

# Spectrum Master™

Compact Handheld Spectrum Analyzer

MS2711E

9 kHz to 3 GHz



# Anritsu Introduces its Next Generation Compact Spectrum Analyzer



The wireless communications market is rapidly growing as the telecommunications and defense sectors continue to evolve. Whether you are installing, troubleshooting, or solving problems for military communications facilities, public safety providers, or wireless service providers, Anritsu has a solution.

Anritsu's new Spectrum Master MS2711E has been designed for technicians, installers, field radio frequency (RF) engineers, and contractors who struggle with both keeping track of the growing number of interfering signals and assessing signal quality on a wide range of increasingly complex signals. Easy-to-use, integrated and high performing, the MS2711E helps users address those challenges and more. Its feature-rich and compact design helps users comply to regulatory requirements, manage and maximize efficiency, improve system up-time, and increase revenue – all in a rugged and field-proven device designed to withstand even the most punishing conditions.

This next generation of Anritsu's best-in-class Spectrum Master series is ideal for spectrum monitoring, interference analysis, RF and microwave measurements, field strength measurements, transmitter spectrum analysis, electromagnetic field analysis and overall field analysis.

## Designed For Field Use

The MS2711E was designed specifically for field environments. Weighing less than 3.45 kg, it is small compact and easy to carry. Its field replaceable Li-Ion battery typically lasts for more than 3 hours, and a new bright 8.4-inch color display provides visibility even in broad daylight. With an operating temperature range from -10 °C to 55 °C, a rugged case and splash proof design, the MS2711E works in the most extreme weather conditions with guaranteed performance anywhere and anytime.

## Integrated Solution

The MS2711E is a multifunctional instrument that eliminates the need for you to carry and learn multiple instruments. It can be configured to include a broad range of parameters, including an interference analyzer with signal mapping, Tracking Generator, power meter, high accuracy power meter, AM/FM/PM Analyzer, and GPS receiver for time/location stamping and accuracy enhancements.

## Easy-To-Use

The new Spectrum Master MS2711E leverages the user interface from Anritsu's popular MS2712E and MS2713E analyzers, giving users intuitive spectrum analyzer menus. A touchscreen keypad combination provides you with an intuitive menu-driven interface designed to give a familiar menu structure with quick access to popular measurements.

## Key Facts

- 9 kHz to 3 GHz
- One-button measurements: ACPR, Channel Power, Field Strength, Occupied BW, AM/FM/SSB Demod
- Interference Analyzer: Spectrogram, Signal Strength, RSSI, Signal ID, Interference Mapping
- DANL: > -142 dBm in 100 Hz RBW
- Dynamic range: > 85 dB in 100 Hz RBW
- +25 dBm TOI typical @ 2 GHz
- < Phase Noise: -90 dBc/Hz @ 10 kHz at 1 GHz
- Frequency accuracy: < ± 50 ppb with GPS on
- Detection methods: Peak, RMS, Negative, Sample, Quasi-peak
- Save-on-event: Automatically saves a sweep when crossing a limit line or at the end of the sweep.
- Three hours of battery life
- Touch-screen display
- USB for data transfer and instrument control
- 8.4-inch daylight viewable touchscreen display
- Lightweight: < 3.45 kg

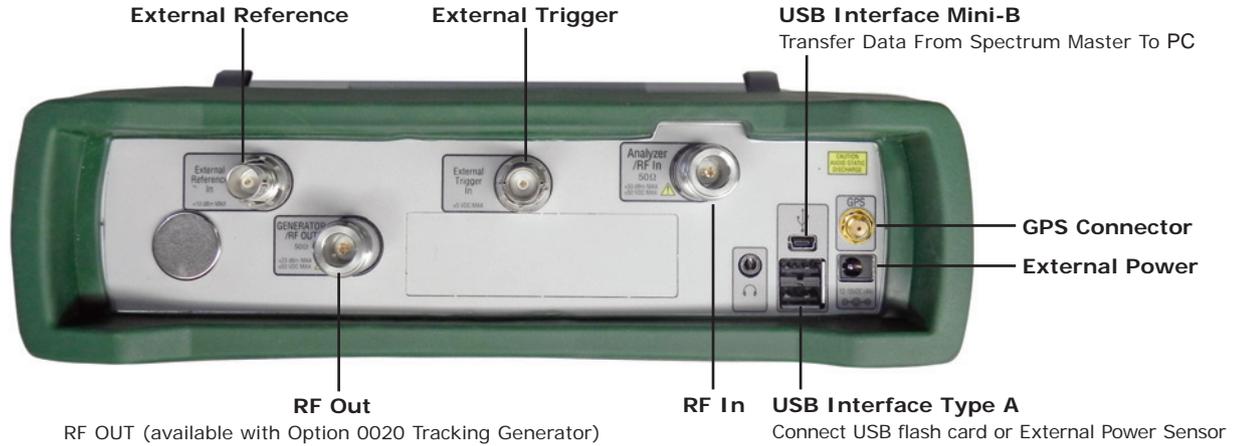
# Integrated Measurement Capabilities



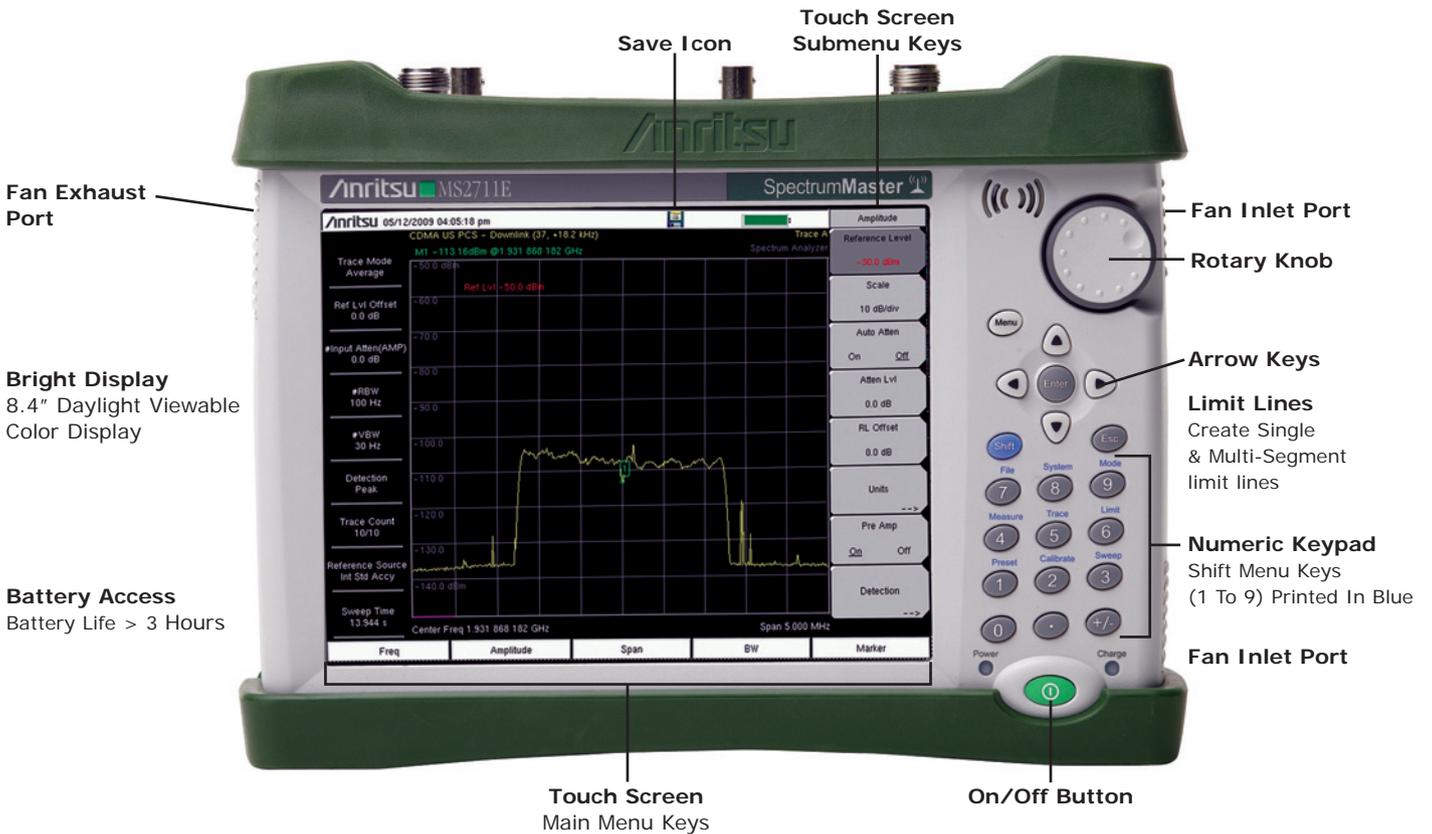
## Configuration Overview

FUNCTION	DESCRIPTION
<b>Spectrum Analyzer, 9 kHz to 3 GHz</b>	Locates and identifies various signals over a wide frequency range. Detects signals as low as -142 dBm with phase noise better than -90 dBc/Hz.
<b>Interference Analyzer (Option 25)</b>	Includes everything you need to monitor, identify, and locate interference using the spectrogram display, RSSI, Signal ID, signal strength meter, and interference mapping.
<b>GPS Receiver (Option 31)</b>	Provides location and UTC time information. Also improves the accuracy of the reference oscillator.
<b>Tracking Generator (Option 20)</b>	Features high dynamic range with power steps ranging from -50 dBm to 0 dBm in 0.1 dB steps.
<b>High Accuracy Power Meter (Option 19)</b>	Connects high accuracy 4, 6, 8, 18, and 26 GHz USB power sensors with better than $\pm 0.16$ dB accuracy.
<b>Power Meter (Option 29)</b>	Makes channelized transmitter power measurements.
<b>Channel Scanner (Option 27)</b>	Measures the power of multiple transmitted signals. Scans up to 1200 channels using Script Master.
<b>AM/FM/PM Analyzer (Option 509)</b>	Analyzes AM/FM/PM signals and measures FM/PM deviation, AM depth, SINAD, Total Harmonic Distortion and much more.

# Designed for the Field



All connectors are conveniently located on the top panel, leaving the sides clear for handheld use.



**File Management**  
Saves & Recall > 2000 traces & setups

## Convenient Soft Case and Tilt Bail

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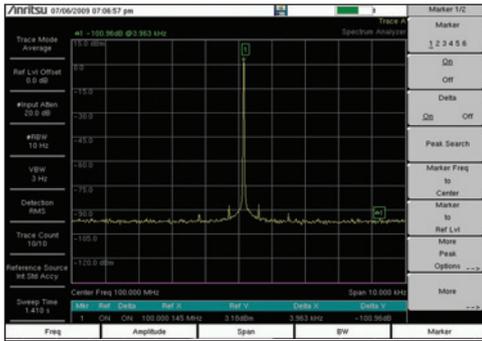


Tilt Bails are integrated into the case and soft case for better screen viewing.

# Best Performance in its Class

Anritsu's MS2711E Spectrum Master spectrum analyzers provide users with high-performance for field environments and for applications requiring mobility. There is no other spectrum analyzer in this class that can deliver the same performance.

The combination of its performance and compact design makes it ideal for a broad range of activities, including spectrum monitoring, interference analysis, field strength measurements, transmitter spectrum analysis, electromagnetic field strength, and overall field analysis.



## High Performance

The dynamic range is better than 85 dB in 100 Hz RBW, enabling measurement of very small signals in the presence of much larger signals. The picture demonstrates the dynamic range in the Spectrum Master.

## Displayed Average Noise Level

Spectrum Master delivers impressive and best-in-class DANL performance. With the built-in pre-amp, better than -142 dBm DANL can typically be realized in 100 Hz RBW and -162 dBm when normalized to 1 Hz. This low-level performance capability is essential when looking for low-level interference signals

## GPS-Assisted Frequency Accuracy

With GPS Option 0031 the frequency accuracy is < 50 ppb. This additional accuracy is important when characterizing 3GPP signals using counted frequency markers. Also all measurements can be GPS tagged for exporting to maps.

## Simple but Powerful for Field Use

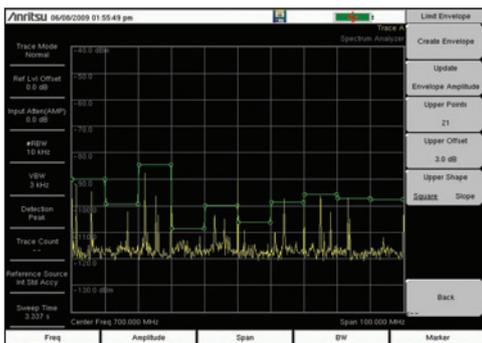
Convenience is a must in the field. This is why the Spectrum Master is equipped with features that will enhance productivity in the field.

The Spectrum Master is equipped with limit lines for all user levels. You can create single limit lines and segmented limit lines in one step using the one-button limit envelope feature.

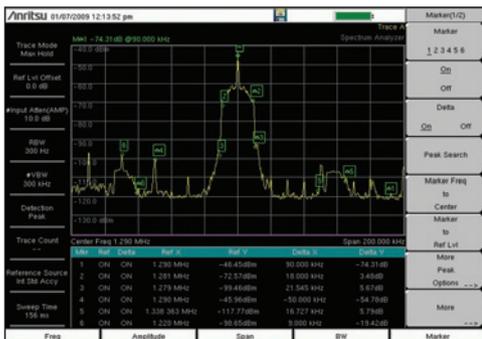
The Spectrum Master automatically sets the fastest sweep possible while still ensuring accurate measurements. This allows users to rely on the instrument to optimize accuracy and consistency.

Auto Attenuation ties the input attenuation to the reference level eliminating the need for the user to determine how much attenuation is needed.

Six regular and six delta markers can be displayed with a marker table that can be turned on as needed. The capability to measure noise level in terms of dBm/Hz or dBµV/Hz is a standard feature of the Spectrum Master.



## Limit Envelope

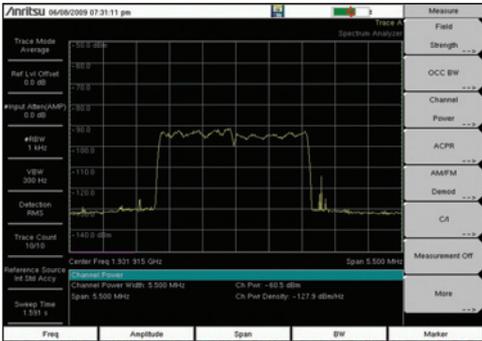


## Comprehensive Marker Menu

# Master Transmitter Testing

## Smart Measurements for Transmitter Systems

Commonly needed transmitter measurements are built in and can be accessed easily. These include field strength, occupied bandwidth, channel power, adjacent channel power ratio (ACPR), and emission mask.



Occupied Bandwidth

## Occupied Bandwidth

This measurement determines the amount of spectrum used by a modulated signal. The Spectrum Master allows you to choose between two different methods of determining bandwidth: the percent-of-power method or the “x” dB down method.

## Adjacent Channel Power Ratio

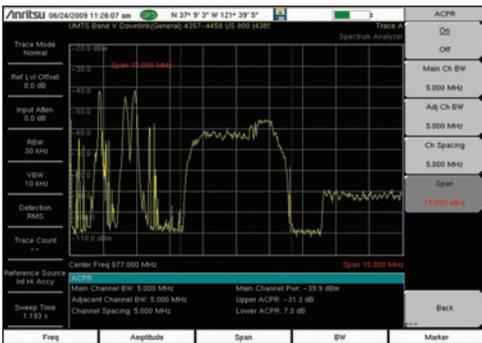
Adjacent Channel Power Ratio is a common transmitter measurement. High ACPR will create interference for neighboring carriers. This measurement can be used to replace the traditional two-tone Intermodulation Distortion (IMD) test for system non-linear behavior.

## Field Strength Measurements

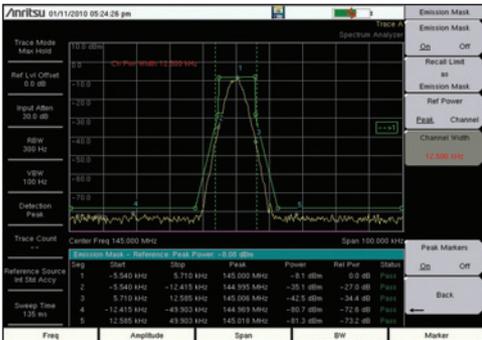
The Spectrum Master can determine the effects of electromagnetic fields caused by transmitter systems. Specific antenna factors of the connected antenna are automatically taken into account, and field strength is displayed directly in dB $\mu$ V/m. The Spectrum Master also supports a wide range of directional antennas. If you are using a different antenna, Master Software Tools can be used to edit the antenna list and upload the custom antenna list to the instrument to accurately measure the maximum field strength.

## Emission Mask

The emission mask is a segmented upper limit line that will display frequency range, peak power and frequency, relative power and pass/fail status for each segment of the mask. The emission mask must have at least two segments. Emission mask adjusts to the peak power value of transmitted signal level per government emission mask requirements.



Adjacent Channel Power Ratio



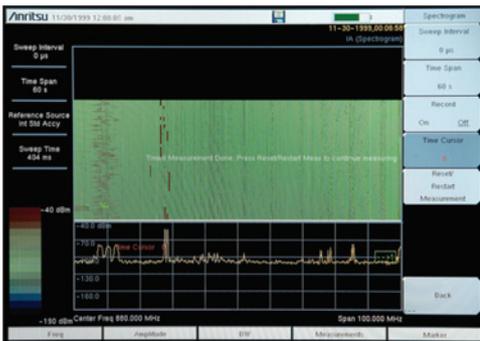
Emission Mask



# Master the Location of Interference

As the wireless industry continues to expand, more diverse uses for the radio spectrum emerge, and the number of signals that may potentially cause interference is constantly increasing.

Compounding the problem are the many sources that can generate interference, including intentional radiators, un-intentional radiators, and self interference. Interference causes Carrier-to-Interference degradation robbing the network of capacity. The goal of these measurements is to resolve interference issues as quickly as possible.



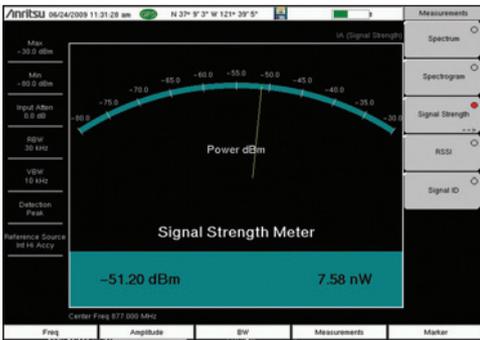
Spectrogram Display

## Interference Analysis (Option 25)

The interference analyzer option provides you with a spectrogram display, RSSI, signal strength meter, signal ID, and signal mapping capabilities. Spectrum Master's integrated spectrum analyzer can detect signals as low as -142 dBm.

## Spectrogram Display

This option provides you with a three-dimensional display of frequency, power, and time of the spectrum activity to identify intermittent interference and track signal levels over time. The dual display screen allows for easy viewing of both the spectrum and 3D display. The Spectrum Master allows you to save a history of data up to one week.



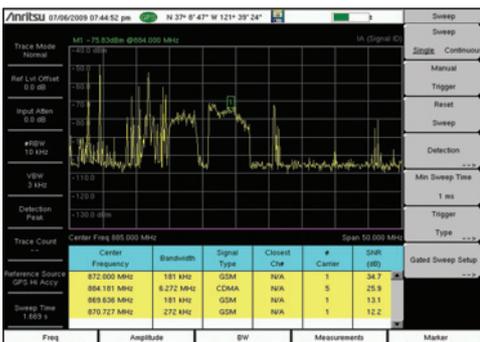
Signal Strength Meter

## Received Single Strength Indicator (RSSI)

You can use the Spectrum Master's RSSI measurement to observe the signal strength of a single frequency over time, and collect data for up to one week.

## Signal Strength Meter

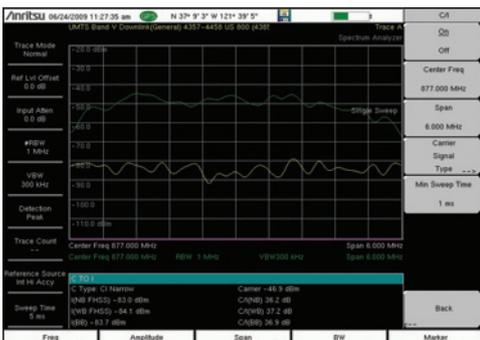
The Spectrum Master's signal strength meter can locate an interfering signal by using a directional antenna and measuring the signal strength. It displays power in Watts or dBm, in the graphical analog meter display and by an audible beep proportional to its strength.



Signal ID

## Signal ID

Spectrum Master's signal ID feature in the interference analyzer can help you quickly identify the type of the interfering signal. You can configure this measurement to identify all signals in the selected band or to simply monitor one single interfering frequency. The Spectrum Master then displays results that include center frequency, signal bandwidth, and signal type.



Carrier-to-Interference (C/I)

## Carrier-To-Interference Measurement

Spectrum Master's carrier-to-interference measurement capability makes it simple for you to determine if the level of interference will affect users in the intended service area.

## AM/FM/SSB Demodulation

A built-in demodulator for AM, narrowband FM, wideband FM and single sideband allows you to easily identify the interfering signal.

# Pin Point Location of Interfering Signal with Interference Mapping



Interference Mapping with Google Earth™

## Interference Mapping

The Interference Mapping measurement eliminates the need to use printed maps and draw lines to triangulate the interfering signal.

Using Map Master, it is easy to convert maps and make them compatible with the Spectrum Master. With a valid GPS signal, the instrument identifies the user location on the map. Using one of the recommended Anritsu Yagi antennas, you can identify the direction of the interfering signal and input the angle information with the rotary knob. With two or more lines from different locations, it is possible to obtain an estimate location of the interfering signal. The Interference Mapping can be done directly on the Spectrum Master. Files can also be saved as kml and opened with Google Earth™.



## Directional Antennas

Anritsu offers more than eight different directional antennas covering a wide range of frequency bands including: 822 to 900 MHz, 885 to 975 MHz, 1710 to 1880 MHz, 1850 to 1990 MHz, 2400 to 2500 MHz, 1920 to 2170 MHz, 500 to 3000 MHz, and 600 to 21000 MHz.



## GPS Antenna

The 2000-1528-R GPS antenna and Option 31 are required for the interference mapping measurements.

**Anritsu** 05/05/2010 02:34:20 pm **GPS** N 37° 8' 48" W 121° 39' 22"

**Interference Mapping**

- Save Current Point
- Location & Direction
- Save/Recall
- Points/Map
- Delete Last Saved Point
- Delete ALL Points
- Speaker On Off
- Volume
- Reset Max/Min Hold
- Back

**Frequency** 2.000 GHz  
**RBW** 1 MHz  
**Detection** Peak

**-59.47 dBm**

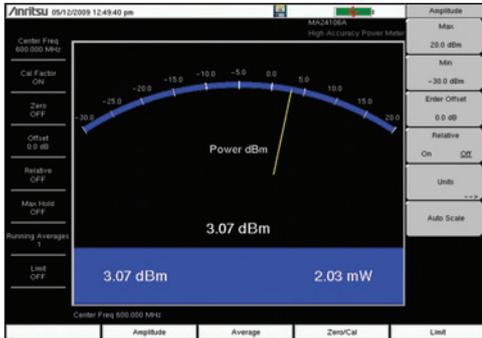
Direction: 0 degrees -72.39 dBm Signal Strength -47.78 dBm

Freq Amplitude BW Measurements IA Mapping

On Screen Interference Mapping

# Power Measurements for a Wide Range of Applications

The Spectrum Master supports many different power measurements, including the channel scanner, high accuracy power meter, internal power meter, and channel power measurement.



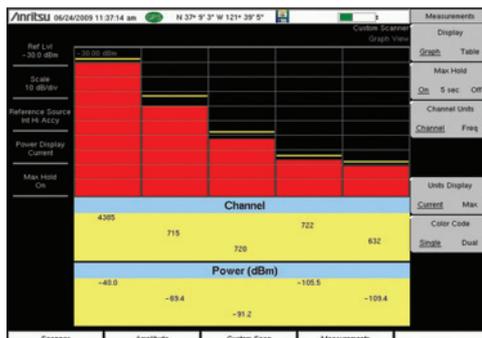
Power Meter



High Accuracy Power Meter



High Accuracy Power Sensors



Channel Scanner

## Channel Power

Use Spectrum Master's channel power measurement to determine the power and power density of a transmission channel. Using the built-in signal standard list, you can measure the channel power of a wide range of signals.

## Power Meter (Option 29)

Spectrum Master's internal power meter provides power measurements without any additional tools and is ideal for making channelized power measurements. You can display the results in both dBm and Watts. This option is easy to use and requires limited setup entries.

## High Accuracy Power Meter (Option 19)

Anritsu's high accuracy power meter option enables you to make high accuracy RMS measurements. This capability is perfect for measuring both CW and digitally modulated signals such as CDMA/EV-DO, GSM/EDGE, WCDMA/HSDPA, and P25. You can select from a wide range of USB sensors delivering better than  $\pm 0.16$  dB accuracy. An additional benefit of using the USB connection is that a separate DC supply (or battery) is not needed because the necessary power is supplied by the USB port.

- PSN50 High Accuracy RF Power Sensor, 50 MHz to 6 GHz, -30 dBm to +20 dBm, True-RMS
- MA24104A Inline High Power Sensor, 600 MHz to 4 GHz, +3 dBm to +51.76 dBm, True-RMS
- MA24105A Inline Peak Power Sensor, 350 MHz to 4 GHz, +3 dBm to +51.76 dBm, True-RMS
- MA24106A High Accuracy RF Power Sensor, 50 MHz to 6 GHz, -40 dBm to +23 dBm, True-RMS
- MA24108A Microwave USB Power Sensor, 10 MHz to 8 GHz, -40 dBm to +20 dBm, True-RMS
- MA24118A, Microwave USB Power Sensor, 10 MHz to 18 GHz, -40 dBm to +20 dBm, True-RMS
- MA24126A, Microwave USB Power Sensor, 10 MHz to 26 GHz, -40 dBm to +20 dBm, True-RMS

## PC Power Meter

These power sensors can be used with a PC running Microsoft Windows® via USB. They come with PowerXpert™ application, a data analysis, and control software. The application has abundant features, such as data logging, power versus time graph, big numerical display, and many more, that enable quick and accurate measurements.

## Channel Scanner (Option 27)

The channel scanner option measures the power of multiple transmitted signals, making it very useful for simultaneously measuring channel power of up to 20 channels in GSM, TDMA, CDMA, W-CDMA, HSDPA, and public safety networks. You can select the frequencies or the scanned data to be displayed, either by frequencies or the channel number. And in the custom setup menu, each channel can be custom built with different frequency bandwidth, or with channels from different signal standards. With Script Master, scans can be automated for up to 1200 channels.

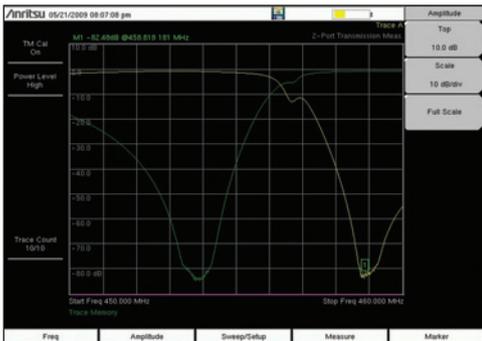
# Passive 2-Port Measurements



Tracking Generator Measurements

## Tracking Generator (Option 20)

Spectrum Master's Tracking Generator capability allows you to make gain, isolation and insertion loss measurements of passive and active devices such as filters, cables, attenuators, duplexers, and tower mounted amplifiers. The Tracking Generator can also be used to make antenna-to-antenna isolation measurements and for repeater testing. The output power level can be varied from -50 dBm to 0 dBm in 0.1 dB steps.



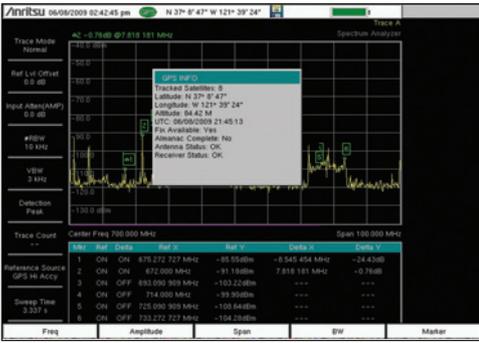
Duplexer Measurement

## Duplexers

Fast sweep speeds, 80 dB dynamic range, and easy-to-use trace math menus make the Spectrum Master well suited for duplexer applications.



# Valuable Options and Features



GPS Receiver

## GPS Receiver (Option 31)

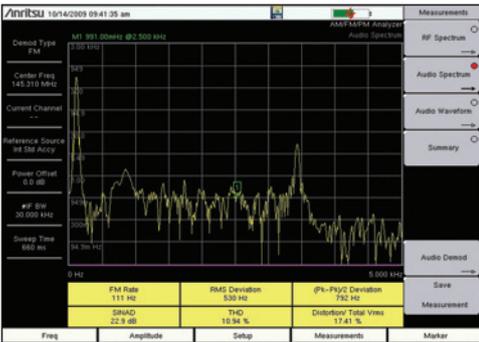
Spectrum Master's GPS option can be used to confirm the exact measurement location (longitude, latitude, altitude) and Universal Time (UTC) information. Each trace can be stamped with location information to ensure you are taking measurements at the right location.

In addition, the GPS option enhances the frequency accuracy of the internal reference oscillator. Within three minutes of acquiring the GPS satellite, the built-in GPS receiver provides a frequency accuracy to better than  $\pm 50$  ppb.

## AM/FM/PM Analyzer (Option 509)

The AM/FM/PM analyzer provides analysis and display of analog modulation. Four measurement displays are provided.

The RF Spectrum display shows the spectrum with carrier power, frequency, and occupied BW. The Audio Spectrum display shows the demodulated audio spectrum along with the Rate, RMS deviation, Pk-Pk/2 deviation, SINAD, Total Harmonic Distortion (THD), and Distortion/Total. Audio Waveform display shows the time-domain demodulated waveform. Finally, there is a Summary Table Display that includes all the RF and Demod parameters.



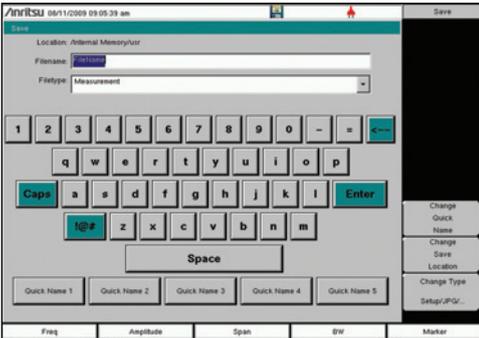
AM/FM/PM Analyzer

## Built-in Keyboard

The built-in touchscreen keyboard gives you access to a fully functional keyboard, saving valuable time in the field when entering trace names. You can create shortcuts to customer-configurable user "quick names" to program frequently used words.

## Local Language Support

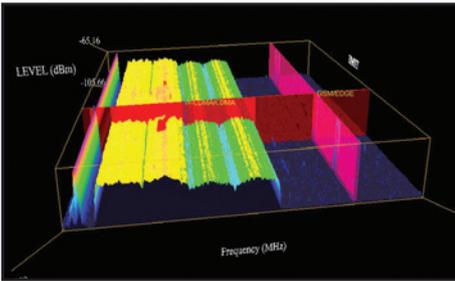
Spectrum Master features eight languages, including English, Japanese, Chinese, Italian, French, German, Spanish, and Korean. Two custom user-defined languages can be uploaded into the instrument using Master Software Tools.



Touchscreen keyboard

# Spectrum Master™ Compact Handheld Spectrum Analyzer Features

## Master Software Tools (for your PC)



### 3D Spectrogram

For in-depth analysis with 3-axis rotation viewing, threshold, reference level, and marker control. Turn on Signal ID to see the types of signals.

## Master Software Tools

Master Software Tools (MST) is a powerful PC software post-processing tool designed to enhance the productivity of technicians in data analysis and testing automation.

### Folder Spectrogram

Folder Spectrogram – creates a composite file of up to 15,000 multiple traces for quick review, also create:

- Peak Power, Total Power, and Peak Frequency plotted over time
- Histogram – filter data and plot number of occurrences over time
- Minimum, Maximum, and Average Power plotted over frequency
- Movie playback – playback data in the familiar frequency domain view
- 3D Spectrogram – for in-depth analysis with 3-axis rotation viewing control

## Master Software Tools Features

### Mapping (GPS Required)

- Spectrum Analyzer Mode
- Mobile WiMAX OTA Option
- TS-SCDMA OTA Option
- LTE, both FDD and TDD Options

### Folder Spectrogram

- Folder Spectrogram – 2D View
- Video Folder Spectrogram – 2D View
- Folder Spectrogram – 3D View

### List/Parameter Editors

- Traces
- Antennas, Cables, Signal Standards
- Product Updates
- Firmware Upload
- Pass/Fail
- VSG Pattern Converter
- Languages
- Mobile WiMAX
- Display

### Script Master™

- Channel Scanner Mode
- GSM/GPRS/EDGE Mode
- W-CDMA/HSDPA Mode

### Connectivity

- Serial, USB
- Download measurements and live traces
- Upload Lists/Parameters and VSG Patterns
- Firmware Updates
- Remote Access Tool over the Internet

# Spectrum Master™ Ordering Information

## Ordering Information – Options

	<b>MS2711E</b>	<b>Description</b>
	9 kHz to 3 GHz	Spectrum Analyzer
	<b>Options</b>	
	MS2711E-0008	Preamplifier
	MS2711E-0020	Tracking Generator
	MS2711E-0031	GPS Receiver (Requires Antenna P/N 2000-1528-R)
	MS2711E-0019	High-Accuracy Power Meter*
	MS2711E-0029	Power Meter
	MS2711E-0025	Interference Analyzer
	MS2711E-0027	Channel Scanner
	MS2711E-0509	AM/FM/PM Analyzer
	MS2711E-0098	Standard Calibration (ANSI 2540-1-1994)
	MS2711E-0099	Premium Calibration to Z540 plus test data *Requires External Power Sensor

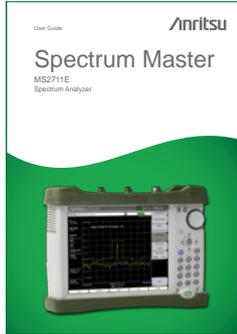
# Spectrum Master™ Ordering Information

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



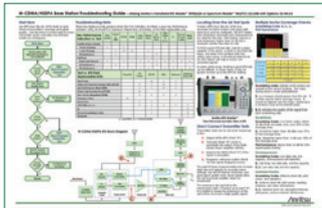
Model Number	Description
PSN50	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +20 dBm
MA24106A	High Accuracy RF Power Sensor, 50 MHz to 6 GHz, +23 dBm
MA24104A	Inline High Power Sensor, 600 MHz to 4 GHz, +51.76 dBm
MA24105A	Inline Peak Power Sensor, 350 MHz to 4 GHz, +51.76 dBm
MA24108A	Microwave USB Power Sensor, 10 MHz to 8 GHz, +20 dBm
MA24118A	Microwave USB Power Sensor, 10 MHz to 18 GHz, +20 dBm
MA24126A	Microwave USB Power Sensor, 10 MHz to 26 GHz, +20 dBm

## Manuals (soft copy included on Handheld Instruments Documentation Disc and at [www.anritsu.com](http://www.anritsu.com))



Part Number	Description
10920-00060	Handheld Instruments Documentation Disc
10580-00328	Spectrum Master User Guide (Hard copy included)
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](http://www.anritsu.com))



Part Number	Description
11410-00551	Spectrum Analyzers Field User Guide
11410-00472	Interference Troubleshooting Guide

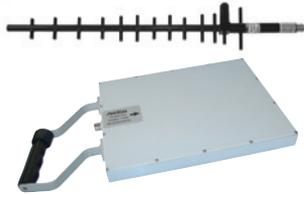
## Standard Accessories (included with instrument)



Part Number	Description
10920-00060	Handheld Instruments Documentation Disc
10580-00328	Spectrum Master User Guide
2000-1654-R	Soft Carrying Case
2300-498	Master Software Tools (MST) CD Disc
2300-530	Anritsu Tool Box with Line Sweep Tools (LST) DVD Disc (for PIM Analyzer Trace Management)
2300-532	Map Master CD
633-44	Rechargeable Li-Ion Battery
40-168-R	AC-DC Adapter
806-141-R	Automotive Cigarette Lighter Adapter
3-2000-1498	USB A/5-pin mini-B Cable, 10 feet/305 cm
11410-00597	Spectrum Master™ MS2711E Technical Data Sheet One Year Warranty (Including battery, firmware, and software) Certificate of Calibration and Conformance

# Spectrum Master™ 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
2000-1519-R	500 MHz to 3 GHz, log periodic
2000-1677-R	300 MHz to 3 GHz, SMA(m), log periodic

## Portable Antennas



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

## Mag Mount Broadband Antenna



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

## 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
1030-105-R	890 MHz to 915 MHz, N(m) to N(f), 50 Ω
1030-111-R	1850 MHz to 1910 MHz, N(m) to SMA(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
1030-112-R	2400 MHz to 2484 MHz, N(m) to SMA(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

# Spectrum Master™ Optional Accessories

## 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)

## 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

## 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	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
34NFN50	Precision Adapter, N(f) to N(f), DC to 18 GHz, 50 Ω

# Spectrum Master™ Optional Accessories

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## 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

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## Miscellaneous Accessories



Part Number	Description
2000-1528-R	GPS Antenna, SMA(m) with 15 ft. cable
2000-1652-R	GPS Antenna, SMA(m) with 1 ft. cable
806-245-R	Calibration Accessory for use with Option 20 Tracking Generator
2000-1374	External Charger for Li-Ion Batteries
2000-1653	Anti-glare Screen Cover (package of 2)
2000-1689	EMI Near Field Probe Kit
633-75	8000 mAh High-capacity Battery Pack

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