

May 2021 Our 102th Year Volume 59, Issue 5

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Website: http://www.mvara.org/

The Voice Coil Newsletter of the Mahoning Valley Amateur Radio Association Established 1919

The Voice Coil

Field Day is coming up and I have a bit of a dilemma. Two of my regular operators have already possibly dropped out. That means if everyone else shows up like usual, we will be operating 4A unless a couple of other people step up to fill the holes. At the writing of this article we still don't know if we have the barn or not and won't know until May 7th when they open up again.

If we have the barn social distancing would not be a problem as there is always plenty of room when we are operating. The problem is when we are putting up the antennas. That is when we are in close proximity to others. We could put up a different type of antennas. Wires wrapped around a fiberglass pole with a auto-tuner between the radio and the antenna. Unfortunately the club does not have 6 auto-tuners and would have to rely on the members to provide them for the weekend much like most of the radios.

ARRL has left in place the same rules as last year and has a category so that operators can operate out of their homes and give credit to the club. Either way I need to hear from you if you plan on operating at the barn if we can get it for field day. Folks I feel the weight of the world on my shoulders with this I want to do field day but on the other hand I don't want anyone to get sick



either. Please reach out to me and let me know if you are planning on operating, or helping out with antennas and equipment. I NEED YOUR HELP. Call me at 727-501-5195 or drop me an email at <u>mvara.w8qly@gmail.com</u> other wise I may be calling you.

73, Scott, KE4UHC

<u>NEXT</u> <u>MEETING</u>

Monthly meeting May 13, 7pm. In person at GOP HQ 8381 Market St Boardman, OH 44512.

Meeting will also be shared on Zoom.

2021 Officers

President: Scott Wilton, KE4UHC Vice President: Mike McCleery, K8PRR Secretary: Ray Bishop, W8CSM, Treasurer: Dean DeMain, W8YSU Trustees: Mark Haverstock, K8MSH Joe Vasco, N8SEJ Andy Brinco, WA8ZLK John DeGutis, N8LVA

Newsletter Editor: Mark Haverstock, K8MSH

Awards Manager: Dave Fairbanks, N8NB, 330.759.6993, 4770 Logan Ave. Youngstown, OH 44505

The Mahoning Valley Amateur Radio Association, Inc, meets the second Thursday of every month. Location and time are subject to change. Dues are \$20.00 per year, \$10.00 each for additional family member. Contact Dean, <u>W8YSU@arrl.net</u> for membership details.

The club call is **W8QLY**; equipment operated under this call includes a two meter voice repeater at 146.745 (-600, 110.9 PL). Club email: <u>mvara.w8qly@gmail.com</u>

MONDAY NIGHT NET operates every Monday at 9:00. PM on 146.745 MHz.

SKYWARN NET - First Wednesday of the month at 8:30 PM on 146.745 MHz as weather warrants.

ARES NET- First and third Mondays of each month at 8:30 PM on 146.745 MHz; prior to the Monday Night Net.

2021 Contest University Announces Speaker Line-Up

The 2021 Contest University (**CTU**), held in conjunction with the Dayton Hamvention® starting at 1300 UTC on May 20, has announced its roster of speakers. The live Zoom webinar event is free. Registration opens on April 21. Talks will run for 45 minutes followed by a question-and-answer session. More information is on the CTU website. The 2021 virtual Contest University will be recorded and available on YouTube following the event. — *Thanks to CTU Chair Tim Duffy, K3LR*

ARRL to Extend Field Day Rule Waivers from 2020, Add Class D and E Power Limit

The COVID-19 pandemic-modified ARRL Field Day rules from 2020 will continue this June with the addition of a power limit imposed on Class D (Home Stations) and Class E (Home Stations-Emergency Power) participants. The news from the ARRL Board's Programs and Services Committee comes as many clubs and groups are starting preparations for Field Day in earnest. Field Day 2021 will take place June 26 - 27.

"This early decision should alleviate any hesitancy that radio clubs and individual Field Day participants may have with their planning for the event," said ARRL Contest Program Manager Paul Bourque, N1SFE. For Field Day 2021: • Class D stations may work all other Field Day stations, including other Class D stations, for points. This year, however, Class D and Class E stations will be limited to 150 W PEP output. • An aggregate club score will be published — just as it was done last year. The aggregate score will be a sum of all individual entries that attributed their score to that of a specific club. ARRL

Field Day is one of the biggest events on the amateur radio calendar. Last summer, a record 10,213 entries were received. "With the greater flexibility afforded by the rules waivers, individuals and groups will still be able to participate in Field Day, while still staying within any public health recommendations and/or requirements," Bourque said.

The preferred method of submitting entries after Field Day is via the web applet. The ARRL Field Day rules include instructions on how to submit entries, which must be submitted or postmarked by Tuesday, July 27, 2021. The ARRL Field Day web page contains for complete rules and entry forms,

Amateur License Refresher Answers: E2C01 (D), E2C02 (A), G5B01 (B), G5B02 (C)

Current Activities

<u>March 23-May 4, Tuesdays:</u> Technician license classes, 7pm. Testing date May 11, 7pm at GOP HQ in Boardman. Other club members who want to upgrade their licenses are welcome to attend. <u>Those taking the</u> <u>Technician exam MUST apply for an FRN on the FCC site prior to the test!</u> <u>https://www.fcc.gov/wireless/support/universal-licensing-system-uls-resources/getting-fcc-registration-number-frn</u>

May 13: Monthly meeting, 7pm, GOP HQ and Zoom. Digital VHF/UHF communications (DMR)

Comments, Questions?

Email: <u>mvara.W8QLY@gmail.com</u> Snail-mail: MVARA, P.O. Box 14141, Poland, OH 44514

Meeting ideas/ suggestions? Contact Dave, KD8NZF, KD8NZF@zoominternet.net

HAMFEST CALENDAR (Always subject to change—check before you go)

07/10/2021 - MANSFIELD Mid-Summer Trunkfest - Location: Richland County Fairgrounds - 750 N. Home Road - MANSFIELD, OH 44901 - Website: http://WWW.IARC.CLUB - Sponsor: Intercity Amateur Radio Club - Public Contact: Danny Bailey, W8DLB - 70 Euclid Street Shiloh, OH 44878 -Phone: 419-541-8557 - Email: <u>W8DLB113@GMAIL.COM</u>

<u>09/26/2021 - Cleveland Hamfest</u> -Location: Cuyahoga County Fairgrounds - 164 Eastland Road - Berea, OH 44017 - Website: http://www.hac.org - Public Contact: Mathew Nickoson, KC8NZJ - PO BOX 201173 Shaker Heights, OH 44120 - Phone: 8002533378 (800-CLE-FEST) - Email: <u>kc8nzj@hac.org</u>

Swap and Shop

1--W2NAN: True-Talk G5RV Jr. [51-ft] (company assembled w/17-ft 300-ohm and 70-ft cable & conn) 2--ALPHA DELTA: dx-40 3--HY POWER: (two) fsd40 4--HY POWER: triwarc (only 30 & 17m/NO 12m) 5--HY POWER: tri1020 6--HY POWER: 2b40801 (90-ft, greatest bandwidth) 7--PAR ELECTRONIC: ef-30, ef-20 & ef-17 8--ARROW: osj-144/440 j-pole 9--MFJ: mfj-1724B vhf/uhf mag. mnt. (dual band, 144/440) 10-MFJ: mfj-259c analyzer 11-YAESU: sp-101b speaker (6-in H/8-in W/11-in D) 12--ICOM: ic-7300 xcvr w/accessories 13--ICOM: sm-50 desktop microphone 14--PALSTAR: at-500 antenna tuner 15--PALSTAR: dl-1500 dummy load 16—ASTRON : rs-35a power supply Contact Ken, KC8Y, by email: cct66000@gmail.com

Updated Radio Frequency Exposure Rules Become Effective on May 3

The FCC has announced that rule changes detailed in a lengthy 2019 *Report and Order* governing RF exposure standards go into effect on May 3, 2021. The new rules do not change existing RF exposure (RFE) limits but do require that stations in all services, including amateur radio, be evaluated against existing limits, unless they are exempted. For stations already in place, that evaluation must be completed by May 3, 2023. 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 antenna or placement or greater power — will need to conduct an evaluation by the date of activation or change.

"In the RF *Report and Order*, the Commission anticipated that few parties would have to conduct reevaluations under the new rules and that such evaluations will be relatively straightforward," the FCC said in an April 2 *Public Notice*. "It nevertheless adopted a 2-year period for parties to verify and ensure compliance under the new rules."

The Amateur Service is no longer categorically excluded from certain aspects of the rules, as amended, and licensees can no longer avoid performing an exposure assessment simply because they are transmitting below a given power level.

"For most amateurs, the major difference is the removal of the categorical exclusion for amateur radio, which means that ham station owners must determine if they either qualify for an exemption or must perform a routine environmental evaluation," said Greg Lapin, N9GL, chair of the ARRL RF Safety Committee and a member of the FCC Technological Advisory Council (TAC).

"Ham stations previously excluded from performing environmental evaluations will have until May 3, 2023, to perform these. After May 3, 2021, any new stations or those modified in a way that affects RF exposure must comply before being put into service," Lapin said.

Amateur radio licensees will have to determine whether any existing facilities previously excluded under the old rules now qualify for an exemption under the new rules. Most will, but some may not. The ARRL Laboratory staff is available to help amateurs to make these determinations and, if needed, perform the necessary calculations to ensure their stations comply. ARRL Laboratory Manager Ed Hare, W1RFI, who helped prepare ARRL's *RF Exposure and You* book, explained it this way. "The FCC did not change any of the underlying rules applicable to amateur station evaluations," he said. "The sections of the book on how to perform routine station evaluations are still valid and usable, especially the many charts of common antennas at different heights." Hare said ARRL Lab staff also would be available to help amateurs understand the rules and evaluate their stations."

RF Exposure and You is **available for free download** from ARRL. ARRL also has an **RF Safety page** on its website.

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.

Ham Humor: RADIO HANDBOOK GETS BACK TO THE BASICS



By <u>K5KVN</u>, on the scene

NEWINGSTEAD, VT – The National Radio Retransmission Legion (NRRL) will release next week an updated version of its popular "Ham Radio Operator's Manual of Operating." This edition will be a departure from its usually highly technical subject matter. Instead, the NRRL says the authors decided to "get back to the basics."

"We need to stop being overly presumptuous about what the average amateur radio operator knows about using a radio," said NRRL spokesman Johnson Longfellow.

The operating manual begins with a simple "How To Get Started" list:

- 1- Obtain a radio
- 2- Connect a microphone to the radio*
- 3- Connect an antenna to the radio
- 4- Ensure the radio is connected to electricity
- 5- Find and activate the power or "on" button
- 6- Turn the big knob to make the numbers start changing**
- 7- Stop turning the big knob when you hear a signal**

8- Push the button that activates a transmission and begin to speak; release button when you want to hear their reply; repeat

* Applicable only if you want to actually talk with someone

** Not applicable if you are using a software-defined radio without knobs

"Yeah, there's a lot more to it than that. We especially hope this helps new hams, who usually feel like they know everything after having memorized the answers of an exam," said Longfellow.

HamHijinks.com

Antenna Build, Part 3

If you remember last month's project, we built a working antenna with the balun. This month, we'll be adding one or more bands to the antenna.

You can provide your own parts for this section of the project (listed below) or obtain a complete kit. All kit parts are ready to assemble.

Tools needed: open end wrenches/ nut driver, soldering iron and solder, wire cutters, crimper, wire stripper, electrical tape, drill, 1/8 in. bit

Parts List:

Wire, 16 or 14 AWG, cut for band you choose zip ties—3" and 6," UV resistant #10 ring connectors ½ inch Sched. 40 PVC pipe

1--Cut wire, for the band you choose. Calculate length using the formula:

468/MHz Ex. 468/14.200MHz (for 20m) = 33 ft.

This is the length used for the entire antenna on 20m, so fold over and cut in half—each leg will be about 16 ft. 6 in. (Figure 1)

2--You'll want to space the original 40/15m element about 4 in. from the element you're adding. Cut 10 pieces of $\frac{1}{2}$ inch PVC pipe 5 inches long for spacers. Drill 1/8 hole through the pipe, $\frac{1}{2}$ inch from the top and the bottom.

3-- Install ring connector on the end of each wire and attach to the antenna terminals. Wrap 6" zip tie around wire and balun as shown. (Figure 2)

4--Thread the antenna wire for the new band you're adding through the bottom hole of the spacer. Thread the 40m leg through the top hole if you haven't permanently attached the end insulators. If you have, cut a slit in the top of the spacer and fasten as shown in the illustration. (Figure 3,4)

5--Secure wire and spacers with zip ties. (Figure 5)

6--Antenna tuning. You'll need to tune the wire for the added band by trimming it as needed. Attach a length of coaxial cable to the balun, enough to reach the ground.



Figure 1 (not to scale)









7--Temporarily install the antenna, pulling the center and ends up in the air—up to 30 ft. or so if possible. Attach the other end of the coax to an antenna analyzer and check for the resonant frequency. Adjust length—more wire to lower frequency, less wire to raise frequency. In this particular example, you'll probably end up trimming the wire. We'll arrange a meet at Boardman Park to tune antennas.

A kit with wire and undrilled spacers listed above is available at cost, \$6, if picked up locally. If you want it mailed add \$5 for postage, total \$9. Contact Mark, <u>mh@zoominternet.net</u> for details or to order a kit. Understand that kits will not be "parted-out" and are sold as a complete set.



<u>Contest and Special Event Operating Information</u> Dave Fairbanks N8NB

Data below as well as more information courtesy of the following website: http://www.hornucopia.com/contestcal/index.html.

Μ	ay 2021			
+	Araucaria World Wide VHF Contest	0000Z, May 1 to 1600Z, May 2		
+	10-10 Int. Spring Contest, CW	0001Z, May 1 to 2359Z, May 2		
+	RCC Cup	0300Z-0859Z, May 1		
+	SBMS 2.3 GHz and Up Contest and Club Challenge	0600 local, May 1 to 2359 local, May 2		
+	Microwave Spring Sprint	0800-1400 local, May 1		
+	F9AA Cup, Digi	1200Z, May 1 to 1200Z, May 2		
+	ARI International DX Contest	1200Z, May 1 to 1159Z, May 2		
+	7th Call Area QSO Party	1300Z, May 1 to 0700Z, May 2		
+	AGCW QRP/QRP Party	1300Z-1900Z, May 1		
+	Indiana QSO Party	1500Z, May 1 to 0300Z, May 2		
+	FISTS Saturday Sprint	1600Z-1800Z, May 1		
+	Delaware QSO Party	1700Z, May 1 to 2359Z, May 2		
+	New England QSO Party	2000Z, May 1 to 0500Z, May 2 and 1300Z-2400Z, May 2		
+	K1USN Slow Speed Test	0000Z-0100Z, May 3		
+	OK1WC Memorial	1630Z-1729Z, May 3		
+	Worldwide Sideband Activity Contest	0100Z-0159Z, May 4		
+	ARS Spartan Sprint	0100Z-0300Z, May 4		
+	RTTYOPS Weeksprint	1700Z-1900Z, May 4		
+	MIE 33 Contest	2300Z, May 4 to 0300Z, May 5		
+	Phone Weekly Test - Fray	0230Z-0300Z, May 5		
+	CWops Mini-CWT Test	1300Z-1400Z, May 5		
+	VHF-UHF FT8 Activity Contest	1700Z-2000Z, May 5		
+	RSGB FT4 Contest Series	1900Z-2030Z, May 5		
+	CWops Mini-CWT Test	1900Z-2000Z, May 5		
+	CWops Mini-CWT Test	0300Z-0400Z, May 6		
+	RTTYOPS Weeksprint	1700Z-1900Z, May 6		
+	NRAU 10m Activity Contest	1700Z-1800Z, May 6 (CW) and		
		1800Z-1900Z, May 6 (SSB) and		
		1900Z-2000Z, May 6 (FM) and		
	EACW/ Maating	20002-21002, May 6 (Dig)		
Ħ	SKCC Sprint Europo	1900Z-2000Z, May 6		
H	NCCC DTTV Sprint	19002-21002, May 0 01457 02157 May 7		
H	NCCC Sprint	01452-02152, May 7 02307-03007 May 7		
H	K11 ISN Slow Spood Tost	20007-21007 May 7		
H	SAPL VHE/LIHE Digital Contast	20002-21002, May 7 05007-07007, May 8 (6m) and		
	SARE VIP/OIP Digital Contest	0700Z-0900Z, May 8 (0m) and 0700Z-0900Z, May 8 (2m) and 0900Z-1100Z, May 8 (70cm) and 0500Z-0700Z, May 9 (6m) and 0700Z-0900Z, May 9 (2m) and 0900Z-1100Z, May 9 (70cm)		
+	VOLTA WW RTTY Contest	1200Z, May 8 to 1200Z, May 9		
_		•		

SKCC Weekend Sprintathon + CQ-M International DX Contest + Arkansas QSO Party + 50 MHz Spring Sprint + WAB 7 MHz Phone/CW K1USN Slow Speed Test + 4 States QRP Group Second Sunday Sprint + OK1WC Memorial + RSGB 80m Club Championship, SSB + Worldwide Sideband Activity Contest + RTTYOPS Weeksprint + Phone Weekly Test - Fray + CWops Mini-CWT Test + VHF-UHF FT8 Activity Contest + CWops Mini-CWT Test + CWops Mini-CWT Test + QRP Minimal Art Session + RTTYOPS Weeksprint + EACW Meeting NCCC RTTY Sprint + NCCC Sprint + K1USN Slow Speed Test + NZART Sangster Shield Contest His Maj. King of Spain Contest, CW Feld Hell Sprint FISTS Sunday Sprint + Run for the Bacon QRP Contest + K1USN Slow Speed Test + OK1WC Memorial + Worldwide Sideband Activity Contest + RTTYOPS Weeksprint + Phone Weekly Test - Fray + CWops Mini-CWT Test + CWops Mini-CWT Test + RSGB 80m Club Championship, Data + NAQCC CW Sprint + CWops Mini-CWT Test + RTTYOPS Weeksprint + EACW Meeting - NCCC RTTY Sprint - NCCC Sprint + Hamvention QSO Party + K1USN Slow Speed Test + YOTA Contest + EU PSK DX Contest Baltic Contest + K1USN Slow Speed Test QRP ARCI Hootowl Sprint

1200Z, May 8 to 2400Z, May 9 1200Z, May 8 to 1159Z, May 9 1400Z, May 8 to 0200Z, May 9 2300Z, May 8 to 0300Z, May 9 1000Z-1400Z, May 9 0000Z-0100Z, May 10 0000Z-0200Z, May 10 1630Z-1729Z, May 10 1900Z-2030Z, May 10 0100Z-0159Z, May 11 1700Z-1900Z, May 11 0230Z-0300Z, May 12 1300Z-1400Z. May 12 1700Z-2000Z, May 12 1900Z-2000Z, May 12 0300Z-0400Z, May 13 1600Z-2200Z, May 13 1700Z-1900Z, May 13 1900Z-2000Z, May 13 0145Z-0215Z, May 14 0230Z-0300Z, May 14 2000Z-2100Z, May 14 0800Z-1100Z, May 15 and 0800Z-1100Z, May 16 1200Z, May 15 to 1200Z, May 16 1600Z-1759Z. May 15 and 2000Z-2159Z, May 15 2100Z-2300Z, May 16 2300Z, May 16 to 0100Z, May 17 0000Z-0100Z, May 17 1630Z-1729Z, May 17 0100Z-0159Z, May 18 1700Z-1900Z, May 18 0230Z-0300Z, May 19 1300Z-1400Z, May 19 1900Z-2000Z, May 19 1900Z-2030Z, May 19 0030Z-0230Z, May 20 0300Z-0400Z, May 20 1700Z-1900Z, May 20 1900Z-2000Z, May 20 0145Z-0215Z, May 21 0230Z-0300Z, May 21 1200Z-2400Z, May 21 2000Z-2100Z, May 21 0800Z-1959Z, May 22 1200Z, May 22 to 1200Z, May 23 2100Z, May 22 to 0200Z, May 23 0000Z-0100Z, May 24 0000Z-0100Z, May 24

+	OK1WC Memorial	1630Z-1729Z, May 24
+	Worldwide Sideband Activity Contest	0100Z-0159Z, May 25
+	RTTYOPS Weeksprint	1700Z-1900Z, May 25
+	SKCC Sprint	0000Z-0200Z, May 26
+	Phone Weekly Test - Fray	0230Z-0300Z, May 26
+	CWops Mini-CWT Test	1300Z-1400Z, May 26
+	CWops Mini-CWT Test	1900Z-2000Z, May 26
+	CWops Mini-CWT Test	0300Z-0400Z, May 27
+	RTTYOPS Weeksprint	1700Z-1900Z, May 27
+	EACW Meeting	1900Z-2000Z, May 27
+	RSGB 80m Club Championship, CW	1900Z-2030Z, May 27
+	NCCC RTTY Sprint	0145Z-0215Z, May 28
+	NCCC Sprint	0230Z-0300Z, May 28
+	K1USN Slow Speed Test	2000Z-2100Z, May 28
+	Feld Hell Sprint	0000Z-2359Z, May 29
+	CQ WW WPX Contest, CW	0000Z, May 29 to 2359Z, May 30
+	Day of the YLs Contest	0001Z, May 29 to 2359Z, May30
+	K1USN Slow Speed Test	0000Z-0100Z, May 31
+	QCX Challenge	1300Z-1400Z, May 31
+	OK1WC Memorial	1630Z-1729Z, May 31
+	QCX Challenge	1900Z-2000Z, May 31

DX Operating Information Dave Fairbanks N8NB

Credit for the below information and further information on these operations and others can be found at the following website: <u>http://www.ng3k.com</u>

Мау								
2021 May07	2021 May25	Christmas Island	VK9XX NEW	EB8DX	<u>DXW.Net</u> 20210415	By VK6SJ fm IOTA OC-002; focus on 80 40 30m; mainly FT8; wires, perhaps a vertical; QRV local mornings and evenings		
2021 May10	2021 Jun15	Niger	5UAIHM New	F4IHM	<u>TDDX</u> 20210416	By F4IHM fm Niamey; CW; 40 20m; wire antenna		
2021 May23	2021 Jun05	Martinique	FM	ON4RU Direct	ON4RU 20210314	By ON4RU as FM/OQ3R fm IOTA NA-107; 160-10m; only CW; holiday style operation; QRV for WPX CW as TO3F		
CQ WW WPX Contest, CW (May 29-30, 2021) Check here for pericontest activity too.								
2021 May30	2021 Jun30	Tonga	<u>A35JP</u>	LoTW	JA0RQV 20210404	By JA0RQV fm Tongatapu I (IOTA OC-049); 80-6m; CW, SSB, FT8; QSL via Club Log OQRS; See web for details; dates may change due to Covid-		

Are you ready for the new RF exposure evaluation regulations?



By Dan Romanchik, KB6NU

On Tuesday, April 27, Dan, W1DAN, ARRL Eastern Massachusetts Section Technical Coordinator, gave a Zoom presentation on the latest FCC regulations on RF exposure evaluation. These are spelled out in FCC-1926A1 (https://www.fcc.gov/document/fcc-maintains-current-rfexposure-safety-standards), "Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields; Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies." The document is as long as the title might suggest—159 pages—but W1DAN boiled it down, focusing on what these changes mean for radio amateurs.

A recording of the presentation can be viewed by going to https://drive.google.com/drive/folders/1_qIGZhHyMrha-axJt87Dcu0UZuJO0t8F.

After explaining how RF exposure can be harmful, Dan explained how the rules are changing: The biggest change, he notes, is that amateur radio's categorical exclusion has been eliminated. What this means is that now every radio amateur will have to perform an RF exposure evaluation of their stations. This now includes mobile and portable stations, including HTs, SOTA/POTA stations, and Field Day and special event stations.

He noted that you must be able to prove that your station is safe. This includes not only performing the evaluation, but also documenting these evaluations, should this data be requested by FCC personnel.

One thing that's not changing are the maximum permissible exposure (MPE) limits. These are spelled out in FCC OET Bulletin 65

(https://transition.fcc.gov/Bureaus/Engineering Technology/Documents/bulletins/oet65/oet65.pdf), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields." The FCC published this document in August 1997, but it's still the Bible when it comes to RF exposure. If you don't have a copy, or have never taken a look at it, you really should do so.

Be careful, though, when reading it. It contains a table (Table 1 on p. 21) that contains a list of output powers at various frequencies. If your station exceeded those limits, then you were required to perform an RF evaluation. Now, however, all amateurs (and other radio services, for

that matter) must perform RF exposure evaluations if their output power exceeds 1 mW. We are no longer categorically excluded from performing these evaluations.

OET Bulletin 65 goes on to give guidance on how to calculate or measure exposure levels. Explaining how to do this is outside the scope of this article, but again, you'll want to refer to the bulletin for more information.

Besides the elimination of the categorical exclusion for amateur radio stations, what else is new is the dates on which amateur radio stations must perform evaluations. They are:

•May 3, 2021(!!) for new and modified stations

•May 3, 2023 for stations that complied under the old rules.

Having said all that, the ARRL's RF Exposure page (<u>http://www.arrl.org/rf-exposure</u>) has a lot of resources to help you understand this topic and perform your own RF exposure evaluations:

- An RF-exposure FAQ (<u>http://www.arrl.org/files/file/Technology/RFsafetyCommittee/RFXFAQ.pdf</u>) to help hams understand the new rules.
- "Learning to Live with RF Safety (<u>http://www.arrl.org/files/file/protected/Group/Members/Technology/tis/info/pdf/QST_March 2009_p70-71.pdf</u>)," *QST* March 2009 pp. 70-71.
- RF Safety at Field Day (<u>http://www.arrl.org/files/file/Technology/tis/info/pdf/9906048.pdf</u>) QS7, June 1999, pp. 48-51. A case study of Field Day with NSRC in a public park
- RF Exposure Station Evaluation and Exemption Worksheets (http://www.arrl.org/files/file/Technology/tis/info/pdf/rfex1_2.pdf)
- *RF Exposure and You* (http://www.arrl.org/files/file/Technology/RFsafetyCommittee/RF% 20Exposure% 20and% 20You.pdf). This 8 Mbyte PDF file contains the text of the entire book by Ed Hare, W1RFI.
- Chapter 5 References

 (http://www.arrl.org/files/file/Technology/tis/info/pdf/RF%20Exposure%20Chapter%205.
 pdf) needed for filling out worksheet.

There are also links to FCC web pages with information on RF exposure.

I'm sure we'll all be hearing more about this in the days ahead. Hopefully, someone will come out with a simple way to do the modeling or make the calculations. As always, play safe.

Dan Romanchik, KB6NU, is the author of the KB6NU amateur radio blog (KB6NU.Com), the "No Nonsense" amateur radio license study guides (<u>https://</u>KB6NU.Com/study-guides/), and often appears on

Amateur License Refresher

Dave, KD8NZF



It's probably been awhile since you took your Amateur License exam. Here are a few sample questions from the current question pools just to keep those synapses firing.

Extra Pool

E2C01

What indicator is required to be used by U.S.-licensed operators when operating a station via remote control and the remote transmitter is located in the U.S.?

A. / followed by the USPS two-letter abbreviation for the state in which the remote station is located B. /R# where # is the district of the remote station

C. / followed by the ARRL Section of the remote station

C. / followed by the ARRL Section of the remote

D. No additional indicator is required

E2C02

Which of the following best describes the term "self-spotting" in connection with HF contest operating?

A. The often-prohibited practice of posting one's own call sign and frequency on a spotting network

B. The acceptable practice of manually posting the call signs of stations on a spotting network

C. A manual technique for rapidly zero beating or tuning to a station's frequency before calling that station

D. An automatic method for rapidly zero beating or tuning to a station's frequency before calling that station

General Pool

G5B01

What dB change represents a factor of two increase or decrease in power?

A. Approximately 2 dB

B. Approximately 3 dB

C. Approximately 6 dB

D. Approximately 12 dB

G5B02

How does the total current relate to the individual currents in each branch of a purely resistive parallel circuit?

A. It equals the average of each branch current

B. It decreases as more parallel branches are added to the circuit

C. It equals the sum of the currents through each branch

D. It is the sum of the reciprocal of each individual voltage drop

Answers pg. 2

Foundations of Amateur Radio

How much bandwidth is there?



Have you ever taken a moment to consider the available bandwidth on the various amateur bands?

As an entrant into amateur radio in Australia as a Foundation licence holder you have access to six different amateur bands, the 80m band, 40m, 15m, 10m, 2m and 70cm. If you add the bandwidth from each of those bands together, you end up with 26.65 MHz worth of bandwidth to play with in Australia.

I can tell you that's a big chunk of bandwidth, but until I give you some context, 26.65 MHz isn't likely something that you can picture.

You might think of things as being pretty crowded. For example, on the 40m band during a contest it's common to hear wall to wall signals. There's barely enough room to call CQ and not interfere with anyone else. But how crowded is it really?

Let's start with an SSB signal, typically it's 2.4 kHz wide. On the 40m band, with 300 kHz of bandwidth, there's room for about 125 SSB signals side-by-side. On the 10m band, there's space for over 700 SSB signals side-by-side. Across all the available bandwidth for a Foundation license holder in Australia, there's room for over 11-thousand different SSB signals side-by-side.

While we're on the subject of crowding, there's talk about the massive influx of FT8, some call it a scourge. FT8 channels are transmitted within a single SSB channel and each takes up 50 Hz. That means that within an SSB channel of 2.4 kHz, there's room for 48 different FT8 channels, and if you take into account the odd and even time-slots, that doubles to 96 different signals, all within the same single SSB channel. So while FT8 is popular and growing, let's not get too excited about how much space it's taking up. From the perspective of an Australian Foundation license holder, it's taking up exactly six separate SSB slots of those 11-thousand across the six available bands, room for 576 separate FT8 signals, taking up a total of 14.4 kHz, or 0.05% of the available bandwidth.

Let's look at this another way, of the 26.65 MHz available bandwidth, 20 MHz is from the 70cm band alone, that means that all the other bands put together, fit inside the 70cm band three times over.

Let that sink in for a moment, adding the 80m, 40m, 15m, 10m and 2m band together fit inside the 70cm band three times.

You can use the 70cm band alone for 800-thousand FT8 signals, remember that there's two time slots, so you get two for one.

If this makes your mind explode, then consider that a carrier wave signal is considered to be about 25 Hz wide, so on the 70cm band you could have 800-thousand individual CW signals. You could allocate a personal CW frequency to every one of the amateurs in the United States in the 70cm band and still have room for expansion, not that I'm advocating that, just to give you a sense of scale. I should note that the 70cm band in the United States is even larger than it is in Australia, but I don't want to get bogged down into the various band plans across the world at the moment.

You might ask yourself why am I getting so excited about this?

Amateur radio is about experimentation. I've been telling you about HF propagation and using techniques like FT8 to determine just how far your signal goes, but you could use the same techniques to build a 70cm communication network with the amateurs within your city and share information across the city, perhaps even build a mesh network using your 70cm hand-held and an FT8-call network. It could be used to distribute propagation information, or messages in case of an emergency, or form the basis of something completely different.

If that doesn't whet your appetite, consider that the 1mm amateur band, which runs from 241 to 250 GHz is ready for you to experiment when your license permits. The current world distance record is 114 km, set in 2008 by Brian WA1ZMS and Peter W4WWQ, it has 9 GHz bandwidth and has room for 360-million FT8 signals, or 60 exclusive FT8 channels for every amateur on the planet.

My point is that as radio amateurs we have access to a massive chunk of radio bandwidth and it's just sitting there waiting for you to experiment with.

I'm *Onno VK6FLAB*

• This article is the transcript of the weekly 'Foundations of Amateur Radio' podcast, produced by **Onno Benschop, VK6FLAB** who was licensed as radio amateur in Perth, Western Australia in 2010. For other episodes, visit <u>http://vk6flab.com/</u>.



The Last Word

"You have brains in your head and feet in your shoes, you can steer yourself in any direction you choose!" --Dr. Seuss

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