AWR® Success Story

Acreo Uses Visual System Simulator™ to Successfully Optimize System Performance of Complex UWB Transceiver

Visual System Simulator (VSS) provides deeper understanding of different system aspects and streamlines optimization of various parameters

acreo

Application:
UWB Transceiver for Optical Communication

AWR Software:
Visual System Simulator

CUSTOMER BACKGROUND

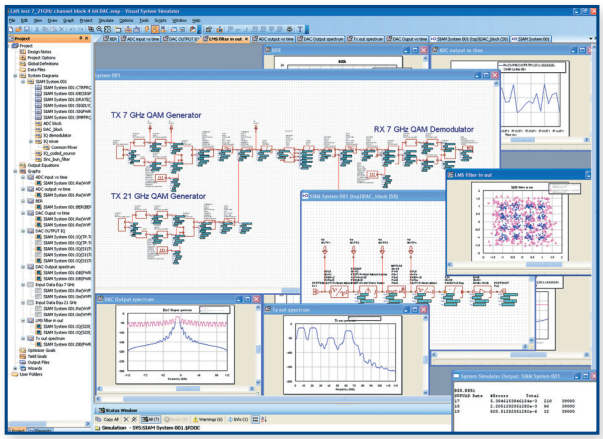
Acreo AB, Kista, Sweden, refines and transfers research results into industrially viable products and processes in the fields of electronics and optics. With operations in Kista, Norrköping, and Hudiksvall, Acreo is active in printed electronics, industrial nano and microtechnology, photonics, quantum well infrared photodetector (QWIP) technology, sysem integration, and relations business services.

ISO9001 certified, Acreo operates clean room facilities for thin-film and volume printing production. The company employs more than 150 people, the majority of whom hold engineering and post-graduate level degrees.

THE DESIGN CHALLENGE

The need for higher capacities within Internet infrastructure is driving the demand for network architectures capable of supporting 100Gb/s Ethernet (IP) based traffic.

One such bandwidth-efficient technology being explored is sub-carrier multiplexing (SCM), where quadrature modulated (QAM) signals on different carrier frequencies are combined and subsequently encoded onto an optical carrier. This transceiver approach capitalizes on the increasing speed of silicon technology (65nm complementary metal oxide semiconductor CMOS process on HR-SOI substrate) to perform more of the signal processing in the electrical domain before converting to light.



2-Carrier SCM transceiver link simulation block diagrams and simulation results in Visual System Simulator.

"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
Acreo AB
www.acreo.se

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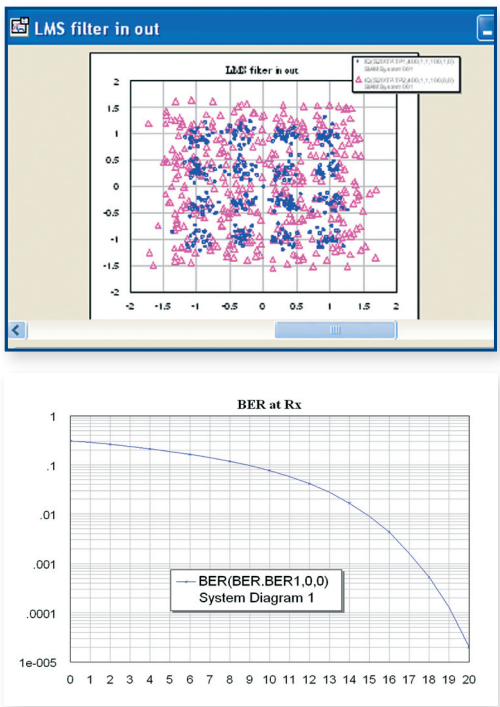
THE SOLUTION

What design problem did AWR's software help you to solve?

We needed to create a SCM transceiver link suitable for 100Gb/s transmission. The system-level development of a SCM transceiver link was modeled within AWR's Visual System Simulator. This RF system model enabled us to assess the influence of component performance in the electrical domain, particularly non-linearity and noise, with respect to the SCM link performance requirements. The design of critical component building blocks in the 65nm CMOS SOI process such as IQ modulators, power combiners, and low noise amplifiers (LNAs) for the SCM transceiver, were done at the circuit level. The performance of these components was then assessed in the VSS system simulation environment to investigate the capabilities of CMOS for next generation optical networking with the SCM architecture.

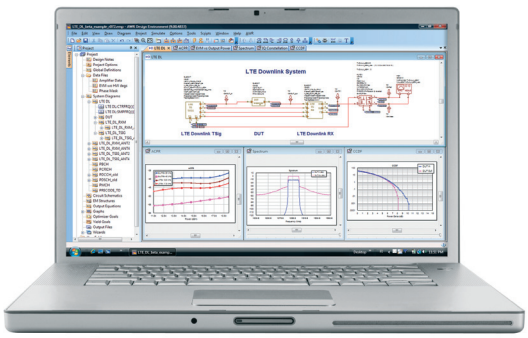
"Using Visual System Simulator together with Matlab® to create the RF system model proved to be a straightforward task." said Lars Pettersson, research engineer at Acreo. "The flexibility, ease-of-use, and open platform of Visual System Simulator was a very positive feature. Visual System Simulator gave a good understanding of how group delay variations affected the whole system performance and we were able to optimize the system using this knowledge."



Visual System Simulator QAM constellation pattern before and after filtering and receiver BER curve.

ABOUT VISUAL SYSTEM SIMULATOR

Visual System Simulator (VSS) is complete and comprehensive software for the design of today's complex communications systems. VSS technology provides engineers with the ability to design the right system architecture as well as formulate suitable specifications for each of the underlying components in the communications designs. Like AWR's flagship Microwave Office® software, VSS is also built on the unique AWR unified data model (UDM), which provides seamless system- and circuit-level co-simulation. VSS is packed with innovative technologies like the RFA™ system-level RF architectural planning tool, which includes RF Inspector™ frequency-domain system simulation.



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