High Performance Handheld Spectrum Analyzer

MS2721A
Spectrum Master™

Introduction
Continuous frequency coverage from 100 kHz to 7.1 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 MS2721A Spectrum Master is the tool to make your job easier and more productive.

High Performance Highlights

- 100 kHz to 7.1 GHz Input
- 10 Hz to 3 MHz RBW Range
- Very Low Phase Noise
  (-100 dBc/Hz Maximum at 10 kHz offset at 100 kHz to 7.1 GHz)
- Built-in AM/FM/SSB Demodulator
- Built-in Preamplifier
- 65 dB Step Attenuator
- Input Protected to 20 Watts
- True RMS Detection
- 3+ Hours of Battery Life
- 3.1 kg (<6.9 lbs)

The Anritsu MS2721A 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.

**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 spectrum.

**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/meter² or dBmV/meter².

**Specifications**

**Frequency**

**Frequency Range:** 100 kHz to 7.1 GHz (useable down to 9 KHz)

**Tuning Resolution:** 1 Hz

**Frequency Reference:**

**Aging:** ±1 ppm/yr.

**Accuracy:** ±1 ppm (25ºC ± 25ºC) + long term drift

**Frequency Span:** 10 Hz to 7.1 GHz plus 0 Hz (zero span)

**Span Accuracy:** Same as frequency reference accuracy

**Sweep Time:** Minimum 100 ms, 10 µs in zero span

**Sweep Time Accuracy:** ±2% in zero span

**Sweep Trigger:** Free run, Single, Video, External

**Resolution Bandwidth:** (–3 dB width) 10 Hz to 3 MHz in 1-3 sequence ±10%, 8 MHz demodulation bandwidth

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

**SSB Phase Noise:**

–100 dBc/Hz max at 10, 20 and 30 kHz offset from carrier from 100 kHz to 7.1 GHz. –102 dBc/Hz max at 100 kHz offset from carrier.

**Amplitude**

**Measurement Range:** DANL to +30 dBm

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

**Amplitude Units:** Log Scale Modes: dBm, dBV, dBMV, dBµV,

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

**Attenuator Range:** 0 to 65 dB

**Attenuator Resolution:** 5 dB steps

**Absolute Amplitude Accuracy:**

**Power levels:** ≥50 dBm, ≤35 dB input attenuation

100 kHz to ≤10 MHz ±1.5 dB

>10 MHz to 4 GHz ±1.25 dB

>4 to 7.1 GHz ±1.75 dB

40 to 55 dB input attenuation

100 kHz to ≤10 MHz ±1.5 dB

>10 MHz to 4 GHz ±1.75 dB

>4 to 6.5 GHz ±1.75 dB

>6.5 to 7.1 GHz ±2 dB

60 to 65 dB input attenuation

100 kHz to ≤10 MHz ±1.5 dB

>10 MHz to 6.5 GHz ±1.75 dB

>6.5 to 7.1 GHz ±3 dB

Preamplifier on, 0 or 10 dB input attenuation

100 kHz to 4 GHz ±1.5 dB

>4 to 7.1 GHz ±1.75 dB

Second Harmonic Distortion

(0 dB input attenuation, –30 dBm input):

0.05 to 0.75 GHz, –50 dBc

>0.75 to 1.05 GHz, –40 dBc

>1.05 to 1.4 GHz, –50 dBc

>1.4 to 2 GHz, –70 dBc

>2 GHz, –80 dBc

**Third Order Intercept (TOI)** (preamplifier off):

–20 dBm tones 100 kHz apart

–20 dBm Ref level

0 dB attenuation

**Frequency**

**Typical**

50 MHz to 300 MHz >8 dBm

>300 MHz to 2.2 GHz >10 dBm

>2.2 to 2.8 GHz >15 dBm

>2.8 to 4.0 GHz >10 dBm

>4.0 to 7.1 GHz >13 dBm

0 dB attenuation, –20 dBm reference level, –20 dBm tones, spaced 100 kHz

Displayed Average Noise Level: DANL in 10 Hz RBW:

**Frequency**

**Preamplifier On**

**Typical Max**

10 MHz to 1 GHz –153 –151 –130 –127

>1 GHz to 2.2 GHz –150 –149 –126 –123

>2.2 to 2.8 GHz –146 –143 –120 –116

>2.8 to 4.0 GHz –150 –149 –129 –126

>4.0 to 7.1 GHz –148 –144 –121 –117

Test conditions: Input attenuation: 0 dB, 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.

**Noise Figure (derived from DANL measurement)**

0 dB attenuation, 23ºC: Preamplifier On

**Frequency**

**Typical**

10 MHz to 1 GHz 11 dB

>1 GHz to 2.2 GHz 14 dB

>2.2 to 2.8 GHz 16 dB

>2.8 to 4.0 GHz 14 dB

>4.0 to 7.1 GHz 16 dB

**Exception:**

1674 MHz –46 dBc max (–56 dBc typical),

0 to 2800 MHz

>1674 to 1774 MHz –50 dBc max (–60 dBc typical)

at (Finput –1674 MHz)

**Noise Figure (derived from DANL measurement)**

>7028 MHz –80 dBc max (–92 dBc typical)

>350 MHz –85 dBc max

~4010 MHz –80 dBc max

~5894 MHz –75 dBc max

~7028 MHz –80 dBc max

**Exception:**

1674 MHz –46 dBc max (–56 dBc typical),

0 to 2800 MHz

>1674 to 1774 MHz –50 dBc max (–60 dBc typical)

at (Finput –1674 MHz)

Residual Spurious, preamplifier off:

(RF input terminated, 0 dB RF attenuation)

–90 dBm max**, 100 kHz to <3200 MHz

–84 dBm max**, 3200 to 7100 MHz

**Exception:**

250, 300, and 350 MHz

Spur Level

–85 dBm max

~4010 MHz –80 dBm max (–90 dBm typical)

~5084 MHz –70 dBm max (–83 dBm typical)

~5894 MHz –75 dBm max (–87 dBm typical)

~7028 MHz –80 dBm max (–92 dBm typical)

Residual Spurious, preamplifier on:

–100 dBm max (RF input terminated, 0 dB RF attenuation)
General
RF Input VSWR: 2.0:1 maximum, 1.5:1 typical (≥10 dB attenuation)
Maximum Continuous Input: (≥10 dB attenuation), +30 dBm
Input Damage Level*:
≥10 dB attenuation, >+43 dBm, ±50 Vdc
<10 dB attenuation, >+23 dBm, ±50 Vdc
* Input protection relay opens at >30 dBm with ≥10 dB input attenuation and at approximately 10 to 23 dBm with <10 dB attenuation.
ESD Damage Level: ≥10 dB attenuation, >10 kV
External Reference Frequencies: 1, 1.2288, 1.544, 2.4576, 4.8, 4.9152, 5, 9.8304, 10, 13 and 19.6608 MHz at –10 to +10 dBm
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, 7 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).
Sweeps
Full span, Zero span, Span Up/Span Down
Detection
Peak, Negative, Sample, RMS
Memory
Trace and Setup storage is limited only by the capacity of the installed Compact Flash card. For a 64 MB card, storage is greater than 1000 traces and 1000 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
BNC female connectors for ext. reference and ext. trigger
5-pin Mini-B USB 2.0 for data transfer to a PC
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: 3.1 kg (<6.9 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.
Ordering Information
Model
MS2721A Handheld Spectrum Analyzer
100 kHz to 7.1 GHz
Options
Option MS2721A-025 Interference Analysis
Option MS2721A-027 Channel Scanner
Standard Accessories Include:
10580-00103 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
2000-1360 USB A-mini B cable
2000-1371 Ethernet Cable
633-44 Rechargeable battery, Li-Ion
2000-1358 64 MB Compact Flash
1091-27 Type-N male to SMA female adapter
1091-172 Type-N male to BNC female adapter
64343 One Year Warranty
Optional Accessories:
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)
34NFF50C Precision Adapter, DC to 18 GHz, 50Ω, N(f) to N(f)
15NFF50-1.5B Test port cable, armored, 1.5 meter N(m) to N(f) 18 GHz
15NFF50-1.5C 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
15N50-5.0C Test port cable armored, 5.0 meter, N(m) to N(m), 6 GHz
15N50F50-1.5C Test port cable armored, 1.5 meter, N(m) to N(f), 6 GHz
15N50F50-3.0C Test port cable armored, 3.0 meter, N(m) to N(f), 6 GHz
15N50F50-5.0C 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
15DF50-1.5C Test port cable armored, 1.5 meter, N(m) to 7/16 DIN(f), 6.0 GHz
One Year Warranty
3230-90 Adapter, 7/16 DIN (f) to N(m), DC to 7.5 GHz, 50Ω
3231-90 Adapter, 7/16 DIN (f)-N(f), DC to 7.5 GHz, 50Ω
3232-90 Adapter, 7/16 DIN(m)–N(m), DC to 7.5 GHz, 50Ω
3233-90 Adapter, 7/16 DIN(m)-N(f), DC to 7.5 GHz, 50Ω
3234-90 Adapter 7/16 DIN (m) to 7/16 DIN(m), DC to 7.5 GHz, 50Ω
### Optional Accessories (Continued):

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Frequency Range</th>
<th>Product Code</th>
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<tbody>
<tr>
<td>1030-105</td>
<td>Band Pass Filters, 890-915 MHz, N(m) to N(f), 50Ω</td>
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<td>1030-106</td>
<td>Band Pass Filters, 1710-1790 MHz, N(m) to N(f), 50Ω</td>
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<td>1030-107</td>
<td>Band Pass Filters, 1910-1990 MHz, N(m) to N(f), 50Ω</td>
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<td>1030-109</td>
<td>Band Pass Filters, 824-849 MHz, N(m) to SMA(f), 50Ω</td>
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<td>Band Pass Filters, 880-915 MHz, N(m) to SMA(f), 50Ω</td>
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<td>Band Pass Filters, 2400-2484 MHz, N(m) to SMA(f), 50Ω</td>
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<td>Band Pass Filters, 806-869 MHz, N(m) to SMA(f), 50Ω</td>
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<td>510-97</td>
<td>Adapter 7/16 DIN(f) to 7/16 DIN(f), 7.5 GHz</td>
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<td>61382</td>
<td>Spare soft carrying case</td>
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<td>64343</td>
<td>Tilt Bale Stand Accessory</td>
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<td>2000-1032</td>
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<td>40-168</td>
<td>Spare AC/DC adapter</td>
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<td>806-141</td>
<td>Spare automotive cigarette lighter/12 Volt DC adapter</td>
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<td>760-235</td>
<td>Transit case for Anritsu MS2721A Handheld Spectrum Analyzer</td>
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<td>2000-1030</td>
<td>Portable antenna, SMA(m) 1.71-1.88 GHz, 50Ω</td>
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<td>10580-00104</td>
<td>Anritsu HHSA User’s Guide, Model MS2721A (spare)</td>
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<td>10580-00103</td>
<td>Anritsu HHSA Programming Manual, Model MS2721A</td>
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<td>10580-00102</td>
<td>Anritsu HHSA Maintenance Manual, Model MS2721A</td>
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<td>64 MB</td>
<td>Compact Flash Memory Module</td>
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<td>ANRITSU Pty Ltd.</td>
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