

The Paradise of the Commons or Privileged Private Property: What Direction Should the FCC Take on Spectrum Regulation?

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Modern technology has fundamentally changed the nature and extent of spectrum use. So the real question is, how do we fundamentally alter our spectrum policy to adapt to this reality? The good news is that while the proliferation of technology strains the old paradigm, it is also technology that will ultimately free spectrum from its former shackles.¹

I. INTRODUCTION

We stand at the verge of a technological revolution that could trigger a new age of ubiquitous communication. For this to happen, our current regulatory environment must adapt. Governments have long treated the airwaves like real estate to be licensed to favored operators or to be auctioned for huge sums.² The Federal Communications Commission (“FCC”) is now considering proposals to alter or completely change their regulation policy.³

For the better part of the 20th century, Congress has faced the dilemma of how to regulate the electromagnetic spectrum.⁴ Before they could do that, however, they needed to decide which legal theory to base this regulation upon.⁵ At the time, few understood completely either the nature or potential application of the invisible

1. FCC Chairman Michael K. Powell, Address at the Silicon Flatirons Telecommunications Program at the University of Colorado (Oct. 30, 2002) (transcript available at <http://www.fcc.gov/Speeches/Powell/2002/spmcp212.html>).

2. See Kevin Werbach, *Spectrum Wants to be Free*, WIRED, January 2003.

3. FCC, SPECTRUM POLICY TASK FORCE REPORT (FCC Docket No. 02-135, Nov. 2002).

4. *Red Lion Broad. Co., Inc. v. FCC*, 395 U.S. 367, 376 (1969).

5. See Powell, *supra* note 1, at 2.

spectrum.⁶ What they saw simply as a tool for wireless telegraphy had not begun to reach its potential.⁷ Today the spectrum is used for everything from baby monitors to global communications to wireless networks.⁸ Due to a failure to truly understand how the spectrum works and how it might be utilized, Congress acted to claim it as a resource for the good of the nation.⁹

The 21st century finds technology quickly erasing assumptions once considered scientific laws.¹⁰ Analog devices are fading into history as digital technologies show us how to manipulate the simple 1s and 0s of the digital language to transmit all means of communication.¹¹ The technological innovation that spawned from the discovery of the wireless spectrum has placed the regulation of this very spectrum in a quandary.¹² The rationale for the legal theory behind the Radio Act and its successors is now facing stiff criticism from opponents who claim it to be archaic and stifling.¹³

Congress created the FCC with the purpose of regulating the spectrum to make it available “to all people of the United States.”¹⁴ The spectrum is therefore a public resource that must be managed in the public’s interest.¹⁵ This means that any spectrum policy should be aimed at providing U.S. citizens and the U.S. economy the benefit of less obstructed markets, improved innovation, increased competition, and a wealth of other side effects that come from open and free communication on a de-centralized and open source network.¹⁶

With those goals in mind, this note will compare and contrast the two primary proposals for a new FCC regulatory model: an expanded auction system based on a property law theory of exclusive rights where the spectrum is parsed into proprietary slices or an open

6. See Kevin Werbach, *Open Spectrum Facts*, available at <http://www.greaterdemocracy.org/OpenSpectrumFAQ.html> (last visited Apr. 6, 2003).

7. *Id.*

8. Kevin Werbach, *Open Spectrum – The New Wireless Paradigm*, (New America Found.: Spectrum Policy Program, Spectrum Series Working Paper No. 6, 2002).

9. Radio Act of 1927, 47 U.S.C.S. § 85 (Law. Co-op. 1927).

10. See Powell, *supra* note 1, at 2.

11. “Digital” is a description of data which is stored or transmitted as a sequence of discrete symbols from a finite set, most commonly this means binary data represented using electronic or electromagnetic signals. DICTIONARY.COM, at <http://dictionary.reference.com/search?q=digital> (last visited May 2, 2004).

12. See Powell, *supra* note 1, at 3.

13. See Werbach, *supra* note 8; see also, Stuart Buck, *Replacing Spectrum Auctions with a Spectrum Commons*, 2002 STAN. TECH. L. REV. 2 (2002).

14. Communications Act of 1934, 47 U.S.C.S. § 151 (Law. Co-op. 2003).

15. *Red Lion Broad. Co., Inc. v. FCC*, 395 U.S. 367, 399 (1969).

16. See generally Powell, *supra* note 1.

spectrum system based on treating the spectrum as a digital commons free for all to use. To fully understand both the implications and plausibility of these proposed regulatory frameworks, this note will begin by offering a brief definition of spectrum technology and discussing the history of spectrum regulation in the United States. In the process of describing the two frameworks, this note will discuss the potential consequence either system will have on public policy, technological innovation and competition in the respective markets.

There are many opinions on how the FCC should regulate this public resource but regardless of their aim, each should find its foundation in the physical characteristics of the electromagnetic spectrum and not a set of outdated assumptions.

II. HISTORY OF SPECTRUM REGULATION/DEFINITIONS

When Guglielmo Marconi invented wireless communication in 1895¹⁷ he could have never dreamt of the regulatory machine that would grow to control the progeny of his first simple transmitting and receiving antenna. Only eight years later, representatives from around the world would meet for the first international radio conference.¹⁸ By 1910 the Wireless Ship Act was enacted to regulate the first wide-scale application of Marconi's device.¹⁹ This first attempt at regulation would be short-lived, however, when the Radio Act of 1912 was enacted in the wake of the Titanic tragedy, giving the Secretary of Commerce and Labor the power to issue licenses and specify frequencies for use by licensors.²⁰ Full-scale domestic regulation had begun.

From those humble beginnings the federal regulation of the invisible spectrum began with the hope of tying societal objectives with a framework built around an appropriate legal model.²¹ The Titanic tragedy put the fear of interference in the minds of Congress.²² Choosing the proper legal framework for regulating the electromagnetic spectrum means understanding the physical properties of spectrum technology itself.²³ The relatively simple

17. *1895: Marconi's Invention*, at <http://www.alpcom.it/hamradio/marconi.html> (last visited April 6, 2003).

18. FCC, SPECTRUM POLICY TASK FORCE REPORT (FCC Docket No. 02-135, Nov. 2002).

19. Wireless Ship Act of 1910, Pub. L. No. 61-262, 36 Stat. 629 (1910).

20. Radio Act of 1912, Pub. L. No. 62-264, 37 Stat. 302 (1912).

21. Wireless Ship Act of 1910, Pub. L. No. 61-262, 36 Stat. 629 (1910).

22. Erwin G. Krasnow & Jack N. Goodman, *The "Public Interest" Standard: The Search for the Holy Grail*, 50 FED. COMM. L.J. 605, 608 (1998).

23. See Powell, *supra* note 1, at 3. The electromagnetic spectrum is the full range of frequencies, from radio waves to gamma rays, that characterizes light.

devices developed by Marconi and his contemporaries were breaking ground by simply transmitting or receiving radio waves of different lengths and frequencies.²⁴ A major dilemma faced by early wireless inventors was this issue of interference.²⁵ The problem with using the term “interference” when describing this problem is that waves do not actually *interfere* with one another – waves simply pass through one another like multiple voices in a crowded room.²⁶

Yet the interference metaphor has led to the current regulatory framework that has stood in place since 1912.²⁷ Before Congress had the chance to pass the Radio Act of 1927, granting the Federal Radio Commission (the early predecessor to the FCC) a wider range of power in issuing licenses, a court in Illinois declared that broadcasters had a property right against interference.²⁸ At the time such a decision made sense. Most viewed the electromagnetic spectrum with an eye toward scarcity.²⁹ They saw the spectrum in slices, with interference the necessary result of any two broadcasters trying to use the same slice.³⁰ Radio technology was at its infancy and the interference that resulted from multiple transmissions was deemed an intrinsic feature of the spectrum itself, not a result of the rudimentary devices used for transmitting and receiving the simple signals they produced and interpreted.³¹

The fear of interference led to the assumption of scarcity, which in turn led to the Radio Act of 1927’s treatment of the invisible spectrum as a resource to be held in the public trust that the

IMAGINE THE UNIVERSE DICTIONARY, available at http://imagine.gsfc.nasa.gov/docs/dict_ei.html (last visited May. 2, 2004). A common synonym for the electromagnetic spectrum is the term “invisible spectrum” because wireless technologies are centered on those segments of the spectrum that are invisible to the human eye. *Id.*

24. See Werbach, *supra* note 6

25. *Id.* Interference was first used to describe the problem of receiving a clear signal when a receiver had to determine which waves it was meant to receive and which to ignore. *Open Spectrum Facts*, available at <http://www.greaterdemocracy.org/OpenSpectrumFAQ.html> (last visited Apr. 6, 2003).

26. *Open Spectrum Facts*, available at <http://www.greaterdemocracy.org/OpenSpectrumFAQ.html> (last visited Apr. 6, 2003).

27. Radio Act of 1912, Pub. L. No. 62-264, 37 Stat. 302 (1912).

28. *Chicago Tribune Co. v. Oak Leaves Broad. Station*, Ill. Circuit Ct., Cook County, Nov. 17, 1926, reprinted in 68 Cong. Rec. 215-19 (1926) (recognizing rights in spectrum acquired by reason of investment of time and money in putting the resource to productive use).

29. Krasnow & Goodman, *supra* note 11, at 608.

30. *Id.*

31. See Werbach, *supra* note 6.

government should manage in the public's interest.³² This was first articulated by then-Secretary of Commerce Herbert Hoover:

The ether is a public medium, and its use must be for public benefit. The use of a radio channel is justified only if there is public benefit. The dominant element for consideration in the radio field is, and always will be, the great body of the listening public, millions in number, countrywide in distribution. There is no proper line of conflict between the broadcaster and the listener, nor would I attempt to array one against the other. Their interests are mutual, for without the one the other could not exist.³³

When the Communications Act of 1934 was enacted, creating the FCC, the philosophy behind spectrum regulation went unchanged.³⁴ Scarcity became the dominant theme behind spectrum regulation, as the FCC could not meet market demand for bandwidth while at the same time ensure against interference.³⁵ This supplied the eventual rationale behind content regulation in *Red Lion Broadcasting v. FCC*.³⁶ The concept of scarcity has been taken so far as to justify a violation of the First Amendment that would be unthinkable in other mediums.³⁷

For the past 76 years the concepts of scarcity and interference have justified the federal government's control and allocation of the spectrum as a natural resource to be maintained as the property of the government and managed in the public interest.³⁸ Licenses were granted for free and given to those who could show their use would be in the public's best interest.³⁹ The weaknesses of this process emerged again in the 1980s when the FCC began issuing licenses for cellular phone networks and again found the demand overwhelming.⁴⁰ By 1996 Congress had changed the rules and allowed the FCC to first use lotteries and then auctions in the process of granting licenses.⁴¹ In

32. *Red Lion Broad. Co., Inc. v. FCC*, 395 U.S. 367, 388 (1969).

33. Secretary of Commerce Herbert Hoover, Address at the Proceedings of the Fourth National Radio Conference and Recommendations for Regulation of Radio (Nov. 9-11, 1925) (Government Printing Office 1926) available at <http://earlyradiohistory.us/1925conf.htm> (last visited Nov. 9, 2003).

34. Communications Act of 1934, 47 U.S.C.S. § 151 (Law. Co-op. 2003). The FCC was created as an agency led by a five-person board served by members nominated by the president and confirmed by the senate for terms of five years. *Id.*

35. See generally *Red Lion Broad. Co., Inc. v. FCC*, 395 U.S. 367 (1969).

36. *Id.*

37. *Id.*

38. See Lawrence J. White, "Propertyizing" the Electromagnetic Spectrum: Why its Important, and How to Begin, 9 MEDIA L. & POL'Y 19, 21 (2000).

39. *Id.* at 22.

40. *Id.*

41. Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stat. 56 (1996)

addition, the FCC were given a mandate to limit pervasive regulation only to where necessary to achieve its goals.⁴²

In 2003, the FCC found itself at a crossroads. Under fire to provide affordable communications access to poor and rural consumers and at the same time being told to de-regulate, the agency is faced with balancing somewhat conflicting agendas.⁴³ In June 2002, FCC Chairman Michael Powell formed the Spectrum Policy Task Force and directed it to provide recommendations for creating a spectrum policy that looks to a more “integrated and market-oriented approach” that provides “greater regulatory certainty, while minimizing regulatory intervention” than the current “command and control” approach.⁴⁴ Chairman Powell described the importance of the task at hand:

The government has an almost impossible task trying to keep pace with the ever-increasing demand for spectrum and continuing advances in wireless technology and applications. In this fast-moving world, the Commission cannot rely on outmoded procedures and policies. We must establish new ways to support innovation and the efficient, flexible use of spectrum.⁴⁵

On June 6, 2002 the task force released a public notice seeking comment on existing spectrum policies and recommendations for possible improvements.⁴⁶ The recommendations ranged from treating the spectrum as real estate with fee simple exclusive and assignable ownership⁴⁷ to a free and open, unregulated commons,⁴⁸ and combinations thereof in between, including the current command-

(codified in scattered sections of 47 U.S.C.); *see also* White, *supra* note 38, at 21.

42. *Id.*

43. *See* Elisa Batista, *Few Cheers for New FCC Rules*, at <http://www.wired.com/news/business/0,1367,57755,00.html> (last visited Feb. 21, 2003); *see also* *FCC Overhaul Could Change Media*, CNN, available at <http://www.cnn.com/2003/TECH/ptech/02/27/media.ownership.ap/index.html> (last visited Feb. 27, 2003). In the opinion of FCC Chairman Powell, “This is a rule-making that will be driven by evidence and not just intuition.” *Id.*

44. Roy Mark, *FCC Forms Spectrum Policy Task Force*, INTERNET.COM, at <http://dc.internet.com/news/article.php/1346381> (last visited June 6, 2002). “Command and control” refers to the FCC regulatory model of exclusive allocation of bands of spectrum for specific uses within a range of service rules. FCC, SPECTRUM POLICY TASK FORCE REPORT (FCC Docket No. 02-135, 35, Nov. 2002).

45. *Id.*

46. “Spectrum Policy Task Force Seek Public Comment on Issues Related to Commission’s Spectrum Policies,” *Public Notice*, ET Docket No. 02-135 (rel. June 6, 2002).

47. *See* White, *supra* note 38, at 21.

48. *See* Stuart Buck, *Replacing Spectrum Auctions with a Spectrum Commons*, 2002 STAN. TECH. L. REV. 2 (2002).

and-control method with a more robust auction procedure.⁴⁹

Whichever changes the FCC ultimately adopts will have an effect that will be felt in every U.S. household and has the potential to cause dramatic repercussions on the U.S. economy, competition within multiple markets, and how average Americans communicate and express themselves.⁵⁰ In the words of former FCC Commissioner Susan Ness, “spectrum is a national resource and the FCC is its steward, charged with assuring the efficient use of spectrum for the benefit of the American public.”⁵¹ With that in mind, the FCC better get it right.

III. COMPETING MODELS OF REGULATION

Somewhat ironically, given the polarity of the different opinions, those who favor exclusive personal property rights and those who favor common property rights see the need for reform for the same reasons.⁵² Both sides blame the FCC for allowing the communication and media sectors to fall significantly short of their potential.⁵³ Both blame the pervasive nature of the FCC regulatory framework for stifling competition, delaying and outright impeding entry of new businesses into the marketplace and slowing the pace of innovation due to its inflexibility and content regulation.⁵⁴ Both perspectives also agree that the FCC’s authority to limit free speech is in direct defiance of true public policy.⁵⁵ The FCC’s failure to respond to consumer demand for new innovations in cellular phones is just one of the more recent examples both camps cite in their demand for a new model for spectrum regulation.⁵⁶

With this in mind, both perspectives feel strongly that their proposed policy models would lead to a new age of spectrum regulation that truly achieves the goals articulated by former Commissioner Susan Ness and current Commissioner Michael Powell.⁵⁷ Despite their agreement on the problems, their differences

49. See Daniel E. Troy, *Advice to the New President on the FCC and Communications Policy*, 24 HARV. J.L. & PUB. POL’Y 503 (2001).

50. See generally Buck, *supra* note 48; Werbach, *supra* note 2; and Powell, *supra* note 1.

51. FCC Commissioner Susan Ness, Opening Statement at the Spectrum Agreement En Banc Hearing (Apr. 6, 1999), transcript available at <http://www.fcc.gov/enbanc/040699/tr040699.pdf>.

52. See generally Buck, *supra* note 48 and White, *supra* note 38.

53. See Buck, *supra* note 48; see also White, *supra* note 38.

54. *Id.*

55. *Id.*

56. See Buck, *supra* note 48; see also White, *supra* note 38, at 23.

57. *Id.*

on the solution can be reduced to basic assumptions on the physical characteristics of the electromagnetic spectrum.⁵⁸ Despite technological advances, personal property proponents hold strong and fast to the concepts of interference and scarcity.⁵⁹

A. “Exclusive Use” Model (Personal Property Theory)

1. The Rationale and Process

The exclusive personal property model hangs its hat on the belief that the productive range of the electromagnetic spectrum is scarce and that some uses of the spectrum interfere with neighboring uses of spectrum.⁶⁰ One personal property proponent, Professor Lawrence J. White, bases his “propertyzing” model on analogizing the invisible spectrum with real estate.⁶¹ His opinion does not take a wild departure from the current regulatory system; rather, it simply takes it to its logical conclusion – if the FCC is going to auction off specific slices of spectrum for exclusive use, why not change the lease into a fee simple title that would allow its owner to either assign the property or use it in whichever manner they see fit?

Ronald Coase first effectively articulated the opinion that the spectrum should be sold off to the highest bidder in 1959.⁶² In an opinion that would be echoed by countless economists to follow, Coase felt that the market should determine effective management of the spectrum.⁶³ One justification for market control is that because of technological and economic conditions that change with the wind, it is simply not possible for an agency to effectively manage something as complex and extensive as the spectrum.⁶⁴ By defining the property rights in terms of a specified frequency band, specific geographic area and specific signal strength, the physical problems of interference can be avoided while spectrum is put to whichever economically efficient use its owner would choose.⁶⁵ Professor White proposes that a national registry similar to those used for recording

58. *Id.*

59. *Id.*

60. White, *supra* note 38, at 21. In Professor White’s opinion, transmission interference is a fundamental, proven, and tried-and-true justification for exclusive rights. *Id.*

61. *Id.*

62. Ronald H. Coase, *The Federal Communication Commission*, 2 J.L. & ECON. 1 (1959).

63. *Id.*

64. White, *supra* note 38, at 23.

65. *Id.* at 25.

real estate transactions would allow for the type of control necessary to track the assignment of spectrum and for identifying potential abusers.⁶⁶

Another benefit of a personal property system, according to its proponents, would be the First Amendment freedoms that would follow from control of the spectrum passing from the government's hands to the private individual, effectively ending content regulation.⁶⁷

One issue that is facilitated by approaches such as Professor White's is that it would not require a drastic departure from the status quo.⁶⁸ With incumbent licensees heavily invested in the monopoly they possess on their current slice of the spectrum, any changes to the regulatory framework would face a stiff lobbying battle from the current holders.⁶⁹ By shifting their licenses into fee simple ownership, the change to a personal property model would not face such heavy opposition and would transition more smoothly than uprooting the current system.⁷⁰

2. Analysis

The first critique levied by opponents to the personal property model (and its real estate analogy) is that it fundamentally ignores the physical characteristics of the invisible spectrum.⁷¹ What personal property proponents see as the core strength of their argument is really its inherent weakness. In the words of Commissioner Powell, a realistic and appropriate regulatory model must be driven by facts.⁷² Despite the common tendency for people to think of the spectrum as a physical entity, as geographically defined and familiar,⁷³ the applied use of the invisible spectrum is really just the electromagnetic carrying capacity for signals sent at different strengths and frequencies.⁷⁴ It is more a concept in line with gravity than real estate.

Technological advances have exposed the true nature of the spectrum's physical qualities, and in 1994, futurist George Gilder responded to spectrum auctions with the statement "you can no more

66. *Id.* at 26.

67. White, *supra* note 38, at 24.

68. *Id.*

69. *Id.* at 23.

70. *Id.*

71. See Werbach, *supra* note 6, at 4.

72. Powell, *supra* note 1.

73. See White, *supra* note 38, at 24.

74. See Werbach, *supra* note 6, at 4.

lease electromagnetic waves than you can lease ocean waves.”⁷⁵ Former FCC attorney and current technology consultant Kevin Werbach likes to refer to a similar analogy.⁷⁶ His metaphor goes something like this: the spectrum exists like an invisible ocean and signals, like boats, traverse the airwaves – there is a risk those boats will collide, but the airwaves, like the ocean, are huge in comparison to the traffic and rather than parcel out the ocean, pilots use a combination of shipping lanes and maneuvering to avoid any impending collision.⁷⁷ Interference and scarcity are not the physical reality that personal property or command-and-control proponents claim them to be.

That being said, a brief analysis of other personal property characteristics exposes additional flaws with the real estate model. Personal property proponents claim that freeing spectrum from the FCC’s current command-and-control regulations would lead to economic efficiency because it would place spectrum in the hands of those who value it most.⁷⁸ This argument ignores that the spectrum is still a resource to be managed in the public interest. Monopolistic control over a section of the spectrum could be used to increase whatever “value” its owner desires, and this is not necessarily going to always be in line with the public interest.⁷⁹ Furthermore, while a personal property model would remove the government’s justification for violating free speech protections, private owners of vast swaths of spectrum would be capable of silencing the airwaves altogether.⁸⁰

Another potential drawback in a personal property model is that it ignores emerging technologies such as spread-spectrum⁸¹ and

75. George Gilder, *Auctioning the Airwaves*, *Forbes* ASAP (Apr. 11, 1994).

76. See Werbach, *supra* note 6.

77. *Id.* at 5.

78. See Troy, *supra* note 49.

79. See Buck, *supra* note 48, at 16.

80. Under a personal property model, spectrum owners would hold the spectrum in fee simple, allowing them to exercise the same set of rights, privileges, powers and immunities enjoyed by similar owners of real property, including the right to exclude, which the United States Supreme Court has held as “one of the most essential sticks in the bundle of rights that are commonly characterized as property.” *Kaiser Aetna v. United States*, 444 U.S. 164, 176 (1979).

81. “Spread-spectrum” involves a process where data is broken into packets, like those used for transmitting data across the internet, and then transmitting these packets across a wide range of frequencies, some of which may encounter traffic, but that can be re-organized by the receiving device, occupying only a band for only a tiny slice of time. David Weinberger, *Why Open Spectrum Matters: The End of the Broadcast Nation*, at http://www.greaterdemocracy.org/framing_openspectrum.html (last visited Nov. 9, 2003).

wideband⁸² that use small parts of many bands to transmit data. Auctioning off exclusive property rights in slices of the spectrum would effectively eliminate the possibility of such emerging technologies. If a new regulatory scheme is intended to foster innovation, effects such as these that limit the possibility of emerging technologies to extend the use of the spectrum must be given considerable weight.

Personal property proponents also like to point to the vast amount of money that the federal government can raise through auctioning off the spectrum.⁸³ While monetary factors such as this certainly play a significant role in Congressional decision-making, it is not one the FCC should consider given the long-term and almost permanent effect of implementing a personal property model.

The effect on competition must also be given significant consideration. Those who favor a system of ownership contend that current antitrust laws would work to prevent anti-competitive behavior, such as mass ownership of spectrum rights, yet current reflections on the monopolistic rights a current licensee possess exposes the root inaccuracy in this argument.⁸⁴ Considering its true physical characteristics, rights to the spectrum carry more of a similarity to patent rights than they do to deeds.⁸⁵ As described above, the spectrum is a concept of physics, not a tangible piece of property, essentially granting current licensees to maintain exclusive rights to a concept or discovery.⁸⁶ To extend this license to a fee simple title, granting an exclusive right to all uses of that section of the spectrum, would, for all intents and purposes, grant the owner a monopoly on devices that would utilize that swath of the spectrum.⁸⁷ Exclusive ownership would stifle competition, not encourage it.

Finally, a point not addressed by Professor White, is the potential outcome if a property model were to fail in achieving its goals. Once Congress takes the personal property path, it is not a decision they can easily reconsider after clear title has passed, as Constitutional

82. "Wideband" is a technology recently approved for limited trials by the FCC that works by transmitting its signal over a wide swath of frequencies, including licensed bands, at such a low power that it does not interfere with other signals on the spectrum. Xeni Jardin, *beyond wi-fi*, *Unwired: A Special Wired Report* at 56 (Apr. 2003).

83. See generally The Balanced Budget Act of 1997, Pub. L. No. 105-33, 111 Stat. 261 (1997).

84. See White, *supra* note 38, at 28.

85. See Buck, *supra* note 48, at 2.

86. *Id.* at 16.

87. *Id.*

protections would apply to this new “property.”⁸⁸ Those proprietary slices of the spectrum will not be given up easily if the system is deemed a failure.

B. “Commons Model” (Open Spectrum)

1. The Rationale and Process

If the personal property model roots itself in the rationale and assumption that the spectrum is scarce and that interference is an inherent trait of such a network,⁸⁹ then the common property model is founded upon defeating that assumption. Over the past decade, technological advances have given rise to the open spectrum⁹⁰ movement as wireless innovation has shown that the electromagnetic spectrum is not a scarce resource.⁹¹ The poorly used term “interference” has been shown to be an inaccurate description of the difficulty rudimentary technologies have in distinguishing between multiple signals.⁹² In fact, electromagnetic spectrum scarcity is a “self-fulfilling illusion.”⁹³ By splitting up and restricting its uses, the spectrum remains scarce and the content it carries controlled.⁹⁴

The current regulatory model, over 76 years old, is founded upon assumptions that have been shown scientifically inaccurate and utterly incorrect.⁹⁵ Regulation itself has created the scarcity it was adopted to control. Use of the spectrum was at its infancy when the Radio Act of 1927 was passed and to ensure proper functioning of the current technologies, ample space was needed to protect against what was experienced as “interference.”⁹⁶ Current technologies such as spread spectrum,⁹⁷ wideband,⁹⁸ cooperative networking,⁹⁹ and

88. See generally White, *supra* note 38.

89. *Id.*

90. “Open spectrum” is simply a common name that has been given to the proposal that the electromagnetic spectrum is best left unregulated and free for all to use within a set of service rules to ensure operability. Kevin Werbach, *Spectrum of the World Unite*, The Feature (Dec. 3, 2001), at <http://www.thefeature.com/article?articleid=13539>.

91. *Id.*

92. See Werbach, *supra* note 6, at 5.

93. Kevin Werbach, *Spectrum of the World Unite*, The Feature (Dec. 3, 2001), at <http://www.thefeature.com/article?articleid=13539>.

94. *Id.*

95. See generally Powell, *supra* note 1.

96. See Werbach, *supra* note 6, at 8.

97. See *supra* note 81.

98. See *supra* note 82.

99. “Cooperative networking” is a networking model that exposes the inherent flaws and naiveté of most current broadcast networks (networks that allow for

software-defined radio¹⁰⁰ have dispelled the old myth that, for a robust network to exist, you must build around the network rather than the devices that transmit and receive across it.

Yet for many of these emerging technologies to develop, the spectrum must be de-regulated to give it the space it needs to function and for a market to mature around the innovation that would develop to take advantage. In the words of technologist David Reed, “we could have the greatest wave of innovation since the Internet (and probably bigger in impact, because more pervasive) if we could unlock the spectrum to explore the new possibilities.”¹⁰¹ This indeed seems to be the preference of Chairman Powell who sees the currently regulatory environment as unnecessarily stifling.¹⁰² “Entrepreneurs are now choosing what to deploy based on regulatory arbitrage, not the best network and the best product for the consumer.”¹⁰³

2. Analysis

If multiple users can transmit along the same bands of spectrum, the current regulatory policy loses its *raison d’être*. Likewise, if the spectrum is not scarce, the Supreme Court’s justification of FCC violations of the First Amendment would lose the rationale articulated in *Red Lion Broadcasting* – that spectrum scarcity dictates the government to regulate content as a trustee of a public resource.¹⁰⁴

Interestingly enough, while de-regulation would seem a Republican objective, it appeals to liberal Democrats as well because while it would act to free the telecommunication market from its current regulatory restraints, it would also serve to free speech on

many receivers but few transmitters). Kevin Werbach, *supra* note 6, at 7. With “cooperative networking” end-user devices work together to relay signals to one-another to create an efficient widespread network. *Id.*

100. “Software-defined radio” works similar to the Internet technologies – rather than using complex hardware to distinguish between signals in a receiver, it uses software instead. See Xenji Jardin, *beyond wi-fi*, Unwired: A Special Wired Report at 56 (Apr. 2003). Software-defined radios can re-configure themselves to distinguish between the myriad of signals it receives, and these signals could then be sent in packets of data, as seen with Internet protocols, allowing basic devices such as household radios to distinguish a signal from many others within the same band. *Id.*

101. David Reed, *The Sky’s No Longer the Limit*, Context Magazine, available at <http://www.contextmag.com/archives/200212/Insight2TheSkysNoLonger.asp> (last visited Mar. 11, 2003).

102. See generally Powell, *supra* note 1.

103. Demitri Sevastopulo, *Rocky Road to the US’s Broadband Future*, Fin. Times (London), December 9, 2003, at 10.

104. 395 U.S. 367 (1969).

these same airwaves for all Americans, not simply those who possess the means to pay the high prices at auction.¹⁰⁵ The political arena surrounding spectrum regulation is filled with highly paid lobbyists who work for incumbent license holders who see open spectrum as a threat to the status quo – a status quo that they have paid highly for in auctions and that allows them to maintain control of the airwaves.¹⁰⁶ There is a fight outside the door of the FCC between those who have paid for a piece of the current system and those who would like to see the spectrum freed to pursue new technological advances and fewer barriers to communication.¹⁰⁷

From an antitrust perspective, a common property model would seem the optimal way to foster competition and technological innovation. High costs of entry have long kept the airwaves a province of only a few industrialists.¹⁰⁸ Large corporations were forced to spend millions, if not billions, of dollars either in the auctioning process or in building a network infrastructure capable of over-coming the inadequacies of dumb-devices.¹⁰⁹ Exclusive licensing has created a market where manufacturers are encouraged to make “dumb” devices because up-front investment in new technologies does not make sense when license holders must re-coup their auction investment, limiting the use of spectrum to archaic yet familiar technologies.¹¹⁰ Just the opposite would be true in an open spectrum environment.¹¹¹ Innovation would thrive because companies would be encouraged to invest in new technologies that find novel methods to apply new products and new services, responding to marketplace demand.¹¹² Hardware and service providers would no longer need to go through a gatekeeper such as the FCC or a license holder.¹¹³ If the technology worked and there was a receptive market, it would be put to use¹¹⁴ – FCC and licensee approval would no longer stand in the way of giving the market what it wants.¹¹⁵

105. *Id.* at 369.

106. Erin Joyce, *Q&A: Kevin Werbach on Open Spectrum*, @NewYork.com, at <http://www.atnewyork.com/news/article.php/1497221> (Nov. 8, 2002).

107. *Id.*

108. *See* Buck, *supra* note 48, at 3.

109. *See* Werbach, *supra* note 6, at 9.

110. *Id.*

111. *Id.*

112. *See* Werbach, *supra* note 6.

113. *Id.*

114. *Id.* at 11.

115. White, *supra* note 38. The FCC uses a four-step process for regulating the airwaves: (1) Allocation; (2) Service Rules; (3) Assignment; and (4) Enforcement. *Id.* In an open spectrum environment, service rules would be the only source of

“Wi-Fi”¹¹⁶ is a shining example of how open spectrum could trigger a robust age of wireless innovation and increased competition. Operating on a currently unlicensed section of spectrum and employing spread-spectrum technology, Wi-Fi operates by spreading itself across 14 channels on the 2.4-Ghz band.¹¹⁷ By reducing costs of entry to the price of research and development, a market that did not exist three years ago now generates over a billion dollars a year amid a technology recession.¹¹⁸ Sales in North America alone are currently in the range of \$500 million and are expected to reach \$800 million by 2005.¹¹⁹ Companies such as Starbucks and McDonalds have created programs to install Wi-Fi networks in their coffee houses and restaurants around the country, timed with Intel’s release in 2003 of its new dual wireless receiver/computer processor.¹²⁰

A report by the Seattle Times points to several technology industry heavy weights who see open spectrum as the key to sparking a resurgence in a sector that has laid dormant since the pop of the internet bubble in 1999-2000.¹²¹ The report points to the work of the Open Spectrum Ad Hoc Consortium, whose members include New York University Law School Professor Yochai Benkler, former Harvard Law Professor Larry Lessig and technologist Larry Reed,¹²² and their fight against the entrenched incumbent cellular service and broadcast companies and their significant lobbying dollar.¹²³ The consortium has made progress by enlisting the support of such companies as Intel, Microsoft and Sony who see countless opportunities for new services and products in an unregulated spectrum environment.¹²⁴

Another potential benefit of even a partial open spectrum policy would be its effect in bringing broadband to poor and rural

regulation by the FCC and would be defined by standardizing organizations such as the IEEE and Underwriter Labs. Werbach, *supra* note 6, at 9.

116. “Wi-Fi” is a name coined by IEEE, the service group that created the standards for wireless-LAN networks and stands for wireless fidelity. DICTIONARY.COM, at <http://dictionary.reference.com/search?q=wi-fi> (last visited Nov. 9, 2003).

117. Chris Anderson, *Free the Air!*, *Unwired: A Special Wired Report*, at 14 (Apr. 2003).

118. Werbach, *supra* note 6, at 11.

119. *The Growth of W-Fi at Home and Work*, *Unwired: A Special Wired Report*, at 9 (quoting research from Allied Business Intelligence, Inc.) (Apr. 2003).

120. Chris Anderson, *The Wi-Fi Revolution*, *Unwired: A Special Wired Report*, at 9 (Apr. 2003).

121. Sarah Lai Stirland, *Open Spectrum Advocates Say it Will Boost Technology*, *The Seattle Times* (Oct. 28, 2002).

122. *Id.*

123. *Id.*

124. Stirland, *supra* note 121.

communities while driving down the price for all consumers.¹²⁵ Several companies and non-profit community groups are working to create local and nationwide wireless networks utilizing Wi-Fi, meshing technology¹²⁶ and cooperative networking to achieve network saturation of urban and rural communities alike.

Personal property proponents claim that their model would not further deprive poor and minority communities from communication resources simply because so few resources exist that the situation could only improve.¹²⁷ Congress has gone so far as to give the FCC a mandate to take minority communities, and the current technological divide that exists in these communities, into consideration when formulating policy.¹²⁸ While the FCC has attempted many programs within its auctioning process to achieve this goal, including payment plans and allowing entrepreneurial groups to submit bids, the results have been slow and mixed.¹²⁹ Given the factual inaccuracies upon which our current regulatory system was modeled, why simply accept an insufficient status quo or a property system that would only promise not to make the digital divide *worse*?

By turning to a common property model for regulation of the electromagnetic spectrum, the FCC can finally properly achieve the wide-ranging goals of the original radio and communication acts.¹³⁰ While such a system may have been impossible ten years ago, current and developing technologies have opened up the spectrum to be used as it functions in reality – as a set of physical properties that allow transmission of data through the air.¹³¹

IV. CONCLUSION

FCC Commissioner Michael Powell issued a challenge when he created the Spectrum Policy Task Force: federal regulation should be

125. See Buck, *supra* note 48, at 20.

126. An extension of the concept behind cooperative networking, mesh networks work by turning every device into a receiver, router and transmitter. Xeni Jardin, *beyond wi-fi*, Unwired: A Special Wired Report at 56 (Apr. 2003). This would allow for the creation of ad hoc networks that sprout whenever a meshing device is placed within proximity of another meshing device, meaning that networks would no longer have to rely on central hubs as part of a hub-and-spoke design. *Id.*

127. See White, *supra* note 38, at 54; see also Buck, *supra* note 48, at 20.

128. See 47 U.S.C.S. § 309(j)(3)(B) (Law. Co-op. 1998) (promoting economic opportunity and competition by ensuring that new and innovative technologies are readily accessible among a wide variety of applicants, including small businesses, rural telephone companies, and businesses owned by members of minority groups and women).

129. See Buck, *supra* note 48, at 20.

130. See generally Buck, *supra* note 48 and Werbach, *supra* note 8.

131. *Id.*

modeled on facts, and not upon politics and the economics of the status quo. That task force set itself upon the same purpose as this note: to compare competing models of spectrum regulation to determine which is best suited to serve the needs of the public interest, yet also determine which model is founded upon factual and accurate scientific principles. After comparing the relative strengths and weaknesses of the personal property and common property approaches, it can be easily concluded that despite the entrenched interests of the current license holders, the public interest can best be served by a regulatory model that encourages innovation, competition and that offers the best opportunity for technology and services to reach all Americans, and not just the wealthy or those in urban environments.

As mentioned above, the potential results should either model fail, must be given heavy consideration. A common property perspective would keep the spectrum in the possession of the American public and if interference turns out to be the pervasive inconvenience that some claim, the FCC could re-adopt a command-and-control method of regulation. If the FCC were to auction off the spectrum as exclusive fee simple ownership rights, those who buy these spectrum rights, and especially those who aggregate these rights, will fight to the end to ensure they are never given back to the public trust.

On November 7, 2002, the Spectrum Policy Task Force issued its report to the FCC, reporting that the agency needed to modernize its out-of-date policies on spectrum management and that its command-and-control model should evolve into a model that is more flexible and consumer-oriented.¹³² The task force questioned the policy assumption that the spectrum was scarce, pointing out the large number of bands that go unused all of the time and the frequency with which other bands are only used from time to time.¹³³ The task force also recognized that technology has placed the concept of interference in the formation of policy into question.¹³⁴

The task force went so far as to announce, “the time is ripe for spectrum policy reform.”¹³⁵ “Increasing demand for spectrum-based services and devices are straining longstanding, and outmoded,

132. Roy Mark, *Task Force Calls for Modernized Spectrum Policy*, at New York.com, at <http://www.atnewyork.com/news/article.php/1496331> (Nov. 7, 2002).

133. FCC, SPECTRUM POLICY TASK FORCE REPORT (FCC Docket No. 02-135, Nov. 2002).

134. *Id.*

135. *See* Mark, *supra* note 132.

spectrum policies.”¹³⁶ Technology is the vehicle we will take into a new age of communication, where access to ubiquitous networks of data will enable the American public to speak, write or even view one another anywhere in the world. The technology to reach these goals may be just emerging, but the principles upon which they are founded are reality. Development depends only upon market demand and an unfettered regulatory environment based on accurate scientific principles that allow the electromagnetic spectrum to finally reach its potential. Antiquated models of property ownership that attempt to analogize the spectrum to real property will only work to place the spectrum in the hands of the few and to stifle development. The future is at our doorstep and open spectrum is the harbinger of the new Communication Age.

136. *Id.*