Chapter 6
Summary

In this essay first it was explained that how a technology introduced by Fraunhofer institute suppresses the losses caused by the inversion channels under the oxide layer of the ISiT substrate. It was shown that this makes it possible to predict the losses of passive elements in this technology by setting the substrate loss to zero in the EM simulations. This in turn assures that the simulated results shown here for the losses are close to reality.

In the following steps two libraries of inductors were designed for the frequencies of 24 and 35 GHz and new models were developed for the coplanar line structure on the ISiT substrate and for the DC-block. These are the passive elements used with the RF MEMS switches in the circuits.

The figures of merit in the inductor design were high quality factor and low area consumption. The coplanar-line model predicts the effective dielectric constant and the characteristic impedance in the ISiT technology quite accurately. The losses could be derived from the available formulas in the literature. The DC-block model is a novel approach, and is developed using electromagnetic concepts along with the help of EM simulations. This model gives the S-parameter behavior of a DC-block having an arbitrary combination of geometrical parameters very precisely.

Later a design-kit including the designed passive components plus several RF MEMS switches was programmed and added to ADS. The components are available in ADS for layout generation or simulation. For layout generation for DC-block an AEL program is written, which receives the different geometrical parameters from the component and sketches the appropriate layout. Inductors and switches though use fixed layout patterns which are stored in the design-kit. The DC-block component uses a scripted model program for simulation, while the inductors and switches use S-parameter Dataset and Touchstone files, respectively.

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