

# NEC Femtocell White Paper

## Enabling technology

### 1. Introduction

NEC is taking the market leadership in the development and deployment of Femtocell solution around the world.

NEC is the only company who is supporting both the IMS based connectivity and Iuh based approach, currently based on GAN standard and upgradable to Iuh in a near future.

NEC anticipates several commercial deployments in 2009 in different parts of the world.

### 2. NEC Femtocell Solution

NEC supports both the IMS based approach and Iuh based approach (RAN GW), currently based on GAN standard and upgradable to Iuh in a near future.

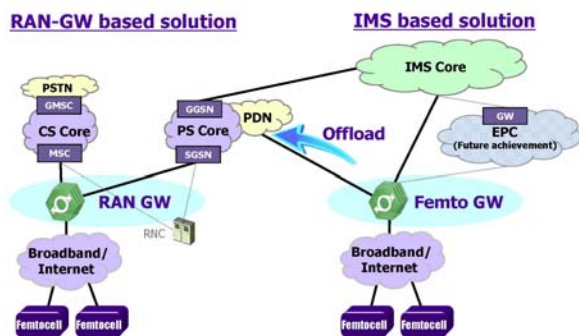


Figure.1 NEC Femtocell Solution

### 3. Global Foot Print

NEC hosts a large footprint across Europe and in other parts of the world. NEC has signed three commercial contracts, one in Japan for IMS based deployment and two in Europe based on its Iuh based approach.

In addition, NEC is leading the market with several live trials underway in Europe and several new planned in Europe and other parts such as Russia, Middle East and Far East.

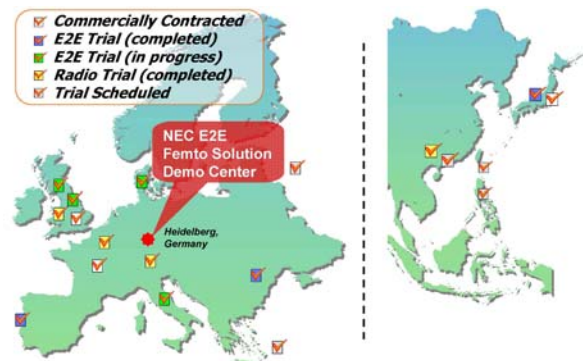


Figure.2 Global Foot Print

### 4. Iuh based Solution

NEC's Iuh based solution (RAN GW) is based on 3GPP GAN standard for the interface between the Femtocell Access Point and the Femtocell GW. The GAN based architecture provides a complete, end-to-end framework for ensuring that all relevant operator, regulatory and law enforcement requirements can be met while minimizing impact to existing systems.

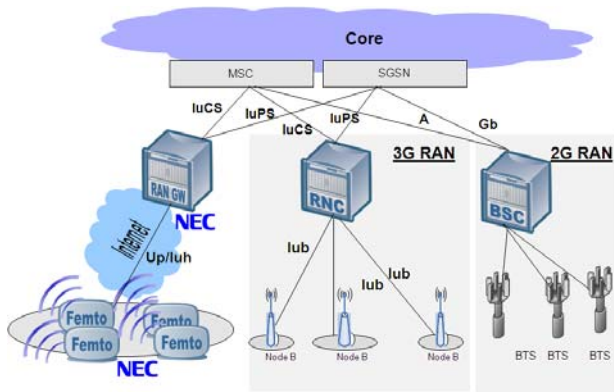
The solution enables the immediate roll out of Femtocell technology while connecting with operator's existing CS and PS core elements using standard 3GPP interfaces.

The solution meets following objectives:

- Enable automatic, dynamic femtocell initialization and efficient attachment to the core network with no operator or subscriber interaction
- Minimize the provisioning impact to the macro and core networks
- Minimize any incremental signaling impact to the existing network
- Provide high quality voice and data services
- Support location determination, emergency call routing and lawful intercept services
- Minimize changes to the billing collection and accounting method
- Ensure fully redundant system operation

NEC is in process of migrating existing UMA interface used between Femto and RAN GW to 3GPP defined in Iuh standard interface.

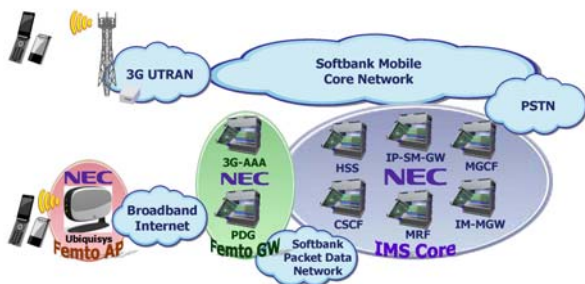
In addition, NEC solution incorporates the FAP Management system which interworks with the FAPs using the standard DSL forum TR-069 standard. NEC solution offers zero touch provisioning for the FAPs, a key requirement for mass market deployment.



**Figure.2 RAN-GW Solution**

## 5. IMS based Solution

The Femto system introduced for SoftBank commercial service is an advanced IMS based Femto system. It consists of IMS/SIP enabled FAP and IMS based Femto Core network. On the other hand, it is expected that prevalent UEs, that have no IMS/SIP client built in, are used at FAPs. Thus a SIP user agent (SUA) for the UEs is located in the FAP to convert between SIP and 3G TS 24.008. The Femto core network interconnects with existing Core network via MGCF/MGW.



**Figure.3 IMS based Solution**

The FAP and the FAP management systems are common between the Iuh and IMS based solutions, except for the provision of the SIP client in the FAP. The Uu interface in the FAP remains unchanged between the two solutions.