

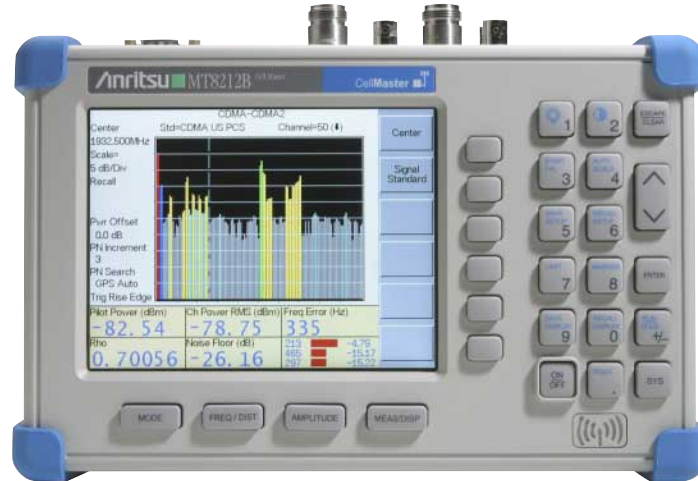
## CELL MASTER MT8212B

25 MHz to 4.0 GHz



*A Multi-Function Base Station Test Tool for Greater Flexibility and Technician Productivity*

**NEW**



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Cell Master MT8212B is a comprehensive, one-box base station test tool for deploying, maintaining and troubleshooting wireless base stations. Combining the functionality of a cable and antenna analyzer (25 MHz to 4.0 GHz), spectrum analyzer (100 kHz to 3.0 GHz), power meter (4.5 MHz to 3.0 GHz), interference analyzer, channel scanner, transmission analyzer for 2-port devices, transmitter analyzer (CDMA and GSM), GPS receiver and T1/E1 analyzer into one lightweight, handheld test set - eliminates the need for field engineer and field technician to carry, manage and learn multiple test sets. MT8212B measurement capability includes precision return loss, VSWR, cable loss, distance-to-fault, signal identification, interference analysis, channel power, adjacent channel power ratio, field strength, occupied bandwidth, burst power, code domain power, noise floor, voltage peak to peak, listen to DS0 or VF channel access. Patented RF interference rejection enables accurate, repeatable measurements in the presence of high RF activity. PC data analysis software enables assessment of system trends, problems, and performance in addition to professional report generation. Built-in GPS to store traces with location information (latitude, longitude and altitude).

The MT8212B includes PC data analysis software, soft carrying case, rechargeable battery, AC/DC power supply, 12V automotive cigarette lighter adapter, RS232 null modem serial cable and user's guide.

### Features

- Handheld, battery-operated, under 5 lbs (2.28 kg), including battery
- Rechargeable, snap-in field replaceable battery
- Withstands repeated drops and rough handling
- Built-in worldwide signal standards and frequency channels
- Multilingual user interface: English, French, Chinese, Japanese, Spanish, German

- Intuitive and easy to use with on-screen test set-ups and single key functions
- No external power sensor required for power meter measurements
- Store/Recall 25 setup configurations and up to 200 traces
- Alphanumeric labeling and automatic time/date stamp of saved measurements
- 6 markers, limit line, and segmented limit lines
- Trace overlay, trace math
- Superior immunity to RF interference
- 130, 259 and 517 data points for optimal resolution and long range fault locations
- FlexCal™ allows troubleshooting cable and antenna systems without multiple calibrations and calibration setups
- < 500 msec per sweep to identify real time intermittent cable problems
- ± 0.5 dB typical amplitude accuracy power measurements
- -135 dBm typical DANL
- Interference analysis
- T1 and E1 histograms
- Using built-in GPS store traces with location information.
- Using Over The Air measurement demodulate CDMA signals sitting in the truck or car.

### Handheld PC Software Analysis Tools Features

- Transfer traces with a single menu selection
- Stores an unlimited number of data traces for comparison to historical performances
- Cable editor supports downloading and uploading cable list and saving as a file
- Distance-to-fault and Smith Chart analysis

## Specifications\*1

### Cable and Antenna Analyzer

Frequency	Range	25 MHz to 4.0 GHz
	Accuracy	± 75 ppm @ +25°C
	Resolution	100 kHz
Output Power	< 0 dBm (-10 dBm nominal)	
Immunity to Interfering Signals	on-channel <sup>2</sup>	+17 dBm
	on-frequency <sup>3</sup>	-5 dBm
Measurement speed	≤3.5 msec / data point (CW ON)	
Number of data points	130, 259, 517	
Return Loss	Range	0.00 to 60.00 dB
	Resolution	0.01 dB
VSWR	Range	1.00 to 65.00
	Resolution	0.01
Cable Loss	Range	0.00 to 30.00 dB
	Resolution	0.01 dB
Measurement Accuracy	> 42 dB corrected directivity after calibration	
Distance-To-Fault	Vertical Range	Return Loss: 0.00 to 60.00 dB VSWR: 1.00 to 65.00
	Horizontal Range	Range: 0 to (# of data pts -1) x Resolution to a maximum of 1197m (3929 ft), # of data pts = 130, 259, 517
	Horizontal Resolution (Rectangular windowing)	Resolution (meter) = $(1.5 \times 10^8) \times (Vp)/DF$ Where Vp is the cable's relative propagation velocity and where DF is the stop frequency minus the start frequency (in Hz)

### Spectrum Analyzer

Frequency	Range	100 kHz to 3.0 GHz
	Reference (Internal Timebase)	Aging: ± 1 ppm/yr Accuracy: ± 2 ppm
	Span	10 Hz to 2.99 GHz in 1, 2, 5 step selections in auto mode, plus zero span
	Sweep Time	≤1.1 sec full span; ≤50 µsec to 20 sec zero span
	Resolution Bandwidth (-3 dB)	100 Hz to 1 MHz in 1-3 sequence ± 5% Accuracy
	Video Bandwidth (-3 dB)	3 Hz to 1 MHz in 1-3 sequence ± 5% Accuracy
	SSB Phase Noise (1 GHz) @ 30 kHz Offset	≤-75 dBc/Hz
	Spurious Responses Input Related	≤-45 dBc
	Spurious Residual Responses	≤-90dBm, ≥10 MHz (10 kHz RBW, pre-amp on)
Amplitude	Total Level Accuracy	±1 dB typical (±1.5 dB max), >10 MHz to 3 GHz ±2 dB typical <10 MHz for input signal levels ≥-60 dBm, excluding input VSWR mismatch
	Measurement Range	+20 dBm to -135 dBm
	Input Attenuator Range	0 to 51 dB, selected manually or automatically coupled to the reference level. Resolution in 1 dB steps.
	Displayed Average Noise Level	≤-135 dBm, >10 MHz (preamp on) ≤-115 dBm (preamp off) for input terminated, 0 dB attenuation, RMS detection, 100 Hz RBW
	Dynamic Range	>65 dB typical
	Display Range	1 to 15 dB/division, in 1 dB steps, 10 divisions displayed
	Scale Units	dBm, dBV, dBmV, dBµV, V, W
	RF Input VSWR	(with 20 dB atten.) 1.5:1 typical, (10 MHz to 2.4 GHz)

### Power Meter

Frequency Range	4.5 MHz to 3.0 GHz
Display Range	-80 dBm to +80 dBm
Measurement Range	-80 dBm to +20 dBm (+80 dBm with external attenuator)
Offset Range	0 to +60 dB
Accuracy	±1 dB typical (±1.5 dB max), ≥10 MHz to 3 GHz (excludes input VSWR)
VSWR	1.5:1 typical (Pin > -30 dBm, >10 MHz to 2.4 GHz)
Maximum Power	20 dBm (0.1W) without external attenuator

## T1 Analyzer (Option 50)

Line Coding	AMI, B8ZS
Framing Modes	D4 (Superframe), ESF (Extended Superframe)
Connection Configurations	Terminate (100 Ω) Bridge (≥1000 Ω) Monitor (Connect via 20 dB pad in DSX)
Receiver Sensitivity	0 to -36 dBdsx
Transmit Level	0 dB, -7.5 dB, and -15 dB
Clock Sources	External Internal: 1.544 MHz ± 30 ppm
Pulse Shapes	Conform to ANSI T1.403
Pattern Generation and Detection	PRBS: 2-9, 2-11, 2-15, 2-20, 2-23 Inverted and non-inverted, QRSS, 1-in-8 (1-in-7), 2-in-8, 3-in-24, All ones, All zeros, T1-Daly, User defined (≤32 bits)
Circuit Status Reports	Carrier present, Frame ID and Sync., Pattern ID and Sync.
Alarm Detection	AIS (Blue Alarm), RAI (Yellow Alarm)
Error Detection	Frame Bits, Bit, BER, BPV, CRC, Error Sec
Error Insertion	Bit, BPV, Framing Bits, RAI, AIS
Loopback Modes	Self loop, CSU, NIU, User defined, In-band or Data Link
Level Measurements	Vp-p (± 5%)
Data Log	Continuous, up to 48 hrs
DS0 Channel Access	Tone Generator: Frequency: 100 Hz to 3000 Hz Level: -30 to 0 dBm, 1 dB steps Audio Monitor: Manually select channel 1-24
VF Measurement	Frequency: 100 Hz to 3000 Hz ±2 Hz Level: -40.0 to +3.0 dBm ±0.2 dBmI

## E1 Analyzer (Option 50)

Line Coding	AMI, HDB3
Framing Modes	PCM30, PCM30CRC, PCM31, PCM31CRC
Connection Configurations	Terminate (75, 120 Ω) Bridge (≥1000 Ω) Monitor (Connect via 20 dB pad in DSX)
Receiver Sensitivity	0 to -43 dB
Clock Sources	External Internal 2.048 MHz ± 30 ppm
Pulse Shapes	Conform to ITU G.703
Pattern Generation and Detection	PRBS: 2-9, 2-11, 2-15, 2-20, 2-23 Inverted and non-inverted, QRSS, 1-in-8 (1-in-7), 2-in-8, 3-in-24, All ones, All zeros, T1-Daly, User defined (≥32 bits)
Circuit Status Reports	Carrier present, Frame ID and Sync., Pattern ID and Sync.
Alarm Detection	AIS, RAI, MMF
Error Detection	Frame Bits, Bit, BER, BPV, CRC, E-Bits, Error Sec
Error Insertion	Bit, BPV, Framing Bits, RAI, AIS
Loopback Modes	Self loopback
Level Measurements	Vp-p (± 5%), can also display in dBdsx
Data Log	Continuous, up to 48 hrs
E1 Frequency	±10 ppm
VF Channel Access	Tone Generator: Frequency: 100 Hz to 3000 Hz Level: -30 to 0 dBm Audio Monitor: Manually select channel 1-31
VF Measurement	Frequency: 100 Hz to 3000 Hz ±2 Hz Level: -40.0 to +3.0 dBm ±0.2 dBmI

## Channel Scanner (Option 27)

Frequency Range	100 kHz to 3.0 GHz
Frequency Accuracy	±10 Hz + Time base error, 99% Confidence level

## AM/FM/SSB Demodulator

Standard speaker and headphone jack
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## Transmission Measurement (Option 21)

RF Source	Frequency Range	25 MHz to 3 GHz
	Frequency Resolution	10 Hz
	Output Power Level	-10 dBm typical (up to -90 dBm with external attenuator)
	Dynamic Range	80 dB, 25 MHz to 1 GHz 60 dB, >1 GHz to 3 GHz
	Output Impedance	50 Ω

## RF Measurements - GSM (Option 40)

Occupied Bandwidth	Bandwidth within which 0-99% of the power transmitted on a single channel lies or 0 to -120 dBc to the down the skirts of the signal.
Channel power	±1 dB typical (±1.5 dB max)
Burst power	±1 dB typical for -20 dBm to +20 dBm (±1.5 dB max) ±1.75 dB typical for -80 dBm to -20 dBm (±2 dB max)
Carrier frequency	99% confidence level
Frequency error	±10 Hz + Time base error

## RF Measurements - CDMA (Option 42)

Occupied Bandwidth	Bandwidth within which 0-99% of the power transmitted on a single channel lies
Channel power	±1 dB typical (±1.5 dB max)
Carrier frequency	99% confidence level
Frequency error	±50 Hz + Time base error

## Demodulator - cdmaOne and cdma2000 1xRTT (Option 43)

Residual rho	≥0.98 for RF input from +20dBm to -48 dBm
Rho accuracy	±0.01 for ρ ≥0.9
Code domain power (CDP)	Accurate to within ±1.5 dB above -20dB for RF input from +20dBm to -48 dBm CDP can be displayed for RF input from +20 dBm to -90 dBm
Carrier Frequency Error	±100 Hz 99% confidence level
Power accuracy	±1 dB typical (±1.5 dB absolute)
PN Offset	Within 1 x 64 chips
Pilot power	±1.5 dB typical

## OTA - cdmaone and cdma2000 1xRTT (Option 33) Requires option 31 and 43

Three strongest pilots with Ec/Io
Two multipaths relative to strongest pilot

## GPS (Option 31)

GPS Location Indicator
Latitude, Longitude and Altitude on Display
Latitude, Longitude, Altitude with Trace Storage

## Interference Analyzer (Option 25)

Audible tone
Strength of the Interferer
RSSI
Spectrogram

## General

Language Support	English, Spanish, French, German, Chinese, Japanese	
Internal Trace Memory	Up to 200 traces	
Setup Configuration*4	25	
Display	TFT Color display, viewable in sunlight	
Input and Output Ports	RF Out Maximum Input without Damage	Type N, female, 50 Ω +20 dBm, ± 50 VDC
	RF In Maximum Input without Damage	Type N, female, 50 Ω +43 dBm (Peak), ± 50 VDC
	Ext. Trig In	BNC, female (5V TTL)
	Ext. Freq Ref In (2 to 20 MHz)	Shared BNC, female, 50 Ω, (-15 dBm to +10 dBm)
	T1/E1 (Receive & Transmit)	Bantam Jacks
	Serial Interface	RS-232 9 pin D-sub, three wire serial
	GPS antenna connector	Reverse BNC female
	CDMA Timing Input	BNC female (5V TTL)
Electromagnetic Compatibility	Meets European Community requirements for CE marking	
Safety	Conforms to EN 61010-1 for Class 1 portable equipment	
Temperature	Operating	-10°C to 50°C, humidity 85% or less
	Non-operating	-51°C to +71°C (recommend battery be stored separately between 0°C to +40°C for any prolonged non-operating storage period)
Power Supply	External DC Input	+12 to +15 VDC, 1500 mA
	Internal	NiMH battery: 10.8 volts, 1800 mA maximum
Dimensions	Size	25.4 cm x 17.8 cm x 6.1 cm (10.0 in x 7.0 in x 2.4 in)
	Weight	<2.28 kg (<5 lbs) includes battery

\*1: All specifications apply when calibrated at ambient temperature after a five minute warm up.

\*2: On-Channel interference immunity is specified to within 1 MHz of the carrier frequency.

\*3: On-Frequency interference immunity is specified to within +10 kHz of the carrier frequency.

\*4: Calibration stored with instrument configuration.

## Ordering Information

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

Model/Order No.	Name
MT8212B	Cable & Antenna Analyzer (25 MHz to 4.0 GHz), with Built-in DTF, Spectrum Analyzer (10 MHz to 3.0 GHz), Power Meter, T1/E1 Analyzer, AM/FM/SSB Demodulator
	<b>Options</b>
Option 21	Transmission Measurement
Option 25	Interference Analyzer (requires directional antenna)
Option 27	Channel Scanner
Option 31	GPS
Option 33	cdmaOne and cdma2000 1xRTT Over The Air (OTA) (requires options 31 and 43)
Option 40	RF Measurements-GSM
Option 42	RF Measurements-CDMA
Option 43	cdmaOne and cdma2000 1xRTT demodulator
Option 50	T1/E1 Analyzer
	<b>Standard Accessories Include</b>
	User's Guide
	Soft Carrying Case
	AC-DC Adapter with Power Cord
	Automotive Cigarette Lighter/12 Volt DC Adapter
	One Year Warranty
	Handheld Software Tools
	Serial Interface Cable
	Rechargeable Battery, NiMH
	<b>Optional Accessories</b>
1N50C	Limitter, N(m) to N(f), 50Ω, 10 MHz to 18 GHz
42N50-20	Attenuator, 20 dB, 5 watt, DC to 18 GHz, N(m)-N(f)
42N50A-30	Attenuator, 30 dB, 50 watt, DC to 18 GHz, N(m)-N(f)
SC7179	Variable Attenuator, DC to 2 GHz, 0-90 dB, N(m)-N(f)
ICN50	InstaCal™ Calibration Module, 2 MHz to 4.0 GHz, N(m), 50Ω
22N50	Open/Short, DC to 18 GHz, N(m), 50Ω
22NF50	Open/Short, DC to 18 GHz, N(f), 50Ω
SM/PL	Precision Load, DC to 4 GHz, 42 dB, N(m), 50Ω
SM/PLNF	Precision Load, DC to 4 GHz, 42 dB, N(f), 50Ω
OSLN50LF	Precision Open/Short/Load, DC to 4 GHz, 42 dB, 50Ω, N(m)
OSLNF50LF	Precision Open/Short/Load, DC to 4 GHz, 42 dB, 50Ω, N(f)
2000-767	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(m), 50Ω
2000-768	Precision Open/Short/Load, DC to 4 GHz, 7/16 DIN(f), 50Ω
15NN50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NN50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(m), 6 GHz, 50Ω
15NNF50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-3.0C	Test Port Cable Armored, 3.0 meters, N(m)-N(f), 6 GHz, 50Ω
15NNF50-5.0C	Test Port Cable Armored, 5.0 meters, N(m)-N(f), 6 GHz, 50Ω
15ND50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-7/16 DIN(m), 6 GHz, 50Ω
15NDF50-1.5C	Test Port Cable Armored, 1.5 meters, N(m)-7/16 DIN(f), 6 GHz, 50Ω

Model/Order No.	Name
34NN50A	Precision Adapter, N(m)-N(m), DC to 18 GHz, 50Ω
34NFNF50	Precision Adapter, N(f)-N(f), DC to 18 GHz, 50Ω
1091-26	Adapter, N(m)-SMA(m), DC to 18 GHz, 50Ω
1091-27	Adapter, N(m)-SMA(f), DC to 18 GHz, 50Ω
1091-80	Adapter, N(f)-SMA(m), DC to 18 GHz, 50Ω
1091-81	Adapter, N(f)-SMA(f), DC to 18 GHz, 50Ω
1091-172	Adapter, N(m)-BNC(f), DC to 1.3 GHz, 50Ω
510-90	Adapter, 7/16 DIN(f)-N(m), DC to 7.5 GHz, 50Ω
510-91	Adapter, 7/16 DIN(f)-N(f), DC to 7.5 GHz, 50Ω
510-92	Adapter, 7/16 DIN(m)-N(m), DC to 7.5 GHz, 50Ω
510-93	Adapter, 7/16 DIN(m)-N(f), DC to 7.5 GHz, 50Ω
510-96	Adapter, 7/16 DIN(m)-7/16 DIN(m), DC to 7.5 GHz, 50Ω
510-97	Adapter, 7/16 DIN(f)-7/16 DIN(f), DC to 7.5 GHz, 50Ω
510-102	Adapter, N(m)-N(m) 90° right angle, DC to 11 GHz, 50Ω
2000-1030	Portable Antenna, SMA (m), 1.71 to 1.88 GHz, 50Ω
2000-1031	Portable Antenna, SMA (m), 1.85 to 1.99 GHz, 50Ω
2000-1032	Portable Antenna, SMA (m), 2.4 to 2.5 GHz, 50Ω
2000-1200	Portable Antenna, SMA (m), 806-866 MHz, 50Ω
2000-1035	Portable Antenna, SMA (m), 896-941 MHz, 50Ω
2000-1410	Magnet Mount GPS Antenna with 15 ft. cable
2000-1411	Portable YAGI Antenna, N(f), 822-900 MHz, 10 dBd
2000-1412	Portable YAGI Antenna, N(f), 885-975 MHz, 10 dBd
2000-1413	Portable YAGI Antenna, N(f), 1.71-1.88 GHz, 10 dBd
2000-1414	Portable YAGI Antenna, N(f), 1.85-1.99 GHz, 9.3 dBd
2000-1415	Portable YAGI Antenna, N(f), 2.4-2.5 GHz, 12 dBd
2000-1416	Portable YAGI Antenna, N(f), 1.92-2.23 GHz, 12 dBd
806-16	Bantam Plug to Bantam Plug
806-116	Bantam Plug to BNC
806-117	Bantam "Y" Plug to RJ48
551-1691	USB to RS-232 adapter cable
48258	Soft Carrying Case
760-229	Transit Case
633-27	Rechargeable Battery, NiMH
2000-1029	Battery Charger, NiMH, w/ Universal Power Supply
40-115	AC/DC Adapter
806-62	Automotive Cigarette Lighter/12 Volts DC Adapter
800-441	Serial Interface Cable
2300-347	Software Tools
10580-00089	Cell Master User's Guide (for Model MT8212B)
10580-000106	Cell Master Programming Manual (for Model MT8212B)
10580-000107	Cell Master Maintenance Manual (for Model MT8212B)
	<b>Printers</b>
2000-1214	HP DeskJet Printer, Model 450: Includes printer cable, 2000-1216 black print cartridge and U.S. power cord. Also includes 2000-753 serial-to-parallel Centronics converter cable and 1091-310 Centronics-to DB25 adapter. Rechargeable battery is optional and is not included. Null Modem Serial-to-Parallel Centronics Converter Cable
2000-753	Adapter 36-pin Centronics female-to-DB25 female
1091-310	Black Print Cartridge
2000-1216	Power Cable (Europe) for DeskJet Printer
2000-663	Power Cable (Australia) for DeskJet Printer
2000-664	Power Cable (S. Africa) for DeskJet Printer
2000-667	Rechargeable Battery for DeskJet Printer, Model 450
2000-1217	Power Cable (U.K.) for DeskJet Print