Before the Federal Communications Commission
Washington DC 20554

In the Matter of:

Amendment of Part 97 of the Commission's Amateur Radio Service Rules to Reduce Interference and Add Transparency to Digital Data Communications; to Permit Greater Flexibility in Data Communications

RM-11831; WT Docket 16-239

Reply Comments of Philip R Karn, Jr KA9Q, President, Amateur Radio Digital Communications Inc (ARDC)

This is a reply in opposition to comments filed in support of New York University (NYU) Petition for Declaratory Ruling Regarding Amateur Radio Communications, WT Docket No

16-239 et al.[1] My previous comments on this matter[2] were filed only on my own behalf, but I write these comments as President and Chair of Amateur Radio Digital Communications, Inc (ARDC). When I use the pronoun "I", I am speaking for myself (e.g., in reference to my earlier filings). When I say "we", I am speaking for ARDC. Again, we write not so much to defend Winlink and Pactor specifically, but to defend the ability of amateurs to experiment freely with new digital communications techniques without unnecessary regulatory obstacles. This is fundamental to ARDC's mission.

Amateur Radio Digital Communications (ARDC)

ARDC[3] is an IRS nonprofit 501(c)(3) charitable foundation. Our mission is to further the educational potential of amateur radio by sponsoring academic scholarships and by encouraging development of and experimentation with new amateur technologies. The "digital" in ARDC's name emphasizes that *all* new communications technologies have been digital for decades, and amateur radio urgently needs to keep up to stay relevant. We recently received substantial funding through the sale of surplus Internet Protocol (IP) addresses that were part of an allocation originally made in the early 1980s for experimentation with the Internet protocols over amateur packet radio. Today's ubiquitous smartphones can trace their origins directly back to these early experiments on amateur radio.[4]

---

[1] https://ecfsapi.fcc.gov/file/1203160811284/NYU%20Ex%20Parte%20December%202%202019.pdf

[2] https://ecfsapi.fcc.gov/file/10422455216228/rm11831.pdf
https://ecfsapi.fcc.gov/file/10513525129724/rm11831-rebuttal-to-rappaport.pdf
https://ecfsapi.fcc.gov/file/10508275224691/rm11831-rebuttal-to-k3wa.pdf

[3] http://www.ampr.org/giving

[4] I retired from Qualcomm in 2011 after 20 years of service. One of my earliest activities was to "port" the Internet software I'd already developed for amateur packet radio to Qualcomm's CDMA digital cellular system. Without the freedom to experiment with the Internet protocols (which include ARQ features) on ham radio for purely personal reasons, I never would have written this software, nor would I have worked for Qualcomm.

ARDC's Open Source Policy

Because ARDC's primary mission is educational, we have adopted a fundamental policy that any technology (e.g., software, hardware and documentation) developed with ARDC support *must* be made publicly available as "open source" so that radio amateurs (and others) can use, study, modify, experiment with, improve and above all *learn* from it. Therefore, we still agree *in principle* with NYU Wireless, Theodore Rappaport and others that air interfaces on the amateur bands *ought* to be openly documented and non-proprietary.[5] However, as I explained in detail in my earlier personal comments, we feel strongly that a legal mandate would be highly disruptive and counterproductive. A better approach is to develop superior open source alternatives and persuade the amateur community to voluntarily adopt them. So far we have not seen this rational approach addressed by any of the comments in favor of the NYU/Rappaport proposal.

Other Remarks by NYU/Rappaport

The NYU and Rappaport filings, both the original *Petition for Declaratory Ruling*[6] and in their comments, largely restate their previous flawed arguments. Since I have already rebutted them in my previous comments, we need not restate them in full here.

There are, however, a few points that require a response. Rappaport's ex-parte letter of December 2[7] claims support with blatant appeals to authority such as

---

[5] https://ecfsapi.fcc.gov/file/10422455216228/rm11831.pdf, page 5

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

[7] https://ecfsapi.fcc.gov/file/1203160811284/NYU%20Ex%20Parte%20December%202%202019.pdf

"…inventors and technical leaders from some of the largest American companies as well as the pioneers of digital modes in today's global cellphone and Wi-Fi technologies."

We ourselves are professionals who have also helped "pioneer global cellphone and Wi-Fi technologies", and we are also current and former employees of "major US engineering companies that rely on amateur radio to provide a source of young technical talent in our country". Furthering young technical talent is precisely why we created ARDC, so we *strongly* resent having words placed in our mouths that we do not agree with. Prof Rappaport should recognize that reasonable people can disagree, and he should limit himself to quoting specific individuals.

Effectiveness of Winlink/Pactor Monitoring

In response to the actual demonstration of several working Winlink/Pactor monitoring systems that completely belie his misleading and inflammatory claim of "effective encryption",[8] Rappaport simply moves the goalposts. *Now* he complains they won't work without perfect propagation between transmitter and monitor. The fact remains that one cannot monitor even the simplest radio communication without being able to hear it!

As explained in my previous comments[9] and as admitted by Rappaport,[10] there is an absolutely fundamental tension between the efficiency of a radio communication and the ability

---

[8] https://ecfsapi.fcc.gov/file/1031895715302/InconvenientObservations.pdf

[9] https://ecfsapi.fcc.gov/file/1106269112612/ARSFI%20FCC%20Ex%20Parte%2011052019.pdf, page 11 (pdf page 15).
Although not a member of ARSFI I joined them in this ex-parte presentation to Commission staff.

[10] https://ecfsapi.fcc.gov/file/10429199250117/FCC%20Letter%20Reply%20to%20Comments%20RM%2011831.pdf: "Mr. Karn describes how more efficient communications inherently become harder to decode, which is generally true…"

of third parties to monitor it. Maximizing efficiency means sending as little radio frequency (RF) energy as possible toward third parties who will see it as interference.[11] If one of these third parties is actually trying to monitor you, this can only make it harder for him. You can't have your cake and eat it too.

Dynamic compression, which Rappaport finds so objectionable, is only one of *many* ways to minimize RF interference to others. Directional (especially "beam forming") antennas, automatic transmitter power control, automatic frequency selection, adaptive modulation and data rate, and forward error correction (FEC) are some of the others. All use a-priori knowledge about the intended receiver: its location, radio channel conditions, even previously sent data. *Every one will necessarily make monitoring more difficult!* Will an amateur wishing to experiment with a new transmission format or even a high gain antenna have to seek prior approval from Rappaport or his NYU laboratory to ensure it isn't *too* efficient before he/she can legally put it on the air? What will those criteria be? He doesn't say.

The Meaning of 'Intent'

Prof Rappaport objects to the existing 'intent to obscure meaning' standard as too subjective despite its use in the International Radio Regulations. But 'intent' has been a key concept in criminal and civil law for centuries, and its meaning is well established in case law.[12] Finders of fact (judges and juries) routinely determine intent every single day. Just as there has been no serious call to replace 'intent' in the law, we see no reason to replace the current 'intent

[11] It goes without saying that if interference didn't exist, there would be no need for a federal agency to regulate radio communications in the first place.

[12] E.g., https://thelawdictionary.org/intent/

to obscure' standard in the amateur rules. It has stood for decades without serious challenge until now, when Prof Rappaport would replace it with a new, vague and highly complex set of criteria about what constitutes a "monitorable" communication. This would open a can of worms for no good reason.

Conclusions

For the aforementioned reasons, the NYU/Rappaport petition should be rejected in its entirety. The Commission should reaffirm the longstanding "intent to obscure meaning" criterion for the encryption prohibition in the amateur service. It should recognize that this simple principle will continue to serve us well as amateur technology continues to develop, as it must for the amateur service to remain relevant.

The many advantages of open source (i.e., non-proprietary) technology for the amateur service — low cost, ease of experimentation, amenability to education — are already pushing back against proprietary air interfaces on the amateur bands. ARDC hopes to accelerate this trend significantly. There is simply no need for a regulatory "fix".

Respectfully submitted,

Philip R. Karn Jr, KA9Q

President and Chair, Amateur Radio Digital Communications, Inc (ARDC)