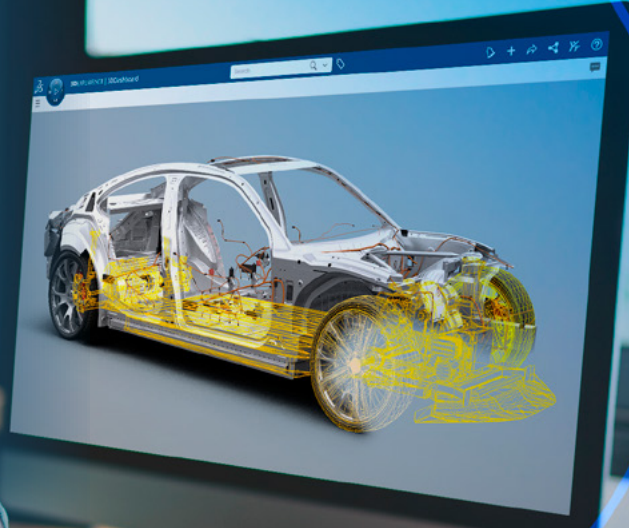
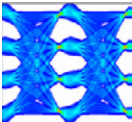
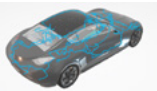


EMC/EMI IN POWER ELECTRONICS AND AUTOMOTIVE SYSTEMS

SIMULIA Electromagnetic Solutions for Fast and Accurate Simulation Results



As vehicles increasingly adopt electrified powertrains, high-density electronics and advanced communication systems, ensuring **electromagnetic compatibility (EMC)** and managing **electromagnetic interference (EMI)** has become critical. To meet these challenges, SIMULIA provides a comprehensive portfolio of **electromagnetic (EM)** simulation solutions, including **CST Studio Suite®**. The toolset encompasses a comprehensive range of full-wave solvers in both time and frequency domains, a multiconductor transmission line method, RLC extraction and hybrid solvers—all seamlessly coupled to a powerful circuit simulator. With this integrated approach, engineers can accurately predict, visualize and mitigate EMC and EMI issues, from individual components to complete vehicle systems.

CHALLENGE	SOLUTION BENEFITS
 Power Electronics Interactions between high- and low-power components and surrounding subsystems generate EMI that is increasingly difficult to manage in complex power systems.	• pRLC solver for parasitic extraction in components, for example, in an inverter. • Coupled circuit full-wave simulation allows the simulation of power electronics at the system level, including inverter, housing and filter. • Powerful visualization of emission and coupling paths.
 High-Speed PCBs and Electronic High-density PCB layouts in modern vehicles make SI/PI issues difficult to detect through testing alone, while increasing data rates in infotainment and ADAS systems add further complexity.	• Signal Integrity (SI): Advanced workflows with a dedicated eye diagram tool for comprehensive channel analysis. • Power Integrity (PI): specialized PI solver and decap optimization. • 3D solvers for SI simulation of more than just the PCB.
 Vehicle-Level EMC Integration Ensuring EMC compliance becomes increasingly challenging as vehicle complexity grows and certain coupling paths, such as those over long cables, are not present in laboratory testing before integration.	• Hybrid full-wave to transmission line coupled simulation with GPU acceleration to handle large complex models. • Flexible component representation by lumped elements, SPICE files or encrypted 3D models. • Best-in-class full vehicle meshing.

