

FEKO for Electronics

Smart Antenna Design, Device Integration and Shielding Effectiveness

FEKO, Altair's comprehensive electromagnetic simulation software suite, is ideal for antenna virtual prototyping and simulation driven design for electronics. This includes antenna design for a wide set of products such as mobile phones, tablets, cameras, laptops and TVs. Proof of concept and comparative studies can quickly eliminate weak antenna designs and reduce the number of prototypes. Antenna integration in the device shows coupling with nearby components or with other antennas within the same device. Pre-compliance of over-the-air (OTA) radiation performance and specific absorption rate (SAR) can be estimated for the standalone device, or for different usage environments.

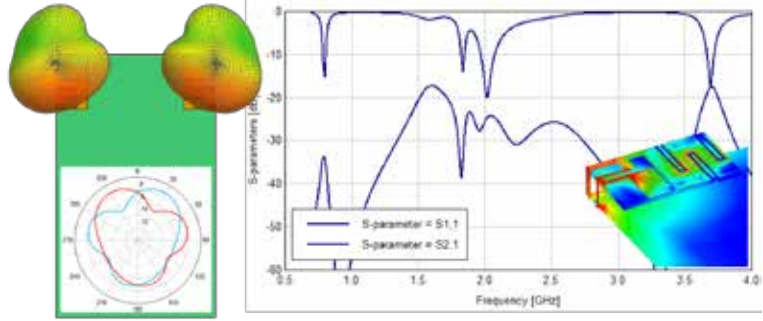


Solution Highlights

- Multiband and multi-antenna design optimizations for wireless devices
- Design of diversity/MIMO antennas (coupling, ECC, MEG)
- Unique FEKO characteristic mode analysis (CMA) - Intuitive design methodologies bring insight into fundamental radiation behavior of the structure.
- Especially useful for antenna design, placement and for the reduction of couplings in multi-antenna systems
- Shielding effectiveness for electronics enclosures
- Cross-validation strategies employing multiple solvers
- Automatic matching circuit design with Optenni Lab

Electronics Capabilities

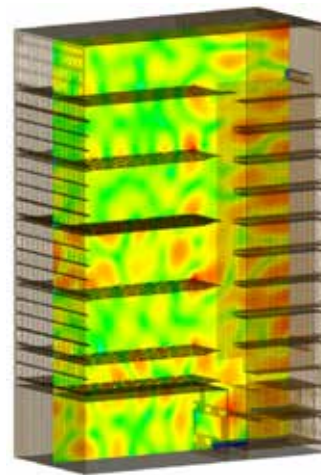
- Efficient antenna conceptual designs and virtual prototyping with the MoM
- Advanced material modelling - metals, isotropic and anisotropic dielectrics and meta-materials
- CMA for conceptual investigation of the fundamental resonant behavior of the structure
- Finite element method (FEM) and finite difference time domain (FDTD) for integration of the antenna in the device, including components, housing and a variety of anatomical models
- Special formulation for shielding analysis
- Adaptive frequency sampling and continuous far fields for efficient simulation of broadband antennas
- Automated antenna matching circuit design with Optenni Lab
- OTA radiation performance parameters and SAR compliance testing



Low profile design of a multiband, dual MIMO antenna, for a mobile device. S-parameter performance and far field radiation patterns. Good isolation and pattern diversity results in good ECC and MEG performance for the MIMO configuration

Interfaces

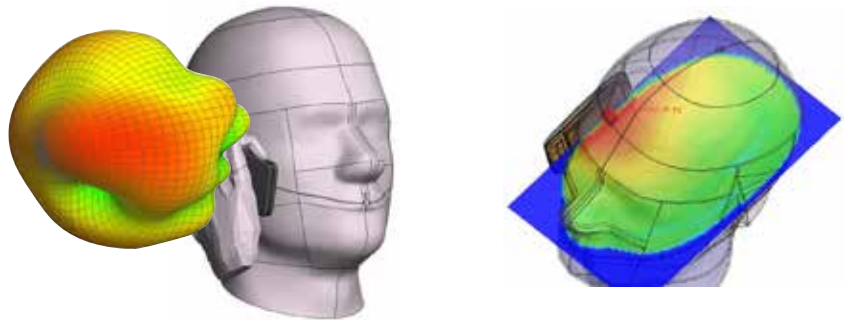
- Most industry standard CAD software and ODB++, 3Di and Gerber layouts
- Mesh importing
- Interface with HyperMesh
- Near field and far field import including general, Sigrity and Orbit/Satimo
- Optenni Lab for antenna matching circuit design
- Touchstone, SPICE circuits and non-radiating networks



Analysis of a shielding enclosure at 2 GHz

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



Radiation pattern (left) and specific absorption rate (SAR) for a mobile phone (right)