Femtocell BS Idle Mode and Sleep Mode

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Venue:

IEEE 802.16m-08/040 Call for Comments and Contributions on Project 802.16m SDD; TGm SDD: Femtocells

Base Contribution:

IEEE C802.16m-08/1423

Purpose:

to be discussed and adopted by TGm for the 802.16m SDD

Notice:

Release:

Patent Policy:

Introduction

- Power saving operations at femtocell BS are important:
  - Utility bill is paid by consumers and
  - It is desirable to reduce interferences to neighbor cells caused by femtocell BSs
- We propose femtocell BS idle mode and sleep mode, just similar to MS idle and sleep mode in the legacy system.
- The basic idea is that an FBS should stop transmission and enter idle/sleep mode when it is not serving active MSs.

Scenarios of FBS idle mode and sleep mode

- Scenario 1: All CUG-MSs are not in femtocell ⇒ FBS idle mode
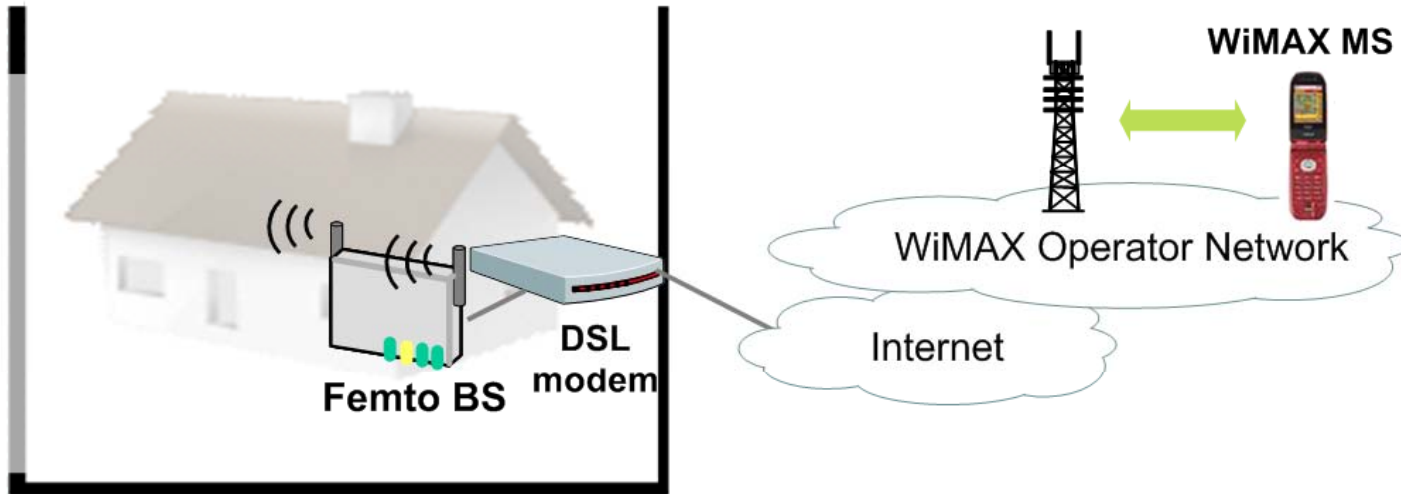
- Scenario 2: All CUG-MSs in femtocell are either in idle mode and sleep mode ⇒ FBS idle mode or FBS sleep mode

State transition diagram of FBS idle mode and sleep mode
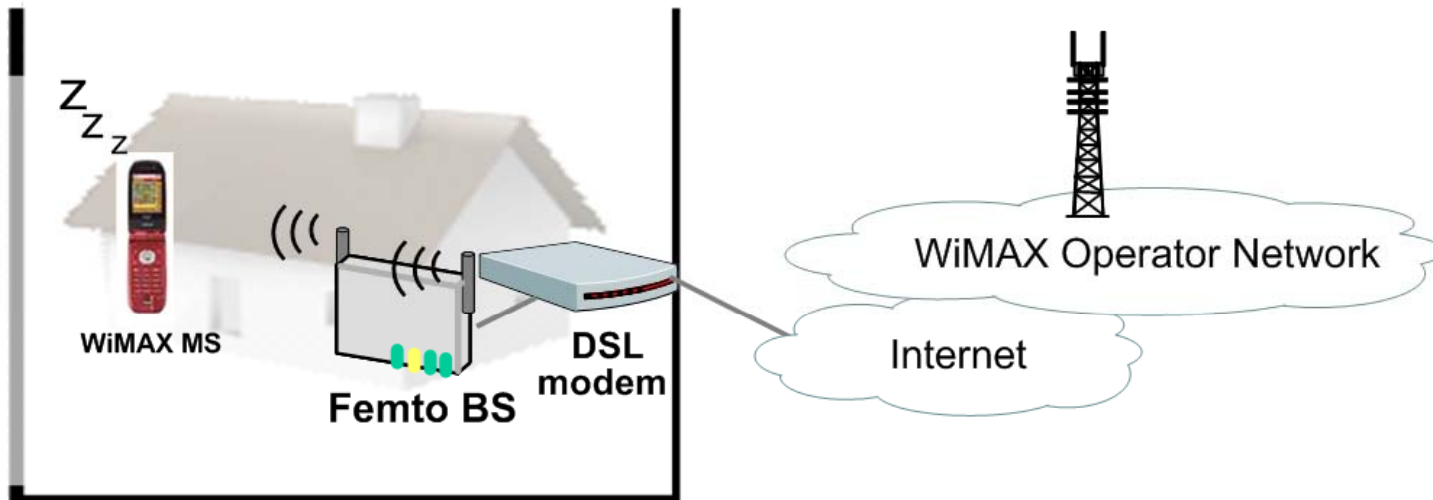
Proposed SDD Text

[Insert the following new subclause to the section 17 (Support for Femtocell)]

17 Support for Femtocells

17.Y Femtocell BS Idle Mode and Sleep Mode

In order to reduce energy consumption and interferences, FBSs should stop transmission when they are not serving any active MSs. In particular, an FBS may enter idle mode either when all of its closed-user-group MSs (CUG-MSs) are not in its service range, or when those CUG-MSs in its service range are in idle mode. Also, an FBS may enter sleep mode when all of its CUG-MSs in its service range are either in sleep mode or in idle mode. On the other hand, FBSs in idle/sleep mode periodically wakeup to serve MSs. In addition, the FBS in idle mode due to none of CUG-MSs in the service range needs to be activated when anyone of its CUG-MSs returns to its service range. Finally, MSs and the core network can send a wakeup signal to activate FBSs during FBS idle/sleep interval if there are data to transmit on the UL and DL connections, respectively.