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Re:	IEEE 802.16j-07/013: "Call for Technical comments and contributions regarding IEEE Project P802.16j"	
Abstract	This document presents a MRS handover mechanism by Tunnel method.	
Purpose	Add proposed spec changes in P802.16j Baseline Document (IEEE 802.16j-06/026r2)	
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MRS Handover in Tunneling Case

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Introduction

Usually, when a MRS performs handover; all attached MS(s) would also perform handover at the same time. This procedure incurs a lot overhead and signaling storm. When a MRS moves from one BS to another, if the MRS keeps the same preamble, an efficient handover procedure for MRS has been suggested [2]. When MRS moves from source BS to the target BS, it exchanges messages on behalf of all the attached MSs with the source BS for handover initialization. The BS can handle the MRS handover by the assistance of the RS, without the involvement of MSs attached to the RS.

Connection management in the tunnel case is proposed in the proposal [1]. We propose that the MR-BS identifies a MS connection via the combination of Tunnel CID and MS CID. As a result, for MSs associated with different RSs or the MR-BS itself under a MR-BS, even if there are assigned with the same MS CID, MR-BS can still distinguish them and treat them differently.

In C802.16j-07/037 [2], the MRS handover scheme in the non-tunneling case is proposed. For the MRS handover solution in the non-tunneling case, the mapping between the new and old CIDs is created in MRS. In this proposal, we present a similar MRS handover scheme for the tunneling case, which can coexist with the scheme used in the non-tunneling case.

The Tunnel mentioned in this proposal should include traffic tunnel and management tunnel.

MRS Handover procedure

If the MRS keeps the same preamble, the following figure shows the MRS HO procedure in the tunneling case.

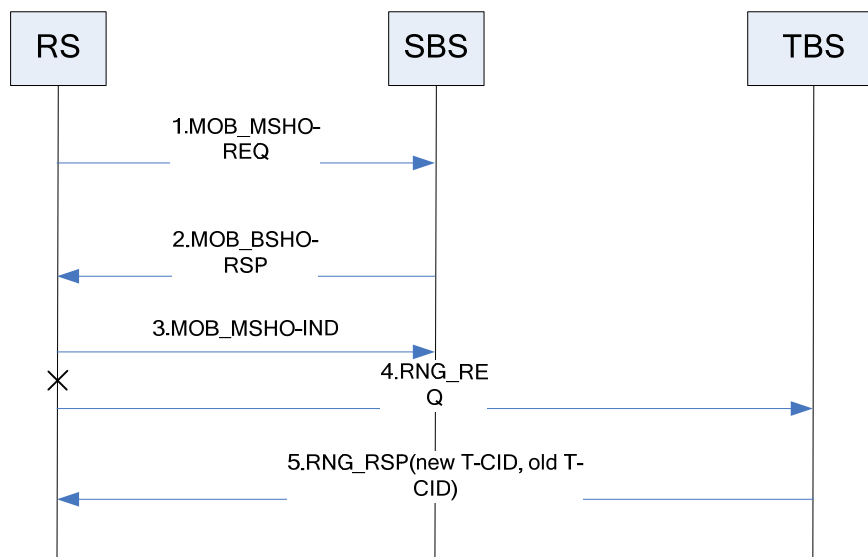


Figure 1 MRS Handover procedure

1. MRS sends MOB_MSHO-REQ message to the serving MR-BS on its basic CID for MRS handover initialization.

2. The serving MR-BS may send MRS info and tunnel info to the target MR-BS(s) over the backbone for handover preparation. MRS info includes MAC address and type of MRS. Tunnel info includes CID and SFID of a tunnel and MAC addresses, SFIDs and CIDs of the MSs who attach to the MRS in tunneling case. After getting the response from target MR-BS(s), the serving MR-BS responds MOB_BSHO-RSP message to the MRS. HO_ID and recommended MR-BS(s) should be included in the MOB_BSHO-RSP message.
3. The MRS will send MOB_HO-IND message to the serving MR-BS to indicate its handover decision, and target MR-BS.
4. The MRS performs network re-entry by sending RNG-REQ to the target MR-BS, containing HO_ID. If the MRS shares a security association with the target MR-BS, it will include HMAC/CMAC in the message. The MRS may not be able to receive HO_ID from the serving BS, if the MOB_BSHO-RSP message is not received by the MRS. The MRS shall include the serving BS ID in the RNG-REQ message to the target MR-BS. The target MR-BS can communicate with serving MR-BS and retrieve the MRS info and tunnel info using backbone procedures.
5. The BS may assign new CIDs for tunnel, and sends them to MRS in RNG-RSP together with the old tunnel CIDs.

From the above procedure, the MSs attached to the MRS are not involved, i.e. no extra signaling is required for these MSs.

Advantages beyond proposal [2]

The security association between MS and MR-BS remains unchanged.

The message length of RNG-RSP may be reduced observably.

Specific Text change

Insert new subclause as section 6.3.22.4.1

6.3.22.4.1.1 HO Decision and Initiation

When MRS makes a decision for handover, it sends MOB_MSHO-REQ message on its basic CID to the Serving MR-BS. The MR-BS, knowing that the basic CID belongs to a MRS, sends MOB_BSHO-RSP message. The serving MR-BS may send the MRS and its tunnel info to the target MR-BS using the backbone message. MRS info should include MAC address and type of MRS. Tunnel info should include CID and SFID of a tunnel and MAC addresses, SFIDs and CIDs of the MSs whose traffic is relay through this tunnel. The backbone message definition is beyond the scope of this specification. The serving MR-BS initiates handoff for a MRS by sending MOB_BSHO-REQ message on the MRS basic CID.

6.3.22.4.1.2 Network Entry/re-Entry

During network entry/re-entry MRS informs the MR-BS that it is a MRS. The serving MR-BS may exchange the backbone messages with the target MR-BS to retrieve MRS and its tunnel info. The details of the backbone messages are beyond the scope of this specification. The target MR-BS may allocate new CIDs to tunnels during ranging procedure with the MRS. MRS replaces old Tunnel CID with the new Tunnel CID in the UL MPDUs.

6.3.2.3.6 Ranging response (RNG-RSP) message

Add the following text at the end:

The following parameter may be included in the RNG-RSP message when the MRS is attempting to perform network re-entry, or handover:
Tunnel CID List TLV (see 11.5)

Insert new subclause (11.6.3):

11.6.3 Tunnel CID List

The Tunnel CID List carries a list of the CIDs of the tunnels between an MRS and the MR-BS. It provides a mapping between old tunnel CID (assigned by the old MR-BS) and new tunnel CID (assigned by the new MR-BS).

Type	Length	Value
—	variable	See the following table

<u>Field</u>	<u>Length</u>	<u>Note</u>
<u>Number of CIDs</u>	<u>2Bytes</u>	<u>The next two fields will be repeated number of MS times</u>
<u>Old CID</u>	<u>2Bytes</u>	
<u>New CID</u>	<u>2Bytes</u>	

References

- [1] IEEE C802.16j-06/274r5 Proposal on addresses, identifiers and types of connections for 802.16j
- [2] IEEE C802.16j-07/037r3 MRS Handover