

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >		
Title	Handover scheme between WirlessMAN-OFDMA Reference and Advanced System		
Date Submitted	2009-03-02		
Source(s)	Haihong Zheng, Shashikant Maheshwari, E-mail: haihong.zheng@nsn.com Yousuf Saifullah Zexian.li@nokia.com NSN Zexian Li, Jan Suumaki Nokia		
Re:	802.16m AWD: IEEE 802.16m-09/0012 - "Call for Contributions on Project 802.16m Amendment Working Document (AWD) content" on MAC Handover Procedures between Reference and Advanced Systems		
Abstract	This contribution proposes IEEE 802.16m AWD text on HO procedure between reference and advanced systems		
Purpose	To be discussed and adopted in 802.16m AWD		
Notice	<i>This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups. It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.</i>		
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.		
Patent Policy	The contributor is familiar with the IEEE-SA Patent Policy and Procedures: < http://standards.ieee.org/guides/bylaws/sect6-7.html#6 > and < http://standards.ieee.org/guides/opman/sect6.html#6.3 >. Further information is located at < http://standards.ieee.org/board/pat/pat-material.html > and < http://standards.ieee.org/board/pat >.		

Handover Scheme between WirelessMAN-OFDMA Reference and Advanced Systems

1 Introduction

This contribution proposes amendment text on handover procedures between WirelessMAN-OFDMA Reference and Advanced System.

2 Text Proposal

===== *Start of Proposed Text* =====

15.2.x Handover

15.2.x.4 Handover between WirelessMAN-OFDMA Advanced and Reference Systems

15.2.x.4.1 Handover from WirelessMAN-OFDMA Reference to Advanced System

15.2.x.4.1.1 Network Topology Acquisition

15.2.x.4.1.1.1 Network Topology Advertisement

A YBS shall broadcast the system information of the LZone of its neighboring ABS using MOB_NBR-ADV message. This system information is used to facilitate AMS and YMS synchronization with the LZone of neighboring ABS without the need to monitor transmission from the neighboring ABS for DCD/UCD broadcasts.

The support of WirelessMAN-OFDMA advanced system in the neighbor ABS is indicated in the MAC version TLV in the MOB_NBR-ADV message transmitted in either the serving YBS or the LZone of the target ABS. An ABS also uses 3 LSBs of the reserved bits in FCH in LZone to specify the frame offset of the MZone. Such frame offset information facilitates the AMS served in the LZone synchronization with the MZone.

15.2.x.4.1.1.2 MS Scanning

The AMS/YMS shall follow the same scanning procedure as defined in section 6.3.21.1.2.

15.2.x.4.1.2 Handover Process

An AMS performs handover from a YBS to an ABS either by using zone switching based handover process or direct handover process. The detailed procedures for zone switch based handover and direct handover are described in 15.2.x.4.1.2.1 and 15.2.x.4.1.2.2 respectively. The zone switching based handover is applicable to the ABS which contains both LZone and MZone. The direct handover based handover is applicable to the ABS which only supports WirelessMAN-OFDMA Advanced System.

15.2.x.4.1.2.1 Zone Switch based Handover Process

An example flow of zone switch based handover process is shown in Figure x and described in the following sections.

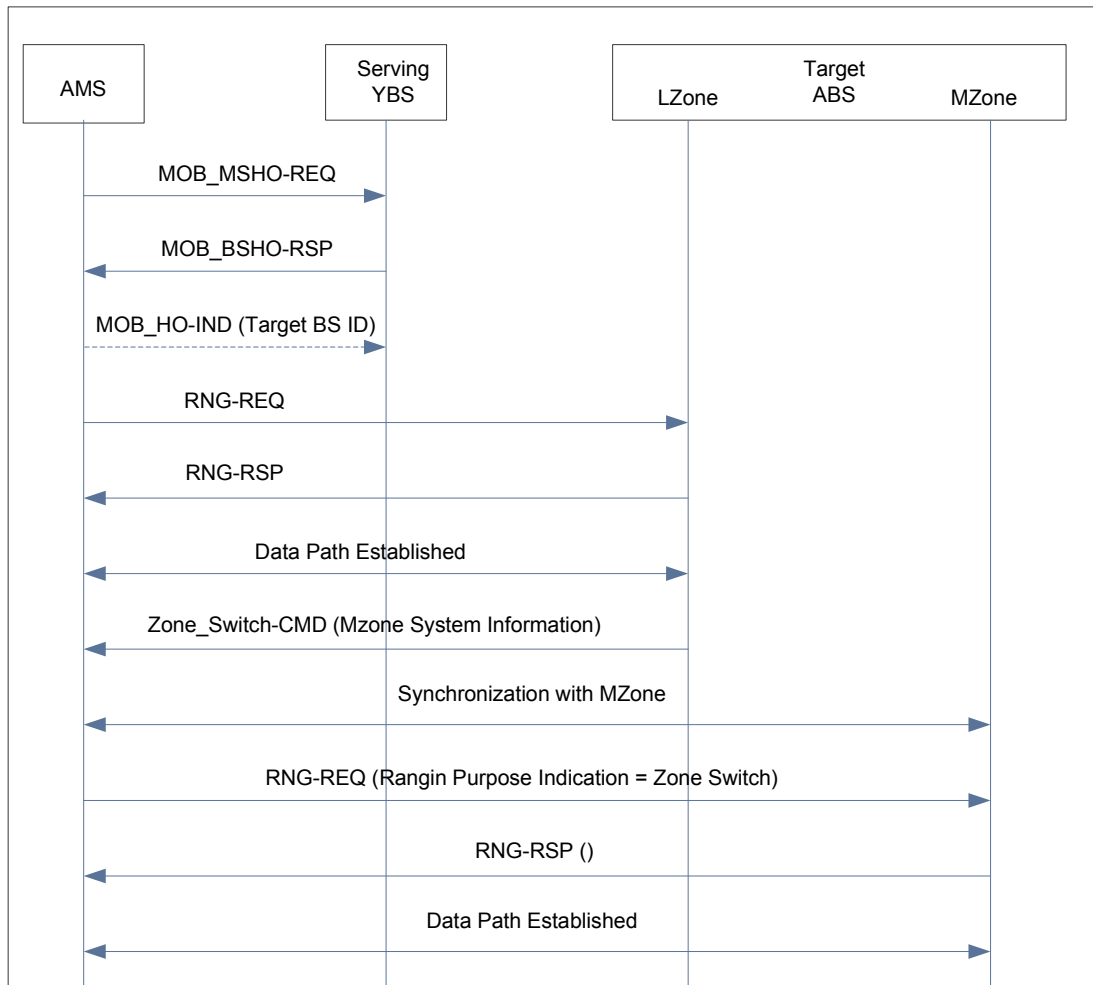


Figure x. Example Flow of Handover Process from YBS to ABS

15.2.x.4.1.2.1.1 Cell Reselection

An AMS uses information acquired from a MOB_NBR-ADV message including the MAC version value to consider available neighbor YBS/ABSs for cell reselection. The AMS/YMS shall follow the same cell reselection procedure as defined in section 6.3.21.2.1.

15.2.x.4.1.2.1.2 Handover from YBS to ABS LZone

An HO begins with a decision for an YMS/AMS to HO from the serving YBS to the LZone of a target ABS. The HO decision, initiation and cancellation follow the same procedures as defined in section 6.3.21.2.

15.2.x.4.1.2.1.3 Network Re-Entry in ABS LZone

After HO, the YMS/AMS performs network reentry in the LZone of the target ABS following the same procedures as defined in section 6.3.21.2.7. In addition, upon knowing the AMS capability of supporting WirelessMAN-OFDMA Advanced System based on the MAC version in the RNG-REQ sent from AMS in the

LZone, the ABS may direct the AMS to switch from LZone to MZone during or after AMS network re-entry to the LZone as described in section 15.2.x.4.1.2.4. After network re-entry procedure completes in the LZone, the AMS is served in the LZone. The AMS may also request a zone switch to the MZone as described in section 15.2.x.4.1.2.4.

15.2.x.4.1.2.1.4 Zone Switch

If the ABS decides to switch the AMS from the LZone to the MZone while AMS performing network reentry in the LZone, the ABS provides certain system information of the MZone to the AMS in the RNG-RSP sent in the LZone. If the ABS decides to switch the AMS after AMS finishes the network reentry in the LZone, it sends a Zone_Switch-CMD which contains certain system information of the MZone. The RNG-RSP or Zone_Switch-CMD also provides the “Zone Switch Timeout” attribute, which specifies the time before which AMS shall initiate network entry in the MZone. The time is measured from the time the RNG-RSP or Zone_Switch-CMD is sent in the LZone. After receiving zone switch command in RNG-RSP or Zone_Switch-CMD in the LZone, the AMS performs network reentry in the MZone, while continuing its normal operation in the LZone (e.g., exchanging user data with the ABS in LZone).

The AMS starts network reentry in MZone by performing DL synchronization with the MZone using the system information provided in the RNG-RSP or Zone_Switch-CMD sent by the ABS in LZone. The AMS may also acquire the system information of the MZone by listening to the ABS’s SFH. Then the AMS shall conduct ranging per section xxx. The AMS shall signal the ABS the zone switch attempt by setting the Ranging Purpose Indication set to “Zone Switch” in the AAI_RNG-REQ message. The AAI_RNG-REQ shall be sent before the time specified by the “Zone Switch Timeout”. If the ABS doesn’t receive the AAI_RNG-REQ in the MZone within the timeout duration, the ABS shall stop allocating resources to the AMS in the MZone, and the AMS continues to be served in LZone.

Upon receiving the AAI_RNG-REQ in MZone with the ranging purpose set to “Zone Switch”, the ABS obtains the context of the AMS in its LZone and maps them to the MZone context pre section 15.2.x.4.1.3. The ABS then sends a AAI_RNG-RSP to the AMS in the MZone. The AAI_RNG-RSP also contains the new STID assigned to the AMS and the nonce(s) used to derive the TEK(s). After the completion of the network reentry procedure at the MZone, the ABS releases all the resource and AMS context in the LZone and starts allocating resource to the AMS in the MZone.

x.y.4.1.2.2 Direct Handover based Handover Process

x.y.4.1.2.2.1 Cell Reselection

The AMS/YMS shall follow the same cell reselection procedure as defined in section 6.3.21.2.1. In addition, an AMS may use the scanning interval to perform a blind scanning for neighboring ABSs. If it finds one or more neighboring ABSs whose BSID is not in the neighbor list in the MOB_NBR-ADV provided by the serving YBS, it determines that the neighboring ABS only supports WirelessMAN-OFDMA Advanced System. The AMS may select such ABS as its target BS.

15.2.x.4.1.2.2.2 Direct Handover from YBS to ABS

If the AMS decides to handover from the serving YBS to the target ABS directly, it sends YBS a MOB_MSHO-REQ message with the desired BS-ID obtained from its previous blind scanning. The YBS responds with a MOB_BSHO-RSP message. The target ABS shall inform serving YBS to set HO Process Optimization bit #0 (i.e., omit SBC-REQ/RSP management messages during re-entry processing) and #2 (omit PKM TEK creation

phase during reentry processing) set to 0.

15.2.x.4.1.2.2.3 Network Re-Entry to ABS

The AMS uses random access for performing network re-entry to the ABS. After random access, the AMS sends an initial AAI_RNG-REQ with its MAC address. The ABS responds with a AAI_RNG-RSP, which contains information such as a temporary STID, nonce and other security related attributes. The AMS then update the its capability setting with the ABS using the procedure per section xxx. The AMS and ABS maps the context used in the serving YBS to the one to be used in ABS per section 15.2.x.4.1.3.1.

15.2.x.4.1.3 Context Mapping

With zone switch based handover, the context management process from serving YBS to the LZone of target ABS follows section 6.3.21.2.8.1. The following section describes the context mapping from the LZone to the MZone of the target ABS during network reentry procedure in the MZone in the case of zone switch based handover. It also applies to the context mapping from serving YBS to the target ABS in the case of direct handover.

15.2.x.4.1.3.1 MAC Identifiers

The FIDs for the basic and primary management connections are set to 0 and 1 automatically. The FIDs for the transport connections are sequentially derived starting from 2 for all of the transport CIDs used in LZone. The AMS autonomously updates its Flow IDs in the ascending order from the first transport Connection ID.

15.2.x.4.1.3.2 Service Flow

FFS.

15.2.x.4.1.3.3 ARQ

FFS.

15.2.x.y.4.1.3.4 Security

FFS.

15.2.x.4.2 Handover from ABS to YBS

Handover of an AMS/YMS from LZone of an ABS to a YBS follows the same HO procedure defined in section 6.3.21.2. The following section only defines the handover procedure for an AMS from MZone of the serving ABS to a target YBS.

15.2x.4.2.1 Network Topology Acquisition

15.2.x.4.2.1.1 Network Topology Advertisement

An ABS shall broadcast the system information of its neighboring YBS in its both LZone using MOB_NBR-ADV message and MZone using AAI_NBR-ADV message. Such system information is used to facilitate YMS served in LZone and AMS served in LZone or MZone to synchronize with the neighboring YBS without the need to monitor transmission from the neighboring YBS for DCD/UCD broadcasts.

15.2.x.4.2.1.2 MS Scanning

The scanning procedure for an YMS/AMS served in LZone of an ABS follow the procedure as defined in section 6.3.21.1.2. The scanning procedure for an AMS served in MZone of an ABS follows the procedure defined in section 15.2.x.1.2.

15.2.x.4.2.2 Handover Process

The handover process for YMS/AMS served in LZone of an ABS shall follow the procedure defined in section 6.3.21.2. The following sections specify the handover process for an AMS served in MZone of the serving ABS to a target YMS.

15.2.x.4.2.2.1 Cell Reselection

An AMS uses information acquired from an AAI_NBR-ADV message including the MAC version value to consider available neighbor BSs for cell reselection. The serving ABS may schedule scanning intervals for AMS to conduct cell reselection activity. The cell reselection procedure follows the same procedure defined in section 6.3.21.2.1.

15.2.x.4.2.2.2 Handover from MZone to YBS

The AMS or the ABS initiates and executes the handover per section xxx with HO_Reentry_Mode set to 0. The ABS may obtain the Basic CID to be used in target YBS from the target YBS over the backbone, and provide the Basic CID to the AMS. Based on the Basis CID, the AMS can derive its primary management CID and transport CIDs autonomously in the target YBS as defined in section 6.3.21.2. If the AMS information is required to be transferred to the target BS for handover optimization, the serving ABS may map the AMS context to the format in WirelessMAN-OFDMA Reference System per section 15.2.x.4.2.2.4, and provide it to the target YBS over the backbone. In addition, the serving ABS may indicate the time of the fast ranging opportunity, negotiated with the potential target YBSs, using AAI_BSHO-REQ/RSP message. The AMS and target YBS use fast ranging opportunity as defined in section 6.3.21.2.4. Handover cancellation procedure is performed per section 15.2.x.y.

15.2.x.4.2.2.3. Network Reentry

The AMS follows the same network reentry procedure to the target YBS as defined in section 6.3.21.2.7.

15.2.x.4.2.3 Context Mapping

15.2.x.4.2.3.1 MAC Identifiers

The management connections with Flow ID 0 and Flow ID 1 are mapped to Basic CID and Primary Management CID respectively. The Basic CID may be allocated to the AMS via the serving ABS. The AMS derives the Primary Management CID based on the procedure defined in section 6.3.21.2. The connection with Flow ID 2 is mapped to the first transport connection. The AMS derives the first transport CID based on the procedure defined in section 6.3.21.2, and it autonomously updates its remaining transport CIDs in the ascending order from Flow ID 2.

The Station Identifier is released after the AMS handover to the target YBS.

15.2.x.4.2.3.2 ARQ

FFS.

15.2.x.4.2.3.3 Security

FFS.

=====*End of Proposed Text*=====