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A NOVAL APPROACH FOR OPTIMIZATION OF PHYSICAL LAYER FOR WIRELESS AND MOBILE COMMUNICATION

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ABSTRACT: *In modern era communication is very important. This communication can be divided in two parts (1) Voice and (2) Data. .In voice communication real time data transmission is necessary while data can wait for while. But major area of concern is cost and that is the main reason why we cannot have separate lines for both. In any communication transmission of signal should be secure, error free and least affected by attenuation. These all can affect signal during transmission in physical layer where little can be done to prevent this. In recent developments in mobile communication has raised the expectation of users to a new height and as demand arises new advancement by mobile companies are also offering newer and faster technologies. In this series the latest development is advancement towards 5 G mobile network with expected data rate over 1 Gbps . This network is expected to roll out around 2020 but a lot of work is pending like infrastructure improvement, architecture development frequency band allotment etc*

KEYWORDS: 5G, PLMN,OFDM, Roaming, IP Address, GSM, OSI

I.INTRODUCTION

In data transmission OSI layers is used. In OSI layer the complete system is divided in seven layers

(i) Application
(ii) Presentation
(iii) Session
(iv) Transport
(v) Network
(vi) Data link
(vii) Physical

Every layer has to give service to lower layers and get services from upper layer. Out of these layers application layer is the layer where data is generated while physical layer is responsible for data transmission.

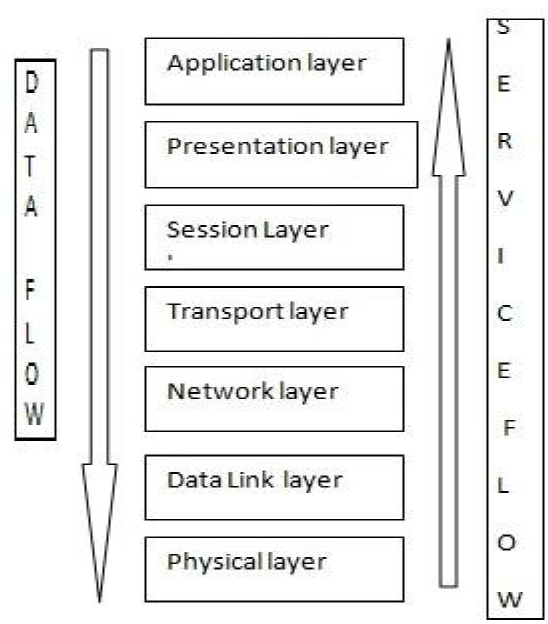

Fig 1 Service and data flow structure in ISO

2.ISSUES TO BE CONSIDER FOR END TO END PHYSICAL LAYER DESIGN

While designing a network we have to consider two major issues

(i) Security of data

(ii) Cost

While security of data involves various algorithms, costing involves efficient designing and optimization. There are two types of channels which are used at presented

(i) Wired

(ii) Wireless

Both the systems have their own advantages and disadvantages. But due to greater flexibility and ease of establishment gives wireless system an edge over wired system. A wireless systems looks very simple but it involves several components and their related issues

1. **Channel :** The connecting medium in between transmitter and receiver is known as channel. During the transmission trough the channel every signal has face two main problems
   (a) Attenuation
   (b) Noise

1.1 Attenuation : When a signal is transmitted from transmitter to receiver, it losses power with the distance . This can be represented mathematically as below

$$P_R = P_T \frac{A}{\pi x^2} G - P_A \text{-------------------------------(i)}$$

Where

P_R=Power received

P_T=Power Transmitted

A=Area of receiving antenna

G = Gain of receiving antenna

X= distance from transmitter

P_A= Total attenuation

1.2 Noise : Any unwanted signal which is interfering the original signal is known as noise. Noise is everywhere but it is most effective in channel , while considering noise factor expression for received power can be written as

$$P_R = P_T \frac{A}{\pi x^2} G - P_A - N \text{---------------(ii)}$$

Where N= Noise

2. **Antenna Parameters:** There are various antenna parameters which has to be considered like
   (a) Minimum threshold value to detect receiving signal,
   (b) Directivity
   (c) Aperture efficiency
   (d) Gain

3. **Spectrum uses:** For data or voice communication every user needs

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bandwidth. So total no of users depends upon total bandwidth available. To increase no of users we may use various types of multiplexing techniques.

4. **Modulation :** Any signal cannot be transmitted without modulating. Various modulation techniques are in use but QPSK is most widely used. However choosing a modulation scheme depends upon environment, amount of data,
5. **Channel Coding:** Depends upon SNR, Fading, Redundancy and receiver design.
6. **Equalization :** To reduce the effect of other signals or ISI

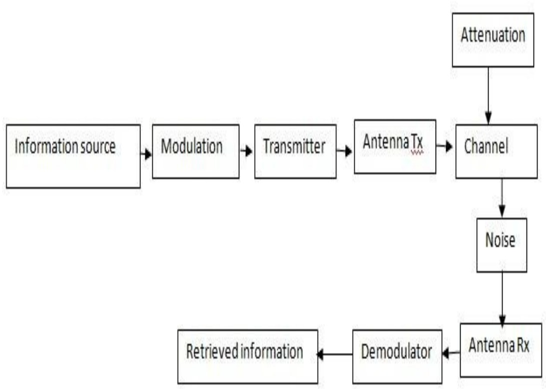

Fig 2 Block diagram of communication system

3.SIMULATION OF PHYSICAL LAYER

In this paper we proposed a system to simulate physical layer

We first consider Convolutional coding and puncturing using code rates of 2/3, and 3/4

Then we inserted Data interleaving as multiplexing to save bandwidth

As discussed earlier we have used QPSK modulation method for modulation

Then we consider orthogonal frequency division multiplexing transmission which is being used in most modern communication system .

After this we have design channel using dispersive multipath fading channel. we have consider COST 207 modeling for this

This all we have shown as algorithm shown below.

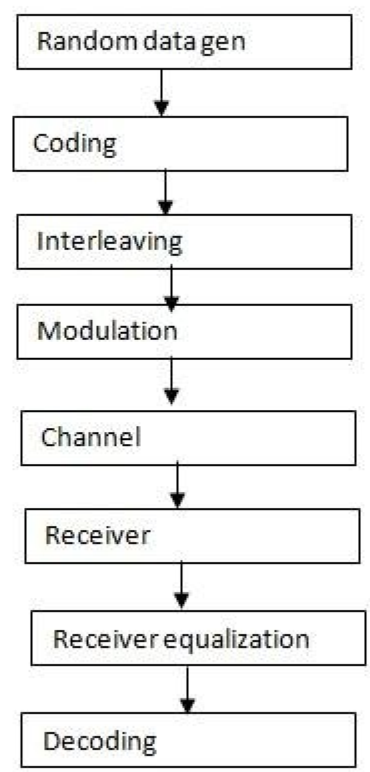

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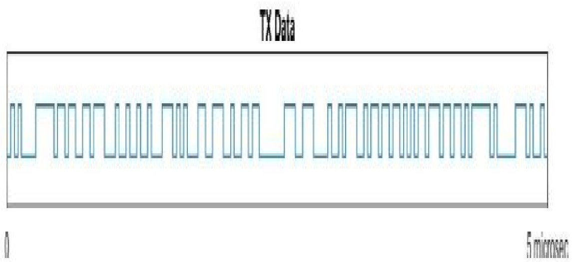
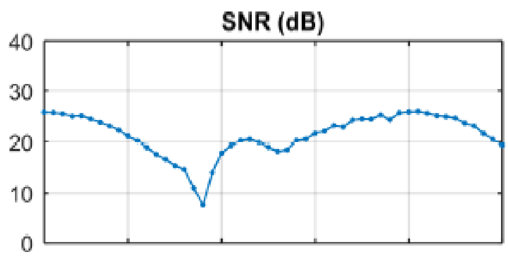
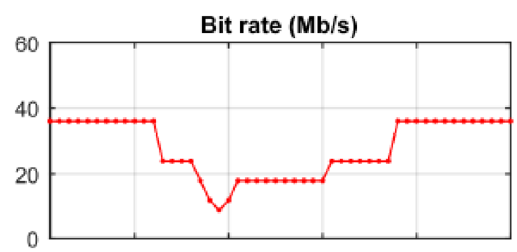
Fig 3 Algorithm for simulation of physical layer

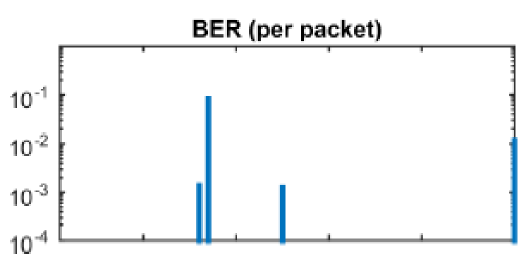
4.RESULTS

From result it is very clear that the results are impresive. They match with practical outcomes









5.CONCLUSION & FUTURE SCOPE

We have simulated end to end physical layer successfully including attenuation and various noise factors. These results can be used to improve the overall system and to reduce cost. The advantage of our simulation is that we have included all types of error, noise, attenuation and effect of environment.

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