

Energy Efficiency Optimization for Future Wireless Broadband Networks

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Abstract

The research aims at the improvement of the energy efficient properties for mobile clients in emerging wireless broadband networks. The need for the energy efficiency optimization is dictated by the limited power budget of mobile wireless devices and at the same time by the lack of adequate analytical models for active and sleep mode operation of these devices. The value of the existing system models for the performance evaluation of the realistic wireless networks is limited due to the fact that they fail to account for many realistic performance factors, such as dynamic traffic arrival flows, predefined QoS parameters, wireless channel degradation factors, etc. Consequently, the energy efficient algorithms formulated in the frameworks of these models have limited applicability and demonstrate poor performance.

The main target of the present research is the design, development and implementation of new effective energy efficient algorithms for the latest wireless broadband networking standards and the construction of the adequate system models. Three main components of the underlying research include sleep mode operation enhancement, active mode performance optimization and coordination improvement between several wireless networks in the heterogeneous environment. As the result of the research the existing simplified energy efficient solutions would be replaced with more sophisticated techniques that account for the degradation factors of a real-world multi-cell environment. Thus the ultimate throughput, power and energy efficiency gains in a wireless broadband network would be established.