AWR Design Environment

RF/Microwave EDA Software Suite

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AWR Design Environment is an EDA software suite that provides RF/microwave engineers with access to innovative high-frequency circuit, system, and EM analysis technologies. Today's microwave and RF engineers use this powerful, open platform to design wireless products ranging from base stations to cellphones to satellite communications.

AWR Design Environment advantages are straightforward:

- An intuitive use model that delivers an exceptional user experience (UX)
- Robust simulation technologies that deliver both speed and accuracy
- An open design flow supporting data to/from third-party tools.

AWR Design Environment
Microwave Office
Visual System Simulator
Analog Office
AXIEM
Analyst

Advantages

Powerful, Innovative UX

An intuitive yet powerful design environment unleashes engineering productivity, enabling designers to address the emerging communication and radar systems driving today's high-frequency hardware developments and integration technologies.

Robust Simulation

Advanced simulation technologies support detailed device modeling and the same performance measurements used to specify device requirements. These technologies provide fast, accurate results with fully integrated system, circuit, and EM analyses that accurately predict and optimize component performance before prototype manufacturing and test, saving development time and costs.

Automation and User Productivity

Design-flow automation connects simulation models, third-party tools, and layout geometries to manufacturing processes to aid designers as they move from early concept through engineering signoff. Flows for PCB, MMIC, RFIC, and multi-chip module fabrication provide specialized support through process design kits (PDKs), wizards/scripting, and third-party solutions.
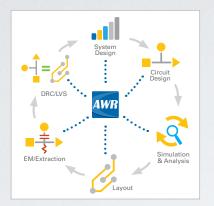
> "AWR Design Environment is a highly integrated platform that brings together almost all aspects needed for RF design. Within it, Microwave Office software has a very friendly user interface that enables designers to have full control of the tool."
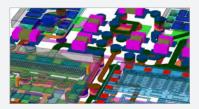>
> — Bumjin Kim, Qorvo

Capabilities

Unified Design Capture – Provides a front-to-back physical design flow for MMIC, RFIC, PCB, and module process technologies with dynamically-linked electrical and layout design entry. Components placed in an electrical schematic automatically generate a synchronized physical layout based on libraries of standard and/or customized components, allowing designs to progress from early concept through final layout in a logical and straight-forward manner.

Simulation and Analysis – Integrates circuit, system, and EM simulation technologies, enabling RF/microwave circuit designers to develop component specifications from system link budgets and analyze device performance with system test benches for communication standards, study linear and nonlinear (time and frequency domain) network behavior, and perform in-situ EM extraction of interconnects from within a single environment.

Design Management/Flow – Supports complex hierarchical projects with parameterized subcircuits for easy optimization and state-of-the-art tuning. Circuit, system, or EM-based subcircuits can be quickly generated and reused to create the complex networks common in today's RF front-end circuitry. Additionally accounts for the parasitic effects of transmission line losses, electromagnetic coupling between structures and impedance mismatches. The layout and physical design work directly with AXIEM 3D planar and Analyst 3D finite element method (FEM) EM solvers to characterize the electrical performance of passive on and off-chip components and interconnects.
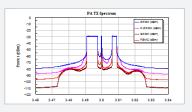
Interoperability and Manufacturing – Supports third-party interoperability with industry-standard tools, allowing the exchange of design data for schematic/netlist import, bi-directional EM co-simulation, ERC/DRC/LVS, and production-ready GDSII export. Powerful yield analysis and optimization supports robust design.

Scripting, Customization and More – The powerful application programming interface (API) extends the capabilities of the software using popular programming languages, enabling users to create scripts for automating common or complex tasks. The platform also offers PDKs, a custom library of models, layout cells, and symbols, as well as other information that configures the environment for a specific foundry process.
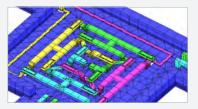

RF/Microwave Circuits
Design and simulate RF/microwave components such as PAs, LNAs, filters, mixers, oscillators, and passive devices that are widely used in radios and communication and radar systems.

Communication Systems
Create end-to-end communication systems, including RF front-end behavioral blocks and signal-processing components, to develop communication algorithms, determine RF link budgets, and simulate digitally-modulated devices.

EM Analysis
Simulate and optimize the electrical performance of high-frequency passive components and complex interconnects to ensure accurate circuit analysis and first-pass success.

AWR Design Environment

- Microwave Office – RF/Microwave Circuit Design
- Visual System Simulator™ (VSS)– Wireless Communication/Radar Systems Design
- Analog Office – RFIC/Analog IC Circuit Design
- AXIEM – 3D Planar EM Analysis
- Analyst™ – 3D FEM EM Analysis

AWR Design Environment
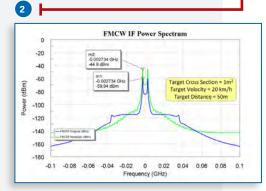
① Microwave Office
RF/microwave circuit design software that includes comprehensive component libraries and an integrated APLAC harmonic balance engine for nonlinear, frequency and time-domain analysis, as well as circuit envelope for digitally-modulated devices.
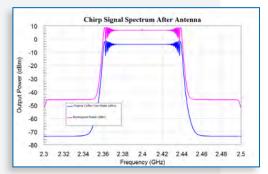
② Visual System Simulator
Communication and radar system design software that provides behavioral models and analysis for end-to-end simulations of baseband through the RF front-end /propagation channel for the development of system architectures, transceivers, and antenna arrays.

Analog Office
An ideal solution for small-scale (low-to-moderate number of active/passive on-chip devices) RFIC design entry, project management, simulation, and post-processing of results for silicon-based devices.

Integrated Design
AWR Design Environment brings together all phases of high-frequency electronic development, including schematic/layout capture, circuit/system/EM co-simulation, and automation to accelerate design starts, optimize and tune performance, and produce manufacturing-ready physical designs.

Intuitive
AWR software enables engineers to work with different model types and simulators, as well as electrical schematic or physical layout, all from within a single, common interface. Not having to manually transfer design data between point tools or struggle with poorly integrated legacy platforms, engineers using AWR software are more efficient and productive.
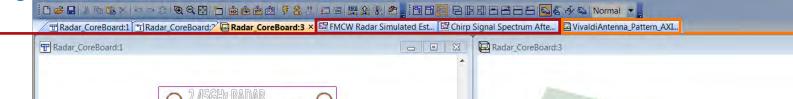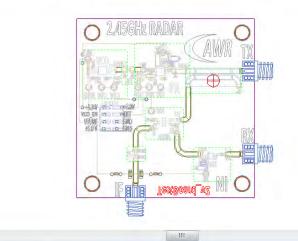
Open Platform
AWR Design Environment was designed to interoperate seamlessly with third-party layout (CAD) tools and EM simulators, enabling organizations to optimize their design flows around their specific tool requirements, engineering disciplines, manufacturing needs, and existing EDA infrastructure.
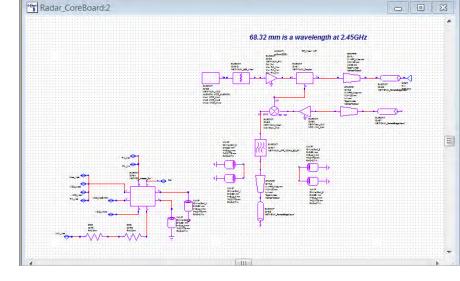
Design to Build
First-pass success requires a platform that offers fast and accurate EM extraction and circuit simulation, as well as the ability to incorporate all the design details that will impact device performance, including manufacturing tolerances and process variations. AWR software provides the power to accurately solve large, complex problems and ensure robust design.
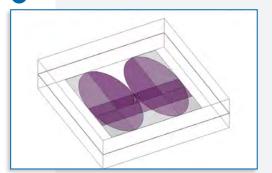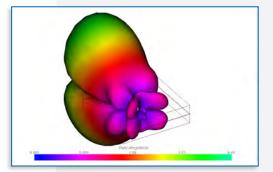
③ AXIEM
3D planar EM analysis software that offers fast solver technology to readily characterize and optimize antennas, passive structures, transmission lines, and large planar devices on RF PCBs, modules, LTCCs, MMICs, RFICs.

Analyst
Arbitrary 3D FEM EM simulation software provides fast and accurate analysis of non-planar structures such as horn and wire-based antennas, waveguide structures, resonant cavities, and component housings, as well as common or complex interconnect technologies such as wire bonds, ball grid arrays, and vias.

Customer Design Challenges

Microwave Components

Enhanced circuit envelope and robust transient and harmonic-balance simulation, as well as stability analysis, combine with design synthesis, load-pull data management, and powerful measurement plotting/visualization to accelerate front-end circuit design and optimization.

MMICs, Modules, and Boards

Enhancements in simulation technology, automation, and design flow capabilities support the physical design of high-frequency electronics with improvements in speed, accuracy, and design management for complex process technologies, including mixed-technology design, which is required for multi-chip module integration..

Radar and Antennas

Phased-array models enable antenna-array planners to rapidly construct custom array configurations based on measured or simulated radiating-element data to study beam steering, shape the main beam and side lobes, and understand the impact of beam steering on driver input impedance..

RFICs

Advancements in silicon technology are providing greater performance and functionality for high-volume, low-cost RF applications. These highly complex devices require design flows that bridge the gap between mainstream analog/mixed-signal EDA and RF-aware simulation.

Wireless Communications

Carrier aggregation with intra/interband component carriers, throughput measurements of combined component carriers, and 5G candidate modulation waveforms are supported with added functionality that includes signal generation and demodulation for full-system simulation, such as APCR, EVM, and BER measurements.

Try AWR

Try AWR Design Environment today and see for yourself how easy and effective it is to streamline your design process, improve end-product performance, and accelerate time to market for MMICs, RFICs, RF PCBs, microwave modules, antennas, communication systems, radar systems, and more.

Download your trial at awrcorp.com/tryawr

"With intense time-to-market pressures, our designers need proven design flows that work seamlessly. AWR Design Environment fills this need."

— Dr. Simon Mahon, MACOM

Services and Support

Technical 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.

Technical Resources
Access volumes of self-help information at awr.com/support, including application tips, example projects, user forum, and more.

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

Academic Resources
AWR software donations are available to support academic institutions with an emphasis on teaching and/or non-proprietary research.

AWR Learn more at awr.com

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