Free Up Time for Innovation

SPEAG Workshop Series 2016

Wednesday, April 13th / Room: B. Rinerhorn

Agenda

11:00 – 11:30	Recent Advances in SEMCAD X Matterhorn for the Efficient Design and Optimization of Mobile In- and On-Body Communication Equipment Dr. Nik Chavannes, Dr. Elaine Barretto, SPEAG, Switzerland
11:30 – 11:45	The Influence of the User's Head and Hand on OTA and SAR Performance of Mobile Communication Devices Dr. Jaume Anguera, Fractus Corporation, Spain
11:45 – 12:00	RF EMF Exposure Evaluation of an Ultra-High-Density Wireless Access Network Dr. Wout Joseph, University of Ghent, Belgium
12:00 – 12:30	Lunch Break
12:30 – 13:00	SPEAG's Next Generation Measurement Solutions for Evaluation, Optimization, and Compliance Testing of Wireless Communication Equipment and In-/On-Body Devices Dr. Sven Kühn, SPEAG, Switzerland
13:00 – 13:15	SEMCAD X Simulations: Sample Case Studies at Plextek Consulting Dr. Marcus Walden, Plextek Consulting, UK
13:15 – 13:30	Development of Microwave Breast Imaging and Sensing Systems at the University of Calgary Dr. Jeremie Bourqui, University of Calgary, Canada
13:30 – 14:00	Coffee Break and Discussion

Limited seating is available - registration is required and will be handled on a first-come first-served basis.
If you are interested in attending the workshop, please send an email to **semx-workshop@speag.com** with your name and affiliation.

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Part I

Title: Recent Advances in SEMCAD X Matterhorn for the Efficient Design and Optimization of Mobile In- and On-Body Communication Equipment

Presenter: Dr. Nik Chavannes, Dr. Elaine Barretto, SPEAG, Switzerland

Abstract: In this presentation, recent advances in SEMCAD X Matterhorn for numerical optimization of radiofrequency devices will be highlighted. Our experts will present the latest technological developments to address a variety of engineering challenges, including safety assessment, electromagnetic interference and compatibility (EMI/EMC), antenna design, and dosimetry. Of particular interest are enhancements for exposure assessment of wireless power transfer (WPT) systems, analysis and optimization of in- and on-body wireless devices, and the simulation of 5G wireless systems, which will be illustrated with various examples. SEMCAD X Matterhorn – from both technological and usage points of view – strives to push computational limits towards ever greater realism.

Title: The Influence of the User's Head and Hand on OTA and SAR Performance of Mobile Communication Devices

Presenter: Dr. Jaume Anguera, Fractus Corporation, Spain

Abstract: Antennas for wireless handset devices operate in a quite hostile environment: small ground planes, small space for the antennas, coupling with other antennas, etc. Moreover, performance needs to be satisfactory not only in a free-space scenario but also in a real environment that takes the user into account. In this sense, head and hand interaction with the antenna in most of cases causes detuning, absorption, and specific absorption rate (SAR) of electromagnetic (EM) radiation by tissues. Prior to laboratory testing, an EM analysis that enables rapid parametric analysis, physical insights, and further optimization should be performed. Some examples of the use of SEMCAD X software to analyze the performance small antennas operated close to head and hand phantoms will be presented to demonstrate the advantage of being able to predict detuning, absorption, and SAR.

Title: RF EMF Exposure Evaluation of an Ultra-High-Density Wireless Access Network

Presenter: Dr. Wout Joseph, University of Ghent, Belgium

Abstract: A novel wireless access architecture (ATTO) that will allow bitrates of 100 Gb/s with very high reliability is evaluated from an exposure point of view. The concept is based on very small so-called ATTO-cells (typical size 15×15 cm^2) that are integrated into a floor and optimized for establishment of a 100 Gb/s communication stream to any mobile object positioned on the floor. Absorption of radiofrequency (RF) electromagnetic fields (EMF) has been assessed by both finite-difference time-domain simulations in a 3D heterogeneous male phantom and validation measurements of electric fields and specific absorption rate in a homogeneous phantom.

Part II

Title: SPEAG's Next Generation Measurement Solutions for Evaluation, Optimization, and Compliance Testing of Wireless Communication Equipment and In-/On-Body Devices

Presenter: Dr. Sven Kühn, SPEAG, Switzerland

Abstract: Antenna design for in- and on-body applications imposes various challenges to antenna engineers, including but not limited to consideration of the effects of the human body, battery life-time, compliance with exposure and implant safety regulations, radiofrequency co-existence, as well as considerable space limitations. This presentation features SPEAG's test solutions for in- and on-body antennas: DAK-TL, a dielectric assessment system for the evaluation of antenna substrates; EM phantoms for over-the-air and reliable body-loading effect testing; cDASY6 and cSAR3D SAR test systems for compliance testing and production quality assurance with respect to safety regulations; OH4VNA, a photonic vector network analyzer port extension for the characterization of small antennas removing cable artifacts; and ICEy, a near-field scanning system for coexistence evaluation, featuring algorithms for the correlation of near-field effects with the far-field radiation performance.

Title: SEMCAD X Simulations: Sample Case Studies at Plextek Consulting

Presenter: Dr. Marcus Walden, Plextek Consulting, UK

Abstract: In this talk, some sample case studies of antenna and electromagnetic problems that Plextek Consulting have addressed through the use of SEMCAD X will be provided. All-important engineering sanity checks – comparisons between simulations and measurements and/or published work – have established confidence in this powerful electromagnetic simulation tool and resulted in numerous successful designs covering the radio spectrum from VHF to mm-wave frequencies.

Title: Development of Microwave Breast Imaging and Sensing Systems at the University of Calgary

Presenter: Dr. Jeremie Bourqui, University of Calgary, Canada

Abstract: Microwave breast imaging and sensing is a major research area pursued by the Applied Electromagnetics Group at the University of Calgary. From sensor design to imaging of a magnetic resonance imaging (MRI) derived breast model, SEMCAD X has become the single simulation tool (now joined by Sim4Life) used to develop this emerging technology over the past 10 years. As a result, this technology has recently moved into clinical testing on breast cancer patients.