Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**CR on SDD Chapter 15: Facilitating Entry of New Femto BS into the Network**
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Re:	Category: SDD comments / Area: Chapter 15 (Femtocell) "Comments on SDD 15 Femtocell"
Abstract	This contribution provides text addition to SDD to facilitate entry of a new femtocell BS into the network.
Purpose	To be discussed and adopted by TGm for use in the IEEE 802.16m SDD
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Facilitating Entry of New Femto BS into the Network

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Resource Allocation on Entry of a New Femto BS

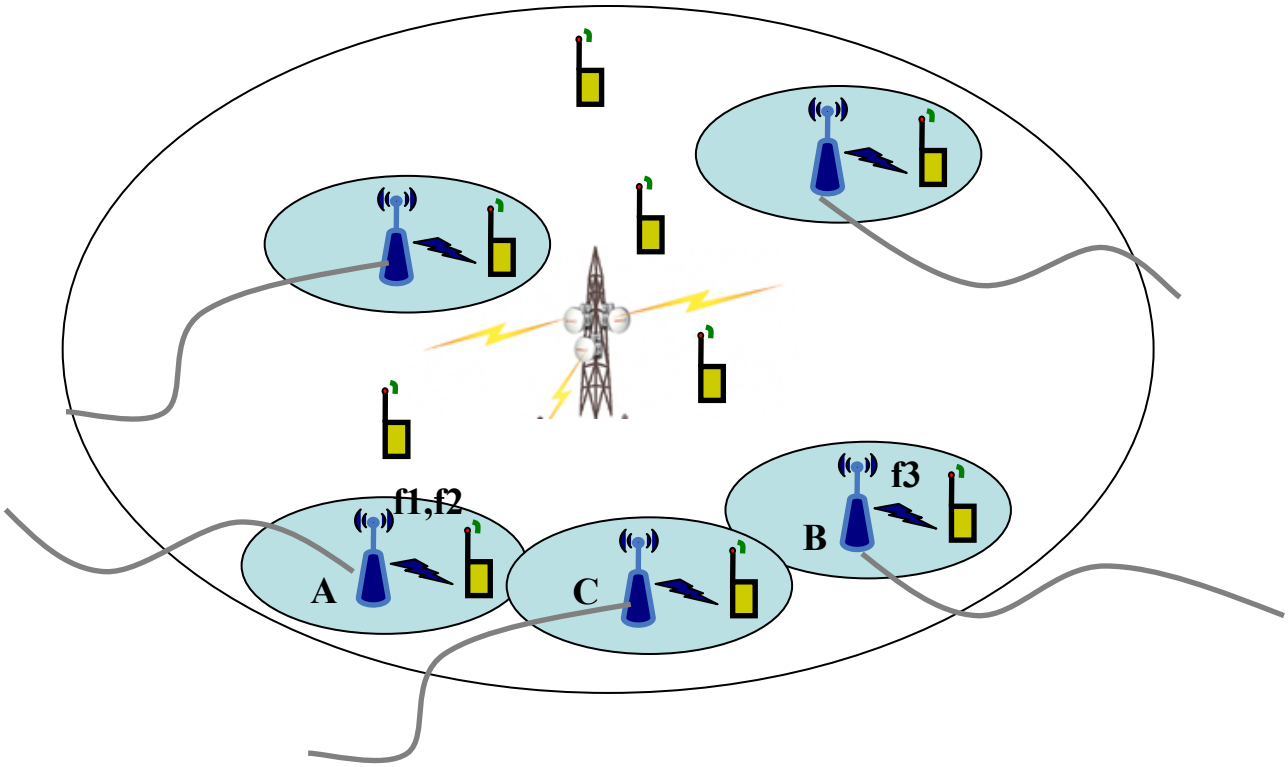

Figure 1. Femto/Macro Network Illustration.

It is often possible that the macro BS may not be able to coordinate resource allocation among femto cells and the femto BS have to autonomously determine their resource region. This is especially likely in moderate to high load scenarios. The SDD currently specifies that a femto BS can measure power on all carriers from neighboring femto/micro/macro BS and accordingly choose a carrier perceived to have low interference for its MS. However, in moderate to high load sceanrios, where the available resources are being fully utilized by existing femto BS, a new femto BS entering the network is likely to see high interference on all available resources from its neighboring femto/micro cells. Hence, a reactive approach of scanning for resources having low interference could potentially result in starvation of the new femto cell being deployed in the network. For eg., consider the scenario shown in Figure 1, where there are three carriers/channels available in the network: f1,f2 and f3. Femto BS A and B have already been deployed and split the resources as say f1+f2 for A and f3 for B. Now when

the femto BS C gets deployed, it finds strong interference on all the available carriers from its neighbors. This leads to starvation of the newly deployed femto BS C and its associated clients. This problem is exacerbated in cases, where there is no coordination of resources by a central entity like the macro BS or network controller and the femto BS have to autonomously determine their resource region of operation.

To address this starvation problem, it is essential for the femto BS to have the notion of "resource readjustment". This essentially means that either (i) an entering femto BS must have the capability to "contend" for resources when it finds them to be occupied; or (ii) mechanisms for (centralized/distributed) resource allocation should be executed by the femto/macro BS either periodically or based on triggers (eg. entry of new femto BS). This would allow for resources to be shared fairly taking into account the change in network and load dynamics. In the above example, a periodic resource allocation mechanism or contention would trigger the three femto BS to enter into a resource re-allocation phase, whereby the three frequencies can get shared as f1 for A, f2 for C and f3 for B respectively.

Insert the following text into the "Interference Avoidance and Mitigation" clause under "Support for Femtocell BS" clause (IEEE 802.16m-08/003r9a***):***

---------- Proposed text ----------

15.9 Interference Avoidance and Interference Mitigation

It is possible that when a new femto BS is initially deployed, all channels (carriers) could be occupied by neighboring femto/micro BS. In such scenarios, the new femto BS will see high interference level on all channels, resulting in its consequent starvation. To avoid such scenarios, which are common in moderate-high load conditions, mechanisms (centralized/distributed) for resource allocation at the femto/micro BS can be enabled either periodically or based on network triggers.

---------- End of Proposed text ----------