Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Option to Redirect ranging MS to another Carrier or Channel**
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Re:	IEEE 802.16 Session #47 plus over the phone
Abstract	This contribution proposes the updates of IEEE 802.16g D7 document to include BS redirection option for initial ranging of an MS
Purpose	Update 802.16g draft to include BS redirection option for a ranging MS
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Option to Redirect ranging MS to another Carrier or Channel

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1. Introduction

In some cases during the initial ranging and network entry the BS may want to handover an MS to another channel or a carrier. If not done initially, the MS needs to enter the network and follow with a quick BS initiated handover procedure. A more expedited process is a channel redirection when multiple carriers are available in the vicinity of the BS/sector. Since the Offset Frequency Adjustment TLV is a 32 bits value the redirection value in the RNG-RSP message can provide +/- 2GHz adjustment value. When the offset frequency adjustment value is small the BS attempts to better tune the MS to the center frequency of the channel. However when the adjustment value is larger than half of the channel BW, the BS is attempting to redirect the MS to another carrier or channel.

Also we are adding here the load balancing text to note 2 indicating that the initial ranging conditions for a suitable uplink channel includes the CINR and loading conditions.

2. Proposed Text Change

Remedy 1:

Modify the text to note that ranging on a suitable uplink channel includes factoring its suitability be the evaluation of the CINR and the Non-pre-assigned UL/DL radio resources.

[In 6.3.9.5.1 insert the following text below Table 115 as indicated:]

Notes

1- The BS shall allow the SS sufficient time to have processes the previous RNG-RSP (i.e., to modify the transmitter parameters_ before sending SS a specific ranging opportunity. This is defined as SS ranging Response Processing Time in Table 342.

2- For multichannel support, the SS shall attempt initial ranging on every suitable uplink channel before moving to the next available downlink channel. Suitability of a channel is determined by conditions that include RSSI, CINR and the available Non-pre-assigned DL/UL radio resources

Remedy 2:

Use the Offset Frequency Adjustment to redirect MS

[In 6.3.9.5.1 insert the following text below notes 1 and 2 (noted in Remedy 1 above), which are placed below Table 115 as indicated:]

During initial Network Entry, a BS may decide to re-direct the ranging SS to another channel by sending the RNG-RSP with an Offset Frequency Adjustment pointing to the other channel. If the Offset Frequency Adjustment value is less than half of the channel bandwidth, this is fine-frequency adjustment within the ranged channel, otherwise, the value is a reassignment to a different channel.

On receiving a RNG-RSP instruction to move to a new downlink frequency, the SS shall consider any previously assigned Basic, Primary Management, and Secondary Management CIDs to be deassigned, and shall obtain new Basic, Primary Management, and Secondary Management CIDs via initial ranging and registration.

Remedy 3:

Use the Offset Frequency Adjustment in the RNG-RSP to redirect the MS

6.3.10.3.1 Contention based initial ranging and automatic adjustments

— The SS, after acquiring downlink synchronization and uplink transmission parameters, shall choose randomly a Ranging Slot (with the use of a binary truncated exponent algorithm to avoid possible re-collisions) at the time to perform the ranging, then it chooses randomly a Ranging Code (from the Initial Ranging domain) and sends it to the BS (as a CDMA code).

— The BS cannot tell which SS sent the CDMA ranging request; therefore, upon successfully receiving a CDMA Ranging Code, the BS broadcasts a Ranging Response message that advertises the received Ranging Code as well as the ranging slot (OFDMA symbol number, subchannel, etc.) where the CDMA Ranging code has been identified. This information is used by the SS that sent the CDMA ranging code to identify the Ranging Response message that corresponds to its ranging request. The Ranging Response message contains all the needed adjustment (e.g., time, power, and possibly frequency corrections) and a status notification.

— Upon receiving a Ranging Response message with continue status, the SS shall continue the ranging process as done on the first entry with ranging codes randomly chosen from the Initial Ranging domain sent on the Periodic Ranging region.

— When the BS receives an initial-ranging CDMA code that results in sending an RNG-RSP message with success status, the BS shall provide BW allocation for the SS using the CDMA_Allocation_IE to send an RNG-REQ message.

— Initial ranging process is over after receiving RNG-RSP message, which includes a valid basic CID (following a RNG-REQ transmission on a CDMA_Allocation_IE). If this RNG-RSP message includes ‘continue’ indication, the ranging process should be continued using the periodic ranging mechanisms.

— If the RNG-RSP includes an Offset Frequency Adjustment pointing to another channel and it is larger than the value required for a channel bandwidth offset the SS SHOULD synchronize with the new channel indicated in the RNG-RSP.

— The timeout required for SS to wait for RNG-RSP, following or not following CDMA Allocation IE, is defined by T3.

— Using the OFDMA ranging mechanism, the periodic ranging timer is controlled by the SS, not the BS.

The message sequence chart (Table 121) and flow charts (Figure 85, Figure 86, Figure 86a, and Figure 87) on the following pages define the CDMA initial ranging and adjustment process that shall be followed by compliant SSs and BSs.