

Radar Frontend with Downmixer for Radar Radiation Measurement in the E-Band Range

Objective of the Master's Thesis:

The objective of this master's thesis is to develop a radar frontend capable of capturing and measuring radar radiation in the E-band range. The radar frontend will be based on microstrip antennas and equipped with a downmixer to convert the captured radar frequencies into a lower frequency range. This will enable precise measurement not only of the intensity but also the frequency of radar radiation. The master's thesis aims to gain a comprehensive understanding of the design, implementation, and evaluation of such a radar frontend with a downmixer.

Sections of the Master's Thesis:

- Identification of relevant parameters for the efficiency and accuracy of radar sensors.
- Investigation of various types of antennas and measurement circuits, especially the GaAs diode, for use in high-frequency environments.
- Design and Commissioning of the Sensor:
 - Design and simulation of the high-frequency printed circuit board with optimal signal integrity in mind.
 - Construction and physical setup of the Vivaldi antenna and the measurement circuit.
 - Implementation of the frontend on the printed circuit board.
- Measurement and Evaluation:
 - Conducting test series to determine the performance characteristics of the developed sensor.
 - Analysis of measurement data to determine frequency independence and voltage proportionality.
 - Validation of results in comparison to theoretical expectations and identification of optimization potentials.

Organizational matters

- Requirements: Education in Electrical Engineering, Information and Computer Engineering or Physics
- Duration: 6 months
- Workplace: EMS, Inffeldgasse 33/I, 8010 Graz
- Payment: possible
- Contact: Alexander Bergmann; Reinhard Klambauer
- E-Mail: alexander.bergmann@tugraz.at; reinhard.klambauer@tugraz.at