Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Handover - MSS Release after Completing Initial Network Entry**
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Re:	Response to IEEE 802.16-04/19 (Recirculation Ballot #14a)
Abstract	Handover - MSS Release after Completing Initial Network Entry
Purpose	Enhance the handover performance during handover
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Handover - MSS Release after Completing Network Entry

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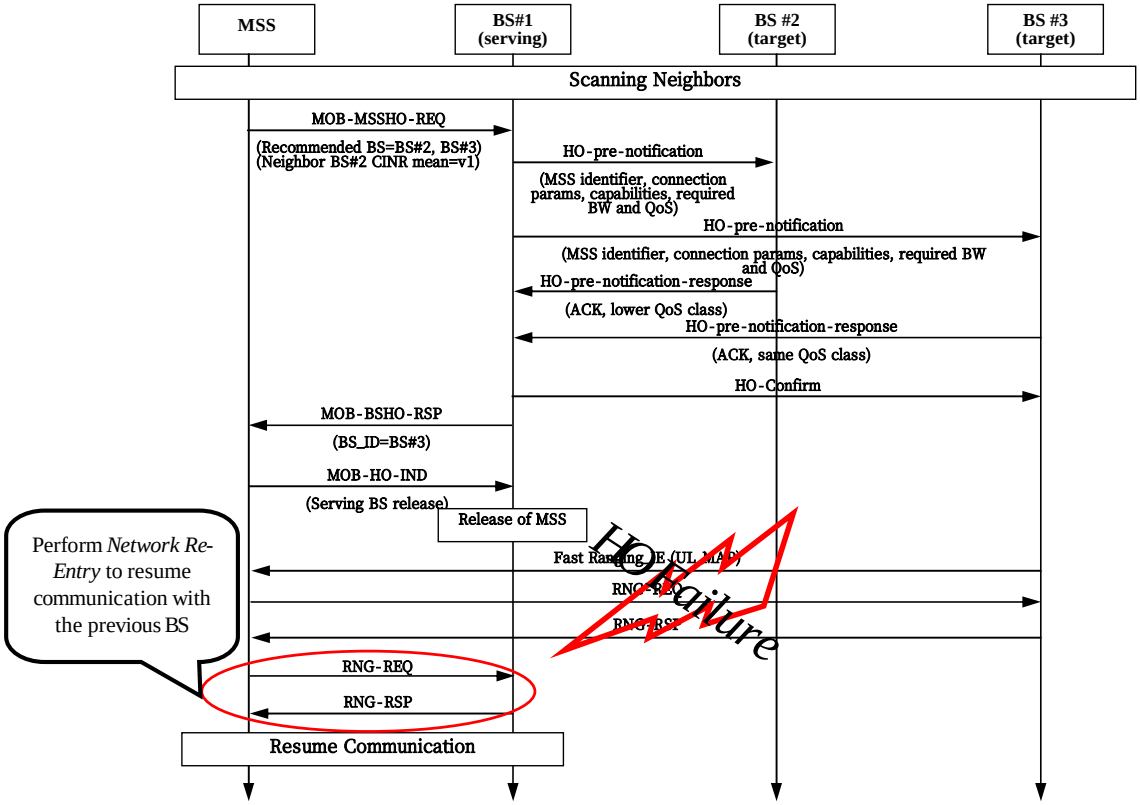
1. Problem Statement

According to the current draft, when handover is performed, the serving BS may either close all connections and discard MAC state machines or retain the connections. If the serving BS closes all connections and discard MAC state machines and a drop (handover fails and tries to comeback to the serving BS) occurs, currently an MSS should perform network re-entry because the serving BS does not have MSS's connection information. This introduces unnecessary delay for MSS to re-enter the network.



In this contribution, we propose a scheme to retain MSS's connection information which makes the MSS avoid unnecessary re-entry procedures.

2. Overview of Proposed Solution

If the successful handover of an MSS can be informed to the serving BS, the serving BS can release the MSS's connection related information at the time of reception of successful handover message. If a drop occurs during HO, the MSS can try to resume communication with the serving BS at first and if this fails then the MSS shall attempt network re-entry with its preferred target BS.

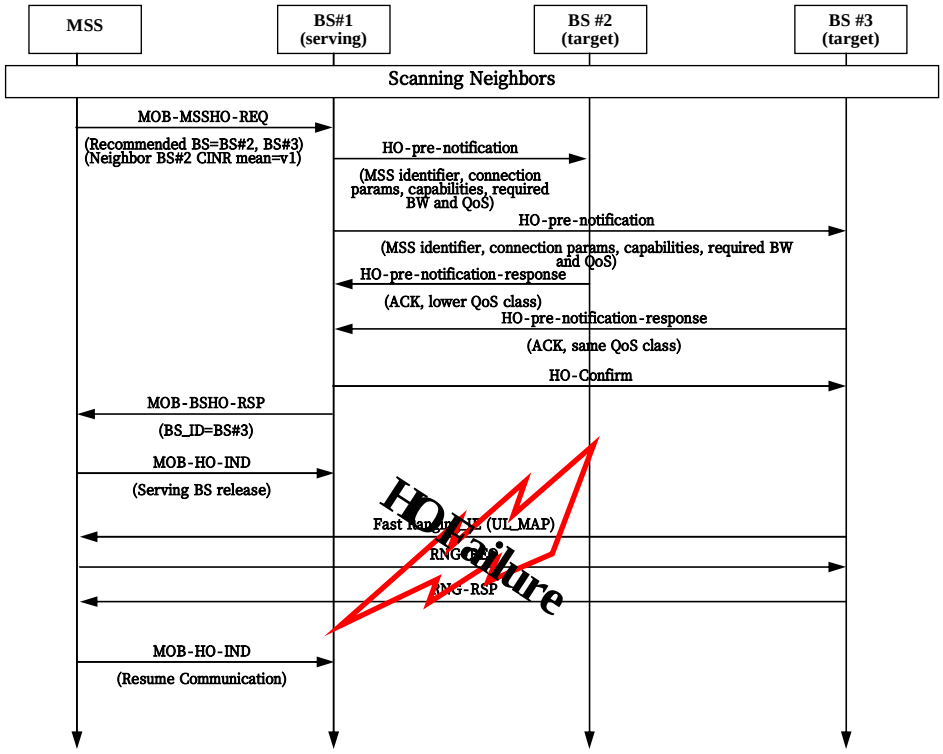


Figure. Proposed Scheme and Resuming Communication in Case of A drop.

3. Proposed Changes in Document

Remedy:
Correct sentences describing BS's and MSS's actions for the serving BS to release MSS information after reception of HO-complete backbone message. Add one HO_IND_type in MOB-HO-IND to indicate to the serving BS that decision of data forwarding shall be indicated back to the MSS. Add one backbone message from the target BS to the serving BS to indicate MSS's successful handover.

[Insert or correct sentences of 6.3.20.2.5 in page 51 as follows]

6.3.20.2.5 Termination with the Serving BS

After the hand-over request/response handshake has completed, the MSS may begin the actual HO. At some stage during the HO process, the MSS terminates service with the serving BS. This is accomplished by sending a MOB-HO-IND MAC Management message with the HO_IND_type value indicating serving BS release.

If the HO_IND_type field specifies Serving BS release, the BS ~~may either close all connections and discard MAC state machines and MAC PDUs associated with the MSS, or it~~ may retain the connections, MAC state machine and PDU associated with the MSS to be forwarded to the Target BS for service continuation, or to be discarded upon reception of a successful Handover backbone message (HO-Complete with Reason indicating Successful Handover) from the Target BS.

[Insert or correct sentences of 6.3.20.2.5 in page 51 as follows]

6.3.20.3 Drops during HO

A drop is defined as the situation where an MSS has stopped communication with its Serving BS (either in the downlink, or in the uplink) before the normal HO sequence outlined in Cell Selection and Termination with the Serving BS has been completed.

An MSS can detect a drop by its failure to demodulate the downlink, or by exceeding the RNG-REQ retries limit allowed for the periodic ranging mechanism. A BS can detect a drop be exceeding the Number of retries on inviting Ranging Requests limit allowed for the periodic ranging mechanism.

When the MSS has detected a drop, it shall resume communication with the serving BS by sending MOB-HO-IND message with HO_IND_type indicating Resume Communication. If resuming communication fails with the serving BS then the MSS shall attempt network re-entry with its preferred target BS as outlined in Section 6.4.18.4. When the BS has detected a drop, it shall react as if a MOB-HO-IND MAC Management message has been received with HO_IND_type indicating Serving BS release and may send call drop report to the serving BS through a backbone message (HO-Complete with Reason indicating Handover Failure).

*[Modify the Table 92j in **6.3.2.3.56 MOB-HO-IND Message Format** in page 25]*

Syntax	Size	Notes
MOB_HO_IND_Message_Format() {		
Management Message Type=56	8 bits	
reserved	6 bits	Reserved; shall be set to zero
HO_IND_type	2 bits	00: Serving BS release 01: HO cancel 10: HO reject 11: ~~reserved~~ Resume Communication

Target_BS_ID	48 bits	Applicable only when HO_IND_type is set to 00 or 11
HMAC Tuple	21 bytes	See 11.4.11
}		

*[Add new Inter-base station message **"D.2.XX HO-Complete";** appropriate allocation of numbering is required.]*

Field	Size	Notes
Global Header	152-bit	
MSS unique identifier	48-bit	48-bit unique identifier used by MSS on initial network entry
Reason	8-bit	#0: Successful Hand Over #1: Handover Failure #2~7: reserved
Security field	TBD	A means to authenticate this message

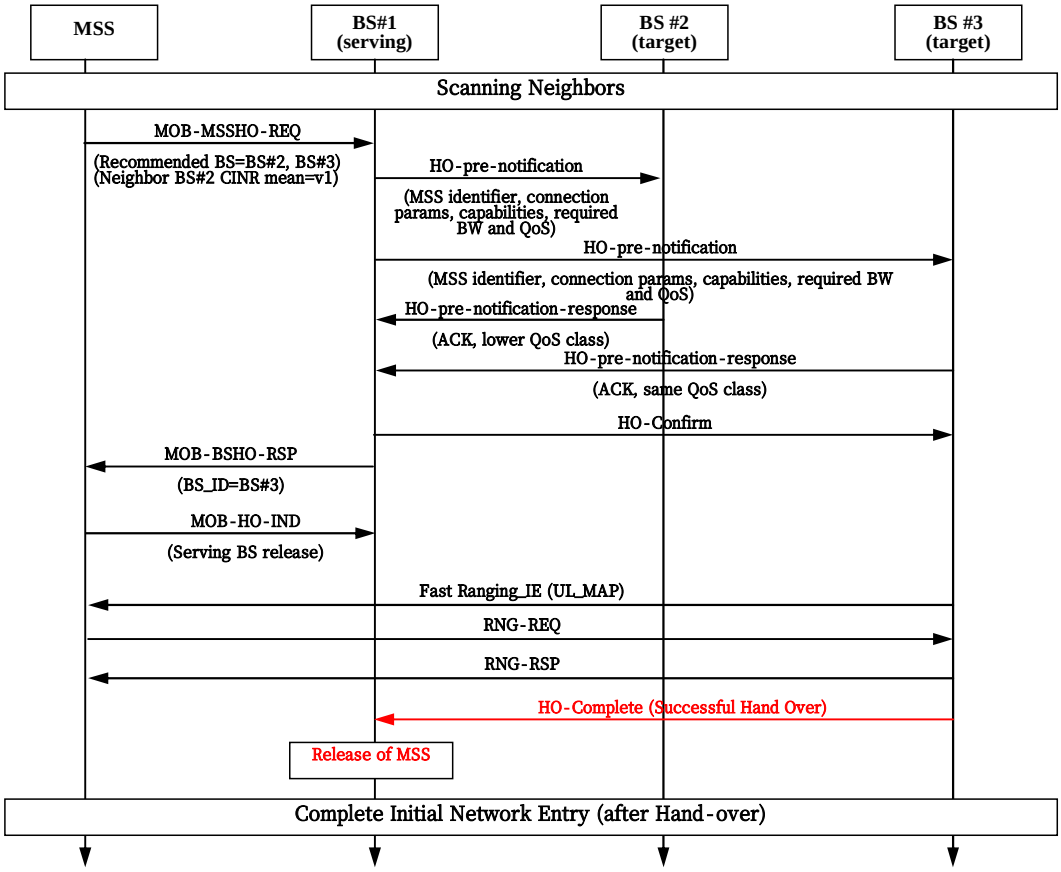


Figure E.8 – Example HO process by MSS request

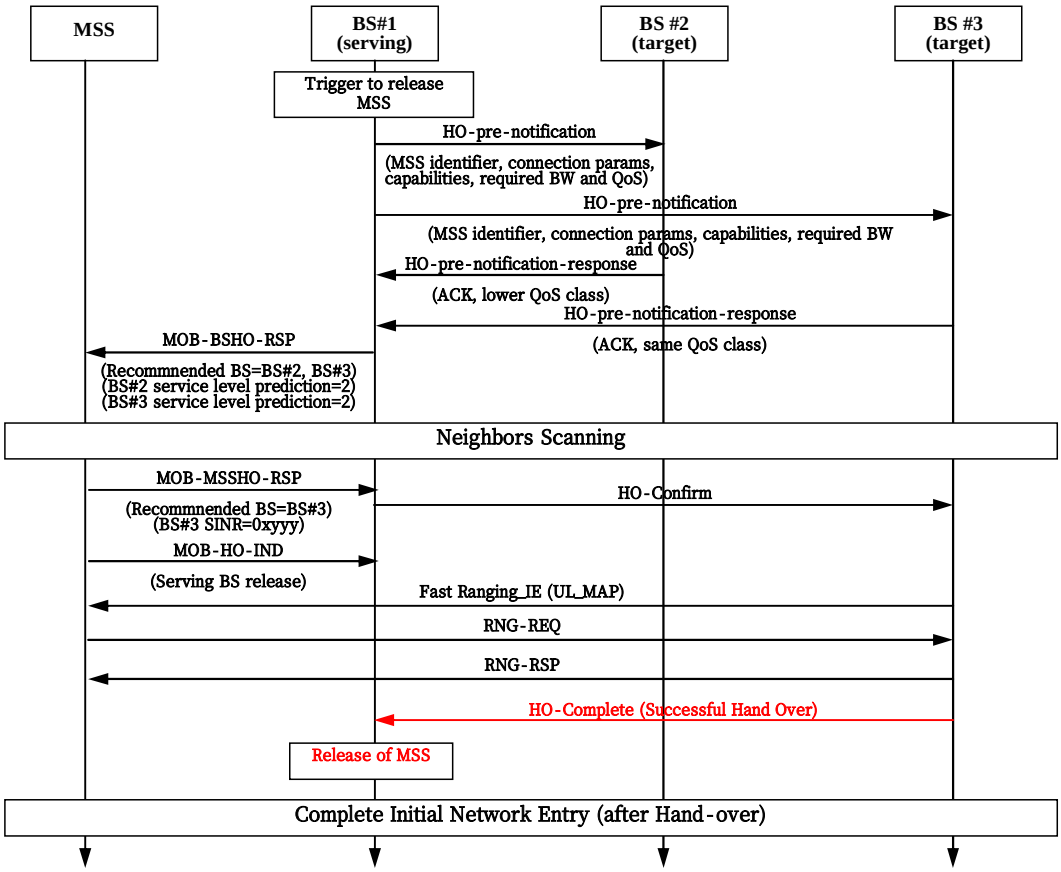


Figure E.9 – Example HO process by BS request