

ELXYS testimonial for the EMX simulator

At ELXYS, in our very first steps, we faced the challenge to design a mmWave Transceiver module at 40GHz. In an integrated mmWave transceiver, every single passive structure has to be modeled accurately, since PDK library components, such as inductors, transformers, coplanar lines either don't exist, or they are not modeled for the frequency range required (dc to at least 5th harmonic) especially for the nonlinear simulations.

Consequently, the use of a 3D electromagnetic simulator was indispensable. The appropriate simulator selection affects not only the quality but also the time and the cost of the deliverable.

EM simulations are usually resource hungry and time consuming. Simulation time needs to be as low as possible, since performance trimming requires a large number of simulations to be done for every passive structure. The preparation of the structure to be simulated (adding probe and excitation ports) especially for complicated structures is also a time consuming procedure, and prone to mistakes. In a small-medium sized design teams, dedicated EM engineers is a luxury. In ELXYS, we realized that we need a fast, flexible, accurate and easy to handle by any designer tool.

EMX process the original layout information, exported in a GDS format, while the ports are inserted directly from the Virtuoso environment. This feature was very advantageous for our team, since we could prepare a 50 port structure in less than 20 minutes without any turnarounds.

EMX, in contrast to other EM simulators, has the ability to model MIM capacitors, which in most of the cases have to be simulated together with inductors and other interconnections.

EMX metal and dielectric stack up configuration files could be easily derived from the PDK's process files with the minimum support.

EMX options like VIA grouping, R-C only extraction, and flexible horizontal and vertical meshing definitions, minimized simulation time, while DC point calculation, aided the convergence of the time domain simulators.

Even EMX lacks of a GUI environment, we took advantage of the numerous hooks and options the tool provides, to create our own configuration and simulation launching scripts, optimized for specific problems.

Concluding, EMX helped our team to deliver a demanding project in time with the minimum risk.