



# Full Quieting

The Official Journal of The Bellbrook Amateur Radio Club



June 2025 — Issue 46

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## From the Editor

Happy June Everyone!

We are all finally rested up from Hamvention weekend, BARC had a lot of members out there. Many photos of you all starting on page 4. Fun stuff!

We're gearing up for Field Day at the end of June. I hope you all can join us. Even if you don't currently operate HF there will be amateur radio operators available to show you the ropes. I don't exactly recall how many people have gotten hooked after trying out our radios at Field Day for the first time. And the Dot's chicken is memorable (especially at 2am).

I am hearing that we may have hit our solar peak for this solar cycle which means in the future it will become more difficult to use HF. So, don't sit around, get your radio on the air, pack up and do some POTA activations, make some contacts around the world while they're easier to get.

Speaking of POTA, I am starting a series of articles analyzing my vertical antennas accumulated over the years, which ones are suitable for which bands, how to set up the matching coil, radials or magic carpet ground plane, and more. The first article of this 3 or 4-part series is on page 18. Those of you with NanoVNAs will find this interesting. The rest of you may want to get a NanoVNA and do your own measuring.

Enjoy the start of summer!

**73, Ray Hitt, [N8VMX](#)**  
Full Quieting Editor

## ARRL FIELD DAY



[www.arrl.org](http://www.arrl.org)



### **2024 BARC Officers and Directors**

President: Geoff Kline, [KI5VNB](#)

Vice President: Eric Bramini, [KC8OPY](#)

Secretary: Jim Gifford, [N8KET](#)

Treasurer: John Westerkamp, [W8LRJ](#)

Senior Director: Bob French, [AC8ZU](#)

Junior Director: Don Macon, [KE8WVJ](#)

### **2024 Coordinators**

Clubhouse: Jim Lusk, [KC8EFD](#)

Comm Center: John Westerkamp, [W8LRJ](#)

Contesting: Ken Gunton, [W8ASA](#)

Education: Paul Sharp, [WS8R](#)

Emergency Preparedness: Jim Lusk, [KC8EFD](#)

Field Day: Glenn Rodgers, [W8IO](#)

Full Quieting Editor: Ray Hitt, [N8VMX](#)

Hospitality & Librarian: Natinka Siwecki, [KD8NUA](#)

IT: John Westerkamp, [W8LRJ](#)

Lunch Bunch: Jim Totten, [WA8HUB](#)

Net: Paul Sharp, [WS8R](#)

Public Service: Don Parker, [KB8PSL](#)

QSLs: Roger Hoffman, [WB9BXT](#)

Repeater: Russ Roysden, [N8NPT](#)

Tech Night: Bob French, [AC8ZU](#)

Webmaster: John Westerkamp, [W8LRJ](#)

### **BARC Net: Every Sunday, 8 PM Local**

147.045 (+) (118.8 PL enc and dec) [Alt = 443.675]

### **Directions to BARC Clubhouse and Comm Center**

Rooms 1 & 3 Lower Level Sugarcreek Elementary School

51 S. East Street, Bellbrook (One block east & one block south from the traffic light in downtown Bellbrook)

Enter at South end of building

## **Member Interviews**

BARC wants to hear from you!

Whether you're a long-time BARC member or a brand new one, young or old, please tell us about yourself. Here are some simple guidelines, although you're free to use whatever format you're comfortable with.

This page is all about you. It's your chance to let BARC members to get to know you better.

Here's are a few sample questions to help get you started, but you can write whatever you want.

Please send us some pictures of anything you want BARC to see (you, station, antennas, pets, family, anything)

- When you were first licensed?
- How did you learn about Ham Radio (HR)?
- Why did you become a Ham?
- What are your current HR interests?
- What are you most passionate about regarding HR?
- Tell us about your stations (past, present, and future)
- What was the most exciting thing that happened to you in HR?
- What do you do for a living?
- Would you like to say something about your family?
- Do you have other hobbies or interests?
- Any other comments for BARC?



# President's Corner

Wow — it's hard to believe June is already here and Hamvention is behind us! Summer is kicking off with warm weather, kids are out of school, and the swimming pools are open. It's the perfect time to take your radio outdoors and enjoy the sunshine before the summer heat really settles in.

If you've been thinking about trying portable operations, now's the time! There are some great ways to get on the air while enjoying the great outdoors:

- **Parks on the Air (POTA)** – [parksontheair.com](http://parksontheair.com)
- **World Wide Flora & Fauna (WWFF)** – [wwff.co](http://wwff.co)
- **Summits on the Air (SOTA)** – [sota.org.uk](http://sota.org.uk)
- **Islands on the Air (IOTA)** – [iota-world.org](http://iota-world.org)

Prefer a little friendly competition? Check out these upcoming events:

- **ARRL Digital Contest** – June 7–8
- **ARRL June VHF Contest** – June 14–15
- **13 Colonies Special Event** – July 1–7

As I've said before, I encourage everyone to try something new this year. And I'm thrilled to hear that many of you already are! From first-time HF contacts, to diving into DMR, building new gadgets at Tech Night, or even starting to use CW — our members are exploring new aspects of the hobby every day. That's what ham radio is all about: learning, experimenting, and having fun.

And speaking of fun — **Field Day** is almost here!

Join us **June 28–29** at **Sackett-Wright Park in Bellbrook** for the largest emergency preparedness and public outreach event in amateur radio. If you're not part of a setup team, we'd love to see you any-time after **10:30 a.m. on Saturday** to help with the final setup or just hang out and enjoy the day.

This year's educational activity will feature a **Fox Hunt** (radio direction finding) — details and timing will be announced soon. And don't miss our **5:00 p.m. dinner and potluck** featuring the club's favorite: **Dot's Fried Chicken!**

Whether you're operating, logging, learning, or just curious — bring your family, invite a friend, and spend some time with us. You don't have to be on the air to be part of the fun.

See you at the park!

73,

**Geoff Kline, [K15VNB](http://K15VNB)**





# What's Up BARC?

Ray Hitt, [N8VMX](#)

Announcements regarding any member news including: new equipment, antennas, grandchildren, children, pets, operating news, etc.

What's Up BARC?



## BARC Represents at Hamvention

Well, the Dayton Hamvention is behind us now, and hopefully you all got out there. BARC played a big role with many of us serving as volunteers. We also had our familiar cyan BARC canopy in the Flea Market. Thanks to all of you who stopped out to talk, get some water, or even help watch the booth for awhile so that we all got a chance to walk around the Greene County Fairgrounds. I logged over 16,000 steps on Friday and Saturday, and over 10,000 on Sunday. Here are some photos from the weekend, many of which I scraped from our BARC Facebook page. — *Editor*





# What's Up BARC? (continued)

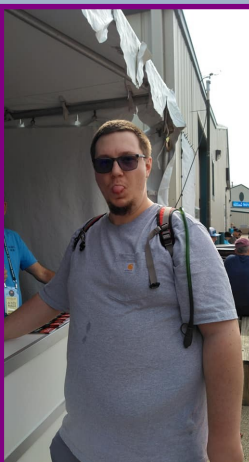
## BARC Represents at Hamvention (continued)





## What's Up BARC? (continued)

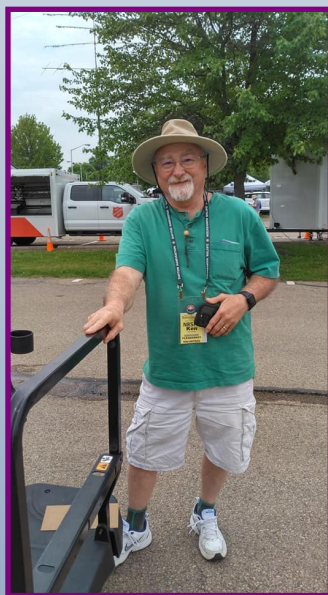
### BARC Represents at Hamvention (continued)





## What's Up BARC? (continued)

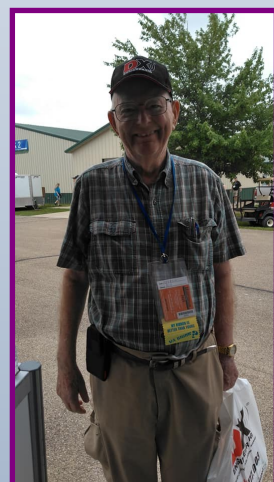
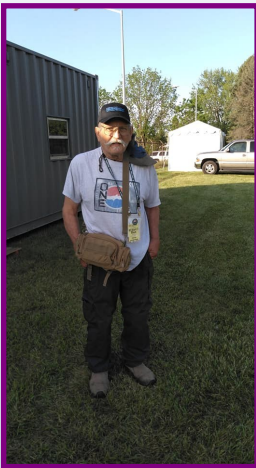
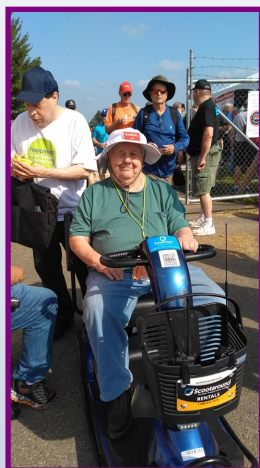
### BARC Represents at Hamvention (continued)





## What's Up BARC? (continued)

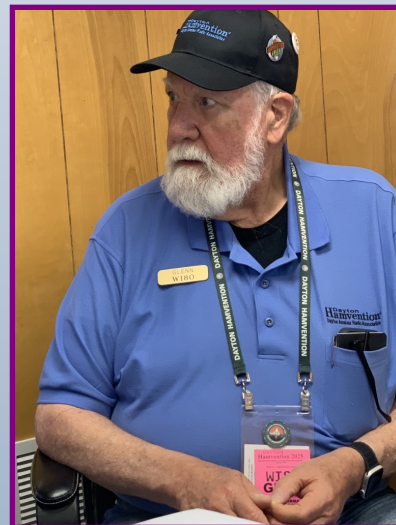
### BARC Represents at Hamvention (continued)





## What's Up BARC? (continued)

### BARC Represents at Hamvention (continued)



## What's Up BARC? (continued)

### BARC Swag from Emerio KE8JNQ

In April's planning meeting, the club officers approved Emerio KE8JNQ to offer a variety of items for sale all in Blue BARC Color. These items complement the other items being offered for sale from other vendors. Notice that the logo is a larger size so other Amateur Radio Operators can see it better. All BARC members get this discount price. If you need more information or would like to order, contact Emerio KE8JNQ. His telephone number is 937-546-9477.



### BARC Swag from Parrot Promo Essentials

We have polo shirts, sweat shirts, hoodies, t-shirts, ball caps, and softshell jackets from Parrot Promo Essentials. You can order them directly from our website, at <https://bellbrookarc.org/wp/order-barc-gear/>. These shirts are a little more expensive than those offered by Emerio, but they match the ones you've seen many of us wearing already.

### BARC Mugs from Chris Hanselman, AD8OM

For those of you wanting 20 oz insulated BARC mugs, please contact Chris Hanselman, AD8OM, at [deeremt@gmail.com](mailto:deeremt@gmail.com). They are offered in Blue with silver print and Black with copper print. They will keep cold things cold and hot things hot for hours. I use mine almost every day and love it!





# Officer, Director, and Coordinator Inputs

**Treasurer: John Westerkamp, [W8LRJ](#):** As usual for this time of year, we had very few transactions. We did earn over \$500 at our Hamvention Flea Market booth. There are a few leftover items in the clubhouse for members to bid on before the next Membership meeting. After that, the items will head to the trash as we downsize for our move.

We continue to be in great financial shape as we look to relocate.

**Repeater: John Westerkamp, [W8LRJ](#):** A reminder that when using Allstar or Echolink, if the repeater is in constant use and unable to drop the carrier, a local user will not be able to send a \*73 to disconnect and the connection will remain active forever! I have since taken steps to prevent this, but if it happens to you, please text me at 937-271-3119 and I can disconnect the node for you. You can also use the Contact Form on the website to reach me.

**Website: John Westerkamp, [W8LRJ](#):** Be sure to check the website for information on the upcoming Field Day and where you can volunteer to make it happen. The Little Miami River clean-up is also in June and is a great opportunity for Public Service and to test out your radio in a real net.

And don't forget about the Member Forum where you can ask questions and make announcements. The website has a new section *Mentors and Experts*! You can find a list of experts by selecting *Mentors and Experts* under the *Membership* tab. Send your questions via the *Contact* page for our Experts!

**Communication Center: John Westerkamp, [W8LRJ](#):** The ad hoc Clubhouse Committee visited the Bellbrook school building where we have been offered space and did a rooftop survey to see what antennas would be supported there and on the existing tower.

We are meeting regularly to inventory all our radio equipment and decide what we can bring with us to our new clubhouse. Leftover items from the Hamvention Flea Market are available in the clubhouse for club members to bid on.

We are meeting regularly to inventory all our radio equipment and decide what we can bring with us to our new clubhouse. Watch out for our Hamvention Flea Market schedule and you can pick up some great deals!

**Secretary: Jim Gifford, [N8KET](#):** The secretary took notes at the planning meeting and minutes at the general membership meeting. My thanks to Steve Siwecki for finishing recording minutes at the membership meeting, because I had to hurry back to Hamvention to pick up Connie W8CSG who was working in the radio room.

**BARC Net Manager: Paul Sharp, [WS8R](#):** Every Sunday at 8:00 PM you can listen to and participate in the exciting BARC Net, on 147.045. For the 4 weeks in May 2025 there were approximately 68 check-ins lasting 149 exciting and informative minutes. Topics range from Open Mike, Parks on the Air, what DX contacts have you made, memories from Mother's Day and Hamvention.

Our faithful Net Controllers are, Larry Darner KD8RER, Connie Gifford W8CSG, Jim Gifford N8KET, Tink Siwecki KD8NUA, John Westerkamp W8LRJ and Paul Sharp WS8R.



# BARC June 2025 Event Calendar

Sun June 1, 2025

**8pm Weekly Net** ..... Where: 147.045+ (118.8 Hz tone)

Tue June 3, 2025

**6:30pm POTA SIG Meeting**..... Where: BARC Clubhouse

Thu June 5, 2025

**7pm Planning Meeting**..... Where: BARC Clubhouse

Sun June 8, 2025

**8pm Weekly Net** ..... Where: 147.045+ (118.8 Hz tone)

Tue June 10, 2025

**11:15am Lunch Bunch**.....Where: Marion's Pizza

Sat June 14, 2025

**9:00am Little Miami River Clean-Up** ..... Where: Bellbrock Park

Sun June 15, 2025

**8pm Weekly Net** ..... Where: 147.045+ (118.8 Hz tone)

Thu June 19, 2025

**7pm Membership Meeting** ..... Where: BARC Clubhouse

Sun June 22, 2025

**8pm Weekly Net** ..... Where: 147.045+ (118.8 Hz tone)

Wed June 25, 2025

**7pm Tech Night** ..... Where: BARC Clubhouse

Thu June 26, 2025

**7pm Dessert and Movie Night** ..... Where: BARC Clubhouse

Sat-Sun June 28-29, 2025

**Field Day** .....Where: Sackett Wright Park

Sun June 29, 2025

**8pm Weekly Net** ..... Where: 147.045+ (118.8 Hz tone)



## BARC Movie and Dessert Night



### Upcoming Dates & Selections for Our 2025 BARC Movie & Dessert Nights:

Date	Movie	Genre	Actors	----
June 26, 2025	<b>Fly Me to the Moon</b> (2024)	<b>Rom/Com</b>	Scarlett Johansson	
July 24, 2025	<b>Witness</b>	<b>Drama</b>	Harrison Ford	
August 28, 2025	<b>TBD</b>			
September 25, 2025	<b>TBD</b>			
October 23, 2025	<b>TBD</b>			

### Past movies and Desserts:

January 23, 2025	<b>Harvey</b> (1950)	Carrot Cake & Carrots
February 27, 2025	<b>Edge of Tomorrow</b> (2014)	Macarons, Cheese cake
March 27, 2025	<b>Paul, Apostle of Christ</b>	Angel food cake & Holy Donuts
April 24, 2025	<b>Jurassic World: Dominion</b>	Dinosaur eggs & ice cream sundaes
May 22, 2025	<b>Twisters</b> (2024)	

September and October movie nights are tentative due to our clubhouse situation but we are planning a full calendar of movies for the 2025 BARC Movie and Dessert Nights.

BARC movie nights are held on the **Fourth Thursday** of each month **January** through **October** at **7:00 PM in the BARC Clubhouse**. We take November and December off for the holidays. At each movie night we pop up, *fresh*, BARC's famous popcorn and you never know what we will come up with for dessert!

***We'll see you in June at the Movies!***

Tink  
KD8NUA

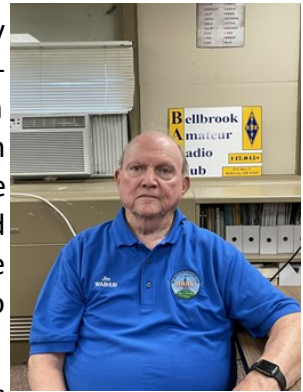




# Lunch Bunch

Jim Totten, [WA8HUB](#)

Hello my fellow lunch lovers. May 2025 is just about over. I hope everybody got their taxes done with some great refunds. I was lucky and actually will receive a refund. Way different than last year. It's time to renew our lunch meetings for this new month, June 2025. To recap: Our club meetings are on Thursdays. The Planning meeting is the first Thursday of the month and the General meeting on the Third Thursday. Our Lunch Schedule is the Second and Fourth Tuesday of each month. If a scheduled Tuesday gets slammed by some unforeseen event the lunch is just cancelled. The invitation messages will go out Wednesday or Thursday of the previous week.



Now, how will the lunches be selected? Accompanying this information page is the same chart in last month's FQ listing our current set of restaurants. The June restaurants are highlighted. I updated all of the dates for all of the restaurants on our list. This includes the restaurants in 2025. This published list is the order we will select each lunch day. You now know what the whole order is and know what's coming next. (Did you notice the plural tense above.)

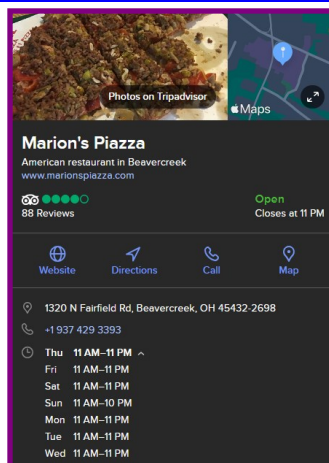
How did we do in May? On May 13, 2025 we had our lunch at at Culps Cafeteria at 1000 Carillon Blvd. This is one of the outstanding features of Carrillon Park and easy to find. Like last year, they had a wait staff and you order from a menu or the verbal offerings. We had 8 stalwart folks. The dishes served were great. Our second feast was at the new City Barbecue at 2001 E. Dorothy Lane. The Bracket sandwiches are super. We had one of our largest turnouts. Eleven hungry people included Victoria's two granddaughters.

Well...how will we do in June? The chart (next page) has the venues highlighted. Our first stop is on June 10, 2025 at an old favorite, **Marion's Piazza** at 1320 N. Fairfield Rd. Beavercreek OH. Plenty of pizza done to your choice. The menu is broader than pizza. I have had their Rueben sandwich: Yum. Our second stop is **Red Robin** at 2671 Fairfield Commons Blvd. Also in Beavercreek OH. Famous for the bottomless fries. Elegant Sandwiches. You can't go hungry.

That's a wrap for this month. Happy eating.

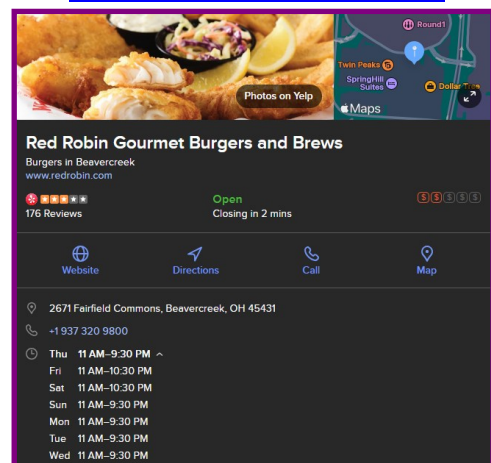
73, Jim, [WA8HUB](#)

**Tuesday, June 10<sup>th</sup>, 11:15am**



*Click pictures or hyperlinks  
for more info and maps*

**Tuesday, June 24<sup>th</sup>, 11:15am**



# Lunch Bunch 2024 List

Jim Totten, [WA8HUB](#)

Date	Restaurant	Address	City	Phone Number
04/08/25	Shawarma Grill	2844 Colonel Glenn Hwy	Fairborn, OH 45324	(937) 429-4959
04/22/25	Chic-Fil-A	5301 Cornerstone N Blvd	Sugarcreek Township, OH 45440	(937) 439-1700
05/13/25	Culp's Café	1000 Carillon Blvd	Dayton, OH 45409	(937) 293-2841
05/27/25	City Barbecue	2001 E. Dorothy Lane	Kettering, OH 45420	(937) 200-1006
06/10/25	Marion's Piazza	1320 N Fairfield Rd.	Beavercreek, OH 45432	(937) 429-3393
06/24/25	Red Robin	2671 Fairfield Commons Blvd.	Beavercreek, OH 45431	(937) 320-9800
07/08/25	Beavercreek Pizza Dive	4021 Dayton-Xenia Rd.	Beavercreek, OH 45432	(937) 431-8669
07/22/25	Cherry House Cafe 7:00 am to 2:00 pm	1241 Meadow Bridge Dr	Beavercreek, OH 45434	(937) 320-6200
08/12/25	Another Broken Egg Cafe 7:00 am to 2:00 pm	2453 Esquire Dr.	Beavercreek, OH 45431	(937) 912-5074
08/26/25	China Garden Buffet	112 Woodman Dr. Airway Shopping Center	Dayton, OH 45431	(937) 781-9999
09/09/25	First Watch 7:00 am to 2:30 pm	5245 Cornerstone North Blvd	Sugarcreek Twp, OH 45440	(937) 732-9013
09/23/25	Submarine House	3195 Dayton-Xenia Rd.	Beavercreek, OH 45434	(937) 429-8650
10/14/25	Roosters Wings	2430 N. Fairfield <i>The Shoppes at FC</i>	Beavercreek, OH 45431	(937) 702-9500
10/28/25	Butterbee's	217 Progress Dr.	Xenia, OH 45385	(937) 352-6504



# Little Miami River Clean Sweep

Darryl Fowler, [KD8JQE](#)



The LMRK Clean Sweep is scheduled for Saturday, June 14, 2025.

The Little Miami River Clean Up is an annual volunteer event focused on removing trash and restoring the health of the Little Miami River. The Little Miami River Network, an Ohio non-profit volunteer organization is working to protect and preserve the Little Miami River, one of American's National Wild and Scenic Rivers. By protecting and promoting the river and encouraging its preservation, the Little Miami River Clean Up event improves the quality of life along the Little Miami River.

This river cleanup is about much more than collecting trash. It is an opportunity to come together with your families, your neighbors, your community, and your friends to accomplish something vital on behalf of our Ohio Waterways. Various partners like BARC work together to coordinate this clean-up, which is attended by hundreds of wonderful volunteers.

On Saturday, June 14 from 8:30 am to 11:00 am volunteers will hit the Little Miami River and its banks in southwestern Ohio for a huge cleanup effort. The cleanup begins as far north as Glen Thompson Reserve in Xenia and ends south of Corwin in Warren County. It is a great excuse to get outside.

## How does it work?

The annual Clean Sweep occurs in one day. Organizers divide the Little Miami River into five sections of approximately equal lengths with easy public access to designated river sections meeting, "put-in," and "takeout" locations. Each river section will have a few canoes and volunteers. The size of the groups of volunteers for each river section enables them to stay together and avoid overcrowding along that stretch of the river. In past events, about 171 people combed the river segments from various watercraft while others walked the banks of the river.



# Little Miami River Clean Sweep

Darryl Fowler, [KD8JQE](#)

The LMWN depends on BARC volunteers to help their volunteers to have a safe trip. Since 2010, the LMWN has removed over 29,000 pounds of trash and over 1,000 tires from the Greene County stretch of the Little Miami River. Every year, it is also a treasure hunt of sorts as volunteers compete to find the strangest pieces of trash. Volunteers have removed everything from Styrofoam fragments from coolers that have fallen apart, plastic water bottles, flip-flops, and beer cans. Incredibly, volunteers have recovered larger items such as tires, light poles, and washing machines.

## How Is BARC Volunteers Involved?

BARC volunteers receive assignments for station locations along the designated input and takeout segments of the river. We do not assign our volunteers to canoes. They do not walk on the riverbanks or go into the water. Once assigned, there are no switching launch locations and takeout locations.

Our tasks include monitoring the number of canoes that go in and out of the river, verifying the number of volunteers assigned to the groups, and notifying net control when each group arrives at the takeout locations.

## Upon Completion of the Event

Immediately following the cleanup, there will be a festival for all volunteers in the afternoon from 11:30 am to 2:00 pm. Be sure to come and enjoy food, beverages, and music. The picnic is at Bellbrook Park, in downtown Bellbrook. Plenty of street parking is available along North Main Street, Franklin Street, East Walnut Street and N East Street. There are a few picnic tables in the park, so bring your own folding chairs.



## YouTube Video—Use Window Screen Instead of Radials for POTA

I happened across an excellent YouTube video that complements the series of articles I am writing (starting on the next page) regarding using faraday cloth or window screen ground planes instead of radials. They set up quickly and perform as well as radials.

This video is from Michael, KB9VBR, who was one of our guest speakers at the May 2025 BARC Membership meeting:

[Window screen antenna ground network- I can't believe what this does! #hamradioqa - YouTube](#)

I have window screen, but also got a faraday cloth which is copper/nickel wire woven cloth. The window screen tore up my hands with the sharp corners. I received a tip from Mark KE8NHT about rolling the edges over on themselves to get rid of the sharp edges. You can even put grommets in the corners if you want to stake it to the ground. What KB9VBR did was find some medium sized branches in the park to weigh down the screen and he was good to go. No need for grommets in that case.

**73, Ray N8VMX**





# Vertical Antenna Analysis Using NanoVNA—Part 1

Ray Hitt, [N8VMX](#)

I have been using several vertical antennas for a while now and wanted to find out which one(s) would be best for POTA. Who wants to drag 5 different antennas to a park? Not me. Also, I have radials that connect to a [Big Kansas Coil](#) but also have some Faraday cloth (Larry KBDEMD refers to it as “magic carpet”). I put the Faraday cloth below the vertical. So, is the magic carpet better than radials? Does it hurt to use both? I wanted to find these things out, so I spent a couple of weekends measuring my four verticals with my NanoVNA, dumped the data into my computer, imported it all into Excel and discovered that a picture is really worth 1000 words.



Here are the antennas I looked at:

- [Opek OP-SS-17F](#) 17-foot telescopic whip (new Hamvention gift from me to me)
- AN-131A manpack whip antenna (8-elements, 128.25")
- 110" 11-meter CB whip
- Long vertical whip, 264" (22') , part of the [SCR-506A Radio Set](#)



The antennas were all mounted in the same way; the tripod-mounted Big Kansas Coil, an 8" coil spring for strain relief, and a bayonet quick disconnect. This all added around 21" to the electrical length of the antennas. The Big Kansas Coil comes with three 31' radials, those were used, also a pair of 43" x 118" faraday cloths side-by-side making an 86" x 118" ground plane. Even though the Big Kansas Coil was mounted, I bypassed it by selecting zero for the coil tap. I measured the antennas from 1.5-30 MHz using either the three radials, the ground plane, or both.

From the antenna I ran a short piece of RG-8 through 2 8" RF chokes to dampen the RF coming back into the NanoVNA to avoid corrupting the results. To this I attached a 25' piece of RG-8X to my deck where I had my NanoVNA connected to my laptop running NanoVNASaver. This enabled me to save many files on the PC for later analysis. I set up NanoVNASaver to collect 7 segments from 1.5-30



# Vertical Antenna Analysis—Part 1 (continued)

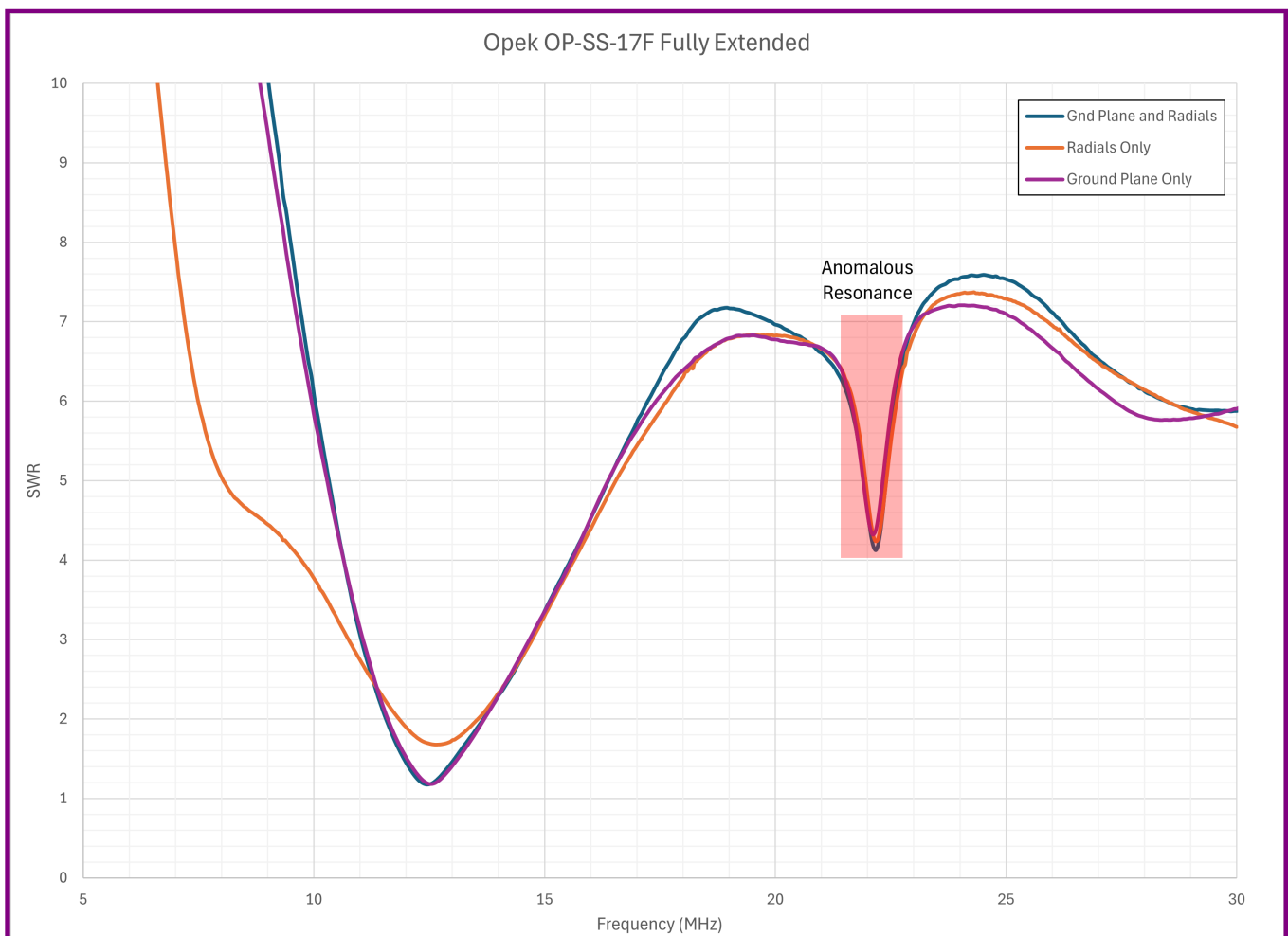
MHz. This increased the number of data points from 101 to 707, allowing me to zoom in to areas of interest in the charts. That evening, I imported the .s1p files into Excel to make better charts.

## Analysis of Opek OP-SS-17F

This antenna consists of 10 telescoping segments which can expand from 24 inches to 17 feet. I started out by extending this antenna fully and measuring SWR from 1.5-30MHz with the radials and faraday cloth ground plane both present. I then collapsed the next-to-bottom segment and repeated the measurements. I then collapsed the second-from-bottom segment and repeated the measurements again. When done, I had measurements of 10% (fully retracted), 20%, 30%, ...,100% (fully extended) of total length.

After that was done, I removed the radials and repeated all measurements with the faraday cloth only. Lastly, I removed the faraday cloth, reattached the radials, and performed the measurements again.

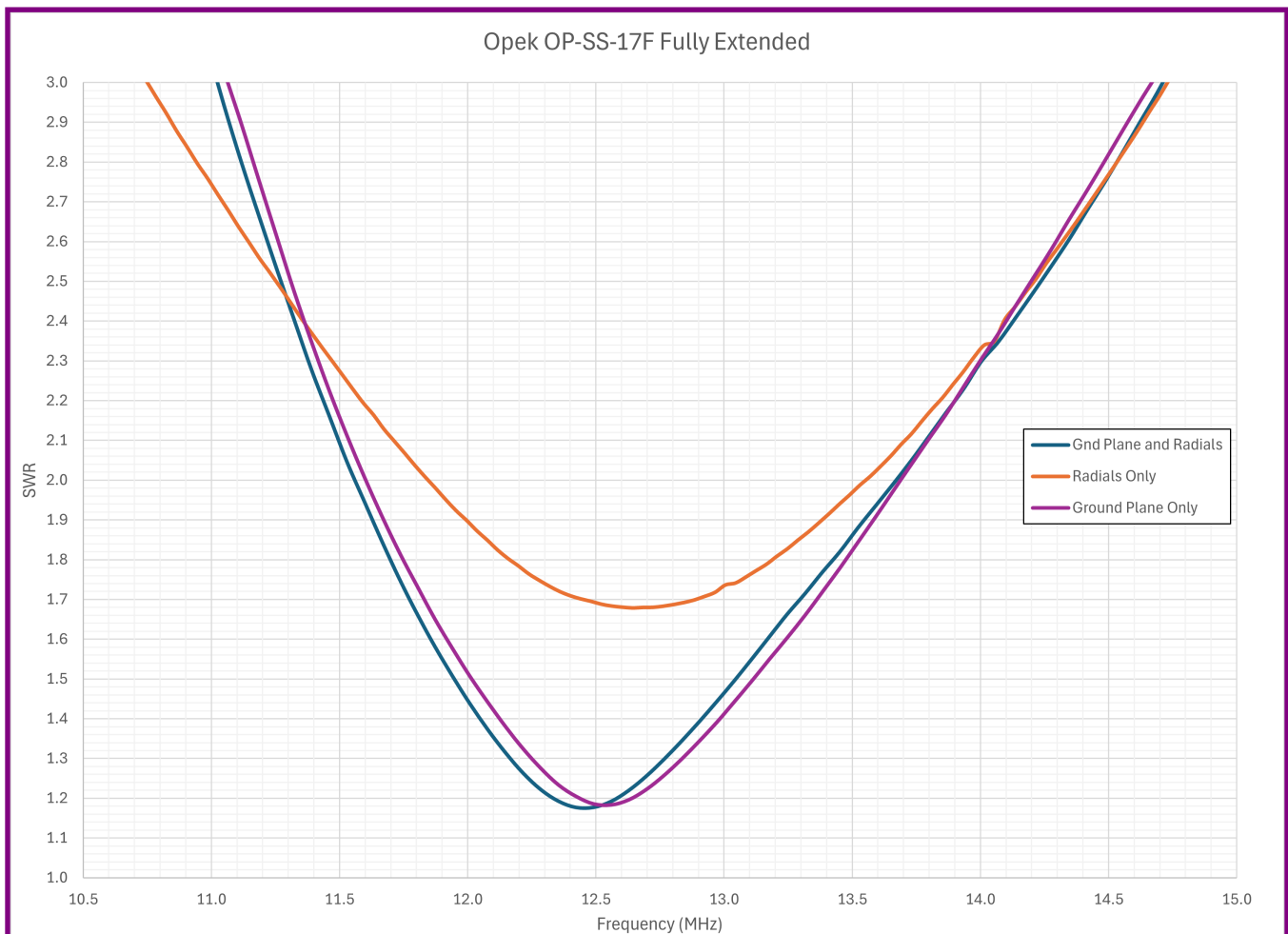
When done, in Excel, I superimposed the SWR sweeps on one chart for each length of antenna. Here's a chart showing SWR when the whip was fully extended. I have similar charts for each length measured. The measurements show resonance at around 12.5 MHz when fully extended. Not a good resonance for amateur radio use, right between the 30m and 20m bands.



## Vertical Antenna Analysis—Part 1 (continued)

You can see there is a difference between using radials, a ground plane, or both. I also noticed that most of my measurements had an unusual resonance around 22 MHz. I haven't figured out if this was due to the antennas or some interaction with the coil or the cable leading to the radio. Further experiments will narrow that down, so I will reserve judgement on that for now.

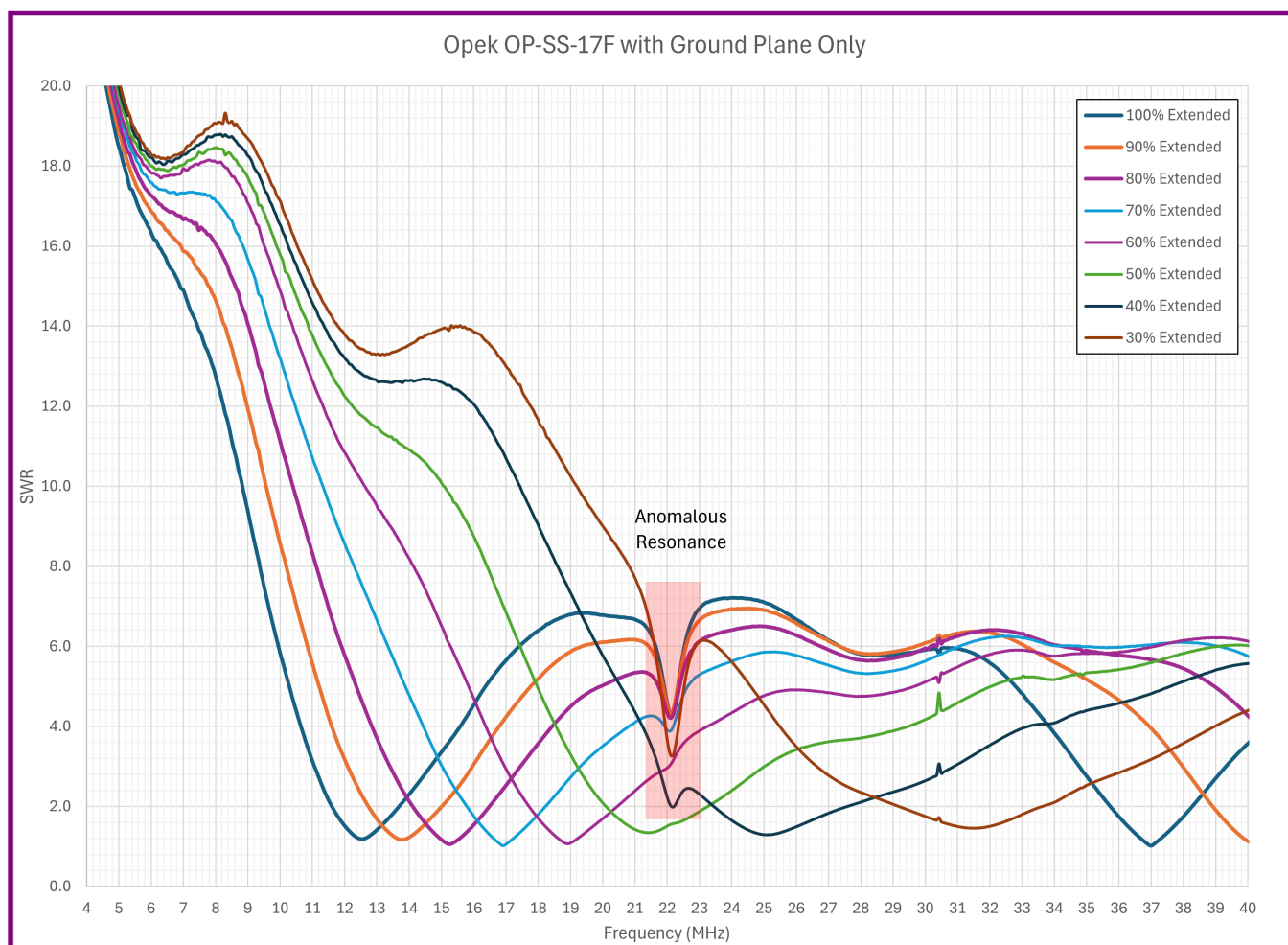
Here's a zoomed in chart around 12.5 MHz. The orange line (radials) didn't have as low a SWR and its SWR didn't rise as sharply than the two lines with ground planes. The use of radials didn't seem to make a big difference when a faraday cloth ground plane was used also.



The next chart I created was plotting the resonant frequency for different amounts of antenna extension. In the chart I went from 100% down to 30% and looked at the resonance shift in frequency. I stopped at 30% extension because the resonance shifted above 30 MHz, and I am focused on performance on the 10m through 80m bands for this analysis. On the next page is a complete table of the resonant frequency as the antenna was extended from 10% to 100% of its full 17-foot length.



# Vertical Antenna Analysis—Part 1 (continued)



	Gnd Plane and Radials		Radials Only		Ground Plane Only	
Length	Freq (MHz)	SWR	Freq (MHz)	SWR	Freq (MHz)	SWR
100%	12.42	1.18	12.64	1.68	12.56	1.18
90%	13.73	1.11	13.65	1.63	13.80	1.16
80%	14.76	1.07	14.82	1.71	15.24	1.06
70%	16.34	1.16	16.19	1.94	16.89	1.02
60%	18.12	1.18	18.54	2.12	18.88	1.06
50%	20.32	1.30	22.04	1.78	21.42	1.35
40%	22.11	1.72	22.11	2.18	22.18	1.99
30%	31.18	1.19	30.42	1.65	30.35	1.65
20%	39.21	1.14	40.38	1.71	38.53	1.42
10%	47.73	1.51	47.32	1.60	47.46	1.58

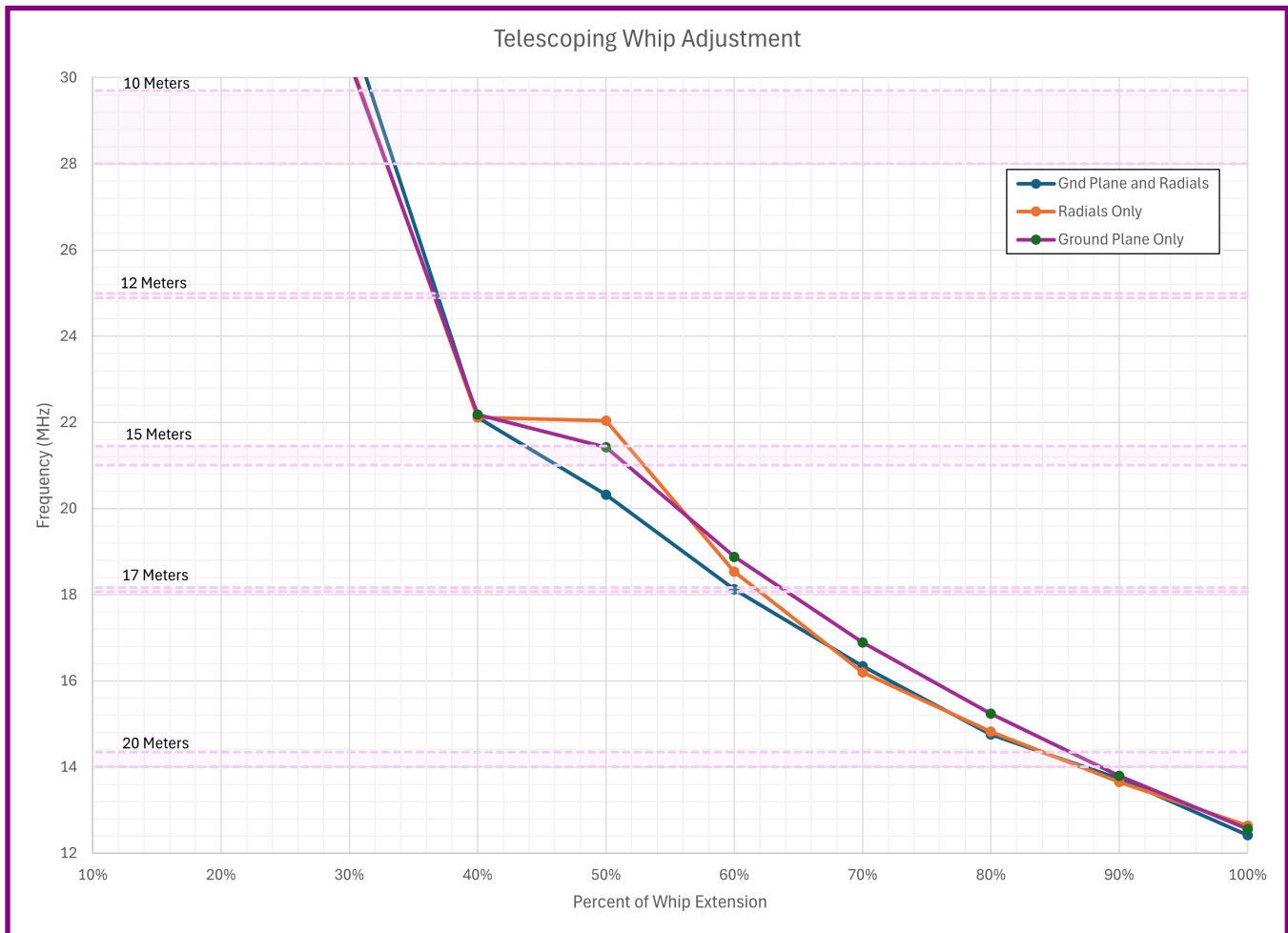
Table 1 – Opek OP-SS-17F resonant frequency shift vs telescopic extension





## Vertical Antenna Analysis—Part 1 (continued)

Another useful chart is to map out the resonant frequency for every 10% of telescoping extension. That can be created directly from Table 1. What is very interesting is that you can now raise the segments to any percentage to try and directly match any amateur band. Excel will interpolate between each 10% data point to give you an idea where to tune. This is how that turns out.



For example, to match 10m, from the chart it appears you need 32-34% at the low end (28 MHz) and 31-32% at the high end (29.3 MHz) of the 10m band. That means you would extend the top segment, then the 2<sup>nd</sup> topmost segment, then the 3<sup>rd</sup> topmost segment another 20-40% of its length. This would be roughly 32-34% of the full antenna length. You would want to verify this with a NanoVNA to make sure you're in the ballpark.

I created many more charts for this antenna, but this gives you a sense of what you can do with the NanoVNA data once it's on your PC. Something I haven't done yet for this antenna is to make use of the Big Kansas Coil to see how low I can tune this antenna. I can update the results soon.

This might be enough for this newsletter, next month I can write up the results for the AN-131A and the AT-271A/PRC. Then a part three to describe how the 22-foot monster does.

73, Ray [N8VMX](#)



# How To Import NanoVNA .s1p Files Into Excel

The data files created by the NanoVNA and NanoVNASaver are referred to as **.s1p** and **.s2p** files. The **.s1p** file is a one-port file, and the **.s2p** file is a two-port file. The SWR measurements make use of **.s1p** files, so I won't mention **.s2p** files anymore. These files can be saved by NanoVNASaver on your PC. Some NanoVNAs also let you save these files on their SDCard if so equipped.

Here are the first few lines from one of my **.s1p** files. So what's going on here?

```
# HZ S RI R 50
1500000 0.231619664 -0.959507072
1985000 -0.182563328 -0.960424704
2470000 -0.55138016 -0.792316544
2955000 -0.812503936 -0.49490592
```

The first line starting with **#** is a comment line describing the contents of the **.s1p** file.

- Hz: The *stimulus* is the frequency measured in Hz. The NanoVNA sends out discrete CW tones.
- S: The file contains complex S-parameters (in this case, the **s<sub>11</sub>** parameter only)
- RI: The S-parameter is expressed as a pair of numbers, the real and imaginary components.
- R 50: The characteristic impedance is 50Ω.

The **.s1p** file contains the frequency in Hz, followed by the Reflection Coefficient ( $\Gamma$ ) expressed as a complex number with real and imaginary components. The Reflection Coefficient is the ratio of voltage reflected back to the NanoVNA. Its magnitude ranges from 0 to 1, where a zero implies all the energy is going out the port, where a 1 implies that all the energy is returning.

Excel can import this file directly, but you then need to perform some calculations to convert the reflection coefficient ( $\Gamma$ ) into SWR. The conversion formulas is:

$$SWR = \frac{1 + |\Gamma|}{1 - |\Gamma|}, \text{ where } |\Gamma| = \sqrt{Re(\Gamma)^2 + Im(\Gamma)^2}$$

In Excel, I imported the **.s1p** data as a space-delimited file, then added some conversion formulas to get SWR, and also converted from Hz to MHz for ease of reading the charts. The first three columns are the exact data imported from the **.s1p** file, while the last three columns are the conversion formulas. Here's a snippet:

Freq (Hz)	Re	Im	Mag( $\Gamma$ )	SWR	Freq (MHz)
1500000	0.231619664	-0.959507072	0.9871	153.6445	1.5000
1985000	-0.182563328	-0.960424704	0.9776	88.3739	1.9850
2470000	-0.55138016	-0.792316544	0.9653	56.6210	2.4700
2955000	-0.812503936	-0.49490592	0.9514	40.1223	2.9550

With this excel sheet, the Freq (MHz) and SWR columns can be copied and pasted into Excel charts. This is how I went about creating all the charts in the article.

**73 de N8VMX**



# Special Event Stations for June

Paul Sharp, [WS8R](#)

Here are a 2 links you can follow to find many SES that suit your varied interest. I may repeat and update some of these links as there are only a few many sites focused on SES.

[http://www.arrl.org/special\\_events/search/page:2/model:Event](http://www.arrl.org/special_events/search/page:2/model:Event).

[https://www.qsl.net/va3rj/spevents\\_dx.html](https://www.qsl.net/va3rj/spevents_dx.html).

Here is my pick of the litter of SES that I think will be of interest to my fellow BARC members. We hit the jackpot this month with many exciting SES. There are SES commemorating:

Armed Forces including Audie Murphy, maritime stations, police, music, Museum Ships Weekend, Great Lakes, Boy Scouts, 13 Colonies, and Field Day.

**06/01/2025 | W2W D-Day Commemoration.** Jun 1-Jun 14, 1300Z-2200Z, W2W, Hunt Valley, MD. Amateur Radio Club of the National Electronics Museum (ARCNEM). 14.244 14.044 7.244 7.044. Certificate & QSL. ARCNEM, 338 Clubhouse Road, Hunt Valley, MD 21031. Amateur Radio Club of the National Electronics Museum (ARCNEM) will operate W2W in commemoration of the anniversary of D-Day and the role of electronics in WWII. Primary operation will be June 1-June 6 with additional operation possible during June 7-14 as operator availability permits. Operation on 80M (3.544, 3.844), additional bands and digital modes possible during event. Frequencies +/- according to QRM. QSL and Certificate available via SASE; details at ww-2.us. [ww-2.us](http://ww-2.us)

**06/02/2025 | Commemorate Crash of B-24 Liberator # 41-29157.** Jun 2-Jun 16, 0000Z-2359Z, TM44LIB, Stuart, FRANCE. CORASUN (Collective of Sundgau Radio Amateurs). 14.074 14.040 14.130 18.100. QSL. Alain MEHR F4JZF, 24 Rue de la Barrière, MULHOUSE 68200, FRANCE. to remember On January 29, 1944, the B-24 Liberator number 41-29157 took off on a mission that would prove fatal. As it flew over the Ill furth region in the Haut-Rhin department of France, the aircraft was shot down, crashing to the ground in a blaze of metal and flames. The exact causes of this accident remain unclear, but it is likely that the plane fell victim to German anti-aircraft defenses or an enemy fighter attack. <https://www.qrz.com/db/TM44LIB>

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## Special Event Stations for June (continued)

**06/02/2025 | Commemorate Crash of B-24 Liberator # 41-29157.** Jun 2-Jun 16, 0000Z-2359Z, TM44LIB, Stuart, FRANCE. CORASUN (Collective of Sundgau Radio Amateurs). 14.074 14.040 14.130 18.100. QSL. Alain MEHR F4JZF, 24 Rue de la Barrière, MULHOUSE 68200, FRANCE. to remember On January 29, 1944, the B-24 Liberator number 41-29157 took off on a mission that would prove fatal. As it flew over the Illfurth region in the Haut-Rhin department of France, the aircraft was shot down, crashing to the ground in a blaze of metal and flames. The exact causes of this accident remain unclear, but it is likely that the plane fell victim to German anti-aircraft defenses or an enemy fighter attack. <https://www.qrz.com/db/TM44LIB>

**06/07/2025 | Museum Ships Weekend Event.** Jun 7-Jun 8, 0001Z-2359Z, NJ2BB, Camden, NJ. Battle Ship New Jersey Amateur Radio Station. 7044 7272 14044 14262. Certificate. Margaret Burgess-KB2BRR, 150 Schooner Ave, Barnegat, NJ 08005. [nj2bb.org](http://nj2bb.org)

**06/07/2025 | Museum Ships Weekend Sat & Sun.** Jun 7-Jun 8, 1330Z-2100Z, K3SAV, Port of Baltimore, MD. Nuclear Ship Savannah Amateur Radio Club. 7,14,18,21,28. QSL. Ullis Fleming, 980 Patuxent Rd, Odenton, MD 21113. 2 day event. Same hours on Saturday and Sunday. Check spotting networks for frequency. See QRZ.com info for Savannah Award [qrz.com/db/k3sav](http://qrz.com/db/k3sav)

**06/07/2025 | Museum Ships Weekend Station.** Jun 7-Jun 8, 0000Z-2359Z, N1S, Groton, CT. Submarine Force Library & Museum. 3.850 7.225 14.275 21.350. QSL. N1S Generations ARC, 110 Vinegar Hill Road, Gales Ferry, CT 06335. • NAUTILUS - First Nuclear Submarine | Jun 7-Jun 8, N1S, 0000Z – 2359Z N1S Groton, CT. Nuclear Submarine USS NAUTILUS SSN 571 Museum Ships Weekend. All Bands; All Modes. QSL; bureau via K3LBD; direct with SASE to N1S Generations ARC, 110 Vinegar Hill Road, Gales Ferry, CT 06335. NAUTILUS information <http://www.ussnautilus.org/>. Station information: [www.qrz.com/db/k3lbd](http://www.qrz.com/db/k3lbd) or [www.qrz.com/db/n1s](http://www.qrz.com/db/n1s) [www.ussnautilus.org](http://www.ussnautilus.org)

**06/07/2025 | National Museum of the Great Lakes Museum Ships Weekend.** Jun 7-Jun 8, 1400Z-1830Z, K8E, Toledo, OH. Toledo Mobile Radio Association. 7.039 7.260 14.239 14.260. QSL. James M. Schoonmaker, P. O. Box 9673, Toledo, OH 43697. [www.qrz.com/db/k8e](http://www.qrz.com/db/k8e) or [www.w8hhf.org](http://www.w8hhf.org)

**06/07/2025 | NB9QV USS Cobia Museum Ships Weekend.** Jun 7-Jun 8, 1400Z-2000Z, NB9QV, Manitowoc, WI. USS Cobia Amateur Radio Club. 7.240 14.240. Certificate. Send contact information to, [kc9yl@arrl.net](mailto:kc9yl@arrl.net), to receive PDF certificate. <https://www.qrz.com/db/NB9QV>

**06/07/2025 | Ships On The Air.** Jun 7-Jun 8, 0359Z-2359Z, W4JDD, Jacksonville, FL. Orleck Amateur Radio Society. 7.225 14.250. Certificate. John Reynolds, 5547 Lofty Pines Cir S, Jacksonville, FL 32210. Operate around the clock with the worldwide Ships On The Air event [johnr1000@aol.com](mailto:johnr1000@aol.com)



## Special Event Stations for June (continued)

**06/14/2025 | Appleton Flag Day Parade.** Jun 14, 1830Z-2030Z, W9ZL, Appleton, WI. Fox Cities Amateur Radio Club. 14.246. QSL. FCARC, PO Box 2346, Appleton, WI 54912. Operate our special event station while we traverse thru the Appleton Flag Day parade. The largest flag day parade in the country. QSL via FCARC PO Box 2346 Appleton WI 54912 [fcarc.club](http://fcarc.club)

**6/14/2025 | Audie Murphy's 100th Birthday.** Jun 14-Jun 29, 0000Z-2359Z, W5M, Greenville, TX. Sabine Valley ARA. 7.270 14.270 21.300 28.350. Certificate & QSL. SABINE VALLEY AMATEUR RADIO ASSN, PO BOX 843, Greenville, TX 75403. Audie enlisted at the downtown Greenville, TX post office in 1942. He went on to become the most decorated soldier of WWII, earning every medal possible, including the Medal of Honor, all before the age of 21. <https://k5gvl.com/audie-murphy>

**06/22/2025 | FESTIVAL JAZZ MONTREAL.** Jun 22-Jul 7, 2200Z-0700Z, VE2JAZZ, Saint-Jérôme. HOME STATION. 14.030. QSL. JEAN CHARRON, 17 Rue Élisabeth, Saint-Jérôme, QC J7Z 2S9, CANADA.

**06/28/2025 | Field day.** Jun 28-Jun 29, 1800Z-1800Z, W2GSB, Lindenhurst, NY. GREAT SOUTH BAY AMATEUR RADIO CLUB . 28.340 21.250 14.246 7.245. Certificate. W2GSB, PO BOX 1356, West Babylon, NY 11704. GSBARC 3F battery-powered open to the public We will run three stations on battery power in all modes on all three radios location 200 East Sunrise hwy N Lindenhurst NY We welcome anyone to stop by good luck to all [WWW.GSBARC.ORG](http://WWW.GSBARC.ORG)

**06/29/2025 | Boy Scouts of America/Michigan CrossRoads Council - Trail To Eagle (TTE) .** Jun 29-Jul 3, 1300Z-0500Z, K2BSA/8, Metamora, MI. Garden City Amateur Radio Club (GCARC). 14.330 7.270 3.840. QSL. GCARC, P.O. Box 482, Garden City, MI 48136. Scouters earning the Radio Merit Badge will operate during the week as time allows. <https://michiganscouting.org/camping/trail-to-eagle>

**07/01/2025 | 13 Colonies Special Event.** Jul 1-Jul 8, 1300Z-0400Z, WM3PEN, Philadelphia, PA. Holmesburg Amateur Radio Club. 7.276 14.276. QSL. Holmesburg Amateur Radio Club, 3341 Sheffield Ave, Philadelphia, PA 19136. Additional info: WM3PEN on QRZ.com or WM3PEN.org [13colonies.us](http://13colonies.us)



Answers to Amateur Radio Test Questions on pages 27-29

### Technician ([pg 27](#))

T7A06 (C)

T8B09 (B)

T7A07 (B)

T1D10 (D) [97.3(a)(10)]

### General ([pg 28](#))

G6B01 (C)

G4A05 (C)

G5B14 (B)

G9B07 (B)

### Amateur Extra ([pg 29](#))

E4B09 (B)

E9G08 (C)

E4B03 (C)

E9H08 (A)





# Amateur License Test Questions

Answers are on [page 26](#)

## Technician

### **T7A06**

What device converts the RF input and output of a transceiver to another band?

- A. High-pass filter
- B. Low-pass filter
- C. Transverter
- D. Phase converter

### **T8B09**

What causes spin fading of satellite signals?

- A. Circular polarized noise interference radiated from the sun
- B. Rotation of the satellite and its antennas
- C. Doppler shift of the received signal
- D. Interfering signals within the satellite uplink band

### **T7A07**

What is the function of a transceiver's PTT input?

- A. Input for a key used to send CW
- B. Switches transceiver from receive to transmit when grounded
- C. Provides a transmit tuning tone when grounded
- D. Input for a preamplifier tuning tone

### **T1D10**

How does the FCC define broadcasting for the Amateur Radio Service?

- A. Two-way transmissions by amateur stations
- B. Any transmission made by the licensed station
- C. Transmission of messages directed only to amateur operators
- D. Transmissions intended for reception by the general public



# Amateur License Test Questions (continued)

Answers are on [page 26](#)

## General

### G6B01

What determines the performance of a ferrite core at different frequencies?

- A. Its conductivity
- B. Its thickness
- C. The composition, or "mix," of materials used
- D. The ratio of outer diameter to inner diameter

### G4A05

Why is automatic level control (ALC) used with an RF power amplifier?

- A. To balance the transmitter audio frequency response
- B. To reduce harmonic radiation
- C. To prevent excessive drive
- D. To increase overall efficiency

### G5B14

What is the output PEP of 500 volts peak-to-peak across a 50-ohm load?

- A. 8.75 watts
- B. 625 watts
- C. 2500 watts
- D. 5000 watts

### G9B07

How does the feed point impedance of a horizontal  $1/2$  wave dipole antenna change as the antenna height is reduced to  $1/10$  wavelength above ground?

- A. It steadily increases
- B. It steadily decreases
- C. It peaks at about  $1/8$  wavelength above ground
- D. It is unaffected by the height above ground





# Amateur License Test Questions (continued)

Answers are on [page 26](#)

## Amateur Extra

### E4B09

Which of the following can be measured by a two-port vector network analyzer?

- A. Phase noise
- B. Filter frequency response
- C. Pulse rise time
- D. Forward power

### E9G08

How is a Smith chart normalized?

- A. Reassign the reactance axis with resistance values
- B. Reassign the resistance axis with reactance values
- C. Reassign the prime center's impedance value
- D. Reassign the prime center to the reactance axis

### E4B03

Which S parameter is equivalent to forward gain?

- A. S11
- B. S12
- C. S21
- D. S22

### E9H08

What is the function of a sense antenna?

- A. It modifies the pattern of a DF antenna to provide a null in only one direction
- B. It increases the sensitivity of a DF antenna array
- C. It allows DF antennas to receive signals at different vertical angles
- D. It provides diversity reception that cancels multipath signals



# Editorial Policy and Style Guidelines for *Full Quieting*

## Editorial Policy

*Full Quieting* welcomes articles from BARC members on any ham radio subject that is relevant to BARC. Our focus is our BARC members. We will not reprint items or articles that are easily available by other means (web, magazines, etc.).

Most articles will be “how to” or “what I did” articles that focus on technical or operational subjects such as a construction (antennas, equipment, stations, etc.), the use of hardware or software, operating in unique/challenging circumstances, or a memoir.

*Full Quieting* will also consider an occasional article on policy issues regarding the various national licensing/regulatory agencies and/or amateur radio associations so long as the article is relevant to BARC members and constructive in tone and recommendations.

Although all *Full Quieting* articles represent the experiences and points-of-view of their authors and not BARC, articles that focus on policy issues will be specifically labeled as a reflection of the author’s opinion.

Regardless of subject, when you submit an article you acknowledge that you are the original author or creator and you grant publication rights to BARC. Anything you submit remains your property and you may have it published elsewhere without the need for permission from *Full Quieting*.

## Style Guidelines

Language: English is the official language of *Full Quieting* and all articles should be submitted in English. Don’t be concerned if English is not your first language: just tell your story in your own voice and use translating tools such as Google Translate to help if necessary.

File format: Submit your article as a Word, Word Perfect, OpenOffice or text file attachment to an email. A shared document available for download (such as a Google Doc) is also okay. **Do not submit as an email or PDF file.**

Pictures and other graphics: Do not embed pictures or tables in the article. Please submit as an email attachment or a shared image available for download. Please reduce the file size of the images before you send them to *Full Quieting*. Large files can be attached to a series of emails. Keep file size in mind regarding publication quality: for example, a half page image in the final PDF version of *Full Quieting* should be at least 400 pixels wide. If a photograph or graphic was taken or created by someone else, you should have their permission to use it and the permission of anyone identifiable in the image. **If you capture images from the web, provide a citation (URL) for that source and make sure the source does not prohibit use of the image in *Full Quieting*.**



# Editorial Policy and Style Guidelines for *Full Quieting*

*(Continued from previous page)*

## **Use these style conventions**

- We are hams, not Hams, and our hobby is ham radio. This is a change to our original format
- The name of our organization is: Bellbrook Amateur Radio Club or BARC
- The code we use is Morse (capitalize the M)
- We use Yagi antennas (capitalize the Y)
- Q codes should be capitalized: QRM, QSB, QSY
- The plural of QSO is QSOs, not QSO's
- Modes should be capitalized: CW, SSB, FT8, RTTY
- Bands are written as 10 m, 15 m etc.
- The abbreviation for a Silent Key is SK.
- You might have had an Elmer, not an elmer

Bruce N7RR has provided a [two-page check list](#) of common International System of Units (SI) formats and abbreviations.

## **Use these formatting conventions:**

- Set all borders to 1 inch. The preferred font is Calibri, 12 point.
- Do not use tabs or spaces at the beginning of a paragraph
- Use only a single paragraph or carriage return at the end of each paragraph
- To enhance readability, use two spaces after the period at the end of a sentence.





# Misc BARC Info

## REGULARLY SCHEDULED NETS

**Daily (Sunday through Saturday)** 1030, 1615 and 1845 Ohio Single Sideband Net (OSSBN) Primary: 3972.5 KHz LSB Alternates: 3968 & 7272 KHz LSB

**Weekdays (Mon-Fri)** 1130 DMR Net Brandmeister Talk group 310557. Accessible via hotspot, 444.875 (+) CC13 TS2(Dayton East), 444.4375 (+) CC11 TS2 (Dayton West)

**Sundays** 1900 Newcomers & Elmers Net (Cincinnati) 146.670 (-) (123.0 PL)

**Sundays** 2000 **BARC Weekly Net 147.045 (+) (118.8 PL) [Alt 443.675 (+) (118.8 PL)]**

**Sundays** 2100 Miami Co. Voice & Data Net (Data Net follows Voice Net) 145.230 (-) (no PL)

**Winlink Tuesdays** GCARES Winlink Net Any time on Tuesdays Eastern Time Send To: W8LRJ, Cc: KE8FMJ W8GCA-10 445.010 (S), W6CDR-10 145.010 (S)

**Tuesdays** 1900 Dayton Veterans Admin Amateur Radio Club Net (W8DVA) 443.850 + 107.2 pl

**Tuesdays** 1915 Ohio ARES HF Net W8SGT Net Control at OEMA HQ Primary: 3902 KHz LSB (+/- QRM) Alternate: 7240 KHz LSB (+/- QRM)

**Tuesdays** 1945 Ohio Digital Emergency Net Primary: 3584.5 KHz USB (1500 WF) Alternate: 7072 KHz USB

**Tuesdays** 2000 MoCoARES Weekly Net 146.640 (-) (123.0 Hz PL) (Except—No Net on last Tuesday of even months (MoCoARES meeting) (Except—On 2nd Tuesday: Voice and Data Net on 444.250 (+) (123.0 PL)

**Tuesdays** 2030 Greene County DMR Net Primary: 444.875+, Color Code 13

**Tuesdays** 2100 GCARES Net (Voice & Data) 146.910 (-)(no PL) [Alt = 442.725]

**Ohio Winlink Wednesdays** OH ARES Winlink Net Any time on Wednesdays Eastern Time Send To: K8EAF, Cc: W8LRJ, KE8FMJ W8GCA-10 445.010 (S), W6CDR-10 145.010 (S)

**Wednesdays** 2000 Ohio District 3 ARES Net (West Central Ohio Regional Net) Primary: 145.110 (-) ( 67.0 PL) Alternate: 146.820 (-) ( 77.0 PL)

**Wednesdays** 2000 Beginners Net (Dayton Area) 444.875 (+) (94.8 PL)

## ZOOM-Basic Setup & Configuration

Here's a link to the Zoom Video Tutorials: [Zoom how-to video tutorials – Zoom Help Center](#)

Also see: "Join a Meeting" and the "Joining & Configuring Audio & Video" tutorials for new users. Send questions or problems to John, [W8LRJ](#) ASAP but BEFORE the next meeting.

**BARC Fundraising Opportunity — Kroger's Rewards Program** Please use your Kroger Card when shopping at Kroger's and support BARC. If you haven't signed up and need help, bring your Kroger Card to the next BARC meeting, and we'll help you get registered (contact the [BARC Treasurer](#)).

**ARRL Discounted Membership Offer** One of the benefits of club membership is the opportunity to become an ARRL member at a discounted price. BARC is an ARRL affiliated club and receives a commission for new first-time ARRL memberships transacted through the club. BARC passes on this commission (discount) as a club membership benefit to promote ARRL membership. BARC members currently receive a \$15 discount on a NEW first year ARRL membership cost when placed through the Club. Please contact the [BARC Treasurer](#) for details.

