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Re:	IEEE 802.16j-07/043: "IEEE 802.16 Working Group Working Group Letter Ballot #28"

| Abstract | This contribution proposes to correct and merge the paragraphs in subclauses 6.3.9.16.1, 6.3.10.3.4.1 and 6.3.10.3.4.3. |

Purpose	Text proposal for 802.16j Draft Document.

Comments on MS ranging and network entry in transparent mode

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Introduction

In P802.16j/D1, MR_Code-REP message is used for reporting received CDMA BR ranging code, whereas RNG-REQ message is used for reporting received CDMA initial, handover and periodic ranging codes. By comparing the response latency and message size, using MR_Code-REP message is a better scheme, which also handles reporting multiple CDMA code more efficiently. That is, initial, periodic, BR and handover ranging codes receiving in a frame could be carried by one MR_Code-REP message as multiple codes. Therefore, we propose to replace RNG-REQ message with MR_Code-REP message for all CDMA ranging.

After unifying CDMA ranging code report with the MR_Code-REP message, paragraphs and diagrams (sequences charts and flow charts) to handle MS CDMA initial, periodic and bandwidth-request ranging in transparent mode could be combined into one unified scheme. Hence, we proposed to merge redundant paragraphs and diagrams in subclauses 6.3.9.16.1, 6.3.10.3.4.1, 6.3.10.3.4.3 and 6.3.10.3.4.5 and move these subclauses to a new subclause 6.3.10.3.6 in 6.3.10.3 "OFDMA-based ranging", which is consistent with how the MS CDMA ranging and OFDMA-based network entry procedure have been described in IEEE 802.16e-2005 (see 6.3.10.3.1 "Contention-based initial ranging and automatic adjustments", 6.3.10.3.2 "Periodic ranging and automatic adjustments" and 6.3.10.3.3 "CDMA HO ranging and automatic adjustment" for detail).

The response latency and message size of using RNG-REQ and MR_Code-REP are described in Figure 1 and Table 1, respectively. In the left side of Figure 1, the value of T48 must be at least 5 frames (25 ms for 5-ms frame). The MR-BS should allocate at least 41 bytes for RS sending RNG-REQ message and will send RNG-RSP (or CDMA allocation IE) at the 6th frame after MS sends initial ranging code. Thus, the minimum latency of initial or periodic ranging is 30 ms for 5-ms frame.

In the right side of Figure 1, the value of T48 must be at least 3 frames (15 ms for 5-ms frame). MR-BS should allocate at least 26 bytes for RS sending MR-Code-REP message and will send RNG-RSP (or CDMA allocation IE) at the 4th frame after MS sends initial ranging code. Thus, the minimum latency of initial or periodic ranging is 20 ms for 5-ms frame. In summary, response latency and message size for using MR_Code-REP are less than those for using RNG-REQ.
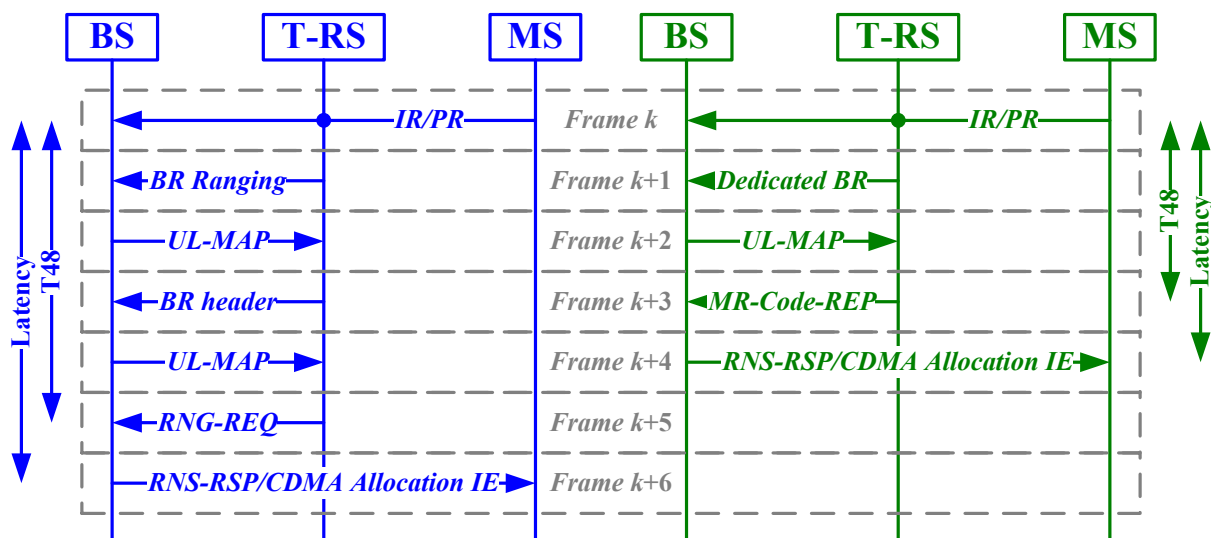

Figure 1 Response latencies for using RNG-REQ and MR_Code-REP

Table 1 Message sizes for RNG-REQ and MR_Code-REP message

Size / Message		RNG-REQ (bytes)	MR-Code-REP (bytes)
Generic MAC header		6	6
Message body	Fix part	2	2
	Variable part	14×*Nr* ~ 29×*Nr*	14×*Nr*
CRC		4	4
Total		12+14×*Nr* ~ 12+29×*Nr*	12+14×*Nr*

Nr: Number of CDMA ranging code in a RNG-REQ or an MR_Code-REP message

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 6.3.10.3.6 in line 16 of page 122 as indicated:]

6.3.10.3.6 MS contention-based ranging and automatic adjustments with transparent RS

[Move all paragraphs of the subclause 6.3.9.16.1in line 19 of page 89 to a new subclause 6.3.10.3.6.1, and modified it as indicated:]

6.3.9.16.1 6.3.10.3.6.1 MS initial ranging and network entry procedures in transparent RS systems

[Modified the first paragraph as indicated:]

In initial ranging and network entry procedure in transparent RS systems, MS scans for downlink channel and establish synchronization with the MR-BS, then obtains transmit parameters from UCD message as described in 6.3.9.1 through 6.3.9.4.

[Modified the third paragraph through the fifth paragraph as indicated:]

The code may be received by the MR-BS and some RSs near the MS. RSs receiving the initial ranging code with sufficient signal quality shall transmit an RNG-REQ MR_Code-REP message containing ranging code attribute and adjustment information (such as frequency, timing and transmission power) to the MR-BS with the RS basic CID to the serving MR-BS. The RNG-REQ message contains ranging status, code attributes and adjustment information such as frequency, timing and transmission power. When a RS receives multiple codes in a frame, the RS should sends an MR_Code-REP message a RNG-REQ message which contains containing information of multiple received ranging codes which are received with sufficient signal quality.

When the MR-BS receives initial ranging code or RNG-REQ MR_Code-REP message containing initial ranging code with RS basic CID at the first time, it shall wait for MR_Code-REQ message RNG-REQ with the same ranging code from its subordinate RSs for T48 timer. Once T48 timer expired, the MR-BS shall compares 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.

When the ranging status at the selected path is continue, the MR-BS transmits a shall broadcast RNG-RSP message to the MS directly with initial ranging CID, . The RNG-RSP message shall containing adjustment information measured at the selected access RS on the selected path. If the received ranging code has been successfully received at the selected access RS requires no correction on the selected path and the MR-BS decides to apply uplink and downlink relaying to the MS, the RS shall receives and relays a the RNG-REQ message transmitted on a burst specified with CDMA_Allocation-IE in UL-MAP after decoding the UL-MAP or optionally R-MAP in the same frame. The MAP messages and IEs are defined in 8.4.5. If the direct communication is selected, the MR-BS follows sequence described in 6.3.10.3.1.

[Modified the eleventh paragraph as indicated:]

Management tunnel CID can also be used to encapsulate and to forward RNG-REQ or MR_Code-REP

messages to the MR-BS over the existing tunnel.

[Move Table 199a to the subclause 6.3.10.3.6.1, and modify it as following indicated]

Table ~~199a~~ xxx-a—Ranging and automatic adjustments procedure in transparent mode

[Replace "RNG-REQ by "MR_Code-REP" from line 5 to line 30 of page 91]

[Merge Figure 95a with Figure 108a and Figure 108h, and move it to 6.3.10.3.6.1 as following indicated:]
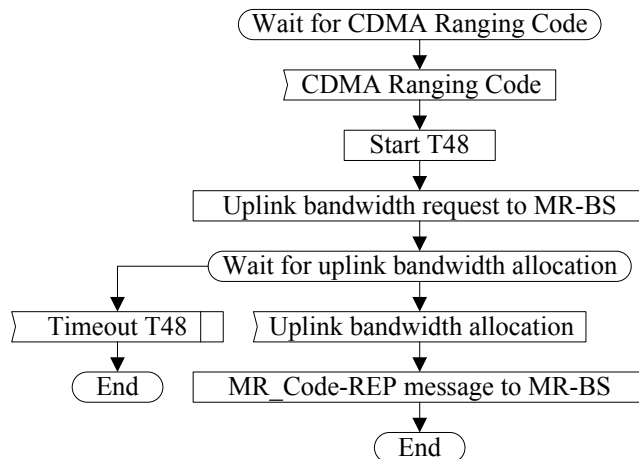
Figure xxx-a—Handling CDMA ranging code at a transparent RS

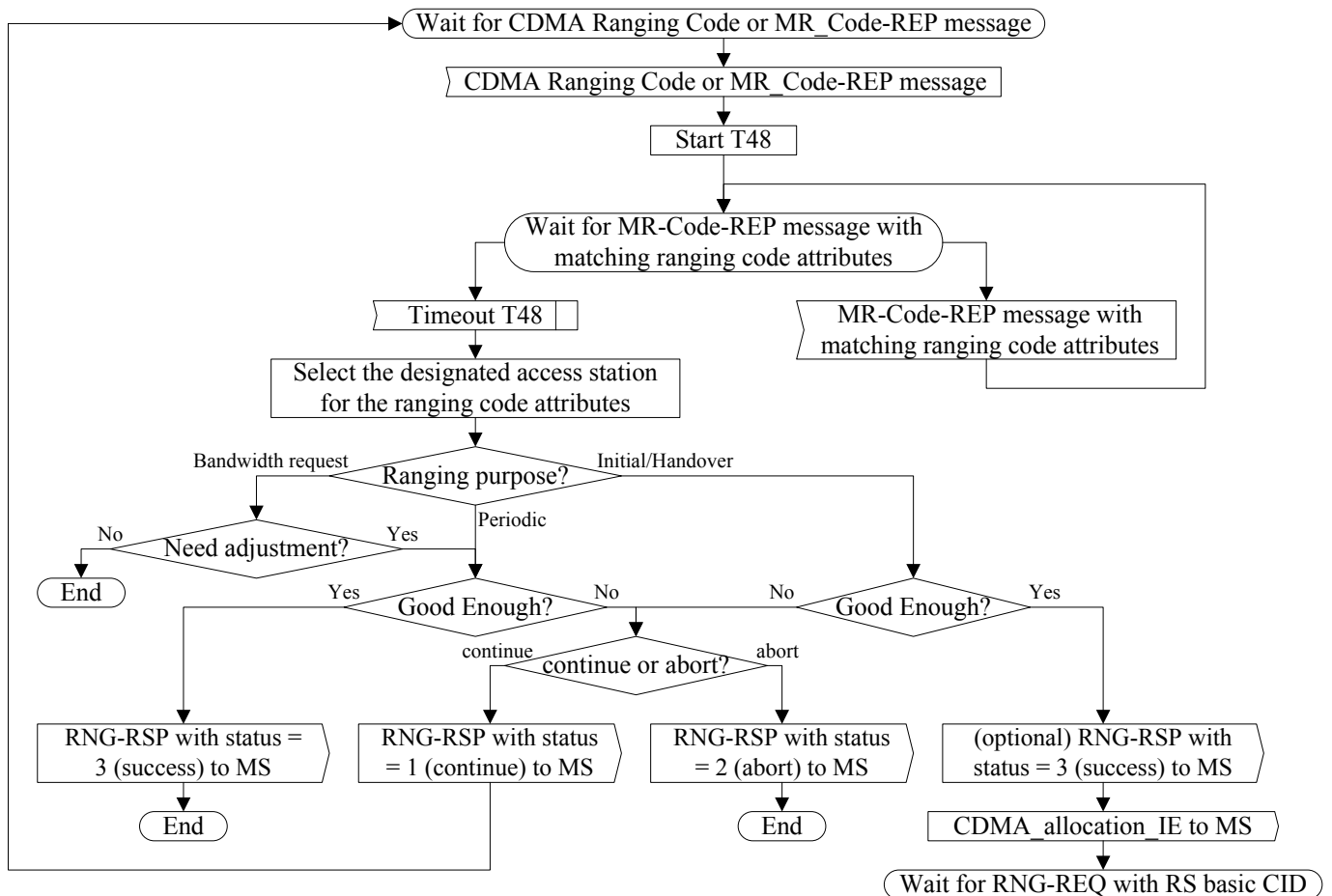*[Merge Figure 95c with Figure 108b and Figure 108i and move it to 6.3.10.3.6.1 as following indicated:]*

Figure xxx-b—Handling CDMA ranging code in transparent mode at MR-BS

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[Move Figure 95b to 6.3.10.3.6.1, and modified it as indicated]

Figure ~~95b~~ xxx-c—Handling RNG-REQ ~~in~~ at a transparent RS

[Modify Figure 95d to subclause 6.3.10.3.6.1 as indicated]

Figure ~~95d~~ xxx-d—Handling RNG-REQ in transparent mode at an MR-BS

[Move all paragraphs of the subclause 6.3.10.3.4.1 in line 17 of page 109 to a new subclause 6.3.10.3.6.2, and modified it as indicated:]

~~6.3.10.3.4.1~~ 6.3.10.3.6.2 MS periodic ranging and automatic adjustments ~~in transparent RS systems~~

The periodic ranging process shall begin by sending a periodic-ranging CDMA codes on the UL allocation dedicated for that purpose.

The code may be received by the MR-BS and RSs near the MS. RSs receiving the periodic ranging code shall transmit a~~n RNG-REQ~~ MR_Code-REP message containing ranging code attribute and adjustment information with the RS basic CID to the serving MR-BS ~~through the relay path~~. When RS receives multiple codes in ~~the ranging subchannel of~~ a frame, the RS should send ~~RNG-REQ~~ MR-Code-REP message ~~sent by the RS to serving MR-BS may~~ containing information of multiple received ranging codes.

When the MR-BS receives periodic ranging code or MR_Code-REP message containing periodic ranging code with RS basic CID at the first time, it shall wait for ~~RNG-REQ~~ MR-Code-REP message containing the same ranging code attribute from its subordinate RSs for T48 timer. Once T48 timer expired, the MR-BS ~~could~~ shall compare the measured signal information at each access station to decide adjustment information for RNG-RSP. Algorithms to decide adjustment information are out of scope of this specification. Afterward, the MR-BS shall ~~transmit an~~ broadcast RNG-RSP message with ranging CID~~to the MS directly~~.

The message sequence chart in Table ~~201a~~ xxx-b and flow charts in Figures ~~108a~~ xxx-a and ~~108b~~ xxx-b define the ranging and adjustment process that shall be followed by compliant RSs and MR-BSs.

[Move Table 201a to the subclause 6.3.10.3.6.2, and modify it as following indicated]

Table ~~201a~~ xxx-b—Ranging and automatic adjustment procedure in transparent ~~RS system~~ mode

[Replace "RNG-REQ" by "MR_Code-REP" in the whole figure 201a]

[Move all paragraphs of the subclause 6.3.10.3.4.3 in line 54 of page 113 to a new subclause 6.3.10.3.6.3, and modified it as indicated:]

~~6.3.10.3.4.3~~ 6.3.10.3.6.3 MS bandwidth request ranging and ~~U~~unsolicited RNG-RSP ~~in transparent RS systems~~

[Modified the following text as indicated:]

The code may be received by the MR-BS and RSs near the MS. ~~After~~ RS~~s~~ receives ~~a~~ the bandwidth request ~~CDMA~~ ranging code~~, it should~~ shall transmit an MR-Code-REP message with the RS basic CID containing ~~the CDMA BR~~ ranging code attribute and adjustment information to the serving MR-BS ~~through the relay path with adjustment information of frequency, power, and timing corrections~~. When RS receives multiple codes in ~~the ranging subchannel of~~ a frame, the RS should send the MR-Code-REP message ~~sent by the RS to serving MR-BS may~~ containing information of multiple received codes.

When the MR-BS receives ~~a~~ bandwidth request ~~CDMA~~ ranging code or MR_Code-REP message containing bandwidth request ranging code with RS basic CID at the first time, it shall wait for MR-Code-REP message with the same ranging code attribute from its subordinate RSs for T48 timer. Once T48 timer expired, the MR-BS shall compare~~s~~ measured signal information at each station to decide the most appropriate path to communicate with the code originating MS, according to channel measurement information. When it needs to do adjustment for the code, the MR-BS shall broadcast an unsolicited RNG-RSP message with associated code attribute.

The message sequence charts (Table 201d and Table 201e xxx-c) and flow charts (Figure 108f, Figure 108g, Figure 108h xxx-a and Figure 108i xxx-b) define the unsolicited RNG-RSP process that shall be followed by compliant RSs and MR-BSs.

[Move Table 201e to the subclause 6.3.10.3.6.3, and modify it as following indicated]

Table 201e xxx-c — Unsolicited RNG-RSP procedure triggered by CDMA BR ranging code Ranging and automatic adjustment procedure in transparent RS system mode

[Replace "RNG-REQ" by "MR_Code-REP" in the whole figure 201e]

[Move all paragraphs of the subclause 6.3.10.3.4.5 in line 20 of page 121 to a new subclause 6.3.10.3.6.4, and modified it as indicated:]

6.3.10.3.4.5 6.3.10.3.6.4 MS CDMA handover ranging and automatic adjustment in RS system

An RS that supports MS handover ranging shall take a process similar to that defined in the section 6.3.10.3.6.1 section 6.3.9.16.1 (MS network entry procedures in transparent RS systems) with the following modifications.

In CDMA handover ranging process, the random selection is used instead of random back-off and the CDMA handover ranging code is used instead of the initial ranging code. The code is selected from the handover-ranging domain as defined in 8.4.7.3.

Alternatively, if the RS MR-BS is pre-notified by the serving MR-BS for the upcoming handover MS, MR-BS it may provide BW bandwidth allocation information for MS by transmitting an RS UL-MAP to the RS. Afterward, the RS should construct to the MS using Fast_Ranging_IE and send to MS for transmitting to send an RNG-REQ message.

10.1 Global values

[Modified the following Table 583 in line 9 of page 202 as indicated:]

Table 583—Parameters and constants

System	Name	Time reference	Minimum value	Default value	Maximum value
MR-BS	T48	Wait for RNQ-REQ MR_Code-REP message from the subordinate RS	tbd	tbd	T3

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