



N.E.W.S. LETTER



The Publication of the North East Weak Signal Group

MAR 2003

VOLUME ELEVEN

ISSUE TWO

President: W1GHZ Paul Wade
V P: WA1MBA, Thomas Williams

CURRENT OFFICERS

Secretary: N1GJ George Jones
Treasurer: N1DPM Fred Stefanik

NEXT MEETING

**OUR NEXT MEETING WILL BE ON SATURDAY, MARCH 15TH, 2003 AT THE
RADISSON HOTEL IN ENFIELD.**

**THE SPEAKER WILL BE STEVE SIMONS, KF6AJ, TALKING ON THE "USES OF
NON-RADIATING RF & MICROWAVE POWER"**

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THE NORTH EAST WEAK SIGNAL GROUP
2 METER VHF AND ABOVE NET
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FROM THE PRESIDENT

Meeting

Our next meeting will be on Saturday, March 15th, 2003 at the Radisson Hotel in Enfield. I hope the weather will be better than January - only three hardy souls made it, and it was my fault that they didn't stay safely at home. I've promised to buy them lunch. Steve, KF6AJ, was the planned speaker for January, and we hope that he can make it in March instead, to talk about high-power amplifiers. There will also be a duct tape auction - a chance for you to pass along those items that seemed like such a great deal at the flea market.

Election

March

We will elect officers for 2003 at the meeting. I've been President for more than two years, and am ready to retire. I've tried to get the NEWSletter out on time (not always successfully), write something for each issue, and have a program for each meeting. We also hosted a very successful Microwave Update, thanks to the efforts of many of you. A few folks have suggested on occasion that they would do things differently if they were President...

Now it is time for someone to step forward. Suggestions or volunteers? Please contact the nominating committee: WA1MBA, KB1VC, and W1GHZ.

January VHF Sweepstakes

The January VHF contest went pretty well for me, though I managed to completely miss the only 6 meter opening Sunday afternoon. Even though we had no rain or snow for 10 GHz scatter, I had fun. The only TVI problem was a neighbor calling to make sure it was me and not terrorists - she wanted to be able to listen in, and I wasn't loud enough.

Your entry is needed to help the club score. Even if it's not a huge total, the number of entries counts as well. Send your score in and put "North East Weak Signal Group" on the club line - no abbreviations, they are apparently very fussy.

73

W1GHZ

SECRETARY'S REPORT OF THE NEWS BOARD/ REGULAR MEETING OF 4 JANUARY 2003.

Because of the snow storm covering the Northeast, the 4 January 2003 Board/ Regular meeting of the NEWS Group was cancelled. Next regular meeting is scheduled for Saturday, 15 March, 2003, at the Radisson Hotel in Enfield, CT. The club will continue to be run by the current slate of officers until a new election can be held at the March meeting.

29TH ANNUAL EASTERN VHF/UHF CONFERENCE AUGUST 22, 23, & 24, 2003

Well, its time to mark your calendars and set aside the week-end of August 22, 23 & 24, 2003 for this years annual conference. After last years Joint Conference event in October. 2002 with Microwave Update we're back to our normal venue with hopefully some new and exciting events to be added. The conference will be held once again at the Radisson Hotel in Enfield, CT. A block of hotel rooms is reserved under the NEWS group and available for making reservations. Volunteers are needed to help with Registration and mailings, Prizes, Lab Sessions, Antenna Range, Bandsessions, Moderators, Fleas Market, etc. Please remember those who helped make your attendance at last years event memorable and please volunteer to help this year. Speakers and conference proceeding papers are being solicited and we're open to new suggestions and recommendations. Please contact me at bdwood@erols.com or (631) 293-9600 (w) or (631) 265-1015 (h). More to follow as it develops.

Bruce Wood - N2LIV - Conference Chairperson

ON THE MOVE AGAIN BY BRUCE N2LIV

The August thru October months are ones which are jamed packed with Amateur Radio Activities: UHF Contest - 10 GHz Contest Aug. - Perseides M.S. - Eastern VHF Conference - Boxboro Conference (alt. years) - Sept. VHF Contest - 10 GHz Contest Sept. - Microwave Update - Packrats Conf/flea market. WOW!!! so little time for family activities and I am sure I missed some events. There has been some discussions relative to moving the Eastern VHF Conference dates for 2004 and foward to another time period in order to help facilitate ease of attendance by all. The late April-May and July time frames have been identified as two possible choices. Years ago, in the early 90's, we met in May and this required coordination with the Hosstraders and Dayton events. July seems to be an open period except for possibly Central States. Please consider these two time periods and bring your suggestions to the March 15, 2003 NEWS Group meeting for discussions. Also comments may be emailed to me at bdwood@erols.com. We need to reserve the hotel for 2004 shortly - our BIG 30th year event. Didn't we just celebrate 25 years?

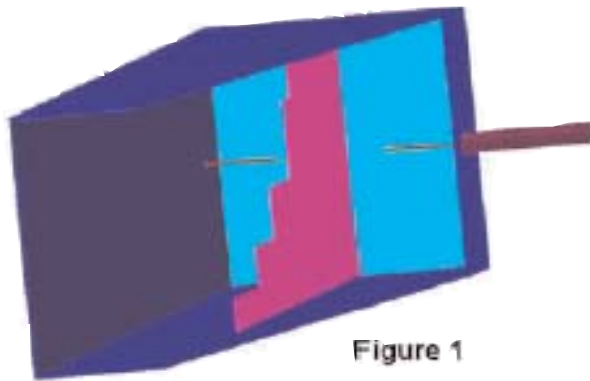
YOUR ATTENDANCE TO OUR MEET- INGS IS NEEDED FOR THE ARRL CLUB COMPETITION

ANALYSIS OF THE OK1DFC SEPTUM FEED **PAUL WADE, W1GHZ ©2003**

The septum feed was described by Zdenek, OK1DFC, at the 10th International EME Conference 2002 in Prague. On-the-air results were promising, but, like any new antenna, there were questions as to how well it really works. Computer simulations suggest that this feed should work well, and also suggest some variations to allow use over a range of dish f/D. The septum polarizer may also be used to generate circular polarization in other feedhorns.

Description

The septum feed as described by OK1DFC is an unflared square horn, or simply a square waveguide, with an internal stepped septum to generate circular polarization. Figure 1 is a

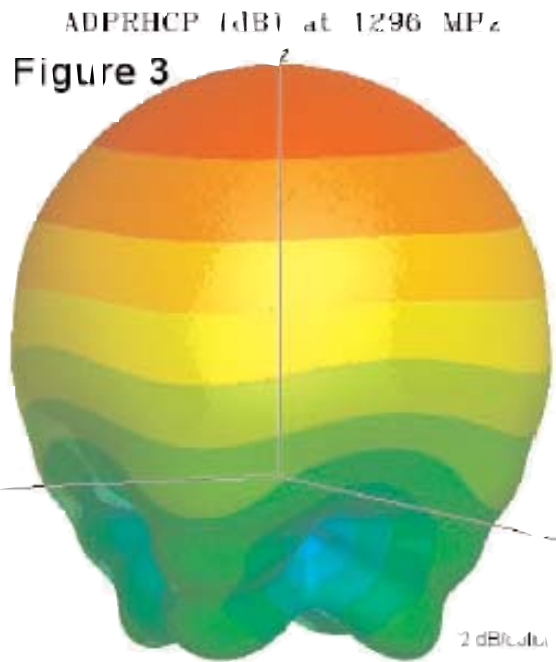


cartoon of a septum feed with one wall cut away. The horn is excited by inputs on either side of the septum, with the two sides exciting opposite senses of circular polarization. For EME, this provides separate transmit and receive ports of opposite polarization. The excitation may come from two rectangular waveguides, each matching the dimensions of one-half of the square horn, or from a perpendicular probe on each side of the septum acting as an integral transition from coax to the waveguide. The two methods should provide identical results provided that the waveguide section before the septum is long enough to suppress any spurious modes.

The radiating element, at the aperture, is simply a square horn. Rotated 45 degrees, it is identical to a diagonal horn²; if the diagonal horn is excited with circular polarization, then the radiated pattern should be identical. N7ART has shown³ the diagonal horn to be a good feed, so we might expect the septum feed to be also. The version described by N7ART used phased crossed dipoles to generate circular polarization. The septum could be a better way to generate circular polarization.

The septum is a bit more complicated. A circularly polarized wave entering the aperture may be considered to have two

polarization components with a 90° phase difference, one parallel to the septum and one perpendicular. The parallel component is divided equally by the septum and passes to the two rectangular input waveguides. The cutoff frequency for the perpendicular component is changed by the septum, so that the wavelength for the perpendicular component is shorter. Thus, the electrical length of the septum is longer for the perpendicular component than for the parallel component; if the difference in length is $\frac{1}{4}\lambda$, or 90° , then the horizontal and vertical components arrive in phase at the input. The components add together on one side and cancel on the other, depending on the sense of circular polarization, so that the two ports are isolated from each other. In order to achieve the difference in electrical lengths in a reasonable physical distance, the septum polarizer operates near the cutoff wavelength of the waveguides.



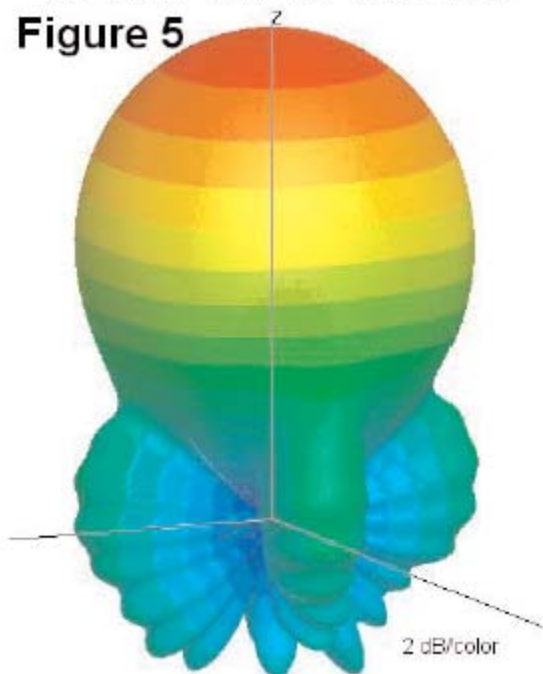
Simulations

A septum feed for 1296 MHz with dimensions specified by OK1DFC was simulated using Ansoft HFSS software⁴. The calculated radiation patterns in Figure 2 show the broad illumination expected of a small horn. Like other open waveguide feeds, the rear lobes are relatively large, only about 12 dB down, reducing the calculated efficiency to about 68% with best f/D around 0.35 to 0.4. Patterns for right and left hand circular polarization are pretty much identical. Patterns were calculated for both probe excitation and rectangular waveguide excitation; they were very similar, so the distance from the probe to the septum is adequate.

The circularly polarized pattern of the septum feed, shown in 3D in Figure 3, shows sidelobes on the four corners like the diagonal horn, generated as the polarization vector passes

through horizontal and vertical polarization in the square horn. The sidelobes on the corners reduce the calculated efficiency by perhaps four percentage points compared to a calculation using only the traditional horizontal and vertical pattern cuts. The circular polarization is quite good, with cross polarization about 21 dB down, and the pattern circularity is good. Isolation between the two ports is about 24 dB at 1296 MHz, with reasonable bandwidth, showing good isolation from at least 1.2 to 1.4 GHz. Note that reflection from the parabolic reflector reverses the circular polarization, so that the reflection coming back into the horn will reduce the isolation.

ADPRHCP (dB) at 1296 MHz
Figure 5



While the calculated efficiency of this feed is not as high as some, the better ones have a larger blockage shadow, so the septum feed may be the best performer on a small dish where circular polarization is required.

Other f/D dishes

The diagonal horn may be tailored to illuminate a various f/D by varying the dimensions of the diagonal section, or by adding a flared section for larger f/D. Since the operation of the septum in generating circular polarization depends on the guide dimensions being close to the cutoff wavelength, the square cross-section is fixed at 0.63λ for a given operating frequency. However, a flare section may be added to increase the aperture size to optimize the horn for any larger f/D, so that the septum feed may be used for any dish with f/D > 0.3. The flare section is similar to a rectangular waveguide horn, except that it should maintain a square cross-section with a gentle taper to prevent excitation of unwanted modes. I first tried adding a flare section with an aperture 1.4λ square and a flare angle of 30° (15° halfangle on each side of the septum), since this size diagonal horn with linear polar-

ization is a good feed for an offset dish with an equivalent f/D around 0.7. With the septum feed generating circular polarization, the calculated efficiency in Figure 4 is high with best f/D is around 0.7 to 0.85, suitable for many offset dishes. This horn also had high rear sidelobes on the corners, so that the 3D pattern in Figure 5 looks like a rocket with fins. An intermediate size flare, with an aperture 1.1λ square, produces the radiation patterns with high calculated efficiency at intermediate f/D, best around 0.5 to 0.6, and less pronounced corner lobes.

Both flared septum horns show good isolation and cross-polarization. Since horn beamwidth is inversely related to aperture size, we can choose an appropriate aperture for the flare for any f/D by interpolating between the results for the three sizes above, 0.63λ square, 1.1λ square, and 1.4λ square. For smaller apertures, the flare angle should be small so that the flare length is reasonably long.

Summary

The septum feeds are impressive as a feedhorn with good circular polarization performance with no adjustments and no phasing losses. The simple square cross-section described by OK1DFC is ideal for low blockage on small deep dishes, while a choke may be added for better performance on larger dishes. A flare section to increase the aperture will better illuminate shallow and offset dishes. The septum polarizer can also be used in cylindrical horns like the VE4MA feed. More information is available on the OK1DFC (www.qsl.net/ok1dfc) and W1GHZ (www.w1ghz.org) web pages.

References

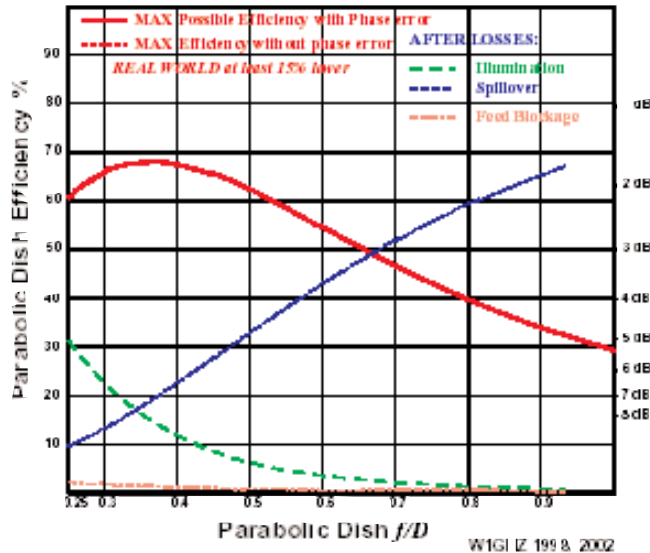
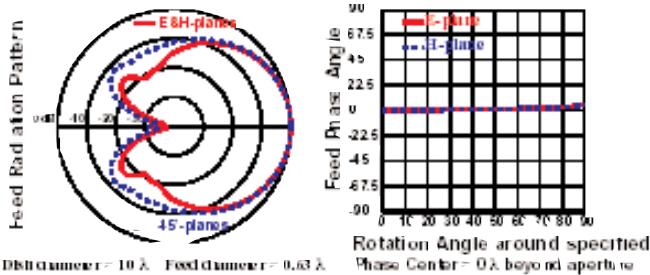
1. Zdenek Samek, OK1DFC, "Feed for Parabolic Dish with Circular Polarization," 10th International EME Conference 2002, Prague, 2002. www.qsl.net/ok1dfc
2. A.W. Love, "The Diagonal Horn Antenna," Microwave Journal, March 1962, pp. 117-122. (reprinted in A.W. Love, Electromagnetic Horn Antennas, IEEE, 1976, pp. 189-194.)
3. R. Miller, N7ART, "A 23cm Diagonal Waveguide Feed," DUBUS, 2/1997, pp. 5-14.
4. www.ansoft.com

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OK 10FC Septum feed for 1296, 0.63λ square, RHCP

Figure 2



NEXT MEETING
DE WA1MBA

Hope to see you all at the March 15th meeting. I've been told that there is a great talk planned, we will be electing your new officers (sorry that our January meeting didn't happen because of the bad storm), and there will be A DUCT TAPE AUCTION. If you haven't been to one, just bring along something that someone might want, and duct tape it to some other thing that you want to get rid of. It's great fun.

Don't forget to renew your membership. Dues will gladly be accepted. As usual we will have our Board of Directors meeting at 11:30, break for lunch at 12 and start the general meeting at 1 PM. All who want to attend are always invited to the board meeting (no secrets).

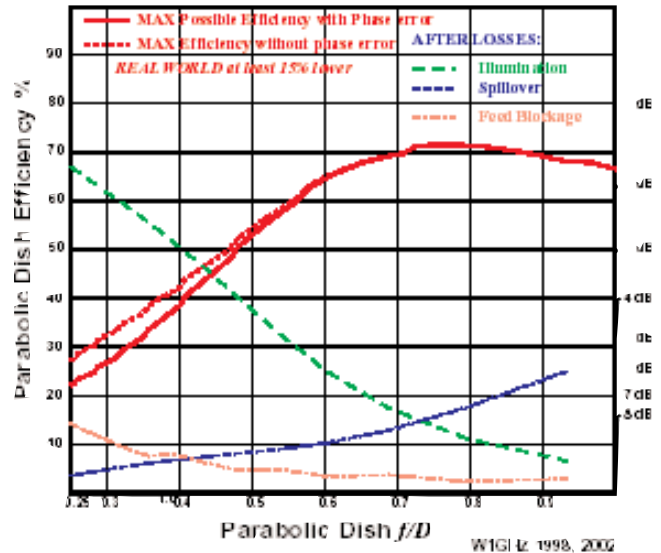
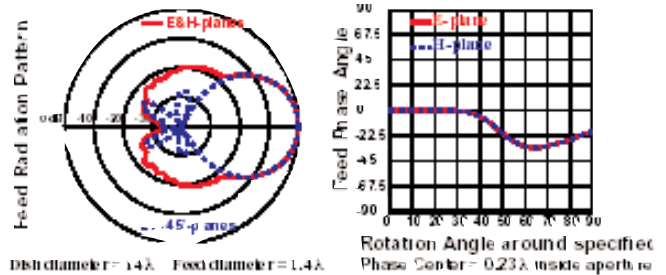
We have to review our meeting schedule for the year. We already have a talk lined up for the May meeting. In the past we have had our cookout in July, so we should start plans for that now. Boy, I hardly recall July - look at all this snow, and zero temperatures!

See you at the meeting!

Tom Williams

OK 10FC Septum feed with flare to 4λ square at 296, RHCP

Figure 4



2003 SPRING SPRINTS

144 MHz Sprint

Friday, April 4, 2003 7 PM until 11 PM local time.

222 MHz Sprint

Saturday, April 12, 2003 7 PM until 11 PM local time

432 MHz Sprint

Saturday, April 19, 2003 7 PM until 11 PM local time.

Microwave (902+)

Saturday, May 3, 2003 6 AM until 1 PM local time.

50 MHz Sprint

Saturday & Sunday, May 10 & 11, 2003 2300Z Saturday until 0300Z Sunday

For more information <http://www.etcxa.org/vhf.htm>

Hope to work you!

Del, K1UHF

THE NORTH EAST WEAK SIGNAL GROUP'S JANUARY VHF SWEEPSTAKES TOTALS

Call	Grid	NEWS	Class	Total	6m	2m	222	432	903	1.2G	2.3G	3.4G	5.7G	10G	24G	47G	75G	120G	145G	240G	GLAS	
K3EAR	FM19	N	U	880304	549/97	529/61	178/44	282/42	25/9	55/17	29/7	19/6	11/4	16/4	4/2	2/2	1/1	-	-	-	-	
W2FU	FN13	N	U	800961	341/90	316/53	124/35	162/35	49/22	59/22	33/13	31/13	25/7	25/7	7/3	-	-	-	-	-	-	4/1
K8CC	EN82	N	L	116494	228/57	224/40	52/29	93/31	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W2DTA	FN20	N	L	54032	213/45	161/18	41/11	79/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KB1DFB	FN41	N	L	35644	265/36	165/20	-	51/11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1XM	FN42	N	L	24837	118/18	161/19	38/5	66/9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AI4CW	EM64	N	L	3920	67/21	45/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K1TEO	FN31	Y	H	444096	319/60	373/41	119/31	175/35	53/15	67/17	21/7	10/6	-	6/4	-	-	-	-	-	-	-	-
AA2UK	FM29	N	H	374262	285/69	225/29	89/27	103/25	44/13	62/17	28/9	17/5	11/4	12/3	-	-	-	-	-	-	-	-
WA2FGK	FN21	N	H	354860	246/69	223/41	90/27	122/32	41/16	55/17	26/11	16/7	-	-	-	-	-	-	-	-	-	-
K2AXX	FN12	N	H	261060	144/57	132/32	65/25	74/26	29/12	36/16	21/9	17/5	16/4	16/4	-	-	-	-	-	-	-	-
K1RZ	FM19	N	H	242200	245/52	251/36	82/22	132/27	25/11	42/16	14/6	-	4/1	8/2	-	-	-	-	-	-	-	-
WB9Z	EN60	N	H	183715	311/65	174/40	73/30	102/28	-	45/18	-	-	-	-	-	-	-	-	-	-	-	-
K1JT	FN20	N	H	167808	184/39	202/42	80/19	107/19	31/7	37/6	18/4	-	-	2/1	-	-	-	-	-	-	-	3/1
K2SMN	FN20	N	H	166800	127/45	257/31	73/20	103/22	30/9	52/9	17/3	-	-	-	-	-	-	-	-	-	-	-
K1GX	FN31	Y	H	163152	173/40	176/25	65/20	85/19	27/12	40/11	9/6	6/5	1/1	11/5	-	-	-	-	-	-	-	-
N3EXA	FN20	N	H	138600	111/27	201/21	89/15	99/18	39/8	55/8	29/6	-	-	1/1	-	-	-	-	-	-	-	2/1
K3DNE	FM19	N	H	135072	162/30	202/30	69/23	111/22	19/9	30/13	11/7	-	-	-	-	-	-	-	-	-	-	-
AA3GN	FN20	N	H	132496	108/14	160/22	72/13	82/14	35/6	35/5	31/6	19/6	13/3	12/2	-	-	-	-	-	-	-	-
W0GHZ	EN34	N	H	124743	108/26	113/19	50/18	79/18	22/14	34/16	17/10	4/3	3/2	8/2	-	-	-	-	-	-	-	1/1
WZ1V	FN31	Y	H	120840	178/27	185/25	71/22	111/24	24/8	32/9	4/3	3/2	-	-	-	-	-	-	-	-	-	-
K1TR	FN42	N	H	115416	196/47	182/26	69/20	96/19	20/6	32/8	-	-	-	-	-	-	-	-	-	-	-	-
W0ZQ	EN34	N	H	90272	80/19	104/20	54/17	71/18	22/13	33/13	18/11	-	-	1/1	-	-	-	-	-	-	-	-
W1GHZ	FN42	Y	H	52955	81/17	130/22	52/16	74/19	18/6	22/5	-	-	-	-	-	-	-	-	-	-	-	-
WA2ONK	FN20	N	H	50400	44/10	106/16	70/17	69/14	29/7	39/8	-	-	-	-	-	-	-	-	-	-	-	-
N2DY	FN30	Y	H	50184	130/42	92/18	50/16	55/18	-	15/8	-	-	-	-	-	-	-	-	-	-	-	-
K9YR	EN52	N	H	46170	103/29	94/21	48/15	62/16	9/4	15/5	-	-	-	-	-	-	-	-	-	-	-	-
KE8FD	EM84	N	H	38199	66/24	101/32	24/16	49/24	3/3	8/8	-	-	-	-	-	-	-	-	-	-	-	-
K2UOP	FM09	N	H	35948	54/15	78/22	36/17	41/15	12/7	17/9	2/1	-	-	-	-	-	-	-	-	-	-	-
K5LLL	EM10	N	H	33065	32/14	61/19	16/11	34/13	10/8	11/8	10/8	4/4	-	-	-	-	-	-	-	-	-	-
W3CMP	FN10	N	H	31372	284/74	57/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W6KBX	CM98	N	H	31044	59/17	91/21	30/13	50/17	-	22/10	-	-	-	-	-	-	-	-	-	-	-	-
AF6O	DM14	N	H	30024	46/11	133/25	35/14	52/17	-	16/5	-	-	-	-	-	-	-	-	-	-	-	-
VE7DXG	CN88	N	H	29986	114/17	117/16	37/9	64/10	-	21/6	-	-	-	-	-	-	-	-	-	-	-	-
K8TQM	EM89	N	H	29164	21/10	46/24	21/18	22/14	8/7	13/11	6/5	4/3	-	-	-	-	-	-	-	-	-	-
W3KM	FN20	N	H	28756	52/9	73/12	62/10	38/9	9/3	22/5	10/2	1/1	7/12	-	-	-	-	-	-	-	-	2/1
K7BV	FN31	N	H	25340	362/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NW5E	EL98	N	H	20510	130/42	49/11	14/5	27/9	-	8/3	-	-	-	-	-	-	-	-	-	-	-	-
W1ZC	FN42	Y	H	14022	-	178/27	-	82/14	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1MRQ	FN43	Y	H	12690	53/15	53/13	12/4	20/6	8/4	11/3	3/2	-	-	-	-	-	-	-	-	-	-	-
NC1I	FN32	Y	H	9802	-	338/29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N1MUW	FN32	Y	H	9240	78/15	38/10	11/5	29/8	3/2	3/2	-	-	-	-	-	-	-	-	-	-	-	-
K1WHS	FN43	Y	H	8844	201/44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KN4SM	FM16	N	H	8820	78/38	30/15	-	16/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W3IIT	FN20	N	H	8670	69/14	70/7	37/4	38/5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NJ2F	EL96	N	H	5610	40/9	45/9	23/4	28/8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K3YWY	FN20	N	H	1121	59/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KF4OLO	EM74	N	H	64	-	16/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W7MQY	CN82	N	H	49	-	7/7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K2DRH	EN41	N	S	160395	215/56	132/38	49/25	83/28	28/17	36/21	-	-	-	-	-	-	-	-	-	-	-	-
WA3GFZ	FN20	N	S	120530	112/22	160/18	80/11	93/11	33/5	51/6	20/4	13/3	11/2	10/2	-	-	-	-	-	-	-	4/1
N1DPM	FN32	Y	S	107442	141/46	137/20	54/18	68/16	17/8	32/9	8/6	4/2	-	4/2	-	-	-	-	-	-	-	-
K1UHF	FN31	Y	S	81888	166/30	213/22	63/15	84/16	-	29/8	-	-	-	8/5	-	-	-	-	-	-	-	-
W3KJ	FN20	N	S	67184	74/14	92/15	67/11	78/14	-	47/6	27/4	16/4	-	-	-	-	-	-	-	-	-	-
AF1T	FN43	Y	S	54439	76/13	119/17	47/12	59/12	17/6	24/5	8/4	4/3	2/2	2/2	-	-	-	-	-	-	-	1/1
K4TO	EM77	N	S	53992	49/27	82/38	26/21	47/29	6/5	14/12	3/2	2/2	-	-	-	-	-	-	-	-	-	-
W1PM	FN41	Y	S	53738	144/39	96/17	45/15	54/13	12/6	17/7	-	-	-	-	-	-	-	-	-	-	-	-
N9DG	EN53	N	S	42180	125/44	101/33	30/19	42/18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WB2SIH	FN31	N	S	40950	73/14	136/17	59/14	65/15	15/5	17/5	-	-	-	-	-	-	-	-	-	-	-	-

KT8O	EN34	N	S	36432	130/22	130/20	45/14	78/16	-	-	-	-	-	-	-	-	-	-	-	-
K4RTS	FM08	N	S	31951	40/19	65/20	31/16	42/18	6/5	15/9	3/2	-	-	-	-	-	-	-	-	-
KC6TEU	CM98	N	S	31430	62/12	111/21	29/11	59/16	-	25/10	-	-	-	-	-	-	-	-	-	-
WA1T	FN43	N	S	27348	70/34	58/18	28/14	27/11	4/2	12/6	2/1	-	-	-	-	-	-	-	-	-
AA1YN	FN43	Y	S	25872	88/27	72/13	36/10	32/8	10/4	14/4	-	-	-	-	-	-	-	-	-	-
N1HO	FN43	N	S	24766	69/19	92/15	43/10	56/10	-	17/4	-	-	-	-	-	-	-	-	-	-
KC6ZWT	CM98	N	S	22852	49/10	91/18	61/14	66/16	-	-	-	-	-	-	-	-	-	-	-	-
K3TUF	FN10	N	S	21708	142/26	88/9	25/5	45/10	-	8/4	-	-	-	-	-	-	-	-	-	-
W3STU	FM19	N	S	21386	103/35	92/23	-	47/16	-	-	-	-	-	-	-	-	-	-	-	-
N0LL	EM09	N	S	18009	53/25	46/25	19/15	25/17	-	5/5	-	-	-	-	-	-	-	-	-	-
N2FKF	FN30	N	S	16032	57/15	99/12	33/10	52/10	2/1	-	-	-	-	-	-	-	-	-	-	-
N6MU	DM05	N	S	15984	182/24	151/24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KC2IDT	FN13	N	S	15576	46/8	62/11	34/9	35/8	12/4	15/4	-	-	-	-	-	-	-	-	-	-
K1PNQ	FN42	Y	S	15180	106/25	84/11	26/5	44/5	-	-	-	-	-	-	-	-	-	-	-	-
VE3KZ	FN03	N	S	15104	89/26	83/21	-	42/12	-	-	-	-	-	-	-	-	-	-	-	-
KE8RO	EN81	N	S	15048	50/24	100/27	-	39/15	-	-	-	-	-	-	-	-	-	-	-	-
W2ENY	FN21	N	S	14322	162/47	47/17	-	4/2	-	-	-	-	-	-	-	-	-	-	-	-
K3GNC	FN20	N	S	14220	-	113/18	-	75/13	-	33/5	-	-	-	-	-	-	-	-	-	-
VA3KA	FN15	N	S	12920	62/33	46/15	13/7	28/13	-	-	-	-	-	-	-	-	-	-	-	-
KA1MDA	FN32	N	S	12427	100/24	97/11	-	42/7	-	2/1	-	-	-	-	-	-	-	-	-	-
N2MCY	FN30	N	S	10209	45/15	94/14	-	47/10	2/1	-	-	-	-	-	-	-	-	-	-	1/1
KA1EKR	FN42	Y	S	9393	38/4	71/11	34/7	43/7	-	10/2	-	-	-	-	-	-	-	-	-	-
VE2ZP	FN25	N	S	8688	39/14	44/15	16/8	27/9	-	3/2	-	-	-	-	-	-	-	-	-	-
K7CW	CN87	N	S	8470	116/18	126/17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W1ATT	FN31	Y	S	5642	38/6	65/11	-	37/7	-	10/2	-	-	-	-	-	-	-	-	-	-
K1WVX	FN31	N	S	5513	44/16	43/10	8/5	15/4	-	4/2	-	-	-	-	-	-	-	-	-	-
KL7GLL	FM18	N	S	3978	35/9	66/12	-	26/5	-	-	-	-	-	-	-	-	-	-	-	-
KB1CJ	FN42	N	S	3936	62/13	88/10	-	7/1	-	-	-	-	-	-	-	-	-	-	-	-
KF6MXK	CM87	N	S	3358	46/7	42/8	5/3	24/5	-	-	-	-	-	-	-	-	-	-	-	-
W4XP	FM18	N	S	3288	70/11	35/6	1/1	11/4	-	2/2	-	-	-	-	-	-	-	-	-	-
K9AM	EN52	N	S	2500	100/25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K8FFO	EM79	N	S	2052	15/10	42/26	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W8PAT	EN81	N	S	1898	18/10	29/9	3/3	10/4	-	-	-	-	-	-	-	-	-	-	-	-
K1EP	FN42	N	S	1881	51/12	34/5	1/1	6/1	-	-	-	-	-	-	-	-	-	-	-	-
KF2XF	FN30	N	S	1547	-	119/13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KB1JDR	FN42	N	S	1326	7/4	71/13	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KM3T	FN42	N	S	1080	24/6	46/8	-	1/1	-	-	-	-	-	-	-	-	-	-	-	-
N7IR	DM43	N	S	1035	19/5	18/5	-	10/4	-	3/1	-	-	-	-	-	-	-	-	-	-
KF3DY	FN11	N	S	858	14/11	17/7	3/3	1/1	-	-	-	-	-	-	-	-	-	-	-	-
K1VU	FN42	Y	S	765	28/11	11/2	-	6/2	-	-	-	-	-	-	-	-	-	-	-	-
N2JH	FN02	N	S	540	-	36/15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W7PW	DM09	N	S	147	4/2	5/2	1/1	5/2	-	-	-	-	-	-	-	-	-	-	-	-
N1SZ	DM79	N	S	45	5/1	6/1	-	2/1	-	-	-	-	-	-	-	-	-	-	-	-
WA2CLV	FN30	N	S	8	-	-	-	-	-	-	1/1	-	-	-	-	-	-	-	-	-
KA2FIR	FN20	N	S	8	-	-	-	-	-	-	1/1	-	-	-	-	-	-	-	-	-
WB9UAI	EN62	N	S	1	-	1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
K8WW	EM75	N	S	1	1/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N9UM	ROVE	N	R	270720	161/24	257/22	131/19	174/18	57/16	80/17	37/13	-	-	-	-	-	-	-	-	1/1
K1DS	ROVE	N	R	101913	73/13	94/9	65/7	100/10	31/4	42/4	23/3	18/3	15/2	17/3	1/1	-	-	-	-	12/5
N6NB	ROVE	N	R	90832	244/52	151/18	88/15	88/14	5/2	11/6	-	-	-	-	-	-	-	-	-	-
K7XC	ROVE	N	R	89184	136/18	211/22	96/13	149/19	-	23/8	-	-	-	-	-	-	-	-	-	-
KB1EAA	ROVE	Y	R	19500	106/23	62/12	28/10	38/10	-	-	-	-	-	-	-	-	-	-	-	-
KB8VAO	ROVE	N	R	8325	6/4	21/10	5/5	8/6	-	3/3	-	4/3	4/3	4/3	3/2	-	-	-	-	-
K2LDT	ROVE	N	R	6512	2/1	6/1	4/1	8/1	10/2	10/2	6/1	7/1	5/1	4/1	1/1	-	-	-	-	-
KJ1K	ROVE	Y	R	6444	1/1	36/7	18/6	29/6	7/4	5/3	-	-	-	-	-	-	-	-	-	-
N2GKM	ROVE	N	R	3822	8/2	10/3	9/2	9/2	6/1	6/1	4/1	3/1	-	3/1	-	-	-	-	-	-
KI5DR	ROVE	N	R	3190	13/4	43/9	-	27/6	-	-	-	-	-	-	-	-	-	-	-	-
AA2YG	ROVE	N	R	2380	40/22	28/11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
W9GKA	EM58	N	Q	7065	59/24	40/11	12/6	17/4	-	-	-	-	-	-	-	-	-	-	-	-
N2IM	FN13	N	Q	1944	3/2	11/4	8/3	9/3	1/1	2/1	3/2	3/2	-	-	-	-	-	-	-	-
N0JK	EM18	N	Q	819	7/4	22/13	-	5/4	-	-	-	-	-	-	-	-	-	-	-	-
KG4BMH	EM76	N	Q	9	-	3/3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Yaesu MD-100A8X Desk Microphone w/tone control

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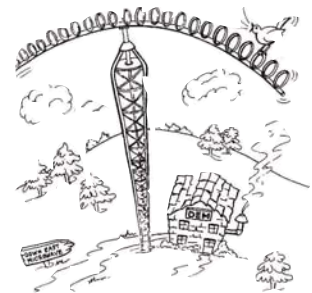
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NOTICE: NEXT MEETING!

**OUR NEXT MEETING WILL BE ON SATURDAY, MARCH 15TH, 2003 AT THE
RADISSON HOTEL IN ENFIELD.**

**THE SPEAKER WILL BE STEVE SIMONS, KF6AJ, TALKING ON THE "USES OF
NON-RADIATING RF & MICROWAVE POWER"**

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