Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**A Generic Proportional Fair Scheduler for OFDMA system simulations**	
Date Submitted	**2007-05-03**	
Source(s)	Dave Pechner, Arvind Raghavan, Gokhan Korkmaz ArrayComm, LLC	dpechner@arraycomm.com, arvind@arraycomm.com, gkorkmaz@arraycomm.com
Re:	Call for comments to the evaluation methodology for TGm	
Abstract	This document describes a generic proportional fair scheduling algorithm for use in OFDMA system simulations	
Purpose	Approve and adopt in the evaluation methodology	
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>.

A Generic Proportional Fair Scheduler for OFDMA system simulations

Dave Pechner, Arvind Raghavan, Gokhan Korkmaz
ArrayComm, LLC.

Problem Statement

A detailed description of a generic scheduling algorithm must be specified in the evaluation methodology, and made normative. Fair comparison of different proposals is impossible unless the same scheduling algorithm is used. Stipulating that a proponent's scheduling algorithm be completely specified is not sufficient to ensure alignment of simulation results.

Suggested Remedy

[Insert the following section before section 8.3]

8.3 Generic Proportional Fair Scheduler for OFDMA

The proportional fair scheduler (PFS), in its simplest form, computes a metric for all active users at for a given scheduling interval. The user with the highest metric is allocated the resource available in the given interval, the metrics for all users are updated before the next scheduling interval, and the process repeats. To adapt this simple algorithm for OFDMA systems, the definition of scheduling interval and scheduling resource must be extended to apply to a two-dimensional OFDMA frame resource.

For OFDMA systems, the scheduling interval is typically a frame, and multiple users may be allocated in the same frame. Therefore, in the simplest extension to OFDMA systems, two modifications must be made to the PFS: (i) Frames must be partitioned into fixed scheduling resources that must be scheduled sequentially until all available resources are used up. (ii) The metric must be updated after scheduling each resource. Note that the number of resources eventually allocated to a user depends on the metric update process, and does not preclude a single user from getting multiple or all the resources in a frame.

To promote fair comparison, each proponent should evaluate system performance using this generic PFS. The scheduling resource size is a simulation parameter that is TBD.