

# **2006 IEEE WIRELESS COMMUNICATIONS AND NETWORKING CONFERENCE**

**LAS VEGAS, NEVADA USA  
3–6 APRIL 2006**

**Volume 1 of 4**



**IEEE Catalog Number:**  
**ISBN:**

**06TH8876**  
**1-4244-0269-7**

# 2006 IEEE Wireless Communications and Networking Conference

Copyright © 2006 by the Institute of Electrical and Electronics Engineers, Inc.  
All rights reserved.

## Copyright and Reprint Permission

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law, for private use of patrons, those articles in this volume that carry a code at the bottom of the first page, provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

Other copying, reprint, or reproduction requests should be addressed to:  
IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

**IEEE Catalog Number** 06TH8876 (softbound)  
06TH8876C (CD-ROM)

**ISBN** 1-4244-0269-7 (softbound)  
1-4244-0270-0 (CD ROM)

**ISSN** 1525-3511

Additional copies of this publication are available from

IEEE Operations Center  
P.O. Box 1331  
445 Hoes Lane  
Piscataway, NJ 08855-1331 USA

1-800-678-IEEE  
1-732-981-1393  
1-732-981-9667 (FAX)  
email: [customer.services@ieee.org](mailto:customer.services@ieee.org)

# CONTENTS

*Volume 1*

## NETWORK LAYER

### **NET01—Physical Layer Design/Analysis**

- NET01-1 Conventional and Scrambling OFDM System Switch in Multicell Environments ..... 1  
Haifeng Wang, Jorma Lilleberg
- NET01-2 Online PN Offset Planning: An Example of Cellular Network Autoconfiguration ..... 6  
David Abusch-Magder, A. Yuyin Chen, Krysta D. Mirzayans, Harish Viswanathan
- NET01-3 Arrival Paths in Ultra Wideband Channels ..... 13  
Yongwei Zhang, A. K. Brown
- NET01-4 On the Error Probability of a Noisy Channel Network Using Network Coding ..... 19  
Ming Xiao, Tor M. Aulin

### **NET02—Cellular Network Capacity/Handoffs Design**

- NET02-1 Cellular CDMA System Capacity in a Service Area with Tapered Traffic Distribution ..... 25  
Masaharu Hata, Narihiro Shiraishi, Shigeru Tomisato
- NET02-2 Evaluation of Handoff Algorithms Using a Call Quality Measure  
with Signal-based Penalties ..... 30  
Malka N. Halgamuge, Kotagiri Ramamohanarao, Hai L. Vu, Moshe Zukerman
- NET02-3 Network-Controlled Cell-Breathing for Capacity Improvement in Heterogeneous  
CDMA/TDMA Scenarios ..... 36  
J. Pérez-Romero, O. Sallent, R. Agustí, N. García, L. Wang, H. Aghvami
- NET02-4 Game-Theoretic Delay-Sensitive Multirate Power Control  
for CDMA Wireless Networks with Variable Path Loss ..... 42  
Christopher A. St. Jean, Bijan Jabbari

### **NET03—Resource Management in Wireless Networks**

- NET03-1 Power Saving in a Mobile Multimedia Terminal ..... 48  
Jae-Sik Lee, Byoung-II Kim, Jae-Pil Moon, Tae-Gyu Chang, Vijay K. Garg
- NET03-2 Joint Radio Resource Management Based on Species Competition Model ..... 52  
Guang Yang, Jie Chen, Kai Yu, Ping Zhang, Victor O. K. Li
- NET03-3 Measurements of the Lost Call Rate as a Function of the Total Forward-Link Power  
on the Dominant Interfering Cell-Sector in a CDMA2000 Network ..... 58  
John M. Graybeal, W. M. MacDonald, Arumugam Buvanewari, David James
- NET03-4 Multi-Access Radio Resource Management using Multi-Agent System ..... 63  
Zhiyong Feng, Kai Yu, Yang Ji, Ping Zhang, Victor O. K. Li, Yongjing Zhang

### **NET04—Transport Layer Design For Wireless Networks**

- NET04-1 SCTP Efficient Flow Control During Handover ..... 69  
Keun Jae Lee, Sang Su Nam, Byung In Mun
- NET04-2 E-RTO: An Enhanced TCP Retransmission Timeout Algorithm using SACK Option ..... 74  
Myungjin Lee, Oh-Cheon Kwon

NET04-3	Comparison of Different Active Queue Management Mechanisms for 3G Radio Network Controllers.....	80
	Jani Lakkakorpi, Renaud Cuny	
<b>NET05—Resource Management in Wireless Networks</b>		
NET05-1	An $H^\infty$ Approach to Congestion Controller Design for Wireless Access Networks .....	86
	Feng Zheng, John Nelson	
NET05-2	Admission Control for Multihop Wireless Backhaul Networks with QoS Support .....	92
	Seungjoon Lee, Girija Narlikar, Martin Pál, Gordon Wilfong, Lisa Zhang	
NET05-3	Axiomatic Multi-Transport Bargaining: A Quantitative Method for Dynamic Transport Selection in Heterogeneous Multi-Transport Wireless Environments.....	98
	Qiuyi Duan, Lei Wang, Charles D. Knutson, Michael A. Goodrich	
NET05-4	On QoS Constraints and Joint Source-Channel Coding for Real-Time Cooperative Multimedia Communications .....	106
	Andres Kwasinski, H. Vicky Zhao, K. J. Ray Liu,	
<b>NET06—Network Modeling/Analysis</b>		
NET06-1	Available Bandwidth Estimation via One-Way Delay Jitter and Queuing Delay Propagation Model .....	112
	Yu-Chen Huang, Chun-Shien Lu, Hsiao-Kuang Wu	
NET06-2	Comparison of Combined Preemption and Queuing Schemes for Admission Control in a Cellular Emergency Network.....	122
	Jiazhen Zhou, Cory Beard	
NET06-3	Impact of Network Subsystem on Reliable Transport Protocol Performance over Wireless Links .....	129
	Zhiguo Xu, Mahesh Marina, Rajive Bagrodia	
NET06-4	A Novel Scheduling Algorithm for Delay-Oriented Services Based on Hopfield Neural Networks Methodology .....	135
	N. García, J. Pérez-Romero, R. Agustí	
<b>NET07—Resource Management/Arch Design for Wireless Networks</b>		
NET07-1	Location-Aware Caching for Spatial Queries in Dynamic Environments .....	141
	Bo Yang, Ali R. Hurson	
NET07-2	Algorithms for Routing and Centralized Scheduling in IEEE 802.16 Mesh Networks.....	147
	Harish Shetiya, Vinod Sharma	
NET07-3	Capacity and Quality Enhancement using an Adaptive Resource Allocation for Multi-beam Mobile Satellite Communication Systems.....	153
	Katsuya Nakahira, Kiyoshi Kobayashi, Masazumi Ueba	
NET07-4	Relay Placement for Minimizing Congestion in Wireless Backbone Networks.....	159
	Abhishek Kashyap, Fangting Sun, Mark Shayman	
<b>NET08—Cellular Network Design</b>		
NET08-1	Position and Velocity Tracking in Mobile Cellular Networks Using the Particle Filter .....	165
	Mohammed M. Olama, Seddik M. Djouadi, Chris S. Pendley	
NET08-2	Performance Evaluation of a Soft Hand Off Scheme in CDMA Cellular Networks .....	171
	Tamba Korteque, Wei Li, Demetrios Kazakos	
NET08-3	Reuse Partitioning in Fixed Two-Hop Cellular Relaying Network.....	177
	Tao Liu, Mengtian Rong, Hongkui Shi, Dan Yu, Yisheng Xue, Egon Schulz	

## **NET09—Multimedia Transport in Wireless Networks**

NET09-1	End-to-End Performance of the IMS over Various Wireless Networks.....	183
	Dragos Vingarzan, Peter Weik	
NET09-2	Quality of VoIP in Wireless Communication Networks .....	189
	Jianming Zhang, Dacheng Yang	
NET09-3	VoMESH: Voice Over Wireless MESH Networks .....	193
	Kyungtae Kim, Sangjin Hong	
NET09-4	Optimal Rate Control for Video Transport over Multi-hop Wireless Networks .....	199
	Sastry Kompella, Shiwen Mao, Y. Thomas Hou, Hanif D. Sherali	

## **NET10—Admission/QoS Design for Wireless Networks**

NET10-1	Admission Control and Pricing in Competitive Wireless Networks Based on Non-cooperative Game Theory .....	205
	Angelos N. Rouskas, Anastasios A. Kikilis, Stilianos S. Ratsiatos	
NET10-2	Context Routing in Heterogeneous Pervasive Computing Fieldwork Environments .....	211
	Thienne Johnson, Djamel Sadok	
NET10-3	Application of Network Layer Mechanisms for Service Differentiation in 802.11 WLANs: Implementation and Experience .....	217
	Vasilios A. Siris, George Stamatakis	
NET10-4	Guarantee of Service Expectation Level and Fairness by Precise Queue Weight Allocation in AF PHB .....	223
	Sangkil Jung, Sangjin Hong	

## **NET11—New Wireless Network Architecture & Challenges**

NET11-1	Research Challenges and Applications for Underwater Sensor Networking .....	228
	John Heidemann, Wei Ye, Jack Wills, Affan Syed, Yuan Li	
NET11-2	Decentralized Architecture and Organizing Mechanisms for Distributed Terminal System .....	236
	Xu Wang, Yang Ji, Xiaosheng Tang, Yinong Li, Ping Zhang	
NET11-3	On The Scalability of Relay-based Wireless Networks.....	242
	Adrian Florea, Halim Yanikomeroglu	
NET11-4	Aeronautical Ad Hoc Networks.....	246
	Ehssan Sakhaee, Abbas Jamalipour, Nei Kato	

## **NET12—Multihop Wireless Network Design**

NET12-1	Smart Deployment/Movement of Unmanned Air Vehicle to Improve Connectivity in MANET .....	252
	Zhu Han, A. Lee Swindlehurst, K. J. Ray Liu	
NET12-2	Efficient Backbone Synthesis Algorithm for Multi-Radio Wireless Mesh Networks .....	258
	Huei-jiun Ju, Izhak Rubin	
NET12-3	Mobile Base Stations Placement and Energy Aware Routing in Wireless Sensor Networks .....	264
	A. P. Azad, A. Chockalingam	
NET12-4	Comparative Study of Routing Metrics for Multi-Radio Multi-Channel Wireless Networks.....	270
	Wei Zhou, Dongbo Zhang, Daji Qiao	

### **NET13—Adhoc Network Routing I**

NET13-1	Mobility Adaptive Self-Parameterization of Routing Protocols for Mobile Ad Hoc Networks.....	276
	Oliver Stanze, Martina Zitterbart, Christian Koch	
NET13-2	PARIS: Path Availability Routing in Sensors .....	282
	Ming Yu, Aniket Malvankar	
NET13-3	Minimum Energy Path Planning for Ad Hoc Networks .....	288
	Danje Chen, Philip J. Lin	

### **NET14—Adhoc Network Routing II**

NET14-1	Protocols for Roadside-to-Roadside Data Relaying over Vehicular Networks .....	294
	Barath Petit, Mostafa Ammar, Richard Fujimoto	
NET14-2	Joint Power Control and Maximally Disjoint Routing for Reliable Data Delivery in Multihop CDMA Wireless Ad Hoc Networks .....	300
	Lijun Qian, Ning Song, Dhadesugoor R. Vaman, Xiangfang Li, Zoran Gajic	
NET14-3	Compact Routing Discovery Protocol with Lower Communication Complexity .....	307
	Huafei Zhu, Feng Bao, Chunxiao Tricia Chigan	

### **NET15—Adhoc Network Routing III**

NET15-1	Multipath Location Aided Routing in 2D and 3D .....	311
	Soumendra Nanda, Robert S. Gray	
NET15-2	Hybrid Routing with Periodic Updates (HRPU) in Wireless Mesh Networks .....	318
	Ameya Damle, Dinesh Rajan, Stefano M. Faccin	
NET15-3	Decoupled Multipath Structure for Throughput Enhancement in Wireless Mesh Networks .....	325
	Xuhui Hu, Yong Liu, Myung J. Lee, Tarek N. Saadawi	
NET15-4	OLSR-MC: A Proactive Routing Protocol for Multi-Channel Wireless Ad-Hoc Networks ...	331
	Unghee Lee, Scott F. Midkiff	

### **NET16—Adhoc Network Routing II**

NET16-1	Mobile Ad-Hoc Network Data Communication in Large Geographic Areas.....	337
	Leslie D. Fife, Le Gruenwald	
NET16-2	Belief-based Packet Forwarding in Self-Organized Mobile Ad Hoc Networks with Noise and Imperfect Observation.....	343
	Zhu Ji, Wei Yu, K. J. Ray Liu	
NET16-3	On Upper Bounds on Communication Rates in Ad-hoc Networks with Non-Uniform Traffic Pattern .....	349
	Sumeeth Nagaraj, Christian Schlegel, Dmitri Truhachev	
NET16-4	Modeling and Evaluation of Traffic Flow and Availability for Mobile Ad hoc Networks .....	355
	Shensheng Tang, Wei Li, Junghwan Kim	

### **NET17—Adhoc Network Connectivity**

NET17-1	A Performance Modeling of Connectivity in Ad Hoc Networks .....	361
	M. K. Mehmet Ali, M. Khabazian	
NET17-2	Link Duration of the Random Way Point Model in Mobile Ad Hoc Networks .....	367
	Cheng-Lin Tsao, Yueh-Ting Wu, Wanjiun Liao, Jia-Chun Kuo	

NET17-3	Connectivity and Minimum Total Transmit Energy per Packet between any Pair of Nodes in a Bounded Wireless Ad-Hoc Network Subject to Fading .....	372
	Dan Avidor, Sayandev Mukherjee	
NET17-4	Connectivity in Energy Balanced Traffic Distribution .....	379
	Jing Wang, Ivan Howitt	
<b>NET18—Adhoc Network Design/Modeling</b>		
NET18-1	Effects of a Realistic Channel Model on Packet Forwarding in Vehicular Ad Hoc Networks .....	385
	Marc Torrent-Moreno, Felix Schmidt-Eisenlohr, Holger Füßler, Hannes Hartenstein	
NET18-2	Adaptive Topology Control for Heterogeneous Mobile Ad hoc Networks Using Power Estimation .....	392
	Xiaofeng Han, Chien-Chung Shen, Zhuochuan Huang	
NET18-3	QoS Provisioning and Queue Management in Mobile Ad hoc Networks.....	400
	Shensheng Tang, Wei Li,	
NET18-4	Power-Aware Topology Control for Wireless Ad-Hoc Networks.....	406
	Wonseok Baek, David S. L. Wei, C.-C. Jay Kuo	
<b>NET19—Sensor Network Design I</b>		
NET19-1	Performance Evaluation of Data Aggregation Schemes in Wireless Sensor Networks.....	413
	Sangjoon Park	
NET19-2	Power Efficient Stochastic— Wireless Sensor Networks .....	419
	Jing Wang, Ivan Howitt	
NET19-3	A Near Optimum RREQ Flooding Algorithm in Sensor Networks .....	425
	Yashar Ghiassi-Farrokhfal, V. R. Arbab, M. R. Pakravan	
NET19-4	Design Optimization of Multi-Sink Sensor Networks by Analogy to Electrostatic Theory ...	431
	Mehdi Kalantari, Mark Shayman	
<b>NET20—Sensor Network Design II</b>		
NET20-1	Lifetime Maximization by Cooperative Sensor and Relay Deployment in Wireless Sensor Networks .....	439
	Thanongsak Himsoon, W. Pam Siriwongpairat, Zhu Han, K. J. Ray Liu	
NET20-2	Adaptive Task Scheduling for Providing Event Miss-Ratio Statistical Assurances in Wireless Sensor Networks .....	445
	H. Ozgur Sanli, Hasan Çam	
NET20-3	Distributed Cooperative Routing Algorithms for Maximizing Network Lifetime .....	451
	Charles Pandana, W. Pam Siriwongpairat, Thanongsak Himsoon, K. J. Ray Liu	
NET20-4	Sector-based Routing for Secure Energy Efficient Communications.....	457
	Sudheer K. Chimbli, Johnson P. Thomas, Venkatesh Sarangan, Ruiyi Zhang	
<b>NET21—WLAN Design</b>		
NET21-1	Improving the Accuracy of Wireless LAN based Location Determination Systems using Kalman Filter and Multiple Observers.....	463
	Raman Kumar K., Varsha Apte, Yogesh A. Powar	
NET21-2	A Novel Hold-Mode-based Adaptive Inter-Piconet Scheduling Algorithm in Bluetooth Scatternets .....	469
	Ching-Fang Hsu, Shu-Ming Hsu	

NET21-3	Saturation Throughput of IEEE 802.11e EDCA Based on Mean Value Analysis .....	475
	Yuxia Lin, Vincent W. S. Wong	
NET21-4	QoS Provisioning in 802.11 WLAN Coupled with UMTS Network.....	481
	Chunming Liu, Chi Zhou	
<b>NET22—Wireless PAN Design</b>		
NET22-1	Performance Study of IEEE 802.15.4 Using Measurements and Simulations .....	487
	Marina Petrova, Janne Riihijärvi, Petri Mähönen, Saverio Labella	
NET22-2	Measuring Effective Capacity of IEEE 802.15.4 Beaconless Mode .....	493
	Tony Sun, Ling-Jyh Chen, Chih-Chieh Han, Guang Yang, Mario Gerla	
NET22-3	Link State Clustering Based on IEEE 802.15.4 MAC for Wireless Ad-hoc/Sensor Networks .....	499
	Chao Gao, Riku Jäntti	
NET22-4	Performance Comparison of Overlaid Bluetooth Piconets (OBP) and Bluetooth Scatternet.....	505
	Sewook Jung, Alexander Chang, Mario Gerla	
NET23-1	A Successive Refinement Approach to Wireless Infrastructure Network Deployment .....	511
	N. Ahmed, S. Keshav	
<b>NET23—Wireless Network Design</b>		
NET23-2	BioNet: A Developer-Centric Middleware Architecture for Heterogeneous Devices and Protocols .....	520
	Kevin K. Gifford, Sebastian Kuzminsky, Shea Williams, John R. Saiz	
NET23-3	A Metric to Increase Throughput in Untrustworthy Multi-hop Wireless Mesh Networks .....	526
	David Waiting, Neco Ventura	
NET23-4	Detection and Repair of Faulty Access Points .....	532
	H. J. Pan, S. Keshav	
<b>NET24—Mobility Management I</b>		
NET24-1	Performance Evaluation of Mobility Management Scheme in DTN .....	539
	Mooi Choo Chuah, Vinay Goel, Brian D. Davison	
NET24-2	Mobility in UMTS Packet IP Networks .....	545
	Peter Bosch, Sape Mullender, Sam Samuel	
NET24-3	An Enhanced Mobility Management Approach for Wireless IP Networks .....	551
	Jeng-Yueng Chen, Wen-Shiung Chen, Chun-Chuan Yang, Yi-Hung Huang, Heng-Te Chu	
NET24-4	Handoff Support for Mobility in Future Wireless MPLS Networks: A Proposal and Analysis .....	556
	Rami Langar, Nizar Bouabdallah, Samir Tohme	
<b>NET25—Mobility Management II</b>		
NET25-1	Mobile IP Use of Private Addresses in an RSIP Home Network .....	562
	Jin Tang, John A. Copeland	
NET25-2	An Experimental Performance Evaluation of the IETF FMIPv6 Protocol over IEEE 802.11 WLANs .....	568
	Emil Ivoy, Thomas Noel	
NET25-3	Efficient End-to-End Mobility Support in IPv6 .....	575
	Christian Vogt, Mark Doll	



NET25-4	Performance Analysis of Enhanced-Mobile IPv6 with Fast Handover over End-to-End TCP .....	581
	Byungjoo Park, Sunguk Lee, Haniph Latchman	

### **NET26—Mobility Management III**

NET26-1	Modeling Environmental Mobility and Its Effect on Network Protocol Stack .....	587
	Maneesh Varshney, Zhengrong Ji, Mineo Takai, Rajive Bagrodia	
NET26-2	Vertical Handoff Initiation Using Road Topology and Mobility Prediction .....	593
	F. Ahdi, B. H. Khalaj	
NET26-3	Multi-States -based Hybrid Location Update Strategy in Wireless Communication System .....	599
	Goo Yeon Lee, Yong Lee, Zygmunt J. Haas	
NET26-4	Dynamic Vertical Handover Control Algorithm for WLAN and UMTS .....	606
	Chie Ming Chou, ChingYao Huang	

Author Index

## *Volume 2*

### **NET27—Wireless Security I**

NET27-1	Management of VoWLAN Security Parameters Using a QoS Tool .....	611
	Alexandre Passito, Arlen Nascimento, Regeane Aguiar, Edjair Mota, Edson Nascimento, Ilias Biris, Eduardo Valentin	
NET27-2	Resolving WPA Limitations in SOHO and Open Public Wireless Networks .....	617
	Chad D. Mano, Aaron Striegel	
NET27-3	A Novel Classification Scheme for 802.11 WLAN Active Attacking Traffic Patterns .....	623
	Wenzhe Zhou, Alan Marshall, Qiang Gu	
NET27-4	Turing Assessor: A New Tool for Cyber Security Quantification .....	629
	Huafei Zhu, Chunxiao Tricia Chigan, Feng Bao	

### **NET28—Wireless Security II**

NET28-1	GMSP: A Generalized Multi-hop Security Protocol for Heterogeneous Multi-hop Wireless Network .....	634
	Bin Xie, Anup Kumar, S. Srinivasan, Dharma Prakash Agrawal	
NET28-2	Distributed Multicast Group Security Architecture for Mobile Ad Hoc Networks .....	640
	Jiejun Kong, Yeng-zhong Lee, Mario Gerla	
NET28-3	Performance Evaluation of Anonymous Routing Protocols in MANETs .....	646
	Jun Liu, Jiejun Kong, Xiaoyan Hong, Mario Gerla	
NET28-4	Efficient Key Tree Construction for Group Key Agreement in Ad Hoc Networks .....	652
	Zhiguo Wan, Bo Zhu, Robert H. Deng, Feng Bao, Akkihebbal L. Ananda	

### **NET29—Wireless Security III**

NET29-1	The Effects of Probabilistic Key Management on Secure Routing in Sensor Networks .....	659
	Patrick Traynor, Guohong Cao, Tom La Porta	
NET29-2	Authentication of Sensor Network Flooding Based on Neighborhood Cooperation .....	665
	Tong Zhou, Krishnendu Chakrabarty	

NET29-3	Policy-driven Physical Attacks in Sensor Networks: Modeling and Measurement .....	671
	Xun Wang, Sriram Chellappan, Wenjun Gu, Wei Yu, Dong Xuan	
NET29-4	Resilient Against Report Fabrication Attack in Clusters of Heterogeneous Sensor Networks.....	679
	Miao Ma	
<b>NET30—Wireless Multicast</b>		
NET30-1	Macro Diversity Combining Techniques for Multimedia Broadcast/Multicast Services in UMTS Networks.....	685
	Armando Soares, Américo Correia	
NET30-2	Multicasting in Sparse MANETs Using Message Ferrying .....	691
	Yang Chen, Jeonghwa Yang, Wenrui Zhao, Mostafa Ammar, Ellen Zegura	
NET30-3	HVE-Mobicast: A Hierarchical-Variant-Egg-based Mobicast Routing Protocol for Wireless Sensornets .....	697
	Yuh-Shyan Chen, Yi-Jiun Liao	
NET30-4	Multicasting in Mobile Backbone based Ad Hoc Wireless Networks .....	703
	Choo-chin Tan, Izhak Rubin, Huei-jiun Ju	
<b>NET31—Cross Layer Design</b>		
NET31-1	Mobility-Location Aided Transmission Aware MAC Enhancements for Ad Hoc Networks .	709
	Kirtimaan Rajshiva, Qing-An Zeng	
NET31-2	Cross-Layer Inference-based Fast Link Error Recovery for MANETs.....	715
	Justin Yackoski, Chien-Chung Shen	
NET31-3	Link Level Aspects Modelling in the Simulation of Packet Switched Wireless Networks....	723
	Luca Zuliani, Claudio Gambetti, Alberto Zanella, Oreste Andrisano	

## PHYSICAL LAYER

### PHY01- MIMO

PHY01-1	Statistical Antenna Selection for MIMO Systems in Double-Sided Correlated Rayleigh Fading Channels.....	729
	Shi Jin, Xiqi Gao	
PHY01-2	A Fast Sub-Optimal Antenna Selection Algorithm in MIMO Systems.....	734
	ShenFa Liu, ZhiQiang He, Weiling Wu, Xin Chang, Zheng Li, Egon Schulz	
PHY01-3	Receiver Selection Diversity Schemes without Channel Estimation for Alamouti MIMO Systems.....	740
	Wenyu Li, Norman C. Beaulieu	
PHY01-4	On the Outage Capacity Distribution of Correlated Keyhole MIMO Channels.....	745
	G. Levin, S. Loyka	

### PHY02— Cross Layer Design

PHY02-1	Optimal Cross-Layer Design for Throughput Maximisation of Multi-Class VSG CDMA in Rayleigh Fading Channel.....	751
	P. Sedtheetorn, K. A. Hamdi	
PHY02-2	Joint PHY/MAC Based Link Adaptation for Wireless LANs with Multipath Fading .....	757
	Sayantana Choudhury, Jerry D. Gibson	

PHY02-3	Power Control and Proportional Fair Scheduling with Minimum Rate Constraints in Clustered Multihop TD/CDMA Wireless Ad Hoc Networks .....	763
	Lijun Qian, Ning Song, Dhadesugoor R. Vaman, Xiangfang Li, Zoran Gajic	
PHY02-4	Cross-Layer Design for Mobile Ad Hoc Networks: Energy, Throughput and Delay-Aware Approach .....	770
	Xinsheng Xia, Qingchun Ren, Qilian Liang	
<b>PHY03— UWB Systems – I</b>		
PHY03-1	On the Performance of Non-Coherent and Differential-Coherent UWB-DCC System.....	776
	Chia-Chin Chong, Su Khiong Yong	
PHY03-2	Multi-User Interference Performance Comparison of Direct-Sequence Impulse Radio and Direct-Sequence UWB in AWGN .....	781
	Bo Hu, Norman C. Beaulieu	
PHY03-3	Performance Comparison of Ultra-Wideband Time-Hopping, DSSS and OFDM Multiple Access Schemes for Wireless Sensor Networks .....	786
	Naveel Riaz, Mohammad Ghavami	
PHY03-4	Performance of Multi-Band OFDM UWB System with Multiple Receive Antennas .....	792
	Alireza Seyedi, Vasanth Gaddam, Dagnachew Birru	
<b>PHY04— OFDM Systems – I</b>		
PHY04-1	Co-Channel Diversity Schemes for an OFDM-based Cellular System with One-Cell Frequency Reuse .....	798
	Changqin Huo, Abu B. Sesay, Abraham O. Fapojuwo	
PHY04-2	Computationally Efficient Resource Allocation for Multiuser OFDM Systems .....	804
	Xiang Gao, Mort Naraghi-Pour	
PHY04-3	A Multiuser Interference Cancellation Scheme for Uplink OFDMA.....	810
	S. Manohar, V. Tikiya, D. Sreedhar, A. Chockalingam	
PHY04-4	Robust Uplink Carrier Frequency Offset Estimation with Interference Mitigation in OFDMA Systems.....	816
	Zhongshan Zhang, Hidetoshi Kayama	
<b>PHY05— Layered Space Time Systems and STBC</b>		
PHY05-1	MIPS Cost Estimation for OFDM-VBLAST Systems .....	822
	Haiyan Jiao, Anders Nilsson, Eric Tell, Dake Liu	
PHY05-2	Analytical BER Analysis of the V-BLAST in a Rayleigh Fading Channel.....	827
	Sergey Loyka, Francois Gagnon	
PHY05-3	A New Layered Space-Time-Frequency Architecture with LDPC Coding for OFDM MIMO Multiplexing.....	833
	Yuanliang Huang, Jiangzhou Wang, Kenichi Higuchi, Mamoru Sawahashi	
PHY05-4	An Equalization Technique for Distributed STBC-OFDM System with Multiple Carrier Frequency Offsets .....	839
	Zheng Li, Daiming Qu, Guangxi Zhu	
<b>PHY06— MIMO— OFDM</b>		
PHY06-1	Receiver Design for Bit-interleaved MIMO-OFDM Systems over Time-varying Channels .....	844
	Fu-Hsuan Chiu, Sau-Hsuan Wu, C.-C. Jay Kuo	

PHY06-2	Low Complexity Linear MMSE Detector with Recursive Update Algorithm for Iterative Detection-Decoding MIMO OFDM System.....	850
	Daniel N. Liu, Michael P. Fitz	
PHY06-3	Recursive Space-Time Decoding for MIMO OFDM Systems.....	856
	Jaekwon Kim, Eung Sun Kim, Jong Hyuk Lee, Yungsoo Kim	
PHY06-4	Frequency Offset Synchronization and Channel Estimation for the MIMO-OFDM System using Rao-Blackwellized Gauss-Hermite Filter.....	860
	Kyeong Jin Kim, Ronald A. Iltis	
<b>PHY07— UWB Systems – II</b>		
PHY07-1	Design and Analysis of Channel-Phase-Precoded Ultra Wideband (CPPUWB) Systems .....	866
	Yu-Hao Chang, Shang-Ho Tsai, Xiaoli Yu, C.-C. Jay Kuo	
PHY07-2	UWB Ranging with Energy Detectors using Ternary Preamble Sequences.....	872
	Zhongding Lei, Francois Chin, Yuen-Sam Kwok	
PHY07-3	Overcomplete Dictionary-based Ultra-Wideband Signal Detection .....	878
	Wei Li, T. Aaron Gulliver	
PHY07-4	Studying the Effect of Bandwidth on Performance of UWB Positioning Systems.....	884
	Bardia Alavi, Kaveh Pahlavan	
<b>PHY08— Cooperative Communications — I</b>		
PHY08-1	Performance Comparison of Cooperative and Non-cooperative Relaying Mechanisms in Wireless Networks.....	890
	Sedat Gormus, Dritan Kaleshi, Joe McGeehan, Alistair Munro	
PHY08-2	Performance Comparison of Conventional and Cooperative Multihop Transmission.....	897
	Jun Zhang, Tat M. Lok	
PHY08-3	Bounds on Ergodic Capacity of Multirelay Cooperative Links with Channel State Information .....	902
	Aitor del Coso, Christian Ibars	
PHY08-4	Impact of Mobility on Cooperative Communication .....	908
	Krishna Srikanth Gomadam, Syed Ali Jafar	
<b>PHY09— Wireless Lan's</b>		
PHY09-1	Access Point Selection Strategy in IEEE 802.11e WLAN Networks .....	914
	Shojiro Takeuchi, Kaoru Sezaki, Yasuhiko Yasuda	
PHY09-2	Performance Anomalies of Nonoptimally Configured Wireless LANs.....	920
	Pablo Serrano, Albert Banchs, Telemaco Melia, Luca Vollero	
PHY09-3	An Opportunistic Power-Saving Mode and Scheduler Design for Wireless Local Area Networks .....	926
	Jeongjoon Lee, Catherine Rosenberg, Edwin K. P. Chong	
PHY09-4	Adaptive Video Multicast over Wireless LANs.....	934
	Soumya Das, Dipankar Raychaudhuri, Kumar Ramaswamy, Charles Wang	
<b>PHY10— Testbed, Measurement and Prototyping</b>		
PHY10-1	Adaptable Measurement Testbed for Wireless Systems Applied to MIMO Channel Modeling.....	940
	Olivier Delangre, Philippe De Doncker, Martine Lienard, Pierre Degauque	

PHY10-2	Capacity of Measured Ricean and Rayleigh Indoor MIMO Channels at 2.4 GHz with Polarization and Spatial Diversity .....	946
	Vikram R. Anreddy, Mary Ann Ingram	
PHY10-3	Next Generation Wireless LAN System Design and Implementation Based on MIMO-OFDM.....	952
	Heejung Yu, Kwhanghyun Ryu, Kyonghee Song, Yunjoo Kim, Seungwook Min, Sok-kyu Lee	
PHY10-4	Rapid Prototyping and VLSI Exploration for 3G/4G MIMO Wireless Systems Using Integrated Catapult-C Methodology .....	958
	Yuanbin Guo, Dennis McCain	
<b>PHY11— 802.16 Networks</b>		
PHY11-1	QoS-Guaranteed Cross-Layer Adaptive Transmission Algorithms for the IEEE 802.16 OFDMA System .....	964
	Stanislav A. Filin, Sergey N. Moiseev, Mikhail S. Kondakov, Alexandre V. Garmonov, Do Hyon Yim, Jaeho Lee, Sunny Chang, Yun Sang Park	
PHY11-2	Combining Random Backoff with a Cross-Layer Tree Algorithm for Random Access in IEEE 802.16 .....	972
	Xin Wang, Yingqun Yu, Georgios B. Giannakis	
PHY11-3	Performance Evaluation of Broadband Fixed Wireless System Based on IEEE 802.16 ....	978
	Wout Joseph, Luc Martens	
PHY11-4	Efficient and Fair Scheduling of Uplink and Downlink in IEEE 802.16 OFDMA Networks .....	984
	Vandana Singh, Vinod Sharma	
<b>PHY12— CDMA Systems – I</b>		
PHY12-1	Cascade Fuzzy Radio Resource Management using SDMA Scheduling in TD-CDMA System.....	991
	Jeich Mar, Chih-Yang Kao	
PHY12-2	Call Admission Control for CDMA Cellular Networks Supporting Multimedia Services .....	997
	Mort Naraghi-Pour, Yaping Chai	
PHY12-3	BER Analysis of Weighted Interference Cancellation in Multicarrier DS-CDMA Systems.....	1003
	S. Manohar, V. Tikiya, R. Annavajjala, A. Chockalingam	
PHY12-4	Differentially Coherent Code Acquisition in the Multiple Transmit/Receive Antenna Aided DS-CDMA Downlink.....	1009
	SeungHwan Won, Lajos Hanzo	
<b>PHY13— Relaying Techniques – I</b>		
PHY13-1	Optimum Threshold-Selection Relaying for Decode-and-Forward Cooperation Protocol.....	1015
	W. Pam Siriwongpairat, Thanongsak Himsoon, Weifeng Su, K. J. Ray Liu	
PHY13-2	Multi-Antenna Aspects of Wireless Fixed Relays .....	1021
	A. Adinoyi, H. Yanikomeroglu	
PHY13-3	Coherent Multiuser Relaying with Partial Relay Cooperation .....	1027
	Armin Wittneben	
PHY13-4	Cooperative Diversity with Opportunistic Relaying .....	1034
	Aggelos Bletsas, Hyundong Shin, Moe Z. Win, Andrew Lippman	

## **PHY14— Channel Estimation in OFDM**

PHY14-1	Time-Variant Doppler Frequency Estimation and Compensation for Mobile OFDM Systems .....	1040
	Zan Li, Jueting Cai, Jian Shen	
PHY14-2	Polynomial Rooting -based Maximum Likelihood Carrier Frequency Offset Estimation for OFDM Systems .....	1046
	Feifei Gao, A. Nallanathan	
PHY14-3	Optimal OFDM Channel Estimation with Carrier Frequency Offset and Phase Noise .....	1050
	Darryl Dexu Lin, Ryan A. Pacheco, Teng Joon Lim, Dimitrios Hatzinakos	
PHY14-4	Performance Evaluation of Channel Estimation Techniques for MIMO-OFDMA Systems with Adaptive Sub-carrier Allocation .....	1056
	Ying Peng, Simon Armour, J. McGeehan	

## **PHY15— UWB Systems – III**

PHY15-1	Measurement and Characterization of the Near-Ground Indoor Ultra Wideband Channel .....	1062
	A. Hugine, H. I. Volos, J. Gaeddert, R. M. Buehrer	
PHY15-2	Adaptive Rate QS-CDMA UWB Systems Using Ternary OVSF Codes with a Zero-Correlation Zone .....	1068
	Di Wu, Predrag Spasojević	
PHY15-3	Multiband UWB System Performance with Random-Clustering Multipath-Rich Fading Channels .....	1074
	W. Pam Siriwongpairat, Weifeng Su, K. J. Ray Liu	
PHY15-4	Bit Error Rates of IR-UWB Transceiver Types at Sub-Nyquist Sampling Rates .....	1080
	İsmail Güvenç, Hüseyin Arslan	

## **PHY16— Multiuser Detection — I**

PHY16-1	Blind Multiuser Receiver Design in ISI Channels .....	1086
	Shu Wang, James Caffery Jr.	
PHY16-2	A Near Optimum Adaptive Iterative MMSE Receiver for Interference Suppression in W-CDMA Systems .....	1092
	Aditya Trivedi, D. K. Mehra	
PHY16-3	Iterative Data-Aided Channel Estimation and Multiuser Detection for Coded CDMA Systems .....	1098
	Shahram Talakoub, Behnam Shahrava	
PHY16-4	Hebbian Learning Based Blind Adaptive Multiuser Detection in DS-CDMA Systems .....	1102
	Malay Gupta, Balu Santhanam	

## **PHY17— Performance Analysis – I**

PHY17-1	BER Performance of Different Single-User Detection Techniques for SIMO and 2IMO Downlink MC-CDMA Systems .....	1108
	Po-Ying Chen, Hsueh-Jyh Li	
PHY17-2	An Accurate Method for Approximating Probability Distributions in Wireless Communications .....	1114
	Raymond Kwan, Cyril Leung	
PHY17-3	Exact Pairwise Error Probability for Block Fading OFDM Systems .....	1120
	Jerry C. H. Lin, Andrej Stefanov	

PHY17-4	Exact BER Performance of Asynchronous DS-CDMA Systems Using Quadrature Phase Spreading and QPSK Modulation over Rayleigh Channels.....	1125
	Xiang Liu, Lajos Hanzo	

**PHY18— Scheduling**

PHY18-1	Delay Constrained Multiuser Scheduling Schemes Based on Upper-Layer Performance.....	1130
	Hongyuan Zhang, Huaiyu Dai	
PHY18-2	Hierarchical Scheduling Algorithm for Guaranteeing QoS of Delay-Sensitive Traffic.....	1136
	Seon Yeob Baek, Dan Keun Sung	
PHY18-3	Adaptive Delay Threshold-based Priority Queueing Scheme for Packet Scheduling in Mobile Broadband Wireless Access System.....	1142
	Jin M. Ku, Sung K. Kim, Sueng H. Kim, Simon Shin, Jay H. Kim, Chung G. Kang	
PHY18-4	Power Control and QoS Trade-offs for Real-Time Wireless Traffic.....	1148
	Aditya Dua, Nicholas Bambos	
PHY19-1	A Contention-based Energy-Efficient MAC Protocol for Wireless Sensor Networks.....	1154
	Qingchun Ren, Qilian Liang	
PHY19-2	Cross-Layer Wireless Sensor Network Radio Power Management.....	1160
	Michael I. Brownfield, Almohanad S. Fayed, Theresa M. Nelson, Nathaniel Davis IV	
PHY19-3	Performance Analysis of a Wireless Sensor Network.....	1166
	M. K. Mehmet Ali, H. Gu	

**PHY19— Sensor Networks**

PHY19-4	CMAC—A Multi-Channel Energy Efficient MAC for Wireless Sensor Networks.....	1172
	Kaushik R. Chowdhury, Nagesh Nandiraju, Dave Cavalcanti, Dharma P. Agrawal	

**PHY20— Relaying Techniques – II**

PHY20-1	Comparison of Schemes for Streaming Multicast in Cellular Networks with Relays.....	1178
	Jay Kumar Sundararajan, Harish Viswanathan	
PHY20-2	Outage Analysis of Multi-Node Amplify-and-Forward Relay Networks.....	1184
	Karim G. Seddik, Ahmed K. Sadek, Weifeng Su, K. J. Ray Liu	
PHY20-3	Decode-and-Forward Differential Modulation Scheme with Threshold-based Decision Combining.....	1189
	Thanongsak Himsoon, W. Pam Siri Wongpairat, Weifeng Su, K. J. Ray Liu	
PHY20-4	Differential Modulation for Multi-Node Amplify-and-Forward Wireless Relay Networks.....	1195
	Thanongsak Himsoon, Weifeng Su, K. J. Ray Liu	

**Author Index**

**PHY21— Advanced Coding Techniques— I**

PHY21-1 A Purely Symbol-based Precoded and LDPC-Coded Iterative-Detection Assisted Sphere-Packing Modulated Space-Time Coding Scheme ..... 1201  
O. Alamri, S. X. Ng, F. Guo, L. Hanzo

PHY21-2 Symbol-Flipping based Decoding of Generalized Low-Density Parity-Check Codes over  $GF(q)$  ..... 1207  
Fang-Chun Kuo, Lajos Hanzo

PHY21-3 Union Bounds to Error Probabilities of LDPC-coded Q-ary Modulation Systems over Fast Fading MIMO Channels ..... 1212  
Jingqiao Zhang, Heung-No Lee

PHY21-4 Multidimensional 16-QAM Constellation Labeling of BI-STCM-ID with the Alamouti Scheme ..... 1217  
Aeman Saad Mohammed, Wahyu Hidayat, Martin Bossert

**PHY22— Feedback Based Communication Systems**

PHY22-1 Unitary Precoding and Power Control in MIMO Systems with Limited Feedback ..... 1221  
Ramakrishna Yellapantula, Yingwei Yao, Rashid Ansari

PHY22-2 Performance of Analog Feedback in Closed-Loop Transmit Diversity Systems ..... 1227  
Eddy Chiu, Paul Ho, Jae Hyung Kim

PHY22-3 Joint Tomlinson-Harashima Precoding and Scheduling for Multiuser MIMO with Imperfect Feedback ..... 1233  
Quan Zhou, Huaiyu Dai, Hongyuan Zhang

PHY22-4 Promising Feedback Methods for Transmit Beamforming in Broadband Mobile OFDM ..... 1239  
Timothy A. Thomas, Kevin L. Baum, Philippe Sartori

**PHY23— Cellular Networks**

PHY23-1 Coexistence Analysis of Bluetooth and Cellular UMTS in the 2500–2690 MHz Band ..... 1245  
Markus Konrad, Wolfgang Koch, Jörg Huschke

PHY23-2 Capacity-based Compressed Mode for Inter-System Handover in UMTS ..... 1250  
ChengTa Chang, ChingYao Huang

PHY23-3 Adaptive Frame Switching for UMTS UL-EDCH ..... 1255  
Shupeng Li, FangChen Cheng, Yifei Yuan, Teck Hu

PHY23-4 A Hybrid Method for Channel Assignment Problems in Cellular Radio Networks ..... 1260  
Seyed Alireza Ghasempour Shirazi, Hamidreza Amindavar

**PHY24— Channel Modeling**

PHY24-1 A New Simulation Model for Mobile-to-Mobile Rayleigh Fading Channels ..... 1266  
Alenka G. Zajić, Gordon L. Stüber

PHY24-2 A Novel Simulation Model With Correct Statistical Properties for Ricean Fading Channels ..... 1271  
Rugui Yao, Yongsheng Wang, Juan Xu

PHY24-3 Time Varying Channel Modeling for Ad-hoc Mobile Wireless Networks ..... 1277  
M. M. Olama, S. M. Djouadi, C. D. Charalambous



PHY24-4	Model Development for the Wideband Expressway Vehicle-to-Vehicle 2.4 GHz Channel.....	1283
	Guillermo Acosta, Mary Ann Ingram	
<b>PHY25— Adaptive Modulation and Coding</b>		
PHY25-1	Improved AMC Using Adaptive SIR Thresholds in OFDM-based Wireless Systems .....	1289
	Ji-Woong Choi, Yong-Hwan Lee	
PHY25-2	Adaptive Modulation and Coding for Turbo Receivers in Space-Time BICM .....	1293
	César Hermosilla, Leszek Szczeciński	
PHY25-3	Joint AMC/ARQ Transmission in Wireless TDMA Systems and Its Performance Analysis.....	1299
	Hong-Chuan Yang, Sanal Sasankan	
PHY25-4	Throughput Analysis of Band AMC Scheme in Broadband Wireless OFDMA System.....	1305
	Sung Kyung Kim, Chung Gu Kang	
<b>PHY26— Precoder Design</b>		
PHY26-1	Non-Orthogonal Precoding Matrix Design for MU-MIMO Downlink Channels.....	1311
	Mingguang Xu, Dong Lin	
PHY26-2	Space-Time Precoding for Asymmetric MIMO Channels .....	1316
	Sumei Sun, Ying-Chang Liang, Tjeng Thieng Tjhung	
PHY26-3	Precoder-aided Iterative Detection Assisted Multilevel Coding and Three-Dimensional EXIT-Chart Analysis .....	1322
	R. Y. S. Tee, S. X. Ng, L. Hanzo	
PHY26-4	Precoding for Spatial Multiplexing with MIMO Iterative Receiver .....	1327
	Jinho Choi, Byung Jang Jeong, Jae Young Ahan	
<b>PHY27— Performance Analysis – II</b>		
PHY27-1	Performance Analysis of MQAM with MRC over Nakagami- $m$ Fading Channels.....	1332
	Iyad Falujah, Vasant K. Prabhu	
PHY27-2	Performance of Optimum Combining with Imperfect Channel Estimates .....	1338
	Amir Ali Basri, Teng Joon Lim	
PHY27-3	Threshold-based Hybrid Selection/Maximal-Ratio Combining in Correlated Nakagami Fading.....	1344
	Xiaodi Zhang, Norman C. Beaulieu	
PHY27-4	Performance Analysis of Output-Threshold Generalized Selection Combining (OT-GSC) over Rayleigh Fading Channels .....	1348
	Le Yang, Hong-Chuan Yang	
<b>PHY28— Wireless Personal Area Networks</b>		
PHY28-1	Soft-in/Soft-out Noncoherent Sequence Detection for Bluetooth: Capacity, Error Rate and Throughput Analysis .....	1354
	Rohit Iyer Seshadri, Matthew C. Valenti	
PHY28-2	A Practical Approach to Multicasting in Bluetooth Piconets .....	1360
	Lóránt Farkas, Balázs Bakos, Péter Spányi	
PHY28-3	WirelessUSB: A Low Power, Low Latency and Interference Immune Wireless Standard .....	1367
	Ryan Woodings, Manoj Pandey	

PHY28-4	On the Suitability of IrBurst for Large Data Block Exchange over High-Speed IrDA Links.....	1374
	Shawkat Shamim Ara, Alam Mohammad Shah, Mitsuji Matsumoto	
<b>PHY29— Advanced Coding Techniques – II</b>		
PHY29-1	Super-Pseudo-Orthogonal Space-Time Trellis Codes .....	1380
	Yun Zhu, Hamid Jafarkhani	
PHY29-2	Good Low-Rate Convolutional Codes Using Integer Linear Programming.....	1386
	Huiping Li, David Huang	
PHY29-3	Design of Structured eIRA Codes with Applications to Wireless Channels .....	1390
	Yifei Zhang, William E. Ryan, Fei Peng	
PHY29-4	Variable Spreading Factor Orthogonal Polyphase Codes for Constant Envelope OFDM-CDMA System.....	1396
	Yingming Tsai, Guodong Zhang, Xiaodong Wang	
<b>PHY30— 802.11 Networks</b>		
PHY30-1	Link Assessment in an Indoor 802.11 Network .....	1402
	Michael R. Souryal, Luke Klein-Berndt, Leonard E. Miller, Nader Moayeri	
PHY30-2	Characterizing Temporal SNR Variation in 802.11 Networks.....	1408
	Ratul K. Guha, Saswati Sarkar	
PHY30-3	Performance Analysis of Controlled Access Phase Scheduling Scheme for Per-Session QoS Provisioning in IEEE 802.11e Wireless LANs.....	1414
	Yaser Pourmohammadi Fallah, Hussein Alnuweiri	
PHY30-4	Quick Data Retrieving for U-APSD in IEEE 802.11e WLAN Networks.....	1421
	Shojiro Takeuchi, Kaoru Sezaki, Yasuhiko Yasuda	
<b>PHY31— Frequency, Timing and Channel Estimation</b>		
PHY31-1	Robust Estimation of Carrier-Frequency Offset and Timing Offset for OFDMA Uplink Systems over Multi-path Fading Channels.....	1428
	Peng kai Zhao, Zuyao Ni, Linling Kuang, Jianhua Li	
PHY31-2	Delay Spread and Time Dispersion Estimation for Adaptive OFDM Systems.....	1433
	Tevfik Yücek, Hüseyin Arslan	
PHY31-3	High Accuracy and Low Complexity Timing Offset Estimation for MIMO-OFDM Receivers.....	1439
	Il-Gu Lee, Eunyoung Choi, Sok-Kyu Lee, Taehyun Jeon	
PHY31-4	SISO-OFDM Channel Estimation in the Presence of Carrier Frequency Offset.....	1444
	Lingfan Weng, Ross D. Murch, Vincent K. N. Lau	
<b>PHY32— Frequency Estimation</b>		
PHY32-1	Implementation of a Carrier Frequency Recovery Loop for MIMO-CDMA Systems.....	1450
	Hamid Eslami, Ahmed M. Eltawil	
PHY32-2	On the Design of a Common Avenue for Frequency Estimation and Frame Synchronization .....	1455
	Marco Villanti, Raffaella Pedone, Matteo Iubatti, Giovanni E. Corazza	
PHY32-3	Maximum-Likelihood Carrier Frequency Offset Estimation for OFDM Systems in Fading Channels .....	1461
	Hao Zhou, Amaresh V. Malipatil, Yih-Fang Huang	

PHY32-4	Carrier Frequency Offset Estimation in qHLRT Modulation Classifier with Antenna Arrays .....	1465
	Hong Li, Ali Abdi, Yeheskel Bar-Ness, Wei Su	
<b>PHY33— Space Time Coding – I</b>		
PHY33-1	Diversity Analysis of Space-Time Coding in Cascaded Rayleigh Fading Channels .....	1471
	Murat Uysal	
PHY33-2	System Performance of Distributed Transmit Diversity for OFDM-based 1xEV-DO Broadcast Networks .....	1475
	Young C. Yoon, Alpaslan Savas, Wanshi Chen	
PHY33-3	Performance Analysis of Space Time Block Coded Systems over Frequency Selective Rayleigh Fading Channels .....	1480
	Tung X. Lai, Tuan A. Tran, Abu B. Sesay	
PHY33-4	Asymptotic Performance of Space-Time Block Codes over Correlated Rician MIMO Channels .....	1486
	Lei Zhao, Yao Ma	
<b>PHY34— Fading Channels</b>		
PHY34-1	Approximate SER of H-S/MRC in Correlated Nakagami Fading .....	1492
	Xiaodi Zhang, Norman C. Beaulieu	
PHY34-2	Bit Error Variances of DPSK and NCFSK in Nakagami-m Channels .....	1497
	Xian Liu	
PHY34-3	Performance Evaluation of Maximal Ratio Combining Diversity over the Weibull Fading Channel in Presence of Co-channel Interference .....	1503
	Mahmoud H. Ismail, Mustafa M. Matalgah	
PHY34-4	General Order Selection Combining for Non-Identically Distributed Nakagami and Weibull Fading Channels .....	1509
	Raymond Kwan, Cyril Leung	
<b>PHY35— Channel Estimation</b>		
PHY35-1	A Simple Subspace-based Blind Channel Estimation for OFDM Systems .....	1515
	Feifei Gao, A. Nallanathan	
PHY35-2	LS FFT-based Channel Estimators Using Pilot-Embedded Data-Bearing Approach in Space-Frequency Coded MIMO-OFDM Systems .....	1519
	Chaoyod Pirak, Z. Jane Wang, K. J. Ray Liu, Somchai Jitapunkul	
PHY35-3	On Subspace Channel Estimation for Chip-level Space-Time Block Coded Multi-Rate CDMA .....	1525
	Eugene B. Nicolov, Shahrokh Nayeb Nazar, Ioannis N. Psaromiligkos	
PHY35-4	New Robust ICI Estimation Using Distributive PM-Sequences in OFDM Systems .....	1531
	Hsiao-Chun Wu, Songnan Xi, Yiyang Wu	
<b>PHY36— Advanced Receiver Techniques – I</b>		
PHY36-1	A Novel Subspace-based Blind Channel Estimation for Cyclic Prefixed Single-Carrier Transmissions .....	1537
	Feifei Gao, A. Nallanathan	
PHY36-2	Joint Turbo Equalization and Channel Estimation with Fixed-Lag Extended Kalman Filtering .....	1543
	Xin Li, Tan F. Wong	

PHY36-3	A Low-Complexity Soft Demapper for OFDM Fading Channels with ICI.....	1549
	Fei Peng, William E. Ryan	
PHY36-4	Reduced Complexity Single-Carrier Maximum-Likelihood Detection for Decision Feedback Assisted Space-Time Equalization .....	1555
	A. Wolfgang, J. Akhtman, S. Chen, L. Hanzo	
<b>PHY37— Advanced Receiver Techniques – II</b>		
PHY37-1	Soft MCI Cancellation for Turbo-coded OFCDM Systems .....	1561
	Yiqing Zhou, Jiangzhou Wang	
PHY37-2	A Parallel Receiver Combining Detection and Decoding for Turbo-Coded Multi-Antenna System .....	1567
	Yang Hu, Changchuan Yin, Guangxin Yue	
PHY37-3	Adaptive Frequency-Domain Interference Cancellation and Channel Equalizer for MIMO-CP-CDMA Systems.....	1573
	Jing Xu, Haifeng Wang, Shixin Cheng, Ming Chen, Zhiyong Bu	
PHY37-4	Single-Carrier Frequency Domain Equalization for Broadband Cooperative Communications .....	1578
	Hakam Mheidat, Murat Uysal, Naofal Al-Dhahir	
<b>PHY38— Multiuser Detection – II</b>		
PHY38-1	A General Approach Towards Blind Multiuser Detection Using Higher Order Statistics...	1585
	Malay Gupta, Balu Santhanam	
PHY38-2	Successive Interference Cancellation for cdma2000 using a Software Defined Radio ....	1591
	Shou Y. Mui	
PHY38-3	Bit-Error-Rate Performance Evaluation of SMI-MSINR and SMI-MVDR DS/CDMA Receivers.....	1597
	Otto Fonseca Escudero, Ioannis N. Psaromiligkos	
PHY38-4	Iterative Minimum Bit Error Rate Multiuser Detection in Multiple Antenna Aided OFDM..	1603
	L. Xu, S. Tan, S. Chen, L. Hanzo	
<b>PHY39— Adaptive Transmission Techniques— I</b>		
PHY39-1	Link Adaptation for MIMO Systems Using Reliability Values.....	1608
	Magnus Sandell	
PHY39-2	Adaptive Antenna Power Level Control for Wireless Forward Link Data Services .....	1614
	Jung-Tsung Tsai, Hui-Chen Hsieh	
PHY39-3	A Joint Code/Time Assignment Strategy with Minimal Fragmentations for CDMA Systems.....	1620
	Chih-Min Chao, Shih-Han Wang	
<b>PHY40— Space Time Coding – II</b>		
PHY40-1	Punctured Super-Orthogonal Space-Time Trellis Codes .....	1626
	Yun Zhu, Hamid Jafarkhani	
PHY40-2	Extended Orthogonal Space-Time Block Codes with Partial Feedback for Wireless Communications.....	1632
	Yi Yu, Sylvie Kerouedan, Jinhong Yuan	
PHY40-3	Time-Reversal Space-Time Coding for Doubly-Selective Channels .....	1638
	Stefan Geirhofer, Lang Tong, Anna Scaglione	

PHY40-4	Efficient Blind Decoding of Orthogonal Space-Time Block Codes over Time-Selective Fading Channels.....	1644
	Tao Cui, Chintla Tellambura	
<b>PHY41— Space Time Coding – III</b>		
PHY41-1	Differential Space-Time Modulation Schemes for Smart Antenna Aided Generalized Multicarrier DS-CDMA Systems.....	1650
	Bin Hu, Lie-Liang Yang, Lajos Hanzo	
PHY41-2	Space-Time Trellis Code Design over Rapid Rayleigh Fading Channels with Channel Estimation.....	1655
	Yan Li, Pooi Yuen Kam	
PHY41-3	Multiple-Symbol Differential Detection for Space-Time Block Codes with Diversity Reception.....	1660
	Ziyan Jia, Shiro Handa, Fumihito Sasamori, Shinjiro Oshita	
PHY41-4	Differential Space-Time Spreading Using Iteratively Detected Sphere Packing Modulation and Two Transmit Antennas.....	1664
	M. El-Hajjar, O. Alamri, L. Hanzo	
<b>PHY42— Cooperative Communications – II</b>		
PHY42-1	Matching Algorithms for Infrastructure-based Wireless Networks Employing Cooperative Diversity System.....	1669
	Veluppillai Mahinthan, Lin Cai, Jon W. Mark, Xuemin Shen	
PHY42-2	Power Allocation Strategies in Cooperative MIMO Networks.....	1675
	Haesoo Kim, R. Michael Buehrer	
PHY42-3	Wireless Diversity through Network Coding.....	1681
	Yingda Chen, Shalinee Kishore, Jing Li	
PHY42-4	An Efficient Cooperation Protocol to Extend Coverage Area in Cellular Networks.....	1687
	Ahmed K. Sadek, Zhu Han, K. J. Ray Liu	
PHY43-1	Optimal Power Control and Opportunistic Fair Scheduling in TH-PPM UWB Ad-hoc Multimedia Networks.....	1693
	Yang Liu, Yu-Kwong Kwok, J. Wang	
PHY43-2	Throughput Guarantee Targeted Hybrid Scheduling for Downlink WCDMA Data Networks.....	1699
	Peifang Zhang, Scott Jordan	
PHY43-3	An Adaptive $p$ -Persistent 802.11 MAC Scheme to Achieve Maximum Channel Throughput and QoS Provisioning.....	1705
	Rose Qingyang Hu, Wei Zha, Yi Qian, Yu Cheng	
<b>PHY44— Adaptive Transmission Techniques – II</b>		
PHY44-1	Multicarrier Energy Allocation for Differentiated QoS Provision and Dynamic Range Reduction.....	1711
	Michael A. Enright, C.-C. Jay Kuo	
PHY44-2	Subcarrier and Bit Allocation for OFDMA Systems with Proportional Fairness.....	1717
	Guanding Yu, Zhaoyang Zhang, Yan Chen, Peng Cheng, Peiliang Qiu	
PHY44-3	Joint Rate and Power Adaptation for Wireless Local Area Networks in Nakagami Fading Channels.....	1723
	Li-Chun Wang, Kuang-Nan Yen, Anderson Chen	

PHY44-4	Bandwidth-Efficient OFDM Cooperative Protocol with Applications to UWB Communications .....	1729
	W. Pam Siriwongpairat, Ahmed K. Sadek, K. J. Ray Liu	

**PHY45— Beamforming Methods**

PHY45-1	Space-Time Multi-Block Coding and Beamforming with Covariance Beamforming with Side Information for Mobile Transceivers.....	1735
	Siavash Ekbatani, Fatemeh Fazel, Hamid Jafarkhani	
PHY45-2	Linear Beamforming Assisted Receiver for Binary Phase Shift Keying Modulation Systems .....	1741
	S. Chen, S. Tan, L. Hanzo	
PHY45-3	A Novel Simplified Opportunistic Beamforming Method for Wide-band Systems .....	1747
	Zhengang Pan, Lan Chen	
PHY45-4	Exploiting Time Coherence in Opportunistic Beamforming for Slow Fading Channels ....	1753
	Iuri R. Baran, Bartolomeu F. Uchôa-Filho	

**PHY46— Detection Methods**

PHY46-1	Low Complexity Approximate Log-MAP Detection for MIMO Systems .....	1759
	Jos Akhtman, Lajos Hanzo	
PHY46-2	Packet Detection and Acquisition at Low SINR in Spread-Spectrum based Wireless Communications .....	1765
	Manish Amde, Joel Marciano, Sushil Singh, Cahit Akin, Rene Cruz, Kenneth Yun	
PHY46-3	Efficient Signal Detection for Space-Time Block Coding over Time-Selective Fading Channels .....	1771
	Tao Cui, Chintha Tellambura	
PHY46-4	Parallel Soft Spherical Detection for Coded MIMO Systems.....	1776
	Hosein Nikopour, Amir K. Khandani, Aladdin Saleh	

**Author Index**

*Volume 4*

**PHY47— Channel Modeling and Implementation**

PHY47-1	Indoor Channel Characterisation for a Wearable Antenna Array at 868 MHz .....	1783
	S. L. Cotton, W. G. Scanlon	
PHY47-2	DSP Implementation of an Efficient Bit Allocation Algorithm for Indoor Wireless Multicarrier Systems .....	1789
	Martin Cudnoch, Alexander M. Wyglinski, Fabrice Labeau	
PHY47-3	Transaction Level Analysis of NoC Based Coded MIMO-OFDM Receiver .....	1794
	Sung-Rok Yoon, Jin Lee, Sin-Chong Park	
PHY47-4	Applying the Convex Metric and the Spatial Channel Model for HRPD Rev-A.....	1800
	Alfonso Rodriguez-Herrera, Sean McBeath, Danny Pinckley, Doug Reed	

## **PHY48— 802.15 Networks and MIMO**

PHY48-1	A Cyclic Odd Bit Inversion Code Mapping and Modulation Scheme for the IEEE 802.15.4b 868 MHz Band .....	1806
	Manjeet Singh, Zhongding Lei, Francois Chin, Y. S. Kwok	
PHY48-2	Performance Analysis and a Proposed Improvement for the IEEE 802.15.4 Contention Access Period .....	1811
	Zhifeng Tao, Shivendra Panwar, Daqing Gu, Jinyun Zhang	
PHY48-3	Optimal Training Design for Multiple-Antenna Communications .....	1819
	Qingyu Zhu, Zhiqiang Liu	
PHY48-4	Interleaver Design for MIMO-OFDM based Wireless LAN .....	1825
	Huaning Niu, Xuemei Ouyang, Chiu Ngo	

## **PHY49— Interference Analysis**

PHY49-1	Analysis of the Statistical Properties of the Interference in the IEEE 802.16 OFDMA Network .....	1830
	Sergey N. Moiseev, Stanislav A. Filin, Mikhail S. Kondakov, Alexandre V. Garmonov, Do Hyon Yim, Jaeho Lee, Sunny Chang, Yun Sang Park	
PHY49-2	A Novel Method of Estimating Desired Signal to Undesired Signal Power Ratio for One-Cell-Frequency-Reuse SIMO-MIMO-OF/TDMA Systems .....	1836
	Masafumi Moriyama, Hiroshi Harada, Seiichi Sampei, Ryuhei Funada	
PHY49-3	Interference Avoidance with Incremental Power Updates for Uplink CDMA Systems.....	1842
	Cătălin Lăcătuș, Dimitrie C. Popescu	
PHY49-4	Intercarrier Interference Analysis for Wireless OFDM in Mobile Channels.....	1848
	Xiaozhou Huang, Hsiao-Chun Wu	
PHY50-1	Employing Cooperative Diversity for Performance Enhancement in UWB Communication Systems.....	1854
	W. Pam Siriwongpairat, Weifeng Su, Zhu Han, K. J. Ray Liu	
PHY50-2	Efficient OFDM-HARQ System Evaluation Using a Recursive EESM Link Error Prediction.....	1860
	Brian Classon, Philippe Sartori, Yufei Blankenship, Kevin Baum, Robert Love, Yakun Sun	
PHY50-3	Multiple-Access Design for Ad Hoc UWB Position-Location Networks.....	1866
	Swaroop Venkatesh, R. Michael Buehrer	

## **PHY51— Space— Time/Space— Frequency Codes**

PHY51-1	Optimizing ZF Precoders for MIMO Broadcast Systems .....	1874
	Prashant U. Sripathi, James S. Lehnert	
PHY51-2	A Sphere-Packing Modulated Space-Frequency Diversity Aided FFH-assisted DSTBC System .....	1881
	N. Wu, S. Ahmed, O. Alamri, L. L. Yang, L. Hanzo,	
PHY51-3	Novel Space-Time-frequency Codes with Improved Distance Spectrum for Mobile Multi-Path Channels .....	1887
	Siavash Ekbatani, Hamid Jafarkhani	
PHY51-4	Tight Error Bound for Coded Unitary Space-Time Modulation .....	1893
	Nghi H. Tran, Ha H. Nguyen, Tho Le-Ngoc	

## **PHY52— Smart Antennas and MIMO**

PHY52-1	Reverse-link Macrodiversity in CDMA Distributed Antenna Systems with Imperfect Channel Estimation .....	1899
	Peng Chen, Jing-Xing Fu, Young-Hak Kim, Yun-Sang Park	
PHY52-2	Rank-Deficient Dispersive Covariance MIMO Precoders .....	1904
	R. Hayes Jr., J. Caffery Jr.	
PHY52-3	Space-Time Adaptive Reduced-Rank Detectors for DS-CDMA Based on Interpolated FIR Filters .....	1910
	Rodrigo C. de Lamare, Raimundo Sampaio-Neto	
PHY52-4	A Smart Antenna with Pre- and Post-FFT Hybrid Domain Beamforming for Broadband OFDM System .....	1916
	Hidehiro Matsuoka, Hideo Kasami, Makoto Tsuruta, Hiroki Shoki	

## **PHY53— Modulation and Traffic Models**

PHY53-1	Improvement on Power Efficiency of MPSK by Employing Elliptical Signals.....	1921
	Chunyi Song, Shigeru Shimamoto	
PHY53-2	Performance of Coded Residual Arithmetic Differential MPSK Modulation .....	1927
	Roseline N. Akol, Fambirai Takawira	
PHY53-3	On Use of Traditional M/G/1 Model for IEEE 802.11 DCF in Unsaturated Traffic Conditions .....	1933
	Wookwon Lee, Chonggang Wang, Kazem Sohraby	
PHY53-4	An Analytical Model of MAC Access Delay in IEEE 802.11e EDCA.....	1938
	Dongxia Xu, Taka Sakurai, Hai L. Vu	

## **PHY54— Cellular Systems and Fading Channels**

PHY54-1	Performance Bounds for Correlated Turbulent Free-Space Optical Channels.....	1944
	Seyed Mohammad Navidpour, Murat Uysal, Mohsen Kavehrad	
PHY54-2	Single-Cell Cluster for High Capacity Narrowband Cellular Systems .....	1949
	Shirin Karimifar, James K. Cavers	
PHY54-3	Teletraffic Analysis of Access and Transmission Rate Fairness in EGPRS Networks .....	1954
	Remberto Sandoval-Aréchiga, Felipe A. Cruz-Pérez, Lauro Ortigoza-Guerrero	
PHY54-4	Maximum Transmission Distance of Geographic Transmissions on Rayleigh Channels .....	1960
	Tathagata D. Goswami, John M. Shea	

## **PHY55— Advanced Coding Techniques – III**

PHY55-1	Effects of Impulse Noise on the Performance of Multidimensional Parity Check Codes.....	1966
	SaiRamesh Nammi, Deva K. Borah, Christian Schneider, Reiner Thoma	
PHY55-2	Channel Coding and Interleaver for Secure Wireless Sensor Networks .....	1972
	Qilian Liang, Lingming Wang	
PHY55-3	Superposition Coding in the Downlink of CDMA Cellular Systems .....	1978
	Sureness Bopping, John M. Shea	
PHY55-4	Distributed Coding for Multiple Access Communication with Side Information.....	1984
	Virendra K. Varshneya, Vinod Sharma	



## **PHY56— OFDM Systems – II**

- PHY56-1 Near-Optimum Nonlinear Soft Detection for Multiple-Antenna Assisted OFDM ..... 1989  
M. Jiang, J. Akhtman, L. Hanzo
- PHY56-2 Transmitter Diversity in SDMA-based Asynchronous Multi-User OFDM Systems ..... 1994  
Hyejung Jung, Michael D. Zoltowski
- PHY56-3 An Efficient Encodable/Decodable OFDM Low PMEPR 16-QAM Code.....2000  
Karen Guan, Chi Guan
- PHY56-4 Novel Low-Complexity Post-IFFT PAPR Reduction Technique for OFDM Systems .....2006  
Lin Yang, Emad Alsusa

## **PHY57— CDMA Systems – II**

- PHY57-1 Low-Complexity Partitioned-Spreading CDMA System  
with Multistage MMSE Reception.....2012  
Zhenning Shi, Mark C. Reed
- PHY57-2 A Novel MC DS-CDMA System Scheme with High Spectral Efficiency .....2018  
Deshan Miao, Daoben Li
- PHY57-3 A Bandwidth Efficient MC-CDMA Transmission Scheme in 1xEV-DV System .....2024  
Chanho Yoon, Sok-Kyu Lee, Jaekwon Kim
- PHY57-4 Performance Analysis of the MVDR Channel Estimator  
for Space-Frequency Block Coded MC-CDMA Systems.....2029  
Shahrokh Nayeb Nazar, Ioannis N. Psaromiligkos

## **PHY58— Multiple Antenna Technology**

- PHY58-1 Investigation into MU-MISO Transmission with Limited Feedback.....2035  
Cheng Wang, Ross D. Murch
- PHY58-2 Antenna Down-Selection for Co-Channel Interference Mitigation  
in a Non-LOS Mobile-to-Mobile Channel.....2040  
Brett T. Walkenhorst, Thomas G. Pratt
- PHY58-3 Achieving Full Spatial Multiplexing and Full Diversity in Wireless Communications.....2046  
Enis Akay, Ersin Sengul, Ender Ayanoglu
- PHY58-4 Effect of Directional Antennas on Spatiotemporal Sampling  
in Clustered Sensor Networks.....2051  
Qingjiang Tian, Seema Bandyopadhyay, Edward J. Coyle

## **PHY59— Performance Analysis – III**

- PHY59-1 Upper Bound on Bit Error Rate for Time Synchronization Errors  
in Band-limited Distributed MIMO Networks.....2058  
Ramesh Chembil Palat, A. Annamalai, Jeffrey H. Reed
- PHY59-2 Performance Analysis of Steiner System Design-based Noncoherent  
M-ary Orthogonal Signals with Diversity Combining over Nonidentically Distributed  
and Arbitrarily Correlated Fading Channels .....2064  
Redha M. Radaydeh, Mustafa M. Matalgah
- PHY59-3 Comparison of Compand-Filter Schemes for Reducing PAPR in OFDM .....2070  
N. Chaudhary, L. Cao
- PHY59-4 Performance of MRC and EGC M-QAM with Imperfect Channel Estimation .....2076  
Yao Ma, Jinghua Jin

## **PHY60— Wireless Communications – I**

PHY60-1	Multilevel Type-II HARQ with Adaptive Modulation Control.....	2082
	R. Bosisio, U. Spagnolini, Y. Bar-Ness	
PHY60-2	Performance of VoIP in HSDPA Based on an Adaptive Power Allocation Scheme .....	2088
	Young Ik Seo, Dan Keun Sung	
PHY60-3	Robust Automatic Modulation Classification Using Cumulant Features in the Presence of Fading Channels .....	2094
	Songnan Xi, Hsiao-Chun Wu	
PHY60-4	An Efficient Broadcast MAC Scheme for Traffic Safety Applications in Automotive Networks.....	2100
	Arash T. Toyserkani, Erik G. Ström, Arne Svensson	

## **PHY61— Performance Analysis – IV**

PHY61-1	Reverse Link Erlang Capacity of OFDMA Wireless Systems with Adaptive Resource Allocation .....	2106
	Beilei Zhang, Ramesh Iyer, Kamran Kiasaleh	
PHY61-2	A Fading-Insensitive Performance Metric for a Unified Link Quality Model .....	2110
	Lei Wan, Shiauhe Tsai, Magnus Almgren	
PHY61-3	Performance Analysis of Differential Receivers in Synchronous Shared Environments...2115	
	Marco Di Renzo, Fabio Graziosi, Fortunato Santucci, Valerio Tarquini	
PHY61-4	Sensitivity of Single-Carrier QAM Systems to Phase Noise Arising from the Hot-Carrier Effect .....	2121
	Sameer R. Herlekar, Hsiao-Chun Wu, Ashok Srivastava	

## **PHY62— Wireless Communications – II**

PHY62-1	Partially Coherent Detection in Rapidly Time Varying Channels.....	2127
	Krishna Srikanth Gomadam, Syed Ali Jafar	
PHY62-2	Generating Multiplicative Pseudo-Noise Codes to Support Multiple Data Rates.....	2133
	Ryan Woodings, Manoj Pandey	
PHY62-3	Joint Demapping and Source Decoding for Multilevel Modulation .....	2140
	J. C. Serrato, T. O'Farrell	
PHY62-4	Different Known Guard Intervals for Single-/Multi-Carrier Transceiver.....	2145
	Wei Li, Chen Ming, Shixing Cheng, Haifeng Wang	

## **SERVICES & APPLICATIONS**

### **SA01—Streaming in Wireless Networks**

SA01-1	Video Stream Authentication in Lossy Networks .....	2150
	Yongdong Wu, Tiejian Li	
SA01-2	Adaptive Audio-Video Streaming Solution over IP Mobile Environments.....	2156
	Daniel Negru, Toufik Ahmed, Ahmed Mehaoua	
SA01-3	A New Smooth Handoff Scheme for Mobile Multimedia Streaming using RTP Dummy Packets and RTCP Explicit Handoff Notification.....	2162
	Kenichi Kashibuchi, Tarik Taleb, Abbas Jamalipour, Yoshiaki Nemoto, Nei Kato	
SA01-4	A Dynamic Geographic Hash Table for Data-Centric Storage in Sensor Networks .....	2168
	Thang Nam Le, Wei Yu, Xiaole Bai, Dong Xuan	

## **SA02—Wireless Sensors Services**

SA02-1	A Quality-Guaranteed and Energy-Efficient Query Processing Algorithm for Sensor Networks.....	2175
	Qingchun Ren, Qilian Liang	
SA02-2	Reliability Enhancements for Environment Monitoring Using Wireless Sensor Networks .....	2181
	Yuan Guo, Janise McNair	
SA02-3	Fundamental Performance Analysis of Event Detection in Wireless Sensor Networks....	2187
	Haining Shu, Qilian Liang	
SA02-4	A PCA-based Vehicle Classification System in Wireless Sensor Networks .....	2193
	Yang Sun, John N. Daigle	

## **SA03—Wireless Ad Hoc Services**

SA03-1	An Efficient Vehicle-Heading based Routing Protocol for VANET Networks.....	2199
	Tarik Taleb, Mitsuru Ochi, Abbas Jamalipour, Nei Kato, Yoshiaki Nemoto	
SA03-2	Implementation of Group Member Authentication Protocol in Mobile Ad-hoc Networks.....	2205
	Hitoshi Asaeda, Musfiq Rahman, Mohammad Hossein Manshaei, Yasuko Fukuzawa	
SA03-3	An Integrated Solution to Delay and Security Support in Wireless Ad Hoc Networks .....	2211
	Wenbo He, Klara Nahrstedt	
SA03-4	A Constrained Resource Allocation Study for LOS MIMO Fading Ad-Hoc Networks .....	2216
	Homayoun Yousefi'zadeh	

## **SA04—Pervasive Applications**

SA04-1	P2P Applications on Smart Phones using Cellular Communications .....	2222
	Balázs Bakos, Lóránt Farkas, Jukka K. Nurminen	
SA04-2	An Efficient Runtime Offloading Approach for Pervasive Services.....	2229
	Shumao Ou, Kun Yang, Qingfu Zhang	
SA04-3	Throughput Performance of a Wireless VoIP Model with Packet Aggregation in IEEE 802.11 .....	2235
	Mustafa Ergen, Sinem Coleri Ergen, Pravin Varaiya	
SA04-4	Novel Communication Services Based on Human Body and Environment Interaction: Applications inside Trains and Applications for Handicapped People .....	2240
	Jordi Agud Ruiz, Shigeru Shimamoto	

## **SA05—Wireless Location Management**

SA05-1	Cellular Geolocation Employing Hybrid of Relative Signal Strength and Propagation Delay.....	2246
	Bo-Chieh Liu, Ken-Huang Lin	
SA05-2	A Future Location-Prediction Replacement Strategy for Mobile Environments .....	2252
	Stylios Drakatos, Niki Pissinou, Kia Makki, Christos Douligeris	
SA05-3	A Cell Planning Scheme along Railway Tracks in CDMA Systems.....	2261
	Shinobu Nanba, Xiaoqiu Wang, Hajime Nakamura	
SA05-4	On RSS and TOA -based Indoor Geolocation— A Comparative Performance Evaluation .....	2267
	Ahmad Hatami, Kaveh Pahlavan, Mohammad Heidari, Ferit Akgul	

## **SA06—Service Performance Analysis**

SA06-1	Experimental Evaluation of Application Performance with 802.11 PHY Rate Adaptation Mechanisms in Diverse Environments .....	2273
	Yi Yang, Mahesh Marina, Rajive Bagrodia	
SA06-2	Throughput Optimization of Cooperative UAVs Using Adaptive Channel Assignment.....	2279
	Ibrahim Y. Abualhaol, Mustafa M. Matalgah	
SA06-3	A Terminal-based Location Service Enabler for the IP Multimedia Subsystem .....	2285
	Rudolf Pailer, Florian Wegscheider, Sandford Bessler	
SA06-4	Evaluation of a Pastry-based P2P Overlay for Supporting Vertical Handover.....	2291
	Tobias Hoßfeld, Simon Oechsner, Kurt Tutschku, Frank-Uwe Andersen	

## **SA07—Service Reliability and Management**

SA07-1	Building Semantically Rich Network Management Interfaces .....	2297
	Boris Danev, David Cleary	
SA07-2	Diameter-based Accounting Management for Wireless Services.....	2305
	Frank Eyer mann, Peter Racz, Burkhard Stiller, Christian Schaefer, Thomas Walter	
SA07-3	A Method to Minimize the Blocking Probability for Heterogeneous Traffic Flows .....	2312
	Xian Liu	
SA07-4	Cluster Sizing and Head Selection for Efficient Data Aggregation and Routing in Sensor Networks.....	2318
	Hao Chen, Seapahn Megerian	

## **SA08—Service Development**

SA08-1	Mobile Agent Migration Algorithms for Collaborative Processing .....	2324
	Yingyue Xu, Hairong Qi	
SA08-2	A 5 GHz CMOS Low Noise Amplifier with a 3.25 Turn Spiral Inductor for IEEE 802.16a .....	2330
	Fatemeh Kalantari, Nasser Masoumi, Nafiseh Gholampour, Roghayeh Saeidi	
SA08-3	Estimating Network Internal Link Loss Behavior From End-to-End Multi-cast Measurements .....	2335
	Sinem Coleri Ergen, Mustafa Ergen, Pravin Varaiya	
SA08-4	Time-Tag -based Efficient Information Access .....	2342
	Raziq Yaqub, Sunil Madhani	

<b>Author Index .....</b>	<b>2351</b>
---------------------------	-------------