Abstract

The deployment of femtocells in a LTE advanced system can extend the system coverage to include indoors. Unfortunately, an electromagnetic interference may occur among the femto users and the macro users in the case of co-channel deployment. A cognitive radio can be used to mitigate the interference among the femtocells and the macrocells. It is applied by allowing the femto users to be handled as secondary users of any other existing network. In this paper, the performance of the LTE advanced Femtocell is studied by using different detectors such as energy detector, cyclostationary detector, and matched filter detector, which is not clarified until now. Moreover, the analysis of these detectors is made. Comparisons among these detectors are carried out. Different wireless channel models, Additive White Gaussian Noise (AWGN) and fading channels, are implemented to verify the operation of the proposed LTE advanced Femtocell. Simulation results show that there is a tradeoff between a false alarm probability and the signal to noise ratio value of any detector to have a certain performance. Moreover, the performance of the cyclostationary detector and the matched filter detector is better than the energy detector especially at low signal to noise ratio values. Unfortunately, the cyclostationary detector performance is not satisfying when the fading
channels are employed.

References

Keywords
LTE Advanced  Femtocells  Cognitive Radio  Spectrum Sensing  Wireless  Channel Models