ARRL EMC Committee Semi-Annual Report

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For The
American Radio
Relay League

Board of Directors Meeting
July 20-21, 2007

Submitted By
Dennis Bodson, W4PWF
Chairman, ARRL EMC Committee

Mission Statement:

The EMC Committee monitors developments in the Electromagnetic Compatibility (EMC) field and assesses their impact on the Amateur Radio Service. The Committee informs the ARRL Board of Directors about these activities and makes policy recommendations for further action, if appropriate.

The overall goals of the committee are:

- Advise the ARRL Board about issues related to radio-frequency interference
- Advise the ARRL HQ staff on the content of its publications
- Make recommendations to the ARRL Board and HQ staff

Members of the Committee:

- Dr. Dennis Bodson, W4PWF, ARRL Roanoke Division Director, EMC Committee Chairman
- Mr. Mike Gruber, W1MG, ARRL Lab RFI Engineer, HQ Staff Liaison
- Mr. Jody Boucher, WA1ZBL, RFI troubleshooter, Northeast Utilities
- Mr. Ed Hare, W1RFI, ARRL Laboratory Manager
- Mr. Ron Hranac, N0IVN, Technical Leader, Cisco Systems; Board of Directors, Society of Cable Telecommunications Engineers
- Mr. Steve Jackson, KZ1X, VDSL and wireless communications
- Dr. Ron McConnell, W2IOL, T1E1.4 VDSL Standards Committee
- Mr. Cortland Richmond, KA5S, EMC Engineer
- Mr. Mark Steffka, WW8MS, Automotive EMC engineer
- Dr. Steve Strauss, NY3B, Home Phone Networking Alliance Technical Committee
- Mr. Hugh Turnbull, W3ABC, ARRL Honorary Vice President

Committee Meeting:

The ARRL EMC Committee met in person at the ARRL Headquarters Building conference room. The two day meeting was called to order at 9:10 AM EDT June 12 by Chairman Dennis Bodson, W4PWF. There were five members present and each discussed EMC issues in there related field of expertise. Additional highlights of this meeting include:

- Mr. Bodson showed a facsimile of an award that will be presented to Committee member Hugh Turnbull, W3ABC. The award recognizes Mr. Turnbull for his many years of dedication and service to the ARRL EMC and RFI programs. In addition, it provides Mr. Turnbull Emeritus status in the ARRL EMC Committee. It should be noted that Mr. Turnbull is the first Committee member to be so recognized.
- Mr. Turnbull was unanimously granted emeritus status on the ARRL EMC Committee. Furthermore, emeritus Committee members were unanimously granted full voting rights and privileges.
- Mr. Bodson reviewed the goals and mission statement of the EMC Committee. Mr. Bodson said the EMC Committee is working well overall.
- Mr. Bodson discussed the possibility of an EMC Committee presence at the 2008 Dayton Hamvention. Mr. Steffka further elaborated upon the idea and Mr. Hare also suggested such a Committee presence. The general sense of the Committee was to approve this idea, including both a forum and an exhibit. No specific plans were discussed however. The 2008 Dayton Hamvention dates are May 16, 17 and 18. Additional discussion and planning can take place when appropriate.

HQ Staff:

The role of the ARRL HQ staff consists of the following:

- Answer individual inquiries from hams (and sometimes their neighbors) about RFI problems
- Write and publish articles about RFI
- Write and publish the ARRL RFI Book
- Design and update ARRL's RFI web pages
- Maintain a database at ARRL to facilitate EMC case tracking and reporting
- Work with ARRL's D.C. office on various spectrum and RFI-related filings
- Maintain contact with industry
- Participate in standards and industry groups. This includes ANSI C63, Society of Automotive Engineers EMC and EMR committees, Home Phone Networking Alliance, VDSL, HomePlug, FCC and individual companies.

Mr. Gruber handles the majority of the staff work on EMC matters. In the 1st half of 2007, he completed work on a new second edition of the ARRL RFI Book. This edition was completely updated with several new chapters and published in April.

First Half 2007 Year Total RFI-case statistics:

New RFI Cases – 151
New electrical power-line cases – 44

- ARRL Letters sent – 15 (Of those 15 letters, 14 went to power companies.)
- FCC 1st Letters sent – 5
- FCC 2nd Letters sent – 1

EMC/RFI-related emails Total - 2074

Electric Utilities:

Power-line interference has continued to be the single number one interference problem reported to ARRL HQ. These cases are being worked on by HQ staff, in cooperation with Riley Hollingsworth of the FCC. As previously reported, two cases have now resulted in a field investigation. An official FCC citation was issued by the Tampa Field Office in May of last year. Although both cases remain ongoing, the Dallas Office conducted a follow-up investigation in the other during the week on May 22, 2007. This investigation concluded there was widespread harmful interference in the area of the complainant. The FCC agent said he would be back sometime in late August or September. He will be measuring progress and improvement in the noise abatement, although neither involved utility has contacted the complainant or actively working on the problem.

The FCC and HQ staff continues to discuss all open cases monthly. Developing a strong case for enforcement action against an offending utility continues to be a primary goal of Mr. Gruber. In addition, he is planning to do a power line noise seminar with Mike Martin of RFI Services, for FCC personnel in Gettysburg. This seminar is expected to provide FCC field investigators a better understanding of power line noise issues and how to effectively deal with them.

Broadband Over Power Line (BPL):

Broadband over power line (BPL) is the use of electrical wiring or power-distribution lines to carry high-speed digital signals. There are two types of BPL of concern to amateurs. Both *in-building* and *access* BPL have signals that occupy most or all of the HF range, extending into VHF. The power-line or electrical wiring can act as an antenna and radiate these signals. In-building BPL can be used to network computers within a building. It uses the building wiring to carry digital signals from one computer to another. Most in-building BPL operates under the HomePlug industry specification. Access BPL provides broadband Internet access to homes and businesses, using a combination of techniques and wiring. Although some BPL feasibility trials have shut down, the number of utilities trying access or utility-applications BPL is slowly increasing. In-building applications are also on the rise.

There were a number of developments related to BPL that occurred in the first half of 2007:

- The BPL situation in Manassas, VA has continued to remain mostly unresolved. Ed Hare did testing in Manassas that showed strong interference in some parts of the system. Interference complaints continue to come from local Amateurs in Manassas. ARRL has formally complained to the FCC about their handling of the interference reports.
- Other BPL manufacturers, electric utilities and BPL operators have continued to work with ARRL. At this point, ARRL has ongoing dialogue with HomePlug, a consortium of in-premise BPL manufacturers and DS2, a BPL chipset manufacturer used in many BPL designs. ARRL has ongoing dialogue with Amperion, Corinex, Current Technologies, IBEC and Motorola, the majority of BPL manufacturers. These contacts are proving fruitful, as many of the systems deployed are indicating in the BPL database that they are notching the Amateur bands.
- The BPL system in Concord, MA reported in the last Committee report has not yet come on line. There were contract issues between the utility and BPL companies and they are essentially starting from scratch.
- New BPL systems continue to come on line, or at least to appear in the BPL database. Central Michigan is process of getting BPL, as just one example.
- Mr. Hare continues to represent Amateur Radio's stake in BPL standards development on various industry committees. These include the IEEE P1775 BPL EMC committee; the IEEE EMC Society Standards Development Committee and ANSI ASC C63™.

ARRL's information on BPL is found at www.arrl.org/bpl.

DSL (Digital Subscriber Line):

Dr. McConnell reports some changes in nomenclature have taken place. The T1E1.4 (which was not an acronym) committee is now NIPP NAI (Network Interface, Power, and Protection - Network Access Interfaces) Committee. This committee is under ATIS (Alliance for Telecommunications Industry Solutions), which is certified by ANSI (American National Standards Institute) to develop telecommunications standards. ATIS also had a former meaning that is no longer in use.

NIPP NAI still deals with the various xDSL interfaces and standards and interfaces with the counterpart committees of ITU-T.

Dr. McConnell also points out there is a VDSL2 tutorial by the DSL Forum at:
www.dslforum.org/learndsl/ppt/VDSL2_Tutorial-2005.ppt

VDSL2 Band Plans appear at:
www.lightreading.com/document.asp?doc_id=93103&page_number=1&image_number=1&site=

And a smaller version of the Band Plans appear at: http://tinyurl.com/395hdr

Automotive EMC:

Mr. Hare continues as the ARRL representative on the Society of Automotive Engineers EMC (Electromagnetic Compatibility) and EMR (Electromagnetic Radiation) Committees. The Headquarters staff continues to send all reports of automotive EMC problems to interested people in the automotive industry. While these reports are advisory, they are helpful to the industry in planning for future designs. Mr. Steffka along with a coauthor, wrote the automotive chapter in the new edition of the *The ARRL RFI Book*.

Cable Television:

As a whole, the cable industry continues to do a good job at adhering to the FCC's regulations about leakage and interference. ARRL has received few reports of problems, indicating that most systems are either clean or are addressing complaints effectively. The few cases ARRL has been involved with have been addressed through Mr. Hranac, the cable-industry member of this committee. He generally refers the report to the senior technical management of the involved cable company, who then in turn help the local system resolve the reported problem. All of the handful of cases with which Mr. Hranac has been involved in the last six months have all been resolved satisfactorily.

The ARRL RFI Book:

Mr. Gruber completed final editing and review for the new edition of *The ARRL RFI Bo*ok, This publication became available for sale in April. Four Committee members wrote or edited and updated several chapters. In addition, one new chapter and a new section to a previously existing chapter have been added:

- Mr. Gruber: Edited all material, wrote a new chapter concerning general Part 15 consumer devices which summarizes some key points in the book. He also wrote a new section to the power line and electrical noise chapter entitled, *How to Resolve a Power-Line Noise Complaint."*
- Mr. Hare: Rewrote the chapter on RFI Standards and Regulations. Mr. Hare also worked with Mr. Gruber on the new chapter concerning general Part 15 consumer devices, which summarizes some key points in the book.
- Mr. Steffka: Rewrote the chapter on Automobiles.
- Mr. Hranac: Edited and updated the chapter on CATV interference. He also updated the chapters on Antenna Television and VCRs.

Two additional authors are not Committee members. Ghery Pettit, N6TPT and Hartley Gardner, rewrote the Computers and RFI At The Receiver chapters, respectively. Mr. Gardner also edited and updated the Intermod chapter.

Database:

The ARRL HQ staff maintains a database of RFI reports and cases. This is used primarily as a case-management tool for the several hundred RFI cases ARRL handles every year, but the information the Lab staff are gathering about types of interference cases, involved equipment and frequencies will provide a wide range of reporting capability. Here are some statistics from the database for the 1st half of 2007:

RFI COMPLAINTS BY SOURCE:	
Power Line Noise	44
Amateur Radio	22
Unknown	33
Appliances & Electrical Devices	7
Automotive	5
Computer	7
Electric Fence	3
Non-Amateur Transmitters	5
TV	7
Medical Device	1
Cordless Phone	1
CATV	1
Street Light	1
Lighting & Lighting Device	6
Miscellaneous	8
TOTAL 1st Half 2006 cases:	**151**

RFI COMPLAINTS BY VICTIM:	
Amateur Radio	115
BC Radio	3
Electrical Device	1
Stereo & Intercom	3
Automotive	5
Telephones	3
Alarm	3
Unknown	2
Sprinkler System	1
Computer & Related Devices	4
TV	5
Garage Door Opener	1
WiFi	1
Miscellaneous	4
TOTAL 1st Half 2007 cases:	**151**

Committees:

ARRL continues to be represented on professional EMC committees. Messrs. Hare and Bodson continue to represent the interests of Amateur Radio on the ANSI ASC C63™ RFI committee. Mr. Hare is the ARRL C63™ representative; Dr. Bodson is the alternate. Mr. Hare serves as the chairman of Subcommittee 5, Immunity. Mr. Hare also chairs the C63 committee's ad-hoc working group on power-line communications devices. This continues to be a hot topic of discussion at the C63 meetings.

The C63 committee is working on developing industry standards for immunity, emissions and testing of electronic devices. ARRL serves as a resource to the committee to protect the interests of Amateur Radio. Subcommittee 1 continues to work on a variety of EMC projects, primarily related to test site standardization. Subcommittee 5 deals with immunity and immunity measurement issues. Subcommittee 8 deals with various types of medical equipment. The ARRL EMC-Committee representation on C63 watches immunity and testing developments.

Mr. Hare was also appointed to serve on the IEEE BPL-standard committee, serving on its EMC Working Group. He was also appointed to serve on the IEEE EMC Standards Development Committee, where he serves as its Secretary and chairs their BPL/PLC study project.

ARRL also continues its participation in the Society of Automotive Engineers EMC and EMR Committees. Mr. Hare is the ARRL representative on those committees. Mr. Steffka also serves on the committees, representing his employment in the automotive industry.

The Future of EMC and Amateur Radio:

Interference to hams appears to be the present major work of the committee. Although immunity problems still do occur, this is being addressed at the national and international standards level. RFI from unlicensed devices poses a major real threat to Amateur Radio at this time. This will continue to require significant Committee and ARRL staff attention. To the extent possible with existing staff, or with additional resources, the ARRL should increase its contact with standards organization, industry groups and individual companies, and continue to work on all aspects of RFI problems and solutions.

ARRL's information about RFI can be read at http://www.arrl.org/tis/info/rfigen.html.