

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

July 2006

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.

1 RF Safety Committee Activities

- 1.1 The committee reviewed 12 new RF-Safety questions that had been proposed by the QPC for the Technician exam. After reading them over, a number of examples of poor wording and a couple of outright errors were identified. The committee provided explanations of what was wrong and suggested corrections. Perry Green, WY1O, represented the committee's comments to the QPC and was able to get the changes incorporated.
- 1.2 The committee reviewed the current version of *RF Safety and You* and concluded that no changes or corrections were warranted before it went into its next printing.
- 1.3 The committee reviewed the RF safety section of the *ARRL Handbook* and identified two statements about potential dangers of RF energy that are no longer believed to be true. We also concluded that, even though time was not sufficient to be ready for the next edition of the Handbook, a complete rewrite of the text was warranted.
- 1.4 The committee received a request from a person, who is not a ham, who was trying to build a case for the RF safety of a police communications tower. The neighbors of the proposed site obtained a court injunction to stop construction of the tower based on RF safety fears. This person was asking for comparative exposure levels from commercial broadcast equipment to try and convince these people that they were already being exposed to more RF energy than the police tower would produce. The committee responded with some suggestions regarding what is known about the safety of such transmissions.
- 1.5 The committee was included in a question from the FCC about differences in the definitions of "RF Safety" between the IEEE C95.1 standard and ARRL. IEEE states that RF safety is "*A shorthand term widely used to mean safety with respect to exposure to RF energy*" and ARRL's definition is "*Preventing injury or illness to humans from the effects of radio-frequency energy.*" Tim Harrington at the FCC wanted to know if SAR compliance testing would be considered an RF safety function or an RF exposure function. The committee's comments included the ideas that measuring SAR of a device only confirms the exposure provided by that device and a scientifically-derived standard, such as IEEE C95.1, makes the connection between exposure and safety. We also discussed whether the ARRL definition of RF Safety should be changed but came to no conclusion.
- 1.6 The committee received a question from a ham in Ohio who said that his club had been offered the use of an operating FM radio station as a Field Day site and he wanted to know if this would be safe. The committee replied that the FM broadcast station was subject to

the same RF safety regulations as are hams. We suggested that he get a copy of the station's environmental assessment and then calculate the added exposure from the Field Day transmitters. He could then determine areas to avoid because of exposure levels above the safety limits. We referred him to a QST article that explained such calculations for Field Day sites.

- 1.7 The committee received a question from a ham that wanted to know about the safety of hands-free ear-bud devices for cell phones. He had heard that these devices capture RF and channel it into the brain. The committee replied that this scare was based on a faulty modeling study that showed this effect and reported its results in the popular press. This study was never published in a scientific journal where it would have been subject to peer review that should have caught the modeling errors. A subsequent scientific modeling study that identified the fault in the original model was performed and published in the highly respected journal, *Radiation Research*, showing that there was no such effect.
- 1.8 The committee was contacted by a ham who related an article from the British press that implied the RF levels produced by BPL introduce a safety hazard. As compelling as this argument sounds to anyone who is an opponent of BPL, there simply is no scientific basis to this argument. It is also a counter-productive argument for a ham, who transmits far more energy into the air than BPL.

2 Monitoring Scientific Studies

- 2.1 The committee discussed an article in the *British Medical Journal*, which reported the conclusions of a study of patients with glioma, a relatively rare brain tumor, and their cell phone usage. The conclusion of the comparison of 966 glioma patients with 1700 healthy people was that the use of the mobile phone was not a factor. The study found a tendency that patients reported using their cell phones on the same side of the head that the glioma was found, but the researchers believed that this was unreliable since there is a high probability of recall bias, where the patients assume that their disease was caused by the phone and answered this question accordingly. The committee noted that, as is common in press articles about such studies, and particularly in the British press, the scientific results were tempered by comments that the limited length of the exposure in the study, up to 10 years, could be insufficient to provide conclusive results. The article also mentioned that some people are still concerned about rural use of cell phones, where the phone's transmitter power is generally higher, and that analog phones are thought to be more dangerous. Neither of these comments has any bearing on the study being reported and do not have a scientific basis.
- 2.2 The committee discussed an article about a Canadian university that banned the use of WiFi networks on campus because of RF safety concerns. We commented on the absurdity of the claim, due to the very low power levels used by the IEEE 802.11b standard, and marveled at the irrational fear of RF that even some educated people seem to have.
- 2.3 The committee discussed an article about a research study on cell phone effects sponsored by the Finnish Radiation and Nuclear Safety Authority. The study will expose the skin on the arms of 10 women to one hour of cell phone energy. The researchers will compare the skin cells before and after exposure to look for differences. The head researcher claimed to be able to use this study to determine if RF energy would be capable of breaking down the barrier that keeps toxins out of the brain. The committee commented that this type of study had already been performed directly on the brains of test animals without any conclusive

results and how very different the cerebral capillary endothelial cells are from skin epithelial cells that this study plans to look at.

- 2.4 The committee discussed an article about research from Sweden that claimed extended use of cell phones raises the risk of brain tumors. This study was in direct contrast to the results of several other studies that showed no connection between cell phone use and brain tumors, including studies by the Dutch Health Council, a British study, and one performed by the National Cancer Institute. We also noted that the group that made these claims was known for poor research techniques in previous studies.
- 2.5 The committee discussed a letter in the *British Medical Journal* that claimed an effect where people talking on cell phones during a storm are more prone to being killed by lightning. We commented about the absurdity of these arguments and how medical doctors should probably leave the physics discussions to physicists.
- 2.6 The committee was presented with a press article in which Italian investigators claimed to demonstrate evidence of cell phone energy temporarily exciting the neural cells of the brain cortex. The committee deferred comment on this article until a copy of the original research report could be reviewed.

3 Participation in the Scientific RF Safety Community.

- 3.1 Dr. Lapin continues to serve on the IEEE Committee on Man and Radiation (COMAR).
- 3.2 Mr. Hare continues 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.

4 Administrative Issues

- 4.1 The Committee will be renewing and revising its membership in the coming year to insure that it contains members who wish to actively participate in its deliberations. All committee members were asked to make a commitment to an active level of participation.
- 4.2 Dr. Lapin is reviewing the backgrounds of several people who have volunteered to serve on the committee. He is attempting to maintain a balance of scientific and medical experts.
- 4.3 The committee has started rewriting the RF Safety text that appears in ARRL publications. New text has been promised for the 2008 editions of the *ARRL Handbook* and the *ARRL Antenna Book*.

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