



ARRL EME Contest 2016 Results

More **By Rick Rosen, K1DS (rick1ds@hotmail.com)**
Logs and More 432 MHz Activity

Following the delightful International EME meeting in Treviso, Italy in August 2016, hams from around the world aimed their antennas at the Moon. They were waiting for the first weekend of the ARRL EME Contest, dedicated to the bands at and above 2.3 GHz. Stations were active using all modes on bands through 10 GHz. Some simply started calling CQ or responding to other's calls. Other operators took advantage of the ability to self-spot their signals on the various online chat rooms or other means. Either way there was plenty of EME activity.

The number of log entries has continued to climb over the past few years, with 163 submissions (Figure 1) increasing by 25 percent from last year. Twenty percent of the entries were CW/SSB only while the rest were All-Mode or Digital-Only.

Total Reported EME QSOs by Mode

Digital	6,048
CW/Phone	2,616
Total	8,664

Some of the biggest contributors to the contact totals, such as G3LTF and HB9Q, did not submit contest logs but were beacons for others who found them easy to work to increase their scores. Rather than actively contest, The HB9Q crew was in pursuit of increasing their totals of new initial contacts with other stations but made QSOs with all callers. Others including EA6VQ submitted check logs. Although the majority of EME contest participation is by DX stations, 45 of the 163 logs (28%) of the submitted logs were from U.S. call signs.

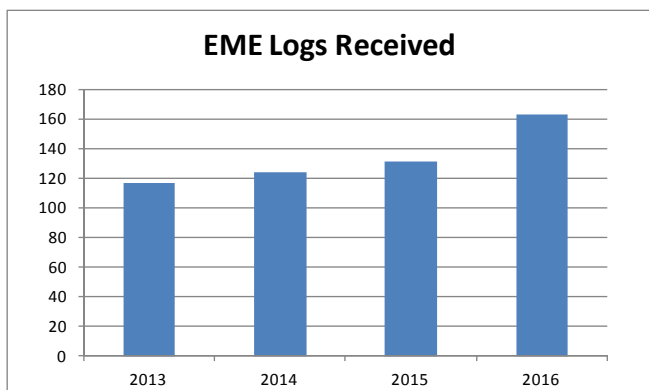


Figure 1 – EME Contest Log Entries

I have heard from several EME operators that the log submissions would increase if it were easier to submit standardized electronic logs and summaries and get a confirmation of their receipt. One of the obstacles is the issue of defining multipliers as this information is not part of the current EME contest exchange. Multipliers are currently defined as U.S. states and DX entities. Operators can make use of QRZ.com to determine the state. If the station is operating from a portable location, you may need to get that information from sources other than the QSO. Perhaps it is time to re-examine these rules and consider use of ITU zones or two-letter grid fields.

One of the most positive results of this year's contest was the return of substantial activity on 432 MHz. The 1332 reported QSOs about doubles the numbers of contacts made on that band in each of the last three years as shown by Figure 2. Many commented that Faraday rotation was disruptive but that stations were able to be worked if you were patient and waited long enough for the polarization to change. Several stations battled the winds that were affecting antenna positioning and at times required the dishes and Yagi arrays to be parked, awaiting better weather.

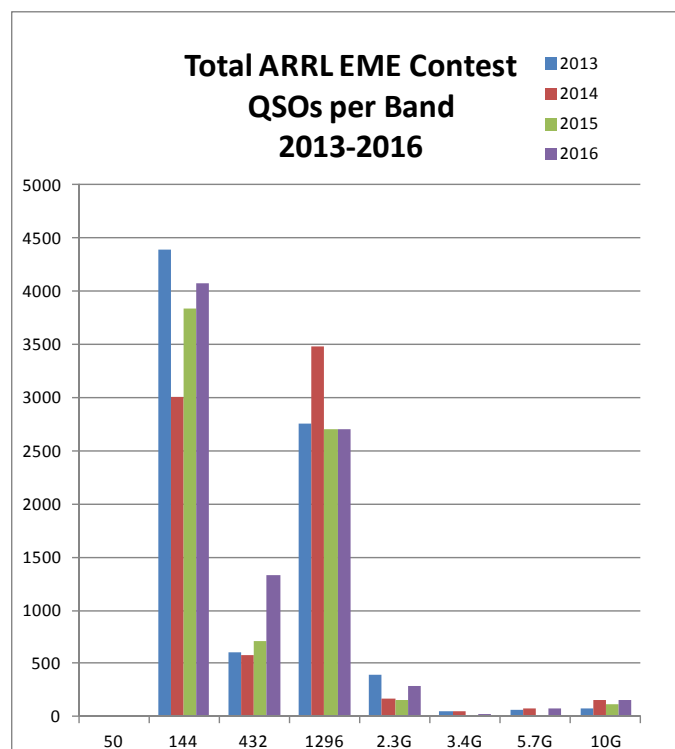


Figure 2 – Band-by-Band Breakdown of QSOs

Total Reported EME QSOs by Band

144 MHz	4,080
432 MHz	1,332
1296 MHz	2,707
2.4 GHz	285
3.4 GHz	27
5.7 GHz	72
10 GHz	161
Total	8,664

The number of contest QSOs is significantly under-reported by using only the submitted logs. This year it appears that a third of the participants sent in their logs and summaries. Of the 163 total logs received, 79 of them included QSOs on 144 MHz and 50 submissions indicated contacts on 432 MHz. However, Conrad, PA5Y's log included 203 QSOs on 144 MHz and Bernd, DL7APV had 127 QSOs on 432 MHz in his log. Other bands confirm the percentage of submitted logs as we found 16 with contacts on 2.3 GHz, but Franta, OK1CA reported 43 QSOs on that band. Only 8 logs showed contacts on 5.7 GHz, but the OK1KIR log had 19 QSOs on that band. Lastly, on 10 GHz we saw entries from 10 stations but OZ1LPR logged 33 QSOs there.



VE4MA reports, "Had a lot of fun on 432...just like the old days in the 80s. I was using a small 3 m dish and 400W on CW and JT. I changed to a more optimum feed PY2BS/ W5LUA dual polarity Patch feed for the second weekend. The Big signals were greater than 20 dB/ N on the SDR radio. (Photo courtesy of Barry Malowanchuk, VE4MA)

To be able to make EME QSOs, the most significant component is the antenna, optimized for gain and moon-tracking. Next is a high-gain, low-noise preamp, preferably mounted as close to the antenna as possible and protected from transmitted power with relays. With the ease of adding an inexpensive USB dongle or an SDR radio, the excitement of moonbounce communication is within reach of every VHF-equipped ham. The VK3UM (SK) EME calculator is a most useful tool for planning the

antenna and power needs for making moonbounce contacts. (www.vk3um.com/eme%20calculator.html)

More and more VHF+ operators are finding that they can make EME QSOs with modest modification to their existing stations. Matej, OK1TEH managed to work 30 QSOs on CW and digital modes with a single 23-element Yagi and 800 watts. Victor, UA1OEJ used a single 18-element Yagi and a kW of power to make 39 QSOs on 144 MHz.

Several stations were able to make contacts with single Yagis and modest power in the 200-400 watt range.

- K7ULS had 5 digital QSOs on 432 MHz using only 70 watts and a single 9-wavelength Yagi.
- The WD5AGO team made 2 CW contacts with 250 watts and their 13 ft x 4 ft homebrew 1296 MHz horn.
- Even though Hannes, OE5JFL did not submit a contest log, his use of a homebrew horn and an 80 W SSPA (solid-state power amplifier) on 1296 MHz was unique. He positioned the horn by hand on his balcony and made 6 JT-65 QSOs in a 2-hour Moon window.
- Although no log was submitted was submitted for their 10 GHz operations, with their 4.6 meter dish the Stanford University station, W6YX worked VK7MO who was using a mere 76 cm diameter dish.



- KG6NUB put the 3 ft-long Yagi on a tripod and aimed it at the Moon (see photo) — with a small

brick amplifier he was able to work 3 QSOs on 432 MHz.

All submitted logs are included in the on-line listings, even those with just 1 QSO like David, 4X1DG and Vladimir, RX8XR with 8 QSOs from rural Russia. With a range from 1 to 350 QSOs, the average station entry had 53 contacts. Figure 3 details the ARRL EME contest CW/SSB and digital activity over the past four years. The growth of activity has largely been in the use of the digital modes; however, there is still a substantial amount of CW/SSB, especially on bands from 1296 MHz and up.

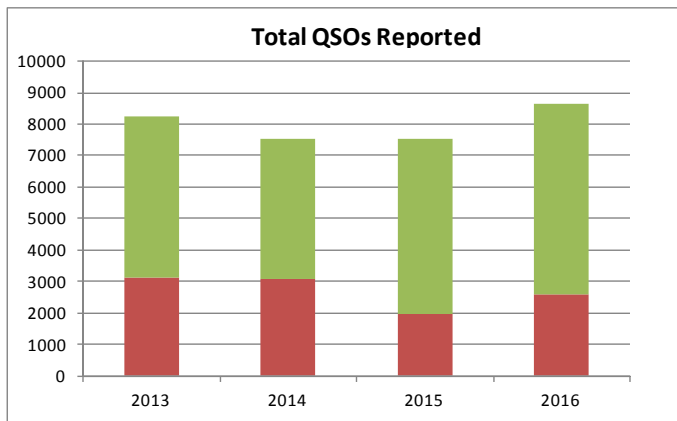


Figure 3 – EME Contest QSOs (Red = CW, Green = Digital)

Those operators who were active on EME for the ARRL weekends shared their results and experiences on the moon-net email reflector (mailman.pe1itr.com/mailman/listinfo/moon-net) and on the pages of the monthly on-line 432 MHz & Up EME Newsletter, published by AI, K2UYH (www.nitehawk.com/rasmit/em70cm.html).

Single-Operator Highlights

There were 147 Single-Op logs submitted. Franta, OK1CA topped the All-Band, CW-Only entries with 166 QSOs across all bands from 432 MHz–10 GHz. DL8UCC worked 8 CW-Only QSOs on 144 MHz. SM4IVE cranked out 58 CW-Only QSOs on 432 MHz for first in that category. G4CCH made a total of 91 QSOs with 37 multipliers to top the 1296 MHz CW-Only category.

Dmitry, UA3PTW has set an all-time record as a Single-Operator, All-band, All-Mode with his score of 6.020 million points. This is more than double the previous Single-Op record score and comes close to the all-time Multiop high score of 6.643 million by the K1JT team in 2010. He has often been a Single-Op leader in recent years. His 350 contacts and 172 multipliers were made across 5 bands including 144, 432, 1296 MHz, 2.3, and 5.7 GHz, with 25% on CW and 75% on digital modes. Gunars, YL2GD was second in this category with a score of 2.1 million using the 144, 432 and 1296 MHz bands.

PA5Y beat the competition in the 144 MHz All-Mode group turning in 203 QSOs with an 83-multiplier log. Running a close second was Ladislav, OK1DIX with 190 QSOs and 78 multipliers. This was the most popular entry category with 54 stations submitting logs.

Bernd, DL7APV was first in the 432 MHz All-Mode category with 110 digital and 17 CW QSOs. On the 1296 MHz band, Marek, OK2DL came in first with 79 CW and 39 digital contacts and 39 multipliers for a 460K score. LZ1DX was first of three in the 2.3 GHz band entries making 22 CW contacts for a score of 44K points. The author's efforts were limited to that band with 13 CW contacts.

Alex, ZS6EME had 8 CW and 1 digital 2.3 GHz QSOs operating from his new location. All of us were glad to see that he has mastered CW for this contest. Nickolay used the special call sign EO25F with his 144 MHz Digital-Only operation, celebrating the 25th anniversary of Ukrainian independence. I'm sure many checked to see if this was a new DX entity when his call appeared.



A forest fire erupted in N8CQ's neighborhood, sparked by an electrical fire in a nearby house. The county firefighters and their fire trucks arrived to put it out and prevent any damage to his station. (Photo courtesy of Gary Abercrombie, N8CQ)

The literally hottest station on the air (see photo above) was Gary N8CQ. His 9.2 meter dish on 1296 MHz helped him make 37 QSOs. A forest fire erupted in his neighborhood sparked by an electrical fire in a nearby house. The county firefighters and their fire trucks arrived to put it out and prevent any damage to his station.



N5BF's first EME outing went well. "This was a great experience reminiscent of my early Novice days in amateur radio in 1972-3). I have a long list of station improvements and operator improvements to work on for next year's events. All (QSOs were made) on 1296 MHz (during the) October weekend, worked 22 stations with a multiplier of 17." (Photo courtesy of Courtney Duncan, N5BF)

Multioperator Highlights

There were 16 Multioperator entries this year. The K2UYH team included AI along with W2HRO, NE2U, K2BMI, and K2TXB. Together they had QSOs on all bands from 144 MHz through 10 GHz for a score of 3.74 million to top the 6 other All-Band, All-Mode entries. The Kłodzka Group EME of SP6JLW, SP6OPN and SQ6OPQ turned in a 672K CW-Only score with 114 contacts using 432 MHz, 1296 MHz and 10 GHz under the SP6JLW call sign. Using the call SP6OPN, Jerzy and Andrzej had a CW-Only entry on 2.3 GHz and 3.4 GHz with 92K points. Guy, F2CT left his magnificent 5 GHz station in Brittany to be one of the operators of the 1296 MHz CW-Only F5KUG group including F6ABX, F6BKD, and F6GUS. The band was clearly busier than his previous 5 GHz experiences.

The W6YX group submitted only their 1296 MHz All-Mode log. Their 4 operators made a score of 279K with 48 CW and 34 digital contacts. Marco, S5ØP and his 3 colleagues operated 144 MHz Digital-Only and scored 1.3 million points with 174 QSOs. OH2PO together with OH2BGR, OH2HYT, and OH6DD continued their outstanding performance on 432 MHz netting 115 contacts; 28 CW and 87 digital. The DLØEF group of DF8ME, DK1FE, and DK2KA operated exclusively on 10 GHz CW and contacted 13 stations.

A rare DX entity was activated on 144 MHz and 432 MHz as Chris, PA2CHR and Jos, PA3FYC put together a portable operation E44CM in Jericho, licensed by the Palestinian Authority. Together they managed to make 95

QSOs using digital and CW for a score of 551K points, creating quite a pile-up while active.



K7ULS made 5 432 MHz QSOs from 8000-ft elevation on Powder Mountain in DN41. (Photo courtesy of Michael White, K7ULS)

Future EME Activity

As more hams discover the excitement of EME, sending and receiving signals that have travelled almost 500,000 miles in space, we are seeing increased moonbounce activity with each passing year. Continued improvements in technology for higher transmit power and receiving weaker signals have improved the opportunity for various achievements, such as WAS and DXCC on the VHF, UHF and microwave bands. The recent release of the WSJT-X suite of digital communications programs including QRA64 will also enable smaller stations to get into the action and make contacts with more than just the biggest EME stations.

The 2017 EME weekends are Sept 9–10 for 2.3 GHz and up and Oct 7–8 and Nov 4–5 for 50–1296 MHz. Although there are other on-the-air activities on those weekends, these are ideal Moon position weekends, enhancing EME signals. Please participate and remember to submit a log of your activity.

A personal note of thanks to my XYL, Jani for editing assistance and to all the EME "Elmers" who have helped me get my signals on the Moon. Thanks also to all of those who sent me reports and pictures of their activity.

Call	Score	QSOs	Mults
SINGLE OPERATOR, CW/PHONE ONLY, ALL BAND			
OK1CA	1,643,400	166	99
WA6PY	501,500	85	59
UA4HTS	432,400	92	47
S53MM	377,300	77	49
KL6M	211,200	64	33
IW2FZR	100,800	42	24
SP3XBO	58,000	29	20

SINGLE OPERATOR, ALL MODE, ALL BAND			
UA3PTW	6,020,000	350	172
YL2GD	2,116,800	189	112
DF3RU	1,312,200	162	81
W5LUA	572,000	88	65
OK1DFC	556,500	105	53
EA8DBM	459,000	90	51
WA2FGK	336,000	70	48
SQ7D	309,600	72	43
VE4MA	294,000	60	49
KNØWS	212,800	56	38

SINGLE OPERATOR, CW/PHONE ONLY, 144 MHZ			
DL8UCC	6,400	8	8
F5VKV	400	2	2

SINGLE OPERATOR, ALL MODE, 144 MHZ			
PA5Y	1,684,900	203	83
OK1DIX	1,482,000	190	78
SM4GGC	762,500	125	61
LZ1DP	701,800	121	58
K3RWR	588,000	105	56
UR3EE	580,000	100	58
W4YTB	540,600	106	51
K1JT	473,200	91	52
OK1DIG	461,100	87	53
EO25F	455,900	97	47

SINGLE OPERATOR, CW/PHONE ONLY, 432 MHZ			
SM4IVE	150,800	58	26
I2FHW	71,400	34	21
F6HLC	11,700	13	9
JA9BOH	5,600	8	7
JAØTJU	5,600	8	7
JH4JLV	4,900	7	7

SINGLE OPERATOR, ALL MODE, 432 MHZ			
DL7APV	622,300	127	49
UT5DL	200,600	59	34
K3MF	179,800	58	31
SM7THS	65,100	31	21
OK1TEH	64,000	32	20
VK4EME	63,800	29	22
OK1YK	52,200	29	18
KA1GT	46,800	26	18
DK1KW	4,200	7	6

K7ULS 2,500 5 5

Call	Score	QSOs	Mults
SINGLE OPERATOR, CW/PHONE ONLY, 1.2 GHZ			
G4CCH	336,700	91	37
I1NDP	292,400	86	24
DL3EBJ	247,500	75	33
SP6ITF	198,000	66	30
OK1CS	186,000	62	30
SM3AKW	150,000	60	25
IK3COJ	132,300	49	27
LZ2US	90,200	41	22
N8CQ	85,100	37	23
DJ8FR	71,400	34	21

SINGLE OPERATOR, ALL MODE, 1.2 GHZ			
OK2DL	460,200	118	39
RA3EC	351,000	90	39
RA3AUB	282,200	83	34
PA3FXB	259,200	81	32
I5YDI	132,500	53	25
N5BF	93,600	36	26
WA3RGQ	84,000	35	24
SP5GDM	82,800	36	23
RWØLDF	66,000	33	20
WA3GFZ	51,300	27	19

SINGLE OPERATOR, ALL MODE, 2.4 GHZ			
LZ1DX	44,000	22	20
K1DS	15,600	13	12
ZS6EME	8,000	10	8

SINGLE OPERATOR, ALL MODE, 5.7 GHZ			
OK1KIR	28,500	19	15

SINGLE OPERATOR, ALL MODE, 10 GHZ			
OZ1LPR	72,600	33	22
F5IGK	10,000	10	10

MULTIOPERATOR, CW/PHONE ONLY, ALL BAND			
SP6JLW (+SP6OPN, SQ6OPG)	672,600	114	59
SP6OPN (+SP6JLW)	91,800	34	27

MULTIOPERATOR, ALL MODE, ALL BAND			
K2UYH (+W2HRO, NE2U, K2BMI, K2TXB)	3,739,200	246	152
E44CM (PA2CHR, PA3FYC, ops)	551,000	95	58
LU1CGB (+LU8ENU, LU9DO, LU1AEE)	456,000	80	57
OZ9KY (OZ1GWD, OZ1FKZ, OZ1PBS, OZ3Z, OZ5KM, OZ5TG, OZ1DLD, ops)	331,100	77	43
W4NH (K4SQC, W4ZST, WW8RR, WG8S, ops)	280,000	70	40

K4EME (+AD4TJ, N1QEQ)	170,000	50	34
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<i>Call</i>	<i>Score</i>	<i>QSOs</i>	<i>Mults</i>
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MULTIOPERATOR, ALL MODE, 144 MHZ

S5ØP (+S57VW, S53RM, S55OO)	1,287,600	174	74
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HG7ØEME (HA1YA, HA1WA,ops)	529,000	115	46
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MULTIOPERATOR, ALL MODE, 432 MHZ

OH2PO (+OH2BGR, OH2HYT, OH6DD)	483,000	115	42
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MULTIOPERATOR, CW/PHONE ONLY, 1.2 GHZ

F5KUG (F2CT, F6ABX, F6BKD, F6GUS,ops)	101,200	44	23
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WD5AGO (+KF5SYP, KG5EWK)	400	2	2
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MULTIOPERATOR, ALL MODE, 1.2 GHZ

W6YX (AD6FP, K2YY, KG6NUB, ops)	278,800	82	34
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VA7MM (VE7CMK, VE7CNF,ops)	192,200	62	31
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MULTIOPERATOR, ALL MODE, 10 GHZ

DLØEF (DF8ME, DK1FE, DK2KA, ops)	15,600	13	12
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