cādence®

AWR Microwave Office

RF and microwave circuit design software

Cadence® AWR® Microwave Office® is used by leading manufacturers to accelerate product development of high-frequency electronics. The intuitive interface, combined with innovative design automation and powerful harmonic-balance circuit simulation, ensures greater engineering productivity and accelerated design cycles. AWR Microwave Office seamlessly interoperates with Cadence AWR Visual System Simulator™ (VSS) system design and Cadence AWR AXIEM® and Cadence AWR Analyst™ electromagnetic (EM) simulation software tools within the Cadence AWR Design Environment® platform to deliver a complete RF and microwave circuit, system, and EM co-simulation environment.

AWR Software Platform

The AWR proprietary unified database directly links RF-aware schematic capture and design layout to accelerate simultaneous physical design with electrical simulation. Powerful design automation and assistance tools such as filter, mixer, passive component, transmission line, and matching network synthesis, along with industry-leading load-pull analysis for power amplifier design, provide critical support for all phases of product development.

Fast and accurate simulation technology offers robust circuit analysis and design insight, providing the linear/nonlinear time- and frequency-domain measurements required to properly characterize and optimize high-frequency electronics.

Comprehensive libraries of high-frequency distributed transmission models, surface-mount vendor components, and process design kits from leading MMIC/RFIC foundries enable accurate simulation of designs prior to manufacture, resulting in fewer and faster design iterations.
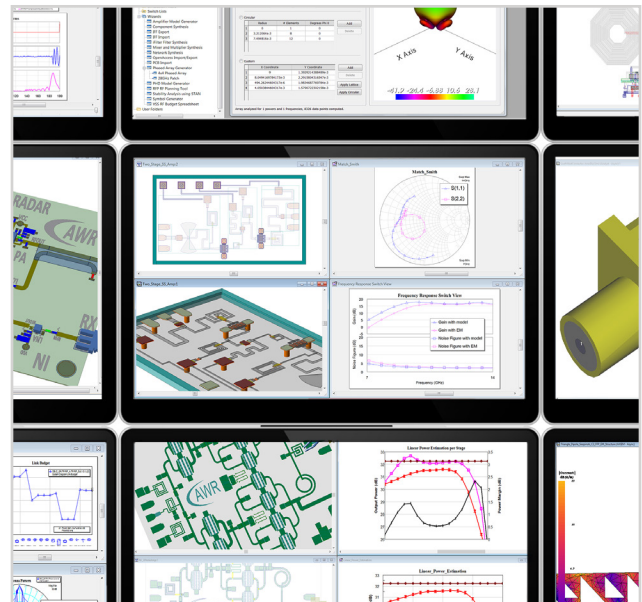
Product Strengths

Design Entry

The intuitive user interface is tailored to provide project management and design entry for high-frequency circuits, enabling designers to quickly build networks from a comprehensive library of RF-aware components. The library supports parameterization for tuning/optimization and hierarchical design with circuit, system, and EM co-simulation, simulation controls, and result graphs for standard and user-customized RF/microwave measurements.

Automation

Powerful automation features expedite design tasks and manage network and measurement data, including labor-saving wizards to import PCB layout and/or OpenAccess schematic information from third-party tools, as well as an easy-to-use application programming interface (API) and scripting functionality to support customization and user-defined automation.

Load-Pull Analysis

Amplifier input/output matching circuits can be readily developed using complex swept load-pull data sets based on either measured or simulated data. Performance contours include available output power, gain, power-added efficiency (PAE), two-tone intermodulation distortion, and other key amplifier performance metrics.

> *Every designer faces a choice during the design cycle: do I believe the simulation results displayed by the software, or not? I trusted the predictions and, thanks to AWR Microwave Office, the new design worked perfectly. The performance we achieved is unlike any other MMIC ever produced.*
>
> Christopher Marki, Marki Microwave

Simulation Technology

The robust AWR APLAC® harmonic-balance (HB) simulator provides linear and nonlinear circuit analysis with powerful multi-rate HB, transient-assisted HB, and time variant (circuit envelope) analysis, supporting large-scale and highly nonlinear RF/microwave circuits.

The AWR AXIEM EM simulator provides the speed and accuracy to characterize and optimize passive structures, transmission lines, planar antennas, and large (more than 100K unknowns) patch arrays.

The AWR Analyst simulator helps accelerate high-frequency product development from early physical design characterization through to full 3DEM verification. Its 3D finite element solver provides fast and accurate EM analysis of interconnects such as bondwires, vias/via fencing, and ball grids.

Synthesis and Design Assistance

Powerful synthesis modules and design assist wizards accelerate design starts that generate impedance-matching networks from vendor libraries and foundry-authorized PDKs for PCB and MMIC designs based on user-specified RF/microwave performance criteria. Synthesized filters, impedance matching, mixer, and passive component networks are available for further refinement, optimization, EM verification, and physical design in AWR Microwave Office software.

Features

Highlights

- Schematic/Layout – Synchronous schematic/layout design entry with industry-leading tuning
- APLAC – Linear and nonlinear harmonic-balance circuit simulation
- EM Analysis – Fully integrated electromagnetic (EM) with AWR AXIEM and AWR Analyst tools
- Load-Pull – State-of-the-art load-pull analysis with harmonic and video-band tuning
- Stability – New fast, rigorous loop circuit envelope analysis for multi-stage and balanced amplifier stability
- DRC/LVS – Design rule checking/layout vs. schematic

# Applications and Technologies

MMIC

The front-to-back monolithic microwave integrated circuit (MMIC) design flow with an innovative user interface and complete integration of design entry, simulation, and physical design tools enhances engineering productivity and ensures first-pass success with PDKs from a wide range of gallium arsenide (GaAs), gallium nitride (GaN), silicon germanium (SiGe), and CMOS foundry partners. The hierarchical framework supports simulation of diverse MMIC, RFIC, and PCB processes, multi-layer interconnects, embedded passives, and surface-mounted mini-devices found within multi-chip RF modules.
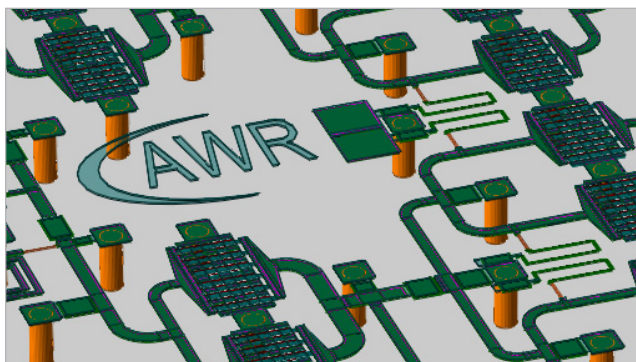
PCB

Accurate modeling of transmission media from the RF signal path to digital control and DC bias lines supports increasing functionality of PCBs. Circuit/system and EM co-simulation provide complete analysis of surface-mount components, interconnecting transmission lines, and embedded and distributed passive elements, as well as EM verification. The integrated platform supports concurrent electrical/physical design and circuit/system/EM co-simulation to minimize reliance on disparate point tools. RF-aware PCB design with EM co-simulation provides enhanced accuracy and greater fast-pass success.
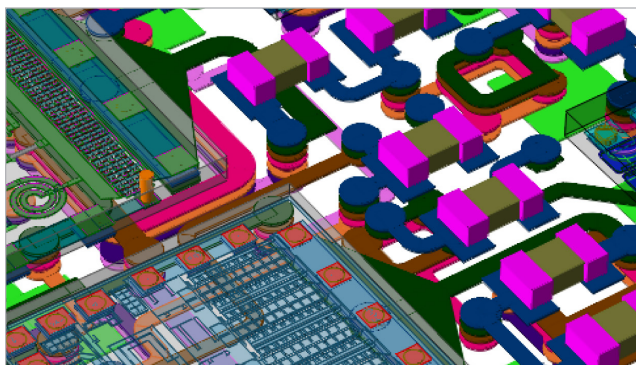
Module

Multi-technology integration models the behavior of many different technologies and the hierarchical framework supports simulation of diverse MMIC, RFIC, and PCB processes, multi-layer interconnects, embedded passives, and surface-mounted mini-devices found within multi-chip RF modules. Design automation accelerates product development with smart workflows for module realization. EM-enabled parasitic extraction and design verification provide enhanced accuracy and greater fast-pass success. The integrated platform supports concurrent electrical and physical design, as well as circuit, system, and EM co-simulation to minimize reliance on multiple point tools.
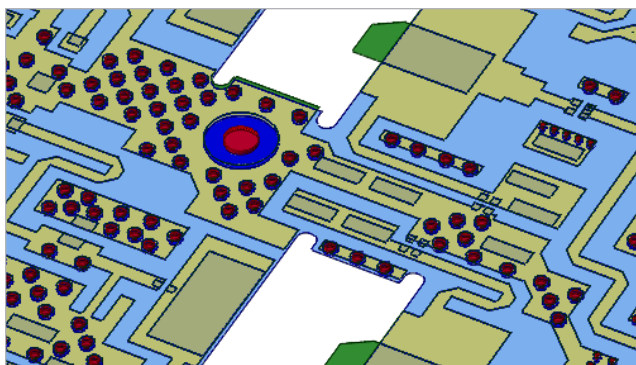
Services and Support

▸ Get started faster or work through tough issues by contacting AWR software support engineers who are ready to help via phone and email during normal business hours.

▸ Access volumes of self-help information in the AWR KnowledgeBase at kb.awr.com, including application tips, example projects, user forum, and more.

▸ Get a jump-start with self-paced modular training videos on awr.com/elearning that educate new users on AWR software.

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