Performance analysis of spectrum sensing methods: A numerical approach

(Conference Paper)

Hasan, M.K. a, Ismail, A.F. b, Abdalla, A.H. c, Ramli, H.A.M. c, Islam, S. c, Hashim, W. a

aDepartment of Electrical and Computer Engineering, International Islamic University Malaysia, Malaysia
bCollege of Information Technology, Universiti Tenaga Nasional (UNITEN), Malaysia

doi:10.1109/ICCCCE.2014.6923696

Abstract

Recent enhancement of Long Term Evolution / Advanced (LTE/LTE-A) is aimed to increase the throughput of the Orthogonal Frequency Division Multiplexing (OFDM) system. This is quite obvious where both frequency and time division are employed in order to augment the system capacity. In LTE/LTE-A heterogeneous Networks (Het Nets), femto cells (He Node Bs) are the optimal choice to extend the coverage within indoor environment. Nonetheless, the deployment of such base stations, somewhat to certain extent, does create cross-tier and co-tier interferences with the macro cell users (UE\textsuperscript{macro-eNB}) that ostensibly can become a critical challenge. It is implied that the unutilized / idle spectrums reallcation might be one of the solutions to mitigate such challenge. However, the errorless spectrum sensing does pose another issue. This paper outlines the investigation findings where spectrum sensing techniques is deployed to maximize the spectrum detection capacity with minimum error in OFDM based Het Nets. In the attempt to increase the efficiency of spectrum resources, this paper proposes a sensing technique which is imposed over advanced energy detection technique to detect the idle spectrums. The result of the proposed scheme is evaluated using Monte Carlo simulation. © 2014 IEEE.
Critical challenges
HetNet
Numerical approaches
Orthogonal frequency division multiplexing systems
Performance analysis
Sensing techniques
Spectrum
Spectrum sensing techniques

Engineering main heading: Orthogonal frequency division multiplexing

Source Type: Conference Proceeding
Original language: English

DOI: 10.1109/ICCCE.2014.63
Document Type: Conference Paper
Volume Editors: Gunawan T.S.
Sponsors: Felda Wellness Corporation, Malaysia Convention and Exhibition Bureau (MyCEB), Malaysian Industry-Government Group for High Technology, University Putra Malaysia, Yayasan Kesejahteraan Bandar
Publisher: Institute of Electrical and Electronics Engineers Inc.

References (15)

1. Haykin, S.
   Cognitive radio: Brain-empowered wireless communications
   View at Publisher

2. Choi, Y., Lee, Y., Cioffi, J.M.
   Optimization of cooperative inter-operability in heterogeneous networks with cognitive ability
   View at Publisher

   Joint power and bandwidth allocation algorithm with QoS support in heterogeneous wireless networks
   (2012) IEEE Communications Letters, 16 (4), art. no. 6168145, pp. 479-481. Cited 38 times. doi: 10.1109/LCOMM.2012.030512.112304
   View at Publisher
4 Ismail, M., Zhuang, W.
Decentralized radio resource allocation for single-network and multi-homing services in cooperative heterogeneous wireless access medium
doi: 10.1109/TWC.2012.091812.120329
View at Publisher

5 Choi, Y., Kim, H., Han, S.-W., Han, Y.
Joint resource allocation for parallel multi-radio access in heterogeneous wireless networks
doi: 10.1109/TWC.2010.11.100045
View at Publisher

6 CHEN, X., BIE, Z.-s., WU, W.-l.
Detection efficiency of cooperative spectrum sensing in cognitive radio network
doi: 10.1016/S1005-8885(08)60098-9
View at Publisher

7 Ma, J., Zhao, G., Li, Y.
Soft combination and detection for cooperative spectrum sensing in cognitive radio networks
doi: 10.1109/T-WC.2008.070941
View at Publisher

8 Liang, Y.-C., Zeng, Y., Peh, E.C.Y., Hoang, A.T.
Sensing-throughput tradeoff for cognitive radio networks
doi: 10.1109/TWC.2008.060869
View at Publisher

9 Mokhtar, R., Noordin, N., Ali, B.M., Ramli, A., Abdalla, Y.
Cooperative spectrum sensing with distributed detection threshold
ISBN: 978-076954177-8
doi: 10.1109/NETAPPS.2010.38
View at Publisher


© Copyright 2015 Elsevier B.V., All rights reserved.