

# The *Microvolt*

May 2021

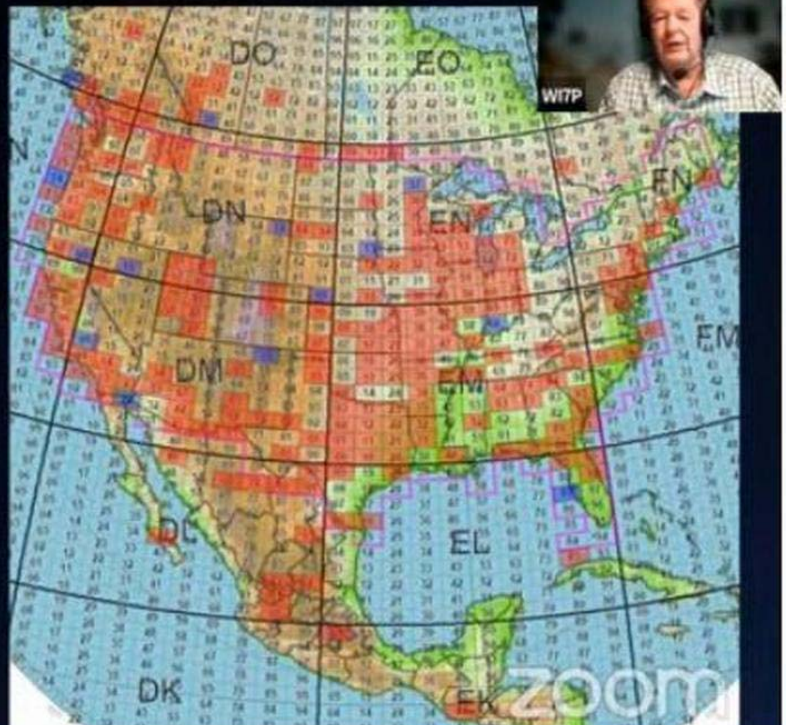
Stepp IR 6-20m 2 element  
30/40 Loop Dipole option  
6M passive element  
Diamond X3200A Tri Band  
145-148, 222-225, 440-450



FFMA/VUCC  
6m

VUCC Award	New LoTW QSLs	LoTW QSLs in Process	VUCC Credits Awarded	Total
Fred Fish Memorial Award	89	0	92	181
VUCC 50 MHz *	110	0	107	217
VUCC 144 MHz *	9	0	194	203
VUCC Satellite *	1	0	858	859

\* Award has been issued



## 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 except 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. Submissions by email are preferred (k7hfv@arrl.net), but other means including diskettes and typewritten submissions can be mailed directly to: Gordon Smith, 632 University St., Salt Lake City, UT 84102-3213. 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 2021 Board

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### Committee Chairpersons and Members

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Field Day Chair: (To be determined)	
License Trustee: Brett Sutherland, N7KG	801 298-5399
Repeater Engineer: Clint Turner, KA7OEI	801 566-4497
Autopatch Engineer: Gordon Smith, K7HFV	801 582-2438

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### IRLP Information

For information on using the club's IRLP node on the 146.76 repeater, check <http://www.utaharc.org/irlp>. If you need the access code, check with the secretary. Please do not give this out to nonmembers of UARC.

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>

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



# The Microvolt

The Official Publication of the Utah Amateur Radio Club, Salt Lake City, Utah  
Volume 64, Issue 5, May, 2021

## Latest News

### May (on-line) Meeting: *Antenna Modeling*

Modern antenna modeling software can be very helpful in learning how antennas work and sometimes in finding an alternate solution for something that will work in the space available.

Our speaker for the May UARC meeting is Mike Mladejovsky, WA7ARK, PhD EE, a long-time Utah resident, but currently residing in central Arizona. He was the father of the first repeater in the Salt Lake Valley and also was Utah's first frequency coordinator.

Mike says:

"I will be able to interactively show currents on the antenna elements, effects on the antenna's feed-point impedance of changing the physical dimensions of the antenna and height above ground, the effect of changing length of coax, and why baluns are necessary."

Our programs are currently available on on the web. To watch the meeting and even ask questions, go to:

<https://www.youtube.com/c/UtahAmateurRadioClub>.

You can start watching soon after 7 P.M. to make sure you have found the right place.

Except for July and August, UARC meetings are held on the second Thursday of each month at 7:30 P.M.

### Our Cover

Our cover this month shows shows a few of the images that Randy Kohlwey, WI7P, presented at our April meeting featuring the HF digital modes. These modes allow one to complete a QSO with a distant station in less than a minute. Randy showed us both the hardware (including antennas) and software that he uses to operate on these modes. He has made nearly 16,000 contacts in less than three years.

If you missed the meeting or just want ot watch parts of it again, it can be replayed on YouTube by going to:

<https://www.youtube.com/c/UtahAmateurRadioClub> and looking for the April 8 video.

### New RF Exposure Rules

The FCC has announced that new RF exposure rules go into effect on Monday, May 3. The complete Report and Order can be found at:

<https://docs.fcc.gov/public/attachments/FCC-19-126A1.pdf>. These are rules which deal with the possibility of the RF radiation from radio transmitters causing health problems for people coming within a certain distance of a transmitting antenna. Exactly how close the danger zone is depends on a number of things including frequency, transmitter power, feedline loss, and antenna gain.

Exposure rules are not new to the amateur service, but certain exemptions have gone away, such as not needing to do the calculations if your transmitter power was less than 50 watts.

For stations that existed before May 3, if you have already calculated that the station is safe for you, those in your household, and passers by, then you need do nothing further. However, if you relied on one of the exemptions (such as power less than 50 watts) then you have until May 3 of 2023 to make sure your station is safe. After May 3 of *this* year, any *new* station, or any existing station modified in a way that's likely to change its RFE profile — such as different antennas or placement, or greater power — will need to have an evaluation conducted by the date the new or modified station goes on the air.

ARRL has published a booklet to help operators make the required evaluation. It is currently available as a free download at:

<http://www.arrl.org/files/file/Technology/RFsafety/Committee/RF+Exposure+and+You.pdf>.

Also, quoting from a recent bulletin:

“The ARRL RF Safety Committee is working with the FCC to update the FCC's aids for following human exposure rules — *OET Bulletin 65* and *OET Bulletin 65 Supplement B for Radio Amateurs*. In addition, ARRL is developing tools that all hams can use to perform exposure assessments.”

Be sure to read Paul Plack's article on common misconceptions about the new rules. It is found on the following page.

## **7QP May 1-2**

The annual 7<sup>th</sup> call area QSO party or “7QP” will take place on the weekend of May 1 and 2. The object is for those outside the 7<sup>th</sup> call area to work as many stations and counties as possible *in* the 7<sup>th</sup> call area; and for those within 7-land to work as many stations as possible in other parts of the nation (or the world).

Darryl Hazelgren, K7UT, the Utah captain for the event writes:

“I'm asking again, for your help in ensuring we cover all Utah counties this year.

“If you can be on the air from *ANY* county for *ANY* amount of time, please send an email to [7qpops@codxc.org](mailto:7qpops@codxc.org) and let us know. It will really help us in our planning.

“If you would like to do a mini DXpedition or mobile operation and can find a way to give us some activity from Daggett or Grand County you could be a hero!

“Thanks & 73”

Full information about 7QP can be found at: <http://7qp.org/>.

## **Errata**

We made an unfortunate error in last month's *Microvolt*: We got Paul Plack's call wrong! The correct one is AE4KR. Our apologies, Paul.

## **What About Field Day?**

Will UARC be making an entry in the annual ARRL Field Day activity? Will it be devoting the June meeting to information about Field Day? The answer is simply that we don't yet know. We would like to support what is said to be the world's biggest operating event; however, we would not want to be responsible for even a single participant contracting a serious disease. We will keep watching recommendations from the medical community and make decisions accordingly.

The same is true of our traditional July Steak-Fry in Big Cottonwood Canyon. (The site has been reserved for us just in case!)

# The New RF Exposure Rules

By Paul Plack, AE4KR

The FCC recently announced rule changes effective May 3, 2021, affecting steps needed for hams to comply with its limits for RF exposure. Cases in which the changes will affect construction or operation of our stations will be rare. The biggest difference to most of us will be the need to conduct and document a formal evaluation. The blanket exemptions covering many typical ham stations are now history.

I was prompted to prepare this article by on-air conversations I've heard since the ARRL bulletin announcing the changes on April 12. See if you've heard any of these generalizations:

- (1) "The FCC is killing amateur radio with new regulations!"
- (2) "This is a non-issue. Almost all hams already comply with the new rules."
- (3) "This won't affect Technicians using handhelds. It's only a big deal for high-power HF operators."
- (4) "What? I can't afford the necessary test equipment!"

All four of these statements are misconceptions, but before we go any further, let's look at why RF exposure limits are even considered necessary.

In the ARRL publication, *RF Exposure and You*, last updated in 2003, the league's lab team explains that the greatest concern for humans exposed to strong radio signals is heat produced in body tissues. One mechanism by which this occurs is whole-body resonance, the mode in which your entire body acts as a receive antenna. It turns out that, when standing on the ground or a conductive surface, the average adult body acts as a quarter-wave vertical antenna, resonant near 35 MHz. If you're not directly over ground, you respond more like a half-wave dipole resonating at about 70

MHz. Children and shorter adults have whole-body resonances at higher frequencies, in proportion to their height.

At 160 meters, your body is a tiny fraction of a wavelength, so heating from RF is minimal. As frequency rises, your height gets closer to a quarter- or half-wavelength, and heating peaks between the 10m and 6m ham bands, just as would occur in a six-foot length of wire. Above the body's resonant frequency, absorption of energy declines again. Resonance reappears at the third harmonic of 35 - 70 MHz, near the 2m and 1.25m bands; but by that point RF current flow is concentrated more on the surface of your body, reducing the risk to internal organs. In this case, the term "skin effect" is literal!

There are other resonant effects in the body, including the tendency of your skull and sinus cavities to resonate at various frequencies above 400 MHz. This has been a frequently expressed concern with cell phones, but heating is increasingly confined to your skin at these frequencies, and the popularity of texting seems to have lessened the time people spend with phones glued to their heads.

Given this background, it's understandable why the FCC focuses on whole-body resonance as the biggest risk, and why RF exposure limits are stricter for the bands surrounding the 35- 10 MHz range than for the lower HF bands, or 70cm and above. There are more than a dozen questions in the Technician exam question pool dealing with these principles. If you passed over them lightly in your prep for the exam, this might be a good time to brush up.

Now — on to the debunking of assumptions (1) - (4) above:

(1) (“The FCC is killing amateur radio with new regulations!”)

These limits on RF exposure are not new! We've always been responsible for meeting them as licensees. What's changing is that hams no longer get a pass on conducting a formal evaluation just because we're operating mobile, or below certain power levels. Even if your station is and always has been compliant with the limits, you'll now have to do the math and have that documentation available at your station. There are stricter limits for spaces where the general public could pass near your antennas, and less-strict limits for your own property, rooms in your home, and other spaces where access is under your control. Fortunately, there are some good tools and guidance to make this math mostly painless.

(2) “This is a non-issue. Almost all hams already comply with the new rules.”

This change is not trivial. While the typical ham station will, as-is, comply with the limits, the fact that most of us have been exempted from formal evaluations will make this new ground for many. It's no longer enough to meet the limits. We'll now have to document, at the very least, the methods we used to determine that no further documentation was necessary.

(3) “This won't affect Technicians using handhelds. It's only a big deal for high-power HF operators.”

The assumption that a VHF handheld is less risky than a kilowatt HF station gets interesting if you use VP9KF's online calculator (URL below.) A five-watt, 2m FM handheld with a rubber duck positioned one inch from your head exceeds safe limits if transmitting continuously. Conversely, a 1500-watt CW or SSB station on 7 MHz, into a resonant dipole at only 20 feet, passes by a wide margin. It's not just about power, but also about duty cycle, frequency and distance. These calculations may surprise you.

(4) “What? I can't afford the necessary test equipment!”

What test equipment? None is required. The FCC and ARRL have teamed up to provide resources to allow these evaluations to be based on published manufacturer specs for output power, coax loss, antenna gain and other values. You're allowed to substitute projected values from antenna modeling software if you choose. You can make actual measurements, but you'll need a calibrated field strength meter if you choose that route.

The FCC also will accept any reasonable alternative method you choose to estimate RF exposure, as long as it's suitably precise and scientifically sound. They'll let you average exposure to include time spent receiving. If you find you just can't meet RF exposure limits with current operating parameters, you may calculate for yourself what reduction in power, repositioning of antennas, or other adjustments will bring you within limits.

I'm excited to become familiar with the available tools, because there are upsides to knowing for sure your station is safe. Imagine the situation of wanting to set up an HF antenna at an apartment building. Being able to show that RF exposure risks from your station are minimal could make the difference in getting permission. It will at least demonstrate technical competence and concern for the safety of others, which are good public relations.

The FCC has given existing ham stations until May, 2023, to have this documentation ready, but all the resources we need are free and available now. The ARRL press release, dated April 12, is available under the "News & Features" tab at [arrl.org](http://arrl.org). That story includes a link to the book, *RF Exposure and You*, which is a free PDF download. Chapter 4 explains the limits, how they were chosen, and how to determine compliance. Finally, find VP9KF's Amateur Radio RF Safety Calculator, which does the math for you, at [http://hintlink.com/power\\_density.htm](http://hintlink.com/power_density.htm).

## What Not to Say: “Back to the Group”

The FCC gives us the ability to talk about almost anything we choose using amateur radio. We are supposed to stay away from profane or obscene language and from using amateur radio to facilitate crimes, but that still gives a lot of latitude. However, there are a few phrases it is best to avoid because they disrupt communications, spread misinformation, or might merely get the speaker laughed at.

This month I'd like to talk about one phrase heard frequently that can result in long silences or double transmissions in QSOs involving more than two operators. It is “back to the group” or “over to the group.”

Group or “round-table” QSO's can be a lot of fun with three or more operators chatting. They are also great for getting the most mileage from a single frequency. Usually round-tables involve establishing an order in which the operators each get a turn to transmit, and then pass the chance to transmit to the next station in the sequence.

It can get a little tricky when a new operator joins the round-table. The newcomer will normally say “break” or give his callsign in the space between transmissions. The most common way to handle that is for the station who was about to transmit to pass “it” to the breaking station, and ask him to pass back to him when he is finished.

For example, if it was turned to Bill, but before Bill could transmit, Mary broke in, Bill might say “go ahead Mary and turn it to me when you're done.” That works well because Mary *might* have something to say that is time-sensitive. It's likely not an emergency, but it might be that she had a message for Sam who is leaving the QSO or she might be approaching a freeway exit and needing directions. All Mary has to remember is Bill's

name or callsign. As the round-table proceeds Mary will always pass it to Bill when she is done.

But occasionally, someone ends his transmission with “back to the group.” That's a wonderful way to turn a smoothly running round-table into general chaos. It's important to remember that the *last* thing in the world you would want is to have the entire group transmit at once! Unless you're a big fan of heterodynes, simultaneous transmissions are not pleasant or helpful to listen to. So don't ever turn it to “the group.” Triple or quadruple transmissions are usually not very useful and that's what you're asking for.

So what should an operator do instead? It may be hard for someone just joining the QSO to know who all are in the group and what the order is. But almost anyone should have enough mental capacity to remember the name, call, or even just the call suffix of one other operator. In most cases the right person to turn it to is the operator who first turned it to you. If you weren't able to catch his name or call, just say:

“Over to the operator who gave it to me.”

Surely by the time it comes around to the newcomer the second time, he or she should have had time to make a note of *some* feature that would identify the operator who should transmit next. But, maybe there are some operators that are just not capable of remembering a couple of letters in the call, the name, or what breed of dog the person owned. Fortunately most round-tables don't get more than one operator at a time who can't remember who he is supposed to pass to.

With a small amount of effort I think most of us can avoid being the one who is totally ignorant as to whom he is talking.

## Member of the Month

### Paul Plack, AE4KR

By Linda Reeder, N7HVF

This month we are featuring Paul Plack, AE4KR. Paul grew up in East Aurora, New York. There are two items that influenced Paul to get into amateur radio. The first one was that Paul loved to take things apart and put them together again. In 1967 when Paul was 13, his parents gave him a transistor radio for Christmas. This radio was an AM only pocket radio and ran on a 9-volt battery. He would save up his allowance so he could buy a new battery when the other battery died. Paul would always keep his radio under his pillow so he could listen to far away radio stations.

When Paul was a Junior in high school he had a friend who was an amateur radio operator. He convinced Paul to get his ham radio license. They got other students to join them and they started a ham radio club.

Paul received his Novice class license in 1972 and loved it. Because of Paul's love of commercial radio he worked in this field for 30 years. Paul was a disc jockey, a talk radio host and he wrote newscasts. Paul became a program director.

In 2006 Paul started working as an aviation podcast host and continued for five years. Paul finished his working years working with prosthetics such as knees.

There was another dream Paul wanted to pursue: Paul wanted to learn to fly. He was able to make this dream come true. He had a single seat gyroplane. Ultimately, Paul retired from flying. This was an expensive hobby; it cost too much to maintain it.

Paul married Cindy while living in Oregon. They have a son and a daughter. The son lives in

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Portland, Oregon, and the daughter in Eagle Mountain, Utah.

Between them, Paul and Cindy have eight grandchildren and one on the way. Cindy wanted to be close to her aging parents so in 2008 they came to Salt Lake, City, Utah.

Paul is a member of UARC, ARRL and the VHF Society. He upgraded to Extra class license in Florida in 1996. Paul also obtained his commercial license.

Paul enjoys building and maintaining repeaters. Currently Paul is building a ten-meter repeater. When it goes on the air it will be the only 10-meter repeater in Utah.

Paul, good luck in all of your endeavors.



Paul Plack, AE4KR with aircraft