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A Working Paper on:

2 Frequency Spectrum Deregulation Alternatives

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FREQUENCY SPECTRUM DEREGULATION ALTERNATIVES

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I. Introduction

This paper represents an attempt to describe that series of concepts that have become known as "spectrum deregulation" or sometimes "spectrum economics." It is important to note that spectrum deregulation is highly controversial because many licensees believe that it only refers to having the government charge license fees or use auctions to distribute licenses. Thus those licensees believe that "spectrum economics" only means they will now have to pay for the right to use the spectrum that they received "for free" in the past. Many licensees are also afraid that spectrum deregulation implies that they would lose much of their existing spectrum or would have a smaller probability of obtaining additional spectrum in the future.

As this paper will indicate, however, auctions and fees are only two of the possible techniques and not necessarily the most important techniques for decreasing the amount of government intervention in licensee use of the spectrum. Moreover, many existing licensees presently pay a high price to use the spectrum, but it is the indirect and often hidden legal and engineering price of obtaining and keeping an FCC license. Spectrum deregulation does imply more reliance on market forces and less reliance on government decision making; it also implies giving licensees more freedom to decide how much spectrum they would like to use (and are willing to pay to use or sell the right to use if they do not want it).

Section II of this paper briefly describes the current frequency management system. Section III discusses some of the problems with the

current system. Section IV then discusses a number of deregulatory changes that have been proposed. That is followed by a brief discussion in Section V of some of the objections that have been raised to spectrum deregulation. Finally, there is a brief concluding section. There are also four appendices that provide a list of questions to be asked concerning any spectrum deregulation change, examples of three recent FCC spectrum deregulation proposals, a list of all the recent major spectrum deregulation proposals, and a glossary of some commonly used terms.

II. The Current Frequency Spectrum Management System

The frequency spectrum is allocated internationally by the International Telecommunications Union (ITU). The ITU allocations plus treaty agreements with nearby countries (especially Canada and Mexico) set overall constraints on the use of the spectrum within the U.S. In the United States the spectrum is allocated to Federal government users by the Interdepartmental Radio Advisory Committee and to all other users by the FCC. Much of the spectrum is shared on a coordinated basis by both Federal and non-Federal users.^{1/} The FCC allocates blocks of

^{1/} According to the 1973 table of allocations, about 60% of the spectrum below 1 GHz was listed as non Federal government, about 23% was exclusively Federal government, and about 16% was shared. However, in 1973 for all frequencies below 100 GHz, about 19% was listed as exclusively non-Federal government, about 20% was exclusively Federal government, and the remaining 61% was shared. See: Office of Telecommunications Policy, The Radio Frequency Spectrum: United States Use and Management (January 1973), pp. D-1 to D-11.

frequencies to particular kinds of uses and classes of users.^{2/} Within any particular allocation, the FCC then licenses particular users for specific frequencies or groups of frequencies. The licensing process is called the assignment process. In addition to allocation and assignment, the FCC also sets many kinds of technical regulations or standards. These regulations include rules on signal strength, bandwidth, mode of emission (FM, AM, single side band), distortion in the signal, etc. Radio licenses typically specify at least a center frequency, a bandwidth, allowable modes of emission, an area of signal coverage and hours of operation. Most licenses, except for daytime AM radio broadcasting licenses are good 24 hours a day.^{3/}

Most FCC allocations are made nationwide, although there are an increasing number of exceptions.^{4/} Thus, Commission allocations and other rules rarely draw distinctions between excess demand ^{5/} for the spectrum in high population density urban centers and along heavily used

^{2/} See: John O. Robinson, "Spectrum Allocation and Economic Factors in FCC Spectrum Management," IEEE Transactions in Electromagnetic Compatibility, EMC-19 (August 1977), pp. 182-190.

^{3/} Most licenses indicate the area of coverage either by specifying maximum transmitter power and antenna height, or by specifying an area of protection from interference or a minimum distance between two transmitters on the same frequency.

^{4/} For example, FCC Rules allow sharing of TV channels 14-20 for land mobile purposes in 13 markets only; currently MDS channel 2 is allocated in the top 50 markets only.

^{5/} Excess demand for spectrum means that quantity of licenses demanded exceeds the quantity of spectrum available (at current prices and under current allocation and technical rules). Excess demand implies that the price is below the equilibrium price; i.e., price is "too low."

terrestrial microwave routes and excess supply ^{6/} of spectrum in low population rural areas. When nationwide allocations are made, generally the same technical standards are set nationwide, even though spectrum may be far more valuable in urban than in rural areas.

Allocations almost always specify technical parameters of the transmitted signal and the allowable kinds of uses and classes of users. Thus, paging systems operated by common carriers and paging systems operated by private radio licensees typically have separate allocations and different rules, even though they may be close substitutes.^{7/} Similarly, private radio users such as taxi cab companies, power companies, petroleum companies, forest product companies, etc. each have separate allocations below 800 MHz.

Generally, allocations and reallocations are made without considering other possible future alternative uses of the spectrum. For example, when television channels 70 to 83 (806 MHz to 890 MHz) were reallocated to land mobile use, it was a forgone conclusion that those channels would be used for land mobile purposes (as opposed to satellite, point to point communications, etc.) ^{8/} Because allocations and

^{6/} Excess supply of spectrum means that the quantity of spectrum available exceeds the quantity demanded (given existing prices and existing allocations and technical rules.) Excess supply implies that the price is above the equilibrium price; i.e., price is "too high," or that the use of the resource has in some way been artificially restricted.

^{7/} Notice of Proposed Rulemaking in Gen. Docket 80-183, adopted April 24, 1980; released May 8, 1980, FCC 80-231.

^{8/} Second Report and Order in Docket 18262, 46 F.C.C. 2d 752 (1974); and Memorandum Opinion and Order in Docket 18262, 51 F.C.C. 2d 945 (1975).

reallocations only consider apparent current demand, there is no guarantee that there may not be some other higher value current or future alternative use that is not even considered by the Commission.

Once frequencies have been allocated to particular kinds of users, the Commission then makes assignments based upon (1) first come-first served, (2) comparative hearings; or (3) unlimited entry and unlimited sharing.

In many broadcasting and common carrier services where there is sufficient spectrum available so that one assignment does not preclude another in the same location, or where there is an excess supply of frequencies (which is true in most rural areas today) the rule has been to assign frequencies on a first come-first served basis. Thus, in these uncontested cases, whoever gets to the Commission first and meets the appropriate eligibility requirements will get a license.

In the case of broadcasting licenses in urban areas and some common carrier point-to-point microwave and mobile radio and MDS licensees, and very likely in the case of satellite orbital slots in the future, the Commission faces an excess demand situation. The number of applicants exceeds the number of channels available (under the existing allocation table and rules and given the fact that there is no explicit price placed on spectrum use) for those applicants. There may be several applicants for a single channel, or there may be several channels, but still more applicants than channels available. In either case, the Commission generally holds comparative hearings to determine the "best" applicant

(unless one or more applicants drop out or reach sharing or joint venture or other agreements with the other applicants).

In contrast, in most of the services regulated by the Private Radio Bureau, the Commission has avoided comparative hearings by not allowing anyone to receive exclusive use of a frequency. Basically, what the Commission has done to avoid comparative hearings in the private radio services is to allow unlimited sharing. This means that each new applicant is given the use of the spectrum by increasing channel loading and thus causing the service to be degraded to some or many existing users.

III. Problems With The Current System

Many individuals have criticized the existing allocation and assignment techniques.^{9/} Those criticisms are based upon the observation that many allocation and assignment actions do not lead to the most efficient use of the spectrum because they do not take into account the economic motives of businessmen and consumers. Economic motives (profit making or income earning motives) cause individuals and business to operate in ways that increase individual economic welfare or well-being and economic efficiency in general and hence the nation's output of goods and services. The possibility that individuals can increase their income and companies can increase their profits creates powerful incentives for them to work hard and to seek new innovations that will allow them to

^{9/} See, for example: Joseph Philip Woodward, "A Market Pricing Method For Spectrum Allocation," MS Thesis, Naval Postgraduate School, Monterey, California, March 1980; Mathtech, Inc., and Telecommunications Systems, Economic Techniques for Spectrum Management: Final Report, by Carson Agnew, Donald A. Dunn, Richard G. Gould and Robert D. Stibolt, a study prepared for the National Telecommunications and Information Administration, December 20, 1979; Remarks of Carlos V. Roberts before the 14th Annual Meeting of the National Association of Business and Educational Radio, Hershey, Pennsylvania, July 12, 1979; Testimony of Nina W. Cornell and Stephen J. Lukasik before the Senate Subcommittee on Communications; Committee on Commerce, Science and Transportation on S. 611 and S. 622; June 18, 1979; Nina W. Cornell, "Frequency and Orbit," chapter 13 in Seyom Brown, Nina W. Cornell, Larry L. Fabian and Edith Brown Weiss, Regimes for the Ocean, Outer Space, the Weather (Washington, D.C.: The Brookings Institution, 1977), pp. 176-196; John O. Robinson, An Investigation of Economic Factors in FCC Spectrum Management, FCC Office of Chief Engineer, Spectrum Allocations Staff, Report No. SAS 76-01, August 1, 1976; John Otto Robinson, "Introduction of Economic Factors Into Spectrum Resource Management," MA Thesis, University of Pennsylvania, Annenberg School of Communications, 1974; Harvey J. Levin, The Invisible Resource: Use and Regulation of the Radio Spectrum (Baltimore: The Johns Hopkins Press, 1971); Nicholas Johnson, "Towers of Babel: The Chaos in Radio Spectrum Utilization and Allocation," Law and Contemporary Problems, XXXIV (Summer, 1969), pp. 505-534.

increase their return for a given expenditure of time and materials. However, in order for users to have such economic incentives, they must have economic property rights, that is the right to control a resource or a service including the right to decide how to use the resource, to make a profit from it's use and the right to share, lease or sell that right to others. Users of the frequency spectrum do not receive explicit property rights, although some users receive implicit property rights. Unlike the owners of houses or automobiles, spectrum users do not have the right to sell their spectrum use right (i.e., their radio license) without Commission permission. Many users are not allowed to share their license in time, area, or frequency with other users and earn a profit through that sharing. What incentive, for example, does a land mobile user have to buy equipment that would allow him or her to carry on twice as many conversations by splitting channel bandwidth, if he or she will just lose one of those channels to other users with no compensation?^{9a/}

It is important to understand that an economic property right does not necessarily imply legal ownership. Economic property rights imply the right to use spectrum in various ways including the right to allow or deny others the use of that spectrum and the right to charge others for the use of the spectrum. If one rents an apartment, prevents someone else from erecting a tall building that blocks out sunlight or legally emits pollution into a river, one is exercising a property right.

^{9a/} Recently the Commission proposed to allow, but not require land mobile users to use new narrower band technologies. Notice of Inquiry in PR Docket 80-440, adopted August 1, 1980, released September 9, 1980, FCC 80-484.

However, one need not legally own the apartment, the sunlight or the river in order to exercise that economic property right.

The difference between legal ownership and an economic property right is a significant distinction because Section 301 of the Communications Act of 1934 states that:

It is the purpose of this Act, among other things, to maintain the control of the United States over all the channels of interstate and foreign radio transmission; and to provide for the use of such channels, but not the ownership thereof, by persons for limited periods of time, under licenses granted by Federal authority, and no license shall be construed to create any right, beyond the terms, conditions, and period of the license.^{9b/}

If users had a clear use right to a certain area, bandwidth, frequency and time of day that they could use in many different ways, then those users might find it worthwhile to use lower power transmitters, shorter antennas or directional antennas, and sell or rent to someone else the right to use part of their coverage area. Similarly, if users were allowed to time share and frequency share their assigned channel, and if they were allowed to make a profit on the sharing, they would have an incentive to find ways to split channels, multiplex signals, etc.^{10/} When the Commission has given some users a band of frequencies and allowed those users to develop more intensive ways to use the frequencies and retain the use of any channels that become available by using new technology, users (such as common carrier operators of

^{9b/} 47 U.S.C. Sec. 301 (1934).

^{10/} Note: Some users such as FM stations may share their frequency and make a profit through use of an SCA; other users may time share a frequency but not make a profit (cooperative sharing by land mobile users).

point-to-point microwave systems) have developed more efficient methods of time and frequency sharing that allow them to transmit many additional conversations on a given bandwidth.

In addition, without an explicit price being attached to the spectrum, there is no objective way for the Commission to choose among competing uses of the spectrum, (TV vs. land mobile; satellite vs. terrestrial microwave), and competing applicants. The Communications Act directs the Commission to make a finding of public interest, convenience and necessity before issuing a license or allowing an existing license to be transferred. The result of this process is that the Commission is often required to decide what is the best use of a frequency or which user would best meet the public interest. There is, in other words, a "wise man" theory of regulation. An important, perhaps even critical assumption is that the agency is capable of deciding what is best for the public. Certainly, the desires of consumers need not be the same as those of the regulatory agency. Moreover, there are many different consumers, each one of which may have different wants from any other consumer. A regulatory agency may find it particularly difficult to weigh the strength of different consumer's wants, something that economic markets do particularly well.^{11/}

In addition, the allocation process takes years (witness the now more than 12 year delay in using most of the channels relocated in the

^{11/} See: Notice of Inquiry and Proposed Rulemaking in the matter of Deregulation of Radio, BC Docket 79-219, 73 F.C.C. 2d 457 (1979).

landmobile Docket 18262).^{12/} When there are competing applications, there may be additional years of delay in actually granting licenses. The regulatory process is often inflexible and can not respond quickly to technological change, because of the Administrative Procedure Act requirements for due process. A major problem with the traditional regulatory allocation and assignment process is that it makes it easy for existing licensees to block or at least slow entry by competitors. Petitions to deny and competing applications are often filed by competitors or persons who want a percent of the profits, even though such petitions may be anticompetitive or may raise the costs of providing services desired by consumers.

IV. Deregulatory Changes

Unrestricted or minimally restricted economic markets tend to allow resources to move from lower valued to higher valued uses. Whenever resources move from a lower valued to a higher valued use, economic efficiency is increased. If a particular piece of land is more valuable for use in building factories than in growing vegetables, it is because consumers value the products of the factory more than they value the farm products. Thus, if no restrictions are placed on the use of that particular piece of land it will eventually wind up holding a

^{12/} Docket 18262 was opened in 1968. As of 1980, most of the reallocated spectrum had not yet been made available for assignment to any particular user.

factory.^{13/} Note, however, that not all land will wind up holding factories, because as more farm land is transformed to factory use, some of the remaining land will become more valuable for farm use.

Thus, one fundamental economic concept is that in general the fewer restrictions that are placed upon transactions among producers and consumers, the better off will society be.

The Communications Act of 1934 indicates in Section 1 that the Commission was "created for the purpose of regulating interstate and foreign commerce in communication by wire and radio so as to make available, so far as possible, to all the people of the United States a rapid, efficient, nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges..."^{14/} This part of the Act may be read as encouraging economic efficiency in the use of the frequency spectrum.

In the context of spectrum use this concept of maximum freedom in transactions implies that there should be as few restrictions as possible on spectrum use and on transfers of licenses from one party to another. Any rules that restrict a license from being transferred from a low

^{13/} Economists talk about the opportunity cost of a resource as the value of a resource in its next best alternative use. The opportunity cost of a hickory tree in the back yard may be the value of the lumber that could be obtained if the tree were cut down. Hence, if one keeps the tree for decoration, one gives up the value of the lumber. Similarly, the opportunity cost of a television channel in Washington, D.C. is the value of that channel in its best alternative use, which may be for another television station, or may be for land mobile communications purposes.

^{14/} Communications Act of 1934, as amended through November 2, 1978, 47 U.S.C. Sec. 1 (1934).

valued to a high valued use reduce the amount of services available to society that society values most, and thus, such restrictions impose a cost on society.

There are a number of changes in the present allocation/assignment/technical regulation system that have been suggested. All of them are deregulatory in the sense that they give users more choices and they put more emphasis on decisions made in markets, and less emphasis on government regulation. Implicit in such deregulatory moves is the observation or the belief that (a) users of the spectrum know what is best for themselves; (b) the profit or income earning motive will drive people to make more economically efficient use of any resource including the spectrum;^{15/} (c) there is no reason to believe that a government agency can judge better than users what those users want. All of the spectrum deregulatory proposals also involve (d) recognizing that the frequency spectrum is a scarce resource that has economic value and

^{15/} Economic efficiency means that a given output of goods or services is produced at the lowest real cost in terms of all inputs used. Technical efficiency refers to producing the maximum output per some unit of input. For example, it may be technically efficient to carry on as many mobile radio conversations as possible per megahertz using narrow band FM or single side band, trunking and cellular techniques, all of which use sophisticated electronic equipment in order to use the spectrum intensively. It may also be economically efficient to use such sophisticated systems in major urban centers where the current demand for spectrum apparently exceeds the supply of spectrum. However, in low population rural areas where there is often an excess supply of spectrum, it may be economically efficient to use old inexpensive, wide band FM or very wide band AM equipment, which is not technically efficient.

should command a positive price;^{16/} (e) allowing users to have certain explicit (although limited) use rights in the spectrum; and (f) allowing users maximum flexibility in how they use the spectrum including the right to transfer all or part of those rights to other users.^{17/}

Among the specific deregulatory tools that will be discussed below are the following:

- (1) Insuring that users have a clear and unambiguous property right;
- (2) Allowing users to transfer their license to any qualified applicant and thus abolishing most or all antitrafficking rules;
- (3) Limiting the use of petitions to deny;
- (4) Allowing (but not requiring) users to share their assignments in time, space and frequency, and also allowing them to subdivide and combine discrete channels or frequencies;
- (5) Allowing users maximum technical flexibility and hence repealing most technical requirements except those that affect interference;

^{16/} Douglas W. Webbink, "The Value of the Frequency Spectrum Allocated to Specific Uses," IEEE Transactions in Electromagnetic Compatibility, EMC-19 (August 1977), pp. 343-351.

^{17/} There are writers who disagree with much of this analysis. See: William H. Melody, "Radio Spectrum Allocation: Role of the Market," American Economic Review Papers and Proceedings: 70 (May 1980), pp. 393-397; and William H. Melody and Dallas W. Smith, "Opportunity Cost and Radio Spectrum Allocation," A Study of the Feasibility of Applying the Opportunity Cost Concept to the Spectrum Allocation Process, for Department of Communications, Ottawa, Canada, Contract No. OSU77-00368, March 1978.

- (6) Repealing many of the artificial regulatory distinctions between common carrier, broadcasting and private radio uses including restrictions on types of services, kinds of users, and the right to earn unregulated profits;
- (7) Allowing all or most users much more flexibility in the kinds of permissible communications;
- (8) Reducing the number of separate classes of allocations;
- (9) Avoiding the use of comparative hearings and instead using (in order of preference):
 - (a) auctions
 - (b) lotteries
 - (c) expedited paper hearings
- (10) Instituting spectrum fees.

It should be noted that the Commission definitely has the legal authority to make some of these deregulatory changes; whereas others may require changes in the Communications Act of 1934.

(A) Insuring That Users Have a Clear and Unambiguous Property Right

In order for users to have an economic incentive to look for more efficient ways to produce services, they must have a clear property right

in the use of the spectrum.^{18/} In other words, they must have a reasonable certainty that for some time period their license gives them control of some frequency channel or channels in some location. Most broadcasters and common carriers have such a property right (at least implicitly) because during the period of their license they expect that they will not lose their license except for certain kinds of unusual rule violations, and their license affords them a certain level of protection either by limiting co-channel and adjacent interference by specifying transmitter location, power level and antenna gain and height; or by specifying signal to noise levels within some distance from their transmitter. Moreover, most licensees expect to be able to renew their license for a long time in the future.

In contrast, most private radio licensees do not have such a property right because there is unlimited loading and sharing for most mobile private radio assignments below 800 MHz. Therefore, those existing users can never predict with certainty how many additional users

^{18/} As this paper indicated earlier, a person may obtain an economic property right to use the spectrum without any implication that the person legally owns the spectrum. On property rights, see especially: Richard A. Posner, Economic Analysis of Law, 2d edition, (Boston: Little Brown and Co., 1977), "Property," chapter 3, pp. 27-64; Jora R. Minasian, "Property Rights in Radiation: An Alternative Approach to Radio Frequency Allocation," Journal of Law and Economics, vol. XVIII (April, 1975), pp. 221-272; Arthur S. DeVany, Ross D. Eckert, Charles D. Mayers, Donald J. O'Hara and Richard C. Scott, "A Property System for Market Allocation in the Electromagnetic Spectrum: A Legal-Economic-Engineering Study," Standard Law Review, Vol. 21 (1969), pp. 1499-1561, and Ronald H. Coase, "The Federal Communications Commission," Journal of Law and Economics, vol. II (October, 1959), pp. 21-40. See also: U.S. Department of Commerce, Office of Telecommunications, Metrics for Spectrum-Space Usage, by Donald R. Ewing and Leslie A. Berry, (Washington, D.C.: Government Printing Office, November 1973), OT Report 73-24.

may share the same frequency, and thus may have little or no individual incentive to increase the technical efficiency of their spectrum use.

Hence one necessary deregulatory change in the private radio services (if the other changes described below were to be instituted) would be to begin issuing exclusive licenses or at least to specify maximum loading or sharing levels which may only be raised with permission of the existing licensees, and not unilaterally by the Commission.^{19/} (Of course, the Commission has traditionally not issued exclusive private radio licenses because it wished to avoid mutually exclusive applications and the apparent need for comparative hearings). It should also be noted that this property rights proposal for private radio users is quite controversial. Many private radio users oppose it because they fear they will lose the ability to get access to additional channels.

Frequency coordination such as is done by terrestrial point-to-point microwave and satellite earth stations represents another kind of property rights system that functions today. Since the first licensee has the right to refuse or to negotiate to allow later applicants in a particular area if they might interfere with his signal, the initial licensee does have a clear (but limited) economic property

^{19/} One possibility that has been specifically suggested for the private radio band would be to give certain users an exclusive "band assignment" of wider than usual bandwidth (for example 500 KHz) and let the user choose his own technical standards, loading levels, etc. See: Donald A. Dunn and Bruce M. Owen, "Policy Options in Mobile Radio Spectrum Management," a report prepared under a contract with the Federal Communications Commission, September 1978.

right. The recent Mathtech report suggests a number of improvements in that frequency coordination process.^{20/}

Another important deregulatory step that the Commission recently took was to say that owners of satellite receive only earth stations do not need a Commission licence unless they wish to be protected against interference. Thus, unless an owner of a receive only earth station desires a reception property right, no Commission action is required.^{21/}

B) Allowing Users to Transfer Their License to any Qualified Applicant (Abolishing Most or All Antitrafficking Rules)

If users are to benefit from a clear (although somewhat limited) property right, it would be important that they be allowed to sell that right or license for a profit.^{22/} While the Commission (or the Bureau staff on delegated authority) reviews all transfers of broadcast

^{20/} Mathtech Inc., and Telecommunications Systems, Economic Techniques for Spectrum Management: Final Report, Sections V and VI. It is important to note that the kind of frequency coordination the Mathtech report talks about is very different from the kind of frequency coordination done by private radio organizations such as APCOA and SIRSA. In the Mathtech case the existing users can refuse to allow new entrants if the new firms would cause interference or can allow firms to enter only if the new firms agree to pay to correct any interference problems; whereas in the latter case, existing firms do not have a right to prevent entry and interference by potential new entrants. SIRSA and APCOA try to find the frequency for a new entrant that will cause the least interference to existing users, but they can not forbid new firms from going on the air.

^{21/} First Report and Order in the matter of Regulation of Domestic Receive - only Satellite Earth Stations, CC Docket 78-374, 74 F.C.C. 2d 205 (1979).

^{22/} The idea that the government can allow users to sell government created intangible rights is being tested with regard to "pollution rights." See: Bruce Yandle, "The Emerging Market in Air Pollution Rights," Regulation, (July/August 1978), pp. 21-29. See also: Hugh H. Macaulay and Bruce Yandle, Environmental Use and the Market, (Lexington: Lexington Books, D.C. Heath and Co., 1977).

licenses, it approves most of them. Hence broadcasters have a clear expectation that they can sell their license. Common Carriers and private radio users are allowed to sell their licenses with Commission approval, but private radio users do not have any incentive to sell since any eligible person can get a new license from the Commission.

This proposal goes far beyond merely allowing users to sell their license for a profit. What this proposal suggests is that it is in the public interest to allow users to sell their license at any time to any qualified applicant. Therefore, the proposal implies that antitrafficking rules in all radio services should be abolished. Trafficking (the selling of a license within a two or three year period of receiving the initial license) is forbidden by various parts of the Commission rules.^{23/} Whenever a license is sold it must be because the seller values the money more than the license, and the buyer values the license more than its money price. Hence, both parties gain from the transaction, and society gains since a resource has been transferred from a lower value to a higher value use. Hence, "trafficking" like selling land and houses for a profit, should be allowed and not be discouraged or forbidden.

A second and more controversial part of this deregulatory proposal is that transfers of licenses to qualified applicants should be allowed without prior Commission review. Section 310(d) of the Communications

^{23/} § 1.597 for broadcasting stations; § 22.40 for public mobile radio services. Under § 1.924 private radio licenses are not transferable; however, some licenses may be assigned when there is a change in ownership of the transmitting station.

Act may not allow such transfers, but it is at least arguable that the Commission could, through a rule making proceeding, come to a general finding that such transfers without prior approval are in the public interest.^{24/} In any case, even if Commission approval of transfers is unambiguously required by the Act, transfer approval could be made even more routine, simple and fast and on delegated authority to the Bureau Chiefs.

One other important aspect of freer transferability of licenses is that in order to make efficient allocation and reallocation decisions the Commission needs information it does not currently collect on the value of the spectrum in alternative uses. Therefore, one important piece of data the Commission could collect that it does not necessarily require today is the price of the transfer. A comparable example is the county court house that registers a transfer of land title and the price paid, but otherwise has no control over the transfer (although the new owner, like the seller is required to observe existing zoning regulations).

^{24/} Section 310(d) of the Communications Act of 1934 states that:

"No construction permit or station license, or any rights thereunder, shall be transferred, assigned, or disposed of in any manner, voluntarily or involuntarily, directly or indirectly, or by transfer of control of any corporation holding such permit or license, to any person except upon application to the Commission and upon finding by the Commission that the public interest, convenience, and necessity will be served thereby."

(C) Limiting the Use of Petitions to Deny

Petitions to deny may be filed with respect to initial license applications, license renewals and license transfers.^{25/} If one accepts the idea that it is desirable and in the public interest to speed up the process and lower the cost of licensing applicants and to allow free transferability of licenses, then anything that slows or prevents initial licensing and license transfers may not be in the public interest. Most petitions to deny are filed by competitors that want to prevent the entry of new firms or new services or by organizations that want a fraction of the profits or capital gains from the service, or that want some special

^{25/} Section 309 (d)(1) of the Communications Act of 1934 states that:

"Any party in interest may file with the Commission a petition to deny any application (whether as originally filed or as amended) to which subsection (b) of this section applies at any time prior to the day of Commission grant thereof without hearing or the day of formal designation thereof for hearing; except that with respect to any classification of applications, the Commission from time to time by rule may specify a shorter period (no less than thirty days following the issuance of public notice by the Commission of the acceptance for filing of such application or of any substantial amendment thereof), which shorter period shall be reasonably related to the time when the applications would normally be reached for processing. The petitioner shall serve a copy of such petition on the applicant. The petition shall contain specific allegations of fact sufficient to show that the petitioner is a party in interest and that a grant of the application would be prima facie inconsistent with subsection (a)."

unprofitable service provided for them.^{26/} In most of these cases (with the exception of petitions based upon genuine frequency interference problems), such petitions do not reflect the desires of consumers of the service or else reflect the desires of some consumers that want certain services without having to pay the full cost of those services. A particularly anticompetitive class of petitions to deny are those based upon arguments of economic injury to existing firms (the so called Carroll Doctrine).^{27/}

If one accepts the fundamental deregulatory concept that the public interest is best served by ensuring that consumers can express their desires in the market place, then most petitions to deny are clearly anticompetitive or raise the costs of providing services to consumers and are not in the public interest. The Commission already dismisses or denies many of those petitions. It might be desirable to attempt to have Section 309(d)(i) either deleted or at least limited in scope, and to repeal the Carroll Doctrine.

^{26/} In the latter case, the petitioning organization often wants some service to be provided for free or at least below cost and to be subsidized from some other profit-making service. Such internal cross subsidies always lead to inefficient use of economic resources. See: Nina W. Cornell and Douglas W. Webbink, "Common Carrier Regulation and Technological Change: The New Competition in the Communications Industries," October 1979, to be published by the Joint Economic Committee of Congress.

^{27/} The Carroll Doctrine states in part that:

"When an existing licensee offers to prove that the economic effect of another station would be detrimental to the public interest, the Commission should afford an opportunity for presentation of such proof and, if the evidence is substantial (i.e., if the protestant does not fail entirely to meet his burden), should make a finding or findings." Carroll Broadcasting Co. v. FCC, 258 F. 2d 440, 443 (D.C. Cir. 1958).

(D) Allowing, But Not Requiring, Users to Share Their Assignments in Time, Space and Frequency, and Also Allowing Them to Subdivide and Combine Discrete Channels or Frequencies

If users had a clear property right in their license, and the freedom to share or combine frequencies they would have the opportunity to use the spectrum more efficiently and to earn larger profits.

For example, the Commission now allows but does not require FM broadcasting stations to broadcast a second signal, their SCA (subsidiary communications authorization) or to broadcast in stereo. Assuming that interference is not caused to others outside the assigned channel or area, this deregulatory proposal would allow the FM station to broadcast as many other SCA type signals as it wished within its assigned channel and to sell or lease that channel for any possible use to anyone it chooses. Similarly, if a television station can include other signals or data in its vertical blanking interval or any other part of its assigned bandwidth the idea would be to allow but not require it to do so.

One way to share the spectrum is by sharing the bandwidth. Another way is time sharing. Thus, the idea would be to allow, but not require, a station to let someone use its channel (and even its transmitter) to transmit some other kind of signal during some part of the day.^{28/} Recently, the Commission allowed Western Union to time share with the

^{28/} This was proposed for ITFS, MDS and OFS systems in the Notice of Inquiry, Proposed Rulemaking and Order in Gen. Docket 80-119, adopted March 19, 1980, released May 2, 1980, para. 51.

Public Broadcasting Stations satellite earth stations that Western Union had supplied to those stations.29/

A third kind of sharing is area sharing. If the FCC rules specify a distance of 170 miles between co-channel VHF TV stations or 75 miles between co-channel land mobile stations, the idea would be to allow but not require either station to reduce its power or use a directional antenna and allow another station to be built between the existing stations, as long as the new station did not cause interference to other stations beyond that permitted by Commission rules.

In some ways these proposals are very similar to allowing unregulated and unrestricted resale and shared use of wireline common carrier services. The Commission has proposed or has found that such resale and sharing makes consumers better off by leading to lower prices and/or new or better services.30/

In each of these cases, the Commission would allow but not require such sharing. While not required to share, existing licensees would have the incentive to engage in such sharing since they would have the right to any revenue and profits received from allowing other users to share their frequency, time or area.

29/ Memorandum Opinion, Order, Authorization and Certificate, File W-P-C-2334, January 30, 1980.

30/ See: Notice of Proposed Rulemaking in the matter of Regulatory Policies Concerning Resale and Shared Use of Common Carrier International Communications Services, CC Docket 80-176, 77 F.C.C. 2d 831 (1980); Notice of Proposed Rulemaking in the matter of Resale and Shared Use of Common Carrier Domestic Public Switched Network Services, CC Docket 80-54, 77 F.C.C. 2d 274 (1980); Report and Order in the matter of Regulatory Policies Concerning Resale and Shared Use of Common Carrier Services and Facilities, Docket 20097, 60 FCC 2d 261 (1976).

In addition to dividing up frequencies, areas and time, licensees could be allowed to combine frequencies, areas or time. Thus, for example, if three mobile radio users each had exclusive use of adjacent channels in a particular city, they could be allowed to share all three frequencies and develop their own trunked system. Or, if the three users each had 25 KHz channels, they would be free to combine their channels to get 75 KHz, but use 15 KHz equipment so they ended up with 5 rather than 3 channels.

The idea, of course, is that within the constraints of their license rights, licensees would have much more freedom in how to use the channel. Their only obligation might be to notify the Commission of what they were doing. These kinds of changes are clearly within the Commission's authority under the 1934 Act.

(E) Allowing Users Maximum Technical Flexibility and Hence Repealing Most Technical Requirements Except Those That Affect Interference

The Commission sets large numbers of technical requirements. Some, such as those that concern bandwidth, harmonic frequency suppression, transmitter power and antenna height may be necessary to prevent interference. When the Commission assigns multiple users to share the same channel without giving any individual user an exclusive license it may also be necessary to establish other standards to allow the systems to be compatible (or to establish rules that allow users to agree upon

standards).^{31/} However, when users have exclusive use of channels or voluntarily allow others to share, unless there is an overriding need for nationwide compatability, users could be allowed to choose their own standards (for example, FM vs AM vs SSB vs digital). Nationwide compatability is not necessarily desirable, because mandated standards always impose costs on some users. Even if nationwide compatability is desired, voluntary standards allow users more flexibility than do mandatory standards.

(F) Repealing Many of the Artificial Regulatory Distinctions Between Common Carriers, Broadcasting and Private Radio Use Including Restrictions on Types of Services, Kinds of Users, and the Right to Earn a Profit

Another major deregulatory idea, and one that is quite controversial and likely to generate substantial legal challenge would be to repeal many of the distinctions between different kinds of licensees, especially those that provide similar services and are close economic substitutes.

For example, many common carrier and private radio mobile systems are close substitutes technologically but the Commission's rules, Court Decisions and possibly the Communications Act require them to be different. Common Carrier mobile radio telephone is a substitute for mobile community repeater and special mobile radio systems and trunked

^{31/} In a recent decision, the Commission decided to allow common carrier mobile telephone companies to use a plurality to pick certain technical standards in local markets. Memorandum Opinion and Order in Docket 21039, adopted March 27, 1980, released April 23, 1980, FCC 80-159.

systems in the private radio service.^{32/} Most common carriers are required to publish tariffs, and Commission rules sometimes limit the numbers of entrants. In contrast, private radio users who have cooperative sharing arrangements are not allowed to resell their services, at least for a profit. There are also restrictions on automatic interconnection of private mobile radio systems to the wire line telephone network. Such restrictions may not serve a useful purpose, other than to make the two services legally distinguishable. Similarly, television broadcasting, MDS, ITFS, OFS, TV translators, and CATV are all substitutes for each other, but each is subject to different regulations.^{32a/}

Another partial deregulatory change would be to allow licensees that are primarily classified as one kind of service also to provide other kinds of services on the same channel. The recent MDS docket proposed to

^{32/} In National Association of Regulatory Commissioners v. F.C.C., 525 F. 2d. 630 (1976), the U.S. Court of Appeals for the District of Columbia held that "...we find nothing in the record on the common carrier definition to cast doubt on its [FCC's] conclusions that SMRS are not common carriers. If practice and experience show the SMRS to be common carriers; then the Commission must determine its responsibilities from the language of the Title II common carrier provisions." This is an important case because it leaves open the future possibility that the court might find these private radio systems to be common carriers. It is also important because some private radio rules are designed to ensure that private radio licensees are legally distinguishable from common carrier licensees, and some of the private radio rules substantially restrict user options.

^{32a/} A recent Commission staff report argues that all video services beyond conventional VHF and UHF television are substitutes and are in the same market. See: FCC, Office of Plans and Policy, Staff Report on: Policies for Regulation of Direct Broadcast Satellites by Florence O. Setzer, Bruce A. Franca and Nina W. Cornell (September 1980), pp. 11-32.

allow time sharing.^{33/} As another example, broadcasting stations could be allowed to provide one-way paging on their SCA. Private radio users could also be allowed to provide common carrier services on their channel. Undoubtedly, there are many other possible examples.

(G) Allowing All or Most Users Much More Flexibility in the Kinds of Permissible Communications

Many classes of licensees are limited in permissible communications or classes of users. For example, amateur operators may not conduct business; citizen band operators must be 18 years old. Many kinds of mobile private radio licensees may not be automatically interconnected to the telephone system; until recently television broadcasting systems could not transmit text (such as newspapers) that was entirely different and unrelated to the sound being broadcast; television stations may not sell or lease their right to control the channel, etc.^{33a/} Undoubtedly there are many more examples. If many of these restrictions were repealed, users could engage in other innovative kinds of communications, could use the spectrum more efficiently, and could earn additional revenues or profits.

^{33/} Notice of Inquiry, Proposed Rule Making and Order in Gen Docket 80-112, adopted March 19, 1980, released May 2, 1980, FCC 80-136.

^{33a/} In a recent decision the Commission ruled that television stations could operate unrelated aural and video transmissions between midnight and 6 A.M. Report and Order in BC Docket 80-10, adopted September 10, 1980, released September 22, 1980, FCC 80-536.

(H) Reducing the Number of Separate Classes of Services

Until Docket 18262 reallocated UHF television channels 70-83 to landmobile use the Commission had traditionally used separate block allocations for many different classes of private radio users that are subject to different kinds of rules such as those listed in (E), (F) and (G) above. The private radio SMR concept (special mobile radio) in the new 800 MHz band is an important move in the direction of breaking down many of those separate blocks. Any eligible private radio business user may subscribe to an SMR.^{34/} Thus, unlike lower frequencies, at 800 MHz there are not separate allocations for petroleum, forest products, business radio, special industrial users, manufacturers, motor carriers, taxicabs, etc. That deregulatory concept could be expanded to all private radio mobile services at all frequencies. Docket 18262 still separates common carriers and private radio systems. In contrast, Docket 18261 allowed sharing of UHF television channels 14-20 with land mobile users in the top 13 markets.^{35/} The recent MDS allocation item proposes allowing ITFS, MDS and OFS systems to have access to the same channels.^{36/} That concept could be expanded to many other services. Undoubtedly, there are many other examples where the Commission could reduce the number of separate service classes and the number of separate block allocations.

34/ Memorandum Opinion and Order in Docket 18262, 51 F.C.C. 2d 945 (1975).

35/ Fifth Report and Order in Docket 18261, 48 F.C.C. 2d 360 (1974); see also the earlier orders in this docket.

36/ Notice of Inquiry, Proposed Rulemaking and Order in Gen. Docket 80-112, adopted March 12, 1980; released May 2, 1980.

(1) Avoiding the Use of Comparative Hearings and Instead Using Auctions, Lotteries or Expedited Paper Hearings

A major source of the increasing interest in spectrum deregulation is the desire to find an alternative to traditional comparative hearings. Comparative hearings are slow and costly; the public is harmed by the loss of service due to legal delays. Equally important is the fact that comparative hearings do not necessarily lead to choosing the applicants and services that consumers want. At best, they only lead to the Commission deciding which applicant it believes will best serve the public. At least three alternatives to traditional comparative hearings have been proposed: auctions, lotteries or paper proceedings. All of these options were suggested in the recent MDS Notice of Inquiry and Notice of Proposed Rule Making.^{37/}

Auctions have several advantages: the license tends to go to the user who will pay the most and for whom the license is most valuable.^{38/} It is economically efficient to allow resources to go to their highest value use. Auctions substitute decisions of the market for

^{37/} Notice of Inquiry and Notice of Proposed Rulemaking in CC Docket No. 80-116, adopted March 19, 1980; released May 2, 1980, FCC 80-141. The issue of using lotteries or auctions was also raised in the Xerox XTEN proceeding and the cellular mobile radio proceeding. See: Notice of Proposed Rulemaking and Inquiry in Gen. Docket 79-188, adopted August 1, 1979, Released August 29, 1979; FCC 79-464, appendix C; and Notice of Inquiry and Notice of Proposed Rulemaking in CC Docket 79-318, adopted November 29, 1979, released January 8, 1980, FCC 79-774, para. 45-51.

^{38/} It should be noted that the bidder willing to pay the most is not necessarily the one with the most money: willingness to pay is not the same as ability to pay. See below, pp. 36.

decisions of a regulatory agency; they provide a clear indication of the value of the spectrum to that user and they allow the government to obtain or capture some of the value of the spectrum resource it is allowing private parties to use.^{39/}

39/ See: John O. Robinson, "Assignment of Radio Channels in the Multipoint Distribution Service by Auction," in Herbert S. Dordick, editor, Proceedings of the Sixth Annual Telecommunications Policy Research Conference, (Lexington: Lexington Books, D.C. Heath, Inc., 1979) pp. 379-391. See also: Mathtech, Inc. and Telecommunications Systems, Economic Techniques for Spectrum Management: Final Report, Sections VII, VIII, XI-XIII; "Frequency and Orbit," chapter 13 by Nina W. Cornell in Seyom Brown, Nina W. Cornell, Larry L. Fabian and Edith Brown Weiss, Regimes for the Ocean, Outer Space and the Weather, (Washington, D.C.: The Brookings Institution, 1977); Charles L. Jackson, "The Orbit-Spectrum Resource: Market Allocation of International Property," Telecommunications Policy (September 1978), pp. 179-190; Charles Lee Jackson, "Technology for Spectrum Markets," Ph.D. Thesis, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, November 1976.

Auctions have been used by the Federal government to distribute many kinds of mineral resources. See for example: U.S. Department of the Interior, Federal Coal Management Program, Bureau of Land Management, U.S. Geological Survey, Office of Policy Analysis, Final Report and Recommendations for the Secretary on Fair Market Value and Minimum Acceptable Bids for Federal Coal Leases, (December 1979); Douglas Kent Reece, "Leasing Offshore Oil: An Analysis of Alternative Information and Bidding Systems," Ph.D. Dissertation in Business Administration, University of California, Berkeley, May 1977; Robert J. Kalter, Wallace E. Tyner and Daniel W. Hughes, Alternative Energy Leasing Strategies and Schedules for the Outer Continental Shelf, Cornell University, Department of Agricultural Economics, (December 1975), A.E. Res. 75-33; U.S. Senate, Committee on Interior and Insular Affairs, Report to the Federal Trade Commission on Federal Energy Land Policy: Efficiency, Revenue and Competition, prepared by the Bureaus of Competition and Economics, 94th Cong., 2d Sess., Serial 94-28, (Washington, D.C.: Government Printing Office, 1976). The Federal Aviation Administration is now considering using auctions to allocate landing and takeoff slots at high-density airports. See: Robert B. Parke, "Bidding Your Time: Takeoff and Landing Slots May Soon Be Upon the Auction Block," Flying (June 1980), pp. 26-27; F. M. Sand and M. L. Balinski, of Econ, Inc., The Allocation of Runway Slots by Auction, vols. I, II, III, Final Report, (April 1980), done under contract to Federal Aviation Administration, Office of Aviation Policy; and David M. Grether, P. Mark Isaac and Charles R. Plott, of Polinomics Research Laboratories, Inc., Alternative Methods of Allocating Airport Slots: Performance and Evaluation (August 1979), Prepared by the Civil Aeronautics Board.

Lotteries are also faster and less costly than comparative hearings.^{40/} There is no guarantee, however, that the winner of a lottery is the one to whom the license is most valuable. Therefore, it is important that the lottery winner have the right to sell immediately the license. Thus, an important corollary of lotteries is that resale be allowed (i.e., that antitrafficking rules be repealed).

If resale is allowed, then ultimately the licensee is likely to be the same in a lottery as in an auction. The difference, of course, is that in the lottery the lottery winner keeps the economic profits or capital gains or "economic rents" from the value of the spectrum. In contrast, in an auction, the government keeps those economic rents. Another point is that in a lottery in which the license is worth millions of dollars, there are likely to be many applicants and the possibility of cheating or fraud obviously exists. Therefore, with a lottery there is a need for very effective checking and policing by the Commission.

An expedited paper hearing is simply a shorter and more efficient kind of comparative hearing. While it does not have all the advantages of an auction or lottery, it may still be faster and less costly than a comparative hearing.

^{40/} The Commission recently voted 4 to 3 to instruct the staff to choose between two FM station applicants using a lottery. See "News: FCC Instructs Staff to Prepare Decision Selecting Broadcast Licensee by Use of Lottery (Dockets 20567-69), Report 15750, May 30, 1980.

On CAB lotteries for new route authorities, see: U.S. Civil Aeronautics Board, Order in Dockets 33889, 33764 et. al., November 30, 1978, Order 78-11-152.

On the question of the "fairness" of lotteries, see: "The Equality of Allocation by Lot," Harvard Civil Rights Civil Liberties Law Review, 12 (Winter 1977), pp. 113-141.

Another alternative to the comparative hearing procedure that has been used in the past is a first come-first served process that limits the number of entrants so that there is little or no possibility of mutually exclusive applications. This may be done in two ways. The first is to make entry requirements so restrictive that only a few applicants are eligible (e.g., only the local wire line common carrier may apply). The second is to establish a fast cut off procedure (e.g., only applications received within 30 days will be processed).40a/

The problem with both of these procedures is that in order to prevent mutually exclusive applications they purposely limit the amount of potential entry and competition. Thus, the potential user who has the most valuable possible use may nevertheless be excluded from even applying for a license. Hence, once again a particularly important corollary to both cut off procedures and limits on entry is that "winners" have the right of resale and sharing. Moreover, from the point of view of economic efficiency, auctions and lotteries are clearly preferable to cut off procedures or limits on eligibility. Auctions and lotteries with resale allow the license to go to the person that values it the most, whereas cut off procedures and eligibility limits may prevent spectrum use by precisely the person to whom it is most valuable.

40a/ The Commission recently ordered that all domestic satellite applications which were received before the cut-off date would be processed as a group before any new applications would be processed. Memorandum Opinion and Order in the matter of processing of pending space applications in the domestic fixed satellite service, adopted April 24, 1980, released April 28, 1980, FCC 80-230.

J) Instituting Spectrum Fees

The Commission has already instituted a Notice of Inquiry on spectrum fees.^{41/} One way to make users more aware of the value of the spectrum is to institute spectrum fees based on "the fair market value" of the spectrum so that the more spectrum licensees use, the higher is the fee they have to pay.^{42/} Because spectrum fees require the Commission to set fees by a formula that takes into account class of licensee, location, bandwidth, area of coverage, etc., it will be exceedingly difficult to calculate the appropriate level of spectrum fees. The basic problem with spectrum fees calculated by formula is that the formula attempts to duplicate the results of a competitive market.

^{41/} Notice of Inquiry in the Matter of Fee Refunds and Future FCC Fees, Gen. Docket No. 78-316, 69 F.C.C. 2d 741 (1978). The Commission has been refunding fees it previously collected. See First Report and Order in Gen. Docket 78-316, 71 FCC 2d 171 (1969); and Second Report and Order in Gen. Docket 78-316, adopted April 11, 1980, released August 29, 1980, FCC 80-496.

^{42/} Much has been written on the charging of user fees by the government. See, for example: U.S. General Accounting Office, The Congress Should Consider Exploring Opportunities to Expand and Improve the Application of User Charges by Federal Agencies, (March 28, 1980), PAD-80-25; Fred L. Olson, "Fees Charged for Non-Fishery National Resources in the United States," a paper prepared for the Workshop on Foreign Fees, Washington, D.C., June 22-23, 1978; U.S. Senate, Committee on Environment and Public Works, Pollution Taxes, Effluent Charges, and Other Alternatives for Pollution Control, A Report prepared by the Environmental and National Resources Policy Division of the Congressional Research Service of the Library of Congress, 95th Cong., 1st Sess., May 1977, Serial No. 95-5; U.S. General Accounting Office, Establishing A Proper Fee Schedule Under the Independent Offices Appropriations Act, 1952 (May 6, 1977), CED-77-70; Charles Stewart Ferrell, "Proprietary Duties of the Federal Government under the Public Land Trust," Michigan Law Review, 75 (January 1977), pp. 586-626; Public Land Law Review Commission, User Fees and Charges for Public Lands and Resources, (Springfield, VA: National Technical Information Service, December 1970), PB-195-846. For legal arguments against the use of spectrum fees, see: Library of Congress, Congressional Research Service, "Legal Analysis of Radio Spectrum Use Changes," prepared at the request of Senator Goldwater, (April 1979).

Since markets establish prices (often many different prices) for thousands or millions of separate transactions depending upon supply and demand conditions in different locations, it is doubtful if not impossible that any formula can adequately take into account all the relevant information. Hence, one can expect many legal challenges from any attempt to institute such fees. Indeed, all of the comments filed by Commission licensees in this proceeding opposed spectrum fees - and only a few non-licensees supported the idea. It is at least doubtful that the Independent Offices Appropriations Act of 1952, 31 U.S.C. 383a., would allow the Commission to collect spectrum fees that greatly exceeded the Commission's operating budget.

An auction has the advantage over fees that users decide how much they wish to bid, rather than having the government attempt to set fees by administrative fiat. Thus it would be much harder for a losing applicant to win a court appeal in an auction than for a group of applicants to appeal "unreasonable" spectrum fees. It is at least questionable whether the Communications Act of 1934 allows the Commission to conduct an auction. Hence, new legislation may be needed for an auction; although only a court test will tell for certain.

V. Arguments Against Spectrum Deregulation

A. Wealthy, Large or Monopoly Firms Will Obtain All the Spectrum

Some people have argued that large firms, monopoly firms or the wealthy will obtain all the spectrum if various market mechanisms replace much of the Commission's administrative allocation and assignment

processes.^{43/} It is obvious, however, that wealthy individuals and large firms do not obtain all the land, houses, buildings, automobiles, trucks, or employees. They do not do so for two reasons: first, no firm or individual has the wealth to buy up all those resources. Second, even if some firm or individual had the necessary wealth, there is no reason to believe an individual or firm would buy up all the buildings or all the spectrum, because it would not be a profitable strategy. As economists often point out, ability to pay is not the same as willingness to pay. Moreover, it is in fact true that high income persons already tend to get access to the most valuable television broadcasting frequencies, so that the argument that if spectrum markets replace administrative procedures only the wealthy will be benefited is not a convincing argument.

Nevertheless, if the Commission or the public is truly worried about the possibility that a single individual or firm might monopolize all the spectrum or a particular portion of the spectrum in a particular area, the Commission could still establish market share rules such as: no firm or individual may control more than 20 percent of all available spectrum in any band in any one standard metropolitan statistical area, or any region of the U.S., or the U.S. as a whole. Note that the term used

^{43/} For a review of some of the issues, see: Douglas W. Webbink and Carlos V. Roberts, "Spectrum Auctioning: Pro," pp. 8-10; Arthur Blooston, "Spectrum Auctioning: Con," pp. 10-11, 26; and Alan A. Reiter, "What RCC's Think About Spectrum Auctioning," pp. 13, 27; all in Telelocator (January 1980). See also: Nina W. Cornell, "Spectrum Economics: For," and Morgan O' Brien, "Spectrum Economics: Against," Mobile Times, (February 1980), pp. 16-19, 24; and "More on the Spectrum Economics Debate," Nina W. Cornell, "Rebuttal for the Proposal," and Morgan O' Brien, "Rebuttal Against The Proposal," Mobile Times (March 1980), pp. 24-26.

here is available spectrum, not just channels in use. Thus, under this proposal a firm would be allowed to control a certain maximum percent of the spectrum regardless of whether the remainder was in use or sitting idle. Also, such a rule would preclude any one from controlling 100 percent of the spectrum in any one city, but would allow a firm to control 5 percent of the spectrum throughout the country.

The opposite side of this argument that some people make is that certain desirable users (such as police departments, fire departments or educational institutions) will be unable to obtain the spectrum they "need" or at least want. There is no reason why these users could not pay for spectrum just as they now have to hire employees, buy land, automobiles, radios, etc. In the case of police and fire departments it would even be possible to give them a right of eminent domain. It should be noted that even government agencies that exercise their right of eminent domain over land have to pay fair market value for resources; they do not receive them "for free." Nevertheless, if it were considered necessary for public interest or political reasons to reserve a certain amount of spectrum for public safety use without charging anything to police departments, that need not constrain the use of market mechanisms for the remainder of the spectrum by other kinds of users. However, if certain classes of users such as public safety organizations are given special treatment outside of spectrum markets, that class of user should be limited to as few organizations as possible.

B. It Will Be Technically Complex to Establish and Enforce Marketable Spectrum Use Rights

It is true that the legal and technical problems in establishing and enforcing spectrum use rights are not trivial. Nevertheless, broadcasting station spectrum rights based on input rights (transmitter power, antenna height, and antenna directionality) exist today. Many broadcasting stations and their spectrum rights (that is, their licenses) are traded with Commission permission each year. With Commission approval common carriers are also allowed to sell their license (with its input rights) under existing rules. Private radio users are allowed to sell their licenses, but until their licenses convey exclusive use rights no one has a strong incentive to buy a license, since it has always been possible to obtain a new private radio license from the Commission.

While it may be somewhat more difficult to establish spectrum output rights (based on predicted, not necessarily actual signal strengths or signal to noise ratios over some area), it is certainly not impossible. Rules that draw a circle around a transmitter location and set up an area of interference protection are really using a kind of output right.

C) Some People Will Lose If Market Mechanisms Are Adopted

Any revision of regulations that changes the status quo will harm some individuals and firms. Spectrum market mechanisms place more reliance on individual choice, agreements and contracts and less reliance on Commission administrative processes. Therefore, individuals and firms that are particularly skilled at dealing with Commission administrative processes and regulatory proceedings are likely to lose (unless they

become more involved in private contracts).^{44/} Certain firms that have received use of large amounts of spectrum at little or no direct cost may also be made worse off. Firms that have been prevented from getting access to the spectrum or who have received less spectrum than they would have been willing to pay for will be made better off. So will firms that would like to adopt new technologies, share their spectrum, etc. So too will firms that would like to pay a high price to accept less interference and congestion or a low price to accept more interference and congestion than current Commission rules allow.

D. International Treaties Restrict Spectrum Market Options in the U.S.

ITU allocations and International treaties restrict the number of options available in terms of use of the spectrum such as restrictions on maximum power, etc. Nevertheless, many of the spectrum market options mentioned above are possible within the current ITU rules and international treaties. Most of the frequency spectrum only allows line of sight transmission, so that only border countries are affected by most U.S. spectrum use decisions.^{45/} In any case, as long as U.S. spectrum users abide by international regulations, foreign countries should not be concerned about how U.S. users are selected, or who the specific users are.

^{44/} See the remarks of Carlos V. Roberts before the 14th Annual meeting of the National Association of Business and Educational Radio, Hershey, Pennsylvania, December 20, 1979.

^{45/} Satellite transmission presents one of the most complex problems, since many countries are potentially affected by any U.S. satellites, and there appears to be excess demand for certain satellite orbital slots.

E. Much of the Spectrum is Shared Between Uses Allocated to Federal Organizations by IRAC and Uses Allocated to Others by the FCC. IRAC Has No Plans to Institute Spectrum Markets

It is true that there is much shared spectrum (although there is also much spectrum that is not shared). Nevertheless, that sharing does not preclude the FCC from introducing market mechanisms, in the shared as well as the not shared parts of the spectrum. Users of FCC allocated spectrum would simply have to abide by whatever agreements relate to shared spectrum.

F. Auctions and Fees Are Inflationary

To the extent that auctions and fees cause the spectrum to be used more efficiently and hence increase U.S. productivity, they are not inflationary. Indeed, they may cause the true cost of using the spectrum to fall, rather than to rise, as new technologies are introduced and idle spectrum is put to use. It is also important to realize that valuable spectrum is not obtained "for free" today. While communications firms do not bid in an auction for a license or pay a spectrum fee, they do spend large sums of money to get valuable licenses. Legal fees and engineering consulting fees are very real and substantial costs of getting a broadcasting license, for example. Without the need to prepare for comparative hearings, and fend off petitions to deny, those legal and engineering costs would be much smaller. In any case, for economic efficiency reasons it is important that prices reflect the true costs of using resources, even if in the short run market mechanisms do cause the apparent prices of some resources to rise. [The price of spectrum should

reflect the true opportunity cost of its use just as the price of gasoline should reflect the true opportunity cost of its use]. If the price of any resource (such as gasoline) is artificially set below its market clearing price, there will be excess demand which may lead to shortages, long lines, or a request for government allocation or rationing decisions. It is far more efficient to allow the price to rise for gasoline and for spectrum.

VII. Conclusions

The purpose of this paper was to review some of the possible spectrum deregulatory proposals that have been suggested both within and outside the Commission. The paper is not intended to be all inclusive. Nevertheless, it should give an indication of directions for further deregulation. As this paper has indicated, many of the proposals complement each other. Among the proposals that seem most important are:

- o Allowing freer transferability of licenses
- o Limiting the Use of Petitions to Deny
- o Allowing Sharing and Resale
- o Allowing more technical flexibility
- o Allowing more flexibility in permissible kinds of communications
- o Giving all users a clear but limited property right
- o Reducing the number of separate classes of allocations.

Among the most important but highly controversial changes are:

- o Using auctions and lotteries instead of comparative hearings

- o Repealing most remaining distinctions between broadcasting stations, common carrier and private radio systems.

Of all the proposals the one that currently appears to be the most difficult to make workable is:

- o Instituting spectrum fees.

It is also important to note that it is possible to adopt some of the deregulatory proposals suggested above without adopting others. For example, it would be possible for the Commission to allow certain users more flexibility in choice of technical standards and sharing without adopting the use of auctions. It would be possible to make it easier to transfer licenses without instituting spectrum fees. It would be possible to decrease the number of separate classes of users without repealing most technical standards. It would be possible to allow more band sharing by common carrier and private radio users without deleting all regulatory distinctions between the two groups. One can think of many other examples. The point is that even if one does not agree that the public interest is served by all these deregulatory changes, or if one favors them all but does not believe they are all legally or politically possible, one can still be in favor of instituting many of them.

APPENDIX A

Questions to Ask Concerning Any Spectrum Deregulatory Change

For any existing or proposed service it is useful to ask a number of questions including the following:

How restrictive are existing rules? For example do they restrict:

- (a) who is eligible to use the service (only businessmen?); how the service may be used (only for broadcasting purposes?); or (c) what technology may be used (only 25 KHz FM modulation?). What are the benefits and the costs of removing those restrictions? More specifically:
- (1) Would it be possible and would it be desirable to establish a spectrum property use right for the use of the necessary license for this service? Can property rights be established based upon existing input rights as currently defined by Commission rules? Can property rights be established based on output rights?
 - (2) Would it be desirable to allow users to buy and sell their licenses and can any existing antitrafficking rules be abolished?
 - (3) Would it be desirable to limit the ability of parties to file petitions to deny? Would it be desirable to limit further the impact of the Carroll Doctrine?
 - (4) Should users be allowed (but not required) to share and/or resell their assignments in time, space or frequency -- and allowed to earn unregulated profits from that sharing? Should users be allowed to combine channels?

- (5) Should users be allowed maximum flexibility in choosing technical standards? Can voluntary standards be used instead of mandatory standards?
- (6) Should users be allowed to communicate without regard to whether their communications are similar to traditional broadcast, common carrier or private radio services?
- (7) Should users be allowed flexibility in the kinds of permissible communications (business vs hobby; short time period vs long period; 1 way vs 2-way communications, voice vs data, etc.)?
- (8) Given the answers to (4), (5), (6) and (7) above, can the number of separate classes of allocations be reduced and a particular service allocation also be allowed to be used by other services? Can the number of separate services with different rules be decreased?
- (9) Is there likely to be excess demand for some frequencies? If so, why? Is it excessive FCC restrictions on other frequencies that generate excess demand for particular frequencies? If there is excess demand, can auctions, lotteries or paper hearings be used in place of traditional comparative hearings to solve mutually exclusive application cases? At the same time, can restrictions on the use of other frequencies be reduced? Conversely, is there an excess supply of some frequencies? If so, is that because FCC rules overrestrict the permissible uses and possible users of these frequencies? Would it be desirable to repeal those restrictions?

- (10) If auctions are used to select applicants, are oral auctions or sealed bids preferable? How should bid payments be structured? For example, should bidders pay one lump sum payment upon winning the auction, or should they make equal installment payments over the period of the license?
- (11) If lotteries are used to select applicants should there be any eligibility requirements to enter the lottery? What rules are necessary to preserve the integrity of the lottery and insure that the selection process is truly random?
- (12) Under what circumstances do the benefits exceed the costs of limiting the number of applicants through restrictive eligibility requirements or using a fast cut off procedure?
- (13) Would it be desirable to institute spectrum fees?
- (14) If spectrum users paid directly for the use of the spectrum (to the Federal Government or to other private users), to what extent would those spectrum users have an incentive to switch to non radiating technologies (such as fiber optics or coaxial cable)? Would it be desirable to create incentives for that kind of change?
- (15) Can these proposed changes be instituted under existing Commission authority? If changes are necessary and desirable in the Communications Act of 1934, what is the minimum legal change that will accomplish the desired goal? What are the legal risks involved in attempting the proposed changes under the existing Communications Act?

APPENDIX B

Examples of Recent FCC Spectrum Deregulation Proposals

A. Multipoint Distribution Service

Existing Situation: MDS licensees have 6 or 4 MHz bandwidth allocations. One 6 MHz channel is available throughout the country, and a second 6 MHz channel is available in the largest 50 cities. A 4 MHz channel is available instead of the second 6 MHz channel throughout the country outside the 50 largest cities.

MDS channels may be used to transmit TV signals, data, etc. There are many competing applicants for the one or two 6 MHz MDS allocations currently available in many cities.

Commission Proposals:

- (1) Reallocate 31 ITFS channels to make them available for ITFS, MDS or OFS.46/
- (2) Use Auctions, Lotteries or Expedited Paper hearing procedures for MDS mutually exclusive situations.47/
- (3) Allow freer transferability of MDS licensees.48/

46/ Notice of Inquiry, Proposed Rulemaking and Order in Gen. Docket No. 80-112, adopted March 19, 1980; released May 2, 1980; FCC 80-136.

47/ Notice of Inquiry and Proposed Rulemaking in CC Docket 80-116, adopted March 19, 1980; released May 2, 1980; FCC 80-141.

48/ Notice of Inquiry and Proposed Rulemaking in CC Docket 80-116, adopted March 19, 1980; released May 2, 1980; FCC 80-141.

(4) Define FCC area of protection for MDS licensees, but allow licensees to negotiate other areas of protection with other co-channel licensees.49/

(5) Allow time sharing of ITFS and MDS facilities or channels.50/

B. Broadcasting Lottery

The Commission recently instructed the staff to write an Order to set up a lottery to choose between two of three mutually exclusive applications for an FM radio station license.51/

C. New Land Mobile Radio Technologies

A general inquiry was opened to investigate possible changes in the Commission's Rules to provide incentives for the introduction and use of new technology in land mobile communication. The initial effort is directed toward narrowband technology; i.e., radio equipment using modulation techniques that require much less bandwidth than the prevailing FM systems. Spectrum saved might be retained by the licensees to provide additional communication channels, establish "guard" bands to reduce interference, or be sold to other eligible users.52/

49/ Notice of Inquiry and Proposed Rulemaking in CC Docket 80-113, adopted March 19, 1980, released April, 24, 1980, FCC 80-137.

50/ Notice of Inquiry, Proposed Rulemaking and Order in Gen. Docket 80-112, adopted March 19, 1980; released May 2, 1980; FCC 80-136.

51/ "News: FCC Instructs Staff to Prepare Decision Selecting Broadcast License by Use of Lottery," (Dockets 20567-69), Report No. 15650, May 30, 1980).

52/ Notice of Inquiry in PR Docket 80-440, adopted August 1, 1980; released September 9, 1980, FCC 80-484.

APPENDIX C

Recent FCC Actions That Explicitly Raise Spectrum Deregulation Issues

- Memorandum Opinion and Order in Docket 18262, (reallocated UHF-TV channels 70-83 and established special mobile radio service), 51 F.C.C. 2d 945 (1975) and
- Second Report and Order in Docket 18262, 46 F.C.C. 2d 752 (1974).
- Notice of Inquiry in the Matter of Fee Refunds and Future FCC Fees, Gen. Docket 78-316, 69 F.C.C. 2d. 741 (1978).
- Notice of Proposed Rulemaking and Inquiry in Gen. Docket 79-188, (Xerox XTEN), adopted August 1, 1979, released August 29, 1979, FCC 79-464.
- Order in Dockets 20567, 20568, 20569, (Greater Media Radio Company), adopted August 1, 1979, FCC 79-401.
- "News: FCC Instructs Staff to Prepare Decision Selecting Broadcast Licensee by Use of Lottery," (Dockets 20567-69), Report No. 15650, May 30, 1980.
- First Report and Order in the Matter of Domestic Receive-Only Satellite Earth Stations, CC Docket No. 78-374, 74 F.C.C. 2d 205 (1979).
- Notice of Inquiry and Notice of Proposed Rule Making in CC Docket 79-318 (Cellular Communications Systems), adopted November 29, 1979, FCC 79-774.
- Notice of Inquiry and Proposed Rulemaking in CC Docket No 80-116 (Use of Alternative Procedures in Choosing Applicants for Radio Authorizations in the Multipoint Distribution Service), adopted March 19, 1980; released May 2, 1980, FCC 80-141.
- Notice of Inquiry, Proposed Rule Making and Order in Gen. Docket No. 80-112, (ITFS, MDS, OFS reallocation), adopted March 19, 1980; released May 2, 1980, FCC 80-136, 45 Fed. Reg. 29323.

Notice of Inquiry and Proposed Rule Making in CC Docket No. 80- 113, (technical requirements for MDS), adopted March 19, 1980, released April 24, 1980, FCC 80-137, 45 Fed. Reg. 29350.

Notice of Inquiry in PR Docket 80-440, (allowing land mobile stations to choose new technologies) adopted August 1, 1980, released September 9, 1980, FCC 80-484.

Recent Deregulatory Staff Reports

Report and Recommendations in the Low Power Television Inquiry, BC Docket 78-253 (October 1980).

FCC, Office of Plans and Policy, Staff Report on: Policies for Regulation of Direct Broadcast Satellites by Florence O. Setzer, Bruce A. Franca and Nina W.Cornell (September 1980).

APPENDIX D

Glossary

Allocation: The commitment of bands or blocks of frequencies to the use of a specific service or services.

Assignment: The selection and authorization (licensing) of the use of discrete frequencies by individual radio stations within a service.

Carroll Doctrine, Carroll Broadcasting v. F.C.C., 258 F. 2d. 440 (D.C. Cir. 1958). The idea that the FCC should be concerned about economic harm done to existing stations from some action that allows in new competitors.

Dunn - Owen Band Assignment Proposal: The proposal by Donald Dunn of Stanford University and Bruce Owen who is now at the Antitrust Division of the Justice Department that the Commission assign some mobile radio users large bandwidths (for example 1 megahertz) and let the users determine their channelization plans, channel bandwidths, emission modes, etc. see: Donald A. Dunn and Bruce M. Owen, "Policy Options in Profile Spectrum Management," a report prepared under contract with the Federal Communications Commission, September 1978.

Economic Efficiency: Producing or obtaining a given service or good at the lowest real cost in terms of all resources used; or producing the largest possible output of goods or services for a given cost.

Excess Demand: When the quantity demanded of any good or service exceeds the quantity supplied at the existing price. Whenever there are shortages or long waiting lines for any good or service, [e.g., for gasoline] that is an indication of excess demand.

Excess Supply: When the quantity supplied of any good or service exceeds the quantity demanded at the existing price. Whenever sellers have excess inventories that they wish to sell, that is an indication of excess supply (for example, when auto dealers have large stocks of unsold cars).

Marketable Rights: Property rights that may be traded (bought or sold) in a market.

Opportunity Cost: The value of the last unit of a resource in its best alternative use. Hence, the opportunity cost of using 6 MHz to broadcast a UHF television signal is the value of that 6 MHz for its best alternative use (which may be to broadcast another television signal, or to provide 400 15 KHz mobile radio channels or some other use).

Property Rights: Legal rights to use a good or service that are owned or controlled by someone and may be bought or sold.

Spectrum Markets: The idea that individuals have the right to buy and sell the right to use the frequency spectrum and that the supply and demand for spectrum will determine its market price.

Spectrum Input Rights. Spectrum use rights that are defined in terms of inputs into the use of the spectrum such as transmitter power, antenna height and effective radiated power at the antenna. Most FCC regulations are based on input rights.

Spectrum Output Rights: Spectrum use rights based upon area covered, bandwidth used, and time of the day by a signal of a given signal strength or signal-to-noise ratio.

Spectrum Use Rights: The right to choose how one wishes to use the spectrum over which one has control. Spectrum use rights imply the right to use the spectrum in many different ways, including renting, leasing or selling some portion of that right (for part of the day, part of the area covered, part of the frequency, the remainder of a license term, etc).

Technical Efficiency of Spectrum Use: Obtaining the most signals or bits of information with a given amount of spectrum. Note that technical efficiency need not be identical to economic efficiency.

"Wise Man" Theory of Regulation: The belief that one or more wise men or women can determine what is best for others and should therefore impose regulations, restrictions or requirements on other people.