



Talk information

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Title of the talk:

Battery-free wireless sensors for industrial applications based on UHF RFID Technology

Abstract of the talk:

The talk will provide a good overview of the current state-of-the-art of the RFID technology in the Wireless Sensor Network (WSN) field. The different RFID alternatives will be described with their pros and cons. The benefits and limitations of battery-free wireless sensors based on RFID technology will be explained. Subsequently, the talk will present the design of an UHF RFID integrated circuit (IC) intended to harvest and store the incoming RF signal in order to supply analog or digital sensors. A battery-free wireless rotor temperature monitoring system based on the designed IC will be presented. The sensor is able to sense from -40° to 150°C and robust to the presence of the high electromagnetic disturbances generated by the electrical machine. Measured data rates are higher than 1 sample per second.

Biography of the speaker:

Roc Berenguer is a Professor in the Electrical, Electronic and Control Engineering Department at TECNUN, the Technological Campus of the University of Navarra in San Sebastian, Spain.

He received his M.S. and PhD. degrees from TECNUN, Spain, in 1996 and 2000 respectively. From 1999 to 2015 he was with CEIT, first as an Associated Researcher until 2013 and as the Head of the Electronics and Communication Unit until 2015. Through CEIT and INCIDE (Spin-off of the CEIT's COMMIC group) he worked as an external consultant for Siemens in Munich (2000), Hitachi Microsystems Europe in Maidenhead (2001), Xignal Technologies in Munich (2001-02), Seiko-Epson in Barcelona (2006-07) and Innophase in Chicago (2012-14) where he collaborated in the design of several RF front-ends for wireless standards like GSM-EDGE, DAB, Wibree, etc. He is also a consultant RFIC engineer at Innophase Inc. (San Diego, USA).

He has transferred technology to two start-up companies: INCIDE S.A in 2000 (April 2014 INCIDE was acquired by IXYS and changed name to IXYS-San Sebastian and later on to Littelfuse-San Sebastian) and FARSENS S.L in 2008 (later on acquired by Rich RFID).

In 2009, he was a visiting researcher in the Illinois Institute of Technology (IIT) where he worked on the design of a 77GHz Receiver front-end in 65nm CMOS for a FM-CW Automotive Radar. He has also been an affiliated researcher in the High Performance Integrated Circuits and Microsystems Lab. in IIT until 2019. During the summer semester 2010 he was a visiting scholar at the High Speed Electronics Lab. of the University of California Los Angeles (UCLA), where he worked on the design of a Power Amplifier at 60GHz. His technical expertise and research interests are in the areas of CMOS RF/mm-wave IC design, ultra-low power analog circuit design for battery-less sensor nodes, high-speed signal processing and Quantum electronics.

He has collaborated in more than 20 research projects. These projects were funded by the European Union, the Spanish government, the local government (Basque Country) or directly subcontracted by companies.

He is author or co-author of more than 100 refereed publications in journals and conferences. He holds 18 patents national and international, and is co-author of 4 books. He is an assessor of the Spanish Agency of Evaluation and Prospective (ANEP). He is a senior member of IEEE. He served in the TPC of the IEEE ESSCC, IEEE Midwest Symposium Circuits and Systems, the IEEE PRIME, etc. He also served as a reviewer for several journals such as IEEE JSSC, IEEE MTT, IEEE TCAS I & II, etc.

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