

MX268151A/MX268351A/MX268751A

(For MS2681A/MS2683A/MS2687B Spectrum Analyzers)

MX860851A/MX860951A

(For MS8608A/MS8609A Digital Mobile Radio Transmitter Testers)

W-CDMA Release5 uplink Measurement Software



For Transmit Modulation Analysis Evaluation of W-CDMA Mobile Terminals

Supports Transmit Modulation Analysis Measurement of W-CDMA Mobile Terminals

MX268151A/MX268351A/MX268751A/MX860851A/MX860951A W-CDMA Release5 Uplink Measurement Software is the application software used in MS2681A/MS2683A/MS2687B Spectrum Analyzers or MS8608A/MS8609A Digital Mobile Radio Transmitter Testers.

The software installation in MS2681A/MS2683A/MS2687B or MS8608A/MS8609A enables to perform phase discontinuity and PRACH preamble quality measurements defined by 3GPP.

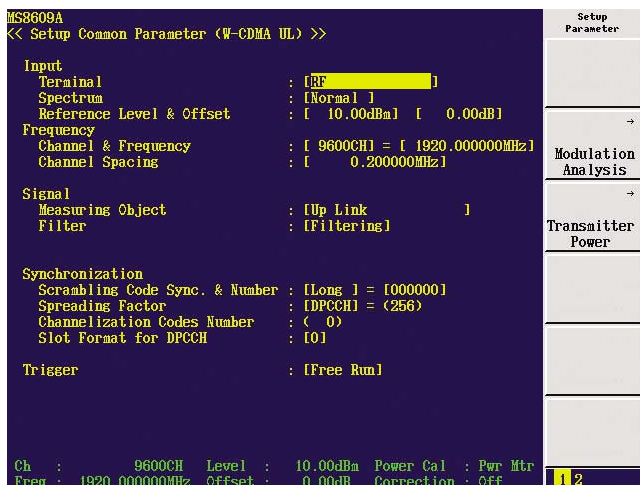
Furthermore, all transmitter tests of W-CDMA mobile terminals can be performed in combination with MX268101B/MX268301B/MX268701B/MX860801B/MX860901B W-CDMA Measurement Software.

List of supported test items

TS 34.121 v5.6.0	Terminal Conformance Specification	Measurement function	MX860x01B	MX860x51A
5	Transmitter Characteristics			
5.2	Maximum Output Power	Power Level	√	
5.3	Frequency Error	Frequency	√	√
5.4	Output Power Dynamics in the Uplink			
5.4.1	Open Loop Power Control in the Uplink	Power Level	√	
5.4.2	Inner Loop Power Control in the Uplink	Power Level	√	
5.4.3	Minimum Output Power	Power Level	√	
5.4.4	Out of synchronization handling of output power	Spectrum	√	
5.5	Transmit ON/OFF Power			
5.5.1	Transmit OFF Power	Power Level	√	
5.5.2	Transmit ON/OFF Time Mask	Power Level	√	
5.6	Change of TFC	Power Level	√	
5.7	Power setting in uplink compressed mode	Power Level	√	
5.8	Occupied Bandwidth	Spectrum	√	
5.9	Spectrum emission mask	Spectrum	√	
5.10	Adjacent Channel Leakage Power Ratio (ACLR)	Spectrum	√	
5.11	Spurious Emissions	Spectrum	√	
5.12	Transmit Intermodulation	Spectrum	√	
5.13	Transmit Modulation			
5.13.1	Error Vector Magnitude	EVM	√	√
5.13.2	Peak code Domain error	CDE	√	√
5.13.3	UE phase discontinuity	Phase Discontinuity		√
5.13.4	PRACH preamble quality	PRACH EVM		√

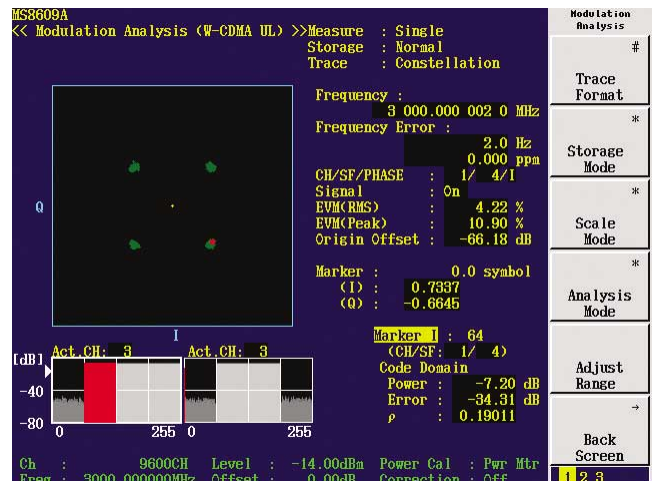
Parameter Settings

This screen is used to set basic parameters such as frequency and signal type. After setting, a simple operation completes each measurement.



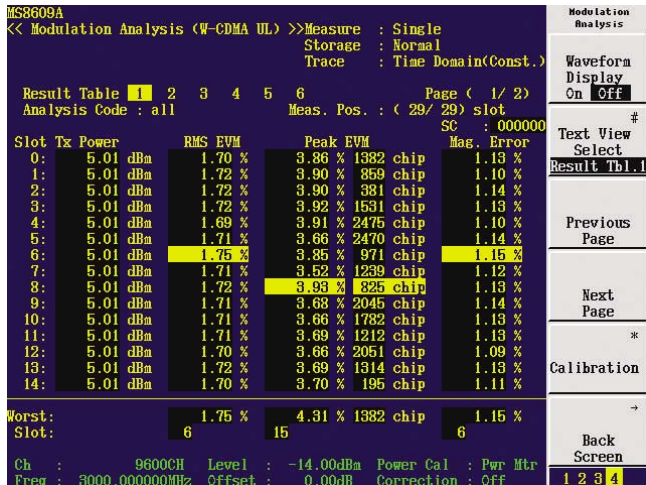
Modulation Analysis Measurement [1]

The results required for modulation analysis such as frequency error, EVM and PCDE are all displayed on the screen. Also, a user can view the constellation of a code selected on the code domain screen.



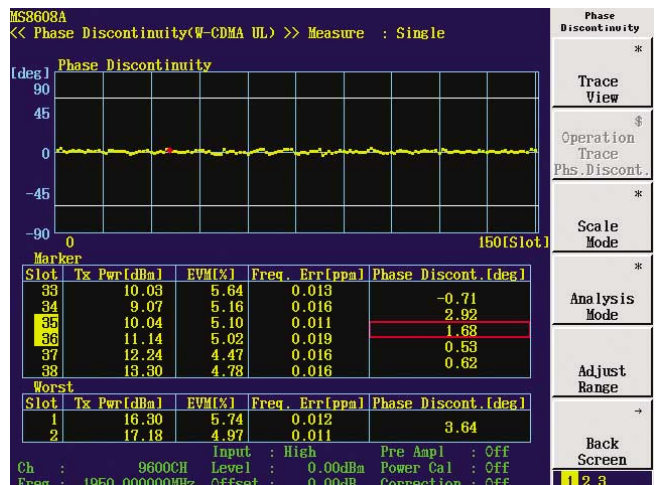
Modulation Analysis Measurement [2]

Test results such as Tx Power, RMS EVM and Peak EVM per slot are listed on the screen. This helps a user to detect the slot-dependent deteriorations easily.



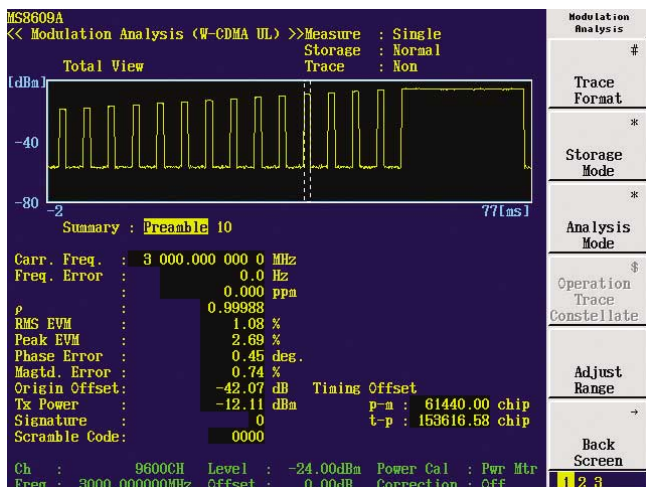
Phase Discontinuity Measurement

Test results such as Tx Power, EVM, Frequency Error and Phase discontinuity per slot and Worst values are displayed on a single screen. This allows a user to grasp the required analysis results instantaneously.

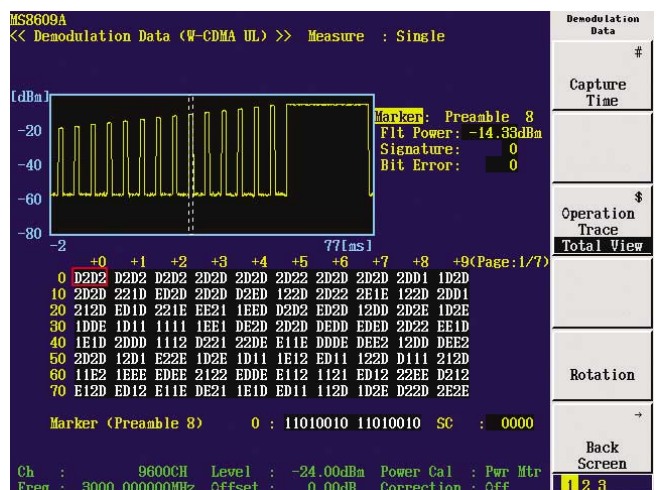


RACH Analysis

Test results such as Tx Power and EVM of Preamble or Message portion and the constellation are displayed. Also, timing differences between Preamble portion and Message portion as well as the external trigger and Preamble portion can be measured.



The demodulated data of Preamble or Message portion is displayed. Especially in Preamble portion, the data different from ideal data strings defined by the standards is shown in red. This helps a user to find errors instantaneously.



Specifications (For MX268151A/MX268351A/MX268751A)

The following specifications are guaranteed after the internal range is optimized (the internal receiver range is automatically adjusted by pushing the Adjust Range key). Power values show mean power. The “pre-amp on” specification for MS2681A and MS2683A applies when options MS2681A-08/MS2683A-08 are installed.

Model		MX268151A	MX268351A	MX268751A	
Modulation/ frequency measurement	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2681A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2683A-08 is installed)	50 MHz to 3.0 GHz	
	Measurement level range	-60 to +30 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on)		-60 to +30 dBm	
	Carrier frequency accuracy	± (reference frequency accuracy +10 Hz) At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)		± (reference frequency accuracy +10 Hz) At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm	
	Modulation accuracy (residual vector error)	<2.0% (rms) At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)		<2.0% (rms) At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm	
	Origin offset accuracy	±0.5 dB Relative to signal with origin offset of -30 dBc At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)		±0.5 dB Relative to signal with origin offset of -30 dBc At 1 code channel (Modulation methods: QPSK) Input level: ≥-30 dBm	
	Code domain power accuracy	±0.1 dB (code power ≥-10 dBc) ±0.3 dB (code power ≥-25 dBc) The input signal does not have the origin offset Modulation methods: QPSK Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)		±0.1 dB (code power ≥-10 dBc) ±0.3 dB (code power ≥-25 dBc) The input signal does not have the origin Modulation methods: QPSK Input level: ≥-10 dBm	
	Code domain error	Residual error: <-50 dB Accuracy: ±0.5 dB Spread factor: 256 The input signal does not have the origin offset Modulation methods: QPSK Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)		Residual error: <-50 dB Accuracy: ±0.5 dB Spread factor: 256 The input signal does not have the origin Modulation methods: QPSK Input level: ≥-10 dBm	
	Waveform display	Constellation display, Eye diagram, EVM vs. Chip, Phase error vs. Chip, Amplitude error vs. Chip, Code vs. Slot, Time domain modulation analysis			
	Code vs. Slot	Code domain power is measured per slot (Max.150 slots) for the specified code channel.			
	Time domain modulation analysis	Modulation analysis per slot (Max.150 slots) is measured.			
Amplitude measurement	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2681A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2683A-08 is installed)	50 MHz to 3.0 GHz	
	Measurement level range	-60 to +30 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on)		-60 to +30 dBm	
	Tx power accuracy	±2 dB (Typical) Measurement range: -20 to +30 dBm (Pre-amp off) -20 to +10 dBm (Pre-amp on)		±2 dB (Typical) Measurement range: -20 to +30 dBm	
	Power measurement linearity	±0.2 dB (0 to -40 dB) After optimized internal range, When the reference level setting is not changed. Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)		±0.2 dB (0 to -40 dB) After optimized internal range, When the reference level setting is not changed. Input level: ≥-10 dBm	
	Filter select function	Power value after passing RRC ($\alpha=0.22$) filter can be measured			
	RACH measurement function	The time difference between a preamble RACH signal and a message RACH signal is measured.			
	Demodulation measurement	The post-despreading data of a specific code channel is outputted for a maximum of 10 frames. Otherwise, the specific preamble data is outputted for a maximum of 16 pieces.			

Model		MX268151A	MX268351A	MX268751A
CCDF	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2681A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2683A-08 is installed)	50 MHz to 3.0 GHz
	Measurement level range	-60 to +30 dBm, +50 dBm (Peek power) : Pre-amp off -80 to +10 dBm, +50 dBm (Peek power) : Pre-amp on		-60 to +30 dBm, +50 dBm (Peek power)
	Measurement methods	CCDF : Displays an accumulation distribution of a ratio between instantaneous power and average power APD : Displays a distribution of a ratio between instantaneous power and average power		
	Filter select function	20 MHz, 10 MHz, 5 MHz, 3 MHz RRC: $\alpha=0.22$, RC: $\alpha=0.22$		
Phase Discontinuity	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2681A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS2683A-08 is installed)	50 MHz to 3.0 GHz
	Measurement level range	-60 to +30 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on)		-60 to +30 dBm
	Phase Discontinuity measurement	The average value per slot is calculated from the test results of phase difference in each symbol and the phase difference between the adjacent slots is displayed.		
Electric performance (IQ input)	Input impedance	1 M Ω (parallel capacitance: <100 pF) , 50 Ω		
	Balance input	Differential voltage : 0.1 to 1.0 Vp-p (input terminals) In-phase voltage : ± 2.5 V (input terminals) (MS2681A-17 is installed)	Differential voltage : 0.1 to 1.0 Vp-p (input terminals) In-phase voltage : ± 2.5 V (input terminals) (MS2683A-17 is installed)	
	Unbalance input	0.1 to 1.0 V p-p (input terminals), DC/AC coupling : Changeable (MS2681A-18 is installed)	0.1 to 1.0 V p-p (input terminals), DC/AC coupling : Changeable (MS2683A-18 is installed)	0.1 to 1.0 V p-p (input terminals), DC/AC coupling : Changeable (MS2687B-18 is installed)
	Measurement items	Modulation/ frequency measurement Amplitude measurement (The power value after RRC filtering is measured.)		
	Modulation accuracy measurement	Residual vector error : <2% (Typical) DC coupling, Input level : ≥ 0.1 V(rms), the input signal does not have the origin offset		
	IQ level measurement	Measures and displays input level of I and Q (rms, p-p)		
	IQ phase difference measurement	When the CW signal is inputted to I and Q input terminals, measures and displays the phase difference between I-phase and Q-phase signals.		

Specifications (For MX860851A/MX860951A)

The following specifications are guaranteed after the internal range is optimized (the internal receiver range is automatically adjusted by pushing the Adjust Range key). Power values show mean power. The “pre-amp on” specification for MS8608A and MS8609A applies when options MS8608A-08/MS8609A-08 are installed.

Model		MX860851A	MX860951A
Modulation/ frequency measurement	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 or MS8609A-30 is installed)
	Measurement level range	-40 to +40 dBm (high power input) -60 to +20 dBm (low power input, Pre-amp off) -80 to +10 dBm (low power input, Pre-amp on)	-60 to +20 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on) -60 to +26 dBm (Pre-amp on, MS8609A-32 is installed)
	Carrier frequency accuracy	± (reference frequency accuracy + 10 Hz) At 1 code channel, Modulation methods: QPSK Input level: ≥-10 dBm (high power input) Input level: ≥-30 dBm (low power input, Pre-amp off) Input level: ≥-40 dBm (low power input, Pre-amp on)	± (reference frequency accuracy + 10 Hz) At 1 code channel, Modulation methods: QPSK Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)
	Modulation accuracy (residual vector error)	<2.0 % (rms) At 1 code channel, Modulation methods: QPSK Input level: ≥-10 dBm (high power input) Input level: ≥-30 dBm (low power input, Pre-amp off) Input level: ≥-40 dBm (low power input, Pre-amp on)	<2.0 % (rms) At 1 code channel, Modulation methods: QPSK Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)
	Origin offset accuracy	±0.5 dB Relative to signal with origin offset of -30 dBc At 1 code channel, Modulation methods: QPSK Input level: ≥-10 dBm (high power input) Input level: ≥-30 dBm (low power input, Pre-amp off) Input level: ≥-40 dBm (low power input, Pre-amp on)	±0.5 dB Relative to signal with origin offset of -30 dBc At 1 code channel, Modulation methods: QPSK Input level: ≥-30 dBm (Pre-amp off) Input level: ≥-40 dBm (Pre-amp on)
	Code domain power accuracy	±0.1 dB (code power ≥-10 dBc) ±0.3 dB (code power ≥-25 dBc) The input signal does not have the origin offset Modulation methods: QPSK Input level: ≥+10 dBm (high power input) Input level: ≥-10 dBm (low power input, Pre-amp off) Input level: ≥-20 dBm (low power input, Pre-amp on)	±0.1 dB (code power ≥-10 dBc) ±0.3 dB (code power ≥-25 dBc) The input signal does not have the origin offset Modulation methods: QPSK Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)
	Code domain error	Residual error: <-50 dB Accuracy: ±0.5 dB Spread factor: 256 The input signal does not have the origin offset Modulation methods : QPSK Input level: ≥+10 dBm (high power input) Input level: ≥-10 dBm (low power input, Pre-amp off) Input level: ≥-20 dBm (low power input, Pre-amp on)	Residual error: <-50 dB Accuracy: ±0.5 Spread factor: 256 Modulation methods : QPSK The input signal does not have the origin offset Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)
	Waveform display	Constellation, Eye diagram, EVM vs. Chip, Phase error vs. Chip, Amplitude error vs. Chip, Code vs. Slot, Time domain modulation analysis	
	Code vs. Slot	Code domain power is measured per slot (Max.150 slots) for the specified code channel.	
Time domain modulation analysis	Modulation analysis per slot (Max.150 slots) is measured.		

Model		MX860851A	MX860951A
Amplitude measurement	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 or MS8609A-30 is installed)
	Measurement level range	-40 to +40 dBm (high power input) -60 to +20 dBm (low power input, Pre-amp off) -80 to +10 dBm (low power input, Pre-amp on)	-60 to +20 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on) -60 to +26 dBm (Pre-amp on, MS8609A-32 is installed)
	Tx power accuracy	±0.4 dB after optimized internal level and Power Calibration, relative to continuous signal. Measurement range: 0 to +40 dBm (high power input) -20 to +20 dBm (low power input, Pre-amp off) -20 to +10 dBm (low power input, Pre-amp on)	±0.4 dB after optimized internal level and Power Calibration, relative to continuous signal. Measurement range: -20 to +20 dBm (Pre-amp off) -20 to +10 dBm (Pre-amp on) -14 to +26 dBm (Pre-amp off, MS8609A-32 is installed) -14 to +16 dBm (Pre-amp on, MS8609A-32 is installed)
	Power measurement linearity	±0.2 dB (0 to -40 dB) After optimized internal level, relative to reference level Input level: ≥+10 dBm (high power input) Input level: ≥-10 dBm (low power input, Pre-amp off) Input level: ≥-20 dBm (low power input, Pre-amp on)	±0.2 dB (0 to -40 dB) After optimized internal level, relative to reference level Input level: ≥-10 dBm (Pre-amp off) Input level: ≥-20 dBm (Pre-amp on)
	Filter select function	Power value after passing RRC ($\alpha=0.22$) filter can be measured	
	RACH measurement function	The time difference between a preamble RACH signal and a message RACH signal is measured.	
	Demodulation measurement	The post-despreading data of a specific code channel is outputted for a maximum of 10 frames. Otherwise, the specific preamble data is outputted for a maximum of 16 pieces.	
CCDF	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 or MS8609A-30 is installed)
	Measurement level range	-40 to +40 dBm, +50 dBm (Peak power, high power input) -60 to +20 dBm, +50 dBm (Peak power, low power input, Pre-amp off) -80 to +10 dBm, +50 dBm (Peak power, low power input, Pre-amp on)	-60 to +20 dBm, +50 dBm (Peak power, Pre-amp off) -80 to +10 dBm, +50 dBm (Peak power, Pre-amp on) -60 to +26 dBm, +50 dBm (Peak power, Pre-amp on, MS8609A-32 is installed)
	Measurement methods	CCDF : Displays an accumulation distribution of a ratio between instantaneous power and average power APD : Displays a distribution of a ratio between instantaneous power and average power	
	Filter select function	20 MHz, 10 MHz, 5 MHz, 3 MHz RRC: $\alpha=0.22$, RC: $\alpha=0.22$	
Phase Discontinuity	Measurement frequency range	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 is installed)	50 MHz to 3.0 GHz 50 MHz to 2.3 GHz (MS8608A-08 or MS8609A-30 is installed)
	Measurement level range	-40 to +40 dBm (high power input) -60 to +20 dBm (low power input, Pre-amp off) -80 to +10 dBm (low power input, Pre-amp on)	-60 to +20 dBm (Pre-amp off) -80 to +10 dBm (Pre-amp on) -60 to +26 dBm (Pre-amp on, MS8609A-32 is installed)
	Phase Discontinuity measurement	The average value per slot is calculated from the test results of phase difference in each symbol and the phase difference between the adjacent slots is displayed.	
Electric performance (IQ input)	Input impedance	1 M Ω (parallel capacitance: <100 pF), 50 Ω	
	Balance input	Differential voltage: 0.1 to 1.0 Vp-p (input terminals) In-phase voltage: ±2.5 V (input terminals)	
	Unbalance input	0.1 to 1.0V p-p (input terminals), DC/AC coupling: Changeable	
	Measurement items	Modulation/ frequency measurement Amplitude measurement (The power value after RRC filtering is measured.)	
	Modulation accuracy measurement	Residual vector error: <2% (rms) (Typical) DC coupling, Input level: ≥0.1 V (rms), the input signal dose not have the origin offset	
	IQ level measurement	Measures and displays input level of I and Q (rms, p-p)	
	IQ phase difference measurement	When a CW signal is inputted to the I and Q input terminals, measures and displays the phase difference between the I-phase and Q-phase signals.	

Ordering Information

Please specify the model/order number, name, and quantity when ordering.

Model/Order No.	Name	
	– Main frame –	
MX268151A	W-CDMA Release5 uplink Measurement Software (for MS2681A)	
MX268351A	W-CDMA Release5 uplink Measurement Software (for MS2683A)	
MX268751A	W-CDMA Release5 uplink Measurement Software (for MS2687B)	
MX860851A	W-CDMA Release5 uplink Measurement Software (for MS8608A)	
MX860951A	W-CDMA Release5 uplink Measurement Software (for MS8609A)	
	– Standard accessories –	
Z0744	Memory card (compact flash, for backup)	:1 pc
W2617AE	W-CDMA Release5 uplink Measurement Software operation manual	:1 copy



Specifications are subject to change without notice.

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