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BFR Performance of OFDM System over AWGN Channel with Different Modulation Scheme

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ABSTRACT: On this paper Bit Error Rate (BER) performance of different modulation techniques are analyzed. There are different modulation schemes such as Binary Phase Shit Keying (BPSK) and Quadrature Phase Shift Keying (QPSK). The performance in between these modulation techniques is analyzed and best suited with respect to low Bit Error Rate (BER) is transmitted. Orthogonal Frequency Division Multiplexing also reduces the inter-symbol Interference (ISI). Simulation is carried out on the software named MATLAB. Simulation is carried over both BPSK and QPSK to obtain the optimum value of BER and SNR. Also examine the bit error rate (BER) efficiency of Orthogonal frequency division multiplexing (OFDM)-Binary section shift keying (BPSK) OFDM-Quadrature segment shift keying (QPSK), OFDM-Quadrature amplitude shift keying (QAM) over AWGN channel. The efficiency of transmission modes are evaluated by means of calculating the BER versus sign to noise ratio (SNR) underneath the Additive white Gaussian noise (AWGN), channel.

KEYWORDS: BER, BPSK, OFDM, AWGN,QAM.

I.INTRODUCTION

In this paper proposed it's an important to evaluate the performance of wireless Devices with the aid of considering the transmission traits, Wireless channel parameters and device structure. The performance of knowledge transmission over wireless channels is well captured via looking at their BER, which is a function of SNR [1] on the receiver. In wireless channels, a number of items have been proposed and investigated to calculate SNR. All of the models are a operate of the distance between the sender and the receiver, the trail loss exponent and the channel reap. A few chance disbursed services are on hand to model a time-variant parameter i.e. Channel acquires.

We describe the three most important and in general used distributions. Those are AWGN, Rayleigh, Rician, Nakagami-m units. It's increasingly believed that OFDM outcome in an accelerated downlink multimedia services requires excessive data premiums communications, however this is significantly confined by means of inter-image interference (ISI) as a result of the existence of the a couple of paths. Multicarrier modulation strategies, including OFDM modulation are viewed as probably the most promising technique to combat this difficulty [2] .OFDM Technique is a multi-provider transmission technique which is being well-known as an exceptional method for prime pace bi-directional wireless data communication. In OFDM system is able of mitigating a frequency selective fading channel to a suite of parallel flat fading channels, which want rather simple methods for channel equalization. Rayleigh and Rician fading distributions in frequency selective fading channels have already been deployed and studied extensive for OFDM programs. Quite a lot of channel estimation and variety schemes were proposed in literature to increase the error performance beneath Rayleigh and Rician fading channel [3].

Nakagami-m fading distribution is a useful and essential mannequin to signify the fading channel [4].Orthogonal frequency division multiplexing (OFDM) has been commonly adopted and implemented in wire and wireless conversation, similar to digital subscriber line (DSL), digital terrestrial TV broadcasting (DVB-T), IEEE 802.11a wireless local field networks (WLANs) and European excessive efficiency nearby discipline network (HIPERLAN/2).[5] When OFDM signal with specific modulation procedure transmitted with exclusive channels, the performance of BER is

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better in some modulation method and with some channels whereas its worst in another type modulation procedure and different channels, it's nonetheless touchy to modulation and channel.[6].

II.RELATED WORK

Anurag Pandey1, et.al [1] this proposed about OFDM is being widely used in many communication systems for its ability to enhance the data rate and reduce the bandwidth. The paper gives a comparison of the performance of OFDM system using different modulation schemes under the influence of AWGN and Rayleigh fading channel. Simulations of OFDM signals are carried out with Rayleigh faded signals to understand the effect of channel fading and to obtain optimum value of Bit Error Rate (BER).Gunjita Jain et.al [2] described the bit error rate (BER) performance of Orthogonal frequency division multiplexing (OFDM)-Binary phase shift keying (BPSK) OFDM-Quadrature phase shift keying (QPSK), OFDM-Quadrature amplitude shift keying (QAM) over different fading channels. The performance of transmission modes are evaluated by calculating the BER versus signal to noise ratio (SNR) under the Additive white Gaussian noise(AWGN), Rayleigh fading, Rician fading, Nakagami-m fading channel. In particular, the simulation of OFDM signals with different modulation schemes over different fading channels are carried out. Our simulation results are enough to understand the effect of fading channels with different modulation schemes and to verify the best suited fading channel in terms of BER Performance. Saroj Kanta Pattanaik et.al[3]Proposed derive approximate closed-form expressions for BER performance in AWGN channel with different modulation techniques like BPSK, QPSK, 8-PSK, 16-PSK, 32-PSK modulations and predict the performance of bit error rate (BER) with respect to Signal Energy per bit over noise power density ratio (Eb/N0). Simulation results show that the proposed simple analytical forms are quite accurate for different modulation techniques, which lead to the conclusion that BPSK gives the best and ideal performance as compared to other PSK in wireless communications. [7, 8]

III.PROPOSED SYSTEM

In this Proposed System when we give to the input of Binary Data. It will convert to serial to Parallel. When we put the OQAM Technique it will test through the Zero Padding works because it allows one to use a longer FFT, which will produce a longer FFT result vector to Adding the cyclic prefix for Photo detector. And the estimating process of channel equalization techniques is analyzed to improve the performance of OFDM System. Then estimating process will proceeding while OQAM post processing to converting parallel to serial Conversion.

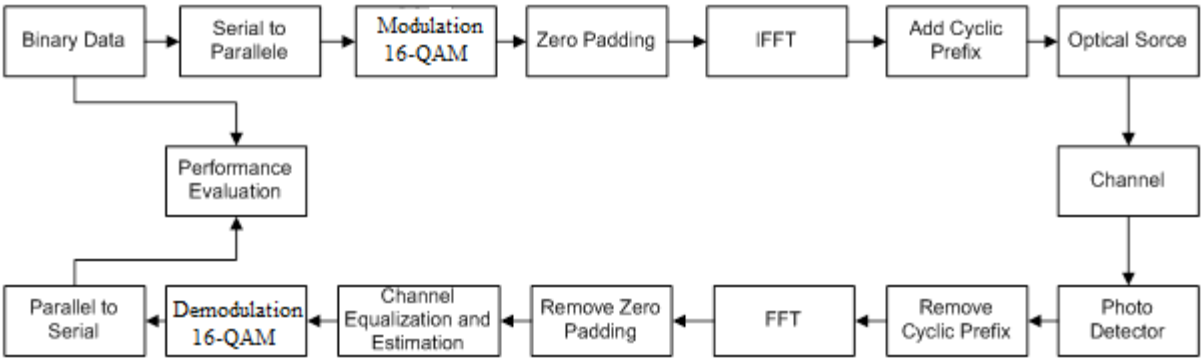

Figure 1: Architecture of the proposed System

A. AWGN

AWGN channel model is widely used in studying OFDM. In this model there is only linear addition of white noise with a constant spectral density and Gaussian distribution of amplitude. The model does not consider fading, frequency selectivity, interference etc. Although it is not much suitable for most of the terrestrial links. Since ever it's being used

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for providing simple and controlled mathematical models to study the basic behavior of a system in the absence of mentioned factors. In contrast to AWGN channel, in a multipath channel the transmitted signal reaches the receiver as a train of impulses. A multipath Rayleigh Fading channel considers the fading effects similar to an actual terrestrial channel [4-5]. It is best suitable for troposphere and ionosphere signal propagation and for signal propagation in urban environments in short when there is no line of sight between transmitter and receiver [9].

B. OQAM PRE-PROCESSING

The first operation is a complex-to-real conversion (C2Rk), where the real and imaginary parts of a complex-valued symbol Ck, n are separated to form two new symbols:

$$d_{k,2n} = \begin{Bmatrix} \mathrm{Re}[C_{k,n}]; \mathrm{k\ even} \\ \mathrm{im}[C_{k,n}]; \mathrm{k\ odd} \end{Bmatrix} \quad (1)$$

And

$$d_{k,2n+1} = \begin{Bmatrix} \mathrm{Im}[C_{k,n}]; \mathrm{k\ even} \\ \mathrm{Re}[C_{k,n}]; \mathrm{k\ odd} \end{Bmatrix} \quad (2)$$

As mentioned above one complex symbol Ck, splits into two real symbols one corresponds to real part and other corresponds to imaginary part. This means that the complex-to-real conversion increases the sample rate by a factor of 2.

C. INVERSE FAST FOURIER TRANSFORMS (IFFT)

The IFFT transform a spectrum (amplitude and phase of each component) into a time domain signal. An IFFT converts a number of complex data points, of length that is power of 2, into the same number of points in time domain. Each data point in frequency spectrum used for an FFT or IFFT operation is called a bin. The Inverse Fast Fourier Transform (IFFT) performs N-Point IFFT operation for the received; The IFFT can be performed by first swapping the real and imaginary parts of the incoming data and then performing the forward FFT on them and once again swapping the real and imaginary parts of the data at the output. This methods allows one to perform the IFFT without changing any internal coefficients and thus, resulting in more efficient hardware implementation.

D. BIT ERROR RATE (BER)

BER is a key parameter that is used in assessing systems that transmit digital data [2][3] from one location to another. Systems for which bit error rate, BER is applicable include radio data links as well as fibre optic data systems, Ethernet, or any system that transmits data over a network of some form where noise, interference, and phase jitter may cause degradation of the digital signal. Although there are some differences in the way these systems work and the way in which bit error rate is affected, the basics of bit error rate itself are still the same.

E. CHANNEL ESTIMATION AND EQUALIZATION

Channel estimation and equalization techniques are analyzed to improve the performance of OFDM system. The channel estimation techniques considered here are estimation using wiener filter and frequency domain approach. Prior Channel estimation leads to simple equalization. The channel equalization techniques employed here are based on LMS algorithm and one tap frequency domain equalization, under different channels.

IV. RESULTS

Figure 2 depicts the BER vs SNR comparison graph for different QAM. The comparison says that the proposed system gives good result when compared to the existing system with QAM with 16 bit.

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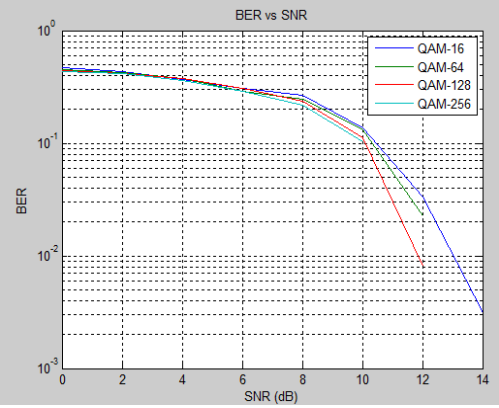

Figure.2: Final Result

V.CONCLUSION

The presence of multipath in wireless OFDM transmission does not allow AWGN channel assumption due to the fading. In this paper the performance of OFDM in AWGN wireless channel models is evaluated.. The SNR for each modulation takes into account the number of bits per symbol, and so the signal power corresponds to the energy per bit times the number of bits per symbol..

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