ANALYZING DIGITAL VIDEO BROADCASTING TERRESTRIAL SYSTEM USING BASIC TRANSMISSION MODEL (GAUSSIAN, RICEAN AND RAYLEIGH CHANNEL)

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ABSTRACT

This paper analyzes the Digital Video Broadcasting – Terrestrial, DVB-T system. All basic transmission channel model (Gaussian, Ricean and Rayleigh) are examined. MATLAB techniques are presented with the transmission parameters setup. These parameters are bit error rate (BER) before Viterbi Decoder and after Viterbi Decoder, with varying Signal to Noise ratio (S/N ratio). The simulation results of actual DVB-T transmission and reception performance using 2K OFDM multi carrier with modulation level of 64 QAM using various transmission channel are graphically compared. These results are then compared to the theoretical value of DVB-T specification.

Keywords *: DVB-T system; Gaussian Channel; Ricean Channel; Rayleigh Channel; 2K OFDM Carrier*

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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter will cover the main idea of the studies and all the necessary details that contributes to the outcome of this study.

1.1 Background of study

The first Colour TV system was introduced around 1955 in the form of the National Television Systems Committee (NTSC) standard in the USA. This was followed in 1969 by the Phase Alternating Line (PAL) and Sequential Colour with Memory (SECAM) standards developed in Europe [1]. All these Colour TV systems are analogue and prone to problems such as multipath interference, ghosting and noise. They are also inefficient in terms of Radio Frequency spectrum usage as more and more TV channels crowded the air waves.

Digital Television (DTV) was then developed to replace these analogue systems [2]. However the international community could not agree to a common DTV standard and 4 different systems have now emerged namely Advanced Television Systems Committee from USA [3], Digital Video Broadcast –Terrestrial [4] from Europe, Integrated Services Digital Broadcast –Terrestrial Wideband [5] from Japan and the Digital Multimedia Broadcasting-Terrestrial [6] from China.

The transmission of DTV to the home uses different delivery methods namely satellite, terrestrial and cable. Although the Satellite, Terrestrial and Cable standards are designed for different channel medium and they share certain common technical specifications such as source coding, digital modulation and channel coding .

The most widely used DTV standard in international broadcasting is the Digital Video Broadcast (DVB) standard developed in 1995 which also specifies the technical standards to be used for Cable [7], Satellite [8], and Terrestrial delivery methods. However, over the past decade, new coding and modulation techniques have been developed and as such the present DVB standards may not be considered as efficient as before. As it is China has taken the