

QoS AND MOBILE TECHNOLOGIES

EDITORS:

AISHA-HASSAN ABDALLA HASHIM

OMER MAHMOUD

RASHEED SAEED

**DEPARTMENT OF ELECTRICAL AND COMPUTER
ENGINEERING
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA**



IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without any prior written permission of the publisher.

Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

ISBN: 978-967-418-142-0

Member of Majlis Penerbitan Ilmiah Malaysia -- MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN.BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan
Tel: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

TABLE OF CONTENTS

	TITLE	No
PART 1:QoS APPROACHES		
CHAPTER 1:	Introduction to QoS Approaches	2
CHAPTER 2:	Internet Quality Of Service Architectures	11
CHAPTER 3:	Integrated Services	17
CHAPTER 4:	Differentiated Services	21
CHAPTER 5:	Quality Of Service (QoS) Ad-Hoc On-Demand Distance Vector (AODV)	27
CHAPTER 6:	QoS Routing In Ad-Hoc Wireless Networks	33
CHAPTER 7:	MPLS And Traffic Engineering	41
PART 2: MOBILITY MANAGEMENT APPROACHES		
CHAPTER 8:	Introduction to Mobility Management	47
CHAPTER 9:	Nested Mobile Networks	53
CHAPTER 10:	Evaluation of NEMO Extensions	59
CHAPTER 11:	Handoff Process In Micromobility Protocols	65
CHAPTER 12:	Comparison Between Network Simulators	71
PART 3: WIRELESS TECHNOLOGY		
CHAPTER 13:	Introduction to Local Area Network (LAN) Communication Protocols	77
CHAPTER 14:	MANET routing protocols	85
CHAPTER 15:	VANET Applications	95
CHAPTER 16:	Vehicle To Vehicle Routing Protocols	101
CHAPTER 17:	Wi-Fi Mesh Network	111
CHAPTER 18:	Overview Of Wimax Mesh	117
CHAPTER 19:	Current Trends On WIMAX Using MIMO Technology	129
CHAPTER 20:	Self-Organized Femtocell Networks	141
CHAPTER 21:	Self-Organized Synchronization For Femtocell Network	155
CHAPTER 22:	Spectrum Management In Femtocell	169
CHAPTER 23:	Smart Grid Communication	179
CHAPTER 24:	UWB Overview	189
CHAPTER 25:	ZIGBEE Applications	197

CHAPTER 26:	Improvement Of Vertical Handover In GPRS/WIFI Seamless Convergence	205
CHAPTER 27:	The Application Of Sensor Network And Routing Protocols In Wireless Communication	215
CHAPTER 28:	A Study Of Channel Assignment Approach To Reduce Frequent Reassignment	227
CHAPTER 29:	Association Management Schemes For Wireless Mesh Network	231
CHAPTER 30:	Challenges In Multi-Radio Multi-Channel Wireless Mesh Network	237
CHAPTER 31:	Mobility Support in Diffserv and MPLS network	243
CHAPTER 32:	Mobility Management And Context Transfer	247
CHAPTER 33:	LTE -Advanced Overview	251
CHAPTER 34:	Time Synchronization Protocols And Approaches	261
CHAPTER 35:	MPLS Architectures	265

CHAPTER 24

UWB OVERVIEW

RASHID A. SAEED

Electrical and Computer Engineering Department, Kulliyah of Engineering, International Islamic University, Malaysia (IIUM), Jalan Gombak, 53100, Kuala Lumpur, Malaysia.

rashid@iium.edu.my

24.1 INTRODUCTION

This chapter presents a review on ultra-wideband (UWB) and UWB PHY/MAC layer related topics. Introduction to UWB system, applications and comparison with narrowband systems is presented. UWB physical layers related aspects viz. channel model, pulse generation, and UWB capacity are reviewed. Joint UWB medium access control (MAC) and physical layer (PHY) related works in terms of power control allocation, rate guarantee/control and quality of services is reviewed. UWB power control parameters i.e. signal-to-interference-noise ratio (SINR), multi-user system capacity, maximum sustainable interference (MSI), narrowband interference (NBI), and channel gain design are discussed. Finally, the chapter is summarized

Short-range wireless systems have recently gained a lot of attention to provide seamless, multimedia communications around a user-centric concept, so called wireless personal area networks (WPAN) (FCC, 1998). UWB is a candidate technology for dedicated inexpensive short-range wireless networks. For example, UWB wireless personal area networks could be established at home allowing televisions, VCRs, stereo-systems, and computers to communicate with each other without using cable connections. Similarly in a typical office environment, UWB wireless links could replace wired connections to the computer, monitor, keyboard, mouse, speakers, and printers. Some UWB chipsets are being developed to operate at data rates between 400 and 700 Mbits/s [1].

24.2 ULTRA-WIDEBAND SYSTEM CONCEPTS

UWB transmission is a widely used technology in radar and remote sensing applications and has received great attention in both academic and industry for applications in wireless communications. The federal communications commission (FCC) identifies two types of UWB bandwidths: absolute bandwidth or fractional bandwidth, which is defined by the 10 dB cutoff bandwidths in Fig 24.1. The absolute bandwidth is the difference between the 10 dB high cutoff frequency and the 10 dB low cutoff frequency ($f_H - f_L$). The fractional bandwidth (η) is defined: