Deployment of femtocell and its interference management approaches in LTE heterogeneous networks

ABSTRACT

With a vast number of wireless devices being connected to the system, the need for very high data rates and extremely low latency with ultra-high reliability is becoming more and more challenging. And with such density of network nodes, it is a huge challenge to provide wide coverage and high quality service in indoor environments. Femtocell, a new add-on in the small cell technology, acts as an extension to the existing outdoor macrocell with the aim of providing quality indoor coverage. However, vast deployment of femtocell network in the absence of proper network planning and coverage strategy makes it difficult to maintain the desired quality of service. Additionally, the service of femtocell in densely deployed heterogeneous network is challenged by interference, unwanted handover and signaling overhead in the system. Given the huge potential of the femtocell technology, extensive research has been carried out by companies, service providers and operators to mitigate the interference and to ensure the highest benefit of femtocell deployment. Against this backdrop, a rigorous review has been attempted in this paper with abrief analysis on femtocell technology and its deployment in LTE Heterogeneous Networks. Challenges of vast femtocell deployment and different interference management techniques have been studied with a quantitative comparison. Graphical and tabular analysis on the interference management techniques is also presented along with their advantages and limitations.

Keyword: Femtocell; Interference management; Hetnet; LTE; Small cell