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Re:	LB comment to 802.16m Amendment Working Document D2	
Abstract	This contribution provides text addition to AWD to enhance the definition of femtocell subscriber type CSG-Closed in IEEE 802.16m	
Purpose	For discussion and approval by IEEE 802.16m TG	
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Proposed text related to Restricted Connection between Non-CSG-Closed Users and Femtocell Basestation in IEEE 802.16m/D2 (15.4.2)

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1 Introduction

In D2, femto base station subscriber types are categorised into CSG-Closed, CSG-Open and OSG, and a closed subscriber group CSG-Closed femtocell base station is accessible only to AMSs which are members of this base station except for emergency services. In this case, when a non-CSG-Closed AMS enters an area, which is covered only by one/several CSG-Closed Femtocell ABSs, its communication with its macrocell ABS may be severely interfered, or even totally interrupted. Specifically, if a macro AMS is switched on in a CSG-closed only area or enters a CSG-closed only area, the interference from the surrounding Femtocell ABSs may interrupt the communication between the macro AMS and the nearest macro ABS or its serving macro ABS.

However, it is a general principle that the deployment of a femtocell should cause as less interference to the overlapping macrocell as possible. According to the current definition of CSG-Closed, this problem can not be solved.

Exchanging information between femtocell ABS and non-CSG AMSs may help to reduce such kind of interference and thus improve the performance for both non-CSG AMSs and the femtocell ABS.

2 Restrict Connection between non-CSG Users and Femtocell ABS

Our proposals are as follows:

When a macro AMS, who is not a member of the nearby CSG-Closed ABS but is severely interfered by the CSG-Closed ABS, it may start the procedure to request the CSG-Closed ABS to mitigate the interference. After the ranging and authentication, if the AMS is proved to be a legal user, it will be put on a non-member list by the CSG-Closed femtocell ABS.
The CSG-Closed Femtocell ABS shall maintain two lists:

- A member list, which includes the ID of all its members and the status of each member;
- A non-member list, which includes any active AMSs within its coverage area which are not members of this femtocell;

If an AMS is in the coverage area of a Femtocell ABS, it can register itself as a non-member or member according to its access right and status. An AMS may be included in the non-member lists of several Femtocell base stations.

AMSs in the non-member list have restricted access to the Femtocell base station. The AMSs can send or/and

receive signaling information with the Femtocell base station via a restricted connection, which cannot be used to transmit or receive traffic data. The signaling information may include channel state information, carrier resources, power level of received interference, etc.

The Femtocell ABS can use various interference mitigation techniques to reduce the interference to the non-CSG-Closed AMS based on the signaling information provided by non-CSG-Closed AMSs. These technologies may include beamforming, power control, and etc. The Femtocell ABS can use interference mitigation techniques to reduce the downlink interference to the non-member AMSs and uplink interference to the femtocell ABS based on the signaling information provided by non-member AMSs.

When the non-member AMS becomes inactive or leave the coverage area of the Femtocell ABS, the Femtocell ABS shall remove it from the non-member list.

3 Proposed Text

[Insert text in subclause 15.4.2 as follows]

----------Start of the Text----------

15.4 Support for Femto AABS

15.4.1 Femto base station subscription types

A Femtocell ABS may belong to one of the following subscriber types.

a) **CSG-Closed Femtocell ABS: a CSG-Closed Femtocell ABS is accessible only to the AMSs, which are in its CSG, except for emergency services. AMSs which are not the members of the CSG, should not try to access CSG-Closed Femtocell ABSs for data traffic. In case the communication between a macro AMS and the macro ABS is interrupted by interference from the CSG-Closed Femtocell ABS, the macro AMS can signal related information (e.g. AMS ID and interference level) to the Femto ABS, which can help bridge the communication between the macro AMS and the macro ABS.**

----------End of the Text----------