Master thesis proposal

Acoustic wireless link

Description and Background

Sometimes when testing wireless devices, it is necessary to send and receive data and commands to and from the device. Often this can be done using one of the ordinary wireless protocols, such as WiFi or LTE. If that is not possible, it is often possible to utilize a USB connection. However, in certain scenarios, none of these options are available. For that purpose Bluetest which to develop an acoustic wireless protocol that can be utilized. The solution should provide a complete communication stack with an Android app that can receive commands and a PC program that communicates in the other end. This project is run at Bluetest towards a high profile customer.

About Bluetest

Bluetest is a spin-off company from Chalmers and a world-leader in over-the-air testing of antennas and wireless communication systems. Bluetest develops and manufactures reverberation chambers which are sold to all major vendors of wireless equipment in the world. Currently Bluetest is working to introduce test systems relevant for the 5th generation of mobile systems that will be available in the next few years. One such interest for Bluetest is the move to mm-wave communication, which will happen in 5G.

Scope

The project consists of the following parts:

1. Design of a complete acoustic wireless link, including link budget/channel investigation, equalization, coding and modulation. We believe there is approximately 5 kHz of bandwidth available for end to end TDD communication. There is already some software available that we believe can be used as a starting point.
2. Implement the wireless link in Android and PC software. Preferably exposing a TCP socket.
3. Verify the implementation in a reverberation chamber.

Tasks

- Literature study
- Review of available solutions
- Selection of solution
• Implementation of acoustic PHY with equalizer, coder/FEC and MAC services
• Implementation of MAC, preferably as an exposed TCP socket.
• Verification of the implementation

Required qualifications

• We believe the master thesis candidate has a background in applied physics, electrical engineering or computer science
• Sufficient programming skills to implement the design in a phone app and in a computer.
• Photonics and wireless engineering
• Capability of hands-on work in building real hardware and performing tests in a microwave lab.

Resources

• Bluetest will provide supervision
• Office space at Bluetest
• All required lab resources
• Budget for purchase of required hardware

Duration

This project is sized for 30 ECTS
We believe that the work is appropriate for 1 student during ½ year.

Supervisor

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More information

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