Abstract

Since the beginning of the IEEE 802.11 technology its channel access in ISM bands was governed by simple rules to ensure fairness and co-existence: such as upper ceiling on maximum transmitted power, moderate out-of-band emission masks and requirement for tolerance to interference. However, over time these rules became outdated and no longer well suited for current capabilities of devices operating in ISM bands. In this paper we propose a new channel access model for IEEE 802.11 and other devices using unlicensed ISM bands at 2.4 GHz and 5 GHz based on Game Theoretic principles and Cognitive Radio features. It is shown that the proposed channel access method can significantly improve the efficiency of spectrum usage, as well as the quality of service that is experienced by users of ISM bands. Moreover, it would allow abolishing constraint on maximum transmission power and making unnecessary the use of CSMA/CA protocol by replacing it by more advanced Multi-Polling with Game Theory (GT) based protocol.


Index Terms

Computer Science  Wireless

Keywords

Interference, IEEE 802.11, Game theory, MAC, Cognitive Radio, ISM band.