

[Next Meeting](#)

[Inside this Issue...](#)

[December Meeting Notes](#)

[From the Editor](#)

[November Board Meeting Minutes](#)

[New Members](#)

[Elmer Wanted](#)

[Recent Public Service Events](#)

[WECA 2-Meter J-Pole Antenna](#)

[APRS Maps, Part 2](#)

[OSCAR 13, SK](#)

[Web Site of the Month](#)

[Repeater Beeps](#)

[Southern District Net](#)

[Next Board Meeting](#)

[Latest Call Signs](#)

[RF Radiation and Electromagnetic Field Safety Part 3](#)



THE WECAGRAM



Volume 21, Issue 1 January 1997



Next Meeting

The next WECA meeting will be held on Monday, January 13, 1997 at the Westchester County Center in White Plains, beginning at 7:30 p.m. with a social half-hour followed by the main program at 8 p.m.

At press time, this month's guest speaker had not been determined yet. If you have ideas for future meeting topics or speakers, please contact David Weiss, N2OGK.

Hope you can all make it to the meeting.

Inside this Issue...

From the Editor Page 2
New Members Page 2
November Board Meeting Minutes Page 2
WECA 2-Meter J-Pole Antenna by WA2NRV Page 3
Recent Public Service Events by N2TSE Page 3
Elmer Wanted Page 3
APRS Maps, Part 2 by N2YGK Page 4

OSCAR 13, SK Page 5
Web Site of the Month Page 5
Repeater Beeps by N2DHH Page 6
Southern District Net Page 6
Next Board Meeting Page 6
Latest Call Signs Page 6
RF Safety, Part 3 Page 7

December Meeting Notes

by **Anthony Licata, N2NWZ**

Robert, N2TSE, handed out t-shirts for the people who participated in the Mamaroneck Turkey Trot.

Rich, WB2QJA, handed out annual awards. Certificates of Appreciation went to N2AMP, N2GDY, N2TSE, WB2NHC, N2TJE, N2TFC, N2QZB, KB2NBN, N2MEF, WA2KHR, and N3EMF. The Bill Knott Memorial Award went to Jeanne Raffaelli, N2NQY.

George, K2RRR, talked about the annual event for Blythdale hospital where George plays Santa

Claus on the radio and Santa's helpers (WECA volunteers) deliver gifts to the children. George and his wife buy specific gifts for the children from funds donated by WECA members. WECA has been doing this for over 20 years now.

Jack Arnouts, N2KUO, from Ham Central in Poughkeepsie, was the guest speaker. Jack spoke about some of the new equipment and major changes in Kenwood's product line. He also mentioned AEA going out of business and some of the possible changes that might happen with their equipment line. Jack also talked about the problems and business dealings of a small ham radio vendor. Jack answered questions from the membership and had literature and some radio equipment on display.

Andy, N4OOX, handed out the proposed budget for 1997 and answered questions from the membership on the budget.

Stan, WA2NRV, had a flyer for the group battery purchase. Members who want to buy batteries need to bring a check to the next membership meeting. Stan is also looking into a club project. He suggested building a cheap digital modes decoder.

Happy New Year!

Editor : Fuat Baran, N2YGN

Assistant to the Editor : Melissa Metz, KB2SXB

The WECAGRAM is the official newsletter of the Westchester Emergency Communications Association, Inc., a Special Service Club affiliated with the ARRL, ARES, the Westchester County Office of Disaster and Emergency Services, and RACES, and a member of the Westchester County Emergency Medical Services Council.

Any inquiries, comments, items for Swap and Shop, commercial advertising, suggestions, contributions and letters for inclusion should be sent to the editor at:
3215 Arlington Ave, #4H

Riverdale, NY 10463.

Submissions via electronic mail to wecagram@weca.org are especially welcome. You can also fax them to 212-662-6442 (ATTN: Fuat Baran). Submissions may be edited for clarity, style and space. The deadline for acceptance of material for each newsletter is the twentieth of the preceeding month.

All materials are the opinions of their authors, and do not necessarily reflect the official position of WECA, its officers, directors, or the editor.

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The WECAGRAM would like to exchange newsletters with other clubs. If you are interested in receiving the WECAGRAM through such an exchange or know someone who would, please contact the editor.

WECA Officers/Directors

President: Joseph L. Brown, KB2NBN

Executive Vice President: David J. Weiss, N2OGK

V. Pres./General Counsel: Michael J. Weitzner, N2EJI

Secretary: Anthony J. Licata, N2NWZ

Treasurer: Andrew R. Farber, N4OOX

Trustee: Paul S. Vydareny, WB2VUK

County Liaison: Sanford H. Fried, N2SF

Digital Modes: Richard L. Benda, WB2QJA

Director At Large: Ronald E. Devenuti, N2TJE

Education: Barry J. Frajer, N2LE

Engineering: Robert A. Wilson, N2DVQ

Membership Services: Peter A. Johnson, N2TFC

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Public Relations: William E. Hertwig, Jr., N2QZB

Public Service: Robert Kantor, N2TSE

Social: Salvatore Cresenzi KB2GTE

Bylaws Committee Chair: Andrew Farber, N4OOX

Awards Committee Chair: Richard Benda, WB2QJA

President Emeritus: Thomas R. Raffaelli, WB2NHC

WECA gladly accepts donations of equipment, new or used (such as from estates). Please write to WECA at the North Tarrytown address on the cover.

WB2ZII/R WECA operates the following repeaters:

147.060(+) MHz PL 2A (114.8 Hz)

447.475(-) MHz PL 2A (114.8 Hz)

224.400(-) MHz PL 2A (114.8 Hz)

WECAGRAM Online: <http://www.weca.org/wecagram>

2

From the Editor

In this issue, Alan, N2YGK, discusses making maps for use with APRS. Adam, N2DHH, fills in for Bob, N2DVQ, and describes the various beeps heard on the 2-meter repeater. We continue with the third installment of the RF Safety series and begin a new series on various simple antenna projects.

As always, I am still looking for some fresh voices for the WECAGRAM. Consider writing about some topic that interests you. No prior experience in writing is necessary. If you'd rather talk than write, how about volunteering to be a guest speaker at an upcoming meeting? Contact Dave, N2OGK, if you want to make a presentation.

I hope you all had a joyous holiday season.

73,

November Board Meeting Minutes

by **Anthony Licata, N2NWZ**

The meeting was called to order at 8:05 p.m. by Joe, KB2NBN.

Tom, WB2NHC, reports that he has started work on WECAFEST, which will be on March 23. It will be in a different building this year because the old one is being torn down.

Peter, N2TFC, reports a new membership roster will be in the WECAGRAM [Ed: It was in the December issue.].

Robert, N2TSE, reports that 23 members participated in Turket Trot. Next event is Blythdale on Dec.18 starting at 7 p.m.

Rich, WB2QJA, reports working on Certificate of Appreciation awards and has two nominees for Special Awards.

Bob, N2DVQ, reports that he used the new portable remote with a new portable tower at the Turkey Trot. He is looking into getting a deep-cycle battery to use to power the remote. He got a new 8-channel voter for the repeater to use with the remotes and hopes to have it installed by the new year. We still have some problems with the controller, specifically with autopatch and macro modes. He is looking into buying a new controller.

Liam Murphy, Director of ODES, asked the board to look into the antennas we have on the tower at the jail site and report on what are in use and what are our backups.

The board worked on the new budget for 1997 to present to the membership. A motion to present the budget to the membership was made by Tom, WB2NHC. It was seconded by Andy, N4OOX. The motion passed.

The meeting adjourned at 10:45 p.m.



New Members

Please welcome the following new WECA members, who have joined the club recently:

N2PCG Charles Morrissey Croton-on-Hudson

KB2ZPT Craig Scatola Yorktown Heights

KB2YHT William Nolan Pound Ridge

Elmer Wanted

Need an Elmer in the White Plains area, to help a blind person prepare for the No-Code Tech FCC exam.

Contact Sandy Fried, N2SF, during working hours at 914-285-3029.

Recent Public Service Events

by **Robert Kantor, N2TSE, Public Service Director**

Turkey Trot

On November 24, WECA volunteers provided communications for the annual Mamaroneck Turkey Trot. The following hams volunteered their time: N2TSE, N2MEF, N2OLU, N2YYL, N2SF, N2QZB, N2AMP, N2NWZ, N2FMC, N2TFC, N2TWN, N2DVQ, KB2NBN, KB2LLV, KB2ZXP, N1XXU, K4ZGE, WB2LNB, WB2NHC, N3EMF, WA2NRV, WA2KHR, and K2ZVI.

Blythdale

On December 18, WECA hams volunteered to be Santa's helpers and manned their radios and distributed gifts to the children at Blythedale. In this annual event coordinated by George Manning, K2RRR, 50 children received gifts specifically targetted to them, such as walkmen, sweatshirts, remote control cars, etc.

The following people came to the event: N2TSE, N2MEF, N2NQY, N2YGK, N2TFC, N2AMP, N2TJE, WB2NHC, WB2QJA, K2RRR, and KB2JKC.

My thanks to all who participated in these events.

WECA 2-Meter J-Pole Antenna

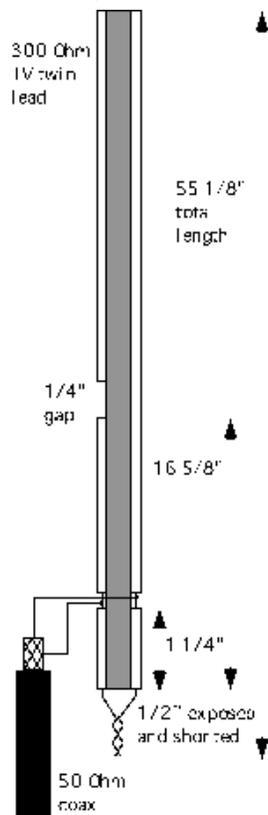
by Stan Rothman, WA2NRV

This portable two meter gain antenna was the first WECA project. It also seems to work on 440 MHz with a reasonable SWR.

1. Cut a piece of 300 Ohm twin-lead 55 1/8" long.
2. Remove 1/2" of insulation at one end. Twist the exposed ends together and solder.
3. Measure 16 5/8" from the shorted end and remove a 1/4" notch from the conductor on one side. You now have a half-wave radiator parallel to a 1/4 wave stub.
4. Cut a piece of RG58U or RG174U coax about 6' long. Put an antenna connector on one end and trim the insulation on the other end to make a connection on the stub.
5. Expose the two twin-lead conductors at a point 1 1/4" from the shorted end, solder the coax braid to the short conductor and the coax center lead to the long conductor. Seal the connection points to keep out moisure.

You can hang this as high as you want if you put a hole in the top (unshorted end). This will give you more gain than a collapsible antenna and less strain on the BNC connector of your HT.

You may contact me if you have questions regarding the construction.



APRS Maps, Part 2

by Alan Crosswell, N2YBK

Making Maps

We're not all "appliance operators," even when it comes to APRS maps. Many in the APRS user community generate maps themselves and make them available to everyone else--usually for free. The sources of data for these maps used to be people crafting them "by hand" using a digitizer on a paper map or by recording GPS waypoints while driving up and down all the roads in town and then using the waypoints to make a map! See MAPMAKIN.TXT in the APRSDOS README directory for details.

Vector Data Sources

Lately though, map makers have been using a number of vector data sources:

USGS 1:2M DLG

US Geological Survey 1:2M scale Digital Line Graphs are available on CD-ROM for \$32 and on the Internet if you've got the patience of Job (or work at a site with a 45 megabit/s link!) Most of the available DOS APRS maps were generated from these "low detail" maps. DOS APRS includes a program to generate maps from these.

USGS 1:100K DLG

USGS 1:100K detail DLGs are much more detailed and can be used to generate street-level detail, if you don't mind the fact that most of the maps are over 10 years old. DOS APRS includes a program to generate maps from these too. However, the process is quite time-consuming.

US Census TIGER/Line

US Census TIGER/Line maps are essentially USGS 1:100K and 1:24K maps with a lot of added value data such as street addresses, ZIP+4, political boundaries, etc. This data is used to analyze demographics, etc. Most of the publicly available computer map systems that popup a detailed map given an address (mapquest.com, yahoo.com maps, and DeLorme CD, for example) are based on TIGER/Line data. TIGER/Line CD's are available for way too much money, but they are also available at many "depository libraries" for free access by members of the public. The nature of access is up to the particular library, though, and in general, you will not be permitted to take the CD home with you.

CIA Digital Chart of the World (DCW)

The DCW CD contains maps of other parts of the world in case you are interested in more than just the US.

Local Government

Local government planning departments usually

have vector map data that is more up to date than the USGS and Census data. Access to this data is not always easy to obtain, however. This is something on my list of things to do for Westchester....

Bitmap Data Sources

GIF maps for javAPRS are available a few places:

DeLorme CD

DeLorme's Street Atlas program lets you save a map to disk as a GIF. This GIF can then be used in javAPRS.

Tiger Map Service

The US Census Tiger Map Service, <http://tiger.census.gov>, allows you to obtain a customized GIF map. It's all documented on their web page.

Automating Production of DOS APRS Maps with tig2aprs

I've been experimenting with creating maps for APRSdos from US Census TIGER/Line data. The program I use is something I've cobbled together over the last several months. It is up to a couple thousand lines of C and runs under Linux on my 486 DX/2 66 PC with 20MB RAM.

Data Reduction

DOS APRS maps are constrained by design to contain no more than 2999 data points per map. This permits the program to work even on small PCs. About 160 maps can be in a MAPLIST, so this limit isn't really all that much of a problem for detailed mapping, which is what *tig2aprs* is all about. Most of what *tig2aprs* does is figure out how to stay within the points limit. [Note for WinAPRS users: *tig2aprs* can generate unlimited size DOS APRS-format maps which WinAPRS can read, so it is possible to generate single large, detailed maps for use with WinAPRS.]

The data reduction techniques *tig2aprs* uses include:

Feature Cutoffs

TIGER/Line identifies all features with a Census Feature Class Code (CFCC) which distinguish Interstate highways from dirt roads, for example. *tig2aprs* has a table of feature

cutoffs to use based on the level of detail requested.

Water Filtering

There are many "trivial" water features such as small lakes and ponds that are unfortunately not properly identified as such with a CFCC. These features lead to noisy maps and waste precious data points. The *tig2aprs* water filter will drop all water features that cover less than a specified percentage of the map area.

Joining segments

Pieces of roads or segments (TIGER/Line jargon for these is Complete Chains) are joined together, eliminating unnecessary duplicate data points at each intersection.

Line Smoothing

tig2aprs includes an algorithm to "straighten" out wiggly lines, thereby eliminating intermediate wiggles and their associated data points.

Point Fuzzing

tig2aprs allows you to control the "focus" such that data points that are "near" each other are considered equivalent, allowing for more point elimination.

Tiling

If the above-mentioned point reduction techniques still fail to get down below 3000 points in a map, *tig2aprs* is able to recursively split a map into quadrants and so on until each resulting map covers a small enough area that the maximum points limit is achieved.

Seamless Map Transitions

When DOS APRS maps are tiled, it is necessary to overlap them as well since APRS will only display a map if its borders entirely cover the screen at the current zoom. In practice, this means that a map of range N will only display when APRS is zoomed in to N/2 and the display "window" is completely within the map borders. By overlapping each map with three other maps by 50% each, it is possible to have seamless panning across an area; APRS automatically reloads the next overlapping map at the same level of detail.

tig2aprs will automatically generate the three overlap maps for each base map.

Labels

The main advantage of TIGER/Line over standard USGS DLG maps is the added value of place and landmark labels. *tig2aprs* generates a variety of types of labels, using the DOS APRS special symbols, for places such as hospitals, schools, airports, cemeteries, parks, etc.

Labels for areas (towns, villages, parks, etc.) are automatically centered within the visible portion of an area on a given map. Multiword labels (names longer than 12 characters) are broken up and stacked to get around the DOS APRS limit.

See my web page, <http://www.cloud9.net/~alan/ham> , for some local detail maps, plus the source code to *tig2aprs* , if you are a Linux ham like me.

OSCAR 13, SK

Reprinted with permission from the *ARRL Letter* , November 29, 1996.

OSCAR 13 has been declared dead. Early in the weekend of November 23-24, OSCAR 13's solar panels began to fail as the satellite's degrading orbit brought it into the upper reaches of Earth's atmosphere (the satellite's perigee is approximately 110 km). System voltages began to plummet, and at 0538 UTC on Sunday, November 24, the satellite

ceased to function. OSCAR 13 no longer responds to ground commands, and it is expected to re-enter and burn up in Earth's atmosphere on December 5 or 6.

Graham Ratcliff, VK5AGR, of the AO-13 command team, reports that the satellite's engineering beacon ceased transmitting on orbit 6481 after the satellite had spent just over 8 years in space. Ratcliff confirmed this loss of signal with VK5ED who was also monitoring the telemetry when the transmission stopped. Further attempts to command AO-13 were unsuccessful!

"Therefore, it is with great sadness that we must assume that AO-13 is dead!!!!" the AO-13 team announced via the Internet.

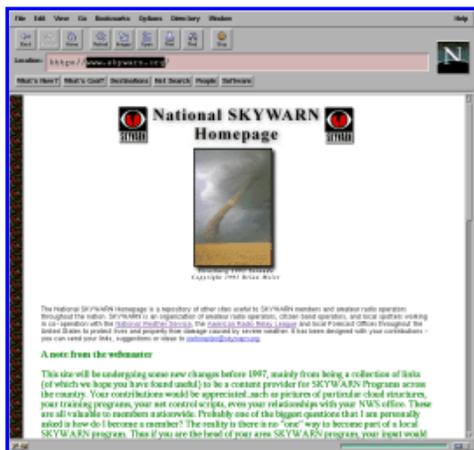
As the weekend approached, stations monitoring the progress of OSCAR 13's demise reported increasing internal temperatures--approaching 100 degrees C. Before it quit altogether, the satellite was down to one operational solar panel.

Before it died, AO-13 broadcast a "birth announcement" to welcome the pending Phase 3D satellite. The message, on November 20, said: "My child, P3D, began 'thinking' today when its IHU was activated. I'm glad I lived long enough to learn of this wonderful event. I wish P3D a long, functional live. Do not grieve for me when I'm gone. I'm only metal, plastic, and sand. My 'life' came from enriching the lives of those who built, commanded and utilized me, and it's been a good 'life'. Danke, Karl [Meinzer, DJ4ZC], et al. No regrets. The baton will soon be passed. AO-13 signing off."

--Amsat News Service.

Web Site of the Month

www.skywarn.org



Repeater Beeps

by Adam Epstein, N2DHH

As most of you know, the 2 meter repeater currently has four receivers. As *all* of you know, the repeater has a *whole bunch* of courtesy tones. This month, we'll look at the relationship between the receivers and these courtesy tones.

When you transmit on 147.66 MHz (with a 114.8 Hz CTCSS tone), your signal is simultaneously received at one or more of our four sites and then fed to a "voter" at the jail. The voter compares the signal-to-noise ratios of the signals received at each site and chooses the best one for transmission by the repeater. This process is continuous. The voter doesn't simply compare the S/N ratio once and then make a binding decision. Instead, it continuously evaluates the signals from the four receivers and chooses the one that is

best at any given instant.

So what does this have to do with courtesy tones? On .06, we use the courtesy tones (or "beeps") to tell you which of the four receivers heard you "best" during your transmission. An outboard microcontroller known as the "voter tallier" keeps track of the total time that each receiver was chosen by the voter while you were talking. When you unkey, the tallier tells the repeater controller to transmit a courtesy tone which identifies the receiver that was most often selected during your transmission.

During normal circumstances, there are four different beeps. Each is designed to have a similar "personality" so that you can always identify .06 when you hear it. At the same time however, each is intended to be distinguishable from the others so that if you want to hear the difference, you can.

Each beep has two tone components--a long one followed by a short one. The beeps that identify the Northwest and Northeast receivers as "most voted" use a high pitch for the first (long) component and a lower pitch for the second (short) component. These two "high-low" beeps are distinguished from one another by the fact that the Northwest uses higher pitched tones for each component.

At the other end of the county, the jail and Southeast courtesy tones use a low pitch for the first (long) component and a higher pitch for the second (short) component. The jail and southeast "low-high" beeps are distinguished from one another by the fact that the jail uses higher pitched tones for each component. (See Table 1.)

In addition to these four basic tone pairs, note that there is also a set of beeps which are used to indicate that the repeater is in one of its special modes. During a net, or bulletin, one of these alternate tones

replaces the usual low-high jail beep. The "net mode" courtesy tone is a very short high pitch chirp and the bulletin tone is a "pseudo-NASA beep."

Thus, if you are interested and you listen to the courtesy tones, you can tell which receiver was selected the most during the last transmission as well as whether the repeater is in a special mode. And of course, if you're not interested, and you don't listen, well, then the beeps just have that familiar .06 ring to them.

| | "Higher" | "Lower" |
|----------|-----------|-----------|
| High-Low | Northwest | Northeast |
| Low-High | Jail | Southeast |

Table 1



Southern District Net

Darlana Mayo, N2DB, net manager of the Southern District Net, reports November SDN stats as follows:

Sessions 30 (29 reported)

Total checkins 420

Traffic brought to the net 129

Traffic passed on the net 111

Percent passed 86

Total time 570 minutes



Next Board Meeting

The next WECA board meeting will be on Monday, January 27, at 8 p.m. at the EOC (148 Martine Avenue) in White Plains, NY. Meetings are open to all WECA members.

Latest Call Signs

As of December 19, 1996, the following call signs have been allocated in the "2" call district:

Group A (Extra) AB2CV

Group B (Advanced) KG2JL

Group C (none left)

Group D (General/Tech/Novice) KC2ANA

RF Radiation and Electromagnetic Field Safety Part 3

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Safe Exposure Levels

How much EM energy is safe? Scientists have devoted a great deal of effort to deciding upon safe RF-exposure limits. This is a very complex problem, involving difficult public health and economic considerations. The recommended safe levels have been revised downward several times in recent years--and not all scientific bodies agree on this question even today. A new Institute of Electrical and Electronics Engineers (IEEE) guideline for recommended EM exposure limits went into effect in 1991 (see references). It replaced a 1982 American National Standards Institute guideline that permitted somewhat higher exposure levels. ANSI-recommended exposure limits before 1982 were higher still.

This new IEEE guideline recommends frequency-dependent and time-dependent maximum permissible exposure levels. Unlike earlier versions of the standard, the 1991 standard recommends different RF exposure limits in controlled environments (that is, where energy levels can be accurately determined and everyone on the premises is aware of the presence of EM fields) and in uncontrolled environments (where energy levels are not known or where some persons present may not be aware of the EM fields).

The graph depicts the new IEEE standard. It is necessarily a complex graph because the standards differ not only for controlled and uncontrolled environ

ments but also for electric fields (E fields) and magnetic fields (H fields). Basically, the lowest E-field exposure limits occur at frequencies between 30 and 300 MHz. The lowest H-field exposure levels occur at 100-300 MHz. The ANSI standard sets the maximum E-field limits between 30 and 300 MHz at a power density of 1 mW/cm² (61.4 V/m) in controlled environments-but at one-fifth that level (0.2 mW/cm² or 27.5 V/m) in uncontrolled environments. The H-field limit drops to 1 mW/cm² (0.163 A/m) at 100-300 MHz in controlled environments and 0.2 mW/cm² (0.0728 A/m) in uncontrolled environments. Higher power densities are permitted at frequencies below 30 MHz (below 100 MHz for H fields) and above 300 MHz, based on the concept that the body will not be resonant at those frequencies and will therefore absorb less energy.

In general, the IEEE guideline requires averaging the power level over time periods ranging from 6 to 30 minutes for power-density calculations, depending on the frequency and other variables. The ANSI exposure limits for uncontrolled environments are lower than those for controlled environments, but to compensate for that the guideline allows exposure levels in those environments to be averaged over much longer time periods (generally 30 minutes). This long averaging time means that an intermittently operating RF source (such as an Amateur Radio transmitter) will show a much lower power density than a continuous-duty station for a given power level and antenna configuration.

Time averaging is based on the concept that the human body can withstand a greater rate of body

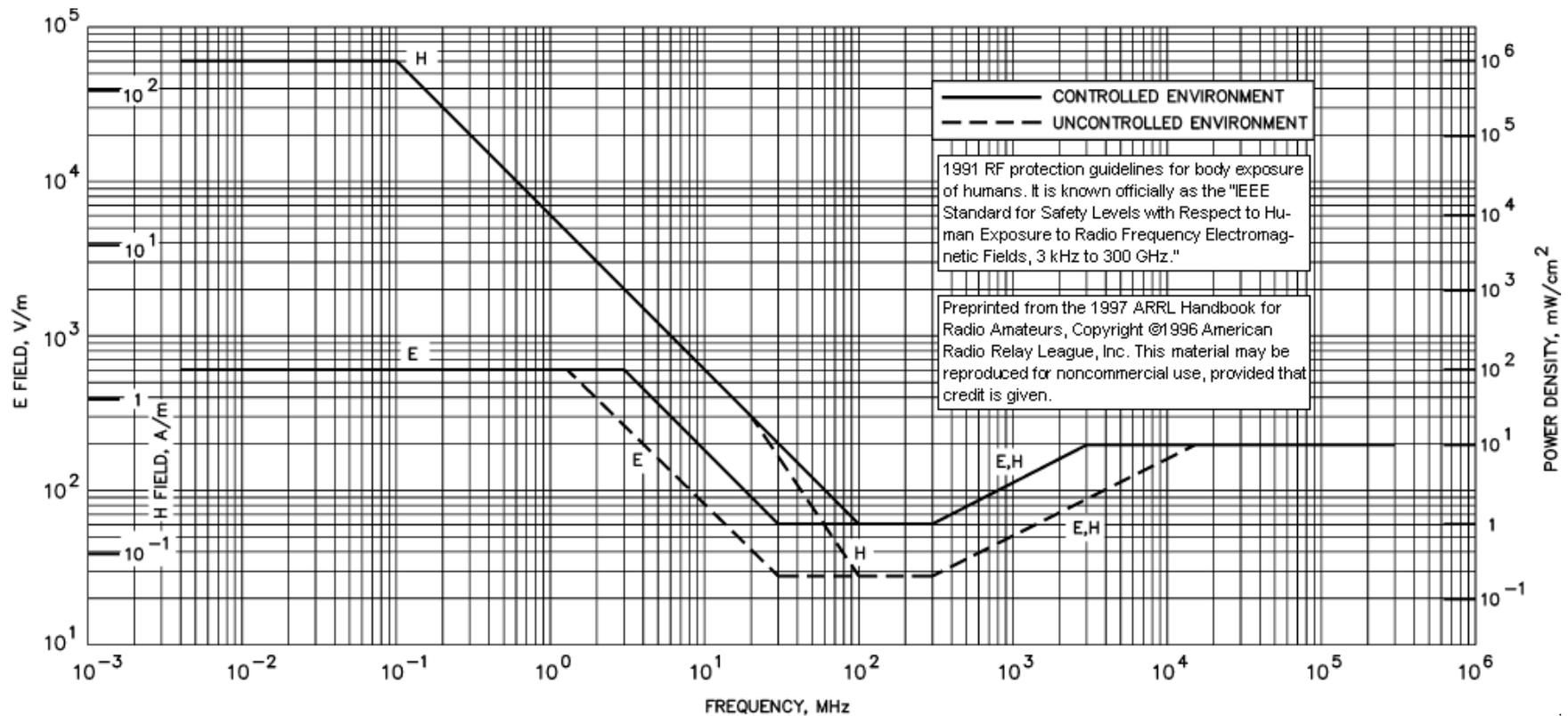
heating (and thus, a higher level of RF energy) for a short time than for a longer period. However, time averaging may not be appropriate in considerations of nonthermal effects of RF energy.

The IEEE guideline excludes any transmitter with an output below 7 W because such low-power transmitters would not be able to produce significant whole-body heating. (However, recent studies show that hand-held transceivers often produce power densities in excess of the IEEE standard within the head.)

There is disagreement within the scientific community about these RF exposure guidelines. The IEEE guideline is still intended primarily to deal with thermal effects, not exposure to energy at lower levels. A small but significant number of researchers now believe athermal effects should also be taken into consideration. Several European countries and localities in the United States have adopted stricter standards than the recently updated IEEE standard.

Another national body in the United States, the National Council for Radiation Protection and Measurement (NCRP), has also adopted recommended exposure guidelines. NCRP urges a limit of 0.2 mW/cm² for nonoccupational exposure in the 30-300 MHz range. The NCRP guideline differs from IEEE in two notable ways: It takes into account the effects of modulation on an RF carrier, and it does not exempt transmitters with outputs below 7 W.

Next Month: Cardiac Pacemakers and RF Safety



January 1997

| 3. nday | 4. nday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---------|--------------------------|---------|--|--|--|---------------------------|
| 21 | 22 | 23 | 24 No Meeting | 25  10 | 26 ADDITIONAL MEETING 2P | 27 ADDITIONAL MEETING |
| 28 | 29 ADDITIONAL MEETING | 30 | 31 | 1  11 | 2 | 3 TRADITIONAL MEETING |
| 5 | 6 ADDITIONAL MEETING | 7 | 8 ADDITIONAL MEETING | 9 | 10 | 11 TRADITIONAL MEETING |
| 12 | 13 ADDITIONAL MEETING | 14 | 15  12 | 16 | 17 | 18 ADDITIONAL MEETING |
| 19 | 20 ADDITIONAL MEETING | 21 | 22 | 23  13 | 24 | 25 |
| 26 | 27 ADDITIONAL MEETING | 28 | 29 | 30 | 31  14 | 1 |

Westchester Emergency
 Communications Association, Inc.
 P.O. Box 831
 Sleepy Hollow, NY 10591-0831
 RUSH DATED MATERIAL
 PLEASE DO NOT DELAY
 Reminder: Next meeting January 13