Agilent
N8262A P-Series Modular Power Meter

Demo Guide

Agilent Technologies

Introduction

This demonstration guide will help you gain familiarity with the basic functions and important features of Agilent N8262A P-Series modular power meter. All demonstration exercises in this guide requires the Agilent N8262A P-Series modular power meter, N1921A (50 MHz - 18 GHz) wideband power sensor (30 MHz bandwidth) and Agilent ESG E4438C Series RF signal generator.

This demonstration guide will include:

* A step-by-step demonstration on basic power measurement GSM900 and time-gating measurement.
* Ordering information
* Related literature

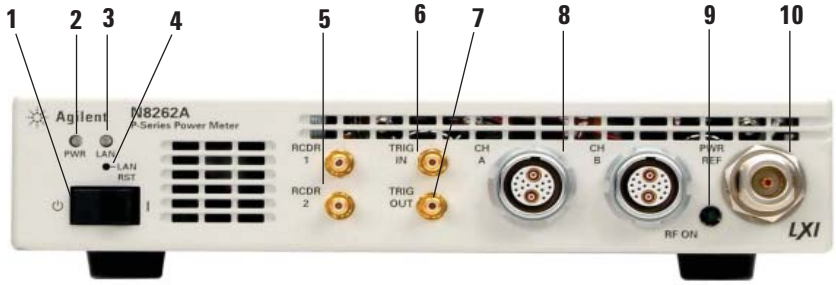

Figure 1. Front panel overview

Table 1. Front panel items descriptions

Item	Description
1	**Power ON/OFF Switch:** To switch the instrument between On and Standby mode.
2	**PWR LED:** To indicate the power status of the instrument. **Orange:** Instrument is OFF and in Standby mode. **Green:** Instrument is OFF and ready to use.
3	**LAN LED:** To indicate the LAN communication between instrument and LAN. **Red:** LAN is not connected to the instrument. **Green:** LAN is connected to the instrument. When LED is blinking, it indicates that the LAN is communicating with the instrument.
4	**LAN RST:** Allows user to reset the LAN configuration if the IP address is missing.
5	**RCDR 1 and RCDR 2:** DC Recorder Output, 0 to 1 Volt. Allows user to monitor the output power whereby the Recorder Outputs will output the corresponding voltage for the measurement that user sets on the Upper/Lower window of the power meter.
6	**TRIG IN:** Trigger Input accepts a TTL signal for initiating a measurement, via SMB connector.
7	**TRIG OUT:** Trigger Output is used to output a TTL signal for synchronizing with external equipment, via SMB connector.

Table 1. Front panel items descriptions (continue)

Item	Description
8	**CH A and CH B Connector**: Sensor input (Type-N connector (f), 50 ohms) operates with Agilent 8480 Series, E-Series (Except E9320 range) and P-Series sensors. Figure 1 shows the dual-channel modular power meter, N8262A.
9	**RF ON LED:** To indicate the calibrator is ON or OFF. **LED ON (Green):** Calibrator is ON. **LED OFF:** Calibrator is OFF.
10	**PWR REF:** 1 mW, 50 MHz source used for power sensor calibration (traceable to National Institute of Standard and Technology, NIST). The 1 mW power reference is provided for calibration of the Agilent 8480 Series and E-Series power sensors.

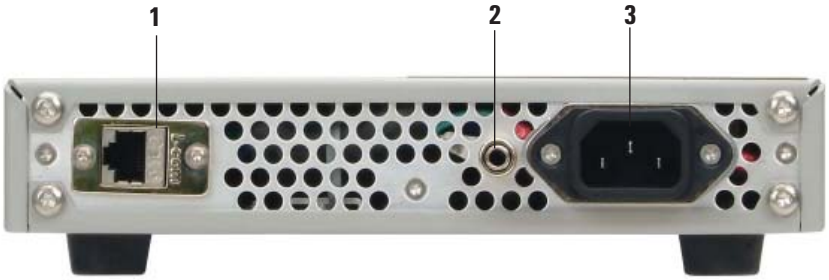

Figure 2. Rear panel overview

Table 2. Rear panel item descriptions

Item	Description
1	**LAN Port:** LAN interface allows communication with an external controller.
2	**Ground Connector:** For applications which requires a hard wired connection between the power meter's ground and a common ground.
3	**Line Power:** Universal input voltage range with automatic range selection.

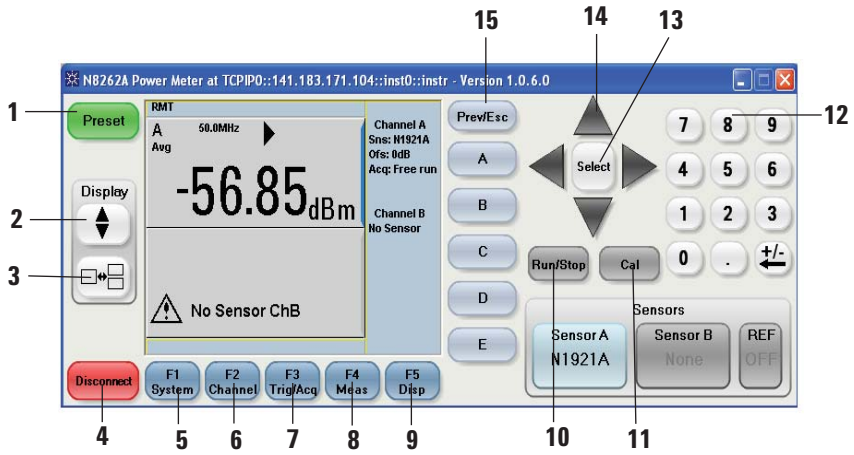

Figure 3. P-Series soft front panel

Table 3. P-Series soft front panel items descriptions.
Keystrokes represented by [ ].

Item	Description
1	**Preset:** To preset the power-meter. An option list of pre-installed measurement configurations is presented.
2	**DISPLAY up/down:** To select the upper or lower measurement window. The selected window is highlighted by a blue line on the right side of the window.
3	: To choose windowed, expanded, or full-screen display of a numeric measurement. It also provides quick access to the Gate Control screen and menu when a trace window is selected.
4	**Disconnect:** To switch off the soft front panel
5	**System:** To access general configuration-menus, such as IP address. You can also access the Self-Test and Table entry menus. The measurement screen remains visible.
6	**Channel:** To access the channel configuration menus. Channel parameters such as averaging and offsets are configured from this menu.
7	**Trig/Acq:** To access the triggering menu. Unless a P-Series Sensor is connected, all the menu softkeys are disabled (grayed out).
8	**Meas:** To setup relative measurements or set display offsets.
9	**Disp:** To access the measurement display menu. You can choose the displayed measurement resolution, units and display format.
10	**Run/Stop:** To start and stop the acquisition of the measurement.
11	**Cal:** To access the zero and calibration menus.
12	**Numeric softkey:** To enter numeric values in the pop-up fields.
13	**Select:** To select a highlighted field to allow data entry, check a checkbox and terminate entry of a popup list.
14	**Arrow softkey:** Use for navigation around the parameter entry screens.
15	**Prev/Esc:** To return to the previous screen. This softkey also cancels pop-up entry.

Demonstration Preparation

The following instruments and software are required in order to perform the basic power measurement GSM900 and time-gating measurement demonstration:

- Agilent ESG E4438C
- Agilent N8262A P-Series modular power meter
- P-Series wideband power sensor N1921A or N1922A
- Synthetic Instrument Finder software
- Power Meter GUI software
- PC
- LAN cable

Update your instrument's firmware and software to the latest version available at:

- www.agilent.com/find/
- www.agilent.com/find/esg
- www.agilent.com/find/N8262A

For Synthetic Instrument Finder and Power Meter GUI software, refer to:

* Power Reference CD (shipped with standard package).

Product type	Model number	Required option
Agilent ESG Vector Signal Generator	E4438C firmware revision C.04.60 or later	• 503 or 506 — frequency range • 601 or 602 — baseband generator
P-Series modular power meter	N8262A firmware revision A2.02.00 or later	
P-Series wideband power sensor	N1921A or N1922A	
Synthetic Instrument Finder		
Power Meter GUI		

Connecting the PC, ESG and N8262A

Instructions

1. Connect a PC (installed with the Synthetic Instrument Finder, Power Meter GUI software and Agilent I/O Libraries Suite) to the N8262A via LAN.
2. Set up a LAN interface connection by using Synthetic Instrument Finder and I/O Configuration of Agilent I/O Libraries.
3. Make necessary connections on the ESG, N8262A and sensors as shown in **Figure 4.** Perform the following steps in the next page to interconnect the ESG, N8262A and the N1921A sensor.

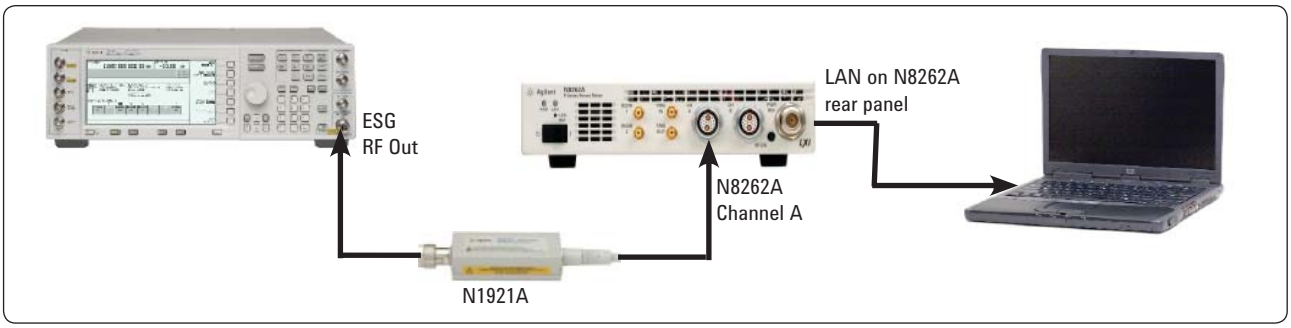

Figure 4. N8262A and ESG configuration diagram. A computer running with Synthetic Instrument Finder and Power Meter GUI software is connected to N8262A P-Series modular power meter (Network connection is used in this demonstration). The Channel A of N8262A is connected to RF Out of ESG with N1921A wideband power sensor.

Demonstration Preparation (continue)

In this demonstration, N8262A is connected via LAN through network. Synthetic Instrument Finder is used to establish the communication link via LAN between PC and N8262A.
Set "**DHCP Enabled**" of Synthetic Instrument Finder to "**True**".

Note:
If the N8262A is directly connect to PC (without go through network), a cross-over cable is required. Perform the following steps:

i) Set the "**DHCP Enabled**" from Synthetic Instrument Finder to "**False**".
ii) Assign the IP address to the N8262A (e.g.: 192.168.100.2)

Further detail refer to *P-Series Modular Power Meter Installation Guide, page 56 (Connecting Power Meter using Private Network).*

All demonstrations are done using the N8262A, P-Series soft front panel, Synthetic Instrument Finder and vector signal generator. Keystrokes surrounded by [ ] represents front panel hardkeys, while keystrokes surrounded by { } represents softkeys on display. Refer to Figure 3 for keystrokes represented by [ ] on the P-Series soft front panel.

Instructions	Keystrokes
Establish a communication link with the N8262A and P-Series soft front panel:	
1. Run the Synthetic Instrument Finder	Double-click on the Synthetic Instrument Finder shortcut on the desktop or access the program via Windows start menu.
2. Set up the N8262A network connection (See **Figure 5**)	From the "**DHCP Enabled**" pull down menu, select **{True}**. **{Send Settings}** for new effective changes. Click **{Turn On/Off Ident LED}** to identify the unit. Notice that the LAN LED will blink when the button is clicked.
3. Run the P-Series soft front panel	Double-click the Power Meter GUI shortcut on the desktop or access the program via Windows start menu.
4. Set up the P-Series soft front panel connectivity (See **Figure 7**)	From Synthetic Instrument Finder, right-click on N8262A and click **"Copy the VISA Address to clipboard (IP Address)"** or **"Copy the VISA Address to Clipboard (hostname)"**. Paste it into the Address box of P-Series soft front panel. Click **{Connect}**.

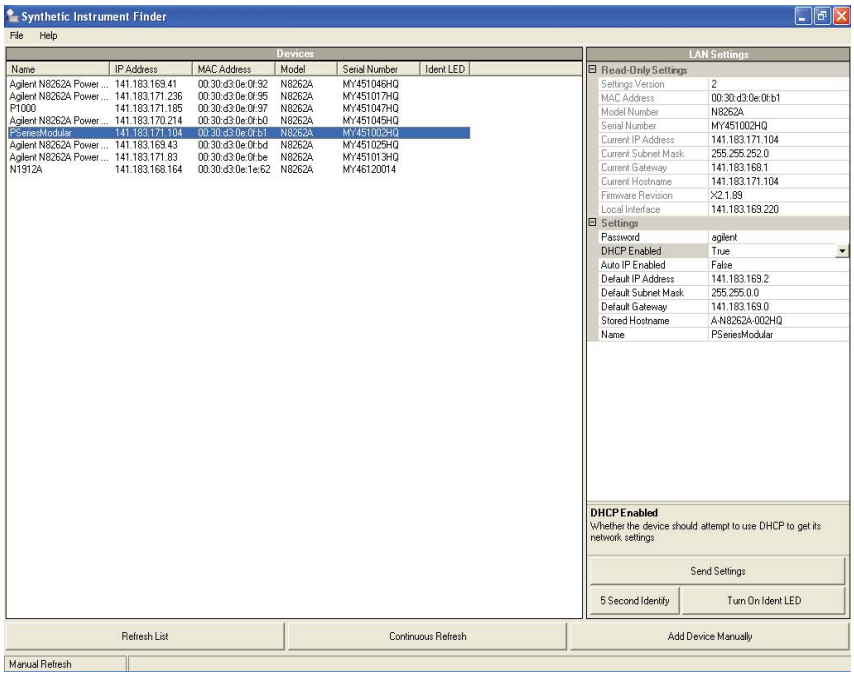

Figure 5. Synthetic Instrument Finder window. To detect and configure the IP address of the instrument. Double click on highlighted "**IP Address**" to open the web browser (see **Figure 6**).

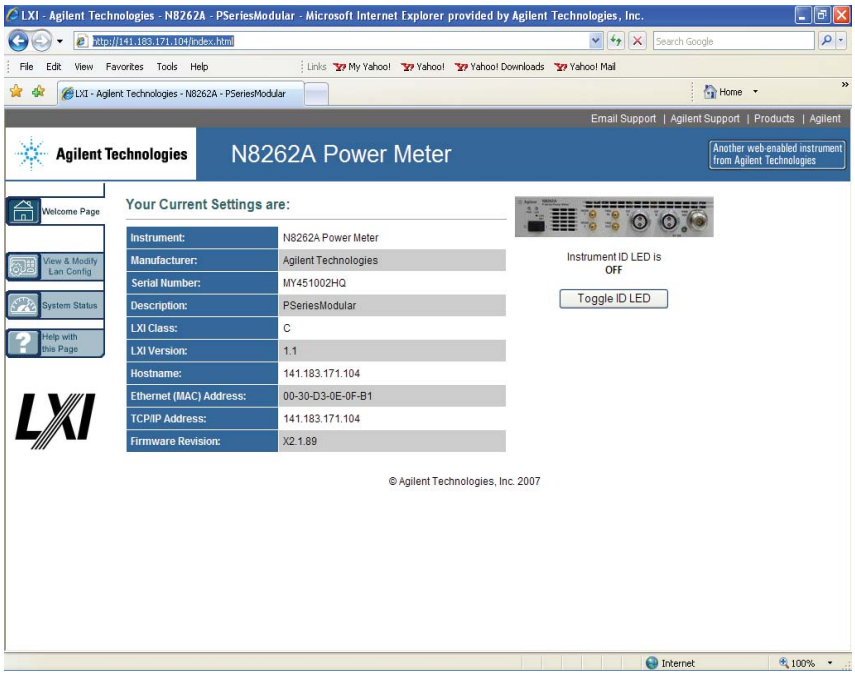

Figure 6. N8262A P-Series modular power meter web browser. Instrument on the network can be physically identified by clicking the **Toggle ID LED** in the web interface. This causes the instrument's front panel **LAN LED** to flash continuously until **Toggle ID LED** is clicked again.

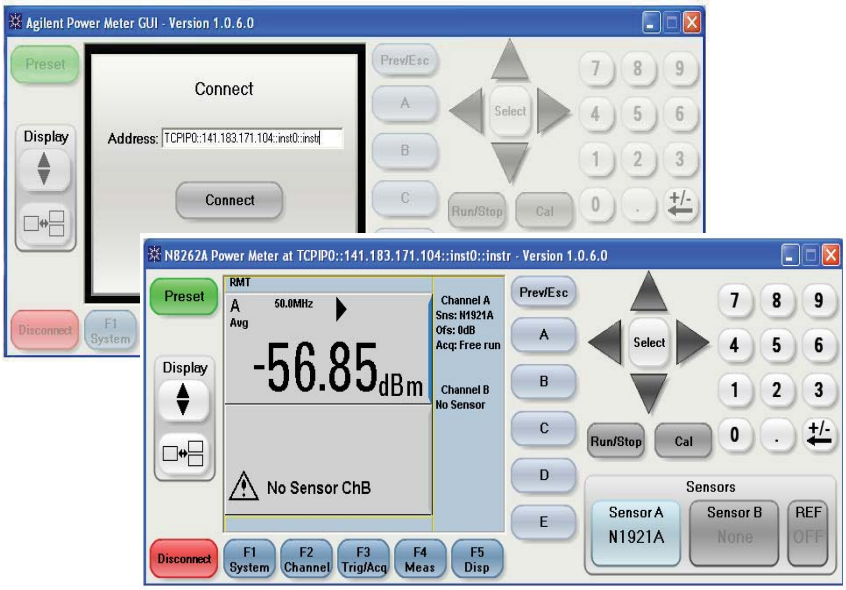

Figure 7. P-Series soft front panel

Basic Measurement: GSM900

To show the ability of the P-Series modular power meter (similar to P-Series power meter) to measure the average power in an active GSM900 timeslot *(i.e. useful part of the burst)* and demonstrate the trigger holdoff feature.

Instructions	Keystrokes
On the ESG:	
1. Setting the frequency and amplitude	Press **[Preset]** to preset the instrument. **[Frequency] [900], {MHz}.** **[Amplitude] [0], {dBm}.**
2. Selecting a GSM Signal	**[Mode], {Real Time TDMA}, {GSM}**, toggle **{GSM ON}.** Toggle **{Data Format Framed}.** Toggle **{Frame Trigger Continuous}.**
3. Activating GSM signal	Toggle **[RF On/Off]** to '**ON**'. Toggle **[Mod On/Off]** to '**ON**'.
4. Configure timeslot 3 to 'ON' *(To activate multiple GSM900 timeslots)*	**{Configure Timeslot}, {Timeslot #}, [3].** Toggle **{Timeslot Off/On}** to **'On'**. Toggle **{Timeslot Type}** to **'Normal'.**

The P-Series modular power meter is configured to show the power trace of the *GSM* signal in upper window, and average power in the Figure 8.

When considering a GSM900 signal with multiple active timeslots, stable triggering can be a problem. P-Series modular power meter offers a **Trigger Holdoff** facility to overcome this problem. After trigger event occurs, the trigger mechanism is disabled for the configured time period (the trigger holdoff period). This allows stable triggering to be achieved when a multiple edges signal occurs. For example, a TDMA signal with non- constant amplitude modulation and trigger holdoff values up to 400 ms can be configured.

Instructions	Keystrokes
Making a measurement using the GSM900 pre-defined setup via P-Series soft front panel:	
1. Select the GSM900 predefined preset value (See **Figure 8**).	**[Preset].** Use the arrow key to choose **{GSM900}. [Select] {Confirm}**
2. Change the trace setup to view the active timeslots (0 and 3). (See **Figure 9**)	[ ] **{Trace Control}, {X Start -200 μs}, {X Scale 400 μs}. {Y Max 10 dBm}, {Y Scale 4 dB}, {Gate Control}.** Expand the window display [ ]

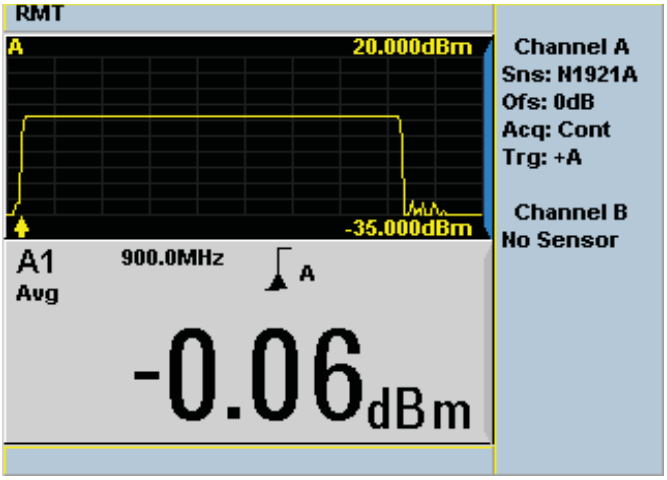

Figure 8. The display show the GSM900 data

Basic Measurement: GSM900 (continue)

The trace display is stable when trigger holdoff is set to 4.275 ms (default setting for GSM900). However by reducing the trigger holdoff such that it occurs before the rising edge of timeslot 3, the trace display will become unstable. For this example, to ensure that the trace display is stable, the trigger holdoff must be set greater than 2 ms.

Instructions	Keystrokes
On the P-Series soft front panel:	
1. Set the trigger holdoff to illustrate an unstable display (See **Figure 10**)	**[Trig/Acq], {Settings}, {1 of 2}, {Hold-off 1.5 ms}.**
2. Set the trigger holdoff to a stable display (See **Figure 9**).	**[Trig/Acq], {Settings}, {1 of 2}, {Hold-off 2 ms}.**

Figure 9. The display shows time slots 0 and 3 on (active)

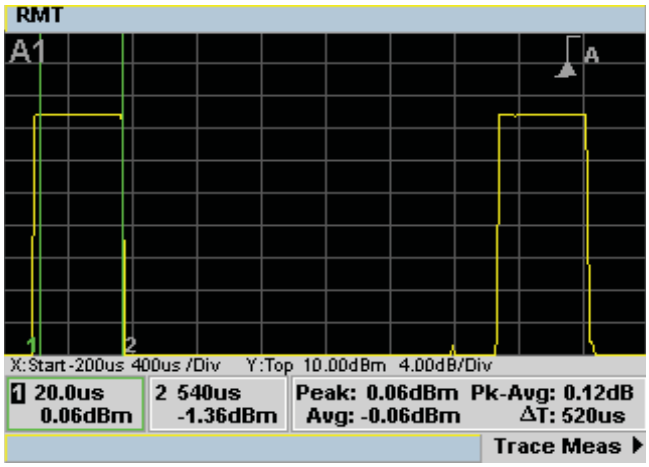

Figure 10. Unstable display compare to **Figure 9**.

Time-Gating Measurement

Similar to P-Series power meter, P-Series modular power meter offers extensive triggering facilities for making time-gated measurements. This allows useful average, peak and peak-to-average ratio measurements of complex modulation formats to be taken.

This demonstration shows the versatility of the time-gating features of P-Series modular power meter, by setting up four independent times gates on a TDMA signal to measure various power parameters, as shown in Figure 11. This figure illustrates a GSM900 pulse, where *Gate 2* provides the burst average power over the useful GSM time period and *Gate 1* indicates the peak-to-average power over the whole timeslot. A pulse droop measurement can be obtained from *Gate 4/Gate 3*.

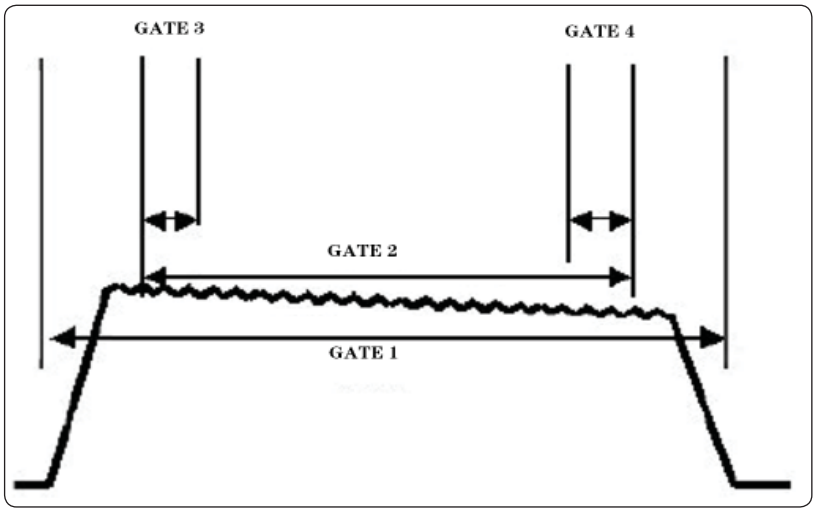

Figure 11. Powerful data configuration routines permit measurements during 4 gate time, each with 2 data "feeds" for display. Computed parameters such as peak-to-average ratio can also be displayed.

From Figure 11, time-gating is used to measure the average power of the useful period *(5% to 95% of the burst duration)*, peak power, peak-to-average ratio and pulse droop in a GSM900 signal.

Instructions	Keystrokes
On the ESG:	
1. Setup the GSM900 format for P-Series modular power meter and ESG E4438C.	**(Refer to ESG setup, Page 8)**

The four gates that are configured will setup to display and measure the burst average power, peak-to-average ratio and the pulse droop. The upper window is configured to display the burst power *(Gate 2)* and the lower window is configured to display the peak-average ratio *(Gate 1)* and the pulse droop *(Gate 4/Gate 3)*. (See Figure 12)

Instructions	Keystrokes
On the P-Series soft front panel:	
1. Select the GSM900 predefined preset value.	**[Preset]**. Use the arrow softkey to choose **{GSM900}. [Select] {Confirm}**
2. Setting up gates	**[Channel], {Gates Setup}**. Use the arrow softkey to select the gate and change its value. **Gate1 Start: 0 μs Length: 600 μs** **Gate 2 Start: 20 μs Length: 520 μs** **Gate 3 Start: 20 μs Length: 40 μs** **Gate 4 Start: 500 μs Length: 40 μs**
3. Set up measurement display	**Upper Window** Use the **DISPLAY up/down** softkey to highlight the upper window. **[Disp], {Disp Type}, {Single Numeric}.** **Lower Window** Use the **DISPLAY up/down** softkey to highlight the lower window. **[Disp], {Disp Type}, {Dual Numeric}.**

Time-Gating Measurement (continue)

Instructions	Keystrokes
On the P-Series soft front panel:	
4. Configure the measurement setup (See **Figure 12**).	**Upper Window** Use the **DISPLAY up/down** softkey to highlight the upper window. **[Meas].** Use the arrow softkey to highlight and change the value in **Feed1**: **{Combination SINGLE}. {Chan A}, {Gate 2}, {Meas Avg}.** **Lower Windows, Upper Line** Use the **DISPLAY up/down** softkey to highlight the lower window upper line. **[Meas].** Use the arrow softkey to highlight and change the value in **Feed1**: **{Combination SINGLE}. {Chan A}, {Gate 1}, {Meas Pk-Avg}.** **Lower Windows, Lower Line** Use the **DISPLAY up/down** softkey to highlight the lower window lower line. **[Meas].** Use the arrow softkey to highlight and change the value in **Feed1**: **{Combination Combined}. {Chan A}, {Gate 4}, {Meas Avg}.** Use the arrow softkey to highlight and change the value in **Feed2:** **{Combination Feed1/Feed2}. {Chan A}, {Gate 3}, {Meas Avg}.** Click [ ] to view results.

Figure 12. The display shows the GSM900 data

Ordering Information

The N8262A P-Series modular power meter ordering information.

Product type	Model number
P-Series modular power meter LXI-C compliance, dual channel	N8262A

For further information, refer to:

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

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 P-Series Wideband Power Sensors, Technical Overview
Literature Number 5989-6606EN

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

Product Web Site

For up-to-date information on complete application and product information, visit our product web site at:

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