

Student Project Proposal

Project title: Designing two RF oscillators

Faculty and Laboratory: STI, Microwaves and Antennas Group (MAG)

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Project description

A common type of oscillator is the voltage-controlled oscillator (VCO), for which the radio frequency (RF) output depends on the applied DC voltage bias. Stability w.r.t. frequency of the signal output is desirable together with a compact design.

The goal is to deliver two VCO designs, one intended for the noise figure lab offered in a course by Prof. Skrivervik and the other intended for efficiency measurements of electrically small implantable antennas. Oscillator 1 shall use a voltage bias below 15 V and deliver a tuneable 868-872 MHz output signal of power in the vicinity of -10 dBm. Compactness is not a priority for the first VCO and the frequency tuning can be implemented with a binary switch. The second VCO is required to be very compact and biased by some available micro battery. It should fit inside a hemisphere with a diameter 1 cm, be operationally stable at 403 MHz, and be impedance matched to small complex loads.

In the project, the student will use a circuit simulator of choice to design the electronics, create matching PCB layouts, and use on-chip components to build the VCOs.

Type of work: Design, fabrication, and measurements 80 %; documentation and reporting 20 %.

Level: BS (MS) Project 8 (10) credits

Student tasks:

- Design 2 VCOs according to description.
- Measure and document the operation in the project report.