ARRL EME Contest 2021 Results

By Rick Rosen, K1DS *(rick1ds@hotmail.com)*

Little Dishes Fulfill EME Wishes

It's the first week of February and I am eagerly awaiting the Excel spreadsheet of the ARRL contest results. I have dutifully saved many of the emails, excerpts from the various loggers and the 432 & Up and 144 MHz EME newsletters. From these resources, my personal communications with other EME ops, my observations and limited participation, I will craft my 10th and final contest summary.

I have had great satisfaction and feedback for my efforts, and I thank the EME community for welcoming me, teaching me, communicating on the moon with me and sending me wonderful QSL cards. For those of you who have taken the time to click on this summary but have not yet tried EME, please read on.

There have been many developments that have facilitated EME communications and once you have made your first moonbounce contact, it's easy to get hooked and want more. Understandably, there are many current moonbouncers who have spent years doing this and favor CW and SSB activity, yet there are those who find the digital modes an opportunity to add contacts with smaller and less powerful stations.

Log Entries

Now it's the last week of February and the Excel sheet of the log results has just arrived by email. My first glance is to the number of logs that were officially submitted: 237 entries, just about the same as last year's count of 240. By adding the number of QSOs from the top scoring stations which operated only on a single band, I counted 570 unique call signs of stations who were active on the moon contest weekends. The percentage of moon-active stations submitting contest logs is just about 40%.

As the contest ended, I led the cheerleading for log entries and assisted many stations with the conversion to Cabrillo format and submission to the ARRL EME Contest portal. I am especially grateful to Bruce Horn, WA7BNM, who has written a program to convert Excel logs into Cabrillo format. I have also realized that there are several logging programs that support EME QSOs and can report Cabrillo format. I am hoping that many of you will share those programs to make it easier for everyone to do log submission in the future.

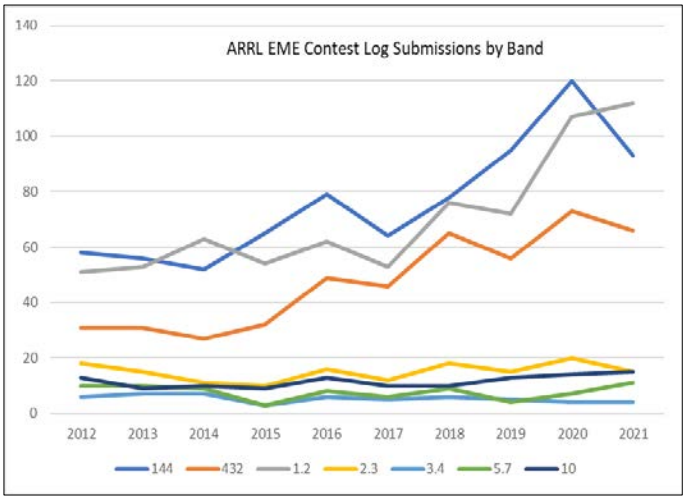
There were 69 US stations reporting logs and 4 Canadian logs, the remaining 164 were from countries all around the world. Thirty-seven entries (15%) were CW/SSB only while the remaining 200 (85%) were mixed mode or digital only logs.

As the trend had been established in recent years, the 144 MHz Single Operator, All Mode category yielded the greatest number of submitted logs with 55 entries. The Single Operator Multi Band, All Mode entries numbered 31. Twenty-eight of the submitted logs were from multi-operator stations.

All told, there were 12,797 QSOs recorded in the submitted logs; 24% were made on CW/SSB and the other 76% were completed using digital modes. Drilling down further, all the contacts on 50 MHz and 144 MHz were digital. As we get higher in frequency there is more CW action. There were 97 CW QSOs on 432 MHz for 6% of that band's reported 1,784 EME contacts.

On 1296 MHz there were 41% of the 6,576 logged QSOs were made using CW/SSB. The 2.3 GHz activity was dominated by CW with 77% of the 186 QSOs completed on CW. The 5.7 GHz log reports showed 78 QSOs, 67% using CW and 10.3 GHz wound up with 233 reported contacts, 40% using CW.

There were no reported contacts using 24 GHz this year. There were 24 digital contacts recorded on 222 MHz, a band permitted in the US and Canada. There are several stations chasing the Worked All States Award using EME on this band.



The Multioperator All Band, All Mode stations made outstanding efforts and that was reflected in their scores. Congratulations to the team of R3YA, RA3EME, RA3Y, and UA3YY operating UA5Y, as they set an all-time record with a score of 7,614,000 points. Their total of 405 QSOs and 188 multipliers was made across the 144 MHz, 432 MHz, 1296 MHz, 2.3 GHz, 5.7 GHz and 10 GHz bands. Going back some 20 years, it appears that this score is 15% higher than any other previous multi-op submission.

The second and third place Multi-op All Band teams scores were separated by a mere 300 points. The NC1I team of N1DPM, NC1I, and W1QA scored 4,219,200 points while the K2UYH group of K2TXB, K2UYH, and W2HRO had a 4,218,900 score. The difference was 6 QSOs more for the NC1I team, although the K2UYH log had 3 more multipliers.

Weekend 1

Plans were made early between some of the stations that would be operating on 2.3 MHz and above. Operations on the three most popular bands, 13cm, 6cm and 3cm require feed changes. Since there were two full moon passes, coordination of bands was essential to optimize contacts.

While many of us with moonbounce stations for bands from 50 MHz through 1296 MHz waited for our turn to contest, 27 stations gathered on 2.3 GHz, 5.7 GHz and 10.3 GHz to exchange call signs and signal reports. Together they logged 491 QSOs across 4 microwave bands from 13cm through 3 cm.

The team of OK1DAI and OK1DAK had the only 2.3 GHz Multioperator Single Band entry and made 31 QSOs using all modes under the call sign of OK1KIR. In a similar manner, OK1CA was the only 2.3 GHz Single Operator entry with 22 QSOs with mixed modes. The action on 9cm (3.4GHz) predictably fell to only 4 reported contacts. The activity on this band during the ARRL EME contest had been foundering for several years.

The announcement of the band auctions and purchases of the frequencies by commercial interests had amateur radio operators fleeing from this band. More recently in the US we note an option to operate on 9cm, but in a segment lower than the previous assigned frequency. Perhaps we may see some future increased activity on this band as there have already been reports on how to modify existing transverters to the new frequencies.

Operating EME on 10 GHz requires excellent dish pointing. The moon is about 0.5 degrees of azimuth and elevation, and a contact usually requires tracking during the few minutes that a QSO might take. Engineering a system for pointing a dish of 3m or larger is no small feat.

There were 15 stations that used 10 GHz for the contest. OK2AQ had 26 mixed-mode contacts to top G3YGF who had 17 digital contacts in the Single Operator 10 GHz category. The team of W3SZ and NN3Q were the only multi-operator entry in the 10 GHz category with 19 mixed-mode QSOs. They were able to do AZ/El auto tracking in spite of the issues that previously prevented them from doing so, and that made the weekend a much more relaxed contest weekend than the previous one.

Weekend 2

As soon as the clock turned 00:00 for November 20, there were EME contesters sending out their CQs on bands 50 MHz through 1296 MHz The various chat rooms and reflectors saw much activity as callers posted their frequencies. From most all of the reports that were posted on the loggers and EME reflectors, there were plenty of stations to work.

Although there were a few grumbles about the moon conditions, everyone seemed to be making contacts one after the other. A most interesting development for the digital contesters was the use of Q65 and the feature of CFOM (Continuous Frequency on the Moon). For me it was an education on the use of the new mode and station frequencies.

This array of Yagis and a 3.8m dish at SM4GGC enabled 170 EME contacts for the contest. [SM4GGC photo]

Using the HB9Q logger for 432 MHz, I noted that at times there were 130 stations monitoring the activity and making CQ announcements and scheduling contacts. Similar activity was occurring on the 1296 MHz logger

with a count of 120 stations posting their frequencies and setting up QSOs.

I was desperate to get on the moon but the weather here in Florida was uncooperative and I couldn't get my small portable station and antenna out in the wind and rain. As I checked the logger periodically, I noted that W2HRO, operating the 1296 position for the K2UYH group was checking with the stations using the 2.4m foldable silvered-cloth dishes and patch feeds that he manufactures.

Both KA6U and KB7Q were having decent success with their small set-ups. I have one of those dishes also and was anxious to use it for the first time, but Mother Nature said otherwise. NT6V was also using the same dish and feed with about 400 watts. Here are some of the comments exchanged in the HB9Q logger:

NT6V: not hearing any callers. first attempts here.
W2HRO: EME is like peeling an onion - you'll be crying the entire time - but you'll get there. :)
NT6V: TNX QSO....U best -20 here (after completing with CX2SC)
W2HRO: Aiming by hand is a skill!
NT6V: just optimized pointing again. almost overhead here
W2HRO: Do you look thru the fabric to aim?
NT6V: Yeah, kinda looking left right past a bit. at high elevation its harder as I need to stick my head almost underneath. glad nobody is watching this here locally...
W2HRO: ham radio people are strange! Your neighbors don't know why there is a guy setting an upside-down umbrella in the middle of the night...
W2HRO to KB7Q: NT6V wants to enroll in pointing school
NT6V: I think I need to get some tracking thing going. I am in/out of the moon. too much angular velocity at highest elevation.
(And finally, to CE3VRT): Thank you for trying. Will try again when I am better at aiming. Hand pointing isn't easy!

There were many other posts on the 432 MHz logger that gave us some of the flavor of the activity:

PA5Y: I set myself a target of 300,000 pts for both legs. I am well passed that already. I have had a lot of fun… OK I will be here if can stay awake…. Stop CQ 069 need coffee BB 5 mins… GN all time for sleeep!
VE6TA to VK2CMP: Thanks Mick. Burning a hole through my trees HI
VK2CMP: Good to hear just finished new antenna 3hrs b4 moon rise:-)
GW4ZHI: Happy days! Glad to be QRV on this band. Got plans to improve everything. Only my 2nd EME QSO on this band. Got the bug now!
SM3LBN: I call now DL7APV, if he gives me normal report I know amp is still ok, Yes he did
DL7APV: I hope to stay awake for some time…. stop CQ & take a nap BBL

Visit the ARRL Soapbox!

You can find additional comments and station photos at the ARRL collection of soapbox comments at contests.arrl.org/eme/soaps/2021/

Weekend 3

I finally got my chance to use EME on 1296 MHz! But rain and wind on Friday had me limited to one pass only on Saturday night. Thanks to the help from KB7Q, W2HRO, and ops at W6YX, I was able to get everything properly assembled and operational. Aligning the dish to the sun to calibrate the AZ-EL rotor and measuring sun noise gave me confidence that I would make some QSOs once the moon was above the trees here in Florida. I immediately decoded DF3RU and had an exchange, everything is working! I went on to have five other Q65 QSOs and one CW QSO with DG5CST, thanks to his great signal and patience. By midnight, the moon was overhead, and it started to rain, making it impossible to copy any more signals.

PAØTBR homebrewed this 3.5m dish and with only 3 watts at the feed was able to make 13 QSOs on 1296 MHz [PAØTBR photo]

The HB9Q logger as well as the NØUK 2m logger continued to show plenty of activity on the bands. Faraday rotation was one of the main features of the 432 MHz activity, especially as there were a few single Yagi

low power stations trying to make their contacts with the "big guns."

Several comments told of seeing a digital trace but getting no decode. The December date for the 3rd weekend was difficult as it got close to the Christmas holiday and of course the winter weather, not to mention a less than optimal moon degradation.

F2CT and family with his 3.7m solid dish used on 1296 MHz and 10 GHz in this year's contest [F2CT photo]

Some more of the interesting comments from the 432 MHz logger:

TI1K: This time of the year is horrible for EME due to Christmas lights etc…. I found the laptop is causing birdies, going for some ferrites
N5NHJ to DL7APV: you are cooking my hamburger!
KU4XO: Seems to be working - more stations in the log than ever this weekend… station improvements here - still more in the tank… I'm just glad to get 432 up before the contest - had to next day air two parts to be up in time
K2UYH: Should be big sig if can find right pol
K5QE: everyone waiting for the last new station to show
DL9LBH to EA5CJ: I tried it vertical, tried it horizontal… you are now -22 once even -19, I give up, 73
OZ1SKYto NC1I: already found you, you can´t hide :-)
NC1I: Wow several callers and moon not even one degree elevation yet!
DL7APV: best start you can have Frank, GE
NC1I: Especially after missing entire pass yesterday due to iced up antenna!
DL7APV: US activity was very good, but overall, I´m far away from last year's numbers, but was on 3 bands this time
G3LTF: I was just too tired to stay up for the US window last night! Age is getting to me!
W1PV: Hope you enjoyed the contest as I did. 73

And comments from the HB9Q 1296 MHz EME logger:

DL7APV: Need bigger dish for CW… can hear IVE only 319, next year with bigger dish we try
KL6M: Knowing you, 15m dish I suppose
DL7APV: No 3m or so, limited by XYL
RD4D: Due to technical problems with GPS, had to stop the TX and work... very sorry that happened
DL6SH: RR understand too much vodka in GPS ;-) good luck for repair
RD4D: Yes, I already cleaned the GPS with alcohol, it didn't help
HSØZOP: I will try to build a 100 EXPRESS SSPA within the next 6 hours, maybe I will show up for first HS-World QSO's
VA7MM to KL6M: You're approaching a quarter century. 25 years in EME would warrant a special edition QSL card.
W6YX: Never made a CW contact before -- looking to see if anyone is willing to go 5wpm haha
VE6TA: I can reply to you at 5 or so
W6YX: Thanks so much! That was my first ever CW contact on any band anywhere – de Sam KN6MYI
HSØZOP to W6YX: Wow, 1st ever Thailand QSO in EME in 23cm, TNX
N5BF to HZØZOP: Amazing what you can do with 50 Watts at half a million miles!
IK2DDR: I'm becoming old, these contest weekends are pure fun, but very hard
PA3FXB: Dish parked. Thanks all for contest QSO's! It was big fun :-) 73 all!!

OZ4MM, a contest regular, used his 10m dish to work 69 1296 MHz QSOs. [OZ4MM photo]

The Bands

Six-meter EME activity has been under-reported in contests. In this contest, OH2BC had 16 digital contacts and YB2MDU made 5 digital QSOs. Both stations were Single Operator 6 Meters All Mode. YL2GD as a Single-op All-band station made 8 digital 6m QSOs and WQ5S had a single 6-meter contact in his log. The exotic 6-meter EME adventures of W7GJ have been well chronicled, but his DXpeditions didn't coordinate with this year's ARRL EME contest.

Two meters is always a popular EME band and an entry point for many new to the mode. There were 93 stations that showed activity on 2 meters in their logs with a total of 3,892 QSO reported by them. Use of CW has disappeared from 2-meter EME, although there are many CW capable stations. Digital exchanges dominate the activity on this band.

Total QSOs Reported by Band and Mode				
Band	**CW&PH**	**Digital**	**Total QSOs**	**Logs**
50	0	30	30	4
144	0	3,892	3,892	93
222	0	24	24	6
432	97	1,687	1,784	66
1.2GHz	2,680	3,896	6,576	112
2.3GHz	144	42	186	16
3.4GHz	2	2	4	4
5.7GHz	53	25	78	10
10GHz	90	133	223	15
24GHz	0	0	0	0
Total	**3,066**	**9,731**	**12,797**	

The RX1AS station with ops RU1AA, RU1AC, and RX1AS had 207 2-meter contacts with 67 multipliers to top the Multioperator 2-meter category, scoring 1,386,900 points. Second in that category was the SK6EI group with SA6AQD, SA6BPD, SM6BWD, SM6LPF, SM6LPG, and SM6THE with 377,200 points based on 82 QSOs and 46 multipliers. Top honors for the single-op 2-meter station go to S51ZO who had 150 contacts and scored 930,000. With 73,1600 points, IW4ARD was in 2nd place in the Single Operator 2-meter group. WA1NPZ had 3rd place with 530K points.

There were a few stations who had the capability and permission to operate on 222 MHz. WA4NJP and W5ZN entered their logs with a few QSOs each on this band only.

The activity on 432 MHz continues to grow as more smaller stations can work a few of the bigger stations. There were 1,784 QSOs, 97 CW and 1,687 digital, reported across the logs of 66 stations that had signals on the band. Although last year there were 71 stations who sent in logs with 432 QSOs, they totaled only 1441 contacts.

There were 32 stations that entered the Single Operator 432 MHz category. PA5Y netted 705,600 points with 126 QSOs and 56 multipliers, topping the list in this category. S56P followed in 2nd place with 86 contacts and 45 multipliers for a score of 387K. Following in 3rd place was 7M2PDT with 217K. There was only a single 432MHz multi-operator entry from S51LF operating with S51YL scoring 273K.

1296 MHz and 10 GHz dishes used at WA3RGQ in Florida [WA3RGQ photo]

The biggest explosion of activity has been on 1296 EME. This year we had 112 of the 237 log submissions showing activity on this band. This number has continually increased from 50 logs with 1296 MHz activity in 2012. Additionally, there are three times the number of QSOs being made on this band than in 2012.

We had 6,576 contacts with 2,680 CW/SSB (41%) and 3,896 digital (59%) in the submitted logs. Alex, operating HSØZOP from Thailand put that country on the air using 1296 MHz EME for the first time, completing 46 digital contacts using 50W and a 3m dish. The top score in the Single Operator 1.2 GHz All Mode category was made by OK2DL with 168 QSOs and 64 multipliers for a score of 1.075 million points. DF3RU took second place in this group with 803.7K based on 141 QSOs and 57 multipliers.

In third place was PA3FXB with a score of 612K. The best score for a Single Operator CW/SSB only entry was made by DG5CST, working 129 stations and 54 multipliers for a score of 696.6K points. G4CCH managed to work 100 CW stations for a 2nd score of 450K and DL7UDA placed 3rd with 93 CW QSOs for a score of 427.8K.

OK1DFC used his latest homebrew 8.5m offset dish to log 76 QSOs on 1296 MHz EME [OK1DFC photo]

There were 8 Multioperator All Mode stations using only 1296 MHz. The SKØCT group of SAØCAN, SMØBSO, SMØDFP, SMØERR, SMØKBD, SMØNCL, and SMØRJV were first in their category with 132 QSOs and 50 multipliers for a score of 660K. The team of I2DGH, I2SVA, and I2UNE operated IQ2DB for a 2nd place score of 606.9K points. In 3rd place was the IK5VLS station with ops IK5AMB and IK5VLS scoring 504K.

KB2SA, a newcomer to EME, appears to be setting some small station records using his 1.9m f/D .35 mesh wire dish as he turned in a log with 72 contacts on 1296 MHz. The smallest station he recalled working during the contest was VE4MA who was using a 1.5m dish. He also remembers working some single Yagi stations.

Optimizing his station with short coaxial connections and using high-quality connectors and relays helps him squeeze every fraction of a dB advantage in both transmit and receive. He reported his strategy of calling CQ almost continuously on the same frequency during his moon passes was most productive.

Even DL7APV added a 1.3m dish with 100 watts and completed 30 digital QSOs, including one with KB2SA. DJ3JJ was able to work 7 stations via CW on 1296 MHz in November with his 2.5 m dish.

KB2SA uses this 1.9m f/D .35 mesh wire dish with a septum feed and scalar ring effectively on 1296 [KB2SA photo]

The Future

This year's ARRL EME contest weekends are September 17 – 18 for 2.3 GHz & Up; October 15 – 16 and November 12 – 13 for 50 to 1296 MHz. What are your plans for participation?

The acceleration of the use of the WSJT-X digital Q65 mode may encourage those with access to small VHF, UHF and microwave stations to try EME contacts. I am passing the editorship of this report to C.R. "Skip" Paulsen, W1PV, who is also an avid EME operator. I look forward to the continued increased participation and log submission of stations in the EME contests. Thanks again to my XYL Jani for her support in my amateur radio activity and for proof-reading these reports.

2022 ARRL International EME Contest

The 2022 contest weekends are as follows:
September 17 – 18 (2.3 GHz and Up)
October 15 – 16 (50 – 1296 MHz)
November 12 – 13 (50 – 1296 MHz)

Category Winners (in Bold) – by Category by Score

Single Operator

Call	Operator(s)	Category	Mode	Band	Score	QSOs CW/PH	QSOs Dig	Mults US	Mults VE	Mults DX
G3LTF	**G3LTF**	**SO-CW-ALL**	**CW**	**ALL**	**561,000**	**102**	**0**	**14**	**2**	**39**
WA6PY	WA6PY	SO-CW-ALL	CW	ALL	244,000	61	0	12	4	24
SP3XBO	SP3XBO	SO-CW-ALL	CW	ALL	158,100	51	0	7	0	24
HB9BBD	HB9BBD	SO-CW-ALL	CW	ALL	15,400	14	0	1	0	10
SM6FHZ	SM6FHZ	SO-CW-ALL	CW	ALL	13,000	13	0	2	1	7

DL9KR	**DL9KR**	**SO-CW-432**	**CW**	**432**	**31,200**	**24**	**0**	**2**	**0**	**11**
JAØTJU	JAØTJU	SO-CW-432	CW	432	1,200	4	0	0	0	3
F6HLC	F6HLC	SO-CW-432	CW	432	100	1	0	0	0	1

DG5CST	**DG5CST**	**SO-CW-1.2G**	**CW**	**1296**	**696,600**	**129**	**0**	**19**	**4**	**31**
G4CCH	G4CCH	SO-CW-1.2G	CW	1296	450,000	100	0	17	3	25
KL6M	KL6M	SO-CW-1.2G	CW	1296	373,800	89	0	14	3	25
DL6SH	DL6SH	SO-CW-1.2G	CW	1296	362,700	93	0	11	1	27
OK1CS	OK1CS	SO-CW-1.2G	CW	1296	331,500	85	0	14	2	23
RA3EC	RA3EC	SO-CW-1.2G	CW	1296	259,200	72	0	10	2	24
OZ4MM	OZ4MM	SO-CW-1.2G	CW	1296	234,600	69	0	9	3	22
SP9VFD	SP9VFD	SO-CW-1.2G	CW	1296	210,800	68	0	9	1	21
DU3T	DU3T	SO-CW-1.2G	CW	1296	200,100	69	0	7	2	20
SP6ITF	SP6ITF	SO-CW-1.2G	CW	1296	185,600	64	0	10	1	18
F5KUG	F5KUG	SO-CW-1.2G	CW	1296	162,400	56	0	10	1	18
JH1KRC	JH1KRC	SO-CW-1.2G	CW	1296	114,400	44	0	9	1	16
LZ2US	LZ2US	SO-CW-1.2G	CW	1296	99,000	45	0	3	1	18
N4PZ	N4PZ	SO-CW-1.2G	CW	1296	64,000	32	0	8	2	10
WK9P	WK9P	SO-CW-1.2G	CW	1296	53,200	28	0	9	1	9
JF3HUC	JF3HUC	SO-CW-1.2G	CW	1296	48,000	24	0	5	1	14
NQ7B	NQ7B	SO-CW-1.2G	CW	1296	46,800	26	0	7	1	10
IW2FZR	IW2FZR	SO-CW-1.2G	CW	1296	44,800	32	0	1	0	13
DL1AT	DL1AT	SO-CW-1.2G	CW	1296	33,600	24	0	1	0	13
W2BYP	W2BYP	SO-CW-1.2G	CW	1296	31,500	21	0	8	1	6
OK2PE	OK2PE	SO-CW-1.2G	CW	1296	29,900	23	0	0	0	13
DJ3JJ	DJ3JJ	SO-CW-1.2G	CW	1296	4,200	7	0	0	0	6

UA3PTW	**UA3PTW**	**SO-ALL**	**ALL**	**ALL**	**5,584,000**	**58**	**291**	**47**	**6**	**107**
DL7APV	DL7APV	SO-ALL	ALL	ALL	4,012,000	10	285	51	7	78
YL2GD	YL2GD	SO-ALL	ALL	ALL	2,363,400	30	172	40	5	72
SM4GGC	SM4GGC	SO-ALL	ALL	ALL	1,479,000	16	154	24	3	60
LZ1DX	LZ1DX	SO-ALL	ALL	ALL	1,170,000	13	137	22	3	53

PA2CHR	PA2CHR	SO-ALL	ALL	ALL	931,000	0	133	23	1	46
PA3DZL	PA3DZL	SO-ALL	ALL	ALL	897,600	12	120	19	0	49
KD2LGX	KD2LGX	SO-ALL	ALL	ALL	716,800	0	112	29	0	35
K3WM	K3WM	SO-ALL	ALL	ALL	504,400	41	56	18	6	28
ES3RF	ES3RF	SO-ALL	ALL	ALL	409,200	16	77	7	2	35
F2CT	F2CT	SO-ALL	ALL	ALL	348,300	79	2	11	2	30
NØAKC	NØAKC	SO-ALL	ALL	ALL	321,200	0	73	23	0	21
W2LPL	W2LPL	SO-ALL	ALL	ALL	309,600	0	72	21	0	22
WA3RGQ	WA3RGQ	SO-ALL	ALL	ALL	299,200	0	68	14	2	28
N1AV	N1AV	SO-ALL	ALL	ALL	292,500	8	57	18	2	25
W1PV	W1PV	SO-ALL	ALL	ALL	237,800	0	58	17	2	22
OK2ULQ	OK2ULQ	SO-ALL	ALL	ALL	234,500	33	34	7	2	26
DL4DTU	DL4DTU	SO-ALL	ALL	ALL	234,000	20	40	9	2	28
US7GY	US7GY	SO-ALL	ALL	ALL	172,800	0	54	11	0	21
JJ3JHP	JJ3JHP	SO-ALL	ALL	ALL	142,800	1	50	10	0	18
UA3TCF	UA3TCF	SO-ALL	ALL	ALL	139,200	4	44	3	0	26
4Z5CP	4Z5CP	SO-ALL	ALL	ALL	68,200	0	31	7	0	15
KNØWS	KNØWS	SO-ALL	ALL	ALL	64,400	0	28	10	0	13
YO5TP	YO5TP	SO-ALL	ALL	ALL	62,000	0	31	6	0	14
W5LUA	W5LUA	SO-ALL	ALL	ALL	57,200	16	10	4	4	14
WQ5S	WQ5S	SO-ALL	ALL	ALL	54,600	0	26	12	0	9
W1FKF	W1FKF	SO-ALL	ALL	ALL	48,600	0	27	8	0	10
UR5LX	UR5LX	SO-ALL	ALL	ALL	35,200	7	15	2	0	14
G4BRK	G4BRK	SO-ALL	ALL	ALL	1,600	0	4	1	0	3
HI8DL	HI8DL	SO-ALL	ALL	ALL	900	0	3	1	0	2
JG2TSL	JG2TSL	SO-ALL	ALL	ALL	900	0	3	0	0	3

OH2BC	**OH2BC**	**SO-6M**	**ALL**	**50**	**19,200**	**0**	**16**	**7**	**0**	**5**
YB2MDU	YB2MDU	SO-6M	ALL	50	2,500	0	5	3	0	2

S51ZO	**S51ZO**	**SO-2M**	**ALL**	**144**	**930,000**	**0**	**150**	**21**	**2**	**39**
IW4ARD	IW4ARD	SO-2M	ALL	144	731,600	0	124	23	2	34
WA1NPZ	WA1NPZ	SO-2M	ALL	144	530,000	0	100	22	0	31
OK1DIX	OK1DIX	SO-2M	ALL	144	485,000	0	97	21	1	28
WB9UWA	WB9UWA	SO-2M	ALL	144	485,000	0	97	22	0	28
K1DG	K1DG	SO-2M	ALL	144	427,700	0	91	21	0	26
G8RWG	G8RWG	SO-2M	ALL	144	396,000	0	88	16	0	29
SM2BYC	SM2BYC	SO-2M	ALL	144	259,200	0	72	14	1	21
UT9UR	UT9UR	SO-2M	ALL	144	183,600	0	54	19	0	15
9H1TX	9H1TX	SO-2M	ALL	144	183,000	0	61	7	0	23
JA1DYB	JA1DYB	SO-2M	ALL	144	154,000	0	55	10	0	18
UA9YJM	UA9YJM	SO-2M	ALL	144	153,900	0	57	8	0	19
KA1W	KA1W	SO-2M	ALL	144	153,000	0	51	14	0	16
JP3EXR	JP3EXR	SO-2M	ALL	144	141,000	0	47	10	0	20

HG5BMU	HG5BMU	SO-2M	ALL	144	127,400	0	49	7	0	19
W6TCP	W6TCP	SO-2M	ALL	144	112,000	0	40	11	0	17
7K3LGC	7K3LGC	SO-2M	ALL	144	109,200	0	42	6	0	20
AG4W	AG4W	SO-2M	ALL	144	108,000	0	40	15	0	12
HSØZIL	HSØZIL	SO-2M	ALL	144	105,000	0	42	10	0	15
I2FAK	I2FAK	SO-2M	ALL	144	100,800	0	36	18	1	9
LZ1DP	LZ1DP	SO-2M	ALL	144	102,500	0	41	7	0	18
UA1OEJ	UA1OEJ	SO-2M	ALL	144	91,000	0	35	14	0	12
K7ULS	K7ULS	SO-2M	ALL	144	72,600	0	33	11	0	11
K8DIO	K8DIO	SO-2M	ALL	144	71,400	0	34	10	0	11
KG6NK	KG6NK	SO-2M	ALL	144	70,400	0	32	10	0	12
SM5CUI	SM5CUI	SO-2M	ALL	144	67,200	0	28	5	1	18
W7GJ	W7GJ	SO-2M	ALL	144	60,900	0	29	12	0	9
9Y4D	9Y4D	SO-2M	ALL	144	45,000	0	25	9	0	9
BA4SI	BA4SI	SO-2M	ALL	144	44,800	0	28	2	0	14
JHØWJF	JHØWJF	SO-2M	ALL	144	43,200	0	27	2	0	14
TA2NC	TA2NC	SO-2M	ALL	144	42,000	0	28	3	0	12
N9EP	N9EP	SO-2M	ALL	144	33,000	0	22	8	0	7
WB6RJH	WB6RJH	SO-2M	ALL	144	23,800	0	17	5	0	9
EA7KI	EA7KI	SO-2M	ALL	144	20,400	0	17	2	0	10
LU5BOJ	LU5BOJ	SO-2M	ALL	144	20,400	0	17	5	0	7
KC2HFQ	KC2HFQ	SO-2M	ALL	144	18,000	0	15	5	0	7
N7ZO	N7ZO	SO-2M	ALL	144	15,400	0	14	5	0	6
LX/PE1ITR	PE1ITR	SO-2M	ALL	144	10,400	0	13	1	0	7
VE3WY	VE3WY	SO-2M	ALL	144	9,600	0	12	1	0	7
R7LP	R7LP	SO-2M	ALL	144	6,000	0	10	2	0	4
CX2SC	CX2SC	SO-2M	ALL	144	5,600	0	8	2	0	5
UA6BAC	UA6BAC	SO-2M	ALL	144	4,800	0	8	3	0	3
SP8OOU	SP8OOU	SO-2M	ALL	144	3,500	0	7	0	0	5
UC8Y	UC8Y	SO-2M	ALL	144	3,500	0	7	1	0	4
DL8JJ	DL8JJ	SO-2M	ALL	144	2,500	0	5	1	0	4
VE1KG	VE1KG	SO-2M	ALL	144	2,000	0	5	0	0	4
YU7MS	YU7MS	SO-2M	ALL	144	1,600	0	4	3	0	1
YO6XK	YO6XK	SO-2M	ALL	144	1,200	0	4	0	0	3
KK4MA	KK4MA	SO-2M	ALL	144	900	0	3	0	0	3
DF7TS	DF7TS	SO-2M	ALL	144	600	0	3	0	0	2
UA9CCL	UA9CCL	SO-2M	ALL	144	600	0	3	1	0	1
OH1MN	OH1MN	SO-2M	ALL	144	400	0	2	0	0	2
UR3VKC	UR3VKC	SO-2M	ALL	144	400	0	2	0	0	2
EA7E	EA7E	SO-2M	ALL	144	100	0	1	0	0	1
N2AMC	N2AMC	SO-2M	ALL	144	100	0	1	1	0	0
ON7EQ	ON7EQ	SO-2M	ALL	144	100	0	1	0	0	1
W8TN	W8TN	SO-2M	ALL	144	100	0	1	0	0	1

WA4NJP	**WA4NJP**	**SO-222**	**ALL**	**222**	**2,500**	**0**	**5**	**5**	**0**	**0**
W5ZN	W5ZN	SO-222	ALL	222	1,200	0	4	3	0	0

PA5Y	**PA5Y**	**SO-432**	**ALL**	**432**	**705,600**	**7**	**119**	**18**	**3**	**35**
S56P	S56P	SO-432	ALL	432	387,000	0	86	13	3	29
7M2PDT	7M2PDT	SO-432	ALL	432	217,600	1	63	12	0	22
VK2CMP	VK2CMP	SO-432	ALL	432	117,000	1	44	12	1	13
VK4EME	VK4EME	SO-432	ALL	432	112,700	0	49	8	0	15
RD3FD	RD3FD	SO-432	ALL	432	96,600	1	41	4	0	19
OK1TEH	OK1TEH	SO-432	ALL	432	66,000	1	32	3	1	16
KU4XO	KU4XO	SO-432	ALL	432	65,100	0	31	10	0	11
N1QG	N1QG	SO-432	ALL	432	39,100	0	23	9	0	8
UB4UAA	UB4UAA	SO-432	ALL	432	38,400	1	23	3	2	11
DF7KB	DF7KB	SO-432	ALL	432	36,800	0	23	3	2	11
DL7URH	DL7URH	SO-432	ALL	432	36,400	2	24	2	0	12
YO8RHI	YO8RHI	SO-432	ALL	432	33,000	0	22	2	0	13
DL1VPL	DL1VPL	SO-432	ALL	432	26,000	0	20	1	0	12
JH7BAY	JH7BAY	SO-432	ALL	432	23,800	0	17	7	0	7
F1NZC	F1NZC	SO-432	ALL	432	16,200	0	18	1	0	8
F4VTP	F4VTP	SO-432	ALL	432	14,300	0	13	5	0	6
PE1ITR	PE1ITR	SO-432	ALL	432	8,800	0	11	1	0	7
RWØLDF	RWØLDF	SO-432	ALL	432	8,100	0	9	3	0	6
N7GP	N7GP	SO-432	ALL	432	4,900	0	7	2	0	5
JRØWFY	JRØWFY	SO-432	ALL	432	4,200	0	7	2	0	4
YO2NAA	YO2NAA	SO-432	ALL	432	4,000	0	8	1	0	4
KBØZ	KBØZ	SO-432	ALL	432	2,500	0	5	3	0	2
TI1K	TI5CDA	SO-432	ALL	432	2,500	0	5	2	0	3
N5NHJ	N5NHJ	SO-432	ALL	432	2,000	0	5	1	0	3
N6WS	N6WS	SO-432	ALL	432	1,600	0	4	1	0	3
K7ATN	K7ATN	SO-432	ALL	432	900	0	3	1	0	2
MXØCNS	MØABA	SO-432	ALL	432	600	0	3	0	0	2
AK4WQ	AK4WQ	SO-432	ALL	432	400	0	2	1	0	1
K3GNC	K3GNC	SO-432	ALL	432	400	0	2	1	0	1
IK2RHE	IK2RHE	SO-432	ALL	432	200	0	2	0	0	1
UR7IMM	UR7IMM	SO-432	ALL	432	100	0	1	1	0	0

OK2DL	**OK2DL**	**SO-1.2G**	**ALL**	**1296**	**1,075,200**	**71**	**97**	**22**	**5**	**37**
DF3RU	DF3RU	SO-1.2G	ALL	1296	803,700	56	85	19	3	35
PA3FXB	PA3FXB	SO-1.2G	ALL	1296	612,000	22	98	16	4	31
IK2DDR	IK2DDR	SO-1.2G	ALL	1296	575,000	48	67	14	3	33
SM5DGX	SM5DGX	SO-1.2G	ALL	1296	571,200	36	76	17	4	30
OK1KKD	OK1FAQ	SO-1.2G	ALL	1296	535,000	65	42	15	3	32
RA4HL	RA4HL	SO-1.2G	ALL	1296	488,800	22	82	11	4	32
OM4XA	OM4XA	SO-1.2G	ALL	1296	474,700	14	87	16	2	29

DL7UDA	DL7UDA	SO-1.2G	ALL	1296	427,800	21	72	15	3	28
N5BF	N5BF	SO-1.2G	ALL	1296	423,200	23	69	16	4	26
KA1GT	KA1GT	SO-1.2G	ALL	1296	378,000	7	83	15	2	25
SP5GDM	SP5GDM	SO-1.2G	ALL	1296	369,800	0	86	13	3	27
YO2LAM	YO2LAM	SO-1.2G	ALL	1296	344,400	0	82	14	2	26
GMØPJD	GMØPJD	SO-1.2G	ALL	1296	328,000	6	74	12	3	26
K7CA	K7CA	SO-1.2G	ALL	1296	323,900	8	71	15	4	22
KB2SA	KB2SA	SO-1.2G	ALL	1296	276,900	0	71	14	4	21
DL1SUZ	DL1SUZ	SO-1.2G	ALL	1296	265,200	9	69	9	2	23
OK1DFC	OK1DFC	SO-1.2G	ALL	1296	250,800	0	76	12	1	20
PE1LWT	PE1LWT	SO-1.2G	ALL	1296	200,600	10	49	9	2	23
DK5AI	DK5AI	SO-1.2G	ALL	1296	186,000	12	48	10	3	18
RX6AIA	RX6AIA	SO-1.2G	ALL	1296	186,000	0	60	9	2	20
W5AFY	W5AFY	SO-1.2G	ALL	1296	183,600	2	52	14	4	16
AA6I	AA6I	SO-1.2G	ALL	1296	171,600	0	52	13	2	18
RD4D	RD4D	SO-1.2G	ALL	1296	171,000	0	57	7	2	21
RN6MA	RN6MA	SO-1.2G	ALL	1296	135,000	9	41	10	1	16
CE3VRT	CE3VRT	SO-1.2G	ALL	1296	121,500	0	45	11	2	14
HSØZOP	HSØZOP	SO-1.2G	ALL	1296	119,600	0	46	3	0	23
FG8OJ	FG8OJ	SO-1.2G	ALL	1296	110,400	1	45	6	2	16
DK1KW	DK1KW	SO-1.2G	ALL	1296	105,600	0	44	8	1	15
VE4SA	VE4SA	SO-1.2G	ALL	1296	104,000	12	28	11	1	14
IK3COJ	IK3COJ	SO-1.2G	ALL	1296	99,000	41	4	5	0	17
W5GLD	W5GLD	SO-1.2G	ALL	1296	96,000	0	40	9	2	13
W3CJK	W3CJK	SO-1.2G	ALL	1296	87,500	0	35	10	1	14
KB7Q	KB7Q	SO-1.2G	ALL	1296	70,400	2	30	8	1	13
FR5DN	FR5DN	SO-1.2G	ALL	1296	66,500	17	18	1	0	18
JA4LJB	JA4LJB	SO-1.2G	ALL	1296	61,200	0	36	4	0	13
OK1IL	OK1IL	SO-1.2G	ALL	1296	49,400	3	23	6	0	13
AE6GD	AE6GD	SO-1.2G	ALL	1296	44,800	0	28	3	0	13
W3HMS	W3HMS	SO-1.2G	ALL	1296	40,500	0	27	6	0	9
OK1USW	OK1USW	SO-1.2G	ALL	1296	39,200	0	28	4	0	10
IØNAA	IØNAA	SO-1.2G	ALL	1296	37,500	1	24	1	0	14
RA9FLW	RA9FLW	SO-1.2G	ALL	1296	36,400	0	26	1	0	13
K7/VE4MA	VE4MA	SO-1.2G	ALL	1296	30,400	3	16	6	3	7
SM6CKU	SM6CKU	SO-1.2G	ALL	1296	28,800	5	19	0	0	12
NT6V	NT6V	SO-1.2G	ALL	1296	10,800	2	10	3	0	6
OH3DP	OH3DP	SO-1.2G	ALL	1296	9,600	0	12	2	0	6
JH3AZC	JH3AZC	SO-1.2G	ALL	1296	9,100	1	12	1	0	6
PAØTBR	PAØTBR	SO-1.2G	ALL	1296	9,100	0	13	1	0	6
N2END	N2END	SO-1.2G	ALL	1296	9,000	0	10	2	1	6
K1DS	K1DS	SO-1.2G	ALL	1296	3,600	1	5	2	0	4
UA1CCU	UA1CCU	SO-1.2G	ALL	1296	1,600	0	4	0	0	4

OK1CA	**OK1CA**	**SO-2.3G**	**ALL**	**2304**	**30,800**	**16**	**6**	**4**	**2**	**8**

OK2AQ	**OK2AQ**	**SO-10G**	**ALL**	**10368**	**46,800**	**8**	**18**	**5**	**0**	**13**
G4RFR	G3YGF	SO-10G	ALL	10368	23,800	0	17	3	0	11

SP6JLW	**SP6JLW SP6OPN SQ6OPG**	**MO-CW-ALL**	**CW**	**ALL**	**832,000**	**128**	**0**	**16**	**4**	**45**

F6KRK	**F1LYS F1MPQ F4BUC**	**MO-CW-1.2G**	**CW**	**1296**	**12,000**	**12**	**0**	**3**	**0**	**7**

Multioperator

Call	Operator(s)	Category	Mode	Band	Score	QSOs CW/PH	QSOs Dig	Mults US	Mults VE	Mults DX
UA5Y	**R3YA RA3EME RA3Y UA3YY**	**MO-ALL**	**ALL**	**ALL**	**7,614,000**	**78**	**327**	**54**	**10**	**124**
NC1I	N1DPM NC1I W1QA	MO-ALL	ALL	ALL	4,219,200	19	274	56	8	80
K2UYH	K2TXB K2UYH W2HRO	MO-ALL	ALL	ALL	4,218,900	61	226	55	8	84
K5QE	AF8Z K5QE KA6U KI5MHB N5YA N5YA	MO-ALL	ALL	ALL	2,656,400	0	229	54	7	55
W6YX	AA6PZ K6MG K6TJ KA6Q KD2SSL KI6CLA KK6JOL KN6MYI N9JIM	MO-ALL	ALL	ALL	1,662,500	43	132	33	4	58
W4ZST	NX9O W4ZST	MO-ALL	ALL	ALL	319,600	0	68	25	1	21
OH1LRY	OH1LRY OH3MCK	MO-ALL	ALL	ALL	288,600	29	45	10	3	26
LU1CGB	LU1AEE LU1CGB LU8ENU LU9DO	MO-ALL	ALL	ALL	168,000	3	45	16	2	17
K4EME	K4EME N3XA	MO-ALL	ALL	ALL	134,400	2	46	12	1	15
OZ9KY	OZ1DLD OZ1FKZ OZ1GWD OZ1PBS OZ2OE OZ3Z OZ5TG OZ8ZS	MO-ALL	ALL	ALL	112,000	0	40	9	0	19

RX1AS	**RU1AA RU1AC RX1AS**	**MO-2M**	**ALL**	**144**	**1,386,900**	**0**	**207**	**27**	**1**	**39**
SK6EI	SA6AQD SA6BPD SM6BWD SM6LPF SM6LPG SM6THE	MO-2M	ALL	144	377,200	0	82	19	1	26
F6HEO	FØEUI F6HEO	MO-2M	ALL	144	176,000	0	55	14	0	18
W9VW	K9LZJ KA9BFM WB9YCZ	MO-2M	ALL	144	112,500	0	45	11	0	14
LU9FVS	LU2FGL LU7FIA LU9FVS	MO-2M	ALL	144	400	0	2	0	0	2
CE3SSB	CE3CT CE3SPR	MO-2M	ALL	144	100	0	1	0	0	1

S51LF	**S51LF S51YL**	**MO-432**	**ALL**	**432**	**273,000**	**5**	**73**	**9**	**2**	**24**

SKØCT	**SAØCAN SMØBSO SMØDFP SMØERR SMØKBD SMØNCL SMØRJV**	**MO-1.2G**	**ALL**	**1296**	**660,000**	**76**	**56**	**14**	**2**	**34**
IQ2DB	I2DGH I2SVA I2UNE	MO-1.2G	ALL	1296	606,900	15	104	15	2	34
IK5VLS	IK5AMB IK5VLS	MO-1.2G	ALL	1296	504,000	25	80	16	3	29

KØPRT	AAØL ADØCY KCØFHN WA2JQZ WBØGMR WDØCUJ	MO-1.2G	ALL	1296	336,200	50	32	16	3	22
SP3YDE	SP3PGN SP3THA SP3TLJ SQ2EAR SQ3DZW SQ3EPX SQ3KLK SQ3NVZ SQ3OPF	MO-1.2G	ALL	1296	315,900	22	59	9	4	26
VA7MM	VA7MAY VA7MM VE7CNF VE7HRY	MO-1.2G	ALL	1296	273,600	23	49	14	2	22
K2QM	K2QM KD2OMA KD2VXN	MO-1.2G	ALL	1296	227,200	15	56	13	2	17
DLØSHF	DF9CY G3WDG	MO-1.2G	ALL	1296	70,300	34	3	4	1	14

OK1KIR	**OK1DAI OK1DAK**	**MO-2.3G**	**ALL**	**2304**	**65,100**	**22**	**9**	**6**	**2**	**13**

W3SZ	**NN3Q W3SZ**	**MO-10G**	**ALL**	**10368**	**22,800**	**2**	**17**	**2**	**0**	**10**