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SC-FDMA FEMTOCELL: A ROAD MAP ON DYNAMIC BANDWIDTH ALLOCATION IN COGNITIVE NETWORKS TO AVOID THE INTERFERENCE

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Abstract

Macrocell network can significantly increase the bandwidth utilization and increase the capacity of macrocell through Femtocell working principle as OFDMA FDD function. Femtocells can be configured in three ways to control or to use other means: Open access: the use All are welcome to join. Closed Access: The femtocell allows only registered people apply to join. They get old: Nonsubscribers using fewer resources femtocell. One of the effective ways to improve matters and improve information and case Wireless cellular network technology is far reduced cell size (i.e. cell division) and infection. Therefore, the idea of purpose femtocells in macrocell recently attracted increasing interest in demi, industrial and Standardization forum. Sufficient guard band separates the two bands, so the transmitter and receiver do not interfere with each other. Good filtering or duplexers and possibly shielding are necessary in order to ensure that the transmitter does not desensitize a neighboring receiver. In this *survey* we are going to address how the femtocell is going to use the channel effectively by using the guard band and the unused spectrum by the primary user with SC-FDMA.

Keywords: FDD, Femtocell, Macrocell, OFDMA, SC-FDMA.

Introduction

Wireless devices are becoming ubiquitous, placing increasing emphasis on constant radio spectrum available for all access technologies. In order to eliminate interference between different wireless technologies, the current policies assign a fixed slice of the spectrum of each technology. This prevents static assignment of devices to the efficient use of the allocated frequency spectrum causing holes (no target devices in the local area) and very low use (6%) in other geographic areas [1]. The general model and utility functions to optimize the use and equitable allocation of the frequency spectrum for open systems. By reducing the optimal allocation to one of the color-sensitive graph coloring

(CSG). In graph theory, graph coloring is a special case marking the chart; it assigns labels traditionally called "colors" in relation to the chart elements subject to certain limitations. In its simplest form, it provides a method for coloring the vertices of the graph such that two adjacent vertices share the same color; it is called the vertex coloring. Similarly, coloring the edges assigns a color to each side, so that no two adjacent edges share the same color, a color flat face chart assigns a color to each area or region, so that no two faces that share a boundary have the same color.

The problem of dynamic bandwidth allocation between different classes of services under uncertainty cognitive radio networks. In such networks, the secondary users compete for resources and bandwidth providers compete for user access (eg subscription). To solve this problem, a two-level framework for a dynamic game is being developed. Eligibility dynamic service user's secondary is modeled as evolutionary game based on the replicator dynamics. Random churning irrational behavior of secondary users is modeled as stochastic disturbances in the development of the distribution range of services.

On the upper level, the allocation of bandwidth stochastic difference game is formulated model competition between different service providers. Distribution range of services of the underlying evolutionary game describes the state of the top game of the differential stochastic and Markov perfect Nash equilibrium is considered to be the solution. The decentralized nature of the framework makes the system flexible and easy to implement.

Cognitive Network (CN) as a network of cognitive process, which can be seen the current network conditions, plan, decide, act on these terms, learn from the consequences of their actions, while the following end-to-end targets. This loop knowledge, sense the environment, action plans in accordance with the input from the sensors and the network policy, decide which scenario best fits the job end-to-end by a motor reasoning, finally working from the script. The system learns from past (situations, plans, decisions, actions) and uses this knowledge to improve decisions in the future. This definition CN clearly not to mention the knowledge of the network; only describes the cognitive loop and adds end-to-end goals, which set it apart from CR or so-called cognitive layers.

Paradigm Networking is referred to as the next generation (XG) network as well as Dynamic Spectrum Access (DSA) and cognitive radio networks. The term Networks XG is used throughout the paper. New features and current research challenges XG networks are explained in detail. More specifically, a brief overview of the cognitive radio technology and network design is xG introduced. What's more, xG network functions such as spectrum management, mobility and

distribution of the spectrum of the spectrum are explained in detail. The impact of these functions on the performance of upper layer protocols, such as routing and transport are investigated and open research issues in these areas are also presented [2].

Challenges of SC-FDMA

Single-carrier FDMA (SC-FDMA) may be FDMA theme. This is further known as a linearly precoded OFDMA (LP-OFDMA). Like many alternative access systems (TDMA, FDMA, CDMA, OFDMA), deals with assigning multiple users to a shared communication resource. SC-FDMA is understood to be linearly precoded OFDMA theme in the sense that it is additional discrete Fourier series transformation (DFT) process step preceding the standard process OFDMA.

Femtocell Network SC-FDMA may be a promising answer accepted these days to deal with large cell transportation needs. Especially allocation channel secondary user communication becomes a problem especially sexy growing interactive services and the enormous volume Uploaded Information. Intelligent allocation of resources and the involvement of a management area many challenges in this context. During this work, we tend to propose a linear model to optimize transmission femtocell SC-FDMA reaches resources adaptively portion in relation to the link quality. Each unit of power and modulation and the area of secret writing systems jointly appointed to each user on each designated sub-channel. The construction cluster is accepted as a hybrid centralized / distributed network. User differentiation strategy provides QoS guarantees in relation to the priority level of each user.

$$X_i = \frac{1}{N} \sum_{i=1}^{N-1} F_n \log(n) n_i$$

The X_i is the channel to be selected for transmission among the n input channels with the carrier channel n_i.

The Sc-FDMA system model is shown in Figure 1. Short description of the model is below. The most distinction between SC-FDMA and OFDMA is that the SC-FDMA has an additional separate processing Fourier process (DFT) and therefore are able to think for the SC-FDMA as an OFDMA DFT-Spread anywhere signals knowledge in the time domain are converted to the frequency domain by a DFT prior to prying OFDMA modulation. Initially, the file input stream is modulated to 1 single carrier symbols by building using part of the Shift Keying (QPSK), 16-QAM (Quadrature Amplitude modulator) or 64-QAM. The resulting modulated symbols become inputs earmarked SC-FDMA blocks. Then, modulated symbols are converted into symbols in parallel and arranged in blocks. Currently, N-point DFT (Discrete Fourier Transform) conversion domains together individual blocks bearing on N separate frequency tones.

Then, subcarrier mapping controls the allocation of frequencies and maps N separate sound frequencies to the sub-transmission. Mapping is located or distributed. In the localized mapping, N-discrete frequency tones are mapped onto N consecutive subcarriers as distributed anywhere in the mapping; N-discrete frequency tones are mapped to subcarriers uniformly distributed. Then the M-point IDFT converts the subcarriers mapped in the time domain. If M> N then the unused inputs are set to zero. If they are equal (M = N), simply wipe out and becoming a standard single user system carrier frequency domain deed. However, if N is less than M, and the other input to the inverse discrete Fourier transform are set to zero, the output of IDFT will be registered with the features "a carrier" and therefore with low variations of energy, as well as a measure of information, which depends on N from subcarriers in the time domain are born again back parallel to serial. Cyclic prefix CP is a supplement to avoid ISI. CP length is greater than the delay of the channel to expand so as to avoid ISI at the receiver. During passage through the channel receiver of SC-FDMA the reverse of the transmitter of SC-FDMA[3]. Femtocell will take input from DFT and will boost the signal to the area exposed. While in the process of downlink data to the receiver will be provided by Femto cell when the receiver is not in range.

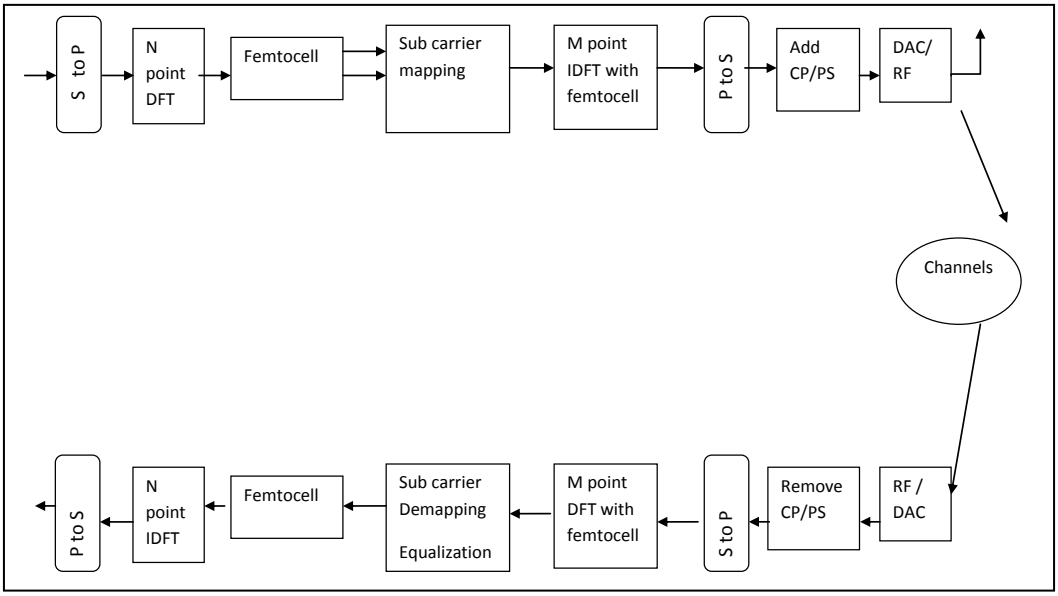

Fig 1.Transmitter and Receiver Structure of LP-OFDMA/SC-FDMA.

DFT: Discrete Fourier Transform

IDFT: Inverse Discrete Fourier Transform

CP: Cyclic Prefix

PS: Pulse Shaping

DAC: Digital to analog Conversion

RF: Radio Frequency signal

ADC: Analog to Digital Conversion

LP-OFDMA: Linearly pre coded OFDMA

Femtocell Deployment and Technical Challenges

Figure 2 [4] Femtocells are applied at intervals of macrocells in the two-stage heterogeneous network. Allocation of spectrum resources between femtocells and macrocells may be an important issue. There are three achievable ways femtocell deployment of resources: the preparation of a dedicated channel, the preparation of the partial Hannele division and distribution of co-channel.

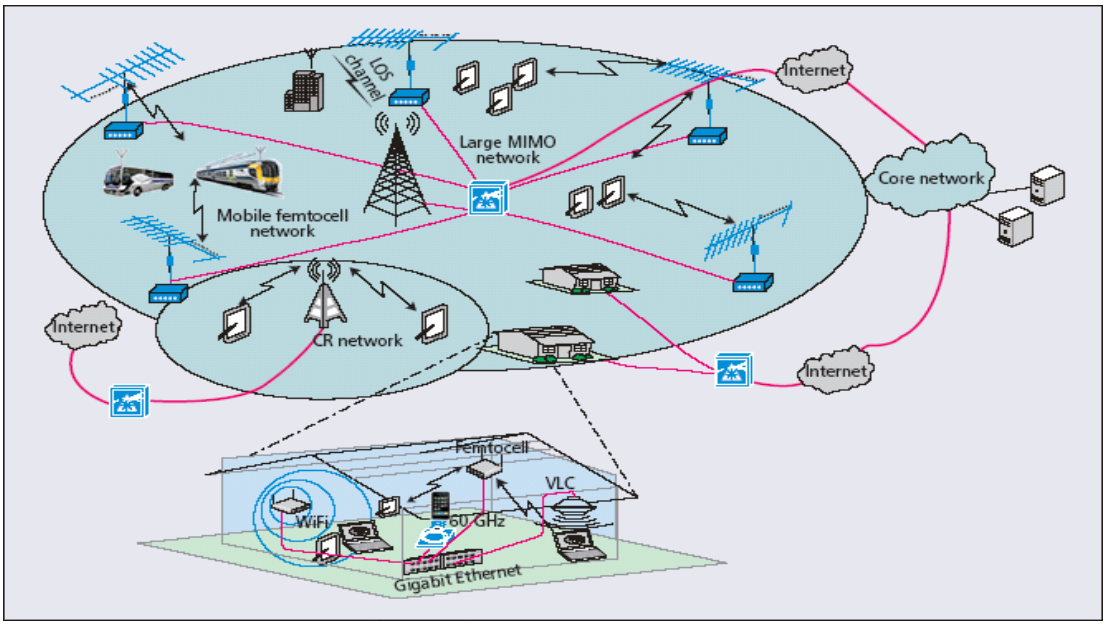

Fig 2. Wireless Mobile architecture with Cognitive Radio Network with SC-FDMA approach.

1) Implementation of a dedicated channel: femtocells square means allocated ardent carrier frequency quite different from those macro cells. This willingness can be a simple resolution, to avoid interference between the 2 layers, but is inefficient use of spectral measurement information through segmentation.

2) Partial-channel division Implementation: All the information is a measure of segment 2 elements. One half is only assigned users macros, as well as the alternative half is divided by macro cells and femtocells. Macro users use the current coverage for booking the carrier frequency and partial coverage (outside of the femtocell coverage) to share carrier frequency. This readiness is economical and at the same time not causing many casualties inside information and mutual interference, but some of the spectrum and the high cost of aggregation carrier-capable terminals square means necessary. The co-channel in this formulation, the spectral usage is high, as is apparent from Femtocells are arranged in

the same carrier frequency as the macro cells although not measure for segmentation. This budget and strategy backward compatible not recognize the high availableness spectrum and support carrier aggregation terminals. Implementation Co-channel is very tempting for operators in a crowded spectrum. Thanks to the cooperation channel implementations of femtocells CSG produce coverage holes in the interference between macro cells-layer [5]. Mobile architecture of cognitive radio network, it will act as a cognitive radio will find unused spectrum by primary users. Cognitive radios are active only within the signal; beyond will not work. To introduce them to work fetmtocell within a macrocell. With femtocells signal range will be increased. For example, in Figure [2] house is not given the signal to each corner. Little of no signal. So we are going to put Femtocell give a signal to the region also showed. We are going to give the cognitive behavior of the radio network.

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Conclusion

In this survey, we are addressing how the femtocell is going to use the channel effectively by using the guard band and the unused spectrum by the primary user with SC-FDMA. The SC-FDMA is working with the single carrier frequency division multiple accesses i.e. similar to OFDMA working is serial passion. The DFT in fig [1] will find the m channel available to transmit the data, at receiving end n channels for downlink. Irrespective of the m,n values transmission is going to happen with SC-FDMA technique. The femtocell is for boosting the signal strength.

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