CHEROKEE AMATEUR RADIO SOCIETY

WX4CAR NEWSLETTER

APRIL 2024 | ISSUE 8

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MESSAGE FROM THE PRESIDENT

Marty Buehring – KB4MG

HELPING STUDENTS TOUCH THE STARS

The stars and outer space have been a fascination of man from the dawn of time. People would gaze at the heavens and wonder what's out there. At the beginning of the human space flight program, NASA was asked the question, "Why go to outer space?". Their short answer was "To see what's out there; to touch the stars". Since that time, we clearly understand the benefits of space exploration and realize technologies developed for this endeavor benefit our daily lives in ways we may not even realize. It continues to inspire a new generation of artists, mathematicians, tinkerers, engineers, and scientists.

In April 2023 I was contacted by the STEM teacher at Mountain View Elementary School to ask if the CARS club could assist in a contact with the International Space Station (ISS). She wanted to help the students "touch the stars". We now know this teacher as a club member **Cassie Z. (KQ4JVI)**. As a club, we want to help inspire this next generation to embrace technology and be the next engineers and scientists. And along the way, they might even get an amateur radio license. Turns out most of the astronauts have licenses, which is what inspired the ARISS program. Equipment was donated to outfit the ISS with amateur radio and was prepared by volunteers at ARISS to meet NASA standards.

Cassie is now an ARISS-USA Education Ambassador who will be working to help other schools across the US to create and submit proposals to have an ISS contact at their school.

We are privileged to be a part of something that makes history for this school and for the students who are participating. Our time to support this is the week of April 15, when we will make a direct radio contact with the ISS. On the day of the contact, the CARS club officers will be on stage with **Daryl Young (K4RGK)** running the radio equipment, Cassie holding the microphone and PTT, and 12 students who will pose questions directly to the astronaut. We will be operating two radio setups, a main, and a backup. CARS is also responsible for the backup antenna system, which we will erect just before the event. The students are so excited they can hardly contain themselves. After the event, we hope to be able to show the club some pictures and video that was captured.

Our next goal is to find a school in Cherokee County, preferably in Woodstock, where we can help write a proposal and possibly be awarded another opportunity to do this again.

LOOKING FORWARD TO FIELD DAY

I sincerely hope you make plans to be part of Field Day 2024. This will likely be our largest Field Day ever in club history. Planning is happening now, and we need people to participate on the teams to support this huge event. Without your help it will be hard to make this successful. At the April meeting, be ready to sign up for a team and participate.

This year there will be some improvements to the operating positions. These details are being worked out. We want anyone who wants to operate a radio on Field Day to have that chance. We encourage anyone who has never operated on the HF bands to try it out. This will encourage you to do more.

We will also have two workshops that will appeal to different groups. There will be a DIY workshop where you will learn to assemble and test your own Power Pole Distribution Block. There will be a cost of about $15-$20 to build the project. We will be supplying it in kit format so that you can choose to build more than one or build it later using the supplied instructions. The second workshop will be ARES-oriented and focus on skills needed for ARES deployments with emphasis on VARAC mode.

Lastly, continue to send in your questions for "Ask an Expert". This column is a great place to ask about something you don't see covered in license manuals, podcasts, YouTube, and other resources. We will research your question and try to provide the best answer.

Enjoy the Spring weather and try some POTA!

73,

Marty - KB4MG

HOW ONE AMATEUR RADIO OPERATOR DISCOVERED SPYING INSIDE THE USA

By Dave Jensen - W7DGJ

Dave was first licensed in 1966 as WN7VDY (and later WA7VDY). Dave loved radio so much he went off to study broadcasting and came out with a BS in Communications from Ohio University. After working his way through the microphone business of Audio-Technica, he moved to Arizona and was later re-licensed as W7DGJ (Scottsdale). His column, Tooling Up, ran for more than 20 years in the website of the leading scientific journal, SCIENCE, and his column Trials and Errors: Ham Life with an Amateur continues to be a popular read each month on QRZ.com.
Read Dave's column at https://www.qrz.com/trials-and-errors

Amateur radio had taken off like crazy at the time of WWI. Experimenters of all ages were reading about electronics and building their own radio equipment. Every day there seemed to be some new development… it was an exhilarating time for radio.

Unfortunately, the USA had allowed the Germans to construct a state-of-the-art station at Sayville, New York, before the hostilities in Europe broke out. This station had the 100 KW of power and 500 ft. towers that would ensure they reached their sister station in Nauen, Germany. The USA was neutral, and President Wilson made it clear that we would provide oversight so that nothing could jeopardize our neutrality. We weren't very careful, however, about the quality of that "oversight." For a time, this consisted of one young engineer who was repeatedly seen going out for dinner and drinks with the German engineers who ran Sayville. To some, it seemed that the US government had not taken warnings seriously about the damage this station could do to Allied forces by sending coded messages. But German radio power meant that they had also figured out a way to send code at 150 words per minute! To listeners, it simply sounded like a "buzz" on the radio.

The Germans took advantage of their radio prowess to communicate across the world to their ships at sea no matter where they were located. This led to the Battle of Coronel off the coast of Chile where nearly 1500 British sailors lost their lives. Somehow, Germany had placed its sea power right in the path of a smaller British force, which led to disaster for the Brits and only three injuries on the German side.

A HAM GETS INVOLVED

One New Jersey ham tried to prove that the problem stemmed from the Sayville station. The German operators were using a system that allowed them to broadcast high-speed code using paper tapes, and which proved impossible to decipher even for advanced amateurs. The "*Nauen Buzz*" was finally "cracked" by station 2MM in New Jersey, run by Charlie Apgar.

Charlie had built a station with 450 watts output (large for the day) using sophisticated homemade equipment. First, he developed a loudspeaker system that amplified the signal and then he invented a wax cylinder device that recorded that amplified sound. He captured hours and hours of code broadcasts from Sayville and then transcribed the code by slowing down the replay. It worked!

It was in 1915 when 2MM solved the *Nauen Buzz* mystery that had been consuming his time. At first, the US government didn't believe the solution could come from an amateur, but after listening to what Apgar produced, they stepped in with armed marines at the station and got serious with Germany about using the States for sending wartime messages from North America.

Sadly, before this amateur radio operator jumped in to help, the German station at Sayville had broadcast "Get Lucy" to the German sub commander harassing British shipping in the North Atlantic. That story is also told in Trials and Errors on QRZ.com, as the sinking of the Lusitania brought America into the war. Another major factor was a famous telegram, which came across undersea cable to New York, but which was then broadcast from Sayville to another large German station in Mexico. It pleaded with the Mexican government to attack the USA, for which it promised America as a new Territory if the Mexican/German alliance would succeed!

SENATE BILL SEEKS TO CURB RESTRICTIVE HOA RULES

By Lee Hall - K4QO

A new bill making the rounds in the U.S. Senate aims to check the power of homeowners' associations (HOA) to restrict the placement of amateur radio antennas. In many states, HOAs wield near omnipotence when it comes to their ability to ban structures visible from the street. Now, Senators Roger Wicker (R-Miss.) and Richard Blumenthal (D-Conn.) have introduced The Amateur Radio Emergency Preparedness Act to give hams greater freedom to erect antennas.

"[P]rohibitive home association rules and confusing approval processes for installing antennas have been an unnecessary impediment," Sen. Blumenthal said in a news release. "This legislation resolves these bottlenecks and ensures that radio operators can function successfully."

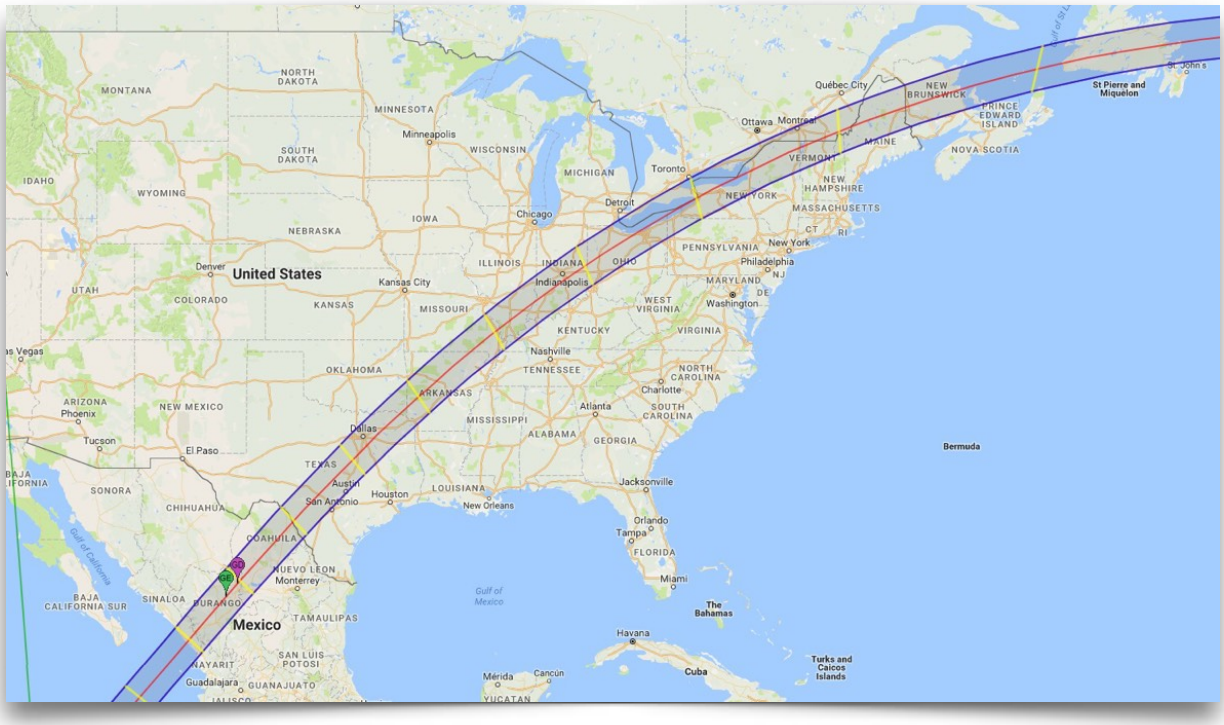
The act would require HOAs to accommodate the needs of amateur radio operators by limiting the situations in which associations could ban, prevent, or require approval to install antennas. The Amateur Radio Relay League (ARRL) has endorsed the legislation.

"Communication during natural disasters is often hindered. We should be making every attempt to give folks more options," Sen. Wicker said. "Our legislation removes roadblocks for amateur radio operators looking to help friends, families, and neighbors."

Specifically, the measure would prohibit HOA rules that prevent of ban amateur radio antennas, clarify the approval process for installing them, and give operators the right to seek legal action against restrictive prohibitions.

Here is a link to the full text of the bill. Contact Sen. Jon Ossoff and Sen. Raphael Warnock to encourage them to support the legislation.

HAMS WORLDWIDE PREPARE FOR SOLAR ECLIPSE



By Lee Hall - K4QO

The total solar eclipse is just a few days away. It will occur on Monday, April 8, and will be the last of its kind visible in the US for the next 20 years.

ARRL is asking hams across North America to participate in a study about how the ionosphere functions by getting on the air to help scientists in a series of ionospheric experiments.

Ham Radio Science Citizen Investigation (HamSCI) scheduled a couple of webinars in late March featuring HamSCI's Festivals of Eclipse Ionospheric Science. Here is the link to the presentations.

The program covered HamSCI's basis and purpose, and explained why the group is conducting experiments, how hams and shortwave listeners (SWLS) could participate, and what they hoped to learn from the event. Topics also included a discussion about why the science behind the eclipse is important to users of the high-frequency (HF) radio spectrum.

Learn about the HamSCI's eclipse-focused operating events:

- Solar Eclipse QSO Party (SEQP)
- Gladstone Signal Spotting Challenge (GSSC)
- Medium Wave Recording Event
- Time Delay of Arrival (TDOA) Event
- Grape 1 Doppler Receiver Project

MARITIME MOBILE PLANNED

During the eclipse, **John Landrigan, KA4RXP,** will be operating in the SEQP as a maritime mobile off the coast of Mazatlán, Mexico, at the beginning of the total solar eclipse as it transits the Maritime provinces of Canada. Look for KA4RXP/MM around 14.265 MHz.

MULTI STATE POTA ROVE

By Chad Cone - KY4KP

When you make a yearly road trip to Kansas City, Kansas, and are a certified POTA-HOLIC, obviously you plan the trip around Parks on the Air. With the trade show starting Friday, I began my trip early Wednesday morning leaving plenty of time to play radio.

Planning for the mission started with a visit to the pota.app website and a peek at the park map. With a goal of activating every state I passed thru, I selected parks close to the Interstate. It didn't take long to plot a list of parks I wanted to visit. With the truck loaded, it was time for a full-scale POTA adventure. My co-pilot for this trip was a young man who had never experienced amateur radio. He knew he was along for the ride, and we were going to work a trade show.

WHAT'S IN THE BAG

My typical POTA Rove equipment setup includes an ICOM IC-7300, 30aH Bioeno battery, MFJ mag mount antenna, MFJ ham sticks and a laptop running N3FJP for logging. Along with all the radio essentials I also ensure a supply of cold ones and snacks. My wife is probably reading this currently and getting on to me for not clarifying my "cold one" of choice is an ice-cold Diet Dr Pepper. As I learned during a recent failed ROVE attempt, food in the truck at all times is essential especially when you have a copilot navigating. There is nothing worse than missing your 10th park of the day when the three-mile trip to Helen for food turns into a two-hour round trip.

WWI Memorial Kansas City Memorial

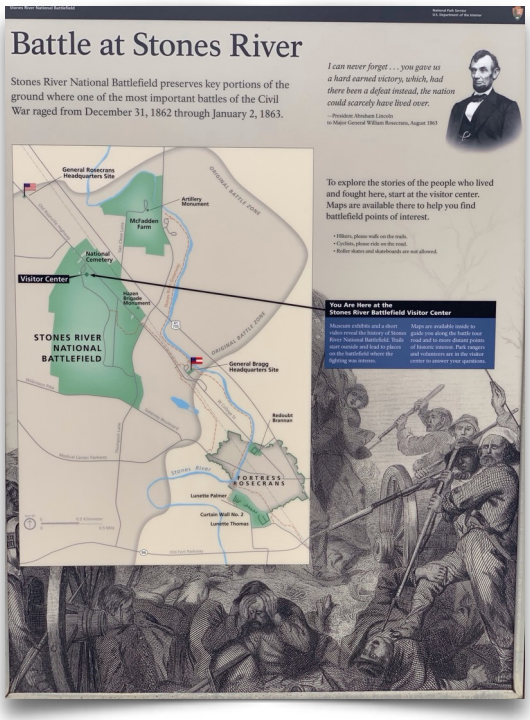
One of the best parts of POTA is the opportunity to visit parks, trails and historic sites that may have otherwise gone unnoticed. Along with an opportunity to get on the air, your spouse may be interested in a hike, a picnic or better yet a camping trip. Any time you can include the spouse while playing radio is a win on multiple levels. During this trip I was able to visit Harry Truman's farmhouse, a World War I memorial as well as the Lake City Ammunition manufacturing facility and shooting range. I've made this trip for the last 10 years and had no idea these places were even near my route.

GETTING DOWN TO BUSINESS

On Wednesday I activated parks in Georgia, Tennessee, Kentucky, Illinois and Missouri. Five states in one day aren't as bad as it sounds when you plan your stops for food and gas around nearby parks. Planning a successful ROVE hinges on plotting a course that is direct and time efficient. You can control your setup time and even your operating style. Driving time, however, is what it is. A well-planned route with no backtracking translates into better odds of a successful ROVE.

Harry S Truman house, Grandview, Missouri

On Thursday, I started activating parks in Missouri just across the state line. Once again, the planned route was crucial. I was able to complete a 10 park ROVE ending in Kansas with hours to spare. Typically, while on a ROVE, I will complete 10-12 contacts and then move onto the next park. During this particular stretch I was able to hit a three-fer where the Oregon, California and Santa Fe Trails intersect.



Anytime you can add a two, three or four park stop to your route you can really increase your odds of a successful ROVE. A few time savers for equipment setup include leaving the mag mount in place while heading to the next park, leaving the radio connected in the back seat and putting your laptop to sleep rather than shutting it down. By utilizing these time savers, you simply park your vehicle and attach your whip to the mag mount. Within minutes you are back on the air making contacts.

My goal during a ROVE is to be set up, on the air and ready to move to the next park in 10 minutes or less. The only park I started to close in on my 10-minute mark was the War Memorial in Kansas City. The extremely high noise floor made it difficult to hear all but the loudest stations.

Over the course of a five-day work trip, I was able to activate five new states, 22 new parks and make over 400 contacts. I was also able to expose another potential operator to the world of amateur radio. By the end of the trip, my navigator was planning parks along our route. If work hadn't got in the way Friday and Saturday, I may have been able to double those numbers. If you are planning a road trip, why not look at the POTA map and activate a few parks along the way. Get outdoors and enjoy the park while you take part in this wonderful hobby. I hope to get you in the log on my next activation.

POTA ON!

Editor's Note: POTA is changing the way it references parks in an effort to comply with ISO standards. US parks previously coded with a "K" prefix will henceforth be listed with the prefix "US." For example, Red Top Mountain State Park is to be coded US-2194. Activators will be required to use the new prefixes in future logs.
Source: Parks on the Air

ASK THE EXPERT

By Marty Buehring – KB4MG

Question: Why does the impedance of my radio have to match 50 ohms for the highest power transfer to the antenna?

Answer: The answer to this question lies in a fundamental law of electric circuits called Jacobi's Law, also known as the Maximum Power Transfer Theorem (MPTT). Moritz Jacobi published it in 1840 while experimenting with source and load resistances. This applies to both AC and DC circuits, but in the AC domain, the load must be the complex conjugate of the source. More on that later.

There is a calculus-based proof for this, but we will keep it simple for our example. The best way to illustrate this is with a DC circuit and Ohm's Law. Consider the following circuit, figure 1:

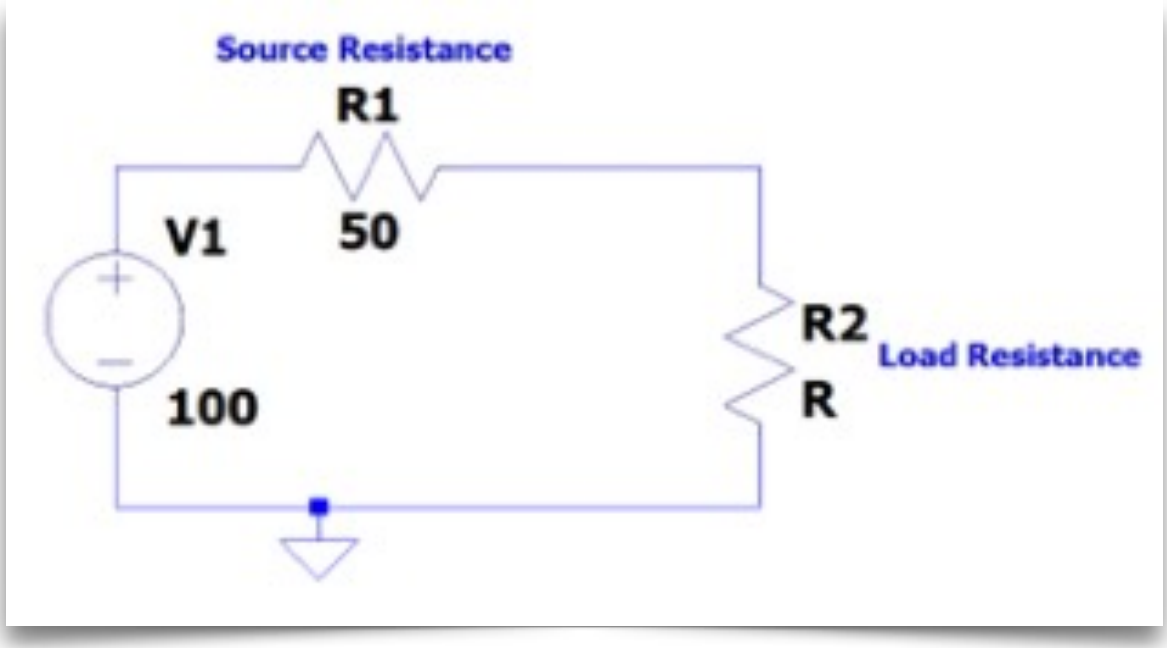


Figure 1

This is a very simple circuit that has a 50-ohm source resistance, much like your radio does. The theorem states that the load resistance must match the source resistance for maximum power to transfer. Let's make a few trial calculations with different load resistances and see if this is actually true:

Trial 1: Set R =100 Ohms. The source voltage is 100 volts. The voltage across R2 is R2/(R2+R1), a simple voltage divider.

Power = E^2/R so P= 66.66^2/ 100Ω = 44.44 Watts

Trial 2: Set R = 30 Ohms

Power = E^2/R so P= 37.5^2/ 30Ω = 46.87 Watts

Trial 3: Set R = 70 Ohms

Power = E^2/R so P= 60^2/ 75Ω = 48 Watts

Trial 4: Set R = 50 Ohms (same as the source resistance)

Power = E^2/R so P= 50^2/ 50Ω = 50 Watts <= Maximum Power Achieved

So, by trial and error we have shown that the Maximum Power Transfer Theorem does work for this DC example. This can also work for AC, which is what your radio puts out. To get a perfect power match the load must cancel out any inductive or capacitive impedance that may be part of the source. You may have seen the impedance measurements you get from an antenna analyzer. They get reported as a complex number that looks like R +jX or R-jX. These show the amount of inductive or capacitive reactance in your antenna system. To get to a perfect match you must apply the complex conjugate value of the impedance to in effect cancel the effects of either inductance or capacitance. This is what an antenna "tuner" does. It measures the impedance and then calculates the complex conjugate value to make your antenna "look" like it is 50 ohms. The tuner adds in capacitance and inductance to try to create the best match.

Let's take an example: Assume you have an antenna impedance of 200 ohms at 100MHz, a mismatch. There is an online tool that will calculate the matching network for you, just like the antenna tuner is doing. This shows you need a capacitance of 13.8pF and inductance of 137.83nH to create a match at 100 MHz. Figure 2 shows the schematic with the values added for simulation in LTSpice.

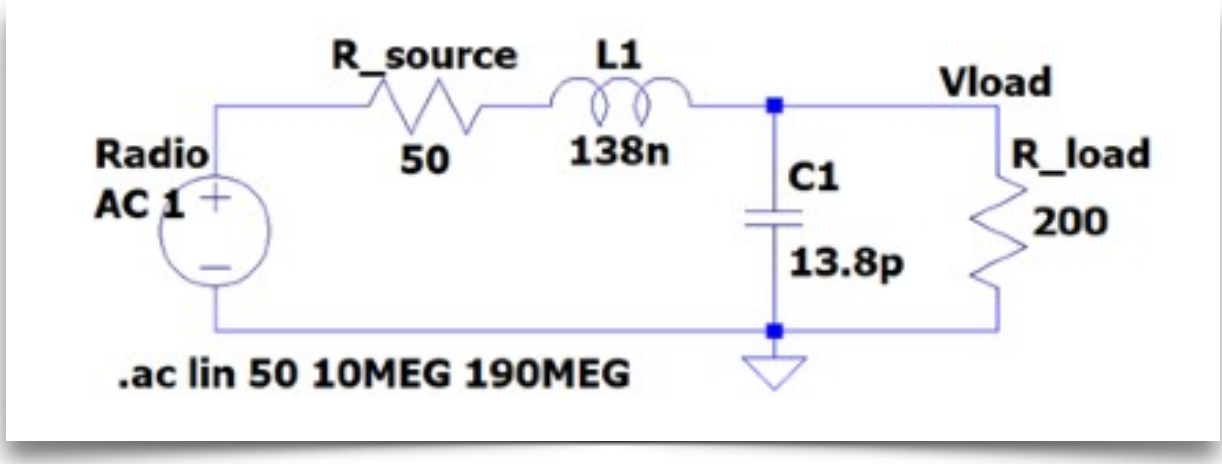


Figure 2

When we simulate this circuit using the capabilities in LTSpice, we can plot the impedance of the matching network by looking at the inductor. The plot below shows how the match will deliver the best power at 100MHz where the R is at or near 50 ohms and the imaginary part is near 0 ohms. This is the point where the lines cross.

This theorem works for the cases of AC but you must match using the complex conjugate of the impedance you are trying to match.

Next time you use your antenna "tuner" (really a matching box) you will have an appreciation for what is happening inside that box.

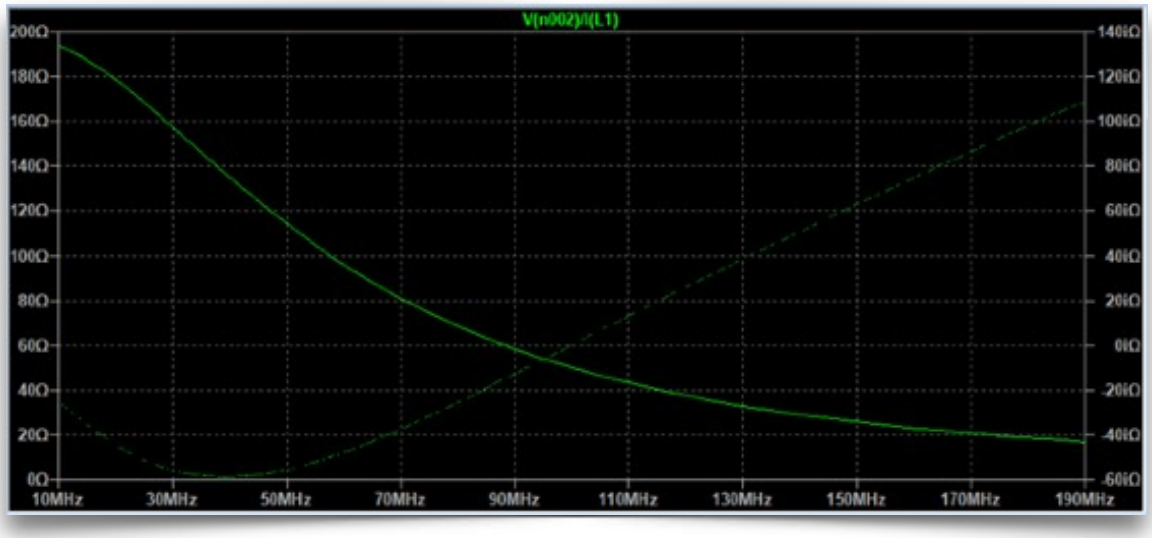


Figure 3

CONTESTING

CONTEST CORNER

APRIL 2024

GA POTA DAY, ANY MODE
1200Z, Apr 6th to 2359Z, Apr 7th

FL POTA DAY, ANY MODE
1400Z-2200Z Apr 6th and 7th

GA QSO PARTY, CW/SSB
1800Z-0359Z 13th 1400Z-2359Z 14th

WORKED ALL PROVINCES OF CHINA
0600Z, Apr 20th to 0559Z, Apr 21st

ARRL ROOKIE ROUND UP, SSB
1800Z- 2359Z, Apr 21st

APRIL QSO PARTIES
LA, MS, MO, MI, NM, ND, NB

DXPEDITION NEWS

VK0DS Davis Station Antarctica - April 2024

H44MS Solomon Islands - April 2024

FK/LZ1GC New Caledonia Island - April 2024

RESOURCE LINKS

Website - https://www.wx4car.org

Contact Us - https://www.wx4car.org/contact-us.html

Membership - https://www.wx4car.org/membership-form.html

CARS Club Technical Programs - https://www.wx4car.org/technical-monthly-programs.html

Club Activities - https://www.wx4car.org/club-activities.html

POTA Corner - https://www.wx4car.org/pota-corner.html

ARRL FIELD DAY - https://www.wx4car.org/field-day.html

Ham Fests - https://www.wx4car.org/amateur-radio-events.html

CARS Groups.io - https://groups.io/groups

ARRL Testing Info - https://www.wx4car.org/testing2023.html

New Ham Kit - https://www.wx4car.org/uploads/8/3/7/7/83773582/wx4cars_intro_to_new_hams-7apr2021.pdf

Ham License Upgrading - https://www.wx4car.org/obtaining-a-license.html

Technician Ham Cram Study Guide - https://www.wx4car.org/uploads/8/3/7/7/83773582/2022-2026_technician_pool_study_guide.pdf

Club Apparel - https://www.hamthreads.com

CARS Club Badges - https://www.thesignman.com/clubs/carsga.html

POTA Supplies - https://www.clubgearonline.com

CONTESTING LINKS

ARRL Contest Calendar - http://www.arrl.org/contest-calendar

Contesting Calendar - http://www.contesting.com/

CQ Contest Calendar - http://cq-amateur-radio.com/cq_contests/cq_annual_contest_calendar/cq_annual_contest_calendar.html

SolarHam Site - http://www.solarham.net/index.htm

Space Weather - http://www.spaceweatherwoman.com/

Contest Calendar - https://www.contestcalendar.com

OTHER LINKS

ARRL - http://www.arrl.org

Sky Warn - http://skywarn.org

QSO Today - http://qsotoday.com

Cherokee EMA - http://cherokeega-ema.org

Georgia ARES - https://www.gaares.org

Ham Radio Work Bench - http://hamradioworkbench.com

On All Bands - https://www.onallbands.com

MISSION STATEMENT

The mission of the Cherokee Amateur Radio Society is to promote the hobby of amateur radio to the Cherokee County residents and surrounding communities. It primarily serves to provide education, FCC testing, public service, and fellowship to people with the common interest of amateur radio.

Cherokee Amateur Radio Society is an organization of FCC licensed amateur radio operators (also called Hams) that meet and share the hobby, educate people about amateur radio, as well as support our local community in times of disaster. We are located in Cherokee County, Georgia and have club call sign WX4CAR. We are an ARRL Affiliated Club.

The club also participates with ARES, and the Cherokee County EOC when severe weather gets close to the area, and we help with local public service projects. The members of the club also dedicate some of their time to promote and help new hams to develop their skills and knowledge on Amateur communications modes and to be better operators. We are a very active club and participate in ARRL Field Day every year. If you are located in Cherokee County or the surrounding area, we would like to invite you to participate.

CARS OFFICERS FOR 2024:

President: Martin Buehring – KB4MG
Vice President: Chad Cone – KY4KP
Secretary: Mark Schulze – KO4IFY
Treasurer: James James – KE4HMS
Cherokee County Emergency Coordinator:
Rob Bruderer – W1JKU

Email: club.wx4car@gmail.com

Time & Location of Meetings:
Meetings are the second Saturday of each month at 10:00 am Eastern Time.

William G. Long Senior Center
223 Arnold Mill Road
Woodstock, Georgia 30188

Our meetings are open to all visitors. You do not need to be a member or have a license to attend.Come for the fellowship and technical programs. We also have a combined ARES meeting at the same time. ARRL FCC Testing is at 1:00PM following the meeting.

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