

Master Thesis (30 ECTS)

RFID Temperature Sensor

Description:

NTC based temperature sensors are linear, and, if individually calibrated, very accurate. They are available in small form factors and at low cost. RFID frontend ICs with interface are getting available and can be used to build maintenance-free sensors via wireless RF links.

This master thesis will focus on the prototype development of an accurate RF connected temperature sensor. It shall contain a market research for available devices and comparative analysis of strengths, weak aspects and cost of the solution. Critical aspects to provide solutions for, are the interconnection of analogue NTC sensor and RFID front-end IC, the accurate sensor calibration and temperature measurement in application, calculation of the RF interface including antennas and matching, and a prototype application frame-work consisting of commercial RFID reader and development of application software with GUI.

Targets:

- Market research and comparative analysis of available RFID frontend ICs suited for sensor connection
- Hardware prototype development of NTC based RF connected sensor
- GUI Application software development to operate the prototype
- Focus on interconnection of analogue (resistive) sensor to RFID frontend IC, calculation of RF interface (antennas, matching, link budget), sensor calibration & determining measurement errors

Organisational:

- Pre-conditions: Motivation for the topic, Layout design (Eagle), measurement techniques, GUI SW development (Matlab, ...)
- Start: May 2021
- Duration: 6 ~ 8 months
- Work space: home office & EMS, Inffeldgasse 33 / I, 8010 Graz

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