IEEE 802.19.1a  
Wireless Coexistence

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| Text proposal on the algorithm for interference alignment based coexistence management | | | | |
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Abstract

This contribution provides text proposals for coexistence algorithm of interference alignment based coexistence management.

7.2.2.x Algorithm for interference alignment based coexistence management

7.2.2.x.1 Introduction

Even in the same tier of spectrum access. For example, in TV band the WSOs could the wireless LAN at shopping mall provided by shops. These shops would like to pay some money for the spectrum utilization in order to have a better performance than other users who pay less/no money for opportunistic spectrum utilization. If these WSOs employ multiple antennas, interference alignment can be utilized to adjust the interference among these WSOs so that the desired performance of the high priority users can be achieved.

7.2.2.x.2 Interference leakage weighting factor

In Figure xx, there are multiple WSOs deployed at a given area. All these WSOs have subscribed to the IEEE 802.19.1a coexistence services. Among them, one WSO provider has paid more money for spectrum utilization thus is denoted as the high priority user. Assume that each WSO transmitter employs transmit beamforming to mitigate interference to the coexisting WSO receivers. We introduce a factor called interference leakage weighting factor which describes the weight on the interference of a WSO to co-channel WSOs, where the value is limited from 0 to 1. A higher priority user will be assigned a lower interference leakage ratio than the ratio of the WSO with a lower priority level. The lower interference leakage ratio means that this WSO does not need to care much interference to others as compared with the WSO that has a high interference leakage ratio. Knowing the location of the coexisting WSO receivers, the potential interference from one WSO to the others can be predicted. The signal to interference leakage ratio is defined as desired signal power of the WSO divided by the total interference from this WSO to the other WSOs multiplied by the weighting factor. The beamforming weighting factor is obtained by maximizing the signal to interference leakage ratio.



Figure XX Example of deployment for centralized control energy detection

7.2.2.x.3 Algorithm description

The processes are as follows.

* P#1  
  P#1 is the procedure operated at the CDIS where the CDIS obtains the receiver information of the WSO through the WSO registration procedure as specified in 5.2.3.1 WSO registration procedure. Based on the information CM Estimate the interference range of the WSO based on the maximal transmit power, the height of transmitting antennas and other related information;
* P#2  
  In this process, the CM obtains all the active WSOs (i.e., the SUs in active communications) in this interference range, and then sort their priorities.
* P#3  
  In this process, the CM determines the interference leakage ratios for the WSOs in a proportional manner according to the required SINR difference and the transmit power at different SUs;
* P#4  
  In this procedure, CM can use the Reconfiguration procedure as specified in 5.2.10 to send the interference leakage ratio, location information of WSOs.
* P#5  
  In this procedure, each WSO generate the beamforming transmit vector by maximizing its own signal to interference leakage ratio with the given function.



Figure XX