



Specifications

Cell Master™ MT8212E and MT8213E

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 (50/75 Ω selectable)

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), RF Pwr When Hold (On/Off)
Data Points	137, 275, 551, 1102, 2204
Markers	Markers 1-6 (On/Off), Delta Markers 1-6 (On/Off), Marker to Peak/Valley, Peak/Valley Auto, Marker Table (On/Off), All Markers Off
Traces	Recall, Copy to Display Memory, No Trace Math, Trace ± Memory, Trace Overlay (On/Off)
Limit Line	On/Off, Single Limit, Multi-segment Edit, Limit Alarm (On/Off), Pass Fail Message (On/Off), Pass/Fail (Unbounded/Bounded), Warning Limit Offset, Clear Limit
Calibration	Start Cal, Cal Type (Standard/FlexCal™), Disp Valid Cal Temp Range
Save/Recall	Setups, Measurements, Screen Shots (.jpg) (save only)

Frequency

Frequency Range	2 MHz to 4 GHz (MT8212E), 2 MHz to 6 GHz (MT8213E)
Frequency Accuracy	≤ ± 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 ms/data point, RF immunity low, typical
Distance-to-Fault	≤ 1.25 ms/data point, RF immunity low, typical

Return Loss

Measurement Range	0 dB to 60 dB
Resolution	0.01 dB

VSWR

Measurement Range	1:1 to 65:1
Resolution	0.01

Cable Loss

Measurement Range	0 dB to 30 dB
Resolution	0.01 dB

Distance-to-Fault

Vertical Range Return Loss	0 dB to 60 dB
Vertical Range VSWR	1:1 to 65:1
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 feet)

1-Port Phase

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

Smith Chart

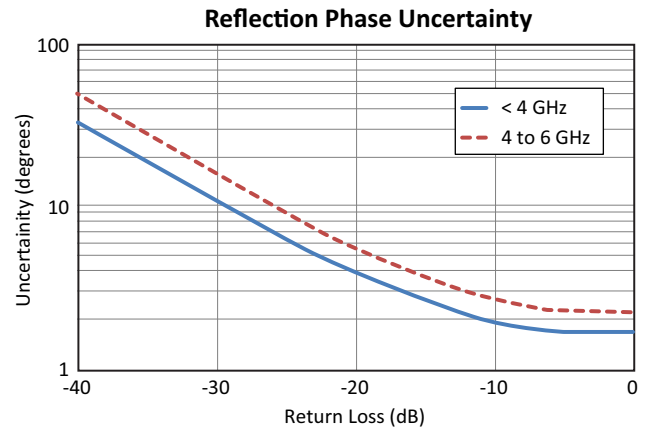
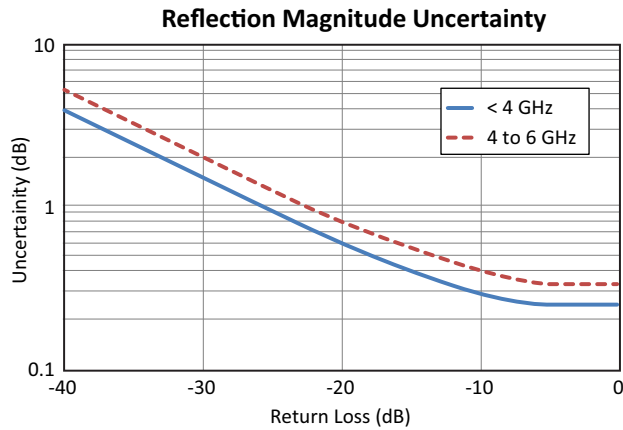
Resolution	0.01 50/75 Ohm Selectable
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Cable and Antenna Analyzer (Continued)

Measurement Accuracy

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

Measurement Uncertainty



PIM Analyzer (Requires PIM Master™)

See Product Brochure 11410-00546

2-Port Transmission Measurement (Option 0021)

Frequency

Frequency Range 2 MHz to 4 GHz (MT8212E), 2 MHz to 6 GHz (MT8213E)
Frequency Resolution 10 Hz

Output Power

High 0 dBm, typical
Low -30 dBm, typical

High Dynamic Range (On)

2 MHz to 4 GHz 80 dB, 95 dB, typical
4 GHz to 6 GHz 70 dB, 85 dB, typical
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 V to +32 V
Current (Low/High) 250 mA/450 mA, 1 A surge for 100 ms
Resolution 0.1 V

 **Spectrum Analyzer**
Measurements

Smart Measurements	Field Strength (uses antenna calibration tables to measure dBm/m ² , dBmV/m, dBV/m, dBμV/m, Volt/m, Watt/m ² , dBW/m ² , A/m, dBA/m and Watt/cm ²) 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) Emission Mask Coverage Mapping (requires Option 0431)
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Setup Parameters

Frequency	Center/Start/Stop, Span, Frequency Step, Signal Standard, Channel #, Channel Increment
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/VBW, Span/RBW
File	Save, Recall, Delete, Directory Management
Save/Recall	Setups, Measurements, Limit Lines, Screen Shots (.jpg) (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, Sweep Mode (Fast, Performance, No FFT), 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 → B, B ↔ C, Max Hold, Min Hold
Trace C Operations	A → C, B ↔ C, Max Hold, Min Hold, A – B → C, B – A → 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	9 kHz to 4 GHz (MT8212E), 9 kHz to 6 GHz (MT8213E)
Tuning Resolution	1 Hz
Frequency Reference	Aging: ± 1.0 ppm/year Accuracy: ± 1.5 ppm (25 °C ± 25 °C) + aging, < ± 50 ppb with GPS On
Frequency Span	10 Hz to 4 GHz including zero span (MT8212E), 10 Hz to 6 GHz including zero span (MT8213E)
Sweep Time	Minimum 100 ms, 10 μs to 600 s in zero span
Sweep Time Accuracy	± 2 % in zero span

Bandwidth

Resolution Bandwidth (RBW)	1 Hz to 3 MHz in 1-3 sequence ± 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

**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
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Amplitude Ranges

Dynamic Range	> 102 dB (2.4 GHz), 2/3 (TOI-DANL) in 1 Hz RBW
Measurement Range	DANL to +26 dBm
Display Range	1 dB to 15 dB/div in 1 dB steps, ten divisions displayed
Reference Level Range	-120 dBm to +30 dBm
Maximum Continuous Input Power	+30 dBm
Attenuator Range	0 dB to 55 dB in 5 dB steps
Amplitude Units	Log Scale Modes: dBm, dBV, dBmV, dBμV, dBW, dBmW, dBμW, dBA, dBmA, dBμA Linear Scale Modes: nV, μV, mV, V, kV, nW, μW, mW, W, kW, nA, μA, mA, A

Amplitude Accuracy

9 kHz to 100 kHz	± 2.00 dB typical
100 kHz to 4.0 GHz	± 1.25 dB, ± 0.5 dB typical
> 4.0 GHz to 6 GHz	± 1.50 dB, ± 0.5 dB typical

Displayed Average Noise Level (DANL)

(RBW = 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
> 4 GHz to 5 GHz	-134 dBm	-138 dBm	-150 dBm	-155 dBm
> 5 GHz to 6 GHz	-126 dBm	-131 dBm	-143 dBm	-150 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 + 190.5 MHz with F1 Input < -52 dBc @ 7349 - (2F2) MHz, with F2 Input, where F2 < 2424.5 MHz < -55 dBc @ 190.5 ± (F1/2) MHz, where F1 < 1 GHz

Third-Order Intercept (TOI)

	Preamp Off (-20 dBm tones 100 kHz apart, 10 dB attenuation)
800 MHz	+16 dBm
2400 MHz	+20 dBm
200 MHz to 2200 MHz	+25 dBm, typical
> 2.2 GHz to 5.0 GHz	+28 dBm, typical
> 5.0 GHz to 6.0 GHz	+33 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

 **Coverage Mapping (Options 0431)**

Measurements

Indoor Mapping	Outdoor Mapping
RSSI	RSSI
ACPR	ACPR

Setup Parameters

Frequency	Center/Start/Stop, Span, Freq Step, Signal Standard, Channel #, Channel Increment
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
BW	RBW, Auto RBW, VBW, Auto VBW, RBW/VBW, Span/VBW
Measurement Setup	ACPR, RSSI
Point Distance / Time Setup	Repeat Type Time Distance
Save Points Map	Save KML, JPEG, Tab Delimited
Recall Points Map	Recall Map, Recall KML Points only, Recall KML Points with Map, Recall Default Grid

 **Interference Analyzer (Option 0025)**

Measurements	Spectrum Field Strength Occupied Bandwidth Channel Power Adjacent Channel Power Ratio (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 Interference Mapping Triangulate location of interference with on-display maps
Application Options	Bias-Tee (On/Off), Impedance (50 Ω, 75 Ω, Other)

GPS Receiver Option (Option 0031) (Antenna sold separately)

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	Spectrum Analyzer, Interference Analyzer, CW Signal Analyzers < ± 50 ppb with GPS On, GPS antenna connected, 3 minutes after satellite lock in selected mode
Connector	SMA, Female

**Channel Scanner (Option 0027)**

Number of Channels	1 to 20 Channels
Measurements	Graph/Table, Max Hold (On/5 s/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 (MT8212E), 100 kHz to 6 GHz (MT8213E)
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 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	2 MHz to 2 GHz
Frequency Reference	Accuracy: ± 1.5 ppm (25 °C ± 25 °C) + aging, < ± 50 ppb with GPS On
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 ms to 65 ms typical) Gate Length (1 μs to 65 ms typical) Zero Span Time

 **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 (MT8212E), 10 MHz to 6 GHz (MT8213E)
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 dB to +100 dB (External Gain or Loss)
VSWR	2:1 typical
Maximum Continuous Input Power	+30 dBm
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/05A	MA24106A	MA24108A/18A/26A
Description	High Accuracy RF Power Sensor	Inline Bi-Directional High Power Sensor	High Accuracy RF Power Sensor	Microwave USB Power Sensor
Frequency Range	50 MHz to 6 GHz	600 MHz to 4 GHz (MA24104A) 350 MHz to 4 GHz (MA24105A)	50 MHz to 6 GHz	10 MHz to 8 GHz (MA24108A) 10 MHz to 18 GHz (MA24118A) 10 MHz to 26 GHz (MA24126A)
Connector	Type N(m), 50 Ω	Type N(m), 50 Ω (MA24104A) Type N(f), 50 Ω (MA24105A)	Type N(m), 50 Ω	Type N(m), 50 Ω (MA24108A/18A) Type K(m), 50 Ω (MA24126A)
Dynamic Range	-30 dBm to +20 dBm (0.001 mW to 100 mW)	+3 dBm to +51.76 dBm (2 mW to 150 W)	-40 dBm to +23 dBm (0.1 μW to 200 mW)	-40 dBm to +20 dBm (0.1 μW to 100 mW)
VBW	100 Hz	100 Hz	100 Hz	50 kHz
Measurand	True-RMS	True-RMS	True-RMS	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
Datasheet (for complete specifications)	11410-00414	11410-00483 (MA24104A) 11410-00621 (MA24105A)	11410-00424	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.

LTE Signal Analyzers (Options 0541, 0542, 0546, 0551, 0552, 0556)

Measurements

RF (Option 0541 FDD) (Option 0551 TDD)	Demodulation (Option 0542 FDD) (Option 0552 TDD)	Over-the-Air (OTA) (Option 0546 FDD) (Option 0556 TDD)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Power vs. Time (TDD only) Frame View Sub-Frame View Total Frame Power DwPTS Power Transmit Off Power Cell ID Timing Error ACPR Spectral Emission Mask Category A or B (Opt 1) RF Summary	Power vs. Resource Block (RB) RB Power (PDSCH) Active RBs, Utilization %, Channel Power, Cell ID OSTP, Frame EVM by modulation (FDD only) Constellation QPSK, 16 QAM, 64 QAM Modulation Results Ref Signal Power (RS) Sync Signal Power (SS) EVM – rms, peak, max hold Frequency Error – Hz, ppm Carrier Frequency Cell ID Control Channel Power Bar Graph or Table View RS, P-SS, S-SS PBCH, PCFICH PHICH, PDCCH (FDD only) Total Power (Table View) EVM (FDD only) Modulation Results Tx Time Alignment (FDD only) Modulation Summary Includes EVM by modulation (FDD only) Antenna Icons Detects active antennas (1/2)	Scanner Cell ID (Group, Sector) S-SS Power, RSRP, RSRQ, SINR Dominance Modulation Results – On/Off Tx Test Scanner RS Power of MIMO antennas Cell ID, Average Power Delta Power (Max-Min) Graph of Antenna Power Modulation Results – On/Off Mapping On-screen S-SS Power, RSRP, RSRQ, or SINR Scanner Modulation Results – Off	View Pass/Fail Limits All, RF, Modulation Available Measurements Channel Power Occupied Bandwidth ACLR Frequency Error Carrier Frequency Dominance EVM peak, rms RS Power RS EVM (FDD only) SS, P-SS, S-SS Power SS, P-SS, S-SS EVM (FDD only) PBCH Power PBCH EVM (FDD only) PCFICH Power PCFICH EVM (FDD only) PHICH Power, EVM (FDD only) PDCCH Power, EVM (FDD only) Cell, Group, Sector ID OSTP (FDD only) Tx Time Alignment (FDD only) Frame Power (TDD only) DwPTS Power (TDD only) Transmit Off Power (TDD only) Timing Error (TDD only)

Setup Parameters

Frequency	E-UTRA FDD bands 1 – 5, 7 – 14, 17 – 21, 23 – 25 (tunable 10 MHz to 4.0 GHz) E-UTRA TDD bands 33 – 43 (tunable 10 MHz to 4.0 GHz) Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Bandwidth	1.4, 3, 5, 10, 15, 20 MHz
Span	Auto, 1.4, 3, 5, 10, 15, 20, 30 MHz
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range
Sweep	Single/Continuous, Trigger Sweep
EVM Mode	Auto, PBCH only
Save/Recall	Setup, Measurement, Screen Shot (save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 0541, 0551)

RF Channel Power Accuracy	± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +10 dBm) (Option 0541) ± 1.5 dB, ± 1.0 dB typical, (RF input –30 dBm to +10 dBm) (Option 0551)
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Demodulation Measurements (Options 0542, 0552)

Frequency Error	± 10 Hz + time base error, 99 % confidence level
Residual EVM (rms) (FDD only)	2.0% typical (E-UTRA Test Model 3.1, RF Input –50 dBm to +10 dBm) for BW ≤ 10 MHz 2.5% typical (E-UTRA Test Model 3.1, RF Input –50 dBm to +10 dBm) for BW > 10 MHz
Residual EVM (rms) (TDD only)	2.0% typical (E-UTRA Test Model 3.1, RF Input –30 dBm to +10 dBm) for BW ≤ 10 MHz 2.5% typical (E-UTRA Test Model 3.1, RF Input –30 dBm to +10 dBm) for BW > 10 MHz

Over-the-Air (OTA) Measurements (Options 0546, 0556)

Scanner	Six strongest signals if present Auto Save — Sync Signal Power and Modulation Results with GPS information
Auto Save	Scanner — three strongest signals if present RS Power — strongest signal
Mapping	Map On-screen S-SS Power, RSRP, RSRQ, or SINR of Cell ID with strongest signal Scanner — three strongest signals if present Save and Export Scanner data: *.kml, *.mtd (tab delimited)

 **GSM/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 and Demodulation measurements 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 (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 %


W-CDMA/HSPA+ Signal Analyzers (Options 0044, 0065, 0035)

Measurements

RF (Option 0044)	Demodulation (Option 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 RF Summary	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 HSPA+ Power vs. Time Constellation Code Domain Power Table Code, Status EVM, Modulation Type Power, Code Utilization Power Amplifier Capacity Codogram Modulation Summary	Scrambling Code Scanner (Six) Scrambling Codes CPICH E_C/I_0 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, Bands I – VI, VIII – XIV, XVII -54 dB/-57 dB ± 1.0 dB @ 5 MHz/10 MHz offset, typical, Band VII

Demodulation (Option 0065) (temperature range 15 °C to 35 °C)

Frequency Error	± 10 Hz + time base error, 99% confidence level
W-CDMA Modulations	QPSK, QPSK-DTX (Codecs: AMR 4.75, 5.9, 7.4, 12.2 kbps, DTX 7.4, 12.2 kbps)
HSPA+ Modulations	QPSK, 16 QAM, 64 QAM
EVM Accuracy	± 2.5 %, $6\% \leq \text{EVM} \leq 25\%$
Residual EVM	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	Multipath power of six signals relative to strongest pilot

CDMA Signal Analyzers (Options 0042, 0043, 0033)

Measurements

RF (Option 0042)	Demodulation (Option 0043)	Over-the-Air (OTA) (Option 0033)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Emission Mask Multi-carrier ACPR RF Summary	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 Modulation Summary	Pilot Scanner (Nine) PN E _c /I ₀ Tau Pilot Power Channel Power Pilot Dominance Multipath Scanner (Six) E _c /I ₀ 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 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 dBm to +20 dBm)

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 dBm 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	Multipath power of six signals relative to strongest pilot
Limit Test	Average of ten tests compared to limit

EV-DO Signal Analyzers (Options 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 RF Summary	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 Modulation Summary	Pilot Scanner (Nine) PN E_C/I_0 Tau Pilot Power Channel Power Pilot Dominance Multipath Scanner (Six) E_C/I_0 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 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
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 0062) (Temperature range 15 °C to 35 °C)

RF Channel Power Accuracy	± 1.5 dB, ± 1.0 dB typical, (RF input -50 dBm to +20 dBm)
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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 dBm 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	Multipath power of six signals relative to strongest pilot

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 RF Summary	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 Modulation Summary	There are no additional OTA Measurements. RF and Demodulation measurements 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 ms
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 dBm to +20 dBm)

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)



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 Channel Power Occupied Bandwidth Power vs. Time Channel Power Preamble Power Downlink Burst Power Uplink Burst Power ACPR RF Summary	Constellation RCE (RMS/Peak) EVM (RMS/Peak) Frequency Error CINR Base Station ID Sector ID Spectral Flatness Adjacent Subcarrier Flatness EVM vs. Subcarrier/Symbol RCE (RMS/Peak) EVM (RMS/Peak) Frequency Error CINR Base Station ID Sector ID DL-MAP (Tree View) Modulation Summary	Channel Power Monitor Preamble Scanner (Six) Preamble Relative Power Cell ID Sector ID PCINR Dominant Preamble Base Station ID	Channel Power Occupied Bandwidth Downlink Bust Power Uplink Burst Power Preamble Power Crest Factor Frequency Error Carrier Frequency EVM RCE Sector ID

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 ms
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 dBm 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 s
Preamble Scanner	Six Strongest Preambles
Auto Save	Yes
GPS Logging	Yes

*Conforms to IEEE Std. 802.16e-2005, WiMAX Forum® Air Interface - Mobile System Profile - Release 1.0 Certified, System Profiles according to WMF-T24-001-R010v07.



TD-SCDMA/HSPA+ 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 Channel Power Occupied Bandwidth Left Channel Power Left Channel Occ B/W Right Channel Power Right Channel Occ B/W Power vs. Time Six Slot Powers Channel Power (RRC) DL-UL Delta Power UpPTS Power DwPTS Power On/Off Ratio Slot Peak-to-Average Power Spectral Emission RF Summary	Code Domain Power/Error (QPSK/8 PSK/16 QAM) Slot Power DwPTS Power Noise Floor Frequency Error Tau Scrambling Code EVM Peak EVM Peak Code Domain Error Modulation Summary	Code Scan (32) Scrambling Code Group Tau E _c /I ₀ Pilot Dominance Tau Scan (Six) Sync-DL# Tau E _c /I ₀ DwPTS Power Pilot Dominance	Occupied Bandwidth Channel Power Channel Power RCC On/Off Ratio Peak-to-Average Ratio Frequency Error EVM Peak EVM Peak Code Domain Error Tau Noise Floor

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 dBm 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 Demodulation	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



ISDB-T Measurements (Options 0030, 0079, 0032)

For full specifications refer to the Digital Broadcast Analysis Options Technical Data Sheet 11410-00624

Measurements

ISDB-T RF (Option 0030)	ISDB-T Signal Analysis (Option 0030)	ISDB-T BER Analysis (Option 0079)	ISDB-T SFN Analysis (Option 0032)
Signal Power Channel Power Termination Voltage Open Terminal Voltage Field Strength Spectrum Monitor Channel Power Zone Center Channel Zone Center Frequency Spectrum Mask Mask (Standard A) Japan Mask (Standard B) Japan Mask (Critical) Brazil Mask (Sub-critical) Brazil Mask (Non-critical) Brazil Phase Noise Spurious Emissions	Constellation (w/zoom) Layer A, B, C, TMCC Sub-carrier MER Delay Profile (w/zoom) Frequency Response Measured Data Frequency Frequency Offset MER (Total, Layer A/B/C, TMCC, AC1) Modulation (Layer A/B/C) Mode, GI Sub-carrier MER w/marker Delay w/marker Frequency Response w/marker	Layer A, Layer B, Layer C BER and Error Count per Layer Before RS Before Viterbi PER and Error Count per Layer MPEG Bit Rate per Layer TMCC Information per Layer Modulation Code Rate Interleave Segments Channel Power Mode, GI Signal Sync Status ASI Out	Impulse Response (w/zoom) In-band Spectrum Measured Data Channel Power Delay DU Ratio Power Field Strength
ISDB-T Measurement Modes			
Custom: User specified measurement and setup parameters			
Easy: User specified measurements. Some setup parameters are automatically set or detected			
Batch: User specified measurements and channels for automatic measurement, results' display and storage			

Setup Parameters

Channel Map	UHF (Japan), UHF (Brazil), IF (37.15 MHz), None
Channel	13 to 62 (Japan), 14 to 69 (Brazil)
Frequency	35 MHz to 806 MHz
Bandwidths	6 MHz, 8 MHz
Partial Reception	Recognized when layer A segment count is 1
One-Seg	On: synchronizes with single segment transmission (Bandwidth 6 MHz only) Off: synchronizes with normal 13 segment signal
Pre-amp	On, Off
Reference Level Setting	-25 dBm to +20 dBm/5 dB steps (Preamp Off), -50 dBm to -10 dBm/10 dB steps (Preamp On)

ISDB-T Digital Video Measurements (Option 0030)

Channel Power Accuracy	± 2 dB, (RF input -84 dBm to -10 dBm)
Frequency Lock Range	± 90 kHz
Frequency Offset Accuracy	± (measurement frequency x reference frequency accuracy) ± 0.3 Hz
Residual MER	≥ 42 dB, typical (Preamp Off, Reference level: -20 dBm) ≥ 37 dB, typical (Preamp On, Reference level: -50 dBm)
Sub-carrier MER Display Range	± 2.785 MHz from center frequency (Bandwidth 6 MHz) ± 3.714 MHz from center frequency (Bandwidth 8 MHz)
Delay Profile Resolution	0.12 μs (Bandwidth 6 MHz) 0.09 μs (Bandwidth 8 MHz)
Frequency Response Resolution	1 kHz, 0.1 dB
Phase Noise Range	-40 dBc/Hz to -140 dBc/Hz
Spurious Emissions Search Range	5 MHz to 5x input signal frequency

ISDB-T BER Measurements (Option 0079) (Operating temperature range 0 °C to 40 °C)

BER Measurement Display per Layer	Rate and Error count: Before Viterbi, Before RS
PER Measurement Display per Layer	Rate and Error count
TMCC Information Display per Layer	Modulation, Code Rate, Interleave, Number of segments
ASI Output	BNC-J 75 Ω

ISDB-T SFN Measurements (Option 0032)

Delay Profile Display Range	-1008 μs to +1008 μs (Bandwidth 8 MHz)
Delay Wave Estimated Level Accuracy	± 2.5 dB typical (-10 dBm to -79 dBm)
DU Ratio Accuracy	± 1 dB typical (-10 dBm to -70 dBm)
Inband Spectrum Range	± 2.74 MHz (Mode 2), ± 2.76 MHz (Mode 3) (Bandwidth 8 MHz)



DVB-T/H (Options 0064, 0057, 0078)

For full specifications refer to the Digital Broadcast Analysis Options Technical Data Sheet 11410-00624

Measurements

DVB-T/H RF (Option 0064)	DVB-T/H Signal Analysis (Option 0064)	DVB-T/H BER Analysis (Option 0057)	DVB-T/H SFN Analysis (Option 0078)
Signal Power	Composite or Individual Views	BER	Impulse Response (w/zoom)
Channel Power	Constellation	Before RS	Inband Spectrum
Termination Voltage	Impulse Response (w/zoom)	Before Viterbi	Measured Data
Open Terminal Voltage	Carrier MER (w/zoom)	PER (Packet)	Channel Power
Field Strength	Freq Response (composite view only)	Channel Power	Delay
Spectrum Monitor	Measured Data	MER (Quick)	DU Ratio
Channel Power	Mode, GI	Bit Rate	Power
Zone Center Channel	Modulation	TPS Info	Field Strength
Zone Center Frequency	Hierarchy	Length Indicator	
Shoulder Attenuation	Freq Offset	Mode, GI	
Channel Power	Channel Power	Modulation	
Zone Center Channel	MER (Total/Data/TPS)	Hierarchy	
Zone Center Frequency	TPS Warning Message	Interleave Type	
Lower Shoulder Attenuation	TPS Info	Cell ID	
Upper Shoulder Attenuation	Interleave Type	Code Rate	
	Cell ID	Time Slicing	
	Code Rate (HP/LP)	MPE-FEC	
	Time Slicing (HP/LP)	TPS Warning Message	
	MPE-FEC (HP/LP)	ASI Out	

Setup Parameters

Channel Map	UHF (Australia), UHF (Europe), VHF (Europe), None
Channel	28 to 69 (Australia), 21 to 69 (Europe), 5 to 12 (Europe)
Frequency Offset	± 166.666 kHz, ± 333.333 kHz, ± 499.999 kHz, None
Frequency	30 MHz to 2.8 GHz when Channel Map is None
Bandwidth	5*, 6*, 7, 8 MHz
Pre-amp	On, Off
Reference Level	-25 dBm to +20 dBm/5 dB steps (Preamp Off), -50 dBm to -10 dBm/10 dB steps (Preamp On)

DVB-T/H Digital Video Measurements (Option 0064)

Channel Power Accuracy	± 2 dB, (RF input -84 dBm to -10 dBm)
Frequency Lock Range	± 90 kHz
Frequency Offset Accuracy	± (measurement frequency x reference frequency accuracy) ± 0.3 Hz
Residual MER	≥ 42 dB (Preamp Off, Reference Level: -20 dBm) ≥ 37 dB (Preamp On, Reference Level: -50 dBm)
Impulse Response Resolution	0.11 µs (Bandwidth: 8 MHz), 0.1 dB
Carrier MER Marker	Carrier Number, Offset Frequency and MER
Composite View	Simultaneous display of Constellation (Data and TPS), Impulse Response, Carrier MER and Frequency Response

DVB-T/H BER Measurements (Option 0057) (Operating temperature range 0 °C to 40 °C)

Bit Count Setting	Range 1E+6 to 1E+12
Service Type	In Service: BER measurement of normal in-service data traffic Simultaneous BER measurement Before Viterbi and Before RS error correction Out of Service: BER measurement of a PRBS23 data sequence BER measurement point can be selected Before Viterbi, Before RS or After RS
TPS Information	Length indicator, Mode, GI, Modulation, Hierarchy, Inner Interleave, Cell ID, Code Rate, Time Slicing, MPE-FEC
ASI Output	BNC-J 75 Ω

DVB-T/H SFN Measurements (Option 0078)

Impulse Response Display Range	-896 µs to +896 µs (Bandwidth 8 MHz)
Resolution	0.11 µs (33 m) (Bandwidth 8 MHz)
Marker	Delay time, relative level (DU ratio), power and field strength or termination voltage
Inband Spectrum Range	± 3.804 MHz (Bandwidth 8 MHz)

*Not available for BER measurements

**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 dBm 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 dBm 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 dBm 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 to 31), Tx Freq, Tx Level (-30 dBm 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
Payload	E1 (2.048 Mbps), Fractional E1 (N x 64, 64, 16, 8 kbps)
Pulse Shapes	Conform to ITU G.703
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


Backhaul Analyzers (Options 0051, 0052, 0053) (Continued)
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 dBm 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 dBm 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 to 24), Tx Freq, Tx Level (-30 dBm 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 (≥ 1000 Ω , -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

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 and is not warranted; 5) Recommended calibration cycle is 12 months; 6) Performance Sweep Mode.

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 (.jpg) (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, \pm 50 VDC
RF In	Type N, female, 50 Ω
RF Input Damage Level	+33 dBm peak, \pm 50 VDC, Maximum Continuous Input (\geq 10 dB attenuation)
ASI Output Connector	BNC-J 75 Ω (with Option 0057 or Option 0079)
GPS	SMA(f)
T1	Bantam jacks
T3	BNC connectors
E1	RJ48C
External Power	5.5 mm barrel connector, 12.5 VDC 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 and/or remote control)
Headset Jack	3.5 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 \pm 50 VDC

Display

Type	Resistive Touchscreen
Size	8.4" daylight viewable color LCD
Resolution	800 x 600
Pixel Defects	No more than one defective pixel (99.9997% good pixels)

Battery

Type	Li-Ion
Battery Operation	3.0 hours, typical

Electromagnetic Compatibility

European Union	CE Mark, EMC Directive 2004/108/EC Low Voltage Directive 2006/95/EC
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	95% RH (non-condensing) at 40 $^{\circ}$ C
Shock	MIL-PRF-28800F Class 2
Storage	-40 $^{\circ}$ C to 71 $^{\circ}$ C
Altitude	4600 meters, operating and non-operating

ESD

RF Port Center Pin	Withstands up to \pm 15 kV
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Size and Weight

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

Line Sweep Tools (for your PC)**Trace Capture**

Browse to Instrument	View and copy traces from the test equipment to your PC using Windows Explorer
Open Legacy Files	Open DAT files captured with Hand Held Software Tools v6.61
Open Current Files	Open VNA or DAT files
Capture Plots To	The Line Sweep Tools screen, DAT files, Database, or JPEG

Traces

Trace Types	Return Loss, VSWR, DTF-RL, DTF-VSWR, Cable Loss, Smith Chart, and PIM
Trace Formats	DAT, VNA, CSV, PNG, BMP, JPG, HTML, Data Base, and PDF

Report Generation

Report Generator	Includes GPS location along with measurements
Report Format	Create reports in HTML or PDF format
Report Setup	Report Title, Company, Prepared for, Location, Date and Time, Filename, Company logo
Trace Setup	1 Trace Portrait Mode, 2 Trace Portrait Mode, 1 Trace Landscape Mode

Trace Validation

Presets	7 presets allow "one click" setting of up to 6 markers and one limit line
Marker Controls	6 regular Markers, Marker Peak, Marker Valley, Marker between, and frequency entry
Delta Markers	6 Delta markers
Limit Line	Enable and drag or value entry. Also works with presets
Next Trace Button	Next Trace and Previous trace arrow keys allow quick switching between traces

Tools

Cable Editor	Allows creation of custom cable parameters
Distance to Fault	Converts a Return Loss trace to a Distance to Fault trace
Measurement Calculator	Converts Real, Imaginary, Magnitude, Phase, RL, VSWR, Rho, and Transmit power
Signal Standard Editor	Creates new band and channel tables
Renaming Grid	36 user definable phrases for creation of file names, trace titles, and trace subtitles

Connectivity

Connections	USB cable, USB Memory Stick
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easyTest Tools (for your PC)**Instrument Mode**

Cable & Antenna Analyzer Mode

Commands

Display Image	Allows putting a custom image on the instrument screen
Recall Setup	Places the instrument into a known state
Prompt	Displays instructional messages on the instrument screen
Save	Allows automatic or manual saving of traces

Connectivity

Connections	USB cable or USB memory stick
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Master Software Tools (for your PC)**Mapping** (GPS Required)

Spectrum Analyzer Mode	MapInfo, MapPoint
Mobile WiMAX OTA, LTE OTA Options	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) - Playback (Frequency and/or Time Domain)

List/Parameter Editors

Traces	Add, delete, and modify limit lines and markers
Product Updates	Auto-checks Anritsu website for latest revision firmware
Pass/Fail	Create, download, or edit Signal Analysis Pass/Fail Limits
Languages	Add custom language or modify non-English language menus

Connectivity

Connections	Connect to PC using USB
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Ordering Information – Options



MT8212E
 2 MHz to 4 GHz
 9 kHz to 4 GHz
 10 MHz to 4 GHz

MT8213E
 2 MHz to 6 GHz
 9 kHz to 6 GHz
 10 MHz to 6 GHz

Description
 Cable and Antenna Analyzer
 Spectrum Analyzer
 Power Meter
 PIM Analyzer (requires PIM Master)

Options

Options



MT8212E-0021
 MT8212E-0010
 MT8212E-0031
 MT8212E-0019
 MT8212E-0025
 MT8212E-0027
 MT8212E-0431
 MT8212E-0090
 MT8212E-0028
 MT8212E-0040
 MT8212E-0041
 MT8212E-0044
 MT8212E-0065
 MT8212E-0035
 MT8212E-0060
 MT8212E-0061
 MT8212E-0038
 MT8212E-0541
 MT8212E-0542
 MT8212E-0546
 MT8212E-0551
 MT8212E-0552
 MT8212E-0556
 MT8212E-0042
 MT8212E-0043
 MT8212E-0033
 MT8212E-0062
 MT8212E-0063
 MT8212E-0034
 MT8212E-0046
 MT8212E-0047
 MT8212E-0066
 MT8212E-0067
 MT8212E-0037
 MT8212E-0030
 MT8212E-0032
 MT8212E-0079
 MT8212E-0064
 MT8212E-0078
 MT8212E-0057
 MT8212E-0051
 MT8212E-0052
 MT8212E-0053
 MT8212E-0098
 MT8212E-0099

MT8213E-0021
 MT8213E-0010
 MT8213E-0031
 MT8213E-0019
 MT8213E-0025
 MT8213E-0027
 MT8213E-0431
 MT8213E-0090
 MT8213E-0028
 MT8213E-0040
 MT8213E-0041
 MT8213E-0044
 MT8213E-0065
 MT8213E-0035
 MT8213E-0060
 MT8213E-0061
 MT8213E-0038
 MT8213E-0541
 MT8213E-0542
 MT8213E-0546
 MT8213E-0551
 MT8213E-0552
 MT8213E-0556
 MT8213E-0042
 MT8213E-0043
 MT8213E-0033
 MT8213E-0062
 MT8213E-0063
 MT8213E-0034
 MT8213E-0046
 MT8213E-0047
 MT8213E-0066
 MT8213E-0067
 MT8213E-0037
 MT8213E-0030
 MT8213E-0032
 MT8213E-0079
 MT8213E-0064
 MT8213E-0078
 MT8213E-0057
 MT8213E-0051
 MT8213E-0052
 MT8213E-0053
 MT8213E-0098
 MT8213E-0099

2-Port Transmission Measurement
 Bias-Tee
 GPS Receiver (requires Antenna)
 High-Accuracy Power Meter (requires External Power Sensor)
 Interference Analyzer (Option 0031 recommended)
 Channel Scanner
 Coverage Mapping (requires Option 0031)
 Gated Sweep
 C/W Signal Generator (requires CW Signal Generator Kit, P/N 69793)
 GSM/EDGE RF Measurements
 GSM/EDGE Demodulation
 W-CDMA/HSPA+ RF Measurements
 W-CDMA/HSPA+ Demodulation
 W-CDMA/HSPA+ OTA Measurements
 TD-SCDMA/HSPA+ Measurements
 TD-SCDMA/HSPA+ Demodulation
 TD-SCDMA/HSPA+ OTA Measurements (recommend Option 0031)
 LTE RF Measurements
 LTE Modulation Measurements
 LTE OTA Measurements (recommend Option 0031)
 TD-LTE RF Measurements
 TD-LTE Modulation Measurements
 TD-LTE OTA Measurements (recommend Option 0031)
 CDMA RF Measurements
 CDMA Demodulation
 CDMA OTA Measurements (requires Option 0031)
 EV-DO RF Measurements
 EV-DO Demodulation
 EV-DO OTA Measurements (requires Option 0031)
 Fixed WiMAX RF Measurements
 Fixed WiMAX Demodulation
 Mobile WiMAX RF Measurements
 Mobile WiMAX Demodulation
 Mobile WiMAX OTA Measurements (recommend Option 0031)
 ISDB-T Digital Video Measurements
 ISDB-T SFN Measurements
 ISDB-T BER Measurements (Requires option 0030, cannot be ordered with option 0051, 0052 or 0053)
 DVB-T/H Digital Video Measurements
 DVB-T/H SFN Measurements
 DVB-T/H BER Measurements (Requires option 0064, cannot be ordered with option 0051, 0052 or 0053)
 T1 Analyzer*
 E1 Analyzer*
 T3/T1 Analyzer*
 Standard Calibration (ANSI 2540-1-1994)
 Premium Calibration to (ANSI 2540-1-1994 plus test data)

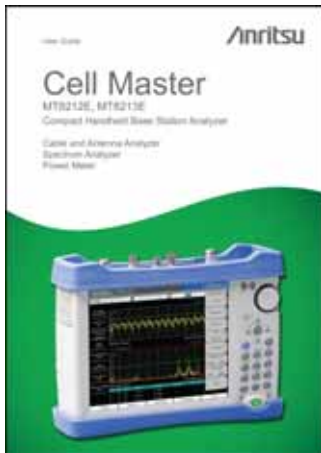
*Mutually exclusive

Standard Accessories (Included with instrument)

Part Number	Description
10920-00060	Handheld Instruments Documentation Disc
10580-00250	Cell Master User Guide (includes Bias-Tee, GPS Receiver)
2000-1654-R	Soft Carrying Case
2300-498	Master Software Tools (MST) CD Disc
2300-530	Anritsu Tool Box with Line Sweep Tools (LST) DVD Disc
2300-539	easyTest Tools CD Disc
633-75	Rechargeable Li-Ion Battery, 7500 mAh
40-187-R	AC-DC Adapter
806-141-R	Automotive Cigarette Lighter 12V VDC Adapter
3-2000-1498	USB A/5-pin mini-B Cable, 10 feet/305 cm
11410-00485	Cell Master MT8212E/MT8213E Technical Data Sheet One Year Warranty (Including battery, firmware, and software) Certificate of Calibration and Conformance

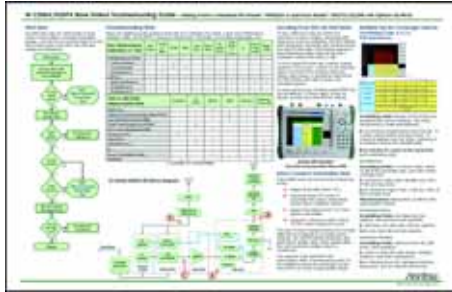
Power Sensors (For complete ordering information see the respective datasheets of each sensor)

Model Number	Description
PSN50	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +20 dBm
MA24106A	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm
MA24104A	Inline High Power Sensor, 600 MHz to 4 GHz, +51.76 dBm
MA24105A	Inline High/Peak Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 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
MA24126A	Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm

Manuals (Soft copy included on Handheld Instruments Documentation Disc and at www.anritsu.com)

Part Number	Description
10920-00060	Handheld Instruments Documentation Disc
10580-00250	Cell Master 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
10580-00244	Spectrum Analyzer Measurement Guide - Interference Analyzer, Channel Scanner, Gated Sweep, CW Signal Generator, AM/FM/PM Analyzer, Interference Mapping, Coverage Mapping
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, LTE
10580-00235	3GPP2 Signal Analyzer Measurement Guide - CDMA, EV-DO
10580-00236	WiMAX Signal Analyzer Measurement Guide - Fixed WiMAX, Mobile WiMAX
10580-00237	Digital TV Measurement Guide - DVB-T/H, ISDB-T
10580-00238	Backhaul Analyzer Measurement Guide - T1, E1, T3/T1
10580-00256	Programming Manual
10580-00280	PIM Master User Guide

Trouble Shooting Guides (Soft copy at www.anritsu.com)



Part Number	Description
11410-00473	Cable, Antenna and Components
11410-00551	Spectrum Analyzers
11410-00472	Interference
11410-00566	LTE eNodeB Testing
11410-00615	TD-LTE eNodeB Testing
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
11410-00552	T1/DS1 Backhaul Testing
11410-00553	E1 Backhaul Testing

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 6.0 GHz 50 Ω
2000-1619-R	Precision Open/Short/Load, 7/16 DIN(f), DC to 6.0 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



Part Number	Description
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 (Recommended for cable & antenna line sweep applications)



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

Optional Accessories (Continued)

Interchangeable Adaptor Phase Stable Test Port Cables, Armored w/Reinforced Grip (recommended for cable and antenna line sweep applications. It uses the same ruggedized grip as the Reinforced grip series cables. Now you can also change the adaptor interface on the grip to four different connector types)



Part Number	Description
15RCN50-1.5-R	1.5 m, DC to 6 GHz, N(m), N(f), 7/16 DIN(m), 7/16 DIN(f), 50 Ω
15RCN50-3.0-R	3.0 m, DC to 6 GHz, N(m), N(f), 7/16 DIN(m), 7/16 DIN(f), 50 Ω

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



Part Number	Description
15NNF50-1.5C	1.5 m, DC to 6 GHz, N(m) to N(f), 50 Ω
15NN50-1.5C	1.5 m, DC to 6 GHz, N(m) to N(m), 50 Ω
15NDF50-1.5C	1.5 m, DC to 6 GHz, N(m) to 7/16 DIN(f), 50 Ω
15ND50-1.5C	1.5 m, DC to 6 GHz, N(m) to 7/16 DIN(m), 50 Ω
15NNF50-3.0C	3.0 m, DC to 6 GHz, N(m) to N(f), 50 Ω
15NN50-3.0C	3.0 m, DC to 6 GHz, N(m) to N(m), 50 Ω
15NNF50-5.0C	5.0 m, DC to 6 GHz, N(m) to N(f), 50 Ω
15NN50-5.0C	5.0 m, DC to 6 GHz, N(m) to N(m), 50 Ω

Adapters



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

Precision Adapters



Part Number	Description
34NN50A	Precision Adapter, N(m) to N(m), DC to 18 GHz, 50 Ω
34NFnF50	Precision Adapter, N(f) to N(f), DC to 18 GHz, 50 Ω

Optional Accessories (Continued)

Miscellaneous Accessories



Part Number	Description
69793	CW Signal Generator Kit
2000-1528-R	GPS Antenna, SMA(m) with 15 foot cable
2000-1652-R	GPS Antenna, SMA(m) with 1 foot cable
2000-1689	EMI Near Field Probe Kit
2000-1374	External Charger for Li-Ion Batteries
2300-532	Map Master CD
633-75	7500 mAh High-Capacity Battery Pack
2000-1653	Anti-glare Screen Cover (package of 2)

Backpack and Transit Case



Part Number	Description
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 MHz to 900 MHz, N(f), 10 dBd, Yagi
2000-1412-R	885 MHz to 975 MHz, N(f), 10 dBd, Yagi
2000-1413-R	1710 MHz to 1880 MHz, N(f), 10 dBd, Yagi
2000-1414-R	1850 MHz to 1990 MHz, N(f), 9.3 dBd, Yagi
2000-1415-R	2400 MHz to 2500 MHz, N(f), 10 dBd, Yagi
2000-1416-R	1920 MHz to 2170 MHz, N(f), 10 dBd, Yagi
2000-1617	600 MHz to 21 GHz, N(f), 5-8 dBi to 12 GHz, 0-6 dBi to 21 GHz, log periodic
2000-1659-R	698 MHz to 787 MHz, N(f), 8 dBd, Yagi
2000-1660-R	1425 MHz to 1535 MHz, N(f), 12 dBd, Yagi
2000-1677-R	300 MHz to 3 GHz, SMA(m), log periodic

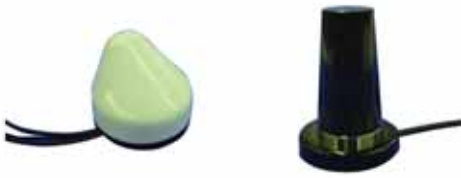
Portable Antennas



Part Number	Description
2000-1200-R	806 MHz to 866 MHz, SMA(m), 50 Ω
2000-1473-R	870 MHz to 960 MHz, SMA(m), 50 Ω
2000-1035-R	896 MHz to 941 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1030-R	1710 MHz to 1880 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1474-R	1710 MHz to 1880 MHz with knuckle elbow (1/2 wave)
2000-1031-R	1850 MHz to 1990 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1475-R	1920 MHz to 1980 MHz and 2110 MHz to 2170 MHz, SMA(m), 50 Ω
2000-1032-R	2400 MHz to 2500 MHz, SMA(m), 50 Ω (1/2 wave)
2000-1361-R	2400 MHz to 2500 MHz, 5000 MHz to 6000 MHz, SMA(m), 50 Ω
2000-1636-R	Antenna Kit (Consists of: 2000-1030-R, 2000-1031-R, 2000-1032-R, 2000-1200-R, 2000-1035-R, 2000-1361-R, and carrying pouch)

Optional Accessories (Continued)

Mag Mount Broadband Antenna



Part Number	Description
2000-1647-R	Cable 1: 698 MHz to 1200 MHz 2 dBi peak gain, 1700 MHz to 2700 MHz 5 dBi peak gain, N(m), 50 Ω, 10 feet Cable 2: 3000 MHz to 6000 MHz 5 dBi peak gain, N(m), 50 Ω, 10 feet Cable 3: GPS 26 dB gain, SMA(m), 50 Ω, 10 feet
2000-1645-R	694 MHz to 894 MHz 3 dBi peak gain, 1700 MHz to 2700 MHz 3 dBi peak gain, N(m), 50 Ω, 10 feet
2000-1646-R	750 MHz to 1250 MHz 3 dBi peak gain, 1650 MHz to 2000 MHz 5 dBi peak gain, 2100 MHz to 2700 MHz 3 dBi peak gain, N(m), 50 Ω, 10 feet
2000-1648-R	1700 MHz to 6000 MHz 3 dBi peak gain, N(m), 50 Ω, 10 feet

Filters



Part Number	Description
1030-114-R	806 MHz to 869 MHz, N(m) to SMA(f), 50 Ω
1030-109-R	824 MHz to 849 MHz, N(m) to SMA(f), 50 Ω
1030-110-R	880 MHz to 915 MHz, N(m) to SMA(f), 50 Ω
1030-111-R	1850 MHz to 1910 MHz, N(m) to SMA(f), 50 Ω
1030-112-R	2400 MHz to 2484 MHz, N(m) to SMA(f), 50 Ω
1030-105-R	890 MHz to 915 MHz, N(m) to N(f), 50 Ω
1030-106-R	1710 MHz to 1790 MHz, N(m) to N(f), 50 Ω
1030-107-R	1910 MHz to 1990 MHz, N(m) to N(f), 50 Ω
1030-149-R	High Pass, 150 MHz, N(m) to N(f), 50 Ω
1030-150-R	High Pass, 400 MHz, N(m) to N(f), 50 Ω
1030-151-R	High Pass, 700 MHz, N(m) to N(f), 50 Ω
1030-152-R	Low Pass, 200 MHz, N(m) to N(f), 50 Ω
1030-153-R	Low Pass, 550 MHz, N(m) to N(f), 50 Ω
1030-155-R	2500 MHz to 2700 MHz, N(m) to N(f), 50 Ω
1030-178-R	1920 MHz to 1980 MHz, N(m) to N(f), 50 Ω
1030-179-R	777 MHz to 797 MHz, N(m) to N(f), 50 Ω
1030-180-R	2500 MHz to 2570 MHz, N(m) to N(f), 50 Ω
2000-1684-R	791 MHz to 821 MHz, N(m) to N(f), 50 Ω

Attenuators



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

T1/E1 Extender Cables

Part Number	Description
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

Notes

Notes



The Master Users Group is an organization dedicated to providing training, technical support, networking opportunities and links to Master product development teams. As a member you will receive the Insite Quarterly Newsletter with user stories, measurement tips, new product news and more.

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List Revision Date: 20121226



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