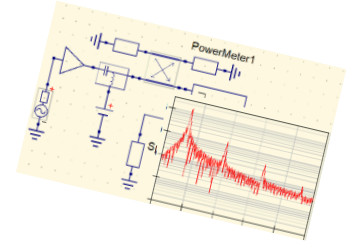


Bachelors/Master thesis

Design a test setup to capture the harmonics of RF signals



Motivation

To increase data rates, cell phones transmit and receive at multiple frequencies at the same time. This can lead to disturbances: for example, 800 MHz couples into 2400 MHz due to harmonic distortion. In general, we call this challenge “co-existence”. This thesis investigates measurement methodology of distortions of radio signals caused by ESD protection elements, namely TVS (Transient Voltage Suppressors) diodes.

ESD protection, such as TVS diodes, placed into the RF signal path cause distortions, which can be observed as harmonics. To characterize this behavior, we apply a pure sinusoidal signal to the device, and we measure the harmonics using spectrum analyzers. This is difficult, as we want to measure signals that are much lower than the actual carrier. Not stopping here, we are looking into more advanced challenges: For example, current research suggests that the transient response of harmonics (when the RF is suddenly changing) is significantly stronger, than the steady state. These are properties, we want to verify, measure and finally understand.

Research topic

Starting point is a preliminary test system designed by Leonhard Petzel. It shows the principal functionality of the methodology. Outcome of your thesis will be an electrically solid test setup that allows to measure over all frequencies of interest. You will learn a lot on RF-measurements, understanding and reducing errors in such measurements and in programming instruments, data capture and analysis.

The data can then be used to answer question on the behavior of the harmonics with respect to their frequency and amplitude dependency and transient time effects. You would be co-author in at least one scientific publication.

Your Profile

You are eager to learn. Prior knowledge and experience in the field of RF or Electronics is highly appreciated.

Organizational matters

- Start: as soon as possible
- Workplace: at the institute
- Employment at the institute for up to 20h/week is possible

Contact/Supervision

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