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Title	Ping Pong Call Resuming Procedure during HO	
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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 ping pong call resuming procedures for the IEEE802.16e Handoff Ad hoc group	
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Ping Pong Call Resuming Procedures during HO

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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 ping pong 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 ping pong 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 ping pong-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 ping pong experience to the Target BS and the other is MSS_PINGPONG_Notification message for also notifying the ping pong situation to the Serving BS. In the case of detecting MSS's ping pong by the ping pong notification message, the serving BS also allocates non-contention based ranging time offset to the MSS. This allocated non-contention based ranging opportunity can give the ping pong experienced MSS's call a priority to perform quicker call recovery than other normal calls. Therefore using the allocated non-contention based ranging time offset, the returning ping pong-experienced MSS performs the initial ranging for network re-entry with the Serving BS. For assuring the Serving BS of the MSS's returning by ping pong, the MSS can also include the previous Basic CID allocated from the Serving BS in the initial ranging request message. Upon receiving the ranging request with Basic CID, the Serving BS sends initial ranging response message with setting a flag whether the Serving BS retains the connection information of the MSS. If 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 without performing the complex network re-entry procedures for reestablishing the connection, except ranging. The example of fast call resuming procedures for the ping pong experienced MSS is depicted in Figure 1.

Therefore we propose the remedies as following:

- Add a new section 1.4.2.3.4 for Ping pong operation during handover after section 1.4.1.2.3 page 12.
- Add a new section 6.4.2.3.53 for MSS-PINGPONG-Report message after section 6.4.2.3.52 in page 30.
- Add the following field to Table 292 RNG-REQ message encodings in page 60.
 - Basic CID
- Add the following field to Table 293 RNG-RSP message encodings in page 60.
 - Resource Retain Flag
- Add a new section C.2.8 for MSS-PINGPONG-Notification message after section C.2.7 in page 73.

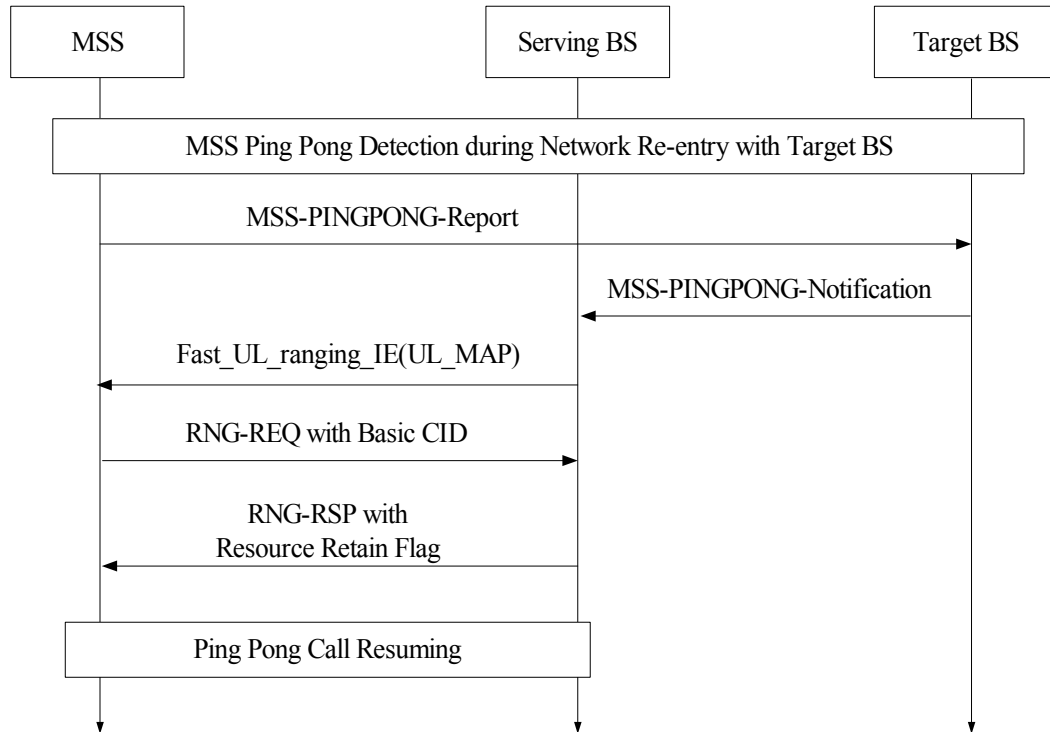


Figure 1 Call Resuming procedure for ping poned MSS

Proposed Text Changes

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

[Insert the following after section 1.4.1.2.3 in page 12]

1.4.2.3.4 Ping pong during HO

Ping pong 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 ping pong, it shall transmit MSS_PINGPONG_Report message to the Target BS for reporting its ping pong situation and attempt a fast call resuming with its Serving BS. The Serving BS, notified of MSS's ping pong situation from the Target BS via backbone network, 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 such as re-authorization, re-registration and connection re-establishment, 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 in page 30]

6.4.2.3.53 Ping pong 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 ping pong and will return to its Serving BS.

Table 851. MSS_PINGPONG_Report Message Format

<u>Syntax</u>	<u>Size</u>	<u>Notes</u>
<u>MSS_PINGPONG_Report_Message_Format()</u> <u>{</u>		
<u>Management_Message_Type = TBD</u>	<u>8bits</u>	<u>TBD</u>
<u>Serving_BS-ID</u>	<u>48bits</u>	<u>The unique identifier of the Serving BS</u>
<u>Estimated_PP_time</u>	<u>8bits</u>	
<u>}</u>		

The MSS shall generate MSS_PINGPONG_Report message in the format shown in Table 851. 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 returns 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 in page 60]

Table 292 – RNG-REQ Message Encodings

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

[Add the following rows to table 293 in page 60]

Table 293 – 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 in page 73]

[C.2.8 MSS Ping pong 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 ping pong and will return to the BS after Estimated PP time. The message contains the following information:](#)

[Table C9 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
}		