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Title	Remedy for the procedure of MRS handover		
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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.		
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## Remedy for the procedure of MRS handover

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### 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).

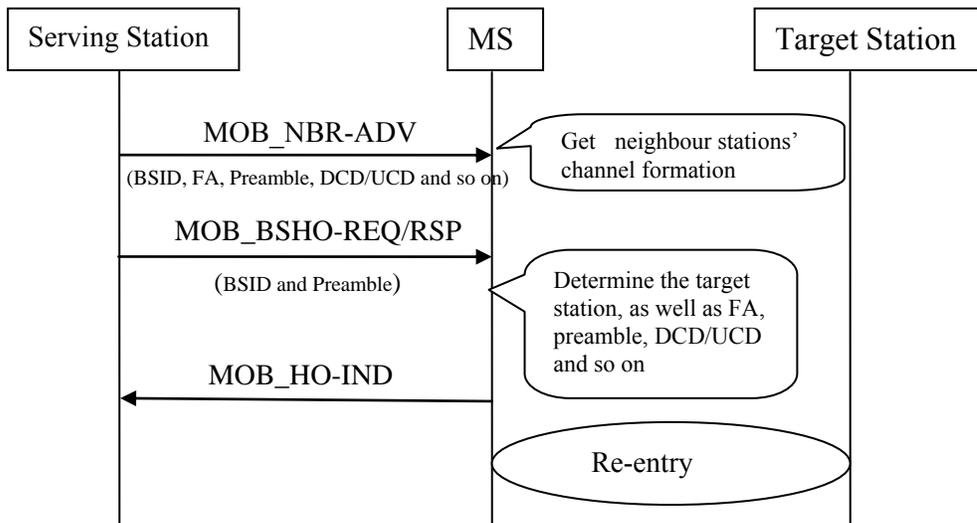


Figure 1 Normal handover

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.

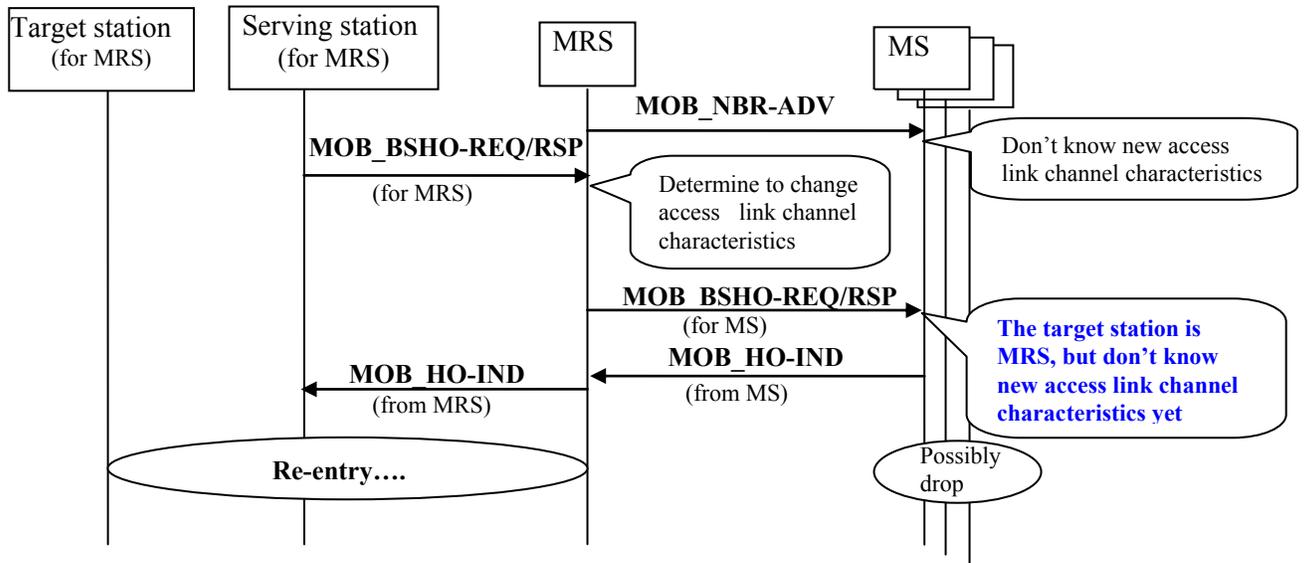


Figure 2 The problem when MRS performs handover with access-link channel characteristics changed

## 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.

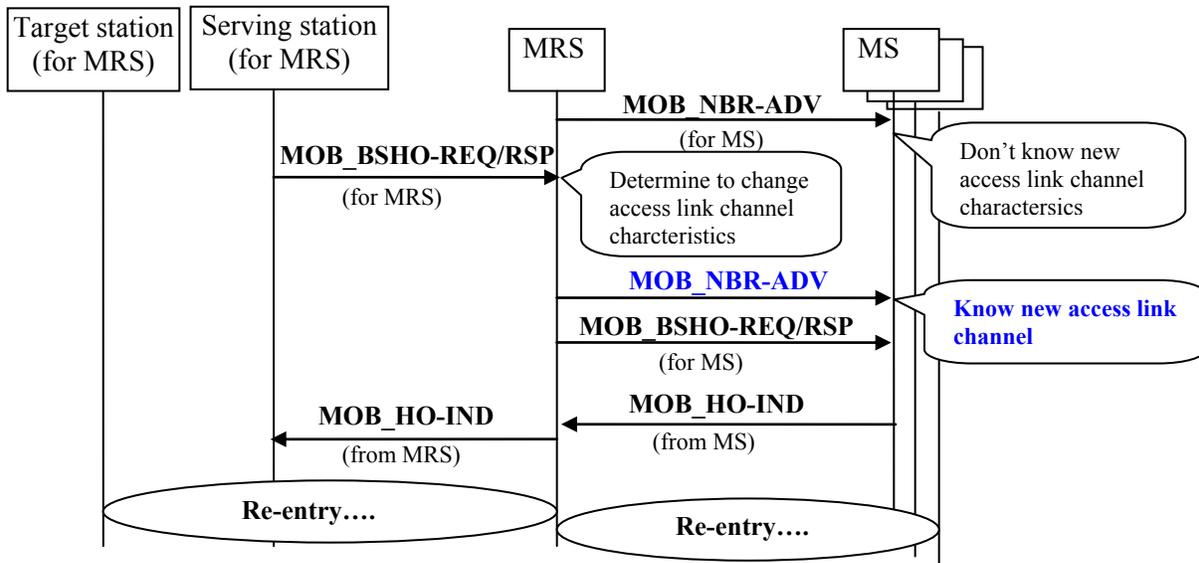


Figure 3 The Proposed Solution (in the case of MRS inter MR-BS handover)

## 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.