

## FEKO for Automotive

Analyze, Design and Optimize Automotive Antenna and EMC Performance

FEKO is Altair's comprehensive electromagnetic simulation software suite extensively used by OEMs and their suppliers for the analysis and design of antennas and electromagnetic compatibility (EMC) problems in the automotive industry. Typical applications range from radio and TV broadcasting, remote keyless entry systems, tyre pressure monitoring system (TPMS), wireless communications, to radar collision avoidance, amongst many others. EMC investigations are also performed, which can include immunity, emissions, cable coupling and shielding analysis.

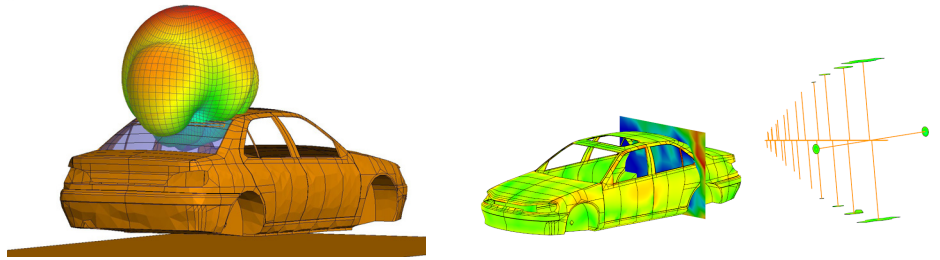


### Solution Highlights

- Comprehensive set of solvers with true hybridization for automotive antenna design, placement and optimization
- Simulation of automotive electromagnetic compatibility (EMC) emissions and immunity tests including car model and test environment
- Dedicated toolset for designing windscreen antennas
- Specialized cable modelling tool and solver to analyze coupling between cables, between cables and antennas and other devices
- System level radiated emissions of electronic control units (ECUs) and coupling effects in a car environment
- Automatic matching circuit design with Optenni lab

**Automotive Capabilities**

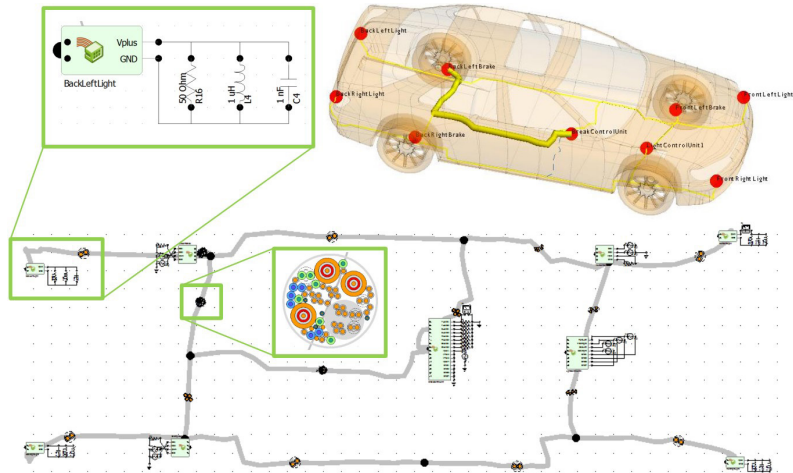
- The multilevel fast multipole method (MLFMM) enables efficient vehicle simulation in the GHz range and the hybridized asymptotic solvers at radar frequencies
- Enhancements for antennas integrated into windcreens, including modeling and efficient analysis for multilayer windows
- Bi-directional cable coupling with multi-conductor transmission line (MTL) cable solution, modelling of complex cables and combined MoM/MTL method
- Model decomposition – replace complex sources and receivers (for example antennas, PCBs, etc.) with equivalent sources to solve large, complex problems more efficiently
- Special formulation for calculation of electric and magnetic shielding
- Import for Cable path .kbl format
- Advanced material modelling, including metals, thin dielectric sheets, coatings and anisotropic layers, for example carbon fibre



Feko offers high performance and hybridized solvers for automotive antenna design and placement studies, as well as EMC emission and immunity simulations. Windscreen antenna design (left) and radiated immunity simulation (right) are illustrated

**Interfaces**

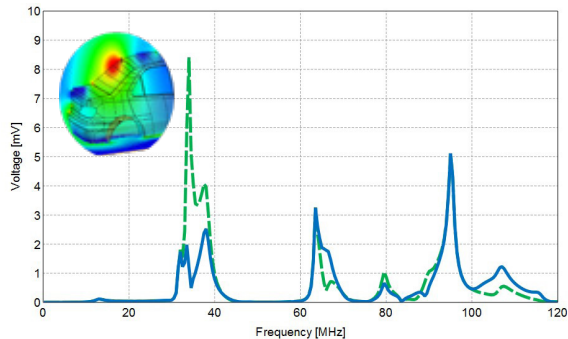
- Most industry standard CAD software and ODB++, 3Di and Gerber layouts
- Mesh importing
- Interface with HyperMesh
- Near and far field import including general, Sigity and Orbit/Satimo
- Cable path (.kbl) import
- Optenni Lab for antenna matching circuit design
- Touchstone, SPICE circuits and non-radiating networks



Cable modelling interface in CADFEKO

**General Capabilities**

- Comprehensive suite of accurate, powerful, reliable and parallelized solvers with true hybridization, including MoM, MLFMM, FEM, FDTD, PO, LE-PO, RL-GO and UTD
- Complete HPC and GPU features
- 3D parametric environment modeling
- Extensive post-processing capabilities
- Integrated Lua scripting environment for data manipulation and task automation



System analysis of cable emissions highlighting a coupling issue with the windscreen antenna at 34 MHz



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