The Official Publication of the Greensboro Amateur Radio Association

Feed Line

GARA - We're putting the "Spark" back in Amateur Radio®

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ARRL Plans Federal Court Appeal of Certain BPL Rules

NEWINGTON, CT, Oct 4, 2006 -- The ARRL Executive Committee is expected this weekend to ratify plans to appeal in federal court certain aspects of the FCC's Part 15 rules governing broadband over power line (BPL) systems. Assuming the EC signs off on the strategy, the League will file a Notice of Appeal by October 22 with the US District Court of Appeals -- DC Circuit. ARRL Chief Executive Officer David Sumner, K1ZZ, said the League went forward with its appeal plans only after considering the effect on licensed spectrum users of letting the BPL rules stand.

"This decision was made after careful review of the FCC's October 2004 BPL Report and Order (R&O) and of the August 2006 Memorandum Opinion and Order (MO&O) that dealt with petitions for reconsideration," said Sumner, who addressed ARRL's concerns with the FCC's BPL rules in his "It Seems to Us . . ." editorial in October QST.

New Rule Limits Interference Liability to Mobile Stations

Several reconsideration petitions of the initial R&O -- including one from ARRL -- called on the FCC to strengthen rules aimed at protecting licensed radio systems from BPL interference. Instead, in a new rule only revealed after the FCC made the MO&O public, the FCC limited the extent to which an unlicensed, unintentional radiator has to protect a licensed mobile station.

The new rule, §15.611(c)(1)(iii), provides that BPL operators only have to reduce emission levels below established FCC permissible limits by 20 dB below 30 MHz and by 10 dB above 30 MHz -- even if that's not enough to resolve harmful interference complaints. The FCC called these levels "modestly above the noise level."

According to ARRL Laboratory Manager Ed Hare, W1RFI, these levels would be some 25 dB higher than the median values for man-made noise in residential areas and up to 40 dB higher than the minimum values hams use for reliable communication.

What the FCC has done with respect to licensed mobile services "should strike fear into the hearts of those who rely on public safety communications," Sumner added, especially since the rule requires BPL operators to do even less above 30 MHz than at HF.

ARRL Challenging Extrapolation Factor Decision

The Commission also declined to adjust the 40 dB per decade "extrapolation factor" applied to measurements performed at distances from power lines other than those specified in Part 15. Sumner says this is an important technical point because the existing Part 15 rule causes test results to underestimate actual field strength. In their petitions for reconsideration, the ARRL and others demonstrated that the 40 dB per decade extrapolation factor was wrong and that a figure closer to 20 dB per decade was appropriate.

Making Matters Worse

"The MO&O just made matters worse," Sumner said, "because the FCC simply cast aside any new information that did not support its original, flawed conclusion and dismissed it without explanation." He called the Commission's stand on the 40 dB per decade rule "clearly, demonstrably and inarguably wrong."

Sumner contends the rule change in the MO&O regarding mobile stations contravenes the International Radio Regulations and the Communications Act of 1934. "The FCC has, in effect, tried to redefine harmful interference," he said. "It can't do that. The Commission doesn't have the authority to do that, and we're going to demonstrate that to the Court of Appeals." Sumner said the FCC's action is "exactly the kind of administrative decision the courts of appeal love to overturn."

He said the principles that the FCC appears to be following for the first time -- if applied generally -- represent an abuse of licensees' rights. "It's unacceptable that the FCC would reduce the rights of its licensees in favor of

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Next Meeting - Location Change

The next meeting of the Greensboro Amateur Radio Association will be October 23, 2006 at the Guilford County EMS facility located on Meadowood St., just off Wendover Ave., and behind Rooms-To-Go and Staples. The program will begin at 6:30 and will be a demonstration of Haz-Mat equipment response procedures given by Steve Marks, KE4FCW. Please plan to attend and bring a friend. We will NOT meet at Golden Corral for this date.

GARA Meeting Minutes

Regular Meeting
September 25, 2006

The regular meeting of the Greensboro Amateur Radio Association was held Monday evening August 28, 2006, at 7:15 PM at the Golden Corral Steak House off Wendover Avenue.

Vice President Rudy Langley, KG4HCT, called the meeting to order. The minutes of the previous meeting were approved as printed in the "Feed Line". It was noted that the October meeting had been scheduled for the Emergency Services Facility off Wendover Ave, and Meadowood St. The program will be presented by Steve Marks, KE4FCW and will be about the HazMat team and how they respond to hazardous materials emergencies. The EMS building is behind Staples and Rooms To Go. Look for the large tower, and talk-in will be on 145.150. We will not meet at the Golden Corral.

Treasurer Ernie Wall, NC4EW, provided his financial report advising that all is well.

"Al" Allred, K4ZKQ, reported that Income and Expenditures are well in line with the forecast for the year. He said finances for the year had tracked somewhat as expected for the year with no great expenses. He added that interest on savings was a bit more than expected.

Tom Forrest, N4GVK, webmaster/secretary, reported all was fine with the web site. He said he still needs input for the newsletter.

Engineering Chairman Arch, KT4AT, spoke briefly about the new digital repeater and the trial run that was made at the picnic September 16 at John Doggett's house. He said it performed as expected "right out of the box." He added that he would be making some modifications in the future to improve the repeater's operation. He also said some "macros" had been changed on the 145.150 repeater controller for SkyWarn and soccer tournaments.

The president announced the following events:

Lunches: Mondays, 10:45 at Jake's Diner, and Fridays, 11:00 at the K&W Cafeteria on Holden Road;
Coffee: Fridays, 8:00 pm at Starbucks on Battleground. The Mt. Mitchell trip will be October 14.

The program for the evening was presented by Allen Bradley, KD4IUN. Allen gave presentation on computers and how they are attached to the internet. Allen gave a great PowerPoint presentation and explained the wiring of computers and their methods of internet connections. The group enjoyed the talk and thanked Allen for his expert information.

The meeting adjourned 8:05p.m.
Respectfully submitted,
Tom Forest, N4GVK, Secretary

ARRL Plans Appeal .. from page 1

unlicensed, unintentional emitters," he said. "Remember that 'unintentional emission' is just another term for 'spectrum pollution.'"

No Free Pass

Sumner made it clear that the League is not suing BPL providers for causing interference, nor suing the FCC for failing to enforce its own rules against harmful interference. "We are not satisfied with the level of attention the Commission is paying to existing cases of BPL interference, but this is not the time to pursue that in federal court," he said.

He said the ARRL will demonstrate in court that the FCC's administrative process was flawed and resulted in rules that go beyond its mandate by reducing the rights of its licensees and providing a free pass to spectrum polluters.

"The court is not going to rewrite the rules," Sumner explained. "The court can make the Commission go back to the drawing board and re-decide them, however." He said the League also wants the court to formally recognize that the FCC's failure to reconsider its initial decision regarding the 40 dB per decade extrapolation factor is "indefensible."

Maine's Governor Is Now KB1NXP

From ARRL Letter

Maine Gov John E. Baldacci may now be the only sitting state chief executive holding an Amateur Radio license. Following up on an effort begun a few years ago, Baldacci took and passed his Technician license test September 6, and the FCC issued his new call sign, KB1NXP, the following day. Bill Crowley, K1NIT, is the liaison for the ARRL VEC volunteer examiner team that administered Baldacci's Amateur Radio license examination.

Crowley said Baldacci became interested in amateur radio after a 1998 ice storm.

Ham Happenings
NEWS briefs

Area Hams, SK

Roy N. Greene, W4NHW, died October 2, at Berverly Health Care in Starmount at 84. Roy was a true VHF Pioneer and put Greensboro on the map big time in 2 meter contests for many many years. He was a top notch RF Engineer and built his own VHF transmitters and receiving converters of Western Electric quality. He was a Member of the old Greensboro Radio Club. Roy's QTH was 1614 Grove St., Greensboro, NC.

Dave Barker, W4IGL, of High Point passed away October 3 at 81. Many of you will remember Dave from old Greensboro Radio Club days and early 2 meter operations.

Our sympathy is extended to the families of these amateurs.

D-Star Repeater - Part 1: Straight out of the box

By Arch, KT4AT
Engineering Chairman

This series of articles will provide more insight into the setup, performance and use of the D-Star UHF RP4000V/RP2C voice repeater. This first part details what I liked, and what I liked less with this repeater, as it came straight out of the box.

System Description: The system consists of a repeater unit RP4000V for UHF (also available RP2000V for VHF, and several more units for 1.2 GHz, both voice and high-speed data), and a digital controller, the RP2C. All units are 19 inch rack-mount, and a single controller can control up to 4 repeaters, and 2 links, all of them digital only. The links, also available from Icom, operate at 10 GHz. Figure 1 shows the RP4000V and RP2C units, after unpacking.

The repeater receiver outputs to the controller a demodulated bitstream at 4.8 kbps, which contains (a) the AMBE vocoded stream at 2.4 kbps plus 1.2 kbps of forward error correction, and (b) 1.2 kbps of additional data, which contains the packet header and the low speed data. With the exception of the synchronization frames, this header is also interleaved (24 frames, this is where most of the delay through the system comes from), scrambled (7 stage scrambler), and encoded for forward error correction with a convolutional encoder. The combination of all of which provides a reasonably robust error protection.

The controller extracts from the above the embedded call-sign addresses, and routes the bitstream to the appropriate destination (i.e. to the same, or to a different repeater at the same site, or to the Internet Gateway if present on site).

It should be noted that there is no AMBE vocoder at the repeater site. All vocoding takes place in the mobiles. This prevents analog audio local repeater interface (like a phone patch, or an analog FM link). It is probably possible to design such an analog interface. The optional UT119 Icom plug-in board for the V/U-82 HT's would probably be a good start. Not in the priorities right now.

In addition to the RX bitstream (RD) and TX bitstream (TD), the connection between repeater and controller also include RX clock (RC), TX clock (TC), RX digital squelch (RE), and TX PTT (TE). Finally, the evaluation of this system is not made easier by the fact that technical manuals, schematics, etc.. are not available from Icom.

Programming the system: To obtain a functional repeater, the first things to do is to program (a) the repeater, and (b) the controller

Programming the repeater is done through two USB ports successively, one for the RX side, the other for the TX side. You will need a computer with a USB port, and an A/B USB patch cord (not included). Those USB ports actually behave as serial COM ports as far as Windows is concerned. The problem there is that Icom provides a Windows utility which can program only frequency. I therefore decided to write my own programming software, which would provide, at a minimum, frequency and output power control, maybe

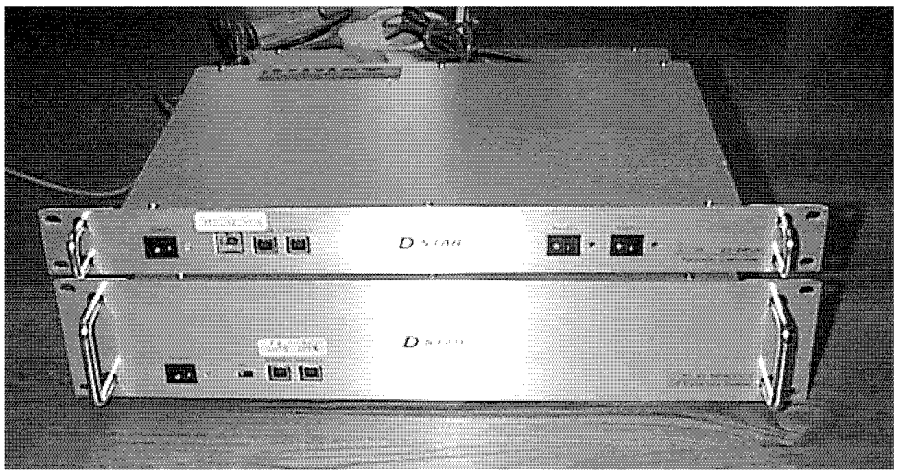

Figure 1 - The RP4000 UHF Repeater (bottom), the RP2C Controller (top)

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squelch functions if necessary, and, as a Deluxe item, master reference oscillator adjustment. Temperature, power supply voltage and received signal S-Meter seem to be also available, among other things. More on that next time in Part 2.

Programming the controller is done through a 10BaseT Ethernet TCP-IP LAN connection. Unless you have a computer which is recent, or you run a home LAN, chances are that you are not setup for that. You will then need a NIC (Network Interface Card), which those days, comes down to a USB to Ethernet converter (plug-in NIC's or PCM-CIA cards are things of the past). Although I ultimately got it to work, I experienced serious problems with that converter on my old Compaq Praesario running Win 98 (a dark issue of enumeration by the Windows Registry). To a point that I decided to procure a brand new Acer machine, with built-in Ethernet, which worked first shot in this application. The Ethernet CAT 5 patch cable is not included either.

The controller gets to be programmed for call-sign, machine number (A through D), and other goodies like IP address, if the Internet Gateway is used.

The Transmit Side: High power checked at 24W, and low power checked at 2.2W. This is selected by a slide switch on the front panel. There is one problem there. Taking as an example the W4GSO UHF setup, we would incur losses of close to 5 dB (duplexer, jumpers, and 330 feet of Heliax 7/8). Starting at 24W, we would recover only around 7W into the antenna... I think, a little puny.

Another issue is heat. There is no external heatsink on the RP4000. Just a fan to extract heat from the internal transmit module. Even at only 24W capability, this is a little "light", and will not provide continuous duty operation. By comparison, the Mastr2 PA weighs 40 pounds (massive, natural convection heatsink), and can pass an 8 hour long, solid transmit key, at 100W RF output.

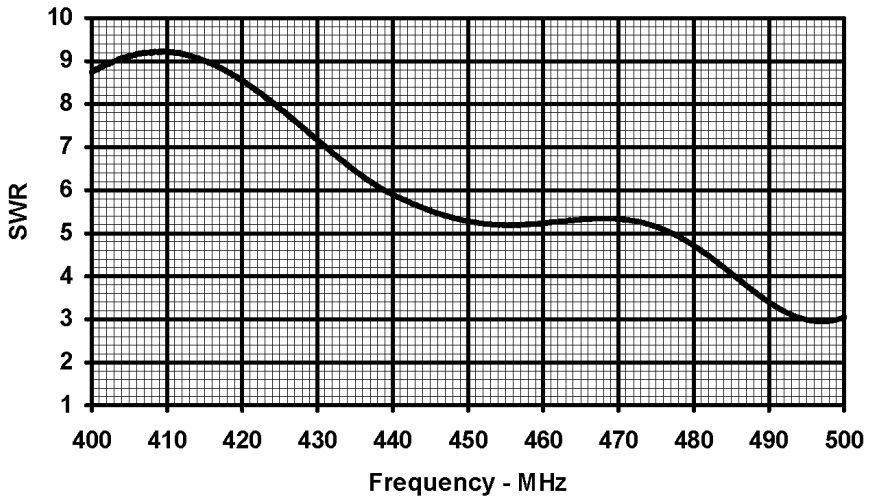

Figure 2 - TX Output SWR (on 50 Ohms)

The third issue found is transmit output impedance. Shown on Figure 2, there is a 5 to 1 SWR there. This is what the duplexer will see on its TX port. I have the feeling that some duplexers are not going to like this very much...

Next time, Part 2 will deal with fixing, or working around, the issues above. Aside from those, the transmitted signal shows the same narrowband characteristics measured before on the HT's. Figure 3 shows the signal spectrum, narrowband, around the center frequency. The 23 dB down bandwidth (equivalent to FCC 0.5% occupied bandwidth) is around 7 kHz. This occupied bandwidth is essentially constant, regardless of modulation, contrary to FM. Finally, Figure 4 shows the spectrum purity from 10 MHz to 2 GHz. The FCC limit there is 60 dB below carrier minimum. As can be seen, nothing emerges out of the spectrum analyzer noise floor, which is around 75 dB down in this setup. Outstanding job there. This is among the cleanest transmitters I have seen.

The Receive Side: The first thing to realize is that the current available instrumentation is absolutely useless to make most measurements on the receive side. What is required is a calibrated D-Star modulated RF generator. This is in the making. It will use an Icom IC-91AD HT on low power, followed by 10- and 1-dB step rotary attenuators, assembled in carefully

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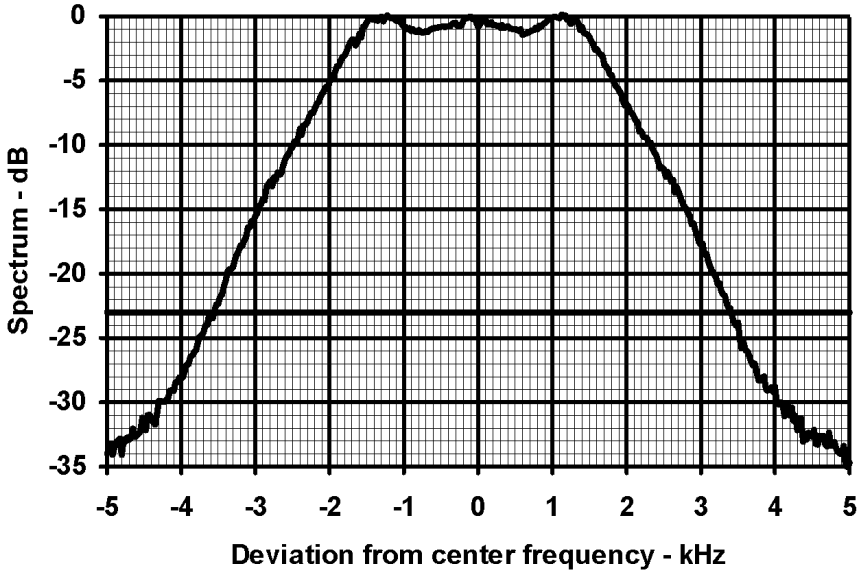

Figure 3 - Narrowband Spectrum (0dB = 24W)

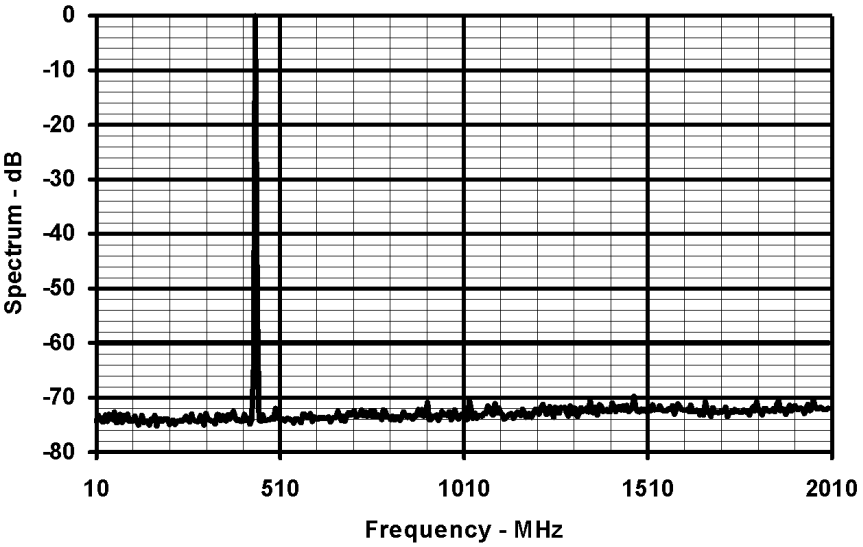

Figure 4 - Spectral Purity (0dB = 24W)

shielded compartments in a bench-top box. Capable of generating a calibrated D-Star carrier down to -140 dBm, this will allow to make repeatable sensitivity measurements, squelch levels, etc...

Short of having that available, it is difficult to make accurate measurements on that receiver. However, there is indeed inside that receiver an analog RSSI line (Received Signal Strength Indicator). It is nicely labeled so, next to a test pad. This RSSI was first calibrated for an incoming unmodulated carrier. Figure 5 shows that. Several relative measurements were then done with it. The most interesting is the one on Figure 6, receiver IF bandwidth. As can be seen, the 3 dB bandwidth of the receiver IF is around 5 kHz. This is 3 times smaller than traditional FM IF bandwidths (which are in the vicinity of 15 kHz). This is important because it should provide a theoretical 4.77 dB reduction in receiver noise floor, with associated improved sensitivity.

Using RSSI, intermodulation distortion measurements were made also, with two carriers spaced 500 kHz from each other.. The receiver IP3 is around +20 dBm, which is equivalent to the preamp we are using now on 442.875.

The last measurement which could be done is receiver input impedance. This is shown on Figure 7. No problem there, with less than 2 to 1 SWR from roughly 434 to 456 MHz.

Controller: The controller was observed to provide smooth operation of the machine. To access the Internet, you will need a computer running Linux, a Class A router, a fixed IP address, 800 kbps of effective Internet speed, and attend an Icom seminar on that subject.

There are a couple of areas which need attention. At the top of those, the controller does not provide any means for a Control Operator to remotely shut down the machine. It is questionable whether this is in compliance with FCC rules or not. Most people who have so far deployed this system have added their own FM control receiver, on a different frequency, or some telephone line control, and have relayed the power supply of the digital ma-

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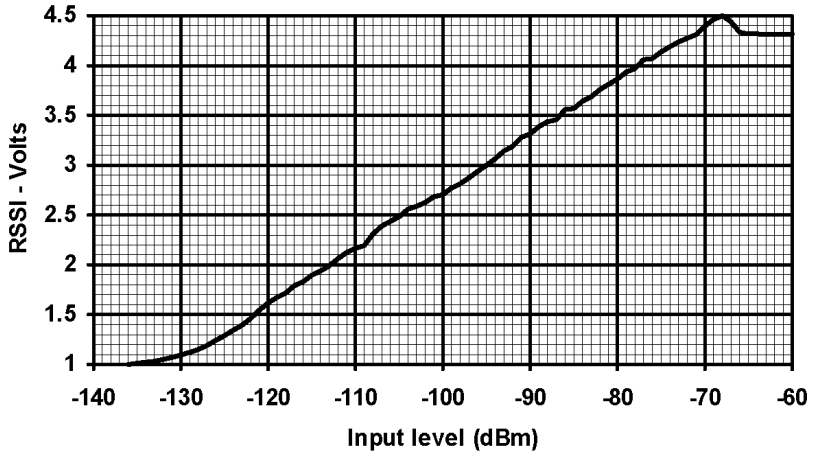

Figure 5 - RSSI Calibration

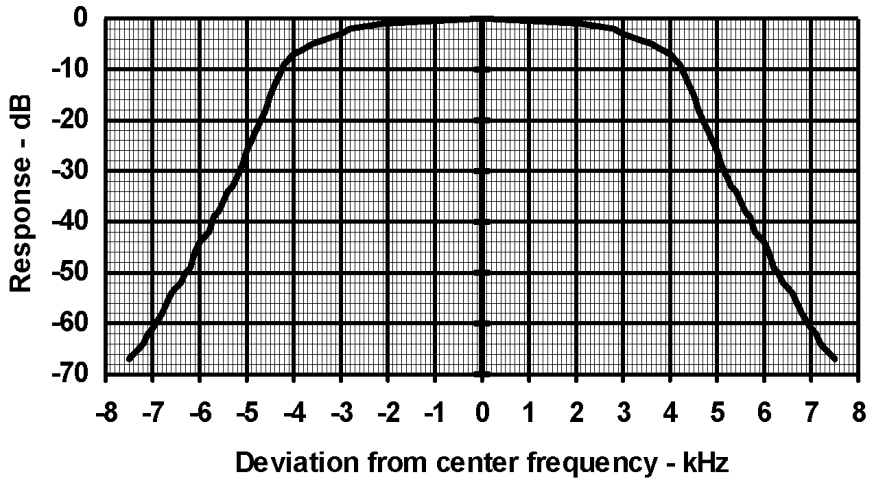

Figure 6 - Receiver IF Bandwith

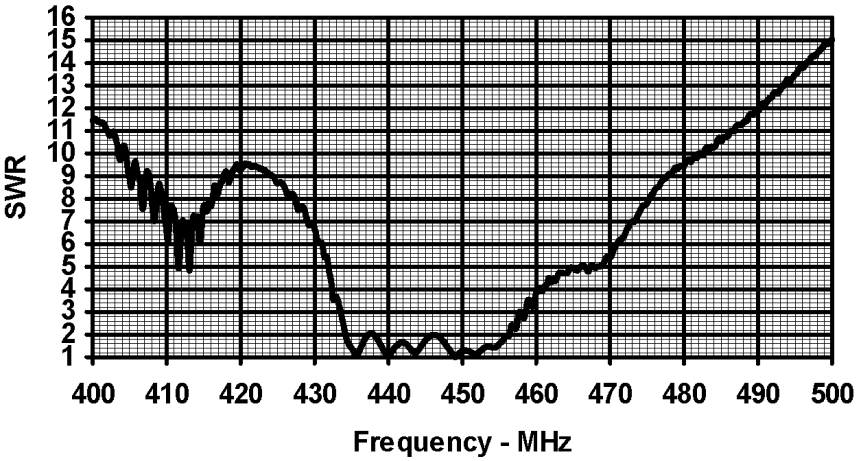

Figure 7 - Receiver Input SWR

chine, so it can be remotely switched off. Interesting... Conversely, there is no mean provided to manually key the TX, which will be a major problem to perform desense tests.

The second area which was unanimously complained about by users is the lack of courtesy tone. As one user put it, "the only way you know you are not in the machine anymore is when other people don't answer you no more". Part 4 will address control issues, especially for a dual mode machine.

Experimental Deployments: The system was deployed in three different setups.

The first setup was at my house, with a 9 dB Diamond vertical in the attic, a Motorola duplexer, and N4GVK roving around with an HT. Results were disappointing, being comparable to a Mastr2 UHF station receiver without preamp.

The second setup was similar, except the attic antenna was replaced by a different Diamond vertical, 6 dB and outside at 12 feet this time, and on 30 feet of 1/2 inch Heliax. There was no coverage difference with the first setup. My conclusion is that my attic loses 3 dB.

The last setup was at the Club picnic, where it provided adequate service to the picnic site. Coverage was however short of expectations again. This machine needs sensitivity improvements... This will be addressed in Part 3.

ARISS Team "Always On A Roll, " ARRL Liaison Says

FROM ARRL LETTER 10/6/06

Recent meetings with NASA officials have laid the foundation for the future of the Amateur Radio on the International Space Station (ARISS) program <http://www.rac.ca/ariss> and, at the same time, garnered accolades for Amateur Radio. Sponsorship of the ARISS program is moving from NASA Headquarters to Johnson Spaceflight Center (JSC) in Houston, and ARISS International Chair Frank Bauer, KA3HDO, and ARISS International Secretary-Treasurer Rosalie White, K1STO, recently held planning sessions with various JSC offices. White described the sessions as "stepping stones" to the realization of future ARISS projects and programs.

"The ARISS Team continues to be on a roll with new and exciting aspects to plan and develop," White said. "It isn't just daydreaming. It is dreams that turn into reality for hundreds of thousands of youths, thousands hams and even most astronauts!" Accompanying Bauer and White on the visits were Bauer's deputy, Mark Steiner, K3MS, and NASA ISS Ham Radio Project Engineer Kenneth Ransom, N5VHO.

The ARISS team's first stop was the ISS Program Office to review a new, nearly completed NASA-ARISS charter. The ISS Program Office's Carlos Fontanot confirmed that the ARISS team will be charged with overseeing all Amateur Radio-in-space activities, no matter what ham radio group initiates them, White said.

At the JSC Education Office, the ARISS delegation discussed the transition of ARISS sponsorship from NASA Headquarters to JSC. They met with Education Leader Cynthia McArthur -- wife of astronaut and ISS Expedition 12 Commander Bill McArthur, KC5ACR. Bauer and White asked McArthur to thank her husband for thrilling thousands of hams by getting on the air so often during his ISS mission. McArthur said she was impressed by the number of Expedition 12 Google hits that mentioned Amateur Radio.

The ARISS delegation also met with ISS Expedition 9 astronaut Mike Fincke, KE5AIT. "He made it very plain that he truly enjoyed getting on the air for ragchew QSOs and being interviewed by school children about the ISS," said White. "He expressed the hope that all astronauts will earn their ham licenses and be able to realize the same pleasures he got from hamming."

Fincke told the ARISS team that he found ARISS to be both exciting and, as an educational outreach program, a great global teaching tool. He recounted that when he missed his family and friends while on orbit, he'd grab the NA1SS mike and call CQ, finding hams all over the world just waiting to make a contact with him. "ARISS lets the ISS crew make contacts with unknown citizens. A crew member needs that," he told Bauer and White.

New Law Formally Makes Amateur Radio Part Of Emergency Communications Community

From ARRL Letter 10/6/06

A section of the Department of Homeland Security (DHS) 2007 Appropriations Act, HR 5441 <http://thomas.loc.gov/cgi-in/bdquery/z?d109:h.r.05441:> formally includes Amateur Radio operators as a part of the emergency communications community. Congress approved the measure before adjourning for its pre-election break. President George W. Bush signed the bill into law October 4.

Amateur Radio is included within the legislation's Subtitle D, Section 671, known as the "21st Century Emergency Communications Act." Radio amateurs are among the entities with which a Regional Emergency Communications Coordination Working Group (RECC Working Group) must coordinate its activities. Included within the DHS's Office of Emergency Communications -- which the measure also creates -- RECC Working Groups attached to each regional DHS office will advise federal and state homeland security officials. The final version of the legislation incorporated language from both House and Senate bills and was hammered out in a conference committee. An earlier version of the 21st Century Emergency Communications Act, HR 5852, included Amateur Radio operators as members of the RECC Working Groups.

In addition to Amateur Radio operators, RECC Working Groups also will coordinate with communications equipment manufacturers and vendors -- including broadband data service providers, local exchange carriers, local broadcast media, wireless carriers, satellite communications services, cable operators, hospitals, public utility services, emergency evacuation transit services, ambulance services, and representatives from other private sector entities and nongovernmental organizations.

The RECC Working Groups will assess the survivability, sustainability and interoperability of local emergency communication systems to meet the goals of the National Emergency Communications Report. That report would recommend how the US could "accelerate the deployment of interoperable emergency communications nationwide." They also will coordinate the establishment of "effective multi-jurisdictional, multi-agency emergency communications networks" that could be brought into play in an emergency or disaster.

In light of the new legislation, the ARRL plans to follow up to determine how it can interact with the DHS and its Office of Emergency Communications.

Area Activities

FOURTH MONDAY – at 6:30 PM, the **Greensboro Amateur Radio Association** has their regular monthly meeting at the Golden Corral on Landview Dr., off W. Wendover Ave. Please plan to gather at 6:30 PM for dinner. The meeting is scheduled to start at 7:15 PM

CLUB NETS:

SUNDAYS – weekly at 9 PM, the **GARA News and Information Net.** This net features NewsLine and is on the 145.150, W4GSO repeater. Roy Smith, N4BYU is always looking for net controls. Contact him if you would like to help.

THURSDAYS – The **Guilford County ARES Net** meets on the 145.150 repeater (100 Hz. tone) at 9 PM.

TUESDAYS – at 8 PM, the **2 Meter SSB Net** meets on 144.225 Mhz. USB. Chris Thompson, K4HC is the net control station.

WEDNESDAYS – **The Guilford Amateur Society** holds their weekly net on the 145.250, W4GG repeater with an 88.5 Hz. tone. Jim Hightower, W4JLH is the net control.

TUESDAYS – at 8:30 PM **The Triad SkyWarn Net** meets on the 147.225, K4ITL repeater, no tone required.

OTHER ACTIVITIES :

FIRST MONDAY – **The Guilford County A.R.E.S.** monthly meeting is held at 1002 Meadowood St. off W. Wendover Ave, in the EMS building, beginning at 7 PM.

THIRD MONDAY – at 6:30 PM **The Guilford Amateur Society** holds their monthly meeting at the Greensboro Police Western Sub Station at 300 Swing Rd in the community room. Refreshments at 6:30 PM and the business meeting begins at 7 PM.

SATURDAYS – at the K&W Cafeteria on Big Tree Way, hams get together for **Saturday Breakfast** at 7:30 AM. Talk-in is on the 145.150, W4GSO repeater, with 100 Hz. tone.

MONDAYS & FRIDAYS – at 11 AM, Greensboro Hams get together for lunch. On Monday they meet at Jake's Diner at Wendover and Big Tree Way and on Friday lunch is at the K&W Cafeteria off South Holden Road. Talk-in is on the 145. 150, W4GSO repeater with a 100 Hz. tone.

EVERY FRIDAY – at 8 PM (approximately) Greensboro Hams get together for coffee at Starbucks on Battleground (summer location till Daylight Savings time changes)

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