Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>
Title	**Drops During MS and MRS Handover**
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Re:	80216-07_043: IEEE 802.16 Working Group Letter Ballot #28: Announcement
Abstract	This contribution proposes how to deal with MS and MRS drop during handover in relay network.
Purpose	The text proposal in this contribution is accepted by P802.16j/D1.
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Drops During MS and MRS Handover

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Introduction

In IEEE 802.16e, a drop is defined as the situation where an MS has stopped communication with its serving BS before the normal handover sequence. Due to the introduction of relay station in the network, the technique to deal with drops during MS handover defined in IEEE 802.16e should be modified to satisfy RS network, especially the mobile relay station (MRS) condition. In addition, procedures should be defined to handle drop during MRS handover.

This contribution proposes modifications to handle drops during non-transparent MRS and MS handover for MR network.

Proposed solution

This contribution describes methods to handle the following types of drop in MR network:

1. MS drop during handover;
2. MRS drop during handover.

For MS drop during handover, MS should perform the same procedure as defined in IEEE802.16e-2005 6.3.22.2.6. In addition, if MS is attempting to handover to a RS when a drop occurred, the MR-BS controlling the target RS should inform the target RS of the handover failure and remove any MS context from the target RS.

If a drop is detected during MRS handover, the MRS should follow similar procedure as defined for MS in IEEE802.16e-2005. However, to minimize impact to the attached MSs, the MRS should always attempt to re-enter the old serving BS first by cancelling HO. This allows fast recovery of MSs' services when drop occurs during MRS handover. For MRS handover without preamble change, returning to the serving BS enables the MSs to be continuously served by the MRS without interruption. For MRS handover with preamble change, all MSs attached to the MRS will be directed to start handover procedure by MR-BS. In many scenarios, the target station where MS hands over to should be the same MRS with a changed preamble. Hence, a drop of MRS could cause a drop in MS handover as well. If MRS re-enters serving BS by cancelling the HO, the MSs can also perform the HO cancellation procedure by re-entering the MRS as defined in IEEE802.16e-2005.

Proposed Text Change

6.3.22.4.5 MS Drops During Handover

[To delete the original whole section and to add the following content as the new subclause]

In MR network, if MS detects a drop when performing network re-entry at the target station, the MS shall perform the same procedure as defined for non-MR network. If the target BS is informed of MS attachment to a different RS or different BS from what is originally targeted due to the drop, the target BS may send MS_INFO-DEL message to make the original target RS discard MS context information. Upon receiving the MS_INFO-DEL message, the RS shall transmit MR_Generic-ACK message or ACK header as an acknowledgement and remove the MS context information.

6.3.22.4.6 MRS drops during handover

[To change the section as follows]

~~MRS can detect its drop by its failure demodulate the downlink, and the attached MSs can detect its drops for they cannot receive correct downlink information from its current MRS. As MS which connect with BS directly, the attached MSs can also receive control information from serving BS.~~

~~When MRS detects its drop before sending the MAC message MOB_HO_IND, MRS may try to resume communication with current serving station by sending the MAC message MOB_HO_IND with HO_type=0b01(or 0b10) to cancel(or reject) handover.~~ If MRS detects its drop ~~after sending the MAC message MOB_HO_IND with HO_type=0b00 (resource release)~~ during network re-entry at target MR-BS, ~~and serving BS does not receive the successful network attachment at target station over backbone,~~ MRS ~~may~~ shall attempt resume communication with the serving MR-BS by transmitting ~~new~~ MOB_HO_IND with HO_type=0b01 ~~(or 0b10)~~ to cancel ~~(or reject)~~ handover if the resource_retain_timer has not expired. If the resource_retain_timer has expired, the MRS may attempt network re-entry with its preferred target BS as through cell reselection. If the MRS fails network re-entry with its preferred target MR-BS, the MRS shall perform initial entry procedure.

When performing network entry, MRS shall perform CDMA ranging with target BS using codes from HO codes dmain.
Upon target MR-BS sending RMG-RSP with 'ranging status' =success, target MR-BS shall provider CDMA_ALLOC_IE with appropriate UL allocation for RNG-REQ from MRS. MRS shall send RNG-RSP with MAC address and HMAC/CMAC. Target MR-BS may now identify that HO attempt by MRS was not coordinated with Serving MR-BS and may request all relevant MRS context and attached MS's context from Serving BS. Using this information target MR-BS shall now send RNG-RSP with "HO Process Optimization" bitmap and network re-entry may continue as in the typical, non-drop case. ~~The old MOB_HO_IND message will be neglected if the new MOB_HO_IND message is received by serving BS before resource-retain-time timer expiration. On the contrary, the new MOB_HO_IND message will be neglected if it is received after resource-retaintime timer expiration. Under such circumstance, MRS still performs handover ranging with its preferred target BS in term of normal handover operation. During MRS drops interval, the attached MSs connect to current serving BS temporary.~~

When serving BS detects a drop, it shall react as if a MOB_HO_IND message has been received with HO_IND_type=0b00.~~, which is similar to IEEE 802.16e. The following procedure may adopt the scheme for the latter case.~~

~~Target BS may send RNG_RSP with 'ranging status'=continue and time, power, frequency adjustment information when MRS is unable to perform handover ranging with its target BS successfully. If MRS cannot establish correct connection with its target BS during network reentry, MRS shall attempt to resume communication with serving BS, and search for appropriate target BS at the same time through cell reselection.~~

Reference

[1] IEEE P802.16j/D1
[2] C80216j-07_281r2