

**Agilent**

## N8262A P-Series Modular Power Meter and Power Sensors

### Technical Overview



## “Future Proof” Power Meter

The N8262A P-Series modular power meter contains features such as:

- ✓ LXI Class-C compliance with built-in Ethernet
- ✓ Equivalent P-Series bench instrument performance
- ✓ Measurement speed of 1500 readings/s
- ✓ Online instrument page enables remote control of power meter

The N8262A P-Series modular power meter has equivalent P-Series bench instrument performance such as:

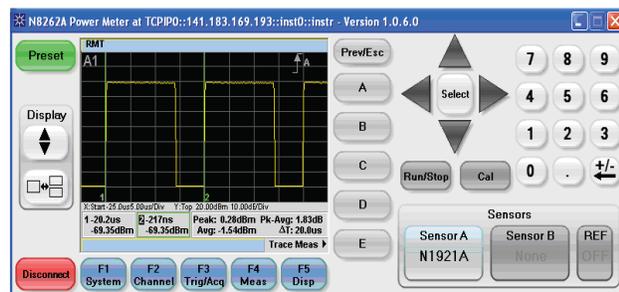
- 30 MHz video bandwidth
- Real time or continuous sampling rate of 100 M-samples/s
- Zero and calibrate while sensor still connected to the DUT
- Peak, average, peak-to-average ratio power measurements
- Comprehensive pulse parameters measurements include rise time, fall time, pulse width and pulse period measurements
- High speed Complementary Cumulative Distribution Function (CCDF) measurements

The N8262A P-Series modular power meter also comes with system-ready software such as:

- ✓ Instrument page that provides instrument setting at a glance and enable remote access/control
- ✓ A user-familiar graphical user interface that provides P-Series N1911/12A front panel display emulation
- ✓ IVI drivers that is used for test software development to work with your choice of programming languages (Agilent VEE, LabView, Lab Windows, C, C++, C#, VB and Matlab®)
- ✓ Optional PC analysis software (N1918A Power Analysis Manager) that is used for complex pulse analysis, statistical analysis, multi-channel analysis, recording and playback capability, and other features.

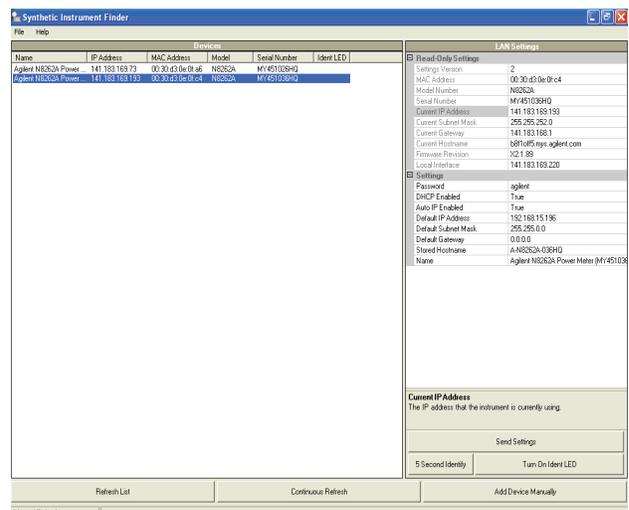
For further details, refer to the *N8262A P-Series Modular Power Meter and Power Sensors Data Sheet*, Literature number 5989-6605EN.

### P-Series Soft Front Panel



**Figure 1.** A user-familiar graphical user interface that provides P-Series N1911/12A front panel display emulation

### Synthetic Instrument Finder



**Figure 2.** Synthetic Instrument Finder to detect and configure the IP address of the instrument

## It's Time To Put the Power of Ethernet to Work in Test System

The N8262A P-Series modular power meter is an LXI (LAN eXtensions for Instrumentation) Class-C compliance instrument which combines the advantages of Ethernet with simplicity and familiarity of GPIB. This helps the test systems designers and integrators to create a faster and more efficient systems.

The P-Series modular power meter reduces the time needed to setup, configure and debug test systems. It offers nine distinctive advantages:

- ✓ Designed for Test Standardization and Interoperability
- ✓ Smaller size and weight with equivalent bench instrument performance and features
- ✓ Reduced overall cost of ownership or start up cost for automatic test systems
- ✓ Enable remote control/access of the instrument
- ✓ Comprehensive power, time and statistical measurements
- ✓ Flexible configurations
- ✓ External calibration-free measurements
- ✓ Simplified test setup
- ✓ Convenience and security

### Designed for Test Standardization and Interoperability

The P-Series modular power meter enables fast, efficient and cost effective creation. It also enables re-configuration of test system with proven and widely used standards such as Ethernet, Web browsers and IVI drivers. The codes are transferable/reusable from design and development industry to manufacturing.

Best of all, the same test system software can be leveraged across industries such as Research and Development (R&D), design validation, manufacturing and services. By using the same software, test development time can be cut down significantly for new products to be marketed earlier. It also helps to provide more consistent results from development to production and prevent time wasted in correlating measurements results and finding the cause of differences.

The use of industry standard drivers such as IVI drivers enables user to use any programming languages that they are familiar with. Therefore, it is hassle-free and effective when P-Series modular power meter is used during instrument communications.

### Smaller size and weight with equivalent bench instrument performance and features

When space is a constraint in your test system environment, you do not need to sacrifice features, accuracy or performance to fit in the instrument. The compact and footprint P-Series modular power meter provides equivalent benchtop power meter performance.

**Reduced Overall Cost of Ownership or Start Up cost for Automatic Test Systems**

The LXI compliance P-Series modular power meter helps to reduce the overall cost of ownership by eliminating the needs of expensive shared power supplies, cardcages and Slot-0 module (or system controller), that are needed in both VXI and PXI platforms. Hence, the LXI modular power meter only needs a thin, flexible low cost cable terminated in an inexpensive plastic-bodied RJ-45 connectors to enable its connection with other equipments.

**Enable Remote Control/Access of the instrument**

Set up of power meter is possible through an informative instrument page where you can access with a standard Web browser. This page contains key information such as the manufacturer, model number, serial number, description, hostname, a MAC address and IP address. Hence, you are able to change the parameters by typing the instrument's IP address in the Web browser. Remote access of test data is also possible with a soft front panel graphical user interface that comes together with the modular power meter in the standard package.

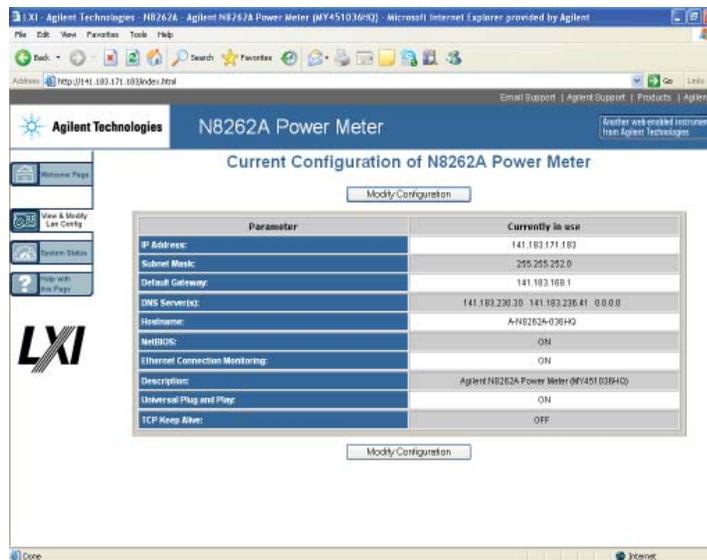


Figure 5. Webpage browser - View and Modify LAN Configuration



Figure 6. Instrument Webpage browser that provides instrument setting at a glance and enable remote access/control

## Comprehensive Power, time and Statistical Measurements

The advance of electronic devices demanded for more stringent power requirements. Agilent N8262A P-Series modular power meter delivers wide bandwidth, accurate and repeatable power measurements to ensure that your products confidently meet their specifications.

The P-Series modular power meter has a 30 MHz video bandwidth and best-in-class sampling rate of 100 M-samples/s continuous sampling rate for fast, accurate and repeatable power measurements. When used with the P-Series power sensors they provide up to 40 GHz frequency coverage, -35 dBm to +20 dBm wide dynamic range, and extensive measurement capability that is optimized for aerospace/defence, wireless communication and wireless networking (IEEE 802.11a/b/g) applications.

The comprehensive measurements include:

- ✓ Peak power, average power and peak-to-average power measurements
- ✓ Time gated and free run modes
- ✓ Automatic rise time, fall time, pulse width, pulse period, time to positive occurrence, and time to negative measurements
- ✓ Complementary cumulative distribution function (CCDF) statistics

## External calibration-Free Measurement

The P-Series power sensors are the first to provide “internal zero and calibration” which eliminates the need for sensor calibration using an external reference source. With Agilent’s patented technology that integrates a DC reference source and switching circuits into each power sensor, it allows you to zero and calibrate the sensor while still connected to the device under test. This feature removes the need for connection and disconnection from the calibration source. Therefore, it helps to reduce test times, measurement uncertainty and wear and tear problems on connectors, especially when it is used in manufacturing and automated test environment where every second and every connection counts. Sensors can be embedded within test fixtures without the need to switch in reference signals.

## Simplified test Setup

The P-Series modular power meter is loaded with time saving features. Pre-defined test setups for common measurements (see Figure 7) used in radar and wireless communication applications gets you started testing, and its easy-to-use menu structure lets you step quickly through measurement sequences.

Once you start a measurement, it is easy to fine-tune, and save the setup for your unique requirements.

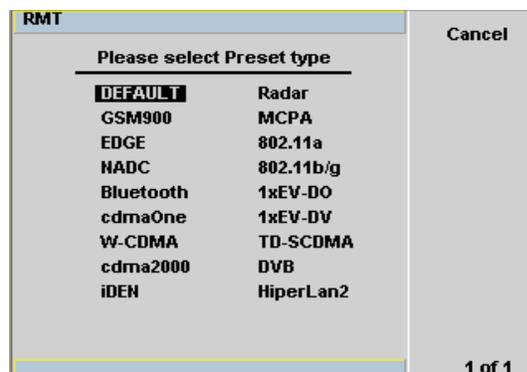


Figure 7. Predefined test setups

## Convenience and Security

*Agilent IO Libraries Suite* shipped with the P-Series modular power meter helps you to establish a quick and an error-free connection between your PC and instruments regardless of the vendor. It provides robust instrument control and works well with the software development environment of your choice.

The P-Series modular power meter provides a *10/100BaseT LAN interface* as standard for remote operation and download of test results.

A *two year calibration cycle* on the P-Series modular power meter helps to reduce the cost of ownership.

A *universal line input* allows you to plug into any supply voltage without additional hardware adjustments, and multiple sensor cable length options (1.5 m, 3 m and 10 m) make it easy to reach out-of-the-way devices in a variety of test environment.

*Save your display information* using either a PC and SCPI commands, or through the N1918A Power Panel, Basic Analyzer Software that is shipped as standard with the power meter. The test results can be downloaded in the form of bitmap or data points in excel format for further processing.

*Secure mode* protects sensitive data by erasing it from instrument memory all user parameters including save/recall states and power on last states.

## Flexible Configurations

The P-Series modular power meter is compatible with a wide range of Agilent power sensors that allows you to choose a sensor that meets your application:

### **Peak and average power measurements:**

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N1921A wideband power sensor, 50 MHz to 18 GHz, -35 to +20 dBm, with internal zero and calibration

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N1922A wideband power sensor, 50 MHz to 40 GHz, -35 to +20 dBm, with internal zero and calibration

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E9321/25A peak and average power sensor, -45 to +20 dBm<sup>1</sup>

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E9322/26A peak and average power sensor, -39 to +20 dBm<sup>1</sup>

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E9323/27A peak and average power sensor, -36 to +20 dBm<sup>1</sup>

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### **Average and CW power measurements:**

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All E9300 average power sensors, 80 dB dynamic range

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All E4410 CW power sensors, 90 dB dynamic range

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All 8480 Series sensors, 50 dB dynamic range

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1. With video bandwidth set to 'Low', compatibility with E9320 sensors is available in next firmware release.

## Optimized for Aerospace and Defence Automatic Test System

The P-Series modular power meter utilizes an open software architecture that helps to reduce the overall cost of ownership and support costs due to instrument obsolescing. Time to deployment of test system is further speed up with reduced in test development time required to setup an automatic test system (ATS). The small size power meter makes the transportation of ATS in the aircraft easier for troubleshooting of the aircraft electronics systems. It is easier to configure the ATS to perform multiple measurements.

## Optimized for Radar Testing



If you design or manufacture components and subcomponents for radar systems, you need a way to accurately measure the output power and timing parameters of the radar pulses. The P-Series modular power meter and sensors provide a cost-effective peak and average power solution that is ideal for the task. With warranted performance that includes up to 40 GHz frequency range, a 30 MHz bandwidth and  $\leq 13$  ns rise and fall time, the P-Series covers most of today's high frequency radar test applications.

## Ideal in the Lab and Manufacturing

In the lab or on the manufacturing floor, you can use the P-Series modular power meter and sensors to check that pulses in radar transmit or receive modules conform to a specified amplitude and shape. You can focus your measurements on a single pulse or on a train of hundreds or even thousands of pulses. Use real-time markers and other features to help you determine whether the pulse power is degrading or the pulse shape is changing over time.

Comprehensive measurements are built in: peak, average, peak-to-average ratio, time and instantaneous power at markers 1 and 2 (see Figure 7), time measurements comprising rise time, fall time, pulse width, pulse period, time to positive occurrence, time to negative occurrence and pulse repetitive frequency (see Figure 8). While the power meter and sensor combination makes an excellent standalone power measurement system, the drivers included in the system make it easy to integrate into other systems in an automatic test equipment (ATE) environment.

**Measure the time delay between your trigger event and the pulse envelope**

Automatic measurement of the time to positive occurrence allows you to verify the delay time between the trigger event using the pulse modulator to drive the power meter’s external trigger and the RF output of your transmitter.

**Remote capture of up to 10 pulses**

For ATE applications, using SCPI commands, you can automatically measure the important time parameters of pulse duration, separation and period on a capture of up to 10 pulses.

**Alternative to a peak power analysis system**

By providing comprehensive, accurate, and repeatable power measurements in a small form factor that is well-suited for R&D and manufacturing test, the P-Series modular power meter and sensors are a viable alternative to a peak power analysis system and at an attractive price point.

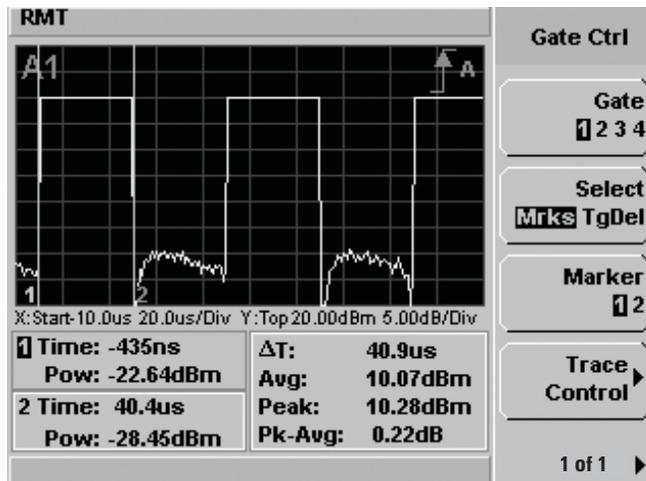


Figure 8. Marker 1 and 2 time and power, with  $\Delta$  time and power measurements between markers

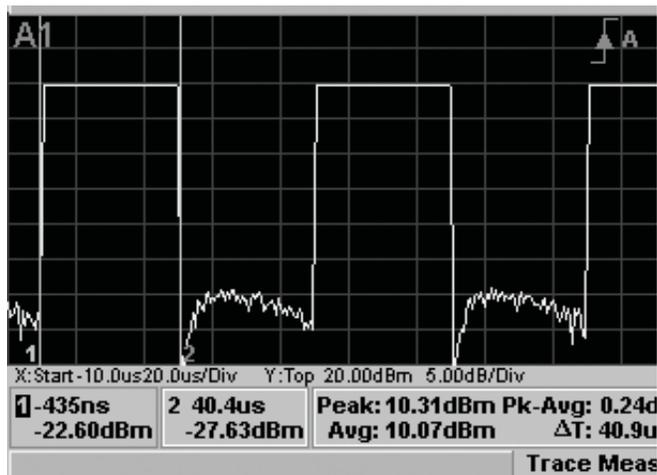


Figure 9. Comprehensive time measurements: comprising rise time, fall time, pulse width, pulse period, duty cycle, time to positive and negative occurrences and pulse repetitive frequency.

## Optimized for Multi-channel Power Amplifier (MCPA) Testing



The base stations that support today's high capacity wireless networks must handle a growing number of data channels. Rather than incorporate a separate amplifier for each channel in the system, engineers are streamlining their designs by using multi-channel power amplifiers (MCPAs). If you are designing or manufacturing MCPAs, you need a wide bandwidth tool that can measure the peak and average power or peak- to-average ratio to verify that your product does not exceed maximum power specifications. The P-Series modular power meter and sensors offer a complete power measurement solution with a 30 MHz bandwidth. It can measure peak and average power of up to six 3G (5 MHz) carriers over a wide  $-35$  to  $+20$  dBm dynamic range, more than enough for power amplifier testing today and in the future.

### Accurate power measurements

The accuracy of power measurements is a major concern in high data rate wireless applications. With the P-Series products, you can accurately measure the linearity of power amplifiers (input power versus output power) at the 1 dB compression point.

The P-Series flat video bandwidth helps to ensure the accuracy of your peak and peak- to-average ratio power measurements. Agilent characterizes the P-Series sensors over their specified temperature, frequency and power ranges. These correction factors are stored in EEPROM, so that along with an average power measurement accuracy specification of  $\leq \pm 0.2$  dB (refer to Data Sheet 5989-6605EN) you do not have to worry about the effects of error on your measurement.

### Multi-level, TDMA power testing made easy

The P-Series modular power meter provide four independent time gates (A1-A4) in a single measurement setup (see Figure 10) so you can choose where you locate your measurements of peak, average, and peak- to-average ratio on the trace.

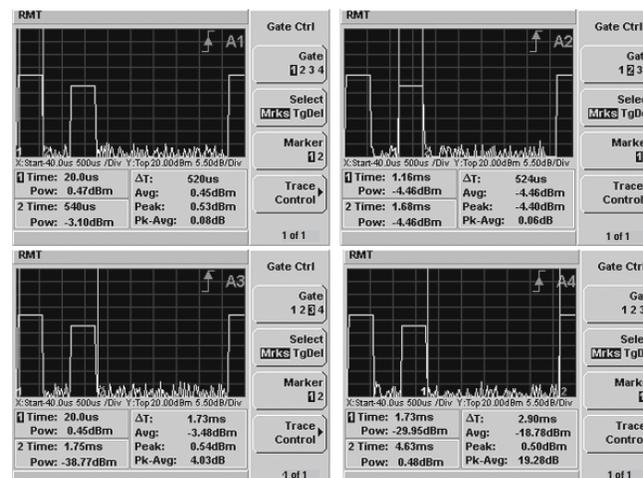


Figure 10. Measurement flexibility with 4 independent time gates

## Optimized for Wireless LAN and WiMAX Testing



If you are designing wireless LAN (IEEE 802.11a/b/g) or WiMAX (802.16e) components and subsystems, you will need to analyze bursted signals. With 30 MHz of video bandwidth, the P-Series modular power meters and sensors can capture signal bursts and measure the peak- to-average ratio of the transmitted power in your WLAN or WiMAX products.

You can verify the power profile and output power of WLAN components easily with the P-Series solution. The WiMAX and WLAN presets will help you to capture unpredictable burst signals easily, though the parameters of the signal is unidentified.

By measuring the signal's rise time and checking the burst profile, you can identify any power transitions that could cause interoperability problems. Measuring the peak- to-average ratio and CCDF enable you to verify that a power amplifier is not clipping.

## Versatile for R&D and manufacturing

The P-Series power modular meter and sensors can measure all IEEE 802.11 WLAN signals. They can be used in developing HiperLAN and HomeRF network devices as well. In component manufacturing, time is always money. This is true in the high volume production of wireless network devices and products where fast measurement speed is essential to maximize throughput. Minutes can be shaved from overall test times by combining the internal zero and calibration capability with the fast measurement speeds achieved through LAN interface for data transfer.

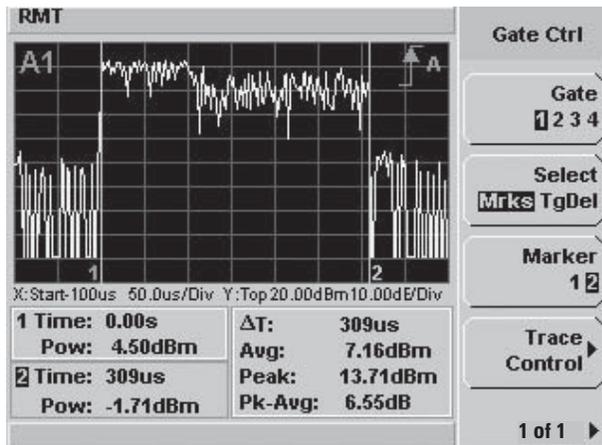


Figure 11. WiMAX burst signal capture

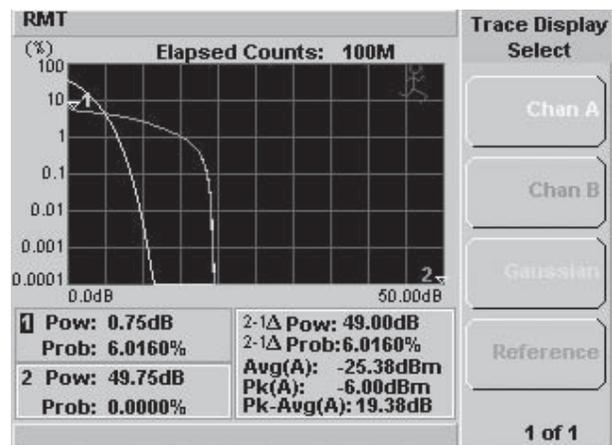


Figure 12. CCDF statistical measurements

2. This feature will be made available in future.

## Related Literature

*Agilent N8262A P-Series Modular Power Meter and Power Sensors, Data Sheet*  
Literature Number 5989-6605EN

*Agilent N8262A P-Series Modular Power Meter and Power Sensors, Configuration Guide*  
Literature Number 5989-6608EN

*Fundamental of RF and Microwave Power Measurements (Part 1), Application notes 1449-1,*  
Literature number 5988-9213EN

*Fundamental of RF and Microwave Power Measurements (Part 2), Application notes 1449-2,*  
Literature number 5988-9214EN

*Fundamental of RF and Microwave Power Measurements (Part 3), Application notes 1449-3,*  
Literature number 5988-9215EN

*Fundamental of RF and Microwave Power Measurements (Part 4), Application notes 1449-4,*  
Literature number 5988-9216EN

*4 Steps for Making Better Power Measurements, Application note 64-4D,* Literature number 5965-8167EN

*Choosing the Right Power Meter and Sensor, Product note,*  
Literature number 5968-7150E

To find out more about P-Series modular power meter and sensors product features, visit our Web site at

[www.agilent.com/find/N8262A](http://www.agilent.com/find/N8262A)



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