

GREENsPACK: Green Smart Packaging

BRIDGE



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The goal of GREENsPACK project is to advance our understanding of materials and processes that allow the development of biodegradable chipless (no silicon IC) sensors for green smart packaging applications. In GREENsPACK, we will advance the state-of-the-art biodegradable electronics to enable solution-processed, printed, wireless sensing tags capable of measuring ID, temperature and relative humidity.

Towards ecological economy –
Innovation against food waste

Motivation: Need for sustainable materials

Target application: Perishable goods

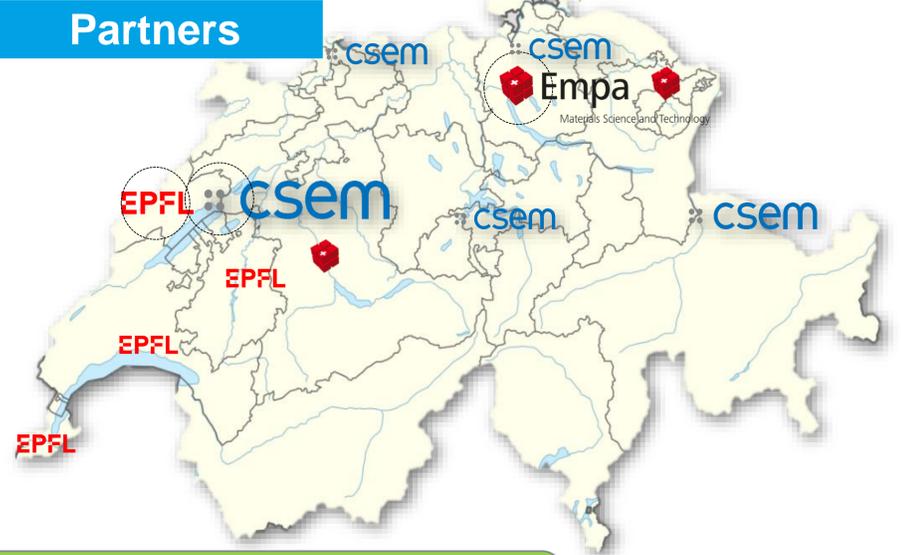
“Green sensor-tags for perishable goods have a tremendous ecological and economic potential”

Michael Suter, Head R&D Pacovis food solutions | food packaging

1/3 of global food production wasted
US\$ 680 billion cost in industrialized countries
Swiss ecological footprint 3x larger than what the world can provide



Partners



Our technology solution

Characteristics:

- Easy to attach to pellets/boxes
- High-volume manufacturing
- Automated wireless read-out
- Green disposability

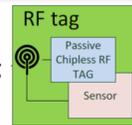
Functionalities:

- Identification: authentication & traceability
- Temperature and humidity sensing: Current values or threshold limit

Sensing tag

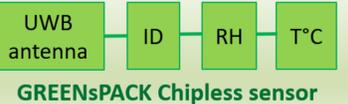
(R)LC oscillator / resonator for ID/ sensing

PCB antenna for passive readout



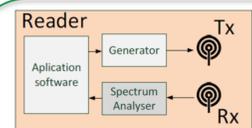
- **Biodegradable materials:** Substrate, conductive tracks and antenna, sensing films
- **Printing** for low cost at high volume
- **Sensors** based on fuse principle for threshold detection

Stationary reader



- 1 GHz – 10.1 GHz
- Readout: direct contact – 0.5 m
- Up to 16-bit

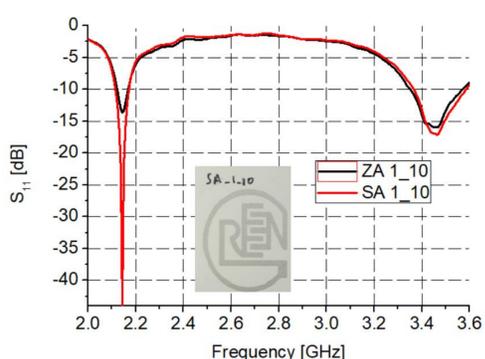
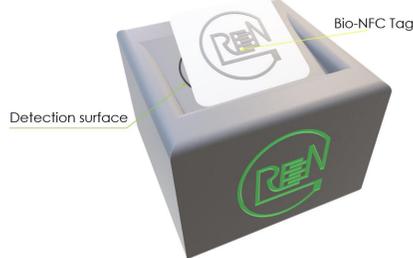
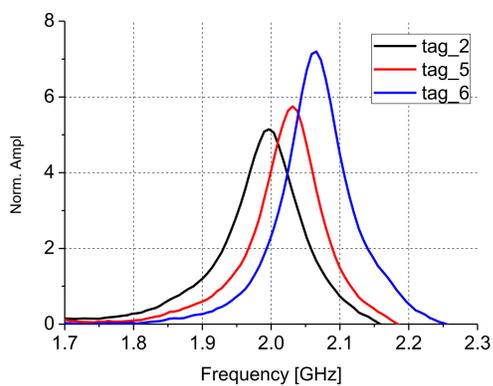
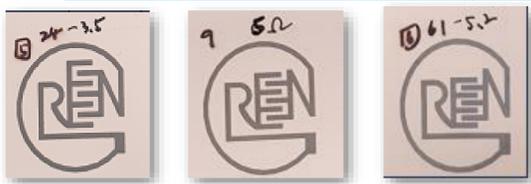
- Few cm²
- Sensing R & C
- Temp_{threshold} ≤ 25 °C
- Rel.Hum_{threshold} ≤ 60%



Reader

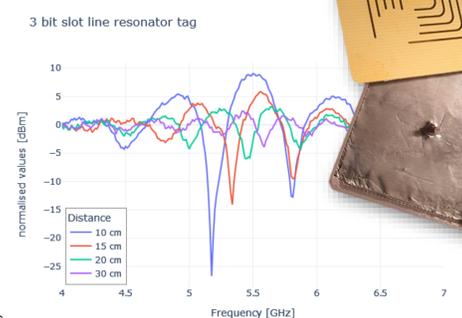
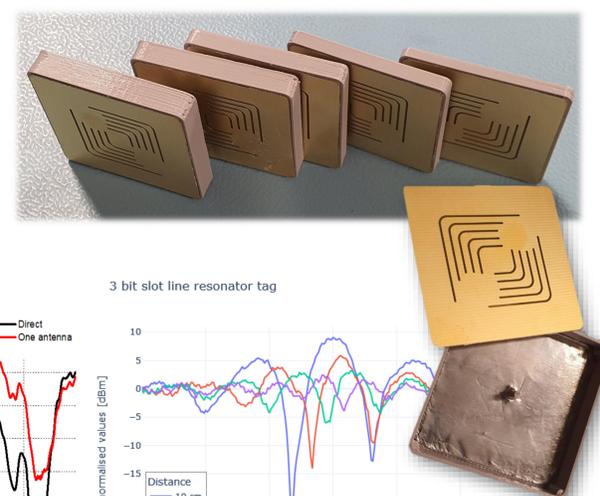
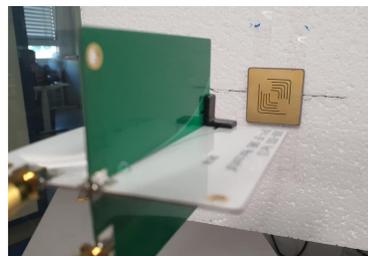
- **Frequency sweep** with custom made reader
 - Passive backscattering
 - **Ultra-Wideband Impulse-Radio (UWB-IR)**
 - Ultra-short pulse (≤10 ns)
- Parameters: spectral frequency signature, resonance frequency shift, amplitude, phase

Short range tag



Zinc (Zn) vs silver (Ag):
Zn is less conductive, but still can be used for short-range tags.

Long range tag



Contact us now

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