



Antennas for Wall Penetrating Radar System

About Radarbolaget

Radarbolaget designs and produces penetrating UWB-radar systems for furnace monitoring and surveillance and needs for future products, include new technologies and innovative solutions to keep up with demands from our customers. For that reason Radarbolaget collaborates extensively with the Center for RF Measurement Technology University of Gävle.

Thesis description

Ultra Wide band technology is used to be able to “see” the production process from outside of a furnace made of ceramic material. The present sensors use two relatively large Vivaldi antennas with the total size 300 x 300 x 300 mm. The antenna has a frequency range from 300 MHz to 10 GHz. The maximal working temperature is 125 °C.

The thesis work is to simulate various types of antennas in HFSS and optimize the key parameters for best performance in the radar system.

Tasks and goals

To study the theory for UWB antennas and the preliminary specification

To set up a theoretical model for the antenna

To simulate the antenna in HFSS and find the limitations for the following key parameters: **bandwidth, gain, reflection coefficients, phase, E-plane pattern and H-plane pattern**

To optimize the antenna layout and the radar systems feeding circuits for maximum performance

To carry out sensitivity analyses for all key-parameters

To document the used models, calculations and results

To design an antenna for the penetrating radar according to the results from the study

To produced a small prototype series (3 units) for test and verification

To finalize the thesis

Optional goals

To simulate the optimal placement of the antennas for minimum crosstalk and study the impulse response function for best target resolution.

Competence requirements

We foresee that the applicants are Master of Science students in Electronics/Telecommunication

Working period

20 weeks.

Working place

The main part of the work will be done at Radarbolaget

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