

VHF and up Contesting Introduction



-. - . - - . - - - . - - - - .

■ About me

- ◆ Have had an Amateur Radio licence since the early 90's.
- ◆ Have been involved in VHF and up contesting for over 10 years. I still enter the contests but have deemphasised the competitive part.
- ◆ For the last 7 years have been largely focused on weak signal operating (ie. not using FM) on the 50Mhz thru 1296 Mhz bands.

VHF and up Contesting Introduction



— • — • — • — • • • — • — • • • — • • • • — •

■ About me

- ◆ In my experience most VHF and up weak signal operation on bands other than 50 Mhz and 144 Mhz takes place during contests, so contests are my main opportunity to use much of my equipment.
- ◆ My main focus these days has been operating on VHF and up from remote and or unusual places (mostly on 50 and 144 Mhz.) I tend to combine this with participation in some of the contests (I usually get a low score but have fun and enjoy being “DX” during a contest.)



1/5/2020

Contesting

3

50 & 7 Mhz (for coordination) in CO81 North of Goldbridge BC



1/5/2020 Contesting 50 Mhz and up. CO80 North of Squamish BC 4

VHF and up Contesting Introduction



- Other than chit chatting with my fellow VHF and up enthusiasts on 144 Mhz I don't do much operating on VHF and up from my home station in Burnaby.
 - ◆ There are several nets or informal gatherings on 144 Mhz SSB
 - ▶ Tuesdays 8:00 pm 144.240
 - ▶ Sundays 8:00 am 144.240
 - ▶ Thursday 7:00 pm ? 144.225
 - ◆ Also most Sundays at 9am on 1296.1 Mhz
 - ◆ Participating in local nets gives me confidence my equipment is working and keeps me in practice dealing with typical signal quality issues encountered with beyond line of sight VHF / UHF SSB.



1/5/2020

Home 144 Mhz Station in CN89 (Burnaby)

VHF and up Contesting



- ◆ There seems to be some interest from our membership in contesting on the VHF and up bands.
- ◆ I would like to see more VHF and up operators in the Vancouver area, I usually make more contacts from the Seattle area than the Vancouver area. Greater Vancouver is currently considered “rare” by many VHF operators (for example we received a QSL card request for a VHF field day contact few years ago.)
- ◆ This seems a bit strange given the number of amateurs in the GVRD. 10 years ago there were far more operators using VHF and up weak signal modes in the GVRD.

VHF and up Contesting

What is “Contesting”



- . . - . - . - . . . - . - . . . - - .
- Radio Contests are pre scheduled events where operators typically compete against each other according to a set of rules. Those with high scores typically get recognition and perhaps a certificate or small trophy.

June VHF Contest

In recognition of achieving a winning score by working fellow amateurs on designated Amateur Radio frequencies above 50 MHz during the contest period.

This award is presented to

VE7AFZ

SECTION WINNER

144 MHz 222 MHz

432 MHz

SCORE: 585

**FIRST PLACE SINGLE OPERATOR LOW POWER
BRITISH COLUMBIA SECTION**

2014

Kary Craigie

N3KN

President, ARRL

W1MSW

W1MSW

Contest Manager

VHF



ARRL The national association for
AMATEUR RADIO®



VHF and up Contesting

What is “Contesting”



- Some operators take things more seriously than others.
- Most serious VHF and up contesters use modes such as SSB, CW, or various Digital modes but FM is also encouraged and many operators (including me) go out of their way to listen for FM signals.
- Some contests have “FM only” categories
 - ◆ FM on 50 Mhz is quite rare however
 - ◆ I believe 222 Mhz is a good choice for FM only contesters
 - ▶ Limited availability of non FM equipment for 222

VHF and up Contesting

What is “Contesting”



- Many contests cater to fixed stations, portable stations, low power stations, FM only stations, “Rover Stations” etc.’
- Lots of areas to specialize in if you want to.
- You can “compete” against similar stations if you wish.
- You can contest with just an HT if you want.

VHF and up Contesting

Why contest on VHF + ?



- Freedom from most cyclical propagation issues that affect HF. Don't need to worry (much) about the 11 year sunspot cycle.
- Ranges of hundreds of Km are typical in my experience
- Many propagation modes can also largely be modeled in advance if one wants to do so (but I believe many operators don't do this to any great extent if at all.)

VHF and up Contesting

Why contest on VHF + ?



- The heywhatsthat web site can display “horizon views”
 - ◆ <https://www.heywhatsthat.com/>
- KA1GT has made a calculator available for calculating path losses via tropo scatter
- <http://www.bobatkins.com/radio/scatter.htm>
!

VHF and up Contesting

Why contest on VHF + ?



- ◆ Antennas can be quite small compared to HF.
 - ▶ Helps during portable operations.
 - ▶ High gain directional antennas are more practical.
- ◆ May have fewer EMI / RFI challenges vis a vis HF.
- ◆ Only need a basic licence.
- ◆ Propagation can often be perceived as more certain and or predictable than on HF ?

VHF and up Contesting

Key concepts



■ Grid Squares

- ◆ Many VHF and up contests require operators to exchange “4 Character” grids.
- ◆ Grids are each 1 deg latitude x 2 deg longitude
 - ▶ Each square is roughly 100 x 160 Km in our area.
- ◆ Our local grid is CN89.
- ◆ Some contests use grids covering a smaller area.
- ◆ If you operate from multiple locations you need a way to find out what grid square you are in.
- ◆ Many contest multiply your score by the number of unique grids you work. Grids are a big deal.

VHF and up Contesting

Key concepts - Rovers



- Rovers visit multiple grid squares.
- They typically “Must” make contacts from at least two grid squares.
- Rules are often designed to “incent” people to rove.
- Portable stations are not always considered to be “Rovers.”
- They usually must use /R or Rover in their calls. Ie. VE7AFZ Rover.
 - ◆ Watch for confusion between “Rover” and “Over.”



Roving on 144 thru 1296 Mhz in CN89ji “Moderate Effort”
Log periodic and Loop Yagi (with rotor and pre amp) antennas 17
Tri pod mount for high gain antenna

1/5/2020



Roving on 927 and 1296 Mhz in CN89ji
“Near Max Effort” with rotor, preamp for 1296, medium mast

1/5/2020

VHF and up Contesting Rover at work with a visitor



VHF and up Contesting Back pack roving



1/5/2020

NSARC / VE7AFZ

20

VHF and up Contesting Back pack roving



VHF and up Contesting

Key concepts - Antennas



- Polarization is important.
- Typically SSB, CW and other weak signal modes use “Horizontal” polarization.
- FM typically uses “Vertical Polarization.”
 - ◆ There are always exceptions.
- Cross polarization is usually bad.
- Gain helps but be aware of beam width with high gain antennas.
 - ◆ Try to keep high gain antennas parallel to the ground during portable / roving work.



1/5/2020

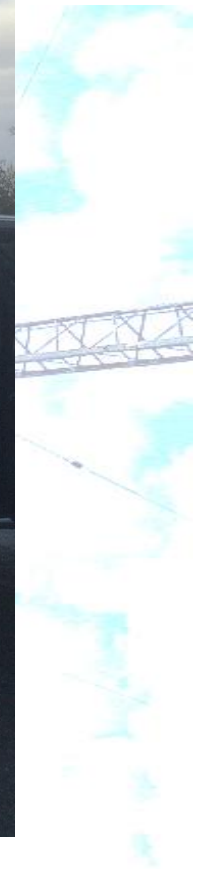
Various Vertically polarized Whip Antennas

23



1/5/2020

Horizontally polarized Yagi antenna



1/5/2020

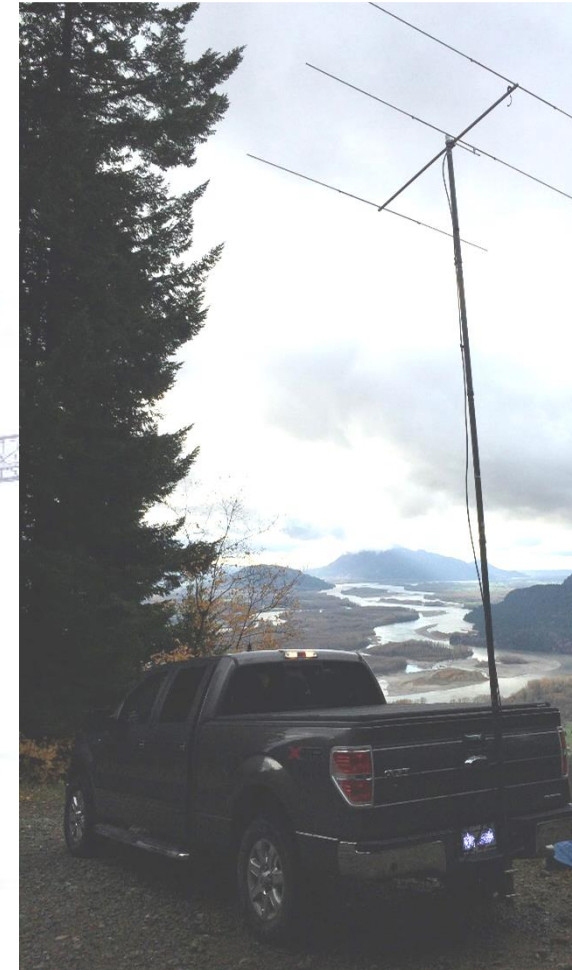
Horizontally polarized Log Periodic antenna

25

VHF and up Contesting Locations



- Antenna Height above local obstructions is very helpful
- A clear view of the horizon in the direction you want to communicate is very helpful for typical propagation modes
- There are some techniques to bounce signals over obstructions or use obstructions as reflectors to bounce signals



VHF and up Contesting

50 Mhz (AKA Six Meters)



- 50 Mhz is by far the most “HF like” VHF band.
- 50 Mhz can (sometimes) offer world wide propagation for small stations.
- At times propagation is similar to the higher HF bands. Very High sun spot numbers help with propagation on 50 Mhz.
- At times operating on a 50 Mhz contest will be very similar to an HF contest. Other times it won't be (:

VHF and up Contesting

144 Mhz and up



- Contesting on 144 Mhz and up tends to be quite different than contesting on HF.
- In my experience sunspots have little practical impact on propagation at 144 Mhz and up during typical contesting activities.
- 222 Mhz is nice band IMHO (:
 - ◆ It is an exclusive amateur band
 - ◆ Low noise levels in my experience

VHF and up Contesting

144 Mhz and up



- Most bands 432 Mhz and up are shared with other services. (Including ATC radar on 1296.)
- Propagation issues / noise etc on 432 Mhz and up seem more troublesome to me than on the lower bands... Your mileage may vary.. (Disclaimer I have never really tried bands over 1296 Mhz.)
- Challenge for someone to prove me wrong (:

VHF and up Contesting

When to operate ?



- Most contests have an initial burst of activity at the start of the contest.
- Early Morning and Evenings tend to be better for “Typical Tropo Scatter” propagation but it works at any time.
- Meteor scatter is always present and tends to peak in the mornings. This is especially helpful on 50 Mhz, less so on 144 and 222 and almost non existent on higher bands. May help enhance Tropo ?

VHF and up Contesting

When to operate ?



- Some operators (including me) make a major “push” to activate rare grids early in the morning or in the evening. Every dB counts (: I usually plan to be on the air at 8am and start to pack up and leave by 9:30 am or so.
- Look for announcements on Chat boards and mailing lists (ie. The PNWVHFS Google group, the VHF contesting mail etc.)

VHF and up Contesting

Contest details



--- . . . --- . . . --- . . . --- . . . --- . . . --- . . . --- . . . --- . . . --- . . . --- . . .

■ ARRL January VHF contest

- ◆ All bands 50 Mhz and up
- ◆ More points for contacts on more difficult bands

■ ARRL June VHF contest

- ◆ All bands 50 Mhz and up
- ◆ More points for contacts on more difficult bands

■ CQ July VHF contest

- ◆ 50 and 144 Mhz only

VHF and up Contesting

Contest details



- . - - . - - - . - - - - -

■ ARRL 222 and up distance contest

- ◆ Historically suffered from low participation
 - ◆ 222 and up
 - ◆ Rules have been revised recently, focus is now on distance (vs Grid Squares), plus other changes (ie. No EME contacts, different Rover rules etc.)
-
- A faint, light blue background image of a radio tower structure, possibly a lattice tower, is visible behind the text.

VHF and up Contesting

Contest details



— • — • — • — • • • — • — • • • — • • • • — •

■ ARRL September VHF contest

- ◆ All bands 50 Mhz and Up
- ◆ More points for contacts on more difficult bands

VHF and up Contesting

Contest details



- Sprint contests
- Held in the spring and summer
- Single band contests (except for 902 Mhz and up contest)
- Typically 4 hours each
- WA7BMN contest calendar is a good resource for contest dates
 - ◆ <http://www.hornucopia.com/contestcal/index.html>

VHF and up Contesting

Operating tips



- In many cases operation takes place almost exclusively on the “calling frequency”
 - ◆ If operating away from the calling frequency it helps to periodically “announce” on the calling frequency. On 144.200 I might say..
 - ◆ “VE7AFZ QSY up 20 up 20 VE7AFZ QSY 144.220”
 - ◆ Some stations may say “QSY 220” this usually means 144.220 not 220 Mhz
 - ◆ Then switch to 144.220 and hopefully work other stations
 - ◆ On 144 and up stations typically QSY in 5 or 10 Khz steps

VHF and up Contesting

Operating tips



- **Some stations don't have "hi fi" quality audio (they only want to pass a call and a grid so they may run lots of compression, "push" their amps etc.)**
 - ◆ **So long as they don't splatter to adjacent frequencies I accept it and move on or ignore them if I can't understand them (:**
 - ◆ **Some propagation modes also degrade audio quality.**
 - ◆ **Most of them have been told many times about their audio (:**
 - ◆ **If I don't hear them on adjacent frequencies I don't worry too much about it.**
 - ◆ **Those who do cause actual interference tend to be told and are encouraged to fix their issues**

VHF and up Contesting

Operating tips



- Listening lots and talking little tends to work best in my experience.
- Power and antenna gain helps to be heard even when stations are not “beaming” towards you.
- Other stations may have 10 Db or more power than you (Several CN87 stations run approx 1,500 watts.)
- Some chit chat is ok but don't over do it.
- Signals may briefly “peak up”
- There are always exceptions (:

VHF and up Contesting

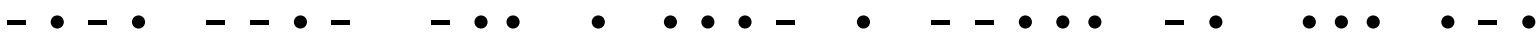
Operating tips



- Announcing your intention to operate from a rare grid or with low power levels can be helpful (double check contest rules if doing this during a contest.)
- Operators are almost always friendly and want to work new stations.
- CN89 is currently quite a rare grid in practice.

VHF and up Contesting

Operating tips



- If operating away from the calling frequencies it helps to be able monitor or observe the calling frequencies (especially on 50 Mhz.)
- If you use CW it is helpful to send it in a way that will allow people using SSB to hear you. (This may involve more than simply setting your radio to CW.)
- Cross mode contacts (ie. SSB and CW) are quite common, especially when sending Roger or “R.”

VHF and up Contesting

Sound bite



- Fairly typical conditions for me in the evening from my home station most likely using “Tropo scatter” propagation on 144.200 SSB during a contest
- I was using a 9 element horizontal beam antenna at approx 10 M above ground level
- At least one of the other stations (N7EPD) was using a simple temporary setup (the antenna was less than 7M above ground) near Seattle.



VHF and up Contesting Radios



- ◆ Typically use what you have to start
- ◆ SSB is helpful if you have it (especially on 50 Mhz.)
- ◆ Some Bands / Modes don't have off the shelf radio solutions.
- ◆ Frequency stability is important on higher bands.
- ◆ Ability to deal with very strong and very weak signals at the same time is helpful.
- ◆ Band scopes / dual receivers can be useful especially on 50 Mhz.
 - ▶ Listening to a calling frequency plus a working frequency can be useful.

VHF and up Contesting Calling frequencies



-
- Typical ssb / cw calling frequencies
 - 50.125 (others for world wide use)
 - 144.2
 - 222.1
 - 432.1
 - 902.1
 - 1296.1
 - Stations usually QSY Up
-
- A faint, light blue background image of a radio tower structure is visible behind the text. The tower is a lattice structure with a horizontal boom extending to the right. It is set against a light blue, textured background that resembles a map or a technical drawing.

VHF and up Contesting Calling frequencies



- . - . - . - . . . - . - - . . . - - .
- Typical FM Calling frequencies
 - 52.525 (rarely used in my experience)
 - 146.52
 - 223.5
 - 446.0
 - 927.5
 - 1294.5
-
- A faint, light blue background image of a radio tower structure is visible behind the text. The tower is a lattice tower with a horizontal boom extending from it, and several guy wires are attached to the base.

VHF and up Contesting

Digital modes



- Most operators use WSJT modes
 - ◆ FT8 (mostly on 50 Mhz.)
 - ◆ MSK144 (meteor scatter)
 - ◆ JT65 (mostly EME)
- Most non EME activity is on 50 Mhz
- Some MSK144 and FT8 on 144 Mhz
- FT8 on 50 Mhz is hugely popular

VHF and up Contesting

Digital modes



- Some 50 Mhz operators seem to focus a lot of their time on 50 Mhz
- My approach is to listen to analog and digital at the same time
- Be mindful of needing to deal with very strong and very weak signals at the same time (perhaps over 100 dB difference between local station vs distant weak tropo station.) All in the same “pass band”
- FT8 is a good tool but don't over use it

VHF and up Contesting



- Next contest ARRL VHF contest 1900 UTC Jan 18 to 0359 UTC Jan 20

- Resources

<http://www.hornucopia.com/contestcal/index.html>

<http://pnwvhfs.org/>

<http://www.arrl.org>

<http://cqww-vhf.com/>

<https://nvlpubs.nist.gov/nistpubs/legacy/TN/nbstechnicalnote95.pdf> (for some insight into beyond line of sight VHF and up propagation.)

- Q and A ?