Microwave Peak USB Power Sensors
Low Cost, Compact, and Highly Accurate Peak Power Sensors for RF and Microwave Applications

MA24406A
Peak, 50 MHz to 6 GHz
MA24418A
Peak, 50 MHz to 18 GHz
MA24440A
Peak, 50 MHz to 40 GHz

MA24408A
Peak, 50 MHz to 8 GHz
MA24419A
Peak, 50 MHz to 18 GHz
MA24441A
Peak, 50 MHz to 40 GHz
Introduction
The MA244xxA Series of Microwave Peak Power Sensors are designed to provide accurate, peak power measurements from 50 MHz to 6 GHz, 8 GHz, 18 GHz, and 40 GHz with up to 80 dB of dynamic range and 195 MHz of video bandwidth. The sensors employ a parallel processing methodology that performs the multi-step process of RF power measurement at incredible, unmatched speeds. While conventional power meters and USB sensors perform steps serially, resulting in long re-arm times and missed data, Anritsu sensors capture, display, and measure every pulse, glitch, and detail with virtually no gaps in data and zero latency.

Features and Benefits
- 6 GHz, 8 GHz, 18 GHz, and 40 GHz RF Power Sensors
- Up to 195 MHz video bandwidth with 3 ns rise time
- 100,000 measurements per second
- 10 GSa/s effective sample rate
- 100 MSa/s continuous sample rate
- Crest factor and statistical measurements (e.g. CCDF)
- Synchronized multi-channel measurements
- Microwave Peak Power Analyzer advanced measurement and analysis software
Specifications

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Definitions

All specifications and characteristics apply under the following conditions, unless otherwise stated:

- Warm-Up Time: 60 minutes
- Operating Temperature Range: 0 °C to 50 °C
- Characteristic Performance: Characteristic specifications are not tested and are not warranted.
- Calibration Cycle: Anritsu recommended calibration interval is 12 months.

All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com
Performance Specifications

Measurement Range

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>Dynamic Range (Average)</th>
<th>Dynamic Range (Pulse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA24406A</td>
<td>50 MHz to 6 GHz</td>
<td>-60 to +20 dBm</td>
<td>-50 to +20 dBm</td>
</tr>
<tr>
<td>MA24408A</td>
<td>50 MHz to 8 GHz</td>
<td>-53dB to +20 dBm</td>
<td>-43dB to +20 dBm</td>
</tr>
<tr>
<td>MA24418A</td>
<td>50 MHz to 18 GHz</td>
<td>-34 to +20 dBm</td>
<td>-24 to +20 dBm</td>
</tr>
<tr>
<td>MA24419A</td>
<td>50 MHz to 18 GHz</td>
<td>-50 to +20 dBm</td>
<td>-40 to +20 dBm</td>
</tr>
<tr>
<td>MA24440A</td>
<td>50 MHz to 40 GHz</td>
<td>-34 to +20 dBm</td>
<td>-24 to +20 dBm</td>
</tr>
<tr>
<td>MA24441A</td>
<td>50 MHz to 40 GHz</td>
<td>-50 to +20 dBm</td>
<td>-40 to +20 dBm</td>
</tr>
</tbody>
</table>

Input Damage Level: +23 dBm, ±10.0 VDC (+30 dBm peak for 1 µs), minimum

VSWR

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
<th>VSWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA24406A</td>
<td>50 MHz to 6 GHz</td>
<td>1.25:1</td>
</tr>
<tr>
<td>MA24408A</td>
<td>&gt;6.0 GHz to 8 GHz</td>
<td>1.25:1</td>
</tr>
<tr>
<td>MA24418A</td>
<td>50 MHz to 2 GHz</td>
<td>1.15:1</td>
</tr>
<tr>
<td></td>
<td>&gt;2.0 GHz to 16 GHz</td>
<td>1.28:1</td>
</tr>
<tr>
<td></td>
<td>&gt;16 GHz to 18 GHz</td>
<td>1.34:1</td>
</tr>
<tr>
<td>MA24419A</td>
<td>50 MHz to 2 GHz</td>
<td>1.15:1</td>
</tr>
<tr>
<td></td>
<td>&gt;2.0 GHz to 6 GHz</td>
<td>1.20:1</td>
</tr>
<tr>
<td></td>
<td>&gt;6.0 GHz to 16 GHz</td>
<td>1.28:1</td>
</tr>
<tr>
<td></td>
<td>&gt;16 GHz to 18 GHz</td>
<td>1.34:1</td>
</tr>
<tr>
<td>MA24440A</td>
<td>50 MHz to 4 GHz</td>
<td>1.25:1</td>
</tr>
<tr>
<td></td>
<td>&gt;4.0 GHz to 38 GHz</td>
<td>1.65:1</td>
</tr>
<tr>
<td></td>
<td>&gt;38 GHz to 40 GHz</td>
<td>2.00:1</td>
</tr>
<tr>
<td>MA24441A</td>
<td>50 MHz to 4 GHz</td>
<td>1.25:1</td>
</tr>
<tr>
<td></td>
<td>&gt;4.0 GHz to 38 GHz</td>
<td>1.65:1</td>
</tr>
<tr>
<td></td>
<td>&gt;38 GHz to 40 GHz</td>
<td>2.00:1</td>
</tr>
</tbody>
</table>

Response

<table>
<thead>
<tr>
<th>Model</th>
<th>Single Channel Rise Time</th>
<th>Video Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast</td>
<td>Standard</td>
<td>Fast</td>
</tr>
<tr>
<td>MA24406A</td>
<td>3 ns</td>
<td>&lt;10 µs</td>
</tr>
<tr>
<td>MA24408A</td>
<td>4 ns</td>
<td>&lt;10 µs</td>
</tr>
<tr>
<td>MA24418A</td>
<td>5 ns</td>
<td>&lt;10 µs</td>
</tr>
<tr>
<td>MA24419A</td>
<td>&lt;100 ns</td>
<td>&lt;10 µs</td>
</tr>
<tr>
<td>MA24440A</td>
<td>5 ns</td>
<td>&lt;10 µs</td>
</tr>
<tr>
<td>MA24441A</td>
<td>&lt;100 ns</td>
<td>&lt;10 µs</td>
</tr>
</tbody>
</table>

Triggering

<table>
<thead>
<tr>
<th>Source</th>
<th>Continuous, Internal, External TTL, Crossover (from another sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm Type</td>
<td>Continuous, Single, Trigger Holdoff, Frame (gap) Holdoff</td>
</tr>
<tr>
<td>Slope</td>
<td>Positive or Negative</td>
</tr>
<tr>
<td>Trigger Hold Off</td>
<td>100 ns to 1 s with 10 ns resolution</td>
</tr>
</tbody>
</table>

Internal Trigger

<table>
<thead>
<tr>
<th>Model</th>
<th>Minimum Pulse Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic Range</td>
<td>Fast</td>
</tr>
<tr>
<td>MA24406A</td>
<td>-38 to +20 dBm</td>
</tr>
<tr>
<td>MA24408A</td>
<td>-38 to +20 dBm</td>
</tr>
<tr>
<td>MA24418A</td>
<td>-10 to +20 dBm</td>
</tr>
<tr>
<td>MA24419A</td>
<td>-27 to +20 dBm</td>
</tr>
<tr>
<td>MA24440A</td>
<td>-10 to +20 dBm</td>
</tr>
<tr>
<td>MA24441A</td>
<td>-27 to +20 dBm</td>
</tr>
</tbody>
</table>

External Trigger

<table>
<thead>
<tr>
<th>External Trigger Input</th>
<th>SMB (female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance Type</td>
<td>10 kΩ</td>
</tr>
<tr>
<td>High Level Input Voltage</td>
<td>2.4 V min, 5.5 V max</td>
</tr>
<tr>
<td>Low Level Input Voltage</td>
<td>-0.1 V min, 0.7 V max</td>
</tr>
<tr>
<td>Latency</td>
<td>&lt; 10 ns (Latency is defined as the time delay between the defined edge of the applied trigger and the sensor switching into the triggered state.)</td>
</tr>
<tr>
<td>Trigger Pulse Width</td>
<td>10 ns min</td>
</tr>
<tr>
<td>Trigger Repetition Period</td>
<td>20 ns min</td>
</tr>
</tbody>
</table>

a. -53 dBm >6 GHz, 60 dBm < 6 GHz
b. -40 dBm >6 GHz, 50 dBm < 6 GHz

< 10 ns (Latency is defined as the time delay between the defined edge of the applied trigger and the sensor switching into the triggered state.)
## General

### PC Requirements

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>1.3 GHz or higher recommended</td>
</tr>
<tr>
<td>RAM</td>
<td>512 MB (1 GB or more recommended)</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft® Windows® 7 to 10 (32-bit and 64-bit)</td>
</tr>
<tr>
<td>Hard-Disk Free Space</td>
<td>Min 1.0 GB free space to install and run</td>
</tr>
<tr>
<td>Display Resolution</td>
<td>800 x 600 (1280 x 1024 or higher recommended)</td>
</tr>
<tr>
<td>Interface</td>
<td>USB 2.0 high speed</td>
</tr>
<tr>
<td>Interface to Host</td>
<td>USB 2.0 high speed</td>
</tr>
</tbody>
</table>

### Connector Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Connector</td>
<td>N male to 20 GHz</td>
</tr>
<tr>
<td></td>
<td>K male (ruggedized) to 40 GHz</td>
</tr>
</tbody>
</table>

### Size and Weight

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>145 mm x 43 mm x 43 mm, excluding N connector</td>
</tr>
<tr>
<td>Weight</td>
<td>363 g (0.80 lb)</td>
</tr>
</tbody>
</table>

### Warranty

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warranty</td>
<td>3 year</td>
</tr>
</tbody>
</table>

### Environmental Requirements

Tests were performed per MIL-28800F (Class 3).

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature Range</td>
<td>0 ºC to 55 ºC</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-40 ºC to +70 ºC</td>
</tr>
<tr>
<td>Relative Humidity (non-condensing)</td>
<td>45 % at 50 ºC</td>
</tr>
<tr>
<td></td>
<td>75 % at 40 ºC</td>
</tr>
<tr>
<td></td>
<td>95 % at 30 ºC</td>
</tr>
<tr>
<td>Altitude</td>
<td>3048 m operational max</td>
</tr>
<tr>
<td>Shock</td>
<td>30 g half-sine, 11 ms duration</td>
</tr>
<tr>
<td>Vibration</td>
<td>Sinusoidal: 5 Hz to 55 Hz, 3 g max</td>
</tr>
<tr>
<td></td>
<td>Random: 10 Hz to 500 Hz, 2.34 g rms</td>
</tr>
<tr>
<td></td>
<td>Power Spectral Density: 0.01 g²/Hz</td>
</tr>
</tbody>
</table>

### Regulatory Compliance

<table>
<thead>
<tr>
<th>Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IEC/EN 61000-4-2/3/4/6</td>
</tr>
<tr>
<td></td>
<td>Low Voltage Directive 2014/35/EU</td>
</tr>
<tr>
<td></td>
<td>EN 61010-1:2001</td>
</tr>
<tr>
<td></td>
<td>RoHS Directive 2015/863/EU</td>
</tr>
</tbody>
</table>
Ordering Information

Available Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA24406A</td>
<td>50 MHz to 6 GHz</td>
</tr>
<tr>
<td>MA24408A</td>
<td>50 MHz to 8 GHz</td>
</tr>
<tr>
<td>MA24418A</td>
<td>50 MHz to 18 GHz</td>
</tr>
<tr>
<td>MA24419A</td>
<td>50 MHz to 18 GHz</td>
</tr>
<tr>
<td>MA24440A</td>
<td>50 MHz to 40 GHz</td>
</tr>
<tr>
<td>MA24441A</td>
<td>50 MHz to 40 GHz</td>
</tr>
</tbody>
</table>

Available Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA24406A-097</td>
<td>Accredited Calibration to ISO/IEC 17025 and ANSI/NCSL Z540-1 or ANSI/NCSL Z540.3 (includes test report, uncertainty data, and accreditation symbol)</td>
</tr>
<tr>
<td>MA24408A-097</td>
<td>Accredited Calibration to ISO/IEC 17025 and ANSI/NCSL Z540-1 or ANSI/NCSL Z540.3 (includes test report, uncertainty data, and accreditation symbol)</td>
</tr>
<tr>
<td>MA24418A-097</td>
<td>Accredited Calibration to ISO/IEC 17025 and ANSI/NCSL Z540-1 or ANSI/NCSL Z540.3 (includes test report, uncertainty data, and accreditation symbol)</td>
</tr>
<tr>
<td>MA24419A-097</td>
<td>Accredited Calibration to ISO/IEC 17025 and ANSI/NCSL Z540-1 or ANSI/NCSL Z540.3 (includes test report, uncertainty data, and accreditation symbol)</td>
</tr>
</tbody>
</table>

Included Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11410-00976</td>
<td>Information Card</td>
</tr>
<tr>
<td>806-390-R</td>
<td>0.9 m BNC (m) to SMB (m) cable</td>
</tr>
<tr>
<td>806-389-R</td>
<td>0.9 m SMB (m) to SMB (m) cable</td>
</tr>
<tr>
<td>806-391-R</td>
<td>1.8 m USB A (m) to USB B (m) cable</td>
</tr>
</tbody>
</table>

Optional Accessories

Attenuators

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1010-122</td>
<td>20 dB, 5 W, DC to 12.4 GHz, N(m) to N(f)</td>
</tr>
<tr>
<td>3-1010-123</td>
<td>30 dB, 50 W, DC to 8.5 GHz, N(m) to N(f)</td>
</tr>
<tr>
<td>3-1010-124</td>
<td>Attenuator, 40 dB, 100 W, DC-8.5 GHz, N(f) input to N(m) output, Unidirectional</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>42N50-20</td>
<td>20 dB, 5 W, DC to 18 GHz, N(m) to N(f)</td>
</tr>
<tr>
<td>42N50A-30</td>
<td>30 dB, 50 W, DC to 18 GHz, N(m) to N(f)</td>
</tr>
</tbody>
</table>

Fixed Attenuators

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>41KB-3</td>
<td>Precision, DC to 26.5 GHz, 1W, 3 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KB-6</td>
<td>Precision, DC to 26.5 GHz, 1W, 6 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KB-10</td>
<td>Precision, DC to 26.5 GHz, 1W, 10 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KB-20</td>
<td>Precision, DC to 26.5 GHz, 1W, 20 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KC-3</td>
<td>Precision, DC to 40 GHz, 1W, 3 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KC-6</td>
<td>Precision, DC to 40 GHz, 1W, 6 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KC-10</td>
<td>Precision, DC to 40 GHz, 1W, 10 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>41KC-20</td>
<td>Precision, DC to 40 GHz, 1W, 20 dB, K(m) to K(f)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>43KC-3</td>
<td>Precision, DC to 26.5 GHz, 1W, 3 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>43KC-6</td>
<td>Precision, DC to 26.5 GHz, 1W, 6 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>43KC-10</td>
<td>Precision, DC to 26.5 GHz, 1W, 10 dB, K(m) to K(f)</td>
</tr>
<tr>
<td>43KC-20</td>
<td>Precision, DC to 26.5 GHz, 1W, 20 dB, K(m) to K(f)</td>
</tr>
</tbody>
</table>
## Specifications

### Coaxial Adapters

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>34AN50</td>
<td>Precision Adapter, DC to 18 GHz, GPC-7 to N(m), 50 Ω</td>
</tr>
<tr>
<td>34ANF50</td>
<td>Precision Adapter, DC to 18 GHz, GPC-7 to N(f), 50 Ω</td>
</tr>
<tr>
<td>34NK50</td>
<td>Precision Adapter, DC to 18 GHz, N(m) to K(m), 50 Ω</td>
</tr>
<tr>
<td>34NKF50</td>
<td>Precision Adapter, DC to 18 GHz, N(m) to K(f), 50 Ω</td>
</tr>
<tr>
<td>33NFNF50B</td>
<td>Calibration Grade Adapter, DC to 18 GHz, N(f) to N(f), 50 Ω</td>
</tr>
<tr>
<td>33NNF50B</td>
<td>Calibration Grade Adapter, DC to 18 GHz, N(m) to N(f), 50 Ω</td>
</tr>
<tr>
<td>34NN50A</td>
<td>Calibration Grade Adapter, DC to 18 GHz, N(m) to N(m), 50 Ω</td>
</tr>
<tr>
<td>34NFK50</td>
<td>Precision Adapter, DC to 18 GHz, N(f) to K(m), 50 Ω</td>
</tr>
</tbody>
</table>

### Accessory Description

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1091-26-R</td>
<td>SMA(m) to N(m), DC to 18 GHz, 50 Ω</td>
</tr>
<tr>
<td>1091-27-R</td>
<td>SMA(f) to N(m), DC to 18 GHz, 50 Ω</td>
</tr>
<tr>
<td>1091-80-R</td>
<td>SMA(m) to N(f), DC to 18 GHz, 50 Ω</td>
</tr>
<tr>
<td>1091-81-R</td>
<td>SMA(f) to N(f), DC to 18 GHz, 50 Ω</td>
</tr>
<tr>
<td>510-90-R</td>
<td>7/16 DIN(f) to N(m), DC to 7.5 GHz, 50 Ω</td>
</tr>
<tr>
<td>510-91-R</td>
<td>7/16 DIN(f) to N(f), DC to 7.5 GHz, 50 Ω</td>
</tr>
<tr>
<td>510-92-R</td>
<td>7/16 DIN(m) to N(m), DC to 7.5 GHz, 50 Ω</td>
</tr>
<tr>
<td>510-93-R</td>
<td>7/16 DIN(m) to N(f), DC to 7.5 GHz, 50 Ω</td>
</tr>
</tbody>
</table>
Training at Anritsu

Anritsu has designed courses to help you stay up to date with technologies important to your job. For available training courses, visit: www.anritsu.com/training