

ARRL EMC Committee Semi-Annual Report

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**For The
American Radio
Relay League**

**Board of Directors Meeting
July 17-18, 2009**

**Submitted By
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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; past member of the 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. Jerry Ramie, KI6LGY, ARC Technical Resources, Inc.
- Mr. Cortland Richmond, KA5S, EMC Engineer
- Mr. Mark Steffka, WW8MS, Automotive EMC engineer
- Dr. Steve Strauss, NY3B, Home Phone Networking Alliance Technical Committee
- Mr. Brent Zitting, KB4SL, International Broadband Electric Communications. Inc. (IBEC)
- Mr. Hugh Turnbull, W3ABC, ARRL Honorary Vice President, EMC Committee Member Emeritus

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 2009, he also started an update and other work on the ARRL RFI Web pages.

Mr. Gruber also completed a rough draft of a proposed IEEE Recommended Practice document for utilities to handle a power line noise complaint. Mr. Hare showed this to the IEEE EMC Society Standards Development Committee, which expressed enthusiasm for the project. An IEEE Project Authorization Request for this project will be considered by the IEEE Electromagnetic Compatibility Society Standards Development Committee at its August 2009 meeting. Mr. Hare reports that there is considerable interest among his electric-utility contacts.

First Half 2009 Year Total RFI-case statistics:

New RFI Cases – 154

New electrical power-line cases – 53

- ARRL Letters sent – 16
- FCC 1st Letters submitted – 9
- FCC 2nd Letters submitted – 0 (Note: Laura Smith had issued a number of FCC letters based on need and input from the ARRL. These letters were not formally submitted by ARRL. Many of these letters were follow-up after the hiatus and therefore required custom legal language.)

Electric Utilities:

Power-line interference has continued to be the single number one known interference problem reported to ARRL HQ. Although these cases continue to be worked on by HQ staff, they were on hold at the FCC after Riley Hollingsworth's retirement on July 3rd, 2008. At the time, all FCC activity on all routine RFI cases had temporarily ceased since

there wasn't anyone to work on them. This hiatus led to a considerable backlog when Laura L. Smith was hired on January 20, 2009.

Mike Gruber reports he met with Ms. Smith on March 5th during her first official visit to the ARRL HQ. Mike reports the focus of their discussion was power line noise and how best to proceed forward with the Cooperative Agreement. He started with a PowerPoint presentation to summarize the program as Riley and he had developed it. Additional discussion took place during the slides, which also included an equipment demonstration using a Model T spark coil as a noise source.

Ms. Smith indicated clearly that she was interested in the subject and intended to continue with the Cooperative Agreement, a process of having the FCC contact power companies about interference complaints. She also proposed some good and useful changes that in Mr. Gruber's opinion will make the program more effective. It was at the time, in everyone's opinion, an extraordinarily successful meeting.

Subsequent to their meeting, Mr. Gruber reports he had been working closely with Ms. Smith to get caught up on case backlog. There are presently about fifty cases with FCC involvement. All cases are now back on track.

Of particular interest is a case that had been previously reported in the last semi-annual report dated January 16-17, 2009. As reported, this case had resulted in a formal field investigation by the Atlanta Field office in May of 2007. Although this case had been ongoing for several years with no resolution, the FCC Field Agent concluded the complainant should continue to work with the utility as he had been. John Pelham, WIJA, the complainant in this matter, reports the noise continued with little or no abatement after the investigation.

Mr. Gruber had the opportunity to visit the site of this complaint in November, 2008 and found four offending sources in about an hour's time. Mr. Gruber further concluded that the utility lacked the necessary equipment and expertise to find the noise sources. One source, in fact, was across the street from the foot of the complainant's driveway. Although Mr. Gruber located this pole in a matter of minutes using modern locating equipment, the utility had been unable to do so in several years.

At the time of this report, the utility in this matter has hired a consultant. The noise however has diminished as a result of hot, humid weather. The complainant will keep the utility, ARRL and FCC advised of any changes.

Another case previously reported in Lakeland, Florida also remains ongoing. At the present time, Mr. Gruber is attempting to work with the FCC to continue working on this case. There doesn't appear to be any active effort by either the FCC or utility to correct this problem.

Mr. Gruber also gave a power line noise presentation in HamCon Colorado in May. While there, he took advantage of the opportunity to investigate another longstanding

power line noise case in Northglenn, Colorado. Mr. Gruber reports he was able to locate two noise sources during his investigation. A third source noted but went away before it could be pinpointed. Mr. Gruber's subsequent report was sent to Laura Smith at the FCC for action.

Plans and discussion remain ongoing to conduct a specialized version of the Workshop for FCC personnel in Gettysburg.

EMC Committee Web Page

Mr. Gruber made some maintenance updates to the EMC Committee Web page which were completed the first half 2009. It includes links to Committee reports, meeting minutes, bios and other relevant Committee information. The URL is:

www.arrl.org/tis/info/emccom.html

Committee Membership

There was no change in the EMC Committee membership during the first half of 2009.

PAVE PAWS

Mr. Hare has continued to work with Dan Henderson, Paul Rinaldo and Chris Imlay to analyze PAVE-PAWS interference and systems. Ed has been running Longley-Rice propagation calculations on repeaters, helping to identify ways that some of the repeaters on "the list" of repeaters requiring mitigation can be kept on the air.

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 continues to be slowly increasing. In-building applications are also on the rise.

In general, BPL installations in 2009 have been stable -- another way of noting that there has not been any significant growth in the number of BPL systems in the US.

- The primary focus points toward BPL to continue to be deployed in rural areas, subsidized by US-government loan, multi-dwelling and in-home BPL and grid automation.
- 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.

Jerry Ramie also reports the following related activities during the first half of 2009:

- The Utility Communications White Paper has been re-titled to *Electric Utility Communications, Applications and Smart Grid Technologies* and posted at <http://www.arrl.org/tis/info/UtilityApplications.html> (it's linked from the "[Alternatives to BPL](#)" page) The material was expanded to include future challenges to the smart grid and re-published in the [TUV Rheinland Market Access magazine](#) in March. The PowerPoint was updated and delivered at the [EmComm West](#) show on May 2 under the ARRL logo. It will be given nine times in 2009, including at the San Francisco IEEE-Communications Society and the IEEE-EMC Society meetings in Minneapolis and Chicago next month. (under the ARRL logo)
- Phase 1 of the [EPRI/NIST Smart Grid Interoperability Standards Project](#) was completed in May with the release of the [initial set of interoperability standards](#) recognized by NIST. Phase 2 began in June, 2009 with the inaugural meeting of the P2030 committee on smart grid interoperability. Mr. Ramie reports he was tasked with attending and reporting on the outcomes of these meetings. The formal report was transformed into a PowerPoint for delivery to the Standards Development Committee at the EMC Symposium at Austin in August, 2009. (also under the ARRL logo)

Mr. Ramie also reports he was approved as Secretary of ANSI-Accredited Standards Committee C63R on Electromagnetic Compatibility on April 20, 2009.

Automotive EMC:

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 also helped prepare some responses to Technical Information Services (TIS) questions for ARRL members. In addition, he is developing an RFI survey for hybrid automobile owners, possibly for use on the ARRL Web. Mr. Hare continues as the ARRL representative on the Society of Automotive Engineers EMC (Electromagnetic Compatibility) and EMR (Electromagnetic Radiation) Committees.

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 only a few reports of problems, indicating that most systems are either clean or are addressing complaints effectively. Only several of these cases have required Mr. Hranac's involvement and ARRL follow up.

Home Phone Networking Alliance

Mr. Strauss reports shipments of HPNA are maintaining steady but obviously pale in comparison to WiFi and other wireless alternatives. There are no issues relative to EMI-conducted or radiated have been reported that he is aware of.

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 2009:

RFI COMPLAINTS BY SOURCE:	
Power Line Noise	53
Amateur Radio	23
Unknown	33
Appliances & Electrical Devices	6
Automotive	5
Computer	4
Electric Fence	5
Non-Amateur Transmitters	4
TV	9
Medical Device	0
Cordless Phone	0
CATV	6
Street Light	1
Lighting & Lighting Device	4
Miscellaneous	0
BPL	0
Water Softener	1
Power Inverter	
TOTAL 1st Half 2009 cases:	154

RFI COMPLAINTS BY VICTIM:	
Amateur Radio	122
BC Radio	0
Stereo & Intercom	4
Automotive	4
Telephones	3
Unknown	1
Computer & Related Devices	5
TV	12
Miscellaneous	3
GFCI	0
TOTAL 1st Half 2009 cases:	154

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 C63TM RFI committee. Mr. Hare is the ARRL C63TM 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.

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>.