

出國報告（出國類別：國際會議）

2012 Asia-Pacific Symposium on  
Electromagnetic Compatibility  
Singapore  
May 21 - 24, 2012

服務機關：國立高雄應用科技大學

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派赴國家：新加坡

出國期間：101年5月21日至5月24日

報告日期：101年5月22日

# 摘要

此會議由新加坡大學與 IEEE EMC SOCIETY 共同主辦的亞太區電磁兼容研討會(2012 Asia-Pacific Symposium on Electromagnetic Compatibility)，會議於 5 月 21 日至 5 月 24 日，在新加坡聖淘沙名勝世界 Hard Rock HOTEL 舉行。會議吸引了來自世界各國學術界及產業界許多的專家學者參與，主要偏重在 EMC 電磁兼容、系統信號與電源完整性、靜電防護、Package EMC, Automotive EMC…等方面，廣泛且深入的就當前與未來電路系統電磁兼容做討論與經驗交流。會期一共四天，包括了第一天由大會安排的 EMC 相關課程，以及接續到 24 號的口說與海報論文發表討論會。在此會議期間，除了和與會人士交流與研討之外，依照議程於五月二十二日海報發表以「System power integrity impact by package power/ground balls assignment and decoupling capacitors」為題的論文後返國。

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# 一、本文

## 目的

學生此次出席在新加坡舉辦的 2012 亞太電磁兼容學術會議(2012 ASIA-PACIFIC SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY)，為期為民國一百零一年五月二十一日(星期一)至五月二十四日(星期四)共四天，其中五月二十一日為大會安排的專題課程，而五月二十二,二十三,二十四日則展開一連串的論文發表及討論議程。此次會議由新加坡大學與 IEEE EMC SOCIETY 共同主辦，參與學者專家來自全球各地。學生參加此國際會議主要為增廣不同國家之學術研究方向，吸收多方思考增進自我思維，透過此國外之旅，體驗不同之風俗民情，並完成論文之發表。

## 補助項目

往返機票及論文之註冊費用

## 過程

這次在新加坡所舉行的 2012 APEMC 國際學術會議共計四天，地點在新加坡聖淘沙 Hard Rock HOTEL 會議廳舉行；第一天(5/21)行程為報到及專題課程。第二天(5/22)開幕式之後為期三天的、主題演講、及發表論文報告，就此展開直到會議閉幕式。個人報告發表時間為(5/22)當天 13:30 ~ 15:30。本次研討會論文分為多個議程，其中學生安排在開放式的會議走廊進行，與會學者分別就不同主題發表、討論並廣泛地交換意見。發表中相當順利的結束。

5/21 會議第一天為大會的 Workshop/Tutorial，研討會於第二天 5/22 開始，在 Workshop

所聽到的為來自各國學術與產業的電磁兼容技術發展，其電磁兼容技術的目的在於抑制電子

產品的電磁干擾，以達到電子系統正常運作的標準，其中以學生的研究領域而言又以高頻電

源完整性為主要研究目的，故參加 Electromagnetic Integral Equation Methods used for the

Simulation of Power Integrity 課程，以數值演算法來運用在系統電源完整性的設計，使計算模

擬結果更為精準。

2012 EMC in Singapore – Symposium & Technical Exhibition  
21 – 24 May 2012

**Workshop / Tutorial Program**

Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
8:50am – 12:20pm	T-AM-1: High Speed PCB Design	W-AM-1: Future Trends for Automotive EMC Measurements: The Impact of eMobility	T-AM-4: Evaluation of Lightning-Induced Disturbances in Distribution Networks for Power Quality Assessment	W-AM-2: Use of the Reverberation Chamber for Wireless Test and Calibration Applications Modeling
	T-AM-1.1 8:50am-10:20am High Speed PCB Design-Part I Frits Buesink, University of Twente, The Netherlands	W-AM-1.1 8:50am-9:30am EMC Testing of Hybrid and Electric Vehicles – Challenges to Simulate the Li-Ion Battery with External Power Sources Wolfgang Winter, EMV, Germany W-AM-1.2 9:30am-10:10am Designing for Reliability of Automotive Electronic Systems Todd Hubing, Clemson University, USA	T-AM-4.1 8:50am-9:20am Lightning Currents for Engineering Applications A. Borghetti, University of Bologna, Italy T-AM-4.2 9:20am-9:50am Lightning Location Systems M. Rubinstein, University of Applied Sciences of Western Switzerland, Yverdon T-AM-4.3 9:50am-10:20am Field-to-Transmission Line Coupling Models with Special Emphasis to Lightning-Induced Voltages F. Rachidi, Swiss Federal Institute of Technology, Lausanne, Switzerland	W-AM-2.1 8:50am-9:20am Introduction to Reverberation Chamber Concept and its Application for Probe Calibration and Antenna Efficiency Dennis Lewis, The Boeing Company, USA W-AM-2.2 9:20am-9:50am MIMO and Other Wireless Measurements in Reverberation Chambers at NIST Perry Wilson, National Institute of Standards and Technology, USA W-AM-2.3 9:50am-10:20am Certification of Wireless Devices on Aircraft: Performance Evaluation Using Discrete Frequency Stir Technique Kenneth Kirchoff, The Boeing Company, USA
	T-AM-1.2 10:40am-11:10am High Speed PCB Design-Part II Frits Buesink, University of Twente, The Netherlands	W-AM-1.3 10:40am-11:10am Full Vehicle Testing for CISPR 12 and ISO 11451.2 (and equivalent) Automotive EMC Standards Vince Rodriguez, ETS-Lindgren, USA	T-AM-4.4 10:40am-11:10am Estimation of Lightning Performance of Distribution Network C.A. Nucci, University of Bologna, Italy T-AM-4.5 11:10am-11:40am Voltage Transient Measurements in a Distribution Network Correlated with Data from Lightning Location Systems M. Poulton, Swiss Federal Institute of Technology, Lausanne, Switzerland	W-AM-2.4 10:40am-11:10am Over-The-Air Measurement with Reverberation Chambers Bryan Saylor, ETS-Lindgren, USA
T-AM-2 11:10am-12:20am Designing for EMC – Fundamentals for Printed Circuit Boards and Systems Mark Montrose, Montrose Compliance Services, Inc., USA	T-AM-3 11:10am-12:20am New EMC Test Requirements for Electric- and Hybrid Electric Vehicles U. Flor, EM TEST GmbH, Germany	T-AM-5 11:40am-12:20am Electromagnetic Integral Equation Methods used for the Simulation of Power Integrity Xing Chang Wei, Zhejiang University, China	T-AM-6 11:10am-12:00am Using Reverberation Chambers for Actual EMC Tests Frank Leferink, University of Twente, The Netherlands	
12:00pm-1:20pm Tea Break				

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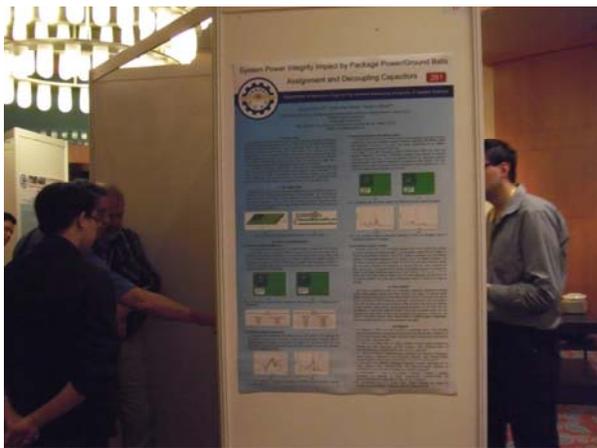
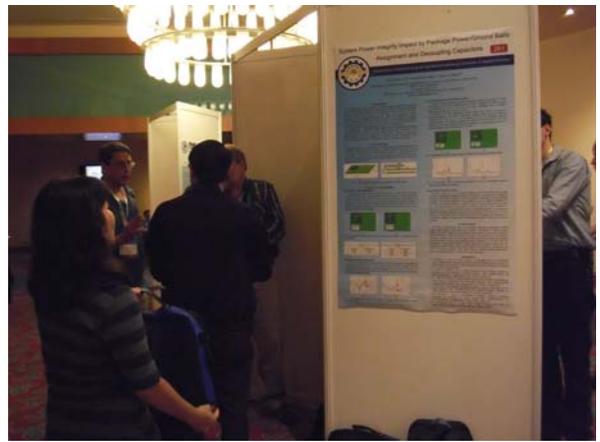
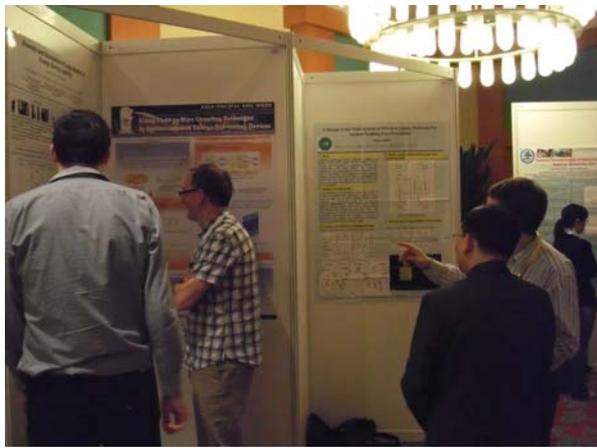
Time	Gemini 1	Gemini 2	Leo 4	Aquarius 4
1:20pm - 5:30pm	T-PM-1: EMC Standards	T-PM-4: Modeling and Measurement of Stochastic Electromagnetic Fields in EMI	W-PM-1: SI and EMC Design for High-speed Differential Channels	W-PM-3: Novel Antenna Measurement Techniques for Commercial and Military
	T-PM-1.1 1:20pm-1:50pm New Requirements of IEC 61000-4-4 Edition 3 – 2012 – Trends for Next Revision of IEC 61000-4-5 Eric Dudenhoefler, TESEQ AG, Switzerland	T-PM-4.1 1:20pm-3:20pm Modeling and Measurement of Stochastic Electromagnetic Fields in EMI Peter Russer, Technische Universität München, Germany Johannes Anton Ruster, Technische Universität München, Germany	W-PM-1.1 1:20pm-1:50pm A Successive Approach for Simple Models with Equivalent Sources bearing on both EMI and SI Linyi R. Koga, Okayama University, Japan W-PM-1.2 1:50pm-2:20pm Equalizer Design for High-speed Differential Channels Joungho Kim, KAIST, South Korea W-PM-1.3 2:20pm-2:50pm Common-mode Noise Mitigation for High-speed Differential Channels Tzong-Lin Wu, National Taiwan University, Taiwan	W-PM-3.1 1:20pm-1:50pm Use of a Tapered Chamber for Far-field and Spherical Near-field Antenna Measurements Over an Extended Frequency Range of 200 MHz to 18 GHz Vince Rodriguez, ETS-Lindgren, USA W-PM-3.2 1:50pm-2:20pm Large Size, Light Weight Broadband RF Leas for Far Field Measurements S. Matitsine, National University of Singapore W-PM-3.3 2:20pm-2:50pm Determining Radiation Efficiency of Antennas in Reverberation Chambers P. Wilson, NIST, USA
	T-PM-2.1 1:50pm-2:30pm ESD for Analogue Integrated Circuits P. Besse, Freescale Semiconductor T-PM-2.2 2:30pm-3:20pm EMC for Analogue Integrated Circuits K. Abouda, Freescale Semiconductor	T-PM-5 3:40pm-5:00pm Grounding: The Grounds for EMC Design Elya B. Joffe, Israel	W-PM-2 2:50pm-3:20pm Numerical Testing via Virtual EMC Lab Richard Gao Xian-Ke, A*STAR, IHPC, Singapore	W-PM-3.4 2:50pm-3:20pm Evaluation of Leaky Feeder Coaxial Antenna Performance Onboard Commercial Aircraft Using Statistical Methods Dennis Lewis, Boeing, USA
3:20pm-3:40pm Tea Break				
T-PM-3 3:40pm-5:00pm EMC Compliant DC/DC Converter Design Stefan Klein, Würth Elektronik eiSos, Germany	T-PM-6.1 3:40pm-4:20pm Metamaterials, Periodic Structures and EBG in EMC/ Antenna/ RF Designs Sungtek Kahng, University of Incheon, Korea T-PM-6.2 4:20pm-5:00pm Low-profile and High-directivity Antennas Jeongho Ju, ETRI, Korea	T-PM-7 5:00pm-5:30pm Application of Numerical Inversion of Laplace Transform in EMC Modeling Qingsheng Zeng, Canada	T-PM-8 3:40pm-5:00pm Model Validation and Accreditation for EMC Simulations F. Schlägenhafer, International Centre for Radio Astronomy Research (ICRAR)/ Curtin University, Australia	

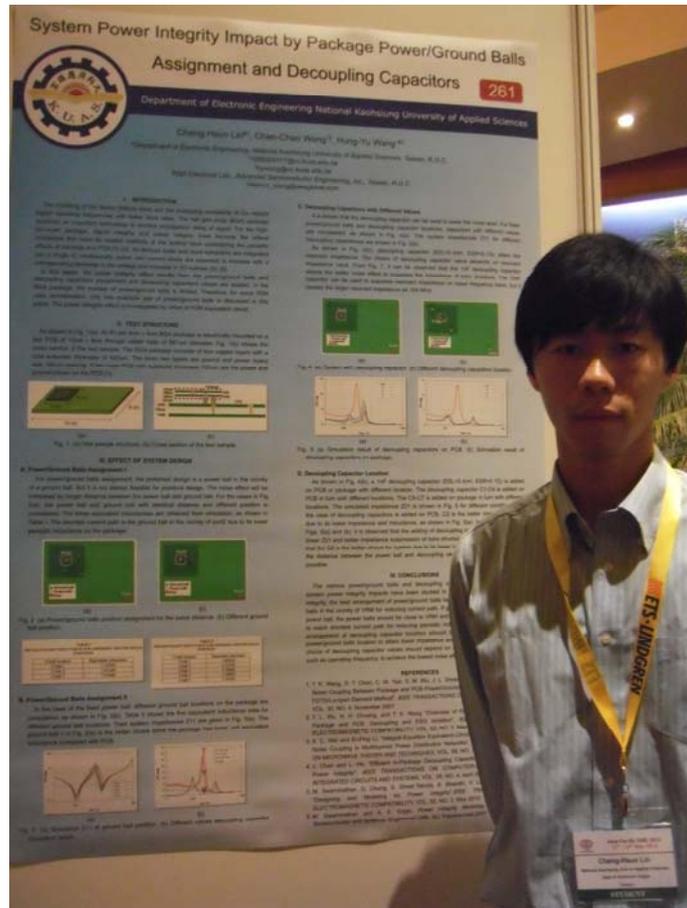
第二天 5/22 早上為研討會開幕典禮，所有參予會議人員都在開幕大廳參予主辦人員的演說，並期許電磁兼容技術在未來有更顯著的發展，而下午為學生的開方式技術討論會，這個場次的演講者大多數來自中國等亞洲國家，少數有歐洲以及澳洲學生參予展示，在過程中由於歐洲國家的學生所做的研究較偏數值模擬分析法，為當前研究主流，故在會場中引起廣大的討論，學生也與隔壁的新加坡大學學生以及中國學生討論學生的研究成果，並針對模擬與量測的準確性做講解，而在 5/21 工作坊的演講者也有詢問學生的研究成果，學生即對演講者說明本研究之重點以及貢獻，而日本來的學生在海報的設計上有明顯的優異性，以圖樣為主的海報設計能吸引大多數人的目光，會使人感到興趣而發問，整個會議時間由 13:30-15:30 進行 2 小時後結束。

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**Open Forum Sessions – Tuesday Afternoon, 22 May 2012**

Time	Foyer @ Leo 4
1:30pm – 3:30pm	Open Forum-1: System EMC Chairs: Dr. Zaw Zaw Oo, Singapore
	Open Forum-2: Signal Integrity and Power Integrity Chairs: Dr. Mark Tan, Singapore
TU-PM-FORUM1-1	TU-PM-FORUM2-1
An Unity PF Controlled Rectifier Driving a Shunt DC Motor for Power Quality Application Ali I. Maswood, Essam Al-Ammar, E.Firmansyah Nanyang Technological University, Singapore	From Galilean Covariance to Gauge Conditions: A Thermodynamic Insight to Signal Integrity Loïc Rondot <sup>1</sup> , Vincent G. Mazauric <sup>1</sup> , P. F. Wendling <sup>2</sup> <sup>1</sup> Schneider Electric, France, <sup>2</sup> Magsoft Corporation, USA
TU-PM-FORUM1-2	TU-PM-FORUM2-2
Spectrum Analysis of Switched-Capacitor Mode DPWM Generator with Spread-Spectrum Clamping Circuit Young-Kyun Park, Ji-Hoon Lim, Je-Kyung Wee, Inchae Song Soongsil University, Korea	Improving the High-frequency Performance of Integrated EMI Filter with Multiple Ground Layers Hui-Fen Huang, Liang-Yong Deng South China University of Technology, China
TU-PM-FORUM1-3	TU-PM-FORUM2-3
The Reduction Method for Radiation Noise from Power Supply Layers in PCB Hitoshi Takakura, Shinichi Sasaki Saga University, Japan	A Constructal H Shaped Power Distribution Network for EBG-Structure Power Plane Hui Fen Huang, Shi Yun Liu, Yan Zhang South China University of Technology, China
TU-PM-FORUM1-4	TU-PM-FORUM2-4
Diversity and Summation of Large Number of Energy Saving Lighting Roelof B. Timens <sup>1</sup> , Frederik J.K. Buesink <sup>1</sup> , Vladimir Cuk <sup>2</sup> , J.F.G. Cobben <sup>3</sup> , F.B.J. Lefrink <sup>1,3</sup> <sup>1</sup> University of Twente, The Netherlands, <sup>2</sup> Eindhoven University of Technology, The Netherlands, <sup>3</sup> Thales Nederland B.V., The Netherlands	Spiral Bridge for Wideband Simultaneous Switching Noise Suppression and Good Signal Integrity in Partitioned Planes Tong-Hao Ding <sup>1</sup> , Yu-Shan Li <sup>1</sup> , Dong-Chu Jiang <sup>1</sup> , Yong-Zhe Qu <sup>1</sup> , Xu Yan <sup>1</sup> <sup>1</sup> Xidian University, China; <sup>2</sup> Hunan City University, China
TU-PM-FORUM1-5	TU-PM-FORUM2-5
Using Field-to-Wire Coupling Technique in Optimization of Energy Harvesting Devices Houriyeh Shadmehr, Marco Mussetta, Francesco Grimalta, Morris Gualdoni, A. Gandelli, Riccardo E. Zich Politecnico di Milano, Italy	Study of Signal Integrity and Radiated Emission of Single Ended and Differential High Speed Digital Signals across a Split Plane Lin Biao Wang, Xye Yak See, Wei-Shan Soh, Kang Rong Li, Jun Wu Zhang, Tengiz Swimonishvili Nanyang Technological University, Singapore
TU-PM-FORUM1-6	TU-PM-FORUM2-6
A Reconfigurable Beam Shape Patch Array Antenna (RES-PA) for WiMAX and WiFi Applications M. Jusoh <sup>1</sup> , M. Faizal <sup>1</sup> , M. F. Malek <sup>1</sup> , M. R. Kamarudin <sup>1</sup> , M. R. Hamid <sup>2</sup> <sup>1</sup> Universiti Malaysia Perlis, Malaysia <sup>2</sup> Universiti Teknologi Malaysia, Malaysia	System Power Integrity Impact by Package Power/ Ground Balls: Assignment and Decoupling Capacitors Cheng-Hsun Lin <sup>1</sup> , Chen-Chao Wang <sup>1</sup> , Hung-Yu Wang <sup>1</sup> <sup>1</sup> National Kaohsiung University of Applied Sciences, Taiwan <sup>2</sup> Advanced Semiconductor Engineering, Inc., Taiwan
TU-PM-FORUM1-7	TU-PM-FORUM2-7
A Design of the Node System of Wireless Sensor Net for Ancient Building Fire Prevention Geng Shuqin, Yang Hongyan, Liu Chen, Hou Ligang Hou, Wang Jinhui Beijing University of Technology, China	A Generalized Equivalent Cable Bundle Method for Modeling Crosstalk of Complex Cable Bundles with Multiple Excitations Liangliang Liu <sup>1</sup> , Zhuo Li <sup>1</sup> , Minghui Cao <sup>1</sup> , Changqing Gu <sup>1</sup> <sup>1</sup> Nanjing Uni. of Aeronautics & Astronautics, China; <sup>2</sup> Southeast University, China
TU-PM-FORUM1-8	TU-PM-FORUM2-8
Transient Thermal Analysis of Global Interconnects based on Transmission Lines Qing Shang, Xiaochun Li, Junfa Mao Shanghai Jiao Tong University, China	EMI Study on Stripline with Split Reference Plane Junxin Min, Wei Bai, Xuequan Yu, Lin Yang, Yadong Bai, Yan Zhou Huawei Technologies Co. Ltd, China





## 心得

隨著科技創新以及研究的進步，使得各式影響電路工作穩定性的雜訊問題逐漸的被克服。由這次大會所安排的講座專題及與會人士所發表的論文中我們可以看出，為因應未來更龐大系統整合與達到高穩定性的目標，各種量測方式與創新的發表都被一一呈現。同時也藉由與來自世界各的與會人士討論與互動中，瞭解目前產業界、學界的研究與發展現況，進而吸收更多的相關資訊與儲備更多未來的研究能量。

## 建議事項

參加國際論文研討會，除可增廣見聞擴展視野外，也是對個人研究和學習的激勵，可以了解各國研究者的研究方向，更是對自己語文能力的磨練機會。因此，建議在追求學術上的發展，要多多參加相關的國際論文研討會，所謂讀萬卷書更應行萬里路，在參加會議的過程和生活上，深刻的體會到外語能力的重要性，不論是閱讀能力或是溝通表達上，聽說讀寫都要能不斷的與時俱進，特別是在全球化的時代，不可固步自封，要能夠多方接觸以增長見識。

另外，因為是第一次參加國際論文研討會的發表，從會議資訊的得知，配合主題擬定題目開始，到進行論文的摘要初稿，以及論文完成提交，在時間上顯得有些匆促和不足，加上又必須以英文撰寫，對個人的英文能力更是一大考驗，因此，在準備上更顯吃力，要能夠更加主動和積極，能夠儘早準備進行論文撰寫和投稿。