Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Idle Mode Location Update Enhancements
Date Submitted	**2004-06-25**
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Re:	IEEE P802.16e/D3-2004
Abstract	This contribution proposes enhancement to Idle Mode location update
Purpose	Review and Adopt the suggested changes into P802.16e/D3
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1 Introduction

In p802.16e/D3, the Idle Mode is an optional mode as described in Section 6.3.21. A MSS in Idle mode shall update its location to the network when the MSS enters a new paging-group or the MSS is requested to update its location by the BS through MOB_PAG_ADV message.

In the case of BS-initiated location update, i.e. action code = 10 in the MOB_PAG_ADV, the MS perform location update using the initial ranging code. The access operation is therefore contention based. This is not efficient because when the BS pages a MSS, the event of response from the MSS is a deterministic event and is fully under the control of the BS. As such, the access operation of initial ranging can be made contention free. Here, we propose to modify the current paging-and-response procedure by assigning a dedicated ranging channel (code) to a MSS at the same time when BS pages a MSS in Idle Mode. In this way, the possible collision and back-off can be completely avoided.

2 Summary of proposal

The proposal includes the following enhancements to Idle Mode location update:

- For a BS initiated location update, when a BS sends the paging (MOB_PAG_ADV), optionally, a code can be assigned to a MSS for use by the MSS to perform ranging. If a code is assigned, the MSS shall use the assigned code to perform initial ranging for the purpose of location update. If a code is not assigned, the MSS shall use the location update/handover codes, which is a set of codes reserved for MSS-initiated location update/handover purpose.
- Optional renewal of authentication key can be performed during location update

The procedures for location update initiated by BS is illustrated in Fig. 1.

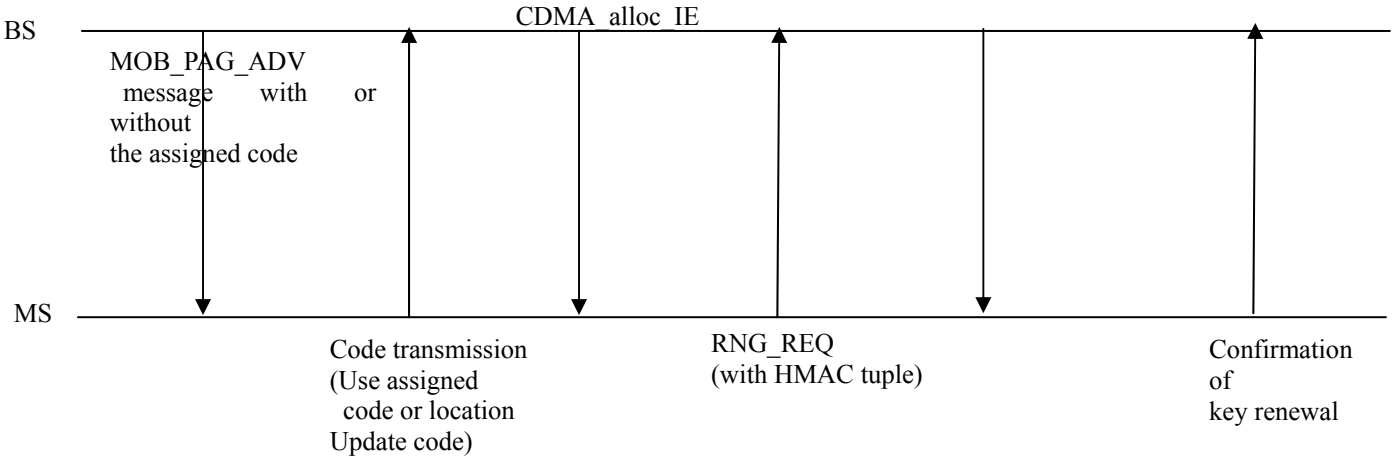

Fig. 1. BS initiated location update.

3 Proposed Text Changes

[Modify Table 92k – BS Broadcast Paging (MOB_PAG_ADV) message format by adding the assigned ranging channel index and code index.]

Table 92k – BS Broadcast Paging (MOB_PAG-ADV) message format

Syntax	Size	Notes
MOB_PAG_ADV_Message_Format() {		
Management Message Type	8 bits	
Num_Paging_Group_IDs	8 bits	
For (i=0;i< Num_Paging_Group_IDs;i++) {		
Paging_Group_ID	8 bits	
}		
For (j=0;j< Num_MACs;j++) {		
MSS MAC Address hash	24 bits	
Action Code	2 bits	
If (Action Code == 01 || Action Code == 10) {		
Code_assignment_indicator	1 bit	0: dedicated code is not assigned with this paging message when a MSS is paged to perform location update or enter network 1: dedicated code is assigned with this paging message when a MSS is paged to perform location update or enter network
If (Code_assignment_indicator == 1) {		
Ranging Code_Index	6 bits	Index of the assigned ranging code
}		
}		
reserved	*variable*	Padding bits to ensure octet aligned
}		

[Modify the following text in section 6.3.21.8.1 to describe enhanced paging procedure]

An MSS shall terminate Idle Mode and re-enter the network if it decodes a BS Broadcast Paging message that contains the MSS own MSS MAC Address hash and an Action Code of 10, enter network. In this case, if a ranging code is assigned to the MSS in the MOB_PAG_AVD message, the MSS shall perform initial ranging using the assigned code in MOB_PAG_ADV. Otherwise, A MSS performs normal network entry. In the event that an MSS decodes a BS Broadcast Paging message that contains the MSS own MSS MAC Address hash and an Action Code of 01, Perform Ranging, the MSS shall conduct and complete Initial Ranging to establish location to the network and acknowledge message decoding. If a ranging code is assigned to the MSS in the MOB_PAG_ADV, the MSS shall perform initial ranging using the assigned ranging code in MOB_PAG_ADV. Otherwise, the MSS shall select one of the ranging in the handover/loction update codes domain to perform ranging. Similarly, the MSS shall conduct and complete Initial Ranging to establish location to the network and acknowledge message decoding in the event that it fails to find the MSS own Paging Group ID in the Broadcast Paging message. In either instance of required Initial Ranging, upon completion of the Ranging procedure the MSS shall assume the Paging Group ID of the Preferred BS.