

## Aufgabe der Abschlussarbeit im ISE Bachelorstudiengang

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<b>Thema:</b>	Equivalent Circuit Description for SMD-Components

### Description of Problem:

At RF- and Microwave frequencies we often use surface mount devices (SMD) as components of electronic circuits. SMD components can be mounted directly on printed circuit boards (PCB) without wires and they exhibit low parasitic elements due to small size. Never-the-less, the remaining parasitic elements need to be known in order to avoid failure of circuit function, e.g. due to resonances, in order to select the appropriate type (size) and in order to optimize the performance of circuits.

### The Task:

The task in this project is to determine the equivalent circuit description valid for frequencies well above 1 GHz of SMD-resistors of the 0603 and 0402 series as well as SMD-capacitors of various types.

In particular the task incorporates

- Search for applicable publications and test equipment products.
- Design, fabrication, test and calibration of a test fixture based on a coaxial cable (which can accept SMD-components) and based on the measurement of the reflection coefficient using a Vector Network Analyzer.
- Fitting of the measured reflection coefficient to the simulation results of suitably chosen R-L-C network (possibly including a transmission line) using the ADS-software.
- Variation of mounting geometries and analysis of effects.
- Analysis of the geometrical parameters of the SMD-components and correlation with the identified equivalent circuit elements.

Depending on the available thesis duration additional tasks may be covered:

- Design, test and calibration of a measurement fixture based on a microstrip line with gap (for the SMD-component).
- Evaluation of measurements performed on substrates of various thicknesses.
- Evaluation of measurements performed with the SMD-components mounted in normal and flip-side position.

**At the end of the work, a public presentation of results is to be given.**