

# **RADIO RESOURCE MANAGEMENT AND SMALL CELL DEPLOYMENT STRATEGIES FOR HETEROGENEOUS BWA NETWORKS: A GREEN COMMUNICATION PERSPECTIVE**

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# Abstract

The inevitable expansion of the modern telecommunication sector has necessitated deploying flexible heterogeneous network (HetNet) architectures to improve coverage and capacity. In this work, we primarily present a unique the RSS based Joint Call Admission Control and Dynamic Bandwidth Allocation Radio Resource Management scheme for a two-tier HetNets that consists of Small cells and/or relays along with Macro cells. A Continuous Time Markov Chain based mathematical model is also developed for the analysis of the QoS metrics like call blocking, call dropping, and bandwidth utilization.

Further, a novel tractable analytical model is developed using Non Homogeneous Poisson Point Process (NHPPP) to design and deploy a two-tier wireless HetNet. It is observed that NHPPP performs better when compared to its parent counterpart Homogeneous PPP in providing improved coverage and rate. The improvement rises even further in the case of three-tier HetNet modelled using NHPPP integrated with the K-Means Clustering algorithm. The analysis is done for both sub-urban and urban scenario conditions by varying the teledensity.

However, ultra-dense deployment of small cells is expected to raise network energy consumption. Hence, we present a novel Sleep Cycle Modulated Energy Harvesting (SCMEH) technique, for SeNBs to ensure proper utilization of energy resources. The comprehensive performance analysis reveals that the SCMEH enabled Small Cell eNodeBs under HetNet can ensure Sustainable Green Communication by radically controlling the estimated power consumption on an hourly basis throughout a random day.