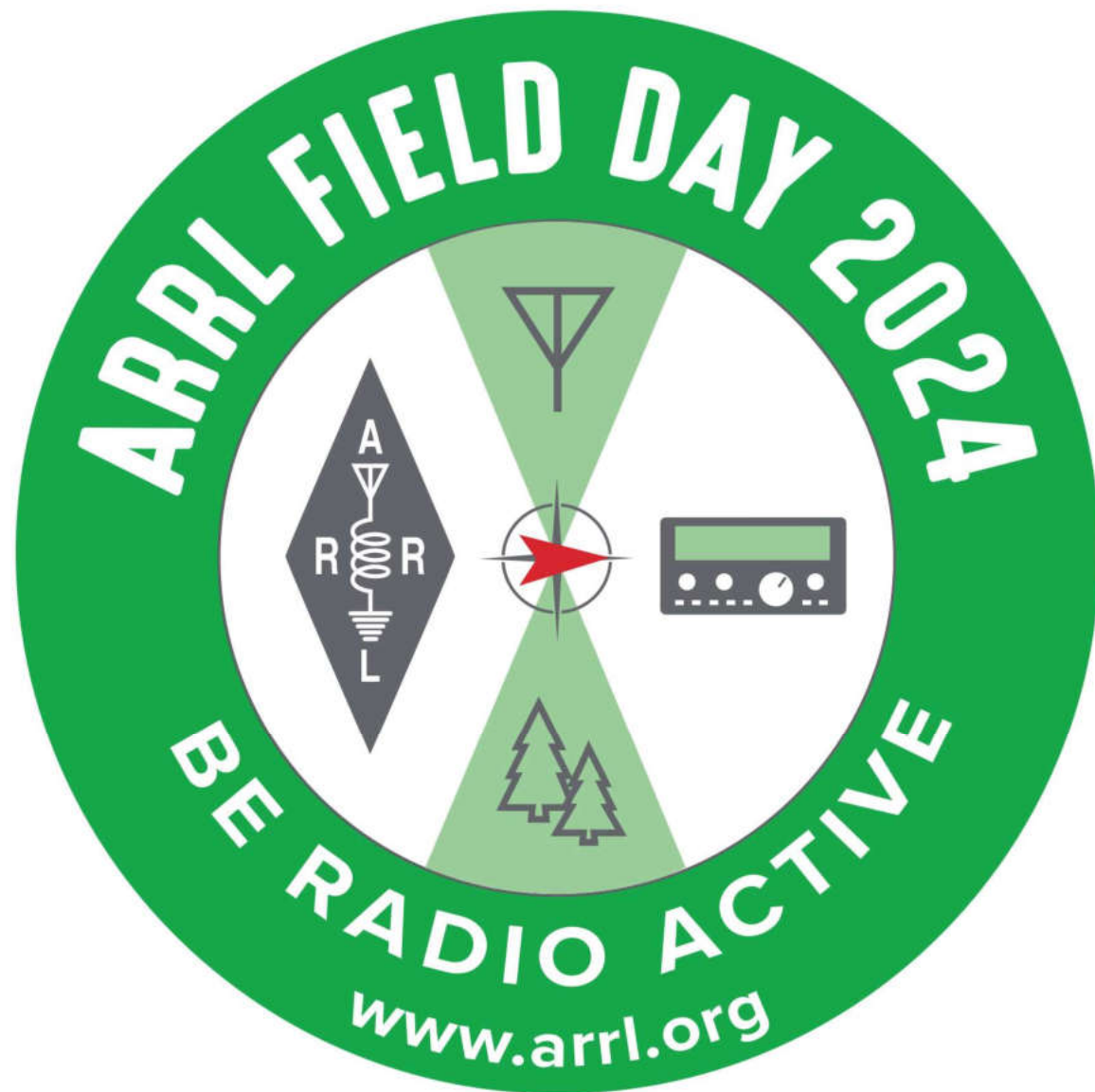


CRCRST Field Day 2024

1

By Avery Davis, WB4RTP

Old slides by David Holman,
AC7DS



Joint Field Day Effort for 2024



Catalina Radio Club

<https://www.w7sa.org/>



Radio Society of Tucson

<https://www.rstclub.org/>

What is Field Day

- ▶ It's a contest!!
 - ▶ *Not Really, but it is*
- ▶ It's a social event!!
- ▶ It's a radio event



Field Day Is FUN!!!

Field Day is a Practice Deployment Emergency Communications Exercise

When Is Field Day?

June 22-23, 2024

Beginning 1800 UTC (1100 MST) Saturday
Ending 1800 UTC (1100 MST) Sunday

Objective

To contact as many stations as possible on the 160-, 80-, 40-, 20-, 15- and 10-Meter HF bands, as well as all bands 50 MHz and above, and to learn to operate in abnormal situations in less than optimal conditions.

Field Day is open to all amateurs in the areas covered by the ARRL/RAC Field Organizations and countries within IARU Region 2. DX stations residing in other regions may be contacted for credit, but are not eligible to submit entries.

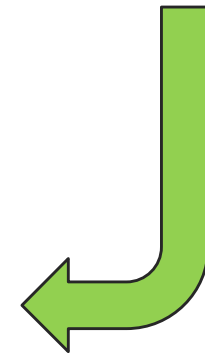
Each claimed contact must include contemporaneous direct initiation by the operator on both sides of the contact. Initiation of a contact may be either locally or by remote. Fully automated contacts are prohibited.

6

What Do We Need?

▶ OPERATORS

- ▶ Band Captains
- ▶ Bonus Captains
- ▶ Set Up Crew
- ▶ Radios
- ▶ Antennas
- ▶ Power
- ▶ N1MM Loggers



What
openings
can you fill?

We need Band Captains

Task	Leader
Station Capt 160SSB	
Station Capt 160CW	
Station Capt 80SSB	
Station Capt 80CW	
Station Capt 40SSB	Richard K7NSW
Station Capt 40CW	Greg KA7BXA
Station Capt 20SSB	Avery WB4RTP
Station Capt 20CW	Jeff AD6T
Station Capt 15SSB	Jerry WN7DX
Station Capt 15CW	Jerry WN7DX
Station Capt 10SSB	Jason KL3PD
Station Capt 10CW	Jerry WN7DX
Station Capt Digital	
Station Capt V/UHF	Randy KD7KEQ

What
openings
can you
fill?

We need Bonus Point Captains

FD Bonus Points	Bonus Points Captains
7.3.1. 100% Emergency Power 100pts	Avery WB4RTP
7.3.2. Media Publicity 100pts	
7.3.3. Public Location 100pts	Avery WB4RTP
7.3.4. Public Information Table 100pts	
7.3.5. Message Origination to Section Manager 100pts	
7.3.6. Message Handling 10pts ea	
7.3.7. Satellite QSO 100pts	
7.3.8. Alternate Power 100pts	Avery WB4RTP
7.3.9. W1AW Bulletin 100pts	
7.3.10. Educational activity bonus 100pts	Joe K3TYE
7.3.11. Site Visitation by an elected governmental official 100pts	
7.3.12. Site Visitation by a representative of an agency 100pts	
7.3.13. GOTA Bonus (updated 2024) 100pts + 5pts ea contact	Joe K3TYE
7.3.14. Web submission 50pts	Avery WB4RTP
7.3.15. Field Day Youth Participation 20pts ea max 100pts	Joe K3TYE
7.3.16 Social Media 100pts	Marcia KD7DYW
7.3.17 Safety Officer Bonus 100pts	Joe K3TYE
7.3.18 Field Day Responsibilities Bonus (new for 2024) 50pts	

What
openings
can you fill?

We need other leaders and crew

Task	Leader
FD Chair	co-chairs: Joe K3TYE & Avery WB4RTP
Pre-reserve site (early campers)	Joe K3TYE
Set up non-radio related infrastructure (RVs, tents, shelters, tables, etc.)	Joe K3TYE
Food Service Field Kitchen	Joe K3TYE
Gotta-Go Station (porta potty)	Randy KD7KEQ
Set up FD signs	

2024 CRCRST FD Site Selection

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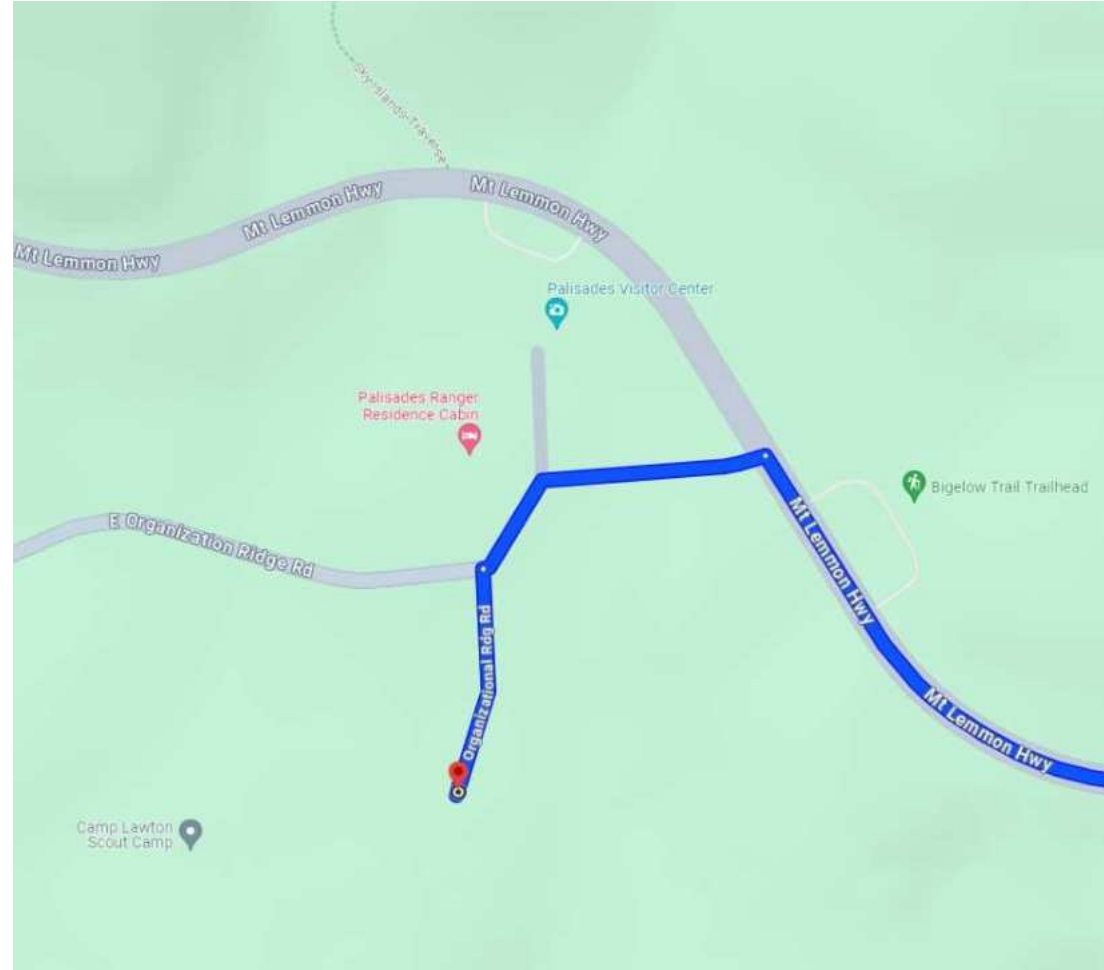
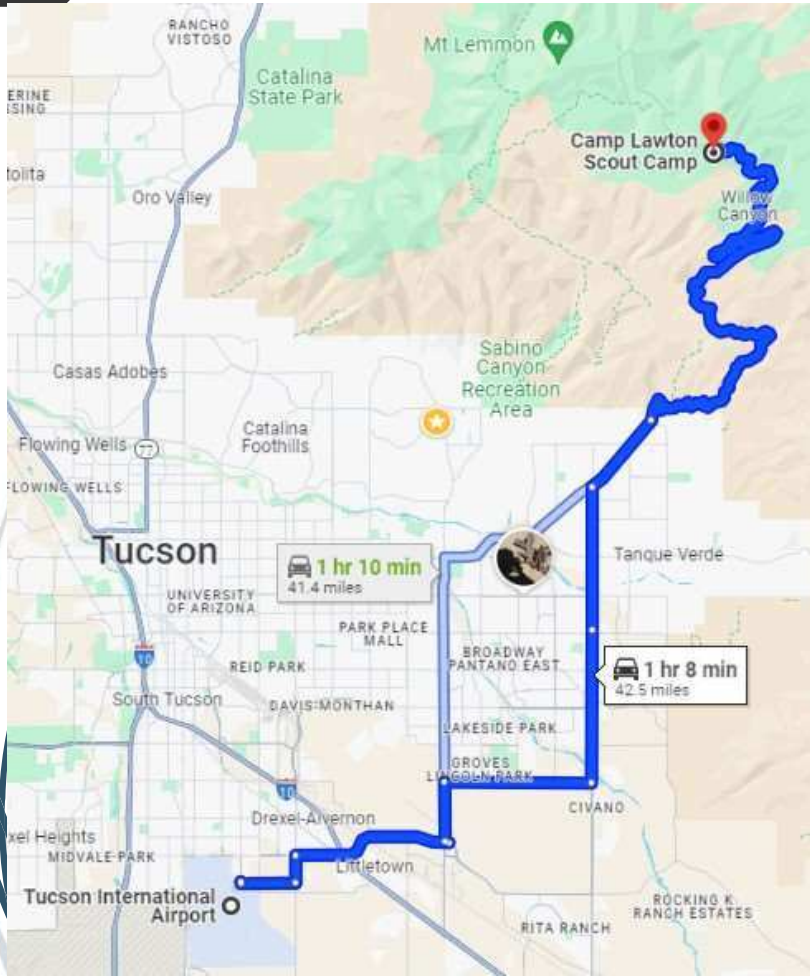
Camp Lawton was the winner

Feature or Description	Camp Lawton	Bear Wallow	Radio Ridge	
Site access	Excellent, right behind USFS Palisades Visitor Center	Big rocks limit access	Small parking lots at several sites	
Site reservation	Reserved for us	First come, first serve	First come, first serve	
Site size	Lots and lots of parking	Lots of parking	Good parking at several sites	
Comfort facilities	Running water, flush toilets, showers, commercial power	Dry site, expensive porta potty rental	Dry site, permanent latrine at top site	
Accommodations	Cabins with beds: Maricopa (upper) Cabins on Staff Hill	BYO tents, RVs	BYO tents, RVs	
Cooking	Ramada with electric range & oven + gas grill	BYO grill, tables, canopy, etc.	BYO grill, tables, canopy, etc.	
Forest Service Quiet Time after 10pm	No, we can run generators 24hrs	Yes	Yes	
Cell Service	Very poor	fair	poor	
WiFi	Good	none	none	
Antennas	Lots of trees, but power lines to avoid	Lots of trees	Lots of trees	
High Site	Shadowed by Mt Bigelow to the North	Somewhat shadowed by Mt Bigelow to the East	Somewhat shadowed by Mt Lemmon to the NorthWest	
SCORING				
Green, 2 points each		8	3	2
Yellow, 1 point each		2	1	3
TOTAL		18	7	7

Where is Field Day for CRCRST?

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Scout Camp Lawton on Mt. Bigelow



Take the Catalina Highway to Mt Lemmon Highway

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- ▶ For those of you who use GPS to get you where you're going, the Field Day Site is:
- ▶ Latitude N 32.4084472 degrees
- ▶ Longitude W -110.7163543
- ▶ Address: 12900 E Organization Ridge Rd, Mt Lemmon, AZ 85619
- ▶ <https://catalinacouncil.org/lawton/>
- ▶ 1. Take Catalina Hwy/Mt Lemmon Hwy to E Organization Ridge Rd (just before the Palisade Ranger Station and Visitor Center) and turn left
- ▶ 2. Approximately 1/10 mile bear left through the narrow gates
- ▶ 3. Back-in parking for quick evacuation in case of fire



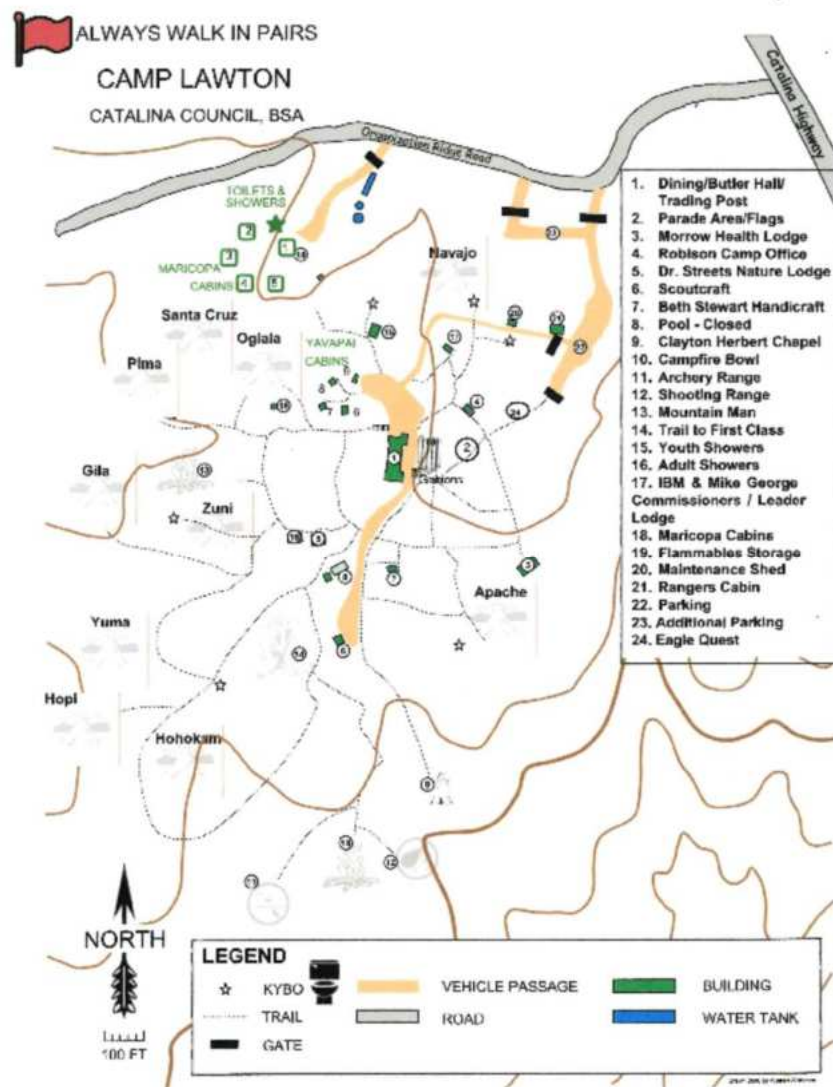
Scout Camp Lawton Map

13

Our main area will be the Maricopa Cabins (18) on Staff Hill with the cooking ramada (see photo, below). We might use a cabin for stations, or a ramada, or tents/canopies.

Another nice spot for stations is the patio behind the main dining hall (1) (which will be closed).

Main parking will be at (22), about 900 feet from Staff Hill (18). Additional parking at (23).



Possible FD station locations

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Proposed: put the SSB stations on Staff Hill (18), and the CW stations on the dining hall (1) patio (below) to minimize interference.

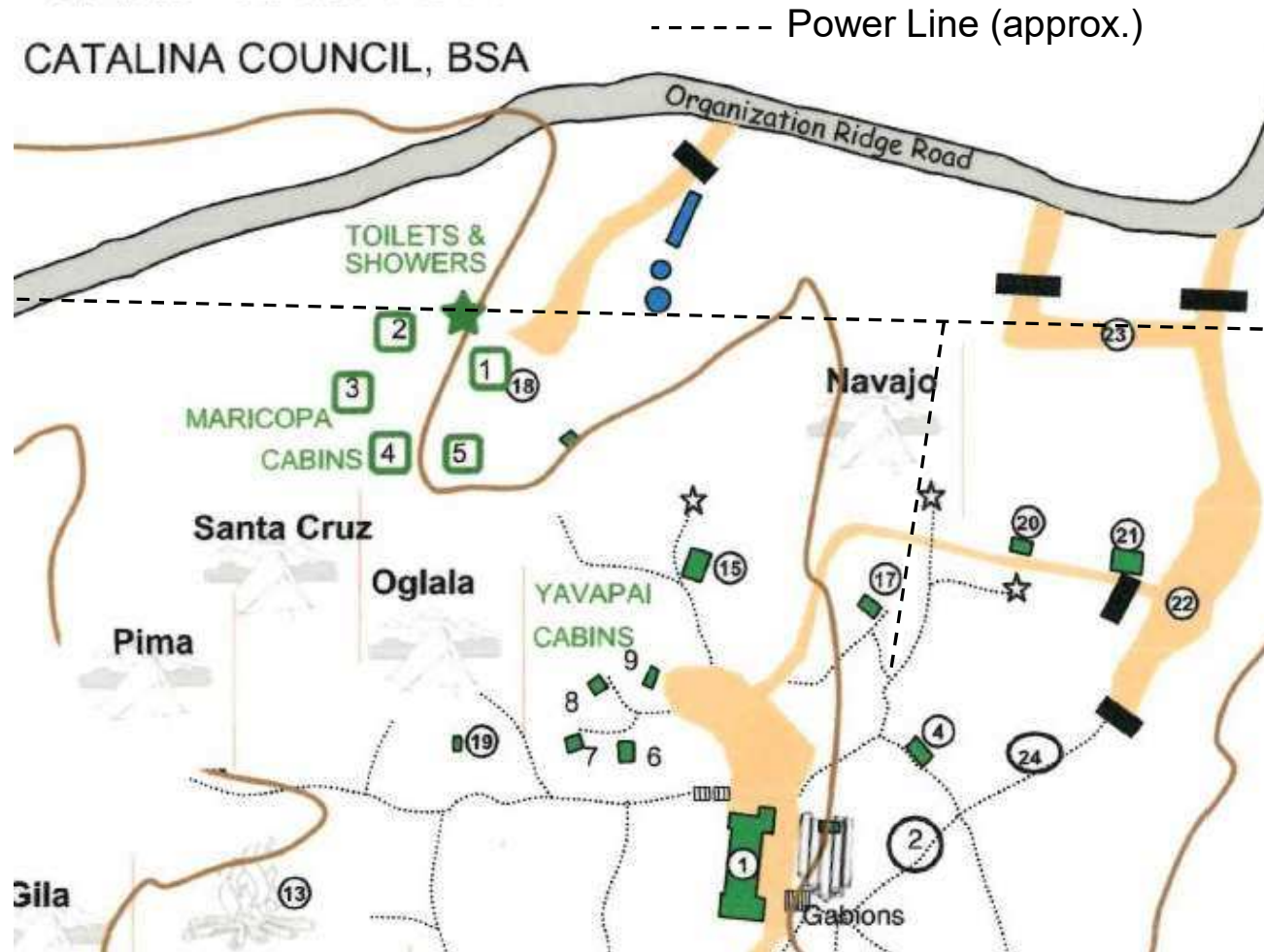
Parking at (1) and (18) should be mainly for band captains & assistants for loading/unloading.

RVs should be in the main parking (22) or additional parking at (23).

These areas may also be used for stations.



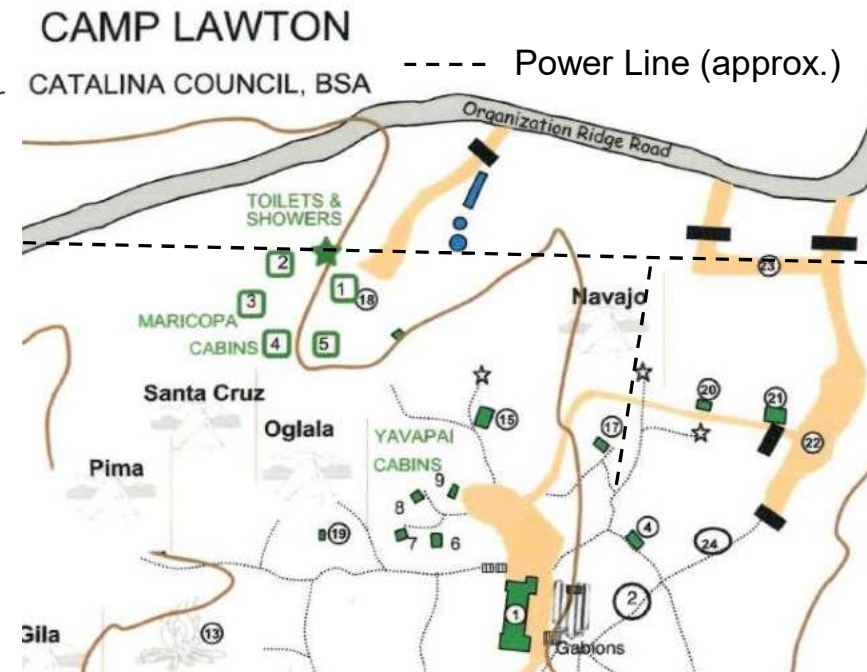
CAMP LAWTON CATALINA COUNCIL, BSA



Camp Lawton Power Line Challenge

15

- ▶ A power line cuts across the Northern edge of the camp, so it could be a problem at Maricopa Cabins (Staff Hill) (18), and the additional parking area (23) is right under the power line.
 - ▶ I have been considering running dipoles North-to-South to try to be at right angles to this line in the Staff Hill area.
 - ▶ A spur line runs South over the Navajo camp area, so that would be a problem there.
 - ▶ It looks like the power goes underground before it gets to the dining hall, so stations in that area should be fine, and the South end of the main parking area (22) should be fine.
- ▶ This is a new site for CRCRST Field Day, so we must expect that we will have to adapt to what we find there. But hey, having "to learn to operate in abnormal situations in less than optimal conditions" is the objective of Field Day.



Simplified Schedule

- ▶ Thursday Early Arrival
 - Need reservation with Camp Lawton
- ▶ Friday, Everyone else arrives
 - Start putting up antennas, after 11:00 am MST
- ▶ Field Day Officially Begins 11:00 am on Saturday, 22 June
- ▶ Scouts will prepare meals
 - Dinner Friday, breakfast Saturday & Sunday, Lunch Saturday
 - No Pot Luck dinner
 - You should bring your own food for special dietary requirements
- ▶ Field Day Officially Ends, Sunday, 23 June, 11:00 am MST
- ▶ Pack up everything and decamp early afternoon Sunday

Some meals provided (preliminary menu)

- ▶ Some meals provided by Scout Troop 157 as a **fund raiser**
 - ▶ **When you contribute, you are paying for the food plus a little more to pay for the scout's year-long camping program, so please plan appropriately when contributing for food costs.**
 - ▶ Contact Joe, K3TYE, if you plan on partaking so the proper food quantity may be obtained
- ▶ Friday Evening Around 6 PM.
 - ▶ Subway type sandwiches. Cold drinks to include popular sodas, water, and seltzer. Cake, cookies, or brownies for desert.
- ▶ Saturday Breakfast:
 - ▶ Ham and scrambled eggs with cheese, plus pancakes. Cold cereal. Maybe some donuts. Coffee, tea, chocolate milk, plain milk, and orange juice.
- ▶ Saturday Lunch:
 - ▶ Our traditional chicken spiedies, Polish sausage sandwich, or cheeseburgers with chips, potato salad, and baked beans.
- ▶ Saturday Supper:
 - ▶ Prepared beef taco with chips, and potato salad. Also left overs from lunch.
- ▶ Sunday Morning:
 - ▶ Fast Continental Breakfast with some donuts. Coffee, tea, chocolate milk, plain milk, and orange juice.

What To Bring To Field Day

- Bring your own **HEADPHONES** or Headset if you want to operate
- Antenna you want to try
- Radio you want to use
- Friends interested in Ham Radio
- Family
- Food for yourself for special dietary requirements
- Water and beverages
- Camera
- Bug spray
- Sunscreen
- MOST OF ALL JUST AN ENJOYABLE SPIRIT!
 - Its all about having FUN!

Things to do better for Field Day 2024

- ▶ Take more pictures
- ▶ Get everyone to use the same logging software.
 - ▶ Merging logs from different logging software or manual logs was a real pain in the neck.
 - ▶ Maybe designate someone whose main task is to provide logging software support for all stations
- ▶ Designate someone to take a role or make a roster of participants and visitors
- ▶ Get everyone to use Field Day filters
- ▶ Bring your own **HEADPHONES** or Headset if you want to operate
 - ▶ Get everyone to use headphone splitters for logger

Camping

20

- ▶ Camp Lawton has cabins and tent sites
- ▶ Camp Lawton has running water
- ▶ Camp Lawton has commercial power
- ▶ Camp Lawton has trash receptacles
- ▶ No fee for camping
- ▶ Camp Lawton has parking for RVs, but no hookups
- ▶ No Dump Station



- ▶ It's Arizona, but sometimes it really does rain
 - ▶ *Come prepared for the weather*
- ▶ 20-30 degrees cooler than Tucson
- ▶ Sometimes it is actually cold (Yes, it's rare)

Safety

Fires

Don't want this....



Safety

22



To Become THIS!!!!

Important Safety Tips

► Fires

- *Fires are badder than Bears*
 - *Fire danger today: VERY HIGH (5/31/2024)*
 - <https://www.fs.usda.gov/alerts/coronado/alerts-notice>
 - *We have had restrictions in prior years:*
 - https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd915424.pdf
- Bears (and other critters)
 - *At Camp Lawton there are turkeys, white tail deer, ringtails, squirrels, skunks, and the occasional mountain lion or bear.*
 - *In no case should any animal be disturbed in any way.*
- We hang antennas, not people
 - But Exceptions can be made
 - *Beware of low hanging ropes for antennas*
- Watch your step
 - *Power Cables on the ground*
 - *Antenna coax cables on the ground*

RF Exposure Calculations for FD

24

Power	Mode DC	TX DC	Ant Gain	Freq	Gnd Refl	Controlled Environment		Uncontrolled Environment		Description
						Max PD	Min Safe	Max PD	Min Safe	
Watts	%	TX,RX min	dBi	MHz	y/n	mw/cm2	feet	mw/cm2	feet	
100	50	1,1	2.15	4	y	56.25	0.3999	11.25	0.8941	80m SSB & CW dipole
100	50	1,1	2.15	7	y	18.3673	0.6998	3.6735	1.5647	40m SSB & CW dipole
100	50	1,1	2.15	14	y	4.5918	1.3995	0.9184	3.1294	20m SSB & CW dipole
100	50	1,1	2.15	21	y	2.0408	2.0993	0.4082	4.6941	15m SSB & CW dipole
100	50	1,1	2.15	28	y	1.148	2.799	0.2296	6.2588	10m SSB & CW dipole
100	50	1,1	10	54	y	1	7.4041	0.2	16.556	6m SSB & CW yagi
50	100	1,1	6	146	y	1	4.6716	0.2	10.4461	2m FM 5/8 vertical
50	100	1,1	9	450	y	1.5	5.388	0.3	12.0478	450 MHz FM colinear vertical

From Amateur Radio RF Exposure Calculator at:

<https://www.arrl.org/rf-exposure>

DC is Duty Cycle

TX is transmit, RX is receive

TX DC is TX time and RX time in minutes

PD is Power Density and $1\text{mW}/\text{cm}^2 = 10\text{ W}/\text{m}^2$

Min Safe is minimum safe distance for personnel

Details in backup slides

Power

- ▶ Normally from gas generators that club provides
 - ▶ *These are small generators expecting that stations will have a local battery to provide peak current and backup for when generators need refueling, with a modest 12V power supply to float charge the battery.*
 - ▶ *A deep cycle battery would be best. Some prefer LFP (LiFePO₄), but these are expensive.*



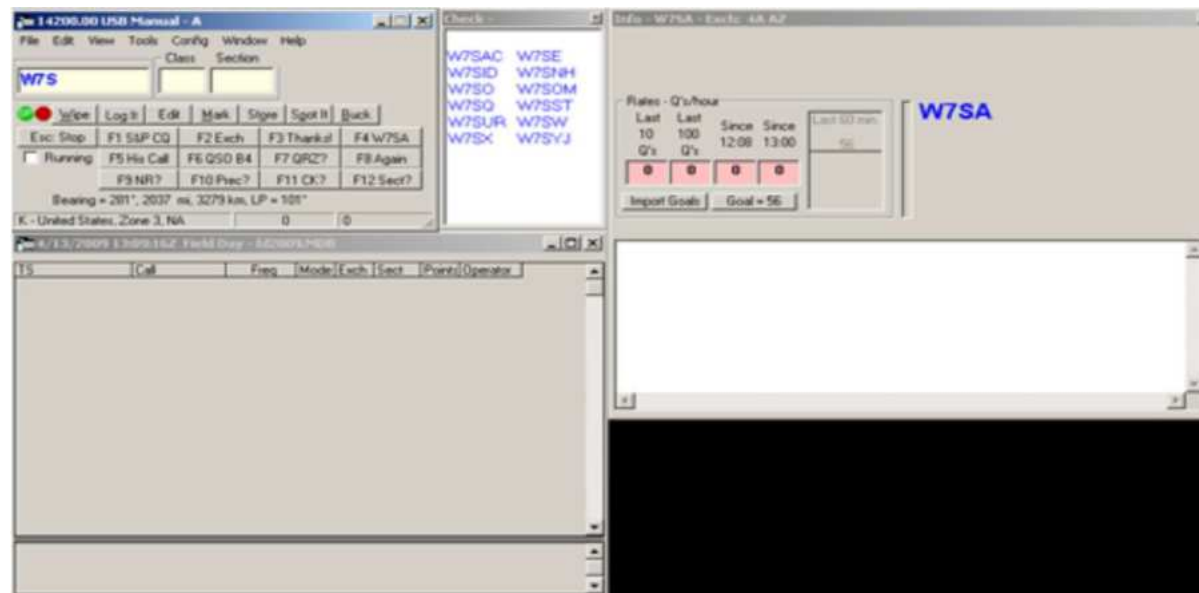
Power – IF NO GENERATORS

- ▶ Solar
 - ▶ *The trees make this difficult*
- ▶ Use your car battery or other battery
 - ▶ *Run the car when needed to recharge*
 - ▶ *Electric Vehicle has a large battery*
 - ▶ *If charged on home solar before FD, this does count for the alternate power bonus!*
 - ▶ *Use inverters for AC power distribution from batteries*
- ▶ Bicycle Generator
- ▶ Treadmill
- ▶ Other ideas??



Logging Software

- ▶ N1MM has been used very successfully in the past
 - ▶ *Open to suggestions for alternatives*
 - ▶ *Most important thing is for everyone to use the same logging software to make merging logs easier afterwards*



ARRL Field Day Rules

- ▶ Please review the Official Rules:
 - ▶ <https://www.arrl.org/field-day>
- ▶ **NEW FOR 2023: There is no limit to the number of contacts made by the GOTA station.** QSOs made by this station may be claimed for credit by its primary field day operation. In addition, bonus points may be earned by this station under rule 7.3.13.
- ▶ **New for 2024: 7.3.13 GOTA Bonus (Updated for 2024).**
- ▶ **7.3.18. Site Responsibilities Bonus (new for 2024):** A 50-point bonus may be earned by having a person ensure that the Field Day site is free of hazards, and that safety precautions have been taken throughout the entire event, as well as providing a point of contact to the visiting public or served agency officials. A signed copy of the Site Responsibilities Check List must be included in the supporting documentation sent to ARRL HQ in order to claim this bonus.
Available to Class B, C, D, E, or F entries.
- ▶ Entries must be postmarked or submitted by Tuesday, July 23, 2024. Late entries cannot be accepted.

Our FD Operating Class

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- ▶ 4.2 Class A Portable non-Commercial Power 100W Max
 - ▶ 7.1. QSO Points:
 - 7.1.1. Phone contacts count one point each.
 - 7.1.2. CW contacts count two points each.
 - 7.1.3. Digital contacts count two points each.
 - ▶ 7.2.3 Power multiplier is two (2) at 100W max for non-commercial power but motor-driven generators are allowed
 - ▶ This is what we have done for most Field Days past
- ▶ Alternate: 4.2 Class A Battery (AB) 5W max
 - ▶ 7.2.1 Power multiplier is five (5) for 5W battery on non-commercial mains and no motor-driven generator source allowed
 - ▶ An EV charged on solar qualifies as non-com/no-motor source
 - ▶ Fewer contacts, but potentially more points
 - ▶ Lower power is safer for pacemakers and with lower RF exposure

Operating

- ▶ Club Call:
 - ▶ K7RST on Mt. Bigelow
 - ▶ W7SA at CRC plant site station
 - ▶ WN7BSA for GOTA
- ▶ Exchange:
 - ▶ *Stations in ARRL / RAC sections will exchange their Field Day operating Class and ARRL / RAC section.*
 - ▶ *Example: a three transmitter Class A station in Arizona which also has a GOTA station and the extra VHF station:*
 - ▶ *Send "3A AZ" on CW or "3 Alpha Alpha Zulu" on Phone.*
- ▶ DX stations send operating class and the term DX (i.e. 2A DX).
- ▶ Only operate on bands and modes authorized by your band captain!

Example Contact

- ▶ “Running”: Find a clear frequency and call...
 - ▶ *(us)* CQ Field Day (CW: FD), CQ Field Day, this is K7RST, kilo 7 romeo sierra tango
 - ▶ *(them)* K7RST from N3TN, November 3 tango november
 - ▶ *(us)* N3TN from K7RST
 - ▶ *(them)* copy 5 Alpha West PA, 5 Alpha West PA
 - ▶ *(us)* QSL your 5 Alpha West PA, we are 3 Alpha Arizona, 3 Alpha Alpha Zulu, good luck (CW: GL) in the contest
 - ▶ *(another caller may follow immediately, if not call CQ again)*
- ▶ Or Hunt and Pounce:
 - ▶ Find someone calling CQ field day, such as N3TN
 - ▶ Check for duplicate before transmitting!
 - ▶ *(us)* N3TN from K7RST kilo 7 romeo sierra tango
 - ▶ *(them)* K7RST from N3TN
 - ▶ *(us)* N3TN copy 3 Alpha Arizona, 3 Alpha Alpha Zulu
 - ▶ *(them)* copy 5 Alpha West PA, 5 Alpha West PA
 - ▶ *(us)* QSL 5 Alpha West PA, thank you (CW: TU) and good luck (CW: GL) in the contest
- ▶ Ask for clarifications as needed

Please be considerate of Scout Camp Lawton Rules

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- ▶ No alcohol or illegal substances
- ▶ No smoking except in designated smoking areas
- ▶ No firearms or other weapons
- ▶ No pets except service animals
- ▶ “T-shirts, caps, or other articles of clothing should not violate the Scout Oath and Law (i.e., depicting alcohol, drugs, tobacco products, or vulgar language are prohibited).”
- ▶ Most vehicles, campers and RVs may be in parking lots only, and backed in. Permission must be obtained to drive to campsites.
- ▶ See this web page for details:
<https://campreservation.com/011/Camps/618>

Please be considerate of each other!

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It is requested that everyone participating be vaccinated, and to consider wearing masks.

➡ **Let's all try to help each other enjoy Field Day!**

Detailed Schedule

2024 CRC & RST Field Day Planning Schedule			
Date	Time (MST)	Activity	Leader
Wednesday, May 22, 2024	6:30 PM	CRC general meeting, and field day preparation opportunity	
Tuesday, June 11, 2024	6:30 PM	RST general meeting, and field day preparation opportunity	
Friday, June 14, 2024	9:00 AM	"No Excuses Breakfast" and FD gear transfer opportunity	
Thursday, June 20, 2024		Set up FD signs	
Thursday, June 20, 2024		Begin setting up non-radio related infrastructure (tents, tables, etc.)	Joe K3TYE
Friday, June 21, 2024		Set up food service field kitchen	Joe K3TYE
Friday, June 21, 2024	11:00 AM	Station captains should have all station hardware on site and ready to set up	Station captains
Friday, June 21, 2024	11:00 AM	Antenna and station setup begins. Need crew to help setup!	Station captains
Friday, June 21, 2024	5:00 PM	Dinner	Joe K3TYE
Friday, June 21, 2024	5:00 PM	Copy FD bulletin CW	
Friday, June 21, 2024	6:45 PM	Copy FD bulletin phone	
Friday, June 21, 2024	8:00 PM	Copy FD bulletin CW	
Saturday, June 22, 2024	6:00 AM	Breakfast	
Saturday, June 22, 2024	7:00 AM	Copy FD bulletin CW	
Saturday, June 22, 2024	7:30 AM	Copy FD bulletin CW	
Saturday, June 22, 2024	8:00 AM	Copy FD bulletin phone	
Saturday, June 22, 2024	10:00 AM	Functional operations check: Stations (RF), computers and N1MM software	Station captains
Saturday, June 22, 2024	11:00 AM	FIELD DAY OPERATIONS START	Station captains
TBD		Satellite operation demonstration	
Saturday, June 22, 2024	5:00 PM	Dinner	Joe K3TYE
Sunday, June 23, 2024	11:00 AM	FIELD DAY OPERATIONS END	Station captains
Sunday, June 23, 2024	11:00 AM	Equipment teardown and packing up	Station captains

Current Status of CRCRST Field Day

- ▶ Mountain is currently open
 - ▶ *But a lot can happen between now and Field Day*
 - ▶ *Fire danger today: VERY HIGH (5/31/2024)*
 - ▶ *We need rain – Do a rain dance a day!!!*
 - ▶ *Rain Keeps the Mountain OPEN!!*
- ▶

Summary

- CRC will join with RST for a combined FD
- Planning for Field Day started in March.
- Primary plan is to go to Scout Camp Lawton on Mt. Bigelow for Field Day
- CRC Plan B – Use the CRC Shack
 - Schedule of operators to use the CRC Shack
- RST will have separate Plan B (TBD)
- Field Day this year is 22-23 June 2024

BACK UP SLIDES

If The Mountain Closes – CRC Plan B

- ▶ Use the CRC Shack
 - ▶ *Develop an operator schedule*
 - ▶ *Raytheon employees welcome as visitors*
 - ▶ *Can't have everyone in the shack at one time*
 - ▶ *Need Instructors to show folks how to use the radios/N1MM*



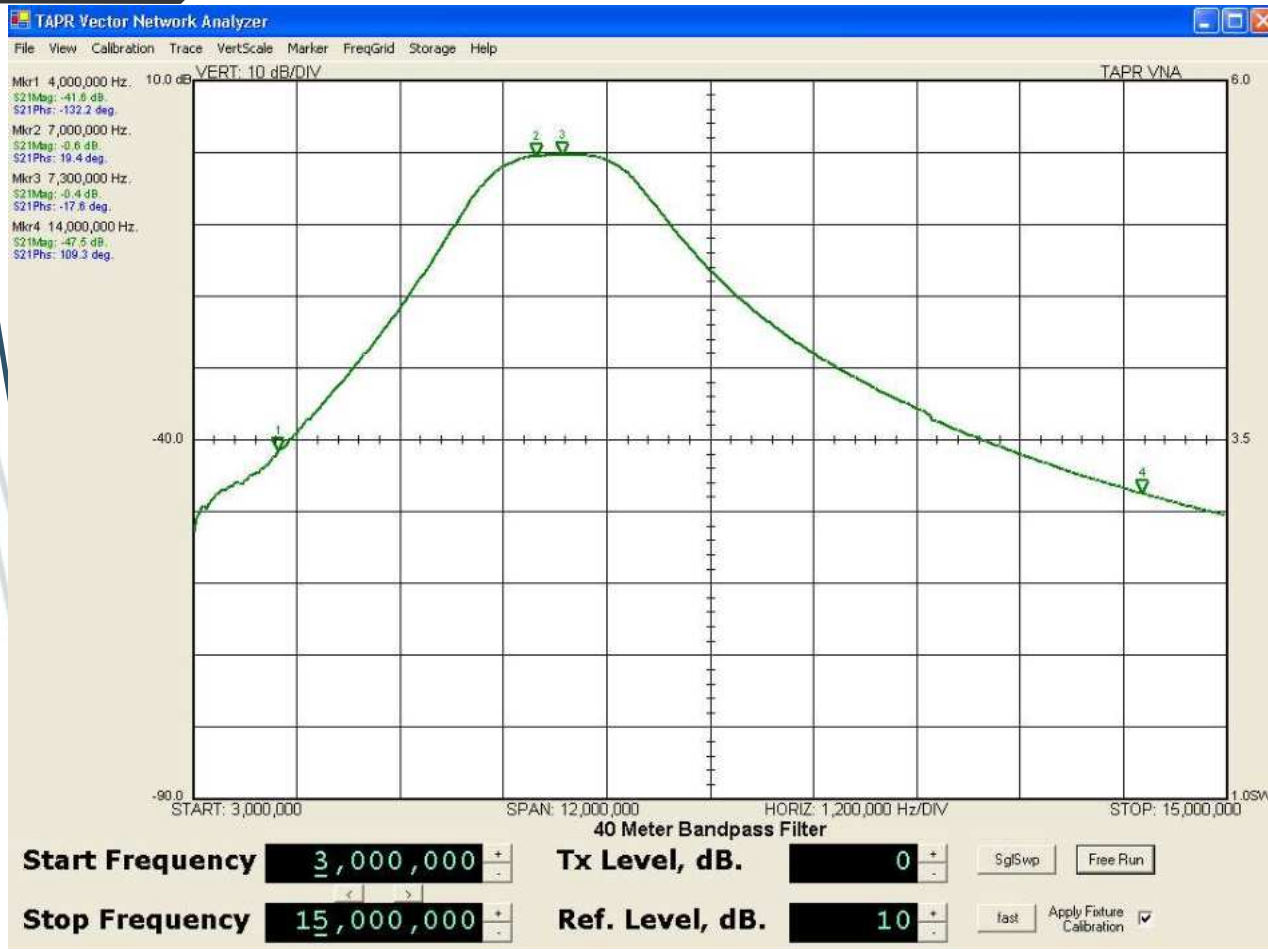
Benefits of using CRC Shack

- ▶ Band captains not needed
- ▶ Equipment is already set up and ready to go
- ▶ Operators will only have to be there for 2-4 hour time slots

Disadvantages of using the CRC Shack

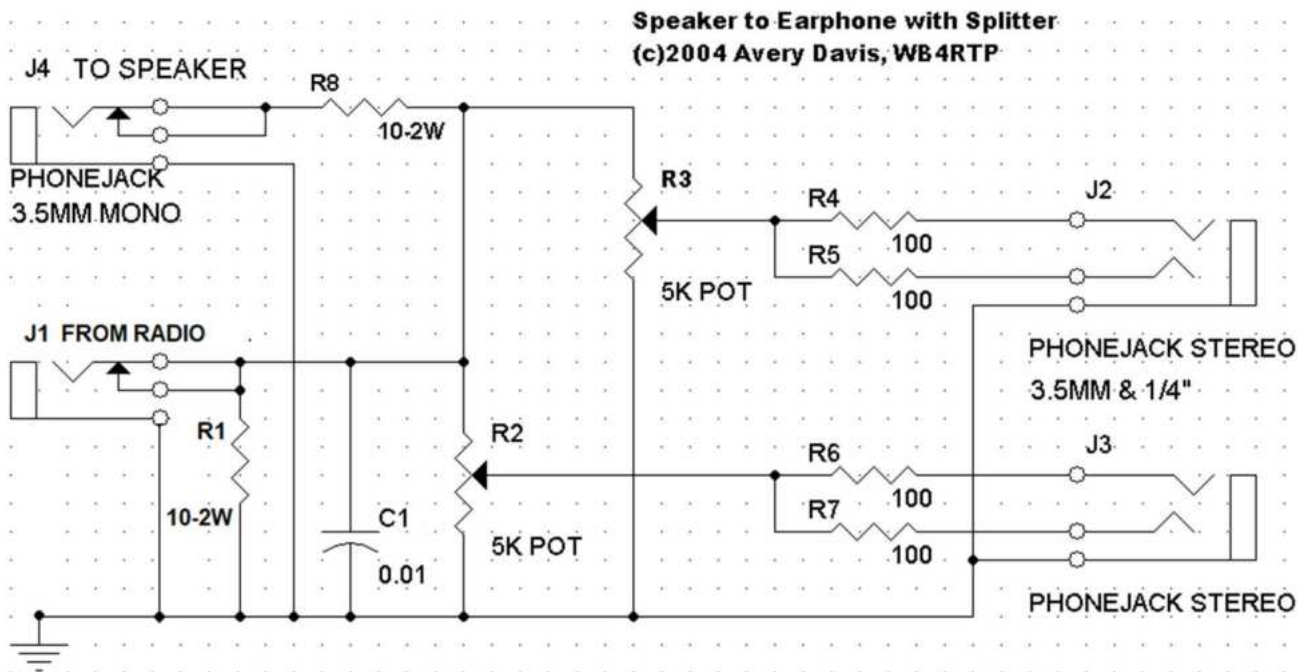
- ▶ In the heat!!!
- ▶ No extra points for public access, official visits, GOTA station, etc.
- ▶ Can't use EOC designator without formal agreements in place
- ▶ Getting the retirees on the plantsite
- ▶ Limited access to facilities
- ▶ No Pictures

Field Day (Contest) Filters



- ▶ Band pass transmitting filter for reducing the interference between HF transceivers operated in close proximity
 - ▶ NVARC “Ugly” Filter
 - ▶ <https://n1nc.org/Filters/>
 - ▶ Easy and inexpensive to build
 - ▶ Great performance
 - ▶ Currently, CRC only has 2: 40m and 20m
 - ▶ WB4RTP brings a second 20m filter
 - ▶ More are being built

Headphone Splitter



- Allows a second operator/logger to plug in headphones
- Provides separate volume control for both operators
- Splits mono output of radio into both left and right channels
- Has output for lower volume speaker for monitoring by visitors
- Optional: both 3.5mm and 1/4" stereo jacks for headphones

- Currently, CRC has 4 of these
 - WB4RTP has a fifth provided for 20m PH
 - 3 more of these have been built by Lloyd, K7NX

Field Day Calculations: 80m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 2.15 (dipole)
- Operating Frequency (MHz): 4
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm²): 56.2500
- Minimum Safe Distance (feet): 0.3999
- Minimum Safe Distance (meters): 0.1219

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm²): 11.2500
- Minimum Safe Distance (feet): 0.8941
- Minimum Safe Distance (meters): 0.2725

Field Day Calculations: 40m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 2.15 (dipole)
- Operating Frequency (MHz): 7
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm2): 18.3673
- Minimum Safe Distance (feet): 0.6998
- Minimum Safe Distance (meters): 0.2133

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm2): 3.6735
- Minimum Safe Distance (feet): 1.5647
- Minimum Safe Distance (meters): 0.4769

Field Day Calculations: 20m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 2.15 (dipole)
- Operating Frequency (MHz): 14
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm²): 4.5918
- Minimum Safe Distance (feet): 1.3995
- Minimum Safe Distance (meters): 0.4266

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm²): 0.9184
- Minimum Safe Distance (feet): 3.1294
- Minimum Safe Distance (meters): 0.9538

Field Day Calculations: 15m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 2.15 (dipole)
- Operating Frequency (MHz): 21
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm²): 2.0408
- Minimum Safe Distance (feet): 2.0993
- Minimum Safe Distance (meters): 0.6399

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm²): 0.4082
- Minimum Safe Distance (feet): 4.6941
- Minimum Safe Distance (meters): 1.4308

Field Day Calculations: 10m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 2.15 (dipole)
- Operating Frequency (MHz): 28
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm2): 1.1480
- Minimum Safe Distance (feet): 2.7990
- Minimum Safe Distance (meters): 0.8531

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm2): 0.2296
- Minimum Safe Distance (feet): 6.2588
- Minimum Safe Distance (meters): 1.9077

Field Day Calculations: 6m SSB & CW

RF Exposure Calculator

Parameters:

- Power at Antenna: 100 (watts)
- Mode duty cycle: Conversational SSB, heavy speech processing (duty cycle=50%)
 - The calculator lists "Conversationsl CW (duty cycle = 40%)", so using 50% for contest CW is conservative
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 10 (yagi)
- Operating Frequency (MHz): 54
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm2): 1.0000
- Minimum Safe Distance (feet): 7.4041
- Minimum Safe Distance (meters): 2.2568

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm2): 0.2000
- Minimum Safe Distance (feet): 16.5560
- Minimum Safe Distance (meters): 5.0463

Field Day Calculations: 2m FM

RF Exposure Calculator

Parameters:

- Power at Antenna: 50 (watts)
- Mode duty cycle: FM (duty cycle=100%)
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 6 (5/8 vertical)
- Operating Frequency (MHz): 146
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm²): 1.0000
- Minimum Safe Distance (feet): 4.6716
- Minimum Safe Distance (meters): 1.4239

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm²): 0.2000
- Minimum Safe Distance (feet): 10.4461
- Minimum Safe Distance (meters): 3.1840

Field Day Calculations: 450MHz FM

RF Exposure Calculator

Parameters:

- Power at Antenna: 50 (watts)
- Mode duty cycle: FM (duty cycle=100%)
- Transmit duty cycle: (time transmitting)
- You transmit for 1 minutes then receive for 1 minutes (and repeat).
- Antenna Gain (dBi): 9 (colinear vertical)
- Operating Frequency (MHz): 146
- Include Effects of Ground Reflections

Results for a controlled environment:

- Maximum Allowed Power Density (mw/cm²): 1.5000
- Minimum Safe Distance (feet): 5.3880
- Minimum Safe Distance (meters): 1.6423

For an uncontrolled environment:

- Maximum Allowed Power Density (mw/cm²): 0.3000
- Minimum Safe Distance (feet): 12.0478
- Minimum Safe Distance (meters): 3.6722