

2006 IEEE International Conference on Ultra-Wideband

**Waltham, MA
24-27 September 2006**

Volume 1 of 2



**IEEE Catalog Number: 06EX1275
ISBN: 1-4244-0101-1**

**Copyright © 2006 by The Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: 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 the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republications permission, write to IEEE Copyrights Manager, IEEE Operations Center, 445 Hoes Lane, Piscataway, New Jersey USA 08854. All rights reserved.

IEEE Catalog Number: 06EX1275

ISBN: 1-4244-0101-1

ISSN: 2005938118

Additional Copies of This Publication Are Available from:

IEEE Service Center

445 Hoes Lane

Piscataway, NJ 08854

IEEE Service Center

445 Hoes Lane

Piscataway, NJ 08854

Phone: (800) 678-IEEE

(732) 981-1393

Fax: (732) 981-9667

E-mail: customer-service@ieee.org

Table of Contents

A Modified Tracking Algorithm for UWB Pilot-Assisted Receivers.....	1
<i>Jihad Ibrahim, R. Michael Buehrer</i>	
Efficient search strategy for coarse synchronization of UWB signals without channel knowledge	7
<i>Eva Arias-de-Reyna, Jos I. Acha-Catalina</i>	
Code Acquisition and Timing-Frame Synchronization for Asynchronous DS-UWB Transmission Systems	13
<i>Marco Hernandez, Ryuji Kohno</i>	
Timing Acquisition of Ultra-wideband Signals in the Presence of Clock Frequency Offset.....	19
<i>Saeed Khalesehosseini, John Nielsen</i>	
Performace of Two Stage Acquisition Scheme with Squared Circuit for Impulsed-Based UWB System on Multipath Environments	25
<i>Wataru Horie, Tomohito Inaba, Yukitoshi Sanada</i>	
An Analog Viterbi Decoder Array for DS-UWB Receiver.....	31
<i>Janne Maunu, Tero Koivisto, Mika Laiho, Ari Paasio</i>	
Kasami Code-Shift-Keying Modulation for Ultra Wideband Communication Systems.....	37
<i>Yuh-Ren Tsai, Xiu-Sheng Li</i>	
Coherent vs. Non-Coherent Detection for Orthogonal Convolutional Modulation: A Trade-Off Analysis	43
<i>Luca Reggiani, Gian Mario Maggio</i>	
Differential UWB Communications with Digital Multi-Carrier Modulation.....	49
<i>Huilin Xu, Liuqing Yang</i>	
Scarcely Populated UWB-IR Systems with Interleaved Coding-Modulation on Multipath Fading Channels	55
<i>Michał M. Pietrzak, Kení Popovski, Tadeusz A. Wysocki, Beata J. Wysocki, Jos H. Weber</i>	
A Unified Framework for Performance Analysis of UWB Receiver Architectures in Multipath Channels	61
<i>Marco Di Renzo, Fabio Graziosi, Fortunato Santucci</i>	
Time Hopping Biorthogonal Pulse Position Modulation in Modified Saleh-Valenzuela UWB Fading Channels	67
<i>Marcus L. Roberts, Michael A. Temple, Richard A. Raines, Donald J. Clabaugh</i>	
A RAKE Combining Scheme for an Energy Detection Based Noncoherent OOK Receiver in UWB Impulse Radio Systems.....	73
<i>Xiaoming Peng, Francois Chin, Sai Ho Wong, Kwok Yuen Sam, Lei Zhongding</i>	
A Study on Improving Performance of Pre-Post-RAKE Combining in UWB-IR System.....	79
<i>Yuta NISHIDA, Chizu Fukao, Masahiro FUJII, Makoto ITAMI, Kohji ITOH</i>	
Multipath Model Selection for UWB Channels	85
<i>Tan F. Wong, Thomas C. M. Lee</i>	
UWB Pulse Generation Techniques With Switched Resonators	91
<i>Shinho Kim, Yuanxun Ethan Wang</i>	
A Low-Power Template Generator for Coherent Impulse-Radio Ultra Wide-Band Receivers	97
<i>Enrique Barajas, Raúl Cosculluela, Diogo Coutinho, Marc Molina, Diego Mateo, José Luis González, Ignasi Cairò, Shunji Banda, Masayuki Ikeda</i>	
Experimental Study on UWB Pulse Generation Using UWB Bandpass Filters.....	103
<i>Keren Li</i>	
A Tunable CMOS UWB Pulse Generator	109
<i>Hyunseok Kim, Youngjoong Joo, Sungyong Jung</i>	
RF-MEMS Enabled RF-Signal Source For Low-Power Consumption Ultrawideband Communication Systems	113
<i>Ulrich L. Rohde, Ajay K. Poddar,</i>	

Table of Contents

On the use of Pilot-Assisted Matched Filtering in UWB Time-Interleaved Sampling	119
<i>S. Venkatesh, C. R. Anderson, R. M. Buehrer, J. H. Reed</i>	
Modified Min-Sum Algorithm for LDPC Decoders in UWB Communications.....	125
<i>Jun Tang, Tejas Bhatt, Victor Stolpman</i>	
Effects of Hard Decision on the Detection of Preambles for UWB Non-Coherent Communications	131
<i>Samuel Dubouloz, Sebastien de Rivaz, Mathieu Sambuq, Laurent Ouvry</i>	
Concatenated RS-Convolutional Codes for Ultrawideband Multiband-OFDM.....	137
<i>Nyembezi Nyirongo, Wasim Q. Malik, David. J. Edwards</i>	
Orthogonal Multicode Channelization Applied to Subsampling Digital UWB Receiver	143
<i>Yves Vanderperren, Geert Leus, Wim Dehaene</i>	
Performance of IR-UWB at 60 GHz for Ad hoc Networks with Directive Antennas	149
<i>H. El Ghannudi, L. Clavier, A. Bendjaballah, A. Bo, P.A. Rolland</i>	
Channel Parameters Estimation for UWB Realistic Environments.....	155
<i>Lorenzo Mucchi, Chiara Falsi, Davide Dardari, Moe Z. Win</i>	
Optimal and Suboptimal Linear Receivers for Impulse Radio UWB Systems	161
<i>Sinan Gezici, H. Vincent Poor, Hisashi Kobayashi, Andreas F. Molisch</i>	
Evaluation and Characterization of an UWB Antenna in Time and Frequency Domains	167
<i>F. Tchoffo Talom, B. Uguen, L. Rudant, J. Keignart, J-F. Pintos, P. Chambelin</i>	
Clear Channel Assessment (CCA) with multiplexed preamble symbols for impulse Ultra-wideband (UWB) communications	173
<i>Yihong Qi, Huan-bang Li, Shinsuke Hara, Ryuji Kohno</i>	
Ultra-Wideband Antenna Characteristics and Pulse Distortion Measurements	179
<i>Wilfred Lauber, Siva Palaninathan</i>	
Hardware Considerations for Spectral Encoded UWB Transmitters	185
<i>Joe I. Jamp, Lawrence E. Larson</i>	
A Low-Complexity Blind Rake Combining Equalizer for UWB Communication Systems.....	191
<i>Y. J. Zheng, J. H. Ng, L. Yang</i>	
A Transform-Domain Decoding Algorithm for Reed-Solomon Codes	197
<i>Z. H. Cai, J. Z. Hao, S. M. Sun, P. S. Chin, Z. N. Chen</i>	
A new pulse detector based on super-regeneration for UWB low power applications	201
<i>M.Pelissier, D. Morche, J. Soen</i>	
Pulse Distortion Caused by Cylinder Diffraction and Its Impact on UWB Communications	207
<i>Chenming Zhou, Robert C. Qiu</i>	
Design and Performance Analysis of the Receivers for DS-UWB Communication Systems	213
<i>Ren-Jr Chen, Chang-Lan Tsai</i>	
Error Analysis for a Hybrid DS-Multiband UWB Multiple Access System Over Multipath Channel.....	219
<i>Mohammad Azizur Rahman, Shigenobu Sasaki, Hisakazu Kikuchi</i>	
A Simple Ultra-Wideband Wake-up Scheme for Semi-Active Sensor Nodes.....	225
<i>Florian Troesch, Armin Wittneben</i>	
An Ultra-wideband Transceiver Front-end in SiGe:C BiCMOS Technology.....	231
<i>Prabir Kumar Datta, Xi Fan, Gunter Fischer</i>	
Transceiver Design Technology for Full Digital DS-UWB Applications	237
<i>Bonghyuk Park, Seungsik Lee, Hui Dong Lee, Kyung-Ai Lee, Bon-Hyun Ku, Songcheol Hong, Sangsung Choi</i>	
System design of an IEEE 802.15.4a-compliant, merged smallband/ultra-wideband radio receiver.....	243
<i>Marian Verhelst, Yves Vanderperren, Wim Dehaene</i>	

Table of Contents

3.1 to 10.6 GHz 100 Mb/s Pulse-Based Ultra-Wideband Radio Receiver Chipset	249
<i>Fred S. Lee, Raul Blazquez, Brian P. Ginsburg, Johnna D. Powell, Michael Scharfstein, David D. Wentzloff, Anantha P. Chandrakasan</i>	
An I/Q based CMOS Pulsed Ultra Wideband Receiver Front End for the 3.1 to 10.6 GHz Band.....	255
<i>Wim Vereecken, Michiel S.J. Steyaert</i>	
Measured Data Rate from Adaptive Modulation in Wideband OFDM Systems.....	259
<i>Farinaz Edalat, Jit Ken Tan, Khoa M. Nguyen, Nir Matalon, Charles G. Sodini</i>	
Modeling the Space- and Time-Variant Ultra-Wideband Propagation Channel	265
<i>Pascal Pagani, Patrice Pajusco</i>	
Role of joint antenna-channel dispersions on UWB energy capture in pulsed schemes.....	271
<i>A. Sibille</i>	
Characterization for Ultra Wideband Pulses Transmitting through a Lossy Dielectric Slab	277
<i>Qingsheng Zeng, Gilles Y. Delisle</i>	
Indoor Channel Measurement of 26 GHz Band UWB Communication System.....	283
<i>Yuko Rikuta, Suguru Fujita, Fumio Ohkubo, Hiroko Hosoya, Kiyoshi Hamaguchi, Jun-ichi Takada, Takehiko Kobayashi</i>	
UWB Channel Measurements and Results for Office and Industrial Environments.....	289
<i>Zoubir Irahhauten, Gerard J.M. Janssen, Homayoun Nikookar, Alex Yarovoy, Leo P. Ligthart</i>	
A Comprehensive MIMO-UWB Channel Model Framework for Ray Tracing Approaches	295
<i>Bernard Uguen, Louis-Marie Aubert, Friedman Tchoffo Talom</i>	
Simulated Imaging Performance of UWB SAR Based on OFDM.....	301
<i>Dmitriy S. Garmatyuk</i>	
Parallel OFDM Signal Generation for UWB Systems.....	307
<i>Christoph Krall, Klaus Witrusal</i>	
Impact of Tone Interference on Multiband OFDM.....	313
<i>Chris Snow, Lutz Lampe, Robert Schober</i>	
Enhanced Channel Coding for OFDM-based UWB Systems	319
<i>Torben Brack, Frank Kienle, Timo Lehnigk-Emden, Matthias Alles, Norbert Wehn</i>	
Interference from MB-OFDM UWB Systems: Exact, Approximate, and Asymptotic Analysis	325
<i>Lutz Lampe, Amir Nasri, Robert Schober</i>	
Precise Timing for Multiband OFDM in a UWB System.....	333
<i>Christian R. Berger, Shengli Zhou, Zhi Tian, Peter Willett</i>	
A Flexible, Low Power, DC-1GHz Impulse-UWB Transceiver Front-end.....	339
<i>Ian D. O'Donnell, Robert W. Brodersen</i>	
Implementation Considerations for a Sub-sampling Impulse Radio	345
<i>Mike Shuo-Wei Chen, Robert W. Brodersen</i>	
UWB Radar RF Front-End to Mitigate Impacts on EESS and Radio Astronomy	351
<i>Tasuku Teshirogi, Masanori Ejima, Masaharu Uchino, Sumio Saito, Takashi Kawamura, Yutaka Arayashiki, Yoshihiro Sakamoto, Takashi Yoshida, Yutaka Watanabe, Akira Ishida</i>	
IQ Imbalance Compensation Scheme for MB-OFDM with Transmit Diversity	357
<i>Yohei Kato, Tsuyoshi Ikuno, Yukitoshi Sanada</i>	
A Low-Cost UWB Radar System for Sensing Applications.....	363
<i>Alexander Reisenzahn, Thomas Buchegger, David Scherrer, Stefan Matzinger, Sebastian Hantscher, Christian Diskus</i>	

Table of Contents

Statistical Analysis of Transmitted-Reference UWB Systems on Multipath Channels.....	367
<i>Klaus Witrisal, Marco Pausini</i>	
A Stop-and-Go Transmitted-Reference UWB Receiver.....	373
<i>Davide Dardari, Andrea Giorgetti, Marco Chiani, Tony Q. S. Queky, Moe Z. Win</i>	
FSR-UWB (TR-UWB without the Delay Element): Effect of Impulse Dithering and Experimental Results	379
<i>Qu Zhang, Dennis L. Goeckel, Justin Burkhart, Brandon K. Mui, Nicholas Merrill, Matthew Carrier, Robert Jackson</i>	
Timing with Dirty Templates for Low-Resolution Digital UWB Receivers	385
<i>Huilin Xu, Liuqing Yang</i>	
An Ultra-Wideband Bicone Antenna	391
<i>Donald N. Black, Jr., Theresa A. Brunasso</i>	
Optimal Port Loading Conditions for Dipole Antennas Operating in UWB Links.....	397
<i>Anatoliy O. Boryssenko, Daniel H. Schaubert</i>	
Numerical and Experimental Investigation of an Ultrawideband Hybrid TEM Horn Antenna with a Small Aperture	403
<i>Carl J. Geisler, Mohamed N. Afsar, Ronald B. Goldner, Joseph C. Hill</i>	
A compact UWB antenna with a wide band circuit model and a time domain characterization.....	409
<i>F. Demeestere, C. Delaveaud, J. Keignart</i>	
A Printed Ultra-Wideband Diversity Antenna	415
<i>Libiao Liu, Haiping Zhao, Terence S. P. See, Zhi Ning Chen</i>	
Cross-Layer Energy Efficiency of FEC Coding in UWB Sensor Networks.....	421
<i>Heikki Karvonen, Carlos Pomalaza-Ráez, Matti Hämäläinen</i>	
Locally Coherent Ultra-Wideband Radio Channel Model for Sensor Networks in Industrial Environment.....	427
<i>J. Kunisch, J. Pamp</i>	
Partial Channel State Information and Intersymbol Interference in Low Complexity UWB PPM Detection	433
<i>Thomas Zasowski, Florian Troesch, Armin Wittneben</i>	
Effect on Network Performance of Common versus Private Acquisition Sequences for Impulse Radio UWB Networks	439
<i>Ruben Merz, Jean-Yves Le Boudec, Saravanan Vijayakumaran</i>	
Cognitive routing in UWB networks.....	445
<i>Maria-Gabriella Di Benedetto, Luca De Nardis</i>	
Narrowband Communication in a Poisson Field of Ultrawideband Interferers.....	451
<i>Pedro C. Pinto, Chia-Chin Chong, Andrea Giorgetti, Marco Chiani, Moe Z. Win</i>	
Interference Mitigation by Statistical Interference Modeling in an Impulse Radio UWB Receiver.....	457
<i>Manuel Flury, Jean-Yves Le Boudec</i>	
Performance Enhancement of a TH-PPM UWB System Using a Near-Interference Erasure Scheme	463
<i>Min Jeong Kim, Bang Chul Jung, Jo Woon Chong, Dan Keun Sung</i>	
An Adaptive Threshold Soft-Limiting UWB Receiver with Improved Performance in Multiuser Interference	469
<i>Norman C. Beaulieu, Bo Hu</i>	
On the Coexistence of Pulsed UWB Communications with TV Distribution Services over MATV Cable Networks.....	475
<i>M. Fauri, P. M. Crespo, J. Del Ser, C. Mitchell</i>	
Hidden Mobile Terminal Device Discovery in a UWB Environment.....	481
<i>Sanghoon Park, Lawrence E. Larson, Laurence B. Milstein</i>	

Table of Contents

The Impact of Chip Duty Factor on DS-UWB System Over Multipath Environment in the Presence of Narrowband Interference	487
<i>Chin Sean Sum, Shigenobu Sasaki, Hisakazu Kikuchi</i>	
Amplify-and-Forward Cooperative Diversity with Space-Time Coded UWB Systems	493
<i>Chadi Abou-Rjeily, Norbert Daniele, Jean-Claude Belfiore</i>	
On the Decode-and-Forward Cooperative Diversity with Coherent and Non-Coherent UWB Systems	499
<i>Chadi Abou-Rjeily, Norbert Daniele, Jean-Claude Belfiore</i>	
Diversity-Multiplexing Tradeoff of Single-Antenna and Multi-Antenna Indoor Ultra-Wideband Channels.....	505
<i>Chadi Abou-Rjeily, Norbert Daniele, Jean-Claude Belfiore</i>	
Performance Study of A Near-Optimum Modulation Diversity Assisted Ultra-Wideband Receiver.....	511
<i>Jin Tang, Zhengyuan Xu</i>	
A Simple Adaptive Beamformer for Ultrawideband Wireless Systems.....	517
<i>Wasim Q. Malik, Ben Allen, David J. Edwards</i>	
An Ultra-Wideband Low Noise Amplifier with Air-suspended RF MEMS Inductors	523
<i>Timothy B. Merkin, Sungyung Jung, Saibun Tjuatja, Youngjoong Joo, Daniel S. Park, J-B Lee</i>	
Interference and Distortion in Pulsed Ultra Wideband Receivers	529
<i>Wim Vereecken, Michiel S.J. Steyaert</i>	
Low Noise Amplifiers for Low-Power Impulse-Radio Ultra Wide-Band Receivers.....	535
<i>Enrique Barajas, Raul Cosculluela, Diogo Coutinho, Marc Molina, Diego Mateo, José Luis González, Ignasi Cairó, Shunji Banda, Masayuki Ikeda</i>	
A Unified Method of Designing Ultra-Wideband Power-Efficient, and High IIP3, Reconfigurable Passive FET Mixers	541
<i>Ulrich L. Rohde, Ajay K. Poddar</i>	
Impulse Radio based Non-Coherent UWB Transceiver Architectures - An Example	547
<i>Lucian Stoica, Alberto Rabbachin, Ian Oppermann</i>	
Comparison of MB-OFDM and DS-UWB Interference	553
<i>A. Nasri, R. Schober, L. Lampe</i>	
Performance of UWB Systems using a Temporal Detect-and-Avoid Mechanism	559
<i>Thomas Zasowski, Armin Wittneben</i>	
Performance Evaluation of Detect and Avoid Procedures for Improving UWB Coexistence with UMTS and WiMAX systems	565
<i>Annalisa Durantini, Romeo Giuliano, Franco Mazzenga, Francesco Vatalaro</i>	
Interference Suppression in Non-coherent Time-Hopping IR-UWB Ranging.....	571
<i>Z. Sahinoglu, I. Guvenc, P. Orlik, A. F. Molisch</i>	
Detect and Avoid (DAA) Mechanisms for UWB Interference Mitigation	577
<i>V. S. Somayazulu, J. R. Foerster, R. D. Roberts</i>	
Position Error Bound and Localization Accuracy Outage in Dense Cluttered Environments.....	583
<i>Damien B. Jourdan, Davide Dardari, Moe Z. Win</i>	
Ranging Mechanism, Preamble Generation, and Performance with IEEE 802.15.4a Low-Rate Low-Power UWB Systems.....	589
<i>Yuen-Sam Kwok, Francois Chin, Xiaoming Peng</i>	
Improved Lower Bounds on Time-of-Arrival Estimation Error in Realistic UWB Channels	595
<i>Davide Dardari, Chia-Chin Chong, Moe Z. Win</i>	
Trellis-based Maximum-Likelihood Crystal Drift Estimator for Ranging Application in UWB-LDR	603
<i>A. Wellig, Y. Qiu</i>	

Table of Contents

Low Noise, Low Power Consumption, Configurable, and Adaptable Ultrawideband VCOs.....	609
<i>Ulrich L. Rohde, Ajay K. Poddar</i>	
A UWB Pulse Transmission Scheme - Switched Resonant Antenna.....	615
<i>Hengzhen Crystal Jing, Yuanxun Ethan Wang</i>	
An Analog CMOS Pulse Energy Detector for IR-UWB Non-Coherent HDR Receiver	621
<i>Mohamad Mroue, Sylvain Haese</i>	
Integrated Distributed Transversal Filters for Pulse Shaping and Interference Suppression in UWB Impulse Radios.....	627
<i>Yunliang Zhu, Hui Wu</i>	
A New Approach of Multiuser Detection in UWB Systems	633
<i>M. Marjanovic, J. M. Páez Borrallo</i>	
Interference Suppression in IR-UWB System Using Kalman Algorithm.....	639
<i>Lin Zheng, Hongbing Qiu, Jiming Lin, Shan Ouyang, Jiyu Zheng</i>	
Overview and Implications of the Emerging Global UWB Radio Regulatory Framework.....	645
<i>Walter Hirt, Martin Weisenhorn</i>	
A Theory of Time-Reversed Impulse Multiple-Input Multiple-Output (MIMO) for Ultra-Wideband (UWB) Communications	651
<i>Robert C. Qiu</i>	
Near Field Imaging for Breast Cancer Detection by UWB Minimum Variance Beamforming	657
<i>Wanjun Zhi, Francois Chin, Michael Yan-Wah Chia</i>	
ML Time-of-Arrival estimation based on low complexity UWB energy detection	663
<i>Alberto Rabbachin, Ian Oppermann, Benoit Denis</i>	
Position Estimation Using UWB TDOA Measurements	669
<i>Jun Xu, Maode Ma, Choi Look Law</i>	
Positioning accuracy in Ultra Wide Band Low Data Rate networks of uncoordinated terminals	675
<i>Luca De Nardis, Maria-Gabriella Di Benedetto</i>	