

## OVERVIEW

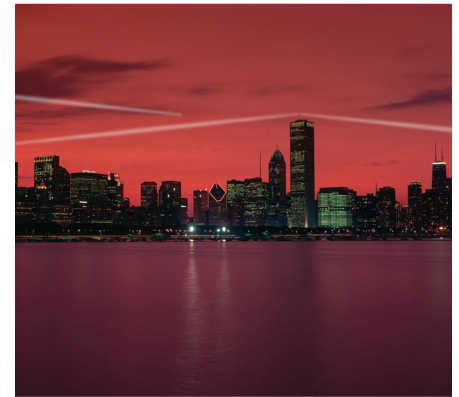
AWR's Visual System Simulator™ (VSS) is a complete and comprehensive software suite for the design of today's complex communication systems. And now with AWR Connected™ for Rohde & Schwarz (R&S), a combined solution exists that integrates design and test domains for orthogonal frequency-division multiplexing (OFDM) signals.

The earlier in the design cycle the engineering team has an accurate prediction of system performance, the faster the team can get thru to final verification and fabrication. While one integrated and complete simulation environment shortens the design cycles/pace, test and measurement (T&M) equipment plays a pivotal role as well in getting to the manufacturing phase. Consequently, it follows that the test signal or vector used with T&M equipment should be one in the same with that used within the simulation environment.

AWR and R&S recognize this reality and in partnership, have seamlessly linked VSS to R&S®WinIQSIM2™ simulation software and to the R&S®FS-K96/K96PC OFDM vector signal analysis software for the demodulation and analysis of generic OFDM signals, further enhancing the connectivity and synergies between simulation and test domains.

## ADVANTAGES AT-A-GLANCE

- ◀ Use same demodulation and analysis methods in simulation environment as in T&M equipment
- ◀ Catch design flaws early in the cycle
- ◀ Optimize component design
- ◀ Evaluate real world RF impairments in simulation environment
- ◀ Predict transmit conformance test results



Connecting System Simulations to T&M Instrumentation



*The spectrum of a mobile WiMAX signal and its constellation, created in R&S®WinIQSIM2™, passed through a VSS simulation and re-exported as R&S®WinIQSIM2™ file and input to the R&S®FS-K96 software.*



## HOW IT WORKS

The R&S®FS-K96/K96PC OFDM vector signal analysis software features modulation measurements of generic OFDM(A) signals that are either user-defined (i.e. proprietary signals in the initial phases of OFDM standards) or compliant with standards such as WiMAX, WLAN, MoCA or DVB-T. The OFDM demodulator is user-configurable and standards independent.

OFDM user-definable parameters include:

- ◀ General OFDM parameters such as signal bandwidth, sample rate, fast Fourier transform (FFT) length, cyclic prefix length
- ◀ Position of the pilots and data carriers
- ◀ Modulation format of the data carriers
- ◀ Preamble structure

Sample list of R&S®FS-K96 software measurements include:

- ◀ Error vector magnitude (EVM)
  - All carriers
  - Only data carriers
  - Only pilots
- ◀ IQ offset (gain imbalance and quadrature offset)
- ◀ Frame power
- ◀ Complementary Cumulative Distribution Function (CCDF)
- ◀ Spectrum flatness

To illustrate (image below), the R&S®WinIQSIM2™ simulation software is used to generate a Mobile WiMAX signal as an R&S® encrypted “wave” (.wv) file which is read into VSS using the WinIQSIM2 source block. The signal is then split into two paths:

- ◀ Upper path– the signal is passed directly through a power amplifier and an EVM measurement is performed using the R&S®FS-K96 software.
- ◀ Lower path– consists of a digital pre-distorter (DPD) built from basic VSS blocks along with a power amplifier. The pre-distortion coefficients are calculated from a circuit simulation measuring AM/AM and AM/PM and taking the inverse characteristics. The R&S®FS-K96 software once again is used to make an EVM measurement. This time however, the EVM is measured after the DPD circuit and power amplifier.

## ABOUT ROHDE & SCHWARZ

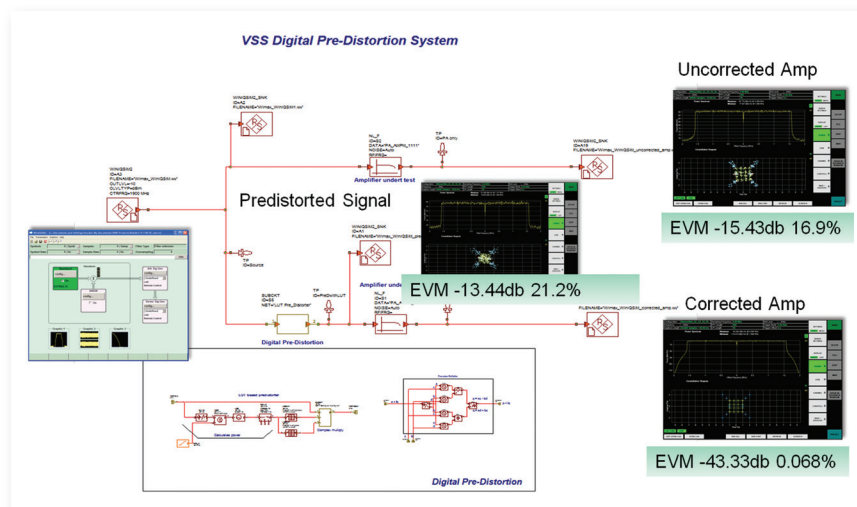
Rohde & Schwarz offers a complete product portfolio of test and measurement solutions, from highly accurate R&D and production testing to conformance tests. To learn more about the R&S®WinIQSIM2™ simulation software and R&S®FS-K96/K96PC OFDM vector signal analysis software packages visit:

[www.rohde-schwarz.com/product/fsk96](http://www.rohde-schwarz.com/product/fsk96)

[www.rohde-schwarz.com/product/winiqsim2](http://www.rohde-schwarz.com/product/winiqsim2)

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*A WiMAX Digital Pre-Distortion (DPD) System realized thru AWR Connected for R&S.*