

Bachelor assignment

Project: **Application of relays to locally extend cell coverage**

Duration: 4 months

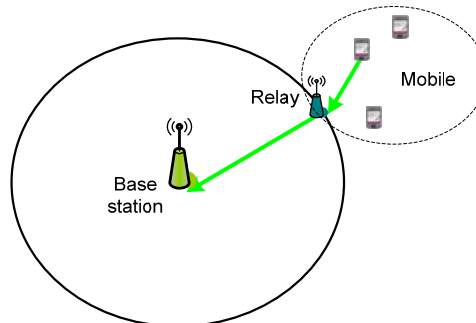


Figure 1 Application of a relay station to provide coverage beyond cell edge

A common problem of cellular networks is providing ubiquitous coverage. Obstacles on the signal path, particularly in urban surroundings, could prevent mobile users from receiving an acceptable service level or any service at all. Networks planners have developed several approaches to deal with coverage problems. One of them is relaying.

Relaying is a deployment strategy which makes use of an additional repeater on the path between base station and mobile users. Beneficial effect of relaying is the shortening of the distance between two communicating units and thus increasing the power of the received signal. Positioned within the cell a relay can improve the offered service. Positioned on the cell edge however a relay may provide local extension of the service coverage. If successful, such deployment strategy can provide service to a small, localized constellation of users beyond the cell edge without the necessity of introducing an additional base station and thus keeping the network cost low.

The goal of the assignment is to examine whether a relay can provide a local, extended coverage at the cell edge. In particular, the position of the relay and its characteristics such as transmit power and scheduling algorithm should be determined. The evaluation should be done in the setting of a HSPA-enabled UMTS network. The steps included in this research are:

- Get familiar with HSPA and the applied there schedulers.
- Define at least two possible deployment scenarios.
- Evaluate the system performance in terms of provided service rates and transfer times as a function of the relay characteristics.

Supervisors

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