

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	An ARQ with Cooperative Relays in IEEE 802.16j	
Date Submitted	2007-03-06	
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Re:	This is a response to Call for Technical Proposals regarding IEEE Project P802.16j	
Abstract	The document contains technical proposals for IEEE P802.16j that would provide a n ARQ scheme by using multiple cooperative relays	
Purpose	The document is submitted for review by 802.16 Working Group members	
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An ARQ with Cooperative Relays

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1. Introduction

Cooperative relay technology becomes upcoming state-of-art technology. It provides reliable downlink frame transmission by either transmitting synchronous frames simultaneously or adopting channel coding mechanism. Both previously introduced schemes are applied to PHYSICAL layer (PHY). In spite of the fact that they can support reliable downlink frame transmission, the technology is only used for downlink frame transmission without Medium Access Control (MAC) support. However, if MAC utilizes cooperative relays, more reliable frame transmission is achieved. This proposal introduces a new ARQ scheme with multiple transmission paths to provide reliable frame transmission by utilizing cooperative relays.

2. Proposal

We can assume that a Mobile Station (MS) transmits uplink frame to at least two cooperative relays. When a Relay Station (RS) receives an erroneous frame where only single bit is incorrect, the whole bits of the frame are useless because it is impossible to recover the frame. However, another RS may receive it successfully, and thus, relaying it toward its Mobile Relay-Base Station (MR-BS). An MR-BS has higher probability to receive a frame successfully compared with utilizing a single relay.

Automatic Repeat Request (ARQ) is one of reliable transmission schemes provided by MAC. ARQ can be applied to reliable frame transmission by utilizing cooperative relays at MAC layer. Both MR-BS and MS are the terminal entities each ARQ path begins or ends.

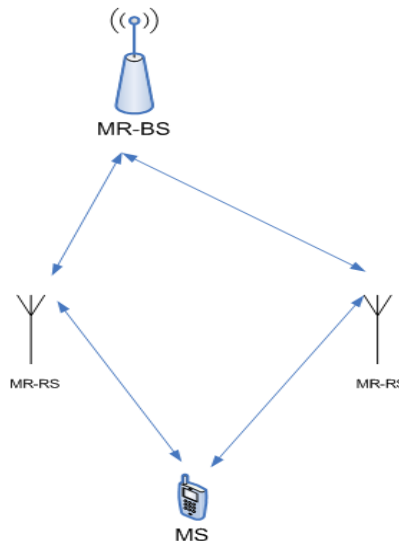


Figure 1 Multiple-path-establishment for ARQ using cooperative relays

Fig.1 shows an example when an ARQ is utilized by supporting multiple paths when cooperative relays are deployed. In this figure, an MS transmits a frame both MRS simultaneously, and then, each MRS filters out erroneous frames by relaying successfully received frames toward MR-BS. In order to make it possible, MR-BS is required to configure each MRS to provide the ARQ scheme.

3. Text Proposal

[Insert the text at the section 6.3.4.6.4]

An MR-BS may establish multiple paths for single ARQ-enabled connection between itself and an MS via several MRSs. An MRS on each path shall drop incorrectly received frames with corrupt CRC. Otherwise, it shall forward the successfully received frames to the next destination on each path.