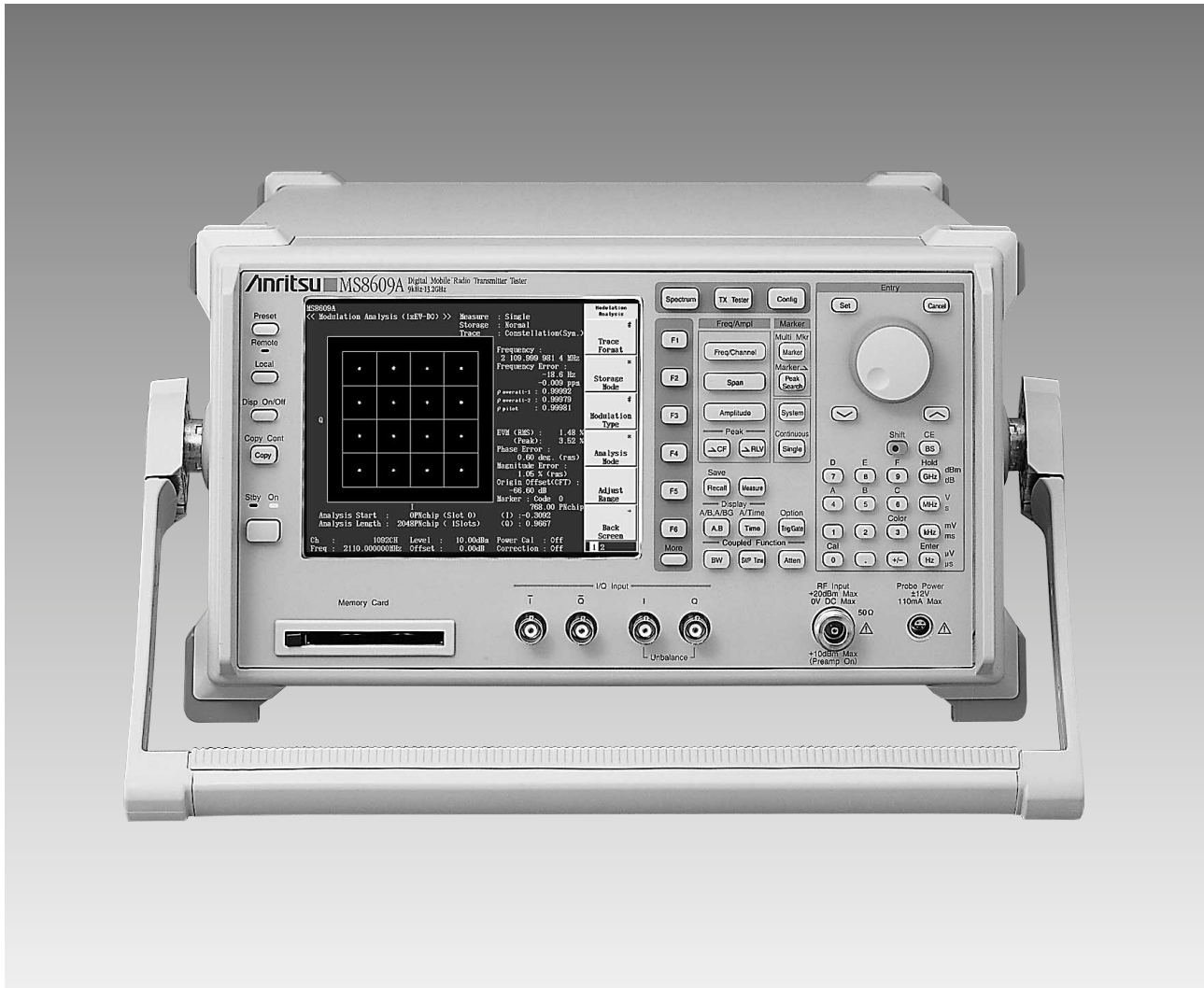


MX860904A

CDMA2000 1xEV-DO Measurement Software

(For MS8609A Digital Mobile Radio Transmitter Tester)



For Evaluation of CDMA2000 1xEV-DO Transmission System

Supporting CDMA2000 1xEV-DO

MX860904A cdma Measurement Software is the application software used in the MS8609A Digital Mobile Radio Transmitter Tester. The installation of MX860904A enables evaluation of base station or mobile transmitters conforming to the 3GPP2 C.S0024 standards.

• Items measured by MX860904A

Modulation analysis:

Carrier frequency, vector error, phase error, magnitude error

Code domain analysis:

Code domain power, code domain timing offset, code domain phase offset

Amplitude measurement: Transmission power measurement

Spurious close to the carrier measurement

Spurious measurement

Occupied bandwidth measurement

I/Q level measurement

CCDF measurement

Modulation Accuracy Measurement

Frequency error, modulation accuracy and code domain analysis are performed and then results are displayed on the screen. The measurement accuracy is 1% (typical value) of residual vector error (rms).

MS8609A		Modulation Analysis	
<< Modulation Analysis (1xEV-DO) >> Measure : Single Storage : Normal Trace : Non(Overall)			
Frequency		Trace Format	
Carrier Frequency	: 2 109.999 979 5 MHz	*	
Carrier Frequency Error	: -20.5 Hz -0.010 ppm	*	
Waveform Quality		Storage Mode	
$\rho_{overall-1}$: 0.99983	*	
$\rho_{overall-2}$: 0.99978	*	
ρ_{pilot}	: 0.99980	*	
Modulation(Overall)		Modulation Type	
RMS & Peak EVM	: 1.12 % (rms) 3.10 %	*	
Phase Error	: 0.45 deg. (rms)	*	
Magnitude Error	: 0.79 % (rms)	*	
Origin Offset(CFT)	: -40.11 dB	*	
Tx Power		Adjust Range	
	: -0.46 dBa	*	
Analysis Start : 0PNchip (Slot 0) Analysis Length : 2048PNchip (15lots)			
Ch : 1092CH Level : 10.00dBa Power Cal : Off Freq : 2110.000000MHz Offset : 0.00dB Correction : Off			

Parameter Setup

A setup screen is provided for the entry of required parameters for modulation accuracy and code domain power measurements in CDMA2000 1xEV-DO analysis.

Measurement can be performed after parameter setup.

MS8609A		Setup Parameter
<< Setup Common Parameter (1xEV-DO) >>		
Input		
Terminal	: [RF]	
Reference Level & Offset	: [10.00dBa] [0.00dB]	
Frequency		Modulation Analysis
Channel & Frequency	: [1092CH] = [2110.000000MHz]	
Channel Spacing	: [1.250000MHz]	
Signal		
Filter	: [Filter+E0]	
Measuring Object	: [Forward Link]	RF Power
Slot Type	: [Active]	
Modulation Type	: [Auto]	
Preamble Length	: [Auto]	
Synchronization		Occupied Bandwidth
Offset Index (PN Offset)	: [01 * 64 PNchip]	
Trigger		Spurious close to the Carrier
	: [Free Run]	
Ch : 1092CH Level : 10.00dBa Power Cal : Off Freq : 2110.000000MHz Offset : 0.00dB Correction : Off		

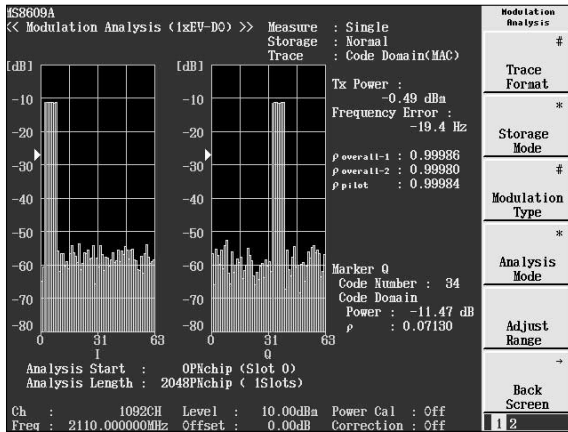
Constellation Display

Auto setup is available for modulation system and preamble length setup, simplifying operations by automated detection.

MS8609A		Modulation Analysis	
<< Modulation Analysis (1xEV-DO) >> Measure : Single Storage : Normal Trace : Constellation(Sym.)			
Frequency		Trace Format	
	: 2 109.999 981 4 MHz	*	
Frequency Error		Storage Mode	
	: -18.6 Hz -0.009 ppm	*	
Waveform Quality		Modulation Type	
$\rho_{overall-1}$: 0.99992	*	
$\rho_{overall-2}$: 0.99978	*	
ρ_{pilot}	: 0.99981	*	
EVM (RMS)		Adjust Range	
	: 1.48 % (Peak): 3.52 %	*	
Phase Error		Analysis Mode	
	: 0.60 deg. (rms)	*	
Magnitude Error		Back Screen	
	: 1.05 % (rms)		
Origin Offset(CFT)			
	: -66.60 dB		
Marker : Code 0			
I			
Analysis Start : 0PNchip (Slot 0)			
Analysis Length : 2048PNchip (15lots)			
Ch : 1092CH Level : 10.00dBa Power Cal : Off Freq : 2110.000000MHz Offset : 0.00dB Correction : Off			

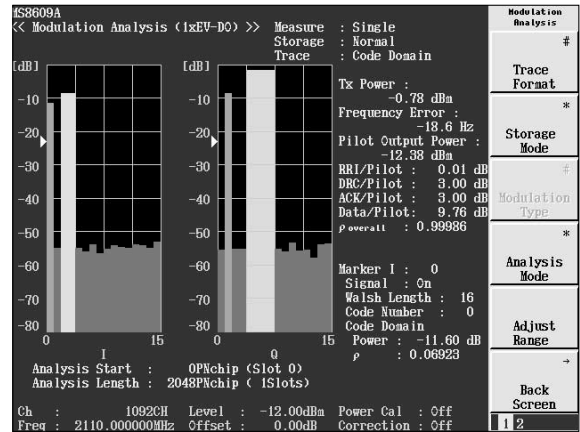
BTS Code Domain Analysis

Perform code domain analysis of forward link signals in approx. 2 seconds. Code domains of I/Q phase are displayed on the screen.



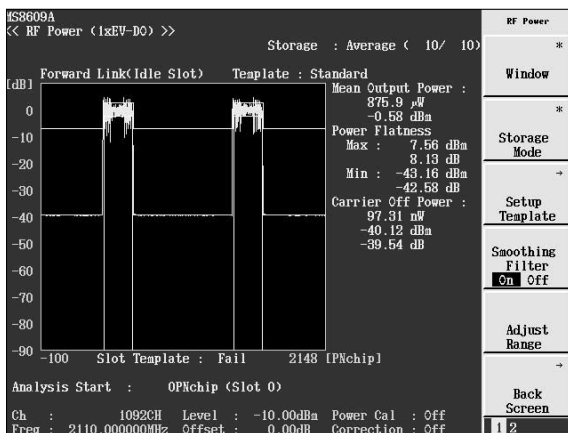
MS Code Domain Analysis

Perform code domain analysis of reverse link signals in approx. 2 seconds. Code domains of I/Q phase are displayed on the screen.



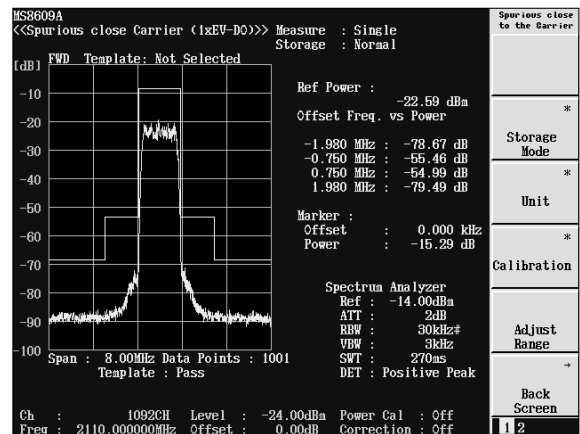
Transmission Power Measurement

When transmission power is measured both the value and signal waveform are displayed on the screen. High accuracy power measurements are achieved using the built-in power meter function.



Spurious Close to the Carrier Measurement

Spurious close to the carrier is measured using the spectrum analyzer function. The PASS/FAIL result of a template judgement is displayed on the screen.



Specifications

Following specifications are guaranteed after optimized internal level (Range of internal receiver is automatically adjusted by pushing Adjust Range key).

<p>Modulation/frequency measurement</p>	<p>Measurement frequency range: 50 MHz to 2.3 GHz Measurement level range: -40 to +20 dBm (average power within burst, pre-amp off) -60 to +10 dBm (average power within burst, pre-amp on[Ⓜ]) Carrier frequency accuracy: ±(reference oscillator accuracy +10 Hz) *Input level: ≥-30 dBm (pre-amp off), ≥-40 dBm (pre-amp on[Ⓜ]), at 1 code channel Modulation accuracy (residual vector error): <2.0% (rms) *Input level: ≥-30 dBm (pre-amp off), ≥-40 dBm (pre-amp on[Ⓜ]), at 1 code channel Origin offset accuracy: ±0.50 dB *Input level: ≥-30 dBm (pre-amp off), ≥-40 dBm (pre-amp on[Ⓜ]), at 1 code channel, relative to signal with origin offset of -30 dBc Waveform Display Forward link: Displays the following items for each or entire domain of DATA, MAC and Pilot: Constellation, Eye Pattern, Vector Error vs. Chip Number, Phase Error vs. Chip Number, Amplitude Error vs. Chip Number Displays the symbol constellation of DATA domain Reverse link: Displays the following items for 1CH to multi CH input signals: Constellation, Eye pattern, Vector Error vs. Chip Number, Phase Error vs. Chip Number, Amplitude Error vs. Chip Number</p>
<p>Code domain analysis</p>	<p>Measurement frequency range: 50 MHz to 2.3 GHz Measurement level range: -40 to +20 dBm (average power within burst, pre-amp off) -60 to +10 dBm (average power within burst, pre-amp on[Ⓜ]) Code domain power accuracy: ±0.1 dB (code power: ≥-10 dBc), ±0.3 dB (code power: ≥-25 dBc) Input level: ≥-10 dBm (pre-amp off), ≥-20 dBm (pre-amp on[Ⓜ]) Analysis signal: Forward link, Reverse link Display function Forward link: Displays the code domain power for each DATA and MAC domain Code domain power for DATA domain, Spread factor: IQ separate display for fixed 16 codes Code domain power for MAC domain, Spread factor: IQ separate display for fixed 64 codes Reverse link: Displays the code domain power for IQ separately, Detects the following channels</p>
<p>Amplitude measurement</p>	<p>Frequency range: 50 MHz to 2.3 GHz Measurement level range -40 to +20 dBm (average power within burst, pre-amp off) -60 to +10 dBm (average power within burst, pre-amp on[Ⓜ]) Tx power measurement: (after level calibration using built-in power meter, automatic operation by pushing key) Measurement range: -20 to +20 dBm (average power within burst, pre-amp off) -20 to +10 dBm (average power within burst, pre-amp on[Ⓜ]) Accuracy: ±0.40 dB Power measurement linearity: ±0.20 dB (0 to -40 dB) *Input level: ≥0 dBm (pre-amp off), ≥-20 dBm (pre-amp on[Ⓜ]) , unchanged reference level setup after range adjustment Idle slot analysis: Rise/Fall characteristics and On/Off ratio analysis function are equipped.</p>
<p>Occupied bandwidth measurement</p>	<p>Frequency range: 50 MHz to 2.3 GHz Measurement level range: -40 to +20 dBm (average power within burst, pre-amp off) -60 to +10 dBm (average power within burst, pre-amp on[Ⓜ]) Measurement method Sweep method: Sweeps signal using spectrum analyzer and calculates result FFT method: Analyzes signal with FFT and calculates result</p>

Spurious close to the carrier measurement	<p>Frequency range: 50 MHz to 2.3 GHz Input level range: -10 to +20 dBm (average power within burst, pre-amp off) Measurement method: Calculates and displays the ratio of Tx power to the power measured by spectrum analyzer with sweep method Tx power measurement Tx power method: Carrier power measured in 1.23 MHz bandwidth SPA method: Carrier power measured in RBW: 3 MHz, VBW: 3 kHz, detection mode: sample, frequency span: 0 Hz Measurement range: ≥50 dBc (900 kHz offset), ≥60 dBc (1.98 MHz offset) *Input level (average power within burst): ≥0 dBm (pre-amp off), RBW: 30 kHz, VBW: 3 kHz, detection mode: positive</p>
Spurious measurement	<p>Measurement frequency range: 10 MHz to 12.75 GHz (except within ±50 MHz of carrier frequency) Input level range (Tx power): 0 to +20 dBm (average power within burst, pre-amp off) Measurement method Sweep method: Sweeps specified frequency range using spectrum analyzer and calculates ratio of carrier power and peak value detected during the sweep. Detection mode is average. Spot method: Measures average power of specified frequencies in time domain using spectrum Analyzer and calculates ratio of carrier power and measured power of the frequencies Detection mode is average. Search method: Sweeps specified frequency range using spectrum analyzer and detects frequency of peak spurious. Measures average power of the detected frequencies in time domain using spectrum analyzer and calculates ratio of carrier power and the measured power for the frequencies. Detection mode is Average. Tx power measurement Tx power method: Carrier power measured in 1.23 MHz bandwidth SPA method: Carrier power measured in RBW: 3 MHz, VBW: 3 kHz, detection mode: sample, frequency span: 0 Hz Measurement range (typical) 79 dB (RBW: 10 kHz, 10 to 30 MHz, Band 0) 79 dB (RBW: 100 kHz, 30 to 1000 MHz, Band 0) *Carrier frequency: 800 to 1000 MHz/1.8 to 2.2 GHz, reference value of power ratio in Tx power^{*2}</p>
CCDF measurement	<p>Frequency range: 50MHz to 3GHz, 50MHz to 2.3GHz (when Option MS8609A-08 or MS8609A-30 is installed) Measurement level range -60 to +20dBm (average power), +30dBm (peak power): Pre-amp off -80 to +10dBm (average power), +20dBm (peak power): Pre-amp on^{*1} Measurement method CCDF: Displays the cumulative distribution of the power difference between instantaneous power and average power APD: Displays the distribution of the power difference between instantaneous power and average power Filter selection function: 20MHz, 10MHz, 5MHz, 3MHz, 1.23MHz</p>
Electric performance (I/Q input)	<p>Input impedance: 1 MΩ (parallel capacitance: <100 pF), 50 Ω Balance input Differential voltage: 0.1 to 1 Vp-p, In-phase voltage: ±2.5 V Unbalance input: 0.1 to 1 Vp-p DC/AC coupling: Changeable Measurement items: Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), I/Q level Modulation accuracy measurement: (residual vector error): <2% (rms) *DC coupling, input level: ≥0.1V (rms) I/Q level measurement: Measures input level of I and Q (rms, p-p) I/Q 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.</p>

*1: Can be set when MS8609A-08 option is installed in the main frame.

*2: When carrier frequency is in a 2030.354 to 2200 MHz range, spurious will be generated at the frequency below.

f (spurious) = f (input) - 2030.345 MHz

Ordering Information

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

Model/Order No.	Name	Remarks
MX860904A	Main frame CDMA2000 1xEV-DO Measurement Software	For CDMA2000 1xEV-DO
JT32MA-NT1 W2090AE	Standard accessories PC-ATA card (32 MB): 1 pc CDMA2000 1xEV-DO measurement software operation manual (Vol. 1): 1 copy	MX860904A software for backup



Specifications are subject to change without notice.

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