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26. N-ACK Implementation in WiMAX

Abstract

Satisfying the rising requirement for BWA in underserved markets has been enduring challenge for service providers. For years, the wildly successful 802.11x or WiFi wireless LAN technology has been used in BWA applications along with a host of proprietary based solutions. But than again rising demand of expanding capacity in terms of bandwidth, number of users and mobility range has come up with an appropriate solution namely WiMAX, based on IEEE 802.16 standard BWA.

Indeed, the IEEE itself, originator of the underlying 802.16 suite of protocols, has attempted to put some sort of framework around the technology by specifying a key distinction between "fixed" operation and "mobile" operation. This is evidenced in the currently ratified version, 802.16-2004 which supports "fixed" operation, and the version now available, 802.16e, designed to support mobility. The IEEE 802.16e is true mobile broadband service, but facing lots of challenges, like QoS, handover issue, security issues, feedback mechanism issue etc etc.

In this paper I am highlighting the issue related to the ARQ mechanism, in order to get confirmation of safely arrived data the service provider offers ARQ mechanism, the ARQ mechanism set by the standard depicts that sender gets couple of ACK that either the data has been received successfully (positive ACK) or has received with some errors or not received (NACK), the ACK could be send to the receiver as stand alone or piggy backed message, this consumes BW for payload data and increases the time of operation or induce delay .

The first layer that is the PHY(physical layer) is responsible for power control management , OFDM ranging. The MAC layer is divided into three sublayers namely, MAC Convergence sublayer mainly responsible for header compression, MAC Common Part Sublayer deals with assembly of MAC PDUs , ARQ Scheduling and MAC Management, and finally the MAC security sublayer responsible for encryption.

The present work, describes the development of the MAC Common Part sublayer model in the IEEE 802.16-e standard, using MATLAB. The wireless networks simulation process has been implemented using two different approaches: The standard ARQ mechanism based on ACK (both positive and negative), the proposed ARQ mechanism (based on NACK only). The presented model deals with the BW allocation to payload process. The result we have achieved from our simulation is that the BW has been increased remarkably for payload**.**