PERFORMANCE ANALYSIS OF VARIOUS PEAK TO AVERAGE POWER RATIO (PAPR) REDUCTIO IN OFDM SYSTEM

Dissertation-II

Submitted By

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Under the Guidance of

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In partial fulfillment of the Requirement for the award of the Degree of

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CERTIFICATE

This is to certify that the Dissertation-II titled "**PERFORMANCE ANALYSIS OF VARIOUS PEAK TO AVERAGE POWER RATIO (PAPR) REDUCTIO IN OFDM SYSTEM**" that is being submitted by "**Sukhraj kaur**" is in partial fulfillment of the requirements for the award of MASTER OF TECHNOLOGY DEGREE, is a record of bonafide work done under my /our guidance. The contents of this Dissertation-II, in full or in parts, have neither been taken from any other source nor have been submitted to any other Institute or University for award of any degree or diploma and the same is certified.

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DECLARATION

I, **SUKHRAJ KAUR,** student of **MASTER OF TECHNOLOGY (WIRELESS COMMUNICATION)** under Department of ELECTRONICS ENGINEERING of Lovely Professional University, Punjab, hereby declare that all the information furnished in this pre-dissertation report is based on my own intensive research and is genuine.

This pre -dissertation, to the best of my knowledge, does not contain any part of my work which has been submitted for the award of my degree without proper citation.

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ABSTRACT

One of the challenging issues for Orthogonal Frequency Division Multiplexing (OFDM) system is its high Peak-to-Average Power Ratio (PAPR). We review and analysis different OFDM PAPR reduction techniques, based on computational complexity, bandwidth expansion, spectral spillage and performance. We also discuss some methods of PAPR reduction for multiuser OFDM broadband communication systems. Higher peak-to-average power ratio (PAPR) refers to the high efficiency of number of transmitter pattern transmission which is orthogonal frequency division multiplexing (OFDM), in this assume the selective mapping (SLM) technique which showing the amplitude of clipping in binary system that increases the PAPR reduction. Number of algorithms is used in the clipping technique which is build at the end of receiver side. These systems are efficient for removing the PAPR reduction and built maximum computational efficiency and decrease the signal to noise ratio (SNR) loss for the receiver. Some of the reduction techniques are used to reduce the PAPR reduction. PTS is the better technique than SLM technique.

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LIST OF ABBREVIATION

SLM	Selective Mapping
PAPR	Peak to the average power ratio
OFDM	Orthogonal Frequency Division Multiplexing
FFT	Fast Fourier Transformation
IFFT	Inverse Fast Fourier Transformation
QPSK	Quadrature Phase shift keying
PSK	Phase shift keying
QAM	Quadrature Amplitude Modulation
PTS	Partial transmit sequence
CCDF	Complementary cumulative distribution function
DFFT	Discrete fast Fourier transform
DCT	Discrete cosine transform

CHAPTER-1

INTRODUCTION

1.1 EVOLUTION OF ORTHOGONAL FREQUENCY DIVISION MULTIPLEXING:

It is a parameter using for encoding higher information on different carrier frequencies. Orthogonal frequency division multiplexing is formed in to a prevalent scheme for wideband computerized correspondence, utility as a part of utilizations, for ex, advanced television and sound telecom, digital subscriber line Internet get to, remote systems, control line systems, and 4^{th} Generation versatile communications. OFDM is a recurrence division multiplexing conspire utility as a computerized many-transporter balance technique. [1] A extensive number of firmly separated orthogonal sub heading-transporter signs are used to pass on information [1] on a couple parallel data streams or channels. Each sub-carrier is balanced with a standard control arrange, (for instance, quadrature sufficiency change or stage move scratching) at a low picture rate, keeping up total data rates like customary single-transporter adjust plots in a comparable exchange speed. The basic favored point of view of OFDM over single-carrier arrangements is its ability to adjust to genuine channel conditions (for ex, decreasing of high frequencies in a long copper wire, narrowband impediment and repeat particular obscuring due to multipath) without complex modification channels. Channel evening out is streamlined in light of the fact that OFDM may be viewed as using various bit by bit adjusted narrowband hails instead of one immediately changed wideband banner. The low picture rate makes the use of an ensure interval between pictures sensible, making it possible to discard bury image impedance and utilize echoes and time-spreading on straightforward TV these are unmistakable as ghosting and clouding, exclusively to achieve a varying qualities get, i.e. a banner to-clatter extent change. This instrument in like manner empowers the blueprint of single repeat frameworks, [2]where a couple abutting transmitters send a comparative banner in the meantime at a comparative repeat, as the signs from various far away transmitters may be combined profitably, instead of interfering as would generally occur in a standard single-carrier system.

1.2 OFDM WITH WIMAX

OFDM (Orthogonal Frequency Division Multiplexing) it provide the data for many users into the higher and the lower accessing channels of WIMAX.

OFDM parameter in worldwide interoperability for microwave access:

1. Fixed WIMAX Orthogonal Frequency Division Multiplexing**:** The version of mobile and fixed has a differ made algorithm of WIMAX in Orthogonal Frequency Division Multiplexing physical OSI layer. Constant WIMAX can be used the IEEE802.16 2004 and required the 256 Fast Fourier Transform is used the physical OSI layer that contain 196 subcarrier for use of carrier data and 8 is used for the pilot subcarrier . that's used for the rest and the guard bands FFT size is fixed, space and the channel bandwidth of subcarrier is vary.
2. Mobile WIMAX OFDM: The standard is used IEEE 802.16e. Size of FFT is vary between the 128 bits to 2048 bits. It is increases the spaces up to 10.94 kHz.

1.3 CHARACTERSTIC/PRINCIPLE

Rate near the Nyqyist rate equivalent to the baseband signal.

- Orthogonality:

OFDM is particular FDM, extra limitations being all the bearer signs are orthogonal to each other.

1. Cross talk between the sub-channels is wiped out and entomb transporter groups are not required.

2. Orthogonal required delta f=K/T Hz subcarrier dividing.

3. T is indicating span, K is a steady or a positive whole number which is equivalents to 1, N is a subcarrier add up to pass band transmission capacity will be B~N delta F Hz.

4. It gives the high unearthly productivity.

1.4 BLOCK DIAGRAM OF OFDM

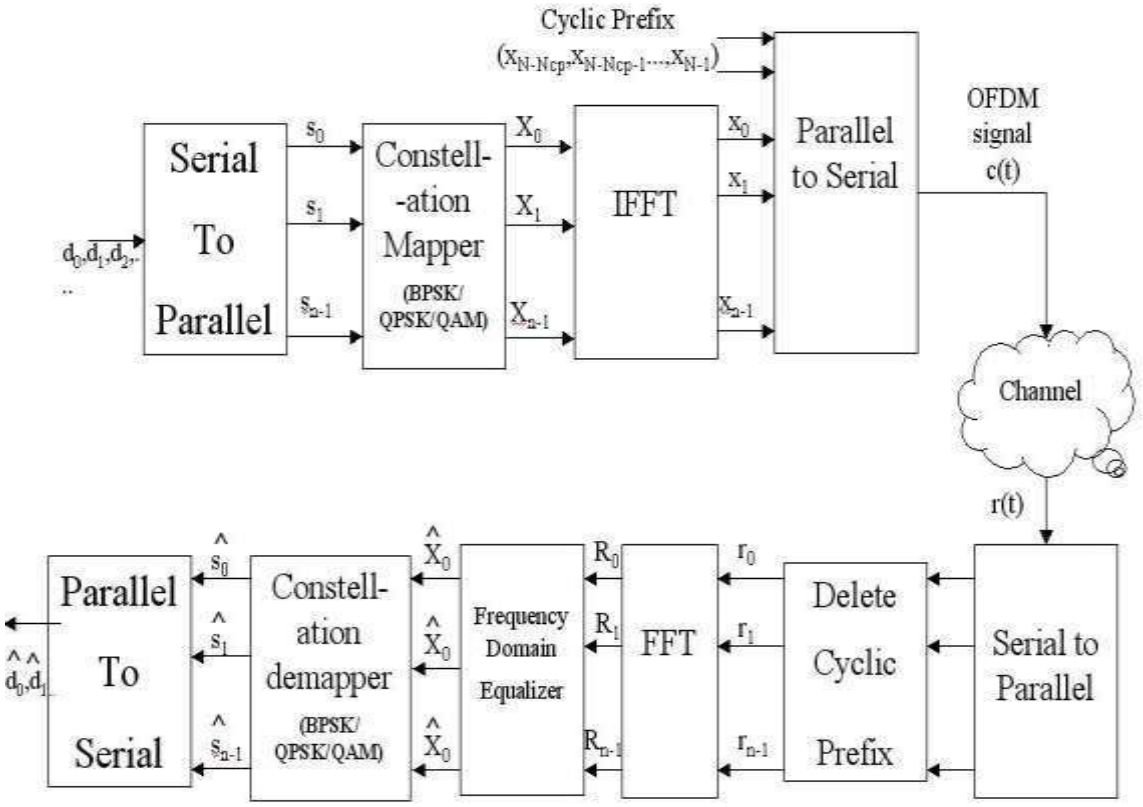


Figure 1:Block Diagram of OFDM[3]

1.4.1 Serial to parallel:

In an OFDM framework, every channel can be broken into different sub-transporters. The utilization of sub-bearers makes ideal use out of the recurrence range additionally requires extra preparing by the transmitter and receiver.[3] This extra handling is important to change over a serial bit stream into a few parallel bit streams to be isolated among the individual transporters. Once the bit stream has been separated among the individual sub-transporters, every sub-bearer is adjusted as though it was an individual channel before all channels are consolidated back together and transmitted overall. The collector plays out the switch procedure to partition the approaching sign into proper sub-bearers and after that demodulating these separately before reproducing the first bit stream.

1.4.2 Modulation with the inverse FFT:

The weak of information into a perplexing waveform happens at the Inverse Fast Fourier Transform (IFFT) phase of the transmitter. Here, the tweak plan can be picked totally freely of the particular channel being utilized and can be picked in light of the direct requirements. [4] truth be told, it is workable for every individual sub-bearer to utilize an alternate adjustment plot. The part of the IFFT is to tweak every sub-channel onto the fitting bearer.

1.4.3 Cyclic Prefix Insertion:

Since remote correspondences frameworks are helpless to multi-way channel reflections, a cyclic prefix is added to diminish ISI. A cyclic prefix is a redundancy of the main segment of an image that is affixed to the end of the image. [5]In addition, it is critical in light of the fact that it empowers multi-way representations of the first flag to blur so they do ot meddle with the consequent image.

1.4.4 FFT (Fast Fourier series):

A quick Fourier change (FFT) calculation figures the discrete Fourier change (DFT) of a succession, or it's backwards. Fourier examination changes over a flag from its unique area (regularly time or space) to a representation in the recurrence space or the path of fast Fourier transform which convert the discrete Fourier transform manage the zero factor . Therefore, it figures out how to lessen the many-sided quality of processing the DFT from, which emerges on the off chance that one essentially applies the meaning of DFT, to where n is the information estimate.

It is used in some of the applications like mathematically, science and technology or building blocks.

1.4.5 Parallel to serial:

This extra handling is important to change over in series bits streams into a few parallels bits stream is isolate in the not same transporters. Once the bit stream has been separated among the individual sub-transporters, every small-bearer can adjusted in though it single was channels are every channel is consolidated back all and transmits every. A collector plays out in switch procedure a partition is approaching sign in to proper sub division-bearers or after that demodulate the separately after reproducing a first bits stream.

1.5 EFFICENCY COMPARE BETWEEN THE SINGLE AND MULTICARRIER

An execution of any correspondence framework is measureable regarding its energy productivity or transfer speed proficiency. The power proficiency portrays the capacity of correspondence framework to save bit blunder rate Bit Error Rate of the transmitted flag in less power level. Transfer speed productivity reflects by productively the assigned transmission capacity is used and is characterized as the throughput information rate per Hertz in a given data transfer capacity. In the event that the substantial number of subcarriers are utilized, the data transmission proficiency of multicarrier framework.

S.No. Transmission Type M in M-QAM No. of Subcarriers Bit rate Fiber length Control at the recipient (at BER of 10−9)Bandwidth productivity

1. single carrier 64 1 10 Gbit/s 20 km -37.3 dBm 6.0000
2. multicarrier 64 128 10 Gbit/s 20 km -36.3 dBm 10.6022

There is just 1 dBm increment in recipient control, however we get 76.7% change in data transfer capacity proficiency with utilizing multicarrier transmission technique.[8]

1.6 IMPACT OF PAPR ON THE PERFORMANCE OF MIMO OFDM SYSTEM:

A crest is normal power proportion Peak Average Power Ratio of a transmitted flag is one of primary difficulties in wideband multi-bearer frameworks that utilization orthogonal recurrence division multiplexing (OFDM) or various information different yield (MIMO) OFDM. Understanding the impacts of PAPR on OFDM and MIMO-OFDM frameworks is basic while figuring out what procedures to utilize enhance framework execution.

1.6.1 What is the PAPR in MIMO-OFDM frameworks?

The utilization of a substantial number of subcarriers presents a high PAPR in OFDM frameworks. PAPR can be characterized as the relationship between the most extreme force of an example in a transmit OFDM image and its normal power.

Mathematically defined as

E(x(t)x*(t)is the average signal power.

1.6.2 How does the PAPR affect MIMO-OFDM systems?

In higher no. of users move out of phase which damage the transmitted power amplifier (PA) to run within a non-linear operating region. This cause significant signal distortion at the output of the power amplifier.[10] In addition, the high PAPR can cause saturation at the digital-to-analog converter (DAC), leading to saturation of the PA. PAPR also causes inter-modulation between the subcarriers and distorts the transmit signal constellation. Therefore, the PA must operate with a large power back-off, approximate to that of the PAPR, which leads to inefficient operation. Therefore, it is necessary to reduce the PAPR of the transmit signal in MIMO-OFDM system.

1.7 OFDM FEATURES:

The key feature of mobile WiMAX is to provide high data rate and less delay. The other key features are explained below:

Data rate: For higher data rate OFDMA air interface is used with higher order modulation scheme i.e. 64 QAM. Convolution coding, turbo coding and radio techniques like MIMO and beam forming called as Forward Error Control scheme

- **Spectral Efficiency:** Within available spectral allocations, operator tries to increase number of customers and also reducing cost.
- **Radio Planning:** On the customer's demand the six cell planning can be changed, because cell planning is flexible.
- **All-IP architecture:** All IP based core networks also provide services such as video, voice, data, and improves internetworking to other mobile and fixed networks.
- **Spectral flexibility:** Operator flexibility is provided due to available scalable bandwidth and to reuse their existing spectrum allocations.

1.8 ADVATAGES OF OFDM:

- It is buy easily channels without the use of domain of time.
- Higher spectral complexity compared with the double sideband modulation techniques.
- Robust the channels of interference by co channel interference.
- Robust for inter symbol interference and fading damage by multipath propagationν
- Good implement and use the mathematically expressions.[11]
- Less sensitivity to the time management techniques.
- Tune the single-channel receives the filters which are not in use.
- Implement single frequency networks.

1.9 DISADVATAGES OF OFDM:

- Low sense to the shift of Doppler
- Lower sense to the synchronizes the limitation of frequency [12]
- Waste the higher speed and not good for cyclic prefix/guard interval.

CHAPTER-2

TERMINOLOGY

- **PAPR:** Peak to the Average Power Ratio It may be defined as the ratio of RMS root mean square root of waveform.
- **OFDM:** OFDM (Orthogonal Frequency Division Multiplexing) This is the new version of FDM (frequency division multiplexing) it uses the digital multiplexing. A large no of subcarrier is divided into the parallel channel.
- **REDUCTION:** In this shows that how to overcome the disadvantages in the OFDM system due to using some techniques.
- **POWER:** This is a behavior of capacitor which act as a definite path to defined the system.
- **SUBCARRIER:** It define the rate of users which showing the fusion between the carriers. Dividing one user into many users.
- **CHANNEL:** Channel is used for the particular station or a particular transmission part for example television transmission.
- **MODULATION:** It may be defined as the amplitude, frequency and phase is modulated through the carrier with respect to modulating signal.
- **COMPLEXITY:** These defined the rate of change in efficiency in system or in other hand the speed of the signal vary from transmitter to receiver.
- **TECHNIQUE:** It is the way of express the system or the signal how to vary the transmitter and is received by a receiver.
- **SIMULATION:** It is model to explain the building blocks of diagrams and the nature of expressions.
- **GRAPH:** Graph is a method which is showing the representation of diagrams and expressions in the form of picture.
- **MAGNITUDE:** This is the amplitude the waveform which expresses the behavior of values in the graphical representation.
- **CONVERSION:** Changes the values in the form of decibel or etc that is known as a conversion nature.

- **SEQUENCE:** Representation of numbering from 0 to so on, that's asking about the behavior of values.
- **PACKETS:** The transmission of data in the form of synchronization pattern and accepted by the receiver.
- **MULTIPATH:** This is showing that the no of ways to find out the results at the end of transmission in the form different ideas or different way of passing areas. One to many way of transferring a data is another definition of multipath.

CHAPTER-3

LITERATURE REVIEW

[13] PAPR reduction in OFDM by PTS technique: Tao jiang, Yiyan Wu(2008):

The non-linear device such as HPA [High pass amplifier] and ADC Analog to digital convertor technique's to reduce the PAPR reduction. ADC to decrease the robust parameter in OFDM It is attractive for high bit rate transmission in OFDM signals. When detected the signal than introduced the BER [Bit error rate] which is the worst case. If system can be used more IDFT than signal is distorted. After IDFT for the DSI (dummy sequence) can be used into the input data which is used for the high flexibility and increased the performance of the PAPR?

[14] Peak-to Average Power Ratio Reduction Techniques for OFDM Signal: Tao jiang, Yiyan Wu (2008):-

Different OFDM PAPR reduction techniques are analyzed for the purpose of decrease in PAPR so as to employ multiple users for OFDM in broadband communication. In this PTS is techniques which is specially used to reduce these parameters the less in costly the rate of data, transmit signal power increase, BER performance degradation, and computational complexity increase. We also showed that it is possible to reduce the PAPR of for multiuser OFDM system. Future experiments are used for having better throughput and provide less cost of loss to use another techniques can be applied.

[15] OFDM Link Performance with Companding for PAPR Reduction in the Presence of Nonlinear Amplification: Thoma s G. Pratt, Nathan Jones, Leslie Smee, and Micha el Torrey: (2009):

Companding means a nonlinear results occur and vary at the end of receiver. μ LAW companding used in this. Explored the connection execution of OFDM with companding as a PAPR relief system. Disabilities from nonlinear contortion at the transmitter, AWGN commotion from the channel, and clamor intensification because of the development change is received at the receiver end. Implementation the companding in the OFDM to increase the higher gain in the system and effected to the PAPR reduction. Due to use of μ law companding the nonlinear amplification will

less and OFDM system should be gain better results.

[16] An Overview: Peak-to Average Power Ratio Reduction Techniques for OFDM Signal : Tao jiang, Yiyanwu (2009):

A few strategies for PAPR diminishment for multiuser OFDM broadband correspondence frameworks, for example, Digital-to Analog Converter (DAC) and High Power Amplifier (HPA).OFDM is an extremely appealing procedure for remote interchanges because of its range productivity and channel strength. One of the genuine disadvantages of in OFDM frameworks is that the composite transmit flag can display a high PAPR when the info groupings are very corresponded. At the point when the information groupings are profoundly associated then OFDM is completely free from PAPR.

[17] A Novel Multi-Points Square Mapping Combined With PTS to Reduce PAPR of OFDM Signals Without Si02de Information: Yang Zhou and Tao Jiang (2009):-

The Multi-points Square mapping (MSM) technique is explained the combination of. Conventional partial transmit sequence or multiple partial transmit sequence, which overcome the PAPR in OFDM system. In this scheme to formulate the problem of PAPR reduction to combine the purposed M PTS scheme combined with the C PTS scheme .In the C PTS used single quadrant but in M PTS used 4QAM and 16QAM and used four quadrant .without side band information C PTS is send correct transmitter the phase shift of the subcarrier. The M PTS is not submit the side information that's by Multi PTS has better band width efficiency and bit error rate as combine to Conventional PTS scheme.

[18] Improved Peak Windowing for PAPR Reduction in OFDM: Guoguang Chen, Rashid Ansari, Yingwei Yao(2009):-

OFDM system performance decrease because of a less power efficiency and presence of non-linear power amplification. In this paper to reduce this problem by the help of peak windowing method with the help of 2 band signal. A Orthogonal Frequency Division Multiplexing analysis the fluctuation is characterized by the PAPR that is known as a crest factor (OFDM=CF2) .This is a factor which cannot transmit the side information and modification of the receiver. So, it overcomes with the help

of new type of peak windowing scheme to achieve the better performance. At the end it achieved through windowing scheme, are "Relative constellation error (RCE) and Small adjacent channel rate (ACPR)". These factors improve the performance and overcome the fluctuations.

[19] A Novel Multi-Points Square Mapping Combined With PTS to Reduce PAPR of OFDM Signals Without Side Information: Yang Zhou and Tao Jiang (2009):-

In this paper, we propose a novel multi-focuses square mapping (MSM) plan. At that point, portray in subtle element consolidate the MSM system routine halfway transmitted arrangement (C/PTS) plan, which is same as Muti-PTS, to decrease the PAPR in OFDM system. In this plan to figure the issue of PAPR lessening to join the purposed M PTS plan joined with the C PTS plan .In the C PTS utilized single quadrant yet as a part of M PTS utilized 4QAM and 16QAM and utilized four quadrant .without side band data C PTS is send effectively transmit and recoup the stage movement of the subcarrier. The M PTS is not present the side data that is by Multi PTS has better band width efficiency and bit mistake rate when contrasted with Conventional PTS plan.

[20] Improved Peak Windowing for PAPR Reduction in OFDM: Guoguang Chen, Rashid Ansari, Yingwei Yao(2009):-

OFDM framework execution corruption because of a low power efficency and nearness of non-straight power enhancement. In this paper to lessen this issue by the assistance of pinnacle windowing strategy with the assistance of In band and out band signal. The OFDM analysis the fluctuation is described by the PAPR that is known as a peak variable (OFDM=CF2) .This is an element which can't transmit the side data and alteration of the receiver. In this way, it overcomes with the assistance of new pinnacle windowing plan to accomplish the better execution. Toward the end it accomplished through windowing plan, are "Relative group of stars error(RCE) and Small contiguous channel rate(ACPR)". These components enhance the execution and beat the fluctuations.

[21] Performance Analysis of the Clipping Scheme with SLM Technique for PAPR Reduction of OFDM Signals in Fading Channels(Byung Moo Lee, Rui j. Figueiredo, Youngok kim)2010:-

Since one of significant issues of OFDM-based frameworks is high top to-normal power proportion (PAPR) of its transmitted flag, numerous PAPR diminishment systems and joined plans with

individual procedures have as of late been created. Among different methods, the section system has been broadly utilized as a functional plan attributable to its low computational multifaceted nature and effortlessness in execution, while the chose mapping (SLM) procedure is known to give great PAPR decrease execution without flag contortion. For the most part, the joined plan of two PAPR diminishment procedures, which are the cut-out and the SLM, is relied upon to give the upgraded execution of PAPR lessening, in light of the fact that the section clamor of consolidated plan would be not as much as that of single cut-out strategy, when the SLM method is utilized before cut-out. Be that as it may, the execution of cut-out plan with SLM method has not been assessed for commonsense frameworks over blurring channels. Consequently, the execution of the cut-out plan with the SLM system is hypothetically dissected and contrasted and comes about over blurring channels. The execution of joined plan is dissected with different cut-out proportions, stage sets for SLM, and balance plots over level and recurrence particular blurring channels. What's more, the impacts of the section at the beneficiary and the oversampling on the BER execution are talked about. In view of the aftereffects of investigation, subsequently, one can plan the viable cut-out plan with the SLM method for the PAPR decrease of OFDM-based frameworks.

[22] On Interference Avoidance through Inter Cell Interference Coordination (ICIC) Based on OFDMA Mobile Systems: Chrysoval antisKosta , Bernard Hunt, Atta UI Quddus, and Rahim Tafazoll (2010):

(PAPR) plan in view of is utilized in UL LTE based frameworks. (e.g. MIMO). Through a progression of steps how the many-sided quality connected with the ICIC issue can be streamlined and comprehended in polynomial time. There is still an on-going examination push to discover not so much unpredictable but rather more proficient incorporated ICIC utilizing these techniques.

[23] On Interference Avoidance through Inter Cell Interference Coordination (ICIC) Based on OFDMA Mobile Systems: Chrysoval antisKosta , Bernard Hunt, Atta UI Quddus, and Rahim Tafazoll (2010):

(PAPR) plan in view of is utilized in UL LTE based frameworks. (e.g. MIMO). Through a progression of steps how the many-sided quality connected with the ICIC issue can be streamlined and comprehended in binary time. There is still an on-going examination push to discover not so

much unpredictable but rather more proficient incorporated ICIC utilizing these techniques.

[23] OFDM PAPR reduction by switching null subcarriers and data subcarriers: K.T. Wong, B Wang and J complexity C. Chen(2011):.-

This is advancement in information which is good in entire measures; force not used, is distortion less, lower calculation al many-sided quality and can supplement most other PAPR decrease strategies. The proposed plan could be utilized with any multicarrier framework with invalid subcarriers. To minimize any debasement to the gatekeeper band, one Innermost‟ invalid subcarrier. Future work will take issues of utilization of the forecast comes about with the end goal of lessening PAPR diminishment utilizing numerous subcarrier.

[24] OFDM Link Performance with Companding for PAPR Reduction in the Presence of Nonlinear Amplification: Thomas G. Pratt, Nathan Jones, Leslie Smee, and Michael Torrey: (2011):

Increased SNR at the receiver. by the use of companding and HPA. The execution additions are unobtrusive (around 0.5 db) and include handling many-sided quality at both the transmit and get finishes of the link. This scheme can be used to reduce another factor also like cost, delay and immune the PAPR reduction in OFDM.

[25] **A Computationally Efficient Tree-PTS Technique for PAPR Reduction of OFDM Signals** (Byung Moo Lee, Rui j. Figueiredo, Youngok kim) 2012:**-**

The high crest to-the normal power proportion (PAPR) of time area signals has been a noteworthy issue in orthogonal recurrence division multiplexing (OFDM) frameworks, and accordingly different PAPR diminishment calculations have been presented. Halfway transmit succession (PTS) is a standout amongst the most high computational many-sided quality. PAPR lessening calculation in view of a tree-organized seeking strategy is proposed to diminish the PAPR with low many-sided quality. In the proposed conspire, the computational multifaceted nature of looking procedure is diminished by altering the span of tree with two parameters,

width and profundity, while safeguarding great execution comes about demonstrate that proposed plot gives comparable execution ideal case with strikingly lessened computational many-sided quality.

[26] Effect of PAPR Reduction on Spectrum and Energy Efficiencies in OFDM Systems With Class-A HPA Over AWGN Channel: Tao jiang(2013):

The relations between top to-normal power proportion (PAPR) diminishment, range proficiency (SE), and vitality productivity (EE) in orthogonal recurrence division multiplexing (OFDM) frameworks, individually. The SE and EE are expanded with an aggregate transmit control limitation over added substance white Gaussian clamor (AWGN) channel. The OFDM framework with PAPR diminishment could accomplish higher SE and EE than the framework without PAPR decrease.

[27] Effect of PAPR Reduction on Spectrum and Energy Efficiencies in OFDM Systems With Class-A HPA Over AWGN Channel: Tao jiang(2013):-

Reduce the PAPR, but multicarrier signaling is occasionally high instantaneous peak to average power ratio (PAPR). It works on operator IFFT. Power amplifier lying in the saturation region the output be a non-linearity and degrade the BER at the receiver. Null subcarrier: Means that virtual/unused/modulated sub-carrier. (No energy is transmitted).

There have a 48 data subcarrier 12 null subcarrier.

1. 6 zero subcarrier to send the time synchronous at less frequency in user.

2. High frequency Switching one or more null subcarrier.(this change the I/P of the IFFT .

[27] Perform the New Phase Sequence to reduce the PAPR in OFDM: (2014):

Its main issue of OFDM is the PAPR transmitter signal and affected the complexity of the power amplification. There have a man techniques are used to reduce the PAPR but mainly in this article to be used as a SLM which is used for SLM techniques. In OFDM the bit rate transmission system can be used. SLM techniques were first techniques which described the phase sequence generate randomly. There have some coding are used mostly use of multiplexing techniques named as CDMA. There have a one method which used in the SLM. PAPR reduction is row vector of normalized Riemann matrix mainly. It can be used for transmitting the information randomly to the receiver by matrix method .It conclude that the mean and the variance of the PAPR is less or difficult from each phase. That's by Riemann matrix is used because of low PAPR.

[31] Perform the OFDM link with non-linear to reduce the PAPR(2014) :-

In this OFDM use of companding for PAPR control. Companding is of a two type μ-law and A-law companding .μ-law is used at the transmitter or receiver end. Use of companding means non-linear results are vary at the end of receiver. and the impact occur on the performance increase the SNR at the receiver than distortion will be less. Due to this format the PAPR

[32] Novel low complexity SLM scheme for PAPR reduction in OFDM: (2014):

SLM technique is used for reducing the PAPR in OFDM. The complexity of the SLM scheme reduces the conversion vector in the conventional IFFT operations. There have a three phase are changed.

1. Magnitude
2. Conversion
3. Sequence

This is the cyclically shifted version techniques. Then it shows that the PAPR reduction is poorer than the back SLM. There are 3 techniques are less computational complexity. The Orthogonal Frequency Division Multiplexing is use in the higher rate of data transmission or against the spectral efficiency or robustness. PAPR is reduced by the SLM and by clipping. Backward SLM schemes have a better. Bandwidth efficiency but requires a store in IFFT and result showing the dramatic change in the computational complexity. IFFT and drawbacks which change the rotation vector phase and it can degrade the BER. The above three phase performance differ by no more 0.64db.tht‟s by it obtained the traditional SLM scheme

[33] OFDM PAPR reduction by switching null subcarriers and data subcarriers: K.T. Wong, B Wang and J complexity C. Chen(2011):.-

This is advancement in information which is good in entire measures, force not used, is distortion less, lower calculation al many-sided quality and can supplement most other PAPR decrease strategies. The proposed plan could be utilized with any multicarrier framework with invalid subcarriers. To minimize any debasement to the gatekeeper band, one Innermost‟ invalid subcarrier. Future work will take issues of utilization of the forecast comes about with the end goal of lessening PAPR diminishment utilizing numerous subcarrier.

[34] Perform the New Phase Sequence to decrease a PAPR of OFDM: (2014):-

Its main issue of OFDM is the PAPR transmitter signal and effected the complexity of the power amplification. There have a man techniques are used to reduce the PAPR but mainly in this article to be used as a SLM which is used for normalized Riemann matrix are selected an phase sequence vector for SLM techniques. In OFDM the bit rate transmission system can be used. SLM techniques were first techniques which described the phase sequence generate randomly. There have some coding are used mostly use of multiplexing techniques. Name as CDMA. There have a one method

which used in the SLM. PAPR reduction is row vector of normalized reamer matrix mainly. It can be used for transmitting the information randomly to the receiver by matrix method .It conclude that the mean and the variance of the PAPR is less or difficult from each phase. That's by Riemann matrix is used because of low PAPR .

[35] Perform the OFDM link with non-linear to reduce the PAPR (2014) :

In this OFDM use of companding for PAPR control. Companding is of a two type μ-law and A-law companding.μ-law is used at the transmitter or receiver end. Use of companding means non-linear results are vary at the end of receiver. and the impact occur on the performance increase the SNR at the receiver than distortion will be less. Due to this format the PAPR

[36] PAPR reduction in OFDM systems using peak insertion: Abdulreh mainframe siddiq(2015):

Crest Peak Insertion (PI) is proposed in this paper. PI depends on upon the duality property of the DFT and PAPR duality of an inspiration. PC multiplication tests show that a tradeoff can without quite a bit of an extend be made among BER and the PAPR of the transmitted sign to achieve a fancied system execution. PAPR diminishment as differentiated and other near frameworks which result in transmitted constrain increment, and in this way, it is in every way sensible to be used for OFDM flag PAPR diminish.

[37] PTS and Modified Clipping Joint Algorithms for PAPR Reduction in OFDM-QAM System: (Zhen He, Jianping Wang∗ , Jing Yan and Haitao Xu) 2015:

As a standout amongst the most alluring methods, incomplete transmit grouping (PTS) gives a viable answer for top to-normal power proportion (PAPR) lessening in orthogonal recurrence division multiplexing (OFDM) frameworks, be that as it may, brings about expansive computational multifaceted nature at the same time. Contrasted with PTS, cutting gives a less complex route towards a superior PAPR execution, while brings about corruption of the bit mistake rate (BER) execution. To proposed two joint calculations called quantization cutting (QC) and recoverable section (RC), which consolidated PTS with changed Clipping plans. The proposed plans accomplish a superior misuse of favorable circumstances, reproduction the outcome proposed joint calculations don't just fundamentally enhance the PAPR decrease execution additionally accomplish a non-

misfortune BER execution.

[38] Progressive Image Transmission Using OFDM System :(Abhijit S. Andure, Prof. S. M. Shende, Prof. S. P. Kharde) 2015:

This is a new technique for dynamic picture transmission utilizing Orthogonal Frequency Division Multiplexing (OFDM). Low Density Parity Check Coding (LDPC) is utilized to enhance the BER of the framework. Trigonometric changes are utilized for lessening the Peak-to-Average Power Ratio (PAPR) of OFDM flag. The Set Partitioning in Hierarchical Trees (SPIHT) calculation is utilized for source coding of the pictures. In this technique, the transmit information arrangement of the OFDM flag is gathered into in-stage and in-quadrature segments after Inverse Fast Fourier Transform (IFFT), then every segment is changed utilizing Discrete Cosine Transform (DCT) or Discrete Sine Transform (DST).

[39] Low complexity PTS algorithms with error correction capability in OFDM systems:(Kuo-Chen Chung ; Houshou Chen ; Ting-Ya Yang)2015:-

One of major problem in OFDM system are maximum PAPR value of transferred OFDM data. One way to enhance PAPR statistics is by using PTS scheme. we propose the parallel PTS (P-PTS)and serial PTS (S-PTS) methods to reduce the C-PTS complexity, based on the fact that the weighting factors are chosen as code words of a linear block code. Compared to the C-PTS, the P-PTS and S-PTS methods not only reduce the computational complexity but also provide error correction capability for the weighting factors. reduction of OFDM-based systems

[40]PAPR reduction in OFDM systems using peak insertion: Abdulreh manikramsiddiq (2015):

Crest Insertion is made in this paper. Peak insertion relies on upon the dual property in the Discrete Fourier transform or PAPR dual of a motivation. PC reproduction tests demonstrate that a tradeoff can without much of a stretch are made amongst BER and the PAPR of the transmitted sign to accomplish a fancied framework execution. PAPR diminishment as contrasted and other comparative systems which result in transmitted force more, and in this manner, it is by all accounts reasonable to be utilized for Orthogonal Frequency Division Multiplexing signal Peak Average Power Ratio decrease.

CHAPTER 4

SCOPE OF STUDY

In this research work the ideas out from the behavior in OFDM in communication system. In other hands saying that this showing the role of mode in communication. When no of users are used than what happening is occur, al these parameters are derived in this study. Like Orthogonal Frequency Division Multiplexing (OFDM) is an extremely alluring method for high-information rate transmission in remote and wired applications. One noteworthy drawback of OFDM is that the time space OFDM flag which is a total of a few sinusoids prompts high crest to normal power proportion (PAPR). Various procedures have been proposed in the writing for lessening the PAPR in OFDM frameworks. Selected Mapping (SLM) and Partial Transmit Sequence i.e. PTS are of those techniques which are used for reducing the PAPR. SLM technique is quite complex than PTS and can be used for small scale clipping only that offers single threshold value. In PTS, many-sided quality of full IFFT can be stayed away from, so it is more profitable than SLM if measure of computational multifaceted nature is restricted. This extraordinarily streamlines the plan of both the transmitter and the collector; not at all like ordinary FDM, a different channel for each sub-channel is not required. The orthogonality requires that the sub-bearer separating is Hertz .OFDM by and large has an about "white" range, giving it amiable electromagnetic obstruction properties as for other co-channel clients.

- **Data rate:** For higher data rate OFDMA air interface is used with higher order modulation scheme i.e. 64 QAM. Convolution coding, turbo coding and radio techniques like MIMO and beam forming called as Forward Error Control schemes.
- **Spectral Efficiency:** Within available spectral allocations, operator tries to increase number of customers and also reducing cost.
- **Radio Planning:** On the customer’s demand the six cell planning can be changed, because cell planning is flexible.
- **All-IP architecture:** All IP based core networks also provide services such as video, voice, data, and improves internetworking to other mobile and fixed networks.
- **Spectral flexibility:** Operator flexibility is provided due to available scalable bandwidth and to reuse their existing spectrum allocations.

CHAPTER 5

OBJECTIVES OF THE STUDY

5.1 RESEARCH OBJECTIVES

The main objectives which can provide solution to the traditional methods are:

1. To study and analyses the various techniques to reduce the PAPR and enhance the SNR (signal to noise ratio)/BER (bit error rate).
2. To implement of OFDM model using techniques SLM, PTS, Clipping in MATLAB.
3. To developed a new model combining various techniques for PAPR reduction.

Above objectives are accomplished in the OFDM system through reduction techniques-Clipping and SLM (selective mapping). Clipping is used to avoid the fluctuation in a signal which is achieved by clipped the original signal with some threshold value but out of band distortion is also there because of the main drawback of clipping technique. SLM needs side band information which is drawback of this technique but good spectral efficiency is also achieved with this avoid the fluctuation in a signal which is achieved by clipped the original signal with some threshold value but out of band distortion is also there because of the main drawback of clipping technique. Various modulation techniques are also used for better efficiency and throughput. Clipping is used to avoid the fluctuation in a signal which is achieved by clipped the original signal with some threshold value but out of band distortion is also there because of the main drawback of clipping technique Inferable from underlying expansive PAPR decrease utilizing ideal SLM technique, an ensuing cut-out is made on a littler scale with the end goal that the signal can be recouped viably at beneficiary with less calculation.

CHAPTER 6

RESEARCH METHODOLOGY

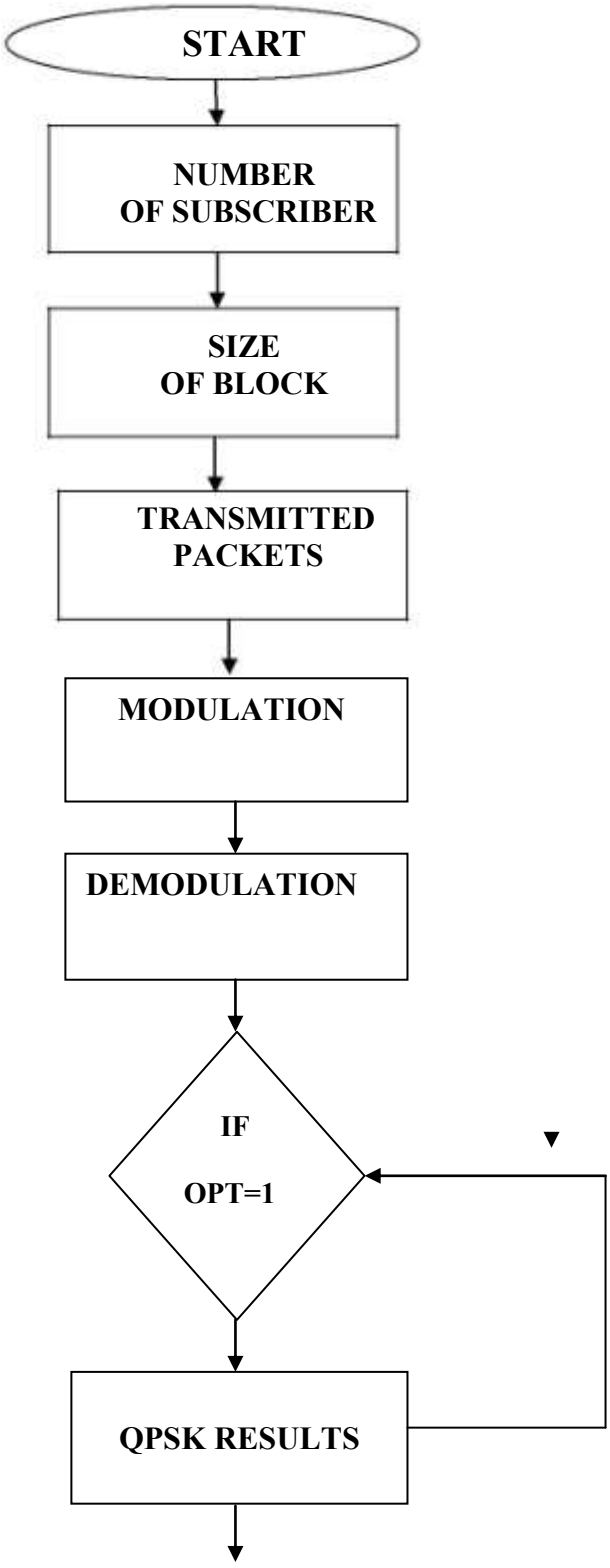
6.1 REDUCTION TECHNIQUES

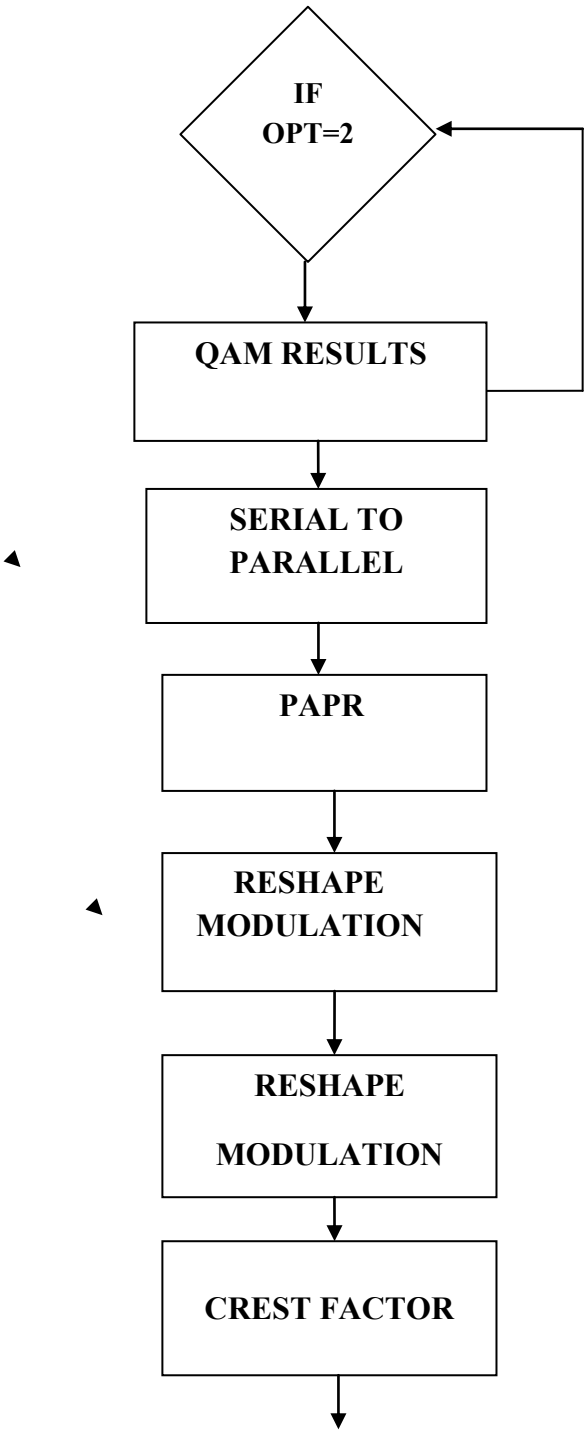
In the OFDM (Orthogonal frequency division multiplexing techniques) are used to reduce the PAPR (Peak to average power ratio). This is the main disadvantages. In this used the SLM (Selective mapping) and Clipping techniques. SLM optimum, PAPR is defined the many users are working using other sequences of phases and the some digitalization modulation. In this the achievement in PAPR is large as a threshold of 10^{-4}. Phase sequence is required the original function of CCDF. OFDM received signal is back the original system is equally at the equal nature of frequency which is clipping part PAPR is defined the many users are working using other sequences of phases and the some digitalization modulation is multipath propagation and AWGN channel is used and phase adjusted by the SLM. The iterative algorithm used to recover and reconstructed the non-clipped.

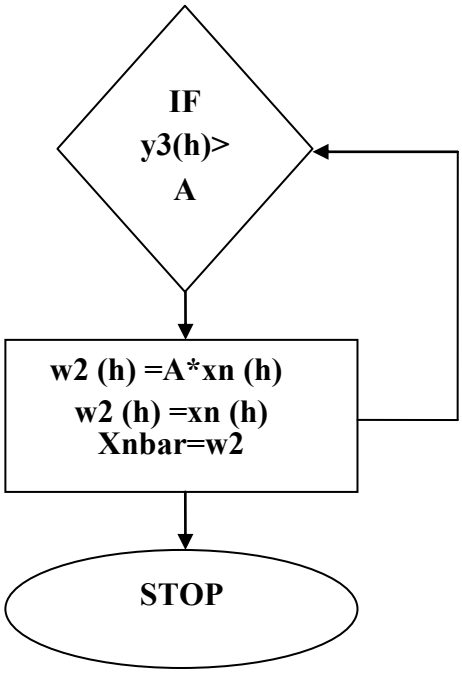
1. Bit error rate achieved, with the use of quantization clipping.
2. Robust parameter is used for decreasing the interference and fading.
3. Input sequences are highly correlated with the use of techniques HPA and ADC.
4. Combine SLM and Clipping, techniques which used for phase shift and better bandwidth.
5. QPSK and QAM modulations are used to adjust the phase sequence of the channel.
6. Improve the PAPR with using the decreasing of BER and increasing the SNR ratio.

Orthogonal Frequency Division Multiplexing is a very well technique for high-data-rate transmission in wireless and wired applications. One major drawback in OFDM to high peak to average power ratio. Many of the techniques have been proposed in the literature for reducing the PAPR in OFDM systems. Selected Mapping (SLM) and Partial Transmit Sequence i.e. PTS are of those techniques which are used for reducing the PAPR. SLM technique is quite complex than PTS and can be used for small scale clipping only that offers single threshold value. In PTS, complexity of full IFFT can be avoided, so it is more advantageous than SLM if amount of computational complexity is limited.

6.2 ALGORITHM




IF
OPT=2
QAM RESULTS
SERIAL TO
PARALLEL
PAPR
RESHAPE
MODULATION
RESHAPE
MODULATION
CREST FACTOR


IF
y3(h)>
A
w2 (h) =A*xn (h)
w2 (h) =xn (h)
Xnbar=w2
STOP

CHAPTER 7

EXPERIMENTAL WORK

7.1 MODULATION TECHNIQUES

There have a three modulations are used QAM, QPSK, PSK.

Quadrature Phase Shift Keying (QPSK) is a type of Phase Shift Keying in which two bits are adjusted on the double, selecting one of four conceivable transporter stage shifts (0, 90, 180, or 270 degrees). QPSK permits the signal to carry twice as much data as common PSK utilizing a similar transmission capacity.

QAM (quadrature adequacy regulation) is a technique for consolidating two sufficiency balanced (AM) signs into a solitary channel, in this manner multiplying the successful data transfer capacity. QAM is utilized with heartbeat abundance tweak (PAM) in advanced frameworks, particularly in remote applications.

1Phase-shift keying (PSK) is an advanced regulation plan that passes on information by evolving (adjusting) the period of a reference signal (the carrier wave). The adjustment is inspired by fluctuating the sine and cosine contributions at an exact time. It is broadly utilized for remote LANs, RFID and Bluetooth correspondence.

7.2 SIMULATION MODEL

The simulation shows that the OFDM transmission at low PAPR reduction between modulation techniques as shown in Figure 4.2. The OFDM is a simple and reduced the PAPR reduction using Matlab software to simulate the graphs. The block diagram of OFDM transmission using QAM and QPSK modulation which is a one way data transmission model is shown in figure below. It is connected with the serial to parallel which change the single carrier into subcarrier or converted into the IFFT , this is the inverse of the FFT. PAPR0 is used for the complex signals and update the no. of candidates. Clipping part is used for PAPR reduction at the transmitter.

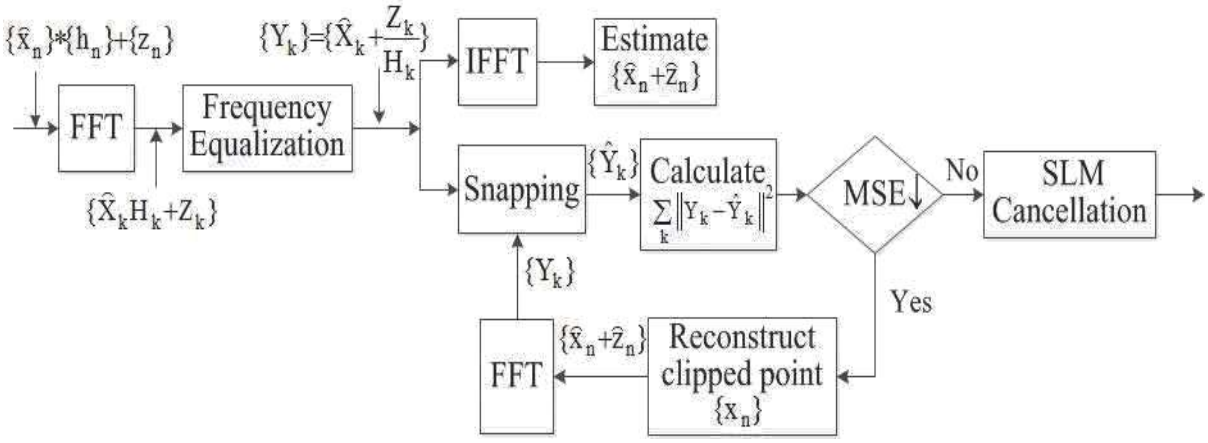


Figure 2. Schematic diagram of low PAPR OFDM transmission [52]

In the clipping part is used at the end of receiver and three modules are used:

1. Done equal Frequency
2. No. of algorithms
3. Cancel the phase of SLM

In multipath propagation and AWGN channel is used and phase adjusted by the SLM. The iterative algorithm used to recover and reconstructed the non-clipped. It is shown in the diagram figure:

First of all in diagram shows that the iterative algorithm is used for again designed a back signal and a part of clipping. Analysis that 256 users at set the sequences of phase are established the sequence combined in 8BPSK (binary phase shift keying) sequence at no of trends. And due this the max power cross co-relation of user transmission candidate of lower user transmitted or medium transmitted. If a is maximum then SLM performance is obtained because 256 candidates allow 10^{-4} PAPR and work under the 6dB.

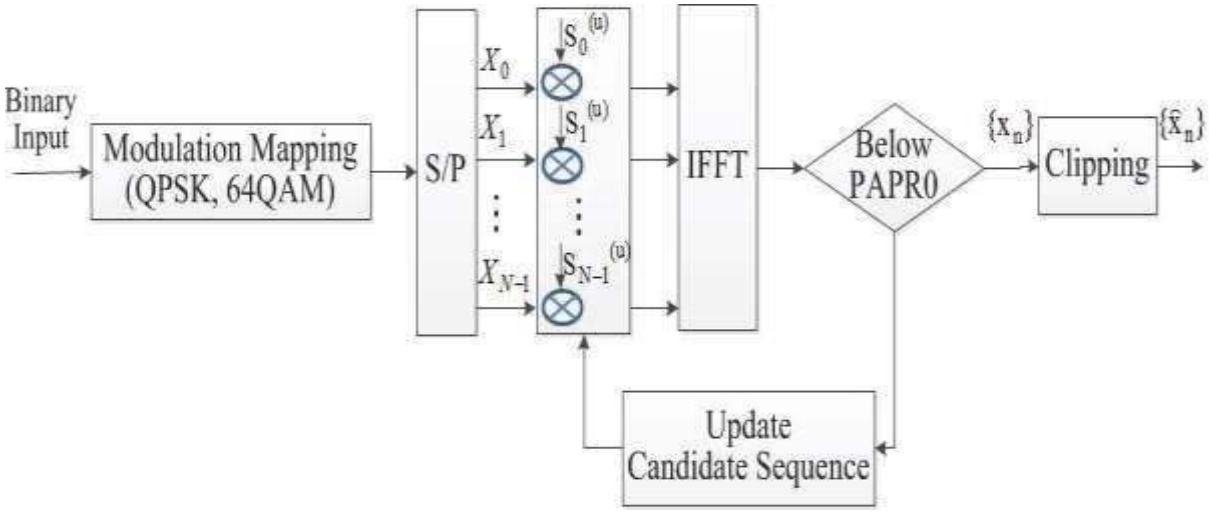


Figure 3. OFDM receiver algorithm [53]

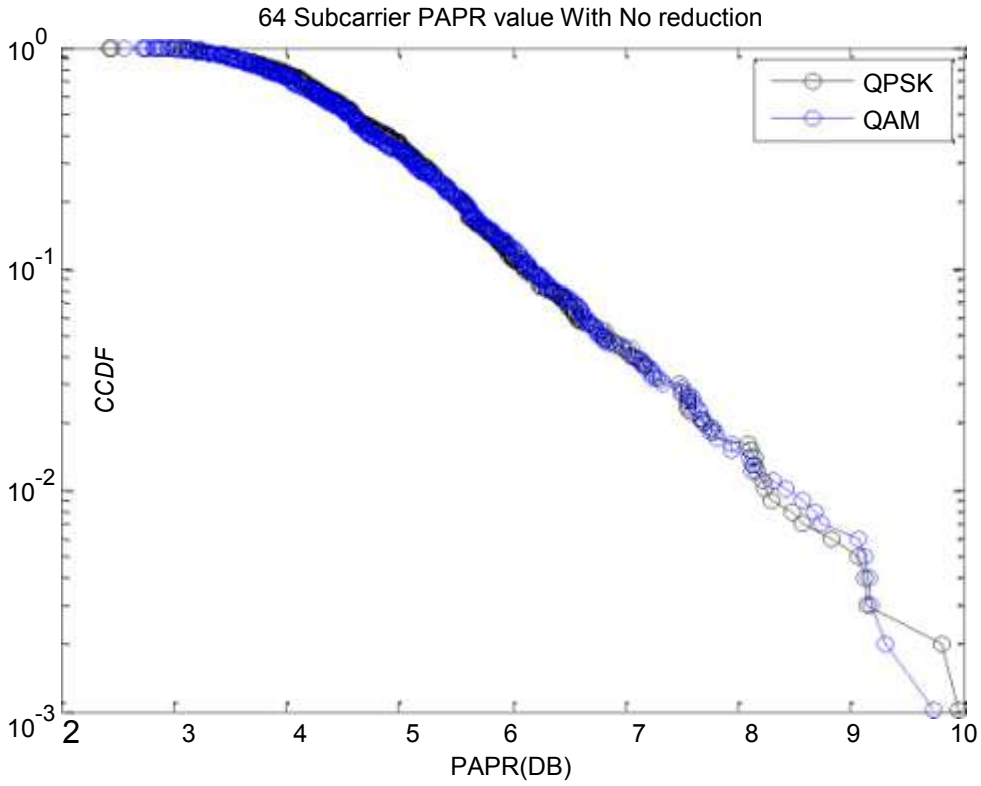
Analysis that 256 users at set the sequences of phase are established the sequence combined in 8BPSK (binary phase shift keying) sequence at no of trends. And due this the max power crosses co-relation of user transmission candidate of lower user transmitted or medium transmitted.

CHAPTER 8
PERFORMANCE EVALUATION

8.1 Graphical Results

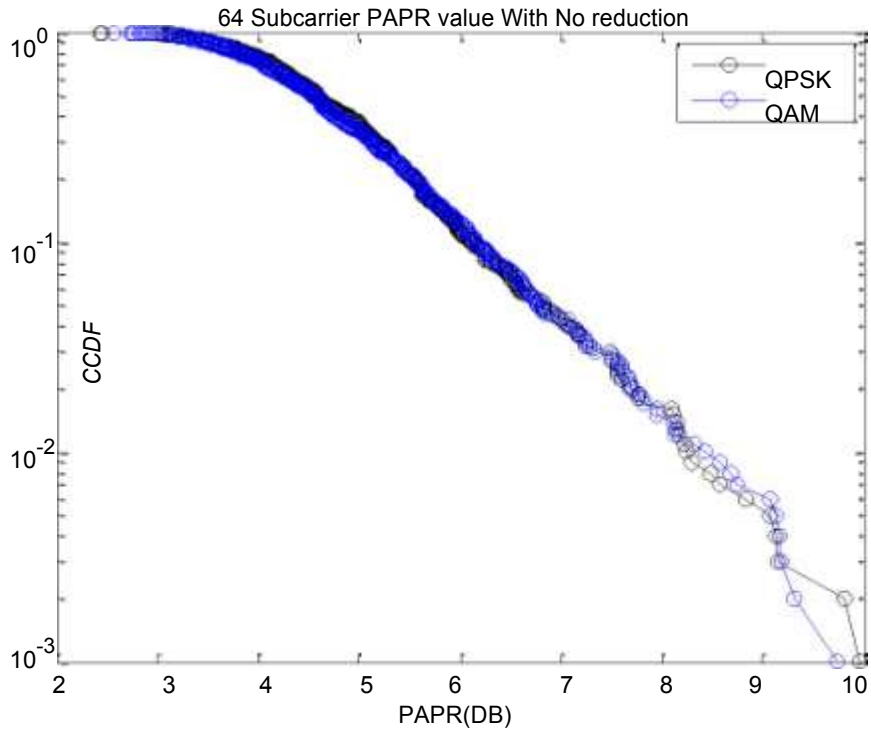
For PAPR reduction, comparing PSK, QPSK and QAM modulation in terms of BER. Less bit-error rate (BER) which leads to better performance of the system. So from the graphical representation it can be concluded that which modulation is best for the PAPR reduction in OFDM and which technique is better for the best PAPR reduction results.

(A) CCDF vs. PAPR(dB) for 64 subcarriers with no reduction

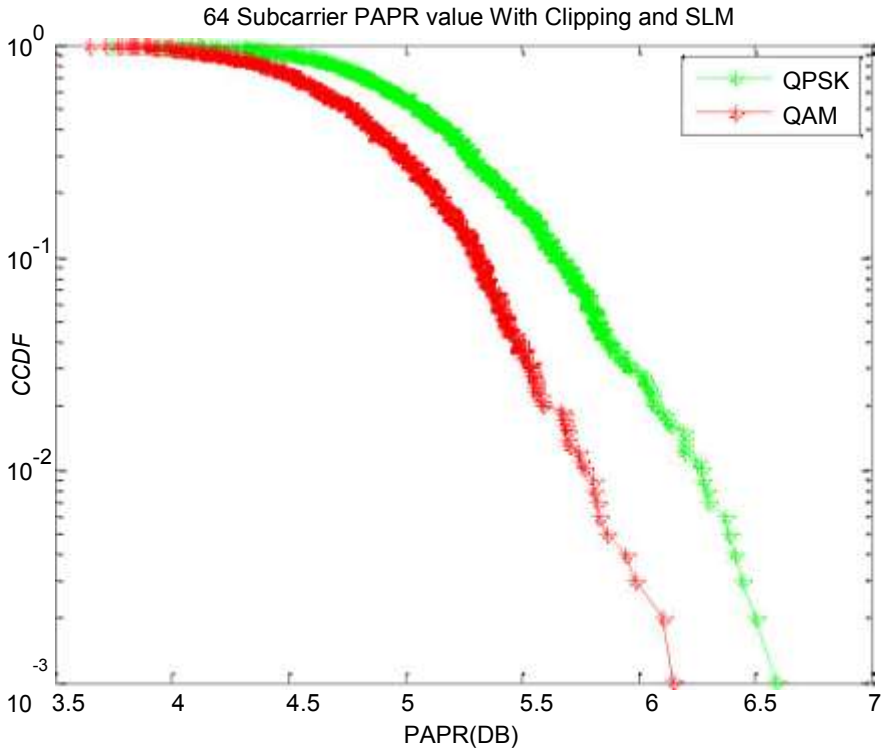


This graph represents the comparison of different modulation techniques i.e. QPSK and QAM in regarding of PAPR. No reduction technique is used here and 64 subcarriers are taken for both the modulation techniques. but out of band distortion is also there because of the main drawback of clipping technique. Various modulation techniques are also used for better efficiency and throughput. Clipping is used to avoid the fluctuation in a signal which is achieved by clipped the original signal with some threshold value but out of band distortion is also there because of the main drawback of clipping technique.

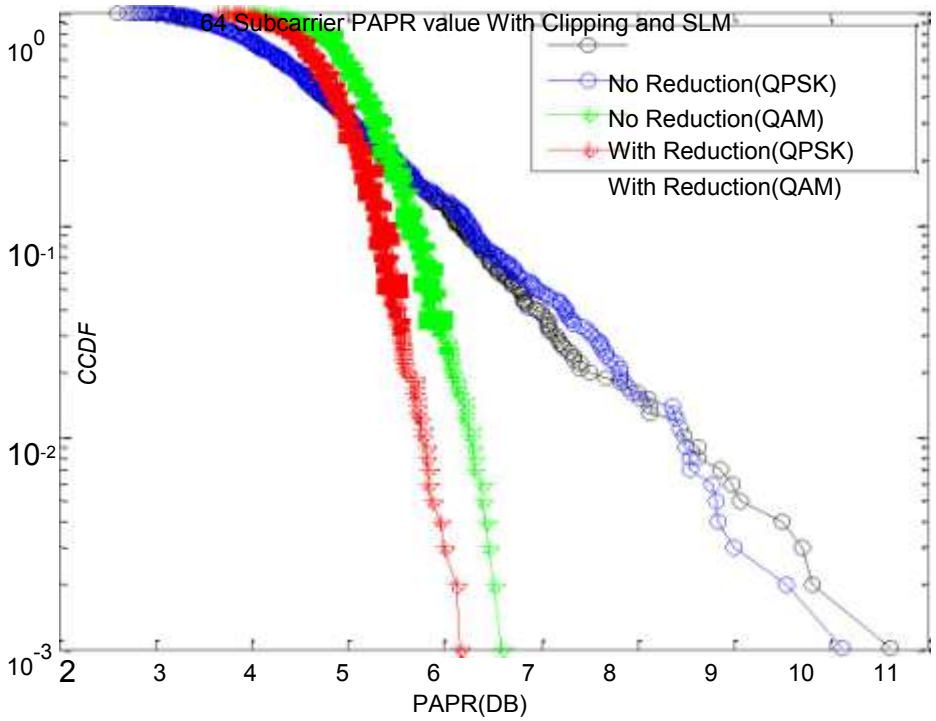
(B) CCDF vs PAPR dB for 64 subcarriers with no reduction



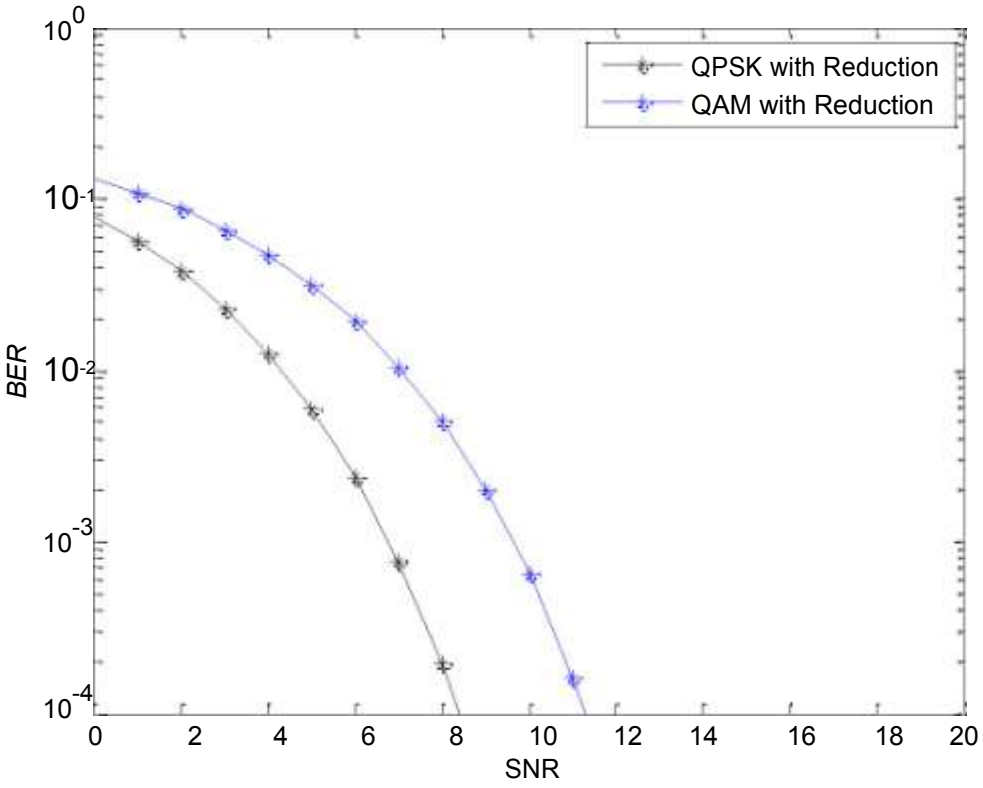
(C) CCDF vs PAPR(dB) for 64 subcarriers with reduction



(D) CCDF vs PAPR(dB) for 64 subcarriers with comparison

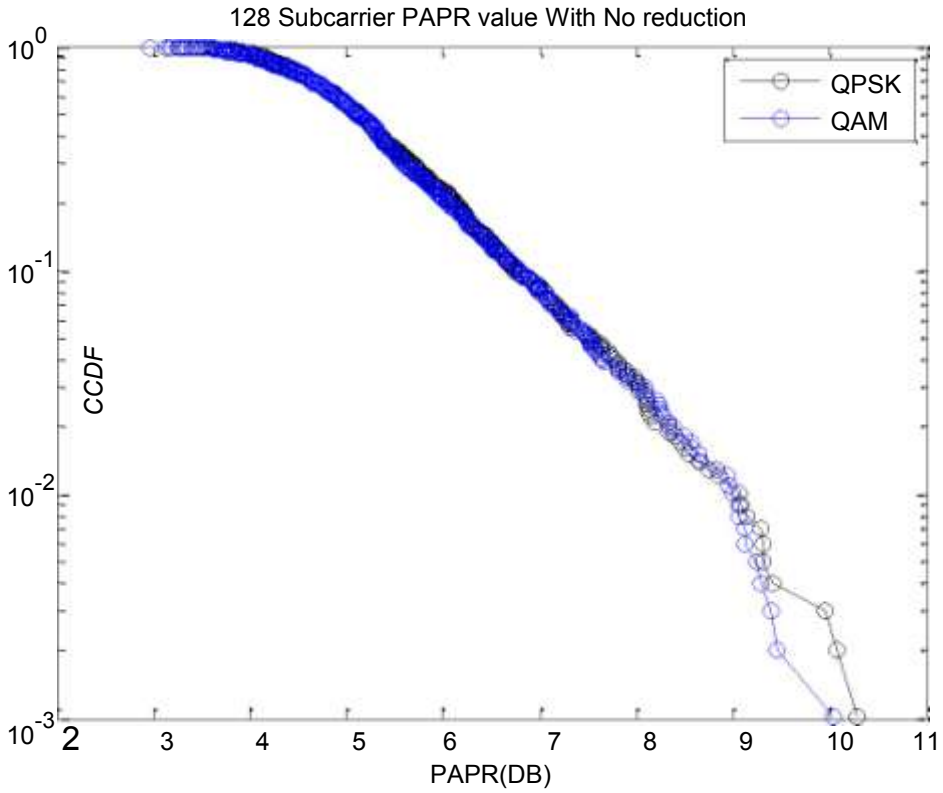


(E) BER vs SNR at receiver

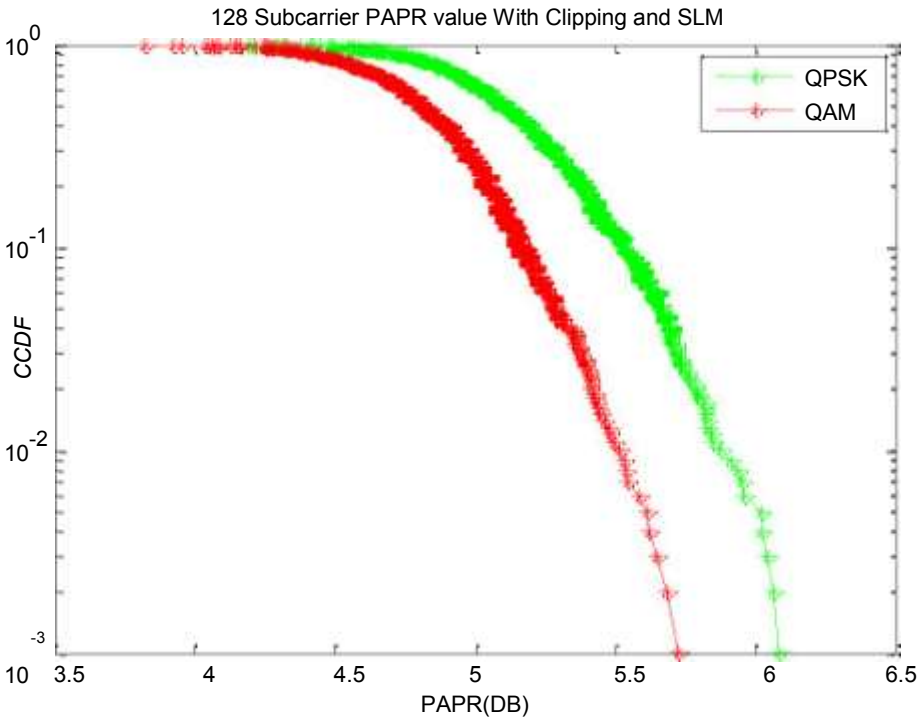


PAPR is resolved just by the quantity of applicants regardless of various stage arrangements or computerized balances utilized. Three charts are demonstrated that without lessening, with decrease and correlation of balance strategies. For instance, set the likelihood of PAPR being bigger than an objective edge to the quantity of hopeful stage successions required can be gotten from Fig (A),(B),(C) as a component of the first PAPR CCDF. The quantity of ideal SLM hopefuls versus 10-4 PAPR target. It shows that a 5.5 dB diminish from 11.3dB (10-4 PAPR). It shows that a 5.5 dB diminish from 11.3dB (10-4 PAPR without SLM), to 6dB requires under 200 autonomous contender for 64-subcarrier OFDM flag. However a further 1dB abatement underneath 6dB needs more than two solicitations of degree addition of the amount of contenders, The recipient exhibitions as for a cut-out limit of 2.5dB for QPSK flag and 4dB for QAM.

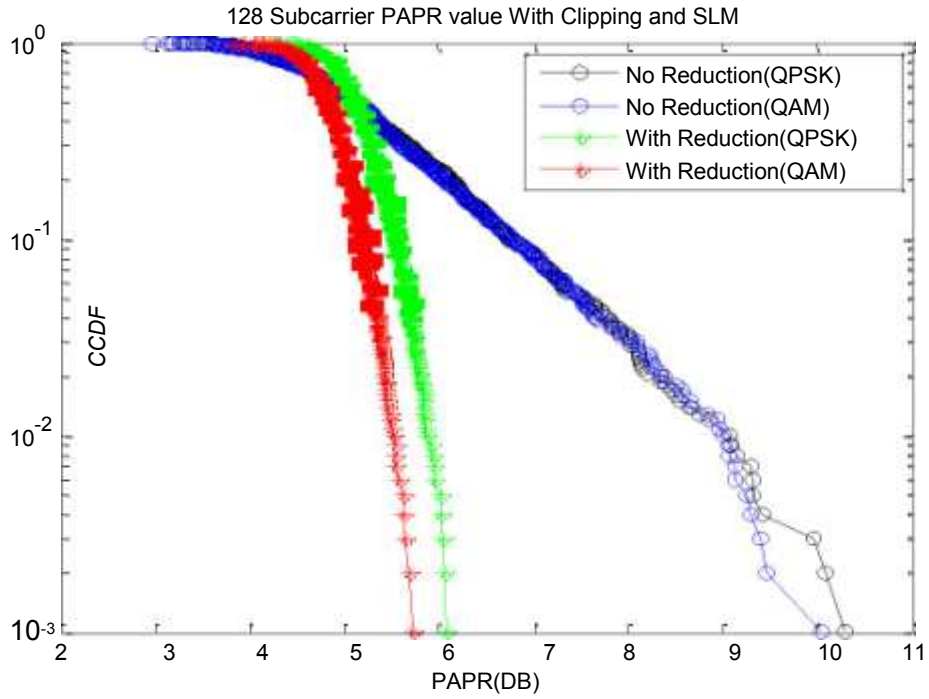
(F)CCDF vs PAPR(dB) for 128 subcarriers with no reduction



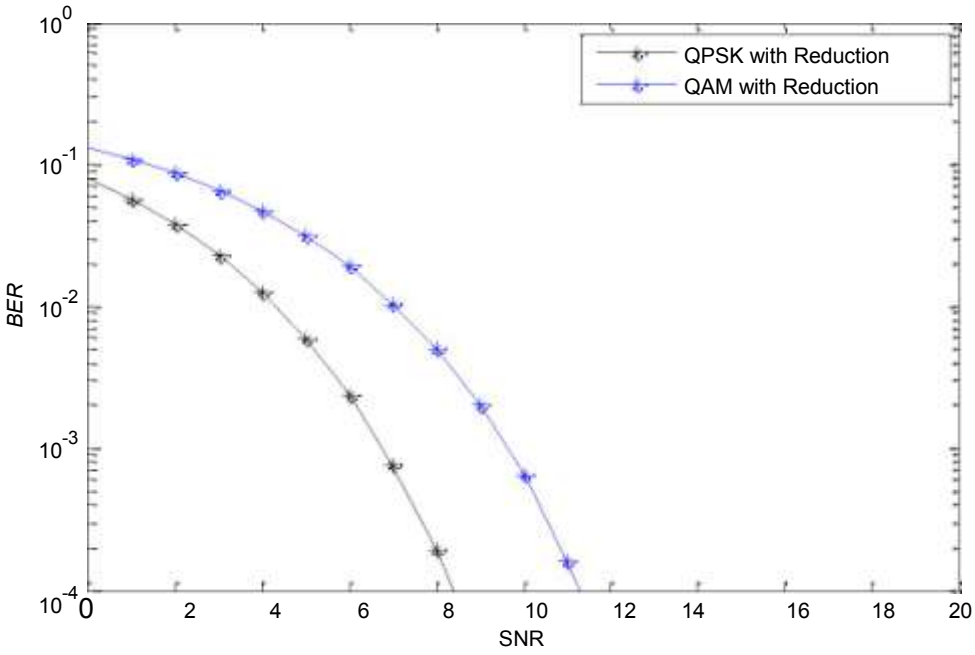
(G)CCDF vs PAPR(dB) for 128 subcarriers with reduction



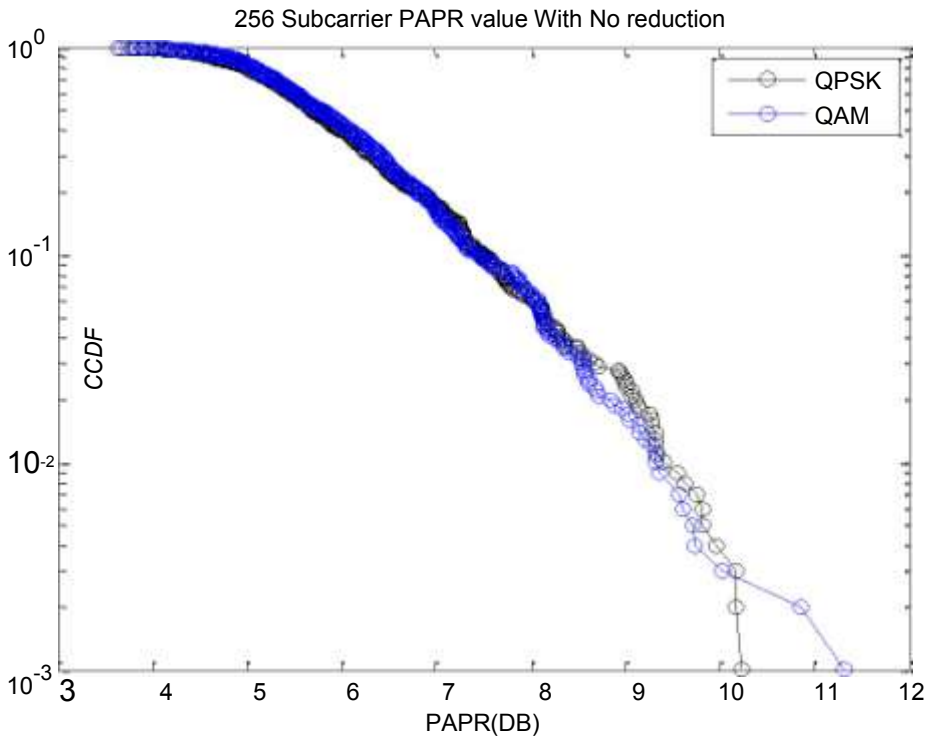
(H)CCDF vs PAPR(dB) for 128 subcarriers with comparison



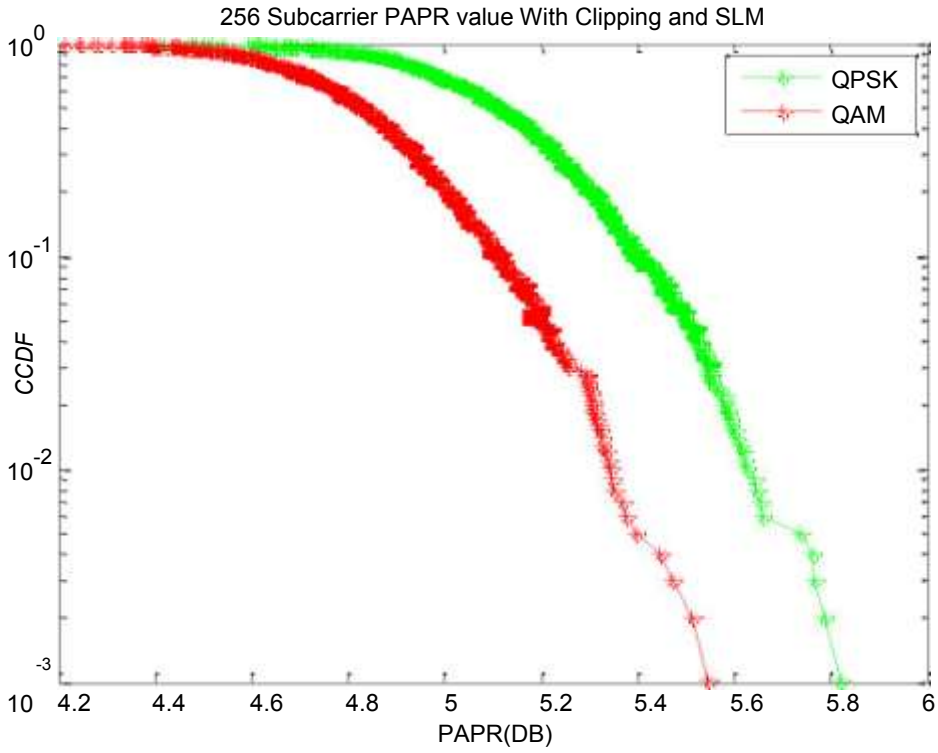
(I) BER vs SNR



(J) CCDF vs PAPR(dB) for 256 subcarriers with no reduction

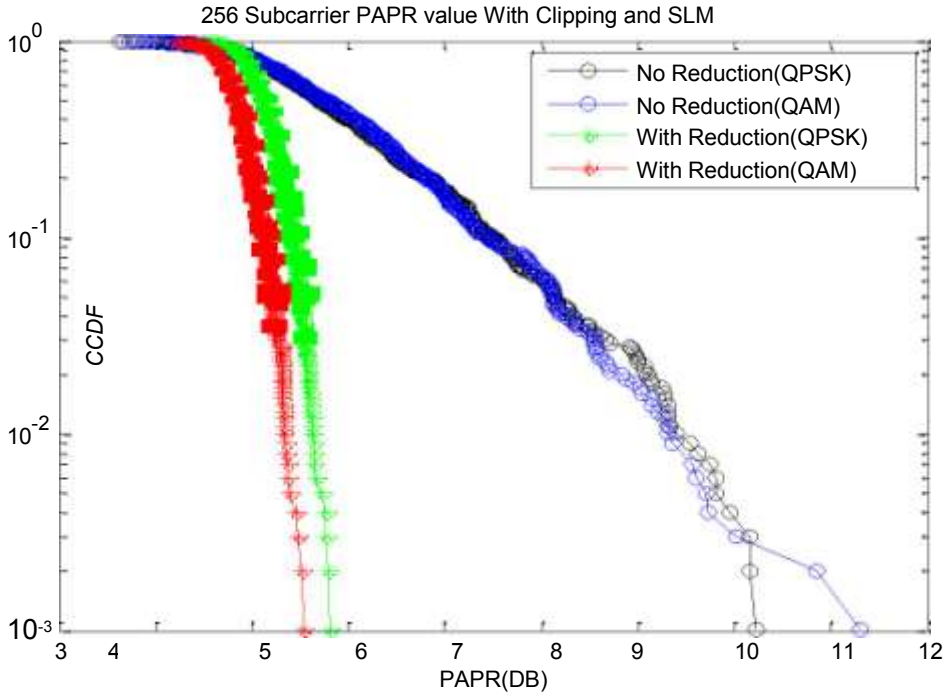


(K)CCDF vs PAPR (dB) for 256 subcarriers with reduction



(L)CCDF vs PAPR(dB) for 256 subcarriers with comparison

The SNR misfortune because of channel blurring, the beneficiary seems to have the comparative exhibitions in recuperating the cut flag to 1 dB-1.5dB SNR misfortune but out of band distortion is also there because of the main drawback of clipping technique. Various modulation techniques are also used for better efficiency and throughput. Clipping is used to avoid the fluctuation in a signal which is achieved by clipped the original signal with some threshold value but out of band distortion is also there because of the main drawback of clipping technique Inferable from underlying expansive PAPR decrease utilizing ideal SLM technique, an ensuing cut-out is made on a littler scale with the end goal that the signal can be recouped viably at beneficiary with less calculation. The main drawback is that OFDM signal which is transmitted in time domain (summation of multiple sinusoidal signals) results in maximizing the average value of power ratio.



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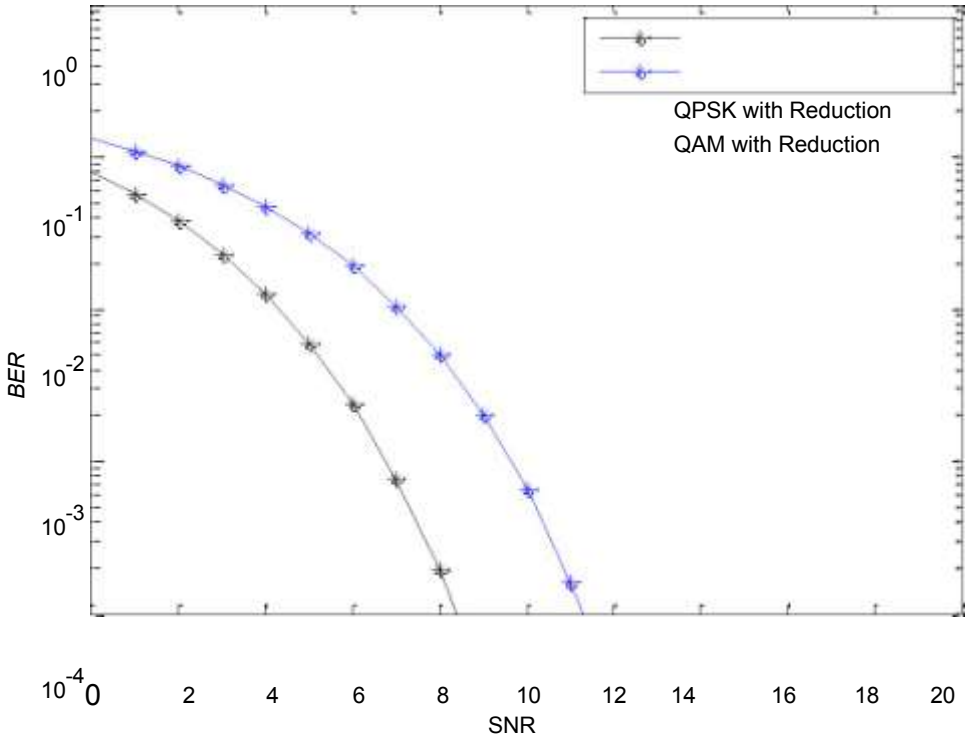
(M) BER vs SNR for receiver



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CHAPTER 9
PROPOSED EXPERIMENTAL WORK

9.1 MODULATION TECHNIQUES

There have a three modulations are used QAM, QPSK, PSK.QPSK is a type of PSK technique in which 2 bits are adjusted on the double, selecting 1 of 4 conceivable transporter stage shifts (0, 90, 180, or 270 degrees). Quadrature PSK modulation technique allows the data signal to carry two times as much data as common Phase Shift Keying utilizing a similar transmission capacity.

QAM (quadrature adequacy regulation) is a technique for consolidating two sufficiency balanced (AM) signs into a solitary channel, in this manner multiplying the successful data transfer capacity. QAM is utilized with heartbeat abundance tweak (PAM) in advanced frameworks, particularly in remote applications.

PTS (Partial transmit sequence) is a techniques which is used for rotate the phase shift of the combination in values and transmit the sequences in the form of blocks, when it moves in the form of blocks and choose the best output. Flipped the result in the sequence wise and obtained the better result matched with the approximation result.

9.2 PROPOSED WORK

As in the problem formulation, it concludes that single threshold value is used in traditional methods which cannot clip upper and lower data simultaneously. Owing to this a modified method will be proposed which offers double threshold value that can clip both parts of the data. Secondly, PTS individually cannot degrade the PAPR value of the data so it has combined with the DCT technique as it has found a better after analysis the literature survey. As a result, proposed method decreases the computation system complexity and gives better results compared to the conventional techniques.

9.3 PROPOSED SIMULATION MODEL

Source is an input which shows the data in the form of bits it can used a modulation techniques which convert the signals through carrier signal into the modulating signal. It refers to the input pattern.

Encoder is an input data which encode the bits in the form of codes and send it to the transmitter. Modulation may be defined as the modulating the signal through the carrier signal convert it into

the modulated signal. This data is converted into the serial to parallel converter, in this the electrical to the optical nature. It can be divided into the blocks by the help of IFFT (Inverse Fast Fourier Transformation). This is a structure of the partial transmit sequence (PTS) which divides the combination of values in blocks and after flipping the sequence of the combination and take a direct pattern to the data like moves from LSB to MSB Rotation should be important because sequence want to be changing the bits in the form of place of the bit, rows and columns. At the end of the receiver take an approximation value of the PAPR and rearrange the data again and again up to the level of giving a minimum PAPR value. When minimum PAPR achieved than it is used for the future work.

In figure 4, when increase the number of phase factor and it decrease the PAPR reduction according to this the computational complexity increases in the system , DCT(discrete cosine transform) is same as the DFT (discrete fast Fourier transformation) and are uses only a real number . The autocorrelation is find out the peak signal of PSD (power spectral density).
When we use the DCT (discrete cosine transform) it reduces the autocorrelation between the OFDM (orthogonal frequency division multiplexing) in a signal. Due to this the PAPR (peak to the average power ratio) is reduced. In figure 5, the DCT (discrete cosine transform) is attached before the PTS(partial transmit sequence) with interleave. In this figure represents the reduction of OFDM (orthogonal frequency division multiplexing) and due to this data bits are represent similarities between the signal bits. DCT (discrete cosine transform) is attached before PTS (partial transmit sequence) it shows that when autocorrelation should be reduced the data bits are modulated. The role of interleave for removing the burst error. This is a technique which reduces more and more PAPR reduction into OFDM.

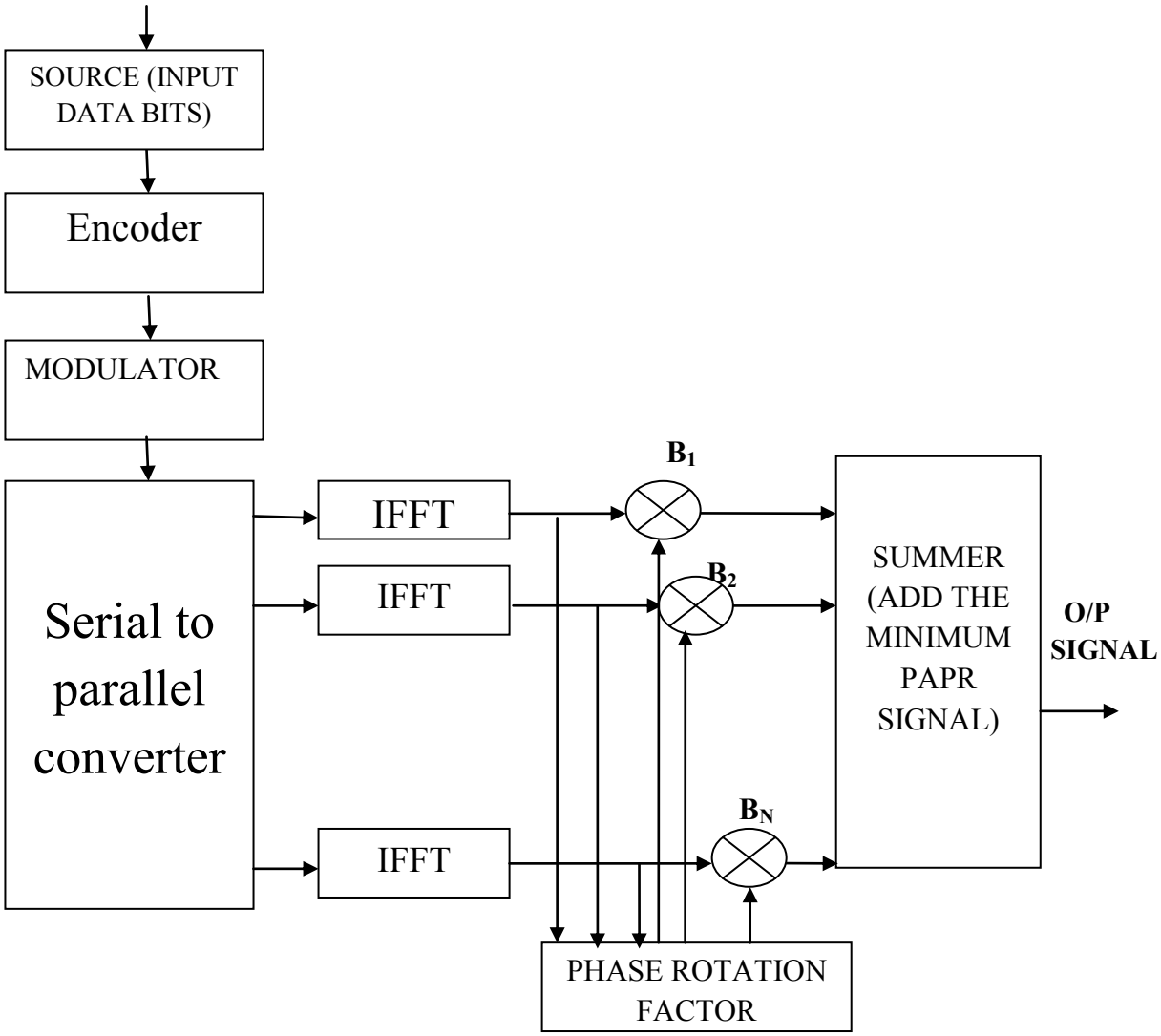


Figure 4. System model of PTS technique in OFDM

Source in an input shows the data in the form of bits it can used a modulation techniques which convert the signals through carrier signal into the modulating signal. It refers to the input pattern. Encoder is an input data which encode the bits in the form of codes and send it to the transmitter. Modulation may be defined as the modulating the signal through the carrier signal convert it into the modulated signal. This data is converted into the serial to parallel converter, in this the electrical to the optical nature. It can be divided into the blocks by the help of IFFT (Inverse Fast Fourier Transformation). This is a structure of the partial transmit sequence (PTS) which divides the combination of values in blocks and after flipping the sequence of the combination and take a direct pattern to the data like moves from LSB to MSB . Rotation should be important because sequence want to be changing the bits in the form of place of the bit, rows and columns.

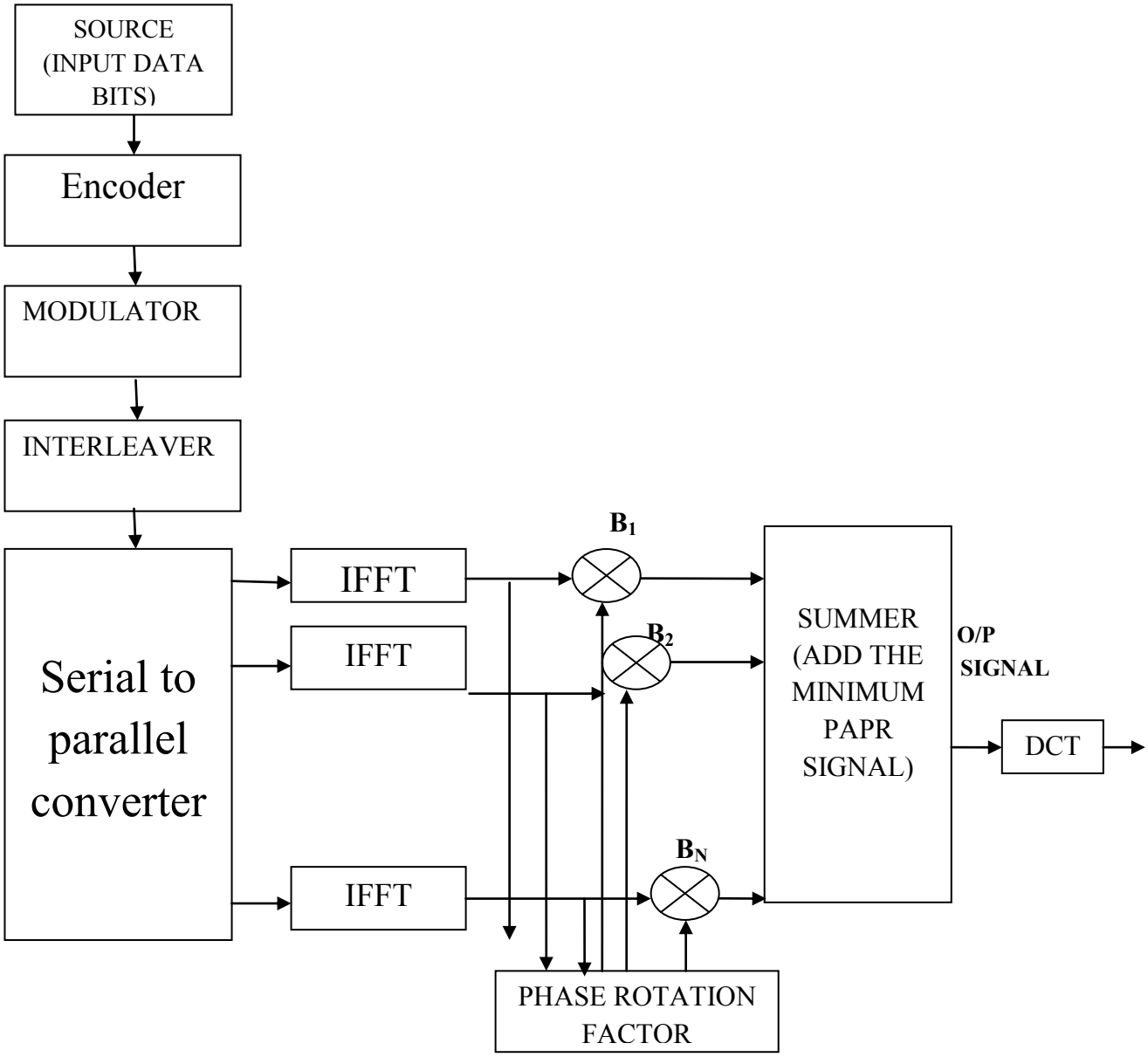


Figure 5. Block diagram of OFDM system using DCT before PTS technique with interleave

Figure 6 shows that after the taking of low PAPR(peak to the average power ratio) is achieved, in this the work of DCT(discrete cosine transform) to auto correlate between the minimum PAPR (peak to the average power ratio) in OFDM(orthogonal frequency division multiplexing) signal. Interleave before DCT(discrete cosine transform) is used because of modulating the data bits. When the minimum PAPR is achieved so, DCT (discrete cosine transform) used for the future work.

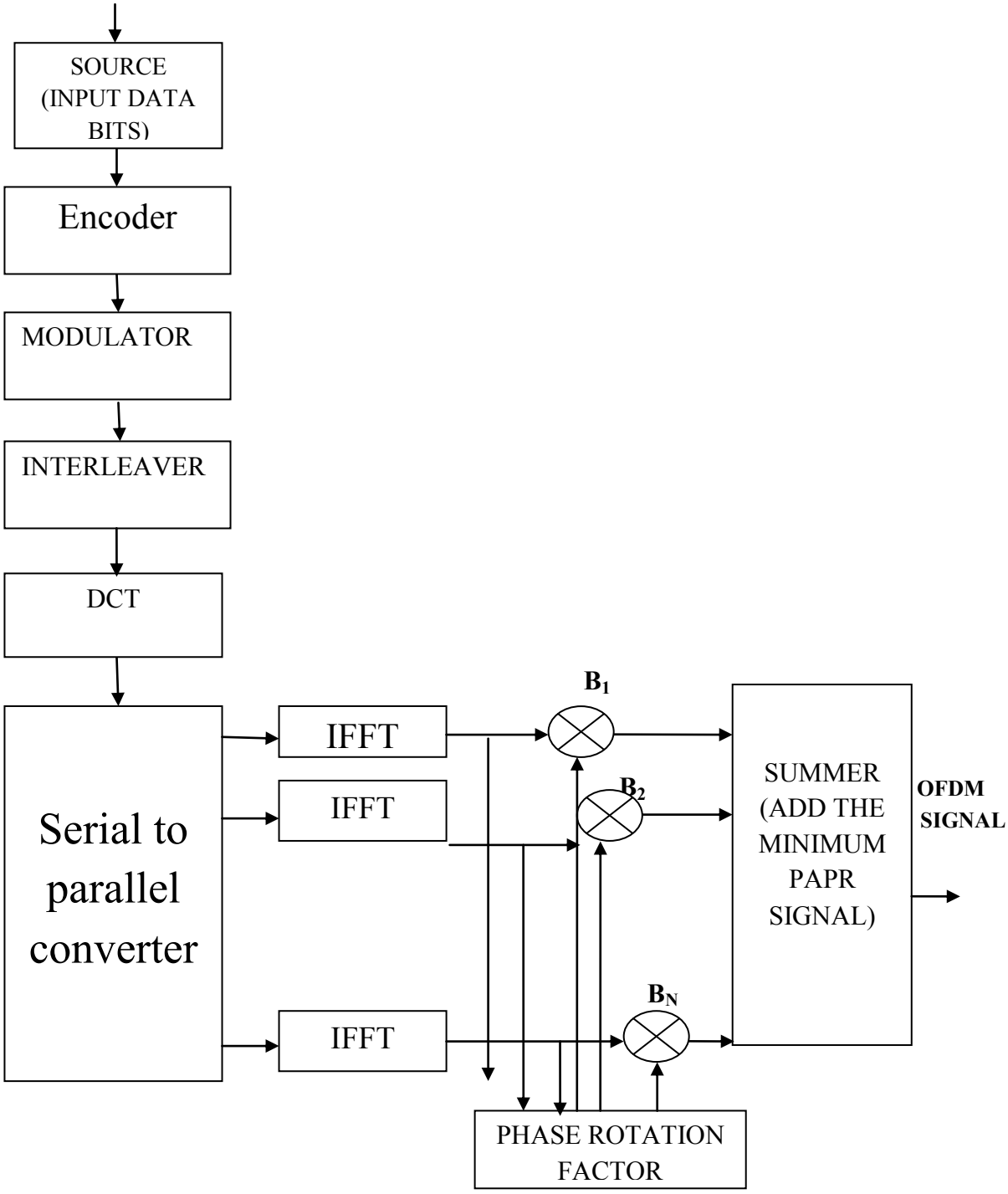
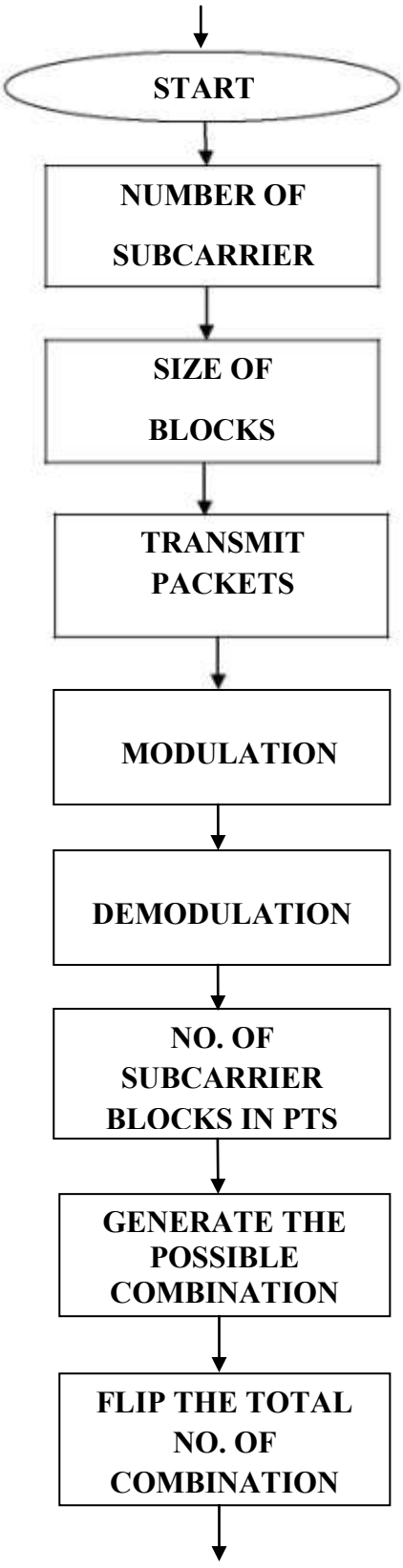
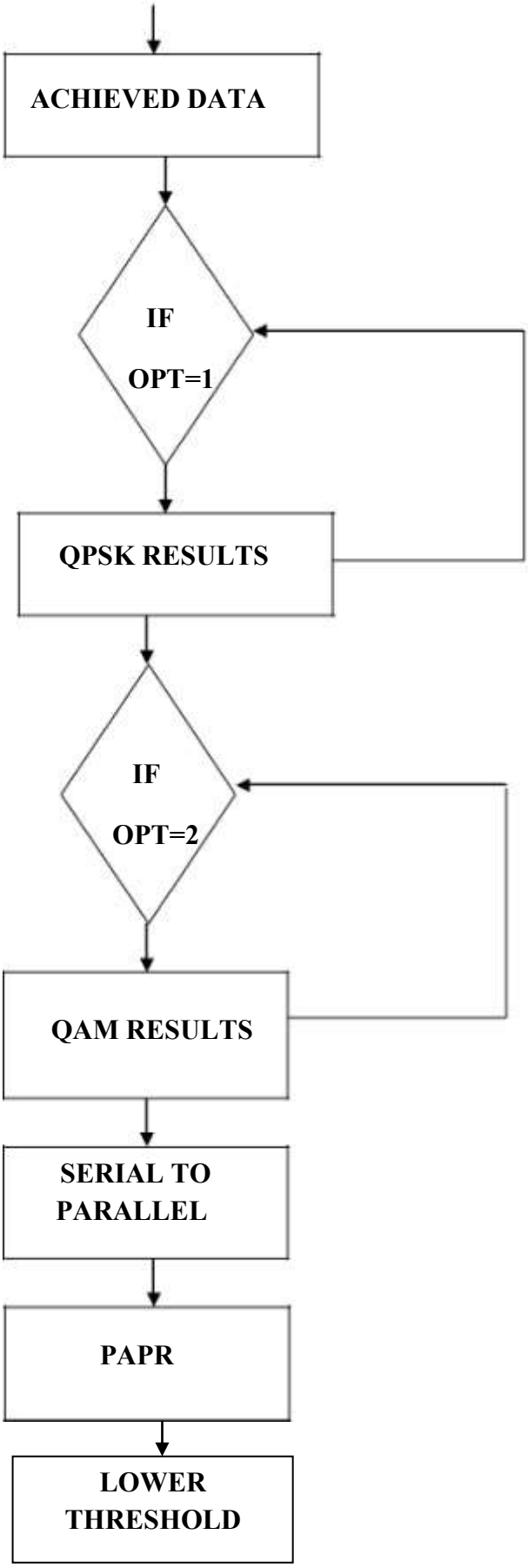
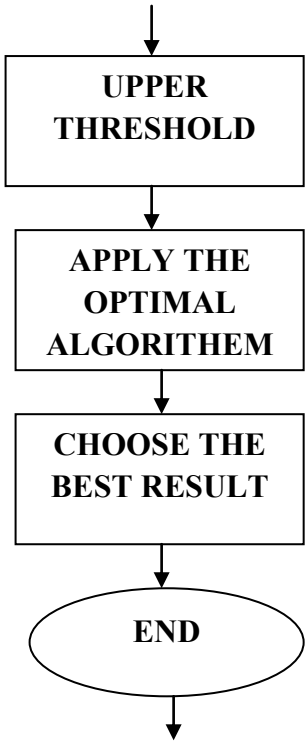


Figure 6. Block diagram of OFDM system using DCT before PTS technique with interleaver

9.4 ALGORITHM




ACHIEVED DATA
IF
OPT=1
QPSK RESULTS
IF
OPT=2
QAM RESULTS
SERIAL TO
PARALLEL
PAPR
LOWER
THRESHOLD


UPPER THRESHOLD
APPLY THE OPTIMAL ALGORITHEM
CHOOSE THE BEST RESULT
END

CHAPTER 10

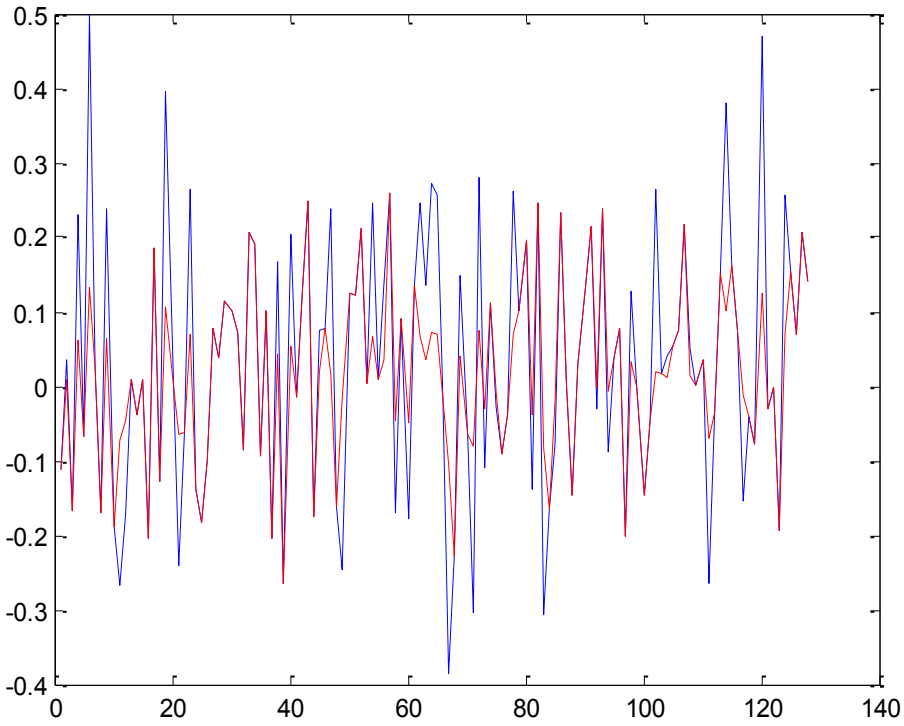
PROPOSED PERFORMANCE EVALUATION

10.1 GRAPHICAL ANALYSIS

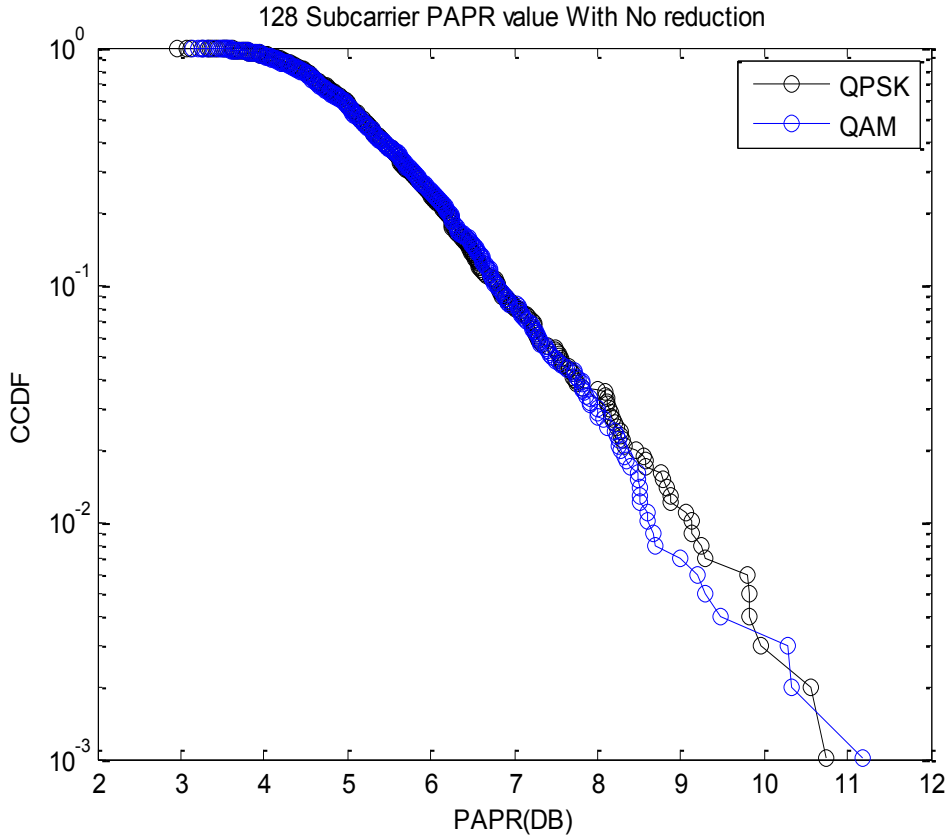
Results analysis of DCT(discrete cosine transform) based on the PTS(partial transmit sequence) technique with interleave . The graphical signal representation is shown on the MATLAB software.

(M) Clipping Analysis with PTS technique

This is a clipping analysis graph shows that the upper threshold and the lower threshold level. The upper threshold represent the positive behave of peak to the signal and the lower threshold represent the negative behave of peak to the signal. The peaks are showing up to the level of 0.5 dB in the upper part of the waveform and same as negative analysis The peaks are showing down to the level of -0.4 dB .These results are vary without any technique of OFDM (orthogonal frequency division multiplexing).[43] when we are using a some of the techniques of OFDM(orthogonal frequency division multiplexing) then due to these the peaks of the signal should be clipped and showing a smooth waveform which cannot vary outface. In this graph representation is using a PTS (partial transmit sequence) for a better output. The peaks are showing up to the level of 0.2 dB in the upper part of the waveform and same as negative analysis the peaks are showing down to the level of -0.2 dB. The blue lines shows that peaks without any techniques and red lines shows that peaks with techniques.[44]



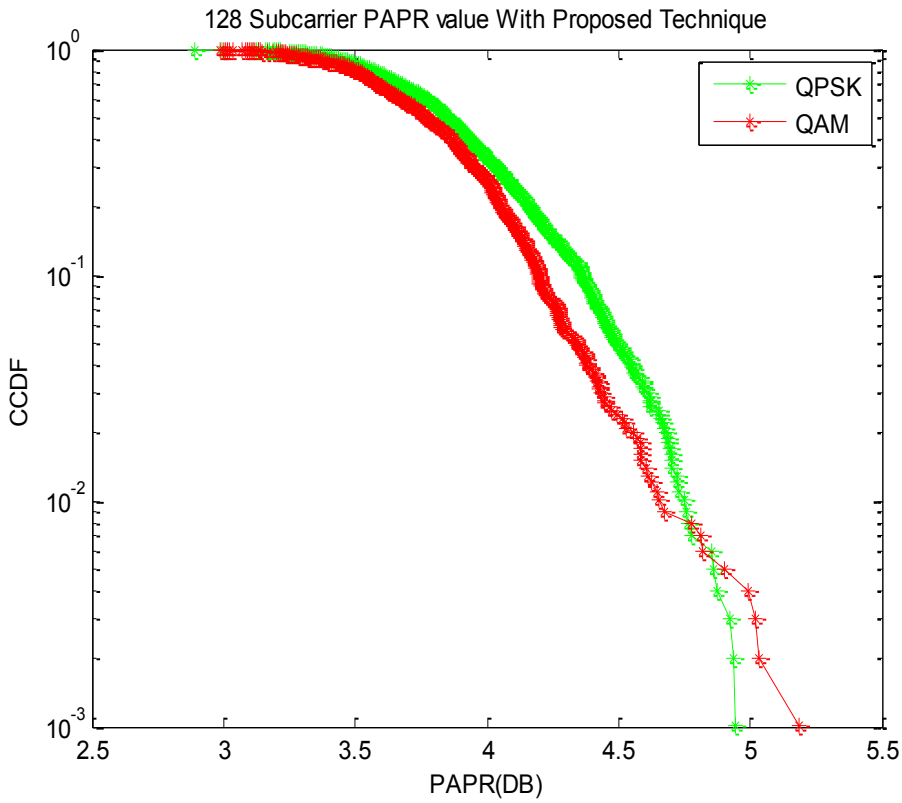
(N) 128 Subcarrier PAPR value with no reduction



In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the information to the customers in this the PAPR reduction is vary between the 4.9 dB with QPSK modulation and with the use of QAM modulation it vary at 5.6dB. This PAPR reduction is more because of it is done with PTS and SLM of any techniques.[45] The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR(dB).

In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the information to the customers in this the PAPR reduction is vary between the 4.9 dB with QPSK modulation and with the use of QAM modulation it vary at 5.6dB. This PAPR reduction is more because of it is done with PTS and SLM of any techniques.[46] The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR(dB).

(O) 128 Subcarrier PAPR value with proposed technique

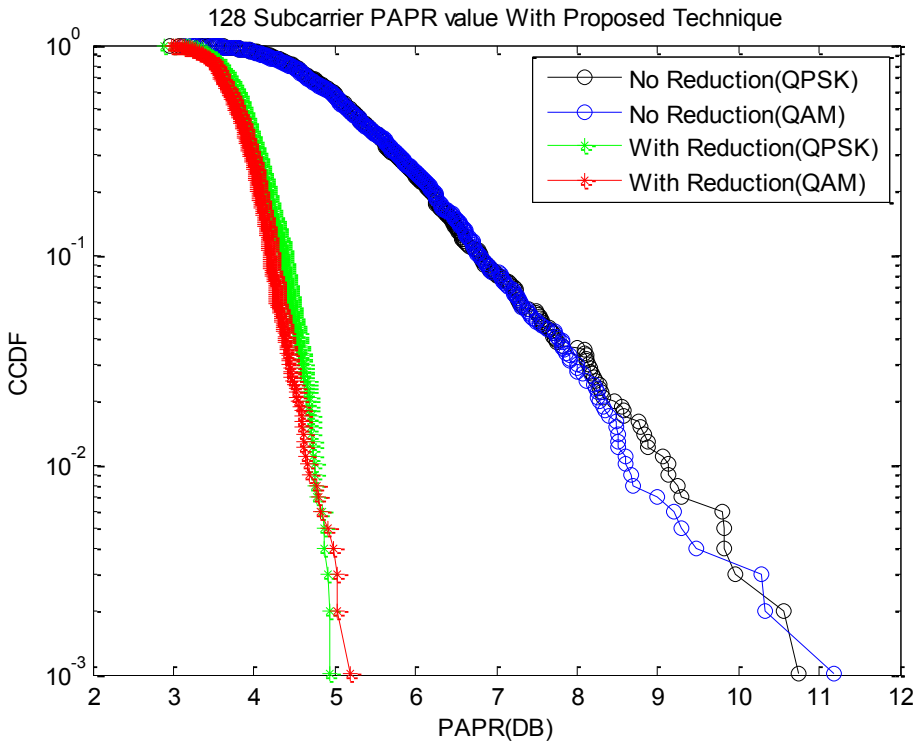


This PAPR reduction is more because of it is done with PTS and SLM of any techniques.[45] The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR(dB).

In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the

information to the customers in this the PAPR reduction is vary between the 4.9 dB with QPSK modulation and with the use of QAM modulation it vary at 5.6dB. This PAPR reduction is more because of it is done with PTS and SLM of any techniques. This PAPR reduction is more because of it is done with PTS and SLM of any techniques.[45] The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR. In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the information to the customers in this the PAPR reduction is vary between the 4.9 dB with QPSK modulation and with the use of QAM modulation it vary at 5.6dB. This PAPR reduction is more because of it is done with PTS and SLM of any techniques

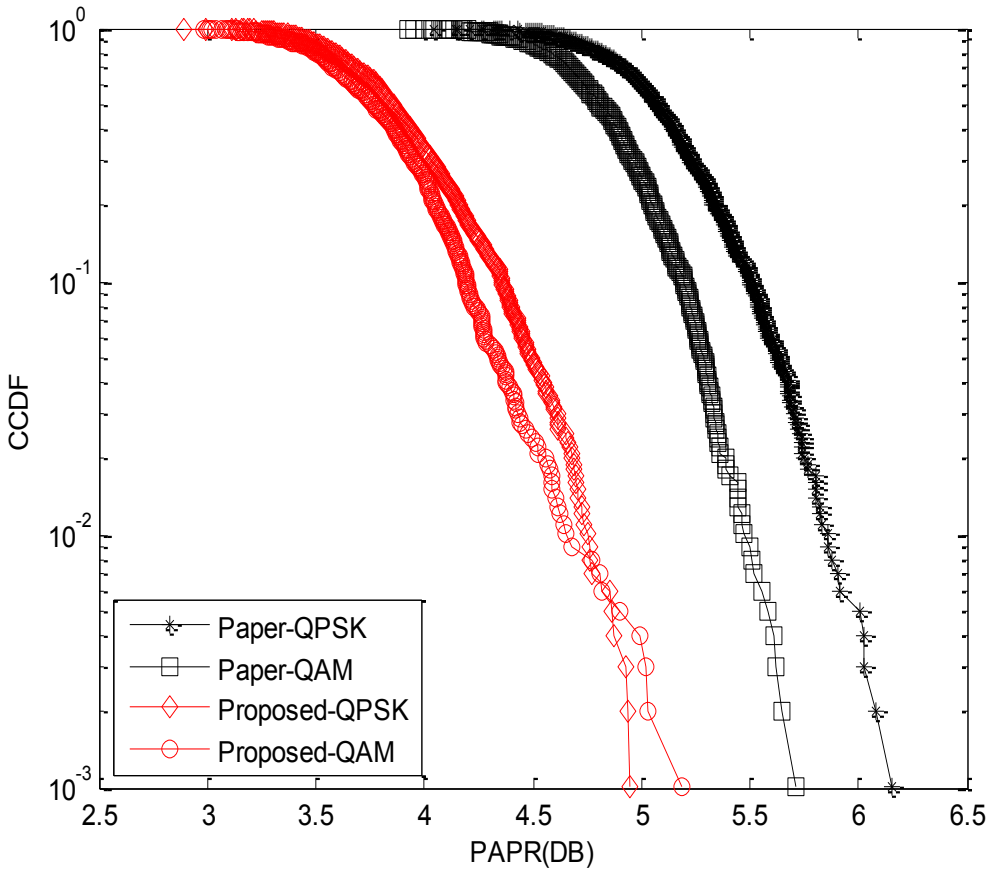
(p) 128 Subcarrier PAPR value with proposed technique



In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the information to the customers in this the PAPR reduction is vary between the 10.8 and 11.3dB with QPSK modulation without reduction and with the use of QAM modulation it vary at 4.10dB and 5.3 dB with reduction techniques[47]. This PAPR reduction is more because of it is done without and with of SLM and PTS reduction techniques.[48] The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR in (dB) or it is also defines the

relationship between the with and without reduction techniques. Through this the find the values of PAPR reduction how much vary without reduction technique and how much vary with reduction technique. Due to the PAPR increases than decreases the CCDF.

(Q) Combination of previous technique with proposed technique



In this graph result analysis the 128 subcarrier are showing the 128 users which are sending the information to the customers in this the PAPR reduction is vary between the 6.5dB with QPSK modulation with reduction in the previous results and with the use of QAM modulation it vary at 5.7dB with reduction techniques from previous results. This PAPR reduction is more because of it is done without and with of SLM and PTS reduction techniques. The threshold level is flow between the 0dB to 3dB.This defines the ratio between the CCDF or PAPR in (dB) or it is also defines the relationship between the with and without reduction techniques. Through this the find the values of PAPR reduction how much vary without reduction technique and how much vary with reduction technique.

CHAPTER 11

CONCLUSION AND FUTURE SCOPE

A technique to expand PAPR diminishment by complimenting ideal SLM with cut-out. The plot joins the advantage is a small SNR in SLM strategy or basic calculation of the cut-out method. We have showed up for both 64-subcarrier and 128-subcarrier OFDM transmissions; the 10-4 PAPR can be decreased from around 10.3 dB~10.5 dB to 2.5 dB for QPSK flag and to 4dB for QAM motion with only 1 dB ~ 1.5 dB SNR misfortunes. These present critical upgrades contrasted with either a definitive execution of section and separating strategies in or the execution of a joined strategy. While computational proficiency of ideal SLM (appeared in Fig.3) is to a great extent misused for the transmitter, these present upgrades contrasted with either a definitive execution of section techniques parallel successions for ideal SLM, the transmission holds a similar group of stars guide. Recipient calculations for recurrence adjustment, cutting recuperation and SLM cancelation to be directed freely, subsequently a measured beneficiary of less many-sided quality. Inferable from a basic far reaching PAPR decrease utilizing ideal SLM, an ensuing cut-out is made on a littler scale with the end goal that the signal can be repeated. In which SNR misfortune because of section can be to a great extent recouped as the BER execution draws near to the social event of a non-cut flag over either an AWGN direct or a multipath notwithstanding AWGN channel. The range enlarging is an issue. In the small level clipping, in outer band radiated on similar with low conventional clipping and filtering system, or easy to reduce the SLM technique by the another algorithm proposed work. in that is fully compatible with the proposed scheme.

In future various modulation techniques will be used to decrease the PAPR and new methodology like companding, filtration etc. will be used in combination to increase the spectral efficiency, Bit error rate etc

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