W5YI

America's Oldest Ham Radio Newsletter

REPORT

Up to the minute news from the world of amateur radio, personal computing and emerging electronics. While no guarantee is made, information is from sources we believe to be reliable.

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In This Issue...

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FCC Authorizes Additional Spread Spectrum Capability to Amateurs!

In one of its longer drawn out rulemaking proceedings, the FCC released a *Report and Order* in WT Docket 97-12 on September 3rd amending the rules to provide for greater use of Spread Spectrum emissions in the Amateur Service. The final ruling comes more than two years after the Commission issued a *Notice of Proposed Rulemaking* and nearly four years after the American Radio Relay League filed a *Petition for Rulemaking* on December 12, 1995. The ARRL wanted the rules changes to allow amateur station to transmit spread spectrum ("SS") type emission technologies employing additional spreading sequences.

The FCC concluded that "...the public interest would be served by removing the restriction in the Amateur Radio Service rules that limit the SS emissions that amateur stations may transmit." The Commission believes this change "...will

(1) allow amateur service licensees to experiment with additional SS emission types;

(2) allow amateur radio operators to develop innovations and improvements to communications products and develop new communications technologies;

(3) facilitate the ability of the Amateur Radio Service to contribute to the development of SS communications by allowing amateur stations to transmit and experiment with SS technologies currently used in consumer and commercial products; and

(4) promote more efficient use of spectrum allocated to the Amateur Radio Service."

In a nutshell, the rules were amended to:

1. remove the limitation that amateur stations transmit SS emission types using only frequency hopping and direct sequence spreading techniques;

2. require that amateur stations use automatic transmitter power control to limit transmitter power to the minimum power necessary to maintain communications; and

3. to remove now-unnecessary record keeping and station identification requirements that apply only to stations transmitting SS emissions.

The Commission said their ruling furthers their goal to improve amateur radio communication capabilities. "In developing these new and amended rules we are guided by three broad policy principles," FCC said. "First, we seek to provide a flexible regulatory framework that allows for continued development of new services through experimentation by amateur radio operators on amateur service spectrum. Second, we seek to promote technological innovation. Finally, we seek to eliminate unnecessary regulatory burdens."

What is Spread Spectrum?

Spread Spectrum ("SS") is a modulation technique that distributes the energy of the transmitted signal over a segment of spectrum that is much larger than would be needed for a "traditional"

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modulation scheme. This technique results in the power density of the transmitted signal being very low, and the duration of a transmission on any frequency in the frequency segment being but a fraction of a second, at any point of bandwidth the SS emission occupies.

This technique also allows reuse of the bandwidth in the available frequency segment that the SS emission occupies, thereby allowing multiple stations transmitting SS and non-SS systems to use the segment of spectrum simultaneously.

While SS modulation techniques have been known for over 60 years, until the last 20 years its use has been almost exclusively for military or other limited applications. In fact, outside of the military context, one of the primary uses of SS was to obscure the content of the message from individuals using receivers capable of reception only on a single channel or for a finite number of channels during some defined time period.

Amateurs experiment with SS

Over eighteen years ago, *Special Temporary Authority* to experiment with SS transmissions was granted to 25 amateur radio stations affiliated with the *Amateur Radio Research and Development Corporation* (AMRAD.) These experiments involved on-air evaluation of different spreading rates, frequency ranges, and interference to stations transmitting other emission types.

On the basis of these tests, amateur radio stations were authorized to transmit SS emissions using two spreading techniques after June 1, 1986. Since SS was introduced in the Amateur Radio Service, the rules applicable to SS have not been substantively amended. In the intervening 12 years, however, numerous entities have developed commercial applications of SS, including medical telemetry, Personal Communications Services, remote meter reading and position locating, including safety applications such as the use of the Global Positioning System for locating ships at sea and other objects or individuals at remote points.

The current Part 97 rules permit amateur stations to transmit SS emissions subject to certain operational constraints. Amateur station SS transmissions may be used only for communications between points where the Amateur Radio Service is regulated by the FCC and may be made only on authorized Amateur Radio Service frequency bands above 420 MHZ.

SS emissions transmitted by amateur radio stations are limited to two types of spreading techniques -- frequency hopping and direct sequence. Additionally, the rules require that documentation sufficient to enable the FCC to demodulate all transmissions be retained for a period of one year following the last entry in the station records. The rules also prohibit SS emission transmissions made for the purpose of obscuring the meaning of any communication. Further, amateur radio stations transmitting SS emission types are secondary to amateur radio stations transmitting other emission types.

On March 3, 1997, the Commission released the *Notice* to examine whether amateur stations should be permitted to transmit SS emission technologies employing additional spreading sequences. The ARRL had asked in its petition that each SS transmitter be required to incorporate a device to automatically limit its power to that actually necessary to carry out the communications and the FCC went along with this request in the NPRM. Fifteen comments and twenty-five reply comments were filed in response to the *Notice*.

The NPRM proposed to allow amateur stations to transmit SS type emission technologies employing additional spreading sequences. Eliminated would be the rules (§97.311(c) and (d)), which restrict amateur stations to transmitting SS emissions that use only frequency hopping and direct sequencing spreading techniques.

The FCC said this change "would allow amateur radio operators to develop innovations and improvements to communications products and technologies, ...would provide amateur radio operators more flexibility to use current and future communications technologies, ...encourage the amateur radio community to expand its experimental activities with SS and allow amateur stations to transmit SS emissions that presently are transmitted using other communications devices.

The FCC decision

The comments generally supported elimination of restrictions on the spreading techniques that amateur radio stations may use. The FCC said that "...one of the fundamental purposes underlying our Part 97 rules is accommodation of the amateur radio operator's proven ability to contribute to the advancement of the radio art. We agree with William Tynan, W3XO that we should not continue restricting the spreading techniques available to the amateur service in order to protect Part 15 manufacturers."

"We also concur with the ARRL that elimination of this restriction makes it likely that amateur radio operators will use Part 15 devices as a source of SS equipment, and we note that Metricom, a manufacturer of Part 15 devices, supports these changes, provided we also adopt our proposal for automatic power control. We also note that, because certain spreading codes and modulation methods used in Part 15 devices are not permissible in amateur radio communications, the most likely effect of the current rules is that experimentation is conducted by amateur radio licensees under Part 15 rules rather than under the amateur service rules."

The manufacturers of unlicensed Part 15 devices argued that the proposed changes could upset the deli-

cate balance that has been struck in the bands they share with the Amateur Radio Service, especially the 915 MHZ and 2.4 GHz bands. "This balance, however, appears to be based in large part on the unattractiveness of SS experimentation in the Amateur Service due to the restriction in the rules that limits amateur radio stations to using only two specified techniques for spreading emissions -- frequency hopping and direct sequencing."

"We do not believe that this concern warrants retaining the current restrictions on amateur radio stations. As an initial matter, we note that Part 15 devices will only receive an SS transmission from an amateur radio station if the station is using the same spreading or coding scheme as the Part 15 device, if the amateur station is transmitting at the same time and on the same channels as the Part 15 device when it is in use, and if the amateur station is within the reception range of the Part 15 device."

"The Part 15 Coalition has not shown with any degree of certainty that this coincidence of events is likely to happen frequently. Further, Part 15 devices do not require the user to have any technical knowledge of how the device works or its potential for interference and use of unlicensed Part 15 devices is conditioned on the user accepting interference from the operation of an authorized radio station, another Part 15 device, or ISM (Industrial, Scientific and Medical) equipment. Additionally, the use of automatic power controls by amateur stations that transmit SS emissions and other technical solutions ...are expected to further reduce the interference potential." The FCC went ahead and adopted their rules as originally proposed.

Automatic power control

Under the current rules, an amateur station must use the minimum power necessary to carry out the desired communications regardless of the emission type, spreading technique, or frequency band used. *(§ 97.113 (a) and (b).)* In addition, amateur stations transmitting SS emission types are restricted to a maximum transmitter power of 100 watts (W). *(§ 97.311(g).)*

The FCC proposed in the NPRM that automatic power control circuitry be required whenever an amateur station transmits an SS emission with more than 1 W. This requirement was intended to ensure that the output power is limited to the minimum level necessary to conduct communications so that interference with other amateur radio stations and users of the frequency bands would be minimized.

The comments were divided over the need and ability to implement automatic power controls. Some commenters believe that such controls would have an inhibiting effect on amateur service communications. The ARRL, however, continued to support automatic power controls.

The FCC concluded "After review of the record, we conclude that the automatic power control requirement proposed in the *Notice* should be adopted. ...such a requirement is reasonable in mixed-mode frequency bands until sharing protocols are sufficiently developed to satisfy users that stations can avoid inter-mode interference. Further, we believe that power limits are a reasonable tradeoff between the wideband characteristics of SS emissions and the ability and flexibility to use various spreading codes."

The FCC declined, however, to adopt the suggestion of the ARRL that the power level of the SS emission be limited to one watt. "We are concerned that reducing the authorized maximum power for SS emissions to the level suggested by the ARRL could adversely affect SS experimentation in the amateur service and would effectively reduce amateur stations transmitting SS emissions to the status of Part 15 devices."

Methods to minimize potential interference

The FCC also asked in the *Notice* for comments regarding methods available, other than automatic power control circuitry, to minimize any potential interference between amateur station operations and Part 15 devices, "We solicited these comments because Metricom expressed concern that amateur radio operators will obtain commercial Part 15 SS devices and modify them for use under our Part 97 rules Symbol, another unlicensed Part 15 device manufacturer, was concerned that the disparity between authorized power for amateur stations and unlicensed devices will affect the operation of unlicensed devices in the vicinity of amateur stations."

"The comments contained technical and other non-regulatory suggestions for alleviating unwanted reception of SS transmissions such as using directional antennas with point-to-point links. Another technique that can be useful in locating and resolving unwanted reception of an SS emission is to allow SS systems to voluntarily incorporate a Morse code identification transmitter that can be demodulated by a conventional receiver. Once the call sign of the transmitting station has been determined, the mailing address of the licensee can be found in many of the numerous Internet databases that list licensee information or by accessing the Commission's databases."

"These suggestions are generally supported by the ARRL. These suggestions also convince us that amateur radio operators interested in SS communication are willing to accommodate each other and other users of the spectrum and that they are willing and capable of resolving interference, should it occur, through technical means. For this reason, we do not believe it is necessary or desirable for us to adopt rules, other than the automatic power control requirement, that specify or could limit methods available for resolving potential interference between

amateur station transmissions and other users of these frequency bands."

Station record keeping and identification

The Part 97 rules (§97.311(e)) of the Commission's rules requires that the station records document all SS emission transmissions and these records be retained for a period of one year following the last entry. Some commenters questioned whether amateur radio operators had the technical expertise or know-how to comply with this rule, and that this rule does not have a bearing on their ability to use SS emission types. Furthermore, retention of this requirement unnecessarily burdens the station operator. *Tucson Amateur Packet Radio* (TAPR) believed that the logging requirement should be the same for all Amateur Radio modes. In contrast, the ARRL did not believe that this requirement is too burdensome.

In addition, Section 97.119(b)(5) requires that a station transmitting an SS emission must transmit its assigned call sign at the end of each communication, and at least every ten minutes during a communication, by a CW or phone emission during SS emission transmission on a narrow bandwidth frequency segment. Alternatively, the station may identify itself by changing one or more parameters of the emission so that a conventional CW or phone emission receiver can be used to determine the station call sign. One of the purposes of station identification is to clearly make the identity of the station transmitting known to those receiving the transmission.

TAPR said that this requirement causes interference and, as a result, outweighs any benefits accrued regarding monitoring. Further, it suggests that conventions for station identification should be developed by the amateur radio community rather than the Commission.

The Manager of the National Communications System pointed out there is no currently available Commercial Off The Shelf (COTS) spread spectrum equipment which complies with this rule. In fact, he believes that deletion of this rule could lead to an increase in the availability of COTS equipment. ARRL does not believe that this requirement is too burdensome; rather, it believes that the requirement is "designed to permit self-regulation and compatibility determinations involving a mode that is difficult to monitor."

The FCC said that "The basis for the station record keeping requirement was a concern that the Commission and amateur radio licensees could not monitor readily SS emissions and therefore ciphers or other prohibited messages could be transmitted by stations using SS emissions. To date, we are not aware of any instances of improper messages being transmitted by amateur stations and the record in this proceeding does not indicate to the contrary."

"We agree that this requirement no longer serves a useful purpose and that eliminating it is a logical outgrowth of our proposal to remove restrictions on the spreading techniques that amateur radio stations may transmit. Further, we are concerned that keeping these records may discourage amateur radio operators from experimenting with SS emissions. We see no regulatory purpose being served by requiring amateur radio stations that transmit SS emissions to keep different records than amateur radio stations transmitting any other emission type."

Types of spread spectrum

Two commenters suggested that the Commission define a "Broad Band" SS that would incorporate the bandwidth proposed by the Commission in the *Notice*, and a "Narrow Band" SS that could occupy a bandwidth of perhaps 10 kHz and be authorized on all the amateur bands above 50 MHZ, which are presently open to SSB and AM, so long as the bandwidth of the transmitted signal does not exceed that of an AM voice signal.

The ARRL opposed this suggestion on the basis that no additional frequency allocations for SS emission types were proposed. Instead, it states that the intent of the *Notice* is to permit the use of additional spreading codes in order to provide SS users with additional flexibility to determine which spreading codes provide the minimum interference to potential narrow band amateur modes."

The FCC agreed with the ARRL and will not grant this request because it is premised on SS being transmitted on additional amateur service frequency bands. "We also believe that subdividing SS emission types is unnecessary and inconsistent with the experimental nature of the Amateur Radio Service.

SS emissions and interference to satellite.

A number of commenters expressed concern that if a significant number of additional stations start transmitting SS emissions, interference to ongoing modes of amateur service communications will increase. In an effort to mitigate this anticipated problem, a suggestion was made that spread spectrum emissions be restricted to band segments that are not used by amateur stations for weak signal communications.

AMSAT requests that the rules be amended to exclude SS emissions from specific frequency segments used for satellite communications. Other commenters wanted frequency segments be reserved for EME operations. SCRRBA (the Southern California Repeater and Remote Base Association) expresses concern about potential interference between stations transmitting SS emissions and amateur stations operating as repeaters.

The 220 MHZ Spectrum Management Association of Southern California said that the burden of interference resolution between SS and the narrowband modes be placed on the "uncoordinated emitter" ...meaning the Spread Spectrum user.

In contrast, TAPR opposed those requests and believes that we should restrict our role to setting technical standards and leave the setting of conventions for other operations to the amateur radio community. ARRL said that "...most repeater usage is on frequency bands below the bands where SS emissions are authorized and further restrictions on SS spectrum are unnecessary."

The FCC agreed with the ARRL. "Section 97.311(b) will require that a station transmitting SS emissions must not cause harmful interference to stations employing other authorized emissions, and must accept all interference caused by stations employing other authorized emissions." This rule change clarifies that stations transmitting SS emissions will remain, as they are now, secondary to other stations on the frequency bands they are authorized to transmit on.

Since the new rule changes do not extend any new frequency allocations to stations transmitting SS emissions, "...concerns about interference to repeater stations or other stations that transmit on frequency bands below the 70 centimeter (cm) frequency band are unfounded because SS emissions are not authorized below the 70 cm frequency band."

"We also note that interference between amateur radio stations is already addressed generally by Section 97.101(d), which prohibits operators from willfully or maliciously interfering with or causing interference to any radio communication or signal."

"Additionally, we believe that excluding specific emission types from additional frequency segments based on the specific operating interests of individual licensees or groups of licensees is inconsistent with the principle that each station licensee and each control operator must cooperate in selecting transmitting channels and in making the most effective use of the frequencies allocated to the Amateur Radio Service and that no frequency will be assigned for the exclusive use of any station."

"A hallmark of the Amateur Radio Service has been that all frequencies are shared. The expectation of any station that it can operate in a totally interference-free environment, therefore, is unreasonable. We also believe that subdividing amateur service frequency bands would undercut the voluntary band planning that the amateur service community does and would result in a loss of flexibility to reallocate spectrum as licensee's operating interests change, new technologies are incorporated, and frequency bands in the radio spectrum are reallocated."

THE NEW PART 97 RULES:

Sections 97.3(a), (b), and (c) are amended by inserting numbers in front of each defined term in the definitions, and revising Section 97.3(c)(8) to read as follows:

§ 97.3 Definitions.

***

(c) ***

(8) *SS.* Spread spectrum emissions using bandwidth-expansion modulation emissions having designators with A, C, D, F, G, H, J or R as the first symbol; X as the second symbol; X as the third symbol.

* * * * *

3. Section 97.119(b)(5) is removed.

4. Section 97.305(b) is revised to read as follows:

§ 97.305 Authorized emission types.

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(b) A station may transmit a test emission on any frequency authorized to the control operator for brief periods for experimental purposes, except that no pulse modulation emission may be transmitted on any frequency where pulse is not specifically authorized and no SS modulation emission may be transmitted on any frequency where SS is not specifically authorized.

***

Section 97.311 is revised to read as follows:

§ 97.311 SS emission types.

(a) SS emission transmissions by an amateur station are authorized only for communications between points within areas where the amateur service is regulated by the FCC and between an area where the amateur service is regulated by the FCC and an amateur station in another country that permits such communications. SS emission transmissions must not be used for the purpose of obscuring the meaning of any communication.

(b) A station transmitting SS emissions must not cause harmful interference to stations employing other authorized emissions, and must accept all interference caused by stations employing other authorized emissions.

(c) When deemed necessary by a District Director to assure compliance with this Part, a station licensee must:

(1) Cease SS emission transmissions;

(2) Restrict SS emission transmissions to the extent instructed; and

(3) Maintain a record, convertible to the original information (voice, text, image, etc.) of all spread spectrum communications transmitted.

(d) The transmitter power must not exceed 100 W under any circumstances. If more than 1 W is used, automatic transmitter control shall limit output power to that which is required for the communication. This shall be determined by the use of the ratio, measured at the receiver, of the received energy per user data bit (Eb) to the sum of the received power spectral densities of noise (N_0) and co-channel interference (I_0). Average transmitter power over 1 W shall be automatically adjusted to maintain an $Eb/ (N_0 + I_0)$ ratio of no more than 23 dB at the

CUTTING EDGE TECHNOLOGY

■ **In many dance clubs, a song submitted for play must be accompanied by a "beats per minute" number** so the DJ can tell in advance how fast or slow it is. It helps to establish or maintain a particular mood and allows for seamless mixes between tracks. Electronic beat-per-minute detectors are already on the market.

■ **We may soon see tiny microphones etched directly into IC substrates.** "Silicon microphones" may be arranged in arrays to enhance performance of hearing aids or even cell phone handsets. Additional filtering components can be connected on-chip, thereby cutting down on discrete component count and cost. The new type of microphone is very robust; it can theoretically take a shock of several hundred g's. Enough of these tiny devices could make directional microphones more efficient.

■ **Some hard disk drives now include shock sensors.** They monitor any hard shocks to the drive, such as bumps or drops, and circuitry monitoring those sensors can temporarily disable the read/write heads to prevent accidental erasures or overwrites of data.

■ **High-tech conference rooms now use visual projectors that lower themselves from the ceiling.** Chief Manufacturing offers ceiling lifts that allow images to be seen without obstruction, and afterwards the entire unit recesses back into the ceiling to look like any other tile.

■ As if DVD wasn't enough, **Philips and Sony have released their Super Audio Compact Disc (SACD) format** specifications to other companies. The Super Audio CD will offer up to six channels of sound, yet can still be played on conventional CD players. Anti-copy techniques are incorporated into the standard. The sampling rate goes well over 2 MHz for a dynamic range of more than 120 dB.

■ **Road crews don't want to shut down a lane of traffic if they don't have to,** since it costs money and inconveniences thousands of drivers. A new type of traffic sign helps eliminate road closure by keeping the illumination source away from the road and delivers the light through fiber-optic cables. Lamps can be replaced easily and quickly, without tying up traffic.

■ **Trade shows now often use credit card sized identification badges that let attendees sign in electronically.** Each exhibitor can swipe the card through a small reader, thus adding that person to his database. This speeds up name and address exchange. Even better, an attendee doesn't have to carry around flyers or other product information; all he has to do is turn in his card at the end of the convention, and a pile of all the information he wants can be waiting for him in his office when he returns home.

■ **If you're trying to find out how, when and where your valuable objects get damaged or destroyed in shipping,** then the Impact-O-Graph may be for you. The electronic indicator keeps track of heavy shocks, with limits from 5g up to 300g. Higher versions can even record the exact time each heavy burst of acceleration takes place. Each low-cost monitor fits easily into most packages and cannot be reset.

■ **Semiconductor demand is so high that Intel will switch to a more productive means of producing them.** Within a couple of years, the company will switch its manufacturing process to accompany a higher-volume silicon wafer. Today's wafers are eight inches across, with tomorrow's wafers to be 12 inches across. This doubles the surface area and allows more integrated circuits to be made at the same time, therefore lowering the cost.

■ World's richest man gets richer. **Last year, Microsoft chairman Bill Gates' personal worth rose to $90 billion** up from $51 billion a year earlier ...a cool $41 billion increase. Assuming that Gates is on the job 60 hours a week, his pay last year was over $13 million an hour. Gates founded Microsoft in 1975.

■ Never be lost. **Casio has just introduced a battery-operated GPS watch ($350)** that tells you where you are in four seconds. After you specify your destination, the watch graphically indicates the direction and the distance to your destination from your current location. The data is updated along the way. Screen has 32x31 dot resolution, weight: 5-oz.

EMERGING COMMUNICATIONS

■ **Within the next four years, about 900,000 km of fiber-optic cable will lay on the ocean floor.** Telecommunications firms around the world are investing over $25 billion in the effort, particularly in an attempt to meet the demand from the Pacific Rim.

■ **Consumer long-distance phone war!** MCI has thrown the long-distance consumer market into a tailspin by going to 5¢ a minute. The No. 2 LD carrier doesn't make most of its earnings from long distance. It is Internet and data traffic (of which it carries 50% of the U.S. total) that pays the freight. The low price LD service only serves to utilize excess capacity and to line up future customers.

MCI WorldCom believes all future growth will come from Internet and international operations. The firm claims to have signed on a million new customers since it announced its five-cent calling plan last month. Telephone service is the major revenue source at rival Sprint and AT&T, however. Voice telecommunications is growing at the rate of 3%-5% a year while data traffic is mushrooming from 200% to 600% a year.

■ **"How fast is the Web growing?** According to Hewlett-Packard, 6,500 new Web sites are created each hour. And Sun Microsystems says that 15,000 new Internet users are added each day, and that within two years, there will be 350 million people using it" *[Quoted from the Wall Street Journal, Sept. 14, 1999].*

COMPUTER INFO

■ **A computer program called FLOtherm allows engineers to predict heat flow in a piece of electronic equipment before it's even built.** Since practically all electronic circuits emit heat and must get rid of it, hot air can collect in a closed space and hasten circuit failure. FLOtherm examines physical locations of power supplies, heat sinks, circuit boards and cabinet walls and compares hot air rising to cold air sinking (with exhaust fans and ventilation slots) to show the designer where any "hot spots" may be and how to correct them -- all before production begins.

■ **GPS is helping farmers to take better care of their crops.** Soil samples are taken at various points on farmland and logged according to locations mapped with precision from overhead navigational satellites. A computer examines the soil samples and returns information about what crops need certain fertilizers, and

how much.

■ **Third-party developers offer special visual filters for standard computer graphics software packages.** You can simulate the appearance of an object as it will look through a shower door, for example. One filter even simulates a picture an on old TV set, revealing individual scan lines, ghost images and even static. Old objects such as maps and books can even be aged with "stains."

■ **Professional recording studio equipment is so advanced now that a singer's voice is often "tweaked" with a computer** if a particular note doesn't sound quite right and a retake isn't possible or is too expensive. A voice can be shifted in frequency without changing the length of the note.

■ **One of the most complex and time-consuming parts of the animation process** is matching mouth movements to voices. LIPSinc's Ventriloquist software now aids animators by listening to human speech and automatically generates the corresponding mouth and lip movements for a 3-D character on-screen.

■ **Some offices actually waste money when they plan their fiber-optic cable layout.** It makes little economic sense to lay out a fiber-based computer network that can easily adapt to 10 years' worth of expansion when the company doesn't plan to stay in the building that long.

■ **More than 15 million homes in America now contain at least two computers.** Within two years, that number is expected to increase to 40 million.

■ **What ever happened to Packard-Bell computers?** The firm is now 49% owned by Japan's NEC Corp., and 13% owned by France's Group Bull. While Packard-Bell $499 to $999 PC's are still around, their promotional emphasis is being placed on the NEC name. They have introduced a new 20-pound Z1 two-toned, 15" flat-panel thin monitor (Pentium III) PC that combines style with the latest technology. It has a wireless keyboard and a minimal number of connections (just power and telephone.) But it isn't cheap! List is $2,499.

■ According to second quarter statistics released by IDC (International Data Corp., Framingham, MA) **the top two PC brands are Dell and Compaq.** Domestic shipments are about the same (each commanding 14.4% of the market) but Compaq is No. 1 internationally (13.9% share), with Dell second (9%.) IBM is third. Dell is the fastest growing PC maker with nearly a 60% growth rate!.

INTERNET NEWS

■ **American Express is launching a Credit Card (called "Blue") especially for online shoppers.** The Blue card contains a smart chip that contains the shopper's personal purchasing information (such as name, address, and account data) in a secure "wallet" on a user's PC. When the "wallet" is opened by the shopper, a vendor can connect to the cardmember's computer to read the encrypted digital data. The card will have an introductory zero percent interest rate for the first six months and as low as 9.99% afterward. <http://www.americanexpress.com/blue>

■ **Priceline.com (Stamford, CT) is an example of just how volatile Internet stocks can be.** After beginning operation in the Spring of 1998, Priceline went public this past March 30. By the first week in May it was a smash hit ...selling for more than $150 a share. Since then, however, it has all been downhill and at this writing, Priceline is selling in the $50's - substantially under its $69 IPO (Initial Public Offering) price.

Priceline.com has an Internet pricing system that enables consumers to achieve significant savings by naming their own price for goods. Priceline earns the spread between the customer's offered price and the fare that an airline will accept. For example, if a customer offers to pay $300, Priceline will tell the airline someone will pay $275 for the ticket. The $25 is their profit. If Priceline knows an airline will sell a ticket for $275 and gets an offer for $500, it keeps $225. The firm is now branching out into hotel rooms, automobiles and home mortgages.

But there can be no doubt that people are using Priceline in a big way! The firm sold over 50,000 leisure airline tickets the second week of September alone! The firm is shaking up the airline industry ...and claims they sell 2% of all leisure airline tickets. Priceline deals with 18 domestic and international airlines, but they won't say who they are.

According to surveys by Princeton-based *Opinion Research Corp.*, a projected 42.1 million adults have already shopped the Internet within the past year. Web shoppers said their top favorite places to save money on the Web are Amazon.com, eBay and Priceline.com. But for purchases over $100, Priceline.com was the clear winner.

■ **Weird method of human identification.** The U.S. Patent and Trademark Office has issued Patent No. 5,878,155 to Thomas W. Heeter of Houston, TX for his "...method for facilitating sales transactions by electronic media. A bar code or a design is tattooed on an appendage of an individual using invisible ink. Before the sales transaction can be consummated, the tattoo is scanned with a scanner. Characteristics about the scanned tattoo are compared to characteristics about other tattoos stored on a computer database in order to verify the identity of the buyer. Once verified, the seller may be authorized to debit the buyer's electronic bank account in order to consummate the transaction. The seller's electronic bank account may be similarly updated." The inventor claims that his ID system eliminates the hazards of phoney identification, lost or stolen drivers licenses, passports, credit cards and e-money. *[Editor: Sounds like a system used to mark cattle to me.]*

WASHINGTON WHISPERS

■ **FCC Chairman Bill Kennard told a September 2nd group meeting of the *National Association of Broadcasters* (NAB)** that he did not believe that allowing low and micro-power FM broadcasting would cause significant interference to existing FM stations. He said studies by FCC engineers using a wide range of inexpensive radios hold promise.

The FCC discontinued licensing low-power FM stations some 20 years ago. Kennard feels that LPFM will help schools, churches, city governments, and community groups get on the air at a time when AM/FM broadcasting is consolidating to fewer owners. The top telecommunications regulator believes that low power FM and digital radio - to which the FCC is committed - can coexist. "We need cooperation, not confrontation," he said.

■ Much to the delight of the technology industry, **the Clinton administration is allowing US firms to export privacy-protecting encryption products.** Law enforcement officials and the FBI had opposed the new regulations.

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October 1, 1999

AMATEUR RADIO

■ **The new editor of CQ Magazine is Richard Moseson, W2VU.** He replaces long-time CQ-editor Alan M. Dorhoffer K2EEK (now deceased) who held the position for 23 years.

■ **Sidney W. Mahan, K5BLB of Estancia, New Mexico** has been informed by the FCC of its intent to revoke his General Class operator license.

On Nov. 18, 1998, the FCC issued a warning letter to Mahan about his operation on 3.950 MHz. The letter said audio tapes were played from his amateur station, as well as sound effects and deliberate interference to other operators.

The FCC said it continues to receive complaints about his station involving profanity, obscenity, broadcasting extreme racial slurs, deliberate interference -- especially during a net operating on Saturday evenings -- and failure to properly identify.

FCC's Riley Hollingsworth said he would be forwarding audio tapes made of his station on August 13, 1999. Mahan will be asked to provide a full explanation. "This information will be used to determine what action to take in this matter."

■ **Andrew Penn, N8JVA of Linden. MI** has also been notified by the FCC that it intends to revoke his Extra Class license.

Penn is charged with "...serious irregularities in the June 3, 1997, Oak Park, MI examination session, for which you were a volunteer examiner and submitted the paperwork for licensing of the applicants by the Commission. As a result of our investigation into this matter, we downgraded two licenses and canceled another."

"Our evidence indicates that before submitting the examination documents to the VEC for forwarding to the Commission, you added paperwork for 4 applicants who did not pass the required examination elements at the Oak Park session. Furthermore, evidence indicates that you applied the signatures of three VE's without their knowledge, to the applications of the four individuals."

Penn was given the option of appearing for a hearing or submitting his license for cancellation,

■ **Alan E. Strauss, WA4JTK of Carol City, FL** - net control station of the "14.247 DX Group" - has again been contacted by the FCC regarding monopolizing that frequency and interfering with ongoing communications.

"We again remind you, and all other licensees who may at times act as net control for your group, that Amateur frequencies are shared frequencies and the 'net' has no greater rights than any other licensed operator on any given frequency."

"A net 'taking over' a frequency from existing legitimate communications is considered deliberate interference and cannot be tolerated on the Amateur frequencies."

Strauss was given 20 days to respond to correspondence received by the FCC concerning his net operations.

■ **Chester R. Cook, (formerly) AC5LZ of Los Lunas, NM** was ordered by the FCC to retake all examinations up to and including the Extra Class last June. Cook passed the General Class written requirements and provided a physician's certificate for the code exemption.

In keeping with his General Class qualifications, on August 24th, Cook's Advanced and Extra Class privileges were canceled and his Group "A"call sign downgraded to Group "C": KC5MQP.

James E. Keller, KF4JQP (Hueytown AL), Raphael Ayala KC2ALT (Brookyn NY), Chris Risher KD6INK (Oakland CA) and Roger Morgan (KB%URM (San Antonio TX) were recently ordered to retake all of their amateur license exams at local FCC offices.

■ **William A. Eitner, KD6TAS of Menlo Park, CA** has been issued a formal warning from the FCC concerning deliberate and malicious interference to the K7IJ repeater operation.

■ **FCC's Riley Hollingsworth is continuing the campaign to reclaim all those club call signs that were improperly applied for and granted.** Five more amateurs are being investigated.

The FCC wants to know the names and addresses of the members of each organization for which a club call sign was requested, information concerning meetings held and the *"Documents of Origination"* for each club.

"We intend to cancel all of the listed call signs if you have not satisfactorily responded to this letter within 30 days," Hollingsworth said. The five amateurs are:

Thomas R. Reynolds KF6UJP, (Technician Class) of Covina CA. (KF6VBN, KF6VXY, KF6VXZ & KF6VYA.)

John Zitzelberger W6GL, (Extra Class) of Thousand Oaks, CA. (NN6PC, W1HRX, W6DBM, W9WZE, & WA6SFM.)

William B. Freely K6HMS, (Extra Class) of Newport Beach, CA. (KF6OJZ, N6CU, N6UW, NH7U, W6BUT, W6DEY, W6EMN, W6GUE, W6NGN, & WB6HPK.)

Leonard Pringle KH8A (Extra Class) of Pago Pago, American Samoa (W7NV, W6LP, KH8DX, K6JJC, KF6JZR, K6KK, K6RPT, KF6SYM & KL1A) and

James T. Schliestett W4IMQ, (Advanced Class)of Cedartown, GA (W4CAN, W4CUO, W4DHM, W4EDI, W4FFC, W4GDW, W4HTS, W4JTS, W4RIL & W4YVD.)

In related news, **Dwaine Modock, K8ME (Extra Class) North Royalton, OH** has returned 18 club call signs that he had collected to the FCC for cancellation.

■ According to John Kanode, N4MM, who was in attendance at **Riley Hollingsworth's presentation at the Shelby Hamfest (North Carolina)** the FCC next plans a crackdown on unlicensed individuals using the 10 meter ham band and the sale of illegal equipment such as RF amplifiers on the Internet and at hamfests.

We received some more responses from our DX survey. Here is what they said:

■ **AUSTRIA** -- There are about 6,000 AR operators in Austria which has 3 license classes. Class 1(= CEPT 1 all privileges), Class 2(= CEPT 2,all bands above 30 MHz = VHF-license). Class 3 is a national license for newcomers and is restricted to 430-440 MHz, 100w)

"We have no written exam. Examination *[which is assumed to be oral]* is by [the] communications authority and includes one radio amateur. Questions concern law and regulations, technical, operation and propagation."

"The code speed is 12 wpm, 3 minutes receiving and sending radio amateur text. We will retain 12 wpm in accordance with the other CEPT-countries until the final decision at WARC 2002. We think that the WARC 2002 will be the end of Morse examinations. However, Morse will remain one of the most effective modes also for the future regarding bandwidth, language and technical requirements. There are several propagation modes which cannot be used without Morse."

"I have a feeling that the number of radio amateurs is decreasing, leaving only those who are interested in radio and radio

techniques. For 'communicators' only, the Internet offers some features without examination and a minimum of learning."

"We must keep things off amateur radio, which look good for the first moment (e.g. direct connection with the Internet) but which might kill our service/-hobby on long term bases. We should keep amateur radio as a pure radio-service on radio amateur bands." ***[Submitted by Dr. Ronald Eisenwagner, Pres. of OEVSV.]***

■ **CZECH REPUBLIC** -- "We have about 7000 Amateur Radio operators. There are 4 classes: "D" - without a Morse code examination for 144 MHz and up, "C"- restricted (only 8 WPM) and part of 160, 80, 30, 15 and 10 m and 144 MHz and up - 100 W out, "B" - 16 WPM - 300 W out, and "A" - after 2 years in class B and 3000 QSO's - 750 W out."

"The requirements are in accordance with CEPT Rec. T/R 61-02. we don't plan to reduce the Morse code examination requirements, but my opinion is that in [the] future [it] will be necessary to find supplementary requirements to prevent the amateur radio bands [from] being CB!"

"Amateur Radio Service expanding in [the] Czech Rep. Most of interest is for Class D -- without Morse code -- to be mostly active on repeaters or Packet. We are also looking to go down with age limit (15 years for Classes D and C) but there is no support from government authorities." ***[Submitted by Milos Prostecky, OK1MP, President Czech Radio Club.]***

■ **JAPAN** -- "As of 1999, there are 3,049,336 licensed amateur radio operators in Japan. *[Operators and stations are licenbsed separately in Japan.]* We have four license classes. First, Second, Third and Fourth Class. All require a written examination on radio technology, laws and regulation."

"Morse code1st Class receiving correctly by ear for three minutes of an European plain language text at a speed of 60 characters a minute (12 wpm.) 2nd Class: 45 characters a minute (9 wpm) for two minutes. 3rd Class: 25 characters a minute (5 wpm) for two minutes. 4th Class: no code." *[4th Class offers some low power HF privileges.]*

"The *Ministry of Posts and Telecommunications* determines the speed and has not changed lately. JARL *[Japan Amateur Radio League]* is not requesting - nor is planning to request -- MPT to reduce the speed."

"JARL regards the International Radio Regulations' requirements of Morse Code as very important, and considers that Morse Code should be preserved as it is a helpful and useful way of amateur radio communication."

"The number of amateur radio stations started decreasing in 1996. In 1997 there were 1,219,907 stations. 1998 figures are not yet available. JARL is collaborating with the *Japan Amateur Radio Industries Association* and others in conducting various campaigns to promote enthusiasm of amateur radio. JARL emphasizes how important role amateur radio play under emergency situation as many people suffer great damage from natural disaster every year." ***[Submitted by Mitsu Sugawara, JN1LQH.]***

■ **KUWAIT** -- "Number of Radio Amateur operators in Kuwait is 225. We have only one general license class that allows to use all Amateur bands and modes. To obtain it, the interested should pass theoretical and practical examinations. There is a written examination [but] there is no Morse code examination. However, after obtaining his/her license, if the Amateur is interested, he can be trained on how to use Morse."

"The Amateur Service is expanding in Kuwait at a good pace through participating in various activities like Kuwait National Day, POW, The World Jamboree On The Air, in collaboration with Kuwait Scouts Boys Association, etc. Discussions are currently undergoing with a view to establish an Amateur Club at Kuwait University."

"We think that the Amateur Service has a great future ...collaboration with other humanitarian and youth bodies should be intensified." ***[Submitted by Mohamed Abbas Al-Holi, Mgr., Kuwait ARS.]***

■ **MALI** -- "Out of the 30 or so radio operators here only 20 are licensed. Most of the licensees are expatriates. We have only 5 Malian licensees. This low rate is due to many factors among which we can cite the extremely high license fees, $150 and the government red tape procedures."

"I had to go to a private telecommunications school to pass the exam. That school has an agreement with the government. There is a written examination but no Morse code test is required at that school. The official document says 5 wpm but it's never been implemented."

"We (the Club) have had many talks on that issue and have come to the conclusion that for the beginner the Code should not be required. It should be required for the advanced levels and for the military. We have sent our findings to the government for approval."

"The amateur service in Mali is severely hindered by the high license fees. The government officials just don't want to understand the difference between private and amateur frequencies. They have the same billing system for both. We have invited some officials for demonstrations and they are now being more receptive."

"Our Club president, Diadie Toure, TZ6RCP [has just been appointed] as Commercial Director of the state-owned and regulatory body *Societe Nationale des Telecommunications du Mali* (SOTELMA). License fees will soon drop to $10, hence many more Malian amateurs will join us. We have plans to teach classes at the club station." ***[Submitted by Hamadoun Yattara, TZ6HY, Club des Radio Amateurs et Affilies du Mali.]***

■ **PAKISTAN** – "The number of licensed Amateur Radio operators in Pakistan is 224. We have one license class. An examination on electricity and electronics is required and 10 wpm Morse. Reducing the code exam speed is currently under discussion with the Frequency Allocation Board who are the license issuing authority here."

"We, at Pakistan Amateur Radio Society (PARS) feel that [a reduction in code speed] is important for the hobby but we shall follow World trend. Amateur radio is growing slowly here with the efforts of the members of PARS. Availability of components and equipment is not easy within the reach of common man. International agencies should advise the governments to encourage this hobby which is an important tool of International Peace and Friendship." ***[Submitted by Yunus, AP2MY.]***

■ **TURKEY** -- "There are 2965 ham operators of which 820 are Class A and B (HF operation, 12 wpm code). Class C is for only VHF and UHF. The written exam is on law/regulations, technical, and traffic. TRAC *[Telsiz Radyo Amatörleri Cemiyeti]* is going to propose to reduce the Morse code speed to 5 wpm. "Amateur Radio here is growing very slowly. Reasons: limited facilities and financial resources, high import taxes for radio equipment, [and] lack of written materials (books, magazines) in the Turkish language." *[Submitted by Bahri Kacan, TA2BK, TRAC President]*

W5YI REPORT

America's Oldest Ham Radio Newsletter

October 1, 1999

THE COMING MIGRATION TO DIGITAL RADIO

"Digital Audio Broadcasting (DAB) is a digital method of transmitting virtual CD quality audio signals to radio receivers. In-band, on-channel (IBOC) DAB is a broadcasting technology that uses the current radio spectrum to transmit existing AM and FM analog simultaneously with new higher-quality digital signals. This technology is designed to provide a unique opportunity for broadcasters and listeners to convert from analog to digital radio without service disruption while maintaining current dial positions of existing stations. Listeners who purchase digital radio receivers will receive their favorite radio stations with superior sound quality free from static, hiss and noise, and with reduced interference. Additionally, listeners would have the capability to receive expanded auxiliary data services, such as station and program content, stock and news information, local traffic and weather, email and Internet access, and more."

Broadcast radio is the primary source of information and entertainment for countless communities across the country, providing music, news, weather, traffic and local information to listeners. There are more than 12,500 AM and FM broadcast radio stations in the United States ...3500 have been added since 1980. Americans own more than 550 million radios. That's more than five per household. And about 40 million radios are sold in the U.S. each year. According to Arbitron, more than 95% of all people over the age of 12 listen to the radio more than 22 hours per week.

According to recent research conducted by Lucent Technologies, fifty-six percent of all radio listeners want digital radio that will make FM sound like a CD ...and AM to sound more like FM. The study also found that 71 percent of consumers intend to buy a digital radio when they become available.

FM radio stations sound better than AM because the band is higher in frequency (88-108 MHz) and less susceptible to natural interference. And FM channels are wider than AM which permits better fidelity. Today's FM signals are plagued by "multipath," an annoying type of interference which results when radio signals bounce off of buildings, mountains or other obstacles. Digital audio broadcasting eliminates both multipath interference for FM and impulse noise and static for AM. Digital signals, being digital, are not subject to interference.

Digital audio radio (DAR) is internationally allocated to operate in the 1452 - 1492 MHz. L band. In April 1997, however, the FCC decided to auction off DAR licenses in 25-MHz S-band blocks (between 2,320 and 2,345 MHz) because lower L-band frequencies were being used by the military and unavailable. Satellite CD Radio and American Mobile Radio were the winning bidders and both said they will use satellites to deliver nationwide digital programming with CD-quality sound.

DAR was first presented as a concept called the 'Eureka System'. A digital signal would be either, (a) a satellite-based (extra terrestrial) system, whereby the signal would be uplinked to a satellite and distributed to satellite receivers, or (b) an earth-based (terrestrial) antenna system whereby a given number of stations could transmit from a central site to receivers in the immediate area. Now a second system has arrived which is referred to as the 'In-band, On-channel (IBOC) System' which is widely supported by land-based broadcasters.

IBOC is a combination system that offers both analog and digital signals on the same frequency. There are two digital IBOC modes: Hybrid and All-Digital. The "Hybrid IBOC mode" will be used during the transition period to allow listeners to receive their favorite radio stations using either current analog radios or new digital radios. At some point in the future, the hybrid mode will be switched off by the radio station to provide more digital power. This is similar to the way television was upgraded from black and white to color. Every black and white set still worked, but every viewer had the option of buying a color TV set.

In its final report to the FCC, the *Consumer Electronics Manufacturers Association* (CEMA), in Arlington, Va., backed the European "Eureka 147" digital-audio broadcasting system over IBOC. The Eureka system outperformed terrestrial IBOC digital systems in audio quality, signal performance, and non-interference to existing analog radio services. In short, the IBOC system CEMA tested did not work well and needed more development work. At the request of broadcasters, however, CEMA held off advocating the Eureka system until the flaws in the IBOC system could be addressed.

In November of last year, USA Digital Radio petitioned the FCC to make their improved IBOC system the industry standard. They designed their IBOC digital audio system to be an enhancement to current analog radio broadcasting. "Our technology places a high capacity DAB signal in the existing spectrum at the dial position already licensed by current broadcasters," they said. Lucent Technologies is contributing its perceptual audio coding (PAC) technology to the IBOC effort. PAC which models the human auditory system was developed by its Bell Laboratories subsidiary.

AT&T also developed an in-band system that puts the digital signal in the adjacent channels between FM stations. But CEMA said an IBAC (in-band, adjacent channel) system cannot be implemented since it would cause interference to current radio stations.

FCC officials much prefer IBOC technology due to its minimized rulemaking and licensing burden and the fact that it does not require new frequency allocations. Existing broadcasters naturally want the capacity to broadcast digitally and like IBOC's lower introduction costs since existing transmitting sites, equipment, towers and antennas can be used. And there is the potential for quick regulatory approval.

The big advantage of IBOC to consumers is that it offers CD-quality sound without having to change to a different band. Consumers will of course have to buy a new radio to receive CD-quality audio, but their old radio will still work with the current analog stations.

USA Digital and Lucent expect to begin testing their improved IBOC system later this year. The field-test plan calls for demonstrating the IBOC system in different cities that mirror the operating environments in most of the nation's AM and FM stations. The initial major test markets for AM/FM digital radio will be New York (WCBS-AM 880, WNEW-FM 102.7); Washington DC (WETA-FM 90.9, WHFS-FM 99.1, WJFK-FM 106.7, WTOP-AM 1500); San Francisco (KLLC-FM 97.3, KYCY-AM 1550); Baltimore (WPOC-FM 93.1) WNOP-AM (740); and Cincinnati (WNOP-AM 740). The digital tests will be conducted under

experimental licenses issued by the Federal Communications Commission.

New radio receivers will be needed in order to receive IBOC DAB signals. Receiver cost estimates range between 15% to 30% more than current high quality radios, and that they would be available in about two years. The increased cost is due primarily to the new digital processing technology that must be included in the IBOC radios. Over time, the cost of these advanced processors will drop.

Kenwood USA Corp., of Long Beach, Ca., a leading producer of radio receivers is the first major manufacturer to enter into a joint technology and marketing agreement to provide the digital radio to consumers.