

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >		
Title	Remedy for the procedure of MRS handover		
Date Submitted	2008-03-15		
Source(s)	Yanling Lu, Sunil Vadgama Masato Okuda Fujitsu	E-mail:	yanling.lu@uk.fujitsu.com
Re:	IEEE 802.16-08/007 "IEEE 802.16 Working Group Letter Ballot Recirc#28b: Announcement"		
Abstract	This contribution proposes to remedy for the procedure of MRS handover with preamble changed (Inter MR-BS).		
Purpose	Text proposal for 802.16j Draft Document.		
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 >. and Further information is located at < http://standards.ieee.org/board/pat/pat-material.html > and < http://standards.ieee.org/board/pat >.		

Remedy for the procedure of MRS handover

Yanling Lu, Sunil Vadgama, Masato Okuda
Fujitsu

Problem

In network topology acquisition phase of an IEEE802.16e handover procedure system, a BS shall broadcast information about the network topology using the MOB_NBR-ADV message. The message provides channel information for neighboring base stations normally provided by each BS's own DCD/UCD message transmissions. Availability of this information facilitates MS synchronization with neighboring BS by removing the need to monitor transmission from the neighboring BS for DCD/UCD broadcasts.

By means of either the MOB_NBR-ADV or by neighbour cell scanning procedure, MS gets to know neighbor station's channel information such as BSID, FA, preamble index, DCD/UCD and so on. The MOB_NBR-ADV message is broadcast periodically for example every 30seconds. Subsequently, when the Serving BS issues a handoff request/response to MS by sending the MOB_BSHO-REQ/RSP message, the message carries only the "target" BSID and preamble index, but does not carry other information as FA, DCD/UCD, etc. However, upon receiving the MOB_BSHO-REQ/RSP message, the MS is able to determine target BS's FA, DCD/UCD and so on, based on the information in MOB_NBR-ADV or scanning procedure (See Figure 1).

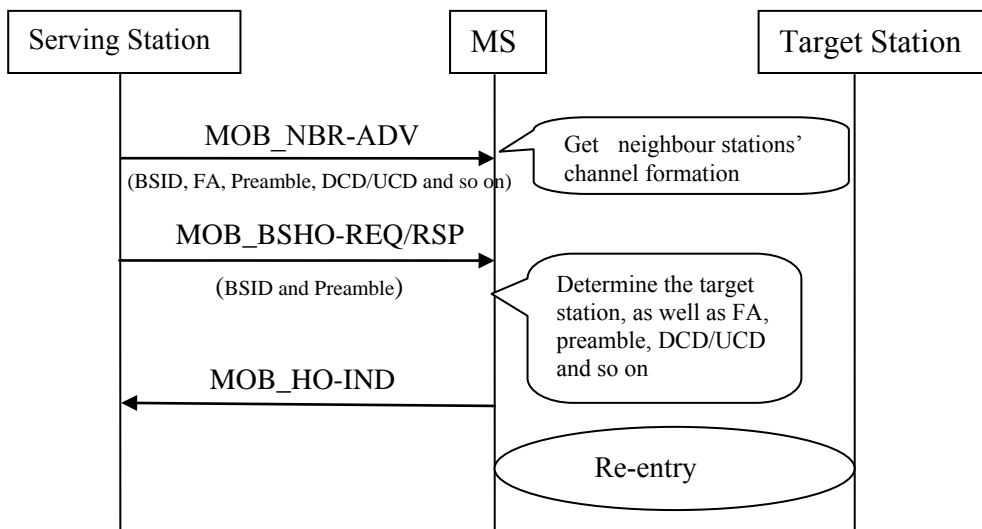


Figure 1 Normal handover

Now consider a situation of Mobile Relay Station (MRS), as defined in IEEE802.16j, located on a vehicle (eg: bus or a train). In some cases, when the MRS handovers from one station to another, it needs to change FA, DCD/UCD or some other access link channel characteristics. However, before the MRS conducts handover, even MRS itself doesn't know its new access link channel information (because it doesn't know its target serving station). Any MOB_NBR-ADV received by MS before the MRS handover procedure associates the MRS to its current access link channel characteristics and not to the new access link channel characteristics. However, without receiving the neighbor station information from MOB_NBR-ADV, MS should take more time to perform re-entry procedure and drop with high possibility even if it receives BSID/Preamble index in MOB_BSHO-REQ/RSP(See figure 2). For example, without FA information, the MS should scan the former frequency of MRS firstly and is doomed to fail. Then the MS may scan other neighbour stations' frequency or

other possible channels of the downlink frequency band of operation until it finds a valid downlink signal. Another example is: Without DCD/UCD information, the MS needs monitor the DCD/UCD broadcasted by the MRS after MRS handover in order to synchronize with MRS.

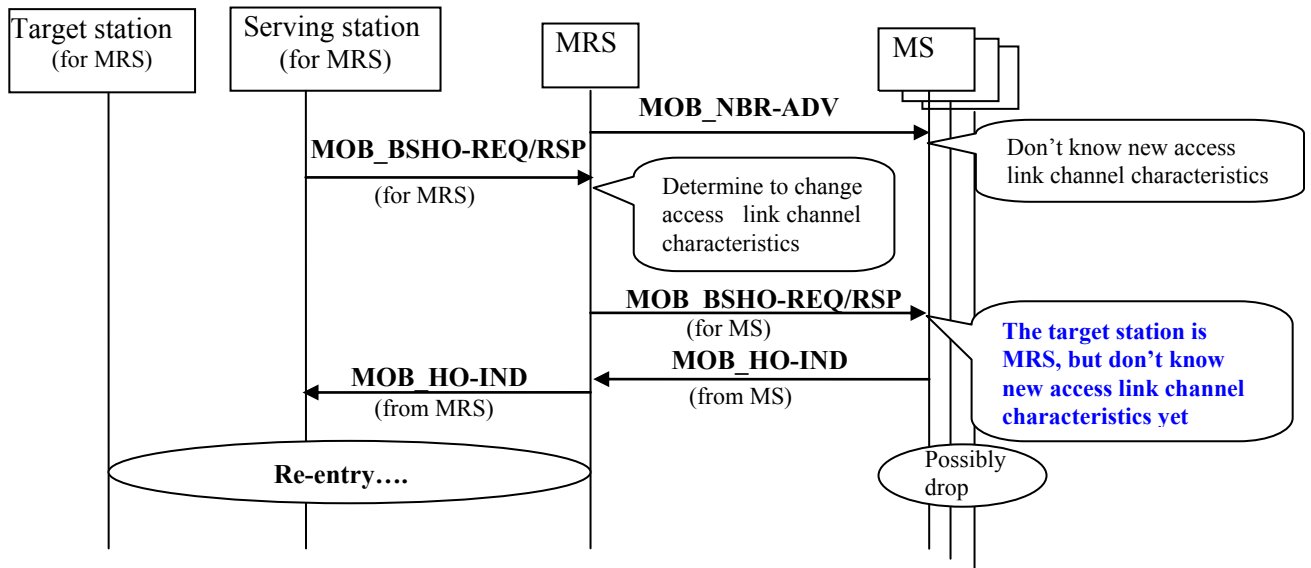


Figure 2 The problem when MRS performs handover with access-link channel characteristics changed

Proposed Method

The following procedure is proposed for solving the above problem(See figure 3):

When the target access link channel characteristics of MRS is determined, the MRS may originate the MOB_NBR-ADV according to MOB_NBR-INFO, MOB_BSHO-REQ/REP and information itself contains. Before the MRS sends MOB_BSHO-REQ/RSP to MSs, it should broadcast MOB_NBR-ADV message to inform the MSs of the MRS's new access link channel characteristics, such as FA, DCD/UCD and so on, if needed. The MRS itself should be included in the neighbour station list with IEs set corresponding to the new access link channel characteristics. This MOB_NBR-ADV message is not a periodic broadcast and precedes the MSs' handover procedure. After sending non-periodic MOB_NBR-ADV message, MRS can initiate the MS' handover procedure or respond to the MS's handover request. In the following MOB_BSHO-REQ/RSP messages, the MRS itself should be included in the neighbour station list with the IEs set according to the new access link channel characteristics.

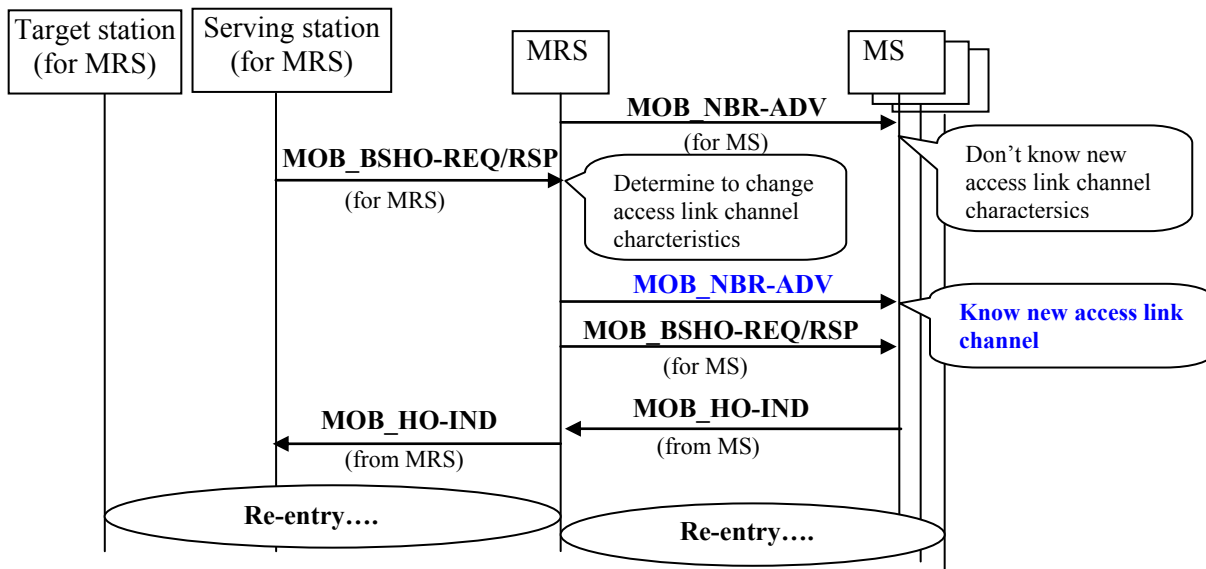


Figure 3 The Proposed Solution (in the case of MRS inter MR-BS handover)

Specification Changes

Change the text in the fifth paragraph in 6.3.22.4.2 as following:

If the target MR-BS decides to change the MRS' preamble after the handover, it sends a preamble index to the serving MR-BS over the backbone. Then the serving MR-BS sends it to the MRS using, the Preamble Index TLV in the MOB_BSHO-REQ/RSP messages. On receiving MOB_BSHO-REQ/RSP from serving MR-BS, the MRS should broadcast a MOB_NBR-ADV message regardless of the MOB_NBR-ADV interval, to inform the MSs of the new access link channel characteristics. The MRS itself should be included in the neighbour station list with the IEs set according to the target access link channel characteristics.

Change the text in the second paragraph in 6.3.22.4.3 as following:

When MRS coverage area overlaps with another RSs/BSs coverage area, MR-BS may initiate MRS preamble reassignment procedures as define in section 9.4, using RS_Config-CMD. If MRS preamble is changed then all the active MS connections are handed over to the same MRS using procedures in 6.3.22. All the associated MSs within the MRS's serving coverage are switched to the newly assigned preamble index via MOB_BSHO-REQ/RSP. Before sending MOB_BSHO-REQ/RSP to MSs, the MRS should broadcast a MOB_NBR-ADV message regardless of the MOB_NBR-ADV interval, to inform the MSs of the new access link channel information. The MRS itself should be included in the neighbour station list with the IEs set according to the new access link channel characteristics. The MRS preamble is changed using the RS_Config-CMD.