

White paper

Orthogonal Frequency Division Multiplexing

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June, 2008

CONTENTS

1.	INTRODUCTION	4
2.	AREA OF USES	4
3.	VARIANTS	4
4.	LIMITATIONS	5
5.	REFERENCES	5

1. INTRODUCTION

Orthogonal Frequency Division Multiplexing (OFDM) is a modified variant of Frequency Division Multiplexing (FDM) in which single transmission path (frequency) is split into several transmission sub-paths with different frequencies which can be sent parallel. To reduce the interference between these frequencies they should be kept apart from each other by providing frequency gap in between.

There are several advantages of OFDM, which are:

- i. Increased spectral efficiency
- ii. Lesser RF interference
- iii. Lower multi-path distortion

2. AREA OF USES

OFDM is also called as multi-carrier or discrete multi-tone modulation. It's being used successfully in the Europe market for Digital Audio Broadcasting (DAB). It is being used in other areas as well.

- i. Digital Audio Broadcasting (DAB) in the European market
- ii. Asymmetric Digital Subscriber Line (ADSL) globally
- iii. Wireless point-to-point and point-to-multipoint Wireless Local Area Networks (WLAN)
- iv. 4G mobile communication technology

3. VARIANTS

It has several variants which are:

- i. MIMO-OFDM: Multiple Input, Multiple Output OFDM uses multiple antennas to transmit and receive radio signals. It allows the service providers to deploy a Broadband Wireless System (BWA) that has Non Line-of-Sight (NLOS) functionality. It was developed by Iospan Wireless
- ii. VOFDM: Vector OFDM also uses the concept of MIMO. The only difference is it is developed by Cisco.
- iii. WOFDM: Wideband OFDM assures enough spacing between frequency sub-channels so that frequency error can be minimized between transmitter and receiver. It was developed by Wi-Lan.

- iv. FOFDM: Flash OFDM uses multiple tones and fast hopping to spread signals over a given spectrum band. It is also known as Fast-Hopped OFDM, developed by Flarion.

4. LIMITATIONS

Like every other technology OFDM also have some limitations.

- i. Sensitive to carrier frequency errors
- ii. It requires a large amplifier power back-off

5. REFERENCES

- [1] <http://www.s3.kth.se/signal/grad/OFDM/URSIOFDM9808.htm>
- [2] <http://www.wave-report.com/tutorials/OFDM.htm>