Master Thesis proposal

Energy Efficiency in CoMP transmission

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Thesis type: System analysis and simulation

Description: Coordinated Multi Point transmission/reception (CoMP) is considered for LTE-Advanced (LTE-A) as a possible solution to improve the coverage of high data rates, the cell-edge throughput and/or to increase system throughput in both high load and low load scenarios. Moreover, CoMP is a key element in the foreseen new radio access architectures generally known as C-RAN ("Cloud-RAN").

Joint Processing (JP) is one possible implementation scheme of CoMP where data transmission is done in a coordinated way among multiple geographically separated transmission points. The potential gains of CoMP-JP derive from the fact that a UE (User Equipment) receives signals from multiple transmitting points in such a way that the perceived signal strength and channel diversity is improved.

Enhanced energy efficiency features in transmitting points, such as fast switch on/off schemes, give the flexibility to smartly trade the improved capacity offered by CoMP with the possibility to switch off unnecessary transmission points to reduce the overall energy consumption when traffic is below the peak.

The objective of the stage will be to analyse and design innovative CoMP transmission schemes in a C-RAN network architecture, evaluating transmission schemes and algorithms used at physical and scheduling level, with a particular focus on approaches that can reduce energy consumption. The selected solution will be implemented in a computer simulation platform in order to evaluate the introduced performance enhancement.

The study will benefit from interactions with the METIS project, a large EU co-funded research project involving 29 partners spanning telecommunications manufacturers, network operators, the automotive industry and academia, where Telecom Italia is leading the task on advanced inter-node coordination.

Duration :	6 months
Required skills:	Knowledge and experience in MATLAB® and C/C++ programming. Knowledge of broadband wireless communication systems and OFDM techniques