# MS Intra-Cell FBSS

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To discuss and adopt the proposal

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# Introduction

- An RS, after network entry, shall be associated with a M-MR-BS. The RS may communicate with the MR-BS directly or via other RS(s)
- For throughput enhancement application scenario,
  - an RS can be configured to transmit the same preamble as the MR-BS (scenario 1); or
  - an RS can be configured to transmit different preamble from MR-BS (scenario 2)
- In scenario 2, the system capacity is expected to over perform that of the scenario 1 due to space multiplexing gain
- For scenario 2, however, more frequent intra-cell hand over across RSs may cause addition delay and signaling overhead
- In this contribution, we propose the coordinated operation among MR-BS and its RSs to enable fast MS intra-cell FBSS

# Proposal -1

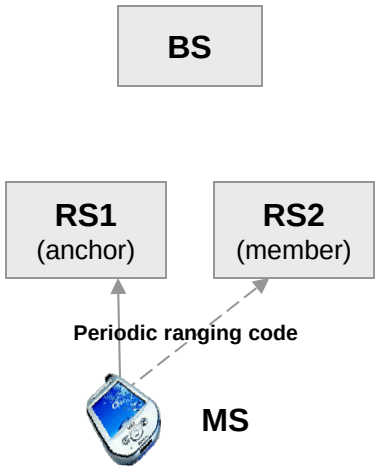
- Introduce common periodic ranging region
  - MMRBS and all associated RSs allocate the same UL resource as the periodic ranging region. This region is called as common periodic ranging region
  - MMRBS and all associated RSs monitor the common periodic ranging region
  - Ranging information of MS can thus be recorded by RSs which captured the code transmission
  - After a switch of a MS, the target BS has the previous recorded ranging information and use this information to determine whether further ranging is required and speed up the further ranging procedure
- Introduce synchronized CQICH assignment
  - MS macro-diversity set is created and maintained as current design defined by 802.16e
  - The CQICH assigned by anchor station shall be monitored by all member station in the set (i.e., all member stations, other than the anchor station, shall not assign the same resource to other MS); If this is not possible, each member shall reserve a CQICH resource for each of MS who select the RS as a member of its MD set
    - The switching indication sent by a MS can be monitored by both anchor station and the target station
    - The procedure for the anchor station to acquire the information on CQICH assignment by the target station is avoided
- Benefit
  - A faster FBSS procedure can be expected by implement the above design

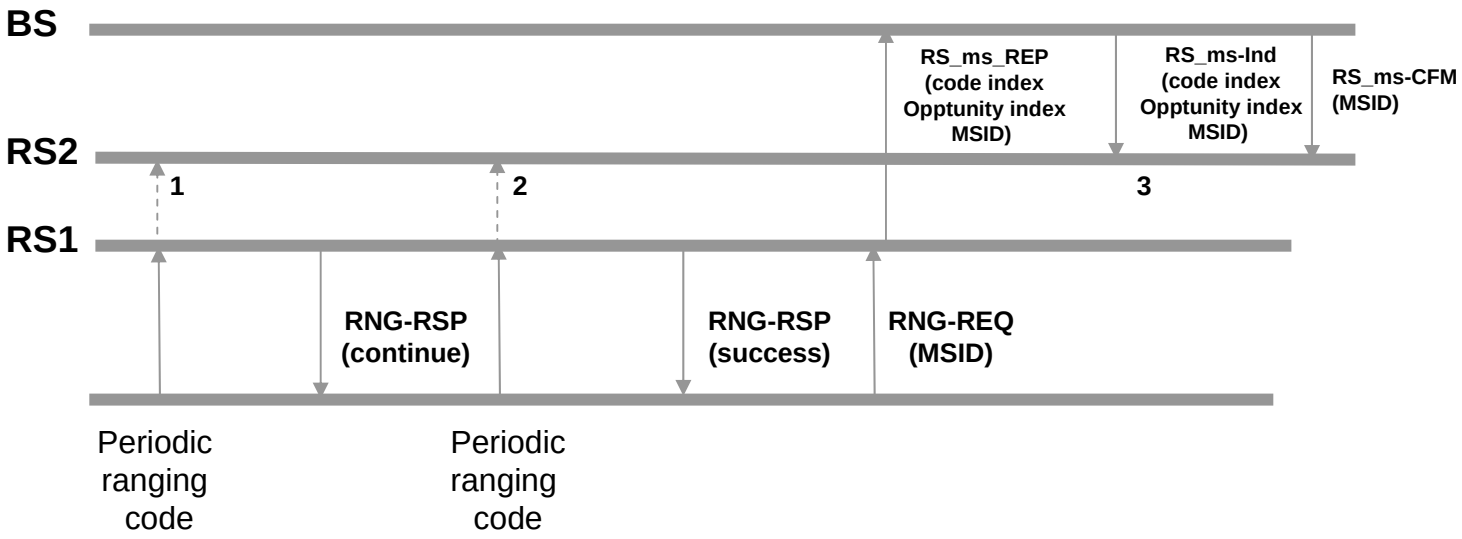
# Proposal -2

- MAC management messages are introduced to enable the coordinated operation
  - RS_ms_REP used by RS to report to MMRBS the information related to MS's operation
    - The reception of periodic ranging code reception
    - CQICH assignment info
    - Switching indication reception
    - Etc
  - RS_ms_Ind used by MMRBS to provide indication to RS regarding the support of MS operation
    - Tracking ranging info of MS
    - CQICH assignment info
    - Etc
  - RS_ms_CFM used by RS to confirm the reception of RS_ms_IND

# Operation Illustration - 1

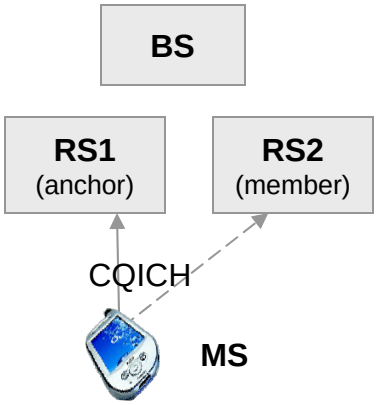
- Ranging information tracking by member station
  - At time 1and 2, RS2 records the reception info of code
  - At time 3, MR-BS inform all member station in MS's MD set the sender MS of the code and RS2 create its record for this MS

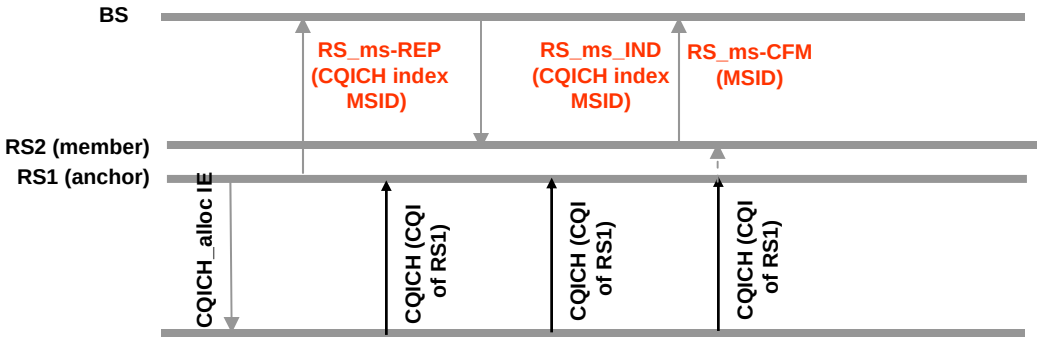


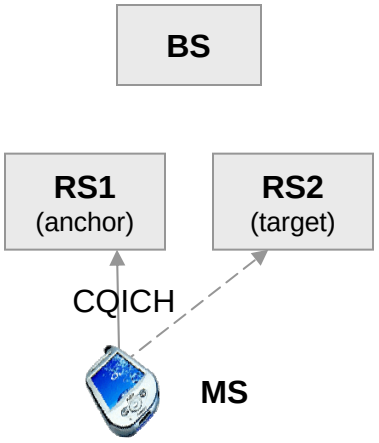
# Operation Illustration - 2

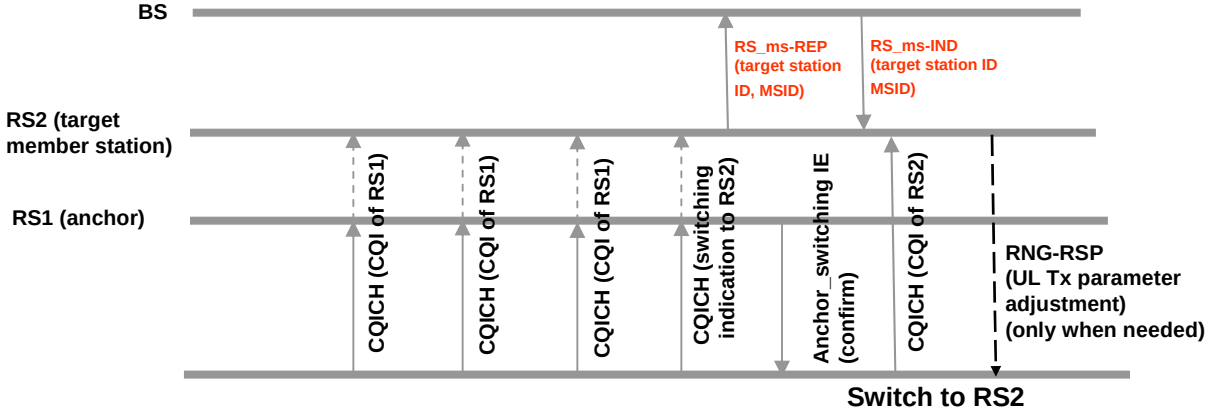
- Fast station switching procedure
  - Synchronized CQICH assignment




  - Switching procedure



# Summary

- By implementing the common periodic ranging region, the delay caused by MS's ranging to the target station after switching can be minimized
- By implementing the synchronized CQICH among member stations, the delay caused by the CQICH resource allocation by target station can be minimized
- The intra-cell switching procedure can be estimated as fast as 3-4 frames

# Proposed Text Changes

The following MAC management messages are introduced to enable the coordinated operation

(1) RS_ms_REP used by RS to report to MR-BS the information related to MS's operation

- The reception of periodic ranging code reception
- CQICH assignment info
- Switching indication reception

Etc

(2) RS_ms_Ind used by MR-BS to provide indication to RS regarding the support of MS operation

- Tracking ranging info of MS

-- CQICH assignment info

Etc

(3) RS_ms_CFM used by RS to confirm the reception of RS_ms_IND Message structure TBD.