

In the Matter of )  
)  
Amendment of Part 97 of the )  
Commission's Rules Governing )  
the Amateur Radio Service to )  
Facilitate Spread Spectrum )  
Communications )

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RM - 8737  
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To: The Commission

**STATEMENT IN OPPOSITION**

I am an advanced-class amateur radio operator and am currently serving as President of the Mid-America Coordination Council, Incorporated (MACC), the largest consortium of recognized volunteer state and regional Amateur Radio Frequency Coordination entities in the United States.

While the Petitioner, the American Radio Relay League (ARRL), represents itself as being 'the' national association of amateur radio operators in the United States, it should be recognized that they are not the only one and that their interests do not necessarily represent all of the amateurs when their membership is actually less than 30% of the entire licensed amateur population. In this particular filing they do not even represent a majority of the members they do claim nor did they solicit input from their general membership before making this Proposal. I am a life-member of the ARRL, and support most of their positions. However, as the MACC President I can not support RM-8737, nor can I support it as an individual amateur radio license holder.

The Proposal dismisses 'harmful interference' as an inconvenience. It is my understanding that marginal signal access to a narrow band FM repeater for would be reduced when Spread Spectrum (SS) noise has further degraded this signal to an unusable degree. The ARRL sought to further erode the integrity of repeaters by earlier appendation of

97.311(b)'s "[U]nintended triggering of carrier operated repeaters is not considered to be harmful interference"

The ARRL asserts that "There have not been, in the League's experience, any established instances of actual interference to narrow-band amateur communications from SS (spread spectrum) communications." This is not true. In their own publication, *1988 ARRL Handbook*, page 21-14 they admit "The SS signals were inaudible to amateurs in QSO, but the signals did cause some interference by keying certain repeaters that did not have a receiver carrier sense activation delay."

The further incompatibility of this mode, among narrow band users, is discussed in *Spread Spectrum Techniques*, Robert C. Dixon, 1976 IEEE Press, page 15, whereas:

"(I)t has been suggested that more efficient use of the available spectrum might be made by assigning both narrow-band and wide-band users the same frequencies for concurrent use. Under the right conditions, such concurrent use would be quite practical. The burden of achieving practicality would necessarily fall on the spread spectrum users, however, because of the fact that most of the frequency spectrum is already filled with narrow-band users who got there first, and the cost of modifying the present narrow-band sets would be astronomical."

The preceding quote was written twenty years ago. Since then, overall spectrum usage, including amateur use, has since increased narrow-band activity tenfold. The operations of thousands of 70 cm repeaters alone could be compromised, as well as considerable satellite, weak-signal and packet activities. RM-8737 would not impose any requirement on SS users to pay these modification costs.

The League's proposal makes reference to reports from a STA holder, Robert Buass, K6KGS. MACC Frequency Coordination Chairman, and professional communications consultant, Whit Brown, WBOCJX, attended an ARRL-sponsored spread spectrum forum in Long Beach, CA, on September 3, 1995, that also heard reports presented by Mr. Buass. His observations follow:

1. For mathematical convenience two meter 'frequency hopping' tests were set up on 25 kHz increments, even though it was known that the area band plan adhered to 15/20 kHz channel separations.
2. This 'off frequency' testing was done on the repeater outputs rather than on the inputs, hardly representative of 'testing' that would display meaningful results in the RF environment of interest.
3. There was no notification to the general weak-signal, satellite or repeater community of when these tests were to be performed. It was stated that operators could have called them or the coordinator if they experienced any interference from this 'testing', yet did not publicize the event/s or inform coordinators, some of whom were in attendance, or any regional coordinator of such operation in progress . . . how would they have even known these tests were going on, must less try to identify the source of any resulting interference?
4. When asked if it was tried on a repeater input, the answer was in the affirmative, but declined to say which one or with whom, when asked.
5. During concerns raised by one representing hundreds of weak-signal operators, the Chair was willing to offer protection to their part of the band, but balked at offering the same protection to the other coordinated users. If this mode is so transparent, why would this protection even be necessary?

While the STA holder was certainly enthusiastic and knowledgeable in the CDMA subject, the test results were seriously flawed and bore little resemblance to an unbiased evaluation and presentation.

As for the technology itself, I offer further observations from the standpoint of our MACC frequency coordinators. Spread Spectrum has been presented by some as being a "transparent panacea" for the problem of continued spectrum crowding. "Transparent" in that existing users of the band will be unaware of its encroachment. "Panacea" in that it

will accommodate virtually unlimited QSO's while coexisting unobtrusively among the many users of various modes.

Real-world experience with this mode tells a different story - as again told by Whit Brown. Mr. Brown was recently involved with an engineering evaluation of the 'direct sequence' type of spread spectrum transceivers, operating within the license-free Part 15, 902-928 MHz spectrum. While evaluating a commercial unit, an IFR spectrum analyzer revealed about 15 MHz of sine waves spaced about 16 kHz apart, more than 900 of them, with the voice envelope superimposed on each one. When modulated with a Firebird digital bit-error-rate instrument, the valleys in the above sine waves increased to the level of the peaks and complete saturation resulted with an attendant increase in the 'noise-floor' of the 15 MHz of occupied spectrum.

This deliberately introduced noise envelope in the spectrum is well illustrated in pro-Spread Spectrum articles in the May '89 issue of *QST* and the June '89 issue of *Z3 Magazine*. The author presents spectral displays wherein the resultant 'hump' in the noise floor is (only) 10 dB above the spectrum threshold. This 'hump' begins at 442 MHz and extends to 450 MHz! The article continues with 'lock' being maintained at over a mile with a quarter-wave antenna and only 390 milliwatts of power. The changes inherent when coupled with typical gain antennas combined with the power levels amateurs are legally capable of is potentially disastrous for narrow band users. Just the power increase from 390 milliwatts to the legal SS limit of 100 watts is about 24 dB, add to that a typical antenna gain of three to 12 db and a potentially serious compromise of existing systems and operations would seem most evident. The cumulative effect of multiple users would further increase the noise floor and interference potential.

The Spread Spectrum use being proposed in RM-8737, would not be a spectrum efficient means of communication. In fact it would alter the operational characteristics of thousands of existing coordinated FM repeaters and other relay systems. The cumulative effect of increased SS noise on the 420-450 MHz band would render carrier-accessed repeaters inoperable by having to continually tighten the squelch to overcome the keying caused by

the increase in the noise floor. The introduction of CTCSS would only mask the problem, minimize nuisance keying, and give the operator one more access method to remember. Unknowing transient operators might be denied access completely. Weak-signal and satellite interests would be affected as well. Just because direct sequence SS may exceed the bandwidth of typical narrow band users' equipment, does not mean the RF amplifying stages within the rig doesn't know it's there. It just means that the recovered signal must be that much stronger, to be recovered within the increased noise threshold created by Spread Spectrum wide band emissions.

The military, State Department, and CIA do not utilize SS emissions in an effort to enhance spectral management and efficiency. Its primary purpose, development and implementation is to mask the source and content of enciphered communiques for security-oriented agencies and organizations.

I am not opposed to the use of Spread Spectrum. But I do oppose the imposition of ultra wide-band modes into frequency bands that would compromise the operations of hundreds of thousands of existing users in the name of progress alone. If this mode is to be accommodated within any VHF and higher Amateur Radio Service frequency band allocation, I ask that it be confined to the 902-928 MHz spectrum, where it can coexist with other SS users. Our frequency coordinators make every effort to accommodate the delicate proportional balance between the interests of the vast majority of narrow band FM operators and those of the lesser-used modes. Compromising the interests of 99% of the bands' users to accommodate the 1% special interests is both unrealistic and grossly inconsiderate.

The safeguards defined within 97.311(c) and (d), that RM-8737 seeks to delete, are as necessary today as when they were originally implemented. With these controls in place, there is at least an opportunity to ascertain the source of any interference. With the virtually unlimited encoding schemes now being proposed this will be nearly impossible with the resources readily available to current users in the affected bands.

I am also very concerned about the attractiveness of this mode to the criminal element in our society. If RM-8737 is adopted, this ostensible 'progress' would severely degrade the usefulness to most of the users of this band. This technology is available to this criminal element now on other bands, we don't need to introduce and encourage their use of it on our 70 cm band.

Lastly, in view of the federal government's on-going effort to restrict the use of advanced encryption technology by legitimate users, I see no reason to spread its' use to the Amateur Radio Service via Spread Spectrum.

Therefore, I respectfully request that the Commission **DENY RM-8737** . . . a Proposal wherein only the equipment vendors would benefit.

Respectfully submitted,

A handwritten signature in black ink that reads "George R. Isely". The signature is written in a cursive style with a large initial "G".

George R. Isely, WD9GIG  
President  
Mid-America Coordination Council, Inc.

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