

President's Message

Gary Mitchell, WB6YRU

Band planning news on 70 cm

In the last issue, I reported that the NCPA was in the process of approving the general band plan for 70 cm and NARCC's board planned to do likewise soon.

It's done! Both boards have approved the 70 cm band plan (appears in this issue). It's now official.

This has been in the works for years. Some thought we'd never have an agreed upon 70 cm band plan over Northern California, but we persevered and finally managed it.

70 cm was the big one, the other bands are nothing in comparison. Work is currently under way on the upper bands (above 70 cm). In all likelihood, those will be agreed upon easily.

Organization changes?

The general meetings haven't been very well attended recently, even managing to have a quorum has been something of a challenge. Currently, the number of people who do something can be counted on one hand, with fingers to spare. Even the last general meeting fit that description.

This problem was discussed at the last meeting. The leading suggestion is

to change the NCPA into a committee format, something like its original form.

Initially, the NCPA was basically a club of clubs. The various packet special interests were each members, like knights of the roundtable. Shortly after that, the general membership format was adopted. This meant a member could be either a packet organization or an individual, but board members each represented some aspect of packet.

When packet (especially BBS packet) was very active, this made sense. Now that participation is down, perhaps it would help to go back to our roots.

The idea is to lighten the load on those very few who are doing something in the organization and make it easier to have a quorum. The question is how exactly should we go about this?

Under this "committee format" one possibility is to have all members be on the board. In other words, joining means being a board member. In part, the hope is this may instill an increased sense of duty in the membership and thus encourage more participation. It also means each member is expected to be more in tune to packet, as opposed to someone new looking to the organization as a mentor and newsletter publisher. Thus, we'd drop or at least considerably scale back the education aspect of the organization.

Ultimately, even if the only members were packet special interest groups, it would still work, as it did in the NCPA's inception.

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Currently, we try to have at least one board member from each packet special interest. It's not clear exactly how this proposed change would affect the "balance of power." This is one of the more fuzzy aspects of the proposal and needs more work.

Under the committee format, this newsletter would be scaled back. As some of you know, the editor post is a significant job. So this would be a major reduction in the workload. There would be a newsletter only when there was something specific to report, as opposed to automatically putting out four issues per year. Perhaps there would only be an annual issue. The current dues structure would also have to be reconsidered.

If the membership would like to maintain the current organization format, then there'll have to be a little more participation. Short of that, something eventually will have to give. It's difficult to keep things going when only a couple people are doing ninety nine percent of the work and even having a

quorum at meetings is an accomplishment.

At any rate, this topic will be discussed further at the next general meeting.

If anyone has any comments or ideas, please let me know.

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News from the ARRL

From *The ARRL Letter*, Jan. 11, 2002

FCC REALLOCATION RETAINS AMATEUR RADIO'S 219-220 MHZ SLOT

Amateur Radio's secondary allocation at 219-220 MHz remains intact in the wake of an FCC spectrum reallocation of the 216 to 220-MHz band, among others. The FCC declined, however, to go along with ARRL's request to expand amateur access to 216 to 220 MHz. On a brighter note, the Commission potentially relieved spectrum competition for Amateur Radio at 2.3 GHz by making space available elsewhere.

The FCC acted December 21, 2001, in ET Docket 00-221 and in several other proceedings that it lumped into a single Report and Order and Memorandum Opinion and Order released January 2, 2002. The FCC Order reallocated 27 MHz of spectrum in seven bands from government to non-government use. Some of the spectrum will be put up for bid in public auctions. The Commission allocated the 216-220 MHz band to the fixed and mobile services (co-primary), although some government systems in the band will remain.

"We are pleased that the FCC has found suitable spectrum for MicroTrax and AeroAstro other than at 2300-2305 MHz," ARRL Executive Vice President David Sumner, K1ZZ, referring to two commercial competitors. "We hope this will clear the way for an upgrade to primary status at 2300-2305 MHz for the Amateur Service."

MicroTrax has sought access to 2300 to 2305 MHz and other bands for a proposed Personal Location and Monitoring System to enable tracking of people and objects. AeroAstro has proposed sharing the band with amateurs on a co-primary basis for its Satellite Enabled Notification System global messaging system. Both indicated

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The digital band plan as well as other information about the NCPA, are available on the Web at: <http://www.n0ary.org/ncpa>

The NCPA Board of Directors meets electronically in order to transact association business and meet with members and interested amateurs. The address for the board remailer is: ncpa@kkn.net. Anyone can subscribe by sending e-mail to ncpa-request@kkn.net with the command "subscribe" (without the quotes) in the body of the message.

interest in the 1670-1675-MHz band; MicroTrax also has said that 2385-2390 MHz might be a good fit. The FCC also noted comments from ArrayCom that the 1670-1675-MHz band would be suitable for its i-BURST high-speed data system, now operating experimentally at 2.3 GHz.

Sumner was less enthusiastic about the FCC's action at 216-220 MHz as it impacts the Amateur Service. "While the limited secondary allocation to the Amateur Service at 219-220 MHz is being maintained, the more intensive use of 216-220 MHz by commercial services is likely to preclude amateur use of the band in many parts of the country," he commented.

The amateur allocation at 219-220 MHz is secondary to the Automated Maritime Telecommunications System (AMTS). Within the 1 MHz of spectrum, Amateurs may install and operate point-to-point digital message-forwarding systems, but only under strict limitations that require coordination with and sometimes approval by AMTS licensees. The ARRL had hoped to expand opportunities for point-to-point digital messaging systems, but the FCC said amateurs already have access to other bands for that purpose and denied the request.

The Order in ET Docket 00-221 is available on the FCC Web site <http://www.fcc.gov/Bureaus/Engineering_Technology/Orders/2001/fcc01382.pdf>

From *The ARRL Letter*, Feb. 1, 2002

ARRL GOING TO THE MAT ON 70-CM BAND THREAT

ARRL officials met recently with FCC staff members as part of the League's effort to stave off a band threat on 70 cm. ARRL General Counsel Chris Imlay, W3KD, and Technical Relations Manager Paul Rinaldo, W4RI, delivered an ex parte presentation to FCC Office

of Engineering and Technology staffers on January 14. At issue was SAVI Technology's plan--already tentatively agreed to by the FCC--to deploy unlicensed transient RF identification devices between 425 and 435 MHz at much higher field strengths and duty cycles than Part 15 rules now permit for such devices. RFID tags are used to track and inventory parcel shipments.

"We told them that this was the worst possible choice of bands for these RFIDs," Imlay said. "Besides, there's no technical justification for that choice of frequencies." The request to use 70 cm has more to do with economics than technology, he said, because SAVI needs to bring down the cost of RFIDs in order to make a profit.

Imlay added that the ARRL would "do whatever it takes" to stave off the threat, including further direct appeals to FCC staff. The ARRL plans to file "strongly worded" comments on the SAVI petition by the February 12 comment deadline. Reply comments are due by March 12, 2002. Imlay said he was assured that SAVI's request "was not a done deal."

The FCC acted on the SAVI request last October in an FCC Notice of Proposed Rule Making and Order (ET Docket 01-278). The ARRL argued in comments filed last March that the field strengths and duty cycles SAVI proposed for its RFID tags as Part 15 "periodic radiators" were unreasonable and "would undoubtedly seriously disrupt amateur communications in one of the most popular of the Amateur Service allocations," particularly for weak-signal enthusiasts.

The League also believes the FCC lacks the statutory authority to permit the RFID tags under its Part 15 rules in the configuration SAVI has requested. The ARRL argues that under the Communications Act of 1934, such devices with substantial interference potential must be licensed. The ARRL also has suggested that SAVI pick one of the Industrial, Scientific and Medical (ISM) bands instead of 425-435 MHz.

The ARRL's January 14 ex parte presentation was complemented by an interference study prepared by ARRL Lab Supervisor Ed Hare, W1RFI, and ARRL Senior Engineer Zack Lau, W1VT. A copy of the interference study and more information is available on the ARRL Web site "Band Threats" page <<http://www.arrl.org/announce/regulatory/rm-1005/SaviExParte.pdf>>.

From *The ARRL Letter*, April 19, 2002

FCC okays geographic area AMTS licensing, agrees to consider ARRL request

The FCC has approved proposed rules allowing geographic-based licensing of coast stations in the Automated Maritime Telecommunications Service (AMTS), the primary user of the 219-220 MHz band. The Commission also agreed to consider an ARRL petition for changes in the rules governing the secondary amateur allocation at 219-220 MHz. Amateur use of the band within 80 km of an AMTS coast station is currently requires permission from the AMTS licensee, and industry practice has been to routinely deny such requests, regardless of channel separation. The FCC will consider whether AMTS licensees denying permission should be required to give a technical justification for the denial in conjunction with the ongoing 3G proceeding (ET Docket 00-221) that's considering use of 216-220 MHz for new technologies.

From *The ARRL Letter*, May 10, 2002

FCC PROPOSES TWO NEW AMATEUR BANDS!

Great news for ham radio this week! The FCC has proposed going along with ARRL's request for a new domestic (US-only), secondary HF allocation at 5.25 to 5.4 MHz. The FCC also is ready to permit operation on a 136-kHz "sliver band" in the low-frequency (LF) region. And, in response to a third ARRL

request, the FCC has proposed elevating Amateur Radio to primary status at 2400 to 2402 MHz.

"I'm just as tickled as I can be," ARRL President Jim Haynie, W5JBP, said upon hearing the news. "This is a classic example of our ARRL at work."

The FCC voted unanimously May 2 to adopt the Notice of Proposed Rulemaking in ET Docket 02-98. The Commission released a Public Notice May 9, and the NPRM is expected to be released soon. A comment deadline will be announced as soon as it's available.

The FCC said the new 5-MHz band would help amateurs "better match their choice of frequency to existing propagation conditions." The band, if

approved, would be the first new amateur HF allocation since World Administrative Radio Conference 1979 gave amateurs 30, 17 and 12 meters--the so-called "WARC Bands." Assuming the 5-MHz band eventually is authorized, it could be a few years before it actually becomes available.

The League said its successful WA2XSY experiments demonstrated that amateurs can coexist with current users and that the band is very suitable for US-to-Caribbean paths. In comparisons with 80 and 40 meters, the WA2XSY operation also showed the 60-meter band to be the most reliable of the three. The ARRL also argued that a new 150-kHz allocation at 5 MHz could relieve periodic overcrowding on 80 and 40.

If allocated to amateurs on a secondary basis, hams would have to avoid interfering with--and accept interference from--current occupants of the spectrum, as they already do on 30 meters. The band 5.250 to 5.450 MHz now is allocated to Fixed and Mobile services on a co-primary basis in all three ITU regions.

The ARRL asked the FCC for two LF allocations in October 1998--135.7 to 137.8 kHz and 160 to 190 kHz. The FCC said its action on one part of that LF request "proposes changes that would enhance the ability of amateur radio operators to conduct technical experiments, including propagation and antenna design experiments, in the 'low frequency' (LF) range of the radio spectrum."

Several countries in Europe and elsewhere already have 136-kHz amateur allocations. The first amateur transatlantic contact on the band was recorded in February 2001.

Hams would be secondary to the Fixed and Maritime Mobile services in the 136-kHz allocation. The League said its engineering surveys suggest that hams could operate without causing problems to power line carrier (PLC) systems already active in that vicinity or to government assignments. Unallocated Part 15 PLC systems are used by electric utilities to send control signals, data and voice.

The FCC said its proposal to upgrade the Amateur Service allocation at 2400 to 2402 MHz to primary "seeks to protect current amateur use of this band." Hams have shared their other 2.4 GHz spectrum on a secondary basis with government users.

Amateurs already are primary at 2390 to 2400 and from 2402 to 2417 MHz. The ARRL has said primary status in the intervening spectrum slice was needed "to provide some assurances of future occupancy of the band segments for the next generation of amateur satellites."

**Packet Sysops of Northern California
Packet Bulletin Board Systems
March 2002**

Call -----	Location -----	User Ports -----
WH6IO	Benica	144.99, 145.71&+, 145.75&, 433.43&+
WA6ZTY	Berkeley	144.97
KE6I	Berkeley	145.01&, 433.43&
N2THD-1	Citrus Heights	145.07, 441.50
N6CKV	Gilroy	144.99
N6LDL	Los Gatos	144.97, 145.71&, 441.50
WA6NWE-1	North Highlands	144.93, 145.09, 145.75, 441.50
KD6DG	Redding	145.09
W6CUS-1	Richmond	145.63
N0ARY-1*	San Jose	* 144.93, 433.37&
K6YV	Sonora	144.97
WA6EWV-1	South Lake Tahoe	144.97
W6YX-9*	Stanford Univ	* 145.75+
W6SF	Stockton	144.99
K6MFV*	Walnut Creek	* 144.31, 145.71&+

Keys:
 & = 9600 Baud Port
 + = TCPIP Port
 * = Currently Inactive

The ARRL has expressed its belief that hams can continue to accommodate Part 15 and Part 18 devices at 2.4 GHz.

ARRL's Chief Development Officer Mary Hobart, K1MMH, was among those welcoming the good news from the FCC. "This a wonderful example of the work ARRL conducts in Washington on matters important to the Amateur Radio community," Hobart said.

"Thanks to the 10,000 hams who contributed so generously to the 2002 Defense of Frequencies Fund. The success of that campaign helps to make decisions like this possible."

Ham radio could have role in Phenomenon sequel

Amateur Radio is poised to hit the big screen yet again in a movie tentatively

titled Phenomenon II. Phenomenon debuted in 1996 and featured John Travolta and his ham operator friend Forest Whitaker. In one scene, Travolta's character appears to be able to copy RTTY transmissions by ear. For the original Phenomenon movie, ARRL provided several props for the ham radio shack. The sequel is still in the very early stages of development. A researcher working on checking facts in the script contacted ARRL to ask if operators actually used the term "CQ" when initiating contacts. She also told ARRL Media Relations Manager Jennifer Hagy, N1TDY, that the possibility exists for the creation of a television series based on the Phenomenon movies. Hagy offered further assistance if needed. No further details were immediately available.

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Board of Directors Electronic Meeting

Excerpts of the NCPA board remainder traffic, November 27, 2001 through May 1, 2002. Compiled by Gary Mitchell WB6YRU (full text of traffic is available).

Nov 27, 2001

Gary wb6yru:

We have a request from the Sonoma County ACS system people for an allocation in the 900 MHz band for a packet pager. They want to use the paging function in Kantronic's KPC 9612 TNC.

I propose 916.97 MHz be allocated to "digital signaling" to cover this kind of activity. We currently don't have a category like that, so this is a two-part

DX Spotting Nodes

June 2000

<u>Location</u>	<u>Call</u>	<u>Alias</u>	<u>Frequency</u>	<u>Coverage</u>
California City	K6ZZ		144.490	Antelope Valley area
	EARN8		144.490	Oak Peak
Castro Valley Chico	W6RGG	DXCV	145.770	East, West, South SF Bay area
	K6EL	DXC	145.670	Chico
	K6EL	DXW	145.670	Oroville, Red Bluff
Hanford	K6EL	DX	144.950	South Fork Mtn - Redding area
	K6UR	DXFRES	144.950	Bear Mtn, Fresno area
	K6UR	DX7	145.770	Mt. Adelaide, Bakersfield area
	K6UR	DX16	145.770	Oakhurst
Livermore	NF6S	DXL	145.770	Tri-Valley area
Los Gatos	N6ST	DXLG	146.580	Santa Cruz Mtns, Monterey Bay
	N6ST	DXF	146.580	Santa Cruz/Los Gatos
Mountain View	K6LLK	DXMV	144.950	Mountain View, San Jose area
Oakdale	K6OQ		146.580	Modesto area
Penngrove	K6ANP	DXANP	145.670	Sonoma County
Reno, Nevada	N7TR	RENODX	144.950, 146.58, 441.500 (2400 baud), 51.7	
	N7TR	PCDX1	146.580	Low Level in Reno
	N7TR	PCDX	144.950	Virginia City, NV
	N7TR	DX2400	441.500 (2400 baud)	
Rio Linda	K6NP	DXRL	144.950	Sacramento, Woodland, Davis

Bob Vallio - W6RGG wsixrgg@crl.com

proposal. "Digital signaling" defined as: "Brief digital transmissions to signal or control another station or device. This is type of activity should be relatively low volume, such as pagers."

From: Dave Willey kd6kwm
W6RGG wrote:

Very interesting concept. My concern is that ACS is in support of a government agency, and this would be day-to-day use of Amateur Radio for governmental communications. If the paging was to reach folks to (l)ket them know of an unusual opening on six-meters, or some other Amateur Radio-related issue, it might be all right, but the possibility of abuse would be very real. I do not favor the use of Amateur Radio in this context.

What you are saying is that ham radio should NOT be supporting FEMA, Nat. Guard, and Nat. Weather Service -Skywarn, etc. or any other government sponsored disaster relief org (whether local, state or federal) or any agency that might benefit from what hams are licensed to do in the first place... provide EMERGENCY communications. It sounds like someone needs to reread Part 97.1 (a)

ACS is a county sponsored Department of Emergency Services group that is made up of (voluntary) hams under direction of the county. If you think ACS is for the government's own use regardless of the users (ham) license, you completely "missed the boat"

Howard N6HM:

I'm all for this and think it is a good application of packet/digital communications.

Bob Vallio w6rgg:

ACS is in support of a government agency, and this would be day-to-day use of Amateur Radio for governmental communications. The possibility of abuse would be very real. I do not favor the use of Amateur Radio in this context.

Mike wa6zty:

I don't share Bob's concern, UNLESS

paggers are issued to non-amateurs. In any event, we aren't the cops. He has asked for an allocation for a digital signaling system, we can't withhold it because he might misuse it.

Gary wb6yru: The allocation vote doesn't depend on this, but their intended use seems to be completely legitimate.

David Harris N6UOW: I'm in support of the digital signalling proposed at 900 MHz.

Mel Gregonis W6BNG:

I vote "YES" on the 900 Mhz allocation.

Dec 01, 2001

Gary wb6yru:

A few weeks ago the proposed 70 cm band plan was posted here for comment. It's time to vote to ratify it. All in favor?

From: "Robert Wilkins" n6fri

I like the current plan showing the new digital segments. I hope you fellows limit the new segments to wideband circuits only (like the 219 MHz segment).

Gary WB6YRU:

High-speed duplex is the idea. This has been so long in coming, I hope all those who would experiment with such things are still around. I've already received some indication that the DXPSN may be interested. And so far one BBS sysop has shown some interest. Since the ink isn't even dry yet, this is cause for hope.

Bob N6FRI:

I am glad ATV repeater and auxiliary broadcasting are not recognized within the 420-450 MHz band. At the same time we do need to be cognizant and encourage the simplex use of 427.25 ATV.

Can someone explain who and what the Exp/Mix segments are?

Gary WB6YRU:

That's Mixed Mode and Experimental. Anything not specifically listed elsewhere.

Bob N6FRI:

Why aren't there any simplex 1200 baud frequencies available to all the guys that used to always seem to want one?

Gary WB6YRU:

This is a general band plan and doesn't include all those nitty gritty details. The NCPA digital band plan covers those things.

Bob N6FRI:

What will be done in the San Joaquin Valley and south coast to interface to the SoCal 438.8-439.10 digital segment?

Gary WB6YRU:

If someone on the border wants to run a 70 cm north/south link, they'll just have to deal with the mis-match...or make the link on another band.

Bob N6FRI:

SoCal Scrrba does make fm voice auxiliary coordinators in the 433 band segment. There are multiple uses of this spectrum from several high level sites looking north toward the San Joaquin valley. You may want to seek their mutual cooperation once this plan is ratified.

Gary WB6YRU:

Based on what it took just to get a NCPA/NARCC agreement on this plan, I've got no energy/desire left to worry about things like that. I'm not saying it isn't a good point, just that I'm not ready to even think about it.

Bob N6FRI:

Gary addressed my concerns. May I encourage every one to ratify the proposed plan.

Mike Fahmie wa6zty: I vote to approve.

Howard M. Krawetz N6HM: OK by me.

David Harris N6UOW: I'm in favor of the proposed 70 cm band plan.

Mel Gregonis W6BNG: I vote "YES" to ratify the 70 cm band plan.

Dale Jr, William N2RHV:
I am against it. It does not recognize the ch 57 ATV frequency on 421.25 mhz unless you call it a Aux Link

Gary WB6YRU:
NARCC Aux. coordinations in 420-426 take up most of that segment.

It may interest you to know that it was the NCPA who suggested ATV share with those links (perhaps coordinating links around the ATV hot spots), but NARCC wouldn't hear of it.

This is the best we could come up with and still have most people agree. Of course, not everyone will be happy, but there isn't an infinite amount of space to go around. The only fair way to go is to have something for each mode.

Dale N2RHV:
I expect more interest in ATV than digital by far so I do not see why you need this change. Move to 900 MHz for you "backbone" - better use the internet. And the FCC is going to take 440 away from use anyway and give it to the part 15 folk. One way or another you are going to loose 70 cm.

Gary WB6YRU:
You don't know that. I assure you, the NCPA isn't the only one that will fight to keep 70 cm.

As for 900 MHz...Work is currently under way on the general band plan for 23 cm. There will be space for digital. Also, we're looking at two ATV channels--that's almost half of the band (12 out of 26 MHz).

Bob. Vallio W6RGG
Subject: new ncpa address

The reply option on the new remailer has been set so replies go back to the remailer, not the original sender. Please be sure to remember that, when you want to send a private comment to someone on the list.

EOF

Where did 50 Ohms come from?

The standard coaxial line impedance for power transmission in the U.S. is almost exclusively 50 ohms. The question often arises why this value was chosen.

In concentric transmission lines, the electromagnetic wave is propagated through a dielectric medium bounded by two coaxial cylinders. Since current penetration at microwave frequencies is small (skin depth at 1GHz in a silver conductor is approximately 0.00008 inches), the only important dimensions are the diameter (d) of the center and the bore (D) of the outer conductor.

For a coaxial line with small losses, such as used in the industry, the characteristic impedance is:

$$Z_0 = \sqrt{L/C} = \frac{138.16}{\sqrt{\epsilon}} \log_{10} (D/d)$$

where L and C are the inductance and capacitance per unit length and e is the dielectric constant of the medium between the concentric cylinders (e equals 1 for air).

Here are a few representative outer-conductor bore values for an airline with a one inch diameter center conductor:

- 30 ohms - 1.65"
- 50 ohms - 2.3"
- 75 ohms - 3.5"
- 100 ohms - 5.3"
- 150 ohms - 12.2"

Different impedance values are optimum for different parameters. Maximum power carrying capacity, for instance, occurs at a diameter ratio of 1.65 which corresponds to 30 ohms. This is derived from $\sqrt{2/Z_0}$ and from the maximum voltage V that can be sustained without breakdown, however is 2.7, corresponding to an impedance of 60 ohms. This value has been used in some other countries of the world.

Power carrying capacity based on

breakdown voltage ignores the current density, which is high at low impedance such as 30 ohms. Attenuation due to conductor losses alone is almost 50% higher at that impedance than at the minimum attenuation impedance of 77 ohms (Diameter ratio 3.6). This ratio, however, is limited to only about one half the maximum power of the 30 ohm impedance line.

We suggested that in the early days, when microwave power was hard to come by and lines, therefore would not be taxed to capacity, low attenuation was the overriding factor which led to the selection of 77 (or 75) ohms as a standard for CW transmission. This, or course, resulted in hardware of certain fixed dimensions. Later on, when low loss dielectric materials were developed that made flexible microwave cables practical, the line dimensions remained unchanged to permit mating with existing equipment.

The dielectric constant of Polyethylene is 2.3. The impedance of a 77 ohm airline is reduced to 51 ohms when filled with Polyethylene:

$$Z_0 = \frac{77}{\sqrt{\epsilon}} = \frac{77}{\sqrt{2.3}} = 51 \text{ ohms}$$

51 ohms is still in use today along with 51.5, 52, 53 ohms, even though the standard for precision work (and for most of our products) is now an even 50 ohms.

While minimum attenuation is desirable in signal transmission, equipment with a known amount of attenuation is a valuable tool in the laboratory.

Coaxial attenuators are used for a variety of applications such as isolation, comparison standards, power reduction at the source or at the receiving end, and for signal observance.

<http://www.aspect.demon.co.uk/bird50ohms.html#where50ohms>
Aspen Electronics Limited

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Northern California Packet Band Plan

N C P A

March 2002

50 MHz

50.60-50.80 (20 kHz channels, non-specific at this time)
51.12 SCA backbone
51.14 BBS
51.16 Keyboard to Keyboard
51.18 Experimental
51.62 TCP/IP, 9600 baud
51.64-51.68 (20 kHz channels, non-specific at this time)

NOTE: On this band adjacent channel interference is harder to overcome for repeaters. NARCC requests that any new six meter permanent packet installations (such as nodes) please check with their six meter coordinator. You don't need a formal coordination, but they would like to be aware of your station and have an opportunity to check for possible conflicts first.

144 MHz

144.31 BBS
144.33 Balloon & experimental
144.35 Keyboard to Keyboard
144.37 BBS LAN forwarding
144.39 APRS (U.S. and Canada)
144.41 duplex, lower half (145.61 upper half, 1.2 MHz split)
144.43 TCP/IP (OK to run duplex with 145.65)
144.91 Keyboard to Keyboard
144.93 BBS
144.95 DX Spotting
144.97 BBS
144.99 BBS
145.01 User access
145.03 Keyboard to Keyboard
145.05 Keyboard to Keyboard
145.07 BBS
145.09 BBS
145.61 duplex, upper half (144.41 lower half)
145.63 BBS
145.65 TCP/IP 9600 bps (OK to run duplex with 144.43)
145.67 DX Spotting
145.69 BBS
145.71 9600 bps
145.73 BBS
145.75 TCP/IP
145.77 DX Spotting
146.58 DX Spotting

NOTE:

Allocations from 144.31 through 144.43 are relatively close to the weak-signal sub-band—please watch your FM deviation.

220 MHz

219.05-219.95 100 kHz channels, Backbone
223.54 LAN
223.56 LAN
223.58 LAN, Gilroy (GARLIC)
223.60 LAN, Sacramento Valley (SACVAL)
223.62 LAN, South Bay (SBAY)
223.64 TCP/IP
223.66 Keyboard to Keyboard
223.68 DX Spotting Backbone
223.70 LAN, Monterey Bay & North Coast (MRYBAY)
223.72 LAN, North Bay (NBAY)
223.74 Backbone, DX Spotting

NOTES:

- 219 channels are by coordination only. There are currently political problems with using 219-220, making them unavailable in most of northern CA.
- On 223.58, TCP/IP interlink (Sacramento) is secondary, not to interfere with node uplink.

440 MHz

431.45 / 434.85 Duplex (100 kHz)
431.55 / 434.95 Duplex (100 kHz)
431.65 / 438.40 Duplex (100 kHz)
431.85 / 438.60 Duplex (100 kHz)
431.95 / 438.70 Duplex (100 kHz)
433.05 TCP/IP backbone (100 kHz)
433.15 BBS backbone (100 kHz)
433.25 DX Spotting backbone (100 kHz)
433.33 Experimental (60 kHz)
433.37 BBS, 9600 baud
433.39 DX Spotting
433.41 BBS LAN
433.43 9600 baud TCP/IP
433.45 BBS LAN
433.47 Keyboard Interlink
433.49 TCP/IP
433.51 Keyboard
433.53 Keyboard
433.55 BBS LAN
441.50 Any digital

900 MHz

903.500 1 MHz wide, TCP/IP
904.500 1 MHz wide, TCP/IP
915.500 1 MHz wide, experimental

916.100 200 kHz wide, experimental
 916.300 200 kHz wide, experimental
 916.500 200 kHz wide, experimental
 916.650 100 kHz wide, experimental
 916.750 100 kHz wide, experimental
 916.810 20 kHz wide, experimental
 916.830 20 kHz wide, experimental
 916.850 20 kHz wide, experimental
 916.870 20 kHz wide, experimental
 916.890 20 kHz wide, experimental
 916.910 20 kHz wide, experimental
 916.930 20 kHz wide, experimental
 916.950 20 kHz wide, experimental
 916.970 20 kHz wide, experimental
 916.990 20 kHz wide, LAN links (Contra Costa County only)

NOTE:

900 MHz activity is on a non-interference basis to vehicle locator service. This sub-band is not considered suitable for omnidirectional systems. Use for point-to-point links only.

1296 MHz

1248.500 1 MHz wide, experimental*
 1249.000-1249.450 Unchannelized, experimental
 1249.500 100 kHz wide, experimental
 1249.600 100 kHz wide, experimental
 1249.700 100 kHz wide, experimental*
 1249.800 100 kHz wide, experimental*
 1249.870 20 kHz wide, experimental
 1249.890 20 kHz wide, DX Packet Spotting
 1249.910 20 kHz wide, experimental*
 1249.930 20 kHz wide, experimental*
 1249.950 20 kHz wide, experimental*
 1249.970 20 kHz wide, experimental*
 1249.990 20 kHz wide, experimental*
 1250.500 1 MHz wide, experimental
 1251.500 1 MHz wide, experimental
 1297.000-1298.000 Unchannelized, experimental
 1298.500 1 MHz wide, experimental*
 1299.000-1299.450 Unchannelized, experimental
 1299.500 100 kHz wide, experimental
 1299.600 100 kHz wide, experimental
 1299.700 100 kHz wide, experimental*
 1299.800 100 kHz wide, experimental*
 1299.870 20 kHz wide, BBS LAN
 1299.890 20 kHz wide, DX Packet Spotting
 1299.910 20 kHz wide, BBS LAN
 1299.930 20 kHz wide, experimental*
 1299.950 20 kHz wide, experimental*
 1299.970 20 kHz wide, experimental*
 1299.990 20 kHz wide, experimental*

* Full duplex channel pairs at 50 MHz separation, example:
 1249.910 ↔ 1299.910

Definitions

9600 BPS Stations using 9600 baud with direct FSK (G3RUH, TAPR, etc.) modems.

Backbone No uncoordinated stations. These channels are for specific purposes as defined by the NCPA and/or affiliated groups. These are frequencies where the various BBS, nodes, and networks forward traffic and are very high volume channels. Please use the normal user entry points of the network you want to access rather than these channels.

BBS These frequencies are for user access to a full-service BBS. Keyboard-to-keyboard is tolerated. Please don't put high level nodes or digipeaters on these channels since they are local. A low-level direct link or node that links into a backbone on another frequency is the proper implementation.

Duplex Simultaneous transmit and receive by a single station, including digital repeaters. Duplex channels are intended for high-volume applications. 9600 baud or higher is encouraged, but not required at this time.

DX Spotting Northern California DX packet spotting network. No other activity should be on these channels.

Experimental Anything goes except full service BBS or any 24 Hr/Day services (nodes, gateways, etc). This is where you can test new gear, programs, etc. These channels may be reassigned in the near future, so no permanent activities please.

Forwarding same as *backbone*

Keyboard to Keyboard Primarily chat channels. These are also the primary emergency channels. No high-volume activity such as full service BBS, DX Spotting, TCP/IP, etc.

Interlink same as *backbone*

LAN Local Area Network. BBS's are grouped into LAN's for more efficient forwarding. A LAN frequency is the forwarding channel within a LAN and to the backbone. Please do not attempt to access the BBS network on these channels.

Personal mailbox/maildrop A BBS-like system, often running entirely within a TNC, with a small number of users that handles information of a personal, local or special-purpose nature. A mailbox is allowed on keyboard-to-keyboard channels ONLY if it does not forward with other BBSs. Mailboxes may forward with full-service BBSs on LAN channels at the discretion of the BBS SYSOP.

TCP/IP Stations using TCP/IP protocol on top of AX.25. Some AX.25 tolerated to communicate to TCP/IP stations if a compatible p-persistence access method used.

User Access User access to a network. This is for the next generation of packet which is expected to operate like the internet.

Note: Automatic beacons are limited to 28.20 - 28.30

SIX METERS =====

50.12 SSB Calling		50.40 AM Calling		Remote	Weak	
Weak Signal	All Mode	Digital	Control	Signal	Digital	
50.0	50.3	50.6	50.8	51.0	51.11	51.19

Repeater			Repeater		Repeater
Inputs	Simplex	Digital	Outputs	Simplex	Inputs
51.19	51.49	51.61	51.69	51.99	52.05

			RC 53.20		RC 53.40
			RC 53.10		RC 53.30
Simplex	Repeater	Simplex		Repeater	Inputs
Outputs					
52.49	52.55	52.99	53.03		53.49

	RC 53.60	RC	53.80	RC	
53.50	RC		53.70	RC	53.90
Simplex		Repeater	Outputs		
53.49	53.53			53.99	

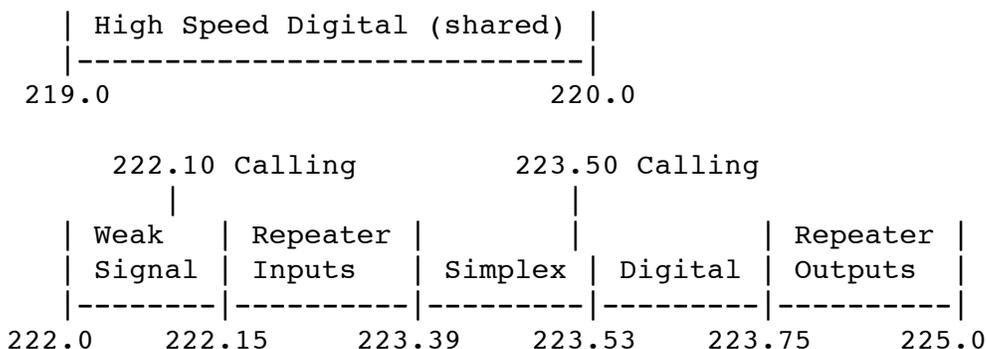
TWO METERS =====

144.20 SSB Calling				Repeater	
Weak Signal	Digital	Sat.	Inputs	Digital	
144.0	144.3	144.44	144.5	144.9	145.1

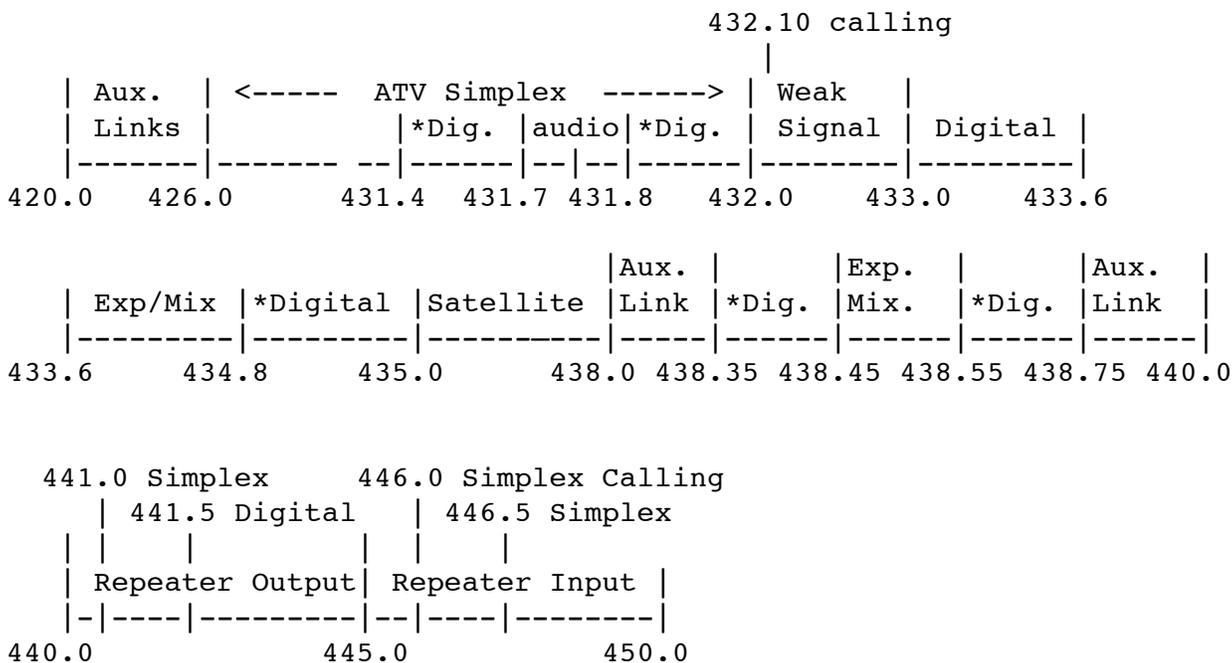
Repeater				Repeater
Outputs	Exp.	Digital	Satellite	Inputs
145.1	145.5	145.6	145.785	146.0

146.52 Calling		146.58 Digital		
		Repeater		Repeater
Simplex	Outputs	Simplex	Outputs	
146.4	146.6	147.4	147.6	148.0

1.25 METERS =====



70 cm =====



*Digital 100 kHz duplex channels.
 Lower duplex: 431.45, 431.55, 431.65, 431.85, and 431.95 MHz.
 Upper duplex: 434.85, 434.95, 438.40, 438.60, and 438.70 MHz.

ATV: video carrier at 427.25, aural carrier at 431.75 MHz.
 The top part of the ATV channel is shared with digital.

Northern California Packet Association

The NCPA fosters digital communications modes of amateur radio through education, band planning, and acts as an umbrella organization for various packet special interest groups. Your annual dues helps pay for this newsletter and other educational materials activities. If you might be interested in getting more involved, please let us know.

Call: _____ Home BBS: _____ e-mail: _____

Name: _____ Address: _____

City: _____ State: _____ Zip + 4: _____ Phone: _____

- New Membership Renewal Change of Address I'm an ARRL Member
 One year: \$10 Two Years: \$20 Three years: \$30
(make checks payable to NCPA)

Please indicate your area(s) of interest:

- BBS SysOp BBS User APRS NET/ROM TCP/IP High-speed packet
 DX Packet Spotting Network Keyboard to Keyboard FCC/legal issues Other:

NCPA *Downlink*

Northern California Packet Association

PO BOX K

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First Class