

# ARRL EMC Committee Semi-Annual Report

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**For The  
American Radio  
Relay League**

**Board of Directors Meeting  
January 26-27, 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, 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
- Mr. Walt Stinson, W0CP, Former ARRL Rocky Mountain Division Director
- Dr. Steve Strauss, NY3B, Home Phone Networking Alliance Technical Committee
- Mr. Hugh Turnbull, W3ABC, ARRL Honorary Vice President

## **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 2<sup>nd</sup> half of 2006, he continued working on a new second edition of the ARRL RFI Book. This edition will be completely updated with several new chapters.

One case of particular interest, especially with regard to FCC enforcement, involves an illegal (unlicensed) broadcast station causing harmful to the amateur service. Although the broadcast station was reported on the November 29, 2006, it appears to still be on the air and operating freely. It is also causing harmful interference to two licensed amateur repeaters that designated for ARES / RACES use.

## **Second Half 2006 Year Total RFI-case statistics:**

New RFI Cases – 175

New electrical power-line cases – 36

- ARRL Letters sent – 18
- FCC 1st Letters sent – 5
- FCC 2nd Letters sent – 4

EMC/RFI-related emails Total - 1672

## **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. Although two cases have now resulted in a field investigation, and an official FCC citation was issued by the Tampa Field Office in one of them, both cases remain ongoing.

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 locations trying access BPL are increasing. In-building applications are also on the rise.

There were a number of developments related to BPL that occurred in the second half of 2006:

- The BPL situation in Manassas, VA has continued to remain mostly unresolved. In the latest development, the FCC did testing in Manassas, in full cooperation with COMTek, the BPL operator, but without any direct consultation with the local amateur community or the complainants in the case. 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. The work done earlier with DS2, a BPL chipset manufacturer, is bearing some fruit. A DS2-based system manufactured by Corinex is being installed in Houston, TX. When Ed Hare was there for an industry committee meeting, he stayed a couple of days to assess the system in Houston. For the most part, he found that, for the Amateur bands, the system did not cause widespread interference. The 40 dB notches were generally adequate for the ambient noise in the area. WWV and shortwave broadcast, however, were severely impacted by the system.
- New BPL systems continue to come on line, or at least to appear in the BPL database. As examples, a Corinex system is planned to be installed in Concord, MA and another system in central New York State is expected to come on line in the early part of 2007.
- 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 <http://www.arrl.org/bpl>

### **HPNA (Home Phone Networking Alliance):**

Dr. Strauss reports he is no longer active within HPNA as his company (Agere Systems) has no commercial interests in that area any longer. He adds that HPNA has been quasi-dormant for some time (the technology really has not been a commercial success because of several factors) but has recently gained some momentum as they "retro-fit" the technology and re-define the SIG to leverage their technology over the cable/coax medium. HPNA technology is also reportedly being used (over the telephone lines) within Multi-Dwelling Units (MDU's)- most notably in the far east. Shipments of the [HPN] technology into the commercial home networking space - while statistically relevant - likely would come in at around 1% of overall shipment of HN technologies (dominated of course by WiFi).

### **DSL (Digital Subscriber Line):**

Dr. McConnell reports he is not aware of and news on the DSL front relative to ham radio EMI. In this case, Dr. McConnell adds, "No news = Good news."

Dr. McConnell also provides a reference indicating that approximately two thirds of new broadband customers pick DSL. This information reports DSL drives subscriber growth, with 1.25 million signing up to broadband each week. Nearly a quarter choose cable, with more than ten percent selecting FTTx. Dr. McConnell adds that this "DSL" is ADSL (Asymmetric DSL), not the VDSL (Very-high-rate DSL), which is/was of more interest for ham radio purposes. The full report is available at [www.broadband-today.com/article/CA6399870.html?nid=2909](http://www.broadband-today.com/article/CA6399870.html?nid=2909).

### **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 has completed a rewrite of the automotive chapter in a 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 has completed editing, rewriting and writing new sections for the new edition of *The ARRL RFI Book*. It is expected to be available for sale sometime in mid-March.

Four Committee members have rewritten 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, written a new chapter concerning general Part 15 consumer devices which summarizes some key points in the book. He has also written a new section to the power line and electrical noise chapter entitled, *How to Resolve a Power-Line Noise Complaint.*”
- Mr. Hare: Rewritten the chapter on RFI Standards and Regulations. Mr. Hare is also worked with Mr. Gruber on the new chapter concerning general Part 15 consumer devices, and summarizing some key points in the book.
- Mr. Steffka: Rewritten 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 2<sup>nd</sup> half of 2006:

<b>RFI COMPLAINTS BY SOURCE:</b>	
Power Line Noise	36
Amateur Radio	31
Unknown	48
Appliances & Electrical Devices	20
Automotive	5
Computer	5
Electric Fence	6
Non-Amateur Transmitters	4
TV	2
Medical Device	4
Cordless Phone	3
CATV	3
Street Light	1
BPL	1*
Miscellaneous	6
<b>TOTAL 2<sup>nd</sup> Half 2006 cases:</b>	<b>175</b>

<b>RFI COMPLAINTS BY VICTIM:</b>	
Amateur Radio	129
FM BC Radio	3
Electrical Device	4
CATV	6
Stereo & Intercom	4
Medical Device (Pacemakers)	1
Automotive	1
Telephones	6
Alarm	1
Unknown	2
Cordless Phone	2
AM Broadcast Radio	3
Computer	4
TV	9
Miscellaneous	0
<b>TOTAL 2<sup>nd</sup> Half 2006 cases:</b>	<b>175</b>

Notes:

\* BPL compliant has been resolved.

### **Committees:**

ARRL continues to be represented on professional EMC committees. Messrs. Bodson and Hare 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>.