TELECOMMUNICATIONS

"PRIVATE COMMONS" IN RADIO SPECTRUM: THE FCC AVOIDS A TRAGIC RESULT

*BY WILLIAM SAYLE CARNELL**

In September, 2004, the Federal Communications Commission (FCC) refined and expanded its spectrum leasing rules, further removing barriers to the transfer of spectrum rights among private parties.[1] One of the most intriguing aspects of this order was its establishment of a novel form of spectrum rights management referred to as a spectrum "commons."

The initial spectrum leasing rules were themselves a pathbreaking departure for the FCC.[2] For decades, the agency had treated license transfers as an all-or-nothing proposition.[3] Spectrum rights could not be borrowed or leased, and a party that needed spectrum rights less than permanently was forced into a circuitous "management agreement" or similar device in order to permit that party access to a licensee's spectrum. But as a continuation of its general move towards more flexible rules, such as the ability to partition or disaggregate certain licenses,[4] the FCC in 2003 amended its rules to permit leasehold interests in spectrum licenses.

The new 2004 Order generally provides tweaks and clarifications to the leasing regime established by the 2003 Order. And, as a practical matter, its most important development may be the institution of "instant approval" processing for most wireless applications.[5] But perhaps the most intriguing development in the 2004 Order is its establishment of an altogether new form of spectrum rights, which it calls "private commons."

In contrast to the traditional conception of licensing, where a single party holds and controls the use of licensed spectrum rights, a private commons would permit "non-hierarchical" and "peer-to-peer" communications among users and devices that are outside the active control of the licensee. This Order represents a significant policy shift for the FCC, which has always retained a command-and-control approach to licensing and spectrum management, and the new regime may prove to have major practical implications, potentially enabling a new generation of networked wireless communications technologies.

The Commons - Property Debate

The notion of a spectrum "commons" is not new, but has arisen gradually even as the FCC has moved towards a more property-like regime for spectrum management.[6] The FCC now allocates most new licenses by auction; it generally allows unfettered transfers among parties; it typically permits flexible use by licensees of their spectrum; and generally provides a bundle of entitlements that begin to make a license feel more like a piece of property. Yet as the FCC has moved towards a more property-based approach, a critique of that approach has emerged from those who believe that spectrum should be allocated as a great "commons" for the public use, rather than parceled out in pieces for the exclusive use of individual private parties.[7]

The "spectrum commons" advocates often begin with the premise that spectrum is abundant, and that notions of spectrum scarcity are as outdated as AM radio and Sputnik. They point out that by using advanced technologies, including digital data compression, multiplexing, and "smart" radio, available radio spectrum could carry many times the throughput for which it is currently used. Spectrum scarcity is created, they say, by the award of exclusive licenses in its use, enshrining a privileged class of spectrum monopolists who preclude others from using the spectrum that they need.[8] Other critics ignore the abundance point, but argue that even if spectrum is scarce, that does not mean that it should be parceled out as a series of property-like entitlements.[9] Rather than award exclusive rights, then, they say that the FCC should simply establish one or more "spectrum commons" that are open to all, according to their needs.

Professor Lawrence Lessig, the open network guru who is famous among other things for his involvement in *U.S. v. Microsoft* and the *Eldred* case challenging the "Sonny Bono Act" extension of copyright durations, is a famous advocate of such an approach.[10] Professor Lessig analogizes his concept of open wireless networks to the development of the Internet. The Internet was built on open access, he says. Its very design is a giant shared network, created and maintained by the millions of individuals and entities that use the network. The code that harmonizes these disparate users, and that dictates who may use what facilities and in what way, is not a traditional legal regime but rather is the software code resident on the PCs and servers of those millions of users; code that instantly routes trillions of data packets through the network, around obstacles, and to their intended destination.[11]

Few lawyers or economists, however, can hear the word "commons" without thinking "tragedy of the."[12] Just as the English commons in land encouraged overgrazing and discouraged capital improvements, a spectrum commons could lead to overuse and underinvestment. Spectrum *is* a finite resource, says the property rights crowd, and there is little incentive to optimize one's use so long as unlimited quantities are available.

It is too easy to dismiss the "commons" advocates as vaguely collectivist idealists who ignore basic economic principles. But they have the benefit of good technology: There is no doubt that spectrum could be used far more efficiently than it is today. And they have several on-point examples apart from Professor Lessig's Internet. The success of unlicensed devices in the 2.4 GHz band, for example, has facilitated great developments in technology and commerce. Engineers are wont to paraphrase Churchill in their conclusion that we shape network architecture, and network architec-

ture shapes us. When the network is simple and open to all, they say, it will generally permit the greatest innovation; anything less than open access will tend to stifle entry and innovation.[13] The question, though, is how to obtain the benefits of a commons approach – how to permit the establishment of an open network to which end users may connect without restriction except that which is inherent in the network itself – while avoiding the tragedy that often attends a move away from individual property rights.

"Private Commons"

The FCC's most recent spectrum leasing order attempts to amalgamate the "spectrum commons" theory with the property rights theory, and marry both to the statutory mandate of the Communications Act. In essence, a private commons allows a licensee to set aside all or part of a spectrum allocation held by that licensee to be a "commons," for the use of the licensee's permittees. The licensee is the lord of the commons; it dictates who may use the spectrum and on what terms, and generally polices and regulates the commoners.

The spectrum commons is intended to permit "peer-to-peer communications between devices in a non-hierarchical network arrangement that does not utilize the network infrastructure of the licensee."[14] This arrangement stands in contrast to the traditional model of licensed spectrum usage, where the network facilities remain wholly within the control of the licensee.

The "commons" concept more closely resembles the model of unlicensed spectrum usage under Part 15 of the FCC's rules.[15] The FCC has reserved bands of spectrum for unlicensed devices under that rule part, which may be used so long as the use complies with certain emissions limits and other fairly minimal technical requirements, and so long as the use does not interfere with a licensed use. A manufacturer of cordless telephones, garage door openers, or similar devices obtains a certification from the FCC that a piece of equipment complies with the Part 15 rules, whereupon it may sell, and consumers may use, that equipment without any further authorization. Part 15 is a national park, or a freeway perhaps, that is available for all to use, subject to some fairly general rules (no littering, no driving above the speed limit) designed to preserve and promote the mutual enjoyment of that shared resource.

A private commons could follow much the same approach. But instead of a national park, it is a private park – Disneyworld instead of Yosemite. Just as Uncle Walt transformed his acres of orange groves into a Magic Kingdom with its own rules of access and behavior (children under 3 free; no alcohol consumption), a licensee may create his own private commons, governed by the licensee. Though just as Disney could not permit otherwise unlawful behavior on its property, the use of a private commons is likewise subject in aggregate to the terms and conditions of the licensee's underlying authorization. Broadcast licensees typically cannot convert their spectrum into two-way data services, for example, and everyone remains subject to emissions and interference limits dictated by the underlying authorization.

The details of the FCC's commons rules remain sketchy. The FCC has issued a notice asking for further comment on the details of its implementation, and as of this writing the (extended) comment date for that notice had not passed.[16] But the nature of the concept – do what you want within the parameters of the underlying license grant, so long as you do not interfere – may belie detailed definition.

Benefits of the Commons

Plainly, the problem with a pure commons approach arises in the chronic issue of overconsumption and underinvestment. Not even the Internet is immune to this problem. Most email users regard email as a tool to communicate with family, friends, and business associates. Yet a tiny few use the network to hawk their discount pharmaceuticals, "urgent business proposals" or physical enhancement devices. Spammers, then, have appropriated the public domain for their own purposes, and by clogging inboxes and jamming servers they interfere with more socially constructive uses of the Internet. Spam is the overgrazing of the Internet; any open network or similar commons would almost certainly lead to a comparable tragedy.

But the benefits of open wireless networks are undeniable. Engineers dream of a kind of inter-wireless-net. Their vision is well beyond wi-fi hotspots at Starbucks and in the Admirals Club, or 3G wide area networks. In this new network, the airwaves are not used simply to provide a connection between a device and the wired network; in this world the airwaves *are* the network. Devices able to communicate directly with each other form ad-hoc networks that mesh themselves together, and in concert with the older wireline-based infrastructure. My home computer talks to my neighbor's laptop; we both talk to a third neighbor, who talks to the public library, and so on; and each of us also talks to our own printers, home theater systems, and household appliances. Hardware that uses modulation techniques such as orthogonal frequency division multiplexing (OFDM), combines with software that enables both spectrum and network management to facilitate this ubiquitous open access wireless net. Engineers tell us that this vision is not some utopian pipe dream, any more than buying groceries and watching TV over the Internet was a decade ago.[17]

The question, then, is how to harness the benefits of the open access network, while avoiding the tragedy of the commons. Two methods present themselves: traditional command-and-control regulation, or private management. Command-and-control regulation may work to a point: The FCC has had some success with its Part 15 regime under which Wi-Fi and other technologies have come to flourish. But much more is called for in order to realize the benefits of open access wireless networks. The very notion of software defined radio is incompatible with the fixed standards required by Part 15. Open wireless networks depend on intelligent devices that will constantly modify the network architecture – modifying power levels and bandwidth used as necessary to transfer data, and to accommodate competing users. As Professor Lessig famously pointed out, the software code, rather than any legal code, establishes the rules

under which these networks operate.[18]

Rather than attempt to write a code for software defined radio, then, the FCC's private commons will permit private parties to write their own rules. A licensee (or a lessee) may establish its own code in its own spectrum. Intel or Qualcomm or whomever may obtain a spectrum license (through a lease or an outright acquisition), and then create or license the equipment that uses that spectrum. The end user would be buying a wireless device that incorporates a physical chipset, software code that governs its operations, and a limited right (limited in accordance with the code baked into that chipset) to use Intel's or Qualcomm's licensed spectrum.

In theory, this should properly align incentives and induce an optimal result. The licensee/equipment maker should be incentivized by the lure of profit maximization to create an optimized product: one that squeezes an optimal number of users onto the available bandwidth, with an optimal signal quality and data rate (and an optimal level of congestion or interference potential), at an optimal price point. And it will create a product, including a set of software-defined sharing rules that best achieve this result. Consumers, in turn will decide whether the product is worth the money, or whether those technical and/or spectrum resources should be allocated to a different use.

Whether the private commons will ever be developed is, of course, unknowable. Practical implementation of the concept will require parties to identify and acquire the rights to nationwide blocks of useful spectrum, the cost and scarcity of which may prove the ultimate stumbling block for the private commons. But in establishing this novel model of spectrum usage, the FCC has taken an intriguing step towards enabling the wireless utopia that the future may hold.

*William Sayle Carnell practices with the firm of Latham & Watkins in its Washington DC office, and thanks James H. Barker for his help in preparing this article. The views of the author are his own.

Footnotes

[1] Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, *Second Report and Order*, WT Dkt. No. 00-230 (rel. Sept. 2, 2004) (the "2004 Order").

[2] Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, *Report and Order*, WT Dkt. No. 00-230 (rel. Oct. 6, 2003) (the "2003 Order"). The 2003 Order was the subject of an earlier article in this journal. *See* R. Edward Price, *The FCC Issues a Groundbreaking Decision to Allow Spectrum Leasing*, ENGAGE vol. 5 issue 1 at 148 (2004).

[3] *See generally, e.g.*, Stephen F. Sewell, *Assignments and Transfers of Control of FCC Authorizations Under Section 310(d) of the Communications Act of 1934*, 43 FED. COMM. L.J. 277 (2004).

[4] *See* 47 CFR § 24.714 (partitioning is a division along geographic lines; disaggregation is a division of the authorized frequencies).

[5] 2004 Order ¶¶ 100-101.

[6] The basic idea of common, versus private, ownership of property has been the subject of extensive scholarly treatment. The title of this article pays homage to Garrett Hardin's famous 1968 article in which he described the "tragic" consequences of the 18th and 19th century English commons in land, which generally led to overexploitation of, and underinvestment in, that property. *See* Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968).

[7] *See* Eli Noam, Sp*ectrum Auction: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access*, 41 J. L. & ECON. 765 (1998).

[8] *See, e.g.*, Yochai Benkler, *Some Economics of Wireless Communications*, 16 HARV. J. L. & TECH. 25 (2002).

[9] *See, e.g.*, Noam, *op cit.*.

[10] *See generally* Lawrence Lessig, *The Future of Ideas* (2001).

[11] *Id*.

[12] *See, e.g.*, Stuart Minor Benjamin, *Spectrum Abundance and the Choice between Private and Public Control*, 78 N.Y.U. L. REV. 2007 (2003).

[13] *See generally, e.g.*, Stuart Buck, *Replacing Spectrum Auctions with a Spectrum Commons*, 2002 STAN. TECH. L. REV. 2 (2002).

[14] 2004 Order ¶ 91.

[15] 47 C.F.R. §§ 15.1 *et seq*.

[16] *See* 2004 Order ¶¶ 159-165. *See also* Public Notice, *FCC Announces Extension of Comment Period*, WT Dkt. No. 00-230 (rel. Nov. 9, 2004) (extending comment deadline to January 17, reply deadline to February 17).

[17] *See, e.g.*, Kevin Werbach, *Supercommons: Toward a Unified Theory of Wireless Communication*, 82 TEX. L. REV. 863 (March 2004).

[18] *See* LAWRENCE LESSIG, CODE AND OTHER LAWS OF CYBERSPACE (1999).