Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Resource Remain type for Drop or Ping Pong Call Recovery**
Date Submitted	**[2004-03-05]**
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Re:	This contribution is for call for contribution IEEEP802.16e/D1-2004
Abstract	This contribution proposes the newly added Resource Remain type in the existing handover MAC management messages for fast call recovery of drop-experienced MSS or ping pong experienced MSS during handover.
Purpose	Propose the type field in handover MAC management message for drop or ping pong call recovery for the IEEE802.16e Handoff Ad hoc group
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Resource Remain type for Drop or Ping Pong Call Recovery

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Introduction

MSS, during the network re-entry procedures with the Target BS, may return to its Serving BS by pingpong effect. After returning to its Serving BS, the MSS should perform the complex call recovery procedures like a normal initial entry call.

If the Serving BS retains the connection information of MSS which has moved to Target BS, the returning pingpong-experienced MSS can perform quick call recovery procedures using the connection information with the Serving BS.

Therefore it should be allowed that the Serving BS notify to the MSS whether the Serving BS will discard the MSS's connection information or retain the information for a certain time upon receiving MOB_HO-IND(HO_IND_type=00) from the MSS.

Especially, the proposed scheme for the pingpong call recovery can be applied to the dropped call recovery, in terms of avoiding unnecessary re-entry procedures and prompt call recovery.

Proposed Mechanism

For the purpose, we propose mechanisms by which MSS can know that the Serving BS remains the connection information of the MSS trying to move to Target BS. By setting Resource_Remain_Type in MOB_BSHO-REQ message or MOB_BSHO-RSP message, the Serving BS will notify to the MSS whether the Serving BS retains the connection information or deletes it. The MSS, upon receiving these messages, can recognize connection information's status after sending MOB_HO-IND(HO_IND_type=00) and beginning the actual HO. And when pingpong-experienced MSS returns to the former Serving BS and tries to resume the normal communication with the Serving BS, the MSS can perform initial ranging procedure according to the status of the connection information. If the MSS knows that the connection information remains in Serving BS, the MSS sends ranging request containing its Basic CID allocated from the BS. And then the MSS and the Serving BS can quickly resume the normal communication with the remained connection information.

In the case that the MSS experiences drop during handover procedure and knows the status of connection information, the drop-experienced MSS can also perform initial ranging procedure with newly found Target BS using the status information. If the drop-experienced MSS knows that the Serving BS will retain the MSS's connection information, the MSS sends ranging request with its Basic CID allocated from the Serving BS. The Target BS, upon receiving the ranging request with the Basic CID from the MSS, can recognize that the Serving BS retains the dropped MSS's connection information. And the Target BS can request the Serving BS to transfer the MSS's connection information and quickly enter the call recovery procedure using the forwarded connection information.

Proposed Text Changes

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

[Insert at the end of 1.4.1.2.2.4 of IEEE P802.16e/D1]

If the Serving BS retains the connection information of MSS which has sent MOB_HO-IND with HO_IND_type=00 and begun the actual HO, the MSS, after experiencing drop or pingpong, can use the remaining connection information to perform quickly re-entry operation with a newly found Target BS or Serving BS. With using Resource Remain Type in MOB_BSHO-RSP message or MOB_BSHO-REQ message during HO initiation operation, the Serving BS shall inform the MSS whether the Serving BS will retain or discard the connection information of the MSS.

(Replace line 56-59 page 12 with followings)

When the MSS has detected a drop, it shall attempt network re-entry with its preferred Target BS as outlined in section Re-entry with the Target BS. And if the MSS knows that its Serving BS retains the connection information of the MSS, the MSS sends initial ranging request to the Target BS with Basic CID previously assigned from the Serving BS. The MSS and the Target BS can promptly perform call recovery operation using the remaining connection information of the MSS. When the BS has detected a drop, it shall react as if a MOB_HO-IND MAC message has been received with HO_IND_type=00.

[Change the table 85g in IEEE P802.16e/D1]

Table 85g – BS HO Request (MOB_BSHO-REQ) Message Format

Syntax	Size	Notes
MOB_BSHO-REQ_Message_Format(){		
Management Message Type = 52		
For(j=0;j<N_Recommended;j++){		N_Recommended can be derived from the known length of the message
Neighbor BS-ID	48bits	
Service level prediction	8bits	
}		
Resource Remain Type	1bits	0 : MSS resource release 1: MSS resource retain
Resource Retain Time	4bits	time duration for case where Resource Remain Type value is 1. Units are frames
Reserved	3bits	reserved; shall be set to zero
}		

[Add the followings parameter descriptions in line 32 page 27]

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Resource Remain Type
This flag Indicates whether the Serving BS will retain or delete the connection information of the MSS upon receiving MOB_HO-IND with HO_IND_type=00. If the flag is set to 1, the Serving BS will retain the MSS's connection information during the time in Resource Retain Time field. Or if the flag is set to 0, the Serving BS will discard the MSS's connection information.

Resource Retain Time
Time duration for MSS's connection information retaining in Serving BS. This filed is validated for the case where Resource Remain Type is set to 1.

[Change the table 85i in IEEE P802.16e/D1]

Table 85i – BS HO Response (MOB_BSHO-RSP) message

Syntax	Size	Notes
MOB_BSHO-RSP_Message_Format(){		
Management Message Type = 54		
Estimated HO time	8bits	
For(j=0;j<N_Recommended;j++){		Neighbor base stations shall be presented in an order such that the first presented is the one most recommended and the last presented is the lease recommended. N_Recommended can be derived from the known length of the message
Neighbor BS-ID	48bits	
Service level prediction	8bits	
}		
Resource Remain Type	1bits	0 : MSS resource release 1: MSS resource retain
Resource Retain Time	4bits	time duration for case where Resource Remain Type value is 1. Units are frames
Reserved	3bits	reserved; shall be set to zero
}		

[Add the followings after parameter description of "Estimated HO time" in Section 6.4.2.3.50]

Resource Remain Type
This flag Indicates whether the Serving BS will retain or delete the connection information of the MSS upon receiving MOB_HO-IND with HO_IND_type=00. If the flag is set to 1, the Serving BS will retain the MSS's connection information during the time in Resource Retain Time field. Or if the flag is set to 0, the Serving BS will discard the MSS's connection information.

Resource Retain Time
Time duration for MSS's connection information retaining in Serving BS. This filed is validated for the case where Resource Remain Type is set to 1.

[Add the following rows to table 292]

Table XXX – RNG-REQ Message Encodings

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