M.Sc Thesis Description: Communication using L'

May 2021

1 Main Goal

The main goal of the thesis is to investigate the novel radio frequency transmitter hardware L', examine parameters such as energy and spectral efficiency and develop coding-schemes for using L' as a transmitter. The thesis will be performed at Ericsson Research, Lindholmen, in collaboration with the Communication Systems group at Chalmers University of Technology.

2 Background

Energy efficiency is becoming increasingly important in wireless communication networks as it has impact on the environment. Therefore, there is continuously ongoing research on the topic of efficient radio-frequency hardware and in particular the power amplification area. Recently emerging, non-conventional hardware technologies provides potential methods for energy efficient communication. However, due to inherent limitations of the hardware, conventional, standardized physical layer can not be used.

The L' technology is a highly power efficient, switched transmission-line based method for generating a voltage waveform capable of driving the transmitter antenna. Due to the nature of how L' is constructed, we are limited in the waveform combinations that can be generated. Therefore, new methods for communication needs to be investigated.

3 Scope

- Study the functionality of a L' hardware unit
- Develop a mathematical model of the L'
- Find an analytical expression for the channel capacity
- Derive an analytical expressions for the L' units energy efficiency (joule/bit)

4 Profile

- Solid background in mathematics is required
- Knowledge in information theory and communication systems is beneficial

5 Duration

For 1-2 students, 1 semester, 30 ECTS points.

6 Application

Attach your resume, transcript, and cover letter stating your interests and thoughts of the proposed thesis area. Send your application to ulf.gustavsson@ericsson.com and thomase@chalmers.se

7 Questions

If you have questions about the project, please contact

- Supervisors Ulf Gustavsson (ulf.gustavsson@ericsson.com), Sverker Sander (sverker.sander@ericsson.com)
- Examiner Thomas Eriksson (thomase@chalmers.se)