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Relative Analysis of Transceiver Diversity and Channel Estimation of MIMO OFDM

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ABSTRACT*:*High data rate and strong reliability attributes are turning out to be the leading factor for triumphant employment of profitable networks features for our wire-less declaration systems. A innovative wireless broadband skill Multiput-Input Multiput-Output (MIMO) communication system united with the orthogonal frequency division multiplexing (OFDM) multicarrier modulation system is a novel wireless broadband skill, has expanded great esteem for its robustness in opposition to multipath fading, competence of high rate transmissions and other channel impairments. A major challenge to MIMO-OFDM system is how to obtain the channel state in-formation accurately. In this research paper, we evaluated dissimilar forms of signals **(**BPSK,QPSK,16PSK),(QAM,16QAM, 64QAM) modulation ,design and replicated MIMO-OFDM receiver, transceiver diversity and fully estimated the channel of MIMO-OFDM system.

KEYWORDS: OFDM,MIMO, Modulation, Diversity, Estimated Channel

I. INTRODUCTION

Wireless channels or mobiles are essential for high-data-rate transmission by numerous applications. Conversely, the data rate increases with the reduction of symbol duration and severe inter symbol interference (ISI) will have caused more by dispersive fading of the wireless channels if single-carrier modulation such as global system for mobile communications (GSM) or in time-division multiple access (TDMA), is still employed[1,2]. The symbol duration must be much superior than the delay spread of wireless channels ,to lessen the effect of ISI[3].Many narrow-band sub-channels are formed inside the entire channel which are transmitted in equivalent to uphold high-data- rate transmission and at the equivalent time, to enlarge the symbol period to combat ISI in orthogonal frequency-division multiplexing (OFDM) [4,5].

In OFDM systems, the channel transfer function of radio channel emerges imbalanced in both time domains and frequency domains. As a result, for the demodulation of OFDM signals a dynamic estimation of the channel is necessary[6].

To form multiple-input–multiple-output (MIMO) channels if multiple transmit and receive antennas applied then the capacity of a wireless system can significantly be improved. It is proved in that, a MIMO system can improve the capacity compared with a single-input–single-output (SISO) system, by a factor of the minimum number of transmit and receive antennas for flat fading or narrow-band channels. For wideband transmission, to obtain diversity or capacity gains, it is natural to deal with frequency selectivity of wireless channels. Therefore, MIMO-OFDM has widely been used in various wireless systems and standards[7,8].

This paper work inspects output characteristics analysis of simple OFDM system model for frequency, amplitude modulations, frequency selective channel and channel estimation with respect to true channel.Ser performance of mimo-ofdm through flat fading channel, receiver diversity, actual channel and estimated channel.

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II. EXPERIMENTAL DETAILS

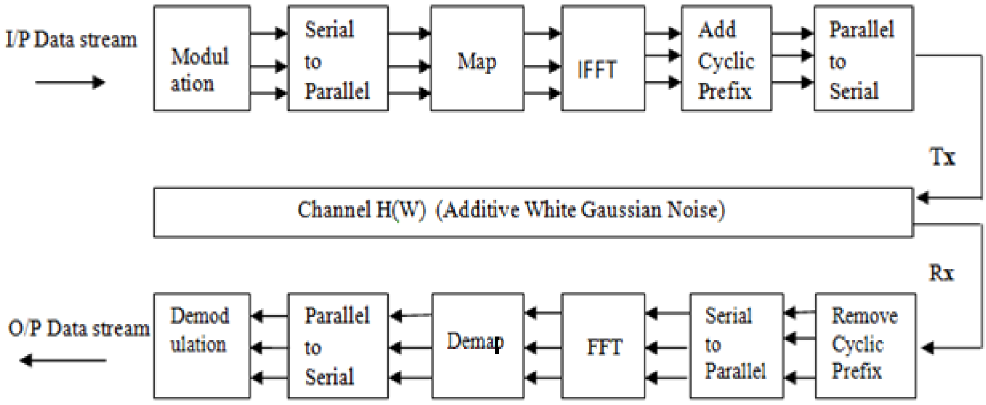

Fig.1.OFDM System Model

The digital i/p data stream generated from source endures 16-QAM modulation. The modulated symbols pass through a serial to parallel convertor with 32 parallel symbol streams. With 32 numbers of orthogonal sub-carriers using Inverse Fast Fourier Transform (IFFT) the parallel symbol streams are modulated and cyclic prefixes are appended. A serial signal stream through a parallel to serial converter are converted and modulated by the parallel modulated data. In order to mitigate the inter symbol interference (ISI) caused due to frequency selective nature of channel, at the end of each OFDM block a cyclic prefix of length 5 symbol duration is appended which would be superfluous at the receiving end, and again done the reverse order to get the o/p data stream.

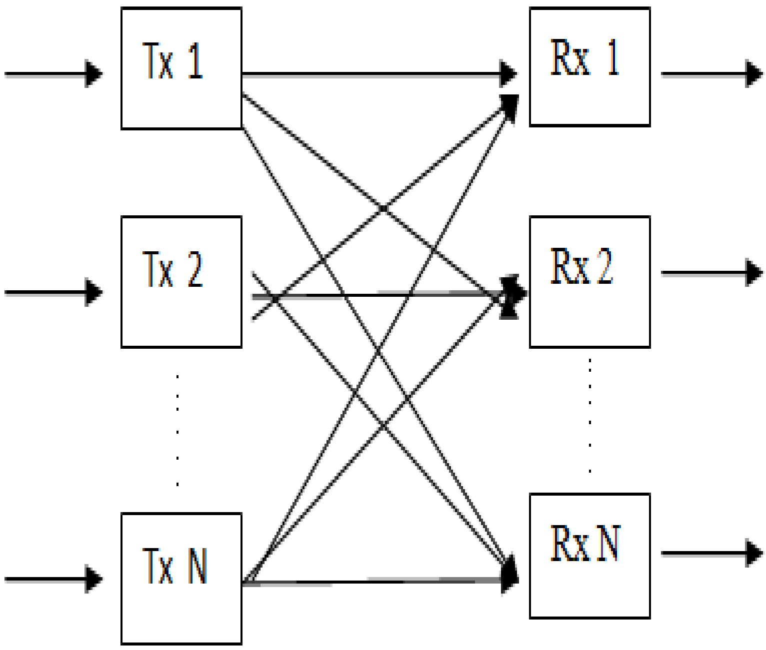

Fig.2.MIMO-OFDM System Model

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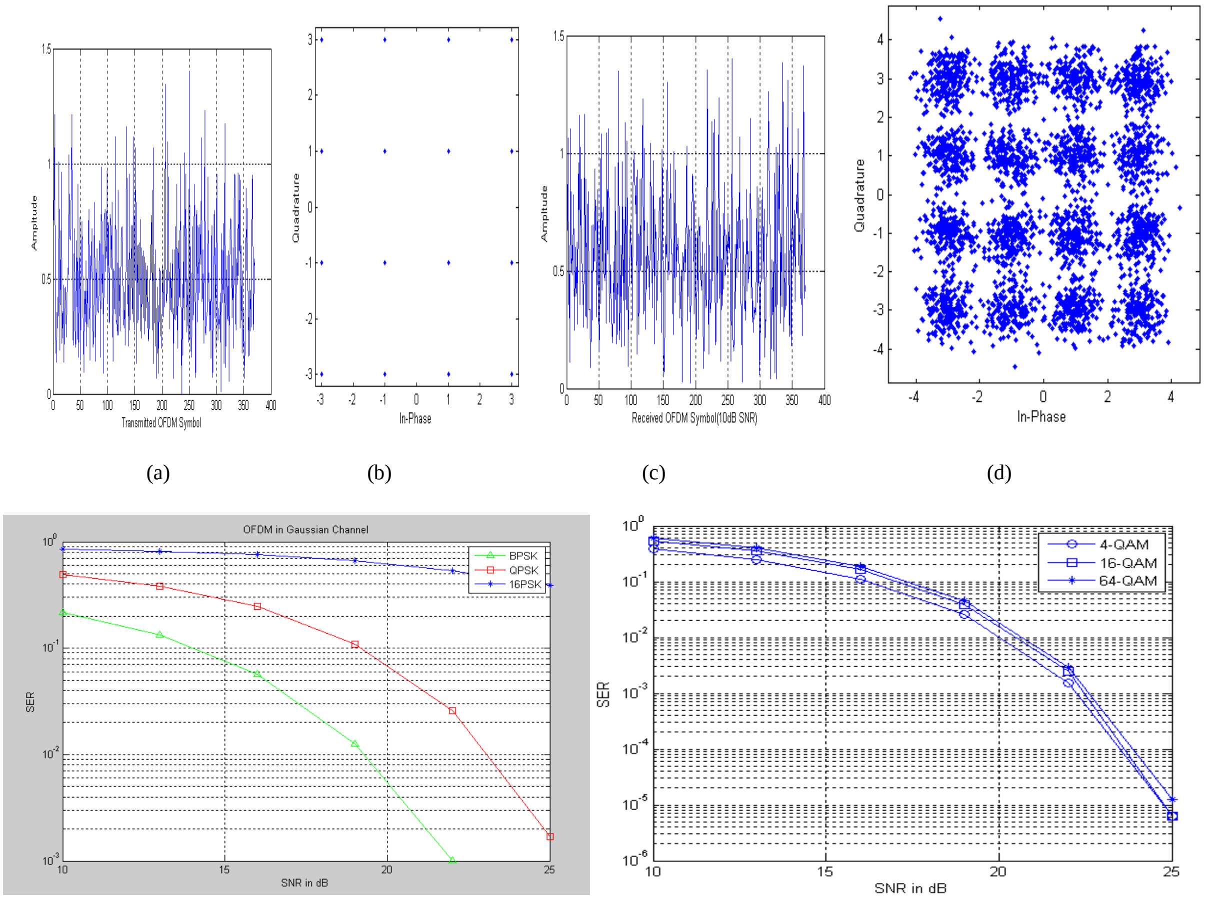
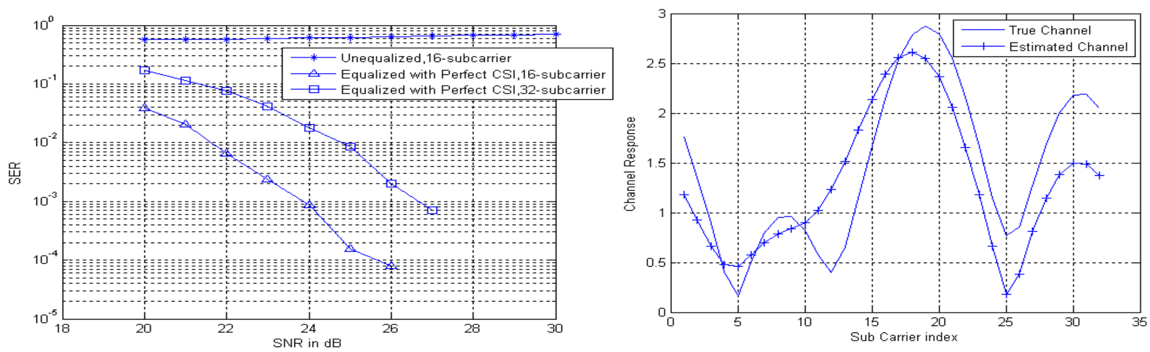
III.EXPERIMENTAL RESULTS



(a) (b) (c) (d)

(e) (f)

Fig. 3. Signal from OFDM (a) Transmitted OFDM signal (b) Constellation Diagram of 16 QAMTransmitted signal(c) Received OFDM signal (d) Constellation Diagram of received OFDM signal (e) SER performance of m-ary PSK used in OFDM through flat fading channel (f) SER performance of m-ary QAM used in OFDM through flat fading channel.



(a) (b)

Fig. 4.(a) SER performance of OFDM systemthrough frequency selective channel(b) Actual channel and estimated channel.

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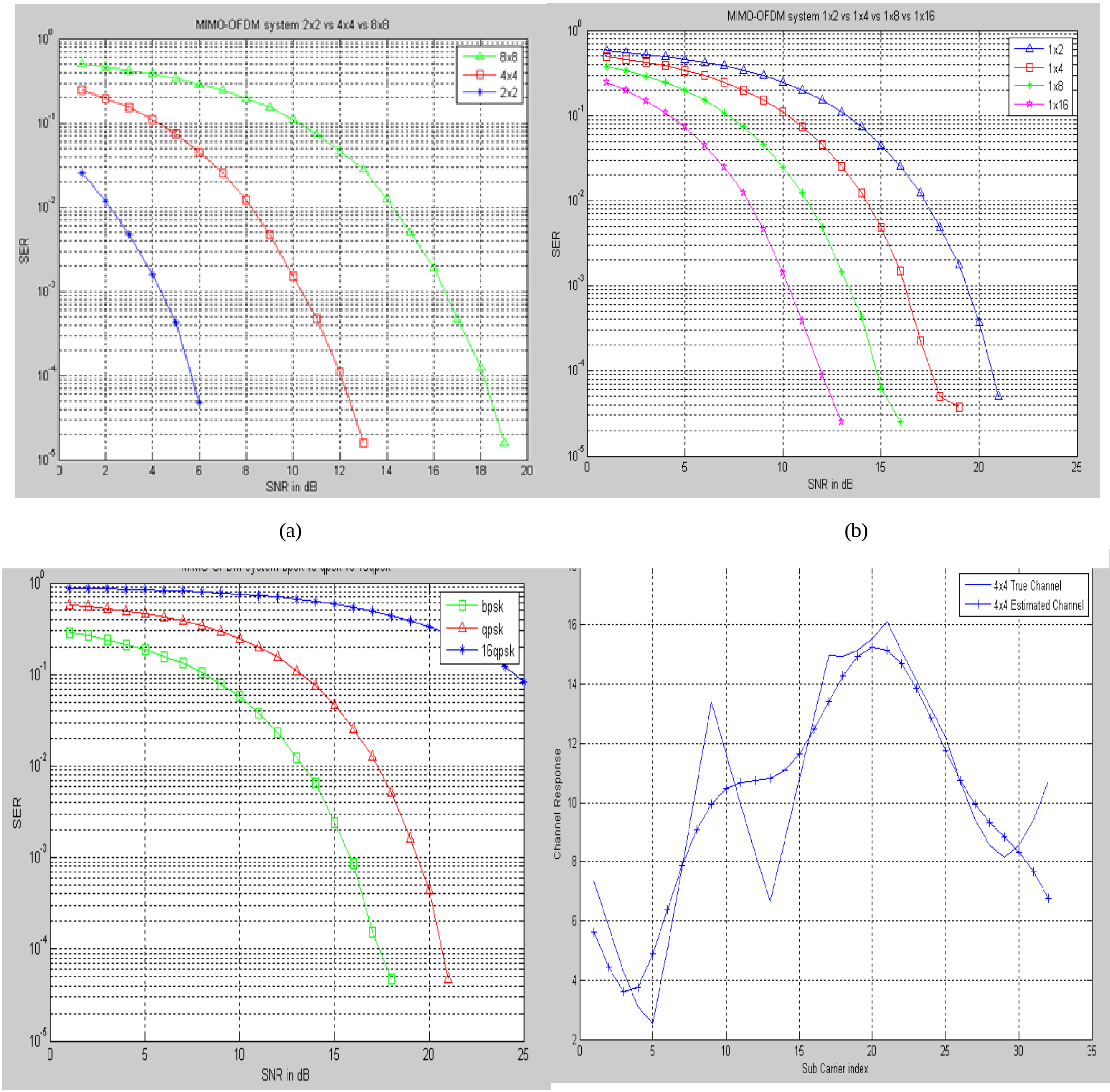

(a) (b)

(c) (d)

Fig. 5.(a) Ser performance of MIMO-OFDM through flat fading channel (b) Receiver diversity(c) Ser performance of bpsk,qpsk,16qpsk in 2x2 mimo-ofdmd) 4x4 mimo-ofdm Actual channel and Estimated channel.

IV. CONCLUSION

Using additive white gaussian noise channel OFDM and MIMO-OFDM system modelare configured. A close evaluation ofm-ary PSK, QAM used in OFDM through flat fading channel are evaluated.The SER performance for OFDM system through frequency selective,actual and estimated channelare inspected through MATLAB simulator.The momentous perfection against the ser performance of MIMO-OFDM through flat fading channel,receiver diversity, performance of bpsk, qpsk, 16 qpsk in 2x2 mimo-ofdm , 4x4MIMO-OFDM actual channel and Estimated channel are monitored.Hence, by using MIMO-OFDM an excellent capacity of a wireless system can significantly be improved.

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