

432 MHz Portable EME Work

by John, W3HMS

As a member of the South Mountain Radio Amateurs (SMRA Club), I have tried to do different activities each Field Day at our site near Carlisle, PA since 2003.

One year, it was a balloon borne 80 m vertical antenna with home brew matcher, in 4 different years it was satellite work on 435 and 145 Mhz , another year it was demonstrating two 10 Ghz Gunnplexors, in another year it was demonstrating ATV via our 1280 MHz in and 3480 MHz out repeater , another year simplex ATV on 1280 Mhz and 3480 MHz. For 2012, I wondered what we could do that was different from prior years.

I was pleased to visit Rex, VK7MO at his lovely QTH high above the harbor in Hobart, Tasmania, Australia in October 2005 and see his 2.3 m. dish and 200 w. on 23 cm and about 150 w. on 2320 Mhz moon bounce station. Rex became so very effective as a long distance EMAIL mentor as I was building my 23 cm, 3 m. dish and 120 w. moonbounce station. After I was operational in August 2008, we tried several JT65C QSOs and finally were successful in January 2010. His other adventures with aircraft scatter on 10 and 24 GHz and JT65 work on 10 and 24 Ghz are well known. My 23 cm EME experience has included 346 QSOs, 93 initials, and 24 DX with a 3m dish and 400 w. + so I felt that it was indeed possible for me to do it.

So, when I saw a picture of his portable 432 MHz EME work in DUBUS in early 2012, I asked him all about it and we exchanged some EMAILs. Encouraged, I block diagrammed what I would need then compared it to what I had in hand. I had a very strong desire to borrow nothing from my 23 cm EME station, not even a pen, HI, as I did not want to invite Murphy in to this station!!

Oh, we made the 432 QSO so what follows is the story of planning, problems, stress, solutions found and finally success!!

Equipment summary....what we needed vs what we had:

Win 7 Laptop with JT65C

HB9Q Internet....Club officers said we would have it.....and we did.

Interface PC to radio....the portable- use Signal link USB worked well.

432 Mhz very stable transverter.....a DEMI with SYNTH, 10 MHz oscillator, and sequencer was in the pipeline to arrive before FD

100 watt class RF amplifier....a Mirage D100 for ATV was in use since 1995

Bird Wattmeter

Transceiver.....an FT 857 that was OK with the interface was in hand

LNA.....a new MFJ mast mounted coax powered was due in mid Feb 12

Antenna.....24 element Yagi was needed.....we had none until W3FEY said he had a loaner for me.

EL AZ portable mount.....the ex-satellite mount should work fine

Power supply....my Rover batteries should be more than adequate

So, the prospects looked good and doable in the several months we had before FD. In May, I assembled the antenna in the back yard and it was easy to handle by hand. For AZ, I had my roving compass and for EL, a carpenters' inclinometer would do nicely. All positioning would be "Armstrong style"!!

In early June, we assembled the station on the back porch. The PC had the latest version of JT65C and I checked that on 2m. with WA3USG about 7 miles away. After some set up problems, we easily worked in JT65C and in PSK-31. The transverter worked fine until I checked the sequencer outputs.....nothing....so we were dead in the water until I remembered the EME backup on the shelf, a DEMI sequencer which worked well in 23 cm EME. So, after several reviews, we connected it in and were once again all OK. Then we measured the DEMI txcvr output power and it was 10 watts as desired.

The Mirage D100 for ATV amplifier did not operate with output of 100 watts from a 75 AH battery nor two in parallel. So I got a Radio Shack 25 amp switching power supply and hit the key!. The breaker tripped and no output....tests 2 and 3 were the same. Then I remembered a friend said I could borrow the SMRA 35 Amp Astron PS. The amp gave me only 65 watts on 13.8 VDC with maximum drive. I was not happy but it would have to do.

Next I tried to use the brand new MFJ 432 MHz mast mounted LNA and found it did nothing. Now, on receipt, I noticed a missing N fitting bolt with a nut like noise inside the box...was that the QA level?.....it was! I was convinced an LNA was a MUST. Even though Rex had not used an LNA, he did highly recommend one. So I frantically ordered a new one from my usual supplier. It was announced as an ICOM 432 Mast Mounted LNA nothing being said about its restricted use with ICOM products with a built in bias T.

At this point, I formulated a new axiom...ensure your EME station uses MFJ and RS products that excel.....specifically, coffee cups and ball point pens!

I was in no mood to consider reengineering a new LNA so when I related my tale of woe to George, W3FEY, he asked how I would like to borrow his SSB Electronics (DL)432 MM LNA IModel SP7000 with 30 dB gain and very low noise like my 23 cm version!!! My YES, was the fastest on record, HI!! Other tests confirmed all was OK except for the LNA issue. I also discovered I needed more than the planned 18 ft of 9913 new coax. Luckily, I remembered some high quality coax used in prior roving so we were in business.

Digressing slightly, I had asked Rex for a suggested station to contact and he suggested I EMAIL Bernd Wilde, DL7APV, whom he had worked from several grids in VK. I did and Bernd was most helpful.

His station would indeed do the “heavy lifting” in any QSO attempt as my little QRP outfit was not going to do it, HI!! He has 16 of the 13 w/ DJ9BV design Yagis and a TH331 PA.

We tested twice with no luck. Liaison used the HB9Q logger. Our next scheduled test was on the Thursday before the FD. George agreed to meet me for lunch, after a long drive from his QTH, with the LNA. We discussed how to power and interface it and I arrived home at 1250 for a 1400 sked with Bernd, DL7APV. I did the necessary LNA mounting, antenna pointing, cable connecting, and power/sequencer connecting then testing. All was well, and I had 9 minutes to spare!!! . At 1359:30, Bernd was not on the logger but at 1400 he said he was calling me. I looked on Spec JT and saw what I hoped was him and the decode was “W3HMS DL7APV JO62”. I told him of this on the logger then we completed the RO, RRRs, and 73. What a great surprise. I was -26 to -28 and he was -22 at my QTH, a few dBs of margin, but not much.

Just to make sure it was a real QSO, we did it again!! I realized the rats- net configuration on the picnic table should be set into an old van roving rack and pre-connected as much as possible. This not only promoted order and reduced the probability of misconnection on Saturday morning, it freed up valuable back-of-the-van-space. The transport to the Saturday FD site on 23 June 2012 went smoothly and I positioned my van at “one heavy duty extension cord length away” from an AC outlet which also afforded a good view of the sky. The antenna went up easily with the quick assist of two Club members taller than me.

The equipment connection, Internet testing, then system testing went quite well and I was happy that I had used the rover cabinet. I also found the sun glare to require a blanket to be mounted to the van rear door which reduced the glare. I found 432 MHz EME on the FT 857 to be much noisier than 1296 MHz EME on my ICOM 756 PRO 3 so it was tough to see the JT signal amongst many QRM lines.

I had set a sked with Bernd at 1130 EST and sure enough he was on the logger. I clicked on what I thought was a JT 65C signal. Happily it was Bernd and we completed rather easily on 432.063 MHz with his report at -17 and me at -23. The QSO from start to finish was witnessed by Glenn, K3SWZ, a well know DXCC and VUCC QSL verification agent of the ARRL whose FD arrival timing was impeccable.

We almost made another QSO with UA3PTW, whom I had worked 2-3 times before on 23 cm, as I knew he had copied me. We received the TX Line One from him but it was not to be a QSO. As the one QSO was before the 1400 EST start the EME QSO score was 0 but the educational score was 100 points. The real value to me was the chance to demonstrate EME operations “up close and personal” to an estimated 15 hams and one Carlisle Sentinel reporter who gave us a very well written article on the SMRA FD and EME/P in the Sunday morning edition.

So, what observations/recommendations have I for the portable EME operator:

1. EME is still not easy even though EME/P is done by a few stations.
2. Plan every detail and action step of your approach on paper....EARLY!!
3. Don't forget precision timing to the SECOND.....an error in this may have cost me a QSO until I got it right.

4. Know how to change time in your PC in the field.
5. Have an Internet connection if at all possible for the logger and for time sync with NIST.
6. Repair your doubtful/marginal equipment with a sledge hammer.

The natural question is will I do it again portable or install it at the QTH? The Monday after FD found me on 23 cm EME and it was so wonderfully quiet and the Spec JT lines like freshly painted white lines on a brand- new Interstate! I think 432 /P EME is a fine memory and experience. My XYL has been most understand about the dish and tower, I do not want to 'push -it", HI!!

My next band will be 3400 Mhz EME using equipment about 95% in hand. Target date is hopefully next Spring 2013.

73 and Happy EMEing, John Jaminet, W3HMS, at EMAIL W3HMS@aol.com. 10 Aug 2012