

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Clarification on HO section	
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Re:	Response to Sponsor Ballot on IEEE802.16e/D7 document	
Abstract	The subsection ordering in HO section was changed in Session #35 by contribution IEEE C802.16e-05/003r3. The change was applied incorrectly. Fix incorrect section ordering	
Purpose	To incorporate the text changes proposed in this contribution into the 802.16e/D8 draft.	
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Clarification on HO Section

Mary Chion , Mo-Han Fong, Vladimir Yanover

1. Problem Statement

The subsection ordering in HO section was changed in Session #35 by contribution IEEE C802.16e-05/003r3. In IEEE P802.16e-D7, the change was applied incorrectly. This contribution corrects the subsection ordering of HO section. Also, some modified text included in contribution IEEE C802.16e-05/003r3 was not incorporated into D7 document, this contribution also re-included the modified changes.

2. Proposed Solutions

Soft Handover and FBSS sections are re-organized as the following:

- Remove all sections/text related to Soft Handover and FBSS from section 6.3.21.2 HO process
- Restructure 6.3.21 to three subsections, 6.3.21.1 Network Acquisition; 6.3.21.2 HO Process; 6.3.21.3 Soft Handover and Fast BS Switching
- Move section 6.3.21.4, 6.3.21.5 and 6.3.21.6 into 6.3.21.2 as subsections for 6.3.21.2.
- Move Soft HO and FBSS section to the end of 6.3.21 as a new section 6.3.21.3
- Change text in section 6.3.21.3.1 to reflect the modifications from contribution C802.16e-05/003r3.

3. Specific Text Changes

[Restructure section 6.3.21, after the restructuring the Table of content for 6.3.21 should be as the following:

6.3.21 MAC Layer HO Procedure

6.3.21.1 Network Topology Acquisition

6.3.21.2 HO Process

6.3.21.2.1 Cell Selection

6.3.21.2.2 HO Decision & Initiation

6.3.21.2.3 HO Cancellation

6.3.21.2.4 Use of scanning and association results

6.3.21.2.5 Termination with the serving BS

6.3.21.2.6 Drops during HO

6.3.21.2.7 Network entry/re-entry

6.3.21.2.8 HO Process SDL

6.3.21.3 Soft Handover and Fast BS Switching

6.3.21.3.1 SHO Decision and Initiation

6.3.21.3.2 FBSS Decision and Initiation

6.3.21.3.3 Active Set update for SHO/FBSS

6.3.21.3.4 Anchor BS update for SHO/FBSS

6.3.21.3.4.1 HO MAC management message method

6.3.21.3.4.2 Fast Anchor BS Selection Feedback Mechanism

6.3.21.3.5 MS-Assisted coordination of DL transmission at new Anchor BS]

[Modify section 6.3.21 as the following:]

6.3.21.2 HO process

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~~6.3.21.2.6 SHO and FBSS Decision and Initiation~~

[Renumber section 6.3.21.6.1 as section 6.3.21.3.4.1, and move the section after Pg 164, line 65]

~~6.3.21.2.6.1~~ 6.3.21.3.4.1 HO MAC management message method

[Renumber section 6.3.21.6.2 to section 6.3.21.3.4.2, move this section to immediately after the previous section, 6.3.21.3.4.1]

~~6.3.21.2.6.2~~ 6.3.21.3.4.2 Fast Anchor BS Selection Feedback Mechanism

[Renumber section 6.3.21.6.3 to section 6.3.21.3.5, move this section to immediately after section 6.3.21.3.4.2]

~~6.3.21.2.6.3~~ 6.3.21.3.5 MS-Assisted coordination of DL transmission at new Anchor BS

[Modify section 6.3.21.3.1 according to the following]

6.3.21.3.1 SHO decision and initiation

Support of SHO ~~or FBSS~~ is optional for both MS and BS.

For MS and BS that support SHO ~~or FBSS~~, the MS and the BS shall maintain a list of BSs that are involved in SHO ~~or FBSS~~ with the MS. The list is called the Active Set. Among the BSs in the Active Set, an Anchor BS is defined. ~~When operating in FBSS, the MS only communicates with the Anchor BS for UL and DL unicast messages and traffic.~~ Regular operation when MSS is registered at a single BS is a particular case of SHO with Active Set consisting of single BS, which in this case shall be the Anchor BS. When operating in SHO, the MS communicates with all BSs in the Active Set for UL and DL unicast messages and traffic.

There are two methods for the MS to monitor DL control information (i.e. DL-MAP, UL-MAP and FCH) and DL broadcast messages. ~~In this case, the DL-MAP and UL-MAP of the Anchor BS may contain burst allocation information for the non-Anchor Active BS.~~ The first method is the MS monitors only the Anchor BS for DL control information and DL broadcast messages. In this case, the DL-MAP and UL-MAP of the Anchor BS may contain burst allocation information for the non-Anchor Active BS. The second method is the MS monitors all the BSs in the Active Set for DL control information and DL broadcast messages. In this case, the DL-MAP and UL-MAP of any Active BS may contain burst allocation information for the other Active BSs. The method to be used by MS is defined during the REG-REQ and REG-RSP handshake.

A SHO begins with a decision for an MSS to transmit/receive unicast messages and traffic from multiple BSs at the same time interval. For DL SHO, two or more BSs provide synchronized transmission of MSS downlink data such that diversity combining can be performed by the MSS. For UL SHO, the transmission from a MSS is received by multiple BSs such that selection diversity of the information received by multiple BSs can be performed..

~~When an Active Set and an Anchor BS are maintained at the MS and the BS, the BS can decide to put the MS in either SHO or FBSS on a per burst allocation basis, based on factor such as QoS of a particular service flow being transmitted. A SHO begins with a decision for an MS to transmit/receive unicast messages and traffic from multiple BSs at the same time interval. For DL SHO, two or more BSs provide synchronized transmission of MS downlink data such that diversity combining can be performed by the MS. For UL SHO, the transmission from a MS is received by multiple BSs such that selection diversity of the information received by multiple BSs can be performed. A FBSS begins with a decision for an MS to transmit/receive unicast messages and traffic from only the Anchor BS.~~

The BS supporting SHO or FBSS shall broadcast the DCD message that includes the H_Add Threshold and H_Delete Threshold. These thresholds are used by the FBSS/SHO capable MS to determine if MOB_MSHO-REQ should be sent. When long-term CINR of a serving BS is less than H_Delete Threshold, the MS shall send MOB_MSHO-REQ to requires

dropping this serving BS from the active set; when long-term CINR of a neighbor BS is higher than H_Add Threshold, the MS shall send MOB_MSHO-REQ to require adding this neighbor BS to the active set.

The decision to update the Active Set or Anchor BS begins with a notification by the MS through the MOB_MSHO-REQ MAC management message or by the BS through the MOB_BSHO-REQ management message. Acknowledgement with MOB_BSHO-RSP of a notification is required, but one with MOB_BSHO-RSP is recommended by not required. If an MS that transmitted a MOB_MSHO-REQ message detects an incoming MOB_BSHO-REQ message, it may respond with a MOB_MSHO-REQ or MOB_HO-IND message and ignore its own previous request. Similarly, a BS that transmitted a MOB_BSHO-REQ message and detects an incoming MOB_MSHO-REQ or MOB_HO-IND message from the same MS shall ignore its own previous request.

The BSs involving in SHO with a MS shall use the same set of CIDs for the connections that are established with the MS. BS may assign a new set of CIDs to the MS during Active Set update through MOB_BSHOREQ message and MOB_BSHO-RSP message.

~~The BS involving in FBSS with an MSS should share CID allocation for the connections that are established with the MSS. When new CIDs are assigned MSS by anchor BS, anchor BS should notify CID of other BSs in active set with CID allocation IE in DSX-REQ/RSP message.~~

There are several conditions that are required to enable soft handover ~~and or Fast BS Switching handover~~ between MS and a group of BSs. These conditions are listed below:

- The BSs involving in SHO/~~FBSS HO~~ are synchronized based on a common time source;
- The frames sent by the BSs involving in SHO/~~FBSS HO~~ at a given frame time arrive at the MS within the prefix interval
- BSs involving in SHO/~~FBSS HO~~ have synchronized frame structure
- BSs involving in SHO/~~FBSS HO~~ have level 3 context transfer or sharing
- BSs involving in SHO/~~FBSS HO~~ have the same frequency assignment
- BSs involving in SHO shall use the same set of CIDs for the connections that are established with the MS.

~~SHO further requires the following conditions:~~

- The same MAC/PHY PDUs shall be multicast by the BSs involving in SHO to the MS

[Renumber section 6.3.21.4, 6.3.21.5 and 6.3.21.6 to 6.3.21.2.6, 6.3.21.2.7 and 6.3.21.2.8. Move these sections to after Pg158, line 45]

6.3.21.42.6 Drops during HO

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6.3.21.52.7 Network entry/re-entry

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6.3.21.62.8 HO Process SDL

4. References

- [1] IEEE 802.16- 2004 IEEE Standards for local and metropolitan area networks part 16: Air interface for fixed broadband wireless access systems
- [2] IEEE P802.16e-D7-2005