Agilent N5115B
Baseband Studio for Fading

Technical Overview

Powerful and Versatile Fading and Noise Solution

Baseband Studio for fading is a powerful tool for verifying your cellular communications, WLAN, or satellite communications receiver designs. Achieve realistic channel simulation using multipath fading and AWGN, and simulate a diversity antenna or an interfering signal by adding a second channel. Preconfigured fading profiles simplify initial setup, or you can choose user–defined fading profiles to meet your specific test needs.

Use this software to fade your digital baseband signals and apply AWGN, and to convert the faded and noisy signals to analog I/Q or RF using an E4438C ESG, E8267C/D PSG, or E5515C wireless communications test set. Baseband Studio for fading also provides support for digital input or output using an N5101A digital signal interface module, enabling you to connect directly to your device's digital subsystem for added power and flexibility.

Key features

- Fading at frequencies up to 44 GHz
- Dynamic fading
- Digital I/Q input and digital faded output
- Up to 80 MHz simulation bandwidth
- Up to 48 paths (96 paths with second PCI card)
- Optional second channel enables antenna diversity testing or interfering signal simulation
- Standards–based fading configurations for cdma2000®, W–CDMA, GSM/EDGE, COST259, WLAN, 1xEV–DO, TD–SCDMA, cdmaOne, HSDPA/HSUPA, TETRA, and 802.16 OFDM
- Built–in AWGN for each simulation channel
- Analog IQ and RF connections with DUT
- Connects with E4438C, E8267C/D, and E5515C

Download to evaluate the software

Go to **www.agilent.com/find/basebandstudio** and download the software to your PC and evaluate the capabilities of the software. One or two Baseband Studio PCI cards and software licensing are required to use the channel simulation capability. To order, refer to **www.agilent.com/find/contactus.**

Agilent Technologies

Channel Simulation Using Real-World Signal Conditions

Channel simulation is an essential part of the design and verification process to ensure the receiver is robust enough to provide reliable communications under fading conditions. The Baseband Studio for fading software provides the capability to change fading parameters for large– and small–scale fading scenarios with wide signal bandwidths.

Figure 1　Test your receiver diversity designs under real-world conditions. Simulate amplitude fluctuations through Rayleigh fading of dual-channel signals.

Simulate dynamically changing environments

In real–world situations, the receiver is often moving through a particular environment. As the receiver moves by various buildings, trees, and other objects, the path length from the transmitter to the receiver changes. Additionally, the received signal level is modified by the reflection coefficient of the objects the signal encounters, as well as changing Doppler frequency due to the vehicle speed. Baseband Studio for fading simulates these real–world scenarios by dynamically changing the path delay, path attenuation, and Doppler frequency for each path as a function of time. Up to 5000 unique states with user–definable dwell times can be configured for the first six paths in the user interface. Each fading state is entered into a Microsoft® Excel spreadsheet, enabling user–definable algorithms to generate the delay, attenuation, and Doppler variation information. Access a simple Excel spreadsheet template from the user interface to quickly configure the fading data.

A variety of predefined fading profiles and setups

The ability to simulate different fading profiles is essential for evaluating receiver performance in a variety of environments. Baseband Studio for fading can simulate both small– and large–scale fading models or combinations of the two. This enables the simulation of rapid signal fluctuations due to small movements of the receiver, and slow changes in

average power caused by shadowing effects of distant objects. The PC–based user interface makes configuring simulation quick and easy. The supported fading profiles include:

- Rayleigh – small–scale multipath scattering
- Rician – Rayleigh with a direct ray
- log normal – large scale free space path loss
- Suzuki – Rayleigh with log normal
- Pure Doppler – frequency shift due to motion
- Constant phase – change phase and delay of a path
- Rayleigh with frequency shift – Rayleigh with moving reflectors

In addition to the filtered noise method of fading generation, the N5115B also offers Jakes method. Jakes method provides more flexibility by allowing different Doppler frequencies for different paths in the fading configuration as well as Rayleigh fading with frequency shift.

Predefined setups for common wireless formats are included with the software to simplify test preparation. You can modify these standard profiles to provide custom configurations for simulating specific environments. The unique 3GPP W–CDMA moving propagation and birth–death fading profiles are also included as predefined setups.

Fading with the E4438C ESG or E8267C/D PSG

Baseband Studio for fading coupled with an E4438C ESG or E8267C/D PSG signal generator offers R&D engineers the features and power needed to develop and debug high–performance receivers while providing a flexible platform for tomorrow's needs. Take advantage of the ability to fade signals created using the signal generator's built–in personalities or Agilent's comprehensive Signal Studio software suite. Need more flexibility? Fade your own custom waveforms created with Agilent ADS, MatLab, C++, or your preferred signal modeling tool. By adding a second PCI card, you can configure your Baseband Studio for fading solution for more paths, dual–channel capability, or direct connectivity with your devices' digital subsystems.

Fading with the E5515C

Baseband Studio for fading coupled with the E5515C wireless communications test set offers a cdma2000, 1xEV–DO, W–CDMA, or HSDPA RF protocol interface to simulate real network control with realistic fading conditions. The E5515C–based fading solution is ideal for engineers doing final RF qualification and verification of wireless terminals, off–loading the basic RF parametric and functional tests that are often the bottlenecks of larger conformance systems. Additionally, test uncertainty is minimized, and since the same fader hardware can be used with the E5515C and the signal generator, the fading results obtained using the E5515C in final verification will correlate with results obtained using the signal generator in early R&D.
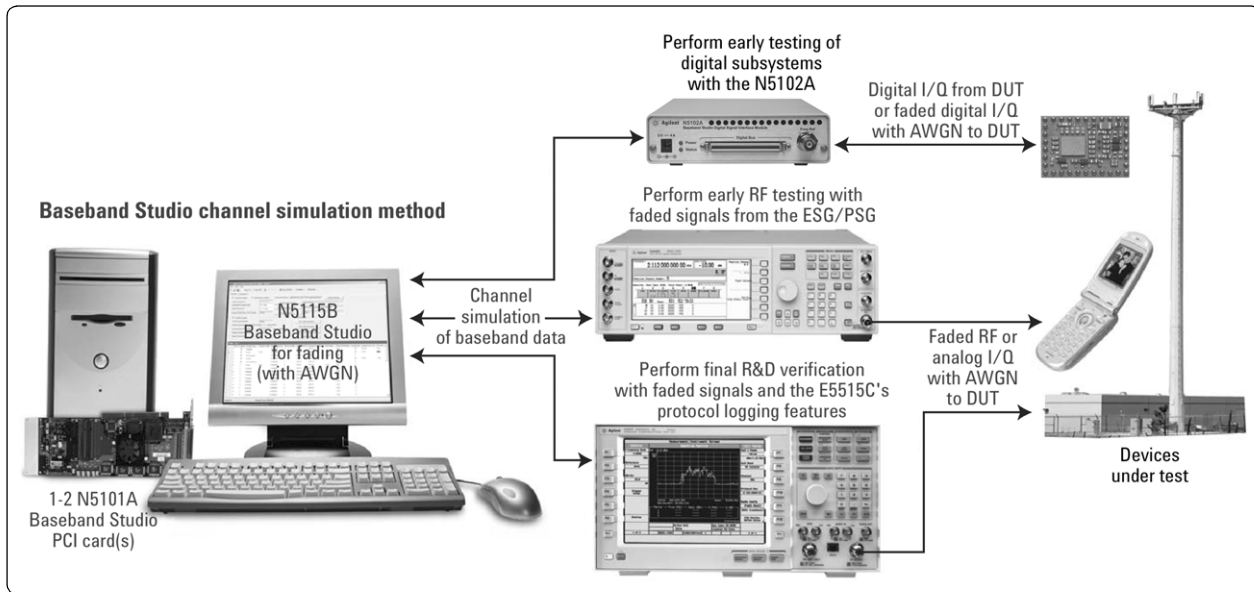
Add AWGN with Ease and Accuracy

Figure 2   Reduce time and cost while increasing accuracy with Baseband Studio for fading's integrated AWGN.

Accuracy

Baseband Studio for fading seamlessly integrates with the N5102A digital signal interface module, E4438C ESG, E8267C/D PSG signal generators or the E5515C wireless communications test set, eliminating calibration issues associated with traditional fading simulators.

The baseband I/Q signal from the signal generator, E5515C, or your device's baseband section is sent to Baseband Studio for Fading as a digital signal with 16 bits of I data and 16 bits of Q data. The multipath fading and AWGN are added to the original baseband data, all in the digital domain. The entire channel simulation process remains digital right up to the point where it is upconverted to RF, IF, or analog I/Q. This results in exceptional C/N ratio accuracy.

Simplicity

Adjust the value of the AWGN by simply entering the C/N or E_b/N_o value in the user interface. Setting the E_b/N_o parameters computes the correct AWGN level on a per–channel basis, and defines the ratio of energy transmitted on the channel to the overall noise power spectral density.

The software automatically queries the ESG, PSG, or E5515C for the current power levels and data rates for the various channels. Baseband Studio for fading then precisely calculates the level of AWGN needed and sets the flat noise bandwidth of the added AWGN to exceed the modulated carrier bandwidth, simplifying AWGN setup.

When setting the level of AWGN you can hold C, N, C/N or C+N constant, making receiver testing easier. For example, fix the C/N ratio as the carrier power changes, or fix the total received power as the C/N ratio varies. This holds the receiver front–end gain fixed, which is important for evaluating receiver performance under known conditions. Changing AWGN levels is also useful for testing the robustness of a particular channel for a given coding scheme. Quickly change C/N and E_b/N_o to characterize receiver performance over a continuum of AWGN levels without having to readjust separate carrier and noise levels.

Flexible Options, Parameters, and Connectivity to Meet Your Specific Fading Needs

Design verification engineers need tools that can replicate the conditions their receivers are designed to handle at various points in the design cycle. Baseband Studio for fading provides a comprehensive solution that offers exceptional fading control, expandability and connectivity options.
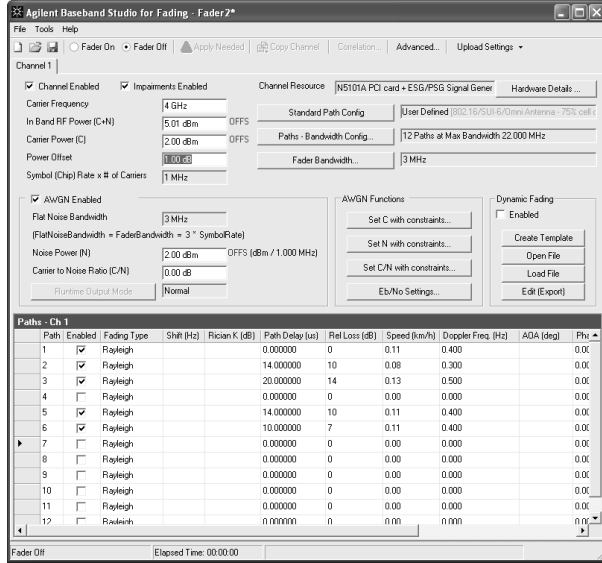
Figure 3 **Baseband Studio for fading has a PC-based user interface that enables quick and easy configuration of channel simulation parameters. Optimize paths or bandwidth when using an ESG or PSG signal generator**

Flexible paths and bandwidth with the ESG/PSG

There are two different bandwidth options available—either 17 or 80 MHz—when using Baseband Studio for fading with the E4438C ESG or E8267C/D PSG signal generator. This lets you choose the level of performance you need, whether you are fading signals for cellular radio formats, WLAN, or microwave applications. The exact bandwidth of the faded channel depends on the sample rate of the signal delivered to the software. Signals that are sampled at a higher rate will have a greater available fading bandwidth.

A unique processing algorithm in the Baseband Studio PCI card enables more paths to be available if the maximum fading bandwidth is not required for a particular application. By adding a second PCI card, up to 96 paths are available for narrower–bandwidth applications, as shown in Table 1. For ESG or PSG applications, Baseband Studio for fading will display the available paths and bandwidths configurations based on the system configuration and the sample rate of the signal.

Table 1 **Maximum number of paths with ESG or PSG.**

0.1 dB Bandwidth	Option 162 (17 MHz) 1 PCI/2 PCI	Option 163 (80 MHz) 1 PCI/2 PCI
5.5 MHz	48/96	48/96
5.6 MHz	45/90	45/90
6.5 MHz	36/72	36/72
8.5 MHz	30/60	30/60
11 MHz	24/48	24/48
13 MHz	18/36	18/36
17 MHz	15/30	15/30
22 MHz	NA	12/24
30 MHz	NA	9/18
46 MHz	NA	6/12
80 MHz	NA	3/NA

Supported applications with the ESG/PSG

Baseband Studio for fading is compatible with most applications that utilize the ESG/PSG baseband generator, including internal personalities and Signal Studio applications.[1]

Compatibility with E5515C lab applications[2]

Baseband Studio for fading is designed to work with the E5515C wireless communication test set's popular lab applications, including W–CDMA/HSDPA, 1xEV–DO, and cdma2000.

The fader bandwidth is optimized for cdma2000, 1xEV–DO, W–CDMA, and HSDPA when using Baseband Studio for fading with the E5515C wireless communications test set. The bandwidth is fixed at 6.144 MHz for the W–CDMA/HSDPA lab application and provides up to 24 paths. The bandwidth is fixed at 1.966 MHz for the cdma2000 and 1xEV–DO lab applications and provides up to 48 paths.

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[1]E4438C-403 and 8267D-403 calibrated noise personality, E4438C-409 GPS personality, and N5110B Baseband Studio for waveform capture and playback are not supported with Baseband Studio for fading.

[2]The internal E5515C AWGN is not supported with fading. To add AWGN to a faded signal, order N5115B-168.

Easy-to-use System Configuration Wizard

The built–in hardware configuration wizard guides you through the steps of detecting, selecting, and setting up various configurations. Use pre–configured quick setups or easily customize them to save time and assure test configuration repeatability. Hardware control panels for the N5102A digital signal interface module and ESG/PSG signal generator are integrated into the user interface for added convenience.
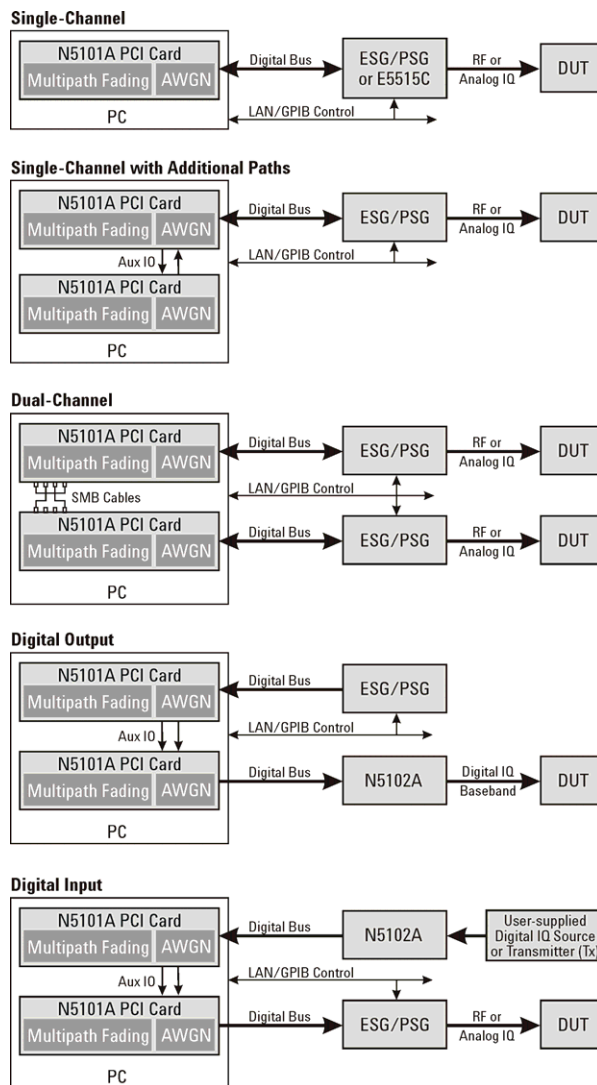
Single-Channel

N5101A PCI Card		Digital Bus	ESG/PSG or E5515C	RF or Analog IQ	DUT
Multipath Fading	AWGN				
PC		LAN/GPIB Control			

Single-Channel with Additional Paths

N5101A PCI Card		Digital Bus	ESG/PSG	RF or Analog IQ	DUT
Multipath Fading	AWGN				
Aux IO		LAN/GPIB Control			
N5101A PCI Card					
Multipath Fading	AWGN				
PC					

Dual-Channel

N5101A PCI Card		Digital Bus	ESG/PSG	RF or Analog IQ	DUT
Multipath Fading	AWGN				
SMB Cables		LAN/GPIB Control			
N5101A PCI Card		Digital Bus	ESG/PSG	RF or Analog IQ	DUT
Multipath Fading	AWGN				
PC					

Digital Output

N5101A PCI Card		Digital Bus	ESG/PSG
Multipath Fading	AWGN		
Aux IO		LAN/GPIB Control	
N5101A PCI Card		Digital Bus	N5102A	Digital IQ Baseband	DUT
Multipath Fading	AWGN				
PC					

Digital Input

N5101A PCI Card		Digital Bus	N5102A	User-supplied Digital IQ Source or Transmitter (Tx)
Multipath Fading	AWGN			
Aux IO		LAN/GPIB Control		
N5101A PCI Card		Digital Bus	ESG/PSG	RF or Analog IQ	DUT
Multipath Fading	AWGN				
PC					

Figure 4 Baseband Studio for fading supports a wide range of system configurations to satisfy your design and verification needs.

One- or two-channel fading

Baseband Studio for fading supports an optional independently faded channel for testing transmitter or receiver diversity or for simulating an interfering signal. This requires the PC to have two N5101A Baseband Studio PCI cards so it can fade a baseband signal from a second signal generator. The correlation between the channels can be specified in the user interface to simulate the distance between the two antennas. The PCI card automatically synchronizes the clocks of both signal generators to ensure accuracy of the transmitted signal.

Digital input and output

The N5102A digital signal interface module provides a flexible way to connect to your device's digital subsystem for channel simulation. In input mode, the interface module transfers your device's digital data to one of the PC's two Baseband Studio PCI cards. After applying digital fading and AWGN, the software sends the signal through the second Baseband Studio PCI card to the connected signal source for conversion to analog I/Q or RF. In output mode, the software uses the same configuration in the reverse data direction, enabling you to deliver faded signals with AWGN directly to your device's digital subsystems.

In both operating modes, the interface module adapts to your device with the data requirements, clock features, logic types, and break–out board connectors to meet your test requirements.

Utilize the Microsoft .NET-based API

Use the Microsoft .NET–based application programming interface (API) to configure channel simulation directly from your test executive rather than from the Baseband Studio for fading graphical user interface. The entire channel simulation process can be automated in your own programming environment. The software's built–in Help system provides Microsoft. Net programming examples. These programming examples can be easily leveraged to minimize the programming and automation learning curve.

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Performance Characteristics

Multipath Fading	E4438C ESG or E8267C/D PSG	E5515C test communication set
RF characteristics		
RF bandwidth[2], maximum		
Option 162	17 MHz	W-CDMA, HSDPA: 6.144 MHz; cdma2000, 1xEV-DO: 1.966 MHz
Option 163	80 MHz	W-CDMA, HSDPA: 6.144 MHz; cdma2000, 1xEV-DO: 1.966 MHz
Maximum paths per channel		
Option 162	Between 15 and 48 paths[3]	W-CDMA, HSDPA: up to 24; cdma2000, 1xEV-DO: up to 48
Option 163	Between 3 and 48 paths[3]	W-CDMA, HSDPA: up to 24; cdma2000, 1xEV-DO: up to 48
Number of channels[4]	1 or 2	1
Carrier feed-through	−55 dBc typical[5]	−47 dBc typical[6]
Signal input/output		
Available inputs[7]	Digital signals from any of the following sources:	
	• customized baseband sources	
	• E4438C-601/602, E8267C-602, or E8267D-601/602 internal baseband generator[8] including user-generated ARB files	
	• E5515C wireless communications test set using the W-CDMA/HSDPA, 1xEV-DO, or cdma2000 lab applications.	
Available outputs	Faded digital or analog I/Q, IF, or RF	Faded analog I/Q, IF, or RF
Simulation method	Filtered noise or Jakes	Filtered noise or Jakes
Spectral shape	3 dB, 6 dB, flat, or rounded	3 dB, 6 dB, flat, or rounded
Fading types	Rayleigh, Rician, Log normal, Suzuki, Pure Doppler, Constant Phase, or Rayleigh with frequency shift	
Rayleigh distribution		
Deviation from CPDF, filtered noise	0.5 dB from 10 to −30 dB of mean power level	0.5 dB from 10 to −30 dB of mean power level
Deviation from CPDF, Jakes	1 dB from 10 to −30 dB of mean power level	1 dB from 10 to −30 dB of mean power level
Rician distribution		
Power ratio (k) range	−60 to 60 dB	−60 to 60 dB
Direct ray angle of arrival	0 to 360°	0 to 360°
Log-normal and Suzuki distributions[9]		
Local constant	1 to 400 m	1 to 400 m
Standard deviation	0 to 12 dB	0 to 12 dB
Path delay	0 to 10 ms	0 to 10 ms
Resolution	< 1 ns	< 1 ns
Accuracy	0.4 ns + 0.2% of path delay	< 40 ns
Phase shift	0 to 360°	0 to 360°
Path loss	0 to 99 dB	0 to 99 dB
Resolution	0.01 dB	0.01 dB
Accuracy	0.1 dB	0.1 dB
Doppler shift	0 or 0.3 Hz to 2.4 kHz (filtered noise) 0 or 0.01 to 4.8 kHz (Jakes)	Maximum Doppler shift limited to 1900 Hz for cdma2000 or 1xEV-DO
Accuracy	0.2% (digital output) 0.05% (all other setups)	

1. Listed specifications are characteristics. These characteristics describe performance distribution derived from measurements where the nominal proportion is typically greater than 50%, e.g. 50% of instruments will meet or exceed the described nominal values.

2. The RF channel simulation bandwidth is dependent upon sample rate and the number of paths selected. The software displays the available paths/bandwidth configurations based on the current settings. The flatness and rolloff characteristics of the source used for upconversion are added to the final RF output. The bandwidth is measured 0.1 dB down from the carrier.

3. The number of paths can be increased up to a maximum of 48 if the full bandwidth is not required. The number of paths can be doubled (up to 46 MHz bandwidth) by using a second N5101A PCI Card.

4. Dual-channel mode requires two ESGs/PSGs, two N5101A Baseband Studio PCI cards, and two sets of options for the Baseband Studio for fading software.

5. Measured under the following condition: After an IQ calibration for a constant amplitude signal at the top of a fade for a single path of Rayleigh fading. Carrier feedthrough will degrade as the crest factor of the modulation signal or fading increases.

6. Measured under the following conditions: After an IQ calibration for a W-CDMA or cdma2000 signal at the top of a fade for single path of Rayleigh fading. Carrier feedthrough will degrade as the fading crest factor increases.

7. RF and analog I/Q inputs are not supported.

8. E4438C-403 calibrated noise personality and E4438C-409 GPS personality are not supported with Baseband Studio for fading. The internal E5515C AWGN is also not supported with fading. To add AWGN to a faded signal order N5115B-168.

9. Not available when dynamic fading is enabled.

Channel simulation (cont)	E4438C ESG or E8267D PSG	E5515C test communication set
Vehicle speed	0, or $V_{min} = \dfrac{180 \times 10^6}{f_{RF}}\dfrac{m}{s}$ (Rayleigh)	0, or $V_{min} = \dfrac{180 \times 10^6}{f_{RF}}\dfrac{m}{s}$
	$V_{max} = \dfrac{7.2 \times 10^{11}}{f_{RF}}\dfrac{m}{s}$ (Rayleigh)	$V_{max} = \dfrac{5.7 \times 10^{11}}{f_{RF}}\dfrac{m}{s}$ (cdma2000 or 1xEv-DO)
	0, or $V_{min} = \dfrac{3 \times 10^6}{f_{RF}}\dfrac{m}{s}$ (Jakes)	$V_{max} = \dfrac{7.2 \times 10^{11}}{f_{RF}}\dfrac{m}{s}$ (W-CDMA)
	$V_{max} = \dfrac{14.4 \times 10^{11}}{f_{RF}}\dfrac{m}{s}$ (Jakes)	
Resolution[1]	0.001 km/h, m/s, mph	0.001 km/h, m/s, mph
Correlation	0 to 1 for each path between channels 1 and 2	NA
Predefined settings	W-CDMA, HSDPA, HSUPA, COST 259, TD-SCDMA, cdma2000, cdmaOne, 1xEV-DO, GSM, EDGE, WLAN, TETRA, and 802.16	
3 GPP W-CDMA tests	Birth-death propagation and moving propagation	Birth-death propagation and moving propagation
Dynamic Fading		
Number of dynamic paths[2]	Up to 6	Up to 6
Number of states	1 to 5000	1 to 5000
Dwell time per state	10 ms to 1000 s	10 ms to 1000 s
Path delay	0 to 10 ms	0 to 10 ms
Path loss	0 to 99 dB	0 to 99 dB
Path Doppler	0 or 0.3 Hz to 2.4 kHz (filtered noise)	0 or 0.3 Hz to 2.4 kHz (filtered noise)
	0 or 0.01 to 4.8 kHz (Jakes)	0 or 0.01 to 4.8 kHz (Jakes)
Path Vehicle speed	See above	See above

AWGN specifications

	E4438C ESG or E8267D PSG	E5515C test communication set
Carrier to noise ratio accuracy[3]	0.3 dB	0.3 dB
Bandwidth	Up to a maximum of 17 MHz with Option 162	W-CDMA, HSDPA: 6.144 MHz;
	Up to a maximum of 80 MHz with Option 163	cdma2000, 1xEV-DO: 1.966 MHz
Crest factor		
3 maximum paths	9 dB minimum	
6 or 9 maximum paths	12 dB minimum	15 dB minimum
$\geq$12 maximum paths	12 dB minimum	15 dB minimum
Randomness	89 bit pseudo-random sequence with a repetition period greater than 3 billion years	
C/N range	−30 to 30 dB	W-CDMA ±10 dB; cdma2000 ±20 dB[3]
Resolution	0.01 dB	0.01 dB
Hold one of the following constant as another of these quantities is varied.	C/N, C, N, or C+N	C/N, C, N, or C+N
E_b/N_o, E_c/N_o, E_b/N_t range	−30 to 30 dB	cdma2000; ±40 dB for E_b/N_t[4]
Resolution	0.01 dB	cdma2000; 0.01 dB for E_b/N_t
Hold one of the following constant as E_b/N_o, E_c/N_o, E_b/N_t is varied.	C, N, or C+N	C, N, or C+N

1. Resolution depends on data rate and carrier frequency.

2. Additional paths beyond the first 6 can be enabled; however, they are not dynamically faded.

3. Not including the effects of carrier feedthrough. Measured with one path of constant fading. C/N accuracy for digital input and output may be decreased to 2 dB in some cases. To optimize C/N accuracy, adjust the N5102A clock phase.

4. Range depends on channel configuration.

Ordering Information

Baseband Studio for fading configuration

Model/option	Description	Notes
N5101A	Baseband Studio PCI card	Required[1]
N5115B	Baseband Studio for fading	Required
N5102A	Digital signal interface module	Optional (Required only for digital input or output)
N5115B-101	ESG fading connectivity for one fading channel	N5115B-101, N5115B-102 or N5115B-125 is required[1]
N5115B-102	PSG fading connectivity for one fading channel	N5115B-101, N5115B-102, or N5115B-125 is required[1]
N5115B-110	Digital I/Q output for one channel	Two N5101A PCI cards and an N5102A digital signal interface module are required
N5115B-111	Digital I/Q input for one channel	Two N5101A PCI cards and an N5102A digital signal interface module are required
N5115B-125	E5515C fading connectivity for one fading channel	N5115B-101, N5115B-102, or N5115B-125 is required[1]
N5115B-162	One fading channel with up to 17 MHz BW	N5115B-162 or N5115B-163 is required[1]
N5115B-163	One fading channel with up to 80 MHz BW	N5115B-162 or N5115B-163 is required[1]
N5115B-168	Add AWGN to one fading channel	Recommended[1]

Recommended ESG configuration

Model/option	Description	Notes
E4438C	ESG vector signal generator	Firmware C.04.10 or later required
E4438C-506	250 kHz to 6 GHz frequency range	Can substitute E4438C-501, -502, -503 or -504 (lower frequencies)
E4438C-UNJ	Enhanced phase noise performance	Only required for Option 506
E4438C-005	6 GB hard drive	Recommended
E4438C-602[2]	Internal baseband generator, 64 MSa	Can substitute E4438C-601 (8 MSa)

Recommended PSG configuration

Model/option	Description	Notes
E8267C	PSG vector signal generator	Firmware C.03.78 or later required
E8267C-520	250 kHz to 20 GHz frequency range	
E8267C-UNR	Enhanced phase noise performance	
E8267C-005	6 GB hard drive	Recommended
E8267C-602	Internal baseband generator, 64 MSa	Required
E8267D	PSG vector signal generator	Firmware C.04.10 or later required
E8267D-544	250 kHz to 44 GHz frequency range	Can substitute E8267D-520, -532 (lower frequencies)
E8267D-UNX	Enhanced phase noise performance	Can substitute E8267D-UNR
E8267D-005	6 GB hard drive	Recommended
E8267D-602[3]	Internal baseband generator, 64 MSa	Can substitute E8267D-601, 8 MSa

1. Two N5101A PCI cards are required for dual channel capability with the ESG or PSG, to support the N5102A digital signal interface module, or to double the number of available fading paths. Dual channel capability is not supported with the E5515C.

2. Replacement kits for E4438C-001 and -002 are E4438CK-601 and -602.

3. Replacement kits for E8267D-001 and -002 are E8267DK-601 and -602.

E5515C configuration

Model/option	Description	Notes
E5515C[1]	Wireless communications test set	Required
E5515C-003	Flexible radio link	Required
E5515C-004	Digital bus	Required
E6702B/T[2]	cdma2000 lab application	One of the following required: E6702B/T, E6703C/D/T, E6706A/T
E6703C/D/T[2]	W-CDMA/HSDPA lab application	One of the following required: E6702B/T, E6703C/D/T, E6706A/T
E6706A/T[2]	1xEV-DO lab application	One of the following required: E6702B/T, E6703C/D/T, E6706A/T
N5880A	cdma2000/IS-95/AMPS enhanced wireless test manager	Optional for automating system
N5882A	W-CDMA enhanced wireless test manager	Optional for automating system

PC configuration[3]

Model/option	Description
PC class	600 MHz Pentium®III
Memory	256 MB, minimum; 512 recommended
Hard drive space	145 MB
Required free slots	1-2 slots for each Baseband Studio PCI card[4]
Operating system	Windows® 2000 service pack 2 or 3 or Windows XP with service pack 1
Software	Microsoft Excel 2000 or later if using dynamic fading feature

1. Older test sets may require additional hardware upgrades to enable fading for W-CDMA/HSDPA.
   Go to www.agilent.com/find/8960upgrades for more information.

2. The E6702T, E6703T, and E6706T lab applications require additional hardware and may have different performance
   characteristics. Go to www.agilent.com/find/8960upgrades for hardware requirements.

3. Agilent does not supply a PC with the Baseband Studio products.

4. The number of required PCI slots depends on the cabling configuration and the version of auxiliary plate that was
   shipped with your N5101A PCI card(s).

Additional Product Information

For more information about Signal Studio software and Baseband Studio products including release notes, user interface descriptions, tutorials, and installation information, read the online documentation at the following websites:

Signal Studio Software

> *www.agilent.com/find/signalstudio*

Baseband Studio Products

> *www.agilent.com/find/basebandstudio*

Compatible Equipment

> *www.agilent.com/find/esg*
> *www.agilent.com/find/esg*
> *www.agilent.com/find/8960devicedesign*

Agilent Baseband Studio Digital Signal Interface Module, technical overview, 5988-9495EN

E5515C Wireless Communications Test Set, Brochure, 5988-0573EN

*Agilent PSG Signal Generator*s, Brochure, 5989-1324EN

Agilent E4438C Vector Signal Generator, Brochure, 5988-3935EN

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Contacting Agilent
For more information on Agilent Technologies' products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

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: 4/25/05

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