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Module Design with AWR Software

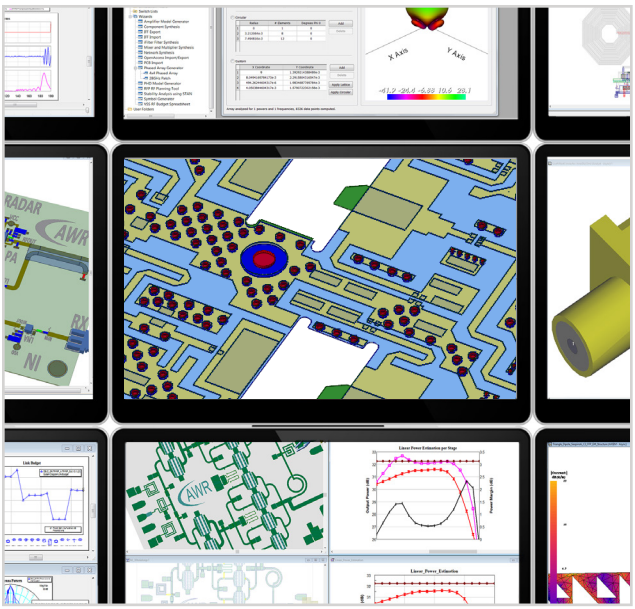
Simulation and design flow technologies that support module product development

RF modules combine multiple integrated circuits (ICs) into a single package, offering a large amount of functionality in a small space. This level of device integration can be an engineering challenge, requiring design teams to model the electrical behavior of different monolithic microwave ICs (MMICs), RFICs, and laminate technologies, including interconnects (transmission lines) and embedded distributed components, as well as RF, analog, and digital components. Electronic design automation (EDA) software is critical for achieving simulation results that are closely matched to the final results.

Module Design Advantage

Module designers use multiple technologies, including III-V semiconductor MMICs, silicon-based RFICs, and multi-ple-layer laminates, to achieve optimal performance in the smallest footprint. Each technology is encapsulated in a specific process design kit (PDK) that details the electrical and physical attributes of the manufacturing process.

The Cadence® AWR Design Environment® platform offers a multi-technology design flow supporting hierarchical projects composed of diverse process-defined subcircuits, as well as circuit/EM co-simulation to model on-chip passives, transmission lines, interconnects, and multi-layer laminate packaging.



Product Strengths

Design Management

Advanced report/measurement management enables designers to track multiple simulation results simultaneously, manage measurement data sources and parameters from a single location, and create sets of linked reports in a single dashboard display.

Simulation

RF front-end modules must perform specific transmit/receive functions according to system requirements for linearity, power efficiency, gain, noise figure, and other figures of merit. Performance must be verified through computer-aided simulation and analysis using specialized measurements in order to achieve these design goals. Cadence AWR® Microwave Office software employs harmonic balance (HB) analysis to simulate the behavior of nonlinear networks with frequency-dependent component responses, including power amplifiers (PAs) and frequency converters (mixers).

In addition, co-simulation with standards-based virtual testbenches in Cadence AWR Visual System Simulator™ (VSS) system design software enables the analysis of digitally modulated modules used for communications systems. The circuit envelope analysis engine simulates metrics such as adjacent-channel power-ratio (ACPR) and error-vector magnitude (EVM).

EM Design/Verification

Module integrators require circuit/EM co-simulation to perform in-situ parasitic extraction, design optimization, and verification. Hierarchical circuit, system, and EM co-simulation with AWR AXIEM® and/or AWR Analyst™ simulators enables designers to optimize passive component design and matching circuit/filter topologies and/or identify parasitic couplings and resonances before tapeout.

Features

Highlights

- Powerful design entry
- Support for heterogenous subcircuits
- Project hierarchy for multi-technology designs
- Accurate, fast, and robust HB simulation
- AXIEM simulator for design verification and parasitic extraction
- Analyst simulator for modeling arbitrary 3D structures
- EM Socket for integration with third-party EM tools
- ERC, DRC, and LVS support production-ready GDSII export and DXF

> *AWR software is a very useful tool that helps us in each phase of a design project. It has many good technologies that streamline our design process.*
>
> Su-Wei Chang, TMYTEK

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