ARRL 10 Meter Contest 2017 Results

By Scott Tuthill K7ZO, k7zo@cableone.net

"That was painful" – by many participants

The 45th Annual ARRL 10 Meter Contest was held on December 9th and 10th, 2017. As commented on by everyone who participated, yes, conditions were terrible. Total logs submitted dropped 30% from 2016 to 1,793. Total reported QSOs dropped 65% from 2016 to 98,094. To put this in perspective in 2014, nearest this solar cycle's peak, over 2 million QSOs were reported. So QSO activity in 2017 was 95% below the best year of this solar cycle. During the 2014 contest there were several hours where reported QSOs were close to the total reported during the entire 2017 contest! Average QSOs per log submitted were just 55 versus 366 in 2014. Top category scores averaged just 24% of the scores in 2016.

The highest number of states worked was 43 by PT3T. The top number from North America was 42 by KTØK. Many Caribbean stations were completely shut out from working the US and Canada. Only three European stations reported working any states with CT7ACG coming in tops with five. Somewhat better, 12 stations in Japan managed to work stateside but they all just managed to work a single state. And that state was…Hawaii!

So, all in all, a pretty slow year. But, enough of this depressing reporting. In any contest there are always fun and interesting stories and positive perspectives to be had. The fact is operators around the world got on the air and made contacts, spending time participating in one of their favorite hobbies, amateur radio contesting.

All of the Top Ten, Winners, and Leader tables can be found at the end of the writeup.

The Big Story

The big story of 2017 was the wide ranging and long lived E-skip opening that occurred in North America right at the start of the contest. Operators who were in front of their radios at the opening bell had a fun filled few hours. As several commented afterwards:

- *Several very weak 0's and 7's later Fri expanded into a full-tilt Es opening, which really saved the contest. Much later the Es path bended to the south, and I worked a very strong K7JA and NX6T (Chip and Dennis) before the band shut down - Bill, N6ZFO*

- *I'm sure I'm repeating what others have said... if you didn't start the contest, you missed all the fun in the first 4+ hours – Max, NG7M*

- *I was very pleased to catch the sporadic E openings on Friday night. It resulted in 27 states – Lee, KY7M*

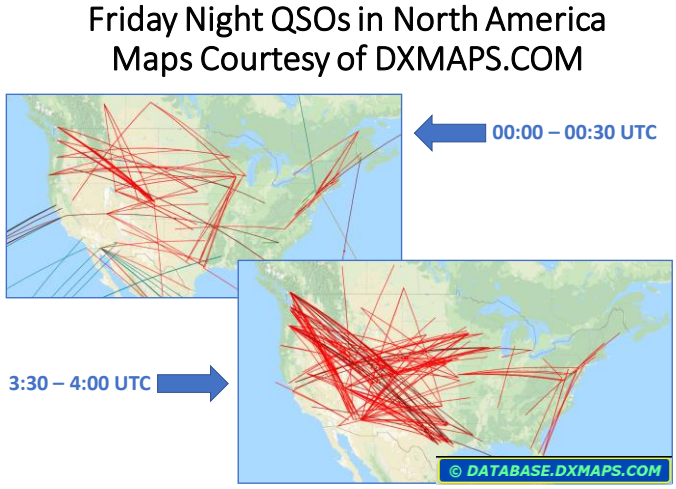

Figure 1 - Friday Night E-skip opening. (Maps courtesy of DXMAPS.COM)

For more information on E-skip openings during the 10 Meter Contest see the online results article for the 2016 ARRL 10 Meter Contest. Because of this opening, the first hour of the contest had the highest reported number of QSOs for the whole weekend and the second hour was the third highest. In the years I have been writing about this contest there has been nothing like this.

In total, 20% of the total QSOs made the whole weekend were made during those first four hours. Typically, in a high sunspot year, this percentage is closer to 4%. As a personal example from my Oregon multioperator participation, after that opening burst of QSOs we were able to scratch out just three more QSOs the entire rest of the weekend!

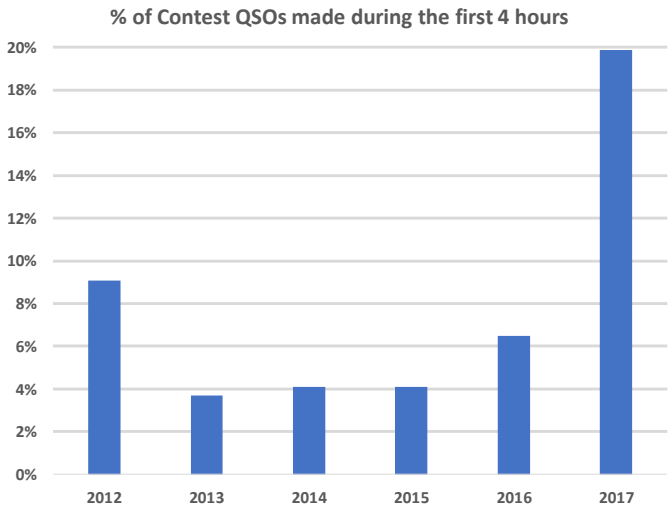

Figure 2 - The contest got off to a fast start in the first 4 hours.

2017 should be a good lesson for all. Drawing upon two classic proverbs — "The early bird gets the worm" and "He who hesitates is lost" — during a 10 Meter Contest in low sunspot years you must be ready for openings whenever they come. Of the 971 US stations that submitted logs 420 (43%) reported making a QSO during the first hour of the contest. Apparently, the word got around that the bands was open because by the end of the first four hours a total of 614 stations (63%) had reported making at least one QSO. That seems like a pretty healthy activity level and awareness by everyone of band conditions. Around 200 US stations who did not make a QSO during the first hour jumped on the air during the next three hours.

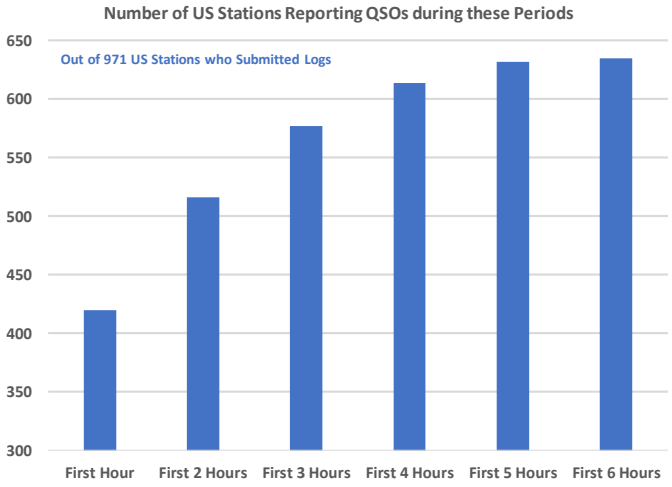

Figure 3 - As the word of the opening got around more stations got on the air.

Certainly, don't be like this guy, who will remain anonymous, lamenting in his comments, "Had it in my head that this was one of those 30 hour contests starting around noon on Saturday, so missed the big opening Friday evening. Watched a couple of movies on Netflix. Got around to checking the rules Saturday morning while setting up N1MM+ and realized my big mistake."

Remember even with poor conditions it is possible to make great QSOs. K5VIP completed his 10 meter Worked All States quest by catching a station in Delaware. And, it's still possible to get together and have fun with your friends as evidenced by these photos. After all, in low sunspot years you don't get distracted as much by the need to log QSOs!

Figure 4 - Here are contest founders Larry, WØPAN (left), and Bob, K8IA (right) enjoying a post contest chat. 2017 marked the 44th anniversary of the contest, which began in 1973. Per the sign in the window, yes 10 meters was open in 2017! (Photo from Bob, K8IA)

Figure 5 - The team at AA1JD. From left to right: Hugh, NC1M; Matt, AA1JD; and Bruce, AA1LH. This team placed 2nd in North America and 5th place Worldwide in the ever competitive Multioperator, Single Transmitter, High Power category. (Photo from Matt, AA1JD)

Another bright spot during 2017 was for contesters in Europe. During 2016 they had miserable conditions and on Sunday the band never really opened for anyone. Better

conditions were present in 2017 and the total reported QSOs from stations in Europe doubled from 2016. Both Saturday and Sunday mornings had periods of reasonable openings. Sunday afternoon from 1500 to 1800 UTC proved to be the best period of the contest for them. In his summary, Oliver, DH8BQA, had the rarest of all observations: “Much better than last year!”

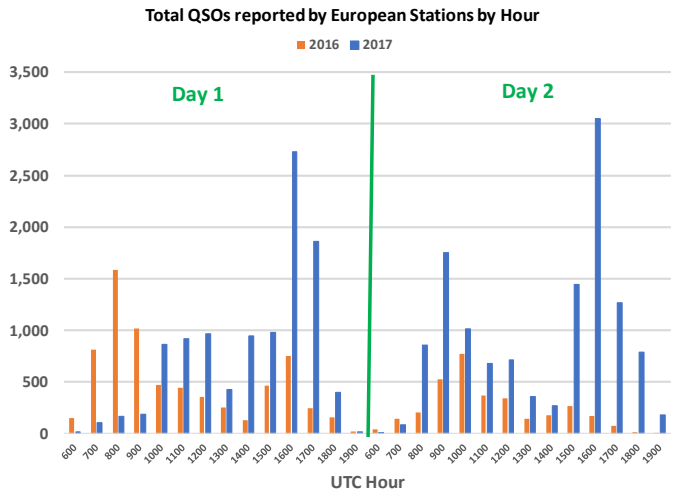

Figure 6 - Improved conditions in Europe over 2016 was a bright spot.

Reading through the Soapbox comments I always find great stories about what operators did during the contest when they weren’t on the radio. After all a fun contest weekend does not necessarily involve being in front of the radio the whole time.

- *Had more fun snow blowing the driveway on Sunday — Mike, VE9AA*
- *I did get to do substantial long overdue clean-up and organization in the garage-shack! — Peter, N6ZE*
- *Flew a drone for a while. Shot some boring video. Ate well. Speechless! — Bob, NX5M*
- *I did get a few shelves re-arranged, a few drawers straightened and the floor vacuumed — Edward, KN4Y*
- *Lots of shack stuff was completed — Fred, K4IU*
- *Did manage to get my Christmas Cards all written and ready to go to the post office, so all was not lost — Tom, KB8UUZ*
- *Threw in the towel and went out with the kids and cut some nice Christmas trees — Todd, KH2TJ/W7TR*
- *During the contest, I finished a book by John McPhee, read a full short story by Ben Rehder, before starting a third book — Richard, K5NA*

New All-Time Records

In a year like 2017, being able to set a new all-time record is a tough challenge. In fact, no new World, W-VE-XE, or DX records were set. One lone W Division record was set when KI9A made the first ever entry from the Central Division in the SOU-CW-QRP category. You have to give Chuck credit for operating QRP in a year with minimal propagation! In fact, 36 of the 42 W-VE-XE Section and DX Entity new records were set by operators submitting the first-ever entry in that category.

The following operators need to be recognized for managing to get on the air and actually beating an existing record:

W1QK setting a new record in CT for SOU-CW-LP with a score of 22,320, beating the old record of 20,976 set by K1IU in 2015

KD2RD setting a new record in NLI for SOU-MIX-HP with a score of 2,794, beating the old record of 2,346 set by W3EH in 2014.

HA3HX setting a new record in HA for SOU-CW-QRP with a score of 3,780, beating his old record of 60 set in 2016.

ON9CC operating as OT6M set a new record in ON for SOU-MIX-LP with a score of 18,180, beating the old record of 4,814 set by ON6FC in 2015.

4F3OM setting a new record in DU for SOU-CW-LP with a score of 2,772, beating the old record of 1,500 set by 4F3BZ in 2016.

VK2NSS setting a new record in VK for SOU-PH-LP with a score of 4,080, beating the old record of 952 set by VK2KDP in 2015.

ARRL Affiliated Club Competition

Club competition continues to be a popular and fun aspect of this contest. Operators get a chance to be part of a team while still operating from their home station. For many of us it is motivating to get on the air to make some points for our club or to compete for honors against rival club members. Many operators mention in their Soapbox something similar to: "Wanted to get on the air to make some points for our club." Just a way to create some fun on an otherwise dismal December weekend for 10 meter operation.

In 2017 a total of 506 operators submitted logs that were also credited towards ARRL Affiliated Club Competition. This means about 50% of the W/VE operators were part of one of the 35 different clubs that participated. Given the conditions this year club organizers were key in

motivating folks to get on the air. Way to go club organizers!

In the Local Category the Hampden County Radio Association (HCRA) took top honors among the five clubs in this category. With their win they dethroned the Central Virginia Contest Club who had won this category in five of the previous six years! HCRA's six entrants combined for a bit more than 60,000 points. Though well down from the 750,000 points it took to win this category in 2016, it was enough for a solid victory. Their success formula this year? Member turnout. They had as many submitted scores as any other Local category club.

Affiliated Club Competition

Club	*Score*	*Entries*
Unlimited		
Potomac Valley Radio Club	503,252	71
Minnesota Wireless Assn	367,286	55
Medium		
Yankee Clipper Contest Club	518,024	43
Frankford Radio Club	394,334	33
Arizona Outlaws Contest Club	351,148	29
Florida Contest Group	274,070	38
Society of Midwest Contesters	242,934	45
Northern California Contest Club	219,538	24
Central Texas DX and Contest Club	151,620	7
Texas DX Society	70,712	7
Northeast Maryland Amateur Radio Contest Society	35,558	8
Alabama Contest Group	33,504	6
Mad River Radio Club	32,356	9
Contest Club Ontario	31,968	14
Hudson Valley Contesters and DXers	28,754	8
South East Contest Club	21,892	6
Kentucky Contest Group	21,232	4
Western Washington DX Club	20,664	6
Mother Lode DX/Contest Club	16,098	12
Southern California Contest Club	15,860	15
Sussex County ARC	11,504	3
Contoocook Valley Radio Club	9,110	3
DFW Contest Group	6,812	7
Maritime Contest Club	5,418	3
Big Sky Contesters	4,514	3
Rochester (NY) DX Assn	4,398	6
Tennessee Contest Group	3,974	6
Order of Boiled Owls of New York	2,816	3
Willamette Valley DX Club	2,132	3
Six Meter Club of Chicago	1,332	5
Local		
Hampden County Radio Association	60,282	6
Kansas City Contest Club	36,408	3
Niagara Frontier Radiosport	25,552	5
Bristol (TN) ARC	2,658	4
Sunday Creek Amateur Radio Federation	1,896	6

* A minimum of (3) logs must be submitted by eligible club members for a club to be recognized in the Club Completition results.

* Clubs not listed above need to confirm they have filed an Eligibility List before the event. (See the ARRL Contest Club Tools web page for more information)

In the popular and always competitive Medium category, 28 clubs fought it out. In the end, the 43 members of the Yankee Clipper Contest Club (YCCC) came out on top by a healthy margin over second place and regional rival Frankfort Radio Club. YCCC's success formula? Participation. They had the second most entrants of any Medium club. This allowed them to finish ahead of other clubs who had much higher average scores per member. In fact, their average score per member was only 3rd among all Medium clubs. The Central Texas DX and Contest Club almost doubled YCCC's score per member, but they only had seven members submit scores.

In the Unlimited category only two clubs fought it out in 2017. Congratulations to the 71 members of the Potomac Valley Radio Club (PVRC) who came out on top by a comfortable margin over the Minnesota Wireless Association. They once again found themselves in their usual first place position after being dethroned in 2015 by the Yankee Clipper Contest Club. This means the PVRC has now won the Unlimited category five of the last six years. PVRC's success formula for 2017 was — this should be no surprise by now — member turnout. They had just as many members submit scores in 2017 as 2016 which is a testament to their organization and motivation. There are not many clubs that can pull that off.

Congratulations to all the clubs and their organizers!

Predictions for 2018

The 46th annual ARRL 10 Meter Contest will be held on December 8th and 9th, 2018. What might we expect this year? Well, it's pretty much the same as we experienced in 2017. We are at the bottom of the solar cycle and solar radio flux is pretty much as low as it can get. For the 10 Meter Contest, flux is everything. A lot of it generates good propagation. Not enough of it deprives us. During the 2017 contest Solar Radio flux was in the 70-72 range. Which is really low. Almost as low as it can get. Depending on who you talk to, the minimum solar flux index (SFI) is in the 64 to 67 range. So, in 2017 we just about hit bottom. And, unfortunately, the forecast for the 2018 contest is for the flux to decline more. Something in the range of 68 is forecasted. At this level though, from what you will experience on the bands, it should be the same as 2017.

Remember, though, even without high flux there was fun to be had by being in the right place at the right time and using your creativity and knowledge of propagation and operating modes. The contest started with a long period of sporadic E ionization covering much of the United States. Experienced 10 meter operators caught that opening and had some real fun. Europe also had better propagation in 2017 than in 2016.

Bill, N6ZFO said it perfectly with his Soapbox comments after the 2017 contest: *"Concept of blending meteor scatter, Es, ground wave and F propagation made this contest challenging and actually rather enjoyable"*

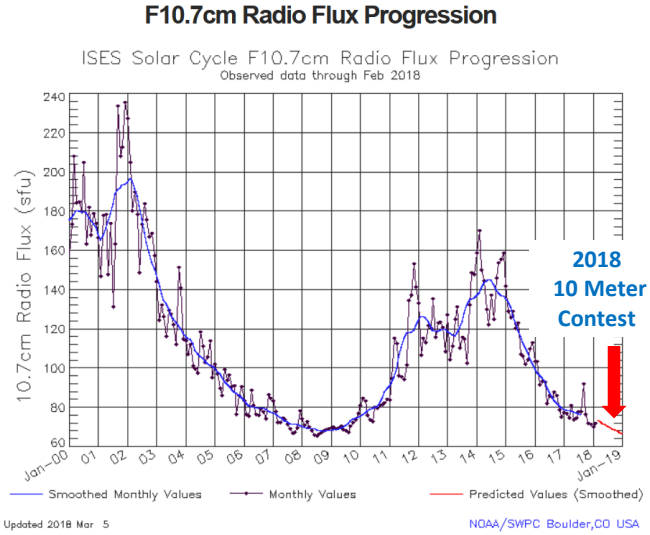

Figure 7 - Solar Radio Flux forecast (Chart courtesy of NOAA/SWPC)

My prediction is that these same opportunities will exist during 2018. You will have to work for your QSOs though just as in 2017. Let me repeat my advice from past year's articles about successful operating strategies for the ARRL 10 Meter contest. The strategies are:

First, an ability to operate CW will become more important for Mixed Mode entries or those Single-Ops interested in maximum QSO counts. CW is a much more effective emission mode in times of marginal propagation. In 2017, 76% of the reported QSOs were made on CW.

Then, searching out other propagation modes than traditional F2-layer ionosphere refraction will be key for those seeking top scores, meeting your personal goals, or just having fun. For instance: backscatter, meteor scatter, transequatorial (TE) and sporadic E ionization will become more important. If you are not familiar with these the ARRL Bookstore has several books which can help you out.

Having the patience and conviction to find path openings that may exist for only minutes over the whole weekend rather than hours on end. Meteor scatter is ethereal in nature with the path open for just a few seconds. It is best around your local dawn — though it could happen any time in the day. Sporadic E often occurs in the early evening hours just when you think you might as well walk away from the radio and the 10 meter band. "It's shut down for good!" may be your thinking. Well – not always. Regular F2 openings will be short, sometimes really short. As Jim, AD1C, mentioned in his 2015 soapbox: "I heard JM7OLW for about 30 seconds on Sunday." That was the extent of his opening from Colorado to Japan. Or as Steve, K6SCA, put it: "Many times the band would open for a minute or so, then just totally fade away. You never knew where your next contact would come from. "

It may also be tempting in these years to just say "I will just watch the spotting network and let others tell me when the band is open." This might work if you are a CW op and you live near, or have your own, *CW Skimmer* running. (*CW Skimmer* is a software package that uses an SDR to automatically log and report CW signals to the Reverse Beacon Net for distribution via the worldwide spotting networks. A "skimmer" is a complete package of receiver and software that runs continuously – *Ed*.) Remember 10 meter openings can be very localized and the band might be open for you and not a faraway skimmer.

My past studies have shown that skimmers often will not start producing spots until well after the band is actually open. For that study, see the "Expanded Results" article for the 2013 ARRL 10 Meter Contest. The reason being is skimmers typically have lower gain antennas than many contest stations, especially on 10 meters where beams of all size are more common.

My recommendation is commit yourself to actual seat time using that big knob on the front of the radio to tune the band yourself to see what you can hear. If you don't hear anything, fine, get up and walk away — but not for too long! Come back in 15 minutes, or 30 minutes, and check again. In 2016, Robin, K1RCT, applied this strategy well. As he described his operating strategy being made of: "2 hours of 'Oh, I have ten minutes, ok sit down and operate...' time." Your best technology assist might come from a band scope or panadapter in your station that gives you a visual indication of your band activity. By doing it this way at some point you will catch a band opening and have some fun. Also remember if everyone just listened all the time, no one would know if the band is open. So, even if you encounter a seemingly dead band, try calling CQ for a while. The key to a successful operating strategy in 2018 will be more to catch the band opening than to work it.

Additional Analysis and Insights

In the six prior years I have written about the ARRL 10 Meter Contest, each year I have provided additional in-depth analysis beyond the results and people. The intent is to provide insight into contest strategy and planning, how the 10 meter band behaves, or just something to satisfy my, and hopefully your, curiosity. In past years I examined the following topics. These articles can be found on the

ARRL website in the 10 Meter Contest Expanded Results articles.

2011
- A Skimmer View of the Contest -- looking at Europe, Asia, and South America openings
- Skimmer Spots Counts as a way to Predict Scores?
- Phone versus CW Mix -- A magic formula?
- A Bit of Contest History

2012
- A Skimmer View of the Contest -- looking at the North America to Europe Opening as well as some perspectives on skimmer spot quality and usage.
- Contest Planning Insights -- characterizing the locations and activity levels in the US by state.

2013
- A look into the North America to Europe opening
- Contest logging program usage

2014
- Breakthrough animated movies of propagation from the US to major contest areas.
- A look at late evening activity in the US and its impact on three close races
- A updated look at contest logging program usage
- New world records established in 2014
- So how many stations really were on the air and how many QSOs were made?

2015
- An updated look at contest logging program usage
- New world records established in 2015
- Total contest activity – how many stations were on the air and how many QSOs did they make?
- Investigating propagation differences in the US between 2014 and 2015

2016
- A very deep dive into 10 meter propagation and how both E-skip and F2 propagation played roles during the contest with visual QSO "movies" to demonstrate.
- An update on entry category usage three years into the Unlimited Category era.
- Updated World, W/VE/XE, and DX records. (News flash for 2017! There were no changes in these.)
- My annual update on logging program usage.

Contest Logging Software – An Update

This year I will once again provide an update on logging program usage. Then I am going to take a very deep dive into Log Check Reports and what we can all learn from them to be better operators.

As I have done in past years, I looked at what logging programs were being used for the ARRL 10 Meter Contest. With access to Cabrillo log files it is easy to investigate. One of the standard Cabrillo tags is "CREATED-BY:" which is followed by the name of the logging program. A simple Python program looks through all the logs tallying the programs everyone used.

For the 2017 ARRL 10 Meter Contest logging program usage looked like this:

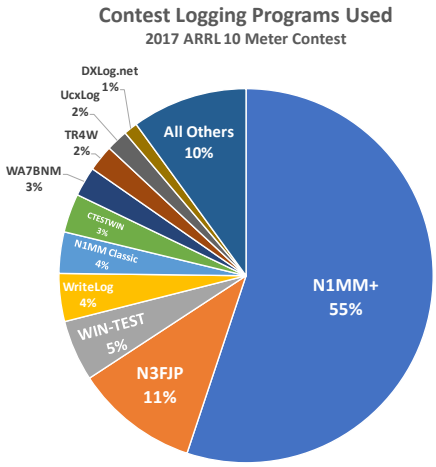

Figure 8 - Logging programs used during the 2017 ARRL 10 Meter Contest.

There are a few programs on this list I am not familiar with. The ARRL 10 Meter Contest is a worldwide event and there are several countries that have a logging program that is popular just in their country or region. For example, *CTESTWIN* is popular in Japan and *UcxLog* and *DXLog.net* are popular in Central and Eastern Europe. There are also a substantial number of operators who still log by hand and then use the WA7BNM Cabrillo Web Form to create their log file.

In 2017 there were more than 50 different logging programs in use. Overall though, the *N1MM* family is used by far more contesters than any other logging program. It is used by more than five times as many contesters as the second most popular logging program, *N3FJP*. Looking into the *N1MM* family itself you can see the migration to *N1MM+* marching along. 2017 represented the fourth running of the ARRL 10 Meter Contest since *N1MM+* was launched in August 2014. In 2017 94% of *N1MM* users were using *N1MM+* versus 53% in 2014.

The *N1MM+* functionality that encourages/forces you to use the latest version seems to be effective as well as almost 75% of *N1MM+* logs were created by the latest version at the time of the contest. Whereas among the *N1MM Classic* users there were more than 30 different versions in use stretching across 7 different major releases.

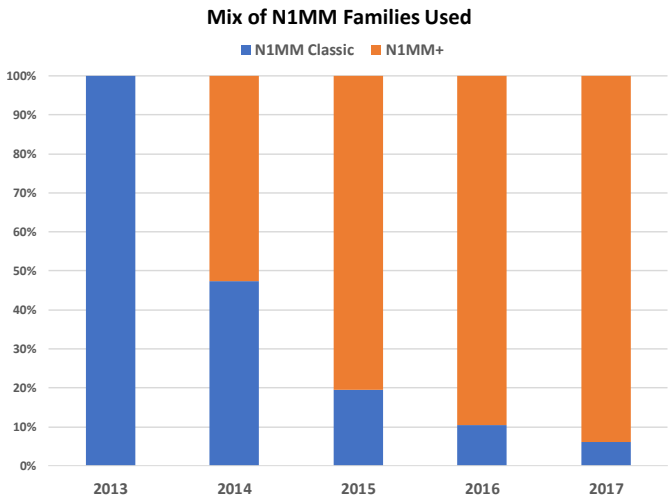

Figure 9 - Mix of N1MM types in use during the ARRL 10 Meter Contest.

To observe longer term trends in program usage I compared the logging programs used in 2017 to those used in 2013. Among the Top 10 programs, the *N1MM* family is the only one to show significant growth. *N1MM* family usage has increased from 45.4% of logs in 2013 to 58.6% of logs in 2017. Both *Win-Test* and *TR4W* usage have declined over the same period by 2.1% and 2.8% respectively. *WriteLog* usage has also decreased by 1.6%. The overall story is really one about continued consolidation around one major logging platform – *N1MM+*.

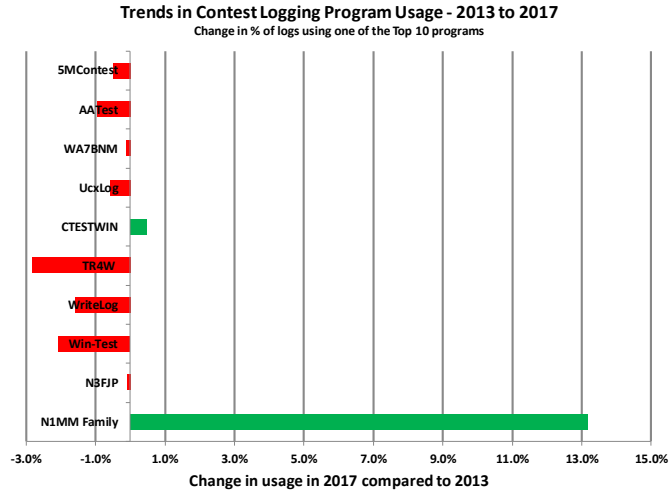

Figure 10 - Change in usage among popular logging programs – 2013 to 2017.

Another perspective about contest logging program that I have heard discussed is "What do serious contesters use?" Using a metric of "Average size of log submitted" seems at least plausible to provide this insight. Serious contesters usually make more QSOs than the casual ones. Using this metric the view looks as follows:

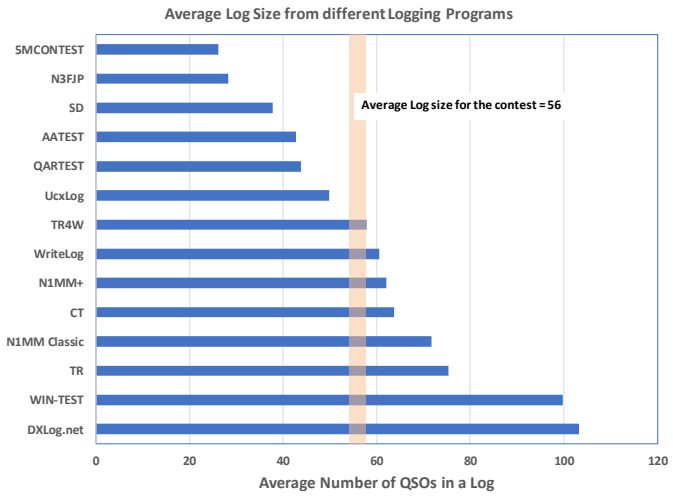

Figure 11 - Average log sizes by popular logging programs during the 2017 ARRL 10 Meter Contest.

DXLog.net and Win-Test users have the largest average log size. Almost twice the average log. *CT* and *TRLog* also have logs larger than average. For these two "oldie but goodie" loggers there must be some die-hard users among a few serious contesters. *WriteLog* and *N1MM* all have pretty much the same log size. Just a little above average. Also interesting is that *N3FJP*, which is the second most popular program, has relatively small logs at less than half the average log size. It would thus seem to appeal to more casual and beginning contesters. (*N3FJP's* simplicity and low cost make it an excellent logging program to try if you're just getting started – *Ed.*)

Exploring Log Check Reports

In the January 10th, 2018 issue of the ARRL's *Contest Update*, the editor, Brian, N9ADG suggested to the contest community that there were many untapped opportunities in analyzing Log Check Reports (LCR). As a refresher, a Log Check Report is prepared for each operator that submits a log in many of the larger contests. Specialized and highly sophisticated software examines every contact in the log to determine if it is a Good QSO or if there is something wrong with it — a "Busted" QSO. Was the call sign or contest exchange copied incorrectly? If one of these was copied incorrectly, what was the correct version? Was the claimed QSO in the log of the operator on the other side? Was it a duplicate of another QSO in the log? In some cases, the log check software will identify call signs that showed up in your log alone. They are called "Uniques."

Each contest looks at different aspects of the QSOs. But what is similar is that as a contest entrant you will be provided with a report, a Log Check Report (LCR), that details all the findings. It will also provide you with your

final "checked" score and reconcile why is it different than the "raw" score you submitted.

So, for this year's deep dive investigation I took up Brian's challenge and will analyze the LCRs from two ARRL 10 Meter Contests. ARRL Contest Branch Manager, Bart Jahnke, W9JJ, provided me the LCRs for each participant in the 2017 and 2014 contests. My perspective is to present what we can all learn about improving log accuracy. There is no intent to point fingers at specific operators — except those that are exceptional in their accuracy. Currently, ARRL LCRs are a private communication from the contest sponsor to the contest participant. I am not going to violate that. (So, I will not be touching on many of the examples that Bart, W9JJ, suggested as they are directed at providing feedback to specific operators.) Let's start by looking at the 2017 edition.

The Exceptional Among Us

If a log is checked and is found to have no errors, other than duplicate QSOs, it is called a "Golden Log." Of the 1,793 logs submitted for the 2017 ARRL 10 Meter Contest a total of 749 were Golden! At least to me it was a total surprise that 42% of the logs were Golden. True, these logs tended to be smaller than average – it is easier to have a Golden Log if you don't make a lot of QSOs. The 749 Golden Logs contained 17% of the reported QSOs. Or, looking at it another way the average log had 56 QSOs whereas the average Golden Log had 23 QSOs. Still it is possible to have a large Golden Log and the following operators should be recognized for having Golden Logs at least twice the average log size. Well done all!

Table 1 – Golden Logs

Call sign	*# of QSOs*	*Entry Category*
KY7M	341	SOU-MIX-HP
SP8N	187	SOU-PH-HP
NN7ZZ	170	SO-CW-HP
OHØZ	142	MSHP
DK1AX	140	SOU-CW-HP
N7EPD	136	SO-CW-HP
DL9ZP	130	SO-CW-LP
OH2PM	125	SOU-CW-HP
N1SOH	124	MSHP
N6VV	120	MSHP
DL4WA	116	SO-CW-HP
N1IX	116	SO-CW-LP
AF1T	113	SO-PH-HP
OF6MW	113	SOU-CW-HP

Summarized conclusions of looking at busted QSOs in the LCRs.

This is going to be a long, dry, and grueling study. If you are an inquisitive analytic type, you will love it. Not everyone is that way. Let me summarize the findings for those that are just interested in the conclusions. If you want to improve your logging accuracy here are lessons learned from this study:

If you want to improve your logging accuracy in the ARRL 10 Meter Contest

- Double check every exchange that is suggested to you by a "pre-fill" or "history" capability in your logging program
- On a Phone QSO if you hear "New" in the exchange, don't assume it is New York. If you are not sure, spend the time to make sure it is not New Jersey or New Mexico.
- Review your Cabrillo file before submitting for formatting errors and respond to any e-mail replies from the contest sponsor about errors in your log.
- As the contest progresses, and serial numbers get longer, increase your diligence in correctly copying them, especially on CW
- Study up and be comfortable copying CW serial numbers from operators using cut numbers.

Figure 12 - Major lessons learned from examining the Log Check Reports – Part 1.

If you want to help other operators copy your call & exchange in the ARRL 10 Meter Contest

- Always use standard Phone phonetics
- Don't use CW cut numbers when sending serial numbers
- If you hear a station return a mis-copied callsign, correct them before going to the next QSO.
- If you have a choice, don't use a callsign that operators don't expect. For instance, special callsigns containing two numbers in the prefix, where that is not the standard for the country are troublesome. For example, in 2014 OG55W was busted in almost 1/3 of the logs.
- When giving a Phone serial number exchange that in whole, or in part, contains number from 60-69, 40-49, and 30-39 be extra careful in enunciating the numbers.

Figure 13 - Major lessons learned from examining the Log Check Reports – Part 2

Where did these recommendations come from? Let's start by taking some broad views of what sorts of errors were made in copying the call sign and/or exchange of QSOs in the 2017 contest. Of the 98,105 reported QSOs, 71,174 or about 72% were able to be cross-checked in the log checking process. This means that logs were submitted from both stations involved in the QSO. Of these 2,212 or 3.1% had some sort of error. The error rate for CW QSOs was the same as for Phone QSOs — 3.1%. The error rate for copying call signs was noticeably lower than for copying exchanges — 1.2% vs 1.8%. And, the error rate for copying call signs in CW QSOs is actually 20% lower than in Phone QSOs. This could be due to skimmers and the Reverse Beacon Network distributing call signs to Unlimited operators. Torturing the data some more should tell this story but I am going to leave that for another time.

QSO Error Rates
2017 ARRL 10 Meter Contest

	All QSOs	Phone QSOs	CW QSOs
Busted Call	1.2%	1.5%	1.2%
Busted Exchange	1.8%	1.6%	1.9%
Total Busted	3.1%	3.1%	3.1%

Figure 14 - Overall QSO Error Rates.

From the total picture you can see that for Phone QSOs there is a fairly equal chance of busting the call sign or the exchange. However, for CW QSOs the chance of busting the exchange is almost 60% higher than busting the call sign. Why might that be and what lessons can be learned and what steps can be taken to improve?

One unique aspect of the ARRL 10 Meter Contest is that some exchanges are letters, for those stations in W, VE, and XE and some exchanges are serial numbers, for the rest of the world. Let's look at the error rates for stations with each type of exchange.

Exchange Copying Error Rates
2017 ARRL 10 Meter Contest

	All QSOs	Exchanges with Letters	Serial Number Exchanges
Phone QSOs	1.6%	0.58%	2.16%
CW QSOs	1.9%	0.75%	3.61%
All QSOs	1.8%	0.73%	3.15%

Figure 15 - Exchange Copying Error Rates.

Now we might be on to something! Torture the data long enough and it will confess. QSOs with serial number exchanges are 4.3 times more likely to be copied in error than QSOs with letters for the exchange. This ratio is also higher for CW QSOs than Phone QSOs, 4.8 vs 3.7. What this is really telling us that the exchange logging error rate for CW QSOs with serial number exchanges is 6.2 times that for Phone QSOs with letters for the exchange.

There could be several reasons for the difference. If numbers in general are harder to copy than letters in CW this would be a cause. A serial number exchange is also somewhat random and unbounded. Within broad limits it could be anything. There are also many variations of "cut number" abbreviations that an operator must translate. Conversely, potential letter-based exchanges are finite based on the total number of states in W and XE and provinces in VE. They are also always made of 2 or 3 characters. In many cases the call sign also narrows down the potential exchanges. If a VE4 calls you and you think you hear him or her send "599 BC" you know better double check. Similarly, if a W1 calls in and you copy "59 WA" you might double check that is was not "59 MA". Finally, it is also possible that the logging program being used has a "pre-fill" capability for stations with letter-based exchanges that is not possible with serial number exchanges. A station would not have to type the exchange — just confirm, if they even bother to do that, what they hear is what was entered for them.

So, all in all, there are many more challenges in logging an accurate QSO from stations who are giving out serial number exchanges. It shows in the error rates. The opportunities for improvement are in practicing copying numbers on CW, including being fluent in "cut numbers". Also, simply asking for repeats if you are not sure you logged the correct number could lead to improved accuracy.

Busted Call sign Case Studies

Now that we have made some big picture discoveries, let's look at some specific examples. First, we will look at the call signs that were the most busted in logs. In the scoring of the ARRL 10 Meter Contest copying call signs correctly is a high priority. If you mis-copy one you lose not only that QSO from your final score but a penalty of more additional QSO of the same points. If you mis-copy an exchange you only lose credit for that QSO. So, the highest priority is to get the call sign copied correctly. Note this examination is not an investigation into the operating of the operator with the call sign being studied. Rather, it is a study of everyone who worked them. Remember, LCR's are private so I am not uncovering anything specific to a single operator or station.

For stations who were reported in more than 100 logs the Top Five most frequently busted calls, measured by % of QSOs busted were:

Table 2 – 2017 Most frequently busted call signs

Call sign	*% of QSOs busted*
LU9DDJ	8.4%
PA/PY2SEX	4.7%
LQØD	4.5%
P4/DL6RAI	4.0%
DL9ZP	3.8%

Remember, the overall average for the contest is that 1.2% of QSOs had the call sign busted. These five were busted at rates 3 to 7 times greater than average. Let's look at each one of these.

LU9DDJ operated as a Single Operator Unlimited, Phone Only, Low Power station. He spent most of the time running versus searching and pouncing (S&P) around the band. Meaning most of the QSOs with him by other stations involved them calling LU9DDJ. Twelve of the 14 times his call sign was busted the call logged was LU9DDS. There was only one instance of him being spotted as LU9DDS and none of the busted call signs was made anywhere near that time. So, what happened here?

Short of having a recording of LU9DDJ's QSOs, this one is going to go down as a mystery. All that I can think of is there may have been something in the way the "J" was enunciated that led to some operators believing they heard an "S" instead of a "J". Remember though, the vast majority copied the "J" correctly. This is a good reminder to always use standard phonetics when operating Phone.

PA/PY2SEX operated as a Single Operator Unlimited, CW Only, Low Power station. About 2/3 of the QSOs were made while running and about 1/3 while S&Ping. Three of the five times the call sign was busted involved errors with the "E" — two of those where it was missed totally and the call sign logged being PA/PY2SX. Both of these were during a S&P QSO by PA/PY2SEX. One of the busted calls logged while running was for "PA/PY2WSX" which is likely just a keyboard typo since the "W" and "E" are next to each other on keyboard. During the contest there were eight Reverse Beacon Network or skimmer spots for "PY2SEX" — the correct call without the "PA/" prefix. None of these lead to a busted QSO in anyone's log. That is a good testament to operators double checking what is spotted to what they hear. So, its hard to draw any lessons from this one. One finger slip on the keyboard and a couple of dropped "dits".

LQØD submitted a Multioperator, Low Power entry. Since their log did not include specific frequencies is it hard to estimate how much they were running vs. S&P-ing. There were six different call signs in the seven times their call sign was busted. None of the busted call signs were spotted. So the busts were seemingly due to random logging errors. Most often the "Q" was busted, being copied once each as "Z", U", and "Y". Once the "D" was copied as an "N" on CW — somehow an extra "dit" snuck in there. Twice on CW they were logged as LQØDK – likely because the other operator thought the "K" was part of the call sign instead of them signing clear. So again, its hard to learn anything from this one.

P4/DL6RAI operated as a Single Operator Unlimited, CW Only, High Power station. About 80% of his QSOs were made while running. Six of the seven times his call sign was busted was while he was running (calling CQ). Twice the final "I" was missing from the call sign, three times the "6" was logged as a "4", and once the "P4" was logged as "PV". We can see some similarities with other errors uncovered so far. "Dits" at the end of the call sign in CW were lost, and numbers being miscopied. The first station that logged this station as P4/DL4RAI actually put out a spot with the call. But, this did not lead to any further logging errors. Once again a positive testament to operators double checking what is spotted to what they hear. The other two times the "6" was copied as "4" were back-to-back QSOs from stations with the same postal address given in the log file. In this case the propagation of error was quite local in nature!

The final call sign of the Top Five is DL9ZP. He operated as a Single Operator, CW Only, Low Power station. Since his log did not include specific frequencies is it hard to estimate how much he was running vs S&P-ing. Twice the "Z" was copied as a "G", once the "P" was copied as an "L" and once the "9" was copied as an "8". The "Z"/"G" error could be due to missing a "dah" in the "Z". The other two could be CW copying errors or keyboard typos as the two characters are close to each other on the keyboard. None of the busted call signs logged were ever spotted.

So what can we learn from looking at the five call signs? Unfortunately, not much, as this is a case where the data is pretty sparse. There just are not enough examples from which to draw clear trends. Later I will look at the data from the 2014 contest that contains 20 times the QSO data. Maybe we can learn something then.

Moving on now let's look at busted exchanges. We already know that exchanges with numbers in them are busted 4.3 times as often as exchanges with letters in them. Also that exchanges in CW QSOs are busted about 20% more often than exchanges in Phone QSOs.

Let's start looking at Phone QSO with letter-based exchanges. This is the most accurate of situations with only 0.58% of exchanges busted. Looking through the data at first it seems random. How could someone who is saying "59 Oregon" be logged as "59 CA"? Well what this probably means is the source of most of these types of errors are due to outdated "pre-fill" files and forgetting to confirm the exchange before logging it. Somewhere around 80% of logging errors in these QSOs are due to this issue.

There is another set of errors that may be due more to actual over the air copying mistakes. There are several examples where stations in New Jersey were logged as in New York, and vice versa. So, the lessons from this class of QSOs are: (1) Always confirm an exchange that your logging program suggests, and (2) If an exchange starts with "New" pay attention. Don't assume that if you can't

quite make out the name of state it is "New York" because more hams live there than "New Jersey." If you are not sure, ask for repeats until you are sure.

The next group to look at are CW QSOs with letter-based exchanges. Operators are also pretty accurate with these QSOs with only 0.75% of them busted. The data exhibits the same patterns seen with Phone QSOs. For example, the state exchange busted the most was MA with 27 errors. The states actually logged and the counts were: CT/2, FL/1, ME/2, MI/1, NY/15!, RI/1, VA/3, VT/1, WA/1. The 15 times NY was logged instead of MA all were associated with the same call sign, N2KW. So, unless N2KW was sending the wrong exchange, these all were due to outdated "pre-fill" files and operators forgetting to check the exchange actually being sent. In fact, N2KW who lives and usually operates in New York, was operating from the K1TTT station in MA during this contest. So, again lesson learned: Always Check The Exchange Pre-filled by a Logging Program.

There was another interesting example around a single call sign. Six operators mis-logged WJ9B's exchange as "IL" instead of "ID". I don't think Willie has ever operated from IL so an out of date pre-fill file is likely not to blame. Neither were bad spots. There were no spots for WJ9B indicating he was in IL. This one may be more of an example of CW and the power of suggestion. If you work a "9" station who gives you "ID" as the exchange and you know "ID" is in 7-land, the power of suggestion might make you log "IL" instead — when you second guess yourself. Did you really hear a "D" or did you miss the leading "dit" of the "L". Guess what? You probably had it right the first time. Trust yourself.

Summarizing here for stations giving letters as exchanges — the single biggest source of busted exchanges is where a logging program "pre-fills" the exchange from a past contest log, when in fact the operator has changed QTH's. Always double check any "pre-filled" exchanges.

Moving on now to where serial numbers are exchanges, from the earlier work we know that serial number exchanges are busted quite a bit more than when exchanges are letters. In the case of Phone QSOs the busted exchange rate increases from 0.58% to 2.16%. In the case of CW QSOs the busted exchange rate increases from 0.75% to 3.61% -- almost a 5X increase. Are there any lessons to be learned?

Let's look first at Phone QSOs. First, upon closer examination of the log data I found that 10% of the busted Phone QSOs with serial numbers were from a single log. What happened in that log was that a "59" was appended to the front of every serial number. This may have happened in the creation of the Cabrillo file after the QSOs were logged and the contest over. So, the lesson here is to always give your log a good review before you send it in. And if you receive a report back from the log submission robot about problems with your log, correct them! Beyond that trying to decipher any patterns is surprisingly difficult.

One simple investigation looked to see if the bust rate changed as the number of digits in the serial number increased.

Serial Number Copying Error Rates
2017 ARRL 10 Meter Contest

	All QSOs	1 digit Serial Number	2 digit Serial Number	3 digit Serial Number
Phone QSOs	2.20%	1.05%	2.28%	2.67%
CW QSOs	3.66%	2.27%	3.46%	4.84%

Figure 16 - Serial Number Copying Error Rates.

Absolutely the error rate increases as the number of digits in the serial number increases. Note I couldn't study any 4-digit serial numbers from the 2017 contest. There weren't any! The lesson here is that as the contest progresses, and serial numbers get larger, that is the time to be extra diligent in copying the exchange.

Next I looked to see if there were any types of numbers that were busted more often than others. For this I looked just at a subset of Phone QSOs. There were 96 busted exchanges where both the sent serial number and the logged serial number had two digits. I looked at them to see if there is a pattern to which digit was miscopied. Of the 96, 36 didn't have a single digit correct, 13 had the first digit correct and the second wrong, and 46 had the second digit correct and the first wrong. The difference between the first and second digit error rate is probably statistically significant, but I am not sure what advice to offer. I also looked to see if there are certain serial number ranges that have higher error rates than others. Those findings are shown in the next chart.

Table 3 – 2017 Phone QSO Serial Number error rates

Sent Serial Number Range	*% of QSOs busted*
10-19	1.6%
20-29	1.2%
30-39	2.1%
40-49	2.8%
50-59	2.1%
60-69	4.0%
70-79	1.7%
80-89	1.8%
90-99	1.3%

Fascinating! Not all serial numbers are copied equally well. Serial numbers from 60 to 69, were busted well more than twice the average rate of 1.3%. And serial numbers from 20 to 29 were copied much better than average. Again though, its interesting but I don't know what lesson to take or advice to offer from it. Perhaps if you are on Phone and sending a serial number that contains entirely or in part, numbers in the range of 60 to 69, 40 to 49, and 30 to 39 — be extra diligent in enunciating your numbers. This is a courtesy to the station you are working and will reduce the chance they will bust your exchange.

Finally, we can look at CW QSOs that have serial numbers in the exchange. These are the QSOs where the exchange is busted the most. By far. At 3.61% of QSOs busted the rate is 6X that for Phone QSOs with letter exchanges. So, if there is place where improvements can be made, it's for CW serial number exchanges.

Before we look at the numbers, it is interesting to think about the relative challenges of copying a serial number in a Phone vs CW QSO. With a Phone QSO you have the common challenges of QSB, QRN, and QRM. Additionally, there is the challenge of languages and accents. As a least common denominator exchanges are typically given in English. But for many operators English is not their first language. How comfortable would you be exchanging a serial number with someone in a language that you don't use every day? And, then there is the challenge of understanding the many diverse accents around the world. All and all it is a great compliment to all the operators that everyone does as well as they do.

Thinking about CW, there are no language and accent issues other than CW is a common "foreign language" for everyone. Ham radio operators have learned this language and is only used when practicing their ham radio hobby. There also no accent challenges, though in some respects "cut numbers" could be considered a CW accent. Though CW may be a common language there are, as with spoken English, diverse levels of fluency among operators as demonstrated by the speed they can send, and most importantly, receive. The net result of these differences is that copying exchanges in a CW QSO is more difficult than for a Phone QSO. With those thoughts what did the LCRs show?

First, referring to Figure 16. as with Phone QSOs, the chance of busting a serial number increases as the number of digits in the serial number increases. In fact, it increases even faster than with Phone QSOs.

Although I couldn't study any 4-digit serial numbers from the 2017 contest, it is plausible that bust rates could be in excess of 6%. The same lesson applies here. Late in the contest when serial numbers are getting bigger, that is the time to be extra diligent in copying the exchange.

I then also looked at the similar set of CW QSOs as I did for Phone — just those where the sent serial number was under 100. I then looked at the bust rate for difference first and second digits to see if there are any differences across different digits. Personally, I know my greatest challenges are with 2 and 3. Your mileage may vary.

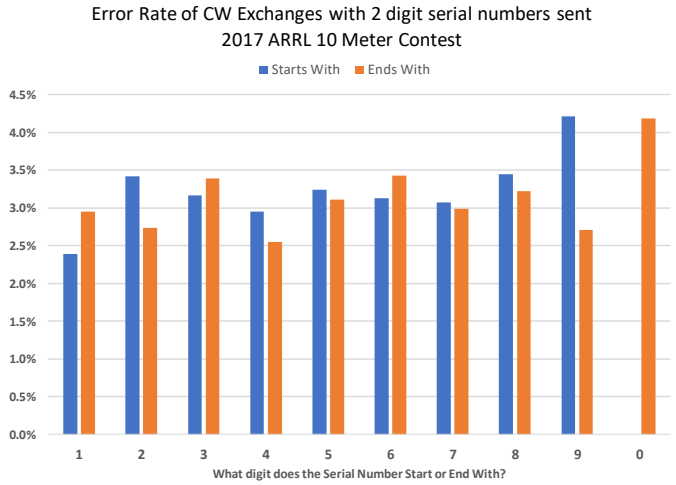

Figure 17 - Error rates with different serial number digits.

All in all, the error rates are remarkably similar for the different first and second digits. The two that stand out with higher error rates are beginning with a 9 or ending with a 0. These two digits are also ones which more commonly are sent with cut numbers – a "N" for "9" and a "O" or even "T" for "0". For a contester the lesson is to study up, and if possible, practice receiving cut numbers to improve your logging. Then, for those that send cut numbers ask yourself is it really a benefit to you because it does seem to make your serial numbers more difficult to copy.

Can we learn anything more from looking at 2014 data?

When I started thinking about this investigation I knew the data set from the 2017 was going to be sparse. There were less than 100,000 QSOs in the logs submitted. The average log contained just around 55 QSOs. And I was going to be looking into events that happen at a rate from <1% to around 3% of QSOs. So I also asked W9JJ for the LCRs from the 2014 edition. In that contest, during the best 10 meter conditions of this solar cycle, over 2,000,000 QSOs were in the submitted logs. Over 20 times the total in 2017. And, the average log contained over 360 QSOs. It is much easier to uncover subtle trends when you have this much data. So, what was there?

First, looking overall error rates it is remarkable how similar the patterns are. Again, as in 2017, total Phone and CW error rates are the same. Call sign and exchange error rates are the same for Phone QSOs and the exchange has a higher error rate for CW QSOs. What is amazing is that each and every error rate in 2014 was lower than in 2017 despite the average log containing almost 7X the QSOs. All I can think of is that better conditions lead to louder and clearer signals to copy. It also reinforces the lesson that if you are having trouble copying someone, which happens more often in low sunspot years, make sure to ask for repeats until you get it correct!

QSO Error Rates
ARRL 10 Meter Contest

2017	All QSOs	Phone QSOs	CW QSOs
Busted Call	1.2%	1.5%	1.2%
Busted Exchange	1.8%	1.6%	1.9%
Total Busted	3.1%	3.1%	3.1%

2014	All QSOs	Phone QSOs	CW QSOs
Busted Call	1.0%	1.2%	1.0%
Busted Exchange	1.5%	1.3%	1.6%
Total Busted	2.5%	2.5%	3.6%

Figure 18 - Overall QSO Error Rates – 2014 vs 2017

Looking at exchange copying errors, again it stands out that 2014 had lower error rates, particularly for CW QSOs with serial number exchanges.

Exchange Copying Error Rates
ARRL 10 Meter Contest

2017	All QSOs	Exchanges with Letters	Serial Number Exchanges
Phone QSOs	1.6%	0.58%	2.16%
CW QSOs	1.9%	0.75%	3.61%
All QSOs	1.8%	0.73%	3.15%

2014	All QSOs	Exchanges with Letters	Serial Number Exchanges
Phone QSOs	1.3%	0.55%	2.01%
CW QSOs	1.6%	0.51%	2.61%
All QSOs	1.5%	0.52%	2.38%

Figure 19 - Exchange Copying Error Rates – 2014 vs 2017

Looking at the top most busted call signs from 2014 tells us more than from the 2017 contest.

Table 4 – 2014 Most frequently busted call signs

Call sign	*% of QSOs busted*
OG55W	30.6%
XE2PXZ	14.8%
UE55KS	9.2%
BW2/JP1RIW	5.4%
CW1DC	5.1%
CO6HK	4.6%

Instead of going through the list call by call, here are my summary conclusions:

OG55W and UE55KS, using special call signs with non-standard prefix numbering, were very hard for stations to copy correctly. OG55W who operated CW Only and mostly S&P had their call sign busted over 30% of the time. UE55KS had an overall lower error rate but spent more time running and thus their call sign appeared on skimmers and spotting clusters for everyone to see. The lesson here is just don't use these types of call sign if you want to help folks copy your call sign and if you hear someone come back to you with an incorrect call sign – correct it for them before giving them an exchange!

XE2PXZ and CO6HK who operated Phone Only and are native Spanish speakers had their call signs busted many many times more than normal. This was not due to spotting errors. For XE2PXZ virtually every bust was due to a station logging the call as XE2PXS. That is converting the "Z" to an "S". In the case of CO6HK the most common busted call was CE6HK followed by CO6DK. Without having recordings of the QSOs it is hard to pinpoint what happened. The two general pieces of advice are: (1) Always use standard phonetics, and (2) for stations in the US, who did 95% of the "busting", realize that different accents will make different letters and words sound different. Pay attention and sort it out. It is your job to copy the call sign correctly – and remember that vast majority of people did so.

BW2/JP1RIW is just a long complex call sign, even on Phone which where he did all his operating. The busted call signs most often had to due with the second letter of the prefix in his home call. The "P" was often logged as a "O" or a "H". The "BW" and "RIW" part of the call sign were always correct. Again, this is a case of a non-native English speaker on Phone. And, most of the "busting" was done by operators in other non-English speaking countries. The two general pieces of advice area: (1) Keep your call sign as short as possible, though in this case he may not have had a choice, and (2) Use standard phonetics.

Finally, when I started drilling down into the sources and causes of busted exchanges the total amount of data finally overwhelmed me. I didn't look at nuances of exchanges based on letters or numbers, other than the simple number of digits in a serial number exchange. I had to do that in 2014 because there were many many QSOs made with 4-digit serial numbers. There were over 150,000 of them, 50% more than the total QSO count in the whole 2017 contest!

Serial Number Copying Error Rates
ARRL 10 Meter Contest

2017	All QSOs	1 digit Serial Number	2 digit Serial Number	3 digit Serial Number	4 digit Serial Number
Phone QSOs	2.20%	1.05%	2.28%	2.67%	N/A
CW QSOs	3.66%	2.27%	3.46%	4.84%	N/A

2014	All QSOs	1 digit Serial Number	2 digit Serial Number	3 digit Serial Number	4 digit Serial Number
Phone QSOs	2.01%	1.25%	2.16%	2.02%	1.94%
CW QSOs	2.61%	1.11%	2.44%	2.65%	3.07%

Figure 20 - Serial Number Copying Error Rates – 2014 vs 2017

Looking at this chart I am glad I did look at serial number length. For Phone QSOs it looks like the error rate is basically the same for any serial number longer than one digit. It is even possible that accuracy increases as the serial number increases. There is enough data behind these calculations that the differences may represent a significant difference. For CW QSOs there still appears to be an increasing error rate as the serial numbers get larger. However, the 2014 error rates were well below those seen in 2017. Again, I surmise that the better conditions led to less QSB and overall louder signals made it easier to copy serial numbers. The repeat lesson here is in poor conditions, make sure to ask for repeats on any part of the QSO you are not sure about. If you are the running station don't give your exchange until you have the call sign correct. If you are S&P-ing don't call until you have the call sign correct and don't send your exchange until you have a high confidence that you copied the running station's exchange.

That's it for this year. Hope you enjoyed this discussion!
73, Scott, K7ZO

Top Ten – United States

Single Operator, Mixed Mode, High Power	
K1WHS (K1BX, op)	142,058
KØTT	83,582
KTØK	78,584
N8OO	56,012
WØETT	42,848
KU2M	23,328
K9ZO	21,920
N4OX	21,384
N4XD	18,768
K3TC	17,422
Single Operator, Mixed Mode, Low Power	
N8II	41,650
KFØUR	30,150
KØUK	14,940
ND9G	12,036
ACØW	11,760
KI6RRN	10,672
K2PS	10,314
KØPC	8,160
KØAD	8,100
N5JJ	7,958
Single Operator, Mixed Mode, QRP	
K2YGM	2,210
NDØC	2,210
N9NE	1,596
N3ZV	1,456
NS7K	1,170
W1TW	784
N4ELM	448
WA6FGV	432
WB2AMU	336
W1IE	312
Single Operator, Phone Only, High Power	
K5TR (WM5R, op)	11,914
WØSD (KEØHQZ, op)	10,800
AF1T	4,520
AF1T	4,480
N4MM	2,040
NØWRK	1,290
KD7RF	1,176
W6LP (NC6R, op)	912
K9MWM	902
KF9US	624
Single Operator, Phone Only, Low Power	
W5PR	3,504
K2SDS	1,680
WZ8T	1,530
K4FCG (K1KNQ, op)	1,240
N7FLT	1,118
NF7E	810
W5WTC	616
KBØSNI	484
KEØITC	456
K7VIT	450
Single Operator, Phone Only, QRP	
KB5KYJ	1,036
WBØIWG	112
N8MWK	48
W6QU (W8QZA, op)	32
KD8RTT	16
K6DPD	14
KF6ZYD	2
Single Operator, CW Only, High Power	
K5NA	67,524
W5KFT (K5PI, op)	58,752
WJ9B	55,488
K1KI	48,480
KD4D	47,068

W6YX (N7MH, op)	41,040
WØZA	38,456
K1RM	29,824
K1TO	29,028
KM6JD	25,740
Single Operator, CW Only, Low Power	
W3BGN	24,816
N4WW (N4KM, op)	24,448
K9QVB	21,744
N4TB	21,140
AE5GT	18,000
WA7NB	16,500
N1IX	12,528
W9RE	11,904
K7SV	11,536
N4ZI	10,752
Single Operator, CW Only, QRP	
N5OE	3,920
WØCW	1,232
K2SM	768
K7HBN	644
KR2Q	420
N8AP	416
K3TW	360
K2YAZ	336
WB4BIN	288
KC4IM	180
Single Operator Unlimited, Mixed Mode, High Power	
KY7M (KY7M, op @NA7TB)	81,030
K3ZU	66,752
N5XZ	64,056
N4RV	56,600
KØKX	53,430
W4MYA	52,752
K3EST	51,408
KØLD (WAØMHJ, op)	50,630
WB9Z	49,704
W1TJL	43,100
Single Operator Unlimited, Mixed Mode, Low Power	
K1ZE	27,216
K5KJ	13,962
K1DJ	7,112
KE8EAS	5,200
AB9YC	5,082
W6OAT	4,350
K9PG	4,136
K7WP	3,600
KM4HI	3,248
WR2G	3,162
Single Operator Unlimited, Mixed Mode, QRP	
K4LQ	7,038
W2MF	3,168
K2GMY	3,136
N1RR	1,260
Single Operator Unlimited, Phone Only, High Power	
W2RD	1,666
KC8QDQ	924
KA1ZD	880
WTØDX	528
KD8ZCH	96
AE7VA	88
KØCZH	64
KF7U	56
W1PEF	44
KØARY	40
Single Operator Unlimited, Phone Only, Low Power	
K2DRH	7,070
W3LL	1,716
ADØTA	1,500
KEØNWG	528
N9VPV	288
WA7YXY	140
K5LGX	110
K9ZM	90
K7HKR	90
N6ORB	48
Single Operator Unlimited, Phone Only, QRP	
N9NBC	24
Single Operator Unlimited, CW Only, High Power	
N2MM	67,968
N6SS	62,208
N2KW	52,608
W3EP	51,912
N3RD	37,696
W8HAP	32,448
K9CT	27,512
AA3B	24,552
N6EE	21,296
N1LN	20,064
Single Operator Unlimited, CW Only, Low Power	
W1QK	22,320
W9XT	15,688
N9TF	12,160
K6WSC	8,064
NZ3D	7,680
W1KM	7,392
K1XM	6,408
K2DFC	6,120
KØTI	4,788
K4GMH	4,704
Single Operator Unlimited, CW Only, QRP	
NØUR	4,240
KI9A	448
W5UE	144
WA7LNW	112
K3HW	40
N9LQ	24
AF5Q	16
Multioperator, Single Transmitter, High Power	
N2NT	106,080
AA1JD	101,790
WØRIC	81,840
NX5M	80,154
W8PR	60,928
KT4Q	41,360
N7AT	32,384
W7RN	31,140
W6TCP	28,810
WW4CP	26,880
Multioperator, Single Transmitter, Low Power	
W7TVC	17,150
AAØAW	12,736
KD9GKL	9,184
W1FM	8,756
N4SVC	4,482
N9CDX	2,080
W2NPT	1,144
W7PU	1,032
KC1EWL	528
K4OTH	416

Top Ten - Canada

Single Operator, Mixed Mode, High Power
VA3TIC 30
Single Operator, Mixed Mode, Low Power
VE7SGW 532
VE3RCN 168
VA3RKM 76
VE6SH 64
VE3TM 52
Single Operator, Phone Only, Low Power
VE2NCG 2
Single Operator, CW Only, High Power
VE5UF 10,600
VE3PN 9,920
VE2FWW 6,300
VE3EJ 6,000
VE6WQ 3,520
VE9AA 1,404
VE3DZ 1,276
VE7JKZ 352
VE3FJ 312
VA7ST 64
Single Operator, CW Only, Low Power
VE5GC 8,976
CF7MM 2,596
VE5VA 1,508
VE4TV 1,344
VE4MR 792
VA3EC 476
VE3ZY 468
VE3AYR 48
VA2LGQ 16
VE7BGP 12
Single Operator, CW Only, QRP
VA3RJ 112
VE3CBK 8
Single Operator Unlimited, Mixed Mode, High Power
VE5MX 8,234
VE6TL 2,686
VE4EA 792
Single Operator Unlimited, Mixed Mode, Low Power
VA3DF 8,640
VE3PJ 1,728
Single Operator Unlimited, CW Only, High Power
VE6BBP 8,256
VE7XF 6,912
VE1OP 3,904
VA3DX 2,880
VE3CX 1,664
VO1HP 96
Single Operator Unlimited, CW Only, Low Power
VE3VY 280
Multioperator, Single Transmitter, High Power
VE9CB 110

Top Ten - Mexico

Single Operator, Mixed Mode, Low Power
XE1H 702
XE3A 224
XE2MWY 48
Single Operator, Phone Only, High Power
XE1R 260
Single Operator, Phone Only, Low Power
XE1AO 196
XE2PEA 120
XE2MXI 4
XE2OCM 2
XE2QD 2
Single Operator, Phone Only, QRP
XE2MZL 2
Single Operator, CW Only, High Power
XE2X 4,692
XE2S 1,100
Single Operator Unlimited, Phone Only, Low Power
XE2JS 868
Single Operator Unlimited, CW Only, Low Power
XE2B 2,736
XE1EE 72
Multioperator, Single Transmitter, Low Power
XE2N 168

Top Ten - DX

Single Operator, Mixed Mode, High Power
G4FKA 38,496
OA4SS 29,072
F6GOX 21,336
GM5X (GM4YXI, op) 13,826
PV8DX 13,720
DM2FDO 13,514
OF3BCX (OH1ZAA, op) 11,376
US8ICM 10,260
MM1E (MMØGOR, op) 8,468
I3FGX 5,580
Single Operator, Mixed Mode, Low Power
PY1ZV 25,172
3G1D (XQ1FM, op) 20,412
LW1EUD 14,820
TM6M 12,376
PU4GOD 10,890
EA8ZT 8,418
R3LC 6,954
PA2REH 6,952
YO4FZX 6,468
ON5WL 5,568
Single Operator, Mixed Mode, QRP
PY2NY 7,104
YW2LV 1,300
JR1UJX 1,288
ON8NT 888
VK3GK 810
JH7UJU 756
NP2Q 384
JR2EKD 170
ON2AD 48
Single Operator, Phone Only, High Power
PP5JR 96,820
ZW5T (PY5ZD, op) 28,768
CE5JZO 13,530
FR4QT 12,032
F5LIW 10,570
LW3EK 10,218
F1RHS 5,742
ES5MG 3,002
6W1SU 2,772
EA5DFV 1,764
Single Operator, Phone Only, Low Power
LU9VD (LU9VEA, op) 10,360
LU8VR 8,610
YTØW (YU1JW, op) 6,486
LQ7E (LW3DN, op) 6,102
LU1MPK 5,550
LW4EF 5,456
PU2WDX 3,696
PU2PSP 3,564
9Z4Y 3,276
EA8BOA 2,730

Single Operator, Phone Only, QRP	
LU4VZ	3,080
PP5XA	1,170
PY2VTC	612
PU2TRX	400
I5KAP	396
PU4ALZ	352
PY2BN	170
JA1NEZ	54
JH3DMQ	52
DU7OK	12
PU7MCV	12
Single Operator, CW Only, High Power	
ZZ4X	93,840
XR2K (CX1EK, op)	58,280
PY2MC	47,436
CE3DNP	28,620
EA6VQ	23,892
IQ9UI (IT9EQO, op)	19,456
9A4W	15,496
YQ6A (YO6BHN, op)	14,896
YL2TD	14,100
DLØRD (DL3ECQ, op)	13,952
Single Operator, CW Only, Low Power	
V51YJ	88,200
LU6DO	28,952
CB3R (XQ3SK, op)	18,720
LZ2HR	18,444
DL9ZP	16,120
US7VF	14,880
F5VMN	14,784
OA4O (OA4DX, op)	14,060
OK1DKR	13,520
F6AUS	12,896
Single Operator, CW Only, QRP	
US5VX	4,608
JQ1NGT	4,010
DL4XU	2,816
DL2TM	2,640
OK1DZD	2,100
UT9EZ	1,276
DL8TG	988
EA6SX	900
DL3MVC	816
LY5G	760
Single Operator Unlimited, Mixed Mode, High Power	
DL2ARD	124,188
DH8BQA	83,496
S51DI	69,632
DL5WW	55,080
YT8A (YU1EA, op)	51,306
DL2SAX	40,068
F5NBX	33,480
LZ9W (LZ1VLS, op)	26,100
DK2OY	25,568
DL6KVA	24,864
Single Operator Unlimited, Mixed Mode, Low Power	
PY3OZ	117,688
PY5ZHP	34,656
IT9SSI	25,714
PY1AX	20,874
F8ATS	19,006
OT6M (ON9CC, op)	18,180
PA4O	17,568
ZW2F (PY2LCD, op)	15,548
PY2LSM	14,362
YO2LEA	11,528
Single Operator Unlimited, Mixed Mode, QRP	
MM3AWD	1,196
JK1TCV	820
PE2K	24
Single Operator Unlimited, Phone Only, High Power	
CV7S (CX7SS, op)	29,880
PY5QW	13,728
SP8N	11,594
LU8VLE	8,874
PP5JD	6,460
DK5A (DK5KMA, op)	5,046
PY2LED	4,732
ZR6GR	3,696
ES6RW	2,940
DM5TS	2,546
Single Operator Unlimited, Phone Only, Low Power	
LU9DDJ	18,090
PP1WW	14,784
PU2UAF	4,600
VK2NSS	4,080
ED8H (EA8ARI, op)	3,724
PU5DUD	3,432
PY8WW	2,686
PY5FO	2,200
CE7KF	1,980
PT7ZT	1,824
Single Operator Unlimited, Phone Only, QRP	
PU2RTO	336
Single Operator Unlimited, CW Only, High Power	
CX2BR	111,884
CX4SS	49,152
PAØO	43,172
S57Q	33,384
P4/DL6RAI	31,752
PA5WT	29,260
LU1DZ	25,296
S5ØØR (S51FB, op)	23,392
M3I (GØORH, op)	23,364
HG7T (HA7TM, op)	21,360
Single Operator Unlimited, CW Only, Low Power	
PP5TU	72,036
PP1CZ	63,204
PP5BI	52,000
PA/PY2SEX	16,920
EA7RM	14,904
DK3GI	13,696
LU4HK	12,064
PY1SL	10,472
DK9OY	7,700
PAØCMU	7,584
Single Operator Unlimited, CW Only, QRP	
LU7DID	10,080
HA3HX	3,780
CE3OP	2,688
EU8F	588
JG1EIQ	56
Multioperator, Single Transmitter, High Power	
CW5W	447,120
PT3T	219,190
LU2DX	210,480
LZ5R	75,144
EA5RS	34,720
TMØW	25,116
9H6A	20,944
PW5T	20,736
OHØZ	16,680
PY2NFT	8,976

Multioperator, Single Transmitter, Low Power		
PY2SR		42,880
LQØD		26,106
ZZ2P		21,888
PJ2T		18,876
OK1OFM		5,616
PV2B		5,320
JJ1ZEJ		3,520
CE1CA		3,192
ED1L		3,174
PY2KC		3,108

Continental Winners

Africa		
Single Operator, Mixed Mode, Low Power	EA8ZT	8,418
Single Operator, Phone Only, High Power	FR4QT	12,032
Single Operator, Phone Only, Low Power	EA8BOA	2,730
Single Operator, CW Only, Low Power	V51YJ	88,200
Single Operator Unlimited, Mixed Mode, Low Power	SU9JG (EA7TN, op)	210
Single Operator Unlimited, Phone Only, High Power	ZR6GR	3,696
Single Operator Unlimited, Phone Only, Low Power	ED8H (EA8ARI, op)	3,724
Asia		
Single Operator, Mixed Mode, High Power	JE1VTZ	1,914
Single Operator, Mixed Mode, Low Power	JR1MEG	4,116
Single Operator, Mixed Mode, QRP	JR1UJX	1,288
Single Operator, Phone Only, High Power	JA7OWD	1,100
Single Operator, Phone Only, Low Power	JS6TQS	364
Single Operator, Phone Only, QRP	JA1NEZ	54
Single Operator, CW Only, High Power	RT9S	6,528
Single Operator, CW Only, Low Power	JJ1LBJ	4,836
Single Operator, CW Only, QRP	JQ1NGT	4,010
Single Operator Unlimited, Mixed Mode, High Power	JH4UTP	15,120
Single Operator Unlimited, Mixed Mode, Low Power	JH6WHN	1,800
Single Operator Unlimited, Mixed Mode, QRP	JK1TCV	820
Single Operator Unlimited, Phone Only, High Power	JG2REJ	12
Single Operator Unlimited, CW Only, High Power	4Z5LY	6,080
Single Operator Unlimited, CW Only, Low Power	7K1CPT	2,680
Single Operator Unlimited, CW Only, QRP	JG1EIQ	56
Multioperator, Single Transmitter, High Power	9M4COK	24
Multioperator, Single Transmitter, Low Power	JJ1ZEJ	3,520
Europe		
Single Operator, Mixed Mode, High Power	G4FKA	38,496
Single Operator, Mixed Mode, Low Power	TM6M	12,376
Single Operator, Mixed Mode, QRP	ON8NT	888
Single Operator, Phone Only, High Power	F5LIW	10,570
Single Operator, Phone Only, Low Power	YTØW (YU1JW, op)	6,486
Single Operator, Phone Only, QRP	I5KAP	396
Single Operator, CW Only, High Power	EA6VQ	23,892
Single Operator, CW Only, Low Power	LZ2HR	18,444
Single Operator, CW Only, QRP	US5VX	4,608
Single Operator Unlimited, Mixed Mode, High Power	DL2ARD	124,188
Single Operator Unlimited, Mixed Mode, Low Power	IT9SSI	25,714
Single Operator Unlimited, Mixed Mode, QRP	MM3AWD	1,196
Single Operator Unlimited, Phone Only, High Power	SP8N	11,594
Single Operator Unlimited, Phone Only, Low Power	EA4AA	1,456
Single Operator Unlimited, CW Only, High Power	PAØO	43,172
Single Operator Unlimited, CW Only, Low Power	PA/PY2SEX	16,920
Single Operator Unlimited, CW Only, QRP	HA3HX	3,780
Multioperator, Single Transmitter, High Power	LZ5R	75,144
Multioperator, Single Transmitter, Low Power	OK1OFM	5,616
North America		
Single Operator, Mixed Mode, QRP	NP2Q	384
Single Operator, Phone Only, Low Power	KP2XX	550
Single Operator, CW Only, High Power	ZF9CW	3,672
Single Operator, CW Only, Low Power	HI8A	1,584
Single Operator Unlimited, Mixed Mode, Low Power	NP2X	11,044
Single Operator Unlimited, Phone Only, Low Power	WP2SC	72
Single Operator Unlimited, CW Only, Low Power	HP1AC	812
Oceania		
Single Operator, Mixed Mode, High Power	FK8IK	2,712
Single Operator, Mixed Mode, Low Power	4F3BZ	1,440
Single Operator, Mixed Mode, QRP	VK3GK	810
Single Operator, Phone Only, High Power	VK2CZ	1,464
Single Operator, Phone Only, Low Power	VK7DW	110
Single Operator, Phone Only, QRP	DU7OK	12
Single Operator, CW Only, High Power	VK2PN	3,104
Single Operator, CW Only, Low Power	VK2IG	3,920
Single Operator Unlimited, Mixed Mode, High Power	VK5GR	6,216
Single Operator Unlimited, Phone Only, High Power	VK4QH	350
Single Operator Unlimited, Phone Only, Low Power	VK2NSS	4,080
Single Operator Unlimited, CW Only, Low Power	4F3OM	2,772
Multioperator, Single Transmitter, Low Power	DV3KRD	68
South America		
Single Operator, Mixed Mode, High Power	OA4SS	29,072
Single Operator, Mixed Mode, Low Power	PY1ZV	25,172
Single Operator, Mixed Mode, QRP	PY2NY	7,104
Single Operator, Phone Only, High Power	PP5JR	96,820
Single Operator, Phone Only, Low Power	LU9VD (LU9VEA, op)	10,360
Single Operator, Phone Only, QRP	LU4VZ	3,080
Single Operator, CW Only, High Power	ZZ4X	93,840
Single Operator, CW Only, Low Power	LU6DO	28,952
Single Operator, CW Only, QRP	PR7AR	12
Single Operator Unlimited, Mixed Mode, High Power	PY6TS	16,560
Single Operator Unlimited, Mixed Mode, Low Power	PY3OZ	117,688
Single Operator Unlimited, Phone Only, High Power	CV7S (CX7SS, op)	29,880
Single Operator Unlimited, Phone Only, Low Power	LU9DDJ	18,090
Single Operator Unlimited, Phone Only, QRP	PU2RTO	336
Single Operator Unlimited, CW Only, High Power	CX2BR	111,884
Single Operator Unlimited, CW Only, Low Power	PP5TU	72,036
Single Operator Unlimited, CW Only, QRP	LU7DID	10,080

Multioperator, Single Transmitter, High Power	CW5W	447,120
Multioperator, Single Transmitter, Low Power	PY2SR	42,880

Regional Leaders

West Coast Region

(Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NT Sections)

W7GKF	13,392	SO-MIX-HP
WA8WZG	12,300	SO-MIX-HP
K7JQ	10,944	SO-MIX-HP
K7RL	7,760	SO-MIX-HP
K6XX	5,678	SO-MIX-HP
KI6RRN	10,672	SO-MIX-LP
N7LOX	7,120	SO-MIX-LP
AA7UN	6,780	SO-MIX-LP
W7MTL	4,092	SO-MIX-LP
NW7E	3,066	SO-MIX-LP
WA6FGV	432	SO-MIX-QRP
KD7RF	1,176	SO-PH-HP
W6LP (NC6R, op)	912	SO-PH-HP
K6LRN	120	SO-PH-HP
K7STO	16	SO-PH-HP
WZ8T	1,530	SO-PH-LP
N7FLT	1,118	SO-PH-LP
NF7E	810	SO-PH-LP
K7VIT	450	SO-PH-LP
KE7K	192	SO-PH-LP
W6QU (W8QZA, op)	32	SO-PH-QRP
K6DPD	14	SO-PH-QRP
KF6ZYD	2	SO-PH-QRP
WJ9B	55,488	SO-CW-HP
W6YX (N7MH, op)	41,040	SO-CW-HP
KM6JD	25,740	SO-CW-HP
AA7V	18,760	SO-CW-HP
N7EPD	14,688	SO-CW-HP
WA7NB	16,500	SO-CW-LP
K7GS	5,168	SO-CW-LP
KH6CJJ	3,640	SO-CW-LP
W7USA	2,640	SO-CW-LP
CF7MM	2,596	SO-CW-LP
K7HBN	644	SO-CW-QRP
WD6DX	108	SO-CW-QRP
NU7Y	64	SO-CW-QRP
KY7M (KY7M, op @NA7TB)	81,030	SOU-MIX-HP
K3EST	51,408	SOU-MIX-HP
N7NM	40,392	SOU-MIX-HP
KA6BIM	34,870	SOU-MIX-HP
K9YC	16,688	SOU-MIX-HP
W6OAT	4,350	SOU-MIX-LP
K7WP	3,600	SOU-MIX-LP
WQ6X	2,952	SOU-MIX-LP
WA7AXT	1,022	SOU-MIX-LP
N9NA	204	SOU-MIX-LP
K2GMY	3,136	SOU-MIX-QRP
W2RD	1,666	SOU-PH-HP
AE7VA	88	SOU-PH-HP
KF7U	56	SOU-PH-HP
WA7YXY	140	SOU-PH-LP
K7HKR	90	SOU-PH-LP
N6ORB	48	SOU-PH-LP
N6SS	62,208	SOU-CW-HP
K6LL	11,484	SOU-CW-HP
VE6BBP	8,256	SOU-CW-HP
VE7XF	6,912	SOU-CW-HP
K7XC	4,032	SOU-CW-HP
K6WSC	8,064	SOU-CW-LP
KD6WKY	1,984	SOU-CW-LP
AC7JM	800	SOU-CW-LP
K3WYC	672	SOU-CW-LP
K7QA	336	SOU-CW-LP
WØRIC	81,840	MSHP
N7AT	32,384	MSHP
W7RN	31,140	MSHP
W6TCP	28,810	MSHP
K7JR	13,764	MSHP
W7TVC	17,150	MSLP
W7PU	1,032	MSLP

Midwest Region

(Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

KØTT	83,582	SO-MIX-HP
KTØK	78,584	SO-MIX-HP
WØETT	42,848	SO-MIX-HP
NCØB	14,212	SO-MIX-HP
KØSRL	7,920	SO-MIX-HP
KFØUR	30,150	SO-MIX-LP
KØUK	14,940	SO-MIX-LP
ACØW	11,760	SO-MIX-LP
KØPC	8,160	SO-MIX-LP
KØAD	8,100	SO-MIX-LP
NDØC	2,210	SO-MIX-QRP
NS7K	1,170	SO-MIX-QRP
NZ5G	20	SO-MIX-QRP
K5TR (WM5R, op)	11,914	SO-PH-HP
WØSD (KEØHQZ, op)	10,800	SO-PH-HP
NØWRK	1,290	SO-PH-HP
K9MWM	902	SO-PH-HP
WE6EZ	520	SO-PH-HP
W5PR	3,504	SO-PH-LP
W5WTC	616	SO-PH-LP
KBØSNI	484	SO-PH-LP
KEØITC	456	SO-PH-LP
NGØC	352	SO-PH-LP
KB5KYJ	1,036	SO-PH-QRP
WBØIWG	112	SO-PH-QRP
K5NA	67,524	SO-CW-HP
W5KFT (K5PI, op)	58,752	SO-CW-HP
WØZA	38,456	SO-CW-HP
NN7ZZ (N5LZ, op)	21,760	SO-CW-HP
KØKT	11,352	SO-CW-HP
AE5GT	18,000	SO-CW-LP
VE5GC	8,976	SO-CW-LP
KNØV	8,904	SO-CW-LP
N4IJ	8,648	SO-CW-LP
WKØP	6,688	SO-CW-LP
N5OE	3,920	SO-CW-QRP
WØCW	1,232	SO-CW-QRP
WB4BIN	288	SO-CW-QRP

KIØG	96	SO-CW-QRP
W5TTE	80	SO-CW-QRP
ADØBI	80	SO-CW-QRP
N5XZ	64,056	SOU-MIX-HP
KØKX	53,430	SOU-MIX-HP
KØLD (WAØMHJ, op)	50,630	SOU-MIX-HP
KBØEO	37,468	SOU-MIX-HP
NG7M	30,544	SOU-MIX-HP
K5KJ	13,962	SOU-MIX-LP
N5DO	3,040	SOU-MIX-LP
NØMK	1,624	SOU-MIX-LP
WØYJT	624	SOU-MIX-LP
WØSEI	576	SOU-MIX-LP
WTØDX	528	SOU-PH-HP
KØARY	40	SOU-PH-HP
ADØTA	1,500	SOU-PH-LP
KEØNWG	528	SOU-PH-LP
K5LGX	110	SOU-PH-LP
KBØLZQ	20	SOU-PH-LP
KDØUXO	2	SOU-PH-LP
WØAD	15,312	SOU-CW-HP
K7SCX	7,296	SOU-CW-HP
KØJPL	6,800	SOU-CW-HP
AC4CA	5,952	SOU-CW-HP
AK7O	3,008	SOU-CW-HP
KØTI	4,788	SOU-CW-LP
KØQC	3,808	SOU-CW-LP
K5GM	1,632	SOU-CW-LP
KØTC	960	SOU-CW-LP
K5TMT	576	SOU-CW-LP
NØUR	4,240	SOU-CW-QRP
WA7LNW	112	SOU-CW-QRP
AF5Q	16	SOU-CW-QRP
NX5M	80,154	MSHP
WA5PFJ	2,584	MSHP
WØGJ	352	MSHP
AAØAW	12,736	MSLP
KEØOR	258	MSLP
K5LRW	130	MSLP

Central Region
(Central and Great Lakes Divisions; Ontario East, Ontario North, Ontario South, and Greater Toronto Area Sections)

K9ZO	21,920	SO-MIX-HP
K9BGL	8,064	SO-MIX-HP
ND4Y	3,304	SO-MIX-HP
N9LYE	1,456	SO-MIX-HP
K8ESQ	1,140	SO-MIX-HP
ND9G	12,036	SO-MIX-LP
W8MET	2,280	SO-MIX-LP
N8CWU	1,428	SO-MIX-LP
KD9MS	1,200	SO-MIX-LP
N8TCP	1,008	SO-MIX-LP
N9NE	1,596	SO-MIX-QRP
KE4TZJ	8	SO-MIX-QRP
KF9US	624	SO-PH-HP
K8DJR	260	SO-PH-HP
N8VZ	104	SO-PH-LP
WB9W	40	SO-PH-LP
KB8UUZ	36	SO-PH-LP
KD8WVX	32	SO-PH-LP
KE8UM	16	SO-PH-LP
N8MWK	48	SO-PH-QRP
KD8RTT	16	SO-PH-QRP
W8TWA	14,552	SO-CW-HP
VE3PN	9,920	SO-CW-HP
K8MP	6,804	SO-CW-HP
VE3EJ	6,000	SO-CW-HP
N4TZ	4,664	SO-CW-HP
K9QVB	21,744	SO-CW-LP
W9RE	11,904	SO-CW-LP
WB8WKQ	8,844	SO-CW-LP
K4FT	2,688	SO-CW-LP
N9CO	1,872	SO-CW-LP
N8AP	416	SO-CW-QRP
K2YAZ	336	SO-CW-QRP
VA3RJ	112	SO-CW-QRP
KEØL	16	SO-CW-QRP
WD8RIF	12	SO-CW-QRP
WB9Z	49,704	SOU-MIX-HP
W9IU	10,478	SOU-MIX-HP
W9PA	3,404	SOU-MIX-HP
N2BJ	2,112	SOU-MIX-HP
KC9K	1,856	SOU-MIX-HP
VA3DF	8,640	SOU-MIX-LP
KE8EAS	5,200	SOU-MIX-LP
AB9YC	5,082	SOU-MIX-LP
K9PG	4,136	SOU-MIX-LP
VE3PJ	1,728	SOU-MIX-LP
KC8QDQ	924	SOU-PH-HP
KD8ZCH	96	SOU-PH-HP
K2DRH	7,070	SOU-PH-LP
N9VPV	288	SOU-PH-LP
K9ZM	90	SOU-PH-LP
NR9K	12	SOU-PH-LP
KC9CND	12	SOU-PH-LP
N9NBC	24	SOU-PH-QRP
K9CT	27,512	SOU-CW-HP
K9NW	16,872	SOU-CW-HP
KE4KY	15,232	SOU-CW-HP
KE8M	8,960	SOU-CW-HP
VA3DX	2,880	SOU-CW-HP
W9XT	15,688	SOU-CW-LP
N9TF	12,160	SOU-CW-LP
NA9RB	3,440	SOU-CW-LP
N8EA	2,736	SOU-CW-LP
K8AJS	1,792	SOU-CW-LP
KI9A	448	SOU-CW-QRP
N9LQ	24	SOU-CW-QRP
W8PR	60,928	MSHP
W9JP	288	MSHP
KD9GKL	9,184	MSLP
N9CDX	2,080	MSLP

Southeast Region
(Delta, Roanoke and Southeastern Divisions)

N8OO	56,012	SO-MIX-HP
N4OX	21,384	SO-MIX-HP
N4XD	18,768	SO-MIX-HP
N4PN	8,844	SO-MIX-HP
N4FP	7,182	SO-MIX-HP

N8II	41,650	SO-MIX-LP
K2PS	10,314	SO-MIX-LP
AJ6T	6,118	SO-MIX-LP
KD5J	2,090	SO-MIX-LP
NZ5O	1,504	SO-MIX-LP
N3ZV	1,456	SO-MIX-QRP
N4ELM	448	SO-MIX-QRP
W1IE	312	SO-MIX-QRP
WB4GHZ	48	SO-MIX-QRP
N4MM	2,040	SO-PH-HP
W4DD	480	SO-PH-HP
W4SLT	72	SO-PH-HP
K4FCG (K1KNQ, op)	1,240	SO-PH-LP
KK4AND	168	SO-PH-LP
KK4BZ	150	SO-PH-LP
K4PZC	132	SO-PH-LP
W5DRR	60	SO-PH-LP
K1TO	29,028	SO-CW-HP
K4BAI	15,872	SO-CW-HP
K5LG	13,192	SO-CW-HP
N4CW	6,816	SO-CW-HP
AD4TJ	6,600	SO-CW-HP
N4WW (N4KM, op)	24,448	SO-CW-LP
N4TB	21,140	SO-CW-LP
K7SV	11,536	SO-CW-LP
N4ZI	10,752	SO-CW-LP
WB4TDH	7,600	SO-CW-LP
K3TW	360	SO-CW-QRP
KC4IM	180	SO-CW-QRP
KN4VV	48	SO-CW-QRP
W8IM	16	SO-CW-QRP
W4ZGR	8	SO-CW-QRP
N4RV	56,600	SOU-MIX-HP
W4MYA	52,752	SOU-MIX-HP
W3IP	33,440	SOU-MIX-HP
W4TAA	29,412	SOU-MIX-HP
K5KG	22,940	SOU-MIX-HP
KM4HI	3,248	SOU-MIX-LP
KN4FIM	448	SOU-MIX-LP
W4EE	408	SOU-MIX-LP
K3MZ	288	SOU-MIX-LP
NØSMX	224	SOU-MIX-LP
K4LQ	7,038	SOU-MIX-QRP
W4ZAO	24	SOU-PH-LP
K5KVN	8	SOU-PH-LP
W5TCB	6	SOU-PH-LP
KM4SII	2	SOU-PH-LP
N6EE	21,296	SOU-CW-HP
N1LN	20,064	SOU-CW-HP
NN7CW	14,784	SOU-CW-HP
N4BP	13,776	SOU-CW-HP
K5AUP	10,396	SOU-CW-HP
K4GMH	4,704	SOU-CW-LP
N4UA	2,584	SOU-CW-LP
K4EJ	1,776	SOU-CW-LP
K3KO	756	SOU-CW-LP
N3UA	704	SOU-CW-LP
W5UE	144	SOU-CW-QRP
KT4Q	41,360	MSHP
WW4CP	26,880	MSHP
AD4ES	10,668	MSHP
W4YCC	3,320	MSHP
K3TD	1,716	MSHP
N4SVC	4,482	MSLP
K4OTH	416	MSLP
W4BSF	64	MSLP
KG5IQU	24	MSLP

Northeast Region

(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

K1WHS (K1BX, op)	142,058	SO-MIX-HP
KU2M	23,328	SO-MIX-HP
K3TC	17,422	SO-MIX-HP
W1JA	10,696	SO-MIX-HP
K1VMT	10,560	SO-MIX-HP
NS3T	3,660	SO-MIX-LP
AC1J	3,168	SO-MIX-LP
K2TV	2,652	SO-MIX-LP
K1MC	2,520	SO-MIX-LP
N2BEG	1,984	SO-MIX-LP
K2YGM	2,210	SO-MIX-QRP
W1TW	784	SO-MIX-QRP
WB2AMU	336	SO-MIX-QRP
AF1T	4,520	SO-PH-HP
AF1T	4,480	SO-PH-HP
4U1WB (AJ3M, op)	480	SO-PH-HP
N3DUE	276	SO-PH-HP
N1JHJ	110	SO-PH-HP
K2SDS	1,680	SO-PH-LP
N2HMM	280	SO-PH-LP
N3VOP	250	SO-PH-LP
NP2GG	224	SO-PH-LP
KA1AMR	216	SO-PH-LP
K1KI	48,480	SO-CW-HP
KD4D	47,068	SO-CW-HP
K1RM	29,824	SO-CW-HP
KW2J	13,776	SO-CW-HP
W1ECT	11,760	SO-CW-HP
W3BGN	24,816	SO-CW-LP
N1IX	12,528	SO-CW-LP
W3SM	7,920	SO-CW-LP
K1TR	4,480	SO-CW-LP
W3CB	3,900	SO-CW-LP
K2SM	768	SO-CW-QRP
KR2Q	420	SO-CW-QRP
W2JEK	176	SO-CW-QRP
KQ2RP	88	SO-CW-QRP
W2BVH	48	SO-CW-QRP
N1JI	48	SO-CW-QRP
K3ZU	66,752	SOU-MIX-HP
W1TJL	43,100	SOU-MIX-HP
K1GQ	41,452	SOU-MIX-HP
KK1W	30,736	SOU-MIX-HP
K3OO	28,480	SOU-MIX-HP
K1ZE	27,216	SOU-MIX-LP
K1DJ	7,112	SOU-MIX-LP
WR2G	3,162	SOU-MIX-LP
W1DYJ	1,958	SOU-MIX-LP
N1API	1,728	SOU-MIX-LP
W2MF	3,168	SOU-MIX-QRP

N1RR	1,260	SOU-MIX-QRP
KA1ZD	880	SOU-PH-HP
KØCZH	64	SOU-PH-HP
W1PEF	44	SOU-PH-HP
N2RJ	24	SOU-PH-HP
W3LL	1,716	SOU-PH-LP
N2MM	67,968	SOU-CW-HP
N2KW	52,608	SOU-CW-HP
W3EP	51,912	SOU-CW-HP
N3RD	37,696	SOU-CW-HP
W8HAP	32,448	SOU-CW-HP
W1QK	22,320	SOU-CW-LP
NZ3D	7,680	SOU-CW-LP
W1KM	7,392	SOU-CW-LP
K1XM	6,408	SOU-CW-LP
K2DFC	6,120	SOU-CW-LP
K3HW	40	SOU-CW-QRP
N2NT	106,080	MSHP
AA1JD	101,790	MSHP
K3CCR	21,760	MSHP
WA2JQK	18,144	MSHP
WA2CP	11,928	MSHP
W1FM	8,756	MSLP
W2NPT	1,144	MSLP
KC1EWL	528	MSLP
W3KWH	220	MSLP

MSHP = Multioperator, Single Transmitter, High Power
MSLP = Multioperator, Single Transmitter, Low Power
SO-CW-HP = Single Operator, CW Only, High Power
SO-CW-LP = Single Operator, CW Only, Low Power
SO-CW-QRP = Single Operator, CW Only, QRP
SO-MIX-HP = Single Operator, Mixed Mode, High Power
SO-MIX-LP = Single Operator, Mixed Mode, Low Power
SO-MIX-QRP = Single Operator, Mixed Mode, QRP
SO-PH-HP = Single Operator, Phone Only, High Power
SO-PH-LP = Single Operator, Phone Only, Low Power
SOU-CW-HP = Single Operator Unlimited, CW Only, High Power
SOU-CW-LP = Single Operator Unlimited, CW Only, Low Power
SOU-CW-QRP = Single Operator Unlimited, CW Only, QRP
SOU-MIX-HP = Single Operator Unlimited, Mixed Mode, High Power
SOU-MIX-LP = Single Operator Unlimited, Mixed Mode, Low Power
SOU-MIX-QRP = Single Operator Unlimited, Mixed Mode, QRP
SOU-PH-HP = Single Operator Unlimited, Phone Only, High Power
SOU-PH-LP = Single Operator Unlimited, Phone Only, Low Power

Division Winners

Single Operator, Mixed Mode, High Power		
Atlantic	K3TC	17,422
Central	K9ZO	21,920
Dakota	KØTT	83,582
Delta	N8OO	56,012
Great Lakes	ND4Y	3,304
Hudson	KU2M	23,328
Midwest	KTØK	78,584
New England	K1WHS (K1BX, op)	142,058
Northwestern	W7GKF	13,392
Pacific	K6XX	5,678
Roanoke	N4XD	18,768
Rocky Mountain	WØETT	42,848
Southeastern	N4OX	21,384
Southwestern	WA8WZG	12,300
West Gulf	N5KF	4,158
Canada	VA3TIC	30

Single Operator, Mixed Mode, Low Power		
Atlantic	NS3T	3,660
Central	ND9G	12,036
Dakota	ACØW	11,760
Delta	KD5J	2,090
Great Lakes	W8MET	2,280
Hudson	K2TV	2,652
Midwest	NWØM	3,738
New England	AC1J	3,168
Northwestern	N7LOX	7,120
Pacific	AF6SA	1,530
Roanoke	N8II	41,650
Rocky Mountain	KFØUR	30,150
Southeastern	K2PS	10,314
Southwestern	KI6RRN	10,672
West Gulf	N5JJ	7,958
Canada	VE7SGW	532
Mexico	XE1H	702
Single Operator, Mixed Mode, QRP		
Central	N9NE	1,596
Dakota	NDØC	2,210
Delta	N4ELM	448
Great Lakes	KE4TZJ	8
Hudson	K2YGM	2,210
New England	W1TW	784
Roanoke	N3ZV	1,456
Rocky Mountain	NS7K	1,170
Southwestern	WA6FGV	432
West Gulf	NZ5G	20
Single Operator, Phone Only, High Power		
Atlantic	4U1WB (AJ3M, op)	480
Central	KF9US	624
Dakota	WØSD (KEØHQZ, op)	10,800
Great Lakes	K8DJR	260
Hudson	KD2NXM	30
Midwest	WØPPF	2
New England	AF1T	4,520
Northwestern	K7STO	16
Pacific	W6LP (NC6R, op)	912
Roanoke	N4MM	2,040
Rocky Mountain	NØWRK	1,290
Southeastern	W4DD	480
Southwestern	KD7RF	1,176
West Gulf	K5TR (WM5R, op)	11,914
Mexico	XE1R	260
Single Operator, Phone Only, Low Power		
Atlantic	K2SDS	1,680
Central	WB9W	40
Dakota	NGØC	352
Delta	W4UT	16
Great Lakes	N8VZ	104
Hudson	N2HMM	280
Midwest	KEØITC	456
New England	NP2GG	224
Northwestern	WZ8T	1,530
Pacific	K6MCS	64
Roanoke	KK4BZ	150
Rocky Mountain	KBØSNI	484
Southeastern	K4FCG (K1KNQ, op)	1,240
Southwestern	NF7E	810
West Gulf	W5PR	3,504
Canada	VE2NCG	2
Mexico	XE1AO	196
Single Operator, Phone Only, QRP		
Dakota	WBØIWG	112
Great Lakes	N8MWK	48
Pacific	KF6ZYD	2
Southwestern	W6QU (W8QZA, op)	32
West Gulf	KB5KYJ	1,036
Mexico	XE2MZL	2

Single Operator, CW Only, High Power

Atlantic	KD4D	47,068
Central	N4TZ	4,664
Dakota	WØOR	7,728
Delta	K5LG	13,192
Great Lakes	W8TWA	14,552
Hudson	K2TTT	8,128
Midwest	KØKT	11,352
New England	K1KI	48,480
Northwestern	WJ9B	55,488
Pacific	W6YX (N7MH, op)	41,040
Roanoke	N4CW	6,816
Rocky Mountain	WØZA	38,456
Southeastern	K1TO	29,028
Southwestern	AA7V	18,760
West Gulf	K5NA	67,524
Canada	VE5UF	10,600
Mexico	XE2X	4,692

Single Operator, CW Only, Low Power

Atlantic	W3BGN	24,816
Central	K9QVB	21,744
Dakota	KNØV	8,904
Delta	N4ZI	10,752
Great Lakes	WB8WKQ	8,844
Hudson	KA2D	2,520
Midwest	KØFLY	6,032
New England	N1IX	12,528
Northwestern	K7GS	5,168
Pacific	KH6CJJ	3,640
Roanoke	K7SV	11,536
Rocky Mountain	WKØP	6,688
Southeastern	N4WW (N4KM, op)	24,448
Southwestern	WA7NB	16,500
West Gulf	AE5GT	18,000
Canada	VE5GC	8,976

Single Operator, CW Only, QRP

Atlantic	K2SM	768
Central	KEØL	16
Dakota	KEØTT	20
Great Lakes	N8AP	416
Hudson	KR2Q	420
Midwest	WØCW	1,232
New England	N1JI	48
Northwestern	K7HBN	644
Pacific	WD6DX	108
Roanoke	KC4IM	180
Rocky Mountain	W5TTE	80
Southeastern	K3TW	360
Southwestern	NU7Y	64
West Gulf	N5OE	3,920
Canada	VA3RJ	112

Single Operator Unlimited, Mixed Mode, High Power

Atlantic	K3ZU	66,752
Central	WB9Z	49,704
Dakota	KØKX	53,430
Delta	K5RM	8,064
Hudson	AB2DE	4,004
Midwest	K3PA	30,024
New England	W1TJL	43,100
Northwestern	N7NM	40,392
Pacific	K3EST	51,408
Roanoke	N4RV	56,600
Rocky Mountain	NG7M	30,544
Southeastern	W4TAA	29,412
Southwestern	KY7M (KY7M, op @NA7TB)	81,030
West Gulf	N5XZ	64,056
Canada	VE5MX	8,234

Single Operator Unlimited, Mixed Mode, Low Power

Atlantic	W6YTG	944
Central	AB9YC	5,082
Dakota	NØMK	1,624
Delta	KS4X	120
Great Lakes	KE8EAS	5,200
Hudson	WR2G	3,162
Midwest	WØYJT	624
New England	K1ZE	27,216
Northwestern	WA7AXT	1,022
Pacific	W6OAT	4,350
Roanoke	KN4FIM	448
Southeastern	KM4HI	3,248
Southwestern	K7WP	3,600
West Gulf	K5KJ	13,962
Canada	VA3DF	8,640

Single Operator Unlimited, Mixed Mode, QRP

Atlantic	W2MF	3,168
New England	N1RR	1,260
Pacific	K2GMY	3,136
Southeastern	K4LQ	7,038

Single Operator Unlimited, Phone Only, High Power

Atlantic	KØCZH	64
Great Lakes	KC8QDQ	924
Hudson	N2RJ	24
Midwest	KØARY	40
New England	KA1ZD	880
Rocky Mountain	WTØDX	528
Southwestern	W2RD	1,666

Single Operator Unlimited, Phone Only, Low Power

Atlantic	W3LL	1,716
Central	K2DRH	7,070
Dakota	KEØNWG	528
Delta	K5KVN	8
Great Lakes	KD8BB	2
Midwest	KBØLZQ	20
Northwestern	WA7YXY	140
Pacific	N6ORB	48
Roanoke	W4ZAO	24
Rocky Mountain	ADØTA	1,500
Southwestern	K7HKR	90
West Gulf	K5LGX	110
Mexico	XE2JS	868

Single Operator Unlimited, Phone Only, QRP

Central	N9NBC	24

Single Operator Unlimited, CW Only, High Power

Atlantic	N2MM	67,968
Central	K9CT	27,512
Dakota	WØAD	15,312
Delta	K3IE	3,608
Great Lakes	KE4KY	15,232
Hudson	W2LE	3,456
Midwest	KØJPL	6,800
New England	N2KW	52,608
Northwestern	K7DSE	2,124
Pacific	K7XC	4,032
Roanoke	N1LN	20,064
Rocky Mountain	K7SCX	7,296
Southeastern	N6EE	21,296
Southwestern	N6SS	62,208
West Gulf	AC4CA	5,952
Canada	VE6BBP	8,256

Single Operator Unlimited, CW Only, Low Power

Atlantic	NZ3D	7,680
Central	W9XT	15,688
Dakota	KØTI	4,788
Delta	W4TTM	100
Great Lakes	N8EA	2,736
Hudson	K2DFC	6,120
New England	W1QK	22,320

Northwestern	K7QA	336
Pacific	KD6WKY	1,984
Roanoke	K4GMH	4,704
Southeastern	K4EJ	1,776
Southwestern	K6WSC	8,064
West Gulf	K5GM	1,632
Canada	VE3VY	280
Mexico	XE2B	2,736
Single Operator Unlimited, CW Only, QRP		
Atlantic	K3HW	40
Central	KI9A	448
Dakota	NØUR	4,240
Delta	W5UE	144
Rocky Mountain	WA7LNW	112
West Gulf	AF5Q	16
Multioperator, Single Transmitter, High Power		
Atlantic	K3CCR	21,760
Central	W9JP	288
Great Lakes	W8PR	60,928
Hudson	N2NT	106,080
Midwest	WØGJ	352
New England	AA1JD	101,790
Northwestern	K7JR	13,764
Pacific	W7RN	31,140
Roanoke	WW4CP	26,880
Southeastern	KT4Q	41,360
Southwestern	WØRIC	81,840
West Gulf	NX5M	80,154
Canada	VE9CB	110
Multioperator, Single Transmitter, Low Power		
Atlantic	W3KWH	220
Central	KD9GKL	9,184
Dakota	AAØAW	12,736
Delta	W4BSF	64
Hudson	W2NPT	1,144
New England	W1FM	8,756
Northwestern	W7TVC	17,150
Roanoke	K4OTH	416
Rocky Mountain	K5LRW	130
Southeastern	N4SVC	4,482
Mexico	XE2N	168