



## The IEEE 802.15.4 for low-power low-bit-rate ubiquitous networking: Technical overview, modelling and applications.

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### resumen:

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The IEEE 802.15.4 standard is poised to become the global standard for low-data-rate, low-energy-consumption wireless sensor networks (WSN) for a wealth of application areas, such as environment monitoring, industrial process surveillance, home automation and personal health monitoring. This standard specifies the physical (PHY) and medium access control (MAC) layers of such wireless sensor networks. Since its ratification, the IEEE 802.15.4 MAC has received much interest to assess its throughput and energy performance.

After a review of the most promising IEEE 802.15.4 applications, the talk will briefly describe the main technical specifications of this standard. Then, it will focus on the modelling of IEEE 802.15.4 MAC. More specifically, the state-of-the-art analytical models will first be described, which allow an accurate prediction of the throughput and energy performance of the IEEE 802.15.4 MAC. Then, we will explore the mechanisms to be exploited to enhance the current IEEE 802.15.4 MAC with quality of service differentiation and traffic prioritization support to accommodate potential high-priority traffic (e.g. alarms and emergency alerts). Finally, we will introduce a novel Markov-chain-based analytical model of the IEEE 802.15.4 MAC with service differentiation.

The accuracy of the model is validated with extensive using the IEEE 802.15.4 network simulator ns-2 module.

### sobre Nadia Khaled:

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Nadia Khaled received the M.Sc. degree in electrical engineering from ENSEEIHT, Toulouse, France, in 2000, and the Ph. D. in applied sciences from the Katholieke Universiteit Leuven, Belgium, in 2005. From 2000 to 2005, she was with the Wireless Research Group of IMEC, Leuven, Belgium.

From 2005 to 2006, she was a postdoctoral researcher at ETH Zurich, Switzerland. Since 2006, she is a research associate at the Swiss Federal Institute of Technology Lausanne, EPFL. She also holds the position of visiting assistant professor at the University of Carlos III Madrid (UC3M). Her research interests lie in the area of signal processing for wireless communications; particularly transmit optimization MIMO techniques and energy-aware MAC design for sensor networks.