

2011 IEEE International Symposium on Power Line Communications and Its Applications

(ISPLC 2011)

**Udine, Italy
3 – 6 April 2011**



**IEEE Catalog Number: CFP11843-PRT
ISBN: 978-1-4244-7751-7**

TABLE OF CONTENTS

M1: COEXISTENCE AND INTEROPERABILITY

A Channel Allocation Protocol for Providing Fairness Between Users in Multi-Cell PLC Networks	1
<i>Le Phu Do, Ralf J. Lehnert</i>	
Spectral Compatibility of In-Home and Access Technologies	7
<i>Jochen Maes, Michael Timmers, Mamoun Guenach</i>	
Flexible FPGA Based Powerline Channel Emulator for Testing MIMO-PLC, Neighborhood Networks, Hidden Node or VDSL Coexistence Scenarios	12
<i>Nico Weling</i>	

M2: NOVEL TRANSMISSION CONCEPTS

Analysis of Impulsive UWB Modulation on a Real MV Test Network	18
<i>Andrea M Tonello, Fabio Versolatto, Carlo Tornelli</i>	
OFDM-IDMA for Power Line Communications	24
<i>Xiang Chen, Fengzhong Qu, Liuqing Yang</i>	
Bursty Impulse Noise Detection by Compressed Sensing	29
<i>Lutz Lampe</i>	

M3: IN-HOME MIMO PLC: THEORY , ANALYSIS AND IMPLEMENTATION

A Channel Model for Multiple Input Multiple Output In-home Power Line Networks	35
<i>Rehan Hashmat, Pascal Pagani, Ahmed Zeddami, Thierry Chonavel</i>	
Characterization of In-Home MIMO Power Line Channels	42
<i>Daniele Veronesi, Raffaele Riva, Paola Bisaglia, Fabio Osnato, Kaywan Afkhamie, Arun Nayagam, Deniz Rende, Larry Yonge</i>	
MIMO PLC: Theory, Measurements and System Setup	48
<i>Andreas Schwager, Daniel M. Schneider, Werner Bäschlin, Altfried Dilly, Joachim Speidel</i>	
Implementation and Results of a MIMO PLC Feasibility Study	54
<i>Daniel M. Schneider, Andreas Schwager, Joachim Speidel, Altfried Dilly</i>	
Noise Correlation and Its Effect on Capacity of In-Home MIMO Power Line Channels	60
<i>Deniz Rende, Arun Nayagam, Kaywan Afkhamie, Larry Yonge, Raffaele Riva, Daniele Veronesi, Fabio Osnato, Paola Bisaglia</i>	
A MIMO PLC Random Channel Generator and Capacity Analysis	66
<i>Fabio Versolatto, Andrea M Tonello</i>	

M4: MODELING AND APPLICATIONS OF PLC IN SHIPS

Analysis of Time-Varying Properties of Power Line Communication Channels in Ships	72
<i>Sami Barmada, Mauro Tucci, Tao Zheng</i>	
Numerical Simulations of the Electromagnetic Field Near the Conductors of a Naval PLC System	78
<i>Giovanni Aiello, Salvatore Alfonzetti, Emanuele Diletto, Santi Rizzo, Nunzio Salerno, Salvatore Sindoni</i>	
Bit Loading Optimization for Naval PLC Systems	84
<i>Sara Carcangiu, Augusto Montisci, Mariangela Usai</i>	
A Supervised Method for the Automatic Detection of Impulsive Noise in Naval Powerline Communications	90
<i>Giuseppe Acciani, Vitantonio Amoroso, Girolamo Fornarelli, Antonio Giaquinto</i>	
Multi-Port Impedance Matching Technique for Power Line Communications	96
<i>Rodolfo Araneo, Salvatore Celozzi, Giampiero Lovat, Francescaromana Maradei</i>	
Measurements and Analysis of PLC Channels in a Cruise Ship	102
<i>Massimo Antoniali, Andrea M Tonello, Matteo Lenardon, Andrea Qualizza</i>	

M5: NOISE AND INTERFERENCE IMMUNITY

Quasi-Synchronous Noise Interference Cancellation Techniques Applied in Low Voltage PLC	108
<i>Asier Llano, Alberto Sendin, Aitor Arzuaga, Sergio Santos</i>	
Field Techniques to Overcome Aggressive Noise Situations in PLC Networks	113
<i>Alberto Sendin, Asier Llano, Aitor Arzuaga, Inigo Berganza</i>	
Conducted Interference Immunity Characteristics to High-Speed Power Line Communication System	118
<i>Masamitsu Tokuda, Hiroyuki Ohsaki, Takashi Mastuo</i>	
Robust Transmission Method in KHz-band PLC	124
<i>Yoichi Sato, Sato Fumiaki, Tetsuya Higuchi, Masahiro Murakawa, Hiroyuki Matsushima, Takayuki Amatsu</i>	

M6: BROADBAND AND MULTIMEDIA APPLICATIONS

Powerline Technology Over Coaxial Cables for In-Home Multimedia Applications: Performances and EMC Issues	130
<i>Angelantonio Gnazzo, Andrea Bergaglio, Mauro Palma, Fabrizio Pittoni, Mariano Giunta, Federico Balleio</i>	
Construction of a PLC Test Bed for Network and Transport Layer Experiments	135
<i>Brad W. Zarikoff, David Malone</i>	
Efficient Adaptation to Channel State Changes Based on H.264/AVC Transrating for Power Line Transmission of Video Streams	141
<i>Christophe Deknudt, Anne-Sophie Bacquet, Christophe Deknudt, Anne-Sophie Bacquet, Patrick Corlay, François-Xavier Coudoux, Marc Slachciak</i>	
Initial Results on an MMSE Precoding and Equalisation Approach to MIMO PLC Channels	146
<i>Stephan Weiss, Nicola Moret, Andrew P Millar, Andrea M Tonello, Robert Stewart</i>	

T1: NARROWBAND STANDARDIZATION

G3-PLC Field Trials in US Distribution Grid: Initial Results and Requirements	153
<i>Kaveh Razazian, Amir H. Kamalizad, Maher Umari, Qi Qu, Victor Loginov, Michael Navid</i>	
PRIME Performance in Power Line Communication Channel	159
<i>Javier Matanza Domingo, Sadot Alexandres, Carlos Rodriguez-Morcillo</i>	
Comparison of PLC G3 and PRIME	165
<i>Martin Hoch</i>	

T2: RELAY TRANSMISSION

On the System Capacity of Relay-Aided Powerline Communications	170
<i>Xilin Cheng, Rui Cao, Liuqing Yang</i>	
Power Savings with Opportunistic Decode and Forward Over In-Home PLC Networks	176
<i>Salvatore D'Alessandro, Andrea M Tonello, Fabio Versolatto</i>	
MIMO Self-Interference Mitigation Effects on PLC Relay Networks	182
<i>Mauro Biagi</i>	

T3: POSTER SESSION

Smart-Grid, Broadband, Modulation and Noise Constrained Optimization of Local Sources Generation in Smart Grids by SDP Approximation	187
<i>Stefano Tomasin, Tomaso Erseghe</i>	
Wr@p: A "Last Meter" Technology for Energy-Aware Networked Appliances	193
<i>Andrea Ricci, Enrico Smargiassi, Davide Mancini, Ilaria De Munari, Valerio Aisa, Paolo Ciampolini</i>	
Power Line Modem Evaluation Possibilities in a Smart Grid Test Platform	199
<i>Paul Van Tichelen, Dominic Ectors, Dominique Weyen, Marcel Stevens</i>	
AMR Field Trial on Underground Power Distribution Line Using BPLC	204
<i>Jae-Jo Lee, Yonghwa Kim, Jung-Mok Bae, Jong-Kwan Seo, Do-Hyun Nam, Jin Young Kim, Dong-Seok In</i>	
Power Line Carrier Permissive as a Simple and Safe Method of Enabling Inverter Ride-Through Operation of Distributed Grid-Tied Photovoltaic Systems	209
<i>Robert Reedy, Kristopher Davis David Click, Michael Ropp, Alan Shaffer</i>	

Simulation of Powerline Communication with OMNeT++ and INET-Framework	213
<i>Holger Kellerbauer, Holger Hirsch</i>	
An Experimental Analysis in Time and Frequency Domain of Impulse Noise Over Power Lines	218
<i>Javad Khangosstar, Li Zhang, Anser Mehboob</i>	
Emulation of AWGN for Noise Margin Test of Powerline Communication Systems	225
<i>Wenqing Liu, Chen Li, Klaus M. Dostert,</i>	
Antenna Mode Currents and Radiated Emissions of In-door PLC Line Within Wall Structure	231
<i>Vesna Arnautovski-Toseva, Khalil El Khamlici Drissi, Kamal Kerroum</i>	
Statistical Evaluation of 55 Million PLC Channel and Topology Measurements by More Than 75.000 End-Users	237
<i>Nico Weling, Neda Nazari</i>	
Rateless Codes for Heterogeneous In-Home Interfaces Aggregation	243
<i>Pedro Jose Piñero-Escuer, David Montoro-Mouzo, Josemaria Malgosa-Sanahuja, Pilar Manzanares-Lopez, Juan Pedro Muñoz-Gea</i>	
Low Rate and High Reliable Modulation Schemes for In-Vehicle Power Line Communications	249
<i>Yasuhiro Yabuuchi, Daisuke Umehara, Masahiro Morikura, Tetsuo Morita, Shinichi Ishiko, Satoshi Horihata</i>	
Analysis of Optimal Power Distribution Over Pilot Tones for Multi-carrier Communications Over PLC	255
<i>David Bueche, Patrick Corlay, François-Xavier Coudoux, Marc Gzalet, Christophe Deknudt</i>	
A Low Cost STBC-OFDM System with Improved Reliability for Power Line Communications	261
<i>Zhi Quan, Moises Vidal Ribeiro</i>	
Simple Discrete Bit-loading for OFDM Systems in Power Line Communications	267
<i>Khalifa S Al-Mawali, Amin Sadik, Zahir M. Hussain</i>	

T4: CHANNEL CHARACTERIZATION AND MODELING I

On the Statistical Properties of Indoor Power Line Channels: Measurements and Models	271
<i>José Antonio Cortés, Francisco J. Cañete, Luis Díez, José Luis González Moreno</i>	
Channel Modeling and Periodic Impulsive Noise Analysis in Indoor Power Line	277
<i>D. Chariag, D. Guezgouz, Yves Raingeaud, Jean-Charles Le Bunetel</i>	
On Noise Modeling for Power Line Communications	283
<i>Luca Di Bert, Peter Caldera, David Schwingshackl, Andrea M Tonello</i>	
Transmission Channel Properties of the Low Voltage Grid for Narrowband Power Line Communication	289
<i>Martin Sigle, Michael Bauer, Wenqing Liu, Klaus M. Dostert</i>	
Periodic Noise in Very Low Frequency Power-Line Communications	295
<i>David W. Rieken</i>	

T5: EMC ISSUES AND MITIGATION

Transmission on Aircraft Power Line Between an Inverter and a Motor: Impulsive Noise Characterization	301
<i>Khaled Kilani, Virginie Degardin, Pierre Laly, Martine Lienard</i>	
Expedient Permanent PSD Reduction Table as Mitigation Method to Protect Radio Services	305
<i>Nico Weling</i>	
Feasibility Study on Detecting Short Wave Radio Stations on the Powerlines for Dynamic PSD Reduction as Method for Cognitive PLC	311
<i>Nico Weling</i>	
PLC Coupling Effect on VDSL2	317
<i>Brice Praho, Mohamed Tlich, Fabienne Moulin, Ahmed Zeddani, Fabienne Nouvel</i>	
Radiation Detection and Mode Selection for a Cognitive PLC System	323
<i>Shinji Tsuzuki, Shinpei Tatsuno, I S Areni, Yoshio Yamada</i>	

T6: COUPLING

High-Current Adaptive Impedance Matching in Narrowband Power-line Communication Systems	329
<i>Yuhao Sun, Gehan A. J. Amaratunga</i>	
Impedance Matching with Low-Cost, Passive Components for Narrowband PLC	335
<i>Mloyiswa P Sibanda, Petrus A. Janse van Rensburg, Hendrik C Ferreira</i>	

AC-DC Smoothing Capacitor Current Coupling for Improved Powerline Signal Reception	341
<i>Abraham Snyders, Petrus A. Janse van Rensburg, Hendrik C Ferreira, Han Vinck</i>	
Strategies for PLC Signal Injection in Electricity Distribution Grid Transformers	346
<i>Alberto Sendin, Asier Llano, Aitor Arzuaga</i>	
digitalStrom: A Centralized PLC Topology for Home Automation and Energy Management	352
<i>Georg Dickmann</i>	
Power-Line Communication-Based Network Architecture for LVDC Distribution System	358
<i>Antti Pinomaa, Jero Ahola, Antti Kosonen</i>	
Broadband Powerline Communication an Indian Experience	364
<i>Pabitra Kumar Ray, Aveek Hazra, Sukanta Basu, Swapan Mitra, Sitesh Roy</i>	
Power Supply Overlaid Communication and Common Clock Delivery for Cooperative Motion Control	370
<i>Fumikazu Minamiyama, Hidetsugu Koga, Kentaro Kobayashi, Masaaki Katayama</i>	

W1: MAC AND RESOURCE ALLOCATION

An Access Control Method Using Repeaters for Multipoint Cyclic Data Gathering Over a PLC Network	376
<i>Yuzo Ohtomo, Kentaro Kobayashi, Masaaki Katayama</i>	
An Opportunistic Random Access MAC Protocol for Indoor PLC Networks with Short-Term Fairness	382
<i>Rongping Dong, Meryem Ouzzif, Samir Saoudi</i>	
Iterative Multiuser Resource Allocation for InHome Power Line Communications	388
<i>Mauro Biagi, Valentina Polli</i>	
Green Resource Allocation for Powerline Communications	393
<i>Abdallah Hamini, Jean-Yves Baudais, Jean-François H�elard</i>	
Markov Chain Model of HomePlug CSMA MAC for Determining Optimal Fixed Contention Window Size	399
<i>Evan Kriminger, Haniph A. Latchman</i>	

W2: MODULATION AND SIGNAL PROCESSING

Windowed OFDM Versus OFDM/OQAM: A Transmission Capacity Comparison in the HomePlug AV Context	405
<i>Pierre Achaichia, Marie Le Bot, Pierre Siohan</i>	
Tradeoff Between Channel Estimation Accuracy and Application Throughput for In-Home MIMO Power Line Communication	411
<i>Arun Nayagam, Srinivas Katar, Deniz Rende, Kaywan Afkhamie, Larry Yonge</i>	
Frequency Mappings with Hadamard Transform for Power Line Communications Channel	418
<i>Tedy Lukusa, Khmaies Ouahada, Hendrik C Ferreira</i>	
A Low Cost OFDM Based Modulation Schemes for Data Communication in the Passband Frequency	424
<i>Fabio da Costa Pinto, Fernando Sergio Oliveira Scoralick, Fabricio Pablo Virginio de Campos, Zhi Quan, Moises Vidal Ribeiro</i>	
A Study of Radiation Detection Methods for Cognitive PLC System	430
<i>I S Areni, Shinji Tsuzuki, Yoshio Yamada</i>	

W3: CHANNEL CHARACTERIZATION AND MODELING II

An Information Rate Analysis of Power Line Communications Impaired by Colored Noise	434
<i>Riccardo Pighi</i>	
A Study on Access Impedance for Vehicular Power Line Communications	440
<i>Nima Taherinejad, Roberto Rosales, Shahriar Mirabbasi, Lutz Lampe</i>	
Advanced Emulation of Channel Transfer Functions for Performance Evaluation of Powerline Modems	446
<i>Wenqing Liu, Martin Sigle, Klaus M. Dostert</i>	
Efficient Hardware Implementation of Powerline Transfer Functions Using FPGA's for the Purpose of Channel Emulation	452
<i>Nico Weling</i>	
Field Channel Measurements in a Medium Voltage Overhead Power Line	458
<i>Monica Navarro, Jose Moreno</i>	

Empirical Measurements of the Low-Frequency Power-Line Communications Channel in Rural North America	463
<i>Badri Varadarajan, Il Han Kim, Anand Dabak, David W. Rieken, Gordon Gregg</i>	

W4: PLC FOR SMART GRID

High-Speed Narrowband PLC in Smart Grid Landscape - State-of-the-Art	468
<i>Abdelfatteh Haidine, Bamidele Adebisi, Albert N. Tretyl, Hans Pille, Honary Bahram, Alexander Portnoy</i>	
Evolution of Powerline Communications for Smart Distribution: From Ripple Control to OFDM	474
<i>Dacfey Dzung, Inigo Berganza, Alberto Sendin</i>	
An Efficient Home Energy Management System Based on Automatic Meter Reading	479
<i>Seong-ho Ju, Yong-Hoon Lim, Moonsuk Choi, Jong-mock Baek, SangYeom Lee</i>	
Seamless Evolution of PLAN+ Based AMR Systems Using Multicarrier Communication Technology	485
<i>Bill Lichtensteiger, Vincent Guillet, BrankoBjelajac, Frederic Valentin, Willem Laflere, Pierre Lebas</i>	
Communication Performance of Broadband PLC Technologies for Smart Grid	491
<i>Jianming Liu, Bingzhen Zhao, Liang Geng, Zhou Yuan, Yirong Wang</i>	
SC-FDMA for Uplink Smart Meter Transmission Over Low Voltage Power Lines	497
<i>Wenshu Zhang, Liuqing Yang</i>	
Author Index	