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Performance Comparison of Up-link and Down-link Techniques under DUDe strategy for Heterogeneous Networks

This paper provides new insights about the performance of Down-link and Up-link Decoupling (DUDe) when compared with Cell Range Expansion (CRE) combined with enhanced Inter-Cell Interference Coordination (eICIC). Instead of an aggregated throughput analysis, this work analyses the users' performance depending on their coverage situation before and after changing the radio planning conditions and also considering their gain/loss situation after applying each of the techniques. For this purpose, the methodology of Monte Carlo system level simulations is adopted in both synthetic and 3D ray tracing based realistic scenarios. All these contribute to a detailed analysis of causes and effects. Simulation results indicate that both DUDe and CRE + eICIC can bring a dramatic increase in Up-link (UL) throughput. The gain for edge users when using DUDe in the realistic scenario reaches up to 767%. On the other hand, CRE + eICIC is still necessary in Down-link (DL) to improve throughput. This is due to a better signal coverage and an optimized allocation of resources. Hence, we argue about the reasonable idea of combining both methods and take their advantages together. This strategy is promising and an interesting radio planning method for Heterogeneous and Small cells Networks (HetSNets).

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