Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Proposal for spectrum sharing, in license exempt bands, between 802.16a compliant systems**
Date Submitted	**2002-02-24**
Source(s)	Marianna Goldhammer, Alvarion 21, HaBarzel , Tel Aviv Voice: +972 54 22 55 48 Fax: +972 3 645 6201 mailto:Marianna.Goldhammer@alvarion.com
Re:	Re-circulation Ballot 4a
Abstract	Problem description and solutions to be discussed
Purpose	Discussion and later standard modification
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 (Version 1.0) <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing 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:r.b.marks@ieee.org> as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Proposal for spectrum sharing, in license exempt bands, between 802.16a compliant systems

Marianna Goldhammer
Alvarion

Introduction

Co-existence in the same band

The available channel number is obviously lower that required. In these conditions, in order to avoid the customer disappointment, the 802.16 community should find a way of intelligent spectrum sharing.

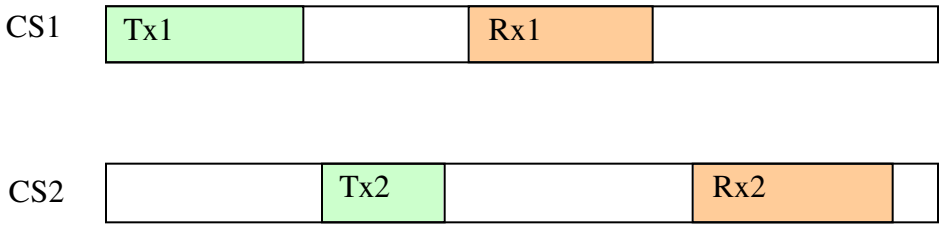
Listen before send

This mechanism is used by 802.11 and permits to co-locate more cells than available channels.
Nevertheless, it destroys the 802.16 scheduling mechanism.

Central Stations communication

Due to TDD operation, the Central Stations are able to exchange information. Such information may be the frame duration code, transmit needed time and receive needed time. The needed time will be function of actual transmitted traffic. The both systems, using the 802.16 protocol, can easily schedule the time needed by the other system for operation, if will use the same frame duration.

The figure bellow exemplifies a situation when 2 systems share the same band.



Scenarios of operation

Suppose that CS1 is already on the field and a new system, around CS2, is deployed.
CS2 listen to all the channels, to see if there are 802.16 compatible systems; an 802.16 compatible system will announce their actual RF configuration (existing DRFM message) and bandwidth requirements. CS2 will try to associate to the CS1, based on RF and traffic considerations.
CS2 joins CS1 cell and announce that is a new system. CS1 becomes the bandwidth manager of the 802.16 system. The CS1 will receive CS2 bandwidth requests and will make a fair allocation of the spectrum, proportional with the requested transmission time. If suddenly the CS1 will become too busy, the allocated bandwidth will be unsatisfactory for CS2 and CS2 will try to find a less occupied bandwidth.
An 802.16 compatible BS shall fairly share the spectrum.

Conclusions

The 802.16 standard should be design in order to enable the market. With one channelization mode (10MHz) and band sharing support the 802.16 equipments will be deployed by an increased number of operators.