Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	**)**	
	)	
Amendment of Part 97 of the Commission's	**)**	**RM-_____**
Amateur Service Rules to Revise Examination	**)**	
Requirements and Improve Testing Standards	**)**	
	)	

To: The Commission **August 22, 2003**

PETITION FOR RULE MAKING

The FISTS CW Club (FISTS)[1] is an international organization, founded in 1987, with chapters in the United States, Great Britain, Australia and New Zealand. A telegrapher's "fist" denotes characteristics in the operator's sending that are unique to him/her. To date, over 10,000 FISTS membership numbers have been assigned. FISTS has no employees; it is run by volunteers who do not receive any monetary compensation for their work. It is the fastest-growing amateur radio organization in the United States. The mission of FISTS is to further the use of Morse code (CW) on the amateur bands, to welcome newcomers to the CW mode and to engender friendship among its members.

FISTS sponsors awards and contests, holds weekly nets, supports emergency preparedness and traffic handling, and promotes low power (QRP) operation with homemade and operator-designed equipment. FISTS encourages the technical side of amateur radio, innovation, youth outreach, personal interaction and one-on-one mentoring. Through the Code Buddy Program, FISTS matches newcomers with experienced operators for practice on the air.

Our membership is very diverse, but we share a common bond and a keen interest in activities where Morse code is an essential component, such as QRP (use of minimal power), VHF and UHF weak signal experimentation, moonbounce and satellite communications. We are active in our communities teaching licensing classes, and working as emergency volunteers with the Amateur Radio Emergency Service, the Red Cross, National Traffic System (NTS) and city and state Emergency

[1] FISTS CW Club is also known as the International Morse Preservation Society.

Operations Centers. Many FISTS members are Volunteer Examiners (VE) and none have indicated that providing Morse exams is a burdensome task.

In July 2003, the United States membership was polled by mail-in ballot regarding the retention of Morse testing in the Amateur Radio Service's licensing structure. This petition represents an overwhelming consensus of the comments received. Pursuant to the Commission's procedural rules (47 CFR §1.405), the FISTS CW Club hereby respectfully requests that the Commission issue a Notice of Proposed Rule Making at an early date looking toward amendment of the rules governing the Amateur Radio Service, 47 CFR §97.1 et seq., as set forth herein and in the attached Appendix.

Contents

Introduction

1. Morse code (CW) is the second-most popular mode of operation in the Amateur Radio Service. Morse code stations can be heard conversing anytime of the day or night in the amateur radio HF, VHF and UHF frequency assignments. The number of contesters operating using Morse code is growing, and Morse code dominates in many mixed-mode contests. Most Amateur Radio contacts through orbiting satellites take place using Morse code.

2. Its strengths are well known; Morse code is often the only usable mode during periods of unfavorable propagation and high noise levels. Then, Morse code replaces Single Sideband (SSB) voice in transferring messages in and out of disaster areas, but only if amateurs still know Morse code.

Amateur Radio in the 21st Century:
Supporting a Technical Amateur Radio Service

3. We must reaffirm our vision for the Amateur Radio Service as it continues to evolve as a government service. Its basic principles still serve us well. The Amateur Radio Service should:

a) Encourage people to enter the service, especially young people;
b) Retain interest by providing a structured path for advancement based on incentives;
c) Use licensing standards as a foundation for individual technical achievement;
d) Improve Commission support for bandwidth-efficient digital modes on HF; and
e) Continue to attract hard-working, well-disciplined,[2] technically-minded volunteers.

4. Heightened homeland security means we should not undermine the technical qualifications of new members of the Amateur Radio community simply to populate the bands with operators of indifferent ability. This will alter the character of the service away from its technical base, and diminish the ability of the Amateur Radio Service to fulfill its essential and time-honored role when the country needs it most.

General Principles

5. We propose fine-tuning the current licensing structure, having completed a two-year extensive restructuring period in April 2000. In furtherance of the vision described above, the following principles should guide the Commission in improving the Amateur Radio Service in light of the recently amended ITU Treaty:

a) Retain Morse code testing within the license structure.
b) Increase the technical skills required on the written exams.

[2] The vast majority of operating violations and suspensions are from licensees using voice modes and not Morse code (see the summary of FCC enforcement actions on the ARRL Web site http://www.arrl.org).

c) Allow Technicians to use digital modes in the Novice subbands.

Retain Morse Code Testing within the License Structure:
It is Relevant to the Amateur Radio Service

6. In time of need, Amateur Radio's value to served agencies is that it does not copy their communications strategies. Amateur Radio functions very differently than other FCC services. Morse code is relevant to Amateur Radio because it contributes not only to our frequency-agility, but also to our unique mode-agility, a special ability our served agencies and the public fully appreciate.

7. When telephony (voice, SSB) modes fail, skilled Amateur Radio Operators can get the message through by using Morse code. Morse code at 20-wpm offers a 13 dB advantage over a SSB signal[3] using a typical Amateur Radio receiver. That is like using 20 times more output power. According to a current ARRL book on radio telegraphy, "a barely audible [Morse] code signal can still be deciphered, whereas the same strength voice transmission is unintelligible."[4]

8. Requiring Morse code proficiency for licensing will ensure an adequate supply of skilled radio operators for emergency communications. Mr. Arnie Macy, (KT4ST) Director of Emergency Management (EM) for the Fort Stewart and Hunter Army Airfield military installations, knows this firsthand. His agency has purchased multiple sets of VHF and HF radio sets for use as primary and backup communications in both his Emergency Operations Center (EOC) as well as the Mobile Incident Command Center (MICC) for use during hurricanes and other natural or man-made disasters. This equipment is used to communicate with both local and state EM Agencies, as well as the National Traffic System (NTS) for use in passing health and welfare traffic. Each set includes Morse code capability as an integral and vital part of the emergency communications system.[5]

9. Amateurs can implement Morse code using a wide variety of technologies, ranging from the extremely simple to the highly sophisticated. This wide variety offers a near-ideal practical learning environment that supports and promotes self-training by amateurs at any level, from beginner to highly advanced experimenter. But the resulting equipment is only useful if the amateur has the Morse code skills to use it. Morse code skill, therefore, supports self-training by radio amateurs at all levels.

10. Building a complete high quality voice station, which requires intricate solid-state construction, is difficult for new builders and requires a substantial

[3] Akima et al, "Required Signal-to-Noise Ratios for HF Communication Systems," Institute for Telecommunications Sciences, ESSA Technical Report, ERL 131-ITS 92 August 1969.

[4] L. Peter Carron Jr., Morse Code: The Essential Language, 2nd edition, 1996, W3DKV. ARRL, Newington, Conn.

[5] Arnie Macy (personal communication, August 18, 2003). Mr. Macy is a licensed Extra Class Amateur Radio Operator (KT4ST), a member of the ARRL A-1 Operator Club, an instructor with the Maryland Slow Speed Traffic Net, a member of the Georgia State Traffic Net , and an ARRL Official Relay Station. He also teaches Morse code (CW) to prospective Army Special Forces soldiers who are pre-assigned as communications specialists.

investment in parts and test equipment. On the other hand, a complete Morse code station can be built with simple circuitry, basic tools and affordable test equipment, providing much needed opportunities for hands-on learning.

11. Moreover, Morse code proficiency assists amateurs in acquiring the very skills that form the basis and purpose[6] of the Amateur Radio Service, and provides something essential to our country — technical skill and experimentation. There exists no simpler entry into the field of radio-frequency circuit design. Without Morse proficiency this easy entrance will be closed.

12. As the foundation for taking part in these popular activities within Amateur Radio, testing for this simple skill is very important. Retaining the Morse code requirement encourages amateurs to become proficient in Morse code and many other activities as well. Failure to keep Morse testing part of the licensing structure undermines many core activities integral to the Amateur Radio Service and nullifies one of the traditional objectives of the Service, i.e., to train a " . . . reserve pool of qualified radio operators and technicians."

A Licensing Path to Encourage Children to Enter Amateur Radio

13. Young people are not “turned off” by learning the Morse code.[7, 8] In fact, children are attracted to it much as they are to other "secret languages" and puzzles. Young people learn languages and codes with facility and become quite proficient. Children young as 6-years of age have earned Technician Class, General Class[9] and even Extra Class licenses.

14. The ARRL awarded their highest honor, the Hiram Percy Maxim Award for 2002, to Ben Shupack (NW7DX). [10] At 18, Mr. Shupack is active in contests; achieved first place in the World Wide WPX Contest (age 16); and is Division Manager for the League of Young Radio Amateurs. The ARRL reports he can copy Morse code, by ear, at 45 words-per-minute (wpm). The current examination requirement is only 5-wpm.

15. In addition to Morse code, a hierarchy of technical written exams and increased operating privileges is the best approach to maintaining a young person's interest and sense of achievement. As discussed elsewhere in this petition, Morse

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[6] Amateur Radio Rules, 47 CFR §97.1, entitled “Basis and Purpose.”

[7] See Mr. Michael Dinelli’s (N9BOR) experiences in his ARRL Web article, Don’t Embarrass me Dad! Featured article at http://www.arrl.org, Web site of the American Radio Relay League (ARRL), September 13, 2000.

[8] When the ARRL polled its members in 1996, the youngest group of respondents (under age 24) were most in favor of the Morse code exam with 85% for, and only 15% against.

[9] One of many examples: *Six-Year-Old Oregon Girl Gets General Ticket*, Nashoba Valley Amateur Radio Club (NVARC) Newsletter, Volume 12, No. 2 (February 2003). Pepperell, Mass. Six-year-old Mattie described the Element 1 Morse exam as, "not too hard, just a little, but kind of easy too."

[10] Jean Wolfgang, Steve Ford, and Dave Hassler, *ARRL Award Winners for 2002,* QST, Volume 87, No. 9 (September 2003), page 62. ARRL, Newington, Conn.

code and the many ancillary activities in which Morse code proficiency opens doors, the educational benefits of Amateur Radio are enhanced.

Examples of CW's Role in Advancing the Radio Art:
Kit Construction, RF Design, and Class E Amplifiers

16. Proficiency in Morse code encourages circuit construction and RF design,[11] including some very sophisticated kits[12] that outperform their commercially-built equivalents. Because the equipment necessary to generate a Morse code signal is straightforward, it offers an opportunity for licensees to experience putting a station on the air they designed and built themselves. All the while improving the skills necessary for more complex projects and experimentation.

17. Another example of Morse code's role in advancing the radio art is the ongoing experimentation with a new family of Class E switching amplifiers which are well-adapted for continuous wave ([CW], which uses Morse code), but not easily adapted to analog voice (SSB) or image modes.[13, 14] They have received attention from the amateur radio community because of their 85-90% efficiency, versus 50-60% for Class C amplifiers used for CW or FM, and 20-30% (or less) efficiency for Class A or A/B used for SSB and soundcard-based digital modes. Because they are easily applied to CW transmitters, Morse ability is the key to amateurs building and testing these amplifiers on the air.

18. A transmitter that uses a Class E amplifier is even available as a kit for $20 by the Arizona ScQRPions Club.[15] This Morse code-only radio gives amateurs access to experiment and improve on the design concepts. The transmitter's simplicity enables experimenters to focus on the innovative, and high-tech aspects of this design.

19. One of the newest digital modes, PSK31, was developed using ideas borrowed from Morse code. In just four years it has displaced radio teletype (RTTY) and much of the PacTOR once so common on the HF bands. Its inventor, Peter Martinez, credits his knowledge of Morse code[16] for the encoding scheme he uses,

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[11] Dave Benson, *The RockMite--A Simple Transceiver for 40 or 20 Meters,* QST, Volume 87, No. 4 (April 2003), page 35. ARRL, Newington, Conn.

[12] Larry Wolfgang, *Product Review: Elecraft K2 HF Transceiver Kit*, QST, Volume 84, No. 3 (March 2000). Also see, Al Alvareztorres, *Product Review: Elecraft K1 QRP CW Transceiver Kit*, QST, Volume 85, No. 3 (March 2001), page 72. ARRL, Newington, Conn.

[13] Eileen Lau, Kai-Wai Chiu, Jeff Qin, John Davis, Kent Potter, and David Rutledge. *High-Efficiency Class-E Power Amplifiers*, Part 1: QST, Volume 81, No. 5 (May 1997); Part 2: QST, Volume 82, No. 6 (June 1997). Also see, Jim Buckwalter, John Davis, Dragan S. Maric, Kent Potter, and David Rutledge. *A Keyed Power Supply for Class-E Amplifiers,* QEX (January/February 2001). ARRL, Newington, Conn.

[14] Scott D. Kee, Ichiro Aoki, and David Rutledge. *7-Mhz, 1.1-kW Demonstration of the New E/$F_{2,odd}$ Switching Amplifier Class,* Department of Electrical Engineering, California Institute of Technology, Pasadena, Calif. Submitted to the 2001 IEEE MTT/S International Microwave Symposium.

[15] See http://www.swlink.net/~w5jh/azsx303e.htm: The Tuthill Class E Transmitter. This is just one of many designs that have appeared in the last year. Almost all require Morse code skills to use.

[16] Peter Martinez, G3PLX (1998), *PSK31: A New Radio-Teletype Mode with a Traditional Philosophy, Part I. RADCOM,* Radio Society of Great Britain.

which requires no handshaking, yet produces solid copy under difficult conditions and occupies a bandwidth of only 30 Hz.

Technician Class:
Increase Technical Skills, Digital Modes, No Additional Voice Frequencies

20. We recommend the Technician and Technician Plus be merged, and not require a Morse code exam. However, technical content should be emphasized on the written test, and include the digital modes.

21. Technician Class privileges should be extended to include digital modes within the Novice subbands. This would allow the Technician Class licensee to participate in the explosive growth in digital applications occurring within the Amateur Radio Service on HF.

22. Do not provide additional voice HF privileges. The rush of upgrades by Technicians to higher classes following the restructuring indicates the barrier between General and Technician have already been lowered sufficiently.

General Class:
Retain 5-wpm Morse Exam and Increase Technical Skills

23. We recommend retaining the test requirement for the General Class at 5-wpm, and increasing the technical level of written exams to that of the pre-restructuring Advanced Class license.

24. In the 1998 NPRM and restructuring, the Commission asked if reduced Morse requirements should be compensated with increased technical content on the written examinations. Almost every commenter who addressed that question said they should. However, the Report and Order in 1999 did not address this issue. The Commission has an opportunity to address this now by providing for a General Class written examination equivalent to the pre-restructuring Advanced Class written exam.

25. The amount of upgrading to the General and Extra Classes in the last three years, unprecedented in the history of the Amateur Radio Service, indicates that 5-wpm Morse code is not a hindrance. Since restructuring, upgrades have outstripped new licenses, further indicating 5-wpm is not an unreasonable burden on a prospective licensee.

Extra Class:
Increase Morse Exam to 12-wpm and Increase Technical Skills

26. We recommend increasing the Morse exam to 12-wpm. We further recommend that the written exam include knowledge of circuit design, information theory, digital methods and encoding schemes, software-defined radio and a more thorough knowledge of propagation and geophysics than currently appears on the examination.

27. The qualifications for the Extra Class license were once considered the most rigorous of the Commission's Amateur or Commercial written examinations. Those attaining the Extra Class license should be the most highly trained and skilled radio licensees in the Amateur Radio Service. Since restructuring, the Extra Class ranks have increased at the expense oftraining and skill.

28. The Commission should once again insist that Extra Class licensees be more highly trained and technically proficient. In addition, reduction of the 20-wpm Morse exam to 5-wpm was too precipitous a change. Possessing the skill to send/receive Morse code at 12-wpm is imperative if an operator during an emergency situation is to communicate effectively. When sending formal traffic experienced operators communicate at speeds in excess of 25-wpm. Therefore, we believe a speed of no less than 12-wpm ensures the operator is fluent in Morse code.

Retain the Novice CW Subbands
for Narrow Band Digital Modes, not Analog Voice/Image.

29. We urge the Commission to monitor the situation for the next several years, and in the meantime retain the Novice CW subbands for narrow-band digital modes. This will underscore the Commission's commitment to support of digital modes. There are new digital modes being developed, including experiments in digital voice on HF. It is expected that the trend toward more and more efficient narrow band digital methods, even narrow band digital voice,[17] will continue for some time. Therefore, it is important not to change the existing Novice CW subbands for the use of analog modes such as SSB or SSTV.

End Instant Retesting on the Exams

30. We recommend only allowing one failed written examination element and one failed Morse code element per examination session. Under current practice, when an examinee fails an examination, he or she pays a second fee and is entered in the manifest twice. This is an unacceptable practice. Instant retesting is extremely common among the Volunteer Exam Coordinators (VECs) and it detracts from the purpose of testing. Each VE team already maintains a manifest of the examinees at its test sessions, showing exactly which elements have been passed and which failed. So, by allowing only one manifest entry per examinee per session, the Commission can rectify this problem.

31. By not allowing retests at an examination session the workload on the VEs will be substantially less and the test sessions would be shorter, since they would not have to administer the same element two or three times to the same person. Also, if

[17] Doug Smith, "Digital Voice: The Next New Mode?" QST Volume 86, No. 1 (January 2003). Also see, Doug Smith, "Digital Voice: An Update and Forecast," QST Volume 86, No. 2 (February 2003), ARRL, Newington, Conn.

a candidate has such marginal command of the material, it benefits both them and the Amateur Radio Service to further study the material and return another day.

Maintain Qualification Standards

32. We recommend reinstating the Commission's regulatory standards and syllabus of topics for the technical requirements of each license. Amateur Radio is a service of the FCC. Establishing and maintaining standards should not be delegated to closed organizations, such as NCVEC, that lack accountability to the Amateur Radio community or the public.

33. The written examinations have been simplified over the years, becoming less and less technical. Rather than establishing a personal foundation of technical knowledge, they are becoming little more than a series of token "merit badges." This decline in licensing standards threatens to turn the Amateur Radio Service into a group of non-technical consumers, rather than its meritorious role as a service peopled by skilled radio operators, experimenters and technically oriented volunteers.

34. In the restructuring implemented in April 2000, the Commission removed language from its regulations establishing a standard syllabus of topics, and left the content of exams to the VECs. We find this practice unacceptable, especially with the NCVECs arguing for lower Morse code and written test standards. The NCVEC should not be establishing this type of policy.

35. We urge the Commission to consider reinstating in their regulations a syllabus of topics and specific guidance on the depth of the knowledge required for each class of license. We believe this would not burden the Commission with additional expense in resources, but would establish minimum standards as appropriate for the Commission's management of its Amateur Radio Service.

Conclusion

36. As part of a well-rounded foundation of knowledge for Amateur Radio licensees, Morse code is a stepping stone to many radio-related activities. It makes a sizable contribution to the Amateur Radio Service in operator discipline, experimentation and acquisition of technical skills. It is an integral part of the service for many modern and practical reasons. When paired with improved technical qualifications, Morse code proficiency enhances self-training opportunities for the licensee.

37. Amateur Radio Service licensees use Morse code in large numbers, so it is reasonable that testing an amateur's Morse code skill remain part of the licensing qualifications.

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PLEASE NOTE: Revisions to the 47 CFR Part 97 Rules begin on the following page.

Appendix:
Proposed Revisions to the 47 CFR Part 97 Rules

Proposed changes to Part 97 of Chapter I of Title 47 of the Code of Federal Regulations to Revise Examination Requirements and Improve Testing Standards. Part 97, is amended as follows:

1. Section 97.301 is amended by revising paragraph (e) to read as follows. The remainder of 97.301, including the frequency tables, would be unchanged.

§97.301 Authorized frequency bands.

The following transmitting frequency bands are available to an amateur station located within 50 km of the Earth's surface, within the specified ITU Region, and outside any area where the amateur service is regulated by any authority other than the FCC.

(d) ******
(e) For a station having a control operator who has been granted an operator license of Novice Class or Technician Class:

2. Section 97.307(f) is amended by revising paragraph (f)(9) and paragraph (f)(10) to read as follows. The remainder of 97.307(f) would be unchanged:

§97.307 Emission Standards.

(f) The following standards and limitations apply to transmissions on the frequencies specified in § 97.305(c) of this part.

(9) A station having a control operator holding a Novice or Technician Class operator license may only transmit a CW emission using the international Morse code**, or RTTY or data emission using a specified digital code listed in § 97.309(a).**

(10) A station having a control operator holding a Novice Class operator license or a Technician Class operator license may only transmit a CW emission using the international Morse code or phone emissions J3E and R3E.

3. Section 97.313 is amended by revising paragraph (c)(2) to read as follows:

§97.313 Transmitter power standards.

(c) No station may transmit with a transmitter power exceeding 200 W PEP on:

(1) ******

(2) The 28.1-28.5 MHz segment when the control operator is a Novice Class operator or a Technician Class operator; or

(3) ******

4. Paragraphs 97.501(a) and 97.501(b) are amended by revising as follows:

§97.501 Qualifying for an amateur operator license.

Each applicant must pass an examination for a new amateur operator license grant and for each change in operator class. Each applicant for the class of operator license grant specified below must pass, or otherwise receive examination credit for, the following examination elements:

(a) Amateur Extra Class operator: Elements **1B,** 2, 3, and 4;
(b) General Class operator: Elements **1A,** 2, and 3;
(c) Technician Class operator: Element 2.

5. Section 97.503(a) is amended by revising as follows, and adding a paragraph and table at 97.503(c):

§97.503 Element standards.

(a) ******

(1) Element 1(A): 5 words per minute;
(2) Element 1(B): 12 words per minute.

(b) ******

(c) The topics and number of questions required in each question set are listed below for the appropriate examination element:

Topics	**Element 2**	**Element 3**	**Element 4**
1. Rules, operating procedures, operating practices	15 (43%)	13 (37%)	15 (30%)
2. Technical topics, **including, but not limited to,** radio wave propagation characteristics, electrical principles, circuit components, practical circuits, signals and emissions, and antennas and feed lines.	14 (40%)	18 (52%)	35 (70%)
3. RF environmental safety and electronic safety	6 (17%)	4 (11%)	0

6. Paragraph 97.509(j) is amended by revising as follows:

§97.509 Administering VE requirements.

(j) When the examinee does not score a passing grade on an examination element, the administering VEs must return the application document to the examinee and inform the examinee of the grade. **An examinee who fails a written element may not attempt any additional written elements, and one who fails a telegraphy element my not attempt any additional telegraphy elements, at that examination session or for 24 hours at any other amateur license examination session.**