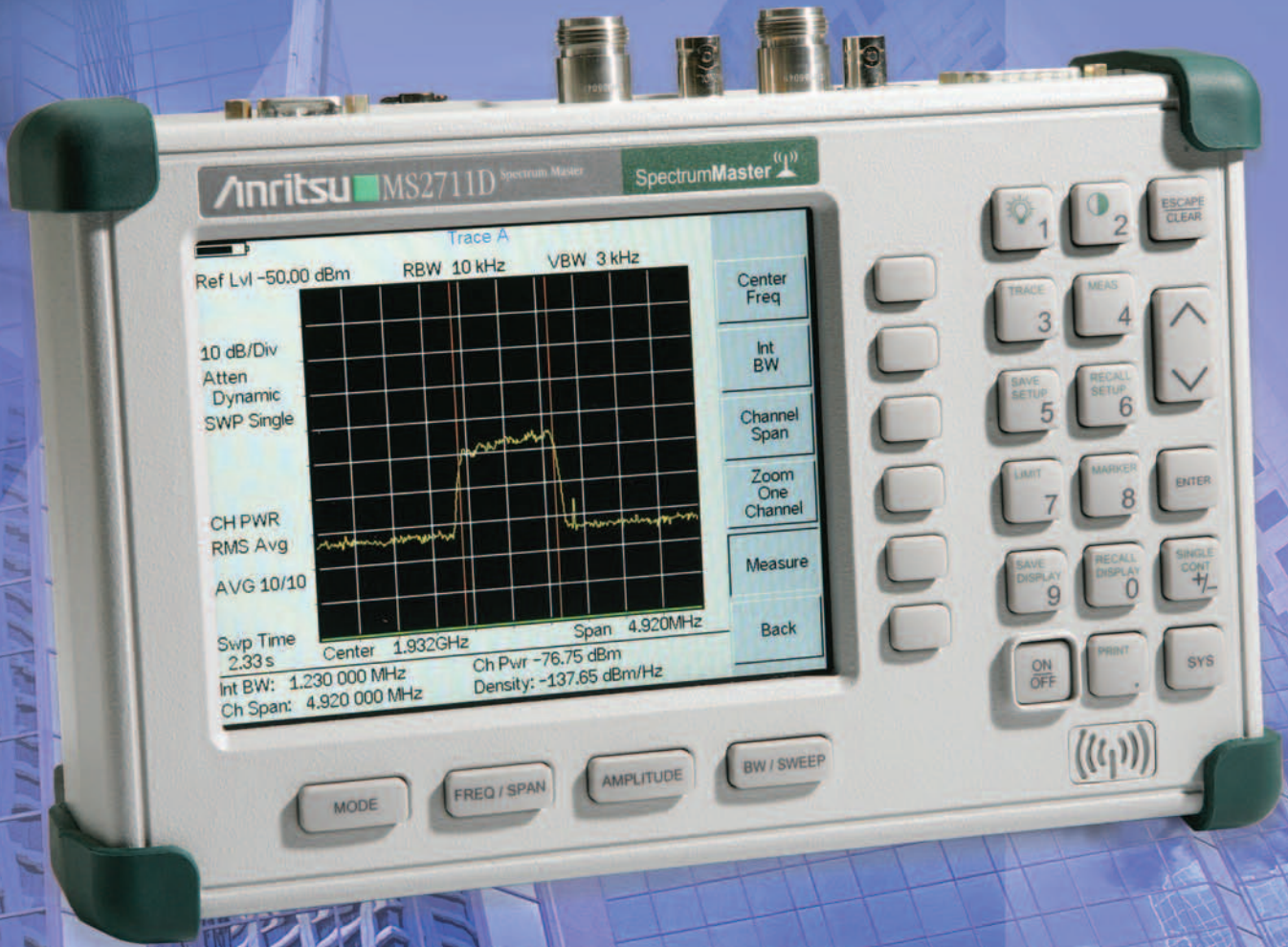
Anritsu

Spectrum Master™
MS2711D

Fast, Accurate, Repeatable, Portable Spectrum Analysis



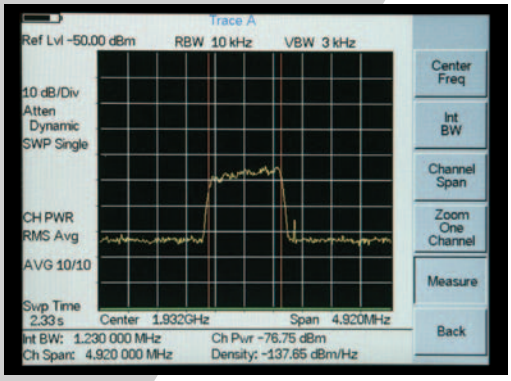
SpectrumMaster

≤–135 dBm noise floor
+43 dBm maximum safe input power
Full span sweep in ≤1.1 seconds

Accurate | Rugged | Easy to use – Powerful Spe

The Anritsu Spectrum Master MS2711D provides ultimate measurement flexibility in a package that is ruggedized for field environments and light enough for mobile applications. Unlike traditional spectrum analyzers, the MS2711D features a rugged, ultra-lightweight, battery-operated design that allows users to conduct spectrum analysis measurements – anywhere, anytime.

With the MS2711D, you can locate, identify, record, and solve communication systems problems quickly and easily, and with incredible accuracy. Whether you are installing, maintaining, or troubleshooting, the MS2711D provides exceptional performance combined with ease-of-use and broad functionality – making it a perfect solution for conducting field measurements in the 100 kHz to 3.0 GHz frequency range. For instance, it is perfect for locating the source of interfering signals.



Rugged and Reliable

Because the MS2711D was designed specifically for field environments, it can easily withstand the day-to-day punishment of field use. The analyzer is almost impervious to the bumps and bangs typically encountered by portable field-based equipment.

Easy-to-Use

At less than five pounds, the MS2711D is the lightest fully-functional spectrum analyzer available. Operation is straightforward; measurements are obtained through a menu-driven user interface that is easy to use and requires little training. The daylight viewable TFT display is large and high-resolution, making interpreting test results easy and quick.

A full range of marker capabilities — such as peak, center, and delta functions — give users fast and comprehensive analysis of displayed signals. Limit lines simplify amplitude measurements, allowing users to create quick, simple, pass/fail tests. Frequency, span, and amplitude functions are easily configured for optimum performance. Used together with the Save Setup feature, these functions make testing easier and faster for users of all experience levels.

ctrum Analysis For Field Applications

Options

The MS2711D's capabilities expand to meet your needs. Available options include a built-in bias tee (option 10) for biasing amplifiers under test, a frequency converter controller module (option 6) to drive Anritsu frequency extension modules, an internal signal source (option 21) for transmission measurements, and an internal power meter (option 29) for accurate power measurement. External power monitor (option 5) for broadband power measurements to 50 GHz, and interference analysis (option 25) to provide a spectrogram display of signals over time, RSSI and signal strength with audible indicator. Also available are a Channel Scanner (option 27), CW Signal Generator (option 28), and a built-in GPS receiver (option 31).

Powerful Trace Management

The unit's internal memory stores up to 10 test setups and 300 measurement traces. The stored data can be easily downloaded to a personal computer (PC) or a printer via an RS-232 serial cable. A notebook computer can be used with the RS-232 interface for automated control and data collection in the field. Handheld Software Tools™ is a powerful data analysis software that comes with every MS2711D. This software allows you to print professional reports for your customers documenting your measurements and saving the traces for future comparison.

≤–135 dBm Noise Floor

To meet the challenges of today's wireless systems, the revolutionary MS2711D handheld spectrum analyzer incorporates a pre-amp which increases the analyzer's sensitivity and dynamic range, and improves measurement time. The built-in pre-amp makes the MS2711D particularly effective in measuring low-level signals.

The handheld spectrum analyzer's sensitivity is ≤–135 dBm (100 Hz RBW; full span). With the preamplifier turned on, the MS2711D can identify and make measurements on low-level signals much faster than previously possible.

+43 dBm Maximum Safe Input Level

Unlike any other spectrum analyzer on the market today, the MS2711D can tolerate an input signal of +43 dBm (20 watts) – without damage. You can be assured that the MS2711D can survive in even the toughest RF environments.

Light Weight

Weighing less than five pounds fully loaded including a NiMH battery, this fully functional handheld spectrum analyzer is light enough to take anywhere, including up a tower.

“Smart” Measurements

The MS2711D has dedicated routines for one-button measurements of field strength, channel power, occupied bandwidth, Adjacent Channel Power Ratio (ACPR), C/I, and interference analysis. These are increasingly critical measurements for today’s wireless communication systems. The simple interface for these complex measurements significantly reduces test time and increases analyzer usability.

Fast Sweep Speed

The MS2711D can do a full span sweep in ≤1.1 seconds, and sweep speed in zero span can be set from less than 50 µs up to 20 seconds. This is faster and more flexible than any portable spectrum analyzer on the market today, simplifying the capture of intermittent interference signals.

AM/FM/SSB Demodulator

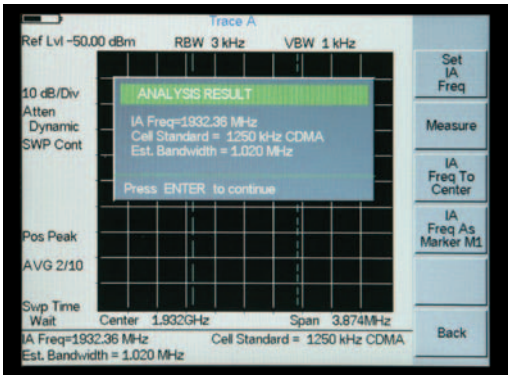
A built-in demodulator for AM, narrowband FM, wideband FM and single sideband (selectable USB and LSB) allows a technician to easily identify interfering signals.

Dynamic Attenuation

With Dynamic Attenuation enabled, the MS2711D automatically activates or de-activates the built-in preamplifier according to the overall input signal amplitude. Dynamic attenuation tracks the input signal level, automatically adjusting the attenuation level to protect the MS2711D in situations of high RF signal levels, or enhancing the instrument’s sensitivity in situations of low-level RF signal input.

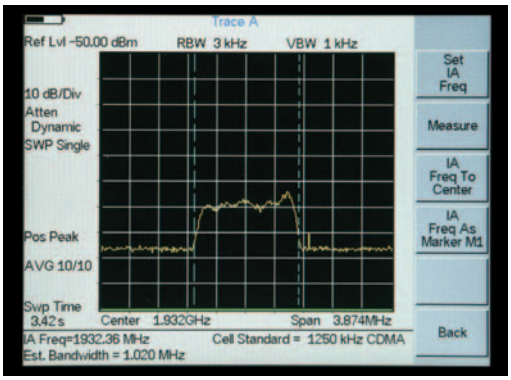
Transmission Measurement (option 21)

An optional built-in 25 MHz to 3 GHz signal source provides the capability to measure loss or gain of two-port devices such as filters, cables, attenuators and amplifiers.



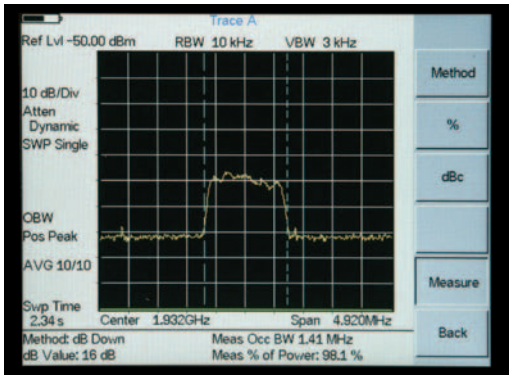
Carrier to Interference Measurement

As more 802.11 access points are installed, there will be an increasing level of interference in the 2.4 GHz band occupied by this service and other devices such as cordless telephones. This measurement capability makes it simple for an access point installer to determine if the level of interference is sufficient to cause difficulty for users in the intended service area, and can show the need to change to another access channel.



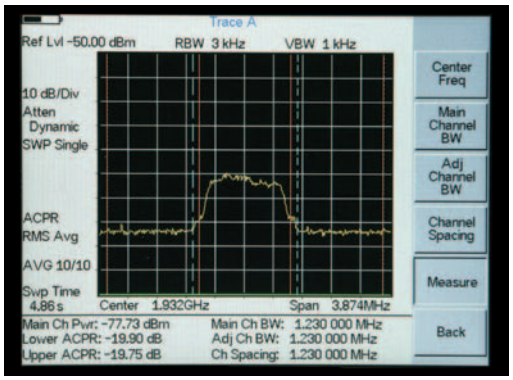
Interference Analysis

Interference Analysis is option 25 in the MS2711D. The capabilities delivered by this option are a spectrogram display that shows multiple sweeps over time with color being used to show signal amplitude. This is a powerful means of seeing interfering signals as they come and go. A received signal strength indicator (RSSI) is part of this option. RSSI shows a graph of the signal strength at a single frequency over time. Also included is an audible signal strength indicator used with a directional antenna to determine the direction of arrival of a signal. The audible output can be heard using the built-in speaker or, for privacy, a set of headphones.



Occupied Bandwidth

This measurement calculates the bandwidth containing the total integrated power occupied in a given signal bandwidth. There are two different methods of calculation depending on the technique used to modulate the carrier. The user can specify percent of power or the “x” dB down point, where “x” can be from 3 dB to 120 dB below the carrier.



Adjacent Channel Power Ratio

A common transmitter measurement is that of adjacent channel leakage power. This is the ratio of the amount of leakage power in an adjacent channel to the total transmitted power in the main channel. This measurement is used to replace the traditional two-tone intermodulation distortion (IMD) test for system non-linear behavior.

The result of an ACPR measurement can be expressed either as a power ratio or a power density. In order to calculate the upper and lower adjacent channel values, the MS2711D allows the adjustment of four parameters to meet specific measurement needs: main channel center frequency, measurement channel bandwidth, adjacent channel bandwidth and channel spacing. When an air interface standard is specified in the MS2711D, all these values are automatically set to the normal values for that standard.

Spectrum Master – Fast, Accurate, Repeatable, Portable Spectrum Analysis

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.

Transmission Measurement Option
Optional built-in RF source adds scalar analysis capability from 25 MHz to 3 GHz.

Option 6
For control of an external frequency extension module.

Multilingual User Interface
Multi-language user interface features on-screen menus and messages in six different languages.

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.

Measurement Key
Executes various functions and measurements such as field strength, occupied bandwidth, channel power, ACPR and AM/FM demodulation.

Rugged Chassis Design
Ruggedized, lightweight, high-impact housing ideally suited for handheld operation and field environments.
A softcase is provided for easy carrying and additional environment protection.

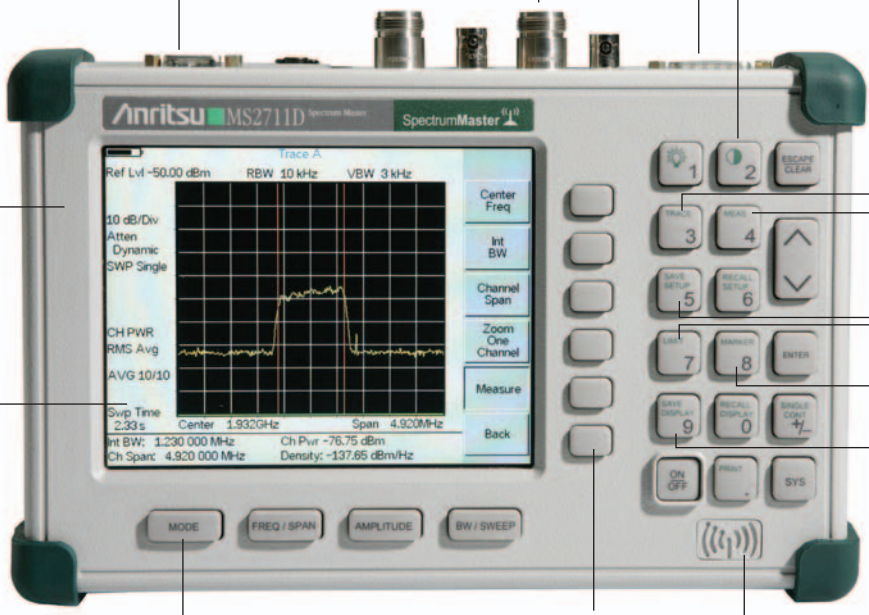
Save Setup
Store 15 test setups for fast repeatable testing.

Limit Line
Create simple pass/fail measurements.

TFT Color Display
Standard TFT (640x480) color display featuring variable brightness control. Viewable in direct sunlight.

Full Range of Marker Capabilities
Faster, more comprehensive measurements.

Save Display
200 memory locations for measurement data. Alphanumeric data labeling allows descriptive naming of measurement data. Automatic time and date stamp simplify data management.

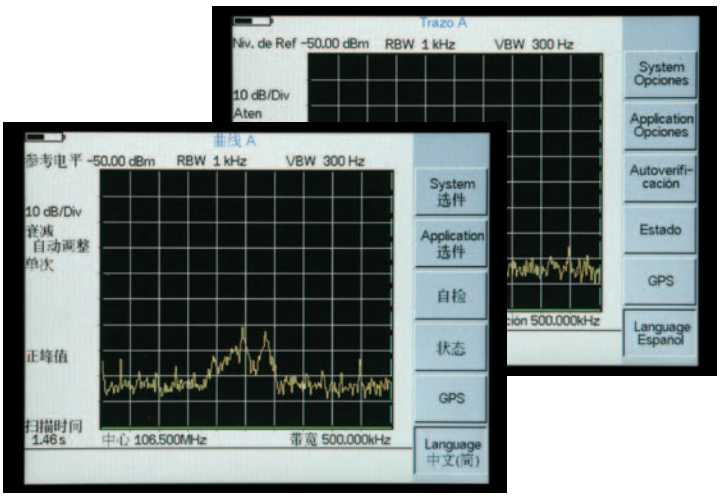


Unit Measurements
Metric: 25.4 x 17.8 x 6.10 cm
Inches: 10 x 7 x 2.4 inches

Function Keys
Four dedicated function keys simplify measurement tasks.

Softkeys
Intuitive softkey menus and user interface.

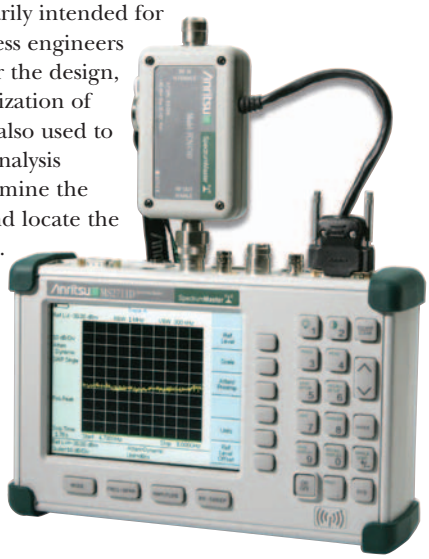
AM/FM Receiver with Internal Speaker
Built-in AM/FM demodulator enables testing and trouble-shooting of wireless communications systems. An internal speaker and jack are included.



The MS2711D features local language graphical user interface support in English, Chinese, Japanese, French, German, and Spanish.

The FCN4760 is a block down converter for the 4.7 to 6.0 GHz frequency range. Is is designed to work with an Anritsu Spectrum Master MS2711D equipped with Option 6.

This converter is primarily intended for field use by fixed wireless engineers who are responsible for the design, deployment and optimization of 802.11a networks. It is also used to conduct interference analysis measurements to determine the level of interference and locate the sources of interference.



Specifications

Frequency

Frequency Range: 100 kHz to 3.0 GHz (tuneable to 9 kHz)
Frequency Reference: Aging: ±1 ppm/yr, Accuracy: ±2 ppm
Frequency Span: 10 Hz to 2.99 GHz in 1, 2, 5 step selections in auto mode, plus zero span
Sweep Time: ≤1.1 sec full span; ≤50 µsec to 20 sec selectable in zero span
Resolution bandwidth (–3 dB width): 100 Hz to 1 MHz in 1-3 sequence, ±5%
Video bandwidth (–3 dB): 3 Hz to 1 MHz in 1-3 sequence, ±5% typical
SSB Phase Noise (1 GHz) at 30 kHz Offset: ≤–75 dBc/Hz
Spurious Responses Input Related: ≤–45 dBc
Spurious Residual Responses: ≤–90 dBm, ≥10 MHz
≤–80 dBm, <10 MHz
(10 kHz RBW, pre-amp on)

Amplitude

Total Level Accuracy:
±1 dB typical (±1.5 dB max), ≥10 MHz to 3 GHz,
±2 dB typical <10 MHz for input signal levels
≥–60 dBm, excluding input VSWR mismatch
Measurement Range: +20 dBm to –135 dBm
Input Attenuator Range: 0 to 51 dB, selected manually or automatically coupled to the reference level. Resolution in 1 dB steps.
Displayed Average Noise Level
(Input terminated , 0 dB atten.,
RMS detection, 100 Hz RBW): ≤–135 dBm, ≥10 MHz (preamp on)
≤–115 dBm, <10 MHz (preamp on)
Dynamic Range: >65 dB, typical
Display Range: 1 to 15 dB/division, in 1 dB steps, 10 divisions displayed
Scale Units: dBm, dBV, dBmV, dBµV, V, W
RF Input VSWR: (with ≥20 dB attenuation), 1.5:1 typical, (10 MHz to 2.4 GHz)

General

Internal Trace Memory: 300 maximum
Setup Storage: 10 test setups
Display: VGA Monochrome or VGA Color (option 3) with adjustable backlight
Inputs and Outputs Ports:
RF Out: Type N, female, 50Ω
Maximum Input without Damage: +23 dBm, ± 50 VDC
RF In: Type N, female, 50Ω
Maximum Input without Damage: +43 dBm (peak), ± 50 VDC
Serial Interface: RS-232 9 pin D-sub, three wire serial
Electromagnetic Compatibility: Meets European community requirements for CE marking
Safety: Conforms to EN 61010-1 for Class 1 portable equipment
Temperature:
Operating: –10°C to 55°C, humidity 85% or less
Non-operating: –51°C to +71°C (Recommend the battery be stored separately between 0°C and 40°C for any prolonged storage period.)
Environmental: MIL-PRF-28800F Class 2
Power Supply:
External DC Input: +12.5 to +15 volts dc, 3A max
Internal: NiMH battery: 10.8 volts, 1800 mAh
Dimensions:
Size (W x H x D): 25.4 cm x 17.8 cm x 6.10 cm (10.0 in x 7.0 in x 2.4 in)
Weight: 2.14 kg (4.7 lbs.) includes battery, 2.28 kg (5 lbs) includes transmission measurement signal source

Option 5 – Power Monitor (requires external detector)

Detector Range: 1A peak 150 ms, 300 mA max steady state
Offset Range: –50 to +20 dBm, 10 nW to 100 nW
Display Range: –80 to 80 dBm
Resolution: 0.1 dB, 0.1 xW
Measurement Accuracy: ±1 dB maximum for >–40 dBm and <18 GHz

Option 6 – Frequency Converter Control Module

Connector providing internal control signals to drive an external Anritsu frequency extension module

Option 10A – Bias Tee Specifications

Voltage: 12 to 24 Vdc
Power: 6 W max, steady state

Option 21 – Transmission Measurement Specifications

Frequency Range: 25 MHz to 3 GHz
Frequency Resolution: 10 Hz
Output Power Level: –10 dBm typical
Dynamic Range: 80 dB, 25 MHz to 2 GHz
60 dB, >2 GHz to 3 GHz
(when using dynamic attenuation)
Output Impedance: 50Ω

Option 25 – Interference Analyzer

Audible tone – Identify Interference type
Strength of the Interferer
RSSI
Spectrogram

Option 27 – Channel Scanner

Frequency Range: 100 MHz to 3.0 GHz
Frequency Accuracy: ±10 Hz + Time base error, 99% Confidence level
Measurement Range: +20 dBm to –110 dBm
Channel Power: ±1 dB typical (±1.5 dB max)
Adjacent Channel Power Accuracy: ±0.75 dBc

Option 28 – CW Signal Generator

Requires CW Signal Generator Kit

Option 29 – Power Meter Specifications

Frequency Range: 3 MHz to 3.0 GHz
Measurement Range: –80 dBm to +20 dBm
(+80 dBm with 60 dB external attenuator)
Display Range: –80 dBm to +80 dBm
Offset Range: 0 to +60 dB
Accuracy**: ±1 dB typical (±1.5 dBm max), ≥10 MHz to 3 GHz
±2 dB typical, 3 MHz to <10 MHz
VSWR: 1.5:1 typical (P_{in} >–30 dBm, >10 MHz to 2.4 GHz)
Maximum Power: +20 dBm (0.1W) without external attenuator
**(Excludes Input VSWR)

Option 31 – GPS

GPS Location Indicator
Latitude, Longitude and Altitude on Display
Latitude, Longitude and Altitude with trace storage

FCN4760 – Frequency Converter Specifications

Frequency:
Frequency Range: 4.7 GHz to 6 GHz
Frequency Resolution: 10 Hz
Frequency Reference: Aging ±1 ppm/yr
Accuracy: ±2 ppm
SSB Phase Noise (6 GHz) at 30 kHz Offset: ≤–65 dBc/Hz
Spurious Responses Input Related: ≤–45 dBc
Spurious Residual Responses: ≤–90 dBm
Amplitude:
Measurement Range: –40 dBm to –100 dBm
Sensitivity (displayed average noise level): –100 dBm
Accuracy: ±1.25 dB typical (±1.75 dB max.)
Maximum Input Level without Damage: –5 dBm
General:
Input and Output Ports: RF In: Type N, female, 50Ω
RF Out (to MS2711D): Type N, male, 50Ω
Communication Interface: Proprietary
Electromagnetic Compatibility: Meets European community requirements for CE marking
Safety: Conforms to EN 61010-1 for Class 1 portable equipment
Operating Temperature: –10°C to 50°C, humidity 85% or less –50°C to –80°C
Power Dissipation: 850 mW max
Dimensions:
Size (W x H x D): 6.6 cm x 10.9 cm x 3.3 cm (2.6 in. x 4.3 in. x 1.3 in.)
Weight: <0.45 kg (<1 lb.)

Ordering Information

Model: MS2711D - Handheld Spectrum Analyzer: 100 kHz to 3 GHz

Standard Accessories Include

10580-00097	MS2711D Spectrum Master User's Guide
48258	Soft Carrying Case
40-168	AC – DC Adapter with Power Cord
806-62	Automotive Cigarette Lighter/12 Volt DC Adapter
2300-347	Handheld Software Tools CDROM

Serial Interface Cable
Rechargeable battery, NiMH
Daylight viewable TFT color display now included at no extra charge
One Year Warranty

Options

Option 5	Power Monitor (requires external detector)
Option 6	Frequency Converter Control Module
Option 10A	Bias Tee
Option 21	Transmission Measurement
Option 25	Interference Analyzer (requires directional antenna)
Option 27	Channel Scanner
Option 28	CW Signal Generator (requires CW Signal Generator Kit)
Option 29	Power Meter
Option 31	GPS (requires GPS antenna)

Optional Accessories

FCN4760	Frequency Converter, 4.7 to 6.0 GHz
42N50A-30	30 dB, 50 Watt, Bi-directional, DC to 18 GHz, N(m) to N(f) Attenuator
34NN50A	Precision Adapter, DC to 18 GHz, 50Ω, N(m) to N(m)
34NFNF50C	Precision Adapter, DC to 18 GHz, 50Ω, N(f) to N(f)
15NN50-1.5C	Test port cable armored, 1.5 meter, N(m) to N(m), 6 GHz
15NN50-3.0C	Test port cable armored, 3.0 meter, N(m) to N(m), 6 GHz
15NN50-5.0C	Test port cable armored, 5.0 meter, N(m) to N(m), 6 GHz
15NNF50-1.5C	Test port cable armored, 1.5 meter, N(m) to N(f), 6 GHz
15NNF50-3.0C	Test port cable armored, 3.0 meter, N(m) to N(f), 6 GHz
15NNF50-5.0C	Test port cable armored, 5.0 meter, N(m) to N(f), 6 GHz
15ND50-1.5C	Test port cable armored, 1.5 meter, N(m) to 7/16 DIN(m), 6.0 GHz
15NDF50-1.5C	Test port cable armored, 1.5 meter, N(m) to 7/16 DIN(f), 6.0 GHz
510-90	Adapter, 7/16 DIN (f) to N(m), DC to 6.0 GHz, 50Ω
510-91	Adapter, 7/16 DIN (f)-N(f), DC to 6.0 GHz, 50Ω
510-92	Adapter, 7/16 DIN (m)–N(m), DC to 6.0 GHz, 50Ω
510-93	Adapter, 7/16 DIN(m)-N(f), DC to 6.0 GHz, 50Ω
510-96	Adapter 7/16 DIN (m) to 7/16 DIN (m), DC to 6.0 GHz, 50Ω
1030-109	Filter, Bandpass, 836.5 MHz Ctr Freq, 25.8 MHz BW, N(m) to SMA(f), 50Ω
1030-110	Filter, Bandpass, 897.5 MHz Ctr Freq, 35 MHz BW, N(m) to SMA(f), 50Ω
1030-111	Filter, Bandpass, 1.88 GHz Ctr Freq, 63.1 MHz BW, N(m) to SMA(f), 50Ω
1030-112	Filter, Bandpass, 2.442 GHz Ctr Freq, 85.1 MHz BW N(m) to SMA(f), 50Ω
510-97	Adapter 7/16 DIN (f) to 7/16 DIN (f), 7.5 GHz
48258	Spare soft carrying case
40-168	Spare AC/DC adapter
806-62	Spare automotive cigarette lighter/12 Volt DC adapter
800-441	Spare serial interface cable
760-235	Transit case for Anritsu Handheld Spectrum Analyzer
2300-347	Anritsu Handheld Software Tools CDROM
10580-00097	MS2711D Spectrum Master User's Guide (spare)
10580-00098	MS2771D Spectrum Master Programming Manual
10580-00099	MS2711D Spectrum Master Maintenance Manual
633-27	Rechargeable battery, NiMH
551-1691	USB to Serial adapter
70-28	Headset
2000-1029	Battery charger, NiMH with universal power supply
2000-1030	Portable antenna, 50Ω, SMA(m) 1.71-1.88 GHz
2000-1031	Portable antenna, 50Ω, SMA(m) 1.85-1.99 GHz
2000-1032	Portable antenna, 50Ω, SMA(m) 2.4-2.5 GHz
2000-1035	Portable antenna, 50Ω, SMA(m) 896-941 MHz
2000-1200	Portable antenna, 50Ω, SMA(m) 806-869 MHz
2000-1411	Portable YAGI Antenna, N(f), 822-900 MHz, 10 dBd
2000-1412	Portable YAGI Antenna, N(f), 885-975 MHz, 10 dBd
2000-1413	Portable YAGI Antenna, N(f), 1.71-1.88 GHz, 10 dBd
2000-1414	Portable YAGI Antenna, N(f), 1.85-1.99 GHz, 9.3 dBd
2000-1415	Portable YAGI Antenna, N(f), 2.4-2.5 GHz, 12 dBd
2000-1416	Portable YAGI Antenna, N(f), 1.92-2.23 GHz, 12 dBd

Printer

2000-1214	HP DeskJet 450 printer Includes: interface cable, black print cartridge, and US power cable
2000-1216	Black print cartridge for DeskJet 450 printer
2000-1217	Rechargeable battery for DeskJet 450 printer
2000-1218	Power cable (UK) for DeskJet printer
2000-663	Power cable (Europe) for DeskJet printer
2000-664	Power cable (Australia) for DeskJet printer
2000-667	Power cable (So. Africa) for DeskJet printer
2000-753	Null Modem Serial-to-Parallel converter cable

SALES CENTERS:

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South America 55 (21) 2527-6922

Europe 44 (0) 1582-433433
Japan 81 (46) 223-1111
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