Thesis Title: **Implementation of Virtualized NB-IoT Baseband Functions**

Description of the Units

This project will be hosted in Ericsson Research and co-supervised by Ericsson Research and RISE SICS. The group in Ericsson Research is specialized in radio processing, RAN design and architecture. The group in RISE SICS focuses on research on the Internet of Things.

Thesis Description

Radio Access Network (RAN) virtualization is a concept that focuses on moving telecommunication functions from hardware to software in order to decrease cost and improve scalability of the network. The low data rates and relatively low latency requirements of IoT communication stacks makes the RAN approach suitable for virtualizing and cloudifying low-layer functionality such as the baseband; Something that is difficult to realize for high performance telecommunication standards such as 5G.

Currently, an SDR (Software-Defined Radio) based testbed has been built. We have partly implemented NB-IoT baseband functions with container-based virtualization. The next step is to further improve and develop NB-IoT baseband stacks on the testbed. For example, one focus is on implementation and verification of uplink transceiver algorithms on both network and UE (User Equipment) sides. The announced thesis will build on this testbed and use GNU Radio to develop the NB-IoT baseband functions.

You will be required to:

- Study NB-IoT standards and transceiver algorithms (especially uplink)
- Implement and evaluate transceiver algorithms on the testbed
- Perform lab measurements with the testbeds
- Provide implementation and usage documentation
- Document the results as a thesis report

Competence

We are looking for a student with good programming skills in Linux and understanding of telecommunications. Experience with GNU Radio, C++/Python, IoT, and SDR is a great merit. Good skills in spoken and written English is a must.

Application

Applications should include a brief personal letter, CV, and recent grades (transcripts). Relevant experience is highly valued so please list projects and programming tasks that are relevant for the position. Candidates are encouraged to send in their application as soon as possible. Suitable applicants will be interviewed as applications are received.

**Start Time**  January 2019 (earlier is also possible)

**Location**  Ericsson Research, Kista, Stockholm

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