

## Project abstract

**Title: A Digital Pre-Distortion Power Amplifier for the NB-IoT Standard**

### Objective

Design of a PA (Power Amplifier) with “Digital Predistortion” (DPD). A transceiver will be integrated with a DPD-algorithm developed by Lund University in cooperation with Xenergetic AB. Test-chip will be fabricated and measurements will be conducted in EIT’s electronics lab.

### Abstract

In this project, a PA for new NB-IoT standard with high efficiency will be designed in 22 nm CMOS-technology [1], [2], according to a concept with low power consumption and good performance. By applying Digital Predistortion (DPD) to the signal that is fed to the power amplifier, an efficiency that is close to maximum can be achieved. Compared to competing standards, NB-IoT is a cellular technology, that uses the present base stations in a GSM or LTE network, which gives a significant competitive advantage. There are many applications for IoT technologies. In logistics, it is desired to be able to track containers to optimize transport costs and decrease environmental impact. Remote reading of sensors is an area that can generate large sales volumes. The higher the volumes of a product, the stronger are the requirements for low cost, small size and low power consumption. The cost requirement is addressed by integrating the PA on the same silicon as the DPD algorithm. Xenergetic AB has developed a technology for memories and logic that can be used for DPD and at the same time have extremely low power consumption. The project goal is to evaluate Xenergetic’s technology by using it to design a PA with high efficiency and thereby reduce the power consumption [3]-[6]. The partner Lund University (LU) will be able to publish this proof of concept in highest international level, whereas Xenergetic will have an attractive show-case for marketing purpose.

**Co-coordinator:** Xenergetic AB

**Project manager:** Dr. Joachim Rodrigues

**E-mail project manager:** Joachim.rodrigues@xenergetic.com **Phone:** +46-70-5220423

### Other project partners:

Dr. Mohammadi (Xenergetic AB), [babak.mohammadi@xenergetic.com](mailto:babak.mohammadi@xenergetic.com)

Dr. Hemanth Prabhu (Xenergetic AB), [hemanth.prabhu@xenergetic.com](mailto:hemanth.prabhu@xenergetic.com)

Mrs Cathelin Melendez (Xenergetic AB) [anely.melendez@xenergetic.com](mailto:anely.melendez@xenergetic.com)

Mrs. Berta Escofet (Xenergetic AB) [berta.escofet@xenergetic.com](mailto:berta.escofet@xenergetic.com)

Mr. Xiao Luo (Xenergetic AB) [xiao.luo@xenergetic.com](mailto:xiao.luo@xenergetic.com)

Prof. Henrik Sjöland (Lunds Universitet), [henrik.sjoland@eit.lth.se](mailto:henrik.sjoland@eit.lth.se)

**Total cost of project:** 6 692 560 SEK

**Total grant:** 3 347 200 SEK

With support from:



STRATEGIC  
INNOVATION  
PROGRAMMES