

EMC EUROPE 2016



WROCLAW, POLAND

Symposium Programme



Wroclaw, Poland, September 5-9, 2016



EMC EUROPE 2016
WROCLAW, POLAND

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Welcome from Tadeusz Więckowski, Conference Chairman

Ladies and Gentlemen,

Dear Participants, Guests, Friends and Colleagues,

It is my great honour and pleasure to welcome you all to EMC Europe 2016, to Wrocław and to Wrocław University of Science and Technology where an International Symposium on electromagnetic compatibility problems was organised for the first time in Europe in 1972.

Six years have passed since the EMC Europe Conference in Wrocław in 2010 when we celebrated the merger of the youngest and oldest International Symposia on Electromagnetic Compatibility organized in Europe. The success of EMC Europe conferences held in York, Rome, Brugge, Gothenburg and Dresden demonstrates that EMC Europe is the most important conference dealing with the subject in Europe and that integration of the European and international EMC research community has become a reality.

These six years have also seen new challenges for my university and the city. You will see all around you how numerous projects and investments have been effected.

Wrocław is over 750 years old. It is a friendly, historical, cosmopolitan and fast developing city with many historical and cultural places of interest and is often called 'the city of bridges' thanks to the Oder river and its many islands. This year, as European Capital of Culture, Wrocław has even more to offer. I do hope you will have the opportunity to enjoy some cultural events as well as feel the spirit and atmosphere of this young at heart city with its 11 universities and over 120 000 students.

Many interesting papers will be presented during this conference. More than 200 regular papers were submitted and assessed by our Editorial Board consisting of 92 international referees. The papers have been arranged into 19 topic sessions and 3 poster sessions. There will also be a number of workshops and tutorials. Sessions devoted to spectrum management and spectrum engineering issues have always been part of the International Wrocław Symposia on EMC. In order to uphold this tradition, a 'Frequency Policy and Spectrum Engineering' workshop will be held on Thursday and Friday in co-operation with the National Telecommunications Institute.

We can look forward to two keynote speeches which will be given during the conference by Jianqing Wang from Nagoya Institute of Technology in Japan and Luiz Da Silva from Trinity College Dublin in Ireland.

I would like extend my thanks to the authors of papers and organisers of the sessions, workshops and tutorials for their contribution to the conference program. Special thanks go to the International Steering Committee and a large group of reviewers for their support in evaluating the papers submitted. I would also like to thank our sponsors for their support and our exhibitors for their contributions. I would personally also like to thank my colleagues from the Local Organising Committee for their work in arranging the conference as well as Wrocław University of Science and Technology for its administrative support.

Thank you very much for your participation in the EMC EUROPE 2016 Conference. I hope the meeting will be valuable for all of you and I wish you a pleasant stay in Wrocław.

I wish success for subsequent EMC Europe conferences and I invite you to the next event - EMC Europe 2017, to be organized by our French colleagues in Angers next year.



Professor Tadeusz W. Więckowski
Chairman of the Local Organizing Committee

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Conference Information

Oral Sessions

Each paper assigned to oral session is allowed for about 20 minutes presentation (including about 3 minutes for discussion). In sessions with 4 presenting papers it is possible to extend the presentation time up to 23 minutes. Detailed time schedule has been defined for each oral session in final programme.

Video projectors and computers (MS Power Point and Acrobat reader) are available for presentation in each conference room.

Authors must meet their session chairman in the room at least 15 minutes before the beginning of the session. Each speaker must give a short biography to the chairman and load the presentation in the computer, if did not send it before to the organizers. Only presentations provided on pendrives will be accepted for upload. The use of personal notebooks for presentation is not allowed.

Poster presentations

Each poster board will be marked with the poster ID-number, which can be found in the final conference programme as well. Authors are required to use only the boards corresponding to their posters.

Poster presenters have to hang up their poster on the day of their presentation 15 minutes before poster session. The authors will need to stay personally just during their poster session and to remove their posters from the boards after the poster session. Posters left on the boards after the poster sessions, will not be returned by the organisers.

Posters should be fixed to the poster board using materials (adhesive tapes or drawing pins) which will be provided on site.

The display area dedicated for presenting of poster of A0 size has the following dimension: approx. 84.1 cm wide and 118.9 high).

Internet Access

Participants equipped with computers and other mobile equipments with wireless card 802.11b/g/n will be able to take advantage of the wireless LAN facility installed in the conference building, enabling them to connect to the Internet network. The dedicated wireless network for Symposium participant is **EMC2016** with password **emceurope**.

It is possible to connect to the Internet using free access **Pwr-WiFi** wireless network, but for limited types of services and IP ports. Participants from universities can take advantage of protected **eduraom** wireless LAN.

Mobile Conference assistant - Conference4Me

The Conference4Me smartphone application provides you with the most comfortable tool for browsing the complete programme of EMC Europe 2016 and planning your participation in this conference. Conference4Me application allows you directly from your phone or tablet to create your very own agenda on the fly. The Conference4Me application is available for free for Android, iOS, Windows Phone and Amazon Kindle Fire devices.

To download the mobile app, please visit <http://conference4me.eu/download> or search for "conference4me" in Google Play, iTunes App Store, Windows Phone Store or Amazon App Store, respectively, or scan codes below.



Venue

The EMC Europe 2016 symposium will take place in Wrocław (Poland) on the main campus of the Wrocław University of Science and Technology (WUST).

The main Campus of WUST is located in the Wrocław city center. The opening ceremony as well as keynote 1 will be held in assembly hall (Aula) of the main building (building A-1) of WUST (Wybrzeże Wyspiańskiego 27).

Oral sessions, poster sessions, workshops and tutorials will be held in building C-13 of WUST, (Wybrzeże Wyspiańskiego 23/25). For details see the Campus map at the end of programme.

Badges

All delegates will receive a badge and invitations for social events during registration. For your convenience please wear your badge throughout the conference, even at the social events. The badge is multifunctional – see details in the following sections (Transport in Wrocław, Lunch).

Transport in Wroclaw

Trams, buses, and taxis are at your disposal. A one-way tram and bus ticket costs 3,00 zloty. Fast buses are marked with capital letters (express buses), and tickets for them cost 3,20 zloty. In both cases price does not depend on the distance travelled. Passengers must validate the tickets. Tickets are sold in the newspaper kiosks.

In the days from **5 to 9 September 2016** all symposium participants can use the public transport using their badges as seasons ticket. The only badge allows transferring without ticket.

Lunch

Lunch is served in the canteen, in building C-18 (see map at the end of programme). For your disposal is a ground and first floor, please follow the guidance of canteen crew. Admission ticket is badge so please bring it with you. Enjoy your meal!

Welcome Cocktail

Tuesday, September 6th at 18:00

The Local Organizing Committee cordially invites to attend the Welcome Cocktail in the Main Building (A-1) of Wroclaw University of Science and Technology. It's unique opportunity to meet with your colleagues and exhibitors in an informal atmosphere.

Symposium Banquet

Wednesday, September 7th at 20:00

The Local Organizing Committee cordially invites to attend the Symposium Banquet in DoubleTree by Hilton. During the banquet the Best Paper and Best Student Paper will be awarded.

DoubleTree by Hilton is located at Podwale 84, closed to Dominikanski Sq. in the city centre. Please remember about your invitation.



Welcome to EMC EUROPE 2017 in Angers, France

On behalf of the International Steering Committee, I am delighted and privileged to welcome you and your families to the major European conference on EMC, from 4 to 7 September in Angers, one of the best cities of good living in France.

Angers, located in the Loire Valley (1,5 hour from Paris by train), is classified by UNESCO as a World Heritage for Humanity. For many centuries, it has evolved from an ancient city into a flagship of modern technology, receiving the FrenchTech label for its contribution to the Internet of Things while keeping its traditional character.

EMC Europe 2017 focuses on the high quality of scientific and technical contributions as well as the fruitfulness of exchanges among EMC researchers and practitioners from all over the world, in a spirit of openness and conviviality. The conference will cover the whole spectrum of EMC topics, including emerging trends. Special sessions, workshops, tutorials and a large exhibition will be organized along with regular sessions.

Angers is a place where the 'French way of life' expression takes on its full meaning. From castles to wine-tasting, from sightseeing to good food, you will not be disappointed with your stay.

Join us in EMC Europe 2017 for an experience you will never forget!

Mohamed Ramdani, Conference Chair

Important Dates

Proposals Deadline:	15 February 2017
Notification of Acceptance:	17 April 2017
Final Submission Deadline:	15 May 2017
Reduced Fee Registration Deadline:	15 May 2017

More details: www.emceurope2017.org

Upcoming EMC Europe Symposia

2017 – Angers, France
2018 – Amsterdam, The Netherland
2019 – Barcelona, Spain

Upcoming IEEE EMC Symposia

2017 – Washington, D.C., USA
2018 – Long Beach, California, USA
2019 – New Orleans, Louisiana, USA
2020 – Reno, Nevada, USA

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B. Andrasz (Secretariat and Reception Desk) – Wroclaw University of Science and Technology

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D. Klepacki – Rzeszów University of Technology

A. Kucharski – Wroclaw University of Science and Technology

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 Kia Wiklundh (*Sweden*)
 Perry Wilson (*United States*)
 Ryszard J. Zielinski (*Poland*)
 Robert Ziemba (*Poland*)

Best Paper Award Nominee

Paper ID	Title and authors	Session
133	Measurement of the Stochastic Electromagnetic Field Coupling to Transmission Line Networks of Single-Wire Lines Above a Ground Plane <u>Johanna Kasper</u> , Mathias Magdowski, Ralf Vick Otto von Guericke University Magdeburg, Germany	OS 6B
138	Proficiency Testing for Conducted Immunity with a new Round Robin Test Device <u>Emrah Tas</u> ¹ , Soydan Cakir ² , Mustafa Cetintas ² , Pavel Hamouz ³ , Thomas Isbring ⁴ , Miha Kokalj ⁵ , Daniel Lopez ⁶ , Urban Lundgren ⁴ , Dwi Mandaris ^{7,11} , Borut Pinter ⁵ , Martin Poriz ³ , Marc Pous ⁸ , Frederic Pythoud ¹ , Osman Sen ² , Ferran Silva ⁸ , Marek Svoboda ³ , Braise Trincas ⁹ , Dongsheng Zhao ¹⁰ ¹ Swiss Federal Institute of Metrology METAS, Switzerland; ² TUBITAK UME, Turkey; ³ Czech Metrology Institute, Czech Republic; ⁴ SP Technical Research Institute of Sweden, Sweden; ⁵ Slovenian Institute of Quality and Metrology, Slovenia; ⁶ National Institute of Aerospace Technology (INTA), Spain; ⁷ University of Twente, the Netherlands; ⁸ Universitat Politècnica de Catalunya, Spain; ⁹ National Laboratory of Metrology and Test, France; ¹⁰ Dutch Metrology Institute VSL, the Netherlands; ¹¹ Indonesian Institute of Sciences, LIPI, Indonesia	OS 7A
155	Distribution of Long Duration Current Impulses in a Test House Lightning Protection System and Electrical Equipment Grzegorz Masłowski, Stanisław Wyderka, Lesław Karpiński, Robert Ziemba, Grzegorz Karnas, Kamil Filik, Paweł Szczupak Rzeszow University of Technology, Poland	OS 9
157	Protection Strategy against IEMI for Wireless Communication Infra-structures <u>Stefan van de Beek</u> ¹ , Mirjana Stojilović ² , Nicolas Mora ³ , Marcos Rubinstein ² , Farhad Rachidi-Haeri ³ , Frank Leferink ^{1,4} ¹ University of Twente, Enschede, Netherlands; ² University of Applied Sciences and Arts Western Switzerland, Yverdon-les-Bains, Switzerland; ³ Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland; ⁴ Thales Nederland B.V., Hengelo, Netherlands	OS 13
173	Crosstalk between wire pairs above a composite ground plane <u>Jesper Lansink Rotgerink</u> ¹ , Fabian Happ ² , Jan-Joris van Es ¹ ¹ Netherlands Aerospace Centre, Netherlands, The; ² Technische Universität Hamburg-Harburg	OS 2B
253	Analysis of Conducted Emissions from an Electric Nacelle Anti-Ice Power Control System <u>Angela Nothofer</u> , Steve Greedy, Luca Tarisciotti University of Nottingham, United Kingdom	OS 12
280	Experimental Analysis for Metamaterials Used to Lower the LUF of a Reverberation Chamber <u>Dominique LEMAIRE</u> ¹ , Luis Felipe WANDERLINDER ¹ , Divitha SEETHARAMDOO ² ¹ AIRBUS, France; ² IFSTTAR, FRANCE	OS 6B
299	Near-Field Measurement Based Prediction of Antenna Test Results below 30 MHz in CISPR 25 Setups Zongyi Chen, <u>Stephan Frei</u> TU Dortmund University, Germany	OS 1A

Best Students Paper Award nominee

Paper ID	Title and authors	Session
225	Measurement and Wigner Function Analysis of Field-Field Correlation for Complex PCBs in Near Field <u>Mohd Baharuddin</u> , Hayan Nasser, Chris Smartt, David Thomas, Gabriele Gradoni, Stephen Creagh, Gregor Tanner The University of Nottingham, United Kingdom	OS 1A
296	Analysis of Transmission Characteristic of a Microstrip Line placed above a Ground Slot <u>Kunihiro Takamatsu</u> , Teruo Tobana, Yoji Isota, Takayuki Sasamori Akita Prefectural University, Japan	OS 2B
171	Plane Wave Coupling to an Aerial Electrical Cable. Assessment of Extreme Interference Levels with the Controlled Stratification Method Mourad Larbi ^{1,2} , <u>Philippe Besnier</u> ¹ , Bernard Pecqueux ² , Frédéric Puybaret ² ¹ IETR-UMR CNRS 6164, Rennes, France; ² CEA, DAM, GRAMAT, F-46500, Gramat, France	OS 2C
119	Inverse Fourier Transform Technique of Measuring Averaged Absorption Cross Section in the Reverberation Chamber and Monte Carlo Study of its Uncertainty <u>Xiaotian Zhang</u> , Martin P. Robinson, Ian D. Flintoft, John F. Dawson University of York, United Kingdom	OS 6C
202	Predicting Shielding Effectiveness of Populated Enclosures Using Absorption Cross Section of PCBs <u>Sarah L. Parker</u> ¹ , Ian D. Flintoft ¹ , Andy C. Marvin ¹ , John F. Dawson ¹ , Simon J. Bale ¹ , Martin P. Robinson ¹ , Ming Ye ² , Changyong Wan ³ , Mengze Zhang ³ ¹ University of York, United Kingdom; ² Huawei Technologies AB, Kista, Sweden; ³ Huawei Technologies Co. Ltd, Shenzhen, People's Republic of China	OS 8
172	Comparison of Active Levelling and Pre-Calibrating/Substitution Method for Radiated Immunity Testing of Large Equipment <u>Dwi Mandaris</u> ^{1,5} , Soydan Cakir ² , Osman Sen ² , Daniel Lopez Sanz ³ , Maria Jimenez Lorenzo ³ , Frank Leferink ^{1,4} , Marek Svoboda ⁶ , Pavel Hamouz ⁶ ¹ University of Twente, Enschede, The Netherlands; ² Electromagnetic Laboratory, TUBITAK UME, Kocaeli/Turkey; ³ EMC Laboratory INTA, Madrid, Spain; ⁴ Thales Netherlands, Hengelo, The Netherlands; ⁵ Research Center for quality System and Testing Technology - LIPI, Serpong, Indonesia; ⁶ Czech Metrology Institute, Electromagnetic Compatibility Laboratory, Brno, Czech Republic	OS 15
231	On Determining the Directivity of Electrically Large, Unintentional Electromagnetic Radiators - Assessment of a Real Electronic Equipment <u>Benjamin Menssen</u> , Henrik Brech, Heyno Garbe Leibniz Universität Hannover, Germany	OS 15
247	A Highly EMI-Immune Folded Cascode OpAmp in 0.18 μm CMOS Technology <u>Subrahmanyam Boyapati</u> ¹ , Jean-Michel Redoute ² , Maryam Shojaei Baghini ¹ ¹ IITB-MONASH RESEARCH ACADEMY, IIT-Bombay, India; ² MONASH University, AUSTRALIA	OS 16

Schedule at glance

	Monday	Tuesday	Wednesday	Thursday	Friday
9:00		OPENING CEREMONY		PLENARY SESSION 2 (Keynote 2)	
9:30		PLENARY SESSION 1 (Keynote 1)	ORAL SESSIONS		WORKSHOPS & TUTORIAL
10:00			INDUSTRIAL FORUM I	COFFEE BREAK	
10:30	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK
11:00					
11:30	WORKSHOPS & TUTORIAL	ORAL SESSIONS	ORAL SESSIONS	WORKSHOP	WORKSHOPS & TUTORIAL
12:00		MEETINGS	INDUSTRIAL FORUM II	ORAL SESSIONS	
12:30				POSTER SESSION 2	
13:00	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
13:30			MEETING		
14:00		POSTER SESSION 1			
14:30	WORKSHOPS & TUTORIAL	ORAL SESSIONS	ORAL SESSIONS	WORKSHOP	WORKSHOPS & TUTORIAL
15:00	MEETING		DEMONSTRATIONS & EXPERIMENTS	ORAL SESSIONS	MEETING
15:30	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK
16:00					
16:30	WORKSHOPS & TUTORIAL	ORAL SESSIONS	ORAL SESSIONS	WORKSHOP	WORKSHOPS & TUTORIAL
17:00	MEETINGS		INDUSTRIAL FORUM III	ORAL SESSIONS	
17:30				MEETINGS	
18:00					
18:30					
19:00		WELCOME COCTAIL			
19:30					
20:00			SYMPOSIUM BANQUET	ISC DINNER	
20:30					
21:00					
21:30					
22:00					

Monday, 5th September 2016 – Workshops & Tutorials

TIME	SESSION or BREAK					
10:30	Coffee break (conference building C-13, hall)					
ROOM TIME	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room D (bldg. C-13 / 1.27)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)
11:00	Workshop 1A Techniques for Measurement and Characterisation of complex multi-functional (digital) systems (1) Organizer/Chair: David Thomas University of Nottingham United Kingdom	Tutorial 1A EMC for Large Installations (1) Organizer/Chair: Frits Buesink University of Twente The Netherlands	Workshop 2A EMC Troubleshooting Methods and New Measurement Techniques Using Oscilloscopes (1) Organizer/Chair: Mike Hertz Teledyne LeCroy USA	Workshop 3 High Power Electromagnetic (HPEM) threats and immunity test methods attacks Organizer/Chair: Nicolas Mora Montena Technology SA Switzerland		
12:30	Lunch (Canteen, building C-18, Hoene-Wronskiego Str. 10)					
14:00	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room D (bldg. C-13 / 1.27)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)
	Workshop 1B Techniques for Measurement and Characterisation of complex multi-functional (digital) systems (2) Organizer/Chair: David Thomas University of Nottingham United Kingdom	Tutorial 1B EMC for Large Installations (2) Organizer/Chair: Frits Buesink University of Twente The Netherlands	Workshop 2B EMC Troubleshooting Methods and New Measurement Techniques Using Oscilloscopes (2) Organizer/Chair: Mike Hertz Teledyne LeCroy USA	Workshop 4 Detection, localization and identification of HPEM attacks Organizers/Chairs: Nicolas Mora Werner Hirschi Montena Technology SA Switzerland		Meeting 4 meeting of Expert Group 7 - EEE of EDSTAR Chair: Frank Leferink University of Twente - THALES, NL
15:30	Coffee break (conference building C-13, hall)					
16:00	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room D (bldg. C-13 / 1.27)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)
	Workshop 5 New AECTP 500 and MIL-STD 461G Organizer/Chair: Frank Leferink University of Twente - THALES, The Netherlands	Tutorial 1C EMC for Large Installations (3) Organizer/Chair: Frits Buesink University of Twente The Netherlands	Workshop 6 Power versus Field: A Novel Approach to Immunity Testing above 1 GHz Organizer/Chair: Ammar Sarwar Lukasz Wilk ETS Lindgren (EMEA)	Workshop 7 Automation of EMI Testing using a Time Domain EMI Measurement System up to 40GHz Organizers/Chairs: Stephan Braun Gauss Instruments Germany	Meeting 1 COST IC 1407 Meeting Organizer/Chair: David Thomas University of Nottingham United Kingdom	
17:00						Meeting 2 IEC SC77B and CISPR-A JWG "Reverberation Chamber" Meeting Organizer/Chair: Mathias Magdowski Otto von Guericke University, Germany
17:30						
18:00						

Tutorials

TUT 1	TUTORIAL 1	Time: 11:00 - 17:30
EMC FOR LARGE INSTALLATIONS		
Chaired by:	Frits Buesink, University of Twente, the Netherlands	Room: B (C-13)
Speakers:	Frits Buesink (University of Twente)	
Sessions:	Abstract:	
TUT 1A (11 00 - 12 30)	Building large installations that perform their tasks over their full lifetime undisturbed by electromagnetic effects within and outside the installation is no trivial matter. This tutorial conveys this message using many practical experiments and demonstrations first to show the relevant electromagnetic phenomena and then effective measures to mitigate their influence. The main objective is awareness of the effects and how complex installations can be hierarchically decomposed into electromagnetically independent modules. This allows for abstraction and the task of integrating these modules is manageable as the integrator can focus on the module specifications without the burden of hidden interference risks.	
<i>Lunch</i>		
TUT 1B (14 00 - 15 30)		
<i>Coffee break</i>		
TUT 1C (16 00 - 17 30)	Programme:	
TUT 1A session		Time: 11:00 - 12:30
EMC for Large Installations		
Frits Buesink (1), Kees Post (2)		
(1) University of Twente, Enschede, the Netherlands		
(2) Lambda Engineering, Hilversum, the Netherlands		
TUT 1B session		Time: 14:00 - 15:30
EMC for Large Installations (continuation)		
Frits Buesink (1), Kees Post (2)		
(1) University of Twente, Enschede, the Netherlands		
(2) Lambda Engineering, Hilversum, the Netherlands		
TUT 1C session		Time: 16:00 - 17:30
EMC for Large Installations (continuation)		
Frits Buesink (1), Kees Post (2)		
(1) University of Twente, Enschede, the Netherlands		
(2) Lambda Engineering, Hilversum, the Netherlands		

Workshops

WS 1	WORKSHOP 1	Time: 11:00 - 15:30
TECHNIQUES FOR MEASUREMENT AND CHARACTERISATION OF COMPLEX MULTI-FUNCTIONAL (DIGITAL) SYSTEMS		
Chaired by:	Dave Thomas, University of Nottingham, UK	Room: A (C-13)

Speakers: Dave Thomas (University of Nottingham), Anders P. Mynster (DELTA), Johannes A. Russer (Technical University of Munich), S. L. Parker (University of York), A. C. Marvin (University of York), J. F. Dawson (University of York), Yuri Kuznetsov (Moscow Aviation Institute), Andrey Baev (Moscow Aviation Institute)

Sessions: Abstract:

WS 1A
(11:00 - 12:30)

Lunch

WS 1B
(14:00 - 15:30)

The development of high performance and highly integrated miniature electronic systems with increased functionality makes the assessment of electromagnetic interference more complex. Particular challenges will be the wideband communications, multiple modulated digital clocks with time dependent emissions and immunity. Immunity levels will also decrease due to lower supply voltages and lower signal power levels. Traditionally, the potential EMI sources were assessed in the frequency domain assuming static emissions. This is not valid for multifunctional devices with many operating modes. New approaches that fully account for time dependence and uncertainty are needed.

The workshop will present some state-of-the-art methods and experiences in the measurement of complex electronic devices.

Primary Audience:

Product designers, test engineers, product regulatory personnel and those that work on EMC measurement and design standards.

Workshop is sponsored by COST IC 1407 : Advanced Characterisation and Classification of Radiated Emissions in Densely Integrated Technologies (ACCREDIT)

Programme:

WS 1A session	Time: 11:00 - 12:30
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The time domain measurement and characterisation of Electromagnetic Interference from printed circuit boards

Dave Thomas (1), Christopher Smartt (1), Gregor Tanner (2), Gabriele Gradoni (2), Stephen C. Creagh (2)

(1) The Department of Electrical and Electronic Engineering, University of Nottingham, UK

(2) The Department of Mathematical Sciences, University of Nottingham, UK

EMC testing IoT devices and Drones

Anders P. Mynster

DELTA – Danish electronics, lights and acoustics

Modeling and Analysis of Stationary and Cyclostationary Noisy EM Fields

Johannes A. Russer, Peter Russer

Technical University of Munich, Germany

WS 1B session

Time: 14:00 - 15:30

Modeling and Analysis of Stationary and Cyclostationary Noisy EM Fields (continuation)

Johannes A. Russer, Peter Russer
Technical University of Munich, Germany

Enclosure Shielding; Studies of the Effects of Circuit Cards in Enclosures and the use of Surrogate Circuit Cards for Shielding Measurement

S. L. Parker (1), I. D. Flintoft (1), A. C. Marvin (1), J. F. Dawson (1), S. J. Bale (1), M. P. Robinson (1) & J. Yan1 Ming Ye (2), Changyong Wan (2), Mengze Zhang2

(1) University of York, Department of Electronics

(2) HUAWEI Technologies

Cyclostationary characterization of unintentional stochastic radiations and time-domain detection of stochastic signals with cyclostationary properties

Yury Kuznetsov, Andrey Baev
Theoretical Radio Engineering Department, Moscow Aviation Institute (National Research University), Russian Federation

WS 2

WORKSHOP 2

Time: 11:00 - 15:30

EMC TROUBLESHOOTING METHODS AND NEW MEASUREMENT TECHNIQUES USING OSCILLOSCOPES

Chaired by: Mike Hertz, Teledyne LeCroy, USA

Room: **C** (C-13)

Speakers: Mike Hertz (Teledyne LeCroy)

Sessions: Abstract:

WS 2A
(11:00 - 12:30)

Lunch

WS 2B
(14:00 - 15:30)

This presentation provides new measurement and troubleshooting techniques for EMC testing using oscilloscopes and includes topics such as how thresholds affect pulse measurement, why standard pulse parameters are not compatible with EMC pulses, measurement thresholds for ESD pulses, sequenced acquisition for EFT (Electrical Fast Transient) burst analysis, parameter limiters applied to filter EMC pulse statistics, methods for performing EMC testing, ESD pulse verification, energy of the loaded pulse, voltage below battery, surge testing and how to perform accurate RC time constant measurements

Programme:

WS 2A session

Time: 11:00 - 12:30

EMC Troubleshooting Methods and New Measurement Techniques Using Oscilloscopes

Mike Hertz
Teledyne LeCroy, United States of America

WS 2B session

Time: 14:00 - 15:30

EMC Troubleshooting Methods and New Measurement Techniques Using Oscilloscopes

Mike Hertz
Teledyne LeCroy, United States of America

WS 3

WORKSHOP 3

Time: 11:00 - 12:30

HIGH POWER ELECTROMAGNETIC (HPEM) THREATS AND IMMUNITY TEST METHODS ATTACKS

Chaired by: Nicolas Mora, Montena Technology SA, Switzerland

Room: **D** (C-13)

Speakers: Nicolas Mora (Montena Technology SA)

Sessions: Abstract:

WS 3
(11:00 - 12:30)

In this workshop, a general overview of man-made high power electromagnetic (HPEM) interference sources is presented. The main immunity test methods according to some of the available standards are explained with an emphasis in protection against nuclear electromagnetic pulses (NEMP) according to the MIL standards.

Programme:

WS 3 session

Time: 11:00 - 12:30

High Power Electromagnetic (HPEM) Threats and Immunity Test Methods Attacks

Nicolas Mora
Montena Technology SA, Switzerland

WS 4

WORKSHOP 4

Time: 14:00 - 15:30

DETECTION, LOCALIZATION AND IDENTIFICATION OF HPEM ATTACKS

Chaired by: Nicolas Mora, Montena Technology SA, Switzerland

Werner Hirschi, Montena Technology SA, Switzerland

Room: **D** (C-13)

Speakers: Nicolas Mora (Montena Technology SA), Werner Hirschi (Montena Technology SA)

Sessions: Abstract:

WS 4
(14:00 - 15:30)

This workshop presents an overview of the capabilities of publicly re-reported high-power electromagnetic (HPEM) radiators, and the global considerations for their detection, identification and localization. A de-tetection, identification and localization system that uses a novel ap-proach for measuring the characteristics such signals with inexpensive, off-the-shelf components is also presented.

Programme:

WS 4 session

Time: 14:00 - 15:30

Detection, Localization AND Identification OF HPEM Attacks

Nicolas Mora, Werner Hirschi
Montena Technology SA, Switzerland

WS 5	WORKSHOP 5	Time: 16:00 - 17:30
NEW AECTP 500 AND MIL-STD 461G		
Chaired by:	Frank Leferink, University of Twente – THALES, the Netherlands	Room: A (C-13)

Speakers: Frank Leferink (University of Twente – THALES)

Sessions: Abstract:

WS 5
(16:00 - 17:30)

The MIL-STD 461G has been published in December 2015 and the NATO AECTP 500 in January 2016. The NATO STANAG 4370, which contains the AECTP procedures, is the preferred standard for defence procurement in Europe. The AECTP is also the preferred standard to show compliance with the essential requirements of the European EMC Directive.

In this session we will discuss the changes: which test methods have been added, what has been removed, and what are the consequences for industry and ministries of defence (MoDs). Some AECTP 500 parts remained the same, but for instance the AECTP 507 has been completely re-written and now contains much more best-practices from especially the German VG and United Kingdom Def-Stan standards.

Programme:

WS 5 session

Time: 16:00 - 17:30

New AECTP 500 and MIL-STD 461G

Frank Leferink
University of Twente - THALES, the Netherlands

WS 6	WORKSHOP 6	Time: 16:00 - 17:30
POWER VERSUS FIELD: A NOVEL APPROACH TO IMMUNITY TESTING ABOVE 1 GHz		
Chaired by:	Lukasz Wilk, ETS Lindgren (EMEA)	Room: C (C-13)

Speakers: Ammar Sarwar (ETS Lindgren (EMEA)), Lukasz Wilk (ETS Lindgren (EMEA))

Sessions: Abstract:

WS 6
(16:00 - 17:30)

An EMField generator is shown as a novel, integrated solution for radiated immunity testing, including IEC 61000-4-3. The novel solution combines an amplifier, directional couplers, and an antenna array into one simplified and compact design to support fully compliant testing. It is shown that virtually all of the generated power is converted into useable field strength. The presentation includes a review of theory, design concept, functionality, setup configuration, main applications and more.

Programme:

WS 6 session

Time: 16:00 - 17:30

Power versus Field: A Novel Approach to Immunity Testing above 1 GHz

Ammar Sarwar, Lukasz Wilk
ETS Lindgren (EMEA)

WS 7	WORKSHOP 7	Time: 16:00 - 17:30
AUTOMATION OF EMI TESTING USING A TIME DOMAIN EMI MEASUREMENT SYSTEM UP TO 40 GHz		
Chaired by:	Stephan Braun, Gauss Instruments, Germany	Room: D (C-13)

Speakers: Stephan Braun (Gauss Instruments), Arnd Frech (Gauss Instruments), Denny Prawira (Gauss Instruments)

Sessions: Abstract:

WS 7
(16:00 - 17:30)

With the integration of the FFT-based measuring instrument into the basic standards and product standards for commercial and military application also new test procedures become available to perform automated EMI testing.

The operation and the mathematical equivalence of the FFT-based measuring instrument is discussed.

Based on the example of a time-domain EMI measurement system with 645 MHz real-time Bandwidth and 6 GHz Real-time scanning bandwidth measurement procedures are presented to perform conducted, disturbance power, radiated emission Measurements from DC - 40 GHz. The measurement procedures are compared with the conventional procedures that are today performed with superheterodyne receivers.

Strategies that combine both methods are also discussed.

Programme:

WS 7 session

Time: 16:00 - 17:30

Automation of EMI Testing Using a Time Domain EMI Measurement System up to 40 GHz

Stephan Braun, Arnd Frech, Denny Prawira
Gauss Instruments, Munich Germany

Meetings

MEETING 9	Time: 14:00 - 15:30
MEETING OF EXPERT GROUP 7 - EEE OF EDSTAR	
Chaired by:	Frank Leferink, University of Twente - THALES, the Netherlands
	Room: F (C-13)

MEETING 1	Time: 16:00 - 18:00
COST IC 1407 MEETING	
Chaired by:	Dave Thomas, University of Nottingham, UK
	Room: E (C-13)

MEETING 2	Time: 17:00 - 18:00
IEC SC77B AND CISPR-A JWG "REVERBERATION CHAMBER" MEETING	
Chaired by:	Mathias Magdowski, Otto von Guericke University, Germany
	Room: F (C-13)

Tuesday, 6th September 2016 – 1st Symposium day

TIME	SESSION or BREAK					
9:00	Opening ceremony Chairs: Tadeusz W. Więkowski, Grzegorz Masłowski (Location: building A1, Aula)					
9:30	Keynote 1 Chair: Grzegorz Masłowski (location: building A1, Aula)					
10:30	Coffee break (conference building C-13, hall)					
ROOM TIME	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)	Poster Area (bldg. C-13 / hall)
11:00	OS 1A (O_Tu_A1) Measurement Techniques (1) Chair: Davy Pissoot KU Leuven, Belgium	OS 2A (O_Tu_B1) EMC Analysis, Modelling, Prediction (1) Chair: Mohamed Ramdani ESEO, France	OS 3 (O_Tu_C1) Standards Chair: Zbigniew Joskiewicz Wrocław Univ. of Science and Technology, Poland	Meeting 3 IEEE EMC-S PL & EMC Section (KEIT PAN) Technical Meeting Chair: Grzegorz Masłowski Rzeszów University of Technology, Poland		
12:30	Lunch (Canteen, building C-18, Hoene-Wronskiego Str. 10)				Meeting 4 IEEE Region 8 Chapter retreat Chair: Frank Leferink University of Twente - THALES, NL	
13:30						P 1 Poster session 1 (13:30 – 15:30) Chairs: Tadeusz W. Więkowski, Tomasz Utkowski Wrocław Univ. of Science and Technology, Poland
	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)	
14:00	OS 1B (O_Tu_A2) Measurement Techniques (2) Chair: Andy Marvin University of York, York EMC Services, United Kingdom	OS 2B (O_Tu_B2) EMC Analysis, Modelling, Prediction (2) Chair: Jan Carlsson Provvinn, Sweden	OS 4 (O_Tu_C2) Smart meters and PLC Chair: David Thomas University of Nottingham, United Kingdom			
15:30	Coffee break (conference building C-13, hall)					
	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room E (bldg. C-13 / 0.31)	Room F (bldg. C-13 / 0.32)	Poster Area (bldg. C-13 / hall)
16:00	OS 1C (O_Tu_A3) Measurement Techniques (3) Chair: Jan Luiken ter Haseborg Hamburg University of Technology, Germany	OS 2C (O_Tu_B3) EMC Analysis, Modelling, Prediction (3) Chair: Valter Mariani Primiani Università Politecnica delle Marche, Italy	OS 5 (O_Tu_C3) Power electronics and systems Chair: David Thomas University of Nottingham, United Kingdom			
17:50						
18:00 - 21:00	Welcome Cocktail (building A1, Hall)					

OPENING CEREMONY

Time: 9:30 - 10:30

Chaired by: Tadeusz W. Wieckowski, Grzegorz Maslowski

Room: **Aula (A-1)**

Welcome addresses:

- **Prof. Dr.-Ing. Tadeusz W. Więckowski**, EMC Europe 2016 Wroclaw Symposium Chair
Wroclaw University of Science and Technology, Poland
- **Prof. Andy Marvin**, Chairman of the International Steering Committee (ISC) of EMC Europe
University of York, York EMC Services Ltd, United Kingdom
- **Prof. Heyno Garbe**, Vice President of the IEEE EMC Society - Member Service
Leibniz University of Hannover, Germany
- **Prof. Mohamed Ramdani**, EMC Europe 2017 Angers Symposium Chair
ESEO Institute of Science and Technology, France
- **Dr. Zbigniew Jóskiewicz**, EMC Europe 2016 Wroclaw Symposium Vice-Chair
Wroclaw University of Science and Technology, Poland

KN 1

Time: 9:30 - 10:30

KEYNOTE 1

Chaired by: Grzegorz Maslowski

Room: **Aula (A-1)**

EMI Evaluation and Immunity Testing Methods for Wearable devices

Jianqing Wang
Nagoya Institute of Technology, Japan

Abstract:

Increasing aging population is leading to a wide-scale demand in healthcare and medical applications. This makes various wearable devices with vital signal sensing and communication functions be developed and put into the market in a high speed. However, EMC evaluation and immunity testing methods for these wearable devices have not been well established because of their too rapid advances.

This talk consists of two parts. In the first part, we will show a two-step approach to quantitatively evaluate the EMI for a wearable device in the design stage. The approach combines electromagnetic field analysis and electronic circuit analysis, and clarifies that the main reason for changing a common mode interference voltage induced by external electromagnetic field into a differential mode interference voltage is due to an imbalance of impedance in the vital signal sensing circuits. In the second part, we will introduce an immunity testing system which consists of a pseudo vital signal generator and a biological-equivalent phantom. By applying this testing system to an artificial hand system in an electrostatic discharge (ESD) test, we demonstrate its usefulness for immunity testing of wearable devices.

Oral sessions

OS 1A (O_Tu_A1)	ORAL SESSION	Time: 11:00 - 12:30
MEASUREMENT TECHNIQUES (1)		
Chaired by:	Davy Pissort, KU Leuven, Belgium	Room: A (C-13)

- 11:00 **Localization of the Equivalent Sources on the PCB Surface by Using Ultra-Wideband Time Domain Near-Field Measurements**
Yury Kuznetsov¹, Andrey Baev¹, Anastasia Gorbunova¹, Maxim Konovalyuk¹, David Thomas², Christopher Smartt², Mohd H. Baharuddin², Johannes A. Russer³, Peter Russer³
¹Moscow Aviation Institute (National Research University), Moscow, Russian Federation;
²University of Nottingham, Nottingham, United Kingdom; ³Technische Universitaet Muenchen, Munich, Germany
- 11:22 **Measurement and Wigner Function Analysis of Field-Field Correlation for Complex PCBs in Near Field**
Mohd Baharuddin, Hayan Nasser, Chris Smartt, David Thomas, Gabriele Gradoni, Stephen Creagh, Gregor Tanner
 The University of Nottingham, United Kingdom
- 11:45 **Correlation Measurement and Evaluation of Stochastic Electromagnetic Fields**
Johannes A. Russer¹, Michael Haider¹, Mohd Baharuddin², Christopher Smartt², Andrey Baev³, Sidina Wane⁴, Damienne Bajon⁵, Yury Kuznetsov³, David Thomas², Peter Russer¹
¹Technische Universität München, Germany; ²University of Nottingham; ³Moscow Aviation Institute; ⁴NXP-Semiconductors; ⁵ISAE-Universite de Toulouse
- 12:07 **Near-Field Measurement Based Prediction of Antenna Test Results below 30 MHz in CISPR 25 Setups**
 Zongyi Chen, Stephan Frei
 TU Dortmund University, Germany

OS 2A (O_Tu_B1)	ORAL SESSION	Time: 11:00 - 12:30
EMC ANALYSIS, MODELLING, PREDICTION (1)		
Chaired by:	Mohamed Ramdani, ESEO, France	Room: B (C-13)

- 11:00 **On the Choice of Huygens' Surfaces in the Vicinity of Electrically Small Apertures**
Fabian Happ, Gazmend Mavraj, Heinz-D. Brüns, Frank Gronwald
 Technische Universität Hamburg-Harburg, Germany
- 11:22 **Passivity Considerations for Sub-Gridded FDTD with Discrete Complex Wave Impedance**
Ata Zadehgo
 University of Idaho, United States of America
- 11:45 **Transient Excitation of Nonlinearly Loaded Resonators and Observation of System Responses in Time Domain**
Miroslav Kotzev¹, Matthias Kreitlow², Frank Gronwald¹
¹Technische Universität Hamburg-Harburg, Hamburg, Germany; ²Bundeswehr Research Institute for Protective Technology and NBC Protection Munster, Germany
- 12:07 **A Novel Method for Equivalent Circuit Synthesis from Frequency Response of Multi-port Networks**
Ata Zadehgo, Venkatesh Avula
 University of Idaho, United States of America

OS 3A (O_Tu_C1) ORAL SESSION Time: 11:00 - 12:30

STANDARDS

Chaired by: Zbigniew Jóskiewicz, Wrocław University of Science and Technology, Poland

Room: **C (C-13)**

- 11:00 **Updated AECTP 250 and AECTP 500 standards for military equipment, as preferred in EDSTAR**
Frank Leferink¹, Edwin van Bladel²
¹University of Twente - THALES, The Netherlands; ²Royal Netherlands Air Force, The Netherlands
- 11:22 **Study on test signals for radiated immunity test in close proximity to equipment**
Naomichi Nakamura, Yuichiro Okugawa, Yoshiharu Hiroshima, Kazuhiro Takaya
 NTT, Japan
- 11:45 **EMC for the IoT**
Anders Pilgaard Mynster, Per Thåstrup Jensen
 DELTA, Denmark
- 12:07 **Tackling the Issue of Non-Compliant Products with a New EMC Directive**
Nick Wainwright
 York EMC Services, United Kingdom

OS 1B (O_Tu_A2) ORAL SESSION Time: 14:00 - 15:30

MEASUREMENT TECHNIQUES (2)

Chaired by: Andy Marvin, University of York, York EMC Services Ltd, United Kingdom

Room: **A (C-13)**

- 14:00 **A Study of The Effects of Truncation Errors on the Compensation of EMI Near-Field Probes**
Tim Claeys^{1,3}, Guy A. E. Vandenbosch³, Davy Pissoot^{1,2}
¹KU Leuven Technology Campus Ostend, Department of Electrical Engineering, Remi, Ostend, Belgium; ²KU Leuven, Department of Electrical Engineering, MICroelectronics And Sensors, Heverlee, Belgium; ³KU Leuven, Department of Electrical Engineering, TELEcommunications and MICrowaves, Heverlee, Belgium
- 14:22 **Diagnosing EMI Problems Using Real-Time Spectrum Analysis**
Mark Terrien
 Keysight Technologies, United States of America
- 14:45 **Hidden Aspects in CISPR 16-1-1 Full Compliant Fast Fourier Transform EMI Receivers**
Mario Monti, Elena Puri, Massimo Monti
 Elettronica Mon i, Italy
- 15:07 **Using Cs and Rb Rydberg Atoms Simultaneously for SI-Traceable RF Electric-Field Metrology via Electromagnetically Induced Transparency**
Christopher Holloway, Matt Simons, Josh Gordon
 NIST, United States of America

OS 2B (O_Tu_B2) ORAL SESSION Time: 14:00 - 15:30

EMC ANALYSIS, MODELLING, PREDICTION (2)

Chaired by: Prof. Jan Carlsson, Provinn, Sweden

Room: **B (C-13)**

- 14:00 **Crosstalk characterization of fabrics elaborated with conductive yarns**
Raúl Fernández-García¹, Ignacio Gil¹, Francesc Cano², Ferran Pares³
¹Department of Electronic Engineering, Universitat Politècnica de Catalunya, Spain;
²INTEXTER, Universitat Politècnica de Catalunya, Spain; ³Department of Textile and Paper Engineering, Universitat Politècnica de Catalunya, Spain
- 14:22 **Crosstalk between wire pairs above a composite ground plane**
Jesper Lansink Rotgerink¹, Fabian Happ², Jan-Joris van Es¹
¹Netherlands Aerospace Centre, Netherlands, The; ²Technische Universität Hamburg-Harburg
- 14:45 **Analysis of Transmission Characteristic of a Microstrip Line placed above a Ground Slot**
Kunihiro Takamatsu, Teruo Tobana, Yoji Isota, Takayuki Sasamori
 Akita Prefectural University, Japan
- 15:07 **Maximum Environmental Electric Field Using Extreme Value Theory**
Bruno Audone¹, Roberto Colombo²
¹EMC Consultant, Italy; ²IMQ EMC Lab manager

OS 3 (O_Tu_C2) ORAL SESSION Time: 14:00 - 15:30

SMART METTERS AND PLC

Chaired by: David Thomas, The University of Nottingham, United Kingdom

Room: **C (C-13)**

- 14:00 **EMI Examination of the Low-Voltage Grid in the Frequency Range from 9 kHz to 2 MHz Focussing on Noise Level, Impedance, Attenuation and the Impact on PLC Data Transmission**
Mike Trautmann¹, Sebastian Jeschke¹, Sascha Grigo¹, Margarethe Malek¹, Holger Hirsch¹, Tobias Pletzer², Christof Hartmann², Norbert van Lier², Sebastian Ponzelar²
¹University Duisburg-Essen, Germany; ²devolo AG, Germany
- 14:22 **Investigation of Smart Meters Using G3 PLC**
Margarethe Malek, Daniel Ketel, Holger Hirsch, Mike Trautmann
 University of Duisburg-Essen, Germany
- 14:45 **EN50561-3: not an EMC Standard, but an Unacceptable Licence to Cause Interference**
Frank Leferink^{1,2}, Alain Alcaras³, Jaap Schuurmans², Maarten Appelman^{2,4}
¹THALES Netherlands, Hengelo, The Netherlands; ²University of Twente, Enschede, The Netherlands; ³THALES Communications, Cholet, France; ⁴Saxion University of Applied Science, Enschede, The Netherlands
- 15:07 **Runaway Energy Meters due to Conducted Electromagnetic Interference**
Frank Leferink^{1,2}, Cees Keyser^{1,3}, Anton Melentjev³
¹University of Twente, Enschede, The Netherlands; ²THALES, Hengelo, The Netherlands; ³University of Applied Science, Amsterdam, The Netherlands

OS 1C (O_Tu_A3)

ORAL SESSION

Time: 16:00 - 17:30

MEASUREMENT TECHNIQUES (3)

Chaired by: Jan Luiken ter Haseborg , Hamburg University of Technology, Germany

Room: **A (C-13)**

- 16:00 **Proposal of Polarization Dependence Limit based on the Test Arrangement of Radiated Emission Measurement in FAR Test Site**
Kunihiro Osabe¹, Shinichi Okuyama²
¹VCCI, Japan; ²NEC Platforms, Ltd.
- 16:22 **Study on Improving the Reproducibility of Radiated Emission Measurement in a Fully Anechoic Room by Using VHF-LISN**
Shinichi Okuyama¹, Nobuo Kuwabara², Masanori Yamaguchi³, Kunihiro Osabe⁴
¹VCCI Council / NEC Platforms, Ltd., Japan; ²Kyushu Institute of Technology; ³EMC Education; ⁴VCCI Council
- 16:45 **Analysis and Verification of Test Site Validation Method by Using Newly Calculated NSA Values According to the Antenna Feed Point Below 30 MHz**
Seungwoo Lee¹, Nam Kim¹, Hong-Sik Keum², Jun-Kyu Yang³
¹Chungbuk National University, Korea, Republic of South Korea; ²Korea Radio Promotion Association, Korea, Republic of South Korea; ³National Radio Research Agency, Korea, Republic of South Korea
- 17:07 **Analysis of Repeatability and Uncertainty Issues in Radiated Emission Tests Regarding HDMI Ports**
 Sezgin Hilavin¹, Cem Cengiz Keskin¹, Engin Kodali¹, İsmail Y İmazlar¹, Emre Ardalı¹, İrem Hilavin²
¹Vestel Electronics, Turkey; ²Dokuz Eylül University the Graduate School of Natural and Applied Sciences, İzmir

OS 2C (O_Tu_B3)

ORAL SESSION

Time: 16:00 - 17:50

EMC ANALYSIS, MODELLING, PREDICTION (3)

Chaired by: Prof. Valter Mariani Primiani, Università Politecnica delle Marche, Italy

Room: **B (C-13)**

- 16:00 **A Statistical Approach to Detect Immunity Degradations**
Bruno Audone¹, Roberto Colombo²
¹EMC Consultant, Italy; ²IMQ EMC lab manager
- 16:20 **Plane Wave Coupling to an Aerial Electrical Cable. Assessment of Extreme Interference Levels with the Controlled Stratification Method**
 Mourad Larbi^{1,2}, Philippe Besnier¹, Bernard Pecqueux², Frédéric Puybarel²
¹IETR-UMR CNRS 6164, Rennes, France; ²CEA, DAM, GRAMAT, F-46500, Gramat, France
- 16:40 **Simulation of Bulk Current Injection Test Using Integrated Circuit Immunity Macro Model and Electromagnetic Analysis**
Yosuke Kondo^{1,2}, Shinichiro Ueyama¹, Masato Izumichi¹, Osami Wada²
¹DENSO CORPORATION, Japan; ²Graduate School of Engineering, Kyoto University, Japan
- 17:10 **Analysis of Electromagnetic Coupling Between Microstrip Line and Ground Slot on a Printed Circuit Board**
Teruo Tobana, Takayuki Sasamori, Yoji Isota
 Akita Prefectural University, Japan

18:30 **A Method to Model Pigtails of Shielded Cables when Using the Combined MoM/MTL Approach**

Morgan Vincent^{1,2}, Marco Klingler¹, Zouheir Riah², Yacine Azzouz²

¹PSA Peugeot Citroen, DRD/DRIA/DSTF/SIEP, Vélizy-Villacoublay, France;

²IRSEEM/ESIGELEC, Electron. & Syst. Group, Saint-Etienne du Rouvray, France

OS 5 (O_Tu_C3)

ORAL SESSION

Time: 16:00 - 17:30

POWER ELECTRONICS AND SYSTEMS

Chaired by: David Thomas, The University of Nottingham,
United Kingdom

Room: **C (C-13)**

16:00 **Frequency Domain EMI-Simulation and Resonance Analysis of a DCDC-Converter**

Philipp Hillenband¹, Jan Hansen², Martin Böttcher², Stefan Tenbohlen¹

¹University of Stuttgart, Germany; ²Robert Bosch GmbH, Germany

16:22 **Design by Optimization of Power Electronics Converter Including EMC Constraints**

Mylene DELHOMMAIS¹, Gnimdu DADANEMANA², Yvan AVENAS¹, Francois COSTA²,
Jean-Luc SCHANEN¹, Christian VOLLAIRES³

¹G2ELab Univ Grenoble Alps, France; ²SATIE - ENS CACHAN, France; ³AMPERE - Ecole Centrale de Lyon, France

16:45 **Determination of Radiated Emissions from Wind Energy Conversion Systems**

Sebastian Koj, Sven Fisahn, Heyno Garbe

Leibniz Universitaet Hannover, Germany

17:07 **A comparative study on conducted noise characteristics of SiC and GaN power transistor**

Takaaki Ibuchi, Tsuyoshi Funaki

Osaka University, Japan

Posters

P 1

POSTER SESSION

Time: 13:30 - 15:30

POSTER SESSION 1

Chaired by: Tadeusz W. Więckowski, Tomasz Utkowski,
Wroclaw Univ. of Science and Technology, Poland

**Poster
area (C-13)**

P1 (1) **Analysis of Shielding Effectiveness for Fiber Reinforced Composites with Microstructures of Rectangle Array of Inclusions**

Yi Liao¹, Liming Yuan¹, Jianfeng Shi², Yuan Zhang¹

¹Shanghai Key Laboratory of Electromagnetic Environmental Effects for Aerospace Vehicle, People's Republic of China; ²Shanghai Aircraft Design and Research Institute

P 1 (2) **Protection Criteria for Sharing Spectrum UE LTE-800 and Air-Traffic Control Radars Based on Experimental Comparability Results**

Valery Tikhvinskiy^{1,2}, Grigory Bochechka^{1,2}, Pavel Korchagin³, Shakhmaran Seilov⁴, Andrey Gryazev⁵

¹Icominvest, Russian Federation; ²Moscow Technical University of Communications and Informatics, Russian Federation; ³Geyser-Telecom Ltd, Russian Federation; ⁴L.N. Gumilyov Eurasian National University, Kazakhstan; ⁵Federal State Unitary Enterprise Central Science Research Telecommunication Institute, Russian Federation

- P 1 (3) **Multisystem microstrip antenna**
Leszek Nowosielski, Marian Wnuk, Mariusz Gruszczyński
Military University of Technology, Poland
- P 1 (4) **Software and hardware assessment of FDTD simulations for very large and complex scenes**
Laurent LABARBE, Bernard PECQUEUX
CEA Gramat, France
- P 1 (5) **Design of Artificial Mains Network for Conducted Disturbance from 2 kHz to 30 MHz**
Farhan Mahmood, Ken Okamoto, Hidetoshi Tatemichi, Kazuhiro Takaya
NTT Network Technology laboratories, Japan
- P 1 (6) **Using the 'Test Wire' Method as an Alternative to the CISPR 12 Full Vehicle Measurement Method**
Max Paterson^{1,2}, John Dawson¹
¹University of York, United Kingdom; ²Horiba MIRA Ltd
- P 1 (7) **Evaluation of the Loading Effect on the Optically Modulated Scatterer**
Andrzej E. Sowa¹, Robert Vogt-Ardatjew²
¹Wrocław University of Technology, Poland; ²University of Twente, Netherlands
- P 1 (8) **Thermal Imaging Aided Assessment of a State of Equipment Under Test and its Protecting Elements**
Stanisław Galla¹, Tomasz Lisewski², Agnieszka Mikołajczyk², Stanisław Abramik²
¹Gdansk University of Technology, Faculty of Electronics, Telecommunications and Informatics, Poland; ²Electrotechnical Institute, Gdansk Branch, Poland
- P 1 (9) **Comparison of Platform and Background Interference in View of Communication Performance**
Karina Fors, Kia Wiklundh
Swedish Defence Research Agency, FOI, Sweden
- P 1 (10) **Model of the Minimum Requirements Regarding Electric and Magnetic Field Strength Measurement Devices for Use in the Near-Field Occupational Exposure in Compliance Testing with Respect to the Requirements of European Directive 2013/35/EU**
Jolanta Karpowicz¹, Paweł Bienkowski², Jarosław Kieliszek³
¹Central Institute for Labour Protection - National Research Inst.(CIOP-PIB), Warszawa, Poland; ²Wrocław University of Technology, Wrocław, Poland; ³Military Institute of Hygiene and Epidemiology, Warszawa, Poland
On authors' request this paper will be presented in poster session P 2
- P 1 (11) **Prediction of Ringing Frequencies in DC-DC Boost Converters**
Piotr Musznicki¹, Marcin Rucinski¹, Marek Turczynski¹, Stanisław Abramik²
¹Gdansk University of Technology, Faculty of Electrical and Control Engineering, Poland; ²Electrotechnical Institute Gdansk Branch, Poland
- P 1 (12) **EMC Assessment of a Switching Mode Power Supply for Electromedical Devices**
Andrea Lai, Ivan Luigi Spano, Ignazio Marongiu, Gianluca Gatto
University of Cagliari, Italy
- P 1 (13) **Voltage-Dependence Capacitance System Calculation of High-Voltage Trench-Gated IGBT**
Guang-xiao Luo¹, Wei-dong Zhang¹, Lei Qi¹, Guo-liang Zhao²
¹North China Electric Power University, People's Republic of China; ²State Grid Smart Grid

Research Institute, People's Republic of China

P 1 (14) **Time Domain Simulation for Multiconductor Transmission Line Model with Frequency Dependent Parameters**

Agnieszka Wardzińska

Poznan University of Technology, Poland

P 1 (15) **Statistical Analysis of Crosstalk Subject to Multiple Uncertainty Sources Using Stochastic Reduced Order Models**

ZHOUXIANG FEI, YI HUANG, JIAFENG ZHOU, QIAN XU

The University of Liverpool, United Kingdom

P 1 (16) **3D/2D Radiation Pattern Measurement of Different GSM Phones for EMC Applications**

Mohammed Adnan Salhi, Osman Şen, Soydan Çakır, Mustafa Çetintaş

TUBITAK UME, Turkey

P 1 (17) **Implementation a database of hardware interfaces for information devices in the identifying process based on radiated emissions**

Rafał Przesmycki, Marek Bugaj, Leszek Nowosielski, Marian Wnuk

Military University of Technology, Poland

P 1 (18) **Method for measuring of emission using half double loaded circular frame antenna located perpendicularly over a conductive plane**

Waldemar Eugeniusz Grzebyk

Wrocław University of Science and Technology, Poland

Meetings

MEETING 3

Time: 11:00 - 12:30

IEEE EMC-S PL & EMC SECTION TECHNICAL MEETING

Chaired by: Grzegorz Masłowski, Rzeszow University of Technology, Poland

Room: **E** (C-13)

MEETING 4

Time: 12:30 - 14:00

IEEE REGION 8 CHAPTER RETREAT

Chaired by: Frank Leferink, University of Twente - THALES, the Netherlands

Room: **F** (C-13)

Welcome cocktail

Time: 18:00 – 21:00

Main building A-1

Details – see page 5.

Wednesday, 7th September 2016 – 2nd Symposium day

SESSION or BREAK						
ROOM TIME	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room D (bldg. C-13 / 1.27)	Room E (bldg. C-13 / 0.31)	EMC Lab (bldg. C-15)
9:00	OS 6A (O_We_A1) Chambers & Cells (1) Chair: Frank Leferink University of Twente - THALES, the Netherlands	OS 7A (O_We_B1) Immunity tests (1) Chair: Ferran Silva, Universitat Politècnica Catalunya, Spain	OS 8 (O_We_C1) Shielding Chair: Jan Carlsson Provin, Sweden	IF&CP 1 Industrial forum & company presentations (1) Chairs: Tadeusz W. Więckowski, Tomasz Utkowski Wrocław Univ. of Science and Technology, Poland		
10:30	Coffee break (conference building C-13, hall)					
11:00	OS 6B (O_We_A2) Chambers & Cells (2) Chair: Valter Mariani Primiani Università Politecnica delle Marche, Italy	OS 7B (O_We_B2) Immunity tests (2) Chair: Ferran Silva, Universitat Politècnica Catalunya, Spain	OS 9 (O_We_C2) Lightning Chair: Grzegorz Maslowski Rzeszów University of Technology, Poland	IF&CP 2 Industrial forum & company presentations (2) Chair: Andrzej E. Sowa Wrocław Univ. of Science and Technology, Poland		
12:30	Lunch (Canteen, building C-18, Hoene-Wronskiego Str. 10)				Meeting 5 IEEE TC7 Meeting Chair: David Thomas University of Nottingham, UK	Exp Experiments and demonstrations (13:30 – 15:30) Chair: Zbigniew Joskiewicz Wrocław Univ. of Science and Technology, Poland
13:30						
14:00	OS 6C (O_We_A3) Chambers & Cells (3) Chair: Heyno Garbe Leibniz Universität Hannover, Germany	OS 10A (O_We_B3) EMC in wireline & wireless communication systems (1) Chair: Ryszard J. Zielinski Wrocław Univ. of Science and Technology, Poland	OS 11 (O_We_C3) EMC in automotive systems Chair: Marco Klingler Peugeot Citroën Automobiles, France			
15:30	Coffee break (conference building C-13, hall)					
16:00	OS 12 (O_We_A4) Electromagnetic Interferencies Chair: Heyno Garbe Leibniz Universität Hannover, Germany	OS 10B (O_We_B4) EMC in wireline & wireless communication systems (2) Chair: Ryszard J. Zielinski Wrocław Univ. of Science and Technology, Poland	OS 13 (O_We_C4) IEMI, HPM & NEMP Chairs: Jan Luiken ter Haseborg Hamburg University of Technology, Germany Frank Sabath WIS, Germany	IF&CP 3 Industrial forum & company presentations (3) Chair: Andrzej E. Sowa Wrocław Univ. of Science and Technology, Poland		
17:30						
20:00 - 23:00	Symposium Banquet (DoubleTree by Hilton Wrocław)					

Oral sessions

OS 6A (O_We_A1)	ORAL SESSION	Time: 9:00 - 10:30
CHAMBERS & CELLS (1)		
Chaired by:	Frank Leferink, University of Twente - THALES, NL	Room: A (C-13)

- 9:00 **Optimization Techniques for Source Stirred Reverberation Chambers**
Alfredo De Leo, Valter Mariani Primiani, Paola Russo, Graziano Cerri
 Università Politecnica delle Marche, Ancona, Italy
- 9:22 **Validating Reverberation Chamber Performance Based on Assessment of Field Anisotropy**
 Luk R. Arnaut¹, Ramiro Serra², Philip D. West³
¹School of Electronic Engineering and Computer Science, Queen Mary University, London, United Kingdom.; ²Eindhoven University of Technology, The Netherlands; ³Centre for Electromagnetic and Time Metrology, National Physical Laboratory, Teddington TW11 0LW, United Kingdom.
- 9:45 **Effect of Loss Distribution on Uncorrelated Spatial Points and Frequency Steps in Reverberation Chambers**
Luca Bastianelli, Valter Mariani Primiani, Franco Moglie
 Università Politecnica delle Marche, DII, Ancona, Italy
- 10:07 **Analytical Model of a Mechanically Stirred Reverberation Chamber Based on EM Field Modal Expansion**
Guillaume Andrieu, Ayoub Soltane, Alain Reineix
 XLIM Laboratory - University of Limoges, France

OS 7A (O_We_B1)	ORAL SESSION	Time: 9:00 - 10:30
IMMUNITY TESTS (1)		
Chaired by:	Ferran Silva, Universitat Politecnica Catalunya, Spain	Room: B (C-13)

- 9:00 **An ESD Test Approach for Spacecraft Applications**
Emiliano Scione¹, Vincenzo Iacovone¹, Edmondo Scorzafava²
¹Thales Alenia Space Italia s.p.a, Italy; ²Italian Space Agency (ASI) Rome
- 9:22 **Proficiency Testing for Conducted Immunity with a new Round Robin Test Device**
Emrah Tas¹, Soydan Kacir², Mustafa Cetintas², Pavel Hamouz³, Thomas Isbring⁴, Miha Korkalj⁵, Daniel Lopez⁶, Urban Lundgren⁴, Dwi Mandaris^{7,11}, Borut Pinter⁵, Mar in Poriz³, Marc Pous⁸, Frederic Pythoud¹, Osman Sen², Ferran Silva⁸, Marek Svoboda³, Braise Trincaz⁹, Dongsheng Zhao¹⁰
¹Swiss Federal Institute of Metrology METAS, Switzerland; ²TUBITAK UME, Turkey; ³Czech Metrology Institute, Czech Republic; ⁴SP Technical Research Institute of Sweden, Sweden; ⁵Slovenian Institute of Quality and Metrology, Slovenia; ⁶National Institute of Aerospace Technology (INTA), Spain; ⁷University of Twente, the Netherlands; ⁸Universitat Politècnica de Catalunya, Spain; ⁹National Laboratory of Metrology and Test, France; ¹⁰Dutch Metrology Institute VSL, the Netherlands; ¹¹Indonesian Institute of Sciences, LIPI, Indonesia
- 9:45 **Alternative Coupling Method for Immunity Testing of Power Grid Protection Equipment**
Christian Suttner¹, Stefan Tenbohlen¹, Werner Ebbinghaus²
¹University of Stuttgart, Germany; ²ABB AG – PPMV-E

- 10:07 **Study on test distance between EUT and antenna for radiated immunity test in close proximity to equipment**
Kazuhiro Takaya, Nomichi Nakamura, Yoshiharu Hiroshima, Yuichiro Okugawa
 NTT Network Technology Laboratories, Japan

OS 8 (O_We_C1) ORAL SESSION Time: 9:00 - 10:30
SHIELDING
 Chaired by: Jan Carlsson, Provinn, Sweden Room: **C (C-13)**

- 9:00 **Measurement of the Electric Transient Shielding Effectiveness of a Cubic Resonator in Time and Frequency Domain**
Stefan Parr¹, Stefan Dickmann¹, Martin Schaarschmidt²
¹Helmut-Schmidt-University Hamburg, Germany; ²Bundeswehr Research Institute for Protective Technologies and NBC Protection Munster, Germany
- 9:22 **A network of Ports to Estimate Shielding Effectiveness of an Enclosure with Apertures**
 Ali Shourvarzi, Mojtaba Joodaki
 Ferdowsi University of Mashhad, Islamic Republic of Iran
- 9:45 **Fast Shielding Effectiveness Prediction for Multiple Cascaded Enclosures with Apertures Based on Electromagnetic Topology**
Liping Yan¹, Yong Kan¹, Xiang Zhao¹, Haijing Zhou²
¹Sichuan University, People's Republic of China; ²Institute of Applied Physics and Computation Mathematics, People's Republic of China
- 10:07 **Predicting Shielding Effectiveness of Populated Enclosures Using Absorption Cross Section of PCBs**
Sarah L. Parker¹, Ian D. Flintoft¹, Andy C. Marvin¹, John F. Dawson¹, Simon J. Bale¹, Martin P. Robinson¹, Ming Ye², Changyong Wan³, Mengze Zhang³
¹University of York, United Kingdom; ²Huawei Technologies AB, Kista, Sweden; ³Huawei Technologies Co. Ltd, Shenzhen, People's Republic of China

OS 6B (O_We_A2) ORAL SESSION Time: 11:00 - 12:30
CHAMBERS & CELLS (2)
 Chaired by: Valter Mariani Primiani, Università Politecnica delle Marche, Italy Room: **A (C-13)**

- 11:00 **Measurement of the Stochastic Electromagnetic Field Coupling to Transmission Line Networks of Single-Wire Lines Above a Ground Plane**
Johanna Kasper, Mathias Magdowski, Ralf Vick
 Otto von Guericke University Magdeburg, Germany
- 11:22 **Experimental Validation of the Stability for Statistical Electromagnetic Characteristics inside Electrically Large Enclosure with Aperture**
Yuan Zhao¹, Xiang Zhao¹, Liping Yan¹, Haijing Zhou², Kama Huang¹
¹The School of Electronics and Information, Sichuan University; ²Beijing Institute of Applied Physics and Computational Mathematics
- 11:45 **Measurement of the Coupling to Shielded Cables Above a Ground Plane in a Reverberation Chamber**
Mathias Magdowski, Buddhi Ram Banjade, Ralf Vick
 Otto von Guericke University, Germany

- 12:07 **Experimental Analysis for Metamaterials Used to Lower the LUF of a Reverberation Chamber**
Dominique LEMAIRE¹, Luis Felipe WANDERLINDER¹, Divitha SEETHARAMDOO²
¹AIRBUS, France; ²IFSTTAR, FRANCE

OS 7B (O_We_B2)	ORAL SESSION	Time: 11:00 - 12:30
IMMUNITY TESTS (2)		
Chaired by:	Ferran Silva, Universitat Politecnica Catalunya, Spain	Room: B (C-13)

- 11:00 **Immunity of a Pacemaker with a Wireless Power Transfer Coil**
 Tommaso Campi, Silvano Cruciani, Valerio De Santis, Mauro Feliziani
 University of L'Aquila, Italy
- 11:22 **EMC Analysis of the Pacing Activity of an Implantable Cardiac Medical Device**
 Andrea Lai, Ivan Luigi Spano, Ignazio Marongiu, Alessandro Serpi
 University of Cagliari, Italy
- 11:45 **EMC Susceptibility Characterization of an Operational Amplifier-Based Circuit Combining Different Technique**
Maxime Girard^{1,2}, Tristan Dubois¹, Genevieve Duchamp¹, Patrick Hoffmann²
¹Univ. Bordeaux, France; ²CEA - Centre de Gramat, France
- 12:07 **On the Use of the IC Stripline to Evaluate the Susceptibility to EMI of Small Integrated Circuits**
Franco Fiori, Michele Perot
 Politecnico di Torino, Italy

OS 9 (O_We_C2)	ORAL SESSION	Time: 11:00 - 12:30
LIGHTNING		
Chaired by:	Grzegorz Masłowski, Rzeszow University of Technology, Poland	Room: C (C-13)

- 11:00 **Distribution of Long Duration Current Impulses in a Test House Lightning Protection System and Electrical Equipment**
Grzegorz Masłowski, Stanisław Wyderka, Lesław Karpiński, Robert Ziemba, Grzegorz Kar-nas, Kamil Filik, Paweł Szczupak
 Rzeszow University of Technology, Poland
- 11:22 **Test set-up to examine electronic circuits' immunity to nearby flash**
 Lesław Karpinski¹, Krzysztof Wojtasiewicz², Dariusz Gibalski², Paweł Karpinski³
¹Rzeszow University of Technology, Poland; ²Military Institute of Armament Technology, Po-land; ³TELAB sp. z o. o, Poland
- 11:45 **Analysis of Features of Selected Models for Simulation of Lightning Threat**
Karol Anisierowicz
 Politechnika Białostocka, Poland
- 12:07 **A Reciprocity Approach to the Indirect Effects of Lightning Impact on an Aircraft Engine**
Paula Aquilera¹, Cyril Lair¹, Bastiaan Michielsens², François Issac²
¹SNECMA, Villaroche, France; ²ONERA, The French Aerospace Lab, Toulouse, France

OS 6C (O_We_A3) ORAL SESSION Time: 14:00 - 15:30

CHAMBERS & CELLS (3)

Chaired by: Heyno Garbe, Leibniz Universitaet Hannover,
Germany

Room: **A (C-13)**

- 14:00 **Investigation of the performance of the GTEM 1750 from 0.08 GHz to 6 GHz.**
Arthur Vie, Benjamin Guy Loader, Daniel Bownds
NPL, United Kingdom
- 14:22 **GTEM cell as an Alternative Method for Radiated Immunity Tests A comparison with an Anechoic Chamber**
Mohammed Adnan Salhi, Soydan Çakır, Mehmet Çınar, Bahadır Tektaş, Mustafa Çetintaş
TUBITAK UME, Turkey
- 14:45 **Measurements with a 3D-D-Dot-Sensor in Reverberation Chambers**
Mar in Aidam, Tobias Zorn
Daimler AG, Germany
- 15:07 **Inverse Fourier Transform Technique of Measuring Averaged Absorption Cross Section in the Reverberation Chamber and Monte Carlo Study of its Uncertainty**
Xiaotian Zhang, Mar in P. Robinson, Ian D. Flintoft, John F. Dawson
University of York, United Kingdom

OS 10A (O_We_B3) ORAL SESSION Time: 14:00 - 15:30

EMC IN WIRELINE & WIRELESS COMMUNICATION SYSTEMS (1)

Chaired by: Ryszard J. Zielinski, Wroclaw University of
Science and Technology, Poland

Room: **B (C-13)**

- 14:00 **Determination of the Radiated Power of Radio Station Through Field Strength Measurement Along a Route**
Georgij Efimovich Leontiev
Communications Regulatory Authority of the Republic of Lithuania, Lithuania
- 14:22 **Measurement of Radiated Spurious Emissions with the Substitution and Field Strength Test Methods**
Bruno Audone¹, Roberto Colombo²
¹EMC Consultant, Italy; ²IMQ EMC Lab manager
- 14:45 **Automatic measurement of electromagnetic interference environment**
Patrik Eliardsson, Karina Fors, Kia C. Wiklundh, Björn Gabrielsson, Mikael Alexandersson,
Johan Hedström
Swedish Defence Research Agency, Sweden
- 15:07 **Time-Frequency Diversity for Solving the Deadlock in Defining Interference Levels in Power Lines**
Iwan Se iawan^{1,3}, Frank Leferink^{1,2}, Frits Buesink¹
¹University of Twente; ²THALES; ³Indonesian Institute of Sciences

OS 11 (O_We_C3)

ORAL SESSION

Time: 14:00 - 15:30

EMC IN AUTOMOTIVE SYSTEMS

Chaired by: Marco Klingler, Peugeot Citroen Automobiles,
France

Room: **C (C-13)**

- 14:00 **Noise Suppression Method for an AM radio Receiver Using Digital Signal Processing**
Yoshiyuki Hattori¹, Tomohisa Harada¹, Shinya Ito², Mitoshi Fujimoto², Toshikazu Hori²
¹TOYOTA CENTRAL R&D LABS., INC., Japan; ²UNIVERSITY OF FUKUI, Japan
- 14:20 **Miniaturization of electric vehicle fast chargers with respect to EMC standards**
Andrzej Tadeusz Uramek¹, Marcin Adam Pietrzycki¹, Aleksander Polit¹, Jim van-der-Heijden²,
Stefan Joannes Raaijmakers²
¹ABB Corporate Research Center, Kraków, Poland; ²ABB BV, Eindhoven, The Netherlands
- 14:40 **Common-mode Current Analysis Focused on Grounding Structures of Shielded Cable and Power Converter Chassis**
Yoshihiro Kida¹, Tatsuya Ozawa¹, Shinji Ohoka¹, Yasuhiro Fukagawa¹, Kaoru Torii²
¹NIPPON SOKEN, INC, Japan; ²TOYOTA MOTOR CORPORATION, Japan
- 15:00 **Characterization of Current Transformers for Impedance Measurements in Automotive Immunity Test Setups**
Seyyed Ali Hassanpour Razavi, Stephan Frei
TU Dortmund, Germany
- 15:20 **Software Based Control of the EMI Generated in BLDC Motor Drives**
Michele Perotti, Franco Fiori
Politecnico di Torino, Italy

OS 12 (O_We_A3)

ORAL SESSION

Time: 16:00 - 17:30

ELECTROMAGNETIC INTERFERENCES

Chaired by: Heyno Garbe, Leibniz Universitaet Hannover,
Germany

Room: **A (C-13)**

- 16:00 **Development of an EMC demonstration unit**
Andy Degraeve¹, Keith Armstrong², Tim Claeys¹, Filip Vanhee¹, Joan Peuteman¹, Davy Pissoort¹
¹KU Leuven, Belgium; ²Cherry Clough Consultants Ltd
- 16:22 **EMI Performance of Power Delivery Networks in 3D TSV Integration**
Yuuki Araga¹, Makoto Nagata², Hiroaki Ikeda², Katsuya Kikuchi¹, Noriyuki Miura²
¹National Institute of Advanced Industrial Science and Technology (AIST), Japan; ²Kobe University
- 16:45 **Analysis of Conducted Emissions from an Electric Nacelle Anti-Ice Power Control System**
Angela Nothofer, Steve Greedy, Luca Tarisciotti
University of Nottingham, United Kingdom
- 17:07 **Characteristic Evaluation of Conducted Disturbance Measuring Apparatus Using Two Parallel TEM cells**
Ryosuke Tani^{1,2}, Ifong Wu², Shinobu Ishigami², Yasushi Matsumoto², Ryosuke Suga¹,
Osamu Hashimoto¹
¹Aoyama Gakuin University, Japan; ²National Institute of Information and Communications Technology

OS 10B (O_We_B4)

ORAL SESSION

Time: 16:00 - 17:30

EMC IN WIRELINE & WIRELESS COMMUNICATION SYSTEMS (2)

Chaired by: Ryszard J. Zielinski, Wroclaw University of Science and Technology, Poland

Room: **B (C-13)**

- 16:00 **Approximations of BEP for Multiple Impulse Noise Sources**
Sara Örn Tengstrand, Erik Axell, Patrik Eliardsson
 Swedish Defence Research Agency, Sweden
- 16:22 **Performance of Frequency Hopping Systems with Adjacent Channel Interference**
Sara Linder¹, Kia Wiklund¹, Leif Junholm²
¹Swedish Defence Research Agency (FOI), Sweden; ²Swedish Defence Material Administration (FMV)
- 16:45 **EMI Susceptibility of High Speed Differential Wireline Communication Front-ends**
Gilbert Andrew Matig-a, Dr. Mehmet Yuce, Dr. Jean-Michel Redoute
 Monash University, Australia
- 17:07 **Simulation of DVOR Carrier Wave Propagation Over Real Terrain**
Sergei Sandmann, Heyno Garbe
 Institute of Electrical Engineering and Measurement Technology, Leibniz University Hannover, Germany

OS 13 (O_We_C3)

ORAL SESSION

Time: 16:00 - 17:30

IEMI, HPM & NEMP

Chaired by: Jan Luiken ter Haseborg, Hamburg University of Technology, Germany
 Frank Sabath, WIS, Germany

Room: **C (C-13)**

- 16:00 **Electro-Thermo-Stress Analysis of AlGaIn/GaN HEMTs Breakdown Caused by HPM Pulses**
 Zheng-wei San¹, Liang Zhou¹, Wen-Yan Yin²
¹Shanghai Jiao Tong University, People's Republic of China; ²Zhejiang University
- 16:22 **Leakage Electric Field Analysis of a Guided Wave NEMP Simulator**
 Rakesh Kichouliya, Subrahmanyam Boyapati
 Research centre Imarat, India
- 16:45 **Protection Strategy against IEMI for Wireless Communication Infrastructures**
Stefan van de Beek¹, Mirjana Stojilović², Nicolas Mora³, Marcos Rubinstein², Farhad Rachidi-Haeri³, Frank Leferink^{1,4}
¹University of Twente, Enschede, Netherlands; ²University of Applied Sciences and Arts Western Switzerland, Yverdon-les-Bains, Switzerland; ³Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland; ⁴Thales Nederland B.V., Hengelo, Netherlands
- 17:07 **Measurements Conducted 2014-2016 – Results and Lessons Learned**
Per Ångskog^{1,2}, Mats Bäckström^{2,3}, Bengt Vallhagen³, Carl Samuelsson³
¹KTH - Royal Institute of Technology, Sweden; ²University of Gävle; ³Saab Aeronautics

Experiments and demonstrations

Exp	EXPERIMENTS AND DEMONSTRATIONS	Time: 13:30 - 15:30
EXPERIMENTS AND DEMONSTRATIONS		
Chaired by:	Zbigniew Jóskiewicz, Wrocław University of Science and Technology, Poland	Building C-15

Experiment 1 "Remote practical works on transmission lines in the L3-EOLES Bachelor degree"

Presenter: Guillaume Andrieu, Assistant Professor, XLIM laboratory, University of Limoges, France

Abstract:

This proposal aims to do a live demonstration of remote practical works (available from any Internet connection) build in the framework of a third year Bachelordegree fully online launched at the University of Limoges in 2014.

Two practical works ("Time-domain study of a RG58 cable", "Dispersion analysis of a LC delay line") about transmission lines will be showed.

Experiment 2 "Innovative solution in Power Integrity & Signal Integrity Electromagnetic Analysis for PCB"

Presenter: Dr. Andrzej Ciminski, AM Technologies, Poland

Abstract:

It has become much more important to get higher frequency s-parameters for PCB accurately due to ever increasing data rates. ADS 2016 features a host of new technologies designed to improve accuracy of PCB simulations, including two electromagnetic (EM) software solutions specifically created to help signal and power integrity engineers.

This solution consists in 4 new EM simulators:

- DC IR drop analysis
- AC PDN impedance analysis
- Power plane resonance analysis
- Power-aware signal integrity analysis.

In his presentation, you will learn the new innovative pure EM based SIPro and PIPro composite technologies for designing high speed digital boards. SIPro and PIPro provides a cohesive workflow with ADS for signal integrity and power integrity applications.

Experiment 3 "Radiated emissions of cables through shielded enclosure seams and effect of time rise/fall on clock signals"

Presenter: Ismael Molina Alba, Product Manager EMC inductors, EMC & Inductive Solutions, Würth Elektronik eiSos GmbH. & Co. KG

Abstract:

This experiment shows a means of measuring leakage of electromagnetic energy through seams of a shielded enclosure to analyse the effects in some test positions around the cover. This cover will be removable and will have 18 threaded fasteners distributed around its periphery.

An oscillator circuit capable of producing a typical periodic clock signal will be put inside the shielded enclosure. The output of the oscillator will be connected to a long twin lead to generate common-mode currents and to investigate their associated radiated emissions.

Next, to study the emissions, a probe will be placed in each defined test positions to measure the potential difference between the cover and the enclosure. Then, it will be used a ferrite common-mode chokes to suppress the common-mode current. Another solution to reduce the common-mode effects is to connect a filter adapter to the long twin lead. Nevertheless, these two methods will increase the rise/fall time of the signal.

Therefore, the final solution could be to use a gasket to shield the seams of the cover and to achieve emissions reduction as using a ferrite common-mode chokes or a filter adapter, but his method does not increase rise/fall times of the generated clock signal.

(These experiments are based in the ESAC's EMC Experiments Manual).

Experiment 4 "DC/DC Converter Measurements and EMC Simulation of Conducted Emission"

Presenter: Jan Eichler, Marcel Plonka, CST

Abstract:

DC/DC converters are common source of conducted emissions. In CST experiment a real Step-down Buck Converter will be presented as an object for both the measurements and 3D-EM simulations.

CST STUDIO SUITE will be use to present the complete simulation workflow including:

1. Layout import - materials, ports,lumped elements
2. 3D-EM setup - 3D geometry, simulation set ings (boundary conditions, mesh)
3. Circuit setup - nonlinear components, components to be tuned

The comparison of simula ion results with measurement results will be presented. Effects of applying EMI filter and possible layout differences will be discussed as well.

Experiment 5 "An EMField Generator - an Integrated Novel Solution for Radiated Immunity Testing, including IEC 61000-4-3"

Presenter: Lukasz Wilk, ETS-Lindgren (EMEA)

Abstract:

In this "live" demonstration in an EMC chamber, attendees will see a novel EMField generator used for an IEC 61000-4-3 fully compliant RF immunity test in the 1 - 6 GHz frequency range at a test level of 3V/m, with 80% AM modulation.

The compact test set up will be reviewed prior to he live demonstration. A comparison will be shown between this novel solution and the traditional approach. The advantages in the simple, novel solution will be contrasted to the complex, tradi tional approach to this test that requires larger amplifiers at a greater expense to compensate for the reflected power loss from the load. Power efficiencies wi h minimal signal loss will be shown in the novel solution.

Attendees will see how the compact novelsolution can be used as a full replacement to the complex traditional set up for testing in accordance with IEC 61000-4-3.

Industrial forum and company presentations

IF&CP 1		ORAL SESSION	Time: 9:00 - 10:30
INDUSTRIAL FORUM & COMPANY PRESENTATIONS (1)			
Chaired by:	Tadeusz W. Więckowski, Tomasz Utkowski Wroclaw University of Science and Technology, Poland		Room: D (C-13)
9:00 - 9:30	A high power aircraft test facility we have recently installed. AR Europe / UEI		
9:30 - 10:30	Harmonic and flicker measurement, tests repeatability and new stand- ards in IEC TR 61000-4-37 &-38 AMETEK CTS - Markus Furer		

IF&CP 2	ORAL SESSION	Time: 11:00 - 12:30
INDUSTRIAL FORUM & COMPANY PRESENTATIONS (2)		
Chaired by:	Andrzej E. Sowa, Wroclaw University of Science and Technology, Poland	Room: D (C-13)
11:00 - 11:20	Altair Engineering GmbH	
11:20 - 11:40	ASTAT Sp. z o.o.	
11:40 - 12:00	ATDI Advanced Radiocommunications	
12:00 - 12:20	CST - Computer Symulation Technology AG	

IF&CP 3	ORAL SESSION	Time: 16:00 - 17:30
INDUSTRIAL FORUM & COMPANY PRESENTATIONS (3)		
Chaired by:	Andrzej E. Sowa, Wroclaw University of Science and Technology, Poland	Room: D (C-13)
16:00 - 16:20	EMI Solutions PVT.LTD	
16:20 - 16:40	ETS Lindgren	
16:40 - 17:00	Frankonia	
17:00 - 17:20	Helmar Jacek A. Dobrowiecki	
17:20 - 17:40	Microwave Vision group (MVG)	

Meeting

MEETING 5	Time: 12:30 - 14:00
Meeting 5: IEEE TC7 Meeting	
Chaired by:	David Thomas, The University of Nottingham, United Kingdom
	Room: E (C-13)

Symposium Banquet	Time: 20:00 - 23:00
DoubleTree by Hilton Wroclaw	

Details – see page 5.

Thursday 8th September 2016 – 3rd Symposium day

SESSION or BREAK					
ROOM TIME	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room F (bldg. C-13 / 0.32)	Poster Area (bldg. C-13 / hall)
9:00	Keynote 2 Chair: Grzegorz Maslowski Rzeszow University of Technology, Poland				
9:50	Coffee break (conference building C-13, hall)			MEETING 8 EU Project Initiators' Meeting (9 50 – 12:30)	P 2 Poster session 2 (9 50 – 12:30)
10:30	Workshop 8A Frequency Policy and Spectrum Engineering: "UHF spectrum – Mobile and/or Broadcasting?" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	SS (S_Th_B1) EMC Diagnostics of Complex Systems Chairs: Vladimir Mordachev Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarus Jarosław Janiszewski Wrocław University of Science and Technology, Poland	OS 14 (O_Th_C1) Human exposure to EM fields Chair: Mauro Feliziani University of L'Aquila, Italy	Chair: Davy Pisssoort KU Leuven, Belgium	Chair: Paweł Bienkowski Wrocław Univ. of Science and Technology, Poland
12:30	Lunch (Canteen, building C-18, Hoene-Wronskiego Str. 10)				
13:30					P 3 Poster session 3 (13:30 – 15:30)
14:00	Workshop 8B Frequency Policy and Spectrum Engineering: "700 MHz spectrum and networks reframing" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	OS 15 (O_Th_B2) EMC testing of industrial or large systems Chair: Frank Leferink University of Twente - THALES, the Netherlands	OS 16 (O_Th_C2) EMC Analysis, Modelling, Prediction for IC Chair: Davy Pisssoort KU Leuven, Belgium		Chair: Dariusz Klepacki Rzeszow University of Technology, Poland
15:30	Coffee break (conference building C-13, hall)			MEETING 6 EMC Europe ISC Meeting (15:30 – 18:00) Chairs: Andy Marvin University of York, York EMC Services, United Kingdom Jan Carlsson Provvinn, Sweden	
16:00	Workshop 8C Frequency Policy and Spectrum Engineering: "Software tools for spectrum engineering" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	OS 17 (O_Tu_B3) Antennas Chair: Andrzej Kucharski Wrocław Univ. of Science and Technology, Poland	OS 18 (O_Tu_C3) Filters Chair: Andrzej Sowa Wrocław Univ. of Science and Technology, Poland		
17:30					
18:00					
19:00 - 22:30	International Steering Committee Dinner (building H-14)				

KN 2

Time: 9:00 9:50

KEYNOTE 2

Grzegorz Masłowski, Rzeszow University of
Chaired by: Technology, Poland

Room: **A (C-13)**

"Trends in Spectrum Sharing for Future Wireless Networks"

Luiz Da Silva,
Trinity College Dublin, Ireland

Abstract:

The traditional model of exclusive use of spectrum is increasingly being challenged, both in civilian and military systems. One recent example is the radar bands, which are being considered for sharing by small cells in commercial wireless systems. Sharing of spectrum can also be coupled with sharing of wireless access infrastructure. In this presentation, we will discuss solutions for enabling spectrum sharing in future systems, as well as performance tradeoffs in spectrum and radio access infrastructure sharing.

Workshops

WS 8

WORKSHOP 8

Time: 10:30 - 17:30

FREQUENCY POLICY AND SPECTRUM ENGINEERING

Organized by: Dariusz Więcek

National Institute of Telecommunications, Poland Room: **A (C-13)**

Speakers: Walid Sami (EBU), Daniel Gueorguiev (GSMA Mobile for Development Foundation), Péter Vári (National Media and Infocommunications Authority of Hungary), Andrew Stirling (Larkhill Consultancy), Pavel Dvořák (Ministry of Industry and Trade of the Czech Republic), Ronald Lorenz (Media Broadcast), Halina Uryga (Orange), Peter Faris (ECO), Istvan Bozsoki (ITU), Dariusz Wypiór & Dariusz Więcek (National Institute of Telecommunications)

Sessions: Abstract:

WS 8A
(10:30 - 12:30)

Lunch

WS 8B
(14:00 - 15:30)

Coffee break

WS 8C
(16:00 - 17:30)

The current technology progress has a big influence on society behaviour and experiences, new technology are rapidly growing. Such situation requires adaption of new technology both on transmission and reception sites and new frequency policy paradigm shifts. The aim of the workshop is presenting, discussing and proposing solutions for future broadcasting and mobile networks, audio and video content delivering as well as highlight potential of future spectrum policy and engineering potential. In this context the motto is „Perspectives of Terrestrial Broadcasting and Mobile Networks”. The workshop is organized within project Frequency Policy and Spectrum Engineering in V4 countries supported by Visegrad Fund.

More information about this workshop is available on:
<http://www.fpse2016.nit.eu/>

Programme:

WS 8A session

"UHF spectrum – Mobile and/or Broadcasting?"

Chair: Dariusz Więcek

Time: 10:30 - 12:30

Opening

UHF spectrum, an essential resource for broadcasting

Walid Sami

European Broadcasting Union

The Socio-Economic Benefits of the Digital Dividend

Daniel Gueorguiev

GSMA Mobile for Development Foundation

Present and possible future of the PPDR in the UHF band in Hungary

Péter Vári

National Media and Infocommunications Authority of Hungary

Developments in spectrum sharing technology – and applications to rural broadband and IoT

Andrew Stirling

Larkhill Consultancy

WS 8B session

"700 MHz spectrum and networks reframing"

Chair: Juraj Oravec

Time: 14:00 - 15:30

Strategy of Terrestrial DTV Evolution in Czech Republic

Pavel Dvořák

Ministry of Industry and Trade of the Czech Republic

Migration to DVB-T2 in Germany and release of the 700 MHz Band

Ronald Lorenz

Media Broadcast

Mobile Broadband in 700 MHz band

Halina Uryga

Spectrum Office of the Orange's Group

WS 8C session

"Software tools for spectrum engineering"

Chair: Péter Nagy

Time: 16:00 - 17:30

New functionalities introduced in SEAMCAT 5 for sharing and compatibility studies

Peter Faris

European Communication Office

ITU-BR and ITU-BDT software tools

Istvan Bozsoki

Spectrum Management and Broadcasting Division International Telecommunication Union

NIT Software Tools for Frequency Planning and Spectrum Management

Dariusz Wypiór, Dariusz Więcek

Spectrum Engineering and Management Group, National Institute of Telecommunications

Oral sessions

SS 1 (O_Th_B1)	SPECIAL SESSION	Time: 10:30 - 12:30
EMC DIAGNOSTICS OF COMPLEX SYSTEMS		
Chaired by: Vladimir Mordachev, Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarus Jarosław M. Janiszewski, Wrocław University of Technology, Poland		Room: B (C-13)

- 10:30 **Electromagnetic Background Created by Base and Mobile Radio Equipment of Cellular Communications**
Vladimir Mordachev
Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarus
- 10:50 **Required Levels of Radiation Power of GSM Base Stations in Urban Area Taking Into Account Attenuation in Buildings and Intrasystem EMC**
Vladimir Mordachev, Alexander Svistunov
Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarus
- 11:10 **Computationally-Effective Worst-Case Model of Coupling between On-Board Antennas That Takes into Account Diffraction by Conducting Hull**
Dzmitry Tsyanenka, Eugene Sinkevich, Alexander Matsveyeu
Belarusian State University of Informatics and Radioelectronics, Belarus
- 11:30 **EMC Diagnostics of Complex Radio Systems by the Use of Analytical and Numerical Worst-Case Models for Spurious Couplings Between Antennas**
Vladimir Mordachev¹, Eugene Sinkevich¹, Dzmitry Tsyanenka¹, Andrey Krachko¹, Gregory Slepyan², Igor Bezruchonok³, Andrey Karaim³
¹Belarusian State University of Informatics and Radioelectronics (BSUIR), Belarus; ²School of Electrical Engineering, Tel-Aviv University, Israel; ³Republic Unitary Enterprise "Belarusian Radio-Television Broadcasting Center", Belarus
- 11:50 **System-Level Model for Analysis of Dipole Antenna Response to Electromagnetic Pulse**
Eugene Sinkevich, Dzmitry Tsyanenka, Oleg Yurtsev
Belarusian State University of Informatics and Radioelectronics, Belarus
- 12:10 **Computationally Effective Wideband Combined Worst-Case Model of Monopole Antenna Coupling**
Yauheni Arlou^{1,2}, Eugene Sinkevich¹, Dzmitry Tsyanenka¹
¹Belarusian State University of Informatics and Radioelectronics, Belarus; ²Belarusian State University, Belarus

OS 14 (O_Th_C1)	ORAL SESSION	Time: 10:30 - 12:30
HUMAN EXPOSURE TO EM FIELDS		
Chaired by: Mauro Feliziani, University of L'Aquila, Italy		Room: C (C-13)

- 10:30 **Human Radio Frequency Exposure Limits: an update of reference levels in Europe, USA, Canada, China, Japan and Korea**
Haim Mazar
ATDI, Poland
- 10:50 **Human Exposure Study for Large Scale Scenarios**
Revaz S Zaridze, Veriko Jeladze, Vasil Tabatadze, Ivan Petoiev, Mikheil Prishvin, Tamar Nozadze
Tbilisi State University, Georgia

- 11:10 **Evolution of the Exposure Level in Poland**
Fryderyk Lewicki, Andrzej Lugowski, Grzegorz Zagorda
 Orange Polska, Poland
- 11:30 **Broadband Environment Mapping Using Modern Time-Domain Receivers for Exposure Assessment and Location Fingerprinting**
Matthias Hampe¹, Olaf Berndt²
¹Ostfalia University of Applied Science; ²WaveTec Engineering
- 11:50 **Simulation of Human Exposure to Electromagnetic Fields of Inductive Wireless Power Transfer Systems in the Frequency Range from 1 Hz to 30 MHz**
Ekaterina Yavolovskaya^{1,2}, Giorgi Chiqovani¹, Giga Gabriaze^{1,2}, Sophia Iosava¹, Lily Svandze^{1,2}, Benjamin Willmann^{3,4}, Roman Jobava^{1,2}
¹EMCoS Ltd., Tbilisi, Georgia; ²Tbilisi State University, Tbilisi, Georgia; ³VOLKSWAGEN AG, Wolfsburg, Germany; ⁴University of Magdeburg, Magdeburg, Germany
- 12:10 **Zero Phase Shift Digital Filtering for Assessment of Exposure to Non-Sinusoidal Magnetic Fields**
Agnieszka Mikołajczyk¹, Tomasz Lisewski¹, Stanisław Abramik¹, Marcin Ruciński²
¹Electrotechnical Institute Gdansk Branch 1 Narwicka st, 80-557 Gdansk; ²Gdansk University of Technology Faculty of Electrical and Control Engineering 11/12 G.Narutowicza st, 80-233 Gdansk

OS 15 (O_Th_B2)

ORAL SESSION

Time: 14:00 - 15:30

EMC TESTING OF INDUSTRIAL OR LARGE SYSTEMS

Chaired by: Frank Leferink, University of Twente - THALES, the Netherlands

Room: **B (C-13)**

- 14:00 **A Single Antenna Ambient Noise Cancellation Method for In-Situ Radiated EMI Measurements in the Time-Domain**
Marco A. Azpúrua, Marc Pous, Ferran Silva
 Universitat Politècnica de Catalunya, Spain
- 14:22 **Comparison of Active Levelling and Pre-Calibrating/Substitution Method for Radiated Immunity Testing of Large Equipment**
Dwi Mandaris^{1,5}, Soydan Cakir², Osman Sen², Daniel Lopez Sanz³, Maria Jimenez Lorenzo³, Frank Leferink^{1,4}, Marek Svoboda⁶, Pavel Hamouz⁶
¹University of Twente, Enschede, The Netherlands; ²Electromagnetic Laboratory, TUBITAK UME, Kocaeli/Turkey; ³EMC Laboratory INTA, Madrid, Spain; ⁴Thales Nederland, Hengelo, The Netherlands; ⁵Research Center for quality System and Testing Technology - LIPI, Serpong, Indonesia; ⁶Czech Metrology Institute, Electromagnetic Compatibility Laboratory, Brno, Czech Republic
- 14:45 **Benefits of Full Time-Domain EMI Measurements for Large Fixed Installation**
Marc Pous, Marco Azpúrua, Ferran Silva
 Grup de Compatibilitat Electromagnètica (GCEM), Universitat Politècnica de Catalunya (UPC)
- 15:07 **On Determining the Directivity of Electrically Large, Unintentional Electromagnetic Radiators - Assessment of a Real Electronic Equipment**
Benjamin Menssen, Henrik Brech, Heyno Garbe
 Leibniz Universität Hannover, Germany

OS 16 (O_Th_C2)

ORAL SESSION

Time: 14:00 - 15:30

EMC ANALYSIS, MODELLING, PREDICTION FOR IC

Chaired by: Davy Pissoort, KU Leuven, Belgium

Room: **C (C-13)**

- 14:00 **Multiport ICIM-CI Modeling Approach Applied to a Bandgap Voltage Reference**
Siham Hairoud Airieau^{1,2}, Tristan Dubois¹, Geneviève Duchamp¹, André Durier²
¹MS Laboratory/Univ. Bordeaux, France; ²IRT SAINT EXUPERY, France
- 14:20 **Immunity Macro Model for Linear Regulator Considering Internal Terminal Voltage**
Tohlu Matsushima, Hidetoshi Miyahara, Takashi Hisakado, Osami Wada
 Kyoto University, Japan
- 14:40 **Modeling of Trench Structures in Integrated Circuits for Fast Isolation Effectiveness Assessment**
Merce Grau Novellas¹, Ramiro Serra², Matthias Rose³
¹Eindhoven University of Technology, The Netherlands; ²Eindhoven University of Technology, The Netherlands; ³NXP Semiconductors, The Netherlands
- 15:00 **Behavioural Model Based Simulation of the ESD- Soft-Failure-Robustness of Microcontroller Inputs**
 Suayb Cagri Yener¹, Stephan Frei², Stanislav Scheier³
¹Sakarya University (Universitesi), Turkey; ²TU Dortmund University; ³TU Dortmund University
- 15:20 **A Highly EMI-Immune Folded Cascode OpAmp in 0.18 μ m CMOS Technology**
Subrahmanyam Boyapati¹, Jean-Michel Redoute², Maryam Shojaei Baghini¹
¹IITB-MONASH RESEARCH ACADEMY, IIT-Bombay, India; ²MONASH University, AUSTRALIA

OS 17 (O_Th_B3)

ORAL SESSION

Time: 16:00 - 17:30

ANTENNAS

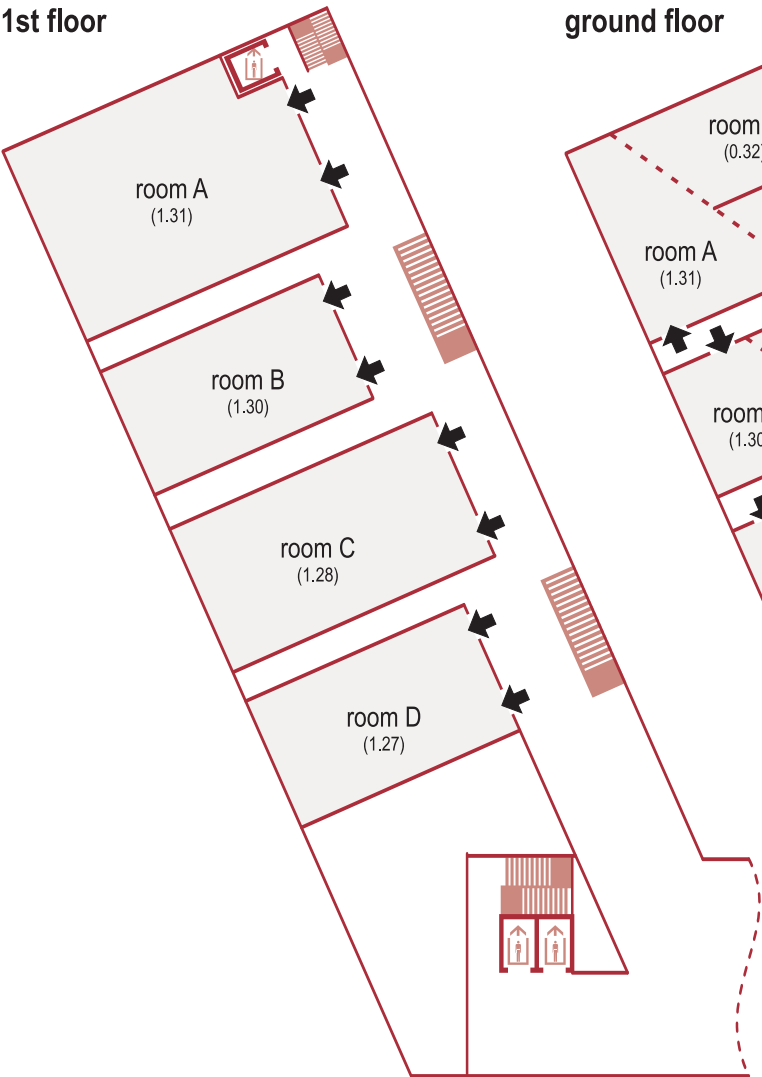
Chaired by: Andrzej Kucharski, Wroclaw University of Technology, Poland

Room: **B (C-13)**

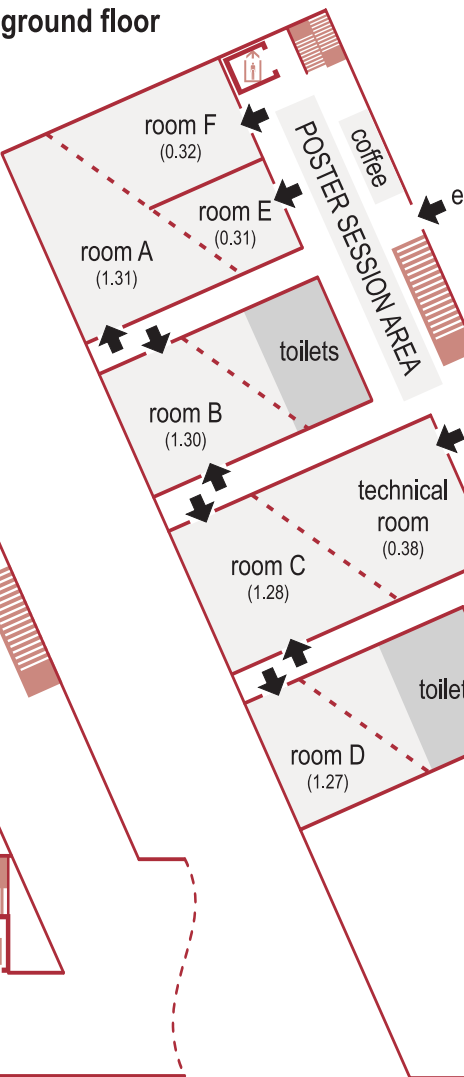
- 16:00 **Study of metamaterial resonators for decoupling of a MIMO-PIFA system**
Ignacio Gil, Raúl Fernández-García
 Department of Electronic Engineering, Universitat Politècnica de Catalunya, Spain
- 16:22 **Improved Isolation Between Closely Spaced Multiple Dipole Antennas Using a Metasurface Structure**
 Muhammad Kamran Khattak¹, Changhyeong Lee¹, Dajung Han¹, Jeongho Ju², Sungtek Kahng¹
¹Incheon national university, Korea, Republic of South Korea; ²SK Hynix, Icheon, Korea, Republic of South Korea
- 16:45 **Miniaturized Printed Giuseppe-Peano Fractal Monopole Blade Antenna**
 Hamed Tahmasbi, Hadi Aliakbarian
 K.N.Toosi University of Technology, Iran, Islamic Republic of
- 17:07 **Design of UWB Printed Monopole Antenna with Short Stub**
Nobuyasu Takemura, Daiki Kaneko, Joichiro Suzuki, Takuya Takeda, Takefumi Hiraguri
 Nippon Institute of Technology, Japan

Exhibition Plan (building C)

1st floor



ground floor



entrance

entrance

entrance

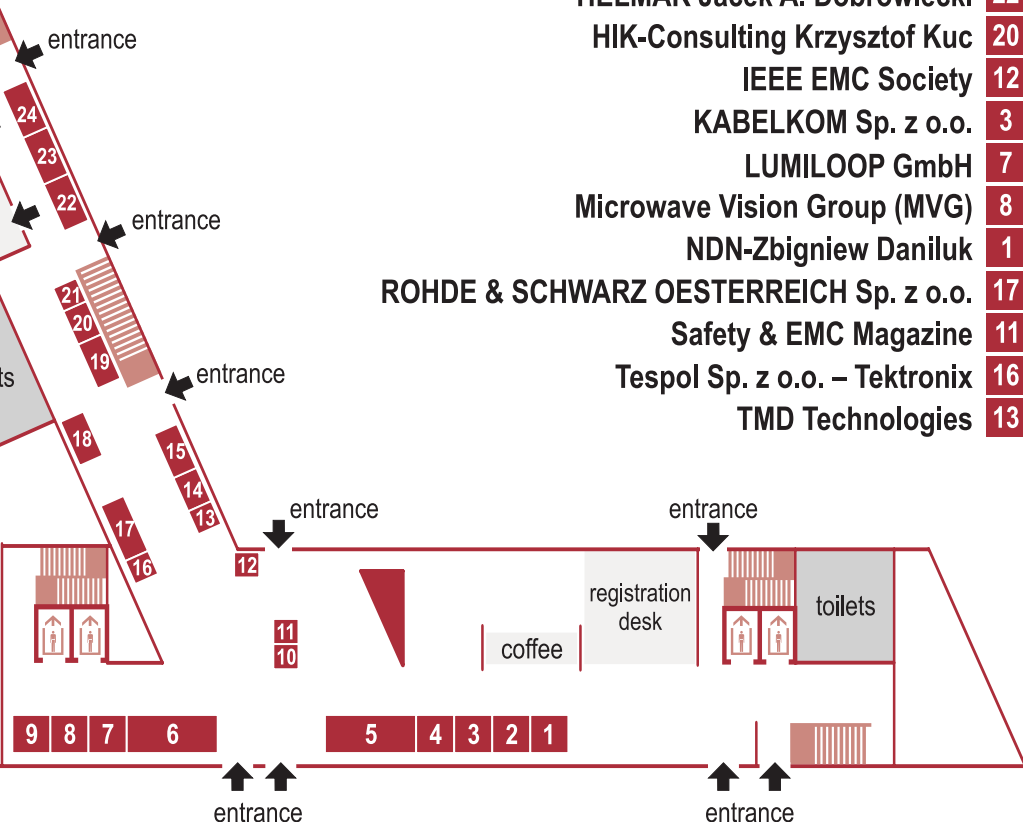
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Altair Engineering GmbH	24
AMETEK CTS Germany GmbH	5
AM Technologies Sp. z o.o. Sp.k.	14
AR Europe & UEI	9
ASTAT Sp. z o.o.	6
ATDI Advanced Radiocommunications	4
CST - Computer Symulation Technology AG	2
COMTEST Engineering bv	23
ELEKTRONIK. Magazyn Elektroniki Profesjonalnej	10
EMCoS Consulting and Software	19
EMI Solutions Pvt. LTD & Freicomp GmbH	21
ETS Lindgren	15
FRANKONIA EMC TEST-Systems GmbH	18
HELMAR Jacek A. Dobrowiecki	22
HIK-Consulting Krzysztof Kuc	20
IEEE EMC Society	12
KABELKOM Sp. z o.o.	3
LUMILOOP GmbH	7
Microwave Vision Group (MVG)	8
NDN-Zbigniew Daniluk	1
ROHDE & SCHWARZ OESTERREICH Sp. z o.o.	17
Safety & EMC Magazine	11
Tespol Sp. z o.o. – Tektronix	16
TMD Technologies	13

OS 18 (O_Th_C3)

ORAL SESSION

Time: 16:00 - 17:30

FILTERS

Chaired by: Andrzej Sowa, Wroclaw University of Technology,
Poland, Poland

Room: **C (C-13)**

- 16:00 **High Performance Broadband Noise Filter Using Inductance Cancellation Technique and Various Capacitors**
Yasuhiro Shiraki¹, Naoto Oka², Yuichi Sasaki², Hideyuki Ohashi²
¹Advanced Technology R&D Center, Mitsubishi Electric Corporation; ²Information Technology R&D Center, Mitsubishi Electric Corporation
- 16:22 **Optimizing Capacitor Placement in EMI-Filter using Back Annotation of 3D Field Coupling Parameters in Circuit Models**
Niek Moonen¹, Frits Buesink¹, Frank Leferink^{1,2}
¹University of Twente, Netherlands, The; ²Thales Nederland B.V., Netherlands, The
- 16:45 **A Wide Differential Passband Filter with Common Mode Suppression Property Based on Left Handed Metamaterial Transmission Line**
Amir Attar, Mojtaba Joodaki
Ferdowsi University of Mashhad, Iran, Islamic Republic of
- 17:07 **Current Barriers to Confine High Frequency Common Mode Currents**
Niek Moonen¹, Frits Buesink¹, Frank Leferink^{1,2}
¹University of Twente, Netherlands, The; ²Thales Nederland B.V., Netherlands, The

Posters

P 2

POSTER SESSION

Time: 9:50 - 12:30

POSTER SESSION 2

Chaired by: Paweł Bieńkowski, Wroclaw University of Science
and Technology, Poland

**Poster
area (C-13)**

- P 2 (1) **Simulation of shielding performance against near field coupling to EMI filter for power electronic converter using FEM**
Keita Takahashi¹, Yuichiro Murata¹, Naohisa Uehara¹, Hideto Maniwa¹, Yusuke Tsubaki¹, Tetsuro Fujiwara²
¹Mitsubishi Electric Corporation, Japan; ²Mitsubishi Electric Engineering Co., Ltd.
- P 2 (2) **Effect of Standby Mode Operation of Some Household Appliances on Disturbance Voltage and Current in Frequency Range of 9-150 kHz Produced by Other Equipment in Low Voltage Network**
Budi Sudiarto, Aji Nur Widyanto, Holger Hirsch
ETS Universität Duisburg-Essen, Germany
- P 2 (3) **On Improving Frequency-to-Voltage Converter immunity versus fast transient pulses**
Kamel ABOUDA, Yuan GAO, Patrice BESSE
NXP, France
- P 2 (4) **Evaluation and Minimization of Conducted Emissions of Electromagnetic Interference Noise Generated by Power Factor Correction**
Mohamed MILOUDI, Abdelber BENDAOUD, Houcine MILOUDI
APELEC Laboratory, Algeria

- P 2 (5) **Interpretation of Conducted Immunity Tests by Means of Conformal Mapping**
Bruno Audone¹, Roberto Colombo²
¹EMC Consultant, Italy; ²IMQ EMC Lab manager
- P 2 (6) **Study of Propagation of the Current and Voltage Waves Induced by the Lightning Discharge in the Resistive Cable Line with Linear and Nonlinear Elements**
Vasily Yu. Belashov^{1,2}, Elena S. Belashova³
¹Kazan (Volga Region) Federal University, Russian Federation; ²Kazan State Power Engineering University, Russian Federation; ³Kazan National Research Technical University named after A.N. Tupolev, Kazan, Russian Federation
- P 2 (7) **PROGRESS Project: Improving the Resilience of Satellite Ground Station Infrastructures**
Sebastian Schopferer¹, Christoph Michalski¹, Martin Schimmerohn¹, Nicolas Ribière-Tharaud², Jean-Christophe Joly², Alain Rouquand², Stephen Crabbe³
¹Fraunhofer Ernst-Mach-Institut (EMI), Germany; ²CEA-Gramat, France; ³Crabbe Consulting Ltd, Germany
- P 2 (8) **Analytical Model of DC-DC Converters Based on Switching Impedances and EMI Sources**
 Achour Ales¹, Abdelhalim zaoui¹, Jean Luc Schanen², James Roudet²
¹Ecole Militaire Polytechnique, Algeria; ²University of Grenoble
- P 2 (9) **Verification and Enforcement of Passivity through Direct Minimal Modification of Equivalent Circuits**
Ata Zadehgoi
 University of Idaho, United States of America
- P 2 (10) **Sensitivity of the Performance Statistics Provided by ISO 13528:2015 to Malfunctions of Participants Assessing Workers' Electromagnetic Field Exposure During Interlaboratory Comparison**
Jolanta Karpowicz¹, Jarosław Kieliszek², Jaromir Sobiech², Krzysztof Gryz¹, Robert Puta²
¹Central Institute for Labour Protection - National Research Inst.(CIOP-PIB), Warszawa, Poland; ²Military Institute of Hygiene and Epidemiology, Warszawa, Poland
- P 2 (11) **Common Mode and Differential Mode Characteristics of AC Motor for EMC Analysis**
 miloudi houcine, miloudi mohamed
 university of sidi bel abbes, Algeria
- P 2 (12) **MeerKAT Radio Telescope Electromagnetic Coupling Investigations**
Pieter Gideon Wiid, Stanley Oko h Kuja, Temwani Joshua Phiri
 Stellenbosch University, South Africa
- P 2 (13) **Modeling of EMI Filters With Shields Placed Between The Filter Components**
Aivis Asmanis, Gundars Asmanis, Deniss Stepins, Leonids Ribickis
 Riga Technical University
- P 2 (14) **Analysis of electromagnetic couplings in LTCC microcircuits**
Dariusz Klepacki¹, Wiesław Sabat¹, Kazimierz Kamuda¹, Stanislav Slosarčík², Dominik Demeter²
¹Rzeszów University of Technology, Poland; ²Technical University of Košice, Slovak Republic
- P 2 (15) **Influence of Electrode Surface Roughness in Electromagnetic Radiation due to Micro Gap ESD**
Kenichiro Abe¹, Ken Kawamata¹, Shigeki Minegishi¹, Osamu Fujiwara²
¹Tohoku Gakuin University, Japan; ²Nagoya Institute of Technology

- P 2 (16) **The Prediction of Radio Frequency Interference from HVDC-flexible Converter Valve**
Weidong Zhang¹, Qian Wan¹, Lei Qi¹, Donglai Zhao², Guoliang Zhao², Linhai Cai²
¹North China Electric Power University, People's Republic of China; ²China Electric Power Research Institute
- P 2 (17) **Analysis of Dependence Factors of Body Shadow Effect of Body-worn Dosimeters in Outdoor and Indoor Scenarios**
Silvia de Miguel-Bilbao¹, Blas Juan², Karpowicz Jolanta³, Ramos Victoria¹
¹Carlos III Health Institute, Spain; ²University of Valladolid; ³Central Institute for Labour Protection
- P 2 (18) **Improvements in Alternative Radiated Emission Test Methods With Surface Wire**
 Bahadır Tektas, Osman Sen, Soydan Cakir, Mustafa Cetintas
 TUBITAK UME, Turkey
- P 2 (17) **IBIS measurement based on static and quasi-static method**
 Adil EL ABBASI¹, Vincent FONTAINE², Nicolas MONNEREAU¹, Alain SAUVAGE², Anass JABER¹
¹SERMA INGENIERIE, France; ²AIRBUS OPERATIONS, FRANCE
- P 1 (10) **Model of the Minimum Requirements Regarding Electric and Magnetic Field Strength Measurement Devices for Use in the Near-Field Occupational Exposure in Compliance Testing with Respect to the Requirements of European Directive 2013/35/EU**
 Jolanta Karpowicz¹, Paweł Bienkowski², Jarosław Kieliszek³
¹Central Institute for Labour Protection - National Research Inst.(CIOP-PIB), Warszawa, Poland; ²Wrocław University of Technology, Wrocław, Poland.; ³Military Institute of Hygiene and Epidemiology, Warszawa, Poland

P 3

POSTER SESSION

Time: 13:30 - 15:30

POSTER SESSION 3

Chaired by: Dariusz Klepacki, Rzeszów University of Technology, Poland

**Poster
area (C-13)**

- P 3 (1) **A Novel FDTD Approach for Numerical Dosimetry at a Single Frequency**
Jerdvisanop Chakarohtai, Kanako Wake, Soichi Watanabe
 National Institute of Information and Communications Technology, Japan
- P 3 (2) **Band-Gap Limits Prediction for Effective Noise Coupling Reduction in Microwave Circuits Metallic Enclosures**
Muhammet Hilmi Nisanci¹, Francesco de Paulis², Antonio Orlandi²
¹Sakarya University, Turkey; ²University of L'Aquila
- P 3 (3) **Investigation of Interference with Medical Devices by Power Line Communication to Promote Its Safe Introduction to the Clinical Setting**
Kai Ishida¹, Eisuke Hanada², Minoru Hirose³
¹Division of Healthcare Informatics, Faculty of Healthcare, Tokyo Healthcare University, Tokyo, Japan; ²Department of Information Science, Faculty of Science and Engineering, Saga University, Saga, Japan; ³Department of Clinical Engineering, School of Allied Health Science, Kitasato University, Kanagawa, Japan

- P 3 (4) **Experiments on the Effect of Reflections from EUT Set-up Tables by Materials in Radiated Emission Measurements above 1 GHz to 18 GHz**
Yutaka Takeuchi, Hiroyuki Shimanoe, Hironari Tanaka, Hidenori Muramatsu
VCCI Council / Canon Inc.
- P 3 (5) **Emission Source Localization using the Method of Auxiliary Sources**
Revas S Zaridze, Vasil Tabatadze, Ivan Petoiev, David Kakulia, Tornike Tchabukiani
Tbilisi State University, Georgia
- P 3 (6) **Equivalent Circuit Identification of Standby Mode Operation for Some Household Appliances in Frequency Range 9-150 kHz for the Investigation of Conducted Disturbance in Low Voltage Installations**
Budi Sudiarto, Aji Nur Widyanto, Holger Hirsch
ETS Universität Duisburg-Essen, Germany
- P 3 (7) **Design of a Marx Generator for HEMP Filter Evaluation Taking Account of Parasitic Effect of Components**
Jiafeng Zhou
University of Liverpool, United Kingdom
- P 3 (8) **Experimental Analysis of Noise Level and Channels Availability for High Frequency OFDM data transmission in NVIS propagation conditions**
Paul Bechet¹, Simona Miclaus², Antoniu Miclaus², Cornel Balint³
¹Land Forces Academy, Romania; ²Technical University of Cluj Napoca; ³Politehnica University of Timisoara
- P 3 (9) **Integrated Modeling of a Motor Driven System for Analysis of Conducted Emissions**
Sangwon Yun¹, Junrae Ha¹, Minho Kim¹, Chanho Lee¹, Youngsik Kim¹, Jiyeon Yoo²
¹Mando, Korea, Republic of South Korea; ²Korea University, Republic of South Korea
- P 3 (10) **Large equipment emission testing in underground mines**
Marek Piotr Michalak, Monika Ewelina Szafranska, Karolina Natalia Spalt
National Institute of Telecommunications, Poland
- P 3 (11) **Influencing Factors on the Directivity Estimates of an Electrically Large EUT**
Xiaowei Wang, Ralf Vick
Otto-von-Guericke-University, Magdeburg, Germany, Germany
- P 3 (12) **Mains Power Synchronous Conducted Noise Measurement in the 2 to 150 kHz band**
Cees Keyer^{1,2}, Frits Buesink², Frank Leferink^{2,3}
¹Amsterdam University of applied sciences Amsterdam the Netherlands; ²Twente University Enschede the Netherlands; ³Thales Nederland B.V. P.O. Box 42, 7550 GD Hengelo, Netherlands
- P 3 (13) **Dynamic In-Line Analysis of Electrostatic Discharge Resistive-Capacitive Time Constant**
Mike Hertz, Dan Steinken
Teledyne LeCroy, United States of America
- P 3 (14) **Passive Magnetic Field Compensation of Existing Underground Cables**
Pablo Frezzi¹, Roland Hug¹, Jodee Grant¹, Alex Klingler²
¹General Electric, Switzerland; ²CFW EMV-Consulting, Switzerland
- P 3 (15) **The Short Time Fourier Transform and the Spectrograms to Characterize EMI Emissions**
Bruno Audone¹, Roberto Colombo², Ilario Marziali³
¹EMC Consultant, Italy; ²IMQ EMC Lab manager; ³Aleniaspace EMC specialist

- P 3 (16) **Analysis of the Radiated Susceptibility of a Transmission Line under Near and Far-field Conditions**
Zhao Zhao, Marco Leone
Otto-von-Guericke Universitaet Magdeburg, Germany
- P 3 (17) **Recommended Sample Size of ESD and Surge Immunity Tests**
Dick Harberts
Philips Innovation Services, The Netherlands
- P 3 (18) **Methodology for signals compatibility assessment in aeronautic environment**
Alexandre HERVE¹, Richard PERRAUD¹, Claude CUIILLER², Sebastien POISSON², Gaël Frazier²
¹Airbus Group Innovations, France; ²Airbus, France
- P 3 (19) **Analysis Methodology for Spectrum Sharing between Medical Implants and Digital Broadcasting**
Haim Mazar
ATDI, Poland

Meetings

MEETING 8

Time: 9:50 - 12:30

EU Project Initiators' Meeting

Chaired by: Davy Pissoort, KU Leuven, Belgium

Room: **E** (C-13)

MEETING 6

Time: 15:30 - 18:00

EMC Europe International Steering Committee Meeting

Chaired by: Andy Marvin, University of York, York EMC
Services Ltd, UK
Jan Carlsson, Provvinn, Sweden

Room: **E** (C-13)

Friday 9th September 2016 – Workshops and Tutorials

TIME	SESSION or BREAK				
	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	Room D (bldg. C-13 / 1.27)	Room E (bldg. C-13 / 0.31)
9:00	Workshop 8D Frequency Policy and Spectrum Engineering: "General Procedures on Spectrum Management" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	Workshop 9A Automotive EMC Organizer / Chair: Marco Klingler Peugeot Citroen Automob les - Groupe PSA	Tutorial 2A Improved EMC Test Methods in Industrial Environments Organizer / Chair: Soydan Cakir TUBITAK UME, Turkey	Workshop 10 The importance of and challenges posed by traceable calibration of Harmonic and Flicker meters Organizer / Chair: Heiko Wilke Ametek CTS, Germany	
9:50	Coffee break (conference building C-13, hall)				
10:30	Workshop 8E Frequency Policy and Spectrum Engineering "Digital audio broadcasting spectrum and networks" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	Workshop 9B Automotive EMC Organizer / Chair: Marco Klingler Peugeot Citroen Automobiles - Groupe PSA	Tutorial 2B Improved EMC Test Methods in Industrial Environments Organizer / Chair: Soydan Cakir TUBITAK UME, Turkey	Workshop 11A Practical approach for choosing the optimal antenna for RF EM field immunity tests Organizer / Chair: Heiko Wilke Ametek CTS, Germany	
12:30	Lunch (Canteen, building C-18, Hoene-Wronskiego Str. 10)				
	Room A (bldg. C-13 / 1.31)	Room B (bldg. C-13 / 1.30)	Room C (bldg. C-13 / 1.28)	EMC lab (bldg. C-15 / SAC)	Room E (bldg. C-13 / 0.31)
14:00	Workshop 8F Frequency Policy and Spectrum Engineering: "Future technologies on spectrum management" Organizer / Chair: Dariusz Więcek National Institute of Telecommunications, Poland	Workshop 9C Automotive EMC Organizer / Chair: Marco Klingler Peugeot Citroen Automob les - Groupe PSA	Tutorial 2C Improved EMC Test Methods in Industrial Environments Organizer / Chair: Soydan Cakir TUBITAK UME, Turkey	Workshop 11B Practical approach for choosing the optimal antenna for RF EM field immunity tests This part is limited for 10 participants only! Organizer / Chair: Heiko Wilke Ametek CTS, Germany	MEETING 7 Polish Committee on Lightning Protection Meeting (14:00 – 16:00) Chair: Grzegorz Maslowski Rzeszow University of Technology, Poland
15:30	Coffee break (conference building C-13, hall)				
16:00		Workshop 9D Automotive EMC Organizer / Chair: Marco Klingler Peugeot Citroen Automob les - Groupe PSA	Tutorial 2D Improved EMC Test Methods in Industrial Environments Organizer / Chair: Soydan Cakir TUBITAK UME, Turkey		
17:30					

Tutorials

TUT 2

TUTORIAL 2

Time: 9:00 - 17:30

IMPROVED EMC TEST METHODS IN INDUSTRIAL ENVIRONMENTS

Chaired by: Soydan Çakır, TÜBİTAK UME, Turkey Room: **C** (C-13)

Speakers: Soydan Çakır (TÜBİTAK UME), Mohammed Salhi (TÜBİTAK UME), Dongsheng Zhao (Dutch Metrology Institute), Marek Svoboda (Czech Metrology Institute), Pavel Hamouz (Czech Metrology Institute), Frederic Pythoud (METAS), Francois Ziadé (LNE), Miha Kokalj (SIQ), Hüseyin Çaycı (TÜBİTAK UME), Frits Buesink (University of Twente)

Sessions: Abstract:

TUT 2A

(9:00 - 10:30)

Coffee break

TUT 2B

(11:00 - 12:30)

Lunch

TUT 2C

(14:00 - 15:30)

Coffee break

TUT 2D

(16:00 - 17:30)

Development and maintenance of the EMC measurement facilities in accordance with standards are heavy loads for industry. Using the facility in EMC laboratories is a solution but expensive and time consuming and in most cases, it is not possible for large or stationary EUTs (Equipment Under Test). Improved methodologies and procedures are required for industry in terms of EMC test and measurement applications. The main obstacle is that relations are not clear between the measurement results of these alternative EMC test methods and the standard test methods in industry.

This tutorial session intends to present an overview of the most recent European research activities in the field of improved alternative EMC test methods for conducted/radiated emission and immunity tests. Furthermore part of program is dedicated to Round Robin Test devices and traceable LISN calibration kits.

Programme:

TUT 2A session

Time: 9:00 - 10:30

Alternative Conducted Emission Test Methods Based On RF Impedance Measurement

Soydan Çakır
TÜBİTAK UME, Turkey

Alternative Conducted Immunity Test Methods in Absence of Common Mode Impedance Requirements

Soydan Çakır
TÜBİTAK UME, Turkey

Alternative Radiated Immunity Test Methods

Mohammed Salhi
TÜBİTAK UME, Turkey

TUT 2B session

Time: 11:00 - 12:30

Alternative Radiated Emission Test Methods

Mohammed Salhi
TÜBİTAK UME, Turkey

In-situ impedance measurement for stationary EUTs

Dongsheng Zhao
VSL, Dutch Metrology Institute, The Netherlands

BCI Immunity tests and its critical point

Marek Svoboda
CMI, Czech Metrology Institute, Czech Republic

TUT 2C session

Time: 14:00 - 15:30

Effects of test setup in radiated immunity measurements

Pavel Hamouz
CMI, Czech Metrology Institute, Czech Republic

How to perform conducted immunity measurements according to 61000-4-6 and how to validate the setup

Frederic Pythoud
METAS, Switzerland

Impact of adapters on LISN's input impedance calibration: How to improve accuracy and reliability of the measurements (Part 1)

Francois Ziadé (1), Miha Kokalj (2)
(1) LNE, France
(2) SIQ, Slovenia

TUT 2D session

Time: 16:00 - 17:30

Impact of adapters on LISN's input impedance calibration: How to improve accuracy and reliability of the measurements (Part 2)

Francois Ziadé (1), Miha Kokalj (2)
(1) LNE, France
(2) SIQ, Slovenia

Design of a programmable Round Robin Test Device for Steady-State Harmonics

Hüseyin Çayci
TÜBİTAK ÜME, Turkey

Evaluation of a pc-oscilloscope based test setup for flicker & harmonic measurements with high accuracy

Hüseyin Çayci
TÜBİTAK ÜME, Turkey

EMC for Large Installations

Frits Buesink
University of Twente, The Netherlands

Workshops

WS 8

WORKSHOP 8

Time: 9:00 - 15:30

FREQUENCY POLICY AND SPECTRUM ENGINEERING

Organized by: Dariusz Więcek
National Institute of Telecommunications, Poland Room: **A** (C-13)

Speakers: Haim Mazar (ATDI and guest professor at Xihua University), Milan Mizera (Regulatory authority for Electronic Communications and Postal Services), Peter Vari (National Media and Infocommunications Authority), Marcin Karolak (Office of Electronic Communication), Wojciech Pieńkowski (Office of Electronic Communication), Yvette Dore (Digital Radio UK), Graham Dixon (EBU), Krystyna Roslan-Kuhn (National Broadcasting Council Republic of Poland), Gunnar Garfors (IDAG & NRK), Ronald Lorenz (Media Broadcast), Halina Uryga (Orange), Bartłomiej Gołębiowski (Nokia Bell Labs), Fabiano Chaves (Nokia Bell Labs), Przemysław Pawełczak (Delft University of Technology)

Sessions:

WS 8D
(9 00 - 10:30)
Coffee break
WS 8E
(10:30 - 12 30)
Lunch
WS 8F
(14:00 - 15 30)

Abstract:

The current technology progress has a big influence on society behaviour and experiences, new technology are rapidly growing. Such situation requires adaption of new technology both on transmission and reception sites and new frequency policy paradigm shifts. The aim of the workshop is presenting, discussing and proposing solutions for future broadcasting and mobile networks, audio and video content delivering as well as highlight potential of future spectrum policy and engineering potential. In this context the motto is „Perspectives of Terrestrial Broadcasting and Mobile Networks“. The workshop is organized within project Frequency Policy and Spectrum Engineering in V4 countries supported by Visegrad Fund.

More information about this workshop is available on:
<http://www.fpse2016.nit.eu/>

Programme:

WS 8D session

"General Procedures on Spectrum Management"

Chair: Jiří Duchač

Time: 10:30 - 12:30

Results of WRC15 and ITU-R Study Groups activities for WRC19

Haim Mazar
ATDI and guest professor at Xihua University

Frequency Management in the Environment of the Slovak Republic

Milan Mizera
Frequency Spectrum Management, Regulatory authority for Electronic Communications and Postal Services, Slovak Republic

Spectrum outlook

Peter Vari
National Media and Infocommunications Authority of Hungary

Technological and legal aspects of 700 MHz refarming in Poland – state of play after release of 800 MHz

Marcin Karolak (1), Wojciech Pierkowski (2)
(1) Frequency Management Department in Office of Electronic Communications
(2) Office of Electronic Communication

WS 8E session

"Digital audio broadcasting spectrum and networks "

Chair: Mirosław Ostrowski

Time: 14:00 - 15:30

DAB digital radio – a platform for Europe

Graham Dixon
EBU

Digital: serving audiences, serving society– a UK case study

Yvette Dore
Digital Radio UK

Can radio remain analogue in a digital world?

Krystyna Roslan-Kuhn
National Broadcasting Council Republic of Poland

A Countdown to the World's First FM Switch-off: 4 Months to Go

Gunnar Garfors
IDAG, Advisor at NRK

The Future of Audio Broadcasting in Germany - Digital

Ronald Lorenz
Media Broadcast

WS 8F session

"Future technologies on spectrum management"

Chair: Krystyna Roslan-Kuhn

Time: 16:00 - 17:30

New frequency bands for 5G/IMT-2020

Halina Uryga
Spectrum Office of the Orange's Group

Future spectrum technologies for Mobile Broadband

Bartłomiej Gołębiowski
Nokia Bell Labs

Spectrum sharing in 28GHz band: feasibility of 5G and FSS (Fixed Satellite Service) co-existence.

Fabiano Chaves
Nokia Bell Labs

White Space Database Connectivity for Mobile Devices: First Experiments

Przemysław Pawełczak
Delft University of Technology

Closing Workshop (unofficial)

WS 9

WORKSHOP 9

Time: 9:00 - 17:30

AUTOMOTIVE EMC

Chaired by: Marco Klingler, Peugeot Citroen Automobiles, France Room: **B (C-13)**

Speakers: Marco Klingler (Peugeot Citroen Automobiles), Dirk Schäfer & Dennis Hasselberg (BMW Group), Roman Jobava & Ekaterina Yavolovskaya (EM Consulting and Software, EMCos Ltd), Benjamin Willmann & Oussama Sassi (Volkswagen AG), Frederic Bocquet (ANSYS), Mateusz Będkowski (ANSYS), Amazir Moknache (ANSYS), Domenico Loricchio (ANSYS), Stephan Frei & Abid Mushtaq (TU Dortmund), Mauro Feliziani (University of L'Aquila), Markus Schick (Altair Engineering), Andreas Barchanski (CST AG), Franz Hirtenfelder (CST AG), Maximilian J. Schwaiger (Dätwyler Cable), Diego Cuartielles (Audi AG), Ferran Silva (Universitat Politècnica de Catalunya), Philipp Hillenbrand & Jan Hansen (Robert Bosch GmbH), Jean-Roger K. Kuvedu-Libla (Delphi Electronics & Safety)

Sessions: Abstract:

WS 9A
(9:00 - 10:30)

Coffee break

WS 9B
(10:30 - 12:30)

Lunch

Automotive electric / electronic systems are endlessly growing in complexity with a permanent constraint of a constant or reduced time-to-market. Therefore, there is a strong need to constantly improve the efficiency of the EMC related tasks throughout the entire development process, starting from the design phase until the full-vehicle validation phase. This workshop intends to present an overview of the most recent industrial advances in the field of automotive EMC design, modeling and simulation as well as in the field of automotive standards, testing and measurements. The presentations in this workshop will cover EMC issues at

WS 9C
(14:00 - 15:30)

Coffee break

WS 9D
(16:00 - 17:30)

system, subsystem, equipment and component levels. In particular, topics addressed by the speakers will include hybrid power-train systems EMC analysis, antenna implementation, equipment design, printed-circuit-board optimization, and electric/electronic component characterization.

Programme:

WS 9A session

Time: 9:00 - 10:30

Online EMC Numerical Simulation

Marco Klingler
Groupe PSA, Vélizy-Villacoublay, France

Keep it mobile – An approach for system to vehicle level testing of electric and hybrid powertrains

Dirk Schäfer, Dennis Hasselberg
BMW Group, Munich, Germany

New Software Solution for Low Frequency Human Exposure Simulations in Electrical Vehicles

Roman Jobava (1), Ekaterina Yavolovskaya (1), Benjamin Willmann (2), Oussama Sassi (2)
(1) EM Consulting and Software, EMCoS Ltd., Tbilisi, Georgia
(2) Volkswagen AG, Germany

WS 9B session

Time: 11:00 - 12:30

Antennas and Wireless Devices Interferences Simulations within a vehicle

Frederic Bocquet (1), Mateusz Będkowski (2), Amazir Moknache (1), Domenico Loricchio (3)
(1) ANSYS France SAS, Montigny Le Bretonneux, France
(2) ANSYS-SYMKOM Poland, Warszawa, Poland
(3) ANSYS Italy, Milano, Italy

Active Shielding/Filtering for Noise Reduction on HV Cable Systems

Stephan Frei, Abid Mushtaq
TU Dortmund University

Magnetic field reduction in automotive wireless charging systems

Tommaso Campi (1), Silvano Cruciani (1), Valerio De Santis (1), Francesca Maradei (2), Mauro Feliziani (1)
(1) University of L'Aquila - DIIE, L'Aquila, Italy
(2) Sapienza University of Rome - DIAAE, Rome, Italy

WS 9C session

Time: 14:00 - 15:30

Simulation of Emissions and Immunity for PCBs and Other Devices Inside Vehicles

Markus Schick (1), Eddy Jehamy (2)
(1) Altair Engineering GmbH, Böblingen, Germany
(2) Altair Engineering France, Anthony, France

Transmission behavior of unshielded data cables in close presence to metal trays

Andreas Barchanski (1), Franz Hirtenfelder (1), Maximilian J. Schwaiger (2)
(1) CST AG, Munich, Germany
(2) Dätwyler Cables, Hallbergmoos, Germany

Benchmark from magnetic field measurement devices

Diego Cuartielles
Audi AG, Ingolstadt, Germany

WS 9D session

Time: 16:00 - 17:30

Automotive EMI measurements with multichannel time-domain systems

Ferran Silva, Marc Aragón, Marc Pous, Marco Azpúrua
Universitat Politècnica de Catalunya-BarcelonaTech, Barcelona, Spain

EMI-Simulation of a SiC based DCDC-Converter in a CISPR25 component test setup

Philipp Hillenbrand, Jan Hansen
Robert Bosch GmbH, Germany

Simple Decoupling and Coupling Strategies of Electromagnetic Disturbances from/on Cable Harnesses when using Automotive Component Test- ing Methods

Jean-Roger K. Kuvedu-Libla
Delphi Electronics & Safety, Bascharage, Luxembourg

WS 10

WORKSHOP 10

Time: 9:00 - 10:30

THE IMPORTANCE OF AND CHALLENGES POSED BY TRACEABLE CALIBRATION OF HARMONIC AND FLICKER METERS

Chaired by: Grigory Suprun, Newtons4th Ltd

Room: **D** (C-13)

Speakers: Grigory Suprun, Newtons4th Ltd

Sessions: Abstract:

WS 10
(9 00 - 10:30) IEC61000 EMC test system compliance and in depth look at the technical requirements of IEC61000 test standards from an instrumentation design as well as end user perspective.

Programme:

WS 10 session

Time: 9:00 - 10:30

The importance of and challenges posed by traceable calibration of Harmonic and Flicker meters

Grigory Suprun
Newtons4 h Ltd

WS 11

WORKSHOP 1

Time: 11:00 - 15:30

PRACTICAL APPROACH FOR CHOOSING THE OPTIMAL ANTENNA FOR RF EM FIELD IMMUNITY TESTS

Chaired by: Heiko Wilke, AMETEK CTS, Germany

Room: **D** (C-13)

Speakers:

Sessions: Abstract:

WS 11A
(10:30 - 12:30) Main target of this workshop is to discuss correct selection of transmitting antenna for immunity test to radio frequency electromagnetic field. Impact of transmitting antenna parameters (radiation pattern and gain) as well as the distance to EUT onto testing area size and field uniformity will be shown as well.

Lunch

WS 11B
(14:00 - 15:30) For better understanding workshop consists of two parts: theoretical (1) and practical (2). Theoretical part is the tutorial with presentation conducted in the classroom.

Coffee break

Practical part (2) contains real tests and experiments performed by participants in 10m SAC located in EMC lab of Wroclaw University of Science and Technology. For this reason practical part of the workshop is limited for about 10 participants only. Attendee list will be available during the conference at the reception desk.

Programme:

WS 11A session

Time: 11:00 - 12:30

Practical Approach for Choosing the Optimal Antenna for RF EM Field Immunity Tests – Introduction (part 1)

Heiko Wilke
AMETEK CTS, Germany

WS 11B session

Time: 14:00 - 15:30

Practical Approach for Choosing the Optimal Antenna for RF EM Field Immunity Tests – Experiments in EMC lab (part 2)

Heiko Wilke
AMETEK CTS, Germany

Location: EMC lab (bldg. C-15)

*This practical part of the workshop is limited for about 10 participants only.
Attendee list will be available during the conference at the reception desk.*

Meeting

MEETING 7

Time: 14:00 - 16:00

Polish Committee on Lightning Protection Meeting

Chaired by: Grzegorz Maslowski
Rzeszow University of Technology, Poland

Room: **E** (C-13)

Test Handbook

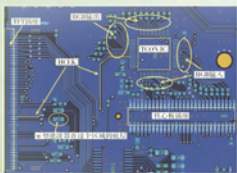


图 5 Tcon IC 顶层布线图

3.2 Tcon IC 旁路电容布局

图6中黄色的是电源脚 V_{CC} ，绿色的是地脚GND，每对电源和地脚都有两只旁路电容，一只100 nF，一只100 μ F，都落在R3的底层，没有靠近IC，只是IC的电源和地脚，R3的电源脚没有先到旁路电容再到电源线，在100 nF和10 μ F的旁路电容阻抗 Z_{ESR} 得6.4 Ω ，16 μ 到100 μ F电容的阻抗 Z_{ESR} 是5 m Ω ，电压降为33.4 μ V，在100 MHz，频率高达1 Ω 的阻抗，电压降为3.3 μ V，影响不大，对信号的影响可以忽略不计，在100 MHz，旁路电容的阻抗 Z_{ESR} 和寄生电感 L_{ESR} 对信号的影响可以忽略不计。

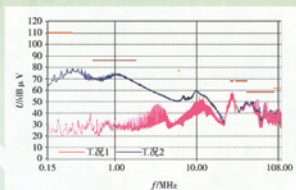


图 1 传导发射测试曲线 (PK 检波器)

的有效性,采用前述的标准方法就存在一定局限。例如,针对上述测试对象,10 MHz 以下频段骚扰值明显变大,原因是因为高压干扰源幅值过大,不是因为高压电路与测试设备之间的耦合效应增大。众所周知,如果能对测试设备进行准确评估,无疑能

2.2 耦合干扰分析

[illegible]

发一系列问题，如收音机中干扰等。

3 耦合衰减测试研究

高压部件中可能存在。高压部件的试验标准试验方法来考核。高压部件与低压电路的耦合,本身并不会产生电磁干扰。但是,如果高压电路与低压电路之间存在较强的耦合,则可能会产生电磁干扰。因此,在高压电路与低压电路之间没有任何屏蔽措施的低压电路中,可能会产生严重的电磁干扰问题。



EMC Guidance



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Account : Safety EMC



Exhibition

Exhibition booths are presented on the ground floor in the conference building C-13. From 9:00 to 17:00 you are invited to attend the exhibiting companies.

Exhibitor Information

Exhibitor	booth no.
Altair Engineering GmbH	24
AMETEK CTS Germany GmbH	5
AM Technologies Sp. z o.o. Sp.k.	14
AR Europe & UEI	9
ASTAT Sp. z o.o.	6
ATDI Advanced Radiocommunications	4
CST - Computer Symulation Technology AG	2
COMTEST Engineering bv	23
ELEKTRONIK	10
EMCoS Consulting and Software	19
EMI Solutions Pvt. Ltd	21
ETS Lindgren	15
FRANKONIA EMC TEST-Systems GmbH	18
HELMAR Jacek A. Dobrowiecki	22
HIK-Consulting Krzysztof Kuc	20
IEEE EMC Society	12
KABELKOM Sp. z o.o.	3
LUMILOOP GmbH	7
Microwave Vision Group (MVG)	8
NDN-Zbigniew Daniluk	1
ROHDE & SCHWARZ OESTERREICH Sp. z o.o.	17
Safety & EMC Magazine	11
Tespol Sp. z o.o. – Tektronix	16
TMD Technologies	13

The exhibition plan – see page 44.

Exhibitor Information

booth 24	Altair Engineering GmbH Calwer Str. 7 D-71034 Boeblingen, GERMANY www.altair.de	booth 18	FRANKONIA EMC TEST-Systems GmbH Daimlerstr. 17 D-91301 Forchheim, GERMANY www.frankoniagroup.com
booth 5	AMETEK CTS Germany GmbH Office in Poland ul. Ogrodowa 31/35 00-893 Warszawa, POLAND www.ametek-cts.com	booth 18	Megmar Logistics & Consulting Sp. z o.o. ul. Marii Skłodowskiej-Curie 10 99-300 Kutno, POLAND www.megmar.pl
booth 14	AM Technologies Sp. z o.o. Sp.k. Al. Jerozolimskie 146C 02-305 Warszawa, POLAND www.amt.pl	booth 22	HELMAR Jacek A. Dobrowiecki Powstańców Śląskich Str. 108C/2 01-466 Warszawa, POLAND www.helmar.com.pl
booth 9	AR Europe & UEI National Technology Pk. - Ashling Bldg, 1st Floor Castletroy, Limeric, IRELAND www.ar-europe.ie	booth 20	HIK-Consulting Krzysztof Kuc Chabrowa Str. 16 01-934 Warszawa, POLAND www.hik-consulting.pl
booth 6	ASTAT Sp. z o.o. Dąbrowskiego Str. 441, PL 60-451 Poznań, POLAND www.astat.com.pl	booth 12	IEEE EMC Society http://www.emcs.org
booth 4	ATDI Advanced Radiocommunications Nowy Świat Str. 54/56 00-363 Warszawa, POLAND www.atdi.com	booth 3	KABELKOM Sp. z o.o. Bukowa Str. 30 43-300 Bielsko-Biała, POLAND www.kabelkom.pl
booth 2	CST - Computer Symulation Technology AG Bad Nauheimer Str. 19 64289 Darmstadt, GERMANY www.cst.com	booth 7	LUMILOOP GmbH Nöthnitzer Straße 64 D-01187 Dresden, GERMANY www.lumiloop.de
booth 23	COMTEST Engineering bv Industrieweg 12, NL-2382 NV Zoeterwoude, NETHERLANDS www.comtest.nl	booth 8	Microwave Vision Group (MVG) 17 avenue de Norvege 91140 Villebon-sur-Yvette, FRANCE www.mvg-world.com
booth 10	ELEKTRONIK Magazyn Elektroniki Profesjonalnej http://elektronikab2b.pl	booth 1	NDN-Zbigniew Daniluk Janowskiego Str. 15 02-784 Warszawa, POLAND www.ndn.com.pl
booth 19	EMCoS Consulting and Software 27 Pekin Str. 0160 Tbilisi, GEORGIA www.emcos.com	booth 17	ROHDE & SCHWARZ ÖSTERREICH Sp. z o.o. POLISH SALES OFFICE Al. Jerozolimskie 92, floor 3 PL-00-807 Warsaw, POLAND www.rohde-schwarz.com.pl
booth 21	EMI Solutions Pvt. Ltd #237-A5 Bommasandra Industrial Area, Hosur Road 560099 Bangalore, INDIA www.emisindia.com	booth 11	Safety & EMC Magazine www.semc.cesi.cn
booth 21	Freicomp GmbH Gewerbestr. 11 D-79285 Ebringen, GERMANY www.freicomp.com	booth 16	Tespol Sp. z o.o. - Tektronix Klecińska Str. 125 54-413 Wrocław, POLAND www.tespol.com.pl
booth 15	ETS Lindgren Mekaanikontie 1 FI - 27501 Eura, FINLAND www.ets-lindgren.com	booth 13	TMD Technologies Swallowfield Way, Hayes Middlesex UB3 1DQ, UNITED KINGDOM www.tmd.co.uk

Altair - Software & Services related to electromagnetic (EM) field computation:

FEKO – a leading EM analysis software suite – is part of Altair's HyperWorks Software Suite (the most comprehensive CAE solution e.g. for structural optimization, modeling, CFD, NVH and composites). FEKO provides solutions for a wide range of EM problems for a large variety of industries. Applications range from 3D antenna design and antenna placement to Electromagnetic Coupling and Interference (EMC, EMI) analysis, Bio-electromagnetics, 3D RF components, 3D EM circuits to radomes and scattering problems.

Besides FEKO Altair also offers further tools in the EM domain e.g. for electromechanical equipment design, for a fully automatic design of matching circuits or for designing high voltage equipment.

Consultation and studies for the areas EMC, antennas and general application of computational electromagnetics. Special extensions to numerical EM software according to customer requirements.

AMETEK CTS – YOUR CONTACT FOR ALL YOUR NEEDS!

AMETEK Compliance Test Solutions (CTS) is a leading provider of test and measurement instrumentation solutions for electromagnetic compatibility (EMC) testing, headquartered in Reinach/Switzerland, producing a broad range of conducted and radiated EMC compliance testing systems, RF and microwave amplifiers.

AMETEK Compliance Test Solutions (CTS) offers four strong product brands under one roof –EM TEST, IFI, MILMEGA and TESEQ. With these four brands united together, AMETEK CTS continues to lead the way in EMC innovation, quality and range of solutions as well as customer support.

AMETEK CTS serves a wide range of industries including automotive, consumer and industrial electronics, medical equipment, telecommunications, defense and avionics.



YOUR CONTACT:

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AM Technologies

AM Technologies is a Polish Company with a strategic focus in two key areas:

- Sales and support of Test Equipment and Systems delivered by world leading suppliers;
- Design and integration of custom test systems, measurement solutions, instrumentation and automation tools as well as software design and expert services.

The Company key success factor is the individual attitude to our clients combined with professional integrity, resulting from remarkable skills and experience of people creating our team. Over the years we build extensive relationships with telecommunication service providers, network equipment and other electronic manufacturers, educational and scientific institutions, military customers and government organizations.

AM Technologies was established in September 1999, as a result of Hewlett-Packard strategic realignment and Agilent Technologies spin-off. The HP Poland Test & Measurement Department was then transformed into AM Technologies - Agilent Technologies independent distributor for Poland. Since then the Company went through several changes and developments. Today AM Technologies product portfolio includes:

- Keysight Technologies general purpose instruments, RF and microwave test systems, telecommunication analyzers, research equipment for nanotechnology;
- Fluke Calibration instruments for electrical, temperature and pressure calibration;
- ETS Lindgren EMC and antenna test facilities;
- Cascade Microtech probing stations and AH Systems measurement antennas;
- VIAVI Solutions, IXIA, Keynote SIGOS telecommunication instruments and test solutions;
- SAAB Grintek, Sysdel and TCI special purpose measurement equipment;
- Consultancy, dedicated measurement software and custom systems.

The Company supports polish educational institutions and is a member of EMC Committee of Polish Academy of Science, as well as Support for Radiocommunication and Multimedia Development Foundation.

AM Technologies has implemented PN-EN ISO 9001:2009, AQAP 2110:2009 and AQAP 2210:2015 International Standards as well as Export Control procedures (WSK Certificate). The Company is also certified to supply strategic products and systems to Polish Government Organizations (Concession no. B-381/2003) and holds its First Degree Industrial Safety Certificate SBPK009213P (to 'Confidential' Clause).

The Company aim is to enhance customer satisfaction through the continuous improvement of delivered products and services in full compliance with all regulatory requirements.

AM Technologies Sp. z o.o. Sp k., Al. Jerozolimskie 146C, 02-305 Warszawa
tel. 22 532 28 00, faks 22 532 28 28, e-mail: info@amt.pl, www.amt.pl

Your Total EMC Source for Over 45 Years



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The solid state alternative to TWTA's. Improved harmonics, lower noise, superior linearity and reliability and now featuring 3,000 watts CW.



16,000 Watts of Pure Power

The new 16000A225 amp. It covers 10 kHz to 225 MHz and delivers 16,000 watts of power and we're not stopping there. Call us for power levels up to 50,000 watts.



"W" Series Amplifiers

The most advanced, highest power and innovative RF Solid State amplifiers in the world. Now providing up to 10,000 Watts CW from 80 to 1000 MHz.



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All-in-one test systems for any EMC application, DC to 50 GHz. Our systems make testing more efficient, accurate, and affordable.



Radiant Arrow® Bent Element Antennas

We bent the rules and advanced the science of log periodic antennas. Smaller, lighter, and more compact to fit in smaller chambers.

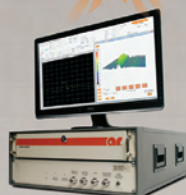


0.7 to 18 GHz Amplifiers

Solid State Class A CW Amplifiers up to 350 Watts from 0.7 - 6 GHz and 40 Watts from 4-18 GHz. Now you don't have to settle for TWTA's.

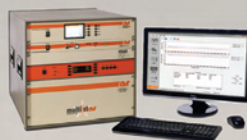
RF Conducted Immunity Test Systems

Self-contained systems driven by our proprietary software; simplify calibration, testing, troubleshooting and reporting. They allow accurate, sensitive and repeatable measurement in one unit. Power levels to 150 watts and up to 3 GHz.



Precision DSP Receiver

This 18 GHz EMI receiver changes the way you think about emissions testing. Data is more accurate and test time is reduced. Available up to 40 GHz.



Multi-Tone Tester

This incredible system cuts RF Radiated Immunity testing from days down to hours by testing multiple frequencies simultaneously, from 10 kHz to 6 GHz, reducing product development cost and time to market.



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The new series of laser powered electric field analyzers have an extremely high sample rate and can precisely measure pulsed electric fields in the microsecond range.

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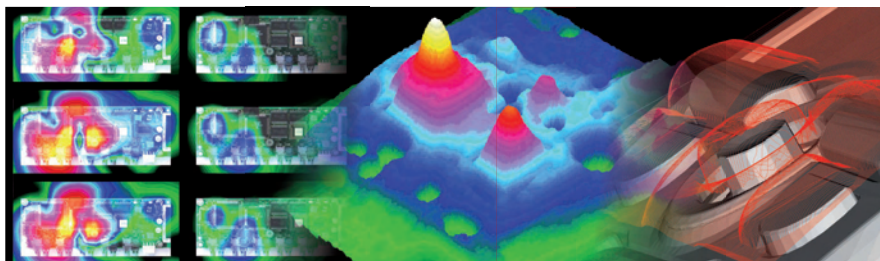
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ASTAT COMPANY PROFILE

ELECTROMAGNETIC COMPATIBILITY



The ASTAT company provides wide range of electromagnetic compatibility (EMC) solutions and it has been operating on this demanding market for over 20 years, sharing expertise and experience with its customers. Many years of presence where EMC is a must confirms we are specialists in areas such as:

Design, installation and commissioning of anechoic and reverberation chambers, GTEM cells and Faraday cages.

Professional supervision over the construction work is offered from the very beginning of the project in order to ensure that new or adapted building is fully compatible with construction of the chamber. Every project is based on specifics of future tests inside the chamber and on the nature of tested objects in full compliance with current standards. Advanced program for numerical simulation of the chamber verifies correctness of assumptions, such as: selection of absorbers, their location and number, or how door location affects chamber performance, even before assembly.

The result is an optimal conception of construction, made of materials of highest quality: shield + absorbers, quickly and perfectly assembled, ensuring great satisfaction of use. The final verification of entire investment are measurements performed by an independent, accredited laboratory, confirmed by positive test report.

Verification of shielded and anechoic installations in terms of compliance with both: civil and military standards.

Creating complete test stations by integrating measuring equipment compliant with particular standards.

Astat offers service of building new and developing existing EMC laboratories, and provides to the user complete turnkey test stations. The entire procedure is carried out in accordance to customer's preferences and in full compliance with requirements of latest standards.

We provide technically advanced, most reliable and best on the market measuring instruments, software and laboratory equipment.

ASTAT COMPANY PROFILE ELECTROMAGNETIC COMPATIBILITY

Along with the software customer is given a full control over measuring equipment, and unlimited possibility of upgrading it, and that all approved by professional test report.

Supply, commissioning and servicing of EMC appliances for testing civil and military equipment in terms of emission and immunity.

Comprehensive offer of filtering, shielding, sealing and absorbing EMI components for production.

Our goal is to not only supply EMI components, but also to consciously and carefully select most effective solutions. As a result, our customers receive perfectly matched product with a number of intangible but very important benefits. Thanks to well-featured machine park and highly qualified engineering personnel we are able to provide service of shielding, sealing and absorbing EMI components production. The priority is to supply the highest quality components in the shortest time.

Consulting services for prototype solutions and modifications of equipment in order to ensure compliance with EMC standards in our laboratory.

Innovative thermal conductive materials.

Scanning PCBs and complete devices for emission and immunity check to identify sources of interference.

Service of automatic application of EMI sealing materials and conductive paint coating.

EMC trainings and courses.

ASTAT REPRESENTS



As specialists in high voltage impulse technology since 1994, EMC PARTNER AG has built a reputation delivering innovative solutions for commercial and industrial EMC immunity testing, indirect lightning on aircraft and component testing for a worldwide customer base.

EMC PARTNER is continually expanding through new product lines and into new geographic areas. Based on our client's needs and the evolving market, EMC PARTNER design both traditional EMC impulse generators and impulse test systems for evolving technology such as smart grid and smart meters.

A team of qualified engineers enable us to provide competent advice, high quality reliable products and an efficient service for our customers. We employ a quality management structure based on ISO9001 which enables our company to obtain the status of an ISO17025 accredited calibration facility. All primary functions are maintained in-house with the benefit of a fast reaction time to meet market demands for updates to existing products or new developments. Access to international markets is through a network of competent representatives, many having long associations with EMC PARTNER.

EMC PARTNER AG

Baselstrasse 160 – CH-4242 Laufen –
Switzerland

ASTAT COMPANY PROFILE

ELECTROMAGNETIC COMPATIBILITY

ASTAT REPRESENTS



„Detectus AB is a Swedish company that develops, manufactures and sells EMC test systems directly and through distributors worldwide”.

For over 20 years our products have been developed in close contact with our customers which allows for flexible and easy-to-use products. In light of the high demands for electromagnetic compatibility that developers are facing, we are confident in our chosen strategic direction.

At Detectus, we're dedicated to provide market leading EMC scanning technology to the electronics industry in general and the cell phone industry in particular. Our goal is to improve the search for emission sources for developers and electronic designers worldwide.

DETECTUS AB

S. Hantverkargatan 38 B – 782 34 Malung
– Sweden



In the early 2000's the founders of GAUSS INSTRUMENTS invented a measurement technology combining Time-Domain and FFT based techniques and superheterodyne technology in a massively parallel topology - the so called TDEMI® Technology, which is a registered brand and patented technology of GAUSS INSTRUMENTS and is only provided by GAUSS or its' official certified local partners.

Official testing and certification institutes as well as leading automotive OEMs and other blue chip companies selected GAUSS as cooperation partner and solution provider for their demanding test requirements during market certification as well as product development.

As an inventor of the TDEMI® Measurement System that uses ultra high-speed analog-to-digital converters and advanced real-time digital signal processing methods we enable ultra fast tests and measurements for electromagnetic compliance. Today GAUSS offers a wide range of solutions from DC to 40 GHz for all kind of test requirements in the world. We provide customized signal processing solutions based on our established well-proven hardware platforms and software solutions. With a strong knowledge in real-time digital technology and millimeterwave and microwave technologies we develop systems that are absolutely outstanding in the field of test and measurement.

Fastest real-time FFT based technology with a full compliance real-time analysis bandwidth of 645 MHz as well as classical superheterodyne technology are only a few of our outperforming features for full compliance testing and analysis of EMI.

GAUSS INSTRUMENTS GmbH

Agnes-Pockels-Bogen 1 – 80992 München
– Germany



ASTAT sp. z o.o.

ul. Dąbrowskiego 441 60-451 Poznań
tel. 61 848 88 71 fax 61 848 82 76
info@astat.pl www.astat.pl

ASTAT COMPANY PROFILE

ELECTROMAGNETIC COMPATIBILITY

ASTAT REPRESENTS



WORLD LEADER FOR NEMP TEST SYSTEMS

Montena is a Swiss company active in the field of electromagnetic compatibility since 1978. Montena designs and manufactures high voltage fast transient pulse generators and EMC test equipment. From development to installation, montena provides turnkey solutions for electromagnetic compatibility test systems compliant with MIL standards.

The product range includes:

- NEMP simulators according to MIL-STD-461 RS105,
- NEMP protecting device testing systems according to MIL-STD-188-125,
- UWB antennas,
- ESD 300kV test setup,
- Pulse electromagnetic field measurement equipment,
- and many other test systems and accessories for MIL standards testing.

Montena offers a comprehensive range of standard solutions, with the ability to develop and adapt to customers' requirements.

Montena is the world leader for small to large sizes NEMP simulators according to MIL-STD-461 RS105 and for NEMP protector testing systems according to MIL-STD-188-125.

MONTENA TECHNOLOGY SA

Route de Montena 89 – 1728 Rossens – Switzerland



Newtons4th Ltd (abbreviated to N4L) was established in 1997 to design, manufacture and support innovative electronic equipment to a world-wide market. Specialising in sophisticated test equipment, particularly related to phase measurement, our product portfolio includes Power Analyzers, Frequency Response Analyzers (gain/phase analyzers), Impedance Analyzers, Vector Voltmeters, Phase Meters, true RMS voltmeters, Selective Level Meters and Laboratory Power Amplifiers.

The company was founded on the principle of using latest technology and sophisticated analysis techniques in order to provide our customers with accurate, easy to use instruments at a lower price than has been traditionally associated with these types of measurements. Flexibility in our products and an attitude to providing the solutions that our customers really want has allowed us to develop many innovative functions in our ever increasing product range.

Newtons4th Ltd are ISO9001 registered, the internationally recognised standard for the quality management of businesses. In recognition of the technical innovation and commercial success of the PPA series, N4L received the „Innovation 2010” Queen's award for enterprise.

Newtons4th Ltd

1 Bede Island Road – Leicester – LE2 7EA



ADVANCED SPECTRUM SOFTWARE

ATDI is an international company that provides a wide range of software products specifically designed to meet the demands of Radio communication, Digital Cartography, Electronic Warfare and Spectrum Management.

Three decades in radio communication, software tools and engineers who have already overcome every challenge the industry can present. It makes ATDI the world's leading authority on radio network planning and modelling, spectrum management, dynamic spectrum and network optimization. Network operators, spectrum regulators, military planners, emergency services, broadcasters and air traffic controllers can all rely on ATDI to handle the planning and modelling for their vital radio systems.

Hundreds of customers worldwide and offices in more than ten countries make ATDI the most comprehensive provider of radio planning solutions. ATDI is currently managing more than 15 spectrum management projects in 14 countries.

The company offers a wide range of studies and solutions supporting all wireless technologies, including PMR, WiMax, Broadcast, Mobile, Microwave, Satellite TV, Radars.

ATDI is accredited with ISO 9001:2008 and ISO 27001:2005

address : ul. Nowy Świat 54/56 | 00-363 Warszawa
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Founded in 1985, Comtest Engineering provides in-depth EMC test facility planning, engineering and installation services to customers on a worldwide basis.

Comtest has a flexible and professional organisation and the products are recognized for quality and performance.

Our experience has run the entire spectrum, from design of small shielded rooms through the construction of large Semi Anechoic EMC facilities for testing of satellites and automobiles.

From 1999 Comtest Engineering started with the in-house design and production of RF shielding. The Pan-Type shielding panels provide a modular concept using 2mm Steel panels covered with a special ZMA-140 coating.

The unique parallel closing concept of our swing doors provide extended life time in line with the RF shielding.

In 2012 Comtest started production of Polystyrene RF absorbers for use in EMC facilities as well as for applications in the Antenna Test Range.

The modular construction of the RF Absorbers allows an efficient transport of the materials. After the installation of the separate baseplates, the pyramids can be installed easily. In case of damage, a pyramid can be replaced rather than a whole absorber.

These Polystyrene RF absorbers meet ROHS and REACH requirements and have an expected life time of 40 Years.

Comtest Engineering is ISO-9001 and ISO-14001 certified. These certificates are issued after a complete review and three days of auditing by Quality Masters, an official accredited registrar for the standard.

For further information, please visit:

<http://www.comtest.eu>

Comtest Engineering bv

Industrieweg 12

NL-2382NV Zoeterwoude

Tel: +31 715417531

Email: info@comtest.eu



Make the Connection

Find the simple way through complex EM systems with CST STUDIO SUITE

Components don't exist in electromagnetic isolation. They influence their neighbors' performance. They are affected by the enclosure or structure around them. They are susceptible to outside influences. With System Assembly and Modeling, CST STUDIO SUITE helps optimize component and system performance.

Involved in EMC/EMI analysis? You can read about how CST technology is used for EMC/EMI analysis at www.cst.com/emc.

If you're more interested in microwave components or signal integrity analysis, we've a wide range of worked application examples live on our website at www.cst.com/apps.

Get the big picture of what's really going on. Ensure your product and components perform in the toughest of environments.

**Choose CST STUDIO SUITE –
Complete Technology for 3D EM.**





EMCoS Simulation Tools

Simulation Has Never Been so Easy!

EMCoS focuses on generation of special simulation software. Powerful simulation tools and techniques lets solve complex EM problems in fast and efficient manner. EMCoS software is widely used in automotive, aircraft and naval industries. Application areas include: EMC / EMI in large systems, complex harness processing, solutions for hybrid vehicles, shielding study, antenna simulations, PCB simulations.

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info@emcos.com
www.emcos.com

We are an **ISO 9001:2008 & ISO 14001:2005** certified industry in the micro sector, located in Bangalore, India, and specialized in the field of **electromagnetic/radio frequency interference solutions**. We manufacture a complete range of power line EMI/RFI filters in single and three phase (**230 V, 440 V, 520 V, 690 V**) and can offer filters with current ratings up to **2500 A**.

We are manufacturing **EMI/RFI** power line filters, HEMP filters, feedthrough capacitors/filters, coaxial/EMP connectors, surge suppressors and lightning arrestor for various applications in:

1. Variable Frequency Drives (VFD)
2. Industrial Automation
3. Home Appliances
4. Military Electronics
5. UPS/Office Automation
6. Medical Electronics
7. Power Electronics
8. Solar & Wind Mill Applications

EMIS make filters are certified for export to all the major continents, Europe, USA & Canada with safety certification as per CSA22.2, UL 1283 and EN 60939.

This is the first time the EMI power line filters, facility filters and feedthrough capacitors/filters from India are available with all the major international safety certifications CSA / C-US and NEMKO with additional "CE" mark.



EMI Solutions Pvt. Ltd

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Hosur Road, India-560099 Bangalore

phone: +91 80 27836837

fax: +91 80 27836880

marketing@emisindia.com

www.emisindia.com



Induktivitäten & Elektronische Bauteile

Freicomp GmbH was founded in 2003 by Thomas Müller, Dip. Eng. (FH), in Freiburg. The Company has since continued to grow and expand, not only in size but also internationally. In 2015, Freicomp GmbH moved to new premises within Ebringen, 5 km off Freiburg, which includes a warehouse with over 600 m², offices and a well-equipped test-lab. Our employees benefit from many years of experience in the development and marketing of passive components. The available know-how provided a very strong basis for the founding of this company and continues to be of great importance, today.

Services

- Trade and development for electrical products
- Distribution of components
- Technical advice
- Engineering services

Products

- EMI components, filters, chokes, capacitors
- Inductors, Transformers and other winding components

Development of services with different manufacturers globally. To accommodate our customer requirements, we work together with several manufacturers worldwide. We place great emphasis on ensuring that the product is in line with the manufacturer's possibilities and are thus confident of providing a qualitative and cost-effective solution.

Please do not hesitate to contact us with any further questions.

We also invite you to visit our home page at www.freicomp.com

FRANKONIA EMC Test Systems GmbH

TURN-KEY SOLUTIONS

**More than 20 years of experience in planning and realizing EMC test laboratories!
Turn-key solutions; from anechoic chambers to automatic EMC test systems for
emission and immunity measurements**

Established in 1987 Frankonia quickly developed to one of the worldwide leading manufacturer and supplier acting on the EMC (electromagnetic compatibility) market.

In the beginning Frankonia's engineers and designer realized their innovative concept for the production of big anechoic chambers (semi-anechoic chambers and fully-anechoic chambers) and RF-shielded rooms.

Afterwards the development of a worldwide new absorber technology followed, which sets new standards till these days. With the so-called thin film technology we developed the first RF-absorber "FrankoSorb®" that fulfill the requirements of DIN 4102, class A2 (non-combustible) with highest RF-performance.

Frankonia is one of only a few suppliers, who manufacture all important shielding parts, e. g. doors and gates, honeycombs, water-, gas- and other feed-through components up to 40 GHz as well as RF-microwave absorbers by themselves. All anechoic chambers and shielded rooms are delivered as a turn-key solution and are installed by our own assembly team. By request we carry out necessary measurements according to all common international standards for shielding attenuation, field-homogeneity and deviation of NSA and Site-VSWR. This will be realized either by skilled Frankonia staff using Frankonia's calibrated test equipment or an independent certification authority.

Because of the increasing demand for turn-key EMC laboratories, we decided almost 20 years ago to expand our range of products to the additional delivery of EMC test systems. In the following years we completed our test equipment program with many own development projects as well as with cooperative projects.

Today we have a wide variety of EMC test systems such as immunity test systems e.g. for tests according to IEC/EN 61000-4-3 or IEC/EN 61000-4-6 and emission measuring systems. But we also offer single components like RF-power amplifiers, antennas, signal generators, RF-power meters and magnetic field test equipment.

It's our philosophy to improve our products, to realize new ideas and to complete our product range in the EMC area. Therefore we have a big team of more than 240 employees as well as productions in Germany, Poland and China.



FRANKONIA
www.frankoniagroup.com

Frankonia EMC Test Systems GmbH
Daimlerstraße 17, 91301 Forchheim, Germany

Web: www.frankoniagroup.com
Mail: sales@frankonia-emv.com

Tel: +49 (0) 9191 / 73666 - 0
Fax: +49 (0) 9191 / 73666 - 20

HELMAR was founded in 1999 as a representative of a number of companies. Distributes the measurement systems of well-known companies, such as:

Albatross Projects, Emerson&Cuming, HAEFELY-HIPOTRONICS, NARDA-PMM, PPS. Offered products are: EMC absorbers, EMC anechoic and shielded chamber, High-voltage testers, Receivers and Antennas, DC/AC power supplies. www.helmar.com.pl



Branch Offices: Cracow zubrzak@helmar.com.pl and Poznan jurkowski@helmar.com.pl





The Albatross Projects GmbH Group

Albatross Projects GmbH is a leading global system provider in RF solutions with around 170 employees at six locations in Heidenheim/Nattheim, Munich, Dallas/USA, Shanghai, India and Belgium. The company specializes in the development and worldwide installation of test facilities to check the electromagnetic compatibility of equipment and systems. An additional division of APG extends to shielding the test environment from RF interference generated by MRI scanners. Albatross Projects GmbH delivers turnkey solutions for all industries, including automotive, telecommunications, IT, medical, household equipment, military and other governmental agencies.

Albatross Projects GmbH
Daimlerstraße 17
89564 Nattheim, Germany
Phone: +49 7321 730 500
info@albatross-projects.com
www.albatross-projects.com

committed to excellent service

Zajmujemy się dostawami specjalizowanych urządzeń i systemów pomiarowych do testów elektrycznych, elektronicznych, radiowych, akustycznych i EMC, oraz zestawów edukacyjnych przeznaczonych dla wyższych uczelni i szkół średnich. Dostarczamy komory badawcze GTEM i komory ekranowane/bezodbiciowe oraz wyposażenie laboratoryjne dla testów kompatybilności. Dla szkół wyższych o profilach technicznych, dla konstruktorów, nauczycieli i studentów dostarczamy zestawy sond pola bliskiego, miniaturowe namioty ekranowane oraz skanery do mapowania zakłóceń wytwarzanych przez układy elektroniczne.

W uzupełnieniu oferty znajdują się także mierniki, specjalizowane zasilacze testowe/arbitrary, oscyloskopy, generatory i inne wyposażenie laboratoriów elektronicznych, serwisowych i dla przemysłu. Dla laboratoriów pomiarowych i operatorów sieci komputerowych dostarczamy generatory częstotliwość wzorcowej oraz przyrządy do diagnostyki i monitorowania sieci. Dla telekomunikacji dostarczamy testery sieci, podzespoły mikrofalowe, przyrządy dla budowy i konserwacji sieci światłowodowych i miedzianych, mierniki TV (DVB), testery stopy błędów szybkiej transmisji danych BER i systemy monitorowania jakości usług QoS, VoIP, IPTV, oraz łączы dostępowych. Współpracujemy z czołowymi producentami sprzętu o specjalnym przeznaczeniu takiego jak: rejestratory audio i wideo, ekranowanie, absorbery elektromagnetyczne, analizatory i odbiorniki sygnałów radiowych, wykrywacze materiałów niebezpiecznych, wykrywacze obecności ludzi za ścianą i inne.

Dla naszych klientów organizujemy regularne seminaria i szkolenia dotyczące produktów, technologii i ich wykorzystania.

ENGLISH

Our company is specialized in technical - commercial deliveries of specialized measuring instruments and systems for electrical, electronic, radio, acoustic and EMC tests. We deliver GTEM cells and shielded rooms / anechoic chambers with additional laboratory equipment for electromagnetic compatibility testing. For technical high schools, designers, teachers and students we provide near field probes, miniaturised shielded tents and scanners for EM disturbances mapping.

For educational centers we deliver training equipment for students laboratories, together with other measuring instruments like specialized power supplies / arbitrary power supplies, oscilloscopes, generators. For measuring and calibration laboratories we deliver frequency and time standards and signal distribution equipment. For telecommunication area we provide network testers, microwave components, instruments for building and maintenance of fibre and copper networks and high speed BER transmission testers, TV network testers (DVB), as well as instruments and systems for network diagnostics, QoS, VoIP, IPTV monitoring and access line testing. We do cooperate with manufacturers of the best equipment for special tasks: audio/video recorders, shielding solutions, electromagnetic absorbers, radio surveillance and antenna systems, behind the wall human detectors and other.

For our customers we organize regular seminars and training for better product and technology understanding and use.

HIK-CONSULTING

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www.hik-consulting.pl
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ACCREDITED TESTING LABORATORY
EN ISO/IEC 17025



KABELKOM

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The **KABELKOM's Testing Laboratory** is accredited by the Polish Center for Accreditation (www.pca.gov.pl, accreditation No. **AB 1149**). The scope of our accreditation is unique in Europe and comprises **leakage measurements** of cable TV networks (based on **EN 50083-8**) and **stationary/mobile propagation measurements** (E field intensity based on **ITU-R SM.378-7**, **ITU-R SM.1708**, **CEPT/ERC/REC (00)08**) of radio transmitters for various radio communication systems (e.g. DVB-T/H, DAB, FM radio, TETRA, P.25).

We can gather and process (the Lee method) the data for propagation model tuning. The Laboratory can prepare and perform any experimental measurement campaign or tests of any new radio communication system. We offer the interpretation of the results leading to the improvement of network coverage/service quality. The measurement results are visualized on maps (satellite, paper tourist maps, GIS systems) in the formats required by a customer. We can also design and verify radio communication systems (including coverage simulation).

The Laboratory cooperates with technical universities and research institutes. Our staff is well-qualified and experienced in measurements, design and deployment of radio communication and cable TV systems. We have modern equipment - two specialized measurement vehicles with 10 m masts and automatic measurement systems for mobile leakage and propagation measurements.

The Laboratory has done propagation and leakage measurements for many companies (e.g., MOTOROLA, UPC, FM radio operators) in the following countries: Austria, France, Switzerland, Portugal, Ireland, Germany, Slovakia, Slovenia, Lithuania, Latvia, Norway, Holland, Hungary, the Czech Republic, Poland.



LUMILOOP develops and markets ready to use optically powered systems. Power-over-fiber is an attractive option in electromagnetically sensitive environments, particularly for long-term, maintenance-free applications. It can deliver uninterrupted power sufficient for elaborate sensors, data processing or even actuators alongside continuous high speed data communication for remote sensor application.

LUMILOOP has launched the **LSProbe 1.2** that offers a significant reduction in measurement time and effort for radiation immunity testing. Continuous streaming of 500,000 samples per second provides precise timing and characteristics of the electric field strength in reverberation chambers and multiple probes can measure synchronously.

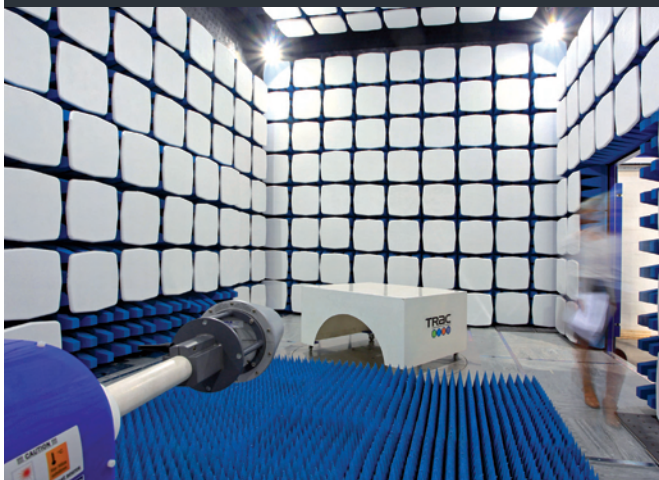


Fig.: LSProbe 1.2

From 10 kHz to 6 GHz the **LSProbe 1.2** delivers best-in-class dynamic range (70 to 100 dB) for electric field strengths from 0.1 V/m to 10 kV/m. Extensive frequency and temperature compensation data is supplied for each probe.

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Since 2008, Microwave Vision Group has combined the technological expertise, product portfolios and infrastructures of four industry leaders: SATIMO, ORBIT/FR, AEMI and Rainford EMC Systems who have joined forces to provide a wide variety of products and solutions for Antenna Measurements and Electro-Magnetic Compatibility (EMC) Testing.

For EMC Solutions we design, manufacture, supply and install shielded enclosures, anechoic chambers, shielded doors, absorbers and more. Through our partnership with Amplifier Research (AR), we can provide exceptional turnkey solutions for the most demanding EMC requirements.

With revenue of Euros 60 million (2015) and 19 years continual growth, MVG is now present in 10 countries with 23 sites. Our 350 employees worldwide are driving Microwave Vision Group's technical success through continual innovation.



Contact your local sales representative for more information

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Firma NDN powstała w 1988 roku i zajmuje się dystrybucją, kalibracją oraz naprawami przyrządów kontrolno-pomiarowych.

Jesteśmy dystrybutorami następujących firm: AARONIA AG, AITELONG, APPA, ARRAY, ATTEN, BK PRECISION, BREVE, BST, CEM, CHAUVIN ARNOUX, CHROMA, CREDIX, ELABO, ERA, ESCORT, FINEST, FLEX, FLUKE, GO5CAM, GWINSTEK, HAMEG, HANTEK, HERA, IDRC, IRODA, ITECH, K&H, LANGLOIS, LEAPTRONIX, LUTRON, MCP, METEX, MICROMADE, MIC, MOTEC, ORANGE PI, PCE, PEARSON, PICOTEST, PINTEK, PRECASTER, PROMAX, PROTEK, RIGOL, ROHDE&SCHWARZ, S.E.A.D.A., SANWA, 5ATLINK, SEW, 5IGLENT, SONEL, TELEDYNE LECROY, TESTEC, TONGHUI, ULI RVISION, VIKING, WENS, WOPSON, XYTRONIC, YOKOGAWA, ZELAP, ZERO PLUS

Oferujemy największy wybór: przyrządów dla elektroinstalatorów i energetyki, multimetrów cyfrowych i analogowych, mostków RLC, mierników cęgowych i izolacji, oscyloskopów, zasilaczy, generatorów, tachometrów, lukśmierzy, mierników i regulatorów temperatury, testerów telekomunikacyjnych, testerów ISDN, przyrządów do TV i SAT, sprzętu lutowniczego, przemysłowych przyrządów pomiarowych i przetworników, mierników wielkości nieelektrycznych oraz aparatury specjalizowanej.

Prowadzimy autoryzowany przez producentów serwis aparatury, wykonujemy kalibrację (kalibratory FLUKE), wystawiamy świadectwa sprawdzenia.



Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, cybersecurity, secure communications, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is the world's leading manufacturer of wireless communications and EMC test and measurement equipment.

Rohde & Schwarz offers an exceptional range of EMC and field strength test equipment, from standalone instruments to customized turnkey test chambers.

The EMI and EMS test instruments and systems determine the causes and effects of electromagnetic interference and ensure compliance with the relevant EMC standard. The EMC test solutions support all relevant commercial, automotive, military and aerospace standards as well as ETSI and FCC standards for radiated spurious emissions and audio breakthrough measurements.

EMC solutions from Rohde & Schwarz:
www.rohde-schwarz.com/ad/emc

Scan contact info:



ROHDE & SCHWARZ



Tespol Sp. z o. o. jest działającą od 25 lat polską firmą, będącą autoryzowanym przedstawicielem czołowych producentów aparatury kontrolno – pomiarowej oraz systemów radiokomunikacyjnych. Zapewniamy kompleksową ofertę produktów oraz usług w zakresie najnowocześniejszych technologii i systemów pomiarowych, łączności oraz nadajników RTV następujących producentów, z którymi związani jesteśmy wieloletnimi umowami serwisowymi i dystrybutorskimi: **Tektronix, Rohde&Schwarz, Fluke, Keithley, Spectracom, Sonel, LitePoint, MVG, ABI Dewetron, Magna-Power** oraz **CST**.

Charakteryzujemy się indywidualnym podejściem do klienta oraz profesjonalizmem, który wynika z kwalifikacji oraz doświadczenia naszych inżynierów. Aby zapewnić najwyższą jakość oferowanych produktów i usług, w firmie Tespol wdrożony został system zapewnienia jakości ISO 9001:2009 oraz AQAP2120:2009. Profil działalności firmy, a zwłaszcza współpraca z sektorem wojskowym i służbami ochrony państwa sprawiły, iż posiadamy pion Ochrony Informacji Niejawnych i kancelarię tajną. Pracownicy współpracujący z sektorem wojskowym legitymują się poświadczeniem bezpieczeństwa osobowego do poziomów tajne i poufne. Ponadto posiadamy koncesję MSWiA na obrót towarami o zastosowaniu militarnym.

Firma Tespol gwarantuje pełną obsługę wdrożonych i dostarczonych rozwiązań w zakresie wsparcia technicznego, autoryzowanego serwisu reprezentowanych firm, kalibracji aparatury pomiarowej oraz szkoleń.

TMD

TMD Technologies Ltd.

Since launching our range of compact, lightweight broadband TWT amplifiers in the early 1990s, TMD has been very successful in supplying products for EMC applications worldwide. These products have evolved and benefited from our expertise in high power military radar amplifiers. TMD's standard amplifier range covers 1 – 40 GHz at up to 1000 W CW and 40 kW pulsed and has gained a worldwide reputation for design innovation; including many unusual, high performance products.

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TMD is pleased to release a brand new range of high power Travelling Wave Tube RF Amplifiers offering improved user interface and maintainability. User applications include EMC / Radiated Immunity testing, Communications, EW, Radar, RF Component Testing and Scientific applications.



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Notes:



Welcome to EMC EUROPE 2017

Angers, France

On behalf of the International Steering Committee, I am delighted and privileged to welcome you and your families to the major European conference on EMC, from 4 to 7 September in Angers, one of the best cities of good living in France.

Angers, located in the Loire Valley (1.5 hour from Paris by train), is classified by UNESCO as a World Heritage for Humanity. For many centuries, it has evolved from an ancient city into a flagship of modern technology, receiving the FrenchTech label for its contribution to the Internet of Things while keeping its traditional character.

EMC Europe 2017 focuses on the high quality of scientific and technical contributions as well as the fruitfulness of exchanges among EMC researchers and practitioners from all over the world, in a spirit of openness and conviviality. The conference will cover the whole spectrum of EMC topics, including emerging trends, Special sessions, workshops, tutorials and a large exhibition will be organized along with regular sessions.

Angers is a place where the 'French way of life' expression takes on its full meaning. From castles to wine-tasting, from sightseeing to good food, you will not be disappointed with your stay.

Join us in EMC Europe 2017 for an experience you will never forget!

Mohamed Ramdani
 Conference Chair

Important Dates

Proposals Deadline: 15 February 2017
Notification of Acceptance: 17 April 2017
Final Submission Deadline: 15 May 2017
Reduced Fee Registration Deadline: 15 May 2017
 Conference: 4 to 8 September 2017

Paper Submission

Prospective authors are invited to submit original papers on their latest research results focusing on all EMC aspects as well as in symposium topics. Authors should submit their full paper (up to 6 pages and approximately 5500 words in 2-column format, with pictures and charts, diagrams) by February 15, 2017. The paper has to be written in English and clearly explain the originality and relevance to EMC topics, and should be uploaded via web-based on-line conference system (www.conftool.com/emceurope2017/). All submitted papers will be evaluated by peer review process. Paper acceptance is based on following criteria: Quality of technical content, Significance for theory or practice, Originality and level of innovativeness and Quality of presentation. Final versions of accepted papers will be presented during oral and poster symposium sessions and will appear in conference proceedings as well as IEEE Xplore. Authors are requested to register as participants till May 15, 2017 and present their papers. For details please visit conference website (<http://www.emceurope2017.org>).

Call for Special Sessions

Special Sessions focus on areas of interest not addressed in Technical Papers. Acceptance criteria are the same as for Technical Papers. Please send proposals for special session to prof. Mohamed Ramdani (mohamed.ramdani@emceurope2017.org) or upload to on-line conference system before March 15, 2017.

Proposals for special session must contain the following information:

- Title of the special session
- Description of special session
- Name of the chair with full contact information
- Chairperson(s)
- Description of topics
- List of potential authors/presenters and papers

Venue

EMC EUROPE 2017 will take place in ESEO Graduate School Of Engineering, in Angers, France.

ESEO is located approximately 2.5 km from the city centre (15 minutes by tram).

Angers is a beautiful medieval city, with many places to visit in and around (castles, churches, wineries...). Do not hesitate to extend your stay!



Call for Workshops and Tutorials

Workshops and Tutorials are informal, interactive educational presentations, often addressing practical issues encountered in the lab. Workshops and tutorials are scheduled for one-half day or full day. For proposals that are accepted, the workshop or tutorial organizer will be responsible for soliciting presentations, coordinating reviews, corresponding with session speakers, ensuring deadlines are met by all their speakers, corresponding with the symposium Local Committee, and moderating the session at the symposium. Please send proposals for workshops or tutorials to prof. Mohamed Ramdani (mohamed.ramdani@emceurope2017.org) or upload them to the on-line conference system before March 15, 2017.

Proposals for workshops or tutorials must contain the following information:

- Title of workshop or tutorial
- Format: Workshop or Tutorial
- Name of Workshop/Tutorial chair with full contact information, including company/affiliation name, address, telephone number, and e-mail address
- Description of the workshop/tutorial, including objectives, content and novelty
- Description of topics
- List of potential authors/presenters

Local Organising Committee

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Wrocław University
of Science and Technology

- Main building **A-1** (orange path)
- Conference centre **C-13**
- Experiments **C-15**
- Canteen **C-18** (red path)

