Agilent EEsof EDA

W1719 SystemVue RF System Design Kit

Data Sheet

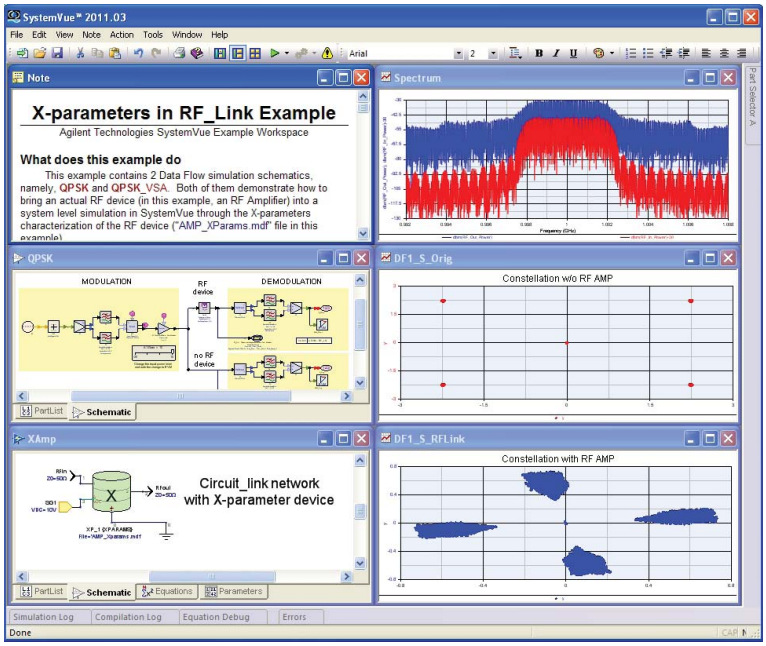

Figure 1. The W1719 brings fast nonlinear X-parameters (ADS) and Fast Circuit Envelope models (GoldenGate) into the dataflow environment, for system-level verification of the full physical layer, including baseband algorithms.

Key Features

- **Spectrasys** – a spectral domain RF System Architecture simulator that offers compelling simulation and interactive graphical Use Model advantages over circuit tools, math-based block sets for time-domain simulators, vendor "calculator" apps, and spreadsheets. Choose from dozens of pre-programmed measurements and interact directly with graphs.
- **RF Link** – a fast, automated dataflow modeling tool that allows system-level Dataflow simulations to use frequency-domain Spectrasys block diagrams directly, without modification. Account for multiple stages of up & down-conversion, spectral inversion, multiple I/O ports, baseband or modulated carrier ports, thermal & phase noise spectral densities, as well as frequency and power-dependence within the band.
- **ADS X-parameter support** – use circuit-level nonlinear X-parameters at the system-level, for fast, bottom-up verification of ADS designs or measured devices from vendors. Accounts for complex impedance loading, harmonics, bias, power & frequency dependence. Enable the new Volterra modeling to make 1-tone X-parameter data more accurate for multi-tone large-signal simulations.
- **GoldenGate "Fast Circuit-Envelope" models** – Verify Wireless SoC/RFIC transceivers up to 1,000-100,000 faster at the system level than with Spice, accounting for frequency translation, frequency & power dependence, and memory effects. Fast enough to run coded LTE BER/Throughput simulations or demodulate live on an Agilent 89600B VSA.
- **WhatIF** – an RF Frequency Planning utility for multi-band, wireless front-ends.

The W1719 RF System Design Kit is an option to the SystemVue environment that adds an innovative RF system-level simulation engine, and also provides bottom-up verification links for designs originating in Agilent ADS and GoldenGate. The W1719 increases the RF modeling accuracy of the main SystemVue dataflow modeling environment, without sacrificing system-level speed and ease-of-use. It is both a captive RF System Architecture tool in its own right, as well as an easy "RF bridge" for System and Baseband algorithm designers who want "just enough RF."

The W1719 bridges design flow gaps for two groups of designers:

- **RF System Architects**
  The W1719 helps create better RF systems, lowers project risk, and saves time and prototyping costs by quickly diagnosing RF/Analog effects that are difficult or impossible to characterize with spreadsheets and other analysis techniques. As an RF architecture tool, it also closes the verification loop by connecting implementation-based models from ADS and GoldenGate into Baseband algorithms, Reference IP, and test equipment, for superior RF-DSP partitioning and model-based verification.
- **Baseband Algorithm and System-level PHY Architects**
  The W1719 provides an easy-to-use RF design flow bridge that is accurate, fast, and doesn't compromise the versatility of SystemVue as a multi-language modeling environment. It allows baseband and system-level designers to take advantage of the accuracy of models based on real transistor-level implementations, but without needing full RF domain knowledge, tools, and licenses. They can simply use the RF models with confidence in the dataflow domain, and exchange results with colleagues across disciplines using a common toolset.

The W1719 provides the RF accuracy, troubleshooting diagnostics, and lightning fast modeling links from enterprise RF design flows required by system architects need to reduce excess design margins for today's challenging wireless and defense systems, without introducing additional project risk. It is essential for physical layer systems requiring high linearity, wide bandwidth, and deep algorithmic complexity.

Agilent Technologies

YouTube Video Tutorials

There are several helpful tutorials and demonstrations available to help you quickly learn about the W1719 RF System Design Kit:

- Bringing RF effects into Baseband DSP using Rflink
- Using Analog/RF X-Parameter Models in System-Level Design
- Applying Spectrasys to Modern RFIC Transceiver Architectures
- Fast Circuit Envelope Models for RFIC verification

http://www.agilent.com/find/eesof-systemvue-video

Who needs the W1719 RF System Design Kit?

Top-level system architects

The W1719 enables superior Baseband-RF partitioning to identify and reduce margins simultaneously in both areas, while allowing continuous BB-RF co-verification throughout a project lifecycle, from architecture & algorithms all the way to hardware test. Account for Zero IF, leakage terms, non-50 ohm terminations, and other RF effects while interoperating with IP at a variety of levels of abstraction.

Baseband DSP/Math/C++ developers

The unique "RF link" feature allows baseband designers to re-use RF Systems directly and conveniently in their native SystemVue DSP environment, without large computational burden from analog/Spice overhead, detailed RF knowledge, or incompatible formats and spreadsheets. If you have ever used "RF" block sets, but used them in an inappropriate time-domain simulator, you urgently need to evaluate SystemVue with the W1719 option.

RF system architects & spreadsheet users

Get superior diagnostic insight, faster results, higher dynamic range and accuracy, and a much easier Use Model than Spreadsheets, Dataflow simulators, or brute-force circuit simulators (such as Spice or Harmonic Balance). Diagnose opportunities that others miss, and propose practical systems quickly. Then verify with real modulation and baseband coding/decoding, connect directly to enterprise design flows, and follow through into measurement equipment, all in the same environment.

Workgroups, and single power-users

SystemVue unites an electronic system-level (ESL) design flow for multi-disciplined design teams in Layer 1 communications or aerospace/defense, yet also provides a cost-effective united platform that meets the needs of smaller organizations, in which 1 person may perform multiple tasks. Moreover, if you are an RF engineer who faces expanded responsibilities for overall ownership of the physical layer (not just the RF), SystemVue can help with linearization, "throughput", and other link-level characteristics, while providing a path to baseband hardware design flows.

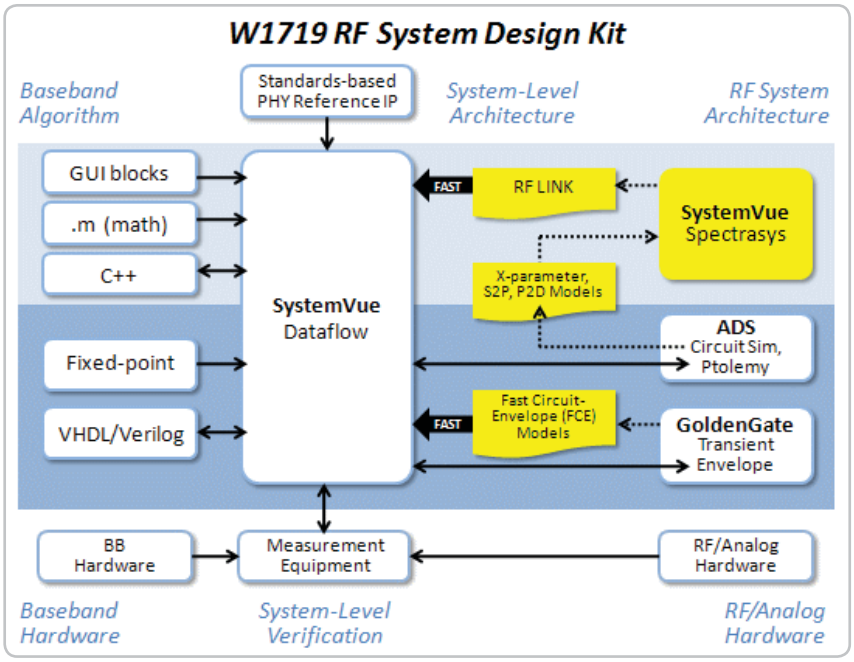

Figure 2. The W1719 RF System Design Kit is an optional add-on to SystemVue that enables deeper insights and RF design flow connectivity than would be possible using only a dataflow simulator.

Spectrasys – Block-level RF simulator for RF Architects

RF System Design Kit saves time for RF system architects by accounting for analog effects while providing one-click graphical diagnosis of RF system performance. Key to this is the Spectrasys simulator.

Spectrasys overcomes key limitations of spreadsheets, math & DSP engines, circuit simulators, and their limited model sets, which miss these analog effects entirely, or make problems very difficult to isolate and diagnose. This allows RF system designers to identify and correct poor architecture choices early in the design, before commitments are made to the frequency plan, board area, layout, bill of materials, and performance.

With more than 100 pre-defined system measurements, and dozens of power and voltage-based behavioral models, designers do not need to spend time writing homegrown code, when they can use a dedicated, graphical tool designed for the RF system design task. High-quality designs can be produced quickly, saving prototyping cycles, costly troubleshooting, and project risk.

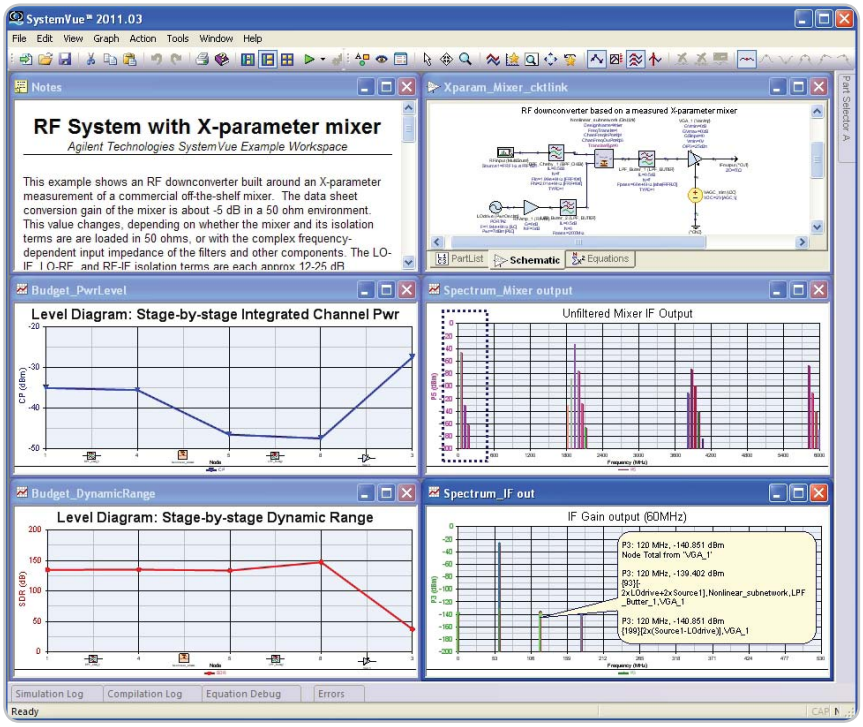

Figure 3. Spectrasys accounts for complex mismatch, bi-directional propagation, nonlinearities, frequency response, leakage terms, continuous spectrums from DC to millimeter waves, and tracks individual signal and noise contributors. These can be inspected interactively in seconds, directly from the graphs.

WhatIF – RF Frequency Planner

The W1719 also provides the "WhatIF" frequency planning tool. WhatIF helps wireless system architects choose a set of Intermediate Frequencies (IFs) that maximize system performance with a minimum of filtering and design margin for multi-band RF receivers. It reduces the frequency planning task from weeks of analysis down to an afternoon using an interactive, graphical approach. It accounts for tuned bandwidths, spurs and intermodulated frequencies.

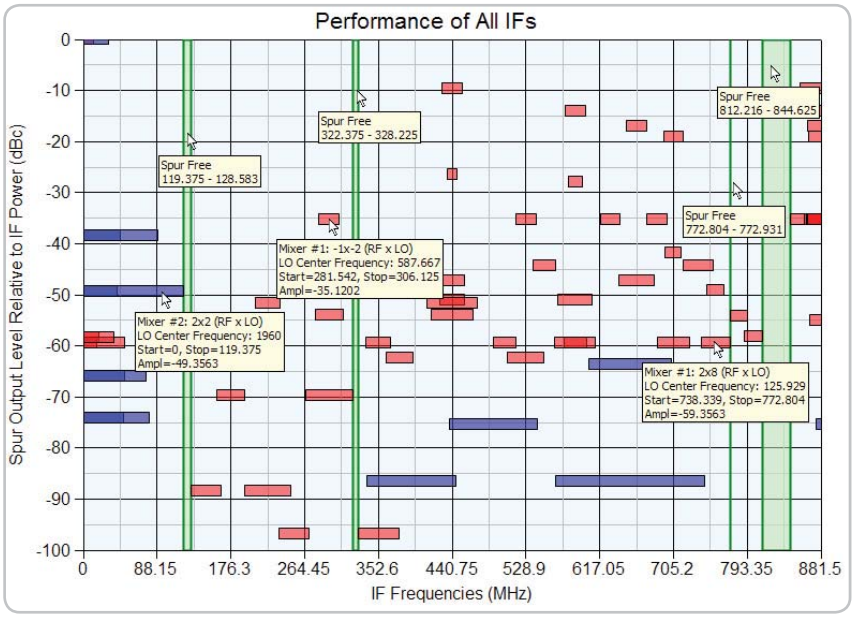

Figure 4. The WhatIF frequency planning tool quickly shows the best choices of IF frequencies for best spur-free performance and with lower system complexity.

Comparison with Genesys Spectrasys

Of the capabilities of the W1719, the basic Spectrasys simulator and WhatIF utility are also available as options to the Agilent Genesys environment. If you primarily design analog/RF circuits, are able to approximate performance using CW tones, or have a low percentage of signal processing content, you may wish to look at the Genesys version of Spectrasys.

If your communications or defense systems contain both RF and signal processing content, require modulation analysis, such as EVM, BER, spectral regrowth, or CCDF, or you need to connect to test equipment, wireless standards references, or interactive baseband modeling, then W1719 RF System Design Kit within SystemVue is the clear choice.

Configurations

The W1719 RF System Design Kit can be added to any SystemVue Environment.

The W1719 is already included in these bundles:

- W1464 SystemVue RF System Architect
- W1465 SystemVue System Architect

Many power amplifier designers interested in this product will also be interested in:

- W1716 SystemVue Digital Pre-Distortion Builder.

For more information about SystemVue, please visit us on the web:

Product information
http://www.agilent.com/find/eesof-systemvue-rf-system-design-kit

Product Configurations
http://www.agilent.com/find/eesof-systemvue-configs

Request a 30-day Evaluation
http://www.agilent.com/find/eesof-systemvue-evaluation

Downloads
http://www.agilent.com/find/eesof-systemvue-latest-downloads

Helpful Videos
http://www.agilent.com/find/eesof-systemvue-videos

Technical Support Forum
http://www.agilent.com/find/eesof-systemvue-forum

www.agilent.com/find/eesof-systemvue-rf-system-design-kit

Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

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

Americas

Canada	(877) 894 4414
Brazil	(11) 4197 3500
Mexico	01800 5064 800
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East

Belgium	32 (0) 2 404 93 40
Denmark	45 70 13 15 15
Finland	358 (0) 10 855 2100
France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 118 9276201

For other unlisted Countries:
www.agilent.com/find/contactus
Revised: October 14, 2010

Published in USA, July 25, 2011
5990-8564EN

Agilent Technologies