Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Ping Pong Call Resuming Procedure during HO**
Date Submitted	**[2004-03-05]**

Source(s)	Hyunjeong Kang Changhoi Koo Jungje Son Sohyun Kim Samsung Elec. 416, Maetan-3dong, Youngtong-gu Suwon-si, Gyeonggi-do Korea	Voice: +82-31-279-5091 +82-31-279-5091 Fax:+82-31-279-5130 +82-31-279-5130 Hyunjeong.kang@samsung.com chkoo@samsung.com jungje.son@samsung.com binde.kim@samsung.com

Re:	This contribution is for call for contribution IEEEP802.16e/D1-2004
Abstract	This contribution proposes the fast call resuming procedures for ping pong experienced MSS during handover.
Purpose	Propose the pingpong call resuming procedures for the IEEE802.16e Handoff Ad hoc group
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Ping Pong Call Resuming Procedures during HO

Hyunjeong Kang, Changhoi Koo, Jungje Son, Sohyun Kim

Samsung Electronics

Introduction

MSS, in process of network re-entry procedures with the Target BS which the MSS have moved to, may return to its Serving BS by the pingpong effect and then try to resume the communication with the Serving BS. But because the Serving BS cannot know the fact that the MSS returns to the BS by pingpong effect and tries to do re-entry procedures with it, the BS will treat the MSS as a normal initial network entry call.
Therefore mechanisms for quick normal communication resuming of the pingpong-experienced MSS should be provided. The mechanisms should also avoid performing unnecessary re-entry procedures.

Proposed Mechanism

For the purpose, we propose two messages: one is MSS_PINGPONG_Report message for reporting MSS's pingpong experience to the Target BS and the other is MSS_PINGPONG_Notification message for also notifying the pingpong situation to the Serving BS. In the case of detecting MSS's pingpong by the pingpong notification message, the serving BS also allocates time offset to the MSS. And using the allocated time offset, the returning pingpong-experienced MSS performs the initial ranging for network re-entry with the Serving BS. For ensuring its returning by pingpong to the Serving BS, the MSS can also include the previous Basic CID allocated from the Serving BS in the initial ranging request message. Upon receiving the initial ranging request, the Serving BS sends initial ranging response message with setting a flag whether the Serving BS retains the connection information of the MSS. When the Serving BS retains the MSS's connection information, the MSS and the Serving BS can quickly resume normal communication using the retained connection information.
The example of fast call resuming procedures for the pingpong experienced MSS is depicted in Figure 1.

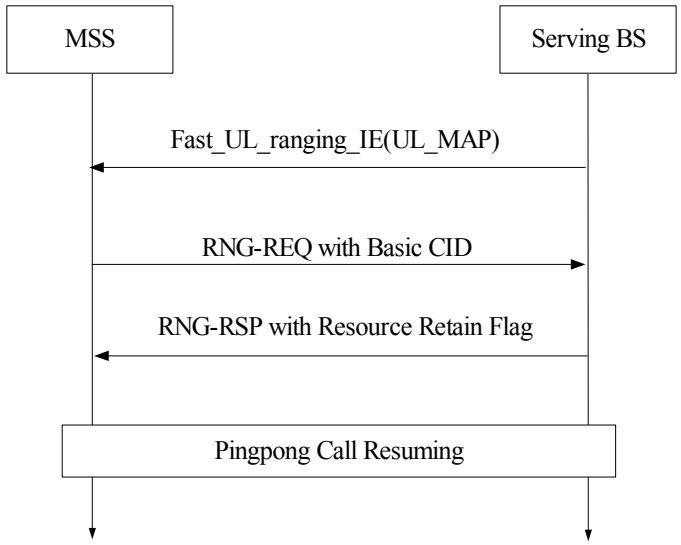

Figure 1 Call Resuming procedure for pingponged MSS

Proposed Text Changes

We propose the following remedies in IEEE P802.16e/D1 to provide the fast call recovery

[Insert the following after section 1.4.1.2.3 of IEEE P802.16e/D1]

1.4.2.3.4 Pingpong during HO

Pingpong is defined as the case that the MSS, while moving to a Target BS and performing network re-entry procedures with the Target BS, tries to return to its Serving BS and resume the communication with the BS. When the MSS has detected the pingpong, it shall transmit MSS_PINGPONG_Report message to the Target BS for reporting its pingpong situation and attempt a fast call resuming with its Serving BS.

The Serving BS, notified MSS's pingpong situation, can allocate a non-contention ranging opportunity using Fast_UL_ranging_IE() based on the MSS's MAC address. For re-entry operation with the Serving BS, using the allocated ranging opportunity, the MSS can send initial ranging request with Basic CID previously assigned from the Serving BS. If the Serving BS retains the connection information of the MSS, the BS sends ranging response with Resource Retain Flag set to 1. In the case, without unnecessary network re-entry operations, the pingponged MSS and the Serving BS can resume the normal communication with the retained connection information .

[Insert the following after section 6.4.2.3.52 of IEEE P802.16e/D1]

6.4.2.3.53 Pingpong Report (MSS_PINGPONG_Report) Message

A MSS shall transmit a MSS_PINGPONG_Report message to the Target BS for the purpose of notifying that the MSS has detected pingpong and will return to its Serving BS.

Table AAA. MSS_PINGPONG_Report Message Format

Syntax	Size	Notes
MSS_PINGPONG_Report_Message_Format() {		
Management Message Type = TBD	8bits	TBD
Serving BS-ID	48bits	The unique identifier of the Serving BS
Estimated PP time	8bits	
}		

The MSS shall generate MSS_PINGPONG_Report message in the format shown in Table AAA. The following parameters shall be included in the MSS_PINGPONG_Report message,

Serving BS-ID
The identifier of the BS which the MSS has been registered with before handover to the Target BS
Estimated PP time
Estimated number of frames starting from the frame until the MSS may return to the Serving BS. A value of zero in this parameter signifies that this parameter should be ignored.

[Add the following rows to table 292]

Table BBB – RNG-REQ Message Encodings

Name	Type	Length	Value (Variable-length)
Basic CID	6	2	Basic CID allocated from the former Serving BS

[Add the following rows to table 293]

Table CCC – RNG-RSP Message Encodings

Name	Type	Length	Value (Variable-length)
Resource Retain Flag	20	1	This value indicates whether the former Serving BS retains the connection information of the MSS. 0 = the connection information for the MSS is deleted 1 = the connection information for the MSS is retained

[Insert the following after section C.2.7 of IEEE P802.16e/D1]

C.2.8 MSS Pingpong Notification message

This message is sent by a Target BS, upon receiving MSS_PINGPONG_Report message from the MSS, to the Serving BS included in MSS_PINGPONG_Report message. The message serves to notify to the Serving BS that the MSS has recognized pingpong and will return to the BS after Estimated PP time. The message contains the following information:

Table DDD. MSS_PINGPONG_Notification Message

FIeld	Size	Notes
MSS_PINGPONG_Notification_Message_Format(){		
Global Header	152bits	
MSS unique identifier	48bits	48-bit unique identifier of the MSS
Estimated PP time	8bits	Same value in MSS_PINGPONG_Report message
Security field	TBD	A means to authenticate this message
CRC field	32bits	IEEE CRC-32
}		