MBS Synchronization

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Base Document:

IEEE C802.16j-06/026r2 and URL <http://ieee802.org/16/… C80216j-06_026r2.pdf>

Purpose:

To Explain the MBS synchronization in baseline document for further discussion

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MBS synchronization

According to the 16e standard, MBS transmission of BSs "should" be synchronized. (see section 6.3.23.2.2)

6.3.23.2.2 Performance enhancement with macro diversity
To increase the receiving performance, MBS transmission in a group of BS should be synchronized. In such case, each BS shall transmit the same PDUs, using the same transmission mechanism (symbol, subchannel, modulation, and etc.) at the same time.

RS Downlink Processing Delay (11.8.3.7.21 in the baseline document)

'RS Downlink Processing Delay' is a maximum fixed delay time (unit: frame) for support delivery of timing-related messages and data.

It consists of following processing time:
PHY(RF and Baseband), MAC (including to identify message type (by CID) etc) scheduling and queuing (take some margin into account).

Each RS has own 'RS Downlink Processing Delay' as a capability parameter, based on RS design and implementation (processor power, buffer, etc.).

To simplify the synchronization issues, timing related messages and data are received at RS, and transmitted from RS after 'RS Downlink Processing Delay'.

Example:

3
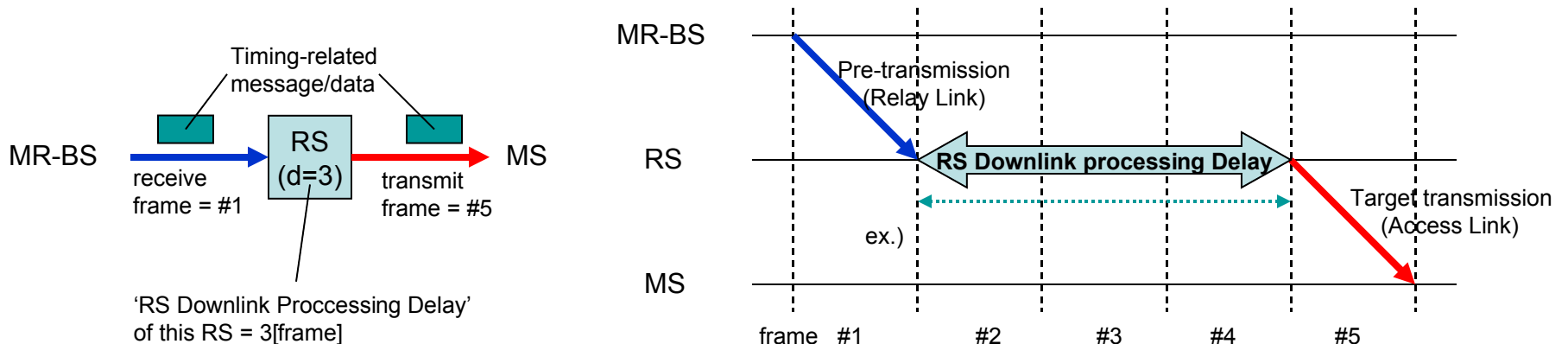
Example of MBS synchronization

path1

RS1
(d=2)

MS3

MR-BS

path2

RS2
(d=3)

MS2

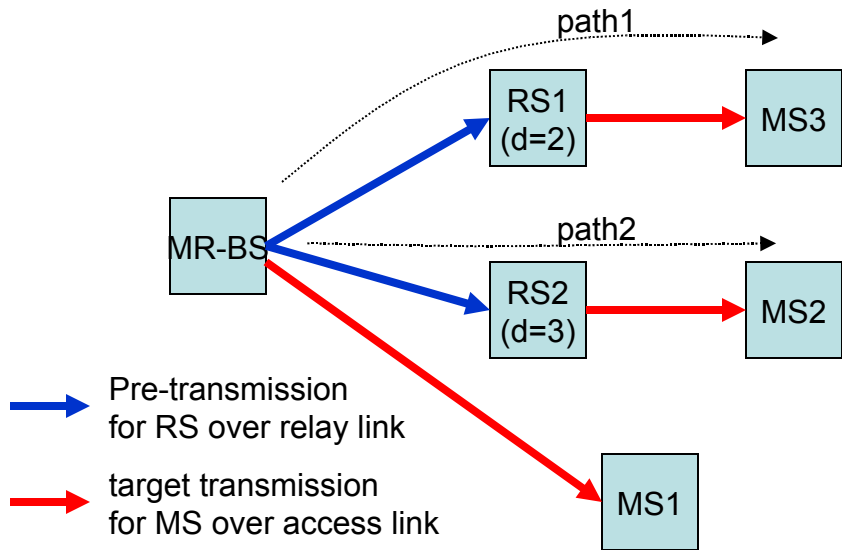Pre-transmission
for RS over relay link

target transmission
for MS over access link

MS1

RS Downlink Processing Delay
  RS1 = 2 frame , RS2 = 3 frame

Cumulative delay
  path1 = 2+0* = 2 frame
  path2 = 3+0* = 3 frame
    * intermediate hop count. ex) If 2 RSs on a path, this value = 1.

Max. cumulative delay: 3 frames (path2)

Waiting time
  RS1: 1 frame , RS2: 0 frame
  MR-BS: 3 frame

Pre-transmission
(Relay Link)

Target transmission
(Access Link)

MR-BS

Waiting time
(3 frame)

RS1

RS Downlink processing Delay
(2 frame)

Waiting time
(1 frame)

RS2

RS Downlink processing Delay
(3 frame)

no wait

MS1-3

frame   #n   #n+1   #n+2   #n+3   #n+4

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