Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	Fast feedback response times
Date Submitted	**2004-11-04**
Source(s)	Intel.
	Yuval Lomnitz Yuval.Lomnitz@intel.com
	Yigal Eliaspur Yigal.Eliaspur@intel.com
Re:	IEEE P802.16e/D5-2004
Abstract	Change fast feedback response time for polling with fast feedback subheader
Purpose	Adopt changes
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>.

Fast feedback response times

Yuval Lomnitz
Yigal Eliaspur

1.   Motivation

The handling of fast-feedback as defined in 802.16REVd/D5 using fast feedback subheader is in some senses more demanding than handling of UL-MAP: The UL-MAP appears as the first burst in the DL subframe, however for fast feedback subheader, it can appear anywhere in the frame, can appear on any of the SS-s CIDs and may also be encrypted (being a subheader). It seems that this message is wrongly located as a subheader (subheaders are used in higher layers in the MAC such as frag/pack and may be handled off-line), and poses strict turnaround requirements on those layers, that otherwise would not be required.

This requirement is especially tough for mobile SS, which regularly handles small amounts of data compared to fixed SS, and therefore could have slower processing per burst.

We propose to delay the response to next-next frame.

2.   Notes

In addition the main use of the fast feedback (UL) slot for mobiles, assuming there are constant changes in the CINR which require high frequency reports, is with periodic allocation done through CQICH allocation IE. With this allocation the processing time is not an issue since it's done through the map (which appears in known location and is not encrypted).

It seems that polling with fast feedback subheader is used for low-frequency or sporadic polling (i.e. poll the user only when there is DL data for it), therefore enlarging the response time by one frame should not cause a problem.

Although the word "fast" is used, the main target of this mechanism (using the fast feedback subheader) is to provide a bandwidth efficient way of reporting downlink CINR to the BS, and the reponse time of 1 frame is not necessary.

Note that correct CINR measurement may take multiple frames (for good accuracy and averaging of temporary effects).

3.   Changes summary

[Add text in 802.16e/D5 to reflect the following change to the baseline document]

6.3.2.2.6 FAST-FEEDBACK allocation subheader

[Change the text as follows]

The allocation applies to the UL sub-frame ~~of the next frame~~ two frames ahead of the current frame.