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Re:	IEEE P802.16e/D5a	
Abstract	This contribution proposes some clarifications on HO Process Optimization field and its usage.	
Purpose	Discussion and Adoption in IEEE 802.16e	
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Clarification of HO Process Optimization field and its usage

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Problem Statement

A HO Process Optimization field includes two bits for indicating whether SBC-REQ/RSP and REG-REQ/RSP management messages may be omitted during re-entry process. However, it is also stated that unsolicited SBC-RSP and REG-RSP management messages may be sent without regard to the settings of the HO Process Optimization field. This may incur following ambiguities of the operation of MSS and BS during re-entry process.

1. Since MSS don't see whether SBC-RSP and/or REG-RSP management messages may be sent, it shall wait for the message(s) during some period of time until moving forward to the next re-entry procedure. So the optional SBC-RSP and/or REG-RSP messages become sort of a mandatory feature for MSS operation irrespective of its original intention.
2. If MSS fails receiving the unsolicited SBC-RSP and/or REG-RSP messages for some reasons, the operation parameters between MSS and BS may be inconsistent. This may result in malfunctioning or even re-initialization.

Suggested Remedy

The first problem is mainly due to the fact that MSS could not figure out whether SBC-RSP and/or REG-RSP message are actually omitted. As a way of making it clear to MSS, we propose that the bit #0 and #2 of HO Process Optimization field be modified to indicate whether only REQ messages are omitted. In other words, if the bit #0 is set, MSS shall not send a SBC-REQ message during current re-entry process. Otherwise, MSS shall send a SBC-REQ message. Same rule is applied to the bit #2 for REG-REQ message.

For SBC-RSP and REG-RSP messages, we propose to extend the size of the TLV from one byte to two bytes in order to add two more bits to indicate whether BS shall send unsolicited SBC-RSP and REG-RSP messages with updated capabilities information respectively.

The second problem comes from lack of any acknowledgement method to guarantee successful transmission of the RSP messages to MSS. So we propose to define a new timer for those unsolicited SBC-RSP and REG-RSP messages. The timer is to deal with the case where MSS shall wait for the unsolicited SBC-RSP and/or REG-RSP message(s) after receiving a RNG-RSP message

which contains a HO Process Optimization TLV indicating that the MSS shall wait for SBC-RSP and/or REG-RSP message(s). If the timer expires, MSS shall send a REQ message corresponding to the expected RSP message as indicated in HO Process Optimization TLV.

Proposed Text Change

[Delete 6.3.2.3.6 Page 30 Line 38]

HO Process Optimization

Identifies re-entry process management messages that may be omitted during the current HO attempt due to the availability of MSS service and operational context information obtained over the backbone network, and the MSS service and operational status post-HO completion. The target BS shall not direct the omission of any re-entry process management messages that would compromise the security or integrity of Normal Operation of the communications as established through an unabridged Initial Entry. ~~Regardless of the HO Process Optimization settings, t~~The target BS may elect to use MSS service and operational information obtained over the backbone network to build and send unsolicited SBC-RSP and/or REG-RSP management messages to update MSS operational information. [MSS shall not enter Normal Operation with Target BS until completing receiving all network re-entry, MAC management message responses as indicated in HO Process Optimization.](#)

[Modify 6.3.20.4 Page 139 Line 60]

[In 6.3.20.4 Network entry/re-entry, page 139, line 51, modify paragraphs as:]

For the target BS to notify an MSS seeking HO of re-entry process management messages that may be omitted during the current HO attempt due to the availability of MSS service and operational context information obtained over the backbone network, the target BS shall place an HO Process Optimization TLV in the RNG-RSP indicating which re-entry management messages may be omitted. The target BS shall not direct the omission of any re-entry process management messages that would compromise the security or integrity of Normal Operation of the communications as established through an unabridged Initial Entry. The MSS shall complete the processing of all indicated messages before entering Normal Operation with target BS.

~~Regardless of~~ As indicated in the HO Process Optimization TLV settings, the target BS may elect to use MSS service and operational information obtained over the backbone network to build and send unsolicited SBC-RSP and/or REG-RSP management messages to update MSS operational information, or to include REG-RSP specific or SBC-RSP specific message items as TLV items in the RNG-RSP. The target BS may ignore only the first corresponding REQ management message

received if it sends an unsolicited SBC-RSP or unsolicited REG-RSP message. The MSS is not required to send the complimentary REQ management message if it receives an unsolicited SBC-RSP or unsolicited REG-RSP management message prior to MSS attempt to send the corresponding REQ management message. Target BS re-entry unsolicited response management messages may be grouped into the same DL frame transmission with the RNG-RSP. However, unsolicited SBC-RSP and unsolicited REG-RSP may not be grouped together into the same DL frame transmission when the PKM-REQ/RSP management message process is required. The integrity of the 6.3.9.5 sequence process must be preserved. For a security keying process that has not been determined to be omitted in the HO Process Optimization TLV settings, if MSS RNG-REQ includes an serving BSID and HO Indication, and target BS has received a backbone message containing MSS information, MSS and target BS shall use the embedded TLV PKM-REQ information and the re-authorization process as defined in 7.2.

[In 10.1 Global values, page 381, line 14, Table 340a—Parameters and Constants, append to end of table:]

System	Name	Time Reference	Minimum Value	Default Value	Maximum Value
MSS	HO Process Optimization MSS Timer Retries	Number of SBC-REQ and/or REG-REQ retries while waiting for unsolicited SBC-RSP and/or REG-RSP as part of MSS network re-entry and as indicated by HO Process Optimization message element of RNG-RSP	3		

[Modify 11.6 Table 365a Page 397 Line 1]

Table 365a — RNG-RSP message encodings

Name	Type (1 byte)	Length	Value
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HO Process Optimization	21	12	<p>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</p> <p>Bit #0: Omit SBC-REQ/RSP management messages during current re-entry processing</p> <p>Bit #1: Omit PKM-REQ/RSP management message during current re-entry processing</p> <p>Bit #2 : Omit REG-REQ/RSP management message during current re-entry processing</p> <p>Bit #3 : Omit Network Address Acquisition management messages during current re-entry processing</p> <p>Bit #4 : Omit Time of Day Acquisition management messages during current re-entry processing</p> <p>Bit #5 : Omit TFTP management messages during current re-entry processing</p> <p>Bit #6 : Full service and operational state transfer or sharing between Serving BS and Ttarget BS (ARQ, timers, counters, MAC state machines, etc...)</p> <p>Bit #7 : post-HO re-entry MSS DL data pending at target BS</p> <p>Bit #8 : BS shall send an unsolicited SBC-RSP management message with updated capabilities information during current re-entry processing</p> <p>Bit #9 : BS shall send an unsolicited REG-RSP management messages with updated capabilities information during current re-entry processing</p> <p>Bit #10-15 : Reserved</p>
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[Add 11.7.12 HO Support, page 403, line 46, , append to end of section:]

11.7.12.2 HO Process Optimization MSS Timer

[During network re-entry, the HO Process Optimization MSS Timer is the duration in frames MSS shall wait until receipt of the next unsolicited network re-entry MAC management message as indicated in the HO Process Optimization element of the RNG-RSP message. MSS shall start HO Process Optimization MSS Timer on receipt of RNG-RSP with HO Process Optimization message element indicating one or more unsolicited network re-entry MAC management messages are pending and required to complete network re-entry and establish MSS Normal Operation with target BS. HO Process Optimization MSS Timer shall recycle on MSS receipt of any unsolicited network re-entry MAC management message and shall terminate on MSS establishment of Normal Operation with the target BS. On HO Process Optimization MSS Timer timeout and while HO Process Optimization MSS](#)

Timer Retries is valid, MSS shall send the network re-entry MAC management request message corresponding to the expected and pending network re-entry MAC management response message as indicated in HO Process Optimization and recycle HO Process Optimization MSS Timer.

<u>Type</u>	<u>Length</u>	<u>Value</u>	<u>Scope</u>
<u>??</u>	<u>1</u>	<u>In frames</u>	<u>REG-REQ;</u> <u>REG-RSP</u>