DATASHEET

AWR AXIEM

3D planar EM analysis software

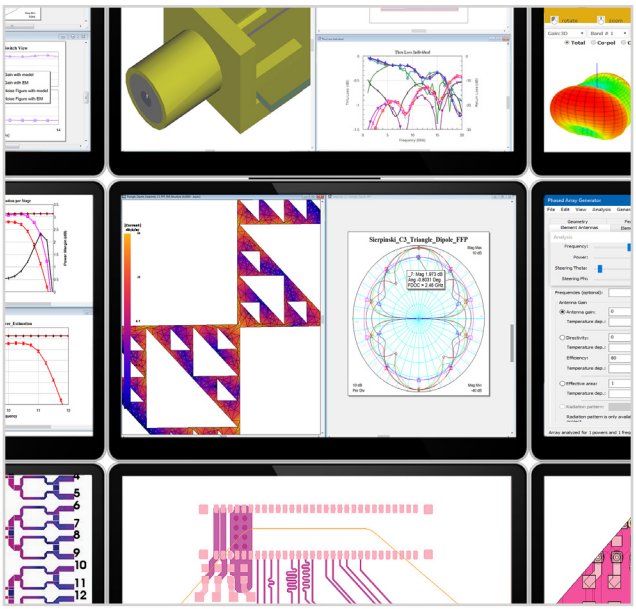
The Cadence® AWR® AXIEM® 3D planar electromagnetic (EM) analysis software in the Cadence AWR Design Environment® platform provides fast solver technology that readily addresses passive structure, transmission line, large planar antenna, and patch array designs. Whether characterizing and optimizing passive components on RF PCBs, modules, low-temperature co-fired ceramics (LTCCs), microwave monolithic integrated circuits (MMICs), RFICs, or antennas, AWR AXIEM software has the accuracy, capacity, and speed needed to ensure a right-the-first-time design.

AWR Software Platform

Fast and accurate adaptive hybrid-meshing technology supports thick-metal planar structures and vias to automatically break down structures into triangular and rectangular elements for maximum accuracy and robust broadband results, from DC to daylight.

Seamless integration with circuit and system designs supports direct EM co-simulation of planar structures such as passive components and interconnects. The proprietary AWR unified data model enables EM extraction and design verification, directly incorporating the results into circuit and/or system simulations without having to perform explicit layout definition, EM simulation set-up steps, or data importing.

Versatile, extensive sources/ports, including auto-calibrated internal ports and de-embedding options, provide greater flexibility while maintaining accuracy for structures with embedded circuit-based, lumped-element components and active devices such as transistors.



Product Strengths

Design Flow

Supports database imports from enterprise layout tools such as Cadence, Mentor Graphics, Zuken, and more, as well as many design automation features such as automatic addition of ports to EM subcircuits that greatly simplify the use of EM simulation throughout the design process.

Passive Modeling

Provides 3D planar EM simulation of transmission lines and arbitrary structures on single- and multi-layer circuits using method-of-moments (MoM) technology with advanced meshing to accurately compute S-, Y-, and Z-parameters, as well as current densities of multilayer RFICs, MMICs, PCBs, hybrids, and multi-chip modules (MCMs).

Optimization and Yield

Enables accurate design diagnostics such as yield analysis and optimization for passive components and complex interconnects, capturing true coupling and parasitic effects of circuit topologies that are specified parametrically and/or defined through rules-based shape modifiers/de-featuring.

Visualization

Allows the plotting of color-coded currents and electric field strength directly on an analyzed structures to gain insight into component behavior and the source of potential design failures.

> *AWR Microwave Office, AXIEM, and Analyst were pivotal in the analysis of circuit parasitics, tuning towards optimization, and analysis of the effects of environmental disturbance, enabling us to produce an overall more robust product.*
>
> Nicolas Henriet, Sensata Technologies

Simulation Technologies

Meshing

AWR AXIEM software is optimized to maximize accuracy with minimal unknowns using advanced hybrid meshing technology that automatically fractures structures with triangular and rectangular elements. This heuristic approach extends the tool's capacity reach above and beyond traditional homogeneous mesh types.

Method of Moments

The software employs a unique and proprietary technique similar to the fast multi-pole method, yet adapted for full-wave analysis. As such, the AWR AXIEM solver algorithm scales on the order of N*log(N) as opposed to the N3 used by most existing MoM products.

Antenna Analysis

The software allows you to perform analysis and post-processing of planar antennas and planar arrays. The fast N*Log(N) solver technology addresses large, complex arrays that were previously impractical to simulate in their entirety. New peak antenna measurements support performance metrics such as total radiated power, or power in a particular polarization across the "cut" of a radiation pattern as a function of swept frequency or other user-defined swept parameters.

Features

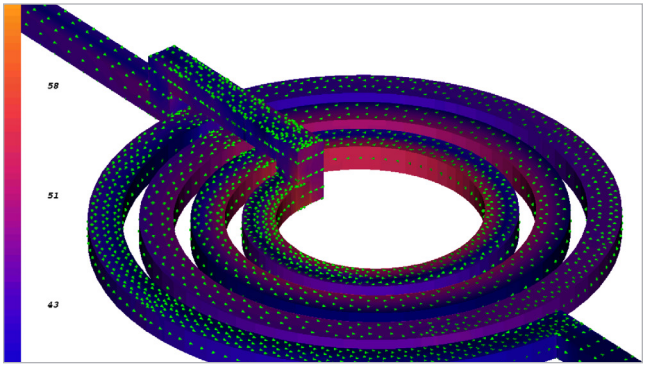
Highlights

- Layout/Drawing Editor – 2D and 3D views
- Proprietary method-of-moments (MoM) technology
- Hybrid Meshing Technology – Automatic adaptive meshing (hybrid rectangular/triangular mesh)
- Numerous sources and excitations
- Visualization and results post-processing
- Parametric Studies – Optimization, tuning, and yield analysis
- HPC – Multi-core configurations and asynchronous simulation

Applications and Technologies

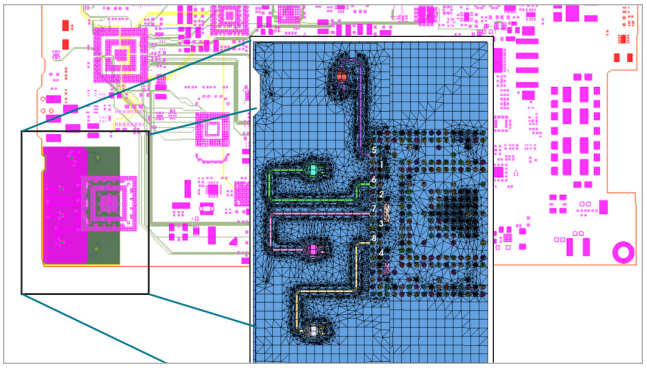
On-Chip

AWR AXIEM software readily analyzes on-chip passive structures, transmission lines, interconnects, vias, and MMIC packaging. Thick metal is supported by creating 3D meshes of extruded planar geometries, accurately accounting for all x, y, and z directed currents on all surfaces—a prerequisite for III-V and silicon MMIC/RFIC designs, which rely on circuit/EM co-simulation to provide embedded parasitic extraction and design verification. With hierarchical EM/circuit co-simulation, designers can perform in-situ EM analysis to capture and correct harmful parasitic couplings and resonances before tapeout.



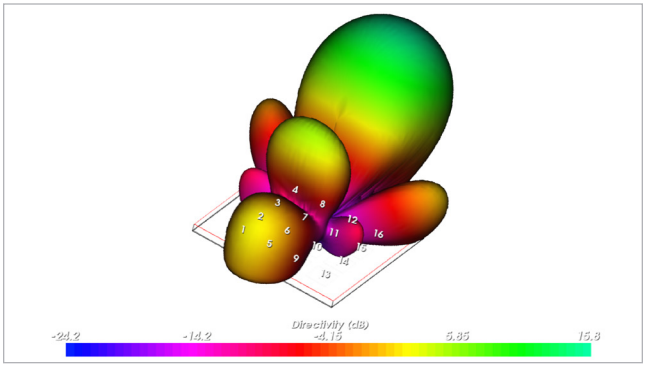
Package and Board

The layout-driven PCB design flow in AWR AXIEM software supports accurate simulation of the entire RF signal path. Circuit/system and EM co-simulation provide first-pass design success with complete PCB analysis of surface-mount components, interconnecting transmission lines, and embedded and distributed passive elements, as well as EM verification. EM verification is enabled by importing an IPC-2581 (Gerber or ODB++) file from PCB layout tools such as Cadence Allegro® technology into AWR software through the PCB import wizard. Powerful editing features prepare the structure for fast, accurate, and efficient EM analysis.



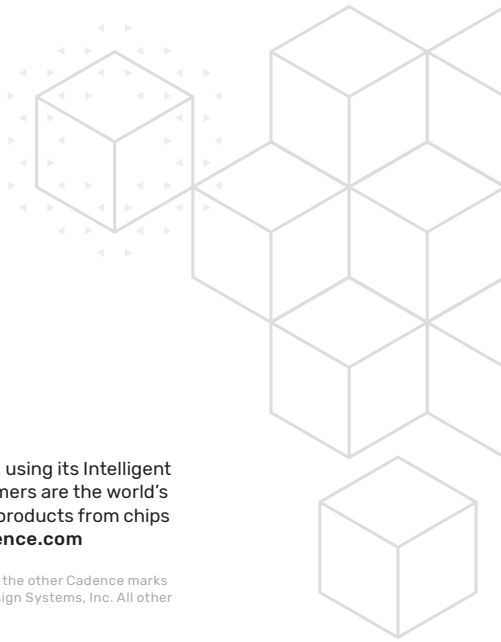
Antennas

RF designers of today's 5G and IoT smart devices need specialized simulation and optimization technology to develop small-size, embedded antennas with high gain and single- or multi-band, as well as wideband, frequency range. AWR AXIEM software helps engineers design, optimize, and integrate antennas/arrays, providing powerful EM technologies to simulate antenna metrics such as gain, return loss, radiation efficiency, and currents, and to visualize 2D/3D far-field antenna patterns.



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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