Technical Data Sheet

Anritsu envision : ensure

Spectrum Master™

Compact Handheld Spectrum Analyzer

MS2711E

9 kHz to 3 GHz

Introduction

Anritsu introduces its next generation compact handheld Spectrum Analyzers to meet the needs for portability. Whether it is for spectrum monitoring, broadcast proofing, interference analysis, RF and microwave measurements, or Wi-Fi and wireless network measurements, the Spectrum Master is the ideal instrument for making fast and reliable measurements.

Spectrum Analyzer Highlights

- Measurements: Occupied Bandwidth, Channel Power, ACPR, C/I
- Interference Analyzer: Spectrogram, Signal Strength, RSSI, Signal ID, Interference Mapping
- Dynamic Range: > 85 dB in 100 Hz RBW
- DANL: –142 dBm in 100 Hz RBW with Preamp Option
- Phase Noise: –90 dBc/Hz max @ 10 kHz offset at 1 GHz
- Frequency Accuracy: < ± 1.5 ppm, < ± 50 ppb with GPS Option 31
- Traces: Normal, Max Hold, Min Hold, Average, # of Averages
- Detectors: Peak, Negative, Sample, Quasi-peak, and true RMS
- Markers: 6, each with a Delta Marker, or 1 Reference with 6 Deltas
- Limit Lines: up to 41 segments with one-button envelope creation
- Trace Save-on-Event: crossing limit line or sweep complete

Capabilities and Functional Highlights

- Store 2000 Traces internally
- Internal Preamplifier Optional
- Internal Power Meter Optional
- High Accuracy Power Meter Optional
- EMF Test Optional
- 4, 6, 8, 18, 26 GHz Power Sensors
- Channel Scanner Optional
- < 5 minute warm-up time
- Touchscreen keyboard
- USB Data Transfer
- Master Software Tools
- 3 hour battery operation time
- Tracking Generator Optional

Table of Contents

Definitions

Specifications	All specifications and characteristics apply under the following conditions, unless otherwise stated:
Warm-Up Time	After 10 minutes of warm-up time, where the instrument is left in the ON state.
Temperature Range	Over the 23 °C ± 5 °C temperature range.
Reference Signal	When using internal reference signal.
Typical Performance	Typical specifications that are not in parenthesis are not tested and not warranted. They are generally representative of characteristic performance.
	Typical specifications in parenthesis () represent the mean value of measured units and do not include any guard-bands or uncertainties. They are not warranted.
Uncertainty	A coverage factor of x1 is applied to the measurement uncertainties to facilitate comparison with other industry handheld analyzers.
Calibration Cycle	Calibration is within the recommended 12 month period (residual specifications also require calibration kit calibration cycle adherence.)
	All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

Spectrum Analyzer

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	

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	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
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 3 GHz (tunable to 0 Hz)
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 3 GHz including zero span
Sweep Time	Minimum 100 ms, 10 µs to 600 s in zero span
Sweep Time Accuracy	± 2 % in zero span

Bandwidth

Resolution Bandwidth (RBW)	100 Hz to 3 MHz in 1–3 sequence ± 10% (1 MHz max in zero-span) (–3 dB bandwidth)
Video Bandwidth (VBW)	10 Hz to 3 MHz in 1–3 sequence (–3 dB bandwidth) (auto or manually selectable)
RBW with Quasi-Peak Detection	200 Hz, 9 kHz, 120 kHz (–6 dB bandwidth)
VBW with Quasi-Peak Detection	Auto VBW is On, RBW/VBW = 1

Spectrum Analyzer (Continued)

Spectral Purity

SSB Phase Noise @ 1 GHz	–90 dBc/Hz, –100 dBc/Hz typical @ 10 kHz offset –95 dBc/Hz, –102 dBc/Hz typical @ 100 kHz offset –105 dBc/Hz, –111 dBc/Hz typical @ 1 MHz offset

Amplitude Ranges

Dynamic Range	> 85 dB (2.4 GHz), 2/3 (TOI-DANL) in 100 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 3.0 GHz	± 1.25 dB, ± 0.5 dB typical

Displayed Average Noise Level (DANL)

	Preamp Off (Reference Level –20 dBm)		Preamp On (Reference Level –50 dBm)	
(RBW Normalized to 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 3 GHz	–137 dBm	–141 dBm	–154 dBm	–159 dBm
(RBW = 100 Hz, 0 dB attenuation)				
10 MHz to 2.4 GHz	–121 dBm	–126 dBm	–137 dBm	–142 dBm
> 2.4 GHz to 3 GHz	–117 dBm	–121 dBm	–134 dBm	–139 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, 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 3.0 GHz	+28 dBm, typical

Second Harmonic Distortion

Preamp Off, 0 dB input attenuation, –30 dBm input

50 MHz	–56 dBc
> 50 MHz to 200 MHz	–60 dBc, typical
> 200 MHz to 3000 MHz	–70 dBc, typical

VSWR

2:1, typical

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	Triangulate location of interference with on-display maps

Channel Scanner (Option 27)

General

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 3 GHz
Frequency Accuracy	± 10 Hz + Time base error
Measurement Range	–110 dBm to +26 dBm
Application Options	Impedance (50 Ω, 75 Ω, Other)

Preamplifier (Option 8)

General

Mode	Spectrum Analyzer, Interference Analyzer, Channel Scanner
Gain	17 dB (Typical)
Frequency Range	100 kHz to 3 GHz

Tracking Generator (Option 20)

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 3.0 GHz
Output Power Range	–50 dBm to 0 dBm
Step Size	0.1 dB nominal
Output Flatness	± 1.0 dB max, ± 0.3 dB typical (Using field calibration, relative to spectrum analyzer input with ≥ 3 dB attenuator)
Zero Span Behavior	CW Output
Output Connector	Type N female, 50 Ω
Damage Level	+ 23 dBm ± 50 VDC (limited dv/dt)

Power Meter (Option 29)

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 3 GHz
Span	1 kHz to 100 MHz
Display Range	–140 dBm to +30 dBm, ≤ 40 dB span
Measurement Range	–120 dBm to +26 dBm
Offset Range	0 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 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 °C to 50 °C) 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.

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

Electromagnetic Field Test (Option 444)

Measurements

Setup	Limit lines, axis dwell time, measurement time, auto-logging, measurement units, trace display
Measurements	Field strength is measured
Units	dBm/m^2, dBV/m, dBmV/m, dBuV/m, V/m, W/m^2, dBW/m^2, A/m, dBA/m, W/cm^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 3 GHz

EMF Measurement Modes Spectrum Analyzer

AM/FM/PM Signal Analyzers (Option 509)

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), ± 2 % (> 100 Hz) Depth: ± 5 % for (Modulation rates 10 Hz to 100 kHz)
FM	Modulation Rate: ± 1 Hz (< 100 Hz); ± 2 % (100 Hz to 100 kHz) Deviation Accuracy: ± 5 % (100 Hz to 100 kHz, IFBW must be greater than 95 % occupied BW)
PM	Modulation Rate: ± 1 Hz (< 100 Hz); ± 2 % (100 Hz to 100 kHz) Deviation Accuracy: ± 5 % (deviation 0 to 93 Rad, rate 10 Hz to 5 kHz, IFBW must be greater than 95 % occupied BW)
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 µs to 50 ms (Audio Waveform)

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
	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
	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	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
	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 55011:2009 +A1:2010 Group 1 Class A
	Immunity	EN 61000-4-2/3/4/5/6/11
	Australia and New Zealand	RSM
	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 meters, operating and non-operating
	Explosive Atmosphere	MIL-PRF-28800F Section 4.5.6.3 MIL-STD-810G, Method 511.5, Procedure 1
ESD	RF Input 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	3.45 kg (7.6 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, Smith Chart, and PIM
	Trace Formats	DAT, VNA, CSV, PNG, BMP, JPG, HTML, Data Base, and PDF
Report Generation		
	Report Generator	Includes GPS location along with measurements
	Report Format	Create reports in HTML or PDF format
	Report Setup	Report Title, Company, Prepared for, Location, Date and Time, Filename, Company logo
	Trace Setup	1 trace Portrait Mode, 2 Trace Portrait Mode, 1 Trace Landscape Mode
Trace Validation		
	Presets	7 presets allow “one click” setting of up to 6 markers and one limit line
	Marker Controls	6 regular Markers, Marker Peak, Marker valley, Marker between, and frequency entry
	Delta Markers	6 Delta markers
	Limit Line	Enable and drag or value entry. Also works with presets
	Next Trace Button	Next Trace and Previous trace arrow keys allow quick switching between traces
Tools	Cable Editor	Allows creation of custom cable parameters
	Distance to Fault	Converts a Return Loss trace to a Distance to Fault trace
	Measurement Calculator	Converts Real, Imaginary, Magnitude, Phase, RL, VSWR, Rho, and Transmit power
	Signal Standard Editor	Creates new band and channel tables
	Renaming Grid	36 user definable phrases for creation of file names, trace titles, and trace subtitles
Connectivity		
	Connections	USB cable, USB Memory Stick

easyTest Tools (for your PC)

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

Master Software Tools (for your PC)

Mapping (GPS Required)		
	Spectrum Analyzer Mode	MapInfo, MapPoint
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 and 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
Connectivity		
	Connections	Connect to PC using USB

Ordering Information – Options

MS2711E	Description
9 kHz to 3 GHz	Spectrum Analyzer
Options	
MS2711E-0008	Preamplifier
MS2711E-0020	Tracking Generator
MS2711E-0031	GPS Receiver (requires Antenna)
MS2711E-0019	High-Accuracy Power Meter (requires External Power Sensor)
MS2711E-0029	Power Meter
MS2711E-0025	Interference Analyzer (Option 31 recommended)
MS2711E-0027	Channel Scanner
MS2711E-0444	EMF Measurements (requires Anritsu Isotropic Antenna)
MS2711E-0509	AM/FM/PM Analyzer
MS2711E-0098	Standard Calibration (ANSI Z540-1-1994)
MS2711E-0099	Premium Calibration (ANSI Z540-1-1994) plus printed test data

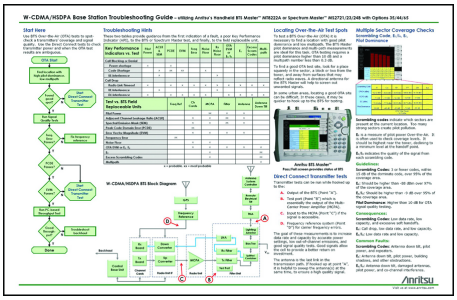
Standard Accessories (Included with instrument)

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
10580-00328	Spectrum Master User Guide
10580-00244	Spectrum Analyzer Measurement Guide - Interference Analyzer, Channel Scanner, Gated Sweep, AM/FM/PM Analyzer, Interference Mapping
10580-00240	Power Meter Measurement Guide - High Accuracy Power Meter
10580-00256	Programming Manual

Troubleshooting Guides (Soft copy at www.anritsu.com)



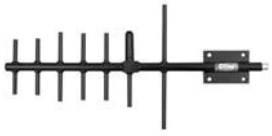
Part Number	Description
11410-00551	Spectrum Analyzers
11410-00472	Interference

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

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)

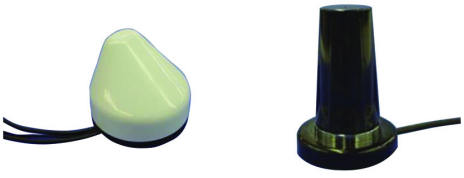
Portable Antennas

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 W

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

Optional Accessories (Continued)

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

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)

Optional Accessories (Continued)

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

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

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

Adapters

Part Number	Description
1091-26-R	SMA(m) to N(m), DC to 18 GHz, 50 Ω
1091-27-R	SMA(f) to N(m), DC to 18 GHz, 50 Ω
1091-80-R	SMA(m) to N(f), DC to 18 GHz, 50 Ω
1091-81-R	SMA(f) to N(f), DC to 18 GHz, 50 Ω
1091-172-R	BNC(f) to N(m), DC to 1.3 GHz, 50 Ω
510-102-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

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)

Optional Accessories (Continued)

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)

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