Institute for High-Frequency & Communication Technology

IHCT

# Master-Thesis

## Design and Implementation of a LoRa Receiver Operating at 868 MHz with Metal-Oxide Thin-Film-Transistors

In the wake of Internet-of-Things, Long Range (LoRa) has appeared as a new emerging technology for deployement of smart cities. It uses low data rates at low carrier frequency over long distance with good sensitivity and low path loss. Although there are several commercial LoRa transciever module available in the market, they have not yet been not implemented in cost effective, transparent and flexible meta-oxide thin film transistor (TFT) technology. In IHCT, we are trying to implement communication systems in TFT technology for wearable devices and IOT.


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The main objective of this thesis is to design and develop a prototype for a LoRa receiver using amorphous Indium Gallium Zinc Oxide (aIGZO) TFT technology. You would be given a compact model of our in-house (LFEB, University of Wuppertal) fabricated TFT. You would design and simulate in cadence a LoRa Receiver frontend with that could operate at 868 MHz ISM band. Your task would include determination the necessary components for the receiver frontends. This would be followed by transistor level designing and simulation of the system in cadence using the given model. Finally you would perform the layout, which will be sent for fabrication in order to have a complete prototype of the receiver frontend.

**Conditions:**

- Knowledge of Field-Effect-Transistors (CMOS technology)
- Experience with Cadence Design and Simulation
- Basic knowledge of RF Communication System

**After completion of the thesis, there are good job prospects in the following areas:**

- Wireless Communication
- Analog Circuit Designing
- RF System Designing

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