POWER SENSORS

MA2400A/D Series 10 MHz to 50 GHz

Anritsu Power Sensors consist of MA247XD Series Standard Diode Power Sensors, MA246XD Series Fast Diode Power Sensors, MA248XD Series Universal Power Sensors, MA244XD Series High Accuracy Power Sensors, MA249XA Series Wideband Power Sensors, and MA2411A Pulse Power Sensor.

Features

- *10 MHz to 50 GHz range*
- *N, K, and V type RF connectors*
- *90 dB dynamic range provides stable power readings to –70 dBm*
- *MA244XD Series High Accuracy Power Sensors contain an additional matching circuit to improve return loss performance.*
- *MA246XD power sensors have fast 1 milli second rise and fall times needed for CDMA measurements*
- *MA248XD Universal sensors measure average power of modulated signals such as W-CDMA, multitone, etc.*
- *All Power Sensors contain internal EEPROMs for storage of calibration data as a function of frequency, power, and temperature. This allows the power meter to interpolate and correct readings automatically*
- *MA2411A Pulse Power Sensor has a rise time of <18ns needed for pulse radar measurements*
- *MA249XA Series Wideband Power Sensors have a video bandwidth of 20 MHz for accurate Peak Measurement on Radar and WLAN. These are also is ideal for Multi Pulse Radar or GPRS measurements.*

Standard diode sensors

Diode sensors have greater speed, sensitivity and dynamic range than thermal sensors (see fig. 1). All Anritsu diode sensors use a dual diode architecture that gives improved sensitivity and dynamic range over single diode architectures. The MA2470D Series Power Sensors 90 dB dynamic range is both fast and accurate. Linearity is better than 1.8%, typically < 1.0% through 18 GHz.

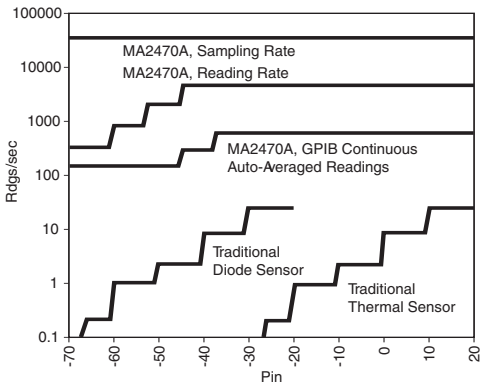

Fig. 1 Standard Diode Sensors

MA2470D power sensors offer an ideal combination of speed and dynamic range for general purpose power measurements. A single sensor replaces the two sensors that were previously required with sensors limited to 50 dB dynamic range. These sensors can be used with any Anritsu power meter.

High accuracy diode sensors

The Anritsu MA2440D series high-accuracy diode sensors have a built in 3 dB attenuator to minimize input SWR thus minimizing measurement uncertainty. They are used where the best 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. These sensors can be used with any Anritsu power meter.

Fast diode sensors

The MA2460D fast diode sensors from Anritsu have a rise time of 0.6 μs. This, together with a sensor video bandwidth of 1.25 MHz, makes them the ideal solution for power measurements on N-CDMA (IS-95) signals. The MA2460 sensors must be used with the ML2480A/90A series power meters. This combination of meter and sensor provides fast signal processing and sampling speeds. Average power, peak power and crest factor on N-CDMA signals can be measured and displayed. The MA2460 are dual diode sensors that deliver a greater-than 80 dB dynamic range, which makes them suitable for both open- and closed-loop power-control testing.

Pulses down to 1 μs can also be captured and displayed, thanks to the sensor rise time of 0.6 μs. In profile mode the meter can be used to measure average power across narrow pulses, an increasingly common test method for amplifiers in digitally modulated systems.

Universal power sensors

The new MA2480D series Universal Power Sensors will measure any modulated or multi-tone signal, thanks to a patented sensor architecture with three diode pairs (see fig. 2). 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.

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 CW 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. These sensors can be used with any Anritsu power meter. However ML2430A series power meters are recommended for modulation measurements.

Wideband sensors

The new MA2490A and MA2491A sensors from Anritsu have rise time of 18 ns and are ideal for Radar, WLAN, Edge, and WCDMA applications. MA2490A and MA2491A are 8 GHz and 18 GHz sensors with 20 MHz video bandwidth. The sensor is equipped with a chopper circuit that allows it to measure CW/average power as low as -60 dBm. Both the sensors must be used with ML2487/88A and ML2490A series Power Meters, specially designed to handle high-speed sampling rates up to 64MS/s.

Pulse sensor

The wideband sensor MA2411 is a 40 GHz diode sensor with 50 MHz video bandwidth. This sensor is not fitted with chopper circuit, and therefore mainly is a pulse-profiling sensor. A rise time of 7 nS along with 50 MHz video bandwidth, makes this sensor ideal for Radar applications. The ML2490A series power meter is recommended for this power sensor. However, this power sensor can be used with ML2480A series power meters but the band width will be limited to 20 MHz.

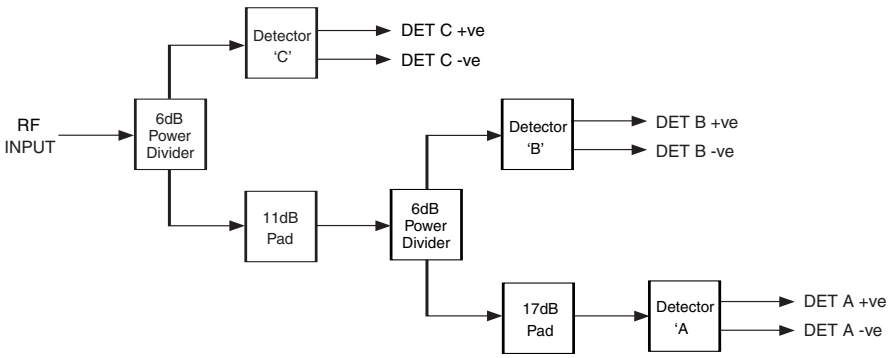

Fig. 2 Universal Power Sensor

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MA2400A/D Series 10 MHz to 50 GHz

Specifications

Model	Frequency range	Dynamic range (dBm)	SWR	Rise time①	Sensor linearity	RF connector②
Standard diode sensors						
MA2472D	10 MHz - 18 GHz	–70 to +20	<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 ms	1.8%, <18 GHz 2.5%, <40 GHz 3.5%, <50 GHz	N (m)
MA2473D	10 MHz - 32 GHz					K (m)
MA2474D	10 MHz - 40 GHz					K (m)
MA2475D	10 MHz - 50 GHz					V (m)
High accuracy diode sensors						
MA2442D	10 MHz - 18 GHz	–67 to +20	<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 ms	1.8%, <18 GHz 2.5%, <40 GHz 3.5%, <50 GHz	N (m)
MA2444D	10 MHz - 40 GHz					K (m)
MA2445D	10 MHz - 50 GHz					V (m)
Fast diode sensors						
MA2468D③	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	< 0.001 ms	1.8%	N (m)
MA2469D③	10 MHz - 18 GHz					
Universal power sensors						
MA2481D	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	<0.0004 ms (with option 1 only)	10 MHz to 6 GHz 3% –60 to +20 dBm 6 to 18 GHz 3% to 18 GHz 3.5% 0 to +20 GHz 3% (1.8% CW with option 1)	N (m)
MA2482D	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.					
Wideband sensors						
MA2490A④	50 MHz - 8 GHz	–60 to +20 CW Mode –20 to +20 Peak Pulse Mode	<1.17; 50 - 150 MHz <1.12; 0.15 - 2.5 GHz <1.22; 2.5 - 8 GHz	<18 ns	<7% 50 - 300 MHz <3.5% 0.3 - 8 GHz	N (m)
MA2491A④	50 MHz - 18 GHz		<1.17; 50 - 150 MHz <1.12; 0.15 - 2.5 GHz <1.22; 2.5 - 12.4 GHz <1.25; 12.4 - 18 GHz		<7% 50 - 300 MHz <3.5% 0.3 - 18 GHz	
Pulse sensor						
MA2411A④	300 MHz - 40 GHz	–20 to +20	<1.15; 0.3 - 2.5 GHz <1.35; 2.5 - 26 GHz <1.50; 26 - 40 GHz	<8 ns <18 ns when used with ML2487/8A	<4.5% 0.3 - 18 GHz <7% 18 - 40 GHz	K (m)

① 0.0 dBm, room temperature.

② Each MA24XXA/D series sensor incorporates precision RF connectors with hexagon coupling nut for attachment by industry standard torque wrench.

③ MA2460D Fast Diode Sensors must be used with ML2480A/90A series Power Meters for NCDMA and Fast Pulse measurements.

④ These power sensors must be used with ML2480A/90A power meters.

Temperature range: 0°C to 50°C

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Ordering information

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

Model/Order No.	Name
	High Accuracy Sensor
MA2442D	10 MHz to 18 GHz
MA2444D	10 MHz to 40 GHz
MA2445D	10 MHz to 50 GHz
	Fast Diode Sensor
MA2468D	10 MHz to 6 GHz
MA2469D	10 MHz to 18 GHz

Model/Order No.	Name
	Power Sensor
MA2472D	10 MHz to 18 GHz
MA2473D	10 MHz to 32 GHz
MA2474D	10 MHz to 40 GHz
MA2475D	10 MHz to 50 GHz
MA2481D	Universal Power Sensor, 10 MHz to 6 GHz
MA2482D	Universal Power Sensor, 10 MHz to 18 GHz
MA2480/01	Option 1, Universal Power Sensor CW Option
MA2400/98	Z540/Guide 25 Calibration
MA2400/99	Premium Calibration
MA2497A	Agilent (HP) Sensor adapter
MA2499B	Anritsu Sensor 10 to 12 pin Adapter
	Wideband Sensor
MA2490A	50 MHz to 8 GHz
MA2491A	50 MHz to 18 GHz
	Pulse Sensor
MA2411A	300 MHz to 40 GHz