

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Amendment of Part 97 of the Commission's Rules) WT Docket No. 05-235
To Implement WRC-03 Regulations Applicable to)
Requirements for Operator Licensing in the)
Amateur Radio Service)
)

**Reply To Reply To Comments Of Robert Rightsell Filed On 14 November
2005**

Submitted electronically on 14 November 2005 by:

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General

This Reply to Comments concerns itself with the Comments made by Robert G. Rightsell filed on 14 November 2005. This Reply to Comments will show my disagreement with several statements made by Mr. Rightsell.

Discussion

Statistical Percentages Favor Continued Code Testing?

1. On Page 1, 2nd Paragraph, Mr. Rightsell states:

“Mr. Blair asserts that the majority of comments filed support the NPRM. He is very mistaken. At this writing, approximately 55% of the comments favor retaining Morse examination either for both upper classes of license or for the Amateur Extra alone. This trend has been growing steadily. Documentation of this has been supplied by Mr. [Joseph] Speroni (widely recognized as Amateur Radio's unofficial statistician) at <http://www.ah0a.org/FCC/05-235/Nom.html> “

The first two sentences are not accurate. The Commission physically released NPRM 05-143 for public view

on 19 July 2005 although it is included in the Electronic Comment Filing System under the date 15 July 2005. The first public comments were filed on 20 July 2005. Legal notice of the existence of NPRM 05-143 and its Comment and Reply to Comments period did not occur until 31 August 2005, about 5 weeks later. During this period up to and including 30 August 2005 there were a total of 1,980 filings in WT Docket 05-235.¹ Of those 1,980 filings, 1036 were unambiguously for the NPRM, approximately 55.5 percent of 1,868.² The total filings as of 31 October 2005, the official end date for Comments in WT Docket 05-235, was 3,703.³ If there were *55 percent in favor of retaining code testing in some form*, those filings should have totaled about 2,036. They did not. By the referenced Appendix 1 tally, those amounted to only 1,755. The alleged *55 percent* may be explained by:

Widely Recognized Amateur Radio Unofficial Statistician

2. Mr. Rightsell dubs Mr. Joseph Speroni as a *widely recognized amateur radio unofficial statistician*. Mr. Rightsell should also have stated that Mr. Speroni is an unabashed proponent of radiotelegraphy in amateur radio and has been so for years, including a Petitioner before the Commission proposing to retain the code test in various forms, an author and distributor of morse code learning-practicing computer programs, and generally boosting morse code use in amateur radio.⁴ That Mr. Speroni has a large Internet site of his own is no authenticator to his expertise for unbiased interpretation of public data nor as a *statistician*. Mr. Speroni has not accounted for the *unofficial comment period* of about 5 weeks which represent about half of all filings made in WT Docket 05-235.⁵

Alleged Lack of Information on Technical Advances

3. On Page 1, Paragraph 3, Mr. Rightsell states:

“Mr. Blair states that Morse examination ‘has been a roadblock for many years to highly technical people, that don’t care to learn about a mode of transmission that they will never use.’ This is an oft repeated claim, but never has anyone, anywhere submitted documentation to support it. Let’s examine the record.”

No documentation? False. The whole of the electronics industry and academia have an enormous base of *documentation* on **all** of radio; radio is a subset within the larger discipline of electronics. The **majority** of

¹ Day-by-day tally of filed Comments included as Appendix 1 in my 31 October 2005 Reply to Mr. Roland A. Anders, et al.

² Based on the Appendix 1 tally, 112 out of 1,920 were determined to be *Indeterminate*; i.e., duplicate filings, unknown-address filings, etc., as explained in Appendix 1. $1920 - 112 = 1868$.

³ Numerical values of WT Docket 05-235 represent those visible to the public on ECFS as of 5 PM, EST, on 14 November 2005.

⁴ Visible on Mr. Speroni’s referenced website.

⁵ Period between 15 July 2005 and 30 August 2005. Federal Register notice was made on 31 August 2005. Fully 52 percent of all filings were made in this period. The public has not been informed by the Commission whether or not it will consider those *unofficial period* filings for any decision on a Report and Order.

that documentation is about modes of transmissions **not** about on-off carrier keying by morse codes. A bibliography of examples by itself could fill a large book. Early important papers on modes of transmissions did not use on-off carrier keying to show new advances or theories.⁶

Where Are All The Advances?

4. On Page 1, Paragraph 3, middle of paragraph, Mr. Rightsell states:

“Highly technical people already have access to Amateur Radio via the Technician license. So just how many of them have developed new modes of transmission? Where is the innovation that has been promised from them since the years leading leading up introduction of the no-code entry license in 1991?”

We can ask Mr. Rightsell the same thing about the *innovation creationism* of the so-called *higher level* licensees either before 1991 or after 1991. In the terrible light of reality of radio communications history we can set a time line roughly as follows:

1896 - First demonstration of radio as communications means in Italy and Russia, using on-off keying by some dialect of morse code.⁷

1906 - First Amplitude Modulation of voice and music heard by multiple witnesses.⁸ First three-element vacuum tube active device for amplification invented by Lee DeForest.

1912 - First federal radio regulating agency created in the United States. Titanic sinks in the North Atlantic, rescuers helped by on-off keyed *spark transmitter* communications.

1918 - Edwin Armstrong, on duty with the U.S. Army and stationed in Paris, France, invents the *superheterodyne receiver* (U.S. patent received in 1920), destined to become the basic radio receiver architecture from that time onward.

1920s - First successful *single sideband* AM modulation and demodulation developed by the

⁶ Claude E. Shannon’s landmark paper *A Mathematical Theory of Communications*, is an accompanying file attachment to my Reply to Comments of Mr. Paul K. Boomer on 12 September 2005. In that 1948 paper establishing the relationship of bandwidth to random noise to information transfer error rate, *Shannon’s Law* (a familiar name for it in the electronics industry and academia) uses the electromechanical teletypewriter as a base example of parts of the *Law*. Teleprinters were already established as the recommended method of written communications for business and governments in the beginning of the 1930s and used in the first Single Sideband radio transmissions between Europe and both North and South America. It has been a common practice in the communications field to include electromechanical teleprinters under a general heading of *telegraphy* even though they do not use any morse code formats in their codings.

⁷ On-off current keying was used in the Morse-Vail Telegraph System of 1844. The morse code used then was not the same as was developed a few years later. In the 52 years between that first telegraph line and the first demonstration of radio communications, a number of *different* dialects of this character code were developed all over the world, such *dialects* reflecting the primary language of the country using it.

⁸ Reginald Fessenden’s famous *Christmas Eve Broadcast* using a spark transmitter carrier generation with modulation done by a special carbon microphone in series with the antenna lead. Needless to say, that method of AM was never used in any broadcasting, has no history of ever being used again by others, and had considerable difficulty in employing multiple audio inputs to the transmitter.

telephone companies for long-distance wire line communications, frequency-multiplexed to carry up to 4 separate circuits on a single pair of wires. First successful radio communications using teleprinters. First trials of multi-channel single sideband AM radio communications on LF portion of EM spectrum.

1930s - First use of single sideband AM multi-channel communications on HF portion of EM spectrum, Netherlands to Netherlands Antilles. First use of Frequency Modulation for broadcasting by Edwin Armstrong, for mobile police two-way radio communications by several eastern U.S. police departments. *Radio TeleTYpewriter* (RTTY) standardized as frequency-shift keying by governments, military, and businesses for teleprinter telegraphy.

1940s - World War II forces advancements in many different techniques. FM voice on high-HF to low-VHF becomes standard for military mobile and military backpack radio communications.⁹ AM voice on VHF becomes standard military aircraft radio communication mode. RADAR development results in many different advancements of pulse and wideband techniques. First use by U.S. military of multi-channel voice microwave radio relay systems. First *moonbounce* of a radio signal reflected off the moon by Signal Corps laboratories in 1946's *Project Diana*. U.S. Air Force lets contracts for *single-channel* single-sideband AM radio for Strategic Air Command aircraft communications over long distances.¹⁰ Television broadcasting expands at an explosive rate after the end of the War; contention for standards of color TV broadcasting results in no immediate adoption of either video-audio standard.

1950s - Multi-channel voice microwave radio relay becomes reality for civilian use for both radio communications and pipeline telemetry monitoring-control at frequencies above 1 GHz. Transcontinental multi-channel microwave radio relay of both voice and TV begun by AT&T. TV broadcasting expands into the UHF range. Radiosondes with *throwaway* designs used extensively at standardized band at 1.6 GHz.¹¹ AT&T's *Telstar* low earth orbit communications satellite demonstrates feasibility of international television, similar to the plan of UK author Arthur C. Clarke described in *Wireless World* magazine of the late 1940s. International Civil Aviation Organization (ICAO, a UN body) standardizes worldwide civil aircraft radio communications (AM voice) and radio navigation band (AM tones) on VHF; begins to adopt a form of Distance Measuring Equipment (DME) as used by the U.S. Navy in the now-standard TACAN (TACTical Area Navigation) military radio navigation system using pulse techniques in a 1 GHz band. Civil aircraft interrogator-transponder techniques for aircraft identification as an adjunct to radar surveillance is first developed, an outgrowth

⁹ Small-unit land forces still use VHF for radio communications, both voice and data digitized with communications security *scrambling* techniques along with agile RF carriers for additional security. Military aviation band later established at 225 to 400 MHz, still using AM voice.

¹⁰ To Collins Radio Co. and RCA Corporation as major developers. Contrary to popular amateur radio belief, the U.S. military needs sparked the mode that was destined to become the most-used mode by later radio amateurs on amateur HF bands, later by the maritime radio services for voice communications.

¹¹ Radiosondes, small balloons carrying a telemetry transmitter were standard atmospheric condition monitors before satellites. These used *one-shot* or primary batteries and were not expected to be recovered. Modulation of a single pencil triode (in a sheet metal cavity) was from the telemetry package audio oscillator whose frequency corresponded to a particular sensor (temperature, altitude, humidity). Given that over a quarter million were used annually by the United States government then, those had to be as cheap as possible to make.

of World War 2 IFF (Identification Friend or Foe) systems. Single sideband AM voice becomes affordable to radio amateurs in ready-built and kit form radios. Amateurs begin using surplus electromechanical teleprinters at 60 word-per-minute rates now available at relatively low cost as commercial and military teleprinters move up to 100 word-per-minute machines. Quartz crystal growth in the laboratory is born, promising more and better yield of that essential frequency control device.

1960s - The first frequency synthesizer subsystems appear in radios from LF on up to UHF, providing quartz-crystal-stable frequency agility at thousands of frequencies. Hand-held transceivers, aided by new semiconductor devices, appear as commercial items for use by the military, governments, businesses, public safety radio services, and some amateurs. AT&T makes available the first slow-scan video telephone service, goes through several variations, eventually drops the service due to low subscriber demand. Stereophonic FM is made a reality in broadcasting, along with the first use of *simulcasting* separate audio transmissions using an audio subcarrier.¹² Teleprinters begin to become more electronic than electro-mechanical using computer terminals but are limited to 300 words-per-minute maximum rates.

1970s - Integrated circuits appear in all radio designs, consumer grade to space-rated. Semiconductors have taken over all functions of active devices save a few specialties.¹³ The first of the ubiquitous cellular telephones appear although confined to mostly mobile use. High-definition television is attempted and will continue to be experimented with by industry in the next decade. Information Theory advances leap-frog as digital communications at rates of 2400 word-per-minute rates become possible in a 3 KHz bandwidth voice circuit. The Personal Computers are born, albeit in their first generation, rather slow and limited in memory compared to today. *Cordless telephones* appear for home and business use, first at low-VHF then marching upward in frequency in the next two decades. Consumer-grade radio prices begin to drop with lower-cost off-shore manufacture.

On entering the 1980s, the number of electronic technology advances available to all become staggering. There is a great deal of cross-discipline between electronics technology designs and a *radio* is no longer just analog in its architecture. The microprocessor not only made the ubiquitous PC possible but also enhanced consumer grade radios from front-panel displays to eliminating mechanical couplings to variable internal devices, made it possible to design test instruments for RF measurements, component measurements, oscillography, and hundreds of other applications at lower cost and with the possibility of some *self-calibration*. Information Theory and clever design have pushed the maximum rate of transmission of digital data to the limit of the *Shannon Law*, enabling the *56K Modem* that most of us use on computers. That same Information Theory has enabled multiple users of the same frequency band by hundreds of Digital Spread Spectrum communication users without any mutual interference. A combined digital-analog-computer-sequenced system exists in ALE (Automatic Link Establishment) used on HF by government, but not by radio amateurs. I would ask Mr. Rightsell if a *non-radio-amateur* can readily quote such things as just described, why could not some so-called *higher class* radio amateur do the same?

¹² Stereophonic voice-music broadcasting and *simulcast* audio channels are similar to the aircraft radio navigation VOR system used for determining the magnetic azimuth of an aircraft from a ground station. The VOR magnetic North bearing reference is transmitted as a frequency-modulated audio tone near 10 KHz even though the actual bearing signal is AM at 30 Hz.

¹³ High-power RF transmitters, cathode-ray oscillographs (and TV *picture tubes*), photomultipliers (including night observation devices) still require vacuum-state technology, especially for UHF and above frequency-range RF sources. Their days are waning as solid-state technology advances.

Amateur Extras Did It All?

5. On Page 1, Paragraph 3, ending, Mr. Rightsell states:

“Every new mode developed in the past 15 years, and there have been many, has resulted from the work of higher class licensees, those who accomplished either the 13wpm or 20wpm requirements for their licensure. Virtually all the new frontiers of operation in the upper reaches of radio frequency operation have been documented by the same group, not by those ‘highly technical’ folks Mr. Blair touts.”

To be blunt, Mr. Rightsell engages in self-puffery and nonsense. Skill at radiotelegraphy has never been shown to be of any creative, innovative, or intellectual superiority. History of *radio* that was just listed was written and accomplished *largely by non-radio-amateurs*, those tens of thousands of engineers, technicians, and technologists in industry, government, and academia who progressed technology for *technologies’ sake*. If those researchers, innovators, developers were also radio amateur hobbyists, fine, they would only show that they liked the technology so well that they enjoyed it as a hobby as well as at work. As to *documenting it as a group*, that depends largely on the editors’ choices of articles to document in a limited number of periodicals devoted entirely to amateur radio, who, not coincidentally, have the same rank-status-privileges of the *higher-class* (through demonstrated radiotelegraphy skill) licensees.¹⁴

Non-Morse-Code Individuals are Equivalent to Two Years Old?

6. On Page 2, 1st Paragraph, Mr. Rightsell states:

“As for the second part of that statement, is it really any different for a person who has no knowledge of or experience with Morse code to say that he doesn’t like it and will never use it than for a two-year-old confronted with peas on his plate for the first time to say he doesn’t like peas and will never eat them? Judgements based on nothing more than that sort of thinking are inherently flawed and indefensible.”

What Mr. Rightsell has written is not only egregious but an outright insult to not only those of us who worked in radio communications responsibly long ago, but to all the planners of radio communications *in every other radio service except amateurism* since the end of World War 2. This commenter began full-time work in HF radio communication in early 1953 by being assigned to the 3rd largest U.S. Army station in the worldwide Army network. At age 20, not 2, a soldier without any specific Signal Corps training on HF transmitters. Three dozen HF transmitters all 1 KW or greater, 220 thousand teleprinter messages relayed per month,

¹⁴ The major publisher of amateur radio periodicals and texts in the United States is the Amateur Radio Relay League, also a membership organization. The only other one is *CQ*, an independent publisher. The *Internet* itself might qualify due to hundreds of *private* websites going into great deal of radio hobby *publishing* on their own. By contrast, this commenter receives monthly periodicals of the industry in the form of *EDN*, *Electronic Design*, *RF Design*, *Microwaves & RF*, and a number of other periodicals devoted to news or new products, plus a number of industry and military association newsletters. Those named in bold face all have articles on theory and application and design which *is* state-of-the-art. None of them tout radiotelegraphy skill as either important or necessary to work responsibly in any radio service.

operation around the clock seven days a week.¹⁵ *None* of those circuits used morse code nor were they planned to use any morse code after 1948. The experience and first steps at responsible leadership at that station over a half century ago led me to a successful career choice as an electronics engineer in aerospace. In that aerospace industry there was never a need to use morse code nor any training required in that to be a design engineer on or to operate any RF emitters ranging from LF to microwaves. Indeed, in all the radio services of the United States, morse code modes had already been tried or never considered from the beginning for any communications and those other radio services were *giving up on morse code*. Today, its only use for communications, other than in the hobby of amateur radio, is some limited applications in maritime radio where ship owners haven't yet *upgraded* to what the majority uses: VHF voice by FM, HF voice by SSB AM, data-teleprinter on HF via the *TOR* or Teletypewriter Over Radio modes. The Global Marine Distress and Safety System, designed by the maritime community itself, has replaced the old 500 KHz morse code mode disaster frequency; the United States Coast Guard no longer monitors 500 KHz.

Who Do They Think They Are?

7. On Page 2, 5th Paragraph, Mr. Rightsell repeats himself on replying to Mr. Morrow:

“Just who does Mr. Morrow think developed those new modes? Does he believe they dropped from the sky like manna?”

In the terribly bright light of *all* history, nearly *every mode allocated to U.S. amateurs today* have been developed by the radio industry, the military, by academia.¹⁶ Those were all in use by others before the Commission or the first radio regulating agency allocated them to amateurs. A single exception is *PSK31*, a narrowband teletypewriter mode developed in the UK by Peter Martinez, G3PLX. There is only some vapid intellectual arguments concerning radiotelegraphy by radio amateurs and only under the invalid definition that the first radio communication demonstrators were said to be *amateurs*.¹⁷ Some say that APLRS used by a few radio amateurs is an innovation but it depends heavily on the Global Positioning System to give that system its information; without that GPS data the APLRS cannot, by itself, find any geographic position. While the most-used mode in HF amateur bands is SSB AM, therefore *amateurs developed it*, they forget two things: The USAF was first with its need for a single-channel HF communications system; SSB AM was actually pioneered first by the telephone infrastructure, then on radio by commercial long-distance communications services. *Manna?* In a way, yes, the modes were nearly all already there, waiting to be used. There are many more modes in use by other radio services, but the radiotelegraphers of the Amateur Extra classes haven't yet discovered them.

¹⁵ A 20-page photo essay (free download) of that station is found at:
<http://sujan.hallikainen.org/BroadcastHistory/uploads/My3Years.pdf>.

¹⁶ The Amateur Radio Relay League histories give the impression that amateurs invented and pioneered everything in radio communications. No so from a number of academic and industry histories. However, their publication target is radio amateurs and they are also a membership organization. Since their membership numbers correspond only to 1 out of 5 licensed U.S. radio amateurs, they attempt some *sinning by omission [of others]* in order to attract new members.

¹⁷ Guglielmo Marconi of Italy was a decided entrepreneur who attempted a worldwide monopoly in the first years of radio's existence. Aleksandre Popov of Russia was an academic who was interested in the science of radio. In 1896 they were neither professional nor amateur. There was no real distinction in the United States until the creation of the first radio regulating agency in 1912.

Shoo the Behooves

8. On Page 5, last Paragraph, Mr. Rightsell writes:

“... I believe it behooves us to submit thoughtful cogent comment. I further believe it would behoove the Commission to disregard the host of simplistic submissions that fail to discuss the issues in any meaningful way (including those supposed ‘reply comments’ that fail to actually reply, but are actually reiterations of previously posted comments).”

Mr. Rightsell is cautioned that the old, tired and trite comments favoring morse code testing for all radio amateur licensing have already been existing for at least a half century. To keep repeating them in this new millennium shows only that he has nothing new to make his case. To attempt insult of a group who does not favor Mr. Rightsell’s opinions shows only that Mr. Rightsell considers his opinions so *higher-class* that they are beyond reproach. Amateur radio is basically a hobby, neither union, nor guild, nor craft and is not absolutely necessary to serve the public. Many other radio services do serve the public and were created for that very purpose. To require newcomers to obey the wishes and desires of a self-styled elite group of traditionalists who set themselves above others by virtue of passing old tests required under old regulations is not in the best interests of the public.

A Thank You

This commenter wishes to thank the Commission for permitting a private citizen of the United States, one who holds no amateur radio license, has no affiliation with any amateur radio membership groups, yet has long experience in radio communications and electronics design as well as being a very long-time hobbyist in electronics to comment on regulations specifically governing getting into United States amateur radio.

Leonard H. Anderson

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Life Member, Institute of Electrical and Electronic Engineers
Veteran, United States Army 1952 to 1960 (Signal Corps), Honorable Discharge 1960
General Radiotelephone (Commercial) Radio Operator license transferred from a First Class Radiotelephone
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