Efficient Scanning Scheme for Femtocells in IEEE 802.16e

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SUMMARY

Scanning scheme of IEEE 802.16e is not suitable for direct use in scanning femtocells in terms of efficiency and scan duration. We propose an efficient scanning scheme which can reduce the number of femtocells needed to be scanned.

I. INTRODUCTION

The femtocells can be classified into two types based on the access control policy. The closed subscriber group (CSG) is accessible only to the member of the CSG and the open subscriber group (OSG) is accessible to any MS. However the access control policy is not taken into account in the existing scanning mechanisms. Therefore, we propose efficient scanning schemes which are capable of reducing the number of femtocells to be scanned for both CSG and OSG femtocells.

II. PROPOSED SCANNING SCHEME

A. The Scanning Scheme for CSG

1) When an MS is handed over to a macro BS, the MS compares the BS ID of the macro BS with the BS IDs in the CSG white list to determine whether the accessible CSG femtocell is in the macrocell or not.
2) If the BS ID of the macro BS is in the list, the MS sends a *MOB_SCN–REQ* which includes the scanning request for the CSG femtocell to the serving BS.
3) The serving BS, which received the *MOB_SCN–REQ*, allocates the scanning interval for the MS by sending a *MOB_SCN–RSP*.

B. The Scanning Scheme for OSG

1) The OSG femtocell monitors the uplink signal of the MSs in the coverage area by using energy detection. If the MS is detected, then the OSG femtocell sends an *MS_detected* to the macro BS. The *MS_detected* includes the system information of the femtocell.
2) The macro BS broadcasts an *MOB_NBR–ADV* including the information of the neighboring BSs and the neighboring OSG.
3) The MS requests an allocation of scanning interval by sending a *MOB_SCN–REQ*.
4) The macro BS, which received the *MOB_SCN–REQ*, will allocate the scanning interval for the MS by sending a *MOB_SCN–RSP*.

III. PERFORMANCE ANALYSIS

We compare the performance of the proposed scheme with the scanning scheme of the IEEE 802.16e and [1]. Fig. 1 shows the control overhead versus the number of CSG and OSG cells, when the sum of the number of CSG and OSG is 500. Proposed scheme can achieve lower scanning overhead than the conventional schemes when the proportion of the CSG is larger than about 30%. Therefore, the proposed scheme will show better performance when the CSG cells are more densely deployed.

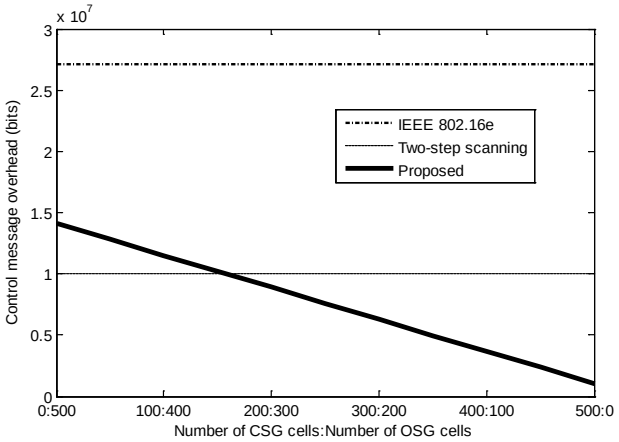

Figure 1: Control message overhead

REFERENCES

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