

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

January 2023

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

1. RF Safety Committee Activities.
2. Monitoring current events and scientific studies regarding RF Safety.
3. Participation in the scientific RF Safety community.
4. Administrative issues.

1 RF Safety Committee Activities

- 1.1 Dr. Lapin is writing an entirely new RF Safety chapter for the 2023 edition of the ARRL Antenna Book. While the new Handbook material provides a basic explanation of the reasoning for and background of RF safety standards and regulations, the new Antenna Book material is directed toward the more technically oriented radio amateur. It concentrates on more exacting methods of analyzing exposure and antenna modifications that can be used to ameliorate high exposure scenarios.
- 1.2 The Committee is finalizing its contributions to the FCC publication OET Bulletin 65 Supplement B, **Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields, *Additional Information for Amateur Radio Stations***. The new document is being reviewed in detail by FCC staff. Publication of the document must be preceded by several stages of review by various government entities and the publication of OET Bulletin 65, which is also undergoing thorough government review.
- 1.3 Dr. Siwiak discussed appropriate duty cycles that should be used for different modulation modes for inclusion in the OET65B bulletin revision and in the ARRL online calculator. The duty cycle for AM was discussed at length, with some suggesting that it should be 100%, or even more than 100%, of carrier PEP for traditional “plate modulation.” However, AM from a software defined transceiver generally has an average modulated power that is lower than the unmodulated carrier’s average power. Thus, it was difficult to correctly define the duty cycle of any particular AM radio transmitter and the committee came to no resolution, except that using 100% is likely a conservative option. Dr. Siwiak suggested the addition of duty cycles for various digital modes and, since the transmit/receive duty cycle is an integral part of many formats, it should also be included in their exposure calculations.
- 1.4 The Committee has discussed small improvements to the ARRL Online Exposure Calculator. One case of misuse of this calculator came to our attention when we identified incorrect guidance in an ARRL online training course relative to using the calculator to determine the safe distance from a handheld radio. The calculator cannot be used for this purpose since any antenna that is within 20 cm of a person must be analyzed with SAR calculations, per FCC regulations. In addition, the method used by the online calculator is not valid for antennas that are very short, such as less than 1/10 lambda, or very close to the ground in terms of wavelength. The calculator has been modified to clarify these situations to those using it and steps are being taken to correct any training that might be in error.
- 1.5 The Committee held an online meeting in August to be able to see each other and discuss the pressing issues that had been shared on the email reflector. The main topic of conversation was how to deal with ARRL articles that illustrate potentially noncompliant RF exposure situations.

We discussed how to enhance radio amateurs' awareness of potentially high exposure situations while minimizing frustration associated with unduly repetitive warning in ARRL publications.

- 1.6 Dr. Lapin held an online seminar for editors of ARRL publications to sensitize them to watch for submitted articles that demonstrate situations that may not conform with FCC exposure regulations. We suggested to the editors that, in such situations, authors be prompted to change questionable photos or add explanatory text to indicate how the article complied with FCC exposure regulations. The editors were skeptical about identifying images that might indicate RF overexposure but were simply photographs staged to show hams with their antennas. The RF Safety Committee is available to provide support to the editors. Becky Schoenfeld, W1BXY, the ARRL Director of Publications, recorded the hour-long seminar and is making that available to other ARRL editors that were unable to attend. We also received a request from our counterpart at RSGB and made a copy of the recording available to them as well.
- 1.7 The Committee reviewed the ARRL Technician License Manual and identified several errors and omissions in the draft that we reviewed. Suggestions for corrections were made before the book was published.
- 1.8 Later, the General Class License Manual was reviewed prior to its being reprinted. The Committee found several things that were no longer correct, and also noted a question in the General Question Pool that was incorrect following the change in FCC rules last year. We suggested that this question be flagged so that it would not be included in any exams until that question pool is rewritten next year.
- 1.9 The Committee was provided with the exposure-related questions slated for the June 2023 update of the General class license question pool. We recommended rewording five questions. In addition, we noted that none of the questions covered things that had changed in the latest FCC rules. We suggested eleven newly written questions to align guidance with the updated FCC rules. We were informed by Maria Somma, AB1FM, the ARRL VEC Manager, that the QPC accepted all our modifications to the question pool and included two of our additional questions. They intend to use the other additional questions in the Amateur Extra question pool revision in 2024.
- 1.10 The Committee continues to collaborate with our counterparts in the RSGB (Great Britain). We meet monthly and discuss different scenarios of exposure from amateur radio. A representative of the IRTS (Ireland) joined our group several months ago and we have aided him in producing a comprehensive safety section for his society's "IRTS HAREC Amateur Station Licence Study Guide."
- 1.11 The Committee is working on an article for QST to remind radio amateurs that the FCC's two year review period for their new regulations will end on May 3, 2023. As of that date, all transmitting stations must be evaluated under the new rules and comply with all exposure limits. An exception to this is with existing handheld transmitters, which will continue to be assumed to be compliant with the SAR regulations even if they have not been evaluated relative to excessive SAR during use.

2 Monitoring Current Events and Scientific Studies

- 2.1 No relevant research on RF effects was discussed by the Committee in the past 6 months.

3 Participation in the Scientific RF Safety Community

- 3.1 Dr. Lapin was elected to serve as co-chair of IEEE ICES TC-95 Subcommittee SC-4: Safety Levels with Respect to Human Exposure to Electromagnetic Fields, 3 kHz to 300 GHz.
- 3.2 Mr. Butcher continues to serve as the co-chair of IEEE ICES TC-95 Subcommittee SC-1: Techniques, Procedures, Instrumentation, and Computation.

- 3.3 Mr. Tell continues to serve as the chairman of the IEEE ICES TC-95 Subcommittee SC-2: Terminology, Units of Measurement, and Hazard Communication.
- 3.4 Mr. Hare continues to serve on the IEEE ICES TC-95 RF Safety Standards Committee.
- 3.5 Dr. Bushberg continues to serve on the IEEE ICES TC-95 RF Safety Standards Committee.
- 3.6 Mr. Tell was awarded the 2022 IEEE Standards Association Lifetime Achievement Award for his extensive work with RF Safety Standards.
- 3.7 Mr. Tell continues to serve as the chairman of the IEEE EMBS Committee on Man and Radiation, COMAR.
- 3.8 Dr. Bushberg continues to serve as the vice chairman of the IEEE EMBS Committee on Man and Radiation, COMAR.
- 3.9 Mr. Butcher continues to serve as a member of the IEEE EMBS Committee on Man and Radiation, COMAR.
- 3.10 Dr. Lapin continues to serve as a member of the IEEE EMBS Committee on Man and Radiation, COMAR.
- 3.11 Dr. Lapin and Mr. Tell continue to serve on the IEEE P.2725.1 Standard Committee, which sets the exposure limits for Microwave Medical Imaging Devices.
- 3.12 Mr. Butcher continues to serve as a member of the United States National Committee of the International Electrotechnical Commission (USNC/IEC) for TC106: Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure.
- 3.13 Dr. Bushberg serves as the chairman of the congressionally-chartered National Council on Radiation Protection, NCRP.
- 4 Administrative Issues
- 4.1 Dr. Siwiak is a contributing editor for QST and Editor of QEX. He shares submitted RF Safety-related articles with the Committee.
- 4.2 Dr. Lapin has participated in the ARRL Electromagnetic Compatibility Committee meetings. Complaints of interference to medical devices that are reported to the RF Safety Committee, are shared with the EMC Committee, whose expertise includes electromagnetic interactions with all types of instrumentation.
- 4.3 Mr. Hare gave presentations on the new FCC rule changes to the W9DXCC and Pacific NW DX Convention events.
- 4.4 Mr. Propper announced to the committee that the Board, in its July meeting, unanimously approved a resolution recognizing the work of the RF Safety Committee. The entire committee was highly appreciative of this recognition.

Respectfully submitted,

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Chair, ARRL RF Safety Committee

The ARRL RF Safety Committee

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