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How Low Can You Go?

"In frequency, that is. For amateurs today it's 1800 kHz — but soon we should be able to hit notes in lower octaves!"

One of the most beloved tales in the storied history of Amateur Radio is how we amateurs were banished to "200 Meters and Down" — in other words, to frequencies above 1500 kHz that were regarded as useless for long-distance communication — and how the discovery of ionospheric propagation soon turned the radio world upside down. Unintentionally, amateurs had been given the better part of the bargain.

While we have achieved far more using the shorter wavelengths than would have been possible on the lower frequencies, most radio amateurs relish a challenge and some have felt the itch to explore the low (LF) and medium (MF) frequencies below the AM broadcast band. In 1976, the FCC advisory committee that prepared the report on Amateur Radio spectrum requirements for the 1979 World Administrative Radio Conference (WARC-79) included 160 – 200 kHz on its wish list. The initial FCC proposals for WARC-79 included an amateur allocation at 160 – 190 kHz but it was withdrawn in the second round in favor of a proposal for an LF broadcasting band similar to Europe (where, incidentally, LF broadcasting today is virtually extinct). In the third and final round the FCC cited concerns about coordination with power line carrier (PLC) operations by electric utilities as a reason for not pursuing an amateur LF allocation.

As discussed on this page in the February 2013 issue, in the 1990s some European amateurs were able to secure permission to experiment in the 135.7 – 137.8 kHz band. This led to the adoption of a CEPT Recommendation in 1997 encouraging CEPT administrations to permit amateur operation in this narrow band on a secondary basis. The ARRL's effort to persuade the FCC to follow suit once again ran into opposition by electric utilities.

An initiative coordinated through the International Amateur Radio Union (IARU) subsequently led to an international allocation of 135.7 – 137.8 kHz at the 2007 World Radiocommunication Conference (WRC). This was followed by success at the next WRC in 2012 in an even more difficult endeavor by the IARU to secure an international allocation near 500 kHz. It wasn't easy, but we emerged with 472 – 479 kHz.

Entries in the international Table of Frequency Allocations do not automatically result in domestic allocations. In the United States it requires FCC rulemaking. In November 2012, the FCC opened a proceeding to address the implementation issues arising from WRC-07. Around the same time the ARRL petitioned for implementation of the 472 – 479 kHz allocation. While the petition was not given a file ("RM") number, we were advised that it would be considered along with WRC-07 implementation.

So we waited. And waited. And waited. In fairness, other issues in the WRC implementation proceeding were far more complex than ours and understandably took time to resolve. In late April our patience was rewarded when the Commission released a 257-page document containing some very good news.

The Commission has concluded that "We are unconvinced by the claims of UTC and electric utility commenters that coexistence of amateur stations and PLC systems is not possible…. Taking steps to enhance efficient, shared use of our scarce spectrum resource both serves the public interest and promotes fundamental Commission spectrum management goals. We recognize the relative public benefits of PLC and amateur radio, and we explicitly reject the suggestion that we must choose one to the exclusion of the other. Our objective is to allocate spectrum on a secondary basis to amateur stations in a manner that is compatible with existing PLC systems. However, we also expect to permit amateur operators to make use of the allocation in a manner that is less burdensome and more productive than they are currently afforded under the experimental authorization process."

Thus the Commission has decided to add the amateur secondary allocation of 135.7 – 137.8 kHz (2200 meters) to the domestic Table and proposes to do the same with 472 – 479 kHz (630 meters). After decades of frustration, the intransigence of representatives of electric utilities — unsupported, incidentally, by any technical substantiation — finally has been overcome.

While this is a most welcome and positive development, there is more work to be done. Amateurs cannot begin to use the new allocations until service rules are adopted and added to Part 97. The Commission proposes to restrict operation in these bands to General and higher class licensees and to permanent fixed locations that are some distance, probably on the order of a mile, from electric power transmission lines (not including the ones feeding customers from substations). The effective radiated power of amateur stations would be limited according to the international Radio Regulations. Some other details, such as authorized emission types, remain to be worked out; the Commission has made no proposal in that regard other than for CW and brief test emissions, but much of the best experimental work in this range is done using data emissions developed specifically for the noisy LF/MF environment. A 60-day comment period will open upon publication of a summary of the document in the Federal Register.

The two new bands will not interest everyone. They will never be as popular as 2 meters or even 160 meters, although the reliability of groundwave propagation at the lower frequencies is something to be considered in emergency communications planning. But as the hardy experimenters among us pursue these new challenges they are bound to learn new lessons that will benefit us all when it comes to designing efficient antennas and decoding weak signals in the presence of noise.

There are so many people — some of them now deceased — who contributed to this effort over the past 40 years that it would be impossible to name them all. To each and every one, a heartfelt THANK YOU!

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