This is a response to IEEE 802.16mmr-05/001 (call for contributions: IEEE 802.16’s Study Group on Mobile Multi-hop Relay) to present a recommendation on the mobility management mechanism.
Network Architecture

- FRS4 is the associated RS of MS2
- FRS2 is the parent RS of FRS4
Assumptions

• BS knows location of FRSs and the infrastructure topology
• For MS, FRS acts as BS
• For BS, FRS acts as MS
• Within a BS Cell, all CIDs are assigned and managed by BS
  – The CIDs include basic CID, primary CID, secondary CID, and transport CID
• FRS does not assign CIDs to MS
<table>
<thead>
<tr>
<th>nodes</th>
<th>info. of MS</th>
<th>MAC address of MS</th>
<th>CIDs assigned to MS</th>
<th>associated RS</th>
<th>IP address</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>parent RS</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>associated RS</td>
<td>●</td>
<td>●</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Principles of the Concept for Mobility Management

- BS has to record the associated RS of an MSS
  - A newly defined TLV in RNG-REQ needs to be appended to carry the information of the associated RS when it relays the message toward the BS
- The RSs along the branch from BS to MSS have to record the MAC address and the CIDs of MSSs, so that they can relay MSS’ messages
- Intra-BS HO, the CIDs of the MSS have not to be updated
  - The RSs along the old branch have to delete the CIDs of the MSS
  - The RSs along the new branch have to obtain and record the MAC address and CIDs of the MSS
- Inter-BS HO, the CIDs of the MSS have to be updated
  - The RSs along the branch in old BS cell have to delete the CIDs of the MSS
  - The RSs along the branch in new BS cell have to obtain and record the MAC address and new CIDs
- RS does not involve the security procedures
  - AK, TEK are still assigned and managed by BS within a BS cell
Example for Ranging Process

- **Conclusion 1:** a new TLV should be defined in RNG-REQ to carry the ID of associated FRS
- **Conclusion 2:** BS1 assigns Basic CID and Primary CID to MS in RNG-RSP
- **Conclusion 3:** FRS1 sends Timing and Power adjust information to MS1
Conclusion 1: The value of CID has not to be changed when intra-BS HO occurs

Conclusion 2: a new MAC management message should be defined to trigger FRS 1 to remove CID 5 from its table (temporarily named RLY_DEL)

Conclusion 3: a new MAC management message should be defined to trigger FRS 2 to add CID 5 into its table (temporarily named RLY_ADD)
Example for Inter-BS Handoff

- Conclusion 1: The value of CID has to be changed when inter-BS HO occurs
- Conclusion 2: RLY_DEL could be reused to trigger FRS 2 to remove CID 5 from its table
- Conclusion 3: RLY_ADD could be reused to trigger FRS 3 to add CID 9 into its table
A new TLV should be defined to be in RNG-REQ message

A new message, RLY_DEL, should be defined to remove leaving CID\(s\) in FRS

A new message, RLY_ADD, should be defined to add coming CID\(s\) in FRS

Should FRS send MOB_NBR-ADV to notify MS of the neighboring RS and BS?