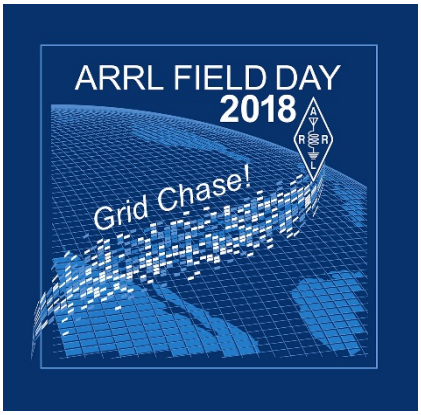

VHF Operation and Field Day:
FAQ's, Tips and Guides for Getting More Field Day QSOs

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When most hams think of Field Day, they automatically envision a stampede of activity on the HF bands. While this may be true, there is a gold mine of contact points on the bands above 30 MHz. **ALL** "Class A" and "Class F" stations are able to have a free VHF station to make extra QSOs towards their Field Day score.

Adding an experienced VHF team to your Field Day effort can pay big dividends. Many efforts to gain points from a VHF station in the past have not succeeded because the operating protocols on VHF are not known to hams who operate mostly HF, and they simply do not know where or when to transmit. This guide attempts to answer some basic questions about VHF operating so your club can utilize their VHF station to its maximum potential.

Terrestrial VHF Communication

During the summer months, sporadic-E propagation comes into full force, opening the door for possible long-haul QSOs on 6 Meters across the country. During exceptional openings, Sporadic-E is possible on 2 Meters, too. Tropospheric enhancement on 2 meters and 432 can occur as well, allowing communications as far as several hundred miles. Sporadic-E is, by definition, unpredictable; nobody knows when it will occur. While it can occur at any time, it seems to occur most often in the afternoon and evening. Tropospheric conditions are generally best in the early-morning hours, especially on 2 meters and 432 MHz.

It is also possible to have VHF bands that are completely dead, or openings that only last a very short period of time. VHF bands generally do not function like HF, and require some enhanced propagation conditions to come to life. Two of the best tools for using the VHF bands are patience and perseverance.

General VHF Tips

Technician-class licensees have full privileges on 6 meters and up. However, don't make the mistake of leaving an inexperienced Technician (or any class licensee, for that matter) at the VHF station without some guidance; you may end up with a very dissatisfied operator. Recruit an experienced VHF operator to your team and let them provide instruction for those unfamiliar with VHF operating techniques.

Feedline losses are much higher on VHF frequencies than HF. If you're going to set up a VHF station, use high-quality coaxial cable. RG-8 is the bare minimum; do not even bother to use RG-58 or RG-59, as the losses will be substantial. Keep the runs as short as possible; the extra coax from a piece that is much longer than required is wasting your power.

Many VHF operators use Maidenhead grid squares to help identify their location more precisely. Some collect grids, much like HF operators try to work all States or DXCC countries. Know what grid square your Field Day operation is in; while exchanging grids is not required for a Field Day QSO, many VHF'ers you work will want to exchange grids. You can get more information on grid squares here: http://www.arrl.org/grid-squares

The VHF bands are generally "line-of-sight" bands, so antenna height is critically important on the VHF bands. "The higher, the better" is definitely true! If possible, set your VHF station at the highest elevation point of your Field Day site. If your Field Day site is in a valley or has high hills surrounding it, your VHF operations may suffer.

The band plans for 6 meters and 2 meters do not follow HF band plans. For example, if you think you will call CQ FD on 6 meter CW at 50.025 MHz because that's near the bottom of the band, you're not going to work a lot of people. Read the next section for tips on where to find the action.

CW/SSB

Most long-haul communications on the VHF bands take place on USB or CW. Horizontally-polarized yagis or loops are the preferred antenna for SSB/CW VHF communication. Even a dipole on 6 meters will work nicely, and is less than 10 feet long.

Attempting VHF SSB/CW communication with a vertically polarized antenna, especially on 2 meters and higher, will reduce your ability to hear stations and be heard by others by as much as 20 dB. Make sure you use horizontally-polarized antennas when attempting SSB/CW VHF work.

Important 6 Meter SSB/CW/Digital tips:

1) 6 meter SSB activity is from 50.125 to 50.200 MHz, and can go up to 50.300 MHz if the band is open and packed with signals.

2) 6 meter CW activity will range from 50.080 to 50.100 MHz. from 50.000 to 50.080 MHz, you can listen for CW beacons to help see if the band is open. **Remember, per FCC Rules, the range 50.000 to 50.100 MHz is limited to CW only!**

3) 6 meter Digital Meteor Scatter FSK/MSK activity is from about 50.250 to 50.290 MHz, and now you can find FT8 users occupying frequencies between 50.300 – 50.330 MHz (with a primary focus on 50.315 MHz).

4) 50.100 to 50.125 MHz is the 6 Meter DX window, which is reserved for stations attempting intercontinental QSOs. **Do not make Field Day QSOs in the DX Window.** There are many non-Field Day operators that focus on 6 meter DX'ing and request the DX window be kept clear. Remember, per FCC Rules, the range 50.000 to 50.100 MHz is limited to CW only!

5) The 6 Meter SSB calling frequency is 50.125 MHz. If you spin the dial and don't hear many callers, you can call CQ on the calling frequency. However, do not monopolize the calling frequency; if the band is open, find a clear frequency above 50.125 and call CQ there. Remember, per FCC Rules, the range 50.000 to 50.100 MHz is limited to CW only!

6) If 6 meters is open, point your antenna in the direction of the location of stations you're hearing. If there isn't a big opening occurring, rotating your antenna in different directions every 15 minutes or so will increase your chances of being heard in different parts of the country. Under poor conditions, try to aim your antenna toward large population centers.

2 Meter SSB/CW/Digital Operating Tips

1) The 2 meters SSC/CW calling frequency is 144.200 MHz. As with 6 meters, please do not monopolize the calling frequency. Digital MSK/FSK and even FT8 operations can be found between 144.140 and 144.160 MHz. JT65 operation is generally only used for Moonbounce (EME) between 144.100 and 144.150 MHz. **Remember, per FCC Rules, the range 144.000 to 144.100 MHz is limited to CW only!**

2) Activity will range between 144.170 to 144.230 MHz in densely populated areas. If you live in a more rural part of the country, activity will be much more centered around the calling frequency.

3) Once again, horizontally-polarized antennas are the custom. A 5 or 6-element Yagi on 2 meters works very well, but larger is generally better. Higher is better, too!

4) If you're not working many stations, rotate your antenna about 30 degrees every 5-10 minutes to maximize coverage to all areas.. Point towards high-population areas when possible.

For 222 and 432 MHz, the calling frequencies are 222.100 and 432.100 MHz.

FM

For Field Day operating, FM is probably the easiest VHF mode to implement. You'll have little trouble finding FM rigs to use; even a hand-held transceiver can make a fine Field Day rig. **FM doesn't have the range of CW or SSB,** but it is the most popular communications mode on the VHF and UHF bands. You'll find the greatest amount of FM simplex activity on the 2-meter band, although 6 meter FM may be worth a try as well. **Remember that Field Day rules prohibit the use of repeaters**. This means you'll have to hunt for contacts on the recognized simplex frequencies.

Unlike CW and SSB, most FM operators use vertically polarized antennas. To maximize your signal coverage, you'll want to use vertical polarization, too (though horizontal does work). A small beam antenna mounted in the vertical-polarity position (elements perpendicular to the ground) is one suggestion. An alternative is a simple omni-directional antenna such as a ground plane. Since most of your contacts will be local, an omni-directional antenna may be nearly as effective as a beam.

There are many 6 meter FM operators, and if the band is open, 6 Meter FM could yield some long-haul QSOs. Monitor the 6 meter calling frequency at 52.525 MHz; simplex QSOs will be possible around the calling frequency. Open your squelch so weak signals will be heard. As with SSB/CW work, please do not monopolize the calling frequency.

SATELLITES

Satellites are a blast on Field Day! Of course, to use a satellite you have to know when it will be passing across your local sky. One easy way to obtain pass predictions is on the AMSAT Web site at www.amsat.org/track/index.php. Just print the predictions for the satellites you intend to use. There are also satellite tracks apps for the iPhone as well as Androids.

FM Birds: SO-50

Do you have a dual band VHF/UHF FM rig that can receive below 437 MHz? You can try the SO-50 satellite using the frequency table below to program the radio's memories so that you can compensate for Doppler shifting by simply changing memory channels. This will help you keep the satellite properly tuned in from Acquisition of Signal (AOS) to Loss of Signal (LOS).

SO-50

Time	Transmit	Receive
AOS (start)	145.850	436.805
Zenith -3 Minutes	145.850	436.800
Zenith (maximum)	145.850	436.795
Zenith+3 Minutes	145.850	436.790
LOS (end)	145.850	436.785

Just switch the memory channel for the strongest and least distorted signal. No need to change the transmit frequency.

Note that you'll need to use a 67 Hz CTCSS tone on the 2 meter uplink to access SO-50.

Another FM satellite is Fox-1A, known as AO-85. It has a 2 meter downlink and a 70CM uplink. Fox-1A has Automatic Frequency Control (AFC) on the receiver so you may not have to compensate for the Doppler. Set your transmit frequency to 435.172 and receive on 145.978. Use 67.0 Hz PL to keep the satellite from timing out. Narrow Band FM works best on the uplink. **There may be other FM birds active during Field Day, Again, check the amsat.org/status page for up-to-date reception reports.**

One important thing to remember is that the ARRL Field Day rules have changed in regards to these single-channel FM satellites. **Stations participating in ARRL Field Day are limited to one (1) QSO on any "birds" that fall into the single channel FM classification**. This change is to allow more groups the opportunity to experience the thrill of satellite communications. *Once you have made one successful FM Satellite QSO, PLEASE allow other Field Day groups the same opportunity at bonus points that you had. Now that SO-50 is the one of the few functioning FM satellite, usage will be exceptionally high.*

Keep in mind that it will be very difficult to make contacts on the FM birds when the satellites are over populated areas of the United States. There may be tens if not hundreds of operators transmitting at the same time during a pass. The option is to consider making contacts on the linear (analog) satellites which support multiple simultaneous QSO's. There are many linear satellites to choose from and your chances of success l can be vastly improved by doing so.

SSB/CW Satellites

Operating on linear birds requires that you operate full duplex in order to determine that you are listening on the correct frequency. You can operate by manually tuning your radios or you can use a computer to control them. Programs such as SatPC32 and Orbitron can control your radios and also predict when passes are in view. There are many functioning linear satellites. Go to www.amsat.org/status to see a list of them and their status.

One of the best linear birds is FO-29. It has a 2M uplink and a 70CM downlink along with a very large footprint. The original Funcube satellite AO-73 is another one to try. It has a 70CM uplink and a 2M downlink. There are also several Chinese birds, XW-2A, XW-2B, XW-2C, XW-2D and XW-2F that work very well. Information on all of these satellites, as well as others that may be active, can be found by clicking the satellite name on the amsat.org/status page.

These are excellent SSB/CW birds and you can work it with a fairly minimal setup. The tricky aspect is that these satellites have *inverting transponders*. Transmit using LSB on the uplink, and receive using USB on the downlink. If you transmit at the high end of the passband (see below), the satellites will repeat your signal at the low end of the passband.

	Uplink Passband (LSB)	*Downlink Passband (USB)*
FO- 29	145.900 – 146.000 MHz	435.800 -- 435.900 MHz
AO-73	435.150 – 435.130 MHz	145.950 – 145.970 MHz
XW-2A	435.030 - 435.050 MHz	145.665 - 145.685 MHz
XW-2B	435.090 - 435.110 MHz	145.730 - 145.750 MHz
XW-2C	435.150 - 435.170 MHz	145.795 - 145.815 MHz
XW-2D	435.210 - 435.230 MHz	145.860 - 145.880 MHz
XW-2F	435.330 - 435.350 MHz	145.980 - 146.000 MHz

The best way to be successful is to practice working the satellites prior to Field Day. Try to find someone in your area who has experience in working the birds. If you have questions and cannot find someone locally, go to amsat.org and click on 'AMSAT" on the left. Scroll down the list to "Area Coordinators" and find someone in your state. However, anyone on the list will be happy to help you.

Lastly, please be mindful of your transmit power. It is not necessary to transmit with more than 5-10 watts for successful satellite operation; more power than that, and you risk damaging the satellite. IT also can affect satellite receiver performance, which will affect all users of the satellite during the pass. Be considerate of others using the satellite.

Good luck with your satellite Field Day Operation!

For more detailed information about satellite operating, pick up a copy of the ARRL Satellite Handbook. You can order on the Web at **www.arrl.org/catalog/** or call **1-888-277-5289.**

Some Final Considerations

When it comes to VHF/UHF operating, antenna height is everything (the only exception is satellite operation). To make the most of your VHF/UHF capability, you'll need to mount your antennas on portable supports or select a hill or mountain for your Field Day site. Feed line loss is substantial at VHF and UHF, so use the best coaxial cable you can find. If you exploit the VHF/UHF bands to their full potential, you'll be surprised at how many points you'll add to your score. And if the HF bands are dead, VHF and UHF may save the day!

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