

**REPORT OF THE RF SAFETY COMMITTEE
TO THE
ARRL BOARD OF DIRECTORS**

July 2002

The RF Safety Committee has participated in the following areas over the past six months:

1. RF Safety Committee Activities.
2. Monitoring recent scientific studies regarding RF Safety.
3. Participation in the scientific RF Safety community.
4. Administrative issues.
5. Future Plans.

1 RF Safety Committee Activities

- 1.1 Mr. Hare testified at a zoning board hearing in Kinderhook, NY in support of the application of Fred Fitte, WA2MMX, for a permit to erect a 50' tower. Mr. Hare presented references to organizations such as IEEE COMAR and the American Physical Society. His presentation showed comments on the lack of scientific backing for theories that RF exposure at levels below those allowed by the existing safety standards, and FCC Regulations, is harmful. The Committee helped to prepare a list of organizations that Mr. Hare could reference to support this.
- 1.2 A ham that was concerned that he could look out his office window and see a cellular telephone base station antenna at the same level near-by contacted the Committee. A comparison to the parameters of his own amateur station, with respect to antenna distances from people and the typical 100-watt power output, helped to ease his fears.
- 1.3 A research assistant for the Wireless Electromagnetic Compatibility Center at The University of Oklahoma, Norman, contacted Mr. Hare. They were looking for some RF Safety calculation methods that could be used to estimate electromagnetic interactions between cell sites and gas stations and also to estimate the electromagnetic interactions between cell sites and pacemakers. Mr. Hare informed the inquirer that we are an Amateur Radio organization and do not usually deal with these topics, and then directed him to some documents on the ARRL website and at the FCC. This contact speaks well of the reputation that ARRL has attained in the scientific RF Safety community.
- 1.4 A ham that was interested in constructing an Earth-Moon-Earth station contacted Mr. Hare for help with an RF Safety analysis. Unlike the usual simple calculations, an EME station has a higher potential for unsafe RF exposure due to the high power levels coupled to a highly directional antenna, and more complex calculations are called for. Mr. Hare did some modeling and described the method that he used to determine that this ham's proposed EME station would not exceed Maximum Permissible Exposure limits.

- 1.5 Mr. Hare provided a “Doctor Is In” response to a question about the safety of EME antennas that appeared in the Jan 2002 issue of QST.
- 1.6 The Committee was asked for its opinion about ARRL using a photo for Kid’s Day where a kid is holding an antenna connected to an HT. Dr. Guy quoted FDTD absorption analysis data for 2M HTs, though a detailed analysis of this specific setup was not available. The consensus was that an RF Safety issue did not exist. The FCC specifically exempts these radios from exposure analysis because of their low power and intermittent transmissions.
- 1.7 The Committee was contacted by a ham who was concerned that the stainless steel rods implanted in his son’s back (as a scoliosis treatment) might be susceptible to heating from the RF from his station. After considerable discussion the Committee’s consensus was that it would be unlikely that these short rods would absorb enough energy at HF to get hot enough to do any biological damage. A similar situation exists in the MRI scanner, where this type of device has not caused a problem. There was also an important discussion that, while the Committee can offer opinions about the RF analysis of this situation, it should not go so far as to make the determination of whether such a medical situation is safe, which could become a liability issue.

2 Monitoring Scientific Studies

- 2.1 The popular press picked up on some conclusions of an investigator who thought that children were more susceptible to RF absorption than adults. The resulting headline was “Research Finds Kids More Susceptible to Phone Radiation.” The Committee discussed the stated reasons and concluded that the evidence for this was not good. Dr. Guy presented some data on this subject that he had calculated that was in direct opposition to these conclusions. Dr. Guy later presented his results at the 2002 BEMS conference. Dr. Lapin later featured this topic in an article on the ARRL Website.
- 2.2 The Committee discussed an article about electrosensitivity – the claim by a growing number of people that they have something akin to an allergy to electromagnetic radiation. The Committee was referred to a recent publication in preparation by IEEE COMAR. This condition has been studied, mostly in Europe, and it appears to be a real claim though no scientific connection has been found. These people are currently treated as most other allergy patients, with treatments that address the symptoms.
- 2.3 The Committee discussed an article in the BEMS journal that claims initiation of micronuclei by exposure to RF. This has been a claim of George Carlo’s for some time, which he points to as proof of the ability of RF to cause cancer. Micronuclei are extra cellular nuclei that are formed because of improper DNA division during cellular replication. The study that claimed to demonstrate this phenomenon was performed with red blood cells in test tubes exposed to RF. The study used a form of exposure that has been shown to heat the cells lining the walls of the test tube; excessive heat is known to cause the formation of micronuclei. Even though this potential complication was discussed at the end of the paper, the wording of the abstract made it seem as though the RF, and not the heat, had caused the micronuclei.

- 2.4 The Committee discussed the many ads that claim to sell devices to protect people from the RF transmitted by their cell phones. The consensus was that these devices are hoaxes: not only is there no evidence that cellular telephones will cause any harm to their users, but the small metallic devices will not affect the absorption of energy from cell phones. Soon after this discussion, we read the news that the Federal Trade Commission was suing companies that were selling these devices because of false advertising claims. Also, IEEE COMAR and the FDA have published responses to these devices.
- 2.5 The subject of lawsuits against the cellular telephone companies and providers was revisited when a lawyer claimed that patents by these companies proved that they knew the dangers of RF exposure. The patents were for devices that claimed to reduce the absorption of RF from cellular telephones. This was the subject of an Op Ed article by Dr. Lapin in the 1999 issue of QST.

3 Participation in the Scientific RF Safety Community.

- 3.1 Dr. Lapin continues writing a column about RF Safety for the ARRL Web Page, though its frequency is decreasing. The only title for the first half of the year is: "Do We Need to Protect Children from RF?"
- 3.2 Dr. Lapin was re-elected as a member of the IEEE Committee on Man and Radiation (COMAR).
- 3.3 Mr. Hare and Dr. Guy continue to serve on the IEEE Standards Coordinating Committee 28 on Non-Ionizing Radiation, which develops the standards for human exposure to RF energy. Mr. Hare maintains a list server for communications among members of this committee, and occasionally cross-pollinates pertinent issues between the RFSC and SCC-28 list servers.
- 3.4 Dr. Lapin and Mr. Hare presented the RF Safety forum at the 2002 Dayton Hamvention. Dr. Lapin's presentation was entitled "How do we know what is safe?" which was followed by Mr. Hare's presentation, entitled "How do we keep our stations within the safety limits?" An audience of over 100 attended this forum.
- 3.5 Dr. Guy presented "FDTD Derived SAR Distributions in Various Size Human Head Models Exposed to Simulated Cellular Telephone Handset Transmitting 600 mW at 835 MHz" by A.W. Guy, C.K. Chou, and G. Bit-Babik at the 2002 Bioelectromagnetics Society Conference in Quebec City, Quebec, Canada on June 25, 2002.
- 3.6 Dr. Small performed an RF safety assessment for the Field Day site of the Radio Association of Western New York (RAWNY).
- 3.7 Dr. Kaune teaches a class to shows local hams how to perform RF Safety evaluations of their stations.

4 Administrative Issues

- 4.1 Mr. Hare continues to administer the RF Safety Committee email reflector, which handles correspondence between committee members. Other ARRL staff members and some

former committee members monitor traffic over the reflector and we occasionally receive helpful comments from them. We have the capability to review things that were discussed in the past and search for keywords. In the first half of this year, approximately 200 messages were posted on the RFSC reflector.

- 4.2 The RFSC has added two new committee members. Mr. Haney confirmed the addition of Dr. Bruce Small, KM2L, and Dr. William Kaune, W7IEQ. Dr. Small is a Clinical Assistant Professor of Medicine and Pathology at the State University of New York in Buffalo and President of the Medical Amateur Radio Council (MARCO). Dr. Kaune is a physicist with a long history of expertise in biological interactions with ELF electrical and magnetic fields. Both have added valuable insight to the Committee's discussions of RF Safety.
- 4.3 Dr. Lapin continues to serve as a member of the FCC Technological Advisory Council, representing ARRL and its RFSC on that body. He attended meetings at the FCC Portals Building in Washington, DC on April 26 and June 12, 2002.
- 4.4 The Committee reviewed the RF Safety text that will be used in the teachers' manual for the "Big Project."

5 Future Plans

- 5.1 The Committee continues to consider restructuring of the RF Safety text that appears in all ARRL publications.
- 5.2 The Committee will continue to monitor the NCI epidemiological study of radio amateurs, and help the investigators maintain the highest level of accuracy.

Gregory Lapin, Ph.D., P.E., N9GL
Chair, ARRL RF Safety Committee

The ARRL RF Safety Committee

Chair

Gregory D. Lapin, Ph.D., P.E., N9GL
1206 Somerset Ave
Deerfield, IL 60015-2819

Committee Members

Robert E. Gold, M.D., W0KIZ
9197 N. Clydesdale Road
Castle Rock, CO 80104-9102

William Raskoff, M.D., K6SQL
1769 Escalante Way
Burlingame, CA 94010-5807

Arthur W. (Bill) Guy, Ph.D., W7PO
18122 60th Place NE
Seattle, WA 98155-4608

James W. Ross, M.D., M.P.H., W4GHL
9472 Ruffin Ridge Rd.
Mechanicsville, VA 23116-6670

William Kaune, Ph.D., W7IEQ
111 Piper Ct.
Richland, WA 99352

Kai Siwiak, P.E., Ph.D., KE4PT
10988 NW 14th St
Coral Springs, FL 33071-8222

Gary E. Myers, M.S., C.I.H., K9CZB
1110 White Rock Drive
Dixon, IL 61021

Bruce Small, M.D., KM2L
10540 Stoneway
Clarence, NY 14031-2100

Liaison to the ARRL Board of Directors

Howard Huntington, K9KM
25350 N. Marilyn Lane
Hawthorn Woods, IL 60047

ARRL HQ Staff Liaison

Ed Hare, W1RFI
ARRL Headquarters
225 Main Street
Newington, CT 06111

ARRL HQ Administrative Liaison

Lisa Kustosik, KA1UFZ
ARRL Headquarters
225 Main Street
Newington, CT 06111