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Title	MS CDMA BR Ranging in Transparent RS Systems	
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Re:	IEEE 802.16j-07/013: "Call for Technical Comments Regarding IEEE Project 802.16j"	
Abstract	This contribution proposes procedures for MS CDMA BR Ranging in Transparent RS system	
Purpose	Text proposal for 802.16j Baseline Document	
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# MS CDMA BR Ranging in Transparent RS Systems

## Introduction

In an MR system under centralized control, there are three stages to complete the MS CDMA BW request (BR) via RS as follows,

1. Upon receiving a CDMA BR ranging code from an MS, the access RS transmits the associated information to the MR-BS through the UL relay path.
  - The contention-based scheme defined in 6.3.6.7.2.1 and 6.3.6.8 or the dedicated scheme defined in 6.3.6.7.3 of the baseline document IEEE 802.16j-06/026r3 can be used for the access RS to transmit the information of the received CDMA BR ranging code.
2. Based on the received information of CDMA BR ranging code and UL relay path, the MR-BS allocates BW for the MS to send the BR header and the RSs along the UL relay path to relay the BR header.
  - The continuous BW allocation scheme defined in 6.3.6.7.2.2 or the dedicated BW allocation scheme defined in 6.3.6.7.3 can be used for the MR-BS to provide the BW allocation to the MS and the RSs along the UL relay path.
3. The RSs along the UL relay path relays the BR header sent from the MS to the MR-BS such that the MR-BS can make decision on the BW allocation.
  - As described in 6.3.6.7.2.1, the BR header received from MS is relayed to the MR-BS without any modification by the RSs along the UL relay path.

However, in an MR system with transparent RSs, the CDMA BR ranging code sent by MS might be received by the MR-BS and multiple RSs near the MS as shown in Figure 1. In order to decide the most appropriate path to communicate with the MS, every transparent RS must report the information of the received CDMA BR ranging code to the MR-BS in stage 1, as long as the CDMA BR ranging code can be decoded successfully. But, the schemes defined for stage 1 in the baseline document, which is applicable to non-transparent RS, cannot be used by the transparent RS since the MR\_Code-REP message does not contain sufficient information for MR-BS making decision. In order to resolve the problem with minimum modifications on the baseline document, we propose a CDMA-based bandwidth request scheme for transparent RS that utilizes the RNG-REQ message instead of the MR\_Code-REP message.

When transparent RS is used to relay the BR header, the MR-BS is required to be able to identify the access RS such that the MR-BS can allocate the corresponding UL BWs for all RSs along the UL relay path. The RS identity is required because the path for relaying BR header might be different from the designated UL relay path for the MS. Therefore, extra information of transparent RS ID is needed in the relayed BR for the MR-BS to allocate appropriate UL BW. One way to piggyback the information of transparent access RS ID is to assign a dedicated UL burst for every RS along the UL relay path to relay the BR header to its superordinated station. However, this scheme suffers when there are more than one UL bursts for RS simultaneously and the MR-BS

cannot handle multiple BR headers at one time. Therefore, we propose a BR\_Relaying message in this document.

In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the baseline working document IEEE 802.16j-06/026r3 are listed below.

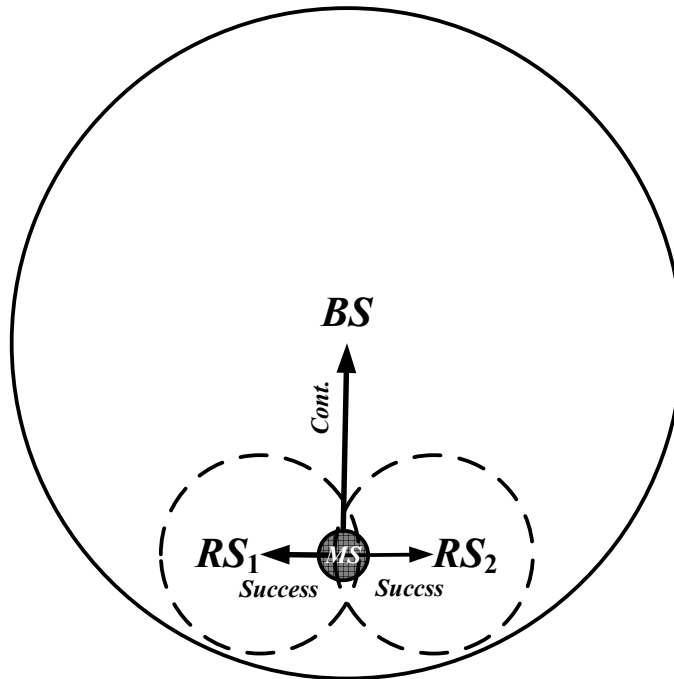


Figure 1 Examples of MR-BS and multiple RSs receiving MS ranging code in transparent RS system

## Text Proposal

*[Insert the following new subclause 6.3.2.3.83 in page 46 as indicated:]*

### 6.3.2.3.83 BR\_Relaying message

TBD

#### 6.3.6.8 Relaying support for Bandwidth Requests

*[Change the following text as indicated:]*

-----Option 1 -----

Upon receiving an RS CMDA ranging code, the MR-BS shall respond by allocating uplink bandwidth to each RS along the relay path from the RS specified by the code for the purpose of forwarding an MR\_Code-REP message for non-transparent RS or an RNG-REQ message for transparent RS, containing information about the CDMA ranging code received from the SS. The MR-BS shall use the CMDA ranging code and transmit region

information in the MR\_Code-REP [or RNG-REQ](#) to create a CDMA\_allocation\_IE that allocates bandwidth on which the SS can forward a BW request header to the MR-BS.

-----Option 2 -----

Upon receiving an RS CMDA ranging code [from a non-transparent access RS](#), the MR-BS shall respond by allocating uplink bandwidth to each RS along the relay path from the RS specified by the code for the purpose of forwarding an MR\_Code-REP\_message containing information about the CDMA ranging code received from the SS. The MR-BS shall use the CMDA ranging code and transmit region information in the MR\_Code-REP to create a CDMA\_allocation\_IE that allocates bandwidth on which the SS can forward a BW request header to the MR-BS.

Upon receiving an RS CMDA ranging code from a transparent access RS, the MR-BS shall respond by allocating uplink bandwidth to each RS along the relay path from the RS specified by the code for the purpose of forwarding an RNG-REQ message containing information about the CDMA ranging code received from the SS. The MR-BS shall use the CMDA ranging code and transmit region information in the RNG-REQ to create a CDMA\_allocation\_IE that allocates bandwidth on which the SS can forward a BW request header to the MR-BS.

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