432 AND ABOVE EME NEWS
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EDITOR: AL KATZ, K2UYH; ENGINEERING DEPARTMENT, THE COLLEGE OF NEW JERSEY, PO BOX 7718 EWING, NJ 08628
TEL (W 609-584-8424) OR (H 609-443-3184), FAX (609-631-0177), E-MAIL a.katz@ieee.org
PROD/MAIL: BRIAN MULLANEY, KB2TIS (609-883-6390), E-MAIL mullaney@mccc.edu
NETNEWS EDITOR: G4RGK, DAVID DIBLEY, E-MAIL g4rgk@btinternet.com (based on K1RQG's Netnotes and Reflector News)
EME NETS: 14.345, 10 AM ET SATURDAY AND SUNDAY (AFTER VARO NET ENDS ON SUNDAY)
NET CONTROL AND SKEDS CORDINATOR: JOE, K1RQG, TEL (207-469-3492), E-MAIL k1rqg@aol.com
EME DIRECTORY: http://www.dl4eby.de/, DL4EBY/DK0TU, KLAUS TIEDEMANN, TEL (49-30-7955467), E-MAIL: tklaus@snafu.de
NL EMAIL DISTRIBUTION and EMAIL LIST CORD: WARREN, W2WD wbutler@comcast.net [TXT OR PDF OR "ON WEB" NOTICE]
EME STANDINGS: DAN GAUTSCHI, HB9CRQ/HB9Q E-MAIL hb9crq@hb9q.ch OR SEE HIS WEBPAGE AT www.hb9q.ch.
THE NL WEB VERSION IS PRODUCED BY W6/PA0ZN AND AVAILABLE AT http://www.nitehawk.com/rasmit/em70cm.html.

CONDITIONS: The 432 portion of the European World Wide (EWW) EME Contest sponsored by DUBUS Magazine was a bit of a disappointment. Conditions were about their worst. Besides the 2 dB loss due to the apogee location of the moon, Faraday kept polarization at near 90 degrees except for the very end of the contest, and libration fading was awful. Very disturbed geomagnetic conditions may have also contributed to the very difficult copy. Nevertheless there were some impressive scores. There was also contest activity at 6 cm, but based the dearth of scores, it appears that 6 cm has a long way to go, before it reaches the of activity found on even 3 cm. Coming up this summer we have the C31TLT dxpedition on 23 cm to Andorra from 24 to 27 Aug. K1RQG has already generated a skeds list – see the end of this NL. On 70 cm HB9CRQ is coordinating skeds for OA4O activity after more than 15 years. See the OA4O report in this NL.

HIGH CONTEST SCORES: HB9Q appears to have run away with the top spot with 58x27. The next closes reported score is unbelievably that of VK3UM with 44x23! Doug despite the tremendous handicap of his far southern location may have the number 2 score. Usual competitors as DL9KR and K1FO for various reasons appear to have ended behind him. Jan will probably have the 3rd place with 40x25.

CT1DMK: Luis cupido@mail.ua.pt was active on 6 cm during the recent EWW EME Contest, but was troubled by the polarization dilemma -- As you know I'm pro-circular for all EME uW bands. I would like to have on 5.7 and 10 GHz (and on >24 GHz) circular polarization as the standard to help prevent newcomers getting started on linear and then staying there. The advantages are clear as the results on 23 and 13 cm show, but I briefly summarize the arguments anyway: Linear fixed H and V - do not work for folks with polar mounts, and not for world wide coverage. The argument of activity only being in EU and US is not true anymore. The solution of switchable V/H adds an extra switch, and therefore extra losses. It is better than fixed V & H, but do not work for worldwide coverage as best performance for some locations can be at 45 deg! With waveguide switching becomes more difficult to make. Switching also adds operational complexity (should I call V or H?). The solution to have rotatable pol is a mechanical problem, but maybe some form of Chaparral mechanical polarotors will do? You will still have operational confusion as nobody will know where we all are! Lets move to circular for good and make it standard as we do have on 23 and 13 cm.

DL0GER: Daniel dl3iae@gmx.de sends a summary of the DUBUS 432 EME contest activity of his group – We did not have time to build a new antenna after the ARRL EME Contest as we had planned. All of the people involved in the project were just too busy with other things. Thus we used 4 x 8.5 wl yagis with "open tube" feeder – same as before. Our GS35 amp ran perfectly at the > 1.5 kW level for the whole weekend - no flashovers, almost no drift, etc, really nice! We did a major change on the receive side. It took lots of my energy during the past months, but it was really worth the effort. I managed to get a LINRAD system running. I started from scratch, having no idea about Linux. Nowadays, I hardly use Windows. With the help of Leif and the people on the LINRAD reflector I got the software package running. Leif also gave me lots of support while building the hardware. The setup now is: 1st preamp ATF54143 and 2nd preamp BFP196 mounted at the feedpoint (NF ~0.4 dB, gain ~35 dB) feeding a low level (+7 dBm) IE500 mixer through 25 m of Aircom cable (-2.5 dB) and a 5 stage cavity filter (-4 dB). The IF is at 28 MHz. For 28MHz I have build a direct conversion RX with a selective preamp (+10 dB) and 2x IE500 converting down to AF I/Q and low noise audio amps. Details are at http://www.nitehawk.com/sm5bsz/linuxdsp/hware/optiq.htm. We measured 11-12 dB of sun noise at a flux of 114. With a Delta 44 soundcard we can monitor about 80 kHz centered at 432.040. It is a unique experience to "see" what is happening on the band. After a while you can identify stations by their amount of drifting etc, and the variable filtering features are just enormous. I can only encourage people to go this way. Good one, Leif! Thanks a lot for your engagement. In the contest we were QRV after 1800 on Friday, after building up the station in about 5 hours and w heard quite nice echoes at moonset. However conditions seemed poor and did not improve during the contest. It was clearly seen that one is wasting a lot of time when using fixed polarity. The stations with rotatable arrays or feeds were at their "normal" signal strengths, while the "horizontal" ones (even DL9KR!) were way down. We worked 12 stations in the contest and W7AMI (4Y) on sked. QSO'd were KL6M, VK3UM, VK4AFL, OZ4MM, HB9Q, F6KHM, K1FO, K5GW, JA6AHB, F2TU (loud but drifting), G3LTF and DL9KR. Heard were SV1BTR (called for ages), OZ6OL, K0RZ, N9AB and JA9BOH. VK3UM was at 20 dB above noise, also F6KHM and HB9Q. Nice signals from G3LTF and VK4AFL. We had a webcam running and I am sure some of you had a look. Some might be bored on watching 2 beer drinking guys playing radio, but I guess sometimes it is nice to see the person and the setup at the other end. The DSL connection went dead early on Sunday morning for some unknown reason. Besides the poor conditions, we spent a really nice weekend in the vineyards where our QTH is located. The crew was DL2IAN, Tom (OP), DJ2ANG, Dave (WLAN), DD8IL, Andi + XYL (Webcam) DJ1UO, Elmar (mental support). Our website at http://dl0ger-eme.dd8il.de/ will be updated soon for Pixs and sound. I promise we will be back.

DL0GER crew in front of their 4 x 8.5 wl yagi array

DL3OCH: dl3och@gmx.de ran some JT65 tests in June with DJ9YW and K2UYH -- I am now convinced that JT65C is better than JT44 on 1296. I think a major problem in past tests was the frequency drift of the IC706. Now that we have fixed it, it definitely worked better than JT44. I had some serious problems with the strong Wind during the tests. My antenna was moving like crazy. On JT44 I had lots of QSB and therefore the text needed a long time to be readable. The average line changed often. On JT65C the first period was already decoded successfully. The "W" was mostly between 4 and 8. JT65C is much better especially when there is so strong QSB. You don't have to receive a full period; a short burst is enough for a decode - really cool! I sent some wave files to K1JT. Joe mentioned that he plans to improve JT65C for 23 cm. The Doppler drift can be > 10 Hz per minute at 23 cm. He could improve the AFC by using the calculated value of the Doppler shift in the correction. With improved drift correction, we probably could also use JT65B on 1296. [See K1JT's comments later in this NL]. I want to do some more skeds to see whom else I can QSO. I will now focus on JT65C, since I know that it is better.

DL9KR: Jan 520034211808-0001@t-online.de reports on the on 70 cm CW in the in DUBUS contest - I as others have also observed found conditions rather poor. I was on only sporadically, but found a 90 deg pol offset throughout Saturday and only one brief period of alignment on Sunday evening. This made QSOs with other H-polarized stations within Europe very difficult, if not impossible. Things were aggravated by unusually hefty libration. My main goal of working new small stations was not fulfilled. A pleasant surprise was the appearance of 2 m big gun F3VS for #821 on Sunday evening. Thanks also to SP7DCS for his SWL report and to my other QSO partners. I worked on 11 June partial OZ6OL due to brief mains power loss here, VK3UM, KL6M, EA3DXU, DK3WG, F2TU, RW3PX, F6KHM, KE2N, G4RGK, OZ4MM, SP6JLW, N9AB, VE6TA, SV1BTR, K5JL and SM3BYA, and on 12 June VK4AFL, JA9BOH, KL7HFQ, JR1RCH, SP6JLW dupe, HB9Q, JA6AHB, DL0GER, OK2BDQ, DL9JY, DJ7GK, UT2EG, YO2IS, DK8VS, S53RM, EA3DXU dupe, ON4KNG, G3LQR, G3LTF, K0RZ, SM2CEW, K5GW, F3VS, W7AMI, K6JEY and I5CTE. Heard were K1FO, PE1ITR and S53J. Total operating time was 6 hours for a score 40 x 25.

EA3DXU: Josep ea3dxu@jazzfree.com found conditions were very hard for my small station during the 70 cm part of the EWW Contest -- On Saturday, 11 June, I was QRV for only 6 hour and lost the VK and JA window and part of USA window. I never heard my own echoes and the small signals were very difficult to read. On 12 June I was QRV for nearly 8 hours. Conditions were similar in the morning and good in the evening, when I heard my echoes clearly for the first time. I ended up with 12 QSOs: DF3RU, OZ4MM, K0RZ, F6KHM, KL6M, HB9Q, VK3UM, JA6AHB, F2TU, DL9KR, SV1BTR and SM2CEW. Heard were OZ6OL, HB9JAW, ON4KNG and G4RGK.

F2TU: Philippe f2tu.om@guideo.fr was active in the June leg of the EWW Contest on 432 and 5760.100 -- I have both the feeds for 70 cm and 6 cm assembled together on the dish. I can now be QRV on both these bands all the time. During the contest I concentrated on 6 cm.

G3LTF: Peter's g3ltf@btinternet.com June report -- Before the AW on 10 June, I worked RW1AW (559/569) on 2320 with a good signal for initial #33. I was only able to be on 432 for 90 minutes on 11 June, but worked K5JL, OZ4MM, F2TU, F6KHM, K0RZ and KL6M. On the 12th I worked VK3UM, SP6JLW, SV1BTR, JA6AHB, DL0GER, S53RM, partial DK8VS, DJ7GK, OZ6OL, OK2BDQ, DL9KR, F3VS for initial #387, G3LQR, I5CTE, VE6TA and finally KL7HFQ. On DK8VS I found that I had used the wrong call (DK8HS). The correct call was originally copied, but it was not confirmed on reply... that's life in poor conditions! I hope to get the opportunity to make a full QSO with them in the future. I ran a sked with PE1ITR, but although I copied all from him, he didn't get my Rs. As reported by others, I found conditions were poor. The 2 dB extra loss didn't help, but the 90 degrees Faraday and polarity changes made it hard going. I suspect a lot of people were only on for the first day. I seem to recall that years ago we used to look at June/July as poor months for 432 EME... We were right!

G4RGK: Dave g4rgk@btinternet.com operated in the DUBUS Contest for a few hours in June on 432 – Condx were very difficult with severe libration and geomagnetically disturbed condx. I worked VK3UM, HB9Q, F6KHM, DL9KR, F2TU, SV1BTR, OZ4MM, K0RZ, SM2CEW and K5JL. Heard were SP6JLW, S53RM, KE2N and G3LQR. I had to QRT early to rescue a Hot Air Balloon that had come down in a nearby field.

GM0ONN: Iain iain.gm0onn@virgin.net writes enthusiastically about future activity on 1296 -- Good news from my end, I have been working in England some 540 miles from home for 17 months. I will be moving back to my home QTH as of the end of 26 Aug, so there should be lots of 23 cm operating coming up for me. I have a new 2.4m dish, 0.37 f/D, 230 W PA, 0.6 dB NF LNA and Septum feed all near ready. I will be QRV for the EME weekends starting in Sept onwards and certainly for the Contest in Oct/Nov. I will have assistance for the contest weekends this year, so expect many hours operating.

JH1KRC: Mike jh1krc@syd.odn.ne.jp reports on his attempted 6 cm EME during the June part of the EWW Contest – It was a tough work to build up my waveguide system and it took longer than expected. I started early in the morning, but it was not completed in time for the sked hour. I continued and finally my 30 m long flexible waveguide was connected to the rig inside the shack. I was surprised to copy someone calling CQ, a weak signal from my RX on 5760.124 at 1100. It was F2TU... It worked! JA4BLC was also listening and heard F2TU's sigs. Unfortunately I had no chance to hear CT1DMK. Immediately I connected the power line cables to my TWTA, and in 20 minutes I was ready to echo test. But the SWR was too high to transmit. I had no time to measure it before I turned on my TWTA. The problem was a broken flexible WG and 90-degree WG bend. They were damaged because of the heavy weight of the WG line. I need more short flexible WG to reduce the stress. My dish has a V-pol feed taken out of 7G commercial system. Any ideas/info on the availability of rotary waveguide joints? I plan to try again off the moon some day soon.

K1FO: Steve's steve@lunarlink.com report for the 432 part of the EWW Contest – I was only able to QRV for 3-1/2 hours on Saturday during the REF contest. I had 17 QSOs and heard a few more. A couple times during the European window I had 4 - 5 stations calling at once and had a hard time picking out calls, so I don't think everyone was QSO'd that I could have. I worked SP6JLW, SM3BYA, DL0GER, YO2IS, K5J, DL7UDA, SV1BTR, OK1CA, F6KHM, UT3DLL, ON4KNG, KL6M, RW3PX, VE6TA, JA6AHB and VK3UM. Heard were OZ6OL, JJ1NNJ? and DJ7GK. Signals were OK, but there was very little polarity definition and lots of libration fading. There was some pretty strong Aurora here on Sunday, which may explain the mediocre conditions and lack of polarity on 432 EME over the weekend.

K1JT: Joe joe@Princeton.EDU sent the following in response to DL3OCH's tests of the sensitivity of JT65C on 23 cm with DJ9YW and K2UYH -- 1. Nearly everyone learns to decode the JT65 shorthand messages RO, RRR, and 73 by eye from the Spectran display, and sometimes by ear, as well, usually before JT65 decodes them. This is quite normal, and is encouraged! 2. K2UYH decoded Bodo's signal in the average of his transmissions at 1304 and 1306 UTC, but not in either of those transmissions individually. This was done while DL3OCH was working DJ9YW -- so for K2UYH the messages were "third party traffic", which does not automatically benefit from the Deep Search decoder. If Al had entered DJ9YW as "My Call" on his Setup --> Options screen, each of those transmissions would probably have decoded immediately with no need for averaging. Perhaps I should have a "Masquerade as" box on the screen? 3. The EME Doppler shift from JN48 to K2UYH was changing by about 6.5 Hz per minute at the time of your tests. That number is consistent with the measured spectral widths W displayed by the program, which were around 6-9 Hz in most cases. (I assume that you were not doing anything to compensate for Doppler, e.g., tuning your receivers very slowly during each reception period.) Doppler shifts are not compensated internally in WSJT, except in echo mode. 4. The signals look somewhat stronger on Spectran than the levels reported on the JT65 screen. I believe that this is due to the Doppler broadening. The signal level reported by JT65, e.g., -27 dB, is based on the peak value of the measured spectrum of the sync tone: roughly speaking, on the height of the peak on the displayed red curve. In cases like these, the *area* under the red peak would be a better measure of the signal level. Perhaps I should change the code to reflect this. 5. Libration fading does not seem to have been very deep on this occasion: see green line in Al's screen dump at 13:10:35 UTC. Heinrich's signal at this time was *many* dB above the noise, and it seems to be quite steady. Is this unusual at 1296 MHz, or would you say it is the norm? [The norm] 6. W is a measure of the width of the spectral peak on the red curve. Somewhat arbitrarily, the width is taken to be the separation between points 5 dB down from the maximum, on either side of the peak. The reported value of W is meaningless if sync has not been achieved, and the value is very uncertain if the signal is weak enough that "5 dB down" is already in the noise. 7. Owing to the non-deterministic nature of the multi-tasking algorithms in Windows and the fact that WSJT is not multi-threaded, reported values of DT are not very reliable. I am working on ways to improve the timing accuracy, and an upcoming version of WSJT will address this weakness. In this respect you may see differences between the JT44 and JT65 modes, and even within the JT65 mode depending on whether you are simultaneously using Spectran. (On my own EME system, I generally see DT about 1 second larger when Spectran is in use.) Observing DT to change by ± 0.5 s (and occasionally even more) is, unfortunately, quite normal. 8. Many thanks to Bodo, for sending the wave files. The file with Heinrich's transmission at 1321 UTC is an excellent example of the power of JT65 shorthand codes. That signal would have been visible on Spectran or an equivalent program, but only barely so; and yet it decodes nicely to "73" at a signal level of -29 dB in 2500 Hz bandwidth. The three files from K2UYH also display the capabilities of JT65 very nicely. The file recorded at 1459 UTC decodes correctly to "RRR", although at -29 dB the signal would have been scarcely visible on Spectran. The files at 1447 and 1453 are decoded perfectly by the Deep Search algorithm at -28 and -27 dB, respectively. This is true ONLY if DL3OCH is entered as "My Call" when decoding is attempted. These transmissions are too weak (by 3 or 4 dB) to be decoded by the fully general Reed Solomon decoder, even after the two synchronized transmissions are averaged. 9. The program displays "*" or "#" just to the right of the W value, if it believes that proper sync has been achieved. There are two possible pseudo-random patterns for the sync tone: messages not including the "OOO" signal report are marked "*", and those including "OOO" are marked "#". I'm sorry to say that this information seems to be missing in the WSJT 4.7 User's Guide. 10. If you have checked "Decode --> JT65 --> Only EME calls", and K2UYH is not listed as being EME-active, the Deep Search decoder will still work as long as you have K2UYH and FN20 entered in the "To Radio" and "Grid" boxes. The only advantage in checking "Only EME calls" is that it will make the decoder

slightly faster and will reduce somewhat the number of false decodes. I notice from the screen shots that you were both running with the "Sked" box checked. In that case, only messages containing the call and grid entered on the main screen are tested for good match with the received signal. False decodes will then be extremely rare, and checking (or not checking) "EME calls only" will have no effect. I am delighted that we all now agree that JT65 is superior to JT44. If this is true at 1296 MHz, then it is also true at 432 MHz. Please help me to spread the word: your endorsements will be much more significant than any claims that I make! I think it is clear that at 1296 MHz, JT65C is the best mode to use. It is also clear that the program's sensitivity can be further improved by adding code to do remove changes in Doppler shift during each transmission. This should have the effect of reducing W, and it will reduce the demands on the AFC routine. [K1JT also reports that in the next major release he will include an option of display both mutual and local (echo) Doppler shifts].

K3MF: Wayde K3mf@aol.com sends some news on his progress – The new 8 x 25 FO yagis for 70 cm are now in the air. I just installed the elevation drive (homebrew jackscrew with 12 vdc motor). I have a 1/8 hp DC motor with gear reduction for AZ, which I will install next. I ordered a W2DRZ controller to use for the motors. I still have to make the phasing lines.

K5JL: Jay k5jl@direcway.com was a bit disappointed with 432 activity and conditions during the EWW Contest. He found on the first night only N9AB, K0RZ and K5JL from the lower 48, KL7HFQ and KL6M from Alaska, VK3UM and VK4AFL and JA6DZI and JA6AHB along with VE6TA were all that were active. Jay also reports much interference from Cell Phone towers and wonder if anyone has any solutions (cavity filters, etc) for this type of interference. (Note Jay has a new e-mail address).

K5SO: Joe k5so@direcway.com is now a regular on 23 cm from NM DM66xw with his 8.6 m dish, 225 W at his septum feed and 0.19 dB NF LNA – I continue to make initials; contacts #15 through #27 were with DJ9YW, IK2MMB, DL6YDH, NA4N, JH1KRC, VE9DW, LX1DB, RW1AW, SM6CKU, W2DRZ, VA7MM, OZ4MM and W7BBM respectively. My 1st month's totals on 1296 were 36 QSOs, 20 initials, 10 US states, and 7 countries. I'm very pleased with the support from the community that I have received and I sincerely thank everyone who assisted me in getting on the band. My station is working quite well at the present time and I certainly welcome any QSOs on 1296, new or repeats. I try to be on the moon frequently to enhance the probability of random QSOs, but will also be pleased to coordinate via email 23 cm skeds with anyone and anytime we have common moon. I have nearly completed construction of a pair of ring combiner/dividers (N6CA-type) to combine a second TH-328 cavity amp with the present one I'm using. Upon completion of the combiner/dividers I expect to then be able to achieve 800 W+ in the shack with a bit more than 400 W at the feedhorn (compared to my present 225 W). I hope to have the combiner and new cavity amp on line for the next AW. I am also investigating using a YD1336 PA

K6JEY: Doug's dougnhelen@moonlink.net writes on his station activity -- You haven't heard much from me in a month or two as I have been finishing up my PhD. I just passed the final defense. So I am Dr. Millar now and join a number of our fellow EME'ers who also have extra initials after their name. [Congratulations – I am amazed you were able to do anything else the last few months!] My degree is in educational technology. I expect that now I will have time to get back in the garage and finish the GS15 amp and get back on 23 cm EME. With some help from KJ6HZ, we fixed the storm damage on my 70 cm array and I was on for the 432 part of the DUBUS contest. I made only one contact with DL9KR. Saturday was full of radar the whole day. Sunday was "better" but conditions were still pretty grim and Jan wasn't as loud as usual. Hope to be more active now. BTW the OVRO big dish project is going smoothly. We hope to install the equipment by the end of July. Chuck, WA6EXV has been doing most of the work on the hardware. So we are still on for Sept.

K7XQ: Jeff k7xq@elite.net writes that he is making some good progress on his 70 and 23 cm EME stations -- On 432, the 4 x 9 WL yagis array with mast mount preamp is running with 50 watts at this time. I worked HB9Q for the first time on 432 a few weeks ago. I have a single GS35B amp being constructed on 432, so I will have about 1 kW soon. On 1296, I am building a 4.9 m dish. This is a upgrade from the 3 m dish I was running at the old QTH. The dish should be mounted to the hub this weekend. I hope to have the feed running some sun noise measurements by next weekend. I have a single GS15B for that band at about 400 W. I am looking forward to be back with the 1296 gang and also make some new contacts on 432. I only have 7 initials on 432 EME.

LX1DB: Willi WILLI.BAUER@airport.etat.lu writes in response to CT1DMK's comments on polarization — I suggest using both a CP and a Lin feed system as I do for 3 and 6 cm. It is possible to make a test. I can change my feeds with in 15 min. So it is possible to transmit for 10 min a carrier on lin pol and then 15 min later for 10 min on CP. All interested stations could then make their own measurements. 4 years ago I made this test with F2TU and the result was that the (circular?) signal was 2 dB less, but more clear in spectrum and sounded clearer on CW. The WX at my site during the test was clear sky with no clouds and no heavy winds.

OA4O: Dan, HB9CRQ dan@hb9q.ch reports that the OA4O station is becoming active again on 432 EME. They have an 8 m dish and initially will have only 100 W. Dan is coordinating skeds, which are expected to begin in Aug and on JT65C. Dan does say that may be able to operate some CW as well. Contact Dan about skeds, but that the CW ops are limited.

OK1CA: Franta ok1ca@ges.cz sends his 432 DUBUS Contest report -- I return on 70 cm after ten years for the June contest weekend. I install feed for 70 cm in 10 m dish with Cassegrain System. It is 9 el yagi with rotary polarization, but not optimally adjusted. I employed my old G17b PA with only around 250 W. I was ready on Saturday only a few hours before the start of the contest. I worked on 11 June VK3UM, HB9Q for initial #122, F6KHM #123, F2TU, K5JL #124, K1FO, OZ4MM #125, SV1BTR #126, KL6M #127 and K0RZ. I CWNR SP6JLW and I heard DL7UDA, DL0GER and DL9KR. I think condx were bad. I QSO'd most EU stations with vertical polarization and W stations with horizontal pol.

OK1KIR's dish with the 6 cm feed in pl ace

OK1KIR: Vlada vladimir.masek@volny.cz reports on his club's 6 cm contest activity and feeling on cirular polarization – During last weekend of the EWW Contest we were QRV on 5.7 GHz, but wasted much time due to equipment problems. On Saturday a WG switch mechanical drive broke. After repairs we completed with IK2RTI, F2TU and F1ANH, but heard nil from VK3FMD. On Sunday morning again nothing from VK3FMD. Later around noon we lost azimuth tracking and after no success in repairing the problem went QRT. Regarding polarization we absolutely agree with Luis. We started on 5.7 GHz and 10 GHz years ago with circular. On the new dish we had CP with a septum in WG on 5.7 and 10 GHz, but have changed to rotatable linear on 10 GHz. We are aware of the simplicity of linear feeds, especially as many are available as surplus for different MW bands. Because of there popularity on 3 cm, we found the only successful strategy was to use a rotatable linear feed! Of course, it's quite complicated in practical design and construction, but it really pays off! Unfortunately this experience is a bit limited due to never ending troubles with the digital tracking of the new dish. (We remember and will not forget the ease of tracking of the old dish's polar mount!) On 5.7 GHz we started operation last weekend with CP with a septum polarizer in rectangular WG followed by a smooth transition from rectangular to circular (tube) WG, which together with a simple choke forms the radiator. This feed was saved from the old 5.7 GHz equipment that was damaged by the floods in Aug 2002. We moved the choke closer to the aperture to narrow the beam for our 0.42 f/d. Three week ago we returned to 2.3 GHz with a septum polarizer in rectangular WG (the same as described by OK1DFC). We all agreed at the 10th EME Conference in Prague that circular on MW bands was to be the standard, but the reality seems a bit far from this resolution. My View is the principle barrier on 5.7 and 10 GHz is total lack of surplus options to adapt or modify. The solution is to find someone to manufacture and sell "cheap" CP feeds for these bands.

OK1TEH: Matej ok1teh@karneval.cz jo70fd is QRV on 70 cm EME. He has a single yagi and GI14b PA with 1 kW capability, but run at 500 W on CW and 300 W on JT because of a thermal considerations. During the DUBUS Contest he worked HB9Q on CW and N9AB on JT65B. He also copied VK3UM,

DL9KR and K5JL. He added on 17 June K2UYH on JT65B, –24 dB on screen and (519) on the speaker for initial #3.

OK1TEH's 70 cm 23 el 18 dBi yagi below his 2 m yagi

RW1AW: Alex rw1aw@skylink.spb.ru has modified his 13 cm rig and is now getting good results -– I now have 2 LNAs in line and 300 W to a VE4MA long feed. I hear my echoes at 10-12 dB (3.7 m dish and 0.4 dB LNA). I worked on 4 June on 2320 OK1KIR (559/459) for initial #7. On 70 cm I am using my 6 m dish with dual dipole rotary feed, 1 kW and 0.5 dB NF LNA. I was active in the EWW Contest and added 2 initials with G3LTF (569/559) and OZ4MM (539/449). On 23 cm I am up to initial #46 with a 6 m dish, W2IMU circular long feed, 160 W at the feed and 0,27 dB LNA.

SP7DCS: Chris sp7dcs@wp.plwas was active on 432 for the EWW Contest and writes – I wanted to try 70 cm EME for many years and I decided to build a small system to try this band. My goal was to be ready before EU EME contest. I completed the antenna, 4 x 25 el I0JXX yagis with open wire feed system, but still did not have a good RX and TX capability. Just before contest I managed to modify a very old preamp and to put it at the antenna. This preamp has very high NF and low gain, but it was better then nothing. I also used 20 years old RX and TX. I did not manage to make any QSOs as I had only 50 W in the shack. Anyway it was great fun to hear my first 70 cm EME signals. It even more satisfying to know I heard theses signals under bad conditions. I copied HB9Q, SV1BTR, OZ4MM, DL9KR, F6KHM, K1FO, VK3UM, K0RZ, K5JL and F2TU?. My activity is only on random CW. I do hope to have better RX and more power in the future and to make my first QSO soon.

SP7DCS's 4 x 25 el I0JXX yagis with open wire feed system

SM2CEW: Peter sm2cew@telia.com was active during the EWW Contest on 70 cm in June and worked about 15 stations during the weekend. The only new one was F3VS. Peter also reports a shortwave listener on 23 cm, RX3QFM, who will hopefully get on 23 cm EME soon.

SV1AWE: Bob bkou@cpi.gr continues to improve his 432 EME system. By the time you read this he expects to have a new GS-23 1 kW PA from LZ2US on the air. During the DUBUS Contest he copied HB9Q (difficult), F6KHM (solid beacon on the moon for 3 hours) and SV1BTR (difficult). The conditions seemed tough for his small station.

SV1BTR: Jimmy jimmyv@hol.gr has completed WAC on 70 cm – I'm very happy to report that I completed WAC on 432 on 20 May with LU7DZ (429/539). I was missing Latin America, only, since 1999! On 21 May I easily worked PY5ZBU (O/O) for my 2nd SA QSO. With both, we had a couple of unsuccessful skeds before due to a frequency shift of 1.5 kHz. The weekend before I also worked K2UYH (559/559) with a FB signal at my moonset and despite the QRN. My array of 8 x 26 el 8.5 wl yagis seems to be working well. I am getting 13 db of sunnoise and am hearing at least equally well as my previous 8 x 39 el 13 wl array. My EME QTH in KM18no is at my weekend house, 2 hrs drive from Athens. I go there once per month, if not on travel for QRL. I run only CW and am always interested in skeds. My power is 1.5 kW at the feed and full elevation. During the DUBUS Contest on 11/12 June, I must say that 2 sides of the coin were evident: 1. The bad news was the most terrible conditions I have ever experienced in a contest, having a fixed linear polarity. Thank God there are stations with dishes and arrays with polarity rotation. No echoes at all for 1.5 day! Signals were very weak except on Sunday afternoon/night; however at the time, libration fading was terrible chopping up severely whatever was audible. Activity was scarce in my opinion, as I worked only 25 more stations in total. 2. The good news was the pleasure to work for the first time ever a single very short yagi station (WA6PY). I was also very happy to work JA9BOH who has 4 very short yagis. I had 8 initials for a total of almost a 100. My result were 30 stations, 34 QSOs, all on CW random. I will quote here a highly respected EME pioneer, fellow station and friend, VK3UM, as what he wrote earlier is also true and totally applicable by myself in all contests: 'Zilch assistance in any shape or form... a ticket holding member of the elite Dinosaur Club and proud of it! QSO'd were VK3UM (569/559), HB9Q (569/549), KL6M (559/559), VK3UM (549/569) dup, F6KHM (569/569), OZ4MM (559/559), OZ6OL (O/O), F2TU (559/559), JA6AHB (559/559), DL9KR (569/569), G4RGK (O/O), KE2N (439/559), VE6TA (O/O), SM3BYA (O/O), K5JL (559/549), K1FO (559/569), W7AMI (O/O), OK1CA (429/549), K0RZ (539/569), WA6PY (O/O), S53RM (O/O), K5JL (569/559), K5GW (569/569), DL0GER (O/O), VK4AFL (539/549), JA9BOH (O/O), G3LTF (539/559), SP6JLW (O/O), YO4FRJ (O/O), EA3DXU (O/O), ON4KNG (O/O), OZ4MM (569/569), K5JL (569/559) and SM2CEW (569/559). I lost 5-6 hours each day as I was doing garden work on the side and needed some sleep. I missed at least 10 stations and hope to meet them in the next one.

SV1BTR 8 x 39 el 13 wl yagi array used to complete WAC

VE6TA: Grant ve6ta@telusplanet.net sends his 70 cm contest results – Not much success to report on this last leg of the EU contest. I found poor conditions with lots of polarity smearing and the distraction of the ARRL June VHF Contest created lots of problems. I had expected there would be more NA stations on exchanging grid squares, but this was not the case. I did not even hear my own echoes until the last 3 hours of the contest. However I managed to work 13 stations and heard a few stations that I need to schedule, so all is not lost. The following stations were worked: JA6AHB, K5JL, K0RZ, VK3UM, KL6M, DL9KR, F6KHM, OZ4MM, SV1BTR, HB9Q, K1FO, SM2CEW and G3LTF. I also heard DL7APV, DL7UDA, EA3DXU, F2TU and S52CW. An SP station called me a few times, but could not get the full call due to the libration.

VK3UM: Doug tikaluna@ycs.com.au DUBUS Contest report – Conditions on 432 were poor to terrible at this location, the worst for years. From my Moon rise at 0120 on 11 June to about 0230 fairly normal but significantly defined (mostly aligned) Faraday was observed. I suspect a solar disturbance at about 0230 as libration became significant to extreme all through to my moonset at 1033. Deep short term fading was also predominate, making copy very difficult. Sun noise measured at 0315 indicated very high activity and from my calculations relate to an SFU of about 140. On Sunday, 12 June at my moonrise at 0140 libration was still significant and again Faraday seemed still very narrow, but nearly aligned. Fading was minimal, but alignment was such as to make things difficult. I was transmitting and receiving vertical with one exception K0RZ. (Normally I TX V and RX H into NA). Conditions had improved significantly at moonrise into Eur at about 0830. Libration had disappeared and signals were good. Unfortunately it did not last and from about 1010 polarity again began to swing and libration and deep short term fading returned with a vengeance. It was extremely hard going. Sun noise measured at 0330 on Sunday was back to normal at about an SFU of 80. Participation was not great from NA, but good from Eur. There was plenty of stations to keep me very busy. The "gentlemen" operating times for us all were great for a change! Here are some observations that maybe of interest. Sun Noise on Saturday showed a 2.5 dB advantage in vertical polarization over horizontal as did the ground noise in this polarity over what I measure as normal. Sunday's measurements returned to normal figures. The apparent very narrow polarization also provided some interesting and most detrimental effects. When Steve K1FO called me at 0159 Sunday, I could not believe it was him at first and though he was a little tardy in rotating the array. Not so, signals were "only" (559) so even the most experienced polarization alignment expert did not have it right. I also spent some time trying to decipher a very weak signal that turned out to be Trevor, VK4AFL whose alignment at the time must have been close to a null for me. HB9Q was also "weak" at (559) and was only being received horizontal… Were they TXing on linear pol? There were amongst all these degraded signals some outstanding and totally devoid of fading and libration (at the time I was listening). These included from memory K5JL, DL9KR, D7APV and F2TU. It was the hardest weekend I have participated in that I can recall. The Sun activity appeared to screw things up big time and for hours and hours on end. It must have tried everyone's patience to the extreme. It proved however to be most rewarding, though as one had to pull every trick in the book to decipher the extremely librated signals. I witnessed time and again the skill and patience from our fellow operators. I could not help thinking how much computer power (without any outside assistance) would be required to do what we humans were employing at the time. I felt I was using more ESP than DSP! It also appeared that the effect was not always reciprocal as I spent many Y's trying to decipher who was calling at times. One QSO took over half an hour! It was apparent that the other station was copying fine at the time when I was suffering from severe libration. After it was all over I listened on 20 m for a while to de "detox" and assure myself what non librated CW still sounded like! How easy is it there! The following is an abbreviated list of stations were worked: On 11 June K5JL, VK4AFL, JA6AHB, KL6M, VE6TA, K0RZ, N9AB, OZ6OL, SM3BYA, SM3AKW, SP6JLW, SV1BTR, RW3RW, DR3RU, OZ4MM, HB9Q, DL9KR, OK1CA, DL0GER, F6KHM, G4YTL, G4RGK, DK3WG, JJ1NNJ, and on 12 June K1FO, JA6DZI, JA9BOH, KL7HFQ, DL7APV, SM2ILF, SM4IVE, RW3PX, F2TU, OK2BDQ, DL7UDA, EA3DXU, G3LQR, DJ6MB, I5CTE, S53RM, S53J, G3LTF, S54T and SM5IOT for a claimed total of 44 stations and 23 multipliers and 101,200 points. My total operating time was 6.5 hours. All QSOs were totally on random with zilch assistance in any shape or form... a ticket holding member of the elite Dinosaur Club and proud of it!

W5LUA: Al al_ward@agilent.com report for 13 cm part of the DUBUS Contest –- I QSO'd on 14 May at 0302 JA8IAD (559/459) 2304/2424, 0324 JA6CZD (569/559) 2304/2424, 0401 WA6PY (559/559), 0410 VE6TA (O/O), 1750 HB9SV (559/559), 1800 ZS6AXT (549/569), 1811 OE9ERC (579/569), 1824 SK0UX (579/569), 1836 F2TU (579/579), 1846 IK2RTI (549/559), 1926 K2UYH (559/569), 1934 OH2DG (569/449), 1944 SM3AKW (559/569), 1954 LX1DB (569/569), 2009 WA9FWD (549/549), 2042 OZ4MM (559/559) and 2109 G3LTF (449/549) 2304/2320, and 15 May 0330 JA8ERE (O/O), 0403 JA4BLC (569/559) 2304/2424, 1905 ES5PC ((559/559), 1922 G3LQR ((559/559) 2304/2320 and 2015 OK1KIR (559/559) 2304/2320 for a total 22 x 17 or 37,400 points. After the contest I added RW1AW. My station is 300 W at PA, 0.5 dB loss to feed and 5 m dish with about 38 dBi gain. [Al was also active on 6 cm in June].

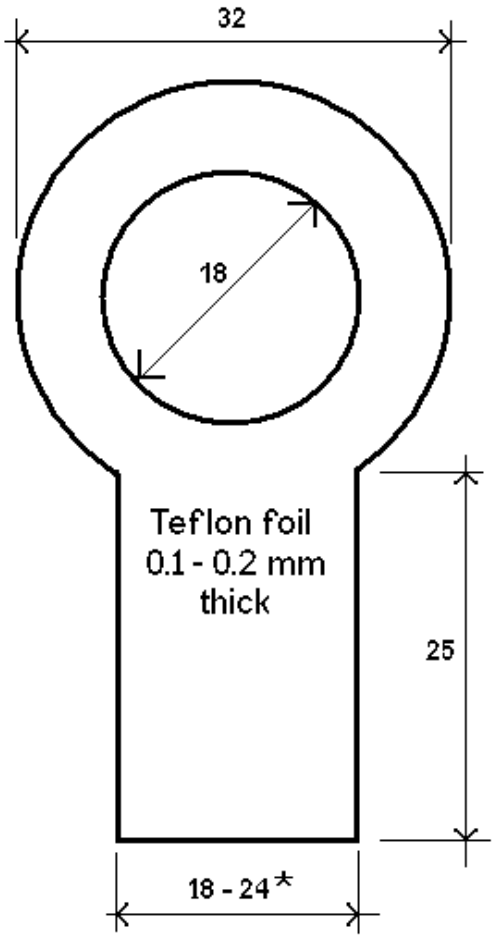
K2UYH: I a.katz@ieee.org was disappointed to have to miss the the 70 cm part of the EWW contest, but had to be in CA on business. I asked Marc, if he might be interested in operating my station as he is presently only QRV on 23 cm, but Marc (now Dr. Franco) had completed his PhD and was graduating the contest weekend. Before the contest I ran some interesting JT tests with DL3OCH on 4 June. I listened in at 1300 on .080 on Bodo's tests with DJ9YW. Heinrich of course had a rock solid signal on JT65C. At 1400 I worked DL3OCH on JT44 and JT65C. From these tests I am now convinced that JT65C is superior to JT44 on 1296. The best mode, however, is Spectran - hi! Signals were clearly visible on Spectran and I could tell when reports were sent (OR, R, 73) before they were decoded by JT65C. Bodo's JT44 signals were very marginal. As in past contacts, it took many periods of averaging to get the calls correct. On JT65C they decoded almost immediately. Later at 1500 I ran on 70 cm with SV1AWE, but copied nil. Earlier I was also on 432 with OK1TEH, but it turned out Matej missed the sked, but we did work on 17 June at 2300 (O/O - 27 dB) on JT65B for my initial #693*.

NETNEWS BY G4RGK (Based on K1RQG's Netnotes): WA6PY was QRV on 70 cm for the EWW contest with single DJ9BV yagi for eastern horizon. And made a number of QSOs. **KL6M** reports working 30 station the first day of the 432 part of the EWW Contest. **K0RZ** found conditions very poor on 70 cm until last few hours of the EWW Contest. Bill ended with a score of 22x18. **VE3KRP** is making some progress on 1296 EME station. He has been working on the dish drive. **WA9FWD** is considering using his 12' dish on 70 cm and has been working with motors and speed control for the dish. He needs only Utah to complete WAS on 70 cm. **RX3QFM** is now able to listen on 23cm and will hopefully get on 1296 EME soon. **W9IIX** is still working on a GS-15B amp. **HB9Q** worked 58 x 27 in the DUBUS Contest on 70 cm. **SM2ILF** is QRV 432 on CW and JT65 and was active in the June. **VE4MA** had another 47 GHz QSO with W6YX in June and is now on to 80 GHz EME! **DL1YMK** will be back on 23 cm later in the year with a solid state system using a 4 m dish with septum feed and 500 W using MOS devices. The system will also be a portable with autotrack. Mike hope to be QRV by Aug. **DK3WG** was active in June on 70 for the EWW Contest. Jurgen found activity light and QSO'd only 8 stations.

FOR SALE: **W9ZIH** has available an 8 x 7289 23 cm amp for sale. Contact Ron at 815–825 -2526 for more information. **WA1JOF** wa1jof@megalink.net is looking for 32 mfd @ 5KV oil filled filter capacitor. **VE3KRP** eddie@tbaytel.net is looking for an older spectrum analyzer (e.g. HP141T with plugins up to 12 GHz). He is also still searching for a Bird slug to measure high power on 23 cm - at least 500 W. **W4RDI** w4rdi@amsat.org has Parabolic 1296/144 and 144/28 transverters for sale.

TECHNICAL: Neutralization of GI-7b/GI-7bT 23cm Amplifiers by OK1VPZ - It is well known that 23cm PAs using Russian GI7b/GI7bt tubes suffer from thermal drift and can oscillate under certain conditions. The majority of amateur radio designs using these tubes are based on 3/4 lambda cavities, the famous CT1DMK design being the prime example. These amplifiers commonly exhibit thermal instability and low efficiency. Instability may also cause the PA to oscillate or, at minimum, create bad intermodulation distortion on the output. This creates splatter, which is especially problematic during contests, particularly if many stations are active. The GI7b/GI7bt tube is not the best tube for linear amplification on the 1296MHz band, but because these tubes are relatively cheap and accessible, many of us tried to use them. Based on the characteristics of the tube, one should not expect PA output power higher than 200 – 250 W for ordinary operation, with efficiency no higher than 35%, even with very well made and silver-plated cavity. Thermal instability is a constant problem. Where is source of instability? One part of it is well described by KD5FZX here. The second part, which is the primary cause at lower output levels, is due to the positive feedback inside tube from parasitic energy transfer between anode and cathode. This feedback can increase gain of amplifier and lower attenuation of input reflections of the amplifier. The result is that input matching varies with anode cavity tuning. When anode cavity is detuned by thermal drift, feedback to the cathode decreases and rapidly lowers amplifier gain. This results in much lower output power even if input power is stable. How to test your amplifier: • Test your amplifier for highest gain with low output level (aprox. 1 W). Amplifier should have adjusted ordinary BIAS and HV. What is the maximum gain when you tune up? If higher than 13 dB, something is probably wrong. • Test your amplifier for input SWR with very low input (less than 1W). Adjust cathode circuit capacitors for best SWR (you will probably need to use a good directional coupler and spectrum analyzer for accurate measurement). Is input SWR better, than 20dB? If not, try tune anode cavity out of frequency - for example 20 MHz down or up. How high influence it has to the input SWR? If the input SWR changes from previous level by more than a few dB, or input reflections are worse than 18 - 20 dB, something is wrong. • Switch off HV but leave filament voltage applied. Connect tracking generator of spectrum analyzer to the output of amplifier and input of analyzer to the input of amplifier. What is the feedback attenuation? For an unneutralized tube, it is usually around 13 to 16dB maximum (with adjustment of anode tuning to maximum). As you can see, it is usually just few dB more than forward gain of amplifier… and the feedback creates many of the troubles described above. Now you should to try neutralize your amplifier: • Neutralization is accomplished by increasing inductance between the grid of the tube and ground. It creates a resonant circuit with Cag & Cgc, which couples anode voltage to the cathode shifted in phase; it is 180 degrees out of phase with parasitic transfer of

energy through Cac. This phase shifted transfer reduces positive feedback to the point where oscillation no longer occurs. • Theoretically it is simple - because of small variations in construction of different cavities, however, there are differences in inductance and capacitance, which can complicate the neutralization process. With this in mind, VE4MA developed a reliable method, which is shown here. It causes a small increase of grid holder inductance by isolating part of the grid ring from the grid contacts. I have tested many tubes in different cavity arrangements and can recommend the solution below which is illustrated in the pictures. • Put a Teflon (or paper for test purposes only) strip as shown, width approx. 24 mm, on the tube, install the tube in the cavity and measure feedback t ransfer as described in point four above. Feedback should be 13 to 16 dB or a bit better (more dB). If not, pull out the tube and change width of strip to 22 mm and repeat. For different tubes and grid holders is usually possible find proper strip width to increase feedback attenuation to at least 26 dB. • Next, rotate the tube in steps of 15 degrees or so. Remember to be careful of the HV on the anode! Because grid inside the tube is not absolutely symmetric, you will probably be able find a feedback min imum - at least 30 dB. Make this position of tube and Teflon strip permanent. • Connect a load to the output and switch the amplifier on. Test the input SWR. Although anode cavity tuning will still have an influence on the input SWR, attenuation of reflection on the input should be now at least 18 – 20 dB for any adjustment of anode cavity tuning. Do not readjust cathode from setting achieved above. • Test gain of amplifier with low output now - maximum gain, after peaking output with anode cavity tuning and loading, should be between 10 and 12 dB. Results: • Your amplifier will have a bit lower gain than before, but will be much more stable. You will need to use higher driving power. • Because of much lower feedback, you will be able probably setup lower loading of anode cavity and by this way obtain a bit better efficiency without danger of oscillations. DO NOT FORGET to be careful with HV on the anode!!



GI7b tube neutralization strip (used in 23cm amplifiers)

FINAL: Joe, K1RQG is getting an increasing amount of bouncing emails on his Net Note e-mail distribution list. Some are due to full mailboxes and some are due to SPAM filters. He asks everyone to please check their filter rules and amend them to allow the net notes through. Anyone who is not receiving the net notes and is on the list please email to k1rqg@aol.com and let him know.

HB9CRQ reports that he has completed revising his Top List to distinguish between entries that are just CW and those including JT mode QSOs. It is now possible to enter two standings one with JT and one without JT. Dan asks that you go to the EME INITIAL LIST page at www.hb9q.ch http://www.hb9q.ch/ to up-date your standings.

The Pack Rats (W3CCX - Mt Airy VHF Radio Club) will be again sponsoring the Mid-Atlantic States VHF Conference, Inc. on Saturday 24 Sept and Hamarama flemarket the following Sunday. There will be plenty of EME related talks. If you are in the area this is a conference you don't want to miss. See http://members.ij.net/packrats/Hamarama/Hama_05.html for details.

Tnx to Vladimir, OK1VPZ for the technical material and to Joe, K1JT for his comments relating to the use of JT65 on 23 cm. We need more technical material. Please keep it and the reports coming. I hope there will be a good showing for the July AW (activity weekend) on the 2nd/3rd. I hope to find you all on the moon. 73, Al – K2UYH

24 Aug	25 Aug Cont'd
Time 1296.050	1296.050
0400z C31TLT-OE9ERC JT65	0800z C31TLT-K2UYH
0500z C31TLT-OE9ERC	0830z C31TLT-W5LUA JT65C
0600z C31TLT-CQJT65C	0900z C31TLT-K5SO
0700z C31TLT-CQCW	26 Aug
0800z C31TLT-CQJT65C	0530z C31TLT-VE1ALQ
2300z C31TLT-CQCW	

25 Aug

0000z C31TLT-CQJT65C
0330z C31TLT-SM2CEW
0400z C31TLT-OZ4MM
0430z C31TLT-HB9Q
0500z C31TLT-DJ9YW JT65C
0600z C31TLT-K5JL
0700z C31TLT-K2UYH JT65C