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A REVIEW ON COST EFFECTIVE AND COMPARISON OF DSP SCHEMES WITH GREEN TDM-PON FOR NEXT GENERATION OPTICAL ACCESS NETWORK

Uma Rani[1], Anu sheetal [2]

[1,2]Guru Nanak Dev University, Regional Campus, Gurdaspur (Punjab

ABSTRACT

Orthogonal Frequency Division Multiplexing (OFDM) has been recently selected for a wide range of wireless and wire line applications. Various transmission technologies such as downstream OFDM and upstream single carrier frequency domain equalization (SCFDE) with TDM–PON to achieve flexibility and reduce complexity. So, in order to analyze the performance of OFDM and SCFDE system based on complexity and flexibility for PON. The main purpose is to design a TDM-PON architecture using these schemes. In this review paper, various parameter and application of NG-PON for modern communication service have been discussed.

Keywords: Passive optical network (PON), orthogonal frequency division multiplexing (OFDM), Single-carrier frequency domain equalization (SCFDE), Frequency domain equalization (FDE).

I. INTRODUCTION

For increasing higher data rates and transmission distance researcher are investigating new technologies and architecture with increase the new network users and business [1-4]. The best solution used to increase the higher data rates and transmission distance is passive optical device (PON) [5]. OFDM is a scheme used to modulate the previously modulated signal into another signal of another signal of higher bandwidth and frequency. SCFDE is a single carrier modulation combined with FDE which can reduce their inter symbol interference. It may provide the demand of NG-PON average speed for a single wavelength downstream/upstream data rate as high as 108Gb/s in PON system [6]. Lower computational complexity used for frequency domain equalization. To get the green transmission and reduce the complexity in this paper, compare the DSP scheme with FDE present a hybrid TDM based PON scheme. Fig. 1 shows the block diagram of SCFDE and OFDM principle [7]. In directly detected optical OFDM multi gigahertz electrical signal is multiplex onto an optical carrier.

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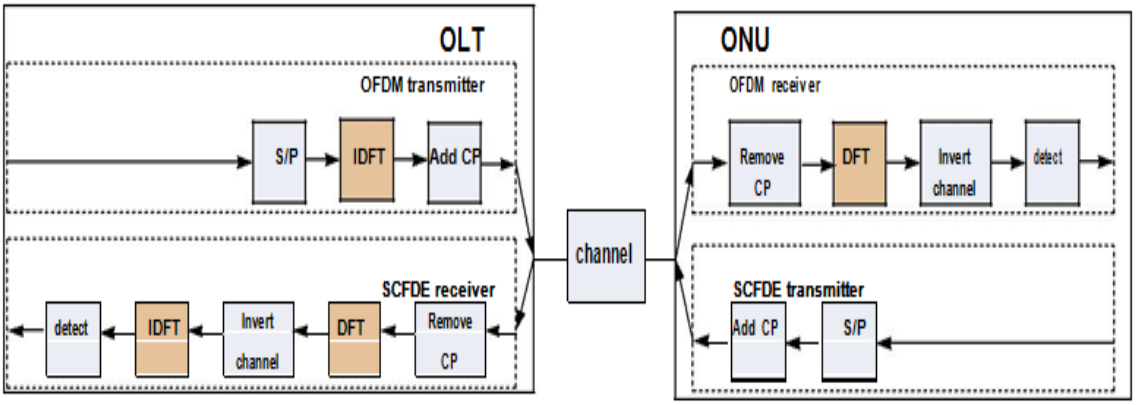

Fig. 1 Block diagram of OFDM and SCFDE principle

II. OFDM AND SCFDE SYSTEM MODELS

The block diagram of OFDM with FDE is shown in Fig. 2 [8]. At transmitter serial to parallel converter is use to convert the serial bit stream into parallel complex symbols. These complex symbols are denoted by the M. These symbols operate on inverse discrete Fourier transform and grouped into complex blocks. IDFT produce the time domain representation of complex signal. In OFDM system Fourier transform are used for modulation and demodulation. The Mp cyclic prefix is added to remove the inter block interference. Digital to analog converter is used to convert digital signal into analog. After this conversion electrical signal is convert into optical. In receiver reverse operations are perform to demodulate OFDM signal.

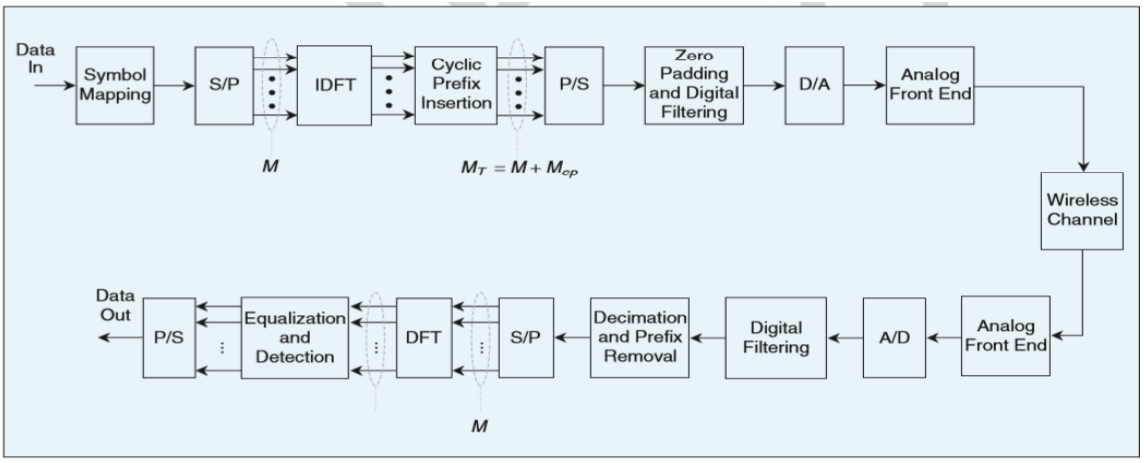

Fig. 2 Block diagram of OFDM

Fig. 3 shows the transmitter and receiver block diagram of SCFDE [9]. In case of SCFDE discrete Fourier transform and inverse discrete Fourier transform are used to convert time domain signal into frequency domain signal.

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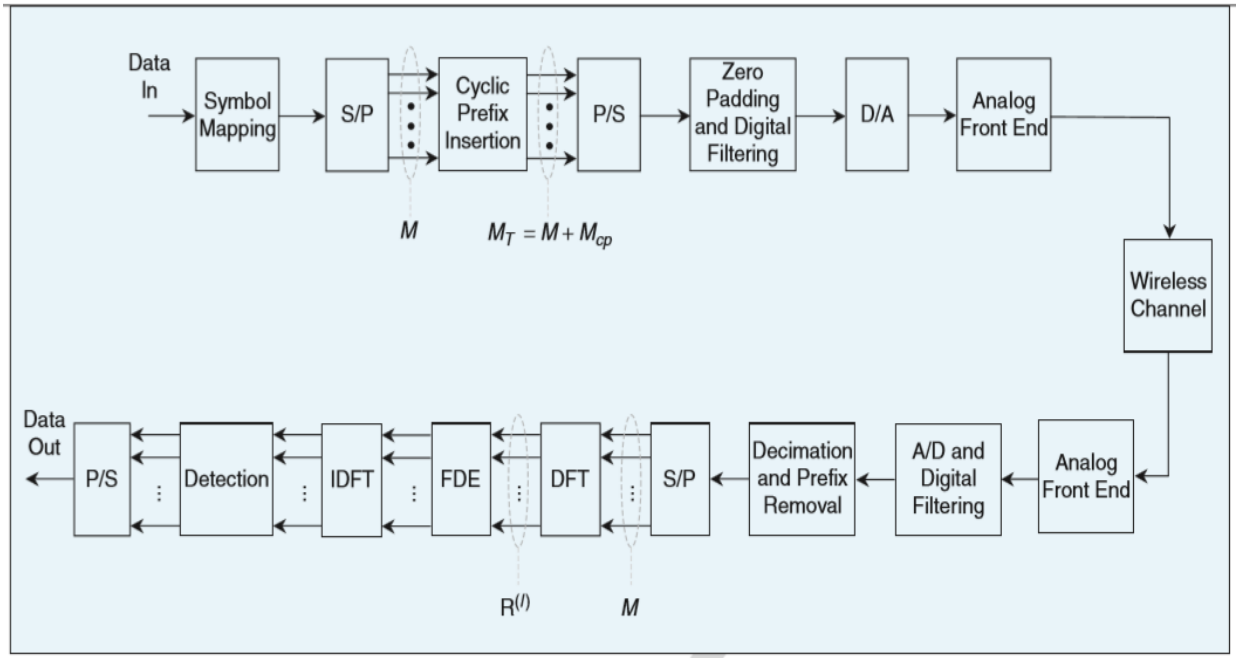

Fig. 3 Block diagram of SCFDE

III. LITERATURE REVIEW

Leonid G.Kazovsky et.al. (2007), [10] investigated the NG PON to provide the higher performance for future bandwidth demands. First review the TDM PON in this paper and named as C- generation. Then review the NG-PON. These types of PON are classified into C+1 and C+2 generations. C +1 generation provides new generation on TDM PON and C+2 provide dramatic system improvement using WDM technology.

W. Shieh et. al. (2009), [11] presents the huge challenges and DSP algorithms to optical orthogonal frequency division multiplexing.

Dayou Qian et. al. (2010), demonstrate the multiple input multiple output OFDMA PON architecture for single wavelength 40Gb/s and 108Gb/s NG -PON system based on OFDM polarization multiplexing.

B. Lin. et. al. (2012), [12] demonstrate the optical MIMO transmission for SCFDE PON based on polarization and direct detection to reduce the bandwidth requirements for optical and electrical component with MIMO algorithm.

B. Lin. et. al. (2014), [13] compared the DSP scheme with FDE for PON and illustrate a DSP enhanced PON architecture with downstream OFDM and upstream SCFDE modulation.

IV. METHODOLOGY

Research Methodology that will be taken to complete the project is described as under:

The first step will be designing and simulation of all modulation schemes. After this more work will be done on the system for better results. This will be done by using Opt wave Opt system software. Firstly the study about software will be done. The Opt system software is easy to use, flexible, powerful and fast.

The Opt system components library includes hundreds of components that enable to enter parameters that can be measured from real devices. We can incorporate new components based on subsystems and user-defined libraries, or utilize co-simulation with a third party tool such as MATLAB or SPICE.

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V. CONCLUSION

In this paper we select wide range of wireless and wire line application. Compare the single carrier frequency domain equalization and orthogonal frequency division multiplexing technique to investigate the next generation PON. We have demonstrated multiple inputs multiple output OFDMA PON architecture for NG-PON system based on direct detection.

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