



Spectrum Master™ MS2712E and MS2713E

Specifications

Spectrum Analyzer

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 (≥ 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
Attenuator Range	0 dB to 55 dB in 5 dB steps
Maximum Continuous Input	+30 dBm
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	± 2.0 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)

(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, 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
200-2200 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

PIM Analyzer

(Requires PIM Master™ MW8208A, MW8209A, or MW8219A)

See Product Brochure 11410-00546

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

Coverage Mapping (Option 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

Ethernet Connectivity (Option 0411)

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

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

Tracking Generator Option (Option 0020)

Setup Parameters

Measure Set-up	Off/On, Output Power, Reset Sweep, Insertion Loss, Abs Max, Min, Avg (On/Off)
Insertion Loss Set-up	Normalize (Off/On), Rel Reference, Rel Scale, Transmission, Min, Avg (Off, On) RL Offset
Frequency Range	500 kHz to 4.0 GHz (MS2712E), 500 kHz to 6.0 GHz (MS2713E)
Output Power Range	-50 dBm to 0 dBm
Step Size	0.1 dB nominal
Output Flatness	± 1.0 dB max, ± 0.3 dB typical*
Zero Span Behavior	CW Output
Output Connector	Type N female, 50 Ω
Damage Level	+ 23 dBm ± 50 VDC (limited dv/dt)

* Using field calibration, relative to spectrum analyzer input with ≥ 3 dB attenuator

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 (MS2712E), 100 kHz to 6 GHz (MS2713E)
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)

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

20 MHz BW Demod (Option 0009)

Required for all signal analyzers except AM/FM/PM Signal Analyzer, Option 509

Power Meter (Option 0029)

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 (MS2712E), 10 MHz to 6 GHz (MS2713E)
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 Power	+30 dBm without attenuator
Accuracy	Same as Spectrum Analyzer
Application Options	Impedance (50 Ω, 75 Ω, Other)

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

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

Power Sensor Model	PSN50	MA24104A/05A	MA24106A	MA24108A/18A/26A
Description	High Accuracy RF Power Sensor	Inline 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)	Modulation (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 Modulation Results Tx Time Alignment 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, Signal Quality 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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Modulation 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 tagging 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)

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

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

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

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_O E_C Pilot Dominance OTA Total Power Multipath Scanner (Six) Six Multipaths Tau Distance RSCP Relative Power Multipath Power	Max Output Power Frequency Error EVM CPICH Occupied Bandwidth Spectral Mask ACLR PCDE P-CCPCH S-CCPCH Code Spread 3 PICH Code 128 Test Models 1 (16), (32), (64) 2 3 (16), (32) 4 (+CPICH), (-CPICH) 5 (2 HS), (4 HS), (8 HS)

Setup Parameters

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

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

Frequency Range	Bands I – XIV, XVII
RF Channel Power Accuracy	± 1.25 dB, ± 0.7 dB typical, (Temperature range 15 °C to 35 °C)
Occupied Bandwidth Accuracy	± 100 kHz
Adjacent Channel Leakage Ratio (ACLR)	-54 dB/-59 dB ± 0.8 dB @ 5 MHz/10 MHz offset, typical, Bands I – VI, VIII – XIV, XVII -54 dB/-57 dB ± 1.0 dB @ 5 MHz/10 MHz offset, typical, Band VII

Demodulation (Option 0065)

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% ≤ 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 (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_o Tau Pilot Power Channel Power Pilot Dominance Multipath Scanner (Six) E_c/I_o Tau Channel Power Multipath Power Limit Test – 10 Tests Averaged Rho Adjusted Rho Multipath Pilot Dominance Pilot Power Pass/Fail Status	Channel Power Occupied Bandwidth Peak-to-Average Power Spectral Mask Test Frequency Error Channel Frequency 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)
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Demodulation (Option 0043) (Temperature range 15 °C to 35 °C)

Frequency Error	± 10 Hz + time base error, 99 % confidence level (in slow mode)
Rho Accuracy	± 0.005, for Rho > 0.9
Residual Rho	> 0.995, typical, > 0.99 maximum, (RF input -50 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_O Tau Pilot Power Channel Power Pilot Dominance Multipath Scanner (Six) E_C/I_O Tau Channel Power Multipath Power	Channel Power Occupied Bandwidth Peak-to-Average Power Carrier Frequency Frequency Error Spectral Mask Noise Floor Pilot Power RMS Phase Error Tau Code Utilization Measured PN Pilot Dominance 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	Constellation	Channel Power Monitor	Channel Power
Channel Power	RCE (RMS/Peak)	Preamble Scanner (Six)	Occupied Bandwidth
Occupied Bandwidth	EVM (RMS/Peak)	Preamble	Downlink Bust Power
Power vs. Time	Frequency Error	Relative Power	Uplink Burst Power
Channel Power	CINR	Cell ID	Preamble Power
Preamble Power	Base Station ID	Sector ID	Crest Factor
Downlink Burst Power	Sector ID	PCINR	Frequency Error
Uplink Burst Power	Spectral Flatness	Dominant Preamble	Carrier Frequency
ACPR	Adjacent Subcarrier Flatness	Base Station ID	EVM
RF Summary	EVM vs. Subcarrier/Symbol		RCE
	RCE (RMS/Peak)		Sector ID
	EVM (RMS/Peak)		
	Frequency Error		
	CINR		
	Base Station ID		
	Sector ID		
	DL-MAP (Tree View)		
	Modulation Summary		

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 s 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.

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	Constellation (w/zoom)	Layer A, Layer B, Layer C	Impulse Response (w/zoom)
Channel Power	Layer A, B, C, TMCC	BER and Error Count per Layer	In-band Spectrum
Termination Voltage	Sub-carrier MER	Before RS	Measured Data
Open Terminal Voltage	Delay Profile (w/zoom)	Before Viterbi	Channel Power
Field Strength	Frequency Response	PER and Error Count per Layer	Delay
Spectrum Monitor	Measured Data	MPEG Bit Rate per Layer	DU Ratio
Channel Power	Frequency	TMCC Information per Layer	Power
Zone Center Channel	Frequency Offset	Modulation	Field Strength
Zone Center Frequency	MER (Total, Layer A/B/C, TMCC, AC1)	Code Rate	
Spectrum Mask	Modulation (Layer A/B/C)	Interleave	
Mask (Standard A) Japan	Mode, GI	Segments	
Mask (Standard B) Japan	Sub-carrier MER w/marker	Channel Power	
Mask (Critical) Brazil	Delay w/marker	Mode, GI	
Mask (Sub-critical) Brazil	Frequency Response w/marker	Signal Sync Status	
Mask (Non-critical) Brazil		ASI Out	
Phase Noise			
Spurious Emissions			
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)

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)

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

AM/FM/PM Signal Analyzers (Option 0509)**Measurements**

Display Type	RF Spectrum AM/FM/PM	Audio Spectrum (AM)	Audio Spectrum (FM/PM)	Audio Waveform (AM)	Audio Waveform (FM/PM)	Summary (AM)	Summary (FM/PM)
Graphic Display	Power (dBm) vs. Frequency	Depth (%) vs. Modulation Frequency	Deviation (kHz/rad) vs. Modulation Frequency	Depth (%) vs. Time	Deviation (kHz/rad) vs. Time	None	None
Numerical Displays	Carrier Power Carrier Frequency Occupied Bandwidth	AM Rate RMS Depth (Pk-Pk)/2 Depth SINAD* THD* Distortion/Total Vrms*	FM/PM Rate RMS Deviation (Pk-Pk)/2 Deviation SINAD* THD* Distortion/Total Vrms*	AM Rate RMS Depth (Pk-Pk)/2 Depth SINAD* THD* Distortion/Total Vrms*	FM/PM Rate RMS Depth (Pk-Pk)/2 Depth SINAD* THD* Distortion/Total Vrms*	RMS Depth (AM) Peak + Depth Peak - Depth (Pk-Pk)/2 Depth Carrier Power Carrier Frequency Occupied Bandwidth AM Rate SINAD* THD* Distortion/Total Vrms*	RMS Deviation (FM/PM) Peak + Depth Peak - Depth (Pk-Pk)/2 Depth Carrier Power Carrier Frequency Occupied Bandwidth AM Rate SINAD* THD* Distortion/Total Vrms*

* Requires Sinewave modulation

Setup Parameters

Frequency	Center Freq, Span, Freq Step, Signal Standard, Channel, Channel Increment, Set Carrier Freq
Amplitude	Scale, Power Offset, Adjust Range
Setup	Demod Type (AM, FM, PM), IFBW, Auto IFBW
Measurements	RF Spectrum AM/FM/PM, Audio Spectrum (AM/FM/PM), Audio Waveform (AM/FM/PM), Summary (AM/FM/PM), Average
Marker	On/Off, Delta, Peak Search, Marker Freq to Center, Marker to Ref Lvl, Marker Table, All Markers Off

Specifications

AM	Modulation Rate: ± 1 Hz (< 100 Hz), $\pm 2\%$ (> 100 Hz) Depth: $\pm 5\%$ for (Modulation rates 10 Hz to 100 kHz)
FM	Modulation Rate: ± 1 Hz (< 100 Hz); $\pm 2\%$ (100 Hz to 100 kHz) Deviation Accuracy: $\pm 5\%$ (100 Hz to 100 kHz)**
PM	Modulation Rate: ± 1 Hz (< 100 Hz); $\pm 2\%$ (100 Hz to 100 kHz) Deviation Accuracy: $\pm 5\%$ (deviation 0 to 93 Rad, rate 10 Hz to 5 kHz)**
IF bandwidth	1 kHz to 300 kHz in 1-3 sequence
Frequency Span	RF Spectrum: 10 kHz to 10 MHz Audio Spectrum: 2 kHz, 5 kHz, 10 kHz, 20 kHz, 70 kHz, 140 kHz
RBW/VBW	30
Span/RBW	100
Sweep time	50 μ s to 50 ms (Audio Waveform)

** IFBW must be greater than 95 % occupied BW

General Specifications

All specifications and characteristics apply to rev 2 instruments 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, 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
RF Out Damage Level	23 dBm, ± 50 VDC
RF In	Type N, female, 50 Ω
RF In Damage Level	+33 dBm peak, ± 50 VDC, Maximum Continuous Input (≥ 10 dB attenuation)
GPS	SMA(f)
External Power	5.5 mm barrel connector, 11.0 to 14.5 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
Ethernet Interface	RJ45 connector for Ethernet 10-Base T (Available with option 0411 Ethernet)
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 ± 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

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 °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 meters, operating and non-operating

ESD

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

Size	273 mm x 199 mm x 91 mm (10.7 inch x 7.8 inch x 3.6 inch)
Weight	3.45 kg, (7.6 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	Ethernet, USB cable, 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

Script Master™

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

Connectivity

Connections	Connect to PC using USB, Ethernet
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