

## Uplink Allocation Window Start Time for Relay Stations

### IEEE 802.16 Presentation Submission Template (Rev. 9)

Document Number:

IEEE S802.16j-08/132r1

Date Submitted:

2008-07-17

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Venue:

IEEE 802.16-08/028; IEEE 802.16 Letter Ballot Recirc #28d, on P802.16j/D5

Base Contribution:

IEEE C802.16j-08/132

Purpose:

Review and discuss for support of the inclusion of IEEE C802.16j-08/132 into P802.16j specification.

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# RS Uplink Allocation Window Start Time

## Summary

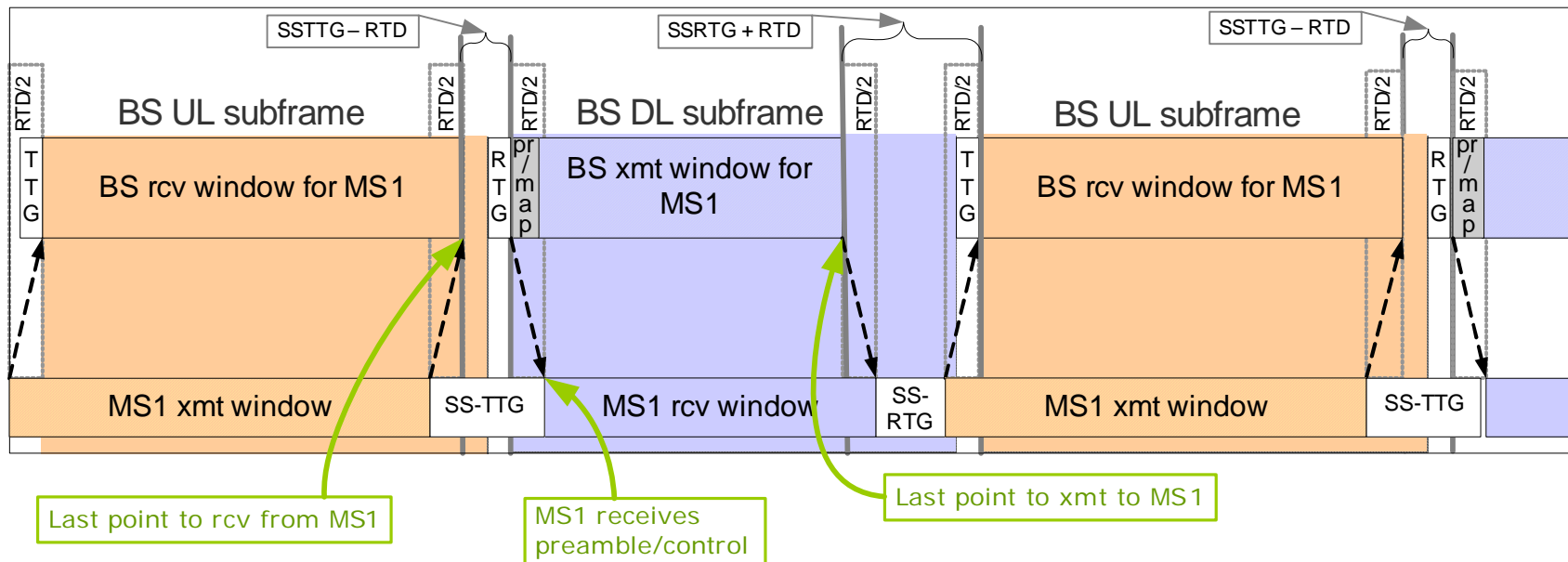
- Provide the capability for the RS and its superordinate station to coordinate the size of transmit/receive windows within uplink relay zones
- In 802.16e, the BS is able to do this with the SS/MS since it has control over DL and UL scheduling for all zones.
- With an RS, scheduling is done by the superordinate zone and the RS
- It is proposed to introduce an Uplink Allocation Window Start Time that is provided to the RS from its superordinate station

# RS Uplink Allocation Window Start Time

## *802.16e SSRTG/SSTTG allowances*

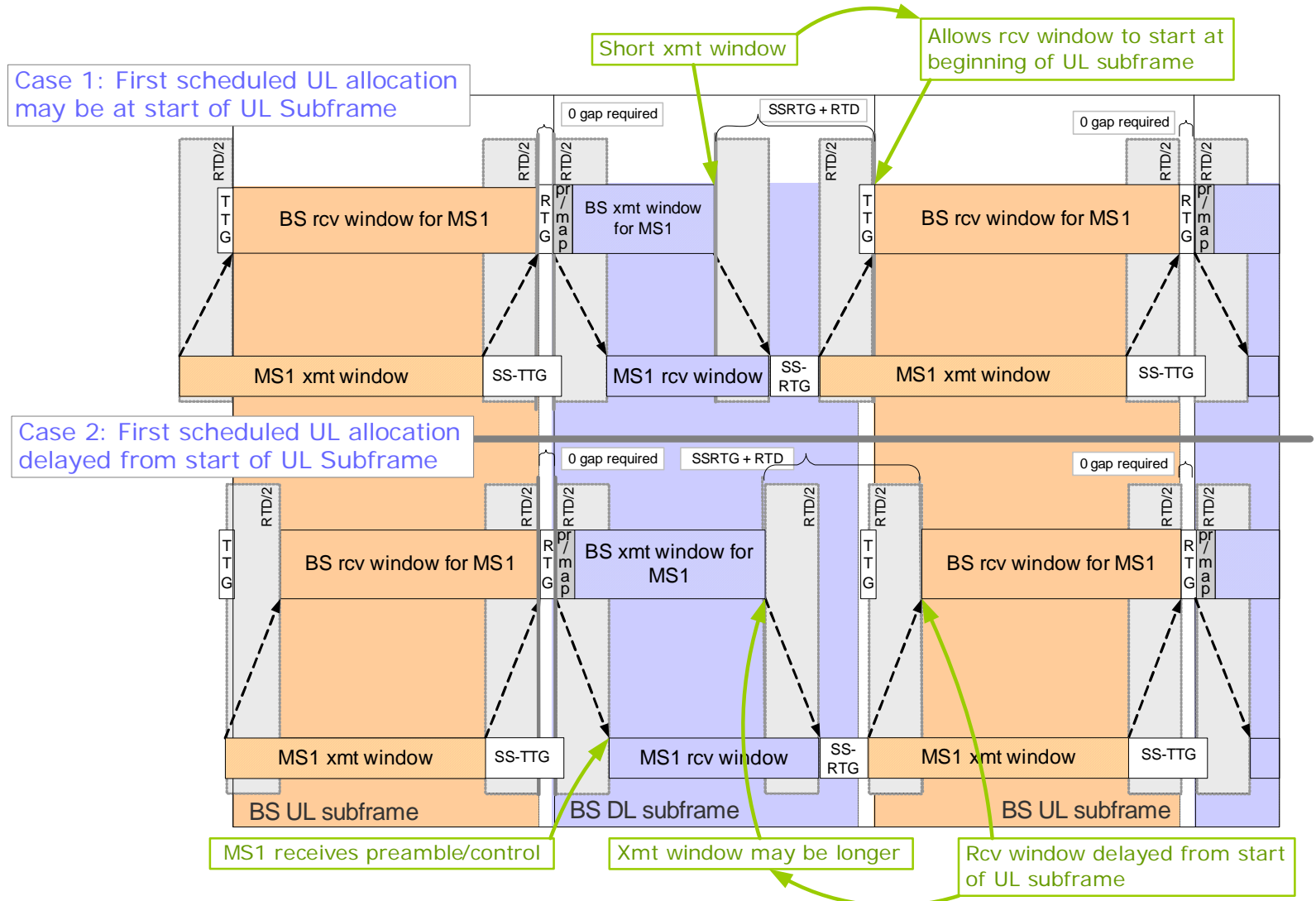
The BS shall not:

- ∠ Transmit DL information to a station later than (SSRTG+RTD) before the beginning of its first scheduled UL allocation in any UL subframe
- ∠ Transmit DL Information to it earlier than (SSTTG-RTD) after the end of the last scheduled UL allocation, where RTD denotes round-trip delay
- ∠ In addition, the SS should be allowed to receive the DL preamble for each frame that contains DL data for it by assuring the period specified above does not overlap with the preamble



# RS Uplink Allocation Window Start Time

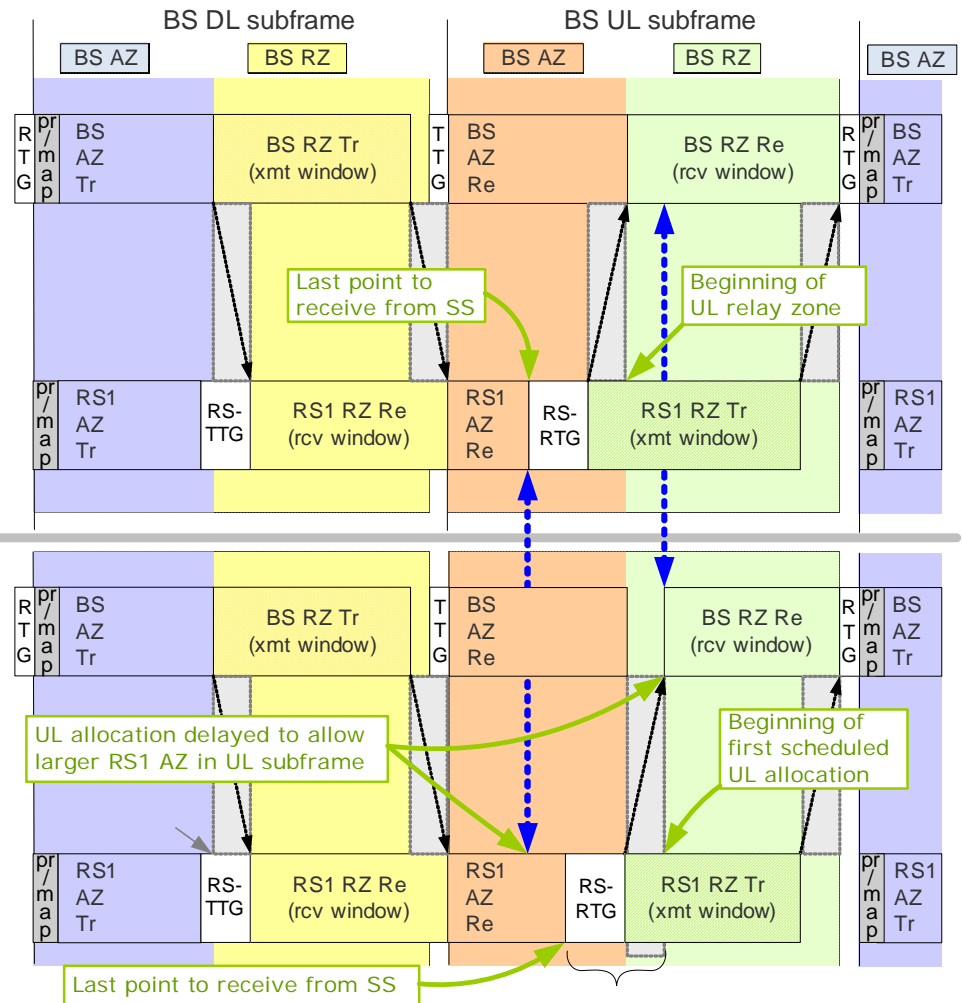
Beginning of MS's first scheduled UL allocation is flexible



# RS Uplink Allocation Window Start Time

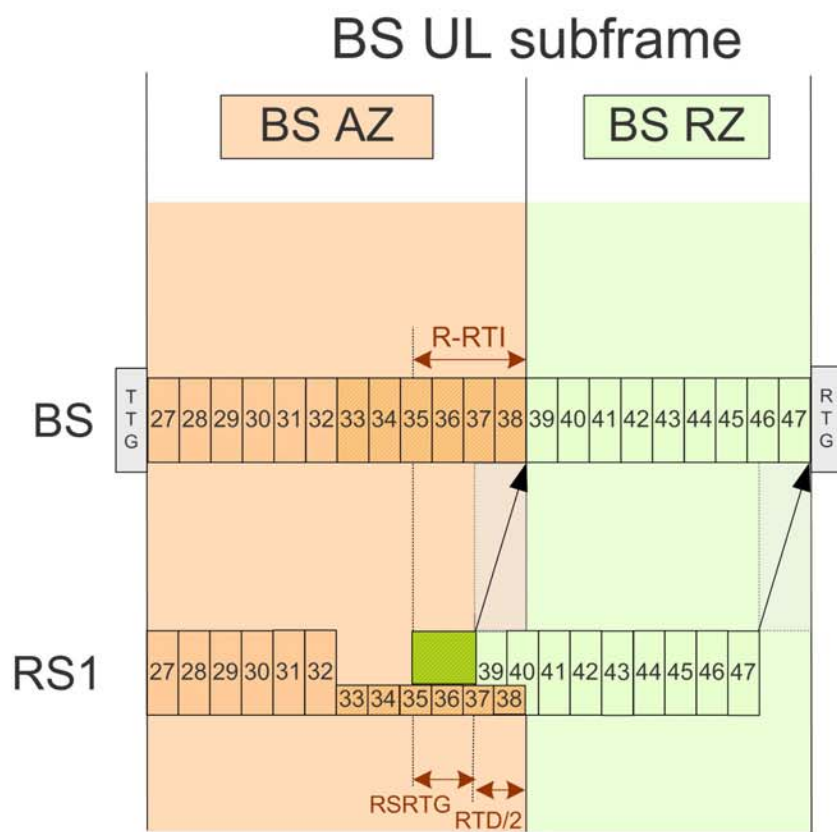
- It would be beneficial to have similar capability for RSs to optimize the size of the xmt/rcv windows
- However, scheduling is controlled by the RS and superordinate node rather than just a BS

- For example, in the UL subframe of the figures, in order to delay the “last point to receive from SS”, the RS needs to know the MR-BS will not schedule it until later.
- However, the RS UL allocation from the MR-BS is received after SS UL allocation from the RS.

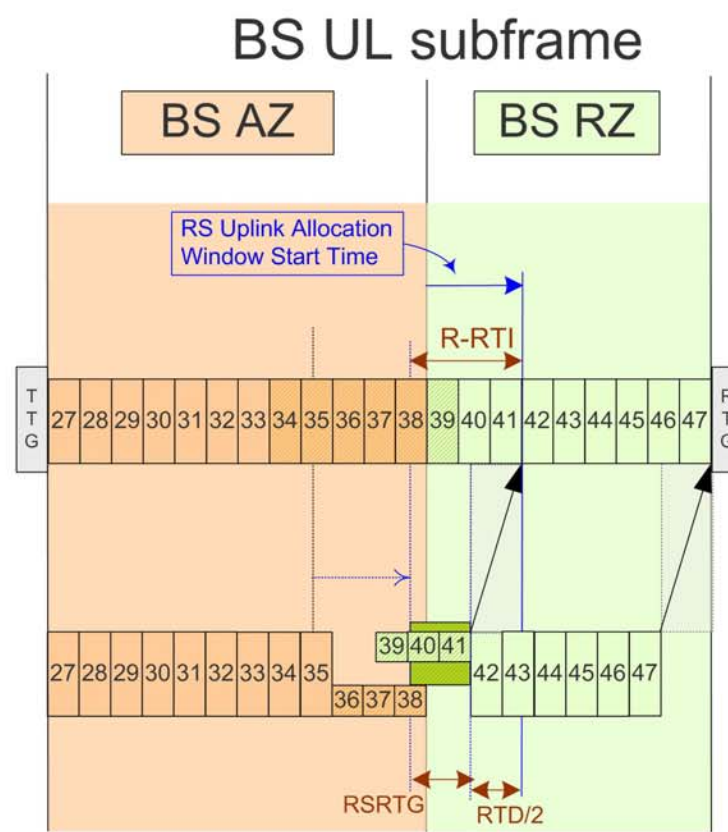


# RS uplink allocation window start time

*Illustration*



Without RS Uplink Allocation Start Time



With RS Uplink Allocation Start Time

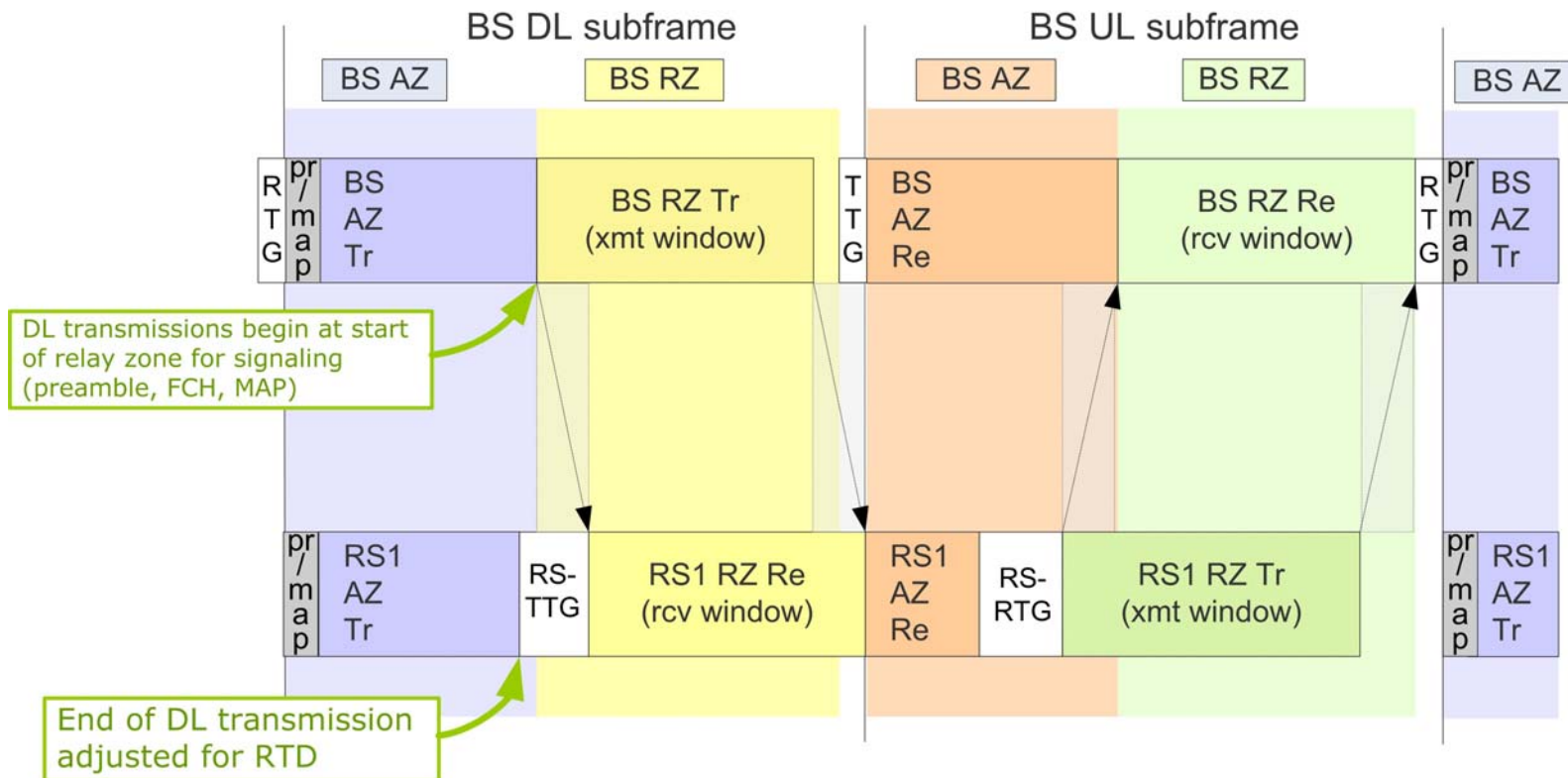
# RS uplink allocation window start time

- The existing 16j parameter "Relay UL allocation start time" cannot be used for this proposal
  - It is sent in the RCD (analogous to DCD/UCD), which is relevant for many RSs and helps RSs find the start of the UL Relay Zone
  - This proposal is relevant for one RS and identifies an "offset" from the start of the UL Relay Zone
- This proposal does not include any propagation delay consideration
  - This offset is a scheduler decision and is relative to any time considerations due to propagation delay
  - This proposal does have the effect of delaying the start of the R-RTI
- The offset from the start of the UL Relay Zone is not included in the R-RTI already
  - The purpose of the R-RTI is to make sure that the RS stops receiving from the MSs and begins the transition to transmit state so that its transmission to the BS will arrive at the right time, compensating for RX/TX transition time and propagation delay
  - The BS may schedule the RS a burst at the start of the UL Relay zone, so the RX/TX transition must start in time for a transmission to be received then
  - This proposal allows the BS to tell the RS that it will not schedule it a burst until later, so the RS can receive data from MSs longer. This is illustrated in the following figures

# RS Uplink Allocation Window Start Time

## Downlink

- RZ DL transmissions must begin at start of relay zone
  - Subordinate station must receive signaling (preamble, R-FCH, R-MAP)
  - Delaying DL RZ transmission is not an option
- End of RS DL transmission is already adjusted for RTD
  - Transceiver switching can begin just in time to receive transmission from superordinate station



# RS Uplink Allocation Window Start Time

## Proposal

- Provide capability for the transmit/receive windows to be balanced between relay zones
- RS's superordinate station provides the RS with an Uplink Allocation Window Start Time, which is the earliest time that it may be scheduled in the UL relay zone on a slowly changing basis based on the RTD
- RS may use this information to determine when to stop scheduling subordinate stations
- An RS may request a Uplink Allocation Window Start Time based on the RTD of subordinate station