EMCABS

EMC Abstracts
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"How Can I Get a Copy of an Abstracted Article?"

Engineering college/university libraries, public libraries, company or corporate libraries, National Technical Information Services (NTIS), or the Defense Technical Information Center (DTIC) are all possible sources for copies of abstracted articles or papers. If the library you visit does not own the source document, the librarian can probably request the material or a copy from another library through interlibrary loan, or for a small fee, you can order it from NTIS or DTIC. Recently it became clear that EMCABs were more timely than publications which were being listed in data files. Therefore, additional information will be included, when available, to assist in obtaining desired articles or papers. Examples are: IEEE, SAE, ISBN, and Library of Congress identification numbers.

As the EMC Society becomes more international, we will be adding additional worldwide abstractors who will be reviewing articles and papers in many languages. We will continue to set up these informal cooperation networks to assist members in getting the information or contacting the author(s). We are particularly interested in symposium proceedings which have not been available for review in the past. Thank you for any assistance you can give to expand the EMCS knowledge base. **EMC**

Good friends gathered at the welcome reception held at the North Star Continental Grand Hotel in Beijing, China on Monday, April 12, including (from left) Professor Osamu Fujiwara of the Nagoya Institute of Technology in Nagoya, Japan; Professor Jinliang He of the Tsinghua University in Beijing, China; and Takeo Yoshino, Emeritus Professor of the University of Electro-Communications in Tokyo, Japan. Professor He was the Symposium President of the successful Asia Pacific EMC (APEMC) conference held at the Beijing International Conference Center from April 12-16, 2010.

EMCABS: 01-05-2010

STATISTICAL CHARACTERIZATION OF THE ELECTROMAGNETIC ENVIRONMENT IN A HOSPITAL

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 293-296.

Abstract: Thanks to advances in digital technology, many hospitals are becoming populated with wireless medical applications to control life critical functions. Electromagnetic interference can cause severe performance degradations on these wireless applications. Several accidents have been reported which calls for a more thorough characterization of these interferences in areas where critical wireless applications are used. In this paper, the results of electromagnetic interference measurements performed in a hospital are presented. The amplitude probability distribution (APD) and the inter arrival pulse probability distribution (PSD) are used to characterize these environments. In addition, Middleton parameters can be calculated from the measured data. This study is considered to be a first effort to characterize the 20 MHz-2500 MHz band in hospitals.

Index terms: Hospital, wireless medical applications, electromagnetic interference, APD, PSD.

EMCABS: 02-05-2010

A DESIGNATED CLOCK GENERATION AND DISTRIBUTION (DCGD) CHIP SCHEME FOR SUBSTRATE NOISE-FREE 3-D STACKED SIP DESIGN

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 338-341.

Abstract: In this paper, we propose a new designated clock generation and distribution (DCGD) chip scheme to offer extremely low jitter clock delivery. The proposed scheme is especially suitable for 3-D multi-stack SiP applications. Considerably enhanced timing jitter performance of the proposed scheme is enabled by the help of sufficiently improved simultaneous switching noise (SSN) isolation from the digital blocks and by lowered inductive parasitics of the clock distribution networks. Substantial suppression of the timing jitter under a severe SSN environment was well proved through a series of design, fabrication, and a measurement process of test devices and packages.

Index terms: Simultaneous switching noise, SiP design, timing jitter.

EMCABS: 03-05-2010

CALIBRATION MEASUREMENT SETUP FOR BAND-SELECTIVE PERSONAL EXPOSURE METERS

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 385-388.

Abstract: In this paper a calibration measurement setup for band-selective personal exposure meters is presented. The equipment and the methods of the measurement procedure are described together with the uncertainty assessment of the measurement equipment, the calibration and the measurement procedure. The average measurement error for the reference measurement is ±0.32 dB, while the expanded uncertainty with a confidence interval of 95% is calculated to 2.5 dB. Furthermore, a straight forward calibration method is described and tested using the EME SPY 120 device from antennas. Up to seven different measurements must be performed for a full characterization of personal exposure meters. The presented measurement setup leads to a higher accuracy of the calibration and the achieved results will allow for an improved exposure assessment in experimental and epidemiological studies.

Index terms: Exposure assessment, band-selective personal exposure meters, calibration measurement setup.

EMCABS: 04-05-2010

EFFECT OF THE SHAPES OF METAL ELECTRODES ON ESD CURRENT AND RADIATION NOISE

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 441-444.

Abstract: In this study, we measure the discharge current and the radiation noise of ESD from charged metal to investigate the effect of the shapes of the metal electrodes. The ESD in this study is approaching and gaseous discharge with gap control. The radius of curvature of the high voltage (±6kV) electrode is 10 types varying from 0.18 mm to 15 mm. From experimental results, it is found that the radius of curvature of the electrode affects the shape of discharge current, the gap length of discharge inception, and their radiation noise, even if the applied voltage is the same. When the radius is bigger, the gap length is narrower and the wave-front of the current is impulsive and the radiation noise is strong. When the radius is smaller, the gap length is wider and the wave-front of the current is moderate.
Index terms: Charged metal, ESD current, radiation noise, metal-shape effect.

EMCABS: 05-05-2010

REVERBERATION CHAMBER FIELD MODELING FOR APPLICATION TO THE SOURCE STIRRING TECHNIQUE

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 548-551.

Abstract: The paper describes an analytical model applied to studying the behavior of an antenna moving inside a resonant cavity. It is the basic step to develop a source stirring mode reverberation chamber (RC). The model is able to account for the different coupling of the source with the many cavity modes. The results obtained for a simple dipole are used to design an array of 50 dipoles, whose generated electromagnetic field shows good statistics when checked by the CDF and by means of a polar plot diagram. The antenna array allows using a fixed source for the chamber. Finally, the paper presents how to practically fabricate a well working array using broadband antennas, more suitable for actual RC applications.
Index terms: Reverberation chamber, cavity mode, source stirring technique.

EMCABS: 06-05-2010

IN-SITU EMC TESTING USING SURFACE CURRENT SENSE WIRES

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 598-601.

Abstract: In-situ EMC testing is - for large fixed systems and installations within the scope of the European EMC Directive - not a primary requirement other than unintended RF emissions may not affect intended radio frequency communication services, like the requirements of IEC/EN 55011 outside the end-user's premises. Whatever happens on the premises of the industrial end-user is a matter of negotiations and agreements between the various system suppliers and the end-user, in particular when EMC is lacking between two or more (sub-) systems installed. A formal standardized method for verification is IEC CISPR/TR 16-2-5 Ed. 1.0, but one of the root problems is the usage of a common EMC measurement antenna nearby a conductive object, when performing in-situ EMC investigations, which remains doubtful. In a pan-European TEMCA-2 (ended 2007) project, several investigations have been carried out which have not (yet) resulted in a standardized test method, but their results have been reported at several international symposia. In this paper, part of an adapted in-situ measurement approach is presented which minimizes the interaction with the local EM-environment even further by using surface current sense wires. This new test method has already been submitted as a NP to the international standardization bodies concerned.
Index terms: EMC measurement, in-situ testing, surface current.

EMCABS: 07-05-2010

STUDY OF SUSCEPTIBILITY OF AN MCU CONTROL SYSTEM IN THE AUTOMOTIVE FIELD

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 622–625.

Abstract: This paper introduces a technique to detect the EMI environment of MCU relying on itself. The measurement setup is explained in detail. Furthermore, based on measurement, an output signal data library and susceptibility results are achieved. Finally, we present a technique which can detect disturbance and PMS (program multi-switching) system which can increase the reliability of MCU control DC Motor system and guarantee system speed. The final objective of the work is to develop a software technique to increase the reliability of the MCU system in the automotive field.
Index terms: Automotive field, MCU control system, susceptibility, EMI detection technique.

EMCABS: 08-05-2010

FAST EMI ANALYSIS OF MASSIVELY COUPLED INTERCONNECTS WITH LONG DELAY

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 630-633.

Abstract: This paper presents an efficient algorithm for simulation of long multiconductor transmission lines (MTL) subject to incident electromagnetic fields. The new method combines the merits of the recently developed delay extraction based passive macro model (DEPACT) for modeling of long delay interconnects and waveform relaxation via transverse partitioning. The proposed algorithm is also suitable for parallel implementation, which enables it to exploit the emerging multi-core/multiprocessor computing platforms.

Index terms: Multi-conductor transmission lines, EMI analysis, delay extraction based passive macro model, simulation algorithm.

EMCABS: 09-05-2010

COMMON-MODE INTERFERENCE SUPPRESSOR FOR CHOPPER CIRCUIT BASED ON NEGATIVE CAPACITANCE: APPLICATIONS AND IMPROVEMENTS

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 649-652.

Abstract: In this paper, the common-mode interference of a typical buck chopper circuit is studied, and it is shown that the parasitic capacitance between the IGBT module and the ground dominates the level of the interference. To eliminate the parasitic capacitance and suppress the interference, a common-mode interference suppressor is introduced, which is based on negative capacitance techniques. Simulation and experimental results indicate the validation and limitation of this suppressor. Finally, some measures are discussed to overcome the shortcomings and improve the performance.

Index terms: Buck chopper circuit, common-mode interference, suppressor based on negative capacitance.

EMCABS: 10-05-2010

CONDUCTIVE ELECTROMAGNETIC INTERFERENCES OF A FUEL CELL BUS

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 699-702.

Abstract: This paper analyzes the electromagnetic disturbances in the driving system of a fuel cell bus. First, the distribution of the disturbance source in the driving system surveyed by measurements is introduced. Then, the characteristics of the conductive emission are presented. Based on the multiconductor transmission line model, the paper analyzes the electromagnetic conductive interference in the driving system. Finally, measures to restrain the disturbance propagation are also discussed.

Index terms: Electromagnetic disturbance, fuel cell bus, multiconductor transmission line.

EMCABS: 11-05-2010

IN VITRO PROTOCOL TO STUDY THE ELECTROMAGNETIC INTERACTION OF RFIDS AND INFUSION PUMPS

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 1094-1097.
Abstract: The paper presents a generalized protocol to test and verify the reported results of EMI effects between RFID scanners and wearable infusion pumps. In addition, the protocol was created to more precisely evaluate the amount of interaction between RFID and medical devices, and identify those factors which had a significant influence on the level of interaction. Experimental EMI testing was conducted between three wearable infusion pumps and two RFIDs; no interference was observed.

Index terms: RFIDs, infusion pumps, electromagnetic interaction, in vitro protocol.

EMCABS: 12-05-2010

FDTD CALCULATION OF LIGHTNING-INDUCED VOLTAGES ON AN OVERHEAD TWO-WIRE DISTRIBUTION LINE

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Proceedings of the 2010 Asia-Pacific International Symposium on Electromagnetic Compatibility, April 12–16, 2010, Beijing, China, pp. 1327-1330.
Abstract: We have calculated lightning-induced voltages on a 680-m long overhead two-wire line using the finite-difference time-domain (FDTD) method for solving Maxwell's equations. The FDTD method employed here uses a three-dimensional non-uniform grid, which is fine (cell side length is 0.875 m) in the vicinity of overhead wires and coarse (maximum cell side length is 7 m) in the rest of the space. The overhead wires having radii of several millimeters are simulated by placing a wire having an equivalent radius of about 0.2 m ($\approx 0.23 \times 0.875$ m) in the center of an artificial rectangular prism having a cross-sectional area of $(2 \times 0.875\ \text{m}) \times (2 \times 0.875\ \text{m})$ and the modified electrical constants: low permittivity and high permeability. The induced voltage waveform, calculated for the condition that the return-stroke wave-front speed is 130 m/μs, the ground conductivity is 3.5 mS/m, and the grounding resistance ranges from 30 to 75 Ω, agrees well with the corresponding waveform measured by Barker et al. in a rocket-triggered lightning experiment.
Index terms: Overhead two-wire distribution line, lightning induced voltages, FDTD calculation, three-dimensional non-uniform grid.

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