case STUDY

Boost Signal and Enhance Antenna Reception Performance

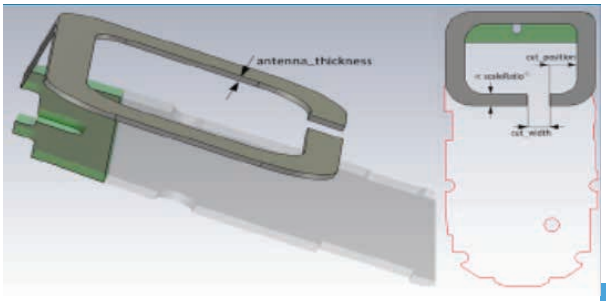
Guaranteeing effective signal transmission with modeFRONTIER

Antenna design *relies on understanding of directivity, impedance matching, radiation efficiency, wave polarization, frequency range and orientation specifications. These imply complex electromagnetic simulation analysis which can be executed by employing computer-aided optimization techniques instead of opting for time-consuming trial and error approach.*

CHALLENGE

The present study focuses on optimizing the shape parameters of a **GSM dual band mobile phone antenna** to guarantee effective transmission and reception while reducing the loss of power in the signal returned at specific frequencies.
The optimization case requires the satisfaction of multiple criteria at the same time. It is necessary both to minimize the return loss amplitude of the signal and the difference of the tuning frequencies at 920 and 1860Mhz.

modeFRONTIER helped minimize signal return loss and tune the frequencies.

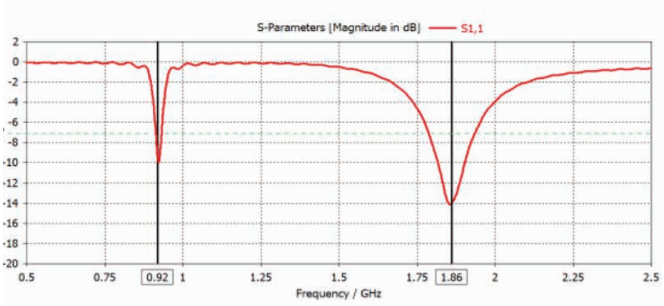


01

CAD model of mobile antenna: optimization parameters.

SOLUTION

The geometrical structure of the antenna was modeled in Catia V5 by setting four parameters (cut position, cut width, scale ratio and antenna thickness). Then, the model was imported in **CST Microwave Studio** to perform accurate analysis of high frequency range. modeFRONTIER has been used to automate the entire process by integrating the CAD model in the workflow and running electromagnetic simulations. The optimization task was driven by the **pilOPT algorithm** which evaluated different antenna design configurations with the purpose of minimizing signal return loss and tuning the frequencies.

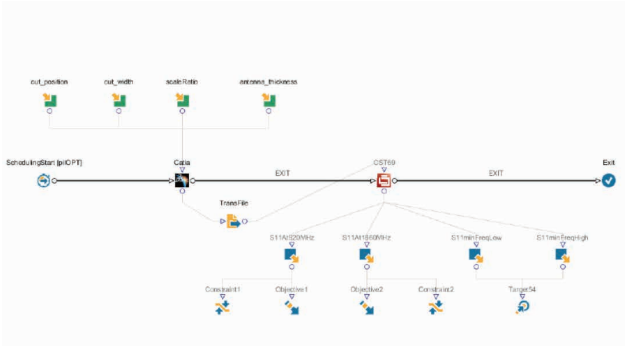


03

Signal of optimal antenna design.

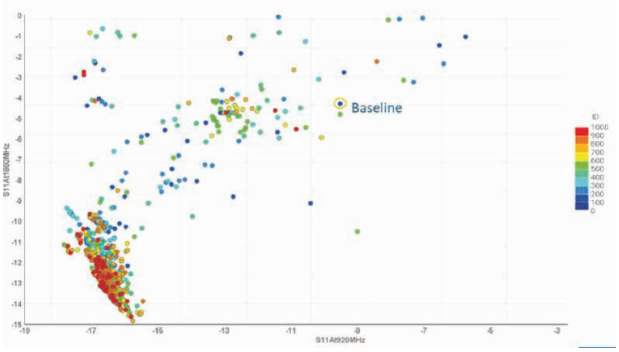
BENEFITS

pilOPT algorithm reached optimum solutions after few design simulations. The execution of the algorithm in autonomous mode allowed to obtain the best signals of the perfectly tuned antenna just with 100 simulations performed in few hours. This methodology may be extended to any component of an electronic system (including geometrical, material and operating parameters).



02

Optimization workflow in modeFRONTIER.



04

Pareto frontier (return loss signal at 920 MhZ vs 1860 MhZ).

ABOUT ESTECO

ESTECO is an independent software provider, highly specialized in numerical optimization and simulation data management with a sound scientific foundation and a flexible approach to customer needs. With 20 years' experience, the company supports leading organizations in designing the products of the future, today. **esteco.com**

Autonomous pilOPT algorithm identified the optimum antenna configuration after few design simulations.

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