2006 Visual System Simulator WiMAX Design Solution

Creating WiMAX signals in accordance with IEEE 802.16-2004 specifications

Benefits

VSS WiMAX test projects can easily be configured for simultaneously viewing of:

- **Error vector magnitude (EVM) or relative constellation error (RCE) vs. input and/or output power**
- **Complementary cumulative distribution function (CCDF)**
- **Time-domain waveform**
- **I/Q plot**
- **Spectral mask**
- **Adjacent channel power ratio (ACPR)**

It is not necessary to start with complicated and difficult-to-understand "test benches" in order to obtain critical performance measurements.

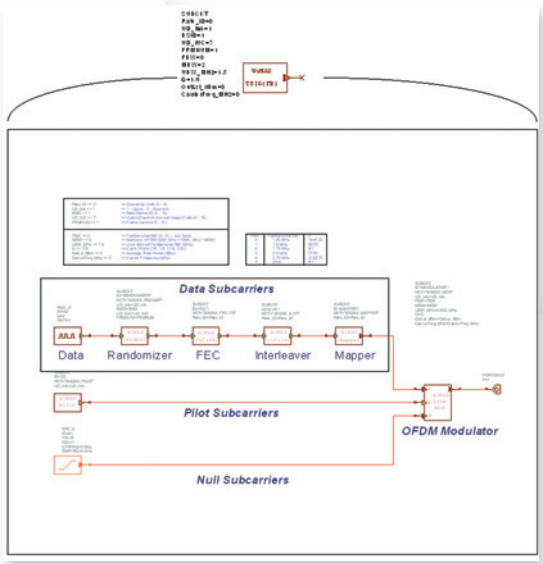
VSS built-in functionality enables implementation of the channel model along with additive white gaussian noise (AWGN) to perform:

- **Bit error rate (BER) or frame error rate (FER) simulations**
- **Receiver sensitivity analysis**
- **Co-channel and/or interference effects on BER performance**

Key Features

A hierarchal WiMAX full-band signal source with user-friendly parameter window includes:

- **A one-step setting for uplink or downlink signal generation**
- **Configurable frames**
- **Support for modes 0 through 6 (binary phase-shift keying [BPSK], quadrature PSK [QPSK], 16 quadrature amplitude modulation [QAM], 64QAM)**
- **Support for Cyclic prefix (G) settings: 1/4, 1/8, 1/16, and 1/32**
- **Setting of average output power level in terms of dBms**
- **Forward error correction and interleaving**
- **Fundamental bandwidth [1.25MHz, 1.5MHz, 1.75MHz, 2.0MHz, 2.75MHz]**



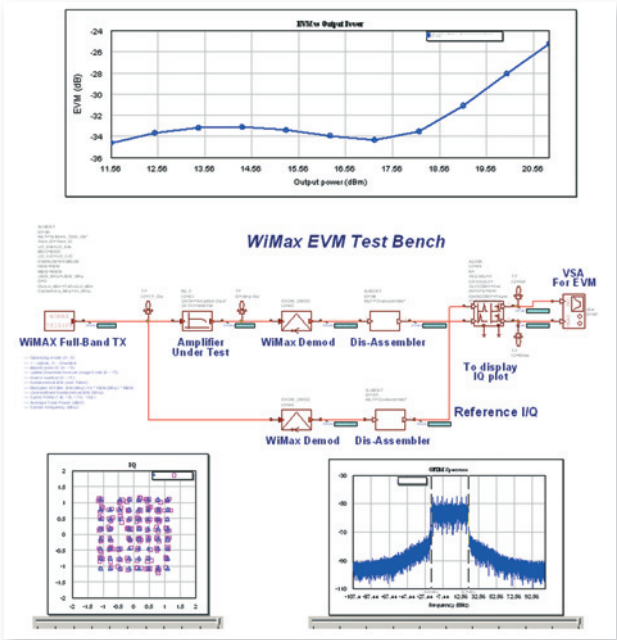
VSS 802.16-2004 WiMAX signal generator

Overview

Worldwide interoperability for microwave access (WiMAX) capability and interoperability in broadband wireless access (BWA) communications products enables network providers worldwide to deliver economical broadband data, voice, and video services to both residential and business customers. The standard, which offers high-capacity point-to-multipoint connectivity, is backed by over 220 of the world's most prominent communications equipment companies.

Visual System Simulator™ (VSS) software from Applied Wave Research (AWR®) provides a WiMAX broadband fixed-wireless solution for the design of WiMAXcertified BWA products. This solution fully meets the IEEE standard 802.16-2004 wireless MAN-OFDM PHY specifications, and includes all the bit-level functions, framing, randomization, RS-CC coding, interleaving, modulation, pilot, channelization, and bandwidth options for uplink and downlink operations.

VSS now enables RF/analog engineers to easily evaluate WiMAX communication systems, including the analog impairments caused by the RF chain. The VSS WiMAX signal generator provides development teams with an intuitive parameter window enabling specification of the key parameters such as bandwidth, modulation type, and average transmitted power. These capabilities help designers reduce time-to-market by eliminating iterations and rework, and cut system costs by ensuring that components are not over-specified and thus unnecessarily expensive.



EVM vs. Output power

VSS 2006 Overview

VSS 2006 design suite is a comprehensive software suite for the design of complete, end-to-end communications systems. VSS 2006 has been enhanced in many areas as part of AWR's ongoing commitment to provide engineers with the unique ability to design the right system architecture and formulate suitable specifications for each of the underlying components in today's complex communications designs.

The VSS 2006 time-domain simulator enables both system and RF/analog engineers to evaluate communication systems that incorporate digital modulated signals with analog impairments due to the RF chain. VSS 2006 offers a robust library of behavioral models, which can be replaced with actual circuit designs or measured data. The software works with both of AWR's circuit design suites, Microwave Office 2006 and Analog Office 2006, to effectively give the engineering team the "big picture" on how component specifications affect overall system performance.

VSS 2006 provides a unique and revolutionary simulation engine that performs true co-simulations with AWR's harmonic balance, linear and electromagnetic (EM) simulators. Because VSS 2006 is seamlessly integrated within the AWR design platform, it eliminates the need for additional control blocks to govern simulations. The AWR design environment automatically initiates a harmonic balance or linear simulation when VSS 2006 uses a Microwave Office- or Analog Office-based circuit.

The AWR design environment is built on a single, integrated platform, eliminating the time-consuming handoffs, errors, and complexity commonly associated with the use of multiple and often disjointed tools needed by different members of the engineering team.

Applied Wave Research, Inc., 1960 East Grand Ave., Suite 430, El Segundo, CA 90245, USA
Tel: (310) 726-3000, Fax: (310) 726-3005, Email: info@appwave.com, Web: www.appwave.com