



## FADHEL M. GHANNOUCHI

(Updated February 22, 2016)

### EDUCATION

Degree	Year	Educational Institution	City
Ph.D.	10/1987	University of Montreal	Montreal
Masters	12/1984	University of Montreal	Montreal
Bachelors	12/1983	Ecole Polytechnique	Montreal

### PROFESSIONAL HISTORY

Period	Organization	Title	Duties & Responsibilities
12/06 - Present	Ningbo University, China	Honorary Guest Professor	R&D Activities
05/05 - Present	University of Calgary	Professor and Chair	Teaching, R&D Activities
10/01 - 09/02	Mitec Telecom Inc., Montreal	Senior Scientific Advisor	Management & Business
09/98 - 10/01	AmpliX Inc., Montreal	Founder and CEO	Management & Business
09/97 - 04/03	Ecole Polytechnique de Montreal	Director, MS program	Management & Teaching
06/97 - 04/05	Ecole Polytechnique de Montreal	Professor	Teaching, R&D Activities
06/94 - 05/97	Ecole Polytechnique de Montreal	Associate Professor	Teaching, R&D Activities
10/91 - 05/94	Ecole Polytechnique de Montreal	Assistant Professor	Teaching, R&D Activities
11/87 - 09/91	Ecole Polytechnique de Montreal	Researcher	Teaching, R&D Activities

### SUMMARY OF PROFESSIONAL ACHIEVEMENTS

- Over 660 publications (see <http://www.iradio.ucalgary.ca/publications>)
- 28 Patents (16 awarded and 12 patent applications, ([http://www.iradio.ucalgary.ca/ip\\_services/patents](http://www.iradio.ucalgary.ca/ip_services/patents)))
- 6 books
- More than 120 MS & PhD students, postdocs have been or currently being supervised
- Co-Founder and CEO of four university spun-off companies for four years (AmpliX Inc. acquired by Mitec Telecom in 2001, EMworks, Green Radio Technologies and Ingtegral Radio Systems)
- Granted and awarded from government funding agencies and industry over \$20 millions to conduct R & D activities, with over \$12 Million in grants and contracts in the past 10 years

### TEACHING ACTIVITIES

- Software Defined Radio Systems (University of Calgary, ENEL 619.64)
- Power Amplifiers/Transmitters for Wireless Applications (University of Calgary, ENEL 613)
- Microwave Transistor Amplifiers (University of Calgary, ENEL 519.49)
- Transmission Media (University of Calgary, ENEL 577)
- Electromagnetic Fields (University of Calgary, ENEL 475)
- Electromagnetic Fields (Polytechnique, ELE3.416)
- Electromagnetic Waves and Propagation (Polytechnique, ELE3.516)
- Electric Circuits (Polytechnique, ELE3.201)
- Microwave Devices (Polytechnique, ELE3.525)

- Microwave Circuits & Systems (Polytechnique, ELE 4501)
- Nonlinear Microwave Circuits (Polytechnique, ELE 6505)
- Satellite Communications (Polytechnique, TS 4600)
- Microwave Instrumentation & Measurements (Polytechnique, ELE 6502)
- Six-Port Theory & Applications (University of Electro-communications, Tokyo, Japan)
- Microwave Electronics for Space Applications (International Space University, Houston, USA)

## RESEARCH INTERESTS

- Characterization of RF & microwaves devices, circuits and systems
- Modeling and analysis of RF devices, circuits and systems
- Design of high performance amplification/transmitting systems
- Design of intelligent RF transceivers for multi-antenna applications
- RF & microwave instrumentation and measurements
- Reconfigurable software defined radio for broadband wireless applications
- Wireless sensors and green radio systems
- Energy-aware signal processing for wireless communications
- Electromagnetic energy harvesting and recycling techniques
- Use of RF and microwaves energy in industrial and medical applications
- Digital radio architectures

## HONORS & ACCOLADES

- ASTech Award "Outstanding Leadership in Alberta Technology", 2014
- Senior Canada Research Chair in Green RF Radio Technology, 2012
- AITF Chair in Intelligent RF Radio Technology, 2011
- Fellow of the Royal Society of Canada, 2010
- 2009 Alberta Ingenuity Fund Research Excellence Award from the Association of Professional Engineers, Geologists, and Geophysicists of Alberta (APEGGA)
- Fellow of the Canadian Academy of Engineering, 2009
- 2007 Best Research Award For the Schulich School of Engineering, University of Calgary
- Distinguish Microwave Lecturer, IEEE – MTT Society (2009-2011)
- Fellow of the Institute of Electrical and Electronic Engineering (IEEE) , 2007
- Fellow of the The Institution of Engineering and Technology (IET) (formally IEE) , 2008
- Honorary Guest Professor at Ningbo University, China, 2007
- Tier 1 Canada Research Chair in Intelligent RF Radio Technology, 2005
- iCORE Professor in Intelligent RF Radio Technology, 2005
- Member of several advisory boards, award committees for the ICT sector of Europe and North America (USA, Europe, Sweden, Austria etc.)

## ACTIVITIES, AWARDS & MEMBERSHIPS

- Awarded as Senior Canada Research Chair in Green Radio Technologies (2012-2019)
- Awarded a major R&D project (\$4.35M) by the Alberta Innovate Technologies Futures (AITF) in 2011
- Awarded a major R&D project (\$5.5M) by the Governments of Alberta (iCORE) and Canada (Canada Research Chair) in 2005 to establish the Intelligent RF iRadio Laboratory at the University of Calgary
- Awarded a major industry oriented R&D project (\$2.5M) award by the Government of Quebec, Canada, in 1994, (Synergy program) to establish the Ampli Laboratory at the Ecole Polytechnique of Montreal
- Provide consulting services to several companies, which design and manufacture RF components and systems and communications systems
- Professional Engineer: Member of the Ordre des Ingénieurs du Quebec since 1983.
- Professional Engineer: Member of the Association of Professional Engineers, Geologists, and Geophysicists (APEGGA) of Alberta, Canada, since 2005
- Board member national and international R&D funding agencies
- Member of College of Reviewers of Canada Research Chairs
- Reviewer for IEEE Transactions and other scientific journals
- Workshop and short course's organizer in IEEE sponsored conferences and symposiums

- Session Chair in IEEE sponsored conferences and symposiums
- Member of technical and/or organizing committees for IEEE sponsored conferences and symposiums
- Member of IEEE-MTT Technical Committee (MTT-5) "Microwave High Power Techniques"
- Awarded a Japan Society for The Promotion of Sciences (JSPS) Research Fellowship in 1998
- Member of Canadian Microelectronic Corporation (CMC), Canada, since 1995.

#### GRANTS:

Over the last 25 years, Dr Gannouchi succeeded to obtain over 20 Million dollars as grants, contracts and awards. The breakdown of the cumulative amount from the different financing sources are approximated to the following:

- National Sciences and Engineering Research Council (NSERC) : \$ 4 M +
- Canada Foundation of Innovation (CFI) : 1.2 M +
- Alberta Innovates Technology Futures (AITF/iCORE) : \$ 6 M+
- Quebec Government (Synergie program) : \$ 2.5 M +
- Alberta Government: \$ 600 K +
- Canada Research Chair Secretary : \$ 2.8 M +
- Industry: \$ 3 M
- Others: \$ 1 M +

#### List of Referred Journal Publications

- [1] S. Dhar, M. Shaarawi, O. Hammi and F. M. Ghannouchi, "Miniaturized Active Integrated Antennas: A Co-design Approach," IET Microwaves, Antennas & Propagation, 2016 accepted.
- [2] M. A. Maktoomi, M. S. Hashmi, F. M. Ghannouchi, "Systematic Design Technique for Dual-Band Branch-Line Coupler using T- and Pi-Networks and a Novel Wide Band-Ratio Crossover," IEEE Transactions on Components, Packaging and Manufacturing Technology, 2016 accepted
- [3] N. Dawar, T. Sharma, R. Darraji and F. M. Ghannouchi, "Linearization of RF Power Amplifiers Exhibiting Memory using Direct Learning based Adaptive Digital Predistortion," IET Communications, 2016 accepted.
- [4] N. Chagmti, N. Boulejfen and F. M. Ghannouchi, "Synthesis and optimization of new wideband symmetrical six-port junction," IET Microwaves, Antennas & Propagation, 2016 accepted.
- [5] S. Dhar, M. Shaarawi, O. Hammi and F. M. Ghannouchi, "An Active Integrated Ultra-Wideband MIMO Antenna," IEEE Transactions on Antennas and Propagation, 2016 accepted
- [6] G. Xu, T. Liu, Y. Ye, J. Li and F. M. Ghannouchi, "Generalised two-box cascaded Hammerstein-like digital predistorter for wide-band RF power amplifiers," IET Electronics Letters, 2016 accepted.
- [7] T. Sharma, R. Darraji, F. M. Ghannouchi and N. Dawar, "Generalized Continuous Class-F Harmonic Tuned Power Amplifiers," IEEE Microwave Wireless and Components Letters, 2015 accepted.
- [8] A. E. Abdelrahman, O. Hammi, A. K. Kwan, A. Zerguine and F. M. Ghannouchi, "A Novel Weighted Memory Polynomial for Behavioral Modeling and Digital Predistortion of Nonlinear Wireless Transmitters," IEEE Transactions on Industrial Electronics, 2015 accepted.
- [9] O. Hammi, M. H. Khan, A. Abdelhafiz, F. M. Ghannouchi and M. S. Sharawi, "Complexity Reduced Behavioural Modeling of Dynamic Nonlinear Power Amplifiers Using Two-Box Structures," Wiley Microwave and Optical Technology Letters, Vol. 58: Issue 3, pp. 726-731, March 2016.
- [10] T. Sharma, R. Darraji and F. M. Ghannouchi, "A Methodology for Implementation of High Efficiency Broadband Power Amplifiers with Second Harmonic Manipulation," IEEE Transactions on Circuits and Systems II: Express Briefs, Vol. 63: Issue 1, January 2016.
- [11] S. Lajnef, N. Boulejfen, A. Abdelhafiz and F. M. Ghannouchi, "2-D Cartesian Memory Polynomial Model for Nonlinearity and I/Q imperfections Compensation in Concurrent Dual-Band Transmitters," IEEE Transactions on Circuits and Systems II: Express Briefs, Vol. 63: Issue 1, pp. 14-18, January 2016.
- [12] M. Akbarpour, M. Helaoui and F. M. Ghannouchi, "Analytical Design Methodology for Generic Doherty Amplifier Architectures Using Three-Port Input/Output Networks," IEEE Transactions on Microwave Theory and Techniques, Vol. 63: Issue 10, pp. 3242-3253, October 2015.
- [13] D. Wang, F. M. Ghannouchi, Y. Ding and A. Kwan, "70% Energy Saving In Wireless Positioning Systems: Non-Data-Bearing OFDM Transmission Replaces Non-Pulse-Shaping PN Transmission," IEEE Systems Journal, Vol. 9: Issue 3, pp. 664-674, September 2015.
- [14] M. V. Amiri, S. A. Bassam, M. Helaoui and F. M. Ghannouchi, "Partitioned Distortion Mitigation in LTE Radio Uplink to

- Enhance Transmitter Efficiency," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 63: Issue 8, pp. 2661-2671, August 2015.
- [15] M. V. Amiri, M. Helaoui, N. Boulejfen and F. M. Ghannouchi, "Optimized Spectrum Constrained Crest Factor Reduction Technique Using Polynomials," *IEEE Transactions on Communications*, Vol. 63: Issue 7, pp. 2555-2564, July 2015.
- [16] M. S. Hashmi, F. M. Ghannouchi and P. J. Tasker, "High Frequency Waveform Engineering and its Applications: Tutorial 54," *IEEE Instrumentation & Measurement Magazine*, Vol. 18: Issue 3, pp. 44-50, June 2015.
- [17] R. Darraji, A. K. Kwan, F. M. Ghannouchi and M. Helaoui, "Digitally Equalized Doherty RF Front-End Architecture for Broadband and Multistandard Wireless Transmitters," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 63: Issue 6, pp. 1978-1988, June 2015.
- [18] M. Younes and F. M. Ghannouchi, "Behavioral Modeling of Concurrent Dual-band Transmitters based on Radial-Pruned Volterra Model," *IEEE Communication Letters*, Vol. 19: Issue 5, pp. 751-754, May 2015.
- [19] M. Jouzdani, M. M. Ebrahimi, K. Rawat, M. Helaoui and F. M. Ghannouchi, "Envelope Tracked Pulse Gate Modulated GaN HEMT Power Amplifier for Wireless Transmitters," *IEEE Transactions on Circuits and Systems I*, Vol. 62: Issue 2, pp. 571-579, February 2015.
- [20] A. Seregin, O. Hammi, D. Wang, M. Helaoui and F. Ghannouchi, "Modified Linear Prediction Algorithm for Narrowband Interference Suppression in Universal Mobile Telecommunication System," *Wireless Communications and Mobile Computing*, Vol. 15: Issue 1, pp. 147-154, January 2015.
- [21] S. Rezaei, L. Belostotski, M. Helaoui and F. M. Ghannouchi, "Harmonically Tuned Continuous Class C Operation Mode for Power Amplifier Applications," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 62: Issue 12, pp. 3017-3027, December 2014.
- [22] A. K. Kwan, M. Younes, F. M. Ghannouchi, S. Zhang, W. Chen, R. Darraji, M. Helaoui and O. Hammi, "Concurrent Multi-Band Envelope Modulated Power Amplifier Linearized Using Extended Phase-Aligned DPD," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 62: Issue 12, pp. 3298-3308, December 2014.
- [23] O. Hammi, A. Kwan, S. Bensmida, K. A. Morris and F. M. Ghannouchi, "A Digital Predistortion System with Extended Correction Bandwidth with Application to LTE-A Nonlinear Power Amplifiers," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 61: Issue 12, pp. 3487-3495, December 2014.
- [24] A. Abdelhafiz, A. Zerguine, O. Hammi and F. M. Ghannouchi, "A Lattice-Based Memory Polynomial Predistorter for Wideband RF Power Amplifiers," *IET Communications*, Vol. 8: Issue 17, pp. 3122-3127, November 2014.
- [25] A. Abdelhafiz, A. Kwan, O. Hammi and F. M. Ghannouchi, "Digital Predistortion of LTE-A Power Amplifiers Using Compressed Sampling Based Unstructured Pruning of Volterra Series," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 62: Issue 11, pp. 2583-2593, November 2014.
- [26] W. Chen, S. Zhang, Y.-J. Liu, F. M. Ghannouchi, Z. Feng and Y. Liu, "Efficient Pruning Technique of Memory Polynomial Models Suitable for PA Behavioral Modeling and Digital Predistortion," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 62: Issue 10, pp. 2290-2299, October 2014.
- [27] M. Aziz, M. Rawat and F. M. Ghannouchi, "Low Complexity Distributed Model for the Compensation of Direct Conversion Transmitter's Imperfections," *IEEE Transactions on Broadcasting*, Vol. 60: Issue 3, pp. 568-574, September 2014.
- [28] M. Rawat, K. Rawat, R. Darraji, F. E. Alfaro, S. A. Bassam, M. Helaoui, F. M. Ghannouchi, M. Fattouche and F. Falcone, "Cooperative network solution and implementation for emergency applications with enhanced position estimation capability," *Wireless Networks*, Vol. 20: Issue 5, pp. 1157-1168, July 2014.
- [29] L. Azpilicueta, M. Rawat, K. Rawat, F. M. Ghannouchi and F. Falcone, "A Ray Launching-Neural Network Approach for Radio Wave Propagation Analysis in Complex Indoor Environments," *IEEE Transactions on Antennas and Propagation*, Vol. 62: Issue 5, pp. 2777-2786, May 2014.
- [30] J. R. G. Oya, A. Kwan, F. M. Ghannouchi, S. A. Bassam and F. M. Chavero, "Design of Dual-Band Multistandard Subsampling Receivers for Optimal SNDR in Nonlinear and Interfering Environments," *IEEE Transactions on Instrumentation and Measurement*, Vol. 63: Issue 4, pp. 981-983, April 2014.
- [31] S. Hatami, M. Helaoui, F. M. Ghannouchi and M. Pedram, "Single-Bit Pseudoparallel Processing Low-Oversampling Delta--Sigma Modulator Suitable for SDR Wireless Transmitters," *IEEE Transactions on Very Large Scale Integration Systems*, Vol. 22: Issue 4, pp. 922-931, April 2014.
- [32] L. Azpilicueta, M. Rawat, K. Rawat, F. M. Ghannouchi and F. Falcone, "Convergence Analysis in Deterministic 3D Ray Launching Radio Channel Estimation in Complex Environments," *Applied Computational Electromagnetics Society Journal*, Vol. 29: Issue 4, pp. 256-271, April 2014.
- [33] M. Younes and F. M. Ghannouchi, "A Generalized Twin-Box Model for Compensation of Transmitters RF Impairments," *IET Communications*, Vol. 8: Issue 4, pp. 413-418, March 2014.
- [34] A. Harguem, N. Boulejfen, F. M. Ghannouchi and A. Gharsallah, "Robust behavioral modeling of dynamic nonlinearities using Gegenbauer polynomials with application to RF power amplifiers," *Wiley International Journal of RF and Microwave*

- Computer-Aided Engineering, Vol. 24: Issue 2, pp. 268-279, March 2014.
- [35] M. Rawat, K. Rawat, F. M. Ghannouchi, S. Bhattacharjee and H. Leung, "Generalized Rational Functions for Reduced-Complexity Behavioral Modeling and Digital Predistortion of Broadband Wireless Transmitters," *IEEE Transactions on Instrumentation and Measurement*, Vol. 63: Issue 2, pp. 485 - 498, February 2014.
- [36] M. A. Maktoomi, M. S. Hashmi and F. M. Ghannouchi, "A T-section Dual-band Matching Network For Frequency-dependent Complex Loads Incorporating Coupled Line With Dc-block Property Suitable For Dual-band Transistor Amplifiers," *Progress In Electromagnetics Research C*, Vol. 54, pp. 75-84, 2014.
- [37] M. Younes, A. Kwan, M. Rawat and F. M. Ghannouchi, "Linearization of Concurrent Tri-Band Transmitters using 3-D Phase-Aligned Pruned Volterra Model," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 61: Issue 12, pp. 4569-4578, December 2013.
- [38] X. Chen, W. Chen, F. M. Ghannouchi, Z. Feng and Y. Liu, "Enhanced Analysis and Design Method of Concurrent Dual-Band Power Amplifiers With Intermodulation Impedance Tuning," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 61: Issue 12, pp. 4544-4558, December 2013.
- [39] A. H. Abdelhafiz, O. Hammi, A. Zerguine, A. T. Al-Awami and F. M. Ghannouchi, "A PSO Based Memory Polynomial Predistorter With Embedded Dimension Estimation," *IEEE Transactions on Broadcasting*, Vol. 59: Issue 4, pp. 665-673, December 2013.
- [40] M. Younes and F. M. Ghannouchi, "On the Modeling and Linearization of a Concurrent Dual-Band Transmitter Exhibiting Nonlinear Distortion and Hardware Impairments," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 60: Issue 11, pp. 3055-3068, November 2013.
- [41] M. V. Amiri, S. A. Bassam, M. Helaoui and F. M. Ghannouchi, "Estimation of Crossover DPD Using Orthogonal Polynomials in Fixed Point Arithmetic," *AEU International Journal of Electronics and Communications*, Vol. 67: Issue 11, pp. 905 - 909, November 2013.
- [42] S. Zhang, W. Chen, Y. Liu and F. M. Ghannouchi, "A Time Misalignment Tolerant 2D-Memory Polynomials Predistorter for Concurrent Dual-Band Power Amplifiers," *IEEE Microwave and Wireless Components Letters*, Vol. 23: Issue 9, pp. 501 - 503, September 2013.
- [43] O. Hammi, A. Kwan and F. M. Ghannouchi, "Bandwidth and Power Scalable Digital Predistorter for Compensating Dynamic Distortions in RF Power Amplifiers," *IEEE Transactions on Broadcasting*, Vol. 59: Issue 3, pp. 520 - 527, September 2013.
- [44] Y.-J. Liu, W. Chen, J. Zhou, B.-H. Zhou and F. M. Ghannouchi, "Behavioral modeling for concurrent dual-band power amplifiers using 2D hammerstein/wiener models," *Wiley International Journal of RF and Microwave Computer-Aided Engineering*, Vol. 23: Issue 6, pp. 646-654, October 2013.
- [45] F. M. Ghannouchi, M. Younes and M. Rawat, "Distortion and Impairments Mitigation and Compensation of Single and Multi-band Wireless Transmitters," *IET Microwaves, Antennas & Propagation*, Vol. 7: Issue 7, pp. 518 - 534, July 2013.
- [46] S. A. Bassam, W. Chen, M. Helaoui and F. M. Ghannouchi, "Transmitter Architecture for CA: Carrier Aggregation in LTE-Advanced Systems," *IEEE Microwave Magazine*, Vol. 14: Issue 5, pp. 78-86, July 2013.
- [47] D. Saffar, N. Boulejfen, F. M. Ghannouchi, M. Helaoui and A. Gharssalah, "A Compound Structure and a Single-Step Identification Procedure for I/Q and DC Offset Impairments and Nonlinear Distortion Modeling and Compensation in Wireless Transmitters," *International Journal of RF and Microwave Computer-Aided Engineering*, Vol. 23: Issue 3, pp. 367-377, May 2013.
- [48] S. Rezaei Nazifi, L. Belostotski, F. M. Ghannouchi and P. Aflaki, "Integrated Design of a Class-J Power Amplifier," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 61: Issue 4, pp. 1639-1648, April 2013.
- [49] B. Georgescu, R. Salmeh, M. Fattouche and F. M. Ghannouchi, "Two-Tone Phase Delay Control of Center Frequency and Bandwidth in Low-Noise-Amplifier RF Front Ends," *IEEE Transactions on Circuits and Systems II: Express Briefs*, Vol. 60: Issue 4, pp. 192-196, April 2013.
- [50] M. Aziz, M. Rawat and F. M. Ghannouchi, "Rational Function based model for the joint mitigation of I/Q imbalance and PA Nonlinearity," *IEEE Microwave and Wireless Components Letters*, Vol. 23: Issue 4, pp. 196-198, April 2013.
- [51] M. Vejdani Amiri, S. A. Bassam, M. Helaoui and F. M. Ghannouchi, "New Order Selection Technique using Information Criteria Applied to SISO and MIMO Systems Predistortion," *International Journal of Microwave and Wireless Technologies*, Vol. 5: Issue 2, pp. 123-131, March 2013.
- [52] M. Rawat, F. M. Ghannouchi and K. Rawat, "Three-Layered Biased Memory Polynomial for Modeling and Predistortion of Transmitters with Memory," *IEEE Transactions on Circuits and Systems I: Regular Papers*, Vol. 60: Issue 3, pp. 768-777, March 2013.
- [53] M. Rawat, K. Rawat, M. Younes and F. M. Ghannouchi, "Joint Mitigation of Non-Linearity and modulator imperfections in a dual-band Concurrent Transmitter Using Neural Networks," *IET Electronics Letters*, Vol. 49: Issue 4, pp. 253-255, February 2013.
- [54] M. S. Hashmi and F. M. Ghannouchi, "Introduction to Load-Pull Systems and Their Applications," *IEEE Instrumentation &*

Measurement Magazine, Vol. 16: Issue 1, pp. 30-36, February 2013.

- [55] D. Wang, M. Fattouche and F. M. Ghannouchi, "Geometry-based Doppler Analysis for GPS receivers," *Wireless Personal Communications*, Vol. 68: Issue 1, pp. 1-13, January 2013.
- [56] K. Rawat, M. Rawat, M. S. Hashmi and F. M. Ghannouchi, "Dual-Band Branch-Line Hybrid With Distinct Power Division Ratio Over The Two Bands," *Wiley International Journal of RF and Microwave Computer-Aided Engineering*, Vol. 23: Issue 1, pp. 90 - 98, January 2013.
- [57] Y. J. Liu, W. Chen, J. Zhou, B. Zhou and F. M. Ghannouchi, "Digital Predistortion for Concurrent Dual-Band Transmitters Using 2-D Modified Memory Polynomials," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 61: Issue 1, pp. 281-290, January 2013.
- [58] M. M. Ebrahimi, M. Helaoui and F. M. Ghannouchi, "Delta-Sigma-Based Transmitters: Advantages and Disadvantages," *IEEE Microwave Magazine*, Vol. 14: Issue 1, pp. 68-78, January 2013.
- [59] D. Wang and F. M. Ghannouchi, "Handset Based Positioning System For Injured Fireman Rescue in Wildfire Fighting," *IEEE Systems Journal*, Vol. 6: Issue 4, pp. 603 - 615, December 2012.
- [60] K. Rawat and F. M. Ghannouchi, "Design Methodology for Dual-Band Doherty Power Amplifier with Performance Enhancement using Dual-Band Offset lines," *IEEE Transactions on Industrial Electronics*, Vol. 59: Issue 12, pp. 4831-4842, December 2012.
- [61] Y.-J. Liu, W. Chen, J. Zhou, B. Zhou, F. M. Ghannouchi and Y.-N. Liu, "Modified Least Squares Extraction for Volterra Series Digital Predistorter in the Presence of Feedback Measurement Errors," *IEEE Transactions on Microwave Theory and Techniques*, Vol. 60: Issue 11, pp. 3559 - 3570, November 2012.
- [62] N. Boulejfen, F. Elsayed, M. Helaoui, L. DeVocht and F. M. Ghannouchi, "Efficiency Enhancement of Sigma-Delta Modulator Based Transmitters Using Multi-Level Quantizers," *Journal of Signal Processing Systems*, Vol. 69: Issue 2, pp. 125-132, November 2012.
- [63] P. Aflaki, F. M. Ghannouchi and R. Negra, "Analytical Method for Optimal Design of RF Dual-Band Rat-Race Couplers for Arbitrary Frequency Ratios," *International Journal of RF and Microwave Computer-Aided Engineering*, Vol. 22: Issue 6, pp. 690 - 700, November 2012.
- [64] D. Wang, M. Fattouche and F. M. Ghannouchi, "Efficient Spectrum Allocation and TOA-based Localization in Cognitive Networks," *Wireless Personal Communications*, Vol. 66: Issue 4, pp. 813 - 831, October 2012.
- [65] C. Jebali, N. Boulejfen, A. Gharsallah and F. M. Ghannouchi, "Effects of Signal PDF on the Identification of Behavioral Polynomial Models for Multicarrier RF Power Amplifiers," *Analog Integrated Circuits and Signal Processing*, Vol. 73: Issue 1, pp. 217-224, October 2012.
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Issue 6, pp. 1886-1895, June 2012.

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### List of Refereed Conference Publications

- [1] X. Li, M. Helaoui and F. M. Ghannouchi, "Optimal Fundamental Load Modulation for Harmonically Tuned Switch Mode Power Amplifier," in 2016 IEEE MTT-S International Microwave Symposium (IMS'2016), San Francisco, CA, USA, 22-27 May 2016 accepted.
- [2] A. K. C. Kwan, M. Younes, O. Hammi, A. Abdelhafiz and F. M. Ghannouchi, "A Multi-Stage Concurrent Dual-Band DPD Architecture for Closely Spaced Carriers using a Low Bandwidth Feedback Loop," in 2016 IEEE MTT-S International Microwave Symposium (IMS'2016), San Francisco, CA, USA, 22-27 May 2016 accepted.
- [3] M. Jouzdani, M. Helaoui and F. M. Ghannouchi, "Advanced Envelope Delta-Sigma Transmitter Architecture with PLM Power Amplifier for Multi-Standard Applications," in 2016 IEEE MTT-S International Microwave Symposium (IMS'2016), San Francisco, CA, USA, 22-27 May 2016 accepted.
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