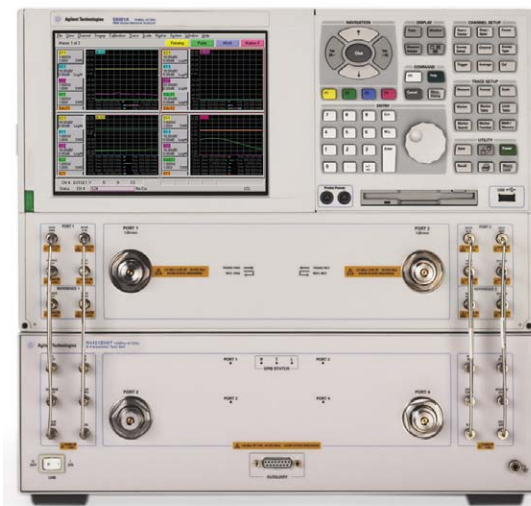
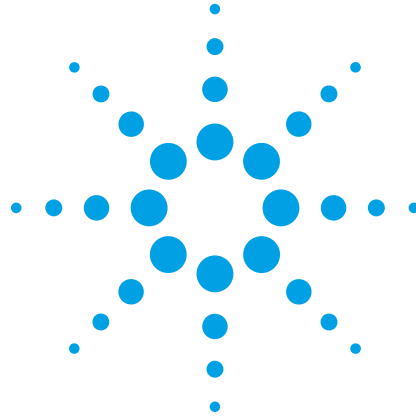


Agilent

N4421BH67 S-Parameter Test Set

10 MHz to 67 GHz

Technical Overview



Expand your 2-port PNA Series network analyzer to a complete 4-port solution

- Compatible with the E8361A Agilent PNA network analyzer
- Solid-state switches for fast and reliable measurement
- Balanced measurement capability
- Control via network analyzer with PNA Option 550



Agilent Technologies

Multiport Measurements – An Introduction



2-port E8361A PNA network analyzer utilizing the 2-port N4421BH67 Test Set.

Many of today's wireless communications and broadband components have four or more ports. These components require multiple connections for complete characterization with a network analyzer. However, time-to-market pressures require that today's components be tested quickly while maintaining high levels of accuracy and high repeatability to achieve production volumes.

Network analyzer sweep speed is only one factor that contributes to the overall throughput that can be achieved in measuring multiport components. The overall throughput depends on how quickly the component can be connected and the system can transition from one measurement path to the next and process that data. Multiport test sets dramatically reduce overall tune and test times because the DUT only needs to be connected once to test multiple signal paths. Minimizing the number of connections also reduces operator fatigue and lowers the chance of connection to the wrong port. In addition, fewer connections mean less wear on cables, connectors, fixtures, and DUTs. A multiport test set is especially valuable in manufacturing applications where the time required for device connection, handling, and/or configuration is significantly greater than the test time. In these situations, a test set provides a solution that supports operators or part-handlers in increasing throughput.

N4421BH67 S-Parameter Test Set



N4421BH67 S-Parameter Test Set front and rear panels.

The Agilent N4421BH67 S-parameter test set, combined with the 2-port E8361A PNA network analyzer and Option 550, offers a complete solution for 4-port measurements.

Features:

- Compatible with Agilent E8361A PNA network analyzer
- Solid-state switches for fast and reliable measurement
- Balanced measurement capability
- Control via network analyzer with PNA Option 550

Signal Integrity Applications



Agilent N1959B Physical Layer Test System for 4-port, 67 GHz signal integrity measurements.

Agilent's Physical Layer Test Systems (PLTS) solutions provide the highest accuracy and most comprehensive tool set for model extraction and characterization of single-ended and differential physical-layer interconnects, or balanced-RF and microwave components with frequency coverage up to 67 GHz. These test solutions offer single-ended, balanced, and mixed-mode measurements in both frequency and time-domain, and eye-diagram analysis with a simple to use graphical user interface.

Features

- Analyze eye diagram for high bit rates
- Extract RLCG for differential transmission line modeling
- Improve design with spatial resolution of 10.7 ps

For additional PLTS information, please visit:

www.agilent.com/find/plts

RF & Microwave Electronic Calibration (ECal)



Agilent offers both 2- and 4-port ECal modules from 300 kHz to 67 GHz.

Multipoint applications can quickly increase calibration complexity. Connecting mechanical standards to multiple ports requires intensive operator interaction, which is prone to error. With ECal, a full one- to four-port calibration can be accomplished with a single connection to the ECal module with minimal operator interaction. The operator simply connects the ECal module via a single USB cable to the network analyzer. The network analyzer controls the calibration process. Easy-to-use operation of the multipoint system minimizes measurement setup time and results in faster and more repeatable calibrations.

Features:

- Fast 2-, 3- and 4-port calibrations up to 67 GHz with a single connection (2-port up to 67 GHz and 4-port up to 20 GHz)
- NIST traceable, accurate calibration
- Direct control via single USB interface
- Reliable solid-state switching
- Reduced connector wear and less error prone (compared to mechanical calibration)
- Nine connector types available and mixed connectors options

For additional Electronic Calibration and ECal information, please visit:

www.agilent.com/find/ecal

System Performance Characteristics*

N4421BH67 4-port Test Set with PNA 10 MHz to 67 GHz

*The following characteristics are applicable for a system in the following configuration:

Network analyzer: Agilent E8361A, Option 014
Test set: Agilent N4421BH67
Calibration technique: Four-port SOLT

Dynamic range

Transmission measurements at 10 Hz IF bandwidth, with four-port error correction.

Frequency range	Dynamic range		Max power
	Max power	-7 dBm	
10 to 45 MHz	47	47	-7
45 to 500 MHz	71	71	-7
500 to 750 MHz	97	93	-3
750 MHz to 2 GHz	98	91	0
2 to 10 GHz	95	88	0
10 to 24 GHz	90	83	0
24 to 30 GHz	82	75	0
30 to 40 GHz	76	71	-2
40 to 45 GHz	65	64	-6
45 to 50 GHz	60	59	-6
50 to 60 GHz	58	55	-4
60 to 67 GHz	52	52	-7

Measurement port characteristics

Residual uncertainties for corrected data. These apply for 25 °C with less than 1 °C variation from calibration.

System Performance Characteristics – Continued

Calibration kit: N4694A Ecal

Description	45 MHz to 2 GHz	2 to 20 GHz	20 to 40 GHz	40 to 67 GHz
Directivity (dB)	50	50	44	38
Source match (dB)	38	39	34	27
Load match (dB)	37	38	33	26
Refl. tracking (mag)	0.040	0.040	0.060	0.090
Refl. tracking (phase)	0.264	0.264	0.396	0.594
Trans. tracking (mag)	0.071	0.060	0.133	0.339
Trans. tracking (phase)	0.469	0.397	0.881	2.238

Calibration Kit: 85058B

Description	45 MHz to 2 GHz	2 to 20 GHz	20 to 40 GHz	40 to 67 GHz
Directivity (dB)	35	38	37	34
Source match (dB)	34	40	42	40
Load match (dB)	35	37	36	33
Refl. tracking (mag)	0.019	0.033	0.020	0.030
Refl. tracking (phase)	0.125	0.218	0.132	0.198
Trans. tracking (mag)	0.098	0.060	0.072	0.129
Trans. tracking (phase)	0.649	0.398	0.472	0.850

Calibration Kit: 85058E

Description	45 MHz to 2 GHz	2 to 20 GHz	20 to 40 GHz	40 to 67 GHz
Directivity (dB)	30	30	28	28
Source match (dB)	28	27	24	24
Load match (dB)	30	30	27	27
Refl. tracking (mag)	0.023	0.029	0.052	0.055
Refl. tracking (phase)	0.152	0.191	0.343	0.363
Trans. tracking (mag)	0.180	0.186	0.296	0.481
Trans. tracking (phase)	1.187	1.227	1.955	3.174

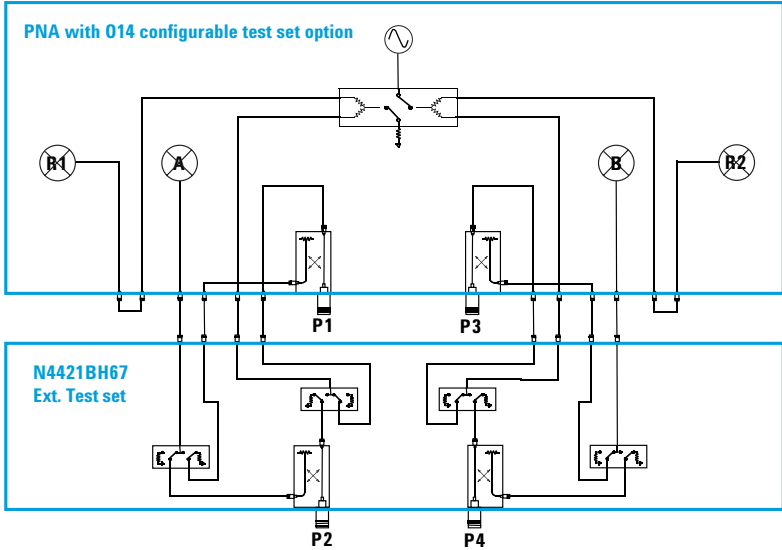
Test set typical performance

Frequency range	10 MHz to 67 GHz
Transition time (10 to 90%)	10.7 ps
Impedance	50 Ohms (nom)
Maximum operating level	+20 dBm
Damage level	+30 dBm
Test port connectors	1.85 mm (m)
RF connectors	1.85 mm (f)
Weight	9 kg

Microwave 4-port Block Diagram



2-port E8361A PNA network analyzer utilizing the 2-port N4421BH67 Test Set.



N4421BH67 block diagram.

Configuration Options for N4421BH67 Test Set (10 MHz to 67 GHz)

Recommended network analyzers:

E8361A PNA Network Analyzer with Option 014 and 550

Highest performance network analyzer with capabilities for advanced applications.

Options descriptions:

Option 014:

Provides front panel access to source output, receiver inputs and couplers to configure a custom test set. Compatible network analyzers: E8361A

Web Resources

The N4421BH67 S-parameter test set is one of many Agilent multiport solutions from 2 to 16 ports.

Agilent multiport solutions are designed to test a variety of devices; from simple duplexers, for both front-end passive and active and wireless infrastructure components, to more complex integrated modules. These solutions optimize key hardware, firmware, and software features, which provide the best accuracy with the convenience of multiport connections and electronic calibration to achieve exceptionally fast measurement speeds.

*For a complete list of Agilent multiport solutions, view or download the *“Agilent Test Solutions for Multiport and Balanced Devices”* Selection Guide (literature number 5988-2461EN) from our Web site.

Visit our Web sites for additional application and product information:

*Multiport Measurements

www.agilent.com/find/multiport

PNA and PNA-L Network Analyzers

www.agilent.com/find/pna

Electronic Calibration Modules (ECal)

www.agilent.com/find/ecal



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Remove all doubt

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