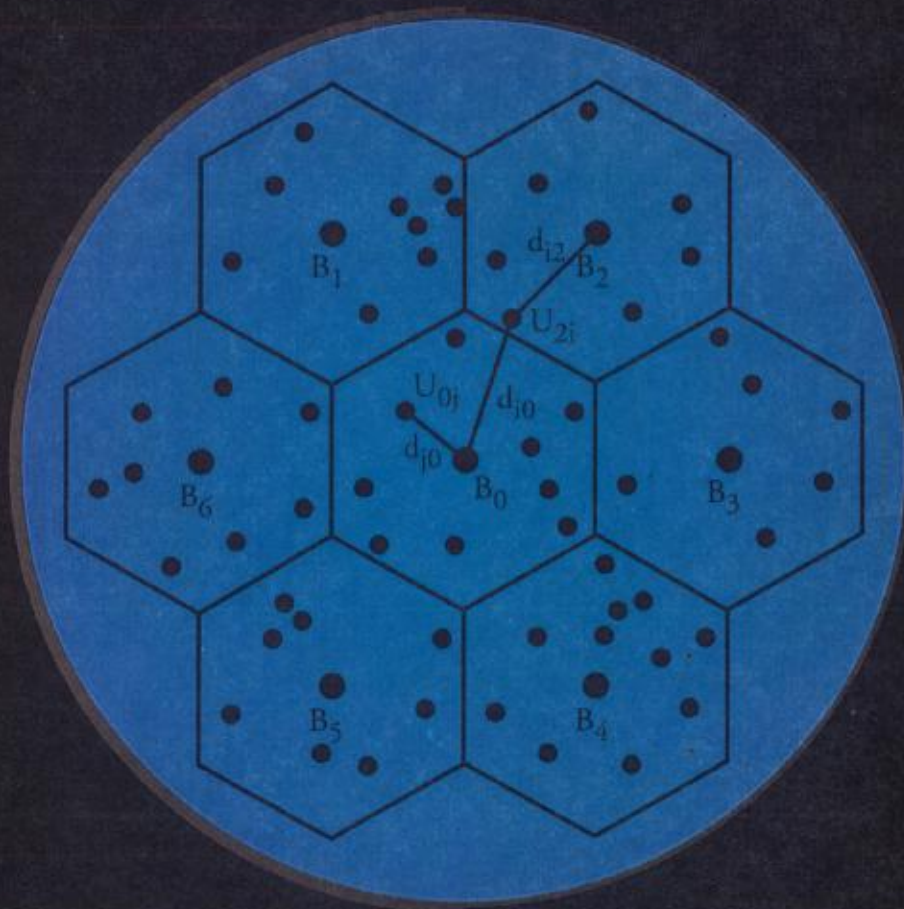


# WIRELESS

communications

Principles & Practice



Theodore S. Rappaport

PRENTICE HALL COMMUNICATIONS ENGINEERING AND  
EMERGING TECHNOLOGIES SERIES  
THEODORE S. RAPPAPORT, SERIES EDITOR

DOCKET  
ALARM

Find authenticated court documents without watermarks at [docketalarm.com](http://docketalarm.com).

BHURICHA S.



CMU 2001.

AUG 2001.

# Wireless Communications

*Principles and Practice*

**Theodore S. Rappaport**

*For book and bookstore information*



<http://www.prenhall.com>

*Prentice Hall PTR  
Upper Saddle River, New Jersey 07458*

**Prentice Hall Communications Engineering and Emerging Technologies Series**

*Theodore S. Rappaport, Series Editor*

**RAPPAPORT** *Wireless Communication: Principles & Practice*

**RAZAVI** *RF Microelectronics*

**FORTHCOMING**

**LIBERTI & RAPPAPORT** *Smart Antennas for CDMA Wireless Systems: Applications to IS-95 and Wideband CDMA*

**TRANTER, KOSBAR, RAPPAPORT & SHANMUGAN** *Simulation of Modern Communications Systems with Wireless Applications*

**GARG & WILKES** *Principles and Applications of GSM*

Editorial/production manager: *Camille Trentacoste*  
Cover design director: *Jerry Votta*  
Cover designer: *Anthony Gemmellaro*  
Manufacturing manager: *Alexis R. Heydt*  
Acquisitions editor: *Karen Gettman*  
Editorial assistant: *Barbara Alfieri*

© 1996 by Prentice Hall, PTR  
Prentice Hall, Inc.  
Upper Saddle River, NJ 07458

The publisher offers discounts on this book when ordered in bulk quantities. For more information, contact Corporate Sales Department, Prentice Hall PTR, One Lake Street, Upper Saddle River, NJ 07458. Phone: 800-382-3419; FAX: 201- 236-7141. E-mail: [corpsales@prehall.com](mailto:corpsales@prehall.com)

All rights reserved. No part of this book may be reproduced, in any form or by any means, without permission in writing from the publisher.

All product names mentioned herein are the trademarks of their respective owners.

Printed in the United States of America  
20 19 18 17 16 15 14 13 12

ISBN 0-13-375536-3

Reprinted with corrections July, 1999

Prentice-Hall International (UK) Limited, *London*  
Prentice-Hall of Australia Pty. Limited, *Sydney*  
Prentice-Hall of Canada, Inc., *Toronto*  
Prentice-Hall Hispanoamericana, S. A., *Mexico*  
Prentice-Hall of India Private Limited, *New Delhi*  
Prentice-Hall of Japan, Inc., *Tokyo*  
Prentice-Hall Asia Pte. Ltd., *Singapore*  
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*



# Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

## Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

## Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

## Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

## API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

## LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

## FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

## E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.