

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Proposed text about sub-frame distribution optimization	
Date Submitted	2006-07-10	
Source(s)	Wu Xuyong, Huawei Huawei Industrial Base, Bantian, Longgang, Shenzhen 518129 P.R.C	Voice: +86-755-28972327 Fax: wuxuyong@huawei.com
Re:	80216h-06_016: Second Working Group Review: P802.16h Working Document (2006-06-05)	
Abstract	The sub-frame distribution optimization mechanism is similar with the channel distribution optimization. Except this deal with the sub-frame instead of the channel allocation.	
Purpose	Propose the text inside the new section of sub-frame distribution optimization	
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 >.	

Proposed text about sub-frame distribution optimization

Huawei Technologies Co., Ltd.

Overview

The basic idea of sub-frame distribution optimization is quite similar with channel distribution optimization. This mechanism is used when the system fail to allocate a free channel and fail to find a free sub-frame with current sub-frame allocation in the neighborhood.

Before creating a new subframe for itself, the system will try to vacate a subframe by subframe distribution optimization in the neighborhood or other community. If this step succeed, it is obviously better than creating a new subframe counting on the over all efficiency in the community. We talk about optimization inside neighborhood only in this paper.

Reference:

- [1] *IEEE 802.16h-06/014: 802.16h License-Exempt Task Group Meeting Minutes (2006-05-31)*
- [2] *IEEE 802.16h-06/015: Working Document for P802.16h (2006-05-31)*
- [3] *IEEE 802.16h-06/016: Second Working Group Review: P802.16h Working Document (2006-06-05)*
- [4] *C802.16h-06/016: Optimization of channel distribution (2006-02-28)*

Proposed Text

3.92 Alternative Subframe (ALTSF): The alternative working subframe by the base station in the system, able to be used as its master subframe in its capable channel, on which the base station haven't detected any user and also not currently chosen to be the working channel of this base station.

15.4.2.2 Sub frame distribution optimization [using the section number of the C80216h-06_048]

When WirelessMAN-CX system have to share one channel with its neighbor system, it shall allocated a subframe as its master subframe. By checking the information table (see 15.3.3), if it can find some subframes free in any channel it can take up in its neighborhood, it can randomly choose one of them as it's master subframe and start operation.

When not able to find a free subframe currently, the system shall check in any of it capable channel if there is some subframe on which all the neighbor systems using it as the master subframe have alternative subframe (ALTSF). The system can negotiate with the systems occupying one of these subframe to move to there ALTSF and vacate a subframe for itself without change the current structure of WirelessMAN-CX frame.

The system shall check with these kind of subframe one by one and negotiate with its neighbors taking it as its master subframe to move to it's ALTSF before it succeed. If the system succeeded on one of this subframe, it can take this subframe as it's master subframe, otherwise, it means that the system fails in vacating a current subframe as its master subframe by subframe distribution optimization. The figure of procedure to find a current subframe as its master subframe for a system is shown below:

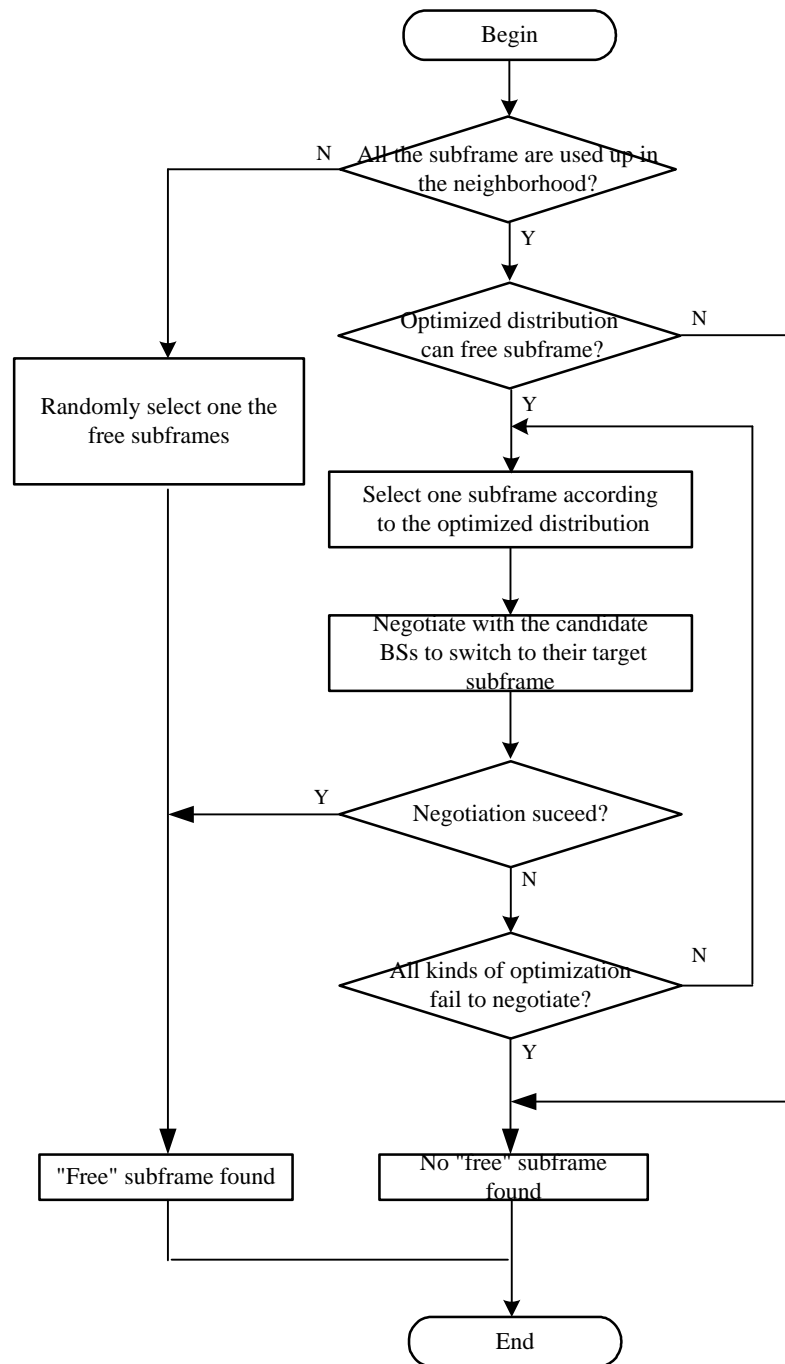


Figure hxx—the procedure to find a current subframe as its master subframe

Similar to the channel distribution optimization (see 15.4.1.2), the order of the subframe to be checked maybe counted on the user using it as master subframe.

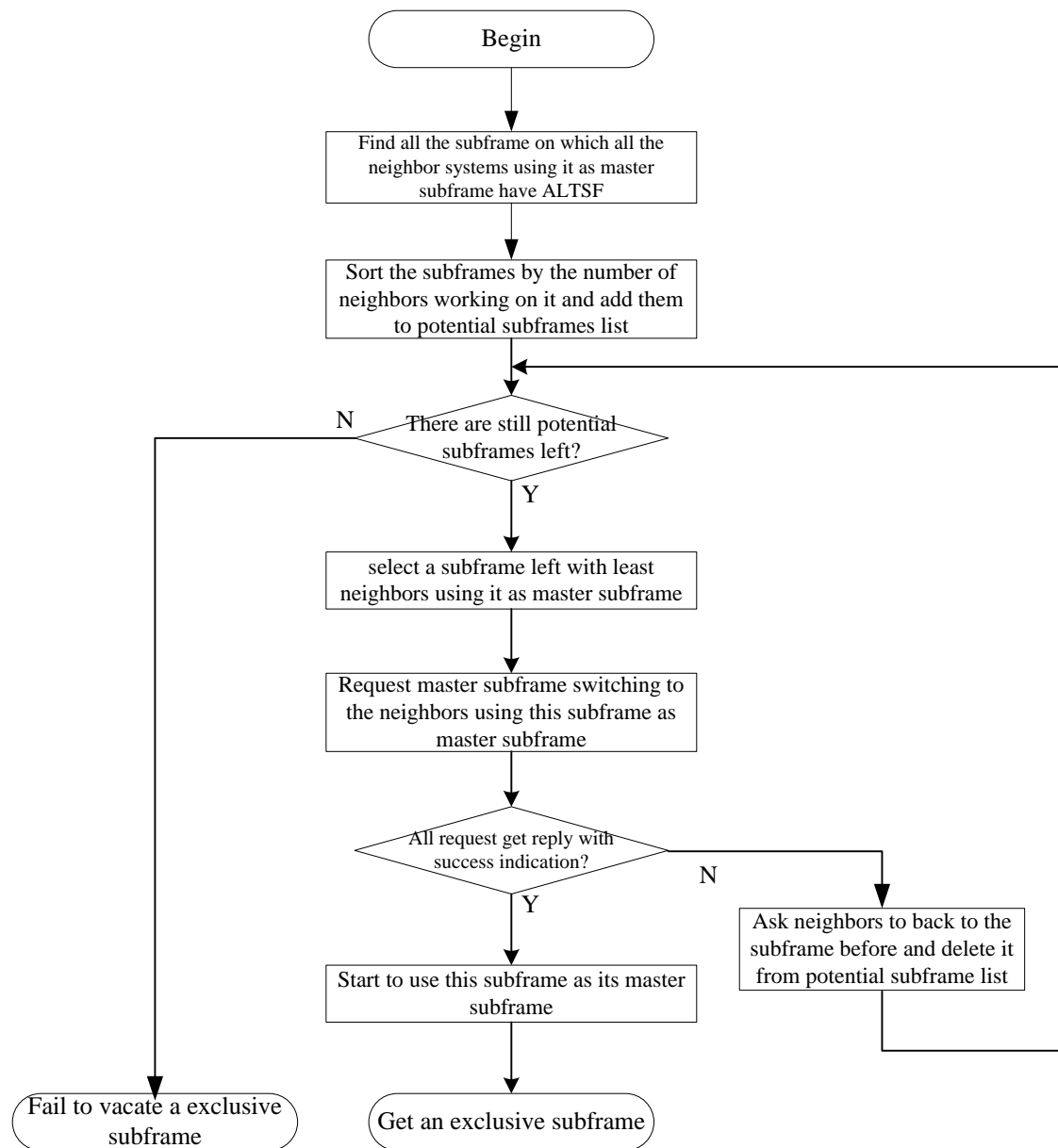


Figure hxx — Process of subframe distribution optimization

Finding all the subframe on which all the neighbor systems using it as master subframe have ALTSF, the system can sort the subframes by the number of neighbors working on it and add them to potential subframe list. Everytime the system should choose a subframe with least neighbors using it as master subframe and negotiate to the neighbors, requesting the neighbor systems currently using this subframe as its master subframe to switch to one of its ALTSF. If all the request succeed, the system can switch to this channel and start to use this subframe as its master subframe, otherwise the system need to ask all the neighbors to keep using their original subframe and deleted the subframe from the potential subframe list. If all the potential subframes in the list have been checked and no one can be vacated as master subframe of the system, the process of subframe distribution optimization is failed to get a exclusive current subframe as the master subframe for the system.

[add a row after the row of “alternative channel Flag” in the information table Table h4 -Information table for the systems inside the neighborhood or community]

| Alternative Subframe Flag | 1bit | Flag indicates this neighbor has one or more ALTSF. |

[add a row after the row of “channel reallocation” in the Table h1]

| Subframe Reallocation(ASFA) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |