

Federal Communications Commission
425 12th Street, SW
Washington, D.C., 20065

Re: 16-239, & additional comments to related RM-11708 filing

To the Commission:

This is a summary of my revised comments opposing unlimited bandwidth digital mode operation in the HF/MF bands with additional comments addressing unattended "robot" HF digital mode stations (e.g. Winlink 2000) in the HF bands. Closely related comments giving my reasoning, previously submitted under RM-11708, are appended.

Although I am an amateur radio user of both narrow-band digital modes (e.g. PSK31) and wide-band digital modes (Olivia, etc), including exchanges with unattended stations (Winlink 2000), I do not believe that the amateur radio bands can continue to effectively serve their various traditional and statutory roles if unlimited bandwidth digital modes are allowed, and if unattended wide-band digital mode stations are not limited to restricted sub-bands by FCC rule, not merely by ARRL promulgated (voluntary) band plans. Refer to extended comments below for my reasoning on these issues.

Unattended stations are notorious for their inability to discern when their frequencies are in use, and given varying band conditions are not likely to ever be reliable in this area. Given this inherent limitation, they must be segregated into an area of each band where their interference to other band users is limited. Submissions by other respondents give detailed reasoning on how wide and where in each band such segments should be, but the principle that they should have only a limited segment of each band is vital, or they will proliferate and become a growing source of interference, as semi-commercial uses encouraged by wider-bandwidth modes and lax enforcement become even more common than at present (e.g., email and Internet activity from yachts and remote locations using the "free" amateur bands in preference to commercial services available in other bands).

Winlink 2000 is widely promoted as an amateur radio emergency service, and fulfills that role admirably (as do other related digital modes operations such as NBEMS, which are not reliant upon unattended stations). Unfortunately, Winlink 2000 has also developed into a competitor with commercial services for purely commercial communications (e.g., ordering supplies, parts, equipment, and services related to boating). If its band footprint and the bandwidth of its individual stations is not limited, this pressure will slowly overwhelm the amateur bands with wide-band interfering signals not under ongoing human operator control.

There are two issues at play here. First is the danger to efficient and equitable band use of very wide digital modes, which are most attractive for non-amateur uses. Second is the disruptive nature of unattended HF stations, which serve a legitimate amateur radio function but are subject to abuse for commercial purposes. Together these two things (wide ultra-high speed digital modes and unattended stations in the HF bands) portend a progressive commercialization of the HF bands for long-haul communications unrelated to emergency or hobby services.

Individual digital mode signals should be limited by bandwidth (not baud rate) as discussed in my comments below, and unattended digital mode stations should be strictly segregated into a reasonable sub-section of each HF band.

Respectfully,

John Bronstein - KG7ABM

Addendum - Re: RM-11708

To the Commission:

I oppose adoption of any rule which removes bandwidth limits to any type of signal, digital or otherwise, in the amateur radio HF bands.

The historic rule, which imposed a baud (symbol-rate) limitation to digitally encoded signals should be changed to remove the baud rate limit, and replaced with a bandwidth limitation.

From the standpoint of other users of these bands, what information a signal contains, what it “sounds like”, or the rate at which information is exchanged is immaterial. To another user of the band, any such signal is merely a potential interferer, which must be avoided. The broader the signal, the larger the segment of bandwidth that is unavailable to non-interfering use. No user should be granted the right to monopolize an unlimited bandwidth for his communications.

“Practical” limitations in signal bandwidth should not be relied upon. Most currently available amateur transmitters are limited to the bandwidth allowed for voice/phone modes (around 2.8 kHz, for SSB/J3E), but this is merely a reflection of manufacturers adhering to existing rules. Fully digital radios have entered the amateur radio commercial market, where the bandwidth constraints of both reception and transmission are largely set by software – very wide signals can be received, and with mere software modification, could be transmitted. If there are no legal limits to bandwidth, technical capabilities exist to generate and transmit signals of essentially arbitrary bandwidth – where the distinction between signal modes, including spread spectrum, become meaningless.

By removing the baud rate limitation, and imposing a signal bandwidth limitation, innovation will be encouraged, as efforts will be made to encode signals to produce the maximum effective symbol rate for various band conditions, within a reasonably constrained bandwidth.

A bandwidth limitation is vital or abuse will run wild very quickly. The only question is what is a reasonable limit. As a rough guide, I would suggest, at most, the current limits of SSB phone (emission type J3E). This has the practical value of being achievable by much of the transmitting equipment currently in use by amateurs, while allowing broad scope for devising signals that are highly efficient, resistant to such effects as selective fading or noise, or meet other specific communications goals. It also represents a significant liberalization over the current baud rate limitation.

Calculating the effective bandwidth of any given digital encoding system would be a task specific to the details of the mode, and is essentially a “fools errand”. Specifying the bandwidth, and allowable levels of spurious emissions beyond it, gets the job done. Modes that don't meet the bandwidth limits

would have to be modified, and emissions measured, until they did. It would be the responsibility of the operator not to exceed this limit (difficult to exceed anyway, using most existing equipment, and would continue to be, as manufacturers limited their equipment to meet the rule).

Simple – if your transmission meets the requirements of a phone SSB J3E emission, it doesn't matter what it “sounds like”, or that it is in fact a digital signal of some baud rate or another.

A lot of the enthusiasm for this rule change is from amateurs who want to enable the 2X faster PACTOR 4 mode on their SCS (Spezielle Communications Systeme GmbH & Co) modems which are limited to PACTOR 3 in the USA by the existing FCC rule. PACTOR 4 has a nominal bandwidth of 2.4 kHz, tailored to the bandwidth of existing SSB transceivers, and would be allowed by my proposal of limiting digital modes by bandwidth to current SSB/J3E limits.

The wisdom of allowing a propitiatory digital encoding scheme, which includes overt encryption, in the amateur bands is not at issue here (though I do think that allowing these aspects of SCS's PACTOR products is unwise).

This liberal limitation in bandwidth already invites increased semi-commercial uses of the amateur bands, currently seen with the use of PACTOR email communications of a commercial nature from sailing vessels and similar remote situations better handled by commercial equipment and radio bands.

Having no bandwidth limit at all, along with no band usage limits, would invite chaos into the amateur bands, where the current relatively lenient FCC licensing requirements throw these bands open to very widespread use (thank goodness, or I likely wouldn't be licensed!). How long do you suppose it would be before some enterprising company like SCS produced a much wider-band PACTOR-like modem with much higher symbol throughput and path reliability? How long before transceivers would be built to handle these wider bandwidth signals? How much more widely would unattended stations proliferate, already common with WinLink. What chaos would it cause?

Right now dozens of communications occur simultaneously using such narrow-band modes as PSK-31, in the bandwidth of a single SSB signal. How much sense does it make to encourage usage of modes that take up more than that bandwidth for a single user, communicating with an unattended station?

Attempting to limit the use of ultra-wide modes with overly restrictive band-plans would not be effective, and would muddy up the relatively simple, and largely voluntary band-plans in current use.

Make the PACTOR 4 boys happy, and give some real scope for innovation, but don't do it by throwing the door open to abusive ultra-wide digital signal types, while further encouraging non-amateur uses of the amateur bands.

In closing, I wish to note that working digital modes is my preferred activity on the amateur bands, including WinLink 2000, where PACTOR 4 usage is almost rabidly desired, and any rule relaxation, no matter how fool-hardy, would be welcomed to allow it. My enthusiasm is more circumspect.

Digital modes, yes. Effectively unlimited bandwidth for them, no.

Respectfully,

John Bronstein - KG7ABM