

**Before the  
Federal Communications Commission  
Washington, D.C. 20054**

<b>In the Matter of</b>	)	
	)	
<b>The Amateur Radio Service:</b>	)	<b>RM-10805,</b>
<b>Proposed Changes to the Morse Code (CW)</b>	)	<b>RM-10806,</b>
<b>Proficiency Requirement for Operator</b>	)	<b>RM-10807,</b>
<b>Access to the Amateur Radio Bands</b>	)	<b>RM-10808,</b>
<b>Below 30 MHz</b>	)	<b>RM-10809,</b>
	)	<b>RM-10810, and</b>
	)	<b>RM-10811</b>
	)	

**To: The Commission**

**Reply In Opposition To The Comments of Earl Gosnell Made On 3 November  
On The Petitions For Rulemaking Retaining Morse Code Testing**

I, Leonard H. Anderson, respectfully wish to make some Comments to Mr. Gosnell's seven Comments. I make these as a private citizen, as a professional electronics design engineer retired but only from regular hours, as a U. S. Army Signal Corps veteran who began in HF radio communication in 1953, and as a long-time radio and electronic hobbyist who has never had any amateur radio license or ever tested for same, nor has any affiliation with amateur radio organizations or businesses or publishers.

These particular comments concern Mr. Gosnell's second attachment for his comments on RM-10805 through RM-10810 and as his third attachment on RM-10811, to wit a copy of the comments of Andrew Roos, amateur license ZS1AN, for the South African Radio League in regards to South Africa's administration ruling on their Morse Code Test retention or elimination.

This reply to comments in opposition are directed to the Roos document contents since Mr. Gosnell has chosen to use those contents as his own. It is presumed that Gosnell's viewpoints are those of Roos' in regard to retention of a Morse Code Test for United States radio amateur license examinations. The following subject headings refer to the Roos document. Throughout, the term "CW" is presumed to mean **on-off keyed continuous wave** modulation using the International Morse Code.

**CW is a Useful Mode**

I will agree to that since I consider all allocated modes for U. S. radio amateurs are useful. However, no case has been presented that a Morse Code Test is required to prove its usefulness. No other mode allocated to United States radio amateurs requires any separate pass-fail test element to demonstrate proficiency, only CW. All allocated modes are **optional** to use by U. S. radio amaeturs.

## Traffic Volume

United States radio amateurs are not defined as message carrier servers. The specific definition of Amateur Service is “A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, duly authorized persons interested in radio techniques solely with a personal aim and without pecuniary interest.”<sup>1</sup> Further, from 47 C.F.R. §97.113 (a) (5) A prohibited transmission is “Communications, on a regular basis, which could reasonably be furnished alternatively through other radio services.”

Any message forwarding performed by United States radio amateurs is a **voluntary** activity, not a professional one. There are no Commission regulations requiring any U. S. radio amateur to forward messages whether by CW modes or any other modes. Ergo, there is no logical connection to the requirement for a Morse Code Test specifically to engage in message forwarding.

## QSO Rate

Roos’ document would have all think that radio contesting is an important factor in amateur radio activity. The Commission neither defines nor sanctions contesting or “radio sport.” Contesting is another **voluntary** activity of a personal, competitive kind.

Again, there is no clear connection to the necessity for Morse Code Testing when all activity is voluntary and all United States radio amateurs have the **option** from the Commission on using any allocated mode on any allocated band.

## Bandwidth Efficiency

Roos’ document makes a good case for CW having minimal bandwidth. However, **radio-communication** involves the transmission of information and that must include throughput, the rate of information transfer. While a reasonable CW spectral occupancy is 250 Hz with a rate of, perhaps 20 words per minute, voice modulation of a slow talker averages about 200 words per minute equivalent and uses a spectral bandwidth of 2500 Hz. Fast talkers can achieve 400 words per minute equivalent in the same bandwidth. Voice communication is ten to twenty times faster than high-proficiency CW operators.

Roos’ document does not mention teleprinter or data modes. An old electromechanical teleprinter can sustain 100 words per minute throughput within a spectral bandwidth of about 300 Hz and provide an automatically written exact copy at each end of the circuit.<sup>2</sup> Other data codings have forward-error correction (FEC) codings capable of self-correction of common transient impulses of a received radio data signal. PSK31 was innovated to allow 30 words per minute manual teleprinting, with some FEC, in a minimal bandwidth equivalent to fast CW.<sup>3</sup>

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<sup>1</sup> 47 C.F.R. 97.3 (a) (4) current as of 1 July 2003.

<sup>2</sup> Examples are Teletype Corporation’s Model 28 KSR to Model 33 ASR on the communications market since before 1970 using 7-unit ASCII teleprinter coding. For radioteleprinting, a frequency-shift keying (FSK) with 170 Hz difference between Mark and Space frequencies will operate in a spectral bandwidth of about 350 Hz.

<sup>3</sup> Devised by UK radio amateur Peter Martinez, G3PLX, it has had six years of on-air testing and success, but mainly in Europe. Full descriptions appeared first in the Radio Society of Great Britain’s Radio Communications membership magazine, then in QST some years later. QST is the membership magazine of the

**Communications efficiency** is not rated exclusively on terms of spectral bandwidth. As Roos states it, spectral bandwidth is the sole arbiter. All other radio communications services in the United States have either dropped Morse Code or never considered it due primarily to limited communications efficiency.<sup>4</sup>

No clear case has been presented that “bandwidth efficiency” is a clear and compelling reason for retaining a Morse Code Test for any United States radio amateur license examination.

## Readability under Poor Signal Conditions

Roos’ document repeats an old mantra which could be better stated in an old urban myth “CW gets through when nothing else will.”<sup>5</sup> Those favoring CW define intelligibility solely on the basis of signal-to-noise ratio (SNR), that SNR related solely to spectral bandwidth.

In reality, the human voice has many components to aid cognition, of gender, of emotion, and is redundant in information content so as to resemble some error-correcting codings based on information redundancy. Verbal voice communication is a psychomotor skill which is naturally learned in early childhood by all humans who are not hearing challenged. CW has no redundancy characteristics and cognition is dependent on good formation of Morse Code symbols.

Roos does not bring up any data modes other than the relatively new PSK31. Such modes exist and came about in other radio services for **reliability** of communications, not just in readability.

47 C.F.R. § 97.313 (a) states: “An amateur station must use the minimum transmitter power necessary to carry out the desired communications.” Other than frequency-specific or geographic region restraints on **maximum** permitted transmitter power standards, the Commission yields the **option** to radio amateurs under a very generalized regulation statement.

The same **options** exist for allocated modes in allocated bands that apply to all U. S. radio amateurs. There is nothing in the Commission’s regulations which state all radio amateurs must operate under “poor signal conditions” any more than “good signal conditions.”

## Simplicity and Home Construction

Roos’ document states that “*One of the objectives of amateur radio is to encourage home construction,*” referring to the construction of radio equipment at home, not large-scale home carpentry. While that may apply to South African administration regulations, the United States radio amateur regulations again yield the **option** of operating radio transmitters that are **either** ready-built or of home workshop origin, all provided they follow technical regulations of Part D, Title 47 C.F.R.

While the vacuum tube based transmitters of 4 to 5 decades past **required simplicity by CW mode,** due primarily to unreliability of vacuum tube filament life, there is no such restraint today with a wealth of

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American Radio Relay League (ARRL).

<sup>4</sup> An exception if Maritime Radio Service in the United States and then primarily for vessels over a certain weight and operating on the Great Lakes.

<sup>5</sup> Etymology of phrase origin is not clear but probably first appeared in the 1930s and the first wide use of AM voice appearing to threaten amateur use of CW.

semiconductor active devices at everyone's purchasing ability. Active semiconductors have mean time between failure (MTBF) rates at least three orders of magnitude greater than vacuum tubes and are available in a massive mix of types and applications today, all available to the innovative amateur designer who does not wish to stay with the radio architecture of a half century ago.

Again, no compelling case has been made to retain the Morse Code Test for an amateur radio license.

## Low Power Requirements

Roos cites the Yaesu FT-817 as "*much less suited to sustained battery-power operation*" since it may draw as much as 450 mA of supply current. For a ready-built HF SSB or CW mode transceiver, I would use the SGC-2020 as a portable or mobile unit example, drawing less than 5 W in receive from a 12 VDC source.<sup>6</sup> Size is 2.75 inches high, 6 inches wide, 7 inches deep, less than 4.5 pounds in weight, Peak Envelope Power (PEP) is 20 W minimum from 1.6 to 29.7 MHz. Extremely portable, it is available in a trade-named "PortaPak" or "Paramilitary" combination of transceiver, battery supply, antenna in a self-contained case. The construction is relatively rugged mechanically and has been operated vehicular mobile and in private boat and light aircraft installations.

It is easy to become caught up in some intellectual comparison as to which has the "lowest power" which may become meaningless when applied to actual emergency conditions and a requirement to have either voice or CW modes for adaptability to an emergency environment. Home-built kits are not necessarily rugged enough or reliable enough for the possible emergency environments that may occur.

No compelling reason has been given to retain any Morse Code Test in order to achieve "low power requirements."

## The CW "Lingua Franca"

While it is true that abbreviations, pro-signs, and Q codes of CW enable a **minimal communications contact and exchange**, CW is slow for communicating more detailed message exchange that can very well arise during emergency conditions. International Morse Code has been defined as the standard Morse Code character set use by 47 C.F.R. 97.3 (a) (26) which applies to all United States radio amateurs. That definition is based on International Telecommunications Union recommendation F.1 which defines the actual character set and coding characteristics for International Telegrams.

In the United States there has been **no** emergency or disaster situation since 1993 which required the use of CW over and above any other mode to effect communications, either nationally or internationally by United States radio amateurs.

The Commission's regulations **already define the Morse Code type for CW use**. Those regulations do **not mandate CW use** over and above any other allocated mode, any allocated band. The Commission yields the **option** of mode to be used to individual U. S. radio amateurs.

No compelling reason has been given to retain any Morse Code Test for minimal communications contact and exchange.

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<sup>6</sup> Manufactured and sold by SGC Incorporated, 13737 S.E. 26<sup>th</sup> Street, Bellevue, Washington 98005, list price \$675 as of 5 November 2003. Two other transceivers, four models of automatic antenna tuners are also manufactured there.

## Emergency Communications

Roos' document does not contain any requisite statement that CW **is** the best, only that it **might need to be used** [by radio amateurs]. While I will agree on the "might be used" possibility, all must remember that public safety radio services in the United States do **not use CW** nor are they required to. International maritime radio services rely on the Global Marine Distress and Safety System (GMDSS) emergency calling through Inmarsat communications satellites. The U. S. Coast Guard no longer monitors the old 500 KHz international distress frequency that required CW. International civil aviation radio uses voice on VHF or HF (HF only for over-ocean flights) or ATC transponder special "squawk" codes for emergency calling. There are no other public safety radio services that require CW proficiency. That should be evidence of the lack of efficacy of CW compared to other available modes.

There is **no guarantee that emergency onsets allow the survival of Morse Code proficient radio operators to successfully complete a radio circuit in times of national disasters.** In the last decade, the United States has experienced a number of localized emergencies and natural disasters but none have exceeded the 300 mile maximum radius of Near-Vertical Incidence Skywave (NVIS) communications. Communications were effected on HF, VHF, UHF, and microwave bands for all public safety radio services to handle all the communications needs.

Roos could have also said that CW might be used to thwart alien invasions from outer space as given in the science fiction motion picture "Independence Day."<sup>7</sup> That is as likely as any other to compel the retention of Morse Code Testing for U. S. radio amateur licensing.

## CW is a Popular Mode

The "survey" tabulated on page 5 was an on-line website optional survey that changes every week at the ARRL website. The one mentioned appeared on 10 March 2003. There is no scientific basis for such a voluntary click-on-the-boxes survey as representing "all amateurs." Further, the ARRL is well-known for being pro-CW ever since it was founded in 1914 as a local New England radio club. ARRL membership itself represents no more than a quarter of all licensed U. S. radio amateurs.<sup>8</sup>

"Popularity" in and of itself is not a compelling reason for the retention of a Morse Code Test.

## The Education and Examination Syllabus

The Commission has not been chartered to be an educational or academic institution nor are

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<sup>7</sup> While considered to be well-executed motion picture with excellent special effects, that science fiction movie had a grossly implausible premise of alien technological capability as well as poor script writing.

<sup>8</sup> Membership in ARRL is taken from the "Publisher's Sworn Statements" required for QST, the ARRL membership magazine. That is indicated as about 170 thousand so ARRL membership is taken as that many. The latest database information from the Commission indicates about 680 thousand licensed U. S. radio amateurs. Ergo, ARRL membership is at 25%. Demographics on the membership as to class of license of members is not fully available but is speculated as being weighted towards the long-time radio amateur favoring CW on the basis of continuing editorial content and remarks of other, independent amateur radio publications as well as other radio organizations.

amateur radio license examinations any academic certificates of achievement. They might be so in South Africa but they haven't been that since 1934 in the United States.

No reasons for retention of the Morse Code Test were given.

## **The Morse Requirement**

Roos' document merely states that a Morse Code Test must exist for several repeated reasons.

## **The No-Code Arguments**

Several main arguments (6 in all) of the No Code International organization (NCI) are cited by Roos. I will take just one of those here:

*NCI: "5. The Morse code requirement serves as an advancement barrier to many otherwise qualified individuals."*

*Roos: "Electronics theory also serves as a barrier to many people who would otherwise make good operators. But in my view that is not a good reason to ditch electronic theory from the syllabus."*

Roos is confusing skills. Morse Code proficiency is a psychomotor skill. Electronics theory is an intellectual skill. Electronics theory knowledge allows understand of **all** existing modes and provides a basis for understanding of new modes as they appear. CW skill only helps in operating CW.

*Roos: "I have yet to see a good argument from anyone as to why he really cannot manage the Morse component."*

It seems that Roos is not amenable to hear from anyone against this "morse component."

*Roos: "And if you have a real physical or mental problem that makes it unreasonably hard for you to pas the Morse test, then you can apply for an exemption."*

The subject under discussion is **not** some military service chew-out for alleged dereliction of duty. It is whether or not a Morse Code Test should be retained in United States amateur radio regulations.

Roos closes his document (page 10 of attachment) with: *"I have examined the arguments given by No-Code International and shown them to be without substance."*

Roos has "shown" only that he refuses to accept any arguments on the elimination of the Morse Code Test in South Africa. Gosnell does not include any attachment or other information on what South African amateur radio regulations contain, especially when such generates the obvious "no-contrary-arguments" attitude exhibited by Roos. Such additional attachments would be irrelevant in any commentary concerning United States radio regulations.

The entirety of the statements of No Code International are valid from the point of view of those desiring to

eliminate the Morse Code Test from United States amateur radio regulations. That is true regardless of the emotional attitude of those desiring to retain the Test.

## **A Summary And Conclusion**

There is no valid reason for retention of the Morse Code Test in United States amateur radio for either technical or legal reasons. Retention of the Morse Code Test only serves as emotional sustenance of those already licensed in the amateur radio service who will never again be expected to take any test in their lifetimes, provided they renew their licenses in accord with regulations. Retention of the Morse Code Test provides a barrier to uncounted numbers of future Americans who are interested in the communications and technical aspects of amateur radio, not in becoming members of a living museum of old radio operating skills.

The Commission yields much to individual radio amateurs in operating options. Unfortunately, there is no such option on CW psychomotor skills to obtain an amateur radio license having below-30-MHz privileges. Options on mode use are plentiful, yet there is no option on a singular mode operating skill test. Options should be opened for the benefit of all. Options should not be restricted by demands of old-timers who refuse both change and arguments in favor of change.

The Commission must continue to look towards and prepare for the future for all Americans, not to satisfy a minority of amateur old-timers. The future is full of promise for Americans as we are a nation of innovators, of pioneers in technology, especially those of radio and electronics. The Morse Code Test has proved its worth in the past. We no longer live in that past. Those who have become proficient in Morse Code should feel secure that they have accomplished a personal task and met test requirements of older times. However, such individual personal accomplishments have no basis for demands that all emulate them in testing in the future, nor subscribe to their personal desires or imaginations. I urge the Commission to discontinue the Morse Code Test for any amateur radio license for the benefit of all, present and future. It is time for that change. Give all modes an equal option. Option is not a failure.

Respectfully submitted electronically this 4th day of November, 2003.

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