

## Simple and efficient systems for decentralized managing of neighboring femtocells

A procedure for the management of neighboring femtocells is proposed that guarantees efficient utilization of the available spectrum and, simultaneously, that the aggregate interference level as perceived by any of the femtocell users is kept below a given value. The technique is well suited to the initial configuration of a femtocell when integrated in an operational femtocell network. In addition, the protected invention includes a simple procedure for the pairwise optimization of the transmission rate and/or power of any pair of neighboring femtocells. Partners to further develop the system and/or to establish commercial agreements along with technical cooperation are sought.

### The Challenge

Conventional solutions to the cooperative management of neighboring femtocells require the employment of a centralized management entity, which collects radio parameters from the neighboring femtocells and determines and communicates the required transmission configuration for each of them. The main limitation of such methods is the fact that any change in the radio parameters experienced by a single femtocell requires its notification to the centralized management entity and the reconfiguration of the transmission parameters of the plurality of the femtocells. Other existing solutions are decentralized and allow the self-configuration of femtocells when integrated in an existing femtocell network. However, owing to the lack of communication with the neighboring femtocells, these techniques cannot guarantee efficient utilization of the radio resources and, simultaneously, avoidance of performance degradation to the existing femtocell network. In fact these inventions might be affected by the hidden node problem, since no procedure is envisaged to control the level of the interference generated to the mobile units served by neighboring cells.

### The Technology

The present invention circumvents the limitations of the existing technologies. The new technology provides a procedure for decentralized self-configuration of femtocells at start-up that does not interfere with the existing operational femtocell network. Neighboring femtocells are given the possibility to set a maximum interference power allowed for each of their bonded users thus guaranteeing their seamless operation unaffected by the introduction of the new femtocell. Moreover, provides a procedure which can be used by mutual agreement of any pair of neighboring femtocells in order to reconfigure in a decentralized fashion their transmission parameters to benefit from increased transmission rate or reduced transmitted energy.

### Innovative advantages

- Simple procedure for decentralized femtocells
- Guarantees efficient utilization for the available spectrum.
- Well suited to the initial configuration.
- Allows the pairwise optimization of the transmission rate and/or power of any pair of neighboring femtocells
- Control the level of the interference generated to the mobile units

### Current stage of development

Several embodiments related to the invention have been evaluated in the context of the LTE-A standard evolution.

### Applications and Target Market

The technology could be of interest for companies devoted to the development of advanced femtocell base stations for LTE-A.

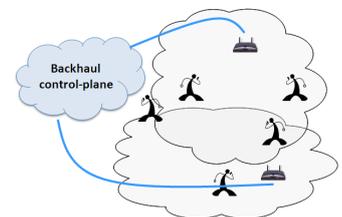
### Reference number

MKT2012/0096\_I

**New solution that circumvents the current limitations to femtocells management**



**Femtocell configuration at start-up does not interfere with the existint operational network**



**The cooperation between two neighboring femtocells can increase transmission rate or reduce transmitted energy**

### Business Opportunity

Technology available for licensing with technical cooperation

### Patent Status

ES and US priority patent application

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