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Enhanced MOB_HO_IND message

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1. Introduction

In the current IEEE P802.16e/D5a, after handover decision, the MSS sends MOB_HO_IND message. The function of the MOB_HO_IND message is as following:

a) MSS sends MOB_HO_IND with option HO_IND_type = 00 indicating commitment to HO and intent to release the serving BS, the MSS is released from any obligation to monitor serving BS DL traffic.
b) After an MSS or BS has initiated an HO using MOB_MSSHO/BSHO_REQ message, the MSS may cancel HO at any time. The cancellation shall be made through transmission of a MOB_HO-IND message with the HO cancel option (HO_IND_type=01).
c) If the MSS signals rejection of serving BS instruction to HO, the MSS can set value of HO_IND_type=10 in the MOB_HO_IND. the BS may reconfigure the target BS list and retransmit MOB_BSHO_RSP message including a new target BS list.

In order to shorten the network re-entry process during handover, the serving BS may send messages to the recommended BSs after receiving the MOB_HO_IND message in order to make the BS to reserve the fast ranging resource for the MSS. And in order not to waste the reserved resource, the Serving BS should tell the Target BS the estimated HO start time. Although the MOB_MSSHO_REQ and MOB_BSHO_RSP message include the estimated HO start time, the MSS maybe delay or advance the HO start time for some cases. The estimated HO start time is in units of frame, so the Target BS can reserve UL resource at actual time, which can avoid a backbone message of Serving BS for notifying the Target BS release the meaningless reserved UL resource.

In this contribution, we propose to enhance the MOB_HO_IND message in order to avoid the waste of the reserved resource.

2. Proposed Text Changes

Modify the text of Page 100£ Line35 in IEEE P802.16e/D5a in section 6.3.2.3.54 shown as indicated .

6.3.2.3.54 HO Indication (MOB-HO-IND) message

An MSS shall transmit a MOB_HO-IND message for final indication that it is about to perform a HO. When the MSS cancels or rejects the HO, the MSS shall transmit a MOB_HO-IND message with appropriate HO_IND type field. The message shall be transmitted on the basic CID.

Table 106m—MOB-HO-IND Message Format

Syntax	Size	Notes
	1	

MOB_HO-IND_Message_Format()		
{		
Management Message Type = 59	8 bits	
reserved	6 bits	Reserved; shall be set to zero
Mode	2 bits	0b00: HHO request 0b01: SHO/FBSS request: Anchor BS update 0b10: SHO/FBSS request: Active Set update 0b11: reserved
if (Mode == 0b00)		
{		
HO_IND_type	2 bits	0b00: Serving BS release 0b01: HO cancel 0b10: HO reject 0b11: reserved
if (HO_IND_type == 0b00)		
{		
Target_BS_ID	48 bits	Applicable only when HO_IND-type is set to 0b00.
Estimated HO start	4 bits	
}		
}		
if (Mode == 0b01)		
{		
SHOFBSS_IND_Type	2 bits	0b00: confirm Anchor BS update 0b01: Anchor BS update cancel 0b10: Anchor BS update reject 0b11: reserved
if (SHOFBSS_IND_Type == 0b00)		
{		
Anchor BS ID	3 bits	TEMP_BS_ID of the Anchor BS
Action time	8 bits	Action time when the Anchor BS shall be updated
}		
}		
if (Mode == 0b10)		
{		
SHOFBSS_IND_Type	2 bits	0b00: confirms Active Set update 0b01: Active Set update cancel 0b10: Active set update reject 0b11: reserved
if (SHOFBSS_IND_Type == 0b00)		
{		
Active Set Included Indicator	1 bit	1: Final decision of Active Set members included in the message 0: Active Set members are as specified in MOB_xxHO_RSP message. No Active Set information included in this message.

if (Active Set Included Indicator==1) {		
Anchor BS ID	3 bits	TEMP_BS_ID of the Anchor BS
N_BSs	3 bits	Number of BS in the Active Set, excluding the Anchor BS
For (j=0 ; j<N_BSs ; j++) {		
Temp BS-ID	8 bits	Active Set member ID assigned
} }		
Action time	8 bits	Action time when the Anchor BS shall be updated
} }		
Preamble index/ Subchannel Index	8 bits	For the SCa and OFDMA PHY this parameter defines the PHY specific preamble for the target BS. For the OFDM PHY the 5 LSB contain the active DL subchannel index for the target BS. The 3 MSB shall be Reserved and set to '0b000'.
Padding	variable	Shall be set to zero.
HMAC Tuple	21bytes	See 11.4.11
}		

An MSS shall generate MOB-HO-IND messages in the format shown in Table 106m. The following parameters shall be included in the message:

Target_BS_ID
Same as the Base Station ID parameter in the DL-MAP message of Target BS. This may include the Serving BS.

Preamble Index/ Subchannel Index
For the SCa and OFDMA PHY this parameter defines the PHY specific preamble for the target BS. For the OFDM PHY the 5 LSB contain the DL subchannel index (as defined in Table 211) used in the target BS sector. The 3 MSB shall be Reserved and set to '0b000'.

Estimated HO start
Estimated number of frames starting from the frame following the reception of the MOB_HO-IND message until the HO may take place. A value of zero in this parameter signifies that this parameter should be ignored.

If Privacy is enabled, the MOB-HO-IND message shall include the following TLV value,

HMAC Tuple (see 11.1.2)
The HMAC Tuple Attribute contains a keyed Message digest (to guarantee the origin and integrity of the message).