SYMPOSIUM PROGRAMME



Angers, FRANCE September 4-8, 2017

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Welcome from Mohamed Ramdani, Conference Chairman

Dear Attendees,

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 8 September in Angers, one of the best cities of good living in France. This great event is held and organized by ESEO, an Institute of Science and Technology with the cooperation of IETR (Institut d'Electronique et de Télécommunications de Rennes).

After Rome, Brugge, Gothenburg, Dresden and Wroclaw, France hosts EMC Europe for the first time, and we are proud to be chosen for the organization of this event.

Angers, located in the Loire Valley, 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. In October 2017, Angers will be the world capital of electronics. The city has been chosen to host the next World Electronics Forum (WEF).

With over 250 submitted regular papers coming from 50 countries, accepted papers have been arranged into 40 oral and poster sessions. Moreover, we will have many great tutorials and workshops taking place on Monday 4th and Friday 8th. Do not forget to visit our exhibitors to get insight into industry trends, and to have access to the newest products and services. For this edition, additional topics have been introduced:

- Statistical EMC Modeling
- Topological Approaches in EMC
- EMC of Wireless Power Transfer Systems
- EMC Health Protection
- Intentional EMI on RF Links or Systems
- Emission Security
- Side-Channel Attacks
- EMC in the IoT
- EMC and Functional Safety
- EMC Validation of Large Systems (reliability, obsolescence)

Two keynote speeches will be given during the conference: Frédéric Thérond from Airbus on EMC challenges on Modern Aircraft, and Alain Kehlhoffner from Valeo on Automated Driving.

As the General Chair of this conference, I would like to thank all the members of the Local Organizing Committee (LOC), my volunteering colleagues from ESEO and all those who have worked tirelessly on this conference

I also would like to express special thanks to the International Steering Committee for the trust he has put in us for the organization of EMC Europe 2017. I would like to thank all the authors, chairmen, reviewers, conference partners, exhibitors and attendees.

Please enjoy the conference and the city of Angers. My colleagues and I will be all over the conference throughout the week and would like to personally meet and warmly welcome each and every one of you.

Sincerely

Mohamed RAMDANI EMC Europe 2017 General Chair

Table of Contents

Welcome	3
Conference Information	5
Venue	
Transport in Angers	
Badges	
Oral Sessions	
Poster presentations	
Internet Access	
Mobile Conference assistants - Conference4Me	
Lunches and coffee breaks	
Welcome Reception	
Symposium Banquet	
Upcoming Conferences1	0
Committees 1	1
International Reviewers' Board1	2
Best Paper Award Nominees 1	3
Best Student Paper Award Nominees1	4
Schedule at a glance 1	5
Conference Programme : Monday1	6
Conference Programme : Tuesday 2	22
Conference Programme : Wednesday 3	34
Conference Programme : Thursday 4	6
Conference Programme : Friday 5	56
Exhibition	54
Exhibition Map	
Exhibition List	
Exhibition Information	
Company Profiles	96
Plans)1

Conference Information

Venue

The whole EMC Europe 2017 symposium will take place in Angers (France) on the main campus of ESEO Graduate School of Engineering. It is located in the north of Angers, about 20 minutes by tram from the railway station and 5 minutes by car from the nearest exit of the A11 motorway from Paris.

Google Maps: https://goo.gl/maps/NXSZAfKQjHm



From the city centre, take tram line A to "Avrillé Ardenne". Get off at "Jean Moulin" station and follow the signs (ESEO is visible from the platform). You can also take bus line #5 and get off at "Jean Moulin" stop.

Oral sessions, poster sessions, workshops and tutorials will be held in the main building. A screen in front of each lecture room will dynamically inform you about the current session and the locations of other parallel sessions.

Transport in Angers

Trams, buses and taxis are available. A ticket (valid for trams and buses) costs $1.40 \in$ (vending machines) or $1.50 \in$ (on board, buses only). In all cases, fares do not depend on distance; connections and round trips are allowed with a single ticket within its validity period (one hour from the first validation). However, passengers must validate their ticket each time when boarding the bus/tram, even in a connection. Tickets are contactless and must not be folded.

Participants will be delivered a 7-day bus/tram pass at the registration desk, valid in the whole city and its suburbs. Likewise, this pass must be validated each time when boarding the bus/tram.

Additional 7-day passes for accompanying people can be bought from the Irigo shop (place Lorraine).

You can download the Irigo application (in French only) for iOS and Android from their respective stores, and browse the Irigo Web site (also in French only) at <u>http://bustram.irigo.fr/.</u>

Non-French speakers can also use the Destineo Web site (<u>http://www.destineo.fr/en/</u>) and choose "Irigo" among the available train/bus lines.

Badges

When registering at the reception desk, all delegates will receive a badge and, if included in their package, invitations for social events. Due to "Vigipirate" security measures in France, the whole conference building will be guarded night and day. Please wear your badge all the time throughout the conference and before your arrival on the following days. This will make it easier for you to enter the conference building.

Oral Sessions

Each paper assigned to an oral session is allowed about 15 minutes for presentation and about 5 minutes for questions and answers. 2-minute gaps between consecutive papers are dedicated to speaker changes. We kindly ask session chairs to comply with this timing. The detailed schedule of each oral session can be found in the final programme.

Videoprojectors and computers (with Microsoft PowerPoint and Adobe Reader) are available for presentation in each lecture room.

Speakers must meet their session chair in the room at least 15 minutes before the beginning of the session. Each speaker must give a short biography to the chairperson and load the presentation into the computer, if he/she did not send it to the organizers before. Only presentations provided on USB key drives will be accepted for upload. The use of personal laptops for presentation is not allowed.

Lecture room Broglie (B007 – ground floor, in the middle of the building) is available to presenters for preparation and rehearsals.

A TV screen in front of each lecture room will dynamically inform you about the current session and the locations of other parallel sessions.

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 board corresponding to their poster.

Presenters must hang their poster on the day of their presentation at least 15 minutes before the poster session begins. Authors are required to stand near their poster only during the poster session time slots of the day. They must remove them before the end of the conference day; posters left on the boards at the end of the conference day will not be returned by the organisers.

Posters should be fixed to the poster board using material (adhesive tape or drawing pins) which will be provided on site. The display area is suitable for portrait A0 posters (approx. 84.1cm wide and 118.9cm high).

Internet Access

Participants with WiFi computers and other mobile equipment will be able to take advantage of the wireless network facility installed in the main building and the exhibition pavilion. The dedicated wireless network for symposium participants is **EMC-EUROPE-2017** with password **emceurope2017**. Participants from academic institutions can use the **eduroam** wireless network, which is also available in the whole building and pavilion, with their usual credentials.

Mobile Conference Assistants - Conference4me and Eventor

The Conference4me smartphone application provides you with the most comfortable tool for browsing the complete EMC Europe 2017 programme and planning your participation to this conference. The Conference4me application allows you to create your very own agenda on the fly directly from your phone or tablet. The Conference4me application is available for free for Android, iOS and Windows Phone devices.

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









The EMC Europe 2017 programme is also available on the Eventor application (for iOS and Android).

Lunches and coffee breaks

Lunches (buffets) and coffee breaks are located in the exhibition area (ground floor -Fermi and Dirac rooms, outdoor pavilion). Please do not forget your badge which serves as your admission ticket. Bon appétit!

Welcome Reception: Tuesday, September 5th at 7:00 PM

The Local Organising Committee has the pleasure to invite you to the Welcome Reception, held in the Musée Jean Lurçat. It is a unique opportunity to meet with your colleagues and exhibitors in an informal atmosphere.

Google Maps: https://goo.gl/maps/bstjCDrfEKx



To go there, you may:

- From ESEO by tram: take tram line A to "Angers Roseraie", get off at "CHU Angers" station and walk to the museum (4 min. tram + 8 min. walk)

- From ESEO by foot: walk along the river Maine to the museum (about 25 min.)

- From the city centre: take bus line #3 to "Avrillé Adézière" or "Avrillé Salette" and get off at "St. Jean" bus stop (approx. 8 min.); the museum is in front of the bus stop. The same bus line in the opposite direction ("Mûrs Erigné") will take you back to the city centre.

Please do not forget to take your personal invitation(s) with you.



EMC EUROPE 2017 ANGERS, FRANCE - Final Programme

Symposium Banquet: Wednesday, September 6th at 7:00 PM

The Local Organising Committee warmly invites you to the Symposium Banquet in the Château du Plessis Bourré for an unforgettable evening. Please do not forget your camera or your mobile phone!

Google Maps: <u>https://goo.gl/maps/Qy96ce6cfE82</u>



Free shuttles will take you to the Château from ESEO (about 15km) and back to your hotels in the city centre:

- departure from ESEO: 6:30PM

- departure from the Banquet: 11:00PM (4 stops near the main hotels)

Please do not be late!

During the banquet, the Best Paper and the Best Student Paper will be awarded.

Please do not forget to take your personal invitation(s) with you.









Welcome to EMC Europe 2018 in Amsterdam, The Netherlands

EMC week in Amsterdam

EMC Europe is the leading EMC Symposium in Europe and the 2018 edition will be held at the Beurs van Berlage in the heart of Amsterdam, the Netherlands, from

August 27th till August 30th, 2018.

We wish to invite and encourage all those working in the field of electromagnetic compatibility to participate in this prestigious event.

Accepted papers will appear in IEEE Xplore

The Call for paper can be found on the website: www.emceurope2018.org

Symposium Venue

Amsterdam is the Netherlands' capital, known for its artistic heritage, elaborate canal system and narrow houses with gabled facades, legacies of the city's 17th-century Golden Age. Its Museum. District houses the Van Gogh Museum, works by Rembrandt and Vermeer at the Rijksmuseum, and modern art at the Stedelijk. Cycling is key to the city's character, and there are numerous bike paths.

The conference center, the Beurs van Berlage, is a building on the Damrak, in the center of the city. This former commodity exchange is one of the defining monuments of the Dutch capital.

Important Dates

- Special Sessions : 1 January, 2018
- Paper submission : 15 February, 2018
- Proposal for Workshops, Tutorials, Short Courses : 15 March, 2018
- Notification of acceptance : 15 April, 2018
- Final Paper Submissions: 15 May, 2018

Contact and Information : info@emceurope2018.org

Upcoming EMC Europe Symposia

Upcoming IEEE EMC Symposia

2018 - Amsterdam, The Netherlands 2019 - Barcelona, Spain 2018 - Long Beach, California, USA 2019 - New Orleans, Louisianana, USA 2020, Reno, Nevada, USA

Committees

International Steering Committee (ISC)

Chairman: A. C. Marvin (United Kingdom) Vice-Chairman: J. Carlsson (Sweden)

- P. Besnier (France) F.G. Canavero (Italy) J. Carlsson (Sweden) J. Catrysse (Belgium) M. D'Amore (Italy) P. Degaugue (France) A.P.J. van Deursen (The Netherlands) M. Feliziani(Italy) H. Garbe (Germany) J.L. ter Haseborg (Germany) Z. Joskiewicz (Poland) M. Klingler (France) F.B.J. Leferink (The Netherlands) F. Maradei (Italy) V. Mariani Primiani (Italy) A. C. Marvin (United Kingdom) G. Peres (France) D. Pissoort (Belgium)
- F. Rachidi (Switzerland) M. Ramdani (France) F. Sabath (Germany) M.S. Sarto (Italy) F. Silva (Spain) D. Thomas (UK) T.W. Wieckowski (Poland)

Local Organizing Committee

General Affairs

Mohamed Ramdani - Conference General Chair ESEO – RFEMC / IETR, France Richard Perdriau - Conference Vice Chair - ESEO – RFEMC / IETR, France

Exhibition Mohamed Amellal - Exhibition Chair - ESEO – RFEMC / IETR, France

Special Sessions Etienne Sicard - Special Sessions Chair - INSA Toulouse – GEI, France

Technical Program

Philippe Besnier - Technical Program Co-Chair - IETR, CNRS / INSA Rennes, France Richard Perdriau - Technical Program Co-Chair - ESEO – RFEMC / IETR, France

Workshops & Tutorials

Frédéric Lafon - Workshops & Tutorials Co-Chair - Valeo GEEDS, France Marco Klingler - Workshops & Tutorials Co-Chair - PSA, France

International Reviewers' Board

Amellal Mohamed, FR Aniserowicz Karol. PL Antonini Giulio. IT Archambeault Bruce. US Armstrong Keith, UK Asai Hideki, JP Audone Bruno IT Bäckström Mats Gösta. SE Baric Adrijan, HR Battermann Sven, DE Beauvois Veronique, BE Besnier Philippe. FR Bienkowski Pawel. PL Boesman Bart, BE Boyer Alexandre, FR Buesink Frits, NL Canavero Flavio. IT Carlsson Jan, SE Catrysse Johan, BE Cerrí Graziano, IT Christopoulos Christos, UK Cicchetti Renato. IT Coenen Mart. NL D Amore Marcello, IT Dawson John, UK Degauque Pierre, FR Drissi M'hamed, FR Dubois Tristan. FR DuBroff Richard Edward, US Duchamp Geneviève, FR Duffy Alistair, UK Feliziani Mauro. IT Fiori Franco IT Frei Stephan, DE Fujiwara Osamu, JP Garbe Heyno, DE Gillon Benaud BF Grcev Leonid. MK Gronwald Frank, DE Hanzelka Zbigniew Tadeusz, PL Holloway Christipher, US Hubing Todd, US Joffe Elya B., IL Jóskiewicz Zbigniew, PL Kami Yoshio, JP Kamuda Kazimierz Waclaw, PL Karwowski Andrzej, PL Klepacki Dariusz, PL Klingler Marco, FR Knighten Jim, US Korovkin Nikolay, RU Krawczyk Andrzej, PL Kruse Klaus-Dieter. DE Kubiak Ireneusz, PL Kucharski Andrzej, PL Kuznetsov Yury, RU Lafon Frédéric. FR Leferink Frank, NL Lemoine Christophe, FR levant jean-luc, FR

Machczynski Wojciech, PL Maradei Francesca. IT Mariani Primiani Valter. IT Marshman Chris, UK Marvin Andy, UK Masłowski Grzegorz, PL Mathis Wolfgang, DE Maurice Olivier. FR Mazzetti Carlo. IT Michalak Marek Piotr, PL Moglie Franco, IT Namiotko Rafal, PL Nowosielski Leszek. PL Nuño Luis, ES Orlandi Antonio. IT Pande D.C., IN Perdriau Richard, FR Peuteman Joan, BE Pilinsky Vlodimir, UA Pissoort Davy, BE Piuzzi Emanúele, IT Podgorski Andrew, CA Pommerenke David, J. US Pues Hugo, BE Rachidi Farhad, CH Ramanujan Abhishek, IE Ramdani Mohamed. FR Ravelo Blaise. FR Redoute Jean-Michel, AU Roc'h Anne, NL Roje Vesna, HR Rostamzadeh Cyrous, US Bubinstein Marcos CH Ruddle Alastair, UK Sabat Wiesław, PL Sabath Frank. DE Sadowski Jaroslaw. PL Sarto Maria Sabrina. IT Schlagenhaufer Franz, AU Schuster Christian, DE Scully Robert, US Serra Ramiro, NL Sicard Etienne. FR Silva Ferran, ES Skrzypczynski Jacek, PL Sowa Andrzej Edward, PL ter Haseborg Jan Luiken, DE Thomas David. UK Tucci Vincenzo, IT van Deursen Alexander, NL Varju Gyorgy, HU Vick Ralf. DÉ Wada Osami, JP Welinder Jan, SE Więcek Dariusz, PL Wiklundh Kia. SE Wilson Perry. US Zielinski Ryszard, J. PL Ziemba Robert, PL

Best Paper Award Nominees

Paper ID	Title and authors					
31	Study of the thermal aging effect on the conducted emission of a synchronous buck converter	O_We_D2				
	<u>A. Boyer</u> ¹ , M. A. Gonzalez Sentis ^{1,2} , C. Ghfiri ^{1,2} , A. Durier ²					
	⁽¹⁾ CNRS, LAAS, Univ. de Toulouse, ⁽²⁾ IRT Saint-Exupéry, Toulouse, France					
100	Development of a Passive Impedance Network for Modeling Electric Vehicle Traction Batteries for EMI	O_Th_C2				
	<u>DrIng. S. Jeschke</u> , DiplIng. M.Maarleveld, DiplIng. J.Baerenfaenger <i>EMC Test NRW GmbH, Dortmund, Germany</i> C. Waldera, DrIng. M.Obholz - <i>Volkswagen AG, Wolfsburg, Germany</i> Prof. DrIng. H.Hirsch, S.Tsiapenko - <i>University of Duisburg-Essen Department of</i> <i>Power - Transmission and Storage, Duisburg, Germany</i>					
110	Crosstalk Analysis of Printed Circuits with Many Uncertain Parameters Using Sparse Polynomial Chaos Metamodels	O_Th_B4				
	Mourad Larbi , Igor S. Stievano ¹ , Flavio G. Canavero ¹ , and <u>Philippe Besnier</u> ² ¹ Dipartimento di Elettronica, Politecnico di Torino, Italy ² IETR, UMR CNRS 6164 : Institut d'Electronique et de Télécommunications de Rennes, INSA de Rennes, Rennes, France.					
111	Effect of Field Area on Disturbance Propagation through Silicon Substrates in SOI-BCD Process	O_We_C2				
	Ko Oyama ¹ , Yosuke Kondo ¹ , Daisaku Ikoma ¹ , Yasuyuki Ishikawa ¹ , Akitaka Murata ¹ , Shuji Agatsuma ¹ , Makoto Nagata ² ¹ Semiconductor Circuit R&D Division, DENSO CORPORATION, Kariya, Japan ² Graduate School of Science, Technology and Innovation, Kobe University,Japan					
125	Efficient evaluation of communication system performance in complex interference situations	O_Tu_B4				
	<u>Sara Orn Tengstrand</u> , Erik Axell, Karina Fors, Sara Linder, Kia Wiklundh Swedish Defence Research Agency - Linköping Sweden					
142	EMC Challenges for the Internet of Things	O_Tu_A4				
	Kia Wiklundh - Dept. of Robust Telecommunications - Linköping, Sweden Peter Stenumgaard - Dept. of Information Security & IT Architecture Linköping, Sweden					
235	Design Approach and Analysis of a MOSFET with Monolithic Integrated EMI Snubber for Low Voltage Automotive Applications	O_We_B2				
	Hermon Afewerki ¹ , Christian Lautensack ¹ , Norman Böttcher ² , Ingmar Kallfass ³ ¹ Robert Bosch GmbH, Power Semiconductors and Modules, Reutlingen, Germany, - ² Reutlingen University, Robert Bosch Center for Power Electronics (RBZ), Reutlingen, Germany - ³ University of Stuttgart, Institute of Robust Power Semiconductor Systems (ILH), Stuttgart, Germany					
250	Progress in Usage of Portable Electronic Devices on Aircraft, An Overview	O_Tu_C3				
	DrIng. Robert Kebel / DrIng. <u>Thiemo Stadtler</u> Airbus - EMC and Lightning Protection - Hamburg, Germany					
275	Near-Field Scanning of Stochastic Fields Considering Reduction of Complexity	O_Th_C4				
	¹ David W. P. Thomas, ¹ Mohd H. Baharuddin, ¹ Christopher Smartt, ¹ Gabriele Gradoni, ¹ Gregor Tanner, ² Stephen Creagh, ² Neboj sa Don covy, ³ Michael Haiderz and ³ Johannes A. Russerz ¹ Dept. Electrical and Electronic Engineering, The University of Nottingham, Nottingham, UK, ² Faculty of Electronic Engineering, University of Nis, Nis, Serbia, ³ Institute for Nanoelectronics, Technische Universität München, Munich, Germany					

Best Student Paper Award Nominees

Paper ID	Title and authors	Session
5	Superposition of Shield Currents in Inverter-Fed AC-Motors <u>Madhavi Sreenivasa Murthy</u> - Institut für Energietechnik - Brandenburgische - Technische Universität - Cottbus-Senftenberg, Germany Guido A. Rasek - Robert Bosch GmbH GS-PE/EHW6 - Tamm, Germany	O_Th_B2
23	Robust Extreme Value Estimation for Full Time-Domain EMI Measurements	0_We_A1
	<u>Marco A. Azpurua</u> , Jose A. Uliva, Marc Pous, Ferran Silva Grup de Compatibilitat Electromagnètica (GCEM), Departament d'Enginyeria Electrònica (DEE) - Universitat Politècnica de Catalunya (UPC) - Barcelona, Spain	
53	A new methodology to extract the ICEM-CE internal activity block of a FPGA	0_We_A2
	C. Ghfiri ^{1,2} , A. Durier ¹ , A. Boyer ²³ , S. Ben Dhia ^{2,3} ⁽¹⁾ IRT Saint-Exupéry, Toulouse, France - ⁽²⁾ CNRS, LAAS, Toulouse, France - ⁽³⁾ Univ. de Toulouse, INSA, LAAS, Toulouse, France	
83	Broadband Foster-Type-Circuit Model of Non-Uniform and Radiating Transmission Lines	0_Th_A1
	<u>Sebastian Südekum,</u> Marco Leone Otto-von-Guericke University, Magdeburg, Germany	
114	MoM-based Foster-type Circuit Model for Lossy Wire-Interconnection Structures	0_We_C3
	Christian Bednarz and Marco Leone Otto-von-Guericke-University, Magdeburg, Germany	
136	Transient Co-Simulation of Electromagnetic Emissions caused by a SiC Traction Inverter	O_Th_C2
	P. Hillenbrand ¹ , M. Beltle ¹ , S. Tenbohlen ¹ , Jan Hansen ² ¹ Institute of Power Transmission and High Voltage Technology - University of Stuttgart, Germany - ² Jan Hansen Automotive Electronics Robert Bosch GmbH, Schwieberdingen, Germany	
159	Broadband Circuit Model for Electromagnetic-Interference Analysis in Cavities	O_Th_A1
	Christoph Lange and Marco Leone Otto-von-Guericke-University, Magdeburg, Germany	
175	Channel Selective Adaption of PWM Frequencies for Undisturbed AM and FM Reception in Automobiles	O_Th_B2
	Andreas Bendicks ¹ , Stephan Frei ¹ , Norbert Hees ² , Marc Wiegand ² ¹ TU Dortmund University, Dortmund, Germany, ² Leopold Kostal GmbH & Co. KG, Lüdenscheid, Germany	
182	Simulation Techniques for EMC Compliant Design of Automotive IC Chips and Modules	O_Th_A2
	Akihiro Tsukioka ⁽¹⁾ , Makoto Nagata ⁽¹⁾ , Kohki Taniguchi ⁽¹⁾ , Daisuke Fujimoto ⁽¹⁾ , Rieko Akimoto ⁽²⁾ , Takao Egami ⁽²⁾ , Kenji Niinomi ⁽²⁾ , Takeshi Yuhara ⁽²⁾ , Sachio Hayashi ⁽²⁾ , Rob Mathews ⁽³⁾ , Karthik Srinivasan ⁽³⁾ , Ying-Shiun Li ⁽³⁾ , Norman Chang ⁽³⁾	
	WKobe University, Wioshiba Corporation, W Semiconductor BU, ANSYS Inc.	

Schedule at a Glance

	Monday		Tuesday		Wednesday		Thursday				Friday										
9:00			Opening Ceremony																		
9:30			Plenar	Plenary		Oral Sessions			Plenary				Workshop & Tutorials								
10:00		ting	Session				g		Session												
10:30		Mee	Coffee Br	eak		Coffee B	leetin		Coffee Break			Coffee Break									
11:00								2													
11:30			Oral Sessions			Oral Sessions			Oral Sessions			Workshop & Tutorials									
12:00																					
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14:30	Workshop & Tutorials	d	Oral Sessions		Oral Sessions			Oral Sessions			Workshop & Tutorials										
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16:30	Workshop & Tutorials		Oral Sessior	ns		Oral Sessions	s		Oral Sessions			Workshop & Tutorials									
17:00																					
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18:00		Mee																			
18:30			Welco	ome																	
19:00			Reception																		
19:30																					
20:00					Symposium			ISC Dinner													
20:30						Banquet															
21:00																					
21:30																					

Monday, 4th September 2017 - Workshops & Tutorials

9:00		ANJOU									
12:00		MEETING COST Action 1407 Private Meeting									
13:00	REGISTRATION (MAIN ENTRANCE)										
14:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL					
		WT_Mo_A1: Workshop A1 Virtual Environments for System- Level Automotive EMC Testing	WT_Mo_A2: Workshop A2 EMI Issues around Flyback Converters and DC/ DC Isolated Converters	WT_Mo_A3: Workshop A3 Near-Field Measurement to Reduce Radiated Emission Testing Issues	WT_Mo_A4: Tutorial A1 Experiments for EMC Education and Awareness (Half-Day 1)						
15:30		COFFE	E BREAK (FERM	DIRAC + PAVILIC	DN)						
16:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL					
		WT_Mo_B1: Workshop B1 Virtual Environments for System- Level Automotive EMC Testing	WT_Mo_A2: Workshop B2 EMI Issues around Flyback Converters and DC/ DC Isolated Converters	WT_Mo_B3: Workshop B3 Near-Field Measurement to reduce Radiated Emission Testing Issues	WT_Mo_B4: Tutorials B1 Experiments for EMC Education and Awareness (Half-Day 1)						
17:30	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	AFRIQUE	MAIN HALL					
18:30					MEETING SC 77B/ CISPR-A JWG REV MEETING						

Workshops

WT_Mo_1 WORKSHOP 1

VIRTUAL ENVIRONMENTS FOR SYSTEM-LEVEL AUTOMOTIVE EMC TESTING

Chaired by: **Dr. Henrik TOSS** - RISE, Research Institutes of Sweden, Sweden

Speakers Bjorn Bergqvist (Volvo Cars, Sweden), Andreas Reil (Rohde & Schwarz, Germany), Jan Carlsson (Provinn AB, Sweden), Martin Aidam (Daimler AG, Germany), Henrik Toss (RISE Research Institutes of Sweden, Sweden), Garth D'Abreu (ETS- Lindgren, Cedar Park, Texas)

Programme :

WT_Mo_A1 session

Time: 14:00 - 15:30

Challenges of Simultaneous Testing of ACC and LKA in Semi-Anechoic Chamber

Bjorn Bergqvist - Volvo Cars, Sweden

The Best Automotive Radars Handle Interference Well Andreas Reil - Rohde & Schwarz, Germany

Simulated GNSS/GPS for Autonomous Drive Testing

Jan Carlsson¹, Torbjörn Persson¹, Alain Caignault² ¹Provinn AB, Sweden; ²Spirent Communications, France

WT_Mo_B1 session Time: 16:00 - 17:30

Extending EMC Test Environments: Reverberation Chambers. Vector Signals. Multi-Source.

Martin Aidam - Daimler AG, Germany

AWITAR - semi-anechoic chamber for high level EMC and communication Henrik Toss - RISE Research Institutes of Sweden, Sweden

Chambers for Full Vehicle OTA Performance Garth D'Abreu - ETS- Lindgren, Cedar Park, Texas Time: **14:00 - 17:30** Room: **ANJOU**

WT_Mo_2 WORKSHOP 2

Time: **14:00 - 17:30** Room: **AMERIQUES**

EMI ISSUES AROUND FLYBACK CONVERTERS AND DC/DC ISOLATED CONVERTERS

Chaired by: Alain LAFUENTE, WÜRTH Elektronik, France

Speakers Alain Lafuente (Würth Elektronik, France), Sylvain LE BRAS (Würth Elektronik, France), Timur Uludag (Würth Elektronik eiSos GmbH & Co. KG, Germany)

Programme :

WT_Mo_A2 session

Time: 14:00 - 15:30

EMC and Switch Mode Power Supply: Important Parameters of Most Common Useful Components and Guidelines to Deal with Insertion Loss

Alain Lafuente - Würth Elektronik, France

Flyback Converter Most Critical Points Regarding Capacitor Selection and EMI Issues

Alain Lafuente - Würth Elektronik, France

WT_Mo_B2 session

Time: 16:00 - 17:30

Flyback Converter Most Critical Points Regarding EMI Issues Sylvain LE BRAS - Würth Elektronik, France

FISM Power Module - How to Choose the Right Filter

Timur Uludag - Würth Elektronik eiSos GmbH & Co. KG, Germany

WT Mo 3 WORKSHOP 3

NEAR-FIELD MEASUREMENT TO REDUCE RADIATED EMISSION TESTING ISSUES

Time: 14:00 - 17:30

Room: ESPACE SAINT-AUBIN

Sebastien SERPAUD - NEXIO, France Chaired by:

Speakers Thi Quynh Van HOANG (Valeo, France), Zouheir RIAH¹, Nimisha SIVARAMAN² (¹ESIGELEC, France; ²IMEP, France), Jean-Philippe TIGNERES (Esterline, France), Samuel LEMAN (Nexio, France)

Programme :

WT Mo A3 session Time: 14:00 - 15:30

Summary of the last developments of near field measurement methods (vector, in time domain)

Thi Quynh Van HOANG¹, Frederic LAFON¹, Bertrand VRIGNON², Adrien DORIDANT², Nicolas BAPTISTAT² ¹Valeo, France: ²NXP, France

Extrapolation algorithms from near field measurement to predict radiated emission at equipment level ZOUHEIR RIAH¹, NIMISHA SIVARAMAN²

¹ESIGELEC. France: ²IMEP. France

WT_Mo_B3 session

Time: 16:00 - 17:30

Presentation of the correlation between near field measurement results and normative radiated emission results done on several industrial equipment

Jean-Philippe TIGNERES - ESTERLINE, France

Open talk about the use of near-field measurement results to evaluate the risk of non-compliance during Radiated Emission test Samuel LEMAN - NEXIO. France

Tutorials

WT_Mo_4 TUTORIAL 1

EXPERIMENTS FOR EMC EDUCATION AND AWARENESS (PART I)

Time: **14:00 - 17:30** Room: **MEITNER**

Chaired by: Frits BUESINK, University of Twente, The Netherlands, Speakers Frits BUESINK - University of Twente, Netherlands, The Sessions Abstract · Over a career of 30 years in EMC education, many experiments have been collected, re-engineered and designed to demonstrate the mechanisms of electromagnetic interference (EMI) stripped of all complexity to make them accessible to electrical engineers but also to their mechanical colleagues: EMC is all about geometries of interconnections. In this first part of the tutorial "Experiments for EMC education and awareness" the basic mechanisms responsible for EMI are explained. The possible construction and operation of simple home-made magnetic and electric field transducers used to perform the experiments is also shown Programme :

WT Mo A4 session

Time: 14:00 - 15:30

Tutorial 1A - Experiments for EMC Education and Awareness (half-day 1) Frits BUESINK - University of Twente, The Netherlands

WT_Mo_B4 session Time: 16:00 - 17:30

Tutorial 1B - Experiments for EMC Education and Awareness (half-day 1) Frits BUESINK - University of Twente, The Netherlands

Meetings

MEETING

COST ACTION 1407 PRIVATE MEETING

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

MEETING

SC 77B/CISPR-A JWG REV PRIVATE MEETING

Chaired by: Dr. Mathias MAGDOWSKI, Otto von Guericke University, Germany Time: **9:00 - 12:00** Room: **ANJOU**

> Time: **17:30 - 18:30** Room: **AFRIQUE**

Tuesday, 5th September 2017 - 1st Symposium day

8:00	REGISTRATION (MAIN ENTRANCE)										
9:00	OPENING CEREMONY (JEANNETEAU + ANJOU)										
9:45	PLENARY SESSION 1 (JEANNETEAU + ANJOU)										
10:30	COFFEE BREAK (FERMI DIRAC + PAVILION)										
11:00	JEANNETEAU ANJOU AMERIQUES ESPACE SAINT-AUBIN MEITNER										
	O_Tu_A1: EMC Analysis, Modelling and Prediction 1	0_Tu_A2: Reverberation Chambers 1	O_Tu_A3: Intentional EMI	O_Tu_A4: Emerging Topics	O_Tu_A5 : EMC and Radio Links						
12:30		LUNCH (I	FERMI DIRAC + P	AVILION)		P1_Tu: Poster session 1					
14:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL					
	O_Tu_B1: EMC Analysis, Modelling and Prediction 2	O_Tu_B2: Reverberation Chambers 2	O_Tu_B3: Lightning and EMP	O_Tu_B4: EMC of Complex Systems							
15:30		COFFEE BRE/	AK (FERMI DIRAC	+ PAVILION)		P1_Tu: Poster session 1					
16:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL					
	O_Tu_C1: EMC Analysis, Modelling and Prediction 3	O_Tu_C2: Test Sites, Chambers and Cells	O_Tu_C3 : Aircraft EMC	S_Tu_C4: EMC Diagnostics of Complex Systems (Special Session)							
17:30											
18:00											
TA:00	WELCO	ME RECEPTION	- Musée Jean Lu	rçat et de la Tapi	sserie Contempo	raine					

OPENING CEREMONY

Chaired by: Olivier Paillet – Groupe ESEO, France, Prof. Andy Marvin – York EMC Services Ltd, United Kingdom

Welcome adresses :

Prof. Mohamed Ramdani,

EMC Europe 2017 Angers Symposium Chair - Groupe ESEO, Angers, France

Olivier Paillet, Managing Director - Groupe ESEO, Angers, France

Prof. Heyno Garbe, Vice President of the IEEE EMC Society (Communication Services) -Leibniz University of Hannover, Germany

Prof. Andy Marvin,

Chairman of the International Steering Committee (ISC) of EMC Europe -University of York / York EMC Services Ltd, United Kingdom

Prof. Frank Leferink, EMC Europe 2018 Amsterdam Symposium Chair - University of Twente / THALES, The Netherlands

Prof. Richard Perdriau,

EMC Europe 2017 Angers Symposium Vice-Chair - *Groupe ESEO, Angers, France*

Keynote

PL_Tu KEYNOTE 1

PLENARY SESSION 1

Time: **9:45 - 10:30** Room: **JEANNETEAU**

Chaired by: Prof. Mohamed RAMDANI, ESEO, France

EMC Challenges on Modern Aircraft – History and Future Prospects Frédéric THEROND, *AIRBUS, France*

Abstract :

- Recap on recent development Key figures
- The EMC/EMH dimension within an aircraft development process
- Perspective on technical aspects
- Where next?

Oral Sessions

O_TU_A1 ORAL SESSION

EMC ANALYSIS, MODELLING AND PREDICTION 1

Time: **11:00 - 12:30** Room: **JEANNETEAU**

Chaired by: Prof. Mohamed RAMDANI, ESEO, France

Analytical Formulation for shielding effectiveness calculation of a lossy enclosure containing holes

Amélie RABAT, Pierre BONNET, Khalil El KHAMLICHI DRISSI, Sébastien GIRARD Institut Pascal, France

Electromagnetic modeling of an enclosure with an aperture excited by a thin wire as an external source

Akram Ramezani, <u>Mojtaba Joodaki</u> Ferdowsi University of Mashhad, Iran, Islamic Republic of

Broadband Circuit Model for Electromagnetic-Interference Analysis in Cavities

Christoph Lange, Marco Leone - Otto-von-Guericke University, Germany

A Study on Wideband Suppression of Noise Radiated from Switching Power Supply

Dai Sakamoto¹, Akihisa Tsuchiya², Ryosuke Suga¹, Hideaki Sugama², Osamu Hashimoto¹ - ¹Aoyama Gakuin University, Japan; ²Kanagawa Industrial Technology Ceneter, Japan

O_Tu_A2 ORAL SESSION

Time: **11:00 - 12:30** Room: **ANJOU**

REVERBERATION CHAMBERS 1

Chaired by: **Prof. Frank LEFERINK**, University of Twente, THALES, Netherlands, The

Multiple Sources in a Reverberant Environment: The "Cocktail Party Effect"

Perry Wilson - National Institute of Standards and Technology, USA

Numerical Analysis of a Reverberation Chamber. Comparison between Mechanical and Source Stirring Techniques

Alfredo De Leo, Valter Mariani Primiani, Paola Russo, Graziano Cerri Universita Politecnica Marche, Italy

The Rice K-Factor Distribution within a Mode-Stirred Reverberating Chamber

Antonio Sorrentino, Sergio Cappa, Angelo Gifuni, Giuseppe Ferrara, Maurizio Migliaccio - Università degli Studi di Napoli Parthenope, Italy

Calibration of Reverberation Chambers From S11 Measurements Guillaume Andrieu XLIM Laboratory, University of Limoges, France

O_TU_A3 ORAL SESSION

INTENTIONAL EMI

Chaired by: **Prof. Jan Luiken ter HASEBORG**, Technische Universität Hamburg, Germany

HPEM Vulnerability of Smart Grid Substations

Marian Lanzrath, Michael Suhrke, Michael Joester, Thorsten Pusch, Christian Adami, Grzegorz Lubkowski, Benjamin Joerres - *Fraunhofer INT, Germany*

Network-level HEMP Effect Evaluation on Fully-Connected Wireless Networks <u>Chuanbao DU</u>, Congguang MAO Northwest Institute of Nuclear Technology, China, People's Republic of

Effects of Intentional Electromagnetic Interference on an Adaptive Predistortion Algorithm

Emmanuel COTTAIS, José LOPES-ESTEVES, Valentin HOUCHOUAS, Chaouki KASMI - *Wireless Security Lab, ANSSI, France*

A Miniaturized Self-actuated Bandpass Protection Structure Based on Energy Low-pass Mechanism

Ke Wang, Peiguo Liu, <u>Yujian Qin</u>, Jijun Huang, Bo Yi National University of Defense Technology (NUDT), China, People's Republic of

O_TU_A4 ORAL SESSION

EMERGING TOPICS

Time: 11:00 - 12:30 Room: ESPACE SAINT-AUBIN

25

Chaired by: Dr. Richard Xian-Ke GAO, Institute of High Performance Computing, Singapore

EMC Challenges for the Internet of Things

Kia Wiklundh, Peter Stenumgaard - Swedish Defence Research Agency, FOI, Sweden

Electromagnetic Analysis : radiated Emission of IoT Applications close to an Anthropomorphic Phantom

<u>Arnaud Guena</u>¹, Stephane Lamesch¹, Nathanael muot², Vincent Forte¹, Thomas Strub², Dominique Halley¹, Bruno Weber², Pierre Muris¹, Christophe Girard², Marc Viguier¹ - ¹*Thales, France*; ²*Axessim, France*

Development and Validation of a Deterministic Propagation Model for MeerKAT

Temwani Joshua Phiri, P. Gideon Wiid, David B. Davidson Stellenosch University, South Africa

Using Electromagnetic Time Reversal to Locate Faults in Transmission Lines: Definition and Application of the "Mirrored Minimum Energy" Property

Zhaoyang Wang¹, Asia Codino², Reza Razzaghi³, Mario Paolone³, Farhad Rachidi¹ ¹Electromagnetic compatibility (EMC) Laboratory, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland; ²Department of Astronautic, Electrical, and Energy Engineering, Sapienza University of Rome, Italy; ³Distributed Energy System Laboratory (DESL), Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland

O_Tu_A5 ORAL SESSION

EMC AND RADIO LINKS

Chaired by: **Prof. Ferran SILVA**, Universitat Politecnica Catalunya, Spain

APD Oudoors Time-Domain Measurements for Impulsive Noise characterization

Marc Pous, Marco A. Azpúrua, Ferran Silva - GCEM-UPC, Spain

Results from Measuring Campaign of Electromagnetic Interference in GPS L1-band

Patrik Eliardsson¹, <u>Mikael Alexandersson¹</u>, Michael Pattinson², Steve Hill³, Åsa Waern¹, Yeqiu Ying², Dimitrios Fryganiotis^{2 / 1}Dept. of Robust Telecommunications, Swedish Defence Research Agency, Sweden; ²Nottingham Scientific Ltd, England; ³Satellite Applications Catapult Limited, England

Over-the-Air Methods for Determining the Radiated Power of Radio Station

Georgij Jefimovic Leontjev - Communications Regulatory Authority of the Republic of Lithuania, Lithuania

Low Frequency Electric Field Radiated Emissions for the Antenna Pointing Subsystems in Space Missions

<u>Alfonso Muñoz,</u> Jose Gala, Alejandro Arnau, Jose Fernandez - SENER, Spain

O_TU_B1 ORAL SESSION

Time: **14:00 - 15:30** Room: **JEANNETEAU**

EMC ANALYSIS, MODELLING AND PREDICTION 2

Chaired by: Prof. Jan CARLSSON, Provinn AB, Sweden

Optimizing the Inductance Cancellation Behavior in an EMI Filter Design with the Help of a Sensitivity Analysis

Sebastian Schuhmacher¹, Andreas Klaedtke¹, Christoph Keller¹, Wolfgang Ackermann², Herbert De Gersem²-¹Robert Bosch GmbH, Germany; ²TU Darmstadt

Determination of the Coupling Model of Common Mode Chokes Using a TEM Cell

<u>Marine Stojanovic</u>¹, Frédéric Lafon¹, Richard Perdriau², Mohamed Ramdani² ¹Valeo, France; ²ESEO - RFEMC/IETR

Computing the Electromagnetic Emission Spectrum of Pulses by Convolution in Frequency Domain

<u>Herbert Hackl¹</u>, Bernd Deutschmann² ¹NXP Semiconductors Austria, Austria; ²Graz University of Technology, Austria

Frequency Domain Simulation of Conducted EMI in Power Electronic Converters Considering Internal Near Field Couplings by FEM

<u>Keita Takahashi¹,</u> Takaaki Ibuchi², Tsuyoshi Funaki² ¹Mitsubishi Electric Corporation, Japan; ²Osaka University, Japan

O_Tu_B2 ORAL SESSION

REVERBERATION CHAMBERS 2

Chaired by: **Prof. Valter MARIANI PRIMIANI**, Universita Politecnica delle Marche, Italy

Performance Characterization of the Oscillating Wall Stirrer

Dimitrios Barakos, Ramiro Serra Eindhoven University of Technology, The Netherlands

Reverberation Chambers Deformed by Spherical Diffractors

Luca Bastianelli^{1,2}, Gabriele Gradoni^{2,3}, Franco Moglie¹, Valter Mariani Primiani¹ ¹Universita` Politecnica delle Marche, Italy; ²School of Mathematical Sciences, University of Nottingham, Nottingham, UK; ³George Green Institute for Electromagnetics Research, University of Nottingham, Nottingham, UK

Finding frequencies of enhanced electromagnetic coupling to electronic devices by the use of mode stirred reverberation chambers

Niklas Wellander, Mattias Elfsberg, Tomas Hurtig - Swedish Defence Research Agency, Sweden

Theoretical and experimental analysis of the stochastic electromagnetic field coupling to multiconductor transmission lines above a ground plane

Johanna Kasper, Mathias Magdowski, Mohammad Ali, Ralf Vick Otto von Guericke University Magdeburg, Germany

O_TU_B3 ORAL SESSION

Time: **14:00 - 15:30** Room: **AMERIQUES**

LIGHTNING AND EMP

Chaired by: **Prof. Alexander VAN DEURSEN**, Eindhoven University of Technology,The Netherlands

Lightning Current Distribution and Hard Radiation in Aircraft, Measured In-Flight

<u>Alexander van Deursen</u>¹, Pavlo Kochkin^{1,2}, Alte de Boer³, Michiel Bardet³, C Allasia⁴, Jean-François Boissin⁴, Franck Flourens⁴ - ¹Eindhoven University of Technology, Netherlands, The; ²University of Bergen, Norway; ³Netherlands Aerospace Centre, Amsterdam, Netherlands, The; ⁴Airbus, Toulouse, France

Electromagnetic Behavior Analysis of Aircraft Composite under Lightning Direct Effect Richard Xian-Ke Gao, Hui Min Lee, Si-Ping Gao Institute of High Performance Computing, Singapore

Electromagnetic Shielding Analysis of Buildings for Different Models of Lightning Strike

Ali Aghabarati¹, Rouzbeh Moini¹, Simon Fortin¹, Farid Paul Dawalibi¹, Francois Grange² - ¹Safe Engineering Services and Technologies, Canada; ²SES-EUROPE

Research on aircraft radome lightning protection based on segmented diverter strips Yan-chao DUAN¹, Xiu XIONG¹, Ping-dao HU²

¹Lightning and Electromagnetic Environmental Laboratory of Xi'an Airborne Electromagnetic Technology Co., Ltd, China, People's Republic of; ²The First Aircraft Institute of AVIC, China, People's Republic of

O_Tu_B4 ORAL SESSION

Time: **14:00 - 15:30** Room: **ESPACE SAINT-AUBIN**

EMC OF COMPLEX SYSTEMS

Chaired by: **Prof. Frank LEFERINK**, University of Twente, THALES, The Netherlands

Cost-Effective Electromagnetic Compatible Installation on Ships using a Risk Based Approach

Cornelis Jan Jacobus van der Ven¹, Bart van Leersum², Merlijn van Rij¹, Frank Leferink³ - ¹RH Marine, Netherlands, The; ²Defence Materiel Organisation; ³University of Twente

Efficient evaluation of communication system performance in complex interference situations

Sara Örn Tengstrand, Erik Axell, Karina Fors, Sara Linder, Kia Wiklundh Swedish Defence Research Agency (FOI), Sweden

Topology Identification Method for Unknown Indoor PLC Home Networks

Ismail AOUICHAK, Kassim KHALIL, Imene ELFEKI, Jean-Charles LE BUNETEL, Yves RAINGEAUD - Université de Tours, GREMAN, UMR 7347, France

Multilayer Power Delivery Network Modeling with Modified Kron's Method (MKM)

Zhifei Xu, Yang Liu, Blaise Ravelo, Olivier Maurice Normandy University UNIROUEN, ESIGELEC, IRSEEM, F-76000 Rouen, France

EMC ANALYSIS, MODELLING AND PREDICTION 3

Chaired by: **Prof. Ferran SILVA**, Universitat Politecnica Catalunya, Spain

Dependence of an OATS' Site Insertion Loss on the Admitted Parameter Tolerances

Inès Barbary¹, Reiner Pape², Michael Hagel¹, Thomas Kleine-Ostmann², Thorsten Schrader², Marcus Stiemer¹

¹Helmut Schmidt University, Hamburg, Germany; ²Physikalisch-Technische Bundesanstalt (PTB), Braunschweig, Germany

2D FEM model for BCI probe-to-cables coupling with several conductors at the secondary winding

Mor Sokhna DIOP¹, Hassan CHEAITO², Edith CLAVEL¹, Christian VOLLAIRE², Enrico VIALARDI³, Erwan GALLI³, Leonce MUTEL⁴, Bruno GAINETDINOFF⁵

¹Grenoble INP*, G2Elab, F-38000 , France; ²Laboratoire Ampère-CNRS UMR5005; ³Altair, Meylan, France; ⁴AVNIR ENGINEERING, Valence; ⁵Grenoble INP – Esisar -Plateforme Esynov, Valence, France

Magnetic Field Behavior in a Carbon-Fiber Electrical Vehicle Charged by a Wireless Power Transfer System

Tommaso Campi¹, Silvano Cruciani¹, Valerio De Santis¹, Francesca Maradei², <u>Mauro</u> <u>Feliziani¹ - ¹University of L'Aquila, Italy;</u> ²University of Rome La Sapienza, Italy

Unshielded Cable modeling for Conducted Emissions Issues in Electrical Power Drive Systems

<u>Victor Dos Santos</u>^{1,2}, Nicolas Roux², Bertrand Revol³, Bruno Sareni², Bernardo Cougo¹, Jean-Pierre Carayon¹

¹IRT Saint Exupery, France; ²Université de Toulouse, LAPLACE, UMR CNRS-INP-UPS; ³SATIE – ENS Paris Saclay

O_TU_C2 ORAL SESSION

TEST SITES, CHAMBERS AND CELLS

Chaired by: **Prof. Heyno GARBE**, Leibniz Universität Hannover, Germany

Measuring the Transfer Function of a TEM Waveguide

<u>Niklas Briest¹</u>, Heyno Garbe¹, Martin Schaarschmidt² ¹Leibniz Universität of Hannover, Germany; ²Bundeswehr Research

Design of a Reference Device for Radiated Immunity Inter-laboratory Comparison

<u>Frederic Pythoud, Emrah Tas - Swiss Federal Institute of Metrology METAS,</u> Switzerland

Experimental Analysis of the Effects of Antenna Tilting on Antenna Types and Test Results in Consideration of Measurement Uncertainty

Sezgin Hilavin, <u>Samet Develi</u>, Cem Cengiz Keskin, Nisa Kılıç, Anıl Korkmaz Vestel Trade Co., Turkey

O_TU_C3 ORAL SESSION

Time: **16:00 - 17:30** Room: **AMERIQUES**

AIRCRAFT EMC

Chaired by: Frédéric THEROND, AIRBUS, France

Study of Electromagnetic Environmental Effects on the Airworthiness Certification for Performance Improvement Aircraft

JungAun LEE, YounJung SONG - Koreanair R&D Center, Korea, Republic of (South Korea)

Characteristic mode analysis of HIRF- and DCI-excitations of an aircraft structure

Markus Rothenhäusler¹, Frank Gronwald² ¹Airbus Defence and Space GmbH, Germany; ²University of Siegen, Germany

Progress in Usage of Portable Electronic Devices on Aircraft, An Overview

Robert Kebel, Thiemo Stadtler - Airbus, Germany

Comparison of Stored Electromagnetic Field Energy Between Carbon Fiber Reinforced Plastic Structures and All-Metallic Structures -Evaluation of Microwave Quality Factors Using a Reverberation Chamber-

Shunichi Futatsumori - Electronic Navigation Research Institute, Japan

S_Tu_C4 ORAL SESSION

Time: 16:00 - 18:00

EMC DIAGNOSTICS OF COMPLEX SYSTEMS (SPECIAL SESSION)

Room: ESPACE SAINT-AUBIN

Chaired by: Dr. Vladimir Mordachev, Belarusian State University of Informatics & Radioelectronics, Belarus

System-Level Estimation of Prevaling Levels of EM Fields of Mobile Phones Considering Near-Field Zone Limitations of Their Antennas Vladimir Mordachev

Belarusian State University of Informatics and Radioelectronics, Belarus

Simulation of Nonlinear Interference in Aircraft Systems Operating in Complex Electromagnetic Environment Created by Land-Based and Air-Based Wireless Systems

Vladimir Mordachev¹, Eugene Sinkevich¹, Yuri Yatskevich¹, Andrey Krachko¹, Pavel Zaharov², <u>Xie Ma³</u>

¹Belarusian State University of Informatics and Radioelectronics, Belarus; ²Aerosystema, Ltd., Minsk, Belarus; ³China Electronics Technology Cyber Security Co., Ltd

Wideband Worst-Case Model of Electromagnetic Field Shielding by Metallic Enclosure with Apertures

Dzmitry Tsyanenka¹, Eugene Sinkevich¹, Yauheni Arlou^{1,2}

¹Belarusian State University of Informatics and Radioelectronics, Belarus; ²Faculty of Radiophysics and Computer Technologies, Belarusian State University, Minsk, Belarus

Worst-case model of spurious resonances appearing in radio-frequency cables and degrading electromagnetic compatibility characteristics of wireless equipment at out-of-band frequencies

Yauheni Arlou^{1,2} Eugene Sinkevich¹, Dzmitry Tsyanenka¹, Yury Yatskevich¹ ¹Belarusian State University of Informatics and Radioelectronics, Belarus; ²Belarusian State University, Belarus

Validation of Empirical Radiowave Propagation Models for Diagnostics of Intrasystem EMC and Electromagnetic Safety of Microcellular Radio Networks

Aliaksandr Svistunou Belarusian State University of Informatics and Radioelectronics, Belarus

Extraction of Frequency Response of Receiver Input Filter from Characteristic of Receiver Susceptibility to Third-Order Intermodulation Eugene Sinkevich

Belarusian State University of Informatics and Radioelectronics, Belarus

Posters

P1_Tu	POSTER SESSION	Time: 12:30 - 14:00
POSTER SESSI	ON 1	
Chaired by:	Dr. Zbigniew JÓSKIEWICZ, Wroclaw University of Science and Technology, Pol	and
P1 (1)	Simulation and experimental investigations of a RF radiated immunity testing in close proximity Holger Hirsch ¹ , Ralf Heinrich ² ¹ University of Duisburg-Essen, Electrical Power Transmi Teseq GmbH, Germany	TEM horn antenna for
P1 (2)	Characteristic Improvement on Conducted Dis Apparatus Using TEM cells Ryosuke Tani ^{1,2} , Ifong Wu ² , Kaoru Gotoh ² , Yasushi Matsum Ryosuke Suga1, Osamu Hashimoto ¹ 1Aoyama gakuin university, Japan; 2National institu communications technology; 3Tohoku gakuin university	sturbance Measuring noto ² , Shinobu Ishigami ^{2.3,} ute of information and
P1 (3)	Antenna factor measurement of folded rhombi microwave frequency range Shinobu Ishigami, Yoshihiko Kato, Ken Kawamata Tohoku Gakuin University, Japan	ic antenna for using
P1 (4)	Anti-interference Effect Test and Analysis for the the Intense Electromagnetic Pulse Weidong Zhang ¹ , Xiaoqun Chen ¹ , Jiangchuan Lin ² , Hui Ha 1North China Electric Power University, China, People Academy of Engineering Physics, China, People's Repub	Fiber Converter under 10 ¹ , Zidong Chen ² e's Republic of; 2China vlic of
P1 (5)	Methods of High Intensity Radiated Field Testing Guochang Shi, yi Liao, Yuan Zhang, Xiaojun Ying Shanghai Key Laboratory of Electromagnetic Environmen Vehicle, China, People's Republic of	for Civil Aircraft Ital Effects for Aerospace
P1 (6)	Monte Carlo Simulation of the Statistical Unc Measurements in an Ideal Reverberation Chamber Mathias Magdowski, Ralf Vick Otto von Guericke University, Germany	ertainty of Emission r
P1 (7)	An Alternative Polarimetric Representation of the in a Reverberating Enviroment Antonio Sorrentino ¹ , Josè Gil ² , <u>Sergio Cappa¹</u> , Maurizi Ferrara ¹ ¹ Università degli Studi di Napoli Parthenope, Italy; 2U Spain	Electromagnetic Field io Migliaccio ¹ , Giuseppe niversidad de Zaragoza,
P1 (8)	A study on risk evaluation of countermeasure tec electromagnetic information leakage from ITE <u>Kimihiro Tajima</u> ¹ , Ryo Ishikawa ¹ , Toshinori Mori ¹ , Yas Takaya ² - <i>1NTT Advanced Technology Corporation, Japa</i>	hnique for preventing sunao Suzuki², Kazuhiro ın; 2NTT, Japan

P1 (9)	Thermal risks due to land vehicle radioelectric exposure Alain Alcaras, Jeanne Frere Thales Communication and security, France
P1 (10)	An Alternative HERO Testing Method Merve Deniz Kozan, M. Murat Uysal, Erdal Usta otokar otomotiv ve savunma sanayi a.ş., Turkey
P1 (11)	Analytical Model for the Assessment of Doppler Spectrum of Rotating Objects Ayoub SOLTANE, Guillaume Andrieu, Alain Reineix XLIM Laboratory(University of Limoges-France), France
P1 (12)	Effectiveness of Cyclic Redundancy Checks under Harsh Electromagnetic Disturbances Jonas Van Waes, Jonas Lannoo, Andy Degraeve, Dries Vanoost, Davy Pissoort, Jeroen Boydens KU Leuven, Belgium
P1 (13)	Immunity Assessment of a Servomotor Exposed to an Intentional Train of RF Pulses Valentin Houchouas ¹ , Jose Lopes Esteves ¹ , Emmanuel Cottais ¹ , Chaouki Kasmi ¹ , Keith Armstrong ² ¹ Wireless Security Lab, French Network and Information Security Agency - ANSSI; 2Cherry Clough Consultants Ltd
P1 (14)	Impact of antenna height and tilt on measurements above 1GHz in the anechoic chambers Krzysztof Sieczkarek, Adam Maćkowiak Institute of Logistics and Warehousing, Poland
P1 (15)	Incorporation of MoM-based Waveguide Port Model into the Mixed Conducting and Dielectric Geometry Faik Bogdanov, Irina Chochia, Lily Svanidze, Roman Jobava EMCoS Ltd., Georgia
P1 (16)	On the More Rationale Approach of HERO Testing of the Instrumented Ordnances Rakesh Kichouliya, Pawan Kumar Research Centre Imarat, India
P1 (17)	Analysis of Transient Electric-Field Emitted by Atom-Probe Tomography
	Zhifei Xu ¹ , Yang Liu ¹ , Blaise Ravelo ¹ , Olivier Maurice ¹ , Lu Zhao ² , Francois Vurpillot ² ¹ Normandy University UNIROUEN, ESIGELEC, IRSEEM, F-76000 Rouen, France; ² GPM UMR 6634 CNRS, Univ. Rouen, Av. de l'Université, 76801 St Etienne du Rouvray, France

33

Wednesday, 6th September 2017 - 2nd Symposium day

8:00	REGISTRATION (MAIN ENTRANCE)										
9:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	AFRIQUE	MAIN HALL					
	O_We_A1: Mesurement and Instru- mentation 1	O_We_A2: EMC at Chip and PCB Level 1	O_We_A3: Computatio- nal Methods 1	O_We_A4: Power Electronics	MEETING Thales Group NoE Private Meeting						
10:30	COFFEE BREAK (FERMI DIRAC + PAVILION)										
11:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	AFRIQUE	MAIN HALL					
	O_We_B1: Mesurement and Instru- mentation 2	O_We_B2: EMC at Chip and PCB Level 2	O_We_B3: Computatio- nal Methods 2	O_We_B4: Power Electronics	MEETING Thales Group NoE Private Meeting						
12:30		LUNCH (I	ERMI DIRAC + P	AVILION)		P2_We: Poster session 2					
14:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	Main Hall					
	O_We_C1: Mesurement and Instru- mentation : Antennas	O_We_C2: EMC at Chip and PCB Level 3	O_We_C3: Computatio- nal Methods 3	O_We_C4: Emission and Immunity in Low Frequen- cy							
15:30		COFFEE BRE/	AK (FERMI DIRAC	; + PAVILION)		P2_We: Poster session 2					
16:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	Main Hall					
17:30	O_We_D1: Interference in Wireless Communica- tions	O_We_D2: Thermal and Ageing Effects	O_We_D3: Exposure to EM Fields	O_We_D4: Power Line Communica- tions							
20:00		SYMPOSIU	M BANOUET - C	hateau du Plessi	s-Bourré						
		01111 0010			o bounc						

O_We_A1 ORAL SESSION

MEASUREMENT AND INSTRUMENTATION 1

Time: **9:00 - 10:30** Room: **JEANNETEAU**

Chaired by: **Prof. Davy PISSOORT,** KU Leuven, Belgium

The Importance of Overload Revealing in EMI Receivers

Mario Monti, Elena Puri, Massimo Monti Elettronica Monti, Italy

Robust Extreme Value Estimation for Full Time-Domain EMI measurements

Marco Azpurua, Marc Pous, José Antonio Oliva, Ferran Silva Universitat Politecnica de Catalunya, Spain

Impedance Characterastic of New Type Measurement System for Measuring Conducted Disturbance

<u>Ifong Wu</u>¹, Shinobu Ishigami², Kaoru Gotoh¹, Yasushi Matsumoto¹ ¹National Institute of Information and Communications Technology (NICT); ²Tohoku Gakuin University

Termination Impedance for AC Mains Cable Leaving from EUT Area in Radiated Emission Measurement

Kunihiro Osabe¹, Nobuo Kuwabara², Shinichi Okuyama³

¹VCCI Council, Japan; ²Kyushu Institute of Technology; ³VCCI Council, NEC Platforms, Ltd.

O_We_A2 ORAL SESSION

EMC AT CHIP AND PCB LEVEL 1

Chaired by: Prof. Richard PERDRIAU, ESEO, France

Modeling and Design of an EMI-Immune Source-buffered Miller OpAmp in 0.18 μm CMOS Technology

Subrahmanyam Boyapati¹, <u>Jean-Michel Redoute²</u>, Maryam Shojaei Baghini³ ¹IITB-MONASH RESEARCH ACADEMY, India; ²Dept. of Elect. and Comp. Syst. Engineering, Monash University, Australia.; ³Department of Electrical Engineering, Indian Institute of Technology (IIT) Bombay, Mumbai, Maharashtra 400076, India.

A Robust CMOS Miller OpAmp with High EMI-Immunity

Subrahmanyam Boyapati¹, <u>Jean-Michel Redoute²</u>, Maryam Shojaei Baghini³ ¹ITB-MONASH RESEARCH ACADEMY, India; ²Dept. of Elect. and Comp. Syst. Engineering,Monash University, Australia.; ³Department of Electrical Engineering,Indian Institute of Technology (IIT) Bombay, Mumbai, Maharashtra 400076, India.

A new methodology to extract the ICEM-CE internal activity block of a FPGA

Chaimae Ghfiri^{1,2,3} Alexandre Boyer^{2,3}, André Durier¹, Sonia Ben Dhia^{2,3} ¹*IRT Saint Exupery, France*; ²*LAAS CNRS, France*; ³*INSA Toulouse, France*

Theoritical and Experimental Study of Magnetic Sensors for Near-Field Emission Measurement. Application to Design and Integration in Power Printed Board Circuit

<u>Guillaume Vine</u>², Jean-Marc DeniotT¹, Paul-Etienne Vidal² ¹University P. Sabatier - Toulouse III, France; ²Ecole Nationale d'Ingénieurs de Tarbes, INPT, France

O_We_A3 ORAL SESSION

Time: **9:00 - 10:30** Room: **AMERIQUES**

COMPUTATIONAL METHODS 1

Chaired by: **Prof. Flavio Canavero**, Politecnico di Torino, Italy

Hybrid DGTD-MTL-MNA Method for Modelling of Transient Field Coupling into Cables

Iskander Badzagua, Lily Svanidze, Irina Oganezova, Zviadi Kutchadze, Roman Jobava - *EMCoS Ltd., Georgia*

Novel VIE Solution for Low Frequency EM Fields Induced Inside Human Body Voxel Models

<u>Giga Gabriadze</u>^{1,2}, Giorgi Chiqovani², Ekaterina Yavolovskaya^{1,2}, Lili Svanidze^{1,2}, David Karkashadze^{1,2}, Roman Jobava^{1,2} ¹EMCoS Ltd.. Tbilisi, Georgia: ²Tbilisi State University. Tbilisi, georgia

Errors in the shielding effectiveness of cavities due to stair-cased meshing in FDTD: Application of empirical correction factors Samuel Anthony Bourke, John Dawson, Ian Flintoft, Martin Robinson

<u>Samuel Anthony Bourke</u>, John Dawson, ian Flinton, Martin Robinso University of York, United Kingdom

Ligthning modelling process for helicopter engine harness cable <u>Charles Julien</u>¹, Jérôme Genoulaz¹, Anca Dieudonne¹, Jean-Julien Vonflet², Gilles Crousier² - ¹Safran Electrical & Power, France; ²Safran Helicopter Engines, France
O_We_A4 ORAL SESSION

POWER ELECTRONICS

Chaired by: **Prof. Françoise PALADIAN**, Clermont Auvergne University, France

EMI Reduction in SPWM Driven SiC Converter Based on Carrier Frequency Shifting

Niek Moonen¹, Frits Buesink¹, Frank Leferink^{1,2} ¹University of Twente, Netherlands, The; ²Thales B.V., Netherlands, The

Effects of Diode Rectifier on the Conducted Emissions in Motor-Drive System

Hemant Bishnoi, Bernhard Wunsch ABB Schweiz AG, Switzerland

A study on parasitic inductance reduction design in GaN-based power converter for high-frequency switching operation

Takaaki Ibuchi, Tsuyoshi Funaki Osaka University, Japan

Contribution to EMC Modeling of DC-DC Converters: Towards a Parametric Model

Bouzid Karouche¹, Mohamed bensetti², Abdelhalim zaoui¹ ¹*EMP*, *Algeria*; ²*CentraleSupélec*, *Paris*, *France*

O_We_B1 ORAL SESSION

Time: **11:00 - 12:30** Room: **JEANNETEAU**

MEASUREMENT AND INSTRUMENTATION 2

Chaired by: **Prof. Andy MARVIN,** York EMC Services Ltd, United Kingdom

> Arbitrary Waveform Generators and Software-Defined Radio for the Synthesis of Non-Continuous Wave EMC-Test Signals

<u>Oliver Kerfin</u>, Marvin Schwarz, Robert Geise *TU Braunschweig, Germany*

Near Magnetic Field Probe for Detection of Noise Current Flowing to Uncertain Directions

KOBAYASHI RYOTA, KOBAYASHI TSUYOSHI, MIYAZAKI CHIHARU, OKA NAOTO, OH-HASHI HIDEYUKI *Mitsubishi Electric Corporation, Japan*

Proof-of-concept of a Method for Contactless Vector Network Analysis Using Impedance Probes

Lukas Oppermann, Martin Harm, Achim Enders TU Braunschweig, Germany

Wide-Band EM Characterization of a Ni-Zn ferrite tile in a TEM structure <u>Paul Monferran</u>¹, Remi Tumayan², Christophe Guiffaut¹, Guillaume Andrieu¹, Alain Reineix¹, Xavier Bunlon² ¹XLIM, France; ²Renault Technocentre, France

O_We_B2 ORAL SESSION

EMC AT CHIP AND PCB LEVEL 2

Chaired by: **Prof. Adrijan BARIC**, University of Zagreb, Croatia

SPICE model extraction for a MOSFET based on a parametric simulation and waveform measurement

<u>Thi Quynh Van Hoang</u>, Daniela Yassuda-Yamashita, Priscila Fernandez-Lopez, Frederic Lafon - *VALEO – GEEDS, Creteil, France*

Design Approach and Analysis of a MOSFET with Monolithic Integrated EMI Snubber for Low Voltage Automotive Applications

Hermon Afewerki¹, Christian Lautensack¹, Norman Böttcher², Ingmar Kallfass³ ¹Robert Bosch GmbH, Germany; ²Reutlingen University, Robert Bosch Center for Power Electronics (RBZ); 3University of Stuttgart, Institute of Robust Power Semiconductor Systems (ILH)

Sensitivity Analysis of Behavioral MOSFET Models in Transient EMC Simulation

Philipp Hillenbrand, Michael Beltle, Stefan Tenbohlen, Stefan Mönch University of Stuttgart, Germany

Influence of RF Disturbance Phase on Amplifier DPI Characteristics

Marko Magerl¹, Christian Stockreiter², Adrijan Baric¹ ¹University of Zagreb, Croatia; ²ams AG, Premstaetten, Austria

O_We_B3 ORAL SESSION

Time: **11:00 - 12:30** Room: **AMERIQUES**

COMPUTATIONAL METHODS 2

Chaired by: **Prof. Frank GRONWALD**, University of Siegen, Germany

Detection of Defects in Single and Multilayer Composite Material Models by Numerical Nondestructive Testing Simulations

Simon Runke, <u>Martin Zang</u>, Markus Clemens University of Wuppertal, Chair of Electromagnetic Theory, Wuppertal, Germany

Statistical Characterization of Overhead Transmission-line Coupling with EMP:from Perspective of System Susceptibility

Congguang Mao¹, Dongyang Sun¹, Beiyun Sun¹, Flavio Canavero²

¹Northwest Institute of Nuclear Technology, China, People's Republic of; ²Politecnico di Torino, Italy

Feature Selective Validation Analysis applied to Measurement and Simulation of Electronic Circuit Electromagnetic Emissions

<u>Arnaud Colin</u>¹, Marcelo Perotoni², Kenedy Marconi^{3,4}, Ednaldo Ferreira⁵, Mateus Andrade², Samuel Marchiori², Magno Menezes⁶, Artur Nogueira⁷

¹LACE Engenharia; ²Universidade Federal do ABC; ³Instituto Federal da Bahia; ⁴Universidade Federal da Bahia; ⁵Senai Cimatec; ⁶Pontifical Catholic University of Minas Gerais, Brazil; ⁷Federal Center for Technological Education of Minas Gerais, Brazil

O_We_B4 ORAL SESSION

POWER SYSTEMS

Chaired by: **Prof. François COSTA**, Univ. Paris Est Créteil France

Examination of screening factor of signaling cables by measurements and calculation

<u>Jozsef LADANYI</u> - Budapest University of Technology and Economics, Hungary

A Novel Method of Transfer-Function Identification for Modeling DM Impedance of AC Motor

Houcine Miloudi¹, Abdelber Bendaoud¹, Mohamed Miloudi¹, Stefan Dickmann², Stefan Schenke^{2 - 1}University of Sidi Bel Abbes, Algeria; ²Helmut Schmidt University, Hamburg, Germany

An Analysis of the Performance of Power Circuit Breakers Using the Modelling of Electric Arc and a Radiometric System

Gustavo Kuhlmann¹, Thair Ibrahim Abdel Hamid Mustafa¹, Ciro André Pitz¹, Hugo Armando Dominguez Almaguer¹, Luiz Henrique Meyer¹, Sérgio Henrique Lopes Cabral¹, Fernando Tim Flores², José Eduardo Malvestio Cereja², Leandro Puchale² ¹University of Blumenau – FURB, Brazil; ²Companhia Estadual de Energia Elétrica CEEE-GT, Brazil

Method and User-Friendly App for Characterization of Transformers at High Frequency

Carmen Bejarano, Nicolas Navea, Jose Garcia Doblado, Pablo Gonzalez Vizuete, Joaquin Bernal Mendez- Universidad de Sevilla, Spain

O_We_C1 ORAL SESSION

Time: **14:00 - 15:30** Room: **JEANNETEAU**

MEASUREMENT AND INSTRUMENTATION : ANTENNAS

Chaired by: Véronique BEAUVOIS,

University of Liege, Belgium

Simulation and measurement of Log-Per Antenna and Double Ridged Guide Horn Antenna for optimised Field Uniformity

Dwi Mandaris^{1,3}, Frank Leferink^{1,2}

¹University of Twente, Netherlands, The; ²Thales, Hengelo, Netherlands, The; ³Research Center for Quality System and Testing Technology, LIPI, Serpong, Indonesia

A System-Independent Algorithm for Phase Center Determination

Dominic Härke¹, Heyno Garbe¹, Prashant Chakravarty² ¹Institute of Electrical Engineering and Measurement Technology, Leibniz Universität Hannover, Germany; ²Department of Electronics, University of York

Loop Antenna Calibrations with Inclusion of Vector Network Analyser and Comparison Between Calibration Methods

Osman Sen, Soydan Cakir - TUBITAK UME, Turkey

Measurement and Estimation of Minimum Antenna Height of Free-Space Antenna Impedance

Shinichi Okuyama¹, Hiroyuki Shimanoe², Ikuo Makino³, Hidenori Muramatsu⁴ ¹VCCI Council / NEC Platforms, Ltd., Japan; ²S-Tech Inc.; ³Fujitsu General EMC Laboratory, Ltd; ⁴VCCI Council

Time: **11:00 - 12:30** Room: **ESPACE SAINT-AUBIN**

O_We_C2 ORAL SESSION

EMC AT CHIP AND PCB LEVEL 3

Chaired by: **Prof. Etienne SICARD**, INSA Toulouse, France

Design and Validation of a Movable Pin-Contact Miniature Current Probe for Chip-Level EMI Noise Measurement

HAN-NIEN LIN¹, Che-Lun Hu1, Jen-Fu Huang¹, Ming-Shan Lin², <u>Tsung-Ching Lin³</u> ¹Feng-Chia University, Taiwan, Republic of China; ²Bureau of Standards, Metrology and Inspection, Ministry of Economic Affairs, Taiwan; ³Electronic Testing Center, Taiwan

Impact of Source Current Distribution Patterns in On-Chip Interference Studies

<u>Merce Grau Novellas</u>¹, Ramiro Serra¹, Matthias Rose² ¹Eindhoven University of Technology, The Netherlands; ²NXP Semiconductors, Eindhoven, The Netherlands

Effect of Field Area on Disturbance Propagation through Silicon Substrates in SOI-BCD Process

<u>Ko Oyama¹</u>, Yosuke Kondo¹, Daisaku Ikoma¹, Yasuyuki Ishikawa¹, Akitaka Murata¹, Shuji Agatsuma¹, Makoto Nagata² ¹DENSO CORPORATION, Japan; ²Kobe University, Japan

EMC of DSI3 communication protocol - PCB Consideration for Sensor product

Adrien Doridant, Anthony Duhamel, Joseph Hon, Bertrand Vrignon, Kamel Abouda, Nicolas Baptistat, Patrice Besse - *NXP Semiconductors*

O_We_C3 ORAL SESSION

Time: **14:00 - 15:30** Room: **AMERIQUES**

COMPUTATIONAL METHODS 3

Chaired by: **Prof. David THOMAS**, The University of Nottingham, United Kingdom

Calculation of Radar Signals Interacting with Scattering Objects by use of Transfer Function

Sergei Sandmann, Heyno Garbe Institute of Electrical Engineering and Measurement Technology, Germany

Hybrid model for fast EM simulation of wireless interferences in railway system

Ulrich Biaou², Sara Iben-Jellal¹, Michael Bocquet², Sylvie Baranowski¹, <u>Samuel Leman³</u>, Frederic Hoeppe³ - ¹Université de Lille 1, IEMN Laboratory France; ²Université de Valenciennes, IEMN Laboratory, France; ³Nexio, France

MoM-based Foster-type Circuit Model for Lossy Wire-Interconnection Structures

Christian Bednarz, Marco Leone Otto-von-Guericke-Universität Magdeburg, Germany

O_We_C4 ORAL SESSION

Time: 14:00 - 15:30 Room: ESPACE SAINT-AUBIN

EMISSION AND IMMUNITY IN LOW FREQUENCY

Chaired by: **Prof. Heyno GARBE**, Leibniz Universität Hannover, Germany

> The Effect of Mains Voltage Level Variations on The Disturbances Produced by Household Appliances in The Frequency Range of 9-150 kHz Budi Sudiarto, Aji Nur Widyanto, Holger Hirsch ETS Universität Duisburg-Essen, Germany

> The Mutual Influence of Appliances on The Disturbance in The Frequency Range of 9-150 kHz Produced by Household Appliances in The Low Voltage Network

Budi Sudiarto, Aji Nur Widyanto, Holger Hirsch ETS Universität Duisburg-Essen, Germany

Impedance characteristics of Aluminum Alloy Stranded Conductors in the frequency range 40 Hz to 150 kHz

András Mohos, József Ladányi Budapest University of Technology and Economics, Hungary

CVNA Calibration Method for Electrically Small Loop Antennas from 9 kHz to 30 MHz

Martin Harm, Lukas Oppermann, Achim Enders - TU Braunschweig, Germany

O_We_D1 ORAL SESSION

Time: **16:00 - 17:30** Room: **JEANNETEAU**

INTERFERENCE IN WIRELESS COMMUNICATIONS

Chaired by: **Prof. Pierre DEGAUQUE**, University of Lille, France

A detection method for interference measurements in partly occupied radio frequency bands

Karina Fors, <u>Kia Wiklundh</u>, Patrik Eliardsson, Mikael Alexandersson Swedish Defence Research Agency, FOI, Sweden

Performance of Coded Frequency Hopping Systems with Adjacent Channel Interference

Sara Linder, Karina Fors, Kia Wiklundh Swedish Defence Research Agency (FOI), Sweden

Elimination of Electromagnetic Interference in Communication Channels by Using Spread Spectrum Techniques Bernhard Auinger, Bernd Deutschmann, Gunter Winkler - TU Graz, Austria

Spectrum sharing in 800 MHz band: Experimental estimation of LoRa networks and Air Traffic Control Radars co-existence

Grigory Bochechka^{1,2}, <u>Valery Tikhvinskiy</u>^{1,2}, Pavel Korchagin³, Andrey Gryazev⁴, Altay Aitmagambetov⁵ - ¹LLC IcomInvest, Moscow, Russian Federation; ²Moscow Technical University of Communications and Informatics, Moscow, Russian Federation; ³Geyser-Telecom Ltd, Moscow, Russian Federation; ⁴Federal State Unitary Enterprise Central Science Research Telecommunication Institute, Moscow, Russian Federation; ⁵International Information Technology University, Almaty, Kazakhstan

O_We_D2 ORAL SESSION

THERMAL AND AGEING EFFECTS

Chaired by : **Prof. Geneviève DUCHAMP**, University of Bordeaux, France

Effects of Thermal Aggressions on Susceptibility Responses and Immunity Figures of PWM patterns

JEAN-MARC DIENOT - University P. Sabatier - Toulouse III, France

Study of the thermal aging effect on the conducted emission of a synchronous buck converter

<u>Alexandre Boyer</u>¹, Manuel Gonzalez Sentis², Chaimae Ghfiri^{1,2}, André Durier² ¹LAAS-CNRS, France; ²IRT Saint-Exupéry

Analytical model for power converter opimization including EMC and thermal constraints

Gnimdu Dadanema¹, Mylène Delhommais², <u>François Costa³</u>, Jean-Luc Schanen², Yvan Avenas², Christian Vollaire⁴

¹ENS Paris Saclay / Laboratoire SATIE, France; ²G2ELab- - Univ Grenoble Alps CS 90624 38031 Grenoble CEDEX1; ³ESPE – Université Paris Est Créteil; ⁴Laboratoire AMPERE - Ecole Centrale de Lyon

Statistical analysis for the long-term electromagnetic compatibility of a DC-DC converter

HE HUANG¹, <u>Alexandre Boyer</u>², Sonia Ben Dhia² ¹Politecnico di torino, Italy; ²INSA Toulouse, France

EXPOSURE TO EM FIELDS

Chaired by: **Prof. Mauro FELIZIANI,** University of l'Aquila. Italy

Study on the Impact of the Body Shadow Effect in Wireless Channels Through Dosimetry Measurements

Silvia de Miguel-Bilbao¹, Juan Blas², Erik Aguirre³, Peio López-Iturri³, Leyre Azpilicueta⁴, Francisco Falcone³, <u>Victoria Ramos¹</u>

¹Carlos III Health Institute, Spain; ²University of Valladolid, Spain; ³Public University of Navarra, Spain; ⁴Tecnológico de Monterrey, Mexico

Low Frequency Human Exposure Analysis for Automotive Applications Ekaterina Yavolovskaya^{1,2}, Benjamin Willmann^{3,4}, <u>Giga Gabriadze^{1,2}</u>, Giorgi Chiqovani¹, Zurab Sukhiashvili¹, Sophia Iosava¹, Lily Svanidze^{1,2}, Roman Jobava^{1,2} ¹EMCoS Ltd., Tbilisi, Georgia; ²Tbilisi State University, Tbilisi, Georgia; ³VOLKSWAGEN AG, Wolfsburg, Germany; ⁴University of Magdeburg, Magdeburg, Germany

The evaluation of stationary and mobile components of radiofrequency electromagnetic exposure in the public accessible environment

Jolanta Karpowicz¹, Silvia de Miguel-Bilbao², <u>Victoria Ramos²</u>, Francisco Falcone³, Krzysztof Gryz¹, Wiesław Leszko¹, Patryk Zradziński¹

¹Central Institute for Labour Protection – National Research Institute (CIOP-PIB), Laboratory of Electromagnetic Hazards, Poland; ²Carlos III Health Institute, Spain; ³Electric and Electronic Engineering Department, Public University of Navarra, Pamplona, Navarra, Spain

A 3D Coil Structure Achieving Uniform Magnetic Field for in-vitro cell experiments

Weinong SUN¹, Yaqing He¹, Yinliang Diao², Sai-Wing Leung¹, Yun-Ming Siu¹, Richard Yuen-Chong Kong¹, Wai-Keung Lo³

¹City University of Hong Kong, Hong Kong S.A.R. (China); ²South China Agricultural University, Guangzhou, China.; ³EMC Consortium Limited, Hong Kong SAR.

O_We_D4 ORAL SESSION

Time: 16:00 - 17:30

POWER LINE COMMUNICATIONS

Room: ESPACE SAINT-AUBIN

Chaired by: **Prof. Marcello D'AMORE**,

Sapienza University of Rome, Italy

Multipath Model Simulator for PLC Home Networks

Ismail AOUICHAK, Yannick KERGOSIEN, Imene ELFEKI, Jean-Charles LE BUNETEL, Yves Raingeaud, Jean-Charles Billaut - *Univ. de Tours, GREMAN, UMR 7347 France*

Estimation of PLC Transmission line and Crosstalk for LV Outdoor Electrical Cables

Imene ELFEKI^{1,2}, Ismail Aouichak¹, Jean-Charles LE BUNETEL¹, Yves RAINGEAUD¹, Thierry DOLIGEZ² - ¹Université de Tours, GREMAN, UMR 7347, France; ²LAN -Laboratoire des Applications Numériques, France

Theoretical maximum data rate estimations for PLC in automotive power distribution systems

Alexander Zeichner, Zongyi Chen, Stephan Frei - TU Dortmund, Germany

Electro-Magnetic Emission of Power Line Communiation system Alain Alcaras¹, Frank Leferink^{2,3} - ¹Thales Communication and security, France; ²Thales Netherlands; ³University of Twente

Posters

P2_We	POSTER SESSION	Time: 12:30 - 14:00 15:30 - 16:00
POSTER SESSI	ON 2	Room: MAIN HALL
Chaired by:	Dr. Jean-Michel REDOUTE , Monash University, Australia	
P2 (1)	Numerical and experimental study of imp immunity to ELF electric fields Cihan Gercek ¹ , Isabelle Magne ² , Djilali Kourtiche Mustapha Nadi ¹ , Martine Souques ³ ¹ Institut Jean Lamour (UMR 7198), Université France; ³ EDF Service des Etudes Médicales, Fran	planted cardiac defibrillators e ¹ , Pierre Schmitt ¹ , Patrice Roth ¹ , de Lorraine, France; ² EDF R&D, nce
P2 (2)	Investigation of the Impact of Parasitic Para by Hybridization of 3D Quasistatic Field So Alexander Demurov ^{1,2} , Giga Gabriadze ^{1,2} , Badri Gheonjian ^{1,2} , Roman Jobava ^{1,2} , Ilona Danelyan ¹ ¹ EMCoS Ltd, Tbilisi, Georgia; ² Tbilisi State University	ameters on PCB Performance olvers and MNA Khvitia ¹ , Zviad Kutchadze ¹ , Anna rsity, Tbilisi, Georgia
P2 (3)	Efficient Magnetic Field Measurements Iwan Setiawan ^{1,2} , Niek Moonen ¹ , Frits Buesink ¹ , F ¹ University of Twente, The Netherlands; ² Inc Indonesia; ³ Thales, The Netherlands	rank Leferink ^{1,3} donesian Institute of Sciences,
P2 (4)	A Novel Approach for Optimal Design of Snubbers Norman Böttcher ¹ , Hermon Afewerki ² , Christian L ¹ Robert Bosch Center for Power Electronics, C Germany; ³ Institute of Robust Power Semiconde	of Monolithic Integrated RC autensack ² , Ingmar Kallfass ³ Germany; ² Robert Bosch GmbH, uctor Systems, Germany
P2 (5)	Influence of the Voltage-Dependent O Semiconductors on the Electromagnetic Inf for Electric Vehicles Karl Oberdieck, Alexander Sewergin, Rik W. De Do RWTH Aachen University, Germany	Output-Capacitance of SiC- terference in Dc-Dc Converter
P2 (6)	Analysis of Analog Power Rails in High-Sp Ihsan Erdin Celestica Inc., Canada	eed Circuit Design
P2 (7)	3D MODELING OF SURFACE-MOUNT O COUPLINGS BETWEEN THEM Aivis Asmanis, Deniss Stepins, Andris Dzenis, Gu <i>Riga Technical University, Latvia</i>	CAPACITORS AND MUTUAL
P2 (8)	Secure Silicon: Towards Virtual Prototypin Laurent Sauvage ^{1,2,} Sofiane Takarabt ² , Youssef So ¹ Télécom ParisTech, France; ² Secure-IC, France,	ig buissi², Naofumi Homma³ ; ³ RIEC Tohoku University, Japan

P2 (9)	A De-embedding Application for EMC Attenuation Measurements of Components Janne Hein ^{1,2} , Johannes Hippeli ¹ , Thomas F. Eibert ² ¹ BMW AG, Germany; ² Chair of High-Frequency Engineering, Technical University
	of Munich, Germany
P2 (10)	Do Bench-Tests Keep Up With Current Technology in EMI Receivers? Mario Monti, Elena Puri, Massimo Monti <i>Elettronica Monti, Italy</i>
P2 (11)	Current probes for differential mode conducted emission measurement David Alistair Knight ¹ , Richard Marshall ² ¹ NPL, United Kingdom; ² Richard Marshall Laboratories
P2 (12)	Broad band PCB probes for near field measurements Nimisha Sivaraman ¹ , Fabien Ndagijimana ¹ , Moncef Kadi ² , Zouheir Riah ² ¹ University grenoble Alpes, France; ² Normandie Univ, UNIV-ROUEN
P2 (13)	Hybrid MoM-MTL Solution for LF Suscepitibility and Radiation Problems Giorgi Chiqovani ¹ , Iskander Badzagua ^{1,2} , David Karkashadze ^{1,2} , Giga Gabriadze ^{1,2} , Roman Jobava ^{1,2} ¹ <i>EMCoS Itd., Tbilisi, Georgia;</i> ² <i>Tbilisi State University, Tbilisi, Georgia</i>
P2 (14)	Near-Field Characterization for 13.56 MHz RFID Antenna Kassem Jomaa ¹ , Fabien Ndagijimana ¹ , Houssam Ayad ² , Majida Fadlallah ² , Jalal Jomaah ² ¹ <i>Grenoble-Alpes University, France; ²Lebanese University, Beirut, Lebanon</i>

Meetings

MEETING

Time: **9:00 - 12:30** Room: **AFRIQUE**

THALES GROUP NOE PRIVATE MEETING

Chaired by: **Prof. Frank LEFERINK,** University of Twente, THALES, The Netherlands

Thursday, 7th September 2017 - 3rd Symposium day

8:00		RI	EGISTRATION (M	AIN ENTRANCE)											
9:30	PLENARY SESSION 2 (JEANNETEAU + ANJOU) COFFEE BREAK (FERMI DIRAC + PAVILION)														
10:30		COFFI	EE BREAK (FERM	I DIRAC + PAVILI	ON)										
11:00	JEANNETEAU		MAIN HALL												
	O_Th_A1: Transmission Lines 1	O_Th_A2: Automotive EMC 1	O_Th_A3: Protection Devices: Absorption	O_Th_A4: Stochastic Modelling for EMC											
12:30	l	LUNCH (FERMI D	IRAC + PAVILION)	AFRIQUE PETER Private Meeting	P3_Th: Poster session 3									
14:00	JEANNETEAU	TESLA	MAIN HALL												
	O_Th_B1: Transmission Lines 2	O_Th_B2: Automotive EMC 2	O_Th_B3: Protection Devices Shielding	O_Th_B4: ESD and Transients	ISC Meeting										
15:30	COFI	FEE BREAK (FERM	/II DIRAC + PAVIL	.ION)		P3_Th: Poster session 3									
16:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN		Main Hall									
17:30	O_Th_C1: Transmission Lines 3	O_Th_C2: Automotive EMC 3	O_Th_C3 : Protection Devices: Shielding and Fieltering	S_Th_C4: Stochastic Electro- magnetics (EUMA Special Session)											
18:00															
19:00			ISC Di	nner											

Keynote

Pl_Th KEYNOTE 2

PLENARY SESSION 2

Time: **9:30 - 10:30** Room: **JEANNETEAU**

Time: 11:00 - 12:30

Room: **JEANNETEAU**

47

Chaired by: **Prof. Mohamed RAMDANI,** ESEO, France

Automated Driving - New Challenges (part 1) Alain Kehlhoffner - Valeo, France

Automated Driving - New Challenges (part 2) Frédéric Lafon - Valeo, France

The automotive industry is currently facing major evolutions, particularly with the development of automated vehicle applications.

The technology behind such an evolution is quite complex and is based on many sensors, radars and post-processing techniques which are quite new in the automotive industry. In the first part of the presentation, the authors will give a general overview of these new technologies and of the global performance level that can be reached on the market today.

As far as automated vehicles are concerned, some of the consequences for users and on EMC must be considered. In the second part of the presentation, the authors will focus on some of these aspects:

When a vehicle is automated, passengers' usages and expectations will change. This will lead to new vehicle interior concepts and new usages.

The EMC performance of such systems will be essential and will raise new concerns for the EMC community. Reliability and safety vs. EMC, for example, is one of the key aspects to be considered.

Oral Session

O_Th_A1 ORAL SESSION

TRANSMISSION LINES 1

Chaired by: **Prof. Francesca MARADEI,** La Sapienza University of Rome, Italy

Broadband Foster-Type-Circuit Model of Non-Uniform and Radiating Transmission Lines

Sebastian Südekum, Marco Leone - Otto-von-Guericke Univ. Magdeburg, Germany

Distributed Voltage Sources on Transmission-lines – Unified Low Frequency Model

Isabelle Junqua, Jean-Philippe Parmantier, Solange Bertuol, Pierre Schickele ONERA, France

Novel Equivalent-Circuit Model for Electrically Short Transmission Lines Including Field Coupling

Andreas Mantzke, Marco Leone - Otto-von-Guericke Univ. Magdeburg, Germany

Study on Short Equivalent Lines in Asymptotic Method for High Frequency Electromagnetic Field Coupling to Transmission Line Chunying Zhao¹, Liping Yan¹, Xiang Zhao¹, Qiang Liu², Haijing Zhou² ¹Sichuan University, China, People's Republic of; ²Institute of Applied Physics and Computation Mathematics, China, People's Republic of

AUTOMOTIVE EMC 1

Chaired by: Prof. Marco KLINGLER, Peugeot Citroen Automobiles, France

Reflection-Optimized Star Topologies for Automotive Bus Systems

Matthias Hampe, Alexander Stieler - Ostfalia Univ. of Applied Science, Germany

Simulation Techniques for EMC Compliant Design of Automotive IC Chips and Modules

<u>Akihiro Tsukioka</u>¹, Makoto Nagata¹, Kohki Taniguchi¹, Daisuke Fujimoto¹, Rieko Akimoto², Takao Egami², Kenji Niinomi², Takeshi Yuhara², Sachio Hayashi², Rob Mathews³, Karthik Srinivasan³, Ying-Shiun Li³, Norman Chang³

¹Kobe University, Japan; ²Toshiba Corporation, Japan; ³Semiconductor BU, ANSYS Inc., US

Experimental and Computational Analysis of a Radiated Immunity Standard Representativeness in the 210-216 MHz Frequency Range

Artur Nogueira de São José¹, Úrsula do Carmo Resende¹, José Hissa Ferreira¹, <u>Arnaud Christophe Pierre Marie Colin²</u>, Magno Alves de Menezes³, Rose Mary de Souza Batalha³, Juliano Fujioka Mologni⁴

¹Federal Center for Technological Education of Minas Gerais, Brazil; ²LACE Engenharia; ³Pontifical Catholic University of Minas Gerais; ⁴ESSS

Modeling of Conducted EMI with Current Probe Method for a Motor-Drive Braking System

Junesang Lee^T, Minho Kim¹, Jungrae Ha¹, Chanho Lee¹, Sangwon Yun¹, Yeongsik Kim¹, Kihoon Nam², Wansoo Nah^{3 - 1}Mando Co. Ltd., Korea, Republic of (South Korea); ²Huwin Co. Ltd., Korea, Republic of (South Korea); ³Sungkyunkwan University, Korea, Republic of (South Korea)

O_Th_A3 ORAL SESSION

Time: **11:00 - 12:30** Room: **AMERIQUES**

PROTECTION DEVICES: ABSORPTION

Chaired by: **Prof. Jan CARLSSON,** Provinn AB, Sweden

Detailed study of different cable ferrite characterization methods using simulation and measurement

<u>Steffen Schulze</u>¹, Moawia Al-Hamid², Marco Leone² - ¹*Würth Elektronik eiSos GmbH & Co. KG, Germany*; ²*Otto-von-Guericke-University, Germany*

A Miniaturized Frequency Selective Rasorber with Tunable Passband Hao Tu, Peiguo Liu, Jijun Huang, Yujian Qin National University of Defense Technology, China, People's Republic of

Adaptive Terahertz Absorber Based On Tunable Graphene Multilayer

<u>Alessandro Giuseppe D'Aloia</u>¹, Marcello D'Amore², Maria Sabrina Sarto³ ¹Sapienza University of Rome, Italy, Italy; ²Sapienza University of Rome, Italy, Italy; ³Sapienza University of Rome, Italy, Italy

An Ultrathin Polarization-independent Wideband Metamaterial Absorber for EMC Applications

<u>Jiaqi Feng</u>¹, Liming Si², Li Sun¹, Ye Tian¹, Dan Li^{1 - 1}Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, China, People's Republic of; ²Beijing Key Laboratory of Millimeter Wave and Terahertz Technology, School of Information and Electronics, Beijing Institute of Technology

STOCHASTIC MODELLING FOR EMC

Chaired by : Dr. Philippe BESNIER, CNRS -UMR 6164 - IETR, France

An Analog-to-Digital Converter Immunity Modelling based on a Stochastic Approach

Siham Hairoud Airieau^{1,2}, Tristan Dubois¹, <u>Geneviève Duchamp</u>¹, André Durier² 1IMS Laboratory / Univ. Bordeaux, France; 2IRT Saint Exupery, Toulouse, France

Crosstalk Analysis of Printed Circuits with Many Uncertain Parameters Using Sparse Polynomial Chaos Metamodels

Mourad Larbi¹, Igor Stievano¹, Flavio Canavero¹, Philippe Besnier²

¹Politecnico di Torino, Dipartimento di Elettronica, Politecnico di Torino, 10129 Torino, Italy; 2IETR, UMR CNRS 6164Institut d'Electronique et de Télécommunications de Rennes, INSA de Rennes, 35708 Rennes, France

Experimental validation of a statistical model of a wiring system in a reverberant room

Louis Kovalevsky¹, Guillaume Andrieu², Robin Langley³ - ¹wavesix LLC, United States America; ²Univ. of Limoges, XLIM laboratory; ³Univ. of Cambridge, United Kingdom

Simulation based analysis of electric field distributions in small reverberation chambers

Inès Barbary¹, Julia Schiffner², Marco Rozgic¹, Robert Hollan¹, Claas Schlie¹, Jens Storjohann¹, Michael Hagel¹, Lars Ole Fichte¹, Stefan Potthast³, Martin Schaarschmidt³, Sebastian Lange³, Marcus Stiemer¹ - ¹Helmut Schmidt University, Hamburg, Germany; ²Düsseldorf, Germany; ³Bundeswehr Research Institute for Protective Technologies and NBC Protection, Munster, Germany

O_Th_B1 ORAL SESSION

Time: **14:00 - 15:30** Room: **JEANNETEAU**

TRANSMISSION LINES 2

Chaired by: **Prof. Alain REINEIX,** XLIM, France

Comparison of Voltage Sources with Current Sources on Unbalanced Differential Microstrip Line

<u>Hiroaki Saito</u>, Tohlu Matsushima, Takashi Hisakado, Osami Wada *Kyoto University, Japan*

A Modal-Analysis-Based Prediction Method for Radiation Power in Differential Channels with Discontinuity

Chi-Hsuan Cheng, Tzong-Lin Wu - National Taiwan University, Taiwan

Electromagnetic characterization of complex flexible printed interconnects

Françoise Paladian¹, Kamal Kerroum¹, Sébastien Girard¹, Sébastien Lalléchère¹, Pierre Bonnet¹, Patrice Foutrel²

¹Clermont Auvergne University, France; ²SAFRAN Electronics & Defense

Identifying Frequency Dispersion of Transmission Characteristics of Shielded-Flexible Printed Circuits

Yoshiki Kayano, Hiroshi Inoue - The University of Electro-Communications, Japan

O_Th_B2 ORAL SESSION

Time: **14:00 - 15:30** Room: **ANJOU**

AUTOMOTIVE EMC 2

Chaired by: Dr. Frédéric LAFON, VALEO, France

EMC and Signal Integrity Design Considerations for Flexible Printed Interconnects in Automotive Data-Bus Applications

Yu Xian Teo, Jiaqi Chen, Alastair R. Ruddle Future Transport Technologies Department, HORIBA MIRA Ltd, United Kingdom

Characterization of Common-Mode Choke for Automotive Ethernet Networks enabling 100 Mbit/s

Sanaz Mortazavi¹, Detlef Schleicher¹, Friedel Gerfers² ¹Volkswagen AG, Germany; ²Technische Universitaet Berlin

Channel Selective Adaption of PWM Frequencies for Undisturbed AM and FM Reception in Automobiles

Andreas Bendicks¹, Stephan Frei¹, Norbert Hees², Marc Wiegand² ¹TU Dortmund University, Dortmund, Germany; ²Leopold Kostal GmbH & Co KG, Lüdenscheid, Germany

Superposition of shield currents in inverter-fed AC-Motors

<u>Madhavi Sreenivasa Murthy</u>¹, Guido A. Rasek² ¹Brandenburgische Technische Universität Cottbus-Senftenberg; ²Robert Bosch GmbH, Germany

O_Th_B3 ORAL SESSION

50

Time: **14:00 - 15:30** Room: **AMERIQUES**

PROTECTION DEVICES: SHIELDING

Chaired by: Dr. John DAWSON, University of York, United Kingdom

Numerical Evaluation of TD Shielding Performance of Thin Shields in the Presence of Vertical Dipoles

Rodolfo ARANEO¹, Salvatore CELOZZI¹, Giampiero LOVAT¹, Paolo BURGHIGNOLl² ¹University of ROME LA SAPIENZA, Italy - DIAEE - EE Division; ²University of ROME LA SAPIENZA, Italy - DIET

Wideband Full Wave Shielding Effectiveness Simulation of Structures with Wire Grid Meshes

Zahra Kazerouni, <u>Hadi Aliakbarian</u> KN Toosi University of Technology, Iran, Islamic Republic of

Measurement of Transmission through Printed Circuit Boards: Application to Enclosure Shielding

Sarah Louise Parker¹, Andy Marvin¹, John Dawson¹, Ming Ye² ¹University of York, United Kingdom; ²Huawei Technologies AB

Effect of power state on absorption cross section of personal computer components: applications to enclosure shielding

<u>Jiexiong Yan</u>, John Dawson, Andy Marvin *University of York, United Kingdom*

O_Th_B4 ORAL SESSION

ESD AND TRANSIENTS

Chaired by: Dr. Jean-Luc LEVANT, Microchip, France

Distance characteristic of electric field waveform and field peak value caused by micro gap ESD in a pair of spherical electrodes

Ken Kawamata¹, Shinobu Ishigami¹, Shigeki Minegishi¹, Osamu Fujiwara² ¹Tohoku Gakuin University, Japan; ²Nagoya Institute of Technology, Japan

LIN communication behaviours against ESD events

Fabien Escudié^{1,2}, Fabrice Caignet^{1,2}, Nicolas Nolhier^{1,2} ¹LAAS-CNRS; 2UPS

Dynamic models of external capacitors to perform accurate EMC and ESD simulations

Nicolas Baptistat, Kamel Abouda, Adrien Doridant, Bertrand Vrignon, Tristan Dubois

NXP, France

Modeling Transient Electrical Disturbances by Inductive Coupling for the ISO 7637-3 ICC Test

Niels Lambrecht¹, Hugo PUES², Daniel De Zutter¹, Dries Vande Ginste¹ ¹Ghent University, Belgium; ²MELEXIS Technologies NV

O_Th_C1 ORAL SESSION

TRANSMISSION LINES 3

Time: **16:00 - 17:30** Room: **JEANNETEAU**

51

Chaired by: **Prof. Maria Sabrina SARTO,** Sapienza University of Rome, Italy

Simulation of the Stochastic Electromagnetic Field Coupling to Multiconductor Transmission Lines using Enhanced Per-Unit-Length Parameters

Johanna Kasper, Ralf Vick - Otto von Guericke University Magdeburg, Germany

Modelling of Transmission Line Loaded with BCI Probe Using Circuit Concept Approach

Kimitoshi Murano¹, <u>Misaki Hoshino</u>¹, Yoshio Kami², Fengchao Xiao², Majid Tayarani³ - ¹Tokai University, Japan; ²The University of Electro-Communications, Japan; ³Iran University of Science and Technology, Iran

Frequency-Domain Analysis of the Characteristic Impedance Matrix of High-Voltage Transmission Lines

Rodolfo Araneo¹, Salvatore Celozzi¹, Jose Antonio Marinho Brandao Faria² ¹University of OF ROME LA SAPIENZA, Italy; ²Instituto de Telecomunicacioes Instituto Superior Tecnico – Universidade de Lisboa

A Practical Application of an Analytical Method for Modeling Power Transmission Lines

Thair Ibrahim Abdel Hamid Mustafa¹, Sergio Henrique Lopes Cabral¹, Hugo Armando Dominguez Almaguer¹, Luiz Henrique Meyer¹, Leandro Henrique Bona Puchale², Jose Eduardo Cereja², Gustavo Vier² -¹*Univ. of Blumenau, Brazil;* ²*CEEE-GT,Brazil*

O_Th_C2 ORAL SESSION

AUTOMOTIVE EMC 3

Chaired by: André DURIER, IRT Saint-Exupéry, France

Development of a Passive Impedance Network for Modeling Electric Vehicle Traction Batteries for EMI Measurements

<u>Sebastian Jeschke</u>¹, Marc Maarleveld¹, Jörg Bärenfänger¹, Holger Hirsch², Sergii Tsiapenko², Christian Waldera³, Martin Obholz³

¹EMC Test NRW GmbH, Germany; ²University Duisburg-Essen; ³Volkswagen AG

Predicting the RF Impedance of Cells in Series for Automotive Traction Battery Applications

<u>Jiaqi Chen</u>, Alastair R. Ruddle, Yu Xian Teo HORIBA MIRA Ltd, United Kingdom

Transient Co-Simulation of Electromagnetic Emissions caused by a SiC Traction Inverter

Philipp Hillenbrand¹, Michael Beltle¹, Stefan Tenbohlen¹, Jan Hansen² ¹University of Stuttgart, Germany; ²Robert Bosch GmbH, Germany

Measurement of RF impedance for automotive 18650 cylindrical lithium ion cells

<u>Alastair R. Ruddle</u>, Jiaqi Chen, Yu Xian Teo HORIBA MIRA Limited, United Kingdom

O_Th_C3 ORAL SESSION

Time: **16:00 - 17:30** Room: **AMERIQUES**

PROTECTION DEVICES: SHIELDING AND FILTERING

Chaired by: Dr. John DAWSON, University of York, United Kingdom

Dedicated Stripline Set-Up for the Characterization of the Shielding Effectiveness of Board-Level Shields

<u>Dries Vanoost</u>, Tim Claeys, Andy Degraeve, Filip Vanhee, Davy Pissoort *KU Leuven, Belgium*

Effective Noise Coupling Reduction in Metallic Enclosures Hosting X-K Bands Microwave Circuits

<u>Muhammet Hilmi Nisanci</u>¹, Francesco de Paulis², Antonio Orlandi² ¹Sakarya University, Turkey; ²University of L'Aquila, Italy

Ultrathin Switchable Microwave Filter Based on Graphene and Slot Array

<u>Chenxi Liu¹</u>, Liang Yang², Peiguo Liu¹, Yujian Qin¹, Jijun Huang¹ ¹National University of Defense Technology, China, People's Republic of; ²Science and Technology on Space Physics Laboratory, Beijing, China

Protection Characteristics of Ferrite Magnetic Ring against HEMP and Lightning

Qin Feng^{1,2}, Mao Congguang^{1,2} ¹State Key Laboratory of Intense Pulsed Radiation Simulation and Effect; ²Northwest Institute of Nuclear Technology

O_Th_C4 ORAL SESSION

Time: 16:00 - 18:00

STOCHASTIC ELECTROMAGNETICS (EUMA SPECIAL SESSION)

Room: ESPACE SAINT-AUBIN

Chaired by: Dr. Philippe BESNIER, CNRS – UMR 6164 – IETR, France Dr. Johannes A. RUSSER, Technische Universität München

Cross-Correlation Analysis of the Cyclostationary Near-Field Unintentional Radiations from the PCB

<u>Yury Kuznetsov</u>¹, Andrey Baev¹, Anastasia Gorbunova¹, Maxim Konovalyuk¹, Johannes A. Russer², Michael Haider², Peter Russer²

¹Moscow Aviation Institute (National Research University); ²Technische Universität München

Near-Field Scanning of Stochastic Fields Considering Reduction of Complexity

David W. P. Thomas¹, Mohd H. Baharuddin¹, Christopher Smartt¹, Gabriele Gradoni¹, Gregor Tanner¹, Stephen Creagh¹, Nebojsa Doncov², Michael Haider³, Johannes A. Russer³

¹University of Nottingham, U.K.; ²University of Nis, Serbia; ³Technische Universität München, Germany

3D Antenna Patterning for MIMO and Phased-Array Systems: Energybased Built-In-Self-Test for Multiphysics Co-Design

<u>Sidina Wane</u>¹, Johannes A. Russer³, Thanh Vinh Dinh¹, Damienne Bajon², Dominique Lesenechal¹, Pablo Corrales², Peter Russer³, Michel Ivrlac³, Josef Nossek^{3,4}

¹NXP-Semiconductors; ²ISAE-Universite de Toulouse, France; ³Technische Universität München, Germany; ⁴Federal University of Ceara, Fortaleza, Brazil

Estimating Radar Cross-Section of Canonical Targets in Reverberation Chamber.

Philippe Besnier, Jérôme Sol, Stéphane Méric - CNRS - UMR 6164 - IETR, France

Propagation methods for stochastic field emissions and source reconstruction

Gabriele Gradoni, Deepthee Madenoor Ramapriya, Stephen Creagh, Gregor Tanner, Hafiz Mohd Baharuddin, Chris Smartt, David Thomas *University of Nottingham, United Kingdom*

Meetings

MEETING

Time: **12:30 - 14:00** Room: **AFRIQUE**

PETER PRIVATE MEETING

Chaired by: **Prof. David PISSOORT** Ku Leuven, Belgium

MEETING

ISC MEETING

Time: **14:00 - 16:00** Room: **TESLA**

Chaired by: **Prof. Andy Marvin,** York EMC Services Ltd, United Kingdom

Posters

P3_Th	POSTER SESSION	Time: 12:30 - 14:00 15:30 - 16:00
PUSTER SESSI	UN 3	Room: MAIN HALL
Chaired by:	Dr. Mohamed AMELLAL, ESEO, France	
P3 (1)	Multi-conductor transmission line modelli measurement methods Jesper Lansink Rotgerink, Harmen Schippers, Jaco Netherlands Aerospace Centre, Netherlands, The	ng of transfer impedance
P3 (2)	Investigation of Common Mode (CM) Imped and BCI CM Voltage Hassan Hussein CHEAITO ¹ , Mor-Sokhna Diop ² , Mar Vollaire ¹ ¹ Iaboratoire ampère, France; ² G2ELab, grenoble, Fr	lance : Comparison of Pure wan Ali ¹ , Edith Clavel ² , Christian rance
P3 (3)	Shielding Effectiveness Estimation of an E Shape Aperture Ali Shourvarzi, Mojtaba Joodaki Ferdowsi University of Mashhad, Iran, Islamic Rep	nclosure with an Arbitrary
P3 (4)	Tapered Structures for Frequency Characte Current-Sense Resistor Josip Bacmaga ¹ , Raul Blecic ^{1,2} , Renaud Gillon ³ , Adri ¹ University of Zagreb Faculty of Electrical Engine ² KU Leuven, ESAT-TELEMIC, Belgium; ³ ON Semico	erization of Wide-Terminal ijan Baric ¹ ering and Computing, Croatia; nductor, Belgium
P3 (5)	A Simulation Method to Determine the RF In Moustafa Raya, Ralf Vick Otto von Guericke University Magdeburg, German	npedance of Batteries y
P3 (6)	A combined CM & DM conducted EMI model to a non-isolated on-board single-phase cha Christelle Saber ^{1,4} , Denis Labrousse ^{1,2} , Bertrand Rev ¹ Laboratory of Systems & Applications of Inform SATIE, France; ² Conservatoire National des Ar Normale Supérieure Paris Saclay, France; ⁴ Renault	ling approach - Application arger for electric vehicles Vol ^{1,3} , Alain Gascher ⁴ <i>nation & Energy Technologies</i> <i>ts et Métiers, France; ³Ecole</i> <i>t S.A.S., France</i>
P3 (7)	Analysis of the Effects of Associated Eq Conducted Emission Test Bekir Solak, Sezgin Hilavin, Emre Alan, Melike Özkar Vestel Elektronik Sanayii ve Ticaret A.Ş., Turkey	uipment in EN 55032 for n, Faik Alan

P3 (8) Closed form model of radiated EM field from wired systems and analysis of coupling impact

Achraf Liakouti^{1,2}, Ali Benbassou², Christophe Pasquier¹, Claire Faure¹, Khalil El Khamlichi Drissi¹, Françoise PALADIAN¹

¹Clermont Auvergne University,Pascal Insitute, France; ²Laboratory of Transmission and Information Processing , USMBA, FEZ, Morocco

P3 (9) Estimating parasitic resonances by analysis of the late time response Sergej Braining¹, Stefan Dickmann¹, Matthias Kreitlow²

¹Helmut-Schmidt-Universität, Universität der Bundeswehr Hamburg, Germany; ²Bundeswehr Research Institute for Protective Technologies and NBC Protection Munster, GERMANY

P3 (10) EMC of Wireless Medical Telemeters and Noise Radiated from Light Emitting Diode Lamps

Kai Ishida¹, Keita Suzuki², Eisuke Hanada³, Minoru Hirose² ¹National Institute of Information and Communications Technology, Japan; ²Kitasato University, Japan; ³Saga University, Japan

P3 (11) Dielectric Measurement of Liquids in 1GHz Band Based on Comparison with Reference Materials Using an Open-ended Cut-off Circular Waveguide

Kouji Shibata, Masaki Kobayashi Hachinohe Institute of Technology, Japan

P3 (12) Assessment of the Electromagnetic Environment Hardware Control Room in Cinema and Concert Hall

Volodymyr Pilinsky¹, Andrey Rozvadovskiy², Alexander Chupakhin¹, Roman Sirota³, levgen Zaitsev⁴

¹National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Department of Audio Engineering and Information Registration, Kiev, Ukraine; ²Branch of the FSUE NIIR Testing Centre «Omega», Sevastopol, Ukraine; ³Software development company "GEAR Electronics", Kyiv, Ukraine; ⁴Warsaw University of Technology, Institute of Electronic Systems, Warsaw, Poland

P3 (13) An Ultra-wideband Miniaturized Printed Dipole Antenna for EMC Measurements

Morteza Ghaderi Aram, Hamed Tahmasbi, Hadi Aliakbarian KN Toosi University of Technology, Iran, Islamic Republic of

Friday, 8th September 2017 - Workshops & Tutorials

8:00		RI	EGISTRATION (M	AIN ENTRANCE)		
9:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL
	WT_Fr_A1: Workshop 4A Automotive EMC	WT_Fr_A2: Workshop 5A EMC of ICs - The French Touch	WT_Fr_A3: Workshop 6A Reverberation Chambers: from Basics to Advanced Concepts And Applications	WT_Fr_A5: Workshop 7 Conduced Emission Reduction for Motor Drives on Industrial Sites	WT_Fr_A4: Tutorial 1C Experiments for EMC Education and Awareness (half-day 2)	
10:30		COFF	EE BREAK (FERM	I DIRAC + PAVILI	ON)	
11:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL
	WT_Fr_B1: Workshop 4B Automotive EMC	WT_Fr_B2: Workshop 5B EMC of ICs - The French Touch	WT_Fr_B3: Workshop 6B Reverberation Chambers: from Basics to Advanced Concepts And Applications		WT_Fr_B4: Tutorial 1D Experiments for EMC Education and Awareness (half-day 2)	
12:30		LL	JNCH (FERMI DIF	RAC + PAVILION)		
14:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	MAIN HALL
	WT_Fr_C1: Workshop 4C Automotive EMC	WT_Fr_C2: Workshop 5C EMC of ICs - The French Touch				
15:30		COFF	EE BREAK (FERM	I DIRAC + PAVILI	ON)	
16:00	JEANNETEAU	ANJOU	AMERIQUES	ESPACE SAINT-AUBIN	MEITNER	Main Hall
	WT_Fr_D1: Workshop 4D Automotive EMC	WT_Fr_D2: Workshop 5D EMC of ICs - The French Touch				
17:30						

Workshops

WT_Fr_1 WORKSHOP 4

AUTOMOTIVE EMC

Time: **9:00 - 17:30** Room: **JEANNETEAU**

Chaired by: Dr. Marco KLINGLER, Peugeot Citroen Automobiles, France

Speakers Marco Klingler (Peugeot Citroen Automobiles, France) - Frederic Bocquet (Ansys, France) - Anna Gheonjian (EMCoS Ltd., Georgia) - Simon Guicheteau (Altair Engineering France) - Andreas Barchanski (Dassault Systemes, SIMULIA, Germany) - Rémi Tumayan (Renault S.A.S, France) - Garth D'Abreu (ETS-Lindgren, United States of America) - Pascal Hervé (CSA Group Bayern GmbH) - Alastair Ruddle (MIRA Limited, United Kingdom) Christoph Keller (Robert Bosch GmbH) -Frédéric Lafon (VALEO, France) - Jean-Roger K. Kuvedu-Libla Delphi Electronics & Safety - Luxembourg

Programme :

WT_Fr_A1 session

Time: 9:00 - 10:30

Online EMC Numerical Simulation - Towards a collaborative French or European project

Marco Klingler - Peugeot Citroen Automobiles, France

Original use of interference system simulation tools for detection and fix of EMC/EMI perturbation from power electronic devices with cables, into wireless device communications within a vehicle

Frederic Bocquet¹, Alain Michel¹, Amazir Moknache¹, Domenico Loricchio² ¹Ansys, France; ²Ansys, Italy

Analysis of the Radiated Emission from Shielded HV-Cables

Anna Gheonjian^{1,2}, Oussama Sassi³, Badri Khvitia^{1,2}, Zviad Kutchadze¹, Diana Eremyan¹. Giorgi Kapanadze^{1,2}, Roman Jobava^{1,2}

¹EMCoS Ltd., Tbilisi, Georgia; ²Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia; ³Volkswagen AG, Wolfsburg, Germany

AUTOMOTIVE EMC

WT_Fr_B1 session Time: 11:00 - 12:30

Minimizing Low Frequency EM Disturbances on Vehicles Using Efficient 3D Simulation

Simon Guicheteau¹, Salah Benassine², Christophe Guérin¹, Cyril Favre¹, Markus Schick³ - ¹Altair Engineering France, Meylan,France; ²Groupe PSA, Vélizy-Villacoublay, France; ³Altair Engineering GmbH, Böblingen, Germany

RF Interference in BCI Testing of Remote Keyless-Entry Systems

Andreas Barchanski¹, Patrick DeRoy¹, Cyrous Romstamzadeh², Michael Grobosky², Ryan Frost², Flavia Grassi³, Sergio Pignari³

¹Dassault Systemes, SIMULIA, Germany; ²Robert Bosch USA; ³Politecnico di Milano

Electromagnetic Field Radiated by Lightened High Voltage Battery for Electric Vehicle

Rémi Tumayan¹, Xavier Bunlon¹, Alain Reineix², Guillaume Andrieu², Christophe Guiffaut² - ¹*Renault S.A.S, France; ²XLIM UMR CNRS n*°7252, *France*

WT_Fr_C1 session Time: 14:00 - 15:30

Meeting the Need for HIL Type Enhanced EMC Full Vehicle Measurements Garth D'Abreu - ETS-Lindgren, United States of America

Coexistence of EMC and Radio requirements for future connected vehicles certification

Pascal Hervé¹, Jürgen Pessinger¹, Oussama Sassi² ¹CSA Group Bayern GmbH; ²EMV-Zentrum, Volkswagen AG

Preliminary Estimates of Electromagnetic Field Exposures Due to Advanced Vehicle Technologies

Alastair Ruddle - MIRA Limited, United Kingdom

WT_Fr_D1 session

Time: 16:00 - 17:30

Parametric Modeling of Common Mode Chokes

Christoph Keller¹, Jan Hansen¹, Philipp Hillenbrand², Matteo Ledri² ¹*Robert Bosch GmbH*; ²*University of Stuttgart*

Global Modeling and simulation methodology to predict ESD performance from IC to system

Frédéric Lafon, Priscila Fernandez Lopez, Van Hoang, Kevin Loudiere VALEO, France

Frequency Extensions as Big Challenges for Electromagnetic Compatibility Investigations of Automotive Electronics

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

WT_Fr_2 WORKSHOP 5

Time: **9:00 - 17:30** Room: **ANJOU**

EMC OF ICs - THE FRENCH TOUCH

Chaired by: **Prof. Etienne SICARD,** INSA Toulouse, France

Speakers Frédéric Lafon (VALEO, France) - Priscila Fernandez-Lopez (Valeo, France) - Sebastien Serpaud (RT Saint Exupéry, Toulouse, France) -Alexandre Boyer (LAAS-CNRS, France) - Richard Perdriau (ESEO-RFEMC/ IETR, France) - Adrien Doridant (NXP Semiconductors, France) - Chaimae Ghfiri (IRT Saint Exupery, France) - Geneviève Duchamp (University of Bordeaux, France) - HABIB BOULZAZEN (ESIGELEC - IRSEEM, France) -Jean-Luc Levant (Microchip, France)

Programme :

WT_Fr_A2 session

Time: 9:00 - 10:30

Immunity Modeling of Integrated Circuits - Review and Application Usage

Frédéric Lafon - VALEO, France

Introducing ICIM-CPI to model the IC immunity to Conducted Pulse Priscila Fernandez-Lopez¹, Christian Marot² ¹Valeo, France; ²Airbus, France

Comparison of extraction methods to build a radiated emission model of ICs (ICEM-RE) : pros and cons

Sebastien Serpaud - IRT Saint Exupéry, Toulouse, France

WT_Fr_B2 session

Time : 11:00 - 12:30

ESD Modeling of Integrated Circuits and Passive Components Frédéric Lafon - VALEO, France

Learning EMC of ICs with IC-EMC Alexandre Boyer - LAAS-CNRS, France

FastImmunity: an EDA extension for PCB immunity prediction Ala Ayed, Sjoerd Op 't Land, Richard Perdriau, Mohamed Ramdani ESEO-RFEMC/IETR, France

WT_Fr_2 WORKSHOP 5 (CONTINUED)

EMC OF ICs - THE FRENCH TOUCH

WT_Fr_C2 session Time: 14:00 - 15:30

EMC System Simulation Flow for Electromagnetic Emission Prediction Adrien Doridant *NXP Semiconductors, France*

Effects of Ageing on the Conducted Emissions and Signal Integrity of an IC Chaimae Ghfiri

IRT Saint Exupery, France

Behavioral modelling taking into account ageing effects for IC's immunity prediction.

Geneviève Duchamp, Tristan Dubois *University of Bordeaux, France*

WT_Fr_D2 session

Time: 16:00 - 17:30

On the combined effect of environmental and service conditions on the EMC behavior of the passive component up to the circuit. HABIB BOULZAZEN

ESIGELEC - IRSEEM, France

Methodology Used to Check the EFT Robustness of 32-bit ARM Microcontroller

Jean-Luc Levant Microchip, France

WT_Fr_3 WORKSHOP 6

REVERBERATION CHAMBERS: FROM BRASICS TO ADVANCED CONCEPTS AND APPLICATIONS

Chaired by: Dr. Philippe BESNIER, CNRS - UMR 6164 - IETR, France

Speakers Philippe Besnier (CNRS - UMR 6164 - IETR, France) - Olivier LEGRAND (Université Côte d'Azur, CNRS, INΦΝΙ, UMR 7010, France) - Elodie RICHALOT (Université Paris-Est Marne-la-Vallée, France) - Matthieu Davy (Institut d'Electronique et des Télécommunications, UMR CNRS 6164, Université de Rennes 1, France)

Programme :

WT_Fr_A3 session

Basic principles and properties. Reverberation chambers in practice. Philippe Besnier - CNRS - UMR 6164 - IETR. France

Chaotic vs non-chaotic chambers

Olivier LEGRAND - Université Côte d'Azur, CNRS, INΦNI, UMR 7010, France

WT_Fr_B3 session

Time: 11:00 - 12:30

Time: 9:00 - 10:30

Achieving chaoticity in a rectangular Reverberation Chamber Elodie RICHALOT

Université Paris-Est Marne-la-Vallée, France

Cross-correlation of electromagnetic fields in a reverberation chamber Matthieu Davy

Institut d'Electronique et des Télécommunications, UMR CNRS 6164, Université de Rennes 1, France

Time: **9:00 - 17:30** Room: **AMERIQUES**

WT_Fr_5 WORKSHOP 7

CONDUCED EMISSION REDUCTION FOR MOTOR DRIVES ON INDUSTRIAL SITES

Chaired by: Daniel Gustave DAUZON, EMITECH, France

Speakers Daniel Gustave DAUZON (EMITECH, France)

Abstract :

On industrial sites, more and more electrical motors driven by electronic drivers are present. These equipments generate common mode currents leading sometimes to critical disturbances. This situation happens especially when cables between the electronic command unit and the motor are long. The different noises generated are differential mode or common mode noise, but the common mode current is often the most severe.

This workshop intends to overview simple solutions which are usually implemented on site, but also it will present some strategies which can be introduced inside the electronic command units and reducing significantly these currents. Different problems will be adressed, as overvoltages due to line transmission model of the cable, common mode resonance, and reduction of the common mode voltage sent to the motor.

Tutorial

WT Fr 4 TUTORIAL 1

EXPERIMENTS FOR EMC EDUCATION AND AWARENESS

Time: 9:00 - 12:30 Room: MEITNER

(PART II)

Chaired by: Frits BUESINK,

University of Twente, Netherlands, The

Speakers Frits BUESINK (University of Twente, Netherlands, The)

Sessions Abstract :

In this second session of the tutorial "Experiments for EMC education and awareness" the measures are demonstrated that allow the mitigation of EMI effects show during the first part of this tutorial (see the Monday, September 4 program). During the tutorial also some systems engineering aspects will be reviewed: the three dimensions of EMC, front- and backdoor interference and the concept of loosely coupled coherent hardware modules.

Programme :

WT Fr A4 session Time: 9:00 - 10:30

Turorial 1C - Experiments for EMC Education and Awareness (half-dav 2) Frits BUESINK - University of Twente, The Netherlands

WT_Fr_B4 session

Time: 11:00 - 12:30

Turorial 1D - Experiments for EMC Education and Awareness (half-day 2)

Frits BUESINK - University of Twente, The Netherlands

Exhibition Map



Ground floor

Exhibition Information

Exhibitor

EMCOS	1
IEEE EMC Society	2
HEMERA RF	
YELLOZGROUP	4
SAFETY & EMC Magazine	5
COMTEST	6
NEXIO	7
LUMILOOP	8
SCHURTER	9
CST	10
WISE	11
ROHDE & SCHWARZ	12
WÜRTH ELEKTRONIK	13
KEMET	14
ETS-LINGREN	15
SPIRENT	16
ATECORP	17
MVG	18
L3T	19
EMITECH	20
IRT Saint-Exupéry	21
FREICOMP	22
ALTAIR	23
AR	24
ANSYS	25
CALICEA	

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Fig.: LSProbe 1.2

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- More Electrical Aircraft in 3 Competence Centres: Understanding of Physical Phenomena, Technological Bricks, Component Robustness.
- Embedded Systems in 3 Competence Centres: Telecom, Images and Data as well as Collaborative System Engineering.

Its expertise and technology platforms, as well as its collaborative environment boost the maturation and transfer of breakthrough technologies (TRL 4-6) to its industrial partners.



Company Profile Freicomp GmbH / Germany

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 wellequipped 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, Transfomers 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 <u>www.freicomp.com</u>



Altair is focused on the development and broad application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance.

Altair provides leading electromagnetic (EM) simulation software, widely used in many industries and applications to solve a broad range of electromagnetic problems from static to low and high frequencies.

As 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: 3D antenna design and antenna placement, Electromagnetic Coupling and Interference (EMC, EMI) analysis, Bio-electromagnetics, 3D RF components, 3D EM circuits, radomes and scattering problems.

The leading software for low frequency electromagnetic and thermal simulations Flux[™] is also now part of Altair's HyperWorks CAE Suit since 2016.The software tool allows users to design and create machines from standard or customized parts, as well as to intuitively add windings and materials to run a selection of tests and compare machine capacity. Open and intuitive, Flux can be easily included in your design workflow to deliver reliable analysis results, allowing engineers to concentrate on innovation.

A newest Release under the name of Flux – FluxMotor – an easy-to-use and efficient dedicated predesign tool, targeting designers from all sectors related to the electric motors field.

The integration to the Altair suite enables users to work in a global creative environment. Flux can be coupled with the best available 3D analysis software to consider Multiphysics phenomena's or to handle system level simulations to develop strategies for controls.

Privately held with more than 2,600 employees, Altair is headquartered in Troy, Michigan, USA and operates more than 45 offices throughout 20 countries. Today, Altair serves more than 5,000 corporate clients across broad industry segments. To learn more, please visit <u>www.altair.com.</u>



AR France, is the AR Group (Amplifier Research) French office, through AR Europe.

AR is the first worldwide manufacturer of high frequency wideband power amplifiers. Our range covers from DC to 50GHz and from 1W to 100kW.

Aside of those amplifiers, AR proposes two other product lines on antennas and field monitoring probes/systems.

To answer to our customer system needs till complete EMC laboratories for example, we propose, in addition to our own AR products, solutions from our partners in the following fields : low frequency amplifiers ; power meters ; antenna radiation pattern measurements ; turntables/antenna mast; current probes; fiber optic link (analog or digital); anechoïc and reverberating chambers; noise sources; ESD bench; nearfield (planar, cylindrical, spherical) and farfield scanners; TWT; pulse and voltage drop simulators; etc...



Product Maintenance is performed locally in our Gennevilliers (92 - FRANCE) laboratory.

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25% of the electronics industry's French jobs in the French West.



Angers, from electronics to the Internet of Things : a pioneering tech ecosystem

Angers has always moved with the times and is now **leading the way in the** current digital and technological revolution by pioneering the IoT, or Internet of Things. This expertise has earned the region membership of the French Tech "IoT and Manufacturing" network and made it the home of Cité de l'Objet Connecté.

The digital and electronics sector encompasses technologies such as electronics, IT, telecommunications, multimedia and virtual reality, and a variety of jobs to create a technology ecosystem unlike any other in Europe. The city's engineering schools and university labs are internationally acclaimed in this field.

WISE - the electronics campus with international horizons - has taken up residence in Angers alongside the **WeNetwork** cluster, which counts 200 members and 700 entities across Western France.





Leading companies Lacroix, Anjou Électronique, Ercogener, Soreel, Thales



Electronics campus

3,900 students and **250** researchers in the Pays de la Loire



A test platform for IoT ventures



Growth of nnovative enterprise



Label French Tech IoT (Internet of things

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Call for Papers

The 2018 Joint IEEE International Symposium on Electromagnetic Compatibility & Asia-Pacific Symposium on Electromagnetic Compatibility (2018 Joint IEEE EMC & APEMC) will take place at the Suntec Convention and Exhibition Center in Singapore from 14 to 17 May 2018. The joint symposium combines the 60th IEEE International Symposium on EMC with the 9th APEMC Symposium. For the former, it is only the 4th time for it to be held outside the North America Continent in 60 years and the first time in Asia over the past three decades. For the latter, it is a homecoming to where the APEMC originated 10 years ago.

The symposium Technical Program Committee invites you to submit your original and unpublished papers in all aspects of electromagnetic compatibility (EMC) as well as signal and power Integrity (SI/PI), including but not limited to EMC/SI/PI design, modeling, management, measurements, and education.

All eligible papers (excluding abstract-reviewed papers) will be submitted for online publication at the IEEE Xplore, and authors will also be invited to submit extended versions of those papers for possible publication in a special issue of the IEEE Transactions on Electromagnetic Compatibility.

Plan ahead and join this unique symposium, meet international colleagues, present your latest research findings, share your insight and perspectives, ask questions, learn from experts and innovators, explore collaborations, visit exhibitions and see new products. Experience Singapore, where east meets west, and much more!

Important Dates

Preliminary Full Paper Submission (3 to 6 pages in PDF format; without author names & affiliations)	Start: 18 August 2017 End: 24 November 2017
Paper Acceptance Notification	16 January 2018

Final Paper Due

Organized by

IEEE

28 February 2018

Please visit symposium website for more information about

Topics of Interest Embedded Conference on SIPI Call for Workshops & Call f Tutorials Revie

Call for Abstract Reviewed Papers







Call for Special

Sessions

Embedded Conference on SIPI

As high-speed designs continue evolving, signal/power integrity and other EMC problems become tightly related to each other. The embedded conference on Signal and Power Integrity (SIPI), which is an integral part of the 2018 Joint IEEE EMC & APEMC Symposium, provides a unique opportunity for attendees to exchange ideas and share experiences relevant for today's high-speed designs. **Topics include but not limited to the TC-10 technical areas**.

SIPI-TPC Chairs: Zhiping YANG (zhipingyang@google.com) Er-Ping LI (erpingli@ieee.org)

Call for Special Sessions

The symposium Technical Program Committee is seeking proposals for Special Sessions to be presented at the 2018 Joint IEEE EMC & APEMC Symposium. The proposals may cover any current or emerging areas of EMC, SIPI and related technologies.

Prospective organizers of a Special Session should send their proposals via email to Special Session Chairs: Richard Gao (gaoxk@ieee.org) and Bob Davis (robert.h.davis@lmco.com). Submissions must be in Word or PDF format following the proposal template that can be found at the symposium website (www.apemc.org).

Special Session Proposal Schedule

- Proposals for Special Sessions: 18 August 2017 14 October 2017
- Notification of acceptance: 07 November 2017

Special Session Paper Schedule

- Special Session Paper must be submitted by 23 December 2017
- Notification of review feedback by 22 January 2018
- Final versions of Special Session papers from all authors are due on 28 February 2018.

Call for Workshops & Tutorials

Prospective organizers of workshops and tutorials should send their proposals via email to John Maas (johnmaas@us.ibm.com) and Martin Leung (martin.Leung@cst.com). Submissions must be in Word or PDF format following the proposal template that can be found at the symposium website (www.apemc.org).

Schedule for Workshop & Tutorial Proposal & Presentation Material

- Proposals to be submitted during 18 August 2017 14 October 2017
- Notification of acceptance: 07 November 2017
- Presentation materials from all presenters are due by **05 March 2018**.

Call for Abstract Reviewed Papers

Schedule for Abstract Reviewed Papers

- Abstract submissions (about 500 words): 18 August 2017 08 January 2018
- Notification of acceptance: 29 January 2018
- Final Paper Material (1 to 6 pages) due: 28 February 2018

The abstract reviewed papers will be invited for resubmission to a special issue of the IEEE EMC Magazine. When accepted and published, they will be archived in the IEEE Xplore.







2018 Joint EMC Symposium in Singapore

Plans

Ground floor



Auditorium, room number D002, 350 seats. Ground floor, in the middle of the building



Auditorium, room number DS02, 250 seats. Basement. Specific stairs and lift (opposite each other) in the middle of the building. Do not take the stairs or lift near the main entrance or the cafeteria.

First floor



Lecture room, room number C108, 100 seats. 1st floor (UK numbering), opposite main entrance, above the cafeteria. Turn left when exiting the stairs, make a U-turn to the left when exiting the lift.



Lecture room, room number C304, 80 seats. Opposite main entrance, 3rd floor (UK numbering). Turn left when exiting the stairs, make a U-turn to the left when exiting the lift.

102



Auditorium, room number A405, 100 seats. 4th floor (UK numbering), above main entrance. Please use the stairs or the lift near the main entrance.

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