IEEE

Electromagnetic Compatibility Society Newsletter

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IEEE AND ICCA JOIN FORCES TO FIGHT SECTION 1706 OF TAX REFORM BILL

The IEEE and the Independent Computer Consultants Association are developing joint strategies aimed at the repeal or amendment of Section 1706 of the Tax Reform Act of 1986. Both associations oppose the legislation because it discriminates against engineers and computer professionals (as well as designers, drafters and other similarly skilled workers who provide services to clients of technical service firms) depriving them of rights to which they were entitled under prior law and which continue to apply to taxpayers in other skilled and unskilled occupations.

The IEEE represents more than 229,000 engineers in the United States, many of whom have independent businesses that provide consulting engineers and computer specialist services. The ICCA, based in St. Louis, has more than 2300 member firms, representing more than 6000 independent computer consultants. It was one of the first organized groups to oppose Section 1706 and to ask the Internal Revenue Service to clarify how it would enforce the provision. The two organizations will coordinate lobbying activities on Capitol Hill and in key Congressional districts in a determined effort to inform House Ways and Means and Senate Finance Committee members about the adverse effects Section 1706 is having on businesses that use consulting engineers and computer consultants.

Both the IEEE and the ICCA support bills in the House and Senate to provide a two-year delay in the effective date of the Section 1706. The purpose for the delaying bills (H.R. 792 and S. 429) introduced by Representative Judd Gregg (R-NH) and Senator David Durenberger (R-MN) is to give Congress time to hold hearings on Section 1706. Legislation calling for repeal of Section 1706 has also been introduced in both houses of Congress. Sponsors of the repeal bills include Alphonse D'Amato (R-NY) and Christopher J. Dodd (D-CT) in the Senate and Joseph DioGuardi (R-NY) and George Hochbrueckner (D-NY) in the House of Representatives.

Neither ICCA nor IEEE wants to see a return to the conditions that prevailed before Congress enacted the safe harbor provisions of the 1978 revenue act, when the industries suffered from many disputes among consultants, clients and the IRS over the interpretation of so-called common law tests and the tax status of independent consultants. "Prior to safe harbor protection, the confusion over differing IRS rulings interpreting common law requirements was killing the computer consulting industry," said Jeffrey I. Sachs, President, ICCA.

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EDUCATION COMMITTEE NEWS

At the May 7, 1987 meeting, the Board of Directors approved the nomination of Dave Hanttula as Chairman of the Distinguished Lecturer Program. Anyone interested in participating in the program should contact Dave at (408) 986-8500 (office), or (415) 948-5459 (home). The program should be operational by the end of the year. For more details on the Distinguished Lecturer Program see this column in the Spring 1987 Newsletter.

The following is a partial listing of some of the short courses and seminars on EMC-related topics being offered this summer and fall:

A 3-day course on *Electromagnetic Compatibility Engineering* will be offered in Palo Alto, CA with Henry Ott and Don Heirman as instructors. For additional information call (201) 992-1793.

George Washington University is offering short courses in Washington, DC on *Lightning Protection* and *Grounding, Bonding and Shielding*. For more information call (202) 994-6106.

Interference Control Technologies is offering courses on *Grounding and Shielding, Practical EMI Fixes, TEMPEST Design* and *MIL-STD-461/462 Testing*. The courses will be offered at various locations. For information call (703) 347-0030.

NORAND EMC Test Lab will present courses in Cedar Rapids, IA on *FCC, VDE, CISPR AND SAE Regulations and Design Criteria, Grounding, Bonding, Shielding and PCB Design, MIL-STD-461/462 Regulations and Design Criteria* and *RF Susceptibility and ESD Testing*. For more information call (800) 553-5971.

The Keenan Corporation will be presenting a 2-day seminar on *Digital Design for Interference Specifications* in Clearwater Beach, FL. For more information call (813) 544-2594.

R&B Enterprises will offer its annual *EMI Training Institute* on August 10–21. The two-week program is designed for new engineers and others who desire comprehensive instruction in EMI principles, practices and test methods. For more information call (215) 825-1960.

Henry Ott
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Education Committee

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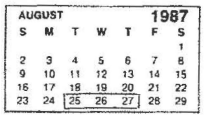
NEWSLETTER STAFF



1987 IEEE INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC COMPATIBILITY

TRAVEL SAVINGS TO ATLANTA EMC SYMPOSIUM

A special convention airfare has been arranged with Delta Air Lines, the official airlines for the 1987 IEEE International Symposium on Electromagnetic Compatibility. A five percent bonus discount off Delta's published fares is available to you or those accompanying you when you travel to Atlanta for the conference. All conference attendees, exhibitors and their travel companions are eligible for this exclusive offer.

Qualification requires that you fly Delta round trip to Atlanta between August 20 and 30, 1987 and meet all restrictions of the fare to which the discount is being applied. (This discount is not applicable to the non-refundable Instant Saver fare.) If you cannot meet the restrictions of the many discount fares Delta offers, a special 40 percent discount from the normal coach (Y) fare will be offered. No minimum stay or advance purchase is necessary for this 40 percent savings.

Travel at these fares is permitted from all points in the United States, including Alaska and Hawaii. (Attention international attendees: It is possible for all travel arrangements to be made for your travel to and from the United States.) Reservations and ticketing at these special reductions are available only through Global Express-Southcenter Travel, the official travel coordinator for the IEEE/EMC 1987 Symposium.

Here's what you should do *today* to take advantage of these special travel savings:

- Call Cathy Gunstone at Global Express-Southcenter Travel (206) 246-7661 between the hours of 8:30 am and 2:00 pm PDT (collect calls will be accepted).
- Cathy will provide all information and make reservations for all flights and fares. Tickets will be mailed to you upon receipt of payment.
- Seats are limited and there are restrictions on some fares, so call early for the best availability. Fares are guaranteed at the time of ticket purchase.
- Arrangements for car rental or pre- and post-conference travel is also available.

As a full service travel agency, Global Express-Southcenter Travel features excellence, experience and dependability and will be happy to handle all of your travel needs.

ATLANTA 1987 EMC SYMPOSIUM HOTEL CHANGES ITS NAME

Those planning to attend the 1987 IEEE International Symposium on Electromagnetic Compatibility in Atlanta on August 25-27 should be aware that the Symposium site hotel, formerly the Atlanta Marriott, is now the Radisson Hotel Atlanta.

What is causing some confusion is the fact that there is another Marriott hotel, the Marriott Marquis, about two blocks from the Symposium site's street address. Some attendees may have ended up with reservations in the wrong hotel.

Please check your reservations carefully. The street address for the Radisson Hotel Atlanta is Courtland at International Boulevard, Atlanta, GA 30303 and the phone number is (404) 659-6500.

NEW DATES FOR 1988 AP-S/URSI SYMPOSIUM

The dates for the 1988 International Antennas and Propagation Society Symposium and URSI National Radio Science Meeting are now June 6-10, 1988 at the Sheraton Universty Inn and Conference Center on the Syracuse University campus, Syracuse, NY. The General Chairman of the meeting is Professor Arlon T. Adams, Department of Electrical Engineering and Computer Science, Syracuse Unversity.

The dates were changed to avoid a conflict with the 1988 IEEE Microwave Theory and Techniques Symposium.

SANTA CLARA VALLEY EMC-S CHAPTER CO-SPONSORS ENGINEERING ETHICS COLLOQUIUM

"Integrity in Engineering, The Role of Ethics in Practice," was the theme of an April 7th Cupertino, CA colloquium that focused on some of the complex issues facing the engineer as a certifier of electronic products. These certifications involve safety and the behavior of a product as a source of electromagnetic interference. The Ethics Colloquium was co-sponsored by the Santa Clara Valley Chapter of the Electromagnetic Compatibility Society and Evergreen Valley College of San Jose, CA. Apple Computer, Inc. provided the facilities and underwrote much of the colloquium costs. The audience of 59 included executives and employees from Apple and other companies, academicians, students and IEEE officers. Attendees received a copy of the IEEE Code of Ethics, reprints of articles on engineering ethics, an anotated bibliography on the subject and supporting papers.

The two-hour meeting was prompted in part by the growth of producer self-certification of products. The U.S. Federal Communications Commission (FCC) rules for EMI-testing apply to many of these products, and self-certification is the norm, with the FCC reserving the right of audit/test. Some U.S.-industry groups have advocated *safety* self-certification as well, an area dominated in the United States by the independent Underwriters Laboratories. Because of tight scheduling of product development, and the enormity of the marketing stakes, there is pressure on the certifying engineers to promptly certify new products. In some cases the product may pass the tests marginally, or even fail, and the engineer is thus put in the position of standing between the corporation and ethical behavior. Further, some companies may hire consultants to perform these tests. There have been hearsay stories of shoddy work, including outright falsification of data, allegedly done by several such consulting organizations.

The Ethics Colloquium's five panelists pondered such questions as: What recourse does an individual engineer have when an employer insists that he or she approve a flawed product? What, if anything, should an individual do when his or her company decides to market a "bad" (and possibly unsafe) product overseas?

The panelists and the attendees read and discussed two fictitious "scenarios," which represented a composite of possible real-life situations. In one, an engineer is pressured by management to certify a product that exceeds FCC limits for E-field radiated emissions at four frequencies in the test-spectrum. In the other, an engineer is asked for an opinion when the company considers marketing a potentially unsafe product in countries lacking safety regulations applicable to this product. While the panelists agreed that engineers must refuse to falsify data, and should under no circumstances approve of a scheme to market an unsafe product, each panel member provided a unique view of professional ethics in general, and the specific scenarios.

Robert J. Baum, the keynote speaker, discussed the major ethical theories proposed by philosophers, noting that all can be reduced to the "Golden Rule." Baum, who is Professor of Philosophy and Director of the Center for Applied Philosophy and Ethics in the Professions at the University of Florida (Gainesville), pointed out that professional codes such as the IEEE's can be restated simply as "do no harm to others." The rest of the code, Baum argued, elaborates on how one determines what actions can cause harm. His advice to an engineer pressured to falsify data is to stand firm, even if it costs one to loose employment.

Hal M. Mickelson, Regional Counsel for Hewlett-Packard, Palo Alto, CA, discussed the legal aspects of engineering ethics. According to Mickelson, California law protects an engineer who is pressured to commit an unethical act. If a person is fired for refusing such pressure, one can sue the former employer. On the other hand, Mickelson emphasized the difference between business ethics and legalities. In a hypothetical case an attorney might advise the employer that the FCC-imposed fine for selling certain substandard units is so small that it is cost-effective to market the product. But clearly, such an act would be unethical. Professional ethics, Mickelson stressed, must be set by companies and the engineers they employ; the attorney's job is to give legal advice.

Charles Susskind, Professor of Electrical Engineering in the University of California, Berkeley, stated that an individual should seek other employment rather than engage in unethical behavior at the boss's request. In his general remarks, however, Susskind pointed out that there is currently no training in ethics for engineering students. As a result, an engineer must distinguish right from wrong in highly complex situations with little or no guidance. While it is logical to expect universities to provide ethical training, Susskind warned that engineering faculties would be unlikely to try to fit an ethics course into the already crowded engineering curriculum.

Kenneth E. Haughton, a 25-year veteran of IBM and former director of IBM's San Jose Product Development Laboratory, remarked that in his experience employers rarely pressure engineers to commit unethical acts. According to Haughton, who is now Dean of the School of Engineering of Santa Clara Unversity, a manager is more likely to re-work and re-test a product, many times if necessary, than to urge staff members to falsify data or certify bad products. He also suggested that engineers often face a very different situation in which ethics are in question: the opportunity to carry expertise and product knowledge gained from one employer to a new job with a competing company.

Maria M. Masterson, a senior research engineer at Lockheed Missiles & Space Co., Sunnyvale, provided the viewpoint of the working engineer. Masterson advised that an engineer concerned about unethical practices by his or her employer must judge how important the results of such conduct will be, and then take a stand against any major violations.

Andrew U. McFarlin, panel moderator, is Engineering Instructor at Evergreen Valley College of San Jose (CA). Mr. McFarlin has long been active in engineering education and professional matters. The colloquium is an outgrowth of panel discussions he has organized for presentation to his students. McFarlin has worked extensively in the American Society for Engineering Education, the Society for Manufacturing Engineers, and the Engineering Liaison Committee of the California State Articulation Conference. Joseph H. Wujek, with McFarlin, was Program Co-Chairman. Mr. Wujek ("Wood-jeck") is a Principal Engineer in Apple Computer's Advanced Technology Group, and a Senior Member of the IEEE (EMC Society and Reliability Society). For any additional information on the Ethics Colloquium, contact Mr. Wujek at (408) 973-3084 Monday through Thursday during working hours or the current Chairman of the Santa Clara Chapter of the EMC Society, Mr. David M. Hanttula, at (408) 986-8500, ext. 324, Monday through Friday.

ALFRED E. ECKERSLEY OF SEATTLE CHAPTER DIES

Alfred E. Eckersley, a founder of the Professional Group on RFI, now the EMC Society, was a member of the IEEE since 1950. He was a Senior Member of the IEEE and served in several capacities in the Philadelphia and Seattle Chapters. He was also a former Chairman of the Seattle Chapter and one of its prime movers.

Al Eckersley graduated with honors from the University of Manchester and earned the MSEE from the University of Pennsylvania. He served as Research Associate and Instructor at the University of Pennsylvania and the University of New Mexico.

His work as an EMC engineer was notable at ARK Electronics, United Control Corporation and The Boeing Company, Seattle. He retired because of illness in March, 1987 and died on May 25th.

Mr. Eckersley is survived by his wife, Sue, and two children, Captain Alan Eckersley, U.S. Army, and Mrs. Monica Suche of Calgary, Canada.

MEASURING SHIELDING EFFECTIVENESS OF MATERIALS

The shielding effectiveness of a material is a measure of how well it is able to isolate a region from electromagnetic fields. Shielding is used to protect equipment from outside interference or to reduce unwanted emissions from equipment. While traditional metal shields have characteristics that are well understood, the recent use of more complex materials with less predictable shielding properties, such as plastic housings and composites, has made measurement of the shielding effectiveness essential. In *A Study of Techniques for Measuring the Electromagnetic Shielding Effectiveness of Materials* (TN 1095), NBS reports on an evaluation of several measurement approaches. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, for $3.50 prepaid. (Order by stock no. 003-003-02735-9).

IEEE CANADIAN REGION PUBLISHES HISTORY BOOK

In celebration of the IEEE Centennial, the Canadian Region of the Institute of Electrical and Electronics Engineers, Inc. has published *Electricity: The Magic Medium,* an English/French narrative commemorating 100 years of outstanding achievement by the entire electrical industry of Canada. One hundred and eighty three pages of pictures and text tell the story of people, institutions, public bodies, private industries and organizations who have been leaders in harnessing the energy of nature for the benefit of the citizens of Canada.

The subjects covered are divided into four parts: *Part 1—Historical Highlights*: Communications and Control; Electric Power in Canada; Electric Utilities Across Canada: The Electrical Manufacturing Industry; *Part 2—Electrical Engineering and Technology Education; Part 3—Past, Present and Future; Part 4—The IEEE-Canadian Region*. Authors George G. Armitage and Fred J. Heath are both from the IEEE Region 7. Fred J. Kee is with Ontario Hydro and Gordon R. Slemon is the Dean of Applied Science and Engineering at the University of Toronto. Larry Collins, a newspaper writer, does free lance writing and contributes to Canadian publications and Ray Findlay is Assistant Dean of Engineering at McMaster University in Hamilton, Ontario.

For historians, students in electrical engineering and veterans of the profession, *Electricity: The Magic Medium* promises many rewards. Over 150 photographs (in color and black and white) illustrate the development of electricity through the years. Priced at $40.00 ($25.00 for IEEE members), the book may be ordered from the IEEE Service Center, 445 Hoes Lane, P.O. Box 1331, Piscataway, New Jersey, 08855-1331.

BOD ACTIVITIES

BOARD OF DIRECTORS' MEETING IN SEATTLE

by Donald N. Heirman

The second Board meeting of 1987 was convened on May 7, 1987 at the Westin Hotel in Seattle, the site of the 1988 EMC Symposium. Eleven of the 18 Board members were present. Jim Hill was unable to attend due to the untimely death of his wife, Betty. The Board remembered Betty and offered Jim their condolences by a moment of silent prayer. A letter from the Secretary indicating the Board's sentiments will be sent to Jim. Five other Society members were present. President Carlson opened the meeting at 10:05 am. Walt McKercher stood in as Recording Secretary for Gilda Haskins. President Carlson requested approval of the minutes for the January 29, 1987 meeting. The Board approved the minutes with appropriate corrections.

Important items from the Seattle meeting are now summarized:

1. Treasurer Dick Ford presented his report which showed, as of 2/28/87, that the current net worth of our Society is $310K. $150K of that is invested in long-term savings. Loans for the 1987 and 1988 symposia amounted to $6K. The report was accepted by the Board.

2. Director Bob Haislmaier, Communications Services, introduced his chairmen who presented their reports and then he reported for those not present. First, Bob announced that Bob Goldblum, Newsletter Editor, will set aside space in the Newsletter for our Society's President's Forum. President Carlson has agreed to provide a contribution for each Newsletter issue. Bob then presented Dick Schulz's report for the EMC Transactions. Dick reported several changes in Transactions reviewers. Tom Dvorjak steps down as systems EMC and equipment reviewer and Henning Harmuth takes over review of papers on non-sinusoidal waves. Next, Gene Cory presented his detailed report on symposium activity. First, Herb Mertel presented the Treasurer with a check for $14,715 representing the surplus from the San Diego Symposium. His final Steering Committee report indicated several ways to improve future symposia by avoiding some of the repetitious work done locally. Instead, Herb strongly suggested that many chores be handled by a permanent Symposium Committee reporting to the Board. For more information contact Herb at (619) 578-1480. Hugh Denny reported that 96 papers are planned to be presented in Atlanta and the Radisson Hotel has accepted the contractual commitments of the previous hotel owners. Don Weber, 1988 Symposium Chairman, reported that plans are well along. The Westin Hotel conference staff provided a tour of the hotel after lunch to show the facilities that will be used. The Board appreciated the opportunity to see the layout and thanked them for the meeting room space for the Board meeting. Gene indicated that the IEEE now requires that an Audit Committee review be conducted for each symposium of our financial size. The Board directed that the Director of Communications appoint such an Audit Committee.

3. Ed Bronaugh, Director for Technical Services, introduced his committee chairmen, who gave their reports. Don Heirman, Standards Committee Chairman, reported the status of the ten standards updates and six new projects under our Society's auspices. Of particular interest was the positive response to letters sent out by the Committee Secretary, Steve Berger, requesting authors from past symposia to participate in their areas of expertise in our Standards Working Groups. For those who are interested in more information on the Society's standards work, contact Don at (201) 834-1801. Next, Hank Ott, Education Chairman, presented guidelines for the Society's Distinguished Lecturer Program. Details on financing, travel reimbursing and scheduling were included. The Board accepted the program and further approved Dave Hanttula, Ridge Company, as the Chairman of the program. For more information on the program and the procedure for voluntering to serve as a lecturer, contact Hank at (201) 386-6660. Finally, Ed Bronaugh described the role of the Technical Committees and presented the report by Wil Lauber, Technical Committee Advisory Committee Chairman. Ed indicated that in his opinion, each committee was making progress, some more so than others. He will meet with Wil Lauber to discuss areas for improvements. There is a need for more volunteers in committees dealing with EMC management, spectrum management, and EMI control. For more information, contact Ed at (518) 843-2600 or Wil at (613) 998-2377.

4. Member Services were next discussed. Two chairmen were present and gave their reports. Bill Duff reported that the fellow evaluation committee membership is comprised of the following Fellows from our Society:

Bill Duff, Chairman
Tom Doeppner
Jim Hill
Ed Chapin
Mike Lustgarten

This year they are reviewing six nominations. Their report will be filed at IEEE Headquarters by June 15. Chester Smith, Board Nomination Chairman, indicated that 13 nominees were identified as Board candidates for the three-year term ending in 1990. The Society vote will be in late summer. No further reports were available. Board members expressed a concern for the apparent risk of losing two chapters (Baltimore and Albuquerque) due to inactivity. Members in these chapters who want further information should contact Bob Hofmann at (312) 979-3627.

5. Walt McKercher, Director for Professional Services, presented a plan to revitalize this service area, which includes committees on employment analysis, government relations, intersociety relations and public relations. In order, Bob Goldblum, Bob Haislmaier (military) and Art Wall (other), Al Smith and Herb Zajac agreed to chair these respective committees. For more information and an opportunity to contribute to these areas, call Walt at (206) 779-7060.

6. Under other business, President Carlson discussed several items. First, Board member George Kunkel presented a report of the special committee on RF gasket performance. The Board approved with amendments the report which suggested alternate technical input to the proposed MIL-STD-MMM-RF gasket performance specification. For more information, contact George at (818) 843-5880. The Board also supported the development of a policy to support regional symposia, both in the technical and financial areas, provided the proper forms and budgets are submitted to the Board for approval. The budgeting will be for a negligible or small surplus. A scope for the transnational committee, chaired by Herb Mertel, was presented. The purpose is to promote international representation and participation in EMC-S activities, such as the formation of local chapters and coordination of international symposia. For details, contact Herb. For other items covered, contact Len Carlson at (206) 773-6297.

7. President Carlson adjourned the meeting at 5 pm. The next Board meeting will be at 10 am on August 24th at the Radisson Hotel in Atlanta, the site of our 1987 Symposium. The EMC Society Standards Committee will meet at 8:30 am in the same room, immediately preceding the Board meeting. For further information, contact Gilda Haskins at (215) 752-4749 or Len Carlson at (206) 773-6297.

Respectfully submitted,
Donald N. Heirman
Associate Editor
Board of Directors' Activities

POINT AND COUNTERPOINT

by Anthony G. Zimbalatti

WHAT'S IN A NAME: DOD STREAMLINE INITIATIVE

About seven years ago, Ronald Lane, NADC E^3 Lead Engineer, challenged me to provide a better title than Electromagnetic Environmental Effects (E^3) for describing the activities embraced by Electromagnetic Compatibility (EMC). My answer is Electromagnetic Environmental Effects Compatibility (E^3C), which came to me in February while working on a special project and responsible for all Environmental Effects (E^2) induced by man-made or natural phenomena. I now urge the EMC Society to change its name to the E^3C Society. What do you recommend?

My call for contributors to a column planned for this Newsletter issue (See Spring 1987, Issue No. 133) covering the "DoD Specification Streamline" effort has resulted in several verbal responses and promises to document their concerns. However, no written responses have been received prior to my deadline.

Consequently, readers seem to lack interest in the streamline effort. Since streamline or the lack thereof can hurt you in the pocketbook, it seemed a natural for stimulating reader interest. Unless the proliferating E^3C specifications and data items (See Spring 1986, Issue 129) are streamlined and balanced inferior products will be built, productivity and productivity raises will decrease and E^3C jobs will be emperiled. Perhaps other issues are more important to you. If so, call or write me. We are listening.

INTER-SOCIETY ACTIVITIES

by Walt McKerchar

The next meeting of the SAE AE-4 Committee will be on Monday, August 24th at the Radisson Hotel Atlanta (Courtland at International Blvd., Atlanta GA 30303 at (404) 659-6500). If you can contribute to the Committee activities, contact the Chairman, Mr. Dwaine Awerkamp (M/S H2550, Motorola, Inc., 8201 E. McDowell Road, Scottsdale, AZ 85252 or phone (202) 949-3138).

Chairman Awerkamp reports on several activities AE-4 is currently working on. One is a "Damped Sine Wave Test Procedure" and an approach to EMI recommended software certification. That is, an evaluation of existing software used in EMI analysis and, perhaps, the "working-up" a program for EMI analysis and test. At the August AE-4 meeting several presentations are planned. Dr. Al Martin will address "S" parameters for evaluating EMI filters and arbitrary impedance. Also, a preliminary EMP Test Procedure will be presented by Mr. Fred Heather of NATC, Patuxent River, MD.

What services should the EMC-S offer members that are not currently available? As the newly elected EMC-S Director of Professional Services, I solicit your thoughts. My phone number is (206) 779-7069 (Fax (206) 697-1259, Telex 510-600-0002).

Included in Professional Services is Public Relations. Our Chairman for Public Relations, Mr. Herb Zajac (Delivery Station 47-565, c/o Tektronix, P.O. Box 500, Beverton, OR 97005, phone (503) 627-4759) invites short articles relative to our EMC profession that would be interesting to the public in general, and/or to other professionals in other endeavors (e.g. Medical, Legal, Architectural). Mr. Zajac would welcome assistance in this regard. Please contact him if you can help.

The dB Society will enter its 12th year of service to the EMC community at the IEEE EMC '87 Symposium in Atlanta. Chairman Hugh Denny has requested that the dB Society assist his Symposium Committee with varied tasks during the Symposium. The dB Society has been commended on its assistance to the EMC '85 and '86 Symposium Committees. At the '86 IEEE EMC Symposium, the dB Society donated the largest amount yet raised at a dB banquet (over $700) to the San Diego Lighthouse Drug Rehabilitation Center for Children. The dB Society has a most interesting method of solicitation of funds for charitable purposes. Society members are to be complimented on their generosity.

IEEE HOME VIDEO TUTORIALS

The Educational Activities Board (EAB) of the IEEE has produced the first five videocassettes in its new *Home Video Tutorials* (HVTs) continuing-education program. Under the direction of Prof. Joseph Biedenbach, University of South Carolina, the videocassettes are designed to provide applications engineers with quality "how-to" instruction on topical subjects. The tutorials contain a mininum of theory and formula derivation.

Each HVT comprises a one- to two-hour presentation by a recognized expert and makes liberal use of charts, graphs and in-plant footage. Where appropriate, the videocassette is supplemented by a study guide that provides course notes, a bibliography and/or practice problems. The HVTs are packaged in a convenient ½-inch VHS format. Titles now available are:

- *The Role of Artificial Intelligence in Manufacturing,* developed by Dr. John C. Sutton of North Carolina University,
- *Analysis and Modeling of Modern Manufacturing Systems,* developed by Dr. Rajan Suri of the University of Wisconsin and
- Three titles in the *Power System Fault Analysis* Series: *Three-Phase Short Circuits, Unsymmetrical Short Circuits* and *Application to Industrial Power Distribution Systems.* This series was developed by Dr. Charles W. Brice, III of South Carolina University.

HVTs should provide a source of visual learning materials for engineers pursuing professional growth and can be off-the-shelf training packages for corporations, IEEE Societies and Sections.

The HVTs are fully described in a new brochure. To obtain a free copy, contact Nancy A. Blair, IEEE Educational Activities Department, 445 Hoes Lane, Piscataway, NJ 08855-1331 or telephone (201) 981-0060, Ext. 423.

CHAPTER CHATTER

by Charles F. W. Anderson

ALL CHAPTER CHAIRS/SECRETARIES

Please note: Some of you are still using my old (Florida) address. Check the list of Associate Editors on page two for my new address!

CENTRAL NEW ENGLAND

The Chapter sponsored a meeting on February 18 at GTE-Needham. Speaker J. DeMarinis (Digital Equipment Corporation) had as his topic "Antenna Calibration as a Function of Height." He described a method of calibration which results in reasonably accurate antenna factors versus frequency/height, using a swept-frequency technique.

On March 25, the Chapter held a joint meeting with the Social Implications of Technology Chapter. The speaker was V.F. Kajunski (FCC New England Field Office). His topic was "RF Exposure Standards." Thanks to John Clarke for the above.

DALLAS/FORT WORTH

This new (October 1985) chapter has been quite active. Their October meeting was held at Hewlett-Packard's Las Colinas facility in Irving. An EMC problems and solutions discussion (workshop type) was featured. Specific problems encountered by some of the participants were aired, with solutions/alternate approaches being developed by the group.

In November, Ron Brewer (Instrument Specialities) was the featured speaker at the seminar-type meeting which covered the following topics:

- Systems Design: EMI Coupling, Spectrum control, Filtering/grounding
- Shielding: Theory and Integrity
- RF Gasketing: Types, Shielding Effectiveness, Mechnical Considerations

On January 7, the Chapter meeting was again hosted by Hewlett-Packard Las Colinas. Ed Vance (SRI International) addressed the meeting on "Transient Interference Control." He discussed the basics of transient (i.e., wideband) interference control, covering the areas of shield topology, grounding (as related to the former) and the applicability of some of the aspects of those concepts to EMI control in digital systems.

At the February meeting, Dick Schulz (Xerox-Lewisville, TX) was the speaker. His topic was "Basic Shielding Theory (and a Little Bit of Practice)." He covered such areas as: What *is* basic EM shielding theory? Why should I be interested in it? How does theory correspond with practice? Thanks to Kurt Fisher (LTV Missiles & Electronics Group) for the inputs.

NEW JERSEY COAST

The Chapter's February meeting had as its speaker Tony Noerpel (Chapter Vice Chair) and Ashok Ranade, both of BellComm Research. Their topic was "A Computer Simulation of Local-access Radio Interference due to Building Reflections." They reported on the results of a simulation of local-access radio self-interference due to building reflections which used a data base derived by using over 2500 buildings in the San Francisco area. Coverage probability (percent of subscriber locations serviceable with given fade margin) calculations included such factors as antenna height changes. Comparisons of a geometrical-optics approach versus a more accurately determined diffraction-field methodology were presented.

At the March meeting, the topic was "Speech Coding in Portable Radio—Status and Trends." The speaker was Dr. V.J. Varma (BellComm Research). He presented an overview of the current status of voice-coding techniques for portable radio use. Among the items covered were complexity/quality tradeoffs, hardware requirements, privacy techniques and trends in voice-coding technology.

The April meeting speaker was Paul Sikora (Electro-Metrics), whose topic was "A Comparison of MIL-STD-461C to the Previous MIL-STD-461 Releases." He identified the changes and additions to MIL-STD-461B which are incorporated in 461C and also commented on some of the resultant effects of the revisions and additions.

At the May meeting, Dr. Yuen Lo (U. of Illinois Electromagnetics Laboratory) gave a presentation entitled "Polart—The Magic of EM Waves." Production of color effects by use of polarization properties was demonstrated and explained. Thanks to Newsletter Editor Bob Davis for the inputs.

SANTA CLARA VALLEY

On May 12, the Chapter held a dinner meeting in Cupertino. Hans Melberg (Wyse Technology) addressed the attendees on "Swedish Magnetic Field Regulations." His presentation covered the background, limits and physics of the new Swedish regulations for magnetic field emissions from video display terminals. Frequency range and test methods were discussed, as were mitigation tech-

niques, the latter being similar to those used for compliance with VDE requirements. Thanks to Ghery Pettit for the information.

TOKYO

Our trans-Pacific colleagues continue to have good attendance at their meetings—over 40 at the March gathering and more than 50 for the April meeting.

Seven papers were presented at the March 20 meeting. Topics included two papers on use of a three-line vinyl cable* for powerline interference measurements by Dr. Tsuruo Shimayama, whose investigations showed that this technique can be used instead of the CISPR artificial networks. Another paper given at that meeting described a method of magnetic field calibration using feederless loop antennas, with optical-fiber output interface for the receiving loop.

At the April 23 meeting, seven papers were also presented, one of which was a report on the '86 Symposium at San Diego. Other topics included were:

- Powerline filtering using specially configured common-mode chokes
- Shielding of HT cables in ducts
- Investigations of a spherical dipole antenna (which showed a constant antenna factor over a wide frequency range)
- Comparison of calculated and measured results of anechoic chambers
- Effects of ground conductivity on lightning field spectra
- Use of spread-spectrum techniques in the infra-red range

Thanks to Professor Echigo for his inputs to us.

TWIN CITIES

On February 18, the Chapter held its first meeting of the year. Bill Walters, of Potter, spoke on the topic "Avoiding Pitfalls when Specifying EMI Filters." The April 15 meeting was held at Honeywell's Underseas System Division. Fred Mykkanen (Honeywell) addressed the group on "How is your ESD Control Environment?" The May 6 meeting was hosted by 3M, with Robin Wilson (Murata Erie) speaking on "Suppression of EMI Utilizing Signal Filters." Thanks to Chapter Chairman Dan Hoolihan (AMADOR) for the inputs.

WASHINGTON/NORTHERN VIRGINIA

As I had hoped when I wrote the Spring issue column, I was able to attend the March meeting of the Chapter. There were about 50 in attendance (and I enjoyed renewing acquaintance with several whom I hadn't seen for quite a while). Gerry Reeve (Program Development Coordinator, NBS-Boulder EM Fields Division) was the speaker. His talk covered a number of the EM measurement areas which NBS is investigating. Among items which he described were:

- Reverb chambers with mode break-up schemes
- High-level field generation with antenna arrays using an amplitude/phase equalization technique
- A phase-linear 200-ohm antenna with superior performance compared to a log-periodic
- "Non-obtrusive" probes, using tapered orthogonal antennas with detector diodes at their centers and multimode optical fiber interface arrangements.

The May 21 meeting (which I wasn't able to attend) featured Rick Gould (Tele-Communications Systems) and Jack Kelleher (Chapter Secretary/Treasurer and Vice-Chairman Elect, Telecommunications Consultant), who addressed the attendees on "Interference Control In Space Telecommunications Systems." (Yes, colleagues, it's getting rather crowded up there. Any candidates for on-location interference Sherlocks?)

A PERSONAL NOTE

If a personal note could be pardoned, I have obtained a new amateur radio station call since moving back to Maryland. I'm now NF3X, and I'd like to hear from those of you who are hams, looking towards setting up some sort of net where we could meet (perhaps one or more times a month) to exchange information relating to our EMI/RFI activities. I'm also one of the Assistant Technical Coordinators in the Maryland/DC Section of the American Radio Relay League. These appointees, of whom there are quite a number throughout the U.S. and Canada, have the EMI/RFI problems of radio amateurs as their primary area of activity.

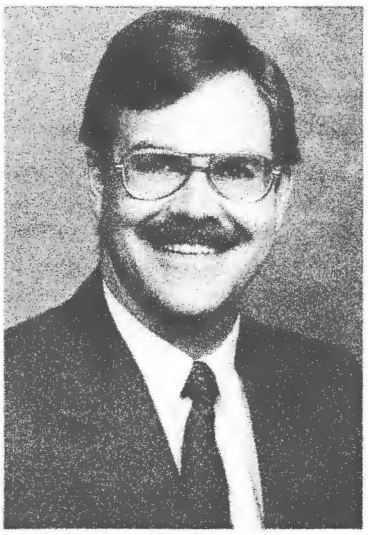
*Column Editor's query: Does anyone have any information on this type of cable?

OUT-OF-BAND RESPONSE OF ANTENNA ARRAYS

The response of antennas to out-of-band frequencies plays an important role in interference and jamming problems. NBS has previously studied and reported on the out-of-band response of reflector antennas and now has continued the work by investigating antenna arrays. A new report analyzes arrays at out-of-band frequencies; effective aperature, directivity, and impedance mismatch are treated in detail. Near-field measurements made on two large arrays of slotted waveguides are reported, and the subject of sampling in frequency and space is considered. *Out-of-Band Response of Antenna Arrays* (NBSIR 86-3047) is available from the National Technical Information Service, Springfield, VA 22161, for $11.95 prepaid. (Order by PB #87-125746/AS).

EMC PERSONALITY PROFILE

by William G. Duff



GLEN DASH

Glen Dash founded his own company, Dash, Straus & Goodhue, in 1980. The firm now specializes in EMC work and employs 35 persons from its Boxborough, MA location. EMC has been a part of his career since 1974, a career which began with, of all things, TV Tennis.

At that time, Glen was a student at MIT in Electrical Engineering. MIT's "Innovation Center" was operating under a grant from NBS to develop commercial products when a prominent games producer asked them to develop one of the first home video games. Glen developed it, but it was the FCC that had to pass on it (under Part 15, Subpart H), and so began on a career in EMC.

First, though, was a stint at Harvard Law School. But a career in law never materialized. In 1979, the FCC adopted Part 15, Subpart J, whose limits and procedures were closely matched to Subpart H. During law school, Glen had maintained an active EMI consulting practice in PCs, VCRs and video games. Now with 15J on the books, much wider vistas beckoned.

A member of the EMC Society since 1983, Glen is a regular participant of IEEE and ANSI meetings. He represents the Association of Telecommunications Attorneys (which he founded) on ANSI 63 and is a Member of Subcommittees 1 and 3. In Subcommittee 1 he chairs the Working Group for Cable and Peripheral Placement, which is attempting to define standards for Peripheral Placement, which is attempting to define standards for just how cable and peripherals are to be placed when testing computing equipment for compliance with EMI requirements.

Glen was recently elected Secretary of Subcommittee 3, which serves as the U.S. National Committee to CISPR. There he will be tasked with tracking CISPR documents and drafting new bylaws. In 1986 he was one of the U.S. delegates to CISPR Subcommittee G, which sets international standards for information technology equipment. Glen has served as the Constitution and Bylaws Officer of the IEEE EMC Society since 1984.

Most people know Glen through his articles. He presented two papers on EMC issues at each of the last two IEEE EMC symposiums. Topics covered ANSI Reference Antennas, Cabling issues, ESD requirements and U.S. and foreign EMC regulations. In addition to these papers, Glen is the Editor of *Compliance Engineering,* an annual EMC handbook covering EMI, ESD, telecom and safety compliance issues.

In 1987, Glen was chosen by the U.S. Trade Representative to advise the U.S. Government in its Market Access Fact Finding (MAFF) talks with the European Communities and the West German government. The object of the MAFF talks is to sound out foreign governments as to their plans to admit U.S. products to their countries. The high level talks have focused on telecommunication specifications, including EMC. They have identified new market opportunities for U.S. firms in an effort to offset the trade deficit and have permitted an exchange of information on EMC matters as well. New West German and Common Market Directives for EMC Control of electronic products are expected and are being discussed in the MAFF talks.

Although his work is almost entirely engineering in nature, Glen still finds time to continue ties to the legal community. He is a member of the Bar in Massachusetts and has been accepted to practice in front of The Supreme Court of The United States.

TECHNICAL COMMITTEES OF THE IEEE EMC SOCIETY
AREAS OF TECHNICAL COMPETENCE

TC-1 EMC MANAGEMENT
Concerned with the need for an EMC program and the management tools by which EMC requirements are integrated into the various phases of system development. Applicable standards, control plans, test plans, design guides, personnel training, etc. are typical areas of concern for this committee.

TC-2 EMC MEASUREMENTS
Concerned with the measurement requirements in EMC standards and how they are interpreted. Also concerned with the adequacy of specified measurement procedures for radiated and conducted emissions and susceptibility tests and the rationale for performance limits for these tests.

TC-3 ELECTROMAGNETIC ENVIRONMENTS
Concerned with natural noise (lightning, magnetospheric discharges, solar activity and atmospheric noise) and man-made interferences (coherent radiations from signal sources such as sidebands and harmonics and incoherent radiation from automotive ignition systems, power generation and transmission facilities and industrial processing equipment).

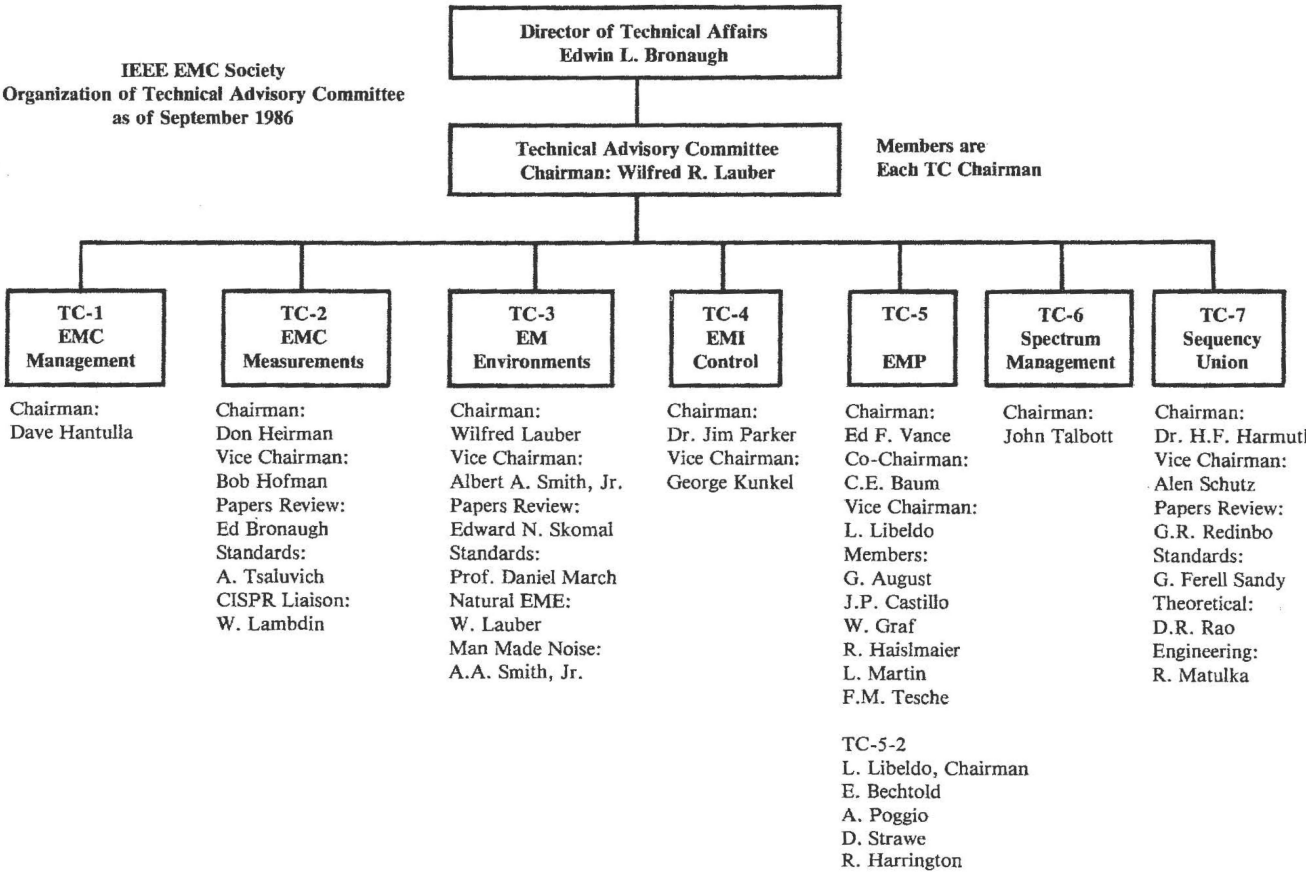
TC-4 INTERFERENCE CONTROL
Concerned with design techniques useful in suppressing interference or eliminating it at its source. Bonding, grounding, shielding and filtering are within the jurisdiction of this committee, whose activities span efforts at the system, subsystem and equipment levels.

TC-5 EMP
Concerned with the nonlinear effects of EMP and hardening protection. Lightning processes, interaction with aircraft and the effects of transient electrical discharges on equipment are also within the jurisdiction of this committee.

TC-6 SPECTRUM MANAGEMENT
Concerned with frequency coordination, support to OTP, management procedures for efficient spectrum use, band occupancy and congestion and federal regulations, and their adequacy.

TC-7 SEQUENCY UNION
Concerned with Walsh Functions and engineering applications of these functions.

IEEE EMC Society
Organization of Technical Advisory Committee
as of September 1986



FUTURE EMC-S SYMPOSIA SCHEDULE

1987 — Atlanta, GA; August 25-27
Marriott Downtown
Hugh W. Denny
(404) 894-3535

1988 — Seattle, WA; August 2-4
Westin Hotel
Donald A. Weber
(206) 575-5781

1989 — International
Nagoya, Japan
Drs. Akao & Sato
0565 48-8121

— National
Denver, CO; May 23-25
The Radisson
John Adams
(303) 497-3328

1990 — Washington, DC; August 21-23
Washington Hilton
Thomas W. Doeppner
(703) 664-3477

1991 — New Jersey, August
Cherry Hill Hyatt
Cherry Hill, NJ
Donald N. Heirman
(201) 834-3566

CALL FOR PAPERS FOR 1988 WROCLAW EMC SYMPOSIUM

Since 1972 the International Wroclaw Symposium on Electromagnetic Compatibility has been held every second year under the auspices of the Polish Academy of Sciences (PAN), Committee of Electronics and Telecommunication and with the cooperation of many national and international technical organizations, such as the IEEE, URSI, CISPR, CCIR, CCITT, and IEC.

Scheduled for June 28–30, 1988, the Symposium will be held in the city of Wroclaw, at the Technical University. Wroclaw may be conveniently reached by plane (from Warsaw), train or car. There are convenient connections between Poland and all European capitals. The climate in Poland is usually mild and pleasant in June. The city of Wroclaw has an average day temperature of about 17 °C, humidity of 79 percent and number of rainy days about 12. Hotel accommodation, transportation (rent-a-car inclusive), transfers etc. will be arranged by the Congress Bureau of the National Tourist Enterprise ORBIS, which cooperates with all major travel agencies throughout the world.

The Symposium Record, available at the Symposium, contains the full texts of all papers in English or Russian, as presented by the author. All papers have summaries in the second language. Two languages, English and Russian, with simultaneous translation during the sessions create special opportunities for easy contacts. During the Symposium, a technical exhibition and exhibition of relevant books and other literature are planned. Exhibition space, stands, showcases, advertisements in the Symposium Record and distribution of information materials to all participants may be booked. A welcome Get Together Cocktail Party and other social events, including a Ladies Program, will be organized. Enjoyable post-Symposium excursions to the most exciting places in Poland will be available.

Prospective authors are invited to submit original, unpublished papers concerning all aspects of EMC. EMC is understood in a broad sense as the ability of a device or system to function in its electromagnetic environment without introducing or suffering intolerable disturbances. Suggested topics include, but are not limited to: Antennas and Propagation, Coatings and Composites, Computer Aided EMC Analysis and Design, Computers and PCBs, EM Radiation Hazards, EMC and Biological Risks, EMC in Wire Communications, EMI Coupling Paths, EMC Management, EMI Measurements, EMI Prediction and Analysis, EMI Reduction Techniques, EMI Sources, ESD, Lightning, EMP, Filters and Filtering Techniques, Grounding and Shielding, Immunity of Electronic Systems, Medical Electronics, Microelectronics, Natural EM Earth Fields, Power Lines, Regulations and Standards in EMC, Spectrum Management and Utilization, Spectrum Monitoring, and Susceptibility and Vulnerability.

Authors should submit five copies of a 50–75 word abstract and a 500 to 750-word summary in English. It should explain clearly the contribution, its originality and relevance to EMC. The author's name, complete return address, phone and, if possible, telex number should appear on the summary. In case of several authors, the name for contacts should be indicated. The language in which the full paper will be delivered should be declared (English or Russian).

Authors' schedule:

- Abstract and summary mailed by: July 15, 1987
- Notification of acceptance and author's kit mailed by: September 30, 1987
- Camera-ready manuscripts mailed by: January 31, 1988

One copy of the abstract and summary should be sent to: **Prof. F.L. Stumpers, Elzentlaan 11, Eindhoven 5611 L.G., The Netherlands.** The remaining copies should be sent to: **EMC Symposium, Box 2141, 51–645 Wroclaw 12,** Poland. The preliminary program is scheduled for February 1988. For more information please contact **Mr. W. Moroń, EMC Symposium, Box 2141, 51–645 Wroclaw 12, Poland: telex 712118 ilw pl.**

NINTH ANNUAL AMTA MEETING AND SYMPOSIUM

The Ninth Annual Meeting and Symposium of the Antenna Measurement Techniques Association will be held from September 29–October 1 at the Stouffer Madison Hotel in Seattle, WA. The Symposium is being organized and hosted by the Boeing Company in conjunction with the AMTA Steering Committee. Topics to be covered will include, but are not limited to:

- Advanced antenna measurement techniques, instrumentation and systems
- Practical aspects of measurement equipment modifications, including hardware and software
- Systems and equipment interfacing
- Theory and application of antenna measurement techniques
- Range design, automation, modification and evaluation
- Nearfield techniques and their applications
- Radar cross-section measurements
- Millimeter wave antenna measurements
- Anechoic chamber and absorber material design and evaluation
- Phased array testing
- Compact range design and evolution

Space has been made available for potential exhibitors. To receive an advanced program and registration forms, contact James R. Otey, 1987 AMTA Symposium, 6632 South 191st Place, Suite E-105, Kent, WA 98032.

EMP NOTE SERIES

The following EMP-related notes have been published and distributed recently:

LPN 18 "Lightning Return-Stroke Transmission Line Model," Louis Baker and R.L. Gardner, Mission Research Corporation, 1720 Randolph Road, S.E., Albuquerque, NM 87106, September 1, 1983.

TN 353 "EMP on Honolulu from the Starfish Event," Conrad L. Longmire, Mission Research Corporation, March 1985.

MN 31 "Winding Topology for Transformers," Carl E. Baum, Air Force Weapons Laboratory, October 2, 1986.

IN 456 "Norm Limiters Combined with Filters," Carl E. Baum, Air Force Weapons Laboratory, August 17, 1986.

SSN 294 "Equivalent Displacement for a High-Voltage Rollup on the Edge of a Conducting Sheet," D.V. Giri, Pro-Tech, 125 University Avenue, Berkeley, CA 94710, and Carl E. Baum, Air Force Weapons Laboratory, October 15, 1986.

SSN 293 "Magnetostatic Surface Field Measurement Facility," V.V. Liepa, D.L. Sengupta, and T.B.A. Senior, Radiation Laboratory, University of Michigan, Ann Arbor, MI 48109, June 1983.

Copies of these notes may be obtained directly from the author, from the Defense Documentation Center, Cameron Station, Alexandria, VA 22134, or from the note series editor, Dr. Carl Baum, Air Force Weapons Laboratory (EL), Kirtland AFB, NM 87117-6008. Non-U.S. citizens desiring the most recently published notes should request copies directly from the authors or through their embassies. In addition, these notes are available at many universities and companies doing research in EMP and electromagnetic theory.

BANGALORE INCEMIC SYMPOSIUM ANNOUNCES WORKSHOP FACULTY AND TOPICS

The International Conference and Workshop on Electromagnetic Interference and Compatibility (INCEMIC) to be held in Bangalore, India on September 7–11 has announced the faculty and topics for the EMC Workshop to be conducted September 7–9. Those named are:

- Dr. Carl E. Baum, Senior Scientist, Air Force Weapons Laboratory, USA
- Dr. Robert L. Gardner, Mission Research Corporation, USA
- Mr. Joseph C. Giles, E G & G Washington Analytical Services Center, Inc., USA
- Dr. D.V. Giri, Visiting Professor, California, Institute of Technology, USA
- Mr. Martin Green, M/s Raychem, UK; Member Don White Consultants, USA
- Mr. I.N. Mindel, Adviser, Illinois Institute of Technology Research Institute, USA

Topics to be covered are digital circuits (including computers), EM coupling problems, transient supression techniques and EMI/EMP considerations in system design for airborne, naval, communications and other systems.

Workshop registration is limited and the deadline for advanced registration is August 20. A draft or check must accompany the registration form. All non-Indian attendees must pay in United States dollars. Fees are:

	Regular	Student
Workshop Alone	Rs. 1500/US $200	Rs. 500/US $70
Conference Alone	Rs. 750/US $100	Rs. 250/US $35
Both Together	Rs. 2000/US $250	Rs. 600/US $90

All IEEE, IETE and IE (1) members will receive a 10 percent rebate. Please include organization and membership number with registration form. Checks should be made out to CONVENERS, INCEMIC, 1987 and sent to Dr. G.K. Deb, Electronics and Radar Development Establishment, CV Raman Nagar, Bangalore-560 075, INDIA. Registration forms are available from the same address.

1988 IEEE VEHICULAR TECHNOLOGY CONFERENCE

The 1988 IEEE Vehicular Technology Conference will be held June 15–17, 1988 at the Holiday Inn Center City in Philadelphia, PA. Papers are being solicited covering the full range of topics associated with the application of electronics to vehicular technology, with special emphasis on the following:

- Mobile communications systems
- Mobile digital communications
- Network system design
- Mobile data systems
- Narrowband radio systems
- Cellular Communications
- Satellite mobile communications
- Computers and mobile communications
- Frequency planning and usage
- Personal communications
- Electric vehicles
- Transportation systems
- Antennas and propagation
- Trunking communications
- Paging systems
- Digital speech encoding for land mobile
- Vehicle location and telemetry systems
- Automotive electronic systems
- Mobile communication systems for public safety
- Vehicular terminal design
- Base station equipment design

Six copies of a 500-word summary should be submitted by December 15, 1987 to: D.L. Huff, Technical Papers Coordinator, IEEE VTC '88, AT&T Bell Laboratories, Whippany, NJ 07981. Authors will be notified of acceptance by January 29, 1988 and the complete text must be submitted by March 31, 1988 to be published in the 38th Vehicular Technology Conference Record to be available at the Conference.

PROCEEDINGS OF PAST WROCLAW EMC SYMPOSIA STILL AVAILABLE

The Organizing Committee of the International Wroclaw Symposium on Electromagnetic Compatibility announces that a limited quantity of the Symposia Records for 1986 (U.S. $40.00), 1984 (U.S. $40.00), 1982 (U.S. $30.00) and 1980 (U.S. $30.00) are still available. Orders with checks enclosed should be directed to: EMC Organizing Committee, Box 2141, 51–645 Wroclaw 12, Poland.

Checks should be made payable to the account of the Institute of Telecommunications in the National Bank of Poland, Główny Oddzial Walutowo-Dewizowy, Warszara, A/C 1111-316-882-151-4787.

EMC-87 TO BE HELD IN MAINLAND CHINA

A National Symposium on Electromagnetic Compatibility, EMC-87, has been scheduled in late November of 1987 in Shen Zhen, People's Republic of China.

The Symposium is being held under the co-sponsorship of the Chinese Institutes of Electronics, Communications, Electrotechnics, Electromechanics and the Chinese Computer and Railway Institutes. The Symposium includes an international exhibit on EMC testing and measurement instrumentation and EMC technology. Those companies interested in exhibiting should supply the Symposium Committee with the following information:

- Company name
- Address
- Telephone and Telex numbers
- Description of products to be exhibited
- Quantities to be exhibited
- Exhibit space required (in meters)
- Company personnel to be informed
- Number of company personnel involved

For additional Symposium program, registration and housing information contact Mr. An Zhi Yuan, EMC-87 Symposium Committee, The Research Institute of Communications, Telemetry and Telecontrol, Ministry of Electronics Industry, P.O. Box 174-216, Shi Jia Zhuang, He Bei, People's Republic of China.

ISEF 87

ISEF 87, the International Symposium on Electromagnetic Fields in Electrical Engineering will be held September 23–25, 1987 at the University of Pavia, Pavia, Italy. The Symposium provides a forum for specialists engaged in theoretical and, particularly, applied researches in the following topics:

- electric and magnetic fields in electrical machines, transformers and other electromagnetic devices
- methods of analysis and synthesis of electromagnetic fields
- electromagnetic fields coupled to other fields

About 75 papers from 17 countries have been accepted for presentation. Rooms and meals can be arranged at the colleges of the University or at nearby hotels. For further information on travel and registration and a registration and accommodation form, contact the Organizing Secretariat ISEF 87, University of Pavia, Department of Electrical Engineering, Via Abbiategrasso 209, I 27100 Pavia, Italy or phone +39382 391250 or Telex UNIPAV I 312841.

CALENDAR
1987

July 28–31

24th Annual Conference on Nuclear and
Space Radiation Effects in Electronics
Snowmass Village, CO
Contact: David W. Bushmire
Sandia National Laboratories
DW 2157
Albuquerque, NM 87185
Telephone (505) 844-6572

August 25–27

IEEE International Symposium on EMC
Radisson Hotel Atlanta
Atlanta, GA
Contact: Hugh W. Denny
Telephone: (404) 894-3535

August 25–28

COMPUMAG 87 Conference on the Computation
of Electromagnetic Fields
Graz, Austria
Contact: K. Preis, M. Konigswieser
INTERCONVENTION
P.O. Box 80
A-1107 Vienna, Austria

August 25–September 2

22nd General Assembly of URSI
Tel Aviv Hilton & Tel Aviv Palace Hotels
Tel Aviv, Israel
Contact: Secretariat
URSI General Assembly
P.O. Box 50006
Tel Aviv 61500, Israel
Telephone: 03-654571
Telex: 341171 KENS IL.

September 7–9

INCEMIC Workshops (see below)

September 7–10

17th European Microwave Conference
Ergife Palace Hotel
Rome, Italy
Contact: Microwave Exhibitions &
Publishers Ltd.
90 Calverly Road
Turnbridge Wells
Kent TN1 2UN
United Kingdom

September 10–11

International Conference on EMI &
Compatibility (INCEMIC)
Bangalore, India
Contact: G.R. Nagabhushana
Convener, INCEMIC
Department of High Voltage Engineering
Indian Institute of Science
Bangalore-560 012, India
Telephone: 364411, ext. 376
Telex: 0845-8349 ISSc IN

September 21–23	IEEE 33rd Holm Conference on Electrical Contacts The Palmer House Chicago, IL Contact: IEEE Holm Conference Registrar 345 East 47th Street New York, NY 10017-2394 Telephone: (212) 705-7405
September 23–25	International Symposium on Electromagnetic Fields in Electrical Engineering University of Pavia Pavia, Italy Contact: Organizing Secretariat ISEF 87 University of Pavia Department of Electrical Engineering Via Abbiategrasso 209 I 27100 Pavia, Italy Telephone: +39382 391250 Telex: UNIPAV I 312841
September 29–October 1	9th EOS/ESD Symposium Peabody Orlando Orlando, FL Contact: EOS/ESD Symposium Box 14 Gillette, NJ 07933 Telephone: (201) 522-4770
September 29–October 1	9th Antenna Measurement Techniques Association Meeting/Symposium Stouffer Madison Seattle, WA Contact: James R. Otey 1987 AMTA Symposium 6632 South 191st Place Suite E-105 Kent, WA 98032
Late November	National Symposium on Electromagnetic Compatibility Shen Zhen, People's Republic of China Contact: An Zhi Yuan EMC-87 Symposium Committee Res. Inst. of Communications, Telemetry and Telecontrol, Ministry of Electronics Industry P.O. Box 174-216, Shi Jia Zhuang, He Bei People's Republic of China

MELVIN J. JOHNSON, 1940–1987

Melvin J. Johnson (or Mel, as he was known to his friends) passed away quietly after a long illness. Mel was a member of the EMC Society Board of Directors, Associate Editor of the EMC-S Newsletter and Chairman of the EMC Abstracts Committee. He served as Chairman of the 1984 National EMC Symposium and as Treasurer, Vice Chairman and Chairman of the Central Texas Section's EMC Chapter. Mel was a member of the Society of Automotive Engineer's EMI Standards and Test Methods Subcommittee and a member of the Passenger Car Activity of the Electrical and Electronics Systems Committee. Mel was a Senior Member of the IEEE and a registered Professional Engineer in the State of Texas.

Mel was born on August 13, 1940 in Grand Rapids, MN. He worked as a Russian language interpreter with the U.S. Air Force from 1958 to 1970, when he received his degree in electrical engineering from Oklahoma State University. He then received a commission in the Air Force and served continuously until his retirement in 1980. His assignments included research and testing of nuclear-generated EMP effects on aircraft and missile systems, high voltage susceptibility of aircraft fuel systems and work with EMP sensors and simulators at the Air Force Weapons Laboratory in Albuquerque, NM. Aircraft and missile systems that he tested include the F-111 and B-52 aircraft, Short Range Attack Missile, Hound Dog and Emergency Rocket Communications System missiles and the Boeing 747 Advanced Airborne Command Post. Additional assignments included program management responsibilities for secure voice and digital communications systems and TEMPEST work at the Electronic Security Command (formerly United States Air Force Security Service) in San Antonio, TX. In this capacity Mel received the United States Air Force Meritorious Service Medal for outstanding contributions to aircraft Identification Friend or Foe (IFF) systems.

Mel joined Southwest Research Institute in San Antonio, TX in 1980. Prior to his illness he managed and directed the EMC Concepts and Development Section in the Department of Electromagnetic Compatibility. His work consisted of studies of EMC phenomena, standards development, measurement techniques and reduction of emissions. The development work was oriented toward special equipment, including EM field generation, reception, conducted emission probes and special receivers and analyzers. Mel developed probes and instrumentation used in major biological research studies of 60 Hz electric fields and researched and performed design work for probe systems throughout the frequency spectrum up to 20 GHz. He was also involved in fiber optic sensor design work.

Author of many technical papers, Mel received the SAE's 1983 Vincent Bendix Automotive Electronics Engineering Award for his paper on "Electromagnetic Interference Measurements with Small Sensors and Fiber Optic Systems." He was also a co-inventor of the Spherical Dipole Probe System which was selected by *Research and Development* magazine to receive an I-R 100 award as one of the 100 most significant technological advancements of 1983.

He is survived by his wife Mary Gail, sons James David, Gregory James and Stephen Lyle, mother Helen V. Johnson, sister Faye Marie Schneider and brother Clayton Johnson.

The EM Emission Phenomena as a Precursor of Earthquakes and the Possibility of Epicenter Location Prediction

EMCABS: 01-05-87

Takeo Yoshino
University of Electro-Communications,
1-5-1 Chofugaoka, Chofu-shi, Tokyo 182, JAPAN
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 5–14

ABSTRACT: This paper presents the observation results of electromagnetic emissions which appear before the first shock of earthquakes as the precursor, and include an examination of the source mechanism of this phenomena. Also this paper shows one example of successful prediction of an earthquake and its epicenter point by means of the multipoint direction finding networks which have been set up around Tokyo area since 1983.
INDEX TERMS: Electromagnetic emissions, earthquakes, epicenter, direction finding

Relationship Between Night Airglow and Seismic Activity

EMCABS: 02-05-87

M.B. Gokhberg, V.A. Pilipenko and L.M. Fishkova
Institute of the Physics of the Earth, Moscow, 123810, USSR
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 25–31

ABSTRACT: The results of photometric observations of night airglow at Abstumani Astrophysical Observatory overlapping with nearby earthquakes are given. An intensity increase of the green oxygen line ($\lambda = 557$Å) during the night before an earthquake was found. Described phenomena may be related with an enhanced electron precipitation into the ionosphere induced by radioemission of seismic origin.
INDEX TERMS: Photometric observations, night airglow, earthquakes, green oxygen line, electron precipitation, ionosphere, radioemission, seismic

Experimental Evidence of VLF Discrete Emissions and Earthquakes Relationship

EMCABS: 03-05-87

Tzvetan Ralchovsky
Geophysical Institute, Bulgarian Academy of Sciences,
Acad. G. Bonchev Street, Block 3, Sofia 1113, BULGARIA
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 41–49

ABSTRACT: Experimental data confirming the possibility of electromagnetic emission generation in the Earth's crust as a result of the earthquake preparedness are presented. The compared seismological data and those about the intensity of the natural VLF electromagnetic emission at two fixed frequencies (5 to 9 kHz) show that the level of the natural radionoise increases a few hours before a given earthquake. The possibility of using the intensity variation of the natural electromagnetic emissions as an operative precursor of impending seismic events is discussed.
INDEX TERMS: VLF, electromagnetic emission generation, earthquake, seismological, natural radionoise

A Survey of Radiofrequency and Microwave Electromagnetic Radiation Exposure Limits Suggested Guidelines for Italian Regulation

EMCABS: 04-05-87

Enzo Casolino and Anna Russo
National Research Council (C.N.R.)—Servizio di Sicurezza del Lavoro e Protezione Sanitaria, Via Serchio 8. 00198 Roma, ITALY
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 50–61

ABSTRACT: Safe exposure limits as proposed in various countries differ from each other greatly, owing to many uncertainties about RFR interaction mechanisms with biological systems. This paper aims to point out the main trends, philosophy and various concepts of standard setting while drawing a survey of requirements of safety standards in Western and Eastern countries. The emphasis is on the latest international trends on the development and establishing of the electromagnetic radiation protection standards. Finally, this paper aims to illustrate standards and guidelines as proposed for Italian regulation.
INDEX TERMS: RFR, exposure, safety standards, biological systems, electromagnetic radiation, standards, Italian regulation

Microstrip Disk Applicators for Biomedical Applications: A Very Efficient Numerical Analysis Technique

EMCABS: 05-05-87

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ABSTRACT: A microstrip disk applicator strongly coupled to a lossy medium facing the antenna is considered. The evaluation of the EM characteristics is obtained by an accurate analysis and a numerical approach, based on the equivalence principle and the method of moment respectively. The efficiency of the antenna and its capability to perform a fixed radiation pattern in multi-frequency conditions are evaluated drawing the power density pattern in the biological medium.

INDEX TERMS: Biomedical, numerical analysis, microstrip disk, lossy medium, antenna, equivalence principle, method of moments, power density, biological medium

Low Frequency Electromagnetic Fields and Biological Systems

EMCABS: 06-05-87

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ABSTRACT: Experimental investigations in rats subjected to repeated exposure in EM fields of 1 kHz, 10 kHz or 25 kHz and intensities ranging from 200 V/m to 3000 V/m have revealed retardation of animal growth rate and shifts of Na^+ and K^+ contents in some brain structures. These results indicate the difference of biological effects due to 1 kHz and 10 kHz EM fields.
INDEX TERMS: Biological systems, exposure, EM fields, animal growth rate, biological effects

Influence of External Low-Frequency Electromagnetic Field Upon a Biological Membrane in the Process of Transporting Ions

EMCABS: 07-05-87

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Part 1, 1986, pp. 110-115

ABSTRACT: The paper presents a biophysical model of the influence of external low-frequency electromagnetic fields upon the transport of ions through a biological membrane. Changes taking place in this transport produce changes in the accumulation of ions in the cells and tissues of a biological material being exposed to an electromagnetic field.
INDEX TERMS: Biophysical model, low-frequency, electromagnetic fields, biological membrane, ions, cells, tissues, biological material

C.A.D. of Waveguide Applicators for Microwave Hyperthermia Applications

EMCABS: 08-05-87

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Part 1, 1986, pp. 138-144

ABSTRACT: A direct contact type of hyperthermia applicators, consisting of multi-stepped rectangular/square waveguides, are accurately analyzed. The tissues are simulated by means of a multilayered configuration. Based on the analysis routine, an optimization of geometry was made in order to improve depth of penetration. Results confirm the usefulness of these applicators.
INDEX TERMS: Microwave hyperthermia, hyperthemia applicators, waveguides, tissues

A New Four-Wire Transmission Circuit with Suppression of Magnetic-Induced Interfering Voltages

EMCABS: 09-05-87

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Part 1, 1986, pp. 145-154

ABSTRACT: Inductively coupled-in interfering voltages can be compensated to a large extent by using a new four-wire transmission circuit. The circuit uses concentric geometry for better compensation of nearby interference sources. For economic realization the receiving (compensating and terminating) network can be passive. The properties of the circuit are discussed in detail. Practical results confirm the theoretical considerations.
INDEX TERMS: Magnetic induced interfering voltages, four-wire transmission circuit, interference

Noise Voltage Induced from Inside Power Lines Affecting Telecommunication Inside Wires

EMCABS: 10-05-87

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Part 1, 1986, pp. 155-164

ABSTRACT: This paper describes the noise voltage characteristics induced from a power line affecting an inside wire. The continuous noise voltage is estimated using a new coupling coefficient evaluation method and CISPR's recommendation. Transient noise voltage measurements are carried out on a lot of electric apparatus. Transient noise voltage is found to be much larger than continuous voltage. The twisted inside wire is quantitatively clarified to be useful for the transmission of digital signals from the viewpoint of noise.
INDEX TERMS: Power line, noise, CISPR's recommendation, transient noise voltage

Analysis of Complex Protecting Devices by Means of Quadripole Theory

EMCABS: 11-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 165-175

ABSTRACT: The contribution deals with the analysis and synthesis of circuits for the protection of wire telecommunication equipment against transient overvoltages. A method is presented based on the quadripole theory which allows to compose complex protecting cascades using simple basic quadripole elements. Further on it is shown how to apply the known calculation methods of the quadripole theory to such protecting networks. Doing so, a simple method is dealt with which makes it possible to analyze the non-linear voltage limiting behavior.
INDEX TERMS: Telecommunication equipment, transient overvoltages, quadripole theory, quadripole elements, non-linear voltage limiting

Conductive Interference of Short-Circuit Current Flowing through a H.V. Station Earth Electrode on Nearby Conductors with Earth Return

EMCABS: 12-05-87

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Part 1, 1986, pp. 176-183

ABSTRACT: In the event of an earth fault occuring at a h.v. station the nearby buried conductors may be exposed to conductive effects of the earth-fault current flowing to the earth through a h.v. earth electrode. By specializing the driving electric field, calculations are made and formulas derived applicable to the analysis of potentials excited by the conductive effect along two infinitely long conductors with earth return, buried in the vicinity of a h.v. station earthing, which is assumed to be a round plate electrode. The technical application of the method presented is illustrated by an example.
INDEX TERMS: Conductive interference, h.v. station, buried conductors, earth-fault current, h.v. earth electrode

Tests to be Carried out on Transistorized Long Distance Transmission Equipment to Check the Efficiency of Protection from External Interferences According to CCITT Recommendations

EMCABS: 13-05-87

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Part 1, 1986, pp. 184-195

ABSTRACT: Question 21/V of CCITT is concerned with protection of long distance transmission equipment from external electromagnetic interference. Up to now three Recommendations were published which describe principles for protection measures as well as specification for testing procedures in full detail. Test procedures recommended by CCITT with regard to power line induction and lightning interferences proved to be reliable and satisfactory in the past. The widespread use of digital equipment in the future may entail recommendations with regard to interference sources other than ac induction and lightning.
INDEX TERMS: CCITT, long distance transmission equipment, electromagnetic interference, test procedures, power line induction, lightning interferences, digital equipment

Spatial Shielding in Correlation to Resonances

EMCABS: 14-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 206-215

ABSTRACT: In this paper a method of shield computation is presented, in which three basic shield models are taken to determine shield damping, also in the case of resonances. The method is not restricted solely to the center of the room and is also applicable to shields of any lamination. Selected results are presented.
INDEX TERMS: Spatial shielding, shield models, shield damping, resonances

The Occurrence of Overvoltages and Overcurrents on Telecommunication Lines

EMCABS: 15-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 1, 1986, pp. 216-226

ABSTRACT: An economically-based overvoltage protection system must take into account the probability of occurrence of overvoltages on telecommunication lines and their parameters. In the P&T Research Institute in Prague measurements have been carried out to get the basic data on overvoltage parameters. To enable a more generalized view on overvoltage and overcurrent parameters, the results of overvoltage measurements published in twelve other papers were analysed. In conclusion, the utilization of the results of analysis in solving protection problems are discussed.
INDEX TERMS: Overvoltage protection, telecommunication lines, overvoltage, overcurrent, measurements

CCITT Directives. The Volume on the Theory of Electromagnetic Coupling and the Basic Calculation Methods

EMCABS: 16-05-87

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ABSTRACT: After a very short overview on the organization of the new CCITT Directives in the form of different volumes, the content of the volume on the theory of electromagnetic coupling and the basic calculation methods is described. Special attention is paid to the calculation methods based on the multiconductor line theory.
INDEX TERMS: CCITT, CCITT Directives, electromagnetic coupling, basic calculation methods, multiconductor line theory.

Tall Tower Triggered Lightning During Winter

EMCABS: 17-05-87

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Part 1, 1986, pp. 235-244

ABSTRACT: To clarify the characteristics of tall tower triggered lightning, lightning currents have been measured by magnetic links and a digital recording system during winters at Niigata coast of Japan. The frequency of positive polarity flashes was higher than that of summer lightning. The bipolar strokes were recorded frequently in a lightning flash. The current waveforms of winter lightning were classified into eight types. Moreover, the winter lightning discharges were observed by still cameras and automatically-driven video systems. The most flashes progress in an upward direction and the height of winter thunderclouds is very low.
INDEX TERMS: Lightning, lightning currents, summer lightning, bipolar strokes, waveforms, winter lightning

Some Deductions from the Traveling Current Source Model

EMCABS: 18-05-87

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ABSTRACT: In the "Traveling Current Source" (TCS) model it is assumed that the charge of the downward leader distributed in a vertical tube is discharged to earth by a fictive current source traveling along the lightning channel. From the sophisticated calculations of the shapes of the electric and magnetic field it is possible to derive simplified formulas with satisfying accuracy in results. By using these formulas the typical initial peak of the electric and magnetic field in LEMPs as well as the shape of the first derivation by time can be evaluated very easily.
INDEX TERMS: Traveling Current Source Model, fictive current source, lightning channel, electric, magnetic field, LEMPs

Characteristics and Theory of Bipolar Flashes Observed from Rocket-Triggered Lightning Experiments

EMCABS: 19-05-87

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Part 1, 1986, pp. 254-262

ABSTRACT: Examinations of selected events of bipolar flashes observed from rocket-triggered lightning experiments in winter in a coastal region of the Sea of Japan reveals the following findings, based upon a new model: 1. A near-horizontal cloud shape and charge distribution is a configuration favorable for a bipolar flash. 2. A rocket with a grounded wire plays twofold roles in triggering a bipolar flash: one is an electric merging and the other is an artificial formation of an electric cusp. 3. Their boundary discontinuities lead to discharge triggering and EHD wind. 4. Discharge characteristics are well described in terms of an equivalent circuit.
INDEX TERMS: Bipolar flashes, rocket-triggered lightning, near-horizontal cloud shape, charge distribution, rocket, electric cusp, boundary discontinuities, discharge triggering, EHD wind, discharge characteristics

Lightning Surge Waves Induced on Overhead and Buried Transmission Lines

EMCABS: 20-05-87

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Part 1, 1986, pp. 263-272

ABSTRACT: Disturbing currents may be induced on the outer shield of overhead buried telecommunications cables by lightning strokes. In this paper a model of lightning discharges is used to determine the response of the line. Using a transmission line theory we first give the current distribution in frequency and time domain. A comparison with experimental results obtained at St Privat d'Allier in 1983 is also given.
INDEX TERMS: Lightning surge waves, overhead, buried transmission lines, telecommunications cables, lightning strokes, transmission line theory, frequency, time domain

Field Radiated by Cloud-Ground Lightning above a Finitely Conducting Soil. Study of the Domains of Validity of the Different Approximations of Sommerfeld Integrals. Elaboration of an Efficient Numerical Code

EMCABS: 21-05-87

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Part 1, 1986, pp. 273-280

ABSTRACT: In order to compute the electromagnetic radiation of a return-stroke in a lightning flash in the case of a dissipative half-space, it is necessary to evaluate the Sommerfeld integrals, present in the field equation of a dipole electric. To reduce the computation time, these integrals have been calculated, considering different approximations available in the technical literature and the domain of validity of each of them is presented.
INDEX TERMS: Cloud-ground lightning, finitely conducting soil, electromagnetic radiation, return-stroke, lightning flash, Sommerfeld integrals

Microwave Propagation in Semi-Desert Conditions

EMCABS: 22-05-87

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Part 1, 1986, pp. 317-326

ABSTRACT: In this paper results of observations made on a terrestrial microwave link operating in the Khartoum region are revealed. The paper addresses two aspects of microwave propagation in semi-desert regions; these are: (i) Attenuation effect of dust storms, and (ii) Multipath propagation due to surface ducts. It is found that attenuation due to dust storms is negligible. On the other hand multipath propagation was observed to occur frequently between sunset and sunrise. It is also found that evenings of hot days are more susceptable to surface duct formation and, therefore, multipath propagation.
INDEX TERMS: Microwave propagation, microwave link, Khartoum region, microwave propagation, semi-desert regions, attenuation, multipath propagation, surface ducts

Radiorefractivity and Refractivity Effects in the Coastal Zone of Northern Poland

EMCABS: 23-05-87

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ABSTRACT: Basing on many years statistical data, investigations of the radiorefractive index in the 100 m thick ground layer of the troposphere in the coastal zone of Northern Poland had been carried out. The influence of the annual cycle was examined. Furthermore, an attempt had been undertaken to prove the effect of the variability of the radiorefractive gradient on coverage conditions in the above mentioned area. The results of the study show that the greatest variability of propagation conditions should be expected in the summer season.
INDEX TERMS: Radiorefractivity, refractivity effects, radiorefractive index, troposphere, radiorefractive gradient, propagation

The Plasma Wave Environment of the Earth as Studied by the AMPTE UKS Satellite Mission

EMCABS: 24-05-87

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ABSTRACT: The AMPTE mission involved the use of three satellites to study, amongst other objectives, processes in the outer part of the earth's magnetosphere. Some results from the wave experiment on the UKS spacecraft are presented which are indicative of the plasma wave environment on the dayside of the earth's outer magnetosphere. These results are discussed in terms of both morphology and generation mechanisms.
INDEX TERMS: Plasma wave, AMPTE UKS Satellite, AMPTE mission, magnetosphere, wave experiment, outer magnetosphere

HF Radio Noise Above the Ionosphere Observed on ISS-b

EMCABS: 25-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
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ABSTRACT: The HF electromagnetic environment at the satellite height was observed by the fixed-frequency receivers on Ionosphere Sounding Satellite (ISS-b). The statistical characteristics of various kinds of radio noises including solar radio noise, cosmic radio noise, the noise from lightning discharges and man-made radio noises emitted from transmitters on the ground were measured and analyzed.
INDEX TERMS: HF electromagnetic environment, Ionosphere Sounding Satellite, (ISS-b), radio noises, solar radio noise, lightning discharges, man-made radio noises

Plasmapause Guiding of VLF Transmissions as an Interference Source for the Sub-ionospherically Propagated Signals

EMCABS: 26-05-87

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ABSTRACT: Ariel 3 and 4 measurements of the GBR (16 kHz) and NAA (17.8 kHz) transmissions above the ionosphere occasionally revealed unusually high field strength in the conjugate hemisphere in the latitude range 50 to 70 degrees, with a longitudinal extent which may, on one occasion, have exceeded 120 degrees. The importance of this magnetospheric mode of propagation as a source of interference for sub-ionospheric signals from VLF transmitters is investigated.
INDEX TERMS: Plasmapause guiding, Ariel 3 and 4 measurements, GBR, NAA, transmissions, ionosphere, field strength, conjugate hemisphere, magnetospheric mode, propagation, interference, sub-ionospheric signals, VLF, transmitters

Improving the Accuracy of Measurement of VHF/UHF Broadcasting Antenna Radiation Patterns by Means of Filtration

EMCABS: 27-05-87

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ABSTRACT: The directional properties of typical television antenna systems in the horizontal plane have been analyzed. The analysis showed that an improvement of measurement accuracy may be achieved by means of Fourier's series approximation, taking the first 12 terms into account. The results obtained for a UHF antenna with and without the use of filtration have been compared. The comparison proves that filtration diminishes measurement errors while slightly influencing the irregularity of the antenna pattern.
INDEX TERMS: Television antenna systems, analysis, measurement, Fourier's series approximation, UHF, antenna, filtration, antenna pattern

The Influence of Helicopter Flight Parameters on the Results of Measurements of Horizontal Radiation Patterns of VHF/UHF Broadcasting Antennae

EMCABS: 28-05-87

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ABSTRACT: The selection of optimum flight parameters as well as navigation influence on the measurement results are discussed. The corrections which permit a decrease in measurement errors related to inaccurate helicopter navigation are determined. An unconventional method of data processing was elaborated to increase the accuracy of determining the antenna pattern. The efficiency of the methods presented is illustrated with an example.
INDEX TERMS: Helicopter flight parameters, measurements, horizontal radiation patterns, VHF/UHF, broadcasting antennae, antenna pattern

Analysis of the Influence of the Mode Type on Microstrip Antenna Directive Properties

EMCABS: 29-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
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ABSTRACT: The subject of this paper is the analysis of the mode type influence on the directive properties of a microstrip antenna with a rectangular radiating element. Investigations in this field were carried out using the aperture model of the antenna. The results of numerical investigations are presented.
INDEX TERMS: Analysis, mode type influence, directive properties, microstrip antenna, rectangular radiating element, aperture model, numerical results

Analyzing the Properties of a Loop-Antenna System

EMCABS: 30-05-87

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ABSTRACT: The objective of the study was to analyze the properties of a system incorporating three circular loop antennae (arranged perpendicular to each other) with coinciding centers. The data obtained in this study substantiate two particular uses of the system: as a probe of a spherical radiation characteristics for the measurement of the electromagnetic (EM) field, and as an indicator of the field structure. Probes having such properties may be achieved by applying a system of appropriately loaded loop antennae, each of them being coupled to an active member which acts as a former-transformer unit for the voltages on the antenna loadings.
INDEX TERMS: Circular loop antennae, spherical radiation characteristics, measurement, electromagnetic (EM) field, probes

The Error for Open Field Radiated Measurements and its Discussion

EMCABS: 31-05-87

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Part 2, 1986, pp. 431-440

ABSTRACT: This paper describes the problems in relation to error signals, i.e., the classification, evaluation and reduction of the error due to unwanted signals. A unifying presentation is given for antenna and radiated emission measurements. This paper reviews some principal errors for the antenna and radiated emission measurements, identifies the more significant errors and offers an example of error budget of the antenna measurement. Finally, this paper reviews the problems in relation to radiated measurements of MMW frequencies.
INDEX TERMS: Error signals, classification, evaluation, reduction, antenna, radiated emission measurements, MMW frequencies

Monopulse Technique for an Array of Linear Wire Antennas

EMCABS: 32-05-87

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ABSTRACT: The peak-amplitude and slope patterns of an array of linear wire antennas fed by a time-varying Gaussian pulse are obtained in the time domain using a numerical method. The antennas are loaded with a nonlinear element in order to reduce the late-time response. The monopulse technique with the slope pattern promises a much better accuracy of angle measurement of a target.
INDEX TERMS: Array, linear wire antennas, time-varying Gaussian pulse, time domain, numerical method, antennas, nonlinear element, monopulse technique, angle measurement, target

Modification of the Scattered Field of a Wire Scatterer by Impedance Loading

EMCABS: 33-05-87

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Part 2, 1986, pp. 457-465

ABSTRACT: The problem of modification of the scattered field of thin wire scatterers is studied. The problem is formulated analytically in terms of magnetic-potential-type integral equation for current distribution on the scatterer. The resulting formulas are in matrix notation (by means of the method of moments) in form suitable for programming on digital computers. Many numerical results for back scattering cross sections as a function of various geometry of wire and type of loads are included.
INDEX TERMS: Scattered field, thin wire scatterers, magnetic-potential-type integral equation, current distribution, method of moments, numerical results, back scattering cross sections

Transmission Line Antennas for Square Wave Field Excitation

EMCABS: 34-05-87

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Part 2, 1986, pp. 446-475

ABSTRACT: Electronic equipments and devices frequently are endangered by transient electromagnetic fields with rise times of a few ns and an electric peak field strength of some 10 kV/m. For the testing of the susceptibility against such irradiated fields, facilities suited with a defined field distribution, such as transmission line antennas, are used. It will be shown that the geometrical design of the line feed in respect to the line termination section decisively affects the rise time and also the time slope in the back of the traveling wave.
INDEX TERMS: Transient electromagnetic fields, field strength, susceptibility field distribution, transmission line antennas, line termination, traveling wave

On Antennas Without a Phase Center and their Applications

EMCABS: 35-05-87

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Part 2, 1986, pp. 484-493

ABSTRACT: The concept of partial antennas and the definition of the common radiation center for the case of antennas without a phase center are introduced. On the basis of the above concept and definition, the formation of antennas with special phase patterns are considered, and the relations of antenna arrays constructed from the radiating elements without a phase center are presented. Some applications in antenna engineering of radiators with special phase patterns are shown.
INDEX TERMS: Partial antennas, common radiation center, phase center, antennas, special phase patterns, antenna arrays, applications, antenna engineering

A Vertically Polarized Radar Antenna for Remote Sensing Applications

EMCABS: 36-05-87

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ABSTRACT: A vertically polarized radar antenna is designed which consists of one hundred waveguide radiating elements. The radiating elements are located linearly, side by side, forming a line source of one hundred wavelengths in length and mounted inside a sectoral horn to shape its vertical radiation pattern. The unit was designed to provide low side lobes (less than 30dB) in the horizontal plane and a beamwidth around one degree. In the vertical plane the antenna pattern was required to have sidelobe levels less than 2dB and a beamwidth in excess of fifteen degrees. The unit was designed to be used as a remote sensing radar for investigation of ice formations in northern waters.
INDEX TERMS: Vertically polarized, radar antenna, waveguide, radiating elements, sectoral horn, vertical radiation pattern, side lobes, beamwidth, antenna pattern, remote sensing, investigation, ice formations

An Auto-Tracking Parabolic Sensing Antenna with Dual Mode Archimedian Spiral Feed

EMCABS: 37-05-87

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Part 2, 1986, pp. 520-529

ABSTRACT: In this paper, an introduction of an auto-tracking parabolic sensing antenna with dual mode Archimedian spiral feed is given. Theoretical analysis, calculation and experiment have also been made. The theoretical values tally with the measured values. The results show that this antenna is suitable for remote sensing. The key to obtain the excellent performances is the good balanced performance of S, D networks, the geometry symmetry of the antenna and the feed, the high polarization purity and the satisfactory phase patterns.

INDEX TERMS: Auto-tracking parabolic sensing antenna, dual mode, Archimedian spiral feed, theoretical analysis, calculation, experiment, remote sensing, polarization purity, phase patterns

Propagation and Radiation Behavior of Rectangular Corrugated Feed with Slots Filled with Medium

EMCABS: 38-05-87

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Part 2, 1986, pp. 530-539

ABSTRACT: Hybrid modes in the rectangular corrugated horns with slots filled with medium are investigated. Equations were developed for the hybrid mode fields which exist in the horns and propagation constants were obtained for the various modes of interest. A technique of combining several modes for pattern shaping is described. The mode amplitude ratio is calculated from a known throat excitation and used to compute radiation patterns. The theoretical patterns were in good agreement with experimental data. Finally, the cross-polarized performance of the feed is investigated and the technique of double medium which is evenly filled in the corrugated slots is provided.

INDEX TERMS: Hybrid modes, rectangular corrugated horns, slots, medium, hybrid mode fields, propagation constants, pattern shaping, mode amplitude ratio, throat excitation, radiation patterns, cross-polarized, double medium, corrugated slots

A Study of Null Distribution of Nearfield of Aperture Antennae

EMCABS: 39-05-87

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Part 2, 1986, pp. 540-547

ABSTRACT: We use the method of aperture partition and fast numerical method for Fresnel Integral evaluation for near-field calculation. We calculate the nearfield in front of an 140l offset paraboloid reflector to show the effectiveness of the method. Also, we compute the field distributions from 1D (140l) to 4D, which have the following characteristics: 1) The power radiated is concentrated in a cylindrical volume in front of the antenna with a diameter a little bit larger than the aperture; 2) The field distribution is roughly the same as that of the field on the reflector; 3) The field outside the cylinder decays rapidly and is about -36dB below the peak. The deepest null is about -60dB; 4) There are fewer sidelobes than the farfield.

INDEX TERMS: Null distribution, nearfield, aperture antennae, mutual coupling, antennae, numerical method, Fresnel Integral evaluation, paraboloid reflector, field distributions, farfield

Analysis of the Source of the Field in the Immediate Neighborhood of Diffraction Wedge and its Application

EMCABS: 40-05-87

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PEOPLE'S REPUBLIC OF CHINA
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 548-555

ABSTRACT: An exact analysis for the diffraction characteristic of a metal wedge is carried out so that some constraints of the results in earlier papers are released with the new formulas. We have analyzed the azimuth pattern of the antenna array which has several stacks of longitudinal slots on the two broad walls of a rectangular waveguide. Theoretical results are compared with experimental ones.

INDEX TERMS: Exact analysis, diffraction, metal wedge, azimuth, pattern, antenna array, rectangular waveguide, theoretical, experimental

A Critical Examination of Geometrical Optics Solutions of High Frequency Solutions to Open and Closed Shell Problems

EMCABS: 41-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 572-585

ABSTRACT: Use is made of the Green's function of a line electric source inside a closed dielectric circularly cylindrical shell to investigate the range for the valid use of G.O ray solution of the field. The possible simplification by the use of composite transmission/reflection coefficients is shown. Accuracy of the various approximations is shown by reference to a 90 term eigenfunction series summation.

INDEX TERMS: Green's function, line electric source, dielectric circularly cylindrical shell, G.O. ray solution, transmission/reflection coefficients, approximations, eigenfunction series summation

Selective Interference in FM and TV Receivers

EMCABS: 42-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 605-615

ABSTRACT: The paper deals with the problem of selective interference caused by stations of the amateur radio service operating in the two meter and 70 and 23 centimeter bands to FM broadcast receivers and TV receivers. Sensitivity measurements of several BC and TV receivers at certain frequencies were carried out. However the measurements were made in the aspect of amateur radio service and with receivers of the OIRT standard, the results obtained and conclusions are also valid to other radio services and to frequency ranges of the CCIR standard, respectively.

INDEX TERMS: Selective interference, amateur radio service, FM, broadcast receivers, TV receivers, sensitivity measurements, BC, OIRT standard, CCIR, standard

The Chemistry of Intermodulation Interference and its Suppression

EMCABS: 43-05-87

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Part 2, 1986, pp. 616–623

ABSTRACT: Intermodulation interference (IMI) from nonlinear metal-oxide-metal (MOM) junctions near HF and VHF transmitters and receivers can be suppressed effectively by removing the metal oxide and forming an alternate low reactance or low resistance current path between the metal structures. Chemicals were developed that perform these functions, reducing IMI below background levels in shipboard and land-based applications. The resulting "chemical ground straps" are environmentally stable, low cost, and effective over a wide spectral range.
INDEX TERMS: Intermodulation interference, IMI, non-linear metal-oxide-metal, MOM, junctions, HF, VHF, transmitters, receivers, reactance resistance current, shipboard, land-based applications, "Chemical ground straps," spectral range

EMC Systems Engineering for the AMPTE UKS Satellite

EMCABS: 44-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 624–633

ABSTRACT: The AMPTE-UKS spacecraft was designed as a low cost research satellite produced in a remarkably short time (three years from approval to launch) but to a high specification for performance in orbit. The purpose of this paper is to discuss the EMC problems which were identified early in the project and present both the EMC solutions which were adopted and the test plan developed for verification. Some results from the test program are presented together with a discussion of the performance achieved in orbit.
INDEX TERMS: EMC systems engineering, AMPTE-UKS spacecraft, satellite, EMC

Electrical Equipment as Sources of Radio Interferences in Ship Power Lines

EMCABS: 45-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 634–643

ABSTRACT: The paper deals with the investigation results of disturbances generated by ship's electrical appliances in the frequency band 10 kHz to 30 MHz. The main sources of disturbances localized in synchronous generators, excitation and regulation voltage systems, thyristor systems of phase control, converters and the main electrical drive systems are presented.
INDEX TERMS: Radio interferences, ships, power lines, electrical appliances, synchronous generators, excitation, regulation voltage systems, thyristor systems, phase control, electrical drive systems

Reflecting Characteristics of Anisotropic Rubber Sheets and Measurement of Complex Permittivity Tensor

EMCABS: 46-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 650–657

ABSTRACT: A rubber sheet manufactured by the rolling process shows a strong anisotropic property which is caused by carbon particles or carbon fibers aligned along the rolling direction. The measurement method of the complex permittivity tensor in the rubber sheet by the least squares method using the reflection loss measured for normal incidence is studied. The tensor, including off-diagonal elements and the principal direction are measured and discussed. Errors in the measured tensor elements and principal direction are evaluated.
INDEX TERMS: Rubber sheet, anisotropic property, carbon particles, carbon fibers, rolling direction, complex permittivity tensor, least squares method, reflection loss

Microwave Absorbing Materials of Metal-Fiber Mixed Ferrite-Resin Composite

EMCABS: 47-05-87

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Part 2, 1986, pp. 658–665

ABSTRACT: In order to modify the dielectric properties of ferrite-resin composite material, short metal fibers are mixed with the material. The fiber mixed material permittivity shows artificial dielectric properties, which include resonance due to ½ wavelength in ferrite resin medium. An ultra broad-band absorber could be developed (e.g. more than 15dB absorption between .8 GHz and 25 GHz) both below and above the resonance regions, while a broad-band absorber was achieved in the below resonance region (e.g. typically more than 20dB absorption over 4.5 GHz in the X-band).
INDEX TERMS: Dielectric, ferrite-resin composite material, metal fibers, permittivity, resonance, broad-band absorber, absorption, resonance

Some EMC Problems of Mine Wire Telecommunication Systems

EMCABS: 48-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 692–699

ABSTRACT: Improper operation of trolleyphone communication after introduction of semiconductor rectifier stations, as well as groundless electric energy breaks caused by CTT63/40U methanometric systems brought to notice the electromagnetic compatibility problems in deep coal mines. The Research-Development Center together with the Silesian Technical University lead investigations on electromagnetic interference sources in mines and their influence on telecommunication systems. The results of the investigations are the basis for standards and regulations ensuring the electromagnetic compatibility of power networks and mine wire telecommunication systems.
INDEX TERMS: EMC, trolleyphone communication, semiconductor rectifier, coal mines, electromagnetic interference, standards, regulations, electromagnetic compatibility, power networks, telecommunication systems

The Disturbances Produced in Typical Household Equipment and the Influence on a Radio Receiver with a Ferrite Antenna

EMCABS: 49-05-87

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Part 2, 1986, pp. 700-708

ABSTRACT: In this paper the results of measurements of interference generated by typical household equipment are presented. The character of these interferences and the contents of the symmetrical and asymmetrical components is determined. The procedure of measurement and the measuring position for simulation of an interaction of an actual source of disturbance on a radio receiver with a ferrite antenna is worked out. The analysis of penetration interference with a power network in a radio receiver with a ferrite antenna for symmetrical and asymmetrical interferences is achieved. The verification of the analytical results obtained is made.

INDEX TERMS: Measurements, interference, household equipment, symmetrical, asymmetrical components, procedure, radio receiver, ferrite antenna, analysis power network, radio reception

On the Propagation Characteristics of the HF Noise Currents in Interior Wiring

EMCABS: 50-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-56)

ABSTRACT: Many electronic equipments with high sensitivity and power machines are connected to a common power line in the same building. If any one of them caused unexpected trouble and generated HF noise voltage, interfering HF currents would propagate through the common interior wiring and earth circuit and flow into these equipments. Therefore, it seems worthwhile to measure the HF propagation characteristics in interior wiring at various frequencies. The present report summarizes the investigation on the measured results.

INDEX TERMS: Power line, HF noise, interfering HF currents, HF propagation characteristics, interior wiring

Transmission Characteristics of Power Line Carrier Communication

EMCABS: 51-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-57)

ABSTRACT: In this paper a computer simulation method for the power line carrier communication system is established. This method presents good results which correspond to experimental ones. The model of the system consists of 59 air-conditioners which are distributed along a 90-meter-long exclusive power line. The parameters obtained by the measurement are used for this simulation, and they are very appropriate. As the result, the evaluation for this kind of communication system can be realized by this simulation.

INDEX TERMS: Power line carrier, communication system, power line

On the Inpulsive Noise Reduction in the Steadying AC Arcs Based on the Investigation about After-Arc Phenomena

EMCABS: 52-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-58)

ABSTRACT: This paper presents a study on the noise reduction in the steadying ac arcs. From the studies of after-arc phenomena, we may conclude that the minimum value of applied HF voltage to the gap is 400-500 (V) to stabilize AC arcs. The noise generated by the stabilizing apparatus for trial at this voltage is very low.

INDEX TERMS: Noise reduction, AC arcs, after-arc phenomena, noise, stabilizing apparatus

Sealing Effects of the Door of Microwave Ovens

EMCABS: 53-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-59)

ABSTRACT: This paper describes the sealing effects of the door of microwave ovens. We measured the leaking microwave power from the gap between an oven and a door.

INDEX TERMS: Sealing effects, door, microwave ovens, leaking microwave power, gap

Orthogonal Real Pseudonoise Sequences Without DC Component

EMCABS: 54-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-60)

ABSTRACT: Pseudonoise sequence plays an important role in the EMC discipline, in the designing of communication or measurement system immune to interferences. Orthogonal balanced real pseudonoise sequences are introduced, and their applications to spread spectrum multiple access (SSMA) system and coding radar system are proposed. The balanced sequences and those with power shaved are composed of cyclically orthogonal real sequences, and can form a system of orthogonal functions. The balanced power-shaved sequences are applied to the time/code division SSMA system and the balanced original sequences to coding radar system.

INDEX TERMS: Pseudonoise sequence, EMC, spread spectrum multiple access, SSMA, system, coding radar system, cyclically orthogonal real sequences, orthogonal functions, balanced power-shaved sequences

Calculation of Thermal Stress Produced by Laser Acupuncture

EMCABS: 55-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-61)

ABSTRACT: Although the clinical investigation of laser acupuncture is being actively performed, the mechanism has not been clear. In order to find out the therapeutic conditions from the engineering standpoint, this interim report pays attention to the thermal stress produced by the laser acupuncture and examine the fundamental characteristics using the semi-infinite model. The numerical examples are also shown.
INDEX TERMS: Clinical investigation, laser acupuncture, therapeutic, thermal stress, laser, semi-infinite model, numerical examples

Application of Finite Element Method Analysis of Induced Current Densities Inside Human Model Which Stands in the Erect Position in Uniform 60 Hz Electric Field

EMCABS: 56-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-62)

ABSTRACT: We have analyzed the induced current densities inside the human model which stands in the erect position in the uniform 60-Hz electric field using Finite Element Method (FEM). It is assumed in our study until now that the human model is uniformly filled with the medium having a conductivity and a permittivity, but human body comprise of the foreign mediums characterized by the conductivities and the permittivities. In this paper, we have analyzed the two-case human models which are composed of a cylinder and a semi-sphere. One is the human model composed of the two-layer body, and the other is the human model whose head part is composed of scalp, skull, cerebrospinal and brain tissues.
INDEX TERMS: Induced current densities, human model, uniform 60-Hz electric field, Finite Element Method, FEM, conductivity, permittivity

Investigation of Practical Quarter-wavelength Type Absorber Consist of Electric Conductive Yarns

EMCABS: 57-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-63)

ABSTRACT: A new microwave absorber of the quarter-wavelength type is investigated practically. It consists of cloth which is woven of resistive yarns and polyester thread in checker. The relation of the resistivity of the yarns and the absorption is analyzed. In order to obtain high durability and high strength, the surface finishing is investigated by painting, laminating and FRP mold sheeting. Very strong space material is designed. Consequently, a practical quarter-wavelength absorber can be obtained.
INDEX TERMS: Microwave absorber, quarter wavelength type, cloth, resistive yarns, resistivity, absorption, space material

Immunity Measurement of the Broadcasting Receiver to Conducted Currents

EMCABS: 58-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-64)

ABSTRACT: When we discuss EMI problems of electronic devices, we must attend to the active interference problems of the devices as well as the passive interference. In this paper we reported the results for immunity of some broadcasting receiver to conducted current under the method described in CISPR Pub. 20 and we pointed out some problems to be improved upon that involve measurement procedures and instruments.
INDEX TERMS: EMI, active interference, passive interference, immunity, broadcasting receiver, conducted current, CISPR Pub. 20, measurement procedures, instruments

The Recent Status of Developing the Better Absorber

EMCABS: 59-05-87

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EMC-S Tokyo Meeting, October 17, 1986
(EMCJ86-51)

ABSTRACT: The absorbing walls or sheets for microwave frequencies have been widely used for many purposes. They are already practically applied to many anechoic chambers, the surroundings of parabolic antennas to improve the front-to-back ratio and the surfaces the tall buildings or huge bridges to reduce ghost images on television or radar screens. In this paper, the recent status of development of better absorbers is explained. Many types of absorber that are thinner, lighter in weight, wider in frequency or the more suitable for buildings are shown. New types of absorber expected in future are also discussed.
INDEX TERMS: Absorbing walls, sheets, microwave frequencies, anechoic chambers, parabolic antennas, buildings, bridges, ghost image, television, radar

Experiments to Detect a Buried Metal-Plate in the Snowpack by Microwave Radiometers

EMCABS: 60-05-87

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(EMCJ86-54)

ABSTRACT: Experiments and discussion about the detection of a metal plate buried in the snowpack using microwave radiometers are reported. Measurement of brightness temperature or emissivity and effects of some parameters as well as the dimensions of the plate and the depth and quality of the snowpack are reported.
INDEX TERMS: Detect, metal plate, snowpack, microwave radiometers, measurement, brightness temperature, emissivity

Equivalent Transformation for the Mixed Circuit Consisting of Lumped Brune Section and Distributed Circuit

EMCABS: 61-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-33)

ABSTRACT: Kuroda's identity is applied n times to a distributed circuit, and proceeding to the limit $n \to \infty$ equivalent doing Kuroda's identity to the circuit consisting of a lumped element and a distributed circuit. As a result, one can obtain the nonuniform transmission line. In this paper, we apply this Kuroda's identity to a circuit consisting of a lumped Brune section and a uniform transmission line, and we can show that the transformed circuit is expressed with the circuit consisting of a nonuniform transmission line and a lumped Brune section. Finally we think that this method is useful for the analysis of nonuniform transmission lines.
INDEX TERMS: Kuroda's identity, lumped Brune section, uniform transmission line, nonuniform transmission

Analysis of Leakage Electromagnetic Field from Opening in Heating System Including Heated Material

EMCABS: 64-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-36)

ABSTRACT: In this paper, we describe the fundamental treatment of the microwave fusing furnace, which includes opening and heated material and we obtain an analytical result for electromagnetic field leakage in three-dimensional space by Bergeron's method.
INDEX TERMS: Microwave fusing furnace, opening, heated material, leakage electromagnetic field, Bergeron's method

Analytic Solutions for Telegraph Equations of Nonuniform Transmission Lines Derived from Equivalent Transformations

EMCABS: 62-05-87

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(EMCJ86-34)

ABSTRACT: This paper deals with analytic solutions for telegraph equations of nonuniform transmission lines derived from equivalent transformations. Nonuniform transmission lines treated in this paper are A-type (parallel inductor), B-type (series capacitor) and Richards-type (Richards section) nonuniform transmission lines.
INDEX TERMS: Analytic solutions, telegraph equations, nonuniform transmission lines, A-type, parallel inductor, B-type, series capacitor, Richards-type, Richards section

A Measurement of Noise in Data Transmission by FM Radio Wave During Snow Season

EMCABS: 65-05-87

Hiroshi Inoue, Tsutomu Kikuchi, Yasuo Yoshida and Daitaro Okuyama
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EMC-S Tokyo Meeting, March 1986
(EMCJ86-37)

ABSTRACT: Measurements of radio noise by a weak 80 MHz FM data transmission model system in heavy snowfall are reported. It is observed that snowfall, specially heavy and fine powdery snowfall, intermittently induces noise with the duration of 15 to 30 minutes and the intensity up to 47dBV. As the similar noise observed in the field measurement, the basic data for noise immunity of the system is obtained.
INDEX TERMS: Measurements, radio noise, FM data transmission, heavy snowfall, noise, field measurement, noise immunity

Improvement of Three-Winding Transformer and its Application to Push-Pull Amplifier

EMCABS: 63-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-35)

ABSTRACT: We have improved the three-winding transformer. Our improved transformer is suitable for application to push-pull amplifiers, which have much balanced outputs. We have constructed a class B push-pull amplifier utilizing transformers of this type and have analyzed the frequency characteristics of the circuit by the distributed parameter theory. The measured values agree well with our theoretical curves and wide band characteristics are obtained.
INDEX TERMS: Three-winding transformer, push-pull amplifier, balanced outputs, class B, distributed parameter theory, wide band

Effect of Doping Ferrite in Electromagnetic Wave Absorber, Carbon-Rubber

EMCABS: 66-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-38)

ABSTRACT: The performance characteristics of ferrite or rubber ferrite as an electromagnetic wave absorber are superior to lossy dielectric materials in the VHF and UHF band. But, as viewed from the point of bandwidth, there is an upper limit frequency for ferrite and rubber ferrite absorber. The bandwidth of ferrite absorber deteriorates over this limit frequency. In this report, ferrite-doped carbon rubber is investigated to widen the bandwidth of the absorber. Compared with a carbon-rubber undoped with ferrite, bandwidth of the absorber has been increased two times and the thickness of the absorber has been decreased by about 15 percent.
INDEX TERMS: Ferrite, rubber ferrite, electromagnetic wave absorber, lossy dielectric materials, VHF, UHF, bandwidth, ferrite-doped carbon rubber

Electromagnetic Wave Absorber Consisting of Foamed Rock Cover with Carbon Powder

EMCABS: 67-05-87

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(EMCJ86-39)

ABSTRACT: A new electromagnetic absorbing material is described consisting of foamed rock covered with carbon powder and its use for absorbers at VHF and above. The experimental results are obtained for the reduced model at microwave frequencies. Though the electromagnetic property of this material is much the same as conventional materials, there is possibility of realization of a non-inflammable absorber.
INDEX TERMS: Electromagnetic absorbing material, foamed rock, carbon powder, absorbers, VHF, electromagnetic property, non-inflammable absorber

Suppression of the Harmonic Noise from the Microwave Oven

EMCABS: 68-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-40)

ABSTRACT: The microwave leakage from a microwave oven is a serious problem both for human health and for its influence on DBS communication by high frequency harmonic noise. Harmonic microwaves leak mainly from the periphery of the door. In this paper, a new type of rubber ferrite absorbing sheet was developed to obtain the high effective absorption in wide frequency range. Various suppression methods were studied for harmonic noises from the door by the new absorbing sheet. The compact new sealing system with (3 mm × 6 mm cross section) rubber ferrite was demonstrated and it was found that the shielding effect was about 10dB.
INDEX TERMS: Microwave leakage, microwave oven, health, DBS communication, harmonic noise, door, rubber ferrite absorbing sheet, absorption, suppression methods, rubber ferrite, shielding

Characteristics of Resonance-Type Absorber for Polarized Planes of Wave

EMCABS: 69-05-87

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(EMCJ86-41)

ABSTRACT: By Bergeron's method we describe the fundamental treatment of resonance-type electromagnetic wave absorber of the magnetic substance and simulate the reflection characteristics for different planes of polarization of waves on both non-coating case and coating case.
INDEX TERMS: Bergeron's method, resonance-type electromagnetic wave absorber, magnetic substance, reflection, polarization

Pattern Modulations of Biconical Horn Antenna by Absorber Mounting

EMCABS: 70-05-87

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(EMCJ86-42)

ABSTRACT: Whereas absorber mountings on a symmetrical biconical antenna has an asymmetrical pattern, suitable absorber mounting on an asymmetrical biconical antenna is likely a symmetrical antenna. In this paper, the pattern's change by absorber mounting is discussed.
INDEX TERMS: Absorber, biconical antenna, asymmetrical pattern, asymmetrical biconical antenna, symmetrical antenna

Effects of Dielectric Supporter on Input Impedance of Wire Antennas

EMCABS: 71-05-87

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(EMCJ86-43)

ABSTRACT: In this paper, the effects of organic dielectric supporter (PMMA) on the input impedance of various types of antennas are reported. The change of the input impedance is measured changing the position of the supporter, which is movable along wires of antennas. When the supporter is on the feed-point, the peak position of the maximum resistance or the maximum reactance as a function of frequency always shifts to a lower frequency than the supporter-free antennas. The peak values are also diminished by the supporter on the feed-point. This effect can be explained by considering the dielectric loss of waves in the supporter. However, changes of the input impedance by the supporter on the other positions is too complex to interprete exactly.
INDEX TERMS: Organic dielectric supporter, PMMA, input impedance, antennas, feed-point, resistance, reactance, dielectric loss

Measurement of the Antenna Gain of the Dipole Antennas by Three-Antenna Method

EMCABS: 72-05-87

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EMC-S Tokyo Meeting, March 1986
(EMCJ86-44)

ABSTRACT: The antenna gain of half-wavelength dipole antennas are measured by the three-antenna method for the frequency range of 120 MHz to 460 MHz. The proximity error between two antennas are analyzed theoretically and compensated in the measurements. It is confirmed that the proximity error can be compensated with an accuracy of ± 0.1dB for antenna spacing larger than a half wavelength.
INDEX TERMS: Antennas gain, half wavelength dipole antennas, three-antenna method, proximity error

A Study on Radiation Patterns of Asymmetrical Discone Antennas

EMCABS: 73-05-87

Koji Nagasawa and Isamu Matsuzuka
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EMC-S Tokyo Meeting, March 1986
(EMCJ86-45)

ABSTRACT: When the circular disk and the cone of discone antennas are asymmetrically constructed, the radiation patterns also lay these asymmetrical characteristics. In this paper, these radiation fields are obtained basing as the symmetrical antenna and the calculated and experimental patterns of the asymmetrical discone antennas are presented. From these results, it may be supposed that the validity of this method obtaining the radiation fields of the asymmetrical discone antenna.
INDEX TERMS: Discone antennas, radiation patterns, asymmetrical, radiation fields calculated, experimental patterns, asymmetrical discone antenna

State Variables Sensitivity in Power Inverter Circuits to Predetermined Influences

EMCABS: 74-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
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ABSTRACT: Considered are sensitivity functions to state variables in power inverters which are sources of high-power concentrated interference. Predetermined influences are represented by parameters of sets of differential equations with discontinuous right sides. Investigated is differentiability of these equations by initial values and parameters. An objective functional is represented in the Mayer form.
INDEX TERMS: Sensitivity functions, state variables, interference, Mayer form

Conductive Coatings for EMI/RFI Shielding

EMCABS: 75-05-87

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Part 2, 1986, pp. 709–715

ABSTRACT: When most communication and business machine equipment was housed in metal enclosures, the problems of electromagnetic (EMI) and radiofrequency (RFI) interference were slight. The increasing use of engineered plastics has now focused greater attention on methods of preventing EMI/RFI and in this area conductive coatings have a major role to play.
INDEX TERMS: Electro-magnetic, EMI, radio-frequency (RFI) interference, EMI/RFI, conductive coatings

The Importance of Electromagnetic Compatibility for Modern Telecommunication Services

EMCABS: 76-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 736–745

ABSTRACT: An overall review of current trends in the development of modern telecommunication services is given and their growing mutual interdependence is underlined. Particular attention is drawn to the fact, that the strong trend towards digitalization and integration of telecommunication networks creates a lot of unexpected difficulties in the operation of such networks. The progress in semiconductor technology and in the LSI and VLSI techniques makes the overcoming of these problems more and more difficult because of a lower level of signals being processed and a greater susceptibility of the integrated circuits to even not very strong electromagnetic fields. On the other hand, the advantages of fiber optic systems from the EMC point of view are presented.
INDEX TERMS: Telecommunication services, telecommunication networks, semiconductor, LSI, VLSI, susceptibility, electromagnetic fields, fiber optic, EMC

Shielding Effectiveness of Conductive Wires over the Underground Railway Lines

EMCABS: 77-05-87

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Part 2, 1986, pp. 746–753

ABSTRACT: Magnetic fields caused by currents in underground railway lines may cause interference in the operation of electronic equipments or systems which are working in buildings near or over these railway lines. In this paper analysis of one shielding method is presented. In this method the additional copper or steel wires were put over the railway line. These wires are insulated or connected with the railway rail and the current flow in these wires is contrary to that of the contact system.
INDEX TERMS: Shielding effectiveness, magnetic fields, interference, railway lines, shielding method

Mathematical Model of Power Converter as a Source of High-Power Concentrated Interference

EMCABS: 78-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 754–763

ABSTRACT: Peculiarities of mathematical models of power coverters as sources of high-power concentrated interference are given. Developed are methods of analysis, synthesis and optimization of power converters of variable structures with the use of gate models of various degrees of complexity. The software developed for modeling converters allows to upgrade the electromagnetic compatibility between converters, information and power networks.
INDEX TERMS: Mathematical models, power converters, interference, analysis, gate models, electromagnetic compatibility

State of EMC Standardization in Czechoslovakia

EMCABS: 79-05-87

P. Vaculikova, J. Svoboda, V. Simacek and M. Vondrak
Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 774–780

ABSTRACT: The complicated problems of EMC arising from increasing utilization of electronic power control and other sources of interference caused an urgent need to limit dangerous and disturbing effects from interference sources upon broadcast reception, power supply networks, control systems, etc., as well as to raise noise immunity of possible interference receivers. Based on several well established international and national documents, several new national and departmental standards have been produced in Czechoslovakia recently. The paper presents a survey of these.
INDEX TERMS: EMC standardization, EMC, interference, noise immunity, interference receivers, standards, Czechoslovakia

Calculation of Attenuation for Waveguide Below Cut Off as a Vent Hole in Enclosure

EMCABS: 80-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 2, 1986, pp. 781–790
ABSTRACT: The effects of seams, cracks, openings, holes and other breaks in a shield can be developed by considering the opening as a waveguide below cut off (WBCO) and determining the waveguide attenuation. Based on equivalent transmission line method, this paper deals with the general formula of attenuation for waveguide below cut off, and gives simple analytical formula of attenuation for circular/rectangular waveguide with H_{11}, E_{01}/H_{10} mode. In addition to this, based on requirements associated with electromagnetic compatibility (EMC), the shield performances of electronic equipment configuration in relation to some factors of influence are described in this paper.
INDEX TERMS: Vent hold, enclosure, shield, waveguide below cut off, WBCO, waveguide attenuation, analytical formula, attenuation, electromagnetic compatibility, EMC, shield performances, leakage, electromagnetic energy

Shielding of a Communication Data Link Against EMP Threat

EMCABS: 81-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 795–804

ABSTRACT: A method is presented in this paper for determining the shielding effectiveness of metal shields to protect data links from EMP threats. For this purpose the EMP is expressed in a double exponential analytical model. The cylindrical shielding structure is approximated by tubes made of steel, copper and aluminum separately and is considered for working out mathematically the minimum thickness of tubular shields necessary for optimum shielding. The results of analysis are shown graphically. Computations are carried out using a Fast Fourier Transform (FFT) technique to get the EMP spectrum. Field coupling into a metal tube is evaluated using classical coupling equations.
INDEX TERMS: Shielding effectiveness, metal shields, EMP, analytical model, shielding structure, Fast Fourier Transform, FFT, spectrum, field coupling

Analysis and Simulation of Transient E-Field Coupling to Cables and Circuits

EMCABS: 82-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 805–814
ABSTRACT: In this paper, an analysis is made to estimate the coupling of transient E-field to interconnecting cables and circuits. The frequency spectrum of a known transient waveform from a transient generator is computed using 64-point Fast Fourier Transform (FFT) and E-field coupling to cable and circuits is then calculated. The Inverse Discrete Fourier Transform (IDFT) is then calculated, which gives the time domain waveform of the coupled transient at the output. A parallel plate antenna built in the laboratory is used for generating the transient E-field. The combined cable and circuit models built for the purpose are subjected to the thus generated E-field and the output waveforms are graphically presented.
INDEX TERMS: Analysis, simulation, transient E-field, coupling, interconnecting cables, circuits, frequency spectrum, Fast Fourier Transform, FFT, Inverse Discrete Fourier Transform, IDFT, parallel plate antenna

Prony's Method Applied to Processing Electromagnetic Transient Data

EMCABS: 83-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 824–831

ABSTRACT: In this paper we compare the results obtained using different autoregressive (AR) parameter estimation algorithms at the pole estimation block of the extended Prony method. The method is applied to the extraction of the poles and residues of the backscattered field for a Gaussian pulse incident from some different angles on a straight wire. Numerical examples for several cases are presented.
INDEX TERMS: Electromagnetic transient, data, autoregressive (AR) parameter estimation algorithms, Prony method, backscattered field, Gaussian pulse, numerical examples

On the Wire Configuration Study in the Time Domain

EMCABS: 84-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 832–841

ABSTRACT: Complex wire configurations excited by pulsed electromagnetic signals are analyzed in the time domain, using the integral equation of the electric field (EFIE). This equation is transformed into a suitable expression to calculate, by numerical computation, the current distribution on the wire structure.
INDEX TERMS: Complex wire configurations, pulsed electromagnetic signals, time domain, electric field, EFIE, numerical computation, current distribution

Electromagnetic Transients in Public Low Voltage Power Installations

EMCABS: 85-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
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ABSTRACT: Measurements of the electric field strength from lightning and the related induced voltage transients in low voltage power (l.v.p.) installations have been performed in two different structures. The small dipole antenna theory has been used to estimate the "effective equivalent antenna height" of the investigated l.v.p. installations. The validity of the small dipole antenna model has been confirmed by calculating the induced voltage transients in the installations, using the measured electric field strength oscillograms and comparing the calculated waveforms with the measured voltage transients.
INDEX TERMS: Electromagnetic transients, measurements, electric field strength, lightning, induced voltage transients, low voltage power, l.v.p., small dipole antenna theory, "effective equivalent antenna height"

Unshielded Simple Cable Configurations Illuminated by Lightning Electromagnetic Pulses

EMCABS: 86-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 857-865

ABSTRACT: A direct lightning stroke to a building may cause damages or interferences in operation of majority of electronic and electric systems. For this reason in this paper an attempt has been made to determine theoretically the voltages induced in low-voltage unshielded simple cables situated in the interiority of buildings struck by lightning. The calculations of these voltages were carried out by changing dimensions of the cable configuration and their places in respect to the striking point.
INDEX TERMS: Lightning electromagnetic pulses, lightning stroke, building, damages, interferences, electronic, electric systems, unshielded simple cables, cable configuration

Closed Form Solution for EMP Reflection by Earth

EMCABS: 87-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 886-873

ABSTRACT: An exact solution for the transient reflected EM wave from a lossy earth is derived for the case of an obliquely incident horizontally polarized impulsive plane wave. The obtained solution can be scaled in time and magnitude to cover responses of different kinds of soil. The similar solutions are obtained for the case of a double exponential EMP. The solutions are expressed as an infinite series of potential and exponential terms. Numerical results are presented for a variety of parameters to illustrate the possibilities of the proposed solution.
INDEX TERMS: Exact solution, transient, reflected EM wave, lossy earth, impulsive plane wave, soil, numerical results

Radio Signals Mutual Relations Index

EMCABS: 88-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 930-939

ABSTRACT: The known signal's relations coefficients, such as mutual resolution coefficient, compatibility coefficient, probability of successful communication and so on, is shortly discussed and compared. Then the new measure called the signal distance index is introduced. It is expressed, in the simplest case, by the probability that the value of a given signal feature (e.g., envelope level) exceeds the appropriate value of interference. Some examples of application of the new measure have been done.
INDEX TERMS: Radio Signals Mutual Relations Index, relations coefficients, mutual resolution coefficient, compatibility coefficient, probability, signal distance index, envelope level, interference

Systematic Analysis of Interference of Fading Radio Signals

EMCABS: 89-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 954-963

ABSTRACT: Investigation of fading radio signals is reported. Three probabilistic signal models (by Rayleigh, Rice and Nakagami) and their combinations are analyzed. Two novel results have been published recently by these authors. The paper presents four novel closed-form expressions for the interference probability, with Rician signals included. All six results are general, exact and surprisingly simple. Merits of the Nakagami model are emphasized.
INDEX TERMS: Fading radio signals, probabilistic signal models, closed-form expressions, interference probability, Rician signals, Nakagami model

Signal Analysis by a Subclass of Hadamard Matrix

EMCABS: 90-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 973-977

ABSTRACT: A subclass of the Hadamard matrix has been proposed in this paper. It is shown that a class of discrete digital signal can be represented with the spectral points of a subclass of the Hadamard matrix. By permutation, The Walsh-Hadamard transform can be used to carry out the signal's pseudo-randomization.
INDEX TERMS: Signal analysis, Hadamard matrix, discrete digital signal, spectral points, Walsh-Hadamard transform, pseudo-randomization

A Method of Producing Random Pulse Signals **EMCABS: 91-05-87**

Zhou Kesheng and Zhang Linchang
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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 978-987

ABSTRACT: This paper presents a method of using a microcomputer and a single board computer to produce random pulses whose amplitude and separation interval can vary in accordance with the definite statistical distributions. The random pulses can be used to simulate some radio noises. The random pulse generator is described in detail.
INDEX TERMS: Random pulses, statistical distributions, simulate, radio noises, generator

Electromagnetic Compatibility and Harmonic Distortion Measurement **EMCABS: 92-05-87**

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 988-994

ABSTRACT: For the investigation of the electromagnetic compatibility and limitation of interferences the knowedge of voltage and current harmonics have decisive importance. To measure harmonics we have built an automatic measuring workplace as a part of our Electromagnetic Compatibility Laboratory. Our measuring system is based on the application of FFT frequency analyzers. Some harmonic measurement results are given.
INDEX TERMS: Electromagnetic compatibility, interferences, voltage, current harmonics, harmonics, FFT frequency analyzers

The Correlative Feature and Logical Network Design of the Modulo 2^n Valued Operations **EMCABS: 93-05-87**

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1004-1014

ABSTRACT: This paper discusses the correlative feature between modulo 2^n valued additions $\oplus_{2^n}$ and subtractions $\ominus_{2^n}$ operation first suggests their intricate truth table and the logical EXCLUSIVE-or conversions, and by using an analytic method of Boolean logic presents a series general formulas of the $\oplus_{2^n}$ and $\ominus_{2^n}$ operations etc. A logical network design for the modulo 2^n valued operations is worked out, which facilitates application of these operations in information transmission and number communication. The importance of the modulo 2^n valued operations in time of $n>2$, and the future expectations of their application are also discussed in this paper.
INDEX TERMS: Boolean logic, logical network design, modulo 2^n valued operations, information transmission, number communication

Solving Method of the Searle Coupled Equations and Their Application in the Sequency Theory **EMCABS: 94-05-87**

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1015-1025

ABSTRACT: This paper first presents how the Carry-Free Fast Walsh-Fourier Transform can be represented by the Searle couple equations, and gives one dependable solving method. These equations and their solving method are very useful in the sequency theory, such as not only can be applied logical network designing of the Carry-Free FWFT, but also quite adequate to demonstrate the detail transforming process and their important reversible properties. The importance of the Searle coupled equations for digital communication and signal processing are also briefly discussed in this paper.
INDEX TERMS: Carry-Free Fast Walsh-Fourier Transform, Searle coupled equations, sequency theory, logical network, digital communication, signal processing

Laboratory for the Measuring of the Industrial Interference **EMCABS: 95-05-87**

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1026-1034

ABSTRACT: A laboratory for electromagnetic compatibility was built in our Institute in 1985. This is a specially equipped laboratory used for the measuring of radio interference, simulation of pulse interference and for the measurement of various devices as far as their resistance against interference is concerned. Devices are made by Rohde and Schwarz, Tektronix, Schaffner and Marconi. We can measure radio interference from 10 kHz to 1 GHz. The whole set of devices is exclusively oriented to the HP-IB bus, which enables us to measure fully automatically.
INDEX TERMS: Electromagnetic compatibility, radio interference, pulse interference, measurement

Computer-Controlled High-Resolution Radio-Monitoring System **EMCABS: 96-05-87**

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1035-1043

ABSTRACT: A high-resolution radio-monitoring system is formed of a suitable measuring receiver, an appropriate demodulator and a low-frequency FFT analyzer. The system measures field strengths and frequencies of signals with high selectivity. The FFT analyzer serves as a panoramic display and, by computer evaluation of spectra, the automatic identification and measurement of signals is possible. A brief overview of different measuring concepts is given. A simple approach to measure the magnitude of periodic signals is described.
INDEX TERMS: Computer-Controlled High-Resolution Radio-Monitoring system, receiver, demodulator, low-frequency FFT analyzer, panoramic display, computer evaluation of spectra, measuring concepts, periodic signals

Characteristics of EMI Statistical Parameters APD and NAD and their Measurements

EMCABS: 97-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1051–1058

ABSTRACT: Use of the statistical parameters APD and NAD to study electromagnetic interference is discussed. The design concepts, construction, details and performance of the first Chinese APD/NAD measurement instrument are described. The instrument consists of medium-scale integrated circuits and is controlled by a Chinese TP801-Z80 microprocessor. Using computer software instead of hardware simplifies the circuitry of the instrument. The results of the measurements of the ignition noise of a Chinese Model 130 truck and the noise of an electric railway using this instrument are analyzed and their APD and NAD data are plotted. The curves show the probability distributions and the main pulse rates of the noises.

INDEX TERMS: Statistical parameters, APD, NAD, electromagnetic interference, Chinese APD/NAD measurement instrument, ignition noise, probability distributions, main pulse rates

Editing of Pulse Interferences in Digital Receiving Systems

EMCABS: 98-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1059–1068

ABSTRACT: A digital filter for editing of data in digital receiving systems is presented. It is intended for localizing and filtering of short time, wideband pulse interferences with a lifetime greater than the correlation interval of the received signal. One and the same signal is used for localizing of the interference as well as for its editing. Analytical expressions for the statistical parameters of the edited signal are obtained. It is shown that the filter has a high efficiency even without a priori information about the signal, and may operate in real time. An example is considered and a computer model of the filter is given.

INDEX TERMS: Digital filter, data, digital receiving systems, wideband pulse interferences, correlation, signal, statistical parameters, real time, computer model, filter

Microwave Field Pattern Measurement for EMC Study

EMCABS: 99-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1069–1074

ABSTRACT: The author has developed a robotic system for automatic measurement of a microwave field. An antenna (sensor) scans a field space to be measured. The data of each point in the scanned space is stored in memory and processed to display or print out as a field pattern. All systems are controlled by a microcomputer. Scattering field by an object to be studied can be obtained without use of a special measuring site by obtaining a difference between the field intensity without object and that with object. Several measuring examples are presented, such as a field pattern in a living space, diffraction pattern around a living body, pattern measurement of an effect of aprons for protection from microwave field, and so on.

INDEX TERMS: Microwave field pattern measurement, EMC, robotic system, microwave field, antenna, field pattern, living space, diffraction pattern, living body, pattern measurement, aprons, protection

The Application of Bridge Functions to Engineering

EMCABS: 100-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1075–1084

ABSTRACT: A bridge function system was introduced where the bridge functions make up a three-valued system, only taking the values -1, 0, and $+1$, and connect the Walsh functions with block pulses. It can be proved that the bridge functions are orthogonal and complete when certain conditions are satisfied. In this paper, we try to develop the applications of the bridge functions to engineering.

INDEX TERMS: Bridge function, three-valued system, Walsh functions, block pulses, orthogonal, complete, applications, engineering

Compatibility Criteria Between Television Signal and Spread-Spectrum Signals

EMCABS: 101-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1113–1122

ABSTRACT: The paper deals with the possibility of coexistence of a spread-spectrum system sharing the same frequency band, on a mutual noninterference basis, with a television transmitter. Frequency-hopping and direct-sequence techniques are examined, and the required protection ratios for providing an imperceptible television quality degradation are experimentally derived by means of subjective assessment tests.

INDEX TERMS: Spread-spectrum, mutual noninterference, television transmitter, direct-sequence techniques, protection ratios, quality degradation

Optimization of Radio Spectrum Use and Frequency Assignment Procedures for Mobile Radio Systems

EMCABS: 102-05-87

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Eighth International Wroclaw Symposium on Electromagnetic Compatibility
Part 3, 1986, pp. 1123–1132

ABSTRACT: The paper presents a definition of spectral efficiency for mobile radio systems which includes the coverage strategy as a S.D.M.A. added to the other multiple access techniques envisaged for the system. The boundary conditions necessary for evaluating this parameter are carefully discussed. Several examples are presented. The advantages obtainable by means of a field strength prediction method based on a geographical data base are shown.

INDEX TERMS: Radio spectrum use, frequency assignment procedures, definition of spectral efficiency, mobile radio, S.D.M.A., multiple access techniques, field strength prediction

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