

Implementation of wireless communication transmitters above 300 GHz

Principal Investigator: Scott Barker, Professor, Electrical and Computer Engineering Fellow, University of Virginia

Project Summary: Investigating the use of software-defined radios (SDRs) with frequency multipliers to implement wireless communication transmitters above 300 GHz. While a traditional millimeter-wave transmitter might be implemented with an SDR followed by a multiplier and power amplifier, this is not necessarily the most efficient design above 300 GHz. This project aims to explore an alternate transmitter architecture based on using high-efficiency Schottky diode frequency multipliers through both simulation and experimental implementation of a prototype transmitter.

Project Purpose: The goal of this project will be to investigate various aspects of a 300 GHz transmitter system implemented using a software-defined radio with a frequency multiplier. Areas of interest include data throughput versus signal-to-noise ratio, DC to RF efficiency, and the use of digital pre-distortion to improve linearity.

Student's Role: Students participating in this project will work with both GNU Radio for design, simulation, and realization of a prototype software-defined radio-based transmitter. This will involve both programming within the GNU Radio environment as well as using laboratory equipment under the supervision of graduate students working in the lab.

Preferred Skills/Background: Some skill with electronic data collection and the use of typical measurement equipment (oscilloscopes, power supplies, digital multimeters). Will also need to have some comfort level with basic programming within an interactive design environment.