Keysight Technologies
Test Solutions for Greater Insight into Wireless Connectivity

Greater insight. Greater confidence. Accelerate next-generation wireless.

KEYSIGHT TECHNOLOGIES

Accelerate next-generation wireless

Keysight Technologies, the world's premier measurement company, offers design and test solutions that span the range of wireless connectivity technologies—from RFID through to WLAN. Keysight products cover the lifecycle.

From design and development...

Keysight is an active participant in the development of test processes and measurement methods with following wireless connectivity forums and organizations: IEEE, Wi-Fi Alliance, WiMAX Forum, WiGi Alliance, and more. We are determined never to let test equipment needs stand in your way of developing innovative products for evolving wireless standards.

To integration and interoperability...

Keysight provides test equipment that can be used to help ensure your wireless products will conform to standards and interoperate with same-technology devices from multiple vendors. Keysight also provides tools and services to streamline the way you prepare for certification, helping you evaluate module performance, characterize interoperability, and make sure your integration effort results in certified products.

To manufacturing...

As technologies move into manufacturing, Keysight extends its expertise to offer stand-alone products and system solutions to help get your designs to market faster and more efficiently. And, we will continue refining our offering as technologies mature and cost-of-test issues drive manufacturing efficiency.

To installation and maintenance...

Field work continues to be demanding. Keysight's tools allow you to do more in the field in less time and increase your ability to detect and eliminate interferring signals.

Worldwide engineering expertise

Our worldwide test engineering expertise and robust knowledge library of application notes, CDs, DVDs, videos and more are designed to help you interpret, clarify and test to continually evolving standards, giving you greater insight into your wireless connectivity designs. You face increasing technical and operational complexity. Keysight measurement and application expertise helps you anticipate these growing complexities so you can accelerate your ability to achieve both engineering and business goals.

Wireless Connectivity presents Engineering Challenges

1 to 30 miles: Wireless Metropolitan Area Network (WMAN)

- Fixed WiMAX™
- Mobile WiMAX™

300 feet: Wireless Local Area Network (WLAN)

- WLAN 802.11ac
- WiGig 802.11ad
- WLAN IEEE 802.11a/b/g/h/j/p/n

30 feet: Wireless Personal Area Network (WPAN)

- WiMedia
- UWB
- *Bluetooth*®
- ZigBee
- NFC
- RFID
- 802.11 ad

WMAN- WiMAX Waves

Keeping abreast with a phased technology is never ending. WiMAX Wave 2 products include MIMO techniques; bringing a whole new complexity to antenna design and modulation schemes. In addition, your product must conform to 802.16 standards in order to be allowed to operate in defined geographic regions. These engineering challenges coexist with a pressure to bring certified high-quality, high-yield products to market quickly.

www.keysight.com/find/wimax

WLAN- Multiple WLAN versions including 802.11ac and 802.11ad

Multiple versions of the standard; 802.11a/b/g/h/j/p/n and the latest varieties 802.11ac and ad, add the challenges of backwards compatibility, embracing the latest standards, and cutting manufacturing costs with each new wave of standard development.

www.keysight.com/find/wlan
www.keysight.com/find/802.11ac
www.keysight.com/find/802.11ad

WPAN- Bluetooth, UWB, RFID, NFC, ZigBee

Additional enhancements to each of these technologies present a new learning curve and a new certification or compliance process. Improved functionality must not interfere with existing signals in close proximity. And package size demands tighter integration of the entire design including PHY requirements which are a new area of expertise for digital engineers.

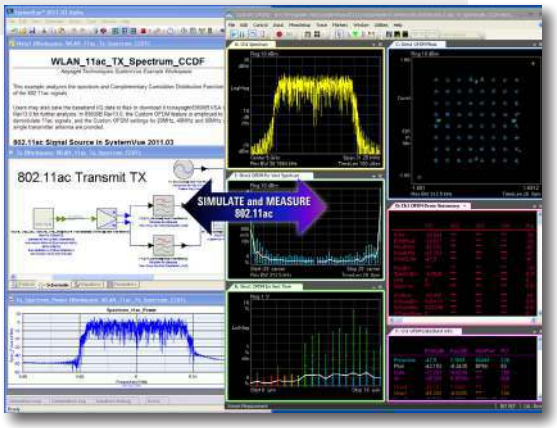
www.keysight.com/find/bluetooth
www.keysight.com/find/uwb
www.keysight.com/find/rfid
www.keysight.com/find/zigbee

Design and Development

Whether you are designing components, or user equipment, only Keysight delivers a complete, integrated R&D design and test environment with simulation, characterization, and evaluation tools. Keysight's broad product portfolio makes it the only test equipment supplier able to provide a single-vendor solution for the cross-domain test challenge of digital wireless designs such as DigRF.

Baseband DSP and System Design

Keysight SystemVue is a focused electronic design automation (EDA) environment for electronic system-level (ESL) design. It enables system architects and algorithm developers to innovate the physical layer (PHY) of wireless and aerospace/defense communications systems and provides unique value to RF, DSP, and FPGA/ASIC implementers. By integrating algorithms with standards-based reference libraries, RF and channel models, and stimulus-response test equipment, Keysight has created a new category of system-level design tools that move designs along much faster.



The W1917 WLAN personality for SystemVue also links to the 89600 VSA "Custom OFDM" measurement personality to provide early stimulus-response support for the emerging 802.11ac standard.

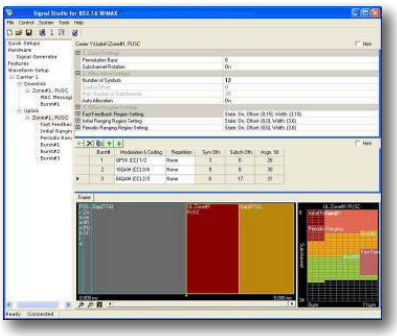
Design, validate and test seamlessly with RF EDA tools.

RF component design and development

Keysight offers leading-edge RF EDA tools for transceiver designers, including RFICs (GoldenGate), RF & microwave (Advanced Design System) and personal RF board design (Genesys). Then using these tools, connect them to benchtop instrumentation and verify your simulated and real designs.

Connect the Keysight PNA-X or ENA network analyzers and match real-world test results with simulation data for accelerated validation and pre-compliance.

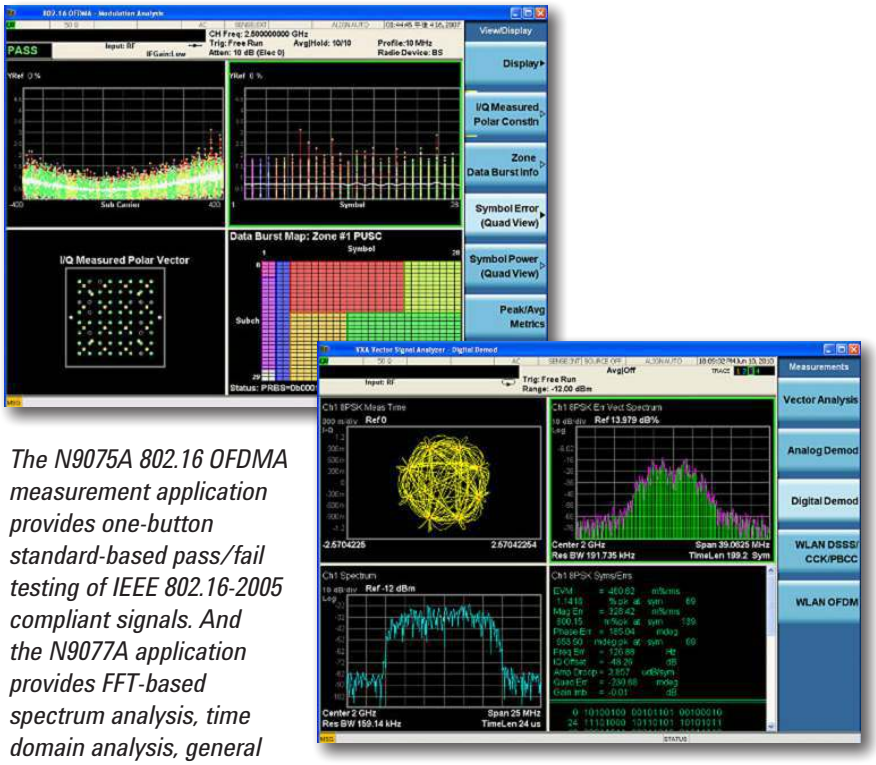
Keysight Signal Studio and embedded software is a suite of flexible, easy-to-use, signal creation software that will cut the time you spend on signal simulation. And, with a demonstrated first-to-market track record, Keysight's signal creation software offers insight and confidence in your design.



Test STC and MIMO features, and new IEEE 802.16Rev2 features such as CDD and FDD/H-FDD frames using N7615 Signal Studio for WiMAX.

Prototype evaluation

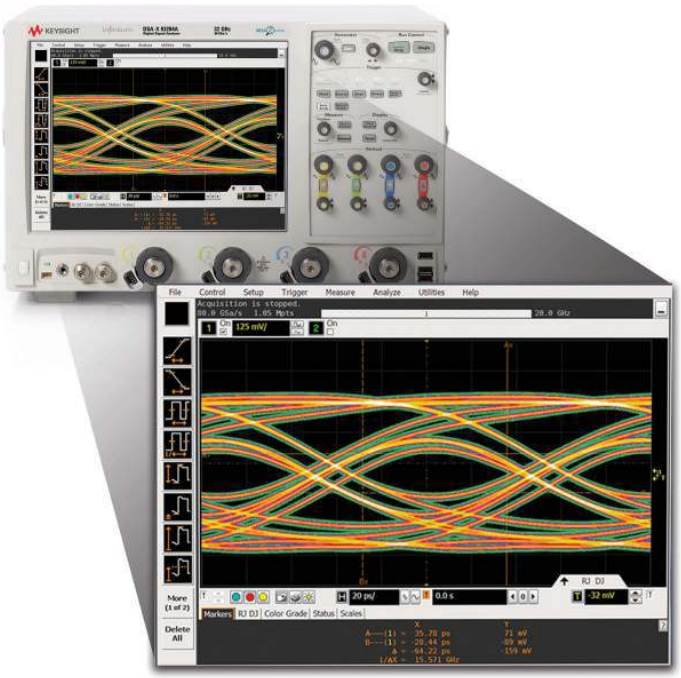
From standalone one-box test sets for early manual testing, to automated conformance test systems, Keysight has the right tools to help you fully evaluate your prototype and pre-production devices throughout your development cycle. X-Series signal analyzers have a library of more than 25 measurement applications including WLAN, WiMAX and Bluetooth.



The N9075A 802.16 OFDMA measurement application provides one-button standard-based pass/fail testing of IEEE 802.16-2005 compliant signals. And the N9077A application provides FFT-based spectrum analysis, time domain analysis, general purpose digital modulation analysis and advanced 802.11 a/b/g/ac modulation analysis.

Module design

Combine the Keysight MXG signal generator, pattern generation, and logic analysis with the Keysight MXA and the Keysight 89600 Vector Signal Analysis software, for complete characterization of digital wireless designs. Keysight's innovations keep pace with technology development. Keysight 89600 VSA software supports newer technologies like 802.11ac. And the PXA Signal Analyzer has 160 MHz bandwidth required by some advanced technologies like 802.11ac.



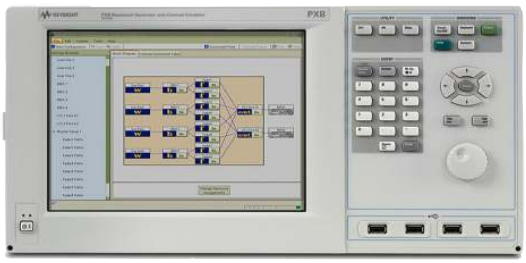
The 89600 Series VSA paired with a DSO90000 Series oscilloscope captures and entire 500 MHz UWB signal.

Integration and Interoperability

Where earlier technologies relied on conformance testing which focused on RF performance and ensuring a new device adhered to standards mainly aimed at providing voice call service, new data-centric technologies such as WiMAX and 802.11ac face a whole new testing paradigm. Device suppliers and mobile network operators must ensure end-users are delighted with the performance of their new gadget under all circumstances.

Integration

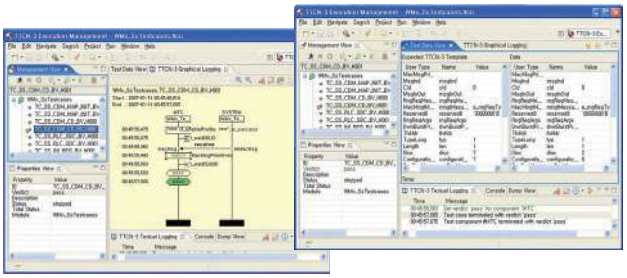
The Keysight N5106A PXB baseband generator and channel emulator offers multi-channel baseband generation, real-time fading, and signal capture in a single instrument.



For signal generation, the PXB has up to 4 built-in baseband generators allowing the creation of standard-compliant signals with support for up to 4x4 MIMO in one instrument.

Conformance

With Keysight's suite of WiMAX test solutions, built on proven platforms, you can approach interoperability and conformance testing with very high confidence. Keysight supports both Radio Conformance Test (RCT) through our partnership with AT4 Wireless and Protocol Conformance Test (PCT) with the Keysight N6430A based on the E6651A Mobile WiMAX Test Set.



The E6651A Mobile WiMAX test set has built-in WiMAX base station emulation which supports network entry, traffic connection, data transfer and RF tests plus the ability to stress, test and debug protocol and data handling.

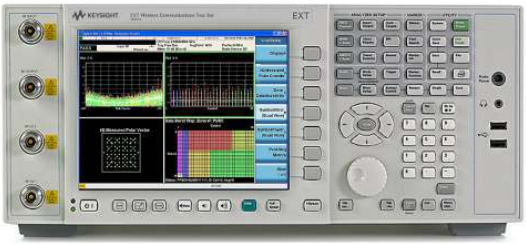
Manufacturing

In the manufacturing environment you feel intense time-to-market pressures, especially for new technologies where being first is key. From complete networks and hubs to end-user equipment with a lifetime of only a few months to make a return on investment, you need to get your product to market fast, while protecting your bottom line. Choose Keysight for a complete portfolio of test equipment solutions that are fast, accurate, flexible, and cost-effective.

The N4010A offers an integrated vector signal generator (transmitter) and a wide bandwidth signal analyzer (receiver) in a single test component–replacing the need for separate spectrum analyzers, power meters, power sensors and golden radios.

A single platform is rarely the right answer for every test scenario. That's why the Keysight portfolio includes more than traditional instruments. PXI modular products deliver measurements today and enable capabilities for the future.

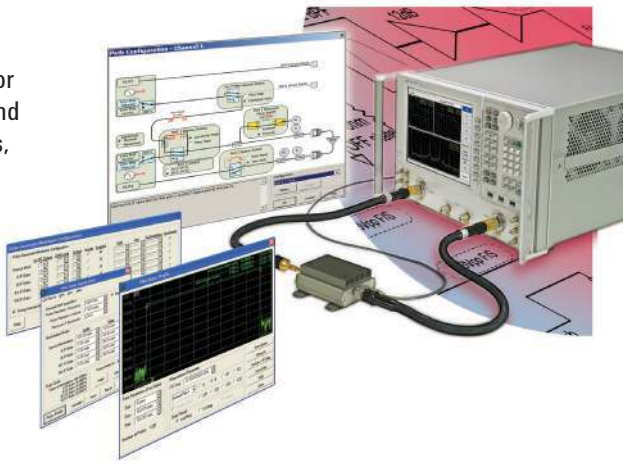
N4019C wireless test manager software provides ready-to-use tests, test plans, test sequencing, and menu-selectable hardware support for quick and easy automation of Bluetooth and WLAN manufacturing.



The EXT's flexible test sequencer allows calibration and verification to be performed by high speed single acquisition and use multiple measurement techniques for faster analysis and breakthrough testing speed.

Component test

Developing technical edge components brings many unexpected problems from various factors. Use Keysight network analyzers with multi-port test sets and calibration tools to minimize reconnection and obtain optimum measurement integrity. For complicated technical issues beyond linear component characterizations, Keysight PNA-X Series is the right solution. Solve the complicated non-linear technical issues in a single instrument with a single set of connections.



The PNA-X is an ideal tool for measuring amplifier specifications, from gain and return loss, to harmonics and IMD.

Installation and Maintenance

As operating frequencies have soared from sub-GHz levels up to 5.8 GHz, you have had to build more hubs or upgrade existing sites to maintain the same size coverage area. As a result, you need to deploy and maintain more sites and more complex and co-located networks than you previously did in the same amount of time. You need the right installation and maintenance tools that make you more productive.

Keysight's FieldFox RF analyzers are designed to withstand your toughest working conditions. To accelerate maintenance and troubleshooting, each operating mode has a task-driven user interface that saves time in the field.

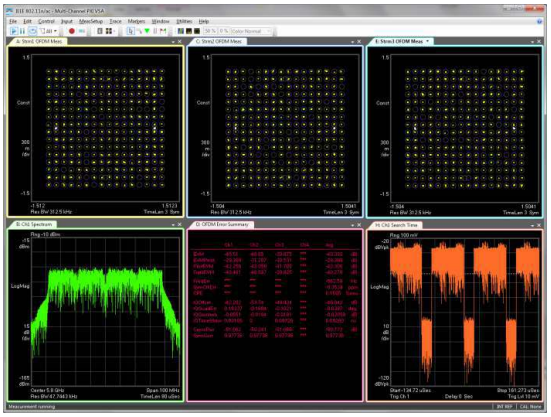
Covering frequencies from 9 kHz to 20 GHz, the Keysight HSAs have the features you need for operating in tough field environments and their measurement performance gives you confidence the job's been done right. The Keysight HSAs let you automate routine tasks to save time and ensure consistent results.

MIMO

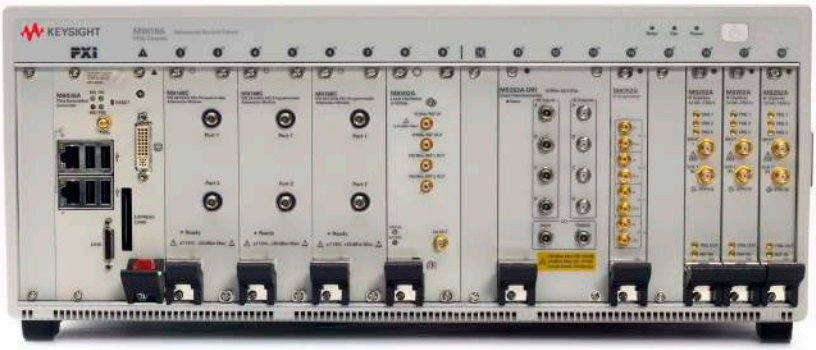
As more and more wireless connectivity technologies aim for higher data rates with better spectrum efficiency, Multi-Input Multi-Output (MIMO) is a key technique for wireless connectivity applications. Keysight provides a broad and powerful set of MIMO test solutions.

www.keysight.com/find/mimo

N7109A Multi Channel Signal Analyzer provides up to 8 channel test capability with 40 MHz analysis bandwidth from 20 MHz to 6 GHz frequency range.



With the 89600 VSA software, the N7109A provides fast, wide spectral searches with high resolution, helping you detect small signals next to large ones and capture intermittent or short-duration signals.



This PXI configuration provides analysis capabilities for up to 4x4 MIMO, and is ideal for 80 + 80 MHz SISO, and 80 MHz or 160 MHz MIMO 802.11ac measurements, as well as, providing up to 780 MHz analysis bandwidth to address tomorrow's wireless standards.

Greater Insight-Web Sites Rich with Resources

Get a jump start on learning new technologies by investigating Keysight's wireless connectivity web sites. Here you will find white papers, application notes, eSeminars, DVDs, videos and other valuable resources to help you research, identify and implement the best test solutions to meet your specific project needs.

The Right Tools for the Right Technology

Keysight products cover the intricacies of design, integration, interoperability, manufacturing and installation. Reliable hardware and personalized software cover the spectrum of Wireless Connectivity Technologies-make WLAN (and its many renditions) first then WiMAX, MIMO, RFID, NFC, Bluetooth, UWB and Zigbee.

Accelerate next-generation wireless

Design and Simulation, Logic Analyzers, Network Analyzers, Oscilloscopes, Power Meters and Sensors, Power Supplies and Sources, Signal Analysis, Signal Generation, Test Sets, Specialty Test

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www.axiestandard.org
AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Keysight is a founding member of the AXIe consortium.

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(BP-05-19-14)

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Published in USA, August 1, 2014
5990-9072EN
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