Technical Data Sheet

13 GHz High Performance Handheld Spectrum Analyzer

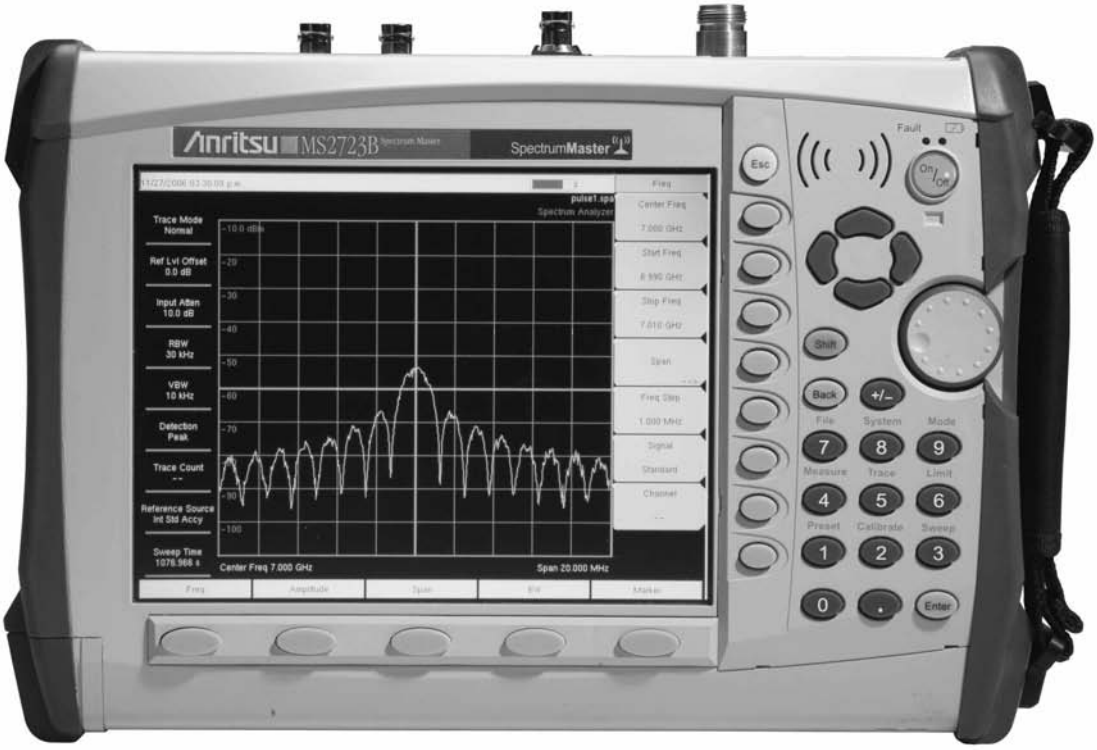
MS2723B
Spectrum Master™

Introduction
Continuous frequency coverage from 9 kHz to 13 GHz gives the wireless professional the performance needed for the most demanding measurements in harsh RF and physical environments.

Whether you need spectrum monitoring, WiFi and WiFi5 installation and testing, RF and microwave signal measurements or cellular signal measurements, the MS2723B Spectrum Master is the tool to make your job easier and more productive.

High Performance Highlights

- 9 kHz to 13 GHz Input
- 1 Hz to 3 MHz RBW Range
- Very Low Phase Noise (–104 dBc/Hz typical at 10 kHz offset at 2 GHz)
- Built-in AM/FM/SSB Demodulator
- Built-in Preamplifier
- 65 dB Step Attenuator
- True RMS Detection
- 2+ Hours of Battery Life
- 3.4 kg (7.5 lb)
- 3G Modulation options
- GPS Receiver option
- Now includes quasi-peak detector and CISPR bandwidths



The Anritsu MS2723B is the most advanced ultra-portable spectrum analyzer on the market, featuring unparalleled performance at a modest price.

Features and Options

Functions

Multiple Marker: Display up to six markers on screen. Each marker includes a delta marker, effectively allowing up to 12 markers on screen. The user may also set marker 1 to be the reference for 6 delta markers.

Marker Table: Display a table of up to six marker frequency and amplitude values plus delta marker frequency offset and amplitude.

Upper/Lower Limit

Fixed and segmented: Each upper and lower limit can be made up of between one and 40 segments.

Smart Measurements

Occupied Bandwidth: Measures 99% to 1% power channel of a signal.

Channel Power: Measures the total power in a specified bandwidth.

C/I: Measures carrier to interference ratio.

ACPR: Measures power levels in the channels immediately above and below the center channel.

Field Strength: Uses antenna calibration tables to measure dBm/meter^2 or dBmV/meter^2.

Specifications

Frequency

Frequency Range: 9 kHz to 13 GHz

Preamp: 100 kHz to 4 GHz

Tuning Resolution: 1 Hz

Frequency Reference:

Aging: ±1 ppm per 10 years

Accuracy: ±0.3 ppm (25ºC ± 25ºC) + aging

Frequency Span: 10 Hz to 13 GHz plus 0 Hz (zero span)

Span Accuracy: Same as frequency reference accuracy

Sweep Time:

Zero span: 10 µs to 600s

Spans >0 Hz: Sweep time is automatically optimized.

Can be manually increased

Sweep Time Accuracy: ±2% in zero span

Sweep Trigger: Free run, Single, Video, External

Resolution Bandwidth: (–3 dB) 1 Hz to 3 MHz in 1-3 sequence ±10%, 10 MHz demodulation bandwidth, 200 Hz, 9 kHz, 120 kHz when quasi-peak detector selected

Video Bandwidth: (–3 dB) 1 Hz to 3 MHz in 1-3 sequence

SSB Phase Noise:

Offset from carrier	Max
10, 20 and 30 kHz	–95 dBc/Hz
100 kHz	–97 dBc/Hz
1 MHz	–105 dBc/Hz
10 MHz	–120 dBc/Hz

Amplitude

Measurement Range: DANL to +30 dBm

Display Range: 1 to 15 dB/div in 1 dB steps. Ten divisions displayed.

Amplitude Units:

Log Scale Modes: dBm, dBV, dBmv, dBµV

Linear Scale Modes: nV, µV, mV, V, kV, nW, µW, mW, W, kW

Attenuator Range: 0 to 65 dB

Attenuator Resolution: 5 dB steps

Absolute Amplitude Accuracy[1]:

Ambient Temperature: 25ºC

RF Attenuation	Accuracy, dB 9 kHz to 4 GHz	4 GHz to 13 GHz
5 to 65 dB	1.2 dB	1.3 dB
0 dB	1.4 dB	1.5 dB

Ambient Temperature: –10 to +55ºC

RF Attenuation	Accuracy, dB 9 kHz to 4 GHz	4 GHz to 13 GHz
0 to 65 dB	2.4 dB	2.4 dB

Conditions: 50Ω source, single sinewave input ≤Reference Level, and ≥DANL, 15 minute warm-up

[1]Specification excludes error due to: Source SWR, noise, spurious signals

Second Harmonic Distortion:
(0 dB input attenuation, –30 dBm input)

50 to 500 MHz	–50 dBc
500 to 800 MHz	–45 dBc
800 to 3000 MHz	–60 dBc
>3 GHz	–80 dBc

Third Order Intercept (TOI):
(–20 dBm tones 100 kHz apart, –20 dBm Ref level, 0 dB input attenuation, preamplifier off)

Frequency	Min
2.4 GHz	+12 dBm

Frequency	Typical
50 MHz to 500 MHz	>6 dBm
500 MHz to 2 GHz	>8 dBm
2 to 6 GHz	>10 dBm
6 to 13 GHz	>12 dBm

Dynamic Range 2/3 (TOI-DANL) in 1 Hz RBW:

2.4 GHz 101 dB min

Displayed Average Noise Level (DANL) in 1 Hz RBW:

Frequency	Preamplifier On	Equivalent Noise Figure, 23ºC
10 MHz to 1 GHz	–159 dBm	15 dB
1 GHz to 3 GHz	–156 dBm	18 dB
3 to 4 GHz	–154 dBm	20 dB
Frequency	**Preamplifier Off**	**Equivalent Noise Figure, 23ºC**
10 MHz to 4 GHz	–139 dBm	35 dB
4 GHz to 10 GHz	–136 dBm	38 dB
10 GHz to 13 GHz	–130 dBm	44 dB

(0 dB input attenuation, RMS detection, Reference level = –20 dBm for preamplifier off and –50 dBm for preamplifier on)

Note: Discrete spurious signals are not included in the measurement of DANL as they are covered by the residual spurious specification.

Input-Related Spurious:
(–30 dBm input, 0 dB input attenuation, Span <1.7 GHz)

–70 dBc typical –60 dBc max

except input frequency 3275 MHz, –50 dBc max

Residual Spurious:
(Preamplifier off, RF input terminated, 0 dB input attenuation)

–90 dBm max

(Preampifier on, RF input terminated, 0 dB input attenuation)

–100 dBm max

Options Specifications

IQ Demodulation Hardware (Option 9)

Hardware needed to run any of the demodulation options

PSN50 High Accuracy Power Meter (Option 19)

PSN50 Sensor:

Measurement Range: –30 dBm to +20 dBm

Frequency Range: 50 MHz to 6 GHz

Input Connector: Type N, male, 50Ω

Max Input Without Damage: +33 dBm, ±25 VDC

Input Return Loss: 50 MHz to 2 GHz: ≥26 dB
2 GHz to 6 GHz: ≥20 dB

PSN50 Accuracy:

Total RSS Measurement Uncertainty (0ºC to 50ºC): ±0.16 dB*

Noise: 20 nW max

Zero Set: 20 nW

Zero Drift: 10 nW max**

Sensor Linearity: ±0.13 dB max

Instrumentation Accuracy: 0.00 dB

Sensor Cal Factor Uncertainty: ±0.06 dB

Temperature Compensation: ±0.06 dB max

Continuous digital modulation uncertainty: ±0.06 dB (+17 to +20 dBm)

PSN50 System:

Measurement Resolution: 0.01 dB

Offset Range: ±60 dB

Power Requirements:

Supply Voltage: 8 to 18 Vdc

Supply Current: <100 mA

Interference Analyzer (Option 25)

Signal Strength: Gives visual and aural indication of signal strength

RSSI: Collect data up to 72 hours

Spectrogram: Collect data up to 72 hours

Channel Scanner (Option 27)

Number of Channels: 1 to 20

GPS (Option 31)

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

GPS High Frequency Accuracy when GPS antenna is connected:
±25 ppb with GPS ON, 3 minutes after satellite lock

Internal High Accuracy, when GPS antenna is not connected:
Better than ±50 ppb for 3 days from a High Accuracy GPS Lock and within 0ºC to 50ºC ambient temperature

Connector: Reverse polarity BNC

WCDMA/HSDPA OTA (Option 35)

Resolution: 0.1 dB

WCDMA/HSDPA RF Measurements (Option 44)

Frequency Ranges: 824 to 894 MHz, 1710 to 2170 MHz, 2300 to 2700 MHz

RF Channel Power (Temperature range 15ºC to 35ºC):

±0.7 dB typical ±1.25 dB max

Occupied Bandwidth Accuracy: ±100 kHz

Residual Adjacent Channel Leakage Ratio (ACLR)***
(824 to 894 MHz, 1710 to 2170): –54 dB typical at 5 MHz offset
–59 dB typical at 10 MHz offset

Leakage Ratio (ACLR)***
(2300 to 2700 MHz): –54 dB typical at 5 MHz offset
–57 dB typical at 10 MHz offset

ACLR Accuracy (Single Channel Active)
(824 to 894 MHz, 1710 to 2170 MHz):

±0.8 dB for ACLR ≥–45 dB at 5 MHz offset
±0.8 dB for ACLR ≥–50 dB at 10 MHz offset

ACLR Accuracy (Single Channel Active) (2300 to 2700 MHz):

±1.0 dB for ACLR ≥–45 dB at 5 MHz offset
±1.0 dB for ACLR ≥–50 dB at 10 MHz offset

Frequency Error:

±10 Hz + time base error, 99% confidence level

* Excludes mismatch errors.
Excludes noise, zero set, zero drift for levels <–20 dBm.
Excludes digital modulation uncertainty between +17 and +20 dBm.
** After 30 min warm-up
*** Depends on reference level, input signal level and single channel conditions
**** Will vary with amount of data burst traffic

WCDMA Demodulation and WCDMA/HSDPA Demodulator (Options 45 and 65)

EVM Accuracy* (824 to 894 MHz, 1710 to 2170 MHz):**
(3GPP Test Model 4) ±2.5%; ≤EVM ≤25%
(3GPP Test Model 5) ±2.5%; ≤EVM ≤20% (2300 MHz to 2700 MHz)

EVM Accuracy*:** ±2.5% for 6 ≤EVM ≤20%

Residual EVM: 2.5% typical

Code Domain Power: ±0.5 dB for code channel power >–25 dB
16, 32, 64 DCPH (test model 1)
16, 32 DCPH (test model 2, 3)

CPICH (dBm) Accuracy: ±0.8 dB typical

Scrambling Code: 3 seconds

General

RF Input VSWR: (≥10 dB input attenuation) 1.5:1 typical

Maximum Continuous Input: (≥10 dB input attenuation) +30 dBm

Input Damage Level:
≥10 dB input attenuation, >+30 dBm, ±50 Vdc

ESD Damage Level: (≥10 dB input attenuation) >10 kV

External Reference Frequencies: 1, 1.2288, 1.544, 2.048, 2.4576, 4.8, 4.9152, 5, 9.8304, 10, 13 and 19.6608 MHz at –10 dBm to +10 dBm

Battery Life: 2.3 hours typical

Display

Bright daylight-viewable color transmissive LCD: Full SVGA, 8 in.

Languages

Built-in English, Spanish, Italian, French, German, Japanese, Korean, and Chinese. The instrument also has the capability to have two customized languages installed from Master Software Tools.

Marker Modes

6 Markers, 9 Modes: Normal, Delta, Marker to Peak, Marker to Center, Marker to Reference Level, Next Peak Left, Next Peak Right, All Markers Off, Noise Marker, Frequency Counter Marker (1 Hz resolution), Markers Tracking or Fixed, Marker 1 reference for all deltas.

Sweeps

Full span, Zero span, Span Up/Span Down

Detection

Peak, Negative, Sample, RMS, Quasi-peak

Memory

Trace and Setup storage is limited only by the capacity of the installed Compact Flash card. For a 256 MB card, storage is greater than 13000 spectrum analyzer traces and over 10000 setups.

Traces

Displayed Traces: Three Traces with trace overlay. Trace A is always the live data; Traces B and C can be either stored data or traces which have been mathematically manipulated. Also Trace C can show max hold or min hold.

Interfaces

Type N female RF connector for Spectrum Analyzer input
Reverse polarity BNC jack for optional GPS antenna connector
BNC female connectors for ext. reference and ext. trigger
5-pin Mini-B USB 2.0 for data transfer to a PC
USB 2.0 Host connector used with PSN50 High Accuracy Power Meter and USB Flash Drives
RJ45 connector for Ethernet 10/100 Base T
2.5 mm 3-wire headset connector

Size and Weight

Size: 313W x 211H x 77D mm (12W x 8H x 3D in.)
Weight: 3.4 kg (<7.5 lbs.) typical

Environmental

MIL-PRF-28800F class 2
Operating: –10ºC to 55ºC, humidity 85% or less
Storage: –51ºC to 71ºC
Altitude: 4600 meters, operating and non-operating

Safety

Conforms to EN 61010-1 for Class 1 portable equipment

Electromagnetic Compatibility

Meets European Community requirements for CE marking.

* Excludes mismatch errors.
Excludes noise, zero set, zero drift for levels <–20 dBm.
Excludes digital modulation uncertainty between +17 and +20 dBm.
** After 30 min warm-up
*** Depends on reference level, input signal level and single channel conditions
**** Will vary with amount of data burst traffic

Ordering Information

Model

MS2723B Handheld Spectrum Analyzer
9 kHz to 13 GHz

Options

Option MS2723B-009	IQ Demodulation Hardware
Option MS2723B-019	High Accuracy Power Meter (PSN50 sensor not included)
Option MS2723B-025	Interference Analysis
Option MS2723B-027	Channel Scanner
Option MS2723B-031	GPS (includes GPS antenna)
Option MS2723B-035	WCDMA/HSDPA OTA (requires Opt. 009)
Option MS2723B-044	WCDMA/HSDPA RF Meas
Option MS2723B-045	WCDMA Demod (requires Opt. 009)
Option MS2723B-065	WCDMA/HSDPA Demod (requires Opt. 009)

Standard Accessories Include:

10580-00175	User's Guide
61382	Soft Carrying Case
40-168	AC – DC Adapter
806-141	Automotive Cigarette Lighter/12 Volt DC Adapter
2300-498	CD ROM containing Master Software Tools
2000-1371	Ethernet Cable
2000-1209	Cross-over Ethernet Cable
633-44	Rechargeable battery, Li-Ion
1091-27	Type-N male to SMA female adapter
1091-172	Type-N male to BNC female adapter
64343	Tilt Bail Stand Accessory
2000-1501	256 MB USB Flash Drive
3-2000-1360	USB Type A to Mini-B Cable
	One Year Warranty

Optional Accessories:

3-2000-1500	256 MB Compact Flash
2000-1501	256 MB USB Flash Drive
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)
15NNF50-1.5B	Test port cable, armored, 1.5 meter N(m) to N(f) 18 GHz
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 7.5 GHz, 50Ω
510-91	Adapter, 7/16 DIN (f)-N(f), DC to 7.5 GHz, 50Ω
510-92	Adapter, 7/16 DIN(m)–N(m), DC to 7.5 GHz, 50Ω
510-93	Adapter, 7/16 DIN(m)-N(f), DC to 7.5 GHz, 50Ω
510-96	Adapter 7/16 DIN\(m) to 7/16 DIN(m), DC to 7.5 GHz, 50Ω
1030-105	Band Pass Filters, 890-915 MHz, N(m) to N(f), 50Ω
1030-106	Band Pass Filters, 1710-1790 MHz, N(m) to N(f), 50Ω
1030-107	Band Pass Filters, 1910-1990 MHz, N(m) to N(f), 50Ω
1030-109	Band Pass Filters, 824-849 MHz, N(m) to SMA(f), 50Ω
1030-110	Band Pass Filters, 880-915 MHz, N(m) to SMA(f), 50Ω
1030-111	Band Pass Filters, 1850-1910 MHz, N(m) to SMA(f), 50Ω
1030-112	Band Pass Filters, 2400-2484 MHz, N(m) to SMA(f), 50Ω
1030-114	Band Pass Filters, 806-869 MHz, N(m) to SMA(f), 50Ω
510-97	Adapter 7/16 DIN(f) to 7/16 DIN(f), 7.5 GHz
61382	Spare soft carrying case
64343	Spare Tilt Bail Stand Accessory
40-168	Spare AC/DC adapter
806-141	Spare automotive cigarette lighter/12 Volt DC adapter
760-235	Transit case for Anritsu MS2723B Handheld Spectrum Analyzer

Optional Accessories (Continued):

2300-498	Anritsu Master Software Tools
10580-00175	Anritsu HHSA User's Guide, Model MS2723B (spare)
10580-00176	Anritsu HHSA Programming Manual, Model MS2723B
10580-00177	Anritsu HHSA Maintenance Manual, Model MS2723B
633-44	Rechargeable battery, Li-Ion
3-2000-1500	256 MB Compact Flash Memory Module
2000-1374	Dual battery charger, Li-Ion with universal power supply
2000-1411	Portable Yagi Antenna, 10 dBd, N(f) 822 to 900 MHz
2000-1412	Portable Yagi Antenna, 10 dBd, N(f) 885 to 975 MHz
2000-1413	Portable Yagi Antenna, 10 dBd, N(f) 1.71 to 1.88 GHz
2000-1414	Portable Yagi Antenna, 9.3 dBd, N(f) 1.85 to 1.99 GHz
2000-1415	Portable Yagi Antenna, 10 dBd, N(f) 2.4 to 2.5 GHz
2000-1416	Portable Yagi Antenna, 10 dBd, N(f) 1.92 to 2.23 GHz
2000-1030	Portable antenna, SMA(m) 1.71 to 1.88 GHz, 50Ω
2000-1031	Portable antenna, SMA(m) 1.85 to 1.99 GHz, 50Ω
2000-1032	Portable antenna, SMA(m) 2.4 to 2.5 GHz, 50Ω
2000-1035	Portable antenna, SMA(m) 896 to 941 MHz, 50Ω
2000-1200	Portable antenna, SMA(m) 806 to 869 MHz, 50Ω
2000-1361	Portable Antenna, SMA(m) 5725 to 5825 MHz, 50Ω
2000-1473	Portable Antenna, SMA(m) 870 to 960 MHz, 50Ω
2000-1474	Portable Antenna, SMA(m) 2.4 to 2.5 GHz, 50Ω
2000-1475	Portable Antenna, SMA(m) 2.11 to 2.17 GHz, 50Ω
61532	Antenna Kit: 2000-1030, 2000-1031, 2000-1032, 2000-1035, 2000-1200, and 2000-1361

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