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Agilent N4010A Wireless Connectivity Test Set and N4011A MIMO/Multi-port Adapter

Configuration Guide



Introduction

The Agilent N4010A wireless connectivity test set is a measurement solution that helps you achieve low cost and efficient testing of products and components that incorporate *Bluetooth*®, Wireless LAN (WLAN), ZigBee, and other emerging wireless connectivity technologies.

The Agilent N4011A MIMO/Multi-port adapter is a ¼-rack width unit used in conjunction with an N4010A test set. The N4011A provides additional features that support production testing of multi-port MIMO-capable devices under test (DUTs). The MIMO adapter provides a switch matrix to connect the multi-ports of the DUT to the RF IN/OUT port of an N4010A.

This configuration guide is intended to assist with the ordering process for options, hardware, and software accessories for the N4010A wireless connectivity test set. Contact your local Agilent Technologies representative for additional information.

The standard N4010A product includes:

- *Getting Started* guide in hardcopy
- CD-ROM containing the documentation set and all necessary software components
- Country-specific power cord
- USB adapter cable (part number 8121-1354)
- Agilent Automation-Ready CD-ROM (part number E2094-60003)
- Carry handle kit
- Rackmount flange kit
- I/O connectivity (Option 110) to enable use of N4010A with signal creation or analysis software tools, such as 89601A and 89607A vector signal analyzer software, Signal Studio and N4017A *Bluetooth* graphical measurement application

At least one wireless standard option (Option 101, 102, or 103) must be ordered with the standard N4010A product.

The standard N4011A product includes:

- *Installation Guide* in hard copy
- Lock link kit
- Semi-rigid cable (connects the N4011A to the N4010A RF IN/OUT)
- 25-way D-sub cable (auxiliary in/out connection)

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1. Choose the wireless technology standard(s) and additional hardware for your application

Ordering number	Description	Purpose	Requires
N4010A-101	*Bluetooth*	Built-in *Bluetooth* transmitter and receiver tests as defined in *Bluetooth* RF Test Specification 1.2	
N4010A-107	*Bluetooth* EDR link plus measurements	Provides enhanced data rate (EDR) normal and loopback test mode support. Six of the eight EDR transmit and receive test cases built-in	N4010A-101
N4010A-113 [1]	*Bluetooth* audio generation and analysis	Provides built-in audio source and analyzer to perform functional audio test over *Bluetooth* SCO link. A-law, μ-law, and CVSD [2] codecs A-law supported	N4010A-101
N4010A-112	*Bluetooth* headset profile	Provides headset profile for audio testing. May be required for audio testing depending on the requirements of the device being tested	N4010A-113
N4010A-105	*Bluetooth* EDR Tx/Rx	Provides EDR transmit and receive tests via remote interface using software driver provided. Does not support normal mode or test mode (loopback testing)	N4010A-101
N4010A-106	*Bluetooth* EDR Tx only	Provides EDR transmit-only tests via remote interface using software driver provided	N4010A-101
N4010A-109	*Bluetooth* low energy Tx/Rx	Provides *Bluetooth* low energy Tx/Rx measurement as defined in *Bluetooth* RF-PHY Test Specification 4.0	N4010A-101
N4010A-102	2.4 GHz WLAN Tx/Rx analysis	Instrument contains fully-calibrated vector signal generator and wideband analyzer. 802.11b and 802.11g RF test coverage via remote interface using software driver provided	N4010A-110 [3]
N4010A-103	2.4 GHz and 5 GHz WLAN Tx/Rx analysis	Instrument contains fully-calibrated vector signal generator and wideband analyzer. 802.11a, b, and g RF test coverage via remote interface using software driver provided	N4010A-110 [3]
N4010A-108	802.11n MIMO modulation analysis	Provides 802.11n and MIMO measurements	N4010A-103
N4011A	MIMO/Multi-port adapter	Supports the testing of multi-port MIMO-capable DUTs. The N4011A and N4010A-108 combination provides full 802.11n test coverage	N4010A-102, or N4010A-103

2. Choose signal creation options

Ordering number	Description	Purpose	Requires
N4010A-104	Enables fully flexible arbitrary waveform generation	Allows user to download and encrypt waveform files to N4010A using such tools as MATLAB and N4010A Signal Studio [3]	N4010A-102 or N4010A-103
N4010A-204	N4010A Signal Studio license	The N4010A Signal Studio software is a PC-based application used to design 802.11a, b, and g signals. These signals can be downloaded to N4010A (if Option 104 is present)	N4010A-104 and N4010A Signal Studio software (free download [4])

1. *Supersedes Option 111 Bluetooth audio.*
2. *CVSD: Continuous variable slope delta modulation.*
3. *Once downloaded to the N4010A-104, the waveforms can subsequently be uploaded and are encrypted in a format suitable for downloading to any N4010A with Option 102 or 103 installed.*
4. *N4010A Signal Studio software may be downloaded via: www.agilent.com/find/N4010A "Library", "Software & Firmware Downloads".*

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3. Choose control and analysis software accessories

Ordering number	Description	Purpose	Requires
N4017A	*Bluetooth* graphical measurement application	Provides the ability to fully configure the test set and display both numerical and graphical results for *Bluetooth* tests	N4010A-110 N4010A-101 N4010A-113 required for audio capability
N4017A-205	*Bluetooth* EDR measurement	Adds *Bluetooth* EDR measurements to N4017A	N4017A N4010A-105, 106, or 107
89601A-200 89601A-300	Vector signal analysis software with hardware connectivity	Fully-flexible vector signal analysis software	N4010A-110
89601A-AYA	Vector modulation analysis		N4010A-110 89601A-200 89601A-300
89601A-B7R	Wireless LAN modulation analysis software	Specifically designed with preset states to demodulate WLAN signals to perform complex transmitter analysis	N4010A-110 89601A-200 89601A-300
89607A-100	Wireless LAN test suite	Provides one-button WLAN transmitter tests; included in 89601A-B7R, wireless LAN option	N4010A-110

4. Choose calibration certification option

Ordering number	Description
N4010A-1A7	ISO17025 compliant calibration performed prior to shipment

5. Choose a warranty plan

Ordering number	Description
Select coverage	
Included	3-year warranty (return to Agilent), standard
R-51B-001-5F	5-year warranty assurance plan (return to Agilent)

6. Choose a repair plan

Ordering number	Description
R-51B-501	Return-to-Agilent repair agreement
R-51D-501	Return-to-Agilent repair – per incident

7. Choose a calibration plan

For a calibration plan, specify a period of coverage for one of the appropriate plans below when ordering. For more information, please visit **www.agilent.com/find/services_upfront_options**

Ordering number	Description
Select Agilent calibration plan	
R-50C-011-3	3-year calibration assurance plan (return to Agilent)
R-50C-011-5	5-year calibration assurance plan (return to Agilent)

8. Choose productivity assistance and training

Agilent provides both product-specific and technology training, as well as specialized consulting services.

Ordering number	Description
PS-S10	Remote scheduled productivity assistance
PS-S20	Daily productivity assistance
PS-S20-1	1 day of start-up assistance (recommended)
PS-T10-N40XX	*Bluetooth* technology fundamentals; one day

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Recommended Configurations

For *Bluetooth* testing

Development	QA/Integration	Manufacturing
N4010A-101	N4010A-101	N4010A-101
N4010A-110	N4010A-110	N4010A-107
N4010A-107 [1]	N4010A-107	N4010A-109
N4010A-109	N4010A-109	N4010A-1A7
N4017A	N4017A	
N4017A-205	N4017A-205	
For audio testing (for *Bluetooth* headset test), also order		
N4010A-113	N4010A-113	N4010A-113
N4010A-112	N4010A-112	N4010A-112

For WLAN testing (IEEE 802.11a, b, g, and n)

Development	QA/Integration	Manufacturing
N4010A-110	N4010A-110	N4010A-110
N4010A-103	N4010A-103	N4010A-103
N4010A-108 [2]	N4010A-108 [2]	N4010A-108 [2]
N4010A-104	N4010A-104 [3]	N4010A-1A7
N4010A-204	N4010A-204	
89601A-200, 300, B7R	89607A-100	

For 802.11n MIMO testing

Manufacturing
N4010A-110
N4010A-103
N4010A-108 [2]
N4010A-1A7
N4011A

For ZigBee (IEEE 802.15.4-2003) testing

Development	QA/Integration	Manufacturing
N4010A-110	N4010A-110	N4010A-110
N4010A-102	N4010A-102	N4010A-102
N4010A-104	N4010A-104 [3]	N4010A-1A7
89601A-200, 300, AYA	89601A-200, 300, AYA	89601A-200, 300, AYA

For testing multiple wireless technologies (e.g. *Bluetooth*, WLAN, and ZigBee)

Part number
N4010A-101
N4010A-113
N4010A-112
N4010A-107
N4010A-103
N4010A-109
N4010A-108 [2]
N4010A-110
N4010A-104
N4010A-204
N4017A-205
89601A-200, 300, AYA, B7R

1. *If Bluetooth EDR transmitter-only analysis is required, order Option 106 instead of Option 107.*
2. *Option N4010A-108 is required only if you want to perform 802.11n measurements.*
3. *Option 104 is required for customers who want to create and then encrypt their own waveform files for use with N4010A. At least one N4010A-104 instrument is required to generate encrypted waveform files. Once down loaded to the N4010A-104, the waveforms can subsequently be uploaded and encrypted in a format suitable for downloading to any N4010A with Option 102 or 103 installed.*

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Upgrade Options

The following upgrade kits are available for the N4010A wireless connectivity test set. Upgrade kits denoted with "K" are customer or field/Agilent service center-installable.

Platform upgrades

Ordering number	Upgrade description	Notes
N4010AK-110	I/O connectivity upgrade	
N4010AK-104	Fully flexible arb upgrade	If N4010A-102 or -103 is already installed
N4010AK-204	N4010A Signal Studio license upgrade	
N4010AK-040	40-MHz receiver bandwidth hardware upgrade	For units with serial number GB45460100 or lower

Bluetooth upgrades

Ordering number	Upgrade description	Notes
N4010AK-101	*Bluetooth* firmware upgrade	
N4010AK-BT2	*Bluetooth* 2.0 upgrade kit	If N4010A-101 is already installed, contains hardware and firmware required for EDR loopback (Option 107) operation [1]
N4010AK-107	*Bluetooth* EDR link plus measurements firmware upgrade	If N4010A-101 is already installed [2]
N4010AK-105	*Bluetooth* Tx/Rx EDR; firmware upgrade	If N4010A-101 plus either N4010A-102 or -103 are already installed. Note: Does not provide EDR loopback capability
NN4010AK-505	*Bluetooth* EDR (transmit and receive) hardware and software upgrade kit	If N4010A-101 is already installed, and N4010A-102 or -103 are not installed
N4010AK-106	*Bluetooth* Tx EDR; firmware upgrade	If N4010A-101 is already installed
N4010AK-109	*Bluetooth* low energy Tx/Rx software upgrade	If N4010A-101 plus either N4010A-102, -103, or -105 are already installed
N4010AK-509	*Bluetooth* low energy Tx/Rx hardware and software upgrade	If N4010A-101 is already installed and N4010A-102 or -103 or -105 are not installed
N4010AK-113	*Bluetooth* audio generation and analysis firmware upgrade	If N4010A-101 is already installed
N4010AK-112	*Bluetooth* headset profiles; firmware upgrade	If N4010A-111 or N4010A-113 are already installed
N4017AK-205	N4017A *Bluetooth* EDR graphical measurement application	If N4017A is already owned

1. *The N4010AK-BT2 kit cannot be used on units whose serial prefix is lower than GB4444. The N4010A-BT2 kit is only required for EDR loop-back test mode support if the LSS N4010-60010 is present. Press System > Service > Hardware Info to find out the revision of hardware in the N4010A. Units with a prefix of GB4444 (or higher) that do not use LSS N4010-60010 can use N4010AK-107 for EDR loopback test mode support.*
2. *Suitable for units whose serial prefix is GB4444 or higher, or for units that do not use LSS N4010-60010. Press System > Service > Hardware Info to find out the revision of hardware in the N4010A. If LSS N4010-60010 is present, order N4010AK-BT2.*

WLAN upgrades

Ordering number	Upgrade description	Notes
N4010AK-102	N4010A 2.4 GHz WLAN Tx/Rx analysis; firmware upgrade	This license-only upgrade path to Option 102 requires that Option 105 is already installed
N4010AK-103	N4010A 2.4 GHz and 5 GHz WLAN Tx/Rx analysis; firmware upgrade	This license-only upgrade path to Option 103 requires that Option 105 is already installed. It can also be installed on a unit that has Option 102, although in this instance the Option 102 license must be deleted before Option 103 can be installed (the instrument must also be re-calibrated following an upgrade from Option 102 to Option 103)
N4010AK-108	802.11n MIMO modulation analysis license upgrade kit	This license-only upgrade path to Option 108 requires that the N4010A is fitted with RF assembly N4010-61043, motherboard N4010-60025, and LSS assembly N4010-60012. This upgrade path also requires Option 103 be already installed. If this option is not present, then an upgrade to Option 103 must be ordered at the same time as N4010AK-108
N4010AK-502	N4010A 2.4 GHz WLAN Tx/Rx analysis hardware and software upgrade kit	This hardware upgrade path to Option 102 is not required if Option 103 or Option 105 is already installed. A software license is also supplied for 2.4 GHz WLAN Tx and Rx analysis
N4010AK-503	N4010A 2.4 and 5 GHz WLAN Tx/Rx analysis hardware and software upgrade kit	This hardware upgrade path to Option 103 is not required if Option 102 or Option 105 is already installed. A software license is also supplied for 2.4 and 5 GHz WLAN Tx and Rx analysis
N4010AK-508	802.11n MIMO hardware (motherboard) and license upgrade kit	This upgrade path to Option 108 requires that the N4010A is fitted with RF assembly N4010-61043 and LSS assembly N4010-60012, and that N4010-60025 motherboard is not present. The Option 108 license is included in this kit
N4010AK-518	802.11n MIMO hardware (motherboard, RF assembly) and license upgrade kit	This upgrade path to Option 108 requires that the N4010A is fitted with LSS assembly N4010-60012, and that the N4010-60025 motherboard and N4010-61043 RF assembly are not present. The Option 108 license is included in this kit
N4010AK-528	802.11n MIMO hardware (motherboard, LSS assembly) and license upgrade kit	This upgrade path to Option 108 requires that the N4010A is fitted with RF assembly N4010-61043, and that the N4010-60025 motherboard and N4010-60012 LSS assembly are not present. The Option 108 license is included in this kit
N4010AK-538	802.11n MIMO hardware (motherboard, RF assembly, LSS assembly) and license upgrade kit	This upgrade path to Option 108 applies to the N4010A which is not fitted with RF assembly N4010-61043, motherboard N4010-60025, and LSS assembly N4010-60012. The Option 108 license is included in this kit

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Related Products

N4018C *Bluetooth* and WLAN Wireless Test Manager, run-time license and software

N4019C *Bluetooth* and WLAN Wireless Test Manager, Development license and software

Related Agilent Literature

Test Multiple Wireless Connectivity Technologies with One Test Platform, Brochure
literature number 5989-2771EN

N4010A Wireless Connectivity Test Set, Data Sheet
literature number 5989-4035EN

Innovative Solutions for Testing Bluetooth Enhanced Data Rate Products, Product Overview
literature number 5989-3055EN

Agilent N4010A Wireless Connectivity Test Set Performance Guide Using the 89601A Vector Signal Analysis Software and the 89607A WLAN Test Suite Software
literature number 5989-0637EN

Agilent N4017A Bluetooth Graphical Measurement Application, Product Overview
literature number 5989-2771EN

Agilent N4018C and N4019C, Brochure
literature number 5989-5809EN

Bluetooth Enhanced Data Rate (EDR): The Wireless Evolution, Application Note
literature number 5989-4204EN

Bluetooth Measurement Fundamentals, Application Note 1333-1
literature number 5988-3760EN

Bluetooth Manufacturing: A Guide to Getting Started, Application Note 1333-4
literature number 5988-1482EN

Next Generation of WLAN Manufacturing Test Solutions, Application Note
literature number 5989-1194EN

Agilent Wireless Connectivity Testing, Brochure,
literature number 5988-4438EN

Agilent 89600 Series Vector Signal Analysis Software 89601A/89601AN/89601N12, Data Sheet
literature number 5989-1786EN

Web Resources

For additional product information, visit
www.agilent.com/find/n4010a
www.agilent.com/find/n4011a

For information on Agilent's complete WLAN offerings, visit
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