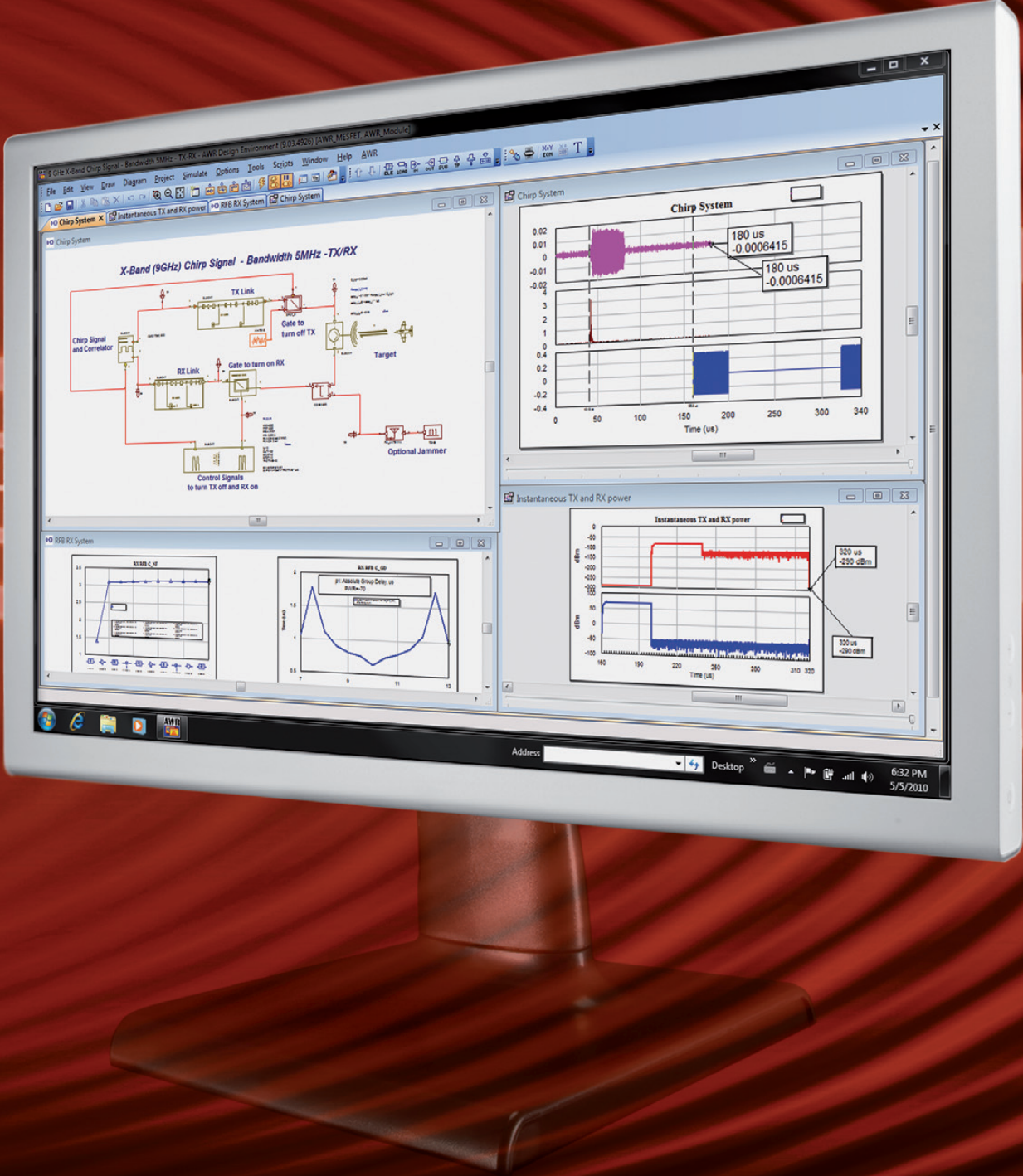


# Visual System Simulator™



Advancing the wireless revolution™

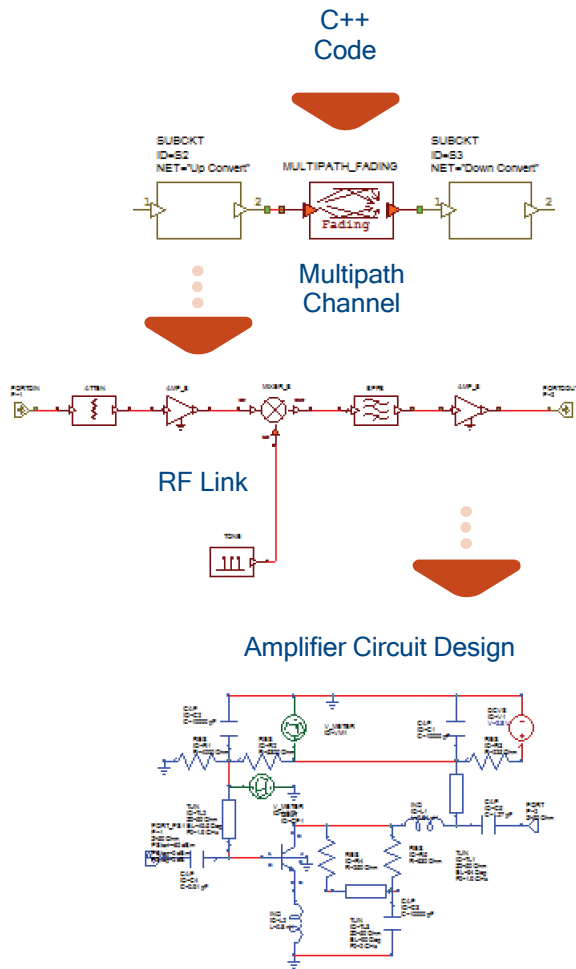


# Advancing the Design of Communications Systems

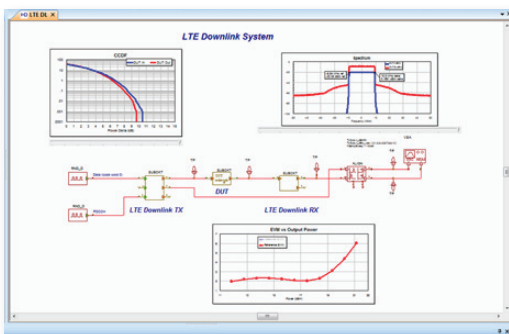
“ VSS gives us a deeper understanding of system aspects. Its flexibility and open platform means parameter optimization can quickly and easily be done. With VSS we were able to successfully realize our system.

Lars Pettersson, Research Engineer

Acree AB ”



VSS software supports the inclusion of custom C++ code models and circuit level component in your system design.



LTE downlink system in VSS.

Visual System Simulator (VSS) software is a comprehensive environment for the end-to-end design and optimization of communications systems. The VSS design software enables you to craft the best architecture for a communications system and optimize each of its components. It reduces cost by eliminating rework and ensuring that components are not over-specified and unnecessarily expensive. With VSS software you can begin at the behavioral level, progress to the component level co-simulating with Microwave Office® or Analog Office® design suites, and even use actual device measurements to validate the final design

## PRODUCTIVITY-FOCUSED DESIGN FLOW

AWR's founding principle is to provide a superior design flow for RF and microwave professionals – inclusive of system level simulation – so that it increases user-productivity and shortens design cycle time.

**Unified Data Model™: schematic and layout** The cornerstone of AWR's design flow is its Unified Data Model architecture with single, object-oriented database that is synchronized for schematic and layout from its core—and not through many layers of software. VSS gives you everything you need to bring your design ideas from concept to simulation and ultimately physical implementation—all in a single platform

## USER-FLEXIBLE DESIGN ENVIRONMENT

VSS software benefits from AWR's long standing commitment to readily enable third-party point tools to function within its design flow framework in order to provide you with a user-flexible design environment that provides you with a complete solution regardless of the stage of the design process.

**C++ and Matlab®: standard tools for system designers** VSS's user-flexible design environment enables the creation of custom models through C++ code. Additionally, with Matlab co-simulation, you can readily import legacy or custom Matlab code into VSS for enhanced system simulation capability.

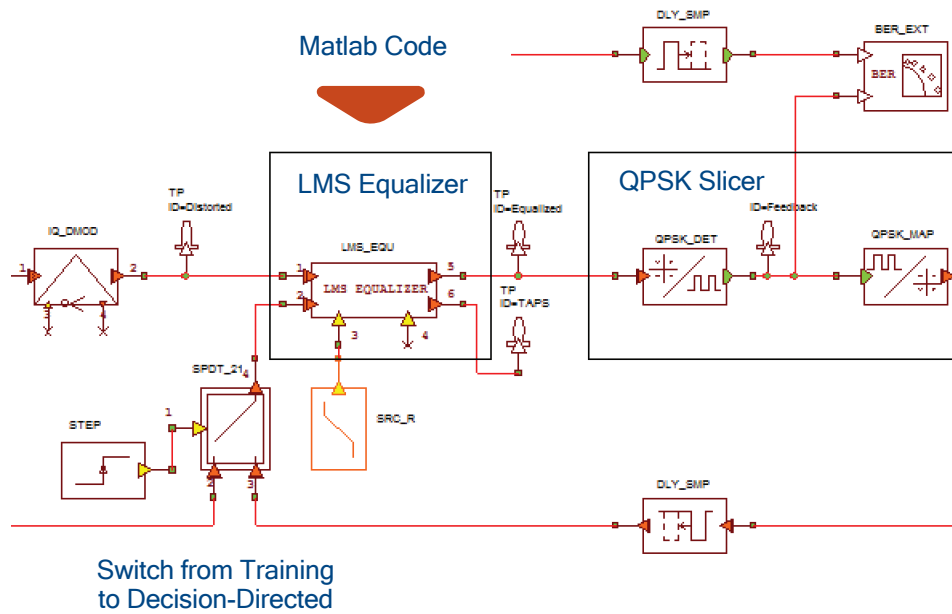
**TestWave™: hardware in the loop simulations** VSS's TestWave software module links test and measurement with system simulation by integrating instruments such as network and spectrum analyzers into VSS via LAN or GPIB.

**R&S®WinIQSIM2™: Rhode & Schwarz communications standards** Fully integrated, WinIQSIM2™ software generates complex digitally-modulated and standard-conform signals.

## SUPPORTED COMMUNICATIONS STANDARDS

### R&S®WinIQSIM2™

- LTE
- WiMAX/802.16d-2004/802.16e-2005 (mobile and fixed)
- CDMA2000
- IS95, which can be used in VSS system diagrams as signal sources for simulation.
- DVB-H/DVB-T
- GSM/EDGE
- 3G WCDMA FDD
- WLAN/802.11a/b/g



## INNOVATIVE TECHNOLOGIES

All of AWR's software tools are continually enhanced to ensure they represent the state-of-the-art in both technology and user-productivity. AWR innovations specific to VSS include:

**RF Architectural Tool (RFA™)** delivers two technologies that enable you to streamline your product development process.

**RF Budget Analysis (RFB™)** enables you to make traditional RF cascaded measurements such as gain, noise figure, and third-order intercept, inclusive of image noise, and perform impedance mismatch along a communication link.

**RF Inspector (RFI™)** helps identify the cause of any intermodulation product of an RF link. It includes the effects of conversions, harmonics, and intermodulation.

Additional innovative features within the VSS software further enhance the user experience:

**TDNN memory effects** - AWR's time delay neural network (TDNN) model is an advanced amplifier behavioral model that accounts for nonlinear memory effects. This innovation provides high fidelity system modeling without the need for circuit envelope and a quality nonlinear black box model to the end customer.

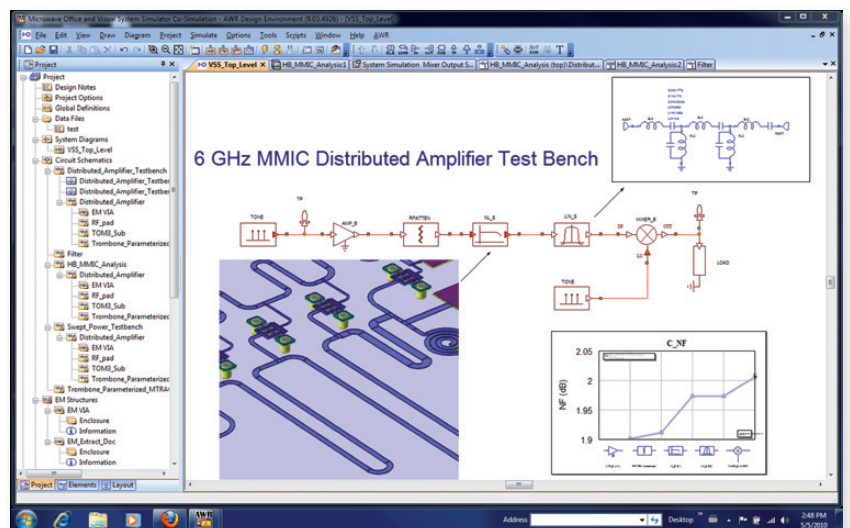
**Turbo decoders** - provides turbo encoding and decoding and custom functionality that supports turbo codes in 3G/4G standards, such as CDMA2000, IS856, WiMAX and LTE.

**Auto-configurable I/Q demodulator** - automatically configures itself to settings of the transmitted signal so you can understand the effect of component impairments on the modulated signals with minimum effort.

**Auto data-alignment for BER simulations** - uses VSS signal generators and the I/Q demodulator to automatically align transmitted-to-received data before performing a BER simulation so that you can perform component tradeoff studies with ease.

**Backward and forward propagation of time step** - makes system design one step easier by "backward propagation" and "forward propagation" of time step, so models automatically adjust their rates.

*VSS software is an efficient and complete for making RF cascade calculations at interior points of the RF link in order to perform EVM measurements.*



*This 6 GHz distributed amplifier test bench reveals Microwave Office components inserted into the VSS test bench for real-time circuit/system level co-simulation.*



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## VSS in the Design Process

- ◀ Development of component specifications
- ◀ Algorithm development
- ◀ Creation of modulated signals
- ◀ Co-simulation with circuit tool
- ◀ End-to-end simulations
- ◀ Prediction of wireless conformance tests
- ◀ Hardware-in-loop simulations

## Features at a Glance

- ◀ Seamless integration with Microwave Office and Analog Office design suites, enabling APLAC® harmonic balance, EM, and/or linear co-simulation



- ◀ RFB for cascaded RF measurements
- ◀ RFI for identification of intermodulation product
- ◀ Optimization and yield analysis
- ◀ RF chain impairment analyses
- ◀ TDNN memory effect
- ◀ Key measurements such as EVM, ACPR, and integrated phase noise
- ◀ Impedance mismatch to monitor VSWR and its impact on the system
- ◀ Communications test benches for cellular, PCS, WiFi, WiMAX, and more
- ◀ R&S®WinIQSIM2™ software (optional) for communications standards inclusive of 802.11n, WiMAX, WLAN, LTE, 1xEV-DO, CDMA200, EDGE/GSM, TD-SCDMA, DVB and more (contact us for latest standards)
- ◀ Signal generators for custom signals
- ◀ Fixed-point library simulation matches mathematics to hardware
- ◀ TestWave module (optional) integrates instruments within VSS to evaluate system performance using real signals