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Re:	Response to Sponsor Ballot
Abstract	Idle Mode Location Update Enhancement in 802.16e
Purpose	Adoption of proposed changes into P802.16e
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Idle Mode Location Update Enhancement (IP re-establishment notification)

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1. Introduction

In this contribution, Idle Mode location update enhancement is proposed. Idle Mode Harmonization contribution was submitted and accepted at last session but the contribution is not reflected as it is in the Draft. This contribution, however, is based on the accepted Idle Mode Harmonization contribution. According to the Idle Mode Location Update there are two Location Update conditions. One is Zone Based Location Update and the other is Timer Based Update. An MSS in Idle Mode updates its status regularly prior to the expiration of Idle Mode Timer. When an MSS passes through a number of BSs in a Paging Zone, there would be more than two subnets. When an MSS moves into a BS which uses different subnet, MSS can only detect the subnet change when Location Update Timer expires. Figure 1 shows this situation. If an MSS can detect the subnet change and re-establish IP address, packet routing can be optimized and this also simplifies BS's operation.

In figure 1, even if an MSS moves into the coverage of BS2, an MSS could not detect the subnet change until the expiration of Idle Mode Timer. If a DL packet arrives toward this MSS, then the BS which is retaining MSS's information should forward DL packet to current BS.

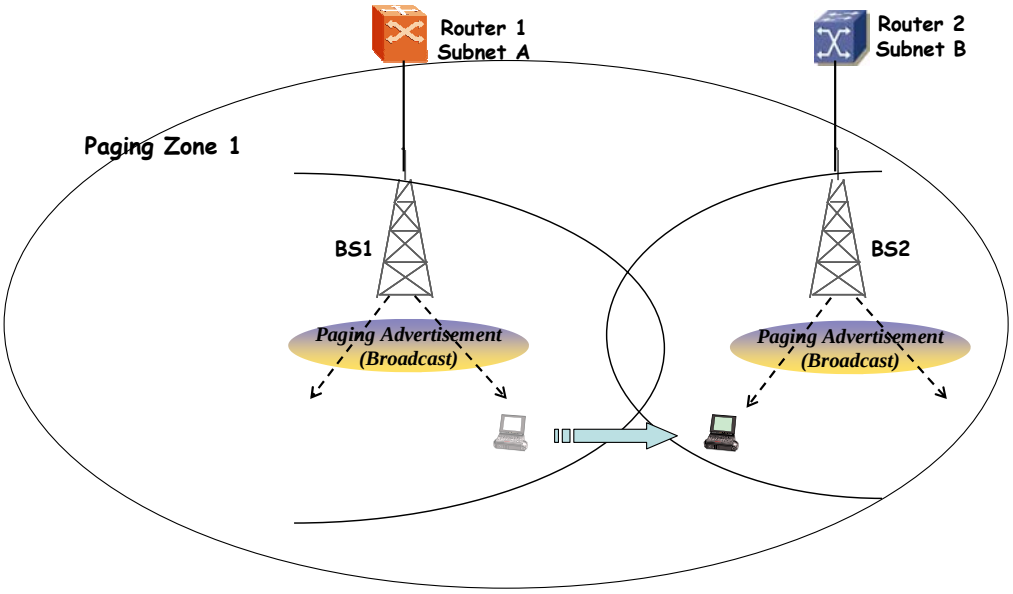

Figure 1. Idle Mode Location Update – IP address re-establishment

2. Proposed Scheme

Therefore, we propose the scheme which can overcome the inefficiency introduced above. We can use one bit out of reserved 6 bits in BS Broadcast Paging (MOB_PAG-ADV) message. When the MSS requests Paging Controller retention of IP address through setting Bit #3 in the DREG-REQ management message, BSs in a Paging Zone will receive information to set IP re-establish flag in MOB_PAG-ADV from the Paging Controller. While an MSS is moving across the BSs, MSS can detect the subnet change by monitoring IP re-establish flag in MOB_PAG-ADV message. A message sequence chart example is shown in Figure 2.

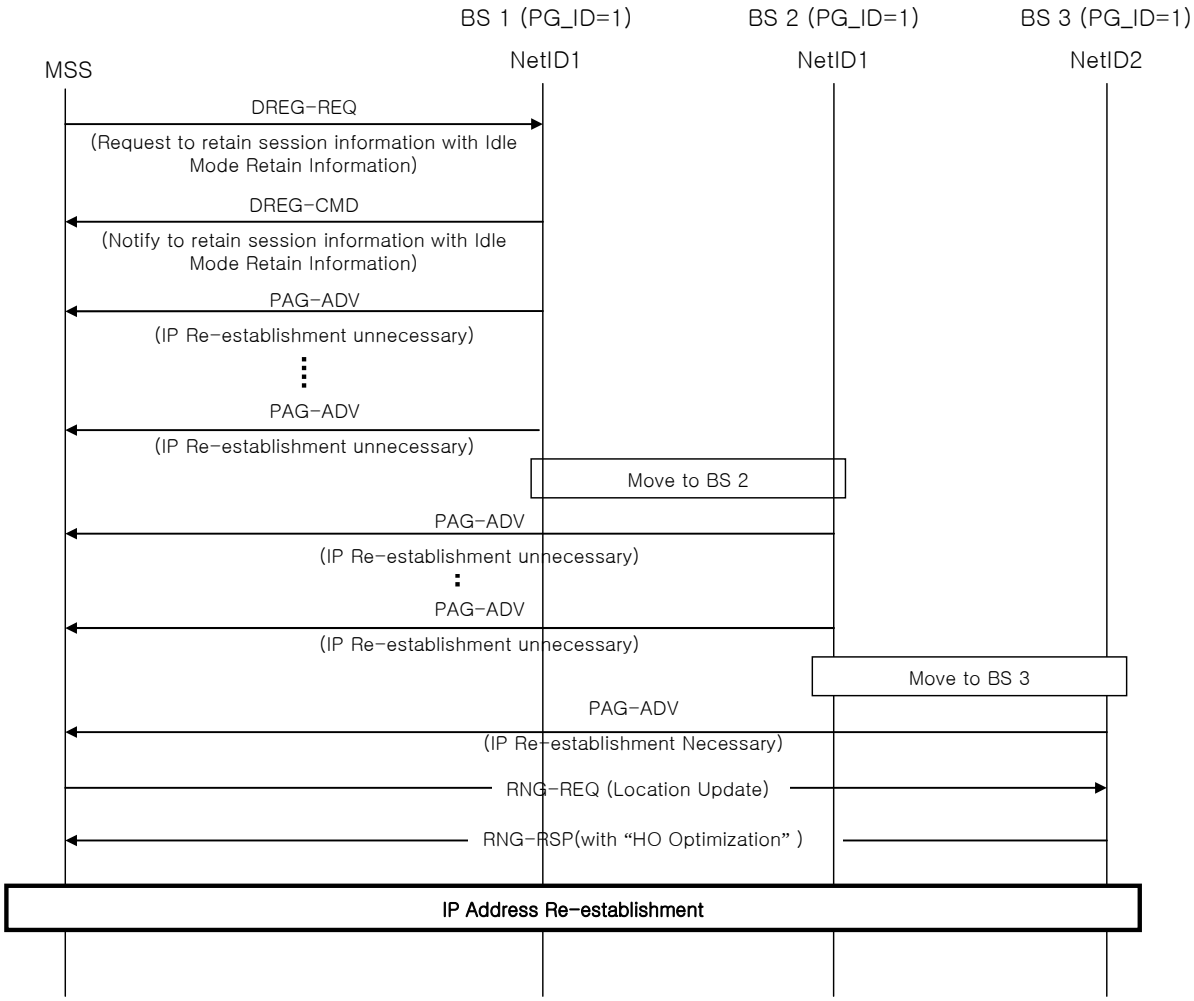

Figure 2. MSC of Idle Mode Location Update – IP address re-establishment

3. Proposed Text Changes in Document

Remedy1:

Add new IP re-establish flag language in the BS Broadcast Paging message.

[In 6.3.21.7 BS Broadcast Paging message, page132, line19, insert]:

A BS Broadcast Paging message is an MSS notification message indicating either the presence of DL traffic pending, through the BS or some network entity, for the specified MSS or to poll the MSS and request a location update without requiring a full network entry. A BS Broadcast Paging message may convey MSS's IP address re-establishment flag when a Paging Controller provides BSs in a Paging Zone with information to set the flag. When an MSS receives Broadcast Paging message indicating IP address re-establishment required, the MSS shall perform Location Update. The BS Broadcast Paging message shall be sent on the Broadcast CID during the BS Paging Interval. A paging message shall be transmitted during the Transmission Interval regardless of the number of MSS that need paging.

Remedy2:

Add new optional Location Update condition for IP retaining MSS in the Location Update Conditions

[In 6.3.21.9 Location Update Conditions, page XXX, line XX, insert]:

6.3.21.9.1 Location Update Conditions

An MSS in Idle Mode shall perform Location Update process operation if any Location Update condition is met. There are two Location Update evaluation conditions: Zone Update and Timer Update. For MSS retaining IP address, MSS also shall perform Location Update when Broadcast Paging message indicates IP address re-establishment required. MSS may also perform Location Update process at will.

Remedy3:

Add new IP re-establish flag in the BS Broadcast Paging message

[In 6.3.2.3.55 BS Broadcast Paging (MOB_PAG-ADV) message, page88, line30, add]:

IP Address Re-establish

This bit is set using the information from the Paging Controller. When this bit is set to be one, MSS shall re-establish IP address. If the BS can not obtain enough information to set the bit, the BS shall set this to be zero.

Remedy4:

Add IP Address Re-establish flag to the 6.3.2.3.55 BS Broadcast Paging (MOB_PAG-ADV) message table.

[In 6.3.2.3.55 BS Broadcast Paging, page 87, line 62, modify and add to Table 106n-BS Broadcast Paging (MOB_PAG-ADV) message format;]:

Syntax	Size	Notes
MOB_PAG-ADV_Message_Format() {		
Management Message Type=62	8 bits	
Num_Paging_Group_IDs	8 bits	Number of Paging Group IDs in this message
For (i=0; i<Num_Paging_Group_IDs; i++) {		
Paging Group ID	8 bits	
}		
For (j=0; j<Num_MACs; j++) {		Number of MSS MAC Addresses in message can be determined from the length of the mes-sage (found in the generic MAC header).
MSS MAC Address hash	24 bits	The hash is obtained by computing a CRC24 on the MSS 48-bit MAC address. The polynomial for the calculation is 0x864CFB
Action Code	2 bit	Paging action instruction to MSS 00=No Action Required 01=Perform Ranging to establish location and acknowledge message 10=Enter Network 11=reserved
~~*Reserved*~~	~~6 bit~~	
IP Address Re-establish	1 bit	If this bit is set, MSS's IP address re-establishment is required. If a BS doesn't have enough information to set this bit, this bit shall not be set.
reserved	5 bit	
}		
TLV Encoded Information	variable	TLV specific
reserved	variable	Padding bits to ensure octet aligned
}		