



## CAPTEURS RFID

A CMOS cells library for low power temperature and humidity sensors using 125 kHz RFID communication and supply.

### Project Summary

Associating low power sensors with RFID technology to manage power and communication is a quite natural but exiting idea. The project team has designed on a standard 0.35  $\mu\text{m}$  CMOS technology a library of cells to build the following 3 main blocs:

- **Analog Front End (AFE).** Power consumption: 5  $\mu\text{A}$  @ 1.8 V; regulated voltage: 2.7 V
- **On chip temperature sensor.** Power consumption: 2.5  $\mu\text{A}$  @ 1.8 V; expected absolute precision: +/- 1  $^{\circ}\text{C}$ ; acquisition time: 260 ms
- **Humidity sensor with off chip capacitive sensitive device.** Power consumption: 3.5  $\mu\text{A}$  @ 1.8 V; acquisition time: 100 to 300 ms.

The 125 kHz RFID segment was chosen to enable applications in wet environment. A VHDL coded control bloc has also been developed to test the communication.

The cells have been fully simulated and their layout drawn. Unfortunately, no real integration was possible within the time and budget frame of this project.

### Valorisation

The main goal of this project was to build a RFID cells "tool box". Mores steps are now needed to make the results directly usable for an application. To fully validate the design, one or more blocs should be integrated. In particular, the temperature sensor would be a good candidate for a publication, as it contains innovative structures.

Contacts are taken with Marcel Jacomet at the BFSH in Biel.

A local IC design company has already shown some interests into this project.

The HES-Vs, partner of the project, has already a large experience with RFID applications. Under the impulsion of Riad Kanan, plans are already set to re-use the concepts and efforts developed within this project.

Contact / Jean-Luc Bolli (jean-luc.bolli@hesge.ch)

Authors / Mario Dellea (Mario.Dellea@he-arc.ch); Riad Kanan (Riad.Kanan@hevs.ch)