Agilent
Wireless Connectivity Testing

Helping You
Connect the Wireless World

W M A N · W L A N · W P A N

Agilent Technologies

Helping You Connect the Wireless World

The last hundred years were all about wiring the world to reap the benefits of communication technology. Now technology is letting us pull the plugs and stay connected.

Connecting the wireless world

Wireless communications are connecting us, our homes, and businesses in new ways, and every day we become more reliant on wireless systems – from massive communication satellites to tiny RF identification tags; from global cellular networks to the hand-held, mobile devices that deliver our news, entertainment, personal messages, and more.

An unplugged world requires absolute confidence in the connections that replace the wires. That's where Agilent comes in. Our extensive portfolio of instruments, software, and systems has the solutions you need to ensure the wireless connectivity of your products.

Proven technology, trusted measurements

Agilent's wireless design and test solutions span the entire product-development life cycle, from R&D through manufacturing. These solutions address every major category of wireless networking, with well-defined road maps to incorporate emerging standards. Our extensive offerings presented here support wireless local area network (WLAN), personal area network (WPAN), and metropolitan area network (WMAN) technologies.

As one of the most successful players in the electronics test industry, Agilent has been focused for years on designing, integrating, testing, and certifying wireless products. We make sure that you get the measurements you need to verify that designs meet wireless functional specifications and that your products work before they ship.

What's more, our design tools, instruments and systems provide insight into your design and manufacturing processes that can help reduce the time, complexity, and cost of testing, without sacrificing the essential quality and reliability of your finished product. We know wireless, and we have the tools, technologies, and people to help make your product a success.

The right solution for every phase of wireless product development

Research and development

Simulation, characterization, and evaluation tools help you integrate and optimize wireless product designs more efficiently. Using Agilent products throughout the design and integration process speeds your time to market.

Integration and interoperability testing

Standards tell you what performance your product must achieve. But it's up to you to guarantee that your product will work as specified with products from other vendors. Agilent tools incorporate the latest industry-required measurements, and our products are found in many certification systems – so you can approach interoperability testing with confidence.

Manufacturing

Agilent helps you ship quality products by providing the tools, systems, and services you need to test chipsets, modules or devices quickly, accurately, and inexpensively.

Keeping pace with emerging technologies

Differentiating among the profusion of current and emerging standards for wireless networking can be a challenge. Agilent has products, education, and services to help you unravel the intricacies of these complementary technologies, including the following.

WiMAX – the emerging IEEE 802.16-2004 standards provide a wireless broadband connection that can replace DSL or cable modems as the medium for high speed Internet access. The range for WiMAX is 1 to 20 miles.
www.agilent.com/find/wimax

WLAN – the IEEE 802.11a/b/g WLAN (or Wi-Fi) standards connect multiple computers in a home or office, or at wireless hot spots, linking devices to a single Internet access point and to each other. The WLAN variants (802.11h/n/p) provide different data rates and networking schemes, generally at distances to 300 feet.
www.agilent.com/find/wlan

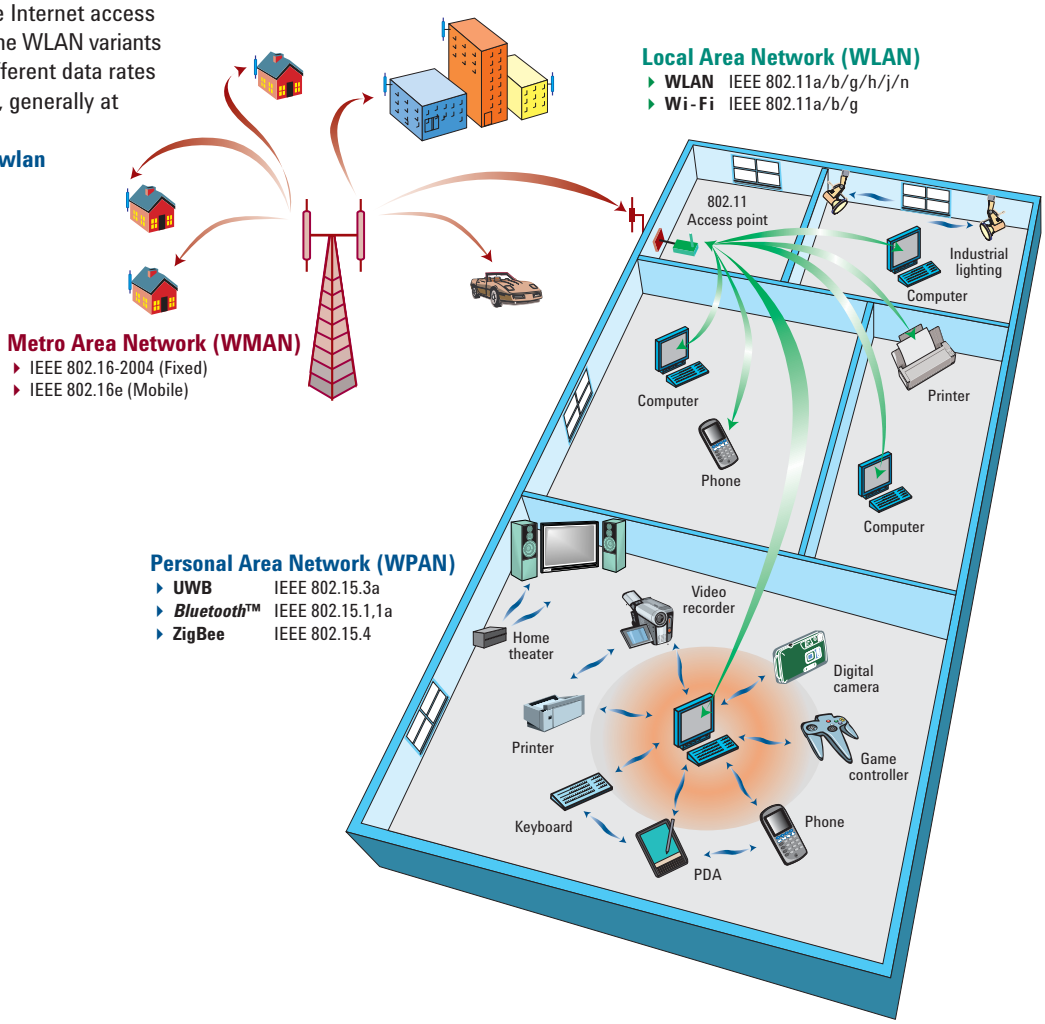
Bluetooth™ – the IEEE 802.15.1 standard is one of the first to provide an RF connection between two devices, allowing them to exchange information. *Bluetooth* lets you synchronize your computer and PDA, for example, or send a file to a printer over the air. Range is up to approximately 30 feet.
www.agilent.com/find/bluetooth

Ultra wideband – in wireless personal area networks, the IEEE 802.15.3a ultra-wideband (UWB) specification is being developed for home theater and wireless USB2 or 1394 (Firewire) applications up to 30 feet.
www.agilent.com/find/uwb

Other emerging wireless technologies such as radio frequency identification (RFID) and ZigBee extend the boundaries of wireless communication. Applications for RFID include product tagging for identification and tracking purposes. ZigBee applications include industrial and commercial monitors, sensors and automation.

There are also some new technologies being investigated to optimize the use of RF spectrum, such as multiple-input multiple-output (MIMO).

For more information, visit:
www.agilent.com/find/rfid
www.agilent.com/find/zigbee
www.agilent.com/find/mimo



THE RIGHT TOOLS FOR THE RIGHT TECHNOLOGY

We know wireless, and we have the tools you need to make your product a success. Agilent's design and test solutions span the entire product development life cycle, from R&D through manufacturing.

	WiMAX	WLAN	Bluetooth	UWB	ZigBee	Chipsets and components	Modules and adapters	Host appliances	R&D	Integration and interoperability	Manufacturing
Advanced Design System (ADS) software	■	■[1]	■[1]	■[1]	■	■			■		
89600 Series vector signal analysis software[2]	■[1]	■[1]	■[1]	■	■	■	■	■	■	■	■
N4010A wireless connectivity test set		■[1]	■[1]		■	■	■	■	■	■	■
ESA-E Series spectrum analyzers	■	■	■[1]		■	■	■	■	■	■	■
PSA Series spectrum analyzers	■	■[1]	■[1]	■	■[1]	■	■	■	■		
E4438C ESG and E8267D PSG vector signal generators	■[1]	■[1]	■[3]	■[4]	■	■	■	■	■	■	■
E8257D PSG analog signal generator	■	■	■	■		■	■	■	■	■	
N6030A arbitrary waveform generator						■	■	■	■	■	
E5052A signal source analyzer	■	■	■	■	■	■			■	■	
ENA and PNA Series network analyzers	■	■	■	■	■	■	■		■		■
16900, 1680 and 1690 Series logic analyzers	■	■	■	■	■	■	■	■	■		
54600 Series mixed signal oscilloscopes	■	■	■	■	■	■	■	■	■		
DSO80000 Series and 54830/850 Series Infiniium oscilloscopes	■	■	■	■	■	■	■	■	■		
66319B/D and 66321B/D mobile communications DC sources with battery emulation	■	■	■	■	■	■	■	■	■		■
E36xxA DC power supplies	■	■	■	■	■	■	■	■	■		■
P-Series and EPM-P Series power meters	■	■	■[1]		■	■	■	■	■	■	■
33220A/33250A function/arbitrary generators	■	■	■			■	■	■	■		■
E8421A wireless test fixture		■	■			■	■	■	■	■	■
TS-50 RF shielded test fixture	■	■	■	■	■	■	■	■	■	■	■
Z2049A wireless test fixture		■				■	■	■	■	■	■
93000 SOC Series test system		■	■			■					■
84000 RFIC Series test system		■				■					■
GS-8300 WLAN test system		■	■				■			■	■

1. Technology specific option available.
2. 89600 Series vector signal analysis software can be used with a variety of digitizers, including: PSA and ESA-E spectrum analyzers, N4010A wireless connectivity test set, oscilloscopes, logic analyzers and VXI.
3. Technology specific option available for the ESG only.
4. Technology specific option available for the PSG only.

RESEARCH & DEVELOPMENT

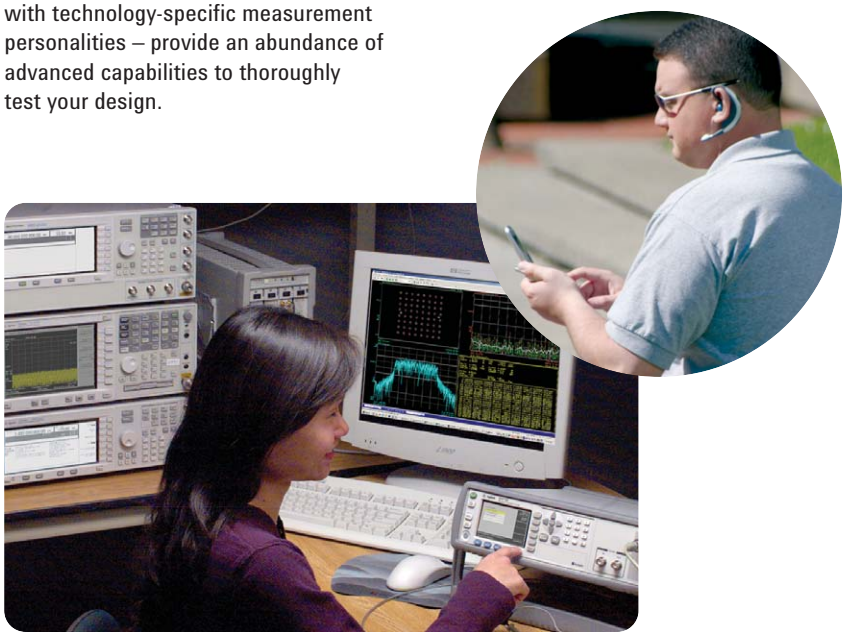
Whether you are working on chipset design, module and adapter development or host appliance development, Agilent can help you get your designs from concept to customer faster. Only Agilent delivers a complete, integrated R&D design and test environment, including simulation, characterization, and evaluation tools.

Chipset design

How do you obtain usable data about the performance of the WLAN or WiMAX chipsets you're designing? Will your new integrated circuit design for a *Bluetooth* transceiver meet the standard's RF specification and pass qualification? How will you analyze your UWB signal? Agilent removes some of the guesswork. Our Advanced Design System (ADS) software combines simulation and troubleshooting capability so you can test and fix your design before it is released downstream. Agilent's RF and digital test equipment – many with technology-specific measurement personalities – provide an abundance of advanced capabilities to thoroughly test your design.

Module and adapter development

When you integrate a chipset or baseband unit into a wireless module, it is often the first instance of a complete, working radio. You need to verify that the module will work properly and meet all measurements required by the standard. Agilent provides test tools to make all of the required parametric tests. If the module does not meet specification, Agilent provides additional troubleshooting tools so you can get the information you need to resolve the issue.



Host appliance development

Integrating a qualified wireless module into a host device raises questions. Will the transceiver affect the performance of the host device? What about power supply noise and pulsed current usage from the TDMA system? Many host appliances are not traditionally "wireless". Whether you are a wireless guru or want to strengthen your wireless knowledge, Agilent can help. Agilent is an expert in wireless, providing tools and information resources to help you be successful in connecting the wireless world.

WiMAX: WMAN is ready for action

IEEE 802.16-2004 is a RF technology that offers fixed broadband wireless access systems employing a point-to-point or point-to-multipoint architecture and covering a variety of physical (PHY) layers. The products coming to market are commonly called "WiMAX" products and are promoted by the WiMAX Forum. Today, the majority of WiMAX implementations will utilize 256 OFDM, up to 20 MHz bandwidth, and frequencies below 11 GHz.

The WiMAX Forum is a group of industry leaders whose goal is to facilitate the deployment of products based on the IEEE 802.16 standard. The WiMAX Forum will define a certification process to ensure WiMAX (IEEE 802.16-2004) network deployment will be seamless and successful. CETECOM has been selected as the official certification laboratory and plans to begin certification testing in July 2005.

INTEGRATION AND INTEROPERABILITY TESTING

Integration is a critical phase in the development of a wireless product and includes interoperability verification to make sure everything works – and works together.

Verifying RF interoperability

Even a mature standard does not tell you how to design your product – it only specifies the final performance. Yet the design of an RF chip, module, or device is a highly complex procedure, and it's possible to end up with a product that complies with the standard but is just different enough from other vendors' products that the RF interfaces do not communicate.

For this reason, industry groups and some standards bodies develop formal test procedures for certifying the conformance and interoperability of products bearing their label. However, emerging technologies in the early stages of standardization may exist only in outline form. Products in these technologies require some cooperative, cross-vendor product testing. A range of instruments can be used to help ensure that your wireless products will conform to standards and interoperate with same-technology devices.

Wi-Fi Alliance certification program

A Wi-Fi seal means that your WLAN products have been certified to interoperate with other network cards and access points that bear the Wi-Fi logo. This branding is powerful and a point of differentiation for your WLAN product. Agilent's Interoperability Certification Lab (ICL), one of the networking industry's leading interoperability test laboratories, has been chosen by the Wi-Fi Alliance to perform the official Wi-Fi testing services to their membership.

The mission of the Wi-Fi Alliance is to ensure the interoperability of IEEE 802.11 products and to promote Wi-Fi as the global WLAN standard across all market segments. Agilent's ICL supports the Wi-Fi Alliance's mission through a global presence in Europe, North America, and the Far East to provide easy access to manufacturers seeking Wi-Fi certification for their products. ICL supports the Wi-Fi Alliance technical committees in activities leading to the development of test plans, hosting "un-plug fests" to validate the test plans, and selecting products to be used in the test bed. Agilent's ICL also supports the resolving of customer or test bed problems that may emerge once official testing has begun.

Visit the Wi-Fi Alliance at **www.wi-fi.net**

Visit the Agilent ICL at **www.agilent.com/comms/service**

Troubleshooting problems

A wireless network link typically has many less-than-ideal transmission characteristics. What happens when your products won't communicate correctly, or when data rates are lower than expected? Agilent's test equipment can provide the test signals you need to stimulate your device and the advanced analysis tools to pull signals apart and provide detailed test results for troubleshooting.

Getting *Bluetooth* to the masses

Bluetooth increases data rates

Bluetooth is a wireless personal area network (WPAN) technology adopted by IEEE as 802.15.1. *Bluetooth* version 1.1 and version1.2 (standard rate) currently offer maximum data transfers of 721 Kb/s. *Bluetooth* version 2.0 with Enhanced Data Rate (EDR) is an evolution of *Bluetooth* wireless technology that offers maximum data transfer rates of 2.1 Mb/s. This increase in transfer rate means that, for a given amount of data, a *Bluetooth* EDR radio will be up to three times less active than a standard version 2.0 radio, hence reducing power consumption, which greatly benefits battery-dependent mobile devices.

Bluetooth EDR achieves its higher data rates by using a Phase Shift Keying (PSK) modulation scheme in place of the Gaussian Frequency Shift Keying (GFSK) of standard rate. *Bluetooth* EDR products are required to support both modulation schemes. Other transmission characteristics are the same or virtually the same, providing excellent backward compatibility with *Bluetooth* version 1.1 and version1.2.

Performing pre-qualification tests

Agilent can help you evaluate module performance, characterize interoperability, and make sure your integration effort results in certified products. Agilent typically performs measurements in accordance with *Bluetooth* specifications – just like the full qualification measurements – enabling you to use Agilent test equipment to conduct pre-qualification tests prior to sending your product to a *Bluetooth* Qualified Test Facility (BQTF). A passing measurement at pre-qualification means you can send your product to a BQTF with a high degree of confidence that it will pass full qualification.

Pre-certification testing

Agilent instruments and systems incorporate the most practical and widely used measurements specified in standards. This means you can use these solutions to conduct pre-certification tests prior to formal interoperability testing. Using Agilent test equipment can help gain a high degree of confidence your products will pass formal certification in an interoperability test lab.

WLAN RF TESTS

To better ensure that your product will interoperate, you can use these solutions to conduct RF tests associated with all the 802.11 RF specifications.

IEEE 802.11 RF layer tests	IEEE reference 802.11a	802.11b	802.11g	89600 VSA software[1]	PSA spectrum analyzer	N4010A test set	E4438C ESG signal generator	P-Series, EPM-P power meters
Transmitter tests								
Output power	17.3.9.1	18.4.7.1.2	19.4.7.1	■	■	■		■[2]
Power rise/fall		18.4.7.6		■		▲[3]		■
Spectrum mask	17.3.9.2	18.4.7.3	19.5.4	■	■	■		
Carrier suppression		18.4.7.7		■	■	■		
Center frequency leakage	17.3.9.6.1			■		■		
Spectral flatness	17.3.9.6.2			■	■	■		
Transmission spurious		18.4.6.8		■[4]	■	▲[5]		
Center frequency tolerance	17.3.9.4	18.4.7.4.5	19.4.7.2	■	■	■		
Symbol clock frequency tolerance	17.3.9.5		19.4.7.3	■	■	▲[3]		
Constellation error	17.3.9.6.3		19.7.2.7	■	■	■		
Error vector magnitude		18.4.7.8	19.7.2.7	■	■	■		
Transceiver tests								
Out-of-band spurious emission	17.3.8.4		19.4.3		■			
Receiver tests								
Sensitivity	17.3.10.1	18.4.8.1	19.5.1			▲[6]	▲[6]	
Maximum input level	17.3.10.4	18.4.8.2	19.5.3			■	■	
Adjacent channel rejection	17.3.10.2	18.4.8.3	19.5.2			■[7]	■[7]	
Non-adjacent channel rejection	17.3.10.3					■[7]	■[7]	
Clear channel assessment	17.3.10.5	18.4.8.4	19.1.2			■	■	

■ Full measurement capability
▲ Some measurement limitations

1. 89600 Series vector signal analysis software can be used with a variety of digitizers including: PSA and ESA-E spectrum analyzers, N4010A wireless connectivity test set, oscilloscopes, logic analyzers and VXI.
2. Thermal sensor gives true rms power reading. Peak detector under-reads peak-average result when OFDM/modulation is applied.
3. Full measurement capability available using 89600 Series VSA software or 89607A in conjunction with N4010A or spectrum analyzer.
4. Available with 89600 Series VSA software spectrum analyzer application.
5. This is an out-of-band measurement and requires a spectrum analyzer such as ESA-E Series.
6. Test signal is fully-coded, which enables vendor-specific PER measurements to be performed. The ESG and N4010A do not perform PER measurements.
7. Use a second signal generator as interferer. CW interference (for blocking tests) can be generated using an Agilent E8257D PSG analog signal generator.

BLUETOOTH RF TESTS

Agilent provides tools and services to streamline the way you verify the physical layer of your *Bluetooth* products. Whether you work with chipsets, modules, or host devices, you can do the RF testing you need for confidence in your design.

Structured test cases for certification testing of the *Bluetooth* RF layer (defined by *Bluetooth* SIG)	N4010A test set	ESA-E spectrum analyzers	E4438C ESG signal generator[1]	P-Series, EPM-P power meters	89600 VSA software[2]	E8257D PSG signal generator
Transmitter tests						
Output power (TRM/CA/01/C)	■	■		■	■	
Power density (TRM/CA/02/C)		■			■	
Power control (TRM/CA/03/C)	■	■		■	■	
Tx output spectrum frequency range (TRM/CA/04/C)		■			■	
Tx output spectrum 20 dB bandwidth (TRM/CA/05/C)		■			■	
Tx output spectrum adjacent channel power (TRM/CA/06/C)		■			■	
Modulation characteristics (TRM/CA/07/C)	■	■				
ICFT (TRM/CA/08/C)	■	■			■	
Carrier frequency drift (TRM/CA/09/C)	■	■			■	
Transceiver tests						
Out-of-band spurious emissions (TRC/CA/01/C)		■			●	
Receiver tests						
Sensitivity/single-slot packets (RCV/CA/01/C)	■		●			
Sensitivity/multi-slot packets (RCV/CA/02/C)	■		●			
C/I performance (RCV/CA/03/C)	▲[3]		▲[3]			
Blocking performance (RCV/CA/04/C)	▲[4]		▲[4]			▲[4]
Intermodulation performance (RCV/CA/05/C)	■[5]		▲[5]			▲[5]
Maximum input level (RCV/CA/06/C)	■		■			■

■ Meets fully specified test requirements
● Pre-compliance testing only
▲ Meets fully specified test requirements when combined with other equipment

1. Used with Signal Studio for *Bluetooth*.
2. 89600 Series vector signal analysis software can be used with a variety of digitizers including: PSA and ESA-E spectrum analyzers, N4010A wireless connectivity test set, oscilloscopes, logic analyzers and VXI.
3. The C/I performance receiver test requires an additional signal source with *Bluetooth* capability such as the N4010A or the ESG for the interfering signal.
4. The blocking performance receiver test requires a *Bluetooth* modulated source such as the N4010A or ESG and a microwave signal source such as the E8257D to generate the interfering signal (30 MHz to 12.75 GHz).
5. The intermodulation performance receiver test requires two *Bluetooth* modulated sources such as the N4010A or ESG and one CW source such as the ESG or the E8257D to generate intermodulation.

WIMAX RF TESTS

Today, most WiMAX implementations will utilize 256 orthogonal frequency division multiplexing (OFDM), up to 20 MHz bandwidth, and frequencies below 11 GHz. Agilent offers flexible tools to help you efficiently and effectively simulate, troubleshoot, and verify your WiMAX design to ensure it meets specifications.

IEEE 802.16-2004 RF layer tests	89600 VSA software[1]	PSA, ESA-E spectrum analyzers	E4438C ESG, E8267D PSG signal generators[2]	P-Series power meters
Transmitter tests				
Output power	■	■		■[3]
Power rise/fall	■	■		■
Spectrum mask		■		
Spectral flatness	■	■		
Transmission spurious	■[4]	■[5]		
Center frequency tolerance	■	▲[6]		
Symbol clock frequency tolerance	■	▲[6]		
Constellation error	■			
Error vector magnitude	■			
Transceiver tests				
Out-of-band spurious emission		■[5]		
Receiver tests				
Sensitivity			■[7]	
Max input level			■	
Adjacent and alternate channel rejection			■[8]	
Receiver linearity			■	
Frequency and timing requirements			■	

■ Full measurement capability
▲ Some measurement limitations

1. 89600 Series vector signal analysis software can be used with a variety of digitizers including: PSA and ESA-E spectrum analyzers, N4010A wireless connectivity test set, oscilloscopes, logic analyzers and VXI.
2. Used with Signal Studio for 802.16-2004 (WiMAX).
3. Thermal sensor gives true rms power reading. Peak detector under-reads peak-average result when OFDM/modulation is applied.
4. Available with 89600 Series VSA software spectrum analyzer application.
5. Requires manual user set up.
6. Full measurement capability available using 89600 Series VSA software in conjunction with spectrum analyzer.
7. Test signal is fully coded, which enables vendor-specific PER measurements to be performed. The ESG does not perform PER measurements.
8. Use a second signal generator with user created waveform file as interferer.

MANUFACTURING TEST

In manufacturing, you feel most intensely the time-to-market pressures – and the pressure to keep your costs as low as possible, while not sacrificing quality. You need to protect your bottom line with test solutions that are fast, accurate, flexible, and cost-effective.

Manufacturing test solutions

If you have ever tried to force-fit a test solution into an established production line under challenging conditions, you know just how inefficient the end result can be. To ensure that your test solution is optimal for your manufacturing environment, it's important to start thinking about test early in the manufacturing cycle – ideally making it an integral part of the overall manufacturing process development.

Many manufacturing test engineers worry about getting their test process right. What measurement capability do I actually need? Should I build my own solution or out-source? How do I get the most cost-effective solution? Does the solution improve my yields and throughput? Is the solution easy to use and support? Can the system be easily deployed and supported worldwide?

Agilent can help you find the answers. We'll help you find a solution that meets your budget requirements while getting the best possible product out the door. Our tailored approach to manufacturing test lets you choose what you need – from integrated systems to single test instruments. A wide array of tools addresses manufacturing for ICs, modules, and devices means the test tools scale to fit your needs. Whatever your choice, you get the measurements required to ship better products, in less time.

Custom system development

Agilent understands that designing and manufacturing wireless products presents enough of a challenge without having to worry about how you are going to test them. That's why we offer specialized expertise for system engineering and custom system development.

System architecture is based on Agilent's market-leading sources and analyzers with unique features in software and fixturing to ensure the highest quality and reliability. Our systems are backed by Agilent's global service and support network. We are committed to providing the training and technical assistance you need to get your wireless products through production quickly.

Choosing the right solution for 802.11a/b/g WLAN

Manufacturing test plan focused on SEM and average power measurements
Use the Agilent ESA-E Series spectrum analyzer with the EPM-P Series power meter.

Early/pilot manufacturing or rework stations that require transmitter and receiver measurements
Use the Agilent N4010A wireless connectivity test set with Options 102/103 and 110, and the 89600 Series VSA software with Option B7R. Can be scaled down for pass/fail testing.

Medium-volume manufacturing using pass/fail transmitter measurements
Use the Agilent N4010A test set with Options 102/103 and 110, and the 89607A WLAN test suite software. A selection menu lets you add or remove measurement easily from the test suite.

Manufacturing applications requiring both transmit and receive measurements
Use the Agilent N4010A test set with Options 102/103 and 110 and its dedicated driver within your own test executive. Or, use the Agilent N4994A GS-8300 WLAN integration bundle, which provides test suite software for quick measurement configuration.

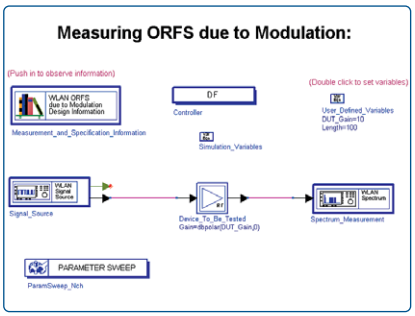
High-volume manufacturing test
Use the Agilent N4010A test set with Options 102/103 and 110 and its dedicated driver within your own test executive and test system. Or, if you need a turnkey system, use the Agilent N4993A GS-8300 WLAN manufacturing functional test system. It can be customized for vendor-specific 802.11a/b/g chipsets.

TEST PRODUCTS

With our heritage in test and measurement, focused domain knowledge, and deeply held values of customer commitment and integrity, Agilent has been earning the trust of the wireless industry for more than 60 years. As proof of our commitment, we continue to enhance and support our existing design and test solutions while creating new solutions for emerging wireless technologies.

The following pages highlight some of the best, most innovative wireless connectivity products available today.

To learn more, please visit:
www.agilent.com/find/wirelessconnectivity



Advanced Design System Software
R&D

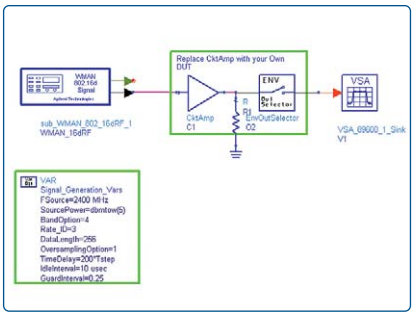
Advanced Design System (ADS) software merges simulation and physical measurements in a single environment.

UWB Design Exploration Library (DEL)

Perform a complete system simulation of both the transmitter and receiver portions in compliance with the MBOA_SIG Sept 2004 PHY specification. The UWB DEL provides preconfigured simulation setups, signal sources and test benches for quick simulation of circuitry used in ultra-wideband applications. It also includes the UWB DesignGuide that supports MB-OFDM and pulse-based technology.

Bluetooth **DesignGuide**

Features include component/subnetwork evaluation, VCO/phase locked loop (PLL) investigation, multipath propagation testing, and system compliance testing.



WLAN Design Library

Supports the IEEE 802.11a/b/g and HiperLAN2 standards and provides complete, fully coded signal path analysis, the ability to predict EVM/BER/ACPR, and end-to-end transmit-to-receive simulation for complete system modeling. It also includes a DesignGuide with tutorials and pre-configured test benches.

Advanced Communications Model Set

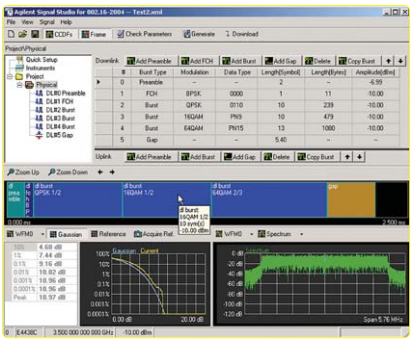
Use this model set to simulate OFDM-based systems like WiMAX (WMAN), Wi-Fi (WLAN), and UWB (WPAN). Features include model components that can help designers create any 802.xx compliant signals, plus proprietary signals, and documented example designs to help use the tool in simulation and measurement.

E4438C ESG Vector Signal Generator
E8257D/67D PSG Signal Generators

R&D/Integration/Manufacturing

Agilent's E4438C ESG (250 kHz up to 6 GHz) and E8267D PSG (250 kHz up to 44 GHz) vector signal generators combine outstanding RF and microwave performance and sophisticated baseband generation to deliver calibrated test signals. Each features an internal baseband generator with arbitrary waveform and real-time I/Q capabilities, ample waveform playback and storage memory, and a wide I/Q modulation bandwidth.

The Agilent E8257D PSG analog signal generator (250 kHz up to 67 GHz) is ideally suited for out-of-band blocking performance measurements for both *Bluetooth* and WLAN. The E8257D PSG delivers industry-leading performance in output power, phase noise, and level accuracy.



Signal Studio Software

Signal Studio software simplifies the creation of I/Q waveforms, reducing the time you spend on signal simulation. It features an intuitive graphical user interface to set various signal parameters for flexible waveform generation, enabling you to better characterize, evaluate, and optimize your transceiver and component designs. Configured waveforms can be downloaded to the ESG or PSG vector signal generator for playback.

- 802.11 WLAN: Configure fully coded WLAN frames for FER, PER, and BER analysis. Software automatically adds the required encoding for testing baseband decoding algorithms.
- 802.16-2004 (WiMAX): Set up spectrally correct WiMAX reference signals, create fully coded MAC layer signals, and configure bursts and MAC PDUs with or without a header and CRC.
- *Bluetooth*: Create fully coded *Bluetooth* packets and continuous PN data streams. Integrated clock/gate/payload delay adjustment optimization routine simplifies BER test setup.
- UWB: Configure MB-OFDM UWB according to the proposed standards.
- Toolkit: Easily correct signal distortion effects and yield high fidelity calibrated test signals (up to 800 MHz BW).

Baseband Studio

Baseband Studio for fading software is used with the ESG to deliver realistic channel simulation for advanced WLAN receiver test applications.

N6030A Arbitrary Waveform Generator

R&D/Manufacturing

Agilent's N6030A arbitrary waveform generator delivers unprecedented performance for creation of complex wideband waveforms. It combines a high sampling rate (1.25 GS/s sample clock) and a high bit resolution (15 bits of vertical resolution) to create ideal waveforms for accurate test of broadband and UWB systems. Each channel of the dual channel input provides 500 MHz of modulation bandwidth and over 65 dBc of spurious free dynamic range. When the N6030A is combined with a wideband I/Q upconverter, modulation bandwidth of 1 GHz can be realized for authentic signal simulations for IF and RF subsystem test.

Other features include differential and single-ended outputs, multiple module synchronization, up to 512 K definable waveform segments, up to 256 K unique definable sequences, complete instrument control from MATLAB®, and compatibility with CompactPCI and VXI mainframes.

N4010A Wireless Connectivity Test Set

R&D/Integration/Manufacturing

The N4010A enables more efficient RF testing, lowering the cost of test for products and components that incorporate *Bluetooth*, WLAN and other emerging wireless connectivity technologies. This new test solution is designed to be an effective tool for every stage – from development, through integration, pre-qualification, and volume manufacturing.

During the product lifecycle, engineers who design or integrate *Bluetooth* or WLAN technology into chipsets, modules, and devices can create test sequences with unprecedented ease, and obtain faster, more accurate measurement results. Fast, high accuracy measurements will also improve manufacturing yield and throughput.

Features

- high throughput with fast measurement speed and data transfer
- high yield - excellent measurement accuracy allows tighter test limits
- consistent results through product lifecycle - use the same test set from development to production
- flexible, extendable solution - adaptable for emerging wireless technologies

Bluetooth and *Bluetooth* EDR testing

The N4010A with *Bluetooth* EDR Option 105 performs key transmitter measurements including carrier frequency stability, modulation accuracy and relative transmitter power. Receiver measurements include EDR sensitivity, EDR BER floor performance and EDR maximum input level. These transmitter and receiver measurement enable the early characterization of emerging EDR designs.

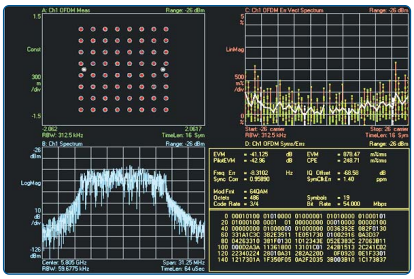
N4010A with *Bluetooth* Option 101 establishes a link with a *Bluetooth* device and measures RF layer performance in accordance with the methods set out in *Bluetooth* Radio Specification 1.2. *Bluetooth* audio (Option 111) provides a path for an audio frequency signal to be transported to and from the device under test. CVSD, A-Law, and µ-Law codes are also supported. Agilent plans to provide additional features and introduce new test capabilities as the *Bluetooth* specification evolves.

WLAN testing

The N4010A with WLAN options 102/103 combines a fully calibrated vector signal generator and wide bandwidth signal analyzer into a single test set. The wideband digitizer captures complete WLAN signal bursts to meet demanding transmitter measurements such as EVM. The vector signal generator emulates 802.11a/b/g signals for receiver measurements.

Additional flexibility

The N4010A I/O connectivity (Option 110) allows use of the wideband receiver in conjunction with Agilent's highly flexible 89600 Series vector signal analysis software. This pairing makes it possible to obtain a broad range of measurements for evaluating current and future wireless connectivity formats. Use N4010A-110 with the Agilent 89600 software for general signal analysis, including ZigBee or 89607A WLAN test suite for 802.11a/b/g transmitter testing.



89600 VSA software

89600 Series vector signal analysis software

R&D/Integration/Manufacturing

The Agilent 89600 Series vector signal analysis software (VSA) offers advanced digital signal processing features, particularly important for emerging communication standards. The 89600 VSA can be combined with a variety of digitizers including: PSA, ESA, N4010A, oscilloscopes, logic analyzers, VXI, and more. This powerful, flexible solution can provide valuable insight to designers working on emerging communications such as 802.16e and UWB long before standards are complete.

Features

- *Bluetooth* signal analysis (in Option AYA)
- link to ADS software environment
- baseband I/Q measurements to 40 MHz
- flexible time-, frequency-, and modulation-domain analysis

Option B7R – WLAN analysis capabilities

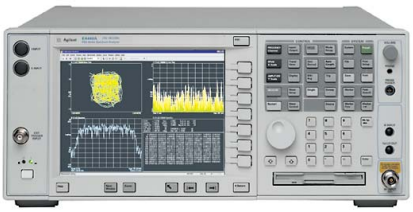
Agilent is an industry leader in baseband, RF, and modulation quality measurements of WLAN signals. The 802.11a/g OFDM analysis option demodulates WLAN bursts down to the bit level. The option handles all the modulation formats allowed by 802.11a/g (BPSK, QPSK, 16QAM, and 64QAM). Multiple formats are automatically detected within a symbol period and as they change between symbol periods. The AYA option provides 802.11b demodulation and measurements.

89607A 802.11a/b/g WLAN test suite

Speed the process of testing your 802.11a/b/g signal to its standard with the 802.11 test suite (also supplied as part of the WLAN analysis Option B7R). This separate applet automatically executes standards-based transmitter tests of your signal. You specify the tests to perform, set the center frequency and other signal parameters, and the applet does the rest. The tests provided in WLAN test suite include: transmit power, center frequency and symbol clock frequency tolerance, modulation accuracy, and spectral mask. Standards-based test limits are pre-programmed into the software, but can be modified as your need requires.

Option B7S – WiMAX analysis capabilities

This option provides comprehensive coverage of the IEEE 802.16-2004 OFDM standard and allows you to set up and adjust the demodulator for the best analysis of your signal. Analyze uplinks and downlinks with a wide range of error analysis measurements and displays. Automatically detect and display all modulation types (BPSK, QPSK, 16QAM, 64QAM) present in a subframe with just one measurement. The modulation types are color coded for easy recognition in the constellation diagram, the EVM time and spectrum displays, and the demodulated bits table. 802.16e OFDMA modulation analysis is also available. Contact your Agilent sales representative.



PSA Series Spectrum Analyzers

R&D

The PSA spectrum analyzer with a 40 or 80 MHz bandwidth digitizer (Option 140 or 122) provides the analysis bandwidth necessary to test today's wireless connectivity signals. It provides the most advanced overall performance in accuracy, dynamic range, sensitivity, resolution, and speed, making the PSA an excellent choice for WLAN, ZigBee, *Bluetooth*, WiMAX and UWB design engineers. Combine the PSA with the 89600 VSA software for troubleshooting WLAN, WiMAX and UWB chipset and module issues including interoperability, phase noise, and power amplifier design. ZigBee demodulation and vector signal analysis capability are included in Option 241.

Option 217 – WLAN measurement personality

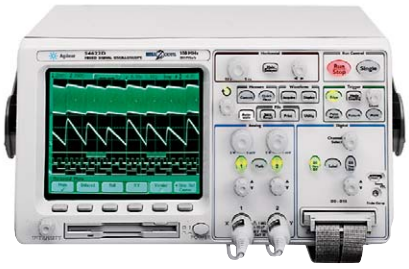
This option analyzes IEEE 802.11a/b/g signals according to the standard, providing WLAN transmitter measurements for standards conformance and verification, and chipset and module integration. Option 217 simplifies test setup with WLAN standards presets and it automatically adapts and detects the different types of modulation formats of a WLAN signal.

ESA-E Series Spectrum Analyzers
R&D/Integration/Manufacturing

The Agilent ESA-E Series provides scalable mid-performance spectrum analysis with a broad range of application specific measurement capabilities. It offers a multi-format RF power measurement suite with easily configurable ACPR and power versus time measurements, excellent for a manufacturing line.

802.11a/b/g WLAN manufacturing lines requiring spurious measurements and spectral masks can benefit from the flexibility and remote programming capability of the ESA-E.

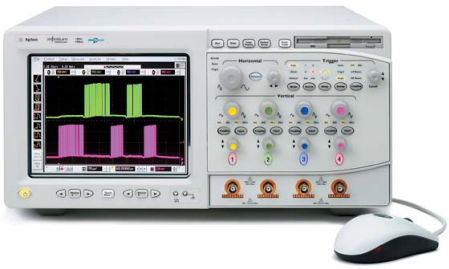
The one-button *Bluetooth* standards-compliant transmitter measurement personality (Option 304), makes it easy to measure frequency drift, initial carrier frequency tolerance, modulation characteristics, 20 dB output spectrum bandwidth, adjacent channel power (ACP), and more.



54600 Series Mixed Signal Oscilloscopes (MSO)
R&D

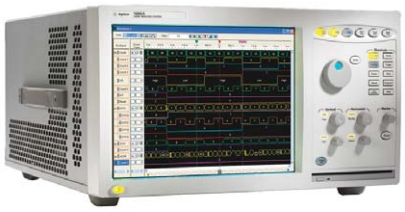
The Agilent 54622D (100 MHz BW), 54641D (350 MHz BW), and 54642D (500 MHz BW) are optimized for verification and debug of *Bluetooth* baseband signals. These unique 2+16 channel MSOs combine the detailed signal analysis of a scope with the multi-channel timing measurements of a logic analyzer. The 54622D is great for designers who work with lower speed, 8-bit microcontrollers in the *Bluetooth* baseband/HCI, while the 54642D provides additional bandwidth for higher speed 16-bit microcontrollers and DSPs.

When used in conjunction with the Agilent N4010A wireless connectivity test set, the MSO provides a complete RF-to-baseband *Bluetooth* debug solution that offers multiple channels, deep memory, and powerful triggering.



DSO80000 Series Ultra-High Performance and 54830/850 Series Infiniium Oscilloscopes
R&D

High bandwidth, fast sample rate (up to 20 GSa/s), MegaZoom deep memory, a familiar Windows®-based interface, and powerful connectivity capabilities make it easy to test and debug today's digital circuits. When integrating *Bluetooth*, WLAN, UWB and WiMAX designs with high speed host processors, the Infiniium Series oscilloscopes combines ease-of-use with the right specifications and a broad feature set to help you get your job done faster. The open Windows XP operating system can be used with the 89600 Series VSA software for wideband modulation analysis up to 13 GHz, including single-ended or differential probing of IQ.



16900, 1680, and 1690 Series Logic Analyzers

R&D

The high-performance 16900 Series modular logic analysis systems can be configured to debug the most complicated WLAN or *Bluetooth* systems. Select from a variety of modules that allow you to make real-time measurements across the digital portion of the system under test. A wide range of innovative probing solutions like the B4655A FPGA dynamic probe, provides access to the microprocessors, buses, AICs, and FPGAs in the system. In addition, the logic analyzer comes equipped with source correlation capabilities that allow designers to correlate their high-level source code with the assembly level mnemonics of the microprocessor.

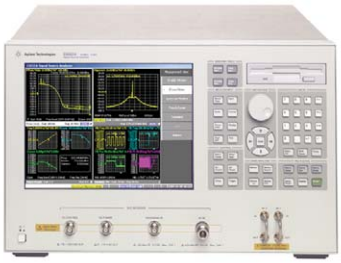
The 16900 Series is best suited for chipsets and components, providing 4 GHz timing zoom, 1.2 GHz timing with 64 MSa of memory depth, and 600 MHz state. The 1680/1690 Series, with its 200 MHz state and up to 800 MHz timing with 4 MSa of memory depth, is better suited for modules and devices.

P-Series and EPM-P Power Meters

R&D/Integration/Manufacturing

The Agilent P-Series power meters (N1911A single channel and N1912A dual channel) provide accurate and repeatable power measurements for R&D and manufacturing engineers in wireless connectivity. Measurements include: peak, peak-to-average ratio, average power, rise time, fall time, maximum power, minimum power and statistical data of wideband signals (30 MHz video bandwidth) with 100 M samples per second continuous sampling.

Agilent EPM-P power meters (E4416A single channel, E4417A dual channel, and E9320 power sensors) simplify development, verification, and manufacturing in wireless communications. The EPM-P power meters are an excellent choice for measuring average power on 802.11a/b/g WLAN manufacturing lines. A dedicated *Bluetooth* preset simplifies and accelerates the task of making power measurements. Real-time markers allow closer analysis of the signal under test.



E5052A Signal Source Analyzer

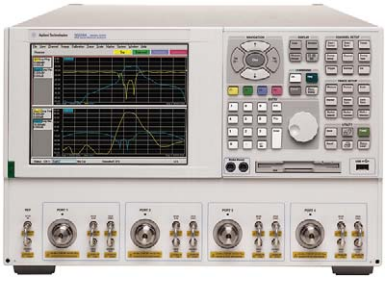
R&D/Integration

The E5052A Signal Source Analyzer is a single-instrument solution that offers an indispensable set of measurement functions for evaluating RF & microwave signal sources such as crystal oscillators, VCOs, SAW oscillators, DROs, YIG oscillators, PLL synthesizers, RFICs, and LO circuits. Capabilities include measurements of phase noise, frequency/power/phase transient, frequency, power, and DC current as well as a spectrum monitor function. This all-in-one solution is designed to provide accurate and efficient measurements with easy-to-use features to significantly improve design and test productivity.

With built-in low-noise reference sources and an innovative technique called "cross-correlation", the Signal Source Analyzer provides unparalleled phase noise sensitivity. It also offers extremely high sampling rate and frequency resolution in its transient measurements.

Features

- True single-connection to dramatically simplify signal source evaluations
- Complete set of transient measurements to fully characterize switching signal sources
- Built-in, ultra-low noise, DC sources provide accuracy and flexibility for oscillator characteristics evaluation



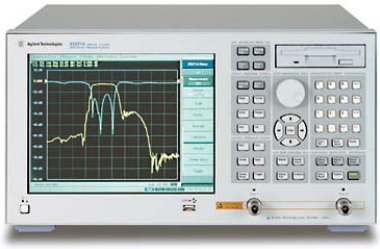
PNA Series Network Analyzers
R&D/Manufacturing

The Agilent PNA and PNA-L Series vector network analyzers (N5230A 4-port 200 kHz to 20 GHz, E8362B 10 MHz to 20/40 GHz) provide the combination of speed and precision for the demanding needs of today's high frequency, high-performance component test requirements. The PNA Series meets these testing challenges by providing the right combination of fast sweep speeds, wide dynamic range, low trace noise, and flexible connectivity. Powerful automation and self-help tools make the instrument well suited for both R&D and manufacturing.

New frequency-offset capability for the PNA Series offers industry-leading accuracy and ease-of-use for non-linear measurements.

Features

- up to 125 dB of dynamic range at 20 GHz
- < 0.006 dB rms trace noise at 1 kHz IFBW
- < 26 µs/point measurement speed
- 32 measurement channels with up to 16,001 points per channel
- supports TRM/LRM calibration
- integrated 4 ports to 20 GHz with built-in Automatic Port Extensions

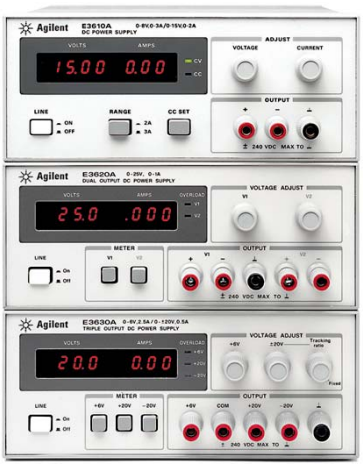


ENA Series Network Analyzers
R&D/Manufacturing

The ENA Series RF network analyzers (E5070B 300 kHz to 3 GHz, E5071B 300 kHz to 8.5 GHz) are fast, accurate and cost-effective, and can perform S-parameter measurements including reflection and transmission coefficients. Their comprehensive analysis capabilities such as time domain and balanced measurements enable thorough design characterization. Fast measurement speed and built-in automation accelerate test throughput. These capabilities make the ENA ideally suited to design and manufacture of *Bluetooth*, WLAN and WiMAX components such as filters, resonators, antennas, and amplifiers. For 2.4 GHz applications, the lower cost ENA-L network analyzer (E5062A 300 kHz to 3 GHz) is also available.

Features

- 125 dB dynamic range at test port (typical)
- 9.6 µs/point sweep speed
- 0.001 dB rms trace noise (at 3 kHz IFBW)
- integrated two, three, and four ports with full port correction
- built-in balanced measurement capabilities to interpret mixed-mode S-parameters



E36xxA DC Power Supplies
R&D/Manufacturing

This series of single, dual, and triple output DC power supplies provide basic, clean, uninterrupted, reliable power at a low price. Suitable for breadboard biasing or for ATE systems, each power supply offers built-in voltage and current measurement capability as well as protection features for the device being used.

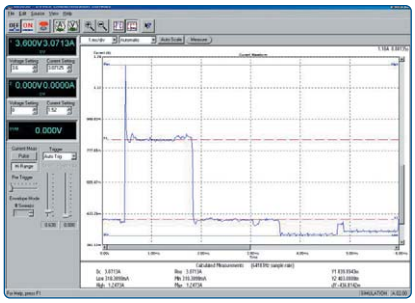
66319B/D and 66321B/D Mobile Communications DC Sources with Battery Emulation

R&D/Manufacturing

Bluetooth and portable WLAN products present a unique testing challenge: they draw rapid pulses of current, which are difficult to measure and create undesirable voltage transients during test. During the design phase, Agilent mobile communications DC sources perform battery emulation and make accurate pulsed measurements that can help you ensure maximum battery operating time. In manufacturing, the fast output response of these power supplies allows you to maximize test throughput by minimizing test interruption due to false triggering of device low-voltage shutdown.

Features

- 20 to 30 times improvement in test throughput over general purpose DC sources
- superior output transient performance with short or long load leads (up to 6 meters)
- measurement of fast pulsed current
- accurate battery drain measurements over a wide range of current levels to easily characterize active, standby, and sleep modes



14565A Device Characterization Software

R&D

Agilent 14565A device characterization software simplifies testing, analysis, and troubleshooting of *Bluetooth* and portable WLAN products. The 14565A provides a graphical user interface that lets you easily control the Agilent 66319B/D and 66321B/D mobile communications DC sources on the R&D bench. No programming required.

Features

- reference waveform save/recall
- oscilloscope-like measurement and analysis including voltage and current waveform parameter measurements, triggering, markers, zoom control
- complementary cumulative distribution function (CCDF) measurements
- long term battery drain data logging

33220A/33250A Function/Arbitrary Generators

R&D/Manufacturing

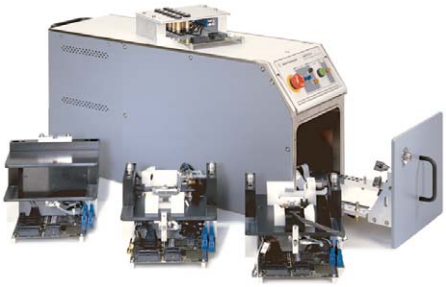
The Agilent 33220A and 33250A function/arbitrary waveform generators give you ten standard waveforms and the ability to create versatile 64 K-point arbitrary waveforms, with 12-bit or 14-bit resolution and a sample rate of 50 MSa/s (33220A), or 200 MSa/s (33250A). In addition, generate ramp, triangle, pulse, noise, and DC waveforms. Built-in modulation capabilities and both linear and log sweeps further expand your test possibilities without requiring additional function generators.

33220A features

- 20 MHz sine and square wave
- AM, FM, PM, FSK, and PWM modulation types

33250A features

- 80 MHz sine and square wave
- AM, FM, and FSK modulation types



E8421A Wireless Test Fixture

R&D/Integration/Manufacturing

This automated fixture platform provides greater than 60 dB of RF isolation at 800 to 2200 MHz. This innovative product transforms wireless fixturing into a reliable standard system instrument that provides a consistent RF and test environment, from R&D into volume manufacturing. The integrated design of the E8421A greatly simplifies the test system and enables high asset reuse and standardization, suitable for a wide variety of DUTs.

Features

- standard driver and I/O, standard AC power input
- Windows-based maintenance and setup software, optional loopback nest for easy troubleshooting
- manual or automatic load and DUT engagement, versatile for any manufacturing environment
- well-defined tailoring process and tools, optional nest kits with step-by-step instructions

Z2049A Wireless Test Fixture

R&D/Integration/Manufacturing

Ideal for the R&D environment where simple RF testing is required, the Z2049A provides an easy to operate manual RF test platform for wireless appliances. Typical RF isolation is 65 to 80 dB from 800 to 2200 MHz. In manufacturing, the Z2049A is well suited for quality assurance and rework stations, where it eliminates the need for multiple test equipment platforms and unnecessary delays.

Features

- easy-to-use pneumatic drawer latch with front panel release switch
- excellent RF isolation for superior consistency and reliability
- adaptable inline for greater efficiency in testing multiple devices
- supports simple nests for run experiments during development, prototype runs, and early production

Functional Test Systems

R&D/Integration/Manufacturing

Agilent has developed solutions to address specific needs for *Bluetooth* and WLAN functional verification to decrease time to market and time to volume. These tailored platforms include integrated and tested systems, RF isolated fixtures, test plan development, and custom device unique interfaces, and each system is designed with maintenance and support in mind. Agilent also offers engineering, integration, test, procurement, and project management resources.

GS-8300 WLAN Test System

R&D/Integration/Manufacturing

The GS-8300 WLAN manufacturing functional test system is a tailorable test platform that helps WLAN module manufacturers quickly ramp up production, increasing manufacturing product yields while reducing overall cost of test. It is a fully integrated turnkey solution that tests 802.11a/b/g. For manufacturers looking to upgrade their existing systems, or who are in need of a one-box, single source and analyzer, the GS-8300 offers an integrated bundle.

GS-8300 solutions use an instrument-grade source and analyzer, which eliminates the use of the Golden Radio in the test process. The GS-8300 provides optimum receiver sensitivity measurements, reduces false failures, and guarantees transmission compliance with regulatory standards.

Measurements include

- power on current check
- Tx and Rx current
- MAC and Cal factor flash
- Go/No-Go Tx/Rx power checks
- Tx calibration (spec mask)
- carrier frequency accuracy
- spectral mask compliance
- carrier suppression
- EVM
- Rx sensitivity
- RSSI calibration
- Rx packet error rate

93000 SOC Series Test System

Manufacturing

The Agilent 93000 SOC Series test system provides the high-performance production test capability required for both the *Bluetooth* radio modem IC, baseband controller IC, single chip solution, and WLAN ICs. It has up to 8 GHz modulated stimulus and 8 GHz measurement capability, multiple tone stimuli, and up to 12 RF ports. Fast switching sources are used, enabling the fast frequency hopping required for *Bluetooth* tests. A wide bandwidth RF receiver minimizes the number of acquisitions needed to make complex measurements such as ACPR, EVM, and modulated power. The system offers real-time data processing and measurements with up to quad-site test capability.

Measurements include

- input/output power
- modulated output power
- gain/gain compression
- isolation
- conversion gain
- leakage
- efficiency
- harmonic distortion
- intermodulation distortion
- spurious signals
- frequency
- phase noise
- modulation characteristics
- BER
- EVM
- ACPR

ADDITIONAL RESOURCES

When business-as-usual is anything but usual, you can get the help you need – financial, operational, educational, and technical – from Agilent. Our resources run deep, giving you a range of alternatives that other test vendors simply can't match. It's the sign of a true partner. Agilent provides test on your terms.

Flexible financing

Agilent instruments and test systems can be on your site on financial terms that make sense for you. And if your situation changes tomorrow, so can your arrangement with Agilent.

To learn more about our powerful alternatives to business-as-usual purchasing, visit **www.agilent.com/find/buyalternatives.** Here's a brief overview.

Financing

Lease an Agilent test system at low rates with terms ranging from 12 to 60 months. Occasional promotions make Agilent systems even more affordable. No other test vendor can match the financial depth or financing options available through Agilent.

Rental

When you need an Agilent instrument for a short period of time, you can rent from one of our Premier Rental Partners. You get short-term use of an Agilent instrument plus our long-term experience in logistics, delivery, installation, support, and training.

Refurbished equipment

Agilent's refurbished instruments carry a minimum one-year warranty with the same options for service and support, all at a fraction of the cost of a new system.

Trade-up

With Agilent you can turn your older instruments into cash. Trade-in your older systems, whether from Agilent or another vendor, and trade-up to a state-of-the-art high-performance Agilent instrument.

Check our online real-time inventory and see our special deals at **www.agilent.com/find/refurbished**

Measurement application services

Staying on top of the latest technology advances is a concern in today's high-pressure business environment, making engineering productivity and skill development more important than ever. Thousands of companies worldwide now rely on the efficient and reliable education and engineering services that Agilent offers. These services deliver real-world skills and insights through hands-on instruction from knowledgeable industry specialists. Training and consulting services can be delivered at your site, at Agilent facilities, or remotely over the phone and Web. Choose from among Agilent's standard service offerings or design a curriculum that meets your needs and schedule.

Instrumentation and application services

Agilent technical experts can quickly provide the key knowledge you need to successfully implement your test strategies. Start-up and productivity assistance can give you the jump on getting your Agilent wireless test equipment utilized and optimized in your application. Custom engineering services save you time as expert engineers transform hardware and software into high performance solutions to your specifications. For a complete list of Agilent Product and Application Services, visit **www.agilent.com/find/consulting**

Examples

- **Using a VSA to Make 802.11 Measurements, R1362A-250**

  Agilent wireless engineers can help utilize your Agilent instruments to make effective physical layer measurements and troubleshoot your IEEE 802.11a/b/g devices

- **Waveforms for ESG Signal Generators, R1361A-205**

  Provides instructions on how to create custom signals and waveforms for the Agilent family of ESG signal generators, as well as understand how to integrate the ESG signal generators into your environment

- **Antenna Pattern Measurements, R1362A-202**

  Agilent provides a simple, low-cost alternative for making antenna pattern measurements

Education and training

Technology education classes, product training, measurement fundamentals, applications training, and more. Classes can be delivered at your site to meet your schedule, or you can attend a scheduled class at an Agilent-provided facility. For a complete list of Agilent course offerings and schedules, please visit **www.agilent.com/find/education**

Examples

- ***Bluetooth* Technology Fundamentals, H7216B-110**

  Introduction to *Bluetooth* technology, including the architecture, application, and procedures around the standard. Topics include: introduction to wireless communication, application fields, development, and standardization, *Bluetooth* system architecture, protocols and profiles, an overview of *Bluetooth* qualification, and a comparison of the advantages and limits of *Bluetooth*. To learn more, go online or contact your Agilent sales office and request publication number 5988-3060EN

- **Wireless LAN Technology Fundamentals, H7216B-337**

  Learn the applications, standards, and implementation of Wireless LAN. Includes IEEE 802.11a/b/g, physical and MAC layers, and interoperability issues

System engineering services

Agilent provides test system implementation expertise for a wide range of test automation tasks from basic conceptual planning and design to building the final system. In wireless applications, this may include test system integration, test code development or optimization, measurement capabilities studies, and more. You get access to the knowledge, experience, and expertise you need for fast, efficient system implementation.

Examples

- **Test Code Optimization, R1362A-110**

  Expertise to optimize test plans and test code on wireless appliance manufacturing functional test systems. Reduce the time a device under test is required to spend in functional test systems and in some cases improve RF test yields

- **Test System Design, R1361A-113**

  Structured and planned set of engineering activities that lead to the functional design of a test and measurement system

- **Test Code Development, R1361A-111**

  Software development for automated engineering and manufacturing test systems. Consultants apply expertise in programming languages along with test automation experience to automate your measurements, optimize system performance, and minimize test time

- **Measurement Capability Study, R1362A-300**

  Provides statistical analysis on a series of test systems to determine the variability of measurements across multiple test stands

- **Fault Detective**

  This solution accelerates the diagnostics of failed products at functional test, saving time and technician costs for repair.

Support solutions

Agilent support solutions are designed with one objective – to help you get more from your test equipment. These solutions can be tailored to your budget, logistical needs and key success factors and there are services available to help you at any point in your process or product lifecycle. Visit **www.agilent.com/find/tm_services** to learn more.

Repair services

Your equipment comes with a global warranty that provides the peace-of-mind that unplanned repair costs are covered. It gives you minimized downtime and simplified problem resolution. Although your warranty will eventually end, the service and support solutions available from Agilent will not. To provide repair coverage beyond the standard warranty, Agilent offers three- or five-year extended warranty plans at the time of purchase. Our quality repair services are available in cost-saving support agreements or per-incident services for your post-warranty equipment.

System uptime services

Agilent can help prevent system failures before they occur or quickly resolve them to minimize downtime. Onsite services include installation, integration and verification, preventive maintenance, and repair for selected systems and instruments. You choose the response time that suits your needs. For critical applications, we can often have an engineer at your site within a few hours.

Calibration services

Agilent can keep your instruments operating at peak precision. All calibration measurements are traceable to international standards for reliable, accurate results. You can choose return-to-Agilent or onsite service, and order the service as needed or on a regularly scheduled basis.

Volume onsite calibration (VOSCAL)

Agilent can bring a fully operational, high quality calibration laboratory to your site, complete with high-specification systems and automation. You get quality calibration without affecting your output schedule.

Equipment management services

Agilent can evaluate your operating environments, including all test and measurement assets, and provide a plan for maximizing asset utilization and reducing cost-of-ownership. We can help you track what equipment you have, where it's being used, and when it needs to be serviced.

Total commitment

At Agilent, all of our resources – products, services, consulting, training, financing, and partnerships – are at your command. More than any other test vendor, Agilent can provide a fully integrated, end-to-end approach for testing wireless products. Our goal is clear: we want to reduce your production risk and delivery time, and help you implement wireless technologies more successfully. We want to help you thrive. Every resource in our company is focused on that goal – it's the Agilent Advantage.

For more information, please visit
www.agilent.com/find/wirelessconnectivity

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

www.agilent.com

Agilent Technologies' Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new Agilent equipment, we can help verify that it works properly and help with initial product operation.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and onsite education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Agilent T&M Software and Connectivity
Agilent's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections. Visit **www.agilent.com/find/connectivity** for more information.

For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office.

Phone or Fax

United States:
(tel) 800 829 4444
(fax) 800 829 4433
Canada:
(tel) 877 894 4414
(fax) 800 746 4866
China:
(tel) 800 810 0189
(fax) 800 820 2816
Europe:
(tel) 31 20 547 2111
Japan:
(tel) (81) 426 56 7832
(fax) (81) 426 56 7840

Korea:
(tel) (080) 769 0800
(fax) (080) 769 0900
Latin America:
(tel) (305) 269 7500
Taiwan:
(tel) 0800 047 866
(fax) 0800 286 331
Other Asia Pacific Countries:
(tel) (65) 6375 8100
(fax) (65) 6755 0042
Email: tm_ap@agilent.com
Contacts revised: 05/12/05

The complete list is available at:
www.agilent.com/find/contactus

Printed in USA, May 16, 2005
5988-4438EN

Agilent Technologies