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Title	<b>Resource Remain type for Drop or Ping Pong Call Recovery</b>	
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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 ping pong 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 and the MSS knows about that, the returning ping pong-experienced MSS can perform quick call recovery procedures using the remaining 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 ping pong 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 notifies to the MSS whether the Serving BS will retain the connection information or delete 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 ping pong-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 previously allocated from the BS. The Basic CID can be used for notifying that the Serving BS retains the connection information of the MSS. And then the MSS and the Serving BS can quickly resume the normal communication with the remaining 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.

Therefore we propose the remedies as followings:

- Add “the operation that the Serving BS informs MSS of the status of connection information which is determined upon receiving MOB\_HO-IND message, by sending modified MOB\_BSHO-REQ or modified MOB\_BSHO-RSP” to section 1.4.1.2.2.4, page 12
- Add “the operation that performing network re-entry using the status of MSS connection information can be applied to the network re-entry procedures between the dropped MSS and the newly found Target BS in drop situation” to section 1.4.1.2.3 in page 12.
- Modify MOB\_BSHO-REQ message in page 27 and MOB\_BSHO-RSP message in page 28 by adding the following fields.
  - Resource\_Remain\_Type
  - Resource\_Retain\_Time
- Add the following field to Table 292 RNG-REQ message encodings in page 60.
  - Basic CID

## Proposed Text Changes

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

[Add the following after line 42 page 12]

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 ping pong, 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 following]

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 page 27]

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	48bit	

	s	
Service level prediction	8bits	
}		
<u>Resource Remain Type</u>	<u>1bits</u>	<u>0 : MSS resource release</u> <u>1: MSS resource retain</u>
<u>Resource Retain Time</u>	<u>8bits</u>	<u>Time duration for case where Resource Remain Type value is 1.</u>
<u>Reserved</u>	<u>7bits</u>	<u>Reserved; shall be set to zero</u>
}		

[Add the following parameter descriptions in line 32 page 37]

### 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. 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 value is measured in frame..

[Change the table 85i in page 28]

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 least recommended. N_Recommended can be derived from the known length of the message
Neighbor BS-ID	48bits	
Service level prediction	8bits	
}		
<u>Resource Remain Type</u>	<u>1bits</u>	<u>0 : MSS resource release</u> <u>1: MSS resource retain</u>
<u>Resource Retain Time</u>	<u>4bits</u>	<u>Time duration for case where Resource Remain Type value is 1.</u>
<u>Reserved</u>	<u>3bits</u>	<u>Reserved; shall be set to zero</u>
}		

[Add the followings after parameter description of “Estimated HO time” in page 29]

**Resource Retain 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. 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 field is measured in frame.

[Add the following rows to table 292]

Table 292 – RNG-REQ Message Encodings

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