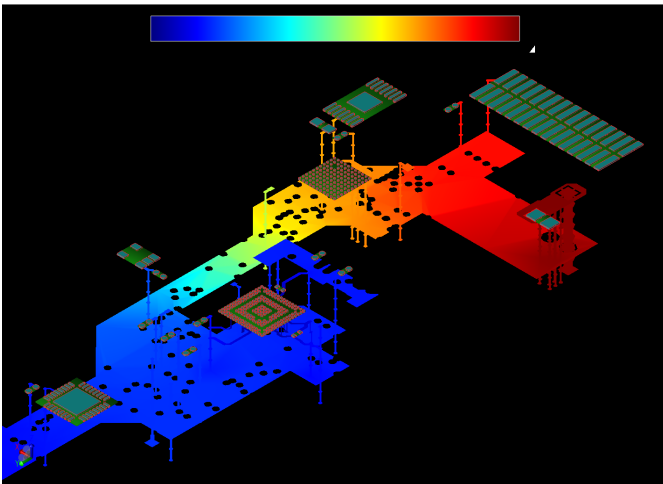
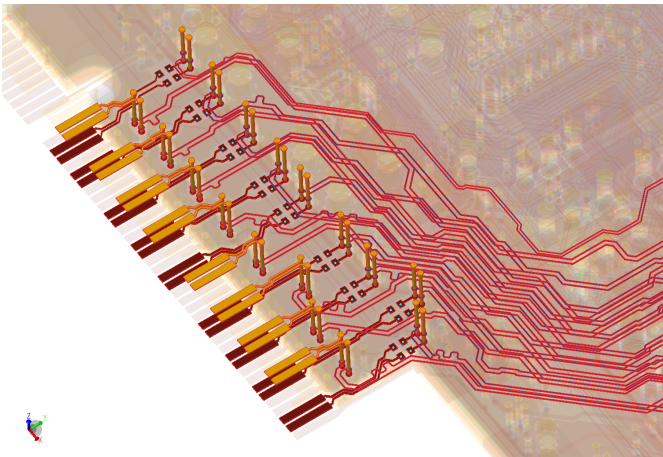


Keysight Technologies

Advanced Design System (ADS)

W2360EP/ET SIPro Signal Integrity EM Analysis
W2359EP/ET PIPro Power Integrity EM Analysis



Data Sheet

Composite EM technology
delivers high-accuracy and
faster results, all within
Advanced Design System

New Cohesive Workflow Redefines SI/PI Solutions

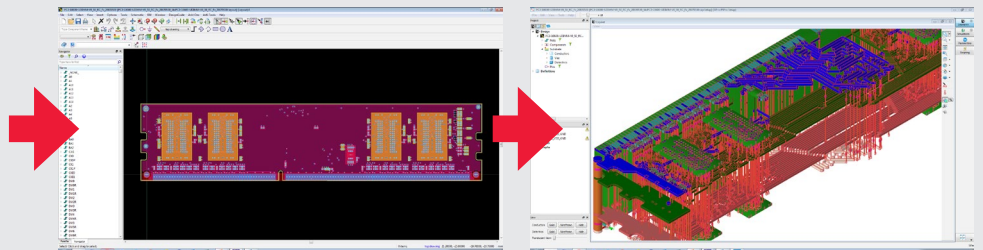
Signal Integrity (SI) and Power Integrity (PI) are often treated as separate design tasks that are closely interrelated, with the same end-goal for a design: Ensure high-speed link performance and system-level reliability.

Consider now a single user interface for both PI and SI analyses, where one setup can be easily copied from one analysis-type to another, with simulations run in the same environment. In ADS, SIPro and PIPro deliver this ideal, sharing a common GUI, workflow, model database, and results visualization; eliminating the need to switch between different point tools, and allowing better collaboration between engineers. Furthermore, with the high-capacity EM solvers in SIPro and PIPro, it is no longer necessary to spend hours manually simplifying designs, reducing size by cookie-cutting and removing layers and nets, that is typically required with general purpose EM tools.

Design import

PCB layout designs imported to ADS using:

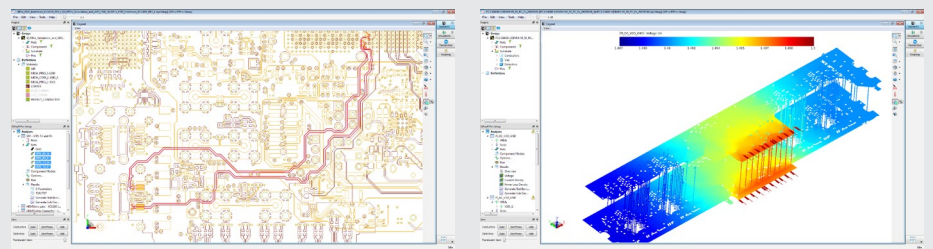
- ODB++
- Direct .brd (Cadence Allegro)
- ADFI (Cadence Allegro)



SI/PI analysis

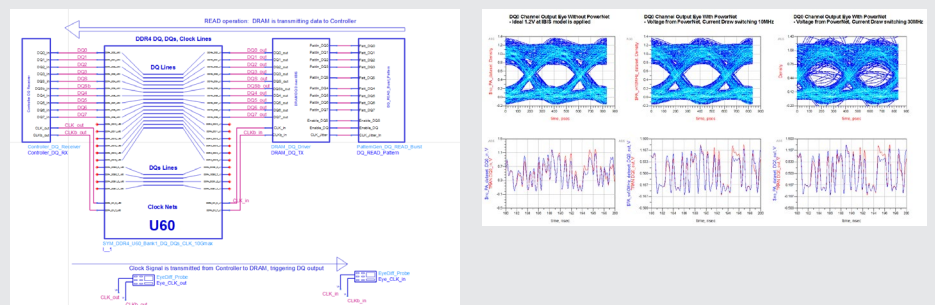
4 new EM simulators

- DC IR drop analysis
- AC PDN impedance analysis
- Power plane resonance analysis
- Power-aware signal integrity analysis



ADS schematic-level analysis

- Transient convolution simulation
- Channel simulation
- DDR bus simulation
- Compliance test benches
- Decap tuning
- PDN EM model + behavioral VRM



SIPro A Fraction of the Full Wave 3DEM Simulation Time

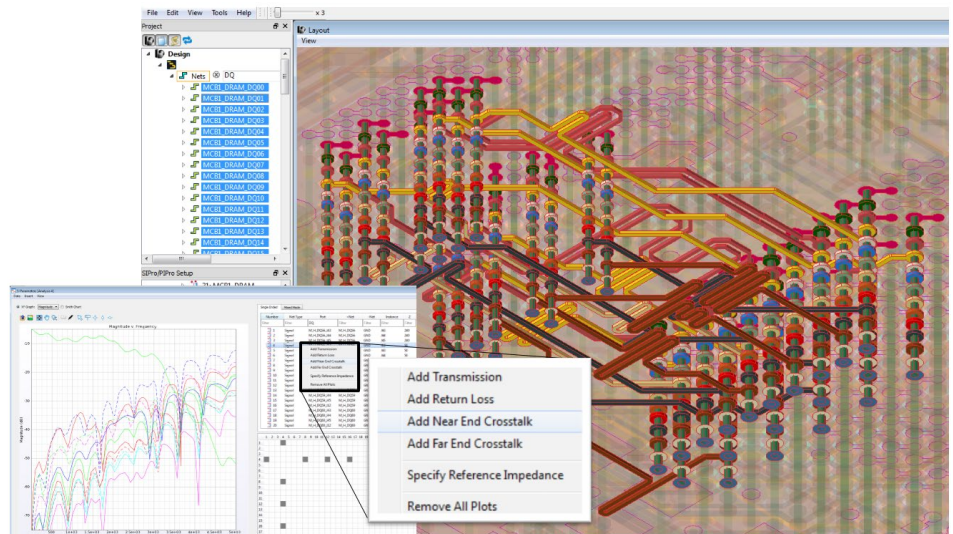
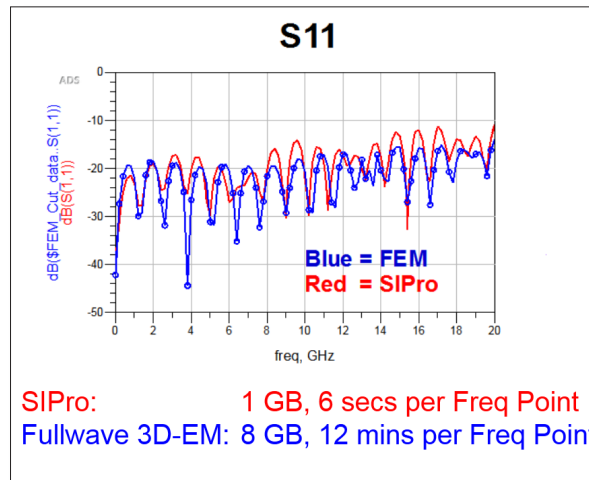
SIPro provides signal integrity analysis of your high-speed PCBs. It empowers you to characterize loss and coupling of signal nets, signal and power nets, and complete ground nets at once. The resulting EM model can be transferred to the ADS Transient and Channel Simulators in one seamless flow.

Speed and accuracy

- Innovative composite EM technology for fast and accurate simulations of large, complex PCB designs
- Based on pure EM technology that delivers accuracy approaching industry-standard 3D EM solvers, in a fraction of the time
- Focused net-driven use-model specifically for SI/PI, to be much faster and more efficient than general purpose EM tools
- EM effects captured:
 - All relevant signal coupling
 - Accurately modeled ground return paths, cut-outs and drills in GND/PWR planes.
 - Via-via coupling
 - Via transition effects
 - Via-GND/PWR coupling

Layout to results in less than 20 clicks

- No layout simplification required!
- Net-driven setup
- Guided port creation
- Quickly plot all crosstalk elements from the same component



SIPro

The following analyses can be performed in SIPro:

EM model extraction

- Generate an EM-accurate model that captures signal-net losses and coupling
- Filter by port, by net, by impedance, for quickly finding and plotting the desired relationships.
- Frequency domain S-parameter results
- Time domain TDR and TDT results
- Mixed-mode S-parameters (e.g. Differential to Common mode conversion)
- Fast plotting of crosstalk (NEXT, FEXT)
- Fast change of reference impedances for plotting without resimulation

Complete channel analysis

- With Automatic Schematic Generation, the extracted EM model flows directly into an ADS transient simulation and ADS channel simulation

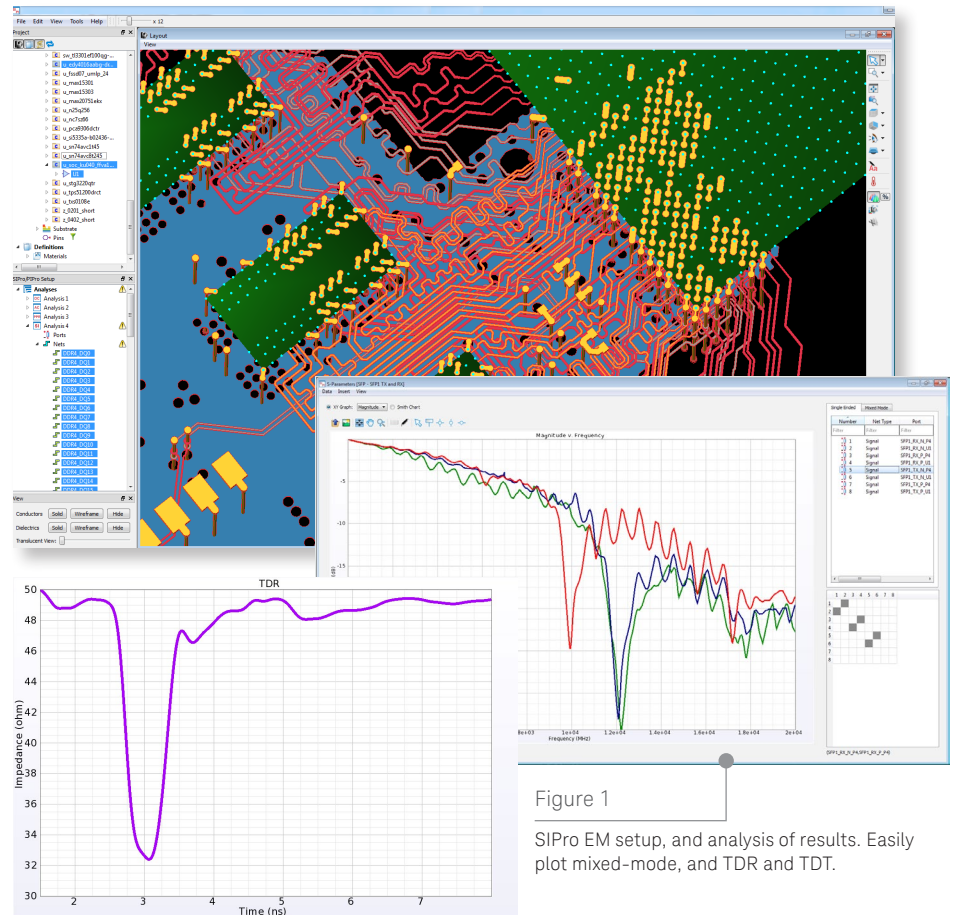


Figure 1

SIPro EM setup, and analysis of results. Easily plot mixed-mode, and TDR and TDT.

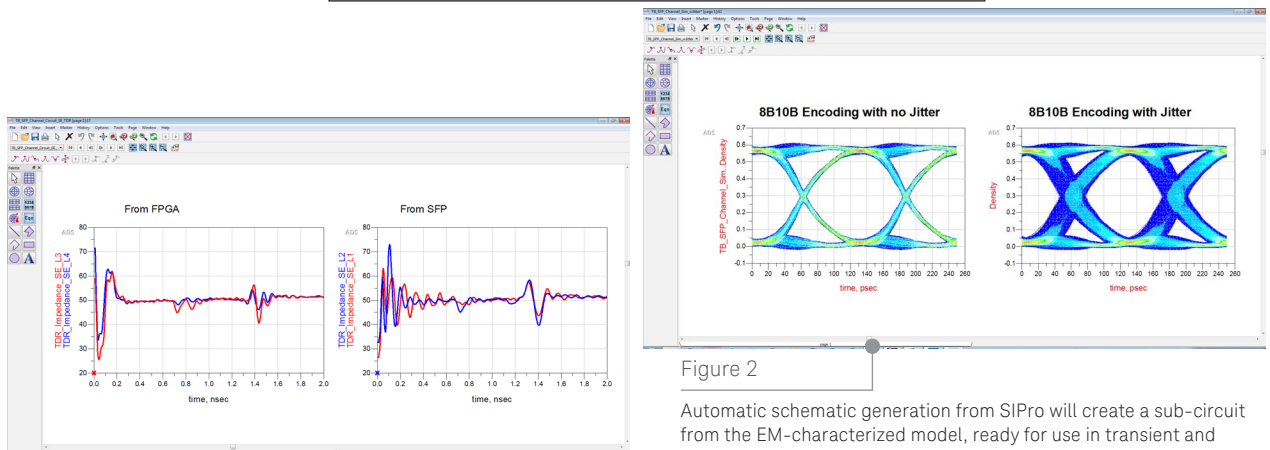
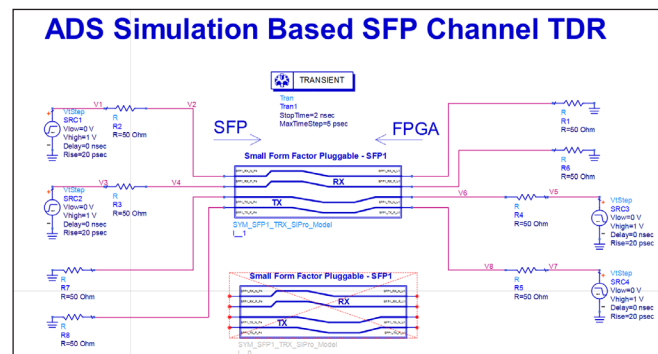


Figure 2

Automatic schematic generation from SIPro will create a sub-circuit from the EM-characterized model, ready for use in transient and channel simulations.

PIPro Accurate and Efficient Net-Driven PI Analysis

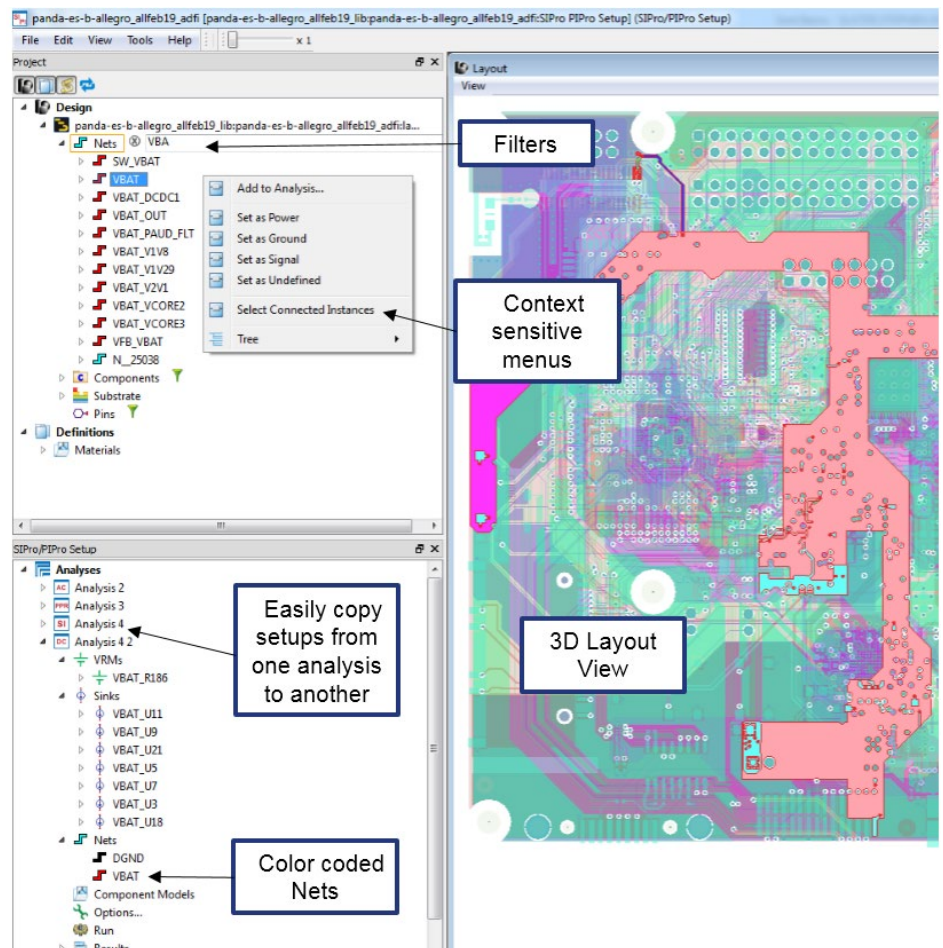
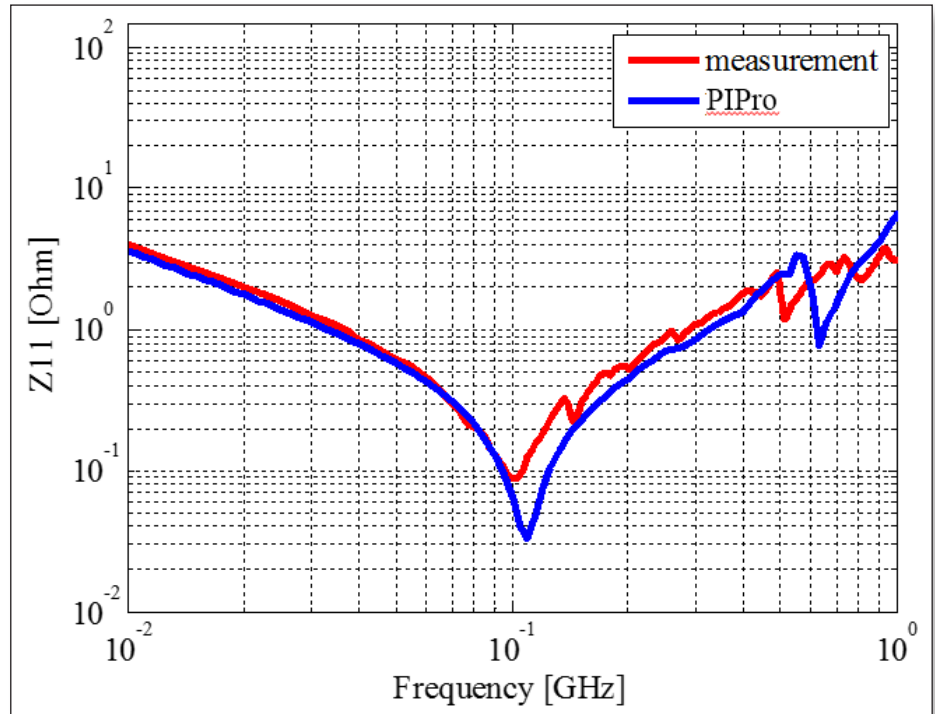
PIPro provides power integrity analysis of your power distribution network (PDN), including DC IR drop analysis, AC impedance analysis and power plane resonance analysis.

Speed and accuracy

- Pure EM-based solution
- DC IR drop analysis
- AC PDN impedance analysis
- Power plane resonance analysis

Designed for usability

- Full-time 3D view of layout, selected nets, ports and components
- Filter by Net
- Filter by Component
- Right-click to add-to-analysis
- Drag & Drop
- Hierarchical search for complex selections
- Context sensitive menus e.g. 'Select instances connected only to all selected nets'



PIPro

The following analyses can be performed in PIPro:

DC IR drop analysis

- Voltage delivered to each sink, and failures based on user-defined tolerances
- Current flow through each via, and failures based on user-defined maximum values
- 3D power dissipation visualization
- 3D voltage distribution visualization
- 3D current density visualization

Power plane resonance analysis

- Analyze self-resonances of the PCB and inspect trouble areas that have the highest field strength
- Report self-resonant frequencies and quality factors for the PDN
- 3D field plots

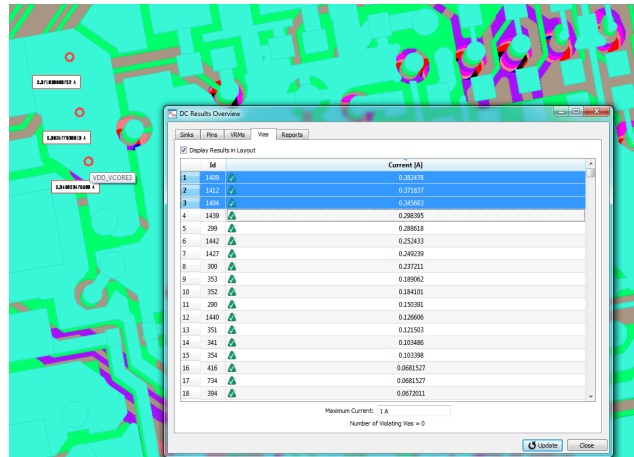


Figure 3

Excessive DC current flowing through individual vias, are reported and highlighted in the 3D-geometry.

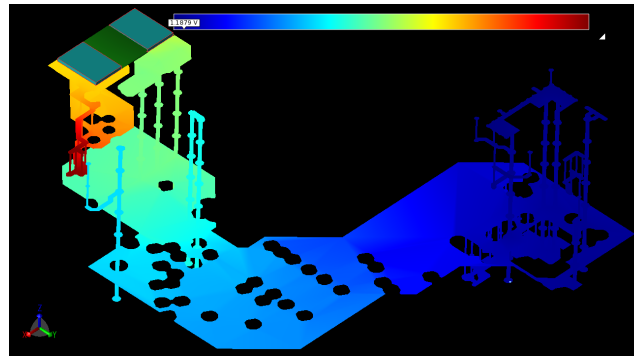


Figure 4

Visualization of DC voltage distribution within the PDN.

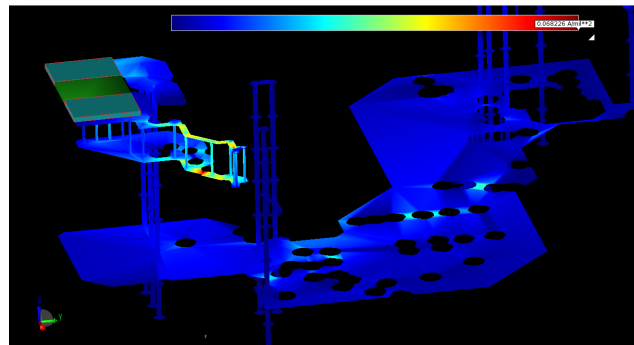


Figure 5

Current density plot highlights areas where resistance is high, and quantifies the Amps per mm².

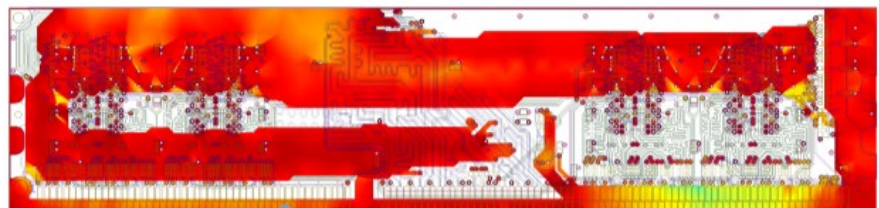


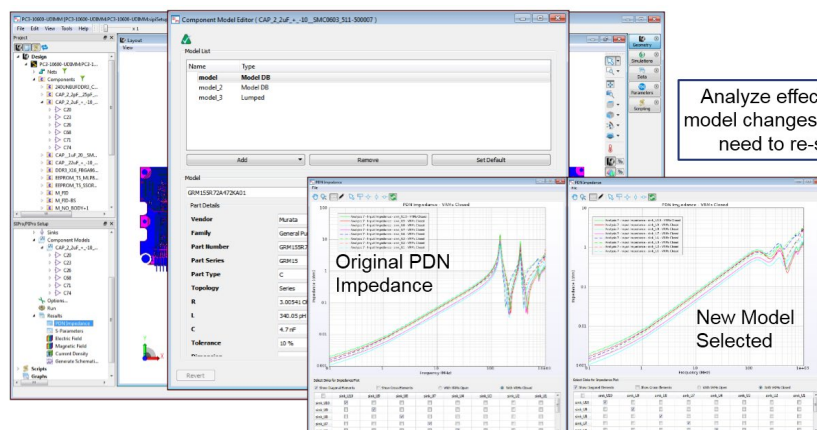
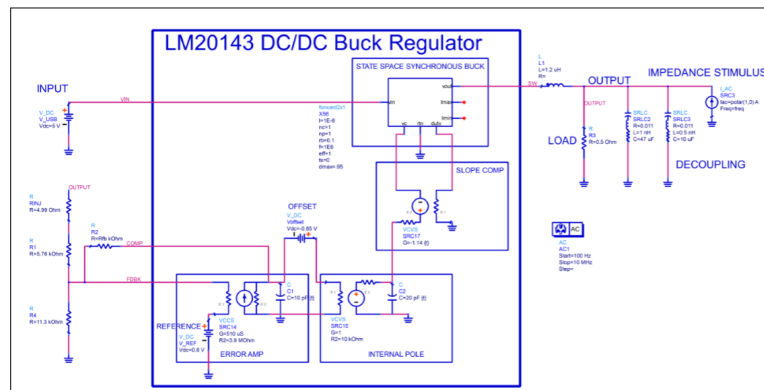
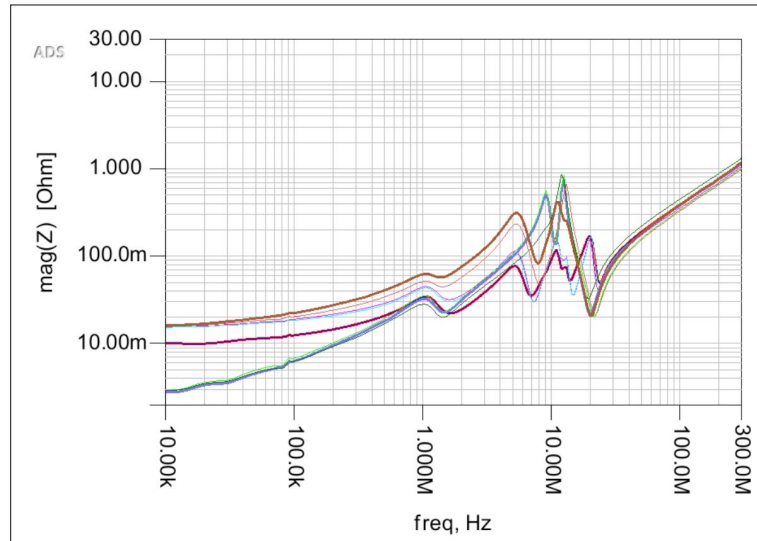
Figure 6

Power plane resonance analysis finds resonant frequencies of the board, and shows the E-field to locate the problematic region of the board.

PIPro

AC PDN impedance analysis

- Easy setup: Select nets, filter, drag and drop component. Guided port creation
- PDN impedances vs. frequency
- S-parameter model extraction of PDN for further simulation in schematic
- 3D field plots and current density plots
- Decap tuning – quickly see effects of changing decap values without re-simulating
- Completely flexible PDN optimization strategy from schematic
- Component model assignment:
 - Lumped
 - SnP
 - Murata
 - Samsung
 - TDK
 - Create custom parts from schematic models
- Full scripting support for setup, advanced automated simulation and post-processing
- VRM Behavioral modeling from schematic together with EM-extracted model of the PDN. An engineering-approach to a flat impedance response!



SIPro and PIPro Product Configurations

SIPro and/or PIPro can be purchased as individual elements, or pre-configured bundles.

	W2223 ADS bundle	W2224 ADS bundle	W2359 PIPro element ¹	W2360 SIPro element ¹
ADS core environment	✓	✓		
ADS layout	✓	✓		
Transient convolution simulation	✓	✓		
Channel simulation	✓	✓		
Controlled impedance line designer	✓	✓		
Momentum EM analysis		✓		
PIPro EM analysis	✓	✓	✓	
SIPro EM analysis	✓	✓		✓

1. Use of SIPro and PIPro Elements require ADS Core Environment and ADS Layout.

Download your next insight

Keysight software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight.

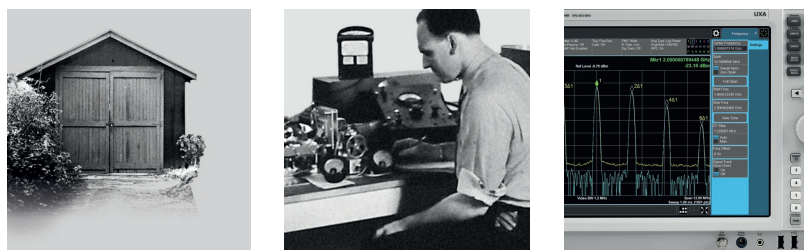
- Electronic design automation (EDA) software
- Application software
- Programming environments
- Utility software



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