Anritsu
envision : ensure

Cell Master™
Compact Handheld Base Station Analyzer

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

Cable & Antenna Analyzer
Spectrum Analyzer
Power Meter

Introduction

Anritsu introduces its latest generation compact handheld Base Station Analyzer for installation and maintenance of wireless networks. Designed as a lightweight base station analyzer meeting virtually all the testing needs of an RF technician, the Cell Master features Signal Analyzer options for 2G, 3G, and 4G cellular networks including LTE, WiMAX, and for digital broadcast.

Cable and Antenna Analyzer Highlights

- Measurements: RL, VSWR, Cable Loss, DTF, Phase
- 2-port Transmission Measurement: High/Low Power
- Sweep Speed: 1 ms/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, Interference Mapping
- Dynamic Range: > 102 dB in 1 Hz RBW
- DANL: –162 dBm in 1 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

- LTE/LTE-A FDD/TDD
- GSM/EDGE
- W-CDMA/HSPA+
- TD-SCDMA/HSPA+
- CDMA, EV-DO
- Fixed, Mobile WiMAX
- EMF Test
- USB Power Sensors, 4 GHz to 26 GHz
- Coverage Mapping
- E1, T1, T3 Backhaul Analyzer
- 3 hour battery operation time
- USB or optional Ethernet data transfer

- ISDB-T, ISDB-T SFN
- DVB-T/H, DVB-T/H SFN
- Interference Analyzer
- GPS information on stored traces
- Built-in Bias Tee
- Internal Power Meter
- High Accuracy Power Meter
- Master Software Tools™
- Line Sweep Tools™
- easyTest Tools™
- Web Remote Control with Ethernet option

Table of Contents

Definitions

Specifications	All specifications and characteristics apply to Revision 1 instruments under the following conditions, unless otherwise stated: • After 5 minutes of warm-up time, where the instrument is left in the ON state. • Sweep Mode set to Performance. • When using the internal reference signal.
Typical Specifications	Typical specifications are not tested and not warranted. They are generally representative of characteristic performance.
Nominal	Design parameters are not tested and not warranted.
Calibration Cycle	Recommended calibration cycle is 12 months.
Time Base Error	Input Frequency × Frequency Reference Error

All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

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🗼 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 Makers 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)	$(1.5 \times 10^8 \times vp) / \Delta F$ (vp = 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 m (4921 ft)

1-Port Phase

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

Smith Chart

Resolution	0.01 50/75 ohm selectable

ᵀᵞ Cable and Antenna Analyzer (Continued)

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

Measurement Uncertainty

Reflection Magnitude Uncertainty	Reflection Phase Uncertainty
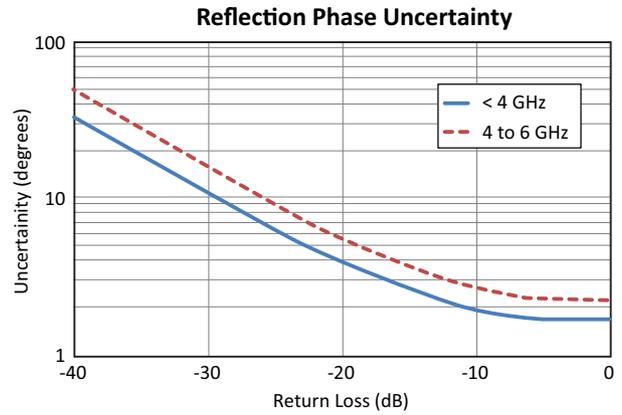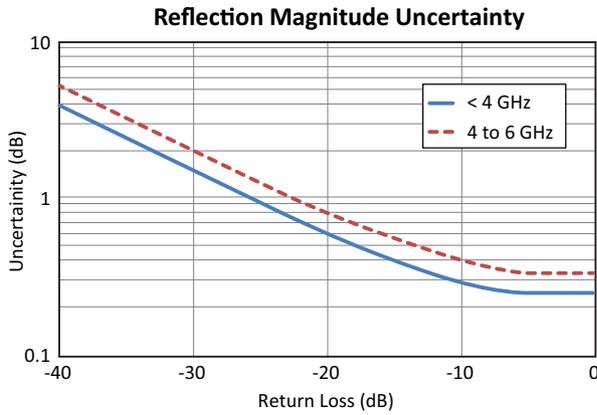
ᴹ 2-Port Transmission Measurement (Option 21)

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 10)

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 431)

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 90)
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

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▦ 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	> 102 dB (2.4 GHz), 2/3 (TOI-DANL) in 1 Hz RBW
Measurement Range	DANL to +26 dBm (≥ 50 MHz)
	DANL to 0 dBm (< 50 MHz)
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 (Preamp Off)
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)

	Preamp Off (Reference Level –20 dBm)		Preamp On (Reference Level –50 dBm)	
(RBW = 1 Hz, 0 dB attenuation)	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 < 2437.5 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 (Option 431)

Measurements

Indoor Mapping	RSSI, ACPR
Outdoor Mapping	RSSI, 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

Electromagnetic Field Test (Option 444)

Measurements

Setup	Limit lines, axis dwell time, measurement time, auto-logging, measurement units, trace display
Spectrum Analyzer	Field strength is measured
LTE OTA, TD-LTE OTA	P-SS, S-SS, and RS are measured and displayed based on each Cell ID received
W-CDMA OTA	P-CPICH signals are measured and displayed for each Scrambling Code measured
Units	Spectrum Analyzer: dBm/m^2, dBV/m, $dBmV/m$, $dBuV/m$, V/m, W/m^2, dBW/m^2, A/m, dBA/m, W/cm^2
	LTE OTA, TD-LTE OTA: dBm/m^2, V/m, W/m^2
	W-CDMA OTA: dBm/m^2, V/m, W/m^2, % of Limit (V/m), % of Limit (W/m^2)
Results	Maximum, minimum, and average of all measurements conducted
Display	Measurement status, number of measurements taken, pass/fail indicators

Frequency Range

Supported Antenna

2000-1800-R	9 kHz to 300 MHz
2000-1792-R	30 MHz to 3 GHz
2000-1791-R	700 MHz to 6 GHz

Modes where EMF Measurements Available

Spectrum Analyzer
LTE OTA (Options 546, 883)
TD-LTE OTA (Options 556, 883)
W-CDMA OTA (Options 35, 881)

Ethernet Connectivity (Option 411)

Connector	RJ45
LAN Speed	10 Mbps
Mode	Static, DHCP
Static IP settings	IP address
	Subnet Mask
	IP Gateway
Remote Control	Remote capability provided with Web Remote Control
Data Upload	With Line Sweep Tools through LAN connection

▥ Interference Analyzer (Option 25)

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
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	Draw multiple bearings of signal strength from GPS location on on-screen map
	Pan and Zoom on-screen maps
	Support for MA2700A Handheld Interference Hunter (see Optional Accessories)
Application Options	Bias-Tee (On/Off), Impedance (50 Ω, 75 Ω, Other)

GPS Receiver (Option 31) (Antenna sold separately)

General

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 27)

General

Number of Channels	1 to 20 Channels
Measurements	Graph/Table, Max Hold (On/5 sec/Off), Frequency/Channel, Current/Maximum, 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	9 kHz to 4 GHz (MT8212E), 9 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 28) (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 90)

General

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

General

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 19) (Requires external USB Power Sensor)

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	MA24105A	MA24106A	MA24108A/18A/26A	MA24208A/18A
Description	Inline High Power Sensor	High Accuracy RF Power Sensor	Microwave USB Power Sensor	Microwave Universal USB Power Sensor
Frequency Range	350 MHz to 4 GHz	50 MHz to 6 GHz	10 MHz to 8/18/26 GHz	10 MHz to 8/18 GHz
Connector	Type N(f), 50 Ω	Type N(m), 50 Ω	Type N(m), 50 Ω (8/18 GHz) Type K(m), 50 Ω (26 GHz)	Type N(m), 50 Ω
Dynamic Range	+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)	–60 dBm to +20 dBm (1 nW to 100 mW)
Measurand	True-RMS	True-RMS	True-RMS, Slot Power, Burst Average Power	True-RMS, Slot Power, Burst Average Power
Measurement Uncertainty	± 0.17 dB[a]	± 0.16 dB[b]	± 0.18 dB[c]	± 0.17 dB[d]
Data sheet (for complete specifications)	11410-00621	11410-00424	11410-00504	11410-00841

Notes:
a. 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.
b. Total RSS measurement uncertainty (0 ℃ to 50 ℃) for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
c. Expanded uncertainty with K=2 for power measurements of a CW signal greater than –20 dBm with zero mismatch errors.
d. Power uncertainty expressed with two sigma confidence level for CW measurement after zero operation. Includes calibration factor and linearity over temperature uncertainties, but not the effects of mismatch, zero set and drift, or noise.

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🔲 LTE/LTE-A Signal Analyzers (Options 541, 542, 546, 551, 552, 556, or 883)

Measurements (Option 883 - combines functionality of Options 541, 542, 546, 551, 552, and 556)

RF (Option 541 FDD) (Option 551 TDD)	Demodulation (Option 542 FDD) (Option 552 TDD)	Over-the-Air (OTA) (Option 546 FDD) (Option 556 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
ACLR
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
	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
	  Total Power (Table View)
	  EVM per Control Channel
	Tx Time Alignment
	Modulation Summary
	  Includes EVM by modulation
	Antenna Icons
	    Detects active antennas (1/2)
		Scanner
		  Cell ID (Group, Sector)
		  S-SS Power, RSRP, RSRQ, SINR
		  Dominance
		  Modulation Results – On/Off
		  Auto Save - 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
		Carrier Aggregation
		  Up to 5 component carriers (CC1 to CC5)
		    CP, MIMO status, RS & SS Power, EVM,
		    Frequency Error, Time Alignment Error,
		    Cell ID
			View Pass/Fail Limits
			  All, RF, Modulation
			
			Available Measurements
			  Channel Power
			  Occupied Bandwidth
			  ACLR
			  Frequency Error
			  Carrier Frequency
			  Dominance
			  EVM peak, rms
			  Frame EVM, rms
			  Frame EVM by mod type
			  RS, SS Power
			  RS EVM
			  P-SS, S-SS, Power, EVM
			  PBCH, PCFICH, PHICH, PDCCH
			    Power, EVM
			  Cell, Group, Sector ID
			  OSTP
			  Tx Time Alignment
			  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 – 14, 17 – 21, 23 – 28 (tunable 10 MHz to 4.0 GHz)
	E-UTRA TDD bands 33 – 44 (tunable 10 MHz to 4.0 GHz)
	Center, Signal Standard, Channel #, Closest Channel, Decrement/Increment Channel
Bandwidth (MHz)	1.4, 3, 5, 10, 15, 20
Span (MHz)	Auto, 1.4, 3, 5, 10, 15, 20, 30
Amplitude	Scale/Division, Power Offset, Auto Range, Adjust Range
Sweep	Single/Continuous, Trigger Sweep
Cyclic Prefix (CP)	Auto, Normal, Extended
EVM Mode	Auto, PBCH only, Max Hold
Sync Type	Normal (SS), RS/Cell ID
Trigger	No Trigger/Ext Trigger, Rising/Falling (TDD Only)
Uplink/Downlink Configuration	0 to 6 (TDD Only)
Save/Recall	Setup, Measurement, Screen Shot (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

LTE **LTE/LTE-A Signal Analyzers (Options 541, 542, 546, 551, 552, 556, or 883)** (Continued)

LTE/LTE-A RF Measurements (Options 541, 551, 883)

RF Channel Power Accuracy	± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +10 dBm) (Option 541)
	± 1.5 dB, ± 1.0 dB typical, (RF input –30 dBm to +10 dBm) (Option 551)

LTE/LTE-A Modulation Measurements (Options 542, 552, 883)

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

LTE/LTE-A Over-the-Air (OTA) Measurements (Options 546, 556, 883)

Scanner	Six strongest signals if present
	Auto Save — Sync Signal Power and Modulation Results with GPS information
Tx Test	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 Mapping data: KML, MTD (tab delimited)
Carrier Aggregation	Up to 5 component carriers specified (CC1 to CC5)
	Automatic detection of CP and MIMO status for each active CC
	RS Power & RS Delta Power, SS Power, EVM (peak and rms), Freq Error (Hz & ppm), TAE, Cell ID

GSM/EDGE Signal Analyzers (Options 40, 41, or 880)

Measurements (Option 880 - combines functionality of Options 40 and 41)

RF (Option 40)	Demodulation (Option 41)	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
			View Pass/Fail Limits
			   GSM, EDGE
			Available Measurements
			   Channel Power
			   Occupied Bandwidth
			   Burst Power
			   Average Burst Power
			   Frequency Error
			   Phase Error
			   EVM
			   Origin Offset
			   C/I
			   Magnitude Error
			Script Master™

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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements

RF Measurements (Options 40, 880) (Temperature range 15 ºC to 35 ºC)

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

Demodulation (Options 41, 880) (Temperature range 15 ºC to 35 ºC)

GMSK Modulation Quality (RMS Phase)

Measurement Accuracy	± 1 deg
Residual Error (GMSK)	1 deg

8 PSK Modulation Quality (EVM)

Measurement Accuracy	± 1.5 %
Residual Error (8 PSK)	2.5 %

🖼 W-CDMA/HSPA+ Signal Analyzers (Options 44, 65, 35, or 881)

Measurements (Option 881 - combines functionality of Options 44, 65, and 35)

RF (Option 44)	Demodulation (Option 65)	Over-the-Air (OTA) (Option 35)	Pass/Fail (User Editable)
Band Spectrum	Code Domain Power Graph	Scrambling Code Scanner (Six)	View Pass/Fail Limits
Channel Spectrum	P-CPICH Power	Scrambling Codes	All, RF, Demod
Channel Power	Channel Power	CPICH	Available Measurements
Occupied Bandwidth	Noise Floor	EC/IO	Max Output Power
Peak-to-Average Power	EVM	EC	Frequency Error
Spectral Emission Mask	Carrier Feed Through	Pilot Dominance	EVM
Single Carrier ACLR	Peak Code Domain Error	OTA Total Power	CPICH
Multi-carrier ACLR	Carrier Frequency	Multipath Scanner (Six)	Occupied Bandwidth
RF Summary	Frequency Error	Six Multipaths	Spectral Mask
	Control Channel Power	Tau	ACLR
	Abs/Rel/Delta Power	Distance	PCDE
	CPICH, P-CCPCH	RSCP	P-CCPCH
	S-CCPCH, PICH	Relative Power	S-CCPCH
	P-SCH, S-SCH	Multipath Power	Code Spread 3
	HSPA+		PICH
	Power vs. Time		Code 128
	Constellation		Script Master™
	Code Domain Power Table		Test Models
	Code, Status		1 (16), (32), (64)
	EVM, Modulation Type		2
	Power, Code Utilization		3 (16), (32)
	Power Amplifier Capacity		4 (+CPICH), (–CPICH)
	Codogram		5 (2 HS), (4 HS), (8 HS)
	Modulation Summary		

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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 44, 881) (temperature range 15 °C to 35 °C)

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 MHz to 894 MHz, 1710 MHz to 2170 MHz
	–54 dB/–57 dB ± 1.0 dB @ 5 MHz/10 MHz offset, typical, 2300 MHz to 2700 MHz

Demodulation (Options 65, 881) (temperature range 15 °C to 35 °C)

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
Frequency Error	± 10 Hz + time base error, 99% confidence level
EVM Accuracy	± 2.5 %, 6% ≤ EVM ≤ 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 (Options 35, 881)

Scrambling Code Scanner	Six strongest Scrambling Codes
Multipath Scanner	Multipath power of six signals relative to strongest pilot

CDMA Signal Analyzers (Options 42, 43, 33, or 884)

Measurements (Option 884 - combines functionality of Options 42, 43, 33, 62, 63, and 34)

RF (Option 42)	Demodulation (Option 43)	Over-the-Air (OTA) (Option 33)	Pass/Fail (User Editable)
Channel Spectrum	Code Domain Power Graph	Pilot Scanner (Nine)	View Pass/Fail Limits
Channel Power	Pilot Power	PN	All, RF, Modulation
Occupied Bandwidth	Channel Power	EC/IO	Available Measurements
Peak-to-Average Power	Noise Floor	Tau	Channel Power
Spectral Emission Mask	Rho	Pilot Power	Occupied Bandwidth
Single Carrier ACPR	Carrier Feed Through	Channel Power	Peak-to-Average Power
Multi-carrier ACPR	Tau	Pilot Dominance	Spectral Mask Test
RF Summary	RMS Phase Error	Multipath Scanner (Six)	Frequency Error
	Frequency Error	EC/IO	Channel Frequency
	Abs/Rel/ Power	Tau	Pilot Power
	Pilot	Channel Power	Noise Floor
	Page	Multipath Power	Rho
	Sync	Limit Test – 10 Tests Averaged	Carrier Feed Through
	Q Page	Rho	Tau
	Code Domain Power Table	Adjusted Rho	RMS Phase Error
	Code	Multipath	Code Utilization
	Status	Pilot Dominance	Measured PN
	Power	Pilot Power	Pilot Dominance
	Multiple Codes	Pass/Fail Status	Multipath Power
	Code Utilization		
	Modulation Summary		

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 (MHz)	1.23, 1.24, 1.25
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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 42, 884) (Temperature range 15 ºC to 35 ºC)

RF Channel Power Accuracy	± 1.5 dB, ± 1.0 dB typical, (RF input –50 dBm to +20 dBm)

Demodulation (Options 43, 884) (Temperature range 15 ºC to 35 ºC)

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 (Options 33, 884)

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 62, 63, 34, or 884)

Measurements (Option 884 - combines functionality of Options 42, 43, 33, 62, 63, and 34)

RF (Option 62)	Demodulation (Option 63)	Over-the-Air (OTA) (Option 34)	Pass/Fail (User Editable)
Channel Spectrum	MAC Code Domain Power Graph	Pilot Scanner (Nine)	View Pass/Fail Limits
Channel Power	Pilot & MAC Power	PN	All, RF, Modulation
Occupied Bandwidth	Channel Power	EC/IO	Available Measurements
Peak-to-Average Power	Frequency Error	Tau	Channel Power
Power vs. Time	Rho Pilot	Pilot Power	Occupied Bandwidth
Pilot & MAC Power	Rho Overall	Channel Power	Peak-to-Average Power
Channel Power	Data Modulation	Pilot Dominance	Carrier Frequency
Frequency Error	Noise Floor	Multipath Scanner (Six)	Frequency Error
Idle Activity	MAC Code Domain Power Table	EC/IO	Spectral Mask
On/Off Ratio	Code	Tau	Noise Floor
Spectral Emission Mask	Status	Channel Power	Pilot Power
Single Carrier ACPR	Power	Multipath Power	RMS Phase Error
Multi-carrier ACPR	Code Utilization		Tau
RF Summary	Data Code Domain Power		Code Utilization
	Active Data Power		Measured PN
	Data Modulation		Pilot Dominance
	Rho Pilot		Multipath Power
	Rho Overall		
	Maximum Data CDP		
	Minimum Data CDP		
	Modulation Summary		

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 (MHz)	1.23, 1.24, 1.25
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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 62, 884) (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 (Options 63, 884) (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 (Options 34, 884)

Pilot Scanner	Nine strongest pilots
Multipath Scanner	Multipath power of six signals relative to strongest pilot

🖳 Fixed WiMAX Signal Analyzers (Options 46, 47, or 885)

Measurements (Option 885 - combines functionality of Options 46, 47, 66, 67, and 37)

RF (Option 46)	Demodulation (Option 47)	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
			View Pass/Fail Limits
			   All, RF, Modulation
			Available Measurements
			   Channel Power
			   Occupied Bandwidth
			   Burst Power
			   Preamble Power
			   Crest Factor
			   Frequency Error
			   Carrier Frequency
			   EVM
			   RCE
			   Base Station ID

Setup Parameters

Bandwidth (MHz)	1.25, 1.50, 2.50, 3.50, 5.00, 5.50, 6.00, 7.00, 10.00
Cyclic Prefix Ratio (CP)	1/4, 1/8, 1/16, 1/32
Span (MHz)	5, 10, 15, 20
Frame Length (ms)	2.5, 5.0, 10.0
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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 46, 885) (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 (Options 47, 885) (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[1] Signal Analyzers (Options 66, 67, 37, or 885)

Measurements (Option 885 - combines functionality of Options 46, 47, 66, 67, and 37)

RF (Option 66)	Demodulation (Option 67)	Over-the-Air (OTA) (Option 37)	Pass/Fail (User Editable)
Channel Spectrum Channel Power Occupied Bandwidth Power vs. Time Channel Power Preamble Power Downlink Burst Power Uplink Burst Power ACPR Spectral Emission Mask 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 Auto Save - On/Off	View Pass/Fail Limits All, RF, Modulation Available Measurements Channel Power Occupied Bandwidth Downlink Burst 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)
Bandwidth (MHz)	3.50, 5.00, 7.00, 8.75, 10.00
Cyclic Prefix Ratio (CP)	1/8
Span (MHz)	5, 10, 20, 30
Frame Length (ms)	5, 10
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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 66, 885) (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 (Options 67, 885)   (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 (Options 37, 885)

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

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1. Mobile WiMAX 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 60, 61, 38, or 882)

Measurements (Option 882 - combines functionality of Options 60, 61, and 38)

RF (Option 60)	Demodulation (Option 61)	Over-the-Air (OTA) (Option 38)	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/64 QAM)
	  Slot Power
	  DwPTS Power
	  Noise Floor
	  Frequency Error
	  Tau
	  Scrambling Code
	  EVM
	  Peak EVM
	  Peak Code Domain Error
	  CDP Marker
	Modulation Summary
		Code Scan (32)
		  Scrambling Code Group
		  Tau
		  EC/IO
		  DwPTS Power
		  Pilot Dominance
		Tau Scan (Six)
		  Sync-DL#
		  Tau
		  EC/IO
		  DwPTS Power
		  Pilot Dominance
		Record
		  Run/Hold
			View Pass/Fail Limits
			  All, RF, Demod
			Available Measurements
			  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, 64 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 (JPEG - save only), to Internal/External Memory
Measurement Summary Screens	Overall Measurements, RF Measurements, Modulation Measurements

RF Measurements (Options 60, 882) (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 (Options 61, 882) (Temperature range 15 °C to 35 °C)

Supported Demodulation	QPSK, 8 PSK, 16 QAM, 64 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 (Options 38, 882)

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 30, 79, 32)[1]

Measurements

ISDB-T RF (Option 30)	ISDB-T Signal Analysis (Option 30)	ISDB-T BER Analysis (Option 79)	ISDB-T SFN Analysis (Option 32)

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 measurements and setup parameters
Easy	User specified measurements. Some setup parameters are automatically set or detected.
Batch	User specified measurements and channels for automatic measurement, and display and storage of results

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 30)

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 79) (Operating temperature range 0 ℃ to 40 ℃)

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 32)

Delay Profile Display Range	–1008 µs to +1008 µs (Bandwidth 6 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 6 MHz)

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

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DVB-T/H (Options 64, 57, 78)

Measurements

DVB-T/H RF (Option 64)	DVB-T/H Signal Analysis (Option 64)	DVB-T/H BER Analysis (Option 57)	DVB-T/H SFN Analysis (Option 78)
Signal Power 　Channel Power 　Termination Voltage 　Open Terminal Voltage 　Field Strength Spectrum Monitor 　Channel Power 　Zone Center Channel 　Zone Center Frequency Shoulder Attenuation 　Channel Power 　Zone Center Channel 　Zone Center Frequency 　Lower Shoulder Attenuation 　Upper Shoulder Attenuation	Composite or Individual Views 　Constellation 　Impulse Response (w/zoom) 　Carrier MER (w/zoom) 　Freq Response (composite view only) Measured Data 　Mode, GI 　Modulation 　Hierarchy 　Freq Offset 　Channel Power 　MER (Total/Data/TPS) 　TPS Warning Message 　TPS Info 　Interleave Type 　Cell ID 　Code Rate (HP/LP) 　Time Slicing (HP/LP) 　MPE-FEC (HP/LP)	BER 　Before RS 　Before Viterbi PER (Packet) Channel Power MER (Quick) Bit Rate TPS Info 　Length Indicator 　Mode, GI 　Modulation 　Hierarchy 　Interleave Type 　Cell ID 　Code Rate 　Time Slicing 　MPE-FEC TPS Warning Message ASI Out	Impulse Response (w/zoom) Inband Spectrum Measured Data 　Channel Power 　Delay 　DU Ratio 　Power 　Field Strength

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 (* Not available for BER measurements)
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 64)

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 57) (Operating temperature range 0 ºC to 40 ºC)

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 78)

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
In-band Spectrum Range	± 3.804 MHz (Bandwidth 8 MHz)

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Backhaul Analyzers (Options 51, 52, 53)

T1 Bit-Error-Rate Tester (BERT) (Option 51)

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 (± 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 (≥ 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
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 52)

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 (± 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 (≥ 1000 Ω, –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

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[BERT] Backhaul Analyzers (Options 51, 52, 53) (Continued)

T3 Bit-Error-Rate Tester (BERT) (Option 53)

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 (± 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 (± 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

Setup Parameters	System	Status (Temperature, Battery Info, Serial Number, Firmware Version, Options Installed) Self Test, Application Self Test, GPS (see Option 31)
	System Options	Name, Date and Time, Brightness, Volume Language (English, French, German, Spanish, Chinese, Japanese, Korean, Italian, Russian, 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, ± 50 VDC
	RF In	Type N, female, 50 Ω
	RF Input Damage Level	+33 dBm peak, ± 50 VDC, Maximum Continuous Input (≥ 10 dB attenuation)
	ASI Output Connector	BNC-J 75 Ω (with Option 57 or Option 79)
	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)
	Ethernet Interface	RJ45 connector for Ethernet 10-Base T (available with Ethernet Option 411)
	Headset Jack	3.5 mm mini-phone plug
	External Reference In	BNC, female, Maximum Input +10 dBm, 1 MHz, 5 MHz, 10 MHz, 13 MHz
	External Trigger/Clock Recovery	BNC, female, Maximum Input ± 5 VDC

Display	Type	Resistive Touchscreen
	Size	8.4 inch 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
	Battery Charging Limits	0 °C to +45 °C, Relative Humidity ≤ 80 %

Electromagnetic Compatibility		
	European Union	CE Mark
	EMC Directive	2004/108/EC
	Interference	EN 61326-1
	Emissions	EN 55011
	Immunity	EN 61000-4-2/3/4/5/6/11
	Australia and New Zealand	RCM
	South Korea	KCC

Safety		
	Low Voltage Directive	2006/95/EC
	Product Safety	EN 61010-1:2010 Class 1, IEC 60950-1 (when used with Anritsu Company supplied Power Supply)

Warranty	Duration	Standard three-year warranty One-year warranty on battery

Environmental		
	Operating Temperature	–10 °C to +55 °C
	Maximum Humidity	95 % RH (non-condensing) at 40 °C
	Shock	MIL-PRF-28800F Class 2
	Storage	–40 °C to +71 °C
	Altitude	4600 m, operating and non-operating
	Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1

ESD	RF Port Center Pin	Withstands up to ± 15 kV

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 lb)

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, and Smith Chart
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	Ethernet, USB cable, USB Memory Stick

easyTest Tools™ (for your PC)

Instrument Modes

	Cable & Antenna Analyzer
	Spectrum Analyzer

Commands

Display Image	Allows putting a custom image on the instrument screen
Recall Setup	Places the instrument into a known state; auto-advance to next command available
Prompt	Displays instructional messages on the instrument screen; timed advance to next command available; instrument users can be allowed or disallowed from making setup adjustments
Save	Allows automatic or manual saving of traces; auto-advance to next command available

Connectivity

Connections	Ethernet, USB cable, USB memory stick

easyMap Tools™ (create instrument-compatible maps on your PC)

Outdoor Maps

On-Line Sources	Google Maps, Cloud Made Open-Source Maps
Pan & Zoom Mode	AZM map file format allows pan and zoom on-instrument
Legacy Mode	MAP format is compatible with older firmware
Geo-Referenced	Works with instrument based GPS
Map Conversion	Convert scanned maps to geo-referenced

Indoor Maps

Sources	Scanned images in JPG, JPEG, JPE, JFIF, GIF, TIF, TIFF, PNG

General

Color Filter	Grayscale, High Contrast
Coverage	Worldwide
Zoom Levels	16 total zoom levels, 7 available in any one map
Map Size	Less than 1 MB to over 1 GB

Master Software Tools (for your PC)

Measurement Viewing

Display	Modify display settings, including scale
Spectrum Traces	Add, delete, and modify limit lines and markers. Overlay traces.
Spectrum Analyzer Measurements	Field Strength, Occupied Bandwidth, Channel Power, ACPR, Emission Mask, C/I[1]
Interference Analyzer Measurements	Spectrograms, Signal Strength Meter, RSSI[2]
Non-Spectrum Measurements	Hi Accuracy Power Meter, Channel Scanner, GSM, WCDMA/HSPA, LTE, TD-LTE, TD-SCDMA, CDMA, EV-DO, Fixed WiMAX, Mobile WiMAX, Screen captures (JPEGs)
	1. Spurious Emissions results viewable in a browser
	2. Coverage Mapping and Interference Mapping files viewable in spreadsheet, Google Earth, or Google Maps

Database Management

Full Trace Retrieval	Retrieve all traces from instrument into one PC directory (limited to approximately 15,000 files)
Trace Catalog	Index all traces in selected folder & subfolder on PC into one catalog
Trace Rename Utility	Rename measurement traces
Group Edit	Titles, subtitles, plot scaling, markers and limit lines, simultaneously on similar files

Data Analysis

Trace Math and Smoothing	Compare multiple traces
Measurement Calculator	Translate into other units

Report Generation

Report Generator	Includes GPS, power level, and measurements
Edit Graph	Change scale, limit lines, and markers
Report Format	Create reports in HTML
Export Measurements	Export measurements or entire folders to *.jpg or *.csv format
Notes	Annotate measurements

Mapping (GPS required on instrument)

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

Spectrogram (Spectrum Monitoring for Interference Analysis and Spectrum Clearing)

Source	Recorded Spectrogram or multiple spectrum traces
Folder Spectrogram	2D View creates a composite file of multiple traces
Available Displays	Spectrogram, Peak Power vs. Time, Variation in Total Power vs. Time, Peak Frequency vs. Time, Number of Traces Saved vs. Time (useful with Save on Limit Exceeded), Maximum/Average/Minimum Power vs. Time
	File Filter (Violations over limit lines or deviations from averages)
	Playback
Display Functions per Trace	Markers, GPS location altitude and time (when recorded), instrument time
	Filename per trace for Folder Spectrogram
Export to Video	Create AVI file of 2D Spectrogram for management review/reports
Export to 3D Spectrogram	Views (Set Threshold, Markers)
	- 3D (Rotate X, Y, Z Axis, Level Scale, Signal ID)
	- 2D (Frequency or Time Domain, Signal ID)
	- Top Down
	Playback (Frequency and/or Time Domain)

List/Parameter Editors

Antennas, Cables, Signal Standards	Modify instrument's Antenna, Cable, and Signal Standard List
Pass/Fail	Create, download, or edit Signal Analysis Pass/Fail Limits
Script Master	Create Script Master files for GSM/WCDMA or Channel Scanner
Languages	Modify non-English language menus
Mobile WiMAX	DL-MAP Parameters

Connectivity

Connections	Connect to PC using USB, LAN, or Direct Ethernet connection
Network Search	Find all Anritsu handheld instruments on local network
Download	Download measurements and live traces to PC for storage and analysis
Upload	Upload measurements and other files from PC to instrument
Export	Measurements can be saved in various formats, depending on the measurement type, including JPEG, CSV, and Anritsu DAT format
Printing	Print individual or all measurement screens

Web Remote Control (enabled with Option 411)

Control	Full instrument control through a browser – all instrument functions except power switch and rotary knob
Connections	RJ45 Ethernet jack
	Third party Wi-Fi router
Protocol	HTTP/TCP/IP
Physical Layer	Cat 5 Cable, Wi-Fi router compatible
Software Required	HTML 5-compliant browser – Google Chrome, Mozilla Firefox
Operating System	iOS, Windows, Linux, Android operating systems that can host the HTML 5-compliant browser
Remote Hardware	PCs, tablets, and smart phones with Ethernet or Wi-Fi connection and an HTML 5-compliant browser
Download	Individual instrument files downloaded via browser
	Multiple instrument files and directories zipped and downloaded via browser
	File downloads are not supported by iOS
	Screen capture capability
Display Modes	Normal: All modes and displays supported
	Fast: Spectrum traces update faster (up to 5 updates per second)
Password	The instrument can be password protected
	Passwords may be used to manage who is controlling the instrument
Users/Instruments	One user/device can view and control many instruments

Programmable Remote Control

Functionality	Many instrument functions are programmable. See the Programming Manual for details.
Programming Language	Standard Commands for Programmable Instruments (SCPI)
Interfaces	Ethernet, USB
Available Drivers	LabView. Visit NI.com for driver

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Ordering Information – Options

	MT8212E	MT8213E	Description
	2 MHz to 4 GHz	2 MHz to 6 GHz	Cable and Antenna Analyzer
	9 kHz to 4 GHz	9 kHz to 6 GHz	Spectrum Analyzer
	10 MHz to 4 GHz	10 MHz to 6 GHz	Power Meter
	Options	**Options**	
	MT8212E-0021	MT8213E-0021	2-Port Transmission Measurement
	MT8212E-0010	MT8213E-0010	Bias-Tee
	MT8212E-0031	MT8213E-0031	GPS Receiver (requires Antenna)
	MT8212E-0019	MT8213E-0019	High-Accuracy Power Meter (requires External Power Sensor)
	MT8212E-0025	MT8213E-0025	Interference Analyzer (Option 31 recommended)
	MT8212E-0027	MT8213E-0027	Channel Scanner
	MT8212E-0431	MT8213E-0431	Coverage Mapping (requires Option 31)
	MT8212E-0444	MT8213E-0444	EMF Measurements (requires Anritsu Isotropic Antenna)
	MT8212E-0090	MT8213E-0090	Gated Sweep
	MT8212E-0028	MT8213E-0028	C/W Signal Generator (requires CW Signal Generator Kit, P/N 69793)
	MT8212E-0040	MT8213E-0040	GSM/EDGE RF Measurements (cannot be ordered with Option 880)
	MT8212E-0041	MT8213E-0041	GSM/EDGE Demodulation (cannot be ordered with Option 880)
	MT8212E-0880	MT8213E-0880	GSM/GPRS/EDGE Measurements (combines functionality of Options 40 and 41. Cannot be ordered with Option 40 or 41)
	MT8212E-0044	MT8213E-0044	W-CDMA/HSPA+ RF Measurements (cannot be ordered with Option 881)
	MT8212E-0065	MT8213E-0065	W-CDMA/HSPA+ Demodulation (cannot be ordered with Option 881)
	MT8212E-0035	MT8213E-0035	W-CDMA/HSPA+ OTA Measurements (Option 31 recommended. Cannot be ordered with Option 881)
	MT8212E-0881	MT8213E-0881	W-CDMA/HSPA+ Measurements (Option 31 recommended. Combines functionality of Options 44, 65, and 35. Cannot be ordered with Option 44, 65, or 35)
	MT8212E-0060	MT8213E-0060	TD-SCDMA/HSPA+ Measurements (cannot be ordered with Option 882)
	MT8212E-0061	MT8213E-0061	TD-SCDMA/HSPA+ Demodulation (cannot be ordered with Option 882)
	MT8212E-0038	MT8213E-0038	TD-SCDMA/HSPA+ OTA Measurements (requires Option 31 for full functionality. Cannot be ordered with Option 882)
	MT8212E-0882	MT8213E-0882	TD-SCDMA/HSPA+ Measurements (requires Option 31 for full functionality. Combines functionality of Options 60, 61, and 38. Cannot be ordered with Option 60, 61, or 38)
	MT8212E-0541	MT8213E-0541	LTE/LTE-A RF Measurements (cannot be ordered with Option 883)
	MT8212E-0542	MT8213E-0542	LTE/LTE-A Modulation Measurements (cannot be ordered with Option 883)
	MT8212E-0546	MT8213E-0546	LTE/LTE-A OTA Measurements (requires Option 31 for full functionality. Cannot be ordered with Option 883)
	MT8212E-0551	MT8213E-0551	TD-LTE/LTE-A RF Measurements (cannot be ordered with Option 883)
	MT8212E-0552	MT8213E-0552	TD-LTE/LTE-A Modulation Measurements (cannot be ordered with Option 883)
	MT8212E-0556	MT8213E-0556	TD-LTE/LTE-A OTA Measurements (requires Option 31 for full functionality. Cannot be ordered with Option 883)
	MT8212E-0883	MT8213E-0883	LTE/LTE-A FDD/TDD Measurements (requires Option 31 for full functionality. Combines functionality of Options 541, 542, 546, 551, 552, and 556. Cannot be ordered with Option 541, 542, 546, 551, 552, or 556)
	MT8212E-0042	MT8213E-0042	CDMA RF Measurements (cannot be ordered with Option 884)
	MT8212E-0043	MT8213E-0043	CDMA Demodulation (cannot be ordered with Option 884)
	MT8212E-0033	MT8213E-0033	CDMA OTA Measurements (requires Option 31. Cannot be ordered with Option 884)
	MT8212E-0062	MT8213E-0062	EV-DO RF Measurements (cannot be ordered with Option 884)
	MT8212E-0063	MT8213E-0063	EV-DO Demodulation (cannot be ordered with Option 884)
	MT8212E-0034	MT8213E-0034	EV-DO OTA Measurements (requires Option 31. Cannot be ordered with Option 884)
	MT8212E-0884	MT8213E-0884	CDMA/EV-DO Measurements (requires Option 31 for full functionality. Combines functionality of Options 42, 43, 33, 62, 63, and 34. Cannot be ordered with Option 42, 43, 33, 62, 63, or 34)

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Ordering Information – Options (Continued)

	MT8212E Options	MT8213E Options	Description
	MT8212E-0046	MT8213E-0046	Fixed WiMAX RF Measurements (cannot be ordered with Option 885)
	MT8212E-0047	MT8213E-0047	Fixed WiMAX Demodulation (cannot be ordered with Option 885)
	MT8212E-0066	MT8213E-0066	Mobile WiMAX RF Measurements (cannot be ordered with Option 885)
	MT8212E-0067	MT8213E-0067	Mobile WiMAX Demodulation (cannot be ordered with Option 885)
	MT8212E-0037	MT8213E-0037	Mobile WiMAX OTA Measurements (requires Option 31 for full functionality. Cannot be ordered with Option 885)
	MT8212E-0885	MT8213E-0885	WiMAX Fixed/Mobile Measurements (requires Option 31 for full functionality. Combines functionality of Options 46, 47, 66, 67, and 37. Cannot be ordered with Option 46, 47, 66, 67, or 37)
	MT8212E-0030	MT8213E-0030	ISDB-T Digital Video Measurements
	MT8212E-0032	MT8213E-0032	ISDB-T SFN Measurements
	MT8212E-0079	MT8213E-0079	ISDB-T BER Measurements (requires Option 30. Cannot be ordered with Option 51, 52, 53, or 411)
	MT8212E-0064	MT8213E-0064	DVB-T/H Digital Video Measurements
	MT8212E-0078	MT8213E-0078	DVB-T/H SFN Measurements
	MT8212E-0057	MT8213E-0057	DVB-T/H BER Measurements (requires Option 64. Cannot be ordered with Option 51, 52, 53, or 411)
	MT8212E-0411	MT8213E-0411	Ethernet Connectivity (cannot be ordered with Option 51, 52, 53, 57, or 79)
	MT8212E-0051	MT8213E-0051	T1 Analyzer (cannot be ordered with Option 52, 53, 57, 79, or 411)
	MT8212E-0052	MT8213E-0052	E1 Analyzer (cannot be ordered with Option 51, 53, 57, 79, or 411)
	MT8212E-0053	MT8213E-0053	T3/T1 Analyzer (cannot be ordered with Option 51, 52, 57, 79, or 411)
	MT8212E-0098	MT8213E-0098	Standard Calibration (ANSI 2540-1-1994)
	MT8212E-0099	MT8213E-0099	Premium Calibration to (ANSI 2540-1-1994 plus test data)

Standard Accessories (Included with instrument)

| Part Number	Description
10920-00060	Handheld Instruments Documentation Disc
2300-577	Anritsu Software Tool Box for Handheld RF Instruments Disc
2000-1654-R	Soft Carrying Case
2000-1691-R	Stylus with Coiled Tether
2000-1797-R	Touchscreen Protective Film, 8.4 in
633-75	Rechargeable Li-Ion Battery, 7500 mAh
40-187-R	AC-DC Adapter
806-141-R	Automotive Power Adapter, 12 VDC, 60 W
3-2000-1498	USB A/5-pin mini-B Cable, 10 ft/305 cm

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 - Bias-Tee, GPS Receiver
10580-00241	Cable and Antenna Analyzer Measurement Guide
10580-00242	2-Port Transmission Measurement - Bias-Tee
10580-00349	Spectrum Analyzer Measurement Guide
10580-00240	Power Meter Measurement Guide
10580-00234	3GPP Signal Analyzer Measurement Guide
10580-00235	3GPP2 Signal Analyzer Measurement Guide
10580-00236	WiMAX Signal Analyzer Measurement Guide
10580-00237	Digital TV Measurement Guide
10580-00238	Backhaul Analyzer Measurement Guide
10580-00256	Programming Manual

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Troubleshooting Guides (Soft copy at www.anritsu.com)
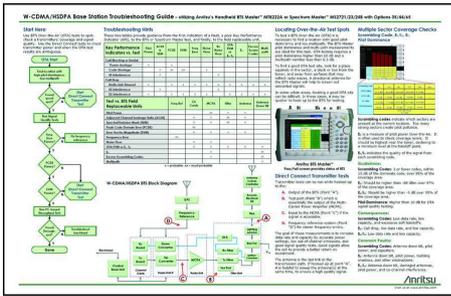
Part Number	Description
11410-00473	Cable, Antenna and Components
11410-00551	Spectrum Analyzers
11410-00472	Interference
11410-00566	LTE eNodeB Testing
11410-00615	TD-LTE eNodeB Testing
11410-00466	GSM/GPRS/EDGE Base Stations
11410-00463	W-CDMA/HSDPA Base Stations
11410-00465	TD-SCDMA/HSDPA Base Stations
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

Power Sensors (For complete ordering information, see the respective data sheets of each sensor)

Model Number	Description
PSN50	RF USB Power Sensor, 50 MHz to 6 GHz, +20 dBm (see data sheet 11410-00414 for details)
MA24105A	Inline Peak Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm
MA24106A	RF USB 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
MA24126A	Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm
MA24208A	Microwave Universal USB Power Sensor, 10 MHz to 8 GHz, +20 dBm
MA24218A	Microwave Universal USB Power Sensor, 10 MHz to 18 GHz, +20 dBm
MA25100A	RF Power Indicator

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

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Optional Accessories (Continued)

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
1091-417-R	N(m) to QMA(f), DC to 6 GHz, 50 Ω
1091-418-R	N(m) to QMA(m), DC to 18 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
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

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

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

Optional Accessories (Continued)

Miscellaneous Accessories

Part Number	Description
2000-1374	External Dual Charger for Li-Ion Batteries
633-75	Rechargeable Li-Ion Battery, 7500 mAh
69793	CW Signal Generator Kit
2000-1689	EMI Near Field Probe Kit
MA2700A	Handheld Interference Hunter (For full specifications, refer to the MA2700A Technical Data Sheet 11410-00692)
2000-1691-R	Stylus with Coiled Tether
2000-1797-R	Touchscreen Protective Film, 8.4 in
2000-1798-R	Port Extender, DC to 6 GHz, N(m) to N(f)

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
760-271-R	Transit Case for Portable Directional Antennas and Port Extender (2000-1777-R, 2000-1778-R, 2000-1779-R, 2000-1798-R)

Optional Accessories (Continued)

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

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 798 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
2000-1734-R	Bandpass Filter, 699 MHz to 715 MHz, N(m) and N(f), 50 Ω
2000-1735-R	Bandpass Filter, 776 MHz to 788 MHz, N(m) and N(f), 50 Ω
2000-1736-R	Bandpass Filter, 815 MHz to 850 MHz, N(m) and N(f), 50 Ω
2000-1737-R	Bandpass Filter, 1711 MHz to 1756 MHz, N(m) and N(f), 50 Ω
2000-1738-R	Bandpass Filter, 1850 MHz to 1910 MHz, N(m) and N(f), 50 Ω
2000-1739-R	Bandpass Filter, 880 MHz to 915 MHz, N(m) and N(f), 50 Ω
2000-1740-R	Bandpass Filter, 1710 MHz to 1785 MHz, N(m) and N(f), 50 Ω
2000-1741-R	Bandpass Filter, 1920 MHz to 1980 MHz, N(m) and N(f), 50 Ω
2000-1742-R	Bandpass Filter, 832 MHz to 862 MHz, N(m) and N(f), 50 Ω
2000-1743-R	Bandpass Filter, 2500 MHz to 2570 MHz, N(m) and N(f), 50 Ω
2000-1799-R	Bandpass Filter, 2305 MHz to 2320 MHz, N(m) and N(f), 50 Ω

Optional Accessories (Continued)

GPS Antennas

Part Number	Description
2000-1528-R	GPS Antenna, SMA(m) with 5 m (15 ft) cable, 3 dBi gain, requires 5 VDC
2000-1652-R	GPS Antenna, SMA(m) with 0.3 m (1 ft) cable, 5 dBi gain, requires 3.3 VDC or 5 VDC
2000-1760-R	GPS Antenna, SMA(m), 25 dB gain, 2.5 VDC to 3.7 VDC

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
2000-1659-R	698 MHz to 787 MHz, N(f), 8 dBd, Yagi
2000-1660-R	1425 MHz to 1535 MHz, N(f), 12.2 dBd, Yagi
2000-1715-R	Directional Antenna, 698 MHz to 2500 MHz, N(f), gain of 2 dBi to 10 dBi, typical
2000-1726-R	Antenna, 2500 MHz to 2700 MHz, N(f), 12 dBd, Yagi
2000-1747-R	Antenna, Log Periodic, 300 MHz to 5000 MHz, N(f), 5.1 dBi, typical
2000-1748-R	Antenna, Log Periodic, 1 GHz to 18 GHz, N(f), 6 dBi, typical
2000-1777-R	Portable Directional Antenna, 9 kHz to 20 MHz, N(f)
2000-1778-R	Portable Directional Antenna, 20 MHz to 200 MHz, N(f)
2000-1779-R	Portable Directional Antenna, 200 MHz to 500 MHz, N(f)
2000-1812-R	Portable Yagi Antenna, 450 MHz to 512 MHz, N(f), 5 dBd
2000-1825-R	Portable Yagi Antenna, 380 MHz to 430 MHz, N(f), 5 dBd

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)
2000-1751-R	Dipole, 698-960/1710-2170/2500-2700 MHz, SMA(m), 2 dBi, typical, 50 Ω

Optional Accessories (Continued)

Isotropic Antennas

Part Number	Description
2000-1791-R	Isotropic Antenna, 700 MHz to 6000 MHz, N(m)
2000-1792-R	Isotropic Antenna, 30 MHz to 3000 MHz, N(m)
2000-1800-R	Isotropic Antenna, 9 kHz to 300 MHz, N(m)

Mag Mount Broadband Antennas

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 ft Cable 2: 3000 MHz to 6000 MHz 5 dBi peak gain, N(m), 50 Ω, 10 ft Cable 3: GPS 26 dB gain, SMA(m), 50 Ω, 10 ft
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 ft
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 ft
2000-1648-R	1700 MHz to 6000 MHz 3 dBi peak gain, N(m), 50 Ω, 10 ft

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