

Cell Master™

Compact Handheld Base Station Analyzer

MT8212E

2 MHz to 4 GHz Cable & Antenna Analyzer

100 kHz to 4 GHz Spectrum Analyzer

Introduction

Anritsu introduces its latest generation compact handheld Base Station Analyzer for installation and maintenance of wireless networks. Designed as a lightweight base station tester meeting virtually all testing needs by an RF technician. The Cell Master features Signal Analyzer options for 2G and 3G cellular networks and WiMAX fixed and mobile networks.

Cable and Antenna Analyzer Highlights

- Measurements: RL, VSWR, Cable Loss, DTF, Phase
- 2-port Transmission Measurement: High/Low Power
- Sweep Speed: 1 msec/data point, typical
- Display : Single or Dual Measurement Touchscreen
- Calibration: OSL, InstaCal™, and FlexCal™
- Bias Tee: 32 V internal

Spectrum and Interference Analyzer Highlights

- Measurements: Occupied Bandwidth, Channel Power, ACPR, C/I
- Interference Analyzer: Spectrogram, Signal Strength, RSSI, Signal ID
- Dynamic Range: > 95 dB in 1 Hz RBW
- DANL: -152 dBm in 10 Hz RBW
- Phase Noise: -100 dBc/Hz max @ 10 kHz offset at 1 GHz
- Frequency Accuracy: < ±50 ppb with GPS On

Capabilities and Functional Highlights

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|-------------------------|--------------------------------|----------------------------------|---------------------------------|
| • GSM/EDGE | • CW Signal Generator | • Internal Power Meter | • E1, T1, T3 Backhaul Analyzer |
| • W-CDMA/HSDPA | • Gated Sweep | • High Accuracy Power Meter | • < 5 minute warm-up time |
| • TD-SCDMA/HSDPA | • GPS tagging of stored traces | • 4, 6, 8, 18 GHz USB Sensors | • 3 hour battery operation time |
| • CDMA, EV-DO | • Up to 2204 Data Points | • Channel Scanner | • USB Data Transfer |
| • WiMAX - Fixed, Mobile | • Touchscreen keyboard | • Internal Preamplifier standard | • Master Software Tools |



*Cell Master™ MT8212E Base Station Analyzer featuring 8.4" Daylight Viewable Touchscreen
Compact Size: 273 x 199 x 91mm, (10.7 x 7.8 x 3.6 in), Lightweight: 3.71 kg, (8.2 lbs)*

Cell Master™ MT8212E Base Station Analyzer Specifications



Cable and Antenna Analyzer

Measurements

Measurements	VSWR
	Return Loss
	Cable Loss
	Distance-to-Fault (DTF) Return Loss
	Distance-to-Fault (DTF) VSWR
	1-Port Phase
	Smith Chart

Setup Parameters

Measurement Display	Single/Dual Measurement Display with independent markers
Frequency	Start/Stop, Signal Standard, Start Cal
DTF	Start/Stop, DTF Aid, Units (m/ft), Cable Loss, Propagation Velocity, Cable, Windowing
Windowing	Rectangular, Normal Side Lobe, Low Side Lobe, Minimum Side Lobe
Amplitude	Top, Bottom Auto Scale, Full Scale
Sweep	Run/Hold, Single/Continuous, RF Immunity (High/Low), Data Points, Averaging/Smoothing, Output Power (High/Low)
Data Points	137, 275, 551, 1102, 2204
Markers	Markers 1-6 (On/Off), Delta Markers 1-6 (On/Off), Marker to Peak/Valley, Marker Table
Traces	Recall, Copy to Display Memory, No Trace Math, Trace $\pm$ Memory, Trace Overlay
Limit Line	On/Off, Single Limit, Multi-segment (41), Limit Alarm, Clear
Calibration	Start Cal, Cal Type (Standard/FlexCal™)
Save/Recall	Setups, Measurements, Screen Shots Jpeg (save only)

Frequency

Frequency Range	2 MHz to 4 GHz
Frequency Accuracy	$\leq \pm 2.5$ ppm @ 25 °C
Frequency Resolution	1 kHz, (RF immunity low) 100 kHz, (RF immunity high)

Output Power

High	0 dBm, typical
Low	-30 dBm, typical

Interference Immunity

On-Channel	+17 dBm @ >1.0 MHz from carrier frequency
On-Frequency	0 dBm within ± 10 kHz of the carrier frequency

Measurement Speed

Return Loss	≤ 1.00 msec/data point, RF immunity low, typical
Distance-to-Fault	≤ 1.25 msec/data point, RF immunity low, typical

Return Loss

Measurement Range	0 to 60 dB
Resolution	0.01 dB

VSWR

Measurement Range	1 to 65
Resolution	0.01

Cable Loss

Measurement Range	0 to 30 dB
Resolution	0.01 dB

Distance-to-Fault

Vertical Range Return Loss	0 to 60 dB
Vertical Range VSWR	1 to 65
Fault Resolution (meters)	$(1.5 \times 10^8 \times v_p) / \Delta F$ (v_p = velocity propagation constant, ΔF is F2-F1 in Hz)
Horizontal Range (meters)	0 to (Data Points-1) x Fault Resolution, to a maximum of 1500 meters (4921 ft)

Cell Master™ MT8212E Base Station Analyzer Specifications



Cable and Antenna Analyzer (continued)

1-Port Phase

Measurement Range	-180° to +180°
Resolution	0.01°

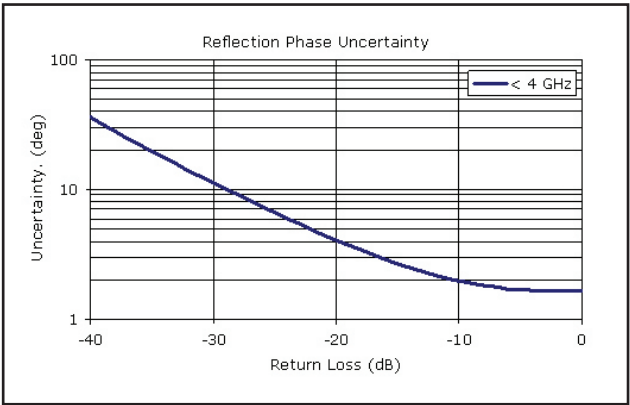
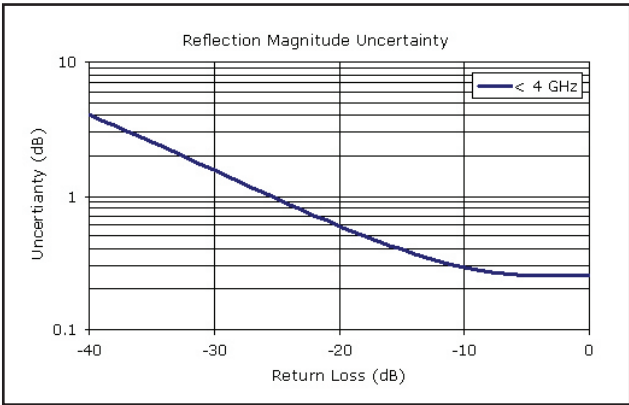
Smith Chart

Resolution	0.01
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Measurement Accuracy

Corrected Directivity	>42 dB, OSL Calibration
	>38 dB, InstaCal™ Calibration

Measurement Uncertainty



Cell Master™ MT8212E Base Station Analyzer Specifications



Spectrum Analyzer

Measurements

Smart Measurements	Field Strength (uses antenna calibration tables to measure dBm/m ² or dBmV/m) Occupied Bandwidth (measures 99% to 1% power channel of a signal) Channel Power (measures the total power in a specified bandwidth) ACPR (adjacent channel power ratio) AM/FM/SSB Demodulation (wide/narrow FM, USB and LSB), (audio out only) C/I (carrier-to-interference ratio)
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Setup Parameters

Frequency	Center/Start/Stop, Span, Frequency Step, Signal Standard, Channel #
Amplitude	Reference Level (RL), Scale, Attenuation Auto/Level, RL Offset, Pre-Amp On/Off, Detection
Span	Span, Span Up/Down (1-2-5), Full Span, Zero Span, Last Span
Bandwidth	RBW, Auto RBW, VBW, Auto VBW, RBW/WBW, Span/RBW
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Limit Lines, Screen Shots Jpeg (save only), Save-on-Event
Save-on-Event	Crossing Limit Line, Sweep Complete, Save-then-Stop, Clear All
Delete	Selected File, All Measurements, All Mode Files, All Content
Directory Management	Sort Method (Name/Type/Date), Ascend/Descend, Internal/USB, Copy, Format USB
Application Options	Bias-Tee (On/Off), Impedance (50 Ω , 75 Ω , Other)

Sweep Functions

Sweep	Single/Continuous, Manual Trigger, Reset, Detection, Minimum Sweep Time, Trigger Type, Gated Sweep (see Option 0090)
Detection	Peak, RMS, Negative, Sample, Quasi-peak
Triggers	Free Run, External, Video, Change Position, Manual

Trace Functions

Traces	Up to three Traces (A, B, C), View/Blank, Write/Hold, Trace A/B/C Operations
Trace A Operations	Normal, Max Hold, Min Hold, Average, # of Averages, (always the live trace)
Trace B Operations	A $\rightarrow$ B, B $\leftarrow$ C, Max Hold, Min Hold
Trace C Operations	A $\rightarrow$ C, B $\leftarrow$ C, Max Hold, Min Hold, A - B $\rightarrow$ C, B - A $\rightarrow$ C, Relative Reference (dB), Scale

Marker Functions

Markers	Markers 1-6 each with a Delta Marker, or Marker 1 Reference with Six Delta Markers, Marker Table (On/Off), All Markers Off
Marker Types	Style (Fixed/Tracking), Noise Marker, Frequency Counter Marker
Marker Auto-Position	Peak Search, Next Peak (Right/Left), Peak Threshold %, Set Marker to Channel, Marker Frequency to Center, Delta Marker to Span, Marker to Reference Level
Marker Table	1-6 markers frequency and amplitude plus delta markers frequency amplitude and offset

Limit Line Functions

Limit Lines	Upper/Lower, On/Off, Edit, Move, Envelope, Advanced, Limit Alarm, Default Limit
Limit Line Edit	Frequency, Amplitude, Add Point, Add Vertical, Delete Point, Next Point Left/Right
Limit Line Move	To Current Center Frequency, By dB or Hz, To Marker 1, Offset from Marker 1
Limit Line Envelope	Create Envelope, Update Amplitude, Points (41 max), Offset, Shape Square/Slope
Limit Line Advanced	Type (Absolute/Relative), Mirror, Save/Recall

Frequency

Frequency Range	100 kHz to 4 GHz (usable to 0 Hz)
Maximum Continuous Input	+26 dBm
Tuning Resolution	1 Hz
Frequency Reference	Aging: ± 1.0 ppm/year Accuracy: ± 1.5 ppm (25 $^{\circ}$ C ± 25 $^{\circ}$ C) + aging, < ± 50 ppb with GPS On
Frequency Span	10 Hz to 4 GHz including zero span
Sweep Time	Minimum 100 ms, 10 μ s to 600 seconds in zero span
Sweep Time Accuracy	$\pm 2\%$ in zero span

Bandwidth

Resolution Bandwidth (RBW)	10 Hz to 3 MHz in 1-3 sequence $\pm 10\%$ (1 MHz max in zero-span) (-3 dB bandwidth)
Video Bandwidth (VBW)	1 Hz to 3 MHz in 1-3 sequence (-3 dB bandwidth)
RBW with Quasi-Peak Detection	200 Hz, 9 KHz, 120 kHz (-6 dB bandwidth)
VBW with Quasi-Peak Detection	Auto VBW is On, RBW/VBW = 1

Cell Master™ MT8212E Base Station Analyzer Specifications



Spectrum Analyzer (continued)

Spectral Purity

SSB Phase Noise @ 1 GHz	-100 dBc/Hz, -110 dBc/Hz typical @ 10 kHz offset
	-105 dBc/Hz, -112 dBc/Hz typical @ 100 kHz offset
	-115 dBc/Hz, -121 dBc/Hz typical @ 1 MHz offset

Amplitude Ranges

Dynamic Range	>95 dB (2.4 GHz), 2/3 (TOI-DANL) in 10 Hz RBW
Measurement Range	DANL to +26 dBm
Display Range	1 to 15 dB/div in 1 dB steps, ten divisions displayed
Reference Level Range	-130 dBm to +30 dBm
Attenuator Resolution	0 to 55 dB in 5 dB steps
Amplitude Units	Log Scale Modes: dBm, dBV, dBmV, dBμV Linear Scale Modes: nV, μV, mV, V, kV, nW, μW, mW, W, kW

Amplitude Accuracy

100 kHz to 40 GHz	±1.25 dB, ±0.5 dB typical
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Displayed Average Noise Level (DANL)

(RBW Normalized to 1 Hz, 0 dB attenuation)	Preamp Off (Reference level -20 dBm)		Preamp On (Reference level -50 dBm)	
	Maximum	Typical	Maximum	Typical
10 MHz to 2.4 GHz	-141 dBm	-146 dBm	-157 dBm	-162 dBm
>2.4 GHz to 4 GHz	-137 dBm	-141 dBm	-154 dBm	-159 dBm
(RBW = 10 Hz, 0 dB attenuation)				
10 MHz to 2.4 GHz	-131 dBm	-136 dBm	-147 dBm	-152 dBm
>2.4 GHz to 4 GHz	-127 dBm	-131 dBm	-144 dBm	-149 dBm

Spurs

Residual Spurious	<-90 dBm (RF input terminated, 0 dB input attenuation, > 10 MHz)
Input-Related Spurious	<-75 dBc (0 dB attenuation, -30 dBm input, span <1.7 GHz, carrier offset >4.5 MHz)
Exceptions, typical	<-70 dBc @ <2.5 GHz, with 2072.5 MHz Input <-68 dBc @ F1-280 MHz with F1 Input <-70 dBc @ F1 + 190 MHz with F1 Input <-52 dBc @ 7349-2F2 MHz, with F2 Input, where F2 < 2424.5 MHz

Third-Order Intercept (TOI)

	Preamp Off (-20 dBm tones 100 kHz apart, 10 dB attenuation)
800 MHz	+16 dBm
2400 MHz	+20 dBm
200-2200 MHz	+25 dBm, typical
>2.2 GHz to 4.0 GHz	+28 dBm, typical

Second Harmonic Distortion

	Preamp Off, 0 dB input attenuation, -30 dBm input
50 MHz	-56 dBc
>50 MHz to 200 MHz	-60 dBc, typical
>200 MHz to 3000 MHz	-70 dBc, typical

VSWR

2:1, typical

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2-Port Transmission Measurement (Option 0021)

Frequency	Frequency Range	2 MHz to 4 GHz
	Frequency Resolution	10 Hz
Output Power	High	0 dBm, typical
	Low	-30 dBm, typical
Dynamic Range	2 MHz to 4 GHz	80 dB
	Application Options	Bias-Tee (On/Off), Impedance (50 Ω , 75 Ω , Other)

Bias-Tee (Option 0010)

	Setup	On/Off, Voltage, Current (Low/High)
	Voltage Range	+12 to +32 V
	Current (Low/High)	250 mA/450 mA, 1 A surge for 100 ms
	Resolution	0.1 V

GPS Receiver Option (Option 0031) (Antenna sold separately, P/N 2000-1528-R)

	Setup	On/Off, Antenna Voltage 3.3/5.0 V, GPS Info
GPS Time/Location Indicator		Time, Latitude, Longitude and Altitude on display Time, Latitude, Longitude and Altitude with trace storage
High Frequency Accuracy when GPS Antenna is connected		Spectrum Analyzer, Interference Analyzer, CW Signal Analyzers < ± 50 ppb with GPS On, 3 minutes after satellite lock in selected mode
	Connector	SMA, Female

Optical Distance-to-Fault Module (P/N ODTF-1)

	Wavelength	1550 nm, typical
	Fiber Type	Single Mode Fiber
	Event Resolution	10.2 cm (0.335 ft) maximum, or $150/(n*\Delta F)$, ΔF in MHz, n is IOR
	Horizontal Range	1020 meter (3345 ft) maximum, or $(\#dp-1)*Event Resolution$
	Optical Dynamic Range	30 dB
	Optical Output Power	3 dBm, typical
	RF Connector	N(m)
	Optical Connector	FC/APC
	Datasheet	11410-00478 (for complete specifications)

Cell Master™ MT8212E Base Station Analyzer Specifications



Power Meter

Frequency	Center/Start/Stop, Span, Frequency Step, Signal Standard, Channel #, Full Band
Amplitude	Maximum, Minimum, Offset, Relative On/Off, Units, Auto Scale
Average	Acquisition Fast/Med/Slow, # of Running Averages
Limits	Limit On/Off, Limit Upper/Lower
Frequency Range	10 MHz to 4 GHz
Span	1 kHz to 100 MHz
Display Range	-140 dBm to +30 dBm, ≤40 dB span
Measurement Range	-120 dBm to +26 dBm
Offset Range	0 to +100 dB
VSWR	2:1 typical
Maximum Power	+26 dBm without attenuator
Accuracy	Same as Spectrum Analyzer
Application Options	Impedance (50 Ω, 75 Ω, Other)



High Accuracy Power Meter (Option 0019) (Requires external USB Power Sensor(s))

Amplitude	Maximum, Minimum, Offset, Relative On/Off, Units, Auto Scale
Average	# of Running Averages, Max Hold
Zero/Cal	Zero On/Off, Cal Factor (Center Frequency, Signal Standard)
Limits	Limit On/Off, Limit Upper/Lower

Power Sensor Model	PSN50	MA24104A	MA24106A	MA24108A	MA24118A
Description	High Accuracy RF Power Sensor	Inline High Power Sensor	High Accuracy RF Power Sensor	Microwave USB Power Sensor	Microwave USB Power Sensor
Frequency Range	50 MHz to 6 GHz	600 MHz to 4 GHz	50 MHz to 6 GHz	10 MHz to 8 GHz	10 MHz to 18 GHz
Connector	Type N(m), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω
Dynamic Range	-30 to +20 dBm (.001 to 100 mW)	+3 to +51.76 dBm (2 mW to 150 W)	-40 to +23 dBm (0.1 μW to 200 mW)	-40 to +20 dBm (0.1 μW to 100 mW)	-40 to +20 dBm (0.1 μW to 100 mW)
VBW	100 Hz	100 Hz	100 Hz	50 kHz	50 kHz
Measurand	True-RMS	True-RMS	True-RMS	True-RMS, Slot Power, Burst Average Power	True-RMS, Slot Power, Burst Average Power
Measurement Uncertainty	±0.16 dB ¹	±0.17 dB ²	±0.16 dB ¹	±0.18 dB ³	±0.18 dB ³
Datasheet (for complete specifications)	11410-00414	11410-00483	11410-00424	11410-00504	11410-00504
Notes:	1) Total RSS measurement uncertainty (0 °C to 50 °C) for power measurements of a CW signal greater than -20 dBm with zero mismatch errors. 2) Expanded uncertainty with K=2 for power measurements of a CW signal greater than +20 dBm with a matched load. Measurement results referenced to the input side of the sensor. 3) Expanded uncertainty with K=2 for power measurements of a CW signal greater than -20 dBm with zero mismatch errors.				

Cell Master™ MT8212E Base Station Analyzer Specifications



Interference Analyzer (Option 0025)

Measurements	Spectrum Field Strength Occupied Bandwidth Channel Power Adjacent Channel Power (ACPR) AM/FM/SSB Demodulation (Wide/Narrow FM, Upper/Lower SSB), (audio out only) Carrier-to-Interference ratio (C/I) Spectrogram (Collect data up to one week) Signal Strength (Gives visual and aural indication of signal strength) Received Signal Strength Indicator (RSSI) (collect data up to one week) Gives visual and aural indication of signal strength Signal ID (up to 12 signals) Center Frequency Bandwidth Signal Type (FM, GSM, W-CDMA, CDMA, Wi-Fi) Closest Channel Number Number of Carriers Signal-to-Noise Ratio (SNR) >10 dB
Application Options	Bias-Tee (On/Off), Impedance (50 Ω , 75 Ω , Other)



Channel Scanner (Option 0027)

Number of Channels	1 to 20 Channels
Measurements	Graph/Table, Max Hold (On/5 sec/Off), Freq/Channel, Current/Max, Single/Dual Color
Scanner	Scan Channels, Scan Frequencies, Scan Customer List, Scan Script Master™
Amplitude	Reference Level, Scale
Custom Scan	Signal Standard, Channel, # of Channels, Channel Step Size, Custom Scan
Frequency Range	100 kHz to 4 GHz
Frequency Accuracy	± 10 Hz + Time base error
Measurement Range	-110 dBm to +26 dBm
Application Options	Bias-Tee (On/Off), Impedance (50 Ω , 75 Ω , Other)



CW Signal Generator Option (Option 0028) (Requires CW Signal Generator Kit, P/N 69793)

Setup Parameters

Frequency	Frequency, Signal Standard, Channel Number, Display Setup Help
Amplitude	Power Level (Low/High), Offset (dB)
Frequency Range	25 MHz to 2 GHz typical
Output Power	High 0 dBm typical, Low -30 dBm typical Attenuator (included in kit 69793): 0 to 90 dB in 1 dB steps

Gated Sweep (Option 0090)

Mode	Spectrum Analyzer, Sweep
Trigger	External TTL
Setup	Gated Sweep (On/Off) Gate Polarity (Rising, Falling) Gate Delay (0 to 65 ms typical) Gate Length (1 μ s to 65 ms typical) Zero Span Time

Cell Master™ MT8212E Base Station Analyzer Specifications



TD-SCDMA/HSDPA Signal Analyzers (Options 0060, 0061, 0038)

Measurements			
RF (Option 0060)	Demodulation (Option 0061)	Over-the-Air (OTA) (Option 0038)	Pass/Fail (User Editable)
Channel Spectrum	Code Domain Power/Error (QPSK/8 PSK/16 QAM)	Code Scan (32)	Occupied Bandwidth
Channel Power	Slot Power	Scrambling Code Group	Channel Power
Occupied Bandwidth	DwPTS Power	Tau	Channel Power RCC
Left Channel Power	Noise Floor	E_C/I_0	On/Off Ratio
Left Channel Occ B/W	Frequency Error	Pilot Dominance	Peak-to-Average Ratio
Right Channel Power	Tau	Tau Scan (Six)	Frequency Error
Right Channel Occ B/W	Scrambling Code	Sync-DL#	EVM
Power vs. Time	EVM	Tau	Peak EVM
Six Slot Powers	Peak EVM	E_C/I_0	Peak Code Domain Error
Channel Power (RRC)	Peak Code Domain Error	DwPTS Power	Tau
DL-UL Delta Power		Pilot Dominance	Noise Floor
UpPTS Power			
DwPTS Power			
On/Off Ratio			
Slot Peak-to-Average Power			
Spectral Emission			

Setup Parameters

Slot Selection	Auto, 0-6
Trigger	Trigger Type (No Trigger/GPS/External), External Trigger (Rising/Falling), Tau Offset
SYNC-DL Code	Auto, 0-31
Scrambling/Midamble Code	Auto, 0-127
Maximum Users	Auto, 2, 4, 6, 8, 10, 12, 14, 16
Measurement Speed	Fast, Normal, Slow
User Selectable	Uplink Switch Point, Number of Carriers (1, 3), Tau Offset
Demodulation Type	Auto, QPSK, 8 PSK, 16 QAM
Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts)
Sweep	Hold/Run, Trigger Sweep
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements

RF Measurements (Option 0060) (temperature range 15 °C to 35 °C)

RF Channel Power Accuracy (RRC)	±1.5 dB, ±1.0 dB typical, (slot power -40 to +10 dBm)
Frequency Error	±10 Hz + time base error, in the presence of a downlink slot

Demodulation (Option 0061) (temperature range 15 °C to 35 °C)

Supported Modulation	QPSK, 8 PSK, 16 QAM
Residual EVM (rms)	3% typical, P-CCPH slot power >-50 dBm
PN Offset	Within 1 x 64 chips
Pilot Power Accuracy	±1.0 dB typical
Timing Error (Tau) for Dominant SYNC-DL	±0.2 µs (external trigger)
Spreading Factor	1, 16

Over-the-Air (OTA) Measurements (Option 0038)

Code Scanner	32 Sync Codes and associated Scrambling Code Groups
Tau Scanner	Six strongest Sync Codes
Auto Save	Yes
GPS Logging	Yes

Cell Master™ MT8212E Base Station Analyzer Specifications



GSM/GPRS/EDGE Signal Analyzers (Options 0040, 0041)

Measurements

RF (Option 0040)	Demodulation (Option 0041)	Over-the-Air (OTA)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Burst Power Average Burst Power Frequency Error Modulation Type BSIC (NCC, BCC) Multi-channel Spectrum Power vs. Time (Frame/Slot) Channel Power Occupied Bandwidth Burst Power Average Burst Power Frequency Error Modulation Type BSIC (NCC, BCC)	Phase Error EVM Origin Offset C/I Modulation Type Magnitude Error BSIC (NCC, BCC)	There are no additional OTA Measurements. RF Measurements and Demodulation can be made OTA	Channel Power Occupied Bandwidth Burst Power Average Burst power Frequency Error Phase Error EVM Origin Offset C/I Magnitude Error

Setup Parameters

GSM/EDGE Select	Auto, GSM, EDGE
Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Amplitude	Power Offset, Auto Range, Adjust Range
Sweep	Single/Continuous, Trigger Sweep
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements

RF Measurements (Option 0040) (temperature range 15 °C to 35 °C)

Frequency Error	±10 Hz + time base error, 99% confidence level
Occupied Bandwidth	Bandwidth within which 99% of the power transmitted on a single channel lies
Burst Power Error	±1.5 dB, ±1 dB typical, (-50 dBm to +20 dBm)

Demodulation (Option 0041) (temperature range 15 °C to 35 °C)

GSMK Modulation Quality (RMS Phase)	
Measurement Accuracy	±1 deg
Residual Error (GSMK)	1 deg
8 PSK Modulation Quality (EVM)	
Measurement Accuracy	±1.5%
Residual Error (8 PSK)	2.5%

Cell Master™ MT8212E Base Station Analyzer Specifications



W-CDMA/HSDPA Signal Analyzers (Options 0044, 0045 or 0065, 0035)

Measurements			
RF (Option 0044)	Demodulation (Option 0045 or 0065)	Over-the-Air (OTA) (Option 0035)	Pass/Fail (User Editable)
Band Spectrum Channel Spectrum Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Emission Mask Single carrier ACLR Multi-carrier ACLR	Code Domain Power Graph P-CPICH Power Channel Power Noise Floor EVM Carrier Feed Through Peak Code Domain Error Carrier Frequency Frequency Error Control Channel Power Abs/Rel/Delta Power CPICH, P-CCPCH S-CCPCH, PICH P-SCH, S-SCH HSDPA Power vs. Time Constellation Code Domain Power Table Code, Status EVM, Modulation Type Power, Code Utilization Power Amplifier Capacity Codogram	Scrambling Code Scanner (Six) Scrambling Codes CPICH E_c/I_o E_c Pilot Dominance OTA Total Power Multipath Scanner (Six) Six Multipaths Tau Distance RSCP Relative Power Multipath Power	Max Output Power Frequency Error EVM CPICH Occupied Bandwidth Spectral Mask ACLR PCDE P-CCPCH S-CCPCH Code Spread 3 PICH Code 128 Test Models 1 (16), (32), (64) 2 3 (16), (32) 4 (+CPICH), (-CPICH) 5 (2 HS), (4 HS), (8 HS)

Setup Parameters

Scrambling Code, Threshold	Auto, Manual
User Selectable	Scrambling Code, S-CCPCH Spread, S-CCPCH Code, PICH Code, Threshold, Max Amp Power, CPICH Power, Frequency Error Average
Maximum Spreading Factor	256, 512
Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts)
Marker	Six Markers, Table On/Off
Sweep	Single/Continuous, Trigger Sweep
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements

RF Measurements (Option 0044) (temperature range 15 °C to 35 °C)

Frequency Range	Bands I – XIV, XVII
RF Channel Power Accuracy	±1.25 dB, ±0.7 dB typical, (temperature range 15 °C to 35 °C)
Occupied Bandwidth Accuracy	±100 kHz
Adjacent Channel Leakage Ratio (ACLR)	-54 dB/-59 dB ±0.8 dB @ 5 MHz/10 MHz offset, typical, 824 to 894, 1710 to 2170 MHz -54 dB/-57 dB ±1.0 dB @ 5 MHz/10 MHz offset, typical, 2300 to 2700 MHz

Demodulation (Option 0045 for W-CDMA only or 0065 for W-CDMA and HSDPA) (temperature range 15 °C to 35 °C)

Frequency Error	±10 Hz + time base error, 99% confidence level
EVM Accuracy	±2.5%, 6% ≤EVM ≤25%
Residual EVM (RMS)	3.25% typical
Code Domain Power	±0.5 dB for code channel power >-25 dB, 16, 32, 64 DCPH (test model 1), 16, 32 DCPH (test model 2, 3)
CPICH (dBm) Accuracy	±0.8 dB typical

Over-the-Air (OTA) Measurements (Option 0035)

Scrambling Code Scanner	Six strongest Scrambling Codes
Multipath Scanner	Six multipaths' power relative to strongest pilot

Cell Master™ MT8212E Base Station Analyzer Specifications



cdmaOne/CDMA2000 1X Signal Analyzers (Option 0042, 0043, 0033)

Measurements

RF (Option 0042)	Demodulation (Option 43)	Over-the-Air (OTA) (Option 33)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Emission Mask Multi-carrier ACPR	Code Domain Power Graph Pilot Power Channel Power Noise Floor Rho Carrier Feed Through Tau RMS Phase Error Frequency Error Abs/Rel/ Power Pilot Page Sync Q Page Code Domain Power Table Code Status Power Multiple Codes Code Utilization	Pilot Scanner (Nine) PN E_C/I_O Tau Pilot Power Channel Power Pilot Dominance Multipath Scanner (Six) E_C/I_O Tau Channel Power Multipath Power Limit Test – 10 Tests Averaged Rho Adjusted Rho Multipath Pilot Dominance Pilot Power Pass/Fail Status	Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Mask Test Frequency Error Channel Frequency Frequency error Pilot Power Noise Floor Rho Carrier Feed Through Tau RMS Phase Error Code Utilization Measured PN Pilot Dominance Multipath Power

Setup Parameters

PN Setup	PN Trigger (No Trigger, GPS, External), PN Search Type (Auto, Manual), PN Offset
Walsh Codes	64, 128
Measurement Speed	Fast, Normal, Slow
External Trigger Polarity	Rising, Falling
Number of Carriers	1 to 5
Carrier Bandwidth	1.23, 1.24, 1.25 MHz
Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts)
Sweep	Single/Continuous, Trigger Sweep
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements

RF Measurements (Option 0042) (temperature range 15 °C to 35 °C)

RF Channel Power Accuracy	±1.5 dB, ±1.0 dB typical, (RF input -50 to +20 dBm)
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Demodulation (Option 0043) (temperature range 15 °C to 35 °C)

Frequency Error	±10 Hz + time base error, 99% confidence level (in slow mode)
Rho Accuracy	±0.005, for Rho >0.9
Residual Rho	>0.995, typical, >0.99 maximum, (RF input -50 to +20 dBm)
PN Offset	1 x 64 chips
Pilot Power Accuracy	±1.0 dB typical, relative to channel power
Tau	±0.5 µs typical, ±1.0 µs maximum

Over-the-Air (OTA) Measurements (Option 0033)

Pilot Scanner	Nine strongest pilots
Multipath Scanner	Six multipaths' power relative to strongest pilot
Limit Test	Average of ten tests compared to limit

Cell Master™ MT8212E Base Station Analyzer Specifications



CDMA2000 1xEV-DO Signal Analyzers (Option 0062, 0063, 0034)

Measurements			
RF (Option 0062)	Demodulation (Option 0063)	Over-the-Air (OTA) (Option 0034)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Peak-to-Average Power Power vs. Time Pilot & MAC Power Channel Power Frequency Error Idle Activity On/Off Ratio Spectral Emission Mask Multi-carrier ACPR	MAC Code Domain Power Graph Pilot & MAC Power Channel Power Frequency Error Rho Pilot Rho Overall Data Modulation Noise Floor MAC Code Domain Power Table Code Status Power Code Utilization Data Code Domain Power Active Data Power Data Modulation Rho Pilot Rho Overall Maximum Data CDP Minimum Data CDP	Pilot Scanner (Nine) PN E_C/I_O Tau Pilot Power Channel Power Pilot Dominance Mulitpath Scanner (Six) E_C/I_O Tau Channel Power Multipath Power	Channel Power Occupied Bandwidth Peak-to-Average Power Carrier Frequency Frequency Error Spectral Mask Noise Floor Pilot Power RMS Phase Error Tau Code Utilization Measured PN Pilot Dominance Mulitpath Power
Setup Parameters			
	PN Setup	PN Trigger (No Trigger, GPS, External), PN Search Type (Auto, Manual), PN Offset	
	Walsh Codes	64, 128	
	Measurement Speed	Fast, Normal, Slow	
	External Trigger Polarity	Rising, Falling	
	Slot Type	Auto, Active, Idle	
	Number of Carriers\	1 to 5	
	Carrier Bandwidth	1.23, 1.24, 1.25 MHz	
	Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel	
	Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range, Units (dBm/Watts)	
	Sweep	Single/Continuous, Trigger Sweep	
	Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory	
	Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements	
RF Measurements (Option 0042) (temperature range 15 °C to 35 °C)			
	RF Channel Power Accuracy	±1.5 dB, ±1.0 dB typical, (RF input -50 to +20 dBm)	
Demodulation (Option 0063) (temperature range 15 °C to 35 °C)			
	EV-DO Compatibility	Rev 0 and Rev A	
	Frequency Error	±10 Hz + time base error, 99% confidence level	
	Rho Accuracy	±0.01, for Rho >0.9	
	Residual Rho	>0.995 typical, >0.99, maximum (RF input -50 to +20 dBm)	
	PN Offset	Within 1 x 64 chips	
	Pilot Power Accuracy	±1.0 dB typical, relative to channel power	
	Tau	±0.5 µs typical, ±1.0 µs maximum	
Over-the-Air (OTA) Measurements (Option 0034)			
	Pilot Scanner	Nine strongest pilots	
	Multipath Scanner	Six multipaths' power relative to strongest pilot	

Cell Master™ MT8212E Base Station Analyzer Specifications



IEEE 802.16 Fixed WiMAX Signal Analyzers (Options 0046, 0047)

Measurements

RF (Option 0046)	Demodulation (Option 0047)	Over-the-Air (OTA)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Power vs. Time Channel Power Preamble Power Data Burst Power Crest Factor ACPR	Constellation RCE (RMS/Peak) EVM (RMS/Peak) Frequency Error Carrier Frequency Base Station ID Spectral Flatness Adjacent Subcarrier Flatness EVM vs. Subcarrier/Symbol RCE EVM Frequency Error Carrier Frequency Base Station ID	There are no additional OTA Measurements. RF Measurements and Demodulation can be made OTA	Channel Power Occupied Bandwidth Burst Power Preamble Power Crest Factor Frequency Error Carrier Frequency EVM RCE Base Station ID

Setup Parameters

Bandwidth	1.25, 1.50, 2.50, 3.50, 5.00, 5.50, 6.00, 7.00, 10.00 MHz
Cyclic Prefix Ratio (CP)	1/4, 1/8, 1/16, 1/32
Span	5, 10, 15, 20 MHz
Frame Length	2.5, 5.0, 10.0 msec
Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range
Sweep	Single/Continuous, Trigger Sweep
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements

RF Measurements (Option 0046) (temperature range 15 °C to 35 °C)

RF Channel Power Accuracy	±1.5 dB, ±1.0 dB typical, (RF input -50 to +20 dBm)
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Demodulation (Option 0047) (temperature range 15 °C to 35 °C)

Frequency Error	0.07 ppm + time base error, 99% confidence level
Residual EVM (rms)	3% typical, 3.5% maximum (RF Input -50 dBm to +20 dBm)

Cell Master™ MT8212E Base Station Analyzer Specifications



IEEE 802.16 Mobile WiMAX Signal Analyzers (Options 0066, 0067, 0037)

Measurements			
RF (Option 0066)	Demodulation (Option 0067)	Over-the-Air (OTA) (Option 0037)	Pass/Fail (User Editable)
Channel Spectrum	Constellation	Channel Power Monitor	Channel Power
Channel Power	RCE (RMS/Peak)	Preamble Scanner (Six)	Occupied Bandwidth
Occupied Bandwidth	EVM (RMS/Peak)	Preamble	Downlink Bust Power
Power vs. Time	Frequency Error	Relative Power	Uplink Burst Power
Channel Power	CINR	Cell ID	Preamble Power
Preamble Power	Base Station ID	Sector ID	Crest Factor
Downlink Burst Power	Sector ID	PCINR	Frequency Error
Uplink Burst Power	Spectral Flatness	Dominant Preamble	Carrier Frequency
ACPR	Adjacent Subcarrier Flatness	Base Station ID	EVM
	EVM vs. Subcarrier/Symbol		RCE
	RCE (RMS/Peak)		Sector ID
	EVM (RMS/Peak)		
	Frequency Error		
	CINR		
	Base Station ID		
	Sector ID		
	DL-MAP (Tree View)		
Setup Parameters			
	Zone Type	PUSC	
	DL-MAP Auto Decoding	Convolutional Coding (CC), Convolutional Turbo Coding (CTC)	
	Bandwidths	3.50, 5.00, 7.00, 8.75, 10.00 MHz	
	Cyclic Prefix Ratio (CP)	1/8	
	Span	5, 10, 20, 30 MHz	
	Frame Lengths	5, 10 msec	
	Demodulation	Auto, Manual, FCH	
	Frequency	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel	
	Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range	
	Sweep	Single/Continuous, Trigger Sweep	
	Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory	
	Measurement Summary Screens	Overall Measurements, RF Measurements, Signal Quality Measurements	
RF Measurements (Option 0066) (temperature range 15 °C to 35 °C)			
	RF Channel Power Accuracy	±1.5 dB, ±1.0 dB typical, (RF input -50 to +20 dBm)	
Demodulation (Option 0067) (temperature range 15 °C to 35 °C)			
	Frequency Error	0.02 ppm + time base error, 99% confidence level	
	Residual EVM (rms)	2.5% typical, 3.0% maximum, (RF Input -50 dBm to +20 dBm)	
Over-the-Air (OTA) Measurements (Option 0037)			
	Channel Power Monitor	Over time (one week), measurement time interval 1 to 60 sec	
	Preamble Scanner	Six Strongest Preambles	
	Auto Save	Yes	
	GPS Logging	Yes	

Cell Master™ MT8212E Base Station Analyzer Specifications



Backhaul Analyzers (Options 0051, 0052, 0053)

T1 Bit-Error-Rate Tester (BERT) (Option 0051)

Measurements

Error Detection	Frame Bits, Bit Errors, BER, BPV, CRC, PATLS
Error Analysis (ITU G-821)	Errored Seconds (ES), Error Free Seconds (EFS), Severely Errored Seconds (SES), Unavailable Seconds (UAS), Available Seconds (AS), Degraded Minutes (DGRM)
Rx Signal	Frequency (± 5 ppm, Max/Min), Vpp ($\pm 5\%$) (Max/Min), dBdsx, Clock Slips, Frame Slips
VF	Frequency (100 Hz to 3000 Hz, ± 3 Hz), Power (-40.0 to +3.0 dBm, ± 0.2 dBm)
Status (Historical and Current)	Rx (Signal, Frame Sync, Pattern Sync), DS1 (Alarms, Errors, B8ZS)
Status (Current)	Tx (Alarm On, Error On, Loop On)

Setup

BERT Display	Table, Histogram, Event List, Clear History
VF	Tx (Off/On), Channel (1-24), Tx Freq, Tx Level (-30 to 0 dBm), Volume, Audio, Clear
Line Code	AMI, B8ZS
Tx Clock	Internal (1.544 MHz ± 5 ppm), Recovered, External
Tx LBO	0.0 dB, -7.5 dB, -15.0 dB
Rx Input	Terminate (Bantam connector 100 Ω balanced), Monitor (Connect via 20 dB pad in DSX, 20 dB flat gain) Bridge ($\geq 1000 \Omega$, -36 dB to +6 dB)
Framing	ESF, SF-D4
Payload	T1 (1.544 Mbps), Fractional T1 (Nx64, 64, 56, 16, 8 kbps)
Pulse Shapes	Conform to ANSI T1.403 and ITU G.703
Patterns	QRSS, PRBS (2-9, 2-11, 2-15, 2-20, 2-23), All Ones, All Zeros, 1-in-8 (1-in-7), 2-in-8, 3-in-24 T1 Daly, Six User defined (≤ 32 bits), Inverse Patterns (On/Off), Remote Loop Up/Down
Loop Codes	CSU, NIU, Link Type (In-Band, Data-Link), Self Loop Up/Down, Loop Code User Defined
Error Insertion	Bit Error, Bit Error Rate (BER), BPV, Frame Bit Error, Error (On/Off)
Alarm Insertion	AIS On/Off (Blue Alarm), RAI On/Off (Yellow Alarm)
Data Log	1 minute to 3 days

E1 Bit-Error-Rate Tester (BERT) (Option 0052)

Measurements

Error Detection	Frame Bits, Bit Errors, BER, BPV, CRC, E Bits
Error Analysis (ITU G-821)	Errored Seconds (ES), Error Free Seconds (EFS), Severely Errored Seconds (SES), Unavailable Seconds (UAS), Available Seconds (AS), Degraded Minutes (DGRM)
Rx Signal	Frequency (± 5 ppm, Max/Min), Vpp ($\pm 5\%$) (Max/Min), dBdsx, Clock Slips, Frame Slips
VF	Frequency (100 Hz to 3000 Hz), Power (-40.0 to +3.0 dBm, ± 0.2 dBm)
Status (Historical and Current)	Rx (Signal, FAS, Pattern Sync), E1 (Alarms, Errors)
Status (Current)	Tx (Alarm On, Error On)

Setup

BERT Display	Table, Histogram, Event List, Clear History
VF	Tx (Off/On), Channel (1-31), Tx Freq, Tx Level (-30 to 0 dBm), Volume, Audio, Clear
Line Code	AMI, HDB3
Tx Clock	Internal (2.048 MHz ± 5 ppm), Recovered, External
Rx Input	Terminate (RJ48 120/75 Ω balanced, BNC 75 Ω unbalanced, -43 dB to +6 dB) Bridge ($\geq 1000 \Omega$, -43 dB to +6 dB) Monitor (Connect via 20 dB pad in DSX, 20 dB flat gain)
Framing	PCM30, PCM30 CRC-4, PCM31, PCM31 CRC-4
Pulse Shapes	Conform to ITU G.703
Payload	E1 (2.048 Mbps), Fractional E1 (N x 64, 64, 16, 8 kbps)
Patterns	QRSS, PRBS (2-9, 2-11, 2-15, 2-20, 2-23), All Ones, All Zeros, 1010, 1-in-8 (1-in-7), 2-in-8, 3-in-24, Six User defined (≤ 32 bits), Inverse Patterns (On/Off)
Loopback Mode	Self loop
Error Insertion	Bit Error, Bit Error Rate (BER), Frame Bit Error, Error (On/Off)
Alarm Insertion	AIS (On/Off) (Blue Alarm), RAI (On/Off) (Yellow Alarm)
Data Log	1 minute to 3 days

Cell Master™ MT8212E Base Station Analyzer Specifications



Backhaul Analyzers (Options 0051, 0052, 0053)

T3 Bit-Error-Rate Tester (BERT) (Option 0053)

Measurements

Error Detection	Frame Bits, Bit Errors, BER, BPV, Lof Count, P-bit Errors, C-bit Errors, FEBE Errors
Error Analysis (ITU G-821)	Excess Zeros, Errored Seconds (ES), Error Free Seconds (EFS), Severely Errored Seconds (SES), Unavailable Seconds (UAS), Available Seconds (AS), Degraded Minutes (DGRM), Pattern Loss Seconds (PATLS)
Rx Signal	Frequency (± 5 ppm, Max/Min), Vpp ($\pm 5\%$) (Max/Min), dBdsx
VF	Frequency (100 Hz to 3000 Hz, ± 3 Hz), Power (-30.0 to +0.0 dBm, ± 0.2 dBm)
Status (Historical and Current)	Rx (Signal, Frame Sync, Pattern Sync), DS3 (Alarms, Errors, DS3ZS)
Status (Current)	Insert (Alarm On, Error On, Loop On)

Setup

BERT Display	Table, Histogram, Event List, Clear History
VF	Tx (Off/On), Channel #, Tx Freq, Tx, Level, Volume, Audio (On/Off)
Line Code	AMI, B3ZS
Tx Clock	Internal (44.736 MHz ± 5 ppm), Recovered
Tx LBO	Low, DSX
Rx Input	DSX3 (Bantam connector 100 Ω balanced) Monitor (Connect via 20 dB pad in DSX)
Framing	M13, C-Bit, Unframed
Test Mode	Auto, DS3, DS1
Pulse Shapes	Carrier present, Frame ID and Sync, Pattern ID and Sync
Patterns	QRSS, PRBS (2-9, 2-11, 2-15, 2-20, 2-23), All Ones, All Zeros, 1010, 1-in-8 (1-in-7), 2-in-8, 3-in-24 T1 Daly, Six User defined (≤ 32 bits), Inverse Patterns (On/Off), Loop Up/Down
Loop Codes	Stuff Bit, DS3 C-Bit FEAC, DS3 Self Loop
Error Insertion	Bit Error, BPV, DS3 Frame Bit Error, C-bit, P-bit, FEBE, Error Insert (On/Off)
Alarm Insertion	AIS (Blue Alarm), RAI (Yellow Alarm), Idle Alarm, Alarm (On/Off)
Data Log	1 minute to 3 days

DS1 Test Mode

Measurements

Error Detection	Frame Bits, Bit Errors, BER, BPV, CRC, PATLS
Error Analysis (ITU G-821)	Errored Seconds (ES), Error Free Seconds (EFS), Severely Errored Seconds (SES), Unavailable Seconds (UAS), Available Seconds (AS), Degraded Minutes (DGRM)
Rx Signal	Frequency (± 5 ppm, Max/Min), Vpp ($\pm 5\%$) (Max/Min), dBdsx, Clock Slips, Frame Slips
VF	Frequency (100 Hz to 3000 Hz, ± 3 Hz), Power (-40.0 to +3.0 dBm, ± 0.2 dBm)
Status (Historical and Current)	Rx (Signal, Frame Sync, Pattern Sync), DS1 (Alarms, Errors, B8ZS)
Status (Current)	Tx (Alarm On, Error On, Loop On)

Setup

BERT Display	Table, Histogram, Event List, Clear History
VF	Tx (Off/On), Channel (1-24), Tx Freq, Tx Level (-30 to 0 dBm), Volume, Audio, Clear
Line Code	AMI, B8ZS
Tx Clock	Internal (1.544 MHz ± 5 ppm), Recovered, External
Tx LBO	0.0 dB, -7.5 dB, -15.0 dB
Rx Input	Terminate (Bantam connector 100 Ω balanced) Monitor (Connect via 20 dB pad in DSX, 20 dB flat gain) Bridge ($\geq 1000 \Omega$, -36 dB to +6 dB)
Framing	ESF, SF-D4
Payload	T1 (1.544 Mbps), Fractional T1 (Nx64, 64, 56, 16, 8 kbps)
Pulse Shapes	Conform to ANSI T1.403 and ITU G.703
Patterns	QRSS, PRBS (2-9, 2-11, 2-15, 2-20, 2-23), All Ones, All Zeros, 1-in-8 (1-in-7), 2-in-8, 3-in-24 T1 Daly, Six User defined (≤ 32 bits), Inverse Patterns (On/Off), Remote Loop Up/Down
Loopback Mode	CSU, NIU, Link Type (In-Band, Data-Link), Self Loop Up/Down, Loop Code User Defined
Error Insertion	Bit Error, Bit Error Rate (BER), BPV, Frame Bit Error, Error (On/Off)
Alarm Insertion	AIS On/Off (Blue Alarm), RAI On/Off (Yellow Alarm)
Data Log	1 minute to 3 days

Cell Master™ MT8212E Base Station Analyzer Specifications

General Specifications

All specifications and characteristics apply under the following conditions, unless otherwise stated: 1) After 5 minutes of warm-up time, where the instrument is left in the ON state; 2) All specifications apply when using internal reference; 3) All specifications subject to change without notice; 4) Typical performance is the measured performance of an average unit; 5) Recommended calibration cycle is 12 months.

Setup Parameters

System	Status (Temperature, Battery Info, Serial Number, Firmware Version, Options Installed) Self Test, Application Self Test GPS (see Option 0031)
System Options	Name, Date and Time, Brightness, Volume Language (English, French, German, Spanish, Chinese, Japanese, Korean, Italian, User defined) Reset (Factory Defaults, Master Reset, Update Firmware)
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Screen Shots Jpeg (save only)
Delete	Selected File, All Measurements, All Mode Files, All Content
Directory Management	Sort Method (Name/Type/Date), Ascend/Descend, Internal/USB, Copy, Format USB
Internal Trace/Setup Memory	2,000 traces, 2,000 setups
External Trace/Setup Memory	Limited by size of USB Flash drive
Mode Switching	Auto-Stores/Recalls most recently used Setup Parameters in the Mode

Connectors

RF Out	Type N, female, 50 Ω (Reflection In)
RF Out Damage Level	23 dBm, ± 50 VDC
RF In	Type N, female, 50 Ω
RF Input Damage Level	+35 dBm peak, ± 50 VDC, Maximum Continuous Input (≥ 10 dB attenuation)
GPS	SMA(f)
T1, T3	Bantam Jacks
E1	RJ48C
External Power	5.5 mm barrel connector, 12.5 to 15 VDC, < 4.0 Amps
USB Interface (2)	Type A (Connect USB Flash Drive and Power Sensor)
USB Interface	5-pin mini-B, Connect to PC for data transfer
Headset Jack	2.5 mm mini-phone plug
External Reference In	BNC, female, 50 Ω , Maximum Input +10 dBm
	1 MHz, 5 MHz, 10 MHz, 13 MHz
External Trigger/Clock Recovery	BNC, female, 50 Ω , Maximum Input ± 50 VDC

Display

Type	Resistive Touchscreen
Size	8.4" daylight viewable color LCD
Resolution	800 x 600

Battery

Type	Li-Ion
Battery Operation	3 hours, typical

Electromagnetic Compatibility

European Union	CE Mark, EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC and Low Voltage Directive 73/23/EEC, 93/68/EEC
Australia and New Zealand	C-tick N274
Interference	EN 61326-1
Emissions	EN 55011
Immunity	EN 61000-4-2/-4-3/-4-4/-4-5/-4-6/-4-11

Safety

Safety Class	EN 61010-1 Class 1
Product Safety	IEC 60950-1 when used with Company supplied Power Supply

Environmental

Operating Temperature	-10 $^{\circ}$ C to 55 $^{\circ}$ C
Maximum Humidity	85%
Shock	MIL-PRF-28800F Class 2
Storage	-40 $^{\circ}$ C to 71 $^{\circ}$ C
Altitude	4600 meters, operating and non-operating

Size and Weight

Size	273 x 199 x 91 mm, (10.7 x 7.8 x 3.6 in)
Weight	3.71 kg, (8.2 lbs)

Cell Master™ MT8212E Base Station Analyzer Specifications

Master Software Tools (for your PC)

Database Management

Full Trace Retrieval	Retrieve all traces from instrument into one PC directory
Trace Catalog	Index all traces into one catalog
Trace Rename Utility	Rename measurement traces
Group Edit	Titles, subtitles, plot scaling, markers and limit lines, simultaneously on similar files
DAT File Converter	Converts HHST files to MST file format and vice-versa

Data Analysis

Trace Math and Smoothing	Compare multiple traces
Data Converter	Convert from/to Return Loss, VSWR, Cable Loss, DTF and also into Smith Charts
Measurement Calculator	Translates into other units

Report Generation

Report Generator	Includes GPS, power level, and calibration status along with measurements
Edit Graph	Change scale, limit lines, and markers
Report Format	Create reports in HTML for PDF format
Export Measurements	Export measurements to *.s2p, *.jpg or *.csv format
Notes	Annotate measurements

Mapping (GPS Required)

Spectrum Analyzer Mode	MapInfo, MapPoint
Mobile WiMAX OTA Option	Google Earth, Google Maps, MapInfo

Folder Spectrogram (Spectrum Monitoring for Interference Analysis and Spectrum Clearing)

Folder Spectrogram – 2D View	Creates a composite file of multiple traces Peak Power, Total Power, Peak Frequency, Histogram, Average Power (Max/Min) File Filter (Violations over limit lines or deviations from averages) Playback
Video Folder Spectrogram – 2D View	Create AVI file to export for management review/reports
Folder Spectrogram – 3D View	Views (Set Threshold, Markers) - 3D (Rotate X, Y, Z Axis, Level Scale, Signal ID) - 2D View (Frequency or Time Domain, Signal ID) - Top Down Playback (Frequency and/or Time Domain)

List/Parameter Editors

Traces	Add, delete, and modify limit lines and markers
Antennas, Cables, Signal Standards	Modify instrument's Antenna, Cable, and Signal Standard List
Product Updates	Auto-checks Anritsu website for latest revision firmware
Firmware Upload	Upload new firmware into the instrument
Pass/Fail	Create, download, or edit Signal Analysis Pass/Fail Limits
VSG Pattern Converter	Import user-defined patterns (ASCII text or MATLAB file format required)
Languages	Add up to two languages and modify non-English language menus
Mobile WiMAX	DL-MAP Parameters
Display	Modify display settings

Script Master™

Channel Scanner Mode	Automate scan up to 1200 channels, repeat for sets of 20 channels, repeat all channels
GSM/GPRS/EDGE or W-CDMA/HSDPA Mode	Automate Signal Analysis testing requirements with annotated how-to pictures

Connectivity

Connections	Connect to PC using USB, LAN, or Direct Ethernet connection
Download	Download measurements and live traces to PC for storage and analysis
Upload	Upload measurements from PC to instrument
Firmware Updates	Create USB Flash Drive for firmware update

Cell Master™ MT8212E Base Station Analyzer Specifications

Ordering Information

MT8212E			Description		
			2 MHz to 4 GHz		
			100 kHz to 4 GHz		
			100 kHz to 4 GHz		
Options					
			MT8212E-0021 2-Port Transmission Measurement		
			MT8212E-0010 Bias-Tee		
			MT8212E-0031 GPS Receiver (Requires Antenna P/N 2000-1528-R)		
			MT8212E-0019 High-Accuracy Power Meter		
			MT8212E-0025 Interference Analyzer		
			MT8212E-0027 Channel Scanner		
			MT8212E-0090 Gated Sweep		
			MT8212E-0028 C/W Signal Generator (Requires CW Signal Generator Kit, P/N 69793)		
			MT8212E-0040 GSM/GPRS/EDGE RF Measurements		
			MT8212E-0041 GSM/GPRS/EDGE Demodulation		
			MT8212E-0044 W-CDMA/HSDPA RF Measurements		
			MT8212E-0045 W-CDMA Demodulation		
			MT8212E-0065 W-CDMA/HSDPA Demodulation		
			MT8212E-0035 W-CDMA/HSDPA Over-the-Air Measurements*		
			MT8212E-0060 TD-SCDMA/HSDPA Measurements		
			MT8212E-0061 TD-SCDMA/HSDPA Demodulation		
			MT8212E-0061 TD-SCDMA/HSDPA Demodulation		
			MT8212E-0038 TD-SCDMA/HSDPA Over-the-Air Measurements		
			MT8212E-0042 cdmaOne/CDMA2000 1X RF Measurements		
			MT8212E-0043 cdmaOne/CDMA2000 1X Demodulation		
			MT8212E-0033 cdmaOne/CDMA2000 1X Over-the-Air Measurements *		
			MT8212E-0062 CDMA2000 1xEV-DO RF Measurements		
			MT8212E-0063 CDMA2000 1xEV-DO Demodulation		
			MT8212E-0034 CDMA2000 1xEV-DO Over-the-Air Measurements *		
			MT8212E-0046 IEEE 802.16 Fixed WiMAX RF Measurements		
			MT8212E-0047 IEEE 802.16 Fixed WiMAX Demodulation		
			MT8212E-0066 IEEE 802.16 Mobile WiMAX RF Measurements		
			MT8212E-0067 IEEE 802.16 Mobile WiMAX Demodulation		
			MT8212E-0037 IEEE 802.16 Mobile WiMAX Over-the-Air Measurements		
			MT8212E-0051 T1 Analyzer**		
			MT8212E-0052 E1 Analyzer**		
			MT8212E-0053 T3/T1 Analyzer**		
			MT8212E-0098 Standard Calibration (ANSI Z540-1-1994)		
			MT8212E-0099 Premium Calibration (ANSI Z540-1-1994 plus test data)		
			*Requires GPS Receiver Option 0031		
			**Mutually exclusive		

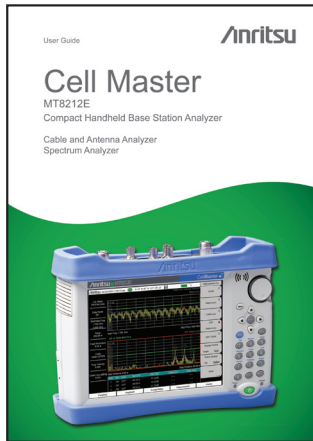
Power Sensors (For complete ordering information see the respective datasheets of each sensor)



Model Number	Description
PSN50	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +20 dBm
MA24104A	Inline High Power Sensor, 600 MHz to 4 GHz, + 51.76 dBm
MA24106A	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm
MA24108A	Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm
MA24118A	Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm

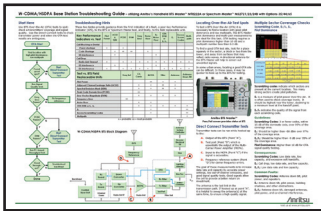
Cell Master™ MT8212E Base Station Analyzer Specifications

Manuals (soft copy included on MST CD and at www.us.anritsu.com)



MT8212E	Description
10580-00250	Cell Master Instrument User Guide (Hard copy included) - Bias-Tee, GPS Receiver
10580-00241	Cable and Antenna Analyzer Measurement Guide
10580-00242	2-Port Transmission Measurement - Bias-Tee
10580-00231	Spectrum Analyzer Measurement Guide - Interference Analyzer, Channel Scanner, Gated Sweep, CW Signal Generator
10580-00240	Power Meter Measurement Guide - High Accuracy Power Meter
10580-00234	3GPP Signal Analyzer Measurement Guide - GSM/EDGE, W-CDMA/HSDPA, TD-SCDMA/HSDPA
10580-00235	3GPP2 Signal Analyzer Measurement Guide - CDMA, EV-DO
10580-00236	WiMAX Signal Analyzer Measurement Guide - Fixed WiMAX, Mobile WiMAX
10580-00238	Backhaul Analyzer Measurement Guide - T1, E1, T3/T1
10580-00215	ODTF-1 Optical Distance-to-Fault Module
10580-00256	Programming Manual

Troubleshooting Guides (soft copy included on MST CD and at www.us.anritsu.com)



11410-00472	Interference
11410-00466	GSM/GPRS/EDGE Base Stations
11410-00463	W-CDMA/HSDPA Base Stations
11410-00465	TD-SCDMA/HSDPA Base Stations
11410-00467	cdmaOne/CDMA2000 1X Base Stations
11410-00468	CDMA2000 1xEV-DO Base Stations
11410-00470	Fixed WiMAX Base Stations
11410-00469	Mobile WiMAX Base Stations

Standard Accessories (included with instrument)



MT8212E	Description
10580-00250	Cell Master User Guide (includes Bias-Tee, GPS Receiver)
3-68736	Soft Carrying Case
2300-498	MST CD: Master Software Tools, User/Measurement Guides, Programming Manual, Troubleshooting Guides, Application Notes
633-44	Rechargeable Li-Ion Battery
40-168-R	AC-DC Adapter
806-141-R	Automotive Cigarette Lighter 12 VDC Adapter
3-2000-1498	USB A/5-pin mini-B Cable, 10 feet/305 cm
11410-00485	Cell Master™ MT8212E Technical Data Sheet
	One Year Warranty (Including battery, firmware, and software)
	Certificate of Calibration and Conformance

Optional Accessories

Calibration Components, 50 Ω



Part Number	Description
ICN50B	InstaCal™ Calibration Module, 38 dB, 2 MHz to 6.0 GHz, N(m), 50 Ω
OSLN50-1	Precision Open/Short/Load, N(m), 42 dB, 6.0 GHz, 50 Ω
OSLNF50-1	Precision Open/Short/Load, N(f), 42 dB, 6.0 GHz, 50 Ω
2000-1618-R	Precision Open/Short/Load, 7/16 DIN(m), DC to 4.0 GHz 50 Ω
2000-1619-R	Precision Open/Short/Load, 7/16 DIN(f), DC to 4.0 GHz 50 Ω
22N50	Open/Short, N(m), DC to 18 GHz, 50 Ω
22NF50	Open/Short, N(f), DC to 18 GHz, 50 Ω
SM/PL-1	Precision Load, N(m), 42 dB, 6.0 GHz
SM/PLNF-1	Precision Load, N(f), 42 dB, 6.0 GHz

Calibration Components, 75 Ω



22N75	Open/Short, N(m), DC to 3 GHz, 75 Ω
22NF75	Open/Short, N(f), DC to 3 GHz, 75 Ω
26N75A	Precision Termination, N(m), DC to 3 GHz, 75 Ω
26NF75A	Precision Termination, N(f), DC to 3 GHz, 75 Ω
12N50-75B	Matching Pad, DC to 3 GHz, 50 Ω to 75 Ω

Phase-Stable Test Port Cables, Armored w/ Reinforced Grip (ideal for contractors and other rugged applications)



15RNFN50-1.5-R	1.5 m, DC to 6 GHz, N(m) - N(f), 50 Ω
15RDFN50-1.5-R	1.5 m, DC to 6 GHz, N(m) - 7/16 DIN(f), 50 Ω
15RDN50-1.5-R	1.5 m, DC to 6 GHz, N(m) - 7/16 DIN(m), 50 Ω
15RNFN50-3.0-R	3.0 m, DC to 6 GHz, N(m) - N(f), 50 Ω
15RDFN50-3.0-R	3.0 m, DC to 6 GHz, N(m) - 7/16 DIN(f), 50 Ω
15RDN50-3.0-R	3.0 m, DC to 6 GHz, N(m) - 7/16 DIN(m), 50 Ω

Phase-Stable Test Port Cables, Armored (ideal for use with tightly spaced connectors and other general use applications)



15NNF50-1.5C	1.5 m, DC to 6 GHz, N(m) - N(f), 50 Ω
15NN50-1.5C	1.5 m, DC to 6 GHz, N(m) - N(m), 50 Ω
15NDF50-1.5C	1.5 m, DC to 6 GHz, N(m) - 7/16 DIN(f), 50 Ω
15ND50-1.5C	1.5 m, DC to 6 GHz, N(m) - 7/16 DIN(m), 50 Ω
15NNF50-3.0C	3.0 m, DC to 6 GHz, N(m) - N(f), 50 Ω
15NN50-3.0C	3.0 m, DC to 6 GHz, N(m) - N(m), 50 Ω

Adapters



1091-26-R	SMA(m) - N(m), DC to 18 GHz, 50 Ω
1091-27-R	SMA(f) - N(m), DC to 18 GHz, 50 Ω
1091-80-R	SMA(m) - N(f), DC to 18 GHz, 50 Ω
1091-81-R	SMA(f) - N(f), DC to 18 GHz, 50 Ω
1091-172	BNC(f) - N(m), DC to 1.3 GHz, 50 Ω
510-90	7/16 DIN(f) - N(m), DC to 7.5 GHz, 50 Ω
510-91	7/16 DIN(f) - N(f), DC to 7.5 GHz, 50 Ω
510-92	7/16 DIN(m) - N(m), DC to 7.5 GHz, 50 Ω
510-93	7/16 DIN(m) - N(f), DC to 7.5 GHz, 50 Ω
510-96	7/16 DIN(m) - 7/16 DIN (m), DC to 7.5 GHz, 50 Ω
510-97	7/16 DIN(f) - 7/16 DIN (f), DC to 7.5 GHz, 50 Ω
1091-379-R	7/16 DIN(f) - 7/16 DIN(f), DC to 6 GHz, 50 Ω , w/ Reinforced Grip
510-102-R	N(m) - N(m), DC to 11 GHz, 50 Ω , 90 degrees right angle

Precision Adapters



34NN50A	Precision Adapter, N(m) - N(m), DC to 18 GHz, 50 Ω
34NFN50	Precision Adapter, N(f) - N(f), DC to 18 GHz, 50 Ω

Miscellaneous Accessories



2000-1528-R	GPS Antenna, SMA(m)
69793	CW Signal Generator Kit
ODTF-1	Optical Distance-to-Fault Module, 1550 nm, Single Mode
2000-1520-R	USB Flash Drive
2000-1374	External Charger for Li-Ion Batteries

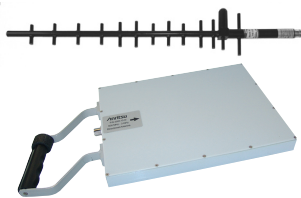
Optional Accessories (continued)

Backpack and Transit Case



67135	Anritsu Backpack (For Handheld Instrument and PC)
760-243-R	Large Transit Case with Wheels and Handle

Directional Antennas



Part Number	Description
2000-1411-R	822-900 MHz, N(f), 10 dBd, Yagi
2000-1412-R	885-975 MHz, N(f), 10 dBd, Yagi
2000-1413-R	1710-1880 MHz, N(f), 10 dBd, Yagi
2000-1414-R	1850-1990 MHz, N(f), 9.3 dBd, Yagi
2000-1415-R	2400-2500 MHz, N(f), 10 dBd, Yagi
2000-1416-R	1920-2170 MHz, N(f), 10 dBd, Yagi
2000-1519	500 MHz to 3 GHz, log periodic

Portable Antennas



2000-1200	806-866 MHz, SMA(m), 50 Ω
2000-1473	870-960 MHz, SMA(m), 50 Ω
2000-1035	896-941 MHz, SMA (m), 50 Ω (1/4 wave)
2000-1030	1710 to 1880 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1474	1710 to 1880 MHz with knuckle elbow (1/2 wave)
2000-1031	1850 to 1990 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1475	1920 to 1980 MHz and 2110 to 2170 MHz, SMA(m), 50 Ω
2000-1032-R	2400 to 2500 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1361	2400 to 2500, 5000 to 6000 MHz, SMA(m), 50 Ω
61532	Antenna Kit (Consists of: 2000-1030, 2000-1031, 2000-1032-R, 2000-1200, 2000-1035, 2000-1361, and carrying pouch)

Bandpass Filters



1030-114-R	806-869 MHz, N(m) - SMA(f), 50 Ω
1030-109-R	824 - 849 MHz, N(m) - SMA (f), 50 Ω
1030-110-R	880 - 915 MHz, N(m) - SMA (f), 50 Ω
1030-105-R	890-915 MHz Band, 0.41 dB loss, N(m) - SMA(f), 50 Ω
1030-111-R	1850 - 1910 MHz, N(m) - SMA (f), 50 Ω
1030-106-R	1710-1790 MHz Band, 0.34 dB loss, N(m) - SMA(f), 50 Ω
1030-107-R	1910-1990 MHz Band, 0.41 dB loss, N(m) - SMA(f), 50 Ω
1030-112-R	2400 - 2484 MHz, N(m) - SMA (f), 50 Ω
1030-155-R	2500-2700 MHz, N(m) - N(f), 50 Ω

Attenuators



3-1010-122	20 dB, 5 W, DC to 12.4 GHz, N(m)-N(f)
42N50-20	20 dB, 5 W, DC to 18 GHz, N(m) - N(f)
42N50A-30	30 dB, 5 W, DC to 18 GHz, N(m) - N(f)
3-1010-123	30 dB, 50 W, DC to 8.5 GHz, N(m)-N(f)
1010-127-R	30 dB, 150 W, DC to 3 GHz, N(m) - N(f)
3-1010-124	40 dB, 100 W, DC to 8.5 GHz, N(m)-N(f), Uni-directional
1010-121	40 dB, 100 W, DC to 18 GHz, N(m)-N(f), Uni-directional
1010-128-R	40 dB, 150 W, DC to 3 GHz, N(m) - N(f)

T1/E1 Extender Cables

806-16-R	Bantam Plug to Bantam Plug
3-806-116	Bantam Plug to BNC
3-806-117	Bantam " Y " Plug to RJ48
3-806-169	72 inch (1.8 m) BNC to BNC, 75 1/2 RG59 Type Coax Cable
806-176-R	Bantam Plug to Alligator Clips



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