Broadband Evolved FEMTO Networks

The aim of BeFEMTO is to develop evolved femtocell technologies based on LTE-A that enable a cost-efficient provisioning of ubiquitous broadband services and support novel usage scenarios like networked, relay and mobile femtocells.

At A Glance: BeFEMTO

Broadband Evolved FEMTO Networks

Project Coordinator

Dr. Thierry LESTABLE

Sagem Communications SAS

Tel: +33 (0)1 57 61 13 91

Mobile: +33.(0)6.88.55.35.22

Email: thierry.lestable@sagemcom.com

Project website: www.ict-befemto.eu

Partners: NEC Europe Ltd. *(GB), Telefónica Investigación y Desarrollo (ES), DOCOMO Communications Laboratories Europe GmbH (DE), Polska Telefonia Cyfrowa Sp. z.o. (PL), Qualcomm CDMA Technologies GmbH (DE), TTI Norte, S. L. (ES), mimoOn GmbH (DE), Centre Tecnològic de Telecomunicacions de Catalunya (ES), Commissariat à l'énergie atomique – LETI (FR), University of Oulu (FI), University of Surrey (GB)*

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EC Contribution: *€ 6.9m*

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BeFEMTO's Answer to the Broadband Gap

Broadband services play an important role in stimulating and fuelling the European economy. It is becoming increasingly clear that the expansion of the broadband base to a larger population is a necessary condition for enabling these services.

BeFEMTO develops evolved Femtocell technologies enabling the cost-effective provisioning of ubiquitous broadband services with the aim of accelerating the uptake of next generation mobile broadband in support of the desirable roll-out of broadband access across Europe.

True broadband anytime, anywhere

The project targets both near-term and long-term solutions. With its strong industry consortium, the BeFEMTO project aims to have a real impact on the standardisation of the next generation Femtocell technologies based on LTE-A in the near term. In the long-term, the project focuses on novel concepts and usage scenarios such as self-organizing and self-optimizing Femtocell Networks, Outdoor Relay Femtocells as well as Mobile Femtocells.

Benefits to European Economy and Society

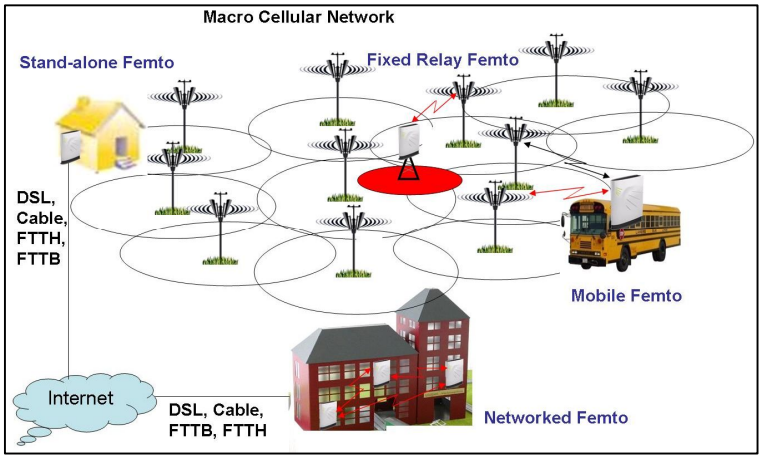
The beneficiaries of the project results will be primarily end-users, but also the operators. End-users will benefit from the technological advances in terms of enhanced mobile coverage, high-speed access to broadband services, despite lower transmit powers leading to substantial reduction in radiation exposure. Operators will benefit from the developed technology due to the capital cost savings through smooth convergence of fixed and mobile broadband services and the operational cost savings through advanced self-management and -optimisation techniques.

The BeFEMTO consortium includes key European operators and vendors and is supported by an Advisory Board with representatives of related standardization (ETSI), industry forum (Femto Forum) and European regulation bodies (Ofcom, UKE, ANFR, ECO). The project will use this unique position to actively promote the harmonization of European regulation and to impact international standards in order to strengthen the position of the European economy.

Technical Approach

BeFEMTO's vision of broadband evolved femtocells comprises four major themes. It envisages a smooth convergence between broadband fixed and wireless services by focusing on LTE-A based **stand-alone femtocell** through development of innovative concepts and algorithms required to guarantee a successful deployment of femto solutions in the near future. In this context, advanced RF, interference and radio resource management procedures and co-existence with macrocells will be the key-enablers exhibiting great advances towards higher spectral efficiencies and reduced radiation exposure.

With **networked femtocells** BeFEMTO will investigate on advanced cooperation between femtocells installed in buildings such as hospitals, offices or shopping malls. This approach offers new service provisioning for home, office and enterprise environments, and, consequently, new market and business opportunities for service providers. This requires novel concepts and algorithms with special focus on resource and interference management, network synchronization, and architectural design facilitating a tight integration into macro and other infrastructure networks. **Fixed outdoor relay** femtocell with self-organising capabilities will relax signalling delay and loading on wireless links between relay and macrocell base station. Mobile or moving femto nodes, **outdoor femtocells**, are also novel and they are to be installed in passenger vehicles such as buses and trains providing broadband communications to people on the move such as public transports. Consequently, we have to cope with a wireless backhaul link as opposed to the wireline link used for fixed or indoor stand-alone femto nodes.



Key Objectives

BeFEMTO is targeting measureable technical objectives that strongly indicate the ambitious research motivation.

- Ensuring minimum capacity to each user irrespective of its location, network loading, mobility, targeting at least **8 b/s/Hz/cell** of system spectral efficiency.
- A maximum averaged transmit power of less than **10 mW** for indoor femto nodes.
- Defining and developing new applications and use cases particularly related to the themes adopted in the proposal thereby enabling seamless convergence between fixed broadband and mobile cellular systems.

Expected Impact

The expected impacts of BeFEMTO will be diverse and immense:

- It will develop advanced radio access technology that will **lead to a highly efficient and unprecedented use of the radio spectrum**.
- Combining this with the **capital cost savings through smooth convergence of fixed and mobile broadband services** and the **operational cost savings through advanced self-management and -optimisation techniques**, BeFEMTO will significantly **increase the cost efficiency of the access infrastructure (cost/bit).**
- Providing support for new deployment scenarios like networked femtocells for shopping malls and mobile femtos for public transport, BeFEMTO will **expand the market opportunities for femto technologies** and **facilitate the entrance of new type of services**.
- BeFEMTO technology will **accelerate the uptake of next generation mobile broadband** for expected 60% of all cellular systems traffic and **support the desirable roll-out of broadband access across Europe.**
- It will actively **contribute to global standards, create European IPR and promote the harmonization of European regulation** related to femtocell markets, **reinforcing European leadership in mobile and wireless broadband systems.**