Project	**IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>**
Title	**MS contention-based ranging and automatic adjustments with transparent RS attached to a superordinate nontransparent RS under centralized scheduling**
Date Submitted	**2007-09-09**
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Re:	IEEE 802.16j-07/043: "IEEE 802.16 Working Group Working Group Letter Ballot #28"
Abstract	This contribution proposes MS contention-based ranging and automatic adjustments with transparent RS attached to a superordinate nontransparent RS under centralized scheduling
Purpose	Text proposal for 802.16j Draft Document.
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MS contention-based ranging and automatic adjustments with transparent RS attached to a superordinate nontransparent RS under centralized scheduling

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Introduction

In P802.16j/D1, "*The RS group has a superordinate station (non-transparent RS or MR-BS) that is the superordinate station of all RSs in the group. All the RSs in the RS group shall either transmit the same preamble, FCH and MAPs or they all do not transmit any preamble, FCH or MAPs. The MR-BS or the superordinate station carries out resource control and scheduling for the RS group.*"

However, a subordinate transparent RS attached to a superordinate non-transparent RS under centralized scheduling cannot handle MS contention-based ranging and automatic adjustments. If the ranging code is received by both subordinate transparent RSs and superordinate non-transparent RS, the transparent RSs must request uplink bandwidth to send MR_Code-REP message to MR-BS, whereas the non-transparent RS must request downlink bandwidth to broadcast RSG-RSP message to MSs. As a result, the MR-BS will compare measured signal information at each transparent RS to decide the most appropriate path to communicate with the code originating MS but will also allocate downlink bandwidth for non-transparent RS broadcasting RNG-RSP message. Hence, the decision at the MR-BS will be incorrect. (see Figure 1)

Therefore, we propose a solution described as follows (see Figure 2). If the ranging code is received by both subordinate transparent RSs and superordinate non-transparent RS, the transparent RSs must request uplink bandwidth to send MR_Code-REP message to the non-transparent RS. As a result, the non-transparent RS will compare measured signal information at each transparent RS to decide the most appropriate path to communicate with the code originating MS. Then, the non-transparent RS must request downlink bandwidth for broadcasting RNG-RSP message.

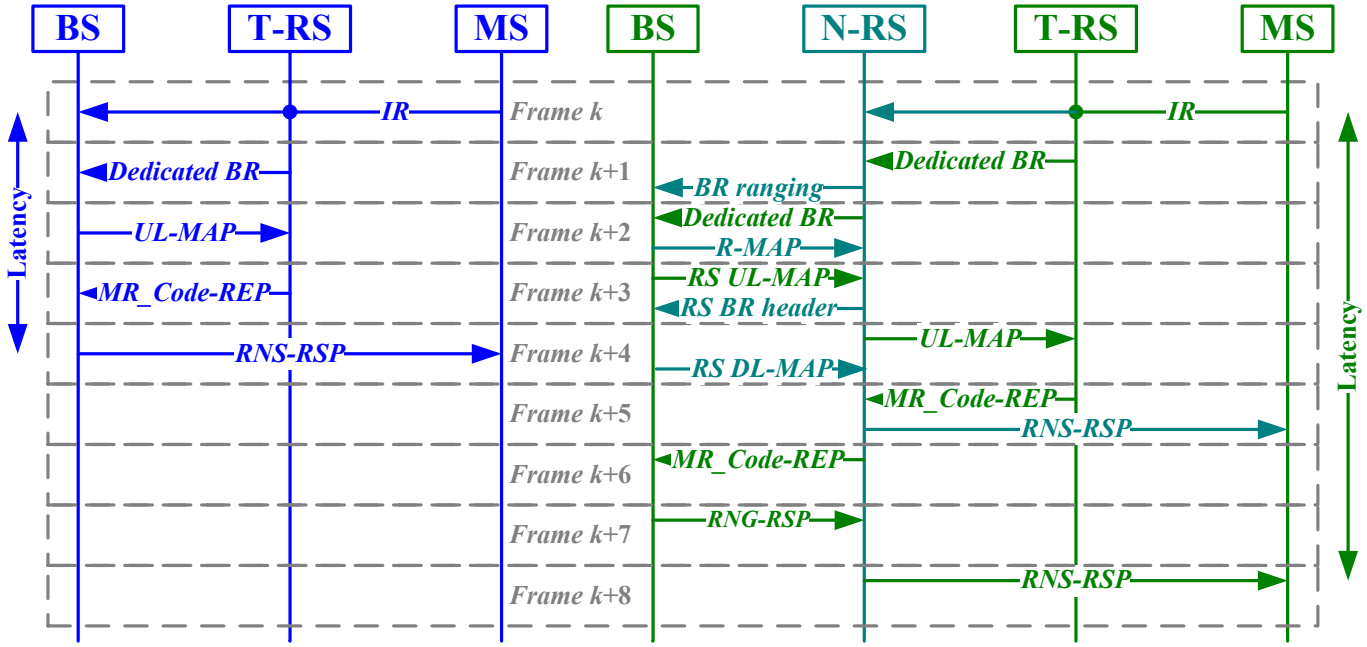

Figure 1 Current scenario

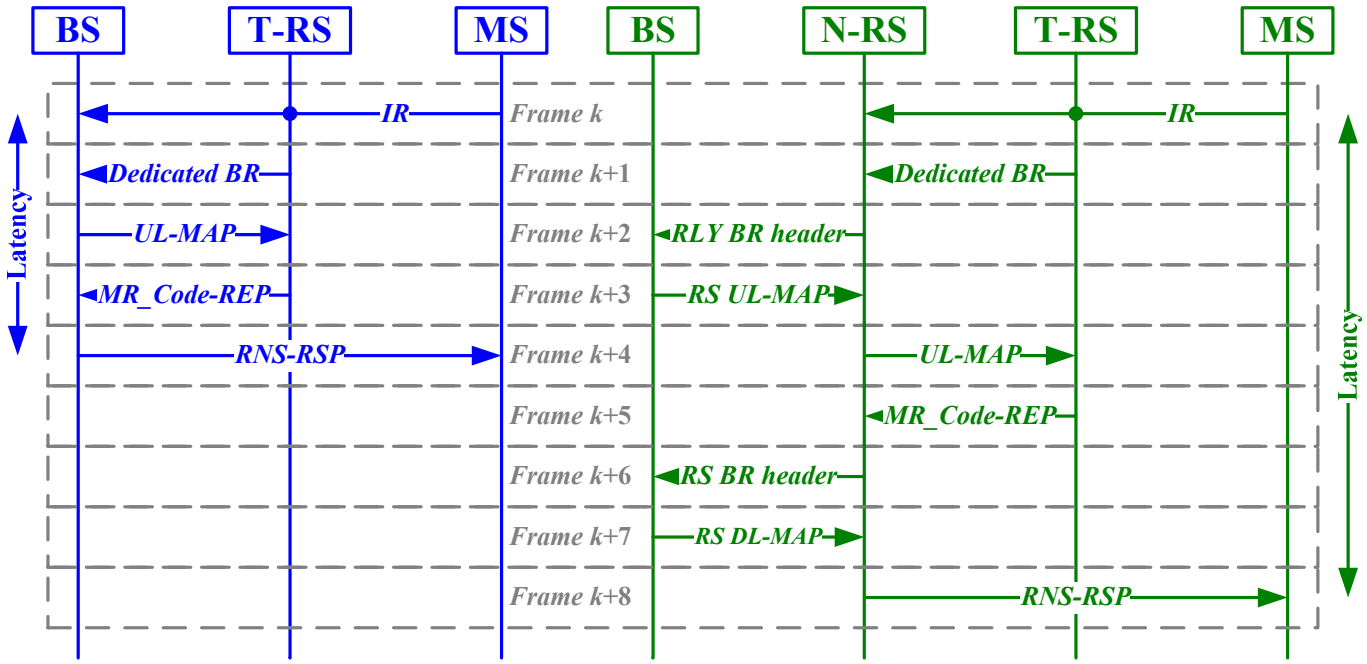

Figure 2 Proposed scenario

In order to facilitate the incorporation of this proposal into IEEE 802.16j standard, specific changes to the draft standard P802.16j/D1 are listed below.

Specification Changes

[Insert the following subclause 6.3.10.3.9 in line 16 of page 122 as indicated:]

6.3.10.3.9 MS contention-based ranging and automatic adjustments with transparent RS attached to a superordinate nontransparent RS under centralized scheduling

The CDMA ranging code may be received by the superordinate nontransparent RS and some subordinate transparent RSs near the MS. The subordinate RSs receiving the initial ranging code with sufficient signal quality shall transmit an MR_Code-REP message containing ranging code attributes and adjustment information to the parent nontransparent RS with the RS basic CID. When a subordinate RS receives multiple codes in a frame, the RS should send an MR_Code-REP message containing information of multiple received ranging codes.

When the superordinate RS receives CDMA ranging code or MR_Code-REP message containing CDMA ranging code with RS basic CID at the first time, it shall wait for MR_Code-REQ message with the same ranging code from its subordinate RSs for T48 timer. Once T48 timer expired, the superordinate RS shall compare measured signal information at each station to decide the most appropriate path to communicate with the code originating MS, according to channel measurement information. Algorithms to select a path are out of scope of this document. If the direct communication is selected, the superordinate follows sequence described in MS contention-based ranging and automatic adjustments with non-transparent RS

When the received CDMA ranging code at the selected RS that requires adjustment of transmission parameters, the superordinate RS shall locally broadcast RNG-RSP message containing adjustment information measured at the selected access RS with ranging CID. When the received periodic ranging code at the selected RS requires no adjustment, the superordinate RS shall also locally broadcast RNG-RSP message containing status success with ranging CID. In order to broadcast the RNG-RSP messages on the access link, the RS shall send an RS BR header or the associated dedicated CDMA code to the superordinate RS. The MR-BS may pre-schedule proper UL bandwidth in relay link for sending RS BR header to the MR-BS after allocating Ranging channel in the RS

access link. Upon receipt of the RS BR header or the dedicated CDMA code at the MR-BS, the MR-BS shall allocate resources for the transmission of the RNG-RSP messages and indicate to the RS the resource allocated with RS_BW-Alloc_IE in the R-MAP.

If the received initial/handover ranging code at the selected access RS requires no adjustment, the superordinate RS shall transmit MR_Code-REP header with the RS basic CID to the MR-BS, containing number of CDMA initial ranging code that requires no correction. When the MR-BS receives the MR_Code-REP header, it may send an RS_BW-Alloc IE with Type equal to 1 to RS for broadcasting RNG-RSP message containing abort status according to its policy. Otherwise, the MR-BS shall provide bandwidth allocation for the MS by sending UL-MAP message to the superordinate RS including CDMA_Allocation-IE with certain fields zeroed out (see 6.3.6.7.2.1 for detail). Sending an RS_BW-Alloc IE with Type equal to 1 to RS for broadcasting RNG-RSP message with status "Success" is optional.

Upon receiving RS_BW-Alloc_IE, the RS shall broadcast RNG-RSP message with ranging CID, which contains status success or abort. If the INC_DFO is 1, the RNG-RSP message shall also contain downlink frequency override given by MR-BS.

Upon receiving a message UL-MAP containing CDMA_Allocation_IE with zeroed out fields, the RS shall fill in the corresponding ranging code and transmit region information into the appropriate fields of the CDMA Allocation IE and then broadcast this updated UL-MAP on the access link.

The message flow charts in Figures xxx-a, xxx-b describe the ranging and adjustment process that shall be followed by compliant RSs and MR-BSs.

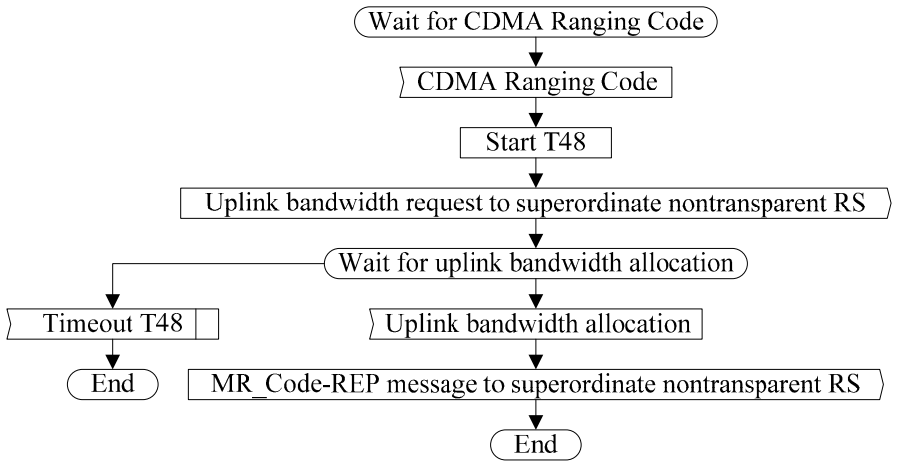

Figure xxx-a—Handling CDMA ranging code at a subordinate transparent RS

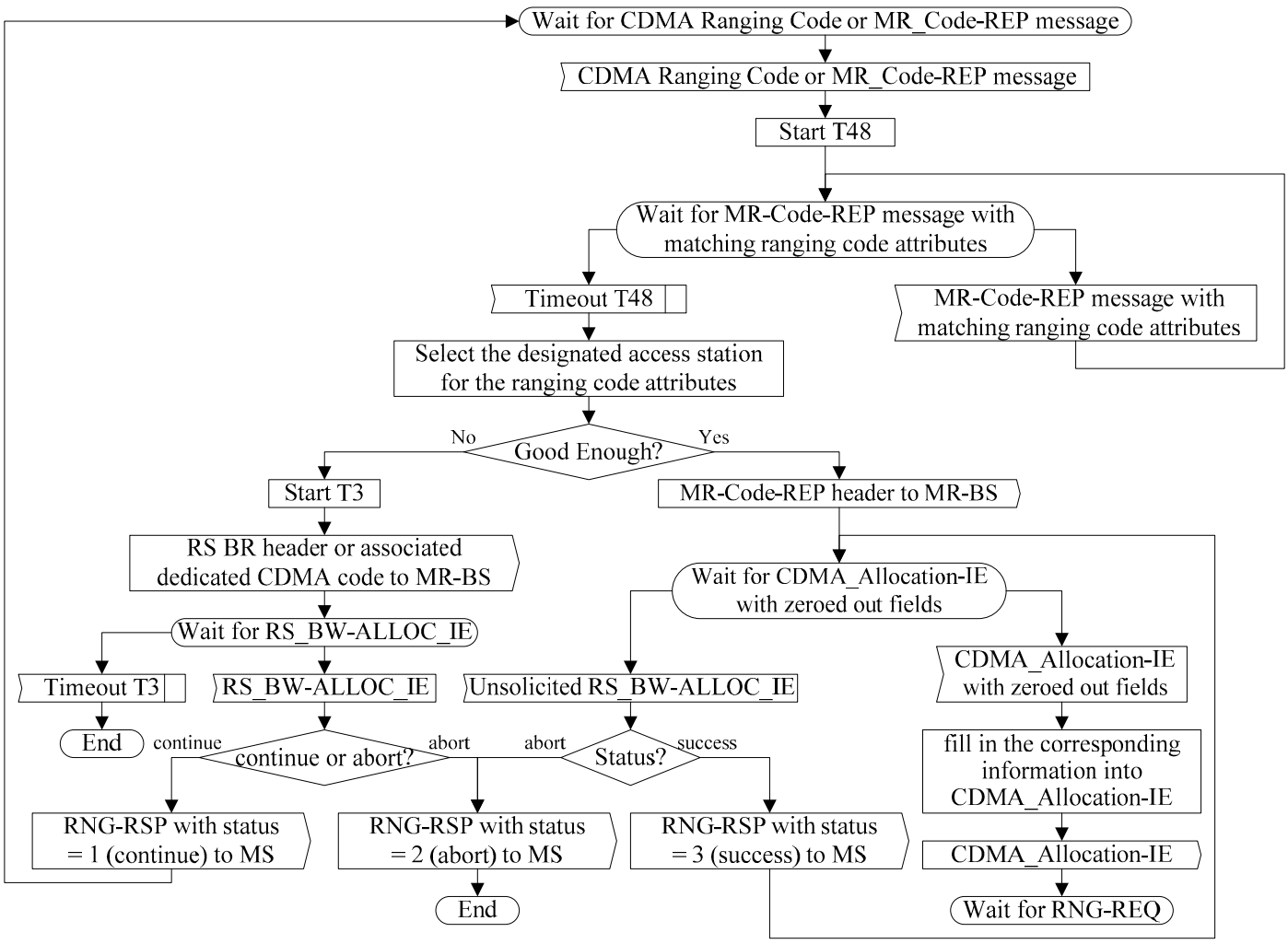

Figure xxx-b—Handling CDMA ranging code at a superordinate nontransparent RS (part 1)

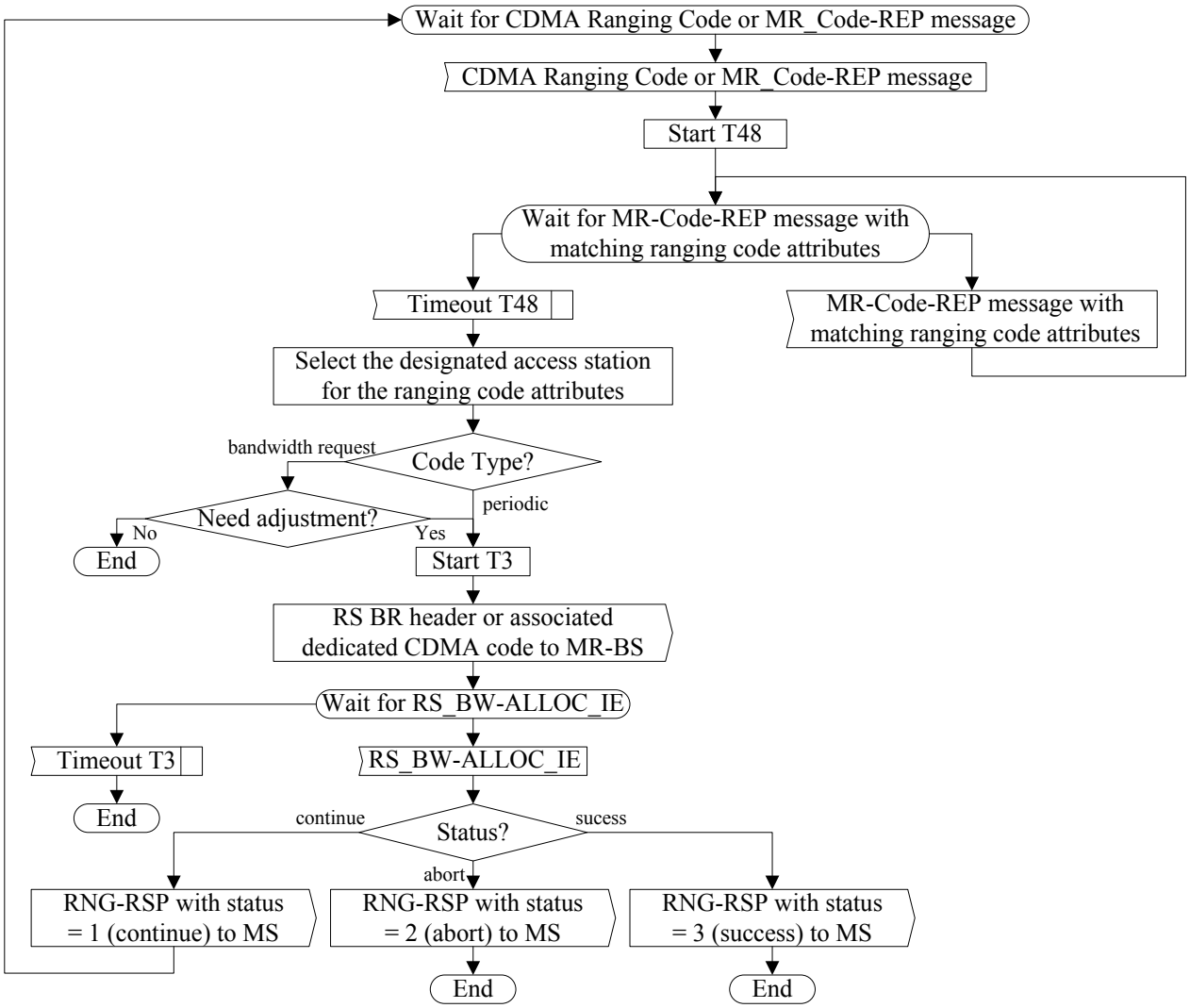

Figure zzz—Handling CDMA ranging code at a superordinate nontransparent RS (part2)