



[ScattererID], Beyond Standard Identification Solutions

E. Perret

Univ. Grenoble Alpes, Grenoble INP, LCIS, F-26000 Valence, France
 Institut Universitaire de France, Paris, France

The need for information identification and capture is a matter of prime importance in modern societies. Every sectors of society rely on the identification of data exchanged, the updating of the data recorded on a tag and the measurement of physical parameters. The ability to make objects interact with one another or with humans is an important factor in many applications, all the more so if this interaction can occur without human presence. The way to reduce power consumption, improve the communication quality-of-service and enhance connectivity has become key issues for lots of industries. Researchers need to consider the multiple factors simultaneously to design state-of-the-art RF devices for the next generation of identification services. One important direction is to develop low-power, low cost tags for wireless identification and sensing. Lots of improvements have been done today on communication systems based on electronic devices where an integrated circuit is at the heart of the whole system [1]. The democratisation of these chipped based systems like the RFID one will give rise to environmental issues in the future. However, these improvements pave the way for the development of new concepts based on approaches where the presence of the chip is not mandatory [2]. These approaches are based on radar or reflectometry principles; these are non-invasive techniques but they require specific theoretical and practical developments [3]. The objective of this presentation is to introduce the paradigm of RF communication system based on chipless labels, i.e. tags without any chip, bringing an ID, able to communicate with radio waves and having extremely low costs. We will see that it is possible to associate the paper based chipless label ID with other features like the ability to write and rewrite the ID, or a sensor function (see Fig. 1).

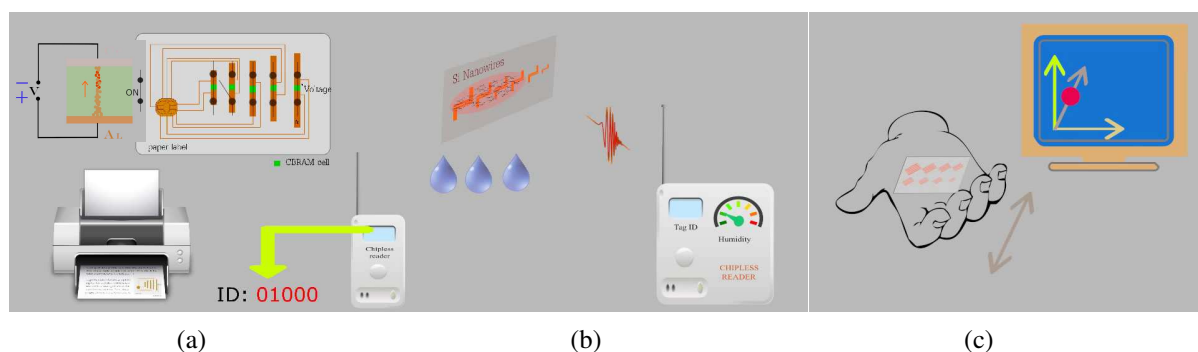


Figure 1. Illustration of the concept of remote data-monitoring with smart electronics labels without chip, and printed with regular printer: (a) reconfigurable chipless label based on CBRAM RF switch with writing and rewriting capability, (b) remote sensor (c) Gesture recognition.

Acknowledgement

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 772539).

References

1. K. Finkenzerler, *RFID Handbook: Fundamentals and applications in contactless smart cards, radio frequency identification and near-field communication*, 3rd Edition: Wiley, 2010.
2. E. Perret, *Radio Frequency Identification and Sensors: From RFID to Chipless RFID*: Wiley-ISTE, 2014.
3. E. Perret, "Displacement Sensor Based on Radar Cross-Polarization Measurements," *IEEE Trans. Microw. Theory Techn.*, vol. 65, pp. 955 - 966, 2017.