

Optimization and manufacturing of complex impedance loads

Context

In IST semester, the laboratory associated to the TLRS module is based on the presentation of different principles through simulations. These simulations using circuit-based models of transmission lines. To go further in the understanding of these principles and especially to get closed to “real world implementation”, it is necessary develop educational demonstrators. These demonstrators need to be relevant enough to feature the different concepts and need to be manufactured with a low cost.

Objectives

Some preliminary implementations were done by using microstrip transmission lines fabricated on a FR4 substrate. Precisely, a 50 Ω transmission line operating at 1 GHz was manufactured and the measured S-Parameters are the expected ones. This transmission line can serve as a basis to measure different transmission line parameters such as characteristic impedance, input impedance and input reflection coefficient. Some other simple circuit implementations such as bandpass filters and matching stubs are also possible.

This project is dedicated to the optimization and the manufacturing of loads presenting complex impedance values. These loads will be designed and implemented on a classical FR4 substrate, with SMA connectors and will have a low form factor.

Expected outcomes

Different PCBs presenting each a complex impedance such that they are covering the representative parts of the Smith Chart.

Written report detailing the design methodology and the measurement results.

Tools

Software: Keysight's ADS

Hardware: Rhode & Schwarz FSH8 Vector Network Analyzer (VNA) and/or JNCRadio VNA

Supervisor

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