Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Changes on CDMA-based BW Request Procedures in OFDMA-PHY for Mobile Environment**
Date Submitted	**2003-11-13**
Source(s)	Chulsik Yoon, Changwahn Yu, Kunmin Yeo, Byunghan Ryu ETRI 161 Gajeong-Dong, Yuseong-Gu, Daejeon, Korea Voice: +82-42-860-6826 Fax: +82-42-860-6732 mailto: csyoon@etri.re.kr
Re:	This is a response to a Call for Comments IEEE 802.16e-03/23 on IEEE 802.16e-03/07r4
Abstract	This document contains suggestions to the improvement of the CDMA-based bandwidth request procedures in OFDMA-PHY.
Purpose	The document is submitted for review by 802.16e Working Group members.
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Changes on CDMA-based BW Request Procedures in OFDMA-PHY for Mobile Environment

Chulsik Yoon, Changwahn Yu, Kunmin Yeo, Byunghan Ryu
ETRI

1. Background

In IEEE P802.16-REVd/D1-2003 OFDMA-PHY, CDMA-based periodic ranging and bandwidth-request transmissions are transmitted in the same uplink allocations for UIUC = 11. Bandwidth-request transmissions are for requesting uplink allocations from the BS, and periodic ranging transmissions are sent for periodic adjustment for the system reflecting the channel conditions (timing and power adjustments). The two ranging codes (BW-request and periodic ranging) are discriminated only by the code usage groups dynamically allocated and notified via UCD messages by the BS.

For detecting the bandwidth-request CDMA codes, BSs also perform the same correlation procedure as the periodic ranging codes. Therefore, the BSs can provide the adjust parameters for timing, power, and frequency for the bandwidth-request codes as well as periodic ranging codes without any additional receiver complexity. In the fixed wireless circumstances, the scope of the 802.16d, it is not necessary to applying the unsolicited ranging response to the bandwidth-request ranging codes, because the periodic ranging can possibly support the channel variations for the SSs. Since channel conditions in the mobile environment are changed more than in the fixed environment, it is required more frequent periodic ranging. But the more frequently it tries periodic ranging, the more overhead is required to support the periodic ranging.

Therefore, we propose the unsolicited RNG-RSP transmission as a response to a CDMA-based bandwidth request before the CDMA_Allocation_IE in UL-MAP for uplink transmission to the MSS as an explicit procedure for a CDMA-based bandwidth request. Then the MSS can adapt to a more recent channel conditions (such as timing and power offset) and send uplink data using appropriate modulation and channel coding.

In Figure 1, we describe the current procedure for CDMA-based bandwidth-request in OFDMA-PHY. And, in Figure 2, we describe the proposed procedure for CDMA-based bandwidth request in OFDMA-PHY.

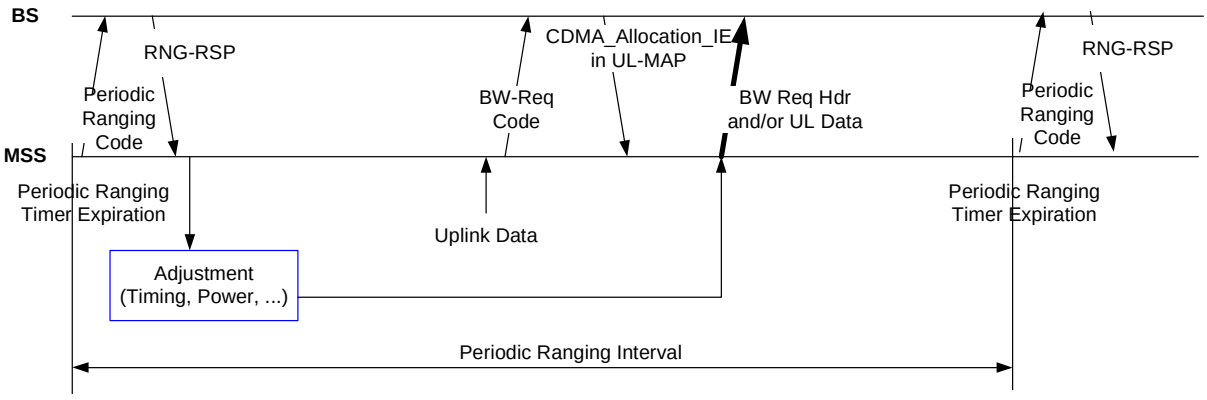

Figure 1. Current CDMA-based bandwidth-request procedure in OFDMA-PHY.

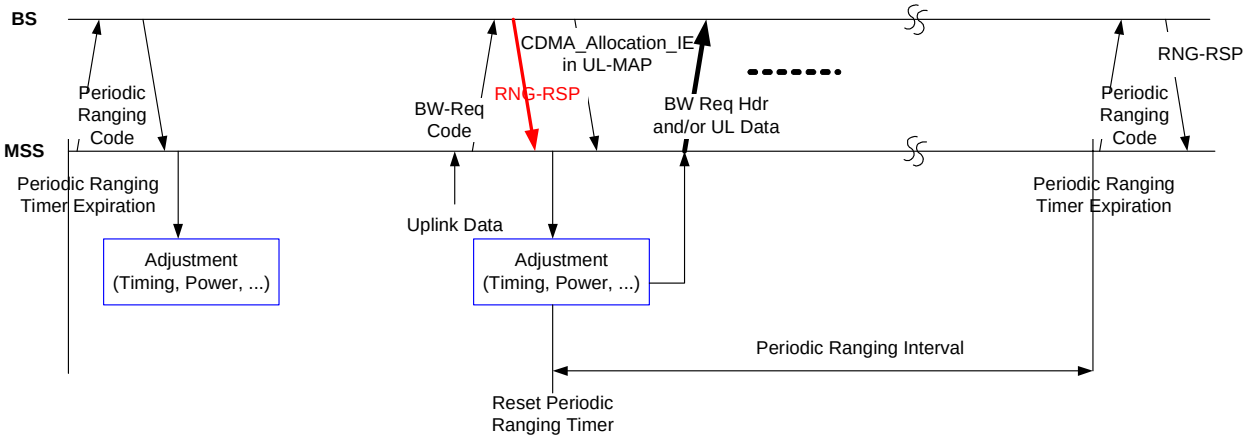

Figure 2. Proposed CDMA-based bandwidth-request procedure in OFDMA-PHY for mobile environment.

2. Proposed changes on CDMA-based bandwidth-request procedure in OFDMA-PHY and addition to the IEEE 802.16e-03/07r4

[add the following to sections to the end of 6.4.10.2 OFDMA-based ranging]

6.4.10.2 OFDMA-based Ranging

(Preceding paragraphs need not be changed, and the following paragraphs are added to the end of the section.)

- The BS may send the unsolicited RNG-RSP as a response to a CDMA-based bandwidth-request.
- When the MSS receives a unsolicited RNG-RSP message after transmitting the bandwidth-request code, it shall reset the periodic ranging timeout, adjust the parameters (timing and power, etc.) as notified in the RNG-RSP message.