The *Microvolt*

October 2022

From Technology to Advocacy - among topics covered during the September, 2022 meeting!

Prologue

Publication: *The Microvolt* (USPS 075-430) is the official publication of the Utah Amateur Radio Club, Incorporated, 632 S. University Street, Salt Lake City, UT 84102-3213. It is published monthly exc0ept August. Subscription is included with club membership at $20 per year. Single copy price is $1.50. Periodicals postage paid at Salt Lake City, Utah. Postmaster: send address corrections to *The Microvolt*, c/o Tom Kamlowsky, 4137 Clover Lane, Salt Lake City, UT, 84124-2711.

Deadline for submissions is the 24th of each month prior to publication. Reprints are allowed with proper credits to *The Microvolt*, UARC, and authors. Changes in mailing address should be communicated to the Club Secretary: Tom Kamlowsky, 4137 Clover Lane, Salt Lake City, UT, 84124-2711.

Club: The Utah Amateur Radio Club was organized under its present name in 1927, although its beginnings may date back as early as 1909. In 1928, it became affiliated with the American Radio Relay League (club #1602) and is a non-profit organization under the laws of Utah. It holds a club station license with the call W7SP, a memorial call for Leonard (Zim) Zimmerman, an amateur radio pioneer in the Salt Lake City area.

Meetings: The club meets each month except July and August. The meetings are held on the second Thursday of the month at 7:30 PM in the University of Utah's Warnock Engineering Building, generally in room 1230 or 2230, sometimes in 2250 or 105.

Membership: Club membership is open to anyone interested in amateur radio; a current license is not required. Dues are $20 per year, including a *Microvolt* subscription. *The Microvolt* and membership cannot be separated. Those living at the same address as a member who has paid $20 may obtain a membership without a *Microvolt* subscription for $12. Send dues to the Club Secretary: Tom Kamlowsky, WA7ZRG, 4137 Clover Lane, Salt Lake City, UT 84124-2711. Let the Secretary know if you prefer the electronic edition of *The Microvolt* instead of the printed version.

Contributions: Monetary contributions are gladly accepted. Send directly to the Club Treasurer: Chuck Johnson, 1612 W. 4915 S. Taylorsville, UT 84123-4244. For in-kind contributions, please contact any board member to make appropriate arrangements.

Repeaters: UARC maintains the 146.62- and 146.76- repeaters. The repeaters are administered by the UARC Repeater Committee. Comments and questions may be directed to any Committee member. The Lake Mountain repeater (146.76-) is IRLP node 3352. Instructions for IRLP use are on the club website.

Ham Hot-Line: The Utah Amateur Radio Club (UARC) has a Ham Hotline, 583-3002. Information regarding Amateur Radio can be obtained, including club, testing, meeting, and membership information. If no one answers leave your name, telephone number and a short message on the answering machine, and your call will be returned.

UARC 2022 Board

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Repeater Engineer: Clint Turner, KA7OEI	801 566-4497

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For late breaking news listen to the UARC Information Net Sundays at 21:00 on 146.62 or set your browser to:
http://user.xmission.com/~uarc/announce.html

We are grateful to the management of XMission, our Internet Service Provider (ISP), for the donation of this Web-Page service.

For account information go to:
http://www.xmission.com/ Or call 801 539-0852

Latest News

Mark the date for the November UARC meeting:

Timothy Duffy, K3LR of DX Engineering

UARC is pleased to announce that we have scheduled Timothy Duffy of DX Engineering as the presenter, "live" *(via Zoom)* for the November 10, 2022 meeting.

While Tim is versed in many things, his main focus for the November meeting will be the vast topic of "Ham Radio Antennas". Be sure to join us for this meeting - and if you have some questions not answered by him during his presentation, be ready to ask them afterwards.

In-person meetings have resumed!

You may have noticed that as of September, UARC meetings are being held ***in person*** – quite a welcome change to over two years of online meetings!

We encourage everyone who ***can*** come to the live meeting to do so and re-acquaint themselves to their fellow club members. We understand that there will be some who, for whatever reason, may not be able to attend the live meeting and we'll do our best to do a "live" stream via YouTube as we have been doing since early 2020, making available an edited version of the meeting a few days after the fact on YouTube, as we have also been doing for the past couple of years.

You can find the club material – including past meetings - on YouTube by going to: https:/www.youtube.com/c/UtahAmateurRadioClub.

From there, look for the feature that is marked "live." The meeting should commence at 7:30. There should be some chatter on the channel by about 7 P.M. and you can connect in that period to make sure everything is working.

UARC meetings are held on the second Thursday of each month except for July (annual steak-fry) and August (vacation).

Our Cover

The September UARC meeting covered a lot of ground. During the "Elmer's Corner", James Bennett, KK7AVS, talked briefly about the NanoVNA - an inexpensive but powerful instrument capable of analyzing both single-port devices *(antennas, loads)* and multi-port devices *(filters, amplifiers)*.

This was followed by Jeri Brummet, W3JRI, talking about "advocacy" - not just for amateur radio, but how to present your case - as a citizen and a ham - to elected officials.

(Pictures by Ron Spiers, K7RLS and captures from the live stream)

Consider a UARC board position!

In addition to an editor, UARC is also looking for "new blood" for 2023 – and the future. If you are willing, please consider running for a club office.

All positions are available for nominations *(there are two individuals for the "Program Chair" positions)* so if you are interested in running for an office, be sure to let the UARC president *(or any UARC officer, for that matter)* know. The initial slate of candidate officers will first be presented during the November meeting and again during the December meeting, prior to the elections.

Paper *Microvolt* or an "E-*Microvolt*"?

It has probably not escaped your attention that UARC is one of the very few clubs *anywhere* that still produces a ***printed*** newsletter. While significant expense and effort is put into producing it, we feel that it is worth doing for *(at least)* two important reasons:

1) A printed newsletter is concise. Unlike an online bulletin, constraints baked into the production of a printed newsletter help to reduce the disseminated information to its essence. It's simply not possible to throw in dozens of pages of "found" articles on myriad topics as is possible in an online format.

2) A physical, printed newsletter is both reassuring and preferred by many - something that you can take anywhere, read any time, and if you wish, put it on the shelf and find it again later.

Even considering the above, there are quite a few people who would be happy to forgo a printed version and simply receive an electronic *(.PDF)* version of the *Microvolt* - and this has been available for several years now. With the electronic version of the Microvolt, both printing and mailing costs are reduced which means that your $20/year dues can go toward other things.

If you wish to receive ***only*** an electronic version of the *Microvolt* - typically sent out about the same time as it is physically mailed - let the UARC Secretary *(Tom Kamlowsky, WA7ZRG)* know via email at wa7zrg@yahoo.com.

Upcoming amateur radio licenses classes

UARC President, Morris Farmer, AD7SR, will start another round of both Technician and General-class teaching sessions, live and online via Zoom.

The Technician classes will begin on Monday, January 16 and the General classes will begin on Wednesday, January 18. Classes typically begin at 7 PM and will run for 9 weeks.

If you are interested in signing up for this class, email Morris at: **ad7sr@arrl.net**

Why have a "generic" Ham Identification?

by Allen Wolff, KC7O

The Sierra Madre Emergency Communications Team came together in the year 2000. We had nothing and after a few years, we decided to make a visual identity for ourselves.

I decided to create a hat that ***DID NOT*** tie itself to our group - or any other group or organization, *except* Ham Radio. Why? Because we were but a few and would get lost among others. In addition, our group, being small, counts on support from other Ham groups along the foothill range as well as members' support of other foothill groups.

Shouldn't we all look the same? We provide the same service, use common equipment, and speak the same language. Why should we look different if we are in a mix of Hams? I could see ARES doing ARES stuff or CERT doing CERT stuff together looking like ARES and CERT, but when we cross organizational lines we should like like a unified organization (of Hams).

Even the ARRL swag boldly advertises the ARRL, NOT Ham Radio! Look at their on-line product store: ARRL is in huge type on most of their swag and below it is "Amateur Radio" in small print. You would expect the ARRL to promote Ham Radio first, not the organization that promotes Ham Radio.

When the Pasadena Radio Club, Altadena ALERT and South Pasadena Amateur Radio Club members help at the Montrose Christmas parade, we should all look the same. The Generic Ham!

Or, to be more descriptive, Ham Mutual Aid Identification that consists of a generic hat and shirt with "Ham Radio" with smaller-printed "Emergency Communications" on the front and callsign on the back as an option.

So, the "Hat" became our standard. I purchased 15 hats initially and our members - and member of other groups that supported us - bought them. After that, others went to the "T-Shirt Factory Outlet" and bought theirs. Matching plain, unadorned orange t-shirts also became a signature: At an event, we definitely stand out!

Why "Ham Radio" and not "Amateur Radio" - because "Ham Radio is more recognizable to the general public and the word "Amateur" - even though it is in the FCC rules and regulations *(Amateur Radio Service 47 C.F.R., Part 97)* does not always have a positive connotation.

When our supporters from other cities assist, we all look the same. The police even direct people to us by saying, "For information, ask the guys in the orange hats!"

Consider adding "Ham Mutual Identification" swag to your Ham Radio hat collection.

Allen Wolff, KC7O, is a former Utahn and UARC member, now living in Sierra Madre, CA. Alan is active on the air and frequently participates in public service events.

The benefits and perils of inexpensive radios

The appearance if ***very*** inexpensive - yet capable - VHF and UHF radios, particularly Handi-Talkies, has arguably been of benefit to the casual amateur radio operator: Having a radio that falls into the category of "dirt cheap" is generally a good thing, potentially lowering the barrier-of-entry to a newly-minted ham who does not wish to buy or cannot afford a more expensive radio.

Many amateurs have come to own two sets of radios: The "good", more expensive radio with bells and whistles on it, and the "cheap" radio that does the basic functions, and would not cause much heartburn should it get broken or lost.

The risk of using a cheap radio

With lower cost, however, comes both risk and responsibility. These radios are "built to a price" which is exactly how it sounds: They are as cheap as they can be, using some clever, "radio-on-a-chip" solutions to reduce the number of components to a bare minimum. While this is generally a good practice in manufacturing to keep costs down, it ***does*** have some serious implications when the manufacturers of those same radios take cost cutting bit too far.

Taking the "Baofeng" radios as an example. While the sector of the Chinese electronics industry that makes this is somewhat opaque, it would appear that these same radios are made by a number of different companies, all cranking out *(more or less)* identical-looking radios, copying *(possibly counterfeiting)* each other *(yes, they do that among themselves)* and making tweaks here and there - but not always checking *(or caring)* about the implications in doing so. Taking the "classic" Baofeng UV-5, you'll find many variations of this same radio - some easily meeting FCC spectral purity requirements - and many that don't even come close!

What do tests actually test?

The new ham night be forgiven for thinking that radios sold in the U.S. ***must*** have some sort of test done on them before they may be sold - and from reputable manufacturers, this is generally true, but there is misunderstanding as to exactly ***what*** is tested.

For example, if you were to buy a radio from one of the "big" manufacturers *(e.g. Yaesu, Kenwood, Icom etc.)* you can find the FCC test documents online - but you may be surprised to learn that

they do ***NOT*** test the transmitter for purity, but rather they check for other things - like the local oscillator of the receiver or its computer radiating spurious signals. Cheap imported radios are simply not presented for such testing by their importers and are typically ***not tested in any way***.

It is *(generally)* legal to import and sell such radios - but like many items, one may be legally restricted in the way it may be used. For example, it is perfectly legal for anyone to ***buy*** an FM broadcast transmitter, but you'd better have the appropriate license if you plan to put it on the air!

One often hears about "type accepted" radios, but for Amateur Radio service, this is ***completely*** irrelevant and means absolutely nothing - it only applies to commercially-used radios where the user has ***no*** control over frequencies other than to select from pre-set channels. If it is possible for the user to enter in a frequency from the front panel, it cannot be legally used on ***anything*** other than the amateur service - not even for FRS or GMRS.

Radios sold into the amateur radio market are - at least in the U.S. - treated very differently from other radios: **It is assumed and expected that they will be operated by the licensee according to the rules and regulations to which they agreed to abide when they *received and signed* their amateur radio license.**

In other words, it is ***entirely*** up to the individual amateur to assure that the radio that they operate is being done so lawfully: If that radio happens to emit spurious signals on other frequencies, the consequences of doing so are ***entirely*** placed on the shoulders of the individual operator, whether they are aware of the problem or not.

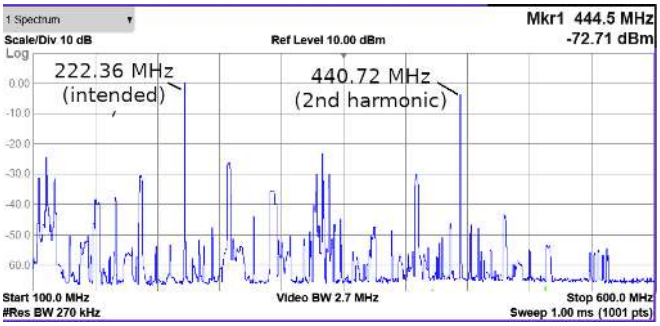
In the past, particularly with large, well-known manufacturers, the average amateur could reasonably expect that a radio produced by them would fall within the rules concerning spurious emissions that might cause interference to other services: A radio that failed to do so would certainly soil the reputation of that brand.

But these days, a funny thing has happened: Cheap radios of generally unknown provenance have appeared with a price so low as to be irresistible! If you can key up and hear the local repeater, it's got to be good, right?

No, not really. Over the past 12 years or so since the proliferation of these "dirt cheap" radios has occurred, a number of cautionary articles have appeared in the amateur radio magazines warning users of some of the more egregious examples - and here is yet another.

A radio that should never be used by anyone!

Recently, Paul Plack, AE4KR, had the opportunity to test out a Baofeng UV-82X - a version of this radio that covers both 2 meters and the 222 MHz band. With the aid of a spectrum analyzer - a device that gives a real-time display of the signals being produced by a piece of equipment - he found something very disturbing, as shown in the spectrum plot. While this may appear to be a jumble of lines, it tells a pretty scary story on several counts:



Plot of a Baofeng UV-82X showing much of its transmit energy NOT where it should be!

A "perfect" radio would have just a single vertical spike representing the transmitted signal - but since no radio is perfect, you could expect to see a rather small spike at the harmonics *(multiples)* of the transmitted frequency. Typically, this would be 50 dB down - about 1/100,000th of the strength of the main signal - but the plot tells a very different story: The 2nd harmonic is around 6 dB down - or about 1/4th of that of the original signal.

Because this radio was operating at 1 watt at the time, that means that its 2nd harmonic energy was around 1/4 of a watt - about 25,000 times ***higher*** that it should have been, about the same as "low" power on many handie-talkies! This signal would surely be heard far and wide, and the operator of the radio would likely have no idea at all that their radio was potentially clobbering another QSO or service - but would be responsible, just the same.

While the lack of filtering of the 2nd harmonic is bad enough, what's worse is junk being emitted at ***other*** frequencies above and below the intended frequency. In reading the analyzer, one can see that some of this energy is in the *milliwatt* range - and a good deal of it falls within both the civilian and military aircraft bands.

To put this in perspective, a 1 milliwatt *(1/1000th of a watt)* signal is perfectly audible when line-of-sight at a distance of 20 miles *(32km)* on 2 meter through 70cm. What this means is that it's possible that someone within a few 10s of miles of this radio, when it's transmitting, can hear "something" - likely with the operator's voice on it - and that it's also capable of clobbering weak signals trying to be received by others. Although it's difficult to be sure from the spectrum plot, it's likely that fully ***half*** of the power being emitted by this radio is ***not*** on the frequency indicated by the front panel display: Not only is this just plain illegal, it's certainly wasteful of battery power - and with such inefficiency, it's also likely that it's output circuitry is badly designed and simply won't last very long, anyway.

In other words, this radio should ***never*** be used by ***anyone*** at ***any*** time! If you bought one of these, you should probably return it for a refund or throw it away as it probably ***cannot*** be made to transmit legally - even with filtering, which would certainly defeat the whole purpose of having a small, inexpensive handie-talkie..

How can I tell if my radio is "clean" - and should I care?

If your radio bears the brand of a well-known, reputable manufacturer *(Icom, Kenwood, Yaesu, Alinco, etc.)* you are almost certainly fine - it's when one gets into the realm of the extremely inexpensive Chinese-made radios that the phrase "caveat emptor" *("Let the buyer beware!")* comes into play.

Not surprisingly, the Internet can be both friend and foe in this regard: For a given radio you'll find lots of people that say that the radio is "fine" - but have not really done any tests on it. The UV-82X can, no doubt, "hear" fine and bring up repeaters, but that tells one little about whether one would dare use it.

If you can, find reviews or articles that put the specific radio to the test using proper equipment such as a spectrum analyzer: The use of a wattmeter alone will likely tell you absolutely nothing about the radio being spectrally "clean". Again, just because you can buy the radio on Ebay or Amazon, it doesn't mean that it is "suitable for its intended purpose" - and the seller won't know either.

If you ***do*** buy an inexpensive radio of unknown build quality or performance, it's best to seek out someone with suitable test equipment: If there is interest in this sort of thing being made available at club meetings or at local swap meets, please let your club president know.

A spectrum analyzer has historically been a rare and expensive piece of equipment, but more recently there's the "Tiny SA" available for well under $100 can, ***if properly used*** can give a reasonable indication of a radio's performance in terms of spectral purity - but that could be the topic of another article!

September Member of the Month: Shawn Evans, K9SLE

by Linda Reeder, N7HVF

This month we are featuring Shawn Evans K9SLE.

Shawn has been around amateur radio all of his life. Shawn's grandfather had his advanced amateur radio license and he made contacts all over the world. Shawn works a lot with emergency preparedness and that is why Shawn got his amateur radio license and he says that amateur radio is a wonderful tool for emergency communications. Shawn received his technician license 1 year ago and that it is his goal to get his general license at the end of this year - then he wants to get his extra license at the end of next year.

Shawn was able to obtain a vanity call sign, K9SLE - the "K9" being for dogs *(he has two of them)* and the "SLE" is for his, name Shawn L. Evans. Shawn partners with a group of individuals which rescues dogs, attempts to train then and find new homes.

Shawn loves meeting new people and helping others get into amateur radio. Shawn enjoys working with other hams on packet radio, ten meters and six meters. Shawn is involved in several nets for different radio clubs. Shawn is a lifetime member of UARC, Arrl and the VHF Society. Shawn is a member of RACES and Ares. He works with the Emergency response team and is also a member of the Crossroads and Millcreek amateur radio clubs.

Shawn works for a systems integration company. Shawn uses amateur radio for emergencies, monitoring 146.52, which is the national simplex call frequency, daily at work. Shawn is also interested in exploring the 900mhz frequencies, some of which are used in businesses. Shawn has Baofeng, Anytone and Retevis handheld radios- the latter being the one Shawn uses for the 900mhz.

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Shawn, and his "dream" tower