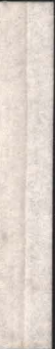


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**THE STUDY OF AN ORTHOGONAL FREQUENCY DIVISION
MULTIPLEXING SYSTEM'S PERFORMANCE IN RADIO
ON FIBER LINK**


By
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A project report submitted in partial fulfillment
of the requirements for the award of the degree of
Bachelor of Applied Science (Physics Electronic and Instrumentation)

**DEPARTMENT OF PHYSICAL SCIENCES
FACULTY OF SCIENCE AND TECHNOLOGY
UNIVERSITY MALAYSIA TERENGGANU
2008**

DECLARATION

I hereby declare that this project report entitled **The Study Of An Orthogonal Frequency Division Multiplexing System's Performance In Radio On Fiber Link** is the result of my own research except as cited in the references.

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ABSTRACT

The radio-on-fiber (RoF) has attracted world attention due its ability to increase the capacity of wireless network. The RoF concept is that the information is transported through optical fiber by modulating the light with the analog signal (radio signal). Orthogonal frequency division multiplexing (OFDM) is a technology that transmits multiple signals simultaneously over a single transmission path, such as a cable or wireless system. OFDM has numerous advantages which make it a choice as a modulation technique to be adopted in broadband wireless network. One of it advantages is high spectral efficiency. Due to the interest in employing both technologies and techniques, the performance study of an OFDM in radio-on-fiber link is proposed. By integrating these technologies, the needs toward wireless broadband and higher bandwidth to transfer much larger data can be fulfilled. In this study, it is proposed to determine the feasibility of an OFDM modulation over RoF link. The OFDM basic system has been studied and simulated. RoF link has been introduced into OFDM system and the performance of an OFDM over RoF link has been evaluated. The simulation model of OFDM over Addative White Gaussian Noise (AWGN) channel has been modeled to make performance comparison with OFDM over RoF link simulation model. The results have been analyzed using the output parameter which is bit error rate (BER), power spectrum density and constellation. From the results, it can be concluded that OFDM is feasible in transmitting over RoF channel.

ABSTRAK

Teknologi radio dalam gentian optik telah menarik perhatian dunia dengan kelebihanannya menambah keupayaan dalam menggunakan jaringan tanpa wayar. Konsep teknologi ini adalah dengan menghantar isyarat radio melalui gentian optik. Untuk menghantar isyarat ini, cahaya dimodulatkan dengan isyarat analog (isyarat radio). Sistem Pemultipleksan Pembahagian Frekuensi Ortogonal (OFDM) adalah satu teknologi yang menghantar beberapa isyarat secara serentak melalui satu media penghantar. OFDM mempunyai banyak kelebihan yang membolehkannya dijadikan sebagai teknik modulasi pilihan untuk diaplikasikan dalam jaringan jalur lebar tanpa wayar. Salah satu di antara kelebihan teknologi ini adalah mempunyai spektral efisien yang tinggi. Disebabkan oleh daya tarikan dan minat dalam mengaplikasikan kedua-dua teknologi ini, kajian tentang perkembangan OFDM menggunakan media radio dalam gentian optik diketengahkan dan difokuskan. Dengan mencantumkan dua teknologi ini, kehendak pengguna yang mahukan jalur lebar tanpa wayar bagi menghantar data yang lebih besar dapat dipenuhi. Dalam kajian ini, kesesuaian penggunaan OFDM sebagai teknik modulasi melalui media radio dalam gentian optik ditentukan. Asas dalam sistem OFDM telah dipelajari dan di simulasikan. Model simulasi OFDM menggunakan media AWGN dibentuk bagi membolehkan perbandingan prestasi antara OFDM menggunakan media radio dalam gentian optik dibuat. Seterusnya, sebarang kesan akan dianalisis berdasarkan analisis yang dibuat ke atas ciri-ciri isyarat yang diterima seperti bit yang rosak, kuasa ketumpatan spektrum dan konstelasi. Daripada hasil kajian, OFDM sesuai digunakan sebagai pemodulat untuk menghantar isyarat melalui teknologi radio dalam gentian optik.