Proposal for IEEE 802.16m Support for Femtocells

Document Number: IEEE C802.16m-08/1406

Date Submitted: 2008-10-31

Source:

Mo-Han Fong, Yi Song, Sophie Vrzic, Robert Novak, Dongsheng Yu, Jun Yuan, Hosein Nikopourdeilami, Kathiravetpillai Sivanesan

Nortel Networks   E-mail: mhfong@nortel.com, yiso@nortel.com

*<http://standards.ieee.org/faqs/affiliationFAQ.html>

Re: IEEE 802.16m-08/040 – Call for Comments and Contributions on Project 802.16m System Description Document (SDD), on the topic TGm SDD: Femtocells

Purpose: Adopt the proposal into the IEEE 802.16m System Description Document

Introduction

- This contribution proposes the support of femtocells that address the TGm SRD (IEEE 802.16m-07/002r6) requirements defined in Section 9.5.

- The following aspects of the femtocells support are proposed:

  – Idle Mode

  – Handover between femto BS and macro BS

  – MS measurement report to support interference management between femtocell and macro-cell

Idle Mode

- A femto BS shares the same paging group ID with its overlaid macro BS. This avoids frequent location update when MS moves from femto BS coverage area to macro BS coverage area.

- MS in Idle Mode performs location update when a change of paging group ID is detected as defined in Section 10.4.2.3.2 of the SDD.

- When the network wants to page the MS, it may decide whether to page the MS on all the femto BSs belonging to the current paging group ID where the MS is located, or only page the MS on the macro BSs. This is implementation specific and can be determined based on whether the most recent location update from the MS is performed on a femto BS or a macro BS.

- MS in Idle Mode can perform idle handover to either a femto BS or a macro BS depending on the signal strength and whether the MS has access to the femto BS. BS may configure the relative signal strength threshold between a femto BS and a macro BS that the MS should use for determining whether it should handover from a femto BS to a macro BS and vice versa.

Handover in Connected State

- The handover is BS controlled as defined in Section 10.3.2.2 of the SDD.
- To facilitate MS scanning of neighbor femto BSs, the serving BS signals the relevant information (e.g. preamble index) of its neighbor femto BSs to the MS for those femto BSs that the MS has access to.
- MS reports to the serving BS the signal strength of the neighbor macro BSs as well as the neighbor femto BSs that it has access to.
- Either MS or its serving BS may initiate the handover process. The serving BS assigns the target BS (which can be a femto BS or a macro BS) to which the MS should handover as defined in Section 10.3.2.2 of the SDD. The BS may also unicast/multicast the target BS system information to the MS to facilitate the handover execution.

MS Measurement Report

- In order to control the DL transmit power of a femto BS, thus the interference caused by the femto BS to the MSs of an overlaid macro BS, an MS can be instructed by its serving macro BS to measure and report the signal strength of specific neighbor femto BSs.

- The serving macro BS can also use the signal strength reports from the MS to estimate the relative proximity of the MS to the neighbor femto BSs, in order to decide whether to limit the UL transmit power of the MS to reduce its UL interference to a neighbor femto BS.

Proposed SDD Text

- Add the content of slides 3 to 5 to section 17 of the SDD.