

ARRL EMC Committee Semi-Annual Report

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**For The
American Radio
Relay League**

**Board of Directors Meeting
July 15-16, 2005**

**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:

- Mr. Dennis Bodson, W4PWF, ARRL Roanoke Division Director, EMC Committee Chairman
- Mr. Jody Boucher, WA1ZBL, RFI troubleshooter, Northeast Utilities
- Mr. Ed Hare, W1RFI, ARRL Laboratory Manager, HQ Staff Liaison
- 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. Mike Gruber, W1MG, ARRL Lab RFI Engineer
- Mr. Cortland Richmond, KA5S, EMC Engineer
- Mr. Mark Steffka, WW8MS, Automotive EMC engineer
- Mr. Walt Stinson, W0CP, 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 1st half of 2005, worked with a volunteer to develop an on-line library of RFI sound recordings, and developed an automotive RFI survey. The survey is intended to help the automotive industry better identify RFI issues. Both the automotive survey and sounds of RFI page will be added to the ARRL's web site in the near future. Several products have also been informally tested for conducted emissions. The results of this testing will be used to submit an illegal Part 15 product to the FCC.

First Half 2005 Year Total RFI-case statistics:

New RFI Cases - 286
New electrical power-line cases - 97
ARRL Letters sent - 17
FCC 1st Letters sent - 2
FCC 2nd Letters sent - 3
EMC/RFI-related emails Total - 2166

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. Several cases are being prepared for field investigation by the FCC. The FCC and HQ staff continue 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. A professional grade interference locating receiver (Radar Engineers Model 240) was purchased to aid in the power-line noise effort.

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 first half of 2005. ARRL worked closely with Motorola to help them design a BPL system that incorporated the needs of Amateur Radio from the concept. Google and others announced that they were investing almost 100 million dollars in Current Technologies, the BPL manufacturer involved in the Cinergy installation in Cincinnati, OH. Current Technologies and ARRL are working together on EMC issues, to help Current improve the design of their product. IBM is also investing in BPL, through a Texas utility company, Centerpoint. They are using BPL equipment manufactured by Amperion and Mitsubishi, the companies involved in interference complaints in Irving, TX and Cottonwood, AZ respectively. Currently, neither Amperion nor Mitsubishi is involved in discussion concerning interference with ARRL.

As part of his HQ staff work, Mr. Hare continued to visit a number of BPL trial areas, documenting BPL interference and working with local BPL teams. He has also analyzed FCC filings and provided input to the League for use in its filings. This work has been generally reviewed by the Committee in draft form or discussed on the Committee reflector. The EMC Committee continues to monitor ARRL's overall BPL efforts and offer its guidance where appropriate.

ARRL's information on BPL is found at <http://www.arrl.org/bpl>

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 has helped ARRL write a chapter in a new upcoming book on mobile radio. Specifically, this chapter deals with automotive EMC issues.

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 but one of the handful of cases with which Mr. Hranac has been involved in the last six months have all been resolved satisfactorily.

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 2005:

RFI COMPLAINTS BY SOURCE:	
Power Line Noise	97
Amateur Radio	32
Unknown	57
Appliances & Electrical Devices	23
Automotive	9
Computer	12
Electric Fence	9
Non-Amateur Transmitters	7
TV	11
Medical Device	4
Cordless Phone	3
CATV	8
Street Light	3
Miscellaneous	11
TOTAL 1st Half 2005 cases:	286

RFI COMPLAINTS BY VICTIM:	
Amateur Radio	182
FM & TV	13
Electrical Device	13
CATV	5
Stereo & Intercom	6
Medical Device (Pacemakers)	6
Automotive	8
Telephones	11
Alarm	3
Unknown	3
Cordless Phone	4
AM Broadcast Radio	4
Computer	9
TV	10
Miscellaneous	9
TOTAL 1st Half 2005 cases:	286

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 C63 RFI committee. Mr Bodson has been appointed as the C63 representative and HQ staff liaison; Mr Hare is ARRL's 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 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>.