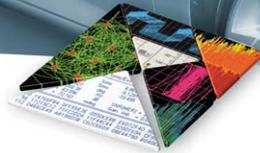


# Accelerate Development of Next Generation 802.11ac Wireless LAN Transmitters-Overview



**DISCOVER** the Alternatives...

... Agilent **MODULAR** Products

Measurement solutions for R&D and Design Verification Test (DVT) of 802.11ac Transmitters  
*Achieve increased insight into chipsets and modules for enterprise wireless set top boxes, mobile computing, and medical devices*

## Abstract

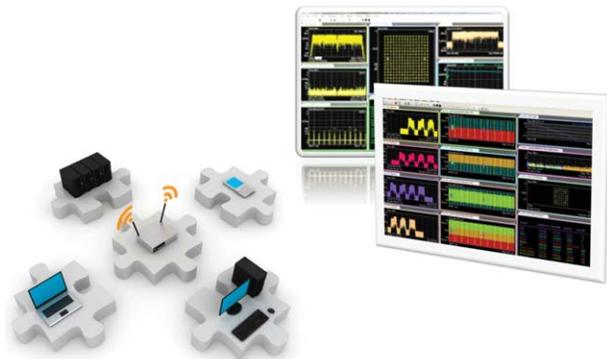
Wireless video and wireless data networking are driving demand for standards, such as 802.11ac, which enable higher throughput.

Design Validation engineers must ensure their 802.11ac designs will perform well under the most demanding modulation schemes, including MIMO spatial multiplexing configurations.

To validate MIMO transmitter performance, you should have a multi-channel signal analyzer that can be used to demodulate the multi-stream waveforms and measure EVM and other physical layer parameters.

Agilent's wideband multi-channel PXI signal analyzer solutions enable MIMO 802.11ac R&D and Test engineers to validate their designs with a mixture of measurement accuracy, fast speed, flexibility and scalability in a small form factor.

For measurements you can trust, with a modular, scalable design for easy upgradability, Agilent's PXI modular software and hardware solutions make 802.11ac validation easy.



## Introduction

Increased use of wireless video and high-speed wireless data networking in homes and offices is driving higher and higher throughput standards. Several standards have emerged that address these new use models, among them 802.11ac, which builds upon the high throughput (HT) capabilities of 802.11n to accommodate these new “Very High Throughput (VHT)” usages.

802.11ac operates in the 5 GHz 802.11a/n bands, and builds upon the high throughput enhancements of 802.11n with key advancements:

- Increased bandwidth (up to 160 MHz)
- Higher-order MIMO (up to 8x8)
- Multi-user MIMO (up to 4 users)
- Higher-order modulation (up to 256 QAM)

## Application Overview

Design Validation engineers must ensure their 802.11ac designs will perform well under a variety of conditions, validating that their devices meet performance requirements even for the most challenging MIMO spatial multiplexing modes.

To validate MIMO transmitter performance, you should have a multi-channel signal analyzer that can be used to demodulate the multi-stream waveforms and measure EVM and other physical layer parameters.

Design and validation of 802.11ac MIMO transmitters requires making EVM measurements of multi-channel MIMO spatial-multiplexing signals. A test solution should be able to make these measurements rapidly, and with a high degree of confidence. The higher-order modulation formats and wider bandwidths proposed in the 802.11ac standard require better EVM than ever before, and the test solution’s residual EVM should be able to exceed these requirements. The test solution should be able to scale with the designs as they evolve, from single- and dual-channel 40 MHz to 3- and 4-channel 160 MHz MIMO designs.

Many test solutions today do not support the wide bandwidths or multi-channel capabilities required by 802.11ac designers. Furthermore, they may lack a full-featured analysis package that includes hardware control and standards-based 802.11ac modulation quality measurements.



Figure 1. 3-channel vector signal analyzer configuration

## Solution

Agilent addresses these requirements with a multi-channel PXI signal analyzer solutions, with up to 4 analysis channels in a single PXI chassis, 780 MHz bandwidth per channel, and fast transfer speeds over the PCIe backplane. Agilent’s trusted 89600 VSA software is used to make standards-based 802.11ac physical layer measurements.

Wideband multi-channel PXI signal analyzer solutions offer the capabilities required for 802.11ac MIMO transmitter test design validation in a fast, scalable and flexible platform. Physical layer parametric measurements such as EVM and crosstalk can be measured with Agilent’s 89600 VSA software using standards-based 802.11ac capability.



# APPLICATION NOTE

## Overview



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

## Ordering information

Quantity	Model	Description
1-4	M9202A	12-bit 2 GSa/s IF digitizers
	M9362A-D01	4-channel downconverter
	M9352A	4-channel IF Amplifier/Attenuator
1-4	M9168C	RF Attenuator
1	M9302A	Local Oscillator

## Want to know more

- 802.11 WLAN Test  
[www.agilent.com/find/wlan](http://www.agilent.com/find/wlan)
- Technical Overview: *Testing New-generation Wireless LAN*, publication number 5990-8856EN
- 4-channel downconverter:  
[www.agilent.com/find/m9362a-d01](http://www.agilent.com/find/m9362a-d01)

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Revised: January 6, 2012

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Printed in USA, February 23, 2012  
5990-9872EN

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