Regular paper

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Energy Detection based Spectrum Sensing for Gamma Shadowed α–η–μ and α–κ–μ Fading Channels

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Abstract: In 5G communication, spectrum sensing is a viable technology to use the available spectrum efficiently. Energy detection based spectrum sensing is known to be very simple as far as the implementation of hardware circuitry is concerned. The performance of Energy Detector (ED) over α–η–μ/gamma and α–κ–μ/gamma composite fading channels is obtained using numerical approximation. Unified analytic expressions for the average probability of detection and average area under the receiver operating characteristic curves (AUC) are derived for both the channels using Gaussian-Laguerre method. The produced results are very generic in the sense that the performance already derived for generalized distributions such as α–η–μ, α– κ–μ, η–μ/gamma, α–μ/gamma, κ–μ/gamma and their inclusive ones can be easily evaluated using the these results. The impact of the system parameters on the performance of ED is studied in terms of complimentary receiver operating characteristics (CROC) and AUC.

Keywords: Cognitive radio; energy detection; generalized fading; AUC; CROC curve

Subject classification codes: wireless and optical communication