.1 is changed [2] An ∗RST common command is received [3] A ∗CLS common command is received

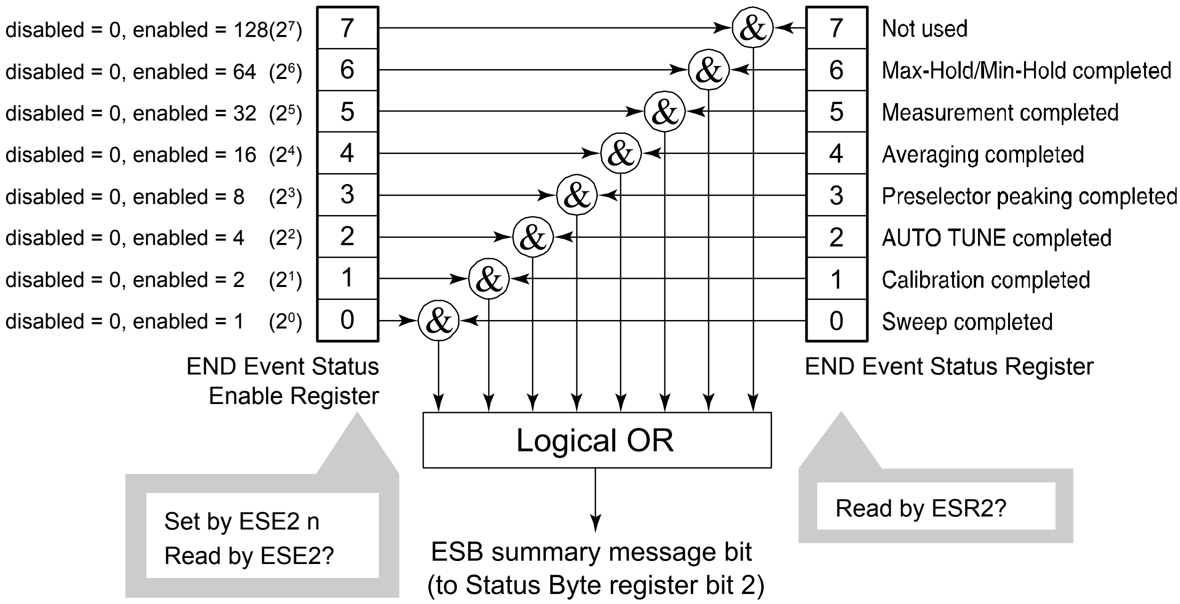
4.5 Extended Event Status Register

For MS860x/MS268x, 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 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 ESR2? 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 MS860x/MS268x with a Controller

MS860x/MS268x 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 MS860x/MS268x and the controller.

If the controller controls and synchronizes with one or more devices, after all the commands specified for MS860x/MS268x have been processed, the next commands must be sent to other devices.

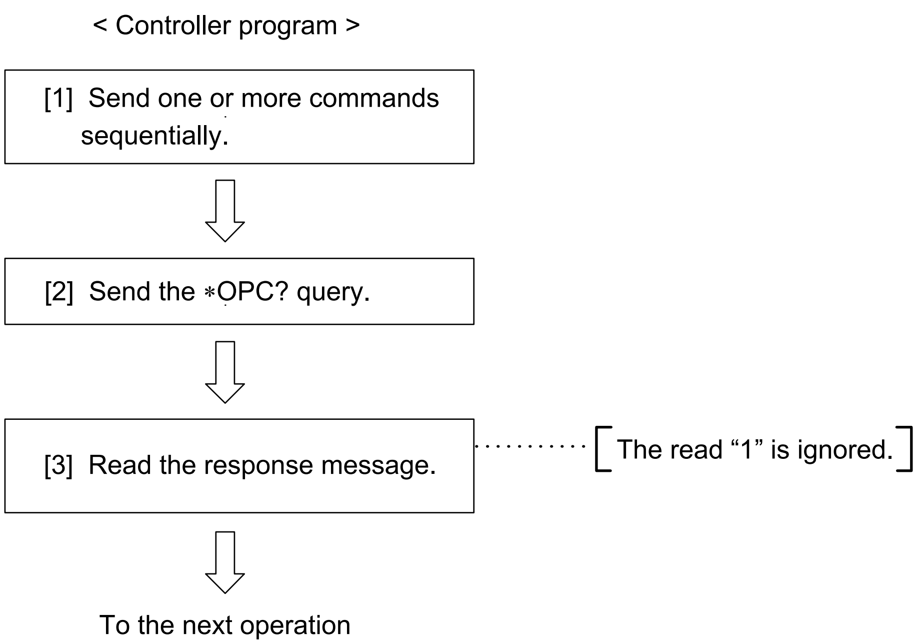
There are two ways of synchronizing MS860x/MS268x with the controller:

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

[2] Wait for SRQ after ∗OPC is sent.

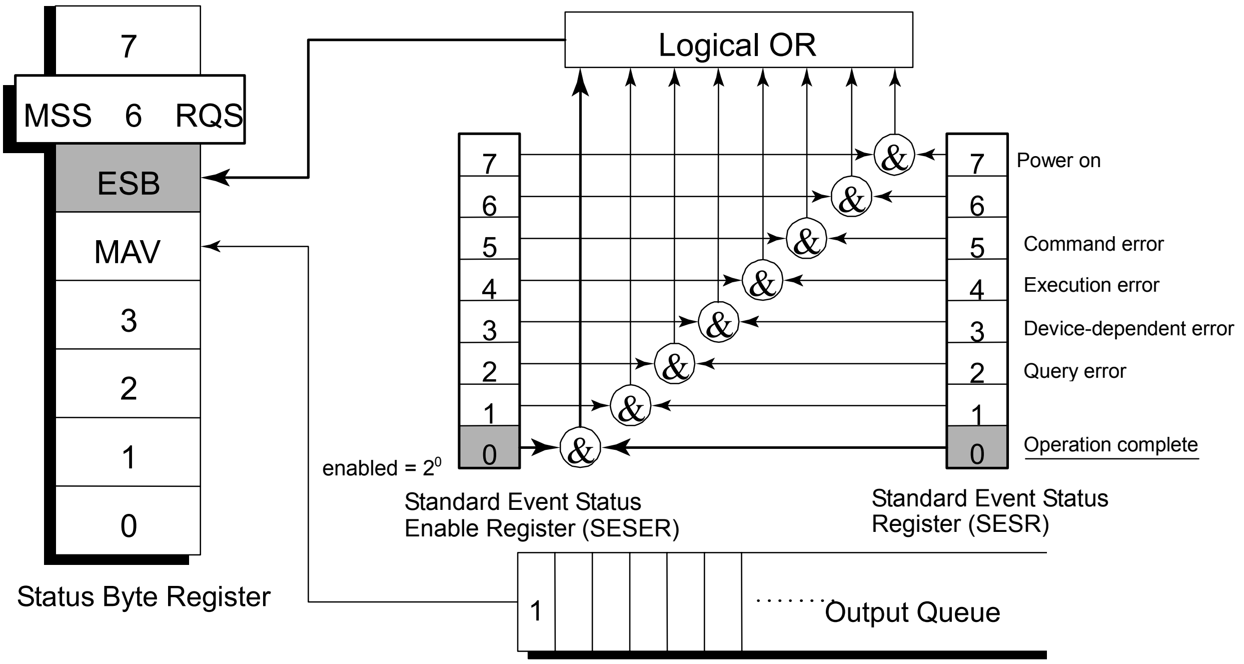
4.6.1 Wait for a response after the ∗OPC? query is sent

MS860x/MS268x outputs "1" as the response message when executing the *OPC? query command. The controller is synchronized with MS860x/MS268x by waiting for the response message to be entered.



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

The MS860x/MS268x 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 MS860x/MS268x initializes the GPIB interface system at three levels by the IEEE488.2 specifications. This section describes how these three levels of initialization are processed, and how to instruct initialization from the controller.

The IEEE488.2 standard has three levels of initialization. The first level is "bus initialization," the second level is "initialization for message exchange," and the third level is "device initialization." This standard also stipulates that a device must be set to a known state when the power is turned on.

Level	Initialization type	Description	Level combination and sequence
1	Bus initialization	The IFC message from the controller initializes all interface functions connected to the bus.	Level 1 can be combined with other levels, but must be executed before level 2.
2	Initialization for message exchange	Message exchanges of all devices and specified devices on the GP-IB are initialized using the SDC and DCL GP-IB bus commands, respectively. These commands also nullify the function that reports operation completion to the controller.	Level 2 can be combined with other levels, but must be executed before level 3.
3	Device initialization	The *RST or INI/IP command returns a specified device to a known device-specific state, regardless of the conditions under which was being used.	Level 3 can be combined with other levels, but must be executed after levels 1 and 2.

When using the RS-232C (standard)/Ethernet (Option) interface port to control the MS860x/MS268x from the controller, the level-3 device initialization function can be used but the level-2 initialization function. When using the GPIB (Standard) interface bus to control the MS860x/MS268x from the controller, all the initialization functions can be used.

The following paragraph describes the commands for initialization at levels 1, 2, and 3 and the items that are initialized. This paragraph also describes the known state which is set when the power is turned on.

5.1 Bus Initialization Using the IFC Statement

Combinations of transmitter testers and 1xEV-DO software and product configurations are given below.

■ Example

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

■ Explanation

This function is available when using the GPIB interface bus 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 clears the interface function states of devices set by the controller to their initial states. In the table below, the circles indicate the functions which are initialized, and the triangle indicates the function which is partially initialized.

No	Function	Symbol	Initialization by IFC
1	Source handshake	SH	○
2	Acceptor handshake	AH	○
3	Talker or extended talker	T or TE	○
4	Listener or extended listener	L or LT	○
5	Service request	SR	△
6	Remote/local	RL	
7	Parallel poll	PP	
8	Device clear	DC	
9	Device trigger	DT	
10	Controller	C	○

Bus initialization by the IFC statement does not affect the device operating state (frequency settings, LED on/off, etc.).

5.2 Initialization for Message Exchange by DCL and SDC Bus Commands

■ Example

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

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

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

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

■ Explanation

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

CAUTION ⚠

The following are not affected even if the DCL and SDC commands are processed.

[1] Current data set or stored in the device
[2] Front panel settings
[3] Status of status byte other than MAV bit
[4] A device operation in progress

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 initialize a device at level 3.

The *RST (Reset) command is used to initialize 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.

5.4 Device Initialization Using the INI/IP Command

■ Syntax

```
INI
IP
```

■ Example

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 spectrum 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 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.

Section 6 Device Message List

This section describes the device message list of the MX860x04A/MX268x04A CDMA2000 1xEV-DO Measurement Software.

For the details of these messages, refer to Section 7 Command Details.

6.1 How to Read the Device Message List

The following pages show a list of commands (device messages) for each item on the 1xEV-DO Software measurement screen.

- Program message and Query message

(a) Upper-case letters: Reserved word

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

(c) Lower-case letters in argument

Argument	Meaning	Type	Unit/Suffix code
f	frequency	Real number with decimal point or integer	GHZ, MHZ, KHZ, HZ, GZ, MZ, KZ, None (HZ)
t	time	Real number with decimal point or integer	S, SC, MS, US, None (MS)
l	level	Real number with decimal point or integer	DB, DBM, DM, DBMV, DBUV, DBUVE, V, MV, UV, W, MW, UW, NW, None (Fixed unit)
n	Non-unit integer or unit-specified integer	Decimal integer	None or specified
o	Non-unit integer	Octal integer	None
h	Non-unit integer	Hexadecimal integer	None
r	Non-unit real number or unit-specified	Real number	None or specified

- Response message

(a) Upper-case letters: Reserved word

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

(c) Lower-case letters in argument

Argument	Meaning (Unit)	Type	Unit
f	frequency	Real number with decimal point or integer	Hz
t	time	Real number with decimal point or integer	ms
l	level	Real number with decimal point or integer	Fixed or specified
n	Non-unit integer or unit-specified integer	Decimal integer, number of digits can be changed. (Integers in effective digits are output.)	None or specified
o	Non-unit integer	Octal integer	None
h	Non-unit integer	Hexadecimal integer	None
r	Non-unit real number or unit-specified real number	Real number with decimal point, number of digits can be changed. (Real numbers in effective digits are output.)	None or specified
j	Value judgment	PASS (Unit specification) or FAIL (Out of specification)	None
u	Specified unit	DB, DBM, DM, DBMV, DBUV, DBUVE, V, MV, UV, W, MW, UW, NW	None

6.2 Commands Commonly Used on All Measurement Screens

This section lists the commands used on all the measurement screens.

For more information on external control commands commonly used in all the measurement modes for the MS860x/MS268x, refer to the "MS8608A/MS8609A Digital Mobile Radio Transmitter Tester Operation Manual Vol. 3 (Remote Control for Spectrum Analyzer Function)" or "MS268x Spectrum Analyzer Operation Manual Vol. 3 (Programming)".

Function	Item	Program Message	Query Message	Response Message	Remarks
Measurement mode change					
Spectrum		PNLMD SPECT	PNLMD?	SPECT	
Tx Tester		PNLMD SYSTEM		SYSTEM	
Config		PNLMD CONFIG		CONFIG	
Measurement system change					
System-1(F1)		SYS 1	SYS?	1	
System-2(F2)		SYS 2		2	
System-3(F3)		SYS 3		3	
Output data format					
Binary code		BIN ON	BIN?	ON	
		BIN 1	BIN?	ON	
ASCII character string		BIN OFF	BIN?	OFF	
		BIN 0	BIN?	OFF	
Preset					
Preset		PRE	---	---	
		INI			
		IP			
Switch Screen					
Setup Common Parameter		DSPL SETCOM	DSPL?	SETCOM	
Modulation Analysis		DSPL MODANAL		MODANAL	
RF Power		DSPL RFPWR		RFPWR	
Setup Template (RF Power)		DSPL SETTEMP_RFPWR		SETTEMP_RFPWR	
Occupied Bandwidth	Spectrum	DSPL OBW,SPECT		OBW,SPECT	• Valid when Terminal is set to RF
	FFT	DSPL OBW,FFT		OBW,FFT	

Function	Item	Program Message	Query Message	Response Message	Remarks
Spurious close to the Carrier	Normal	DSPL ACP		ACP,NRM	
		DSPL ACP,NRM			
	3GPP2 FWD Band Class0,2,3,5,9	DSPL ACP,PRECISE1		ACP,PRECISE1	• Valid when Terminal is set to RF
	3GPP2 FWD Band Class 1,4,6,8	DSPL ACP,PRECISE2		ACP,PRECISE2	
	3GPP2 FWD Band Class3+	DSPL ACP,PRECISE3		ACP,PRECISE3	
Setup Spurious Template (Spurious close to the Carrier)		DSPL SETTEMP_ACP		SETTEMP_ACP	
Spurious Emission	Spot	DSPL SPURIOUS,SPOT	DSPL?	SPURIOUS,SPOT	
	Search	DSPL SPURIOUS,SEARCH		SPURIOUS,SEARCH	• Valid when Terminal is set to RF
	Sweep	DSPL SPURIOUS,SWEEP		SPURIOUS,SWEEP	
Setup Spot Table (Spurious Emission)		DSPL SETTBL_SPU,SPOT		SETTBL_SPU,SPOT	
Setup Search/Sweep Table (Spurious Emission)		DSPL SETTBL_SPU, SWEEP		SETTBL_SPU, SWEEP	
IQ Level		DSPL IQLVL		IQLVL	• Valid when Terminal is set to other than RF *1
CCDF	CCDF	DSPL CCDF,CCDF		CCDF,CCDF	
	APD	DSPL CCDF,APD		CCDF,APD	
Power Meter		DSPL PWRMTR		PWRMTR	• Valid when Terminal is set to RF *2
Back Screen		BS	---	---	
Start Measure					
Sweep/ Measure	Single, No Sync	SNGLS	---	---	
		S2			
	Single, Sync	SWP			
		TS			
	Continous, No Sync	CONTS			
		S1			

*1: Valid when option MS268x-17 or 18 is installed for MS268x. *2:Available only MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Sweep/ Measure status	Status of result	---	MSTAT?	0	Normal
				1	RF Level Limit
				2	Level Over
				3	Level Under
				4	Signal Abnormal
				5	No Synchronization
				6	Trigger Timeout
				9	No Measure
	During Measurement/ sweep	---	SWP?	SWP 1	
	Measurement/ Sweep End			SWP 0	

Function	Item		Program Message	Query Message	Response Message	Remarks
Switch Screen and Measure Start	Setup Common Parameter		MEAS SETCOM	MEAS?	SETCOM	
	Modulation Analysis		MEAS MODANAL		MODANAL	
	RF Power		MEAS RFPWR		RFPWR	
	Setup Template (RF Power)		MEAS SETTEMP_RFPWR		SETTEMP_RFPWR	
	Occupied Bandwidth	Spectrum	MEAS OBW,SPECT		OBW,SPECT	• Valid when Terminal is set to RF
		FFT	MEAS OBW,FFT		OBW,FFT	
	Spurious close to the Carrier	Normal	MEAS ACP		ACP,NRM	• Valid when Terminal is set to RF
			MEAS ACP,NRM			
		3GPP2 FWD Band Class 0,2,3,5,9	MEAS ACP,PRECISE1		ACP,PRECISE1	
		3GPP2 FWD Band Class 1,4,6,8	MEAS ACP,PRECISE2		ACP,PRECISE2	
		3GPP2 FWD Band Class 3+	MEAS ACP,PRECISE3		ACP,PRECISE3	
	Setup Spurious Template (Spurious close to the Carrier)		MEAS SETTEMP_ACP		SETTEMP_ACP	
	Spurious Emission	Spot	MEAS SPURIOUS,SPOT		SPURIOUS,SPOT	
		Search	MEAS SPURIOUS,SEARCH		SPURIOUS,SEARCH	
		Sweep	MEAS SPURIOUS,SWEEP		SPURIOUS,SWEEP	
	Setup Spot Table (Spurious Emission)		MEAS SETTBL_SPU,SPOT		SETTBL_SPU,SPOT	
	Setup Search/ Sweep Table (Spurious Emission)		MEAS SETTBL_SPU, SWEEP		SETTBL_SPU, SWEEP	
	IQ Level		MEAS IQLVL		IQLVL	• Valid when Terminal is set to othet than RF *1

Function	Item		Program Message	Query Message	Response Message	Remarks
Switch Screen and Measure Start	CCDF	CCDF	MEAS CCDF, CCDF		CCDF,CCDF	
		APD	MEAS CCDF,APD		CCDF,APD	
	Power Meter		MEAS PWRMTR		PWRMTR	• Valid when Terminal is set to RF *2
Switch RF Input Connector						
RF Input	High		RFINPUT HIGH	RFINPUT?	HIGH	• Valid only MS8608A
	Low		RFINPUT LOW		LOW	
Pre Ampl (option)						
Pre Ampl	On		PREAMP ON	PREAMP?	ON	*3
	Off		PREAMP OFF		OFF	
Correction						
Correction	Off		CORR 0	CORR?	0	
	Table1		CORR 1		1	
	Table2		CORR 2		2	
	Table3		CORR 3		3	
	Table4		CORR 4		4	
	Table5		CORR 5		5	

*1:Valid only when option MS268x-17 or 18 is installed for MS268x. *2:Valid only MS860x.
*3:Valid only when option MS860x-08/MS2681A-08/MS2683A-08 is installed.

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	50Ω	IQINZ 50	IQINZ?	50	• Can be set when Terminal is set to other than RF
	1MΩ	IQINZ 1M		1M	
Reference Level		RFLVL l	RFLVL?	l	• Can be set when Terminal is set to RF
Offset		RFLVLOFS l	RFLVLOFS?	l	• Can be set when Terminal is set to RF
Frequency					
Channel		CHAN n	CHAN?	n	• Can be set when Terminal is set to RF
Frequency		FREQ f	FREQ?	f	• Can be set when Terminal is set to RF
Channel & Frequency		CHFREQ n,f	---	---	• Can be set when Terminal is set to RF
Channel Spacing		CHSPC f	CHSPC?	f	• Can be set when Terminal is set to RF
Signal					
Filter	No Filter	FILTER OFF	FILTER?	OFF	
	Filtering	FILTER ON		ON	
	Filter +EQ	FILTER EQ		EQ	
Measuring Object	Forward Link Rev.0	MEASOBJ FORWARD MEASOBJ FORWARD_REV0	MEASOBJ?	FORWARD_REV0	
	Forward Link Rev.A	MEASOBJ FORWARD_REVA		FORWARD_REVA	
	Reverse Link Rev.0	MEASOBJ REVERSE		REVERSE	
	QPSK	MEASOBJ QPSK		QPSK	
Slot Type	Active	SLOTTYPE ACTIVE	SLOTTYPE?	ACTIVE	• Can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
	Idle	SLOTTYPE IDLE		IDLE	

Function	Item	Program Message	Query Message	Response Message	Remarks
Modulation Type	Auto	MODTYPE AUTO	MODTYPE?	AUTO	• Can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active
	QPSK	MODTYPE QPSK		QPSK	
	8PSK	MODTYPE 8PSK		8PSK	
	16QAM	MODTYPE 16QAM		16QAM	
Preamble Length	Auto	PREAMBLELEN AUTO	PREAMBLELEN?	AUTO	• Can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active
	0PNchip	PREAMBLELEN 0		0	
	64PNchip	PREAMBLELEN 64		64	
	128PNchip	PREAMBLELEN 128		128	
	256PNchip	PREAMBLELEN 256		256	
	512PNchip	PREAMBLELEN 512		512	
	1024PNchip	PREAMBLELEN 1024		1024	
Synchronization					
Offset Index (PN Offset)		PNOFFSET n	PNOFFSET?	n	n: 0 to 511 • Can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
Long Code Mask	MI	IMASK h	IMASK?	h	h: 00000000000 to 3ffffffffff • Can be set when Measuring Object is set to Reverse Link Rev.0
	MQ	QMASK h	QMASK?	h	h: 00000000000 to 3ffffffffff • Can be set when Measuring Object is set to Reverse Link Rev.0 (Note) When MI setting is changed, that for MQ is always calculated and set again.

Function	Item	Program Message	Query Message	Response Message	Remarks
Trigger					
Trigger	Free Run	TRG FREE	TRG?	FREE	
	External	TRG EXT		EXT	
Trigger Edge	Rise	TRGEDGE RISE	TRGEDGE?	RISE	• Can be set only when Trigger is set to External
	Fall	TRGEDGE FALL		FALL	
Trigger Delay		TRGDLY r	TRGDLY?	r	r: –16384.0 to 16384.0 PNchip • Can be set only when Trigger is set to External
PN Synchronization	PN Search	PNSYNC SEARCH	PNSYNC?	SEARCH	• Can be set when Trigger is set to External while Measuring Objuct is set to other than QPSK
	Ext Trigger	PNSYNC EXTTRG		EXTTRG	

6.4 Modulation Analysis

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Trace Format	Non	TRFORM NON	TRFORM?	NON	•Code Domain of MAC can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A •Code Domain of Data can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active •Code Domain can be set when Measuring Object is set to Reverse Link Rev.0
	Constellation	TRFORM CONSTEL		CONSTEL	
	Eye Diagram	TRFORM EYE		EYE	
	EVM	TRFORM VECT		VECT	
	Phase Error	TRFORM PHASE		PHASE	
	Magnitude Error	TRFORM MAGTD		MAGTD	
	Code Domain of Data	TRFORM CODEOFDATA		CODEOFDATA	
	Code Domain of MAC	TRFORM CODEOFMAC		CODEOFMAC	
	Code Domain	TRFORM CODE		CODE	
Operation Trace	I	OPRTTR I	OPRTTR?	I	•Can be set when Trace Format is set to Code Domain of Data, Code Domain of MAC or Code Domain
	Q	OPRTTR Q		Q	
Analysis Start		ANLYSTA_MOD n	ANLYSTA_MOD?	n	•When Measuring Object is set to other than QPSK n: 0 to 15 Slot •Cannot be set when Measuring Object is set to QPSK
Analysis Length		ANLYLEN_MOD n	ANLYLEN_MOD?	n	•When Measuring Object is set to other than QPSK n: 1 to 16 Slot •When Measuring Object is set to QPSK n: 384 to 2048PNchip

Function	Item	Program Message	Query Message	Response Message	Remarks
Trace Slot	Overall	TRSLOT OVERALL	TRSLOT?	OVERALL	• Can be set when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Trace Format is set to other than Code Domain of Data or Code Domain of MAC • WhenSlot Type is set to Active, the following parameters are available: Overall, Pilot, MAC, Data, Symbol However, Symbol is available only when Trace Format is set to Constellation. • WhenSlot Type is set to Idle, the following parameters are available: Overall, Pilot, MAC
	Pilot	TRSLOT PILOT		PILOT	
	MAC	TRSLOT MAC		MAC	
	Data	TRSLOT DATA		DATA	
	Symbol	TRSLOT SYMBOL		SYMBOL	
Code Order	Walsh	CODEORDER_CDP WALSH	CODEORDER_CDP?	WALSH	• Walsh or MAC Index can be set when Trace Format is set to Code Domain of MAC • Walsh or OVSF Index can be set when Trace Format is set to Code Domain
	MAC Index	CODEORDER_CDP MACIDX		MACIDX	
	OVSF	CODEORDER_CDP OVSF		OVSF	
Channel Type	Traffic	CHANTYPE_MOD TRAFFIC	CHANTYPE_MOD?	TRAFFIC	• Can be set only when Measuring Object is set to Reverse Link Rev.0
	Access	CHANTYPE_MOD ACCESS		ACCESS	
Interpolation	Non	INTPOL NON	INTPOL?	NON	• Can be set only when Trace Format is set to Constellation
	Linear	INTPOL LIN		LIN	
	Linear & Symbol Position	INTPOL LINSYM		LINSYM	
Error Scale	5%	ERRSC 5	ERRSC?	5	• Can be set only when Trace Format is set to Constellation while Trace Slot is set to Symbol and Modulation Type is set to other than Auto
	10%	ERRSC 10		10	
	20%	ERRSC 20		20	
	Off	ERRSC OFF		OFF	

Function	Item	Program Message	Query Message	Response Message	Remarks
Vertical Scale (EVM or Phase Error or Magnitude Error)	5% or 5 deg	VSCALE 5	VSCALE?	5	• Can be set when Trace Format is set to EVM, Phase Error or Magnitude Error
	10% or 10 deg	VSCALE 10		10	
	20% or 20 deg	VSCALE 20		20	
	50% or 50 deg	VSCALE 50		50	
	100% or 100 deg	VSCALE 100		100	
Vertical Scale (Code Domain of MAC or Code Domain)	20 dB	VSCALE_CDP 20	VSCALE_CDP?	20	• Can be set when Trace Format is set to Code Domain of MAC or Code Domain
	40 dB	VSCALE_CDP 40		40	
	60 dB	VSCALE_CDP 60		60	
	80 dB	VSCALE_CDP 80		80	
Vertical Scale (Code Domain of Data)	1 dB	VSCALE_CDPDAT 1	VSCALE_CDPDAT?	1	• Can be set when Trace Format is set to Code Domain of Data • When 1dB, 5 dB or 10 dB is set, the specified range is displayed by setting –12.0 dB as the center.
	5 dB	VSCALE_CDPDAT 5		5	
	10 dB	VSCALE_CDPDAT 10		10	
	20 dB	VSCALE_CDPDAT 20		20	
	80 dB	VSCALE_CDPDAT 80		80	
Square Scale	1	SSCALE 1	SSCALE?	1	• Can be set when Trace Format is set to Eye Diagram, Constellation (Note) when Modulation Type is set to 16QAM while Trace Slot is set to Symbol, display does not change.
	2	SSCALE 2		2	
	5	SSCALE 5		5	
	10	SSCALE 10		10	
Threshold		THRESH_MOD l	THRESH_MOD?	l	l: –50.0 to –10.0 dB • Cannot be set when Measuring Object is set to QPSK
Storage Mode	Normal	STRG_MOD NRM	STRG_MOD?	NRM	
	Average	STRG_MOD AVG		AVG	
	Overwrite	STRG_MOD OVER		OVER	
Average Count		AVR_MOD n	AVR_MOD?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_MOD EVERY	INTVAL_MOD?	EVERY	
	Once	INTVAL_MOD ONCE		ONCE	

Function	Item	Program Message	Query Message	Response Message	Remarks
Marker Mode	Normal	MKR_MOD NRM	MKR_MOD?	NRM	
	Off	MKR_MOD OFF		OFF	
Marker Position	Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error	MKP_MOD n	MKP_MOD?	n	• Can be set when Trace Format is set to Constellation • When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A • When Trace Slot is set to Overall n= 0 to (2048 * Analysis Length –1)PNchip • WhenTrace Slot is set to Pilot n= 0 to (192 * Analysis Length –1) PNchip • WhenTrace Slot is set to MAC n= 0 to (256 * Analysis Length –1)PNchip • WhenTrace Slot is set to Data n= 0 to (1600 * Analysis Length –1)PNchip • WhenTrace Slot is set to Symbol n= 0 to 1599PNchip • When Measuring Object is set to Reverse Link Rev.0 n= 0 to (2048 * Analysis Length –1) • When Measuring Object is set to QPSK n= 0 to (Analysis Length –1)PNchip • When Trace Format is set to Eye Diagram • When Measuring Object is set to other than QPSK n= 0 to 2047.75PNchip • When Measuring Object is set to QPSK n= 0 to (Analysis Length –0.25)PNchip • When Trace Format is set to EVM, Phase Error or Maginitude Error • When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A • When Trace Slot is set to Overall n= 0 to (2048 * Analysis Length –1)PNchip • When Trace Slot is set to Pilot n= 0 to (192* Analysis Length –1) PNchip • When Trace Slot is set to MAC n= 0 to (256 * Analysis Length –1)PNchip • When Trace Slot is set to Data n= 0 to (1600 * Analysis Length –1)PNchip • When Measuring Object is set to Reverse Link Rev.0 n= 0 to (2048 * Analysis Length –1) • When Measuring Object is set to QPSK n= 0 to (Analysis Length –1)PNchip

Function	Item	Program Message	Query Message	Response Message	Remarks
Marker Position	Code Domain of Data, Code Domain of MAC, Code Domain	MKP_CDP n,p	MKP_CDP? p	n	• When Trace Format is set to Code Domain of Data n= 0 to 15 • When Trace Format is set to Code Domain of MAC and Measuring Object is Forward Link Rev.0 n= 0 to 63 • When Trace Format is set to Code Domain of MAC and Measuring Object is Forward Link Rev.A n= 0 to 127 • When Trace Format is set to Code Domain n= 0 to 15 (when Code Order is set to Walsh) n= 0 to Max Marker Position (wheh Code Order is set to OVSF) p= I or Q (optional) (Operation Trace setting applys when omitted)
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB *1
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n: mode (0: not calibrated, 1: internal calibration, 2: external writing l: –10.00 to 10.00 dB
Results					
Tx Power	dBm	---	TXPWR? DBM	l	
	Watt		TXPWR? WATT		
Carrier Frequency		---	CARRF?	f	
Carrier Frequency Error	Hz	---	CARRFERR?	f	
		---	CARRFERR? HZ	f	
	ppm	---	CARRFERR? PPM	r	unit: ppm

*1:Valid only MS860x.

<table>
<tr><th>Function</th><th colspan="2">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td rowspan="9">Waveform Quality Factor</td><td colspan="2">Overall-1</td><td rowspan="2">---</td><td>WAVQUAL? OVERALL1</td><td rowspan="5">r</td><td rowspan="2">• When Measuring Object=Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active</td></tr>
<tr><td colspan="2">Overall-2</td><td>WAVQUAL? OVERALL2</td></tr>
<tr><td colspan="2" rowspan="2">Pilot</td><td rowspan="2">---</td><td>WAVQUAL? PILOT</td><td rowspan="2">• When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>WAVQUAL?</td></tr>
<tr><td colspan="2">Overall</td><td>---</td><td>WAVQUAL?</td><td>• When Measuring Object is set to other than Forward Link Rev.0</td></tr>
<tr><td colspan="2">MAC</td><td>---</td><td>WAVQUAL? MAC</td><td>r(MAC)</td><td>• When Measuring Object is set to Forward Link Rev.A</td></tr>
<tr><td colspan="2">data</td><td>---</td><td>WAVQUAL? DATA</td><td>r(data)</td><td>• When Measuring Object is set to Forward Link Rev.A while Slot Type is set to Active</td></tr>
<tr><td colspan="2" rowspan="2">All Result</td><td rowspan="2">---</td><td rowspan="2">WAVQUAL? ALL</td><td>r(pilot), r(overall1), r(overall2)</td><td>• When Measuring Object is set to Forward Link Rev.0 while Slot Type is set to Active</td></tr>
<tr><td>r(pilot), r(MAC), r(data)</td><td>• When Measuring Object is set to Forward Link Rev.A while Slot Type is set to Active</td></tr>
<tr><td colspan="3">Timing Error</td><td>---</td><td>TAU?</td><td>n,t</td><td>n:unit: 64PNchip
t:unit: µsec</td></tr>
<tr><td rowspan="7">RMS EVM</td><td rowspan="6">Trace Slot</td><td>Overall</td><td rowspan="6">---</td><td>VECTERR? OVERALL</td><td rowspan="6">r</td><td rowspan="6">unit: %
• When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>Pilot</td><td>VECTERR? PILOT</td></tr>
<tr><td>MAC</td><td>VECTERR? MAC</td></tr>
<tr><td>Data</td><td>VECTERR? DATA</td></tr>
<tr><td>Symbol</td><td>VECTERR? SYMBOL</td></tr>
<tr><td>Current Value</td><td>VECTERR?</td></tr>
<tr><td colspan="2">---</td><td>---</td><td>VECTERR?</td><td>r</td><td>unit: %
• When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A</td></tr>
</table>

Function	Item		Program Message	Query Message	Response Message	Remarks
Peak EVM	Trace Slot	Overall	---	PVECTERR? OVERALL	r	unit: % • When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
		Pilot		PVECTERR? PILOT		
		MAC		PVECTERR? MAC		
		Data		PVECTERR? DATA		
		Symbol		PVECTERR? SYMBOL		
		Current Value		PVECTERR?		
	---		---	PVECTERR?	r	unit: % • When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A
Phase Error	Trace Slot	Overall	---	PHASEERR? OVERALL	r	unit: % • When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
		Pilot		PHASEERR? PILOT		
		MAC		PHASEERR? MAC		
		Data		PHASEERR? DATA		
		Symbol		PHASEERR? SYMBOL		
		Current Value		PHASEERR?		
	---		---	PHASEERR?	r	unit: % • When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

Function	Item			Program Message	Query Message	Response Message	Remarks
Peak Phase Error	Trace Slot	Overall	Positive	---	PPHASEERR? +,OVERALL	r	unit: % • When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
			Negative		PPHASEERR? -,OVERALL		
			Absolute		PPHASEERR? ABS,OVERALL		
					PPHASEERR?		
		Pilot	Positive		PPHASEERR? +,PILOT		
			Negative		PPHASEERR? -,PILOT		
			Absolute		PPHASEERR? ABS,PILOT		
					PPHASEERR?		
		MAC	Positive		PPHASEERR? +,MAC		
			Negative		PPHASEERR? -,MAC		
			Absolute		PPHASEERR? ABS,MAC		
					PPHASEERR?		
		Data	Positive		PPHASEERR? +,DATA		
			Negative		PPHASEERR? -,DATA		
			Absolute		PPHASEERR? ABS,DATA		
					PPHASEERR?		
		Symbol	Positive		PPHASEERR? +,SYMBOL		
			Negative		PPHASEERR? -,SYMBOL		
			Absolute		PPHASEERR? ABS,SYMBOL		
					PPHASEERR?		
		Current Value	Positive		PPHASEERR? +		
			Negative		PPHASEERR? -		
			Absolute		PPHASEERR? ABS		
					PPHASEERR?		
	---		Positive	---	PPHASEERR? +	r	unit: % • When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A
			Negative		PPHASEERR? -		
			Absolute		PPHASEERR? ABS		
					PPHASEERR?		

<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 rowspan="7">Magnitude Error</td><td colspan="2" rowspan="6">Trace Slot</td><td>Overall</td><td rowspan="6">---</td><td>MAGTDERR? OVERALL</td><td rowspan="6">r</td><td rowspan="6">unit: %
• When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>Pilot</td><td>MAGTDERR? PILOT</td></tr>
<tr><td>MAC</td><td>MAGTDERR? MAC</td></tr>
<tr><td>Data</td><td>MAGTDERR? DATA</td></tr>
<tr><td>Symbol</td><td>MAGTDERR? SYMBOL</td></tr>
<tr><td>Current Value</td><td>MAGTDERR?</td></tr>
<tr><td colspan="3">---</td><td>---</td><td>MAGTDERR?</td><td>r</td><td>unit: %
• When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td rowspan="28">Peak Magnitude Error</td><td rowspan="24">Trace Slot</td><td rowspan="4">Overall</td><td>Positive</td><td rowspan="24">---</td><td>PMAGTDERR? +,OVERALL</td><td rowspan="24">r</td><td rowspan="24">unit: %
• When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -,OVERALL</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS,OVERALL</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td rowspan="4">Pilot</td><td>Positive</td><td>PMAGTDERR? +,PILOT</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -,PILOT</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS,PILOT</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td rowspan="4">MAC</td><td>Positive</td><td>PMAGTDERR? +,MAC</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -,MAC</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS,MAC</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td rowspan="4">Data</td><td>Positive</td><td>PMAGTDERR? +,DATA</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -,DATA</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS,DATA</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td rowspan="4">Symbol</td><td>Positive</td><td>PMAGTDERR? +,SYMBOL</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -,SYMBOL</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS,SYMBOL</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td rowspan="4">Current Value</td><td>Positive</td><td>PMAGTDERR? +</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS</td></tr>
<tr><td>PMAGTDERR?</td></tr>
<tr><td colspan="2" rowspan="4">---</td><td>Positive</td><td rowspan="4">---</td><td>PMAGTDERR? +</td><td rowspan="4">r</td><td rowspan="4">unit: %
• When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>Negative</td><td>PMAGTDERR? -</td></tr>
<tr><td rowspan="2">Absolute</td><td>PMAGTDERR? ABS</td></tr>
<tr><td>PMAGTDERR?</td></tr>
</table>

Function	Item		Program Message	Query Message	Response Message	Remarks
Origin Offset	Trace Slot	Overall	---	ORGNOFS? OVERALL	r	unit: % •When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
		Pilot		ORGNOFS? PILOT		
		MAC		ORGNOFS? MAC		
		Data		ORGNOFS? DATA		
		Symbol		ORGNOFS? SYMBOL		
		Current Value		ORGNOFS?		
	---		---	ORGNOFS?	r	unit: % •When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A
Modulation Type	Each Slot		---	RSLTMODTYPE? n	p	n: 1 to Analysis Length p: 8PSK or QPSK or 16QAM •When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active
	All result			RSLTMODTYPE? ALL	p(1),p(2),....,p(n)	
Pilot Channel	dB		---	PLTCDP? DB	l	
Code Domain Power	dBm			PLTCDP? DBM		
Channel/Pilot	RRI		---	CHPERPILOT? RRI	l1	
	DRC			CHPERPILOT? DRC	l2	
	ACK			CHPERPILOT? ACK	l3	
	Data			CHPERPILOT? DATA	l4	
	All Result		---	CHPERPILOT? ALL	l1,l2,l3,l4	

Function	Item		Program Message	Query Message	Response Message	Remarks
Marker Level	Constellation, Eye Diagram		---	MKL_MOD? I	r	
				MKL_MOD? Q		
	EVM, Phase Error, Magnitude Error		---	MKL_MOD?	r	
	Code Domain	Max Marker Position	---	MKPMAX_CDP?	n	• Only when Trace Format is set to Code Domain • Operation Trace setting applys when omitted
				MKPMAX_CDP? I		
				MKPMAX_CDP? Q		
		Signal Status	---	MKSGNL?	p	p: NOISE or SIGNAL • Only when Trace Format is set to Code Domain, Code Domain of Data and Code Domain of MAC • Operation Trace setting applys when omitted
				MKSGNL? I		
				MKSGNL? Q		
		Walsh Length	---	MKWL?	r	• Only when Trace Format is set to Code Domain, Code Domain of Data and Code Domain of MAC • Operation Trace setting applys when omitted
				MKWL? I		
				MKWL? Q		
		Code Number	---	MKSCNO?	r	• Only when Trace Format is set to Code Domain, Code Domain of Data and Code Domain of MAC • Operation Trace setting applys when omitted
				MKSCNO? I		
				MKSCNO? Q		
		Code Domain Power	---	MKCDP?	l	• Operation Trace setting applys when omitted
				MKCDP? I		
				MKCDP? Q		
		Waveform Quality	---	MKWAV?	r	• Operation Trace setting applys when omitted
				MKWAV? I		
				MKWAV? Q		
		Difference	---	MKDIFF?	r	• Only when Trace Format is set to Code Domain of Data • Operation Trace setting applys when omitted
				MKDIFF? I		
				MKDIFF? Q		

Function	Item		Program Message	Query Message	Response Message	Remarks
Wave Data	Constellation	I	XMC 0,na,nb	XMC? 0,na,nb	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 32767 • Written data nb:–32768 to 32767 • Address for reading data nc:0 to 32767 • Number of read points nd:1 to 32768 • Read data ne:−2147483648 to 2147483647 (Ideal signal 1=10000)
		Q	XMC 1,na,nb	XMC? 1,na,nb		
	Constellation (Symbol)	I	XMSYM 0,na,nb	XMSYM? 0,na,nb	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 1599 • Written data nb:–32768 to 32767 • Address for reading data nc:0 to 1599 • Number of read points nd:1 to 1600 • Read data ne:−2147483648 to 2147483647 (Ideal signal 1=10000)
		Q	XMSYM 1,na,nb	XMSYM? 1,na,nb		
	Eye Diagram	I	XMEYE 0,na,nb	XMEYE? 0,na,nb	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 8191 • Written data nb:–32768 to 32767 • Address for reading data nc:0 to 8191 • Number of read points nd:1 to 8192 • Read data ne: −2147483648 to 2147483647 (Ideal signal 1=10000)
		Q	XMEYE 1,na,nb	XMEYE? 1,na,nb		

Function	Item		Program Message	Query Message	Response Message	Remarks
Wave Data	Constellation Eye Diagram	Origin	OXMC na,nb,p	OXMC? na,p	nb	• Phase selection na: 0(I),1(Q) • Data writing address nb: –32768 to 32767(Written data) • Trace Slot selection p: OVERALL, PILOT, MAC, DATA or SYMBOL (Note) Only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
	EVM		XMV na,nb	XMV? nc,nd	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 32767 • Written data nb:–32768 to 32767 • Address for reading data nc:0 to 32767 • Number of read points nd:1 to 32768 • Read data ne: −2147483648 to 2147483647 (Ideal signal "1%"=100)
	Phase Error		XMP na,nb	XMP? nc,nd	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 32767 • Written data nb:–32768 to 32767 • Address for reading data nc:0 to 32767 • Number of read points nd:1 to 32768 • Read data ne: −2147483648 to 2147483647 (Ideal signal "1deg"=100)
	Magnitude Error		XMN na,nb	XMN? nc,nd	ne(1),ne(2),..., ne(nd)	• Data writing address na : 0 to 32767 • Written data nb : –32768 to 32767 • Address for reading data nc : 0 to 32767 • Number of read points nd : 1 to 32768 • Read data ne : −2147483648 to 2147483647 (Ideal signal "1%"=100)

<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 rowspan="5">Wave Data</td><td rowspan="5">Code Domain</td><td colspan="2" rowspan="2">Each channel</td><td>---</td><td>CDANAL? n1,n2,p1,p2</td><td>pwr,wav(,diff)</td><td>n1 : 16 or 64
* When Measuring Object is set to Forward Link Rev.0
16 or 128
* When Measuring Object is set to Forward Link Rev.A
n2 : 0 to (n1-1)
p1 : I or Q (optional)
* Operation Trace setting applys when omitted
p2 : WL or MAC (optional)
* Code Order setting applys when omitted
* Only when n1 = 64 or 128
(Note) Results output format when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>---</td><td>CDPANLY? n1,n2,p1,p2</td><td>pwr,wav(,diff)</td><td>n1 : 0 to (n2-1)
n2 : 16 or 64 (when Measuring Object is set to Forward Link Rev.0)
: 16 or 128 (when Measuring Object is set to Forward Link Rev.A)
: 4 or 8 or 16 (when Measuring Object is set to Reverse Link Rev.0)
p1 : I or Q (optional)
* Operation Trace setting applys when omitted
p2 : WL or MAC (optional)
* Code Order setting applys when omitted
* Only when n1 = 64 or 128</td></tr>
<tr><td rowspan="3">Each Item</td><td>Code Domain Power</td><td rowspan="3">---</td><td>CDANAL? PWR,p1</td><td>wl0,cd0,pwr0,wl1,cd1,pwr1,...,
wl0(n-1),cd(n-1),pwr(n-1)</td><td rowspan="3">p1 : I or Q (optional)
* Operation Trace setting applys when omitted
(Note) Results output format when Measuring Object is set to Reverse Link Rev.0</td></tr>
<tr><td>Waveform Quality</td><td>CDANAL? WAVE,p1</td><td>wl0,cd0,wav0,wl1,cd1,wav1,....,
wl(n-1),cd(n-1),wav(n-1)</td></tr>
<tr><td>All result</td><td>CDANAL? ALL,p1</td><td>wl0,cd0,pwr0,wav0,wl1,cd1,pwr1,wav1,...,
wl(n-1),cd(n-1),pwr(n-1),wav(n-1)</td></tr>
</table>

<table>
<tr><th>Function</th><th colspan="4">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td rowspan="4">Wave Data</td><td rowspan="4">Code Domain</td><td rowspan="4">Each Item</td><td rowspan="4">Each Walsh Length</td><td>Code Domain Power</td><td rowspan="4">---</td><td>CDALLCH? PWR,n1,p1,p2</td><td>pwr0,pwr1,...,pwr(n-1)</td><td rowspan="4">n1 : 16 or 64 (when Measuring Object is set to Forward Link Rev.0)
: 16 or 128 (when Measuring Object is set to Forward Link Rev.A)
: 4 or 8 or 16 (when Measuring Object is set to Reverse Link Rev.0)
p1 : I or Q (optional)
* Operation Trace setting applys when omitted
p2 : WL or MAC (optional)
* Code Order setting applys when omitted
* Only when n1 = 64 or 128
(Note) DIFF is available only when Measuring Obect is set to Forward Link Rev.0 or Forward Link Rev.A</td></tr>
<tr><td>Waveform Quality</td><td>CDALLCH? WAVE,n1,p1,p2</td><td>wav0,wav1,...,wav(n-1)</td></tr>
<tr><td>Difference</td><td>CDALLCH? DIFF,16,p1</td><td>diff0,diff1,...,diff(n-1)</td></tr>
<tr><td>All result</td><td>CDALLCH? ALL,n1,p1,p2</td><td>pwr0,wav0,(diff0),pwr1,wav1,(diff1),...,
pwr(n-1),wav(n-1),(diff(n-1)</td></tr>
</table>

6.5 RF Power

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Window	Slot	WINDOW SLOT	WINDOW?	SLOT	• First Half Slot Transient and Second Half Slot Transient can be set only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Idle
	First Half Slot	WINDOW 1STHALFSLOT		1STHALFSLOT	
	First Half Slot Transient	WINDOW 1STTRANSIENT		1STTRANSIENT	
	Second Half Slot	WINDOW 2NDHALFSLOT		2NDHALFSLOT	
	Second Half Slot Transient	WINDOW 2NDTRANSIENT		2NDTRANSIENT	
	Slot Expanded Scale	WINDOW SLOTEXP		SLOTEXP	
	First Half Slot Expanded Scale	WINDOW 1STHALFSLOTEXP		1STHALFSLOTEXP	
	Second Half Slot Expanded Scale	WINDOW 2NDHALFSLOTEXP		2NDHALFSLOTEXP	
Storage Mode	Normal	STRG_RFPWR NRM	STRG_RFPWR?	NRM	
	Average	STRG_RFPWR AVG		AVG	
	Cumulative	STRG_RFPWR CUM		CUM	
	Overwrite	STRG_RFPWR OVER		OVER	
Average Count		AVR_RFPWR n	AVR_RFPWR?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_RFPWR EVERY	INTVAL_RFPWR?	EVERY	
	Once	INTVAL_RFPWR ONCE		ONCE	
Average Mode	Normal	AVGMD_RFPWR NRM	AVGMD_RFPWR?	NRM	
	Continuous	AVGMD_RFPWR CONTS		CONTS	
Analysis Start		ANLYSTA_RFPWR n	ANLYSTA_RFPWR?	n	• When Measuring Object is set to other than QPSK n: 0 to 15 Slot • Cannot be set when Measuring Object is set to QPSK
Smoothing Filter	On	SMOFLT ON	SMOFLT?	ON	
	Off	SMOFLT OFF		OFF	

Function	Item	Program Message	Query Message	Response Message	Remarks
Smoothing target	All	SMOTGT ALL	SMOTGT?	ALL	• Available when Smoothing Filter = On
	Wave	SMOTGT WAVE		WAVE	
Level	Relative	LVLREL_RFPWR ON	LVLREL_RFPWR?	ON	
	Absolute	LVLREL_RFPWR OFF		OFF	
Code Sync	On	CODESYNC ON	CODESYNC?	ON	• Can be set only when Trigger is set to External
	Off	CODESYNC OFF		OFF	
Marker Mode	Normal	MKR_RFPWR NRM	MKR_RFPWR?	NRM	
	Off	MKR_RFPWR OFF		OFF	
Marker Position		MKP_RFPWR r	MKP_RFPWR?	r	r: –100.00 to 2148.00PNchip
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB　*1
Multi Carrier Calibration		MLTCARRCAL	---	---	
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n: mode(0: Uncalibrated, 1: Internally calibrated, 2: External writing) l: –10.00 to 10.00 dB

*1:Valid only MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Setup Template					
Line Level		TEMPLVL_RFPWR n,l	TEMPLVL_RFPWR? n	l	n: 1 to 2 (when Slot Type is set to Active) : 1 to 3 (when Slot Type is set to Idle) • Can be set only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
Template Condition	Standaard	SLCTTEMP_RFPWR STD	SLCTTEMP_RFPWR?	STD	• Can be set only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
	Not Selected	---		NOT	
Results					
Tx Power	Window / Slot or Slot Exp. Scale / dBm	---	TXPWR? DBM,SLOT	l	
	Window / Slot or Slot Exp. Scale / Watt		TXPWR? WATT,SLOT		
	Window / First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale / dBm		TXPWR? DBM,1STHALF		
	Window / First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale / Watt		TXPWR? WATT,1STHALF		
	Window / Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale / dBm		TXPWR? DBM,2NDHALF		
	Window / Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale / Watt		TXPWR? WATT,2NDHALF		
	Window / Current Value / dBm		TXPWR? DBM		
	Window / Current Value / Watt		TXPWR? WATT		

Function	Item			Program Message	Query Message	Response Message	Remarks
Power Flatness Maximum	Window	Slot or Slot Exp. Scale	dBm	---	MAXPWR? DBM,SLOT	1	
			dB		MAXPWR? DB,SLOT		
		First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale	dBm		MAXPWR? DBM,1STHALF		
			dB		MAXPWR? DB,1STHALF		
		Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale	dBm		MAXPWR? DBM,2NDHALF		
			dB		MAXPWR? DB,2NDHALF		
		Current Value	dBm		MAXPWR? DBM		
			dB		MAXPWR? DB		

Function	Item			Program Message	Query Message	Response Message	Remarks
Power Flatness Minimum	Window	Slot or Slot Exp. Scale	dBm	---	MINPWR? DBM,SLOT	1	
			dB		MINPWR? DB,SLOT		
		First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale	dBm		MINPWR? DBM,1STHALF		
			dB		MINPWR? DB,1STHALF		
		Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale	dBm		MINPWR? DBM,2NDHALF		
			dB		MINPWR? DB,2NDHALF		
		Current Value	dBm		MINPWR? DBM		
			dB		MINPWR? DB		
Carrier Off Power	Window	Slot or Slot Exp. Scale	dBm	---	OFFPWR? DBM,SLOT	1	
			dB		OFFPWR? DB,SLOT		
			Watt		OFFPWR? WATT,SLOT		
		First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale	dBm		OFFPWR? DBM,1STHALF		
			dB		OFFPWR? DB,1STHALF		
			Watt		OFFPWR? WATT,1STHALF		
		Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale	dBm		OFFPWR? DBM,2NDHALF		
			dB		OFFPWR? DB,2NDHALF		
			Watt		OFFPWR? WATT,2NDHALF		
		Current Value	dBm		OFFPWR? DBM		
			dB		OFFPWR? DB		
			Watt		OFFPWR? WATT		

Function	Item		Program Message	Query Message	Response Message	Remarks
Power vs Time	First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale	1	---	PWRVSTIME? 1,1STHALF ,u	l	
		2		PWRVSTIME? 2,1STHALF ,u		
		3		PWRVSTIME? 3,1STHALF ,u		
		4		PWRVSTIME? 4,1STHALF ,u		
		All Result	---	PWRVSTIME? ALL,1STHALF ,u	l1,l2,l3,l4	
	Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale	1	---	PWRVSTIME? 1,2NDHALF ,u	l	
		2		PWRVSTIME? 2,2NDHALF ,u		
		3		PWRVSTIME? 3,2NDHALF ,u		
		4		PWRVSTIME? 4,2NDHALF ,u		
		All Result	---	PWRVSTIME? ALL,2NDHALF ,u	l1,l2,l3,l4	

Function	Item	Program Message	Query Message	Response Message	Remarks
Template Judgement	Total	---	TEMPPASS_RFPWR? TOTAL TEMPPASS_RFPWR?	j1	j: PASS or FAIL or OFF
	First Half Slot		TEMPPASS_RFPWR? FIRST	j2	
	Second Half Slot		TEMPPASS_RFPWR? SECOND	j3	
	All Result	---	TEMPPASS_RFPWR? ALL	j1,j2,j3	
Marker Level		---	MKL_RFPWR?	l	
Wave Data		XMD na,nb	XMD? nc,nd	ne(1),ne(2),..., ne(nd)	• Data writing address na:0 to 8992 • Written data nb:–32768 to 32767(1 dB=100) • Address for reading data nc:0 to 8992 • Number of read points nd:1 to 8993 • Read data ne: −2147483648 to 2147483647 (Ideal signal 1 dB=100)

6.6 Occupied Bandwidth

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Measure Method	Spectrum	DSPL OBW,SPECT	DSPL?	OBW,SPECT	
	FFT	DSPL OBW,FFT		OBW,FFT	
Storage Mode	Normal	STRG_OBW NRM	STRG_OBW?	NRM	
	Average	STRG_OBW AVG		AVG	
Average Count		AVR_OBW n	AVR_OBW?	n	n:2 to 9999
Refresh Interval	Every	INTVAL_OBW EVERY	INTVAL_OBW?	EVERY	
	Once	INTVAL_OBW ONCE		ONCE	
Span		FSPAN_OBW f	FSPAN_OBW?	f	
Ref Level		RL_OBW n	RL_OBW?	n	
Attenuator Ref Level Mode	Auto	ATTRLMD_OBW AUTO	ATTRLMD_OBW?	AUTO	
	Manual	ATTRLMD_OBW MAN		MAN	
Attenuator		ATT_OBW n	ATT_OBW?	n	
Attenuator Mode	Auto	ATTMD_OBW AUTO	ATTMD_OBW?	AUTO	
	Manual	ATTMD_OBW MAN		MAN	
RBW		RBW_OBW n	RBW_OBW?	n	
RBW Type	Normal	RBD_OBW NRM	RBD_OBW?	NRM	
	Digital	RBD_OBW DGTL		DGTL	
VBW		VBW_OBW n	VBW_OBW?	n	
VBW Mode	Auto	VBM_OBW AUTO	VBM_OBW?	AUTO	
	Manual	VBM_OBW MAN		MAN	
VBW/RBW Ratio		VBR_OBW n	VBR_OBW?	n	
Sweep Time		SWT_OBW n	SWT_OBW?	n	
Sweep Time Mode	Auto	STM_OBW AUTO	SWM_OBW?	AUTO	
	Manual	STM_OBW MAN		MAN	
Detection	Positive	DET_OBW POS	DET_OBW?	POS	• Average can be set when RBW Mode is set to Normal. • RMS can be set when RBW Mode is set to Digital.
	Sample	DET_OBW SMP		SMP	
	Negative	DET_OBW NEG		NEG	
	Average	DET_OBW AVG		AVG	
	RMS	DET_OBW RMS		RMS	
Data Points	501	DPTS_OBW 501	DPTS_OBW?	501	
	1001	DPTS_OBW 1001		1001	

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l: –10.00 to 10.00 dB *1
Multi Carrier Calibration		MLTCARRCAL	---	---	
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode(0: Uncalibrated, 1: Internally calibrated, 2: External writing) l: –10.00 to 10.00 dB
Results					
Occupied Bandwidth (99%)		---	OBW?	f	
Upper Limit		---	OBWFREQ? UPPER	f	
Lower Limit			OBWFREQ? LOWER		
Center (Upper+Lower)/2			OBWFREQ? CENTER		
Wave Data		XME na,nb	XME? nc,nd	ne(1),ne(2),...,ne(nd)	• Data writing address na: 0 to 500 (when Data Points=501) : 0 to 1000 (when Data Points=1001) • Written data nb: –32768 to 32767 (1 dB=100) • Address for reading data nc: 0 to 500 (when Data Points=501) : 0 to 1000 (when Data Points=1001) • Number of read points nd: 1 to 501 (when Data Points=501) : 1 to 1001 (when Data Points=1001) • Read data ne: –2147483648 to 2147483647 (Ideal signal 1 dB=100)

*1:Valid only MS860x.

6.7 Spurious close to the Carrier

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Unit	dB	UNIT_ACP DB	UNIT_ACP?	DB	
	dBm	UNIT_ACP DBM		DBM	
	mW	UNIT_ACP MW		MW	
	μW	UNIT_ACP UW		UW	
	nW	UNIT_ACP NW		NW	
	Template Line	UNIT_ACP TEMP		TEMP	
Storage Mode	Normal	STRG_ACP NRM	STRG_ACP?	NRM	
	Average	STRG_ACP AVG		AVG	
Average Count		AVR_ACP n	AVR_ACP?	n	n: 2 to 9999
Refresh Interval	Every	INTVAL_ACP EVERY	INTVAL_ACP?	EVERY	
	Once	INTVAL_ACP ONCE		ONCE	
Ref Power Mode	SPA	REFPWRMD_ACP SPA	REFPWRMD_ACP?	SPA	
	Tx Power	REFPWRMD_ACP TXPWR		TXPWR	
Integral Waveform	On	INTEGRAL_ACP ON	INTEGRAL_ACP?	ON	• Can be set when Measure Method is set to Normal
	Off	INTEGRAL_ACP OFF		OFF	
Display Data Type	Freq. vs Power	DISPTYPE_ACP FREQVSPWR	DISPTYPE_ACP?	FREQVSPWR	
	Peak (Power)	DISPTYPE_ACP PEAKPWR		PEAKPWR	
	Peak (Margin)	DISPTYPE_ACP PEAKMARGIN		PEAKMARGIN	
Ref Level		RL_ACP n	RL_ACP?	n	
Span		FSPAN_ACP f	FSPAN_OBW?	f	• Can be set when Measure Method is set to Normal
Attenuator Ref Level Mode	Auto	ATTRLMD_ACP AUTO	ATTRLMD_ACP?	AUTO	
	Manual	ATTRLMD_ACP MAN		MAN	
Attenuator		ATT_ACP n	ATT_ACP?	n	
Attenuator Mode	Auto	ATTMD_ACP AUTO	ATTMD_ACP?	AUTO	
	Manual	ATTMD_ACP MAN		MAN	
RBW		RBW_ACP n	RBW_ACP?	n	•Can be set when Measure Method is set to Normal or 3GPP2 FWD Band Class 0,2,3,5,9
RBW Type	Normal	RBD_ACP NRM	RBD_ACP?	NRM	
	Digital	RBD_ACP DGTL		DGTL	

Function	Item	Program Message	Query Message	Response Message	Remarks
VBW		VBW_ACP n	VBW_ACP?	n	•Can be set when Measure Method is set to Normal or 3GPP2 FWD Band Class 0,2,3,5,9
VBW Mode	Auto	VBM_ACP AUTO	VBM_ACP?	AUTO	
	Manual	VBM_ACP MAN		MAN	
VBW/RBW Ratio		VBR_ACP n	VBR_ACP?	n	
Sweep Time		SWT_ACP n	SWT_ACP?	n	
Sweep Time Mode	Auto	STM_ACP AUTO	STM_ACP?	AUTO	
	Manual	STM_ACP MAN		MAN	
Detection	Positive	DET_ACP POS	DET_ACP?	POS	• Average can be set when RBW Mode is set to Normal. • RMS can be set when RBW Mode is set to Digital.
	Sample	DET_ACP SMP		SMP	
	Negative	DET_ACP NEG		NEG	
	Average	DET_ACP AVG		AVG	
	RMS	DET_ACP RMS		RMS	
Data Points	501	DPTS_ACP 501	DPTS_ACP?	501	
	1001	DPTS_ACP 1001		1001	
Marker Position	Point	MKP_ACP n	MKP_ACP?	n	• When Data Points=501 n: 0 to 500(When Measure Method is set to Normal) n: 0 to 1500(When Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9 and 3+) n: 0 to 2000(When Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8) • When Data Points=1001 n: 0 to 1000(When Measure Method is set to Normal) n: 0 to 3000(When Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9 and 3+) n: 0 to 3500(When Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8)
	Frequency	MKN_ACP f	MKN_ACP?	f	f: –(Span/2) to (Span/2)

Function	Item	Program Message	Query Message	Response Message	Remarks
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l:–10.00 to 10.00 dB *1
Multi Carrer Callibration		MUTCARRCAL	---	---	
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode(0: Uncalibrated, 1: Internally calibrated, 2: External writing) l:–10.00 to 10.00 dB

*1:Valid only MS860x.

Function	Item	Program Message	Query Message	Response Message	Remarks
Setup Template					
	3GPP2 Forward Link Band Class 0,2,3,5,7,9 f<1MHz	SLCTTEMP_ACP 3GPP2,FWDTMP1		3GPP2,FWDTMP1	
	3GPP2 Forward Link Band Class 0,2,3,5,9 f≥1MHz Power≥33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP2		3GPP2,FWDTMP2	
	3GPP2 Forward Link Band Class 0,2,3,5,9 f≥1MHz 28dBm≤Power< 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP3		3GPP2,FWDTMP3	
	3GPP2 Forward Link Band Class 0,2,3,5,9 f≥1MHz Power<28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP4		3GPP2,FWDTMP4	
	3GPP2 Forward Link Band Class 7 f≥1MHz Power≥33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP5		3GPP2,FWDTMP5	
Standard Template	3GPP2 Forward Link Band Class 7 f≥1MHz 28dBm≤ Power<33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP6	SLCTTEMP_ACP?	3GPP2,FWDTMP6	• Can be set when Measure Method is set to Normal
	3GPP2 Forward Link Band Class 7 f≥1MHz Power<28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP7		3GPP2,FWDTMP7	
	3GPP2 Forward Link Band Class 1,4,8 f<2.25MHz Power≥36dBm	SLCTTEMP_ACP 3GPP2,FWDTMP8		3GPP2,FWDTMP8	
	3GPP2 Forward Link Band Class 1,4,8 f<2.25MHz 33dBm≤ Power<36dBm	SLCTTEMP_ACP 3GPP2,FWDTMP9		3GPP2,FWDTMP9	
	3GPP2 Forward Link Band Class 1,4,8 f<2.25MHz 28dBm≤Power< 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP10		3GPP2,FWDTMP10	
	3GPP2 Forward Link Band Class 1,4,8 f<2.25MHz Power<28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP11		3GPP2,FWDTMP11	

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	3GPP2 Forward Link Band Class 1,4,6,8 f≥2.25MHz	SLCTTEMP_ACP 3GPP2,FWDTMP12	SLCTTEMP_ACP?	3GPP2,FWDTMP12	• Can be set when Measure Method is set to Normal
	3GPP2 Forward Link Band Class 6 f<2.25MHz	SLCTTEMP_ACP 3GPP2,FWDTMP13		3GPP2,FWDTMP13	
	3GPP2 Reverse Link Band Class 0,2,5,9 Power≥ –16.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP1		3GPP2,RVSTMP1	
	3GPP2 Reverse Link Band Class 0,2,5,9 –28.13dBm≤Power< –16.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP2		3GPP2,RVSTMP2	
	3GPP2 Reverse Link Band Class 0,2,5,9 Power<–28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP3		3GPP2,RVSTMP3	
	3GPP2 Reverse Link Band Class 3 Power≥–28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP4		3GPP2,RVSTMP4	
	3GPP2 Reverse Link Band Class 3 Power<–28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP5		3GPP2,RVSTMP5	
	3GPP2 Reverse Link Band Class 7 Power≥–16.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP6		3GPP2,RVSTMP6	
	3GPP2 Reverse Link Band Class 7 –28.13dBm≤Power <–16.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP7		3GPP2,RVSTMP7	
	3GPP2 Reverse Link Band Class 7 Power<–28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP8		3GPP2,RVSTMP8	
	3GPP2 Reverse Link Band Class 1,4,8 Power≥–20.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP9		3GPP2,RVSTMP9	

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	3GPP2 Reverse Link Band Class 1,4,8 –28.13dBm≤Power <–20.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP10	SLCTTEMP_ACP?	3GPP2,RVSTMP10	• Can be set when Measure Method is set to Normal
	3GPP2 Reverse Link Band Class 1,4,8 Power<－28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP11		3GPP2,RVSTMP11	
	3GPP2 Reverse Link Band Class 6 f≥2.25MHz Power≥ –20.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP12		3GPP2,RVSTMP12	
	3GPP2 Reverse Link Band Class 6 f<2.25MHz –28.13dBm≤ Power< –20.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP13		3GPP2,RVSTMP13	
	3GPP2 Reverse Link Band Class 6 f<2.25MHz Power< –28.13dBm	SLCTTEMP_ACP 3GPP2,RVSTMP14		3GPP2,RVSTMP14	
	3GPP2 Reverse Link Band Class 6 f≥2.25MHz	SLCTTEMP_ACP 3GPP2,RVSTMP15		3GPP2,RVSTMP15	
	3GPP2 Forward Link Band Class 0,2,3,5,9 Power≥33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP30		3GPP2,FWDTMP30	• Can be set when Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9
	3GPP2 Forward Link Band Class 0,2,3,5,9 28dBm≤Power< 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP31		3GPP2,FWDTMP31	
	3GPP2 Forward Link Band Class 0,2,3,5,9 Power<28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP32		3GPP2,FWDTMP32	
	3GPP2 Forward Link Band Class 6	SLCTTEMP_ACP 3GPP2,FWDTMP60		3GPP2,FWDTMP60	• Can be set when Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8
	3GPP2 Forward Link Band Class 1,4,8 Power≥36dBm	SLCTTEMP_ACP 3GPP2,FWDTMP61		3GPP2,FWDTMP61	
	3GPP2 Forward Link Band Class 1,4,8 33dBm≤Power＜ 36dBm	SLCTTEMP_ACP 3GPP2,FWDTMP62		3GPP2,FWDTMP62	

Function	Item	Program Message	Query Message	Response Message	Remarks
Standard Template	3GPP2 Forward Link Band Class 1,4,8 28dBm≤Power< 33dBm	SLCTTEMP_ACP 3GPP2,FWDTMP63		3GPP2,FWDTMP63	• Can be set when Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8
	3GPP2 Forward Link Band Class 1,4,8 Power<28dBm	SLCTTEMP_ACP 3GPP2,FWDTMP64		3GPP2,FWDTMP64	
	3GPP2 Forward Link Band Class 3+ Power>47 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP3P0	SLCTTEMP_ACP?	3GPP2,FWDTMP3P0	• Can be set when Measure Method is set to 3GPP2 FWD Band Class 3+
	3GPP2 Forward Link Band Class 3+ 30 dBm<Power≤47 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP3P1		3GPP2,FWDTMP3P1	
	3GPP2 Forward Link Band Class 3+ Power≤30 dBm	SLCTTEMP_ACP 3GPP2,FWDTMP3P2		3GPP2,FWDTMP3P2	
Level	Relative	LVLREL_ACP ON	LVLREL_ACP?	s, s, s, s	s: ON or OFF
		LVLREL_ACP ON,1	LVLREL_ACP? 1	s	s: ON or OFF
		LVLREL_ACP ON,2	LVLREL_ACP? 2	s	s: ON or OFF
		LVLREL_ACP ON,3	LVLREL_ACP? 3	s	s: ON or OFF
		LVLREL_ACP ON,4	LVLREL_ACP? 4	s	s: ON or OFF
	Absolute	LVLREL_ACP OFF	LVLREL_ACP?	s, s, s, s	s: ON or OFF
		LVLREL_ACP OFF,1	LVLREL_ACP? 1	s	s: ON or OFF
		LVLREL_ACP OFF,2	LVLREL_ACP? 2	s	s: ON or OFF
		LVLREL_ACP OFF,3	LVLREL_ACP? 3	s	s: ON or OFF
		LVLREL_ACP OFF,4	LVLREL_ACP? 4	s	s: ON or OFF
Line Level	Limit-1	TEMPLVL_ACP 1,l	TEMPLVL_ACP? 1	l	l: 0 to −100.00
	Limit-2	TEMPLVL_ACP 2,l	TEMPLVL_ACP? 2		
	Limit-3	TEMPLVL_ACP 3,l	TEMPLVL_ACP? 3		
	Limit-4	TEMPLVL_ACP 4,l	TEMPLVL_ACP? 4		
Offset Frequency	Limit-a	TEMPFREQ_ACP A,f	TEMPFREQ_ACP? A	f	f: −(span / 2) to (span / 2)
	Limit-b	TEMPFREQ_ACP B,f	TEMPFREQ_ACP? B		
	Limit-c	TEMPFREQ_ACP C,f	TEMPFREQ_ACP? C		
	Limit-d	TEMPFREQ_ACP D,f	TEMPFREQ_ACP? D		

Function	Item			Program Message	Query Message	Response Message	Remarks
Results							
Ref Power	dBm			---	REFPWR_ACP? DBM	l	
	Watt				REFPWR_ACP? WATT		
Adjacent Channel Power	Lower4	Unit	dBm	---	ADJCH? LOW4,DBM	l	
			dB		ADJCH? LOW4,DB		
			Watt (mW,uW,nW)		ADJCH? LOW4,WATT		
			Current Value		ADJCH? LOW4		
	Lower3	Unit	dBm	---	ADJCH? LOW3,DBM	l	
			dB		ADJCH? LOW3,DB		
			Watt (mW,uW,nW)		ADJCH? LOW3,WATT		
			Current Value		ADJCH? LOW3		
	Lower2	Unit	dBm	---	ADJCH? LOW2,DBM	l	
			dB		ADJCH? LOW2,DB		
			Watt (mW,uW,nW)		ADJCH? LOW2,WATT		
			Current Value		ADJCH? LOW2		
	Lower1	Unit	dBm	---	ADJCH? LOW1,DBM	l	
			dB		ADJCH? LOW1,DB		
			Watt (mW,uW,nW)		ADJCH? LOW1,WATT		
			Current Value		ADJCH? LOW1		
	Upper1	Unit	dBm	---	ADJCH? UP1,DBM	l	
			dB		ADJCH? UP1,DB		
			Watt (mW,uW,nW)		ADJCH? UP1,WATT		
			Current Value		ADJCH? UP1		
	Upper2	Unit	dBm	---	ADJCH? UP2,DBM	l	
			dB		ADJCH? UP2,DB		
			Watt (mW,uW,nW)		ADJCH? UP2,WATT		
			Current Value		ADJCH? UP2		
	Upper3	Unit	dBm	---	ADJCH? UP3,DBM	l	
			dB		ADJCH? UP3,DB		
			Watt (mW,uW,nW)		ADJCH? UP3,WATT		
			Current Value		ADJCH? UP3		
	Upper4	Unit	dBm	---	ADJCH? UP4,DBM	l	
			dB		ADJCH? UP4,DB		
			Watt (mW,uW,nW)		ADJCH? UP4,WATT		
			Current Value		ADJCH? UP4		

Function	Item			Program Message	Query Message	Response Message	Remarks
Peak Power	All	Unit	dBm	---	PEAK_ACP? ALL,DBM	f1,l1,a1,...4f,l4, a4	a: PASS or FAIL or OFF
			dB		PEAK_ACP? ALL,DB		
			Watt (mW,uW,nW)		PEAK_ACP? ALL,WATT		
			Current Value		PEAK_ACP? ALL		
	Peak	Unit	dBm	---	PEAK_ACP? PEAK,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? PEAK,DB		
			Watt (mW,uW,nW)		PEAK_ACP? PEAK,WATT		
			Current Value		PEAK_ACP? PEAK		
	Lower4	Unit	dBm	---	PEAK_ACP? LOW4,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW4,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW4,WATT		
			Current Value		PEAK_ACP? LOW4		
	Lower3	Unit	dBm	---	PEAK_ACP? LOW3,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW3,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW3,WATT		
			Current Value		PEAK_ACP? LOW3		
	Lower2	Unit	dBm	---	PEAK_ACP? LOW2,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW2,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW2,WATT		
			Current Value		PEAK_ACP? LOW2		
	Lower1	Unit	dBm	---	PEAK_ACP? LOW1,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? LOW1,DB		
			Watt (mW,uW,nW)		PEAK_ACP? LOW1,WATT		
			Current Value		PEAK_ACP? LOW1		
	Upper1	Unit	dBm	---	PEAK_ACP? UP1,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP1,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP1,WATT		
			Current Value		PEAK_ACP? UP1		
	Upper2	Unit	dBm	---	PEAK_ACP? UP2,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP2,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP2,WATT		
			Current Value		PEAK_ACP? UP2		

Function	Item			Program Message	Query Message	Response Message	Remarks
Peak Power	Upper3	Unit	dBm	---	PEAK_ACP? UP3,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP3,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP3,WATT		
			Current Value		PEAK_ACP? UP3		
	Upper4	Unit	dBm	---	PEAK_ACP? UP4,DBM	f,l,a	a: PASS or FAIL or OFF
			dB		PEAK_ACP? UP4,DB		
			Watt (mW,uW,nW)		PEAK_ACP? UP4,WATT		
			Current Value		PEAK_ACP? UP4		
Peak Margin	All			---	PEAK_ACP? ALL,MARGIN	f1,l1,a1,...f4,l4, a4	a: PASS or FAIL or OFF
	Peak			---	PEAK_ACP? PEAK,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower4			---	PEAK_ACP? LOW4,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower3			---	PEAK_ACP? LOW3,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower2			---	PEAK_ACP? LOW2,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Lower1			---	PEAK_ACP? LOW1,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper1			---	PEAK_ACP? UP1,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper2			---	PEAK_ACP? UP2,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper3			---	PEAK_ACP? UP3,MARGIN	f,l,a	a: PASS or FAIL or OFF
	Upper4			---	PEAK_ACP? UP4,MARGIN	f,l,a	a: PASS or FAIL or OFF
Marker Level		Unit	dBm	---	MKL_ACP? DBM	l	
			dB		MKL_ACP? DB		
			Watt (mW,uW,nW)		MKL_ACP? WATT		
			Current Value		MKL_ACP?		
Template Judgement				---	TEMPPASS_ACP?	j	j: PASS or FAIL or OFF

<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 rowspan="2">Wave Data</td><td>SPA data</td><td>XMB na,nb</td><td>XMB? na,nc</td><td>nd(1),nd(2),...,nd(nc)</td><td rowspan="2">•Data writing address
• When Data Points=501
na: 0 to 500 (when Measure Method=Normal)
na: 0 to 1500 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
na: 0 to 2000 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
• When Data Points=1001
na: 0 to 1000 (when Measure Method=Normal)
na: 0 to 3000 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
na: 0 to 3500 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
•Written data
nb: –32768 to 32767 (1 dB=100)
•Address for reading data
• When Data Points=501
nc: 0 to 500 (when Measure Method=Normal)
nc: 0 to 1500 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
nc: 0 to 2000 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
• When Data Points=1001
nc: 0 to 1000 (when Measure Method=Normal)
nc: 0 to 3000 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
nc: 0 to 3500 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
•Number of read points
• When Data Points=501
nd: 1 to 501 (when Measure Method=Normal)
nd: 1 to 1501 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
nd: 1 to 2001 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
• When Data Points=1001
nd: 1 to 1001 (when Measure Method=Normal)
nd: 1 to 3001 (when Measure Method=3GPP2 FWD Band Class 0,2,3,5,9 and 3+)
nd: 1 to 3501 (when Measure Method=3GPP2 FWD Band Class 1,4,6,8)
•Read data
ne: −2147483648 to 2147483647
(Ideal signal 1 dB=100)
(Invarid value: –2147483648)</td></tr>
<tr><td>1.23 MHz Integrated data</td><td>XMBI na,nb</td><td>XMBI? nc,nd</td><td>nd(1),nd(2),...,nd(nc)</td></tr>
</table>

6.8 Spurious Emission

<table>
<tr><th>Function</th><th colspan="2">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td colspan="7">Parameters</td></tr>
<tr><td rowspan="3">Spurious Mode</td><td colspan="2">Spot</td><td>DSPL SPURIOUS,SPOT</td><td rowspan="3">DSPL?</td><td>SPURIOUS,SPOT</td><td rowspan="3"></td></tr>
<tr><td colspan="2">Search</td><td>DSPL SPURIOUS,SEARCH</td><td>SPURIOUS, SEARCH</td></tr>
<tr><td colspan="2">Sweep</td><td>DSPL SPURIOUS,SWEEP</td><td>SPURIOUS,SWEEP</td></tr>
<tr><td rowspan="2">Ref Power Mode</td><td colspan="2">SPA</td><td>REFPWRMD_SPU SPA</td><td rowspan="2">REFPWRMD_SPU?</td><td>SPA</td><td rowspan="2"></td></tr>
<tr><td colspan="2">Tx Power</td><td>REFPWRMD_SPU TXPWR</td><td>TXPWR</td></tr>
<tr><td rowspan="15">Detect Mode</td><td rowspan="5">Spot</td><td>Positive Peak</td><td>DET_SPU SPOT,POS</td><td rowspan="5">DET_SPU? SPOT</td><td>POS</td><td rowspan="15">• RMS can be set when RBW Mode is set to Digital.</td></tr>
<tr><td>Sample</td><td>DET_SPU SPOT,SMP</td><td>SMP</td></tr>
<tr><td>Negative Peak</td><td>DET_SPU SPOT,NEG</td><td>NEG</td></tr>
<tr><td>Average</td><td>DET_SPU SPOT,AVG</td><td>AVG</td></tr>
<tr><td>RMS</td><td>DET_SPU SPOT,RMS</td><td>RMS</td></tr>
<tr><td rowspan="5">Search</td><td>Positive Peak</td><td>DET_SPU SEARCH,POS</td><td rowspan="5">DET_SPU? SEARCH</td><td>POS</td></tr>
<tr><td>Sample</td><td>DET_SPU SEARCH,SMP</td><td>SMP</td></tr>
<tr><td>Negative Peak</td><td>DET_SPU SEARCH,NEG</td><td>NEG</td></tr>
<tr><td>Average</td><td>DET_SPU SEARCH,AVG</td><td>AVG</td></tr>
<tr><td>RMS</td><td>DET_SPU SEARCH,RMS</td><td>RMS</td></tr>
<tr><td rowspan="5">Sweep</td><td>Positive Peak</td><td>DET_SPU SWEEP,POS</td><td rowspan="5">DET_SPU? SWEEP</td><td>POS</td></tr>
<tr><td>Sample</td><td>DET_SPU SWEEP,SMP</td><td>SMP</td></tr>
<tr><td>Negative Peak</td><td>DET_SPU SWEEP,NEG</td><td>NEG</td></tr>
<tr><td>Average</td><td>DET_SPU SWEEP,AVG</td><td>AVG</td></tr>
<tr><td>RMS</td><td>DET_SPU SWEEP,RMS</td><td>RMS</td></tr>
</table>

Function	Item	Program Message	Query Message	Response Message	Remarks
Preselector	Normal	BAND 0	BAND?	0	*1
	Spurious	BAND 1		1	
Unit	dBm	UNIT_SPU DBM	UNIT_SPU?	DBM	
	dB	UNIT_SPU DB		DB	
View	Judgement	VIEW_SPU JDG	VIEW_SPU?	JDG	
	BW,SWT	VIEW_SPU BWSWT		BWSWT	
	Ref Level,ATT	VIEW_SPU REFATT		REFATT	
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	l:–10.00 to 10.00 dB *2
Multi Carrier Calibration		MLTCARRCAL	---	---	
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode(0: Uncalibrated, 1: Internally calibrated, 2: External writing) l: –10.00 to 10.00 dB
Setup Spot Table					
Frequency		TBLFREQ_SPU SPOT,Fn,f	TBLFREQ_SPU? SPOT,Fn	f	n: 1 to 15 f: 100 Hz to 3 GHz (MS2681A) f: 100 Hz to 7.8 GHz (For MS8608A/MS2683A) f: 100 Hz to 13.2 GHz (For MS8609A) f: 100Hz to 30 GHz (MS2687A/B)
Harmonics		TBLFREQ_SPU SPOT,HRM	---	---	
Attenuator Ref Level Mode	Auto	TBLATTRLMD_SPU SPOT,AUTO	TBLATTRLMD_SPU? SPOT	AUTO	
	Manual	TBLATTRLMD_SPU SPOT,MAN		MAN	
Attenuator Mode	Auto	TBLATTMD_SPU SPOT,AUTO	TBLATTMD_SPU? SPOT	AUTO	
	Manual	TBLATTMD_SPU SPOT,MAN		MAN	
Ref Level		TBLRL_SPU SPOT,Fn,l	TBLRL_SPU? SPOT,Fn	l	n: 1 to 15
Attenuator		TBLATT_SPU SPOT,Fn,l	TBLATT_SPU? SPOT,Fn	l	n: 1 to 15

*1:Valid only when MS8608A/MS2683A-03 Pre-selector Lower Limit option is installed. *2:Valid only MS860x

Function	Item	Program Message	Query Message	Response Message	Remarks
RBW		TBLRBW_SPU SPOT,Fn,f	TBLRBW_SPU? SPOT,Fn	f	n: 1 to 15 f: 300 Hz to 3 MHz (1 to 3 sequence), 5 MHz, 10 MHz, 20 MHz
RBW Mode	Auto	TBLRBWMD_SPU SPOT,AUTO	TBLRBWMD_SPU? SPOT	AUTO	
	Manual	TBLRBWMD_SPU SPOT,MAN		MAN	
RBW Type	Normal	TBLRBWTP_SPU SPOT,NRM	TBLRBWTP_SPU? SPOT NRM	NRM	
	Digital	TBLRBWTP_SPU SPOT,DGTL		DGTL	
VBW		TBLVBW_SPU SPOT,n,f	TBLVBW_SPU? SPOT,n	f	n: 1 to 15 f: 1 Hz to 3 MHz (1 to 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	
SWT		TBLSWT_SPU SPOT,Fn,ta	TBLSWT_SPU? SPOT,Fn	tb	
SWT Mode	Auto	TBLSWTMD_SPU SPOT,AUTO	TBLSWTMD_SPU? SPOT	AUTO	
	Manual	TBLSWTMD_SPU SPOT,MAN		MAN	
Limit	Absolute	SPULMT SPOT,Fn,l,ABS	SPULMT? SPOT,Fn,ABS	l	l: –100.00 to 100.00 (dB or dBm) (Note) At setting, Response Message is 0.
		SPULMT SPOT,Fn,l	SPULMT? SPOT,Fn		
	Relative	SPULMT SPOT,Fn,l,REL	SPULMT? SPOT,Fn,REL		
View	RBW,VBW,SWT	TBLVIEW_SPU SPOT,BWSWT	TBLVIEW_SPU? SPOT	BWSWT	
	Ref Level, Attenuator	TBLVIEW_SPU SPOT,REFATT		REFATT	
	Limit	TBLVIEW_SPU SPOT,LMT		LMT	
Judgement Unit	Absolute	JUDGUNIT_SPTBL ABS	JUDGUNIT_SPTBL?	ABS	
		JUDGUNIT_SPTBL ON			
	Relative	JUDGUNIT_SPTBL REL		REL	
		JUDGUNIT_SPTBL OFF			
	Absolute & Relative	JUDGUNIT_SPTBL RELABS		RELABS	

Function	Item	Program Message	Query Message	Response Message	Remarks
Setup Search/Sweep Table					
Start Frequency		TBLFREQ_SPU START,Fn,f	TBLFREQ_SPU? START,Fn	f	n: 1 to 15 f: 1 kHz to 2999.999 MHz (For MS2681A) f: 1 kHz to 7799.999 MHz (For MS8608A/MS2683A) f: 1 kHz to 13999.999 MHz (For MS8609A) f: 100 kHz to 29999.999 MHz (For MS2687A/B)
Stop Frequency		TBLFREQ_SPU STOP,Fn,f	TBLFREQ_SPU? STOP,Fn	f	n: 1 to 15 f: 1 kHz to 3.0 GHz (For MS2681A) f: 1 kHz to 7.8 GHz (For MS8608A/MS2683A) f: 2 kHz to 13.2 GHz (For MS8609A) f: 100 kHz to 30.0 GHz (For MS2687A/B)
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
RBW		TBLRBW_SPU SWEEP,Fn,f	TBLRBW_SPU? SWEEP,Fn	f	n: 1 to 15 f: 300 Hz to 3 MHz (1 to 3 sequence), 5 MHz, 10 MHz, 20 MHz
RBW Mode	Auto	TBLRBWMD_SPU SWEEP,AUTO	TBLRBWMD_SPU? SWEEP	AUTO	
	Manual	TBLRBWMD_SPU SWEEP,MAN		MAN	
RBW Type	Normal	TBLRBWTP_SPU SWEEP,NRM	TBLRBWTP_SPU? SWEEP	NRM	
	Digital	TBLRBWTP_SPU SWEEP,DGTL		DGTL	

<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="2">VBW</td><td>TBLVBW_SPU SWEEP,Fn,f</td><td>TBLVBW_SPU? SWEEP,Fn</td><td>f</td><td>n: 1 to 15
f: 1 Hz to 3 MHz (1 to 3 sequence), Off</td></tr>
<tr><td rowspan="2">VBW Mode</td><td>Auto</td><td>TBLVBWMD_SPU SWEEP,AUTO</td><td rowspan="2">TBLVBWMD_SPU? SWEEP</td><td>AUTO</td><td rowspan="2"></td></tr>
<tr><td>Manual</td><td>TBLVBWMD_SPU SWEEP,MAN</td><td>MAN</td></tr>
<tr><td colspan="2">RBW/VBW Ratio</td><td>TBLVBWRT_SPU SWEEP,r</td><td>TBLVBWRT_SPU? SWEEP</td><td>r</td><td></td></tr>
<tr><td colspan="2">SWT</td><td>TBLSWT_SPU SWEEP,Fn,ta</td><td>TBLSWT_SPU? SWEEP,Fn</td><td>tb</td><td></td></tr>
<tr><td rowspan="2">SWT Mode</td><td>Auto</td><td>TBLSWTMD_SPU SWEEP,AUTO</td><td rowspan="2">TBLSWTMD_SPU? SWEEP</td><td>AUTO</td><td rowspan="2"></td></tr>
<tr><td>Manual</td><td>TBLSWTMD_SPU SWEEP,MAN</td><td>MAN</td></tr>
<tr><td rowspan="3">Limit</td><td rowspan="2">Absolute</td><td>SPULMT SWEEP,Fn,l,ABS</td><td>SPULMT? SWEEP,Fn,ABS</td><td rowspan="3">l</td><td rowspan="3">l: –100.00 to 100.00 (dB or dBm)
(Note) At setting, Response Message is 0.</td></tr>
<tr><td>SPULMT SWEEP,Fn,l</td><td>SPULMT? SWEEP,Fn</td></tr>
<tr><td>Relative</td><td>SPULMT SWEEP,Fn,l,REL</td><td>SPULMT? SWEEP,Fn,REL</td></tr>
<tr><td rowspan="3">View</td><td>RBW,VBW,SWT</td><td>TBLVIEW_SPU SWEEP,BWSWT</td><td rowspan="3">TBLVIEW_SPU? SWEEP</td><td>BWSWT</td><td rowspan="3"></td></tr>
<tr><td>Ref Level, Attenuator</td><td>TBLVIEW_SPU SWEEP,REFATT</td><td>REFATT</td></tr>
<tr><td>Limit</td><td>TBLVIEW_SPU SWEEP,LMT</td><td>LMT</td></tr>
<tr><td rowspan="5">Judgement Unit</td><td rowspan="2">Absolute</td><td>JUDGUNIT_SWTBL ABS</td><td rowspan="5">JUDGUNIT_SWTBL?</td><td rowspan="2">ABS</td><td rowspan="5"></td></tr>
<tr><td>JUDGUNIT_SWTBL ON</td></tr>
<tr><td rowspan="2">Relative</td><td>JUDGUNIT_SWTBL REL</td><td rowspan="2">REL</td></tr>
<tr><td>JUDGUNIT_SWTBL OFF</td></tr>
<tr><td>Absolute & Relative</td><td>JUDGUNIT_SWTBL RELABS</td><td>RELABS</td></tr>
</table>

Function	Item	Program Message	Query Message	Response Message	Remarks
Results					
Ref Power	dBm	---	REFPWR_SPU? DBM	l	
	Watt	---	REFPWR_SPU? WATT		
Frequency		---	SPUFREQ? Fna,nb	fa(na),fa(na+1),...,fa(na+nb)	• Start point for reading frequency na: 1 to 15 • Frequency reading point nb: 1 to 15 u: DBM or DB (optional) Unit setting applys when omitted fa: Frequency la: Level fb: RBW fc: VBW t : Sweep Time lb: Ref Level lc: Attenuator
Level		---	SPULVL? Fna,nb,u	la(na),la(na+1),...,la(na+nb)	
Frequency and Level		---	SPUFREQLVL? Fna,nb,u	fa(na),la(na),fa(na+1),la(na+1),...,f(na+nb),l(na+nb)	
Ref Level		---	SPURL? Fna,nb	lb(na),lb(na+1),...,lb(na+nb)	
Attenuator		---	SPUATT? Fna,nb	lc(na),lc(na+1),...,lc(na+nb)	
RBW		---	SPURBW? Fna,nb	fb(na),fb(na+1),...,fb(na+nb)	
VBW		---	SPUVBW? Fna,nb	fc(na),fc(na+1),...,fc(na+nb)	
Sweep Time		---	SPUSWT? Fna,nb	t(na),t(na+1),...,t(na+nb)	
All result		---	SPUALL? Fna,nb,u	fa(na),la(na),fb(na),fc(na),t(na),... ,fa(na+nb),la(na+nb),fb(na+nb),fc(na+nb),t(na+nb)	
Judgement Level		---	SPUJUDGLVL? Fna,nb	l(na),u(na),...,l(na+nb),u(na+nb)	• Start point for reading frequency na: 1 to 15 • Number of frequency reading points nb: 1 to 15 l: Limit Level u: Judgement Unit
Judgement	Each Point	---	SPUPASS? Fn	j(n)	n: 1 to 15 j: PASS or FAIL or OFF
	All result		SPUPASS? ALL	j1,j2,j3,...,j15	
Total Judgement		---	SPUJDG?	j	j: PASS or FAIL or OFF

6.9 Power Meter

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Set Relative		SETREL	---	---	
Range	Up	RNG UP	---	---	
	Down	RNG DN			
	Range 1	RNG1	---	---	
	Range 2	RNG2	---	---	
	Range 3	RNG3	---	---	
	Range 4	RNG4	---	---	
	Range 5	RNG5	---	---	
Calibration					
Adjust Range		ADJRNG	---	---	
Zero Set		ZEROSET	---	---	
Results					
Power	dBm	---	POWER? DBM	l	
	dB	---	POWER? DB	l	
	Watt	---	POWER? WATT	l	

6.10 IQ Level

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Storage Mode	Normal	STRG_IQL NRM	STRG_IQL?	NRM	
	Average	STRG_IQL AVG		AVG	
Average Count		AVR_IQL n	AVR_IQL?	n	n:2 to 9999
Refresh Interval	Every	INTVAL_IQL EVERY	INTVAL_IQL?	EVERY	
	Once	INTVAL_IQL ONCE		ONCE	
Unit	mV	UNIT_IQL MV	UNIT_IQL?	MV	
	dBmV	UNIT_IQL DBMV		DBMV	
Results					
Level	I	---	ILVL? u	l	
	Q	---	QLVL? u		
	I p-p	---	IPPLVL? u		
	Q p-p	---	QPPLVL? u		
	All	---	IQLVL? u	la,lb,lc,ld	
Phase	I/Q Difference	---	IQPHASE?	r	

6.11 CCDF

Function	Item	Program Message	Query Message	Response Message	Remarks
Parameters					
Measure Method	CCDF	DSPL CCDF,CCDF	DSPL?	CCDF,CCDF	
	APD	DSPL CCDF,APD		CCDF,APD	
Trace Format	Positive	TRFORM_CCDF POS	TRFORM_CCDF?	POS	• Can be set only when Measure Method is set to APD
	Negative	TRFORM_CCDF NEG		NEG	
	Positive & Negative	TRFORM_CCDF POSNEG		POSNEG	
Horizontal Scale	2 dB	HSCALE_CCDF 2	HSCALE_CCDF?	2	
	5 dB	HSCALE_CCDF 5		5	
	10 dB	HSCALE_CCDF 10		10	
	20 dB	HSCALE_CCDF 20		20	
	50 dB	HSCALE_CCDF 50		50	
Display Data Type	Probability	DISPTYPE_CCDF PROB	DISPTYPE_CCDF?	PROB	
	Distribution	DISPTYPE_CCDF DSTRBT		DSTRBT	
Reference Trace	Off	REFTR_CCDF OFF	REFTR_CCDF?	OFF	• Gaussian Trace and Save & Gaussian Trace can be selected when Measure Method is set to CCDF
	Save Trace	REFTR_CCDF SAVE		SAVE	
	Gaussian Trace	REFTR_CCDF GAUSS		GAUSS	
	Save & Gaussian Trace	REFTR_CCDF SAVEGAUSS		SAVEGAUSS	
Save Trace	Save	SAVETR_CCDF	----	----	
Filter Type	20 MHz	RBW_CCDF 20 MHZ	RBW_CCDF?	20 MHZ	
	10 MHz	RBW_CCDF 10 MHZ		10 MHZ	
	5 MHz	RBW_CCDF 5 MHZ		5 MHZ	
	3 MHz	RBW_CCDF 3 MHZ		3 MHZ	
	1.23 MHz	RBW_CCDF 1.23 MHZ		1.23 MHZ	
Data Count		DCOUNT_CCDF n	DCOUNT_CCDF?	n	n: 10000 to 2000000000
Analysis Length		ANLYLEN_CCDF n	ANLYLEN_CCDF?	n	n: 1 to 100000 μsec
Marker Mode	Off	MKR_CCDF OFF	MKR_CCDF?	OFF	
	Normal	MKR_CCDF NRM		NRM	

Function	Item	Program Message	Query Message	Response Message	Remarks
Marker Position		MKP_CCDF l(or per)	MKP_CCDF?	l (or per)	• When Display Data Type is set to Probability per: 0.0001 to 100% • When Display Data Type is set to Distribution • When Measure Method is set to CCDF l: 0 to (Horizontal Scale) dB • When Measure Method is set to APD • When Trace Format is set to Positive l: 0 to (Horizontal Scale) dB • When Trace Format is set to Negative l: –(Horizontal Scale) to 0 dB • When Trace Format is set to Positive & Negative l: –(Horizontal Scale) to (Horizontal Scale) dB
Calibration					
Adjust Range		ADJRNG	---	---	
Power Calibration		PWRCAL	PWRCAL?	l	• Valid Only MS860x. l: –10.00 to 10.00 dB
Calibration Cancel		CALCANCEL	---	---	
Calibration Value		CALVAL l	CALVAL?	n,l	n:mode (0: Uncalibrated, 1: Internally calibrated, 2: External writing) l: –10.00 to 10.00 dB

Function	Item	Program Message	Query Message	Response Message	Remarks
Results					
Power		---	POWER_CCDF?	la,lb,lc,ld,le	la: Average Power lb: Maximum Power (absolute value) lc: Maximum Power (relative value to the average power) ld: Minimum Power (absolute value) le: Minimum Power (relative value to the average power)
Power at x %		---	PROBPWR_CCDF?	l1,l2,l3,l4,l5,l6	l1: Power value at 10% l2: Power value at 1% l3: Power value at 0.1% l4: Power value at 0.01% l5: Power value at 0.001% l6: Power value at 0.0001% (Note) When no applicablepower value exists, "***" is returned.
Distribution at Grid		---	PWRPROB_CCDF?	per1,per2,...,per(n)	• When Trace Format is set to other than Negative n: 1 to 5 Outputs from the smalest one of the values obtained by dividing Horizontal Scale into 5 equal parts. (Ex.) When Horizontal Scale = 5 dB 1: 1 dB 2: 2 dB 3: 3 dB 4: 4 dB 5: 5 dB • When Trace Format is set to Negative n: 1 to 5 Outputs from the largest one of the values obtained by dividing Horizontal Scale into 5 equal parts. (Ex.) When Horizontal Scale = 5 dB 1: –1 dB 2: –2 dB 3: –3 dB 4: –4 dB 5: –5 dB

<table>
<tr><th>Function</th><th colspan="2">Item</th><th>Program Message</th><th>Query Message</th><th>Response Message</th><th>Remarks</th></tr>
<tr><td rowspan="4">Marker</td><td rowspan="2">Result Data</td><td>Probability</td><td rowspan="2">---</td><td>MKL_CCDF? n,PROB</td><td>ra</td><td rowspan="4">n:0 to 2
0:Meas
1:Save
2:Gaus
ra: power distribution (unit: dB)
rb: probability (unit: %)</td></tr>
<tr><td>Distribution</td><td>MKL_CCDF? n,DSTRBT</td><td>rb</td></tr>
<tr><td rowspan="2">All Result</td><td>Probability</td><td rowspan="2">---</td><td>MKL_CCDF? All,PROB</td><td rowspan="2">ra,rb</td></tr>
<tr><td>Distribution</td><td>MKL_CCDF? ALL,DSTRBT</td></tr>
<tr><td colspan="3">Delta Marker</td><td>---</td><td>DELTAMKR_CCDF?</td><td>r</td><td></td></tr>
</table>

Function	Item	Program Message	Query Message	Response Message	Remarks
Wave Data		---	CCDFDSTRBT? na,nb,nc	ne(1),ne(2),...,ne(nd)	• Address for reading data • When Measure Method is set to CCDF na: 0 to 50.0 dB • When Measure Method is set to APD na: –50.0 to 50.0 dB Resolution: 0.1 dB • Number of read points • When Measure Method is set to CCDF nb: 1 to 501 • When Measure Method is set to APD nb: 1 to 1001 • Output waveform data nc: 0 to 2 (optional) 0: Measured waveform data 1: Saved waveform data 2: Gaussian waveform data Outputs measured waveform data when omitted. • Number of read points • When Measure Method is set to CCDF nd: 1 to 501 • When Measure Method is set to APD nd: 1 to 1001 • Read data ne: 0.0001 to 100.0000

Section 7 Command Details

This Section explains the details of device messages and response messages used in the MX860x04A/MX268x04A cdma2000 1x EV-DO Measurement Software in alphabetical order.

For the list of these messages, see Section 6 Device Message List.

7.1 How to Read the Detailed Description of Commands

Example: Setting impedance

IQINZ [1]

IQ Impedance [2]

[3]

Program Message	Query Message	Response Message
IQINZ a	IQINZ?	a

■ Function [4]

Sets the IQ signal input impedance on the Setup Common Parameter screen.

■ Value of a [5]

Impedance

a	Impedance	Initial value
50	50 Ω	*
1 M	1 M Ω	

■ Restriction [6]

- No setting is allowed when the Terminal is other than IQ-AC, IQ-DC or IQ-Balance.

■ Initialization of setting [7]

PRE, INI, IP, *RST

■ Example of use [8]

"Sets the impedance to 50 Ω."

<Program>

TERM IQAC

IQINZ 50

IQINZ?

<Response>

50

[1] Message header for Program Message and Query Message
[2] Name of Setup/Recall item (Note: This is not always the same as that on the screen of measuring equipment.)
[3] Syntax for Program Message, Query Message and Response Message.
Upper-case letters represent the reserved words. Lower-case letters represent the argument for the device message described in [5] or the response data.
[4] Outline of Setup/Recall function in Program Message and Query Message
[5] Description of lower-case letters in table of [3].
In case of set value; each argument includes the meaning of set item, initial value, range, resolution and restrictions.
In case of Response Message, each argument includes the meaning of output data, resolution, unit, etc.
[6] Description of restrictions and precautions in using the command. The command is not properly set or recalled if these restrictions are not met.
[7] A Program Message that initializes the items set by this command.
[8] An example of command use. The example of <Program> is given here only to show the examples of Program Message, Query Message and their order. It is not an actual program code. (Program code depends on the environment.) The values in <Response> differ from the actual measured values.

ADJCH

Offset freq. vs Power

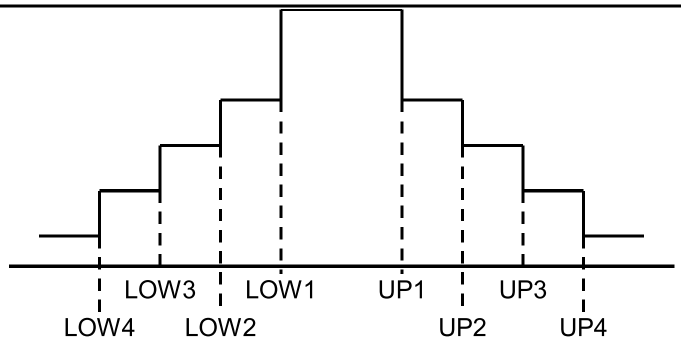
Program Message	Query Message	Response Message
–	ADJCH? a, b	c

■ Function

Outputs electric power at inflection point of template.

■ Value of a

Frequency position

a	Frequency position
LOW4 LOW3 LOW2 LOW1 UP1 UP2 UP3 UP4	

■ Value of b

Read out unit

b	Unit
None	In accordance with unit set by “Unit” (*cf.* UNIT_ACP)
DBM	dBm
DB	dB
WATT	W

■ Value of c

Electric power at each inflection point of template

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating point type)	W

■ Example of use

“Read out LOW1 electric power on dB unit basis”

<Program>
ADJCH? LOW1, DB

<Response>
–43.8

ADJRNG

Adjust Range

Program Message	Query Message	Response Message
ADJRNG	–	–

■ Function

Performs optimization of internal ATT and A/D levels, etc.

■ Restriction

- The following are executable screens (*cf.* DSPL).
    - Modulation Analysis
    - RF Power
    - Occupied Bandwidth
    - Spurious close to the Carrier
    - Spurious Emission
    - Power Meter
    - CCDF
- Where the Terminal is other than RF, execution cannot be performed (*cf.* TERM).
- Where the Frequency is less than 20 MHz, execution cannot be performed (*cf.* FREQ).

■ Example of use

"Perform optimization of internal ATT and A/D levels, etc."

<Program>
DSPL MODANAL
ADJRNG

<Response>
None

ANLYLEN_CCDF

Analysis Length for CCDF

Program Message	Query Message	Response Message
ANLYLEN_CCDF a	ANLYLEN_CCDF?	a

■ Function

Sets the duration of analysis for one measurement on the CCDF screen.

The following table shows the correspondence between filter and number of data to be analyzed for the minimum analysis duration (1usec).

Filter (Hz)	Number of data to be analyzed
20M	64
10M	32
5M	32
3M	32
1.23 M	32

■ Parameters

a

Duration of analysis

Range	Resolution	Initial value
1 to 100000	1μs	500(500μs)

□ Suffix code

None : μs

S : s

MS : ms

US : μs

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets the duration of analysis to 1msec."

<Program>
DSPL CCDF,CCDF
ANLYLEN_CCDF 1MS
ANLYLEN_CCDF?

<Response>
1000

ANLYLEN_MOD

Analysis Length of Modulation Analysis

Program Message	Query Message	Response Message
ANLYLEN_MOD a	ANLYLEN_MOD?	a

■ Function

Sets the analysis length of the modulation signal on the Modulation Analysis screen.

■ Value of a

Analysis length

Measuring Object	Range	Resolution	Initial value	Unit
Reverse Link Rev.0	1 to 16	1	1	Slot
Forward Link Rev.0				
Forward Link Rev.A				
QPSK	384 to 2048	1	1024	PNchip

□Suffix code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

“Set the analysis length to 5 slots when performing modulation analysis of Forward Link Rev.0.”

<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
ANLYLEN_MOD 5
ANLYLEN_MOD?

<Response>
5

ANLYSTA_MOD

Analysis Start Modulation

Program Message	Query Message	Response Message
ANLYSTA_MOD a	ANLYSTA_MOD?	a

■ Function

Sets the position for starting analysis on the Modulation Analysis screen.

■ Value of a

Position for starting analysis

Measuring Object	Range	Resolution	Initial value	Unit
Reverse Link Rev.0	0 to 15	1	0	Slot
Forward Link Rev.0				
Forward Link Rev.A				

□ Suffix code

None

■ Restriction

- No setting is allowed when Measuring Object is set to QPSK (*cf.* MEASOBJ).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the position for starting analysis to 15 slots when performing modulation analysis of Forward Link Rev.0. "

<Program>

```
DSPL SETCOM
MEASOBJ FORWARD_REV0
ANLYSTA_MOD 15
ANLYSTA_MOD?
```

<Response>

15

ANLYSTA_RFPWR

Analysis Start of RF Power

Program Message	Query Message	Response Message
ANLYSTA_RFPWR a	ANLYSTA_RFPWR?	a

■ Function

Sets analysis start position on the RF Power screen.

■ Value of a

Analysis start position

Measuring Object	Range	Resolution	Initial value	Unit
Reverse Link Rev.0	0 to 15	1	0	Slot
Forward Link Rev.0				
Forward Link Rev.A				

□ Suffix code

None

■ Restriction

- No setting is allowed when Measuring Object is set to QPSK (*cf.* MEASOBJ).
- No setting is allowed when Average Mode is set to Continuous (*cf.* AVGMD_RFPWR).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the analysis start position to 5 slots."

<Program>

```
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL RFPWR
TRG EXT
CODESYNC ON
ANLYSTA_RFPWR 5
ANLYSTA_RFPWR?
```

<Response>

5

ATT_ACP

Attenuator for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATT_ACP a	ATT_ACP?	a

■ Function

Sets the attenuator for Spurious close to the Carrier measurement.

■ Value of a

Attenuator

Range	Resolution	Initial value	Unit	RF Input
20 to 82	2	50	dB	High
0 to 62	2	30	dB	Low

□ Suffix code

None: dB

DB: dB

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Attenuator setting range depends on Ref Level (*cf.* RL_ACP).

■ Example of use

"Setting Attenuator to 20 dB."

<Program>

DSPL ACP,NRM

RL_ACP –30DBM

ATT_ACP 20DB

ATT_ACP?

<Response>

20

ATT_OBW

Attenuator for Occupied Bandwidth

Program Message	Query Message	Response Message
ATT_OBW a	ATT_OBW?	a

■ Function

Sets the attenuator for occupied bandwidth measurement with spectrum analyzer.

■ Value of a

Attenuator range	Resolution	Initial value	Unit	RF Input
20 to 82	2	50	dB	High
0 to 62	2	30	dB	Low

□Suffix code

None: dB

DB: dB

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Restriction

- Attenuator setting range depends on Ref Level (*cf.* RL_OBW).

■ Example of use

"Setting Attenuator to 20 dB."

<Program>

RL_OBW –30DBM

ATT_OBW 20DB

ATT_OBW?

<Response>

20

ATTMD_ACP

Attenuator Mode: Manual/Auto for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATTMD_ACP a	ATTMD_ACP?	a

■ Function

Selects manual or automatic attenuator setting of spectrum analyzer for Spurious close to the Carrier screen.

■ Value of a

Attenuator setting mode

a	Mode	Initial value
MAN	Attenuator manual setting mode	
AUTO	Attenuator automatic setting mode	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When attenuator is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator is set automatically.

■ Example of use

"Setting attenuator to Auto mode."

<Program>
ATTMD_ACP AUTO
ATTMD_ACP?

<Response>
AUTO

ATTMD_OBW

Attenuator Mode: Manual/Auto for Occupied Bandwidth

Program Message	Query Message	Response Message
ATTMD_OBW a	ATTMD_OBW?	a

■ Function
Selects manual or automatic attenuator setting of spectrum analyzer for Occupied Bandwidth screen.

■ Value of a
Attenuator setting mode

a	On/Off of Display Mode	Initial value
MAN	Sets Attenuator setting mode to manual.	
AUTO	Sets Attenuator setting mode to auto.	*

■ Initialization of setting
PRE, INI, IP, *RST

■ Restriction
- When attenuator is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator is set automatically.

■ Example of use
"Setting attenuator to Auto mode."

<Program>
ATTMD_OBW AUTO
ATTMD_OBW?

<Response>
AUTO

ATTRLMD_ACP

Attenuator Ref Level Mode: Manual/Auto for Spurious close to the Carrier

Program Message	Query Message	Response Message
ATTRLMD_ACP a	ATTRLMD_ACP?	a

■ Function

Selects manual or automatic Attenuator/Ref-level settings of spectrum analyzer for Spurious close to the Carrier screen.

■ Value of a

Attenuator/Ref-level setting mode

a	Mode	Initial value
MAN	Attenuator/Ref-level manual setting mode	
AUTO	Attenuator/Ref-level automatic setting mode	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When attenuator or Ref level is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator and Ref level are set automatically.

■ Example of use

"Setting attenuator/Ref-level to Auto mode."

<Program>
ATTRLMD_ACP AUTO
ATTRLMD_ACP?

<Response>
AUTO

ATTRLMD_OBW

Attenuator Ref Level Mode: Manual/Auto for Occupied Bandwidth

Program Message	Query Message	Response Message
ATTRLMD_OBW a	ATTRLMD_OBW?	a

■ Function

Selects manual or automatic attenuator/Ref-level setting of spectrum analyzer for Occupied Bandwidth screen.

■ Value of a

Attenuator/Ref-level setting mode

a	On/Off of Display Mode	Initial value
MAN	Sets Attenuator/Ref-level setting mode to manual.	
AUTO	Sets Attenuator/Ref-level setting mode to Auto.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When attenuator or Ref level is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator and Ref level are set automatically.

■ Example of use

"Setting attenuator and Ref level to Auto mode."

<Program>
ATTRLMD_OBW AUTO
ATTRLMD_OBW?

<Response>
AUTO

AVGMD_RFPWR

Average Mod for RF Power

Program Message	Query Message	Response Message
AVGMD_RFPWR a	AVGMD_RFPWR?	a

■ Function

Set the method of capturing waveforms for RF Power screen.

■ Value of a

Average mode

a	Average mode	Initial value
NRM	Normal: Captures waveforms and performs averaging for each measurement.	
CONTS	Continuous: Captures waveforms up to 256slots, then performs averaging.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Valid only when Storage mode is set to Average(*cf.* STRG_RFPWR).

■ Example of use

"Setting Average Mode to Continuous."

<Program>
DSPL RFPWR
STRG_RFPWR AVG
AVGMD_RFPWR CONTS
AVGMD_RFPWR?

<Response>
CONTS

AVR_ACP

Average Count for Spurious close to the Carrier

Program Message	Query Message	Response Message
AVR_ACP a	AVR_ACP?	a

■ Function

On the Spurious close to the Carrier screen, sets the average (measurement) count when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Average Count at 500."

<Program>
AVR_ACP 500
AVR_ACP?

<Response>
500

AVR_IQL

Average Count for IQ Level

Program Message	Query Message	Response Message
AVR_IQL a	AVR_IQL?	a

■ Function

Sets the measuring (average) count on the IQ Level screen when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Average Count at 500."

<Program>
AVR_IQL 500
AVR_IQL?

<Response>
500

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

AVR_MOD

Average Count for Modulation Analysis

Program Message	Query Message	Response Message
AVR_MOD a	AVR_MOD?	a

■ Function

Sets the average (measurement) count on the Modulation Analysis screen when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting Average Count at 500."

<Program>
AVR_MOD 500
AVR_MOD?

<Response>
500

AVR_OBW

Average Count for Occupied Bandwidth

Program Message	Query Message	Response Message
AVR_OBW a	AVR_OBW?	a

■ Function

Sets the average (measurement) count on the Occupied Bandwidth screen when Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Sets Average Count to 500."

<Program>
AVR_OBW 500
AVR_OBW?

<Response>
500

AVR_RFPWR

Average Count for RF Power

Program Message	Query Message	Response Message
AVR_RFPWR a	AVR_RFPWR?	a

■ Function

Sets the average (measurement) count on the RF Power screen when the Storage Mode is set to Average.

■ Value of a

Average (measurement) count

Range	Resolution	Initial value
2 to 9999	1	10

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets Average Count to 500."

<Program>
AVR_RFPWR 500
AVR_RFPWR?

<Response>
500

BAND

Preselector for Spurious Emission

Program Message	Query Message	Response Message
BAND a	BAND?	a

■ Function

On the Spurious Emission Measurement, set the Preselector route for use or non-use.

■ Value of a

Route selection

a	Route selection	Initial value
0	No use of Preselector route (Normal)	*
1	Use of Preselector route (Spurious)	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Use Preselector route”.

<Program>
BAND 1
BAND?

<Response>
1

■Restrictions according to model type and options

This function is optional.

If MS8608A-03/MS2683A-03 Pre-selector Lower-limit expansion is not installed, this command is invalid.

BIN

Binary/ASCII mode

Program Message	Query Message	Response Message
BIN a	BIN?	a

■ Function

Sets ASCII or binary format to read the waveform data.

■Value of a

Specification of ASCII or binary format

Value	ASCII／Binary	Initial Value
ON	Binary format	*
1		
OFF	ASCII format	
0		

■Use example

Read the waveform data in binary format.

<Program>
BIN ON
BIN?

<Response>
ON

BS

Back Screen

Program Message	Query Message	Response Message
BS	–	–

■ Function

Switches to the upper screen of the currently displayed screen. The relationship among each of the screens is as follows:

- Setup Common Parameter
  - Modulation Analysis
  - RF Power
    - Setup Template
  - Occupied Bandwidth
  - Spurious close to the Carrier
    - Setup Spurious Template
  - Spurious Emission
    - Setup Spot Table
    - Setup Search/Sweep Table
  - IQ Level
  - Power Meter
  - CCDF

■ Example of use

"Shifting to the upper screen."

<Program>

BS

CALCANCEL

Power Calibration Cancel

Program Message	Query Message	Response Message
CALCANCEL	–	–

■ Function

Cancels Power Calibration and resets the calibration value to 0.00.

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
    - Modulation Analysis
    - RF Power
    - Occupied Bandwidth
    - Spurious close to the Carrier
    - Spurious Emission
    - CCDF
- When the Terminal is other than RF, execution cannot be performed (*cf.* TERM).

■ Example of use

"Canceling Power Calibration."

<Program>
DSPL SETCOM
TERM RF
DSPL MODANAL
CALVAL 10.00DB
CALVAL?
CALCANCEL
CALVAL?

<Response>
2,10.00
0,0.00

CALVAL

Power Calibration Value

Program Message	Query Message	Response Message
CALVAL a	CALVAL?	b, a

■ Function

Sets the calibration value for Power Calibration.

■ Value of a

Calibration value

Range	Resolution	Initial value	Unit
–10.00 to 10.00	0.01	0.00	dB

□ Suffix code

None: dB

DB: dB

■ Value of b

Type of calibration

b	Type of calibration	Initial value
0	Uncalibrated	*
1	Internal calibration	
2	External calibration	

■ Restriction

- When the Terminal is other than RF, execution cannot be performed (*cf.* TERM).

■ Example of use

“Setting the calibration value at 5 dB.”

<Program>

DSPL SETCOM

CALVAL 5.00

CALVAL?

<Response>

2,5.00

CARRF

Carrier Frequency

Program Message	Query Message	Response Message
–	CARRF?	a

■ Function

Outputs the carrier frequency on the Modulation Analysis screen.

■ Value of a

Carrier frequency

Resolution	Unit
0.1	Hz

■ Restriction

- When the Terminal is other than RF, measurement is not performed (*cf.* TERM).

■ Example of use

"Read out the carrier frequency."

<Program>
MEAS MODANAL
CARRF?

<Response>
1922499857.2

CARRFERR

Carrier Frequency Error

Program Message	Query Message	Response Message
–	CARRFERR? a	b

■ Function

Outputs the carrier frequency error on the Modulation Analysis screen.

■ Value of a

Output unit

a	Output unit
None	Hz
HZ	Hz
PPM	ppm

■ Value of b

Frequency error

Resolution	Unit
0.1	Hz
0.001	ppm

■ Restriction

- When the Terminal is other than RF, measurement is not performed (*cf.* TERM).

■ Example of use

"Read out the carrier frequency error."

<Program>
MEAS MODANAL
CARRFERR? HZ

<Response>
–14.5

CCDFDSTRBT

Distribution for CCDF

Program Message	Query Message	Response Message
–	CCDFDSTRBT? a,b,c	d(1),d(2),...,d(b)

■ Function

Outputs the distribution waveform for CCDF measurement.

■ Value of a

Start position of readout data

Range	Resolution	Unit	Measure Method
0.0 to 50.0	0.1	dB	CCDF
–50.0 to 50.0	0.1	dB	APD

■ Value of b

Number of read out data

Range	Resolution	Measure Method
1 to 501	1	CCDF
1 to 1001	1	APD

■ Value of c

Output waveform data

Value	Output waveform data
None	Outputs measurement waveform data.
0	
1	Outputs waveform data of Trace specified in Save Reference Trace. (*cf.* SAVETR_CCDF)
2	Outputs waveform data of Gaussian Trace.

■ Value of d(n)

Read out data

Range	Resolution
0.0001 to 1.0000	0.0001

■ Example of use

"Read 5 distribution waveforms from memory address 0."

<Program>

```
DSPL CCDF,CCDF
SWP
CCDFDSTRBT? 0,5
```

<Response>

```
0.5123,0.2432,0.1234,0.1123,0.0123
```

CDALLCH

Code Domain Results

Program Message	Query Message	Response Message
–	CDALLCH? PWR,b,c,d	f1,f2,f3,...,fn
–	CDALLCH? WAVE,b,c,d	g1,g2,g3,...,gn
–	CDALLCH? DIFF,16,c	h1,h2,h3,...,hn
–	CDALLCH? ALL,b,c,d	f1,g1,(h1), f2,g2,(h2),..., fn,gn,(hn)

■ Function

On the Modulation Analysis screen, outputs all of the measurement results of Code Domain Power, Waveform Quality, Difference at one time.

■ Value of a

Measurement result to be output

a	Measurement result to be output
PWR	Code Domain Power
WAVE	Waveform Quality
DIFF	Difference with the each channel average in Forward Link Rev.0 or Forward Link Rev.A data area
ALL	All measured results

■ Value of b

Walsh Length

Range	Measuring Object
16, 64	Forward Link Rev.0
16, 128	Forward Link Rev.A
4, 8, 16	Reverse Link Rev.0

■ Value of c

Operation Trace

c	Signal type
I	I signal
Q	Q signal
None	Depends on Operation Trace setting

■ Value of d

Valid only when b is set to 64 or 128.

Code Order

d	Code Order
WL	Walsh
MAC	MAC
None	Depends on Code Order setting

■ Value of f

Code Domain Power

Resolution	Unit
0.01	dB

■ Value of g

Waveform Quality

Resolution	Unit
0.00001	None

■ Value of h

Difference

Resolution	Unit
0.01	dB

■ Restriction

DIFF is valid only when Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A.

■ Example of use

“Read out the measurement result of Code Domain Power from Code Number of 0 to 15.”

<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL MODANAL
SWP
CDALLCH? PWR, 15

<Response>
74,–3122,–1648,...,–5860,–1938

CDANAL

Code Domain Results

When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A

Program Message	Query Message	Response Message
–	CDANAL? a,b,c,d	e,f,g

When Measuring Object is set to Reverse Link Rev.0

Program Message	Query Message	Response Message
–	CDANAL? PWR,c	a0,b0,e0,a1,b1,e1,...,a(n-1),b(n-1),e(n-1)
–	CDANAL? WAVE,c	a0,b0,f0,a1,b1,f1,...,a(n-1),b(n-1),f(n-1)
–	CDANAL? ALL, c,	a0,b0,e0,f0,a1,b1,e1,f1,..., a(n-1),b(n-1),e(n-1),f(n-1)

■ Function

Outputs the measurement results of Code Domain Power, Waveform Quality or Difference in specified Walsh Length, Code Number or Operation Phase on the Modulation Analysis screen.

■ Value of a

Walsh Length

a	Measuring Object
16	Data area of Forward Link Rev.0 or Forward Link Rev.A
64	MAC area of Forward Link Rev.0
128	MAC area of Forward Link Rev.A
4,8,16	Reverse Link Rev.0

■ Value of b

Code Number

b	Resolution
0 to (a - 1)	1

■ Value of c

Operation Trace

c	Resolution
I	I signal
Q	Q signal
None	Depends on Operation Trace setting

■ Value of d

Valid only when a is set to 64, 128

d	Code Order Type
WL	Walsh
MAC	MAC
None	Depends on Code Order setting

■ Value of e

Code Domain Power

Resolution	Unit
0.01	dB

■ Value of f

Waveform Quality

Resolution	Unit
0.00001	None

■ Value of g

Difference

Resolution	Unit
0.01	dB

■ Example of use

"Output the measurement results of Code Domain Power, Waveform Quality or Difference when Walsh Length is 16, Code Number is 3 and Operation Trace is Q."

```
<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL MODANAL
SWP
CDANAL? 16,3,Q
<Response>
–27.6,0.00037,9.24
```

CDPANLY

Code Domain Results

Program Message	Query Message	Response Message
–	CDPANLY? a,b,c,d	e,f,g

■ Function

Outputs the measurement results of Code Domain Power, Waveform Quality or Difference in specified Code Number, Walsh Length or Operation Trace on the Modulation Analysis screen.

■ Value of a

Channelization Code Number

a	Resolution
0 to (b – 1)	1

■ Value of b

Walsh Length

Range	Measuring Object
16, 64	Forward Link Rev.0
16, 128	Forward Link Rev.A
4, 8, 16	Reverse Link Rev.0

■ Value of c

Operation Trace

c	Signal type
I	I signal
Q	Q signal
None	Depends on Operation Trace setting

■ Value of d

Valid only when b is set to 64, 128

d	Code Order Type
WL	Walsh
MAC	MAC
None	Depends on Code Order setting

■ Value of e

Code Domain Power

Resolution	Unit
0.01	dB

■ Value of f

Waveform Quality

Resolution	Unit
0.00001	None

■ Value of g

Difference

Resolution	Unit
0.01	dB

■ Example of use

"Output the measurement results of Code Domain Power, Waveform Quality or Difference when Code Number is 3, Walsh Length is 16 and Operation Trace is Q."

```
<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL MODANAL
SWP
CDPANLY? 3,16,Q

<Response>
–10.88,0.00318,–4.88
```

CHAN

Channel

Program Message	Query Message	Response Message
CHAN a	CHAN?	a

■ Function

Setting of channel number.

■ Value of a

Channel

Value	Resolution	Initial value
0 to 20000 (See Restrictions)	1	1092

■ Restriction

- The terminal must be set to RF (*cf.* TERM).
- If the frequency goes beyond the setting range when changing the channel, the channel cannot be changed even within the setting range (*cf.* FREQ). For example, the channel cannot be changed when channel = 0, frequency = 7.8 GHz and Channel Spacing = 0.2 MHz.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the channel to 500."

<Program>
DSPL SETCOM
TERM RF
CHAN 500
CHAN?

<Response>
500

CHANTYPE_MOD

Channel Type

Program Message	Query Message	Response Message
CHANTYPE_MOD a	CHANTYPE_MOD?	a

■ Function

Sets the channel type of waveform when Measuring Object is Reverse Link Rev.0 on the Modulation Analysis screen.

■ Value of a

Channel type specification

a	Description	Initial value
TRAFFIC	Performs analysis for the Traffic channel that consists of PILOT, PRI, DRC, ACK, and DATA channels.	*
ACCESS	Perform analysis for the Access channel that consists of PILOT and DATA channels.	

■ Restriction

- Enable when Reverse Link Rev.0 is set for Measuring Object. (*cf.* MEASOBJ)

■ Initialization of setting

PRE,INI,IP,*RST

■ Example of use

"Performs analysis with the Traffic channel."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
CHANTYPE_MOD TRAFFIC
CHANTYPE_MOD?

<Response>
TRAFFIC

CHFREQ

Channel and Frequency

Program Message	Query Message	Response Message
CHFREQ a, b	–	–

■ Function

Sets the channel and the frequency of the channel concurrently on the Setup Common Parameter screen.

■ Value a : Channel

Same as “CHANa” (*cf.* CHAN).

■ Value b : Carrier frequency

Same as “FREQb” (*cf.* FREQ).

■ Restriction

- No setting is allowed when the terminal is one other than RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

“Setting the carrier frequency of Channel 2 to 1 GHz.”

```
<Program>
DSPL SETCOM
TERM RF
CHFREQ 2,1 GHZ
CHAN?
FREQ?

<Response>
2
1000000000
```

CHPERPILOT

Channel/Pilot

Program Message	Query Message	Response Message
–	CHPERPILOT? a	bn(n=1,2,3,4)
–	CHPERPILOT? ALL	b1,b2,b3,b4

■ Function

Displays the ratio of channel code domain powers to PILOT channel code domain power on the Modulation Analysis screen.

■ Value of a

Channel specification

a	Corresponding channel
PRI	PRI channel code domain power
DRC	DRC channel code domain power
ACK	ACK channel code domain power
DATA	DATA channel code domain power

■ Value of b

Power ratio

bn	Power ratio	Resolution	Unit
b1	PRI channel code domain power	0.01	dB
b2	DRC channel code domain power		
b3	ACK channel code domain power		
b4	DATA channel code domain power		

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Displays the ratio of DRC channel code domain power to PILOT channel code domain power."

<Program>
DSPL MODANAL
SWP
CHPERPILOT? DRC

<Response>
–35.15

CHSPC

Channel Spacing

Program Message	Query Message	Response Message
CHSPC a	CHSPC?	a

■ Function

Sets the one-channel frequency band on the Setup Common Parameter screen.

■ Value of a

One-channel Frequency Band.

Range	Resolution	Initial value	Unit
–10000000000 to 10000000000	1	1250000	Hz

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

- No setting is allowed when the terminal is other than RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the inter-channel frequency band to 300 kHz."

<Program>
DSPL SETCOM
TERM RF
CHAN 501
FREQ 400MHZ
CHSPC 300KHZ
CHSPC?
CHAN 502
FREQ?

<Response>
300000
400300000

CODEORDER_CDP

Code Order

Program Message	Query Message	Response Message
CODEORDER_CDP a	CODEORDER_CDP?	a

■ Function

Switches the display mode of the code domain power on the Modulation Analysis screen.

■ Value of a

Display mode of code domain power

a	Description	Initial value
WALSH	Display with Walsh series.	*
MACIDX	Display in the order of MAC Index.	
OVSF	Display with orthogonal Variable Spreading Factor.	

■ Restriction

- WALSH or MACIDX can be set when Code Domain of MAC is set for Trace Format. (*cf.* TRFORM)
- WALSH or OVSF can be set when Code Domain is set for Trace Format. (*cf.* TRFORM)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display with Walsh series."

<Program>
DSPL MODANAL
TRFORM CODEOFMAC
CODEORDER_CDP WALSH
CODEORDER_CDP?

<Response>
WALSH

CODESYNC

Code Sync

Program Message	Query Message	Response Message
CODESYNC a	CODESYNC?	a

■ Function

Sets the RF power screen so that the Measuring Object does or does not indicate the position of the waveform by means of code synchronization, in the case of Forward Link Rev.0, Forward Link Rev.A and Reverse Link Rev.0.

■ Value of a

On/Off of Code Synchronization

a	On/Off of Code Synchronization	Initial value
ON	Performs synchronization by code.	
OFF	Does not perform synchronization by code.	*

■ Restriction

- No setting is allowed where the Measuring Object is QPSK (*cf.* MEASOBJ).
- Setting is allowed where the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Trigger is set to External (*cf.* TRG).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set so that the position of the waveform is indicated by means of synchronization."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
DSPL RFPWR
CODESYNC ON
CODESYNC?

<Response>
ON

CONTS

Continuous Sweep

Program Message	Query Message	Response Message
CONTS	–	–

■ Function

Executes continuous measurement (sweep).

■ Restriction

- Executable screens are as follow (*cf.* DSPL).

Executable screen	Remarks
Modulation Analysis	–
RF Power	–
Occupied Bandwidth	–
Spurious close to the Carrier	at Aberage, Single operation
Spurious Emission	Single operation
IQ Level	–
Power Meter	–
CCDF	–

■ Example of use

"Execute continuous measurement (sweep)".

<Program>
CONTS

CORR

Correction

Program Message	Query Message	Response Message
CORR a	CORR?	a

■ Function

Selects the Correction data table for level correction.

■ Value of a

Correction data table

a	Correction data table	Initial value
0	No data correction is carried out.	*
1	Use Table 1 for performing data correction.	
2	Use Table 2 for performing data correction.	
3	Use Table 3 for performing data correction.	
4	Use Table 4 for performing data correction.	
5	Use Table 5 for performing data correction	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Selecting Correction Data Table 3."

<Program>
CORR 3
CORR?

<Response>
3

DCOUNT_CCDF

Measurement Data Count for CCDF

Program Message	Query Message	Response Message
DCOUNT_CCDF a	DCOUNT_CCDF?	a

■ Function

Sets the number of measurement data on the CCDF screen.

■ Value of a

Number of measurement data

Range	Resolution	Initial value
10000 to 2000000000	1	1000000

□ Suffix code

None : 1 point

KP: K point

MP: M point

GP: G point

■ Initialization command

PRE, INI, IP, ∗RST

■ Example of use

"Sets the number of measurement data to 10000."

<Program>

DSPL CCDF,CCDF

DCOUNT_CCDF 10KP

DCOUNT_CCDF?

<Response>

10000

DELTAMKR_CCDF

Delta Marker Value for CCDF

Program Message	Query Message	Response Message
–	DELTAMKR_CCDF?	a

■ Function

Outputs the power deviation and probability of the delta marker on the CCDF screen.
Sets the delta marker according to the Reference Trace (*cf.* REFTR_CCDF) setting value and outputs power deviation or probability according to Display Data Type. (*cf.* DSPLTYPE_CCDF)

Reference Trace	Delta Marker
Save Trace	Measure Trace - Save Trace
Gaussin Trace	Measure Trace - Gaussian Trace
Save & Gaussian	Measure Trace - Save Trace
Off	Not output

Display Data Type	Output format
Distribution	Probability
Probability	Power deviation

■ Value of a

Output data

Resolution	Unit	Output format
0.0001	%	Probability
0.1	dB	Power deviation

■ Initialization command

PRE, INI, IP, *RST

■ Restriction

- This is not output when Marker is Off or Reference Trace is Off. (*cf.* MKR_CCDF)

■ Example of use

"Read the difference of power deviations."

<Program>

```
DSPL CCDF,CCDF
MKR_CCDF NRM
REFTR_CCDF SAVE
SWP
DELTAMKR_CCDF?
```

<Response>

```
5.12
```

DET_ACP

Detection Mode

Program Message	Query Message	Response Message
DET_ACP a	DET_ACP?	a

■ Function

Sets the wave-detection mode in Spurious Close to the Carrier measurement.

■ Value of a

Wave-detection mode

a	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	*
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction

- RMS can be set when Digital is set for RBW Mode. (*cf.* RBD_ACP)
- If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* RBD_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the wave-detection mode to Average."

<Program>
DET_ACP AVG
DET_ACP?

<Response>
AVG

■ Notes
RMS is an option.

DET_OBW

Detection Mode

Program Message	Query Message	Response Message
DET_OBW a	DET_OBW?	a

■ Function

Sets the wave-detection mode respective of Occupied Bandwidth measurement using a spectrum analyzer.

■ Value of a

Wave-detection mode

a	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	*
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction

- RMS can be set when Digital is set for RBW Mode. (*cf.* RBD_OBW)
- If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* RBD_OBW)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the wave-detection mode to Average."

<Program>
DET_OBW AVG
DET_OBW?

<Response>
AVG

■ Notes
RMS is an option.

DET_SPU

Detection Mode

Program Message	Query Message	Response Message
DET_SPU a,b	DET_SPU? a	b

■ Function

Sets the wave-detection mode of Spurious Emission measurement.

■ Value of a

Detection Mode

a	Detection Mode
SPOT	The wave-detection mode used in the Spot measurement method is the object hereof.
SEARCH	The wave-detection mode used in the Search measurement method is the object hereof.
SWEEP	The wave-detection mode used in the Sweep measurement method is the object hereof.

■ Value of b

Wave-detection mode

b	Wave-detection mode	Initial value
POS	Sets the wave-detection mode to Positive Peak. Makes the maximum value during one sampling period to the data of the point thereof.	
NEG	Sets the wave-detection mode to Negative Peak. Makes the minimum value during one sampling period to the data of the point thereof.	
SMP	Sets the wave-detection mode to Sample. Makes the instantaneous data at the point of when the hardware executes sampling operation to the data of that point.	
AVG	Sets the wave-detection mode to Average. Makes the average value between sampling points to the data of the points.	*
RMS	Sets the wave-detection mode to RMS. Makes the RMS value between the sampling points to the data of the points.	

■ Restriction

- RMS can be set when Digital is set for RBW Mode. (*cf.* TBLRBWTP_SPU)
- If RBW Mode is set to Digital when Average is set for detection mode, detection mode will be set to RMS. (*cf.* TBLRBWTP_SPU)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the wave-detection mode of the Sweep method to Positive Peak. "

<Program>
DET_SPU SWEEP,POS
DET_SPU? SWEEP

<Response>
POS

■ Notes

RMS is an option.

DISPTYPE_ACP

Display Data Type for Spurious close to the Carrier

Program Message	Query Message	Response Message
DISPTYPE_ACP a	DISPTYPE_ACP?	a

■ Function

Sets the display type of measurement result in the Spurious close to the Carrier screen.

■ Value of a

Measurement result type selection

a	Display format	Initial value
FREQVSPWR	Shows the leakage power at each offset frequency.	
PEAKPWR	Displays level of measured point of minimum margin at each frequency band of the template.	*
PEAKMARGIN	Displays margin of measured point of minimum margin at each frequency band of the template.	

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets the display type of measurement result to Freq. vs. Power."

<Program>
DSPL ACP,NRM
SWP
DISPTYPE_ACP FREVSPWR
DISPTYPE_ACP?

<Response>
FREQVSPWR

DISPTYPE_CCDF

Display Data Type for CCDF

Program Message	Query Message	Response Message
DISPTYPE_CCDF a	DISPTYPE_CCDF?	a

■ Function

Sets the grid display format in the CCDF screen.

■ Value of a

Measurement method selection

a	Display format	Initial value
PROB	Displays the waveform distribution for vertical axis grids.	*
DSTRBT	Displays the waveform probability for horizontal axis grids.	

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets Display Data Type to Probability."

<Program>
DSPL CCDF,CCDF
SWP
DISPTYPE_CCDF PROB
DISPTYPE_CCDF?

<Response>
PROB

DPTS_ACP

Data Points:1001/501

Program Message	Query Message	Response Message
DPTS_ACP a	DPTS_ACP?	a

■ Function

Sets the number of data points received from Spectrum-Analyzer sweeping on the Spurious Close to the Carrier screen.

■ Value of a

Data number

a	Data number	Initial value
1001	Sets so that 1001 data points are received.	*
501	Sets so that 501 data points are received.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Spectrum Analyzer sweeping data to 1001 points."

<Program>
DPTS_ACP 1001
DPTS_ACP?

<Response>
1001

■ Notes

A setting value differs from a display value when Measure Method is 3GPP2 FWD Band Class 0, 2, 3, 5, 9 or 3GPP2 FWD Band Class 1, 4, 6, 8.

display value

Measure Method	setting value	
	501	1001
Normal	501	1001
3GPP2 FWD Band Class 0,2,3,5,9	1501	3001
3GPP2 FWD Band Class 1,4,6,8	2001	3501

DPTS_OBW

Data Points:1001/501

Program Message	Query Message	Response Message
DPTS_OBW a	DPTS_OBW?	a

■ Function

On the Occupied Bandwidth screen, set the number of data points received from Spectrum Analyzer sweeping.

■ Value of a

Data number

a	Data number	Initial value
1001	Sets so that 1001 data points are received.	
501	Sets so that 501 data points are received.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Spectrum Analyzer sweeping data to 1001 points."

<Program>
DPTS_OBW 1001
DPTS_OBW?

<Response>
1001

DSPL

Change Screen

Program Message	Query Message	Response Message
DSPL a	DSPL?	a
DSPL a,b	DSPL?	a,b

■ Function

Changes the screen. Measurement is not performed even if the screen to which one is changing is a measurement screen.

■ Value of a, b

a: Name of screen

b: Measurement method or table selection

a	b	Name of screen	Measurement method or table selection	Initial value	Change condition
SETCOM	–	Setup Common Parameter	–	*	
MODANAL	–	Modulation Analysis	–		
RFPWR	–	RF Power	–		
SETTEMP_RFPWR	–	Setup Template (for RF Power)	–		
OBW	SPECT	Occupied Bandwidth	Spectrum		A
	FFT		FFT		
ACP	NRM	Spurious close to the Carrier	Normal		A
	—				
	PRECISE1		3GPP2 FWD Band Class0,2,3,5,9		
	PRECISE2		3GPP2 FWD Band Class 1,4,6,8		
	PRECISE3		3GPP2 FWD Band Class 3+		
SETTEMP_ACP	–	Setup Spurious Template (for Spurious close to the Carrier)	–		C
SPURIOUS	SPOT	Spurious Emission	Spot		A
	SEARCH		Search		A
	SWEEP		Sweep		A
SETTBL_SPU	SPOT	Setup Table (for Spurious Emission)	Spot		A
	SWEEP		Search & Sweep		A
IQLVL	–	IQ Level	–		B
PWRMTR	–	Power Meter	–		A
CCDF	CCDF	CCDF	CCDF		
	APD		APD		

■ Change conditions

A: Change is not allowed when the Terminal is other than RF.

B: Change is not allowed when the Terminal is RF.

C: Change is not allowed when the Terminal is other than RF.
Change is not allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8 (*cf.* SLCTEMP_ACP).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

[1] "Changing to the Modulation Analysis screen."

<Program>
DSPL MODANAL
DSPL?

<Response>
MODANAL

[2] "Changing to sweep measurement on the Spurious Emission screen."

<Program>
DSPL SPURIOUS,SWEEP
DSPL?

<Response>
SPURIOUS, SWEEP

■Restrictions according to model type and options

For MS268x, changing to IQ Level Screen is not allowed when Option –17 or –18 I/Q Input is not installed.
For MS268x, changing to Power Meter Screen is not allowed.

ERRSC

Error Scale for Constellation

Program Message	Query Message	Response Message
ERRSC a	ERRSC?	a

■ Function

Sets a circle indicating the error range of each symbol on the constellation display of the Modulation Analysis screen.

■ Value of a

Error Range

a	Error Range	Initial value
5	5 %	
10	10 %	
20	20 %	
OFF	Off	*

■ Restriction

- No setting is allowed when the Trace Format is other than Constellation (*cf.* TRFORM).
- No setting is allowed when the Trace Slot is other than Symbol while the Modulation Type is Auto (*cf.* TRSLOT, MODTYPE).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the error scale to 20%."

<Program>
TRFORM CONSTEL
TRSROT SYMBOL
MODTYPE QPSK
ERRSC 20
ERRSC?

<Response>
20

FILTER

Filter

Program Message	Query Message	Response Message
FILTER a	FILTER?	a

■ Function

Set up on the Setup Common Parameter screen to indicate whether filter processing has been performed on the signal subject to analysis.

■ Value of a

Specification of filtering On/Off

a	Specification of filtering On/Off	Initial value
OFF	Analyzes without filter processing.	
ON	Analyzes with filter processing.	*
EQ	Analyzes with filter processing and equalizing processing.	

■ Restriction

- This setting is disabled when the displayed measurement screen is other than the Setup Common Parameter screen.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Performing filter processing for analysis."

<Program>
DSPL SETCOM
FILTER ON
FILTER?

<Response>
ON

FREQ

Frequency

Program Message	Query Message	Response Message
FREQ a	FREQ?	a

■ Function

Sets the carrier frequency to be measured on the Setup Common Parameter screen.

■ Value of a

Carrier frequency

Range	Resolution	Initial value	Unit	Remarks
100 to 7800000000	1	887650000	Hz	For MS8608A
100 to 13200000000	1	887650000	Hz	For MS8609A
100 to 3000000000	1	887650000	Hz	For MS2681A
100 to 7800000000	1	887650000	Hz	For MS2683A
100 to 30000000000	1	887650000	Hz	For MS2687A/B

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Restriction

- No setting is allowed when the terminal is one other than RF (*cf.* TERM).
- When the channel value changes only by ΔCh, carrier frequency Fnew after changing is found by Fnew = Fold + {(Channel Spacing) × ΔCh}, where Fold is carrier frequency before changing (*cf.* CHAN).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the carrier frequency to 1 GHz."

```
<Program>
DSPL SETCOM
TERM RF
FREQ 1GHZ
```

<Response>
1000000000

FSPAN_ACP

Frequency Span for Spurious close to the Carrier

Program Message	Query Message	Response Message
FSPAN_ACP a	FSPAN_ACP?	a

■ Function

Sets the measurement frequency bandwidth on the Spurious Close to the Carrier screen.

■ Value of a

Frequency bandwidth

Range	Resolution	Initial value	Unit
1000000 to 10000000	2000	8000000	Hz

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

- No setting is allowed when the Measure Method is other than Normal. (*cf.* DSPL)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Setting the measurement frequency bandwidth to 3 MHz on the Spurious close to the Carrier screen.”

<Program>
DSPL ACP,NRM
FSPAN_ACP 3MHZ
FSPAN_ACP?

<Response>
3000000

FSPAN_OBW

Frequency Span for Occupied Bandwidth

Program Message	Query Message	Response Message
FSPAN_OBW a	FSPAN_OBW?	a

■ Function

Sets the measurement frequency bandwidth on the Occupied Bandwidth screen.

■ Value of a

Frequency bandwidth

Range	Resolution	Initial value	Unit
1000000 to 10000000	1	4000000	Hz

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

- When the method is FFT, fixed 3.91 MHz is set. Namely, when the bandwidth is read out during FFT method, “3,910,000” is read out always.
- Regardless of the method, setting is performed depending on Span during Spectrum method. Moreover, there is no relation of dependence between Span of Spectrum and Span of FFT.

■ Example of use

“Set Span on the Occupied Bandwidth screen.”

<Program>
DSPL OBW,SPECT
FSPAN_OBW 2MHZ
FSPAN_OBW?
DSPL OBW,FFT
FSPAN_OBW 5MHZ
FSPAN_OBW?
DSPL OBW,SPECT
FSPAN_OBW?

<Response>
2000000
3910000
5000000

HSCALE_CCDF

Horizontal Scale for CCDF

Program Message	Query Message	Response Message
HSCALE_CCDF a	HSCALE_CCDF?	a

■ Function

Sets the horizontal scale of trace on the CCDF screen.

■ Value of a

Trace specification

Value	Maximum horizontal value (absolute)	Initial value
2	2dB	
5	5dB	
10	10dB	
20	20dB	*
50	50dB	

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets Horizontal Scale to 2dB."

<Program>
DSPL CCDF,CCDF
HSCALE_CCDF 2
HSCALE_CCDF?

<Response>
2

ILVL

I Level (RMS)

Program Message	Query Message	Response Message
–	ILVL? a	b

■ Function

Reads out the measured results of the RMS value of Signal I on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	Conforms to the unit set by the Unit *(cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b

RMS value of Signal I

Resolution	Unit
0.01	mV
	dBmV

■ Example of use

"Reading out the RMS value of Level I."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
ILVL? MV

<Response>
1.42

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IMASK

Long Code Mask

Program Message	Query Message	Response Message
IMASK a	IMASK?	a

■ Function

Sets MI for I-phase Long Code Mask of the Reverse Link signal.

■ Value of a

Specification of MI for I-phase Long Code Mask

Range	Resolution	Initial value
00000000000 - 3ffffffffff	1	00000000000

■ Restriction

- The measurement screen must be "Setup Common Parameter."
- Enable when Reverse Link Rev.0 is set for Measuring Object. (*cf.* MEASOBJ)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Performs analysis by setting MI for I-phase Long Code Mask to "00000000001"."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
IMASK 1
IMASK?

<Response>
00000000001

INI

Initialize

Program Message	Query Message	Response Message
INI	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the PRE and IP commands (*cf.* PRE, IP).

■ Example of use

"Initializing the parameters to be initialized."

<Program>
INI

INTEGRAL_ACP

Integral Waveform

Program Message	Query Message	Response Message
INTEGRAL_ACP a	INTEGRAL_ACP?	a

■ Function

Sets the integral waveform display On/Off.

■ Value of a

On/Off for the integral waveform display

a	Initial value
ON	
OFF	*

■ Restriction

- No setting is allowed when the Measure Method is other than Normal. (*cf.* DSPL)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the integral waveform display to On."

<Program>
DSPL ACP,NRM
SWP
INTEGRAL_ACP ON
INTEGRAL_ACP?

<Response>
ON

INTPOL

Interpolation for Constellation

Program Message	Query Message	Response Message
INTPOL a	INTPOL?	a

■ Function

Sets the interpolation display on the Modulation Analysis screen when Trace Format is set at Constellation.

■ Value of a

Interpolation display

a	Interpolation mode	Initial value
NON	Non: Displays only the symbol points.	*
LIN	Linear: Displays the linearly interpolated symbol points.	
LINSYM	Linear & Symbol Position: Displays the symbol points and the linearly interpolated symbol points.	

■ Restriction

- No setting is allowed when Trace Format is set to other than Constellation (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Linearly interpolating the symbol points."

<Program>
TRFORM CONSTEL
INTPOL LIN
INTPOL?

<Response>
LIN

INTVAL_ACP

Refresh Interval for Spurious close to the Carrier

Program Message	Query Message	Response Message
INTVAL_ACP a	INTVAL_ACP?	a

■ Function

Sets the display renewal interval on the Spurious close to the Carrier screen when the storage mode is Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Setting the updating interval to Once.”

<Program>
INTVAL_ACP ONCE
INTVAL_ACP?

<Response>
ONCE

INTVAL_IQL

Refresh Interval for IQ Level

Program Message	Query Message	Response Message
INTVAL_IQL a	INTVAL_IQL?	a

■ Function

Sets the display renewal interval on the IQ Level screen when the Storage Mode is Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Displays the average value of the measured results obtained after every measurement.	*
ONCE	Displays the average value of the measurement results after measurement of Average Count is completed.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Setting the updating interval to Once.”

<Program>
INTVAL_IQL ONCE
INTVAL_IQL?

<Response>
ONCE

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

INTVAL_MOD

Refresh Interval for Modulation Analysis

Program Message	Query Message	Response Message
INTVAL_MOD a	INTVAL_MOD?	a

■ Function

Sets the display updating interval on the Modulation Analysis screen when the Storage Mode is set to Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the updating interval to Once."

<Program>
INTVAL_MOD ONCE
INTVAL_MOD?

<Response>
ONCE

INTVAL_OBW

Refresh Interval for Occupied Bandwidth

Program Message	Query Message	Response Message
INTVAL_OBW a	INTVAL_OBW?	a

■ Function

Sets the display updating interval on the Occupied Bandwidth screen when the Storage Mode is set to Average.

■ Value of a

Updating interval

Value	Updating interval	Initial value
EVERY	Updates the display after every one sweep. Calculates and displays the average value by the number of measurements repeated by that sweep.	*
ONCE	Updates the display once after completion of averaging. Calculates the average value by the times specified with Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the updating interval to Once."

<Program>
INTVAL_OBW ONCE
INTVAL_OBW?

<Response>
ONCE

INTVAL_RFPWR

Refresh Interval for RF Power

Program Message	Query Message	Response Message
INTVAL_RFPWR a	INTVAL_RFPWR?	a

■ Function

Sets the display updating interval on the RF Power screen obtained when the Storage Mode is set to Average.

■ Value of a

Updating interval

a	Updating interval	Initial value
EVERY	Updated after every sweep. An average is obtained based on the times of measurements conducted.	*
ONCE	Updated after every averaging. An average is obtained based on the times specified by Average Count.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the updating interval to Once."

<Program>
INTVAL_RFPWR ONCE
INTVAL_RFPWR?

<Response>
ONCE

IP

Preset

Program Message	Query Message	Response Message
IP	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the PRE and INI commands (*cf.* PRE, INI).

■ Example of use

"Initializing the parameters to be initialized."

<Program>
IP

IPPLVL

I Level(Peak to Peak)

Program Message	Query Message	Response Message
–	IPPLVL? a	b

■ Function

Reads out the measured results of the Peak-to-Peak value of Signal I on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	Conforms to the current set unit by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b

Peak-to-Peak value of Signal I

Resolution	Unit
0.01	mV
	dBmV

■ Example of use

"Reading out the Peak-to-Peak value of Level I."

<Program>

```
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IPPLVL? MV
```

<Response>

4.07

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQINZ

Impedance

Program Message	Query Message	Response Message
IQINZ a	IQINZ?	a

■ Function

Sets the input impedance of Signals I/Q on the Setup Common Parameter screen.

■ Value of a

Impedance

Value	Impedance	Initial value
50	Sets input impedance to 50 Ω.	*
1 M	Sets input impedance to 1 MΩ.	

■ Restriction

- The measurement screen must be set to Setup Common Parameter (*cf.* DSPL).
- The Terminal must be set to IQ-AC, IQ-DC or IQ-Balance (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the impedance value at 50 Ω."

<Program>
DSPL SETCOM
TERM IQAC
IQINZ 50
IQINZ?

<Response>
50

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQLVL

IQ Level

Program Message	Query Message	Response Message
–	IQLVL? a	b, c, d, e

■ Function

Reads out the measured results of the RMS values and Peak to Peak values of Signal I and Signal Q on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	Conforms to the unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b

Same as result of “ILVL? a” (*cf.* ILVL).

■ Value of c

Same as result of “QLVL? a” (*cf.* QLVL).

■ Value of d

Same as result of “IPPLVL? a” (*cf.* IPPLVL).

■ Value of e

Same as result of “QPPLVL? a” (*cf.* QPPLVL).

■ Example of use

“Read out all IQ Level values”

<Program>

DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IQLVL? MV

<Response>

1.42,0.53,4.07,3.55

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

IQPHASE

IQ Phase Difference

Program Message	Query Message	Response Message
–	IQPHASE?	a

■ Function

Reads out the measurement results of phase difference of Signals I/Q on the IQ Level screen.

■ Value of a

Phase difference of I/Q

Resolution	Unit
0.01	°

■ Example of use

"Reading out the phase difference of I/Q."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
IQPHASE?

<Response>
99.97

■Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

JUDGUNIT_SPTBL

Judge Unit

Program Message	Query Message	Response Message
JUDGUNIT_SPTBL a	JUDGUNIT_SPTBL?	a

■ Function

Switches the judgement unit for Spot method of Spurious Measurement.

■ Value of a

Relative/Absolute

a	Judge Unit Relative/Absolute	Initial value
ABS	Judge in dBm	*
ON		
REL	Judge in dB	
OFF		
RELABS	Judge in dBm or dB, with stricter conditions.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Set Unit Judge to Relative.”

<Program>
DSPL SPURIOUS,SPOT
JUDGUNIT_SPTBL OFF
JUDGUNIT_SPTBL?

<Response>
REL

JUDGUNIT_SWTBL

Judge Unit

Program Message	Query Message	Response Message
JUDGUNIT_SWTBL a	JUDGUNIT_SWTBL?	a

■ Function

Switches the judgement item.

■ Value of a

Relative/Absolute

a	Judge Unit Relative/Absolute	Initial value
ABS	Judge in dBm	*
ON		
REL	Judge in dB	
OFF		
RELABS	Judge in dBm or dB, with stricter conditions.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Unit Judge to Relative."

<Program>
DSPL SPURIOUS,SWEEP
JUDGUNIT_SWTBL ON
JUDGUNIT_SWTBL?

<Response>
ABS

LVLREL_ACP

Relative Level

Program Message	Query Message	Response Message
LVLREL_ACP a	LVLREL_ACP?	a,a,a,a
LVLREL_ACP a,1	LVLREL_ACP? 1	a
LVLREL_ACP a,2	LVLREL_ACP? 2	
LVLREL_ACP a,3	LVLREL_ACP? 3	
LVLREL_ACP a,4	LVLREL_ACP? 4	

■ Function

Sets the units that will serve as reference, based on the template judgement of the Spurious Close to the Carrier measurement. In the event of relative value, the average power of the carrier is the reference value.

■ Value of a

Judgement Criteria

a	Judgement reference
ON	Relative: Judges with the average power of the carrier as the reference (dB unit).
OFF	Absolute: Judges with absolute value (dBm Unit).

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set dBm unit system."

<Program>
LVLREL_ACP OFF
LVLREL_ACP?

<Response>
OFF,OFF

LVLREL_RFPWR

Relative Level

Program Message	Query Message	Response Message
LVLREL_RFPWR a	LVLREL_RFPWR?	a

■ Function

Sets the relative display of the waveform on the RF Power screen. When displaying the relative value, burst average power becomes the reference value. When displaying the absolute value, template indication and Pass/Fail judgement is not performed.

■ Value of a

On/Off of Relative Value Display

a	On/Off of relative value display	Initial value
ON	Relative Level: Displays the relative value (dB unit) of the vertical axis graduation of the waveform.	*
OFF	Absolute Level: Displays the absolute value (dBm unit) of the vertical axis graduation of the waveform.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display the absolute value of the waveform."

<Program>
LVLREL_RFPWR OFF
LVLREL_RFPWR?

<Response>
OFF

MAGTDERR

RMS Magnitude Error

Program Message	Query Message	Response Message
–	MAGTDERR? a	b

■ Function

Outputs the measurement results of the RMS value of Magnitude Error on the Modulation Analysis screen.

■ Value of a

Output

a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

RMS value of Magnitude Error

Resolution	Unit
0.01	%

■ Example of use

“Reading out the measurement results of Magnitude Error.”

<Program>
DSPL MODANAL
SWP
MAGTDERR?

<Response>
16.67

MAXPWR

Power Flatness Maximum

Program Message	Query Message	Response Message
–	MAXPWR? a,b	c

■ Function

Outputs the maximum electric power on the RF Power screen in dBm unit and dB unit that is the ratio of electric power to Tx Power.

■ Value of a

Setting of unit

a	Description
DBM	dBM
DB	Db

■ Value of b

Waveform range specification

b	Description
SLOT	Waveform for one slot
1STHALF	Waveform for first half slot
2NDHALF	Waveform for second half slot
None	Current waveform

■ Value of c

Resolution	Unit
0.01	dBm or dB

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

“Outputs the maximum electric power on the RF Power screen in dB unit.”

<Program>
DSPL RFPWR
SWP
MAXPWR? DB,SLOT

<Response>
0. 86

MEAS

Change screen and measure

Program Message	Query Message	Response Message
MEAS a	MEAS?	a
MEAS a,b		a,b

■ Function

Switches the screen. Measurement is started when the screen to be transferred to is the measurement screen.

■ Value of a, b

Same as DSPL command (*cf.* DSPL).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

[1] "Executing a measurement on the Modulation Analysis screen."

<Program>
MEAS MODANAL
MEAS?

<Response>
MODANAL

[2] "Executing sweep measurement on the Spurious Emission screen."

<Program>
MEAS SPURIOUS,SWEEP
MEAS?

<Response>
SPURIOUS,SWEEP

MEASOBJ

Measuring Object

Program Message	Query Message	Response Message
MEASOBJ a	MEASOBJ?	a

■ Function

Sets the signal type of the object for analysis on the Setup Common Parameter screen.

■ Value of a

Type of burst signal

a	On/Off of Display Mode	Initial value
REVERSE	Reverse Link Rev.0	
FORWARD	Forward Link Rev.0	*
FORWARD_REV0		
FORWARD_REVA	Forward Link Rev.A	
QPSK	QPSK	

■ Restriction

- No setting is allowed when the measurement screen is other than Setup Common Parameter.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the object of analysis to Forward Link Rev.A."

<Program>
DSPL SETCOM
MEASOBJ FORWARD_REVA
MEASOBJ?

<Response>
FORWARD_REVA

MINPWR

Power Flatness Minimum

Program Message	Query Message	Response Message
–	MINPWR? a,b	c

■ Function

Outputs the minimum electric power on the RF Power screen in dBm unit and dB unit that is the ratio of electric power to Tx Power.

■ Value of a

Unit specification

a	Description
DBM	dBm
DB	dB

■ Value of b

Waveform range specification

b	Description
SLOT	Waveform for one slot
1STHALF	Waveform for first half slot
2NDHALF	Waveform for second half slot
None	Current waveform

■ Value of c

Resolution	Unit
0.01	dBm or dB

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Outputs the minimum electric power on the RF Power screen in dB unit."

<Program>
DSPL RFPWR
SWP
MINPWR? DB,SLOT

<Response>
–0.53

MKCDP

Marker Level (Code Domain Power)

Program Message	Query Message	Response Message
–	MKCDP? a	b

■ Function

Reads out the Code Domain Power at the marker position when Trace Format is set to Code Domain, Code Domain of Data or Code Domain of MAC at Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Code Domain Power

Resolution	Unit
0.01	dB

■ Restriction

- Valid only when the Trace Format is set to Code Domain ,Code Domain of Data and Code Domain of MAC (*cf.* TRFORM).

■ Example of use

"Read Code Domain Power of 10 CH when the Measuring Object is Reverse Link Rev.0."

<Program>
```
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 10
SWP
MKCDP?
```

<Response>
```
–13.82
```

MKDIFF

Marker Level (Code Domain Power – Difference form average power)

Program Message	Query Message	Response Message
–	MKDIFF? a	b

■ Function

Displays the difference with the average marker point (log10(1/16) = –12) when Trace Format is set to Code Domain Power on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Difference

Resolution	Unit
0.01	dB

■ Restriction

- Setting is allowed only when Code Domain of Data is set (*cf.* TRFORM).

■ Example of use

"Display the difference with the average marker point (log10(1/16)= –12) when Trace Format is set to Code Domain Power."

```
<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL MODANAL
TRFORM CODEOFDATA
MKR_MOD NRM
SWP
MKDIFF?

<Response>
11.23
```

MKL_ACP

Marker Level for Spurious close to the Carrier

Program Message	Query Message	Response Message
–	MKL_ACP? a	b,c

■ Function

Outputs the measurement value of the marker position of the Spurious close to the Carrier screen.

■ Value of a

Output unit

a	Readout unit
None	Conforms to the Unit setting (*cf.* UNIT_ACP).
DB	dB
DBM	dBm
WATT	W

■ Value of b

Marker Level (Level value of specified RBW)

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Value of c

Marker level (RBW: 1.23 MHz equivalent level value)

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- In RBW: 1.23 MHz data, some data is invalid due to arithmetic computation. In the case of invalid data, the following values are output.

<table>
<tr><th>Resolution</th><th>Output value</th></tr>
<tr><td>dBm</td><td rowspan="2">–2147483648</td></tr>
<tr><td>dB</td></tr>
<tr><td>W</td><td>0.00E-12</td></tr>
</table>

- The value of c can be read only when Measure Method is set to Normal.

■ Example of use

"Read out the level at offset frequency 1.25 MHz."

<Program>

DSPL ACP

MKN_ACP 1.25MHZ

SWP

MKL_ACP? DB

<Response>

–34.08, –22.77

MKL_CCDF

Marker Value for CCDF

Program Message	Query Message	Response Message
–	MKL_CCDF? a,b	c

■ Function

Outputs power deviation and probability at the marker location on the CCDF screen.

■ Value of a

Output waveform

Value	Output waveform
0	Outputs the value of measurement waveform.
1	Outputs the value of waveform saved. If the waveform is not saved, 0 will be output.
2	Outputs the value of Gaussian Trace waveform.
ALL	Outputs the value in the order of measurement waveform, waveform saved, and Gaussian Trace waveform.

■ Value of b

Output format

Value	Output waveform
PROB	Outputs the value of power deviation (x coordinate).
DSTRBT	Outputs the value of probability (y coordinate).

■ Value of c

Value specified in b

Resolution	Unit	Output format
0.1	dB	Power deviation
0.0001	%	Probability

■ Example of use

"Reads out the measurement result for the probability at the marker location of measurement waveform."

<Program>
DSPL CCDF,CCDF
SWP
MKL_CCDF? 0,DST RBT

<Response>
0.5012

MKL_MOD

Marker Level for Modulation Analysis

Program Message	Query Message	Response Message
–	MKL_MOD? a	b

■ Function

On the Modulation Analysis screen, outputs each measurement value of marker positions when Trace Format is Constellation, Eye Diagram, EVM, Phase Error, or Magnitude Error.

■ Value of a

Type of marked signal

Trace Format	a	Marked signal
Constellation, Eye Diagram	I	I signal
	Q	Q signal
EVM, Phase Error, Magnitude Error	None	–

■ Value of b

Marker Level

Trace Format	Resolution	Unit
Constellation, Eye Diagram	0.0001	None
EVM, Magnitude Error	0.01	%
Phase Error		deg.

■ Restriction

- In the following cases, **** is output.
  - Where Trace Format is other than Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error (*cf.* TRFORM).
  - Where Marker Mode is Off (*cf.* MKR_MOD).
- In the following cases, Insufficient data error results.
  - Where Parameter (a) has not been specified, when Trace Format is Constellation or Eye Diagram.
  - Where Parameter (a) has been specified, when Trace Format is EVM, Phase Error, or Magnitude Error.

■ Example of use

"Read out the value at the 320.0 chip point at the Constellation I signal."

<Program>
DSPL MODANAL
TRFORM CONSTEL
MKR_MOD NRM
MKP_MOD 320.0
SWP
MKL_MOD? I

<Response>
–0.2889

MKL_RFPWR

Marker Level for RF Power

Program Message	Query Message	Response Message
–	MKL_RFPWR? a	b

■ Function

Outputs the measurement value of the Marker position on the RF Power screen.

■ Value of a

Output unit

a	Output unit
None	When the Relative Level is On (Relative), it is deemed that dB has been specified, and in the event of Off (Absolute) it is deemed that dBm has been specified (*cf.* LVLREL_RFPWR).
DB	dB
DBM	dBm

■ Value of b

Marker Level

Resolution	Unit
0.1	dB
	dBm

■ Restriction

- *** is output when the Marker Mode is off (*cf.* MKR_RFPWR).

■ Example of use

"Read out power at position of 80.00 PNchip."

<Program>
DSPL RFPWR
WINDOW SLOT
MKR_RFPWR NRM
MKP_RFPWR 80.00
SWP
MKL_RFPWR?

<Response>
–10.62

MKN_ACP

Marker Position for Spurious close to the Carrier (in frequency)

Program Message	Query Message	Response Message
MKN_ACP a	MKN_ACP?	a

■ Function

Uses the frequency to specify the Marker position of the Spurious close to the Carrier screen. The function is the same as that of MKP_ACP.

■ Value of a

Frequency position

Range	Initial value	Unit
–(Span/2) to (Span/2)	0	Hz

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the marker position to 1 MHz."

<Program>
DSPL ACP,NRM
MKN_ACP 1MHZ
MKN_ACP?

<Response>
1000000

MKP_ACP

Marker Position for Spurious close to the Carrier (in points)

Program Message	Query Message	Response Message
MKP_ACP a	MKP_ACP?	a

■ Function

Specifies the Marker position of the Spurious Close to the Carrier screen with the point number. The function is the same as that of MKN_ACP.

■ Value of a

Point position

When Measure Method is set to Normal

Data Points	Range	Resolution	Initial value
501	0 to 500	1	250
1001	0 to 1000		500

When Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9 or 3GPP2 FWD Band Class 3+

Data Points	Range	Resolution	Initial value
501	0 to 1500	1	750
1001	0 to 3000		1500

When Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8

Data Points	Range	Resolution	Initial value
501	0 to 2000	1	1000
1001	0 to 3500		1750

□ Suffix code

None

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When the Data Points are changed, the number of points equivalent to the Marker position (frequency) is set.

■ Example of use

"Set the marker position to 250 points."

<Program>
DPTS_ACP 501
MKP_ACP 250
MKP_ACP?
DPTS_ACP 1001
MKP_ACP?

<Response>
250
500

MKP_CCDF

Marker Position for CCDF

Program Message	Query Message	Response Message
–	MKP_CCDF?	a

■ Function

Sets the maker location on the CCDF screen.

■ Value of a

Sets power deviation or probability according to the setting value of Display Data Type (*cf.* DISP-TYPE_CCDF).

<table>
<tr><th>Display Data Type</th><th>Measure Method</th><th>Trace Format</th><th>Range</th><th>Resolu-tion</th><th>Unit</th></tr>
<tr><td>Probability</td><td>—</td><td>—</td><td>0.0001 to 100.0000</td><td>0.0001</td><td>Probabil-ity (%)</td></tr>
<tr><td rowspan="4">Distribution</td><td>CCDF</td><td>—</td><td>0.0 to (Horizontal Scale)</td><td rowspan="4">0.1</td><td rowspan="4">Power deviation (dB)</td></tr>
<tr><td rowspan="3">APD</td><td>Positive</td><td>0.0 to (Horizontal Scale)</td></tr>
<tr><td>Negative</td><td>−(Horizontal Scale) to 0 dB</td></tr>
<tr><td>Positive & Negative</td><td>−(Horizontal Scale) to (Horizontal Scale)</td></tr>
</table>

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets the marker to 10.0 dB."

<Program>

DSPL CCDF,CCDF
MKR_CCDF NRM
MKP_CCDF 10.0
MKP_CCDF?

<Response>

10.0

MKP_CDP

Marker Position for Modulation Analysis (Code Domain, Code Domain of Data, Code Domain of MAC)

Program Message	Query Message	Response Message
MKP_CDP a,b	MKP_CDP? b	a

■ Function

On the Modulation Analysis screen, specifies the Marker position when the Trace Format is Code Domain, Code Domain of Data or Code Domain of MAC.

■ Value of a

Number of bars counted from the origin of the Code Domain bar graph.

Trace Format	Measuring Object	Range	Resolution	Initial value
Code Domain of Data	Forward Link Rev.0 or Forward Link Rev.A	a= 0 to 15	1	1
Code Domain of MAC	Forward Link Rev.0	a= 0 to 63		
	Forward Link Rev.A	a= 0 to 127		
Code Domain	Reverse Link Rev.0	a= 0 to 15		

■ Value of b

Signal of operation object

b	Type of marked signal
None	Signal specified by Operation Trace
I	I Signal
Q	Q Signal

■ Restriction

- Valid only when Code Domain, Code Domain of Data or Code Domain of MAC is set.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set marker on the 6th bar."

<Program>
MKP_CDP 6
MKP_CDP?

<Response>
6

MKP_MOD

Marker Position for Modulation Analysis (Constellation, Eye Diagram, EVM, Phase Error, Magnitude Error)

Program Message	Query Message	Response Message
MKP_MOD n	MKP_MOD?	n

■ Function

On the Modulation Analysis screen, specifies Marker position when Trace Format is Constellation, Eye Diagram, EVM, Phase Error, or Magnitude Error.

■ Value of n

Marker position

Measuring Object	Trace Format		Range	Resolution	Initial value	Unit
Forward Link Rev.0 or Forward Link Rev.A	Constellation	Overall	n= 0 to (2048 * Analysis Length −1)	1	Screen center	PNchip
		Pilot	n= 0 to (192 * Analysis Length − 1)			
		Mac	n= 0 to (256 * Analysis Length − 1)			
		Data	n= 0 to (1600 * Analysis Length −1)			
		Symbol	n= 0 to 1599			
	EVM Phase Error Magnitude Error	Overall	n= 0 to (2048 * Analysis Length −1)			
		Pilot	n= 0 to (192 * Analysis Length −1)			
		Mac	n= 0 to (256 * Analysis Length −1)			
		Data	n= 0 to (1600 * Analysis Length −1)			
	Eye Diagram		n= 0 to 2047.75	0.25		
Reverse Link Rev.0	Other than Eye Diagram		n= 0 to (2048 * Analysis Length –1)	1		
	Eye Diagram		n= 0 to 2047.75	0.25		
QPSK	Other than Eye Diagram		n= 0 to (Analysis Length −1)	1		
	Eye Diagram		n= 0 to (Analysis Length −0.25)	0.25		

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the Marker position at 600 PNchip on the EVM display of Forward Link Rev.0."

<Program>

```
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL MODANAL
TRFORM EVM
MKR_MOD NRM
MKP_MOD 600
MKP_MOD?
```

<Response>

```
600
```

MKP_RFPWR

Marker Position for RF Power

Program Message	Query Message	Response Message
MKP_RFPWR a	MKP_RFPWR?	a

■ Function

Specifies the Marker position on the RF Power Screen.

■ Value of a

PNchip position

<table>
<tr><th>Window</th><th>Range</th><th>Init Value</th><th>Resolution</th><th>Unit</th></tr>
<tr><td>Slot</td><td rowspan="2">n= −100 to 2148</td><td rowspan="6">1024.00</td><td rowspan="8">0.25</td><td rowspan="8">PNchip</td></tr>
<tr><td>Slot Expanded Scale</td></tr>
<tr><td>First Half Slot</td><td rowspan="2">n= −100 to 1124</td></tr>
<tr><td>First Half Slot Expanded Scale</td></tr>
<tr><td>Second Half Slot</td><td rowspan="2">n= 924 to 2148</td></tr>
<tr><td>Second Half Slot Expanded Scale</td></tr>
<tr><td>First Half Slot Transient</td><td>n= 380 to 415, 604 to 639</td><td>415.00</td></tr>
<tr><td>Second Half Slot Transient</td><td>n= 1404 to 1439, 1628 to 1663</td><td>1439.00</td></tr>
</table>

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Set the marker on the 1530.25 PNchip of the Slot display."

<Program>
DSPL RFPWR
WINDOW SLOT
MKR_RFPWR NRM
MKP_RFPWR 1530.25
MKP_RFPWR?

<Response>
1530.25

MKPMAX_CDP

Max Marker Position for Code Domain

Program Message	Query Message	Response Message
–	MKPMAX_CDP? a	b

■ Function

Reads out the maximum possible value of Marker Position when Trace Format is Code Domain on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Maximum value of Marker Position

Resolution	Unit
1	None

■ Restriction

- Valid only when the Trace Format is set to Code Domain.

■ Example of use

"Read out the Max Marker Position value of I signal when Measuring Object is Reverse Link Rev.0."

<Program>
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
SWP
MKPMAX_CDP? I

<Response>
16

MKR_CCDF

Marker Mode for CCDF

Program Message	Query Message	Response Message
MKR_CCDF a	MKR_CCDF?	a

■ Function

Sets the marker mode on the CCDF screen.

■ Value of a

Marker specification

Value	Marker specification	Initial value
NRM	Normal: Displays the marker and sets the marker location to entry status.	*
OFF	Off: Deletes the marker display and releases the entry status of the marker location.	

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets the marker mode to entry status."

<Program>
DSPL CCDF,CCDF
MKR_CCDF NRM
MKR_CCDF?

<Response>
NRM

MKR_MOD

Marker Mode for Modulation Analysis

Program Message	Query Message	Response Message
MKR_MOD a	MKR_MOD?	a

■ Function

Sets the marker on/off of each Trace on the Modulation Analysis screen.

■ Value of a

On/Off of Marker

a	On/Off of Marker	Initial value
NRM	Normal (On): Displays the marker and sets the marker position to the entry state.	
OFF	Off: Deletes the marker display and cancels the entry state of the marker position.	*

■ Restriction

- No setting is allowed when the Trace Format is set to Non *(cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display the marker on the EVM display of the Modulation Analysis screen."

<Program>
DSPL MODANAL
TRFORM EVM
MKR_MOD NRM
MKR_MOD?

<Response>
NRM

MKR_RFPWR

Marker Mode for RF Power

Program Message	Query Message	Response Message
MKR_RFPWR a	MKR_RFPWR?	a

■ Function

Sets the marker on/off on the RF Power screen.

■ Value of a

On/Off of Marker

a	On/Off of Marker	Initial value
NRM	Normal (On): Displays the marker and sets the marker position to the entry state.	
OFF	Off: Deletes the marker display and cancels the entry state of the marker position.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display of marker on the RF Power Screen."

<Program>
DSPL RFPWR
MKR_RFPWR NRM
MKR_RFPWR?

<Response>
NRM

MKSCNO

Code Number of Marker Position

Program Message	Query Message	Response Message
–	MKSCNO? a	b

■ Function

Reads out the Channelization Code at Marker Position when Trace Format is Code Domain, Code Domain of Data, or Code Domain of MAC on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Code Number

Trace Format	Range	Resolution	Unit
Code Domain Code Domain of Data	0 to 15	1	None
Code Domain of MAC	0 to 63	1	None

■ Restriction

- Valid only when the Trace Format is set to Code Domain, Code Domain of Data, or Code Domain of MAC (*cf.* TRFORM).

■ Example of use

"Read out the Channelization Code at 10th I signal when Measuring Object is Reverse Link Rev.0."

<Program>
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 10,I
SWP
MKSCNO? I

<Response>
10

MKSGNL

Signal Status of Marker Position

Program Message	Query Message	Response Message
–	MKSGNL? a	b

■ Function

Reads out whether the signal at Marker Position is noise when Trace Format is Code Domain, Code Domain of Data and Code Domain of MAC on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Signal

b	Signal
SIGNAL	Signal
NOISE	Noise

■ Restriction

- Valid only when the Trace Format is set to Code Domain, Code Domain of Data and Code Domain of MAC (*cf.* TRFORM).

■ Example of use

"Read out the Signal status at 10th I signal when Measuring Object is Reverse Link Rev.0."

<Program>
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 10,I
SWP
MKSGNL? I

<Response>
SIGNAL

MKWAV

Waveform Quality (ρ) of Marker Position

Program Message	Query Message	Response Message
–	MKWAV? a	b

■ Function

Reads out Waveform Quality (ρ) at Marker position on Modulation Analysis screen when Trace Format is Code Domain, Code Domain of Data or Code Domain of MAC.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Waveform Quality (ρ)

Resolution	Unit
0.00001	None

■ Restriction

- Valid only when the Trace Format is set to Code Domain, Code Domain of Data, Code Domain of MAC (*cf.* TRFORM).

■ Example of use

"Read out of Waveform Quality (ρ) of 10CH when the Measuring Object is Reverse Link Rev.0."

<Program>
```
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 10
SWP
MKWAV?
```

<Response>
```
0.00243
```

MKWL

Walsh Length of Marker Position

Program Message	Query Message	Response Message
–	MKWL? a	b

■ Function

- Reads out the Walsh Length at Marker Position when Trace Format is Code Domain, Code Domain of Data and Code Domain of MAC on the Modulation Analysis screen.

■ Value of a

a	Type of marked signal
None	Signal specified by Operation Trace
I	I signal
Q	Q signal

■ Value of b

Walsh Length

Range	Measuring Object
16, 64	Forward Link Rev.0
16, 128	Forward Link Rev.A
4, 8, 16	Reverse Link Rev.0

■ Restriction

- Valid only when the Trace Format is set to Code Domain ,Code Domain of Data and Code Domain of MAC (*cf.* TRFORM).

■ Example of use

"Read out the Walsh Length at 15th I signal when Measuring Object is Reverse Link Rev.0."

<Program>
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
MKR_MOD NRM
MKP_CDP 15,I
SWP
MKWL? I

<Response>
16

MLTCARRCAL

Multi Carrier Calibration

Program Message	Query Message	Response Message
MLTCARRCAL	–	–

■ Function

- Executes multi carrier calibration.

■ Restriction

- This command is enabled only when the measurement screen is set to
  Modulation Analysis
  RF Power
  Occupied Bandwidth
  Spurious close to the Carrier
  Spurious Emission
  CCDF
- Terminal must be set to RF.

■ Example of use

"Executes Multi Carrier Calibration."

<Program>
DSPL MODANAL
MLTCARRCAL

MODTYPE

Modulation Type

Program Message	Query Message	Response Message
MODTYPE a	MODTYPE?	a

■ Function

Sets the modulation method for Forward Link (Active) signal measurement.

■ Value of a

Modulation method specification

a	Description	Initial value
AUTO	Automatically judges the modulation method according to the signal to be measured. If the condition of the signal is bad, a judgement error may occur. In this case, specify the correct modulation method.	*
QPSK	Assumes that the data is QPSK-modulated and performs analysis.	
8PSK	Assumes that the data is 8PSK-modulated and performs analysis.	
16QAM	Assumes that the data is 16QAM-modulated and performs analysis.	

■ Restriction

- Enable when Forward Link Rev.0 or Forward Link Rev.A is set for Measuring Object and Active is set for Slot Type. (*cf.* MEASOBJ)

■Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Assumes that the data is QPSK-modulated and performs analysis."

<Program>
DSPL SETCOM
MODTYPE QPSK
MODTYPE?

<Response>
QPSK

MSTAT

Status of Result

Program Message	Query Message	Response Message
–	MSTAT?	a

■ Function

Queries about status of measurement just performed.

■ Value of a

Measurement Status

a	Measurement Status
0	Normal
1	RF Level Limit
2	Level Over
3	Level Under
6	Trigger Timeout
9	No Measure

■ Example of use

"Execute Modulation Analysis measurement and reads out measurement status."

<Program>
DSPL MODANAL
SWP
MSTAT?

<Response>
0

OBW

Occupied Bandwidth

Program Message	Query Message	Response Message
–	OBW?	a

■ Function

On the Occupied Bandwidth screen, reads out the range of frequency that remains 99 % of the total power of carrier frequency.

■ Value of a

99 % occupied bandwidth

Resolution	Unit
1	Hz

■ Example of use

"Reads out the 99 % occupied bandwidth."

<Program>
DSPL OBW,SPECT
SWP
OBW?

<Response>
1152750

OBWFREQ

Occupied Bandwidth Limit and Center

Program Message	Query Message	Response Message
–	OBWFREQ? a	b

■ Function

On the Occupied Bandwidth screen, reads out upper and lower frequency bands from the center frequency.

■ Value of a

Frequency bands from center

a	Frequency bands from center
UPPER	Upper Limit: Displays the bandwidth accounting for 49.5 % of the total power in the upper frequency area from the displayed waveform center frequency in MHz unit.
LOWER	Lower Limit: Displays the bandwidth accounting for 49.5 % of the total power in the lower frequency area from the displayed waveform center frequency in MHz unit.
CENTER	(Upper + Lower)/2: Displays the half-value of the sum of the upper-limit frequency and lower-limit frequency.

■ Value of b

Bandwidth

Resolution	Unit
1	Hz

■ Example of use

"Reads out the Upper Limit of the occupied bandwidth."

<Program>
DSPL OBW,FFT
SWP
OBWFREQ? UPPER

<Response>
807124

OFFPWR

Carrier Off Power

Program Message	Query Message	Response Message
–	OFFPWR? a,b	c

■ Function

Displays average power when transmission is set to Off on the RF Power screen.

■ Value of a

Output unit

a	Output unit
DBM	dBm
DB	dB
WATT	W

■ Value of b

Measured range

b	Power measurement range
SLOT	Slot or Slot Exp. Scale: Reads the average power for one slot.
1STHALF	First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale: Reads the average power for the first half slot.
2NDHALF	Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale: Reads the average power for the second half slot.
None	Reads the average power according to the current window.

■ Value of c

Average power when transmission is set to off.

Resolution	Unit
0.01	dB,dBm
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- Setting is allowed when the Slot Type is Idle (*cf.* SLOTTYPE).

■ Example of use

"Reading out average power when transmission is set to off."

<Program>
DSPL RFPWR
SWP
OFFPWR? DBM

<Response>
–4.89

OPRTTR

Operation Trace

Program Message	Query Message	Response Message
OPRTTR a	OPRTTR?	a

■ Function

On the Code Domain of the Modulation Analysis screen, selects the I/Q signal for the marker operation.

■ Value of a

Signal targeted for operation

a	Signal Targeted for Operation	Initial value
I	I signal	*
Q	Q signal	

■ Restriction

- Setting is allowed when the Trace Format is Code Domain, Code Domain of Data or Code Domain of MAC (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Make the Q Signal the object of operation."

<Program>

```
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
OPRTTR Q
OPRTTR?
```

<Response>

```
Q
```

ORGNOFS

Origin Offset

Program Message	Query Message	Response Message
–	ORGNOFS? a	b

■ Function

Outputs the measurement results for Origin-offset (carrier leak component) of the signal to be measured on the Modulation Analysis screen.

■ Value of a

Output

a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

Origin Offset value

Resolution	Unit
0.01	dB

■ Example of use

“Read out the measurement result of Origin Offset.”

<Program>
DSPL MODANAL
SWP
ORGNOFS?

<Response>
–45.00

OXMC

Wave Data for Origin I-Q Signal

Program Message	Query Message	Response Message
OXMC a,b,c	OXMC? a,c	d

■ Function

Reads out and processes IQ signal at origin on the Modulation Analysis screen.

■ Value of a

Selection of IQ

a	Selection of IQ
0	I signal
1	Q signal

■ Value of b

Data for input

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.0001 units so that ideal signal “1” is shown as 10,000.

■ Value of c

Trace Slot selection

Value of c	Trace Slot
OVERALL	Overall
PILOT	Pilot
MAC	MAC
DATA	Data
SYMBOL	Symbol
None	Current Trace Slot

- Valid only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A.

■ Value of d

Read out data

Range	Resolution
–2147483648 to 2147483647	1

- Reading out is made by using an integer in 0.0001 units so that ideal signal “1” is shown as 10,000.

■ Example of use

"Read out I and Q signals at origin point."

<Program>
DSPL MODANAL
SWP
OXMC? 0
OXMC? 1

<Response>
–9940
–9940

PEAK_ACP

Peak Data for Spurious close to the Carrier

Program Message	Query Message	Response Message
–	PEAK_ACP? a,b,c	d,e,f

■ Function

Outputs the peak value and the results of pass/fail judgement at specified template on Spurious close to the Carrier screen.

■ Value of a

Selection of readout data

a	Display Format
ALL	Reads out value at the point of minimum margin for the template of each frequency band.
PEAK	Reads out value at the point of minimum margin among the template of all frequency bands.
LOW1, LOW2, LOW3, LOW4, UP1, UP2, UP3, UP4	Reads out value at the point of minimum margin for the specified template among the template of frequency band.

The value setting (Level or Margin) at the point of minimum margin is set by DISPTYPE_ACP.

■ Value of b

Data type of readout data

b	Data Type
PWR	Reads out level at the point of minimum margin.
MARGIN	Reads out margin at the point of minimum margin.

■ Value of c

Unit setting of readout data

c	Unit of Leakage Power
None	Set value of unit (*cf.* UNIT_ACP)
DB	dB
DBM	dBm
WATT	W

■ Value of d

Frequency at the point of minimum margin

Resolution	Unit
0.01	kHz

■ Value of e

RMS value of Phase Error

Resolution	Unit
0.01	dBm
0.01	dB
Significant digits: 4 digits (floating point format)	W

■ Value of f

Judgement result

f	Judgement result
PASS	Pass: Passed
FAIL	Fail: Failed
NOT	Not: Can not judge

■ Example of use

"Reads out the peak value at the point of minimum margin."

<Program>
DSPL ACP,PRECISE2
SWP
PEAK_ACP? LOW1,PWR,DBM

<Response>
-13.08.75,-65.78,PASS

PHASEERR

RMS Phase Error

Program Message	Query Message	Response Message
–	PHASEERR? a	b

■ Function

Outputs the measurement result of the RMS value of the Phase Error of the modulation analysis screen.

■ Value of a

Output

a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

RMS value of Phase Error

Resolution	Unit
0.01	deg

■ Example of use

"Read out of result of measurement of Phase Error."

<Program>
DSPL MODANAL
SWP
PHASEERR?

<Response>
11.58

PLTCDP

Pilot Channel Code Domain Power

Program Message	Query Message	Response Message
–	PLTCDP? a	b

■ Function

Outputs the result of measurement for code domain power in pilot channel (0 CH), on the Modulation Analysis screen.

■ Value of a

Output unit specification

a	Output unit
DB	dB
DBM	dBm

■ Value of b

Pilot Channel Code Domain Power value

Resolution	Unit
0.01	dB, dBm

■ Example of use

"Read out the measurement result of Pilot Channel Code Domain Power."

<Program>
DSPL MODANAL
SWP
PLTCDP? DB

<Response>
–25.81

PMAGTDERR

Peak Magnitude Error

Program Message	Query Message	Response Message
–	PMAGTDERR? a,b	c
–	PMAGTDERR?	c

■ Function

Outputs maximum instantaneous value of Magnitude Error on Modulation Analysis screen.

■ Value of a

Positive and negative code of Magnitude Error

a	Positive and negative code
ABS	Absolute value at peak value
+	Positive peak value
–	Negative peak value

■ Value of b

Output

b	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

Value of a,b	Output
None	Displays the absolute value to the Trace Slot of the current peak value.

■ Value of c

The maximum value of Magnitude Error for the code specified in "a."

c	Unit
0.01	%

■ Example of use

"Read out the maximum value of Magnitude Error."

<Program>
DSPL MODANAL
SWP
PMAGTDERR?

<Response>
7.05

PNLMD

Panel Mode

Program Message	Query Message	Response Message
PNLMD a	PNLMD?	a

■Function

Switches the measurement mode for the Tx Tester.

■Value of a

Measurement mode

Value	Measurement mode
SPECT	Spectrum Analyzer mode
SYSTEM	Tx Tester mode
CONFIG	Config mode

■Example of use

"Switches to the Tx Tester mode."

<Program>
PNLMD SYSTEM
PNLMD?

<Response>
SYSTEM

PNOFFSET

Offset Index

Program Message	Query Message	Response Message
PNOFFSET a	PNOFFSET?	a

■ Function

Sets offset of PN Sequence

■ Value of a

PN Sequence Offset

Range	Resolution	Initial value	Unit
0 to 511	1	0	None (*64 PNchip)

■ Restriction

- Setting is allowed only when the Measuring Object is Forward Link Rev.0 or Forward Link Rev.A(*cf.* MEASOBJ).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set PN Sequence offset to 511*64PNchip."

<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
TRG EXT
PNOFFSET 511
PNOFFSET?

<Response>
511

PNSYNC

PN Synchronization

Program Message	Query Message	Response Message
PNSYNC	PNSYNC?	a

■ Function

Sets the search range for PN synchronization at Ext Trigger.

■ Value of a

Search range for PN synchronization

a	Search range for PN synchronization	Initial value
SEARCH	Searches all 32768 PNchips regardless of Trigger.	*
EXTTRG	Searches 384 PNchips before and after Trigger.	

■ Restrictions

- No setting is allowed when Measuring Object is QPSK（*cf.* MEASOBJ）.
- No setting is allowed when Trigger is Free Run (*cf.* TRG).

■ Initialization of setting

PRE, INI, IP,*RST

■ Example of use

"Set PN search range to all sections."

<Program>
DSPL SETCOM
TRG EXT
PNSYNC SEARCH
PNSYNC?

<Response>
SEARCH

POWER

Power

Program Message	Query Message	Response Message
–	POWER? a	b

■ Function

Outputs the absolute value or relative value of RF average power measured by the power meter.

■ Value of a

Readout unit

a	Unit
DBM	dBm
DB	dB
WATT	W

■ Value of b

Absolute value or relative value of RF average power

Unit	Resolution
0.01	dBm
0.01	dB
Significant digits, four places (floating decimal-point type)	W

■ Example of use

"Reading out RF average power in dBm units."

<Program>
DSPL PWRMTR
SWP
POWER? DBM

<Response>
–1.43

■ Restrictions according to model type and options

For MS268x, this command is not invalid.

POWER_CCDF

Power for CCDF

Program Message	Query Message	Response Message
–	POWER_CCDF?	a,b,c,d,e

■ Function

Outputs the power on the CCDF screen.

■ Parameters

a, b, c, d, and e values are shown below.

Value of a	Average Power
Value of b	Maximum Power (absolute)
Value of c	Maximum Power (relative value to Average Power)
Value of d	Minimum Power (absolute)
Value of e	Minimum Power (relative value to Average Power)

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Reads out the measurement result of the average power."

<Program>
DSPL CCDF,CCDF
SWP
POWER_CCDF?

<Response>
10.53, 20.53, 10.00, 0.53, –10.00

PPHASEERR

Peak Phase Error

Program Message	Query Message	Response Message
–	PPHASEERR?	c
–	PPHASEERR? a,b	c

■ Function

Outputs the maximum instantaneous value of phase error on the Modulation Analysis screen.

■ Value of a

Positive and negative codes for phase error

a	Positive and negative codes
ABS	Absolute value of peak value
+	Positive peak value
–	Negative peak value

■ Value of b

Output

Value of a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

Value of a,b	Output
None	Displays the absolute value to the Trace Slot of the current peak value.

■ Value of c

The maximum value of phase error for the code specified in “a.”

Resolution	Unit
0.01	deg

■ Example of use

“Read out the position peak value of phase error.”

<Program>
MEAS MODANAL
PPHASEERR? +

<Response>
9.45

PRE

Preset

Program Message	Query Message	Response Message
PRE	–	–

■ Function

Initializes all the measurement control parameters to be initialized. This function has the same effect as the INI and IP commands (*cf.* INI, IP).

■ Example of use

"Initializing the parameters to be initialized."

<Program>
PRE

PREAMBLELEN

Preamble Length

Program Message	Query Message	Response Message
PREAMBLELEN a	PREAMBLELEN?	a

■ Function

Sets the length of preamble included in the Forward Link (Active) signal.

■ Value of a

Preamble length specification

a	Description	Initial value
AUTO	Automatically judges the length of preamble according to the signal to be measured. If the condition of the signal is bad, a judgement error may occur. In this case, specify the correct length of preamble.	*
0	Analyzes the length of preamble as 0 chip.	
64	Analyzes the length of preamble as 64 chips.	
128	Analyzes the length of preamble as 128 chips.	
256	Analyzes the length of preamble as 256 chips.	
512	Analyzes the length of preamble as 512 chips.	
1024	Analyzes the length of preamble as 1024 chips.	

■ Restriction

- The measurement screen must be "Setup Common Parameter."
- Enable when Forward Link Rev.0 or Forward Link Rev.A is set for Measuring Object and Active is set for Slot Type. (*cf.* MEASOBJ)

■ Initialization of setting

PRE, INI, IP,*RST

■ Example of use

"Analyzes the length of preamble as 64 chips."

<Program>

DSPL SETCOM

PREAMBLELEN 64

PREAMBLELEN?

<Response>

64

PREAMP

Pre Amplifier

Program Message	Query Message	Response Message
PREAMP a	PREAMP?	a

■ Function

Sets Pre Ampl on/off.

■ Value of a

On/Off setting of Pre Ampl

a	On/Off of Display Mode	Initial value
ON	Sets Pre Ampl to on.	
OFF	Sets Pre Ampl to off.	*

■ Restriction

- No setting is allowed when a value in excess of 3 GHz is set for the frequency (*cf.* FREQ).
- Valid only when Terminal is set to RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Pre Ampl to on."

<Program>
PREAMP ON
PREAMP?

<Response>
ON

■ Restrictions according to model type and options

This function is an option.

This command is available when main unit option MS860x-08/MS268x-08 is installed.

PROBPWR_CCDF

Power at Specified Probability for CCDF

Program Message	Query Message	Response Message
–	PROBPWR_CCDF?	a1,a2,a3,a4,a5,a6

■ Function

Outputs the power deviation at a specified probability on the CCDF screen.

■ Parameters

Value of a

Resolution	Unit
0.1	dB

Outputs the result in the order of 10, 1, 0.1, 0.01, 0.001, and 0.0001%. If no corresponding power exists, *** will be output.

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Reads out the measurement result of power deviation."

<Program>
DSPL CCDF,CCDF
SWP
PROBPWR_CCDF?

<Response>
2.3,4.5,5.6,6.8,***,***

PVECTERR

Peak EVM

Program Message	Query Message	Response Message
–	PVECTERR? a	b

■ Function

Outputs the result of measurement for the EVM maximum instantaneous value on the Modulation Analysis screen.

■ Value of a

Output

a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

Peak EVM

Resolution	Unit
0.01	%

■ Example of use

"Reads out the peak EVM value."

<Program>
DSPL MODANAL
SWP
PVECTERR?

<Response>
45.23

PWRCAL

Power Calibration

Program Message	Query Message	Response Message
PWRCAL	PWRCAL?	a

■ Function

Performs calibration during the power measurement with "PWRCAL" and reads out the calibration value with "PWRCAL?". The calibration value can be set only by external control with "CALVAL" (*cf.* CALVAL).

■ Value of a

Calibration value

Range	Resolution	Initial value	Unit
–10.00 to 10.00	0.01	0.00	dB

■ Restriction

- Executable screens are as follows (*cf.* DSPL):
  - Modulation Analysis
  - RF Power
  - Occupied Bandwidth
  - Spurious close to the Carrier
  - Spurious Emission
  - CCDF
- Where the Terminal is other than RF, execution cannot be performed (*cf.* TERM).
- Where the Frequency is less than 50 MHz, execution cannot be performed (*cf.* FREQ).

■ Example of use

"Performing calibration during the power measurement."

<Program>
DSPL SETCOM
TERM RF
FREQ 1920MHZ
DSPL RFPWR
CALVAL 2.33
PWRCAL?
PWRCAL

<Response>
2.33

■ Restrictions according to model type and options

For MS268x, this command is not available.

PWRPROB_CCDF

Probability at Specified Power for CCDF

Program Message	Query Message	Response Message
–	PWRPROB_CCDF?	a1,a2,a3,a4,a5

■ Function

Outputs the probability for grids on the CCDF screen.

■ Value of a

Probability of power specified.

Resolution	Unit
0.0001	%

Outputs the result in the ascendant order of grid values. If no corresponding power exists, *** will be output.

Horizontal Scale (*cf.* HSCALE_CCDF)	Grid value to be read out				
	a1	a2	a3	a4	a5
2 dB	0.4 dB	0.8 dB	1.2 dB	1.6 dB	2 dB
5 dB	1 dB	2 dB	3 dB	4 dB	5 dB
10 dB	2 dB	4 dB	6 dB	8 dB	10 dB
20 dB	4 dB	8 dB	12 dB	16 dB	20 dB
50 dB	10 dB	20 dB	30 dB	40 dB	50 dB

Reads out data of minus grid only when Trace Format is Negative.

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Reads measurement result of probability for grids."

<Program>
DSPL CCDF,CCDF
SWP
PWRPROB_CCDF?

<Response>
50.1234,12.2345,7.1234,3.2345,***

PWRVSTIME

Power vs Time for RF Power

Program Message	Query Message	Response Message
–	PWRVSTIME? a, b ,c	d
–	PWRVSTIME? ALL, b ,c	d1,d2,d3,d4

■ Function

Displays the measured result for power at specified time on the RF Power screen.

■ Value of a, b

Measured range

a	Half slot b	Readout position
1	1STHALF	Displays the power at 319.3 μs
2		Displays the power at 326.3 μs.
3		Displays the power at 507.0 μs.
4		Displays the power at 514.0 μs.
ALL		Displays the power at 319.3 μs, 326.3 μs, 507.0 μs and 514.0 μs.
1	2NDHALF	Displays the power at 1152.7 μs.
2		Displays the power at 1179.7 μs.
3		Displays the power at 1340.3 μs.
4		Displays the power at 1347.3 μs.
ALL		Displays the power at 1152.7 μs, 1179.7 μs, 1340.3 μs and 1347.3 μs.

■Value of c

Output unit

c	Output unit
None	When the Relative Level is On (Relative), it is deemed that dB has been specified, and in the event of Off (Absolute) it is deemed that dBm has been specified (*cf.* LVLREL_RFPWR).
DB	dB
DBM	dBm

■ Value of d

Power at the specified time.

Resolution	Unit
0.01	dB
	dBm

■ Restriction

- Valid only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A, and Slot Type is set to Idle Slot(*cf.* MEASOBJ, SLOTTYPE).

■Example of use

"Read the power at the specified time."

<Program>
DSPL RFPWR
SWP
PWRVSTIME? 2,1STHALF

<Response>
1.22

QLVL

Q Level (RMS)

Program Message	Query Message	Response Message
–	QLVL? a	b

■ Function

Reads out the measurement results of the RMS value for Signal Q on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	In accordance with unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b

RMS value for Signal Q

Resolution	Unit
0.01	mV
	dBmV

■ Example of use

"Reading out the RMS value for Level Q."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
QLVL? MV

<Response>
0.53

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

QMASK

Long Code Mask

Program Message	Query Message	Response Message
QMASK a	QMASK?	a

■ Function

Sets MQ for Q-phase Long Code Mask of the Reverse Link signal.

■ Value of a

Specification of QI for Q-phase Long Code Mask

Range	Resolution	Initial value
00000000000 - 3ffffffffff	1	00000000000

■ Restriction

- The measurement screen must be "Setup Common Parameter."
- Enable when Reverse Link Rev.0 is set for Measuring Object. (*cf.* MEASOBJ)
- When the setting of MI is updated, the value is set again after MQ is recalculated.

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Performs analysis by setting QI for Q-phase Long Code Mask to "00000000001"."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
QMASK 1
QMASK?

<Response>
00000000001

QPPLVL

Q Level (Peak to Peak)

Program Message	Query Message	Response Message
–	QPPLVL? a	b

■ Function

Reads out the measurement results of the Peak-to-Peak value for Signal Q on the IQ Level screen.

■ Value of a

Readout unit

a	Readout unit
None	In accordance with unit set by Unit (*cf.* UNIT_IQL).
MV	mV
DBMV	dBmV

■ Value of b

Peak-to-Peak value for Signal Q

Resolution	Unit
0.01	mV
	dBmV

■ Example of use

"Reading out the Peak-to-Peak value for Level Q."

<Program>
DSPL SETCOM
TERM IQAC
DSPL IQLVL
SWP
QPPLVL? MV

<Response>
3.55

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

RBD_ACP

RBW Mode: Digital/Normal

Program Message	Query Message	Response Message
RBD_ACP a	RBD_ACP?	a

■ Function

Makes setting to or not to digital filter sweeping mode, for the Spurious Close to the Carrier measurement.

■ Value of a

Sweeping Mode

a	Sweeping Mode	Initial value
DGTL	Set to digital filter sweeping mode (Digital).	
NRM	Set to normal sweeping mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to digital filter sweeping mode."

<Program>
RBD_ACP DGTL
RBD_ACP?

<Response>
DGTL

■ Note

This function is an option. If the option is invalid, it is deemed that Normal has been set.

RBD_OBW

RBW Mode: Digital/Normal

Program Message	Query Message	Response Message
RBD_OBW a	RBD_OBW?	a

■ Function

Make setting to or not to digital filter sweeping mode, for the Occupied Bandwidth measurement using Spectrum Analyzer.

■ Value of a

Sweeping Mode

a	Sweeping Mode	Initial value
DGTL	Set to digital filter sweeping mode (Digital).	
NRM	Set to normal sweeping mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Set to digital filter sweeping mode.”

<Program>
RBD_OBW DGTL
RBD_OBW?

<Response>
DGTL

■ Note

This function is an option. If the option is invalid, it is deemed that Normal has been set.

RBW_ACP

Resolution Bandwidth for Spurious close to the Carrier

Program Message	Query Message	Response Message
RBW_ACP a	RBW_ACP?	a

■ Function

Sets the Resolution Bandwidth (RBW) in the Spurious close to the Carrier measurement.

■ Value of a

RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	30000	Hz	For RBW Mode: Digital
300 to 20000000	1	30000	Hz	For RBW Mode: Analog

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input into the setting range. However, the value that is actually set is the value, as shown in the Table below.

Set value	Remarks
10, 30, 100, 300, 1000, 3000, 10000, 100000, 300000, 1000000	For RBW Mode: Digital
300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000, 5000000, 10000000, 20000000	For RBW Mode: Analog

- No setting is allowed when Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8 and Template is set to Band Class 6.(*cf.* DSPL)

■ Example of use

"Set RBW to 30 kHz."

<Program>
RBW_ACP 30KHZ
RBW_ACP?

<Response>
30000

RBW_CCDF

Select Resolution Bandwidth for CCDF

Program Message	Query Message	Response Message
RBW_CCDF a	RBW_CCDF?	a

■ Function

Selects the digital filter for filtering on the CCDF screen.

■ Value of a

Filter selection

Value	Filter selection	Initial value
3MHz, 5MHz, 10MHz, 20MHz, 1.23 MHz	Uses RBW of "Value of a."	5MHz

□ Suffix codes

None : Hz
HZ : Hz
KHZ, KZ : kHz
MHZ, MZ : MHz

■ Initialization command

PRE, INI, IP, *RST

■ Example of use

"Sets RBW to 10MHz."

<Program>
DSPL CCDF,CCDF
RBW_CCDF 10MHZ
RBW_CCDF?

<Response>
10MHZ

RBW_OBW

Resolution Bandwidth for Occupied Bandwidth

Program Message	Query Message	Response Message
RBW_OBW a	RBW_OBW?	a

■ Function
Sets Resolution Bandwidth (RBW) in Occupied Bandwidth measurement using a Spectrum Analyzer.

■ Value of a
RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	10000	Hz	For RBW Mode: Digital
300 to 20000000	1	10000	Hz	For RBW Mode: Analog

□ Suffix code
None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Initialization of setting
PRE, INI, IP, *RST

■ Restriction
- Any value may be input into the setting range. However, the value that is actually set is the value, as shown in the Table below.

Set value	Remarks
10, 30, 100, 300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000	For RBW Mode: Digital
300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000, 5000000, 10000000, 20000000	For RBW Mode: Analog

■ Example of use
"Set RBW to 30 kHz."

<Program>
RBW_OBW 30KHZ
RBW_OBW?

<Response>
30000

REFPWR_ACP

Ref Power

Program Message	Query Message	Response Message
–	REFPWR_ACP? a	b

■ Function

Reads out the average power in one slot.

■ Value of a

Specification of output unit

a	Output unit
DBM	dBm
WATT	W

■ Value of b

Ref Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal)	W

■ Example of use

"Read out the Ref Power measurement result."

<Program>
DSPL ACP
SWP
REFPWR_ACP? DBM

<Response>
–18.53

REFPWR_SPU

Ref Power

Program Message	Query Message	Response Message
–	REFPWR_SPU? a	b

■ Function

Reads out the average power in one slot.

■ Value of a

Specification of output unit

a	Output unit
DBM	dBm
WATT	W

■ Value of b

Ref Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal)	W

■ Example of use

“Read out the Ref Power measurement result.”

<Program>
DSPL SPURIOUS,SPOT
SWP
REFPWR_SPU? DBM

<Response>
–18.53

REFPWRMD_ACP

Ref Power Mode for Spurious close to the Carrier

Program Message	Query Message	Response Message
REFPWRMD_ACP a	REFPWRMD_ACP?	a

■ Function

Sets the measurement method for Reference Power to calculate the relative value on the Spurious close to the Carrier screen.

■ Value of a

Measurement method

a	Measurement method	Initial value
SPA	Measurement method that sets Ref Power to be a Power at the zero span for RBW = 3MHz.	
TXPWR	Measurement method that sets Ref Power to be a Total Power.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the measurement method that sets Ref Power to be a Total Power."

<Program>
REFPWRMD_ACP TXPWR
REFPWRMD_ACP?

<Response>
TXPWR

REFPWRMD_SPU

Ref Power Mode for Spurious Emission

Program Message	Query Message	Response Message
REFPWRMD_SPU a	REFPWRMD_SPU?	a

■ Function

Set the measurement method for Reference Power to calculate the relative value on the Spurious Emission screen.

■ Value of a

Measurement method

a	Measurement method	Initial value
SPA	Measurement method that sets Ref Power to be a Power at the zero span for RBW = 3MHz.	*
TXPWR	Measurement method that sets Ref Power to be a Total Power.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Set the measurement method that sets Ref Power to be a Total Power.”

<Program>
REFPWRMD_SPU TXPWR
REFPWRMD_SPU?

<Response>
TXPWR

REFTR_CCDF

Select Reference Trace for CCDF

Program Message	Query Message	Response Message
REFTR_CCDF a	REFTR_CCDF?	a

■ Function

Selects the waveform to be added for display on the CCDF screen.

■ Value of a

Waveform selection

Value	Waveform selection	Initial value
OFF	Displays measurement waveform only .	*
SAVE	Displays Trace specified in Save Reference Trace (cf. SAVETR_CCDF).	
GAUSS	Displays Gaussian Trace.	
SAVEGAUSS	Displays Save Trace and Gaussian Trace.	

■ Initialization command

PRE, INI, IP, *RST

■ Restriction

- Gaussian Trace and Save & Gaussian Trace can be selected only when Measure Method is CCDF. (*cf.* DSPL)

■ Example of use

"Displays Save Trace."

<Program>
DSPL CCDF,CCDF
SWP
SAVETR_CCDF
REFTR_CCDF SAVE
REFTR_CCDF?

<Response>
SAVE

RFINPUT

RF Input Connector

Program Message	Query Message	Response Message
RFINPUT a	RFINPUT?	a

■ Function

Sets the connector of the RF signal to be input.

■ Value of a

RF signal level

a	RF signal level	Initial value
HIGH	High Power	*
LOW	Low Power	

■ Restriction

- The terminal must be set to RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the RF signal level to High Power."

<Program>
RFINPUT HIGH
RFINPUT?

<Response>
HIGH

■ Restrictions according to model type and options

This command is available only MS8608A.

RFLVL

Reference Level

Program Message	Query Message	Response Message
RFLVL a	RFLVL?	a

■ Function

Sets the Reference Level.

■ Value of a

Reference Level

Value	Initial value	Resolution	Unit	RF Input
See Restrictions	30.00	0.01	dBm	High
See Restrictions	10.00	0.01	dBm	Low

□ Suffix code

None: dBm

DBM: dBm

■ Restriction

- The terminal must be set to RF (*cf.* TERM).
- The setting range of the reference level becomes as follows depending on the status of RF Input: High/Low (*cf.* RFINPUT) and Pre Ampl: On/Off (*cf.* PREAMP). Please see RFLVLOFS regarding RefLevelOffset.

			RF Input	
			High	Low
Pre Ampl	Off	With Power Sensor	(–10.00 + RefLevelOffset) to (42.00 + RefLevelOffset)	(–30.00 + RefLevelOffset) to (22.00 + RefLevelOffset)
		Without Power Sensor	(–10.00 + RefLevelOffset) to (52.00 + RefLevelOffset)	(–30.00 + RefLevelOffset) to (32.00 + RefLevelOffset)
	On		(–30.00 + RefLevelOffset) to (32.00 + RefLevelOffset)	(–50.00 + RefLevelOffset) to (12.00 + RefLevelOffset)

- When the reference level goes out of the setting range due to a change of the RF Input or the Pre Ampl, round off to the nearest value.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Setting the Reference Level to –10.00 dBm.”

<Program>
DSPL SETCOM
TERM RF
RFINPUT HIGH
RFLVLOFS 0
RFLVL –10.00
RFLVL?

<Response>
–10.00

RFLVLOFS

Reference Level Offset

Program Message	Query Message	Response Message
RFLVLOFS a	RFLVLOFS?	a

■ Function

Sets Offset value of the Reference Level. The Reference Level setting range expands only for the portion of the offset value.

■ Value of a

Reference Level Offset

Range	Resolution	Initial value	Unit
–99.99 to 99.99	0.01	0.00	dB

□ Suffix code

None: dB

DB: dB

■ Restriction

- The Terminal must be set to RF (*cf.* TERM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the Reference Offset Level to 0.00 dB."

<Program>
DSPL SETCOM
TERM RF
RFLVLOFS 0.00
RFLVLOFS?

<Response>
0.00

RL_ACP

Ref Level for Spurious close to the Carrier

Program Message	Query Message	Response Message
RL_ACP a	RL_ACP?	a

■ Function

Sets the Ref Level for Spurious close to the Carrier measurement.

■ Value of a

Ref Level

Range	Resolution	Initial value	Unit	RF Input
See Restriction.	0.01	40.00	dBm	High
See Restriction.	0.01	20.00	dBm	Low

□ Suffix code

None: dBm

DBM: dBm

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Restriction

• Reference level setting range depends on RF Input: High/Low (*cf.* RFINPUT), Pre Ampl: On/Off (*cf.* PREAMP), as follows. Refer to RFLVLOFS for RefLevelOffset.

		RF Input	
		High	Low
Attenuator Mode: Auto	Pre Ampl:Off	(–100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)	(–120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)
	Pre Ampl:On	(–120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)	(–140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)

If the reference level will become out of range due to RF Input or Pre Ampl. change, the level is rounded to the nearest value within the range.

■ Example of use

"Setting Ref Level to –30 dBm."

<Program>

ATTMD_ACP AUTO

RL_ACP –30DBM

RL_ACP?

<Response>

–30.00

RL_OBW

Ref Level for Occupied Bandwidth

Program Message	Query Message	Response Message
RL_OBW a	RL_OBW?	a

■ Function
Sets the Ref Level for Occupied Bandwidth measurement using spectrum analyzer.

■ Value of a
Ref Level

Range	Resolution	Initial value	Unit	RF input
Refer to Restriction.	0.01	40.00	dBm	High
Refer to Restriction	0.01	20.00	dBm	Low

□ Suffix code
None: dBm
DBM: dBm

■ Initialization of setting
PRE, INI, IP, *RST

■ Restriction
- Reference level setting range depends on RF Input: High/Low (cf. RFINPUT), Pre Ampl: On/Off (cf. PREAMP), as follows. Refer to RFLVLOFS for RefLevelOffset.

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="2">RF Input</td></tr>
<tr><td>High</td><td>Low</td></tr>
<tr><td rowspan="2">Attenuator Mode: Auto</td><td>Pre Ampl:Off</td><td>(–100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)</td><td>(–120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)</td></tr>
<tr><td>Pre Ampl:On</td><td>(–120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)</td><td>(–140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)</td></tr>
</table>

If the reference level will become out of range due to RF Input or Pre Ampl. change, the level is rounded to the nearest value within the range.

■ Example of use
"Setting Ref Level to –30 dBm."

<Program>
ATTMD_OBW AUTO
RL_OBW -30DBM
RL_OBW?

<Response>
–30.00

RNG

Range

Program Message	Query Message	Response Message
RNG a	–	–

■ Function

Increases and decreases the power meter measurement range.

■ Value of a

Operation of the power meter range

a	Operation of the power meter range
UP	Increases the measurement range by one step.
DN	Decreases the measurement range by one step.

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
    - Power Meter

■ Example of use

<Program>
DSPL PWRMTR
RNG UP

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG1

Range1

Program Message	Query Message	Response Message
RNG1	–	–

■ Function

Sets the power meter measurement range to the lowest level.
The range value is 0 dBm when the RF Input is High, and –20 dBm when Low (*cf.* RFINPUT).

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
- Power Meter

■ Example of use

"Setting the power meter measurement range to the lowest level."

<Program>
DSPL PWRMTR
RNG1

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG2

Range2

Program Message	Query Message	Response Message
RNG2	–	–

■ Function

Sets the power meter measurement range to the second lowest level.
The range value is +10 dBm when RF Input is High, and –10 dBm when Low (*cf.* RFINPUT).

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
- Power Meter

■ Example of use

"Setting the power meter measurement range to the second lowest level."

<Program>
DSPL PWRMTR
RNG2

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG3

Range3

Program Message	Query Message	Response Message
RNG3	–	–

■ Function

Sets the power meter measurement range to the intermediate level.

Sets the measurement range of the Power Meter to the medium level. The range value is +20 dBm when the RF Input is High, and 0 dBm when Low (*cf.* RFINPUT).

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
- Power Meter

■ Example of use

"Setting the power meter measurement range to the intermediate level."

<Program>
DSPL PWRMTR
RNG3

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG4

Range4

Program Message	Query Message	Response Message
RNG4	–	–

■ Function

Sets the power meter measurement range to the fourth lowest level.
The range value is +30 dBm when the RF Input is High, and +10 dBm when Low (*cf.* RFINPUT).

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
- Power Meter

■ Example of use

"Setting the power meter measurement range to the fourth lowest level."

<Program>
DSPL PWRMTR
RNG4

■ Restrictions according to model type and options

For MS268x, this command is not available.

RNG5

Range5

Program Message	Query Message	Response Message
RNG5	–	–

■ Function

The measurement range of the power meter is set at the highest level.
The range value is +40 dBm when the RF Input in High, and +20 dBm when Low (*cf.* RFINPUT).

■ Restriction

- Executable screen is as follows (*cf.* DSPL).
- Power Meter

■ Example of use

"Setting the power meter measurement range to the highest level."

<Program>
DSPL PWRMTR
RNG5

■ Restrictions according to model type and options

For MS268x, this command is not available.

RSLTMODTYPE

Result of Modulation Type

Program Message	Query Message	Response Message
–	RSLTMODTYPE? a	b
–	RSLTMODTYPE? ALL	b(1),b(2),...,b(a)

■ Function

Outputs the analyzed modulation method on the Modulation Analysis screen.

■ Value of a

Analysis Length

Range	Resolution
1 to Analysis Length	1

■ Value of b

Modulation Type

a	Description
QPSK	Data area has been QPSK-modulated.
8PSK	Data area has been 8PSK-modulated.
16QAM	Data area has been 16QAM-modulated.

■ Restriction

Enable when Forward Link Rev.0 or Forward Link Rev.A is set for Measuring Object and Active is set for Slot Type. (*cf.* MEASOBJ)

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Outputs the analyzed modulation method."

<Program>
DSPL SETCOM
MEASOBJ FORWARD_REV0
MEAS MODANAL
RSLTMODTYPE? 1

<Response>
8PSK

S1

Continuous Measure/Sweep

Program Message	Query Message	Response Message
S1	—	—

■ Function

Executes a measurement and sweeping continuously.
Accepts a command even during measurement.
This command functions the same as the CONTS command.
Stops the current measurement and starts with a new measurement when a measurement execution command, such as CONTS command, is received during measurement.
When an operation command not related to the measurement, for example, the INTPOL command or query message, is received during measurement; the current measurement is continued while responding to the received command.
However, when a measurement-related command is received during measurement, the current measurement is stopped and the command is executed.

■ Example of use

"Continuously executes a measurement and sweeping."

<Program>
S1

S2

Single Measure/Sweep

Program Message	Query Message	Response Message
S2	—	—

■ Function

Executes a measurement and sweeping once.

Accepts a command even during measurement.

This command functions the same as the SNGLS command.

Stops the current measurement and starts with a new measurement when a measurement execution command, such as SNGLS command, is received for the second time during measurement.

When an operation command not related to the measurement, for example, the INTPOL command or query message, is received during measurement; the current measurement is continued while responding to the command.

However, when a measurement-related command is received during measurement, the current measurement is stopped and command is executed.

■ Example of use

"Executes a measurement and sweeping once."

<Program>

S2

SAVETR_CCDF

Save Reference Trace for CCDF

Program Message	Query Message	Response Message
SAVETR_CCDF	SAVETR_CCDF?	a

■ Function

Saves Reference Trace on the CCDF screen.

■ Value of a

Value	Status
OFF	Waveform is not saved.
ON	Waveform is saved.

■ Example of use

"Saves Reference Trace."

<Program>
MEAS CCDF,CCDF
SAVETR_CCDF
SAVETR_CCDF?

<Response>
ON

SETREL

Set Relative level

Program Message	Query Message	Response Message
SETREL	–	–

■ Function

Sets the power value displayed on the Power Meter screen to the reference value for relative value display.

■ Restriction

- This function can be executed only when the displayed measurement screen is the Power Meter screen. (cf. DSPL)

■ Example of use

"Setting the currently displayed power value to the reference value for relative value display."

<Program>
MEAS PWRMTR
SETREL

■ Restrictions according to model type and options

For MS268x, this command is not available.

SLCTTEMP_ACP

Standard Template

Program Message	Query Message	Response Message
SLCTTEMP_ACP a,b	SLCTTEMP_ACP?	a,b

■ Function

Set the specified template for standard.

■ Value of a and b

Standard and type specifications

When Measure Method is set to Normal

<table>
<tr><th>a</th><th>b</th><th>Stan-dard</th><th>Type</th><th>Set Offset Fre-quency A</th><th>Set Offset Fre-quency B</th><th>Set Offset Fre-quency C</th><th>Set Line Level 1</th><th>Set Line Level 2</th><th>Set Line Level 3</th><th>Re-marks</th></tr>
<tr><td rowspan="8">3GPP 2</td><td>FWDTM P1</td><td rowspan="8">3GPP2 (Forward Link)</td><td>Class 0,2,3,5,7,9 f<1MHz</td><td colspan="3">0.750MHz</td><td colspan="3">–45.00dB</td><td rowspan="8"></td></tr>
<tr><td>FWDTM P2</td><td>Class0,2,3,5, 9 f≥1MHz Power≥ 33dBm</td><td rowspan="6">1.000 MHz</td><td rowspan="6">1.980 MHz</td><td rowspan="3">1.980 MHz</td><td rowspan="6">–45.00 dB</td><td colspan="2">–60.00dB</td></tr>
<tr><td>FWDTM P3</td><td>Class0,2,3,5, 9 f≥1MHz 28dBm≤Power<33dBm</td><td colspan="2">–27.00dBm</td></tr>
<tr><td>FWDTM P4</td><td>Class0,2,3,5, 9 f≥1MHz Power<28dBm</td><td colspan="2">–55.00dB</td></tr>
<tr><td>FWDTM P5</td><td>Class7 f≥1MHz Power≥ 33dBm</td><td rowspan="3">3.250 MHz</td><td>–60.00 dB</td><td rowspan="3">–46.00 dBm</td></tr>
<tr><td>FWDTM P6</td><td>Class7 f ≥ 1MHz 28dBm≤Power<33dBm</td><td>–27.00 dBm</td></tr>
<tr><td>FWDTM P7</td><td>Class7 f≥1MHz Power<28dBm</td><td>–55.00 dB</td></tr>
<tr><td>FWDTM P8</td><td>Class1,4,8 f<2.25MHz Power≥36dBm</td><td>0.885 MHz</td><td>1.250 MHz</td><td>1.980 MHz</td><td>–45.00 dB</td><td>–9.00 dBm</td><td>–55.00 dB</td></tr>
</table>

a	b	Stan-dard	Type	Set Offset Fre-quency A	Set Offset Fre-quency B	Set Offset Fre-quency C	Set Line Level 1	Set Line Level 2	Set Line Level 3	Re-marks
3GPP 2	FWDTM P9	3GPP2 (Forward Link)	Class1,4,8 f<2.25MHz 33dBm≤Power<36dBm	0.885 MHz	1.250 MHz	1.980 MHz	–45.00dB		–55.00 dB	
	FWDTM P10		Class1,4,8 f<2.25MHz 28dBm≤Power<33dBm	0.885 MHz	1.250 MHz	1.980 MHz	–45.00dB		–22.00 dBm	
	FWDTM P11		Class1,4,8 f<2.25MHz Power<28dBm						–50.00 dB	
	FWDTM P12		Class1,4,6,8 f≥2.25MHz	2.250MHz			–13.00dBm			
	FWDTM P13		Class6 f<2.25MHz	0.885 MHz	1.250 MHz	(1.450 MHz)	–45.00 dB	–13.00 dBm	(–26.60 dBm)	
	RVSTM P1	3GPP2 (Reverse Link)	Class0,2,5,9 Power≥ –16.13dBm	0.885 MHz	1.980 MHz		–42.00 dB	–54.00dB		
	RVSTM P2		Class0,2,5,9 –28.13dBm ≤ Power< –16.13dBm					–54.00dBm		
	RVSTM P3		Class0,2,5,9 Power< –28.13dBm				–54.00dBm			
	RVSTM P4		Class3 Power≥ –28.13dBm	0.885MHz			–42.00dB			
	RVSTM P5		Class3 Power< –28.13dBm				–54.00dBm			
	RVSTM P6		Class7 Power≥ –16.13dBm	0.885 MHz	1.980 MHz	2.250 MHz	–42.00 dB	–54.00 dB	–35.00 dBm	
	RVSTM P7		Class7 –28.13dBm ≤Power< –16.13dBm					–54.00 dBm		
	RVSTM P8		Class7 Power< –28.13dBm				–54.00dBm			
	RVSTM P9		Class1,4,8 Power≥ –20.13dBm	1.250 MHz	1.980MHz		–42.00 dB	–50.00dB		

<table>
<tr><th>a</th><th>b</th><th>Standard</th><th>Type</th><th>Set Offset Freq. A</th><th>Set Offset Freq. B</th><th>Set Offset Freq. C</th><th>Set Line Level 1</th><th>Set Line Level 2</th><th>Set Line Level 3</th><th>Re-marks</th></tr>
<tr><td rowspan="6">3GPP2</td><td>RVSTMP 10</td><td rowspan="6">3GPP2 (Reverse Link)</td><td>Class1,4,8 –28.13dBm ≤ Power< –20.13dBm</td><td rowspan="5">1.250 MHz</td><td colspan="2" rowspan="5">1.980MHz</td><td>–42.00 dB</td><td colspan="2">–54.00dBm</td><td rowspan="6"></td></tr>
<tr><td>RVSTMP 11</td><td>Class1,4,8 Power < –28.13dBm</td><td colspan="3">–54.00dBm</td></tr>
<tr><td>RVSTMP 12</td><td>Class6 f < 2.25MHz Power≥ –20.13dBm</td><td rowspan="2">–42.00 dB</td><td colspan="2">–50.00dB</td></tr>
<tr><td>RVSTMP 13</td><td>Class6 f < 2.25MHz –28.13dBm ≤ Power< –20.13dBm</td><td colspan="2">–54.00dBm</td></tr>
<tr><td>RVSTMP 14</td><td>Class6 f < 2.25MHz Power< –28.13dBm</td><td colspan="3">–54.00dBm</td></tr>
<tr><td>RVSTMP 15</td><td>Class6 f ≥ 2.25MHz</td><td>2.250 MHz</td><td colspan="2">(2.250MHz)</td><td>–13.00 dBm</td><td>(–13.00 dBm)</td><td>(–14.75 dBm)</td></tr>
<tr><td colspan="2">NOT</td><td>—</td><td>Not Selected</td><td colspan="6">—</td><td>Query only</td></tr>
</table>

When Measure Method is set to 3GPP2 FWD Band Class 0,2,3,5,9

<table>
<tr><th>a</th><th>b</th><th>Standard</th><th>Type</th><th>Set Offset Freq. A</th><th>Set Offset Freq. B</th><th>Set Offset Freq. C</th><th>Set Line Level 1</th><th>Set Line Level 2</th><th>Set Line Level 3</th><th>Re-marks</th></tr>
<tr><td rowspan="3">3GPP2</td><td>FWDTM P30</td><td rowspan="3">3GPP2 (Forward Link)</td><td>Class 0,2,3,5,9 Power ≥ 33dBm</td><td rowspan="3">0.750 MHz</td><td colspan="2" rowspan="3">1.980MHz</td><td rowspan="3">–45.00 dB</td><td colspan="2">–60.00dB</td><td rowspan="3"></td></tr>
<tr><td>FWDTM P31</td><td>Class 0,2,3,5,9 28dBm ≤ Power< 33dBm</td><td colspan="2">–27.00dBm</td></tr>
<tr><td>FWDTM P32</td><td>Class 0,2,3,5,9 Power< 28dBm</td><td colspan="2">–55.00dB</td></tr>
<tr><td colspan="2">NOT</td><td>—</td><td>Not Selected</td><td colspan="6">—</td><td>Query only</td></tr>
</table>

When Measure Method is set to 3GPP2 FWD Band Class 1,4,6,8

<table>
<tr><th>a</th><th>b</th><th>Standard</th><th>Type</th><th>Set Offset Freq. A</th><th>Set Offset Freq. B</th><th>Set Offset Freq. C</th><th>Set Offset Freq. D</th><th>Set Line Level 1</th><th>Set Line Level 2</th><th>Set Line Level 3</th><th>Set Line Level 4</th><th>Remarks</th></tr>
<tr><td rowspan="5">3GPP2</td><td>FWDT MP60</td><td rowspan="5">3GPP2 (Forward Link)</td><td>Class6</td><td>0.885 MHz</td><td>1.250 MHz</td><td>1.450 MHz</td><td>2.250 MHz</td><td>–45.00 dB</td><td>–13.00 dBm</td><td>–26.60 dBm</td><td>–13.00 dBm</td><td rowspan="5"></td></tr>
<tr><td>FWDT MP61</td><td>Class 1,4,8 Power≥36dBm</td><td rowspan="4">0.885 MHz</td><td rowspan="4">1.250 MHz</td><td rowspan="4">1.980 MHz</td><td rowspan="4">2.250 MHz</td><td rowspan="4">–45.00 dB</td><td>–9.00 dBm</td><td>–55.00 dB</td><td rowspan="4">–13.00 dBm</td></tr>
<tr><td>FWDT MP62</td><td>Class 1,4,8 33dBm ≤Power < 36dBm</td><td rowspan="3">–45.00 dB</td><td>–55.00 dB</td></tr>
<tr><td>FWDT MP63</td><td>Class 1,4,8 28dBm ≤Power < 33dBm</td><td>–22.00 dBm</td></tr>
<tr><td>FWDT MP64</td><td>Class 1,4,8 Power<28dBm</td><td>–50.00 dB</td></tr>
<tr><td colspan="2">NOT</td><td>—</td><td>Not Selected</td><td colspan="8">—</td><td>Query only</td></tr>
</table>

When Measure Method is set to 3GPP2 FWD Band Class 3+

<table>
<tr><th>a</th><th>b</th><th>Standard</th><th>Type</th><th>Set Offset Freq. A</th><th>Set Offset Freq. B</th><th>Set Offset Freq. C</th><th>Set Line Level 1</th><th>Set Line Level 2</th><th>Set Line Level 3</th><th>Re-marks</th></tr>
<tr><td rowspan="3">3GPP2</td><td>FWDTMP3P0</td><td rowspan="3">3GPP2 (Forward Link)</td><td>Class 3+ Power >47 dBm</td><td rowspan="3">0.750 MHz</td><td colspan="2" rowspan="3">1.980MHz</td><td rowspan="3">–45.00 dB</td><td colspan="2">–13.00dBm</td><td rowspan="3"></td></tr>
<tr><td>FWDTMP3P1</td><td>Class 3+ 30 dBm< Power ≤ 47 dBm</td><td colspan="2">–45.00dB</td></tr>
<tr><td>FWDTMP3P2</td><td>Class 3+ Power ≤ 30 dBm</td><td colspan="2">–16.00dBm</td></tr>
<tr><td colspan="2">NOT</td><td>—</td><td>Not Selected</td><td colspan="6">—</td><td>Query only</td></tr>
</table>

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Set 3GPP2 Forward Link Band Class0,2,3,5,9 f ≥ 1MHz Power ≥ 33dBm.”

<Program>
DSPL ACP,NRM
SLCTTEMP_ACP 3GPP2,FWDTMP2
SLCTTEMP_ACP?

<Response>
3GPP2,FWDTMP2

SLCTTEMP_RFPWR

Select Template for RF Power

Program Message	Query Message	Response Message
SLCTTEMP_RFPWR a	SLCTTEMP_RFPWR?	a

■ Function

Sets the template used on the RF Power screen to the value prescribed by the 3GPP2 cdma2000 High Rate Packet Data Air Interface.

■ Value of a

Status of Template

a	Status of template	Initial value
NOT	Level value has been changed	
STD	Value prescribed by the standard	*

- When the Line Level is changed, the status becomes “NOT,” and “NOT” is retained until “SLCTTEMP_RFPWR STD” is executed.

■ Restriction

- Valid only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Return of template to standard value.”

<Program>
SLCTTEMP_RFPWR STD
SLCTTEMP_RFPWR?

<Response>
STD

SLOTTYPE

Slot Type

Program Message	Query Message	Response Message
SLOTTYPE a	SLOTTYPE?	a

■ Function

Sets the slot type for Forward Link signal measurement.

■ Value of a

Slot type specification

a	Description	Initial value
ACTIVE	Assumes and analyzes the signal output for Forward Traffic Channel or Control Channel.	*
IDLE	Assumes and analyzes the signal output for Forward Traffic Channel or Control Channel.	

■ Restriction

- The measurement screen must be "Setup Common Parameter."
- Enable when Forward Link Rev.0 or Forward Link Rev.A is set for Measuring Object. (*cf.* MEASOBJ)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Assumes and analyzes the signal output for Forward Traffic Channel or Control Channel."

<Program>
DSPL SETCOM
SLOTTYPE ACTIVE
SLOTTYPE?

<Response>
ACTIVE

SMOFLT

Smoothing Filter

Program Message	Query Message	Response Message
SMOFLT a	SMOFLT?	a

■ Function

On the RF Power screen, sets whether or not to smoothen the waveform.

■ Value of a

On/Off of smoothing of waveform

a	On/Off of smoothing of waveform	Initial value
ON	Smoothing of waveform	
OFF	No smoothing of waveform	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Smooth the waveform.”

<Program>
DSPL RFPWR
SMOFLT ON
SMOFLT?
SWP

<Response>
ON

SMOTGT

Smoothing Target

Program Message	Query Message	Response Message
SMOTGT a	SMOTGT?	a

■ Function

On the RF Power screen, sets target of smoothing filter.

■ Value of a

All/Wave of target of smoothing

a	On/Off of smoothing of waveform	Initial value
ALL	Smoothing of all measurement result	
WAVE	Smoothing of waveform only	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

“Smooth the all measurement result.”

<Program>
DSPL RFPWR
SMOFLT ON
SMOTGT ALL
SMOTGT?
SWP

<Response>
ALL

SNGLS

Single Sweep

Program Message	Query Message	Response Message
SNGLS	–	–

■ Function

Performs measurement one time. The subsequent command is processed without waiting for the completion of measurement.

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
  - Modulation Analysis
  - RF Power
  - Occupied Bandwidth
  - Spurious close to the Carrier
  - Spurious Emission
  - IQ Level
  - Power Meter
  - CCDF

■ Example of use

"Perform measurement one time."

<Program>
SNGLS

SPUALL

Frequency, Level, RBW, VBW, Sweep Time

Program Message	Query Message	Response Message
–	SPUALL? Fa,b,c	d(a),e(a),f(a),g(a),h(a), d(a+1),e(a+1),f(a+1),g(a+1),h(a+1),..., d(a+b–1),e(a+b–1),f(a+b–1),g(a+b–1), h(a+b–1)

■ Function

Outputs simultaneously the measurement result of Frequency, Level, RBW, VBW and Sweep Time, on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Output unit

c	Unit
None	Conforms to unit set by Unit. (*cf.* UNIT_SPU)
DBM	dBm
DB	dB

■ Value of d

Frequency measurement result

Resolution	Unit
1	Hz

Same as c of SPUFREQ

■ Value of e

Level measurement result

Resolution	Unit
0.01	dB or dBm

Same as d of SPULVL

■ Value of f

RBW

Resolution	Unit
1	Hz

Same as c of SPURBW

■ Value of g

VBW

Resolution	Unit
1	Hz

Same as c of SPUVBW

■ Value of h

Sweep Time

Resolution	Unit
1	μs

Same as c of SPUSWT

■ Example of use

"Read out all results of f1 to f2."

<Program>

DSPL SPURIOUS,SEARCH
SWP
SPUALL? F1,2

<Response>

1775300000, –33.97, 1000, 3000, 200000, 2162950000, –37.87, 10000, 30000, 600000

SPUATT

Attenuator for Spurious Emission

Program Message	Query Message	Response Message
–	SPUATT? Fa,b	c

■ Function

Outputs Attenuator during measurement at Spurious Emission measurement.
In Spurious Mode of Spot, outputs Attenuator set on Setup Spot Table screen.
In Spurious Mode of Search or Sweep, outputs Attenuator set on Setup Search/Sweep Table screen (*cf.* TBLATT_SPU).

■ Value of a

Frequency point of readout start

Range	Resolution
1 to 15	1

■ Value of b

Number of frequency points of readout start

Range	Resolution
1 to 15	1

■ Value of c

Attenuator

Resolution	unit
1	dB

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Reading out Attenuator from f1 to f3."

<Program>
SPUATT? F1,3

<Response>
60,61,62

SPUFREQ

Frequency

Program Message	Query Message	Response Message
–	SPUFREQ? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the measurement result for Frequency on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Result of Frequency Measurement

Resolution	Unit
1	Hz

■ Restriction

- When the Spurious Mode is Spot, the result of output always matches the Frequency set up on the Setup Spot Table screen (*cf.* DSPL).

■ Example of use

“Read out of frequencies of f1 to f3.”

<Program>
DSPL SPURIOUS,SPOT
SWP
SPUFREQ? F1,3

<Response>
1775300000, 2162950000, 2550600000

SPUFREQLVL

Frequency and Level

Program Message	Query Message	Response Message
–	SPUFREQLVL? Fa,b,c	d(a),e(a),d(a+1),e(a+1),...,d(b),e(b)

■ Function

Simultaneously outputs the measurement results of Frequency and Level, on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Level output unit

c	Unit
None	Conforms to unit set by Unit. (*cf.* UNIT_SPU)
DBM	dBm
DB	dB

■ Value of d

Result of Frequency Measurement

Resolution	Unit
1	Hz

■ Value of e

Result of Level Measurement

Resolution	Unit
0.01	dB or dBm

■ Example of use

"Read out of Frequency and Level at f1 to f3"

<Program>
DSPL SPURIOUS,SPOT
SWP
SPUFREQLVL? F1,3,DB

<Response>
1775300000, –33.97, 2162950000, –37.87, 2550600000, –68.69

SPUJDG

Total Judgement

Program Message	Query Message	Response Message
–	SPUJDG?	a

■ Function

Reads out the total result of Level pass/fail judgement by means of the Limit value on the Spurious Emission screen. If the Spurious Mode is Spot, judge with the Limit value set on the Setup Spot Table screen as the reference, and if Search or Sweep, use the Limit value set on the Setup Search / Sweep Table screen.

■ Value of a

Judgement result

a	Pass/fail judgement
PASS	Pass
FAIL	Fail
OFF	Unmeasured

■ Restriction

- In order to pass, all valid measurements from f1 to f15 must be completed, and the result of judgement of each point must be Pass.
- Fail would result if the judgement result is Fail on any voluntary valid measurement from f1 to f15.

■ Example of use

"Read out of total result of pass/fail judgement."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUJDG?

<Response>
PASS

SPUJUDGLVL

Judgement Level

Program Message	Query Message	Response Message
–	SPUJUDGLVL? Fa,b	c(a),d(b),...c(a+b),d(a+b)

■ Function

Outputs the upper limit level and its unit used for judgement at each frequency point on the Spurious Emission screen.

■ Value of a

Readout start frequency point

Range	Resolution
1 to 15	1

■ Value of b

Number of readout frequency points

Range	Resolution
1 to 15	1

■ Value of c

Upper limit level

Range	Resolution	Initial value
–100.00 to 100.00	0.01	0.00

■ Value of d

Unit of upper limit level

d	Unit
dB	dB
DBM	dBm

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Outputs the upper limit level and its unit used for judgement at each frequency point on the Spurious Emission screen."

<Program>

```
DSPL SPURIOUS,SPOT
SWP
SPUJUDGLVL? F2,5
```

<Response>

```
0.00,DBM,0.00,DBM,0.00,DBM,0.00,DBM,0.00,DBM
```

SPULMT

Limit for Spurious Emission

Program Message	Query Message	Response Message
SPULMT a,Fb,c,d	SPULMT? a,Fb,d	c

■ Function

Sets the Limit value on the Pass/Fail judgement during Spurious Emission measurement.

■ Value of a

Selection of means of measurement

a	Means of measurement
SPOT	The Limit value used in the Spot method measurement is subjected.
SWEEP	The Limit value used in the Search or Sweep method measurement is subjected.

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

Limit value

Range	Resolution	Initial value	Unit
–100.00 to 100.00	0.01	Refer to initial value column of TBLFREQ_SPU.	dBm

■ Value of d

d	Setting item
ABS	Outputs Absolute Limit.
None	Outputs Absolute Limit.
REL	Outputs Relative Limit.

□ Suffix code

None

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

“Set Limit value of f1 of Search method measurement to –13.00 dBm.”

<Program>

SPULMT SWEEP,F1,-13.00

SPULMT? SWEEP,F1

<Response>

–13.00

SPULVL

Level

Program Message	Query Message	Response Message
–	SPULVL? Fa,b,c	d(a),d(a+1),...,d(b)

■ Function

Outputs the result of Level measurement on the Spurious Emission screen.

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Output unit

c	Unit
None	Conforms to unit set by Unit (*cf.* UNIT_SPU).
DBM	dBm
DB	dB

■ Value of d

Result of Level measurement

Resolution	Unit
0.01	dB or dBm

■ Example of use

"Read out of Levels from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPULVL? F1,3,DB

<Response>
–33.97, –37.87, –68.69

SPUPASS

Judgement

Program Message	Query Message	Response Message
–	SPUPASS? a	b

■ Function

On the Spurious Emission screen, reads out the pass/fail judgement result of Level by means of Limit value. When the Spurious Mode is Spot, the Limit value set on the Setup Spot Table screen is used as the reference for judgement, and when the Search or Sweep, the Limit value set on the Setup Search/Sweep Table screen is used.

■ Value of a

Frequency point

a	Frequency point
Fn	Reads out result of certain frequency point (n: 1-15).
ALL	Reads out the result of all frequency points at one time.

■ Value of b

Judgement Result

b	Pass/Fail Judgement
PASS	Pass
FAIL	Fail
OFF	Unmeasured

■ Example of use

"Read out the result of Pass/Fail judgement of f3."

<Program>
DSPL SPURIOUS,SWEEP
SWP
SPUPASS? F3

<Response>
PASS

SPURBW

RBW

Program Message	Query Message	Response Message
–	SPURBW? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the RBW value at the measurement on the Spurious Emission screen.
When the Spurious Mode is Spot, the RBW set on the Setup Spot Table screen is output, and when the Search or Sweep, the RBW set on the Setup Search/Sweep Table screen is output (*cf.* TBLRBW_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

RBW

Resolution	Unit
1	Hz

■ Example of use

"Read out of RBW from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPURBW? F1,3

<Response>
1000, 10000, 100000

SPURL

Ref Level for Spurious Emission

Program Message	Query Message	Response Message
–	SPURL? Fa,b	c

■ Function

Outputs Ref Level during measurement at Spurious Emission measurement.
In Spurious Mode of Spot, outputs Ref Level set on Setup Spot Table screen.
In Spurious Mode of Search or Sweep, outputs Ref Level set on Setup Search/Sweep Table screen (*cf.* TBLARL_SPU).

■ Value of a

Frequency point of readout start

Range	Resolution
1 to 15	1

■ Value of b

Number of frequency points of readout

Range	Resolution
1 to 15	1

■ Value of c

Ref Level

Resolution	Unit
0.01	dBm

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Reading out Ref Level from f1 to f3."

<Program>
SPURL? F1,3

<Response>
50.00,51.00,52.00

SPUSWT

Sweep Time

Program Message	Query Message	Response Message
–	SPUSWT? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the Sweep Time value at the time of measurement on the Spurious Emission screen. When the Spurious Mode is Spot, the Sweep Time set on the Setup Spot Table screen is output, and when Search or Sweep, the Sweep Time set on the Setup Search/Sweep Table screen is output (*cf.* TBLSWT_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

Sweep Time

Resolution	Unit
1	μs

■ Example of use

"Read out Sweep Time from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUSWT? F1,3

<Response>
200000, 600000, 500000

SPUVBW

VBW

Program Message	Query Message	Response Message
–	SPUVBW? Fa,b	c(a),c(a+1),...,c(b)

■ Function

Outputs the VBW value at the measurement on the Spurious Emission screen.
When the Spurious Mode is Spot, outputs VBW set on the Setup Spot Table screen, and when Search or Sweep, outputs VBW set on the Setup Search/Sweep Table screen (*cf.* TBLVBW_SPU).

■ Value of a

Start frequency point for reading out

Range	Resolution
1 to 15	1

■ Value of b

Number of readouts

Range	Resolution
1 to 15	1

■ Value of c

VBW

Resolution	Unit
1	Hz

■ Example of use

"Read out VBW from f1 to f3."

<Program>
DSPL SPURIOUS,SEARCH
SWP
SPUVBW? F1,3

<Response>
3000, 30000, 300000

SSCALE

Square Scale

Program Message	Query Message	Response Message
SSCALE a	SSCALE?	a

■ Function

Changes the scale of constellation and eye diagram waveforms display area on the Modulation Analysis screen.

■ Value of a

Display area scale specification

a	Description	Initial value
1	Displays the display area with normal scale factor.	*
2	Displays the display area twice as large as the normal size.	
5	Displays the display area five times as large as the normal size.	
10	Displays the display area ten times as large as the normal size.	

■ Restriction

- Enable when Constellation or Eye Diagram is set for Trace Format. (*cf.* TRFORM)
- The display is not switched when Modulation Method is 16QAM and Symbol is set for Trace Slot. (*cf.* TRSLOT MODTYPE)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the scale of the constellation waveform display area to five times scale as large as the normal size".

<Program>
DSPL MODANAL
TRFOMR CONSTEL
SSCALE 5
SSCALE?

<Response>
5

STM_ACP

Sweep Time: Manual/Auto

Program Message	Query Message	Response Message
STM_ACP a	STM_ACP?	a

■ Function

On the Spurious Close to the Carrier screen, sets either manual or automatic operation for the Sweep Time setting.

■ Value of a

Sweep Time setting mode

a	Mode	Initial value
MAN	Putting Sweep Time on manual setting mode.	
AUTO	Putting Sweep Time on automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
- In the Auto, the value of Sweep Time is automatically set from the values of RBW, VBW and others.
- With the automatic setting where the Slot Type is Idle, the value more than the value from the table below is set, automatically (*cf.* SLOTTYPE).

Data Points (*cf.* DPTS_ACP)	Sweep Time
501	10 s
1001	20 s

■ Example of use

"Set the Sweep Time to automatic setting mode."

<Program>
STM_ACP AUTO
STM_ACP?

<Response>
AUTO

STM_OBW

Sweep Time: Manual/Auto

Program Message	Query Message	Response Message
STM_OBW a	STM_OBW?	a

■ Function

On the Occupied Bandwidth screen, sets either manual or automatic operation for the Sweep Time setting.

■ Value of a

Sweep Time setting mode

a	Mode	Initial value
MAN	Putting Sweep Time on manual setting mode.	
AUTO	Putting Sweep Time on automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
- In the Auto, the value of Sweep Time is automatically set from the values of RBW, VBW and others.
- With the automatic setting where the Slot Type is idle, the value more than the value from the table below is set, automatically (*cf.* SLOTTYPE).

Data Point (*cf.* DPTS_OBW)	Sweep Time
501	10 s
1001	20 s

■ Example of use

"Set the Sweep Time to automatic setting mode."

<Program>
STM_OBW AUTO
STM_OBW?

<Response>
AUTO

STRG_ACP

Storage Mode for Spurious close to the Carrier

Program Message	Query Message	Response Message
STRG_ACP a	STRG_ACP?	a

■ Function

Sets the display mode on the Spurious Close to the Carrier screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Performs Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to the average value display."

<Program>
STRG_ACP AVG
STRG_ACP?

<Response>
AVG

STRG_IQL

Storage Mode for IQ Level

Program Message	Query Message	Response Message
STRG_IQL a	STRG_IQL?	a

■ Function

Sets the display mode on the IQ Level screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Performs Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to the average value display."

<Program>
STRG_IQL AVG
STRG_IQL?

<Response>
AVG

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

STRG_MOD

Storage Mode for Modulation Analysis

Program Message	Query Message	Response Message
STRG_MOD a	STRG_MOD?	a

■ Function

Sets the display mode on the Modulation Analysis screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	
OVER	Overwrite: Displays the plotted measurement results to be overwritten successively during continuous measurement.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to the average value display."

<Program>
STRG_MOD AVG
STRG_MOD?

<Response>
AVG

STRG_OBW

Storage Mode for Occupied Bandwidth

Program Message	Query Message	Response Message
STRG_OBW a	STRG_OBW?	a

■ Function

Sets the mode of display on the Occupied Bandwidth screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Gives an ordinary display (single measurement).	*
AVG	Average: Repeats a measurement by the number of times specified by Average Count, and displays the average value as the result.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to average value display."

<Program>
STRG_OBW AVG
STRG_OBW?

<Response>
AVG

STRG_RFPWR

Storage Mode for RF Power

Program Message	Query Message	Response Message
STRG_RFPWR a	STRG_RFPWR?	a

■ Function

Sets the display mode on the RF Power screen.

■ Value of a

Display mode

a	Display mode	Initial value
NRM	Normal: Normal display (single measurement).	*
AVG	Average: Measures by the number of times specified by Average Count, and then displays the average value of the results.	
OVER	Overwrite: On the Continuous measurement, overwrites and displays the waveform with a broken line.	
CUM	Cumulative: On the Continuous measurement, overwrites and displays the waveform with points.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set to average value display."

<Program>
STRG_RFPWR AVG
STRG_RFPWR?

<Response>
AVG

SWP

Single Sweep or Sweep Status

Program Message	Query Message	Response Message
SWP	SWP?	SWP a

■ Function

The “SWP” command performs measurement one time. Processing of the subsequent command must wait until measurement is completed.

The “SWP?” command makes an inquiry about the current measurement status (i.e. measurement completion/measurement in process).

■ Value of a

Measurement status

a	measurement status
0	measurement completion
1	measurement in process

■ Restriction

- Executable screens are as follows (*cf.* DSPL).
    - Modulation Analysis
    - RF Power
    - Occupied Bandwidth
    - Spurious close to the Carrier
    - Spurious Emission
    - IQ Level
    - Power Meter
    - CCDF

■ Example of use

“Perform measurement once. ”

<Program>

SWP

■ Note

Even if the “SWP?” command is sent immediately after the “SWP” command, processing thereof must wait until measurement is completed, therefore response is always 0.

SWT_ACP

Sweep Time for Spurious close to the Carrier

Program Message	Query Message	Response Message
SWT_ACP a	SWT_ACP?	b

■ Function

Sets the Sweep Time of the Spurious Close to the Carrier measurement.

■ Value of a

Sweep Time

Range	Resolution	Initial value	Unit
10 to 1000000	1	70	ms

□ Suffix code

None: ms
S: s
MS: ms
US: µs

■ Value of b

Sweep Time

Resolution	Unit
1	µs

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input within the set range. However, please see the table below for the actually set value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Example of use

"Set Sweep Time to 100 ms."

<Program>

```
SWT_ACP 100MS
SWT_ACP?
```

<Response>

```
100000
```

SWT_OBW

Sweep Time for Occupied Bandwidth

Program Message	Query Message	Response Message
SWT_OBW a	SWT_OBW?	b

■ Function

Sets Sweep Time of Occupied Bandwidth measurement using a Spectrum Analyzer.

■ Value of a

Sweep Time

Range	Resolution	Initial value	Unit
10 to 1000000	1	120	ms

□ Suffix code

None: ms

S: s

MS: ms

US: μs

■ Value of b

Sweep Time

Resolution	Unit
1	μs

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input within the set range. However, please see the table below for the actually set value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Example of use

"Set Sweep Time to 100 ms."

<Program>

SWT_OBW 100MS
SWT_OBW?

<Response>

100000

SYS

System Change

Program Message	Query Message	Response Message
SYS a	SYS?	a

■ Function

Switches the measurement software in the TX tester mode.

■Value of a

Storage area for measurement software

Value	Storage Area for Measurement Software
1	area1 (F1 key)
2	area2 (F2 key)
3	area3 (F3 key)

■ Example of use

"Switches to the software stored in Area 1."

<Program>
SYS 1
SYS?

<Response>
1

TAU

Timing Error

Program Message	Query Message	Response Message
–	TAU?	a,b

■ Function

Outputs measurement result of Timing Error of Modulation Analysis screen.

■ Value of a

Timing Error of 64 PNchip resolution

Resolution	Unit
1	64 PNchip

■ Value of b

Timing Error of less than 64 PNchip resolution

Resolution	Unit
0.01	μs

■ Restriction

- Where trigger is other than External, measurement is not performed (*cf.* TRG).

■ Example of use

"Read out of measurement result of Timing Error."

<Program>
DSPL SETCOM
TRG EXT
DSPL MODANAL
SWP
TAU?

<Response>
12, 27.5

TBLATT_SPU

Attenuator for Spurious Emission

Program Message	Query Message	Response Message
TBLATT_SPU a,Fb,c	TBLATT_SPU? a,Fb	c

■ Function

Sets attenuator for Spurious Emission measurement.

■ Value of a

Measurement method selection

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

Attenuator

Range	Resolution	Initial value	Unit	RF Input
20 to 82	1	44	dB	High
0 to 62	1	24	dB	Low

□ Suffix code

None: dB

DB: dB

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Attenuator setting range depends on Ref Level (*cf.* TBLRL_SPU).

■ Example of use

"Set the f10 attenuator of Spot method measurement to 20 dB."

<Program>

```
TBLATT_SPU SPOT,F10,20DB
TBLATT_SPU? SPOT,F10
```

<Response>

```
20
```

TBLATTMD_SPU

Attenuator Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLATTMD_SPU a,b	TBLATTMD_SPU? a	b

■ Function

Selects manual or automatic attenuator setting of spectrum analyzer for Spurious Emission screen.

■ Value of a

Measurement method selection

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Attenuator setting mode

b	Mode	Initial value
MAN	Sets Attenuator setting mode to manual.	
AUTO	Sets Attenuator setting mode to auto.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When attenuator is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator is set automatically.

■ Example of use

"Setting attenuator of Spot method measurement to Auto mode."

<Program>
TBLATTMD_SPU SPOT,AUTO
TBLATTMD_SPU? SPOT

<Response>
AUTO

TBLATTRLMD_SPU

Attenuator Ref Level Mode: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLATTRLMD_SPU a,b	TBLATTRLMD_SPU? a	b

■ Function

Selects manual or automatic attenuator and Ref-Level settings of spectrum analyzer for Spurious Emission screen.

■ Value of a

Measurement method selection

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Attenuator and Ref-Level setting mode

b	Mode	Initial value
MAN	Sets Attenuator and Ref-Level setting mode to manual.	
AUTO	Sets Attenuator and Ref-Level setting mode to auto.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When attenuator or Ref Level is changed in Auto, the mode becomes Manual, forcibly.
- When Auto, attenuator or Ref Level is set automatically.

■ Example of use

"Setting attenuator or Ref Level of Spot method measurement to Auto mode."

<Program>
TBLATTRLMD_SPU SPOT,AUTO
TBLATTRLMD_SPU? SPOT

<Response>
AUTO

TBLFREQ_SPU

Frequency for Spurious Emission

Program Message	Query Message	Response Message	Function
TBLFREQ_SPU SPOT,Fa,b	TBLFREQ_SPU? SPOT,Fa	b	Sets the frequency of Spot method measurement.
TBLFREQ_SPU SPOT,HRM	–	–	Sets the frequency of Spot method measurement to Harmonics.
TBLFREQ_SPU START,Fa,c	TBLFREQ_SPU? START,Fa	c	Sets the sweep starting frequency of Search or Sweep method.
TBLFREQ_SPU STOP,Fa,d	TBLFREQ_SPU? STOP,Fa	d	Sets the sweep ending frequency of Search or Sweep method.

■ Function

Sets frequency of Spurious Emission Measurement.

Harmonics is a function that automatically sets the nth (n:2,3,4...) frequency of carrier frequency until the frequency reaches the maximum value. Refer to Spurious Mode for the means of measurement.

■ Value of a

Frequency point

Range	Resolution
1 to 15	1

■ Value of b

Frequency (Spot)

Range	Resolution	Initial value	Unit
Note 1:	1	Note 2:	Hz

- Note 1: Same as FREQ. However, the maximum value is not affected by Pre Ampl.
- Note 2: Respective of the initial value of FREQ, the same value as in the case of Harmonics operation. For details please see the column of initial values.
- Setting of 0 Hz results in a state of unsetting.

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Value of c

Start Frequency (Search/Sweep)

Range	Resolution	Initial value	Unit
Note 3:	1	See the initial value column.	Hz

- Note 3: The lower limit is 1 kHz, and upper limit is (upper limit of FREQ –1 kHz). The upper limit is not affected by the Pre Ampl.
- If the Stop Frequency < (Start Frequency +1 kHz), the Stop Frequency is automatically changed to (Start Frequency + 1 kHz). So, the frequency sweep span always becomes 1 kHz or more.
- If the Start Frequency is set to 0 Hz, it becomes not-set state.

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Value of d

Stop Frequency (Search/Sweep)

Range	Resolution	Initial value	Unit
Note 4:	1	See the initial value column.	Hz

- Note 4: The same as FREQ, the lower limit is 2 kHz. The upper limit is not affected by the Pre Ampl.
- If the Start Frequency > (Stop Frequency –1 kHz), the Start Frequency is automatically changed to (Stop Frequency –1 kHz). So, the frequency sweep span always becomes 1 kHz or more.
- If the Stop Frequency is set to 0 Hz, it becomes not-set state.

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the f1 sweep interval of Search method measurement from 846 to 860 MHz."

<Program>
TBLFREQ_SPU START,F1,846MHZ
TBLFREQ_SPU STOP,F1,860MHZ
TBLFREQ_SPU? START,F1
TBLFREQ_SPU? STOP,F1

<Response>
846000000
860000000

■ Initial value

The initial values of each parameter are as follows. “---” indicates not-set status.

For Spot of Spurious mode

	Frequency	RBW	VBW	SWT	Ref Level	ATT	Abs Limit	Rel Limit
f1	1775.300000 MHz	1 MHz	1 MHz	10 ms	*cf.* TBLRL_SPU	*cf.* TBLATT_SPU	0.00 dBm	0.00 dB
f2	2662.950000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f3	3550.600000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f4	4438.250000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f5	5532.590000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f6	6213.550000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f7	7101.200000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f8	7988.850000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f9	8876.500000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f10	9764.150000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f11	10651.800000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f12	11539.450000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f13	12427.100000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f14	13314.750000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB
f15	14202.400000 MHz	1 MHz	1 MHz	10 ms			0.00 dBm	0.00 dB

For MS2681A, Initial values are set from f1 to f2. For MS8608A/2683A, values are set from f1 to f7. For MS8609A, values are set from f1 to f13. For MS2687A/B, values are set from f1 to f15.

For Search/Sweep of Spurious mode

	Start Frequency	Stop Frequency	RBW	VBW	SWT	Ref Level	ATT	Abs Limit	Rel Limit
f1	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f2	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f3	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f4	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f5	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f6	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f7	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f8	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f9	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f10	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f11	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f12	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f13	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f14	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB
f15	-----.------ MHz	-----.------ MHz	--- Hz	--- Hz	---- ms	---.-- dBm	-- dB	---.-- dBm	---.-- dB

TBLRBW_SPU

RBW for Spurious Emission

Program Message	Query Message	Response Message
TBLRBW_SPU a,Fb,c	TBLRBW_SPU? a,Fb	c

■ Function

Sets RBW of the Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	RBW used in Spot method measurement is subjected.
SWEEP	RBW used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency points

Range	Resolution
1 to 15	1

■ Value of c

RBW

Range	Resolution	Initial value	Unit	Remarks
10 to 1000000	1	1000000	Hz	For RBW Mode: Digital
300 to 20000000	1	1000000	Hz	For RBW Mode: Analog

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the f2 RBW of Search method Measurement to 30 kHz."

<Program>

TBLRBW_SPU SWEEP,F2,30KHZ
TBLRBW_SPU? SWEEP,F2

<Response>

30000

TBLRBWMD_SPU

RBW: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLRBWMD_SPU a,b	TBLRBWMD_SPU? a	b

■ Function

Sets either the manual or automatic operation of the RBW setting of the Spurious Emission screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	RBW of Spot method measurement is subjected.
SWEEP	RBW of Search or Sweep method measurement is subjected.

■ Value of b

RBW setting mode

b	Mode	Initial value
MAN	Sets RBW to manual setting mode.	
AUTO	Sets RBW to automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When RBW is changed during Auto, the system compulsorily goes to Manual.
- In the Auto, the value of RBW is automatically set from the frequency value, as shown in the table below.

Frequency	RBW
9 kHz ≤ f < 150 kHz	1 kHz
150 kHz ≤ f < 30 MHz	10 kHz
30 MHz ≤ f < 1 GHz	100 kHz
1 GHz ≤ f	1 MHz

■ Example of use

"Set RBW of Spot method measurement to automatic setting mode."

<Program>
TBLRBWMD_SPU SPOT,AUTO
TBLRBWMD_SPU? SPOT

<Response>
AUTO

TBLRBWTP_SPU

RBW Mode: Digital/Normal for Spurious Emission

Program Message	Query Message	Response Message
TBLRBWTP_SPU a,b	TBLRBWTP_SPU? a	b

■ Function

Sets to or not to digital filter Sweeping mode for Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweeping mode of Spot method measurement is subjected.
SWEEP	The Sweeping mode of Search or Sweep method measurement is subjected.

■ Value of b

Sweeping Mode

b	Sweeping Mode	Initial value
DGTL	Sets to digital filter Sweeping Mode (Digital).	
NRM	Sets to ordinary Sweeping Mode (Normal).	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting Sweep method measurement to digital filter Sweeping mode."

<Program>
TBLRBWTP_SPU SWEEP,DGTL
TBLRBWTP_SPU? SWEEP

<Response>
DGTL

■ Note

This function is an option

TBLRL_SPU

Ref Level for Spurious Emission

Program Message	Query Message	Response Message
TBLRL_SPU a,Fb,c	TBLRL_SPU? a,Fb	c

■ Function

Sets Ref Level for Spurious Emission measurement.

■ Value of a

Measurement method selection

a	Measurement method
SPOT	Target attenuator for Spot method measurement
SWEEP	Target attenuator for Search/Sweep method measurement

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

Ref Level

Range	Resolution	Initial value	Unit	RF Input
See Restriction.	0.01	14.00	dBm	High
See Restriction.	0.01	−6.00	dBm	Low

□ Suffix code

None: dBm

DBM: dBm

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Ref Level setting range depends on RF Input: High/Low (*cf.* RFINPUT) and Pre Ampl: On/Off (*cf.* PREAMP), as follows. For RefLevelOffset, refer to RFLVLOFS.

		RF Input	
		High	Low
Attenuator Mode: Auto	Pre Ampl:Off	(–100.00 + RefLevelOffset) to (50.00 + RefLevelOffset)	(–120.00 + RefLevelOffset) to (40.00 + RefLevelOffset)
	Pre Ampl:On	(–120.00 + RefLevelOffset) to (30.00 + RefLevelOffset)	(–140.00 + RefLevelOffset) to (20.00 + RefLevelOffset)

- If the reference level will become out of range due to RF Input or Pre Ampl. change, it is rounded to the nearest value within range.

■ Example of use

"Set the f10 Ref Level of Spot method measurement to －30dBm."

<Program>

TBLRL_SPU SPOT,F10,-30DBM
TBLRL_SPU? SPOT,F10

<Response>

－30.00

TBLSWT_SPU

Sweep Time for Spurious Emission

Program Message	Query Message	Response Message
TBLSWT_SPU a,Fb,c	TBLSWT_SPU? a,Fb	d

■ Function

Sets Sweep Time of the Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweep Time used in Spot method measurement is subjected.
SWEEP	The Sweep Time used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency Points

Range	Resolution
1 to 15	1

■ Value of c

Sweep Time

Slot Type	Range	Resolution	Initial Value	Unit
Active	10 to 1000000	1	10	ms
Idle			20	

□ Suffix code

None: ms

S: s

MS: ms

US: μs

■ Value of d

Sweep Time

Resolution	Unit
1	μs

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input within the setting range. However, see the table below for the actually set values. See the initial value column of TBLFREQ_SPU for the initial value.

Input value	Set value
10 ms to 1 s	Value in 5 ms resolution (rounded up value)
1 to 1000 s	Effective 3 digits (4th digit from top is rounded.)

■ Example of use

"Setting f3 Sweep Time of Search method measurement to 100 msec."

<Program>
TBLSWT_SPU SWEEP,F3,100MS
TBLSWT_SPU? SWEEP,F3

<Response>
100000

TBLSWTMD_SPU

Sweep Time: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLSWTMD_SPU a,b	TBLSWTMD_SPU? a	b

■ Function

On the Spurious Emission Screen, sets either the manual or automatic operation of Sweep Time setting.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The Sweep Time of Spot method measurement is subjected.
SWEEP	The Sweep Time of Search or Sweep method measurement is subjected.

■ Value of b

Sweep Time setting mode

b	Mode	Initial value
MAN	Sets Sweep Time to Manual setting mode.	
AUTO	Sets Sweep Time to Automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When Sweep Time is changed during Auto, the system compulsorily becomes Manual.
- In the Auto, Sweep Time has the following value.

Measurement method	Spot	10 ms (Note 1)
	Search Sweep	Automatic setting at more than 5 s.

Note 1: When the RBW Mode is Digital, the value is the larger of this value hereof or the smallest value of Table below.

Minimum value and setting resolution in RBW Mode: Digital

For 501 Data Points

RBW	Sweep Time (in ms unit)	
	Minimum value	Setting resolution
10 Hz	50	50
30 Hz	50	50
100 Hz	50	50
300 Hz	10	10
1 kHz	10	10
3 kHz	10	5
10 kHz	10	5
30 kHz	10	5
100 kHz	10	5
300 kHz	10	5
1 MHz	10	5

For 1001 Data Points

RBW	Sweep Time (in ms unit)	
	Minimum value	Setting resolution
10 Hz	100	100
30 Hz	100	100
100 Hz	100	100
300 Hz	20	20
1 kHz	20	20
3 kHz	10	10
10 kHz	10	5
30 kHz	10	5
100 kHz	10	5
300 kHz	10	5
1 MHz	10	5

■ Example of use

"Setting Sweep Time of Spot method measurement to Manual setting mode."

<Program>
TBLSWTMD_SPU SPOT,MAN
TBLSWTMD_SPU? SPOT

<Response>
MAN

TBLVBW_SPU

VBW for Spurious Emission

Program Message	Query Message	Response Message
TBLVBW_SPU a,Fb,c	TBLVBW_SPU? a,Fb	c

■ Function

Sets the VBW of Spurious Emission measurement.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The VBW used in Spot method measurement is subjected.
SWEEP	The VBW used in Search or Sweep method measurement is subjected.

■ Value of b

Frequency point

Range	Resolution
1 to 15	1

■ Value of c

VBW

Range	Resolution	Initial value	Unit
0, 1, 3, 10, 30, 100, 300, 1000, 3000, 10000, 30000, 100000, 300000, 1000000, 3000000	1	See TBLFREQ_SPU initial value column.	Hz

□ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set f2 VBW of Search method measurement to 30 kHz."

<Program>
TBLVBW_SPU SWEEP,F2,30KHZ
TBLVBW_SPU? SWEEP,F2

<Response>
30000

TBLVBWMD_SPU

VBW: Manual/Auto for Spurious Emission

Program Message	Query Message	Response Message
TBLVBWMD_SPU a,b	TBLVBWMD_SPU? a	b

■ Function

On the Spurious Emission screen, sets manual or automatic setting for VBW setting.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	The VBW of Spot method measurement is subjected
SWEEP	The VBW of Search or Sweep method measurement is subjected

■ Value of b

VBW setting mode

b	Mode	Initial value
MAN	Sets VBW to manual setting mode.	
AUTO	Sets VBW to automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When VBW is changed during Auto, the system compulsorily changes to Manual.
- In the Auto, VBW value is set automatically from the RBW value and the VBW/RBW Ratio value.

■ Example of use

"Set VBW of Spot method measurement to automatic setting mode."

<Program>
TBLVBWMD_SPU SPOT,AUTO
TBLVBWMD_SPU? SPOT

<Response>
AUTO

TBLVBWRT_SPU

VBW/RBW Ratio for Spurious Emission

Program Message	Query Message	Response Message
TBLVBWRT_SPU a,b	TBLVBWRT_SPU? a	b

■ Function

Sets VBW and RBW ratio used in VBW automatic setting on the Spurious Emission screen.

■ Value of a

Selection of measurement method

a	Measurement method
SPOT	VBW of Spot method measurement is subjected.
SWEEP	VBW of Search or Sweep method measurement is subjected.

■ Value of b

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	1

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input within setting range. However, actually set values are as shown in Table below.

Setting value											
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Example of use

"Set the Search method measurement VBW/RBW Ratio to 3."

<Program>
TBLVBWRT_SPU SWEEP,3
TBLVBWRT_SPU? SWEEP

<Response>
3

TBLVIEW_SPU

View for Setup Search/Sweep Table

Program Message	Query Message	Response Message
TBLVIEW_SPU a,b	TBLVIEW_SPU?	b

■ Function

On the Setup Search/Sweep Table screen, selects whether to display RBW/VBW/SWT, Ref-Level/ATT, or Limit on the right side of the screen.

■ Value of a

Measurement method

a	Measurement method
SPOT	Items of Spot method measurement are subjected.
SWEEP	Items of Search or Sweep method measurement are subjected.

■ Value of b

Display items

b	Display items	Initial value
None	Displays RBW, VBW, SWT → Ref Level, ATT → Limit → RBW, VBW, SWT in this sequence.	
BWSWT	Displays RBW, VBW, and SWT.	*
REFATT	Displays Ref Level and ATT.	
LMT	Displays Limit.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Displays Limit."

<Program>
DSPL SETTBL_SPU,SWEEP
TBLVIEW_SPU SWEEP,LMT
TBLVIEW_SPU?

<Response>
LMT

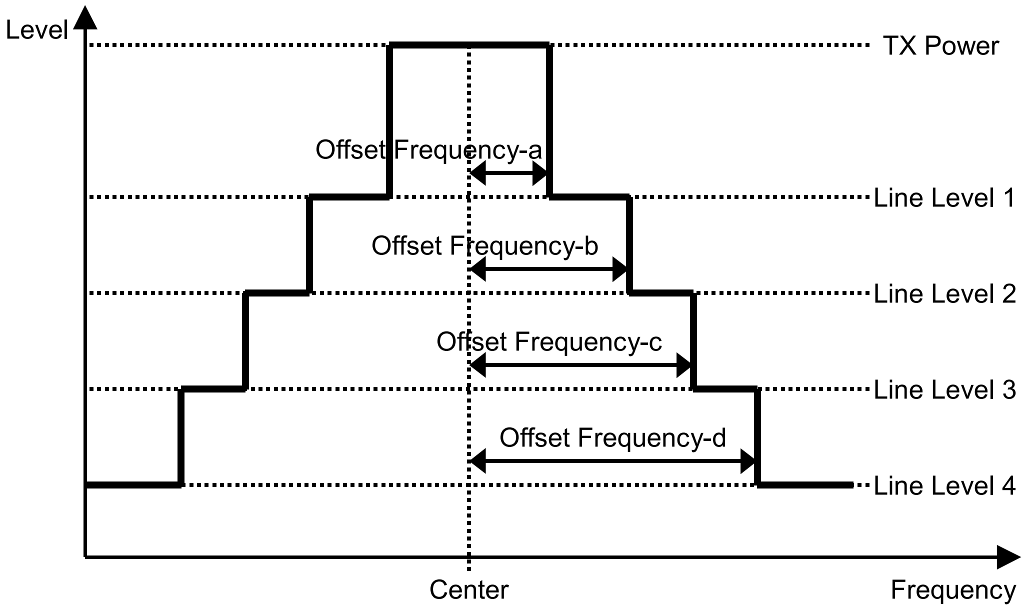
TEMPFREQ_ACP

Offset Frequency for Spurious Template

Program Message	Query Message	Response Message
TEMPFREQ_ACP a,b	TEMPFREQ_ACP? a	b

■ Function

Sets offset frequency for template lines (Offset Frequencies a, b, c and d in the following diagram) on the Setup Spurious Template screen.



■ Value of a

Selection of template line subjected to operation

a	Selection of template line subjected to operation
A	Offset Frequency-a is subjected.
B	Offset Frequency-b is subjected.
C	Offset Frequency-c is subjected.
D	Offset Frequency-d is subjected.

■ Value of b

Offset frequency

Range	Resolution	Unit
0 to (Span/2)	1000	Hz

■ Suffix code

None: Hz
HZ: Hz
KHZ, KZ: kHz
MHZ, MZ: MHz
GHZ, GZ: GHz

■ Restriction

- Offset Frequency is set to Frequency-a ≤ Frequency-b ≤ Frequency-c ≤ Frequency-d all the time.
- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Offset Frequency-a to 1 MHz."

<Program>
TEMPFREQ_ACP A,1MHZ
TEMPFREQ_ACP? A

<Response>
1000000

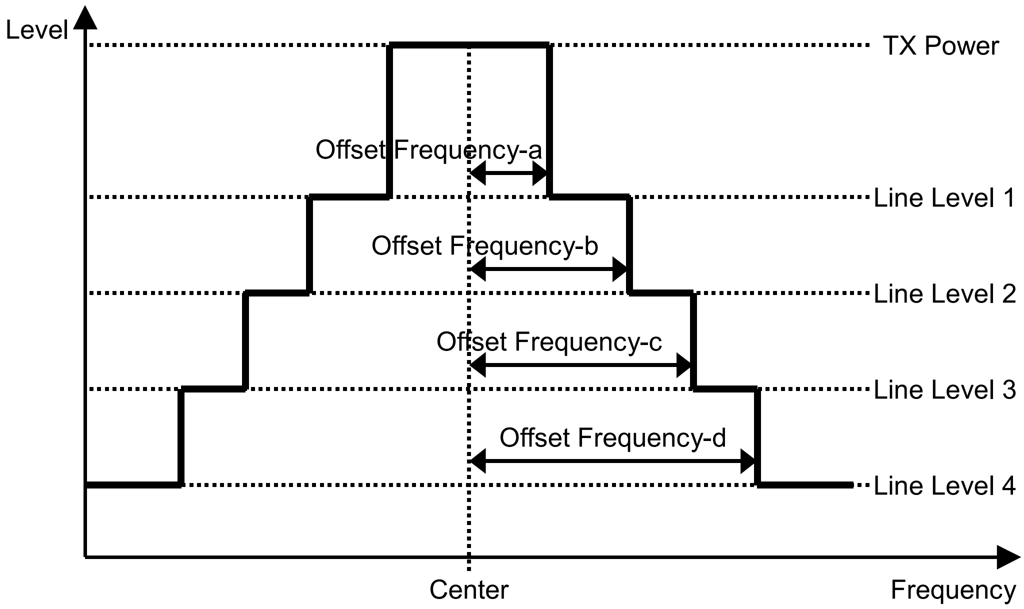
TEMPLVL_ACP

Level Modify for Spurious Template

Program Message	Query Message	Response Message
TEMPLVL_ACP a,b	TEMPLVL_ACP? a	b

■ Function

Sets levels of template lines (Line Levels 1, 2, 3 and 4 in the following diagram) on the Setup Spurious Template screen.



■ Value of a

Selection for level of template line

a	Selection for level of template line
1	Line Level 1 is subjected
2	Line Level 2 is subjected
3	Line Level 3 is subjected
4	Line Level 4 is subjected

■ Value of b

Level value based on Tx Power as reference

Range	Resolution	Unit
–100.0 to 0.0	0.1	dB or dBm

■ Restriction

- The display unit is dB and dBm at Line level: Relative and Absolute, respectively.
  When the Line level is changed between Relative and Absolute; the display unit is changed, but the actual data is not changed. (*cf.* LVLREL_ACP)
- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Line Level 1 to –49.5 dB."

<Program>
TEMPLVL_ACP 1, –49.5
TEMPLVL_ACP? 1

<Response>
–49.5

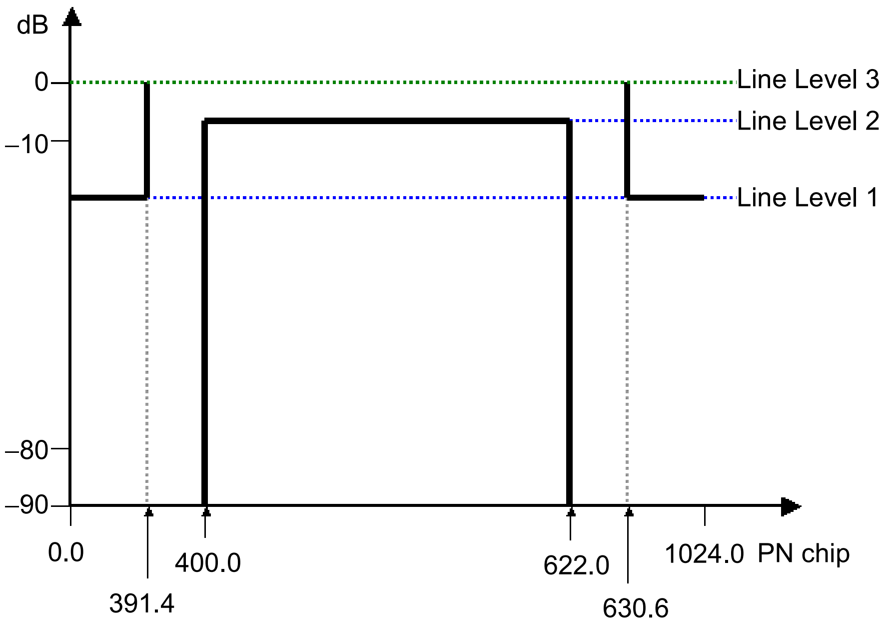
TEMPLVL_RFPWR

Level Modify for RF Power Template

Program Message	Query Message	Response Message
TEMPLVL_RFPWR a,b	TEMPLVL_RFPWR? a	b

■ Function

Sets levels of template lines (Line Levels 1, 2 and 3 in the following diagram) on the Setup Template screen.



■ Value of a

Selection for level of template line

a	Selection for level of template line	Slot Type
1	Line Level 1 is subjected	When the Slot Type is set to Active or Idle
2	Line Level 2 is subjected	
3	Line Level 3 is subjected	When the Slot Type is set to Idle

■ Value of b

Level value based on Tx Power as reference

Range	Resolution	Unit
–90.0 to 10.0	0.1	dB

□ Suffix code

None: dB

DB: dB

Initial value (Standard)

Level of template line	Initial value (Active)	Initial value (Idle)
Line Level 1	2.5 dB	–7.0 dB
Line Level 2	–2.5 dB	2.5 dB
Line Level 3	--	–2.5 dB

■ Restriction

- Valid only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set Line Level 1 to -49.5 dB."

<Program>

TEMPLVL_RFPWR 1,-49.5

TEMPLVL_RFPWR? 1

<Response>

–49.5

TEMPPASS_ACP

Template Pass

Program Message	Query Message	Response Message
–	TEMPPASS_ACP?	a

■ Function

Reads out the pass/fail evaluation result for measurement waveform by Template on the Spurious close to the Carrier screen. Evaluation criteria is as follows: it passes if it is within Template at all the points, and fails if it misses Template even at 1 point.

■ Value of a

Evaluation result

a	Pass/fail evaluation
PASS	Pass: Pass
FAIL	Fail: Fail
OFF	Off: Not judged.

■ Restriction

- When integral waveform is displayed, reads out the pass/fail evaluation result for integration measurement waveform by Template.

■ Example of use

"Read out the pass/fail evaluation result for Spurious close to the Carrier measurement waveform."

<Program>
DSPL ACP
SWP
TEMPPASS_ACP?

<Response>
PASS

TEMPPASS_RFPWR

Template Pass

Program Message	Query Message	Response Message
–	TEMPPASS_RFPWR? a	b
–	TEMPPASS_RFPWR? ALL	b1,b2,b3

■ Function

Reads out the pass/fail evaluation result for measurement waveform by 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).

■ Value of a

Selected half slot

a	Slot
TOTAL	Judges the entire slot.
None	
FIRST	Judges the First Half Slot.
SECOND	Judges the Second Half Slot.
ALL	Judges all of above.

■ Value of b

Pass/fail evaluation

b	Pass and fail judgement
PASS	Pass: Passed
FAIL	Fail: Not passed
OFF	Off: Not judged.

■ Restriction

- Displayed only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Level is set to Relative.

■ Example of use

"Read out the pass/fail evaluation result for RF Power measurement waveform."

<Program>
```
DSPL SETCOM
MEASOBJ FORWARD_REV0
DSPL RFPWR
LVLREL_RFPWR ON
SWP
TEMPPASS_RFPWR? TOTAL
```

<Response>
```
PASS
```

TERM

Terminal

Program Message	Query Message	Response Message
TERM a	TERM?	a

■ Function

Sets connector for input signal to be measured.

■ Value of a

Connector for input signal to be measured

Value	Meaning	Initial value
RF	Set to RF.	*
IQDC	Set to IQ-DC.	
IQAC	Set to IQ-AC.	
IQBAL	Set to IQ-Balance.	

■ Restriction

- Measurement screen must be set to Setup Common Parameter (*cf.* DSPL).
- Following restrictions are applied depending on validity/invalidity of IQ Balance and IQ Unbalance options.
    - When IQ Balance option is valid, all items can be selected regardless of validity/invalidity of IQ Unbalance option.
    - When IQ Unbalance option is valid, IQ Balance cannot be selected.
    - When both IQ Balance and IQ Unbalance options are invalid, no items except RF can be selected.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the input signal to IQ-DC."

```
<Program>
DSPL SETCOM
TERM IQDC
TERM?

<Response>
IQDC
```

THRESH_MOD

Threshold Level for Modulation Analysis

Program Message	Query Message	Response Message
THRESH_MOD a	THRESH_MOD?	a

■ Function

Sets the Threshold Level to discriminate the active channel for modulation analysis.

■ Value of a

Threshold level

<table>
<tr><th>Measuring Object</th><th>Range</th><th>Resolution</th><th>Initial value</th><th>Unit</th></tr>
<tr><td>Forward Link Rev.0</td><td rowspan="3">–50.0 to –10.0</td><td rowspan="3">0.1</td><td rowspan="2">–27.0</td><td rowspan="3">dB</td></tr>
<tr><td>Forward Link Rev.A</td></tr>
<tr><td>Reverse Link Rev.0</td><td>–23.0</td></tr>
</table>

■ Restriction

- No setting is allowed when Measuring Object is set to QPSK (*cf.* MEASOBJ)

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the Threshold Level for Measuring Object: Reverse Link Rev.0 to –20.0 dB."

<Program>
MEASOBJ REVERSE
THRESH_MOD -20.0
THRESH_MOD?

<Response>
–20.0

TRFORM

Trace Format

Program Message	Query Message	Response Message
TRFORM a	TRFORM?	a

■ Function
Sets waveform display format on the Modulation Analysis screen.

■ Value of a
Waveform Format

a	Waveform Format	Initial Value
NON	None: Displays the numeric results only. Does not display a waveform.	*
CONSTEL	Constellation: Displays the IQ diagram.	
EYE	Eye Diagram: Displays the change in the IQ signals via the elapse of time.	
VECT	EVM: Displays the EVM.	
PHASE	Phase Error: Displays the phase error.	
MAGTD	Magnitude: Displays the amplitude error.	
CODE	Code Domain: Displays the code domain.	
CODEOFDATA	Code Domain of Data: Displays the code domain of Data area.	
CODEOFMAC	Code Domain of MAC: Displays the code domain of MAC area.	

■ Restriction
- Code Domain of MAC: Setting is allowed when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
- Code Domain of Data: Setting is allowed when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while Slot Type is set to Active
- Code Domain: Setting is allowed when the Measuring Object is set to Reverse Link Rev.0

■ Initialization of setting
PRE, INI, IP, *RST

■ Example of use
"Set the waveform display format to Phase Error."

<Program>
TRFORM PHASE
TRFORM?

<Response>
PHASE

TRFORM_CCDF

Trace Format for CCDF

Program Message	Query Message	Response Message
TRFORM_CCDF form	TRFORM_CCDF?	Form

■ Function

Sets the trace type to be displayed on the CCDF screen.

■ Parameters

form

Waveform format

Value	Waveform format	Initial value
POS	Displays the Power distribution equal to or more than the Average Power.	*
NEG	Displays the Power distribution equal to or less than the Average Power.	
POSNEG	Displays the total Power distribution.	

■ Initialization command

PRE, INI, IP, *RST

■ Restriction

- Enable only when Measure Method is APD. (*cf.* DSPL)

■ Example of use

"Sets Trace Format to Positive & Negative."

<Program>
DSPL CCDF,APD
SWP
TRFORM_CCDF POSNEG
TRFORM_CCDF?

<Response>
POSNEG

TRG

Trigger

Program Message	Query Message	Response Message
TRG a	TRG?	a

■ Function

Selects whether to start measurement with internal timing or with an external trigger on the Setup Common Parameter screen.

■ Value of a

Trigger setting

a	Trigger setting	Initial value
FREE	Free Run	*
EXT	External	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Inputting a trigger from the outside."

<Program>
DSPL SETCOM
TRG EXT
TRG?

<Response>
EXT

TRGDLY

Trigger Delay

Program Message	Query Message	Response Message
TRGDLY a	TRGDLY?	a

■ Function

Sets the time difference from when a trigger is input to when timing is actually set, on the Setup Common Parameter screen.

■ Value of a

Trigger delay value

Range	Resolution	Initial value	Unit
–16384.0 to 16384.0	0.1	0.0	PNchip

■ Restriction

- No setting is allowed when Trigger is set to Free Run (*cf.* TRG).

■ Initialization of setting

PRE, INI, IP, ∗RST

■ Example of use

"Setting the trigger delay value to 50.0 PNchip."

<Program>
DSPL SETCOM
TRG EXT
TRGDLY 50.0
TRGDLY?

<Response>
50.0

TRGEDGE

Trigger Edge

Program Message	Query Message	Response Message
TRGEDGE a	TRGEDGE?	a

■ Function

Sets either the rising or falling edge as reference trigger timing, on the Setup Common Parameter screen.

■ Value of a

Trigger reference

a	Trigger reference	Initial value
RISE	Sets the rising edge as the trigger reference.	*
FALL	Sets the falling edge as the trigger reference.	

■ Restriction

- No setting is allowed when Trigger is set to Free Run (*cf.* TRG).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the rising edge as the trigger reference"

<Program>
DSPL SETCOM
TRG EXT
TRGEDGE RISE
TRGEDGE?

<Response>
RISE

TRSLOT

Trace Slot

Program Message	Query Message	Response Message
TRSLOT a	TRSLOT?	a

■ Function

Sets the channel of the waveform to be analyzed on the Modulation Analysis screen.

■ Value of a

Channel specification

a	Description	Initial value
OVERALL	Analyzes all channels.	*
PILOT	Analyzes PILOT channel only.	
MAC	Analyzes MAC channel only.	
DATA	Analyzes DATA channel only.	
SYMBOL	This is valid only when Trace Format is Constellation and displays data area as symbol.	

■ Restriction

- Enable when Forward Link Rev.0 or Forward Link Rev.A is set for Measuring Object and the value other than Code Domain of Data and Code Domain of MAC is set for Trace Format. (*cf.* MEASOBJ TRFORM)
- OVERALL, PILOT, MAC, DATA, or SYMBOL can be set when Active is set for Slot. (*cf.* SLOTTYPE) However, SYMBOL can be set only when Constellation is set for Trace Format.
- OVERALL, PILOT, or MAC can be set when Idle is set for Slot Type. (*cf.* SLOTTYPE)

■ Initialization of setting

PRE,INI,IP,*RST

■ Example of use

"Analyzes only the PILOT channel."

<Program>
DSPL MODANAL
TRSLOT PILOT
TRSLOT?

<Response>
PILOT

TS

Single Measure/Sweep

Program Message	Query Message	Response Message
TS	—	—

■ Function

Executes a measurement and sweeping once.
This command functions as the same as the SWP command.
Unlink the SNGLS command, when the Tx Tester accepts a command during measurement, the command is not processed immediately but is queued until the current measurement is completed.
Since the command following the TS command is processed after the current measurement is completed, this means that the synchronization (between the Tx Tester operation and the program to send the command) is ensured.

■ Example of use

"Executes a measurement and sweeping once."

<Program>
TS

TXPWR

Tx Power

Program Message	Query Message	Response Message
–	TXPWR? a, b	c

■ Function

Reads out the average power of 1 slot (PCG).

■ Value of a

Specification for output unit

a	Output unit
DBM	dBm
WATT	W

■Value of b

Measured range

b	Power measurement range	Screen
SLOT	Slot or Slot Exp. Scale: Reads the average power for one slot.	RF Power screen
1STHALF	First Half Slot or First Half Slot Transient or First Half Slot Exp. Scale: Reads the average power for the first half slot.	
2NDHALF	Second Half Slot or Second Half Slot Transient or Second Half Slot Exp. Scale: Reads the average power for the second half slot.	
None	Reads the average power according to the current window.	
None	Reads the average power for one slot.	Other than RF Power screen

■ Value of c

Tx Power

Resolution	Unit
0.01	dBm
Significant digits, four places (floating decimal-point type)	W

■ Restriction

- Tx Power measurement result can be obtained from the measurement in the next screen (*cf.* MEAS).
  - Modulation Analysis
  - RF Power

■ Example of use

"Reading out the measurement results of Tx Power."

<Program>
DSPL RFPWR
SWP
TXPWR? DBM

<Response>
–7.64

UNIT_ACP

Unit for Spurious close to the Carrier

Program Message	Query Message	Response Message
UNIT_ACP a	UNIT_ACP?	a

■ Function

Sets the unit of measurement result for Offset frequency vs Power on the Spurious close to the Carrier screen.

■ Value of a

Unit for Offset frequency vs Power

a	Unit for Offset frequency vs Power	Initial value
DB	dB	
DBM	dBm	
MW	mW	
UW	μW	
NW	nW	
TEMP	dB/dBm (Template) (Note)	*

(Note) It displays by dB or dBm, which is set up for every Line Level. (*cf.* LVLREL_ACP)

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set the unit for Offset frequency vs Power to mW."

<Program>
UNIT_ACP MW
UNIT_ACP?

<Response>
MW

UNIT_IQL

Unit for IQ Level

Program Message	Query Message	Response Message
UNIT_IQL a	UNIT_IQL?	a

■ Function

Sets the measured results unit for the IQ Level on the IQ Level screen.

■ Value of a

Unit of the IQ Level

a	Unit of the IQ Level	Initial value
MV	mV	
DBMV	dBmV	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the IQ Level unit to mV."

<Program>
UNIT_IQL MV
UNIT_IQL?

<Response>
MV

■ Restrictions according to model type and options

For MS268x, if Option –17 or –18 I/Q Input is not installed, this command is invalid.

UNIT_SPU

Unit for Spurious Emission

Program Message	Query Message	Response Message
UNIT_SPU a	UNIT_SPU?	a

■ Function

Sets the unit for each measurement result of level at f1 to f15 on the Spurious Emission screen.

■ Value of a

Unit for each level

a	Unit for each level	Initial value
DB	dB	
DBM	dBm	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Set dB for the unit for each level at f1 to f15."

<Program>
UNIT_SPU DB
UNIT_SPU?

<Response>
DB

VBM_ACP

VBW: Manual/Auto

Program Message	Query Message	Response Message
VBM_ACP a	VBM_ACP?	a

■ Function

Sets either manual or automatic for setting VBW on the Spurious close to the Carrier screen.

■ Value of a

VBW setting mode

a	Mode	Initial value
MAN	Sets VBW to the manual setting mode.	
AUTO	Sets VBW to the automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When VBW is changed while Auto is set, the setting is forcibly set to Manual.
- When Auto is set, the VBW value is automatically set from the values of RBW and VBW/RBW Ratio.
- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)

■ Example of use

"Set VBW to the automatic setting mode."

<Program>
VBM_ACP AUTO
VBM_ACP?

<Response>
AUTO

VBM_OBW

VBW: Manual/Auto

Program Message	Query Message	Response Message
VBM_OBW a	VBM_OBW?	a

■ Function

Sets either manual or automatic for setting VBW on the Occupied Bandwidth screen.

■ Value of a

VBW setting mode

a	Mode	Initial value
MAN	Sets VBW to the manual setting mode.	
AUTO	Sets VBW to the automatic setting mode.	*

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- When VBW is changed while Auto is set, the setting is forcibly set to Manual.
- When Auto is set, the VBW value is automatically set from the values of RBW and VBW/RBW Ratio.

■ Example of use

"Set VBW to the automatic setting mode."

<Program>
VBM_OBW AUTO
VBM_OBW?

<Response>
AUTO

VBR_ACP

VBW/RBW Ratio for Spurious close to the Carrier

Program Message	Query Message	Response Message
VBR_ACP a	VBR_ACP?	a

■ Function

Sets the ratio of VBW to RBW use in VBW automatic setting on Spurious close to the Carrier measurement.

■ Value of a

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	0.1

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value												
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Example of use

"Set VBW/RBW Ratio to 3."

<Program>
VBR_ACP 3
VBR_ACP?

<Response>
3

VBR_OBW

VBW/RBW Ratio for Occupied Bandwidth

Program Message	Query Message	Response Message
VBR_OBW a	VBR_OBW?	a

■ Function

Sets the ratio of VBW to RBW used in VBW automatic setting on Occupied Bandwidth measurement.

■ Value of a

VBW/RBW Ratio

Range	Resolution	Initial value
0.0001 to 100	0.0001	1

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value												
0.0001	0.0003	0.001	0.003	0.01	0.03	0.1	0.3	1	3	10	30	100

■ Example of use

"Set VBW/RBW Ratio to 3."

<Program>
VBR_OBW 3
VBR_OBW?

<Response>
3

VBW_ACP

Video Bandwidth for Spurious close to the Carrier

Program Message	Query Message	Response Message
VBW_ACP a	VBW_ACP?	a

■ Function

Sets VBW (Video Bandwidth) of Spurious close to the Carrier measurement.

■ Value of a

VBW

Range	Resolution	Initial value	Unit
0 (OFF) to 3000000	1	3000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- No setting is allowed when Template is set to Band Class 6 while Measure Method is set to 3GPP2 FWD Band Class 1, 4, 6, 8. (*cf.* DSPL, SLCTEMP_ACP)
- No setting is allowed when RBW Mode is Digital (*cf.* RBD_ACP).
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value														
0 Hz (OFF)	1 Hz	3 Hz	10 Hz	30 Hz	100 Hz	300 Hz	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz

■ Example of use

“Set VBW to 30 kHz.”

<Program>

VBW_ACP 30KHZ

VBW_ACP?

<Response>

30000

VBW_OBW

Video Bandwidth for Occupied Bandwidth

Program Message	Query Message	Response Message
VBW_OBW a	VBW_OBW?	a

■ Function

Sets VBW (Video Bandwidth) of Occupied Bandwidth measurement using a spectrum analyzer.

■ Value of a

VBW

Range	Resolution	Initial value	Unit
0 (OFF) to 3000000	1	10000	Hz

□ Suffix code

None: Hz

HZ: Hz

KHZ, KZ: kHz

MHZ, MZ: MHz

GHZ, GZ: GHz

■ Initialization of setting

PRE, INI, IP, *RST

■ Restriction

- No setting is allowed when RBW Mode is Digital (*cf.* RBD_OBW).
- Any value may be input into the setting range. However, the value that is actually set is the value in Table below.

Setting value														
0 Hz (OFF)	1 Hz	3 Hz	10 Hz	30 Hz	100 Hz	300 Hz	1 kHz	3 kHz	10 kHz	30 kHz	100 kHz	300 kHz	1 MHz	3 MHz

■ Example of use

"Set VBW to 30 kHz."

<Program>

VBW_OBW 30KHZ

VBW_OBW?

<Response>

30000

VECTERR

RMS EVM

Program Message	Query Message	Response Message
–	VECTERR? a	b

■ Function

Outputs the RMS value measurement results for EVM on the Modulation Analysis screen.

■ Value of a

Output

a	Output	Measuring Object
OVERALL	Displays the measured results for all analysis data.	When Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
PILOT	Displays the measured result for the Pilot area.	
MAC	Displays the measured result for the MAC area.	
DATA	Displays the measured result for the Data area.	
SYMBOL	Displays the measured result for the Symbol (Data area).	
None	Displays the measured result according to the current Trace Slot.	
None	Displays the measured results for all analysis data.	When Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

RMS EVM

Resolution	Unit
0.01	%

■ Example of use

"Read measurement result for RMS EVM."

<Program>
DSPL MODANAL
SWP
VECTERR?

<Response>
1.35

VIEW_SPU

View for Spurious Emission

Program Message	Query Message	Response Message
VIEW_SPU a	VIEW_SPU?	a

■ Function

Selects RBW/VBW/SWT, Ref-Level/ATT, or Judgement result to display on the right of the Spurious Emission screen.

■ Value of a

Display item

a	Display item	Initial value
None	Displays judgement ∅ RBW, VBW, SWT ∅ Rel Level, ATT ∅ Judgement, in this sequence.	
JDG	Displays Judgement.	*
BWSWT	Displays RBW, VBW and SWT.	
REFATT	Displays Ref Level and ATT.	

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display RBW, VBW and SWT."

<Program>
DSPL SPURIOUS,SPOT
VIEW_SPU BWSWT
VIEW_SPU?

<Response>
BWSWT

VSCALE

Vertical Scale for EVM, Phase Error and Magnitude Error

Program Message	Query Message	Response Message
VSCALE a	VSCALE?	a

■ Function

Sets the upper limit value of the vertical scale on the coordinate displayed on the Modulation Analysis screen when the Trace Format is set to EVM, Phase Error or Magnitude Error.

■ Value of a

Upper limit value of the vertical scale

a	Upper limit value of the vertical scale	Initial value
5	5% (EVM, Magnitude Error), 5˚ (Phase Error)	
10	10% (EVM, Magnitude Error), 10˚ (Phase Error)	
20	20% (EVM, Magnitude Error), 20˚ (Phase Error)	*
50	50% (EVM, Magnitude Error), 50˚ (Phase Error)	
100	100% (EVM, Magnitude Error), 100˚ (Phase Error)	

■ Restriction

- No setting is allowed when the Trace Format is set to other than EVM, Phase Error and Magnitude Error (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Setting the upper limit value of the vertical scale for Phase Error to 50˚."

<Program>
TRFORM PHASE
VSCALE 50
VSCALE?

<Response>
50

VSCALE_CDP

Vertical Scale for Code Domain

Program Message	Query Message	Response Message
VSCALE–CDP a	VSCALE_CDP?	a

■ Function

Sets the vertical scale range when Trace Format is set to Code Domain on the Modulation Analysis screen.

■ Value of a

Vertical scale range

Code Domain Display	Command	Vertical Scale Range	Initial Value
Power	20	–20 dB to 0 dB	
	40	–40 dB to 0 dB	
	60	–60 dB to 0 dB	
	80	–80 dB to 0 dB	*

■ Restriction

- No setting is allowed when Trace Format is other than Code Domain and Code Domain of MAC (*cf.* TRFORM).

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Sets the Code Domain display range to 0 dB through 40 dB."

<Program>
DSPL SETCOM
MEASOBJ REVERSE
DSPL MODANAL
TRFORM CODE
VSCALE_CDP 40
VSCALE_CDP?

<Response>
40

VSCALE_CDPDAT

Vertical Scale (Code Domain of Data)

Program Message	Query Message	Response Message
VSCALE_CDPDAT a	VSCALE_CDPDAT?	a

■ Function

Sets the upper limit of vertical axis graduation on the Modulation Analysis screen when Trace Format is Code Domain of Data display.

■ Value of a

Display mode of code domain power

a	Description	Initial value
1	1dB	
5	5dB	*
10	10dB	
20	20dB	
80	80dB	

■ Restriction

- Enable when Code Domain Data is set for Trace Format. (*cf.* TRFORM)
- When 1dB, 5dB, or 10dB is set, the value of range specified as around –12.0dB will be displayed.

■ Initialization of setting

PRE,INI,IP,*RST

■ Example of use

"Changes the upper limit of the vertical axis graduation for Code Domain of Data display to 5dB."

<Program>
DSPL MODANAL
TRFORM CODEOFDATA
VSCALE_CDPDAT 5
VSCALE_CDPDAT?

<Response>
5

WAVQUAL

Waveform Quality Factor

Program Message	Query Message	Response Message
–	WAVQUAL? a	b
–	WAVQUAL? ALL	b(pilot), b(overall1), b(overall2) or b(pilot), b(MAC), b(data)

■ Function

Outputs the measurement result for Waveform Quality Factor on Modulation Analysis screen.

■ Value of a

Signal to be measured

Value of a	Signal to be measured	Measuring Object
OVERALL1	Outputs the measured results for Overall-1.	When the Measuring Object is set to Forward Link Rev.0 while the Slot Type is set to Active
OVERALL2	Outputs the measured results for Overall-2.	
PILOT	Outputs the measured results for Pilot.	When the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while the Slot Type is set to Active
MAC	Outputs the measured results for MAC.	When the Measuring Object is set to Forward Link Rev.A
DATA	Outputs the measured results for data.	When the Measuring Object is set to Forward Link Rev.A while the Slot Type is set to Active
ALL	Outputs all measured results.	When the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while the Slot Type is set to Active
None	Outputs the measured results for Pilot.	When the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A
	Outputs the measured results for Overall.	When the Measuring Object is set to other than Forward Link Rev.0 or Forward Link Rev.A

■ Value of b

Waveform Quality Factor

Resolution	Unit
0.00001	None

■ Example of use

"Reads out the measured results for Waveform Quality Factor."

<Program>
DSPL MODANAL
SWP
WAVQUAL?

<Response>
0.99950

WINDOW

Window

Program Message	Query Message	Response Message
WINDOW a	WINDOW?	a

■ Function

Sets the interval to display the waveform on the RF Power screen.

■ Value of a

Interval to display the waveform

a	Interval to display the waveform	Initial value
SLOT	Slot : Displays the waveform for the interval of one slot.	*
1STHALFSLOT	First Half Slot: Displays the waveform for the first half slot.	
1STTRANSIENT	First Half Slot Transient: Enlarges the transient part of the first half slot.	
2NDHALFSLOT	Second Half Slot: Displays the waveform for the second half slot.	
2NDTRANSIENT	Second Half Slot Transient: Enlarges the transient part of the second half slot.	
SLOTEXP	Slot Expanded Scale: Enlarges the vertical scale of one slot.	
1STHALFSLOTEXP	First Half Slot Expanded Scale: Enlarges the vertical scale of the first half slot.	
2NDHALFSLOTEXP	Second Half Slot Expanded Scale: Enlarges the vertical scale of the second half slot.	

■ Restriction

- First Half Slot Transient and Second Half Slot Transient can be set only when the Measuring Object is set to Forward Link Rev.0 or Forward Link Rev.A while the Slot Type is set to Idle.

■ Initialization of setting

PRE, INI, IP, *RST

■ Example of use

"Display the waveform of the first half slot."

<Program>
DSPL RFPWR
WINDOW 1STHALFSLOT
SWP
WINDOW?

<Response>
1STHALFSLOT

XMB

Wave Data for Spurious close to the Carrier (Spectrum Analyzer)

Program Message	Query Message	Response Message
XMB a,b	XMB? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data by spectrum analyzer on the Spurious close to the Carrier screen.

Use XMBI to access to the digital signal processed data (RBW: 1.23 MHz).

■ Value of a

Data writing address

Measure Method	Data Point	Range	Resolution
Normal	501	0 to 500	1
	1001	0 to 1000	
3GPP2 FWD Band Class 0,2,3,5,9	501	0 to 1500	
	1001	0 to 3000	
3GPP2 FWD Band Class 1,4,6,8	501	0 to 2000	
	1001	0 to 3500	
3GPP2 FWD Band Class 3+	501	0 to 1500	
	1001	0 to 3000	

■ Value of b

16-bit waveform data to be written

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Value of c

Start address for reading out the data

Measure Method	Data Point	Range	Resolution
Normal	501	0 to 500	1
	1001	0 to 1000	
3GPP2 FWD Band Class 0,2,3,5,9	501	0 to 1500	
	1001	0 to 3000	
3GPP2 FWD Band Class 1,4,6,8	501	0 to 2000	
	1001	0 to 3500	
3GPP2 FWD Band Class 3+	501	0 to 1500	
	1001	0 to 3000	

■ Value of d

Number of data read out

Measure Method	Data Point	Range	Resolution
Normal	501	1 to 501	1
	1001	1 to 1001	
3GPP2 FWD Band Class 0,2,3,5,9	501	1 to 1501	
	1001	1 to 3001	
3GPP2 FWD Band Class 1,4,6,8	501	1 to 2001	
	1001	1 to 3501	
3GPP2 FWD Band Class 3+	501	1 to 1501	
	1001	1 to 3001	

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
–2147483648 to 2147483647	1

• Reading out is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Example of use

"Read out the 10 waveform data of Spurious close to the Carrier, starting from the memory address 0."

<Program>
DSPL ACP
SWP
XMB? 0,10

<Response>
–8829, –8925, –8776, –8771, –8735, –8636, –8882, –8806, –8700, –8846

XMBI

Wave Data for Spurious close to the Carrier (RBW: 1.23 MHz)

Program Message	Query Message	Response Message
XMBI a,b	XMBI? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data (RBW: 1.23 MHz) by digital signal process on the Spurious close to the Carrier screen.
Use XMB to access to the processed data of spectrum analyzer.

■ Value of a

Data writing address

Range	Resolution
0 to 1000	1

■ Value of b

16-bit waveform data to be written

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Value of c

Start address for reading out the data

Range	Resolution
0 to 1000	1

■ Value of d

Number of data read out

Range	Resolution
1 to 1001	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
–2147483648 to 2147483647	1

- Reading out is made by using an integer in 0.01 dB units so that 1 dB is shown as 100.

■ Restriction

- In relation to the calculation, some part of the data is invalid. –2147483648 is output if the data is invalid.
- Enable when Normal is set for Measure Method. (*cf.* DSPL)

■ Example of use

"Read out the 10 waveform data of Spurious close to the Carrier, starting from the memory address 0."

<Program>
DSPL ACP,NRM
SWP
XMBI? 0,10

<Response>
–8829, –8925, –8776, –8771, –8735, –8636, –8882, –8806, –8700, –8846

XMC

Wave Data for I-Q Signal

Program Message	Query Message	Response Message
XMC a,b,c	XMC? d,e,f	g(1),g(2),...,g(f)

■ Function

Reads out and processes the waveform data for Signal IQ on the Modulation Analysis screen.

■ Value of a

Selection of IQ

a	Selection of IQ
0	Signal I
1	Signal Q

■ Value of b

Data writing address

Range	Resolution
0 to 32767	1

■ Value of c

16-bit waveform data to be written

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in the unit of 0.0001 with the ideal signal "1" set at 10000.

■ Value of d

Selection of IQ

d	Selection of IQ
0	Signal I
1	Signal Q

■ Value of e

Address from which to start data readout:

Range	Resolution
0 to 32767	1

■ Value of f

Number of data readouts

Range	Resolution
1 to 32768	1

■ Value g (n)

32-bit waveform data to be read out

Range	Resolution
–2147483648 to 2147483647	1

- Data are read out by using an integer in the unit of 0.0001 with the ideal signal “1” set at 10000.

■ Example of use

“Making five readouts of the waveform data for Signal IQ starting from memory address 0.”

<Program>
DSPL MODANAL
SWP
XMC? 0,0,5

<Response>
–10033,–8255,–6134,–3825,–1347

XMD

Wave Data for RF Power

Program Message	Query Message	Response Message
XMD a,b	XMD? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data on the RF Power screen.

■ Value of a

Data writing address

Range	Resolution
0 to 8992	1

• Relation between data storage address and Marker Position is shown below.

Data storage address	0	1	2		399	400	401		8991	8992
Marker Position [PNchip]	–100.00	–99.75	–99.50		–0.25	0.00	0.25		2147.75	2148.00

■ Value of b

Data to be written

Range	Resolution
–32768 to 32767	1

• Setting is made by using an integer in the unit of 0.01 dBm with 1 dB set at 100.

■ Value of c

Address from which to start data readout:

Range	Resolution
0 to 8992	1

■ Value of d

Number of data readouts

Range	Resolution
1 to 8993	1

■ Value e (n)

Data to be read out

Range	Resolution
–2147483648 to 2147483647	1

• Data are read out by using an integer in the unit of 0.01 dB with 1 dB set at 100.

■ Example of use

"Making five readouts of the waveform data of RF Power starting from memory address 0."

<Program>
DSPL RFPWR
SWP
XMD? 0,5

<Response>
116,109,92,176,56

XME

Wave Data for Occupied Bandwidth

Program Message	Query Message	Response Message
XME a,b	XME? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data at Occupied Bandwidth measurement.

■ Value of a

Write address for data

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■ Value of b

16-bit waveform data to be written

Range	Resolution
–32768 to 32767	1

- Data are set using integers in 0.01 dB units, where 1 dB becomes 100.

■ Value of c

Read start address for data

Data Points	Range	Resolution
501	0 to 500	1
1001	0 to 1000	1

■ Value of d

Number of read-out data

Data Points	Range	Resolution
501	1 to 501	1
1001	1 to 1001	1

■ Value of e (n)

32-bit waveform data to be read out

Range	Resolution
–2147483648 to 2147483647	1

- Data are read out using integers in 0.01 dB units, where 1 dB becomes 100.

■ Restriction

- When Measure Method is Spectrum, waveform data by Spectrum method is operated; and When Measure Method is FFT, waveform data by FFT method is operated.

■ Example of use

"Reads out ten waveform data of Occupied Bandwidth starting from memory address 0."

<Program>
DSPL OBW,FFT
SWP
XME? 0,10

<Response>
–8829, –8925, –8776, –8771, –8735, –8636, –8882, –8806, –8700, –8846

XMEYE

Eye Diagram

Program Message	Query Message	Response Message
XMEYE a,b,c	XMEYE? a,d,e	f(1),f(2),...,f(e)

■ Function

Read or Write the Eye-diagram waveform data on the Modulation Analysis screen.

■ Value of a

Channel specification

a	Phase
0	I-phase
1	Q-phase

■ Value of b

Data write address

Range	Resolution
0 to 8191	1

■ Value of c

Data write data

Range	Resolution
–32768 to 32767	1

■ Value of d

Data readout address

Range	Resolution
0 to 8191	1

■ Value of e

Number of points for readout

Range	Resolution
1 to 8192	1

■ Value of f

Readout data

Range	Resolution
−2147483648 to 2147483647	1

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Reads 10 data from 10th item of I-phase."

<Program>

DSPL MODANAL

SWP

XMEYE? 0,10,10

<Response>

10012,10472,10422,9897,8954,7677,6170,4541,2910,1362

XMN

Wave Data for Magnitude Error

Program Message	Query Message	Response Message
XMN a,b	XMN? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of Magnitude Error on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 32767	1

■ Value of b

Data write address

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.01% units so that 1% is shown as 100.

■ Value of c

Data readout address

Range	Resolution
0 to 32767	1

■ Value of d

Number of data readout

Range	Resolution
1 to 32768	1

■ Value of e (n)

Data readout data

Range	Resolution
–2147483648 to 2147483647	1

- Data are read out using integers in 0.01% units, where 1% becomes 100.

■ Example of use

"Reads out five waveform data of Magnitude Error starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMN? 0,5

<Response>
0, 1413, –1, –7415, –1

XMP

Wave Data for Phase Error

Program Message	Query Message	Response Message
XMP a,b	XMP? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of Phase Error on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 32767	1

■ Value of b

Data write data

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.01 deg units so that 1 deg is shown as 100.

■ Value of c

Data readout address

Range	Resolution
0 to 32767	1

■ Value of d

Number of data readout

Range	Resolution
1 to 32768	1

■ Value of e (n)

Data readout data

Range	Resolution
–2147483648 to 2147483647	1

- Data are read out using integers in 0.01 deg units, where 1 deg becomes 100.

■ Example of use

"Reads out five waveform data of Phase Error starting from memory address 0."

<Program>

DSPL MODANAL

SWP

XMP? 0,5

<Response>

–1, –1660, 0, 8679, 0

XMSYM

Constellation(Symbol)

Program Message	Query Message	Response Message
XMSYM a,b,c	XMSYM? a,d,e	f(1),f(2),...,f(e)

■ Function

Reads or writes the constellation waveform data on the Modulation Analysis screen.

■ Value of a

Channel specification

a	Phase
0	I-phase
1	Q-phase

■ Value of b

Data write address

Range	Resolution
0 to 1599	1

■ Value of c

Data write data

Range	Resolution
–32768 to 32767	1

■ Value of d

Data readout address

Range	Resolution
0 to 1599	1

■ Value of e

Number of points for readout

Range	Resolution
1 to 1600	1

■ Value of f

Readout data

Range	Resolution
−2147483648 to 2147483647	1

■ Initialization of setting

PRE,INI,IP,∗RST

■ Example of use

"Reads 10 data from 10th item of I-phase."

<Program>

XMSYM? 0,10,10

<Response>

–9487,–3162,3162,–9487,–3162,3162,–3162,–3162,9487,–9487

XMV

Wave Data for EVM

Program Message	Query Message	Response Message
XMV a,b	XMV? c,d	e(1),e(2),...,e(d)

■ Function

Reads out and processes the waveform data of EVM on the Modulation Analysis screen.

■ Value of a

Data write address

Range	Resolution
0 to 32767	1

■ Value of b

Data write data

Range	Resolution
–32768 to 32767	1

- Setting is made by using an integer in 0.01% units so that 1% is shown as 100.

■ Value of c

Data readout address

Range	Resolution
0 to 32767	1

■ Value of d

Number of data readout

Range	Resolution
1 to 32768	1

■ Value of e (n)

Data readout data

Range	Resolution
–2147483648 to 2147483647	1

- Data are read out using integers in 0.01% units, where 1% becomes 100.

■ Example of use

"Reads out five waveform data of EVM starting from memory address 0."

<Program>
DSPL MODANAL
SWP
XMV? 0,5

<Response>
10, 3743, 20, 9272, 30

ZEROSET

Zero Set

Program Message	Query Message	Response Message
ZEROSET	–	–

■ Function

Executes zero-point calibration of the power meter.

■ Restriction

- This function can be executed only when the displayed measurement screen is the Power Meter screen. (cf. DSPL)

■ Example of use

"Performs Zero Set for Power Meter."

<Program>
DSPL PWRMTR
ZEROSET

■ Restrictions according to model type and options

For MS268x, this command is not available.