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Source(s)	Jianjun(Alen) Wu, John Lee, Duke Dang HUAWEI No.98,Lane91,Eshan Road,Pudong ,Shanghai,China Pudong Lujiazui Software Park ,200127 P.R. China, Voice: 86-21-68644808-24717 Fax: 86-21-50898375 mailto: wujianjun@huawei.com John_Lee@huawei.com
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Clarify HO Process Optimization during HO

Jianjun (Alen) Wu, John Lee£¨Duke Dang
HUAWEI

1. Introduction

In the current IEEE P802.16e/D5a, HO Process Optimization indication would be included in some MAC messages, such as MOB_NBR_ADV, MOB_BSHO_REQ, MOB_BSHO_RSP.

It is well known that HO Process Optimization indication can affect an MSS network re-entry process during HO. For each bit location of HO Process Optimization, a value of '0' indicates the associated re-entry management messages shall be required and a value of '1' indicates the reentry management message may be omitted.

Analyzing the whole HO Process, the function of HO Process Optimization can only accomplished by the message exchanges between Serving BS and Target BS, and it is nothing to do with the MSS, so it is not necessary to notify the MSS in the handover message. Hence, HO Process Optimization in MOB_NBR_ADV, MOB_BSHO_REQ and MOB_BSHO_RSP messages is meaningless. And Only HO Process Optimization indication in RNG_RSP message is necessary.

This contribution clarify the use of the HO Process Optimization indication.

2. Proposed Text Changes

Modify the text in section 6.3.2.3.47 shown as indicated.] Page 75£¨Line48 in IEEE P802.16e/D5a.

6.3.2.3.47 Neighbor Advertisement (MOB_NBR-ADV) message

BSs supporting mobile functionality shall be capable of transmitting a MOB_NBR-ADV management message at a periodic interval (MOB_NBR-ADV interval, see Table 340a) to identify the network and define the characteristics of neighbor BS to potential MSS seeking initial network entry or hand-over. For the compression of neighbor BSIDs using this message in MOB_SCAN-REPORT and MOB_MSSHO-REQ message, BSs have to keep mapping-tables of neighbor BS MAC addresses and neighbor BS indexes transmitted through MOB_NBR-ADV message, for each Configuration Change Count. Using these mapping-tables, BSs can derive 48 bit neighbor BSID from neighbor BS index included in MOB_SCAN-REPORT or MOB_MSSHO-REQ message.
If neighbor information is not available, this message need not be transmitted.

Table 106d—MOB_NBR-ADV Message Format

Syntax	Size	Notes
MOB_NBR-ADV_Message_Format()		
{		
Management Message Type = 53	8 bits	
Skip-Optional-Fields bitmap	8bits	Bit [0]: if set to '1', omit Operator ID field Bit [1]: if set to '1', omit NBR BS ID field Bit [2]: if set to '1', omit HO process optimization field Bit [3]: if set to '1', omit QoS related fields Bit [4]-[7]: reserved
If (Skip-Optional-Fields-[0]=0) {		

Operator ID	24 bits	Unique ID assigned to the operator
}		
Configuration Change Count	8 bits	Incremented each time the information for the associated neighbor BS has changed.
Fragmentation Index	4 bits	This field indicates the current fragmentation index.
Total Fragmentation	4 bits	This field indicates the total number of fragmentations.
N_NEIGHBORS	8 bits	
For (j=0 ; j<N_NEIGHBORS ; j++)		
{		
Length	8 bits	Length of message information within the iteration of N_NEIGHBOR in bytes.
PHY Profile ID	8 bits	Aggregated IDs of Co-located FA Indicator, FA Configuration Indicator, FFT size, Bandwidth,Operation Mode of the starting subchannelization of a frame, and Channel Number
if (FA Index Indicator == 1)		
{		
FA Index	8 bits	This field, Frequency Assignment Index, is present only the FA Index Indicator in PHY Profile ID is set. Otherwise, the neighbor BS has the same FA Index or the center frequency is indicated using the TLV encoded information.
}		
if (BS EIRP Indicator == 1)		
{		
BS EIRP	8 bits	Signed Integer from -128 to 127 in unit of dBm This field is present only if the BS EIRP indicator is set in PHY Profile ID. Otherwise, the BS has the same EIRP as the serving BS.
}		
if (Skip-Optional-Fields[1]=0) {		
Neighbor BSID	24 bits	This is an optional field for OFDMA PHY and it is omitted or skipped if Skip Optional Fields Flag = '1'
}		
Preamble Index /Subchannel Index	8 bits	The index for the PHY profile specific preamble. Preamble Index is PHY specific for SCa and OFDMA. The value of Preamble Index shall be ignored and a value of '0x00' shall be used for OFDM PHY
if (Skip-Optional-Fields[2]=0) {		

~~HO Process Optimization~~	~~8 bits~~	~~HO Process Optimization is provided as part of this message is indicative only. HO process requirements may change at time of actual HO. For each Bit location, a value of '0' indicates the associated reentry management messages shall be required, a value of '1' indicates the reentry management message may be omitted. Regardless of the HO Process Optimization TLV settings, the Target BS may send unsolicited SBC-RSP and/ or REG-RSP management messages Bit #0: Omit SBC-REQ/RSP management messages during current re-entry processing Bit #1: Omit PKM-REQ/RSP management message during current re-entry processing Bit #2: Omit REG-REQ/RSP management during current re-entry processing Bit #3: Omit Network Address Acquisition management messages during current reentry processing Bit #4: Omit Time of Day Acquisition management messages during current reentry processing Bit #5: Omit TFTP management messages during current re-entry processing Bit #6: Full service and operational state transfer or sharing between Serving BS and Target BS (ARQ, timers, counters, MAC state machines, etc…)~~
~~}~~		
if (Skip-Optional-Fields-[3]=0) {		
Scheduling Service Supported	4 bits	Bitmap to indicate if BS supports a particular scheduling service. '1' indicates support, '0' indicates not support: bit 0: Unsolicited Grant Service (UGS) bit 1: Real-time Polling Service (rtPS) bit 2: Non-real-time Polling service (nrtPS) bit 3: Best Effort value of '1111' indicates no information on service available
Available Radio Resource	4 bits	Percentage of reported average available subchannels and symbols resources per frame 0000: 0% 0001: 20% 0010: 40% 0011: 60% 0100: 80% 0101: 100% 0110-1110: reserved 0110-1110: reserved value of '1111' indicates no information on service available
Reserved	6bits	Shall be set to zero
Hand Off Neighbor Preference	2 bits	00 Normal 01 Preferred 10 Non-Preferred 11 Reserved
}		
}		
DCD Configuration Change Count	4 bits	This represents the Neighbor BS current DCD configuration change count
UCD Configuration Change Count	4 bits	This represents the Neighbor BS current UCD configuration change count
TLV Encoded Neighbor information	Variable	TLV specific
}		
}		

Modify the text in section 6.3.2.3.47 shown as indicated.] Page 79£ Line40 in IEEE P802.16e/D5.

BS EIRP
The neighbor BS EIRP is listed in a signed integer form from -128 to 127 in units of dBm. This field shall be omitted if the BS EIRP Indicator bit in PHY Profile ID is set zero.
~~**HO Process Optimization**~~
~~The HO Process Optimization that is provided as part of this message is indicative only. HO process requirements may change at time of actual HO. For each bit location, a value of '0' indicates the associated re-entry management messages shall be required and a value of '1' indicates the reentry management message may be omitted. Regardless of the HO Process Optimization TLV settings, the Target BS may send unsolicited SBC-RSP and/or REG-RSP management messages:~~
~~Bit #0: Omit SBC-REQ/RSP management messages during re-entry processing~~
~~Bit #1: Omit PKM-REQ/RSP management message during re-entry processing~~
~~Bit #2: Omit REG-REQ/RSP management message during re-entry processing~~
~~Bit #3: Omit IP address Acquisition management messages during re-entry processing~~
~~Bit #4: Omit Time of Day Acquisition management messages during re-entry processing~~
~~Bit #5: Omit TFTP management messages during re-entry processing~~
~~Bit #6: Full service and operational state transfer or sharing between Serving BS and Target BS (ARQ, timers, counters, MAC state machines, etc…)~~
Scheduling Service Supported
Bitmap to indicate if BS supports a particular scheduling service. '1' indicates support, '0' indicates not support:
Bit #0: Unsolicited Grant Service (UGS)
Bit #1: Real-time Polling Service (rtPS)
Bit #2: Non-real-time Polling service (nrtPS)
Bit #3: Best Effort
value of '1111' indicates no information on service available.

Modify the text in section 6.3.2.3.51 shown as indicated.] Page 87£ Line29 in IEEE P802.16e/D5a.

6.3.2.3.51 BS HO Request (MOB_BSHO-REQ) message

The BS may transmit a MOB_BSHO-REQ message when it wants to initiate an HO. An MSS receiving this message may scan recommended neighbor BSs in this message. The message shall be transmitted on the basic CID.

Table 106j—MOB_BSHO-REQ Message Format

Syntax	Size	Notes
MOB_BSHO-REQ_Message_Format()		
{		° °
Management Message Type = 56	8 bits	
Network Assisted HO supported	1 bit	Indicates that the BS supports Network Assisted HO
Mode	3 bits	0b000: HHO request 0b001: SHO/FBSS request: Anchor BS update with CID update 0b010: SHO/FBSS request: Anchor BS update without CID update 0b011: SHO/FBSS request: Active Set update with CID update 0b100: SHO/FBSS request: Active Set update without CID update 0b101: SHO/FBSS request: Active Set update with CID update for newly added BS 0b110: SHO/FBSS request: Active Set update with CID update and CQICH allocation for newly added BS 0b111: reserved
If (Mode == 0b000)		° °

{		° °
N_Recommended	8 bits	N_Recommended can be derived from the known length of the message
For (j=0 ; j<N_Recommended ; j++)		° °
{		° °
Neighbor BS-ID	48 bits	
Service level prediction	8 bits	
}		° °
}		° °
else if (Mode==0b001) {…….}		
else if (Mode==0b010) {…….}		
else if (Mode==0b011) {…….}		
else if (Mode==0b100) {…….}		
else if (Mode==0b101) {…….}		
else if (Mode==0b110) {…….}		
Action time	8 bits	Recommended action time when the Active Set shall be updated
Resource Remain Type	1 bit	0: MSS resource release 1: MSS resource retain
reserved	6 bits	Reserved; shall be set to zero
HMAC Tuple	21 bytes	See 11.1.2
TLV encoded information	Variable	TLV specific
}		° °

Delete the text Line14~31, page92 ,in section 6.3.2.3.51.

~~**HO process optimization**~~

~~The HO Process Optimization that is provided as part of this message is indicative only. HO process requirements may change at time of actual HO. For each Bit location, a value of '0' indicates the associated re-entry management messages shall be required, a value of '1' indicates the re-entry management message may be omitted. Regardless of the HO Process Optimization TLV settings, the target BS may send unsolicited SBC-RSP and/or REG-RSP management messages~~

~~Bit #0: Omit SBC-REQ/RSP management messages during re-entry processing~~

~~Bit #1: Omit PKM-REQ/RSP management message during re-entry processing~~

~~Bit #2: Omit REG-REQ/RSP management during re-entry processing~~

~~Bit #3: Omit IP address Acquisition management messages during re-entry processing~~

~~Bit #4: Omit Time of Day Acquisition management messages during re-entry processing~~

~~Bit #5: Omit TFTP management messages during re-entry processing~~

~~Bit #6: Full service and operational state transfer or sharing between serving BS and target BS (ARQ, timers, counters, MAC state machines, etc…)~~

Modify the text in section 6.3.2.3.53 shown as indicated.] Page 95£ Line11 in IEEE P802.16e/D5a.

6.3.2.3.53 BS HO Response (MOB-BSHO-RSP) message

The BS shall transmit an MOB-BSHO-RSP message upon reception of MOB-MSSHO-REQ message. The message shall be transmitted on the basic CID.

Table 106l—MOB-BSHO-RSP Message Format

Syntax	Size	Notes°°
MOB-BSHO-RSP_Message_Format()		
{		°°
Management Message Type = 58	8 bits	
Mode	3 bits	0b000: HHO request 0b001: SHO/FBSS request: Anchor BS update with CID update 0b010: SHO/FBSS request: Anchor BS update without CID update 0b011: SHO/FBSS request: Active Set update with CID update 0b100: SHO/FBSS request: Active Set update without CID update 0b101: SHO/FBSS request: Active Set update with CID update for newly added BS 0b110: : SHO/FBSS request: Active Set update with CID update and CQICH allocation for newly added BS 0b111: *reserved*
If (Mode == 0b000)		°°
{		°°
N_Recommended	8 bits	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
For (j=0 ; j<N_Recommended ; j++)		°°
{		°°
Neighbor BS-ID	48 bits	
Preamble index/ Preamble present & Subchannel Index	8 bits	For the SCa and OFDMA PHY this parameter defines the PHY specific preamble for the neighbor BS. For the OFDM PHY the 5 LSB contain the active DL subchannel index for the neighbor BS. The 3 MSB shall be Reserved and set to '0b000'.
Service level prediction	8 bits	
~~HO process optimization~~	~~8 bits~~	
HO_ID_included_indicator	1 bit	Indicates if the field HO_IND is included
If (HO_ID_included_indicator == 1)		°°
{		°°

HO_ID	8 bits	ID assigned for use in initial ranging to the target BS once this BS is selected as the target BS
}		° °
}		° °
}		° °
else if (Mode==0b001) {…….}		
else if (Mode==0b010) {…….}		
else if (Mode==0b011) {…….}		
else if (Mode==0b100) {…….}		
else if (Mode==0b101) {…….}		
else if (Mode==0b110) {…….}		
Action time	8 bits	
Estimated HO start	8 bits	
Resource Remain Type	1 bit	
padding	variable	Padding bits to ensure byte aligned.
TLV encoded information	variable	TLV specific
HMAC Tuple	21bytes	See 11.1.2
}		° °

Delete the text Line7~Line23, page100 ,in section 6.3.2.3.53.

~~**HO process optimization**~~

~~HO Process Optimization is provided as part of this message is indicative only. HO process requirements may change at time of actual HO. For each Bit location, a value of '0' indicates the associated re-entry management messages shall be required, a value of '1' indicates the reentry management message may be omitted. Regardless of the HO Process Optimization TLV settings, the target BS may send unsolicited SBC-RSP and/or REG-RSP management messages~~

~~Bit #0: Omit SBC-REQ/RSP management messages during re-entry processing~~

~~Bit #1: Omit PKM-REQ/RSP management message during re-entry processing~~

~~Bit #2: Omit REG-REQ/RSP management during re-entry processing~~

~~Bit #3: Omit IP address Acquisition management messages during re-entry processing~~

~~Bit #4: Omit Time of Day Acquisition management messages during re-entry processing~~

~~Bit #5: Omit TFTP management messages during re-entry processing~~

~~Bit #6: Full service and operational state transfer or sharing between serving BS and target BS (ARQ, timers, counters, MAC state machines, etc…)~~

Modify the text in section 6.3.2.3.5 shown as indicated. Page 29£ Line27~35 in IEEE P802.16e/D5a.

6.3.2.3.5 Ranging Request (RNG_REQ) message

The following parameter may be included in the RNG-REQ message when the MSS is attempting to perform network re-entry ~~or handover~~, and shall be included in RNG-REG message when the allocated bandwidth by Target BS enough for carry the HMAC Tuple for expediting the security authentication.during handover. ~~The MSS has a valid HMAC Tuple necessary to expedite security authentication.~~

HMAC Tuple (see 11.1.2)

The HMAC Tuple shall be the last attribute in the message.