REDUCTION OF BER & PAPR PROFILE BY USING WAVELET BASED OFDM ANALYSIS

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Abstract - This paper present the analysis of system BER and PAPR performance of wavelet based OFDM using different types of wavelet like as Symlet, Coiflect, Daubechies. The OFDM has less spectral efficiency than wavelet OFDM.By using this different types of wavelet families to find out Bit Error Rate performance and PAPR characteristics of WOFDM. The selected wavelet based OFDM system are shows the improvement of 3 dB gain Eb/No.and significant amount of PAPR reduction as compared to OFDM.

Keywords - FPGA; Orthogonal Frequency Division Multiplexing; Bit error rate; Peak to average power ratio.

I. INTRODUCTION

The OFDM is modulation technique that offers superior performance and benefit over older ,more traditional single carrier modulation .OFDM is extremely difficult to implement on the hardware. For practically semiconductor method and computer technology can be used. OFDM is depend on the concept of frequency-division multiplexing (FDD),it is used for transmitting multiple data stream over the signal. The medium like as radio spectrum, coaxial cable, twisted pair, or fiber-optic cable can be used. The FDD technique is typically wasteful over the bandwidth.

The OFDM modulation technique is depend on the channel. For long channel Validation of assumption does not take place. Policy of Divide and rule used in OFDM. The modulation of Bits are used in different modulation technique. OFDM is depends on digital signal processing.
The subcarrier should be orthogonal, so that different spectra may overlap. The discrete frequency and time transformation is performed in OFDM. For generation of the sub carriers Fourier transform is used. These problems we need to look at other type of modulation for generation of the carrier. OFDM is highly resistance to the multipath problem in high frequency wireless. Short wavelength signal travels.

In wavelet based OFDM we used the discrete and inverse discrete transform in the form of wavelet. In OFDM time-frequency gives lesser flexibility than the wavelet transform. All wavelet transform may be considerable form of the time frequency representation of continuous wave signal and it is related to the harmonic analysis.Broadband communication is used for high speed communication. Small channel width obtained the flat frequency response. When the channel width grows it is divided into small sub channels. Digital signal processing techniques is used for data transmission for long difficult channel. Field-Programmable Gate Array (FPGA) is a hardware which is used for implementation. It can be programmable and actual design implementation can be done by designer.

Wavelet transform

Wavelet is a wave like oscillation with an amplitude that starts at minimum level i.e. zero, then increases, and it again decreases then it goes returns back to zero. It can be visualized in the form of graph.Generally, wavelets produce some specific properties and it is useful for signal processing. Wavelets is nothing but the combination of mathematical operation and it perform the multiple operation characteristics technique and it is called as convolution, with portions of a known signal which is obtained from the unknown signal. Wavelet transform divides the feeding signal then it obtained the series of local basis functions which is called as wavelet.
A wavelet transform can be represent in the form of square-integral function with respect to large no of set of function set of functions.Wavelet transforms are broadly classified into three classes: multi resolution-based,continuous and discrete the wavelet transform is nothing but the typically subset of versatile transform. In wavelet transform linear combination of wavelet that is Wavelet packets can be used.

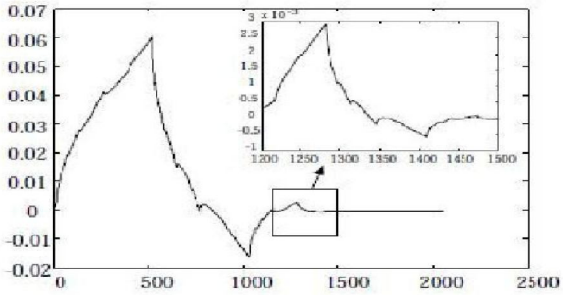

Fig1. mother wavelet.

Nowadays, wavelet transformation is time-frequency transformations used in wavelet based OFDM.
For mother (prototype) wavelet (functions).prefers continuously differentiable functions practical applications, and for efficiency reasons than the wavelet based OFDM.

1.2. Wavelet based OFDM

Wavelets are a class of a functions used to localize which is obtained in terms of finite interval. It produce the translation and contraction properties can be obtained from the Daughter wavelets. Wavelets are most useful for compressed the image data, A wavelet transform has properties which are more superior and useful than conventional Fourier transform.

Generalization of the classical wavelet transform is obtained from the fractional wavelet transform (FRWT) .This transform is used to provide the domain information as well as this signals represent in the form of time ,fractional, frequency signal.

II. DETAILS EXPERIMENTAL

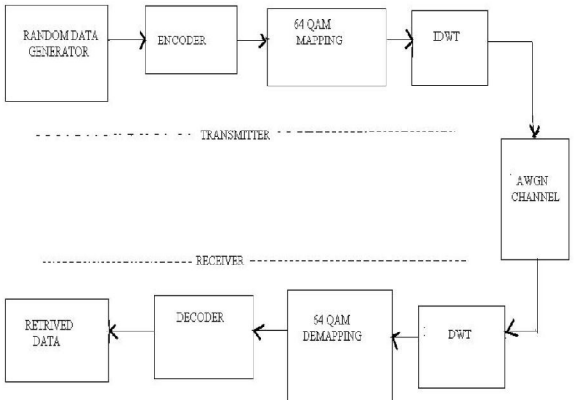

Fig2.Block Diagram of Wavelet Based OFDM

2.1. Convolutional Encoder:

A convolutional code is used for error correction that produce the parity symbols like in even and odd parity the Boolean polynomial function in the form of data stream. This sliding application are used torepresents the convolution encoder over the data, then this can be used in to the term of 'convolutional coding.'.The classic block codes can be obtained in the forms of arbitrary block length.

2.2. Mapper:

According to this modes of operation the data bits are mapping with QPSK .Rejection of the parity bits are done by puncturing .MAPPER is used for the proper database management and for the processing system

2.3. AWGN Channel:

Additive white Gaussian noise (AWGN) is a type of noise which is used in most of the Information theory to reduce the effect of random processes. It is used for the modifiers to identify the some specific characteristics: Additive means adding of noise which is most of the done in the information system. It is in the form of white color which is used for all frequencies in the visible spectrum.

2.4. DWT&IDWT:

A discrete wavelet transform is wavelet transform for which the wavelets are process successfully7. it captures both frequency and location information signal . The function reconstructs data by performing Inverse Discrete Wavelet Transform.

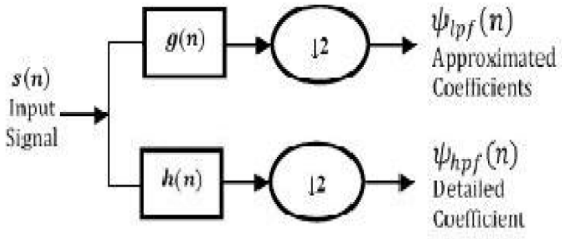

Fig3.DWT &IDWT Process

For the decomposition process Series of High pass and low pass filter is used.

2.5. PAPR & BER in OFDM

Table1.The parameter used for the analysis of BER & PAPR reduction are as follow.

Parameter	value
Modulation type	64 QAM
No.of subcarrier	128
DWT point	128
Channel model	AWGN

This also applies to different wavelet families like as Symlets and Coieflet wavelets. For discrete Meyer, dmey is the discrete approximation version. The performance of BER under 128- subcarriers of OFDM and WOFDM are compared with 64-QAM modulation under AWGN channel. AWGN analytic is reference profile in AWGN channel.Envelope fluctuation of the OFDM signal can be performed.

2.6. Effect Of High PAPR

In wavelet OFDM transform number of subcarrier are used and it give the large dynamic range of signal. It produce the radiation band and distortion when signal passing in power amplifier. This can be avoided by using linear region. It is defined by the peak divided by the Root mean square (RMS) of the waveform

2.7. BER Rate

Reduction of bit error rate is perform in wireless communication. Noise robustness of DWT-OFDM communication scheme are performed. At the receiver side Various parameter is affected .BER like

as channel noise, interference, distortion, etc. The strong signal strength is improved by choosing the powerful signal

2.8. FPGA

The FPGA can be used programmable read-only memory (PROM) and programmable logic devices (PLDs). PROMs and PLDs both are used for the programmed in the factory or in the field However, programmable logic is a hard-wired used in the logic gates. Hardware description language used for FPGA implementation.

III. RESULTS AND DISCUSSION

3.1. Implementation

Matlab is used for verification of each step in this paper. The Matlab is a software which is used for mathematical computation. First the algorithm is verified, then the hardware implementation can be done. Additionally, HDL Coder built on the System on Chip and on the Field Programmable Gate array design tools and IP from Xilinxand Alterais used for the implementations. It performs the following steps :

- Firstly Model is simulate, and explore your algorithms in MATLAB, then it perform the simulation.
- After secondly it generate the target independent HDL code.
- Thirdly make the Program by using Xilinx and MATLAB then it Simulink.
- Lastly verify FPGA design

For this we use HDL Coder and HDL Verifier for generation and verify VHDL code by using the ASIC designs.

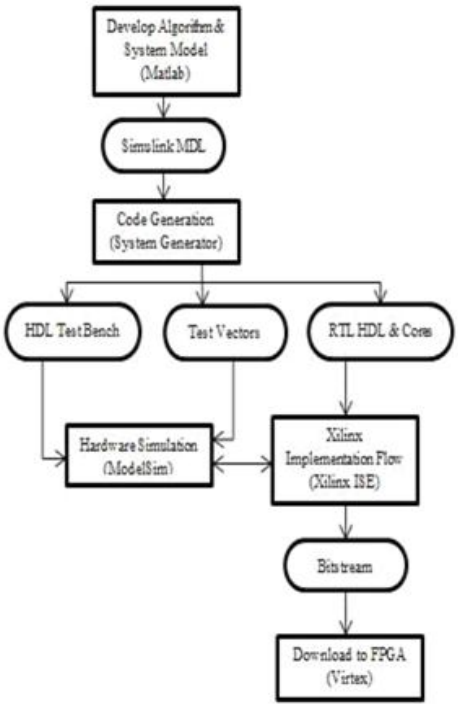

Fig.4 Hardware model

FPGA is superior method for implementation of the OFDM system

CONCLUSIONS

The range of signal is increased in reconstruction process of wavelet based OFDM. PAPR &BER performance can take place under the A white Gaussian Noise Channel. 3 dB improvement for BER can gives best performance of the WOFDM. The z of CCDF function also increased when PAPR performance take place. The higher no of coefficient produce the higher no of wavelet.

ACKNOWLEDGMENTS

To build a system which produce the lowest CCDF function at the z power. Best optimum power consumption is used for the operation of the system to perform the error. With respect to the selected power level Technique is that wavelets allow flexibility in this system.

The high data rate for wireless communication increasing widely. In the wavelet based OFDM the coherence bandwidth of the channel is much smaller than the transmitted bandwidth, then receiver are required highly complex equalizers for recovering the transmitted information signal.

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