

# MS Handover Support in Relay Mode

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Purpose:

. Propose handover schemes for IEEE802.16j

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# Outline

- Classification of handover
- Target access station selection
- MS handover process
- Summary

# Classification of Handover

- **Intra MMR-BS handover:** MS or RS handover between two RSs controlled by the same MMR-BS or between an MMR-BS and one of its subordinate RSs.
- **Inter MMR-BS handover:** MS or RS handover between two RSs controlled by different MMR-BSs or between an MMR-BS and an RS controlled by a different MMR-BS.

**Handover procedure and complexity is depended on the relay frame structure**

# Handover in Different Relay Frame Structures

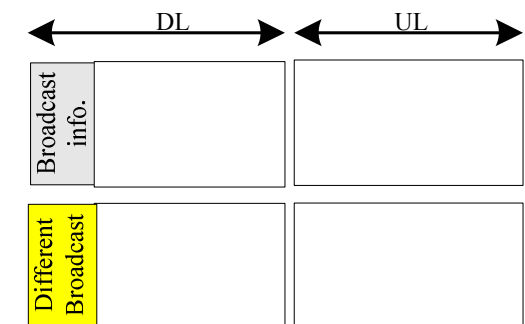
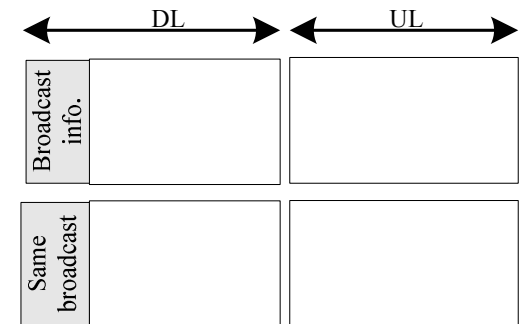
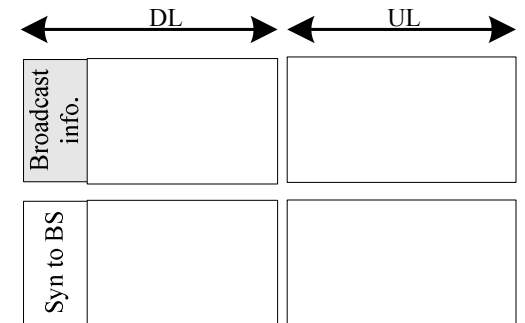
- Strategies of broadcast info. transmission in different relay frame structures
  - Uniform-broadcast info. frame structures**
    - No broadcast info. relay:** Subordinate RS does not send broadcast information
    - Simulcast same broadcast info. relay:** BS and subordinate RS send the same broadcast information

MS is synchronized to the same preamble before and after the intra-BS handover

- Different-broadcast info. frame structures**

- BS and subordinate RS send different broadcast info.
- In-band or out-of-band

MS is synchronized to different preamble before and after the intra / inter-BS handover



# Procedure of Handover

- MS is synchronized to the same preamble as that of the source access station after HO
  - MMR-BS makes the decision to select a target access station
  - MS adjust its parameters to adapt to target access station
- MS is synchronized to a different preamble after HO
  - MMR-BS makes the decision to select a target access station
  - MS performs a legacy 16e handover process

**Target access station selection is the key procedure for HO**

# Target Access Station Selection

- Target access station selection: BS decides whether RS or MMR-BS, and which RS is required for a specified MS relaying in MS initialization and handover
  - Based on whole path evaluation instead of the access link only
    - Evaluate the path composed of MS access link and optimal RS-BS path, where an optimal RS-BS path can be calculated according to the RS topology table maintained in BS
  - Requires the measurement & report of candidate access link quality
    - RS / BS measures MS signal quality (UL data burst, ranging, etc.) and report to MMR-BS
    - MS scans for the downlink channel, measures link quality and report to MMR-BS
- Target selection metrics
  - Quality of radio link (CINR,...), MS power level, Multi-hop bandwidth efficiency, QoS requirement, Traffic load, etc.

# Intra MMR-BS HO

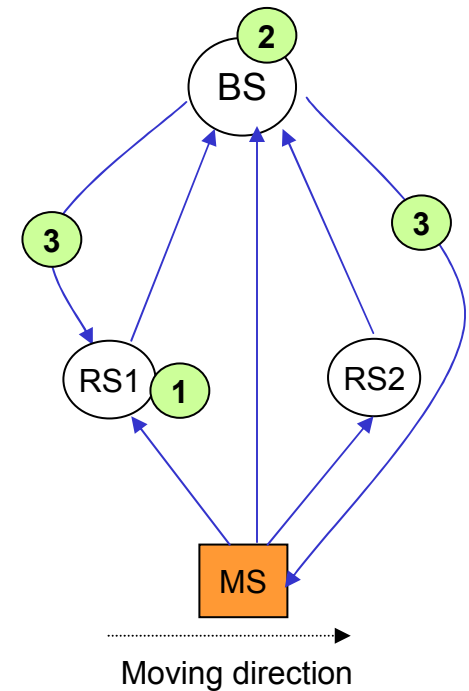
(Uniform-broadcast info. frame structures)

- Features

- MS Synchronized to the same preamble before and after the handover
- Target access station selection by BS
- Handover process is invisible to MS

- Process

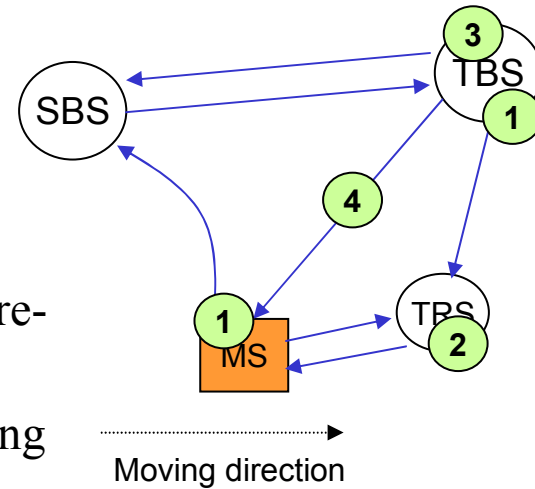
1. Link quality monitoring and report to BS
2. Handover target access station selection by BS
3. Notification to MS and RS
  - RNG-RSP for MS adjustment (power level, timing offset, etc. )
  - BS notifies RS the handover target selection



# Inter MMR-BS HO

(Uniform-broadcast info. frame structures)

- Features
  - MS first performs legacy inter-BS handover procedures
  - Handover target access station selection at network re-entry
- Process
  1. Handover initialization
    - MS or BS initialize a legacy handover procedure
  2. RS conducts link quality monitoring of MS ranging at re-entry, and reports to target serving station
  3. Handover target access station selection by target serving station
  4. Notification to MS and RS
  5. Complete legacy MS handover procedure





# Intra MMR-BS HO

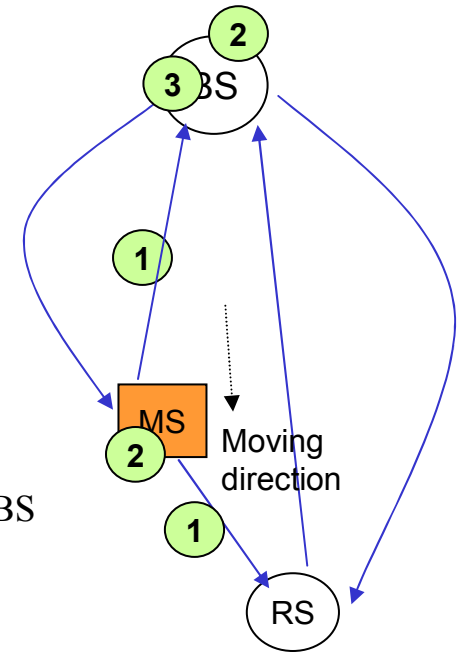
(Different-broadcast info. frame structures)

- Features

- Subordinate RS has its own preamble different from BS
  - MS regards RS as a BS
- MS performs legacy handover procedures

- Process

1. Link quality measurement by RS and report to BS
  - MS scans for the downlink channel, measures link quality and report to BS
2. Handover initialization by MS or BS
  - MS scans for the downlink channel, measures link quality and report to BS
3. Handover target access station selection by BS
4. Complete the legacy handover process
  - Synchronization to target
  - Ranging
  - Network re-entry

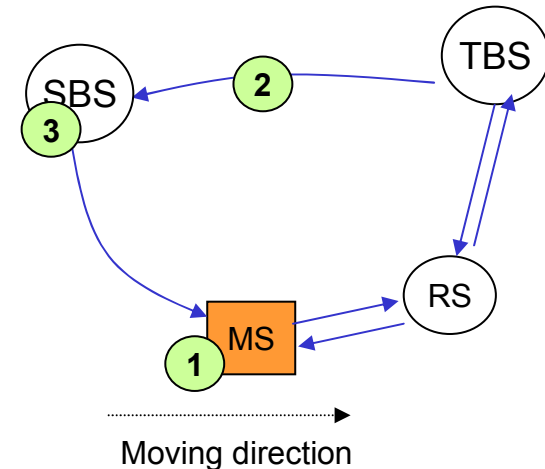


# Inter MMR-BS HO

(Different-broadcast info. frame structures)

- Features
  - MS performs legacy handover procedures
  - Handover target access station selection in HO decision period.

- Process
  1. Handover procedure initialization by MS or BS
  2. Neighbor BS reports to serving station
    - Channel information of relay links in its coverage
  3. Handover target access station selection and decision
    - Considering neighbor BS reports, and also MS scanning results
  4. Complete the legacy handover process



# Summary

- Target access station selection
  - Based on the whole path evaluation instead of access link only
  - Require RS / MS to measure and report link qualities
- Different frame structure schemes introduce different handover procedures
  - MS performs a legacy 16e handover, if it is synchronized to the different preamble after handover
  - MS just adjusts parameters, if it is synchronized to the same preamble after handover