

POWER METERS

ML2400A/2430A Series



For Measuring Wide Dynamic Range Power



The ML2430A series Power Meters combine the advantages of thermal meter accuracy, diode meter speed, and peak power meter display graphics. The result is a single instrument that achieves 90 dB dynamic range with a single sensor. The ML2430A series includes graphics display capability as a standard feature. The ruggedized housing and optional high-capacity NiMH battery bring convenience and accuracy to field service applications.

Performance

• Speed and dynamic range

The 90 dB range MA2470A series Power Sensors' high sensitivity reaches stable power readings to -70 dBm. 35 kHz sample rates profile cellular, PCS, and other pulsed signals to 0.1 μ sec resolution. Modern connector technology achieves industry-leading return loss for improved accuracy through 50 GHz. The 87 dB range MA2440A series High Accuracy Sensors further improve return loss performance by adding a matching circuit to the MA2470A series' front end.



New power sensor technology achieves industry leading measurement linearity and high sensitivity.

• Universal power sensors

The new MA2480A series Universal Power Sensor will measure any modulated or multi-tone signal thanks to a patented sensor architecture with three diode pairs. Universal power sensors deliver over 80 dB of dynamic range with speed and accuracy.

Average power measurements on WCDMA signals can now be made without the need for special power meters. Universal sensors are also ideal for power measurements on other digitally modulated carriers such as HDTV, DAB or QAM modulated radio links.

The sensor architecture ensures that one of the diode pairs is always operating in its square law region. The meter selects the diode pair operating in its square law region and is designed so that even the peaks of CDMA signals are measured accurately. Anritsu's three stage diode pair approach leads to a very much faster measurement time than the two stage approach used in previous generations of average power sensors. No slowing of measurement speed is observed at switching points, making them transparent to the user.

Universal power sensors are also ideal for applications where multiple signals are present, such as intermodulation measurements and satellite multi carrier power loading measurements.

A unique additional capability of the Anritsu Universal power sensor is the ability to use it as a standard diode sensor for fast CW measurements and pulse or TDMA measurements. In this mode the fast response of diode sensors is maintained across the full dynamic range of the sensor, meaning that for the majority of users it is the only sensor that they will ever need - a truly Universal Power Sensor.

• Fast thermal sensors

Anritsu's latest semiconductor processing technology produces thermal power sensors with speed increased by an order of magnitude. Improvements in connector technology reduce measurement mismatch uncertainty through 50 GHz to levels previously attained only to 20 GHz. The fabrication technique, as well as the ML2430A's sampling and DSP technology, optimize measuring speed to 4 ms rise and fall times.

• GPIB speed

Industry leading speed of >600 continuous readings per second is achieved under a variety of operating conditions including averaging settings, sensor control settings, triggering conditions, operating mode, sensor type, and GPIB interface manufacturer. The ML2430A series offers the ability to measure and transfer a high-speed burst of 200 data points using profile operating mode with sampling rates of 35k per second.

• GPIB emulation

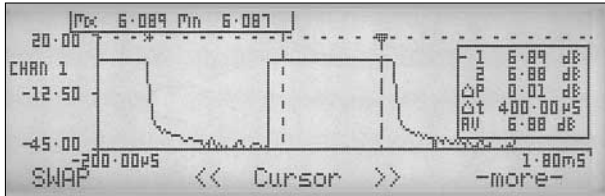
With 99.9% emulation of older meters, the ML2430A series improves ATE system productivity. Typical test system speed improvement is 2 to 10 times faster system speed depending upon the number of measurements taken during the test, the minimal use of wait statements within the code, and the meter model emulated.

• Triggering controls

What use is high speed without triggering and sample controls? Data acquisition event arming and triggering functions traditionally found on expensive peak power meters are standard in the ML2430A series. Triggering delay and the sample integration time per reading can be directly controlled by the operator. Trigger sources include, continuous, internal, external TTL, and manual. Thus, data acquisition can be optimally controlled for synchronization with other test equipment.

• Burst profile graphics display

The ML2430A features random repetitive sampling for high resolution of fast signals. A time domain graphic display profiles pulsed signals over a power range of -40 dBm to +20 dBm. 35 kHz sampling speed produces clear power profiles of cellular and PCS signals including TDMA, PHS, GSM, and DCS-1800. Pulse top power is easily and repeatably measured using between cursor averaging. Measure pulse-top power over >80 dB dynamic range in readout mode at GPIB speeds >200 readings per second.

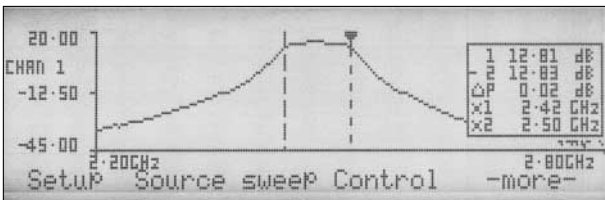


• Power vs. time graphics display

The power versus time mode is a strip chart style display for monitoring gain and output power variations over time/temperature, supply voltage, or a component tolerance. In service applications, measurement of power versus time aids trouble shooting of unusual conditions, such as intermittent switches or abnormal power control in a mobile telephone base stations. The power versus time mode provides a clear strip chart display of RF power variation.

• Source sweep graphic display

Power Sweep or frequency sweep data are acquired at more than 10 sweeps per second over GPIB. Synchronization with synthesizers requires connection (BNC) of a 0.0 V sweep ramp input and an RF blanking/dwell input.



• Parallel printer connector

Many deskjet series printers can be connected directly to the ML2430A for fast documentation of performance on the bench or in the field. Meter calibration, triggering, and averaging settings are listed with the display printout. Thus, evidence of DUT (device under test) anomalies can be duplicated quickly.

• 90 dB dynamic range

Typical communications industry ATE systems operate over a 60 to 80 dB dynamic range. The MA2470A series' 90 dB dynamic range replaces two 50 dB sensors. Furthermore, an RF switch is no longer needed for the two sensors. This reduces software control complexity and further speeds test execution.

• Sensor EEPROM

All MA2400A series sensors are equipped with internal EEPROMs for storage of calibration factor data vs. frequency. This allows the power meter to interpolate and correct readings automatically, improving accuracy and convenience.

• High reliability

A rugged polycarbonate chassis handles drop shocks and rough field treatment. The absence of vent holes makes the meter splash resistant. A front cover panel and softcase are optional for further environmental protection. Power sensors are also ruggedized for rough handling.

• Improved accuracy

Mismatch uncertainty is typically the largest source of error. The MA2400A series Power Sensors offer a typical 5 to 6 dB improvement in sensor return loss, typically cutting mismatch uncertainty in half. The MA2440A series High Accuracy Sensors incorporate a matching pad which further improves return loss by 5 to 6 dB — again halving mismatch uncertainty.

• Offset table for path loss correction

Compensating for the true frequency response of attenuators, couplers, cables, switches, and other test setup devices improves measurement accuracy. For this reason, the ML2430A series can apply an offset table of attenuation-versus-frequency in addition to the traditional fixed dB offset capability. When a power sensor connection is preceded with a new 1N series wideband power limiter, the offset table compensates for frequency response. Thus, the combination achieves an accurate, "burnout-proof" sensor.

• Softkey menu control

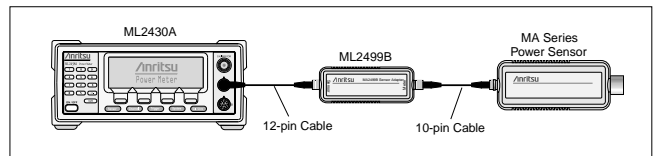
Softkey menus simplify instrument control by making the user interface easier to understand. The numerical keypad simplifies the operator interface.

• Battery

The optional NiMH "Smart" battery supports high charge density for a typical 8 hour day of operation. Accurate fuel gauging, <2 hour fast charge cycling, and the elimination of NiCd style memory effect further enhance the convenience of this battery technology.

• Voltmeter

The ML2430A series also supports high-speed voltage measurement. A rear panel BNC measures voltage or operates as V/GHz input supporting automated sensor calibration factor correction.



• Sensor Adapter, MA2499B

The ML2499B Sensor Adapter operates with older (10-pin) MA Series Power Sensors. An internal EEPROM allows storage of up to 9 sets of sensor calibration factor tables. Each table is individually selectable from the sensor menu. MP series waveguide power sensors are also compatible when used with the MA4002A adapter.

• High power applications

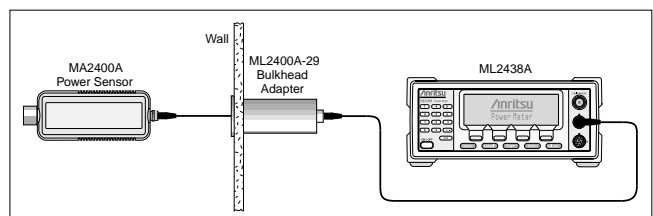
Traditional high power sensors are expensive and have degraded accuracy specifications. Further, their annual calibration requires more time and expense. Anritsu's new User Calibration Factor Tables avoid these problems. Any attenuator or coupler can be compensated by entering frequency and attenuation values into the MA2400A Series Power Sensors 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. The User Calibration Factor Tables are easily deactivated — allowing the power sensor to be used stand-alone also.

• Remote monitoring by telephone

Monitor transmitter performance remotely with standard telephone lines using the ML2430A's full duplex RS-232 and dial-out capabilities. When the ML2430A detects a high or low limit line violation, it will automatically dial a phone number. The meter's data acquisition settings can adjust to monitor average power or the burst power of specific timeslots. The RS-232 port uses the same commands as the GPIB. Contact your Anritsu representative for PC compatible software.

• Locate power sensors remotely

Some power meter applications require the sensor and meter to be separated by long distances or physical barriers. There is no requirement to perform a 0.0 dBm reference with the power meter; however, the lack of a reference may cause a small offset error. When a reference is desired, the MA2418A Reference Oscillator (0.0 dBm, 50 MHz) provides a convenient solution. DC power supply, and small size allows the MA2418A to be embedded in switch matrices or other enclosures. When a power sensor's cable must pass through walls or shielded enclosures, the ML2400A/29 Bulkhead Adapter provides a convenient connection between two sensor cables.





• N-CDMA Power Measurements

The Anritsu ML2407A power meter and MA2460B/C series power sensor have been specifically designed to make the exacting measurements required on N-CDMA signals. Today's digital radio standards employ a variety of techniques to enhance performance and increase spectral efficiency. Application of Code Division Multiple Access (CDMA) technology enables multiple users to share the same spectrum, with a channel bandwidth of 1.2288 MHz. Having a much wider channel bandwidth than earlier generation analog or TDMA systems has created new challenges for radio and component equipment manufacturers.

The Anritsu MA2460B/C series power sensor has a video bandwidth of 1.25 MHz. When used with the ML2407A (single channel) or ML2408A (dual channel) power meters, it is able to correctly characterize IS-95 waveforms and accurately measure average power. Advanced signal processing with fast sampling speeds facilitate measurements of peak power and crest factor.

The dual diode MA2460B/C series power sensor is both fast and accurate. It delivers over 80 dBs of dynamic range, making it suitable for both open and closed loop power control testing. A built-in EEPROM automates sensor calibration factor correction to simplify test set up and reduce human error.

EEPROM correction also corrects for sensor linearity across a range of temperatures, providing test engineers with unmatched measurement accuracy under all operating conditions.

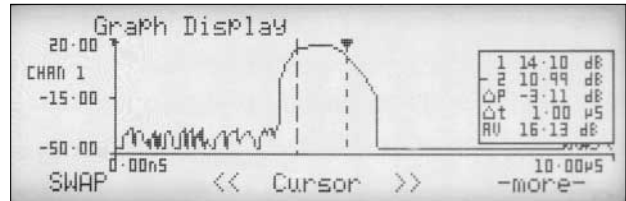


• Power Meter ML2407A

For automated measurements under GPIB control, the ML2407A power meter offers many class-leading features. Over 600 readings per second are available in fast mode, reducing total test time. Programmers have control over low-level averaging, sensor setting, and noise reduction for optimization of program speed. The sensors internal AC detection circuitry delivers a guaranteed noise floor of -60 dBm with typical performance to -70 dBm, even when measuring CDMA signals.

When testing transmitters and amplifiers it is often necessary to measure crest factor. If an amplifier is unable to cope with the peaks within the signal they will be attenuated and information lost.

Amplifiers are often tested across a range of average powers to ensure that the crest factor is maintained. This provides a simple way of ensuring that the amplifier is maintaining linearity across its full dynamic range. The Anritsu ML2407A facilitates tuning of amplifiers through the use of a crest factor time window. The period of time for which a peak will be stored is set by the user. Thus the change in crest factor can be monitored as the average power into an amplifier is increased.



• Fast Pulse Analysis

The MA2460B/C series sensor also benefits from improved pulse response times. Pulses down to 1 μs can now be captured and displayed thanks to a sensor rise time of 0.6 μs. It is becoming increasingly common for amplifiers to be tested by analyzing their responses to short pulses. The ML2407A in profile mode can graphically display the pulse shape. Two cursors can be positioned on the trace and cursor readouts show the power at each cursor position plus the average power between the cursors.

Triggering for pulse analysis is from a TTL input or from a rising or falling edge. Variable trigger delay provides the ability to view the whole pulse profile or exactly the portion of the pulse of interest. With the ML2408A dual channel power meter, the pulsed gain of an amplifier can be measured directly.

• PowerSuite

PowerSuite software runs on a standard PC running Windows® 95 (or higher). PowerSuite adds the following measurements to the capability of the Anritsu ML2400A series power meters:

- Statistical power analysis
 - Probability Density Function (PDF)
 - Cumulative Density Function (CDF)
 - Inverse Cumulative Function (1-CDF)
- Pulse characterization (pulse width, rise time, peak power, pulse power, overshoot repetition, and period)
- GSM (and other TDMA) time slot power analysis
- Automated amplifier compression analysis
 - Single frequency compression
 - Compression vs frequency

Statistical analysis of power distribution can reveal important information to optimize CDMA system design. PDF displays the percentage of time (or samples) that the power is at a specific value. CDF takes the same data but displays the percentage of time (or samples) that the power is at or below a specific value. Analyzing this data can reveal how a system or device may be distorting the signal that it is transmitting. Comparison of the CDF plots from an amplifier at differing average power levels validates linearity and reveals the potential introduction of data errors.

PowerSuite is a very flexible package that provides full user control over measurement settings. The screen can be set for continuous update so that changes to the device or system under test can be viewed instantly. Alternatively plots can be archived for later analysis.

Specifications ML2400A and ML2430A Series

Frequency range	100 kHz to 90 GHz (sensor dependant)	
Power sensors	Meter specifications apply to MA2400A/B series Power Sensors. Compatible with MA and MP series sensors.	
Sensor dynamic range	MA2420A/B Series Thermal Sensors: 50 dB MA2440A Series High Accuracy Power Sensors: 87 dB CW, >57 dB Peak MA2460B/C Series Fast Diode Sensors: 80 dB MA2470A Series Power Sensors: 90 dB CW, >60 dB Peak MA2480A Series Universal Sensors: 80 dB	
Power measurement range	-70 to +47 dBm (0.1 nW to 50 W), sensor/attenuator dependent. Use couplers for higher power levels.	
Voltage measurement range	0.00 to 20.00 V, nominal	
Display range	-99.999 to +99.999 dB	
Display resolution	Selectable from 0.1 dB to 0.001 dB limited to 0.01 dB in graphical display modes; Linear power units, 3 to 6 digit, 1 - 3 digits selectable to right of decimal nW - W; Voltage, 1 - 2 digits selectable to right of decimal.	
Offset range	-99.999 to +99.999 dB. Fixed value or frequency dependent table.	
Display units	dBm, dB, dBr, dBmV, dBuV, W, %, Volts	
Instrumentation accuracy	<0.5%	
Zero set and drift	ML2437/8A <0.5% of full scale in most sensitive range, measured over one hour with maximum averaging after one hour warm up at constant temperature. ML2407/8A <1.8% of full scale in most sensitive range, measured over one hour with maximum averaging after one hour warm up at constant temperature.	
Noise	ML2437/8A <0.5% of full scale in most sensitive range, ML2407/8A <1.8% of full scale in most sensitive range, both measured over a one minute interval with maximum averaging, two standard deviations at constant temperature after hour warm up, typical. MA 2470 series, 20 pW typical.	
1.00 mW power reference	Frequency: 50 MHz nominal Output level: 1.00 mW, $\pm 1.2\%$ /year, $\pm 0.9\%$ RSS, NIST Traceable Maximum input: +20 dBm continuous or peak, ± 50 V dc VSWR: <1.04 Connector: Type N female	
Sensor/channel control	Operating modes	Readout, dual channel. RF power or voltage. Power versus time: Single channel graphic of readout data Profile: Single channel RF peak power graphic display for analysis of repetitive pulse or transient waveforms Source sweep: Single channel power sweep or frequency sweep NCDMA Average Power, Peak Power and Crest Factor - ML2407/8A only.
	Range hold	Current range or selectable 1 through 5.
	Averaging	Auto-averaging: Automatically increases moving averaging at low power ranges. Averaging types: Auto, Manual (Moving, Repeat) Manual average range: 1 to 512 Low-level averaging: Low, Medium, and High settings apply post average low pass filter to improve visibility at high display resolution.
	Limit lines	Fixed value high and low limits with audible, rear panel TTL output, and/or visible Pass/Fail alarm indication. Failure indication can latch for transient failure detection.
	Cursors	Two manually adjustable cursors with power, delta cursor power, between cursor power average, and delta time readout display.
	Delta t resolution	0.5% of display period or 100 ns
Triggering	Trigger sources	Internal, External TTL, GPIB, Manual, Continuous
	Delay range	0.0 to 999.0 Milliseconds
	Delay resolution	0.5% of display period or 100 ns
	Internal trigger range	-15 to +20 dBm, all diode sensors. Selectable to -25 dBm.
	Internal trigger level accuracy	1.0 dB, typical
	External trigger range	TTL rising or falling edge trigger. BNC input
Manual trigger	Front panel softkey	
Channel bandwidth	ML2437/38A 100 kHz nominal ML2407/08A 1.4 MHz nominal	

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System configuration	Display	LCD graphic display with backlight and adjustable contrast.	
	Save/Recall	10 storage registers plus RESET default settings	
	Secure mode	Erases memory information upon power ON. Default condition is secure mode OFF.	
	Rear panel inputs/ outputs	Cal factor voltage input (BNC)	Operating modes Voltage: Display voltage reading on selected channel Voltage proportional to frequency for sensor calibration factor compensation Blanking input: TTL levels only. Selectable positive or negative polarity. Input range: 0 to 20 V Resolution: 0.5 mV Control: Adjustable voltage to frequency relationship
		Analog output (BNC): two outputs configurable to log or lin	Operating modes: Analog out: Selectable channel adjusted for calibration factors and other power reading correction settings. Pass/Fail: Selectable TTL High or Low Channel output: Near real time analog. Uncalibrated. AC modulation output: Output 1 only. Dwell output: Output 2 only Output range: -5.0 to 5.0 V Resolution: 0.1 mV
		Trigger input	Operating modes: External TTL or RF Blanking.
		GPIB interface	IEEE-488.2 and IEC-625
RS-232		Supports software download and modem dial-out.	
Parallel printer output	Compatible with Deskjet 540 and 310 models. Other 500 series and 300 series and later are typically compatible. Also Canon BJC 80. See manual for DIP switch settings.		
General specifications	General	MIL-T28800E, Type 3, class 5, Style E	
	Display	Flat panel monochrome LCD graphic with backlight	
	Operating temperature range	0.0 to +50°C.	
	Storage temperature range	-40 to +70°C	
	Moisture	Splash and rain resistant, 95% humidity non-condensing.	
	Power requirements	AC: 90 to 250 Vac, 47 to 440 Hz, 40 VA maximum DC: 12 to 24 Vdc, Reverse protected to -40. Maximum input 30 V. Battery: >6 hr usable with 3000 mAh battery	
	Replaceable battery (Option)	3000 mAh NiMH	
	EMI	Complies with requirements for CE marking.	
	Warranty	1 to 2 year additional available	
	Dimensions	8.39 inches (213 mm) wide, 3.46 inches (88 mm) high, 9.84 inches (390 mm) deep	
	Weight	<6.6 lbs (<3 kg)	

Power sensor specifications

Model	Frequency range	Dynamic range (dBm)	SWR	Rise time*1 (ms)	Sensor linearity	RF connector*2
Standard diode sensors						
MA2472B	10 MHz - 18 GHz	-70 to +20	<1.17; 10 - 150 MHz (MA2472B only) <1.90; 10 - 50 MHz <1.17; 50 - 150 MHz <1.12; 0.15 - 2 GHz <1.22; 2 - 12.4 GHz <1.25; 12.4 - 18 GHz <1.35; 18 - 32 GHz <1.50; 32 - 40 GHz <1.63; 40 - 50 GHz	<0.004	1.8%, <18 GHz 2.5%, <40 GHz 3.5%, <50 GHz	N (m)
MA2473A	10 MHz - 32 GHz					K (m)
MA2474A	10 MHz - 40 GHz					K (m)
MA2475A	10 MHz - 50 GHz					V (m)
Fast thermal sensors						
MA2421B	0.1 MHz - 18 GHz	-30 to +20	<1.10; 0.1 MHz - 2 GHz <1.15; 2 - 12.4 GHz <1.20; 12.4 - 18 GHz <1.90; 10 - 50 MHz <1.17; 50 - 150 MHz <1.10; 0.15 - 2 GHz <1.15; 2 - 12.4 GHz <1.20; 12.4 - 18 GHz <1.25; 18 - 32 GHz <1.30; 32 - 40 GHz <1.40; 40 - 50 GHz	<4.0	1.3%, <18 GHz 1.5%, <40 GHz 1.8%, <50 GHz	N (m)
MA2422B	10 MHz - 18 GHz					N (m)
MA2423B	10 MHz - 32 GHz					K (m)
MA2424B	10 MHz - 40 GHz					K (m)
MA2425B	10 MHz - 50 GHz					V (m)
High accuracy diode sensors						
MA2442B	10 MHz - 18 GHz	-67 to +20	<1.17; 10 - 150 MHz (MA2442B only) <1.90; 10 - 50 MHz <1.17; 50 - 150 MHz <1.08; 0.15 - 2 GHz <1.16; 2 - 12.4 GHz <1.21; 12.4 - 18 GHz <1.29; 18 - 32 GHz <1.44; 32 - 40 GHz <1.50; 40 - 50 GHz	<0.004	1.8%, <18 GHz 2.5%, <40 GHz 3.5%, <50 GHz	N (m)
MA2444A	10 MHz - 40 GHz					K (m)
MA2445A	10 MHz - 50 GHz					V (m)
Fast diode sensors						
MA2468B*3	10 MHz - 6 GHz	-60 to +20	<1.17; 10 - 150 MHz <1.12; 0.15 - 2 GHz <1.22; 2 - 12.4 GHz <1.25; 12.4 - 18 GHz	<0.0006	1.8%	N (m)
MA2469C*3	10 MHz - 18 GHz					
Universal power sensors						
MA2481B	10 MHz - 6 GHz	-60 to +20	< 1.17; 10 - 150 MHz < 1.12; 0.15 - 2 GHz < 1.22; 2 - 12.4 GHz < 1.25; 12.4 - 18 GHz	<0.004 (with option 1 only)	10 MHz to 6GHz 3% -60 to +20 dBm 6 to 18 GHz 3% -60 to 0 dBm 3.5% 0 to +20 dBm (1.8% CW with option 1)	N (m)
MA2482A	10 MHz - 18 GHz					
MA2480/01	Adds fast CW mode to Universal Power Sensors for high speed measurements of CW signal plus TDMA and pulse measurements.					

*1: 0.0 dBm, room temperature.

*2: Each MA2400A/B series sensor incorporates precision RF connectors with hexagon coupling nut for attachment by industry standard torque wrench.

*3: MA2460B/C Fast Diode Sensors must be used with ML2407/08A Power Meters for NCDMA and Fast Pulse measurements.

Ordering information

Please specify model/order number, name, and quantity when ordering.

Model/Order No.	Name
ML2437A	Main frame Power Meter, single input
ML2438A	Power Meter, dual input
ML2407A	NCDMA Power Meter, single input
ML2408A	NCDMA Power Meter, dual input
	Power meter options
Option-1	Rack mounted, single unit
Option-3	Rack mounted, side-by-side
Option-5	Front bail handle
Option-6	Rear mount input A on ML2437A/ML2407A
Option-7	Rear input A and reference on ML2437A/ML2407A
Option-8	Rear mount inputs A, B and reference
Option-9	Rear mount inputs A and B on ML2438A/ML2408A
Option-11	Ni-MH battery with Desktop Charger
Option-12	Front panel cover
Option-20	Extra 1.5 m sensor cable
Option-21	0.3 m sensor cable
Option-22	3 m sensor cable
Option-23	5 m sensor cable
Option-24	10 m sensor cable
Option-25	30 m sensor cable
Option-26	50 m sensor cable
Option-27	100 m sensor cable
Option-29	Bulkhead Adapter
Option-33	Printer
Option-98	Z 540 guide 25 calibration
Option-99	Premium calibration

Options 1 to 5 are mutually exclusive for any given ML2430A unit. Options 6, 7, 8 and 9 above are mutually exclusive for any given ML2430A unit. Options 25, 26, 27 cannot be used with ML2407/8A.

Model/Order No.	Name
	Power meter accessories
760-209	Hardside transit case
D41310	Soft carry case with shoulder strap
10585-00001	Extra operation manual for ML2430A series
10585-00013	Power meter operations manual (for 2400A Sensors)
ML2419A	Power meter, range calibrator
MA2418A	50 MHz Reference Oscillator with power supply
MA2472B	Power Sensor 10 MHz to 18 GHz
MA2473A	Power Sensor 10 MHz to 32 GHz
MA2474A	Power Sensor 10 MHz to 40 GHz
MA2475A	Power Sensor 10 MHz to 50 GHz
MA2421A	Thermal Sensor 0.1 MHz to 18 GHz
MA2422B	Thermal Sensor 10 MHz to 18 GHz
MA2423B	Thermal Sensor 10 MHz to 32 GHz
MA2424B	Thermal Sensor 10 MHz to 40 GHz
MA2425B	Thermal Sensor 10 MHz to 50 GHz
MA2442B	High Accuracy Sensor 10 MHz to 18 GHz
MA2444A	High Accuracy Sensor 10 MHz to 40 GHz
MA2445A	High Accuracy Sensor 10 MHz to 50 GHz
MA2468B	Fast Diode Sensor 10 MHz to 6 GHz
MA2469C	Fast Diode Sensor 10 MHz to 18 GHz
MA2481B	Universal Power Sensor 10 MHz to 6 GHz
MA2482A	Universal Power Sensor 10 MHz to 18 GHz
	Sensor options & accessories
MA2497A	HP Sensor Adaptor
MA2499B	Anritsu Sensor Adaptor
2300-243	LabView driver
MA2418A	50 MHz Reference Oscillator with power supply
ML2419A	Power Meter, range calibrator
MA2499B	Sensor Adapter (10 to 12 pin)
1N75C	5W Limiter, 0.01 to 3 GHz, Nm-f, 75 Ω
1N50C	5W Limiter, 0.01 to 18 GHz, Nm-f, 50 Ω
1K50A	5W Limiter, 0.01 to 20 GHz, Km-f, 50 Ω
1K50B	3W Limiter, 0.01 to 26 GHz, Km-f, 50 Ω
42N75-20	5 Watt attenuator, Nm-f, 75 Ω
42N50-20	5 Watt attenuator, Nm-f, 50 Ω
42N50-30	50 Watt attenuator, Nm-f, 50 Ω