

# MS2711A

## Handheld Spectrum Analyzer



*Spectrum Analysis – Anywhere, Anytime*

## SPECTRUM ANALYSIS – ANYWHERE, ANYTIME

The MS2711A Handheld Spectrum Analyzer provides the “ultimate” in measurement flexibility for field environments and applications requiring mobility. Unlike traditional spectrum analyzers, the MS2711A features a rugged, ultra-light-weight, battery-operated design that enables users to conduct spectrum analysis measurements – *anywhere, anytime*.

Providing complete freedom from AC/DC power requirements, the MS2711A enables you to locate, identify, record and solve communication systems problems quickly and easily, without sacrificing measurement accuracy.

Whether you are installing, maintaining, or troubleshooting a modern wireless communication system, the MS2711A provides exceptional performance combined with ease-of-use and broad functionality – making it an ideal solution for engineers and technicians who conduct field measurements in the 100 kHz to 3.0 GHz frequency range.

### The Lightest Spectrum Analyzer Available

Weighing only 4.0 lbs. (1.8 kg), the MS2711A is the lightest spectrum analyzer available.

### Rugged and Reliable

Because the MS2711A handheld spectrum analyzer was designed specifically for field environments, it can easily withstand the day-to-day punishment of field use. Rugged packaging also keeps the MS2711A performing in harsh environments.

With its lightweight NiMH battery, the MS2711A operates continuously for over two hours on a single charge. Built-in energy conservation features allow battery life to be extended beyond an eight-hour workday. The MS2711A can also be operated from a 12.5 Vdc source such as an AC-DC adapter or automotive cigarette lighter adapter that also simultaneously charges the battery.

### Easy-to-Use

Operation is straight-forward and driven by firmware that simplifies the process of making measurements and interpreting the results shown on the large, high-resolution LCD display. The menu-driven user interface is easy to use and requires little training.

A full range of marker capabilities such as peak, center and delta functions are also provided, giving users a faster and more comprehensive measurement of displayed signals. Limit lines simplify amplitude measurements, giving users the capability to create quick, simple, pass/fail measurements. Frequency, span and amplitude functions are easily configured for optimum performance. Used together with the Save setup feature, these functions can help to make testing easier and faster for less experienced users.



### Exceptional Performance

The MS2711A utilizes an advanced synthesizer-based design that delivers accurate, reliable and repeatable measurements – *anywhere, every time*.

A broad range of functions coupled with narrow resolution bandwidths down to 10 kHz make it ideal for finding the source of interfering signals in modern wireless systems.

### Powerful Trace Management

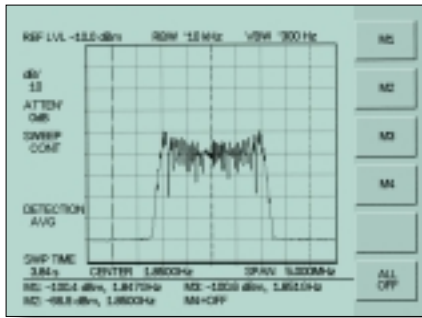
Users are able to store ten test setups along with 200 measurement traces internally in the unit's non-volatile memory. The stored data can be easily downloaded to a personal computer (PC) or a printer via an RS-232 serial cable for further analysis. A notebook computer can be used with the RS-232 interface for automated control and data collection in the field. Additionally, a modem can be used for remote operation.

## Powerful New Features

- Wider dynamic range
- Increased video bandwidth selection
- Ability to store and recall antenna factors
- Two new detection algorithms
- Built-in AM/FM demodulation
- Quick zoom-in, zoom-out display
- Improved user interface
- Field strength measurement
- Faster zero-span sweep speed
- Manual and automatic attenuator control

## Wide Measurement Range

The MS2711A provides an input signal range of +20 dBm to -97 dBm that delivers a broad range of performance for finding the source of interfering signals in various wireless technologies including cellular, PCS, mobile data, mobile satellite, fixed wireless and SMR applications.



Wide Signal Range

## AM/FM Receiver

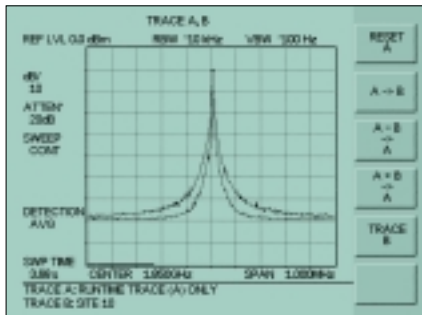
A built-in AM/FM demodulator enables full testing and troubleshooting of a wide range of wireless communications systems. An internal speaker or headset easily interprets signals of interest.

## Accurate, Repeatable Measurements

Synthesized-based operation delivers broadband amplitude resolution and amplitude accuracy of 0.1 dB and  $\pm 2.0$  dB respectively.

## Trace Overlay

View two on-screen traces at the same time to compare the current measurement to baseline measurements stored in the unit's memory.

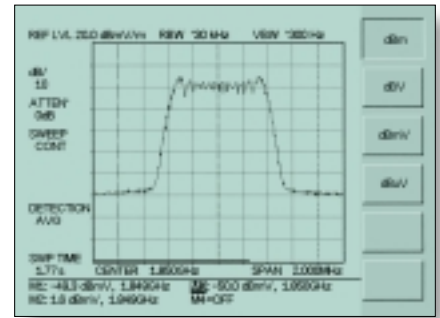


Trace Overlay Screen



## Field Strength Measurements

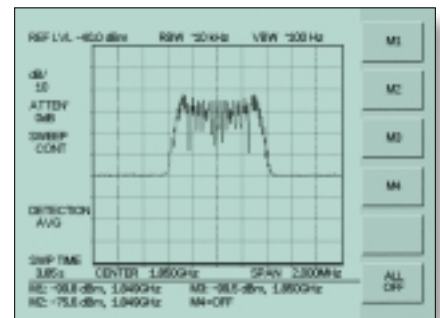
Use the MS2711A as a field strength meter for propagation and coverage measurements or to pinpoint electromagnetic (EM) leakage in broadcast systems.



Field Strength Measurement

## High Resolution Display

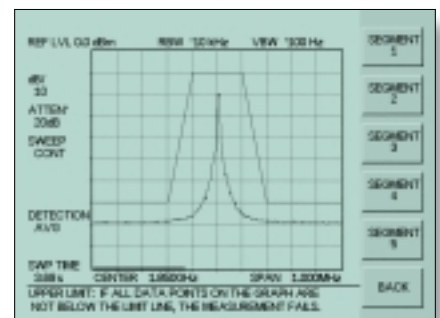
Large, high-resolution LCD display allows for easy viewing and trace interpretation under a variety of conditions.



Marker Screen

## Marker and Limit Line Functions

A full range of marker and limit line functions facilitate quick, comprehensive measurement of displayed signals.



Segmented Limit Line

# THE SMART SOLUTION FOR FIELD MEASUREMENTS

The MS2711A is perfect for radio communications agencies needing to monitor signals and sources of interference in field environments.

Power, frequency, occupied bandwidth, frequency deviation, signal strength, AM/FM demodulation and modulation depth measurements are easily executed with the MS2711A's intuitive soft-key/hard-key user interface.

The MS2711A provides a broad range of testing capability across a variety of field applications including:

- Detection of signal interference
- Monitoring of selected and unselected transmissions
- Detection of unlicensed transmitters
- Detection of undesired emissions
- Protection against concealed transmitters
- Coverage/Signal strength mapping

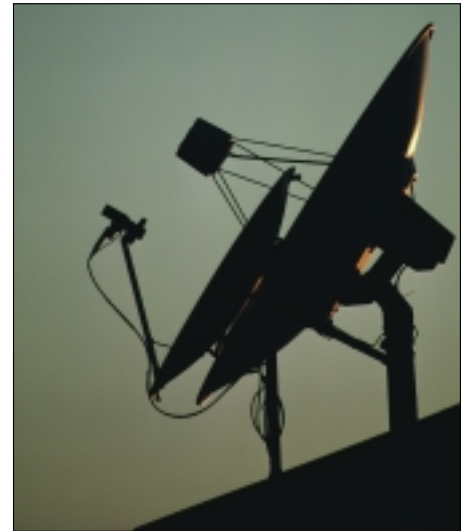


## Antenna Alignment

The MS2711A is ideal for field alignment of small dish antennas. Simply tune to the frequency of interest and monitor received signal strength until position is optimized.

## Signal Mapping

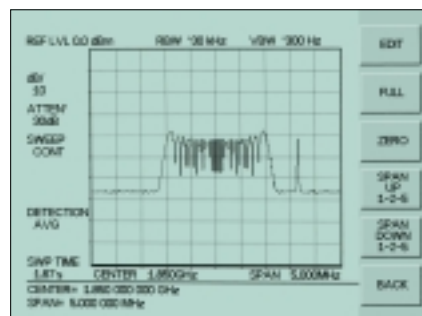
Ideal for site surveys and other signal mapping applications, the MS2711A can optimize placement of antennas and access points in a WLAN or WPBX network. Identification of potential in-band interference as well as transmitted signal quality can be easily performed as the installer moves about the installation site.



## Interference

With the increased deployment of wireless technologies, identifying the source of RF interference problems can be very difficult. The MS2711A solves this problem by providing the noise floor and phase noise performance necessary to enable easy detection of signal interference. The units built-in AM/FM demodulation and zero span capability, further facilitates detection of signal interference.

With the units RS-232 interface, a notebook computer can be used for automated control and collection of interference data in the field. A modem can also be used for remote operation.



*Interference Measurement*



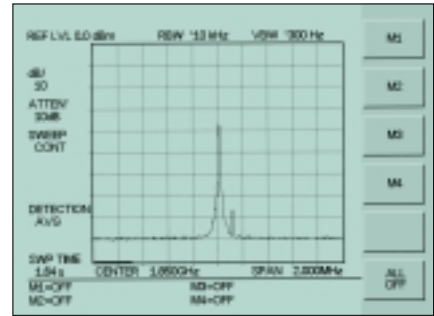
## On-Site System Test

Featuring precision calibration, synthesizer-based design and built in functions enable the MS2711A to optimize accuracy and allow for easy verification of system compliance. Convenient operating procedures, high sensitivity and excellent repeatability pinpoint the smallest RF performance degradation. Harmonic distortion, Occupied Bandwidth, Antenna-to-Antenna isolation and potential interference problems can be detected before small problems grow into big, costly, time-consuming headaches and unwanted site downtime.

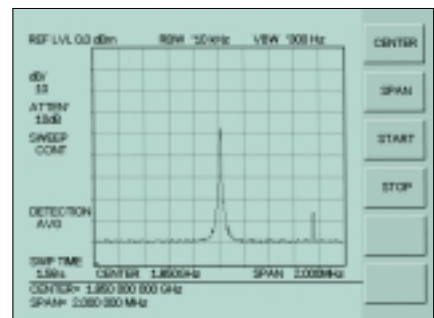


## Spurious Emissions

In-Band and Out-of-Band spurious emissions can cause havoc with Tx-Rx communication systems. Real-time monitoring of spurious emissions from a transmitter or receiver can uncover unwanted signals before they interfere with other users of the radio spectrum, rendering your system non-compliant.



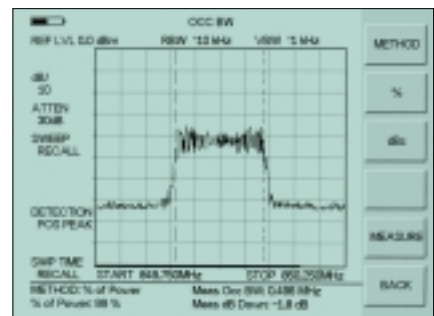
*In-Band Spur Measurement*



*Out-of-Band Spur Measurement*

## Occupied Bandwidth

Monitoring of a transmitters occupied bandwidth enables the user to determine if the transmitter is functioning properly. The MS2711A provides Xdb Down and N% methods to assist users in making transmitter occupied bandwidth measurements.



*Occupied Bandwidth Measurement*

# The Picture is Actual Size . . .

## RS-232 Interface

Download stored data to a personal computer (PC) or a printer via a serial cable for further analysis. Use your notebook computer to automatically control and collect data in the field. Use a modem for remote operation.

## RF Input

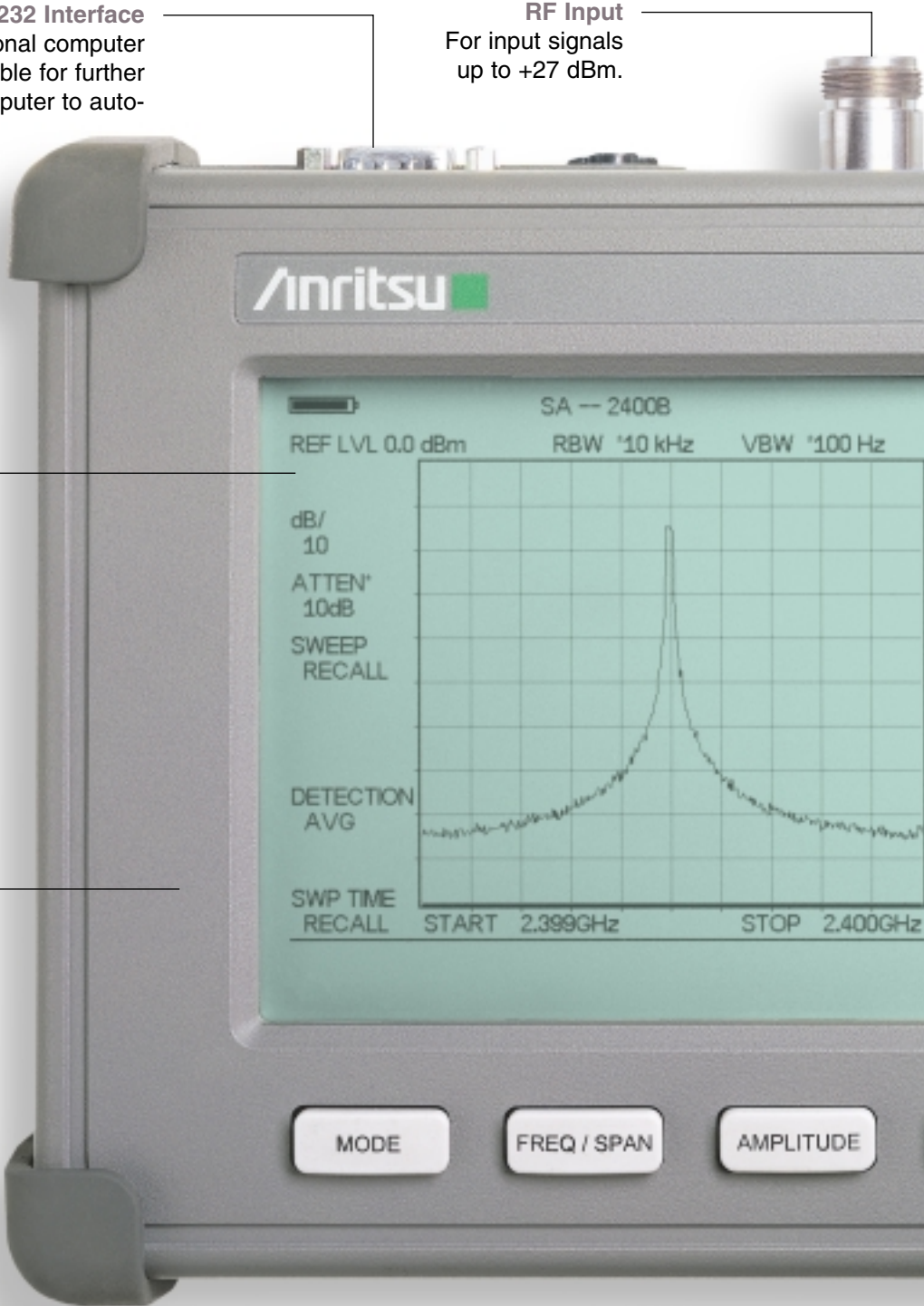
For input signals up to +27 dBm.

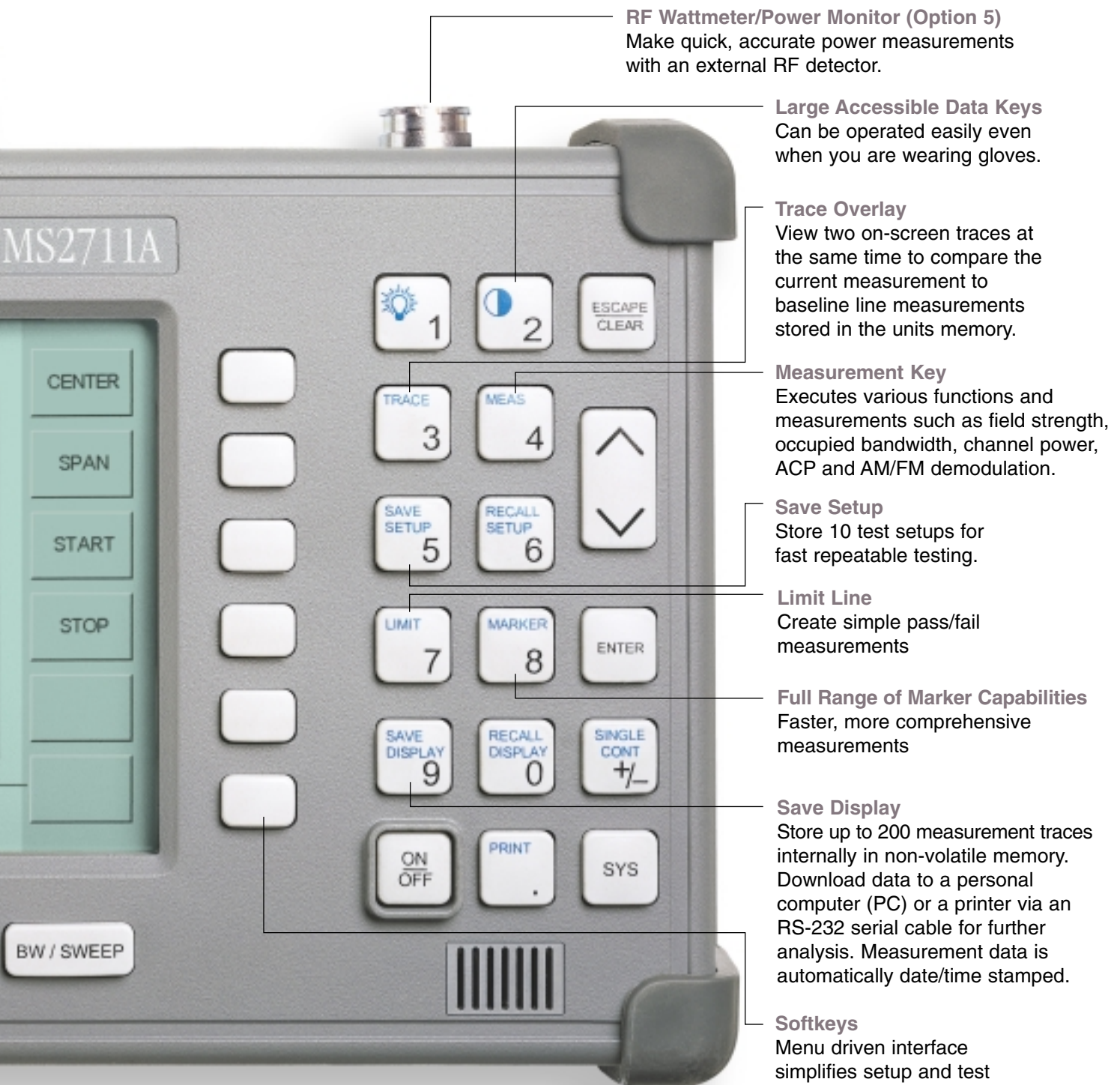
## Large High Resolution Display

Easy viewing under a variety of lighting conditions.

## Rugged Chassis Design

Withstands rough field treatment. A softcase is provided for easy carrying and additional environmental protection.





# The Benefits are Much Larger



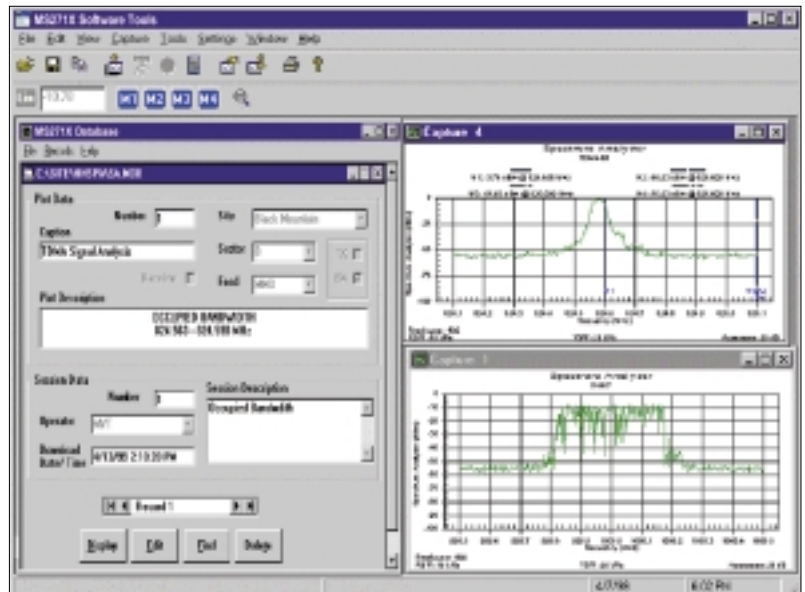
# POWERFUL SOFTWARE TOOLS SIMPLIFY DATA MANAGEMENT

Anritsu MS2711A Software Tools is a database and analysis tool for system maintenance. Test data can be analyzed and compared to historical performance. Up to 200 trace memory storage locations can be downloaded with a single menu selection.

MS2711A Software Tools run on Windows®, Windows 95®, Windows 98® and Windows NT®. The MS2711A Handheld Spectrum Analyzer communicates to external controllers with an RS-232 port. A serial null modem (RX-TX lines are crossed, not straight through) cable is standard with every MS2711A.

MS2711A data traces can be transferred to a PC database with a single menu selection. Then each trace / data record can be quickly annotated with site, sector, feed, test type and other information. Data is stored with each record, so it's easy to keep track of each Test Site's data history. Handy pull down menus minimize on-site typing during installation.

If you'd rather minimize data entry, just type in the site number or customer name to the database header file. MS2711A Software Tools automatically store several critical configurations and test data when it's downloaded.



The MS2711A Handheld Spectrum Analyzer Software Tools quickly stores Test Site data to a Relational Database File



Tired of searching for a notebook full of obsolete measurement data? When you go to a site, your database goes with you. MS2711A Software Tools is intended for use as a maintenance tool. You can add new data to an existing database. Compare historical measurements to current test data to quickly pinpoint small changes in performance. The database's search feature allows technicians to enter data into any open field on the menu. The search returns all trace data ("records") which fit the description. So, if you'd like to see every trace measured by "Phil B." at site number "51", just pull-down (or key-in) those selections and click on the Search button.



## ENHANCE PERFORMANCE WITH PRODUCT OPTIONS

### RF Wattmeter/Power Monitor (Option 5)

A RF Wattmeter option is also available on the Anritsu MS2711A HSA. The MS2711A power monitor features precision, high return loss (low SWR) detectors. The excellent impedance match dramatically reduces the largest component of power measurement error, mismatch uncertainty. Display formats include absolute power (dBm or Watts) and relative power (dB or %). Built-in Auto-averaging automatically reduces the effects of noise. Zeroing control allows optimum measurement accuracy at lower power levels.



*The protective softcase is designed to hold spare adapters. Velcro adjustments on the shoulder strap allow convenient, one hand operation.*



*Signal Detector range, -50 to +20 dBm*



*Anritsu test cables accurately extend the MS2711A's test port into hard to reach positions.*

# SPECIFICATIONS

Except where noted otherwise, specified values are obtained after warming up the Anritsu MS2711A Handheld Spectrum Analyzer for 5 minutes at a constant ambient temperature. The typical values are given for reference, and are not guaranteed.

## Frequency

### Frequency Range

100 kHz to 3.0 GHz

### Frequency Reference

Aging:  $\pm 1$  ppm/yr  
Accuracy:  $\pm 2$  ppm

### Frequency Span

100 kHz to 3.0 GHz in 1,2,5 step selections in auto mode, plus zero span

### Sweep Time

$\geq 650$  ms full span; 400 ms zero span

### SSB Phase Noise

-75 dBc/Hz, 30 kHz offset

### Spurious Responses

Input Related:  $\leq -45$  dBc

### Spurious

Residual Responses:  $\leq -95$  dBm

## Resolution Bandwidths

### Selections

10 kHz, 30 kHz, 100 kHz and 1 MHz

### Accuracy

$\pm 20\%$ , typical

## Video Bandwidth

### Selections:

100 Hz to 300 kHz in 1-3 sequence

## Amplitude

### Measurement Range

+20 to -97 dBm

### Displayed Average Noise Level

$\leq -97$  dBm (full span, typical)

### Dynamic Range

> 65 dB

### Total Level Accuracy

$\pm 2$  dB,  $\geq 200$  kHz, typical  
 $\pm 3$  dB, < 200 kHz, typical

## Amplitude Units

### Log Scale Mode

dBm, dBV, dBmV, dB $\mu$ V

### Display Range

2 to 15 dB/div in 1 dB steps.  
Ten divisions displayed

### Attenuator

Range: 0 to 50 dB, selected manually or automatically coupled to the reference level  
Resolution: 10 dB steps

## Display

### Type

Monochrome LCD (with backlight capability)

### Resolution

640 x 480

### Marker Modes

4 Markers; standard, delta, marker to peak and marker to center

## Memory

### Trace Storage

200 stored traces

### Setup Storage

10 test setups

### Displayed Traces

2

## Inputs

### RF Input

50-Ohms

### Connector

Type N Female

### Maximum Input Level

+ 20 dBm, + 50 Vdc

### RF Input VSWR

2.0:1

## RS-232 Interface

### Type

Null modem

### Baud Rate

9600/56k Baud

## Printer Interface

### Drivers

Epson ESC/P  
Epson ESC/P RAST  
Epson ESC/P2  
HP PCL3

## General Characteristics

### Dimensions

10.0 in. x 7.0 in. x 2.25 in.  
25.4 cm x 17.8 cm x 6.1 cm

### Weight

4.0 lbs (1.8 kg) includes battery

## Power Requirement

### Battery Operation (standard)

NiMH battery

### AC/DC Operation (optional via external DC input)

+ 12.5 to +15 Vdc, 1100 mA max.

## Environmental

### Temperature

Operating: 0 to +50°C, humidity 85% or less  
Non-operating: -20 to +75°C

## Electromagnetic Compatibility

Complies with European community requirements for CE marking

## Safety

Conforms with EN 61010-1 for class 1 portable equipment



Panel connections include a 9 pin D-sub RS-232, precision test port connector, DC power input, headphone jack (not pictured) and an optional RF detector connection for the Wattmeter operations.

# ORDERING INFORMATION

## Standard Product and Accessories

### Model MS2711A (100 kHz to 3000 MHz)

User's Guide  
Soft Carrying Case  
Rechargeable Battery, NiMH  
AC – DC Adapter  
Automotive Cigarette Lighter/12 Volt DC Adapter  
One Year Warranty  
CD ROM containing Software Management Tools  
Serial Interface Cable



## Product Options

Option 5 RF Watt Meter Power Monitor  
(RF Detector not included)

## Optional Accessories

5400-71N50	RF Detector, N(m), 50 Ohm, 1 to 3000 MHz
42N50A-30	30 dB, 50 Watt, Bi-directional, DC to 18 GHz, N(m) to N(f) Attenuator
15NN50-1.5A	Test Port Cable Armored, 1.5 meter, N(m) to N(m), 3.5 GHz
15NN50-3.0A	Test Port Cable Armored, 3.0 meter, N(m) to N(m), 3.5 GHz
15NN50-5.0A	Test Port Cable Armored, 5.0 meter, N(m) to N(m), 3.5 GHz
15NNF50-1.5A	Test Port Cable Armored, 1.5 meter, N(m) to N(f), 3.5 GHz
15NNF50-3.0A	Test Port Cable Armored, 3.0 meter, N(m) to N(f), 3.5 GHz
15NNF50-5.0A	Test Port Cable Armored, 5.0 meter, N(m) to N(f), 3.5 GHz
15ND50-1.5A	Test Port Cable Armored, 1.5 meter, N(m) to 7/16 DIN(m), 3.5 GHz
15NDF50-1.5A	Test Port Cable Armored, 1.5 meter, N(m) to 7/16 DIN(f), 3.5 GHz
800-109	Detector Extender Cable, 7.6 m (25 ft.)
800-110	Detector Extender Cable, 15.2 m (50 ft.)
800-111	Detector Extender Cable, 30.5 m (100 ft.)
800-112	Detector Extender Cable, 61 m (200 ft.)
510-90	Adapter 7/16 (f) to N(m), 3.5 GHz
510-91	Adapter 7/16 (f) to N(f), 3.5 GHz
510-92	Adapter 7/16 (m) to N(m), 3.5 GHz
510-96	Adapter 7/16 DIN (m) to 7/16 DIN (m), 3.5 GHz
510-97	Adapter 7/16 DIN (f) to 7/16 DIN (f), 3.5 GHz
1091-26	Adapter, DC to 18 GHz, 50 Ohm, N(m) to SMA(m)
1091-27	Adapter, DC to 18 GHz, 50 Ohm, N(m) to SMA(f)
1091-172	Adapter, DC to 1.3 GHz, 50 Ohm, N(m) to BNC(f)
34NN50A	Precision Adapter, DC to 18 GHz, 50 Ohm, N(m) to N(m)
34NNF50A	Precision Adapter, DC to 18 GHz, 50 Ohm, N(f) to N(f)

## Optional Accessories (continued)

48258	Spare Soft Carrying Case
40-115	Spare AC/DC Adapter
806-62	Spare Automotive Cigarette Lighter/12 Volt DC adapter
800-441	Spare Serial Interface Cable
760-215A	Transit Case for Anritsu Handheld Spectrum Analyzer
633-27	Rechargeable Battery, NiMH
2000-1029	Battery Charger, NiMH
2300-347	Anritsu Handheld Spectrum Analyzer Software Tools
10580-00048	Anritsu HHSA User's Guide, Model MS2711A
10580-00049	Anritsu HHSA Programming Manual, Model MS2711A
10580-00050	Anritsu HHSA Maintenance Manual, Model MS2711A
2000-1030	Portable Antenna, 50 Ohm, SMA (m), 1.71-1.88 GHz
2000-1031	Portable Antenna, 50 Ohm, SMA (m), 1.85-1.99 GHz
2000-1032	Portable Antenna, 50 Ohm, SMA (m), 2.4-2.5 GHz
2000-1034	Portable Antenna, 50 Ohm, SMA (f), 806-869 MHz
2000-1035	Portable Antenna, 50 Ohm, SMA (m), 902-960 MHz
70-28	Headset



## Printers

2000-766	HP DeskJet Printer Includes: Interface Cable, Black Print Cartridge, and U.S. Power Cable
2000-753	Spare Serial-to-Parallel Converter Cable
2000-661	Black Print Cartridge
2000-662	Rechargeable Battery for DeskJet Printer
2000-663	Power Cable (Europe) for DeskJet Printer
2000-664	Power Cable (Australia) for DeskJet Printer
2000-665	Power Cable (U.K.) for DeskJet Printer
2000-667	Power Cable (So. Africa) for DeskJet Printer
2000-1008	Sieko DPU-414-30B Thermal Printer Includes: Internal Battery, Thermal Printer Paper, Serial Cable, Power Cable
2000-755	Five (5) rolls of Thermal Paper
2000-1002	U.S. Adapter (for Seiko DPU-414-30B)
2000-1003	Euro Adapter (for Seiko DPU-414-30B)
2000-1004	Battery Pack Adapter (for Seiko DPU-414-30B)
2000-10012	Serial 9-pin (male) for 9-pin (female) cable
2000-1046	Serial-to-Parallel Converter Cable with Dip Switch Labeling and a 36-pin Centronics Female to DB25 Female Adapter







**Sales Centers:**

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