

WAVES

Chattanooga Amateur Radio Club P.O Box 23121 Chattanooga Tn. 37421

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Getting the Most from Your Hand-Held Transceiver

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If repeaters are unavailable after a disaster and you are limited to simplex operation, a portable transceiver with its original flexible antenna is inadequate for emergency communications.

I started with a "handy-talkie" or "HT" when I first got my ham license. Today, as Virginia ARES / RACES training officer I recommend that new operators buy 2-meter mobile transceivers. They cost no more than a portable. Today's equipment is very compact, rugged and reliable. For portable operation, carry the mobile transceiver in a briefcase with a 17ah-gel cell battery and telescoping 1/2 wave or magnetic-mount mobile antenna. Include 25 feet or more of coax to get the antenna up high, away from people. This arrangement may not work for everyone. Therefore, if all you have is a portable transceiver, the following will help you to make the most of it!

An "HT" makes perfectly good sense for:

- Anyone who doesn't drive;
- Commuters who use public transportation;
- Controlling a mobile radio as a cross-band repeater
- As a spare, a backup or loaner.

The National Institute of Science and Technology tested Public Safety "high-band" VHF and amateur 2-meter antennas. Flexible antennas commonly used on portable transceivers have negative gain compared to a quarter wave whip held at face level. This means that 5-watt portable VHF with stock antenna has an effective radiated power of only 1-watt. Placing the portable on your belt produces -20db of attenuation, reducing EIRP to 50 milliwatts! UHF results are no better...

"Rubber ducky" antennas are rubber covered helical springs, which are intended to withstand some rough handling, but they are not indestructible. Flexible antennas used on California fire lines for several weeks showed a 60% failure rate. Flexible antennas should be replaced annually or as soon as they show ANY apparent kinks, cracks, abrasion or other wear to visual inspection.

An effective expedient to improve a flexible antenna is to attach a counterpoise (19.5" long for the 2-meter band, or 6.5" for the 70 cm band) of stranded wire, crimped and soldered to a battery clip or ring terminal which will fit over the antenna connector. Reinforce the soldered connection with heat shrink to resist flex. When attached to the outer collar of the BNC connector or the antenna shield, the counterpoise prevents transmitted RF from coupling with your body. This enables it to perform like a center-fed dipole, instead of an "end-fed dummy load!" The main lobe of the radiation pattern can be "aimed" by grasping and pointing the end of the counterpoise in the direction where you need a stronger signal.

Some after-market and home-made antennas perform much better than the standard helical "rubber duck." A J-pole antenna constructed of 300-ohm twin-lead rolls up and fits into your pocket. When thrown up in a tree, it increases both height and gain. Full-sized, flexible 1/4 wave and telescoping 2-wave antennas work very well.

A quarter wave provides unity gain when used with a counterpoise and held at face level. This represents a 5 dB improvement over a stock flexible antenna, because most of the effective signal is radiated. If operating from a vehicle, connect your portable to a magnetic mount mobile antenna to provide a clear RF path outside the vehicle. This overcomes the substantial attenuation, which results from operating a portable unit from inside a metal vehicle. Always carry suitable adapters so that you can connect your portable transceiver to an outside base or mobile antenna, when one is readily available.

In marginal operating locations a telescoping, half-wave is much better, because it provides the same unity gain without a ground plane that a 1/4 wave antenna does when used with a ground plane. A 2-wave antenna can be pulled up into a tree, dangled out a window, attached to a window pane with suction cups, or be used bicycle or motorcycle mobile, or in city driving on a window clip mount. A telescoping half-wave increases useable simplex range of a typical 5 watt, 2-meter portable from about a mile with the stock flexible antenna to 3 miles or more, depending upon terrain. Adding a counterpoise to an efficient antenna enables a portable unit to keep in reliable contact within 5 miles of an EOC or base station equipped with an efficient antenna elevated on a tower.

Telescoping antennas are more fragile and work best when stationary or in the open, avoiding side impacts or rough handling. Avoid prolonged mobile use of telescoping antennas on window clip mounts at highway speed, because excessive flexing loosens their internal electrical connections. Never collapse a telescoping antenna by whacking it down with the palm of your hand. Gently pull it down with your fingers. If you note any wobbling or looseness, replace the antenna.

Flexible antennas are safer when working in close quarters around people and are more durable when walking through dense vegetation for wildfire suppression or search and rescue operations. They better for dual-band transceivers because telescoping antennas are usually mono-band. Dual-band flexible antennas approximate a 1/4 wave on 2 meters and a 5/8 wave on 70 cm, are

optimized for one band and may resonate poorly on the other. How efficient a particular antenna is can be determined only by testing. A telescoping half-wave, or half-wave, dual-band-mobile antenna with magnetic mount, will work well either with or without a ground plane, and offer the best bang for the buck.

Any emergency antenna for your portable transceiver is rated to safely handle up to 25 watts of RF output. This enables it to be used as an expedient antenna for a mobile radio in portable operation, or to permit use of an external "brick" amplifier with the portable transceiver.

A magnetic mount works best on a car, but an improvised ground plane can almost always be found around the home or office, such as a metal filing cabinet, metal trash can, cookie sheet, rain gutter, refrigerator, window air conditioning unit, balcony railing or any other large metal object. On boats, motorcycles, fiberglass truck caps or wooden balcony railings use a half-wave antenna, which does not require a ground plane.

BATTERY POWER BASICS

A common error of new ARES / RACES operators is failure to plan to carry enough battery power. Always carry at least one spare charged NiCd pack and AA battery case, which enables you to keep operating when the power goes off, if you can't recharge your NiCd pack.

Cycle and recharge dry NiCd packs monthly. Write the recharge date on a strip of tape on each pack. In cold weather keep NiCd packs warm by keeping them in an inside coat pocket and not exposed on your belt.

An adapter cord to power your transceiver from an auto cigarette lighter plug or a gel cell battery is needed for extended operation. Cigarette lighter cords are often unreliable because auto sockets aren't the best conductors, due to contamination and size variations, which cause the plug to vibrate loose. As an alternate power source, you should still have one, because they are ubiquitous and in a pinch, much better than nothing!

Portable power packs such as Quantum are excellent, but expensive. We encourage our operators to make their own using 12-volt gel cell batteries obtained from local hospitals. Sealed lead-acid (SLA) batteries are used to power emergency lighting, alarm systems, medical instruments and computer backup power supplies. They are replaced on a fixed schedule, usually before they are worn out. Because SLA batteries require disposal as hazardous waste unless recycled or reused, a hospital donation to your CERT or ARES / RACES group reduces their disposal cost. Contact your local hospital and explain how SLA batteries they discard can support auxiliary emergency communications.

Donated SLA batteries must be inspected, recharged and load-tested. Any 12V batteries with an open circuit voltage (Voc) of 12.8V or more are tested immediately and distributed for reissue, if OK. Batteries with Voc <12.8V are connected in parallel across a regulated 13.8V power supply. Those which are not accepting charge after 4 hours are discarded. Total charge time and current should not exceed 140% of battery capacity. Gel cells should never be recharged at over 14V due to gassing.

Reject batteries if their internal resistance exceeds an ohm, as determined by voltage drop divided by the current load in amps. Good batteries suitable for re-issue should not drop below 11.7V under a test load approximating AC, @ their amp-hour capacity, for 30 seconds or AC/5" for one minute.

A simple test load for small gel cells up to 20ah is a 50w, 12V-marine/RV bulb or automotive droplight. This equals about 3.8A, approximating a mobile radio on low power 5w transmit or a portable 2-meter hand held, plus a laptop PC and packet TNC. Using two bulbs and 'Y' adapter simulates mobile or brick amp at 25w RF output. This is a good test load for batteries to 30amp-hours. In a good battery, voltage drop stabilizes quickly, does not fall below 11.5V under load, and recovers quickly when the test load is removed.

STANDARD POWER CORD CONNECTORS

Auxiliary power cords should follow the configuration shown in the ARRL ARES Resource Manual. Use twin lead, red-black AWG14 or AWG16 zip cord with Molex Series 1545, 2-pin polarized connectors and .093 pins. The female pins are assembled into the male plug, which is attached to the power source, and the male pins into the female receptacle, which is attached to the rig.

The plug, receptacle and pin set is rated for 8A continuous duty and costs \$0.99 from Radio Shack, Part No. 274-222. Wiring is simple. The end of the two-conductor Molex plug in cross section resembles a little 2-story house with peaked roof. Remember proper polarity by the word associations red roof and black basement, or pointy positive and flat black. Crimp wires before soldering to ensure a strong connection. After inserting the pins into the plug and receptacle, check fit of the assembled fitting. Reinforce the wires behind the plug and receptacle with heat shrink or tape. On the battery ends attach crimp type female tab terminals to fit the male tabs on the battery.

It is recommended that you rig two sets of cords directly to your car battery to power your portable or mobile radio, and laptop computer, if you will send data via packet radio to your EOC. Splice type fuse holders onto both leads, as close to the battery as possible.

If all you have is a portable transceiver, the above information will help to ensure that you can provide an adequate signal for reliable emergency communications. Doing so is vitally necessary to enable your volunteer disaster unit to complete its mission efficiently and safely. More training materials for amateur radio operators to learn essential core skills in emergency communications are featured on the Virginia ARES / RACES Training page located at: <http://va-ares.org/Training/training.htm>

March 4, 2010 Chattanooga Amateur Radio Club Regular monthly meeting

Officers Present: Mark Rose, Rick Curtis, Jim Knight, Susan Miller Jim Bowman
Directors Present: Tom Cash, Bill Dobbs, Ben Timmerman, Susan Miller

This was the clubs annual chili cook off and we were lucky to have 5 wonderful posts of chili, toppings, chips, crackers, drinks and several desserts. Attendance to the dinner was good and the food was wonderful!!

Meeting was called to order at 7:30.

We were honored to have a new member join us. Chris Schauwekker, AJ4UO, of Hixson was voted on and accepted. Welcome Chris!

Minutes from the February meeting as printed in the Waves were accepted.

No treasurer's report.

Dues are due now and late on March 31. Names will be deleted from the membership on April 1.

Board of Directors meets on the 3rd Wednesday of each month . If you have business for the board please let Tom Cash know you will be attending the BOD meeting. Meeting is at Ryans on Hixson Pike at 6:00pm. This month it will be on March 17.

It was mentioned the website needs to be updated to have Rick Curtis as vice-president and not Bill Dobbs.

Ben made a motion to pay for 4 domain names. (All four names -.com, .net, .org, and .info- all point to one website.)Susan Miller seconded motion. Vote carried.

The club paid \$200 to Lloyd Headrick to have our domain names renewed for 5 years.

On April 24 the Boy Scouts of America are setting up at Coolidge Park and have invited members of the club to set up radios and join them. Check with Mark Rose for details.

Jack Green has a data base of all hams in Hamilton County, with names and call signs. If you would like to use this data please contact Jack for location on web.

Our radio room at the Red Cross building is taking shape, but we could still use help painting and laying carpet. Marks dad is building desks and we have radios and files. Decisions are being made on which antennas to use.

We are looking for someone who can write grants. The grants would be used for upgrading the radio room.

Jim Bowman, Hamfest chairman, has several feelers out and is waiting for replies.

Meeting adjourned at 9:00.

Respectfully submitted,

V. Susan Miller, KI4RZJ

C.A.R.C. Recording Secretary

Hamfests

10 Apr 2010

Memphis FreeFest
Mid-South
Amateur Radio Association

<http://www.maraonline.org>

Talk-In: 146.850 (PL 107.2)

Contact: Tony Brignole,
WA4KHN
2444 Lacosta Drive
Bartlett, TN 38134
Phone: 901-372-2738
Email:
abrigno@comcast.net

Memphis, TN
Bartlett Station Municipal
Center
[5868 Stage Road](#)
Div: Delta
Sect: Tennessee

8 May 2010

Tail-gate Party
Clarksville Amateur Transmitting
Society (C.A.T.S.)

<http://www.kf4l.org>

Talk-In: 147.390 (no tone)

Contact: John D. Freed, KX6F
216 Maplewood Drive
Clarksville, TN 37042
Phone: 931-216-2503
Fax: 931-645-7608
Email:
jdfreed@bellsouth.net

Clarksville, TN
Hilldale Baptist Church Family
Life Center Picnic Pavillion
[250 Old Farmers Road](#)
Div: Delta
Sect: Tennessee

24 Apr 2010

Calhoun Hamfest
Cherokee Capital Amateur Radio
Society

<http://www.k4woc.com>

Talk-In: 443.675+, 146.745-,
146.805+

Contact: Felton Floyd, AF4DN
1054 Mountain Loop
Road NW
Sugar Valley, GA
30746
Phone: 770-324-9859
Email:
af4dn@iwispr.net

Sugar Valley, GA
Sugar Valley Community
Center
[3295 Sugar Valley Road NW](#)
Div: Southeastern
Sect: Georgia

8 May 2010

Heart of Georgia Hamfest
Central Georgia ARC & Middle
Georgia Radio Assn.

<http://www.wa4ort.com>

Talk-In: 146.25/85 -600 (no PL
tone)

Contact: Tim Hardy, AF1G
207 River Valley Trail
Kathleen, GA 31047
Phone: 478-396-0124
Email: AF1G@arrl.net

Byron, GA
Byron Middle School
[201 Linda Drive](#)

Div: Southeastern
Sect: Georgia

10 Apr 2010

Hamfest & Computer Show
Mobile Amateur Radio Club
<http://W4IAX.net>

Talk-In: 146.82 (PL 203.5)

Contact: Jerry Myers, KG4YIA
3100 Rand Court
Mobile, AL 36606
Phone: 251-473-5813
Email:
kg4yia@email.com

Mobile, AL
Elk's Lodge

[2671 Dauphin Island Parkway](#)

Div: Southeastern
Sect: Alabama

FCC Proposes to Eliminate Spread Spectrum APC Requirement, Reduce Spread Spectrum Power Limit; Cleans Up Portions of Part 97

In response to a 2006 ARRL [Petition](#) regarding spread spectrum issues, the FCC released a *Notice of Proposed Rule Making (NPRM)* on March 16 (WT Docket No 10-62), proposing to amend Part 97 to facilitate the use of spread spectrum communications technologies by eliminating the requirement that amateur stations use automatic power control (APC) to reduce transmitter power when the station transmits a spread spectrum (SS) emission and reducing the maximum transmitter power output when transmitting a SS emission. Through an *Order* [attached to the NPRM](#), the Commission also made "certain non-substantive revisions" to the Amateur Service rules.

Notice of Proposed Rule Making

Spread spectrum techniques are methods by which the information signal of a particular bandwidth is intentionally spread in the frequency domain. At any point of bandwidth the SS emission occupies, either the power spectral density of the transmitted signal is reduced to a comparatively low level or the duration of a transmission on any frequency in the frequency segment is very brief. Consequently, stations in the same area can transmit SS signals without causing harmful interference to or experiencing harmful interference from each other or a station transmitting a non-SS signal over the same spectrum segment.

Back in 1985, the FCC authorized Amateur Radio stations to transmit SS emissions with a maximum transmitter power limit of 100 W PEP. To emphasize the experimental nature of spread spectrum as well as some of the potential benefits associated with it, the Commission authorized such transmissions on a secondary basis to other amateur service communications. At that time, the Commission noted that "to reduce the likelihood that SS transmissions from an amateur station could be made for the purpose of obscuring the meaning of a message, the Commission permitted only frequency hopping and direct sequence spreading techniques." Fourteen years later, the FCC eliminated restrictions on spreading techniques "to allow amateur stations greater flexibility and permit them to use the SS techniques used in other communications services." The Commission also required stations transmitting SS communications with a transmitter power greater than 1 W to utilize APC to limit the transmitter power in accordance with a specific formula (permissible power is determined by the use of the ratio, measured at the receiver, of the received energy per user data bit [Eb] to the sum of the received power spectral densities of noise [No] and co-channel interference [Io]; average transmitter power over 1 W shall be automatically adjusted to maintain an $E_b/[N_o + I_o]$ ratio of no more than 23 dB at the intended receiver).

In 2006, [the ARRL petitioned the FCC](#), requesting that the APC requirement be eliminated, asserting that the APC provision has proven to be "virtually impossible" as it requires the operators of the transmitting stations to determine the transmitter power received at distant receivers and that this requirement has proven to be "something of a barrier to SS experimentation." The League further contended that the APC requirement could be eliminated without increasing the risk of harmful interference because:

- The station licensee or control operator of the station transmitting the SS emission would still be obligated under Section 97.313(a) of the Commission's Rules to use the minimum power necessary to conduct communications, and
- Under Section 97.311(b) of the Commission's Rules, SS communications are already secondary to other Amateur Service communications.

In the *NPRM*, the FCC agreed with the ARRL that the APC requirement "may be unnecessarily impeding Amateur Radio operators in advancing the radio art," but the Commission does not propose to simply eliminate the APC requirement. Noting that the purpose of the APC requirement is to limit interference to other stations, the FCC pointed out that commercial broadband Internet service providers operating in the 900 MHz and 2.4 GHz ISM bands argue that the APC requirement should be maintained in order to prevent interference to other users. They also referred to suggestions maintaining that if the APC requirement is eliminated, the FCC should lower the maximum power limit on amateur stations transmitting SS emissions so that interference is minimized. Given these concerns, the FCC proposes to eliminate the APC requirement and reduce the maximum transmitter power output amateur stations may use when transmitting SS communications from 100 W to a peak of 10 W.

"We believe that this approach is consistent with both the ARRL's request that we eliminate a requirement that may be impossible to implement and the intent of the APC requirement to limit interference to other stations," the FCC stated in the *NPRM*. "We also believe that the proposed rule change would (1) encourage individuals who can contribute to the advancement of the radio art to more fully utilize SS technologies in experimentation, (2) balance the interests of all users in mixed-mode and mixed-service frequency bands until sharing protocols are sufficiently developed to avoid interference and (3) promote more efficient use of the radio spectrum currently allocated to the Amateur Service." The Commission is seeking comments on this proposal.

Order

In the *Order*, the FCC made amendments "to correct the Amateur Service rules or conform them to prior Commission decisions." These revisions will take effect once they are published in the *Federal Register*.

The FCC noted that when they authorized Novice class and Technician Plus class operators to transmit in certain portions of the 80, 40, 15 and 10 meter bands in 2006, they intended to limit those stations' power in those bands to 200 W PEP, "but the implementing amendment to Section 97.313(c) inadvertently applied that power limitation to all frequencies authorized to Novice and Technician Class licensees. We therefore correct Section 97.313(c) to clarify that the limitation applies only in those bands."

The Commission also revised Sections 97.301 and 97.303 related to the 40 and 60 meter and the 70 cm and 9 cm bands to conform to the Table of Frequency Allocations (Table), and to references within the relevant sections of the rules. They also revised the frequency sharing requirements in Section 97.303 "to limit the summary to those frequency bands that are allocated to the Amateur Service on a secondary basis, and to present the requirements more clearly."

In addition, the FCC moved transmitter power limit information from Section 97.303(s) to Section 97.313, the section concerning transmitter power standards. Section 97.103(c) was amended to delete the cross-reference to Section 0.314(x) that was removed in 1999. They also removed the entry "1260-1270 MHz" from Section 97.207(c) that lists the frequency bands authorized to amateur space stations "because footnote 5.282 to the Table limits the use of that segment to Earth station transmissions."

How to Make Comments on the *NPRM*

Pursuant to Sections 1.415 and 1.419 of the Commission's Rules, interested parties may file comments on the *NPRM* on or before 30 days after date of publication in the *Federal Register* and reply comments on or before 45 days after date of publication in the *Federal Register*. Based on previous experience, the ARRL expects publication of the *NPRM* and *Order* in the *Federal Register* sometime in early spring. Instructions on how to file comments on the *NPRM* **only** are listed on pages 6-7 in the [NPRM](#).

Club Events

1 April 2010	Club meeting	ARC Building	7 PM
20 April 2010	D-Star	Memorial Hospital	6 PM
24 April 2010	Boy Scouts	Coolidge Park	8 AM