NYU WIRELESS

www.NYUWIRELESS.org

Prof. Theodore (Ted) S. Rappaport, Ph.D, PE
David Lee/Ernst Weber Professor of Electrical & Computer Engineering
NYU WIRELESS
Tandon School of Engineering
New York University
9th Floor, 2 Metrotech Center
Brooklyn, NY 11201
Ph: 646 997 3403
tsr@nyu.edu

Federal Communications Commission   April 27, 2019
445 F St. NW
Washington, DC 20022

Subject: **Reply Comments in RM-11831**

Dear FCC and ARRL Officials:

In my role as a wireless communications engineer and expert, a former Federal Communications Commission Technological Advisory Council member, a friend to the amateur radio community, a licensed amateur radio operator (N9NB), a Professional Engineer in Virginia and Texas, and a life member of the American Radio Relay League (ARRL), I file this reply regarding RM-11831 to <u>reinforce why</u> the FCC must urgently adopt this proposal in principle, in order to **ensure data transparency** in amateur radio and to **eliminate the use of private email and secret file transfers that are currently being transmitted in the amateur radio spectrum**.

I.   Introduction

RM-11831 cures ongoing deficiencies that the ARRL and FCC have ignored since the late 1990s. Adoption of RM-11831 would remove existing rule ambiguities to ensure that all data transmissions in amateur radio have a readily available decoder for public use and eavesdropping, so that the public and other amateur operators can "read the mail" and learn about the hobby while intercepting any data signal for meaning over the air. As shown here in my reply to comments, RM-11831 would vastly improve the effectiveness of ACDS transmissions in emergency situations by making all data "open" for others to hear and react to, as required in 13-1918. As originally stated in my comments for RM-11831, I believe the FCC should broaden the "open source" language in the original proposal to also include proprietary but widely available decoding solutions, such as AMBE (as well as the recently proposed decoder software by SCS, provided they make it widely available to the public) that have proven, low cost or free solutions to enable over-the-air decoding by the general public and other amateur operators.

I firmly believe RM-11831 will improve the culture of amateur radio, will enable self-policing and public monitoring of all data transmissions, will enhance our national security, will bolster our long term goals in STEM, and will spawn interest and openness in the hobby by making it more accessible to future entrants. Enactment of RM-11831 would cure existing problems with many data transmissions that: (i) directly violate numerous FCC Part 97 rules including Part 97.1, 97.3(a)(4), and 97.113(a)(5) ; (ii) degrade the accessibility, utility, and value of the amateur radio service for its intended use; (iii) provide a national security risk using effectively encrypted signals while harming our long term efforts in

promoting STEM education, and (iv) violate current US State Department regulations regarding third-party messages (e.g. where non-hams communicate with ham operators via ham radio frequencies).

In this reply, I also reiterate the need for the FCC to deny or reject RM-11828, RM-11708, RM-11759 and NPRM 16-239, all which are proposals that would only escalate the proliferation of private/effectively encrypted email and computer files that bypass other commercial means of communication and which cannot be intercepted over the air by other amateur operators, the public, or the FCC. These masked transmissions are also a source of interference in the HF amateur radio spectrum.

II. Request for due diligence by ARRL Officers and a meeting of interested parties

In this reply, I ask ARRL and ARSFI leaders to read the vast number of comments in RM-11306, RM-11708, NPRM 16-239, RM-11828, RM-11831, RM-11759, and for ARRL officials to use their W1AW Pactor modem with Winlink software at the ARRL Newington, CT headquarters station to verify that they are unable to decipher, for meaning, random over-the-air Winlink transmissions, so that they may understand the merits of RM-11831. Here, I also publicly ask ARRL and ARSFI officials to personally meet with me and others amateur operators who are deeply concerned about the ongoing problems of obscured, effectively-encrypted ACDS transmissions in amateur radio. Since the ARRL filed its letter requesting a pause in NPRM 16-239 (see (https://ecfsapi.fcc.gov/file/1032717663093/ARRL%20Ltr%202%20FCC%2016-239%2003_27_2019.pdf), I have twice offered to meet with ARRL officers, including ARRL attorney David Siddall, and ARSFI President Lor Kutchins in Dayton, OH just prior to the Dayton Hamvention in May. My hope would be that such a meeting could forge an acceptable approach for all parties that could put amateur radio on a strong path for growth and openness.

III. Notable events since RM-11831 was published

Since RM-11831 was published at the FCC ECFS on March 28, 2019, a number of promising events and statements have been made.

a. SCS admits proprietary signaling and offers to provide a free decoder for Pactor

During the RM-11831 proceedings, SCS admitted publicly that their Pactor modem signaling is proprietary and that it is very hard to implement a decoder. In response to RM-11831, they offered to do the hard and expensive work to make a free, over-the-air decoder available in the spirit of "mutual understanding." While their initial offer is to only give such a decoder to a very limited number of unnamed official observers in the USA associated with the FCC, they have at least expressed a willingness to create the free, open decoder solution that could just as easily be made available publicly to all amateur radio operators. Below, I reply specifically to this particular filing.

b. ARSFI/Winlink provides a "Winlink Window" message viewer for US relay stations

Since RM-11831 was published, ARSFI and Winlink have for the first time ever, created a public "Winlink Window" that purports to allow the public to use a web browser to read messages transmitted by Winlink ACDS stations within the past 21 days.

(https://www.winlink.org/content/us_amateur_radio_message_viewer). It is not possible to verify if this traffic represents all or just some of the Winlink global email traffic, or if the emails are displayed in real time or if they are curated, filtered, or truncated, since over-the-air-intercept is not possible for most Winlink/ARSFI transmissions.

c. FCC receives detailed complaint of Part 97 rule violations over Winlink/ARSFI network

Many amateur operators have reported vast violations of Part 97 rules occurring daily in much of the email traffic now being displayed in the "Winlink Window." Examples of violations and samples of some email traffic being carried over amateur radio, gleaned from the Winlink Window, have been posted on the QRZ.com forum about RM-11831 (https://forums.qrz.com/index.php?threads/new-digital-petition-at-the-fcc-rm-11831.652589/). Amateur radio operators have filed a complaint to the FCC, citing the fact that offending traffic is routinely being erased from the Winlink Window portal, casting doubts about the trustworthiness of what is being posted publicly. In a complaint sent to Laura Smith of the FCC Enforcement Bureau, there were over 100 pages of emails (collected from the Winlink Window in less than 21 days of observations), demonstrating many violations of FCC Part 97 rules. The Winlink Window is not a substitute for over-the-air monitoring, and does not address RM-11831 concerns for a variety of reasons, including the fact that the public would not know what was transmitted in the case of internet outages or computer and memory failures within the Winlink network, and given the prospect of human tampering, human error, and limited visibility to the ongoing activities at each ACDS node. <u>Over the air monitoring is the only way to self-police the amateur radio spectrum and to validate the activities of both the Winlnk system operators and Winlink users, as is done with all other modes in the hobby</u>.

d. CW ID and listen-before-transmit are being considered by ARSFI to address long standing complaints of amateur radio operators

Also, during these proceedings, there are reports that ARSFI/Winlink just recently implemented mandatory CW identification in its US ACDS stations. Further, ARRL officers have told me that ARSFI/Winlink is considering the implementation of a mandatory "listen-before-transmit" feature for all of its Winlink transmissions in the US amateur radio spectrum. These are noteworthy events, since past commenters in RM-11306, RM-11708, and NPRM 16-239 have complained about the need for both features, in addition to the requirements being sought in RM-11831. Winlink pioneer and ARSFI member Steve Waterman, the same person who was mysteriously copied on the SCS response to FCC's Scot Stone's query in June 2018 (which was hidden from public view for 5 months), and the same Steve Waterman who mysteriously called the FCC CTO just hours after I emailed the FCC CTO a draft of my RM-11828 comments, is reported to have insisted that no Winlink station should ever need to listen before it transmits (see: last few pages of this filing: https://ecfsapi.fcc.gov/file/1032167020169/FCC%20Letter%20RM%2011828.pdf and comments regarding "listen before transmit" and "appropriateness of Winlink" in: https://ecfsapi.fcc.gov/file/1011027600966/Comments%20of%20WA3VJB.pdf)

e. Early actions show signs of willingness for SCS and ARSFI to provide data transparency in amateur radio

The recent actions listed above are positive developments, and while not yet sufficient to address the vast number of complaints about ACDS over the past two decades, and while falling short of the request for data transparency in RM-11831, these activities show that there may be both a willingness and an ability on the part of ARSFI, Winlink, and SCS to adapt their approaches and processes for compliance with the spirit and intent of RM-11831. These recent actions also authenticate the thousands of complaints in RM-11306, RM-11708, NPRM-16239, which have been continually ignored by the FCC and ARRL to date. These actions have only come about in the past few weeks due to the likelihood of RM-11831 being adopted by the FCC. This is strong evidence for why RM-11831 needs to be adopted – it is already having the positive effect of addressing some of the peripheral, yet long-standing, complaints about ACDS stations in amateur radio.

While these recent activities are positive steps that show an ability to "play nice" in the amateur radio service, Winlink, ARSFI, and SCS have not yet complied with the two most fundamental and long-standing requirements of amateur radio – to provide open, unobscured over-the-air transmissions that are strictly for hobby use and not pecuniary in nature, and to operate in a way that avoids interfering with others. This is why RM-11831 must be enacted immediately by the Commission.

IV.   ARSFI has spread emotional fire about RM-11831

There has been much emotional fire and false information spread by ARSFI, and the yachting groups and emergency communication communities that it informs. Some amateur radio operators, many who are RVers or blue water sailors, stand to lose their free, private email connections if RM-11831 is enacted. Yet, such communications are strictly forbidden by Part 97 rules for amateur radio. This is why RM-11831 must be enacted.

Rather than publicly address the issue of data transparency complaints by thousands of amateur operators over the past two decades, ARSFI has instead selected to engage in a public relations campaign aimed at defaming RM-11831 and its proponents, without dealing squarely with the facts. This can be seen vividly at QRZ.com, and in many of the filings at the ECFS for RM-11831, and in earlier FCC proceedings such as RM-11306, RM-11708, NPRM 16-239, and PSHSB 17-344. The misinformation about ACDS data in amateur radio is precisely why RM-11831 - a reinstatement of a firm requirement of openness of all data transmissions - is so vital to the future and culture of amateur radio.

It is only by open, publicly available data transmissions and decoders, and constructive team work within our hobby that more radio enthusiasts will become attracted and engaged with amateur radio, and more experimentation and discovery will occur. The more that ARSFI and ARRL ignore, oppress, deny and repel the notion that all amateur radio transmissions should be completely open to public interception with widely available decoders, the less useful and relevant amateur radio will become in cultivating technical competencies and assisting in emergencies, and the less valuable it will become for helping the long term technical capabilities of our country through the creation of technical experts and economic development through innovation.

ARSFI and Winlink leaders have been open about their desire to expand their use of secure/private data and the quest for more bandwidth in the amateur radio bands (see the appendices here and in RM-11828).

ARRL allowed Winlink developers to have a leading role in crafting Part 97.221 rules with the FCC in the early days of ACDS stations, yet ARSFI/Winlink proponents have not made their software open or provided decoder solutions that would encourage experimentation, technical development, or sharing of ideas. In essence, by not providing open decoding or open source solutions, and by using effectively encrypted transmissions, ARSFI/Winlink and ARRL have shut out others from being able to learn and create improvements through experimentation in ACDS, thus ignoring one of the most important tenets of the amateur radio service. At the same time, they have cultivated a free, private, secure email service over the public airwaves of ham radio, in violation of Part 97 rules as now seen in the Winlink Window, while endangering Winlink users in emergency situations.

Rather than address the basic request in RM-11831 to implement openly decodable signaling methods and to operate in their allocated subbands, ARSFI/Winlink, boaters, and ARRL-associated emergency communications groups have made emotional claims to incite fear and anger throughout the hobby- this can be seen in some of the responses filed with the FCC which I address below. The ARSFI headline: "FCC Petition RM-11831 Threatens Amateur Digital Operations Like Winlink" is written to instill fear that Winlnk will disappear, even though they admit in the same posting that they need to do some work if they are forced to make their data transmissions open to the public (see: https://www.winlink.org/content/fcc_petition_rm_11831_threatens_amateur_digital_operations_winlink)

This same emotional fire has been parroted throughout the ARRL Amateur Radio Emergency Services (ARES) community and the boater community throughout the Internet; see these typical examples, there are dozens of others: Amateur Radio Emergency Data Network (www.arednmesh.org/content/rm-11831) Noonsite.com The Ultimate Cruisers' Planning Tool: https://www.noonsite.com/Countries/USA/fcc-petition-rm-11831-threatens-amateur-radio-services Seattle Auxiliary Communications Service: https://seattleacs.org/post-category/uncategorized/)

The emotional, and often vitriolic, responses to a well-reasoned and much needed rulemaking proposal show that a minority of amateur operators are using the amateur radio service for effectively encrypted communications, and ARSFI appears to have more of a desire to do nothing about its own software and encoding offerings, but would rather instill fear and encourage rancor to protect its effectively encrypted email. ARSFI admits publicly on its RM-11831 webpages, and others that it informs, that it would rather have the users of its private email system complain loudly to the FCC (and ARRL leaders) to avoid the use of transparent data, rather than to do the right thing and "produce monitoring software for an unconnected eavesdropper for WINMOR, ARDOP. VARA's author must do the same." (quoted from the ARSFI website).

The impenitence exhibited by the some ARSFI and Winlink proponents illustrates how privacy and secrecy in the amateur radio hobby have harmed the culture of our great hobby. Such rancor makes amateur radio unbecoming to would-be entrants, especially young people who may not have been exposed to such inflammatory rhetoric.

Rather than consider the rulemaking proposal on its merits, most commenters have offered histrionic pleas for rejection of the proposal, following the lead of ARSFI, often citing the need to ensure that

emergency communications remain intact, or to ensure that their Winlink email services at sea not be disrupted. These pleas for rejection are completely without merit, since nothing in RM-11831 would endanger or harm emergency communications or email in any way. All that would be needed for compliance of RM-11831 is for ACDS stations and emergency communication operators to embrace the use of open data formats that are readily available for over-the-air copy by others (e.g. non-encrypted, non-compressed) for any Pactor modem or Winlink software user, as is already required by FCC in 13-1918 and in Part 97.113. ACDS stations would simply need to operate in their already-assigned sub band. Pactor modems would simply need to use the "unproto" mode already built in to the modem (the "o" open or "unprotected" mode), and no change would be required whatsoever. ARSFI/Winlink would either need to provide a public decoder for others to intercept all of the data transmissions used by Winlink over the air, or would need to move away from the ARQ and compression approaches it currently employs (giving it the feature of effective encryption), and instead adopt published, documented Forward Error Correction (FEC) coding that is ideally suited for broadcast channels and which may be intercepted over the air for meaning by others.

V.   ARSFI/Winlink can open up their ACDS network by using FEC instead of ARQ

ARSFI modulations under development, and Winlink connections using Pactor modems, use Automated Repeat Query (ARQ) to correct errors during its on-the-air connections, which gives an effective encryption capability to its data. ARQ is an old and somewhat inefficient technology for HF channels. It was originally developed for non-fading hard-wired channels, and its use in commercial wireless applications first occurred in the 1950s as an extension of its original use on wired networks. On a wired network that connects multiple users, the channel state does not fade or change along the wire, enabling all users to simultaneously know the channel state when ARQ is used. However, HF radio channels undergo fading which causes the channel states to be different for an eavesdropper than for a particular transmitter or receiver engaged in a connected file transfer. By using ARQ on HF fading channels, combined with differential encoding or compression that uses the instantaneous channel state information shared between a specific connected transmitter and receiver to encode successive packet data transmissions during a connection, ARSFI/Winlink is able to obtain secure, effectively encrypted communications in amateur radio, since the specific channel states between a unique transmitter and unique receiver are used to encode the subsequent data bits of that transmission packet on each ARQ packet interlude, and that precise channel state used for the encoding of subsequent packets is generally different and independent from a random eavesdropper. If an eavesdropper experiences a different channel state (e.g. has different fading conditions, which is certain to be the case over many packets) than the connected transmitter and receiver, the eavesdropper cannot fill in the proper information to intercept over-the-air data, since it is missing the precise channel state information needed to decode the successive transmissions properly. The eavesdropper sees gibberish, as has been reported widely for over a decade.

Published, standard FEC codes are spectrally efficient and are best suited for rapidly fading wireless broadcast channels at HF, since they provide error correction while also providing the ability of others to intercept the meaning over the air without needing to know the particular channel state of the sender or the receiver. Many public domain amateur radio data signaling methods, such as AMTOR, PACTOR 1,

and WSJT signaling (FT-8, PSK-31, etc.) use FEC as part of their open-source data solutions in amateur radio. All of these data methods have free, open, widely available detection software programs.

The Commission and ARRL leaders must recognize that virtually all amateur radio data modes, including WSJT (FT-8, PSK-31, etc.), AMTOR, Pactor 1 (original Pactor), AMBE (Fusion, D-Star, DMR), RTTY, and CW are available, openly, to the public and have freely available software decoders for over-the-air interception without obscuring the meaning of the transmitted signals. That is, publicly available decoding solutions for all of these digital modes are widely available for over-the-air interception at little or no cost, and this availability encourages experimentation, usage, and learning with these data modes. **It is only ARSFI/Winlink and SCS that have continued to refuse to provide any software or hardware for over-the-air decoding of their transmissions by other amateur radio stations or the public.** RM-11831 is vital to safeguard amateur radio, as it would require ARSFI/Winlink and any other creator of data formats to also provide a widely available decoder that would ensure open decoding whenever a new data transmission scheme is introduced to the hobby.

VI.   RM-11831 is needed for EMCOMM and to avoid Third Party Rules violations

Before addressing particular comments, it is important to point out that Winlink and ARSFI, through the use of obscured signaling, often place US amateur operators as well as operators from other countries at risk of violating US State Department rules regarding third party traffic handling. There are daily violations (this can now be seen readily on the Winlink Window), as ACDS stations carry email traffic across the earth via the ionosphere. The potential danger of violating US State Department rules for third party traffic handling is yet another reason why RM-11831 should be immediately adopted, since open transmissions would allow other amateur operators in any part of the world to immediately intercept and correct offending ACDS stations that routinely attempt to improperly pass or forward messages (email from other Winlink stations or email sources) to countries that are not currently recognized by US treaties. See the ARRL website for the list of the 50 or so countries that have 3rd party message passing treaty agreements with the US (note there are no countries in Asia and virtually none in Europe, as US 3rd party treaty agreements are primarily just with other entities in North and South America, Africa, and Oceania) http://www.arrl.org/third-party-operating-agreements

The regulations regarding prohibited 3rd party traffic are often ignored by ARSFI/Winlink, blue water sailors, and EMCOMM proponents who improperly claim that Winlink and Pactor are allowed to operate everywhere except in the US. In fact, quite the opposite is true, as Pactor 4 and Winlink are only allowed in a very small portion of the countries of the world.

I believe Winlink and ARSFI would see much more global adoption if their protocols were open to public interception, since doing so would engender trust, would comply with both the spirit and letter of amateur radio laws, and would likely lead to willingness by other governments to allow ARSFI data modes to operate in ham radio. The widespread popularity of FT-8 not only stems from its remarkable performance in low Signal to Noise Ratio conditions (something Winlink would enjoy if it made this a technical focus and switched to publicly documented FEC), but also because it is an open source

solution. FT-8 does not get "caught up in controversies" about whether or not others can decode the transmissions, or if it creates interference.

Also, by obscuring the meaning of their data transmissions over the air through ARQ and compression (e.g. effective encryption) as is done currently, **ARSFI and Winlink are actually endangering its user base by precluding the listening public or other amateur operators from being able to respond to emergency traffic, and precluding others from jumping in to lend help in a rescue when needed**. Thus, while EMCOMM enthusiasts may complain about RM-11831 due to the emotional fire being spread by ARSFI, **they unwittingly are hurting their own cause**, and harming the ability of amateur radio to serve most effectively in emergencies by holding on so tightly to the use of improper, obscured data transmissions.

VII. Reply to comments in opposition to RM-11831

My reply comments serve to find common ground, and to rebut flawed or misleading comments made by numerous filers. The FCC should take note that most filers in RM-11831 have failed to consider the fundamental aspects of the proposal which deal with the simple adoption of published and open, readily-available data protocols and decoding methods that assure interception by others over the air and for meaning (in contrast to effectively encrypted data that is provided when proprietary compression and ARQ signaling are used in amateur radio). Most commenters also neglected to comment about proposed operations of ACDS stations in their own already-existing sub-bands.

a. Reply to Hans-Peter Helfert of SCS

https://ecfsapi.fcc.gov/file/10417301289214/SCS_FCC_Comment_RM11831.pdf

Hans-Peter Helfert of SCS rejects the demand for "open source" software in RM-11831. While open source is ideal for encouraging learning, participation, modification and experimentation, I am in agreement with his point that unintended consequences could possibly arise if the precise language of the petitioner were implemented. Other commenters also made this point. Given this, I encourage the FCC to broaden or alter the proposed language in RM-11831, while retaining the principal requirement of a widely available over-the-air intercept solution for public use, such that there will always be a free or low cost real-time solution that the general public may use to decode, for meaning, any data sent over the amateur radio spectrum.

Mr. Helfert claims "Through its almost 30 years of development and evolution, PACTOR has complied with US law at all times." I and thousands of others do not believe this is true, as 97.113 has been violated through Pactor 2 and Pactor 3 messages that are obscured for meaning when sent over the air. He further claims "that our comprehensive monitoring mode allows full transparency of the PACTOR traffic, also for third parties. The monitoring mode is available as a standard tool in every PACTOR modem." This is categorically false, since other operators who own Pactor modems are unable to intercept data over amateur radio using a stock Pactor modem with Winlink.

Mr. Helfert's position seems disingenuous, and is part of the problem that has been created by ACDS operations by ARSFI/Winlink and SCS in amateur radio. Mr Helfert makes the assertion that a

comprehensive monitoring mode allows for full transparency of Pactor for third parties, but he might be misconstruing the term "third parties" as being a user in the closed Winlink email network that is having a message relayed within the closed private network, as opposed to a "third party" who would be an eavesdropper trying to listen to the message for meaning. There is absolutely no evidence that a random eavesdropper can intercept the compressed Pactor modem transmission. In fact, it is widely known and admitted by Winlink (see my comments in this proceeding and in RM-11828) that no one (other than signal intelligence personnel) is able to use a Pactor modem for over-the-air intercept of other Pactor stations when used with SCS compression/ARQ. This is precisely why the FCC must enact RM-11831.

While SCS may sell ultra-expensive ($10K -$20K) interception capabilities to a small number of signal intelligence agencies, it and ARSFI do not allow for the monitoring of other Winlink traffic by the public or rank-and-file amateur operators, or even by other Winlink users who own SCS Pactor modems. The ARRL officers need to do the proper due-diligence before making any further rulemaking proposals to the FCC. They need to investigate this for themselves by using the Pactor Modem and Winlink software at W1AW, so that they can see that they are unable to decode random over-the-air Winlink/Pactor traffic.

Despite his deceptive comments in many places, I applaud Mr. Helfert and SCS for being open to the concerns of the petitioner. Helfert states "We understand the demand for a free PACTOR monitoring tool for everyone, independent of the purchase of a modem or expensive monitoring software. …… this proposal is a novelty. Nevertheless, SCS is willing to develop and provide a free PACTOR monitoring tool as a contribution to "mutual understanding" in the spirit of AR. This would be a software solution under the operating systems Linux and / or Windows. The tool would not require any special hardware. However, such a development would require considerable effort for SCS, as our modems are powered by specialized signal processors. Porting the software to common Intel and ARM processors will be correspondingly expensive. Nonetheless, we are willing to provide such a comprehensive, free monitoring tool. It would integrate with the Volunteer Monitor Program now being organized by the ARRL."

Mr. Helfert has admitted that creating a monitoring tool for public intercept of its Pactor modem transmissions would "require considerable effort for SCS. " In making this statement, he admits that such an open monitoring solution does not exist today. He also states that porting the software would be "expensive" and require "considerable effort," thus proving the point that Pactor cannot, today, be intercepted over the air readily by the public or by other amateurs. Winlink advocates and ARSFI members have denied these facts in the past, and continue to do so.

Mr. Helfert's offer to develop a comprehensive, free monitoring tool is significant and offers a potential key to opening up one of the known sources of obscured data in amateur radio – Pactor 2 and Pactor 3. Through such a free monitoring tool, the public could eavesdrop, and no changes would be needed to existing operators who already have Pactor modems, although RM-11831 would still need to be enacted in order to ensure that publicly available decoders were always available to the public for any and all data modes, including Pactor.

If SCS's proposed decoding software solution was made publicly and widely available, and could be used by any listener with a standard amateur radio transceiver and personal computer (sound card), and if

this solution could be demonstrated by rank and file amateurs to provide the complete meaning of all messages sent over the air via Pactor with Winlink, then SCS's proposed solution would seem to comply with RM-11831 and the basic tenets of amateur radio. Mr. Helfert's offer to build and provide a free decoder for "mutual understanding" in the spirit of amateur radio is precisely the right approach that puts our hobby on a strong footing.

By enacting RM-11831, SCS would then be able to comply with the data transparency tenet of our hobby by providing a free decoder, and would be following the lead of other data systems such as AMBE. The use of a publicly available decoder by SCS would set an example that would need to be followed by ARSFI / Winlink and other data users and experimenters, to ensure that all data modes in amateur radio had widely available decoders.

The only problem with Mr. Helfert's proposed decoder is his suggestion that the decoder be made available only to a small number of official observers associated with the FCC. That is not acceptable, since limiting the free decoder to only a small group of amateur operators would fail to meet the data transparency requirements of 97.113 and RM-11831, and would merely perpetuate the existing privacy within ACDS circles. The public would not be able to participate through over-the air-intercept, and the small number of official observers equipped with such decoders might miss emergency transmissions that other amateurs could eavesdrop on. The flawed suggestion would exclude the vast majority of amateur operators from being able to help self-police the spectrum, and would preclude most amateur operators from helping in emergencies or learning from over-the-air transmissions. Limiting the availability of the decoder simply is not acceptable.

Mr. Helfert is grossly mistaken when he claims the "US would be an island in the world" if it were to ban Pactor modems. On the contrary, most countries in the world presently do not allow the use of Pactor modems or the use of Winlink in their amateur radio spectrum. One merely needs to see the 3rd party treaty agreements for the US, and the map of Winlink ACDS stations at the ARSFI website to see the very limited reach of Winlink and global email via ham radio. I firmly believe that SCS and Winlink/ARSFI would find broader global adoption of their products and services if they followed the example of CW, RTTY, and FT-8, and made all of their data protocols open and available for public eavesdropping and public scrutiny.

b. Reply to Phil Karn

https://ecfsapi.fcc.gov/file/10422455216228/rm11831.pdf

Mr. Karn applauds the use of open-source software, and in this area we agree. His experience with open source AX.25 and AMTOR serves as a "poster child" of the value and capability of amateur radio and openness. His experience is precisely why RM-11831 needs to be adopted, and how the hobby of amateur radio can and should contribute to the technical know-how of our country and to America's long term economic development.

Mr. Karn takes issue with my use of the term "effectively encrypted," even though I am not the petitioner, and states his belief that "intent" is the proper measure for determining if a message is obscured for meaning in 97.113.

I disagree with Mr. Karn, in light of language used by the FCC in many places over the past 24 years. First, consider 13-1918, para. 6, where the Commission states (bold emphasis is mine):

> Section 97.113 is intended to help maintain the non-commercial character of the amateur radio service by prohibiting certain types of transmissions.[18] **The primary protection against exploitation of the amateur service and the enforcement mechanism in the amateur service is its self-regulating character**.[19] As noted by numerous commenters, the amateur community has a long tradition of self-regulation and a strong commitment to maintaining the **unclouded distinction between the amateur service and other radio services**.[20] **To ensure that the amateur service remains a non-commercial service and self-regulates, amateur stations must be capable of understanding the communications of other amateur stations**.

The Commission is very clear in 13-1918 that amateur stations <u>must</u> be capable of <u>understanding the communications of other amateur stations</u>. In this language, there is simply no wiggle room for having obscured transmissions sent over the air, even if the sender does not "intend" to obscure the message. The Commission asserts that the only way for amateur radio to remain a non-commercial service that can self-regulate is to insist that no transmissions be obscured for meaning. If they are obscured, they are forbidden and in violation of 97.113, and thus in my mind are "effectively encrypted."

The FCC is also clear about the requirement for over-the-air data transparency when it gave its original ruling to allow Pactor 1 (open source Pactor) into amateur radio through 95-2106. Para. 3 of 95-2106 is where the Commission specifies the terms for allowing new data modes into amateur radio:

> 3. The primary purpose of CLOVER, G-TOR, and PacTOR is to facilitate communications using already-authorized digital codes, emission types, and frequency bands. The technical characteristics of CLOVER, G-TOR, and PacTOR have been documented publicly for use by amateur operators,[5] and commercial products are readily available that facilitate the transmission and reception of communications incorporating these codes. Including CLOVER, G-TOR, and PacTOR in the rules **will not conflict with our objective of preventing the use of codes or ciphers intended to obscure the meaning of the communication.**[6]

In 95-2106, the Commission makes clear its objective is to use already-authorized digital codes with completely documented technical characteristics, and to prevent the use of codes or ciphers that intend to obscure the meaning of the communications. In previous comments that I filed with RM-11828 and RM-11831, I gave numerous instances where ARSFI/Winlink and ARRL have promoted the fact that Winlink successfully provides privacy, security, and makes it "nearly impossible" for others to intercept the meaning of the transmitted signal. Thus, ARSFI/Winlink and ARRL have publicly promoted the ability of Winlink transmissions to intentionally obscure the meaning of the communication, in direct violation of 95-2106, even though in other instances they take a public stance, as Mr. Karn has, in claiming that there was no "intent' to obscure the transmitted message.

The FCC further clarifies its desire to ensure all amateurs are able to understand the meaning of data transmissions in 95-2106, by declaring a prohibition on transmitting messages using any coding method that impairs the ability of others to understand a transmitted message in plain language. This is evident in footnote 6 of 95-2106:

[6] The HF bands are widely used for international communications. Number 2732 § 2.(1) of Article 32 Section I of the International Telecommunications Union *Radio Regulations* requires that **transmissions between amateur stations** of different countries **be made in plain language.** Section 97.1 13(a)(4) of the Commission's Rules. 47 C.F.R. § 97.113(a)(4), therefore, **prohibits amateur stations from transmitting messages in codes or ciphers** intended to obscure the meaning **thereof**.

By noting the plain language requirement of ITU, the FCC is clarifying that all transmitted messages must be in plain language, and the Commission is strictly prohibiting the transmission of messages using any code or cipher that obscures the meaning in plain language. It should be clear that the FCC is not allowing "intent" to serve as a convenient, arbitrary, or subjective excuse that can be used to override the strict prohibition of any coding that obscures the plain meaning of text. Mr. Karn's creative interpretation is similar to that used to justify the obscured Winlink traffic which uses ARQ coding techniques and proprietary compression that obscure the plain language meaning of the transmission from others who are attempting to listen in. **No other data transmission schemes in amateur radio, other than ARSFI/Winlink and SCS, take such an outrageous position on the meaning of what the FCC intends for "obscured messages."** The FCC uses words and terms like "must," "prohibited," and "meaning of the communications" in 95-2106, and more recently stresses the requirement that all data unequivocally support "understanding the communications of other amateur stations" in 13-1918, These words forcefully instruct the amateur radio community that all data transmissions must be available for over-the-air interception for plain meaning by other amateur radio stations, and the public. With the lack of enforcement resources at the FCC, the ACDS community has used the creative and improper interpretation espoused by Mr. Karn to implement effectively encrypted data transmissions, in direct violation of the stated intent and requirement of the FCC. Mr. Karn , Winlink/ARSFI and SCS advocates must be challenged on their interpretation of obscured messages. This is why RM-11831 is vital for the future of amateur radio.

Mr. Karn describes how more efficient communications inherently become harder to decode, which is generally true, but FCC Part 97.113 makes clear that efficiency cannot be used as an excuse to obscure the transmitted signal for meaning. Mr. Karn and others should know that the commercial wireless industry uses published FEC codes instead of ARQ codes in broadcast channels where other mobile users need to listen in on the channel. Just like a broadcast mobile wireless (cellphone) system that undergoes fading, FEC can be used to provide HF amateur radio data stations with excellent anti-fading performance, excellent spectral efficiency, error-free communication, and complete data transparency to other users. Other popular amateur radio data modes such as PSK-31 and FT-8 use published FEC codes and operate at low signal to noise ratio levels. The ARSFI/Winlink methods that rely on ARQ and compression are most likely less spectrally efficient than if they used FEC (e.g. Viterbi decoding). Moving to FEC would also satisfy the FCC requirement to make the messages available for plain meaning to eavesdroppers, as well.

Mr. Karn postulates that I am being disingenuous and use the term "effective encryption" as a "loaded word" to describe dynamic compression. Nothing could be further from the truth. I am very genuine and sincere in my belief that FCC rules are being violated by the improper use of ARQ/dynamic compression, since such a combination does not lend itself to over-the-air interception by others, and violates 97.113 when informed by 95-2106 and 13-1918. The FCC instructs all of us that we must avoid "the use of codes or ciphers intended to obscure the meaning of the communication." The admission of SCS in VII.a, along with its admission to Scot Stone in June 2018 (published at the FCC website in Nov. 2018) further makes clear that ARQ with dynamic and proprietary compression fails to "ensure that the amateur service remains a non-commercial service and self-regulates, [where] amateur stations must be capable of understanding the communications of other amateur stations" as required in 13-1918.

Just as "intent" can be subjective, "sufficient or complete documentation" is also subjective. I disagree with ARSFI and its followers who claim Pactor 2, 3 and 4 are publicly documented for sufficiency, since I know they are not, and no decoder has ever been produced to date for use by a wide range of other amateur radio stations. SCS says in VII.a that it will be considerably difficult and expensive to create such a decoder. The way to overcome the perceived differences in what is "sufficient or complete documentation" is to simply require the developer of a new digital mode to also offer an available data decoder to the public whenever a new data mode is introduced. That is what Joe Taylor (FT-8), AMBE, and all other data mode developers (except ARSFI/Winlink and SCS) have done historically in amateur radio.

RM-11831, with slight language adjustments from the petitioner's original proposal, would clarify and cure the current ambiguity of what constitutes suitable documentation by simply stating the need for all data modes to have either a publicly documented coding and decoding capability that has been proven through an open source, widely available, publicly available decoder, or, if the data mode is proprietary (such as AMBE), the data mode developer would be required to provide a widely available decoding solution that can be demonstrated to work and is available to the public

Pactor 2, 3, and 4 are not sufficiently documented to allow others to make a decoder for widespread public monitoring. SCS or anyone else can cure problems and comply with RM-11831 by simply making a publicly available decoder widely available for the masses to use, so data may be openly interpreted for meaning through intercepted, over the air messages. Other data modes are (ft-8, rtty, psk31), and even AMBE D-star, and fusion, already offer a free or low cost widespread decoding method for the masses. SCS and ARSFI/Winlink need to, as well, in order to conform to 97.113. RM-11831 seeks to clarify this requirement.

As stated in 13-1918, the spirit, intent and stated purpose of ham radio is quite different than commercial, business use of spectrum. In our hobby, openness, teaching. and sharing are much more important than spectrum efficiency, although advances in amateur radio will continue to improve in all of those facets. To address Mr. Karn's question, I would support any data method, including documented dynamic compression, so long as it complied with FCC rules and came with a publicly available decoder that could be demonstrated to properly decode all transmissions by an eavesdropper, and was made widely available at little or no cost to the public for successful eavesdropping.

Mr. Karn gave a keynote speech in 2017 where he echoed many of the same sentiments I have expressed in the past, when he stated "Ham radio still offers this unique opportunity to do hands on experimentation and learning." I contend that such an opportunity can only happen when the data transmissions and reception capabilities are made open to all for discovery – hence the need for widespread decoding capabilities for any data mode in amateur radio as called for in RM-11831.

c. Reply to Michael Samyn

https://www.fcc.gov/ecfs/filing/104231853008291

Michael Samyn incorrectly claims in his objection to RM-11831 that "Winlink is an Open source communication tool." …and that "as in all digital modes, third parties with the proper equipment and software can read all the WinLink traffic and identify the transmitting stations." These are false statements, and his comments are refuted by SCS's admission that it does not currently have an available decoder for the public, and that it would have to go to considerable effort and expense to make an over-the-air decoder for their Pactor modem transmissions. ARRL board members are hesitant to use their Pactor modem with Winlink software to see what W4RUS has already admitted to the FCC and which is well-known throughout the world (see: https://www.fcc.gov/ecfs/filing/1222718116209). Winlink and Pactor modems cannot be used to do over the air intercept of other email transmissions that are in ARQ or using proprietary compression.

d. Reply to Scott Berg

https://www.fcc.gov/ecfs/filing/1042691208589

Scott Berg objects to RM11831 and states that the proposal will "limit digital mode." This is false, as there is no limitation imposed by RM-11831. The only imposed requirements are that digital modes be open for over the air interception by others, and operate within their already-allocated amateur radio spectrum, yet these rules already exist. He claims that "America is falling behind" by rules that "restrict experimentation", yet his argument is flawed, since having private communications without source code or open source decoding or available decoders stifles learning, and stunts experimentation. That is, not enacting RM-11831 is what would restrict experimentation, since the status quo precludes others from engaging with the ACDS technology and the reception of transmissions for meaning in the public airways.

e. Reply to Linda Edeiken

https://www.fcc.gov/ecfs/filing/1042688624984

Linda Edeiken asks that RM-11831 not be adopted because she "count[s] on Winlink to get weather information at sea." Nothing in RM-11831 would cause Ms. Edeiken to lose her weather broadcasts. All Winlink would need to do is stop using proprietary signaling modes that obscure the meaning of its data sent over the air , and instead use the unprotected, open mode available in all Pactor modes. Alternatively, Winlink could adopt standard FEC coding and publish their data formats as a standard, and prove to others with a YouTube video and through available public domain software that they can be

readily and openly decoded by the public, instead of using Automatic Repeat Query and compression that provides effective encryption that prohibits others from "reading the mail."

f. Reply to Matthew Copeland

https://www.fcc.gov/ecfs/filing/10425050254804

Matthew Copeland files comments similar to many others. He "adamantly opposes" RM-11831and claims that "communications modes or protocols of which the Petitioners complain is no more "encrypted" than is CW." This of course is patently false, since CW is fully documented and decoders for CW exist widely and freely, yet effectively-encrypted data signals do not have such decoders available (SCS has admitted this in this proceeding). Mr. Copeland also states "The current system of Pactor, Sound Card Digital Modes, Winlink, and similar protocols are essential to Emergency Communications as currently employed in the US. Adoption of the proposed Rule would be devastating to EMCOMM operations. Constant practice with available protocols and tools is essential to ensuring that EMCOMM systems "work" during an actual, emergency situation. If the protocols and tools which RM-11831 complains of are restricted on or from the amateur bands, communications practice and, thus, "readiness" will be adversely affected.".

I disagree with Mr. Copeland. I do not believe RM-11831would harm any of the EMCOMM operations or tools and protocols that Mr. Copeland uses. The only difference would be that different protocols, which are able to be decoded by other amateur operators, would be used in place of the currently effectively encrypted signals. Nothing in the network, routing, addressing, or readiness arenas would be adversely affected. All that would be needed is for amateur operators to comply with FCC Part 97, and with RM-11831 that would further clarify that all amateur radio protocols be open for intercept for their plain meaning by others. **In fact, the implementation of RM-11831 would dramatically improve the value and impact of emergency communications, since it would ensure that only open protocols were used over the air, so that other ham operators and the public could listen in and help**.

VIII. Reply to Comments in support of RM-11831

a. Reply to Dr. Robert Frohne

https://ecfsapi.fcc.gov/file/104252430731053/RM-11831.pdf

Dr. Rob Frohne, an electrical engineering professor in Alaska, advocates for openness in amateur radio, and gives powerful evidence why RM-11831 is so important for the future of the hobby and the United States. I concur with his statements.

b. Reply to Raymond Sokola

https://www.fcc.gov/ecfs/filing/10422311615904

Raymond Sokola, the former CTO of Motorola and a pioneer in cellular communications, who later served as CTO for Motorola's cable modem business, gives very important reasons why RM-11831 must

be enacted immediately for the safety of the US and the ability to attract new technical competencies to amateur radio. He also points out why openness is critical for emergency communications. I concur with all of his statements.

c. Reply to John Long

https://www.fcc.gov/ecfs/filing/1042581093353

John Long points out how the private email system of Winlink is completely obscured to other amateur operators, and acts as an improper repeater system. He calls for immediate passage of RM-11831. While I do not have an opinion on the classification of ACDS as a repeater, I reserve the right to form an opinion at a later time. I concur with his astute observation that the Winlink ACDS traffic is obscured and should be prohibited, and I agree with his call for passage of RM-11831.

d. Reply to Samuel Leslie

https://www.fcc.gov/ecfs/filing/10415253120156

Samuel Leslie is a retired engineering leader from General Electric who holds a Master's Degree in Electrical Engineering. Mr. Leslie points out the importance of RM-11831 and the need for amateur operators to be able to listen in and self-police the radio spectrum. He points out the danger of turning the amateur radio service into a large private email provider, and cites the irony and fallacy being propagated by EMCOMM enthusiasts in their desire to keep their emergency communications a secret over the air. He cites national security as a further reason for why all data in amateur radio should be open for intercept. I concur with his comments.

e. Reply to Nathaniel Moreschi

https://www.fcc.gov/ecfs/filing/104100808304256

Nate Moreschi, N4YDU, is a high school teacher and world-renowned radio sport operator. He points out the importance of RM-11831 and the need for ensuring that all data signals have transparent meaning in amateur radio. He also cites the interference created by existing ACDS stations, and the need for them to remain in their allocated subbands. He notes the national security concerns of effectively encrypted data, and observes how amateur radio is vital for helping youth develop skills in engineering, public service, and communications. He notes that interest in those three key areas will likely fade if the hobby does not remain open and inviting for youth.

f. Reply to William Axelrod

https://www.fcc.gov/ecfs/filing/104192491710229

William Axelrod is a veteran Navy Officer, entrepreneur, and an electronics technician who obtained his Master's degree. He observes the potential for encrypted email with malware, as well as criminal activities over amateur radio, are serious and valid concerns that should be taken into consideration for the adoption of RM-11831. He points out that the cultivation of STEM in the US is an important

aspiration of amateur radio, and the encrypted transmissions make it difficult for others to become part of the hobby. He also points out how RM-11831 would cure various existing problems in the Amateur Radio Service. I concur with his statements.

IX. Summary

In summary, RM-11831 solves two vital problems that have been neglected for the past two decades, but which must be <u>recognized and solved</u> before any further allocations or privileges are given for the use of data in amateur radio.

Based on comments filed in this proceeding, it seems clear that SCS and ARSFI/Winlink are data mode developers in amateur radio who do not comply with spirit and intent of FCC Part 97.113 and other rules in the Amateur Radio Service. Recent actions and statements by SCS and ARSFI/Winlink – apparently the <u>only participants in the hobby</u> who fail to provide a readily available public decoding method for all amateur radio operators – may indicate a potential willingness to comply with RM-11831. **Future data modes will surely evolve-- it is vital to ensure data transparency now.**

Winlink emails have now been made public by ARSFI for the first time, and amateur operators have been able to confirm their suspicions of **wanton misuse** of the amateur radio spectrum. At least one detailed complaint has been filed with Laura Smith of the FCC Enforcement Bureau, and examples of rule violations and rancor by users of the Winlink global email system have surfaced at QRZ.com in a thread that now surpasses 150 pages.

The FCC should consider the evidence in the record, and should immediately implement a version of RM-11831 that makes clear that widely available, proven decoders must be made widely available for the public whenever a data transmission mode is used in ham radio. The use of published FEC codes, instead of ARQ, can ensure eavesdropping with no loss of spectrum efficiency for ARSFI/Winlink.

To help speed the hobby to a harmonious future of openness and growth, I have proposed to meet with ARRL and ARSFI officials just before the Dayton Hamvention in an effort to figure out a way forward that will ensure all data remains open, while also providing a path that gives ACDS, EMCOMM, and ARRL a path forward for growth, as well.

I applaud the FCC, ARRL and Congress who are looking to safeguard our country and the future of amateur radio by taking a close look at this long-standing, improper use of amateur radio as a private email service, and curing the problem by the adoption of RM-11831 with modifications.

Sincerely,

Theodore S. Rappaport, N9NB
David Lee/Ernst Weber Chair
Director, NYU WIRELESS

APPENDIX A

Example of Inaccurate statements about RM-11831 by ARSFI/Winlink in public record

In FCC comments and a recent web posting, https://winlink.org/FCC_Action, ARSFI stated the following about my past filings at the FCC:

…His [Prof. Rappaport's] arguments would have the FCC remove Winlink, D*Star, Fusion, and all 'connected' modes not easily intercepted on-air by unskilled operators without a proprietary component in the monitoring equipment—before addressing the 300 symbols/second NPRM. He would set amateurs back 40 years or more with respect to the radio art and digital techniques. We don't have to say how devastating the consequences would be if Winlink and all others using similar modes disappeared from the ham bands.

FACT CHECK: D-Star and Fusion, and many other proprietary modes are able to be intercepted and monitored in real time without any exotic or expensive equipment. Many modes used in the Winlink system are NOT available to over-the-air intercept even if, in the case of Pactor 2-4, one owns the equipment. I have urged ARRL officials to verify this by using the W1AW Pactor modem and Winlink account at its Newington, CT headquarters station, but as of yet no board member has told me that they have tried to intercept Winlink ARQ traffic being sent to other stations. They likely know what I and thousands of other amateur operators know and have been publicly worried about for years -- it is virtually impossible to decode any compressed ARQ mode by an outside observer over the air. The message is obscured. Appendix B shows admission of this fact by Winlink's head, Steve Waterman, after the ARRL filed a petition RM-11708 to expand this improper digital data without first addressing the major problem of effectively-encrypted data.

ARSFI and Winlink "claim to be just like" these other modes, but that is false. These other modes are actually "out in the open" for public intercept at little or no cost:

D-star examples:

- https://forums.qrz.com/index.php?threads/listen-to-dstar-via-the-internet.249029/
- https://www.broadcastify.com/listen/feed/5429
  and easily copied by owning the equipment
- https://www.youtube.com/watch?v=QkZOfAcps3c

DMR examples:

- https://www.youtube.com/watch?v=75-AvQJKHNE
- https://hose.brandmeister.network
- https://itunes.apple.com/us/app/dmr-monitor/id595075253?mt=8

Fusion examples:

- https://www.youtube.com/watch?v=p_91XXgztzo
     This was accomplished with a $20 USB SDR dongle and free software.
- http://wiki.radioreference.com/index.php/Digital_Speech_Decoder_(software_package)#Overview
- https://www.rtl-sdr.com/rtl-sdr-radio-scanner-tutorial-decoding-digital-voice-p25-with-dsd/

Many other proprietary modes can be decoded using the above software and Software Defined Radio (SDR) dongle from HF to low microwave bands. Some of the inexpensive SDR's work to 2 GHz and above. This is <u>NOT TRUE</u> for Winlink or other modes being used and developed by ARSFI and used by Winlink in the ARQ mode.

Winlink uses amateur AND government/maritime frequencies (https://www.winlink.org/) and boasts about having HIPPA privacy and being nearly impossible to intercept, and being compressed to enhance privacy, and for sending private emails from one person to another (which bypasses commercial email systems), all which are **strictly forbidden** by FCC in 95-2106, 13-1918, FCC Part 97.113(a)4, Part 97.113(a)5, and Part 97.1(a), which expressly require noncommercial use and forbid "messages encoded for the purpose of obscuring their meaning" or providing "communications, on a regular basis, which could reasonably be furnished alternatively through other radio services,"

See how Winlink/ARSFI brag about their security/privacy in ham radio:

- https://ema.arrl.org/ares/winlink-2000/
- http://www.arrl-mdc.net/Winlink/MDCWL2KOVwAM.htm

Winlink admits to none of the above to the FCC or ITU in its public filings:

 (e.g., see: https://ecfsapi.fcc.gov/file/104012122120334/30March19FCCLetter.pdf

and https://ecfsapi.fcc.gov/file/12300483528083/Reply%20to%20comments%202.pdf

and https://winlink.org/sites/default/files/arsfi_comments.pdf

and https://www.rrmediagroup.com/News/NewsDetails/NewsID/17804

and https://winlink.org/FCC_Action)

Appendix B

2015 Email from Steve Waterman to Winlink Group, following ARRL's RM-11708 proposal, admitting "secure" transmissions and Winlink's aggressive data ambitions for the amateur radio spectrum

Key admissions (highlighting is mine):

"..**securely transferring data like an ARQ protocol such as Pactor, Winmor..**"

"**Reaffirmation of such limited bandwidth because of irrational complaints, made by people who don't even operate in these spectrums is not what will grow our Amateur service**"

"**In my opinion, we must visit these matters, and make store and forward data available on our spectrum as it is everywhere else today.**"

> *Date: *February 27, 2015 at 9:26:55 PM CST
> *Subject: **[Winlink_Programs_Group] ARRL QUERY RE: ARRL Digital bandplan*
> *Reply-To: *Winlink_Programs_Group@yahoogroups.com
>
> All,
>
> The ARRL has asked the Amateur population to comment on their digital band
> plan proposal
>
http://www.arrl.org/files/file/About%20ARRL/Committee%20Reports/2015/January/Doc_22.pdf .
> Rather than just check a bunch of boxes that really do not cover the
> issues, I highly recommend that you provide your own wording, which is an
> option they request. Thus, here are some talking points if you wish to
> send your comments to the ARRL at bandplan@arrl.org. Regardless of your
> slant on this, please do comment. Without being heard, we will never
> advance the digital art within Amateur radio.
>
>
> 1. There has been a digital explosion since the Part 97.221 rules (below)
> were written. "(b)" are for unattended operations over 500 Hz, and under
> 500 Hz below the SSB sub-bands, which are shown in "(C)." The protocols
> that were in question at its writing are no longer used, and new enabling
> technologies have arrived. This also applies to the information contained
> within RM-11708 regarding the 300 baud symbol rate limitation. **Should the
> ARRL NPRM RM-11708 succeed, the explosion will continue at an
> ever-increasing rate, but without additional spectrum. After all, no one
> uses a wide band data transfer mode to interactively have a conversation.
> Rather, such *Data transfer *modes are mostly unattended, point-to-point,**

> store and forward operations, and not narrow, low speed FEC (or no error
> correcting) modes used to *"chat."* "Chat" is reserved for PSK, MT63,
> CW,RTTY etc. They are broadcast protocols used for that purpose, and not
> securely transferring data like an ARQ protocol such as Pactor, Winmor on
> HF or Packet or TCP/IP on VHF/UHF. Today, ARQ protocols such as Pactor and
> others are linked with high speed digital systems such as HAMNET, etc., and
> provide a truly interoperable network of systems that can be used for many
> purposes, including emergency communications (with or without the
> Internet.) They have their own resting places and should be out of the way
> of those who want to chat interactively (see Part 97.221 below).
>
> 2. Growth of unattended data transfer operations, even on the ham bands,
> has skyrocketed. **Just with Winlink alone, the RMS population has gone from**
> 40 plus, Worldwide in 2004 to *well *over 300 plus on HF in the US alone
> (over 1200 passive scan RF RMS gateways, Worldwide). Where can they set up
> and operate? Certainly gets crowded within the Part 97.221 space (see
> below), and it appears that the new band plan will eliminate current space
> below the US SSB "phone" bands, where unattended operations with modes of
> 500 HZ or less fall outside the Part 97.221 auto-subbands. **Either way, it**
> is not adequate for the growth. This growth is factual, regardless of
> opinions. Reaffirmation of such limited bandwidth because of irrational
> complaints, made by people who don't even operate in these spectrums is not
> what will grow our Amateur service.
>
> 4. *Point-to-Point data Transfer protocols are very different than
> conversational broadcast modes *and thus, are used for a very different
> purpose. Separating the "data by purpose" seems like a more logical step,
> but not when it costs a piece of what little spectrum we now have. How many
> 2.4 KHz signals can concurrently operate (as an example) within the 40
> Meter Part 97.221 5 allowable KHz? Not many. Remember, Pactor 3 = 2.4 KHz,
> Winmor wide mode = 1.6 KHz, and under RM-11708, now under consideration, we
> are talking about 2.8 KHz, all with no increase in spectrum (see Part
> 97.221 (b) below. The squeeze is not just on 40 meters!
>
> 5. **Today, store and forward data communications is the name of the game**
> everywhere you look but not yet in Amateur radio. How many digital
> real-time interactive digital conversations do you have per day compared to
> e-mail, messaging on your phone, Skype, Reflectors, Facebook, and even
> voice mail. It is the wave of the present and certainly, the future. Such
> store and forward communications dwarf real-time, interactive voice/digital
> conversations in just about any communications arena, but within the US
> Amateur spectrum, such technologies have not been fairly dealt with to
> date. Only in Amateur radio is such growth being ignored, and I see no
> plans for any expansion, only reaffirmation of current restrictions. If we
> want change to our radio art, we must let those who have some influence in
> US Amateur spectrum allocations know our desires. OR, we can continue to

> ignore modern communications principles, continue to not attract the
> interest of the younger population, and not make any difference. **<u>In my</u>**
<u>> opinion, we must visit these matters, and make store and forward data</u>
<u>> available on our spectrum as it is everywhere else today.</u>
>
> I am certain that there are many other points of view and attitudes toward
> this subject. Whatever they may be, please let the ARRL know what you think
> about their proposal and the rate at which digital communications is being
> enhanced by our representative organization.
>
>
>
> Thanks,
>
>
> Steve Waterman, K4CJX
> Winlink network Administrator
> Winlink Development Team
>FEMA Region IV RECCWG AuxComm Committee Chair
>DHS NCC SHARES Member (SHARES Winlink Network Administrator)
>TEMA Comm Reserve
>TN Homeland Sec. Dist. 5 Comm. Committee
>Williamson County, TN Reserve
>President, ARSFI (Winlink Development Team)

Appendix C

Some Past filings at the FCC that document Winlink's/ARSFI's desire to neglect the "obscured messaging" aspect of its ARQ protocols while pursuing legalized encryption and increased bandwidth of digital data in the amateur radio spectrum

Exemplar historical FCC filings by Winlink/ARSFI advocates

RM-11306:

https://ecfsapi.fcc.gov/file/6518324273.pdf

https://www.fcc.gov/ecfs/filing/5513461509

https://ecfsapi.fcc.gov/file/6519114260.pdf

https://ecfsapia.fcc.gov/file/6518308936.pdf

RM-11708

https://www.fcc.gov/ecfs/filing/10806082279684

https://ecfsapi.fcc.gov/file/7520959842.pdf

https://www.fcc.gov/ecfs/filing/6017479557

PSHSB-17344

https://ecfsapi.fcc.gov/file/10123298305905/%2017-344.pdf

https://ecfsapi.fcc.gov/file/1022302842747/PS%20Docket%2011-344%20Reply%20Comment.pdf

https://www.fcc.gov/ecfs/filing/10223111684700

NPRM 16-239

https://ecfsapi.fcc.gov/file/120566997404/ARSFI_Comments.pdf

https://ecfsapi.fcc.gov/file/100873087058/RM11708_16-239.pdf

RM-11828

https://ecfsapi.fcc.gov/file/104012122120334/30March19FCCLetter.pdf

Appendix D

Some of my past filings at the FCC that document ARRL's or Winlink's/ARSFI's desire to neglect the "obscured messaging" aspect of its ARQ protocols while pursuing legalized encryption and increased bandwidth of digital data in the amateur radio spectrum

RM-11708

https://ecfsapi.fcc.gov/file/7521095484.pdf

https://ecfsapi.fcc.gov/file/60001039573.pdf

NPRM 16-239

https://ecfsapi.fcc.gov/file/1116597429048/FCC%20Letter%20Nov.%2015%202018%2016-239.pdf

https://ecfsapi.fcc.gov/file/1111110314487/FCC%20EX%20PARTE%2016-239%20Eric%20Burger%20Nov%2011%202018.pdf

https://www.fcc.gov/ecfs/filing/10806876707999

https://www.fcc.gov/ecfs/filing/1092719005718

https://www.fcc.gov/ecfs/filing/10925839109476

PSHSB-17344

https://ecfsapi.fcc.gov/file/102221007912824/FCC%20PS%2017-344%20Reply%20to%20ARRL%20and%20Steve%20Waterman%20from%20N9NB.pdf

RM-11828

https://ecfsapi.fcc.gov/file/1032167020169/FCC%20Letter%20RM%2011828.pdf

Appendix E

Email I sent to ARRL on today's date, April 2, 2019, asking them to immediately correct inaccuracies on their public website regarding RM-11831

From: Theodore S. Rappaport [mailto:tr51@nyu.edu]
Sent: Tuesday, April 2, 2019 5:21 PM
To: tsr@nyu.edu; David Siddall; - B2X W2Ru; hopengarten@post.harvard.edu; N5AUS@n5aus.com; rjairam@gmail.com; hdwhite@charter.net; ab2ra@htva.net; rkolarik@neb.rr.com; lee.mcvey@prodigy.net; k3lr@k3lr.com; Robert B. Famiglio Esq.; Evan McWalters; mark@mrw.org; va09mgima@mail.house.gov
Cc: Sandi Wendelken; Rick Merritt; Drew FitzGerald; mark.righter@nyu.edu; Kurt H. Becker
Subject: RM-11831 Final letter: Important: obscured data in amateur radio
Importance: High

Dear Colleagues: I had sent 3 emails in a row earlier today regarding the ARRL's public announcement of RM-11831, and wanted to clarify those 3 emails with one, single, consolidated and correct email, for the record, that I shall file with the FCC and many congressional officials today.

Here is the proper email – please consider this one as my final, official email. I will submit it publicly on the FCC website today, as well. Please disregard the other 3 emails, as they were piecemeal and contained errors which are clarified below.

I apologize for the three emails that confuse an already confusing topic for many (this is NOT my day job, yet it's a hobby that is near and dear to my heart, as it is for many of you, and I and thousands of others are deeply concerned about our national security and the future of ham radio!).

Thanks for your forbearance and for accepting this final email to summarize my request to ARRL on its website.

I would be grateful for your immediate attention to correct your public statement of the ARRL announcement of RM-11831.

With kind regards, ted

--------Final version of email, please use this and respond – --------

Dear ARRL officials:

Thank you for alerting the ham radio community regarding public comments about RM-11831, and for your interest in solving the digital aggression and lack of open transmissions in the amateur radio service: http://www.arrl.org/news/petition-for-rule-making-calls-for-amateur-digital-mode-transparency

I write to ask you to please immediately correct your public statement at the above link and in all ARRL publications, as I am concerned it inadvertently mischaracterizes the RM-11831 "digital transparency" petition that the FCC published recently for public comment.

Importantly, the Kolarik proposal does not seek to eliminate ACDS everywhere, as could be inferred by the current wording in your web posting, but rather the petition simply seeks to contain ACDS transmissions to within the already allocated ACDS subbands, and to disallow them from operating throughout the entire the RTTY/Data subbands.

This is a critical point that you appear to have overlooked in your public posted comment, since the petition does not eradicate the ACDS transmissions, but merely contains them into already existing ham bands for that purpose.

Your Official website omits this important point, and also has a glaring rule error (your post cites a non-existing FCC rule). I urge you to immediately correct these points by amending the following paragraph (in yellow) in your public statement to properly reflect the facts:

REQUIRED EDIT TO ARRL WEB ANNOUNCEMENT OF RM-11831:

Kolarik said his petition also aims to reduce levels of amateur-to-amateur interference from Automated Controlled Digital Stations (ACDS) on HF operating under §97.221(d)(2).(There is no 97.221 (d)(2)????) Kolarik wants the FCC to delete §97.221(c), which permits automatic control of digital emissions anywhere in the CW/RTTY sub bands, outside of the ACDS sub bands as defined by 97.221(b), provided the station "is responding to interrogation by a station under local or remote control, and [n]o transmission from the automatically controlled station occupies a bandwidth of more than 500 Hz." ACDS stations would thus be required to operate only in the ACDS sub bands, under Mr. Kolarik's proposal.

Also, in your last paragraph of the web posting, I note that ARRL has still not acknowledged the problems of the "obscured" data in pending NPRM 16-239, or in ARRL's proposed 2.8 KHz bandwidth limit through its RM-11708 proposal. I ask again, has anyone at ARRL attempted to eavesdrop another Winlink ARSFI ARQ data protocol transmission (such as Pactor 2, Pactor 3, Winmor or ARDOP) intended for another station by using the W1AW Winlink account in the ham radio bands?

This would inform the board of ARRL whether or not this email traffic can or cannot be intercepted over the air, and would inform the ARRL board if these transmissions are obscured for meaning to others, in violation of part 97 rules and which harm public participation of the hobby and which jeopardizes our national security as no one else can eavesdrop the on-air transmissions.

I urge ARRL to immediately correct the noted errors in its website, to clarify the facts about the petition.

I and the hobby are deeply grateful for your support in this matter, and for your role in determining the use of the HF spectrum for the future of amateur radio.

The minority view, that has enjoyed unfettered and inappropriate use of the HF spectrum for the last 20 years, clearly does not like my position on this matter (see link below), so it's critical that ARRL deal in facts, and that the board determine whether my position or the position by ARSFI below is accurate.

https://ecfsapi.fcc.gov/file/104012122120334/30March19FCCLetter.pdf

 With kind regards,
Ted

Prof. Theodore (Ted) S. Rappaport
David Lee/Ernst Weber Professor
Founding Director NYU WIRELESS
Dept. of Electrical and Computer Engineering
Tandon School of Engineering

Courant School of Computer Science
Langone Medical Center /Radiology
New York University
2 Metrotech Center, 9th floor
Brooklyn, NY 11201
Tel: 646-997-3403
Email: tsr@nyu.edu