Complex approach to analysis of PCB structures and its integration into EMCoS PCB VLab program package

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Ever-increasing demands for functionality and increased operating frequencies of printed circuit boards (PCB) lead to an increase in their complexity, the need for multi-layered structures and integration of mixed digital-analog circuitry into a single module. Because of this complexity, one of the most difficult challenges facing the engineers is to assess the reliability of such designs, their immunity to external excitations, as well as estimation of radiation of the board itself. At our company we decided to develop a specialized software package EMCoS PCB VLab for analysis and estimation of signal integrity and EMC/EMI radiation of complex PCB structures. Due to the complexity of the goal and lack of a single effective methodology to the analysis of such structures, the integrated approach has been developed, including a variety of analysis techniques, such as the Method of Moments (MoM), multi-conductor transmission lines theory (MTL), circuits solving, and hybridization of these methods has been performed. This paper discusses several aspects of the design and development of the system and presents some of the obtained results.