Product Brochure

Anritsu Advancing beyond

Power Meters and Sensors

ML2430A CW Power Meter
MA2400A/D and MA24000A Power Sensors

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Anritsu Power Meter and Power Sensors: Accurate, Fast, and Affordable

Power Meters

Anritsu offers comprehensive general purpose power meters. The Power Meter ML2430A series are designed for CW applications, offering a combination of accuracy, speed, and flexibility in a low cost package.

Power Sensors

With seven different families of power sensors (including USB sensors*) to choose from, you can trust you'll find the right combination for precision power measurement, whatever your application requirements might be.

*For more information on USB Sensors see "Microwave USB Power Sensors" Product Brochure/Technical Datasheet (11410-00504). This only covers the 100 series USB sensors.

Select the Optimum Power Meter for Your Application

ML2430A Series

- Fully-Featured General Purpose Power Meter. Ideal for CW applications, offering a combination of speed, accuracy and flexibility in a low cost package.
- Designed for Field Applications. Portable and rugged splash-resistant chassis design handles the roughest field treatment. Add a front panel cover and soft case for further protection. There is also an optional NiMH battery, providing six hours continuous operation.
- Graphics Display. Provides graphical display of pulsed power or TDMA signals, displaying individual time slots. Frame triggering allows the user to measure the average power across a time slot.

PowerSuite – PowerSuite is free software for the ML2430A series power meters. This software is used to continuously view measurement traces on the PC in real-time or to archive data and plots for future analysis. PowerSuite runs on a standard PC running Windows® 95 or higher via GPIB or RS232.

The ML2430A series Power Meters combines the advantages of thermal meter accuracy (*Requires firmware v2.20 or greater. **For PC requirements, see Technical Datasheet), diode meter speed, and peak power meter display graphics. The result is a single instrument that samples at more than 35K per second and achieves 90 dB dynamic range with a single sensor.

This meter includes graphics display capability as a standard feature. The ruggedized housing and optional high-capacity NiMH battery bring laboratory quality accuracy to field service applications. ML2437A has one input and ML248A has two inputs.

The Information You Need, Right Where You Want it

Amplifier Measurements

Power amplifiers designed for peak applications, whether pulsed or CDMA, cannot operate at full peak power under CW test conditions. The gain and output power can only be measured accurately using a peak power meter under representative conditions.

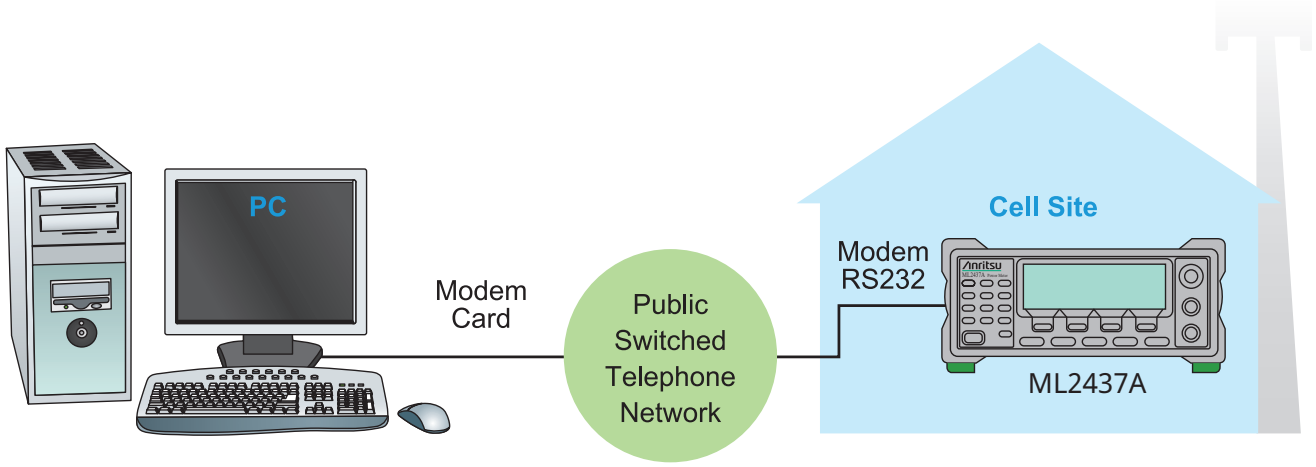
For the precise characterization of amplifier output power and gain, the Power Meter ML2438A is a true dual channel meter with two independent signal channels that eliminate the need for multiplexing. Gain and output power are measured simultaneously. Fast responding diode sensors respond immediately to changes in power level to reduce total test time.

Return Loss Measurements

Take advantage of the power meter's dual inputs to measure the return loss of an amplifier under correct operating conditions.

Remote Monitoring

The Power Meter ML2430A series automatically calls a pre-entered phone number whenever a limits threshold is exceeded. Just set the limit level, enter the phone number, and connect a modem.



The Power Meter ML2430A's data acquisition settings can also adjust to monitor average power or the burst power of specific timeslots. The RS232 port uses the same commands as the GPIB.

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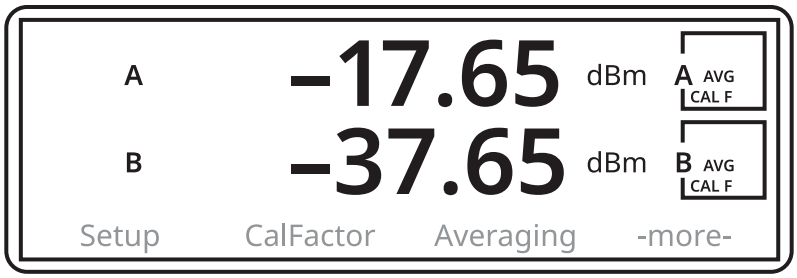
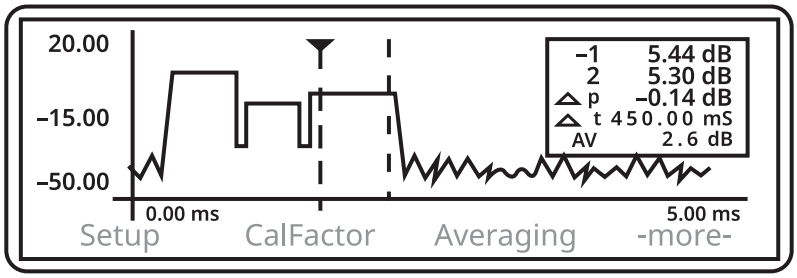
Features Loaded into Every Power Meter

Dual Display Channel

Each display channel in the Anritsu's Power Meter ML2430A is a measurement set up and can use any selection or combination of the sensor inputs. View one display channel or two. Switch between display channels quickly via the front panel hard 'hot' key. The user can also choose to view the measurement results as a graph profile or numerical readout.

The user may also opt to adjust the sample rate directly.





Test Limits

- A simple power limit can be setup for many applications to test the upper and/or lower boundaries of the signal.
- A time varying limit line can be set up for pulsed systems such as radar, TDMA cellular systems, or WLAN to test all aspects of the pulse profile.

Set-up Recall

Conveniently recall application-specific measurement setups.

Secure Mode

The power meter series have a secure mode for operation in security sensitive environments. On activation, the secure mode wipes all information stored in the non-volatile RAM on power up.

GPIB

Comprehensive command-set for full functionality over GPIB.

RS232

For control and firmware updates.

Analog Voltage Input

Measures voltage or accepts the V/GHz signal from a synthesizer for automated sensor calibration factor correction or PAE measurements.

Analog Outputs

Supports corrected and scaled measurements or real-time dual channel output. Synthesizer interface controls

Discover a Comprehensive Range of Power Sensors

The Anritsu Family of Power Sensors Designed to Cover a Wide Range of Measurement Applications

Power Sensors for Every Application

Anritsu's power sensors have been designed with just one thing in mind: everything. The range of sensors provide frequency coverage to 50 GHz, with dynamic range up to 90 dB, and includes both diode and thermal based technologies.

The Anritsu diode-based sensors offer speed, sensitivity, and dynamic range with designs using half- or full-wave diode rectifiers constructed from zero-bias Schottky diodes. The rectifier output is low-pass filtered, forming an envelope detector. This post-detection bandwidth is sometimes referred to as the video bandwidth and is a measure of how quickly the power sensor can respond to a changing input signal, such as a radar pulse or a multi-carrier OFDM signal.

Standard Diode Sensors: MA2470D

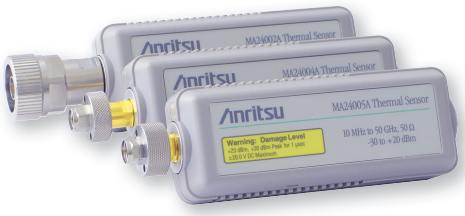
Designed for high dynamic range, high accuracy CW, and TDMA measurements, these power sensors have 90 dB dynamic range and linearity better than 1.8%. This makes them the choice for precision measurements. The rise-time of these sensors is fast enough for power measurements on GSM and similar TDMA systems that use GMSK modulation.

High Accuracy Diode Sensors: MA2440D

With its built in 3 dB attenuator, the MA2440D sensors minimize VSWR input. They are typically used when high measurement accuracy is required over a large dynamic range, for example when measuring amplifiers. High accuracy diode sensors have a dynamic range of 87 dB compared to the 90 dB of standard diode sensors. In all other respects, the performance of the sensors is identical to the standard diode sensor.

Universal Power Sensors: MA2480D

The MA2480A series are true RMS sensors with a dynamic range of 80 dB. These power sensors are modulation independent and can be used for average power measurements on a wide variety of signals, including multi-tone or W-CDMA signals. The sensor architecture consists of three pairs of diodes, each one configured to work in its square law region over the dynamic range of the sensor. Option 1 provides TDMA measurement capability, calibrating one of the diode pairs for linearity over a wide dynamic range.



Thermal Power Sensors: MA24000A

The Anritsu MA2400xA series thermal sensors provide excellent power measurement accuracy over 50 dB of dynamic range.
Thermal sensors use Seebeck elements where the combined effect of a thermal gradient and charge migration between dissimilar metals gives a true reading of the average power of any incident waveform. Anritsu thermal sensors have class leading SWR and a built-in EEPROM with calibration factor and linearity correction data. This results in assured accuracy when measuring any signal.

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Power Sensors for Every Application

Features

• True-RMS detection enables accurate average power measurements of any signal type

• 50 dB dynamic range

• Wide frequency coverage from 10 MHz to 50 GHz (sensor dependent)

• Calibration factors stored in EEPROM

Sensor EEPROM

The family of Anritsu power sensors store calibration data and model information within internal EEPROMS. User calibration factor tables allow frequency points or compensation for test system loss, including that from couplers and attenuators.

High Power Applications

Traditional high-power sensors are expensive and have degraded accuracy specifications. Having additional specialized sensors lead to more annual calibrations requiring more down time and expense. Using user calibration factor tables coupled with a precision high power attenuator avoids these problems and eliminates the need for specialized, high-power. Users can easily reduce operating costs and save time:

• Compensation can be made for any precision attenuator or coupler by entering frequency and attenuation values into the user calibration factor table in the internal EEPROM.

• The attenuation device can be semi-permanently attached. The power meter automatically applies compensation during the 0.0 dBm, 50 MHz calibration reference process.

• User calibration factor tables are easily deactivated – allowing the power sensor to be used as a stand-alone device.

• Up to six tables can be stored.

Sensor and Power Meter Selection

Sensors	Standard Diode	(High Accuracy) Diode	Universal	Thermal
	MA2470D Series	MA2440D Series	MA2480D Series	MA2400xA
Power Measurement	Average (RMS)	Average (RMS)	Average (RMS)	Average (RMS)
Measurement Application (Examples)	CW, GMSK, GFSK, 8PSK	CW, GMSK	CW, GMSK, GFSK, 8PSK, QPSK, QAM	Any modulation
	TDMA, FDMA, IS136	TDMA, FDMA	TDMA, FDMA, CDMA, OFDM, Radar	Any access scheme
Compatible Power Meters	ML2437A/ML2438A	ML2437A/ML2438A	ML2437A/ML2438A	ML2437A/ML2438A

Ordering Information

Power Meter Models

ML2437A CW Power Meter, Single Input
ML2438A CW Power Meter, Dual Input

ML2430A Series

ML2400A-05	Front Bail Handle
ML2400A-06	Rear Mount Input A on ML2437A
ML2400A-07	Rear Mount Input A and Reference on ML2437A
ML2400A-08	Rear Mount Inputs A, B and Reference on ML2438A
ML2400A-09	Rear Mount Inputs A and B on ML2438A
2000-1603	NiMH Battery
2000-996-R	Desktop Battery Charger with Power Supply
2000-1534-R	Desktop Battery Charger (for use in Japan only)
2000-1538-R	3m Sensor Cable
2000-1539-R	5m Sensor Cable
2000-1540-R	10m Sensor Cable
2000-1541-R	30m Sensor Cable
2000-1542-R	50m Sensor Cable
2000-1543-R	100m Sensor Cable
2000-1545	Bulkhead Adapter
10585-00001	Operation and Programming Manual ML2437/8A (hard copy)
10585-00001-ja	Operation and Programming Manual: Japanese (soft copy only)
10585-00003	Maintenance Manual ML2400A Series (hard copy)
ML2400A-98	Calibration to Z540, ISO Guide 25
ML2400A-99	Premium Calibration
ML2400A-30A	Option 30, Operation/Prog Manual (for use in Japan only)

Options 5, 2400-82, and 2400-83 are mutually exclusive for any given ML2430A unit.

Options 6, 7, 8, and 9 are mutually exclusive for any given ML2430A unit.

Standard Accessories

Power Cord for destination country
One 1.5 m sensor cord per meter input
Operation Manual (soft copy only; hard-copy available for order)
Programming Manual (soft copy only; hard-copy available for order)
Certificate of Calibration (also included with sensors)

General Options and Accessories

760-209	Hardside Transit Case
D41310	Soft Carry Case with Shoulder Strap
2400-82	Rack Mount, Single Unit
2400-83	Rack Mount, Side-by-Side
2000-1535	Front Panel Cover
2000-1536-R	0.3m Sensor Cable
2000-1537-R	Spare 1.5m Sensor Cable
2000-1544-R	RS232 Bootload Cable

Power Sensor Models

MA2472D	Standard Diode Sensor (10 MHz to 18 GHz, –70 dBm to 20 dBm)
MA2473D	Standard Diode Sensor (10 MHz to 32 GHz, –70 dBm to 20 dBm)
MA2474D	Standard Diode Sensor (10 MHz to 40 GHz, –70 dBm to 20 dBm)
MA2475D	Standard Diode Sensor (10 MHz to 50 GHz, –70 dBm to 20 dBm)
MA2442D	High Accuracy Diode Sensor (10 MHz to 18 GHz, –67 dBm to 20 dBm)
MA2444D	High Accuracy Diode Sensor (10 MHz to 40 GHz, –67 dBm to 20 dBm)
MA2445D	High Accuracy Diode Sensor (10 MHz to 50 GHz, –67 dBm to 20 dBm)
MA2481D	Universal Sensor (10 MHz to 6 GHz, –60 dBm to 20 dBm)
MA2482D	Universal Sensor (10 MHz to 18 GHz, –60 dBm to 20 dBm)
MA24002A	Thermal Sensor (10 MHz to 18 GHz, –30 dBm to 20 dBm)
MA24004A	Thermal Sensor (10 MHz to 40 GHz, –30 dBm to 20 dBm)
MA24005A	Thermal Sensor (10 MHz to 50 GHz, –30 dBm to 20 dBm)

Anritsu Advancing beyond

Specifications are subject to change without notice.

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