IEEE 802.15.4 Now and Then: Evolution of the LR-WPAN Standard

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***Abstract*—For 15 years, the popular IEEE 802.15.4 standard has served as de facto standard for applications with low latency and small energy consumption requirements. During this time, it has evolved and dramatically extend its original purpose. With thousand of possible parameters and combinations, its objectives are not as clear as they were when it was first introduced. In this paper, we present a concise and chronological description of the standard highlighting the main features introduced by each one of its revisions as well as a notion of its usage. A compendium of this kind can be valuable to researchers working on implementations and improvements and to users seeking a general reference. This is relevant now more than ever because the standard must coexist with hundreds of other standards that are also constantly evolving. As presented in this document and despite its popularity and importance, there are very few capable IEEE 802.15.4 simulators and these are often outdated and incomplete. The aim of this paper is to provide a quick reference but also present the evolution of the standard and its future directions. Similarly, we hope that this study fosters the creation of new implementations, particularly new simulations modules.**

***Keyword*—LR-WPAN, protocols, survey, WSN, simulations, Zigbee, IEEE 802.15.4, modulations**

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