



ARRL EME Contest 2019 Results

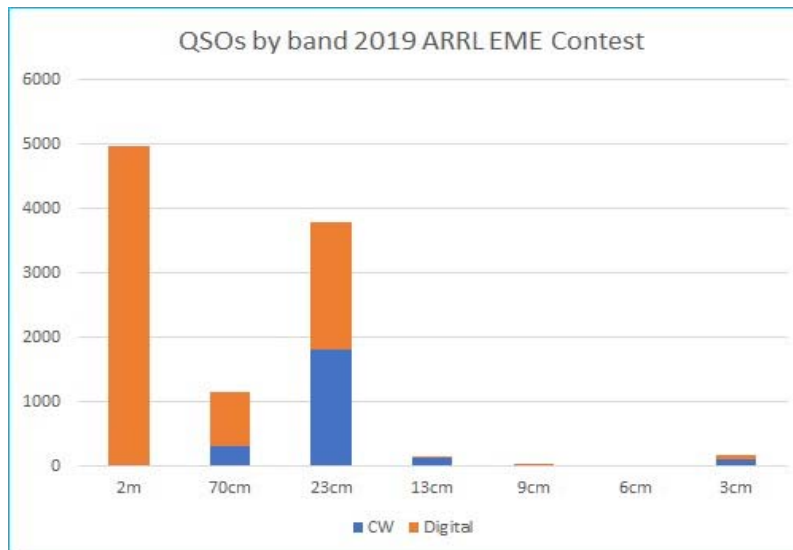
By Rick Rosen, K1DS (rick1ds@hotmail.com)

The Moon is Our Friend

What a delightful surprise to have 194 submitted logs for the contest, one more than we had last year. Of that total, 57 (30%) of the logs were from stations in the United States. For many years there have been concerns that the number of US participants was dwindling. I'm sure many were happy to be able to work these stations for the multipliers.

Considering the numbers of stations appearing in the logs, about half of the participants submitted their scores. Although some European operators reported adverse weather conditions, for most of those active on the moon, overall conditions were very good. Overall there were 10,225 contacts reported in the submitted logs, probably representing 50% of the contest activity.

This year almost a quarter of the QSO totals were on CW, and the rest were made using digital modes. All of the 4,890 reported 2-meter contacts were digital. The band with the balance between CW (1,850) and digital (1,975) was 1.2 GHz (23cm). Eighty percent of the contacts on 2.3 GHz (13cm), 3.4 GHz (9cm) and 5 GHz (6cm) were CW. On 10 GHz (3cm), 56% of the reported 183 contacts were on CW.



Single Operators

It's no surprise that Dmitry, UA3PTW, was the top scorer in the single operator (SO), all-band, all-mode category. There were 22 stations in this entry class. For several years he has been a dominating force and once again he scored over 6 million points with a five-band effort. His closest competitor was

Gunars, YL2GD, scoring 2.5 million points with a three-band entry.

Seventy-five single-band operators participated on 2-meters with Lada, OK1DIX, topping the scores with 1.7

million points based on 205 QSOs. The next largest single-band group focused on 1.2 GHz (23cm) with 27 stations competing. Marek, OK2DL, had the best score in this group with 625K points.

The 432-MHz (70cm) band ops had a challenge this year with significant Faraday issues. The 18 stations in this category were led again by Bernd, DL7APV, and a score of 629K with his huge antenna array of 128 Yagis. There were only three entries of SO using 10 GHz exclusively and Peter, OZ1LPR, had 28 mixed-mode QSOs for a best score of 56K.

This year we had 30 entries from SO stations operating exclusively in the CW / Phone category. Seven of those were all-band (with at least 2 bands) and were led by

Peter, G3LTF, with 917K based on 124 CW QSOs. Franco, I2FHW, had 33 CW QSOs on 432 MHz (70cm) and posted a score of 66K. Lars, SM4IVE, had 94 CW QSOs on 1296 MHz (23cm) for 366K points.

Multi-operators

This year again the multi-op (MO) K2UYH all-band all-mode group was the top scorer with 4.3 million points. Together with NE2U, K2TXB, K2YY and W2HRO, they

managed to amass 287 QSOs with 150 multipliers, operating on all bands from 2 meters through 10 GHz (3cm). Al has been a long-time EME op and a stimulus for many of the neophytes who are anxious to get involved in moon-bounce activity.

In addition, he has been the editor of the *432 and Above EME Newsletter* for as long as anyone can remember, and is now ably assisted by Matej, OK1TEH.

Following closely in second place in this category was the RA3EME group including R3YA and RA3Y, scoring 4.0 million points with 308 contacts and 132 multipliers. They were active on 2 meters through 2.3 GHz (13cm).

Three entries in the MO CW 1.2-GHz (23cm) category were led by the F5KUG group of F6ABX, F6GUS and F8BMG. The MO all-mode 2-meter team of RX1AS led the 8 entries in their category with 2.5 million points from 284 digital contacts and 91 multipliers.

There were 5 MO all-mode entries in the 1.2-GHz (23cm) category led by the K6MG team of 6 ops scoring 391K. The 4 other MO all-mode teams of SK0UX, VA7MM, OH1LRY and IK5VLS also had scores in the 288K to mid 300K range.

The OK1KIR team of OK1DAI and OK1DAK had the only entry in the MO 2.3-GHz (13cm) all-mode section and scored 42K. There was only 1 entry in the 10-GHz (3cm) all-mode category and the team of W3SZ, NN3Q and WA3GFZ managed to establish a new station, site, and scored 17K.

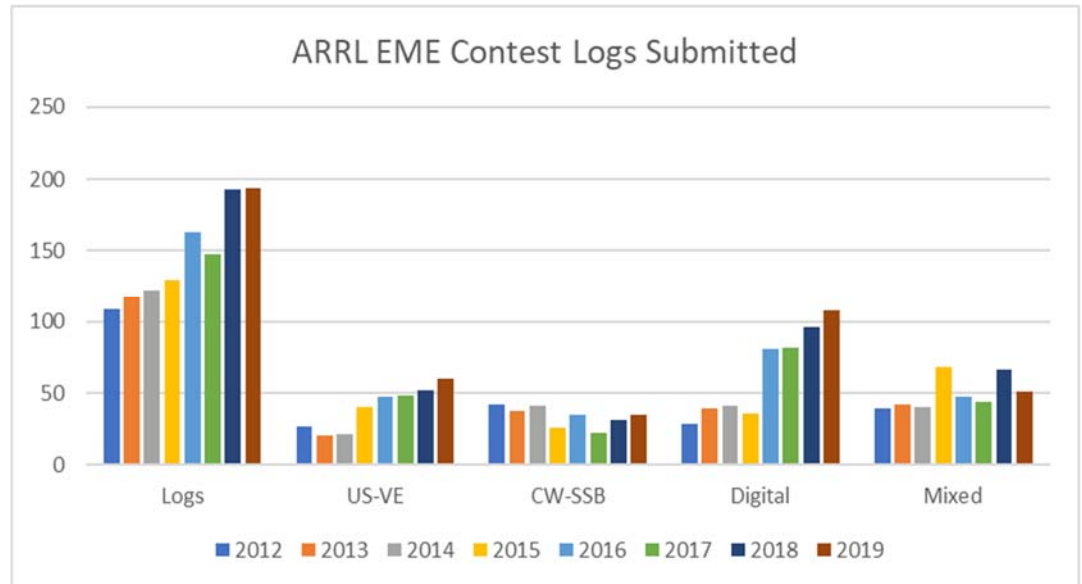
Log Submission

This was the first year that the ARRL was ready with a program to receive and parse the submitted EME electronic Cabrillo formatted logs. In a sense this makes submission and log review easier for the ARRL, yet many of the participants did not have logging programs that could output a Cabrillo log. The submission of a Cabrillo log through the ARRL EME log portal gave instant feedback on log acceptance, or feedback on any submission errors that needed correction.

I was able to assist several stations with log conversion, using the free downloadable W3KM GenLog. Perhaps many will use this great logger utility in the future, as most logs had QSO numbers less than 100. Several others were still able to submit PDF or paper logs and summaries.

Bruce, WA7BNM's, Web-to-Cabrillo app also supports the EME contest and can be used to convert paper logs or spreadsheet data into a Cabrillo log: <http://www.b4h.net/cabforms/>.

Activity level was good for the three weekends. The number of participants is often gauged by the number of logs submitted, and this is reflected in the amount of attention given to the contest by the organization. I am also grateful to Bart, W9JJ, and Bruce, WA7BNM, who



were instrumental in working with all the log submissions in their various formats.

Scoring and Results for Future Events

All scoring and results for the 2019 contest were based upon the information in submitted logs. There are no score reductions or penalties being assessed for any log discrepancies. The logs were fed into an updated computerized log-checking program as a trial run to be able to match the information of call signs and signal reports of QSOs between stations which submitted logs. The program can spot NIL (not-in-log) QSOs where one station claimed to work another, but the call of the claiming station does not appear in the submitted log of the other station.

The program can also detect "busted" calls: a log showing WA1W worked rather than the correct W1AW. There is also the ability to detect station call signs claimed to have been worked by a station that do not appear in any other log. Understandably, some of the participants make only one or a few QSOs, not submit a log, and may appear as a "unique" submitted log. There is no penalty for "uniques" unless there is an excessive number of them in a log, or if there is a call sign which is not a valid licensed station.

Future EME contest logs should be in Cabrillo format with all QSOs included in the log. It is also important to have the correct call sign and category information in the header, correct call sign of the station worked, mode, and correct band abbreviations.

In future ARRL EME contests, the scores will reflect the results of the log checking, as they have for all the other ARRL contests, and there may be some point reductions for busted calls, incorrect frequency bands, NIL, or problematic "unique" issues.

It took a bit of coaxing and cajoling to get as many logs submitted as we did. Sometimes the personal contact and frequent reminders were helpful. There were several stations that posted their plans prior to the contest and operated during the contest but did not submit their logs. It has been my hope that a greater percentage of participants would submit a log, no matter how large or small.

I was especially impressed that the Packrats of the Mt. Airy VHF Radio Club submitted their logs. Many members of the club participated in EME activity in the 1970s. The club set up a successful EME station for 432 MHz (70cm) that drew a lot of interest from the members at that time. In 1975, planning commenced for transporting an EME station to Columbia, South America, and the dream came true the following year with a DXpedition there to enable the first WAC on that band. Although K2UYH's Kennedy dish installation at his QTH was largely facilitated by the club members, he did not become an official member of the club until 6 years ago. Joe, K1JT, became a club member 20 years ago, about the time he introduced his WSJT programs. With the influence of these two moon-bouncers, and the technical capabilities of so many of the members, seven of us were active and submitted logs for this year's contest, with several others participating at the multi-op, multiband station.

Weekend 1

The contest dates were selected to have the most ideal moon conditions and the least amount of interference with other on-the-air activities worldwide. Moon elevation for much of Europe, North America and Asia was 70° on the contest weekend. Although it coincided with the ARRL September VHF Contest weekend, the EME contest time that started on Friday evening at 00:00 UTC September 21st allowed activity that did not compete with much of the North American terrestrial contest activity that had started at 18:00 UTC September 21st (later that day). Since the first weekend of the EME contest is focused on the bands at 2.3 GHz (13cm) and up, there would hardly be any competing time, stations or frequencies between the two contests. Apologies to those who burned the candle at both ends and tried to operate in both contests on the microwave bands on Weekend 1.

Although I was not operational on the higher microwave bands, I was able to track some of the activity by referring to the chatter on the HB9Q microwave reflectors. The traffic about scheduling contacts on 10 GHz (3cm) included at least 27 stations that were prepared and seeking QSOs. In addition, there were several others with receive-only capability who were monitoring the band to



William Corbin, W3CJK's homemade wooden tower with antennas for 2 Meters, 432 MHz, and 1.2 GHz. (William Corbin, W3CJK, photo).

test their stations' hearing ability. Of those stations, there were only 14 logs submitted with 10 GHz (3cm) QSOs.

There were at least 18 stations participating on 5 GHz (6cm) that were apparent on the reflector but only 4 logs submitted showing 5-GHz (6cm) contacts. I found 13 different call signs with traffic on the 3.4-GHz (9cm) page however only 4 logs that were submitted with EME QSOs on that band. It seems like the busiest microwave band has been 2.3 GHz (13cm) with 25 unique call signs noted on the HB9Q logger, yet only 15 logs came in with contacts on that band.

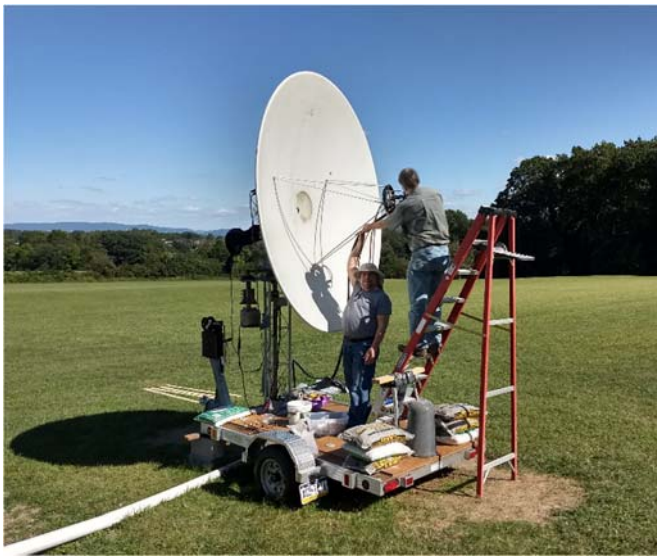
I watched the communication on the HB9Q logger pages in order to follow some of the EME microwave weekend activity. The action on 10 GHz was the most popular for the first moon pass with 6 stations from Europe and Asia active within the first 2 hours of the contest.

Within 12 hours there were 17 stations operating on 10 GHz and another 4 were following the activity on receive only. As the evening of the first pass progressed there was substantial activity on 2.3 GHz, 3.4 GHz and 5.7 GHz with Dan HB9Q appearing on all four bands with his ability to QSY without going out to change feeds as they are all present at the focal point of his big dish. While Dan does not submit a contest log, his station always provides contest QSOs to all those who seek him, as he attempts to find smaller and initial stations with whom to make contact.

On the second pass an additional 10 stations showed up on the 10-GHz logger and there were others active on the band making contacts who were not using the logger. Overall, this band had the most participants for the microwave weekend. Operators worked hard to connect with each other using CW and several different JT digital modes. Having the local oscillator disciplined seemed to be of great help, but the Doppler on 3cm EME can be huge and can lead to frustration when completing QSOs.

Roger, W3SZ announced his plans and capabilities with an improved 10-GHz (3cm) station using 200W and a 2.4m dish. He changed the station location to the location of another local ham whose property had a capability of tracking the moon from east to west horizons. Additionally, it allowed him to be at a more stable operating position, rather than portable from his vehicle. He produced an excellent log with 16 QSOs using CW and JT modes.

Zdenek, OK1DFC, used his new 2.4m dish and was able to put 28 10-GHz (3cm) contacts in his log. There were another 8 EME stations including three Australian stations who were active during the final few hours of the weekend contest that joined the activity on 6cm. There were some who noted a decrease in the 6cm activity from previous years.



Roger Rehr, W3SZ adjusting the feed for his new 10-GHz (3cm) trailer mounted station dish with Paul WA3GFZ providing support. (Russell Lamm, NN3Q, photo)

Nine more stations activated their 9cm gear and activity picked up from the first moon pass. The number of users of 13cm increased to 31 for the second moon pass. Paul, WA6PY, added this thought via the web, "Working

efficiently world-wide on 5 microwave bands (including 24 GHz) in one weekend in simply impossible.

On the top of this overcrowded band selection problem, activity is divided between CW and digital modes." Ingolf, SM6FHZ, posted this thought on the reflector, "I understand running multi-band during this contest is a masterpiece in compromising, trying to satisfy all constraints with bands and moon availability for all different stations. It turns out like all compromise, dissatisfaction in a lot of places."

There has been concern that for an ARRL sponsored contest that there has been limited participation from the valuable North American (NA) multipliers of the 50 United States and Canadian (VE) Provinces. We have to thank Al, K2UYH, for making the state of New Jersey available on all bands through 10 GHz. There were 5 other NA stations active on 10 GHz, 3 additional VE stations on 5 GHz (6cm), 3 additional NA stations on 3 GHz (9cm) and 4 additional NA stations on 2.3 GHz (13cm) that were visible on the logger.

Hopefully there were more active stations that did not appear on the logger, but whose signals did appear on the air. Much appreciation is due to Mike, KL6M from the cold, snowy and icy DX multiplier in Anchorage, Alaska who is operational on all bands from 144 MHz through 5 GHz (6cm). Here is a portion of the email he sent to me:

A Fine Contest at KL6M

The moon orbit was such that I was only able to operate two of the microwave bands, 13cm and 9cm, which impacted my total score. And my moon rise was 7 hours after the start of the contest, so I was also seriously handicapped by a late start. Activity was VERY low on microwave. Much of it was due to one weekend being spread between numerous bands.

With a complex EME station I encountered the usual technical problems. This time I blew a 50-volt FET switch in the W6PQL amplifier. I had this problem before but this time I was using a different 50v power supply that has over current protection. So, the FET didn't weld itself to the heat sink and burst into flames like last time. Fortunately, I had a spare and I only wasted an hour and a half of prime moon time fixing that at 2AM local time. When you look at the FET and the tiny lead that is carrying 30+ Amps, it's no wonder that things warm up. It certainly doesn't meet NEC code which would be a #10 for 30A. But I am loving my new 50v PS. The old FT-736R started acting up intermittently, suddenly losing power output. I have no clue on that yet, but I worked around it. The antenna system worked perfect, which is amazing. It took years to get there with this 25-year-old

F1EHN tracking system moving a 6000-pound 30-foot dish in 0.2-degree steps.

Mike also added these comments on the reflector, "There is a 'perceived' lack of activity on the ARRL Microwave segment. I say perceived because I believe there were MANY stations active but the problem is they were on many different bands. I personally only operated 13cm and 9cm. I love the 6cm band but there was no way I was going to change feeds at 4AM local in pitch dark and pouring rain."

The group at the Stanford Radio Club has had an interesting few years pursuing moonbounce operations. Operating as Team W6YX, they have several options for band selection and operating configuration. This year they chose to operate on the 144 MHz (2m) and 1296 MHz (23cm) as single-band entries. Their significant 10-GHz (3cm) station had various mechanical and operational issues. Their full and colorful story is best told through a click on this link to their website:

<https://w6yx.stanford.edu/index.php/news/37-2018-2019-moon-bounce-adventures>



The EME array at the W9VW club station located near Indianapolis, IN, is pointed at the Moon and ready to go. (Dale Schieman, WB9Y CZ, photo)

Some of the messages on the HB9Q reflector were notable as many of the long-time EME operators expressed themselves. While most all of the posts were stations listing their CQ and mode frequencies, some of the more entertaining comments spotted included the following, to which I'm sure you can all relate:, "Getting woozy," "These midnight events are harder these days," "...too old to be playing radio at 4AM," and "...(at) my age it's harder

to stay up later—mostly the next day I suffer." Valter, IK1FJI wrote, "I'm getting older...two weekends without sleep is now a little bit hard!" Stamina is certainly part of the adventure of EME!

Weekends 2 & 3

The second and third contest weekends are for bands 50 MHz (6m) through 1296 MHz (23cm) and activity was busy across Europe and Asia from the opening moments at 00:00 UTC of October 19th. Stations were busy with their Morse code keys on 432 MHz (70cm) and 1296 MHz (23cm). As many of the stations worked each other on code, several then turned to WSJT digital activity where some of the more "QRP" stations could be contacted. Almost any VHF station with a reasonable Yagi and 50-100 watts could make an EME QSO with DL7AVP as his 128-Yagi array on 432 MHz (70cm) has more than 30dB gain. Some stations were stymied with Faraday rotation and contacts that could be made under 'usual' circumstances were problematic or missed.

Many testers posted their results on the moonbounce reflectors and sent their comments to the *432 and Up EME* Newsletter monthly on-line publication. Although there are several operators who are strictly using CW, others reported a nice balance of CW and digital QSOs. Others with small stations relied mainly on JT65 for their contacts, using the various loggers to find CQ'ers or to announce their own calls and frequencies. Courtney, N5BF wrote, "This (first-Ed) weekend, without any equipment failures or major operational goofs for once, it impressed me the degree to which tuning around, spotting, skedding, and generally just trying to figure out how to work everybody in the limited time is not as straightforward as it seems it might be." Many were glad to be able to work BD4SY on 1296 MHz (23cm) as a new DXCC and multiplier. Mike, K7ULS was trying to increase his 222-MHz (1.25m) QSO totals with requests on the reflectors, but there were only 3 digital contacts reported in his log and the log of K1OR on that band.

Murphy certainly makes an appearance at contest time. Paul, WA6PY, had this visit, "On Sunday after little over 1 hour of operation, high voltage power supply burned and forced me to QRT. This power supply is used for both bands. It was built back in 1986 in Stockholm, and this was first failure in 33 years."

Dick, PA2DW, added this drama, "It started so well yesterday morning...However in my case the fun was quickly spoiled...when I wanted to try and work both Stig's in one QSO (hi!), my foot slipped off the foot switch causing a timing glitch in my sequencer...The sudden lack of noise alarmed me and soon it was clear that not only my signals went to the moon, but my preamp as well. I took my preamp to the shack and replaced both

transistors. I could not check the result, because the battery in my noise meter was low. I was obviously in a down going flow...I had to put the preamp in the focus box without testing and alas, the preamp still refused to work. I had loaned my spare preamp to Jan, PA0SSB, so the only solution was to use a Hauppage surplus amp. After mounting this one, I heard a weak signal so there was hope! The signal(s) went even weaker and weaker and disappeared!... and only then I realized that the Hauppage runs on 12V and I applied 24V, so game over!”

Raf, SP9VFD, reported this, “With 50w drive directly from TS-2000X I was able to achieve 1100w stable output without thermal detuning problems. Unfortunately, after one day heavy duty test input circuit of GS35B tube blew smoke and flame. The reason was simply... high voltage RX type capacitors in input circuits tube cavity aren’t suitable even for 50w driving power.”

Philippe, F6ETI, added this more typical situation, “I lost almost an hour and a half after the moonrise on Saturday night due to preamp failure for an indeterminate reason when it was in good condition at sunrise. Fortunately, there is a spare LNA ...”

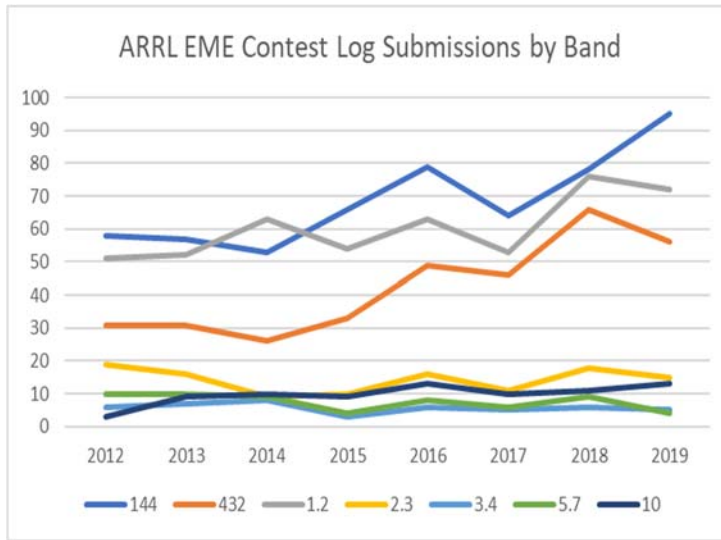
Lars, SM4IVE, had preamp issues also, “It’s amazing how I was able to work any stations lately since my G4DDK LNA was totally deaf ...I went to my friend SM4DHN and we checked the noise factor: amazing 4.5 dB, 32 dB gain. No wonder I had problems to copy some stations. (With a) New MGF 4919, we are back on track.”

I still wonder why we see so few, sporadic, contest entries for 50 MHz (6m). This year we had no logs that included a QSO on that band. There are many well-equipped stations who are capable of 6m EME, but they are absent during the EME contests and mainly active when there is an exotic 6m DXpedition.

Realistically, most of the EME ops who submit logs for the ARRL and various European sponsored EME contests do not have 6m EME capability, but there is a subset of 6m ops who do have the stations, power, antennas and experience.

Perhaps we can stimulate some contest activity for this band. There are so many EME ops that are the masters of

this operating mode on so many bands that provide the fulfillment of contesting for themselves and others. Thanks to all the big guns for their efforts to provide the EME community with on-the-air activity. And thanks to all the little guns for making the effort and making those challenging “just out of the noise” contacts. Although trends have shown favor to the digital modes, there is still plenty of opportunity for CW and Voice QSOs with a large group of capable stations and operators.



Looking Forward

There have been many discussions regarding the dates and the format of the ARRL EME contest. Many of the same themes have been repeated ever since the introduction of this competition, the main one being selection of the contest weekends: poor moon conditions, apogee vs perigee, too close to the sun, too much southern

declination, same weekend as other conferences and/or terrestrial contests. In today’s busy world there never seems to be a perfect time!

With the introduction of the “assisted” category back in 2015, we are now in a situation where almost any type of scheduling and station availability announcement is allowable by phone, radio or internet. The comments regarding digital and CW/SSB operating periods and scoring continue as various shifts in mode usage are occurring. Perhaps this may be given additional consideration in the future.

The suggestion has been made and seconded by Stig, SM4GGC, and Lars, SM4IVE, to have one contest weekend for digital and one for CW, using the same station for both modes. That might stimulate the activity on both weekends for the all mode and CW only categories and possibly add a new category, "digital only."

This year’s contest weekends will be September 12-13 for 2.3 GHz & Up, October 10-11 and November 28-29 on 50 MHz - 1.2 GHz. Let’s continue the trend of increased activity, Cabrillo log submission, and plenty of satisfaction!

Thanks again to Bruce, WA7BNM, Bart, W9JJ for all their assistance, and my XYL Jani who does my editing and proofreading.

Category Winners (in Bold) – by Category by Score

Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
SINGLE OPERATOR										
G3LTF	G3LTF	SO-CW-ALL	917,600	CW	ALL	124	0	20	4	50
OZ4MM	OZ4MM	SO-CW-ALL	744,200	CW	ALL	122	0	16	4	41
KL6M	KL6M	SO-CW-ALL	731,600	CW	ALL	118	0	13	4	45
OK1CA	OK1CA	SO-CW-ALL	680,400	CW	ALL	108	0	12	4	47
WA6PY	WA6PY	SO-CW-ALL	470,400	CW	ALL	84	0	10	5	41
SP3XBO	SP3XBO	SO-CW-ALL	182,000	CW	ALL	52	0	3	0	32
IW2FZR	IW2FZR	SO-CW-ALL	104,000	CW	ALL	40	0	5	1	20
I2FHW	I2FHW	SO-CW-432	66,000	CW	432	33	0	3	1	16
DK5OZ	DK5OZ	SO-CW-432	58,900	CW	432	31	0	3	1	15
G0JLO	G0JLO	SO-CW-432	25,200	CW	432	18	0	3	1	10
SP9VFD	SP9VFD	SO-CW-432	10,800	CW	432	12	0	0	0	9
F6HLC	F6HLC	SO-CW-432	4,200	CW	432	7	0	0	0	6
DL8UCC	DL8UCC	SO-CW-432	3,000	CW	432	6	0	0	0	5
JA0TJU	JA0TJU	SO-CW-432	3,000	CW	432	6	0	1	0	4
JA9BOH	JA9BOH	SO-CW-432	1,200	CW	432	4	0	0	0	3
RA4UAT	RA4UAT	SO-CW-432	100	CW	432	1	0	0	0	1
SM4IVE	SM4IVE	SO-CW-1.2G	366,600	CW	1296	94	0	12	3	24
G4CCH	G4CCH	SO-CW-1.2G	295,200	CW	1296	82	0	11	2	23
LZ2US	LZ2US	SO-CW-1.2G	192,000	CW	1296	64	0	7	2	21
W4OP	W4OP	SO-CW-1.2G	164,700	CW	1296	61	0	8	2	17
IK1FJI	IK1FJI	SO-CW-1.2G	153,400	CW	1296	59	0	7	0	19
IK3COJ	IK3COJ	SO-CW-1.2G	85,800	CW	1296	39	0	5	1	16
F6ETI	F6ETI	SO-CW-1.2G	66,000	CW	1296	33	0	4	1	15
N4PZ	N4PZ	SO-CW-1.2G	59,400	CW	1296	33	0	4	1	13
DJ8FR	DJ8FR	SO-CW-1.2G	58,900	CW	1296	31	0	5	2	12
JH1KRC	JH1KRC	SO-CW-1.2G	36,800	CW	1296	23	0	1	2	13

Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
WK9P	WK9P	SO-CW-1.2G	27,300	CW	1296	21	0	4	0	9
BD4SY	BD4SY	SO-CW-1.2G	20,800	CW	1296	16	0	2	0	11
DJ3JJ	DJ3JJ	SO-CW-1.2G	18,000	CW	1296	15	0	1	0	11
K8ZR	K8ZR	SO-CW-1.2G	3,600	CW	1296	6	0	1	0	5
UA3PTW	UA3PTW	SO-ALL	6,142,200	ALL	ALL	73	280	54	11	109
YL2GD	YL2GD	SO-ALL	2,513,200	ALL	ALL	27	179	36	6	80
OK1DFC	OK1DFC	SO-ALL	648,000	ALL	ALL	30	78	16	5	39
ES3RF	ES3RF	SO-ALL	398,400	ALL	ALL	8	75	10	3	35
US7GY	US7GY	SO-ALL	340,000	ALL	ALL	0	68	11	0	39
KN0WS	KN0WS	SO-ALL	315,000	ALL	ALL	4	66	14	3	28
4Z5CP	4Z5CP	SO-ALL	272,800	ALL	ALL	1	61	8	3	33
JA6AHB	JA6AHB	SO-ALL	225,500	ALL	ALL	3	52	10	3	28
WA3RGQ	WA3RGQ	SO-ALL	219,600	ALL	ALL	0	61	12	3	21
W3CJK	W3CJK	SO-ALL	193,800	ALL	ALL	0	51	10	2	26
PA2CHR	PA2CHR	SO-ALL	171,500	ALL	ALL	0	49	12	1	22
PA0PLY	PA0PLY	SO-ALL	130,500	ALL	ALL	11	34	6	1	22
VK4CDI	VK4CDI	SO-ALL	106,400	ALL	ALL	4	34	0	0	28
YL2FZ	YL2FZ	SO-ALL	81,600	ALL	ALL	0	34	6	1	17
W5LUA	W5LUA	SO-ALL	46,800	ALL	ALL	20	6	3	1	14
UA3TCF	UA3TCF	SO-ALL	45,000	ALL	ALL	5	20	3	0	15
DL9LBH	DL9LBH	SO-ALL	28,500	ALL	ALL	0	19	5	0	10
K1DS	K1DS	SO-ALL	5,600	ALL	ALL	0	8	1	0	6
K1OR	K1OR	SO-ALL	4,200	ALL	ALL	0	7	4	0	2
K7ULS	K7ULS	SO-ALL	3,600	ALL	ALL	0	6	3	0	3
K3GNC	K3GNC	SO-ALL	2,500	ALL	ALL	0	5	0	0	5
KG5CCI	KG5CCI	SO-ALL	2,500	ALL	ALL	0	5	0	0	5
KB0HNN	KB0HNN	SO-ALL	1,200	ALL	ALL	0	4	0	0	3
OK1DIX	OK1DIX	SO-2M	1,742,500	ALL	144	0	205	29	3	53
S51ZO	S51ZO	SO-2M	1,514,700	ALL	144	0	187	26	3	52
K7CA	K7CA	SO-2M	1,203,600	ALL	144	0	177	22	2	44
PA5Y	PA5Y	SO-2M	1,192,900	ALL	144	0	151	29	3	47
WA1NPZ	WA1NPZ	SO-2M	1,104,000	ALL	144	0	160	27	3	39
DF2ZC	DF2ZC	SO-2M	730,300	ALL	144	0	109	21	2	44
RZ4A	RZ4A	SO-2M	715,000	ALL	144	0	143	11	1	38
VE6XH	VE6XH	SO-2M	535,300	ALL	144	0	101	21	1	31
LZ1DP	LZ1DP	SO-2M	529,200	ALL	144	0	98	18	2	34
I2FAK	I2FAK	SO-2M	406,700	ALL	144	0	83	20	1	28
R3PA	R3PA	SO-2M	400,200	ALL	144	0	87	13	2	31

Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
G8RWG	G8RWG	SO-2M	346,500	ALL	144	0	77	11	1	33
7K3LGC	7K3LGC	SO-2M	340,400	ALL	144	0	74	19	2	25
K0TPP	K0TPP	SO-2M	281,400	ALL	144	0	67	13	2	27
TI2CDA	TI2CDA	SO-2M	277,500	ALL	144	0	75	11	1	25
AI1K	AI1K	SO-2M	275,200	ALL	144	0	64	16	1	26
ND4X	ND4X	SO-2M	273,600	ALL	144	0	72	15	2	21
W4TAA	W4TAA	SO-2M	264,600	ALL	144	0	63	14	1	27
RK9JR	RK9JR	SO-2M	260,000	ALL	144	0	65	13	2	25
W2LPL	W2LPL	SO-2M	231,800	ALL	144	0	61	12	1	25
K7MAC	K7MAC	SO-2M	220,500	ALL	144	0	63	11	1	23
N4HB	N4HB	SO-2M	205,200	ALL	144	0	57	13	2	21
EB1DNK	EB1DNK	SO-2M	188,700	ALL	144	0	51	16	2	19
JP3EXR	JP3EXR	SO-2M	169,200	ALL	144	0	47	18	1	17
TA2NC	TA2NC	SO-2M	162,000	ALL	144	0	54	9	0	21
K1DG	K1DG	SO-2M	161,700	ALL	144	0	49	11	2	20
W8KEN	W8KEN	SO-2M	145,700	ALL	144	0	47	7	0	24
UA10EJ	UA10EJ	SO-2M	139,500	ALL	144	0	45	13	1	17
WP4G	WP4G	SO-2M	129,000	ALL	144	0	43	11	1	18
UT2EG	UT2EG	SO-2M	124,200	ALL	144	0	46	8	0	19
CX2SC	CX2SC	SO-2M	120,000	ALL	144	0	40	9	1	20
HG5BMU	HG5BMU	SO-2M	118,800	ALL	144	0	44	8	0	19
AG4W	AG4W	SO-2M	101,200	ALL	144	0	44	7	0	16
5B0EME	5B0EME	SO-2M	41,600	ALL	144	0	26	2	0	14
RA6C	RA6C	SO-2M	40,800	ALL	144	0	24	5	1	11
UA9CFH	UA9CFH	SO-2M	39,100	ALL	144	0	24	4	0	13
K8DIO	K8DIO	SO-2M	34,500	ALL	144	0	23	6	1	8
RX6AIA	RX6AIA	SO-2M	33,000	ALL	144	0	22	4	0	11
KG7P	KG7P	SO-2M	32,000	ALL	144	0	20	2	0	14
PA5MS	PA5MS	SO-2M	31,500	ALL	144	0	21	8	0	7
KD7UO	KD7UO	SO-2M	27,000	ALL	144	0	18	5	2	8
UT5IG	UT5IG	SO-2M	26,600	ALL	144	0	19	4	1	9
OK2AB	OK2AB	SO-2M	26,000	ALL	144	0	20	3	0	10
UT5EL	UT5EL/A	SO-2M	16,500	ALL	144	0	15	4	0	7
YB2MDU	YB2MDU	SO-2M	15,000	ALL	144	0	15	2	0	8
W0XG	W0XG	SO-2M	14,300	ALL	144	0	13	1	1	9
PE1ITR	PE1ITR	SO-2M	14,000	ALL	144	0	14	2	1	7
W8TN	W8TN	SO-2M	12,000	ALL	144	0	12	3	0	7
BX2AI	BX2AI	SO-2M	11,000	ALL	144	0	11	4	0	6
SP2FRY	SP2FRY	SO-2M	11,000	ALL	144	0	11	2	1	7
YU7MS	YU7MS	SO-2M	9,600	ALL	144	0	12	2	0	6
R3UG	R3UG	SO-2M	7,700	ALL	144	0	11	2	0	5

Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
RA4SD	RA4SD	SO-2M	7,000	ALL	144	0	10	0	0	7
UT9UR	UT9UR	SO-2M	7,000	ALL	144	0	10	3	0	4
CT7ABA	CT7ABA	SO-2M	5,500	ALL	144	0	11	0	0	5
G8TTI	G8TTI	SO-2M	4,800	ALL	144	0	8	1	0	5
YO6XK	YO6XK	SO-2M	3,000	ALL	144	0	6	0	0	5
LY2WR	LY3BF	SO-2M	2,500	ALL	144	0	5	2	0	3
GW3TKH	GW3TKH	SO-2M	2,400	ALL	144	0	6	1	0	3
WS3C	WS3C	SO-2M	1,600	ALL	144	0	4	0	0	4
KA9CFD	KA9CFD	SO-2M	900	ALL	144	0	3	3	0	0
NA5C	NA5C	SO-2M	900	ALL	144	0	3	0	0	3
WQ5S	WQ5S	SO-2M	600	ALL	144	0	3	0	0	2
HI8DL	HI8DL	SO-2M	100	ALL	144	0	1	0	0	1
N2AMC	N2AMC	SO-2M	100	ALL	144	0	1	1	0	0
PT9IR	PT9IR	SO-2M	100	ALL	144	0	1	0	0	1
DL7APV	DL7APV	SO-432	629,200	ALL	432	17	104	22	1	29
LZ1DX	LZ1DX	SO-432	344,400	ALL	432	0	82	15	1	26
PA2V	PA2V	SO-432	269,800	ALL	432	14	57	11	1	26
UT5DL	UT5DL	SO-432	244,800	ALL	432	9	63	7	1	26
VK4EME	VK4EME	SO-432	105,000	ALL	432	2	40	6	0	19
UB4UAA	UB4UAA	SO-432	102,500	ALL	432	6	35	4	1	20
OK1TEH	OK1TEH	SO-432	77,000	ALL	432	3	32	3	1	18
RD3FD	RD3FD	SO-432	58,900	ALL	432	2	29	1	1	17
DK1KW	DK1KW	SO-432	55,100	ALL	432	3	26	1	1	17
SM5EPO	SM5EPO	SO-432	30,400	ALL	432	2	17	3	0	13
A65BR	A65BR	SO-432	9,900	ALL	432	0	11	0	0	9
JE2UFF	JE2UFF	SO-432	8,100	ALL	432	0	9	1	0	8
BD9BU	BD9BU	SO-432	4,900	ALL	432	0	7	1	0	6
YO2NAA	YO2NAA	SO-432	4,200	ALL	432	0	7	0	0	6
OK2POI	OK2POI	SO-432	1,600	ALL	432	1	3	2	0	2
W7TZ	W7TZ	SO-432	1,600	ALL	432	0	4	1	0	3
KJ7OG	KJ7OG	SO-432	900	ALL	432	0	3	1	0	2
MX0CNS	M0ABA	SO-432	400	ALL	432	0	2	0	0	2
AK4WQ	AK4WQ	SO-432	100	ALL	432	0	1	0	0	1
OK2DL	OK2DL	SO-1.2G	625,000	ALL	1296	56	69	16	5	29
DL3EBJ	DL3EBJ	SO-1.2G	585,600	ALL	1296	63	59	16	5	27
SM4GGC	SM4GGC	SO-1.2G	448,800	ALL	1296	47	55	15	4	25
PA3FXB	PA3FXB	SO-1.2G	401,800	ALL	1296	21	77	11	4	26
RA4HL	RA4HL	SO-1.2G	304,200	ALL	1296	18	60	10	4	25
KA1GT	KA1GT	SO-1.2G	296,400	ALL	1296	8	68	11	4	24

Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
SM6CKU	SM6CKU	SO-1.2G	291,600	ALL	1296	50	31	12	2	22
DL7UDA	DL7UDA	SO-1.2G	276,900	ALL	1296	10	61	12	3	24
FR5DN	FR5DN	SO-1.2G	231,000	ALL	1296	31	39	10	3	20
N5BF	N5BF	SO-1.2G	230,400	ALL	1296	15	49	12	4	20
YO2LEL	YO2LEL	SO-1.2G	214,400	ALL	1296	0	67	10	3	19
W8MQW	W8MQW	SO-1.2G	129,600	ALL	1296	0	48	6	3	18
SP5GDM	SP5GDM	SO-1.2G	123,200	ALL	1296	0	44	7	2	19
WA2FGK	K2LNS	SO-1.2G	97,500	ALL	1296	3	36	8	1	16
ES6FX	ES6FX	SO-1.2G	95,000	ALL	1296	0	38	7	1	17
VE2UG	VE2UG	SO-1.2G	95,000	ALL	1296	0	38	7	2	16
W1PV	W1PV	SO-1.2G	91,200	ALL	1296	1	37	7	2	15
OK1YK	OK1YK	SO-1.2G	88,200	ALL	1296	7	35	1	0	20
VE3KRP	VE3KRP	SO-1.2G	69,600	ALL	1296	1	28	11	2	11
RN6MA	RN6MA	SO-1.2G	68,000	ALL	1296	3	33	5	0	15
AA4MD	AA4MD	SO-1.2G	60,800	ALL	1296	5	27	6	1	12
WA3GFZ	WA3GFZ	SO-1.2G	47,500	ALL	1296	0	25	7	2	10
SV1CAL	SV1CAL	SO-1.2G	31,500	ALL	1296	2	19	4	0	11
4X1AJ	4X1AJ	SO-1.2G	15,400	ALL	1296	0	14	4	0	7
I0NAA	I0NAA	SO-1.2G	6,400	ALL	1296	0	8	2	1	5
UA3RAW	UA3RAW	SO-1.2G	1,600	ALL	1296	0	4	0	0	4
W3HMS	W3HMS	SO-1.2G	900	ALL	1296	0	3	1	0	2
OZ1LPR	OZ1LPR	SO-10G	56,000	ALL	10368	19	9	5	1	14
DL0EF	DJ5BV	SO-10G	30,000	ALL	10368	15	5	2	1	12
OK2AQ	OK2AQ	SO-10G	14,300	ALL	10368	1	12	1	1	9
MULTIOPERATOR										
SP6OPN	SP6OPN SP6JLW	MO-CW-ALL	12,000	CW	ALL	12	0	3	1	6
WD5AGO	WD5AGO KG5SSI	MO-CW-ALL	2,000	CW	ALL	5	0	1	1	2
F5KUG	F6ABX F6GUS F8BMG	MO-CW-1.2G	145,800	CW	1296	54	0	5	1	21
9A5AA	9A5AA 9A2WA	MO-CW-1.2G	102,900	CW	1296	49	0	6	1	14
F6KRK	F4BUC F1MPQ	MO-CW-1.2G	20,800	CW	1296	16	0	3	0	10
K2UYH	NE2U K2TXB K2YY K2UYH W2HRO	MO-ALL	4,305,000	ALL	ALL	49	238	46	9	95
RA3EME	RA3EME R3YA RA3Y	MO-ALL	4,065,600	ALL	ALL	54	254	33	8	91
LU1C	LU1CGB LU8ENU LU9DO LU1AEE	MO-ALL	990,000	ALL	ALL	16	116	17	4	54

N0AKC	N0AKC K9MU	MO-ALL	466,100	ALL	ALL	0	79	19	3	37
Call	Operator(s)	Category	Score	Mode	Band	QSOs CW/PH	QSOs Dig	Multipliers US	Multipliers VE	Multipliers DX
OZ9KY	OZ1GWD OZ3Z OZ5TG OZ8ZS OZ1DL	MO-ALL	291,100	ALL	ALL	2	69	0	0	41
RX1AS	RU1AA RU1AC RX1AS	MO-2M	2,584,400	ALL	144	0	284	29	3	59
RU3GX	RU3GX UA3GTM R5GR	MO-2M	1,146,100	ALL	144	0	157	23	3	47
KG6NUB	KG4UHM AI6VU KG6NUB AJ6IV	MO-2M	874,200	ALL	144	0	141	21	3	38
LZ1KU	LZ1KU LZ1KQ LZ1GHT	MO-2M	291,100	ALL	144	0	71	12	3	26
F6HEO	F0EUI F5UNH F6HEO	MO-2M	217,600	ALL	144	0	64	11	1	22
W9VW	WB9YCZ KA9BFM K9LZL	MO-2M	154,000	ALL	144	0	55	7	2	19
VE3MIS	VE3CWU VE3AXC VA3ELE	MO-2M	27,300	ALL	144	0	21	3	0	10
LR5F	LU2FGL LU7FIA	MO-2M	600	ALL	144	0	3	0	0	2
K6MG	K6MG N9JIM KG6NUB AI6VU KG4UHM AJ6IV	MO-1.2G	391,300	ALL	1296	32	59	15	4	24
SK0UX	SM0ERR SM0KAK SM0NCL SM0BSO SA0CAN SM0RJV	MO-1.2G	351,000	ALL	1296	49	41	11	4	24
VA7MM	VE7CMK VE7CNF VE7HRY	MO-1.2G	348,000	ALL	1296	19	68	12	3	25
OH1LRY	OH3MCK OH3LWP OH4MVH	MO-1.2G	307,800	ALL	1296	30	51	12	2	24
IK5VLS	IK5VLS IK5AMB	MO-1.2G	288,600	ALL	1296	22	56	9	3	25
OK1KIR	OK1DAI OK1DAK	MO-2.3G	42,500	ALL	2300	19	6	5	1	11
W3SZ	W3SZ NN3Q WA3GFZ	MO-10G	17,600	ALL	10368	1	15	0	1	10