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Performance Evaluation of Cognitive Relay Networks for End User Mobile Over Mixed Realistic Channels

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Abstract: The cognitive relay network is a spectrum dynamic paradigm that makes use of unlicensed spectrum. This is based on combining cooperative relaying techniques with a cognitive radio network to improve spectrum efficiency and overall system performance. The presence of mobile users at the destination node is taken into account in this paper. End users can navigate at relatively fast vehicular speeds, resulting in dynamic multipath fading and high Doppler shift, which can be fairly modeled using the Nakagami-m fading channel (i.e., ? < 1). In a spectrum-scarce environment, a secondary user must implement an optimal power allocation policy in order to achieve higher transmission rates while keeping overall interference affecting the primary user (PU) below a certain threshold value. The outage probability (OP) performance of underlay dual-hop cognitive relay networks with a single AF relay is studied in particular over the mixed Rayleigh and Nakagami-m fading channels for different scenarios, and tight closed-form expressions for the system OP of underlay dual-hop cognitive relay networks with and without the use of direct link transmission and selection diversity at the destination are derived. This scenario takes into account interference power constraints for the primary network over independent and non-identical (i.n.i.d) Rayleigh and Nakagami-m fading channels when ? < 1 based on statistical signal-to-noise ratio characteristics. The impact of the fading parameter, m, the maximum aggregated intrusion constraint, and the locations of the primary users (PUs) on different channel scenarios at high vehicular speeds are evaluated numerically. To verify and validate analytical results, Monte Carlo simulations are presented. devices. The main and crucial restriction is on the available energy for each sensor which drastically affects the network performance. Many clustering techniques have been proposed to save energy and consequently imp