

SPECTRUM FOR SALE OR RENT
COMMENTS ON US SPECTRUM AUCTIONS

by

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1. Introduction

Economists agree. The use of market forces to determine the allocation of the electromagnetic spectrum results in the efficient allocation of that spectrum. It appears this idea was first introduced by Leo Herzel in his Comment¹ on how the U.S. Federal Communications Commission (FCC) was attempting to choose a standard for color television. After about 50 years of discussion, the U.S. Congress directed the FCC to use auctions to assign licenses when mutually exclusive applications were received². Though there has been much discussion on the subject of spectrum auctions, many questions remain. In this article, I present some of these questions along with possible answers (and more questions).

2. Why pay the government for spectrum?

Economists point out that market pricing mechanisms result in the most efficient use of resources. As long as a secondary market exists, it matters little how the initial allocation is made. "An initial distribution by lottery, for instance, would suffice."³ While the strong secondary market probably does result in efficient allocation, there is a strong possibility of unjust enrichment of the lottery winner at the expense of those who did not win (generally, the public at large). Incumbent licensees who received licenses without any sort of spectrum fee may also benefit from unjust enrichment should they later sell the license at the newly established market value. Further, the electromagnetic spectrum is generally considered a "public resource." 47 USC 301⁴ "maintains control" of this resource by the federal government while providing for the use ("but not the ownership") of "all channels of radio transmission." It appears reasonable for the users of property to pay the owners of property the market value for such use. This rea-

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¹ Leo Herzel, "Public Interest" and the Market in Color Television Regulation, 18 Univ. Chi. L. Rev. 802 (1951).

² Thomas W. Hazlett gives a brief history of allocation methods (*Assigning Property Rights to Radio Spectrum Users; Why Did FCC License Auctions Take 67 Years?*, 41 J. Law & Econ. 529, 533) as including priority-in-use, comparative hearings, lotteries, and, finally, auctions.

³ Glen O. Robinson, *Spectrum Property Law 101*, 41 J. Law & Econ. 609, 619.

⁴ The text of the US Code is available at <http://law2.house.gov/usc.htm>. It is also available in hypertext format at <http://www4.law.cornell.edu/uscode>.

soning was recognized by Congress when it enacted 47 USC 309(j)(3)(C), which states the following as one of several objectives of spectrum auctions: "recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource." It is interesting that Congress chose to only recover a *portion* of the value. This limited recovery of the value results in a public subsidy to users of the spectrum, possibly diverting some users from use of more efficient wired communications services that do not benefit from such a subsidy.

Eli Noam presents an interesting approach to spectrum auctions,⁵ having each packet of information desiring transmission bid for access to the spectrum. This is compared to continuous demand-based pricing in "wired" (including fiber) communications systems. His approach uses pricing to determine access, but the question remains: Who receives the amounts paid by users for access? In wired systems, it is obvious that the owner of the wire gets the proceeds. In wireless systems, it is less clear. He suggests the user-owners of the clearinghouse (where access rights for packets are negotiated) or the Treasury. It is unclear how one becomes a "user-owner." If all the citizens are "user-owners," it appears the two are equivalent.

In general, it appears equitable for the public to be compensated by users of a public resource for the use of that resource.

3. Sale or Lease?

Apparent inconsistencies between law and practice, and amongst various sections of the Communications Act (as amended), make it unclear what the winning bidder is winning and what the public is selling. 47 USC 309(h) specifies that "The station license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized therein." Further, 47 USC 309(j)(6)(C) indicates that the award of spectrum by auction does not diminish the Commission's right to reclaim that spectrum. 47 USC 309(j)(6)(D) specifies that a winning bidder has no rights (including an expectation of license renewal) beyond those rights granted to licensees through methods other than competitive bidding. However, 47 USC 309(j)(1) only authorizes a competitive bidding system for the awarding of an "initial license or construction permit" (apparently prohibiting an auction on license renewal). 47 USC 309(k) requires the renewal of broadcast licenses if the station has "served the public interest, convenience, and necessity" and there have been no serious violations of the corresponding laws and rules, or violations that when considered together would constitute a pattern of abuse. Specific rules for each type of licensee further outline what is expected of a licensee to gain a "renewal expectancy."⁶

⁵ Eli Noam, *Spectrum Auctions: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access*, 41 J. Law & Econ. 765.

⁶ For example, 47 CFR 90.473 outlines the renewal expectancy requirements for private mobile radio users in the 220 to 222 Mhz band. These stations are required to provide "substantial" service during the license period to gain a renewal expectancy. Demonstrating substantial service includes a showing of system build-out, avoiding spectrum warehousing. Note that title 47 of the Code of Federal Regulations (the FCC Rules) is available in hypertext format at <http://hallikainen.com/FccRules>.

The strong possibility of perpetual renewal of a license won at auction without further payment makes the auction more of a sale of the spectrum instead of the auction of a "fixed term lease."

I see several problems with this pseudo spectrum sale. I prefer that this particular "public resource" remain in the hands of the public. Despite the renewal expectancy practice, it appears Congress desires the same through the above prohibition of vesting any rights to the spectrum beyond the term of the license.

Second, there have been concerns expressed that the government may be "dumping" spectrum in an effort to raise cash quickly, while it could raise more money by slowly rationing the spectrum out (the government becoming guilty of the warehousing of spectrum that it prohibits others from doing). It does not seem to be in the public interest to withhold a public resource from the public in the hopes of getting a higher bid. The market value of spectrum varies with time. The public can be compensated with an approximation of that actual varying value through fixed term "lease" type licenses where the license is auctioned again on its expiration (though expiring leases may discourage investment).

Third, there is the problem of how the revenue from spectrum license auctions is recognized in the government budget. If the auctions are considered a sale instead of a lease, the revenue from the "sale" should not be considered "income" for accounting purposes. Instead of generating income, we have merely traded value between different asset accounts (out of the spectrum asset account and into the cash asset account)⁷. The sale of assets to fund ongoing operations is a bit like burning your house to stay warm - It's a bad idea.

4. Spectrum use by government and noncommercial users

In the United States, the electromagnetic spectrum is generally claimed for use by the government (and allocated by the National Telecommunications and Information Administration). That not used by the government is released to private use (and allocated by the Federal Communications Commission). Therefore, spectrum use by the federal government is not subject to competitive bidding. This exemption from competitive bidding is further expanded to cover most public safety radio services operated by the various levels of government or non-profit organizations by 47 USC 309(j)(2)(A). This "free spectrum" promotes inefficient use by these organizations⁸. If, instead, these agencies and organizations bid at auction for use of the frequencies, the market value of this use would be determined. The agency may find it more economical to use more spectrum efficient equipment or to substitute a non-spectrum communications method (wired). The overall effect is more efficient use of the spectrum. The Treasury gains income from the private and public use of the spectrum while having to expend funds for the public use. This "paying out of one government pocket into another" results in an increase in income (from private and public organizations) that is more than enough to cover the "in-

⁷ Eli Noam raises this concern in *Spectrum Auctions: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access*, 41 J. Law & Econ. 765, 773.

⁸ See R. H. Coase, *The Federal Communications Commission*, 2 J. Law & Econ. 1, 21 (1959).

creased communications costs" (though the "costs" have not increased, they have merely been properly accounted for).

Some have questioned whether noncommercial users of the spectrum should pay for their use. For example, Dallas Smythe said "Surely it is not seriously intended that noncommercial radio users (such as police), the nonbroadcast common carriers (such as radio-telegraph) and the nonbroadcast commercial users (such as the oil industry) should compete with dollar bids against the broadcast user for channel allocations."⁹ To which, Leo Herzel answers in his Rejoinder, "It certainly is seriously suggested. Such users compete for all other kinds of equipment or else they don't get it." Should government and noncommercial users be exempted from paying for spectrum use, "... the result would be that government would be saved from the self-knowledge of what such services cost and, unlike other consumers, would not have to decide whether they were really worth it in comparison with available substitutes."

Another group of spectrum users Mr. Smythe claimed should be exempt from paying for use of the spectrum are radio amateurs ("which by definition could hardly be expected to pay for frequency use"). I agree. In addition, the users of cordless telephones, garage door openers, wireless LAN systems, low power broadcast stations, and microwave ovens should be exempt. What sets these users apart is that they are not *exclusive* users of the spectrum. They have no guarantee of interference-free operation. The spectrum set aside for these users can be considered the "public parks" of the spectrum where the public is permitted to use the spectrum on a free and nonexclusive basis.

Some have expressed concern that economic allocation of the spectrum will mean that only the rich will have access (particularly to broadcast spectrum). Several solutions are available to such a problem. Ownership limits may be imposed, both nationally and locally, preventing one person or organization from controlling substantially all of the spectrum. A variety of "spectrum parcel sizes" can be created. Smaller sizes would, of course, be lower cost due to the market value. The new Low Power FM service created by the FCC is an example of such a "low cost model" of broadcast station.

Summarizing, all exclusive spectrum users (including government and noncommercial users) should pay the public for the continuing use of that spectrum. Nonexclusive users could use spectrum set aside as public parks without payment, but also without interference protection. These nonexclusive users would use equipment approved for that use, giving all comers approximately equal access to the license-free spectrum.

5. *Spectrum Lease Term*

Short lease terms benefit the lessee and lessor in that each is assured that the price is close to market rates for the spectrum. A lessee is in danger of overpaying should the value of spectrum decrease, while the lessor is in danger of being underpaid should the value of spectrum increase. However, a lessee is encouraged to make associated investments (equipment, etc.)

⁹ Dallas W. Smythe, *Facing Facts About The Broadcast Business*, 20 U. Chi. L. Rev. 96, 100 (1952).

more with a long term lease. The public benefits from these increased investments. As a compromise between the desirability of short and long duration leases, I propose the public lease portions of the spectrum for 25 year periods. A lessee would be allowed to sublease or to sell the remainder of the lease. The lease would be auctioned once again five years before its expiration. Ideally, several nearly equivalent "chunks of spectrum" would be auctioned simultaneously so the value determined at auction would be close to that of the spectrum as opposed to the value of the service established by an existing user. Five years after the auction (at the expiration of the current lease), the new lessee would take possession of the spectrum. The five year transition allows an incumbent lessee that loses the auction time to make adjustments in its business (possible subleasing other spectrum, converting to wired delivery, etc.).

6. Broadcasters' Public Interest Obligation

All spectrum licenses issued in the United States are granted subject to their serving the "public interest, convenience, and necessity." Broadcasters have specific obligations imposed upon them by the FCC rules.¹⁰ This "public interest obligation" is imposed on broadcasters but not on print media because of broadcasters' use of the public spectrum. This "barter" arrangement partially compensates the public for use of the spectrum, though each side often disagrees as to whether they are being properly compensated. An auction to determine the market value of a fixed term lease on the spectrum would remove these disagreements. Broadcasters should get "full first amendment rights"¹¹ in exchange for their payment for use of the spectrum (through a lease).

The National Association of Broadcasters determined that US broadcasters provide \$8 100 000 000 per year in public service.¹² Some figure that the public is getting a good deal. It is, of course, difficult to determine the actual market value of the spectrum used by broadcasters and the market value of the public service offered in exchange. In 1990, NTIA estimated the value of spectrum used by broadcasters at \$11 500 000 000.¹³ Adjusting for inflation, we get about \$14 900 000 000 as the approximate value of the spectrum used by US broadcasters in the year 2000. For simplicity, we might assume an annual lease payment on an asset would be 10% of the value of that asset. The total annual lease payment by US broadcasters would be about 1

¹⁰ For example, 47 CFR 73.1942 provides for discounted ("lowest unit rate") for candidates for federal office and 47 CFR 73.671 requires television stations to broadcast children's educational programming.

¹¹ The first amendment to the U.S. Constitution is part of the "Bill of Rights" that were ratified by the states between 1789 and 1791. The first amendment states "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances." The U.S. Constitution with annotations is available at <http://www.findlaw.com/cascode/constitution>.

¹² <http://www.broadcastpublicservice.org>

¹³ See <http://www.ntia.doc.gov/osmhome/91specagen/1991.html>, chapter 4, section I.B.2. "Dollar Value." The total of broadcast station sale prices was extrapolated to approximate the estimated sale price should all stations be sold. The value of the spectrum was estimated to be half this sale price.

400 000 000. This is only 17% of the existing "public service payment" as estimated by NAB, which doesn't account for "lowest unit rate", children's television requirements, etc. If broadcasters paid the \$1 400 000 000 each year (or, ideally, the lease amount determined at auction), they would gain full first amendment rights and have the public service obligation lifted. The Treasury would gain this amount in annual income (as opposed to a one time payment that occurs in a spectrum "sale"). This income could be applied to ongoing programs as Congress determines (perhaps including the purchase of airtime for various public service programs).

Use of the public service obligation as compensation to the public for the continuing use of a public resource is a barter transaction where it is difficult to determine if the amount being "paid" is appropriate. Use of auctions of leases would insure market rates are paid to the public for the use of the spectrum.

7. Reserve Prices

47 USC 309(j)(4)(F) authorizes the FCC to set a reserve price or minimum bid for any spectrum to be auctioned. Should this price not be met, the spectrum would remain unused. There appears to be little, if any, public benefit to leaving spectrum unused, even if the price paid is minimal.

8. "Zoning"

Leo Herzel's original article dealt with the choice of transmission standards and introduced economic allocation as a way of settling the standards battle. The FCC has recently auctioned blocks of spectrum without setting "zoning requirements" on how the spectrum would be used. The ultimate use and signal characteristics (modulation method, etc.) are determined by the licensee. Almost all other spectrum is allocated for specific uses. These zoning requirements may result in disparate values for nearly identical spectrum (the only difference being the permitted use). Allowing the market to determine the use of the spectrum would remove these disparities. Former FCC Commissioner Robert E. Lee stated it well: "I am finding it increasingly difficult to explain why a steel company in a large community, desperate for additional frequency space cannot use a frequency assigned, let us say, to the forest service in an area where there are no trees."¹⁴

9. Transition

Auctioned spectrum leases are a long-term goal. As vacant spectrum becomes available (generally that spectrum released from federal government use), leases could be auctioned immediately. For that spectrum currently occupied by other licensees, I suggest continuing to renew these licenses for their standard term (under the existing renewal expectancy), but to not renew any of the licenses that expire in the year 2025 or later. Five years prior to expiration, the license (lease) for the next 25 year term would be auctioned. This 25 year period gives existing

¹⁴ Broadcasting, February 4, 1957, as quoted in R.H. Coase, *The Federal Communications Commission*, 2 J. Law & Econ. 1, 18 (1959).

licensees time to amortize their existing investment. There will possibly be disagreement from existing licensees on the introduction of payment for spectrum. However, the 100 years of free use of a public resource should to be discontinued. Other transitions (frequency aggregation, geographic licensing instead of facility licensing, etc.) can be introduced to this "reclaimed" spectrum once it is back in the hands of the public.

10. Conclusion

It is proposed that the public exert ownership control over the spectrum. Further, the public should *maintain* this ownership of the spectrum, leasing "chunks" for fixed terms (25 years is suggested) for a price determined at auction. The lessee would be free to sublease or transfer the unexpired portion of the lease. The lessee would be able to use the spectrum in whatever manner it sees fit (subject to limits established by the FCC, similar to property lines in real property), using any modulation system or to carry any information the lessee determines is appropriate. The "public interest obligation" would be removed from all licensees. Instead, the public (through Congress) can fund those interests with the proceeds from the continuing use of the spectrum. Government and noncommercial licensees would also be required to bid for spectrum leases they desire. Congress may grant these organizations the funds to cover these spectrum use costs, or, the organizations may choose to use other lower cost (or more spectrum efficient) communications systems.