

Comments to FCC regarding 630 meter NPRM

Michael Ports

NR50 Amateur Extra / WH2XAR Part 5 Experimental

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of Amendment of Parts 2, 15, 80, 90, 97 and 101
of the Commission's Rules Regarding Implementation of the
Final Acts of the WRC-12 Geneva, 2012, other Allocation Issues,
and Related Rule Updates (ET Docket No. 15-99)

Abstract and Intent:

The Petition for Rulemaking of the ARRL to Amend Parts 2 and 97 of the Commission's Rules to Create a New Medium-Frequency Allocation for the Amateur Radio Service is no trivial task.

Numerous interests have a potential stake in the utilization of the band commonly referred to as "630-meters", the frequency range bound by 472 kHz and 479 kHz. It is my intent to show, from the perspective of one very active Part 5 Experimental station on the 630-meter band that services can co-exist within this small piece of spectrum without causing interference or interruption of services.

Introduction:

My name is Michael Ports. I have held the Amateur Extra Class radio call sign NR5O since 1983 and hold General Radio Telephone Operators License since 1983.

I hold a degree in electronic engineering with back ground in radio frequency design and radio communications.

I work as a RF Engineer for an avionics company for 15 years.

I have also worked in RF design for the military SINCGARS radio system for 10 years, Single Channel Ground and Airborne Radio System (SINCGARS) which is a Combat Net Radio (CNR) currently used by U.S. and allied military forces.

I have also worked in RF design of VSAT communications systems, a type of two-way satellite that transmits both narrow and broadband data to satellites in orbit.

I am currently the owner/operator/chief engineer of WH2XAR, an FCC-licensed Part 5 experimental station located in Glendale, Arizona.

Station Description:

WH2XAR, located in Glendale, Arizona, is formally situated on a standard residential lot surrounded by homes, trees and other obstructions.

Average ground conductivity, as specified by the Federal Communications Commission ground conductivity charts for this region suggests 8 mS/m.

Situated 2.5 miles to the south of WH2XAR is a 500-kilovolt single-lattice electrical distribution easement passing from East to West. The associated transmission line support towers are owned and operated by and are administered by APS (Arizona Public Service Company) on the behalf of the regulator, The Public Utility Commission of Arizona. WH2XAR is located at an elevation of 1300 feet (396.34 meters).

WH2XAR's primary transmitting structure consists of a 30-foot tall monopole vertical antenna of telescoping aluminum. Three sets of guy ropes are used to secure the structure. The system utilizes both base and top-loading. The top-loading consists of five (5) single capacitive wires, in parallel with asymmetric lengths of 45-feet, respectively. Base-loading is comprised of a loading coil and variometer to allow control of the resonant frequency of the structure and variable shunt elements are utilized to achieve a 50-ohm match to the coaxial feed line.

Impedance is regularly measured with a Rig Expert AA-30 Impedance Analyzer to account for variations in system resistance due to environmental changes (seasonal and weather-related variations). This information, in turn, is used to make

determinations about the necessary drive power to achieve a maximum granted ERIP of 1-watt, where applicable. Effective Radiated Power determinations are made utilizing antenna base current, which is measurable at the operating position, and the known system resistance. Real time system conditions are monitored at the operating position by sampling both the voltage and current and adjustments of both phase and magnitude can be made to ensure the system is operating in a resistively-matched conditions of $50 +j0$ ohms.

The radial system for WH2XAR consists of 30, 50-foot long radials. The radial field is generally symmetrical and homogeneous around the feed point of the antenna structure.

The relative field strength at distances of 1-kilometer, 5 kilometers, 10-kilometers, and 20-kilometers have been made. In general, the relative field strength of this system on the ground-wave path is homogeneous on a variety of radials that are regularly tested at these prescribed distances.

Operations

WH2XAR has been operational since May, 1, 2014, logging close to 1200 hours of radio frequency emissions utilizing a variety of modulation types including 150HA1A, 62H0F1B, 62H0G1D and 62H0J2B. Power levels have ranged from 0.2 to 1 watt Effective Radiated Power as prescribed by the original grant, dated April 1, 2014 (0054-EX-PL-2014)

The modification granted on August 12, 2014 (File number 0171-EX-ML-2014) that allowed an increase in Effective Radiated Power to 10-watts. To date, ZERO interference complaints have been reported by licensed or unlicensed services with 1 watt ERP. Current plans are to increase power level to 10 watts ERP for propagation studies.

Current experiments utilizing 4-FSK (commonly referred to as WSPR – Weak Signal Propagation Reporter) with an Effective Radiated Power estimated to range from 0.2 -watts to 1-watt Effective Radiated Power.

These instances represent a small sample of experimental operations on 630-meters that are occurring throughout the United States every day and have been occurring since the early 2000's. With no instances of interference complaints for ANY Part 5 experimental station associated with radio frequency communications on the 630-meter band, co-existence with other services appears to be a very viable mode of operation.

Band Utilization by the Amateur Radio Operator:

In the interest of satisfying the goals of Part 97 with respect to the intent of the amateur service, Part 97.1 (b) states, "Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art." Amateurs have always been at the forefront of technological advancement and many of the luxuries that we enjoy today might not have been possible without an amateur taking the time and showing the interest to experiment. One of the advancements that has come out of the work done by many Part 5 experimental stations on 630-meters is the development of weak signal modulation schemes that allow for two-way communications to occur in less than optimal conditions, whether those conditions be caused by atmospheric conditions or a minimalist approach to building and operating a station. These facts have significant implications for other subparts of Part 97, such as 97.1 (a), which states, "Recognition and enhancement of the value of the amateur service to the public as a voluntary noncommercial communication service, particularly with respect to providing emergency communications." One of the capabilities that 630-meters offers the amateur, which can be utilized in the public interest, is a long-range regional communication system that does not require an infrastructure and is not subject to solar conditions by utilizing the very nature of ground wave radio propagation that is well documented at these frequencies.

In fact, on a winter day, WH2XAR can effectively cover a 50-150 mile radius utilizing ground wave propagation with 1-watt ERP. These signals are consistent and repeatable through solar noon.

Not limiting ones operating strictly to ground wave regional communications, effective sky wave communications have been well documented utilizing traditional Morse (150HA1A), which is comfortably usable to hear -10db S/N at 18-20 words per minute, in addition to low-baud rate, narrow band weak signal modes like JT9 (an FSK variant) and MSK variants which can routinely allow for practical two-way communications in the -20 to -30 db S/N range. 630-meters is a practical communications band for those that are willing and interested in putting forth the effort and the result, over the long term, will no doubt result in the development of new modulation techniques which stand to serve the public interest through innovation and advancement of the radio arts.

I support the creation of a secondary allocation under Part 97 for the 630 meter band as specified in ET-Docket number 15-99. I support the requirement to protect PLC systems from RF Interference. Furthermore, I support antenna height limitations (97.15c) and power limitation of 5-watts EIRP in accordance with 97.313 (1).

Respectfully Submitted,

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