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Survey on - Analysis of Conventional and Wavelet Based System for Detection of Impulse Noise

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Abstract - ***This paper deals with the review of analysis of Impulse Noise and BER based on Conventional and Wavelet based OFDM system. Consider, here OFDM is partitioned into conventional i.e. single carrier and wavelet based i.e. multiple carrier system. OFDM is an orthogonal frequency division multiplexing system, here used with multiple carriers. Wavelet based OFDM does not require the use of available bandwidth as that of conventional one and gives higher spectral efficiency with good orthogonality. Here we are going to proposed wavelet based OFDM system instead of Discrete Fourier Transform (DFT) based OFDM for showing the performance of wavelet for BER and impulse noise.***

Key Words: **LTE, OFDM, DFT, wavelet, BER.**

1.INTRODUCTION

The 4th generation cellular systems have defined their set of requirements by International Telecommunication Union Radio communication sector called ITU-R. Today different wireless communication usage require high spectral efficiency and very flexible spectral utilization. In ofdm multicarrier given inputs are divided into several streams. And these subcarriers are orthogonal to each other. In frequency domain, subcarriers are overlapped because of orthogonality and give good bandwidth efficiency. Wavelet based OFDM can be used in both domain i.e. in frequency and time domain. In DFT based OFDM,ISI and ICI occurs due to less orthogonality.

In this paper we are trying to compare the performances of wavelet based OFDM with conventional one. On this basis we are also trying to detect the noise created during transmission of data by orthogonality concept and making graphs of BER(bit error ratio) for error enhancement with the help of proposed wavelet based method. Here we are using Daubechies and Haar wavelet for performance point of view with the help of Additive White Gaussian noise.

The paper contains the details about conventional OFDM system and its performances in one part and all about the proposed OFDM system in second part.

I. CONVENTIONAL OFDM SYSTEM

Here we explained the 1st and basic part of concept behind this paper i.e. traditional system which is used in earlier result papers. In this system input signal to the system are used to modulate the the signals with DFt transform basis functions. Here we used FFT and IFFT basis functions because it requires less computations. During performance we have taken number of copies at the end of receiver called by process cyclic prefix.

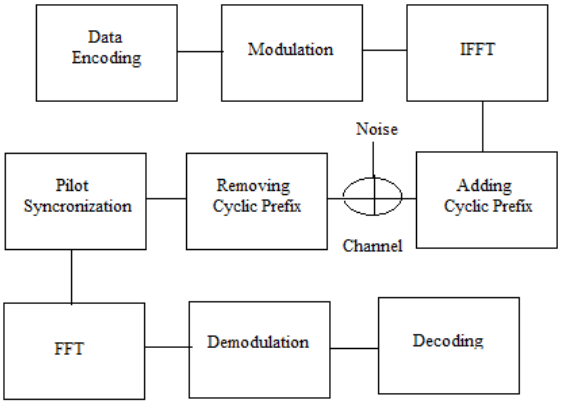

Figure 1. DFT based OFDM transmitter and receiver

II. WAVELET BASED OFDM SYSTEM

Here we are showing results for wavelet based ofdm system. As DFT based ofdm is complex so we need to use simple one i.e. wavelet based. This wavelet based ofdm system has the strength to covert DFT based ofdm to wavelet based. Here in this section we are using Discrete wavelet transform(DWFT). In this we need to pass the input data through different LPF and then through HPF. When it passes through the HPF it only takes high frequency. But after some

time this same procedure gets repeated until the receiption of wavelet coefficient of required level.

By LPF process we got some approximated wavelet coefficient and by HPF we got perfect selected wavelet coefficient.And this whole procedure is repeatative. Decomposition through this above procedure is given by equation

yhigh[k]=ΣnX[n]g[2k-n]

ylow[k]=ΣnX[n]g[2k-n]

III. Proposed Wavalet Based OFDM Design

As this is our proposed design which we are proposed on the basic of some calculated results of earlier work done. Here we are using IDFT and DFT instead of IDWT and DWT used in above given wavelet based system. The whole procedure is given in related block diagram. Here in transmission of signan we are usingb AWGN channel without cyclic prefix concept. In this method input is given and encoded it following by interleaving process. then interleaved data is coverted to decimal form by modulation technique.

Here after modulation data is followed by AWGN channel for providing orthogonality to the subcarriers. Here out signalisin time domain and thischannel convertes the singnalinto frequency domain. Finally to check the noise presence the data is agin demodulated ans deinterleaved and we will get the original data again at receiver.

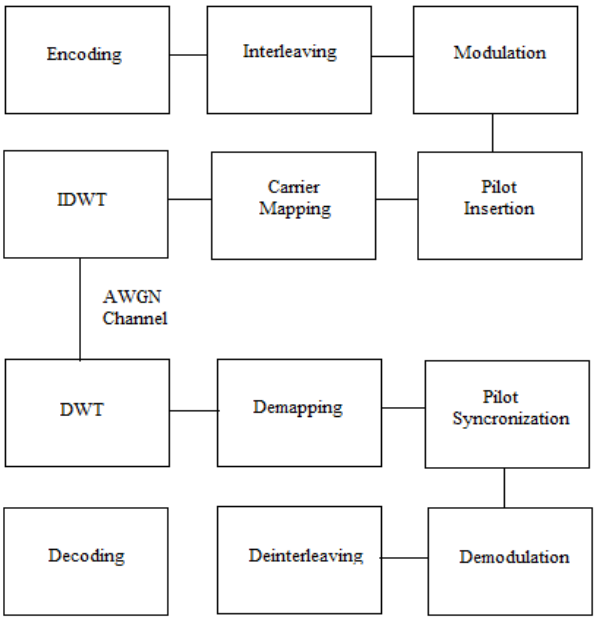

Figure2. Wavelet based proposed OFDM system design

IV. BER Performance and Impulse noise evaluation

In this project we are doing all this performances using Matlab. Here DFT based OFDM and wavelet based OFDM are trying to draw ani impulse noise also with different modulation techniques. Modulation used here for showingthe performances are QPSK,16QAM and 64QAM uplink and downlink both. But we found that by using QPSK used for LTE data can not be carried at very high speed. Hence only higher modulation forms are used here finally.

For impulse noise detection, signal to noise ratio has been introduced through AWGN channel. Here 9600 bits data is sent through form of 100 symbols. Hence single data will be of 96bits.

Here we tried to find the performance of DFT based and wavelet based OFDM for different modulation forms. We used Daubechies and Haar type of wavelet for different type of modulations.

So finally it came to conclude that performance of BER is better then DFT based OFDM design. And we got some graphs which shows following results.

- db2 performance is better than haar when used with QPSK.
- When used with 16QAM db2 andhaar has similar in performance.
- When used with 64QAM haar and db2 has better then DFT.

3. CONCLUSIONS

Here in this paper we came to the analysis of performance of proposed design of wavelet based system and compared its performances using different types of modulations with DFT based OFDM. We got some graphs from transmitter side of BER and impulse noise curves. These curves for wavelet based are better than that of DFT based. On the above analysis done here,now we are trying find the graph performance for impulse noise analysis also on the basis of BER performance. We have used daubechies and haar types of wavelet which provides better performances at different SNR intervals.

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