Contents

Preface viii
Conference Organization ix

How to regulate the use of cognitive radio? 1
Controlling Aggregate Interference under Adjacent Channel Interference Constraint in TV White Space
Lei Shi, Ki Won Sung, Jens Zander

Field measurements of WSD–DTT protection ratios over outdoor and indoor reference geometries
Pekka Talmola, Juha Kalliovaara, Jarkko Paavola, Reijo Ekman, Atte Vainisto, Niko Aurala, Heikki Kokkinen, Kari Heiska, Risto Wichman, Jussi Poikonen 7

On the Permissible Transmit Power for Secondary User in TV White Spaces
Lei Shi, Ki Won Sung, Jens Zander 13

Effect of geolocation database update algorithms to the use of TV white spaces
Jaakko Ojaniemi, Jussi Poikonen, Risto Wichman 18

Two Days of Spectrum Use in Europe
Alexandros Palaios, Janne Riihijarvi, Petri Mahonen, Vladimir Atanasovski, Liljana Gavrilovska, Peter Van Wesemael, Antoine Dejonghe, Peter Scheele 24

Cognitive radio systems Session 1 30
On Combined Beamforming and OSTBC over the Cognitive Radio S-Channel with Partial CSI
Efthymios Stathakis, Mikael Skoglund, Lars Rasmussen

Exploiting Polarization for Spectrum Sensing in Cognitive SatComs
Shree Krishna Sharma, Symeon Chatzinotas, Bjorn Ottersten 36

GRaTIS: Sensing and Intelligence for Performance in The Presence of Legacy Networks
Dola Saha, Aveek Dutta, Dirk Grunwald, Douglas Sicker 42

Detection Error Aware Spectrum Handoff Mechanism for Cognitive Radios
Pedro Smith Coutinho, Marcel William Rocha da Silva, José Ferreira de Rezende 48

Joint Channel and User Selection for Transmission and Sensing in Cognitive Radio Networks
Salim Eryigit, Tuna Tugcu 54

Poster session 1 60
Always One/Zero Malicious User Detection in Cooperative Sensing Using the FCME Method
Johanna Vartiainen

iii
Channel Reservation in Cognitive Radio Networks with the RESTART Retransmission Strategy
*Sandra Castellanos-Lopez, Felipe Cruz-Pérez, Genaro Hernandez-Valdez*

Multiuser Automatic Modulation Classification for Cognitive Radios using Distributed Sensing in Multipath Fading Channels
*Munawwar Sohul, Barathram Ramkumar, Tamal Bose*

A Novel Architectural Framework and Configuration Scheme for Spectrum Sensing
*Abdoulaye BAGAYOKO, Dorin PANAITOPOL, Philippe DELAHAYE, Christian MOUTON*

Guaranteed Service and Delay-Constrained Capacity of a Multi-Channel Cognitive Secondary Network
*Yuehong Gao, Wenting Jiang, Yuming Jiang*

Adaptive Model based on Proactive Spectrum Sensing for Emergency Cognitive Ad hoc Networks
*Sasirekha GVK, Jyotsna Bapat*

Optimal cost-based strategies in mobile network offloading
*Kimmo Berg, Michail Katsigiannis*

On the Performance of Spectrum Sharing Systems with Multiple Antennas
*Liang Yang, Mohamed-Slim Alouini, Khalid Qaraqe*

On Multiuser Switched Diversity Transmission for Spectrum Sharing Systems
*Marwa Qaraqe, Mohamed Abdallah, Erchin Serpedin, Mohamed-Slim Alouini*

Enhanced Energy Detector Via Algebraic Approach for Spectrum Sensing in Cognitive Radio Networks
*Amira Ben Jemaa, Monia Turki, Wael Guibène*

Spectrum Sensing using Single-Radio Switched-Beam Antenna Systems
*Elpiniki Tsakalaki, David Wilcox, Elisabeth de Carvalho, Constantinos Papadias, Tharmalingam Ratnarajah*

**How to make business with cognitive radio?**

Impact of deployment costs and spectrum prices on the business viability of mobile broadband using TV white space
*Jan Markendahl, Pamela Sanchez, Bengt Mölleryd*

Business opportunities using white space spectrum and cognitive radio for mobile broadband services
*Jan Markendahl, Thomas Casey*

Spectrum Trading with Interference Rights
*Martin Weiss, Luy Cui*

Long-Range Communications In Licence-Exempt TV White Spaces: An Introduction To Soft-Licence Concept
*Santosh Kawade*

**Cognitive radio systems Session 2**

Cognitive Radios with Ergodic Capacity Guarantees for Primary Users
*Antonio Marques, Luis Lopez-Ramos, Javier Ramos*
Minimizing Symbol Error Rate for Cognitive Relaying with Opportunistic Access
Ammar Zafar, Mohamed-Slim Alouini, Yunfei Chen, Redha Radaydeh

Average Throughput in AWGN Cognitive Fading Interference Channel with Multiple Secondary Pairs
Nicolas Schrammar, Hamed Farhadi, Lars Rasmussen, Mikael Skoglund

Per-Node Throughput Performance of Overlapping Cognitive Radio Networks
Jari Nieminen, Lijun Qian, Riku Jääntti

Transmission Capacity of D2D communication under heterogeneous networks with Dual Bands
Ziyang Liu, Tao Peng, Qianxi Lu, Wenbo Wang

TVWS
TV White Space Channel Allocation with Simulated Annealing as Meta Algorithm
Bo Ye, Maziar Nekovee, Anjum Pervez, Mohammad Ghavami

A Model Based Approach for Estimating Aggregate Interference in Wireless Networks
Janne Riihijärvi, Petri Mähönen

Aggregate interference from WLAN in the TV white space by using terrain-based channel model
Konstantinos Koufos, Kalle Ruttik, Riku Jääntti

Dimensioning of secondary cellular system in TVWS
Jussi Kerttula, Kalle Ruttik, Riku Jääntti

Availability assessment of TVWS for Wi-Fi-like secondary system: A case study
Pero Latkoski, Jovan Karamacoski, Liljana Gavrilovska

Acropolis Special Session
Torus Quorum System and Difference Set-based Rendezvous in Cognitive Radio Ad Hoc Networks
Sylwia Romaszko, Petri Mahonen

Interference Management Strategy for Deploying Energy Efficient Femtocells Network
zayen bassem, Hayar Aawatif, Bouferda Sofia

Near Optimal Power Allocation Algorithm for OFDM-Based Cognitive Using Adaptive Relaying Strategy
Hamza SOURY, Faouzi Bader, Musbah Shaat, Mohamed-Slim Alouini

Combination of DOA and beamforming in position-based routing for underlay cognitive wireless networks
Luca De Nardis, Maria-Gabriella Di Benedetto, Auon Akhtar, Oliver Holland

Comparison of Underlay and Overlay Spectrum Sharing Strategies in MISO Cognitive Channels
Ricardo Blasco-Serrano, Jing Lv, Ragnar Thobaben, Eduard Jorswieck, Adrian Kliks, Mikael Skoglund
Sensing and Estimation Session 1

Empirical Modeling of Public Safety Voice Traffic in the Land Mobile Radio Band
Tanim Taher, Roger Bacchus, Dennis Roberson, Kenneth Zdunek

Duty Cycle and Channel Occupancy Rate Estimation with MED-FCME LAD ACC
Janne Lehtomäki, Risto Vuotoniemi, Kenta Umebayashi

Location estimation of radio transmitters based on spatial interpolation of RSS values
Valentin Rakovic, Marko Angjelicinoski, Vladimir Atanasovski, Liljana Gavrilovska

Reliability of a Radio Environment Map: Case of Spatial Interpolation Techniques
Daniel Denkovski, Vladimir Atanasovski, Liljana Gavrilovska, Janne Riihijärvi, Petri Mähönen

Estimation of Time-Domain Calibration Parameters to Restore MIMO-TDD Channel Reciprocity
Boris Kouassi, Irfan Ghauri, Luc Deneire

Cognitive radio systems Session 3

Exploiting Knowledge Management for Supporting Spectrum Selection in Cognitive Radio Networks
Faouzi Bouali, Oriol Sallent, Jordi Pérez-Romero, Ramon Agustí

Energy and Throughput Tradeoff in Temporal Spectrum Sharing
Sibel Tombaz, Ki Won Sung, Jens Zander

Opportunistic Spectrum Access in Cognitive Radio Based on Channel Switching
Fakhreddine Gaaloul, Hong-Chuan Yang, Redha Radaydeh, Mohamed-Slim Alouini

Joint Congestion Control and Routing Subject to Dynamic Interruptions in Cognitive Radio Networks
Husheng Li, Lijun Qian

Predictive Behavior Classification For Cognitive Radio: Introduction and Preliminary Results
Daniel DePoy, Tamal Bose

Poster Session 2

Spectrum Occupancy Measurements and Analysis Methods on the 2.45 GHz ISM Band
Joonas Kokkonen, Janne Lehtomäki

Blind Spectrum Detector for Cognitive Radio Using Compressed Sensing and Symmetry Property of the Second Order Cyclic Autocorrelation
Jacques PALICOT, Ziad KHALAF, Amor NAFKHA

Dynamic valuation function based definition of the primary spectrum user in collocated cellular networks
Michal Szydelko, Jaroslaw Byrka, Jakub Oszmianski
Dynamic Spectrum Management System Aggregating Non-Contiguous Spectrum over TVWS
Yuying Dai, Angelo Cuffaro, Jean-Louis Gauvreau, Rocco Di Girolamo, Athmane Touag, Alpaslan Demir

Spectrum Availability Recheck Scheme (SARS) for Cognitive Radio Systems with Mobility
Woongsup Lee, Dong-Ho Cho

A Comparison of PHY Layer on the Ecma-392 and IEEE 802.11af Standards
Jungsun Um, Sung-Hyun Hwang, Byung Jang Jeong

Server-Uncertain Spectrum Trading in Cognitive Radio Networks: A Queueing-Theoretic Modeling Approach
Lixia LIU, Gang HU, Ming XU, Yuxing PENG

Evaluation of Multi-Objective Optimizers for Cognitive Radio using Psychometric Methods
Carl Dietrich, Edward Wolfe, Garrett Vanhoy

Wideband frequency domain detection using Teager-Kaiser energy operator
Matthieu Gautier, Vincent Berg, Dominique Noguet

Impact of the Primary Resource Occupancy Information on the Performance of Cognitive Radio Networks with VoIP Traffic
Sandra Castellanos-López, Felipe Cruz-Pérez, Mario Rivero-Angeles, Genaro Hernandez-Valdez

The LAD Methods in WLAN Indoor Multipath Channels
Johanna Vartiainen, Janne Lehtomäki, Risto Vuohtoniemi

Sensing and Estimation Session 2

Grid based Cooperative Spectrum Sensing in Cognitive Networks under Correlated Shadowing
Xia Li, Petri Mahonen

Performance Analysis of Eigenvalue Based Spectrum Sensing under Frequency Selective Channels
Sener Dikmese, Markku Renfors

Estimation-Based Noise-Robust Sensing
Andreas Polydoros, Ioannis Dagres

Locally Best Invariant Test for Multiple Primary User Spectrum Sensing
Lu Wei, Prathapasinghe Dharmawansa, Olav Tirkkonen

Jointly Optimal Sensing and Resource Allocation for Multiuser Interweave Cognitive Radios
Luis Lopez-Ramos, Antonio Marqués, Javier Ramos