Slides for "RS support for OFDMA Based Ranging"

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IEEE C802.16j-06/193 http://dot16.org/CSUpload//upload/Relay_db/C80216j-06_193.pdf

Purpose:

The purpose of this slide set is to introduce our contribution C802.16j-06_193. This contribution is proposing RS support for OFDMA Based Ranging of MS. Changes in the standard are described in contribution C802.16j-06_193.pdf.

Outline

- Introduction
- RS support for OFDMA Based Ranging procedure for MS
- Signaling procedure for different types of scheduling
- Summary

Introduction

- OFDMA Based Ranging (CDMA Initial and Periodic Ranging) is performed between MS and BS.
- It may takes multiple iterations over the air interface
  - Link between BS and MS needs to be adjusted (power, time, frequency etc) before BS can make allocation for MS to send complete RNG_REQ or allocate CIDs.
- With Relays, the ranging procedure has to traverse multiple hops of the air interface.
  - ranging procedure serves the function of timing advance power adj, as well as CID establishment. Therefore can't be just done with the access RS, without involving BS.
  - If ranging procedure is fully controlled by MMR-BS, it would cause increased delay and spectrally inefficient.
  - While the timing and power adjustments are desired from the access RS, the CID establishment and RNG_REQ processing is desired at the BS.
- This contribution proposes a fast, spectral efficient Ranging procedure.

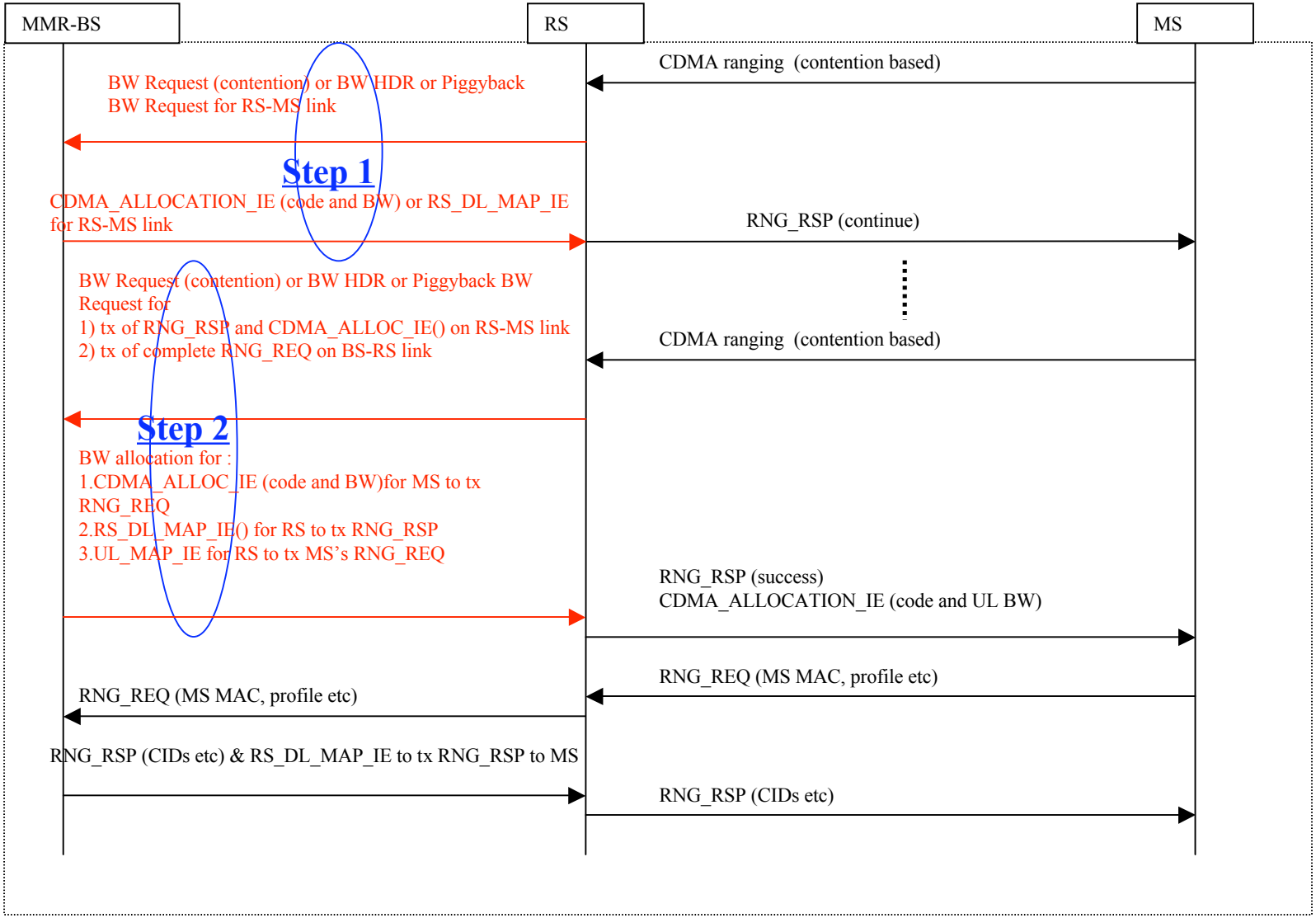
RS support for OFDMA Ranging procedure of MS (1)

- When RS(s) is introduced between BS and MS, access RS shall perform the part of Ranging procedure.
  - RS transmit its own preamble.
  - MS shall perform the ranging with RS. (MS can't differentiate between RS and BS. It does the ranging with station which is strongest and suitable)
- RS as part of ranging procedure for MS,
  - process the CDMA ranging request messages
    - Locally adjust the access link and manages the power/timing/frequency of MS.
    - RS can performs the bandwidth request to upstream node (BS/RS) either in parallel or sequential to get the UL allocation and use that allocation to transmit MS's complete RNG_REQ.
  - RS relays all the other messages (including complete RNG_REQ) to and from between MS and BS.
    - MS context shall be anchored at BS, all the allocation of parameters (Basic, primary CID etc.) for MS is done by BS.

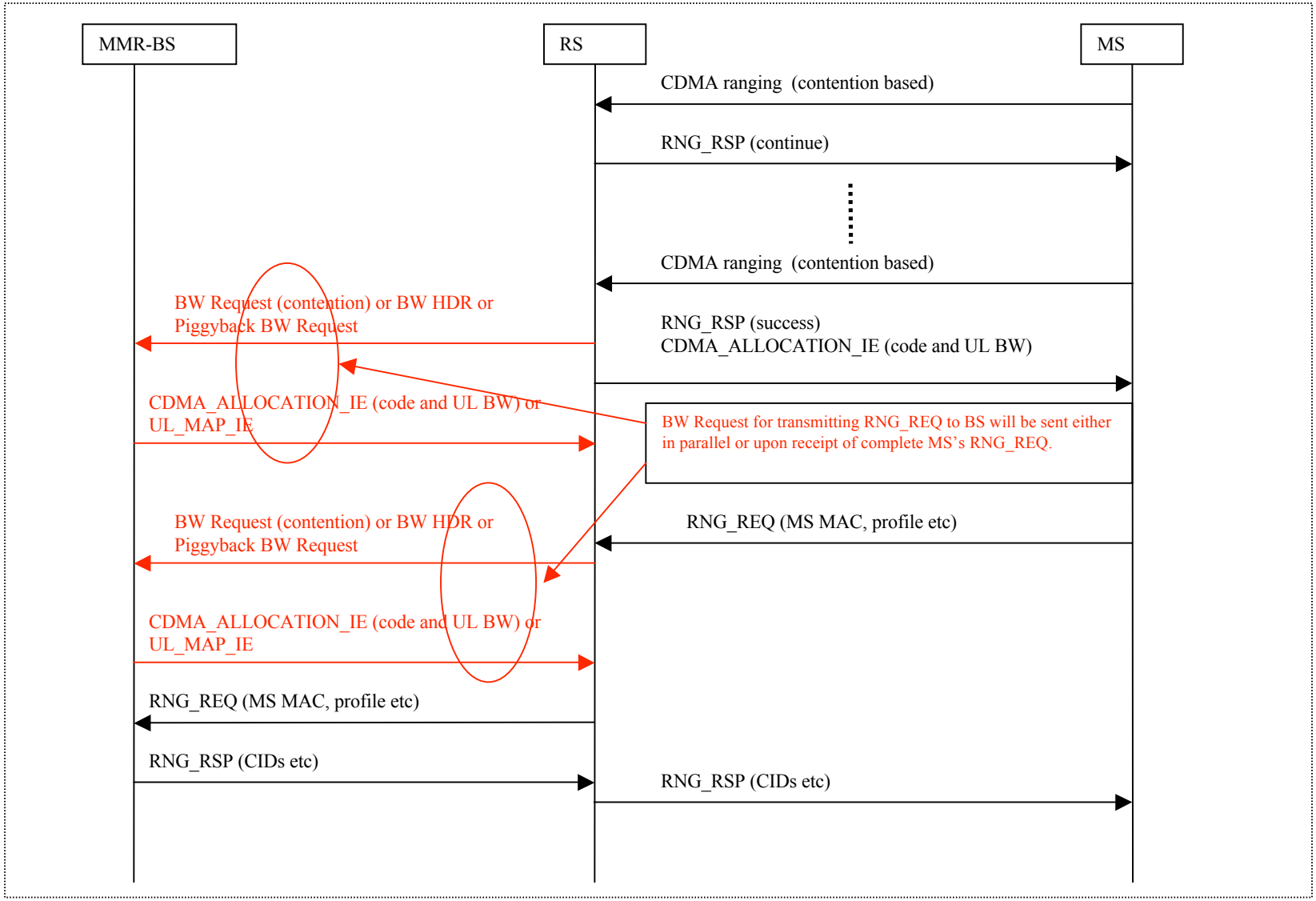
RS support for OFDMA Ranging procedure of MS (2)

- Bandwidth request and scheduling
  - For messages on access link
    - In case of centralized scheduling, RS request transmission opportunity from BS (see figure 1)
      - for sending RNG_RSP of CDMA ranging request (Initial or periodic ranging)
      - To send CDMA_ALLOCATION_IE for MS to send complete RNG_REQ.
    - In case of distributed scheduling, RS can schedule this messages on its own. (See figure 2)
  - For messages on relay link
    - RS uses the already specified methods (Bandwidth request) to request resources to send complete RNG_REQ to BS
    - or utilizes the methods defined in contribution C802.16-06_189.pdf

Signaling Procedure - Centralized Scheduling



Signaling Procedure - Distributed Scheduling



Summary

- Identified the issues of delay and bandwidth inefficiency associated with the CDMA ranging in multi-hop system and discussed the RS support to tackle the issue.

- Proposed solution does not require RS to relay CDMA Ranging codes and adjustment parameters back to BS, therefore it is spectrally efficient. It saves bandwidth on both DL and UL.

- Reduced overall latency for MS's initial ranging process. The main time consuming step of back and forth ranging with CDMA code is done only on the access link.

- Detailed description of Relay Station support for OFDMA Based ranging procedure and required "changes to the specs" are defined in contribution C802.16j-06_193.pdf.