

Supporting W-CDMA2000

– Evaluation of W-CDMA transmission system with single unit –

MX268101B/MX268301B/MX268701B W-CDMA Measurement Software is the application software used in the MS2681A/MS2683A/MS2687B Spectrum Analyzer. The installation in Spectrum Analyzer main frame enables to measure functions and performance of W-CDMA digital mobile equipment simply.

• Measured items

Modulation analysis:

Carrier frequency, Vector error, Phase error, Magnitude error, Code domain analysis (Code domain power, Code domain error), Code vs. time

Amplitude measurement: Transmission power measurement

Occupied bandwidth measurement

Adjacent channel power

Spurious measurement

Demodulation data monitoring

Spectrum emission mask

CCDF measurement

IQ level measurement

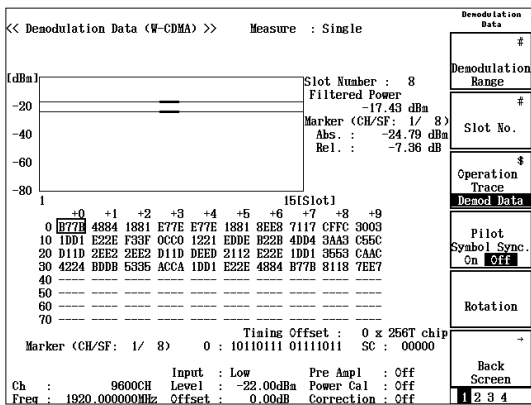
Parameter Setup

A setup screen is provided for the entry of required parameters for modulation accuracy and code domain power measurements in W-CDMA analysis. Measurement can be performed after parameter setup.

<< Setup Common Parameter (W-CDMA) >>		Setup Parameter
Input		
Terminal	: [RF]	
Spectra	: [Normal]	
Reference Level & Offset	: [-22.00dBa] [0.00dB]	
Frequency		
Channel & Frequency	: [9600CH] = [1920.000000MHz]	Modulation Analysis
Channel Spacing	: [0.200000MHz]	
Signal		
Measuring Object	: [Down Link]	Transmitter Power
Filter	: [Filtering]	
Synchronization		
Scrambling Code Sync. & Number	: [Auto] (Using SCH)	Occupied Bandwidth
Spreading Factor	: [P-CPICH] = (256)	
Channelization Codes Number	: (0)	
Spreading Factor for DPCCH	: [64]	Adjacent Channel Power
Trigger	: [Free Run]	
		Spurious Emission
Ch : 9600CH	Input : Low	Pre Ampl : Off
Level : -22.00dBa	Power Cal : Off	
Freq : 1920.000000MHz	Offset : 0.00dB	Correction : Off

Demodulation data monitoring

After de-spreading, up to 10 frames of demodulation data can be evaluated.



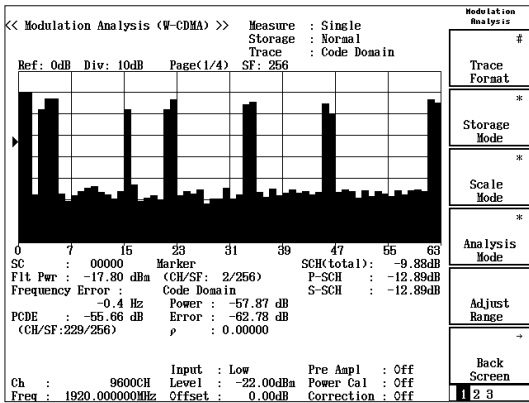
Modulation Accuracy Measurement

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).

<< Modulation Analysis (W-CDMA) >>		Modulation Analysis
Frequency		
Carrier Frequency	: 1 919.999 999 6 MHz	Trace Format
Carrier Frequency Error	: -0.4 Hz	
	: 0.000 ppa	Storage Mode
Waveform Quality		
Waveform Quality Factor	: 0.99943	Scale Mode
Modulation		
RMS EVM	: 1.63 % (rms)	Analysis Mode
Peak EVM	: 4.69 %	
Phase Error	: 0.67 deg. (rms)	
Magnitude Error	: 1.13 % (rms)	
Origin Offset	: -35.26 dB	Adjust Range
Power		
Filtered Power	: -17.80 dBa	Back Screen
SCH(Total)	: -9.88 dB	
P-SCH	: -12.89 dB	
S-SCH	: -12.89 dB	
Scramble Code Number	: 00000	
Ch : 9600CH	Input : Low	Pre Ampl : Off
Level : -22.00dBa	Power Cal : Off	
Freq : 1920.000000MHz	Offset : 0.00dB	Correction : Off

BTS Code Domain Analysis

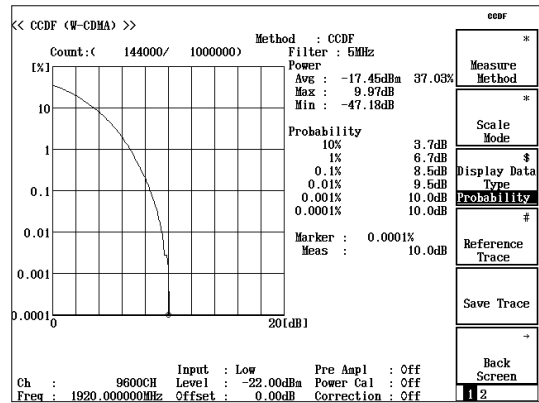
Perform code domain analysis of forward link signals in approx. 2 seconds. Code domains of IQ phase are displayed on the screen.



CCDF Measurement

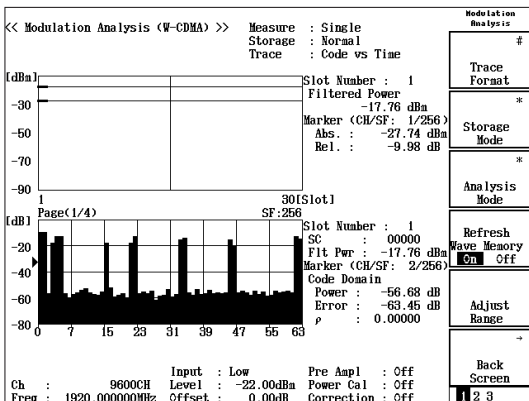
It enables distribution display or cumulative distribution display of the power difference between instantaneous power and average power.

Max. 20 MHz of filter bandwidth is able to perform multi-carrier measurement.



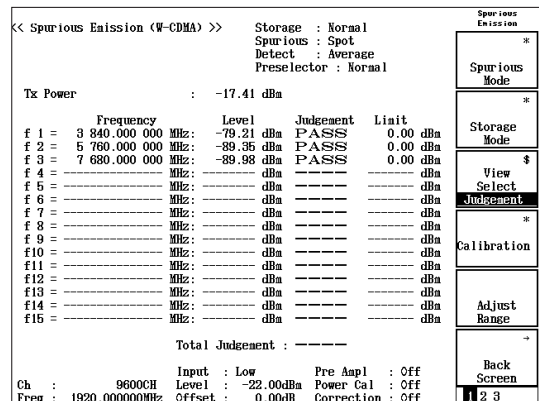
Code vs. time

This function is for measuring code power of specified code channel for each slot in the continuous slot range. It enables to check some functions, such as power control of code channel and compressed mode of down link (Spreading Factor Reduction), efficiently.



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).

The “pre-amp on” of MS2681A and MS2683A can be set up when MS2681A-08/MS2683A-08 of an option are carried.

Model	MS2681A	MS2683A	MS2687B	
Modulation/ frequency measurement	Measurement frequency range	50 MHz to 3 GHz 50 MHz to 2.3 GHz (with MS2681A-08/MS2683A-08)	50 MHz to 3 GHz	
	Measurement level range	-60 to +30 dBm (average power, pre-amp off) -80 to +10 dBm (average power, pre-amp on)	-50 to +30 dBm (average power)	
	Carrier frequency accuracy	Input level : ≥ -30 dBm (pre-amp off), ≥ -40 dBm (pre-amp on), at 1 code channel \pm (reference oscillator accuracy + 10 Hz)	Input level: ≥ -30 dBm, at 1 code channel \pm (reference oscillator accuracy + 10 Hz)	
	Modulation accuracy (residual vector error)	Input level: ≥ -30 dBm (pre-amp off), ≥ -40 dBm (pre-amp on), at 1 code channel <2.0 % (rms)	Input level: ≥ -30 dBm, at 1 code channel <2.0 % (rms)	
	Origin offset accuracy	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 ± 0.50 dB	Input level: ≥ -30 dBm, at 1 code channel, relative to signal with origin offset of -30 dBc ± 0.50 dB	
	Waveform display	Displays the following items for 1 CH to multi-CH input signal. Constellation display, Eye pattern display, Vector error vs. Chip no. display, Phase error vs. Chip no. display, Amplitude error vs. Chip no. display		
Code domain analysis	Frequency range	50 MHz to 3 GHz 50 MHz to 2.3 GHz (with MS2681A-08/MS2683A-08)	50 MHz to 3 GHz	
	Measurement level range	-60 to +30 dBm (average power, pre-amp off) -80 to +10 dBm (average power, pre-amp on)	-50 to +30 dBm (average power)	
	Code domain power accuracy	Input level: ≥ -10 dBm (pre-amp off), ≥ -20 dBm (pre-amp on) ± 0.1 dB (code power ≥ -10 dB) ± 0.3 dB (code power ≥ -25 dB)	Input level: ≥ -10 dBm ± 0.1 dB (code power ≥ -10 dBc) ± 0.3 dB (code power ≥ -25 dBc)	
	Code domain error	Input level: ≥ -10 dBm (pre-amp off), ≥ -20 dBm (pre-amp on) Spread factor: 512 (down-link)/256 (up-link) Residual error: < -50 dB Measurement accuracy: ± 0.5 dB (at error of -30 dBc)	Input level: ≥ -10 dBm Spread factor: 512 (down-link)/256 (up-link) Residual error: < -50 dB Measurement accuracy: ± 0.5 dB (at error of -30 dBc)	
	Display function	Code domain power, code domain error Spread factor: 4 to 256 (up-link)/4 to 512 (down-link) IQ separately displayed at up-link Automatic spreading factor detection function available SCH level measuring function available		
	Code vs. slot measurement	Measures code domain power for each slot of specified code channel up to 150 slots (applicable to compressed mode of down link)		
Amplitude measurement	Frequency range	50 MHz to 3 GHz 50 MHz to 2.3 GHz (with MS2681A-08/MS2683A-08)	50 MHz to 3 GHz	
	Measurement level range	-60 to +30 dBm (average power): pre-amp off -80 to +10 dBm (average power): pre-amp on	-50 to +30 dBm (average power)	
	Tx power measurement range	-20 to +30 dBm (average power): pre-amp off -20 to +10 dBm (average power): pre-amp on	-20 to +30 dBm (average power)	
	Tx power measurement accuracy	± 0.40 dB	± 0.40 dB	
	Power measurement linearity	Input level: ≥ -10 dBm (pre-amp off), ≥ -20 dBm (pre-amp on), unchanged reference level setup after range adjustment ± 0.20 dB (0 to -40 dB)	Input level: ≥ -10 dBm, unchanged reference level setup after range adjustment ± 0.20 dB (0 to -30 dB)	
	Filter selection function	Enables the measurement of the value of the power passed through the RRC ($\alpha = 0.22$)		
	Transmitter power control measurement function	Displays relative power for each slot of maximum 150 slots. Pass/Fail judgment function available.		
	RACH measuring function	Measures the time difference between preamble RACH signal and message RACH signal		

Model	MS2681A	MS2683A	MS2687B
Occupied bandwidth measurement	Frequency range	50 MHz to 3 GHz	
	Measurement level range	-60 to +30 dBm (average power): pre-amp off -80 to +10 dBm (average power): pre-amp on	
	Measurement method	Sweep method: After measuring the signal with the sweep type spectrum analyzer, performs calculation and displays the result. FFT Method: After analyzing the signal with FFT, performs calculation and displays the result.	
Adjacent channel power	Frequency range	50 MHz to 3 GHz 50 MHz to 2.3 GHz (with MS2681A-08/MS2683A-08)	50 MHz to 3 GHz
	Input level range	-10 to +30 dBm (average power): pre-amp off	
	Measurement method	Sweep method (all): After measuring the signal with the sweep type spectrum analyzer, performs calculation and displays the result. Sweep method (separate): After measuring adjacent channel and the channel next to the adjacent channel with the sweep type spectrum analyzer, performs calculation and displays the result. Filter method: Measures power at adjacent channel and at the channel next to the adjacent channel after it passes the built-in receive filter (RRC: $\alpha = 0.22$) and displays the value.	
	Measurement range	Input level: ≥ 0 dBm, filter method, in broad dynamic range mode At code channel 1CH 5 MHz offset: ≥ 55 dBc, 10 MHz offset: ≥ 62 dBc At multiple code channel 16CH (only with Option 08) 5 MHz offset: ≥ 50 dBc, 10 MHz offset: ≥ 60 dBc Input level: ≥ -10 dBm, filter method, in broad dynamic range mode At code channel 1CH 5 MHz offset: 55 dBc Typical, 10 MHz offset: 62 dBc Typical At multiple code channel 16CH 5 MHz offset: 50 dBc Typical, 10 MHz offset: 60 dBc Typical	Input level: 0 dBm, filter method, in broad dynamic range mode At code channel 1CH 5 MHz offset: ≥ 55 dBc, 10 MHz offset: ≥ 62 dBc At multiple code channel 16CH 5 MHz offset: ≥ 55 dBc, 10 MHz offset: ≥ 60 dBc Input level: ≥ -10 dBm, filter method, in broad dynamic range mode At code channel 1CH 5 MHz offset: 55 dBc Typical, 10 MHz offset: 62 dBc Typical At multiple code channel 16CH 5 MHz offset: 50 dBc Typical, 10 MHz offset: 60 dBc Typical
Spurious measurement	Measurement frequency range	9 kHz to 3.0 GHz (except within ± 50 MHz of carrier frequency)	9 kHz to 7.8 GHz (except within ± 50 MHz of carrier frequency)
	Input level range (Tx power)	0 to +30 dBm (average power): pre-amp off	
	Measurement method	Sweep method: After sweeping the designated frequency range with the spectrum analyzer, detects the peak value and displays it. Calculates the ratio with the transmitted power value, which is the power ratio, and displays it. Detection mode should be AVERAGE. Spot method: After measuring the designated frequency in time domain of the spectrum analyzer, displays the average value. Calculates the ratio with the transmitted power value, which is the power ratio, and displays it. Detection mode should be AVERAGE. Search method: After sweeping the designated frequency range with the spectrum analyzer and detecting the peak value, measures the frequency in time domain, and displays the average value. Calculates the ratio with the transmitted power value, which is the power ratio, and displays it. Detection mode should be AVERAGE.	
	Measurement range (typical)	Carrier frequency: 1800 to 2200 MHz When carrier frequency is in a 2030.354 to 2200 MHz range, spurious will be generated at the frequency below. $f(\text{spurious}) = f(\text{in}) - 2030.345 \text{ MHz}$	≥ 79 dB (RBW: 1 kHz, 9 kHz to 150 kHz, band 0) ≥ 79 dB (RBW: 10 kHz, 150 kHz to 30 MHz, band 0) ≥ 79 dB (RBW: 100 kHz, 30 MHz to 1 GHz, band 0) $\geq 76 - f$ [GHz] dB (RBW: 1 MHz, 1 GHz to 3.15 GHz, band 0) ≥ 76 dB (RBW: 1 MHz, 3.15 GHz to 7.8 GHz, band 1)

Model		MS2681A	MS2683A	MS2687B
Spectrum emission mask measurement		After measuring the signal with the sweep type spectrum analyzer, performs judgment with template and displays it.		
Demodulation measurement		Maximum ten frames data of the designated code channel After De-Spreading is outputted.		
CCDF measurement	Frequency range	50 MHz to 3 GHz 50 MHz to 2.3 GHz (with MS2681A-08/MS2683A-08)		50 MHz to 3 GHz
	Measurement level range	-60 to +30 dBm (average power): pre-amp off -80 to +10 dBm (average power): pre-amp on		-50 to +30 dBm (average power)
	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	20 MHz, 10 MHz, 5 MHz, 3 MHz, RRC: $\alpha = 0.22$, RC: $\alpha = 0.22$		
Electric performance (IQ input)	Input impedance	1 M Ω (parallel capacitance: <100 pF), 50 Ω		
	Balance input	With MS2681A-17/MS2683-17A Differential voltage: 0.1 to 1 Vp-p (input terminals) In-phase voltage: ± 2.5 V(input terminals)		—
	Unbalance Input	With MS2681A-18/MS2683A-18/MS2687B-18 0.1 to 1 Vp-p (input terminals) DC/AC coupling: Changeable		
	Measurement items	Modulation accuracy, code domain power, amplitude, occupied bandwidth (FFT method), IQ level		
	Modulation accuracy measurement residual vector error	Input level: ≥ 0.1 V (rms) <2 %(rms), DC coupling		
	IQ level measurement	Measures 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.		



Ordering Information

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

Model/Order No.	Name
	Main frame
MX268101B	W-CDMA Measurement Software (For MS2681A)
MX268301B	W-CDMA Measurement Software (For MS2683A)
MX268701B	W-CDMA Measurement Software (For MS2687B)
	Standard accessories
JT32MA3-NT1	PC-ATA card (32 MB, for backup): 1 pc
W1746AE	W-CDMA Measurement Software operation manual: 1 copy



Specifications are subject to change without notice.

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